Cub Cadet

Power Equipment

Service Manual

GARDEN TRACTORS, SUPER GARDEN TRACTORS, MOWER DECKS AND ATTACHMENTS

Model Numbers
1340, 1535, 1541, 1860, 1862, 1782, 1882, 2082, 2182, 190-328, 190-336, 190-349, 190-357, 190-358, 190-359, 190-374, 383, 433/383, 388/389 and 759-3493

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RECORD OF REVISIONS

Change No.	Date	Description of Revision
1	October 1991	Added 1991 changes

TRACTOR SERVICE MANUAL CROSS REFERENCE CHART

TRACTOR MODELS LISTED IN MANUAL	TRACTOR MODELS SIMILAR TO THE MODELS IN MANUAL				
1340	replaced by	1440			
1535	replaced by	none			
1541	replaced by	1440	1641	1861	1863
1860	replaced by	1440			
1862	replaced by	1864			
1782	replaced by	none			
1882	replaced by	none			
2082	replaced by	2084	2284		
2182	replaced by	2086			

WORK SAFELY — FOLLOW THESE RULES

This symbol is used to call your attention to instructions concerning your personal safety. Be sure to observe and follow these instructions.

1. To prevent accidental starting, always pull the high tension wire(s) off the spark plug(s) before servicing and/or adjusting the machine.
2. To prevent injury, do not allow children or bystanders around the machine while it is being adjusted and/or serviced.
3. Do not wear rings, wrist watches or loose fitting clothing when working on machinery; they could catch on moving parts causing serious injury. Wear sturdy, rough-soled work shoes. Never adjust and/or service a machine in bare feet, sandals or sneakers.
4. Always wear safety glasses when using a hammer, chisel or other tools that may cause chips to fly.
5. Be sure to reinstall safety devices, guards or shields after adjusting and/or servicing the machine.
6. When operating a power washer to clean a machine before servicing, be careful at all times to avoid injury. Maintain proper footing and balance at all times. Never direct the spray at people or animals, as high pressure spray can cause serious injury.
7. If a portable heater is used to heat the service area, the following precautions must be observed:
    a. Do not use portable heaters in presence of volatile materials such as gasoline or paint, as fire or explosion may result.
    b. To avoid being burned, do not touch the heater during operation.
    c. Portable heaters consume oxygen and combustion fumes can be hazardous. Heater should be used only in a well ventilated area. Keep a window or door partially open to provide ventilation.
    d. Keep the heater at least four feet from combustible materials.
    e. Never use gasoline as fuel.
8. Handle gasoline with care—it is highly flammable.
    a. Use approved gasoline container.
    b. Never remove the fuel tank cap or fill the fuel tank when the engine is running, is hot or indoors. Also, do not smoke when working around flammable fuel.
    c. Avoid fires: be sure container or funnel does not touch the battery. Do not overfill the fuel tank. Wipe up spilled gasoline.
    d. Replace fuel tank cap securely.
9. Never use trouble lights or electric powered tools that have cut and/or damaged cords or plugs. Be sure all electric tools are properly grounded.
10. Never run an engine in a confined area such as a garage or storage building any longer than is necessary for immediate moving of the machine out of or into the area. EXHAUST GASES ARE TOXIC. OPENING DOORS AND WINDOWS MAY NOT PROVIDE ADEQUATE VENTILATION.
11. After servicing, be sure all tools, parts or servicing equipment are removed from the machine.
12. Electrical storage batteries give off highly inflammable hydrogen gas when charging and continue to do so for some time after receiving a steady charge. Do not under any circumstances allow an electric spark or an open flame near the battery. Always disconnect a battery cable before working on the electrical system.
13. Hydraulic fluid escaping under pressure can have enough force to penetrate the skin. Hydraulic fluid may also infect a minor cut or opening in the skin. If injured by escaping fluid, see a doctor at once. Serious infection or reaction can result if medical treatment is not given immediately.

    Do not attempt to repair or tighten hoses that are under pressure, when the boom is raised or with the tractor engine running. Cycle all hydraulic control valves to relieve all pressure before disconnecting the lines or performing other work on the hydraulic system. Make sure all connections are tight and hoses and lines

are in good condition before applying pressure to the system. To locate a leak under pressure, use a small piece of cardboard or wood. Never use hands.

14. When using an acetylene torch, always wear welding goggles and gloves. Keep a charged fire extinguisher within reach. Do not weld or heat areas near fuel tanks or fuel lines and utilize proper shielding around hydraulic lines.

15. Always use safety stands in conjunction with hydraulic jacks or hoists. Do not rely on the jack or hoist to carry the load; it could fall. Always use a safety bar to block hydraulic cylinders.

16. When splitting tractors or disassembling machines, be sure to use safety stands and adequate supports to prevent tipping or rollover.

17. Use a safety catch on all hoist hooks. Do not take a chance, the load could slip off the hook.

18. Use pullers to remove bearings, bushings, gears, cylinder sleeves, etc. when applicable. Use hammers, punches and chisels only when absolutely necessary. Then, be sure to wear safety glasses.

19. Be careful when using compressed air to dry parts. Use approved air blow guns, do not exceed 30 psi, wear safety glasses or goggles and use proper shielding to protect everyone in the work area.

20. Petroleum based solvents, often used for cleaning parts, are flammable. Use care to avoid fire or explosion when using these solvents.

IMPORTANT: The above is only a partial list of safe work rules. In addition, always refer to the Operator's Manual for the specific machine for additional safe work rules regarding the machine operation.

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SECTION 1
GENERAL INFORMATION AND SAFETY PRECAUTIONS

1-1. SAFETY PRECAUTIONS.

1-1.1 Refer to the Safety Summary on page i, and observe all WARNINGS and CAUTIONS when servicing tractors covered in this manual.

1-2. GENERAL.

1-2.1 This service manual covers 1990 and 1991 model year garden tractors, super garden tractors, mower decks and selected attachments listed in Table 1-1. Service instructions for engines are detailed in separate service manuals; refer to Appendix A, Related Service Manuals.

Table 1-1. Equipment In This Manual

DESCRIPTION	MODEL NUMBER
Garden Tractor	1340
Garden Tractor	1535
Garden Tractor	1541
Garden Tractor	1860
Garden Tractor	1862
Super Garden Tractor	1782
Super Garden Tractor	1882
Super Garden Tractor	2082
Super Garden Tractor	2182
38" Mower Deck (deep deck)	190-328
46" Mower Deck (deep deck)	190-336
42" Bush Hog	190-349
38" Mower Deck	190-357
44" Mower Deck	190-358
50" Mower Deck	190-359
60" Mower Deck	190-374
3-Point Hitch Kit	383
Rear PTO and 3-Point Hitch Kit	433/383
3-Point Hitch Kits	388/389
Front Hydraulic Outlet Kit	759-3493

1-3. REFERENCE DATA.

1-3.1 **Specifications.** Specifications for each garden tractor and super garden tractor are contained in Tables 1-2 through 1-9.

1-3.2 **Serial Number Location.** Chassis serial number plate is located near the left rear fender. Refer to Figure 1-1.

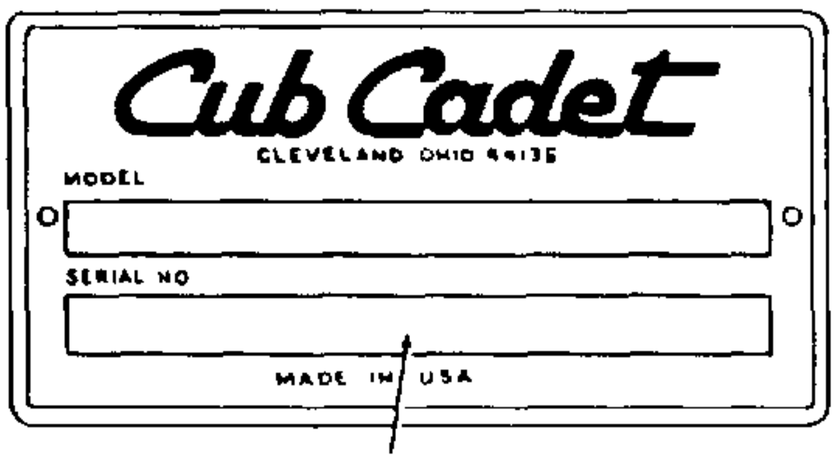


Figure 1-1. Chassis Serial Number.

NOTE

LEFT and RIGHT indicate the left and right sides of the tractor when facing forward in the driver's seat. Reference to FRONT indicates grille end of the tractor; REAR indicates the drawbar end.

1-4. FACILITIES.

1-4.1 The minimum requirement for facilities sufficient to service the tractors, decks and accessories contained in this manual is a normally equipped shop for the service of commercial power equipment.

1-5. SUPPORT ITEMS.

1-5.1 **Special Tools and Equipment.** Special tools and equipment necessary to service the equipment covered in this manual are contained in Appendix B.

1-5.2 **Bulk Service Items.** Appendix C lists bulk service items which are necessary when repairing or overhauling certain equipment covered in this manual.

1-5.3 **Mandatory Replacement Parts.** Mandatory replacement parts are those parts which must be replaced, regardless of condition, if the assembly or subassembly in which they are used is repaired or overhauled. Appendix D lists mandatory replacement parts. A dealer inventory of these items may serve to expedite repair and overhaul of equipment.

1-5.4 **Contingency Replacement Parts.** Contingency replacement parts are those parts which are variably subject to wear. They may, at some point in their service life, need to be replaced. Appendix E lists some contingency replacement parts.

1-6. SPECIAL SERVICE INFORMATION.

1-6.1 **Electrical Components – Service Methods and Equipment.** Information on service methods and equipment used in the testing of selected electrical components is contained in Appendix F. This information may be useful to technicians with limited knowledge of such methods and equipment.

1-6.2 **Electrical Schematics and Testing.** Complete electrical schematics for each tractor and specific testing are contained in Appendix G.

1-6.3 **Torque Data.** Information on torque data is listed in Appendix H.

1-6.4 **Mower Deck Belt Information.** Information dealing with mower deck belt problems, and how to avoid or resolve such problems, are discussed in Appendix I.

Table 1-2. Model 1340 Specifications

	1340
CAPACITIES	
Fuel tank	5 gallons
Crankcase	4 pints
Transmission case with hydro-drive unit mounted	7 qts.
Steering gear housing	1/4 lbs.
HYDROSTATIC DRIVE	
Speed: Forward	0 to 7.5 mph
Reverse	0 to 4 mph
ENGINE	
Make and model	Kohler
(electric starting)	12.5 HP
Cylinders	1
Bore	3.43 in.
Stroke	2.64 in.
Displacement (cubic inches)	24.29
Engine speed (governed)	
Low speed	1800 RPM
High idle speed (no load)	3400 RPM ±75
Ignition	Battery
Spark plug gap (*Cub Cadet* No. 759-3334)	.040 in. gap
ELECTRICAL SYSTEM	
System voltage	12 volt neg. ground
Battery	725-3174
Alternator	15 amp regulated
Fuse (auto type)	20 amp
Head lamp bulb	725-3161
Tail light	Lamp No. 194
BRAKES	Dual disc, external

Table 1-2. Model 1340 Specifications (Continued)

	1340
TIRE SIZES	
Front	16 x 6.50-8
Rear	23 x 10.50-12
DIMENSIONS	
Tread:	
Front with 16 x 6.50-8 tires	29.00 in.
Rear with 23 x 10.50-12 tires	27.00 in.
Wheelbase	45.5 in.
Length, overall	72.00 in.
Width, overall	37.75 in.
Height, overall (to top of steering wheel)	44.00 in.
Ground clearance	6.00 in.
Turning radius	25.0 in.

Specifications are subject to change without notice.

Table 1-3. Model 1535 Specifications

	1535
CAPACITIES	
Fuel tank	5 gallons
Crankcase	3 pints 8 oz.
Transmission case	8 pints
Steering gear housing	1/4 lbs.
TRANSMISSION GEARS	3 speed
Speed: 1st	2.3 mph
2nd	3.3 mph
3rd	6.8 mph
Reverse	2.5 mph
CREEPER SPEEDS	
1st	.6 mph
2nd	.8 mph
3rd	1.7 mph
Reverse	.6 mph
ENGINE	
Make and model	Kohler
(electric starting)	15 HP
Cylinders	2
Bore	3.125 in.

Table 1-3. Model 1535 Specifications (Continued)

	1535
ENGINE	
Stroke	2.75 in.
Displacement (cubic inches)	42.18
Engine speed (governed)	
Low speed	1200 RPM
High idle speed	
(no load)	3600 RPM
(full load)	3350 RPM
Valve clearance (engine cold)	
Intake	.003-.006 in.
Exhaust	.011-.014 in.
Ignition	Battery
Spark plug gap (*Cub Cadet* No. 759-3334)	.025 in. gap
ELECTRICAL SYSTEM	
System voltage	12 volt neg. ground
Battery	725-3174
Alternator	15 amp
Fuse (auto type)	20 amp
Head lamp bulb	725-3161
Tail light	Lamp No. 194
BRAKES	Dual disc, external
CLUTCH	Single-plate dry disc, spring loaded 4-1/2 inch
TIRE SIZES	
Front	16 x 6.50-8
Rear	23 x 10.50-12
DIMENSIONS	
Tread:	
Front with 16 x 6.50-8 tires	29.00 in.
Rear with 23 x 10.50-12 tires	27.00 in.
Wheelbase	45.5 in.
Length, overall	72.00 in.
Width, overall	37.75 in.
Height, overall (to top of steering wheel)	44.00 in.
Ground clearance	6.00 in.
Turning radius	25.0 in.

Specifications are subject to change without notice.

Table 1-4. Model 1541 Specifications

	1541
CAPACITIES	
Fuel tank	5 gallons
Crankcase	3 pints 8 oz.
Transmission case with hydro-drive unit mounted	7 qts.
Steering gear housing	1/4 lbs.
HYDROSTATIC DRIVE	
Speed: Forward	0 to 7.5 mph
Reverse	0 to 4 mph
ENGINE	
Make and model	Kohler
(electric starting)	15 HP
Cylinders	2
Bore	3.125 in.
Stroke	2.75 in.
Displacement (cubic inches)	42.18
Engine speed (governed)	
Low speed	1200 RPM
High idle speed	
(no load)	3600 RPM
(full load)	3350 RPM
Valve clearance (engine cold)	
Intake	.003-.006 in.
Exhaust	.011-.014 in.
Ignition	Battery
Spark plug gap (*Cub Cadet* No. 759-3334)	.025 in. gap
ELECTRICAL SYSTEM	
System voltage	12 volt neg. ground
Battery	725-3174
Alternator	15 amp
Fuse (auto type)	20 amp
Head lamp bulb	725-3161
Tail light	Lamp No. 194
BRAKES	Dual disc, external
TIRE SIZES	
Front	16 x 6.50-8
Rear	23 x 10.50-12
DIMENSIONS	
Tread:	
Front with 16 x 6.50-8 tires	29.00 in.
Rear with 23 x 10.50-12 tires	27.00 in.
Wheelbase	45.5 in.
Length, overall	72.00 in.
Width, overall	37.75 in.
Height, overall (to top of steering wheel)	44.00 in.
Ground clearance	6.00 in.
Turning radius	25.0 in.

Specifications are subject to change without notice.

Table 1-5. Model 1860 Specifications

	1860
CAPACITIES	
Fuel tank	5 gallons
Crankcase	3 pints 8 oz.
Transmission case with hydro-drive unit mounted	7 qts.
Steering gear housing	1/4 lbs.
HYDROSTATIC DRIVE	
Speed: Forward	0 to 7.5 mph
Reverse	0 to 4 mph
ENGINE	
Make and model	Kohler
(electric starting)	18 HP
Cylinders	2
Bore	3.125 in.
Stroke	2.75 in.
Displacement (cubic inches)	42.18
Engine speed (governed)	
Low speed	1200 RPM
High idle speed	
(no load)	3600 RPM
(full load)	3350 RPM
Valve clearance (engine cold)	
Intake	.003-.006 in.
Exhaust	.011-.014 in.
Ignition	Battery
Spark plug gap (*Cub Cadet* No. 759-3334)	.025 in. gap
ELECTRICAL SYSTEM	
System voltage	12 volt neg. ground
Battery	725-3174
Alternator	15 amp
Fuse (auto type)	20 amp
Head lamp bulb	725-3161
Tail light	Lamp No. 194
BRAKES	Dual disc, external
TIRE SIZES	
Front	16 x 6.50-8
Rear	23 x 10.50-12
DIMENSIONS	
Tread:	
Front with 16 x 6.50-8 tires	29.00 in.
Rear with 23 x 10.50-12 tires	27.00 in.
Wheelbase	45.5 in.
Length, overall	72.00 in.
Width, overall	37.75 in.
Height, overall (to top of steering wheel)	44.00 in.
Ground clearance	6.00 in.
Turning radius	25.0 in.

Specifications are subject to change without notice.

Table 1-8. Models 1882 and 2082 Specifications

	1882	2082
CAPACITIES		
Fuel tank	5 gallons	
Crankcase	3 pints 8 oz.	
Transmission case with hydro-drive unit mounted	7 qts.	
HYDROSTATIC DRIVE		
Speed: Forward	0 to 7.5 mph	
Reverse	0 to 4 mph	
ENGINE		
Make and model	Kohler	
(electric starting)	18 HP	20 HP
Cylinders	2	
Bore	3.125 in.	
Stroke	2.75 in.	3.06 in.
Displacement (cubic inches)	42.18 in.	46.98 in.
Engine speed (governed)		
Low speed	1200 RPM	
High idle speed		
(no load)	3600 RPM	
(full load)	3350 RPM	
Valve clearance (engine cold)		
Intake	.003-.006 in.	
Exhaust	.011-.014 in.	
Ignition	Battery	
Spark plug gap (*Cub Cadet* No. 759-3334)	.025 in. gap	
ELECTRICAL SYSTEM		
System voltage	12 volt neg. ground	
Battery	725-3174	
Alternator	15 amp	
Fuse (auto type)	20 amp	
Head lamp bulb	725-3161	
Tail light	Lamp No. 194	
BRAKES	Dual disc, external	
TIRE SIZES		
Front	18 x 8.50-8	
Rear	26 x 12.00-12	
DIMENSIONS		
Tread:		
Front with 18 x 8.50-8 tires	33.0 in.	
Rear with 26 x 12.00-12 tires	31.5 in.	
Wheelbase	51.6 in.	
Length, overall	78.5 in.	
Width, overall	43.5 in.	
Height, overall (to top of steering wheel)	47.5 in.	
Ground clearance	7.6 in.	
Turning radius	36.0 in.	

Specifications are subject to change without notice.

Table 1-9. Model 2182 Specifications

	2182
CAPACITIES	
Fuel tank	5 gallons
Crankcase	6.2 pts. including oil in filter
Transmission case with hydro-drive unit mounted	7 qts. approx.
Cooling capacity	1 gallon (2 quarts water, 2 quarts anti-freeze) [ethylene glycol]
HYDROSTATIC DRIVE	
Speed: Forward	0 to 7.5 mph
Reverse	0 to 4 mph
ENGINE	
Make and model	Kubota
(electric starting)	21 HP
Cylinders	3
Bore	2.52 in.
Stroke	2.45 in.
Displacement (cubic inches)	36.61 in.
Engine speed (governed)	
Low speed	1200 RPM
High idle speed	
(no load)	3600 RPM
(full load)	3350 RPM
Valve clearance (engine cold)	
Intake	.0057-.0072 in.
Exhaust	.0057-.0072 in.
Ignition	Battery
Spark plug gap (*Cub Cadet* No. KB-12581-67710)	.043 in.
ELECTRICAL SYSTEM	
System voltage	12 volt neg. ground
Battery	725-3174
Alternator	15 amp
Fuse (auto type)	20 amp
Head lamp bulb	725-3161
Tail light	Lamp No. 194
BRAKES	Dual disc, external
TIRE SIZES	
Front	18 x 8.50-8
Rear	26 x 12.00-12
DIMENSIONS	
Tread:	
Front with 18 x 8.50-8 tires	33.0 in.
Rear with 26 x 12.00-12 tires	31.5 in.
Wheelbase	51.6 in.
Length, overall	78.5 in.
Width, overall	43.5 in.
Height, overall (to top of steering wheel)	47.5 in.
Ground clearance	7.6 in.
Turning radius	36.0 in.

Specifications are subject to change without notice.

SECTION 2
DEALER PREPARATION

2-1. GENERAL.

2-1.1 The tractors covered in this manual are shipped from the factory fully assembled. The steering wheel is removed for ease of shipping. Engine oil has been added and the unit lubricated at the factory.

2-1.2 Battery electrolyte must be added and the steering wheel must be installed. Refer to paragraphs 2-2 and 2-3. It is a good practice to check tire pressure and all lubrication points during the preparation process. Lubrication guides are located in Section 3. The fuel tank is shipped empty and the fuel valves are closed.

2-2. BATTERY ACTIVATION.

2-2.1 Activate battery with electrolyte as follows:

WARNING

Electrolyte is diluted sulfuric acid. Use extreme care to avoid spilling and to avoid contact with skin and eyes. It can destroy clothing and burn your skin.

NOTE

When battery is charged, the heat will expand the electrolyte.

NOTE

Proper activation of battery will affect its life and performance.

WARNING

Battery cables must be disconnected in proper order to avoid arcing. When disconnecting cables from the battery, ALWAYS remove the negative cable first, and then remove the positive cable.

1. Remove battery from tractor. Place on a bench or table.
2. Fill each cell to top of plates.
3. Allow battery to sit 30 minutes. This allows chemical action to take place.

CAUTION

Charging the battery at more than 5 AMPS will cause the plates to warp and short out the battery.

4. Charge battery at 5 AMPS maximum until specific gravity is at least 1.250 or higher.
5. Check level of electrolyte in all cells and add, if necessary, to bring the level up to split ring.
6. Wash off any spilled electrolyte.
7. Connect battery cables as follows.

WARNING

Battery cables must be installed in proper order to avoid arcing. When connecting cables to battery, ALWAYS connect the positive cable first, then connect the negative cable

a. Connect POSITIVE battery cable to positive terminal of battery

b. Connect NEGATIVE battery cable to negative terminal of battery.

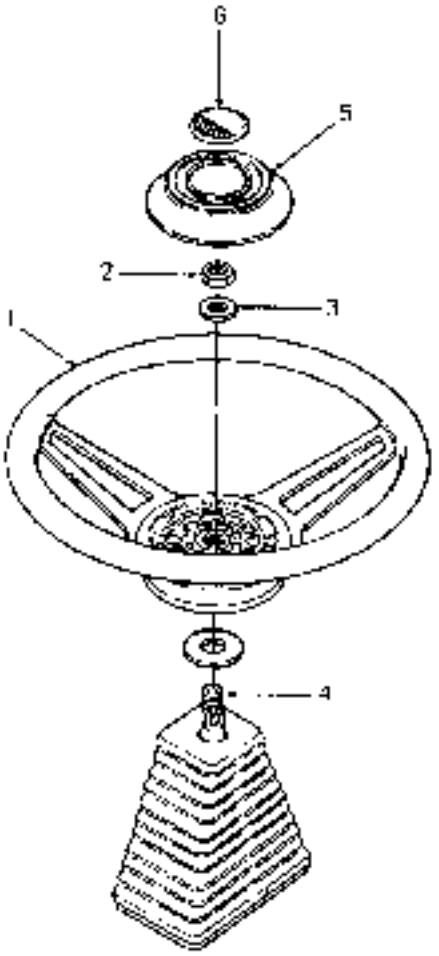
2-3. STEERING WHEEL INSTALLATION.

2-3.1 The steering wheels for all tractors covered in this manual are installed as follows.

1. Remove steering wheel (1, Figure 2-1) from under hood.
2. Remove hex jam nut (2) and flat washer (3) from upper steering shaft (4).
3. Install steering wheel (1) on upper steering shaft (4) and secure with flat washer (3) and hex jam nut (2).
4. Install steering wheel cap (5) and steering cap label (6)

2-4. SERVICE CHECKLIST.

2-4.1 Service checklists for garden tractors and for decks are contained in Tables 2-1 and 2-2.



1. Steering Wheel
2. Hex Jam Nut
3. Flat Washer
4. Upper Steering Shaft
5. Steering Wheel Cap
6. Steering Cap Label

Figure 2-1. Steering Wheel Installation.

Table 2-1. Pre-Delivery Check Sheet

CUSTOMER NAME _____	MODEL NUMBER _____
CUSTOMER ADDRESS _____	SERIAL NUMBER _____
CITY _____ STATE _____ ZIP _____	TECHNICIAN _____ DATE _____

- ☐ 1. Operator's Manual – Is it present and complete?
  - A. Owner's Manual
  - B. Attachment Guide
  - C. Merchandising Catalog
  - D. Folder
- ☐ 2. Check battery and connections
  - A. Remove battery and fill to proper level with electrolyte
    - (1) Allow battery to set for 1/2 hour after initial filling
    - (2) Refill to proper level
  - B. Charge battery with manual charger at 4-6 amperes
    - (1) Charge to 1.265 specific gravity – corrected to 26.7°C (80°F)
- ☐ 3. Tire pressure
  - A. Front – 12 PSI
  - B. Rear – 12 PSI
- ☐ 4. Lubricate all grease points with Cub Cadet grease or equivalent
  - A. Front axle pivot bar
  - B. Each steering knuckle
  - C. Each front wheel
  - D. Brake assembly cross shaft
  - E. Steering gearbox (if applicable)
  - F. Rocker shaft (if applicable)
- ☐ 5. Check lubrication levels
  - A. Kubota engines
    - (1) Engine oil - 3 quarts (approximate) with filter
      - a. 10W30 oil (winter)
      - b. 30W oil (summer)
        1. Diesel - CC/CD grade only
        2. Gas - SF/SG grade only
  - B. Kohler Magnum engines
    - (1) Engine oil - 3 pints (approximate) with filter
      - a. 10W30 oil (winter)
      - b. 30W oil (summer) SF/SG grade only
  - C. Kohler Command engines
    - (1) Engine oil - 4 pints (approximate) with filter
      - a. 10W30 oil - year round - SF/SG grade only
  - D. Transmission oil – 7 quarts (approximate) - Cub Cadet Hydraulic Oil
- ☐ 6. Check coolant level – Kubota engine only
  - A. Add if necessary - premix of 50/50 mixture of ethylene glycol and water
  - B. Inspect for leaks
- ☐ 7. Air cleaner and connections
  - A. Remove air cleaner check all sealing points
    - 1. Air cleaner seal
    - 2. Air cleaner retaining bolt seal
    - 3. Breather hose assembly
- ☐ 8. Check starting system and control cables
  - A. Throttle cable and related parts
  - B. Choke cable and related parts
- ☐ 9. Check engine speeds
  - A. Lo-idle speed – 1200 RPM
  - B. Hi-idle speed – 3600 RPM
    - (1) 3400 RPM on Kubota Engines (gas and diesel)
- ☐ 10. Implement lift system
  - A. Check operation of lift valve and handle
  - B. Check operation of linkages - rocker shaft
  - C. Inspect for leaks
  - D. Check operation of manual lift system
- ☐ 11. Steering
  - A. Hydrostatic power steering
    - (1) Operation
    - (2) Adjusted for full L/R turn
    - (3) Adjust toe-in (1/8" to 1/4")
    - (4) Check for leaks
  - B. Manual steering
    - (1) Operation
    - (2) Adjust for full L/R turn
    - (3) Adjust toe-in (1/8" to 1/4")
- ☐ 12. Hydrostatic drive and brakes
  - A. Check brakes
  - B. Check for neutral and movement forward to reverse
  - C. Check for brake pedal neutralization of forward/reverse lever
- ☐ 13. Check all lights including instrument panel lights
- ☐ 14. Attach mower deck/snowblower
  - A. Check PTO air gap (.015 to .017)
  - B. Burnish PTO clutch
    - (1) Run engine on 1/2 throttle
    - (2) Engage and disengage PTO clutch 10 times
    - (3) Let PTO clutch cool and readjust to above specifications
  - C. Check all safety functions and operations
- ☐ 15. Clean and polish

Table 2-2. Delivery Service

☐ 1. Is unit set up as instructed on delivery sheet?

☐ 2. Safety

A. Instruct customer in proper operating instructions

(1) Starting and stopping

(2) PTO clutch

(3) Suggested mowing practice

☐ 3. Lubrication

A. Engines

(1) Type and grade of oil and filter change intervals

B. Transmissions

(1) Type of oil to use and filter change intervals

☐ 4. Fuels – Gasoline

A. 87 Octane

B Stay away from alcohol blends

C. Never purchase more than can be used in thirty (30) days

☐ 5. Warranty

A. Give customer copy of warranty

B. Have customer sign delivery registration form

SECTION 3
PREVENTIVE MAINTENANCE

3-1. GENERAL.

3-1.1 This section presents basic preventive maintenance and specific lubrication information for tractors and decks covered in this manual. Refer to appropriate Tables 3-1 through 3-17 and Figures 3-1 through 3-10.

LUBRICATION GUIDE

WARNING

The life of any machine depends upon the care it is given. Proper lubrication is a very important part of that care.

Be certain that all lubrication fittings are assembled in place, using the lubrication illustrations as a guide.

Always lubricate the tractor thoroughly before taking it to the field. Use a pressure lubricating gun.

Be sure all fittings are free from dirt and paint so the lubricant is certain to enter the bearing.

Always force the lubricant through the full length of each bearing until it emerges at the end, carrying with it the worn lubricant and any dirt that may have entered the bearing.

Miscellaneous working parts not provided with lubrication fittings should be oiled daily with a good grade of lubricating oil.

Lubricant is cheap. Use plenty of it. Worn parts can be expensive to replace.

Keep your supply of lubricating oil and grease stored in clean containers, and covered to protect from dust and dirt.

Keep the lubricating gun nozzle clean and wipe dirt from grease fittings before lubricating.

The symbols in the illustration indicate the method of application and the hourly intervals to apply the lubricant.

Use a pressure lubricating gun and apply 251H EP grease (or equivalent No. 2 multi-purpose lithium grease) sufficient to flush out the old grease and dirt. Lubricate at hourly intervals indicated on symbols.

Dipstick, use to check engine oil before each use.

Table 3-1. Model 1340 Maintenance

Operation to be performed	Before each use	10 hours or once a month	30 hours three times a season	50 hours or twice a season	100 hours or yearly	Before storage
Clean grille insert, engine inlet air screen and side panels		More often under dirty conditions				
Check engine oil level	X					
Fill fuel tank	X					
Change engine oil and oil filter	After first 5 hours				More often under dirty conditions	
Check transmission oil level	X					
Replace transmission filter		After first 10 hours X		After first 50 hours X	Every 100 hours there-after	
Re-oil and clean foam air precleaner			More often under dirty conditions			
Check battery electrolyte level		X				
Grease front axle pivot bolt		X				
Lubricate steering knuckles (2) and steering arm		X				
Retorque rear wheel lug nuts		After first 10 hours				
Lubricate brake shaft			X			
Clean cooling fins and external surfaces			X			
Service air cleaner paper cartridge					More often under dirty conditions	
Check spark plugs					X	X
Grease front wheel bearings			X			X
Drain fuel						X
Pivot bar adjustment bolts				X		

NOTE

Maintenance information for optional equipment may be found in the manual which is included with the specific piece of optional equipment.

Table 3-2. Model 1340 Lubrication

Point of Lubrication	Check at Hours	Change at Hours	Capacity	Anticipated Air Temperature		
				Above +60°F	+32°F to 0°F	Below 0°F
Engine crankcase	Check before each use	5 hours then every 100 hours	4 pints	*Cub Cadet* Low Ash Engine Oil SAE 10W-30	*Cub Cadet* Low Ash Oil SAE 10W-30	*Cub Cadet* Low Ash Engine Oil SAE 5W-20 or 5W-30
Hydro-drive unit mounted on trans-mission case with filter	Check before each use	Add as needed Change yearly	Approx. 7 quarts	*Cub Cadet* Hydraulic Transmission Fluid **NOTE:** *Cub Cadet* hydraulic transmission fluid meets IH B-6 specifications. If fluid is used that does not meet these requirements, *Cub Cadet* will not be responsible for substandard performance. Failures due to use of improper fluid are not covered by warranty. For maximum protection, use *Cub Cadet* Hydraulic Transmission Fluid.		
Steering knuckles and front axle pivot bolt	10			Use 251H EP grease or equivalent No. 2 multi-purpose lithium grease and apply two or three strokes or sufficient grease to flush out old grease and dirt.		
Front wheel bearings	30			Two or three strokes minimum of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Steering gear housing	100	or yearly	1/4 lb	Two strokes of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Alignment couplings	500		1 ounce	C-V Joint grease – purchase locally.		

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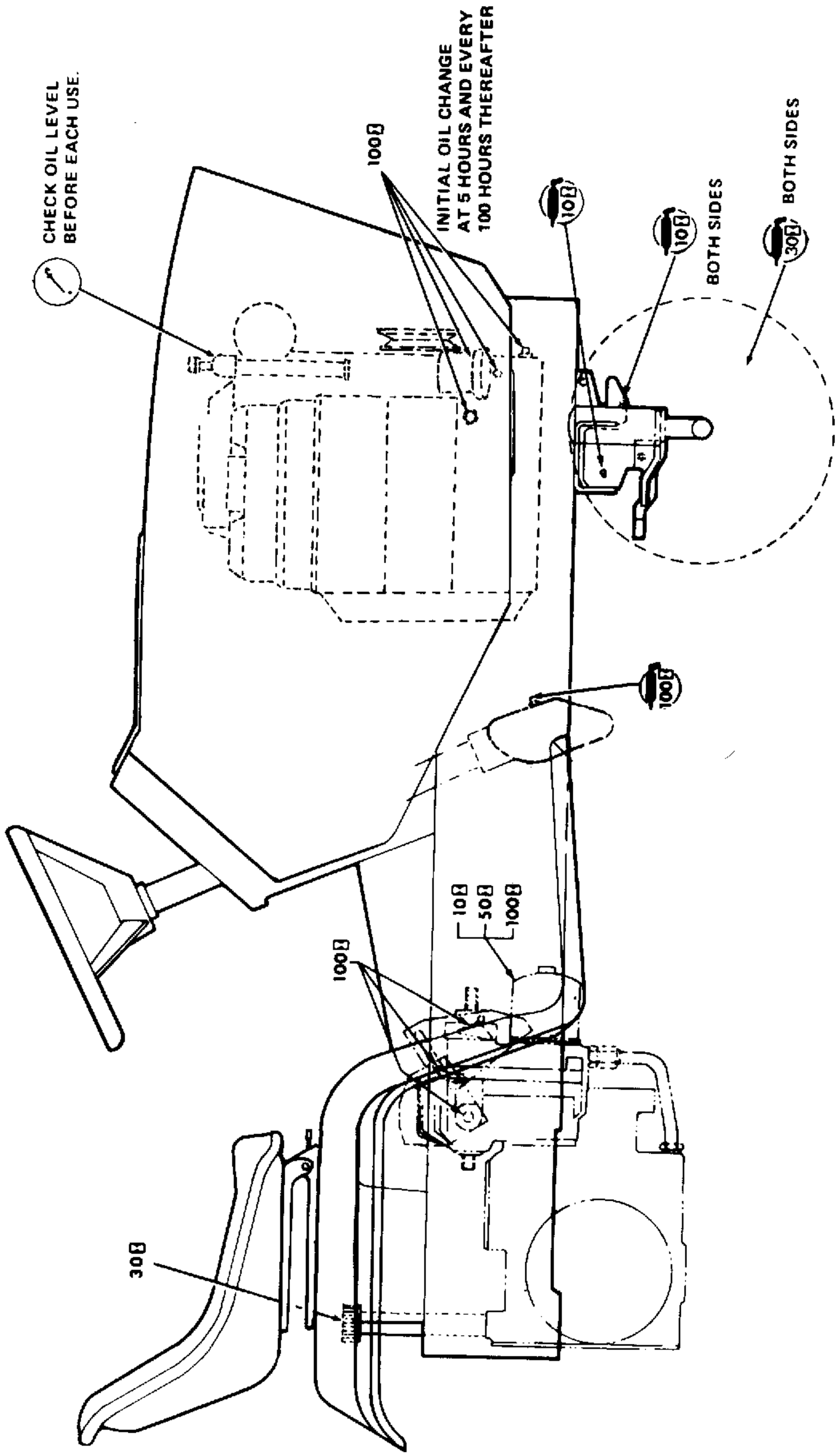

Figure 3-1. Model 1340 Lubrication Points.

Table 3-3. Model 1535 Maintenance

Operation to be performed	Before each use	10 hours or once a month	30 hours three times a season	50 hours or twice a season	100 hours or yearly	Before storage
Clean grille insert, engine inlet air screen and side panels		More often under dirty conditions X				
Check engine oil level	X					
Fill fuel tank	X					
Cylinder head cleaning				Leaded fuel - 250 hrs. Unleaded fuel - 500 hrs.		
Change engine oil and oil filter	After first 5 hours			More often under dirty conditions X		
Check transmission oil level	X					
Replace transmis-sion oil				After first 50 hours X	Every 100 hours there-after	
Re-oil and clean foam air precleaner		X				
Check battery electrolyte level		X				
Grease front axle pivot bolt		X				
Lubricate steering knuckles (2) and steering arm		X				
Retorque rear wheel lug nuts		After first 10 hours X				
Lubricate brake shaft			X			
Clean cooling fins and external surfaces			X			
Service air cleaner paper cartridge					More often under dirty conditions	
Check spark plugs					X	X
Grease front wheel bearings			X			X
Drain fuel						X
Pivot bar adjustment bolts				X		
Lubricate clutch shaft			X			
Check creeper drive oil level					X	

NOTE

Maintenance information for optional equipment may be found in the manual which is included with the specific piece of optional equipment.

Table 3-4. Model 1535 Lubrication

Point of Lubrication	Check at Hours	Change at Hours	Capacity	Anticipated Air Temperature		
				Above +32°F	+32°F to 0°F	Below 0°F
Engine crankcase	Check before each use	50	3 pints 8 ounces (1-3/4 quarts)	*Cub Cadet* Low Ash Engine Oil SAE 30	*Cub Cadet* Low Ash Oil SAE 10W-30	*Cub Cadet* Low Ash Engine Oil SAE 5W-20 or 5W-30
Steering knuckles and front axle pivot bolt	10			Use 251H EP grease or equivalent No. 2 multi-purpose lithium grease and apply two or three strokes or sufficient grease to flush out old grease and dirt.		
Front wheel bearings	30			Two or three strokes minimum of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Steering gear housing	100	or yearly	1/4 lb	Two strokes of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Transmission	100	Add as needed Change yearly	8 pints approx.	*Cub Cadet* Hydraulic Transmission Fluid **NOTE**: *Cub Cadet* hydraulic transmission fluid meets IH B-6 specifications. If fluid is used that does not meet these requirements *Cub Cadet* will not be responsible for substandard performance. Failures due to use of improper fluid are not covered by warranty. For maximum protection, use *Cub Cadet* Hydraulic Transmission Fluid.		
Creeper drive housing	100	Add as needed	10 ounces	SAE 85W-140W Gear Lube		
Drive shaft lubricating bushing		30 or as needed		Two or three strokes of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Alignment couplings	500		1 ounce	C-V Joint grease – purchase locally.		

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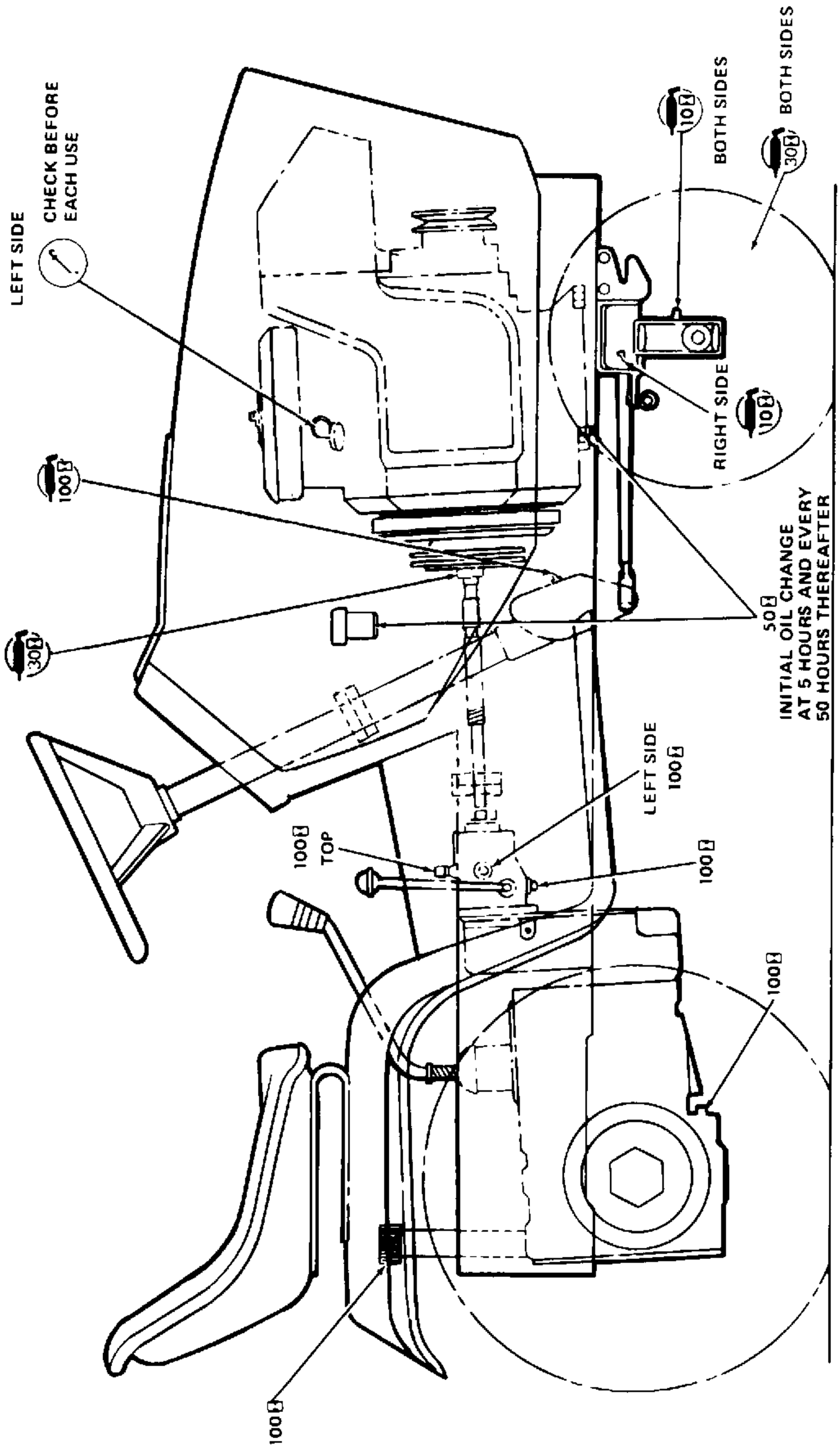

Figure 3-2. Model 1535 Lubrication Points.

Table 3-5. Model 1541 Maintenance

Operation to be performed	Before each use	10 hours or once a month	30 hours three times a season	50 hours or twice a season	100 hours or yearly	Before storage
Clean grille insert, engine inlet air screen and side panels		More often under dirty conditions X				
Check engine oil level	X					
Fill fuel tank	X					
Cylinder head cleaning				Leaded fuel - 250 hrs. Unleaded fuel - 500 hrs.		
Change engine oil and oil filter	After first 5 hours			More often under dirty conditions X		
Check transmission oil level	X					
Replace transmis-sion filter		After first 10 hours X		After first 50 hours X	Every 100 hours there-after	
Re-oil and clean foam air precleaner		X				
Check battery electrolyte level		X				
Grease front axle pivot bolt		X				
Lubricate steering knuckles (2) and steering arm		X				
Retorque rear wheel lug nuts		After first 10 hours X				
Lubricate brake shaft			X			
Clean cooling fins and external surfaces			X			
Service air cleaner paper cartridge					More often under dirty conditions	
Check spark plugs					X	X
Grease front wheel bearings			X			X
Drain fuel						X
Pivot bar adjustment bolts				X		

NOTE

Maintenance information for optional equipment may be found in the manual which is included with the specific piece of optional equipment.

Table 3-6. Model 1541 Lubrication

Point of Lubrication	Check at Hours	Change at Hours	Capacity	Anticipated Air Temperature		
				Above +32°F	+32°F to 0°F	Below 0°F
Engine crankcase	Check before each use	50	3 pints 8 ounces (1-3/4 quarts)	*Cub Cadet* Low Ash Engine Oil SAE 30	*Cub Cadet* Low Ash Oil SAE 10W-30	*Cub Cadet* Low Ash Engine Oil SAE 5W-20 or 5W-30
Steering knuckles and front axle pivot bolt	10			Use 251H EP grease or equivalent No. 2 multi-purpose lithium grease and apply two or three strokes or sufficient grease to flush out old grease and dirt.		
Front wheel bearings	30			Two or three strokes minimum of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Steering gear housing	100	or yearly	1/4 lb	Two strokes of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Transmission	100	Add as needed Change yearly	7 quarts	*Cub Cadet* Hydraulic Transmission Fluid **NOTE**: *Cub Cadet* hydraulic transmission fluid meets IH B-6 specifications. If fluid is used that does not meet these requirements *Cub Cadet* will not be responsible for substandard performance. Failures due to use of improper fluid are not covered by warranty. For maximum protection, use *Cub Cadet* Hydraulic Transmission Fluid.		
Drive shaft lubricating bushing		30 or as needed		Two or three strokes of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Alignment couplings	500		1 ounce	C-V Joint grease – purchase locally.		

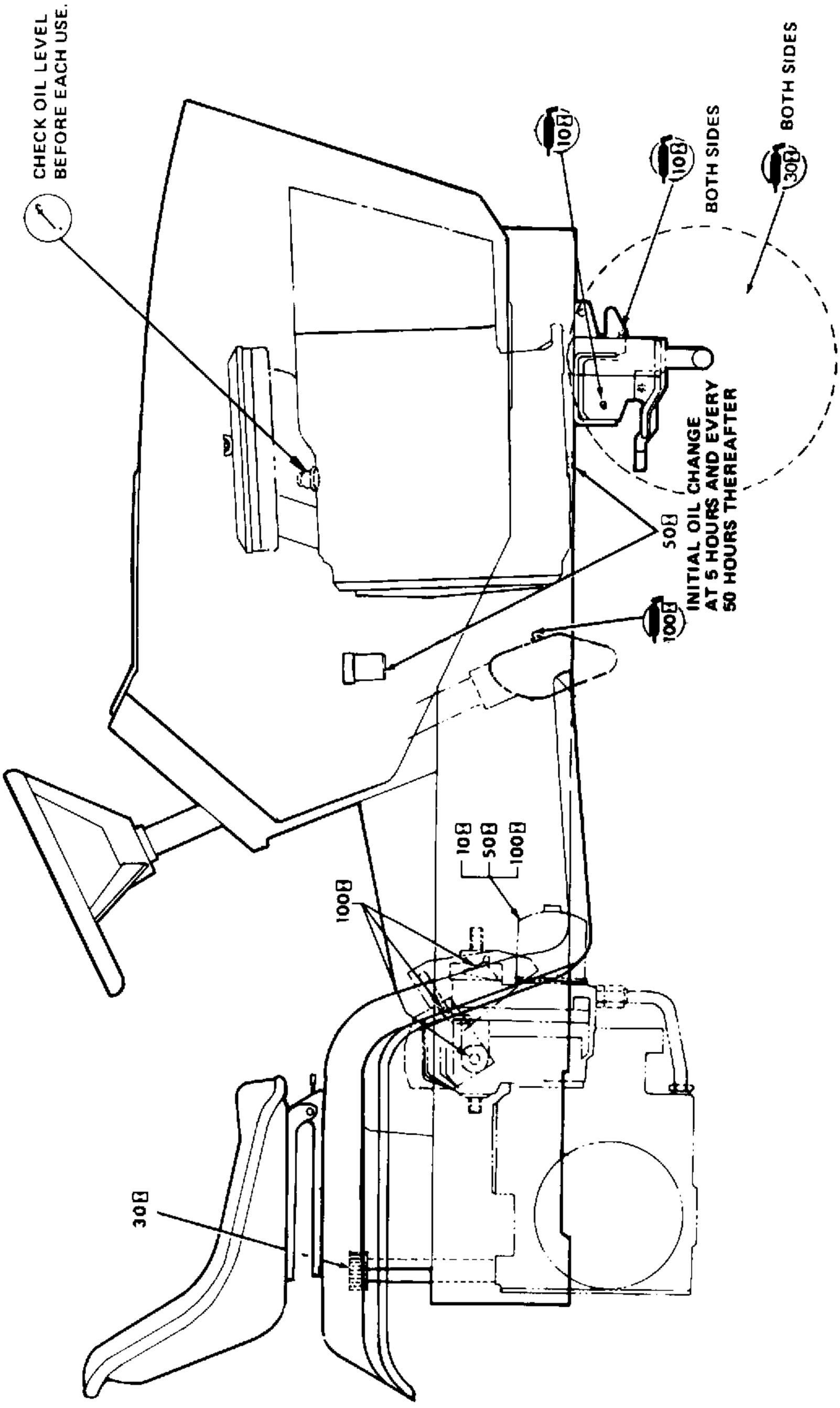

Figure 3-3. Model 1541 Lubrication Points.

Table 3-7. Model 1782 Maintenance

Operation to be performed	Before each use	10 hours or once a month	35 hours three times a season	50 hours or twice a season	100 hours or yearly	Before storage
Clean grille insert, (front and backside)		More often under dirty conditions X				
Check engine oil level	X					
Fill fuel tank	X					
Change engine oil			1st time & more often under dirty conditions		X	X
Change engine oil filter			1st time Thereafter change with every other engine oil change			
Check transmission oil level	X					
Replace transmission oil filter		After first 10 hours X		After first 50 hours X	Every 100 hours there-after	
Check battery electrolyte level		X				
Grease front axle pivot bolt		X				
Lubricate steering knuckles (2) and steering arm		X				X
Retorque rear wheel lug bolts		After first 10 hours X				
Lubricate brake shaft			X			
Grease turning brake pedal – RH			X			
Service air cleaner, element and dust cup	Dust Cup X				Air Cleaner Element More often under dirty conditions	
Lubricate speed con-trol linkage cam plates					X	X
Grease front wheel bearings			X			
Radiator coolant level	X					X
Radiator screen	X					
Pivot bar adjusting bolt				X or when loose		

NOTE

Maintenance information for optional equipment may be found in the manual which is included with the specific piece of optional equipment.

Table 3-8. Model 1782 Lubrication

Point of Lubrication	Check at Hours	Change at Hours	Capacity	Anticipated Air Temperature		
				Above +77°F	+32°F to 77°F	Below 32°F
Engine crankcase	Check before each use	35 and 100	Approx. 3.4 qts including oil in oil filter	Engine Oil SAE 30 Grade CD	Engine Oil SAE 20 or SAE 15W-40 Grade CD	Engine Oil SAE 10 or SAE 10W-30 Grade CD
Hydro-drive unit mounted on trans-mission case with filter	Check before each use	Add as needed Change yearly	Approx. 7 quarts	*Cub Cadet* Hydraulic Transmission Fluid **NOTE:** *Cub Cadet* hydraulic transmission fluid meets IH B-6 specifications. If fluid is used that does not meet these requirements, *Cub Cadet* will not be responsible for substandard performance. Failures due to use of improper fluid are not covered by warranty. For maximum protection, use *Cub Cadet* Hydraulic Transmission Fluid.		
Steering knuckles and front axle pivot bolt	10			Use 251H EP grease or equivalent No. 2 multi-purpose lithium grease and apply two or three strokes or sufficient grease to flush out old grease and dirt.		
Front wheel bearings	35			Two or three strokes minimum of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Alignment couplings	500		1 ounce	C-V joint grease – purchase locally.		

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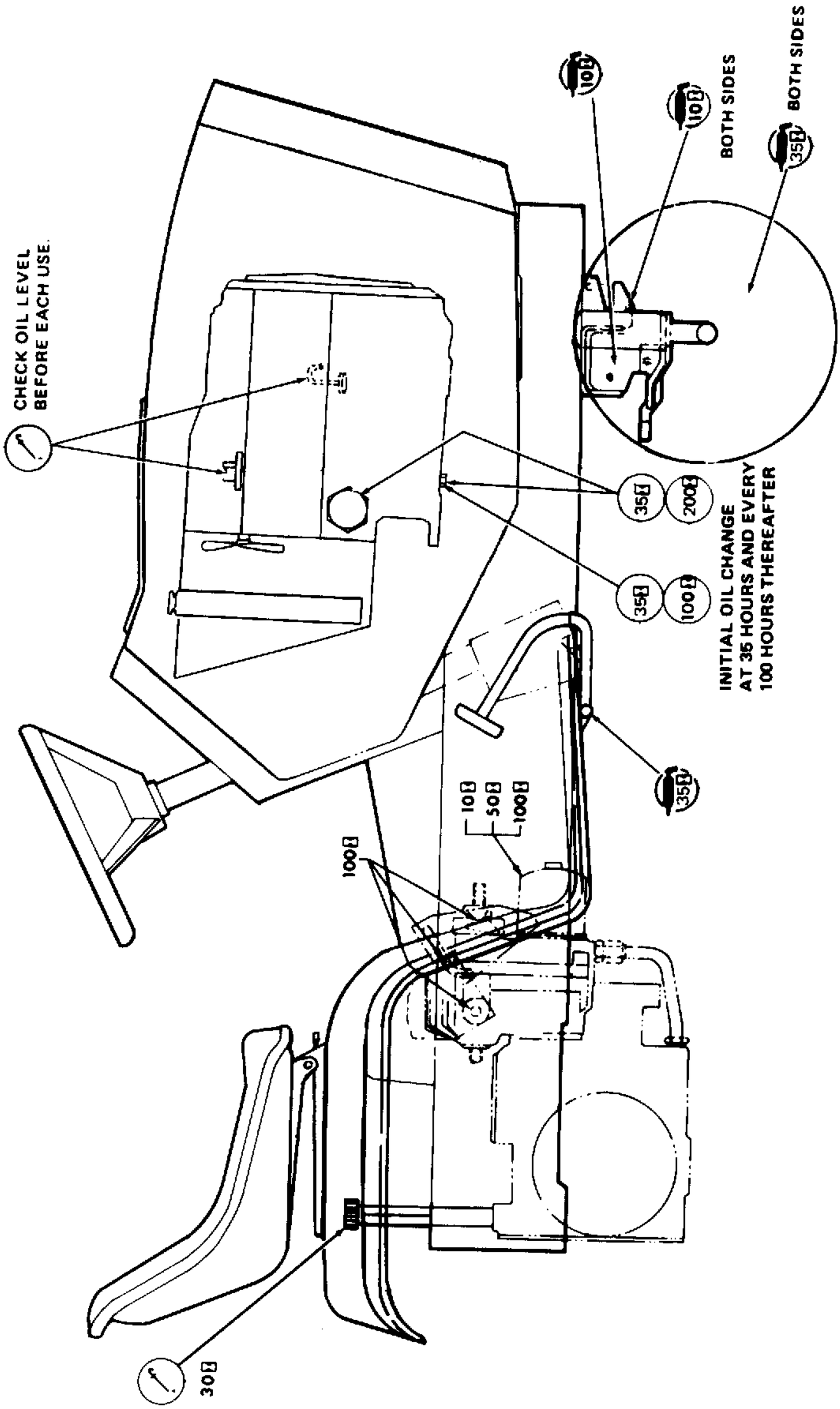

Figure 3-4. Model 1782 Lubrication Points.

Table 3-9. Model 1860 Maintenance

Operation to be performed	Before each use	10 hours or once a month	30 hours three times a season	50 hours or twice a season	100 hours or yearly	Before storage
Clean grille insert, engine inlet air screen and side panels		More often under dirty conditions X				
Check engine oil level	X					
Fill fuel tank	X					
Cylinder head cleaning				Leaded fuel - 250 hrs. Unleaded fuel - 500 hrs.		
Change engine oil and oil filter	After first 5 hours			More often under dirty conditions X		
Check transmission oil level	X					
Replace transmis-sion filter		After first 10 hours X		After first 50 hours X	Every 100 hours there-after	
Re-oil and clean foam air precleaner		X				
Check battery electrolyte level		X				
Grease front axle pivot bolt		X				
Lubricate steering knuckles (2) and steering arm		X				
Retorque rear wheel lug nuts		After first 10 hours X				
Lubricate brake shaft			X			
Clean cooling fins and external surfaces			X			
Service air cleaner paper cartridge					More often under dirty conditions	
Check spark plugs					X	X
Grease front wheel bearings			X			X
Drain fuel						X
Pivot bar adjustment bolts				X		

NOTE

Maintenance information for optional equipment may be found in the manual which is included with the specific piece of optional equipment.

Table 3-10. Model 1860 Lubrication

Point of Lubrication	Check at Hours	Change at Hours	Capacity	Anticipated Air Temperature		
				Above +32°F	+32°F to 0°F	Below 0°F
Engine crankcase	Check before each use	50	3 pints 8 ounces (1-3/4 quarts)	*Cub Cadet* Low Ash Engine Oil SAE 30	*Cub Cadet* Low Ash Oil SAE 10W-30	*Cub Cadet* Low Ash Engine Oil SAE 5W-20 or 5W-30
Hydro-drive unit mounted on transmission case with filter	Check before each use	Add as needed Change yearly	Approx. 7 quarts	*Cub Cadet* Hydraulic Transmission Fluid **NOTE:** *Cub Cadet* hydraulic transmission fluid meets IH B-6 specifications. If fluid is used that does not meet these requirements, *Cub Cadet* will not be responsible for substandard performance. Failures due to use of improper fluid are not covered by warranty. For maximum protection, use *Cub Cadet* Hydraulic Transmission Fluid.		
Steering knuckles and front axle pivot bolt	10			Use 251H EP grease or equivalent No. 2 multi-purpose lithium grease and apply two or three strokes or sufficient grease to flush out old grease and dirt.		
Front wheel bearings	30			Two or three strokes minimum of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Steering gear housing	100	or yearly	1/4 lb	Two strokes of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Alignment couplings	500		1 ounce	C-V Joint grease – purchase locally.		

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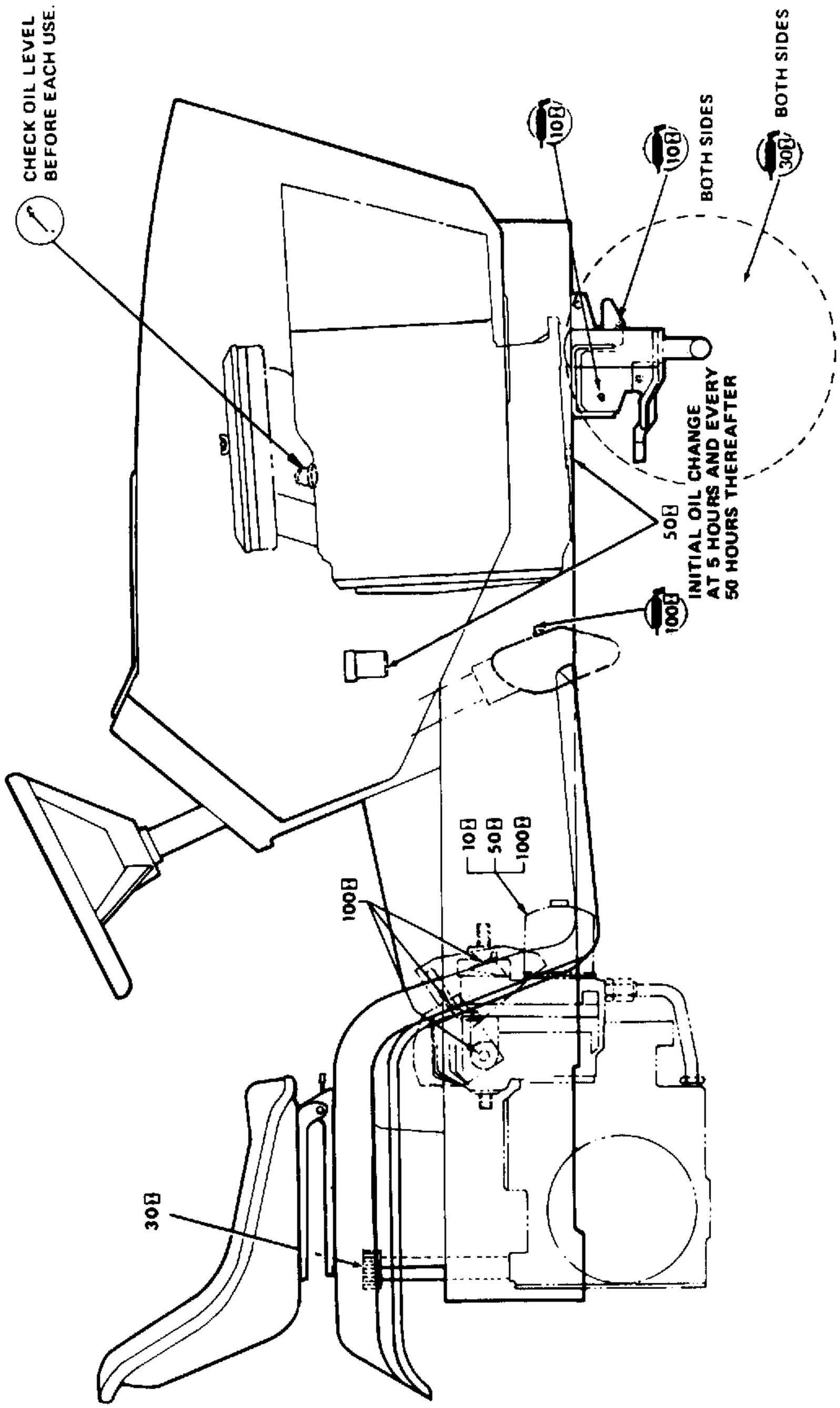

Figure 3-5. Model 1860 Lubrication Points.

Table 3-11. Model 1862 Maintenance

Operation to be performed	Before each use	10 hours or once a month	30 hours three times a season	50 hours or twice a season	100 hours or yearly	Before storage
Clean grille insert, engine inlet air screen and side panels		More often under dirty conditions X				
Check engine oil level	X					
Fill fuel tank	X					
Cylinder head cleaning				Leaded fuel - 250 hrs. Unleaded fuel - 500 hrs.		
Change engine oil and oil filter	After first 5 hours			More often under dirty conditions X		
Check transmission oil level	X					
Replace transmis-sion filter		After first 10 hours X		After first 50 hours X	Every 100 hours there-after	
Re-oil and clean foam air precleaner		X				
Check battery electrolyte level		X				
Grease front axle pivot bolt		X				
Lubricate steering knuckles (2) and steering arm		X				
Retorque rear wheel lug nuts		After first 10 hours X				
Lubricate brake shaft			X			
Clean cooling fins and external surfaces			X			
Service air cleaner paper cartridge					More often under dirty conditions	
Check spark plugs					X	X
Lubricate speed con-trol linkage cap plates					X	
Grease front wheel bearings			X			X
Drain fuel						X
Pivot bar adjustment bolts				X		

NOTE

Maintenance information for optional equipment may be found in the manual which is included with the specific piece of optional equipment.

Table 3-12. Model 1862 Lubrication

Point of Lubrication	Check at Hours	Change at Hours	Capacity	Anticipated Air Temperature		
				Above +32°F	+32°F to 0°F	Below 0°F
Engine crankcase	Check before each use	50	3 pints 8 ounces (1-3/4 quarts)	*Cub Cadet* Low Ash Engine Oil SAE 30	*Cub Cadet* Low Ash Oil SAE 10W-30	*Cub Cadet* Low Ash Engine Oil SAE 5W-20 or 5W-30
Hydro-drive unit mounted on transmission case with filter	Check before each use	Add as needed Change yearly	Approx. 7 quarts	*Cub Cadet* Hydraulic Transmission Fluid **NOTE:** *Cub Cadet* hydraulic transmission fluid meets IH B-6 specifications. If fluid is used that does not meet these requirements, *Cub Cadet* will not be responsible for substandard performance. Failures due to use of improper fluid are not covered by warranty. For maximum protection, use *Cub Cadet* Hydraulic Transmission Fluid.		
Steering knuckles and front axle pivot bolt	10			Use 251H EP grease or equivalent No. 2 multi-purpose lithium grease and apply two or three strokes or sufficient grease to flush out old grease and dirt.		
Front wheel bearings	30			Two or three strokes minimum of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Alignment couplings	500		1 ounce	C-V Joint grease – purchase locally.		

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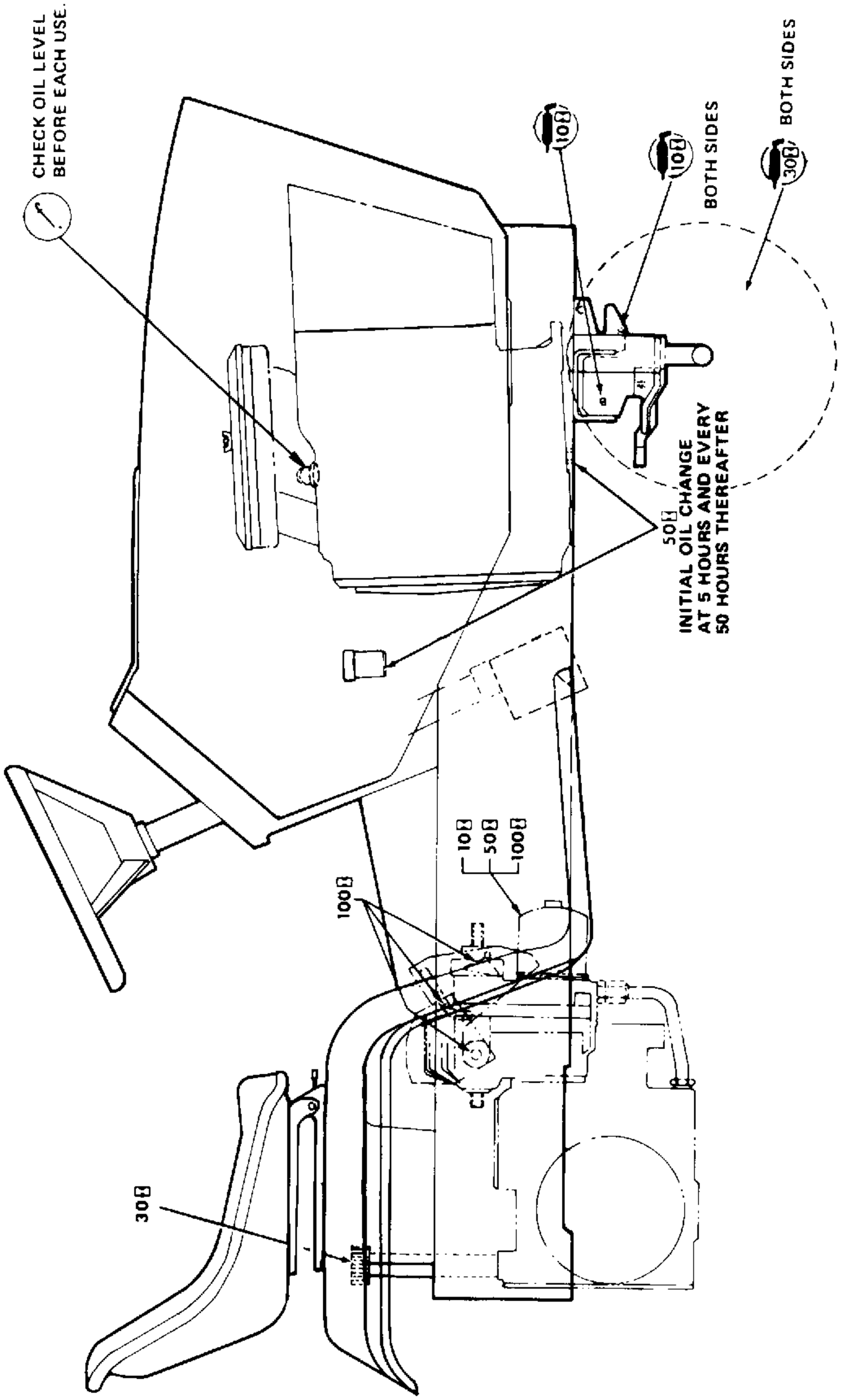

Figure 3-6. Model 1862 Lubrication Points.

Table 3-13. Models 1882 and 2082 Maintenance

Operation to be performed	Before each use	10 hours or once a month	30 hours three times a season	50 hours or twice a season	100 hours or yearly	Before storage
Clean grille insert, engine inlet air screen and side panels		More often under dirty conditions X				
Check engine oil level	X					
Fill fuel tank	X					
Change engine oil and oil filter	After first 5 hours			More often under dirty conditions X		
Check transmission oil level	X					
Replace transmission oil filter		After first 10 hours X		After first 50 hours X	Every 100 hours there-after	
Re-oil and clean foam air precleaner		X				
Check battery electrolyte level		X				
Grease front axle pivot bolt		X				
Lubricate steering knuck-les (2) and steering arm		X				
Retorque rear wheel lug nuts		After first 10 hours X				
Lubricate brake shaft			X			
Grease turning brake pedal – RH			X			
Check transmission oil level	X					
Clean cooling fins and external surfaces			X			
Service air cleaner paper cartridge					More often under dirty conditions	
Check spark plugs					X	X
Lubricate speed control linkage cam plates					X	
Grease front wheel bearings			X			X
Drain fuel						X
Pivot bar adjustment bolt				X or when loose		
Cylinder head cleaning				Leaded fuel - 250 hours Unleaded fuel - 500 hours		

NOTE

Maintenance information for optional equipment may be found in the manual which is included with the specific piece of optional equipment.

Table 3-14. Models 1882 and 2082 Lubrication

Point of Lubrication	Check at Hours	Change at Hours	Capacity	Anticipated Air Temperature		
				Above +32°F	+32°F to 0°F	Below 0°F
Engine crankcase	Check before each use	50	3 pints 8 ounces (1-3/4 quarts)	*Cub Cadet* Low Ash Engine Oil SAE 30	*Cub Cadet* Low Ash Oil SAE 10W-30	*Cub Cadet* Low Ash Engine Oil SAE 5W-20 or 5W-30
Hydro-drive unit mounted on trans-mission case with filter	Check before each use	Add as needed Change yearly	Approx. 7 quarts	*Cub Cadet* Hydraulic Transmission Fluid **NOTE:** *Cub Cadet* hydraulic transmission fluid meets IH B-6 specifications. If fluid is used that does not meet these requirements, *Cub Cadet* will not be responsible for substandard performance. Failures due to use of improper fluid are not covered by warranty. For maximum protection, use *Cub Cadet* Hydraulic Transmission Fluid.		
Steering knuckles and front axle pivot bolt	10			Use 251H EP grease or equivalent No. 2 multi-purpose lithium grease and apply two or three strokes or sufficient grease to flush out old grease and dirt.		
Front wheel bearings	30			Two or three strokes minimum of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Alignment couplings	500		1 ounce	C-V Joint grease – purchase locally.		

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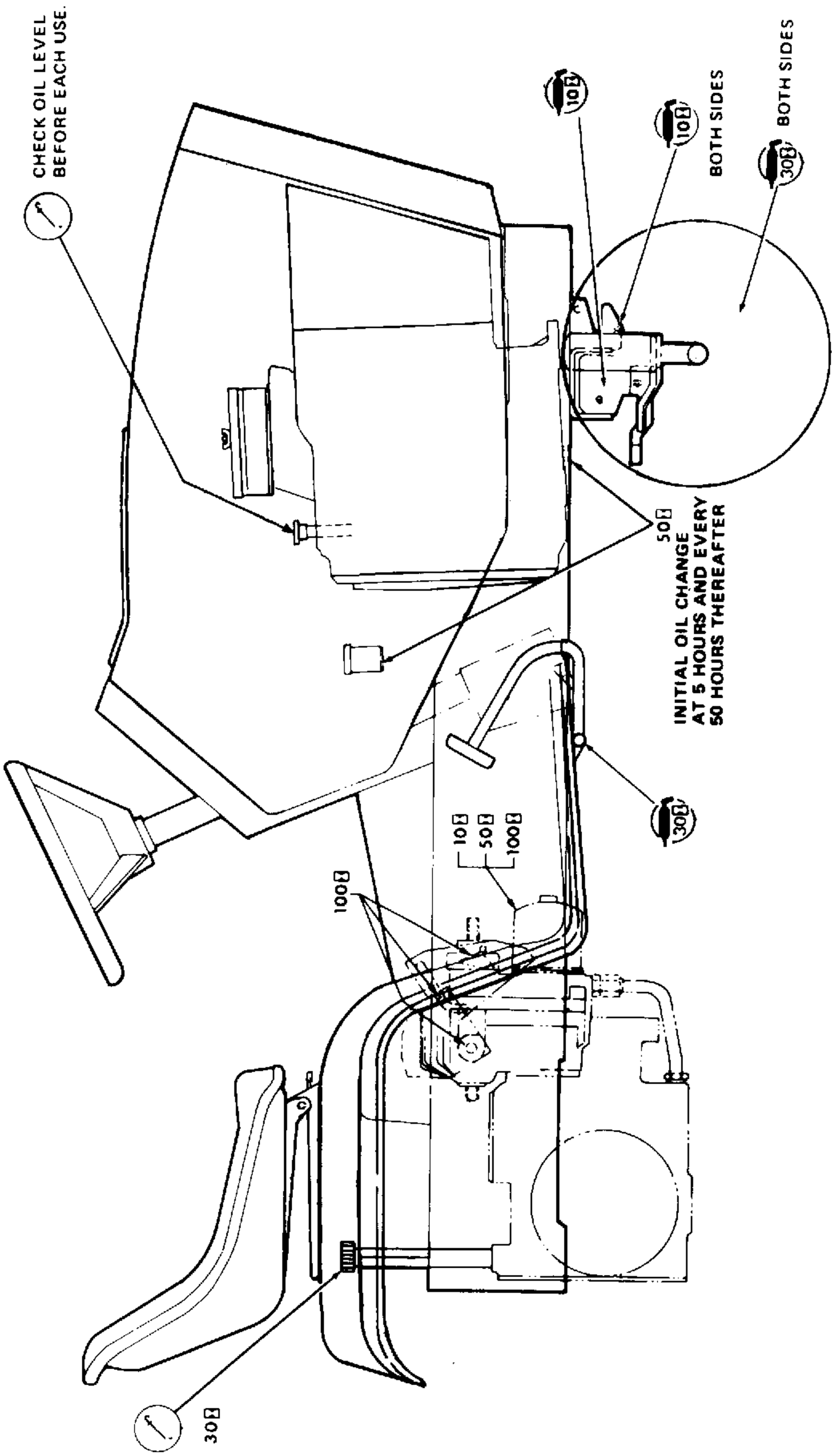

Figure 3-7. Models 1882 and 2082 Lubrication Points.

Table 3-15. Model 2182 Maintenance

Operation to be performed	Before each use	10 hours or once a month	35 hours three times a season	50 hours or twice a season	100 hours or yearly	Before storage
Clean grille insert (front and backside)		More often under dirty conditions X				
Check engine oil level	X					
Fill fuel tank	X					
Change engine oil			First time & more often under dirty conditions		X	X
Change engine oil filter			First time Thereafter change with every other engine oil change			
Check transmission oil level	X					
Replace transmission oil filter		After first 10 hours X		After first 50 hours X	Every 100 hours there-after	
Check battery electrolyte level		X				
Grease front axle pivot bolt		X				
Lubricate steering knuckles (2) and steering arm		X				X
Retorque rear wheel lug bolts		After first 10 hours X				
Lubricate brake shaft			X			
Grease turning brake pedal – RH			X			
Service air cleaner, element and dust cup	Dust Cup X				Air Cleaner Element More often under dirty conditions	
Lubricate speed control linkage cam plates					X	X
Grease front wheel bearings			X			
Radiator coolant level	X					X
Radiator screen	X					
Pivot bar adjusting bolt				X or when loose		

NOTE

Maintenance information for optional equipment may be found in the manual which is included with the specific piece of optional equipment.

Table 3-16. Model 2182 Lubrication

Point of Lubrication	Check at Hours	Change at Hours	Capacity	Anticipated Air Temperature		
				Above +77°F	+32°F to 77°F	32°F to 0°F
Engine crankcase	Check before each use	35 and 100	Approx. 3.4 qts including oil in oil filter	*Cub Cadet* Low Ash Engine Oil SAE 30W or SAE10W-30	Engine Oil SAE-20W or SAE-10W-30	Engine Oil SAE-10W or SAE-10W-30
Hydro-drive unit mounted on transmission case with filter	Check before each use	Add as needed Change yearly	Approx. 7 quarts	*Cub Cadet* Hydraulic Transmission Fluid **NOTE:** *Cub Cadet* hydraulic transmission fluid meets IH B-6 specifications. If fluid is used that does not meet these requirements, *Cub Cadet* will not be responsible for substandard performance. Failures due to use of improper fluid are not covered by warranty. For maximum protection, use *Cub Cadet* Hydraulic Transmission Fluid.		
Steering knuckles and front axle pivot bolt	10			Use 251H EP grease or equivalent No. 2 multi-purpose lithium grease and apply two or three strokes or sufficient grease to flush out old grease and dirt.		
Front wheel bearings	35			Two or three strokes minimum of the lubricator using 251H EP grease or equivalent No. 2 multi-purpose lithium grease.		
Alignment couplings	500		1 ounce	C-V Joint grease – purchase locally.		

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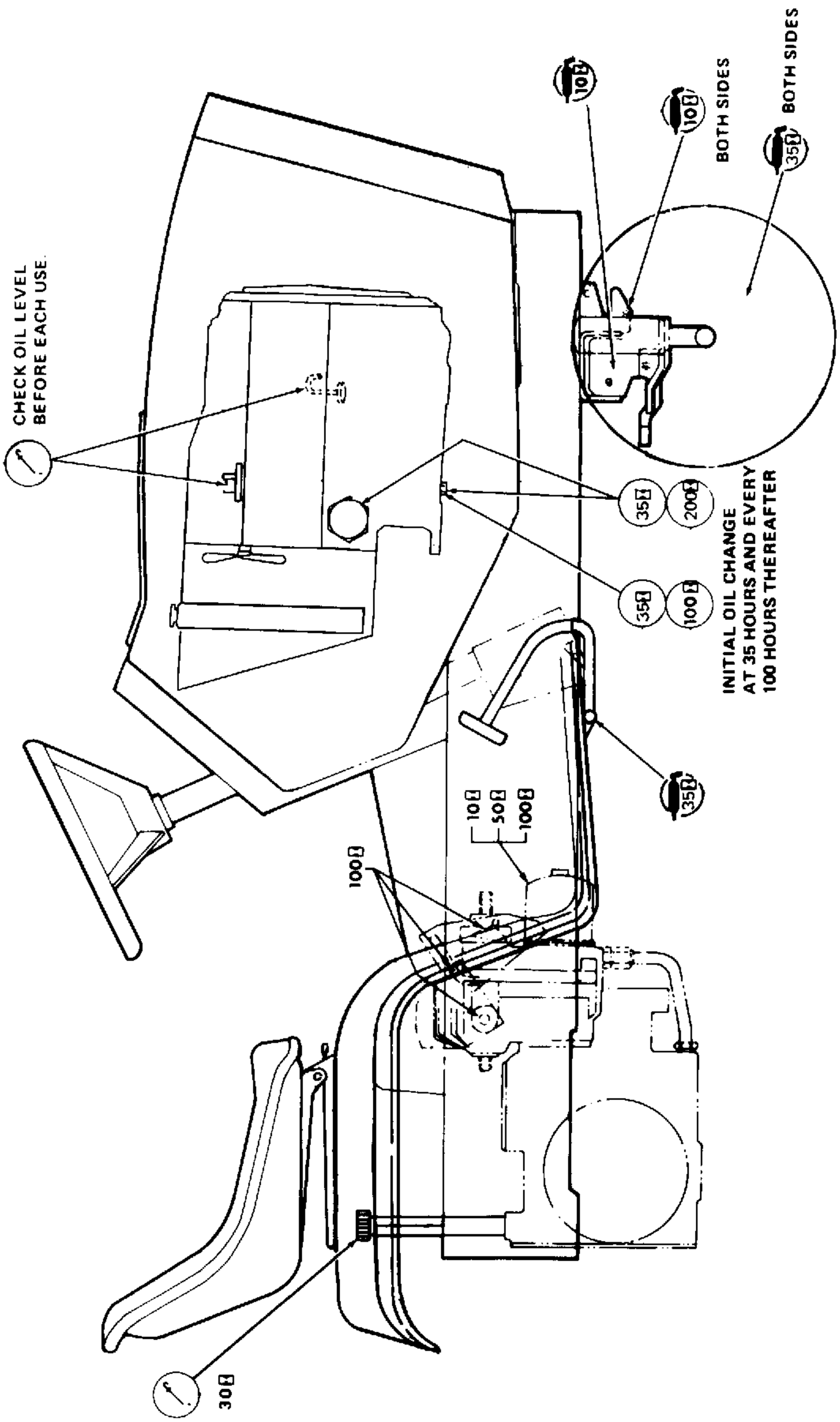


Figure 3-8. Model 2182 Lubrication Points.

Table 3-17. Mower Deck Lubrication

Point of Lubrication	328	336	349	357	358	359	374
Spindle assemblies, every 50 hours with *Cub Cadet* 251H EP grease	X	X		X	X	X	X
Gauge wheels, every 40 hours with *Cub Cadet* 251H EP grease							X
Tailwheel pivot, every 40 hours with *Cub Cadet* 251H EP grease			X				
Driveline universal joints, before each use with *Cub Cadet* 251H EP grease			X				
Driveline housing, before each use with *Cub Cadet* 251H EP grease			X				
Driveline shaft, before each use with *Cub Cadet* 251H EP grease			X				
Idler pivot, every 50 hours with light weight lubricating oil	X	X		X	X	X	X
Gearbox, check every 40 hours. Fill with EP80W-90 gear oil (P/N 737-3033)			X				

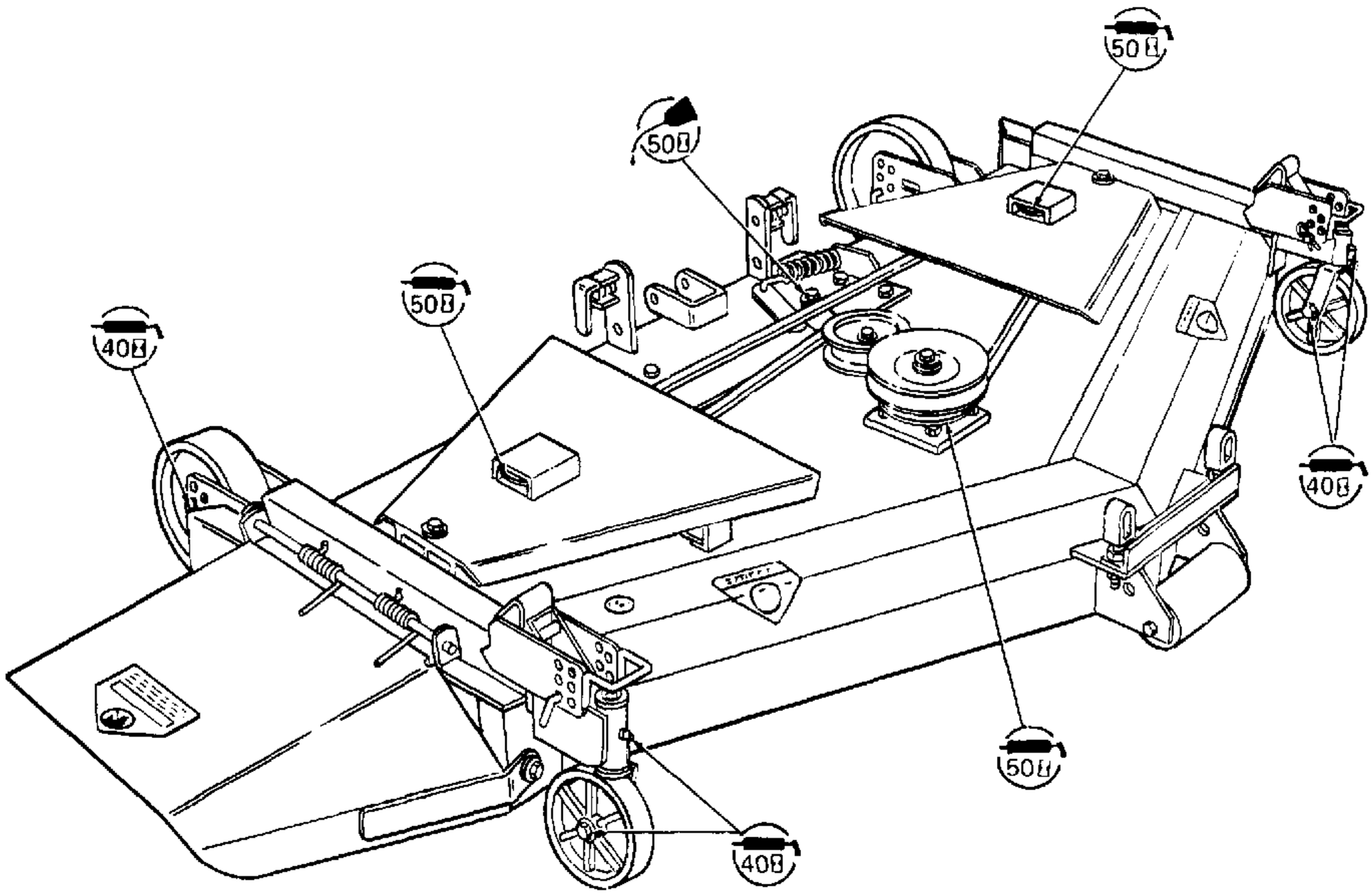


Figure 3-9. Model 374 Lubrication Points.

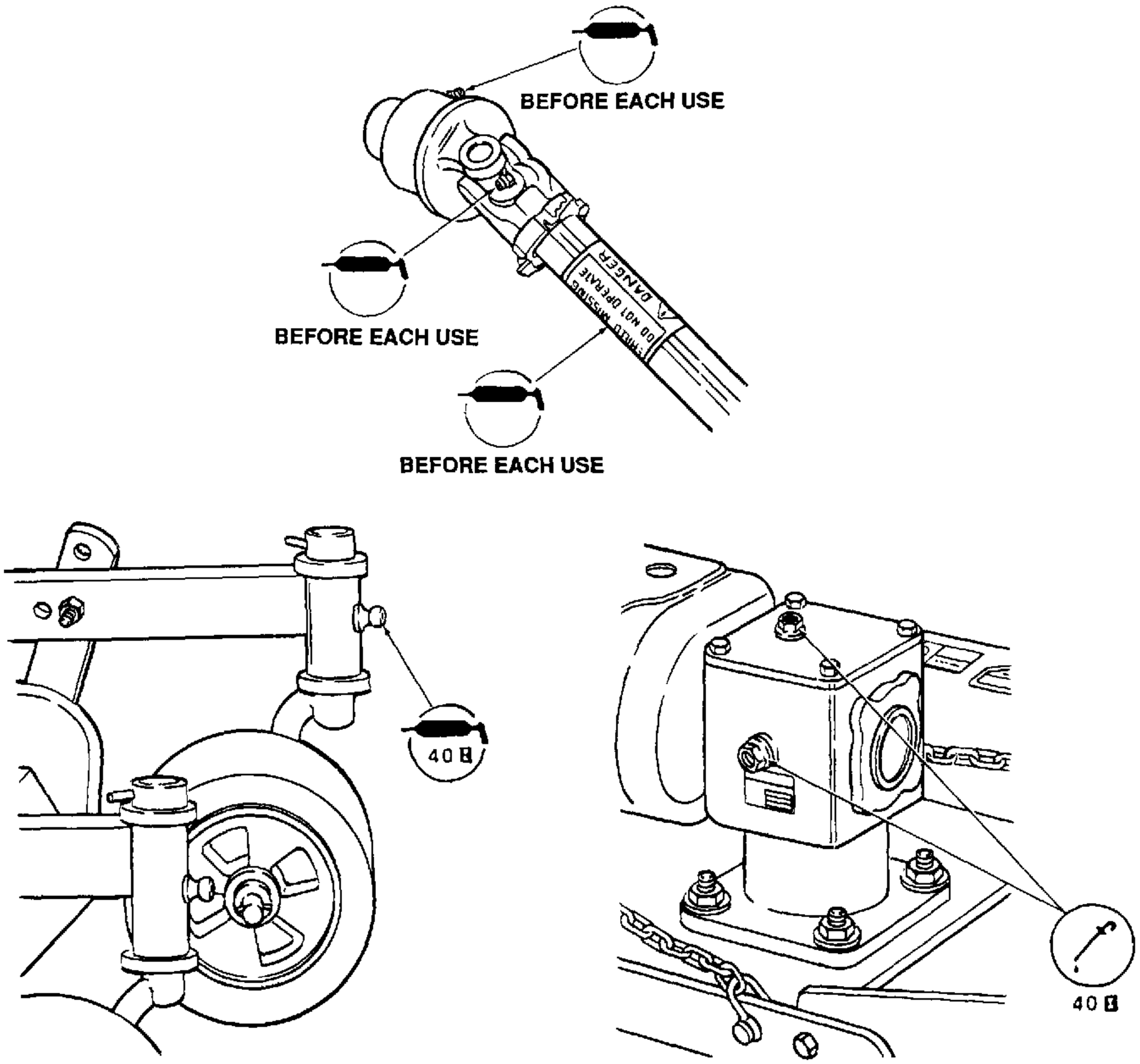


Figure 3-10. Model 349 Lubrication Points.

SECTION 4
TROUBLESHOOTING

4-1. GENERAL.

4-1.1 This section provides information regarding troubleshooting electrical problems (Table 4-1) and troubleshooting power steering components (Table 4-2).

NOTE

Refer to Appendix A to determine appropriate service manuals for troubleshooting the engines.

Table 4-1. Troubleshooting Guide

BASIC TYPES OF TROUBLE	PROBABLE CAUSES	POSSIBLE SOLUTIONS	REFER TO
Battery will not hold charge	Electrolyte (specific gravity)	Test each cell and evaluate condition: • All readings even at 1.225 or above — Battery O.K • All readings even, but less than 1.225 — Recharge and retest. • High-Low variation between cells less than 50 gravity points — Recharge and retest. • High-Low variation between cells exceeds 50 gravity points — Replace battery.	
	Battery (capacity)	Test capacity and evaluate condition: • Minimum voltage 9.6 for 12-volt battery (value under specified test load conditions). • If capacity is under minimum specifications, perform 3-minute charge test. If below maximum (15.5 volts for 12-volt battery, 75 amps, charge rate), battery is O.K. — Recharge. If above maximum, battery is sulfated. Slow charge at 1 amp/positive plate. Replace battery if it doesn't respond to slow charge.	
Voltage indicator light stays on	Battery cables or charging system wiring	Clean cables and terminals. Tighten loose connections. Repair or replace as required.	N/A
	Improper ground at sensor	Remove sensor and clean mating surfaces.	N/A
	Improper wire connections or defective voltage sensor	Check for correct wiring. Replace sensor.	Wire harness drawings

Table 4-1. Troubleshooting Guide (Continued)

BASIC TYPES OF TROUBLE	PROBABLE CAUSES	POSSIBLE SOLUTIONS	REFER TO
Fuses fail prematurely Short battery life Battery uses excessive water	Charging system wiring, including regulator	Tighten loose connections. Repair or replace wiring, as required. Check for grounds or shorted wires.	Wire drawings
High charging rate	Voltage regulator	Perform the voltage output tests to verify the condition of the regulator.	Engine service manual
Engine does not start	Battery, keyswitch or cable condition	Check battery voltage and condition of cables and keyswitch.	
	Solenoid defective or improperly grounded	Test for solenoid operation.	Separate solenoid test chart
PTO does not engage	Insufficient voltage	Check battery and charging rate from regulator.	
PTO engages but does not stay engaged when PTO switch is released	Reverse relay defective	Check relay for proper operation.	Separate relay test chart
	Defective switches	Check switches for proper operation.	Wire drawings
	Incorrect PTO air gap	Check for correct air gap.	

4-2. ELECTRICAL TROUBLESHOOTING.

4-2.1 Troubleshooting an electrical problem may involve any one or more of the components in the tractor's system: the stator, rectifier, regulator, battery, voltage sensor, all switches, relays and the complete wire harness including lights.

4-2.2 Use Table 4-1 as a guide for identifying troubles and suggesting probable causes and solutions.

NOTE

Battery failure is not always due to charging system defects. Excessive use of lights and PTO while the engine is running at a low speed, corroded battery cables and connectors, low battery water level or prolonged disuse of the battery, which would permit self discharge.....these are all probable causes which should be considered when a battery is run down or low in charge.

4-3. POWER STEERING TROUBLESHOOTING.

4-3.1 Refer to the following general troubleshooting information, Tables 4-1 and 4-2, and troubleshooting information in paragraph 4-3.4.

4-3.2 **Preparation.** Make your troubleshooting easier by preparing as follows:

1. Work in a clean, well-lighted area.
2. Have the proper tools and materials nearby.
3. Set aside a space where you can lay components, parts and tools.
4. Have an adequate supply of clean petroleum-based solvent.

WARNING

Since solvents are flammable, be extremely careful when using them. Even a small explosion or fire could cause injury or death.

Table 4-2. Power Steering System Troubleshooting Guide

STEERING PROBLEM	PROBABLE CAUSES	POSSIBLE SOLUTIONS	REFER TO
Steering unit sticky and/or lumpy	Stack bolts overtorqued	Replace steering unit if damage has resulted from overtorque. Otherwise retorque bolts to correct torque level.	Fig. 4-1/38
	Contamination causing valve plate to stick off center	Clean and flush hydraulic system. Install new hydraulic fluid and new filters. Replace steering unit.	Fig. 4-2/15
	Mounting bracket for steering unit bowed or distorted	Loosen steering mounting bolts. If problem ceases, replace steering bracket.	Fig. 4-2/9
	Steering column in bind (if unit has column assembly)	Loosen all mounting bolts. If problem ceases, realign column clamp hardware.	Fig. 4-2/2
	Steering system overheated	Check for possible restriction in steering circuit.	Fig. 4-3
Steering unit motorizes	Stack bolts overtorqued	Replace steering unit if damage has resulted from overtorque. Otherwise retorque bolts to correct torque level.	Fig. 4-1/37
	Contamination causing valve plate to stick off center	Clean and flush hydraulic system. Install new hydraulic fluid and new filters. Replace steering unit.	Fig. 4-3
	Steering unit mounting bracket bowed or distorted	Loosen steering mounting bolts. If problem ceases, replace bracket.	Fig. 4-2/9
	Steering column in bind (if unit has column assembly)	Loosen all mounting bolts. If problem ceases, realign column clamp hardware.	Fig. 4-2/2
	Steering system overheated	Check for possible restriction in steering circuit.	Fig. 4-3
Steering drifts or wanders	Worn front end parts	Replace worn parts.	Para. 5-21
	Steering cylinder piston seal worn	Replace steering cylinder.	Fig. 4-2/22
	Air in steering circuit	Check steering reservoir fluid level. Also check for loose fittings and/or leaky hoses.	Fig. 4-3
	Steering cylinder hose or fitting leaking	Replace leaky hose or fitting.	Fig. 4-3
	Improperly adjusted or worn wheel bearings	Readjust or replace wheel bearings.	Para. 5-21

NOTE

The cylinder is an unbalanced area cylinder and could drift slowly over a period of time.

Table 4-2. Power Steering System Troubleshooting Guide (Continued)

STEERING PROBLEM	PROBABLE CAUSES	POSSIBLE SOLUTIONS	REFER TO
No steering or hard steering	Hydraulic pump problem	Check pump pressures.	Para. 5-52B
	Air in steering circuit	Check steering reservoir fluid level. Also check for loose fittings and/or leaky hoses. Tighten fitting or replace hose.	Fig. 4-3
	Contamination causing steering unit to lock	Clean and flush hydraulic system. Install new hydraulic fluid and new filters. Tear down complete power steering column and check for wear.	Fig. 4-1
	Front end binding	Check front end. Replace any parts causing front end to bind.	Para. 5-21
	Power steering system overheated	Check for possible restriction in hydraulic circuit or low hydraulic oil reservoir level.	Fig. 4-2
	Vehicle overloaded	Remove excess weight. Never overload vehicle.	
Little or no tire movement when steering	Air in steering circuit	Check steering reservoir. Also check for loose fittings and/or leaky hoses. Tighten fitting or replace hose.	Fig. 4-3
	Power steering cylinder piston seal leaking	Replace steering cylinder.	Fig 4-2/22
	System relief valve set too low	Reset relief valve.	Para. 5-53, 5-54 or 5-55
	Insufficient pump flow	Replace pump if defective.	
External leaks	Power steering system over-pressurized	Check relief valve pressure. Replace steering unit and/or other circuit components if damaged. Otherwise replace leaky seal.	Para. 5-52B Fig. 4-1 also Hydro Section for pressure check
	Leaky hoses or fittings	Replace leaky hoses and/or tighten hoses. A leaky hose or fitting could appear as though the steering unit is leaking.	Fig. 4-3
	Hydraulic oil not compatible with seals	Use only *Cub Cadet* hydraulic oil.	
	Stack bolts not torqued to specification	Torque to specification.	
	Steering system overheated	Check for possible restriction in steering circuit.	Para. 5-3

NOTE

Hydraulic oil temperatures over 200°F can cause seals to shrink, harden or crack.

1. Hex Nut
2. Power Steering Cover and Check Valve Assembly (Includes Item 3)
3. Check Ball
4. Seal Ring
5. O-Ring
6. Port Manifold
7. Spring
8. Spring
9. Hex Drive Assembly
10. Needle Roller Kit (Includes Item 11)
11. Needle Roller
12. Valve and Ring Assembly
13. Isolation Manifold
14. Drive Link
15. Valve Plate
16. Screw
17. Commutator Cover Seal
18. Commutator Cover
19. Commutator (Matched part with Item 20)
20. Commutator Ring (Matched part with Item 19)
21. Drive Link Spacer
22. Rotor
23. Stator
24. Drive Plate
25. Spacer
26. Thrust Bearing
27. Face Seal
28. Back-Up Ring
29. Face Seal Spacer
30. Upper Cover Plate
31. Input Shaft Assembly
32. Retaining Ring
33. Washer
34. Retaining Plate
35. Upper Cover and Tube Assembly
36. Column Bearing
37. Column Dust Seal
38. Special Bolt
39. Metering Ring

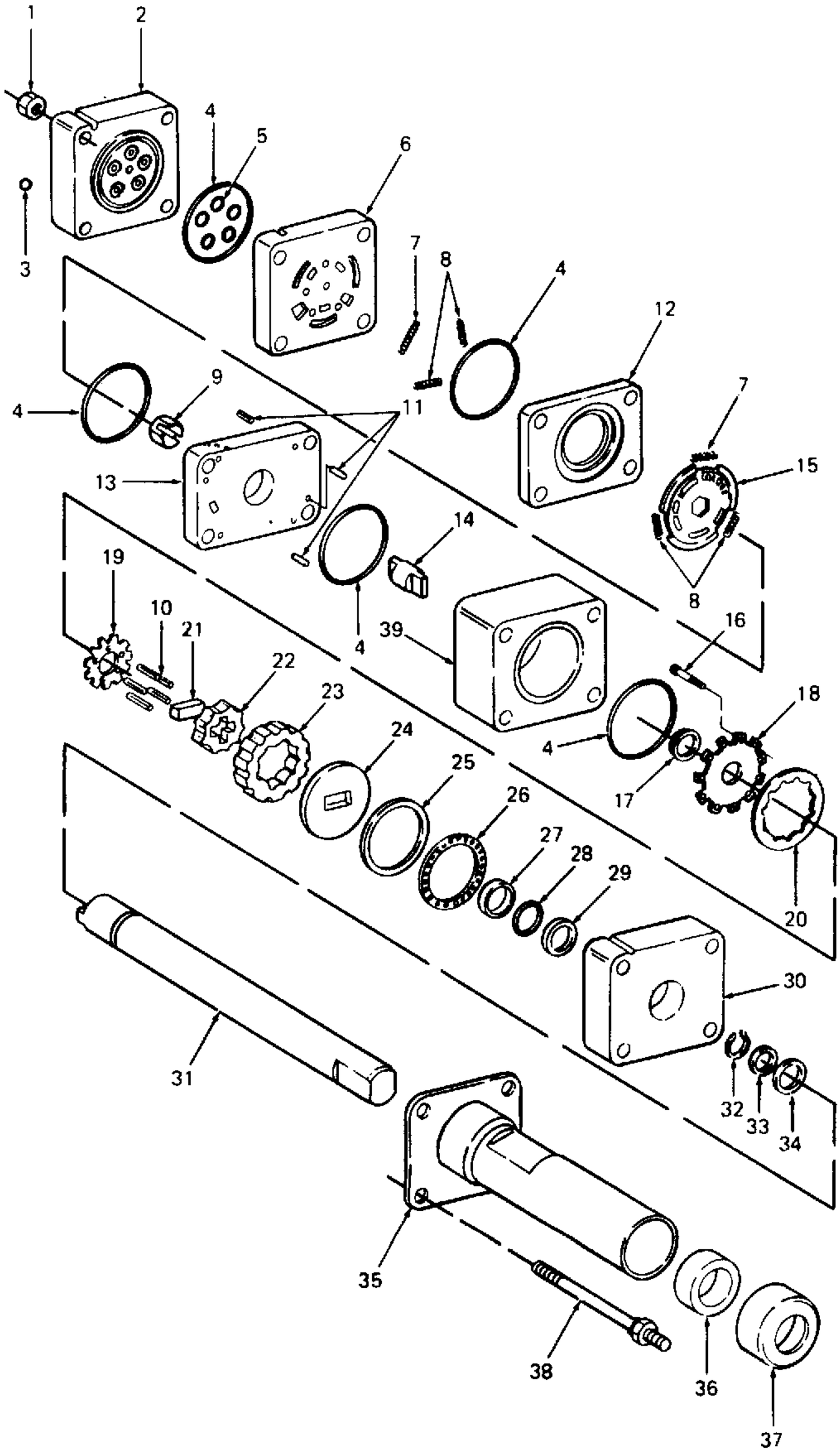
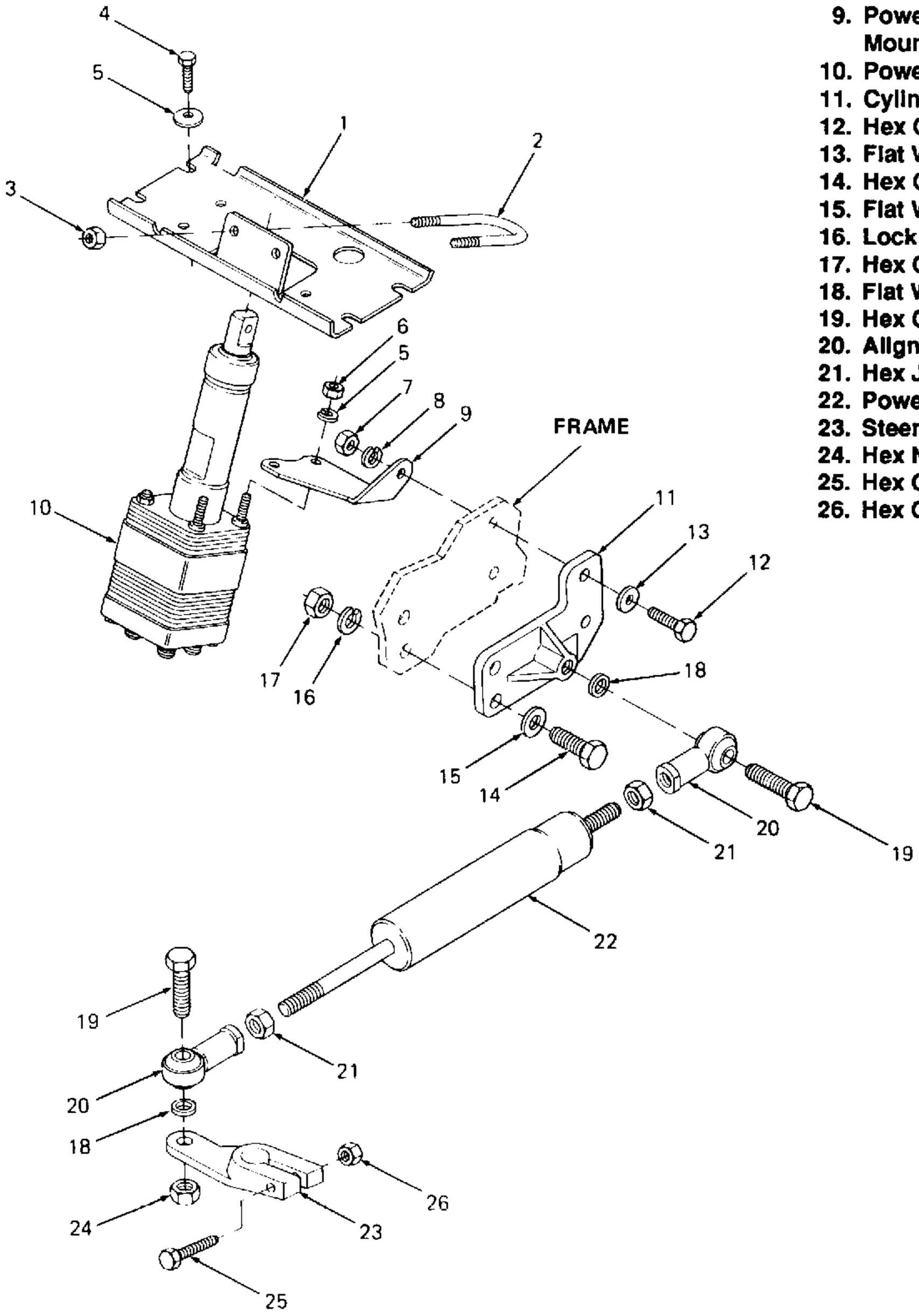
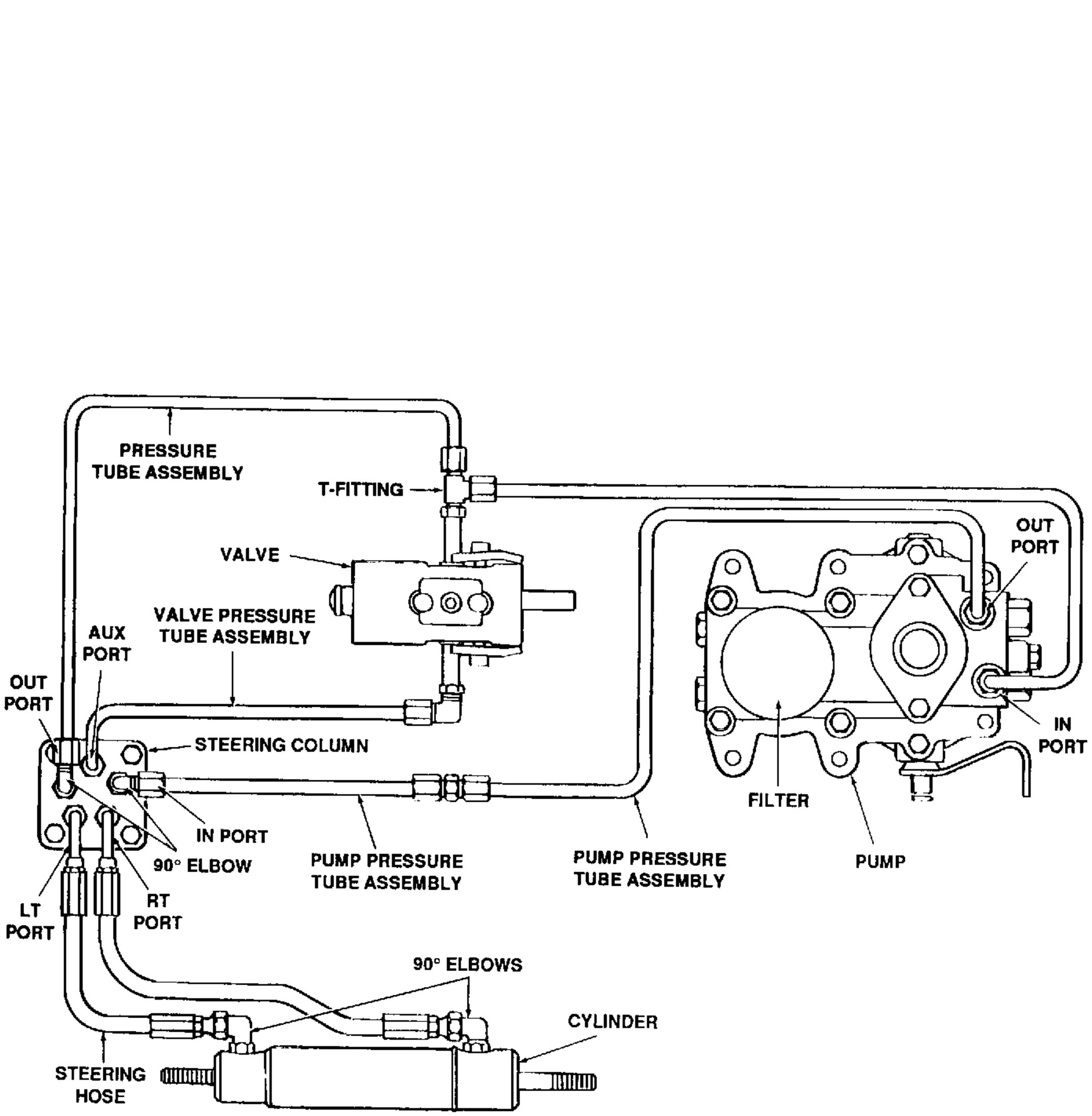


Figure 4-1. Power Steering Box Assembly.



1. Steering Support Plate
2. Clamp
3. Hex Center Lock Nut
4. Hex Cutting Screw
5. Bell Washer
6. Hex Nut
7. Hex Center Lock Nut
8. Lock Washer
9. Power Steering Box Mounting Bracket
10. Power Steering Box
11. Cylinder Mounting Bracket
12. Hex Cap Screw
13. Flat Washer
14. Hex Cap Screw
15. Flat Washer
16. Lock Washer
17. Hex Center Lock Nut
18. Flat Washer
19. Hex Cap Screw
20. Allgnaball End
21. Hex Jam Nut
22. Power Steering Cylinder
23. Steering Arm
24. Hex Nut
25. Hex Cap Screw
26. Hex Center Lock Nut

Figure 4-2. Steering Mounting.



NOTE

This diagram is for reference only. The tube assemblies are not shown with the correct bends.

Figure 4-3. Hydraguide Steering System.

WARNING

Wear eye protection and be sure to comply with OSHA or other maximum air pressure requirements.

4-3.3 **Preliminary Checks.** For all their complexity, hydraulic systems are often troublefree. It may be necessary to perform hydraulic tests on the pump and other hydraulic components. The steering problem that an operator is complaining about could be caused by something other than the hydraulic components. Thus once you have determined the problem and test driven the tractor (if possible), start with the easy-to-check items.

1. Tire conditions may affect steering abilities. Make sure tires are properly inflated.

   Front tires: 16 x 6.50-8 12 psi
   18 x 8.50-8 12 psi

   Rear tires: 23 x 10.50-12 12 psi
   26 x 12.00-12 12 psi

2. Make sure the tires show no signs of damage or severe wear, and that they are mounted properly.
3. Check steering and front end linkage for broken, loose or binding parts that could cause certain steering problems.
4. Make sure vehicle is not overloaded.
5. Check for parts damaged from impact that were not properly repaired, or that should have been replaced.
6. Check for improper replacement parts.
7. Check steering column for loose or binding component.

4-3.4 **Hydraulic Components.** If you think the problem is caused by a hydraulic component, start by checking the easy-to-reach items.

1. Check all hoses and lines for cracks, hardening or other signs of wear. Replace any unusable hoses that are kinked, severely bent or that rest against a rubbing surface. Look for leaks, especially at couplings.
2. Check fluid level at differential. Examine hydraulic filter for dents or leakage. Replace the filter if any damage is found or if the tractor is within the time standards for the filter to be changed.

4-3.4.1 Normal Noises.

- A low hissing from the hand pump during a turn.
- A noise from the system relief valve when the steering wheel is turned to either stop.
- Growl from the hydrostatic pump.

4-3.4.2 Abnormal Noise.

- A clicking noise during a turn may indicate that some component is loose and shifting under a load.

4-3.4.3 Tractor speeds up momentarily when the steering cylinder reaches the end of its stroke. May be caused by high implement relief pressure; check hydraulic pressure.

4-3.4.4 Excessive steering wheel movement after contacting the stops, may be caused by internal leak in the steering cylinder. This is normal.

4-3.5 The following information will assist in the repair of power steering components after a problem has been identified. Refer to Tables 4-3, 4-4 and Figure 4-4 before repairing power steering components.

4-4. DISASSEMBLY AND INSPECTION.

4-4.1 Preparation Before Disassembly.

1. Before you disassemble the Hydraguide unit or any of its parts, read this entire manual. It provides important information on parts and procedures you will need to know to service the unit.
2. When disassembling any of the parts, use a clean workbench. Wash all parts in clean petroleum based solvent and blow them dry. Keep each part separate to avoid nicks and burrs.

WARNING

Since solvents are flammable, be extremely careful when using them. Even a small explosion or fire could cause injury or death.

WARNING

Wear eye protection and be sure to comply with OSHA or other maximum air pressure requirements.

WARNING

Remove steering wheel with a steering wheel puller after removing wheel nut. Do not loosen with hammer, as this could damage unit internally.

Table 4-3. Steering Column Troubleshooting Guide

STEERING PROBLEM	PROBABLE CAUSES	POSSIBLE SOLUTIONS	FIGURE 4-1 REFERENCES
High steering efforts	Face seal damage due to contamination	Replace face seal.	27
	Eccentric commutator ring	Disassemble from commutator and realign ring.	20
	Incorrect or improperly installed valve springs	Replace as required.	7 and 8
	Commutator cover seal installed upside down	Disassemble and correct.	17
	Section alignment pins not installed	Disassemble and correct.	11
	Insufficient pump flow or pressure	Correct input flow problems. Replace pump or relief circuit.	
	Check ball leaking	Reseat or replace check ball.	3
	Port O-ring leaking	Replace all small O-rings.	5
	Contamination	Disassemble and inspect all parts for damage. Replace any damaged parts.	
	Column binding	Eliminate misalignment. Replace any bent part.	
Excessive slippage or leakage (steering drift)	Excessive rotor set tip clearance	Replace rotor set.	22, 23
	Missing or damaged commutator seal	Replace as required.	17
	Valve plate upside down or damaged	Disassemble and correct or replace valve set.	15
	Cylinder piston seal failure	Replace steering cylinder.	
Excessive internal leakage	Check ball leakage	Reseat or replace check ball.	3
	Excessive valve clearance	Replace valve set.	12 and 15
	Damaged valve or isolation manifold edges	Replace as required.	13 or 15
Valve sticks (will not recenter or return to idle pressure)	Pinched or broken valve springs	Replace as required.	7 and 8
	Overtight stack bolts	Loosen and retorque to 18-22 ft-lbs.	38
	Contamination	Disassemble and inspect all parts for damage. Replace any damaged parts.	
	Column damage or misalignment	Correct binding condition or replace column.	

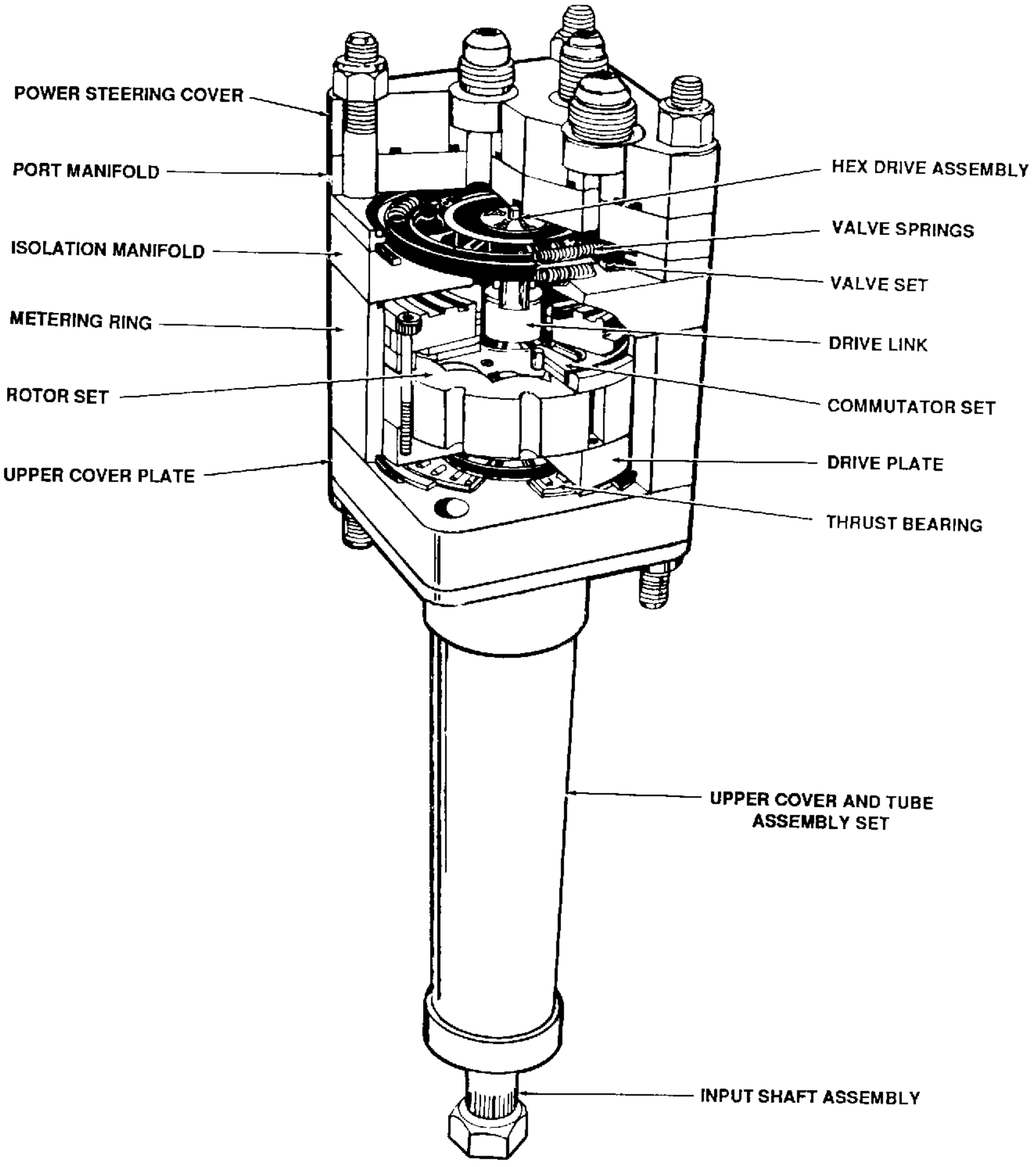


Figure 4-4. Power Steering Design Features.

Table 4-4. Tools and Materials Required for Servicing

Service assembly, fixture
(See Figure 4-5)

Clean, petroleum-based solvent

Vise

Pliers

Screwdriver

Blunt ended punch

6 pieces of .007 inch (.18 mm) shim stock, approximately .5 inch (13 mm) wide x 1.5 inch (38 mm) long

External retaining ring pliers

Plastic electrical tape

Breaker bar

1/2 inch sockets

3/32 inch Allen wrench socket

T-30 Torx socket

Slot type screwdriver socket

5/16-24 UNF hex nut (4 required)

3/4 inch (19 mm) to 7/8 inch (22 mm) bearing puller

Clean grease

Lightweight oil

Torque wrenches: 11 to 13 in-lbs and ft-lbs or Newton Meter

Feeler gauge: .003 in. (.08 mm) or .005 in. (.13 mm) (See disassembly procedure 35)

Electrical continuity checking device

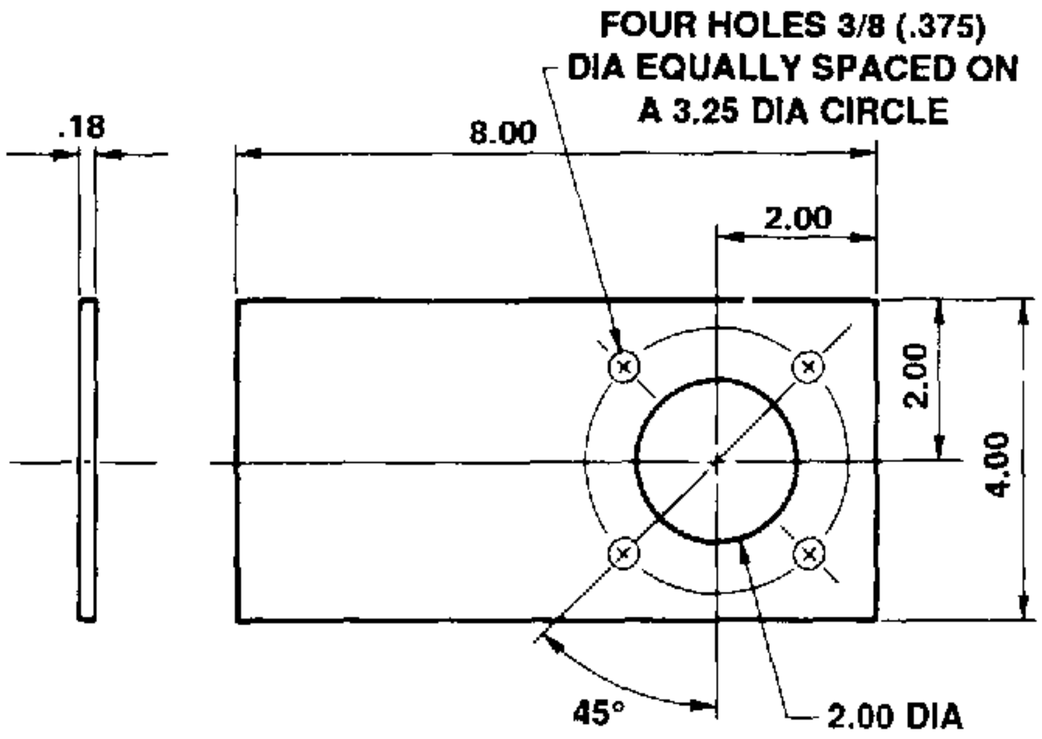


Figure 4-5. Service Assembly Fixture (To be fabricated by customer).

3. Before you disconnect any hoses, clean off all outside dirt from around the fittings. Plug the port holes and hoses immediately after you disconnect the hoses and before you remove the unit from the vehicle. This is to prevent foreign matter from entering the unit and damaging it when you clean and reassemble it.

4. Remove any contact brush cover, contact brush cover seal and related screw and lock washers, and disconnect any horn wire connection to the unit. Next, remove nuts from the mounting bolts, blow the unit dry and place it on a workbench.

5. Components throughout this assembly are stacked on four bolts and held in alignment with needle rollers designed to be a slip fit into the components. Use the minimum force necessary and maximum care to separate or assemble the components.

6. The Hydraguide unit has several components that are of brazed laminate construction, places and parts bonded together permanently to form an integral component that is not subject to disassembly for service. Disassemble the unit only to the extent shown in this manual.

CAUTION

Do not force or abuse closely fitted parts or you may damage them. Use only genuine OEM approved service parts.

4-4.2 **Disassembly and Inspection Procedures.**

1. To avoid distorting or damaging the unit, do not clamp it directly into a vise. Clamp a service assembly fixture, described in Figure 4-5, securely in a vise, see Figure 4-6, and place the unit, input shaft/wheel tube first, into the service assembly fixture. Attach the unit to the fixture with four 5/16-24 UNF nuts. See Figure 4-7.

NOTE

Before beginning the disassembly of unit, study the relative positions of the alignment grooves on the side of the components in the assembly. (Also refer to Figure 4-94.)

2. Remove the four retaining nuts (1, Figure 4-1) from the power cylinder cover (2) assembly. Be careful not to damage the protruding ports. See Figure 4-8. Replace any nut that has damaged threads or hex.

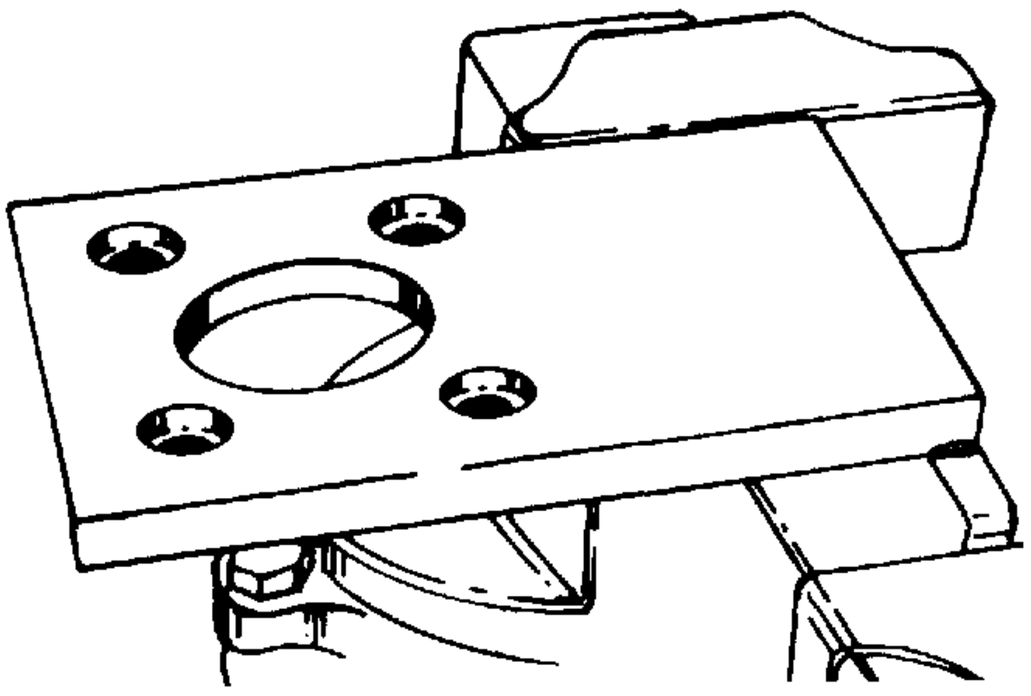


Figure 4-6. Placing Unit in Service Fixture.

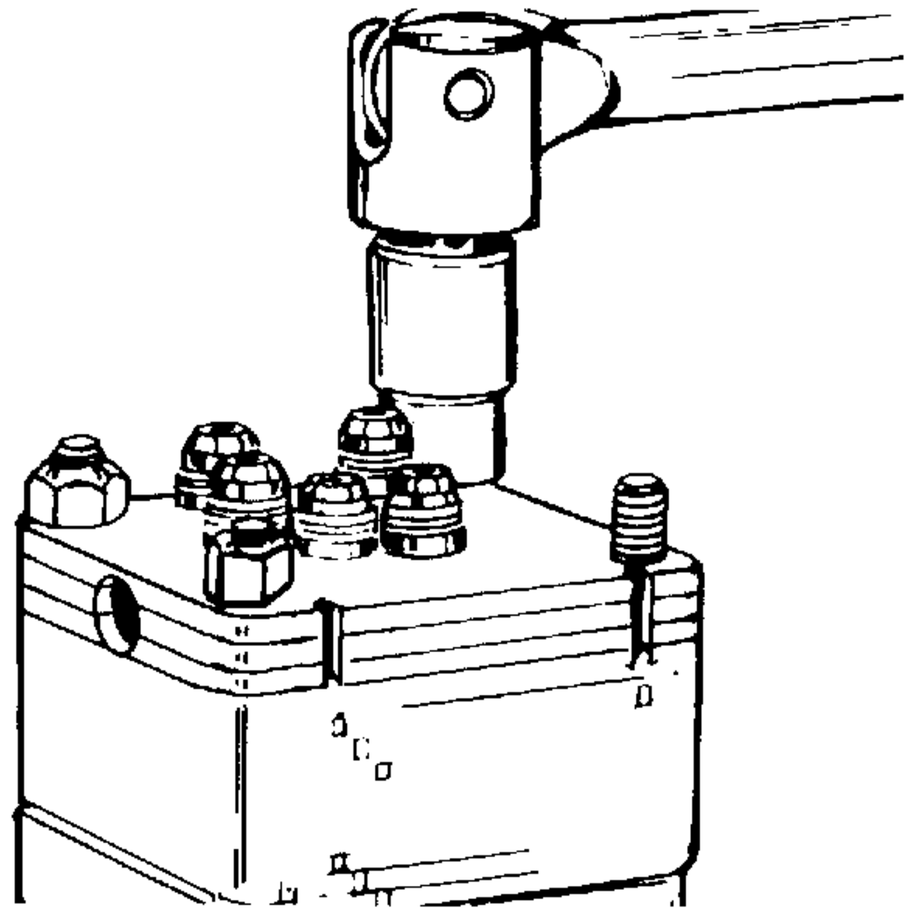


Figure 4-8. Power Cylinder Cover Nuts.

3. Grasp the power cylinder cover (2, Figure 4-1) assembly (four plates bonded together) and lift it from the unit. Discard the four or five O-rings (5) and seal ring (4). See Figure 4-9.
4. Be ready to catch the steel check ball (3, Figure 4-1) as it falls from its cavity.
5. Inspect the power cylinder cover (2) for port fitting sealing surface scratches and thread damage. Replace cover if these conditions are evident.

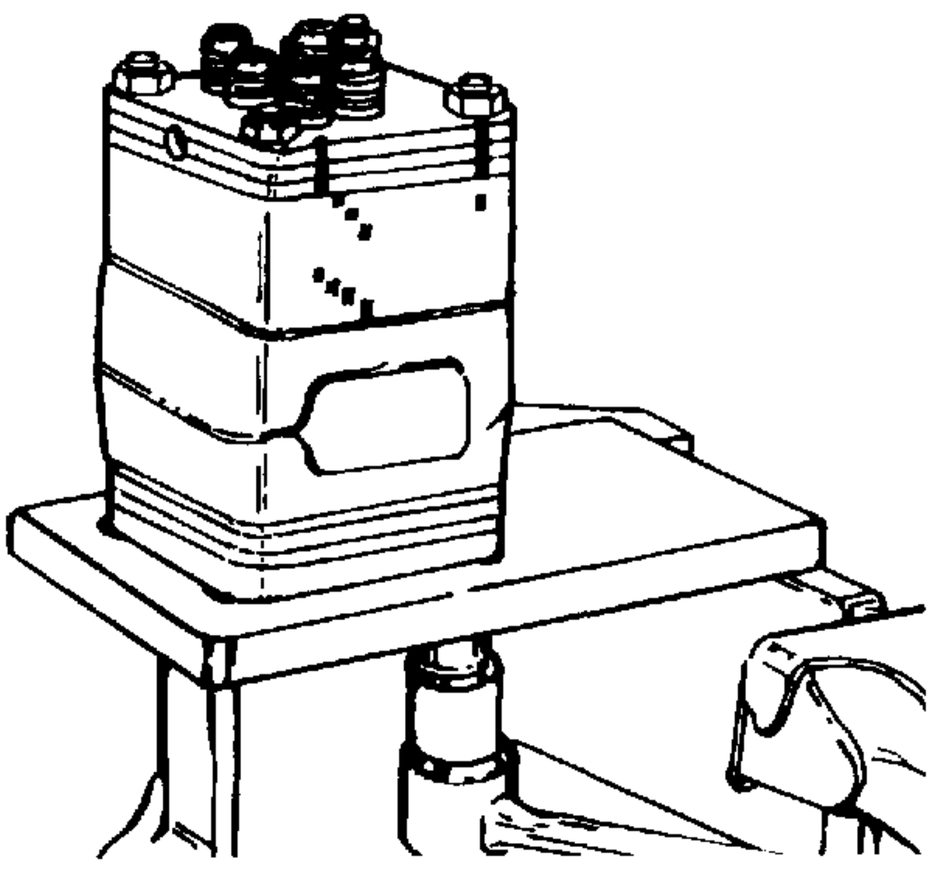


Figure 4-7. Attaching Unit to Fixture.

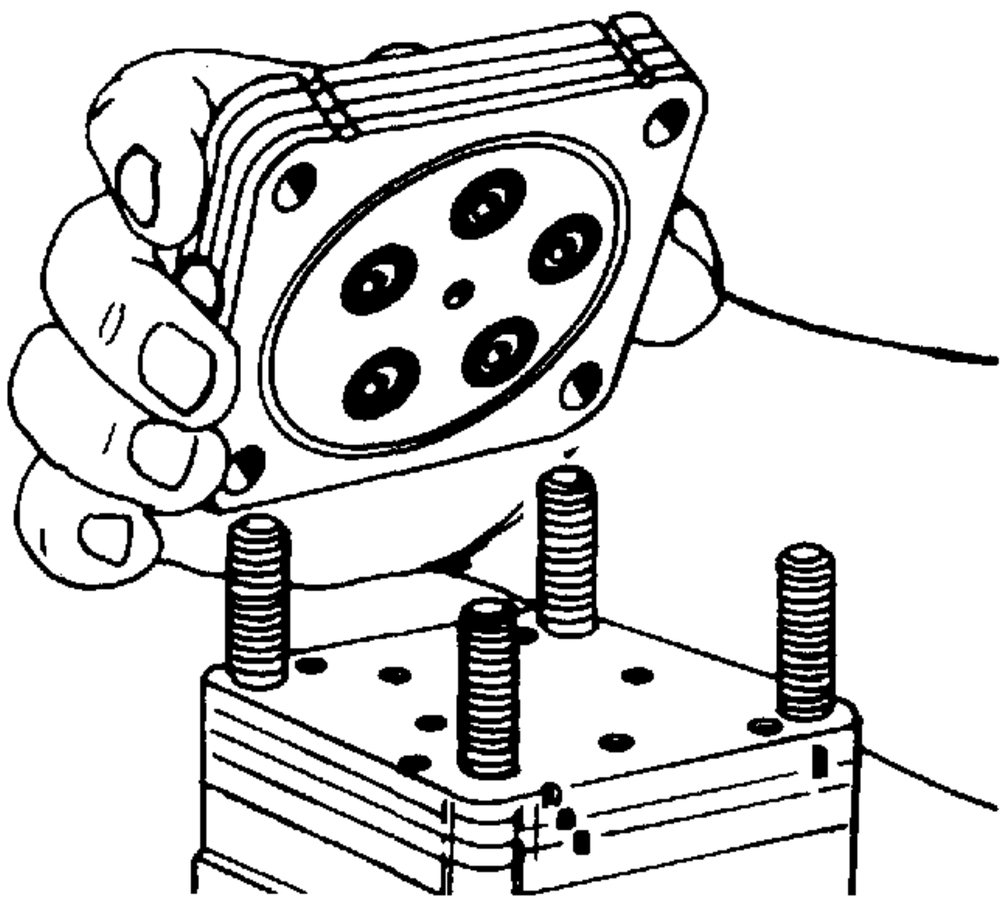


Figure 4-9. Removing Power Cylinder Cover.

6. Carefully lift the port manifold (6) (3 plates bonded together) from the unit. See Figure 4-10.

NOTE

Be prepared to catch three springs (7, Figure 4-1) which may become disengaged when removing the port manifold (6).

7. Remove three springs (7) from the port manifold (6).

NOTE

The unit has two different length spring sets. The set (7) you have just removed from the port manifold (6) is .75 inch (19 mm) long. Keep this set of three springs separate from the next set of three springs to be removed.

8. Inspect the springs for bent or distorted coils. If a spring is broken or deformed, all six springs in the unit should be replaced.

9. Inspect the ground surfaces of the port manifold (6). You should notice a normal polished pattern due to the rotation of the valve plate (15) and hex drive assembly (9). All edges should be sharp and free of nicks and burrs. The surfaces of the port manifold should be free of scratches or scoring. If any of these wear conditions exist, replace the port manifold.

CAUTION

Many components in the unit have finely ground surfaces. Be careful not to nick or scratch these surfaces.

10. Remove valve ring (part of 12). Discard the two seal rings (4). See Figures 4-11 and 4-12. The valve ring should be free of nicks and scoring.

11. Remove the valve plate (15, Figure 4-1) by lifting it from the isolation manifold (13).

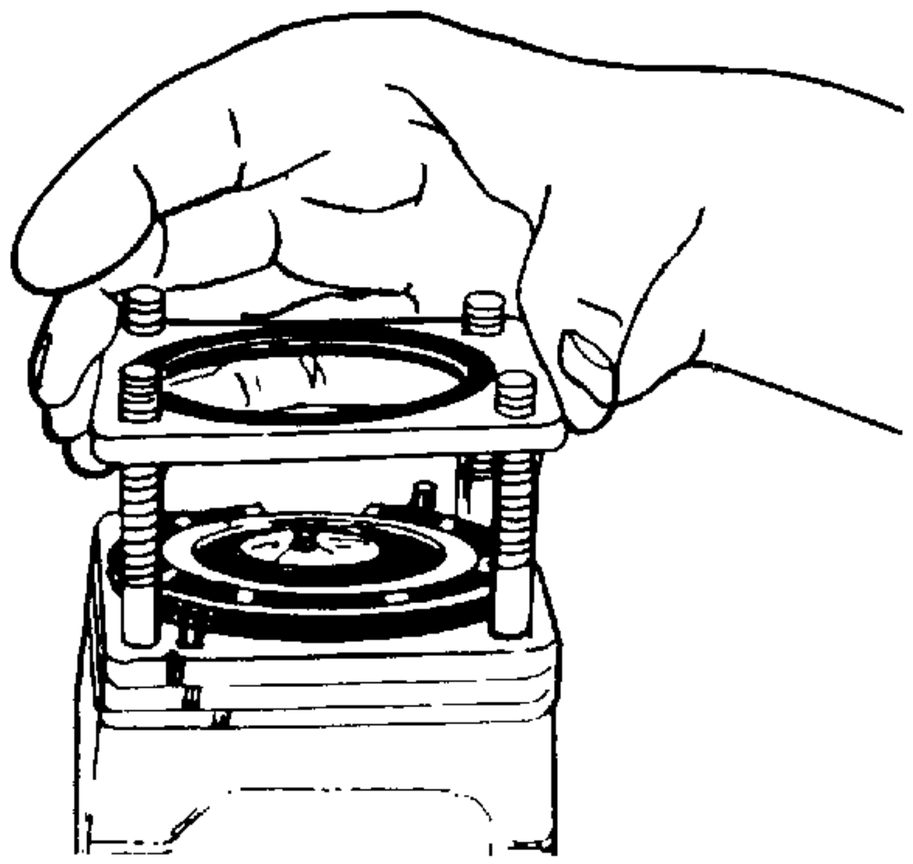


Figure 4-11. Removing Valve Ring.

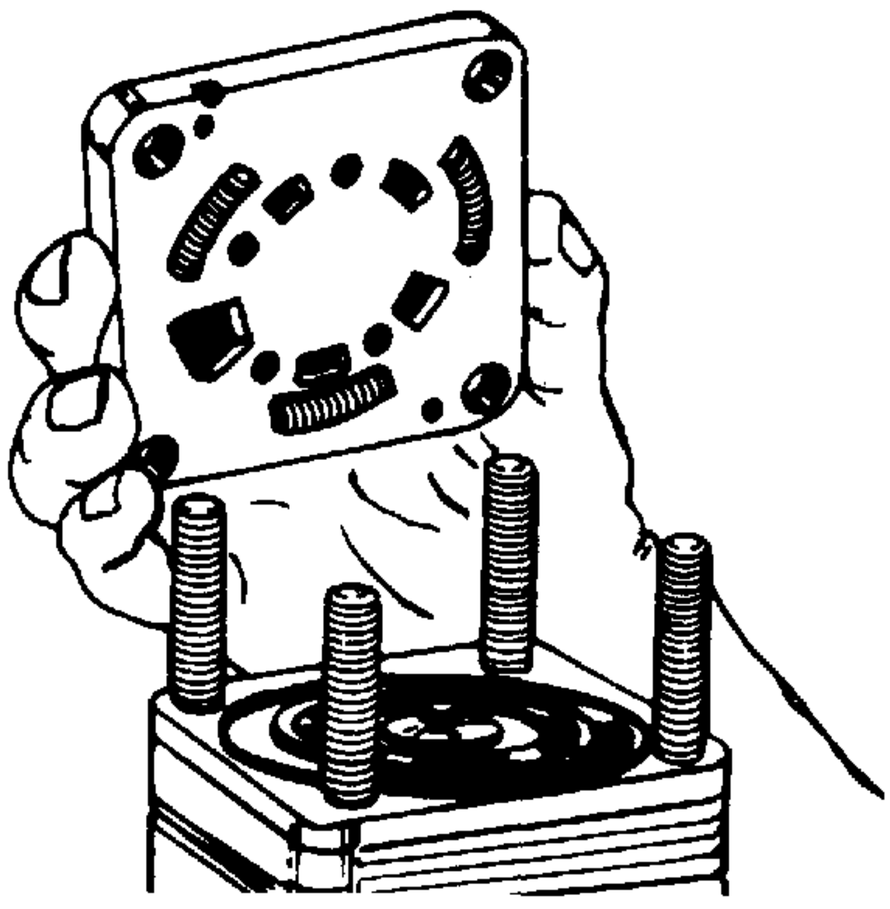


Figure 4-10. Removing Port Manifold.

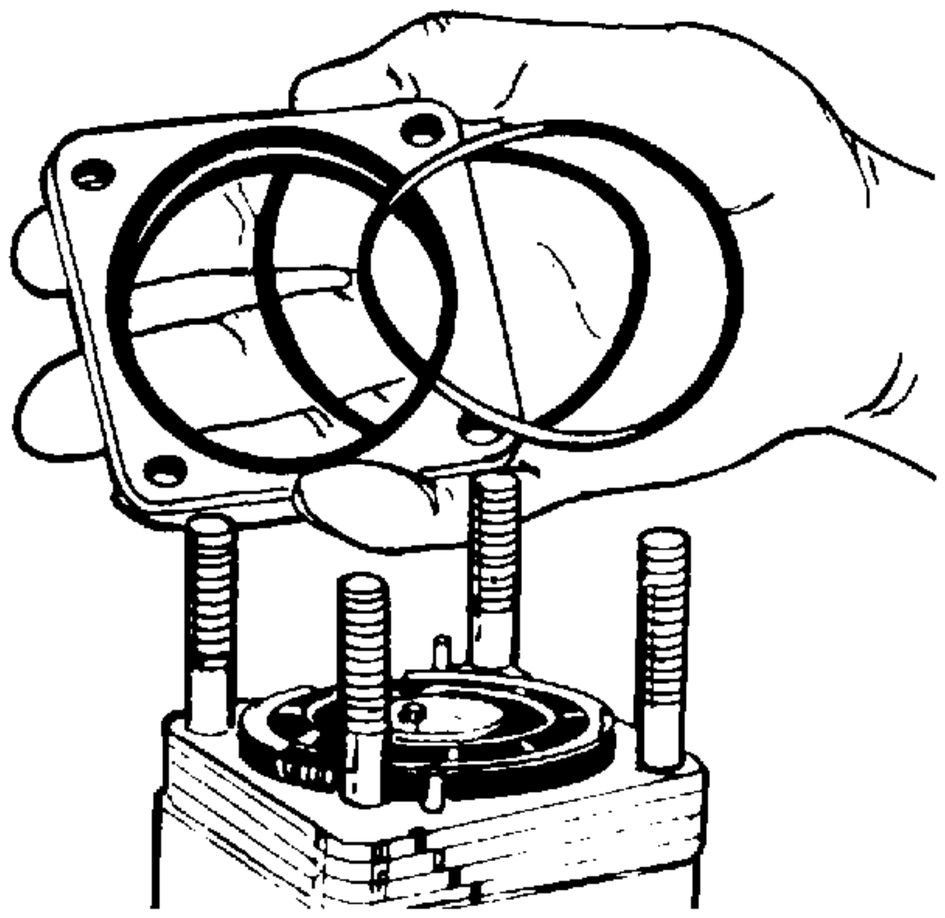


Figure 4-12. Removing Seal Rings.

12. Inspect the slot edges and ground surfaces of the valve plate (15). If the valve plate shows nicks or scoring or the edges are not sharp, it must be replaced. See Figure 4-13.

NOTE

The valve ring (12, Figure 4-1) and valve plate (15) are a matched set and must be replaced as a set.

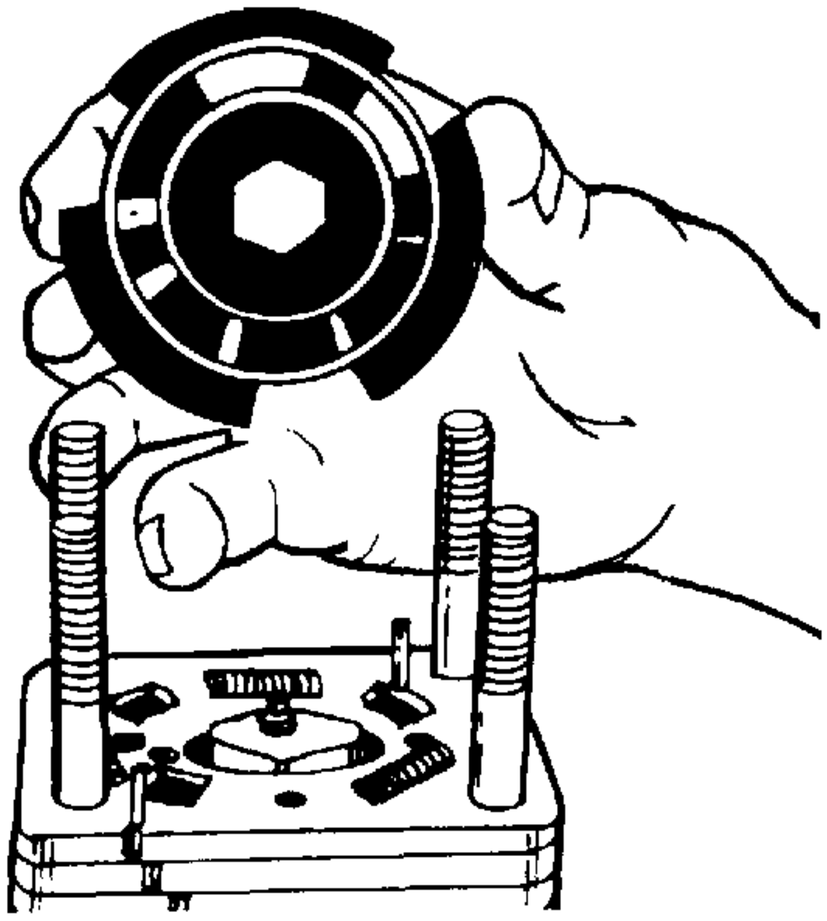


Figure 4-13. Inspecting Valve Plates.

13. Remove three springs (8) from the isolation manifold (13) pockets. See Figure 4-14.

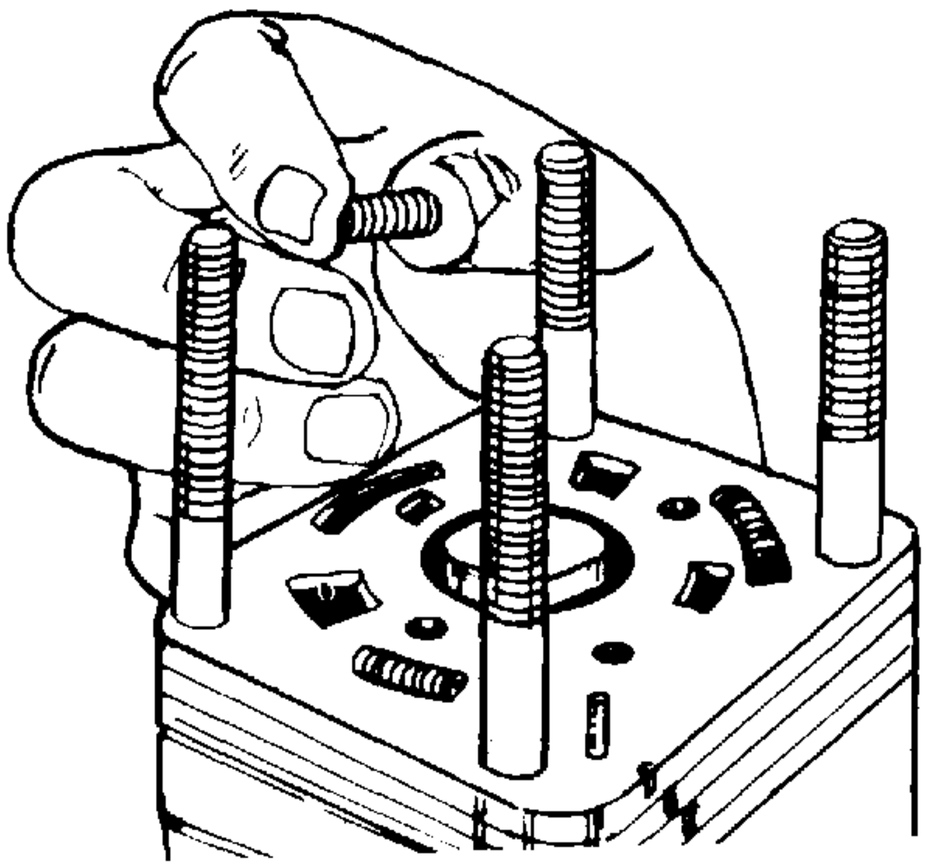


Figure 4-14. Removing Springs From Isolation Manifold.

NOTE

The unit has two different length spring sets. The set (8, Figure 4-1) you have just removed from the isolation manifold is .5 inch (13 mm) long. Keep this spring set separate from the set removed from the port manifold (6).

14. Inspect the springs (7 and 8) for bent or distorted coils. If a spring is broken or deformed, all six springs in the unit must be replaced. See Figure 4-15.

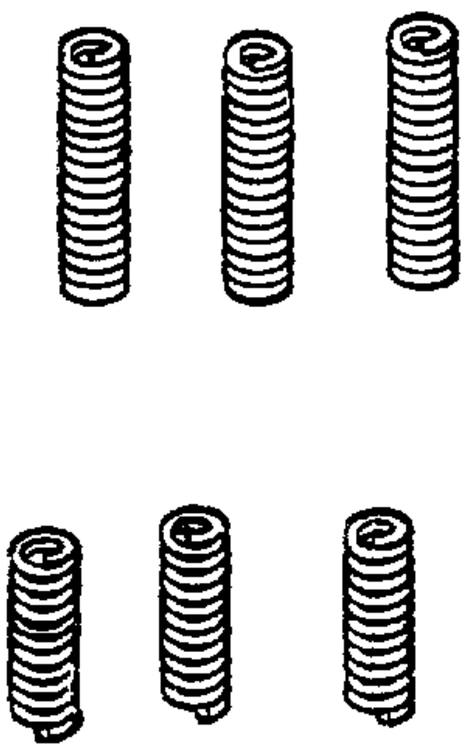


Figure 4-15. Inspecting Springs.

15. Remove hex drive assembly (9, Figure 4-1) from drive link (14). See Figure 4-16.

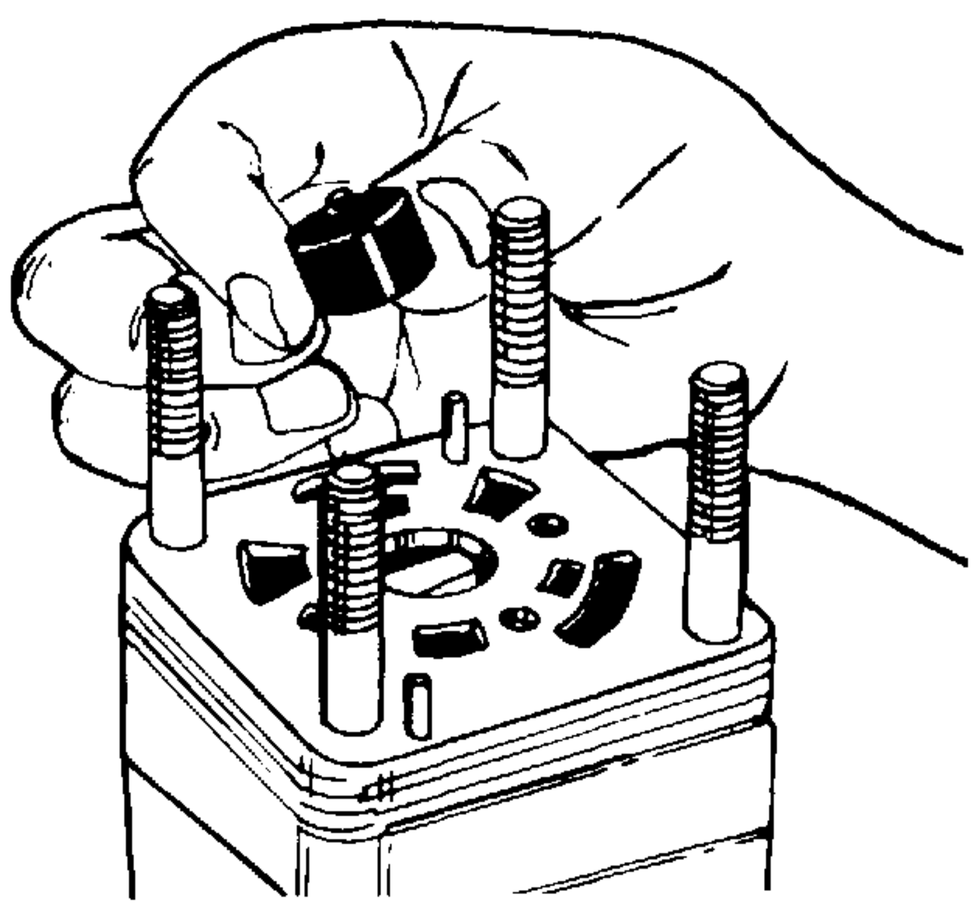


Figure 4-16. Removing Hex Drive Assembly.

16. The pin in the hex drive assembly (9, Figure 4-1) should not show wear and must be firmly pressed in place. The sides of the hex and the slot should not have grooves or scoring. If the hex drive assembly (9) shows signs of this type of wear, it must be replaced.

17. Remove the two needle rollers (11) that align port manifold (6), valve ring (12) and isolation manifold (13). See Figure 4-17.

NOTE

A service kit of nine needle rollers (11, Figure 4-1) is available for servicing the unit.

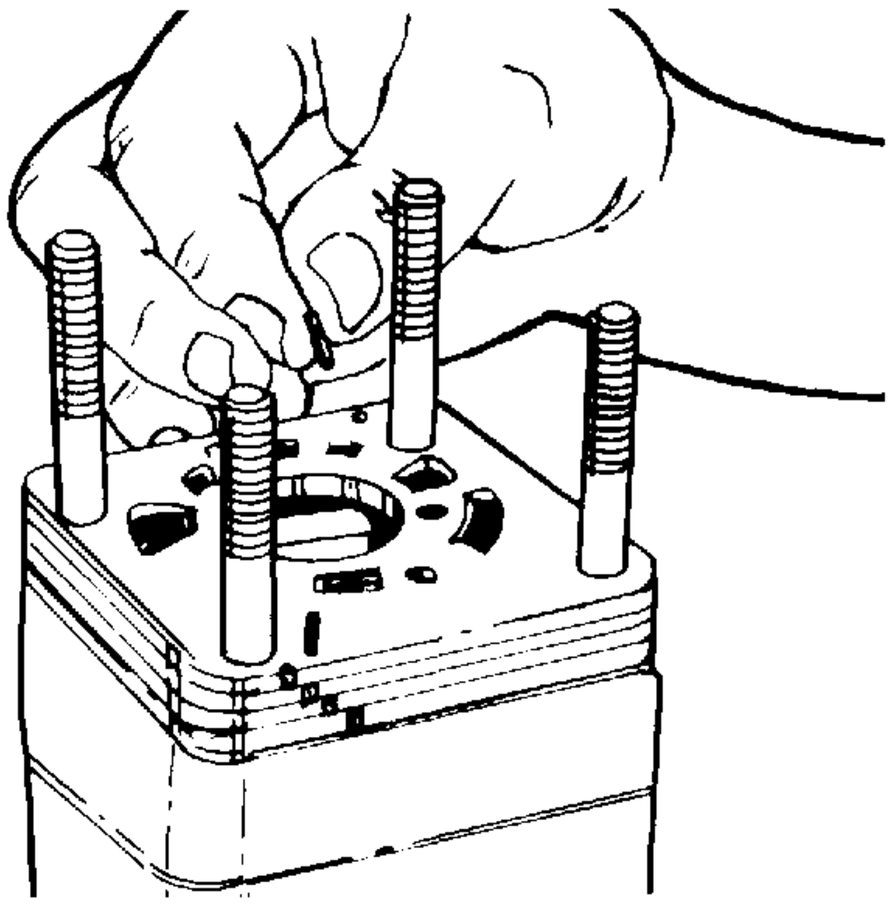


Figure 4-17. Removing Needle Rollers.

18. Remove isolation manifold (13) (four plates bonded together). See Figure 4-18.

19. Inspect the ground surfaces of the isolation manifold (13, Figure 4-1). You should notice a normal polished pattern due to the rotation of the valve plate (15) and on the opposite side a normal polished pattern due to the action of the commutator cover (18) and commutator cover seal (17). The holes and edges should be free of nicks. The manifold surfaces should be free of nicks or scoring. If the manifold has developed any of these conditions, it must be replaced.

20. Remove the two isolation manifold-metering ring needle rollers (11). See Figure 4-19.

21. Remove drive link (14, Figure 4-1) from the unit. See Figure 4-20.

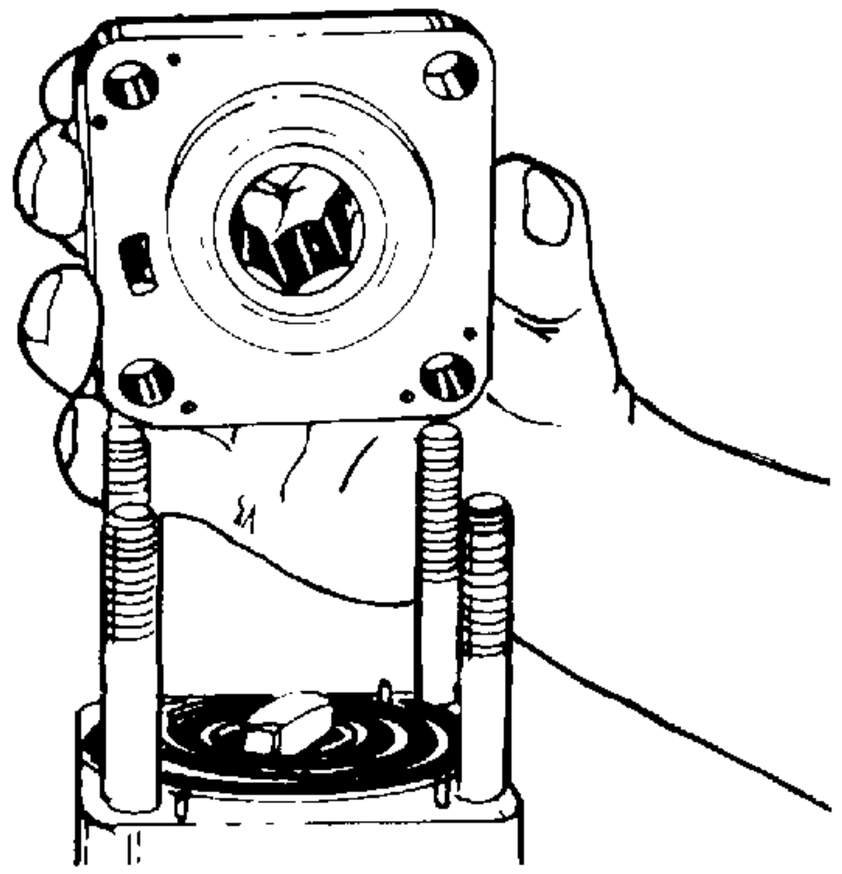


Figure 4-18. Removing Isolation Manifold.

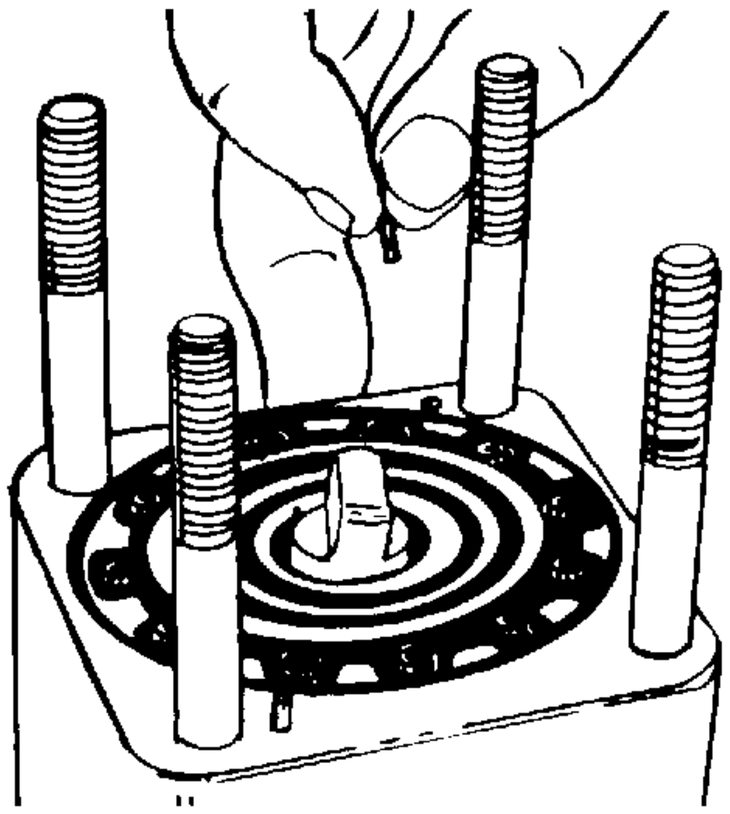


Figure 4-19. Removing Needle Rollers.

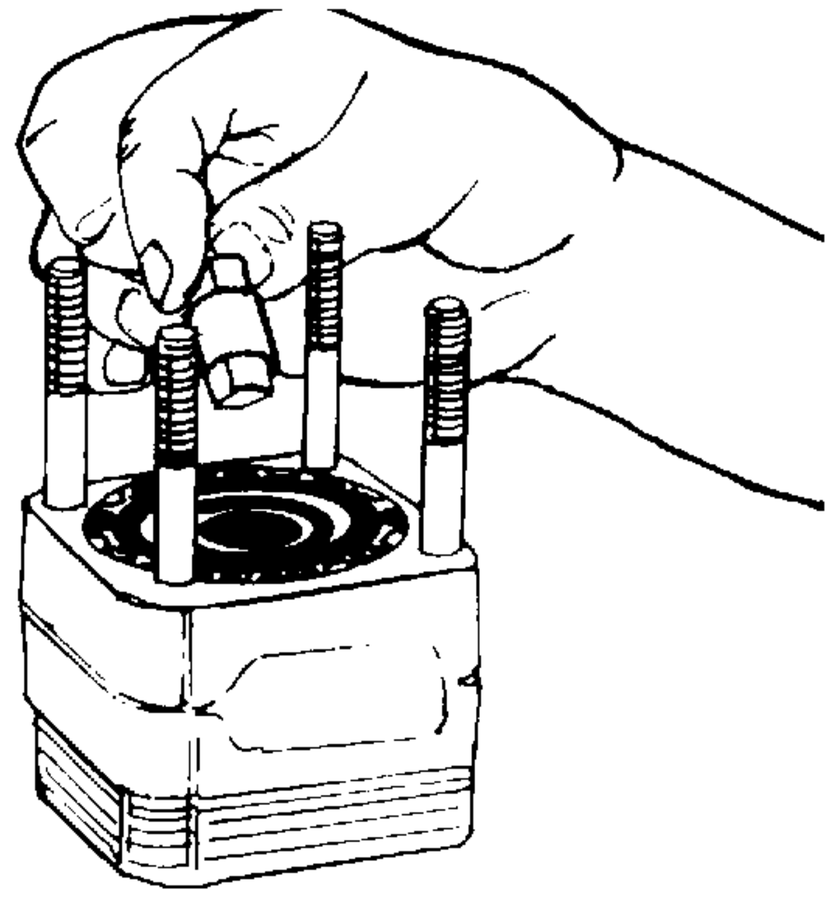


Figure 4-20. Removing Drive Link.

22. Inspect each end of the drive link (14, Figure 4-1). The four crowned contact surfaces should not be worn or scored. Replace if wear or scoring is evident.

23. Remove metering ring (39) and discard the two seal rings (4). See Figure 4-21. If the metering ring bore is scored, it should be replaced.

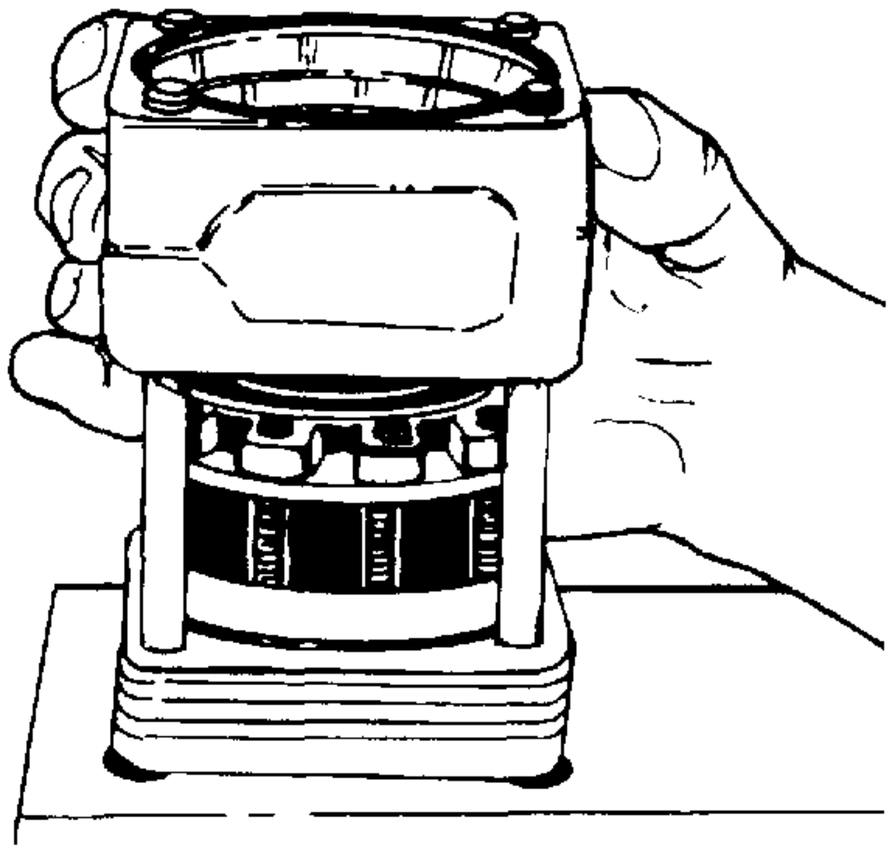


Figure 4-21. Removing Metering Ring.

24. The metering package components are held together with eleven hex socket head screws. Lift the metering package from the assembly, and place it on a clean surface. See Figure 4-22.

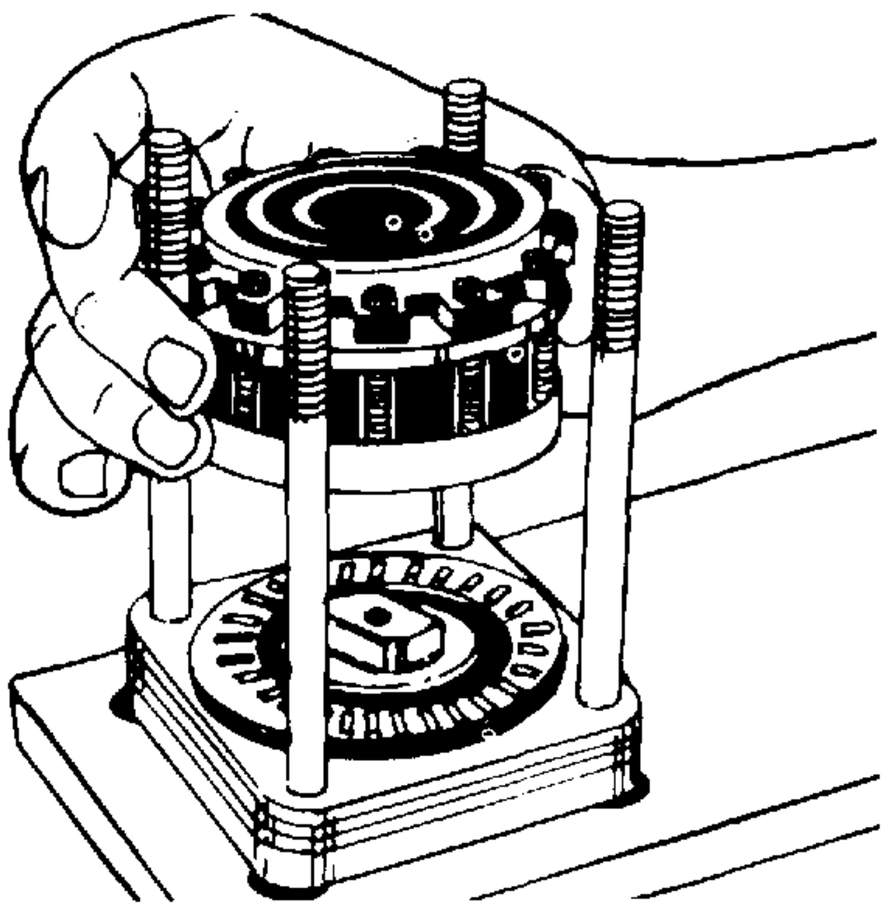


Figure 4-22. Removing Metering Package.

CAUTION

Do not clamp the metering package in vise as this could damage the components.

25. Remove and discard the commutator cover seal (17, Figure 4-1) from the commutator cover (18). See Figure 4-23.

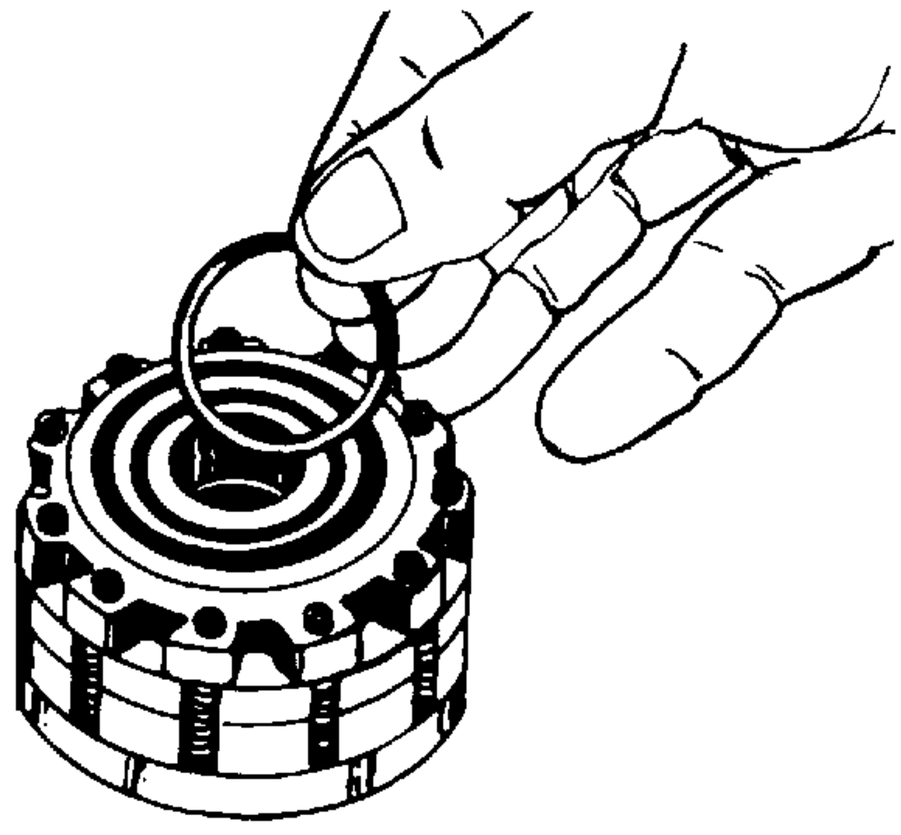


Figure 4-23. Removing Commutator Seal.

26. Remove the eleven hex socket head screws (16, Figure 4-1) that hold the metering package together. See Figure 4-24. Use a 3/32 inch Allen wrench. Inspect screws for thread and socket damage and replace as required.

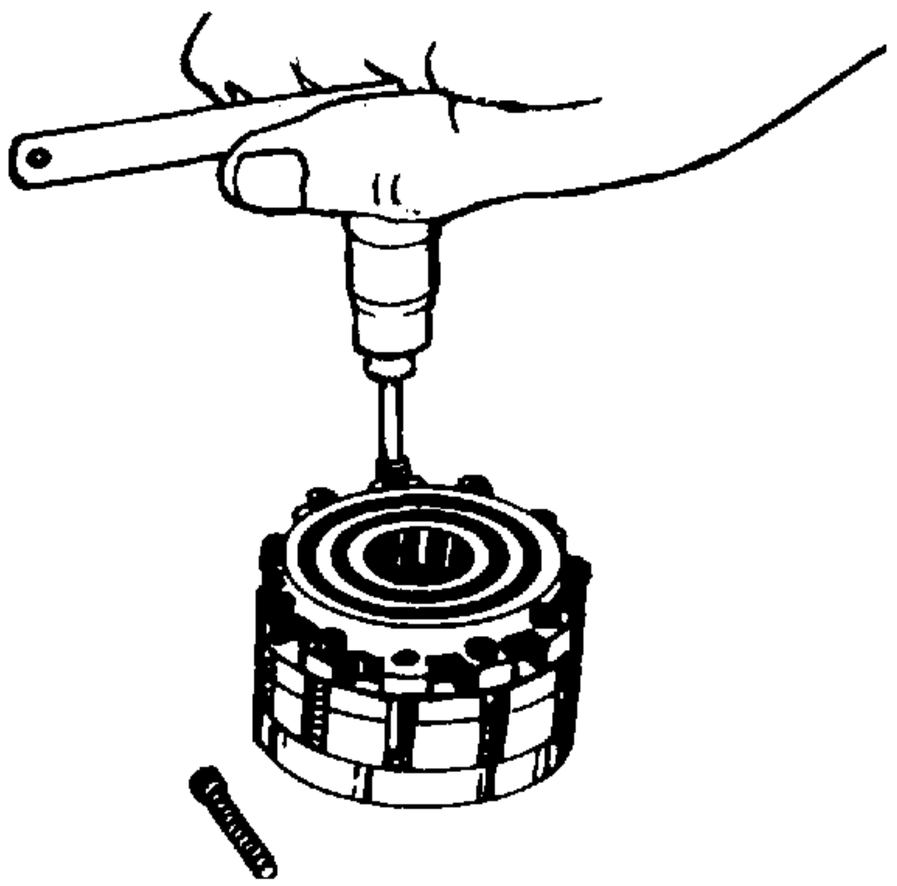


Figure 4-24. Removing Hex Socket Head Screws.

27. Lift the commutator cover (18, Figure 4-1) from the metering package.

28. Inspect the ground surfaces of the commutator cover (18). You should notice a normal polished pattern due to the rotation of the commutator (19). If the cover has nicks, burrs or scoring, it must be replaced. See Figure 4-25.

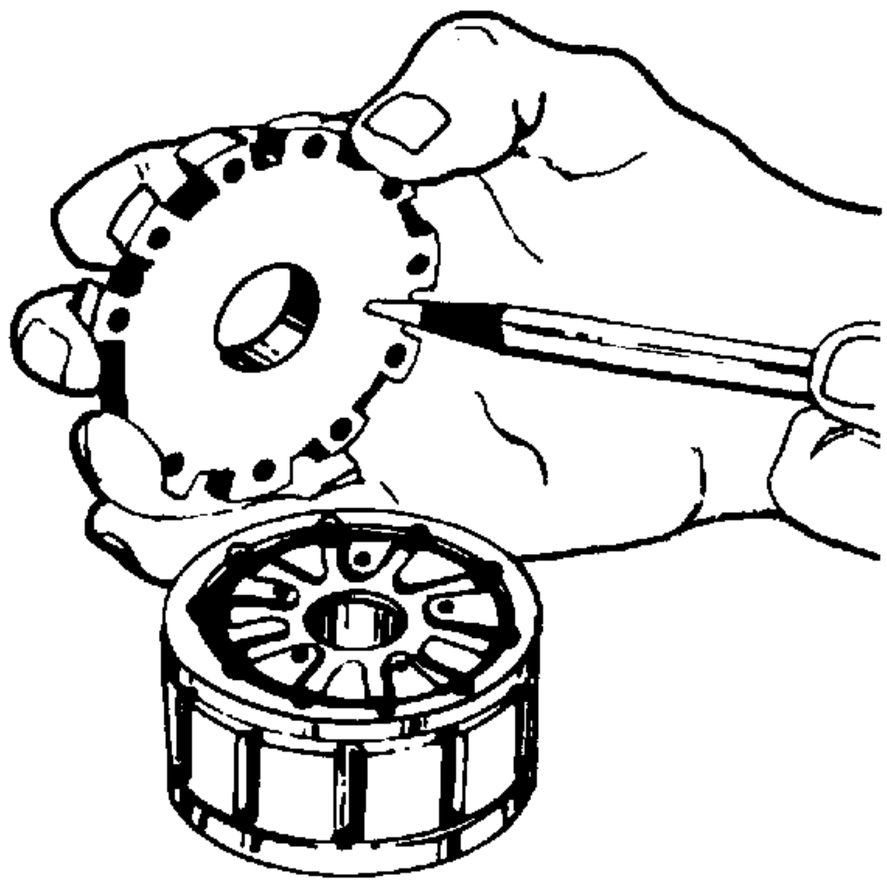


Figure 4-25. Inspecting Commutator Cover.

29. Remove commutator ring (20, Figure 4-1). See Figure 4-26. Inspect for cracks, burrs and scoring.

CAUTION

Handle commutator ring with care as it is easily broken.

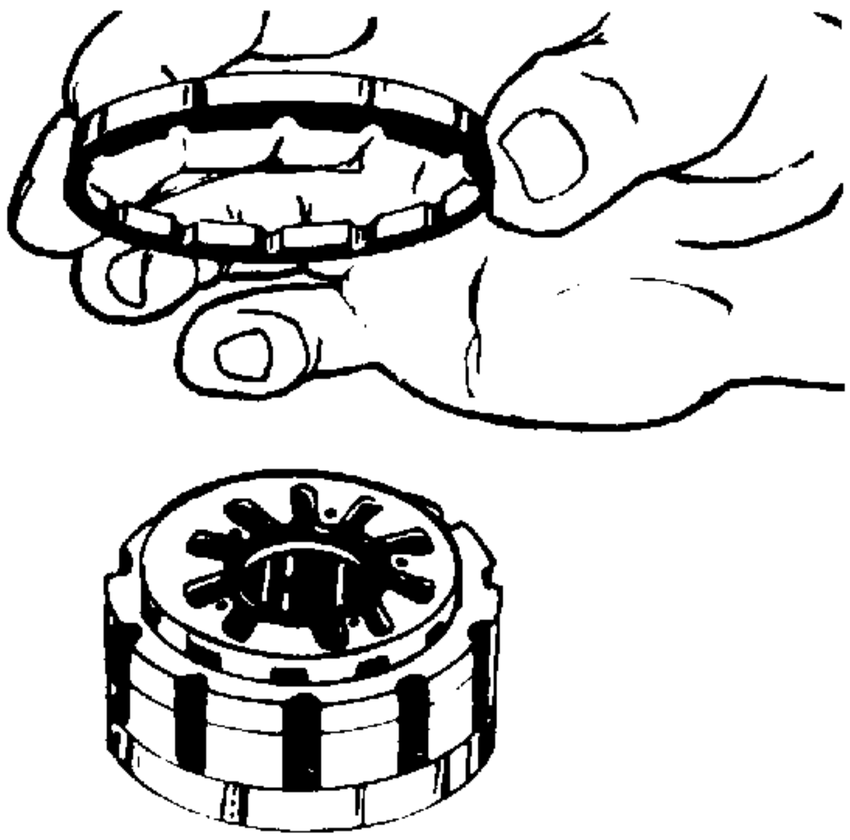


Figure 4-26. Removing Commutator Ring.

30. Remove the commutator (19, Figure 4-1) from the rotor (22). See Figure 4-27.

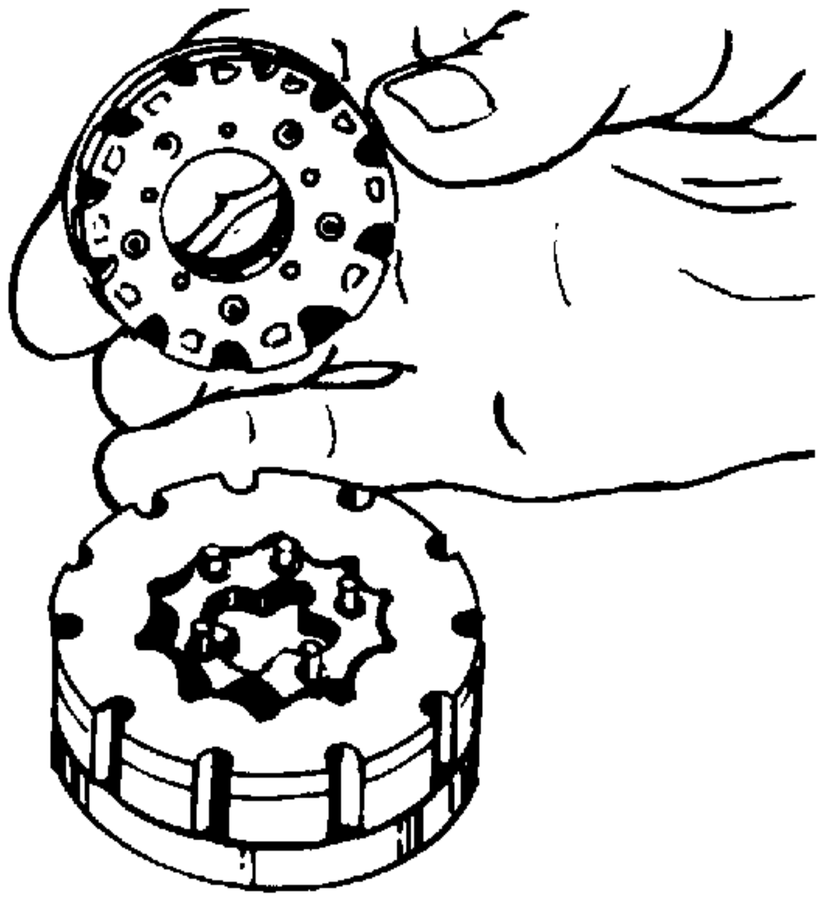


Figure 4-27. Removing Commutator.

CAUTION

Five needle rollers (11, Figure 4-1) connect the commutator to the rotor with a slip fit. Care and minimum force should be used to separate the two components.

31. Remove the five needle rollers (11). See Figure 4-28.

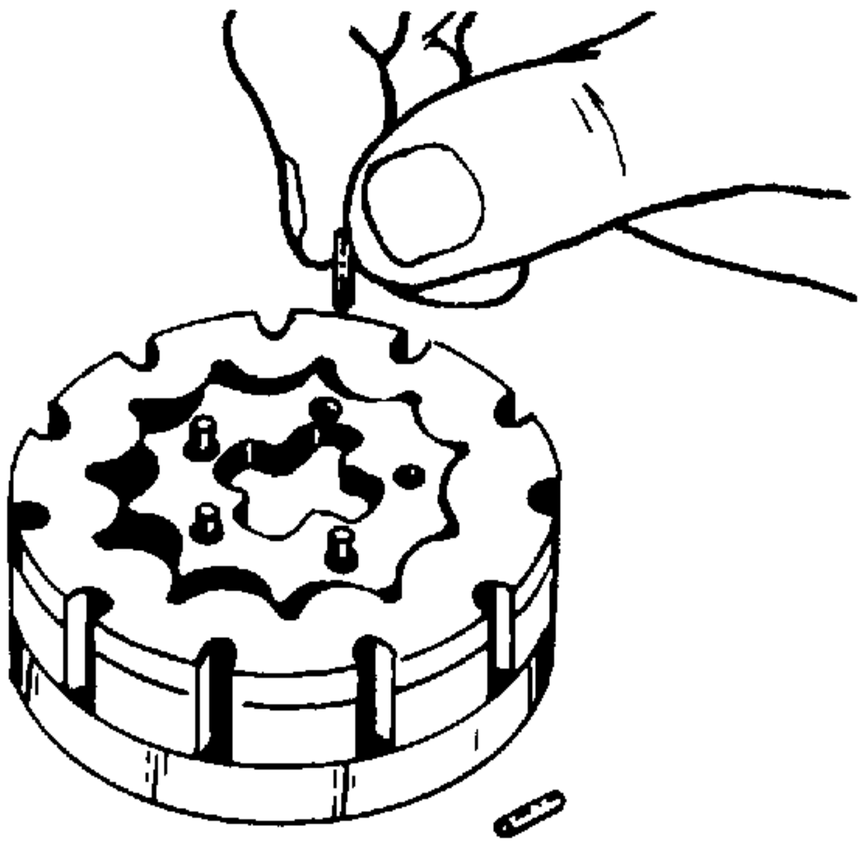


Figure 4-28. Removing Needle Rollers.

32. Remove drive link spacer (21, Figure 4-1). See Figure 4-29. Replace it if it is grooved or worn.

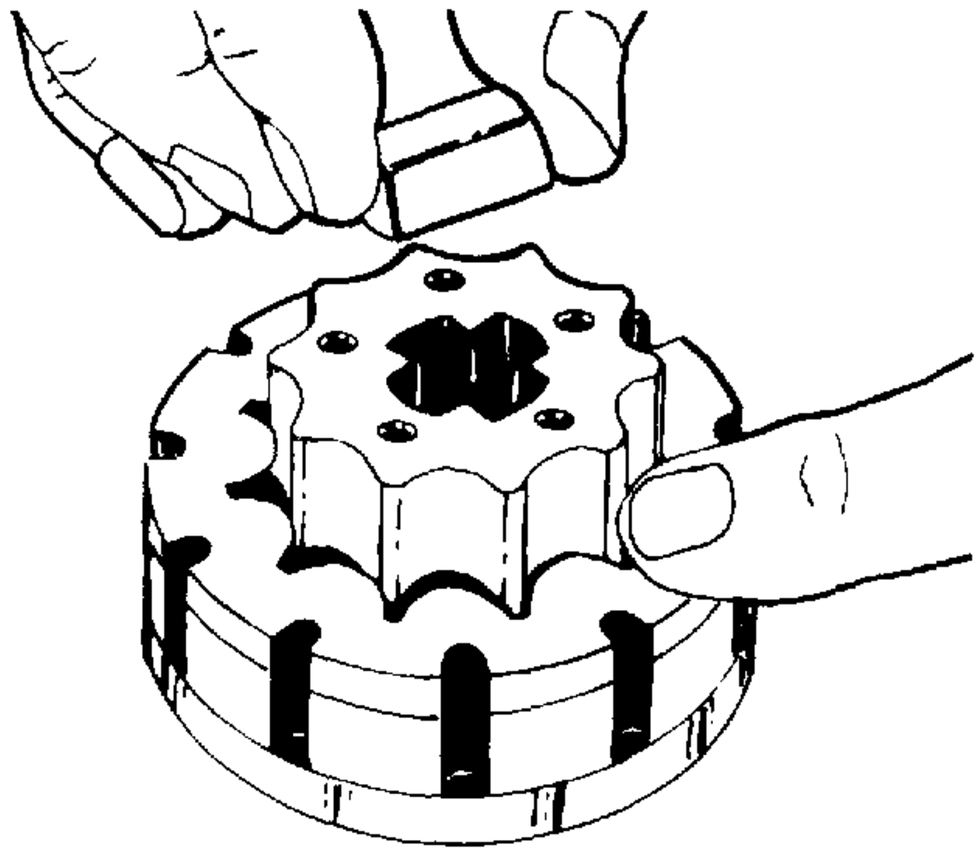


Figure 4-29. Removing Drive Link Spacer.

33. The commutator (19, Figure 4-1) is made up of two round plates pinned and bonded together as a permanent assembly and is not subject to further disassembly. Inspect the ground surfaces of the commutator. The holes and edges should be free of nicks. The ground surfaces should be free of scoring. The edges should be sharp.

NOTE

The commutator (19) and commutator ring (20) are a matched set. If either is worn or damaged, you must replace the set.

34. With the rotor (22) and stator (23) lying on the drive plate (24), the rotor (22) should rotate and orbit freely within the stator (23). The commutator side of the stator face must be free of grooves or scoring.

NOTE

The rotor (22) and stator (23) are a matched set. You must replace them as a matched set if either is worn or damaged.

35. Check the rotor (22) lobe "tip" to stator (23) lobe "tip" clearance using the appropriate feeler gage. See Figure 4-30. The rotor lobe directly across from the rotor lobe tip being gaged (see pointer, Figure 4-30) must be centered between stator lobes during the gaging process. A rotor and stator set that is .75 inch (19 mm) or less in height has a maximum allowable "tip" clearance of .003 inch (.08 mm). A rotor and stator set that is 1.00 inch (25.4 mm) or more in height has a maximum allowable "tip" clearance of .005 inch (.13 mm). A rotor and stator that exceeds the maximum allowable "tip" clearance must be replaced.

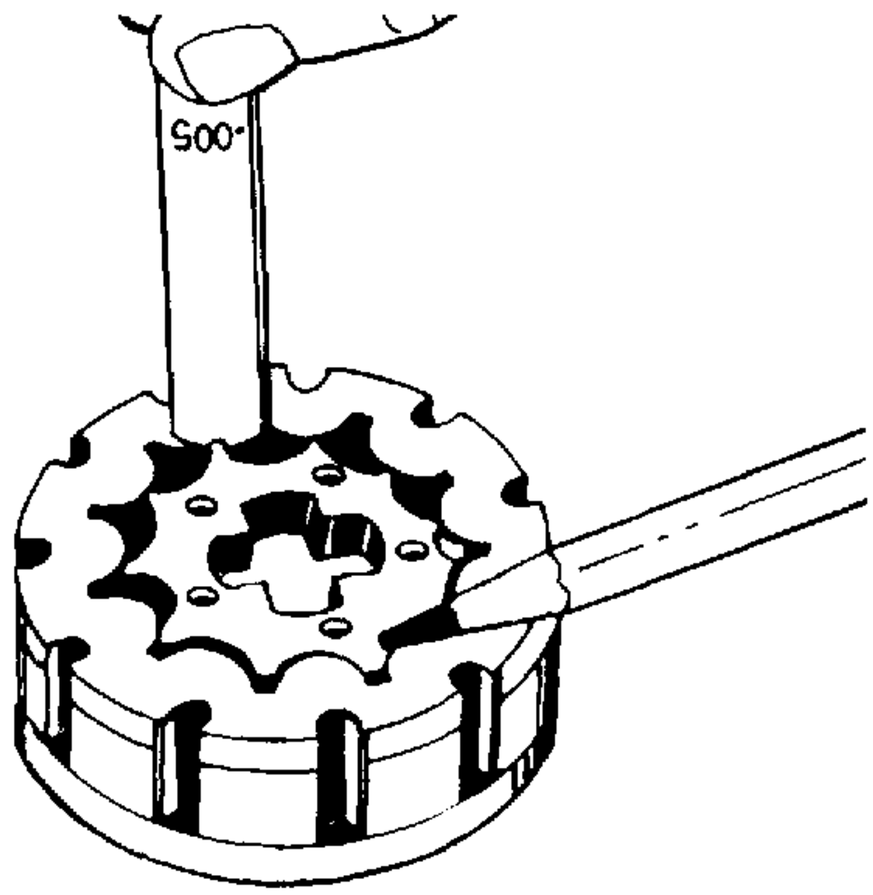


Figure 4-30. Checking Rotor to Stator "Tip" Clearance.

36. Remove rotor (22, Figure 4-1) and stator from the drive plate (24). The drive plate side of the rotor and stator set also must be free of grooves or scoring.

NOTE

Handle the rotor and stator set carefully to avoid nicks and scratches.

37. The rotor side of the drive plate (24) should show the normal spiral pattern due to rotor movement. Inspect the thrust bearing side of the plate for brinelling (dents) or spalling (flaking). The flat sides of the input shaft engagement hole should not be grooved or worn. If any of these conditions are present, the drive plate (24) must be replaced. See Figures 4-31 and 4-32.

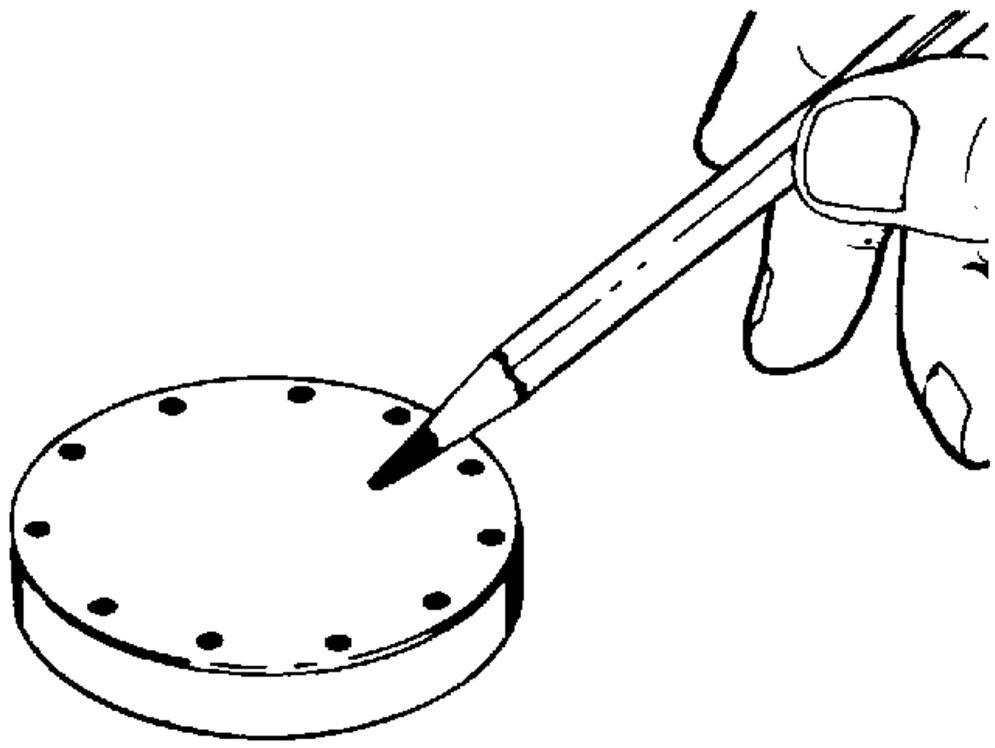


Figure 4-31. Inspecting the Rotor Side of the Drive Plate.

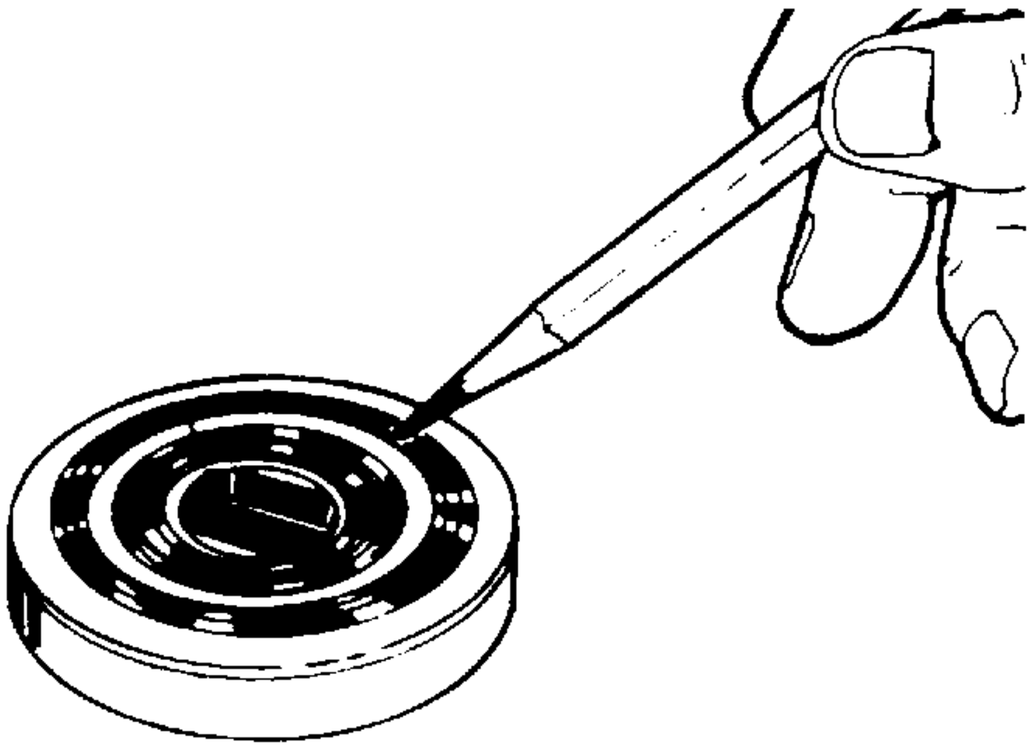


Figure 4-32. Inspecting the Thrust Bearing Side of the Drive Plate.

38. Remove face seal (27, Figure 4-1), back-up ring (28), and face seal spacer (29) from upper cover plate (30). Discard face seal (27) and back-up ring (28). Retain metal spacer (29). See Figure 4-33.

39. Remove thrust bearing (26, Figure 4-1) and bearing spacer (25) from upper cover plate (30). See Figure 4-34.

40. Inspect the thrust bearing (26, Figure 4-1) for brinelling (dents) or spalling (flaking). If either exists, or if one or more of the rolls are lost or broken, replace the bearing assembly. See Figure 4-34. Replace face seal spacer (29, Figure 4-1) or bearing spacer (25) if worn or broken.

NOTE

The thrust bearing assembly (26) will have 16 or 17 rolls evenly spaced in a roller cage that can hold 32 or 34 rolls or the thrust bearing will have a full complement of 32 or 34 rolls. The bearing assembly with 32 or 34 rolls should not be replaced with a bearing assembly that has 16 or 17 rolls.

NOTE

For reassembly purposes, note the radial position of the alignment grooved edge of the upper cover plate (30).

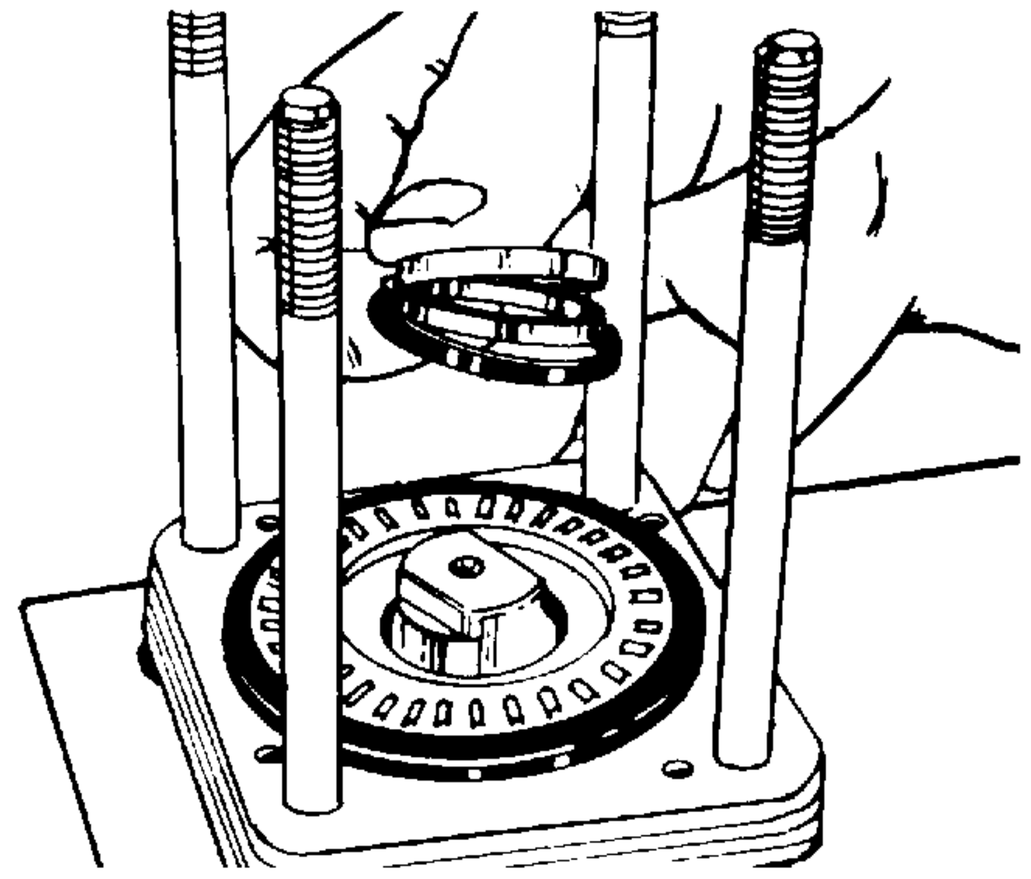


Figure 4-33. Removing Face Seal, Back-Up Ring and Spacer.

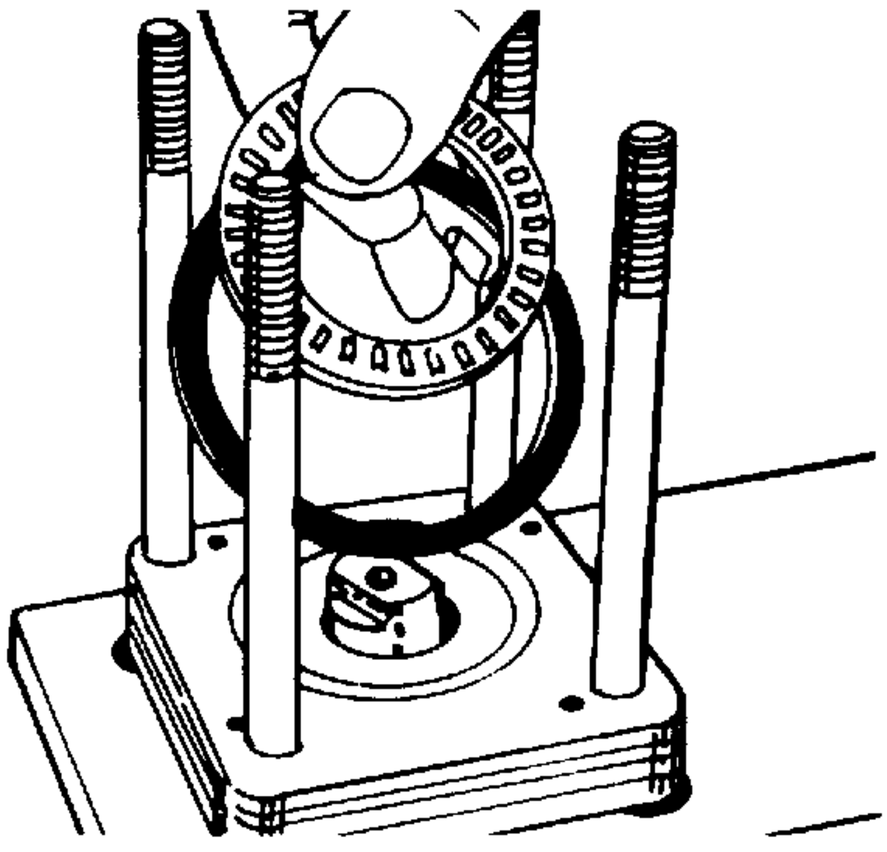


Figure 4-34. Removing Thrust Bearing and Spacer.

41. Remove the upper cover plate (30) (four plates bonded together). Inspect the upper cover plate. You should notice some polishing due to the action of the seal. The plate should be free of brinelling (dents) or spalling (flaking). If it is damaged, the upper cover plate must be replaced. See Figure 4-35.

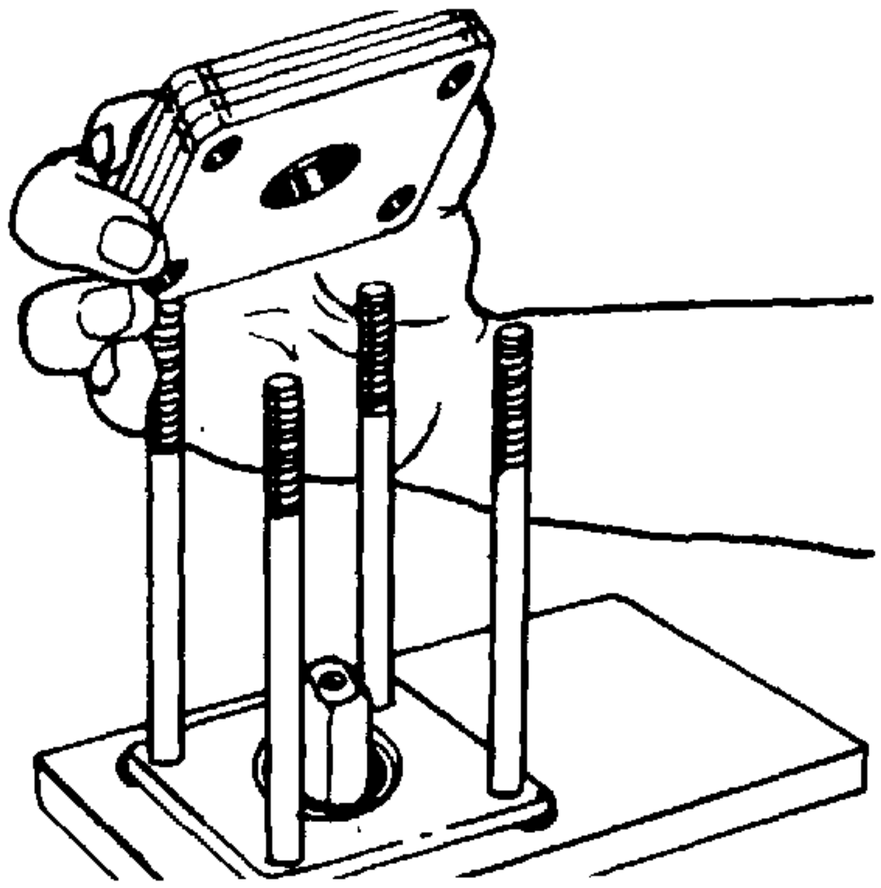


Figure 4-35. Removing Upper Cover Plate.

42. Slide seal (37, Figure 4-1) from the tube. If the seal is worn or damaged, it must be replaced. See Figure 4-36.

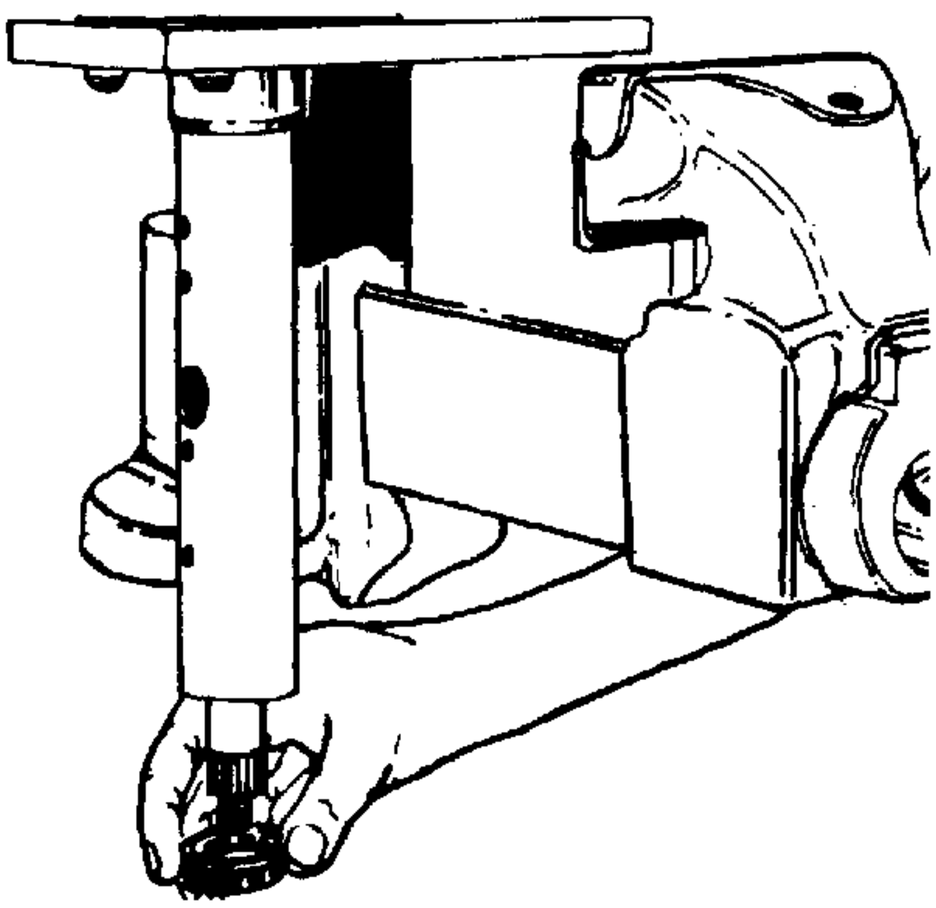


Figure 4-36. Removing Seal From the Tube.

43. Remove the input shaft assembly (31, Figure 4-1) sliding it out of the upper cover end of the assembly. See Figure 4-37.

NOTE

If the input shaft assembly has 7/8 serrations, the washer (33, Figure 4-1) and retaining plate (34). Will be removed with input shaft assembly (31).

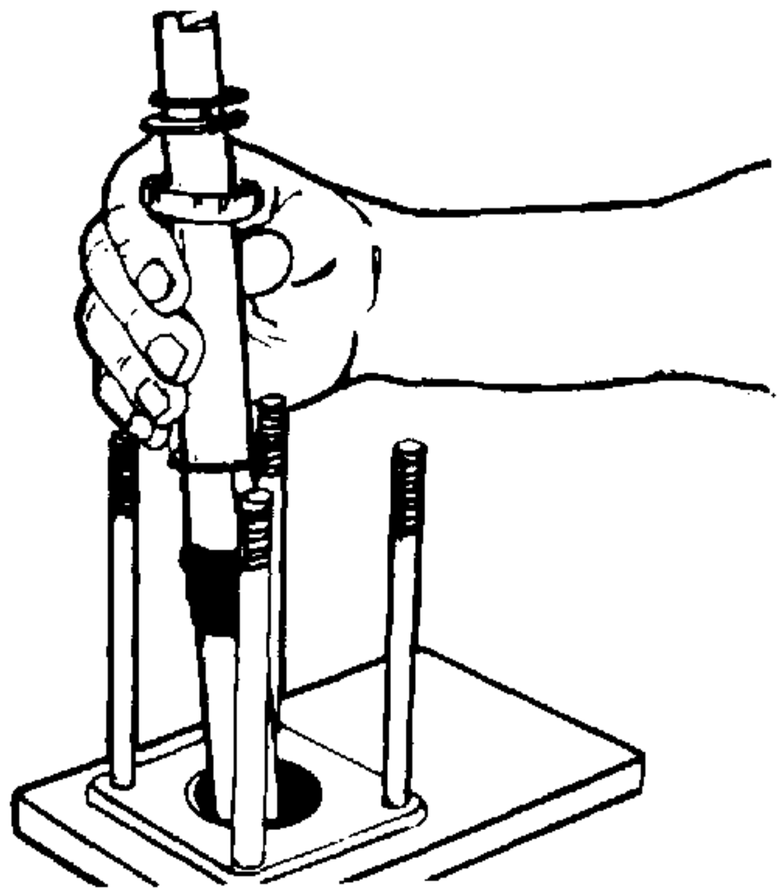


Figure 4-37. Removing Input Shaft Assembly.

44. Inspect the input shaft assembly (31) and subassembly components as assembled. Inspect input shaft for worn or damaged serrations, wheel nut threads, bearing diameter and flats on the lower end. Inspect the other components of the subassembly for wear damage. If this subassembly passes inspection, set it aside and go to step 48. If it does not pass inspection, continue with step 45.

45. Using appropriate external retaining ring pliers, remove retaining ring (32) from the input shaft assembly (31). See Figure 4-38. Discard if deformed or broken.

46. Remove washer (33, Figure 4-1) and retaining plate (34) from input shaft assembly (31) or upper cover and tube assembly (35). Discard if deformed or damaged. See Figure 4-39.

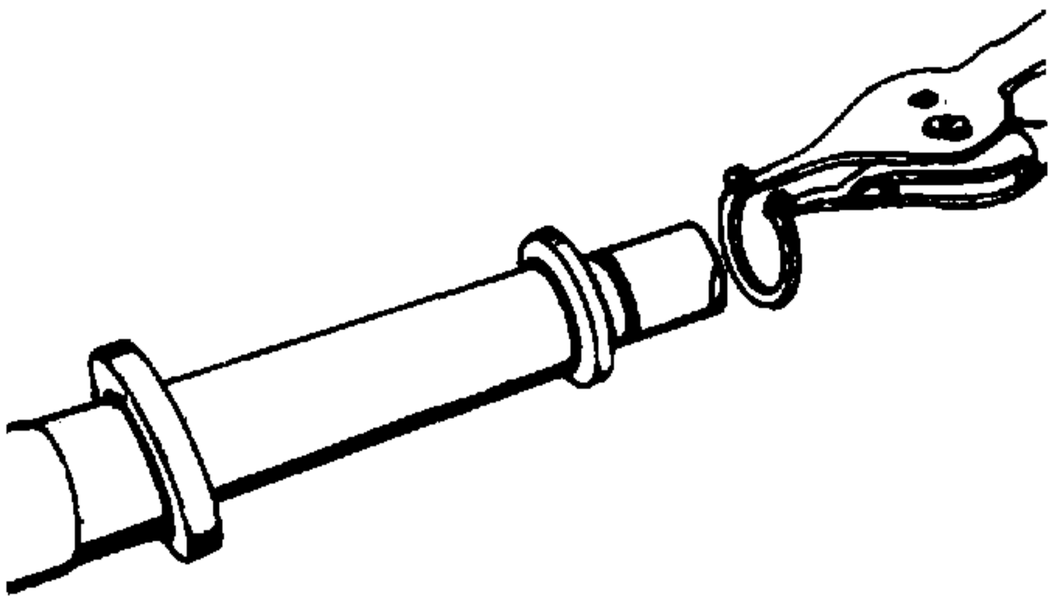


Figure 4-38. Removing Retaining Ring.

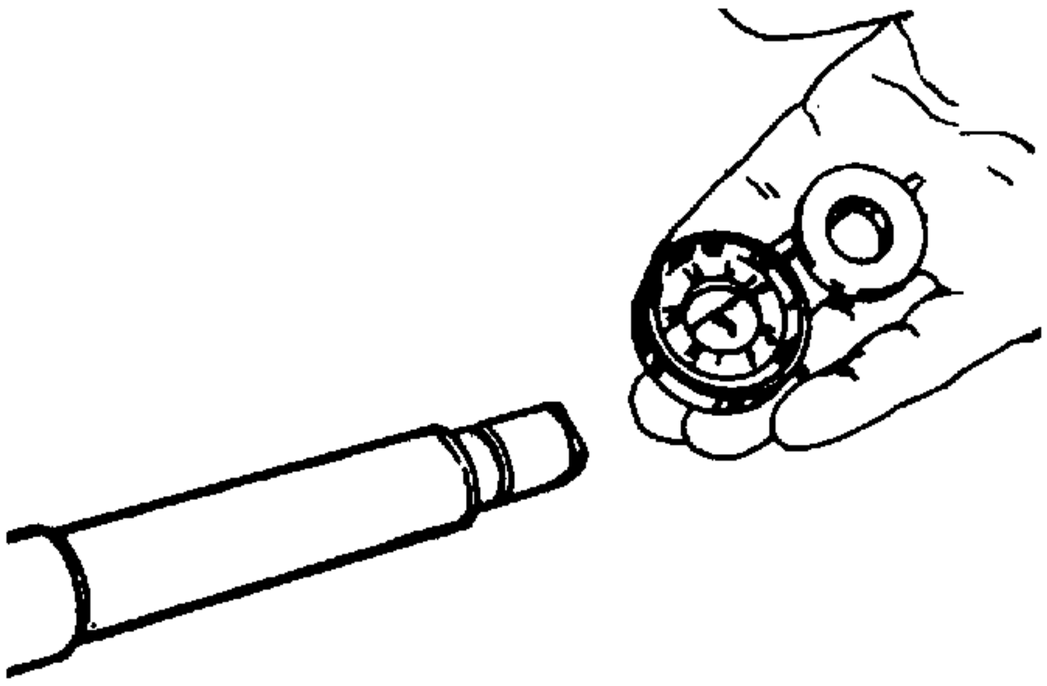


Figure 4-39. Removing Washer and Retaining Plate.

47. Remove the upper cover and tube assembly (35, Figure 4-1) and lay the assembly on the bench. See Figure 4-40.

48. The tube has been pressed into and welded to the upper cover plate support tube such that the retaining plate (34, Figure 4-1) is flush with the upper cover plate surface when seated against the tube. Any signs of looseness or movement of tube in the upper cover support tube will require replacement of upper cover and tube assembly (35), retaining plate (34) and bearing (36) as a set. A loose or worn input shaft bearing (36) in the upper cover and tube assembly can be serviced separately.

49. If the bearing (36) is to be replaced, place the upper cover and tube assembly (35) in a vise with the vise jaws clamping firmly on the tube without deforming the tube. Using an appropriate type of pliers, uncrimp or relieve the two crimped areas on the bearing end of the tube. Remove bearing using a bearing or seal type puller and discard the bearing. Set the upper cover and tube aside to await reassembly. See Figures 4-41 and 4-42.

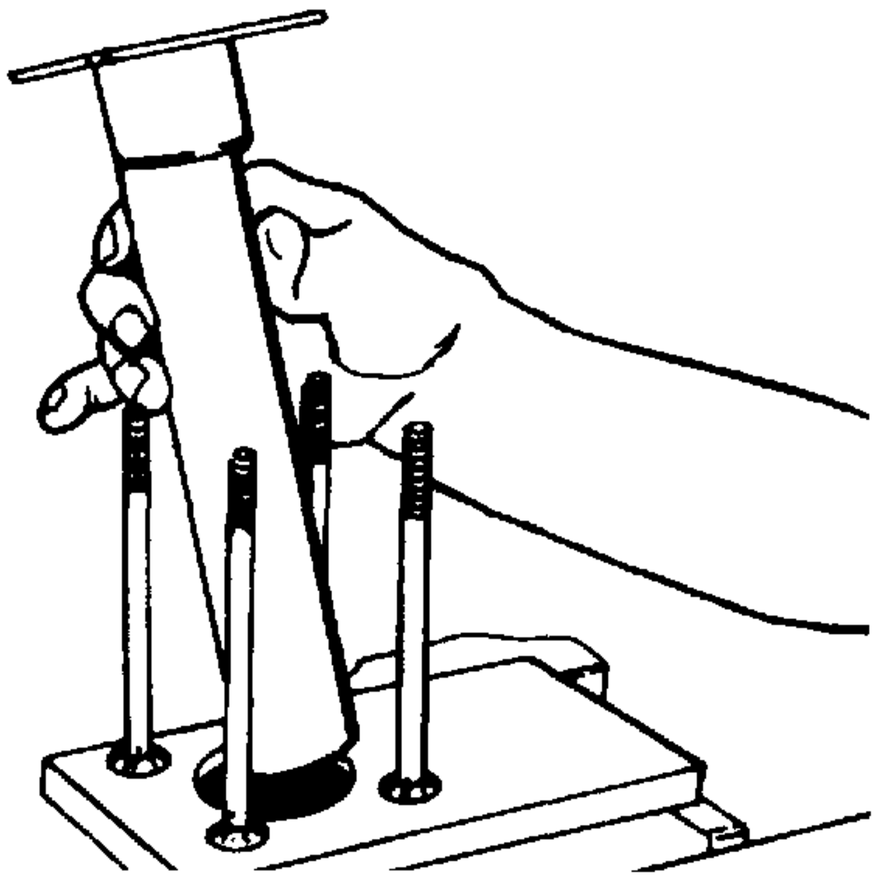


Figure 4-40. Removing Upper Cover and Tube Assembly.

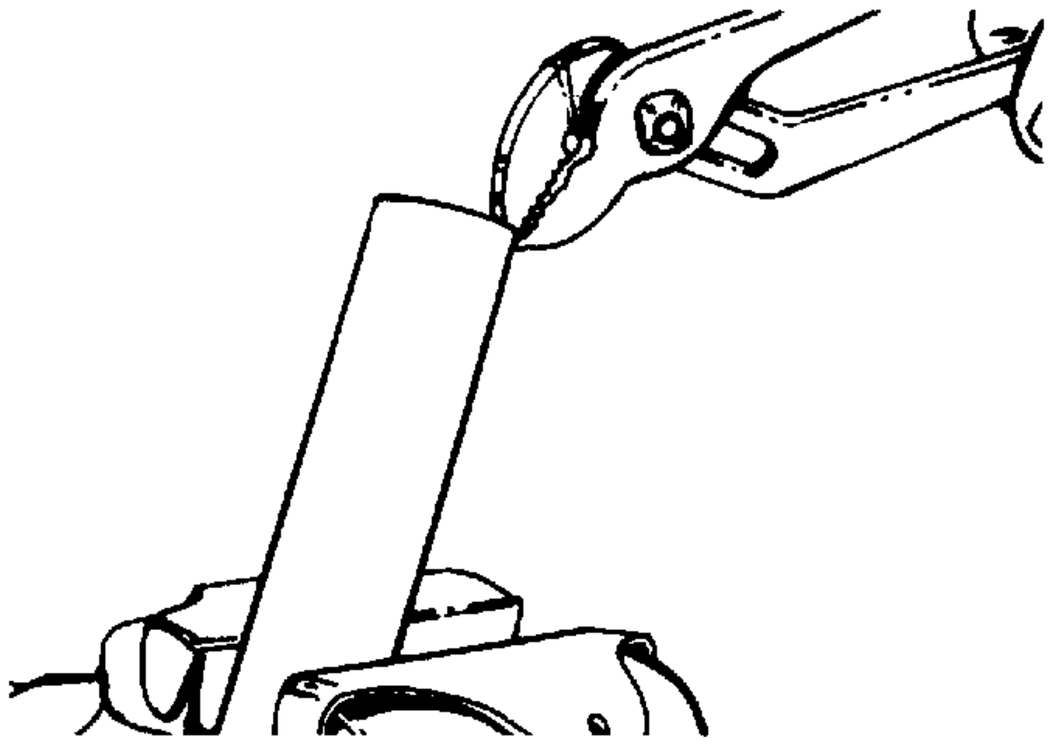


Figure 4-41. Uncrimping the Tube.

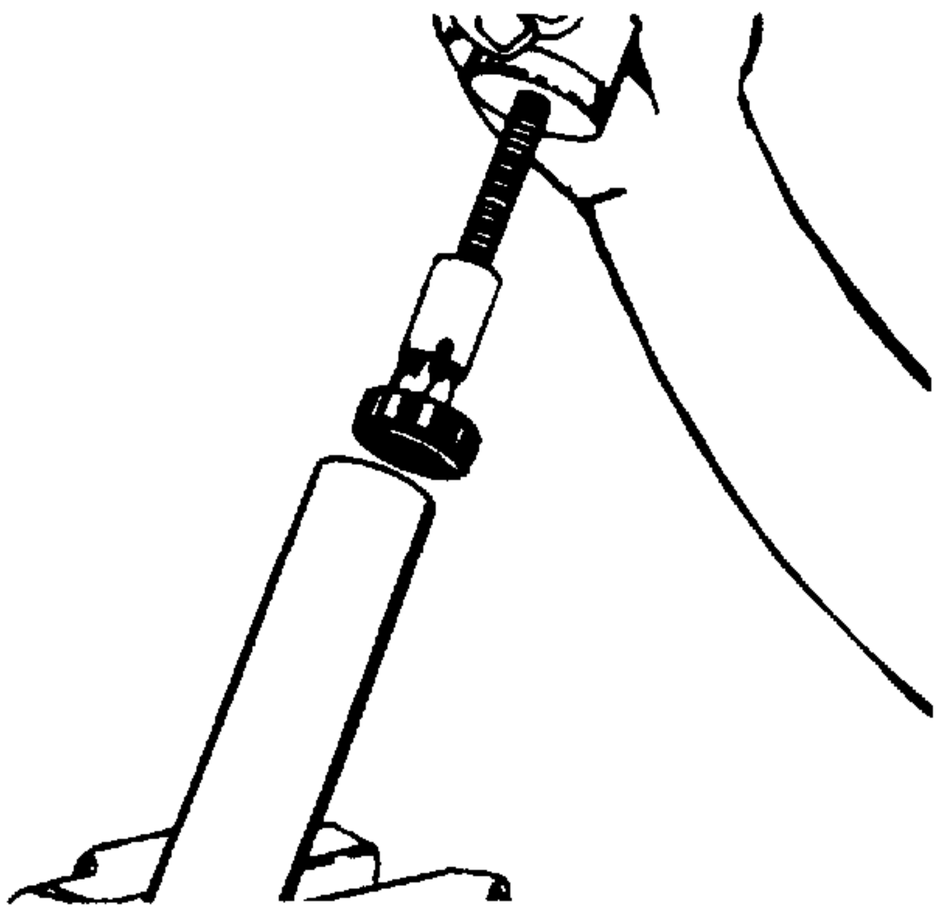


Figure 4-42. Removing Bearing From Tube.

50. Remove the nuts holding the four special bolts (38, Figure 4-1) to the fixtures and remove the bolts. Bolts with square shoulders or the threads damaged such that the nuts cannot be properly torqued must be replaced. See Figure 4-43.

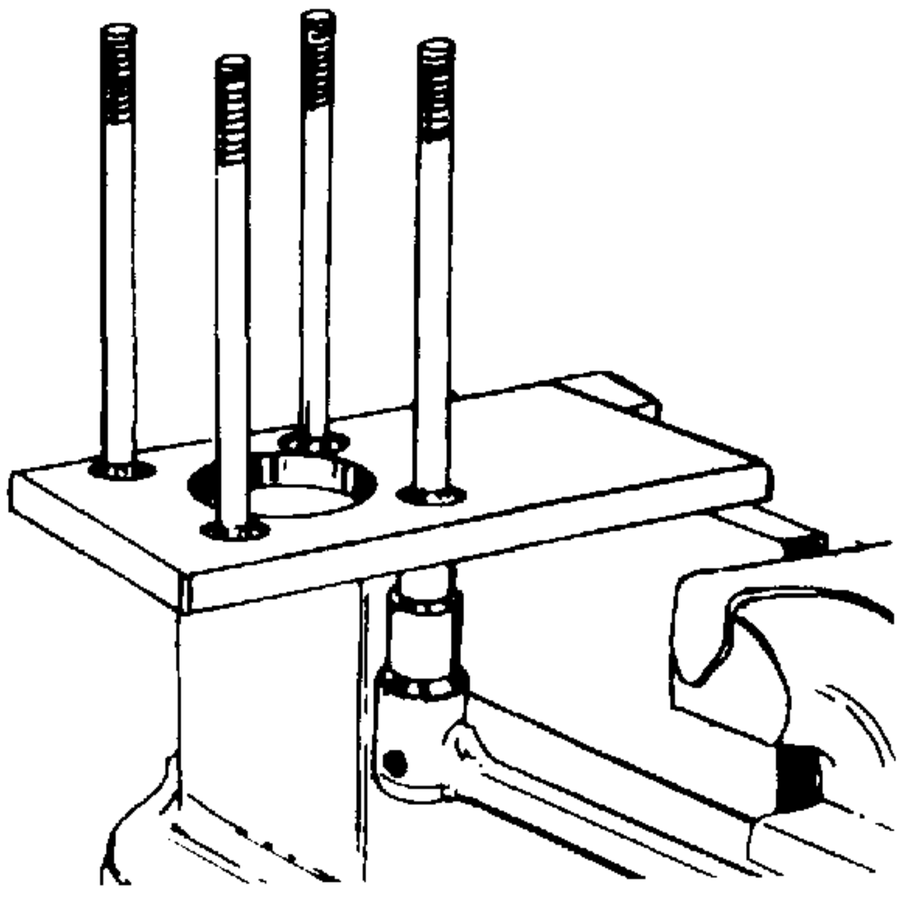


Figure 4-43. Removing the Special Bolts.

WARNING

Use only genuine OEM approved replacement parts. The use of improper parts could cause a loss of steering which could lead to an accident.

Disassembly is complete.

4-5. ASSEMBLY.

4-5.1 Replace all seals and O-rings with new ones each time you assemble the unit. Be sure the seal and O-rings remain seated correctly when components are assembled. See Figure 4-44.

NOTE

A seal kit with all required seals except the column and tube seal is available for service. The seal (37, Figure 4-1) is available separately.

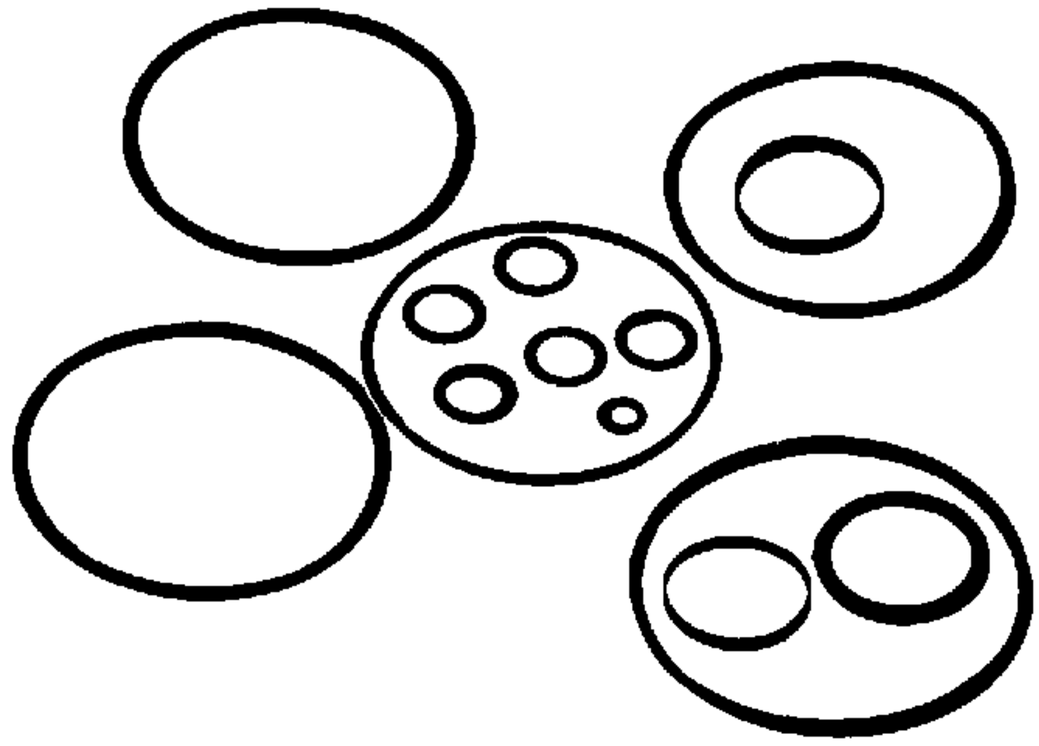


Figure 4-44. Seals and O-Rings.

4-5.2 Before you reassemble the unit, wash all parts in clean petroleum-based solvent. Blow parts dry with compressed air.

4-5.3 **Assembly Procedures.**

WARNING

Since solvents are flammable, be extremely careful when using any solvent. Even a small explosion or fire could cause injury or death.

WARNING

Wear eye protection and be sure to comply with OSHA or other maximum air pressure requirements.

1. Place four special bolts (38) into fixture with shortest threaded end of bolts through the fixture holes. Secure bolts to fixture with four 5/16-24 UNF nuts. Tighten nuts to secure assembly to fixture but loose enough to turn bolts and facilitate stacking of components. See Figure 4-45.
2. If the bearing (36, Figure 4-1) was removed from the upper cover and tube assembly (35) for replacement, press a new bearing (36) into the upper end of the tube with the end of the bearing that has recesses toward the tube. This may be

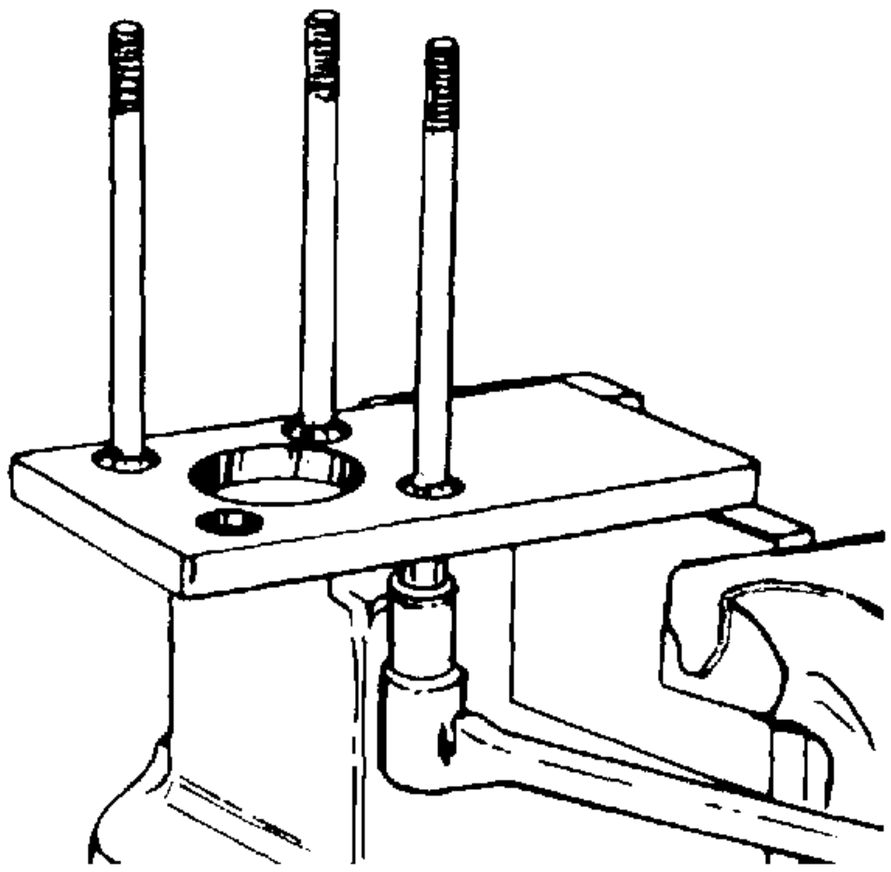


Figure 4-45. Installing Special Bolts.

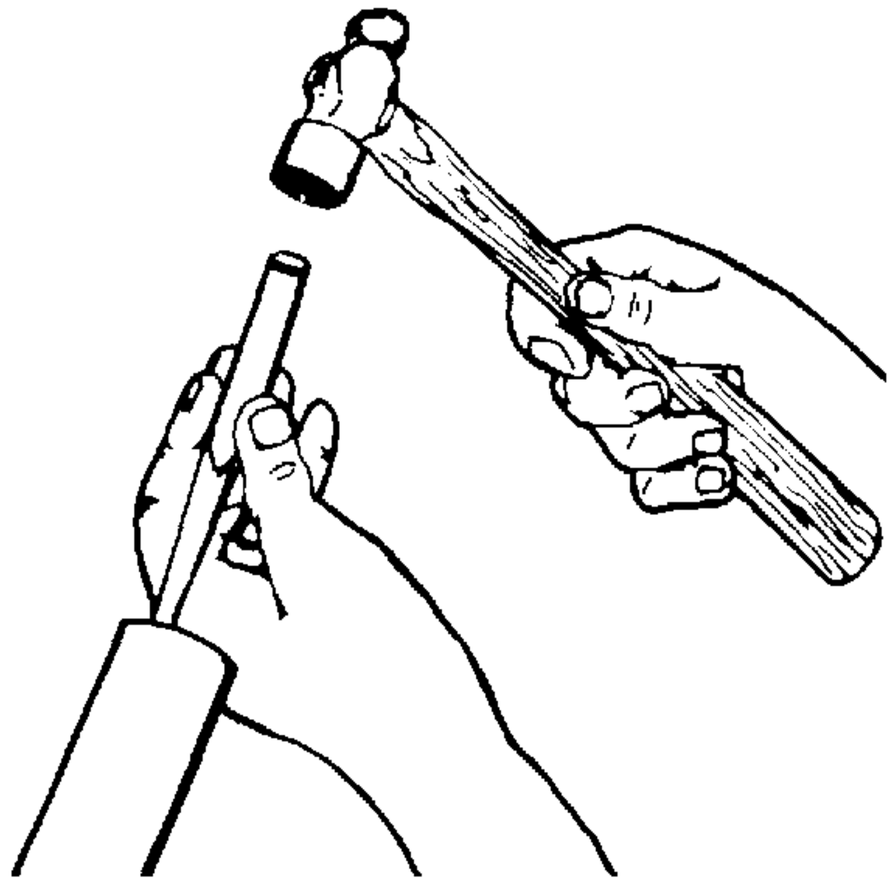


Figure 4-47. Crimping the Tube.

done using an arbor press or clamping on the tube per disassembly step 48 and using the wood handle end of a hammer. The bearing must be seated firmly in the tube and below the end of the tube. Crimp the end of the tube over the bushing in two places, approximately 90° away from the original crimped areas, using pliers and/or a blunt ended punch. See Figures 4-46 and 4-47.

3. Apply clean grease to bearing (36, Figure 4-1) and stack upper cover and tube assembly (35) on the four special bolts (38) with the tube pointing down through the hole in the fixture. Make sure the square shoulders of the bolts engage the square holes in the upper cover. See Figure 4-48.

4. Install retaining ring (32, Figure 4-1) onto input shaft assembly (31) using the appropriate external retaining ring pliers. See Figure 4-49.

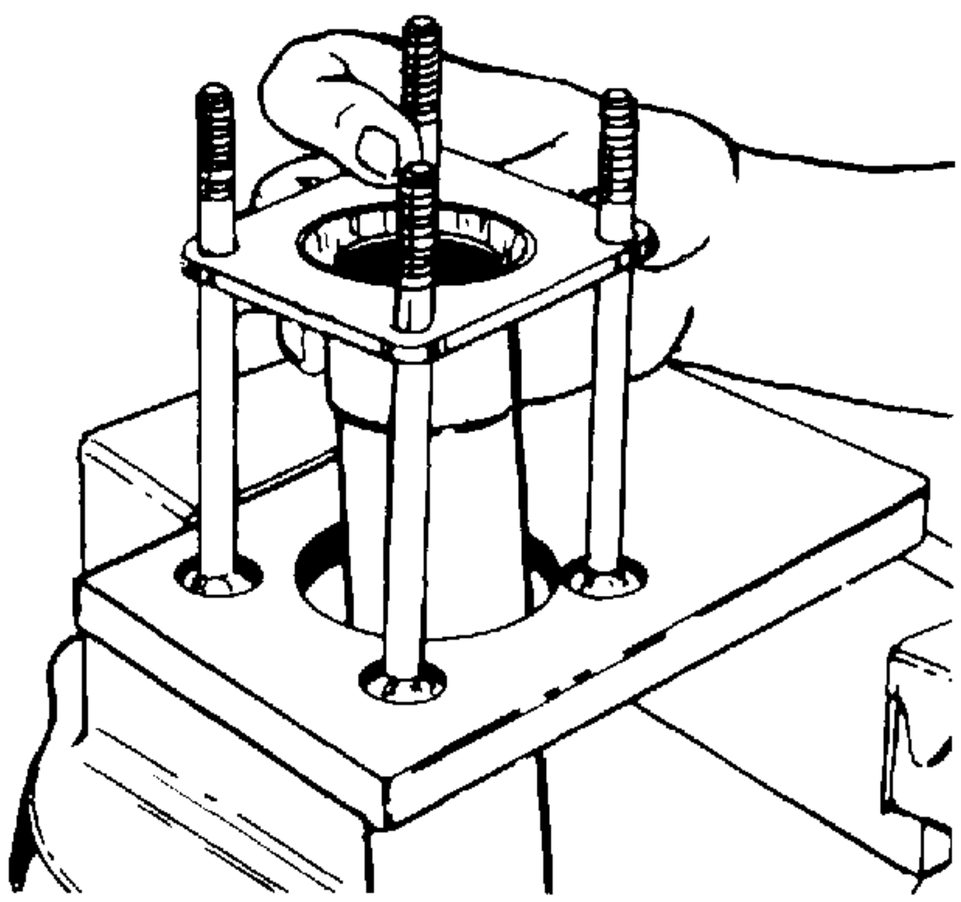


Figure 4-48. Installing Upper Cover and Tube Assembly.

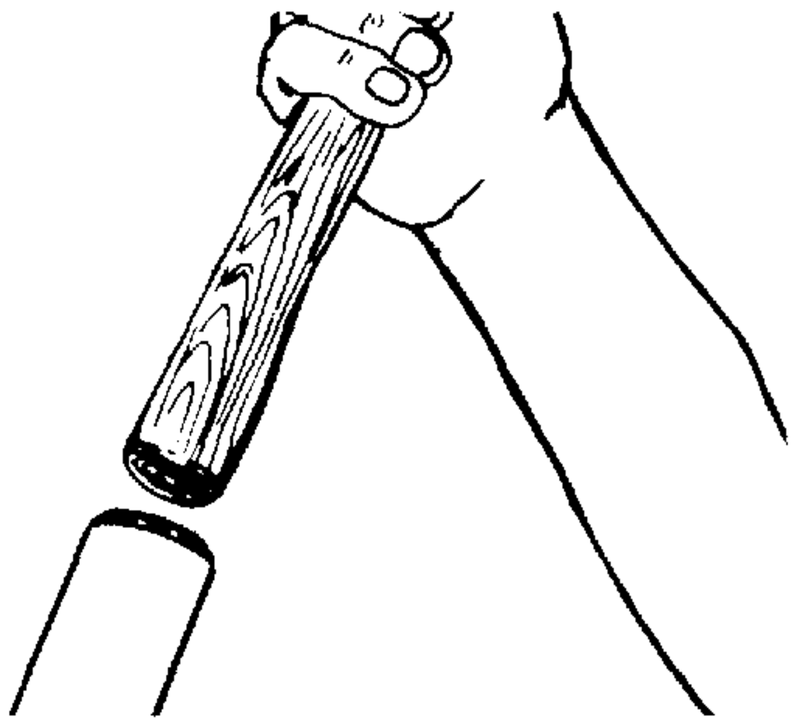


Figure 4-46. Installing the Bearing.

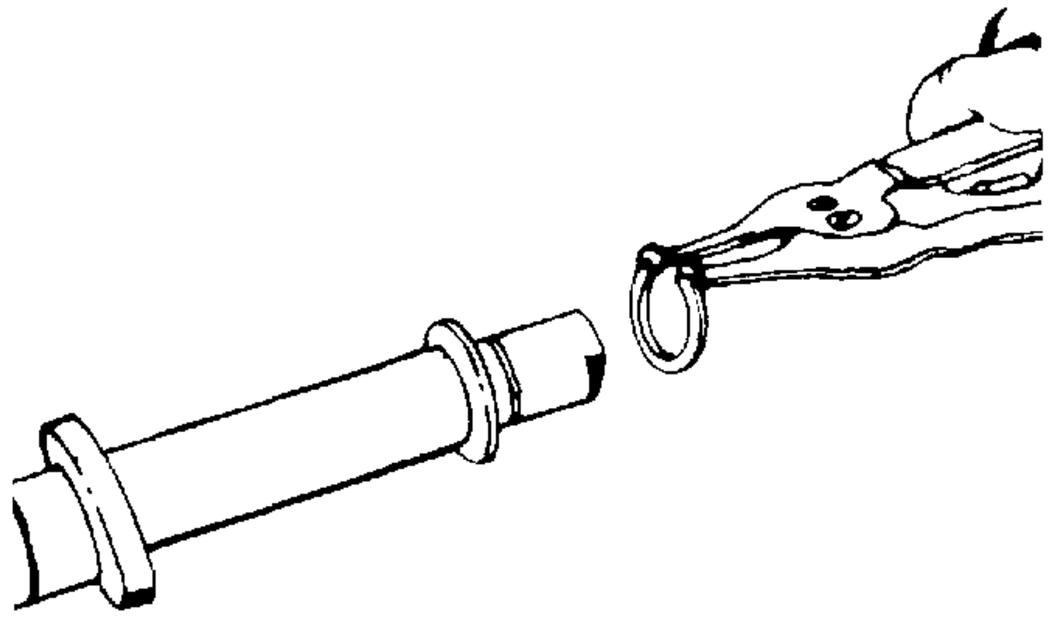


Figure 4-49. Installing Retaining Ring.

5. Slide input shaft assembly (31, Figure 4-1) into upper cover end of upper cover and tube assembly (35) and through bearing (36) until the retaining ring (32) bottoms against washer (33) which bottoms against recessed face of retaining plate (34) and the retaining plate seats against the end of the tube. See Figure 4-50.

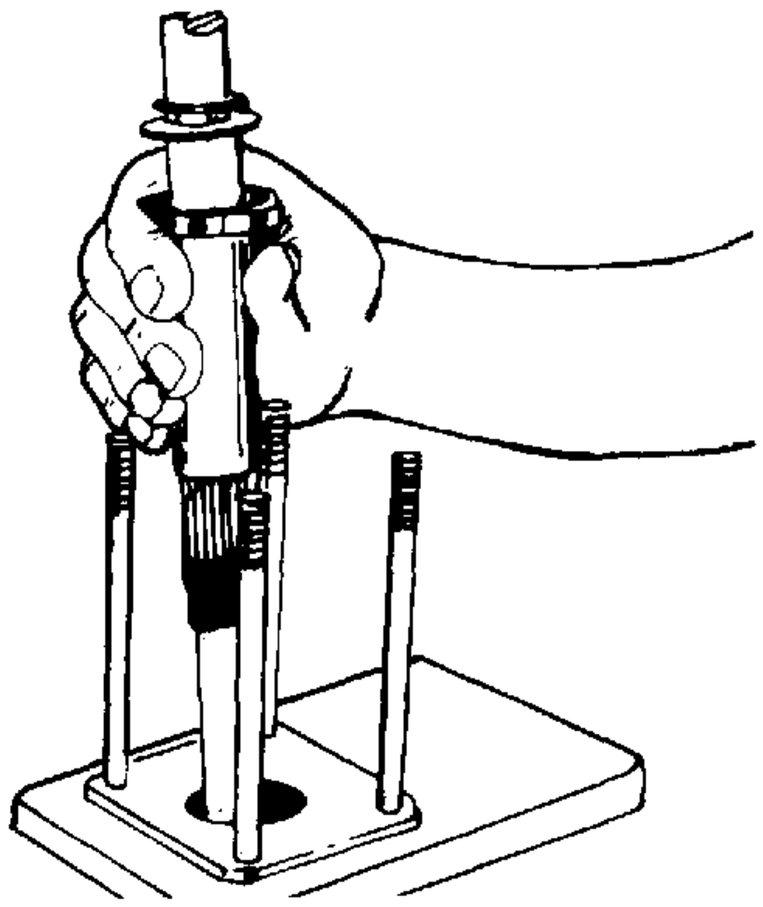


Figure 4-50. Installing Input Shaft Assembly.

6. Assemble the upper cover plate (30, Figure 4-1) over the four special bolts (38) and input shaft assembly (31) onto the upper cover and tube assembly (35) with the highly polished surface up and the edge with the alignment groove in the same position as noted before disassembly. See Figure 4-51. (Reference alignment groove graphic, Figure 4-93.)

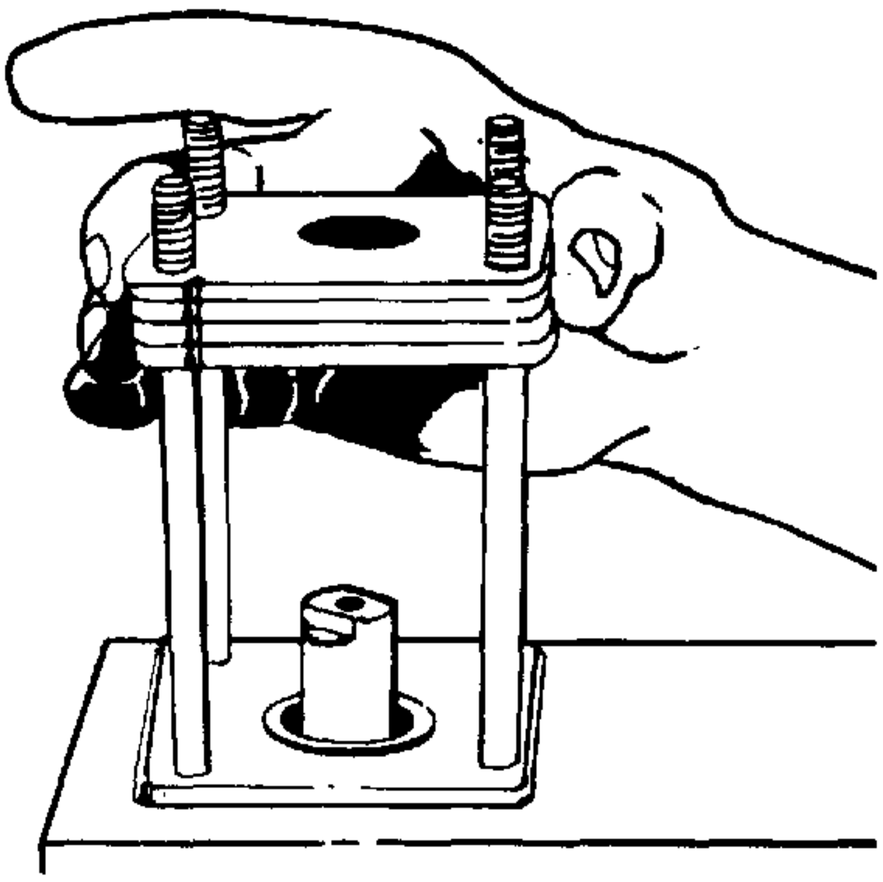


Figure 4-51. Installing Upper Cover Plate.

7. Apply clean grease to the face of the upper cover plate (30, Figure 4-1), to the drive plate end of the input shaft assembly (31) and to the face seal (27). See Figure 4-52.

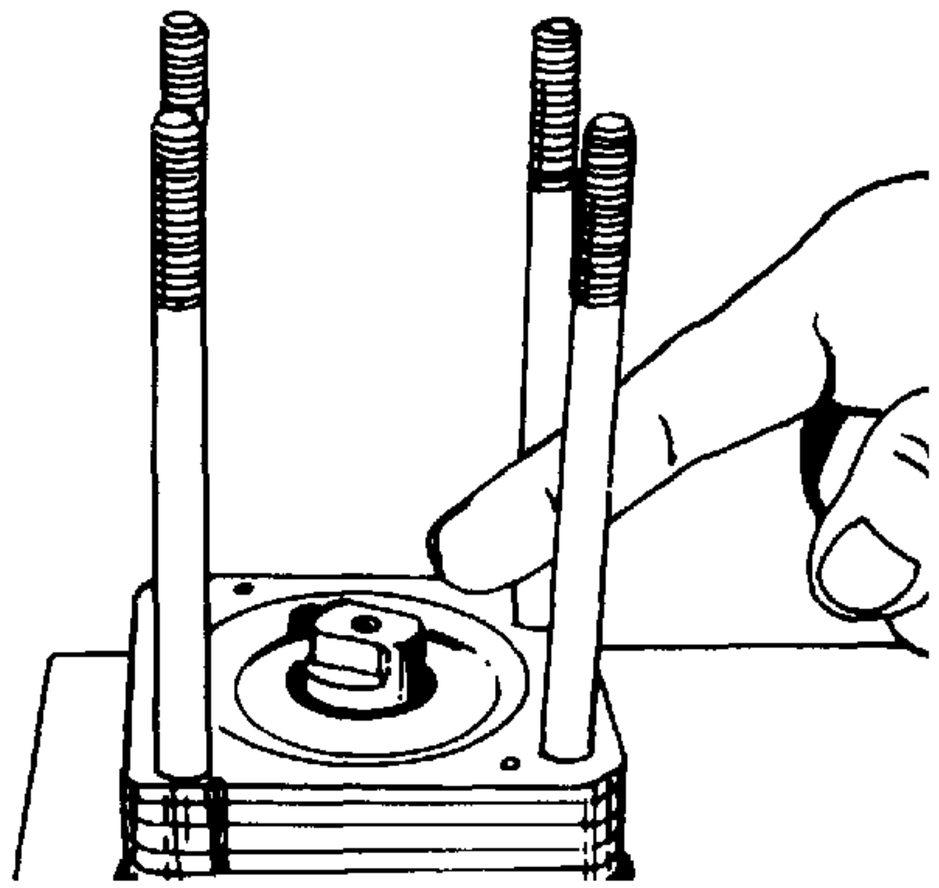


Figure 4-52. Applying Grease to Upper Cover Plate Face.

8. Assemble seal back-up ring (28, Figure 4-1) and face seal (27) onto the seal spacer (29). See Figure 4-53.

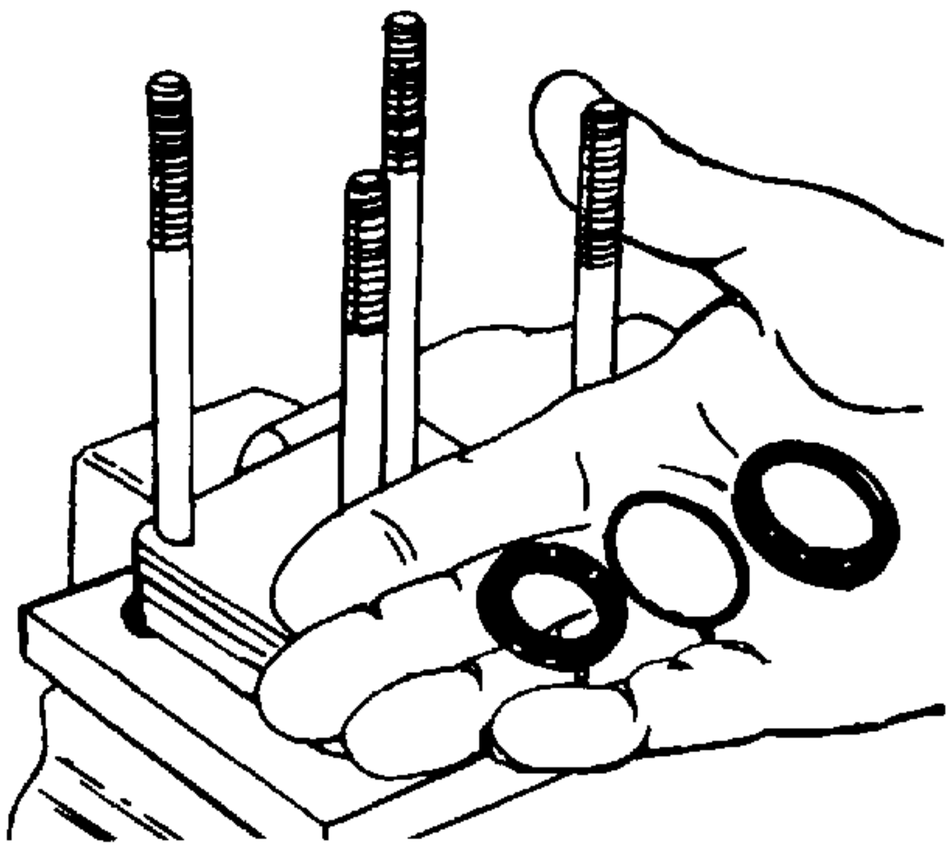


Figure 4-53. Assembling Face Seal, Back-Up Ring and Spacer.

9. Install face seal (27, Figure 4-1), back-up ring (28) and spacer (29) over end of input shaft assembly (31) onto upper cover plate (30). See Figure 4-54.

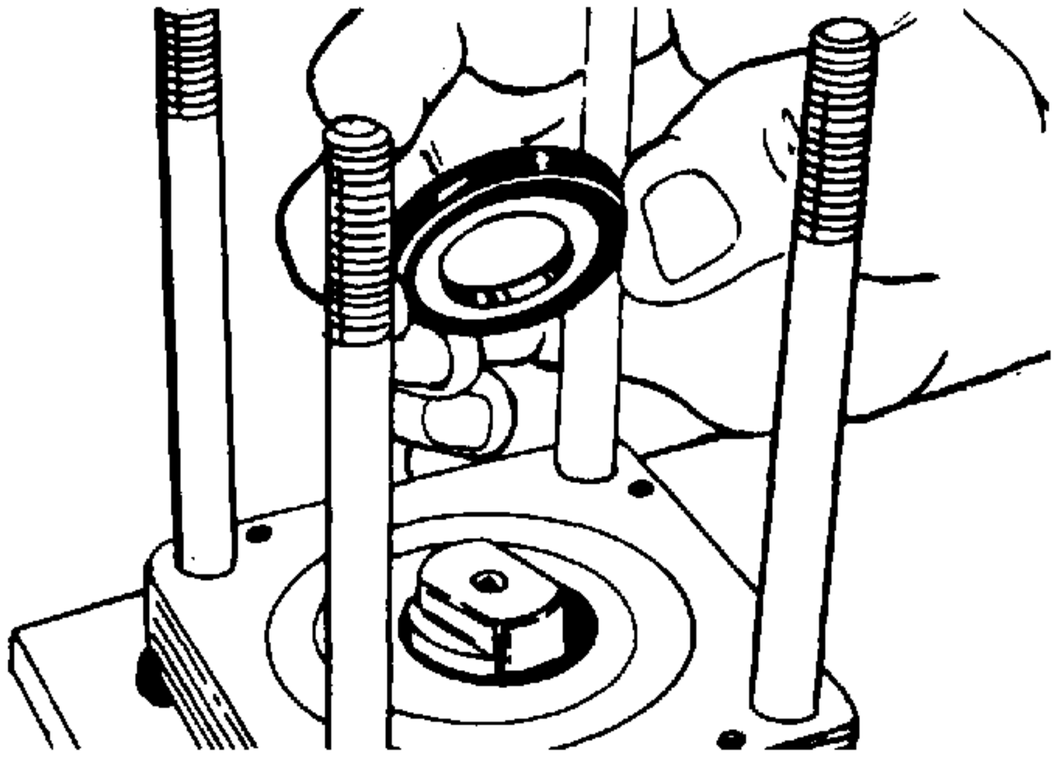


Figure 4-54. Installing Assembled Face Seal, Back-Up Ring and Spacer.

10. Place the drive plate (24) on a clean lint-free surface with the eleven tapped holes facing up. Place the rotor (22) and stator (23) on top of the drive plate with the five needle roller holes facing up. Rotate the stator (23) until the eleven hex socket head screw relief slots are aligned with the tapped holes in the drive plate. See Figure 4-55.

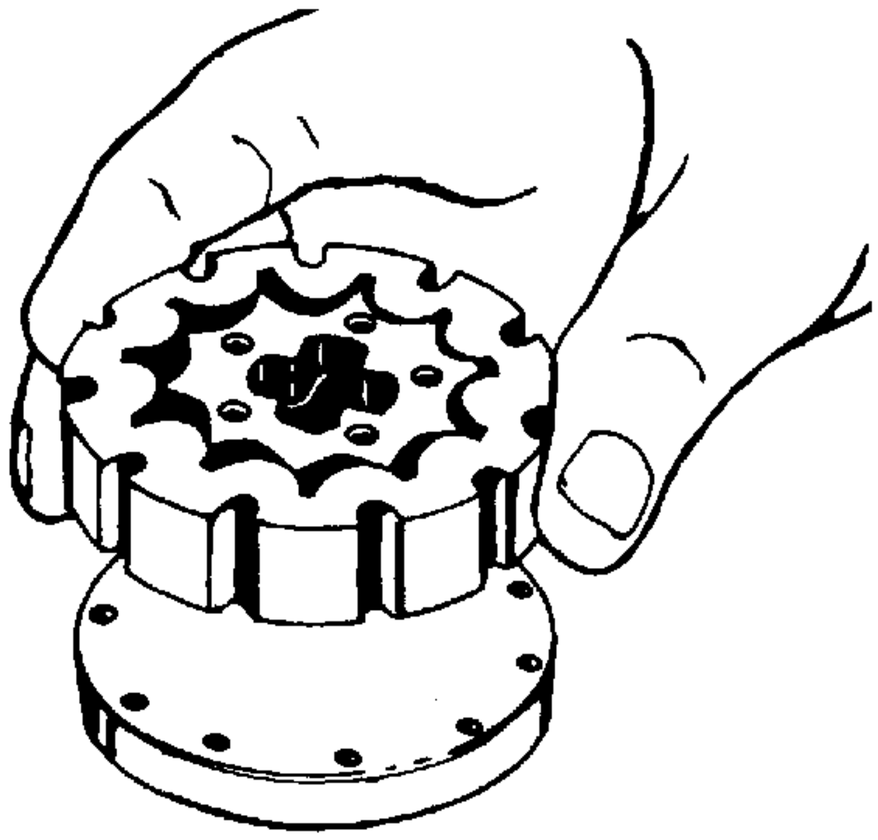


Figure 4-55. Aligning Needle Roller Holes and Screw Relief Slots.

11. Apply a small amount of clean grease to drive link spacer (21, Figure 4-1) and insert it into the drive slot in rotor (22). See Figure 4-56. The grease will aid in retaining the spacer during other assembly procedures.

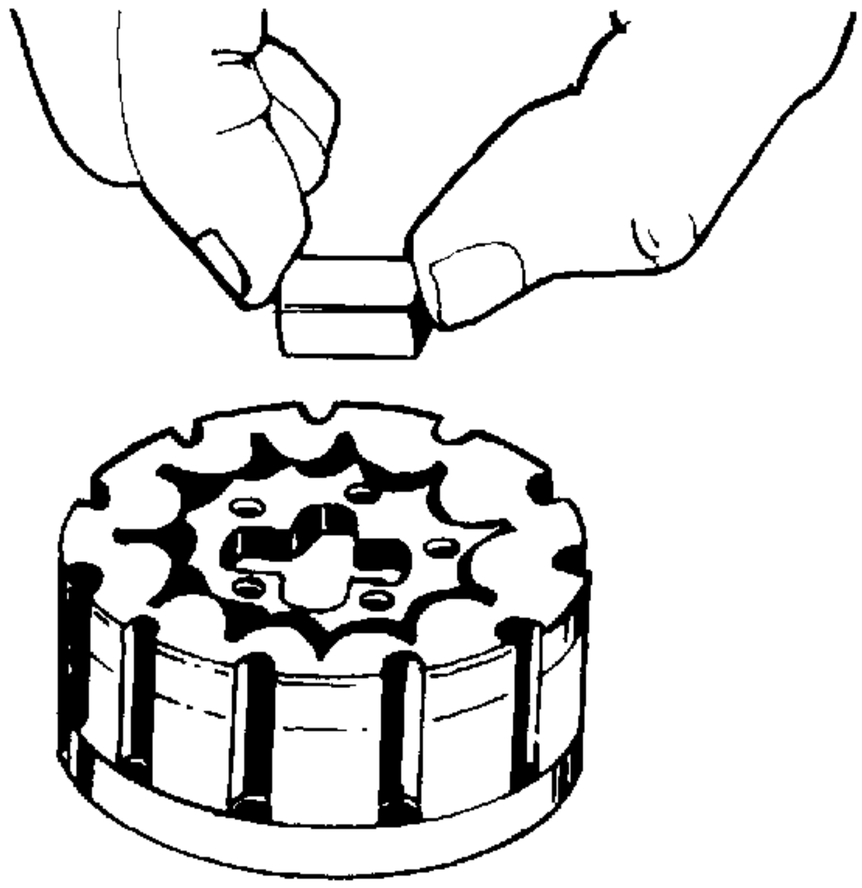


Figure 4-56. Inserting Drive Link Spacer Into Rotor Drive Slot.

12. Place commutator (19, Figure 4-1) on top of the rotor (22). Be sure the correct surface, shown in Figure 4-57, is toward the rotor. Align the five holes and press the five needle rollers (11) in place. See Figure 4-58.

⚠ CAUTION

Make sure the five needle rollers (11, Figure 4-1) are pressed below the surface of the commutator (19).

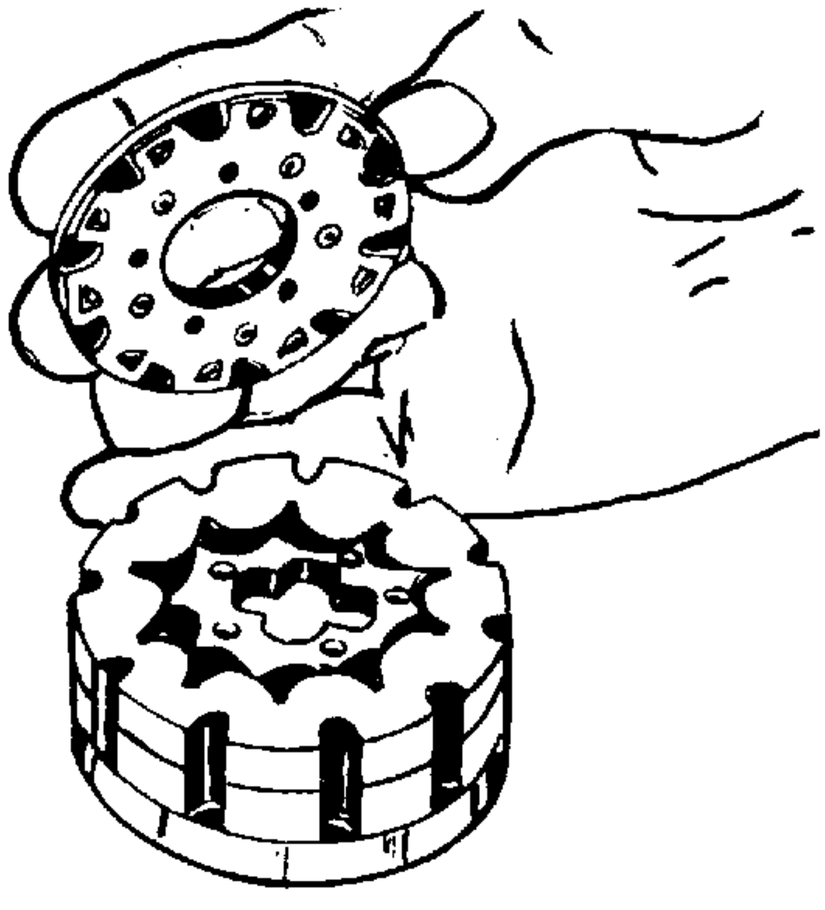


Figure 4-57. Installing Commutator.

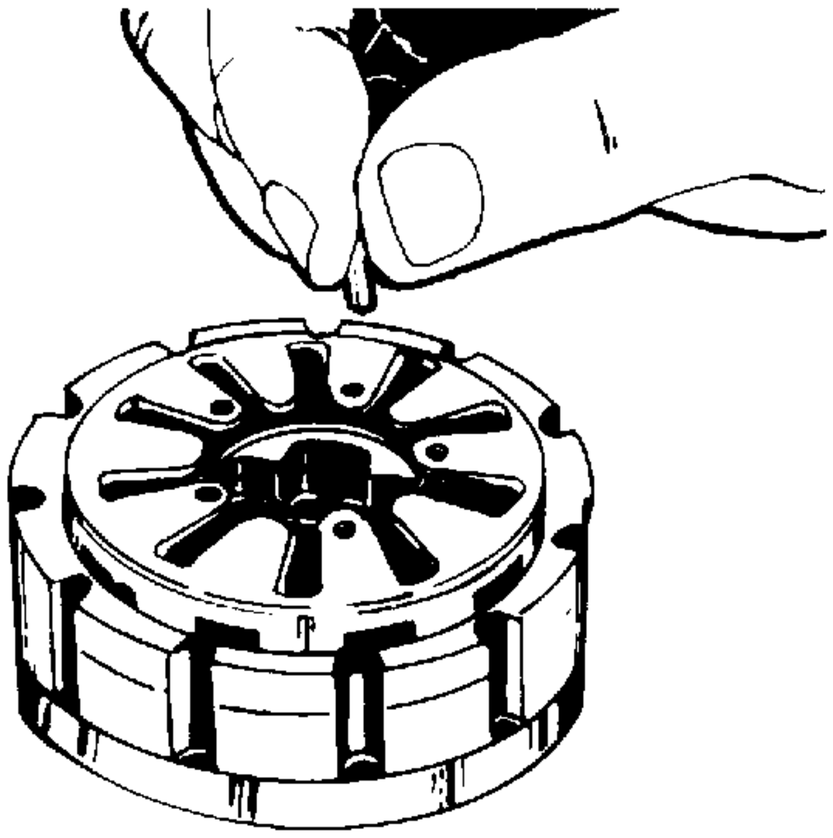


Figure 4-58. Installing Needle Rollers.

13. Place a few drops of oil into each recess in the commutator (19). See Figure 4-59.

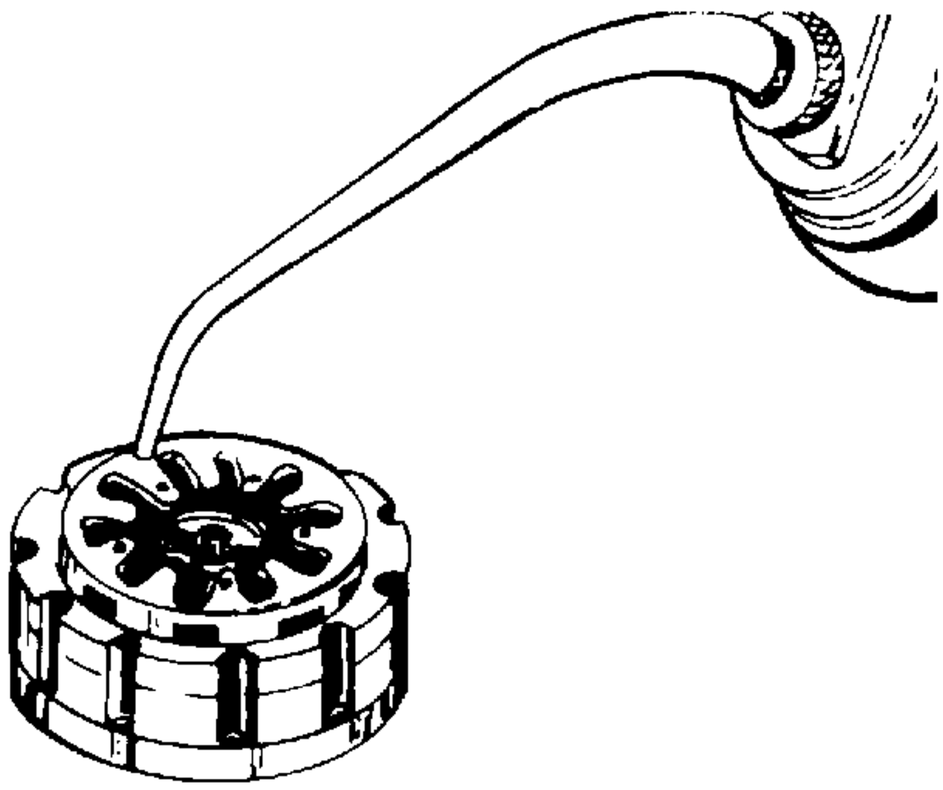


Figure 4-59. Lubricating the Commutator.

14. Place commutator ring (20, Figure 4-1) either side up on top of stator (22). Align commutator ring screw recesses with stator screw slots. See Figure 4-60.

15. Place commutator cover (18, Figure 4-1) on top of commutator ring (20) with flat surface toward commutator. Align screw holes in cover with screw holes in drive plate (24). See Figure 4-61.

16. Screw the eleven hex socket head cap screws (16, Figure 4-1) loosely into metering package. See Figure 4-62.

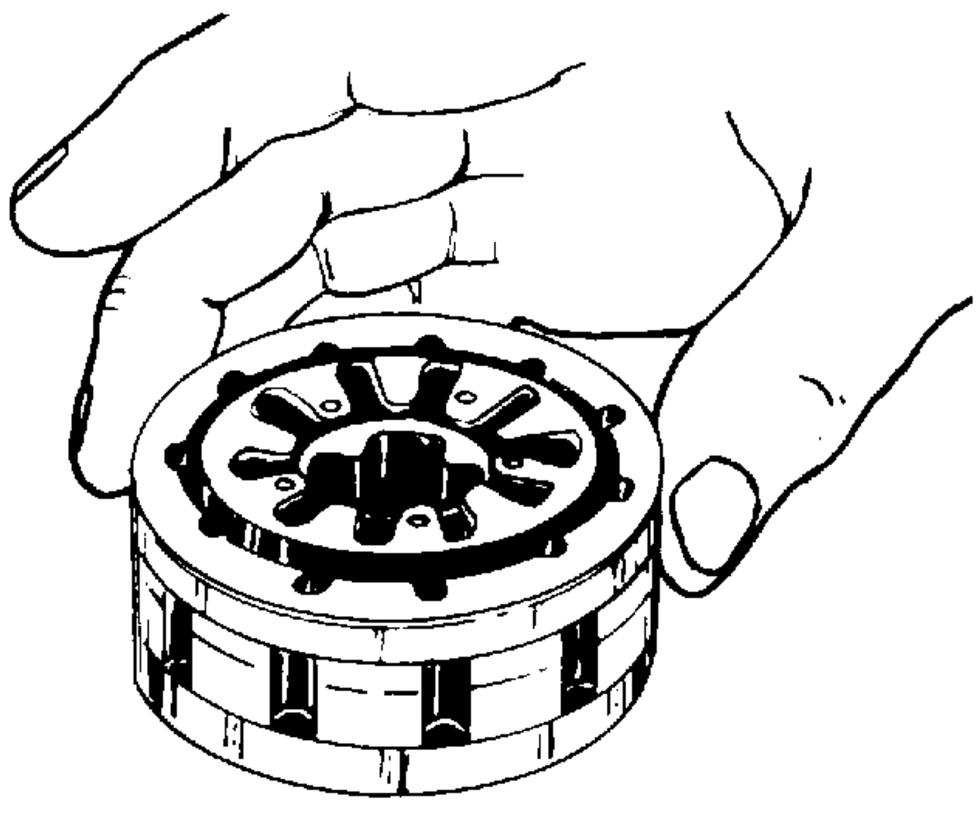


Figure 4-60. Installing Commutator Ring.

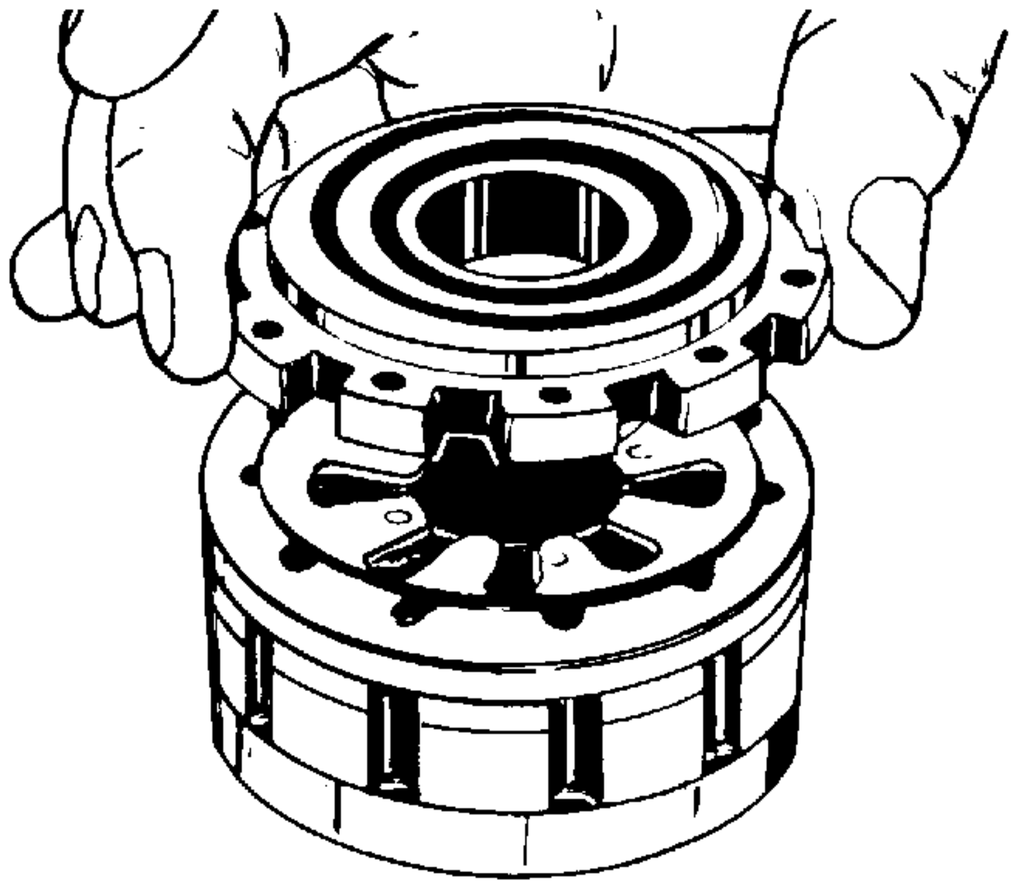


Figure 4-61. Installing Commutator Cover.

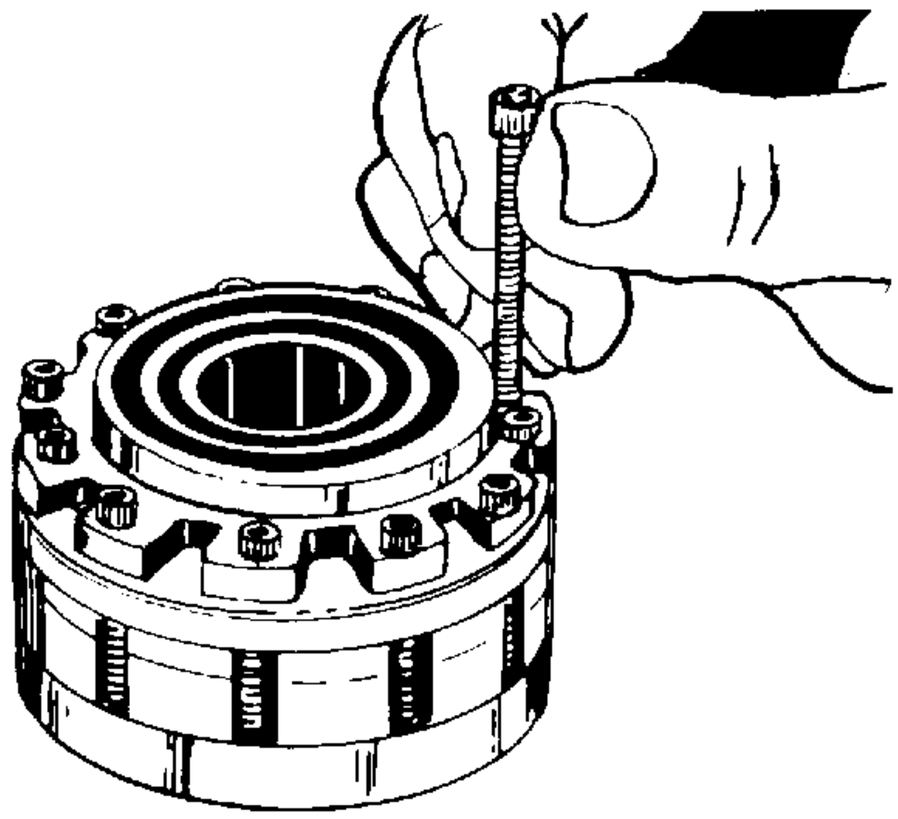


Figure 4-62. Installing Cap Screws.

NOTE

The commutator ring (20, Figure 4-1) must be concentric with drive plate (24) within .005 inch (.127 mm) total indicator reading after tightening the eleven hex socket head cap screws (16). The next two steps are a method of achieving the concentricity.

17. Place the metering ring (39) on a hard flat surface. Place the assembled metering package into the metering ring with the commutator cover (18) down, such that the drive plate (24) is partially out of the metering ring. (A suitable wood block under the metering package will hold it in this position.) See Figure 4-63.

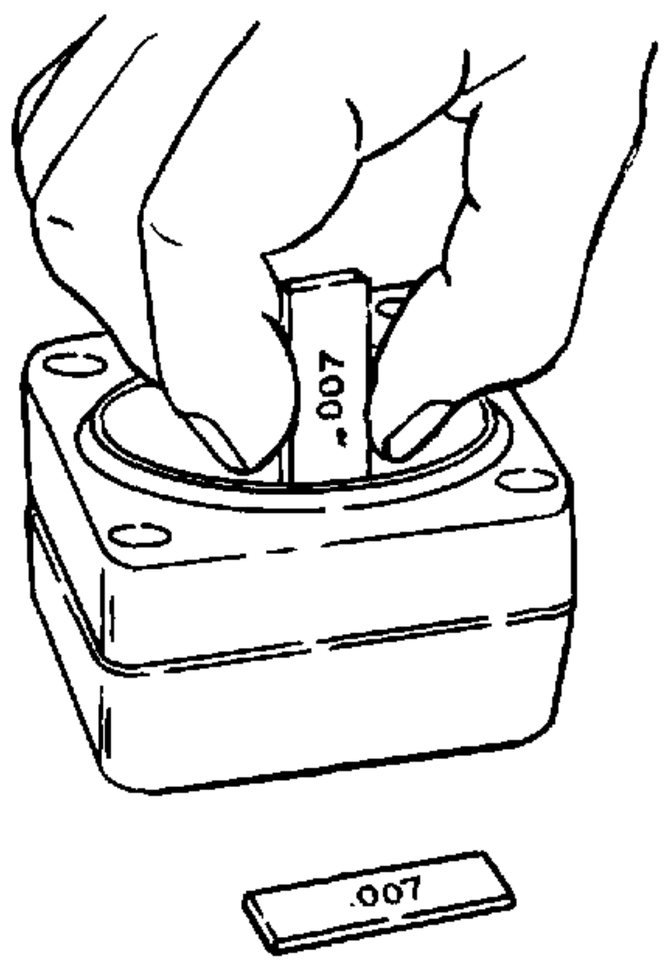


Figure 4-63. Aligning Drive Plate With Metering Ring.

18. Place one piece of .007 inch (.18 mm) shim stock approximately .5 inch (13 mm) wide x 1.5 inch (38 mm) long between the metering ring and drive plate in three places approximately equal distance around the outside diameter of the drive plate. Place another piece of the .007 inch (.18 mm) shim stock between the drive plate and each of the three pieces of shim stock already in place. Lift the metering ring and metering package and remove the wood block. Push the metering package and shims into the metering ring until the drive plate and shims are at least flush with the metering ring. See Figure 4-64.

19. Reverse the metering ring (39, Figure 4-1) and metering package as a unit on the flat surface.

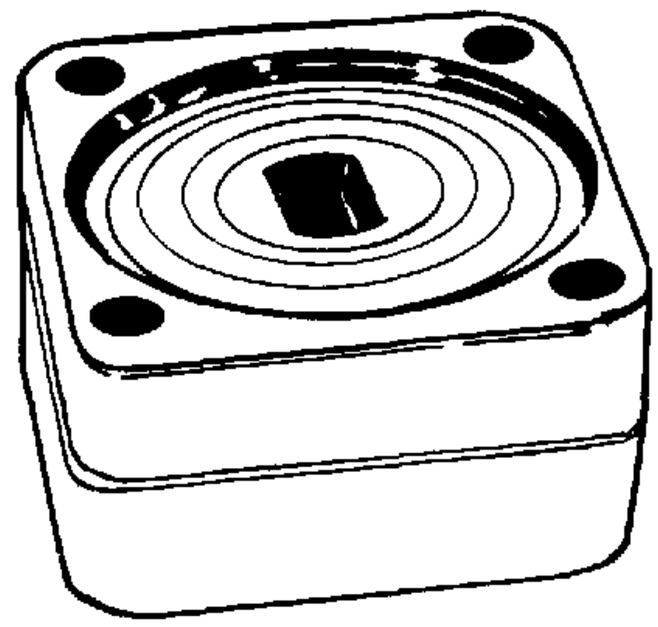


Figure 4-64. Installing Metering Package and Shims In Metering Ring.

Push down on the metering package until the drive plate is on the flat surface. Be sure the cap screws (16) are loose enough to allow the commutator ring (20) and drive plate (24) to align themselves concentrically in the metering ring bore. Gradually tighten the eleven cap screws, following the sequence shown in Figure 4-66, at least twice until a final torque of 11-13 in-lbs (1.24 to 1.47 N·m) is reached. See Figures 4-65 and 4-66. Remove the metering package and shims from the metering ring. Discard the shims.

WARNING

Use care and eye protection while adding and removing shims from metering ring as the shims will be under spring tension and could fly into the air causing injury.

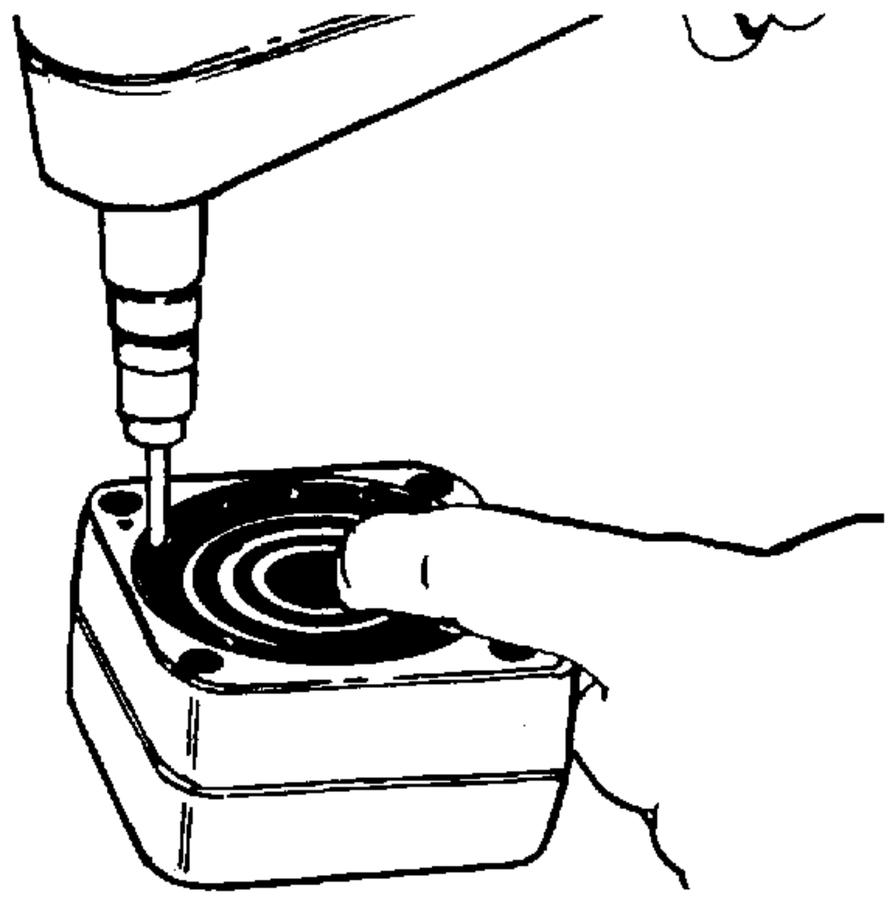


Figure 4-65. Tightening Cap Screws.

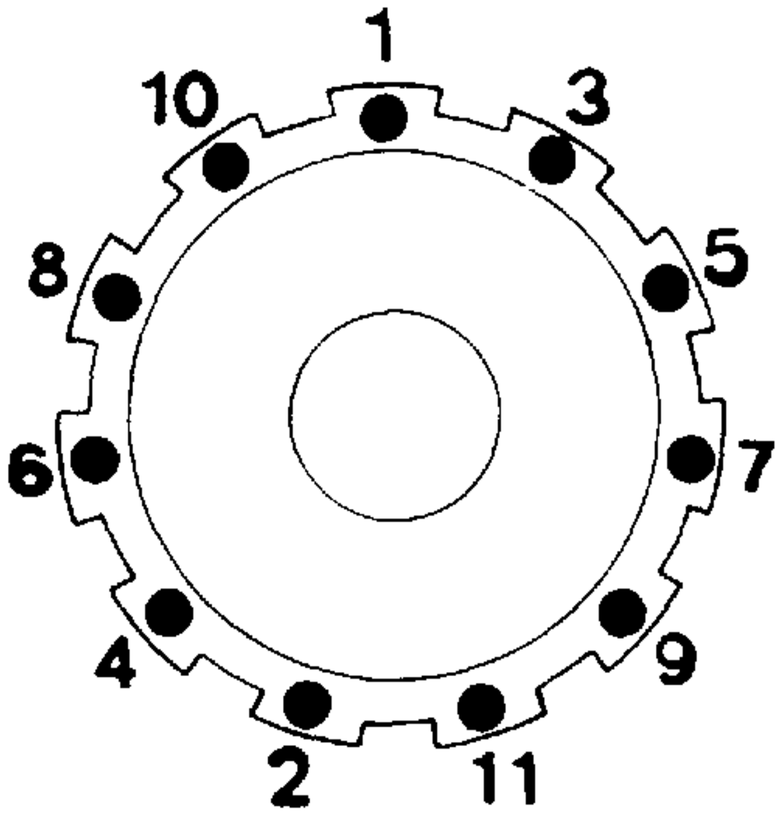


Figure 4-66. Cap Screw Tightening Sequence.

20. Insert large tang of the drive link (14, Figure 4-1) into the slot in the rotor (22). See Figure 4-67.

CAUTION

An incorrect (reversed) assembly of the drive link will prohibit the assembly of the hex drive (9, Figure 4-1) in step 35.

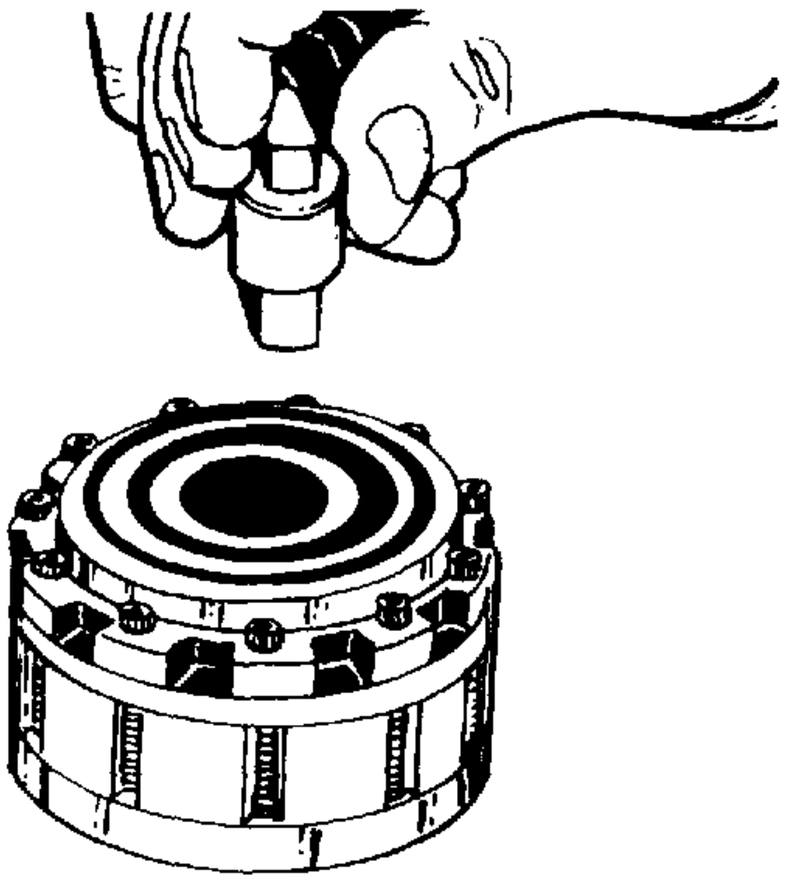


Figure 4-67. Installing Drive Link in Rotor.

21. Grasp the drive link (14) and rotate the metering package by hand to make sure the parts do not bind. The rotor (22) should orbit inside the stator (23). If they bind, disassemble the metering package, correct the cause and repeat the assembly and concentricity procedures. See Figure 4-68.

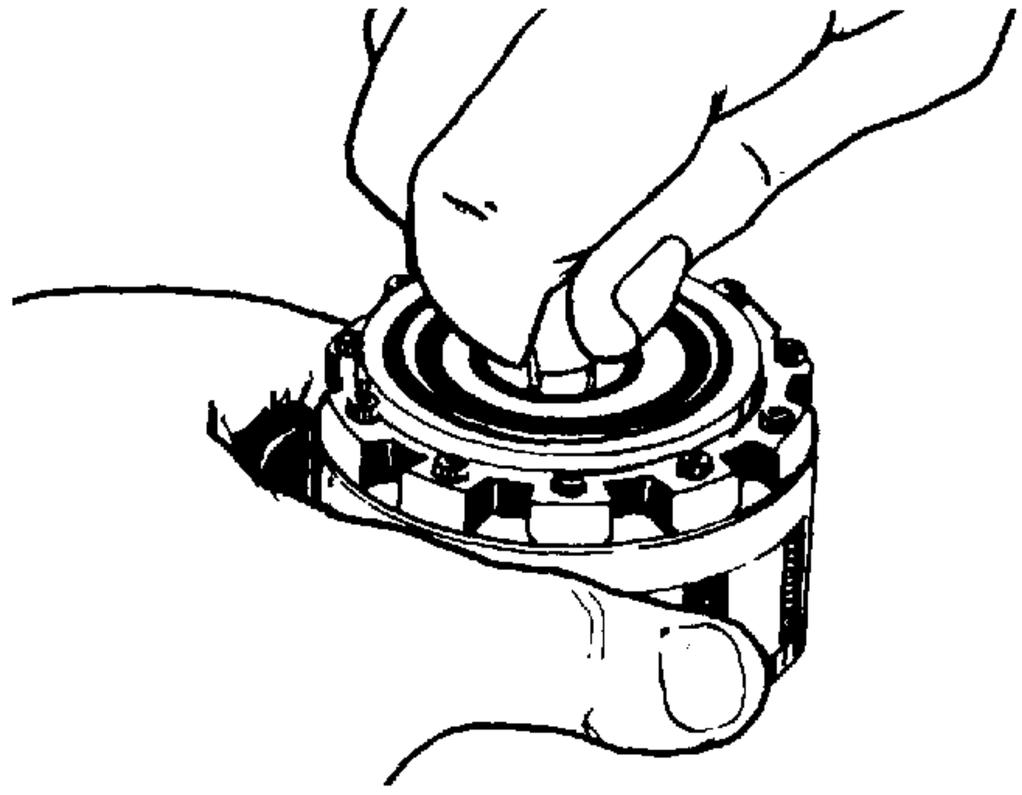


Figure 4-68. Checking Rotor Movement.

22. Apply clean grease to the metering ring seal ring (4, Figure 4-1). Position the seal ring in the metering ring seal groove opposite to the end with the needle roller holes. Stack the metering ring (39) into place, over the four bolts (38), with the seal ring toward the upper cover plate (30), and a needle roller hole on the metering ring in line with and on the same side as the alignment groove on the side of the upper cover plate. See Figure 4-69. This is required so that the other components can be aligned correctly.

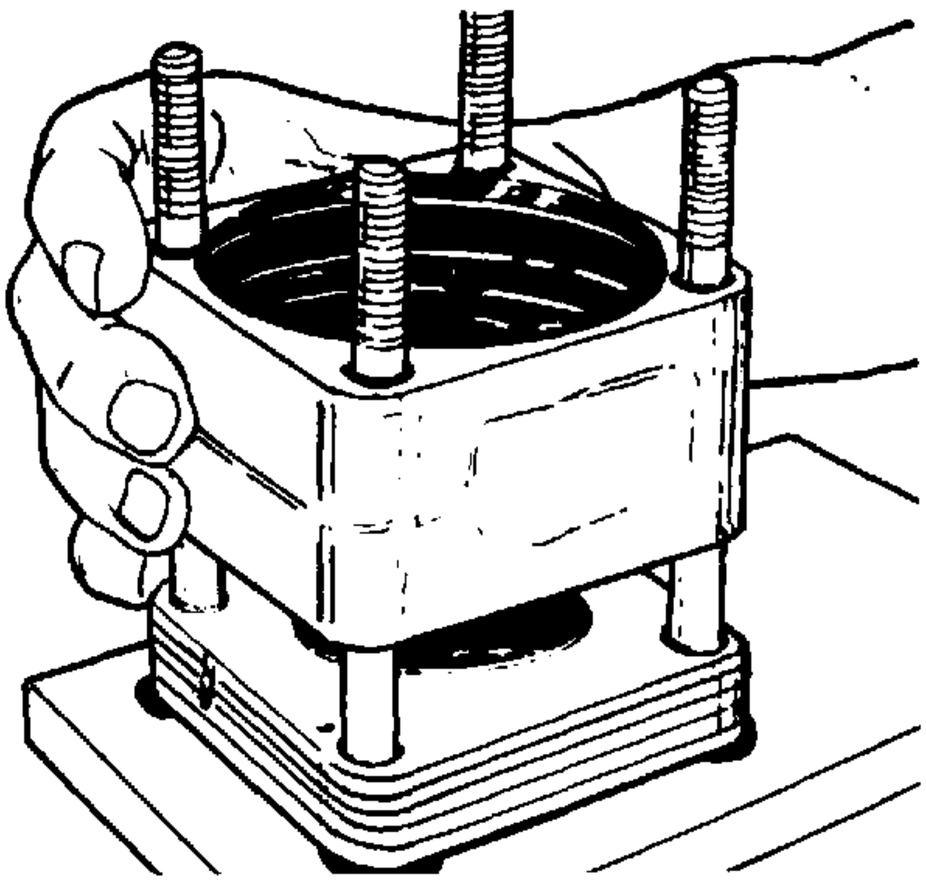


Figure 4-69. Installing Metering Ring.

CAUTION

Be sure the seal ring (4, Figure 4-1) does not slip from position.

23. Place the bearing spacer (25) onto the face of the upper cover plate (30). See Figure 4-70.

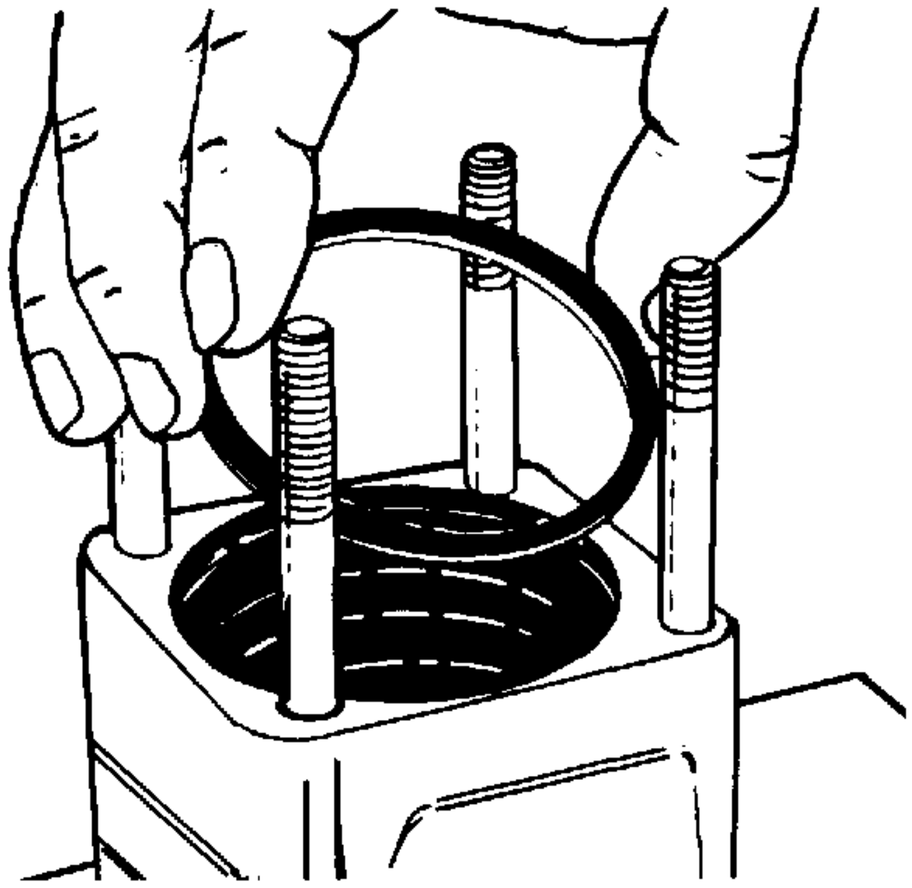


Figure 4-70. Installing Bearing Spacer.

24. Lightly grease roller thrust bearing (26, Figure 4-1), and place it on the upper cover plate (30) inside the bearing spacer (25). See Figure 4-71.

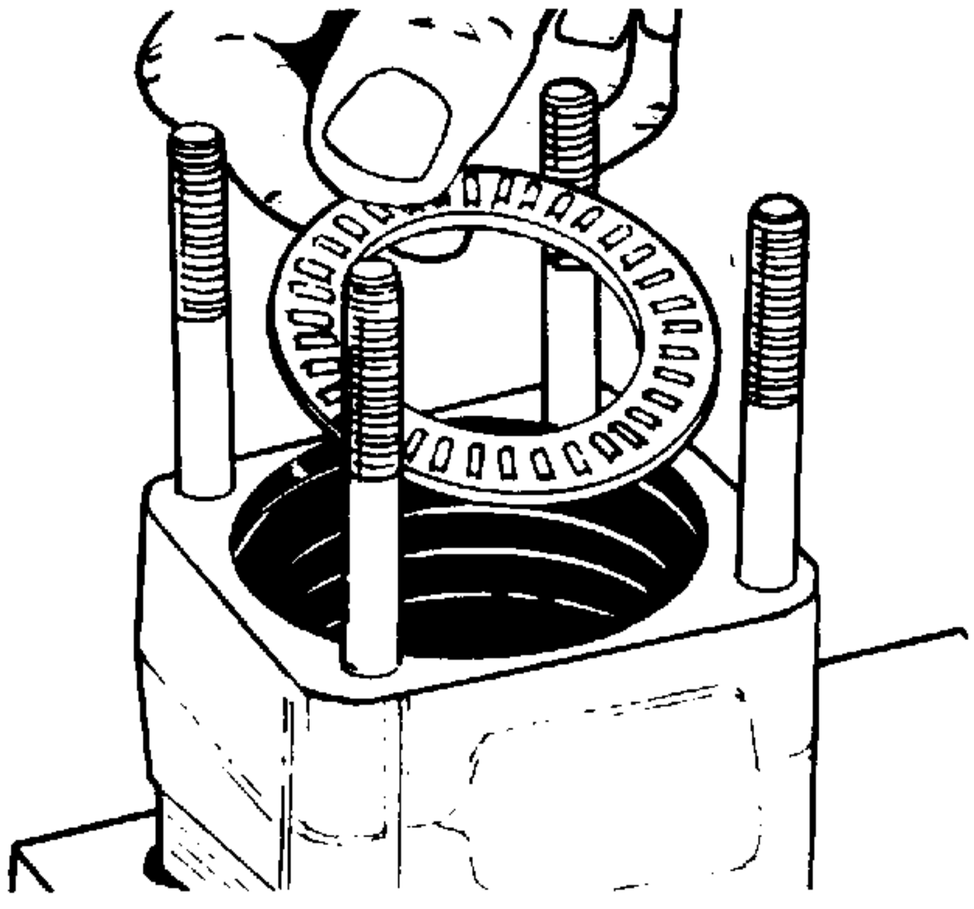


Figure 4-71. Installing Thrust Bearing.

25. Inspect the exposed face of the drive plate (24, Figure 4-1) making sure it is clean and lint free. Apply a small amount of clean grease on the drive plate. Place the metering package, drive plate side first, into the metering ring (39). Revolve the input shaft (31) or metering package until the hole in the drive plate (24) engages the end of the input shaft and drive plate (24) is seated on the thrust bearing (26). When properly seated, the metering package will be below the surface of the metering ring (39). See Figures 4-72 and 4-73.

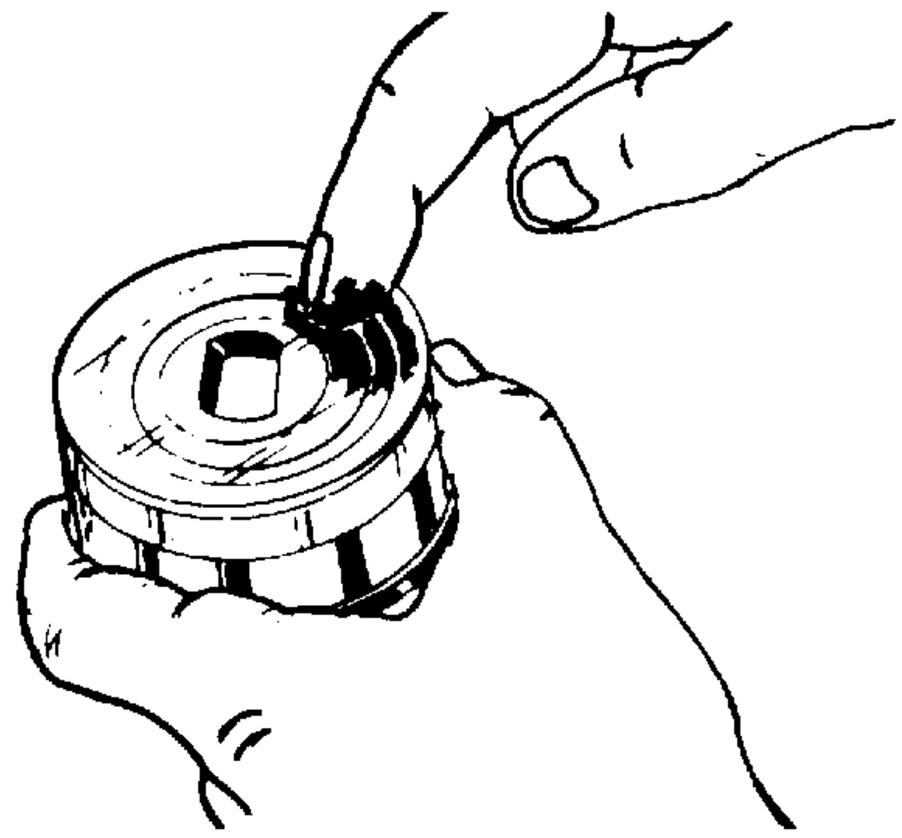


Figure 4-72. Installing Metering Package.

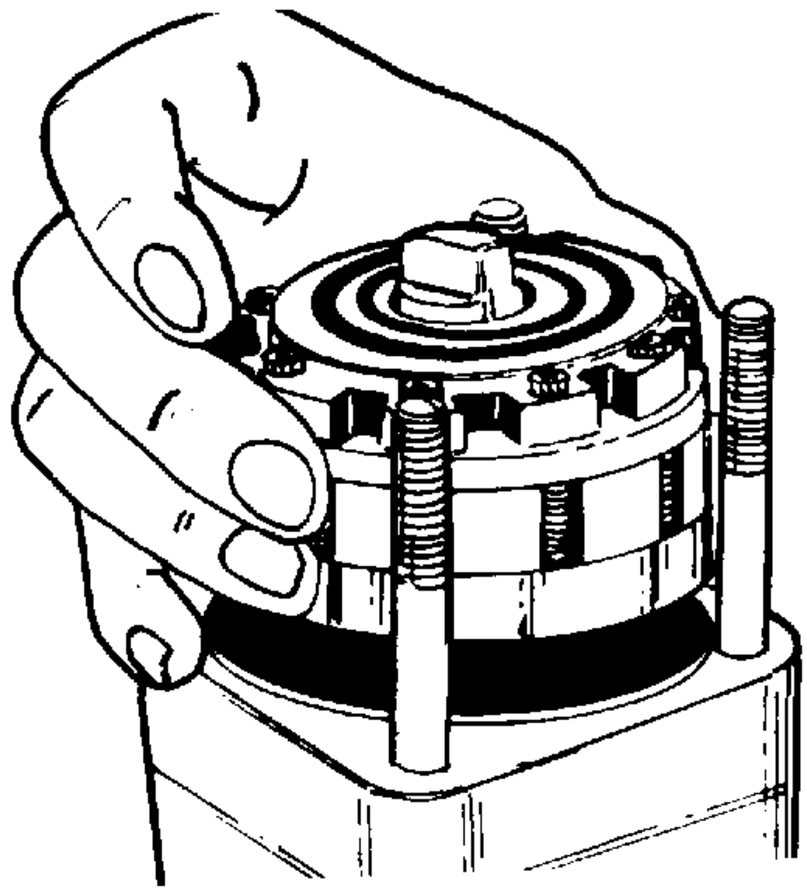


Figure 4-73. Metering Package Properly Installed.

26. Grease the new commutator cover seal (17, Figure 4-1) and place it into the commutator cover (18) seal groove. The rubber portion (the softer side) of the seal with the yellow mark must be placed into the seal groove. See Figure 4-74.

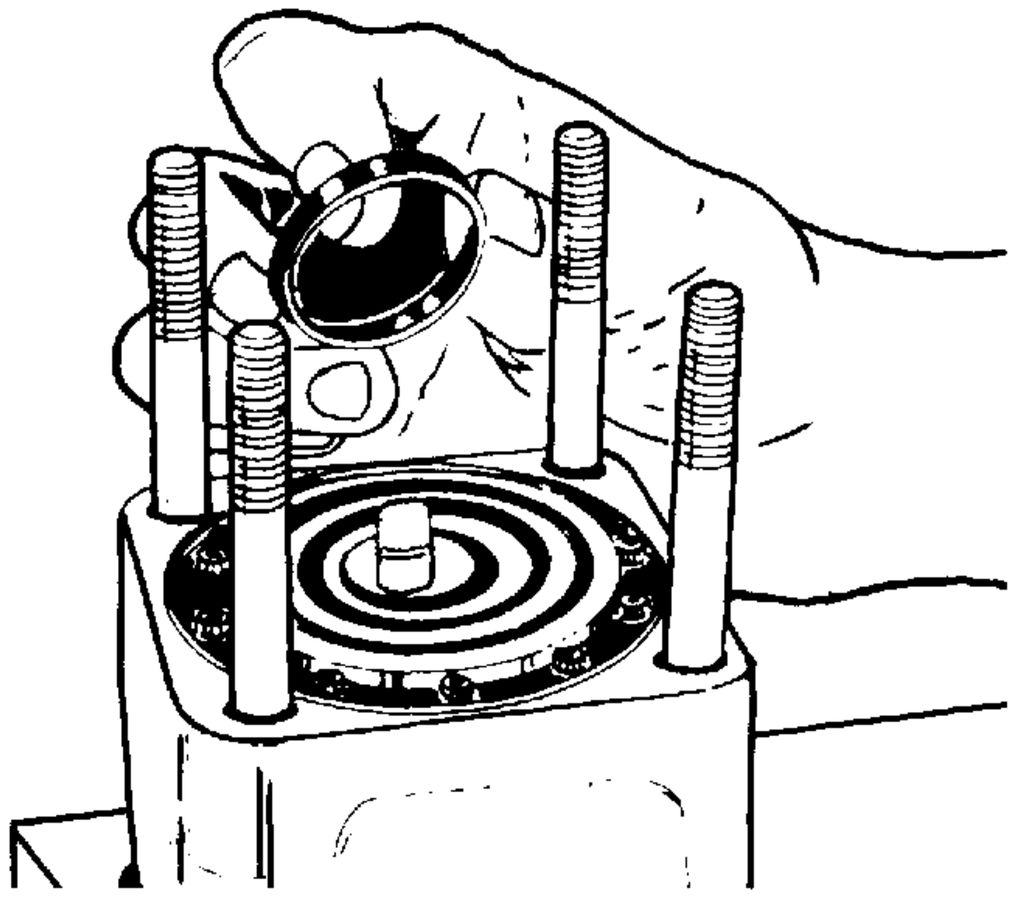


Figure 4-74. Installing Commutator Seal.

27. Apply clean grease to the metering ring seal ring (4, Figure 4-1). Place the seal ring into the metering ring seal ring groove. See Figure 4-75.

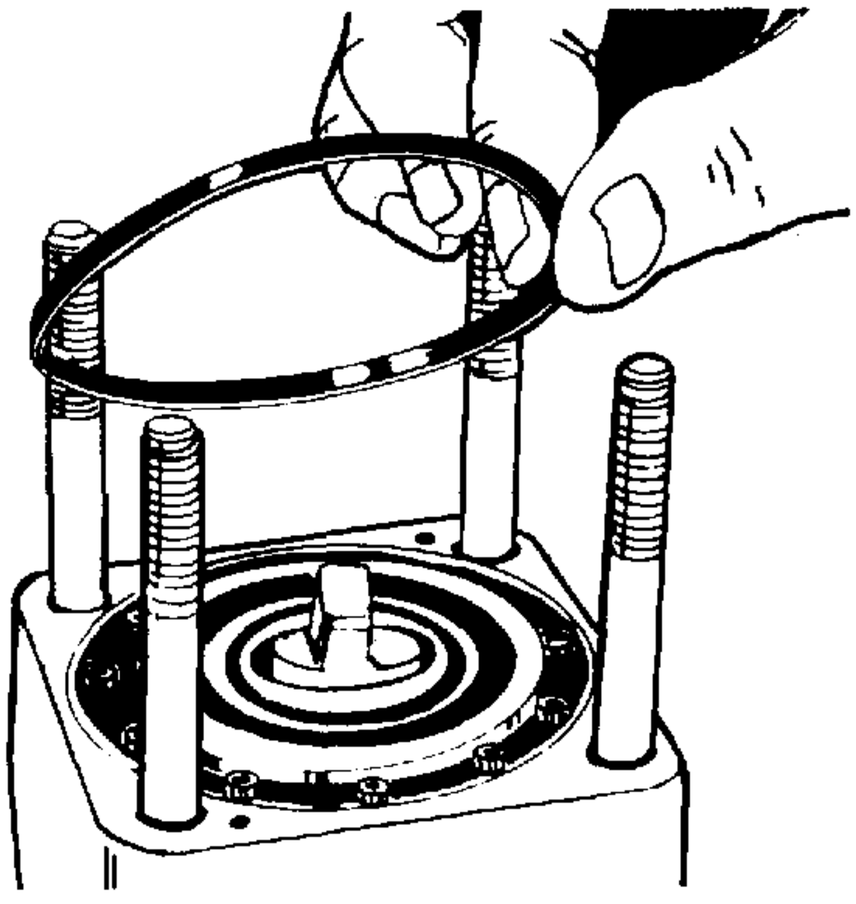


Figure 4-75. Installing Metering Ring Seal Ring.

28. Place two needle rollers (11, Figure 4-1) into the metering ring (39). See Figure 4-76.

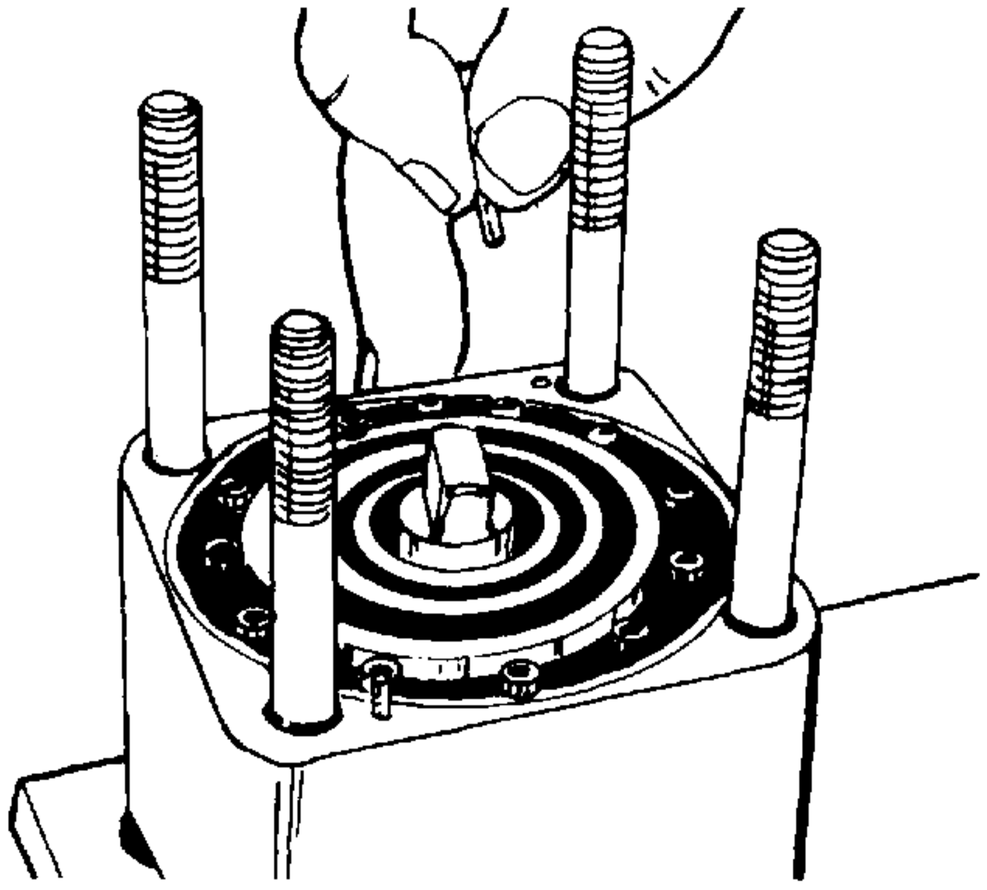


Figure 4-76. Installing Needle Rollers.

29. Stack the isolation manifold (13, Figure 4-1) (4 plates bonded together) onto the metering ring (39) aligning the grooves on the side of the manifold with the grooves on the side of the upper cover plate (30) and the needle roller holes with the needle rollers in the metering ring. The isolation manifold surface without the recessed slots must be placed toward the metering ring. See Figure 4-77.

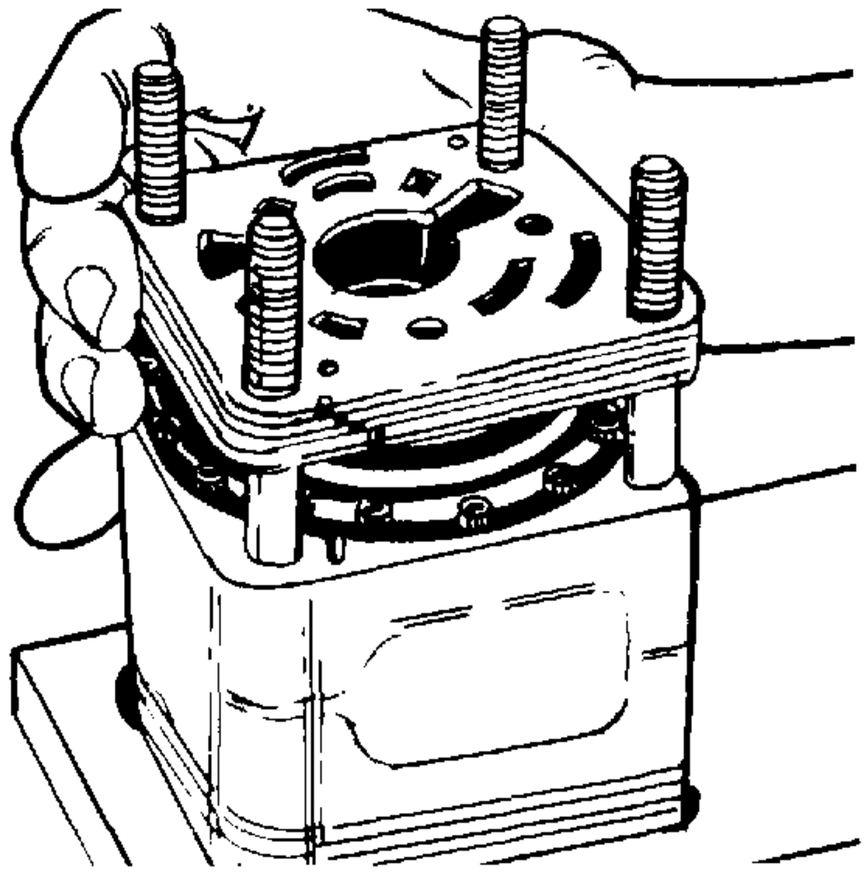


Figure 4-77. Installing Isolation Manifold.

30. Install two needle rollers (11, Figure 4-1) into the isolation manifold (13). See Figure 4-78.

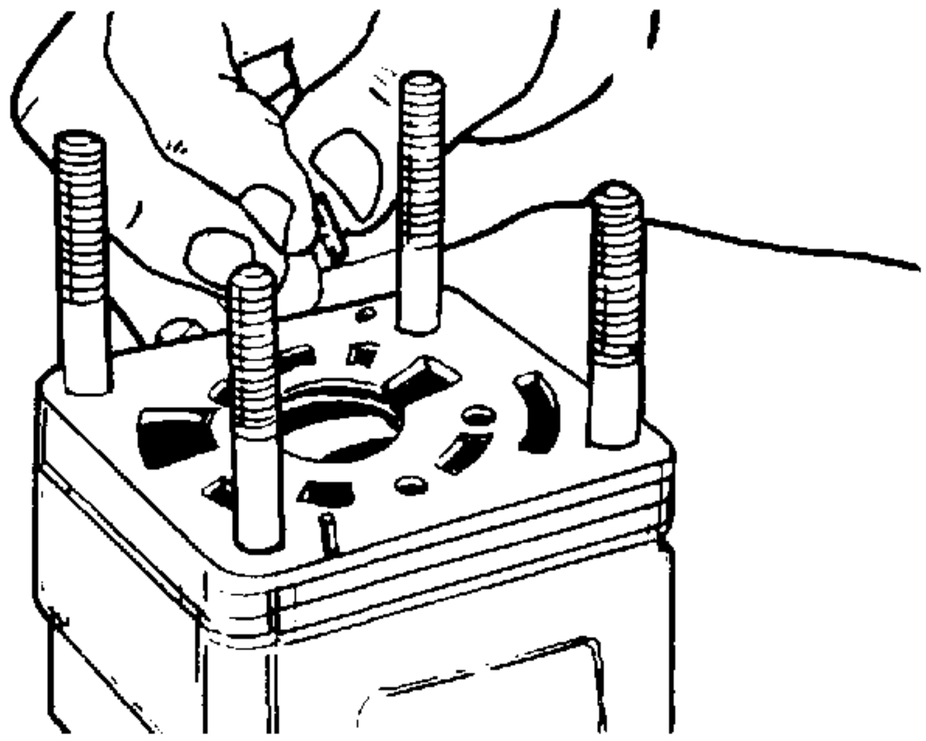


Figure 4-78. Installing Needle Rollers.

31. Place the three 1/2-inch (13 mm) springs (8, Figure 4-1) into the spring pockets of the isolation manifold (13). See Figure 4-79.

NOTE

Two different length springs are used in the unit. Be sure to use the 1/2-inch (13 mm) length springs (8, Figure 4-1) during this part of the assembly.

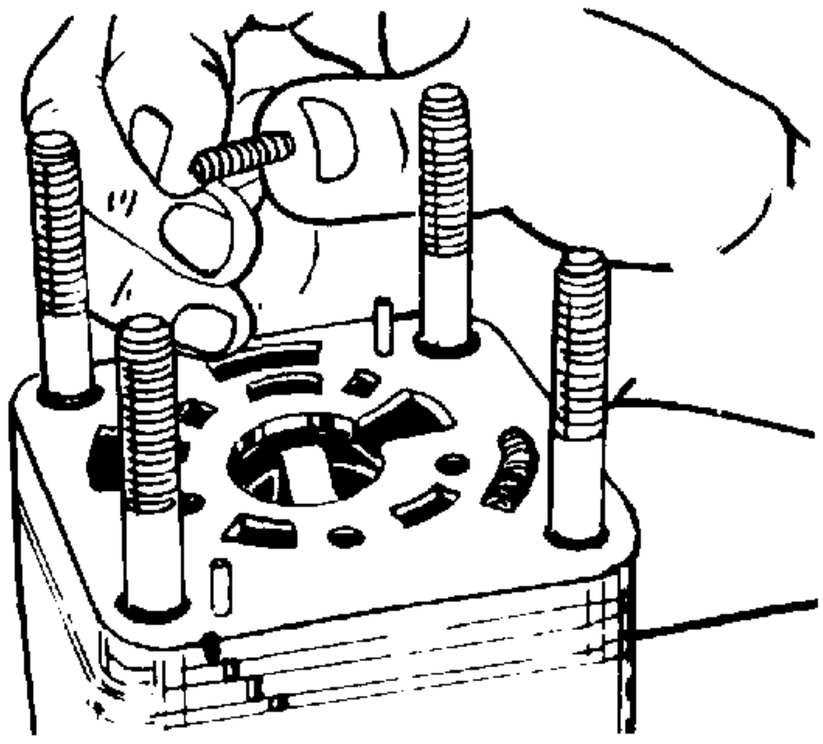


Figure 4-79. Installing 1/2-Inch Springs.

32. Apply clean grease to a seal ring (4) and place it in the valve and ring assembly (12) recess that will face down when installed. Install the valve and ring assembly over the bolts and needle rollers with seal ring facing the isolation manifold (13). See Figure 4-80.

CAUTION

Be sure seal ring is seated correctly after valve and ring assembly is assembled.

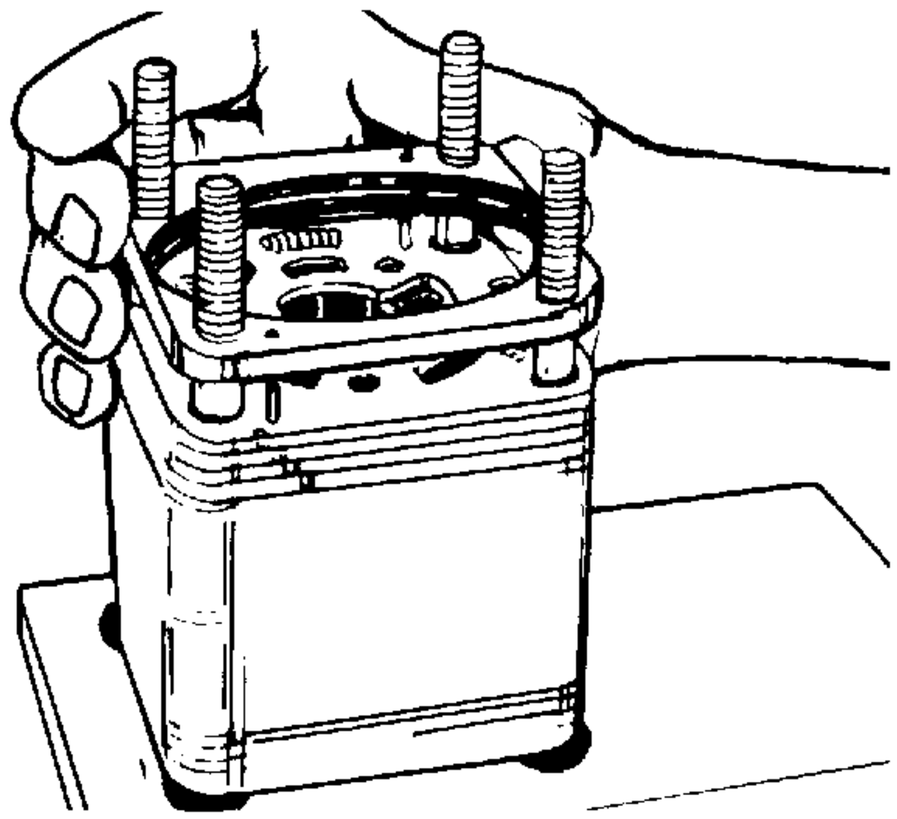


Figure 4-80. Installing Valve and Ring Assembly.

33. Place hex drive assembly (9, Figure 4-1), pin side up, through the hole in the isolation manifold (13). The slot in the hex drive must be engaged with the small tang of the drive link (14). Turn the input shaft assembly (31) to assist the engagement. See Figure 4-81.

NOTE

If hex drive does not readily assemble on drive link, see CAUTION note after assembly step 22.

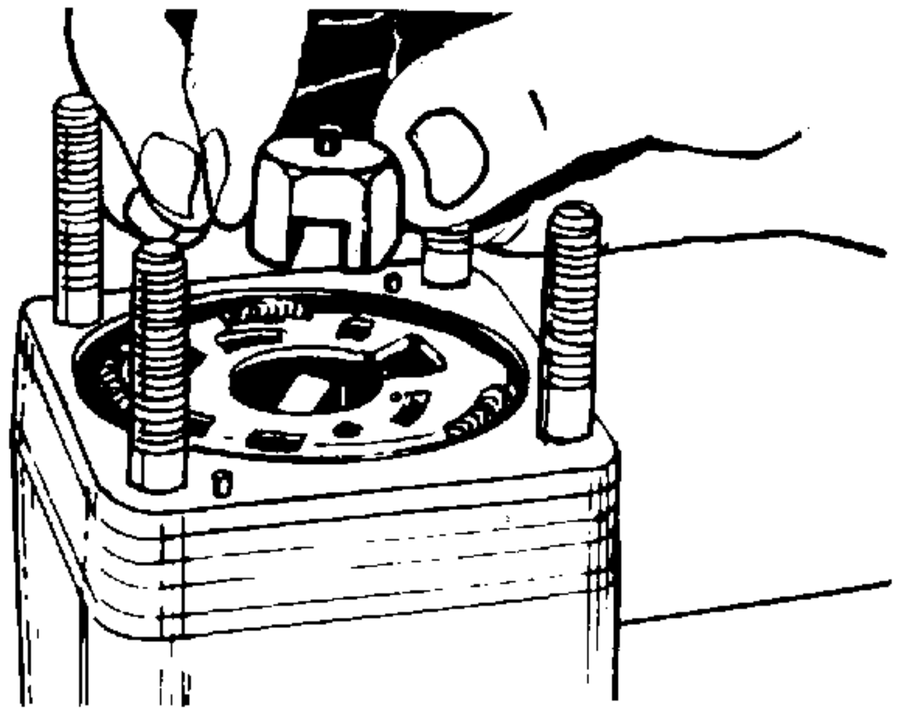


Figure 4-81. Installing Hex Drive Assembly.

34. To install the valve plate (15, Figure 4-1) correctly, first carefully study Figures 4-82 and 4-83 for positioning of the valve plate spring slots and its other cavities in relation to the spring and spring recesses on the isolation manifold (13, Figure 4-1). Be sure to use the alignment grooves on the side of the isolation manifold for orientation.

35. Place the valve plate (15) with the surface that reads SHAFT SIDE down over the hex drive assembly (9), aligning the three spring slots centrally over the three springs placed in the spring recesses of the isolation manifold (13). The valve plate spring slot with the small cavity and then the words PORT SIDE centrally below it as pointed to in Figure 4-82, must be placed over the spring and spring recess in the isolation manifold at the top (12 o'clock) as shown in Figures 4-82 and 4-83. Adjust the valve plate position radially to centralize the spring slots over the springs and the spring recesses in the isolation manifold.

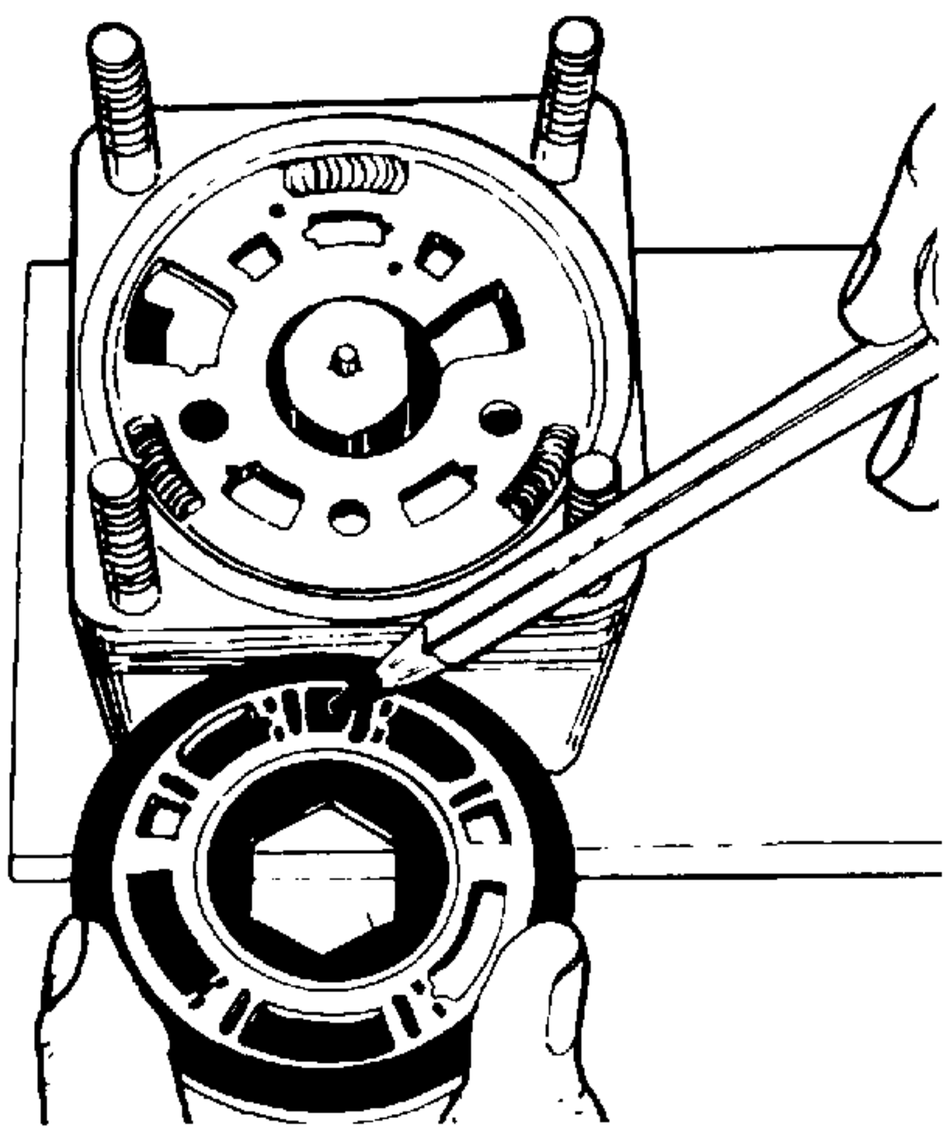


Figure 4-82. Installing the Valve Plate.

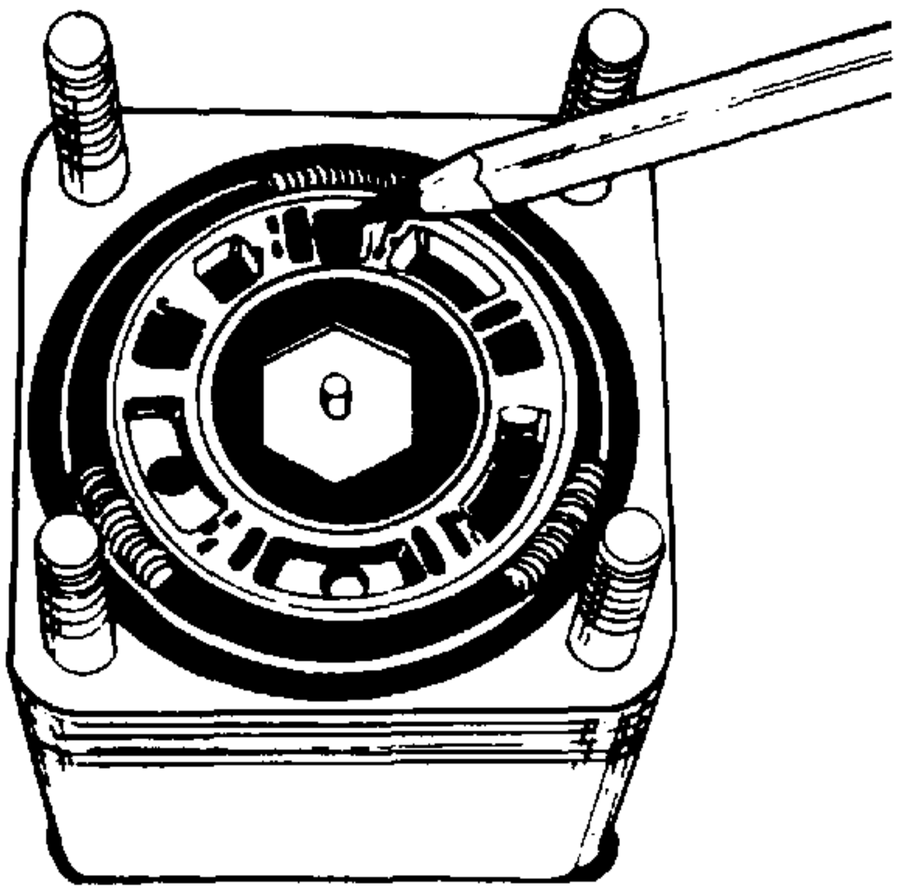


Figure 4-83. Valve Plate Correctly Installed.

CAUTION

The unit will not function if the valve plate is not positioned on the isolation manifold exactly as shown in Figure 4-83. If the valve plate spring slots, isolation manifold spring recesses and springs are not centrally aligned in this step, the springs could be damaged when the port manifold is placed on the assembly.

36. Apply clean grease to seal ring (4, Figure 4-1). Install seal ring in the valve and ring assembly (12). See Figure 4-84.

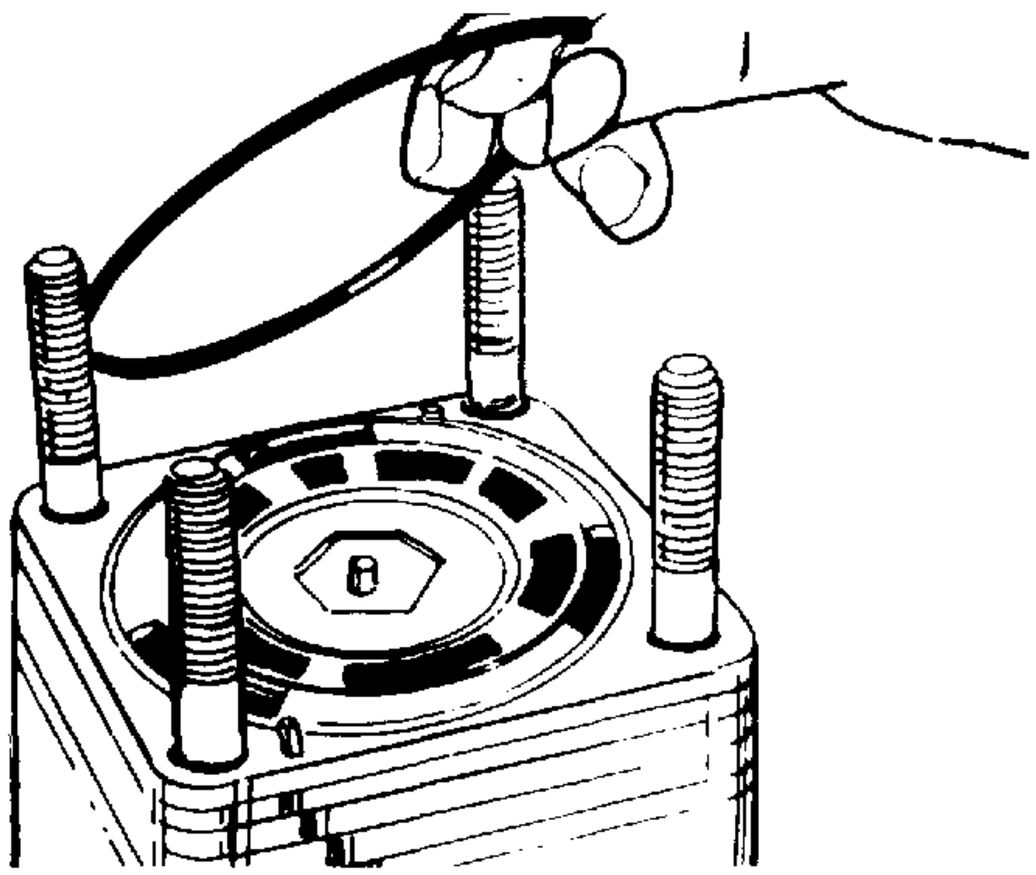


Figure 4-84. Installing Seal Ring.

37. Place port manifold (6, Figure 4-1) valve side up on a clean surface. Install three 3/4-inch (19 mm) springs (7) into the spring pockets. See Figure 4-85.

38. Apply a few drops of oil to the valve plate (15, Figure 4-1). Align the grooves on the side of the port manifold (6) with the grooves on the side of the isolation manifold (13) and assemble the port manifold with the springs toward the valve plate (15). Be careful not to pinch a spring during

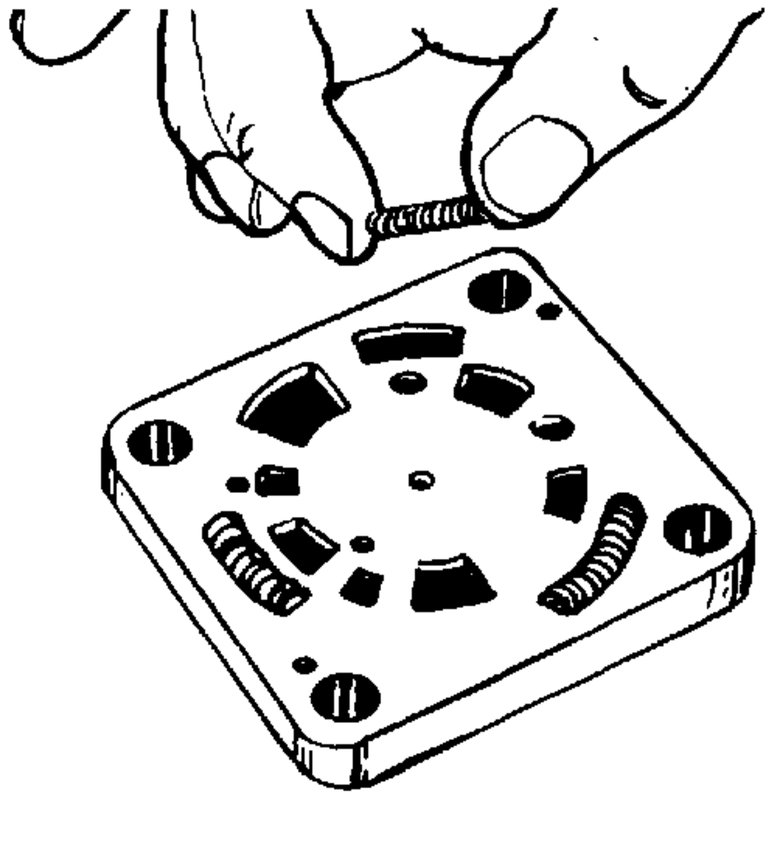


Figure 4-85. Installing 3/4-inch Springs.

installation. The two needle rollers (11) in the valve plate will engage the holes in the port manifold. The roller on the hex drive assembly (9) must engage the center hole in the port manifold. See Figure 4-86.

39. Insert check ball (3, Figure 4-1) into check ball hole in power cylinder cover (2). Be sure ball (3) is seated in bottom of check ball hole. See Figure 4-87.

40. Apply clean grease to the four or five O-rings (5, Figure 4-1) as required and seal ring (4). Place the new O-rings (5) and seal ring (4) into their proper location in power cylinder cover (2). See Figure 4-88.

41. Align a groove on the side of the cover (2, Figure 4-1) with the grooves on the side of the port manifold (6) and place the cover (2) into position. See Figure 4-89.

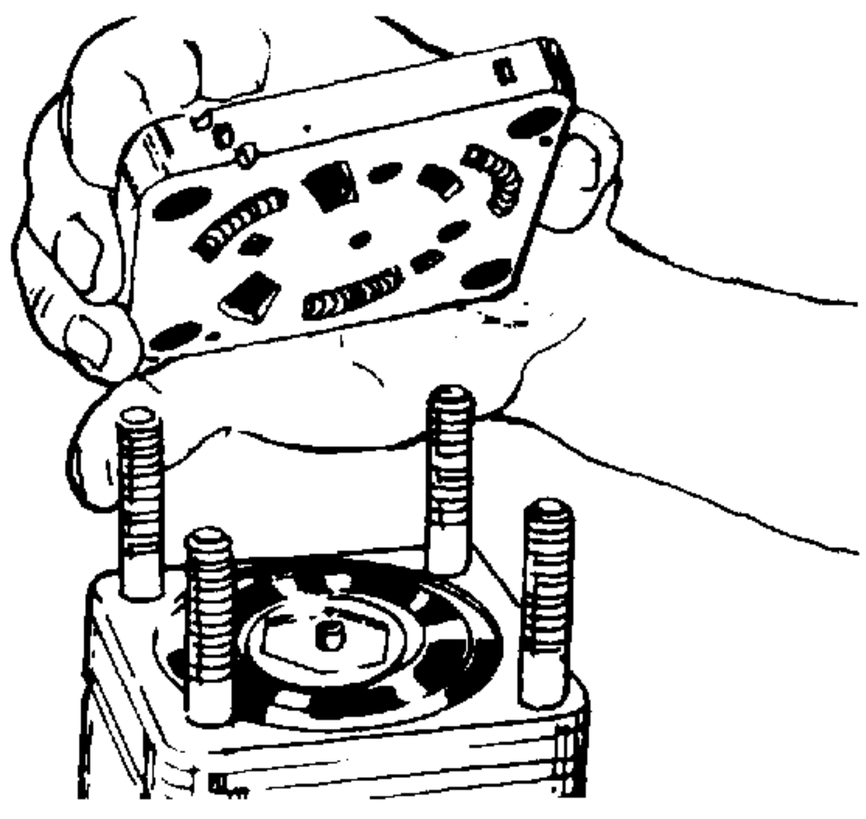


Figure 4-86. Installing Port Manifold.

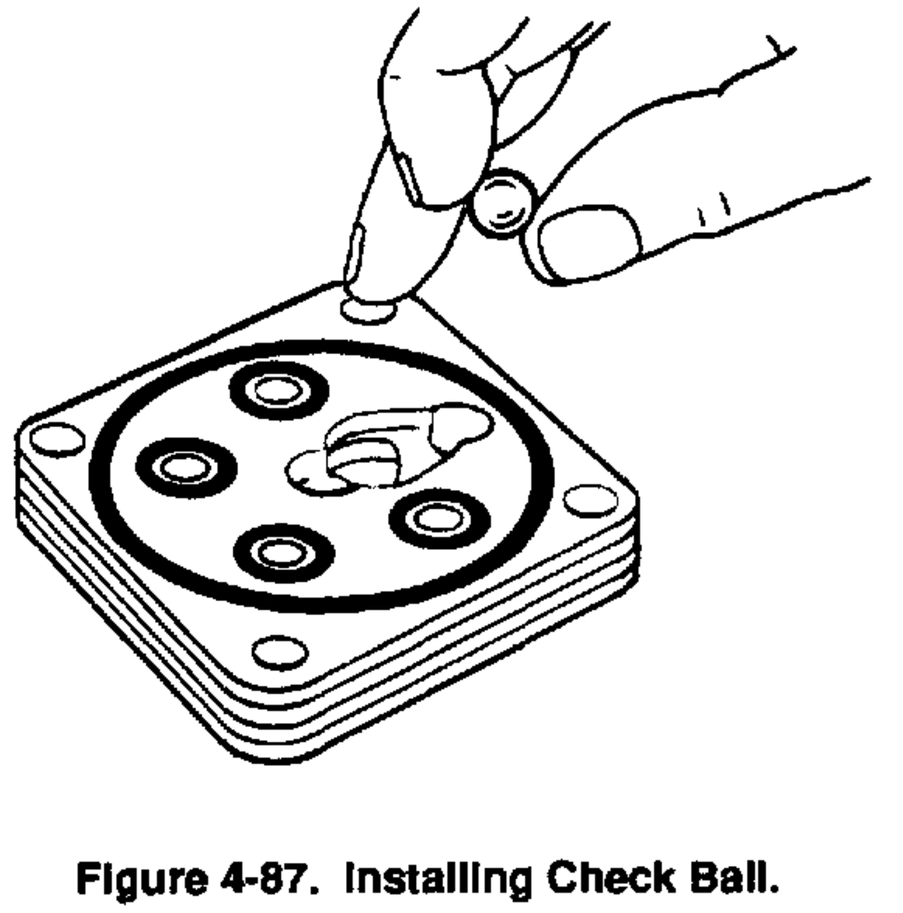


Figure 4-87. Installing Check Ball.

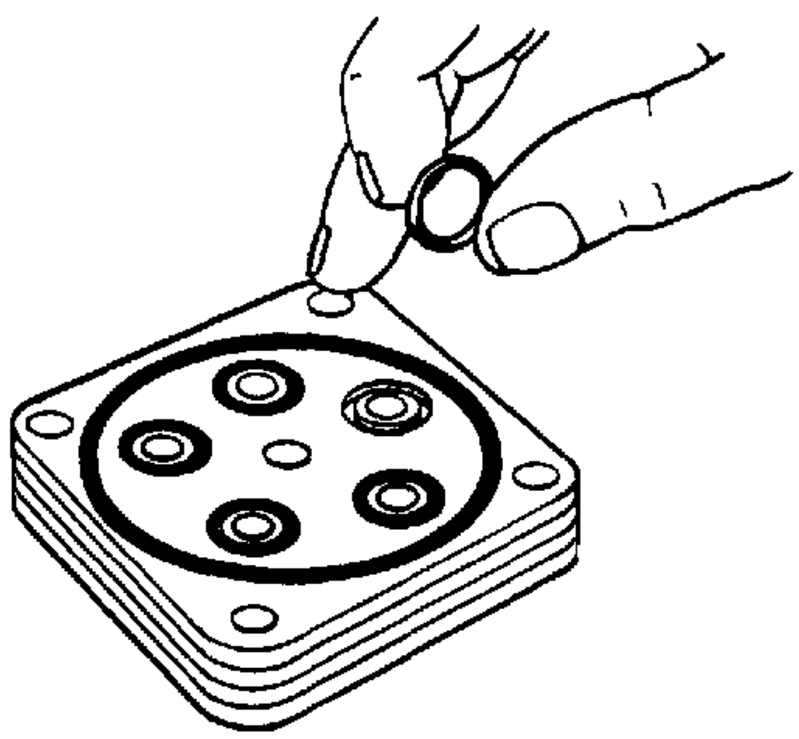


Figure 4-88. Installing O-Ring and Seal Ring in Power Cylinder Cover.

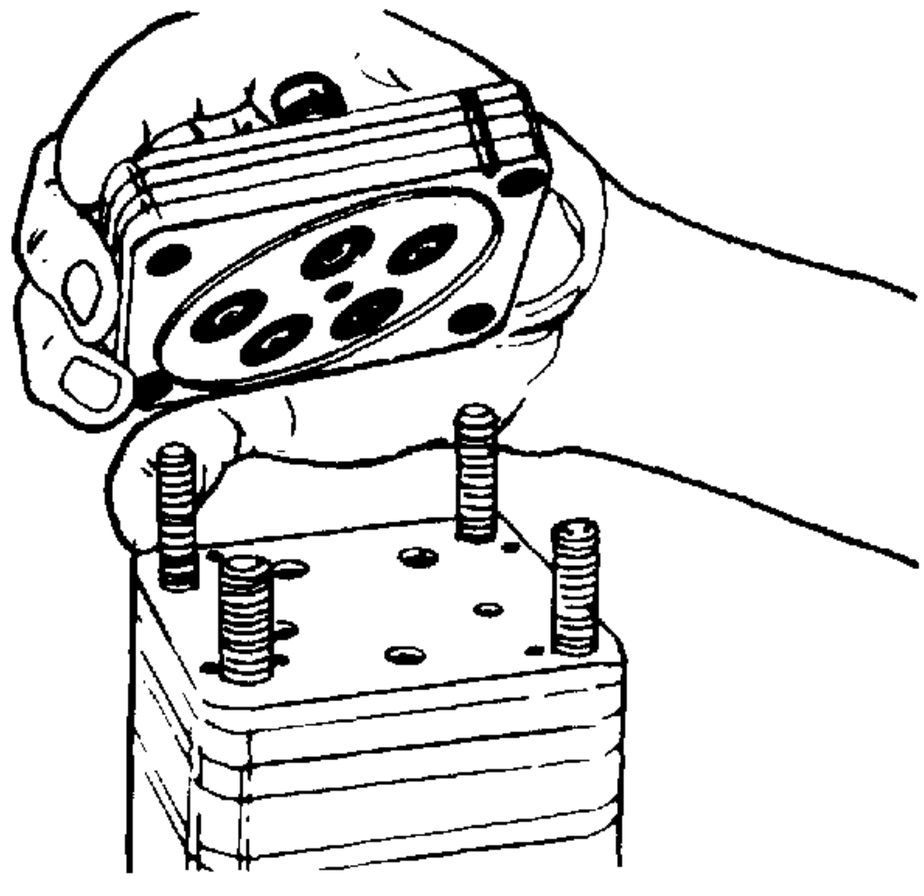


Figure 4-89. Installing Power Cylinder Cover.

42. Install nuts (1, Figure 4-1) onto special bolts (38). Tighten each one gradually until resistance is felt. Torque to 18-22 ft-lbs (24-30 N·m) in sequence shown. See Figures 4-90 and 4-91.

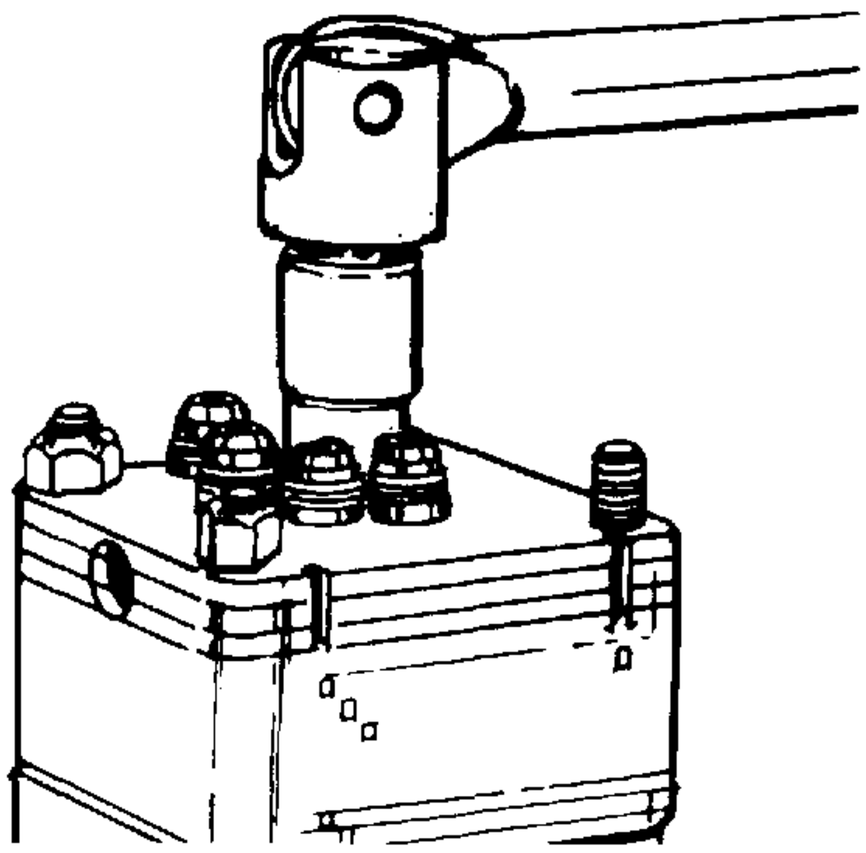


Figure 4-90. Installing Nuts on Special Bolts.

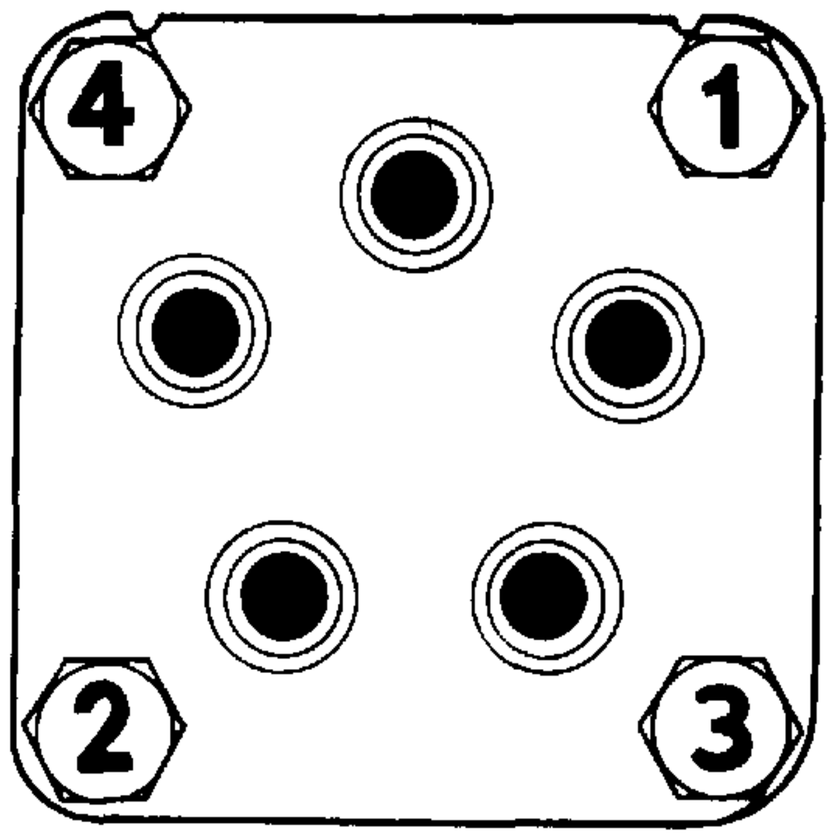


Figure 4-91. Nut Tightening Sequence.

43. Apply a small amount of clean grease on the lip of the dust seal (37, Figure 4-1). Install the seal onto the upper cover and tube assembly (35). See Figure 4-92.

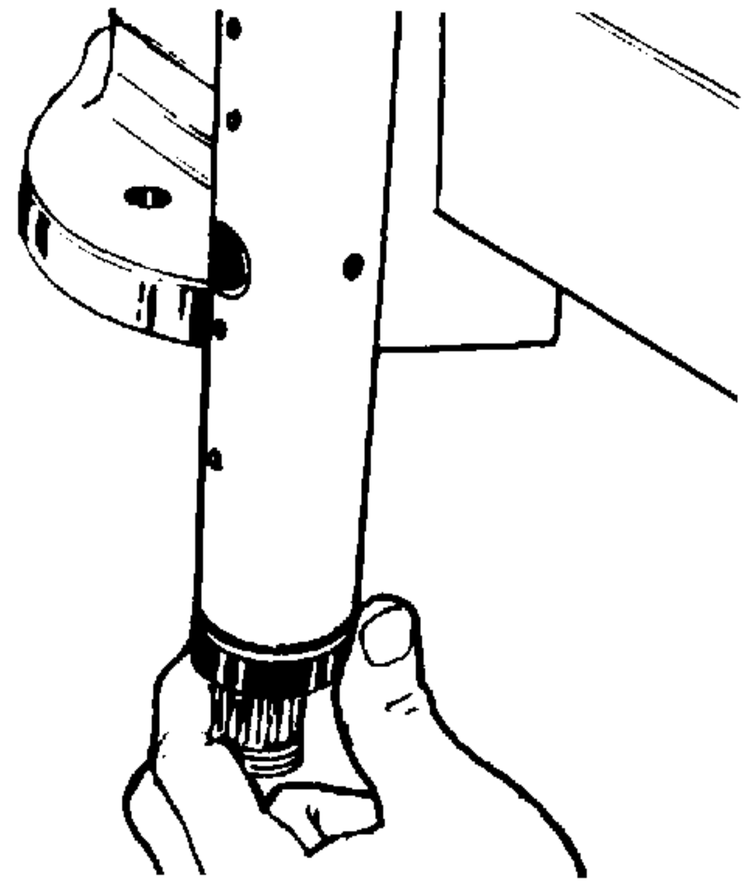


Figure 4-92. Installing Dust Seal on Upper Cover and Tube Assembly.

44. Make a final check of the relative groove positions on the side of the unit. See Figure 4-94. Disassemble and correct any misassembly. Remove the four nuts holding the unit to the fixture and remove the unit. See Figure 4-93.

45. For hydraulic fluid, filling and air bleeding, refer to page 0-00.

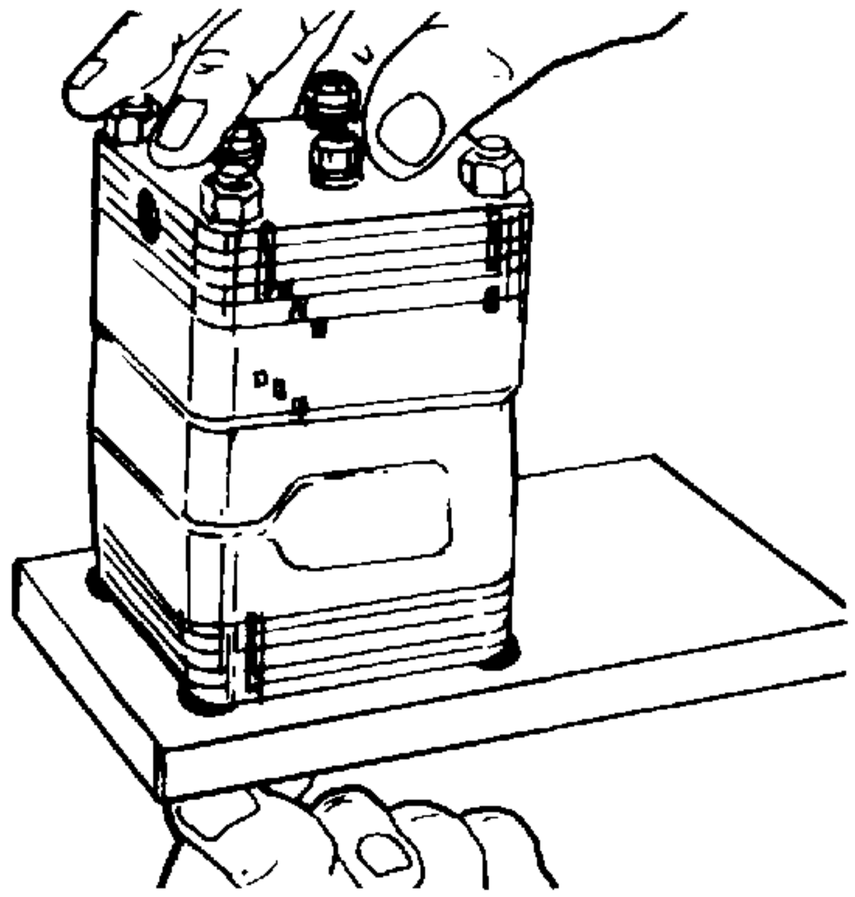


Figure 4-93. Removing Unit From Fixture.

COMPONENTS OF THE UNIT WITH ALIGNMENT GROOVES MUST BE ASSEMBLED SO THAT THEIR ALIGNMENT GROOVES ARE POSITIONED AS ILLUSTRATED FOR THE UNIT TO FUNCTION CORRECTLY.

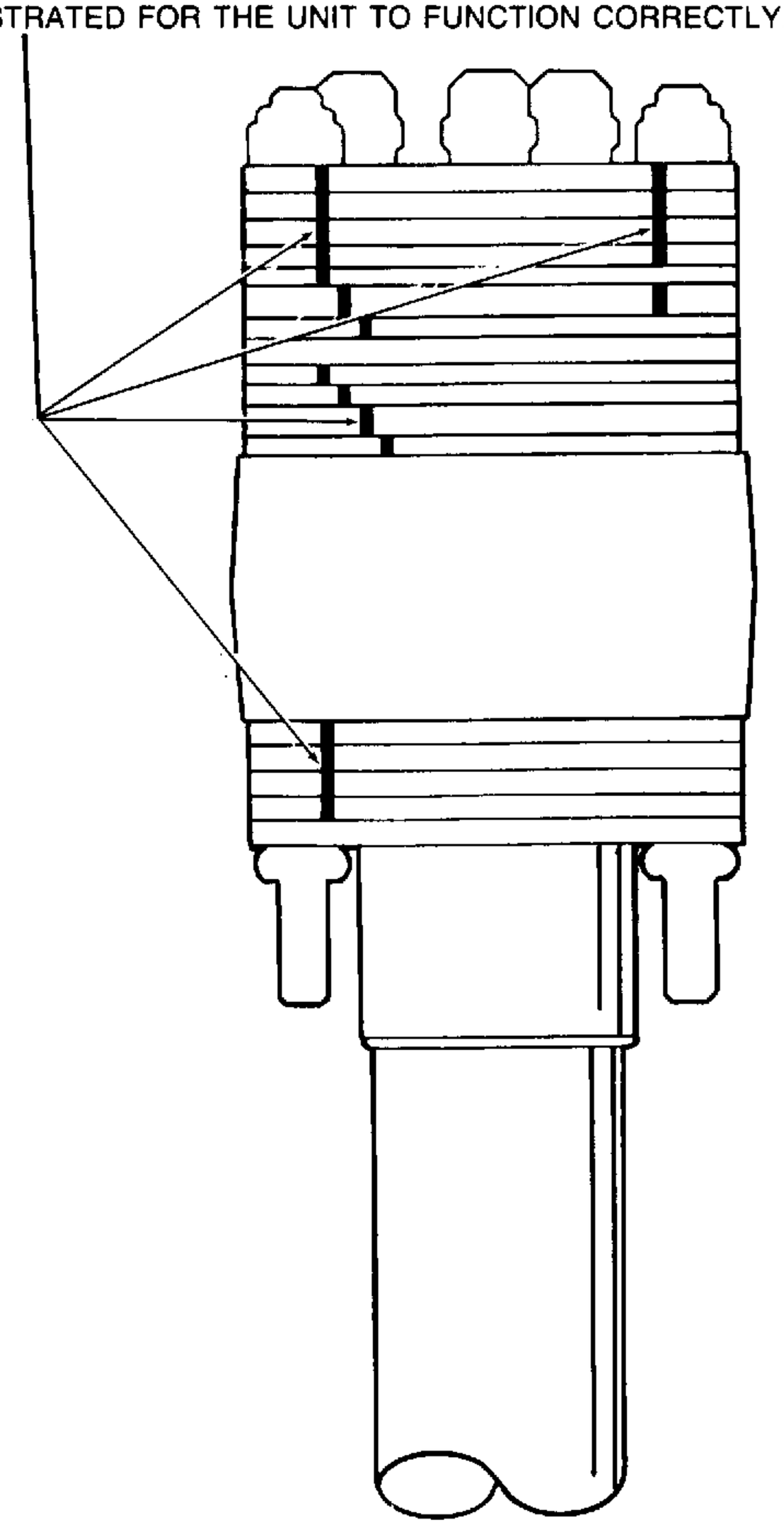


Figure 4-94. Component Alignment Groove Illustration.

SECTION 5
CORRECTIVE MAINTENANCE

5-1. GENERAL.

5-1.1 This section contains instructions necessary to return garden tractors and mower decks, covered in this manual, to operating condition after trouble has been identified or isolated.

5-1A. CONFIGURATION CHANGES.

5-1A.1 Numerous refinements were made in Cub Cadet garden tractors and super garden tractors for the 1991 model year (tractors with serial numbers 811,672 and above). Where possible, these configuration changes are covered in existing paragraphs containing instructions for 1990 model tractors. **In some instances, earlier model tractors may be upgraded to the 1991 specifications during repair.** Where changes are extensive, they are covered separately in new paragraphs, such as 5-12A and 5-12B. The new paragraphs immediately follow existing paragraphs and are clearly referenced by tractor serial number for correct identification.

5-2. MAJOR COMPONENTS.

5-2.1 Corrective maintenance for major components of garden tractors, and spindle assemblies and gearboxes of mower decks, can be quickly referenced by paragraph number in Tables 5-1 and 5-2 located on pages 5-1 through 5-3.

Table 5-1. Reference Chart for Garden Tractors

	1340	1535	1541	1782	1860	1862	1882	2082	2182
Battery and Electrical Components	5-7	5-8	5-8	5-9	5-8	5-8	5-8	5-8	5-10
Battery Tray and Air Baffles		5-12	5-12		5-12	5-12	5-12	5-12	
Battery Tray and Heat Baffles	5-11		5-12B[6]				5-12A[6]	5-12A[6]	
Brakes and Connections	5-41	5-42	5-41	5-43	5-41	5-41	5-43	5-43	5-43
Brake Caliper Assembly	5-44	5-44	5-44	5-44	5-44	5-44	5-44	5-44	5-44
Clutch and Controls		5-58							
Charge Pump and Implement Relief Valves	5-52B		5-52B[2]	5-52B	5-52B	5-52B	5-52B	5-52B	5-52B
Creeper Drive		5-59							
Drive Line	5-48		5-48[1] 5-49[4]	5-50	5-48[3] 5-49[5]	5-48	5-50	5-50	5-50

1 Tractors with serial numbers 800,000 through 800,349 and 800,534 and above.
2 Tractors with serial numbers 816,508 and below.
3 Tractors with serial numbers 800,000 through 800,461 and 800,596 and above.
4 Tractors with serial numbers 800,350 through 800,533.
5 Tractors with serial numbers 800,462 through 800,595.
6 Tractors with serial numbers 811,672 and above.

Table 5-1. Reference Chart for Garden Tractors (Continued)

	1340	1535	1541	1782	1860	1862	1882	2082	2182
Electrical System	5-13	5-14	5-13	5-15	5-13	5-13	5-13	5-13	5-15
Engine Mounting	5-67								
Engine Mounting, Muffler and Air Duct		5-64	5-64		5-64	5-64	5-64	5-64	
Engine Removal	5-65	5-65	5-65	5-66	5-65	5-65	5-65	5-65	5-66
Fenders and Foot Rest	5-26	5-26	5-26	5-27	5-26	5-26	5-27	5-27	5-27
Frame	5-68	5-68	5-68	5-68	5-68	5-68	5-68	5-68	5-68
Front Axle and Connections	5-21	5-21	5-21		5-21				
Front Axle and Connections – Power Steering Cylinder and Hydraulic Lines				5-23		5-22	5-23	5-23	5-23
Front Wheel	5-19	5-19	5-19	5-19	5-19	5-19	5-19	5-19	5-19
Fuel Tank	5-45	5-45	5-45	5-46	5-45	5-45	5-45	5-45	5-45
Fuel Pump		5-46A[1]	5-46A[1]			5-46A[1]	5-46A[1]	5-46A[1]	
Hood, Grille and Side Panels	5-4	5-4	5-4	5-5	5-4	5-4	5-4	5-4	5-5
Hydraulic Lift Controls			5-36 5-36A[2]	5-37		5-37	5-37	5-37	5-37
Hydrostatic Transmission	5-53		5-54[3] 5-54A[2]	5-55	5-53	5-54	5-55	5-55	5-55
Implement Lift and Hydraulic Cylinder			5-39	5-40		5-39	5-40	5-40	5-40
Implement Lift Handle	5-38	5-38			5-38				
Lower Steering	5-31	5-31	5-31		5-31				
Muffler and Air Duct	5-63								
Oil Filter		5-66A	5-66A			5-66A	5-66A	5-66A	
Pedestal, Instrument Panel and Engine Controls	5-28	5-28	5-28	5-29	5-28	5-28	5-28	5-28	5-29
Power Steering Box Assembly				5-33		5-33	5-33	5-33	5-33
Power Steering Hydraulics				5-35		5-35	5-35	5-35	5-35

1 Tractors with serial numbers 811,501 and above.
2 Tractors with serial numbers 816,509 and above.
3 Tractors with serial numbers 800,001 through 816,508.

Table 5-1. Reference Chart for Garden Tractors (Continued)

	1340	1535	1541	1782	1860	1862	1882	2082	2182
PTO Clutch	5-16	5-17	5-17		5-17	5-17	5-17	5-17	
PTO Clutch and Clutch Breakdown				5-18					5-18
Radiator Removal				5-6					5-6 5-6A[1]
Rear Axle Carrier	5-51	5-51	5-51	5-51	5-51	5-51	5-51	5-51	5-51
Rear Wheel	5-20	5-20	5-20	5-20	5-20	5-20	5-20	5-20	5-20
Seat and Support		5-25							
Seat and Track Assembly	5-24		5-24	5-24	5-24	5-24	5-24	5-24	5-24
Steering Mounting						5-34			
Steering Mounting, Power Steering Cylinder and Hydraulic Lines				5-32			5-32	5-32	5-32
Transmission Controls	5-47		5-47	5-47	5-47	5-47	5-47	5-47	5-47
Transmission – Differential	5-52	5-52	5-52 5-52A[2]	5-52	5-52	5-52	5-52	5-52	5-52
Transmission – Gear Shift		5-60							
Transmission – Rear Housing and Gear Housing		5-62							
Transmission – Rear Transaxle and Adapter Housing	5-56		5-56	5-57	5-56	5-56	5-57	5-57	5-57
Transmission – Reduction Housing		5-61							
Upper Steering	5-30	5-30	5-30	5-30	5-30	5-30	5-30	5-30	5-30

1 Tractors with serial numbers 816,536 and above.
2 Tractors with serial numbers 816,509 and above.

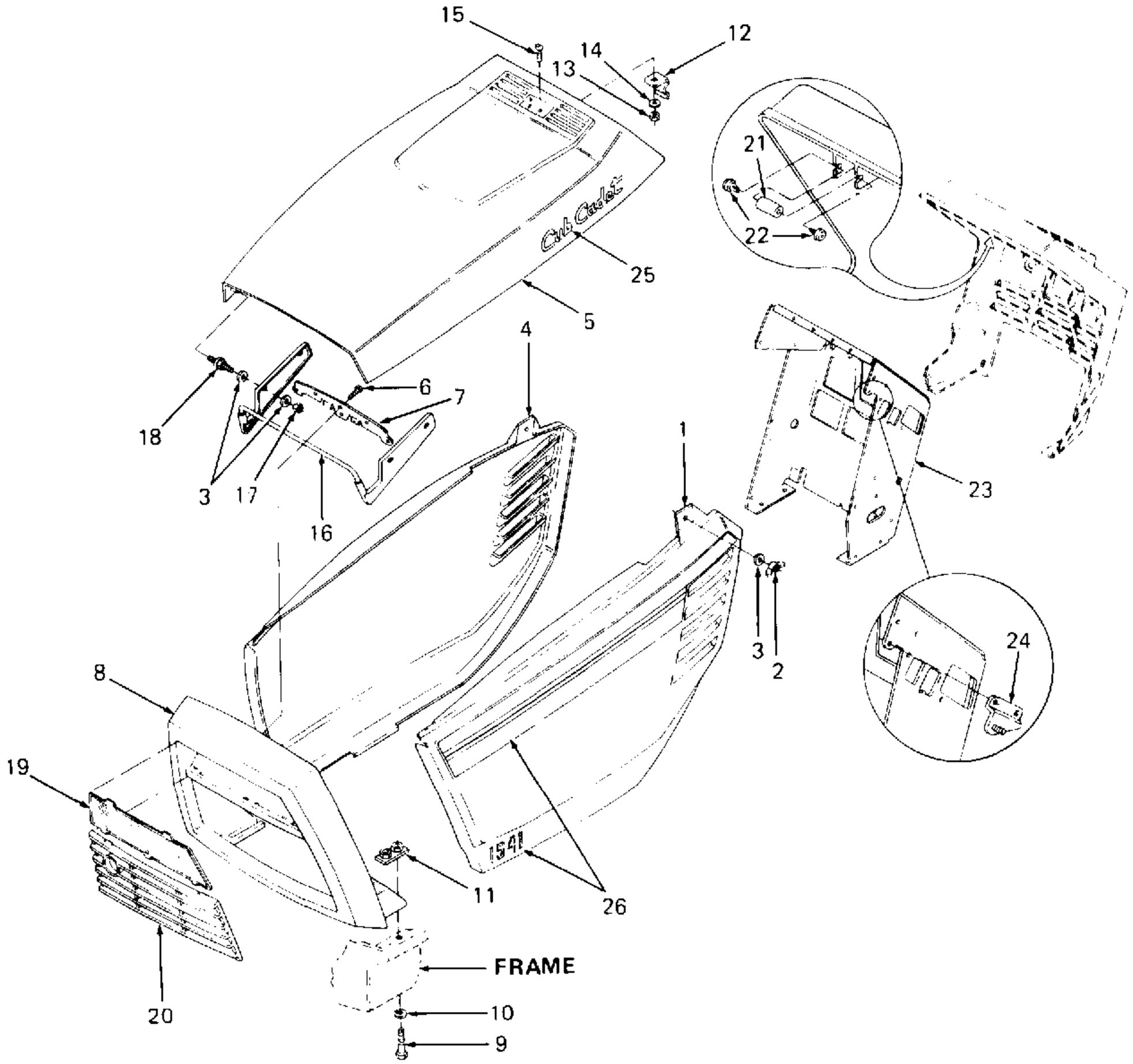
Table 5-2. Reference Chart for Mower Decks

	190-328	190-336	190-349	190-357	190-358	190-359	190-374
Rear PTO Mower			5-71				
38" Mower Deck	5-69			5-72			
44" Mower Deck					5-73		
46" Mower Deck		5-70					
50" Mower Deck						5-74	
60" Mower Deck							5-75

5-3. SECTION USE.

5-3.1 Corrective maintenance for each of the major components of all garden tractors and decks covered in this manual is presented, as applicable, under the following headings: Removal, Disassembly, Inspection, Repair, Reassembly and Installation.

5-3.2 Corrective maintenance of a problem with a major component may or may not require carrying out the complete removal and disassembly sequence which is presented. The technician should follow corrective maintenance instructions to the degree necessary to accomplish the necessary repair.



1. Left Side Panel
2. Wing Nut
3. Flat Washer
4. Right Side Panel
5. Hood
6. Pan Head Tap Screw
7. Hinge Plate
8. Grille w/Label
9. Hex Cap Screw
10. Lock Washer
11. Grille Housing Retainer
12. Hood Latch Clip
13. Hex Nut
14. Flat Washer
15. Truss Head Screw
16. Hood Hinge Assembly
17. Hex Patch Lock Nut
18. Double Ended Stud
19. Grille Lens
20. Grille Insert
21. Latch Pin
22. Phillips Head Machine Screw
23. Pedestal
24. Left Panel Mounting Bracket Assembly
25. Cub Cadet Script Graphic w/Studs
26. Left Side Panel Graphics Kit
    Right Side Panel Graphics Kit
    (Not Shown)

Figure 5-1. Hood, Grille and Side Panels
(Models 1340, 1535, 1541, 1860, 1862, 1882 and 2082).

5-4. HOOD, GRILLE AND SIDE PANELS (Models 1340, 1535, 1541, 1860, 1862, 1882 and 2082).

5-4.1 **General.** Hood, grille and side panels serve, in part, to protect the operator. They should be replaced if damaged.

5-4.2 **Removal.**

1. Remove left and right side panels (1 and 4, Figure 5-1) as follows:

   a. Open hood and remove wing nut (2) and flat washer (3).

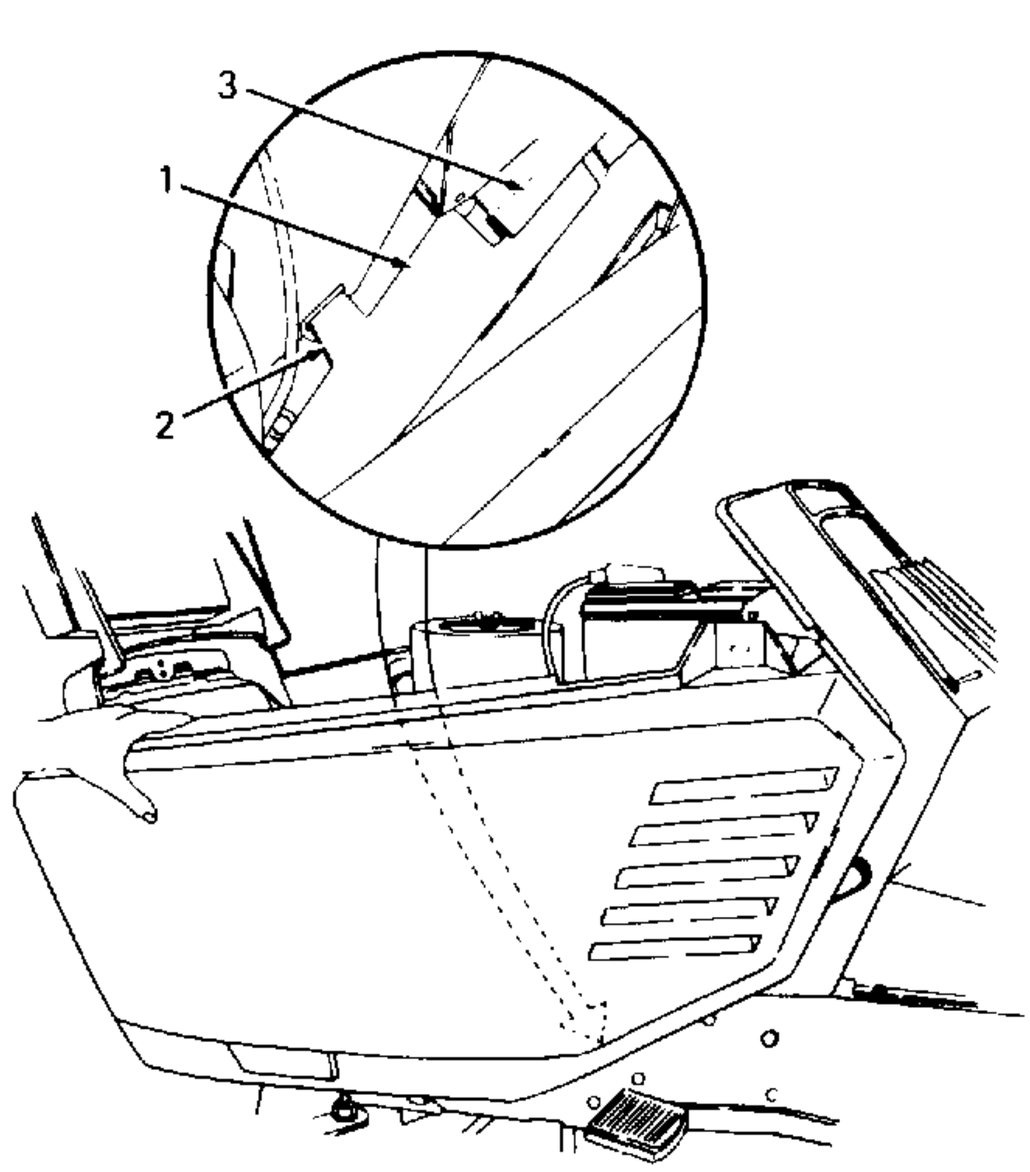
   b. Remove front snaps on side panel by applying pressure to side of grille and gently pulling on side panel until snaps pop out of grille side flange.

   c. Remove lock tab (see Figure 5-2) by gently pulling front of side panel toward you and pull upward. Slide side panel forward to disengage dash panel lock. Refer to Figure 5-3.

2. Remove hood (5, Figure 5-1) by removing pan head tap screws (6) and hinge plate (7).

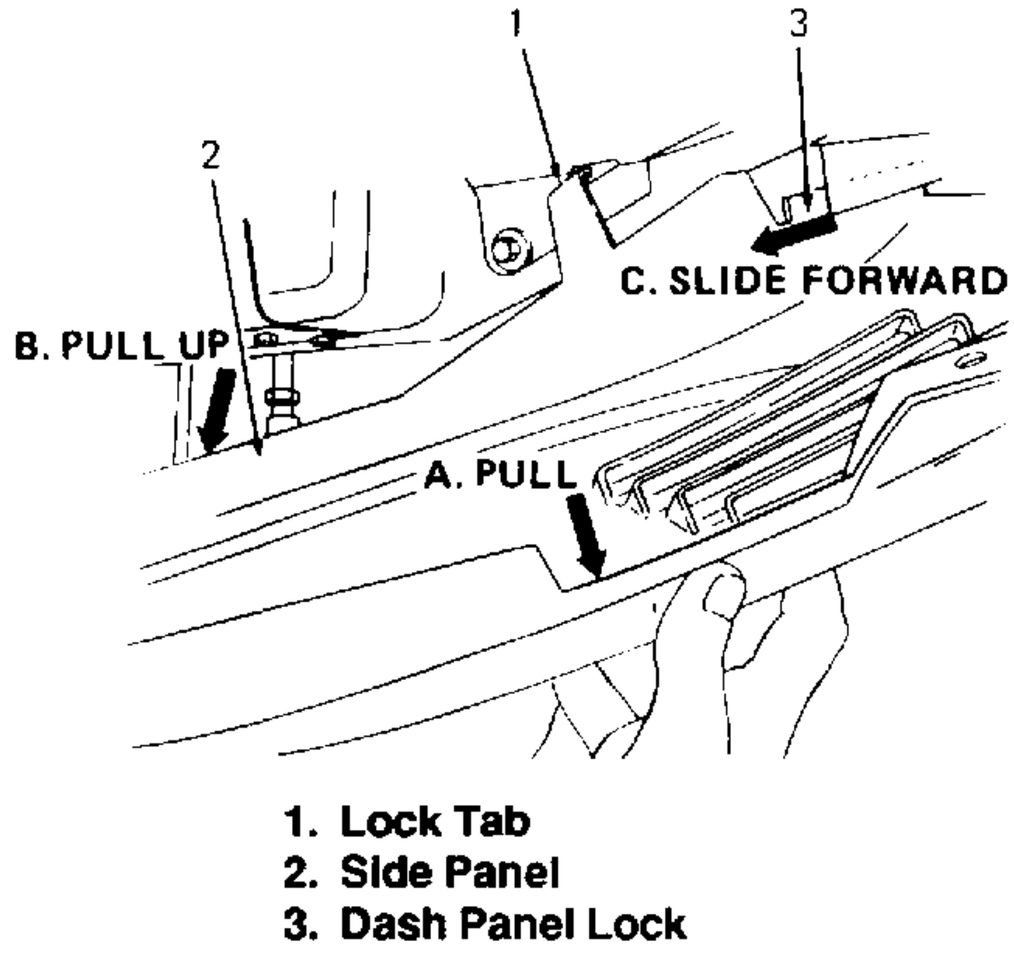
3. Remove grille lens (19) as follows:

   a. Press down on lens lockiing tabs with flat blade screw driver to release tabs from grille (8). Refer to Figure 5-3A.



1. Side Panel
2. Lock Tab
3. Dash Panel Lock

Figure 5-2. Lock Tab Removal.



1. Lock Tab
2. Side Panel
3. Dash Panel Lock

Figure 5-3. Side Panel Removal.

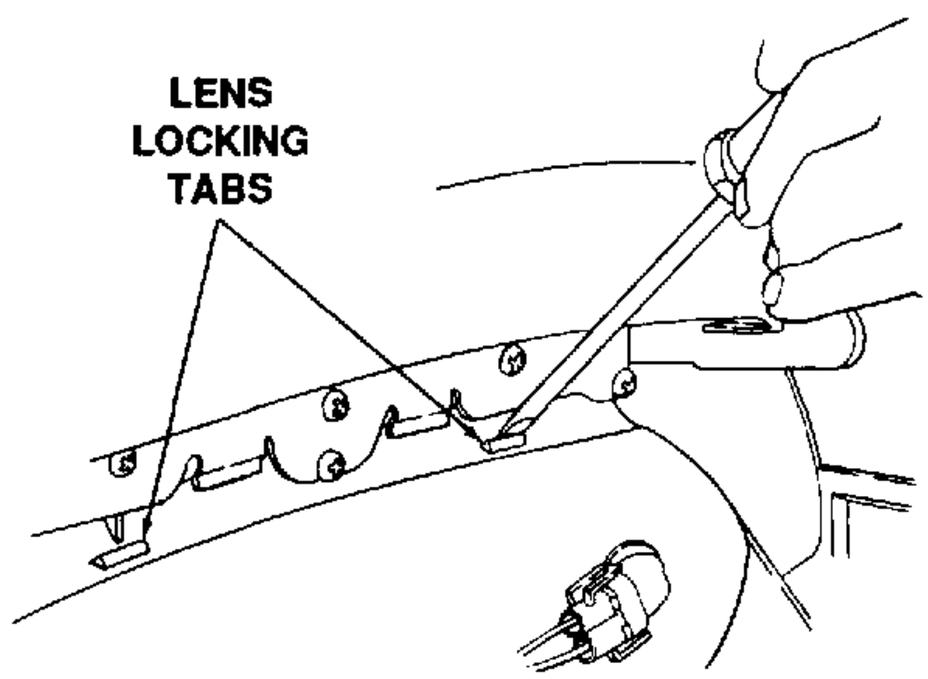


Figure 5-3A. Grille Lens Removal.

   b. Remove lens (19) from grille (8) by pressing down on tabs and pulling lens from front of grille.

4. Remove grille (8) as follows:

CAUTION

Do not touch glass portion of head lamp bulb. Touching glass portion, or allowing other contact with dirt or oil, will reduce life of head lamp bulb.

   a. Disconnect head lamp wiring harness and cut tie strap securing harness to grille.

   b. Remove hex cap screw (9), lock washer (10) and grille housing retainer (11).

5-4.3 **Disassembly.**

1. Disassemble hood (5) as follows:
   a. Remove hood latch clip (12) by removing hex nut (13), flat washer (14) and truss head screw (15).
   b. Remove hood hinge assembly (16) by removing hex patch lock nut (17), flat washer (3) and double ended stud (18).
2. Disassemble grille (8) by removing insert (20).
3. Disassemble latch pin (21) by removing phillips head machine screws (22).
4. Disassemble pedestal (23) by removing left panel mounting bracket assembly (24).

5-4.4 **Inspection**. Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear. Discard and replace cracked hood, panels or grille.

5-4.5 **Repair.**

1. Deburr and dress damaged threads.

5-4.6 **Reassembly.**

1. Reassemble pedestal (23) by installing left panel mounting bracket assembly (24).
2. Reassemble latch pin (21) with phillips head machine screws (22).
3. Reassemble grille (8) by installing insert (20).
4. Reassemble hood (5) as follows:
   a. Install hood hinge assembly (16) by installing double ended stud (18), flat washer (3) and hex patch lock nut (17).
   b. Install hood latch clip (12) by installing truss head screw (15), flat washer (14) and hex nut (13).

5-4.7 **Installation.**

1. Install grille (8) as follows:
   a. Install grille housing retainer (11), position grille and secure with lock washer (10) and hex cap screw (9).

CAUTION

Do not touch glass portion of head lamp bulb. Touching glass portion, or allowing other contact with dirt or oil, will reduce life of head lamp bulb.

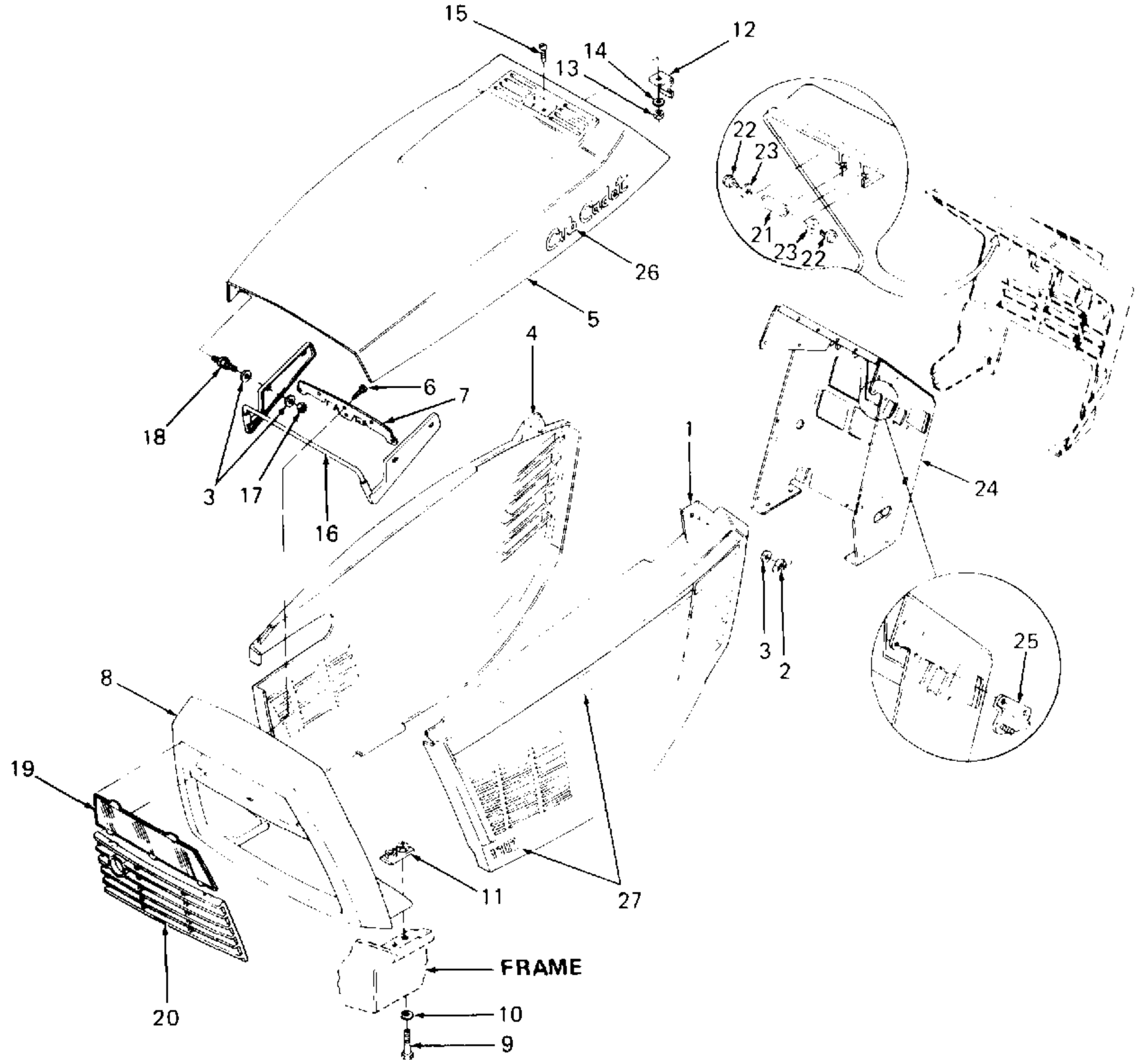
   b. Route head lamp wiring harness along inside of grille and secure with tie strap. Connect harness to head lamps.
2. Install grille lens (19) by inserting into grille (8) and pushing upper part of lens to engage locking tabs.
3. Install hood (5) onto grille with hinge plate (7) and pan head tap screws (6).
4. Install right and left side panels (4 and 1) as follows:
   a. Align lock tab (refer to Figure 5-2) and slide panel rearward to engage dash panel lock.
   b. Install front snaps of side panel into grille flange by pressing in firmly.
   c. Install flat washer (3) and wing nut (2).

5-5. HOOD, GRILLE AND SIDE PANELS (Models 1782 and 2182).

5-5.1 **General.** Hood, grille and side panels serve, in part, to protect the operator. They should be replaced if damaged.

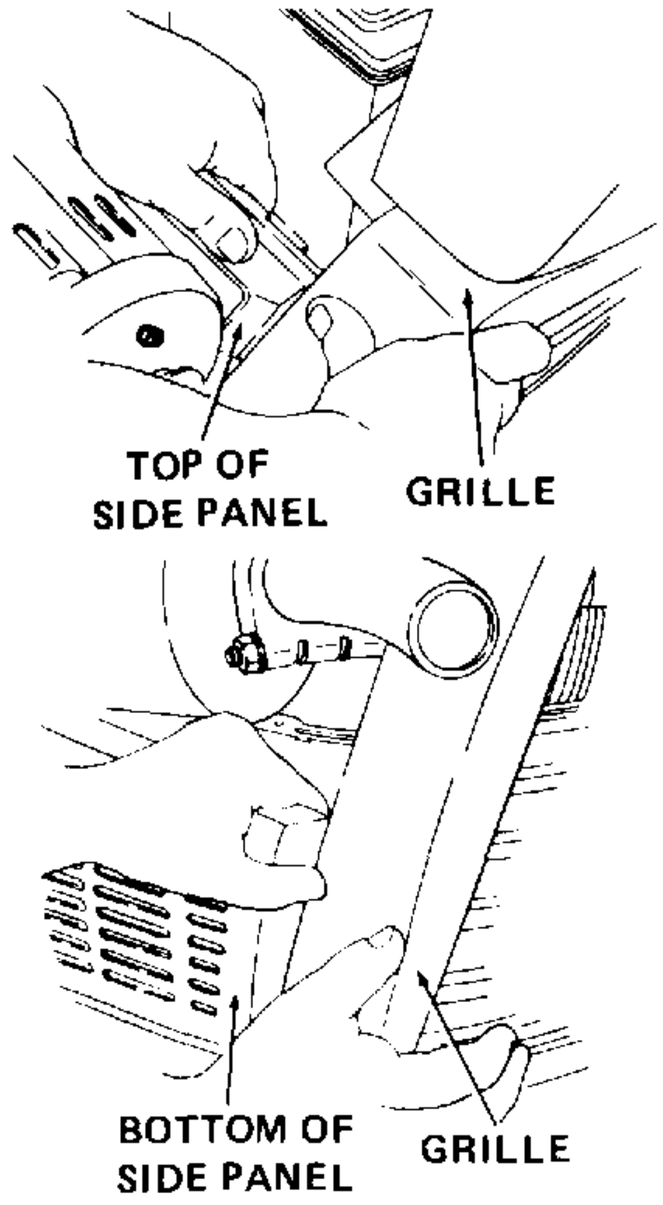
5-5.2 **Removal.**

1. Remove left side panel (1, Figure 5-4) as follows:
   a. Open hood and remove wing nut (2) and flat washer (3).
   b. Remove front snaps on side panel by applying pressure to side of grille and gently pulling on side panel until snaps pop out of grille side flange.
   c. Remove lock tab (see Figure 5-2) by gently pulling front of side panel toward you and pull upward. Slide side panel forward to disengage dash panel lock. Refer to Figure 5-3.
2. Remove right side panel (4) as follows:
   a. Remove wing nut (2) and flat washer (3).
   b. Remove top snap from grille side flange. Grasp front of panel below muffler and pull gently to remove bottom snap.
   c. Remove lock tab (see Figure 5-5) by gently pulling front of side panel toward you and pull upward. Slide side panel forward to disengage dash panel lock.
3. Remove hood (5, Figure 5-4) by removing pan head tap screws (6) and hinge plate (7).
4. Remove grille lens (19) as follows:
   a. Press down on lens locking tabs with flat blade screw driver to release tabs from grille (8). Refer to Figure 5-3A.



1. Left Side Panel w/Slots
2. Wing Nut
3. Flat Washer
4. Right Side Panel w/Cutout & Slots
5. Hood
6. Pan Head Tap Screw
7. Hinge Plate
8. Grille w/Label
9. Hex Cap Screw
10. Lock Washer
11. Grille Housing Retainer
12. Hood Latch Clip
13. Hex Nut
14. Flat Washer
15. Truss Head Screw
16. Hood Hinge Assembly
17. Hex Patch Lock Nut
18. Double Ended Stud
19. Grille Lens
20. Grille Insert
21. Latch Pin
22. Phillips Head Machine Screw
23. Flat Washer
24. Pedestal
25. Left Panel Mounting Bracket Assembly
26. Cub Cadet Script Graphics w/Studs
27. Left Side Panel Graphics Kit
    Right Side Panel Graphics Kit
    (Not Shown)

Figure 5-4. Hood, Grille and Side Panels (Models 1782 and 2182).



RIGHT SIDE PANEL

Figure 5-5. Lock Tab Removal.

b. Remove lens (19) from grille (8) by pressing down on tabs and pulling lens from front of grille.

5. Remove grille (8) as follows:

CAUTION

Do not touch glass portion of head lamp bulb. Touching glass portion, or allowing other contact with dirt or oil, will reduce life of head lamp bulb.

a. Disconnect head lamp wiring harness and cut tie strap securing harness to grille.

b. Remove hex cap screw (9), lock washer (10) and grille housing retainer (11).

5-5.3 **Disassembly.**

1. Disassemble hood (5) as follows:

a. Remove hood latch clip (12) by removing hex nut (13), flat washer (14) and truss head screw (15).

b. Remove hood hinge assembly (16) by removing hex patch lock nuts (17), flat washers (3) and double ended studs (18).

2. Disassemble grille (8) by removing insert (20).

3. Disassemble latch pin (21) by removing phillips head machine screws (22) and flat washers (23).

4. Disassemble pedestal (24) by removing left panel mounting bracket assembly (25).

5-5.4 **Inspection**. Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.

2. Inspect parts for cracks, scoring, distortion, corrosion and wear. Discard and replace cracked hood, panels or grille.

5-5.5 **Repair.**

1. Deburr and dress damaged threads.

5-5.6 **Reassembly.**

1. Reassemble pedestal (24) by installing left panel mounting bracket assembly (25).

2. Reassemble latch pin (21) with flat washers (23) and phillips head machine screws (22).

3. Reassemble grille (8) by installing insert (20).

4. Reassemble hood (5) as follows:

a. Install hood hinge assembly (16) by installing double ended studs (18), flat washers (3) and hex patch lock nuts (17).

b. Install hood latch clip (12) by installing truss head screw (15), flat washer (14) and hex nut (13).

5-5.7 **Installation.**

1. Install grille (8) as follows:

a. Install grille housing retainer (11), position grille and secure with lock washer (10) and hex cap screw (9).

CAUTION

Do not touch glass portion of head lamp bulb. Touching glass portion, or allowing other contact with dirt or oil, will reduce life of head lamp bulb.

b. Route head lamp wiring harness along inside of grille and secure with tie strap. Connect harness to head lamps.

2. Install grille lens (19) by inserting into grille (8) and pushing upper part of lens to engage locking tabs.

3. Install hood (5) onto grille with hinge plate (7) and pan head tap screws (6).

4. Install right side panel (4) as follows:

   a. Position panel with front cut out area placed behind muffler as shown in Figure 5-6. Slide forward to position panel on tractor, and secure front snaps.

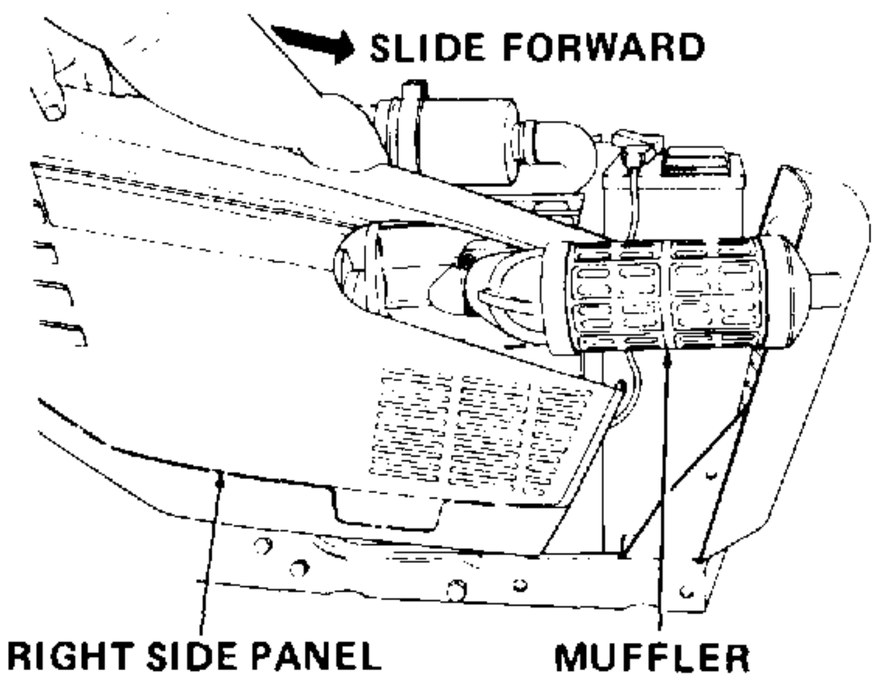


Figure 5-6. Side Panel Positioned on Tractor.

   b. Grasp top center of panel as shown in Figure 5-7 and gently pull toward you in order to position mounting hole over stud.

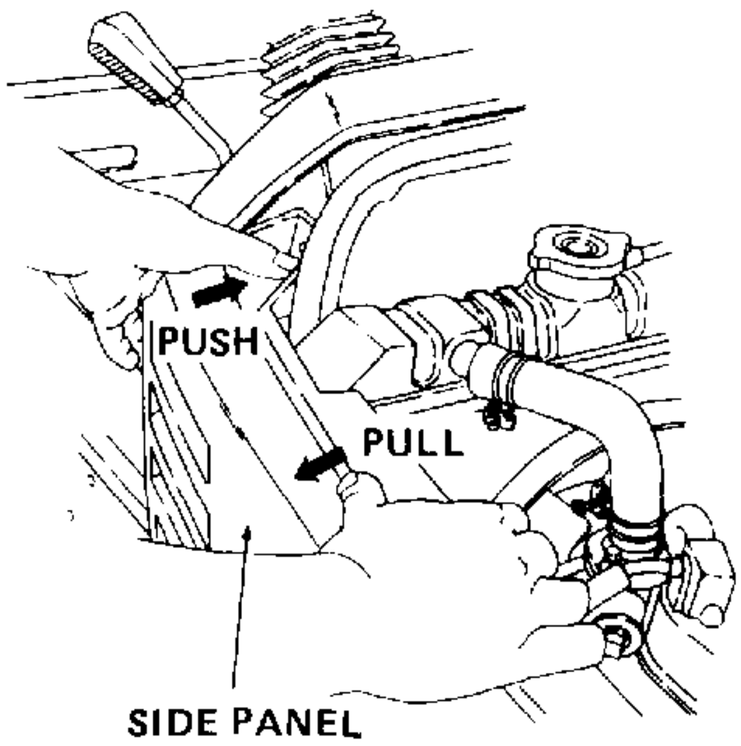


Figure 5-7. Side Panel Mounting Hole Positioned on Stud.

   c. Gently pull tip of dash panel toward you. Push in and engage dash panel lock. Refer to Figure 5-8.

   d. Install flat washers (3) and wing nuts (2).

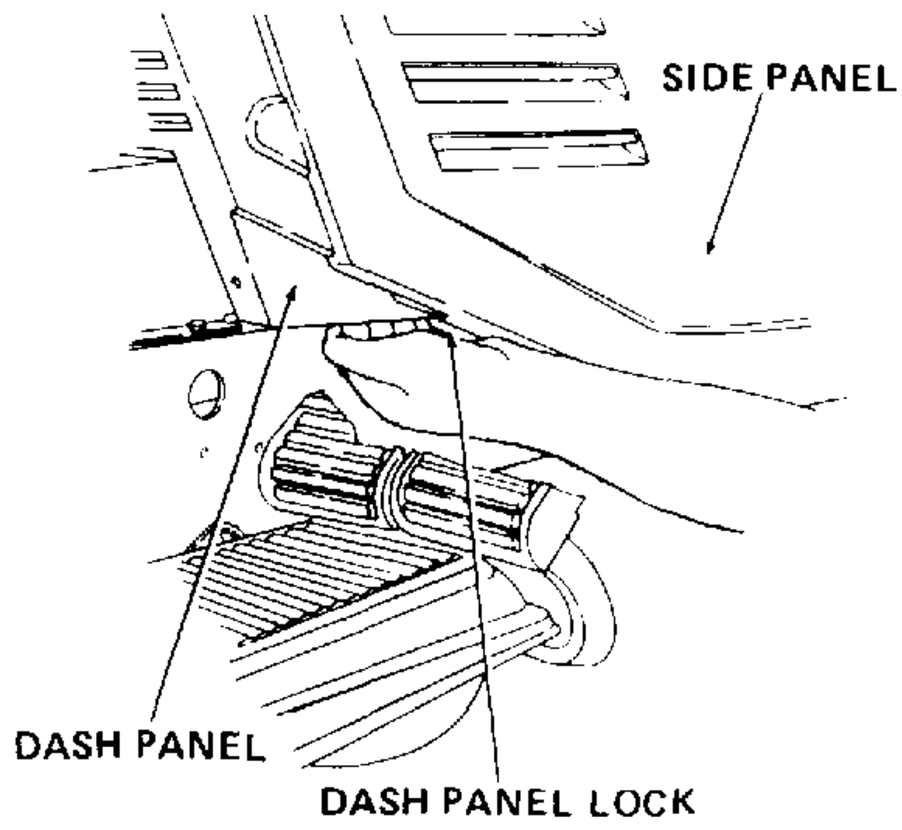


Figure 5-8. Dash Panel Lock Engaged.

5. Install left side panel (1) as follows:

   a. Position panel on tractor and secure two front snaps.

   b. Grasp top center of panel and gently pull toward you in order to position mounting hole over stud.

   c. Gently pull tip of dash panel toward you. Push in and engage dash panel lock.

   d. Install flat washers (3) and wing nuts (2).

5-6. RADIATOR REMOVAL (Models 1782 and 2182).

5-6.1 **General.**

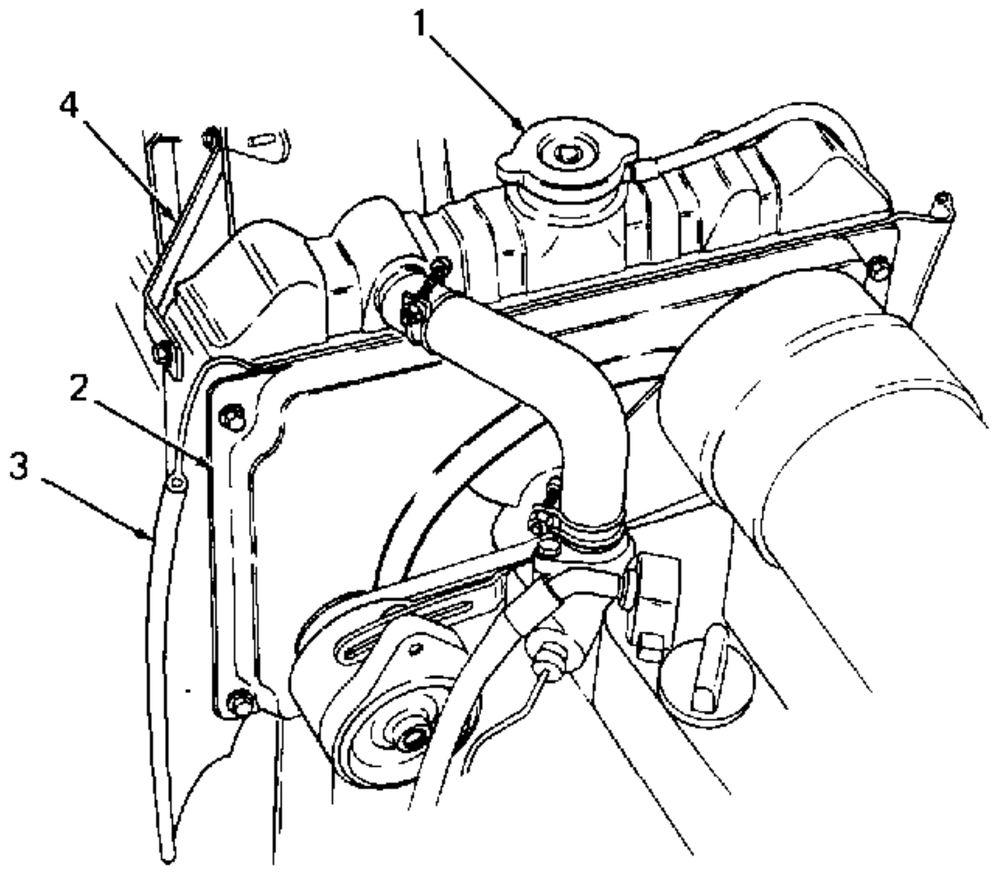
5-6.2 **Removal.** Refer to Section 1, Tables 1-5 and 1-9, for further information regarding the radiator.

WARNING

Do not remove radiator when engine is hot.

1. Remove side panels per paragraph 5-5.2.
2. Remove radiator screen.

3. Remove radiator cap (1, Figure 5-9).
4. Drain radiator fluid.
5. Remove lower and upper radiator hoses.
6. Unscrew shroud (2) from front of radiator and remove flexible curtain (3) from each side of radiator.
7. Remove two bolts securing bottom of radiator to tractor.
8. Remove upper radiator strap (4) and remove radiator from tractor.



1. Cap
2. Shroud
3. Curtain
4. Strap

Figure 5-9. Radiator Removal.

5-6.3 **Installation.**

1. Position radiator in tractor and loosely attach upper radiator strap (4).
2. Secure bottom of radiator to tractor with two bolts.
3. Secure shroud (2) to front of radiator after positioning throttle cable and flexible curtains (3).
4. Install lower and upper radiator hoses.
5. Tighten upper radiator strap (4).
6. Refill radiator with fluid and install radiator cap (1).
7. Install radiator screen.
8. Install side panels per paragraph 5-5.7.

5-6A. **RADIATOR REMOVAL (Model 2182 Tractor Serial Number 816,536 and above).**

5-6A.1 **General.**

5-6A.2 **Removal.** Refer to Section 1, Table 1-5, for further information regarding the radiator.

WARNING

Do not remove radiator when engine is hot.

1. Remove side panels per paragraph 5-5.2.
2. Remove radiator screen.
3. Remove radiator cap (3, Figure 5-9A).
4. Remove radiator fluid by unscrewing and removing drain cock (4) and gasket (7).
5. Remove upper and lower water pipes (12 and 13) by loosening and removing hose clamps (14 and 15).
6. Remove water overflow pipe by loosening and removing clamps (6) at base of radiator cap (3) and reserve tank assembly (8).
7. Drain and remove reserve tank assembly (8) by unscrewing bolt (11) to fan shroud (2). Unscrew nuts (16) securing fan shroud (2) to radiator and remove radiator air flaps (26) on each side of shroud.
8. Remove heat baffle assembly (19) and trim strip (25) from radiator assembly (1). Remove hex cap screws (22) and washers (29) securing bottom of radiator to radiator mount (17).
9. Remove radiator brace (18) by removing hex cap screw (20), hex nut (23) and lock washer (28). Lift radiator from tractor.

5-6A.3 **Inspection.** Clean all parts prior to inspection.

1. Flush radiator thoroughly and inspect for corrosion, damage or leaks.
2. Inspect water pipes for cracking and other signs of wear. Replace if cracked or worn.
3. Inspect radiator mount (17) and bottom flap (30) and replace if damaged or corroded by removing hex cap screws (21), lock washer (27) and hex nut (24).

5-6A.4 **Installation.**

1. Position radiator (1) in tractor and loosely attach radiator brace (18).
2. Secure bottom of radiator to radiator mount (17) with two hex cap screws (22) and bell washers (29).

3. Attach reserve tank assembly (8) to fan shroud (2) with three hex bolts (11).

4. Secure fan shroud (2) to front of radiator after positioning right and left radiator air flaps (26).

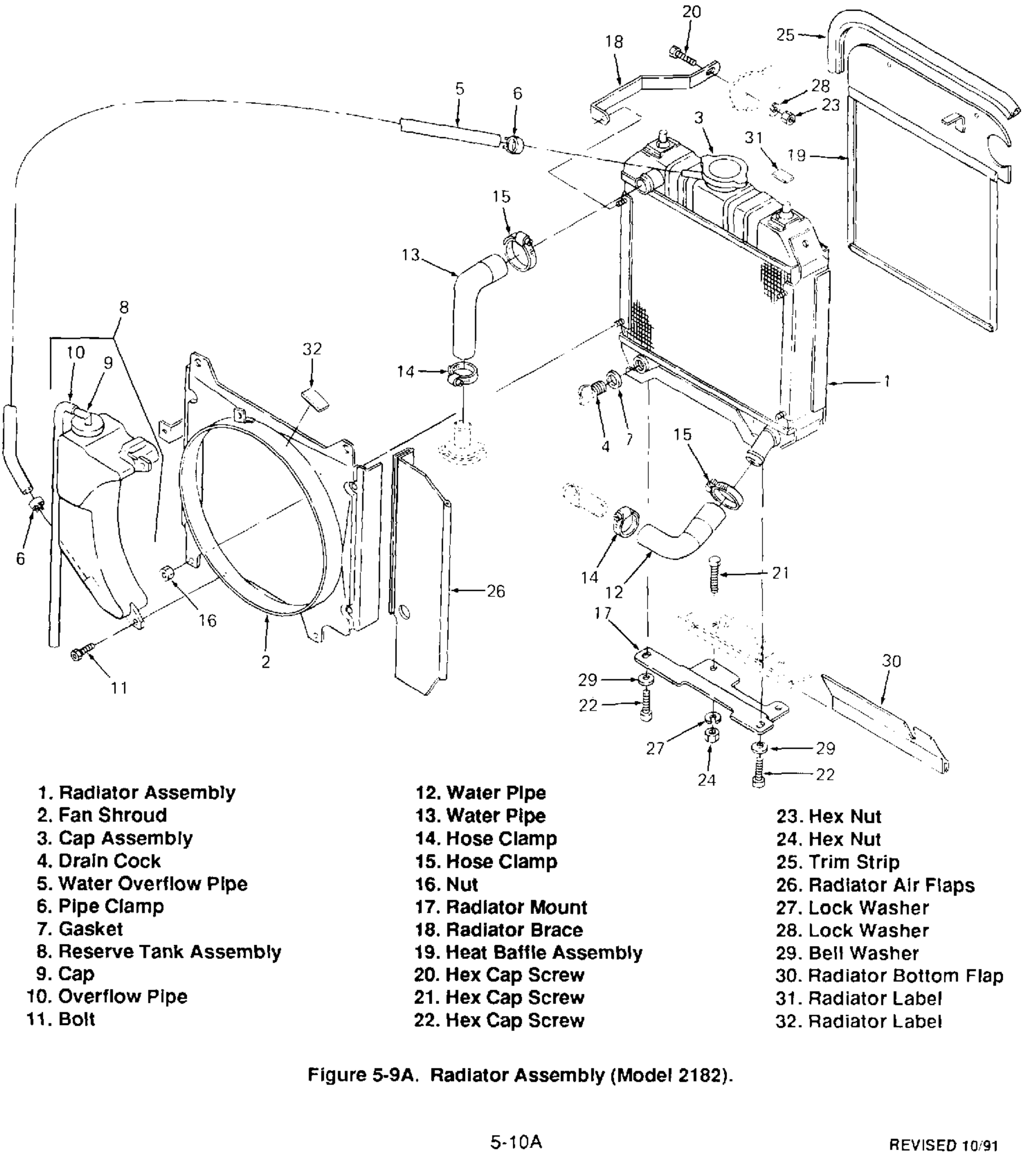
5. Install water pipes (12 and 13) using hose clamps (14 and 15).

6. Tighten radiator brace (18).

7. Refill radiator with fluid and install radiator cap (3).

8. Install heat baffle assembly (19) and trim strip (25).

9. Install side panels per paragraph 5-5.7.



1. Radiator Assembly
2. Fan Shroud
3. Cap Assembly
4. Drain Cock
5. Water Overflow Pipe
6. Pipe Clamp
7. Gasket
8. Reserve Tank Assembly
9. Cap
10. Overflow Pipe
11. Bolt
12. Water Pipe
13. Water Pipe
14. Hose Clamp
15. Hose Clamp
16. Nut
17. Radiator Mount
18. Radiator Brace
19. Heat Baffle Assembly
20. Hex Cap Screw
21. Hex Cap Screw
22. Hex Cap Screw
23. Hex Nut
24. Hex Nut
25. Trim Strip
26. Radiator Air Flaps
27. Lock Washer
28. Lock Washer
29. Bell Washer
30. Radiator Bottom Flap
31. Radiator Label
32. Radiator Label

Figure 5-9A. Radiator Assembly (Model 2182).

5-7. BATTERY AND ELECTRICAL COMPONENTS (Model 1340).

5-7.1 **General.** Refer to Appendix F for additional information about servicing electrical equipment.

5-7.2 **Removal.**

1. Remove side panels per paragraph 5-4.2.

WARNING

Battery cables must be disconnected in proper order to avoid arcing. When disconnecting cables from the battery, ALWAYS remove the negative cable first, and then remove the positive cable.

2. Remove battery (1, Figure 5-10) as follows:
   a. Disconnect negative battery cable (2) from battery (1) first, then disconnect positive battery cable (3) from battery.
   b. Remove battery hold down (4) by removing hex cap screw (5) and flat washer (6).
3. Remove negative battery cable (2) from frame.
4. Remove positive battery cable (3) by removing secured end from solenoid (9).
5. Remove battery tray (7).
6. Remove starter cable (8) from solenoid (9) and from starter.
7. Remove solenoid (9) by removing hex center lock nut (10), hex cap screw (11), bell washer (12), hex cap screw (13), washer (14) and quick connect lug (26).

NOTE

Prior to 1991, Model 1340 Tractors (Serial Number 811,672 and below) were not equipped with quick connect lugs (26). These tractors may be upgraded by installing lugs during repair when circumstances permit.

8. Remove battery harness (15) by disconnecting from voltage indicator (16), indicator harness and main harness.
9. Remove voltage indicator (16) by removing hex nut (17), lock washer (18), truss machine screw (19) and external washer (20).
10. Remove relay (21) by removing hex nut (17), lock washer (18) and truss machine screw (22).
11. Remove fuse holder (23) by removing fuse holder mounting clip (24). Remove fuse (25).

5-7.3 **Inspection.** Refer to Appendix F and/or Appendix G for additional information on testing of electrical systems and components.

1. Inspect all threaded areas for damage.
2. Inspect all wires for breaks, cuts or damage to insulation.
3. Test all electrical components to ensure operational condition. Discard and replace any electrical component found to be defective.

NOTE

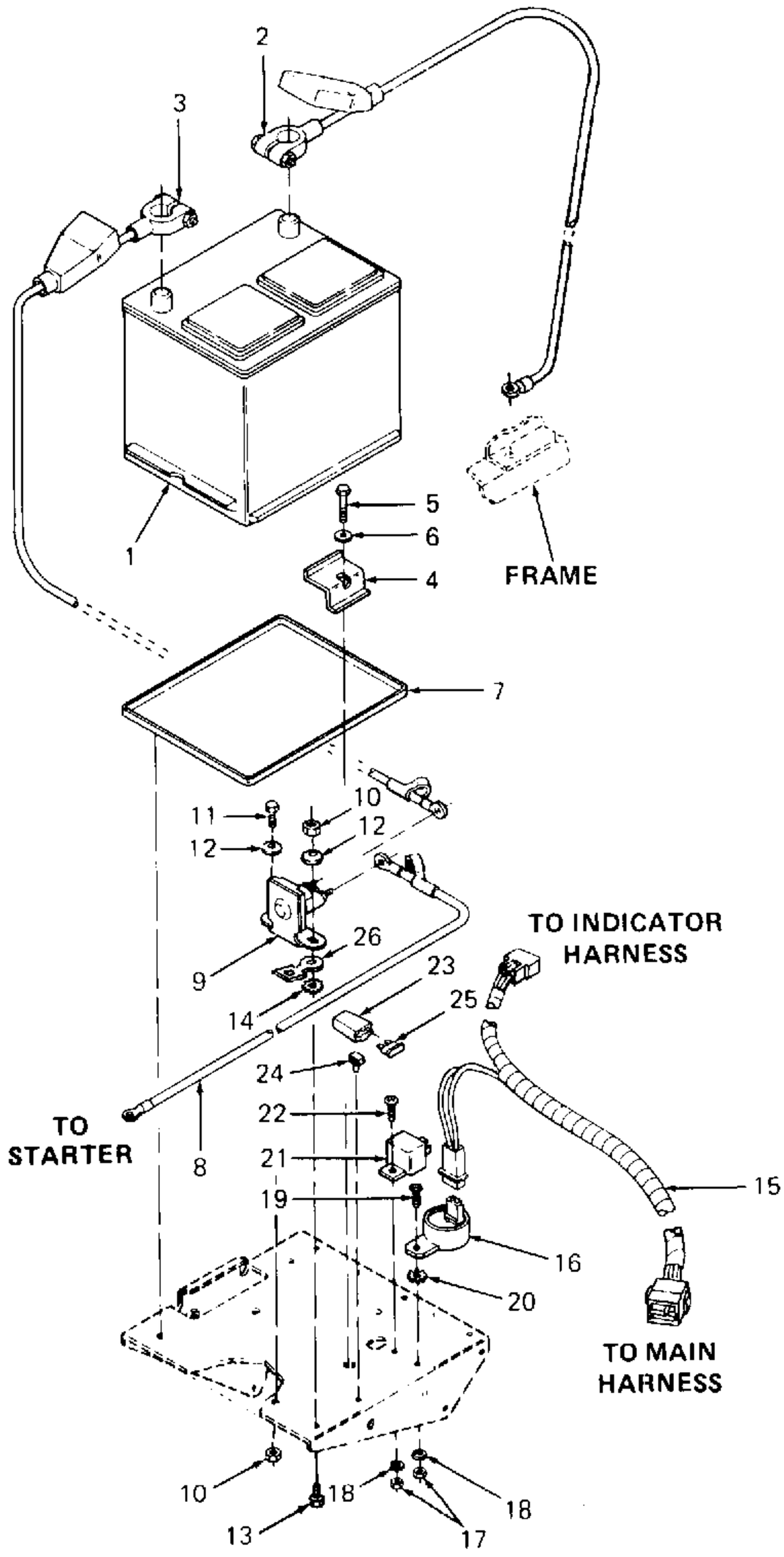
Additional information on testing of electrical components is contained in Appendices F and G.

5-7.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor damage to wires as necessary.
3. Clean negative and positive terminals of battery (1) with a post cleaning tool.
4. Clean terminal clamps on negative and positive battery cables (2 and 3).

5-7.5 **Installation.**

1. Install fuse holder (23) and fuse holder mounting clip (24). Install fuse (25).
2. Install relay (21) with truss machine screw (22), lock washer (18) and hex nut (17).
3. Install voltage indicator (16) with external washer (20), truss machine screw (19), lock washer (18) and hex nut (17).
4. Install battery harness by connecting to main harness, indicator harness and voltage indicator (16).
5. Install solenoid (9) with quick connect lug (26), washer (14), hex cap screw (13), bell washer (12), hex cap screw (11) and hex center lock nut (10).
6. Install battery tray (7).
7. Install starter cable (8) by attaching to solenoid (9) and starter.
8. Secure positive battery cable (3) to solenoid (9).
9. Secure negative battery cable (2) to frame.



1. Battery
2. Negative Battery Cable
3. Positive Battery Cable
4. Battery Hold Down
5. Hex Cap Screw
6. Flat Washer
7. Battery Tray
8. Starter Cable
9. Solenoid
10. Hex Center Lock Nut
11. Hex Cap Screw
12. Bell Washer
13. Hex Cap Screw
14. Int-Ext Washer
15. Battery Harness
16. Voltage Indicator
17. Hex Nut
18. Lock Washer
19. Truss Machine Screw
20. External Washer
21. Relay
22. Truss Machine Screw
23. Fuse Holder
24. Fuse Holder Mounting Clip
25. 20 Amp Fuse
26. Quick Connect Lug

Figure 5-10. Battery and Electrical Components (Model 1340).

10. Install battery (1) as follows:

    a. Position battery on tray (7).

    b. Install battery hold down (4) with flat washer (6) and hex cap screw (5).

WARNING

Battery cables must be installed in proper order to avoid arcing. When connecting cables to the battery, ALWAYS connect the positive cable first, then connect the negative cable.

    c. Connect positive battery cable (3) to positive terminal of battery, then connect negative battery cable (2) to negative terminal of battery.

11. Install side panels per paragraph 5-4.7.

5-8. BATTERY AND ELECTRICAL COMPONENTS (Models 1535, 1541, 1860, 1862, 1882 and 2082).

5-8.1 **General.** Refer to Appendix F for additional information about servicing electrical equipment.

5-8.2 **Removal.**

1. Remove side panels per paragraph 5-4.2.

WARNING

Battery cables must be disconnected in proper order to avoid arcing. When disconnecting cables from the battery, ALWAYS remove the negative cable first, and then remove the positive cable.

2. Remove battery (1, Figure 5-11) as follows:

    a. Disconnect negative battery cable (2) from battery (1) first, then disconnect positive battery cable (3) from battery.

    b. Remove battery hold down (4) by removing hex cap screw (5) and flat washer (6).

3. Remove negative battery cable (2) by removing hex head screw (7) and washer (8).

4. Remove positive battery cable (3) from solenoid (11).

5. Remove battery tray (9).

6. Remove starter cable (10) from solenoid (11) and from starter.

7. Remove solenoid (11) by removing hex center lock nut (12), hex cap screw (13), bell washer (14), cable clip (15), quick connect lug (27) and washer (8).

NOTE

Tractors prior to 1991 (Serial Number 811,672 and below) were not equipped with quick connect lugs (27). When circumstances permit, these tractors may be upgraded by installing lugs during repair.

8. Remove battery harness (16) by disconnecting from voltage indicator (17), indicator harness and main harness.

9. Remove voltage indicator (17) by removing hex nut (18), lock washer (19), truss machine screw (20) and external washer (21).

10. Remove relay (22) by removing hex nut (18), lock washer (19) and truss machine screw (23).

11. Remove fuse holder (24) by removing fuse holder mounting clip (25). Remove fuse (26).

5-8.3 **Inspection.** Refer to Appendix F and/or Appendix G for additional information on testing of electrical systems and components.

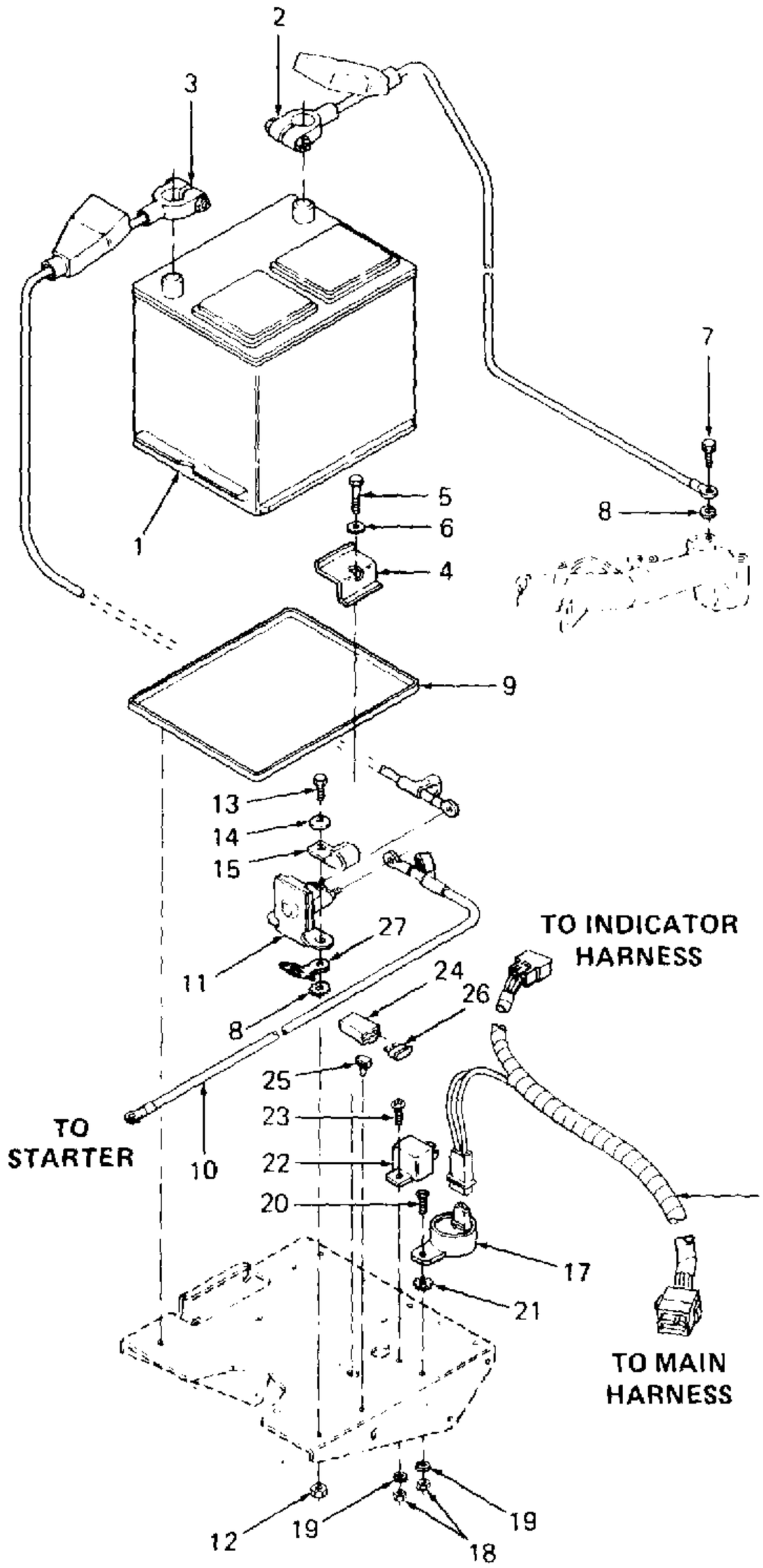
1. Inspect all threaded areas for damage.

2. Inspect all wires for breaks, cuts or damage to insulation.

3. Test all electrical components to ensure operational condition. Discard and replace any electrical component found to be defective.

NOTE

Additional information on testing of electrical components is contained in Appendices F and G.



1. Battery
2. Negative Battery Cable
3. Positive Battery Cable
4. Battery Hold Down
5. Hex Cap Screw
6. Flat Washer
7. Hex Head Screw
8. Int-Ext Washer
9. Battery Tray
10. Starter Cable
11. Solenoid
12. Hex Center Lock Nut
13. Hex Cap Screw
14. Bell Washer
15. Cable Clip
16. Battery Harness
17. Voltage Indicator
18. Hex Nut
19. Lock Washer
20. Truss Machine Screw
21. External Washer
22. Relay
23. Truss Machine Screw
24. Fuse Holder
25. Fuse Holder Mounting Clip
26. 20 Amp Fuse
27. Quick Connect Lug

Figure 5-11. Battery and Electrical Components (Models 1535, 1541, 1860, 1862, 1882 and 2082).

5-8.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor damage to wires as necessary.
3. Clean negative and positive terminals of battery (1) with a post cleaning tool.
4. Clean terminal clamps on negative and positive battery cables (2 and 3).

5-8.5 **Installation.**

1. Install fuse holder (24) and fuse holder mounting clip (25). Install fuse (26).
2. Install relay (22) with truss machine screw (23), lock washer (19) and hex nut (18).
3. Install voltage indicator (17) with external washer (21), truss machine screw (20), lock washer (19) and hex nut (18).
4. Install battery harness (16) by connecting to main harness, indicator harness and voltage indicator (17).
5. Install solenoid (11) with washer (8), cable clip (15), bell washer (14), hex cap screw (13) and hex center lock nut (12).
6. Install battery tray (9).
7. Install starter cable (10) by attaching to solenoid (11) and starter.
8. Secure positive battery cable (3) to solenoid (11).
9. Secure negative battery cable (2) to frame with washer (8) and hex head screw (7).
10. Install battery (1) as follows:
    a. Position battery on tray (9).
    b. Install battery hold down (4) with flat washer (6) and hex cap screw (5).

WARNING

Battery cables must be installed in proper order to avoid arcing. When connecting cables to the battery, ALWAYS connect the positive cable first, then connect the negative cable.

    c. Connect positive battery cable (3) to positive terminal of battery, then connect negative battery cable (2) to negative terminal of battery.
11. Install side panels per paragraph 5-4.7.

5-9. BATTERY AND ELECTRICAL COMPONENTS (Model 1782).

5-9.1 **General.** Refer to Appendix F for additional information about servicing electrical equipment.

5-9.2 **Removal.**

1. Remove side panels per paragraph 5-5.2.

WARNING

Battery cables must be disconnected in proper order to avoid arcing. When disconnecting cables from the battery, ALWAYS remove the negative cable first, and then remove the positive cable.

2. Remove battery (1, Figure 5-12) as follows:
    a. Disconnect negative battery cable (2) from battery (1) first, then disconnect positive battery cable (4) from battery.
    b. Remove battery hold down (5) by removing hex cap screw (6) and flat washer (7).
3. Remove negative battery cable (2) from ground cable (3). Remove ground cable (3) from engine.
4. Remove positive battery cable (4) by removing secured end from starter.
5. Remove battery tray (8).
6. Remove main harness (9) as follows:

CAUTION

Do not touch glass portion of head lamp bulb. Touching glass portion, or allowing other contact with dirt or oil, will reduce life of head lamp bulb.

    a. Remove head lamp bulb (10) by unplugging main harness (9) from bulb. Turn bulb to align lugs with slots, and pull bulb from grille housing.
    b. Disconnect main harness (9) from light timer (11), voltage indicator (15), rectifier (20) and pedestal harness.
7. Remove timer (11) by removing hex nut (12), bell washer (13) and hex cap screw (14).
8. Remove voltage indicator (15) by removing hex nut (16), external washer (17), truss machine screw (18) and external washer (17).

1. Battery
2. Negative Battery Cable
3. Ground Cable
4. Positive Battery Cable
5. Battery Hold Down
6. Hex Cap Screw
7. Flat Washer
8. Battery Tray
9. Main Harness
10. Head Lamp Bulb
11. Light Timer
12. Hex Nut
13. Bell Washer
14. Hex Cap Screw
15. Voltage Indicator
16. Hex Nut
17. External Washer
18. Truss Machine Screw
19. Relay
20. Rectifier
21. Lock Washer
22. Hex Cap Screw
23. Fuse Holder
24. Fuse Holder Mounting Clip
25. 30 Amp Fuse (right side)
26. 20 Amp Fuse (left side)
27. Battery Tray Assembly

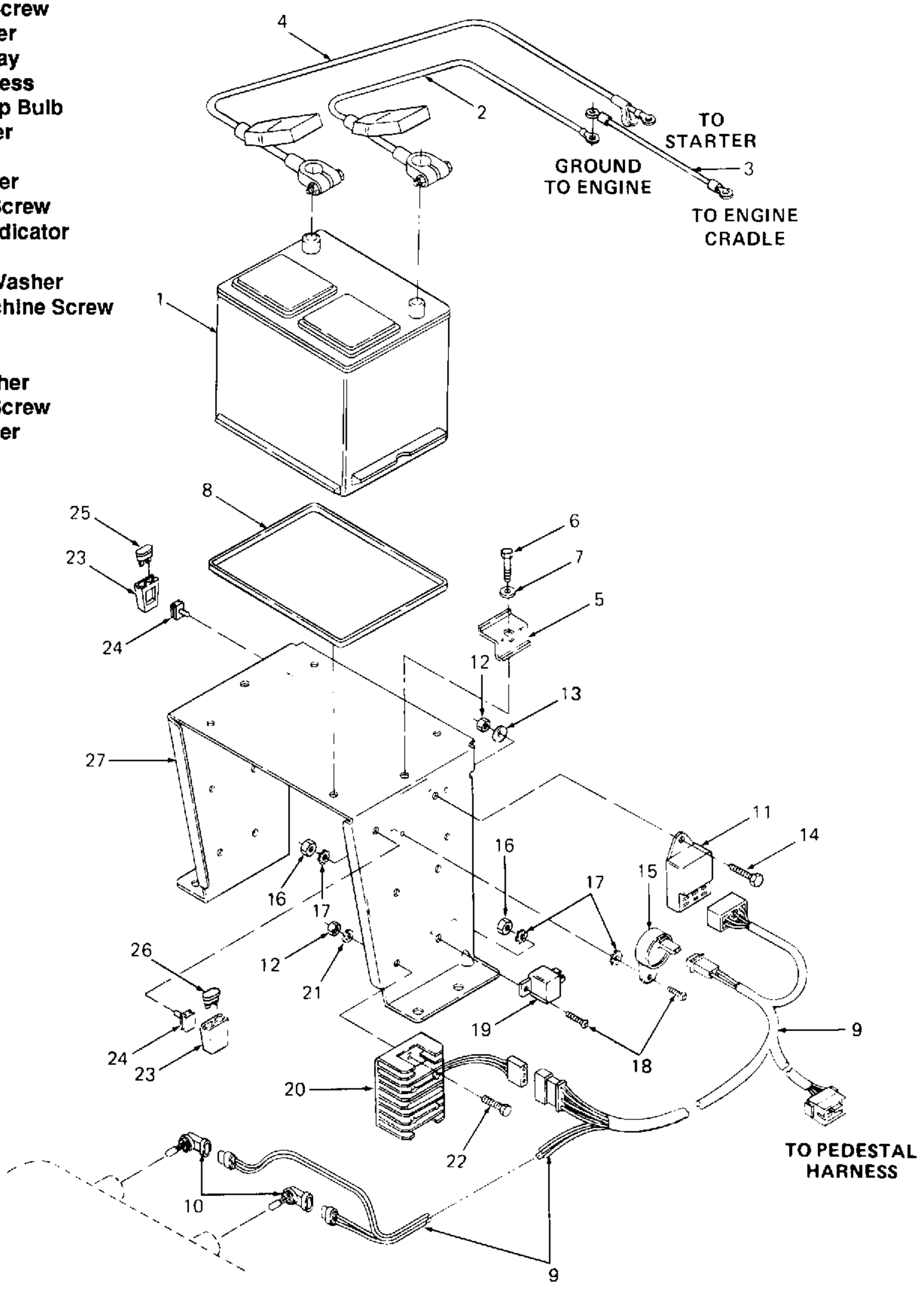


Figure 5-12. Battery and Electrical Components (Model 1782).

9. Remove relay (19) by removing hex nut (16), external washer (17) and truss machine screw (18).
10. Remove rectifier (20) by removing hex nuts (12), lock washers (21) and hex cap screws (22).
11. Remove fuse holders (23) by removing fuse holder mounting clips (24). Remove fuses (25 and 26); 30 amp fuse (25) is used on right side of tractor, 20 amp fuse (26) is used on left side of tractor.
12. Remove battery tray assembly (27).

5-9.3 **Inspection.** Refer to Appendix F and/or Appendix G for additional information on testing of electrical systems and components.

1. Inspect all threaded areas for damage.
2. Inspect all wires for breaks, cuts or damage to insulation.
3. Test all electrical components to ensure operational condition. Discard and replace any electrical component found to be defective.

NOTE

Additional information on testing of electrical components is contained in Appendices F and G.

5-9.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor damage to wires as necessary.
3. Clean negative and positive terminals of battery (1) with a post cleaning tool.
4. Clean terminal clamps on negative and positive battery cables (2 and 4).

5-9.5 **Installation.**

1. Install battery assembly (27).
2. Install fuse holders (23) and fuse holder mounting clips (24). Install fuses (25 and 26); 20 amp fuse (26) is used on left side of tractor, 30 amp fuse (25) is used on right side of tractor.
3. Install rectifier (20) with hex cap screws (22), lock washers (21) and hex nuts (12).
4. Install relay (19) with truss machine screw (18), external washer (17) and hex nut (16).
5. Install voltage indicator (15) with external washer (17), truss machine screw (18), external washer (17) and hex nut (16).
6. Install timer (11) with hex cap screw (14), bell washer (13) and hex nut (12).
7. Install main harness (9) as follows:
   a. Connect main harness to pedestal harness, rectifier (20), voltage indicator (15) and light timer (11).

CAUTION

Do not touch glass portion of head lamp bulb. Touching glass portion, or allowing other contact with dirt or oil, will reduce life of head lamp bulb.

   b. Install head lamp bulb (10) in grille housing and rotate it to lock in place. Connect main harness (9) to bulbs.
8. Install battery tray (8).
9. Install positive battery cable (4) to starter.
10. Attach negative battery cable (2) to ground cable (3). Attach ground cable (3) to engine.
11. Install battery (1) as follows:
   a. Install battery hold down (5), flat washer (7) and hex cap screw (6).

WARNING

Battery cables must be installed in proper order to avoid arcing. When connecting cables to the battery, ALWAYS connect the positive cable first, then connect the negative cable.

   b. Connect positive battery cable (4) to positive terminal of battery, then connect negative battery cable (2) to negative terminal of battery.
12. Install side panels per paragraph 5-5.7.

5-10. BATTERY AND ELECTRICAL COMPONENTS (Model 2182).

5-10.1 **General.** Refer to Appendix F for additional information about servicing electrical equipment.

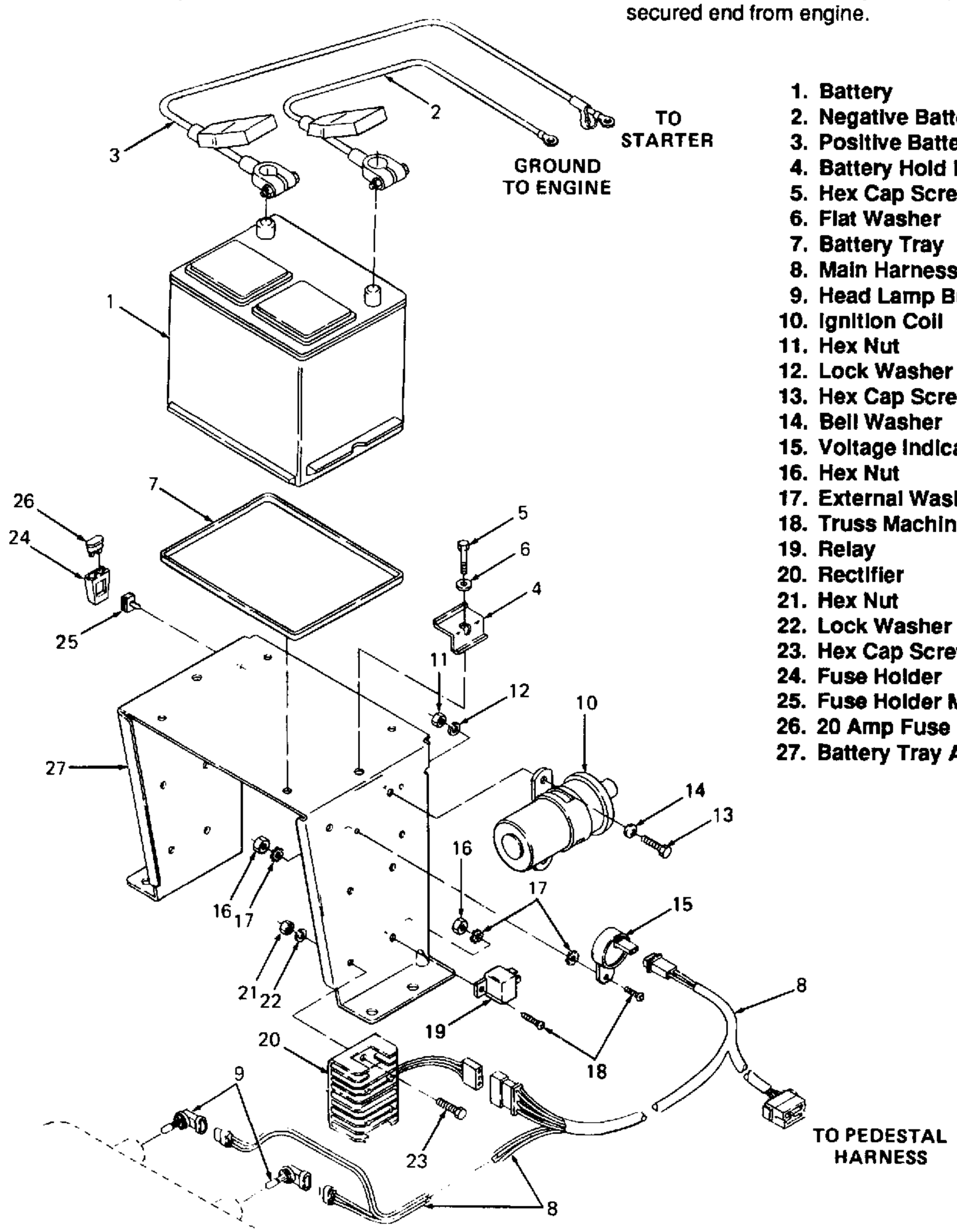
5-10.2 **Removal.**

1. Remove side panels per paragraph 5-5.2.

WARNING

Battery cables must be disconnected in proper order to avoid arcing. When disconnecting cables from the battery, ALWAYS remove the negative cable first, and then remove the positive cable.

2. Remove battery (1, Figure 5-13) as follows:
   a. Disconnect negative battery cable (2) from battery (1) first, then disconnect positive battery cable (3) from battery.
   b. Remove battery hold down (4) by removing hex cap screw (5) and flat washer (6).
3. Remove negative battery cable (2) by removing secured end from engine.



1. Battery
2. Negative Battery Cable
3. Positive Battery Cable
4. Battery Hold Down
5. Hex Cap Screw
6. Flat Washer
7. Battery Tray
8. Main Harness
9. Head Lamp Bulb
10. Ignition Coil
11. Hex Nut
12. Lock Washer
13. Hex Cap Screw
14. Bell Washer
15. Voltage Indicator
16. Hex Nut
17. External Washer
18. Truss Machine Screw
19. Relay
20. Rectifier
21. Hex Nut
22. Lock Washer
23. Hex Cap Screw
24. Fuse Holder
25. Fuse Holder Mounting Clip
26. 20 Amp Fuse
27. Battery Tray Assembly

Figure 5-13. Battery and Electrical Components (Model 2182).

4. Remove positive battery cable (3) by removing secured end from starter.
5. Remove battery tray (7).
6. Remove main harness (8) as follows:

CAUTION

Do not touch glass portion of head lamp bulb. Touching glass portion, or allowing other contact with dirt or oil, will reduce life of head lamp bulb.

   a. Remove head lamp bulb (9) by unplugging main harness (8) from bulb. Turn bulb to align lugs with slots, and pull bulb from grille housing.
   b. Disconnect main harness (8) from voltage indicator (15), rectifier (20) and pedestal harness.
7. Remove ignition coil (10) by disconnecting electrical lead and removing hex nut (11), lock washer (12), hex cap screw (13) and bell washer (14).
8. Remove voltage indicator (15) by removing hex nut (16), external washer (17), truss machine screw (18) and external washer (17).
9. Remove relay (19) by removing hex nut (16), external washer (17) and truss machine screw (18).
10. Remove rectifier (20) by removing hex nuts (21), lock washers (22) and hex cap screws (23).
11. Remove fuse holder (24) by removing fuse holder mounting clips (25). Remove fuse (26).

5-10.3 **Inspection.** Refer to Appendix F and/or Appendix G for additional information on testing of electrical systems and components.

1. Inspect all threaded areas for damage.
2. Inspect all wires for breaks, cuts or damage to insulation.
3. Test all electrical components to ensure operational condition. Discard and replace any electrical component found to be defective.

NOTE

Additional information on testing of electrical components is contained in Appendices F and G.

5-10.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor damage to wires as necessary.
3. Clean negative and positive terminals of battery (1) with a post cleaning tool.
4. Clean terminal clamps on negative and positive battery cables (2 and 3).

5-10.5 **Installation.**

1. Install fuse holder (24) by inserting 20 amp fuse (26) and installing fuse holder mounting clip (25).
2. Install rectifier (20) with hex cap screws (23), lock washers (22) and hex nuts (21).
3. Install relay (19) with truss machine screw (18), external washer (17) and hex nut (16).
4. Install voltage indicator (15) with external washer (17), truss machine screw (18), external washer (17) and hex nut (16).
5. Install ignition coil (10) with bell washer (14), hex cap screw (13), lock washer (12) and hex nut (11). Connect electrical lead to coil.
6. Install main harness (8) as follows:
   a. Connect main harness to pedestal harness, rectifier (20) and voltage indicator (15).

CAUTION

Do not touch glass portion of head lamp bulb. Touching glass portion, or allowing other contact with dirt or oil, will reduce life of head lamp bulb.

   b. Install head lamp bulb in grille housing and rotate it to lock in place. Connect main harness to bulbs.
7. Install battery tray (7).
8. Install positive battery cable (3) to starter.
9. Attach negative battery cable (2) to engine.
10. Install battery (1) as follows:
    a. Install battery hold down (4), flat washer (6) and hex cap screw (5).

WARNING

Battery cables must be installed in proper order to avoid arcing. When connecting cables to the battery, ALWAYS connect the positive cable first, then connect the negative cable.

b. Connect positive battery cable (3) to positive terminal of battery, then connect negative battery cable (2) to negative terminal of battery.

11. Install side panels per paragraph 5-5.7.

5-11. BATTERY TRAY AND HEAT BAFFLE (Model 1340).

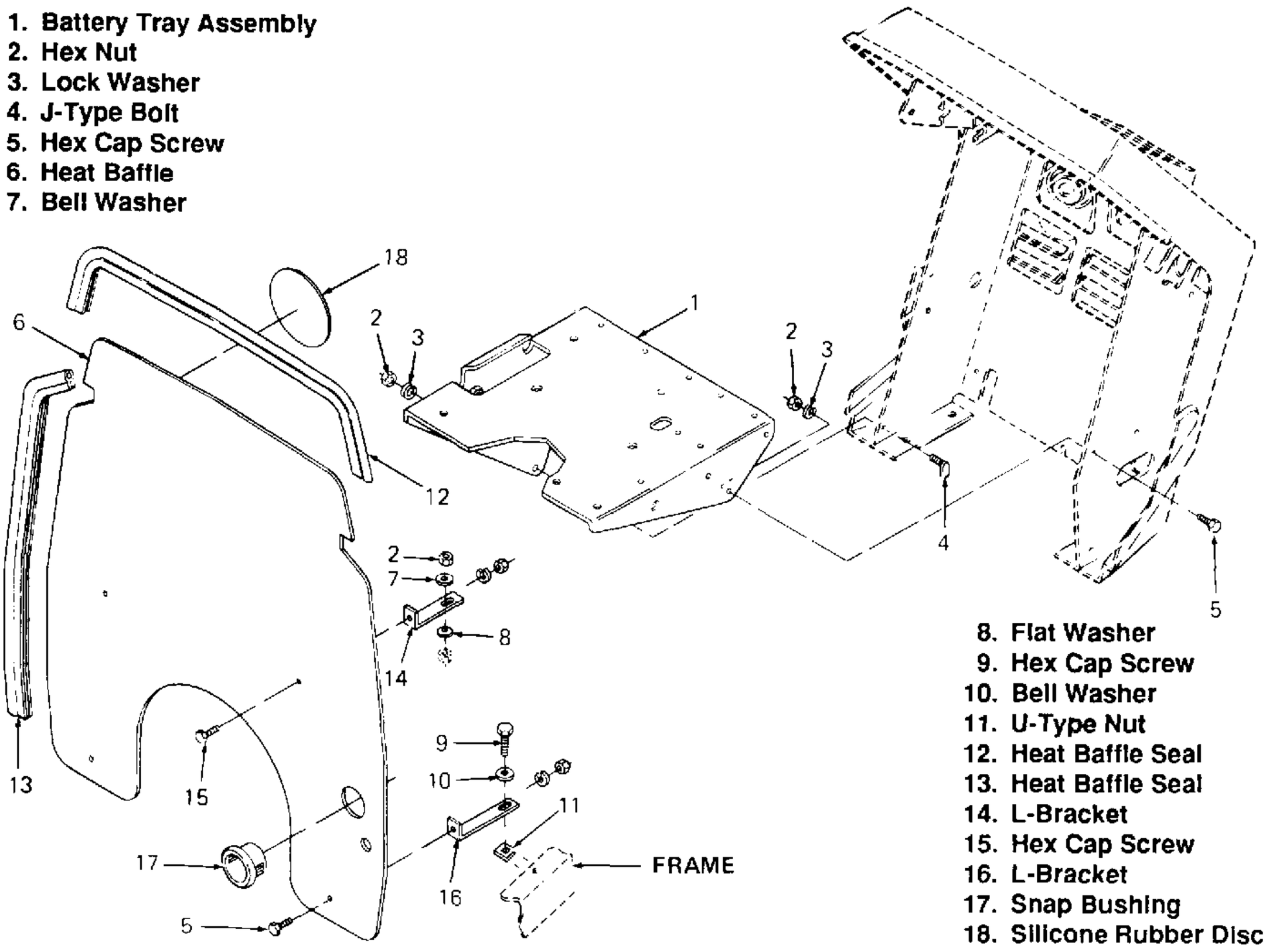
5-11.1 **General.** Refer to Appendix F for additional information about servicing electrical equipment.

5-11.2 **Removal.**

1. Remove battery and electrical components per paragraph 5-7.2.
2. Remove battery tray assembly (1, Figure 5-14) by removing hex nuts (2), lock washers (3), J-type bolt (4) and hex cap screws (5).
3. Remove heat baffle (6) by removing hex nut (2), bell washer (7), flat washer (8), hex cap screw (9), bell washer (10) and U-type nut (11).

5-11.3 **Disassembly.**

1. Disassemble heat baffle (6) as follows:
   a. Remove heat baffle seals (12 and 13).
   b. Remove L-brackets (14 and 16) by removing hex nuts, lock washers and hex cap screws (15).
   c. Remove snap bushing (17) and silicone rubber disc (18).



1. **Battery Tray Assembly**
2. **Hex Nut**
3. **Lock Washer**
4. **J-Type Bolt**
5. **Hex Cap Screw**
6. **Heat Baffle**
7. **Bell Washer**
8. **Flat Washer**
9. **Hex Cap Screw**
10. **Bell Washer**
11. **U-Type Nut**
12. **Heat Baffle Seal**
13. **Heat Baffle Seal**
14. **L-Bracket**
15. **Hex Cap Screw**
16. **L-Bracket**
17. **Snap Bushing**
18. **Silicone Rubber Disc**

Figure 5-14. Battery Tray and Heat Baffle (Model 1340).

5-11.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect condition of heat baffle seals (12 and 13). Discard and replace if badly worn.

5-11.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-11.6 **Reassembly.**

1. Reassemble heat baffle (6) as follows:
   a. Install silicone rubber disc (18) and snap bushing (17).
   b. Install L-brackets (14 and 16) with hex cap screws (15), lock washers and hex nuts. Note that longer bracket is installed on left side of heat baffle.
   c. Install heat baffle seals (12 and 13).

5-11.7 **Installation.**

1. Install heat baffle (6) with U-type nut (11), bell washer (10), hex cap screw (9), flat washer (8), bell washer (7) and hex nut (2).
2. Install battery tray assembly (1) with hex cap screws (5), J-type bolt (4), lock washers (3) and hex nuts (2).
3. Install battery and electrical components per paragraph 5-7.5.

5-12. BATTERY TRAY AND AIR BAFFLES (Models 1535, 1541, 1860, 1862, 1882 and 2082).

5-12.1 **General.** Refer to Appendix F for additional information about servicing electrical equipment.

5-12.2 **Removal.**

1. Remove battery and electrical components per paragraph 5-8.2.
2. Remove left intake baffle (1, Figure 5-15) by removing hex cap screws (2) and bell washers (3).
3. Remove right intake baffle (4) by removing hex cap screws (2) and bell washers (3).
4. Remove battery tray assembly (5) and foam gasket sealing strip (10) by removing hex nuts (6), lock washers (7), J-type bolt (8) and hex cap screws (9).

5-12.3 **Inspection.** Clean all parts prior to inspection.

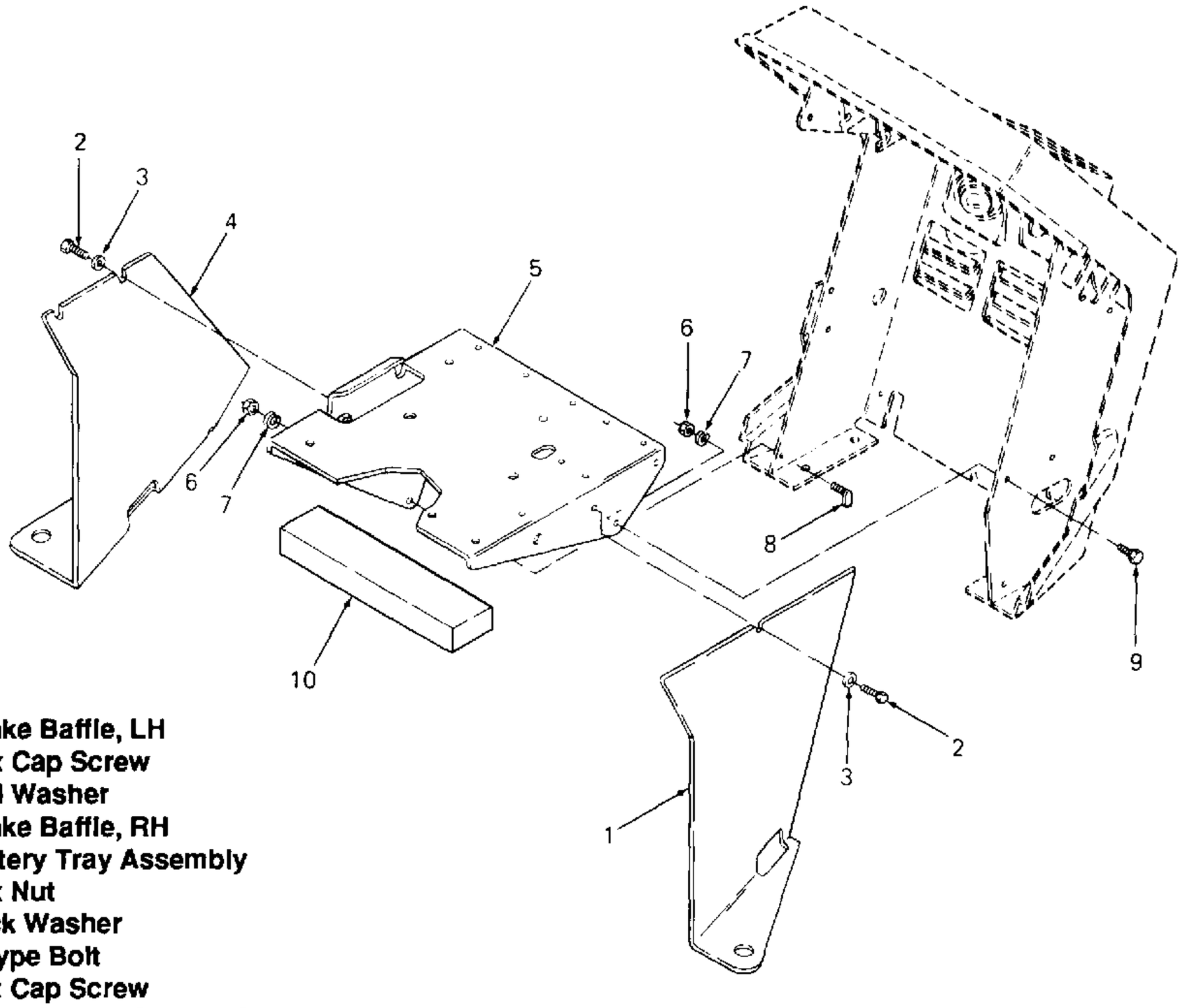
1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect foam gasket sealing strip (10). Discard and replace if badly worn.

5-12.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Secure foam gasket sealing strip (10) if loose.

5-12.5 **Installation.**

1. Install battery tray assembly (5) and foam gasket sealing strip (10) by installing hex cap screws (9), J-type bolt (8), lock washers (7) and hex nuts (6).
2. Install right intake baffle (4) by installing bell washers (3) and hex cap screws (2).
3. Install left intake baffle (1) by installing bell washers (3) and hex cap screws (2).
4. Install battery and electrical components per paragraph 5-8.5.



1. **Intake Baffle, LH**
2. **Hex Cap Screw**
3. **Bell Washer**
4. **Intake Baffle, RH**
5. **Battery Tray Assembly**
6. **Hex Nut**
7. **Lock Washer**
8. **J-Type Bolt**
9. **Hex Cap Screw**
10. **Foam Gasket Sealing Strip**

Figure 5-15. Battery Tray and Air Baffles (Models 1535, 1541, 1860, 1862, 1882 and 2082).

5-12A. **BATTERY TRAY AND HEAT BAFFLE (Model 1882 [Tractor Serial Number 811,672 and above] and Model 2082 [Tractor Serial Number 811,672 and above]).**

5-12A.1 **General.** Refer to Appendix F for additional information about servicing electrical equipment.

5-12A.2 **Removal.**

1. Remove battery and electrical components per paragraph 5-8.2
2. Remove left intake baffle (1, Figure 5-15A) by removing hex cap screws (2) and bell washers (3).
3. Remove right intake baffle (4) by removing hex cap screws (2) and bell washers (3).
4. Remove battery tray assembly (5) and foam gasket sealing strip (10) by removing hex nuts (6), lock washers (7), J-type bolt (8) and hex cap screws (9).

5-12A.3 **Disassembly.**

1. Disassemble heat baffle (11) as follows:
   a. Remove heat baffle seals (12 and 13).
   b. Remove L-brackets (14, 15 and 18) by removing hex nuts (6), lock washers (7) and hex cap screws (17).
   c. Remove snap bushings (16) and battery post insulator (19).

5-12A.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect foam gasket sealing strip (10). Discard and replace if badly worn.
4. Inspect condition of heat baffle seals (12 and 13). Discard and replace if badly worn.

5-12A.5 **Repair.**

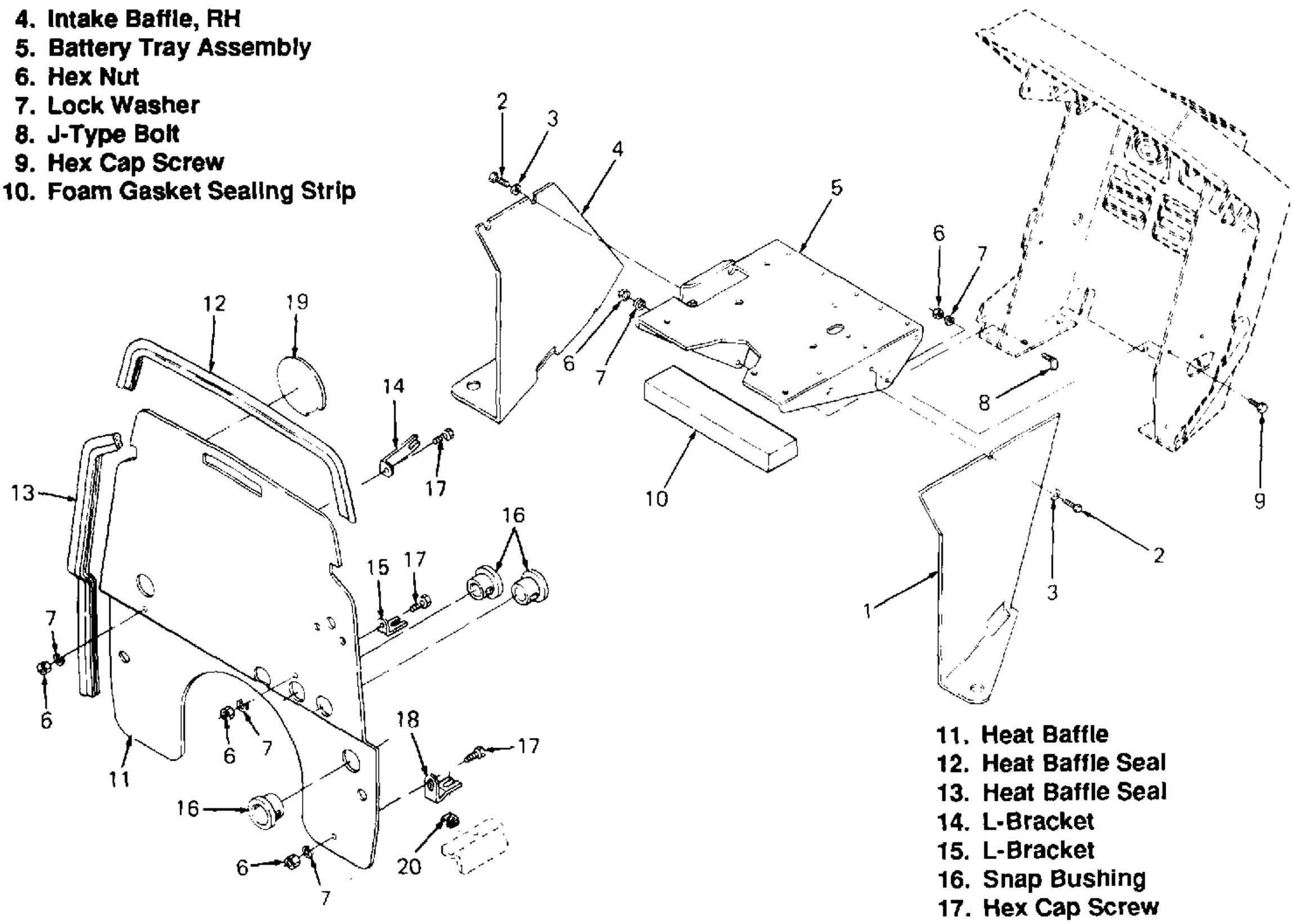
1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-12A.6 **Reassembly.**

1. Reassemble heat baffle (11) as follows:
   a. Install battery post insulator (19) and snap bushings (16).
   b. Install L-brackets (14, 15 and 18) with hex cap screws (17), lock washers (7) and hex nuts (6). Note that longer bracket is installed on left side of heat baffle.
   c. Install heat baffle seals (12 and 13).

5-12A.7 **Installation.**

1. Install heat baffle (11) with U-type nut (20).
2. Install battery tray assembly (5) and foam gasket sealing strip (10) by installing hex cap screws (9), J-type bolt (8), lock washers (7) and hex nuts (6).
3. Install right intake baffle (4) by installing bell washers (3) and hex cap screws (2).
4. Install left intake baffle (1) by installing bell washers (3) and hex cap screws (2).
5. Install battery and electrical components per paragraph 5-8.5.



1. **Intake Baffle, LH**
2. **Hex Cap Screw**
3. **Bell Washer**
4. **Intake Baffle, RH**
5. **Battery Tray Assembly**
6. **Hex Nut**
7. **Lock Washer**
8. **J-Type Bolt**
9. **Hex Cap Screw**
10. **Foam Gasket Sealing Strip**
11. **Heat Baffle**
12. **Heat Baffle Seal**
13. **Heat Baffle Seal**
14. **L-Bracket**
15. **L-Bracket**
16. **Snap Bushing**
17. **Hex Cap Screw**
18. **L-Bracket**
19. **Battery Post Insulator**
20. **U-Type Nut**

Figure 5-15A. Battery Tray and Heat Baffle (Models 1882 and 2082).

5-12B. BATTERY TRAY AND HEAT BAFFLE (Model 1541 [Tractor Serial Number 811,672 and above]).

5-12B.1 **General.** Refer to Appendix F for additional information about servicing electrical equipment.

5-12B.2 **Removal.**

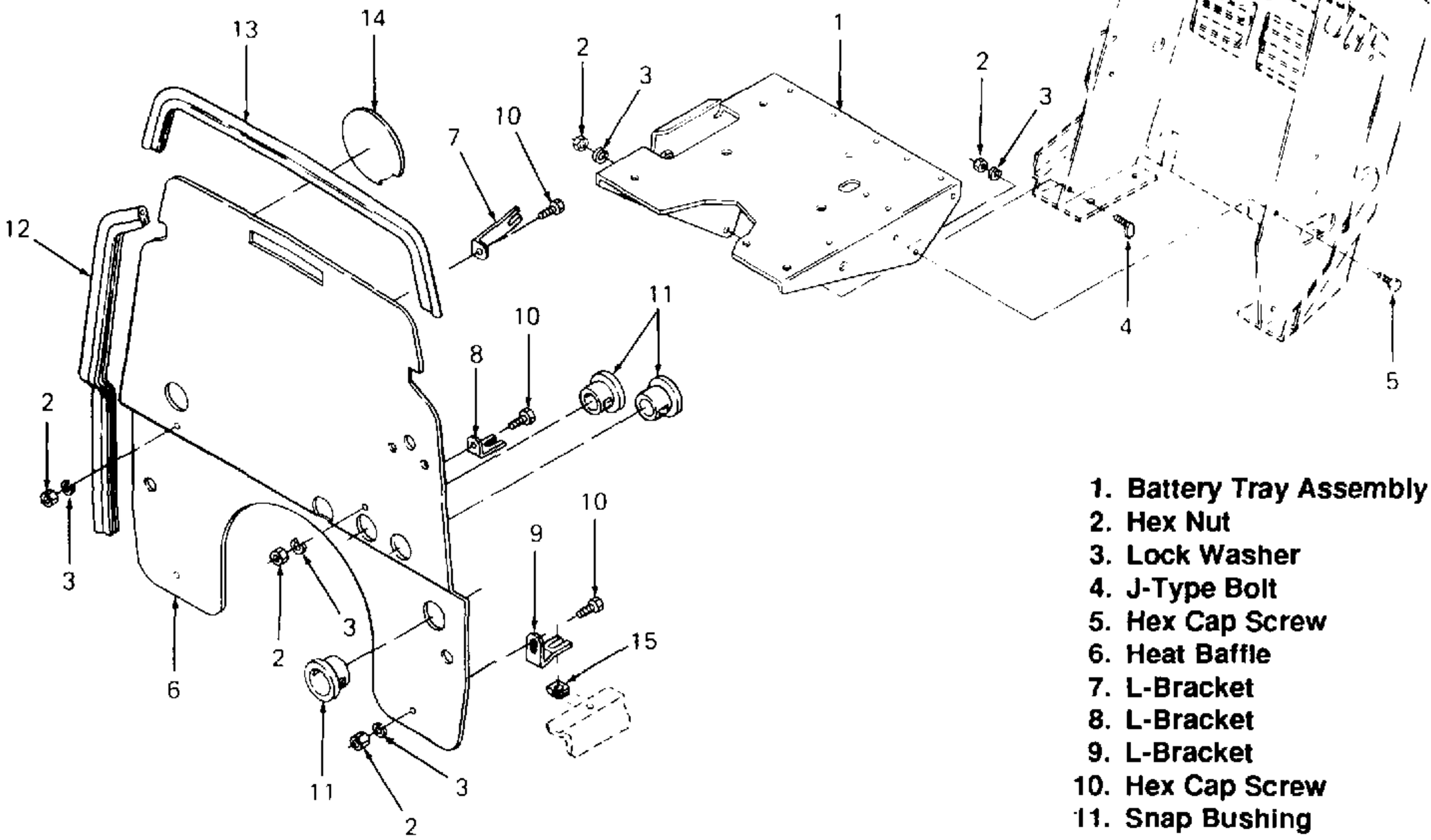
1. Remove battery and electrical components per paragraph 5-8.2.
2. Remove battery tray assembly (1, Figure 5-15B) by removing hex nuts (2), lock washers (3), J-type bolt (4) and hex cap screws (5).

5-12B.3 **Disassembly.**

1. Disassemble heat baffle (6) as follows:
   a. Remove heat baffle seals (12 and 13).
   b. Remove L-brackets (7, 8 and 9) by removing hex nuts (2), lock washers (3) and hex cap screws (10).
   c. Remove snap bushings (11) and battery post insulator (14).

5-12B.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.



1. Battery Tray Assembly
2. Hex Nut
3. Lock Washer
4. J-Type Bolt
5. Hex Cap Screw
6. Heat Baffle
7. L-Bracket
8. L-Bracket
9. L-Bracket
10. Hex Cap Screw
11. Snap Bushing
12. Heat Baffle Seal
13. Heat Baffle Seal
14. Battery Post Insulator
15. U-Type Nut

Figure 5-15B. Battery Tray and Heat Baffle (Model 1541).

3. Inspect condition of heat baffle seals (12 and 13). Discard and replace if badly worn.

5-12B.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-12B.6 **Reassembly.**

1. Reassemble heat baffle (6) as follows:
   a. Install battery post insulator (14) and snap bushings (11).
   b. Install L-brackets (7, 8 and 9) with hex cap screws (10), lock washers (3) and hex nuts (2). Note that longer bracket is installed on left side of heat baffle.
   c. Install heat baffle seals (12 and 13).

5-12B.7 **Installation.**

1. Install heat baffle (6) with U-type nut (15).
2. Install battery tray assembly (1) by installing hex cap screws (5), J-type bolt (4), lock washers (3) and hex nuts (2).
3. Install battery and electrical components per paragraph 5-8.5.

5-13. ELECTRICAL SYSTEM (Models 1340, 1541, 1860, 1862, 1882 and 2082).

5-13.1 **General.** Supplemental information on the electrical system is located in Appendices F and G.

WARNING

The electrical system contains a number of safety interlock switches which are essential for operator safety. These devices must be present on the tractor and must be in proper working order.

5-13.2 **Removal.**

NOTE

Side panel removal and battery removal are necessary only for removal of electrical components located on the tractor instrument panel. However, always disconnect the battery before working on the electrical system.

1. Remove side panels and battery per paragraph 5-8.2.

CAUTION

Do not touch glass portion of head lamp bulb. Touching glass portion, or allowing other contact with dirt or oil, will reduce life of head lamp bulb.

2. Remove head lamp bulb (1, Figure 5-16) by unplugging main wire harness (2) from bulb. Turn bulb to align lugs with slots, and pull bulb from grille housing. Remove second bulb in the same way.

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3. Remove each indicator bulb (3) by removing corresponding lead from indicator wire harness (4) from underside of instrument panel. Remove each bulb from indicator wire harness.

4. Remove hour meter (5) by removing lead from indicator wire harness (4), and remove Tapp screws (6).

5. Remove reverse switch (7) by removing electrical lead, hex insert lock nut (8) and switch screw (9).

6. Remove ignition switch (10) by removing electrical lead, ignition key (11) and ignition switch nut (12).

7. Remove PTO switch (13) by removing electrical lead and hex nut (14).

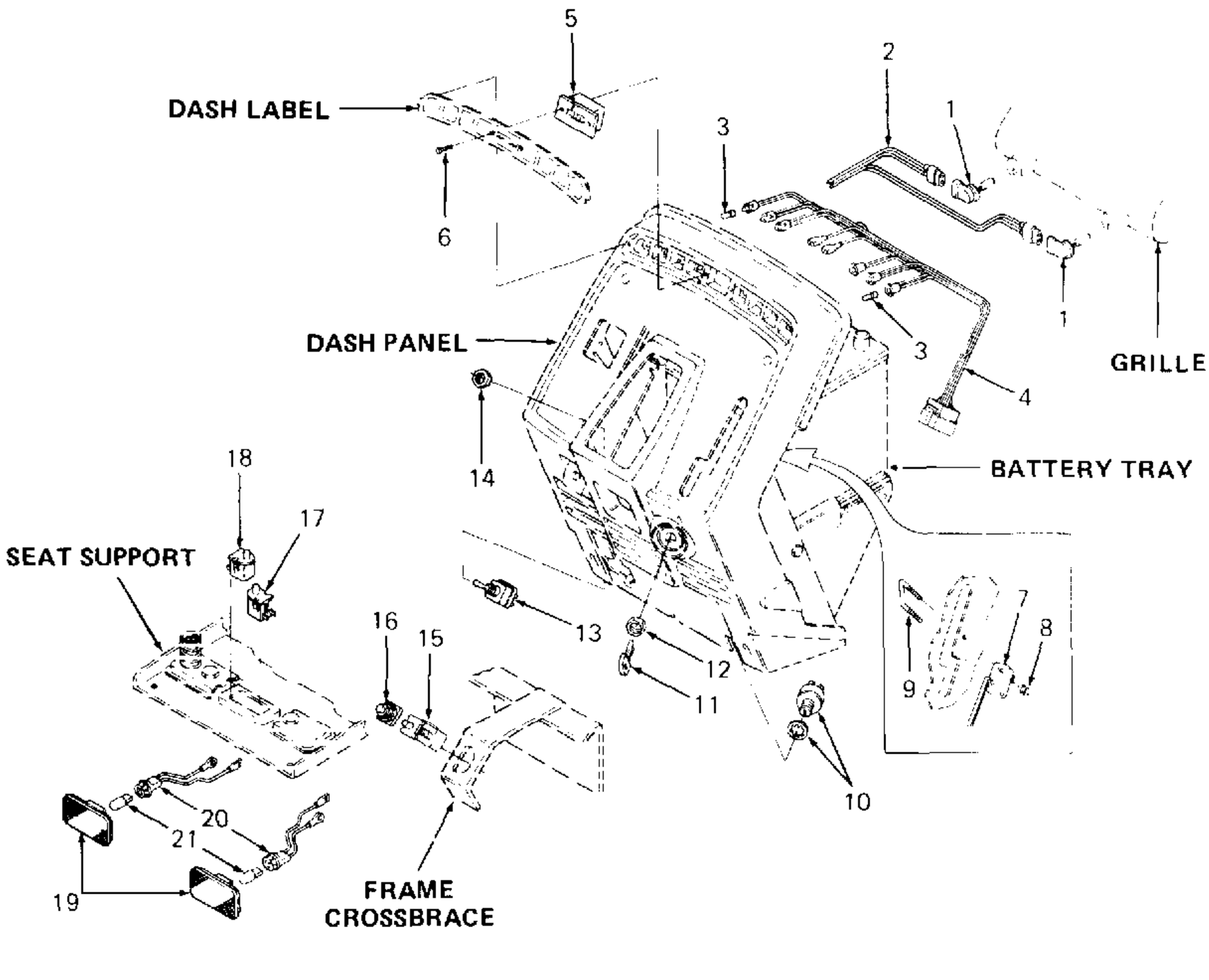
8. Remove interlock switch (15) from frame crossbrace by first removing frame cover. Remove electrical lead from interlock switch and remove switch boot (16).

9. Remove snap mount switches (17 and 18) from seat support by disassembling seat to level necessary to disconnect electrical leads and then remove switches.

10. Remove tail light lens assembly (19) by removing nut, washer and screw.

11. Remove tail light cable assembly (20) from rear fender housing by turning 1/4 turn. Disconnect ground and electrical lead.

12. Remove tail light bulb (21) from cable assembly.



1. Head Lamp Bulb
2. Main Wire Harness
3. Indicator Bulb
4. Indicator Wire Harness
5. Hour Meter
6. Tapp Screw
7. Reverse Switch
8. Hex Insert Lock Nut
9. Switch Screw
10. Ignition Switch
11. Ignition Key
12. Ignition Switch Nut
13. PTO Switch
14. Hex Nut
15. Interlock Switch
16. Switch Boot
17. Snap Mount Switch
18. Snap Mount Switch
19. Tail Light Lens Assembly
20. Tail Light Cable Assembly
21. Tail Light Bulb

Figure 5-16. Electrical System (Models 1340, 1541, 1860, 1862, 1882 and 2082).

5-13.3 **Inspection.** Refer to Appendix F and/or Appendix G for additional information on testing of electrical systems and components.

1. Inspect all threaded areas for damage.
2. Inspect all wires for breaks, cuts or damage to insulation.
3. Test all switches to ensure operational condition. Discard and replace any switch found to be defective.
4. Discard and replace nonfunctional bulbs.

NOTE

Additional information on testing of electrical components is contained in Appendices F and G.

5-13.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor damage to wires as necessary.

5-13.5 **Installation.**

1. Install tail light bulb (21) in tail light cable assembly (20).
2. Install tail light cable assembly (20) by connecting ground and electrical lead. Secure in rear fender housing with 1/4 turn.
3. Install tail light lens assembly (19) with screw, washer and nut.
4. Install snap mount switches (17 and 18) by placing in seat support and connecting electrical leads.
5. Install interlock switch (15) by placing in frame crossbrace and connecting electrical lead and install switch boot (16). Install frame cover.
6. Install PTO switch (13) in instrument panel with hex nut (14). Connect electrical lead.

NOTE

Green ground lead must be installed on ignition switch (10) or engine will not start.

7. Install ignition switch (10) in instrument panel with ignition switch nut (12). Connect electrical lead and green ground lead, and install ignition key (11).
8. Install reverse switch (7) on underside of instrument panel with switch screw (9) and hex insert lock nut (8). Connect electrical lead.
9. Install hour meter (5) with Tapp screws (6). Connect electrical lead.
10. Install each indicator bulb (3) in indicator wire harness (4). Install harness lead and bulbs in underside of instrument panel.

CAUTION

Do not touch glass portion of head lamp bulb. Touching glass portion, or allowing other contact with dirt or oil, will reduce life of head lamp bulb.

11. Install head lamp bulb (1) in grille housing by aligning lugs on bulb with slots on housing. Once installed, turn bulb to lock in place and connect lead from main wire harness (2) to bulb. Install second bulb in the same way.
12. Install battery and side panels per paragraph 5-8.5.

5-14. ELECTRICAL SYSTEM (Model 1535).

5-14.1 **General.** Supplemental information for servicing the electrical system is located in Appendices F and G.

WARNING

The electrical system contains a number of safety interlock switches which are essential for operator safety. These devices must be present on the tractor and must be in proper working order.

5-14.2 **Removal.**

NOTE

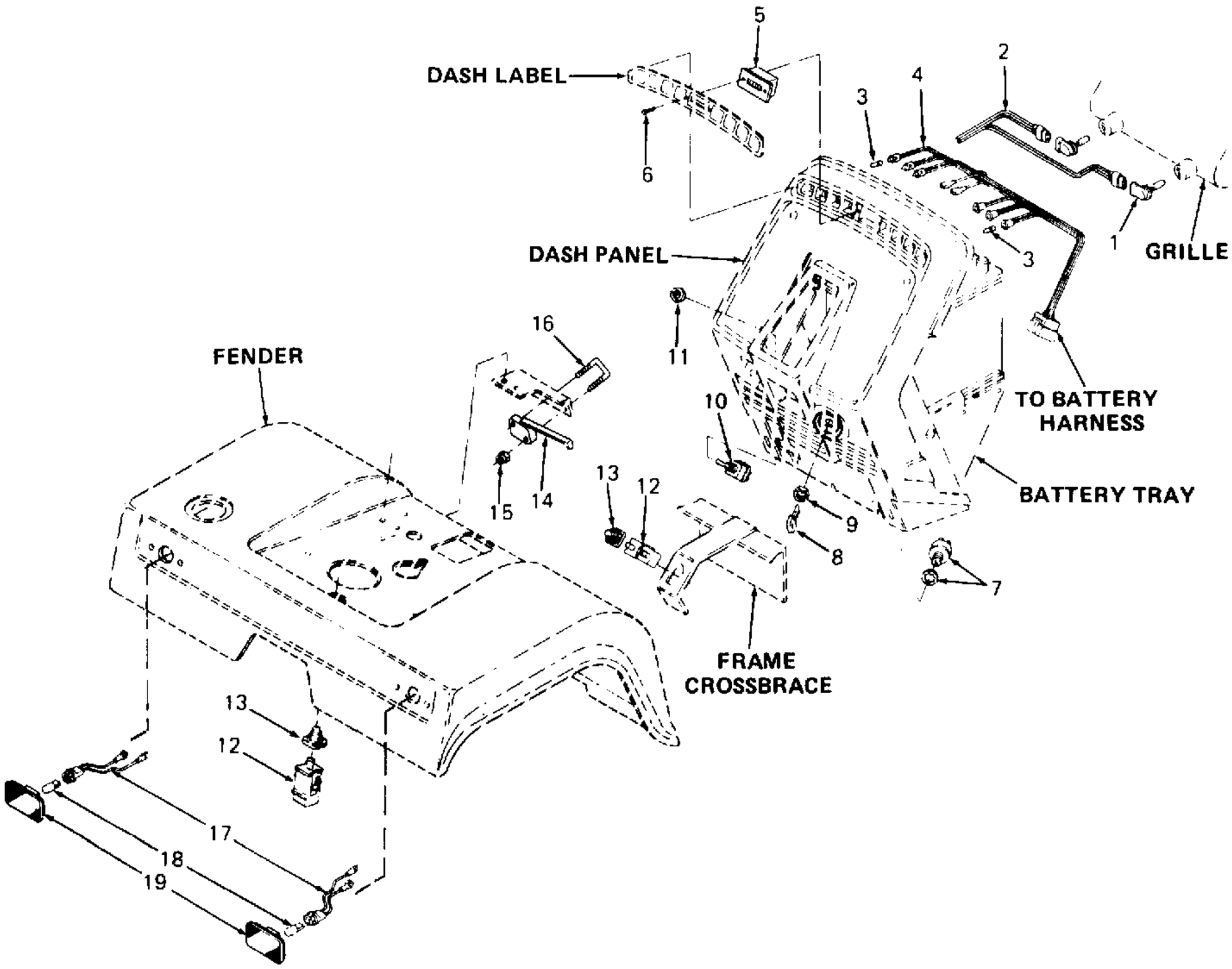
Side panel removal and battery removal are necessary only for removal of electrical components located on the tractor instrument panel. However, always disconnect the battery before working on the electrical system.

1. Remove side panels per paragraph 5-4.2 and battery per paragraph 5-8.2.

CAUTION

Do not touch glass portion of head lamp bulb. Touching glass portion, or allowing other contact with dirt or oil, will reduce life of head lamp bulb.

2. Remove head lamp bulb (1, Figure 5-17) by unplugging main wire harness (2) from bulb. Turn bulb to align lugs with slots, and pull bulb from grille housing. Remove second bulb in the same way.
3. Remove each indicator bulb (3) by removing corresponding lead from indicator wire harness (4) from underside of instrument panel. Remove each bulb from indicator wire harness.
4. Remove hour meter (5) by removing lead from indicator wire harness (4), and remove Tapp screws (6).
5. Remove ignition switch (7) by removing electrical lead, ignition key (8) and ignition switch nut (9).



1. Head Lamp Bulb
2. Main Wire Harness
3. Indicator Bulb
4. Indicator Wire Harness
5. Hour Meter
6. Tapp Screw
7. Ignition Switch
8. Ignition Key
9. Ignition Switch Nut
10. PTO Switch
11. Hex Nut
12. Interlock Switch
13. Switch Boot
14. Reverse Switch
15. Hex Insert Lock Nut
16. Switch Screw
17. Tail Light Cable Assembly
18. Tail Light Bulb
19. Tail Light Lens Assembly

Figure 5-17. Electrical System (Model 1535).

6. Remove PTO switch (10) by removing electrical lead and hex nut (11).
7. Remove front interlock switch (12) from frame crossbrace by first removing frame cover. Remove electrical lead from interlock switch and remove switch boot (13).
8. Remove reverse switch (14) by removing hex insert lock nut (15) and switch screw (16).
9. Remove rear interlock switch (12) by removing electrical lead from interlock switch and remove switch boot (13).
10. Remove tail light cable assembly (17) from rear fender housing by turning 1/4 turn. Disconnect ground and electrical lead.
11. Remove tail light bulb (18) from cable assembly.
12. Remove tail light lens assembly (19) by removing nut, washer and screw.
13. Remove other tail light assembly in the same way.

5-14.3 **Inspection.** Refer to Appendix F and/or Appendix G for additional information on testing of electrical systems and components.

1. Inspect all threaded areas for damage.
2. Inspect all wires for breaks, cuts or damage to insulation.
3. Test all switches to ensure operational condition. Discard and replace any switch found to be defective.
4. Discard and replace nonfunctional bulbs.

5-14.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor damage to wires as necessary.

5-14.5 **Installation.**

1. Install tail light lens assembly (19) with screw, washer and nut.
2. Install tail light bulb (18) in tail light cable assembly (17).
3. Install tail light cable assembly (17) by connecting ground and electrical lead. Secure in rear fender housing with 1/4 turn.
4. Install other tail light assembly in the same way.
5. Install rear interlock switch (12) by installing switch boot (13) and electrical lead.
6. Install reverse switch (14) by installing switch screw (16) and hex insert lock nut (15).
7. Install front interlock switch (12) by placing in frame crossbrace and connecting electrical lead and installing switch boot (13). Install frame cover.
8. Install PTO switch (10) in instrument panel with hex nut (11). Connect electrical lead.
9. Install ignition switch (7) in instrument panel with ignition switch nut (9). Connect electrical lead and install ignition key (8).
10. Install hour meter (5) with Tapp screws (6). Connect electrical lead.
11. Install each indicator bulb (3) in indicator wire harness (4). Install harness lead and bulbs in underside of instrument panel.

CAUTION

Do not touch glass portion of head lamp bulb. Touching glass portion, or allowing other contact with dirt or oil, will reduce life of head lamp bulb.

12. Install head lamp bulb (1) in grille housing by aligning lugs on bulb with slots on housing. Once installed, turn bulb to lock in place and connect lead from main wire harness (2) to bulb. Install second bulb in the same way.
13. Install battery per paragraph 5-8.5.

5-15. ELECTRICAL SYSTEM (Models 1782 and 2182).

5-15.1 **General.** Supplemental information on the electrical system is located in Appendices F and G.

WARNING

The electrical system contains a number of safety interlock switches which are essential for operator safety. These devices must be present on the tractor and must be in proper working order.

5-15.2 **Removal.**

NOTE

Side panel removal and battery removal are necessary only for removal of electrical components located on the tractor instrument panel. However, always disconnect the battery before working on the electrical system.

1. Remove side panels per paragraph 5-5.2.
2. Remove radiator per paragraph 5-6.2.
3. Remove indicator adapter harness (1, Figure 5-18) by removing ends from underside of instrument panel and from pedestal harness (2).
4. Remove indicator wire harness (3) by removing ends from underside of instrument panel and from pedestal harness (2). Remove each indicator bulb (4) by removing corresponding leads.
5. Remove hour meter (5) by removing lead from indicator wire harness (3) and remove Tapp screws (6).
6. Remove reverse switch (7) by removing electrical lead, hex insert lock nuts (8) and switch screw (9).
7. Remove ignition switch (10) by removing electrical lead, ignition key (11) and ignition switch nut (12).
8. Remove headlight switch (10A, Model 1782 only) after disconnecting electrical lead.
9. Remove PTO switch (13) by removing electrical lead and hex nut (14).
10. Remove interlock switch (15) from frame crossbrace by first removing frame cover. Remove electrical lead from interlock switch and remove switch boot (16).
11. Remove snap mount switches (17 and 18) from seat support by disassembling seat to level necessary to disconnect electrical leads and then remove switches.
12. Remove tail light lens assembly (19) by removing nuts, washers and screws.
13. Remove tail light cable assembly (20) from rear fender housing by turning 1/4 turn. Disconnect ground and electrical lead.
14. Remove tail light bulbs (21) from cable assembly.

5-15.3 **Inspection.** Refer to Appendix F and/or Appendix G for additional information on testing of electrical systems and components.

1. Inspect all threaded areas for damage.
2. Inspect all wires for breaks, cuts or damage to insulation.
3. Test all switches to ensure operational condition. Discard and replace any switch found to be defective.
4. Discard and replace nonfunctional bulbs.

NOTE

Additional information on testing of electrical components is contained in Appendices F and G.

5-15.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor damage to wires as necessary.

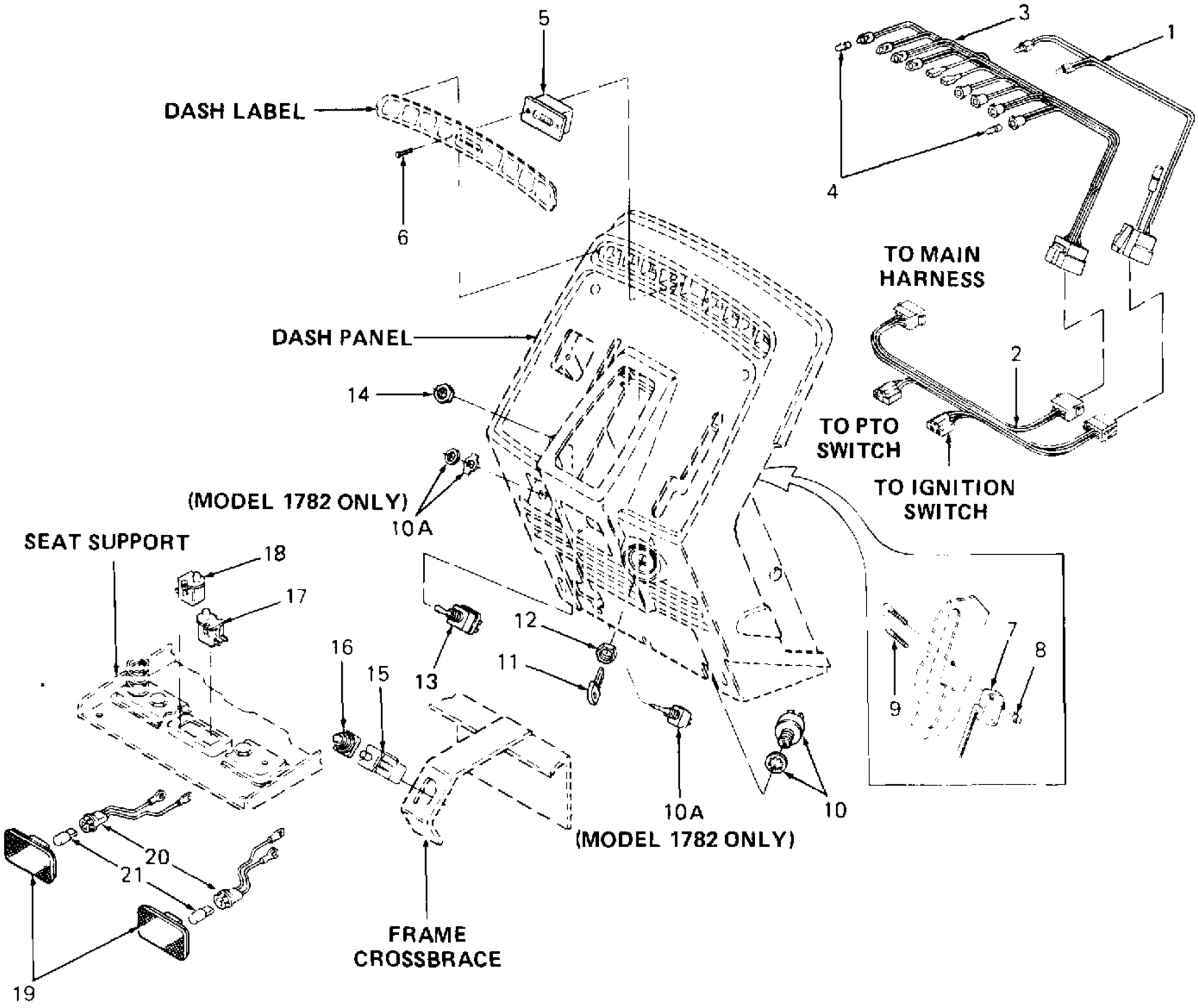
5-15.5 **Installation.**

1. Install tail light bulbs (21) in tail light cable assembly (20).
2. Install tail light cable assembly (20) by connecting ground and electrical lead. Secure in rear fender housing with 1/4 turn.
3. Install tail light lens assembly (19) with screws, washers and nuts.
4. Install snap mount switches (17 and 18) by placing in seat support and connecting electrical leads.
5. Install interlock switch (15) by placing in frame crossbrace and connecting electrical lead and install switch boot (16). Install frame cover.
6. Install PTO switch (13) in instrument panel with hex nut (14). Connect electrical lead.
7. Install headlight switch (10A, Model 1782 only) and connect electrical lead.

NOTE

Green ground lead must be installed on ignition switch (10) or engine will not start.

8. Install ignition switch (10) in instrument panel with ignition switch nut (12). Connect electrical lead and green ground lead, and install ignition key (11).
9. Install reverse switch (7) on underside of instrument panel with switch screw (9) and hex insert lock nuts (8). Connect electrical lead.
10. Install hour meter (5) with Tapp screws (6). Connect electrical lead.
11. Install indicator bulbs (4) in indicator wire harness (3). Install bulb end of harness lead in underside of instrument panel, and attach other end of harness to pedestal harness (2).



1. Indicator Adapter Harness (Temperature and Glow Plug Indicator 1782; Temperature Indicator 2182)
2. Pedestal Harness
3. Indicator Wire Harness
4. Indicator Bulb
5. Hour Meter
6. Tapp Screw
7. Reverse Switch
8. Hex Insert Lock Nut
9. Switch Screw
10. Ignition Switch
10A. Headlight Switch
11. Ignition Key
12. Ignition Switch Nut
13. PTO Switch
14. Hex Nut
15. Interlock Switch
16. Switch Boot
17. Snap Mount Switch
18. Snap Mount Switch
19. Tail Light Lens Assembly
20. Tail Light Cable Assembly
21. Tail Light Bulb

Figure 5-18. Electrical System (Models 1782 and 2182).

12. Install indicator adapter harness (1) by attaching bulb end to underside of instrument panel and other end to pedestal harness (2).

13. Install radiator per paragraph 5-6.3.

14. Install side panels per paragraph 5-5.7.

5-16. PTO CLUTCH (Model 1340).

5-16.1 **General.** Detailed information regarding electrical troubleshooting of the PTO clutch is located in Section 4.

5-16.2 **Removal.**

1. Remove side panels and grille per paragraph 5-4.2.
2. Disconnect electrical connection at PTO.
3. Remove PTO clutch (1, Figure 5-19) and spacer (5) from engine by removing hex cap screw (2), lock washer (3) and flat washer (4).
4. Remove torque bracket (6) by removing hex cap screws (7) and bell washers (8).

5-16.3 **Disassembly.**

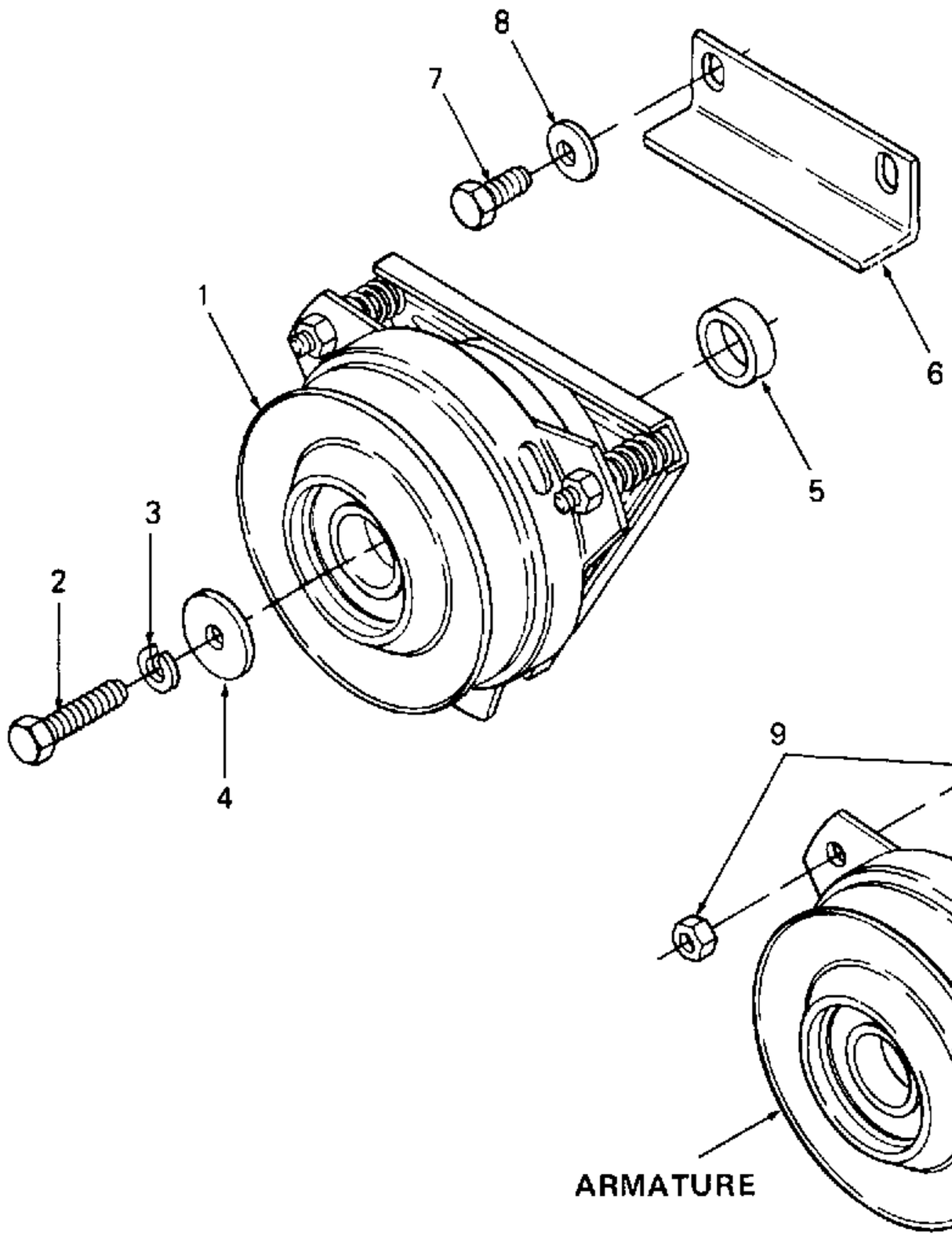
1. Disassemble PTO clutch (1) by removing hex nuts (9) then separating armature and rotor (10), field assembly (11) and springs (9).

5-16.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect springs (9) for damage or distortion. Discard and replace damaged springs.
4. Inspect armature (10) for wear in groove area. Replace if significantly worn.

5-16.5 **Repair.** Refer to Appendix E for parts which are worn or damaged beyond repair.

1. Deburr and dress damaged threads.



1. **PTO Clutch Assembly**
2. **Hex Cap Screw**
3. **Lock Washer**
4. **Flat Washer**
5. **Spacer**
6. **Torque Bracket**
7. **Hex Cap Screw**
8. **Bell Washer**
9. **Hex Nuts and Springs**
10. **Rotor and Armature Kit**
11. **Field Assembly**

Figure 5-19. PTO Clutch (Model 1340).

2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-16.6 **Reassembly.**

1. On field assembly (11), reposition springs (9) and rotor and armature (10). Secure with nuts (9).

5-16.7 **Installation.**

1. Install torque bracket (6) with bell washers (8) and hex cap screws (7).
2. Install spacer (5) and PTO clutch (1) by installing flat washer (4), lock washer (3) and hex cap screw (2).
3. Adjust air gap to .017 inch. Refer to paragraph 6-2.

5-17. PTO CLUTCH (Models 1535, 1541, 1860, 1862, 1882 and 2082).

5-17.1 **General.** Detailed information regarding electrical troubleshooting of the PTO clutch is located in Section 4.

5-17.2 **Removal.**

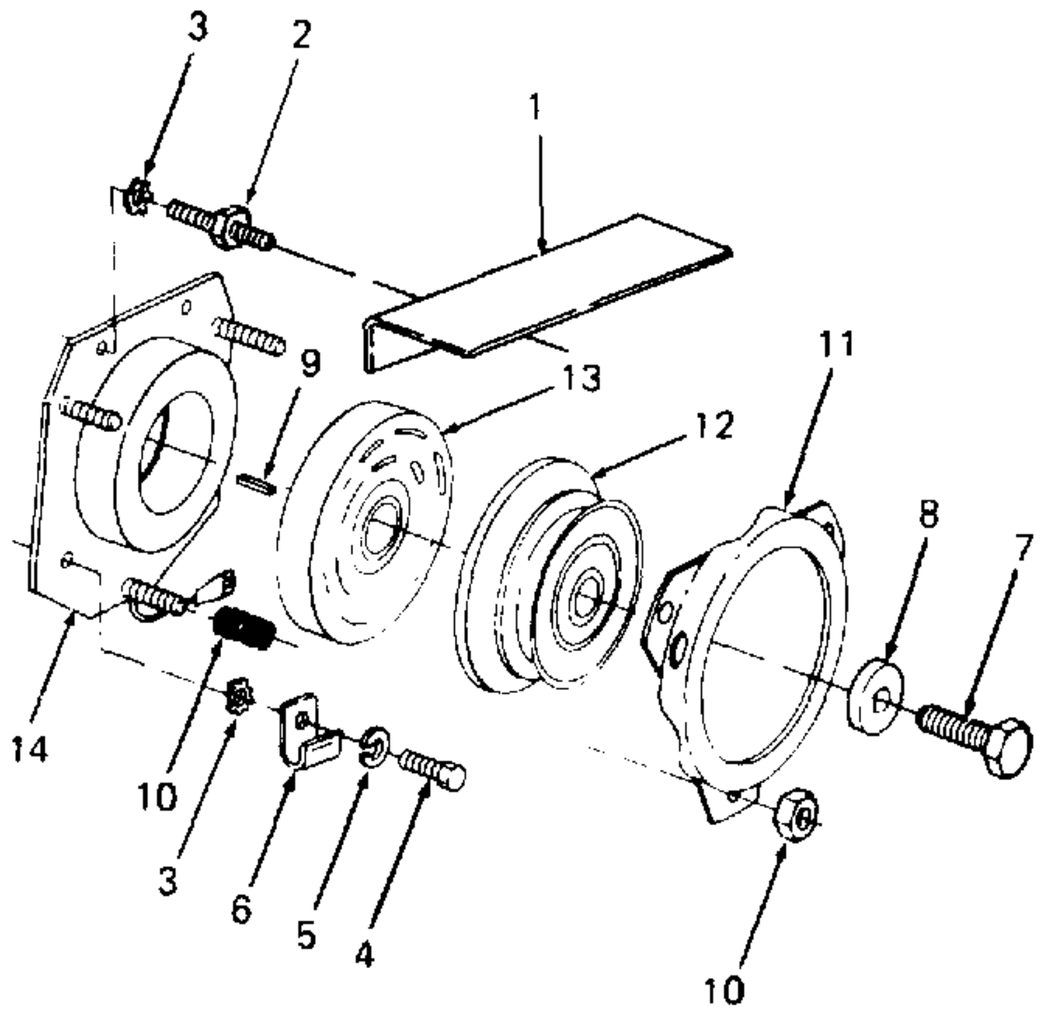
1. Remove side panels and grille per paragraph 5-4.2.
2. Disconnect electrical connection at PTO.
3. Remove PTO from tractor by removing PTO baffle (1, Figure 5-20), studs (2), external lock washers (3), hex cap screws (4), lock washers (5), cable clamp (6), external lock washer (3), hex cap screw (7) and flat washer (8).
4. Remove key (9) from shaft.

5-17.3 **Disassembly.**

1. Remove nut (10) and separate brake drum (11), spring (10), armature (12), rotor (13) and field (14).

5-17.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect spring (10) for damage or distortion. Discard and replace damaged spring.
4. Inspect key (9) for damage. Repair or replace as necessary.
5. Inspect armature (12) for wear in groove area. Replace if significantly worn.
6. Inspect electrical lead for damage.



1. PTO Baffle
2. Stud
3. External Lock Washer
4. Hex Cap Screw
5. Lock Washer
6. Cable Clamp
7. Hex Cap Screw
8. Flat Washer
9. Square Key
10. Spring and Nut Kit
11. Brake Drum
12. Armature
13. Rotor
14. Field

Figure 5-20. PTO Clutch (Models 1535, 1541, 1860, 1862, 1882 and 2082).

5-17.5 **Repair.** Refer to Appendix E for contingency replacement parts which are worn or damaged beyond repair.

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-17.6 **Reassembly.**

1. On field (14), reposition spring (10), rotor (13), armature (12) and brake drum (11). Secure with nut (10).

5-17.7 **Installation.**

1. Install key (9) on shaft.
2. Install PTO by installing flat washer (8), hex cap screw (7), external lock washer (3), cable clamp (6), lock washers (5), hex cap screws (4), external lock washers (3), studs (2) and PTO baffle (1).
3. Adjust air gap to .017 inch. Refer to paragraph 6-2.

5-18. PTO CLUTCH AND CLUTCH BREAKDOWN (Models 1782 and 2182).

5-18.1 **General.** Detailed information regarding electrical troubleshooting of the PTO clutch is located in Section 4.

5-18.2 **Removal.**

1. Remove side panels and grille per paragraph 5-5.2.
2. Disconnect electrical connection at PTO.
3. Remove PTO clutch (1, Figure 5-21) from engine by removing hex cap screw (2), lock washer (3) and flat washer (4).
4. Remove stub shaft (5) by removing hex cap screws (6) and lock washers (7).
5. Remove torque bracket (8) by removing hex cap screws (6) and bell washers (9).

5-18.3 **Disassembly.**

1. Disassemble PTO clutch (1) by removing hex nuts (10), then separate field assembly (11), rotor and armature (12) and springs (10).

5-18.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect springs (10) for damage or distortion. Discard and replace damaged springs.
4. Inspect armature (12) for wear in groove area. Replace if significantly worn.

5-18.5 **Repair.** Refer to Appendix E for contingency replacement parts which are worn or damaged beyond repair.

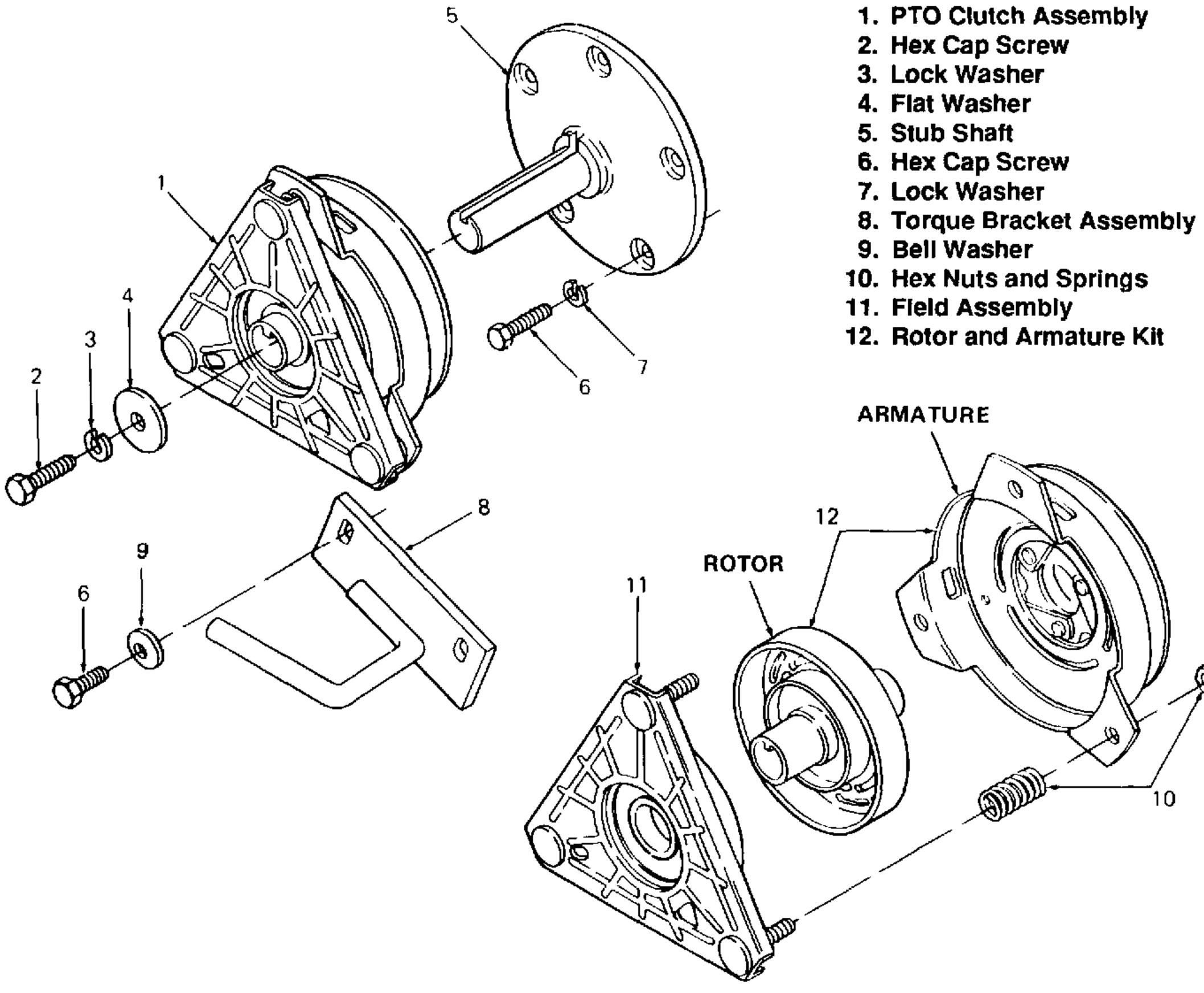


Figure 5-21. PTO Clutch and Clutch Breakdown (Models 1782 and 2182).

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-18.6 **Reassembly.**

1. On field assembly (11), reposition springs (10) and rotor and armature (12). Secure with nuts (10).

5-18.7 **Installation.**

1. Install torque bracket (8) with bell washers (9) and hex cap screws (6).
2. Install stub shaft (5) with lock washers (7) and hex cap screws (6).
3. Install PTO clutch (1) by installing flat washer (4), lock washer (3) and hex cap screw (2).
4. Adjust air gap to .017 inch. Refer to paragraph 6-2.

5-19. FRONT WHEEL (All Models).

5-19.1 **General.** Refer to Section 2 for additional wheel information.

5-19.2 **Removal.**

1. Remove hub cap (2, Figure 5-22), loosen patch bolt (3) and raise and secure the front end of the tractor.
2. Remove front wheel assembly (1) by removing patch bolt (3) and flat washers (4 and 5).

5-19.3 **Disassembly.**

1. Disassemble front wheel assembly (1, Figure 5-22) as follows:
   a. Deflate and remove tire.

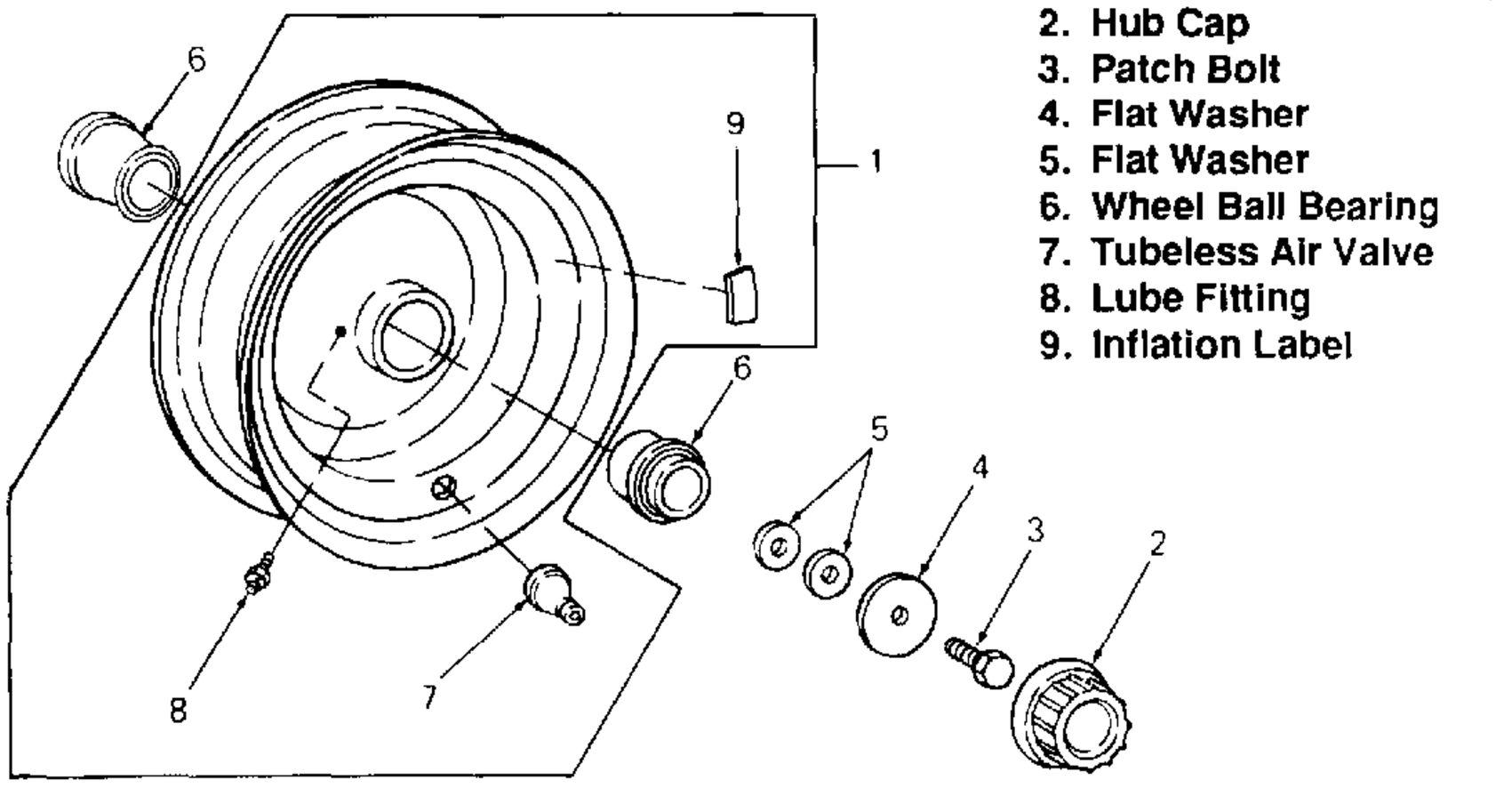
NOTE

Remove ball bearing (6) from wheel only if damaged. Bearings must be replaced if removed.

   b. Disassemble wheel by removing ball bearing (6), tubeless air valve (7) and lube fitting (8).

5-19.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect wheel for damage or excessive wear. Discard and replace wheels damaged beyond repair.
4. Inspect bearing for roughness, noise or looseness within the wheel hub. Remove from wheel and discard and replace if worn or damaged.
5. Inspect that inflation label (9) is firmly attached and can be read.



1. **Front Wheel Assembly**
2. **Hub Cap**
3. **Patch Bolt**
4. **Flat Washer**
5. **Flat Washer**
6. **Wheel Ball Bearing**
7. **Tubeless Air Valve**
8. **Lube Fitting**
9. **Inflation Label**

Figure 5-22. Front Wheel (All Models).

5-19.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-19.6 **Reassembly.**

1. Reassemble front wheel assembly (1) as follows:
   a. Install lube fitting (8), tubeless air valve (7) and ball bearing (6).
   b. Install tire. Inflate to 20 psi to seat tire bead on rim flange. Then deflate tire to 12 psi.

5-19.7 **Installation.**

1. Install front wheel assembly (1) with flat washers (5 and 4) and loosely install patch bolt (3).
2. Lower front end of tractor, securely tighten patch bolt (3) and install hub cap (2).

5-20. **REAR WHEEL (All Models).**

5-20.1 **General.** Refer to Section 2 for additional wheel information.

5-20.2 **Removal.**

1. Loosen lug nuts (2, Figure 5-23) and raise and secure rear end of tractor.
2. Remove rear wheel rim (1) from tractor by removing lug nuts (2).

5-20.3 **Disassembly.**

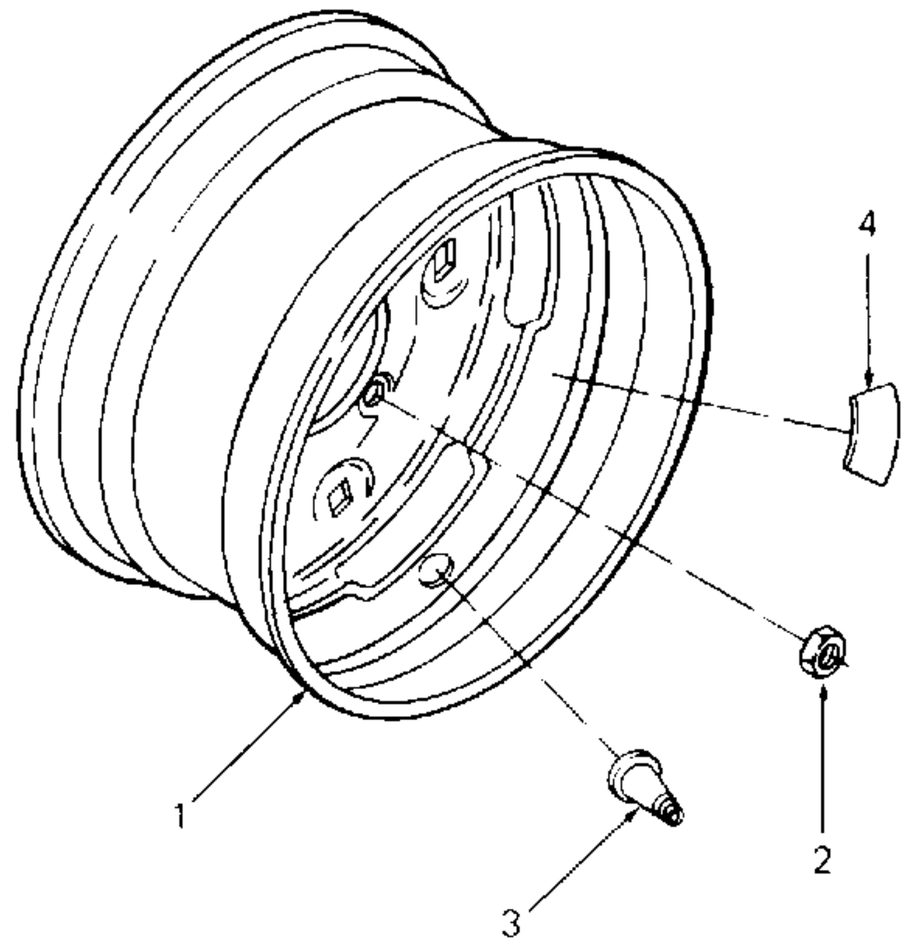
1. Disassemble rear wheel rim (1) as follows:
   a. Deflate and remove tire.
   b. Remove tubeless air valve (3).

5-20.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect wheel for damage or excessive wear. Discard and replace wheels damaged beyond repair.
4. Inspect that inflation label (4) is firmly attached and can be read.

5-20.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.



1. **Rear Wheel Rim**
2. **Lug Nut**
3. **Tubeless Air Valve**
4. **Inflation Label**

Figure 5-23. Rear Wheel (All Models).

5-20.6 **Reassembly.**

1. Reassemble rear wheel rim (1) as follows:
   a. Install tubeless air valve (3).
   b. Install tire. Inflate to 20 psi to seat tire bead on rim flange. Then deflate tire to correct operating pressure (refer to paragraph 1-3.1).

5-20.7 **Installation.**

1. Install rear wheel rim (1) and loosely install lug nuts (2).
2. Lower tractor and tighten lug nuts (2).

5-21. **FRONT AXLE AND CONNECTIONS (Models 1340, 1535, 1541 and 1860).**

5-21.1 **General.** Refer to Appendices C, D and E prior to servicing front axle and connections.

5-21.2 **Removal.**

WARNING

Place tractor on a firm and level surface before removing front axle and connections.

NOTE

Remove any front mounted attachments prior to removal of front axle and connections.

1. Lock the brakes, block the rear wheels and raise and secure the front axle.
2. Remove front wheels per paragraph 5-19.2.
3. Remove drag link (1, Figure 5-24) as follows:
   a. Remove drag link from steering arm by removing cotter pin (2) and hex castle nut (3).
   b. Remove drag link from steering arm (22) by removing hex top lock nut (4) and lock washer (5).

WARNING

Following step 4 will free the axle from the tractor. Secure the front axle before accomplishing axle removal in following step 4.

4. Remove front axle (6) by removing cotter pin (7), hex castle nut (8) and hex bolt (9).

1. Drag Link
2. Cotter Pin
3. Hex Castle Nut
4. Hex Top Lock Nut
5. Lock Washer
6. Front Axle
7. Cotter Pin
8. Hex Castle Nut
9. Hex Bolt
10. Ball Joint
11. Hex Jam Nut
12. Ball Joint
13. Hex Jam Nut
14. Tie Rod
15. Cotter Pin
16. Hex Castle Nut
17. Steering Knuckle, LH
18. Hex Patch Bolt
19. Flat Washer
20. Hex Patch Lock Nut
21. Socket Head Cap Screw
22. Steering Arm
23. Thrust Washer
24. Steering Knuckle, RH
25. Hex Cap Screw
26. Lock Washer
27. Flat Washer
28. Lube Fitting

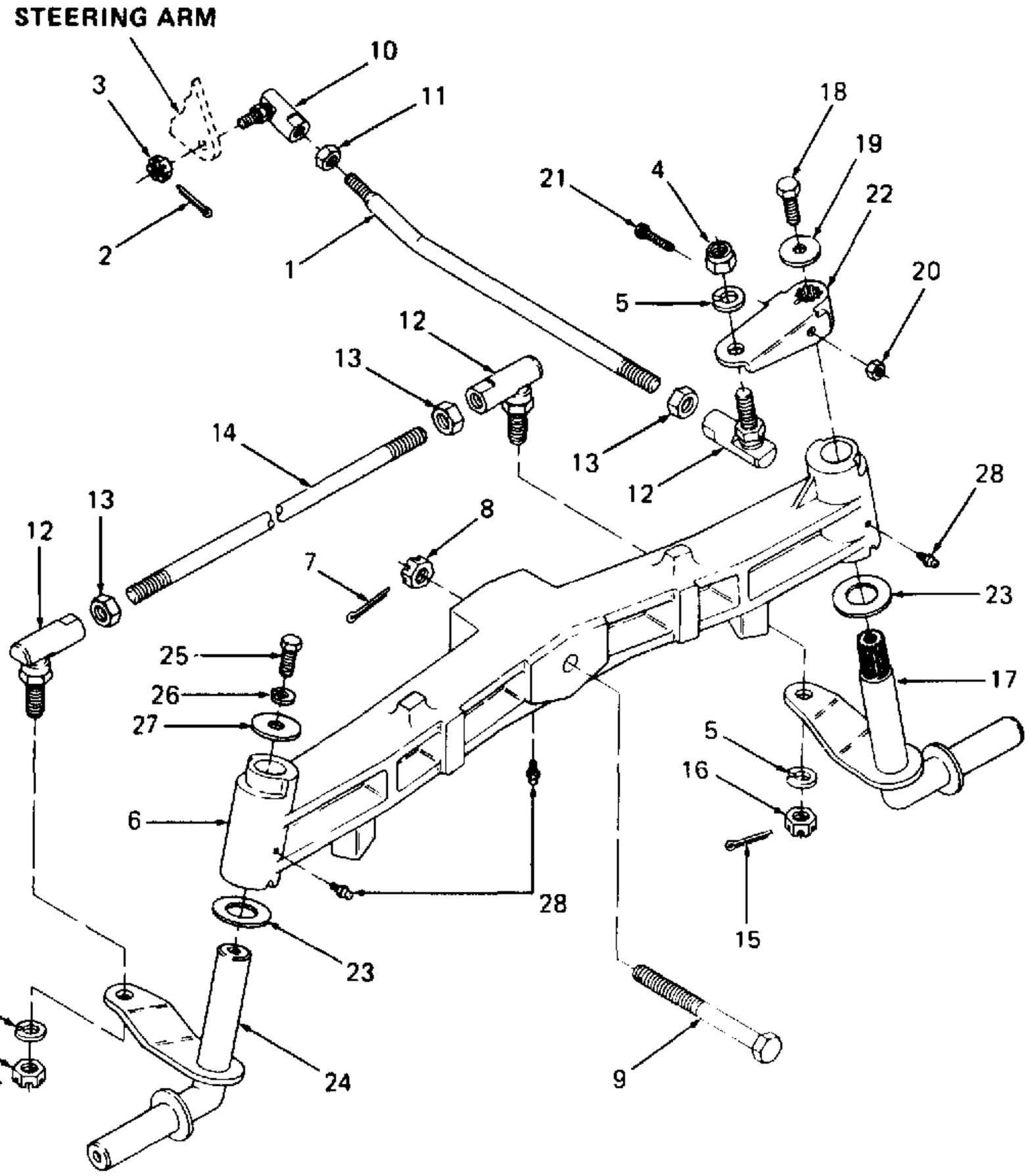


Figure 5-24. Front Axle and Connections (Models 1340, 1535, 1541 and 1860).

5-21.3 **Disassembly.**

1. Disassemble drag link by removing ball joints (10 and 12) and hex jam nuts (11 and 13).
2. Disassemble front axle (6) as follows:
   a. Disassemble tie rod (14) as follows:
      (1) Remove tie rod by removing cotter pins (15), hex castle nuts (16) and lock washers (5).
      (2) Remove ball joints (12) and hex jam nuts (13).
   b. Remove left steering knuckle (17) by removing hex patch bolt (18), flat washer (19), hex patch lock nut (20), socket head cap screw (21), steering arm (22) and thrust washer (23).
   c. Remove right steering knuckle (24) by removing hex cap screw (25), lock washer (26), flat washer (27) and thrust washer (23).
   d. Remove lube fittings (28).

5-21.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect drag link (1) and tie rod (14) for cracks or distortion. Discard and replace if damaged.
4. Inspect splined areas on left steering knuckle (17) and steering arm (22) for damage.
5. Inspect left and right steering knuckles (17 and 24) and steering arm (22) for excessive wear in and around ports for ball joints (12). Discard and replace if worn beyond repair.

5-21.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to splined areas.
4. Remove burrs or other roughness around ports for ball joints in steering knuckles (17 and 24) and steering arm (22).

5-21.6 **Reassembly.**

1. Reassemble front axle (6) as follows:
   a. Install lube fittings (28).
   b. Install right steering knuckle (24) by installing thrust washer (23), flat washer (27), lock washer (26) and hex cap screw (25).

NOTE

The steering arm (22) must be installed so that it is set 20 degrees ahead of the front axle. Refer to Figure 5-25 for proper positioning of steering arm.

   c. Install left steering knuckle (17) by installing thrust washer (23), steering arm (22), socket head cap screw (21), hex patch lock nut (20), flat washer (19) and hex patch bolt (18).
   d. Install tie rod (14) as follows:
      (1) Install hex jam nuts (13) and ball joints (12).
      (2) Secure to right and left steering knuckles (24 and 17) with lock washers (5), hex castle nuts (16) and cotter pins (15).
2. Reassemble drag link (1) as follows:
   a. Install hex jam nuts (11 and 13) and insert ball joints (10 and 12) to 5/8 inch of thread depth.

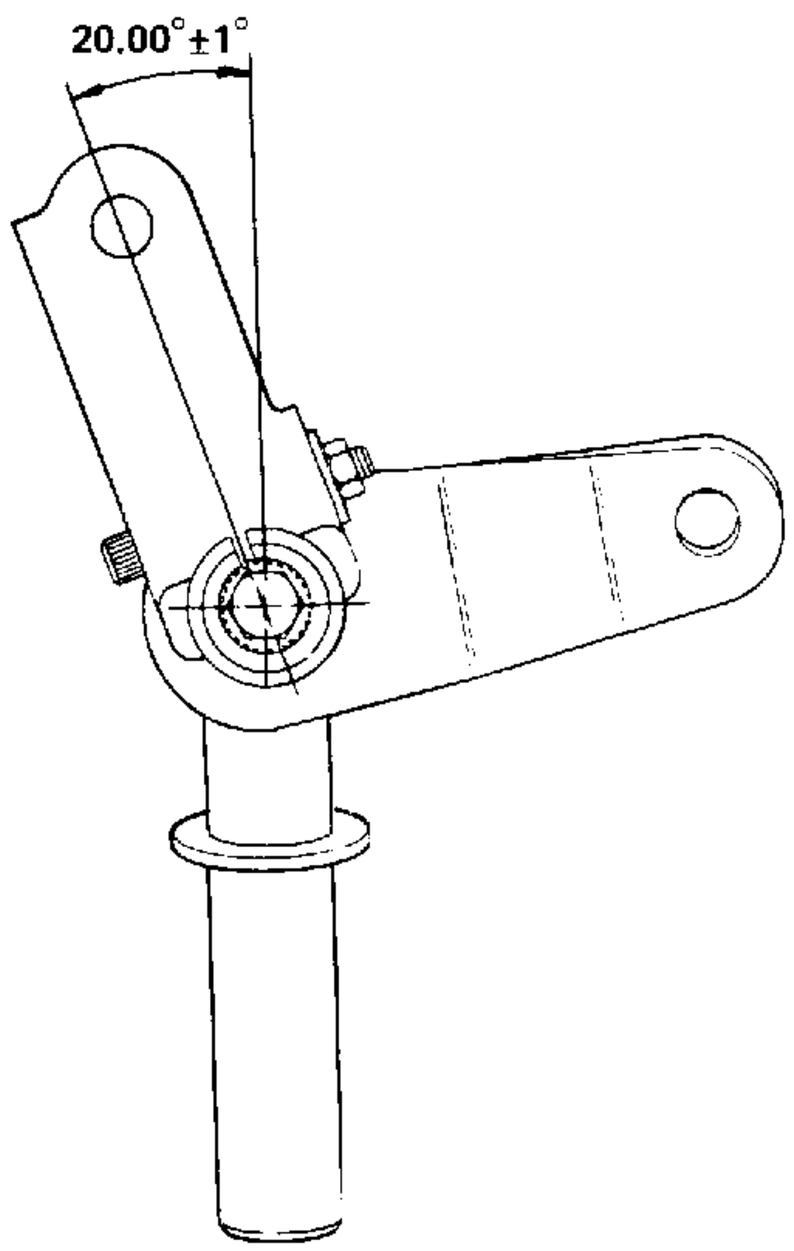


Figure 5-25. Steering Arm Installation (Models 1340, 1535, 1541 and 1860).

b. Tighten rear hex jam nut (11) against rear ball joint (10). Leave front hex jam nut (13) loose until installation of drag link.

5-21.7 **Installation.**

1. Install front axle (6) onto tractor with hex bolt (9), hex castle nut (8) and cotter pin (7).
2. Install drag link (1) as follows:
   a. Turn front wheels to the right until right steering knuckle contacts the stop on the front axle.
   b. Secure drag link to steering arm (22) with lock washer (5) and hex top lock nut (4).
   c. Secure link to steering arm with hex castle nut (3) and cotter pin (2).
   d. Tighten hex jam nut (13) against ball joint (12).
3. Install front wheels per paragraph 5-19.7.
4. Refill hydraulic fluid reservoir with clean hydraulic oil if necessary.
5. Apply 251H EP grease to lube fittings.

5-22. FRONT AXLE AND CONNECTIONS – POWER STEERING CYLINDER AND HYDRAULIC LINES (Model 1862).

5-22.1 **General.** Refer to Appendices C, D and E prior to servicing front axle and connections.

5-22.2 **Removal.**

WARNING

Place tractor on a firm and level surface before removing front axle and connections.

NOTE

Remove any front mounted attachments prior to removal of front axle and connections.

1. Lock the brakes, block the rear wheels and raise and secure the front axle.
2. Remove front wheels per paragraph 5-19.2.
3. Remove hydraulic power steering cylinder (1, Figure 5-26) as follows:
   a. Remove steering hoses (2 and 4) as follows:
      (1) Remove hoses from hydraulic cylinder by loosening nuts from 90 degree tube elbows (3).
      (2) Remove hoses from power steering box by loosening nuts on ends of hoses.
   b. Remove cylinder from tractor as follows:
      (1) Remove rear end of cylinder by removing center lock nut (5), hex cap screw (6) and spacer (7).
      (2) Remove front end of cylinder by removing hex top lock nut (8), hex bolt (9) and flat washer (10).
4. Remove power steering mounting bracket (11) by removing hex nut (12), lock washer (13) and hex cap screw (14).

WARNING

Upon completion of step 5, axle will be free from the tractor. Secure the front axle before accomplishing axle removal in following step 5.

5. Remove front axle (15) by removing cotter pin (16), hex castle nut (17) and hex bolt (18).

5-22.3 **Disassembly.**

1. Disassemble power steering cylinder (1) by removing alignaball ends (19) and hex jam nuts (20).
2. Disassemble front axle (15) as follows:
   a. Disassemble tie rod (21) as follows:
      (1) Remove tie rod by removing cotter pins (22), hex castle nuts (23) and lock washers (13).
      (2) Remove ball joints (24) and hex jam nuts (20).
   b. Remove left steering knuckle (25) by removing hex patch bolt (26), flat washer (27), hex patch lock nut (28), socket head cap screw (29), power steering arm (30) and thrust washer (31).

c. Remove right steering knuckle (32) by removing hex cap screw (33), lock washer (34), flat washer (35) and thrust washer (31).

d. Remove lube fittings (36).

5-22.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect power steering cylinder (1) for leaks.
2. Inspect steering hoses (2 and 4) for cuts or damage. Replace badly cut hoses.
3. Inspect all threaded areas for damage.
4. Inspect parts for cracks, scoring, distortion, corrosion and wear.
5. Inspect tie rod (21) for cracks or distortion. Discard and replace if damaged.
6. Inspect splined areas on left steering knuckle (25) and power steering arm (30) for damage.
7. Inspect left and right steering knuckles (25 and 32) and power steering arm (30) for excessive wear in and around ports for ball joints (24). Discard and replace if worn beyond repair.

5-22.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to splined areas.
4. Remove burrs or other roughness around ports for ball joints in steering knuckles (25 and 32) and steering arm (30).

Legend for Figure 5-26

1. Power Steering Cylinder
2. Steering Hose
3. 90 Degree Tube Elbow
4. Steering Hose
5. Center Lock Nut
6. Hex Cap Screw
7. Spacer
8. Hex Top Lock Nut
9. Hex Bolt
10. Flat Washer
11. Power Steering Mounting Bracket
12. Hex Nut
13. Lock Washer
14. Hex Cap Screw
15. Front Axle
16. Cotter Pin
17. Hex Castle Nut
18. Hex Bolt
19. Alignaball End
20. Hex Jam Nut
21. Tie Rod
22. Cotter Pin
23. Hex Castle Nut
24. Ball Joint
25. Steering Knuckle, LH
26. Hex Patch Bolt
27. Flat Washer
28. Hex Patch Lock Nut
29. Socket Head Cap Screw
30. Power Steering Arm
31. Thrust Washer
32. Steering Knuckle, RH
33. Hex Cap Screw
34. Lock Washer
35. Flat Washer
36. Drive Lube Fitting

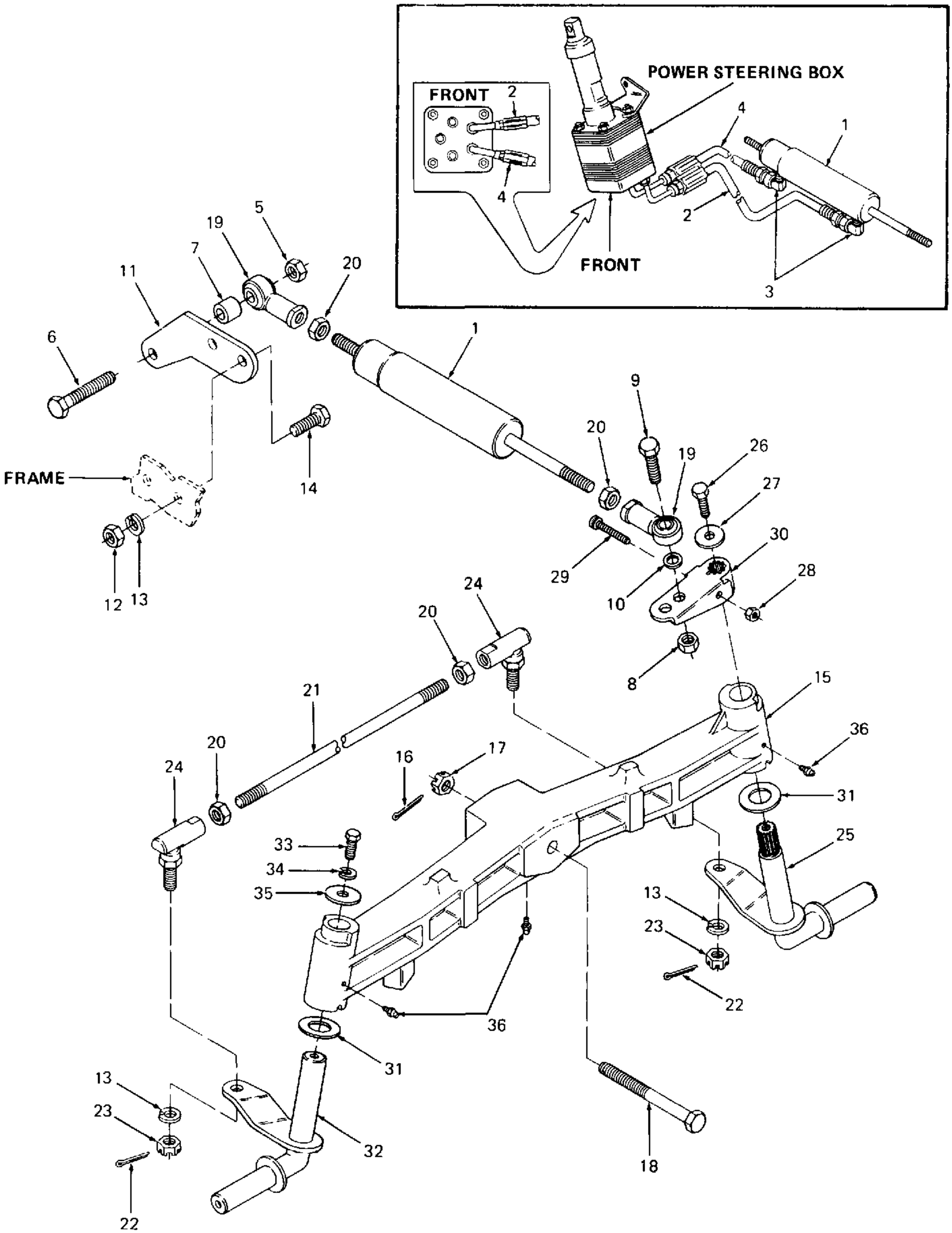


Figure 5-26. Front Axle and Connections – Power Steering Cylinder and Hydraulic Lines (Model 1862).

5-22.6 **Reassembly.**

1. Reassemble front axle (15) as follows:

   a. Install lube fittings (36).

   b. Install right steering knuckle (32) by installing thrust washer (31), flat washer (35), lock washer (34) and hex cap screw (33).

NOTE

The power steering arm (30) must be installed so that it is set 0-6 degrees ahead of the front axle. Refer to Figure 5-27.

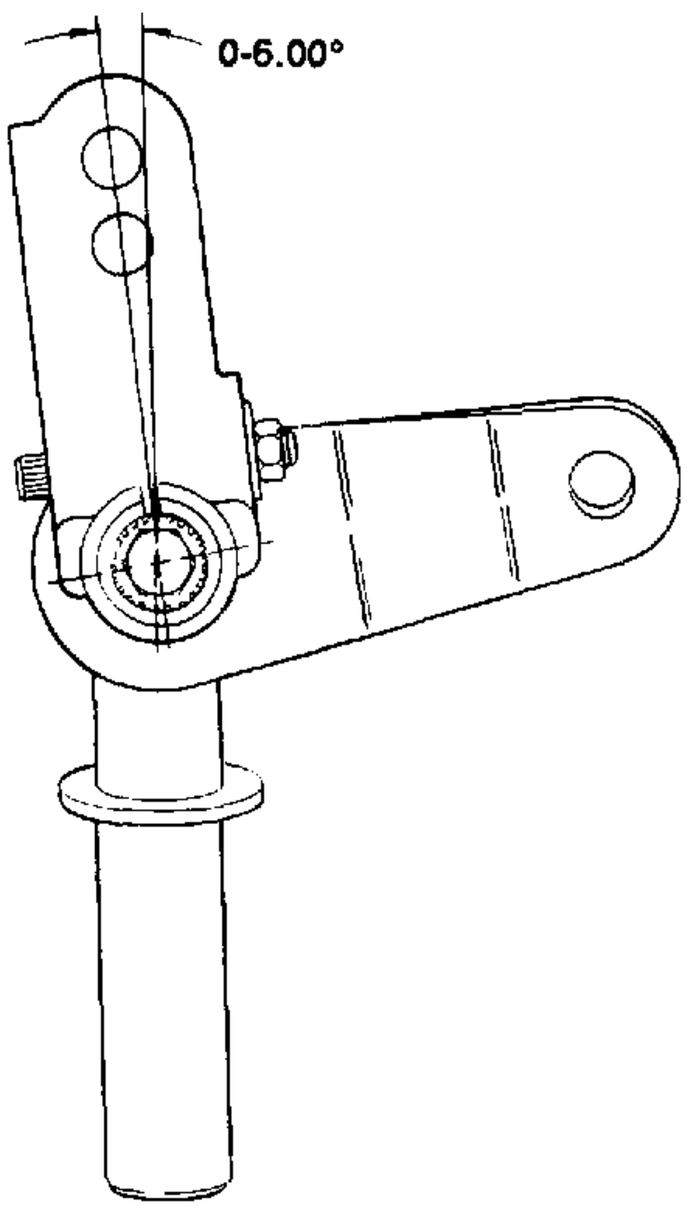


Figure 5-27. Power Steering Arm Installation (Model 1862).

   c. Install left steering knuckle (25) by installing thrust washer (31), power steering arm (30), socket head cap screw (29), hex patch lock nut (28), flat washer (27) and hex patch bolt (26).

   d. Install tie rod (21) as follows:

      (1) Install hex jam nuts (20) and ball joints (24) on tie rod.

      (2) Secure rod to right and left steering knuckles (32 and 25) with lock washers (13), hex castle nuts (23) and cotter pins (22).

2. Reassemble power steering cylinder (1) as follows:

   a. Install hex jam nuts (20) and insert alignaball ends to 5/8 inch of thread depth.

   b. Tighten rear hex jam nut against rear alignaball end. Leave front hex jam nut loose until installation of power steering cylinder.

5-22.7 **Installation.**

1. Install front axle (15) onto tractor with hex bolt (18), hex castle nut (17) and cotter pin (16).

2. Install power steering mounting bracket (11) with hex cap screws (14), lock washers (13) and hex nuts (12).

3. Install power steering cylinder (1) as follows:

   a. Turn front wheels fully right until right steering knuckle contacts stop on the front axle.

   b. Secure cylinder to tractor as follows:

      (1) Attach rear end of cylinder to mounting bracket (11) with spacer (7), hex cap screw (6) and center lock nut (5).

      (2) Attach front end of cylinder to power steering arm (30) with flat washer (10), hex bolt (9) and hex top lock nut (8).

      (3) Tighten front hex jam nut (20) against front alignaball end (19).

   c. Install steering hoses (2 and 4) as follows:

      (1) Attach hoses to power steering box by tightening nuts on ends of hoses. Refer to Figure 5-26 for proper placement of hoses.

      (2) Attach hoses to power steering cylinder by tightening nuts on end of hoses onto 90 degree tube elbows (3). Refer to Figure 5-26 for proper placement of hoses.

4. Install front wheels per paragraph 5-19.7.

5. Refill hydraulic fluid reservoir with clean hydraulic oil if necessary.

6. Apply 251H EP grease to lube fittings (36).

5-23. FRONT AXLE AND CONNECTIONS – POWER STEERING CYLINDER AND HYDRAULIC LINES (Models 1782, 1882, 2082 and 2182).

5-23.1 **General.** Refer to Appendices C, D and E prior to servicing front axle and connections.

5-23.2 **Removal.**

WARNING

Place tractor on a firm and level surface before removing front axle and connections.

NOTE

Remove any front mounted attachments prior to removal of front axle and connections.

1. Lock the brakes, block the rear wheels and raise and secure the front axle.
2. Remove front wheels per paragraph 5-19.2.
3. Remove hydraulic cylinder per paragraph 5-32.2.

WARNING

Upon completion of step 4, axle will be free from the tractor. Secure the front axle before accomplishing axle removal in following step 4.

4. Remove front axle (1, Figure 5-28) by removing cotter pin (2), hex castle nut (3) and hex bolt (4).

5-23.3 **Disassembly.**

1. Disassemble front axle assembly (1) as follows:
   a. Remove tie rods (5) as follows:
      (1) Remove tie rods from steering lever (22) by removing cotter pin (6) and hex cap screw (7).
      (2) Remove tie rods from right and left knuckle assemblies (11 and 14) by removing cotter pin (8), hex castle nut (9) and lock washer (10).
   b. Remove right steering knuckle assembly (11) by removing hex cap screw (12) and flat washer (13).
   c. Remove left steering knuckle assembly (14) as follows:
      (1) Remove hex cap screw (15) and flat washer (16).
      (2) Remove power steering arm (17) by removing hex center lock nut (18) and hex cap screw (19).
2. Disassemble tie rods (5) by removing ball joints (20) and alignaball ends (21).
3. Disassemble steering lever (22) by removing retaining ring (23), steering pivot pin (24) and lube fitting (25).
4. Disassemble front axle by removing lube fittings (25) and bushings (26).

5-23.4 **Inspection.** Clean all parts prior to inspection.

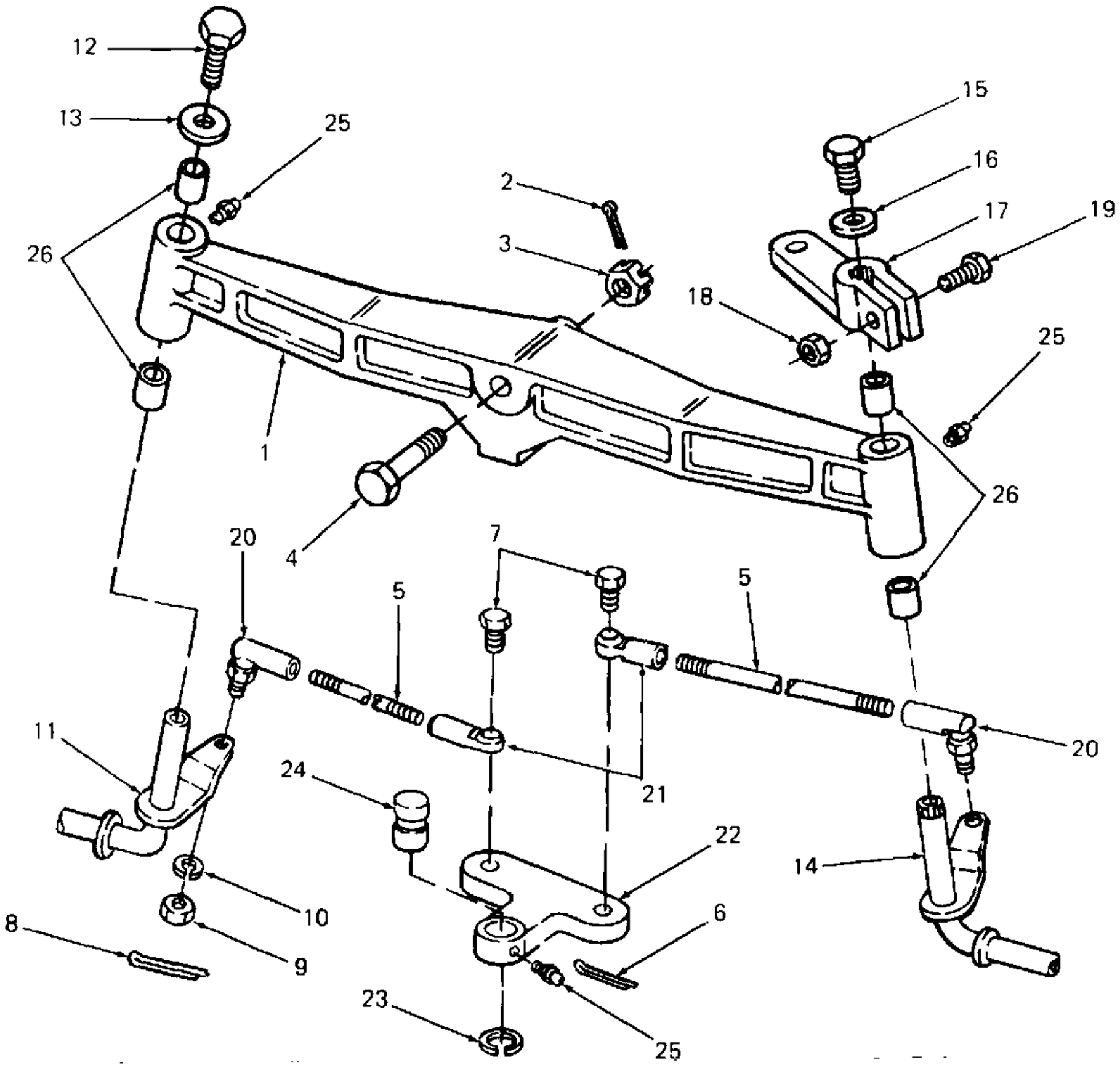
1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect tie rods (5) for cracks or distortion. Discard and replace if damaged.
4. Inspect splined areas on left steering knuckle (14) and power steering arm (17) for damage.
5. Inspect right and left steering knuckles (11 and 14) and power steering arm (17) for excessive wear in and around ports for ball joints (20). Discard and replace if worn beyond repair.
6. Inspect bushings for scratches or wear. Discard and replace if badly worn.

5-23.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to splined areas.
4. Remove burrs or other roughness around ports for ball joints in steering knuckles (11 and 14) and power steering arm (17).

5-23.6 **Reassembly.**

1. Reassemble front axle by installing bushings (26) and lube fittings (25).
2. Reassemble steering lever (22) by installing lube fitting (25), steering pivot pin (24) and retaining ring (23).



1. Front Axle Assembly
2. Cotter Pin
3. Hex Castle Nut
4. Hex Bolt
5. Tie Rod
6. Cotter Pin
7. Hex Cap Screw
8. Cotter Pin
9. Hex Castle Nut
10. Lock Washer
11. Steering Knuckle Assembly, RH
12. Hex Cap Screw
13. Flat Washer
14. Steering Knuckle Assembly, LH
15. Hex Cap Screw
16. Flat Washer
17. Power Steering Arm
18. Hex Center Lock Nut
19. Hex Cap Screw
20. Ball Joint
21. Alignaball End
22. Steering Lever
23. Retaining Ring
24. Steering Pivot Pin
25. Lube Fitting
26. Bushing

Figure 5-28. Front Axle and Connections – Power Steering Cylinder and Hydraulic Lines (Models 1782, 1882, 2082 and 2182).

3. Reassemble tie rods (5) by installing alignaball ends (21) and ball joints (20). Tighten hex jam nuts against alignaball ends and ball joints. Thread on ball joints far enough so that cylinder fully extends before steering linkage hits stops.

4. Assemble front axle assembly (1) as follows:

   a. Install left steering knuckle assembly (14) as follows:

      (1) Position steering knuckle on axle so wheel (when installed) will be at 90 degree angle to axle.

NOTE

Power steering arm (17) must be installed so that it is set 0-6 degrees ahead of the front axle. Refer to Figure 5-29.

      (2) Position power steering arm (17) on steering knuckle. Install hex cap screw (19) and hex center lock nut (18).

      (3) Install flat washer (16) and hex cap screw (15).

   b. Install right steering knuckle assembly (11) and secure with flat washer (13) and hex cap screw (12).

   c. Install tie rods (5) as follows:

      (1) Secure tie rods to right and left knuckle assemblies (11 and 14) and secure with lock washer (10), hex castle nut (9) and cotter pin (8).

      (2) Secure tie rods to steering lever (22) and secure with hex cap screw (7) and cotter pin (6).

5-23.7 **Installation.**

1. Install front axle assembly (1) onto tractor with hex bolt (4), hex castle nut (3) and cotter pin (2).
2. Install power steering cylinder per paragraph 5-32.7.
3. Install front wheels per paragraph 5-19.7.
4. Refill hydraulic fluid reservoir with clean hydraulic oil if necessary.
5. Apply 251H EP grease to lube fittings.

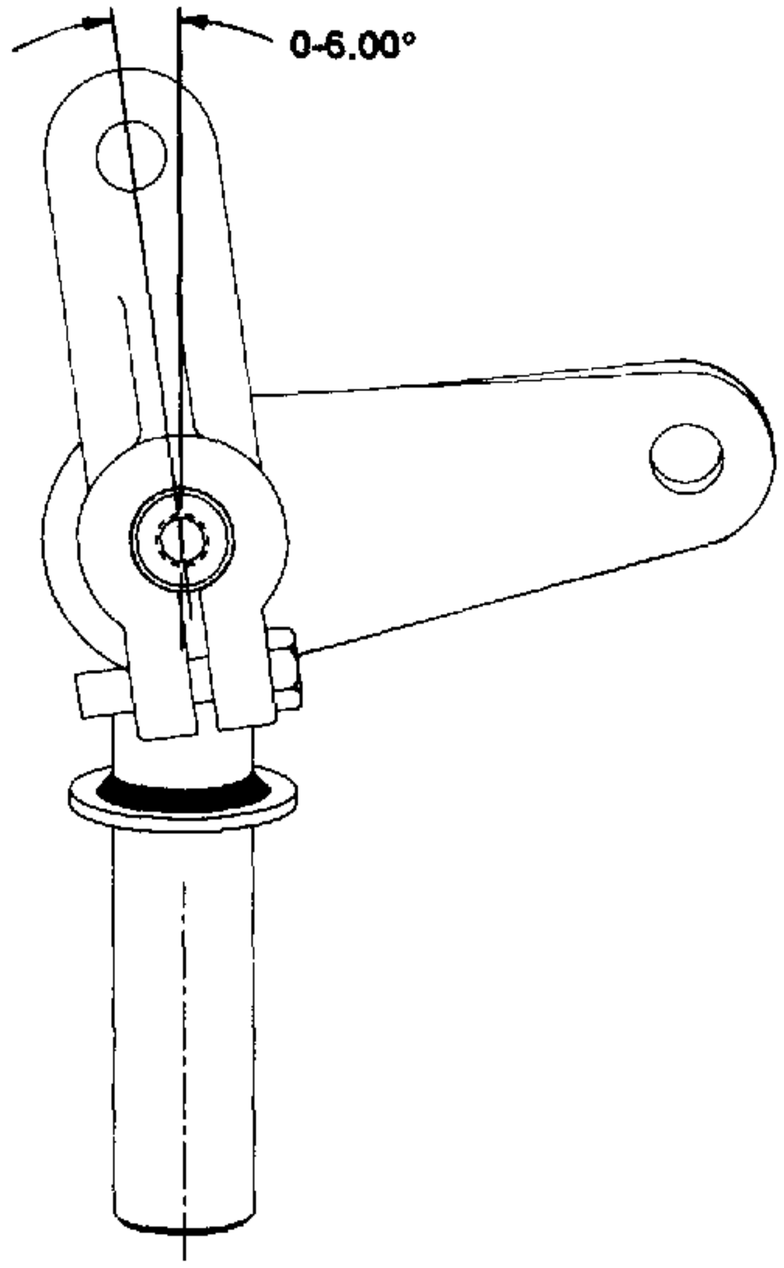


Figure 5-29. Steering Arm Installation (Models 1782, 1882, 2082 and 2182).

5-24. SEAT AND TRACK ASSEMBLY (Models 1340, 1541, 1782, 1860, 1862, 1882, 2082 and 2182).

5-24.1 **General.** Damaged safety decals should be replaced.

5-24.2 **Removal.**

1. Remove seat and track assembly from tractor as follows:

   a. Slide seat rearward and remove two socket head cap screws (1, Figure 5-30), self-locking nuts and flat washers.

   b. Slide seat forward and remove two socket head cap screws (1).

CAUTION

Tag electrical leads to interlock switches before removing.

   c. Raise seat pivot support bracket (8) several inches off the fender, and disconnect electrical leads to snap interlock switches.

5-24.3 **Disassembly.**

1. Disassemble seat and track assembly as follows:

   a. Remove seat (2) by removing hex cap screws (3) and bell washers (4).

   b. Remove seat pivot bracket (5) by removing hex lock nut (6), bell washer (4) and shoulder screw (7).

   c. Disassemble seat pivot support bracket (8) as follows:

      (1) Remove seat spring channel (9) by removing hex nut (10), lock washer (11), shoulder screw (12) and compression spring (13).

      (2) Remove hex center lock nut (6), hex cap screw (14), flat washer (15), compression spring (16) and bushing (17) from seat spring channel (9).

      (3) Remove snap interlock switches.

      (4) Remove left seat slide (18) and right manual seat adjuster (22) by removing hex nut (19), lock washer (20) and short neck carriage bolt (21).

5-24.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect compression springs (13 and 16) for damage or distortion. Discard and replace damaged springs.
4. Inspect left seat slide (18) and right manual seat adjuster (22) for smooth operation.
5. Inspect Caution graphic (24) and seat adjustment label (23) for damage. Replace if illegible.

5-24.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Lubricate left seat slide (18) and right manual seat adjuster (22) as needed.

5-24.6 **Reassembly.**

1. Reassemble seat and track assembly as follows:

   a. Reassemble seat pivot support bracket (8) as follows:

      (1) Install left seat slide (18) and right manual seat adjuster (22) with short neck carriage bolts (21), lock washers (20) and hex nuts (19).

      (2) Install snap interlock switches.

      (3) On seat spring channel (9) secure bushing (17), compression spring (16), flat washer (15), hex cap screw (14) and hex center lock nut (6).

      (4) Install seat spring channel with compression spring (13), shoulder screw (12), lock washer (11) and hex nut (10).

   b. Install seat pivot bracket (5) with shoulder screw (7), bell washer (4) and hex center lock nut (6).

   c. Install seat (2) with bell washers (4) and hex cap screws (3).

5-24.7 **Installation.**

1. Install seat and track assembly as follows:

   a. Set seat and track assembly on tractor fender and connect electrical leads to snap interlock switches.

   b. Slide seat forward and install two socket head cap screws (1).

   c. Slide set rearward and install flat washers, self-locking nuts and two socket head cap screws (1).

1. Socket Head Cap Screw
2. Seat w/Graphic
3. Hex Cap Screw
4. Bell Washer
5. Seat Pivot Bracket
6. Hex Center Lock Nut
7. Shoulder Screw
8. Seat Pivot Support Bracket
9. Seat Spring Channel
10. Hex Nut
11. Lock Washer
12. Shoulder Screw
13. Compression Spring
14. Hex Cap Screw
15. Flat Washer
16. Compression Spring
17. Bushing
18. Seat Slide, LH
19. Hex Nut
20. Lock Washer
21. Short Neck Carriage Bolt
22. Manual Seat Adjuster, RH
23. Seat Adjustment Label
24. Caution Graphic

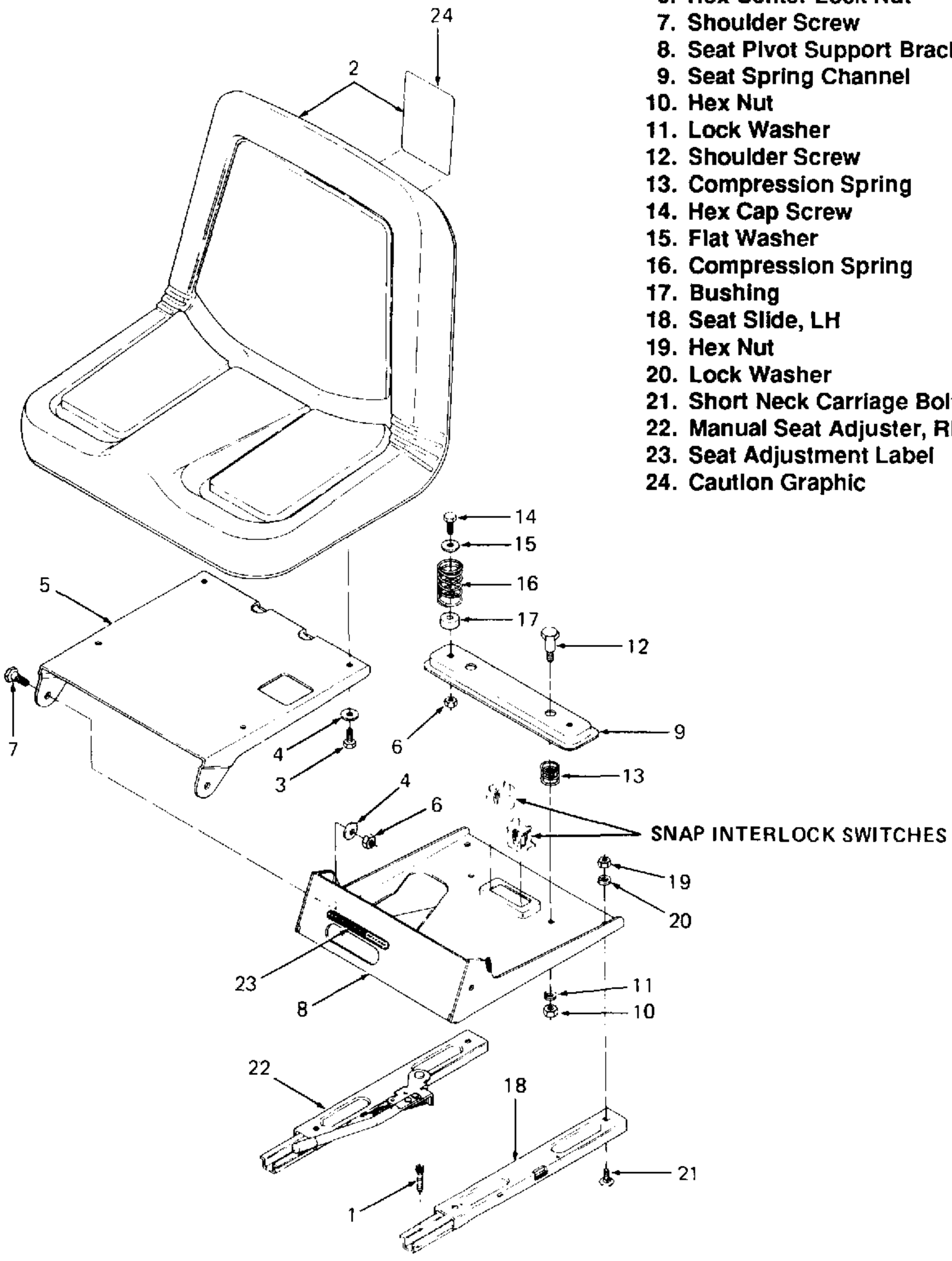


Figure 5-30. Seat and Track Assembly (Models 1340, 1541, 1782, 1860, 1862, 2082 and 2182).

5-25. SEAT AND SUPPORT (Model 1535).

5-25.1 **General.** Damaged safety decals should be replaced.

5-25.2 **Removal.**

1. Remove seat (1, Figure 5-31) and battery box cover (2) as follows:
   a. Remove right pivot bracket (3) from tractor.
   b. Remove left pivot bracket (4) from tractor by removing hex center lock nuts (5) and reverse switch bracket (6).

5-25.3 **Disassembly.**

1. Disassemble seat (1) by removing from seat springs (7).
2. Disassemble battery box cover (2) as follows:
   a. Remove seat springs (7) by removing hex nuts (8) and bell washers (9).
   b. Remove spring nut (10), compression spring (11) and spring cap (12).

5-25.4. **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect compression spring (11) for damage or distortion. Discard if damaged.
4. Inspect hood bumper (13) and Caution graphic (14) for damage or wear. Replace if worn.

5-25.5 **Repair.**

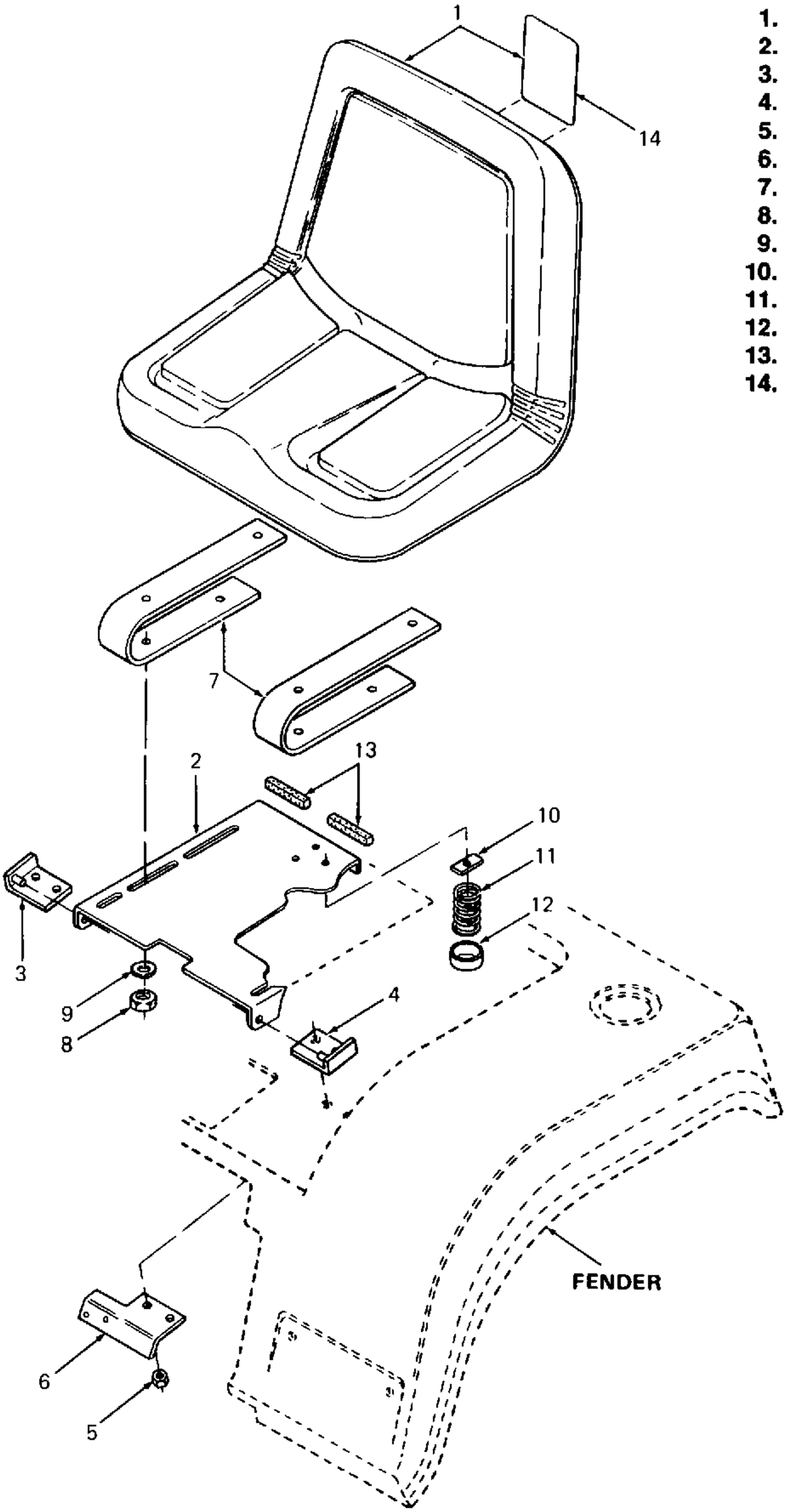
1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-25.6 **Reassembly.**

1. Install battery box cover (2) as follows:
   a. Install spring cap (12), compression spring (11) and spring nut (10).
   b. Install seat springs (7) with bell washers (9) and hex nuts (8).
2. Reassemble seat (1) by assembling to seat springs (7).

5-25.7 **Installation.**

1. Install seat (1) and battery box cover (2) as follows:
   a. Install left pivot bracket (4) onto tractor by installing reverse switch bracket (6) and securing with hex center lock nuts (5).
   b. Install right pivot bracket (3) on tractor.



1. Seat w/Graphic
2. Battery Box Cover
3. Pivot Bracket, RH
4. Pivot Bracket, LH
5. Hex Center Lock Nut
6. Reverse Switch Bracket
7. Seat Spring
8. Hex Nut
9. Bell Washer
10. Spring Nut
11. Compression Spring
12. Spring Cap
13. Hood Bumper
14. Caution Graphic

Figure 5-31. Seat and Support (Model 1535).

5-26. FENDERS AND FOOT REST (Models 1340, 1535, 1541, 1860 and 1862).

5-26.1 **General.** Fenders and foot rest should be replaced if damaged.

5-26.2 **Removal.**

1. Remove frame cover.

2. Remove seat and track assembly per paragraph 5-24.2 or, for Model 1535 only, remove seat and support per paragraph 5-25.2.

3. Remove left and right running boards (1 and 2, Figure 5-32) as follows:

   a. Remove left and right foot pads (3 and 4) by pulling up and off running boards.

   b. Remove hex center lock nuts (5), hex cap screws (6 and 7), hex patch lock nuts (8), bell washers (9), hex cap screws (10) and flat washers (11).

CAUTION

Tag all electrical leads before removal.

4. Remove fender (12) after first disconnecting fuel sensor and tail light leads. Remove fuel cap.

5. Remove fuel tank per paragraph 5-45.2.

6. Remove seat support assembly (13) by removing hex cap screw (7), flat washer (14) and electrical leads.

5-26.3 **Disassembly.**

1. Disassemble fender (12) by removing snap bushing (15).

2. Disassemble seat support assembly (13) by removing snap bushing (15).

5-26.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.

2. Inspect parts for cracks, scoring, distortion, corrosion and wear.

3. Inspect foot pads (3 and 4) for excessive wear. Discard and replace if worn smooth.

4. Inspect snap bushings (15) for damage. Discard and replace if damaged.

5-26.5 **Repair.**

1. Deburr and dress damaged threads.

2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-26.6 **Reassembly.**

1. Reassemble seat support assembly (13) by installing snap bushing (15).

2. Reassemble fender (12) by installing snap bushing (15).

5-26.7 **Installation.**

1. Install seat support assembly (13) with flat washer (14) and hex cap screw (7). Route electrical leads.

2. Install fuel tank per paragraph 5-45.7.

3. Install fender (12); route electrical leads and install fuel cap.

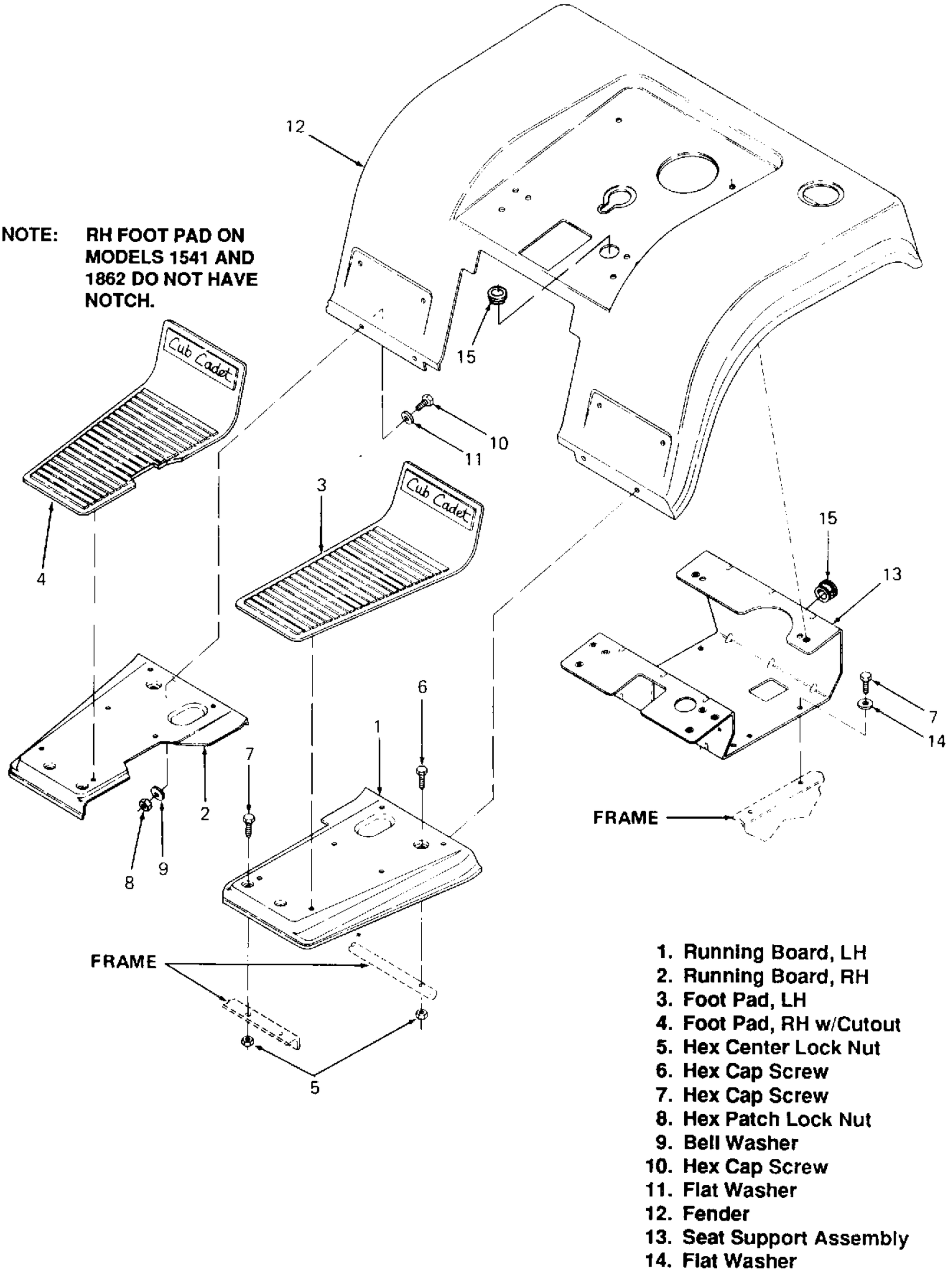
4. Install right and left running boards (2 and 1) as follows:

   a. Install flat washers (11), hex cap screws (10), ball washers (9), hex patch lock nuts (8), hex cap screws (7 and 6) and hex center lock nuts (5).

   b. Install right and left foot pads (4 and 3) on running boards.

5. Install seat and track assembly per paragraph 5-24.7 or, for Model 1535 only, install seat and support per paragraph 5-25.7.

6. Install frame cover.



1. Running Board, LH
2. Running Board, RH
3. Foot Pad, LH
4. Foot Pad, RH w/Cutout
5. Hex Center Lock Nut
6. Hex Cap Screw
7. Hex Cap Screw
8. Hex Patch Lock Nut
9. Bell Washer
10. Hex Cap Screw
11. Flat Washer
12. Fender
13. Seat Support Assembly
14. Flat Washer
15. Snap Bushing

Figure 5-32. Fenders and Foot Rest (Models 1340, 1535, 1541, 1860 and 1862).

5-27. **FENDERS AND FOOT REST (Models 1782, 1882, 2082, and 2182).**

5-27.1 **General.** Fenders and foot rest should be replaced if damaged.

5-27.2 **Removal.**

1. Remove frame cover.
2. Remove seat and track assembly per paragraph 5-24.2.
3. Remove left and right running boards (1 and 2, Figure 5-33) as follows:
   a. Remove left and right foot pads (3 and 4) by pulling up and off running boards.
   b. Remove hex center lock nuts (5), hex cap screw (6), hex patch lock nuts (7), bell washers (8), hex cap screws (9) and flat washers (10).

CAUTION

Tag all electrical leads before removal.

4. Remove fender (11) after first disconnecting fuel sensor and tail light leads and removing fuel cap.
5. Remove fuel tank per paragraph 5-45.2.
6. Remove seat support assembly (12) by removing hex nut (13), bell washer (14), hex cap screw (6) and electrical leads.
7. Remove left and right fender support brackets (16 and 17) by removing hex cap screw (18) and flat washer (19).

5-27.3 **Disassembly.**

1. Disassemble fender (11) by removing snap bushing (15).
2. Disassemble seat support assembly (12) by removing snap bushing (15).

5-27.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect foot pads (3 and 4) for excessive wear. Discard and replace if worn smooth.
4. Inspect snap bushings (15) for damage. Discard and replace if damaged.
5. On Model 1782 only, inspect Diesel Fuel Only label (20) for damage. Replace if illegible.

5-27.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-27.6 **Reassembly.**

1. Reassemble seat support assembly (12) by installing snap bushing (15).
2. Reassemble fender (11) by installing snap bushing (15).

5-27.7 **Installation.**

1. Install left and right fender support brackets (16 and 17) with flat washers (19) and hex cap screws (18).
2. Install seat support assembly (12) with hex cap screw (6), bell washer (14) and hex nut (13). Route electrical leads.
3. Install fuel tank per paragraph 5-45.7.
4. Install fender (11); route electrical leads and install fuel cap.
5. Install right and left running boards (2 and 1) as follows:
   a. Install flat washers (10), hex cap screws (9), bell washers (8), hex patch lock nuts (7), hex cap screws (6) and hex center lock nuts (5).
   b. Install right and left foot pads (4 and 3) on running boards.
6. Install seat and track assembly per paragraph 5-24.7.
7. Install frame cover.

1. Running Board, LH
2. Running Board, RH
3. Foot Pad, LH
4. Foot Pad, RH
5. Hex Center Lock Nut
6. Hex Cap Screw
7. Hex Patch Lock Nut
8. Bell Washer
9. Hex Cap Screw
10. Flat Washer
11. Fender
12. Seat Support Assembly
13. Hex Nut
14. Bell Washer
15. Snap Bushing
16. Fender Support Bracket, LH
17. Fender Support Bracket, RH
18. Hex Cap Screw
19. Flat Washer
20. Label - Diesel Fuel Only

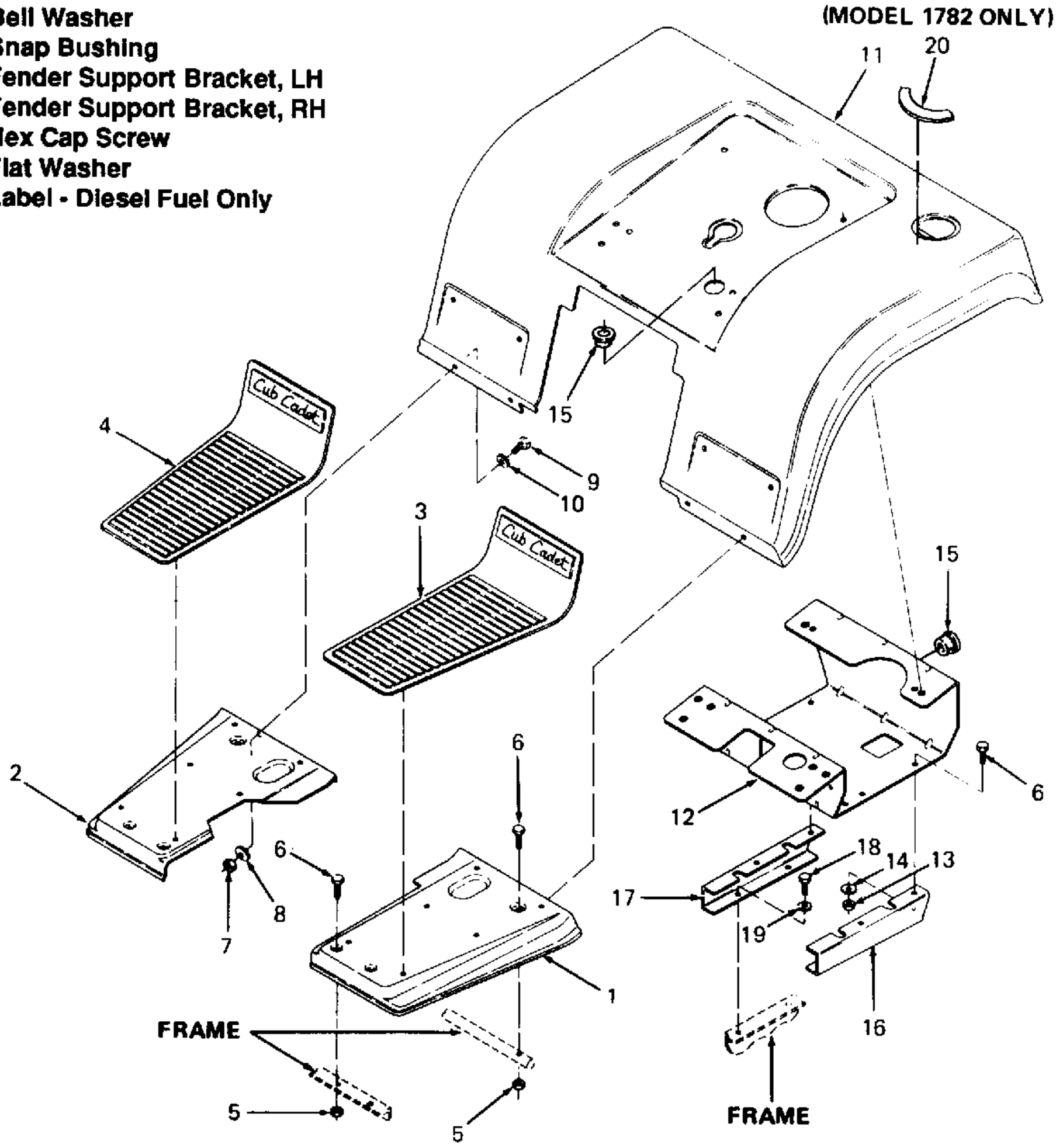


Figure 5-33. Fenders and Foot Rest (Models 1782, 1882, 2082 and 2182).

5-28. PEDESTAL, INSTRUMENT PANEL AND ENGINE CONTROLS (Models 1340, 1535, 1541, 1860, 1862, 1882 and 2082).

5-28.1 **General.** Refer to Appendices D and E prior to servicing this equipment.

5-28.2 **Removal.**

1. Remove side panels per paragraph 5-4.2.
2. Disconnect battery per paragraph 5-8.2.
3. Disconnect throttle control from engine.
4. Disconnect choke cable from engine.
5. Remove necessary electrical components per paragraph 5-7.2 (Model 1340) or 5-8.2 (Models 1535, 1541, 1860, 1862, 1882 and 2082).
6. Remove speed control knob per paragraph 5-47.2.
7. Remove necessary upper steering components per paragraph 5-30.2.
8. Remove throttle knob (1, Figure 5-34) by removing nut (2) and cross recessed truss head screw (3).
9. Remove nut and choke cable (4).
10. Remove instrument panel (5) by removing pan head cutting screws (6). Remove dash label (7) from instrument panel.
11. Remove throttle control (8) from pedestal (11) by removing hex keps nut (9) and self clinching stud (10).

5-28.3 **Inspection.** Clean all parts prior to inspection.

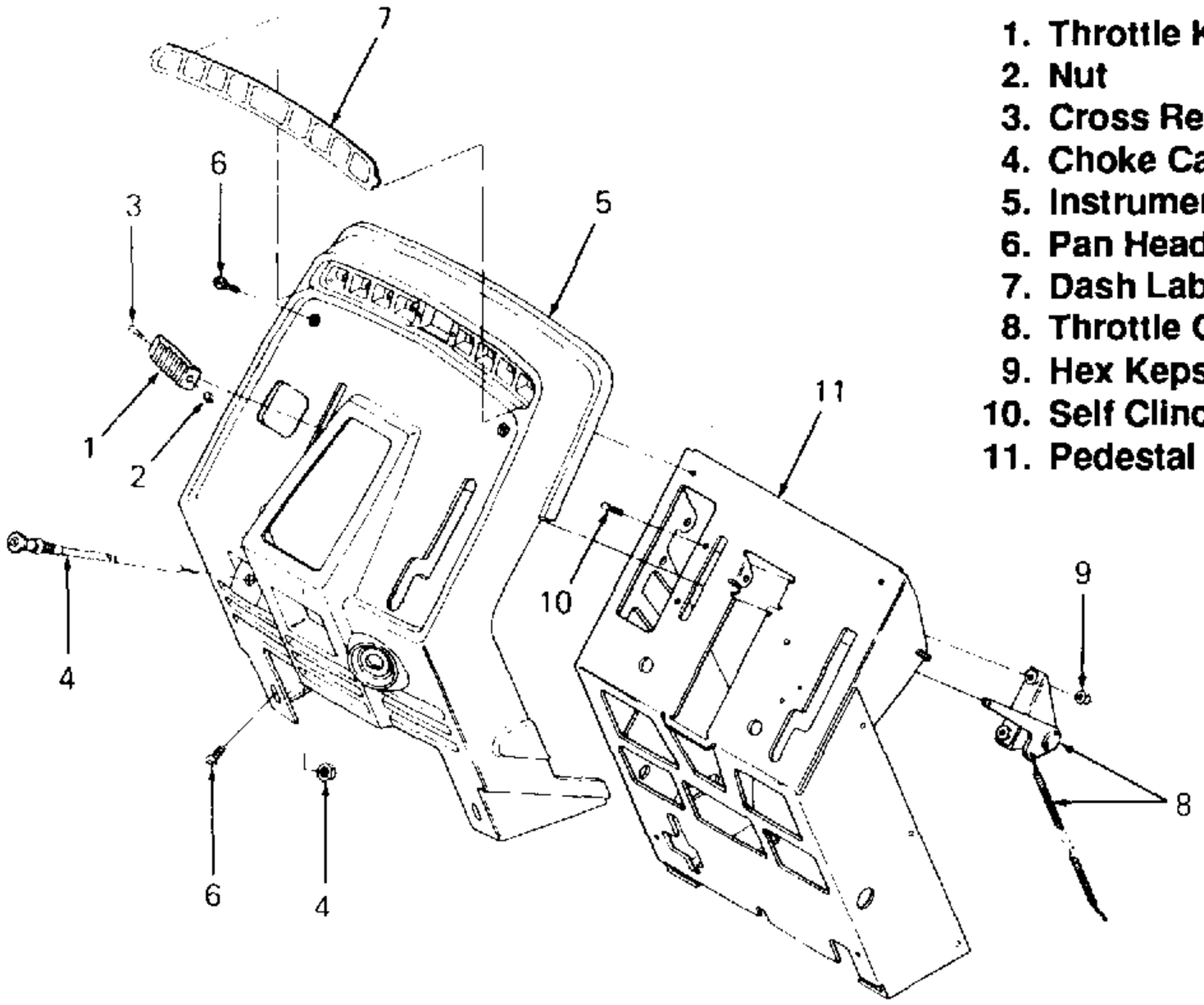
1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect cables (4 and 8) for kinks or binding. Discard and replace damaged cables.

5-28.4 **Repair.**

1. Deburr and dress damaged threads.

5-28.5 **Installation.**

1. Install throttle control (8) on pedestal (11) using self clinching stud (10) and hex keps nut (9).
2. Install dash label (7) on instrument panel (5). Position instrument panel over pedestal (11) and secure with pan head cutting screws (6).
3. Install choke cable (4) on instrument panel using nut.
4. Install throttle knob (1) with truss head screw (3) and nut (2).
5. Install upper steering components per paragraph 5-30.5.



1. **Throttle Knob**
2. **Nut**
3. **Cross Recessed Truss Head Screw**
4. **Choke Cable w/Nut**
5. **Instrument Panel**
6. **Pan Head Cutting Screw**
7. **Dash Label**
8. **Throttle Control**
9. **Hex Keps Nut**
10. **Self Clinching Stud**
11. **Pedestal**

Figure 5-34. Pedestal, Instrument Panel and Engine Controls (Models 1340, 1535, 1541, 1860, 1862, 1882 and 2082).

6. Install speed control knob per paragraph 5-47.7.
7. Install electrical components per paragraph 5-7.5 (Model 1340) or 5-8.5 (Models 1535, 1541, 1860, 1862, 1882 and 2082).
8. Attach choke cable to engine.
9. Attach throttle control to engine and adjust per paragraph 6-3.
10. Connect battery per paragraph 5-7.5 or 5-8.5.
11. Install side panels per paragraph 5-4.7.

5-29. PEDESTAL, INSTRUMENT PANEL AND ENGINE CONTROLS (Models 1782 and 2182).

5-29.1 **General.** Refer to Appendices D and E prior to servicing this equipment.

5-29.2 **Removal.**

1. Remove side panels per paragraph 5-5.2.
2. Disconnect battery per paragraph 5-9.2 (Model 1782) or 5-10.2 (Model 2182).
3. Disconnect throttle control from engine.
4. Remove choke cable from engine (Model 2182 only).
5. Remove necessary electrical components per paragraph 5-9.2 (Model 1782) or 5-10.2 (Model 2182).
6. Remove speed control knob per paragraph 5-47.2.
7. Remove necessary upper steering components per paragraph 5-30.2.
8. Remove instrument panel (1, Figure 5-35) as follows:
   a. Remove dash label (2).
   b. Remove throttle knob (3) by removing nut (4) and cross recessed truss head screw (5).

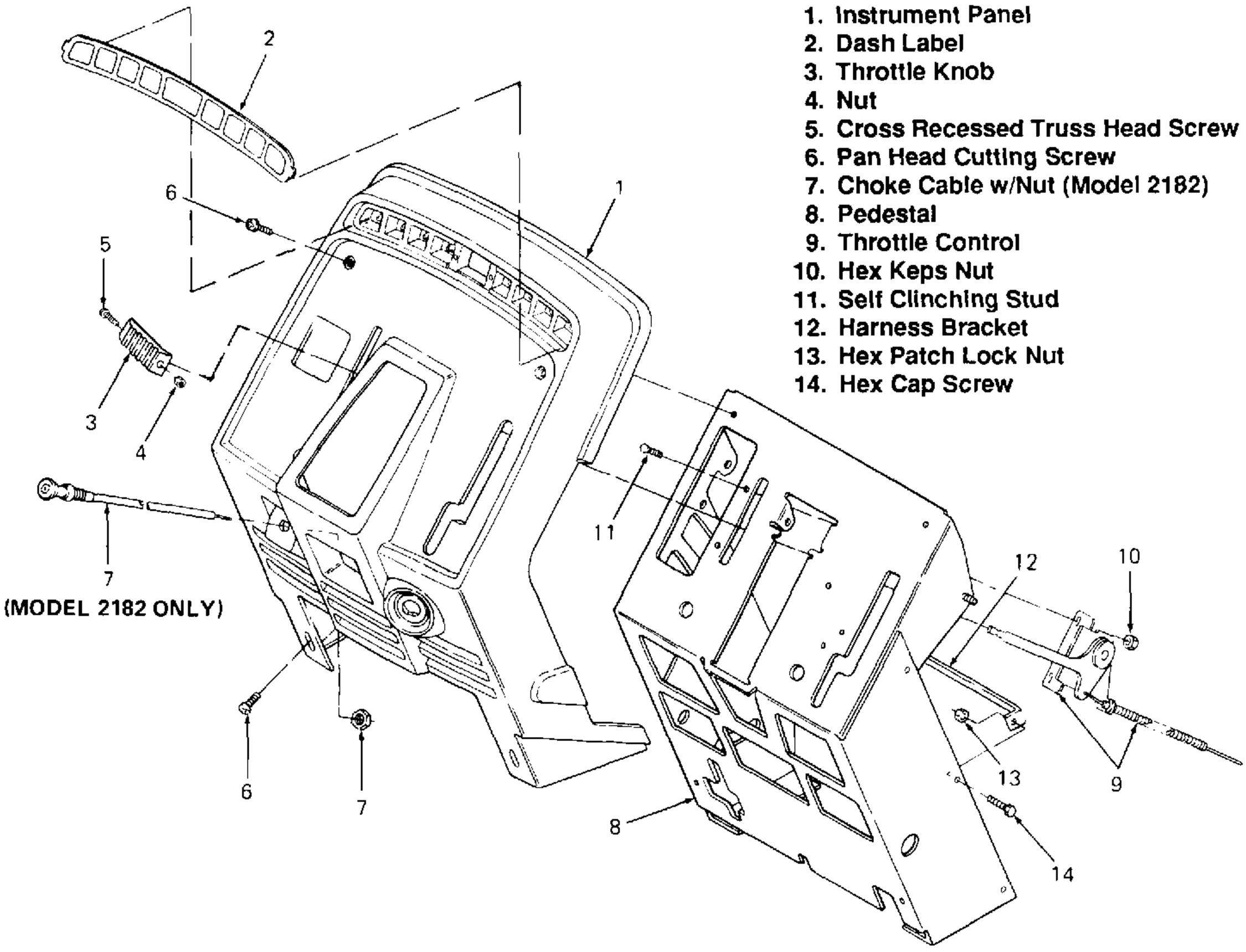


Figure 5-35. Pedestal, Instrument Panel and Engine Controls (Models 1782 and 2182).

c. Remove pan head cutting screws (6).

d. Remove choke cable and nut (7) (Model 2182 only).

9. Remove pedestal (8) as follows:

a. Remove throttle control (9) by removing hex keps nut (10) and self clinching stud (11).

b. Remove harness bracket (12) by removing hex patch lock nuts (13) and hex cap screws (14).

5-29.3 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect cable (7) and throttle control (9) for kinks or binding. Discard and replace damaged parts.

5-29.4 **Repair.**

1. Deburr and dress damaged threads.

5-29.5 **Installation.**

1. Install pedestal as follows:

a. Install harness bracket (12) with hex cap screws (14) and hex patch lock nuts (13).

b. Install throttle control (9) with self clinching stud (11) and hex keps nut (10).

2. Install instrument panel (1) as follows:

a. Position panel and secure with pan head cutting screws (6).

b. Install throttle knob (3) with cross recessed truss head screw (5) and nut (4).

c. Install dash label (2).

d. Install choke cable and nut (7) (Model 2182 only).

3. Install upper steering components per paragraph 5-30.5.
4. Install speed control knob per paragraph 5-47.7.
5. Install electrical components per paragraph 5-9.5 (Model 1782) or 5-10.5 (Model 2182).
6. Attach throttle control to engine and adjust per paragraph 6-3.
7. Attach choke cable to engine.
8. Connect battery per paragraph 5-9.5 or 5-10.5.
9. Install side panels per paragraph 5-5.7.

5-30. **UPPER STEERING (All Models).**

5-30.1 **General.** The following text applies to all tractor models. Before servicing the upper steering, refer to Appendix D for a list of mandatory replacement parts.

5-30.2 **Removal.**

1. Remove side panels per paragraph 5-4.2 (Models 1340, 1535, 1541, 1860, 1862, 1882 and 2082) or 5-5.2 (Models 1782 and 2182).
2. Remove radiator (Models 1782 and 2182 only) per paragraph 5-6.2.

NOTE

Steps 3, 4 and 5, following, do NOT apply to tractor Models 1782 and 2182.

3. Remove battery per paragraph 5-7.2 (Model 1340) or 5-8.2 (Models 1535, 1541, 1860, 1862, 1882 and 2082).
4. Remove battery tray assembly and intake baffles per paragraph 5-11.2 (Model 1340) or 5-12.2 (Models 1535, 1541, 1860, 1862, 1882 and 2082).
5. Remove steering wheel (1, Figure 5-36) as follows:

a. Remove steering wheel cap (3) with steering cap label (2).

b. Loosen, but do not remove hex jam nut (4).

c. Pull up on steering wheel and strike top end of upper steering shaft (20) with a plastic mallet.

d. Remove hex jam nut (4), flat washer (5) and steering wheel (1).

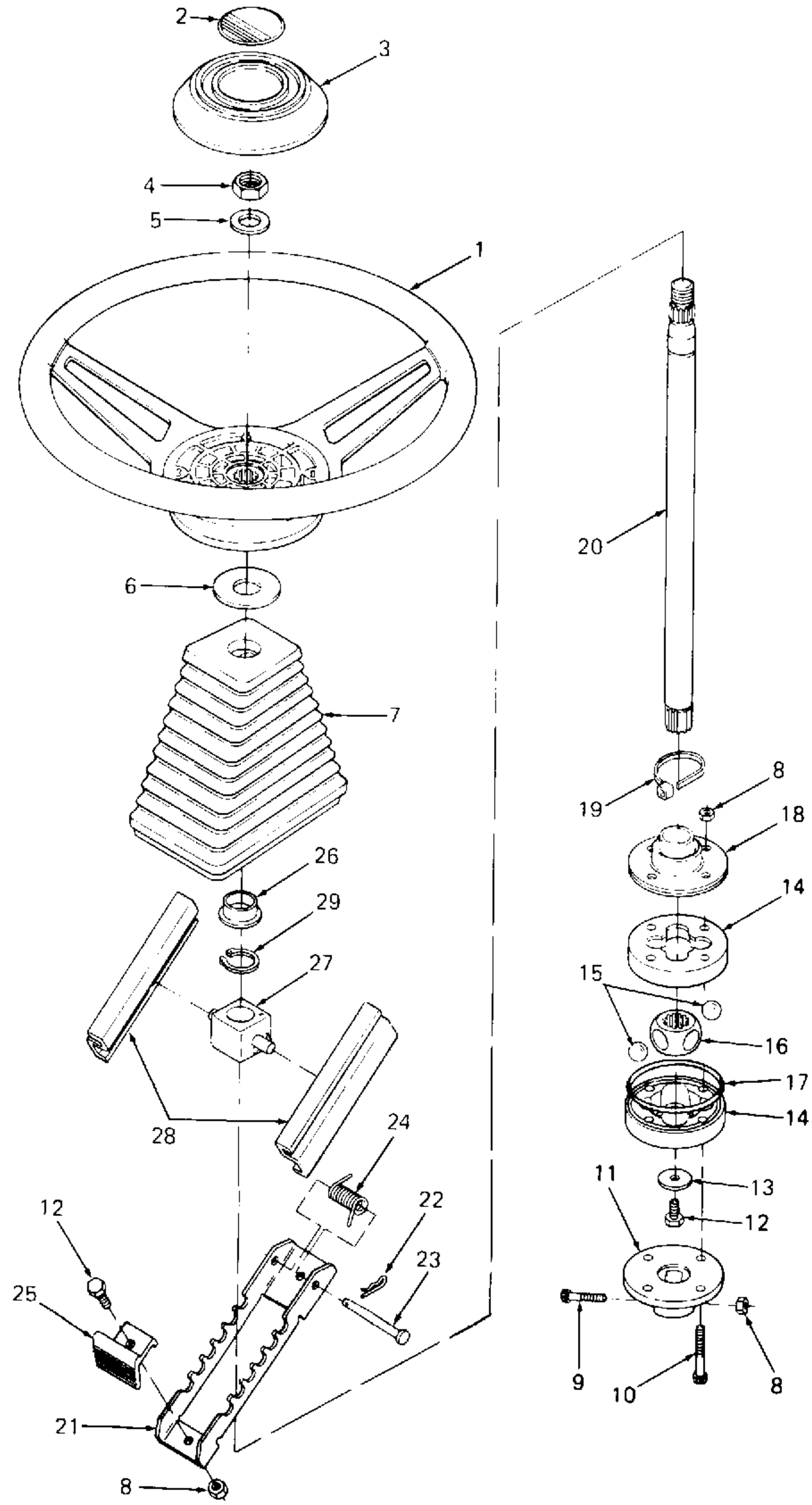
6. Remove flat washer (6) and steering shaft boot (7).
7. Remove hex patch lock nut (8) and socket head cap screw (9).
8. Remove hex patch lock nut (8), socket head cap screw (10), steering adapter (11), hex cap screw (12), flat washer (13), lower drive coupling (14A), steel balls (15), drive hub (16) and upper drive coupling (14).
9. Unseat O-ring (17) from lower drive coupling (14A) groove. Discard O-ring.

NOTE

Tractors prior to the 1991 model year (Serial Number 811,671 and below) were not equipped with O-rings (17) on the upper drive coupling. When circumstances permit, these tractors may be upgraded during repair by installing grooved drive couplings (14A, Figure 5-36) with O-ring (17) seated.

10. Remove and discard tie strap (19). Remove and discard coupling boot (18).

11. Remove flange bearing (26), snap ring (29) and upper steering shaft (20).



1. Steering Wheel
2. Steering Cap Label
3. Steering Wheel Cap
4. Hex Jam Nut
5. Flat Washer
6. Flat Washer
7. Steering Shaft Boot
8. Hex Patch Lock Nut
9. Socket Head Cap Screw
10. Socket Head Cap Screw
11. Steering Adapter
12. Hex Cap Screw
13. Flat Washer
14. Upper Drive Coupling
14A. Lower Drive Coupling
15. Steel Ball
16. Drive Hub
17. O-Ring
18. Coupling Boot
19. Tie Strap
20. Upper Steering Shaft
21. Tilt Control Plate
22. Internal Cotter Pin
23. Clevis Pin
24. Torsion Spring
25. Tilt Control Button
26. Flange Bearing
27. Shaft Guide Bushing
28. Shaft Guide
29. Snap Ring

Figure 5-36. Upper Steering (All Models).

WARNING

Torsion spring (24) is under spring tension and could cause personal injury when removed. Wear eye protection when removing torsion spring.

12. Remove internal cotter pin (22), clevis pin (23) and torsion spring (24).
13. Remove hex patch lock nut (8), hex cap screw (12), tilt control button (25) and tilt control plate (21).
14. Remove shaft guide bushing (27) from top of shaft guides (28). Remove shaft guides.

5-30.3 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and internal wear. Especially check steel balls (15) for surface damage.
3. Inspect flange surfaces for nicks or scratches.
4. Inspect splined surfaces for chips, missing teeth or excessive wear. Especially note drive hub (16) and upper steering shaft (20).
5. Inspect drive hub (16) as follows:

NOTE

When assembling the drive hub for inspection in step 5a, DO NOT lubricate parts and DO NOT install steel balls (15).

a. Assemble drive hub (16), upper drive coupling (14), O-ring (17) and lower drive coupling (14A), and firmly secure with four socket head cap screws (10) and nuts (8).
b. Grasp assembled joint and insert upper steering shaft (20) into drive hub.
c. Rotate free end of upper steering shaft (20) in an approximate 4-inch circle. Refer to Figure 5-37.

NOTE

Drive hub (16) should rotate freely in response to movement of upper steering shaft (20).

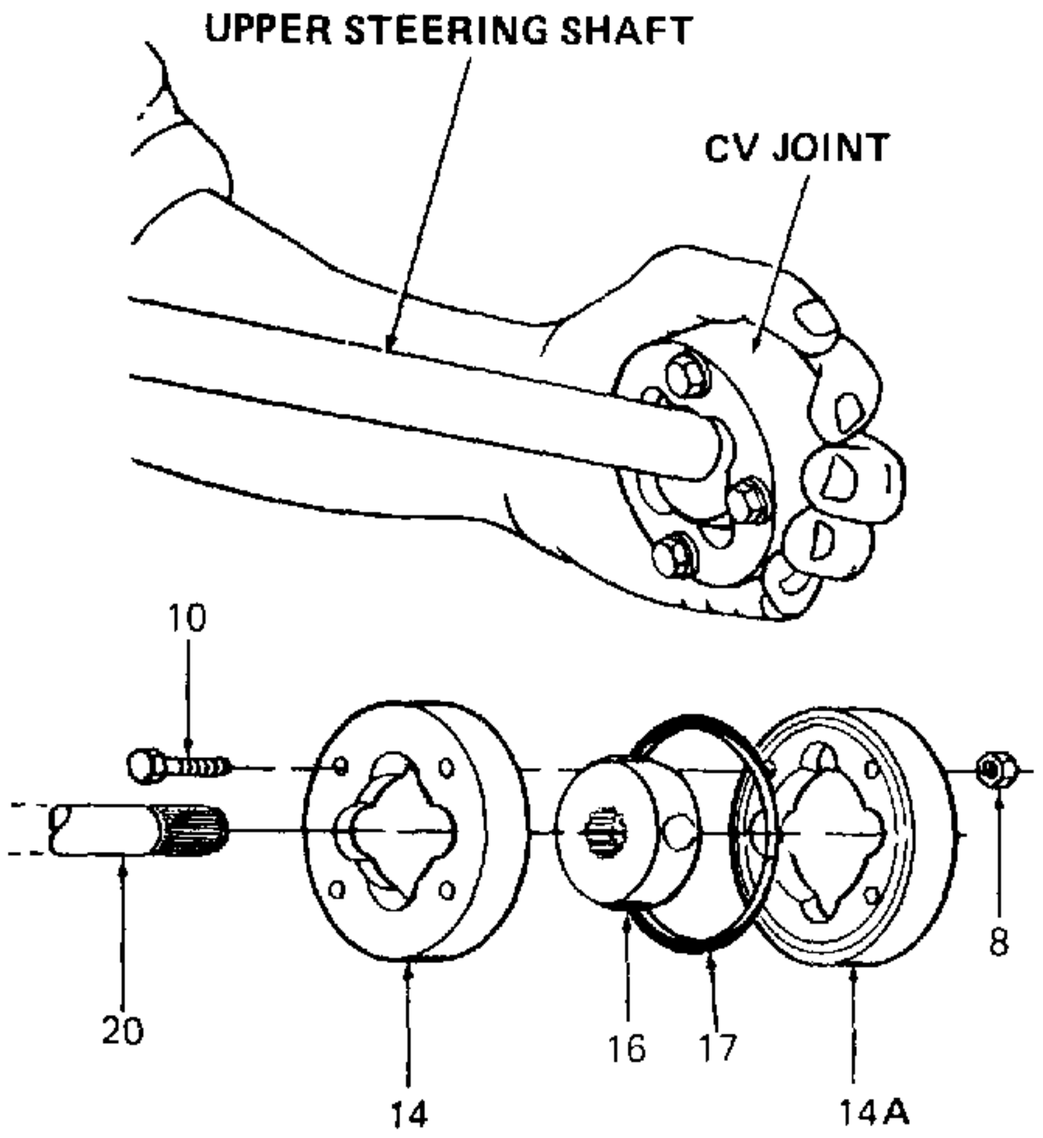


Figure 5-37. Inspecting Drive Hub.

d. If drive hub (16) is hard to move, or is tight at a particular position, discard and replace hub. If drive couplings (14 and 14A) are damaged, discard and replace. Discard and replace O-ring (17) in lower drive coupling (14A).

CAUTION

Following the inspection described in step 5, the joint must be disassembled for reassembly onto the upper steering shaft (20) and installation of the steel balls (15).

5-30.4 **Repair.** Refer to Appendix E for contingency replacement parts which are worn or damaged beyond repair.

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-30.5 **Installation.**

1. Install shaft guides (28) and shaft guide bushing (27).
2. Install tilt control button (25) onto tilt control plate (21) with hex cap screw (12) and hex patch lock nut (8).

WARNING

Torsion spring (24) is under spring tension and could cause personal injury when removed. Wear eye protection when removing torsion spring.

NOTE

Installation of torsion spring (24) is facilitated by use of spring installation tool Part No. 759-3596.

3. Use spring installation tool Part No. 759-3596 to place torsion spring (24) on tilt control plate (21). Install tilt control plate (21) using clevis pin (23) and internal cotter pin (22).
4. Install upper steering shaft (20), snap ring (29) and flange bearing (26).
5. Pack interior of coupler components with C-V joint grease. Install coupling boot (18) over lower end of upper steering shaft (20).
6. Position drive hub (16) and steel balls (15) between two drive couplings (14 and 14A). Apply C-V joint grease to splined area of upper steering shaft (20). Install couplings (14 and 14A) onto upper steering shaft (20) making sure to properly align splined areas of steering shaft and drive hub.
7. Secure drive couplings (14) to upper steering shaft (20) with flat washer (13) and hex cap screw (12).
8. Position steering adapter (11) and secure with socket head cap screws (10) and hex patch lock nuts (8).
9. Secure tie strap (19) to coupling boot (18).
10. Position steering adapter (11) over cam shaft assembly (24, Figure 5-38), and secure with socket head cap screw (9, Figure 5-36) and hex patch lock nut (8).
11. Install steering shaft boot (7) and flat washer (6).
12. Install steering wheel (1) and secure with flat washer (5), hex jam nut (4), steering wheel cap (3) and steering cap label (2).
13. Install radiator (Models 1782 and 2182 only) per paragraph 5-6.3.

NOTE

Steps 14 and 15, following, do NOT apply to tractor Models 1782 and 2182.

14. Install intake baffles and battery tray assembly per paragraph 5-11.7 (Model 1340) or 5-12.5 (Models 1535, 1541, 1860, 1862, 1882 and 2082).
15. Install battery per paragraph 5-7.5 (Model 1340) or 5-8.5 (Models 1535, 1541, 1860, 1862, 1882 and 2082).
16. Install side panels per paragraph 5-4.7 (Models 1340, 1535, 1541, 1860, 1862, 1882 and 2082) or 5-5.7 (Models 1782 and 2182).

5-31. LOWER STEERING (Models 1340, 1535, 1541 and 1860).

5-31.1 **General.** Before servicing the lower steering, refer to Appendix D for a list of mandatory replacement parts.

5-31.2 **Removal.**

1. Remove side panels per paragraph 5-4.2.
2. Remove battery per paragraph 5-7.2 (Model 1340) or 5-8.2 (Models 1535, 1541 and 1860).
3. Remove battery tray per paragraph 5-11.2 (Model 1340) or 5-12.2 (Models 1535, 1541 and 1860).
4. Disconnect camshaft assembly (24, Figure 5-38) from CV joint by removing hex patch lock nut (8, Figure 5-36) and socket head cap screw (9).
5. Remove frame cover.
6. Remove drag link per paragraph 5-21.2.
7. Remove lower screen from frame.
8. Remove lower steering gear assembly (1, Figure 5-38) as follows:
   a. Remove hex center lock nut (2) and clamp (3).
   b. Remove hex cap screws (5) and bell washers (6).
9. Remove steering support plate (4) by removing hex head cutting screws (7) and bell washers (8).

5-31.3 **Disassembly.**

1. Disassemble steering gear assembly (1) as follows:
   a. Remove nut jam nut (9), cam follower (10), hex crown lock nut (11), pivot shaft (12) and flat washer (13).

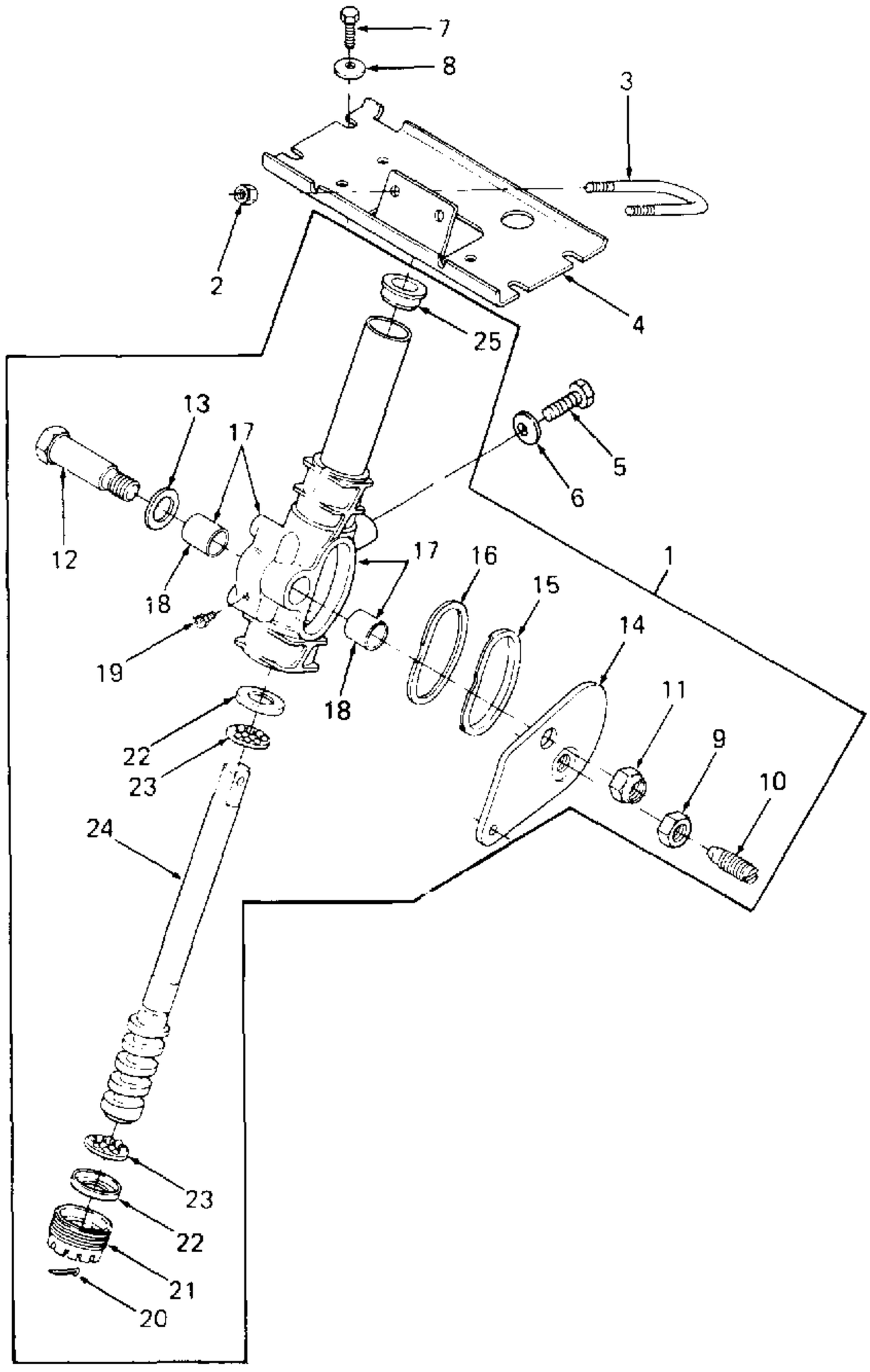
b. Remove steering arm (14), seal retainer (15) and remove and discard seal (16).

c. Remove tube assembly housing (17). Remove bushing (18) from tube assembly housing. Remove lube fitting (19).

d. Remove cotter pin (20), adjusting plug (21), bearing cup (22), ball retainer assembly (23) and camshaft assembly (24). Remove column bearing (25).

5-31.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and internal wear.
3. Inspect cam follower (10) for flat spots which indicate wear.
4. Inspect lower end of camshaft assembly (24) for roughness or wear.
5. Inspect flange or gasket surfaces for nicks or scratches.
6. Inspect column bearing (25) for damage. Discard and replace if damaged.
7. Inspect housing for cracks.



1. Steering Gear Assembly
2. Hex Center Lock Nut
3. Clamp
4. Steering Support Plate
5. Hex Cap Screw
6. Bell Washer
7. Hex Head Cutting Screw
8. Bell Washer
9. Hex Jam Nut
10. Cam Follower
11. Hex Crown Lock Nut
12. Pivot Shaft
13. Flat Washer
14. Steering Arm
15. Seal Retainer
16. Seal
17. Tube Assembly Housing
18. Bushing
19. Lube Fitting
20. Cotter Pin
21. Adjusting Plug
22. Bearing Cup
23. Ball Retainer Assembly
24. Camshaft Assembly
25. Column Bearing

Figure 5-38. Lower Steering (Models 1340, 1535, 1541 and 1860).

5-31.5 **Repair.** Refer to Appendix E for contingency replacement parts which are worn or damaged beyond repair.

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-31.6 **Reassembly.**

1. Reassemble steering gear assembly (1) as follows, after coating internal parts with 251H EP grease.
   a. Install column bearing (25). Install ball retainer assemblies (23) and bearing cups (22). Install cam shaft assembly (24), adjusting plug (21) and cotter pin (20).
   b. Install lube fitting (19). Place bushing (18) into tube assembly housing (17). Install tube assembly housing.

CAUTION

A new seal (16) must be installed when lower steering is reassembled.

   c. Install new seal (16), seal retainer (15) and steering arm (14).
   d. Install flat washer (13), pivot shaft (12), hex crown lock nut (11), cam follower (10) and hex jam nut (9).
2. Adjust steering gear assembly per paragraph 6-4 BEFORE installing on tractor.

5-31.7 **Installation.**

1. Install steering support plate (4) with bell washers (8) and hex head cutting screw (7).
2. Install steering gear assembly (1) on tractor with bell washers (6) and hex cap screws (5). Properly engage top end of camshaft assembly (24) into bottom of coupling joint.
3. Secure camshaft assembly to coupling joint with hex patch lock nut (8, Figure 5-36) and head cap screw (9).
4. Install clamp (3, Figure 5-38) and hex center lock nut (2).
5. Install lower screen on frame.
6. Install drag link per paragraph 5-21.7.
7. Install frame cover.
8. Apply 251H EP grease via lube fitting (19).
9. Install intake baffles and battery tray per paragraph 5-11.5 (Model 1340) or 5-12.5 (Models 1535, 1541 and 1860).
10. Install battery per paragraph 5-7.5 (Model 1340) or 5-8.5 (Models 1535, 1541 and 1860).
11. Install side panels per paragraph 5-4.7

5-32. STEERING MOUNTING, POWER STEERING CYLINDER AND HYDRAULIC LINES (Models 1782, 1882, 2082 and 2182).

5-32.1 **General.** Refer to Appendices D and E prior to servicing this equipment.

5-32.2 **Removal.**

1. Remove side panels per paragraph 5-4.2 (Models 1882 and 2082) or 5-5.2 (Models 1782 and 2182).
2. Remove radiator (Models 1782 and 2182 only) per paragraph 5-6.2.

NOTE

Steps 3, 4 and 5, following, apply to tractor Models 1882 and 2082 only.

3. Remove battery per paragraph 5-8.2 (Models 1882 and 2082).
4. Remove battery tray assembly and intake baffles per paragraph 5-12.2 (Models 1882 and 2082).
5. Remove steering support plate (1, Figure 5-39) as follows:
   a. Remove hex center lock nut (2) and clamp (3).
   b. Remove hex cutting screws (4) and bell washers (5) and lift out support plate.
6. Remove power steering box mounting bracket (6) as follows:
   a. Remove bracket from frame by removing hex center lock nut (7), lock washer (8), hex cap screw (9) and flat washer (10).
   b. Remove bracket from power steering box (12) by removing hex nut (11) and bell washer (5).
7. Remove power steering cylinder (13) as follows:
   a. Remove steering hoses (14 and 16) as follows:
      (1) Remove hoses from hydraulic cylinder by loosening nuts from 90 degree tube elbows (15).

(2) Remove hoses from power steering box by loosening nuts on end of hoses.

b. Remove cylinder from tractor as follows:

(1) Remove rear end of cylinder from cylinder mounting bracket (23) by removing hex cap screw (17) and flat washer (18).

(2) Remove front end of cylinder from steering arm (20) by removing hex nut (19), hex cap screw (17) and flat washer (18).

8. Remove steering arm (20) by first removing hex center lock nut (21) and hex cap screw (22).

9. Remove cylinder mounting bracket (23) by removing hex center lock nut (24), lock washer (25), hex cap screw (26) and flat washer (27).

5-32.3 **Disassembly.**

1. Disassemble power steering cylinder (13) by removing 90 degree tube elbows (15), alignaball ends (28) and hex jam nuts (29).

5-32.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and internal wear.
3. Inspect surfaces for nicks or scratches.
4. Inspect power steering cylinder (13) for leaks or damage.
5. Inspect steering hoses (14 and 16) for cuts or other damage. Replace if badly cut.

5-32.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-32.6 **Reassembly.**

1. Reassemble power steering cylinder (13) as follows:

a. Install hex jam nuts (29) and insert alignaballs (28) to 5/8 inch of thread depth.

b. Tighten rear hex jam nut against rear alignaball. Leave front hex jam nut loose until installation of power steering cylinder (13).

c. Install two 90 degree tube elbows (15).

5-32.7 **Installation.**

1. Install cylinder mounting bracket (23) with flat washer (27), hex cap screws (26), lock washer (25) and hex center lock nut (24).
2. Install steering arm (20) with hex cap screw (22) and hex center lock nut (21).
3. Install power steering cylinder (13) as follows:

a. Turn front wheels fully right until right steering knuckle contacts stop on the front axle.

b. Secure cylinder to tractor as follows:

(1) Attach rear end of cylinder to mounting bracket (23) with flat washer (27) and hex cap screw (26).

(2) Attach front end of cylinder to power steering arm (20) with flat washer (18), hex cap screw (17) and hex nut (19).

(3) Tighten front hex jam nut (29) against front alignaball (28).

c. Install steering hoses (14 and 16) as follows:

(1) Attach hoses to power steering box (12) by tightening nuts on end of hoses. Refer to Figure 5-39 for proper placement of hoses.

(2) Attach hoses to power steering cylinder by tightening nuts on end of hoses onto 90 degree tube elbows (15). Refer to Figure 5-39 for proper placement of hoses.

4. Install power steering box mounting bracket (6) as follows:

a. Install bracket onto power steering box (12) with bell washer (5) and hex nut (11).

b. Install bracket onto frame with flat washer (10), hex cap screw (9), lock washer (8) and hex center lock nut (7).

5. Install steering support plate (1) as follows:

a. Position plate, and secure with bell washers (5) and hex cutting screws (4).

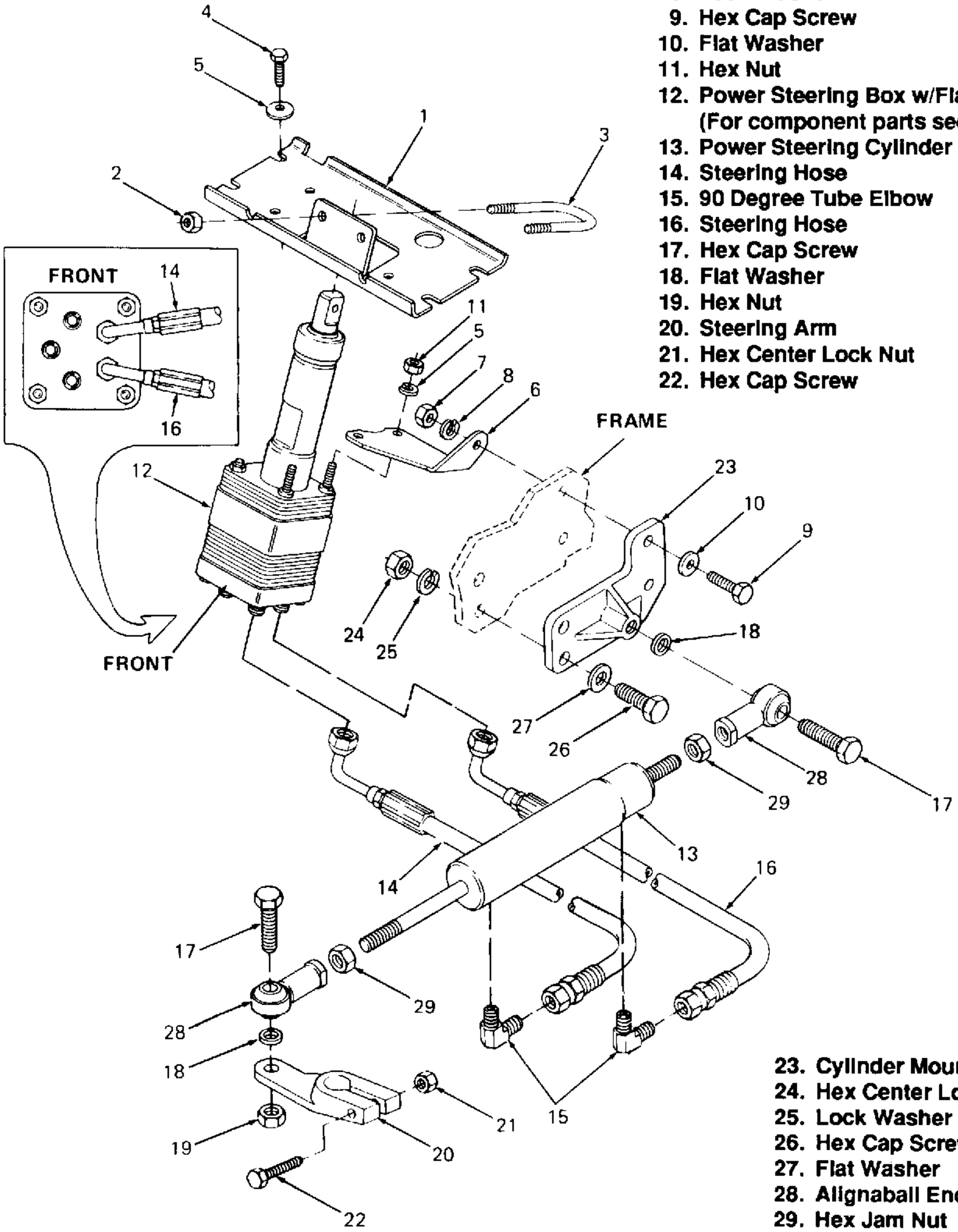
b. Install clamp (3) and hex center lock nuts (2).

6. Install radiator (Models 1782 and 2182 only) per paragraph 5-6.3.

NOTE

Steps 7 and 8, following, do NOT apply to tractor Models 1782 and 2182.

7. Install air baffles and battery tray assembly per paragraph 5-12.5 (Models 1882 and 2082).
8. Install battery per paragraph 5-8.5 (Models 1882 and 2082).



1. Steering Support Plate
2. Hex Center Lock Nut
3. Clamp
4. Hex Cutting Screw
5. Bell Washer
6. Power Steering Box Mounting Bracket
7. Hex Center Lock Nut
8. Lock Washer
9. Hex Cap Screw
10. Flat Washer
11. Hex Nut
12. Power Steering Box w/Flat
    (For component parts see Figure 5-33)
13. Power Steering Cylinder
14. Steering Hose
15. 90 Degree Tube Elbow
16. Steering Hose
17. Hex Cap Screw
18. Flat Washer
19. Hex Nut
20. Steering Arm
21. Hex Center Lock Nut
22. Hex Cap Screw
23. Cylinder Mounting Bracket
24. Hex Center Lock Nut
25. Lock Washer
26. Hex Cap Screw
27. Flat Washer
28. Alignaball End
29. Hex Jam Nut

Figure 5-39. Steering Mounting, Power Steering Cylinder and Hydraulic Lines (Models 1782, 1882, 2082 and 2182).

9. Install side panels per paragraph 5-4.7 (Models 1882 and 2082) or 5-5.7 (Models 1782 and 2182).

5-33. POWER STEERING BOX ASSEMBLY (Models 1782, 1862, 1882, 2082 and 2182).

5-33.1 **General.** Refer to Appendix B for information on a holding fixture that is necessary for disassembly of the power steering box assembly. Refer to Appendix D for a list of mandatory replacement parts. Additional information regarding disassembly, inspection and reassembly of the power steering box assembly can be found in Section 4.

5-33.2 **Removal.**

1. Remove side panels per paragraph 5-4.2 (Models 1862, 1882 and 2082) or 5-5.2 (Models 1782 and 2182).

2. Remove radiator (Models 1782 and 2182 only) per paragraph 5-6.2.

NOTE

Steps 3 and 4, following, apply to tractor Models 1862, 1882 and 2082 only.

3. Remove battery per paragraph 5-8.2 (Models 1862, 1882 and 2082).

4. Remove battery tray assembly and intake baffles per paragraph 5-12.2 (Models 1862, 1882 and 2082).

5. Disconnect input shaft of power steering box assembly from upper steering by removing hex patch lock nut and socket head cap screw located at bottom of CV joint.

6. Remove steering mounting per paragraph 5-32.2 (Models 1782, 1882, 2082 and 2182) or 5-34.2 (Model 1862).

NOTE

Position a suitable container to collect hydraulic fluid before removing hydraulic tubes from power steering box.

7. Remove screen from bottom of tractor frame.

8. Tag and remove all hydraulic tubes from bottom of power steering box, and remove box from tractor.

5-33.3 **Disassembly.**

CAUTION

To avoid distorting or damaging the power steering box assembly, do not clamp directly into a vise. Utilize a holding fixture which is described in Appendix B.

CAUTION

Many components in the power steering box assembly have finely ground surfaces. Be careful not to nick or scratch these surfaces.

1. Clamp holding fixture in a vise.

2. Place power steering box, input shaft first, into holding fixture, and secure with four 5/16-24 UNF nuts.

NOTE

Study the relative positions of the alignment grooves on the side of the components in the assembly before beginning disassembly. Check for input shaft end play. You should have approximately .030 to .060 inch.

3. Remove power cover and check valve assembly (2, Figure 5-40) by removing hex nuts (1).

4. Remove and discard seal ring (3) and O-rings (4).

5. Remove port manifold (5) and springs (6) located on manifold.

CAUTION

Springs (6) are under tension. Wear protective goggles.

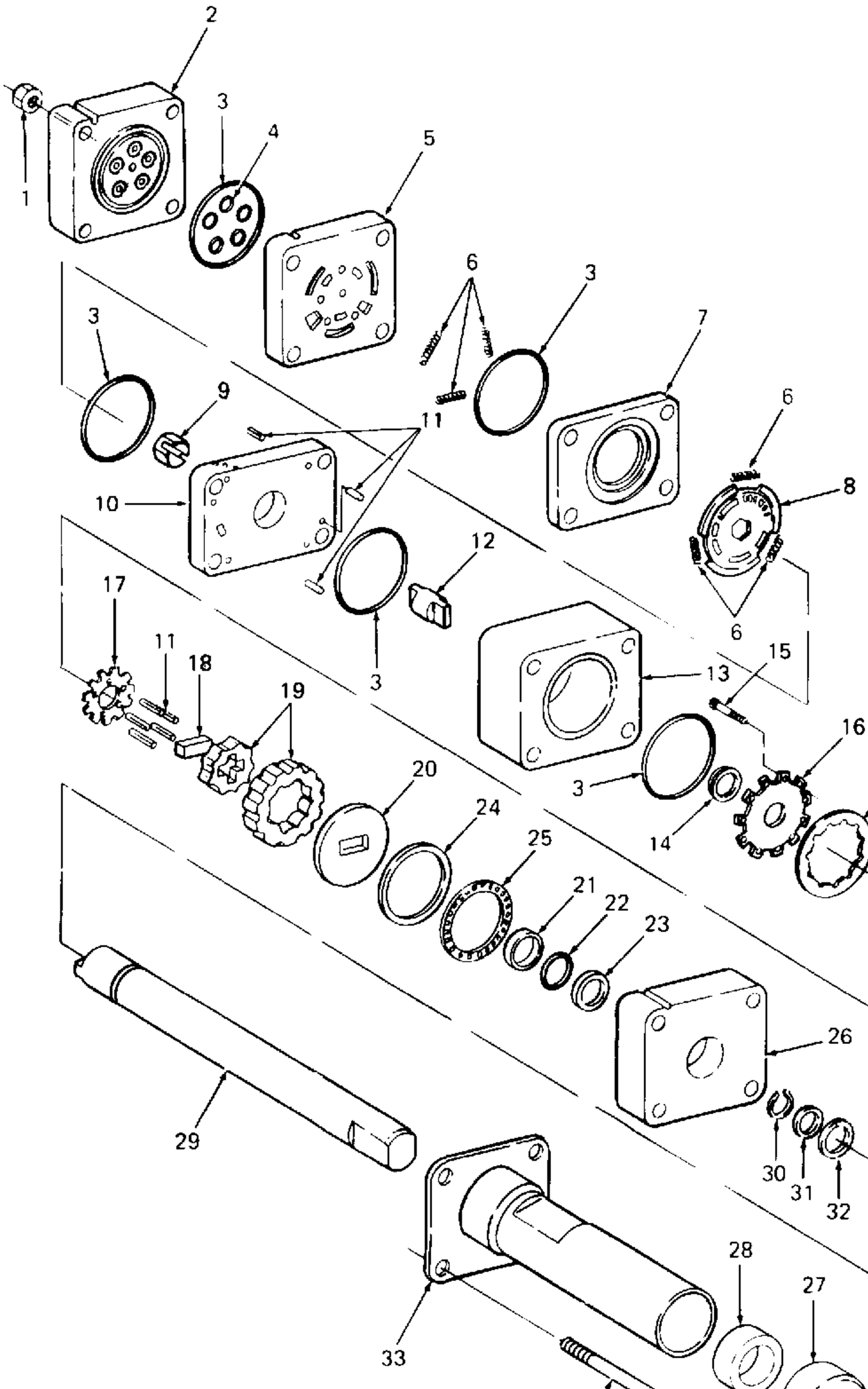
6. Remove valve and ring assembly (7), and remove and discard the two seal rings (3).

7. Remove valve plate (8), springs (6) and hex drive assembly (9).

8. Remove isolation manifold (10). Remove needle rollers (11) from manifold.

9. Remove drive link (12) and metering ring (13). Remove needle rollers (11) and two seal rings (3). Discard seal rings.

10. Remove metering package (consisting of parts 14 through 20) which is held together by screws (15).
    a. Remove and discard seal (14).
    b. Remove eleven screws (15) and remove commutator cover (16).



1. Hex Nut
2. Power Cover and Check Valve Assembly
3. Seal Ring
4. O-Ring
5. Port Manifold
6. Spring Kit
7. Valve and Ring Assembly
8. Valve Plate
9. Hex Drive Assembly
10. Isolation Manifold
11. Needle Roller Kit
12. Drive Link
13. Metering Ring
14. Seal
15. Screw
16. Commutator Cover
17. Commutator and Ring Assembly
18. Drive Link Spacer
19. Rotor Assembly
20. Drive Plate
21. Face Seal
22. Back-up Ring
23. Spacer Seal
24. Spacer
25. Thrust Bearing
26. Upper Cover Plate
27. Column Dust Seal
28. Column Bearing
29. Input Shaft Assembly
30. Retaining Ring
31. Washer
32. Retaining Plate
33. Upper Cover and Tube Assembly
34. Special Bolt

Figure 5-40. Power Steering Box Assembly (Models 1782, 1862, 1882, 2082 and 2182).

CAUTION

Five needle rollers (11) connect the commutator and ring assembly (17) to the rotor assembly (19) with a slip fit. Use care and minimum force to separate the two components.

c. Remove commutator and ring assembly (17).

d. Remove needle rollers (11) and drive link spacer (18).

e. Remove rotor assembly (19) and drive plate (20).

11. Remove face seal (21), back-up ring (22) and spacer seal (23). Discard face seal and back-up ring.

12. Remove spacer (24), thrust bearing (25) and upper cover plate (26).

13. Remove column dust seal (27) and input shaft assembly (29).

14. Remove retaining ring (30), washer (31) and retaining plate (32) from input shaft.

15. Remove column bearing (28) from upper cover and tube assembly (33).

16. Remove upper cover and tube assembly (33) and special bolts (34).

5-33.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.

2. Inspect parts for cracks, scoring, distortion, corrosion and internal wear.

3. Inspect surfaces for nicks or scratches.

4. Inspect power cover and check valve assembly (2) for port fitting sealing surface scratches and thread damage. Replace if these conditions are present.

5. Inspect springs (6) for bent or distorted coils. If any spring is bent or damaged, ALL springs should be replaced.

6. Inspect port manifold (5) surfaces. Polished pattern is normal. All edges should be sharp and free of nicks and burrs. Surfaces should be free of scratches or scoring. Replace if damaged.

7. Inspect valve plate (8) slot edges and ground surfaces. If valve plate shows nicks or scoring or edges are not sharp, it must be replaced.

NOTE

The valve plate (8) and valve and ring assembly (7) are a matched set and must be replaced as a set.

8. Inspect hex drive assembly (9) pin for wear. Pin should be firmly pressed in place. Sides of hex and slot should not have grooves or scoring. Replace if damaged.

9. Inspect isolation manifold (10) surfaces. Polished pattern is normal. Holes and edges should be free of nicks. Manifold surfaces should be free of nicks or scoring. Replace if damaged.

10. Inspect drive link (12) ends. Four crowned contact surfaces should not be worn or scored. Replace if worn or scored.

11. Inspect metering ring (13) bore for scores. Replace if scored.

12. Inspect commutator cover (16) surfaces. Polished pattern is normal. Replace if nicks, burrs or scoring are present.

13. Inspect drive link spacer (18). Replace if grooved or worn.

14. Inspect commutator and ring assembly (17) for nicks at edges or holes. Check surfaces for scoring. Edges should be sharp. Replace if damaged.

15. Inspect rotor assembly (19) as follows:

    a. With rotor assembly lying on drive plate (20), inner part of rotor should rotate and orbit freely within outer part of rotor assembly. Commutator side of outer part must be free of grooves or scoring.

    b. Perform tip clearance as follows: Check inner part (part A) tip clearance to outer part (part B) tip clearance with the appropriate feeler gauge. An A tip located directly across from A tip being gauged, must be centered between B lobes during gauging check as shown in Figure 5-41. Rotor assembly .75 inch (19 mm) or less in height has a maximum allowable tip clearance of .003 inch (.08 mm). Rotor assembly 1.0 inch (25.4 mm) or more in height, has a maximum allowable tip clearance of .005 inch (.13 mm). Replace if maximum tip clearance is exceeded.

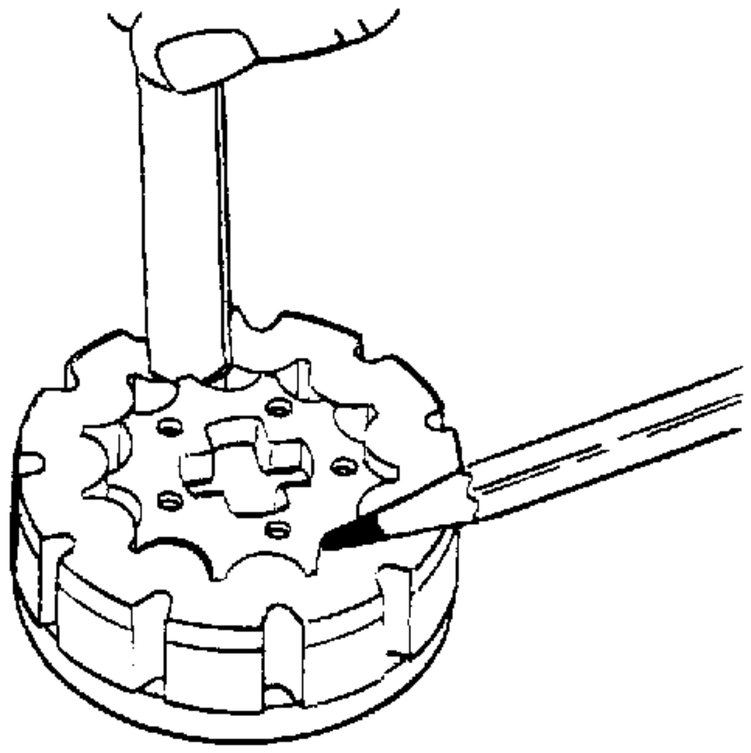


Figure 5-41. Checking Tip Clearance.

NOTE

Inner and outer parts of the rotor assembly are a matched set and must be replaced as a matched set if worn or damaged.

16. Inspect drive plate (20). Spiral pattern on rotor side is normal. Inspect thrust bearing side for dents or flaking. Flat sides of input shaft engagement hole must not be grooved or worn. Replace if damaged.
17. Inspect thrust bearing (25) for dents, flaking or missing or broken rolls. Replace if damaged.
18. Inspect seal spacer (23) and spacer (24) for wear or breaks. Replace if damaged.
19. Inspect upper cover plate (26) for dents or flaking. Some polishing is normal. Replace if damaged.
20. Inspect input shaft (29) for cracks or distortion. Inspect both ends for wear. Inspect snap ring groove for wear. Replace damaged shaft.
21. Inspect upper cover and tube assembly (33) for signs of looseness between tube and plate. Replace if loose.

5-33.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage to input shaft (29).

5-33.6 **Reassembly.**

CAUTION

Replace all seals and O-rings with new ones each time unit is reassembled.

NOTE

A seal kit containing all required seals, except the column dust seal which is available separately, is available. Refer to Appendix D.

1. Place four special bolts (34) into fixture with shortest threaded end of bolts through fixture holes. Secure bolts to fixture with four 5/16-24 UNF nuts. Tighten nuts to secure assembly to fixture but loose enough to turn bolts and facilitate stacking of components.
2. Install column bearing (28) in upper cover and tube assembly (33).

NOTE

During reassembly, make sure the square shoulders of bolts (34) engage the square holes in the upper cover and tube assembly (33).

3. Install upper cover and tube assembly (33), with tube pointing down, over bolts (34).

NOTE

The recessed face of retaining plate (32) must be toward washer (31) when these items are installed on input shaft (29).

4. Install retaining plate (32), washer (31) and retaining ring (30) on input shaft (29) after first applying small amount of grease to face of retaining plate and washer.
5. Install input shaft (29) in upper cover and tube assembly (33).
6. Install upper cover plate (26) with polished surface up and edge with alignment groove in the same position as before disassembly. Apply grease to upper face of cover plate and to drive plate end of input shaft.
7. Assemble back-up ring (22) and face seal (21) onto spacer seal (23) after applying grease to face seal.
8. Install assembled spacer seal (23), back-up ring (22) and face seal (21) over drive plate end of input shaft and onto upper cover plate (26).

9. Assemble the metering package as follows:

   a. Place drive plate (20) on clean lint-free surface with eleven tapped holes facing up.

   b. Place rotor assembly (19) on top of drive plate (20) with five pin holes facing up. Rotate inner part of rotor assembly (19) until eleven screw relief slots are aligned with tapped holes in drive plate.

   c. Apply grease to drive link spacer (18) and install in rotor assembly (19).

   d. Install commutator and ring assembly (17) after first applying a few drops of oil. Refer to Figure 5-42 to be sure proper side of commutator and ring assembly (17) faces rotor assembly (19). Align rotor screw slots with commutator screw recesses.

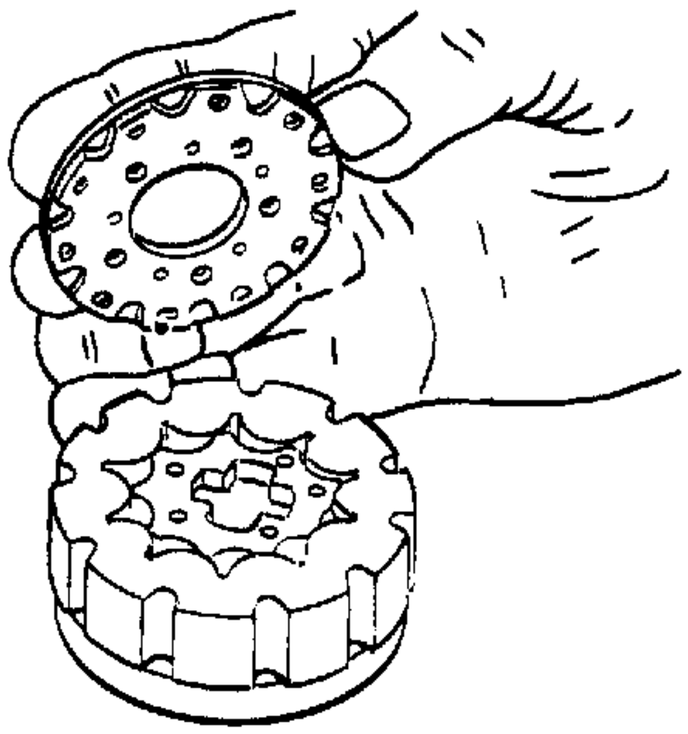


Figure 5-42. Installing Commutator and Ring Assembly.

CAUTION

When installing needle rollers in the commutator and ring assembly (17), be sure they are pressed below the surface.

   e. Align holes in commutator and ring assembly (17) and insert needle rollers (11).

   f. Install commutator cover (16) with flat surface toward commutator. Align screw holes in cover with screw holes in drive plate (20).

   g. Install eleven screws (15) loosely.

NOTE

The commutator and ring assembly (17) must be concentric with drive plate (20) within .005 inch (.127 mm) total indicator reading after tightening the eleven screws (15). The following step, h., will help achieve concentricity.

   h. Establish concentricity between commutator and ring assembly (17) and drive plate (20) as follows:

      (1) Place metering ring (13) on a hard flat surface. Place assembled metering package into metering ring with commutator cover (16) down, such that drive plate (20) is partially out of metering ring. A suitable wood block under metering package will hold it in this position. Refer to Figure 5-43.

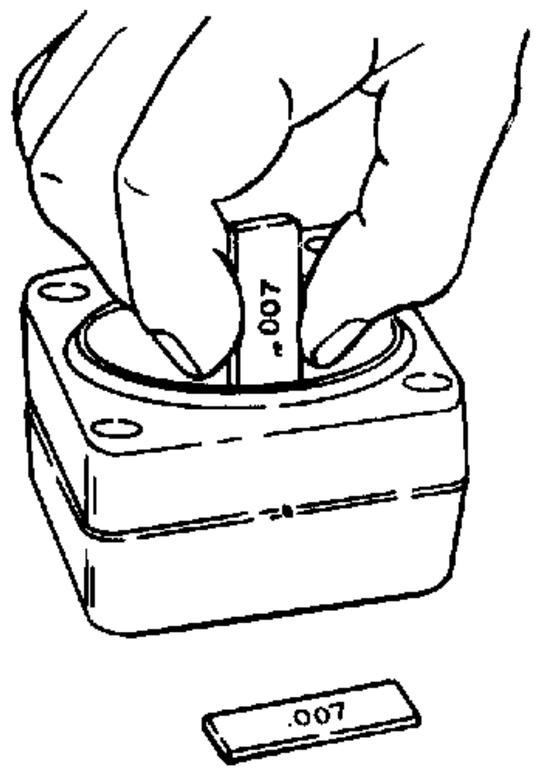


Figure 5-43. Installing Shims.

WARNING

Use care and eye protection while adding and removing shims from metering ring as the shims will be under spring tension and could fly into the air causing injury.

      (2) Place one piece of .007 inch (.18 mm) shim stock approximately .5 inch (13 mm) wide x 1.5 inches (38 mm) long between metering ring (13) and drive plate (20) in three places approximately

equal distance around outside diameter of drive plate. Place another piece of .007 inch (.18 mm) shim stock between drive plate and each of three pieces of shim stock already in place. Lift metering ring and metering package and remove wood block. Push metering package and shims into metering ring until drive plate and shims are at least flush with metering ring. Refer to Figure 5-44.

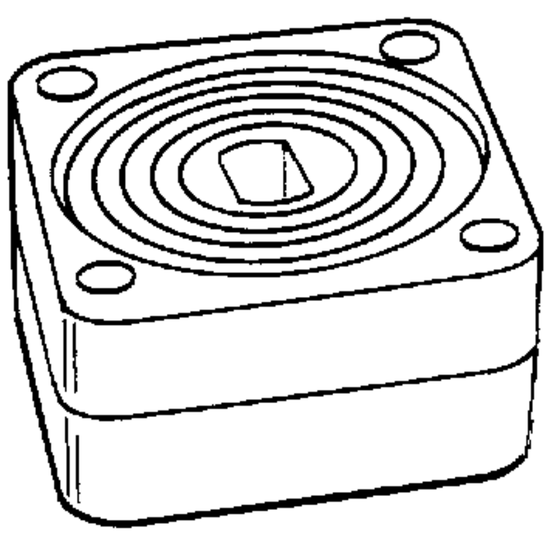


Figure 5-44. Insuring Drive Plate Flushness.

(3) Reverse metering ring (13) and metering package as a unit on flat surface. Push down on metering package until drive plate (20) is on flat surface. Be sure screws (15) are loose enough to allow commutator and drive plate to align themselves concentrically in metering ring bore. Gradually tighten eleven screws (15) following sequence shown in Figure 5-45 at least twice until a final torque of 11-13 in-lbs (1.24 to 1.47 N·m) is reached. Remove metering package and shims from metering ring. Discard shims.

CAUTION

Incorrect (reversed) assembly of drive link (12) will prohibit assembly of hex drive (9).

i. Install drive link (12) by placing large tang of link into slot in rotor assembly (19).

j. Grasp drive link (12) and rotate metering package by hand to make sure parts do not bind. Inner part of rotor should rotate freely within outer part of rotor. If they bind, disassemble metering package, correct the cause and repeat assembly and concentricity steps.

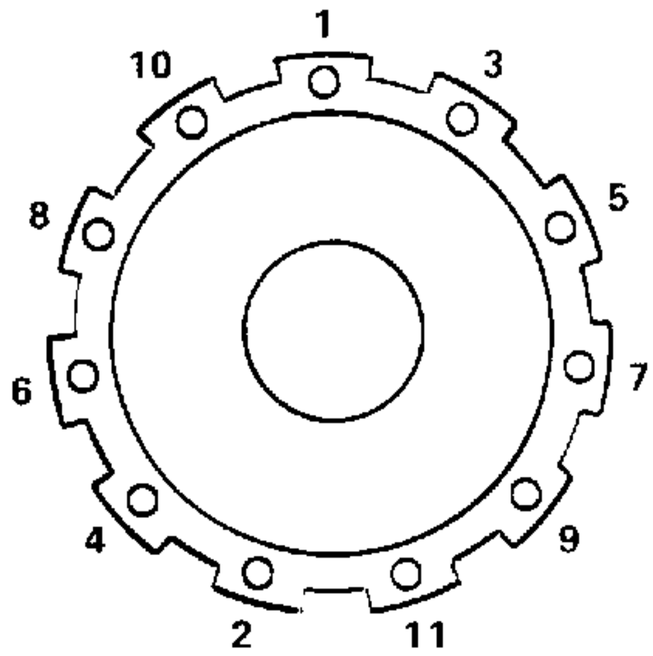


Figure 5-45. Cap Screw Tightening Sequence.

10. Grease seal ring (3) and place on metering ring (13) seal groove opposite the end with alignment pin holes.

CAUTION

Be sure seal ring (3) does not slip from metering ring (13) when metering ring is installed.

11. Install metering ring (13) with seal ring towards upper cover plate and an alignment pin hole on the metering ring in line with and on the same side as the alignment groove on the side of the upper cover plate.

12. Install spacer (24) onto upper cover plate. Lightly grease thrust bearing (25) and place it within spacer (24).

13. Install the metering package as follows:

    a. Grease drive plate (20) and place metering package, drive plate side first, into metering ring (13).

    b. Turn input shaft (29) until hole in drive plate (20) engages end of input shaft and drive plate is seated on thrust bearing.

NOTE

When properly seated, the metering package will be flush with the surface of the metering ring.

14. Grease seal (14) and install side with yellow mark into commutator cover seal groove.

15. Grease seal ring (3) and install in metering ring (13) seal ring groove.

16. Place two needle rollers (11) into metering ring (13).

17. Install isolation manifold (10) on metering ring (13) with side of manifold without recessed slots toward metering ring. Align grooves on side of manifold with grooves on side of upper cover plate (26) and alignment pin holes with the alignment pins in the metering ring.

18. Install two needle rollers (11) on isolation manifold (10).

19. Install three springs (6) into spring pockets of isolation manifold (10).

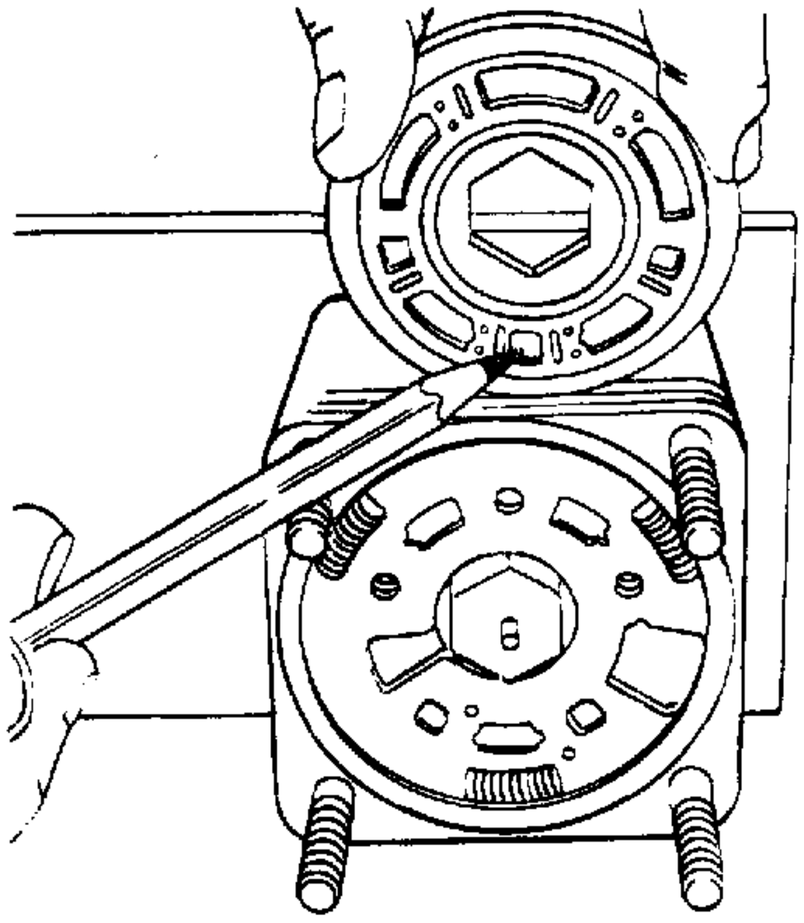


Figure 5-46. Location of Valve Plate Spring Slots.

CAUTION

Be sure seal ring (3) is properly seated following installation of valve and ring assembly (7).

20. Apply grease to seal ring (3) and place in valve and ring assembly (7), and install valve and ring assembly, seal ring side down, onto isolation manifold (10).

21. Install hex drive assembly (9), pin side up, through hole in isolation manifold (10). Slot in hex drive must be engaged with small tang of drive link (12). Turn input shaft (29) to assist engagement.

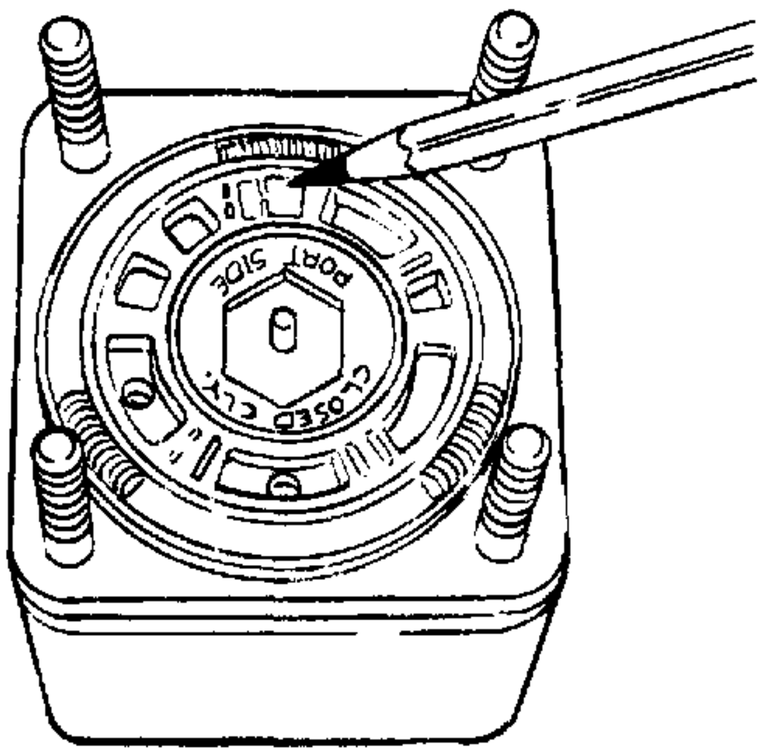


Figure 5-47. Location of Spring Slots After Assembly.

NOTE

If hex drive (9) does not readily assemble on drive link (12), see CAUTION following step 9.h.(3).

NOTE

Before installing valve plate (8), refer to Figures 5-46 and 5-47 for positioning of valve plate spring slots and its other cavities in relation to spring and spring recesses on isolation manifold (10). Be sure to use alignment grooves on side of isolation manifold for orientation.

CAUTION

Unit will not function if valve plate is not positioned on isolation manifold exactly as shown in Figure 5-47. If the valve plate spring slots, isolation manifold spring recesses and springs are not centrally aligned in this step, the springs could be damaged when port manifold is placed on the assembly.

22. Install valve plate (8) with surface reading "shaft side" down over hex drive assembly (9), aligning three spring slots centrally over three springs placed in spring recesses of isolation manifold (10). Valve plate spring slot with small cavity and words "port side" centrally below it must be placed over spring and spring recess in isolation manifold at top as shown in Figures 5-46 and 5-47.

23. Grease seal ring (3) and install in valve and ring assembly (7).

24. Place port manifold (5), port side up, on a clean surface and install three springs (6) into spring pockets.

25. Apply a few drops of oil to valve plate (8). Align grooves on side of port manifold (5) with grooves on side of isolation manifold (10). Place port manifold with springs toward valve plate (8). Be careful not to pinch a spring during installation. Two needle rollers (11) in valve plate will engage holes in port manifold. Pin on hex drive assembly (9) must engage center hole in port manifold.

26. Grease O-rings (4) and seal ring (3) and place on power cover and check valve assembly (2).

27. Align a groove on side of power cover and check valve assembly (2) with grooves on side of port manifold (5) and place into position over power cover and check valve assembly (2).

28. Install nuts (1) onto special bolts (34). Tighten each nut gradually until resistance is felt. Torque to 18-22 ft-lbs (24-30 N·m) in sequence shown in Figure 5-48.

29. Grease column dust seal (27) and install on upper cover and tube assembly (33).

5-33.7 **Installation.**

1. Position power steering box in tractor and connect hydraulic tubes to bottom of box.

2. Install screen on tractor.

3. Install steering mounting per paragraph 5-32.7 (Models 1782, 1882, 2082 and 2182) or 5-34.5 (Model 1862).

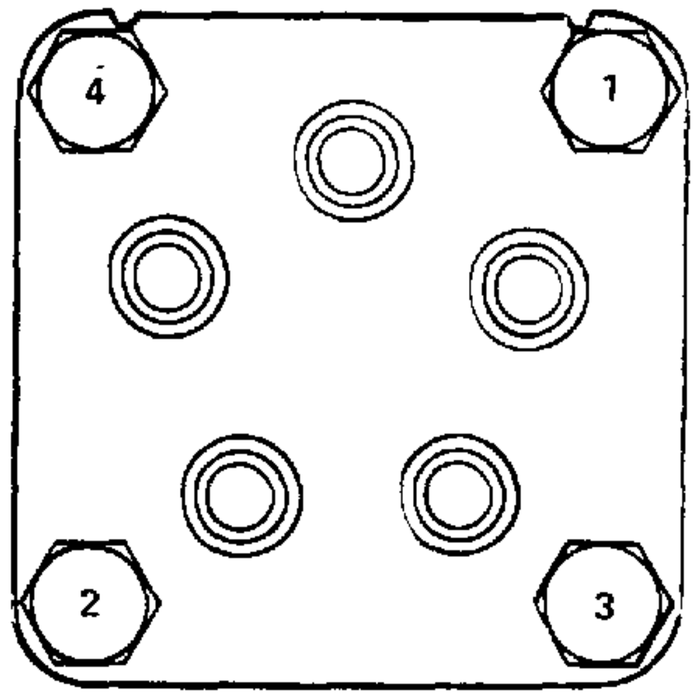


Figure 5-48. Bolt Tightening Sequence.

4. Attach input shaft of power steering box assembly to upper steering with socket head cap screw and hex patch lock nut located at bottom of CV joint.

NOTE

Steps 5 and 6 apply only to tractor Models 1862, 1882 and 2082.

5. Install battery tray assembly and intake baffles per paragraph 5-12.5 (Models 1862, 1882 and 2082).

6. Install battery per paragraph 5-8.5 (Models 1862, 1882 and 2082).

7. Install radiator (Models 1782 and 2182 only) per paragraph 5-6.3

8. Install side panels per paragraph 5-4.7 (Models 1862, 1882 and 2082) or paragraph 5-5.7 (Models 1782 and 2182 only).

9. Inspect hydraulic fluid level and refill to proper level with *Cub Cadet* Hydraulic Fluid.

5-34. **STEERING MOUNTING (Model 1862).**

5-34.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-34.2 **Removal.**

1. Remove side panels per paragraph 5-4.2.
2. Remove battery per paragraph 5-8.2.
3. Remove battery tray assembly and air baffles per paragraph 5-12.2.
4. Remove steering support plate (1, Figure 5-49) as follows:
   a. Remove hex center lock nut (2) and clamp (3).
   b. Remove hex cutting screws (4) and bell washers (5) and lift out support plate.
5. Remove power steering box mounting bracket (6) as follows:
   a. Remove bracket from frame by removing hex center lock nut (7), lock washer (8), hex cap screw (9) and flat washer (10).
   b. Remove bracket from power steering box (12) by removing hex nut (11) and bell washer (5).

5-34.3 **Inspection.** Clean all parts prior to inspection.

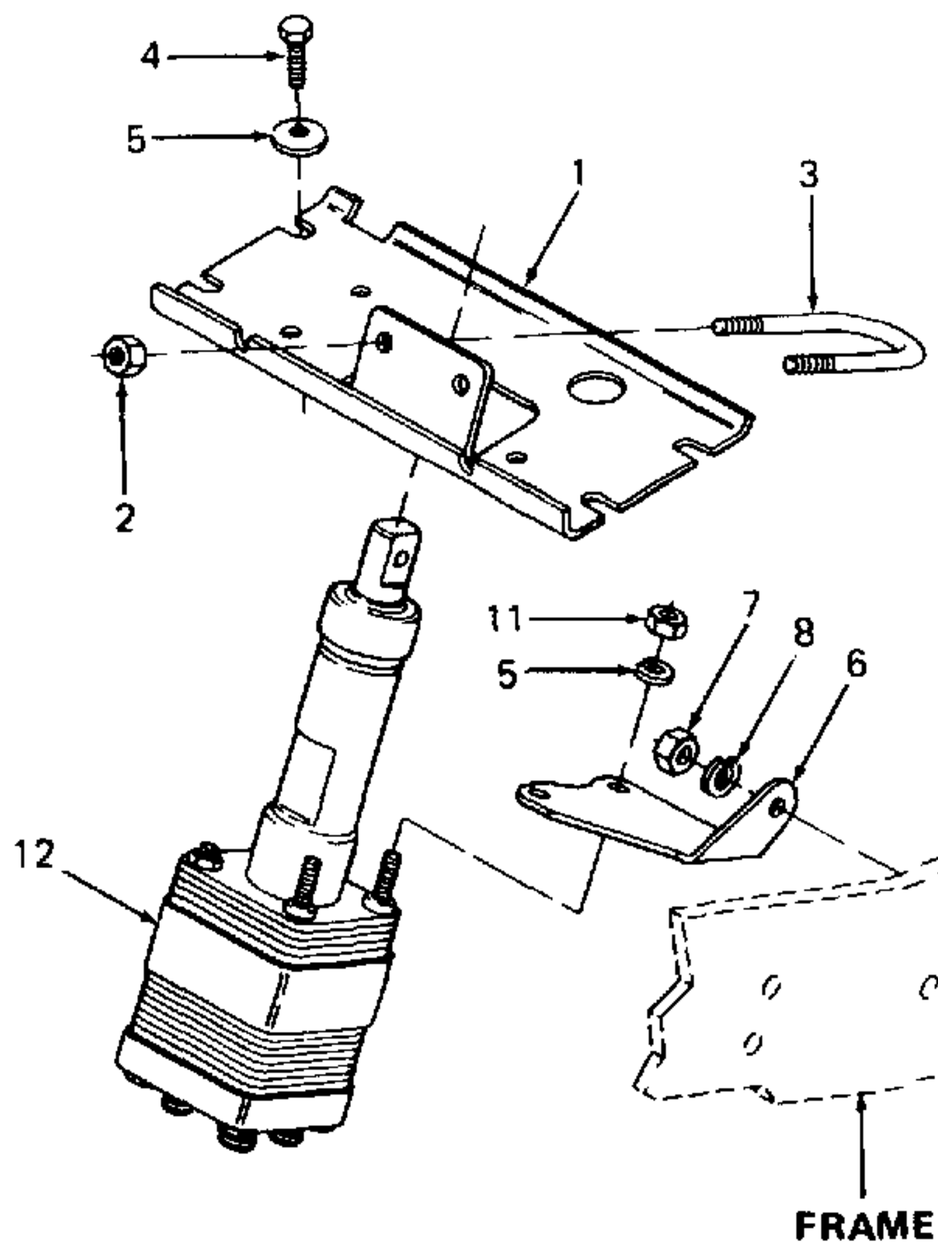
1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and internal wear.
3. Inspect surfaces for nicks or scratches.

5-34.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-34.5 **Installation.**

1. Install power steering box mounting bracket (6) as follows:
   a. Install bracket onto power steering box (12) with bell washer (5) and hex nut (11).
   b. Install bracket onto frame with flat washer (10), hex cap screw (9), lock washer (8) and hex center lock nut (7).
2. Install steering support plate (1) as follows:
   a. Position plate, and secure with bell washers (5) and hex cutting screws (4).
   b. Install clamp (3) and hex center lock nuts (2).



1. **Steering Support Plate**
2. **Hex Center Lock Nut**
3. **Clamp**
4. **Hex Cutting Screw**
5. **Bell Washer**
6. **Power Steering Box Mounting Bracket**
7. **Hex Center Lock Nut**
8. **Lock Washer**
9. **Hex Cap Screw**
10. **Flat Washer**
11. **Hex Nut**
12. **Power Steering Box (For components parts see paragraph 5-33)**

Figure 5-49. Steering Mounting (Model 1862).

3. Install air baffles and battery tray assembly per paragraph 5-12.5.
4. Install battery per paragraph 5-8.5.
5. Install side panels per paragraph 5-4.7.

5-35. POWER STEERING HYDRAULICS (Models 1782, 1862, 1882, 2082 and 2182).

5-35.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-35.2 **Removal.**

1. Remove side panels per paragraph 5-4.2 (Model 1862, 1882 and 2082) or 5-5.2 (Models 1782 and 2182).
2. Remove radiator (Models 1782 and 2182 only) per paragraph 5-6.2
3. Remove battery (Models 1862, 1882 and 2082 only) per paragraph 5-8.2

CAUTION

Small amounts of dirt can damage the hydraulic system. Clean the hydraulic valve and fittings before removal.

NOTE

Position a container to catch dripping hydraulic fluid during removal of hydraulic tubes.

4. Remove hydraulic tubes, after first tagging, as follows:
   a. Remove power steering upper return tube assembly (2, Figure 5-50) as follows:
      (1) Remove tube (2) and O-ring (3) from lift valve (1) by removing socket head cap screws (4), lock washer (5) and single clamp (6). Discard O-ring (3).
      (2) Remove tube (2) from T-fitting (7) by loosening nut.
   b. Remove power steering auxiliary tube assembly (8) as follows:
      (1) Remove tube (8) and O-ring (3) from lift valve (1) by removing socket head cap screw (4), lock washer (5) and single clamp (6). Discard O-ring (3).
      (2) Remove tube (8) from power steering box (14) by loosening nut.
   c. Remove power steering return tube assembly (9) by loosening tube nuts at T-fitting (7) and power steering box (14).
   d. Remove power steering inlet tube assembly (10) by loosening tube nuts at power steering box (14) and at rear end of tube from 37 degree tube connector (11) and O-ring (12). Discard O-ring (12).
   e. Remove power steering lower return tube assembly (13) by unloosening nut on rear end of tube from 37 degree tube connector (11) and O-ring (12). Discard O-ring (12).

5-35.3 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and internal wear.
3. Inspect hydraulic tubes for crimps or cuts. Replace damaged tubes.

5-35.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

CAUTION

Use care to avoid dirt or debris from contaminating hydraulic components which have been cleaned, inspected and repaired.

5-35.5 **Installation.**

CAUTION

Small amounts of dirt or debris can damage the hydraulic system. Use care to avoid entry of contaminants into the hydraulic system during installation.

1. Install hydraulic tubes as follows:
   a. Install power steering lower return tube assembly (13) onto hydrostatic transmission after installing O-ring (12) and 37 degree tube connector (11) on transmission.

b. Install power steering inlet tube assembly (10) as follows:

(1) Secure tube (10) to hydrostatic transmission with nut at rear end of tube after installing O-ring (12) and 37 degree tube connector (11) on transmission.

(2) Secure tube (10) to power steering box (14) by tightening nut on front end of tube. Refer to Figure 5-50 for proper placement of tube.

c. Install power steering return tube assembly (9) as follows:

(1) Secure tube (9) to T-fitting (7) by tightening tube nut at rear end of tube.

(2) Secure tube (9) to power steering box (14) by tightening nut at front end of tube. Refer to Figure 5-50 for proper placement of tube.

1. Lift Valve
2. Power Steering Upper Return Tube Assembly
3. O-Ring
4. Socket Head Cap Screw
5. Lock Washer
6. Single Clamp
7. T-Fitting
8. Power Steering Auxiliary Tube Assembly
9. Power Steering Return Tube Assembly
10. Power Steering Inlet Tube Assembly
11. Tube Connector
12. O-Ring
13. Power Steering Lower Return Tube Assembly
14. Power Steering Box (For component parts see paragraph 5-33)

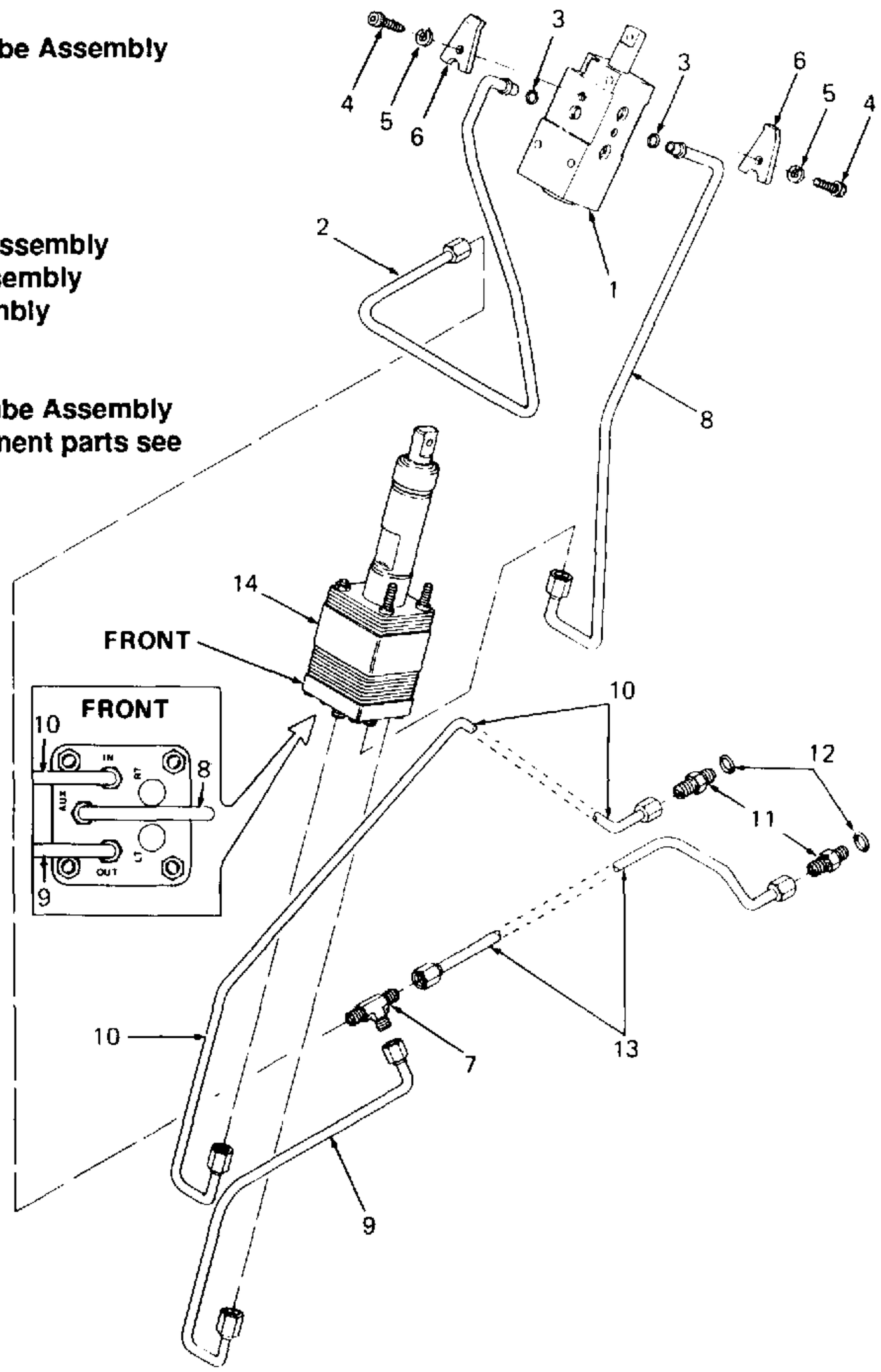


Figure 5-50. Power Steering Hydraulics (Models 1782, 1862, 1882, 2082 and 2182).

d. Install power steering auxiliary tube assembly (8) as follows:

(1) Secure tube (8) onto power steering box by tightening nut on end of tube. Refer to Figure 5-50 for proper placement of tube.

(2) Secure tube (8) and O-ring (3) onto lift valve (1) and secure with single clamp (6), lock washer (5) and socket head cap screw (4).

e. Install power steering return tube assembly (2) as follows:

(1) Secure tube (2) onto T-fitting (7) by tightening nut at rear end of tube.

(2) Secure tube (2) and O-ring (3) onto lift valve (1) and secure with single clamp (6), lock washer (5) and socket head cap screw (4).

2. Install battery (Models 1862, 1882 and 2082) per paragraph 5-8.5.

3. Install radiator (Models 1782 and 2182 only) per paragraph 5-6.3.

4. Install side panels per paragraph 5-4.7 (Models 1862, 1882 and 2082) or 5-5.7 (Models 1782 and 2182).

5. Inspect hydraulic fluid level and refill to proper level with *Cub Cadet* Hydraulic Fluid.

5-36. HYDRAULIC LIFT CONTROLS (Model 1541).

5-36.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-36.2 **Removal.**

1. Remove side panels per paragraph 5-4.2.
2. Remove battery per paragraph 5-8.2

CAUTION

Small amounts of dirt can damage the hydraulic system. Clean the hydraulic valve and fittings before removal.

NOTE

Position a container to catch dripping hydraulic fluid during removal of valve and fittings.

3. Remove hydraulic tubes and hoses, after first tagging, as follows:

a. Remove return tube assembly (2, Figure 5-51) as follows:

(1) Remove tube (2) and O-ring (3) from lift valve (1) by removing socket head cap screw (4), lock washer (5) and single clamp (6). Discard O-ring (3).

(2) Remove tube (2) from hydrostatic transmission by loosening nut. Remove 37 degree tube connector (7) and O-ring (8). Discard O-ring (8).

b. Remove pressure tube assembly (9) as follows:

(1) Remove tube (9) and O-ring (3) from lift valve (1) by removing socket head cap screws (4), lock washer (5) and single clamp (6). Discard O-ring (3).

(2) Remove tube (9) from hydrostatic transmission by loosening nut. Remove 37 degree tube connector (7) and O-ring (8). Discard O-ring (8).

c. Remove extending cylinder hose (10) and contracting cylinder hose (11) as follows:

(1) Remove cylinder hoses (10 and 11) and O-rings (3) from lift valve (1) by removing socket head cap screw (4), lock washer (5) and double clamp (12). Discard O-rings (3).

(2) Remove extending cylinder hose (10) from hydraulic cylinder (25) by loosening nut. Remove 45 degree elbow (13) and O-ring (14). Discard O-ring (14).

(3) Remove contracting cylinder hose (11) from hydraulic cylinder (25) by loosening nut. Remove 90 degree elbow (15) and O-ring (14). Discard O-ring (14).

4. Remove hex nut (16), lock washer (5) and hex cap screw (17).

5. Remove valve mounting brackets (18) by removing hex nut (16), lock washer (5), hex cap screw (19) and bell washer (20).

6. Remove hydraulic cylinder (25) per paragraph 5-39.2.

5-36.3 **Disassembly.**

1. Disassemble valve handle (21) by removing hex center lock nut (22), hex cap screw (23) and chain link (24).

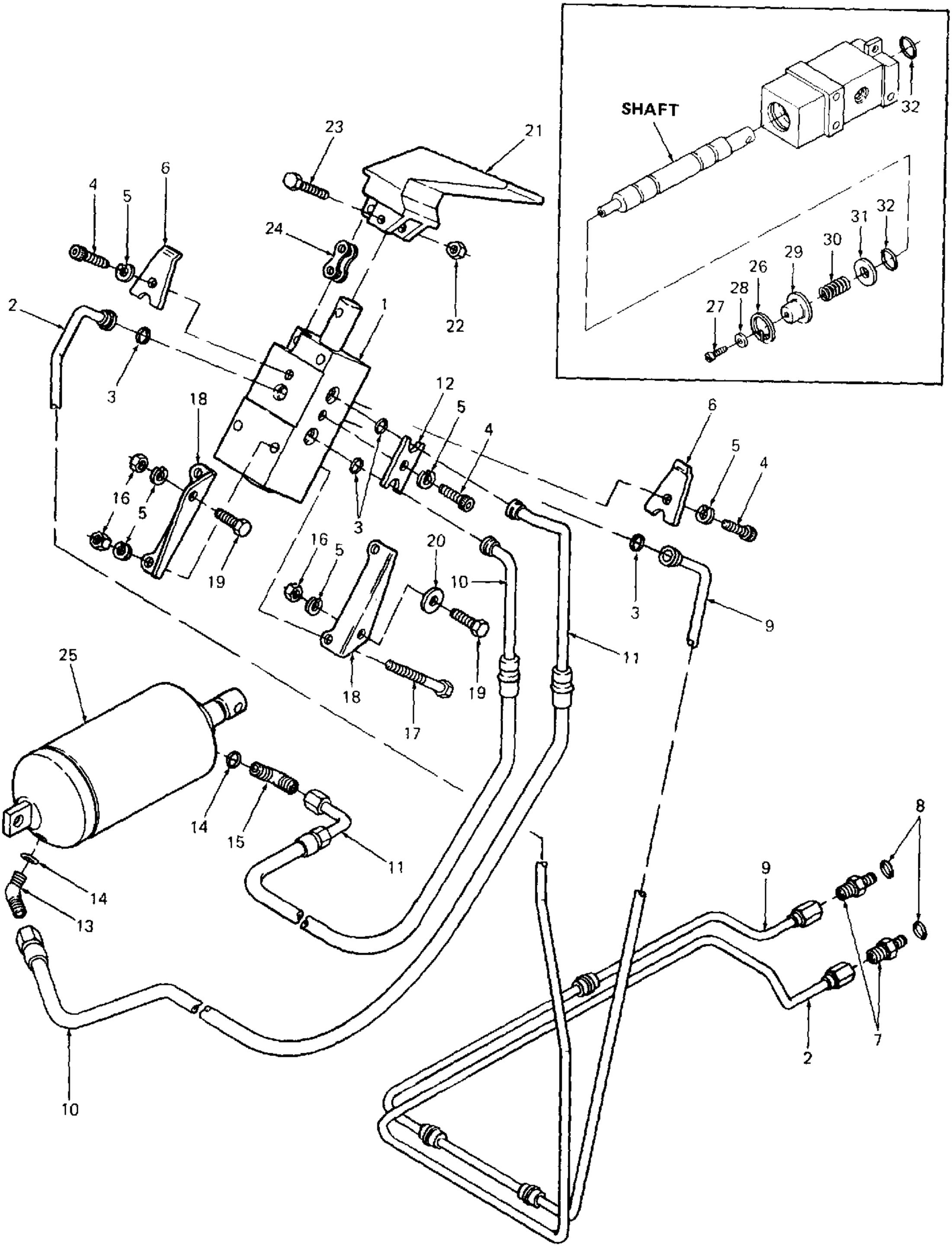


Figure 5-51. Hydraulic Lift Controls (Model 1541).

Legend for Figure 5-51

1. Lift Valve
2. Return Tube Assembly
3. O-Ring
4. Socket Head Cap Screw
5. Lock Washer
6. Single Clamp
7. 37 Degree Tube Connector
8. O-Ring
9. Pressure Tube Assembly
10. Extending Cylinder Hose
11. Contracting Cylinder Hose
12. Double Clamp
13. 45 Degree Elbow
14. O-Ring
15. 90 Degree Elbow
16. Hex Nut
17. Hex Cap Screw
18. Valve Mounting Bracket
19. Hex Cap Screw
20. Bell Washer
21. Valve Handle
22. Hex Center Lock Nut
23. Hex Cap Screw
24. Chain Link
25. Hydraulic Cylinder (For component parts see Figure 5-39)
26. Snap Ring
27. Truss Machine Screw
28. Flat Washer
29. Centering Cup
30. Compression Spring
31. Flat Washer
32. O-Ring

2. Disassemble lift valve (1) as follows:
   a. Remove and discard snap ring (26), truss machine screw (27) and flat washer (28).
   b. Remove and discard centering cup (29), compression spring (30) and flat washer (31) from valve shaft.
   c. Remove valve shaft from valve body. Remove and discard O-rings (32) from shaft.
3. Disassemble hydraulic cylinder (25) per paragraph 5-39.3.

5-36.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect hydraulic tubes and hoses for crimps or cuts. Replace damaged tubes or hoses.
4. Inspect lift valve as follows:

CAUTION

DO NOT use a rag to clean the interior of the valve body. Lint from the rag can contaminate and damage the hydraulic system.

   a. Inspect interior of valve for pieces of O-ring. Use compressed air to clean valve body.
   b. Inspect valve shaft for nicks or scratches.
5. Inspect hydraulic cylinder (25) per paragraph 5-39.4.

5-36.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair hydraulic cylinder (25) per paragraph 5-39.5.

CAUTION

Use care to avoid dirt or debris from contaminating hydraulic components which have been cleaned, inspected and repaired.

5-36.6 **Reassembly.**

CAUTION

Internal port of valve body can damage O-rings (32) if valve is assembled incorrectly.

1. Reassemble lift valve as follows:

CAUTION

Use only new parts from valve rebuild kit, Part No. 717-3308, when reassembling the hydraulic lift valve.

a. Coat inside of valve body with hydraulic oil.

b. Place one O-ring (32) over round end of valve shaft and into O-ring groove. Place valve shaft, flat end first, halfway into valve body. Refer to Figure 5-52.

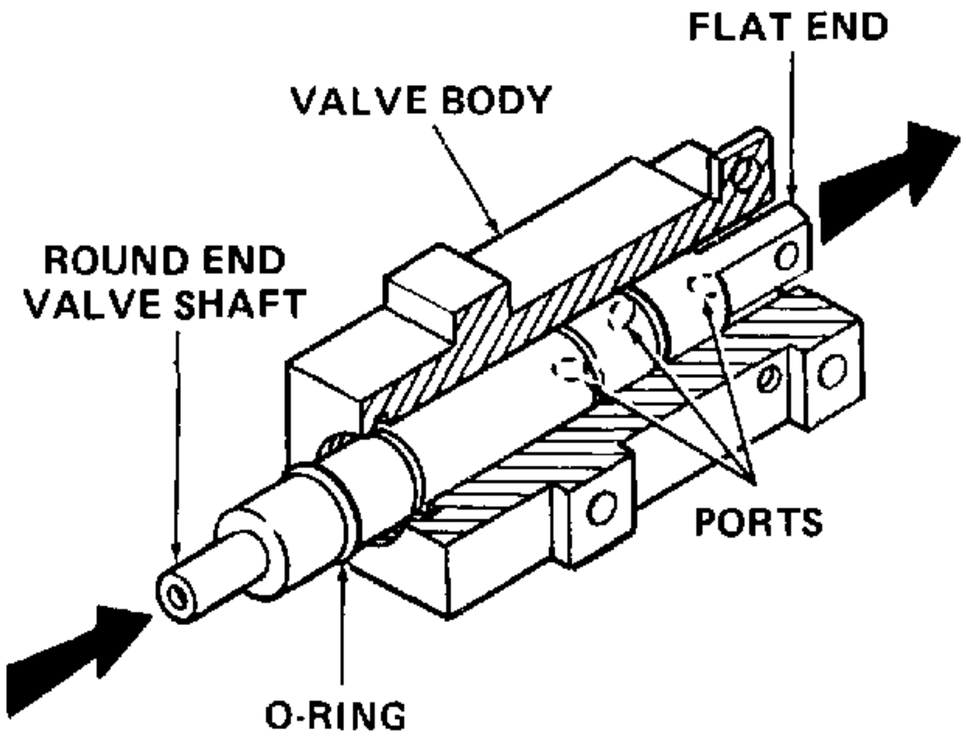


Figure 5-52. Installing Valve Shaft Into Valve Body.

CAUTION

Do not push valve shaft too far into valve body. If O-ring is visible through ports, O-ring has been damaged and must be replaced.

c. Push valve shaft through valve body until O-ring groove on flat side of shaft is just outside of valve body. Refer to Figure 5-53.

d. Place O-ring (32, Figure 5-51) on O-ring groove on flat end of shaft. Refer to Figure 5-54.

e. Push valve shaft back into valve body until round section near flat end of shaft is just inside valve body. Refer to Figure 5-55.

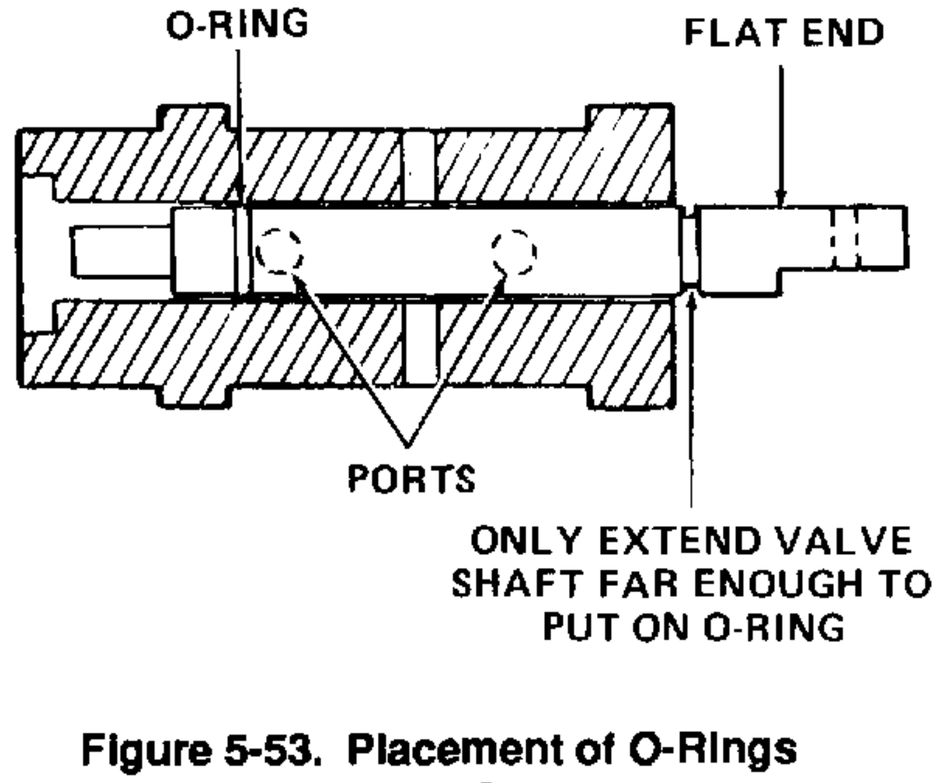


Figure 5-53. Placement of O-Rings on Valve Shaft.

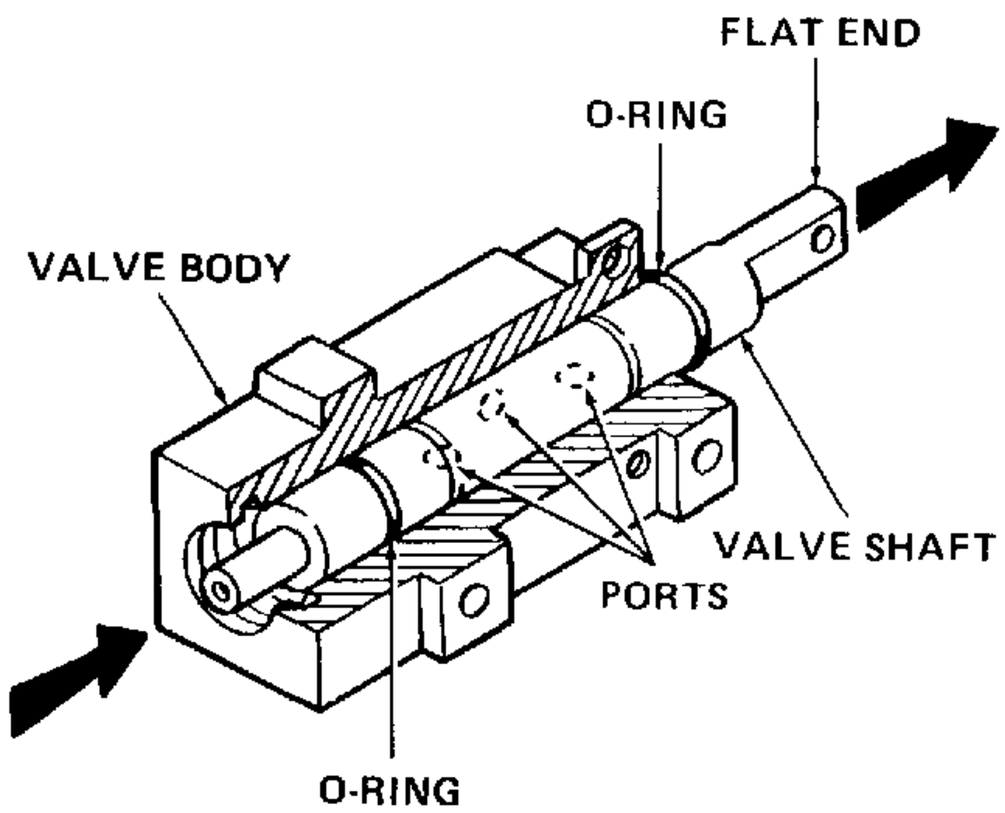


Figure 5-54. O-Rings Correctly Installed on Valve Shaft.

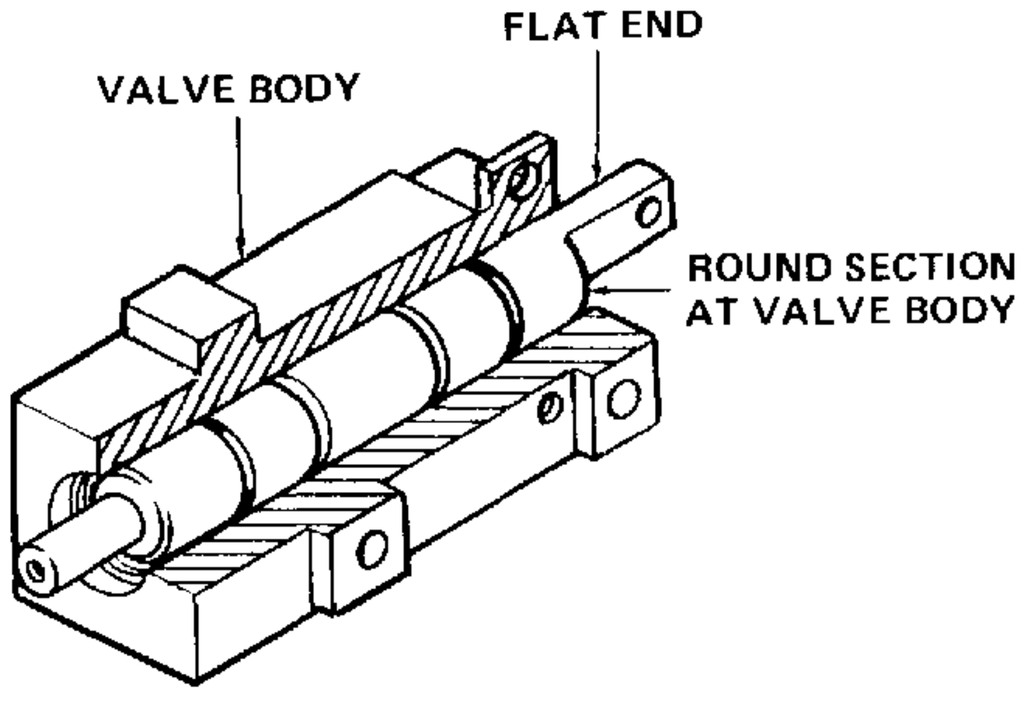


Figure 5-55. Valve Shaft Correctly Positioned In Valve Body.

f. Place flat washer (31, Figure 5-51), compression spring (30) and centering cup (29) on shaft.

NOTE

Apply Lock-Tite to truss machine screw (27) before installing on valve shaft.

g. Install flat washer (28) and truss machine screw (27), and place snap ring (26) into groove.

NOTE

Small O-rings in valve rebuild kit should be used on hydraulic tubes (2 and 9) and hydraulic hoses (10 and 11).

2. Assemble valve handle (21) by installing chain link (24), hex cap screw (23) and hex center lock nut (22).
3. Assemble hydraulic cylinder (25) per paragraph 5-39.6.

5-36.7 **Installation.**

CAUTION

Small amounts of dirt or debris can damage the hydraulic system. Use care to avoid entry of contaminants into the hydraulic system during installation.

1. Install hydraulic cylinder per paragraph 5-39.7.
2. Install valve mounting brackets (18) with bell washer (20), hex cap screws (19), lock washers (5) and hex nuts (16).
3. Position valve and secure to valve mounting brackets (18) with hex cap screws (17), lock washers (5) and hex nuts (16).
4. Install hydraulic tubes and hoses as follows:
   a. Install contracting cylinder hose (11) and extending cylinder hose (10) as follows:
      (1) Install contracting cylinder hose (11) onto hydraulic cylinder (25) with nut after first installing 90 degree elbow (15) and O-ring (14) onto hydraulic cylinder.
      (2) Install extending cylinder hose (10) onto hydraulic cylinder (25) with nut after first installing 45 degree elbow (13) and O-ring (14) onto hydraulic cylinder.
      (3) Install cylinder hoses (11 and 10) and O-rings (3) onto lift valve (1) and secure with double clamp (12), lock washer (5) and socket head cap screw (4).
   b. Install pressure tube (9) as follows:
      (1) Install tube (9) onto hydrostatic transmission after installing O-ring (8) and 37 degree tube connector (7) on transmission.
      (2) Install tube (9) and O-ring (3) onto lift valve (1) and secure with single clamp (6), lock washer (5) and socket head cap screw (4).
   c. Install return tube (2) as follows:
      (1) Install tube (2) onto hydrostatic transmission after installing O-ring (8) and 37 degree tube connector (7) on transmission.
      (2) Install tube (2) and O-ring (3) onto lift valve (1) and secure with single clamp (6), lock washer (5) and socket head cap screw (4).
5. Install battery per paragraph 5-8.5.
6. Install side panels per paragraph 5-4.7.
7. Refill hydraulic oil reservoir to proper level with new *Cub Cadet* hydraulic oil.

5-36A. HYDRAULIC LIFT CONTROLS (Model 1541 [Tractor Serial Number 816,509 and above]).

5-36A.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-36A.2 **Removal.**

1. Remove side panels per paragraph 5-4.2.
2. Remove battery per paragraph 5-8.2

CAUTION

Small amounts of dirt can damage the hydraulic system. Clean the hydraulic valve and fittings before removal.

NOTE

Position a container to catch dripping hydraulic fluid during removal of valve and fittings.

3. Remove hydraulic tubes and hoses, after first tagging, as follows:

   a. Remove return tube assembly (2, Figure 5-51A) as follows:

      (1) Remove tube (2) and O-ring (3) from lift valve (1) by removing socket head cap screw (4), lock washer (5) and single clamp (6). Discard O-ring (3).

      (2) Remove tube (2) from relief valve (34) by removing socket head cap screw (4), lock washer (5), valve side clamp (33) and O-rings (3). Discard O-rings.

   b. Remove pressure tube assembly (9) as follows:

      (1) Remove tube (9) and O-ring (3) from lift valve (1) by removing socket head cap screws (4), lock washer (5) and single clamp (6). Discard O-ring (3).

      (2) Remove tube (9) from relief valve (34) by removing socket head cap screw (4), lock washer (5), valve side clamp (33) and O-rings (3).

   c. Remove extending cylinder hose (10) and contracting cylinder hose (11) as follows:

      (1) Remove cylinder hoses (10 and 11) and O-rings (3) from lift valve (1) by removing socket head cap screw (4), lock washer (5) and double clamp (12). Discard O-rings (3).

      (2) Remove extending cylinder hose (10) from hydraulic cylinder (25) by loosening nut. Remove 45 degree elbow (13) and O-ring (14). Discard O-ring.

      (3) Remove contracting cylinder hose (11) from hydraulic cylinder (25) by loosening nut. Remove 90 degree elbow (15) and O-ring (14). Discard O-ring.

   d. Remove relief valve (34) and adapter tube assembly (8) as follows:

      (1) Remove socket head cap screw (4), lock washer (5), valve side clamp (33) and O-rings (3) that connect adapter tube assembly (8) to relief valve (34).

      (2) Remove 90 degree elbow tube (7) connecting adapter tube assembly (8) to hydrostatic transmission.

4. Remove hex nut (16), lock washer (5) and hex cap screw (19).

5. Remove valve mounting brackets (18) by removing hex nut (16), lock washer (5), hex cap screw (19) and bell washer (20).

6. Remove hydraulic cylinder (25) per paragraph 5-39.2.

5-36A.3 **Disassembly.**

1. Disassemble valve handle (21) by removing hex center lock nut (22), hex cap screw (23) and chain link (24).

2. Disassemble lift valve (1) as follows:

   a. Remove and discard snap ring (26), truss machine screw (27) and flat washer (28).

   b. Remove and discard centering cup (29), compression spring (30) and flat washer (31) from valve shaft.

   c. Remove valve shaft from valve body. Remove and discard O-rings (32) from shaft.

3. Disassemble hydraulic cylinder (25) per paragraph 5-39.3.

5-36A.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.

2. Inspect parts for cracks, scoring, distortion, corrosion and wear.

3. Inspect hydraulic tubes and hoses for crimps or cuts. Replace damaged tubes or hoses.

4. Inspect lift valve as follows:

CAUTION

DO NOT use a rag to clean the interior of the valve body. Lint from the rag can contaminate and damage the hydraulic system.

   a. Inspect interior of valve for pieces of O-ring. Use compressed air to clean valve body.

   b. Inspect valve shaft for nicks or scratches.

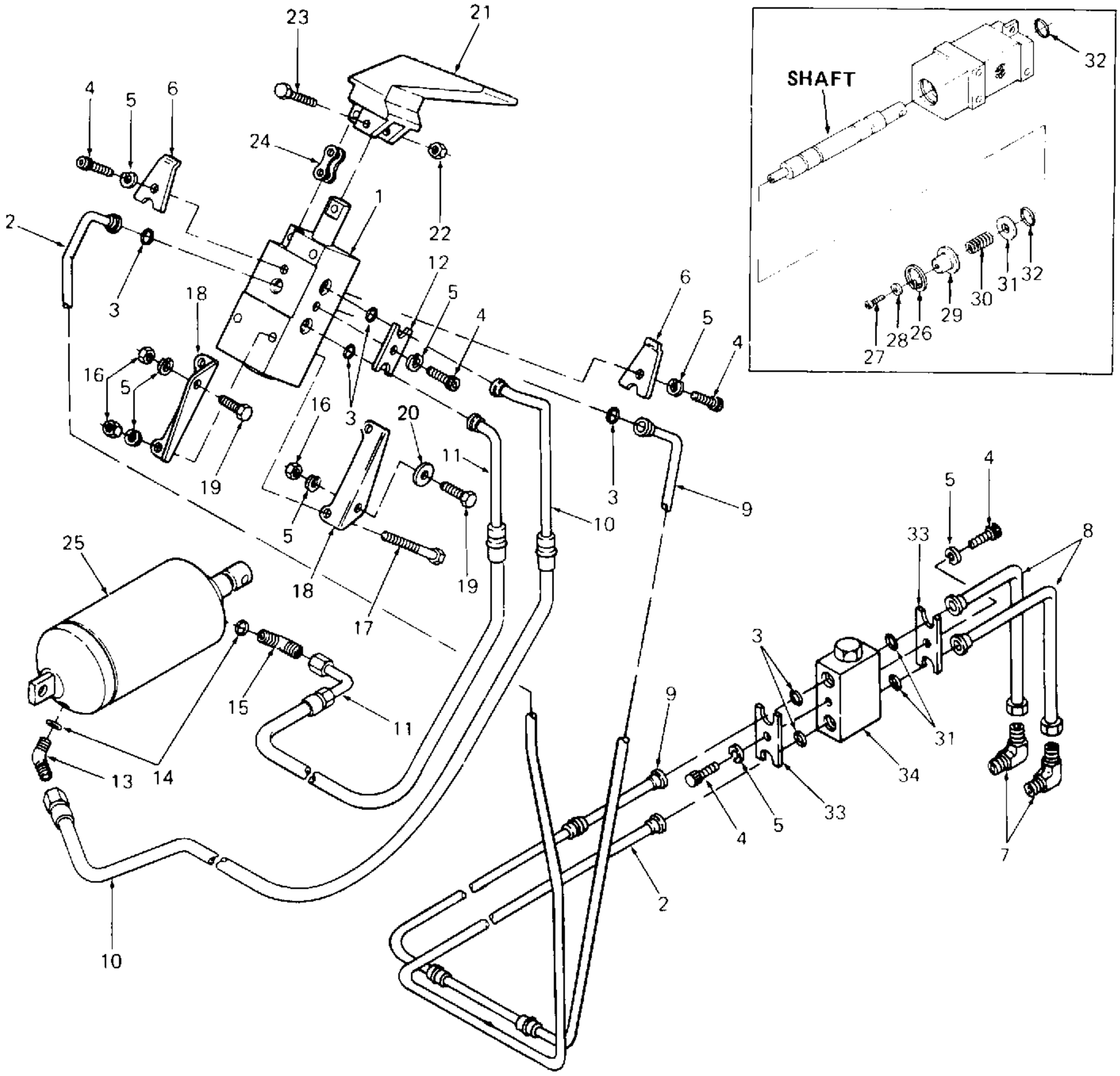
5. Inspect hydraulic cylinder (25) per paragraph 5-39.4.

5-36A.5 **Repair.**

1. Deburr and dress damaged threads.

2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

3. Repair hydraulic cylinder (25) per paragraph 5-39.5.



1. Lift Valve
2. Return Tube Assembly
3. O-Ring
4. Socket Head Cap Screw
5. Lock Washer
6. Single Clamp
7. 90 Degree Elbow Tube
8. Adapter Tube Assembly
9. Pressure Tube Assembly
10. Extending Cylinder Hose
11. Contracting Cylinder Hose
12. Double Clamp
13. 45 Degree Elbow
14. O-Ring
15. 90 Degree Elbow
16. Hex Nut
17. Hex Cap Screw
18. Valve Mounting Bracket
19. Hex Cap Screw
20. Bell Washer
21. Valve Handle
22. Hex Center Lock Nut
23. Hex Cap Screw
24. Chain Link
25. Hydraulic Cylinder (For component parts see Figure 5-39)
26. Snap Ring
27. Truss Machine Screw
28. Flat Washer
29. Centering Cup
30. Compression Spring
31. Flat Washer
32. O-Ring
33. Valve Side Clamp
34. Relief Valve

Figure 5-51A. Hydraulic Lift Controls (Model 1541).

CAUTION

Use care to avoid dirt or debris from contaminating hydraulic components which have been cleaned, inspected and repaired.

5-36A.6 **Reassembly.**

CAUTION

Internal port of valve body can damage O-rings (32) if valve is assembled incorrectly.

1. Reassemble lift valve as follows:

CAUTION

Use only new parts from valve rebuild kit, Part No. 717-3308, when reassembling the hydraulic lift valve.

a. Coat inside of valve body with hydraulic oil.

b. Place one O-ring (32) over round end of valve shaft and into O-ring groove. Place valve shaft, flat end first, halfway into valve body. Refer to Figure 5-52A.

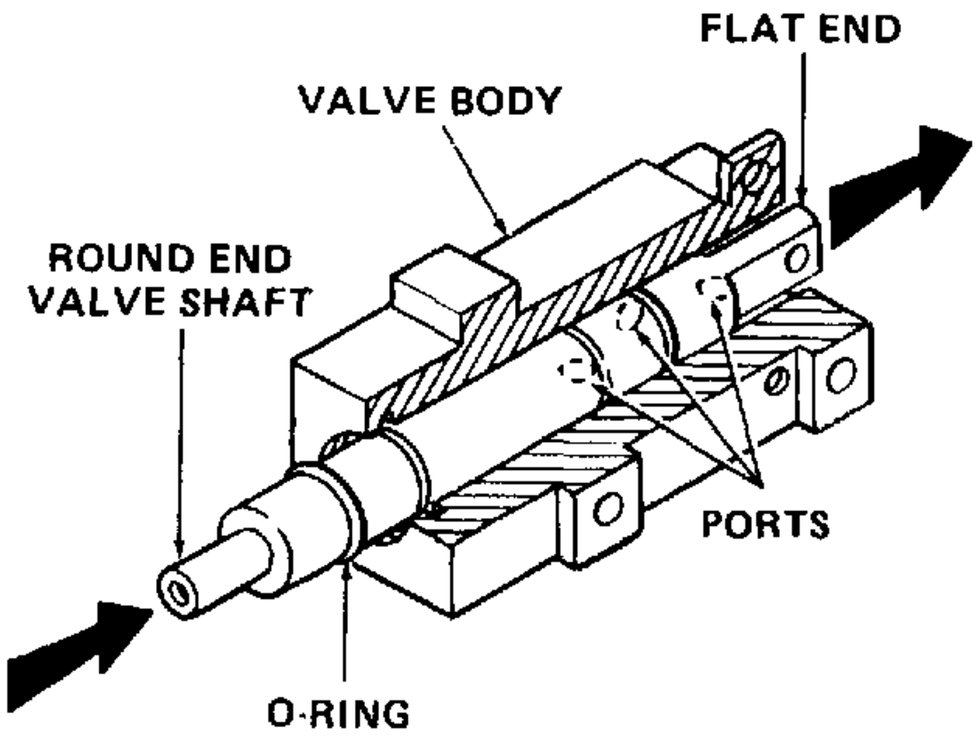


Figure 5-52A. Installing Valve Shaft Into Valve Body.

CAUTION

Do not push valve shaft too far into valve body. If O-ring is visible through ports, O-ring has been damaged and must be replaced.

c. Push valve shaft through valve body until O-ring groove on flat side of shaft is just outside of valve body. Refer to Figure 5-53A.

d. Place O-ring (32, Figure 5-51A) on O-ring groove on flat end of shaft. Refer to Figure 5-54A.

e. Push valve shaft back into valve body until round section near flat end of shaft is just inside valve body. Refer to Figure 5-55A.

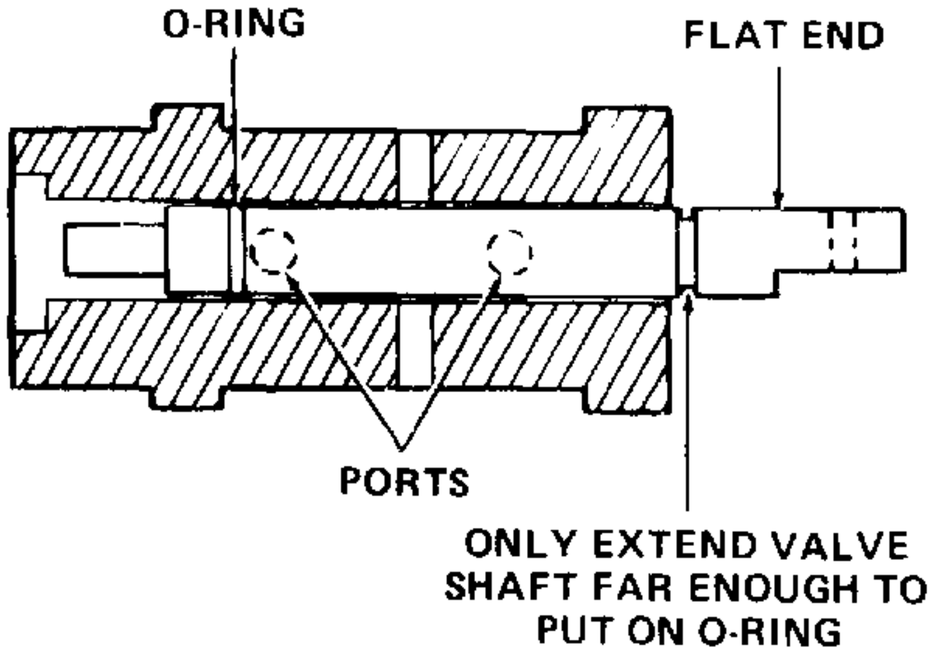


Figure 5-53A. Placement of O-Rings on Valve Shaft.

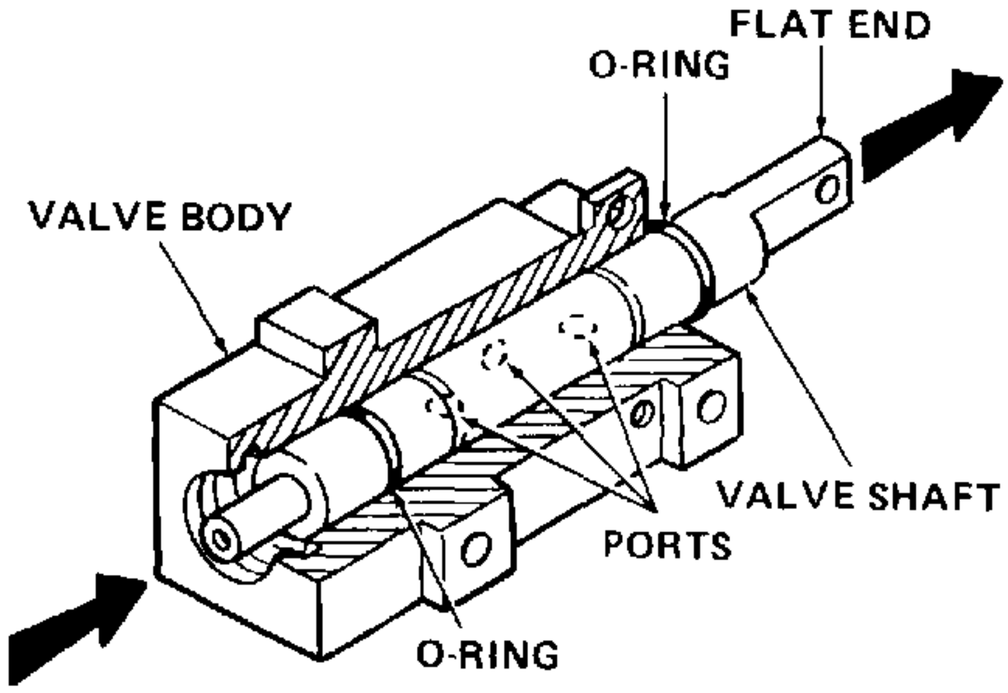


Figure 5-54A. O-Rings Correctly Installed on Valve Shaft.

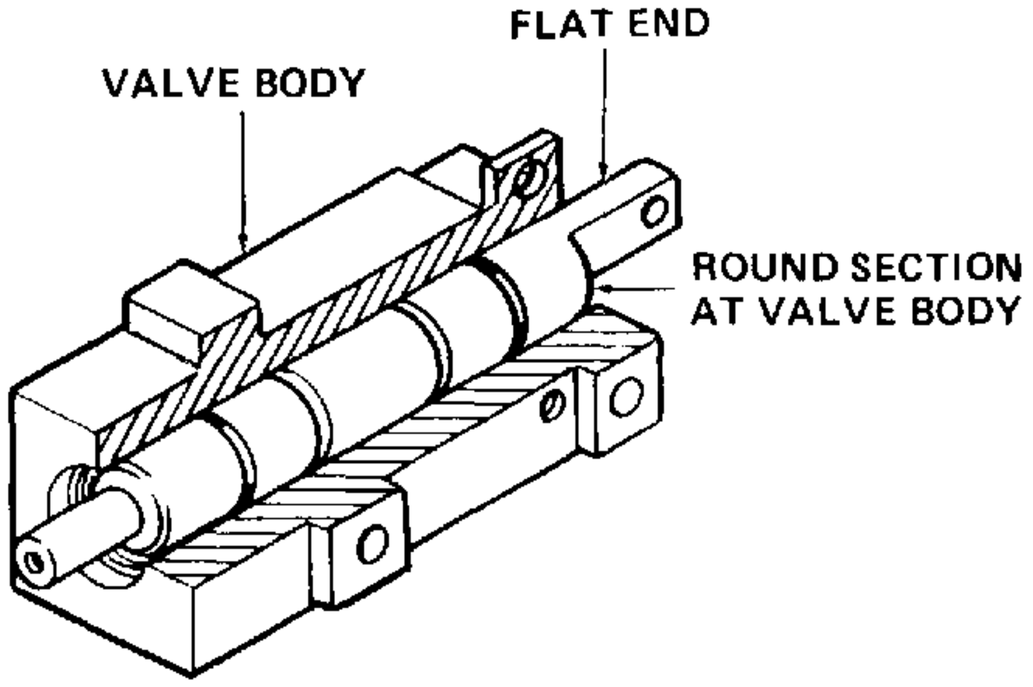


Figure 5-55A. Valve Shaft Correctly Positioned In Valve Body.

f. Place flat washer (31, Figure 5-51A), compression spring (30) and centering cup (29) on shaft.

NOTE

Apply Lock-Tite to truss machine screw (27) before installing on valve shaft.

g. Install flat washer (28) and truss machine screw (27), and place snap ring (26) into groove.

NOTE

Small O-rings in valve rebuild kit should be used on hydraulic tubes (2 and 9) and hydraulic hoses (10 and 11).

2. Assemble valve handle (21) by installing chain link (24), hex cap screw (23) and hex center lock nut (22).
3. Assemble hydraulic cylinder (25) per paragraph 5-39.6.

5-36A.7 **Installation.**

CAUTION

Small amounts of dirt or debris can damage the hydraulic system. Use care to avoid entry of contaminants into the hydraulic system during installation.

1. Install hydraulic cylinder per paragraph 5-39.7.
2. Install valve mounting brackets (18) with bell washer (20), hex cap screws (19), lock washers (5) and hex nuts (16).
3. Position valve and secure to valve mounting brackets (18) with hex cap screws (17), lock washers (5) and hex nuts (16).
4. Install hydraulic tubes and hoses as follows:
   a. Install contracting cylinder hose (11) and extending cylinder hose (10) as follows:
      (1) Install contracting cylinder hose (11) onto hydraulic cylinder (25) with nut after first installing 90 degree elbow (15) and O-ring (14) onto hydraulic cylinder.
      (2) Install extending cylinder hose (10) onto hydraulic cylinder (25) with nut after first installing 45 degree elbow (13) and O-ring (14) onto hydraulic cylinder.
      (3) Install cylinder hoses (11 and 10) and O-rings (3) onto lift valve (1) and secure with double clamp (12), lock washer (5) and socket head cap screw (4).
   b. Install pressure tube (9) as follows:
      (1) Install tube (9) onto relief valve (34) after installing O-rings (3), valve side clamp (33), lock washer (5) and socket head screw (4).
      (2) Install tube (9) and O-ring (3) onto lift valve (1) and secure with single clamp (6), lock washer (5) and socket head cap screw (4).
   c. Install return tube (2) as follows:
      (1) Install tube (2) onto hydrostatic transmission after installing O-rings (3), valve side clamp (33), lock washer (5) and socket head screw (4).
      (2) Install tube (2) and O-ring (3) onto lift valve (1) and secure with single clamp (6), lock washer (5) and socket head cap screw (4).
   d. Install relief valve (34) and adapter tube assembly (8) as follows:
      (1) Install O-rings (3), valve side clamp (33), lock washer (5) and socket cap screw (4) attaching adapter tube assembly (8) to relief valve (34).
      (2) Install 90 degree elbow tubes (7) connecting adapter tube assembly (8) to hydrostatic transmission.
5. Install battery per paragraph 5-8.5.
6. Install side panels per paragraph 5-4.7.
7. Refill hydraulic oil reservoir to proper level with new *Cub Cadet* hydraulic oil.

5-37. HYDRAULIC LIFT CONTROLS (Models 1782, 1862, 1882, 2082 and 2182).

5-37.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-37.2 **Removal.**

1. Remove side panels per paragraph 5-4.2 (Models 1862, 1882 and 2082) or 5-5.2 (Models 1782 and 2182).
2. Remove radiator (Models 1782 and 2182 only) per paragraph 5-6.2.
3. Remove battery (Models 1862, 1882 and 2082 only) per paragraph 5-8.2

CAUTION

Small amounts of dirt can damage the hydraulic system. Clean the hydraulic valve and fittings before removal.

NOTE

Position a container to catch dripping hydraulic fluid during removal.

4. Remove power steering tubes from hydraulic valve. Refer to paragraph 5-35.2.

5. Remove extending cylinder hose (2, Figure 5-56) and contracting cylinder hose (3) as follows:

   a. Remove cylinder hoses (2 and 3) and O-rings (4) from lift valve (1) by removing socket head cap screw (5), lock washer (6) and double clamp (7). Discard O-rings (4).

   b. Remove extending cylinder hose (2) from hydraulic cylinder (20) by loosening nut. Remove 45 degree elbow (8) and O-ring (9). Discard O-ring (9).

   c. Remove contracting cylinder hose (3) from hydraulic cylinder (20) by loosening nut. Remove 90 degree elbow (10) and O-ring (9). Discard O-ring (9).

6. Remove hex nut (11), lock washer (6) and hex cap screw (12).

7. Remove valve mounting brackets (13) by removing hex nut (11), lock washer (6), hex cap screw (12) and bell washer (15).

8. Remove hydraulic cylinder (20) per paragraph 5-39.2.

5-37.3 **Disassembly.**

1. Disassemble valve handle (16) by removing hex center lock nut (17), hex cap screw (18) and chain link (19).

2. Disassemble lift valve (1) as follows:

   a. Remove and discard snap ring (21), truss machine screw (22) and flat washer (23).

   b. Remove and discard centering cup (24), compression spring (25) and flat washer (26) from valve shaft.

   c. Remove valve shaft from valve body and remove and discard O-rings (27) from shaft.

3. Disassemble hydraulic cylinder (20) per paragraph 5-39.3.

5-37.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect hydraulic tubes and hoses for crimps or cuts. Replace damaged tubes.
4. Inspect lift valve as follows:

CAUTION

DO NOT use a rag to clean the interior of the valve body. Lint from the rag can contaminate and damage the hydraulic system.

   a. Inspect interior of valve for pieces of O-ring. Use compressed air to clean valve body.
   b. Inspect valve shaft for nicks or scratches.

5. Inspect hydraulic cylinder (20) per paragraph 5-39.4.

5-37.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair hydraulic cylinder (20) per paragraph 5-39.5.

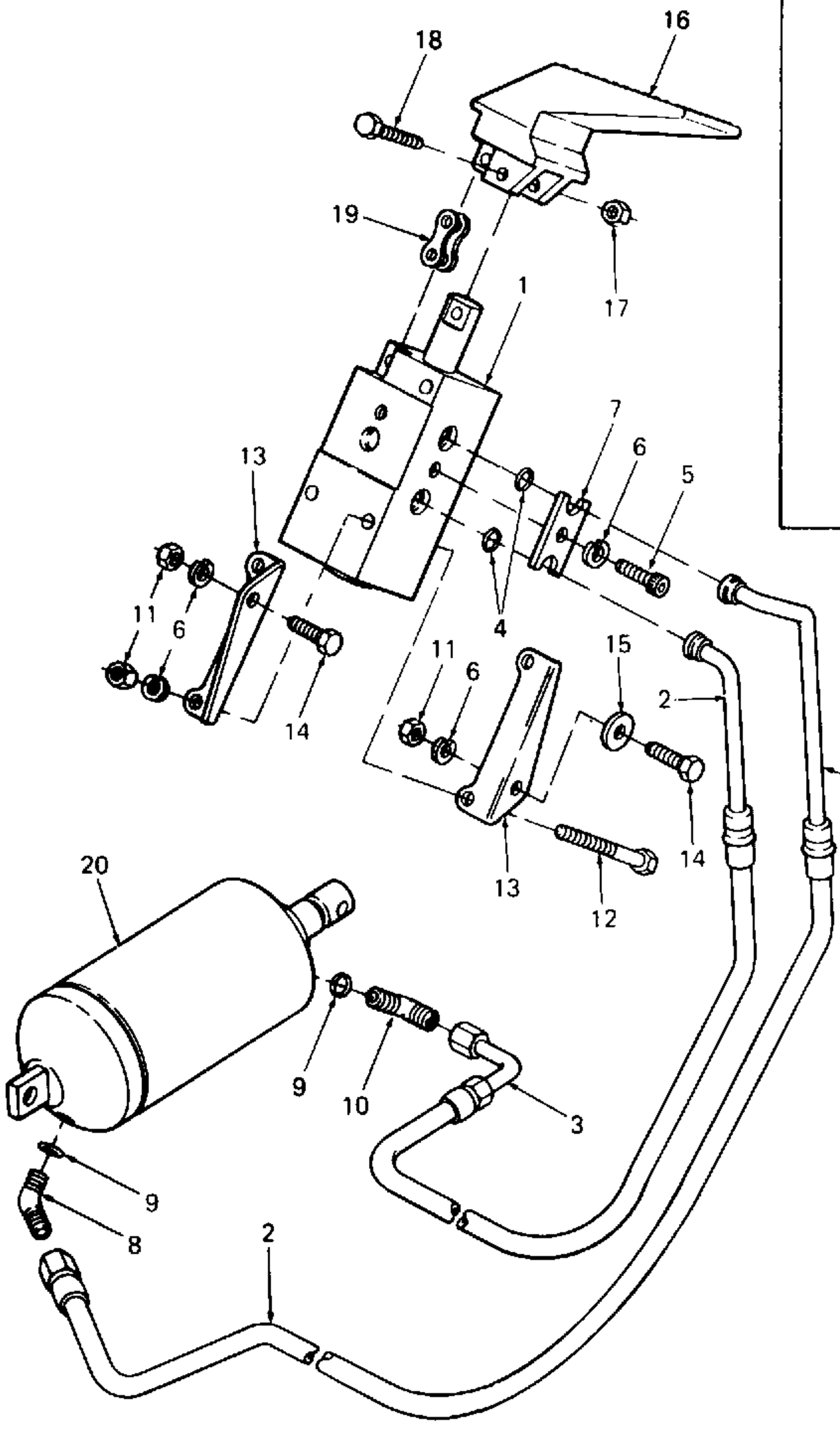
CAUTION

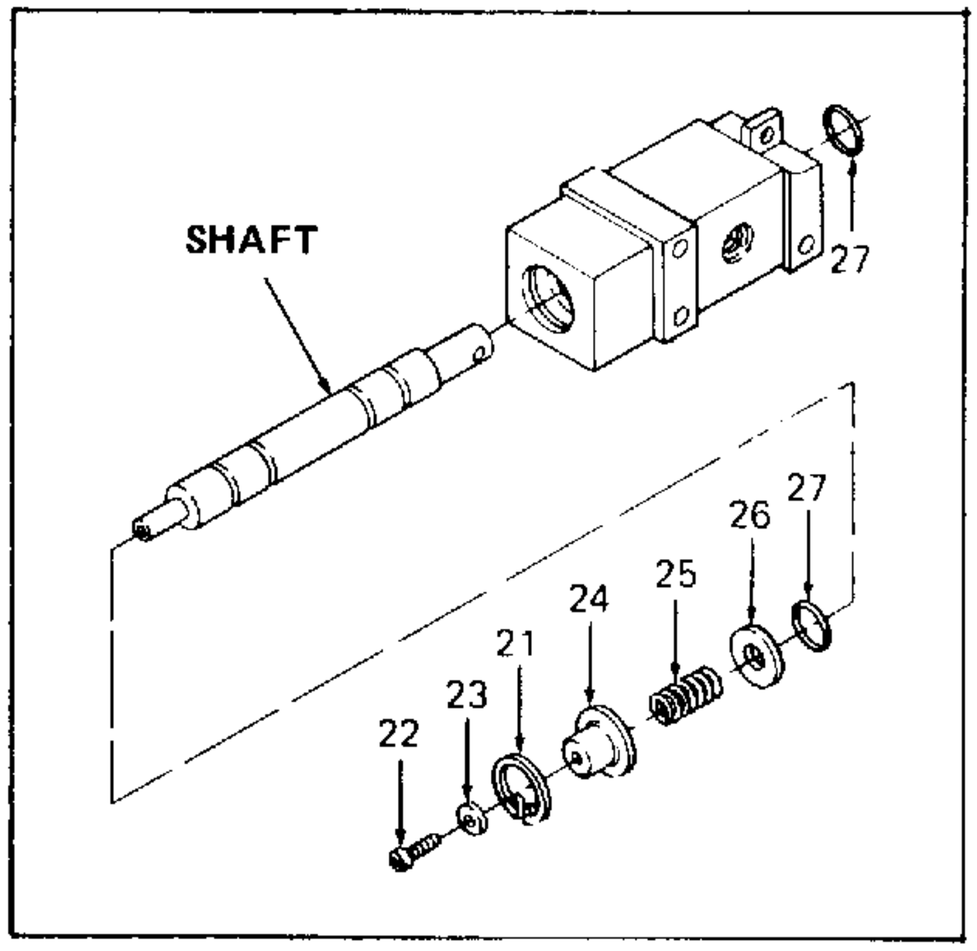
Use care to avoid dirt or debris from contaminating hydraulic components which have been cleaned, inspected and repaired.

5-37.6 **Reassembly.**

CAUTION

Internal port of valve body can damage O-rings (27) if valve is assembled incorrectly.





1. Lift Valve
2. Extending Cylinder Hose
3. Contracting Cylinder Hose
4. O-Ring
5. Socket Head Cap Screw
6. Lock Washer
7. Double Clamp
8. 45 Degree Elbow
9. O-Ring
10. 90 Degree Elbow
11. Hex Nut
12. Hex Cap Screw
13. Valve Mounting Bracket
14. Hex Cap Screw
15. Bell Washer
16. Valve Handle
17. Hex Center Lock Nut
18. Hex Cap Screw
19. Chain Link
20. Hydraulic Cylinder (For component parts see Figure 5-60 or 5-61)
21. Snap Ring
22. Truss Machine Screw
23. Flat Washer
24. Centering Cup
25. Compression Spring
26. Flat Washer
27. O-Ring

Figure 5-56. Hydraulic Lift Controls (Models 1782, 1862, 1882, 2082 and 2182).

1. Reassemble lift valve (1) as follows:

CAUTION

Use only new parts from valve rebuild kit, Part No. 717-3308, when reassembling the hydraulic lift valve.

a. Coat inside of valve body with hydraulic oil.

b. Place one O-ring (27) over round end of valve shaft and into O-ring groove. Place valve shaft, flat end first, halfway into valve body. Refer to Figure 5-52.

CAUTION

Do not push valve shaft too far into valve body. If O-ring is visible through ports, O-ring has been damaged and must be replaced.

c. Push valve shaft through valve body until O-ring groove on flat side of shaft is just outside of valve body. Refer to Figure 5-53.

d. Place O-ring (27, Figure 5-56) on O-ring groove on flat end of shaft. Refer to Figure 5-54.

e. Push valve shaft back into valve body until round section near flat end of shaft is just inside valve body. Refer to Figure 5-55.

f. Place flat washer (26, Figure 5-56), compression spring (25) and centering cup (24) on shaft.

NOTE

Apply Lock-Tite to truss machine screw (22) before installing on valve shaft.

g. Install flat washer (23), truss machine screw (22) and place snap ring (21) into groove.

NOTE

Small O-rings in valve rebuild kit should be used on hoses (2 and 3).

2. Assemble valve handle (16) by installing chain link (19), hex cap screw (18) and hex center lock nut (17).

3. Assemble hydraulic cylinder (20) per paragraph 5-39.6.

5-37.7 **Installation.**

CAUTION

Small amounts of dirt or debris can damage the hydraulic system. Use care to avoid entry of contaminants into the hydraulic system during installation.

1. Install hydraulic cylinder per paragraph 5-39.7.

2. Install valve mounting brackets (13) with bell washer (15), hex cap screws (14), lock washers (6) and hex nuts (11).

3. Position valve and secure to brackets (13) with hex cap screws (12), lock washers (6) and hex nuts (11).

4. Install contracting cylinder hose (3) and extending cylinder hose (2) as follows:

a. Install contracting cylinder hose (3) onto hydraulic cylinder (20) with nut after first installing 90 degree elbow (10) and O-ring (9) onto hydraulic cylinder.

b. Install extending cylinder hose (2) onto hydraulic cylinder (20) with nut after first installing 45 degree elbow (8) and O-ring (9) onto hydraulic cylinder.

c. Install cylinder hoses (2 and 3) and O-rings (4) onto lift valve (1) and secure with double clamp (7), lock washer (6) and socket head cap screw (5).

5. Install power steering tubes. Refer to paragraph 5-35.7.

6. Install battery (Models 1862, 1882 and 2082 only) per paragraph 5-8.5.

7. Install radiator (Models 1782 and 2182 only) per paragraph 5-6.3.

8. Install side panels per paragraph 5-4.7 (Models 1862, 1882 and 2082) or 5-5.7 (Models 1782 and 2182).

9. Refill hydraulic oil reservoir to proper level with new *Cub Cadet* hydraulic oil.

5-38. IMPLEMENT LIFT HANDLE (Models 1340, 1535 and 1860).

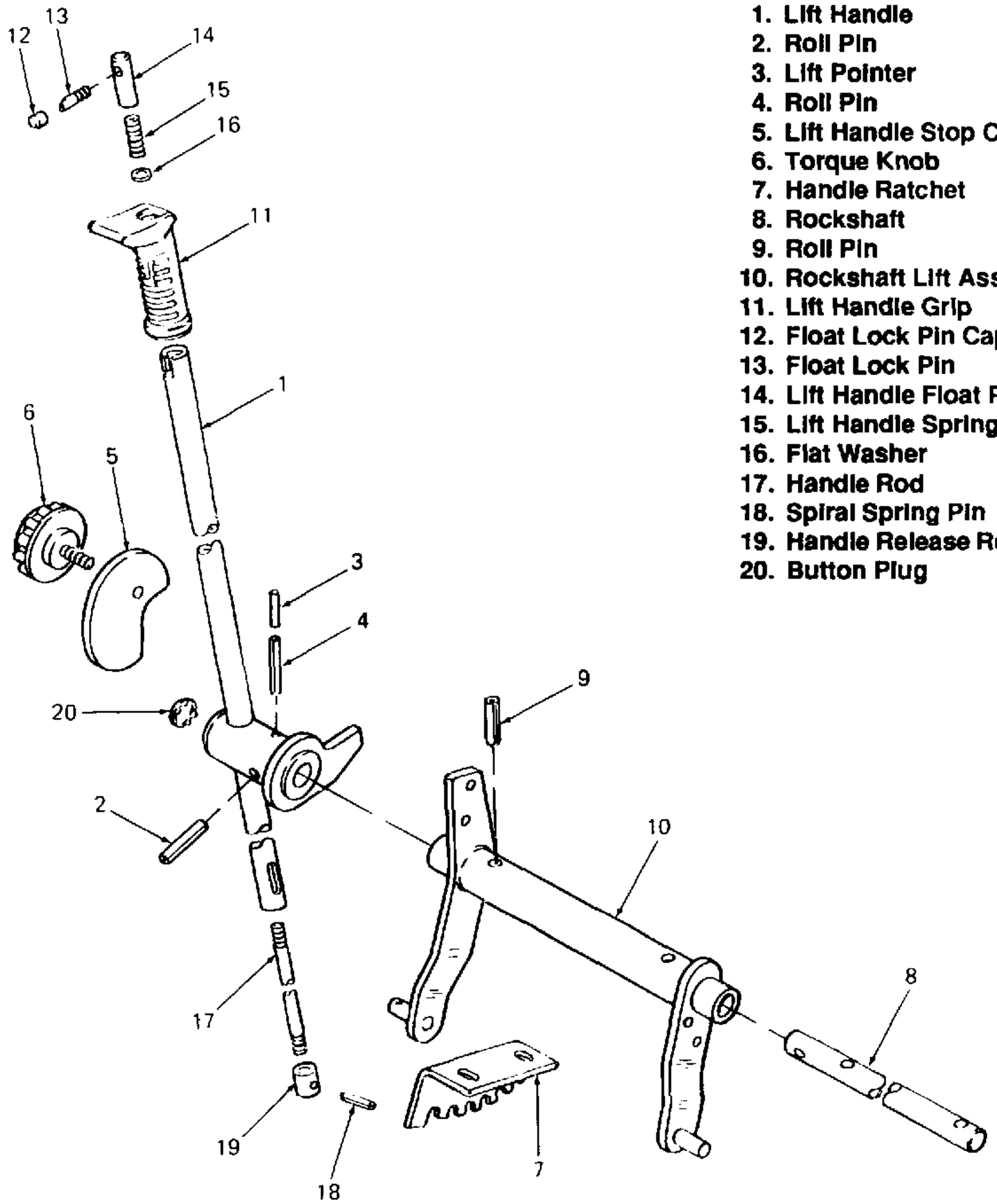
5-38.1 **General.** Before servicing the implement lift handle, refer to Appendix D for a list of mandatory replacement parts.

5-38.2 **Removal.** Before removing the implement lift handle, remove deck (if applicable).

1. Remove right running board per paragraph 5-26.2.
2. Remove lift handle (1, Figure 5-57) by removing roll pin (2), lift pointer (3) and roll pin (4). Discard roll pins.
3. Remove lift handle stop cam (5) by removing torque knob (6).
4. Remove handle ratchet (7).
5. Remove rockshaft (8) by removing roll pins (9). Discard roll pins.
6. Remove rockshaft lift assembly (10).

5-38.3 **Disassembly.**

1. Disassemble lift handle (1) as follows:
   a. Remove lift handle grip (11) by removing float lock pin cap (12), float lock pin (13), lift



1. **Lift Handle**
2. **Roll Pin**
3. **Lift Pointer**
4. **Roll Pin**
5. **Lift Handle Stop Cam**
6. **Torque Knob**
7. **Handle Ratchet**
8. **Rockshaft**
9. **Roll Pin**
10. **Rockshaft Lift Assembly**
11. **Lift Handle Grip**
12. **Float Lock Pin Cap**
13. **Float Lock Pin**
14. **Lift Handle Float Pin**
15. **Lift Handle Spring**
16. **Flat Washer**
17. **Handle Rod**
18. **Spiral Spring Pin**
19. **Handle Release Rod**
20. **Button Plug**

Figure 5-57. Implement Lift Handle (Models 1340, 1535 and 1860).

handle float pin (14), lift handle spring (15) and flat washer (16).

b. Remove handle rod (17) by removing spiral spring pin (18) and handle release rod (19). Discard spiral spring pin.

c. Remove button plug (20).

5-38.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring distortion, corrosion and wear.

5-38.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-38.6 **Reassembly.**

1. Install button plug (20).

CAUTION

A new spiral spring pin (18) must be used during reassembly.

2. Install handle rod (17) by installing handle release rod (19) and spiral spring pin (18).
3. Install lift handle grip (11), flat washer (16), lift handle spring (15), lift handle float pin (14), float lock pin (13) and float lock pin cap (12).

5-38.7 **Installation.**

1. Position rockshaft lift assembly (10) in tractor.

CAUTION

New roll pins (9) must be used during installation.

2. Install rockshaft (8) and secure with roll pins (9).
3. Install handle ratchet (7).
4. Install lift handle stop cam (5) by installing torque knob (6).

CAUTION

New roll pins (2 and 4) must be used during installation.

5. Install lift handle (1) and install roll pin (4), lift pointer (3) and roll pin (2).
6. Install right running board per paragraph 5-26.7.

5-39. IMPLEMENT LIFT AND HYDRAULIC CYLINDER (Models 1541 and 1862).

5-39.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-39.2 **Removal.**

1. Remove frame cover.
2. Remove right foot plate. Refer to paragraph 5-26.2.
3. Remove hydraulic cylinder (1, Figure 5-58) as follows:

   a. Remove hydraulic tubes from cylinder (1). Refer to paragraph 5-36.2 (Model 1541) or 5-37.2 (Model 1862).

NOTE

Cap hydraulic tubes and plug opening in hydraulic cylinder to prevent dirt from entering components.

   b. Remove lift pin assembly (2) by removing clevis pin (3) through access hole in right side of frame.

   c. Remove hex center lock nut (4), flat washer (5) and shoulder bolt (6).

4. Remove cylinder bracket (7) by removing hex center lock nuts (4), flat washers (5) and hex cap screws (8).
5. Remove torque knob (9) and lift handle stop cam (10).
6. Remove lift pointer (11) and roll pin (12).
7. Remove rockshaft lift assembly (13) and lift bracket (15) by first removing slotted roll pins and removing rockshaft assembly (14). Discard roll pins.

1. Hydraulic Cylinder (For component parts see Figure 5-59)
2. Lift Pin Assembly
3. Clevis Pin
4. Hex Center Lock Nut
5. Flat Washer
6. Shoulder Bolt
7. Cylinder Bracket
8. Hex Cap Screw
9. Torque Knob
10. Lift Handle Stop Cam
11. Lift Pointer
12. Roll Pin
13. Rockshaft Lift Assembly
14. Rockshaft Assembly
15. Lift Bracket

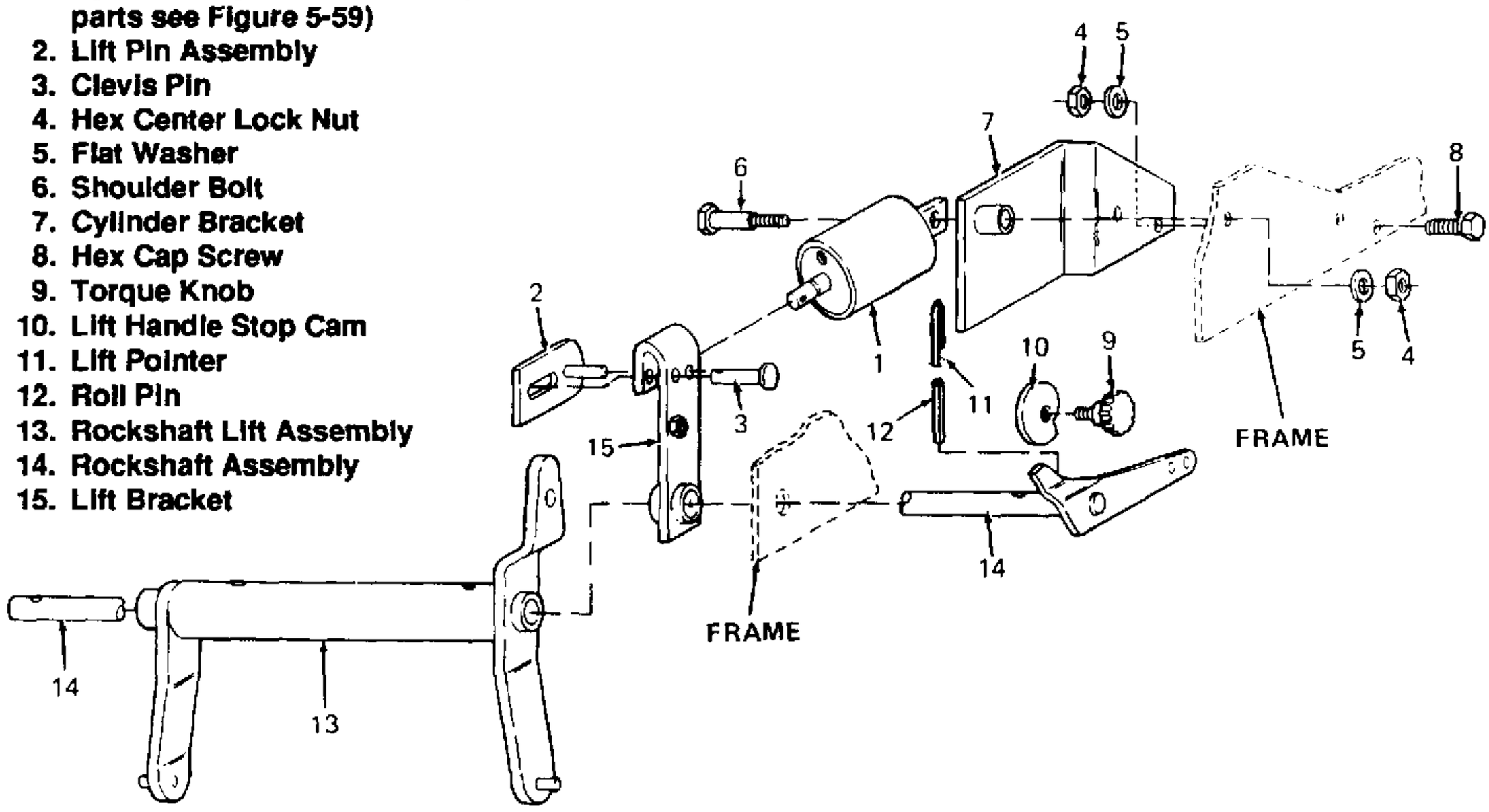


Figure 5-58. Implement Lift and Hydraulic Cylinder (Models 1541 and 1862).

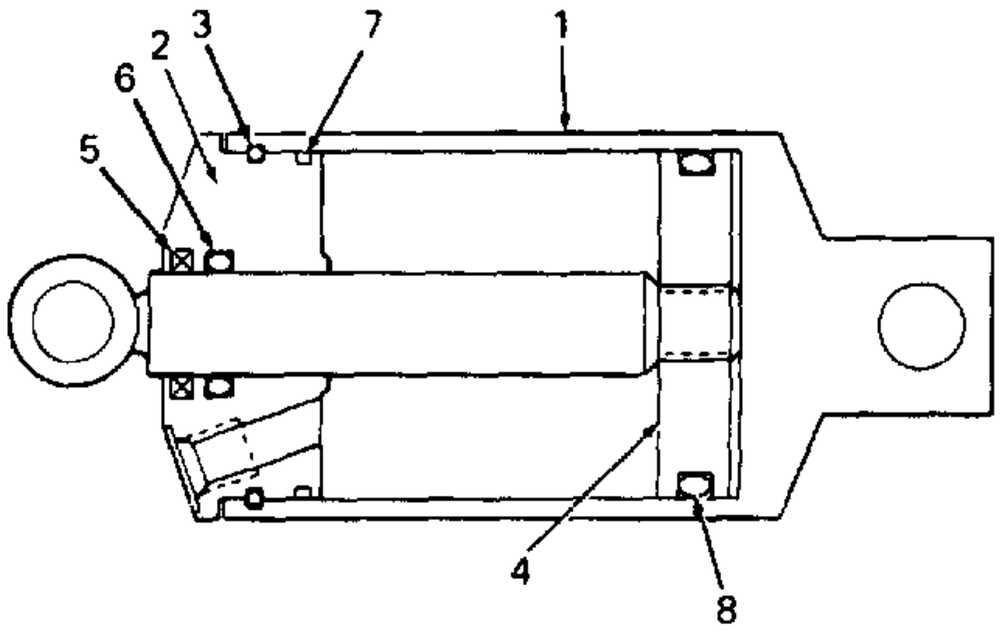
5-39.3 **Disassembly.**

1. Disassemble hydraulic cylinder (1, Figure 5-59) as follows:

   a. Remove 45 degree and 90 degree elbows and O-rings. Refer to paragraph 5-36.2 (Model 1541) or 5-37.2 (Model 1862).

   b. Remove cylinder head (2) as follows:

      (1) Secure front end of cylinder in vise.



1. Hydraulic Cylinder
2. Cylinder Head
3. Retaining Wire
4. Piston
5. Wiper Seal
6. Inner O-Ring
7. Outer O-Ring
8. Piston O-Ring

Figure 5-59. Hydraulic Cylinder.

      (2) Insert pins of a 3/16 inch adjustable face spanner wrench into two holes of cylinder head. Turn head counterclockwise until end of retaining wire (3) appears in access hole of cylinder body. Refer to Figure 5-60.

      (3) Pry end of wire out of hole and continue to turn cylinder head counterclockwise to remove retaining wire.

      (4) Pull cylinder head out of cylinder body and off piston (4, Figure 5-59).

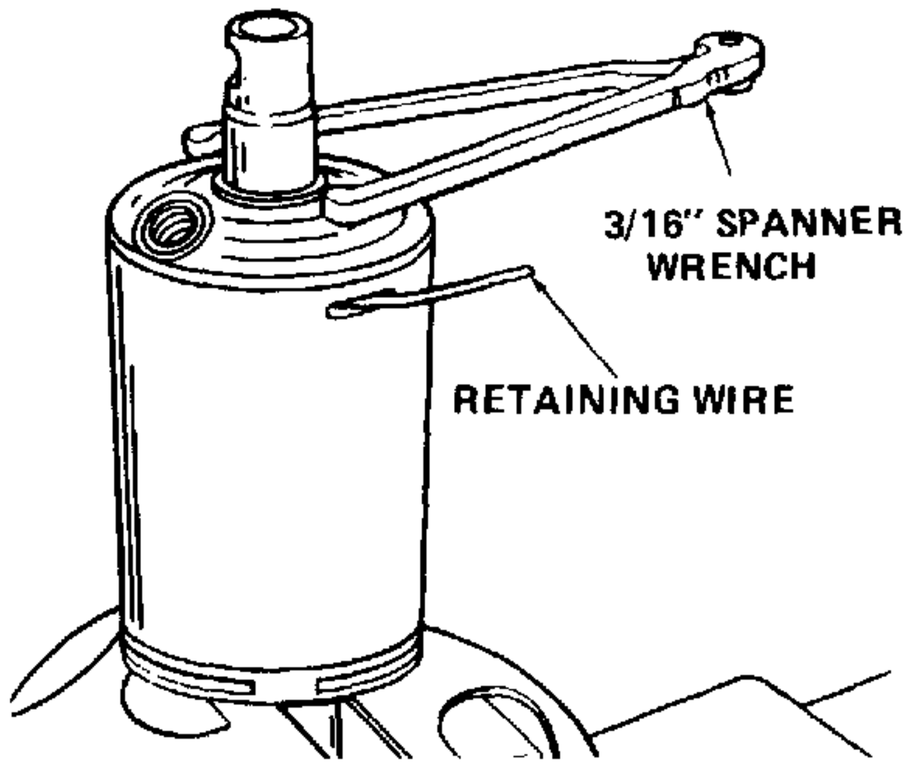


Figure 5-60. Removing Retaining Wire.

NOTE

Cylinder head may be difficult to remove once the outer O-ring (7) enters the retaining ring groove in the cylinder body. If so, through the access hole in the cylinder body, cut and remove this O-ring. Cylinder head should then slide out easily.

c. Remove piston rod by inserting a drift pin through hole in piston rod and pulling on rod while turning spirally.

d. Remove and discard all O-rings (6, 7 and 8) and wiper seal (5).

5-39.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect rockshaft assembly (14, Figure 5-58) for cracks or distortion. Replace badly damaged rockshaft.
4. Inspect piston and cylinder walls for scoring, pitting or damage.

5-39.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-39.6 **Reassembly.**

CAUTION

Small amounts of dirt or debris can damage the hydraulic system. Use care to avoid entry of contaminants into the hydraulic system during reassembly.

NOTE

Use hydraulic cylinder seal kit, Part No. 759-3431, when reassembling the hydraulic cylinder.

1. Reassemble hydraulic cylinder as follows:

a. Install wiper seal (5, Figure 5-59) and O-rings (6, 7 and 8) after first coating with petroleum jelly and lubricating inner walls of cylinder with hydraulic fluid.

b. Position piston (4) in cylinder body, insert drift pin through hole in piston rod and rotate piston to seat it within cylinder body.

c. Install cylinder head (2) as follows:

(1) Secure front end of hydraulic cylinder in vise.

(2) Turn cylinder head into cylinder body until hole in cylinder head aligns with hole in cylinder body.

(3) Place hooked end of retaining wire (3) through holes and continue to rotate cylinder head with spanner wrench until tight.

d. Install O-rings and 45 degree and 90 degree elbows.

5-39.7 **Installation.**

CAUTION

Small amounts of dirt or debris can damage the hydraulic system. Use care to avoid entry of contaminants into the hydraulic system during installation.

1. Position lift bracket (15, Figure 5-58) and rockshaft lift assembly (13) and install rockshaft assembly (14). Secure with new slotted roll pins.
2. Install roll pin (12) and lift pointer (11) on rockshaft assembly (14).
3. Install lift handle stop cam (10) and torque knob (9).
4. Install hydraulic cylinder (1) as follows:

a. Install lift pin assembly (2) by positioning it through hole in cylinder piston and installing clevis pin (3) through access hole in right side of frame. Secure pin with flat washer and cotter pin.

b. Install shoulder bolt (6), flat washer (5) and hex center lock nut (4).

c. Install hydraulic tubes on hydraulic cylinder. Refer to paragraph 5-36.7 (Model 1541) or 5-37.7 (Model 1862).

5. Install frame cover.
6. Install right foot plate. Refer to paragraph 5-26.7.

7. Refill hydraulic oil reservoir to proper level with new oil.

5-40. IMPLEMENT LIFT AND HYDRAULIC CYLINDER (Models 1782, 1882, 2082 and 2182).

5-40.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

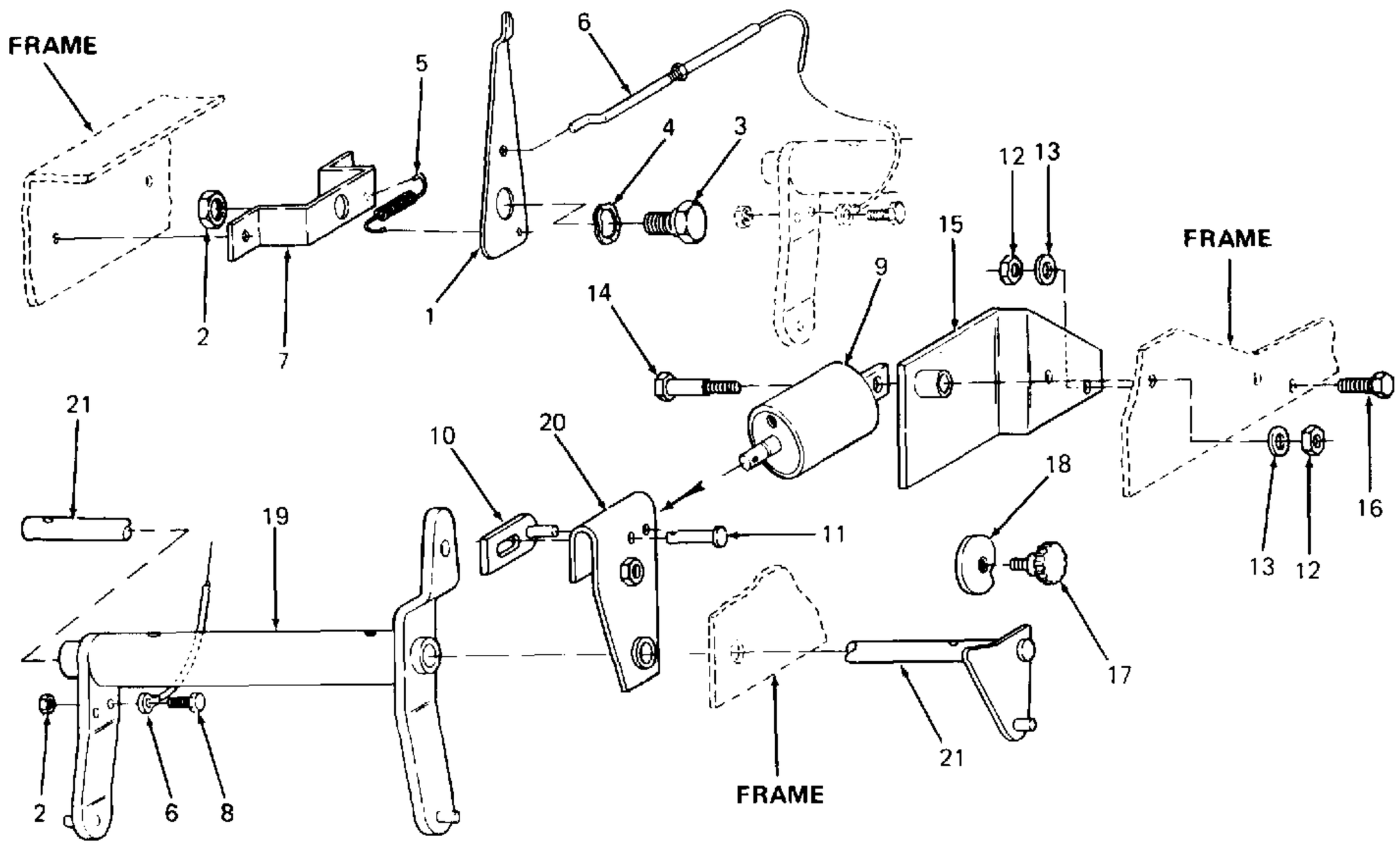
5-40.2 **Removal.**

1. Remove frame cover.
2. Remove right foot plate. Refer to paragraph 5-27.2.
3. Remove indicator arm (1, Figure 5-61) as follows:
   a. Remove extension spring (5) and indicator cable assembly (6) from indicator arm (1).
   b. Remove indicator arm (1) from mounting bracket (7) by removing hex patch lock nut (2), shoulder screw (3) and bowed spring washer (4).
4. Remove indicator cable assembly (6) from rockshaft lift assembly (19) by removing hex patch lock nut (2) and hex cap screw (8).
5. Remove hydraulic cylinder (9) as follows:
   a. Remove hydraulic tubes from cylinder (9). Refer to paragraph 5-35.2.

NOTE

Cap hydraulic tubes and plug opening in hydraulic cylinder to prevent dirt from entering components.

   b. Remove lift pin assembly (10) by removing clevis pin (11) through access hole in right side of frame.



1. Indicator Arm
2. Hex Patch Lock Nut
3. Shoulder Screw
4. Bowed Spring Washer
5. Extension Spring
6. Indicator Cable Assembly
7. Mounting Bracket
8. Hex Cap Screw
9. Hydraulic Cylinder
10. Lift Pin Assembly
11. Clevis Pin
12. Hex Center Lock Nut
13. Flat Washer
14. Shoulder Bolt
15. Cylinder Bracket
16. Hex Cap Screw
17. Torque Knob
18. Lift Handle Stop Cam
19. Rockshaft Lift Assembly
20. Lift Bracket
21. Rockshaft Assembly

Figure 5-61. Implement Lift and Hydraulic Cylinder (Models 1782, 1882, 2082 and 2182).

c. Remove hex center lock nut (12), flat washer (13) and shoulder bolt (14).

6. Remove cylinder bracket (15) by removing hex center lock nuts (12), flat washers (13) and hex cap screws (16).

7. Remove torque knob (17) and lift handle stop cam (18).

8. Remove rockshaft lift assembly (19) and lift bracket (20) by first removing slotted roll pins and removing rockshaft assembly (21). Discard roll pins.

5-40.3 **Disassembly.**

1. Disassemble hydraulic cylinder (9) as follows:

   a. Remove 45 degree and 90 degree elbows and O-rings. Refer to paragraph 5-37.2

   b. Remove cylinder head (2, Figure 5-59) as follows:

      (1) Secure front end of cylinder in vise.

      (2) Insert pins of a 3/16 inch adjustable face spanner wrench into two holes of cylinder head. Turn head counterclockwise until end of retaining wire (3) appears in access hole of cylinder body. Refer to Figure 5-60.

      (3) Pry end of wire out of hole and continue to turn cylinder head counterclockwise to remove retaining wire.

      (4) Pull cylinder head out of cylinder body and off piston (4, Figure 5-59).

NOTE

Cylinder head may be difficult to remove once the outer O-ring (7) enters the retaining ring groove in the cylinder body. If so, through the access hole in the cylinder body, cut and remove this O-ring. Cylinder head should then slide out easily.

   c. Remove piston rod by inserting a drift pin through hole in piston rod and pulling on rod while turning spirally.

   d. Remove and discard all O-rings (6, 7 and 8) and wiper seal (5).

5-40.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.

2. Inspect parts for cracks, scoring, distortion, corrosion and wear.

3. Inspect rockshaft assembly (21, Figure 5-61) for cracks or distortion. Replace badly damaged rockshaft.

4. Inspect piston and cylinder walls for scoring, pitting or damage.

5-40.5 **Repair.**

1. Deburr and dress damaged threads.

2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-40.6 **Reassembly.**

CAUTION

Small amounts of dirt or debris can damage the hydraulic system. Use care to avoid entry of contaminants into the hydraulic system during reassembly.

NOTE

Use hydraulic cylinder seal kit, Part No. 759-3431, when reassembling the hydraulic cylinder.

1. Reassemble hydraulic cylinder as follows:

   a. Install wiper seal (5, Figure 5-59) and O-rings (6, 7 and 8) after first coating with petroleum jelly and lubricating inner walls of cylinder with hydraulic fluid.

   b. Position piston (4) in cylinder body, insert drift pin through hole in piston rod and rotate piston to seat it within cylinder body.

   c. Install cylinder head (2) as follows:

      (1) Secure front end of hydraulic cylinder in vise.

      (2) Turn cylinder head into cylinder body until hole in cylinder head aligns with hole in cylinder body.

      (3) Place hooked end of retaining wire (3) through holes and continue to rotate cylinder head with spanner wrench until tight.

d. Install O-rings and 45 degree and 90 degree elbows per paragraph 5-37.7.

5-40.7 **Installation.**

CAUTION

Small amounts of dirt or debris can damage the hydraulic system. Use care to avoid entry of contaminants into the hydraulic system during installation.

1. Position lift bracket (20, Figure 5-61) and rockshaft lift assembly (19) and install rockshaft assembly (21). Secure with new slotted roll pins.
2. Install lift handle stop cam (18) and torque knob (17).
3. Install hydraulic cylinder (9) as follows:
   a. Install lift pin assembly (10) by positioning it through cylinder piston hole and installing clevis pin (11) through access hole in right side of frame. Secure pin with flat washer and cotter pin.
   b. Install shoulder bolt (14), flat washer (13) and hex center lock nut (12).
   c. Install hydraulic tubes on hydraulic cylinder. Refer to paragraph 5-35.7.
4. Secure indicator cable assembly (6) to rockshaft lift assembly (19) with hex cap screw (8) and nut (2).
5. Install indicator arm (1) as follows:
   a. Attach indicator arm (1) to mounting bracket (7) with bowed spring washer (4), shoulder screw (3) and hex patch lock nut (2).
   b. Attach indicator cable assembly (6) and extension spring (5) to indicator arm (1).
6. Install frame cover.
7. Install right foot plate. Refer to paragraph 5-27.7.
8. Refill hydraulic oil reservoir to proper level with new oil.

5-41. **BRAKES AND CONNECTIONS (Models 1340, 1541, 1860 and 1862).**

5-41.1 **General.** Before servicing the brakes and connections, refer to Appendix D for a list of mandatory replacement parts.

WARNING

Place the tractor on a level surface and chock the wheels before performing corrective maintenance on the brakes and connections.

5-41.2 **Removal.**

1. Remove frame cover.
2. Remove brake link rod (1, Figure 5-62) and return spring (2).
3. Remove start switch bracket (3) by removing hex center lock nut (4) and hex cap screw (5).
4. Remove brake levers (6 and 7) by removing spiral spring pins and pulling brake pedal assembly (8) from the tractor. Discard spiral spring pins.
5. Remove brake rod (14) by removing clevis pin (15), adjustment clevis (16) and tension spring (17).
6. Remove brake shaft assembly (18).
7. Remove brake caliper kit (19).
8. Remove brake mounting bracket (20) by removing hex cap screw (21) and lock washer (22), which can be removed through access hole in the axle hub.

5-41.3 **Disassembly.**

1. Disassemble brake pedal assembly (8) as follows:
   a. Remove brake pedal pad (9).
   b. Remove parking brake bracket (10) by removing hex insert lock nut (11) and wave washers (12).
2. Disassemble brake caliper kit (19) per paragraph 5-44.3.

5-41.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and internal wear.
3. Inspect springs (2 and 17) for signs of wear or weakness. Discard worn springs.
4. Inspect brake mounting bracket (20) for warpage.
5. Inspect brake caliper kit (19) per paragraph 5-44.4.

5-41.5 **Repair.** Refer to Appendix E, Contingency Parts, for parts which are worn or damaged beyond repair.

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair brake caliper kit (19) per paragraph 5-44.5.

5-41.6 **Reassembly.**

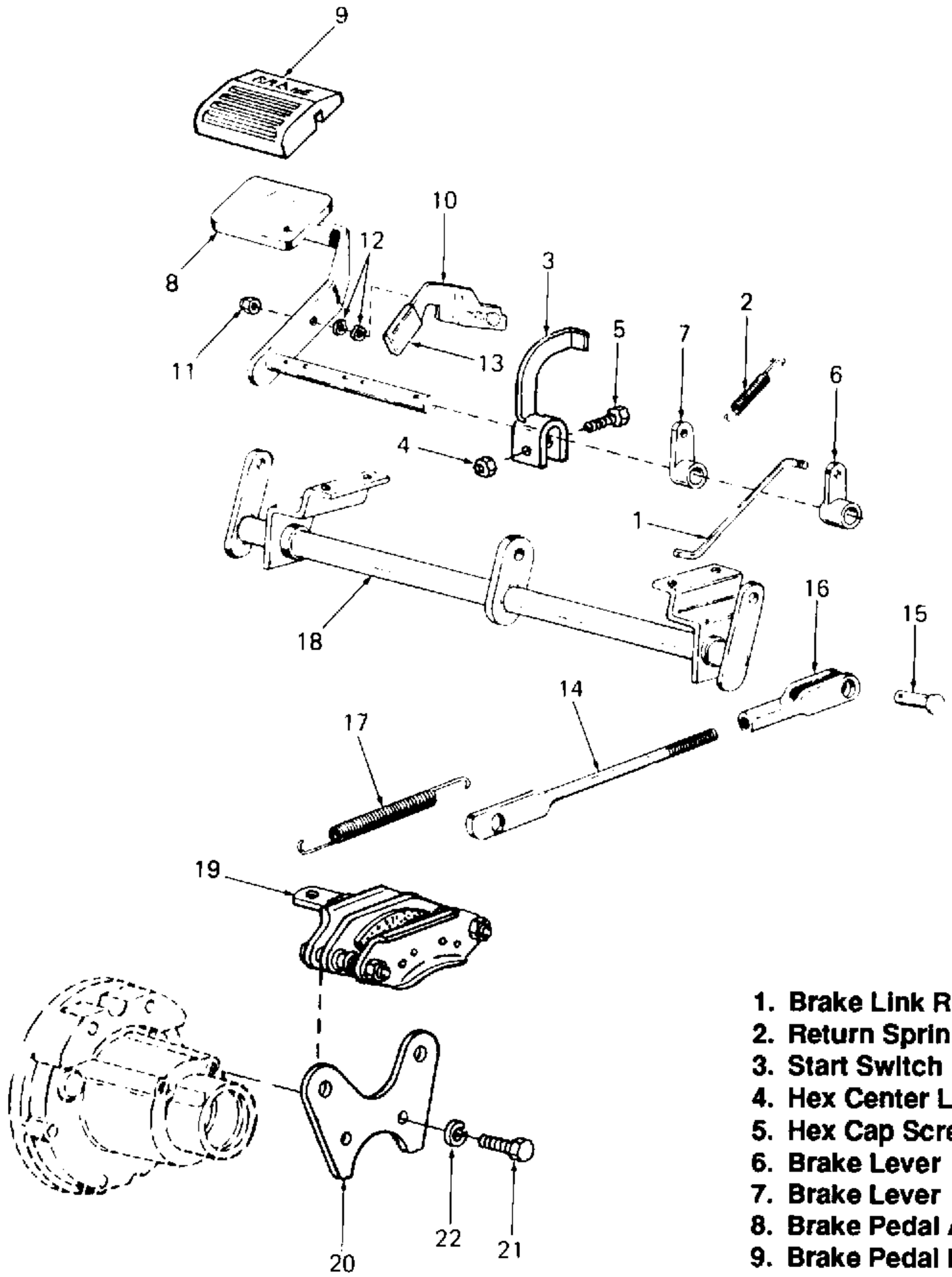
1. Reassemble brake pedal assembly (8) as follows:
   a. Assemble parking brake bracket (10) by installing wave washers (12) and securing bracket to pedal assembly with hex insert lock nut (11).
   b. Install brake pedal pad (9).
2. Reassemble brake caliper kit (19) per paragraph 5-44.6.

5-41.7 **Installation.**

NOTE

Use new spiral spring pins when installing the brakes and connections.

1. Install brake mounting brackets (20) with lock washers (22) and hex cap screws (21). Torque screws (21) to 21 ft-lbs.
2. Install brake caliper kit per paragraph 5-44.7.
3. Install brake shaft assembly (18).
4. Install brake rod (14) by installing adjustment clevis (16) on rod and securing with clevis pin (15) and tension spring (17).
5. Pass brake pedal assembly (8) through mounting hole on left side of tractor and install brake levers (6 and 7) onto shaft of brake pedal assembly with new spiral spring pins.
6. Install start switch bracket (3) with hex cap screw (5) and hex center lock nut (4).
7. Install frame cover.
8. Adjust the brakes per paragraph 6-5.



1. Brake Link Rod
2. Return Spring
3. Start Switch Bracket
4. Hex Center Lock Nut
5. Hex Cap Screw
6. Brake Lever
7. Brake Lever
8. Brake Pedal Assembly
9. Brake Pedal Pad
10. Parking Brake Bracket
11. Hex Insert Lock Nut
12. Wave Washer
13. Parking Brake Grip
14. Brake Rod
15. Clevis Pin
16. Adjustment Clevis
17. Tension Spring
18. Brake Shaft Assembly
19. Brake Caliper Kit
20. Brake Mounting Bracket
21. Hex Cap Screw
22. Lock Washer

Figure 5-62. Brakes and Connections (Models 1340, 1541, 1860 and 1862).

5-42. BRAKES AND CONNECTIONS (Model 1535).

5-42.1 **General.** Before servicing the brakes and connections, refer to Appendix D for a list of mandatory replacement parts.

WARNING

Place the tractor on a level surface and chock the wheels before performing corrective maintenance on the brakes and connections.

5-42.2 **Removal.**

1. Remove frame cover.
2. Remove brake link rod (1, Figure 5-63) and return spring (2).
3. Remove start switch bracket (3) by removing hex center lock nut (4) and hex cap screw (5).
4. Remove brake lever (6) and clutch and brake arm (7) by removing spiral spring pins and pulling brake pedal assembly (8) from the tractor. Discard spiral spring pins.
5. Remove brake rod (14) by removing clevis pin (15), adjustment clevis (16) and tension spring (17).
6. Remove brake shaft assembly (18).
7. Remove brake caliper kit (19).
8. Remove brake mounting bracket (20) by removing hex cap screw (21) and lock washer (22), which can be removed through access hole in the axle hub.

5-42.3 **Disassembly.**

1. Disassemble brake pedal assembly (8) as follows:
   a. Remove clutch/brake pedal pad (9).
   b. Remove parking brake bracket (10) by removing hex insert lock nut (11) and wave washers (12).
2. Disassemble brake caliper kit (19) per paragraph 5-44.3.

5-42.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and internal wear.
3. Inspect springs (2 and 17) for signs of wear or weakness. Discard worn springs.
4. Inspect brake mounting bracket (20) for warpage.
5. Inspect brake caliper kit (19) per paragraph 5-44.4.

5-42.5 **Repair.** Refer to Appendix E for contingency replacement parts which are worn or damaged beyond repair.

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair brake caliper kit (19) per paragraph 5-44.5.

5-42.6 **Reassembly.**

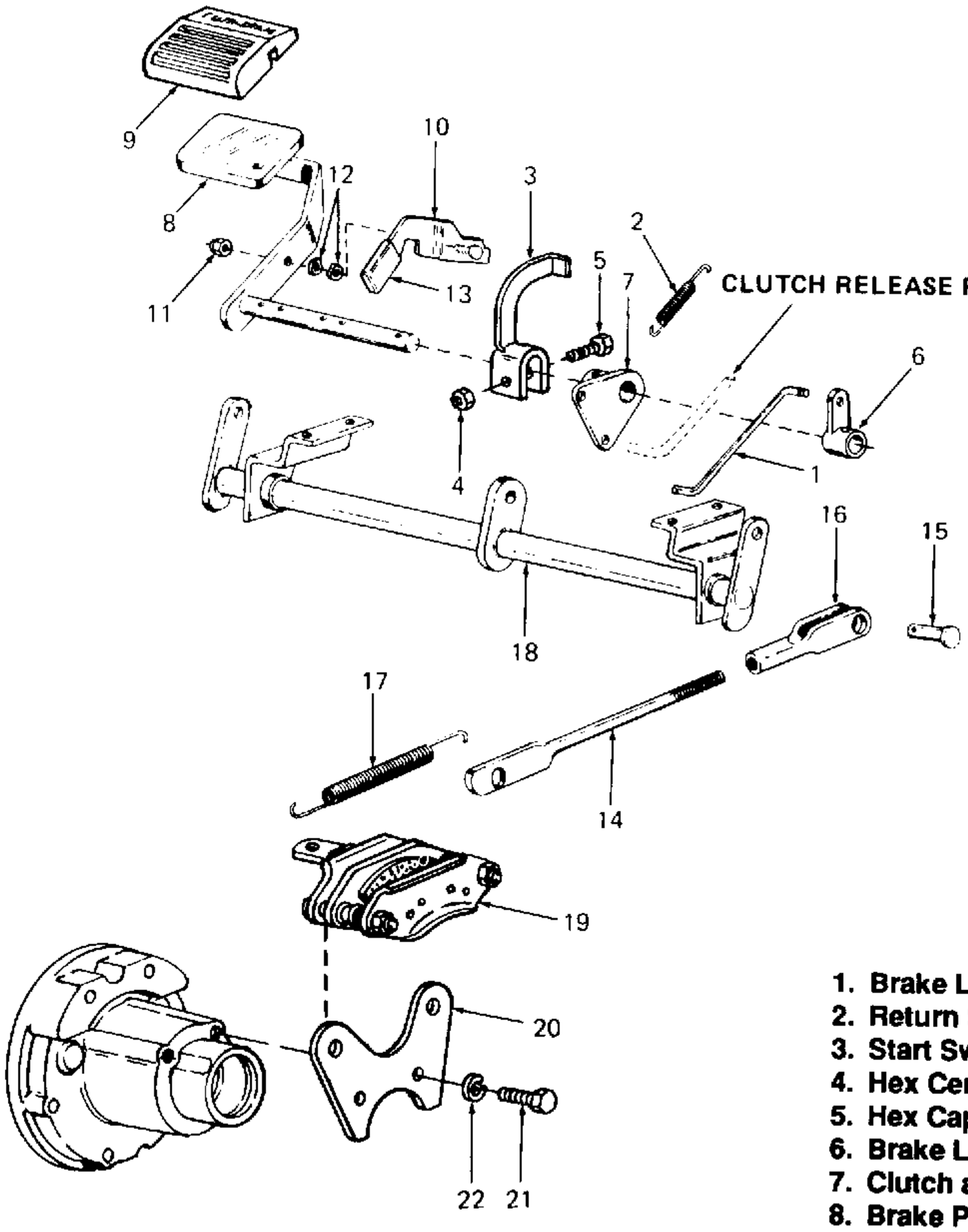
1. Reassemble brake pedal assembly (8) as follows:
   a. Assemble parking brake bracket (10) by installing wave washers (12) and securing bracket to pedal assembly with hex insert lock nut (11).
   b. Install clutch/brake pedal pad (9).
2. Reassemble brake caliper kit (19) per paragraph 5-44.6.

5-42.7 **Installation.**

NOTE

Use new spiral spring pins when installing the brakes and connections.

1. Install brake mounting brackets (20) with lock washers (22) and hex cap screws (21). Torque screws (21) to 21 ft-lbs.
2. Install brake caliper kit (19) per paragraph 5-44.7.
3. Install brake shaft assembly (18).
4. Install brake rod (14) by installing adjustment clevis (16) on rod and securing with clevis pin (15) and tension spring (17).
5. Pass brake pedal assembly (8) through mounting hole on left side of tractor and install clutch and brake arm (7) and brake lever (6) onto shaft of brake pedal assembly with new spiral spring pins.
6. Install start switch bracket (3) with hex cap screw (5) and hex center lock nut (4).
7. Install frame cover.
8. Adjust the brakes per paragraph 6-5.



1. Brake Link Rod
2. Return Spring
3. Start Switch Bracket
4. Hex Center Lock Nut
5. Hex Cap Screw
6. Brake Lever
7. Clutch and Brake Arm
8. Brake Pedal Assembly
9. Clutch/Brake Pedal Pad
10. Parking Brake Bracket
11. Hex Insert Lock Nut
12. Wave Washer
13. Parking Brake Grip
14. Brake Rod
15. Clevis Pin
16. Adjustment Clevis
17. Tension Spring
18. Brake Shaft Assembly
19. Brake Caliper Kit
20. Brake Mounting Bracket
21. Hex Cap Screw
22. Lock Washer

Figure 5-63. Brakes and Connections (Model 1535).

5-43. BRAKES AND CONNECTIONS (Models 1782, 1882, 2082 and 2182).

5-43.1 **General.** Before servicing the brakes and connections, refer to Appendix D for a list of mandatory replacement parts.

WARNING

Place the tractor on a level surface and chock the wheels before performing corrective maintenance on the brakes and connections.

5-43.2 **Removal.**

1. Remove frame cover.
2. Remove brake pedal assembly (1, Figure 5-64) as follows:
   a. Remove start switch bracket (2) by removing hex center lock nut (3) and hex cap screw (4).
   b. Remove extension spring (5) from center brake rod (6).
   c. Remove center brake rod (6) from brake lever (7) and parking brake plate arm assembly (16) by removing cotter pin and flat washer.
   d. Remove spiral spring pins from brake lever (7) and brake pedal assembly (1). Remove brake lever (7) as brake pedal assembly is removed from left side of tractor. Discard spiral spring pin.
3. Remove brake shaft assembly (8) as follows:
   a. Remove brake rod (9), adjustment clevis (10) and extension spring (11) from right brake pedal assembly (13) by removing clevis pin (12).
   b. Remove right brake pedal assembly (13) by removing retaining ring (14).
   c. Remove left brake pedal assembly (15) by removing spiral spring pin. Discard spiral spring pin.
   d. Remove parking brake plate arm assembly (16) by removing spiral spring pin and pulling brake shaft assembly from left side of tractor. Discard spiral spring pin.
4. Remove brake caliper kit (17) per paragraph 5-44.2.
5. Remove brake mounting bracket (18) by removing hex cap screws (19) and lock washers (20), which can be removed through access hole in the axle hub.

5-43.3 **Disassembly.**

1. Disassemble brake pedal assembly (1) as follows:
   a. Remove brake pedal pad (21).
   b. Remove parking brake bracket (22) by removing hex insert lock nut (23) and wave washers (24).
   c. Remove parking brake grip (25).
2. Disassemble brake caliper kit (17) per paragraph 5-44.3.

5-43.4 **Inspection.** Clean all parts prior to inspection.

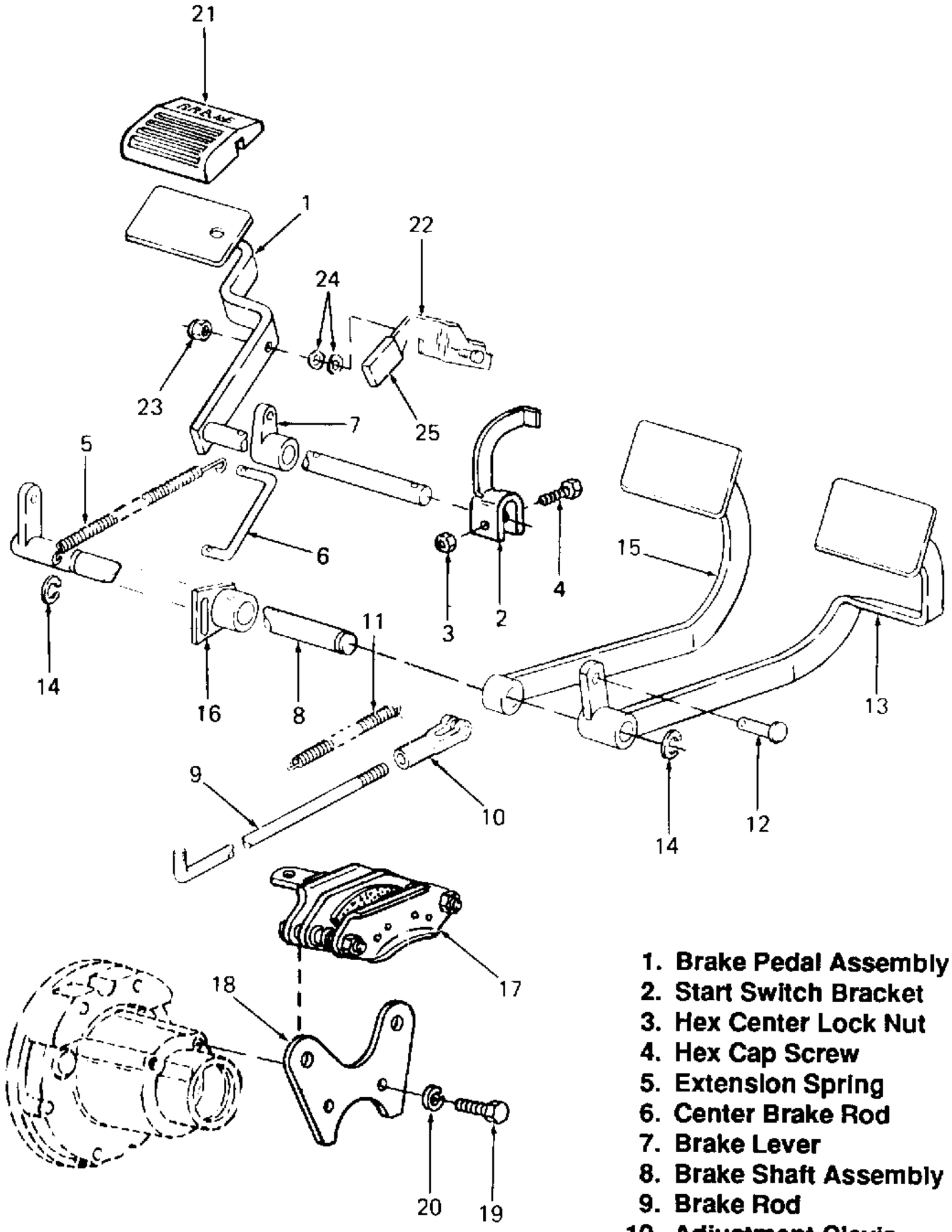
1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and internal wear.
3. Inspect springs (5 and 11) for signs of wear or weakness. Discard worn springs.
4. Inspect brake mounting bracket (18) for warpage.
5. Inspect brake caliper kit (17) per paragraph 5-44.4.

5-43.5 **Repair.** Refer to Appendix E for contingency replacement parts which are worn or damaged beyond repair.

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair brake caliper kit (17) per paragraph 5-44.5.

5-43.6 **Reassembly.**

1. Reassemble brake caliper kit (17) per paragraph 5-44.6
2. Reassemble brake shaft assembly (8) as follows:
   a. Install parking brake grip (25).
   b. Assemble parking brake bracket (22) by installing wave washers (24) and securing bracket to pedal assembly with hex insert lock nut (23).
   c. Install brake pedal pad (21).



1. Brake Pedal Assembly
2. Start Switch Bracket
3. Hex Center Lock Nut
4. Hex Cap Screw
5. Extension Spring
6. Center Brake Rod
7. Brake Lever
8. Brake Shaft Assembly
9. Brake Rod
10. Adjustment Clevis
11. Extension Spring
12. Clevis Pin
13. Brake Pedal Assembly, RH
14. Retaining Ring
15. Brake Pedal Assembly, LH
16. Parking Brake Plate Arm Assembly
17. Brake Caliper Kit
18. Brake Mounting Bracket
19. Hex Cap Screw
20. Lock Washer
21. Brake Pedal Pad
22. Parking Brake Bracket
23. Hex Insert Lock Nut
24. Wave Washer
25. Parking Brake Grip

Figure 5-64. Brakes and Connections (Models 1782, 1882, 2082 and 2182).

5-43.7 **Installation.**

NOTE

Use new spiral spring pins when installing brakes and connections.

1. Install brake mounting brackets (18) with lock washers (20) and hex cap screws (19). Torque screws (19) to 21 ft-lbs.
2. Install brake caliper kit (17) per paragraph 5-44.7.
3. Install brake shaft assembly (8) as follows:
   a. Install parking brake plate arm assembly (16) by installing brake shaft (8) through left side of tractor. Secure parking brake plate arm to shaft with spiral spring pin.
   b. Install left brake pedal assembly (15) to shaft (8) with spiral spring pin.
   c. Install right brake pedal assembly (13) to shaft (8) and secure with retaining ring (14).
   d. Install brake rod (9), adjustment clevis (10) and extension spring (11). Secure items (9, 10 and 11) to right brake pedal assembly with clevis pin (12), flat washer and cotter pin.
4. Install brake pedal assembly (1) as follows:
   a. Install brake lever (7) on brake pedal assembly (1) as assembly is installed from left side of tractor. Secure brake pedal assembly (1) and brake lever (7) with spiral spring pins.
   b. Install center brake rod (6) onto parking brake plate arm assembly (16) and brake lever (7) and secure with flat washer and cotter pin.
   c. Install extension spring (5).
   d. Install start switch bracket (2) with hex cap screw (4) and hex center lock nut (3).
5. Install frame cover.
6. Adjust the brakes per paragraph 6-5.

5-44. BRAKE CALIPER ASSEMBLY (All Models.)

5-44.1 **General.** Before servicing the brake caliper assembly, refer to Appendix D for a list of mandatory replacement parts.

WARNING

Place the tractor on a level surface and chock the wheels before performing corrective maintenance on the brake caliper assembly.

5-44.2 **Removal.**

1. Remove tension spring and brake mounting bracket per paragraph 5-41.2 (Models 1340, 1541, 1860 and 1862), 5-42.2 (Model 1535) or 5-43.2 (Models 1782, 1882, 2082 or 2182).

5-44.3 **Disassembly.**

1. Disassemble brake caliper kit (1, Figure 5-65) as follows:
   a. Remove brake puck kit (2) by removing hex lock nuts (3), hex cap screws (4), spacers, compression spring (5) and flat washers (6).
   b. Remove actuator bracket (7) and brake mounting bracket.
2. Disassemble actuator arm (8) from actuator bracket (7) by removing hex top lock jam nut (9) and socket head shoulder screw (10).

5-44.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and internal wear.
3. Inspect compression springs (5) for signs of wear or weakness. Discard worn springs.
4. Inspect brake pucks (2) for excessive pad wear. Discard pucks with excessive pad wear.

5-44.5 **Repair.** Refer to Appendix E for contingency replacement parts which are worn or damaged beyond repair.

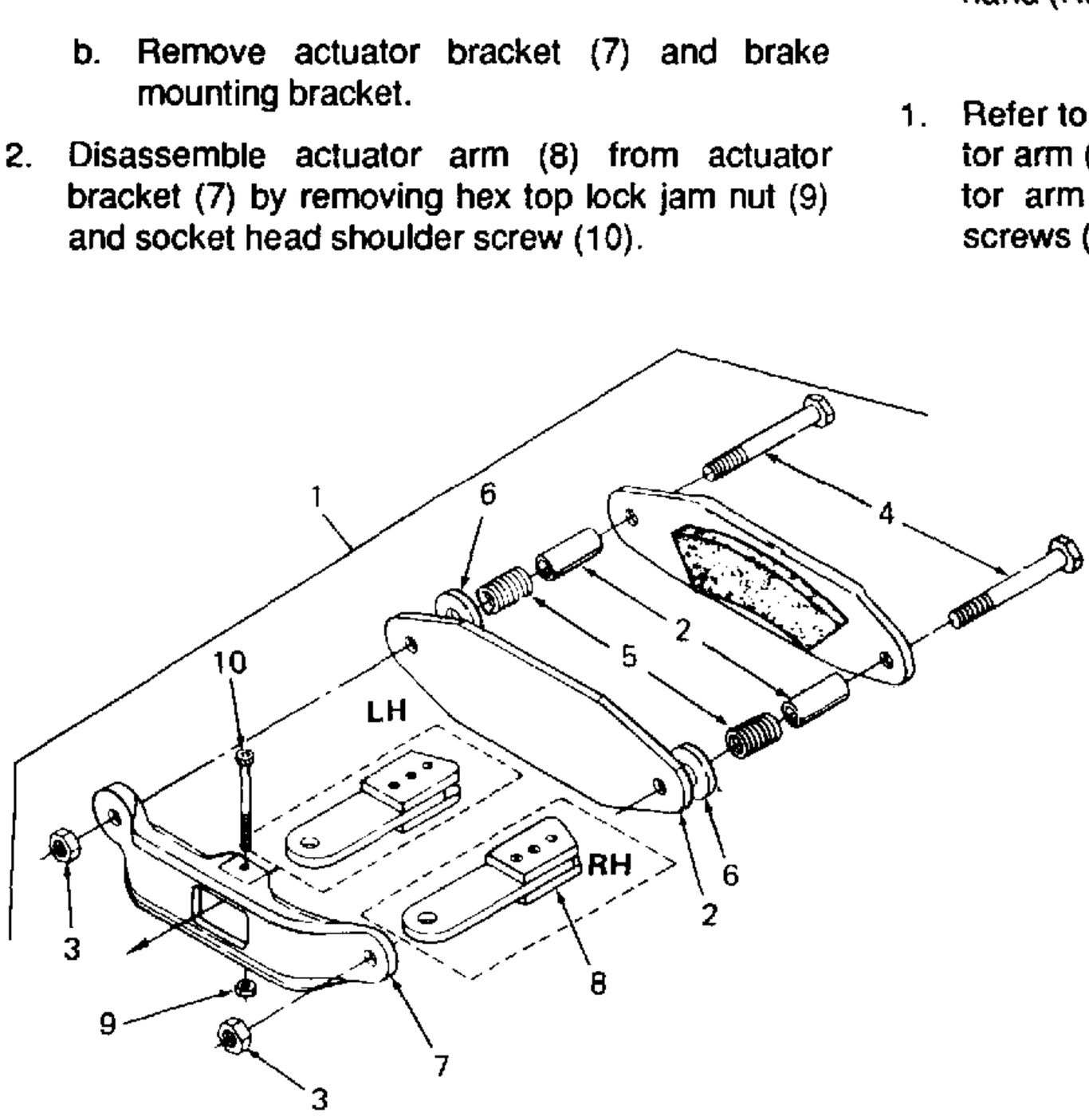
1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-44.6 **Reassembly.**

CAUTION

Proper positioning of actuator arm (8) is necessary for proper brake caliper operation. Refer to Figure 5-65 to determine proper positioning for left hand (LH) or right hand (RH) actuator arm.

1. Refer to Figure 5-65 and correctly position actuator arm (8) on actuator bracket (7). Secure actuator arm to bracket with socket head shoulder screws (10) and hex top lock jam nut (9).



1. Brake Caliper Kit
2. Brake Puck Kit
3. Hex Lock Nut
4. Hex Cap Screw
5. Compression Spring
6. Flat Washer
7. Actuator Bracket
8. Actuator Arm
9. Hex Top Lock Jam Nut
10. Socket Head Shoulder Screw

Figure 5-65. Brake Caliper Assembly (All Models).

2. Reassemble brake caliper kit (1) by installing brake puck kit (2), spacers, compression springs (5), flat washers (6), brake mounting bracket and actuator bracket (7) onto hex cap screw (4). Secure with hex lock nut (3).

5-44.7 **Installation.**

1. Install brake mounting bracket and tension spring per paragraph 5-41.7 (Models 1340, 1541, 1860 and 1862), 5-42.7 (Model 1535) or 5-43.7 (Models 1782, 1882, 2082 or 2182).

5-45. FUEL TANK (Models 1340, 1535, 1541, 1860, 1862, 1882, 2082 and 2182).

5-45.1 **General.** Refer to special product in paragraph 5-45.6, step 3.b before servicing this equipment.

5-45.2 **Removal.**

WARNING

Fuel vapors are very flammable. Do not service the fuel tank when the tractor engine is hot. Remove all sources of ignition.

1. Disconnect the battery per paragraph 5-7.2 (Model 1340), 5-8.2 (Models 1535, 1541, 1860, 1862, 1882 and 2082) or 5-10.5 (Model 2182).

2. Remove fuel cap (2, Figure 5-66) and drain all fuel from fuel tank assembly (1). Close fuel shutoff valves (11).

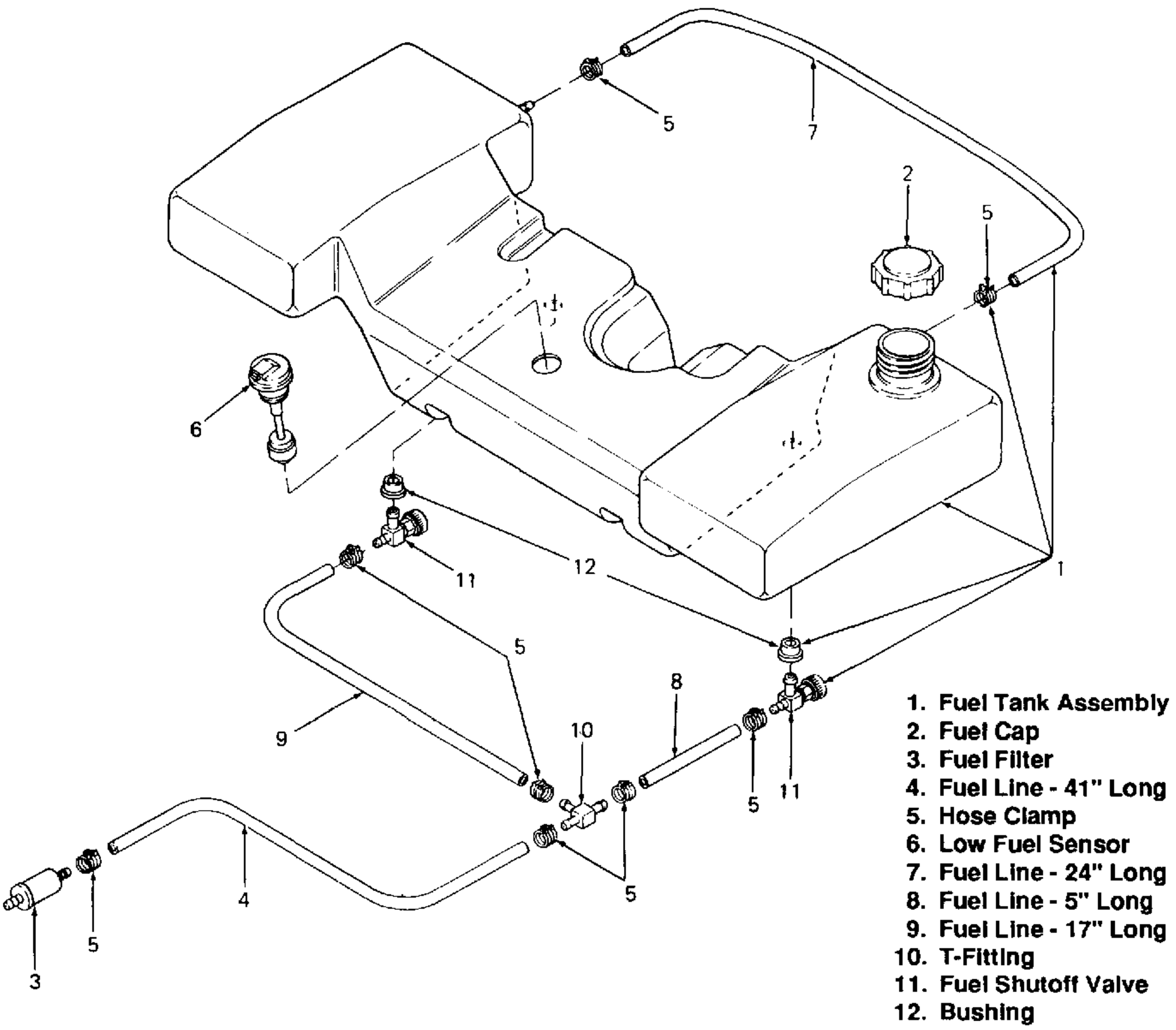


Figure 5-66. Fuel Tank (Models 1340, 1535, 1541, 1860, 1862, 1882, 2082 and 2182).

3. Remove seat and track assembly per paragraph 5-24.2 (Models 1340, 1541, 1860, 1862, 1882, 2082 and 2182) or 5-25.2 (Model 1535).
4. Remove fender per paragraph 5-26.2 (Models 1340, 1535, 1541, 1860 and 1862) or 5-27.2 (Models 1882, 2082 and 2182).
5. Remove fuel filter (3) from engine.
6. Remove fuel line (4) from fuel filter (3) and T-fitting (10) by removing hose clamps (5).
7. Remove electrical lead from low fuel sensor (6).
8. Remove fuel tank assembly (1) from tractor.

5-45.3 **Disassembly.**

1. Remove low fuel sensor (6) from tank by first disconnecting electrical lead, then twist sensor back and forth while pulling upward.
2. Remove fuel lines (7, 8 and 9) and T-fitting (10) by removing hose clamps (5).

NOTE

If fuel shutoff valve (11) is removed, bushing (12) must be removed, discarded and replaced.

3. Remove fuel shutoff valves (11). Remove and discard bushings (12).

5-45.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect fuel tank assembly (1) for cracks or damage.
3. Inspect fuel filter (3) for dirt. Discard and replace dirty filter.
4. Inspect fuel lines (4, 7, 8 and 9) for kinks, cracks or wear on ends of each hose. Discard and replace damaged hoses.
5. Inspect hose clamps (5) for damage. Discard and replace damaged clamps.

5-45.5 **Repair.** No repairable parts. Replace damaged or worn parts.

5-45.6 **Reassembly.**

NOTE

If fuel shutoff valve (11) was previously removed, bushing (12) must be replaced.

1. Install bushings (12) and fuel shutoff valves (11).
2. Install fuel lines (7, 8 and 9) and T-fitting (10) with hose clamps (5).
3. Install low fuel sensor (6). Refer to Figure 5-67.
   a. Remove seal from sensor.
   b. Apply either Lock-Tite Gasket Eliminator 515 Sealant or Permatex 2 Form-A-Gasket to inside and outside of seal.
   c. Install seal on sensor and install sensor in fuel tank.

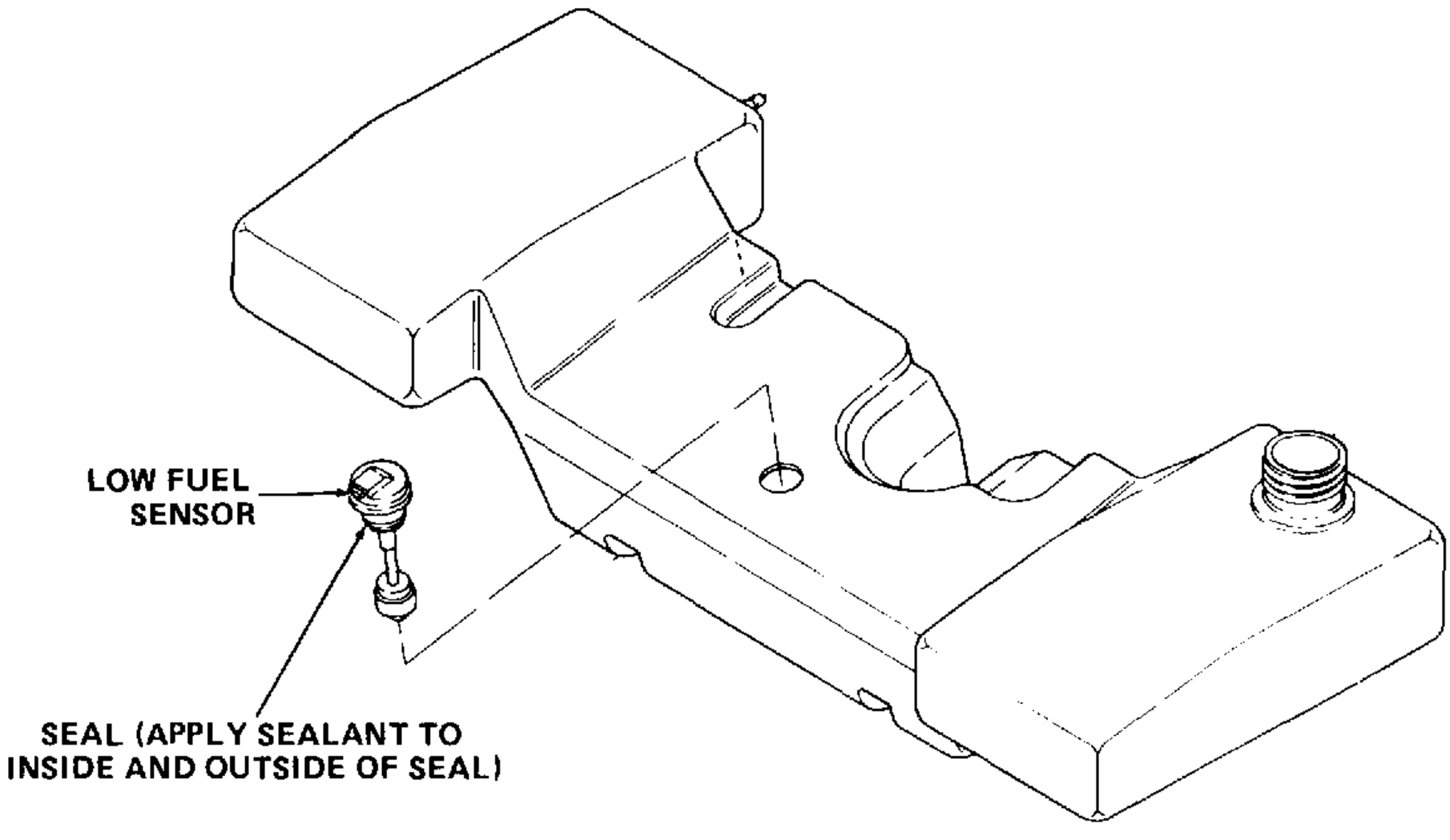


Figure 5-67. Low Fuel Sensor Installation.

5-45.7 **Installation.**

1. Place fuel tank assembly (1, Figure 5-66) on tractor.
2. Install fender per paragraph 5-26.7 (Models 1340, 1535, 1541, 1860 and 1862) or 5-27.2 (Models 1882, 2082 and 2182).
3. Connect electrical lead to low fuel sensor (6).
4. Install fuel line (4) to T-fitting (10) and fuel filter (3) with hose clamp (5).
5. Connect fuel filter (3) to engine.
6. Install seat and track assembly per paragraph 5-24.7 (Models 1340, 1541, 1860, 1862, 1882, 2082 and 2182) or 5-25.7 (Models 1535).
7. Refill fuel tank (1) until fuel level is above sensor (6). Install fuel cap (2).
8. Open fuel shutoff valves (11) and check for leaks including area around sensor (6).
9. Connect battery per paragraph 5-7.5 (Model 1340), 5-8.5 (Models 1535, 1541, 1860, 1862, 1882 and 2082) or 5-10.5 (Model 2182).

5-46. FUEL TANK (Model 1782).

5-46.1 **General.** Refer to special product in paragraph 5-46.6, step 5.b before servicing this equipment.

5-46.2 **Removal.**

WARNING

Fuel vapors are very flammable. Do not service the fuel tank when the tractor engine is hot. Remove all sources of ignition.

WARNING

When removing fuel tank from tractor, plug fuel lines to prevent spills.

NOTE

If tank is to be disassembled, empty tank before removing from tractor.

1. Disconnect the battery per paragraph 5-9.2.
2. Remove fuel cap (2, Figure 5-68) and drain all fuel from fuel tank assembly (1). Close fuel shutoff valves (14).
3. Remove seat and track assembly per paragraph 5-24.2.
4. Remove fender per paragraph 5-27.2.
5. Remove fuel filter (3) from engine.
6. Remove fuel line (4) from fuel filter (3) and T-fitting (10) by removing hose clamps (5).
7. Remove fuel line (9) from engine by removing hose clamp (11).
8. Remove electrical lead from low fuel sensor (6).
9. Remove fuel tank assembly (1) from tractor.

5-46.3 **Disassembly.**

1. Remove low fuel sensor (6) from tank by first disconnecting electrical lead, then twist sensor back and forth while pulling upward.
2. Remove fuel lines (7 and 8) from fuel tank and T-fitting (10) by removing hose clamps (5).
3. Remove fuel line (9) from T-fitting (10) by removing hose clamp (5), and from engine by removing hose clamp (11).

NOTE

If fuel shutoff valves (14) are removed, bushing (15) must be removed, discarded and replaced.

4. Remove fuel lines (12 and 13) from T-fitting (10) and fuel shutoff valves (14) by removing hose clamps (5).
5. Remove fuel shutoff valves (14). Remove and discard bushings (15).

5-46.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect fuel tank assembly (1) for cracks or damage.
3. Inspect fuel filter (3) for dirt. Discard and replace dirty filter.
4. Inspect fuel lines (4, 7, 8, 9, 12 and 13) for kinks, cracks or wear on ends of each hose. Discard and replace damaged hoses.
5. Inspect hose clamps (5) for damage. Discard and replace damaged clamps.

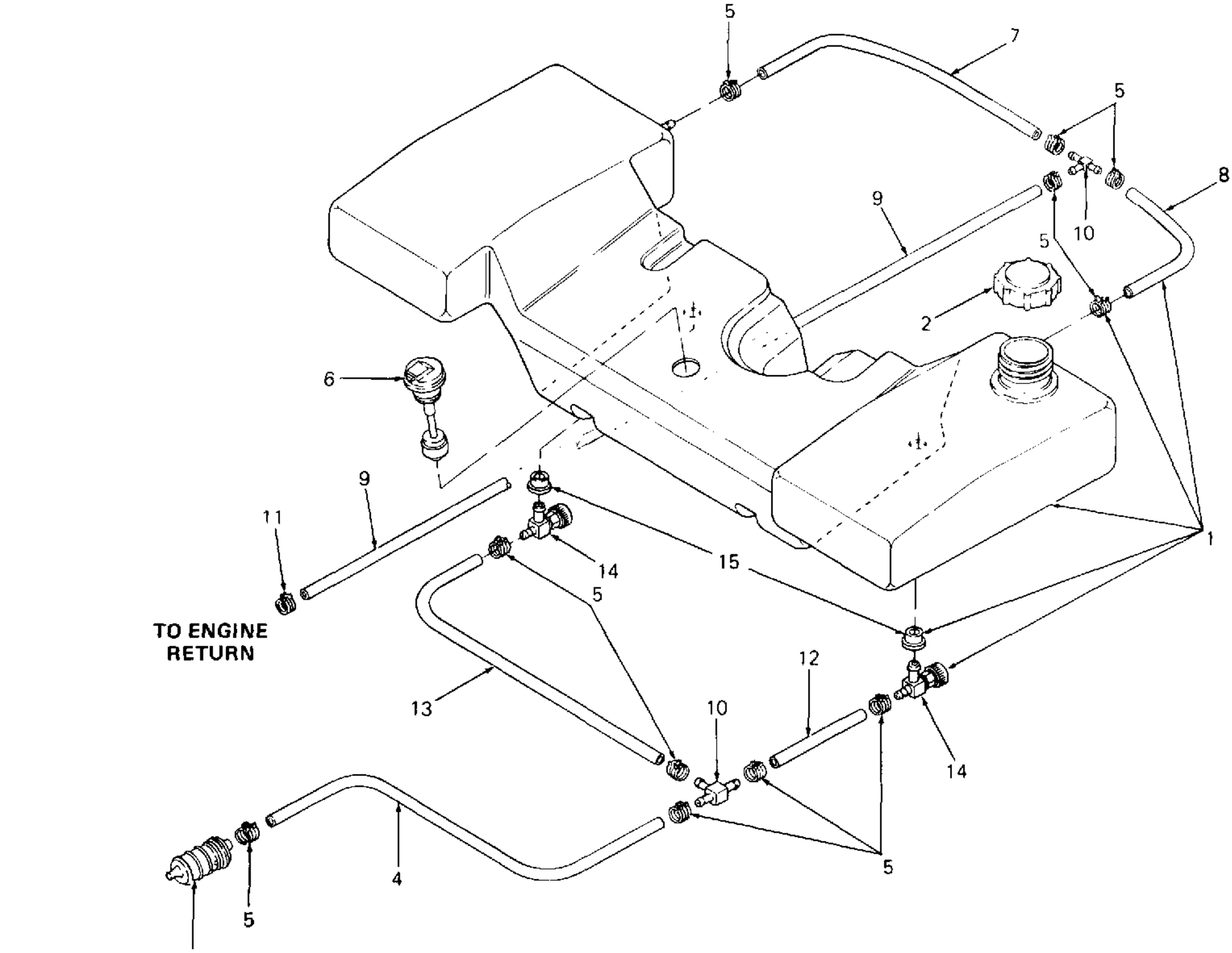
5-46.5 **Repair.** No repairable parts. Replace damaged or worn parts.

5-46.6 **Reassembly.**

NOTE

If fuel shutoff valve (14) was previously removed, bushing (15) must be replaced.

1. Install bushings (15) and fuel shutoff valves (14).
2. Install fuel lines (12 and 13) on T-fitting (10) and fuel shutoff valves (14) with hose clamps (5).
3. Install fuel line (9) onto T-fitting (10) with hose clamp (5).
4. Install fuel lines (7 and 8) onto fuel tank and T-fitting (10) with hose clamps (5).



1. **Fuel Tank Assembly**
2. **Fuel Cap**
3. **Fuel Filter**
4. **Fuel Line - 38" Long**
5. **Hose Clamp**
6. **Low Fuel Sensor**
7. **Fuel Line - 14" Long**
8. **Fuel Line - 9" Long**
9. **Fuel Line - 73" Long**
10. **T-Fitting**
11. **Hose Clamp**
12. **Fuel Line - 5" Long**
13. **Fuel Line - 19" Long**
14. **Fuel Shutoff Valve**
15. **Bushing**

Figure 5-68. Fuel Tank (Model 1782).

5. Install low fuel sensor (6). Refer to Figure 5-67.
   a. Remove seal from sensor.
   b. Apply either Lock-Tite Gasket Eliminator 515 Sealant or Permatex 2 Form-A-Gasket to inside and outside of seal.
   c. Install seal on sensor and install sensor in fuel tank.

5-46.7 **Installation.**

1. Place fuel tank assembly (1, Figure 5-68) on tractor.
2. Install fender per paragraph 5-27.7.
3. Connect electrical lead to low fuel sensor (6).
4. Connect fuel line (9) to engine with hose clamp (5).
5. Install fuel line (4) to fuel filter (3) and T-fitting (10) with hose clamps (5).
6. Connect fuel filter (3) to engine.
7. Install seat and track assembly per paragraph 5-24.7.
8. Refill fuel tank (1) until fuel level is above sensor (6). Install fuel cap (2).
9. Open fuel shutoff valves (14) and check for leaks including area around sensor (6).
10. Connect battery per paragraph 5-9.5.

5-46A. FUEL PUMP (Models 1535, 1541, 1862, 1882 and 2082 [Tractor Serial Number 811,501 and above]).

5-46A.1 **Removal.**

WARNING

Fuel vapors are very flammable. Do not service the fuel pump when the tractor engine is hot. Remove all sources of ignition.

WARNING

When removing fuel pump, plug fuel lines to prevent spills.

1. Remove fuel line (12, Figure 5-68A) from fuel filter (11) and fuel pump (10) by removing hose clamps (7).
2. Remove short fuel line (5) and long fuel line (6) by removing hose clamps (7).
3. Unscrew hose connector (1) from fuel cover (4) and gasket (2).
4. Remove fuel pump (10) by removing truss machine screws (8) and hex center lock nuts (9).

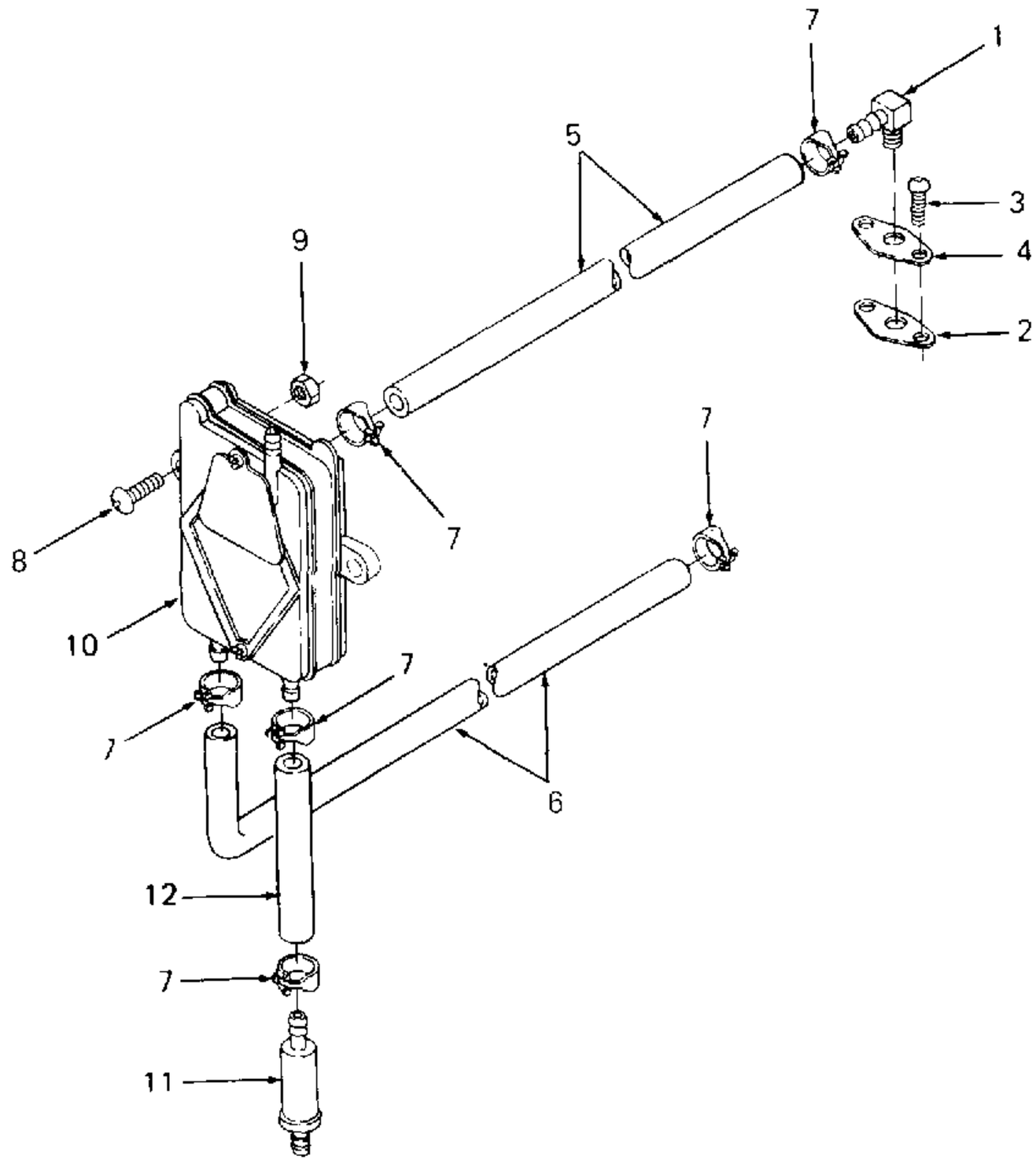
5-46A.2 **Inspection.** Clean all parts prior to inspection.

1. Inspect fuel pump (10) for dirt or wear. Discard and replace if required.
2. Inspect fuel lines (5, 6 and 12) for kinks, cracks or wear on ends of each line. Discard and replace damaged lines.
3. Inspect hose clamps (7) for damage. Discard and replace damaged clamps.

5-46A.3 **Repair.** No repairable parts. Replace damaged or worn parts.

5-46A.4 **Installation.**

1. Install fuel pump (10) with truss machine screws (8) and hex center lock nuts (9).
2. Install hose connector (1) and long and short fuel lines (5 and 6) with hose clamps (7).
3. Install fuel line (12) connecting fuel pump (10) to fuel filter (11) with hose clamps (7).



1. Hose Connector
2. Fuel Pump Gasket
3. Screw
4. Cover
5. Fuel Line, Short
6. Fuel Line, Long
7. Hose Clamp
8. Truss Machine Screw
9. Hex Center Lock Nut
10. Fuel Pump
11. Fuel Filter
12. Fuel Line, 5-inch

Figure 5-68A. Fuel Pump (Models 1535, 1541, 1862, 1882 and 2082).

5-47. **TRANSMISSION CONTROLS (Models 1340, 1541, 1782, 1860, 1862, 1882, 2082 and 2182).**

5-47.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-47.2 **Removal.**

1. Remove side panels per paragraph 5-4.2 (Models 1340, 1541, 1860, 1862, 1882 and 2082) or 5-5.2 (Models 1782 and 2182).
2. Remove the battery per paragraph 5-7.2 (Model 1340), 5-8.2 (Models 1541, 1860, 1862, 1882 and 2082), 5-9.2 (Model 1782) or 5-10.2 (Model 2182).
3. Remove radiator per paragraph 5-6.2 (Models 1782 and 2182 only).
4. Remove the frame cover.
5. Remove cross shaft assembly (1, Figure 5-69) by removing speed control knob (2), hex jam nuts (3 and 4), rockshaft bearing screw (5), hex top lock nut (6), bell washers (7), hex patch lock nut (8) and friction disc (9).
6. Remove connecting rod (10) by removing hex patch lock nut (8) from rear end of rod.
7. Disconnect front end of control rod (16) by removing cotter pin, flat washer and clevis pin.
8. Remove assembled control cam (20) from hydrostatic transmission as follows:
   a. Remove cam pivot bracket (11) by removing hex cap screw (12) and flat washer (13).
   b. Remove damper spring plate assembly (17) by removing snap ring (19).

5-47.3 **Disassembly.**

1. Disassemble connecting rod (10) by removing ball joints (21 and 22) and hex jam nuts (23 and 24).
2. Disassemble damper spring plate assembly (17) by removing spring guide pins (25) and compression springs (26 and 27).
3. Disassemble control rod (16) by removing adjustment clevis (28) and hex jam nut (29).

4. Disassemble control cam (20) as follows:

   a. Remove cam pivot bracket (11) and control rod (16) from control cam (20) by removing snap ring (14) and flat washer (15).

   b. Remove damper spring plate assembly (17) from cam control (20) by removing retaining ring (18).

5-47.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear. Especially check friction disc (9) for signs of cracks. Discard and replace cracked friction disc.
3. Inspect springs (26 and 27) for damage or distortion. Maximum unloaded spring length is 1-1/16 inch. Discard and replace damaged springs or those which exceed maximum length.
4. Inspect shafts (1) and rods (10 and 16) for cracks or distortion.
5. Inspect damper spring plate assembly (17) for wear on pin.
6. Inspect control cam (20) for damage or wear to top slot.

5-47.5 **Repair.** Refer to Appendix E for contingency replacement parts which are worn or damaged beyond repair.

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth. Especially check pin surface of damper spring plate assembly (17) and top slot of cam control (20).

5-47.6 **Reassembly.**

1. Reassemble control rod (16) by installing hex jam nut (29) and adjustment clevis (28).

NOTE

When reassembling the damper spring plate assembly (17), the larger compression spring (26) is positioned toward the front and the smaller compression spring (27) toward the rear.

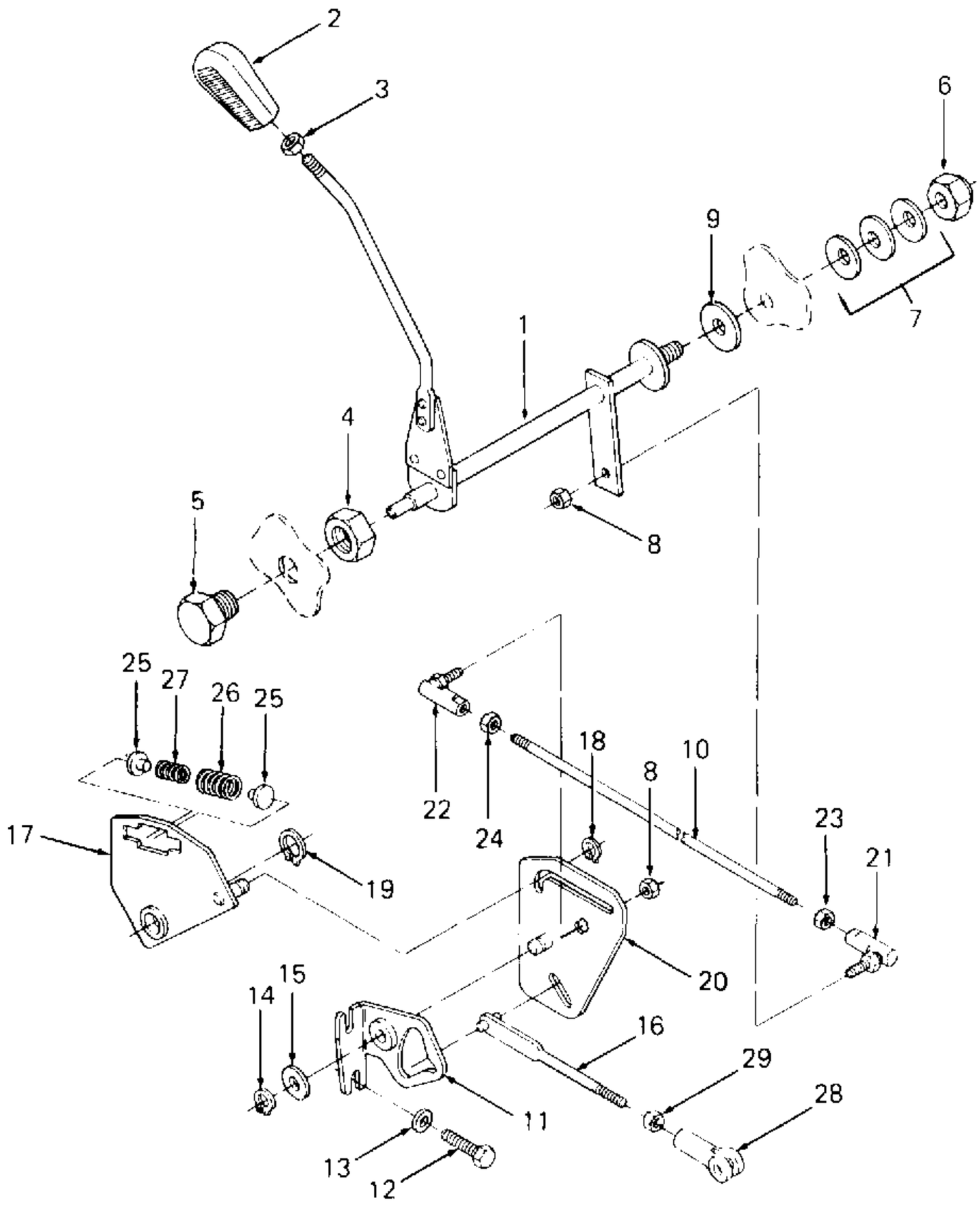
2. Reassemble damper spring plate assembly (17) by capturing compression springs (26 and 27) between spring guide pins (25) and position in damper spring plate assembly.
3. Reassemble the connecting rod (10) by installing hex jam nuts (23 and 24) and ball joints (21 and 22).
4. Reassemble control cam (20) as follows:

   a. Secure control rod (16) and cam pivot bracket (11) to control cam (20) with flat washer (15) and snap ring (14).

   b. Secure damper spring plate assembly (17) with retaining ring (18).

5-47.7 **Installation.**

1. Install assembled control cam (20) and damper spring plate assembly (17) onto hydrostatic transmission with snap ring (19).
2. Secure front end of control rod (16) with clevis pin, flat washer and cotter pin.
3. Install rear end of connecting rod (10) to control cam (20) with hex patch lock nut (8).
4. Install cross shaft assembly (1) by first placing friction disc (9) and hex jam nut (4) on ends of shaft. Secure cross shaft assembly with bell washers (7), hex top lock nut (6) and rockshaft bearing screw (5). Install hex jam nut (3) and speed control knob (2).
5. Adjust friction pressure on cross shaft assembly per paragraph 6-6.
6. Secure front end of connecting rod (10) to cross shaft assembly (1) with hex patch lock nut (8).
7. Adjust cam pivot bracket (11) per paragraph 6-7.
8. Install frame cover.
9. Install battery per paragraph 5-7.5 (Model 1340), 5-8.5 (Models 1541, 1860, 1862, 1882 and 2082), 5-9.5 (Model 1782) or 5-10.5 (Model 2182).
10. Install radiator per paragraph 5-6.3 (Models 1782 and 2182 only).
11. Install side panels per paragraph 5-4.7 (Models 1340, 1541, 1860, 1862, 1882 and 2082) or 5-5.7 (Models 1782 and 2182).



1. Cross Shaft Assembly
2. Speed Control Knob
3. Hex Jam Nut
4. Hex Jam Nut
5. Rockshaft Bearing Screw
6. Hex Top Lock Nut
7. Bell Washer
8. Hex Patch Lock Nut
9. Friction Disc
10. Connecting Rod
11. Cam Pivot Bracket
12. Hex Cap Screw
13. Flat Washer
14. Snap Ring
15. Flat Washer
16. Control Rod
17. Damper Spring Plate Assembly
18. Retaining Ring
19. Snap Ring
20. Control Cam
21. Ball Joint
22. Ball Joint
23. Hex Jam Nut
24. Hex Jam Nut
25. Spring Guide Pin
26. Compression Spring
27. Compression Spring
28. Adjustment Clevis
29. Hex Jam Nut

Figure 5-69. Transmission Controls (Models 1340, 1541, 1782, 1860, 1862, 1882, 2082 and 2182).

5-48. **DRIVE LINE (Models 1340, 1541 [Tractor Serial Numbers 800,000 through 800,349 and 800,534 and above], 1860 [Tractor Serial Numbers 800,000 through 800,461 and 800,596 and above] and 1862).**

5-48.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-48.2 **Removal.**

1. Remove side panels per paragraph 5-4.2.
2. Remove frame cover.
3. Remove drive shaft (1, Figure 5-70) as follows:

a. Remove drive shaft from engine as follows:

(1) Remove socket head cap screw (3) and lock washer (4). Cut tie strap (5) and slide coupling boot (2) and rear drive coupling (7) rearward on shaft.

(2) Remove steel balls (8), O-ring (17), front drive coupling (7), coupling cover (6) and drive hub (9). Discard and replace O-ring.

NOTE

Tractors prior to the 1991 model year (Serial Number 811,671 and below) were not equipped with O-rings (17). When circumstances permit, these tractors may be upgraded during repair by installing grooved drive couplings (7, Figure 5-70) with O-rings (17) seated.

(3) Remove rear drive coupling (7) and coupling boot (2) from drive shaft. Discard coupling boot.

b. Remove coupling from hydrostatic pump as follows:

(1) Remove fan nut (11) and slide fan (10) forward on shaft.

(2) Remove flat washer (12). Cut tie strap (5) and move coupling boot (2) forward.

(3) Move front drive coupling (7) forward and remove steel balls (8).

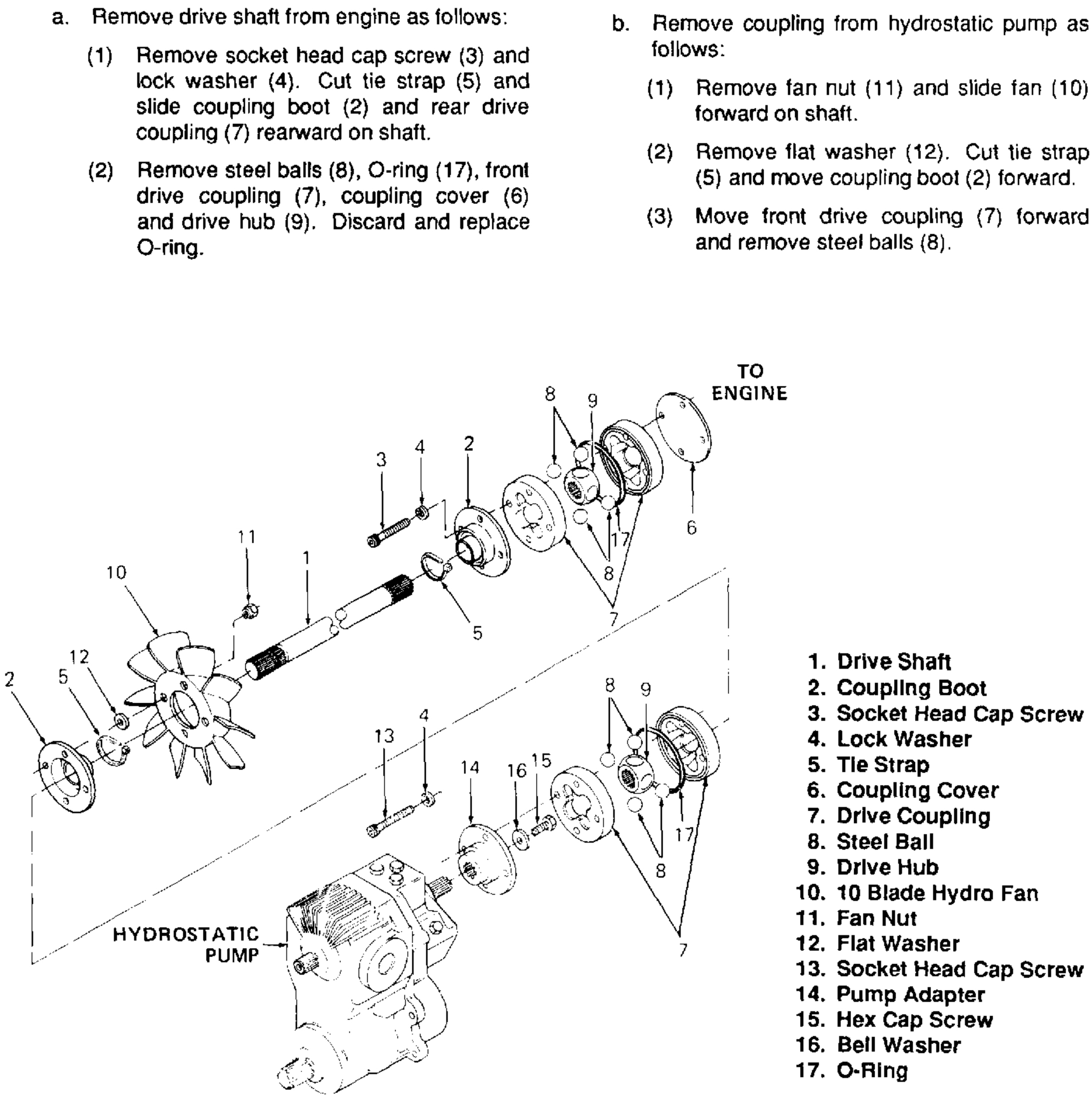


Figure 5-70. Drive Line (Models 1340, 1541, 1860 and 1862).

(4) Remove socket head cap screws (13), lock washers (4) and rear drive coupling (7). Discard and replace O-ring (17).

NOTE

On early models only, a snap ring may be found on the drive shaft immediately forward of the drive hub.

NOTE

Tractors prior to the 1991 model year (Serial Number 811,671 and below) were not equipped with O-rings (17). When circumstances permit, these tractors may be upgraded during repair by installing grooved drive couplings (7, Figure 5-70) with O-rings (17) seated.

(5) Remove drive hub (9). Remove front drive coupling (7), coupling boot (2) and fan (10) from shaft. Discard boot (2).

(6) Remove pump adapter (14) by removing hex cap screw (15) and bell washer (16).

5-48.3 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect drive shaft (1) for cracks or distortion. Replace if bent.
4. Inspect splined areas of drive shaft (1), drive hub (9) and pump adapter (14) for damage.
5. Inspect fan (10) for damaged or missing blades. Discard and replace fan if blades are missing.
6. Inspect drive hub (9) in both front and rear coupling assemblies as follows:

NOTE

When assembling the drive hub for inspection in step 6.a, DO NOT lubricate parts and DO NOT install steel balls (8).

a. Assemble drive hub (9), drive couplings (7) with O-rings (17) seated, and firmly secure with four socket head cap screws (13), lock washers (4) and nuts (11).

b. Grasp assembled joint and insert drive shaft into drive hub (9).

c. Rotate free end of drive shaft in an approximate 4 inch circle. Refer to Figure 5-37.

NOTE

Drive hub should rotate freely in response to movement of drive shaft.

d. If drive hub (9) is hard to move, or is tight at a particular position, discard and replace hub. If drive couplings (7) are damaged, discard and replace.

CAUTION

Following the inspection described in step 6, the joint must be disassembled for reassembly onto the drive shaft and installation of the steel balls.

5-48.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to splined areas.

5-48.5 **Installation.**

1. Install drive shaft (1) as follows:
   a. Install drive shaft (1) onto hydrostatic pump as follows:
      (1) Coat parts 2, 7, 8, 9 and 14 with C-V Joint grease.
      (2) Install pump adapter (14), containing lock washer (4) and socket head cap screw (13), on shaft of hydrostatic pump with bell washer (16) and hex cap screw (15). Torque hex cap screw (15) to 132 in-lbs.
      (3) Install a drive coupling (7) against pump adapter (14) by aligning with socket head cap screw (13).

CAUTION

A new coupling boot (2) must be installed when the drive shaft is installed.

      (4) Place fan (10), coupling boot (2), a drive coupling (7) and drive hub (9) on drive shaft.
      (5) Install steel balls (8) in drive coupling (7).
      (6) Align parts installed on drive shaft, including flat washer (12), with socket head cap screw (13) and secure with fan nut (11).
      (7) Position coupling boot (2) and secure with tie strap (5).
   b. Install drive shaft onto engine as follows:
      (1) Coat parts 2, 7, 8 and 9 with C-V Joint grease.

CAUTION

A new coupling boot (2) must be installed when the drive shaft is installed.

NOTE

On early models only, a snap ring may be found on the drive shaft immediately forward of the drive hub.

(2) Place coupling boot (2), a drive coupling (7) and drive hub (9) on drive shaft.

(3) Install steel balls (8) in drive coupling (7).

(4) Align parts installed on drive shaft with a drive coupling and coupling cover (6) and secure with socket head cap screw (13) and lock washer (4).

(5) Position coupling boot (2) and secure with tie strap (5).

2. Install frame cover.

3. Install side panels per paragraph 5-4.7.

5-49. DRIVE LINE [Models 1541 (Tractor Serial Numbers 800,350 through 800,533) and 1860 (Tractor Serial Numbers 800,462 through 800,595)].

5-49.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-49.2 **Removal.**

1. Remove side panels per paragraph 5-4.2.

2. Remove frame cover.

3. Remove drive shaft (1, Figure 5-71) as follows:

   a. Remove coupling assembly (5) from hydrostatic pump as follows:

      (1) Remove hex center lock nuts, flat washers and hex cap screws that secure flexible discs (3) to coupling.

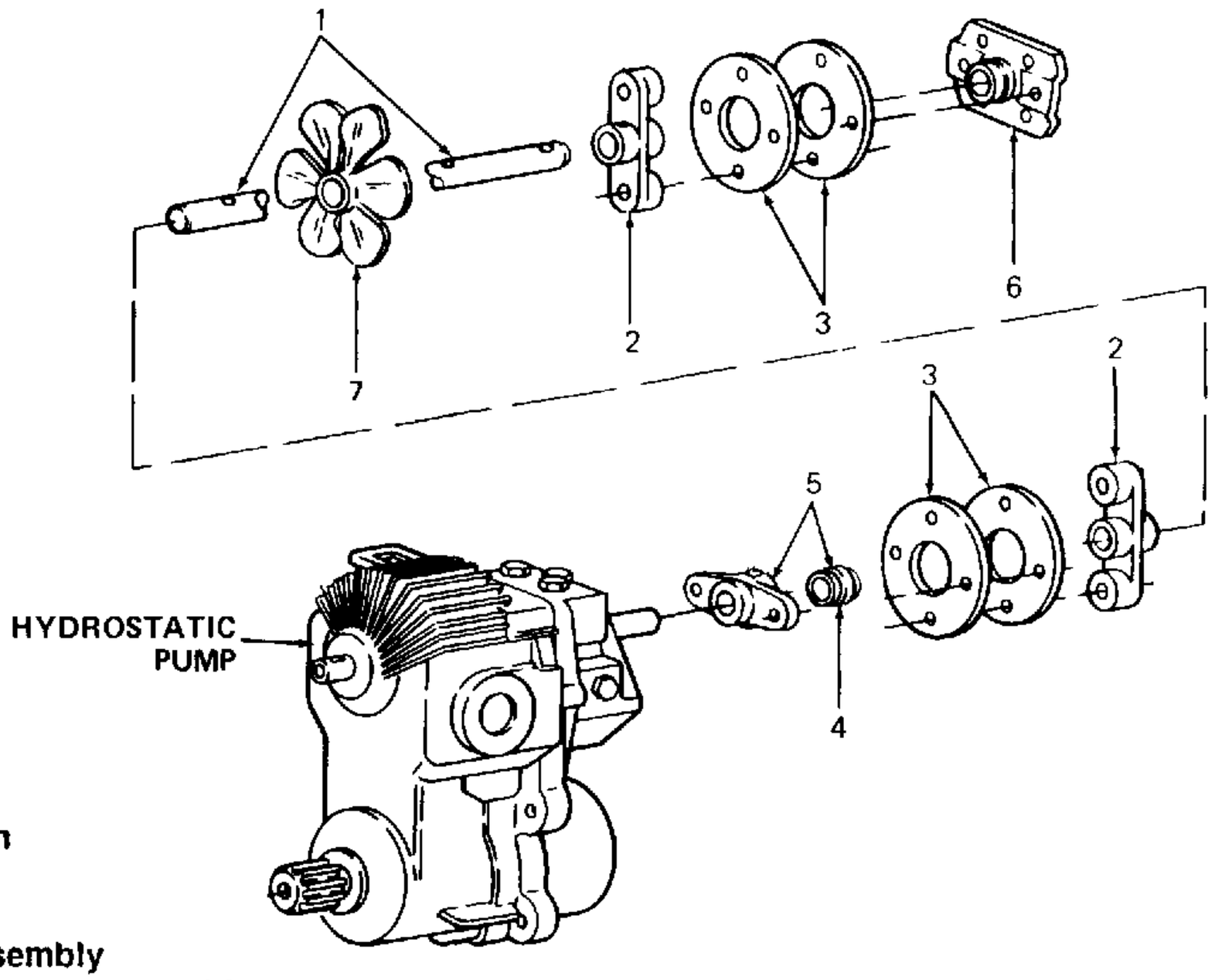
      (2) Move coupling arm (2) and attached flexible discs (3) forward on the shaft by supporting drive shaft (1) and driving out spiral spring pin from coupling arm (2). Discard spiral spring pin.

      (3) Remove ball bushing (4).

      (4) Remove coupling assembly (5) from shaft of hydrostatic pump by removing spiral spring pin. Discard spiral spring pin.

      (5) Remove coupling arm (2) and attached flexible discs (3) from shaft.

      (6) Remove cooling fan (7) by removing hex center lock nut, flat washer and truss machine screw.



1. Drive Shaft
2. Coupling Arm
3. Flexible Disc
4. Ball Bushing
5. Coupling Assembly
6. Drive Shaft Flange Assembly
7. Cooling Fan

Figure 5-71. Drive Line (Models 1541 and 1860).

b. Remove coupling from engine as follows:

(1) Remove hex center lock nuts and flat washers that secure flexible discs (3) to drive shaft flange assembly (6).

(2) Remove coupling arm (2) and attached flexible discs (3) from shaft by supporting drive shaft and driving out spiral spring pin from coupling arm (2). Discard spiral spring pin.

(3) Remove drive shaft flange assembly (6) by removing hex cap screws and lock washers.

5-49.3 **Disassembly.** Disassemble flexible discs (3) from coupling arms (2) by removing hex center lock nuts, flat washers and hex cap screws. Discard flexible discs.

5-49.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect drive shaft (1) for cracks or distortion. Replace if bent.
4. Inspect cooling fan (7) for damaged or missing blades. Discard and replace fan if blades are missing.

5-49.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-49.6 **Reassembly.**

CAUTION

New flexible discs (3) must be used when reassembling the drive shaft.

1. Reassemble flexible discs (3) onto coupling arms (2) with hex cap screws, flat washers and hex center lock nuts.

5-49.7 **Installation.**

1. Install drive shaft (1) as follows:

a. Install drive shaft (1) onto engine as follows:

(1) Place coupling arm (2) and attached flexible discs (3) over front end of drive shaft (1).

(2) Install drive shaft flange (6) onto engine with lock washers and hex cap screws.

(3) Slide flexible discs (3) over drive shaft flange bolts and install lock washers and hex cap screws.

CAUTION

A new spiral spring pin must be used when the drive line is reinstalled.

(4) Support drive shaft (1) and install spiral spring pin.

b. Install drive shaft (1) onto hydrostatic pump as follows:

(1) Install cooling fan (7) onto drive shaft (1) with truss machine screw, flat washer and center lock nut.

(2) Place coupling arm (2) and attached flexible discs (3) over rear end of drive shaft (1).

CAUTION

A new spiral spring pin must be used when the drive line is reinstalled.

(3) Install coupling assembly (5) on shaft of hydrostatic pump shaft and secure with spiral spring pin.

(4) Install ball bushing (4).

(5) Slide flexible discs (3) rearward and secure to coupling (2) with hex cap screws, lock washers and hex center lock nuts.

CAUTION

A new spiral spring pin must be used when the drive line is reinstalled.

(6) Support drive shaft (1) and install spiral spring pin.

2. Install frame cover.
3. Install side panels per paragraph 5-4.7.

5-50. **DRIVE LINE (Models 1782, 1882, 2082 and 2182).**

5-50.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-50.2 **Removal.**

1. Remove side panels per paragraph 5-4.2 (Models 1882 and 2082) or 5-5.2 (Models 1782 and 2182).
2. Remove radiator per paragraphs 5-6.2 and 5-6A.2 (Models 1782 and 2182 only).
3. Remove frame cover.
4. Remove drive shaft (14, Figure 5-72) as follows:
   a. Remove rear coupling assembly (6) from hydrostatic pump as follows:
      (1) Remove fan nut (1) and slide fan (2) forward on shaft.
      (2) Remove flat washer (3). Cut tie strap (4) and move coupling boot (5) forward.
      (3) Move front drive coupling (6) forward on shaft, and remove steel balls (7).
      (4) Remove socket head cap screws (8), lock washers (9) and rear drive coupling (6).

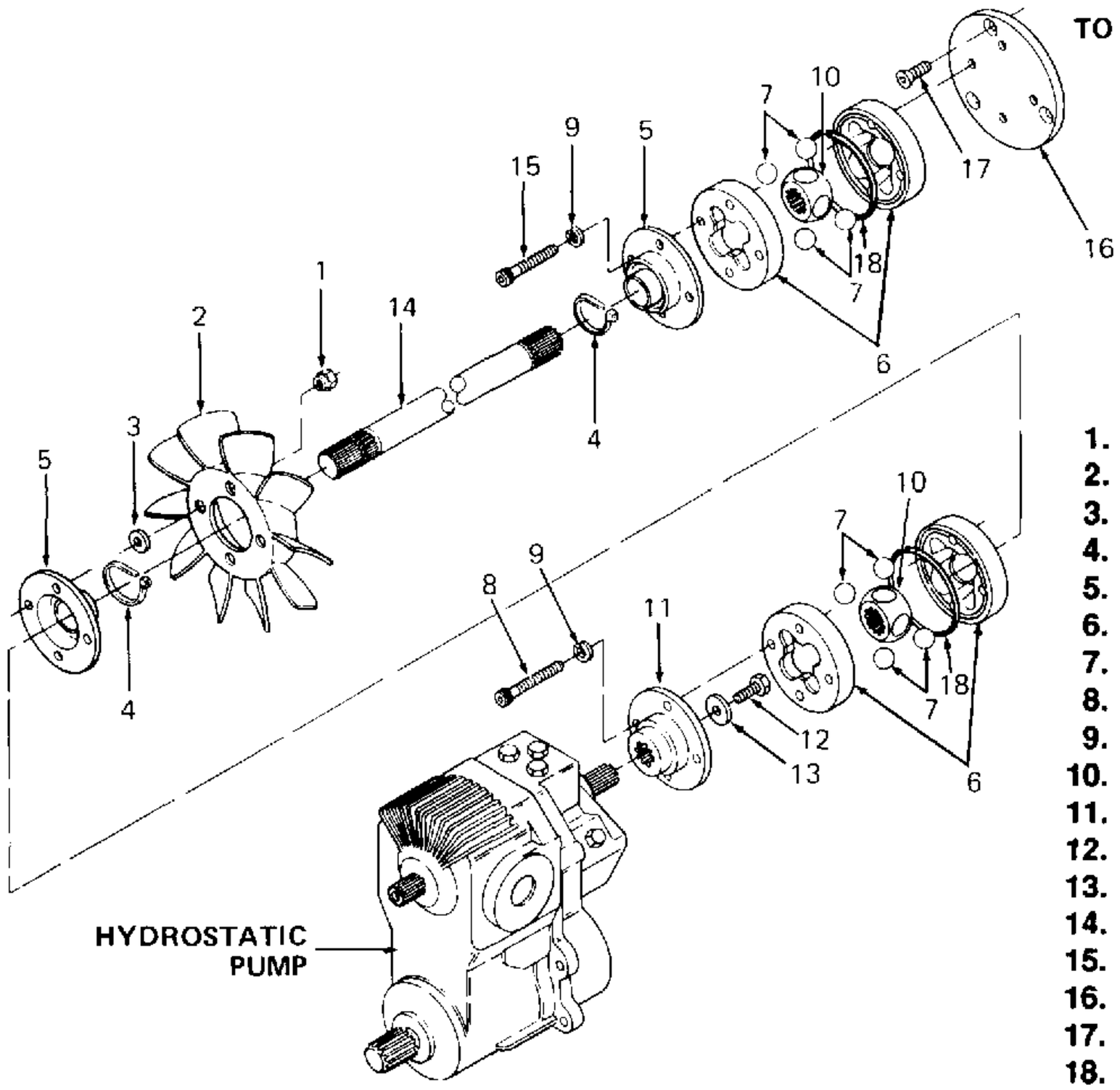
NOTE

On early models only, a snap ring may be found on the drive shaft immediately forward of the drive hub.

      (5) Remove drive hub (10). Remove front drive coupling (6), O-ring (18), coupling boot (5) and fan (2) from shaft. Discard and replace O-ring (18) and boot (5).

NOTE

Tractors prior to the 1991 model year (Serial Number 811,671 and below) were not equipped with O-rings (18). When circumstances permit, these tractors may be upgraded during repair by installing grooved drive couplings (6, Figure 5-72) with O-rings (18) seated.



1. Fan Nut
2. 10 Blade Hydro Fan
3. Flat Washer
4. Tie Strap
5. Coupling Boot
6. Drive Coupling
7. Steel Ball
8. Socket Head Cap Screw
9. Lock Washer
10. Drive Hub
11. Pump Adapter
12. Hex Patch Screw
13. Bell Washer
14. Drive Shaft
15. Hex Patch Screw
16. Coupling Adapter Plate
17. Flat Head Countersunk Screw
18. O-Ring

Figure 5-72. Drive Line (Models 1782, 1882, 2082 and 2182).

(6) Remove pump adapter (11) by removing hex patch screw (12) and bell washer (13).

b. Cut tie strap (4) on front coupling assembly (6) and pull on free end of drive shaft (14) to remove it from front coupling.

5. Remove front coupling assembly from engine as follows:

a. Remove hex patch screw (15) and lock washer (9).

b. Remove coupling boot (5), rear drive coupling (6), steel balls (7) and front drive coupling (6) with O-ring (18). Discard and replace O-ring.

NOTE

Tractors prior to the 1991 model year (Serial Number 811,671 and below) were not equipped with O-rings (18). When circumstances permit, these tractors may be upgraded during repair by installing grooved drive couplings (6, Figure 5-72) with O-rings (18) seated.

6. Remove coupling adapter plate (16) by removing flat head countersunk screw (17).

5-50.3 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect drive shaft (14) for cracks or distortion. Replace if bent.
4. Inspect splined areas of drive shaft (14), drive hub (10) and pump adapter (11) for damage.
5. Inspect fan (2) for damaged or missing blades. Discard and replace fan if blades are missing.
6. Inspect drive hub (10) in both front and rear coupling assemblies as follows:

NOTE

When assembling the drive hub for inspection in step 6.a, DO NOT lubricate parts and DO NOT install steel balls (7).

a. Assemble drive hub (10) and drive couplings (6) and secure firmly with four socket head cap screws (8), lock washers (9) and nuts (1).

b. Grasp assembled joint and insert drive shaft (14) into drive hub (10).

c. Rotate free end of drive shaft (14) in an approximate 4 inch circle. Refer to Figure 5-37.

NOTE

Drive hub should rotate freely in response to movement of drive shaft.

d. If drive hub (10) is hard to move, or is tight at a particular position, discard and replace hub. If drive couplings (6) are damaged, discard and replace.

CAUTION

Following the inspection described in step 6, the joint must be disassembled for reassembly onto the drive shaft and installation of the steel balls.

5-50.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to splined areas.

5-50.5 **Reassembly.**

NOTE

Reassembly of front coupling assembly simplifies the installation process.

1. Reassemble front coupling assembly (6) as follows:

a. Place lock washer (9) on hex patch screw (15).

b. Coat parts 6, 7 and 10 with C-V Joint grease.

CAUTION

A new coupling boot (5) must be used when the coupling assembly is reassembled.

c. Place the following parts onto assembled screw (15) and lock washer (9): coupling boot (5), rear drive coupling (6), drive hub (10), steel balls (7) and front drive coupling (6).

5-50.6 **Installation.**

1. Install coupling adapter plate (16) onto engine with flat head countersunk screws (17).
2. Install drive shaft (14) as follows:
   a. Install front coupling assembly (6) onto engine by securing hex patch screws (15) to coupling adapter plate (16).
   b. Engage front end of drive shaft (14) in drive hub (10) of front coupling assembly (6).
   c. Install tie strap (4) on front coupling assembly boot (5).
3. Install rear coupling assembly (6) as follows:
   a. Install pump adapter (11) on hydrostatic pump shaft and secure with bell washer (13) and hex patch screw (12). Torque hex patch screw (12) to 132 in-lbs.
   b. Coat parts 6, 7 and 10 with C-V Joint grease.

CAUTION

A new coupling boot must be installed when the rear coupling assembly is installed.

NOTE

On early models only, a snap ring may be used on the drive shaft immediately forward of the drive hub.

   c. Install fan (2), coupling boot (5), front drive coupling (6), drive hub (10) and steel balls (7).
   d. Position rear drive coupling (6). Use lock washers (9) and socket head cap screws (8) to secure drive couplings (6) and coupling boot (5).
   e. Install flat washers (3) on screws (8). Position fan (2) and secure with fan nuts (1).
   f. Secure tie strap (4) to boot (5).
4. Install radiator per paragraph 5-6.3.
5. Install frame cover.
6. Install side panels per paragraph 5-4.7 (Models 1882 and 2082) or 5-5.7 (Models 1782 and 2182).

5-51. **REAR AXLE CARRIER (All Models).**

5-51.1 **General.** Before servicing the rear axle carrier, refer to Appendix D for a list of mandatory replacement parts.

5-51.2 **Removal.**

WARNING

Place tractor on a firm and level surface, and chock the front wheels before performing the following corrective maintenance to the rear axle carrier.

NOTE

Before removal of rear axle carrier, place pan beneath rear transaxle housing to catch transmission oil.

1. Remove rear wheels per paragraph 5-20.2
2. Remove brake caliper assembly per paragraph 5-44.2.
3. Remove rear axle assembly (1, Figure 5-73) as follows:

CAUTION

Before removing rear cover plate, clean surrounding area to prevent dirt from entering transmission.

NOTE

Before removing rear cover plate, position a pan beneath transmission to collect oil.

   a. Remove rear cover plate (2, Figure 5-74) from rear transaxle housing by removing hex patch bolts (3 and 4) and tap cover plate to loosen seal.

b. Remove E-ring retainer (2, Figure 5-73) from end of axle inside differential.

c. Remove rear axle assembly (1).

4. Remove rear axle carrier assembly (3) by removing hex patch bolts securing carrier to transaxle housing. Tap carrier to loosen seal and remove carrier.

5-51.3 **Disassembly.**

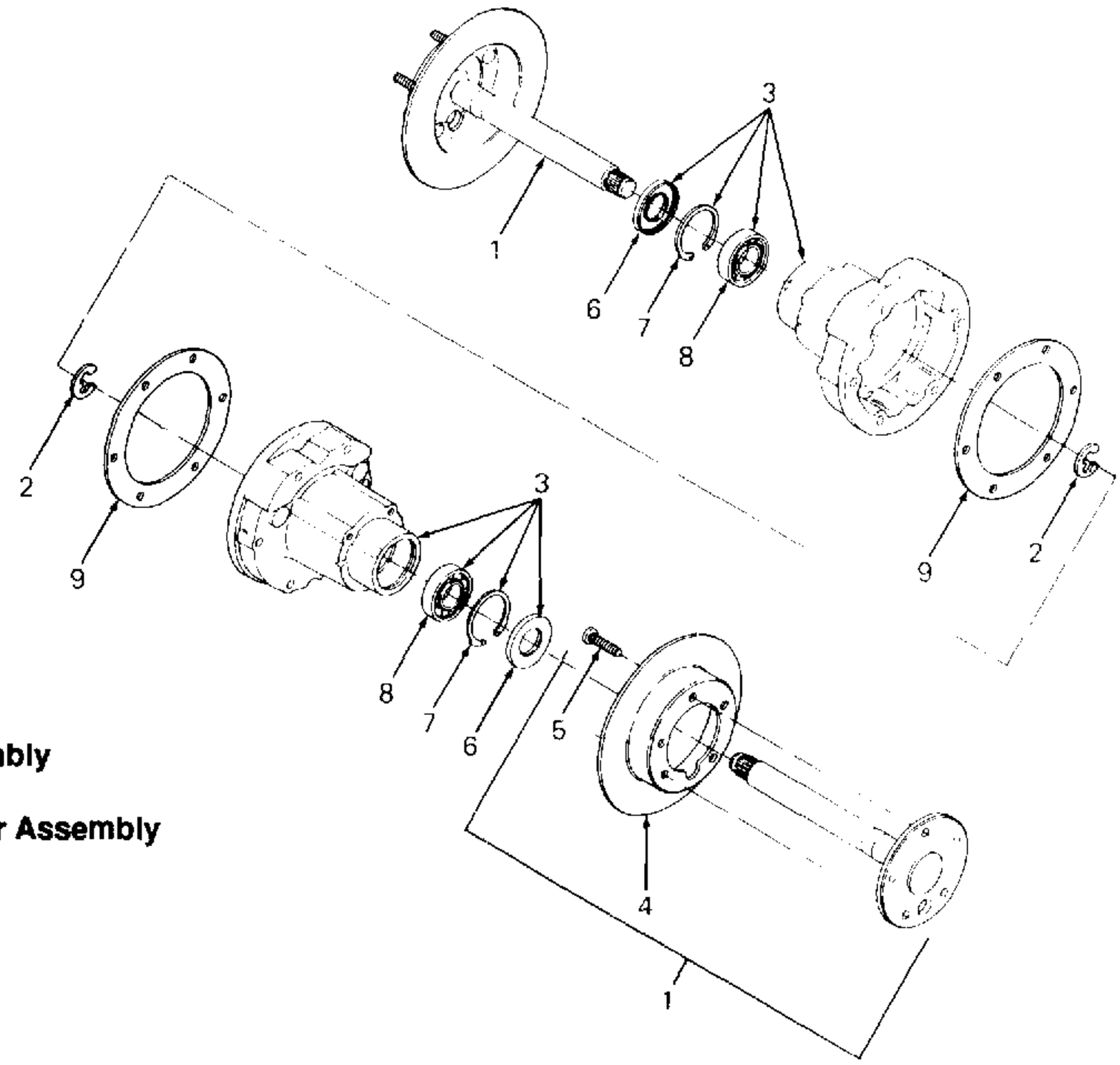
1. Disassemble rear axle assembly (1) from brake disc (4) by removing lug bolts (5).
2. Disassemble rear axle carrier assembly (3) by removing oil seal (6), retaining ring (7), ball bearing (8) and carrier gasket (9). Discard carrier gasket.

5-51.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect flange or gasket surfaces for nicks or scratches.
4. Inspect ball bearing (8) for noisy or rough operation and for discoloration due to excessive heat. Discard and replace if damaged.
5. Inspect brake disc (4) for deep gouges or warpage. Discard and replace if warped or if gouges deeper than .062 inch are present.
6. Inspect rear axle for cracks in shaft, splined end of shaft for chipped or missing teeth and E-ring and E-ring groove.

5-51.5 **Repair.** Refer to Appendix E for contingency replacement parts which are worn or damaged beyond repair.

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to splined area of rear axle shaft.



1. **Rear Axle Assembly**
2. **E-Ring Retainer**
3. **Rear Axle Carrier Assembly**
4. **Brake Disc**
5. **Lug Bolt**
6. **Oil Seal**
7. **Retaining Ring**
8. **Ball Bearing**
9. **Carrier Gasket**

Figure 5-73. Rear Axle Carrier (All Models).

5-51.6 **Reassembly.**

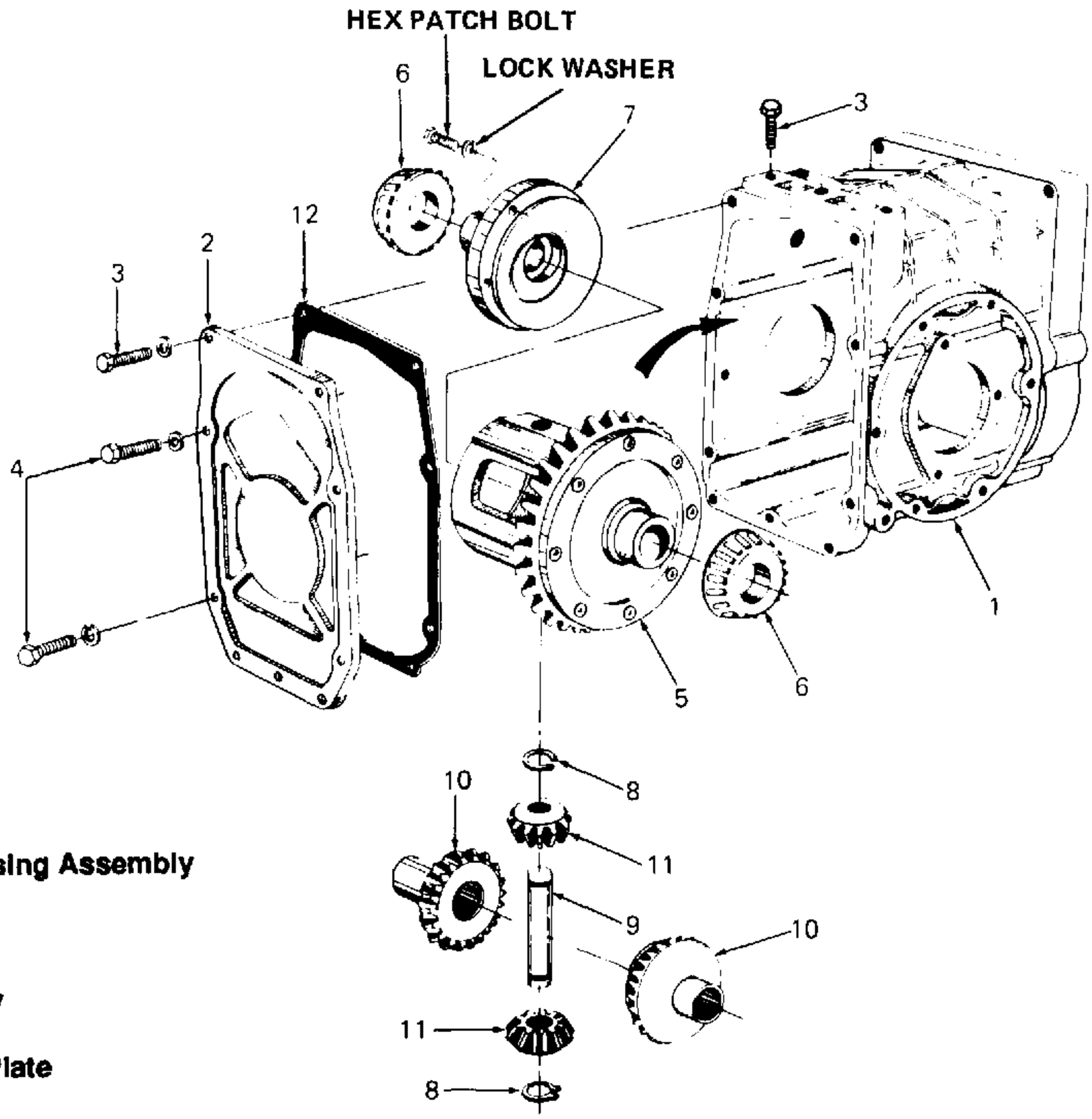
CAUTION

Install a new carrier gasket (9) and oil seal (6) when reassembling the rear axle carrier.

1. Assemble rear axle carrier by installing a new carrier gasket (9), ball bearing (8), retaining ring (7) and new oil seal (6).
2. Reassemble rear axle assembly (1) to brake disc (4) by installing lug bolts (5).

5-51.7 **Installation.**

1. Install rear axle carrier assembly (3) onto rear transaxle housing assembly. Tighten hex patch bolts alternately and evenly.
2. Install rear axle assembly (1) and E-ring retainer (2).
3. Install rear cover plate (2, Figure 5-74) with hex patch bolts (3 and 4) by first installing a new rear cover gasket (12).
4. Install caliper brake assembly per paragraph 5-44.7.
5. Install rear wheels per paragraph 5-20.7.
6. Refill transmission with *Cub Cadet* hydraulic fluid.



1. **Rear Transaxle Housing Assembly**
2. **Rear Cover Plate**
3. **Hex Patch Bolt**
4. **Hex Patch Bolt**
5. **Ring Gear Assembly**
6. **Roller Bearing Cone**
7. **Differential Flange Plate**
8. **Retaining Ring**
9. **Cross Shaft**
10. **Side Gear -16T**
11. **Pinion Gear -10T**
12. **Rear Cover Gasket**

Figure 5-74. Transmission – Differential (All Models Except 1541).

5-52. TRANSMISSION – DIFFERENTIAL (All Models except Model 1541 [Tractor Serial Number 816,509 and above).

5-52.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-52.2 **Removal.** Removal of the differential does not require removal of the rear transaxle housing from the tractor.

CAUTION

Before removing rear cover plate, clean surrounding area to prevent dirt from entering transmission.

NOTE

Before removing rear cover plate, position a pan beneath transmission to collect oil.

1. Remove left and right rear axles and rear axle carriers along with rear cover plate (2, Figure 5-74) and hex patch bolts (3 and 4) per paragraph 5-51.2.
2. Remove left and right bearing retainers per paragraph 5-56.3 (Models 1340, 1541, 1860 and 1862), 5-57.3 (Models 1782, 1882, 2082 and 2182) or 5-62.3 (Model 1535).
3. Lift differential from rear transaxle housing (1).

5-52.3 **Disassembly.**

1. Remove roller bearing cones (6) from ring gear (5) and differential flange plate (7) using appropriate pullers.

NOTE

If roller bearing cone (6) is to be replaced with a new bearing, its bearing cup must be removed and discarded from bearing retainer per paragraph 5-56.3 (Models 1340, 1541, 1860 and 1862), 5-57.3 (Models 1782, 1882, 2082 and 2182) or 5-62.3 (Model 1535).

2. Remove differential flange plate (7) by removing hex patch bolts and lock washers.
3. Remove retaining rings (8) and remove cross shaft (9).
4. Remove side gears (10) and pinion gears (11).
5. Remove rear cover gasket (12) from rear cover plate (2). Discard cover gasket.

5-52.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect roller bearing cones (6) for damage or wear. Replace worn bearings.
4. Inspect gears (5, 10 and 11) for chipped or missing teeth.
5. Inspect splined area of side gear (10) for damage. Replace badly worn gears.
6. Inspect rear transaxle housing (1) for cracks.
7. Inspect that all gasket and sealing surfaces are clean and smooth.
8. Inspect cross shaft (9) for cracks, distortion or damage to retaining ring grooves. Replace cracked or distorted shaft.

5-52.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to gear teeth and splined areas.

5-52.6 **Reassembly.**

1. Install side gears (10) and pinion gears (11) within ring gear (5).
2. Install cross shaft (9) and secure with retaining rings (8).
3. Assemble differential flange plate (7) to ring gear (5) with lock washers and hex patch bolts.
4. Install roller bearing cones (6) to differential flange plate (7) and ring gear (5).

NOTE

If new roller bearing cone (6) is installed, a new bearing cup must be installed in bearing retainer per paragraph 5-56.6 (Models 1340, 1541, 1860 and 1862), 5-57.6 (Models 1782, 1882, 2082 and 2182) or 5-62.6 (Model 1535).

5-52.7 **Installation.**

1. Place differential in rear transaxle housing (1).
2. Assemble left and right bearing retainers per paragraph 5-56.6 (Models 1340, 1541, 1860 and 1862), 5-57.6 (Models 1782, 1882, 2082 and 2182) or 5-62.6 (Model 1535).
3. Perform following checks:
   a. Tapered bearing preload – 4 to 14 lbs. on pull scale. Refer to Figure 5-75.
   b. Ring gear to pinion backlash – .003 to .008 inch. Refer to Figure 5-76.
   c. Ring gear tooth contact check – brush gear with red oxide or rub on a thin coat of prussian blue. Hand roll testing should produce a pattern as shown in Figure 5-77. In use, when load and deflection increase, the pattern will elongate as shown in Figure 5-78.

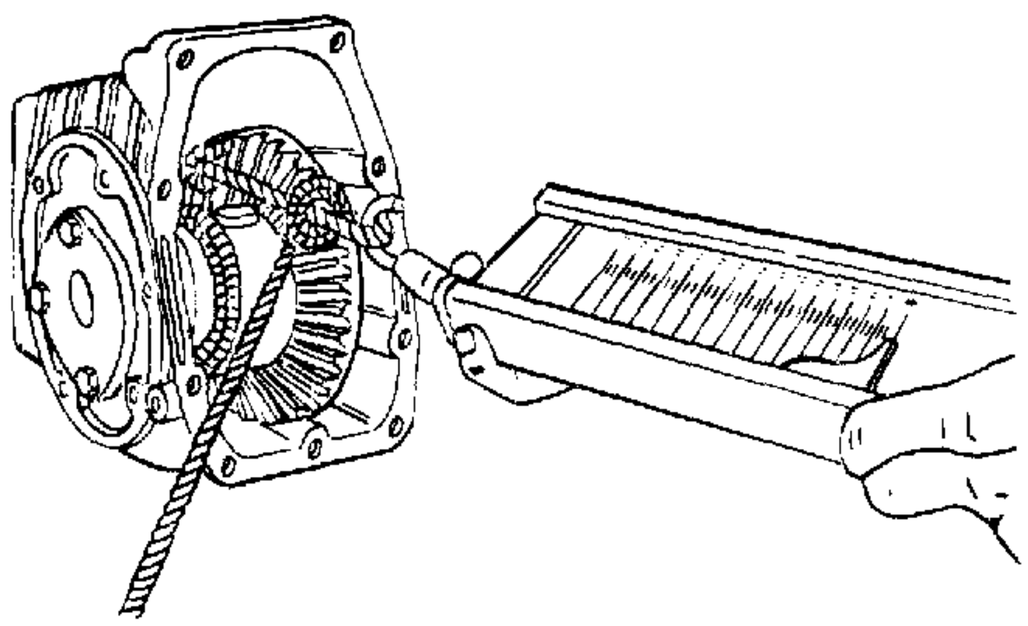


Figure 5-75. Tapered Bearing Preload.

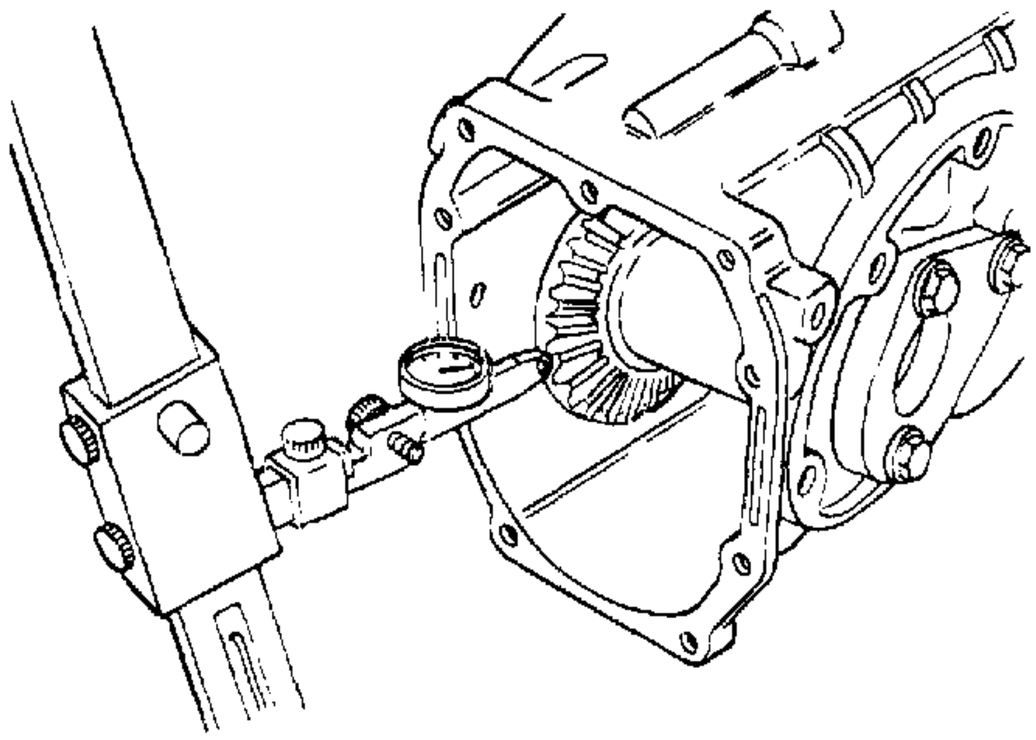


Figure 5-76. Measuring Ring Gear to Piston Backlash.

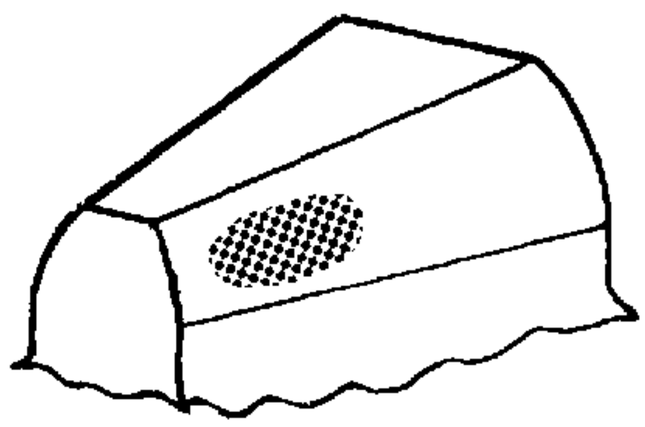


Figure 5-77. Ideal Ring Gear Tooth Contact Pattern.

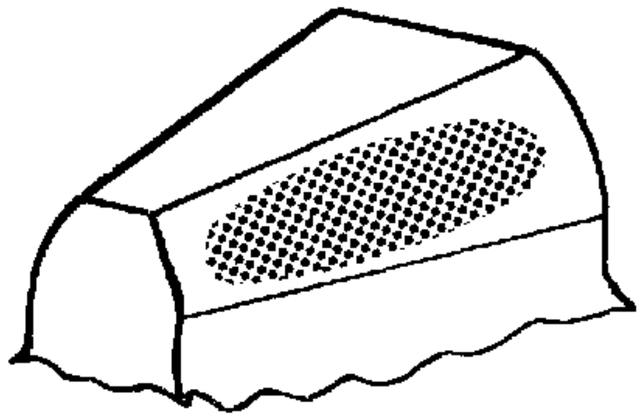


Figure 5-78. Elongated Ring Gear Tooth Contact Pattern.

NOTE

If ring gear has been damaged in tooth area, it is very likely that the mating drive pinion also has been damaged and must be replaced.

NOTE

Each time a new gear or pinion is used, a new shimpack must be devised for the left and right side bearing retainers. Start with single or multiple shims totalling .014 inch. When assembled, perform tests described in paragraph 5-52.7, step 3. By trial and error, the shim thickness is increased to reduce preload, decreased to increase preload and shifted from left to right to increase backlash, and right to left to decrease it. This procedure must be repeated until all criteria set forth in paragraph 5-52.7, step 3, are met.

4. Install gasket (12), cover plate (2) using hex patch bolts (3 and 4) and rear axle carriers and rear axles per paragraph 5-51.7.
5. Refill with *Cub Cadet* hydraulic fluid.

5-52A. TRANSMISSION – DIFFERENTIAL (Model 1541 [Tractor Serial Number 816,509 and above]).

5-52A.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-52A.2 **Removal.** Removal of the differential does not require removal of the rear transaxle housing from the tractor.

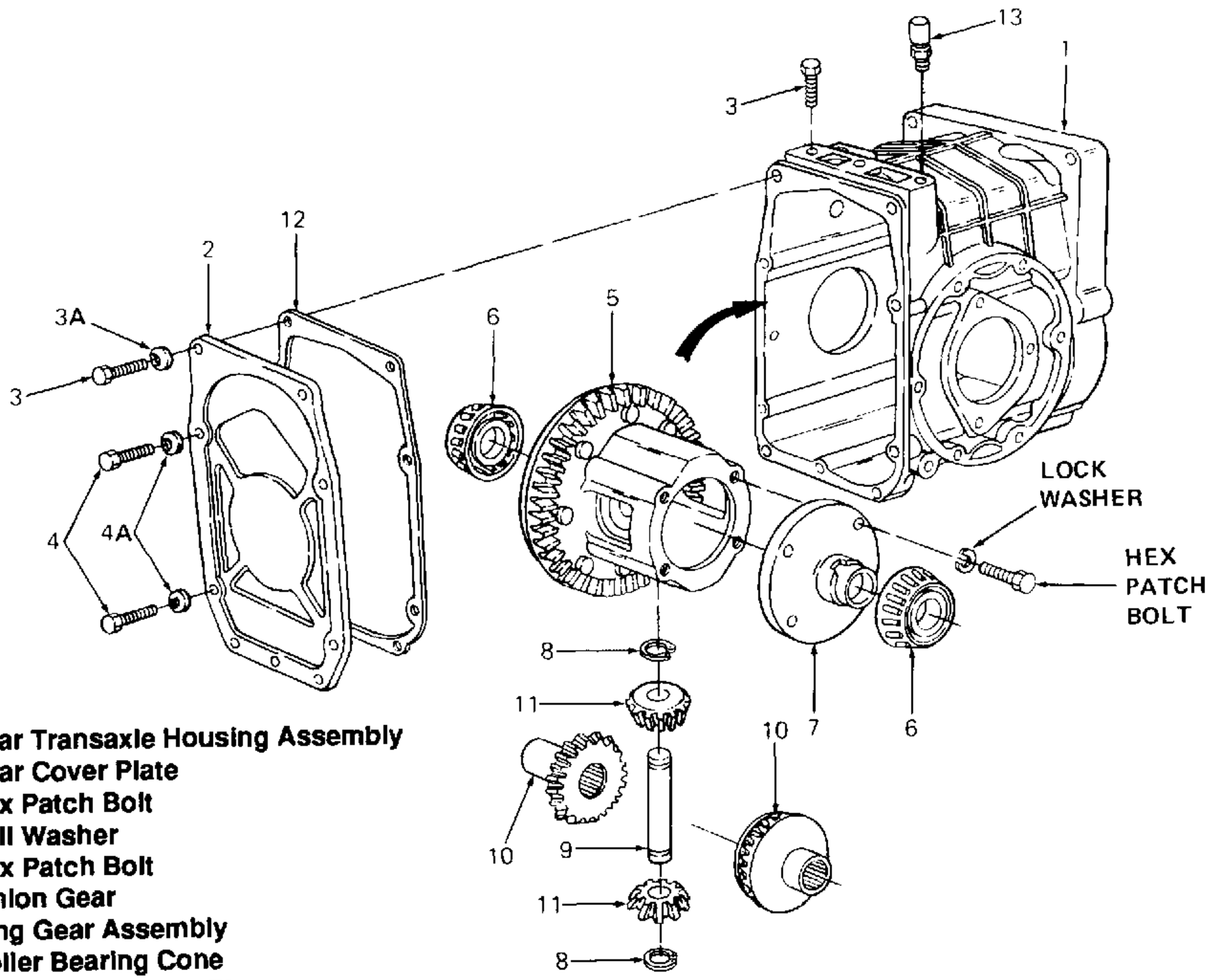
CAUTION

Before removing rear cover plate, clean surrounding area to prevent dirt from entering transmission.

NOTE

Before removing rear cover plate, position a pan beneath transmission to collect oil.

1. Remove left and right rear axles and rear axle carriers along with rear cover plate (2, Figure 5-78A), hex patch bolt (3), bell washer (3A), hex patch bolt (4) and pinion gear (4A) per paragraph 5-51.2.
2. Remove left and right bearing retainers per paragraph 5-56.3.
3. Lift differential from rear transaxle housing (1).



1. **Rear Transaxle Housing Assembly**
2. **Rear Cover Plate**
3. **Hex Patch Bolt**
3A. **Bell Washer**
4. **Hex Patch Bolt**
4A. **Pinion Gear**
5. **Ring Gear Assembly**
6. **Roller Bearing Cone**
7. **Differential Flange Plate**
8. **Retaining Ring**
9. **Cross Shaft**
10. **Side Gear -16T**
11. **Pinion Gear -10T**
12. **Rear Cover Gasket**
13. **Housing Breather**

Figure 5-78A. Transmission – Differential (Model 1541).

5-52A.3 **Disassembly.**

1. Remove roller bearing cones (6) from ring gear (5) and differential flange plate (7) using appropriate pullers.

NOTE

If roller bearing cone (6) is to be replaced with a new bearing, its bearing cup must be removed and discarded from bearing retainer per paragraph 5-56.3.

2. Remove differential flange plate (7) by removing hex patch bolts and lock washers.
3. Remove retaining rings (8) and remove cross shaft (9).
4. Remove side gears (10) and pinion gears (11).
5. Remove rear cover gasket (12) from rear cover plate (2). Discard cover gasket.
6. Remove housing breather (13) from top of rear transaxle housing (1).

5-52A.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect roller bearing cones (6) for damage or wear. Replace worn bearings.
4. Inspect gears (5, 10 and 11) for chipped or missing teeth.
5. Inspect splined area of side gear (10) for damage. Replace badly worn gears.
6. Inspect rear transaxle housing (1) for cracks. Inspect and clean housing breather (13).
7. Inspect that all gasket and sealing surfaces are clean and smooth.
8. Inspect cross shaft (9) for cracks, distortion or damage to retaining ring grooves. Replace cracked or distorted shaft.

5-52A.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to gear teeth and splined areas.

5-52A.6 **Reassembly.**

1. Install side gears (10) and pinion gears (11) within ring gear (5).
2. Install cross shaft (9) and secure with retaining rings (8).
3. Assemble differential flange plate (7) to ring gear (5) with lock washers and hex patch bolts.
4. Install roller bearing cones (6) to differential flange plate (7) and ring gear (5).
5. Install housing breather (13).

NOTE

If new roller bearing cone (6) is installed, a new bearing cup must be installed in bearing retainer per paragraph 5-56.6 (Models 1340, 1541, 1860 and 1862).

5-52A.7 **Installation.**

1. Place differential in rear transaxle housing (1).
2. Assemble left and right bearing retainers per paragraph 5-56.6.
3. Perform following checks:
   a. Tapered bearing preload – 4 to 14 lbs. on pull scale. Refer to Figure 5-78B.
   b. Ring gear to pinion backlash – .003 to .008 inch. Refer to Figure 5-78C.
   c. Ring gear tooth contact check – brush gear with red oxide or rub on a thin coat of prussian blue. Hand roll testing should produce a pattern as shown in Figure 5-78D. In use, when load and deflection increase, the pattern will elongate as shown in Figure 5-78E.

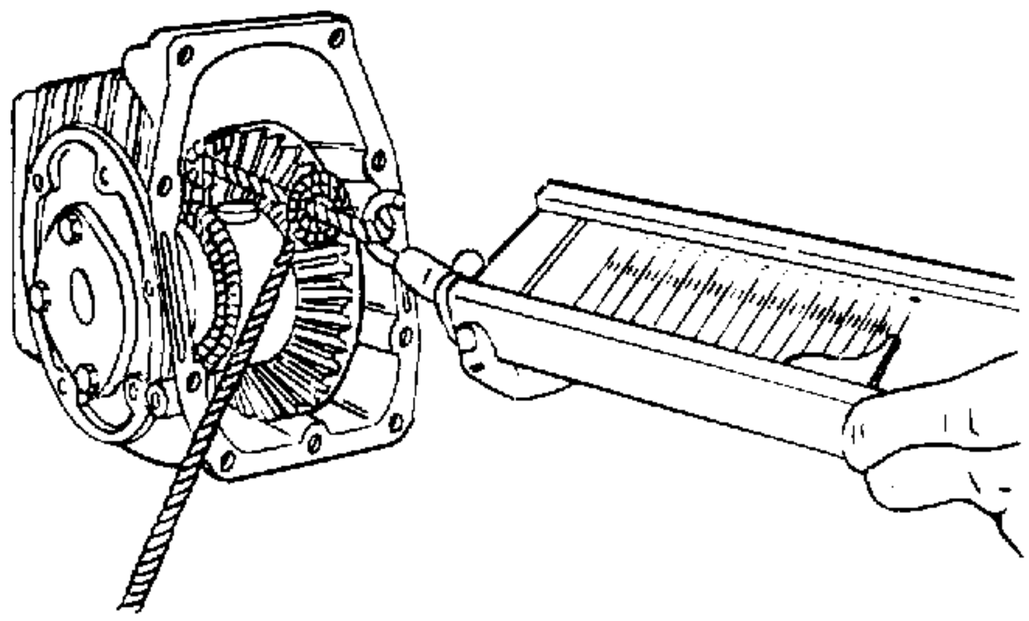


Figure 5-78B. Tapered Bearing Preload.

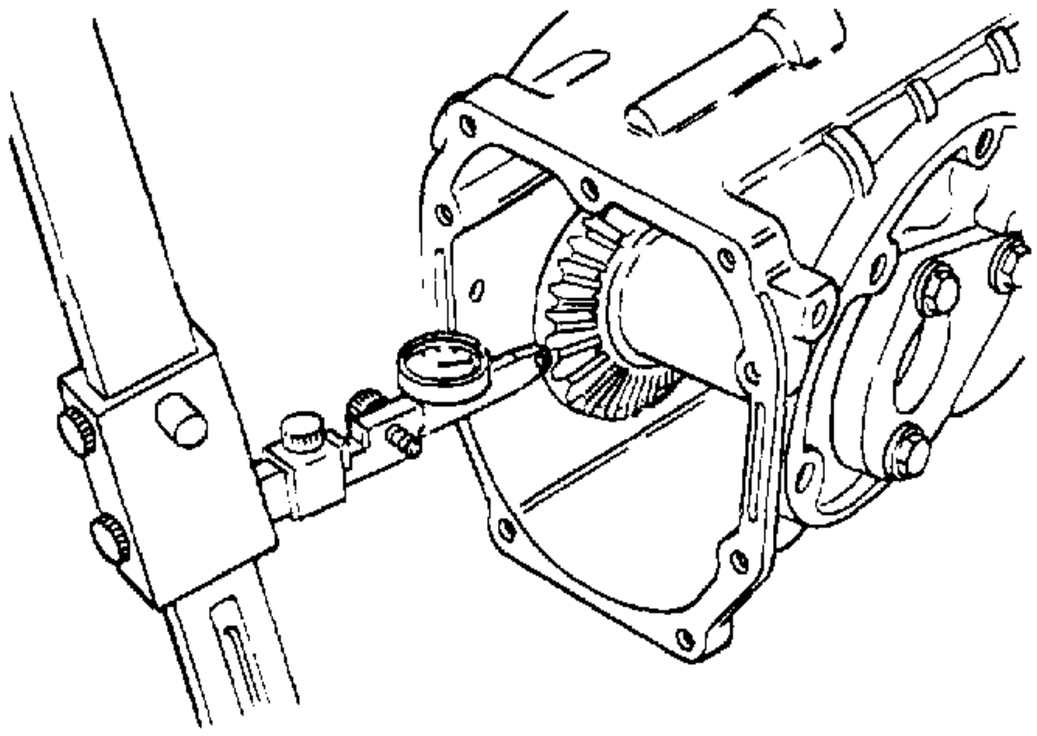


Figure 5-78C. Measuring Ring Gear to Piston Backlash.

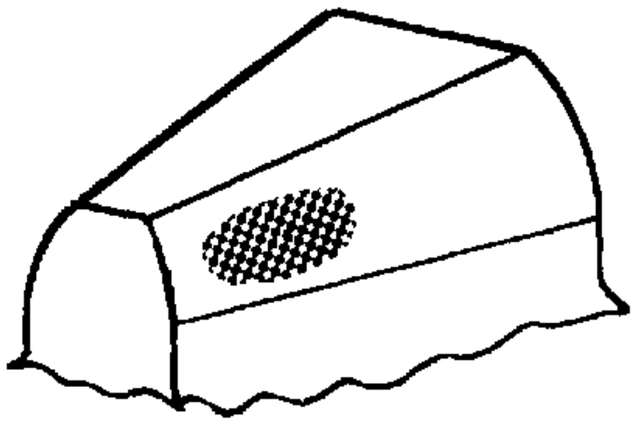


Figure 5-78D. Ideal Ring Gear Tooth Contact Pattern.

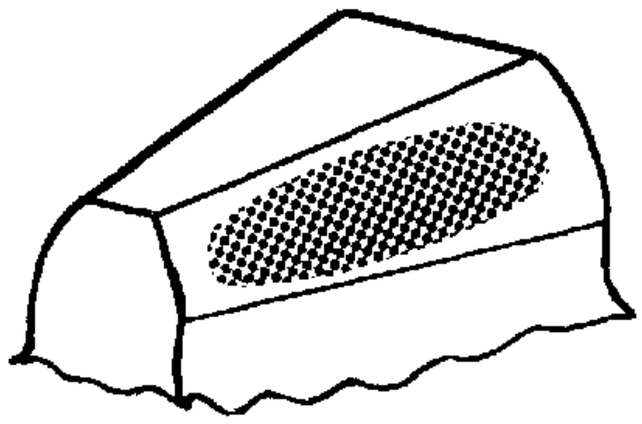


Figure 5-78E. Elongated Ring Gear Tooth Contact Pattern.

NOTE

If ring gear has been damaged in tooth area, it is very likely that the mating drive pinion also has been damaged and must be replaced.

NOTE

Each time a new gear or pinion is used, a new shimpack must be devised for the left and right side bearing retainers. Start with single or multiple shims totalling .014 inch. When assembled, perform tests described in paragraph 5-52A.7, step 3. By trial and error, the shim thickness is increased to reduce preload, decreased to increase preload and shifted from left to right to increase backlash, and right to left to decrease it. This procedure must be repeated until all criteria set forth in paragraph 5-52A.7, step 3, are met.

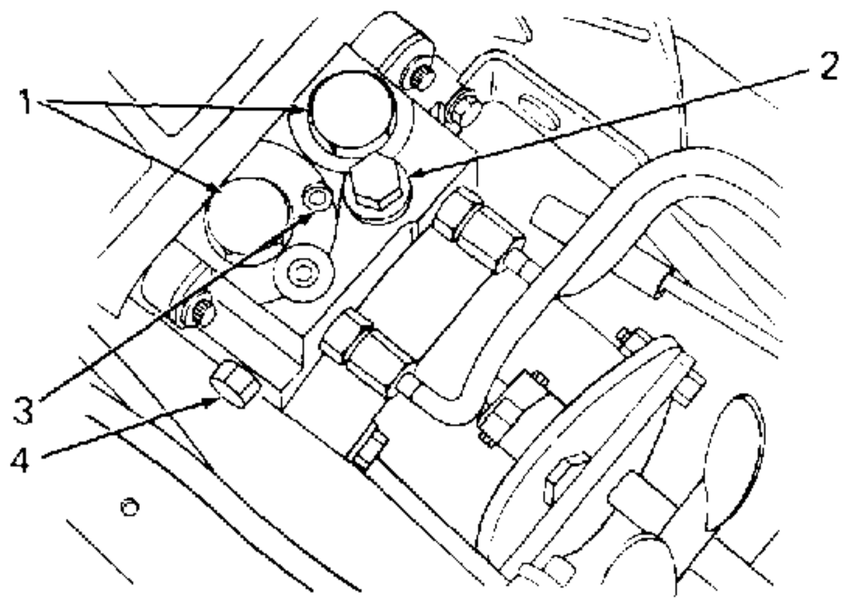
4. Install gasket (12), cover plate (2) using hex patch bolt (3), bell washer (3A), hex bolt (4), pinion gear (4A) and rear axle carriers and rear axles per paragraph 5-51.7.

5. Refill with *Cub Cadet* hydraulic fluid.

5-52B. CHARGE PUMP AND IMPLEMENT RELIEF VALVE PRESSURE CHECK USING HYDRAULIC GAUGE – Cub Cadet Part No. 759-3593 (Models 1340, 1541 [Tractor Serial Number 816,508 and below], 1782, 1860, 1862, 1882, 2082 and 2182).

5-52B.1 **General.** The charge pump furnishes fluid to the hydrostatic pump to make up for leakage and to circulate fluid for cooling. Charge pressure is regulated at a maximum of 1.3 MPa (200 psi) by the charge pressure relief valve. The excess flow is returned to the reservoir. On models equipped with hydraulic lift, this excess flow is directed to the implement control valve. The fluid returns from the valve to the reservoir. Moving the control handle to the raise or lower position will direct fluid to the hydraulic cylinder. Charge pressure during the raise or lower cycle will be equivalent to the lift pressure. Lift pressure is regulated by the lift pressure relief valve to 3.4 to 4.3 MPa (500 to 625 psi).

5-52B.2 **Pressure Check.** Refer to Figures 5-78F and 5-78G.



1. **Check Valves**
2. **Implement Lift Relief Valve**
3. **Test Port**
4. **Charge Pump Relief Valve**

Figure 5-78F. Check Valves, Implement Relief Valve, Test Port and Charge Pump Relief Valve.

1. Install a 7 MPa (1000 psi) gauge (1, Figure 5-78G).

2. Start engine and allow transmission fluid to warm up to approximately 130°F. Operate at maximum idle speed.

3. With hydraulic control valve in neutral (if equipped), the gauge should indicate charge pressure as follows:

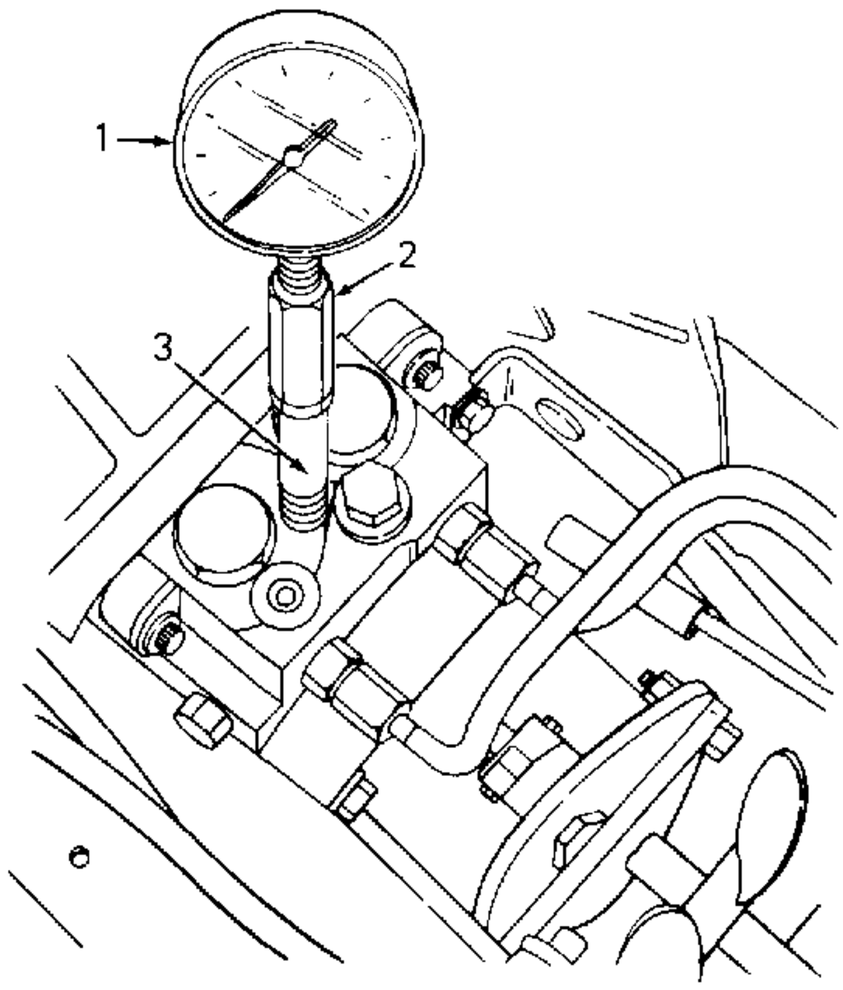
   Models 1340 and 1860 ..... 62 to 1.1 MPa
   Manual Lift Tractor.....(90 to 165 psi)

   Models 1541, 1782, 1862, ... 62 to 1.3 MPa
   2082 and 2182.....(90 to 200 psi)
   Hydraulic Lift Tractor

4. With the control valve in the raised position and the cylinder at the end of its stroke, the gauge should indicate maximum lift pressure as:

   Models 1541 and 1862 ..... 3.4 to 4.3 MPa
   (500 to 625 psi)
   Models 1782, 1882, ... 4.8 to 62 MPa
   2082 and 2182.....(700 to 900 psi)

5. Refer to paragraphs 6-9 and 6-10 for what to do if pressures are not correct.



1. Gauge - 759-3593
2. Adapter - 1/8" to 1/4"
3. Steel Pipe Nipple - 1/8"

Figure 5-78G. Pressure Check.

5-53. HYDROSTATIC TRANSMISSION (Models 1340 and 1860).

5-53.1 **General.** A holding fixture is necessary to conveniently service the hydrostatic transmission. Instructions for the construction of this holding fixture are contained in Appendix B.

5-53.2 **Removal.**

1. Remove drive shaft from hydrostatic transmission per paragraph 5-48.2 (Model 1340) or 5-49.2 (Model 1860).
2. Remove cam pivot bracket and damper spring plate per paragraph 5-47.2.
3. Place a pan under tube assembly (4, Figure 5-79) to collect oil. Loosen tube assembly by removing compression nut and rotate tube out of way.
4. Remove oil filter (2).
5. Remove four hex patch lock bolts which secure hydrostatic pump (1) to adapter housing. Lift pump out of tractor.

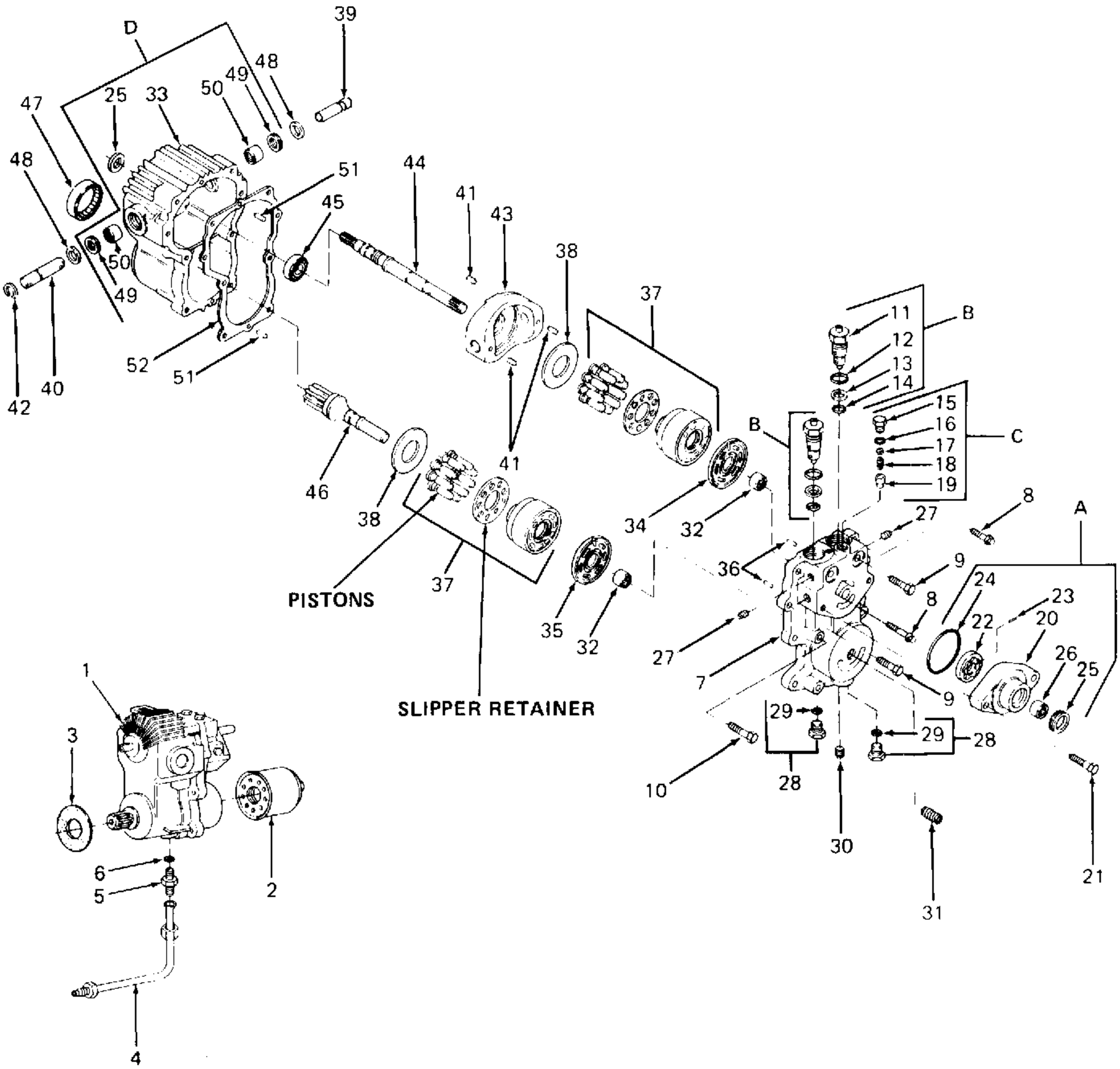


Figure 5-79. Hydrostatic Transmission (Models 1340 and 1860).

Legend for Figure 5-79

A. Charge Pump Kit
B. Valve Assembly
C. Relief Valve Kit
D. Housing Assembly
1. Hydrostatic Pump
2. Oil Filter
3. Front Gasket
4. Tube Assembly
5. 37 Degree Connector
6. O-Ring
7. Center Section
8. 12 Point Screw
9. Hex Screw
10. Hex Screw
11. Valve
12. O-Ring
13. Back-up Ring
14. O-Ring
15. Plug
16. O-Ring
17. Shim Pack Kit
18. Relief Valve Spring
19. Relief Valve Cone
20. Charge Pump Housing
21. Hex Screw
22. Gerotor
23. Pin
24. O-Ring
25. Lip Seal
26. Needle Bearing
27. Pipe Plug
28. Plug
29. O-Ring
30. Pipe Plug
31. Pipe
32. Roller Bearing
33. Transmission Housing
34. Valve Plate
35. Valve Plate
36. Pin
37. Cylinder Block
38. Thrust Plate
39. Trunnion Shaft Assembly
40. Trunnion Shaft
41. Spring Pin
42. Retaining Ring
43. Swashplate
44. Pump Shaft
45. Ball Bearing
46. Motor Shaft
47. Roller Bearing
48. Washer
49. Lip Seal
50. Needle Bearing
51. Pin
52. Gasket

5-53.3 **Disassembly.**

CAUTION

Thoroughly clean and deburr the outside of the hydrostatic pump before disassembling. Remove paint from shaft surfaces.

1. Disassemble exterior of hydrostatic transmission by removing front gasket (3), connector (5) and O-ring (6). Remove tube (4) from transaxle housing. Discard gasket and O-ring.
2. Disassemble charge pump (20) as follows:

CAUTION

Match mark charge pump housing (20) and center section (7) before disassembly. Charge pump could be installed incorrectly resulting in no charge pressure.

a. Remove hex screws (21) and carefully remove charge pump (20), gerotor (22), pin (23) and O-ring (24). Discard O-ring.
b. Remove lip seal (25) and needle bearing (26). Discard lip seal.
3. Disassemble center section (7) as follows:

CAUTION

Valve plates (34 and 35) may stick to the center section housing surface during removal of center section. Use care to avoid dropping valve plates.

a. Remove center section (7) from transmission housing (33) by removing 12 point screws (8) and hex screws (9 and 10).
b. Disassemble exterior of center section (7) by removing pipe plugs (27), plug (28), O-ring (29), pipe plug (30) and pipe (31).
c. Remove roller bearings (32).
d. Disassemble check valve by removing valve (11), O-ring (12), back-up ring (13) and O-ring (14). Discard O-rings and back-up ring.
e. Disassemble relief valve by removing plug (15), O-ring (16), shim pack kit (17), relief valve spring (18) and relief valve cone (19). Discard O-ring.

4. Disassemble transmission housing (33) as follows:

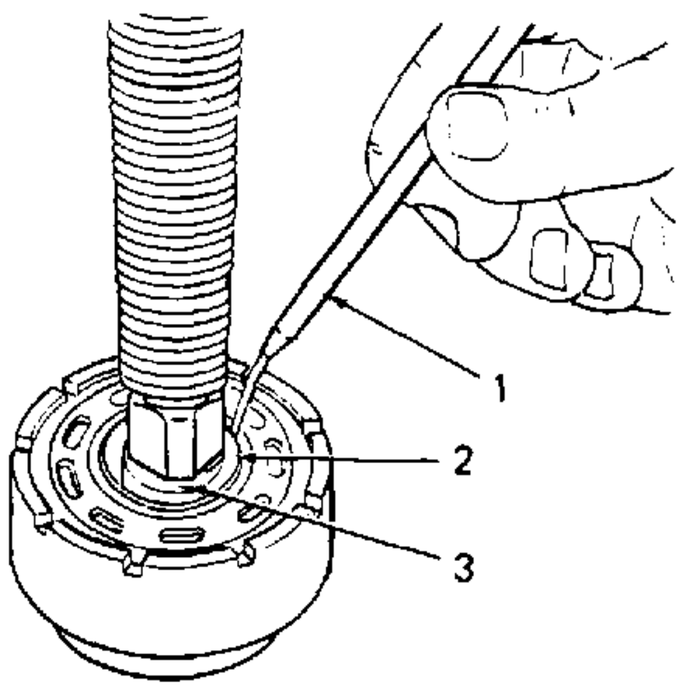
   a. Remove pump valve plate (34), motor valve plate (35) and pins (36).

   b. Disassemble cylinder blocks (37), after removing blocks and thrust plates (38) from transmission housing, as follows:

      (1) Remove slipper retainer and pistons.

      (2) Place cylinder block assembly in a press on wood blocks.

      (3) Using a step plate (3, Figure 5-80), press on spring retainer compressing cylinder block spring. Remove retainer ring (2). Refer to Figure 5-80.



1. O-Ring Pick
2. Retainer Ring
3. Step Plate

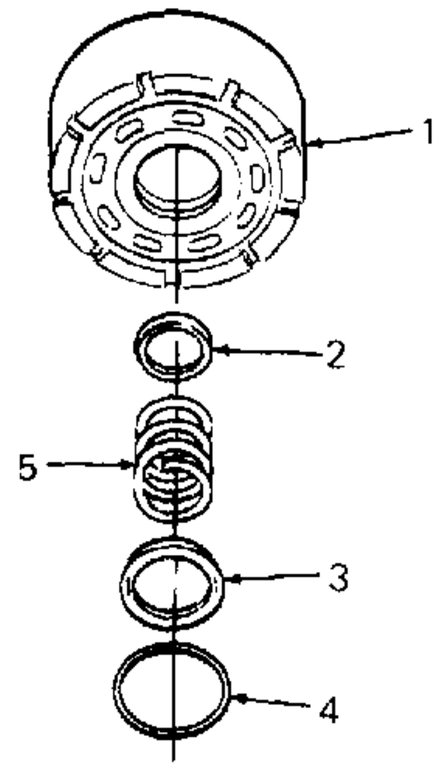
Figure 5-80. Removing Retainer Ring from Cylinder Block.

      (4) Carefully release press. Remove spring retainer (3, Figure 5-81), spring (5) and spring washer (2). Remove cylinder block (1) from press. Refer to Figure 5-81.

   c. Disassemble trunnion shafts (39 and 40, Figure 5-79) as follows:

NOTE

Trunnion shafts (39 and 40) are secured to swashplate (43) with pins (41). One pin is used on trunnion shaft (40). Two pins are used on trunnion shaft (39).



1. Cylinder Block
2. Spring Washer
3. Spring Retainer
4. Retainer Ring
5. Spring

Figure 5-81. Removing Spring Retaining Parts.

      (1) Mark or tape a punch exactly 15/32 inch from the end.

CAUTION

Be extremely careful not to drive pins (41) through the shaft and into hole in bottom of swashplate as removal is then very difficult. Also, if the pins are driven too far, it is possible to drive pins through hydrostatic unit housing.

      (2) Carefully drive pins (41) until mark on punch is even with top surface of swashplate (43), a distance of 15/32 inch. Refer to Figure 5-82.

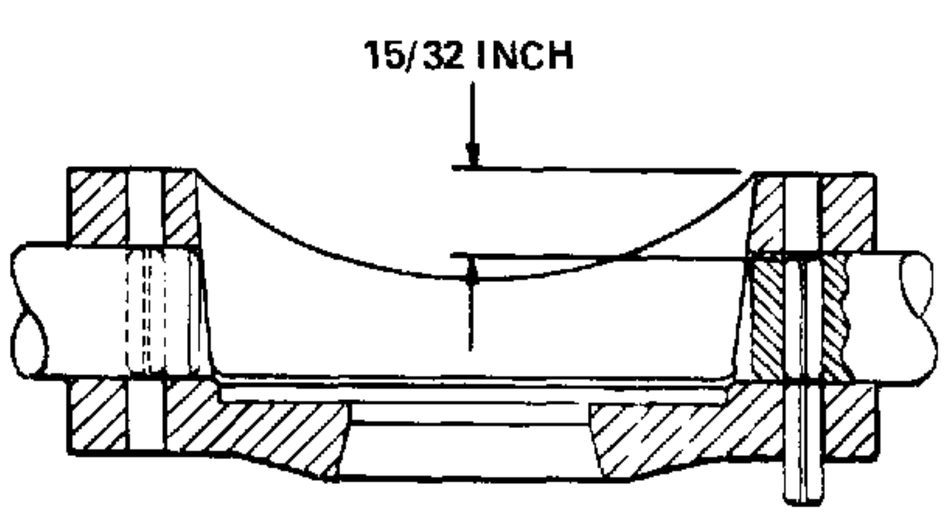


Figure 5-82. Hydraulic Pump Swashplate.

(3) Remove retaining ring (42, Figure 5-79) and trunnion shafts (39 and 40).

d. Remove swashplate (43) and drive out remaining pin (41).

e. Remove pump shaft (44) and ball bearing (45).

f. Remove and discard lip seal (25).

g. Remove motor shaft (46) and roller bearing (47).

h. Remove washer (48), lip seal (49) and needle bearing (50). Discard seal.

i. Remove pins (51) and gasket (52). Discard gasket.

5-53.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect check valve for dirt, paint and corrosion.
4. Inspect relief valve spring (18) for pitting and rust. Check relief valve cone (19) for wear or damage. Discard spring and/or cone if damaged or worn.
5. Inspect charge pump for excessive wear or damage. Replace parts if necessary.
6. Inspect valve plates (34 and 35) for scratches, excessive wear or erosion. Check pin slot and grooves on face of plates for wear. Replace plates if significantly worn.

NOTE

A worn or scored valve plate reduces pump efficiency.

7. Inspect cylinder blocks (37, Figure 5-79 and 1, Figure 5-81) as follows:

CAUTION

Cylinder block parts should be wrapped in clean paper or lint-free cloth after they have been cleaned and blown dry, and after they have been inspected.

a. Inspect pistons for scoring, wear or scratches. Be certain oil passage is open.

b. Inspect slippers for severe scratches or embedded material. A slight wear pattern, where slippers ride, is normal. Discard if badly worn.

NOTE

If cylinder bores or pistons are badly worn or scored, a block assembly with pistons is available for replacement. Pistons or block are NOT serviced as individual parts.

c. Inspect cylinder block valve face for damage and the piston bores for excessive wear. Check piston fit in bores.

NOTE

Any linear scratches along length of bore will reduce efficiency.

8. Inspect thrust plate (38) for wear. Use fingernail or sharp pencil across face of thrust plate. If wear is felt, replace thrust plate.
9. Inspect bearings (32, 45, 47 and 50) for damage or wear. Replace worn bearings.
10. Inspect shafts (44 and 46) for cracks, distortion or damage to splined areas. Replace distorted shafts.
11. Inspect transmission housing (33) for cracks.
12. Inspect that all gasket and sealing surfaces are clean and smooth.
13. Inspect tube (4) for damage. Replace if damaged.

5-53.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Check valve assembly kit (B) is available.
4. Relief valve kit (C) is available.
5. Charge pump kit (A) is available.
6. Slippers may be lapped, but do not remove more than .005 inch. All slippers must be within .002 inch thickness of each other.
7. Transmission housing kit (D) is available.
8. Repair minor damage to splined areas.

5-53.6 **Reassembly.**

1. Thoroughly lubricate all parts with *Cub Cadet* hydraulic fluid.
2. Use all new O-rings, seals and gaskets.
3. Assemble transmission housing (33) as follows:
   a. Install pins (51).
   b. Install needle bearing (50), lip seal (49) and washer (48).
   c. Install roller bearing (47) and motor shaft (46).
   d. Install lip seal (25).
   e. Install ball bearing (45) and pump shaft (44).

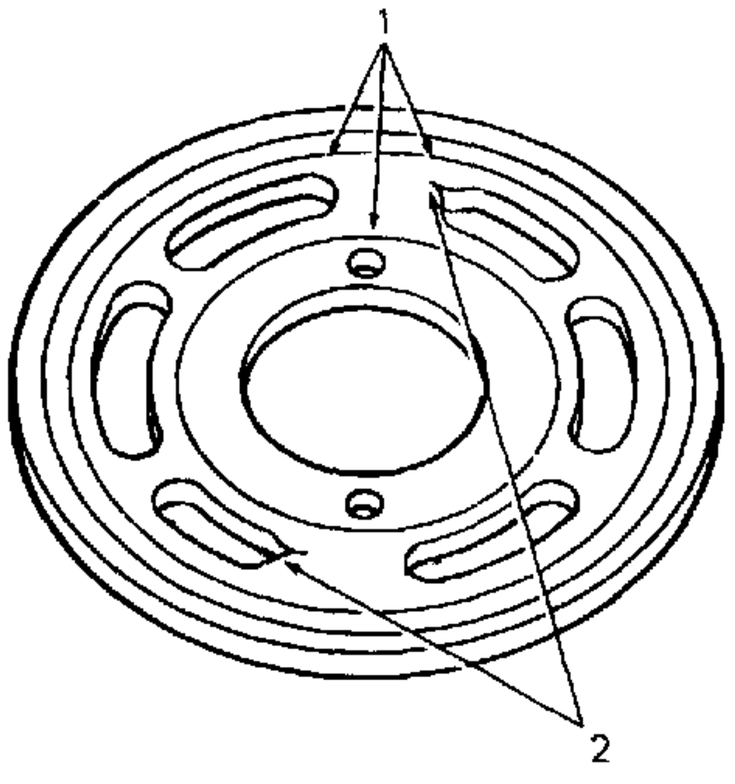
CAUTION

Install swashplate (43) with the thin pad, located on rear end of plate, toward top of the transmission housing.

   f. Position swashplate (43) in transmission housing.
   g. Assemble trunnion shafts (39 and 40) as follows:
      (1) Install trunnion shafts (39 and 40) and retaining ring (42).
      (2) Secure trunnion shaft (40) to swashplate (43) with one pin (41). Secure trunnion shaft (39) to swashplate with two pins (41).
   h. Install thrust plate (38) on motor shaft (46) and pump shaft (44).
   i. Assemble cylinder blocks (37, Figure 5-79 and 1, Figure 5-18) as follows:
      (1) Install spring washer (2, Figure 5-81) (bevel side in), spring (5) and spring retainer (3). Place assembly in a press.
      (2) Compress spring (5) using a step plate (3, Figure 5-80). Install retainer ring (2).
      (3) Install slipper retainer and pistons.
      (4) Install a cylinder block on motor shaft (46, Figure 5-79) and pump shaft (44).

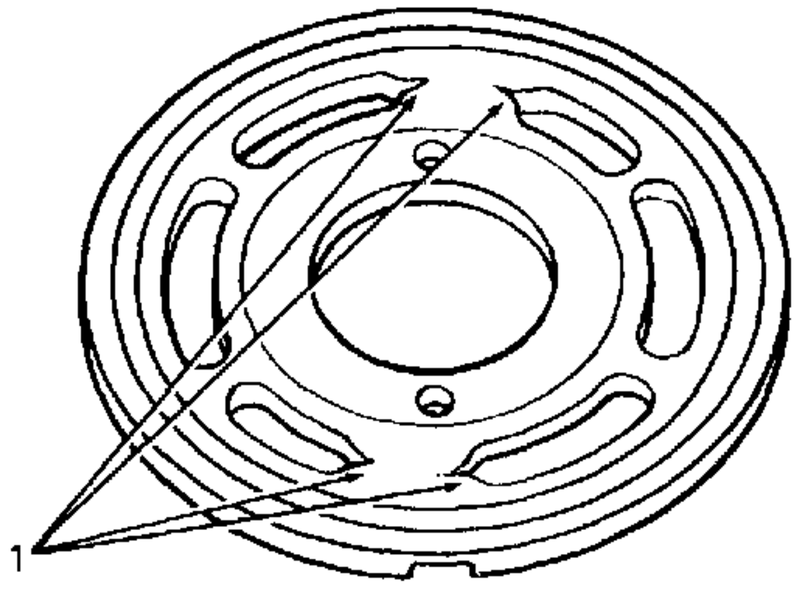
NOTE

Motor valve plate (35) has four notches. Pump valve plate (34) has two notches. Refer to Figures 5-83 and 5-84.



1. Check These Areas For Wear
2. Pump Valve Plate (Two Notches)

Figure 5-83. Pump Valve Plate.



1. Motor Valve Plate (Four Notches)

Figure 5-84. Motor Valve Plate.

4. Assemble center section (7, Figure 5-79) as follows:

NOTE

If new roller bearings (32) are installed, they must extend .1 inch above machined surface of center section.

a. Install roller bearings (32).

b. Assemble exterior of center section by installing pipe (31), pipe plug (30), O-ring (29), plug (28) and pipe plugs (27).

c. Install pins (36) and then valve plates (34 and 35). A thin coat of petroleum jelly applied to steel side of valve plate will assist in holding plate in place during assembly.

NOTE

Be sure valve plates (34 and 35) are indexed onto pins (36) when placed on center section (7).

d. Assemble relief valve by installing relief valve cone (19), relief valve spring (18), shim pack kit (17), O-ring (16) and plug (15).

e. Assemble check valve by installing O-ring (14), back-up ring (13), O-ring (12) and valve (11).

f. Install gasket (52) and secure center section (7) to transmission housing (33) with hex screws (9 and 10) and 12 point screws (8). Tighten alternately and evenly.

g. Assemble charge pump as follows:

(1) Install needle bearing (26) and lip seal (25) in charge pump housing (20).

(2) Install O-ring (24), pin (23) and gerotor (22).

CAUTION

Charge pump could be installed incorrectly resulting in low charge pressure. Observe previous match mark. If new charge pump is being installed, see following NOTE.

NOTE

The flat side of the pump housing (20), located by the mounting bolt hole, should face the right side of the machine.

5. Assemble exterior of hydrostatic transmission by installing O-ring (6), connector (5) and front gasket (3). Install tube (4) onto transaxle housing.

6. Install a new oil filter.

CAUTION

DO NOT rotate either shaft upon reassembly. Damage to the transmission could result.

5-53.7 **Installation.**

1. Squirt *Cub Cadet* hydraulic fluid into suction line fitting. Turn unit upside down to allow oil to flow into passages. Rotate pump input shaft and motor output shaft to insure free rotation.

2. Position hydraulic transmission in tractor and secure to adapter housing with four hex patch lock bolts.

3. Rotate tube (4) into place and secure with compression nut.

4. Connect damper spring plate and cam pivot bracket per paragraph 5-47.7.

5. Install drive shaft per paragraph 5-48.7 (Model 1340) or 5-48.7 or 5-49.7 (Model 1860).

6. Adjust cam bracket per paragraph 6-7.

7. Refill transmission with *Cub Cadet* hydraulic fluid.

5-54. HYDROSTATIC TRANSMISSION (Models 1541 [Tractor Serial Numbers 800,001 through 816,508] and 1862).

5-54.1 **General.** A holding fixture is necessary to conveniently service the hydrostatic transmission. Instructions for the construction of this holding fixture are contained in Appendix B.

5-54.2 **Removal.**

1. Remove drive shaft from hydrostatic transmission per paragraph 5-48.2 (Models 1541 and 1862) or 5-49.2 (Model 1541).

2. Remove cam pivot bracket and damper spring plate per paragraph 5-47.2

3. For Model 1862 only, remove hydraulic inlet tube and return tube per paragraph 5-35.2.

4. Place a pan under tube assembly (4, Figure 5-85) to collect oil. Loosen tube assembly by removing compression nut and rotate tube out of way.

5. Remove oil filter (2).

6. Remove four hex patch lock bolts which secure hydrostatic pump (1) to adapter housing. Lift pump out of tractor.

5-54.3 **Disassembly.**

CAUTION

Thoroughly clean and deburr the outside of the hydrostatic pump before disassembling. Remove paint from shaft surfaces.

1. Disassemble exterior of hydrostatic transmission by removing front gasket (3), connector (5) and O-ring (6). Remove tube assembly (4) from transaxle housing. Discard gasket and O-ring.

2. Disassemble charge pump (21) as follows:

CAUTION

Match mark charge pump housing (21) and center section (7) before disassembly. Charge pump could be installed incorrectly resulting in no charge pressure.

a. Remove hex screws (22) and carefully remove charge pump (21), gerotor (23), pin (24) and O-ring (25). Discard O-ring.

b. Remove lip seal (26) and needle bearing (27). Discard lip seal.

3. Disassemble center section (7) as follows:

CAUTION

Valve plates (35 and 36) may stick to the center section housing surface during removal of center section. Use care to avoid dropping valve plates.

a. Remove center section (7) from transmission housing (34) by removing 12 point screws (8) and hex screws (9 and 10).

b. Disassemble exterior of center section (7) by removing pipe plug (28), plug (29), O-ring (30), pipe plug (31) and pipe (32).

c. Remove roller bearings (33).

d. Disassemble check valve by removing valve (11), O-ring (12), back-up ring (13) and O-ring (14). Discard O-rings and back-up ring.

e. Disassemble relief valve by removing plug (15), O-ring (16), shim pack kit (17), implement relief spring (18) and relief valve cone (19). Discard O-ring.

f. Disassemble side relief valve by removing plug (15), O-ring (16), shim pack kit (17), center relief valve spring (20) and relief valve cone (19). Discard O-ring.

4. Disassemble transmission housing (34) as follows:

a. Remove pump valve plate (35), motor valve plate (36) and pins (37).

b. Disassemble cylinder blocks (38), after removing blocks and thrust plates (39) from transmission housing, as follows:

(1) Remove slipper retainer and pistons.

(2) Place cylinder block assembly in a press on wood blocks.

(3) Using a step plate (3, Figure 5-80), press on spring retainer compressing cylinder block spring. Remove retainer ring (2). Refer to Figure 5-80.

(4) Carefully release press. Remove spring retainer (3, Figure 5-81), spring (5) and spring washer (2). Remove cylinder block (1) from press. Refer to Figure 5-81.

c. Disassemble trunnion shafts (40 and 41, Figure 5-85) as follows:

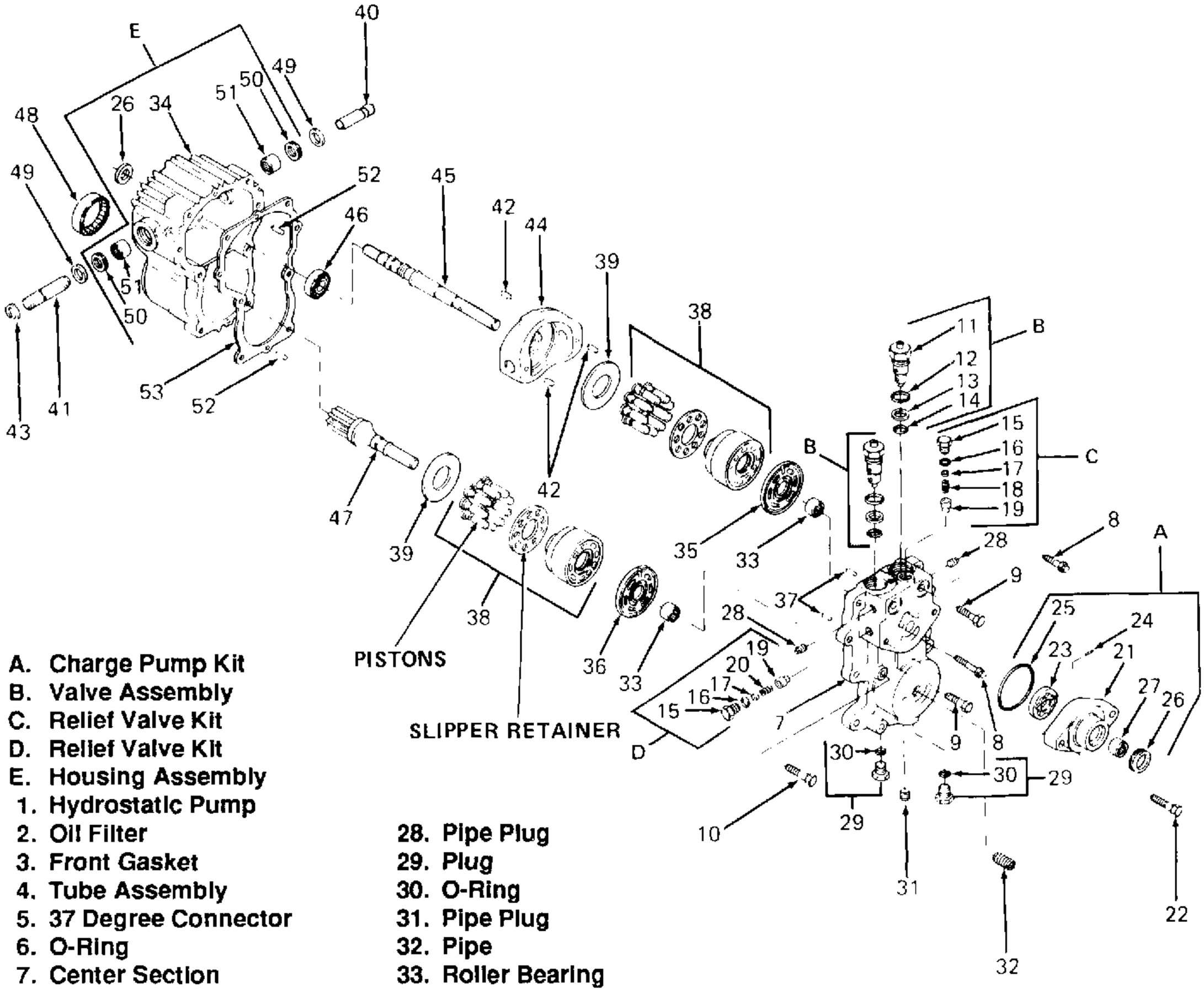
NOTE

Trunnion shafts (40 and 41) are secured to swashplate (44) with pins (42). One pin is used on trunnion shaft (41). Two pins are used on trunnion shaft (40).

(1) Mark or tape a punch exactly 15/32 inch from the end.

CAUTION

Be extremely careful not to drive pins (42) through the shaft and into hole in bottom of swashplate as removal is then very difficult. Also, if the pins are driven too far, it is possible to drive pins through hydrostatic unit housing.



A. Charge Pump Kit
B. Valve Assembly
C. Relief Valve Kit
D. Relief Valve Kit
E. Housing Assembly

1. Hydrostatic Pump
2. Oil Filter
3. Front Gasket
4. Tube Assembly
5. 37 Degree Connector
6. O-Ring
7. Center Section
8. 12 Point Screw
9. Hex Screw
10. Hex Screw
11. Valve
12. O-Ring
13. Back-up Ring
14. O-Ring
15. Plug
16. O-Ring
17. Shim Pack Kit
18. Implement Relief Spring
19. Relief Valve Cone
20. Center Relief Valve Spring
21. Charge Pump Housing
22. Hex Screw
23. Gerotor
24. Pin
25. O-Ring
26. Lip Seal
27. Needle Bearing
28. Pipe Plug
29. Plug
30. O-Ring
31. Pipe Plug
32. Pipe
33. Roller Bearing
34. Transmission Housing
35. Valve Plate
36. Valve Plate
37. Pin
38. Cylinder Block
39. Thrust Plate
40. Trunnion Shaft Assembly
41. Trunnion Shaft
42. Spring Pin
43. Retaining Ring
44. Swashplate
45. Pump Shaft
46. Ball Bearing
47. Motor Shaft
48. Roller Bearing
49. Washer
50. Lip Seal
51. Needle Bearing
52. Pin
53. Gasket

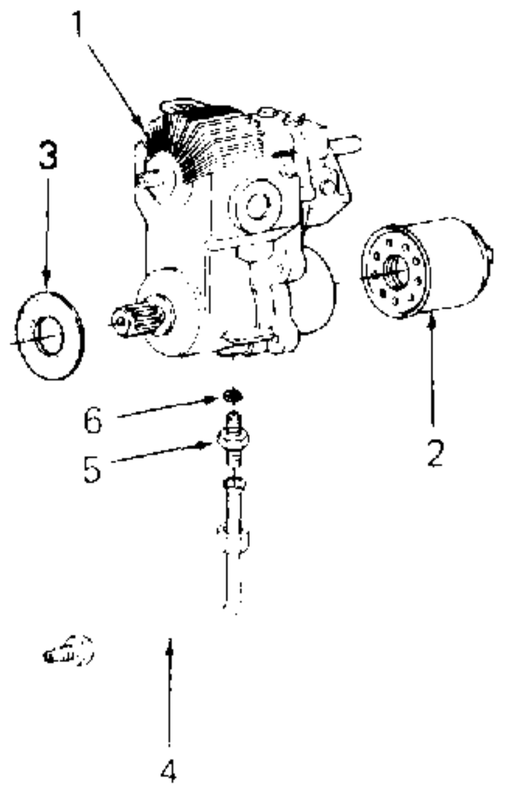


Figure 5-85. Hydrostatic Transmission (Models 1541 and 1862).

(2) Carefully drive pins (42) until mark on punch is even with top surface of swashplate (44), a distance of 15/32 inch. Refer to Figure 5-82.

(3) Remove retaining ring (43, Figure 5-85) and trunnion shafts (40 and 41).

d. Remove swashplate (44) and drive out remaining pin (42).

e. Remove pump shaft (45) and ball bearing (46).

f. Remove and discard lip seal (26).

g. Remove motor shaft (47) and roller bearing (48).

h. Remove washer (49), lip seal (50) and needle bearing (51). Discard seal.

i. Remove pins (52) and gasket (53). Discard gasket.

5-54.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect check valve for dirt, paint and corrosion.
4. Inspect relief valve springs (18 and 20) for pitting and rust. Check relief valve cone (19) for wear or damage. Discard spring and/or cone if damaged or worn.
5. Inspect charge pump for excessive wear or damage. Replace parts if necessary.
6. Inspect valve plates (35 and 36) for scratches, excessive wear or erosion. Check pin slot and grooves on face of plates for wear. Replace plates if significantly worn.

NOTE

A worn or scored valve plate reduces pump efficiency.

7. Inspect cylinder blocks (38, Figure 5-85 and 1, Figure 5-81) as follows:

CAUTION

Cylinder block parts should be wrapped in clean paper or lint-free cloth after they have been cleaned and blown dry, and after they have been inspected.

a. Inspect pistons for scoring, wear or scratches. Be certain oil passage is open.

b. Inspect slippers for severe scratches or embedded material. A slight wear pattern, where slippers ride, is normal. Discard if badly worn.

NOTE

If cylinder bores or pistons are badly worn or scored, a block assembly with pistons is available for replacement. Pistons or block are NOT serviced as individual parts.

c. Inspect cylinder block valve face for damage and the piston bores for excessive wear. Check piston fit in bores.

NOTE

Any linear scratches along length of bore will reduce efficiency.

8. Inspect thrust plate (39) for wear. Use fingernail or sharp pencil across face of thrust plate. If wear is felt, replace thrust plate.
9. Inspect bearings (33, 46, 48 and 51) for damage or wear. Replace worn bearings.
10. Inspect shafts (45 and 47) for cracks, distortion or damage to splined areas. Replace distorted shafts.
11. Inspect transmission housing (34) for cracks.
12. Inspect that all gasket and sealing surfaces are clean and smooth.
13. Inspect tube (4) for damage. Replace if damaged.

5-54.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Check valve assembly kit (B) is available.
4. Center relief valve kit (C) is available.
5. Side relief valve kit (D) is available.
6. Charge pump kit (A) is available.
7. Slippers may be lapped, but do not remove more than .005 inch. All slippers must be within .002 inch thickness of each other.

8. Transmission housing kit (E) is available.
9. Repair minor damage to splined areas.

5-54.6 **Reassembly.**

1. Thoroughly lubricate all parts with *Cub Cadet* hydraulic fluid.
2. Use all new O-rings, seals and gaskets.
3. Assemble transmission housing (34) as follows:
   a. Install pins (52).
   b. Install needle bearing (51), lip seal (50) and washer (49).
   c. Install roller bearing (48) and motor shaft (47).
   d. Install lip seal (26).
   e. Install ball bearing (46) and pump shaft (45).

CAUTION

Install swashplate (44) with the thin pad, located on rear end of plate, toward top of the transmission housing.

   f. Position swashplate (44) in transmission housing (34).
   g. Assemble trunnion shafts (40 and 41) as follows:
      (1) Install trunnion shafts (40 and 41) and retaining ring (43).
      (2) Secure trunnion shaft (41) to swashplate (44) with one pin (42). Secure trunnion shaft (40) to swashplate with two pins (42).
   h. Install thrust plate (39) on motor shaft (47) and pump shaft (45).
   i. Assemble cylinder blocks (38, Figure 5-85 and 1, Figure 5-81) as follows:
      (1) Install spring washer (2, Figure 5-81) (bevel side in), spring (5) and spring retainer (3). Place assembly in a press.
      (2) Compress spring (5) using a step plate (3, Figure 5-80). Install retainer ring (2).
      (3) Install slipper retainer and pistons.
      (4) Install a cylinder block on motor shaft (46, Figure 5-85) and pump shaft (44).

NOTE

Motor valve plate (36) has four notches. Pump valve plate (35) has two notches. Refer to Figures 5-83 and 5-84.

4. Assemble center section (7, Figure 5-85) as follows:

NOTE

If new roller bearings (33) are installed, they must extend .1 inch above machined surface of center section (7).

   a. Install roller bearings (33).
   b. Assemble exterior of center section (7) by installing pipe (32), pipe plug (31), O-ring (30), plugs (29) and pipe plugs (28).
   c. Assemble side relief valve by installing relief valve cone (19), center relief valve spring (20), shim pack kit (17), O-ring (16) and plug (15).
   d. Assemble center relief valve by installing cone (19), spring (18), shim pack kit (17), O-ring (16) and plug (15).
   e. Assemble check valve by installing O-ring (14), back-up ring (13), O-ring (12) and valve (11).
   f. Install gasket (53) and secure center section (7) to transmission housing (34) with hex screws (9 and 10) and 12 point screws (8). Tighten alternately and evenly.
   g. Install pins (37) and then valve plates (35 and 36). A thin coat of petroleum jelly applied to steel side of valve plate will assist in holding plate in place during assembly.

NOTE

Be sure valve plates (35 and 36) are indexed onto pins (37) when placed on center section (7).

5. Assemble charge pump as follows:
   a. Install needle bearing (27) and lip seal (26) in charge pump housing (21).
   b. Install O-ring (25), pin (24) and gerotor (23).

CAUTION

Charge pump could be installed incorrectly resulting in low charge pressure. Observe previous match mark. If new charge pump is being installed, see following NOTE.

NOTE

The flat side of the pump housing (21), located by the mounting bolt hole, should face the right side of the machine.

6. Assemble exterior of hydrostatic transmission by installing O-ring (6), connector (5) and front gasket (3). Install tube (4) onto transaxle housing.
7. Install a new oil filter.

CAUTION

DO NOT rotate either shaft upon reassembly. Damage to the transmission could result.

5-54.7 **Installation.**

1. Squirt *Cub Cadet* hydraulic fluid into suction line fitting. Turn unit upside down to allow oil to flow into passages. Rotate pump input shaft and motor output shaft to insure free rotation.
2. Position hydraulic transmission in tractor and secure to adapter housing with four hex patch lock bolts.
3. Rotate tube (4) into place and secure with compression nut.
4. For Model 1862 only, connect hydraulic inlet tube and return tube per paragraph 5-35.7.
5. Connect damper spring plate and cam pivot bracket per paragraph 5-47.7.
6. Install drive shaft per paragraph 5-48.7 (Models 1541 and 1862) or 5-49.7 (Model 1541).
7. Adjust cam bracket per paragraph 6-7.
8. Refill transmission with *Cub Cadet* hydraulic fluid.

5-54A. **HYDROSTATIC TRANSMISSION (Model 1541 [Tractor Serial Number 816,509 and above]).**

5-54A.1 **General.** A holding fixture is necessary to conveniently service the hydrostatic transmission. Instructions for the construction of this holding fixture are contained in Appendix B.

5-54A.2 **Removal.**

1. Remove drive shaft from hydrostatic transmission per paragraph 5-48A.2.
2. Remove cam pivot bracket and damper spring plate per paragraph 5-47.2
3. Place a pan under transmission dump valve linkage, filter and pickup line (Figure 5-85A).
4. Remove oil filter (5) and oil filter nipple (4).
5. Remove four hex patch lock bolts which secure hydrostatic pump to adapter housing. Lift pump out of tractor.

5-54A.3 **Disassembly.**

CAUTION

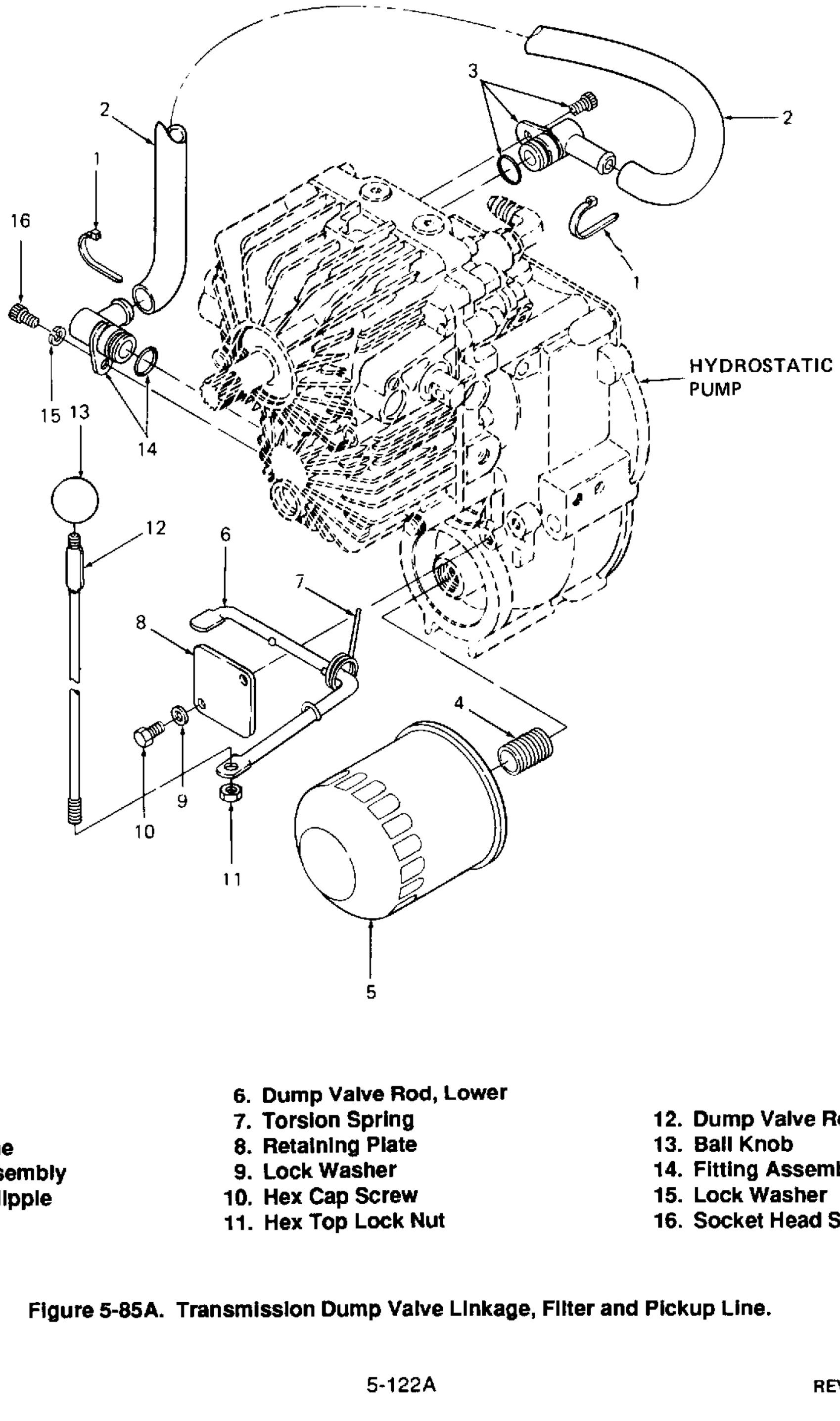
Thoroughly clean and deburr the outside of the hydrostatic pump before disassembling. Remove paint from shaft surfaces.

1. To disassemble exterior of hydrostatic transmission:
   a. Remove cable ties (1), pickup line (2), socket head screw (16) and lock washer (15).
   b. Remove fitting assemblies (3 and 14), hex cap screws (10), lock washers (9) and retaining plate (8).
   c. Remove torsion spring (7), hex top lock nut (11) connecting upper and lower dump valve rods (12 and 6). Remove ball knob (13).
2. Disassemble charge pump (37, Figure 5-85B) as follows:

CAUTION

Match mark charge pump housing (37) and center section (31) before disassembly. Charge pump could be installed incorrectly resulting in no charge pressure.

   a. Remove screws (46) and carefully remove charge pump (37), charge pump shim (38), gerotor (39), pins (44) and O-rings (45). Discard O-rings.



1. Cable Tie
2. Pickup Line
3. Fitting Assembly
4. Oil Filter Nipple
5. Oil Filter
6. Dump Valve Rod, Lower
7. Torsion Spring
8. Retaining Plate
9. Lock Washer
10. Hex Cap Screw
11. Hex Top Lock Nut
12. Dump Valve Rod, Upper
13. Ball Knob
14. Fitting Assembly
15. Lock Washer
16. Socket Head Screw

Figure 5-85A. Transmission Dump Valve Linkage, Filter and Pickup Line.

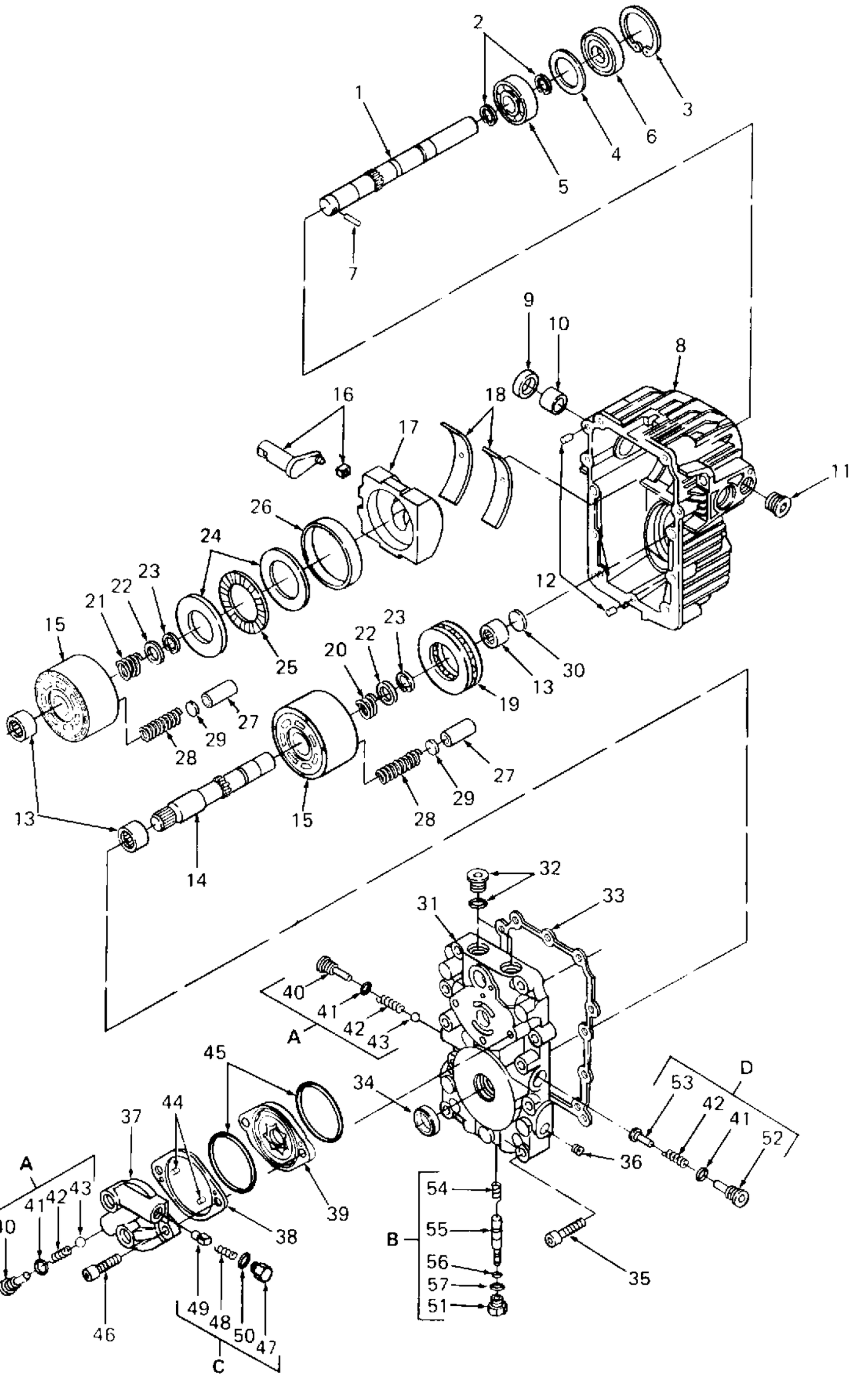


Figure 5-85B. Hydrostatic Transmission (Model 1541).

Legend for Figure 5-85B

A. Check Valve Kit
B. Bypass Valve Kit
C. Relief Valve Kit
D. Check Valve Kit
1. Pump Shaft
2. Retaining Ring
3. Retaining Ring
4. Spacer
5. Ball Bearing
6. Lip Seal
7. Pin
8. Transmission Housing
9. Lip Seal
10. Journal Bearing
11. Plug
12. Pins
13. Roller Bearing
14. Motor Shaft
15. Cylinder Block
16. Trunnion Arm and Guide Slot
17. Swashplate
18. Shell Bearing
19. Thrust Washer and Roller Bearing Assembly
20. Spring
21. Spring
22. Keeper
23. Retaining Ring
24. Thrust Washers
25. Roller Bearing
26. Retainer
27. Piston
28. Piston Spring
29. Spring Seat
30. Plug
31. Center Section
32. Plug
33. Gasket
34. Lip Seal
35. Screw
36. Plug
37. Charge Pump Housing
38. Charge Pump Shim
39. Gerotor
40. Check Valve Plug
41. O-Ring
42. Relief Spring
43. Ball
44. Pin
45. O-Ring
46. Screw
47. Plug
48. Spring
49. Relief Valve Cone
50. O-Ring
51. Bypass Plug
52. Check Valve Plug
53. Check Valve Orifice
54. Spring
55. Bypass Spool
56. O-Ring
57. O-Ring

b. Disassemble check valve (A) by removing plug (40), O-ring (41), relief spring (42) and ball (43). Discard O-rings.

3. Disassemble center section (31) as follows:

   a. Remove center section (31) from transmission housing (8) by removing 12 point screws (35).

   b. Disassemble exterior of center section (31) by removing plug (32), lip seal (34) and plug (36).

   c. Remove roller bearings (13).

   d. Disassemble second check valve (A) by removing plug (40), O-ring (41), relief spring (42) and ball (43). Discard O-ring.

   e. Disassemble bypass valve (B) by removing bypass plug (51), O-rings (56 and 57), bypass spool (55) and spring (54). Discard O-rings.

   f. Disassemble relief valve (C) by removing plug (47), O-ring (50), spring (48) and relief valve cone (49).

   g. Disassemble check valve (D) by removing plug (52), O-ring (41), spring (42) and check valve orifice (53).

4. Disassemble transmission housing (8) as follows:

   a. Remove lip seal (9), journal bearing (10) and plug (11).

b. Extract retainer (26) from swashplate (17) and remove cylinder block assembly from pump shaft (1).

   c. Remove lower cylinder block assembly (15) from motor shaft (14).

5. Disassemble motor shaft cylinder block by removing thrust washer and roller bearing assembly (19), retaining ring (23), keeper (22), spring (20), piston (27), piston spring (28) and spring seat (29).

6. Disassemble pump shaft cylinder block by removing thrust washers (24), roller bearing (25), retaining ring (23), keeper (22), spring (21), piston (27), piston spring (28) and spring seat (29).

7. Remove shell bearings (18).

5-54A.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect check valve for dirt, paint and corrosion.
4. Inspect relief valve springs for pitting and rust. Discard if damaged or worn.
5. Inspect charge pump for excessive wear or damage. Replace parts if necessary.
6. Inspect cylinder blocks (15, Figure 5-85B) as follows:

CAUTION

Cylinder block parts should be wrapped in clean paper or lint-free cloth after they have been cleaned and blown dry, and after they have been inspected.

a. Inspect pistons for scoring, wear or scratches.

NOTE

If cylinder bores or pistons are badly worn or scored, a block assembly with pistons is available for replacement. Pistons or block are NOT serviced as individual parts.

b. Inspect cylinder block valve face for damage and the piston bores for excessive wear. Check piston fit in bores.

NOTE

Any linear scratches along length of bore will reduce efficiency.

7. Inspect swashplate (17) for wear. Use fingernail or sharp pencil across face of swashplate. If wear is felt, replace swashplate.

8. Inspect bearings for damage or wear. Replace worn bearings.

9. Inspect shafts (1 and 14) for cracks, distortion or damage to splined areas. Replace distorted shafts.

10. Inspect transmission housing (8) for cracks.

11. Inspect that all gasket and sealing surfaces are clean and smooth.

5-54A.5 **Repair.**

1. Deburr and dress damaged threads.

2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

3. Bypass valve kit (B) is available.

4. Relief valve kit (C) is available.

5. Check valve kit (D) is available.

6. Check valve kits (A) are available.

7. Repair minor damage to splined areas.

5-54A.6 **Reassembly.**

1. Thoroughly lubricate all parts with *Cub Cadet* hydraulic fluid.

2. Use all new O-rings, seals and gaskets.

3. Assemble transmission housing (8) as follows:

   a. Install gasket (33) and pins (12).

   b. Install plug (11), journal bearing (10) and lip seal (9).

   c. Install shell bearings (18) in transmission and position swashplate (17) with rounded end seated on curved bearing surface.

   d. Assemble pump shaft cylinder block by installing piston spring (28), spring seat (29), piston (27), spring (21), keeper (22) and retaining ring (23).

   e. Assemble motor shaft cylinder block by installing piston spring (28), piston (27), spring seat (29), spring (20), keeper (22), retaining ring (23), thrust washer and roller bearing assembly (19), roller bearing and plug (30).

4. Assemble center section (31) as follows:

   a. Assemble exterior of center section (31) by installing plug (32), lip seal (34) and plug (36).

   b. Assemble check valve (D) by installing check valve orifice (53), spring (42), O-ring (41) and plug (52).

   c. Assemble relief valve (C) by installing cone (49), spring (48), O-ring (50) and plug (47).

   d. Assemble check valves (A) by installing ball (43), spring (42), O-ring (41) and plug (40).

   e. Assemble bypass valve (B) by installing spring (54), spool (55), O-rings (56 and 57) and bypass plug (51).

   f. Install gasket (33) and secure center section (31) to transmission housing (8) with screws (35). Tighten alternately and evenly.

5. Assemble charge pump (37) by installing O-ring (45), pins (44) and gerotor (39).

CAUTION

Charge pump could be installed incorrectly resulting in low charge pressure. Observe previous match mark.

6. Assemble exterior of hydrostatic transmission as follows:

   a. Install fitting assemblies (3 and 14, Figure 5-85A) and pickup line (2) using fitting assembly (14), lock washer (15), socket head screw (16) and cable ties (1).

   b. Position lower dump valve rod (6) and torsion spring (7) and install retaining plate (8) using lock washer (9) and hex cap screw (10).

   c. Attach ball knob (13) to upper dump valve rod (12) and connect upper and lower dump valve rods with hex top lock nut (11).

7. Install a new oil filter (5) and nipple (4).

CAUTION

DO NOT rotate either shaft upon reassembly. Damage to the transmission could result.

5-54A.7 **Installation.**

1. Squirt *Cub Cadet* hydraulic fluid into suction line fitting. Turn unit upside down to allow oil to flow into passages. Rotate pump input shaft and motor output shaft to insure free rotation.

2. Position hydraulic transmission in tractor and secure to adapter housing with four hex patch lock bolts.

3. Connect damper spring plate and cam pivot bracket per paragraph 5-47.7.

4. Adjust cam bracket per paragraph 6-7.

5. Refill transmission with *Cub Cadet* hydraulic fluid.

5-55. HYDROSTATIC TRANSMISSION (Models 1782, 1882, 2082 and 2182).

5-55.1 **General.** A holding fixture is necessary to conveniently service the hydrostatic transmission. Instructions for the construction of this holding fixture are contained in Appendix B.

5-55.2 **Removal.**

1. Remove drive shaft from hydrostatic transmission per paragraph 5-50.2.
2. Remove cam pivot bracket and damper spring plate per paragraph 5-47.2.
3. Remove hydraulic inlet tube and return tube per paragraph 5-35.2.
4. Place a pan under tube assembly (4, Figure 5-86) to collect oil. Loosen tube assembly by removing compression nut and rotate tube out of way.
5. Remove oil filter (2).
6. Remove four hex patch lock bolts which secure hydrostatic pump (1) to adapter housing. Lift pump out of tractor.

5-55.3 **Disassembly.**

CAUTION

Thoroughly clean and deburr the outside of the hydrostatic pump before disassembling. Remove paint from shaft surfaces.

1. Disassemble exterior of hydrostatic transmission by removing front gasket (3), connector (5) and O-ring (6). Remove tube (4) from transaxle housing. Discard gasket and O-ring.

2. Disassemble charge pump (21) as follows:

CAUTION

Match mark charge pump housing (21) and center section (7) before disassembly. Charge pump could be installed incorrectly resulting in no charge pressure.

   a. Remove hex screws (22) and carefully remove charge pump (21), gerotor (23), pin (24) and O-ring (25). Discard O-ring.

   b. Remove lip seal (26) and needle bearing (27). Discard lip seal.

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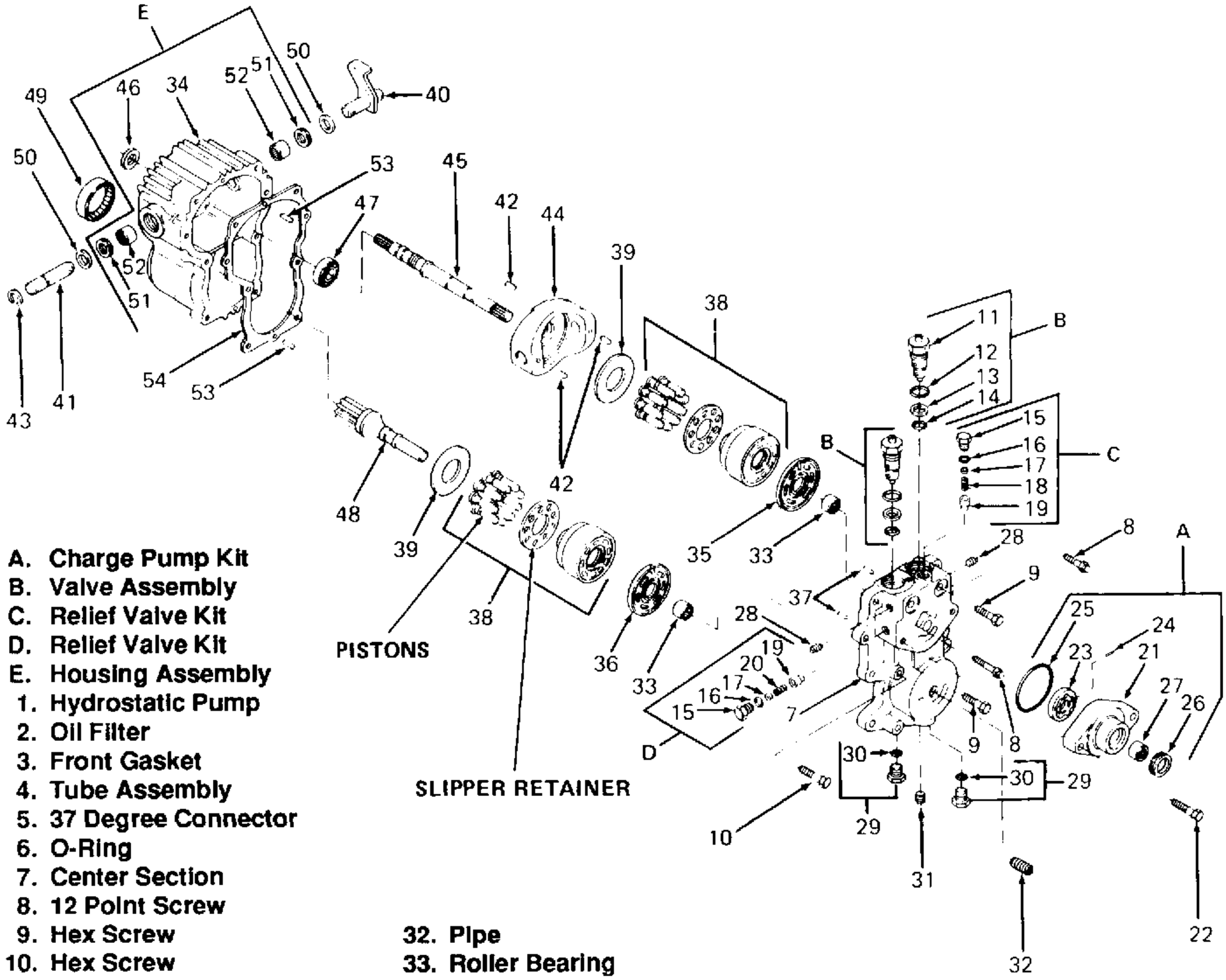
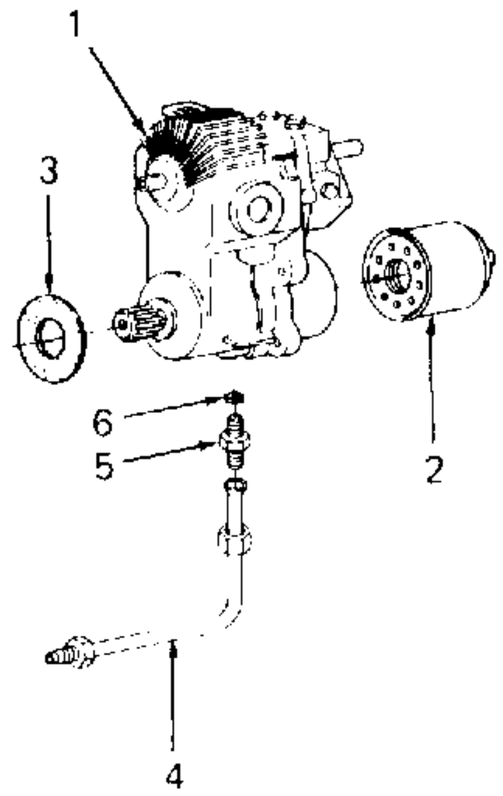




A. Charge Pump Kit
B. Valve Assembly
C. Relief Valve Kit
D. Relief Valve Kit
E. Housing Assembly
1. Hydrostatic Pump
2. Oil Filter
3. Front Gasket
4. Tube Assembly
5. 37 Degree Connector
6. O-Ring
7. Center Section
8. 12 Point Screw
9. Hex Screw
10. Hex Screw
11. Valve
12. O-Ring
13. Back-up Ring
14. O-Ring
15. Plug
16. O-Ring
17. Shim Pack Kit
18. Implement Relief Spring
19. Relief Valve Cone
20. Center Relief Valve Spring
21. Charge Pump Housing
22. Hex Screw
23. Gerotor
24. Pin
25. O-Ring
26. Lip Seal
27. Needle Bearing
28. Pipe Plug
29. Plug
30. O-Ring
31. Pipe Plug
32. Pipe
33. Roller Bearing
34. Transmission Housing
35. Valve Plate
36. Valve Plate
37. Pin
38. Cylinder Block
39. Thrust Plate
40. Trunnion Shaft Assembly
41. Trunnion Shaft
42. Spring Pin
43. Retaining Ring
44. Swashplate
45. Pump Shaft
46. Lip Seal
47. Ball Bearing
48. Motor Shaft
49. Roller Bearing
50. Washer
51. Lip Seal
52. Needle Bearing
53. Pin
54. Gasket

Figure 5-86. Hydrostatic Transmission (Models 2082 and 2182).

3. Disassemble center section (7) as follows:

CAUTION

Valve plates (35 and 36) may stick to the center section housing surface during removal of center section. Use care to avoid dropping valve plates.

a. Remove center section (7) from transmission housing (34) by removing 12 point screws (8) and hex screws (9 and 10).

b. Disassemble exterior of center section (7) by removing pipe plugs (28), plug (29), O-ring (30), pipe plug (31) and pipe (32).

c. Remove roller bearings (33).

d. Disassemble check valve (B) by removing valve (11), O-ring (12), back-up ring (13) and O-ring (14). Discard O-rings and back-up ring.

e. Disassemble center relief valve (C) by removing plug (15), O-ring (16), shim pack kit (17), implement relief spring (18) and relief valve cone (19). Discard O-ring.

f. Disassemble side relief valve (D) by removing plug (15), O-ring (16), shim pack kit (17), center relief valve spring (20) and relief valve cone (19). Discard O-ring.

4. Disassemble transmission housing (34) as follows:

a. Remove pump valve plate (35), motor valve plate (36) and pins (37).

b. Disassemble cylinder blocks (38), after removing blocks and thrust plates (39) from transmission housing, as follows:

(1) Remove slipper retainer and pistons.

(2) Place cylinder block assembly in a press on wood blocks.

(3) Using a step plate (3, Figure 5-80), press on spring retainer compressing cylinder block spring. Remove retainer ring (2). Refer to Figure 5-80.

(4) Carefully release press. Remove spring retainer (3, Figure 5-81), spring (5) and spring washer (2). Remove cylinder block (1) from press. Refer to Figure 5-81.

c. Disassemble trunnion shafts (40 and 41, Figure 5-86) as follows:

NOTE

Trunnion shafts (40 and 41) are secured to swashplate (44) with pins (42). One pin is used on trunnion shaft (41). Two pins are used on trunnion shaft (40).

(1) Mark or tape a punch exactly 15/32 inch from the end.

CAUTION

Be extremely careful not to drive pins (42) through the shaft and into hole in bottom of swashplate as removal is then very difficult. Also, if the pins are driven too far, it is possible to drive pins through hydrostatic unit housing.

(2) Carefully drive pins (42) until mark on punch is even with top surface of swashplate (44), a distance of 15/32 inch. Refer to Figure 5-82.

(3) Remove retaining ring (43, Figure 5-86) and trunnion shafts (40 and 41).

d. Remove swashplate (44) and drive out remaining pin (42).

e. Remove pump shaft (45) and ball bearing (47).

f. Remove and discard lip seal (26).

g. Remove motor shaft (48) and roller bearing (49).

h. Remove washer (50), lip seal (51) and needle bearing (52). Discard seal.

i. Remove pins (53) and gasket (54). Discard gasket.

5-55.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect check valve for dirt, paint and corrosion.
4. Inspect relief valve springs (18 and 20) for pitting and rust. Check relief valve cone (19) for wear or

damage. Discard spring and/or cone if damaged or worn.

5. Inspect charge pump for excessive wear or damage. Replace parts if necessary.

6. Inspect valve plates (35 and 36) for scratches, excessive wear or erosion. Check pin slot and grooves on face of plates for wear. Replace plates if significantly worn.

NOTE

A worn or scored valve plate reduces pump efficiency.

7. Inspect cylinder blocks (38, Figure 5-86 and 1, Figure 5-81) as follows:

CAUTION

Cylinder block parts should be wrapped in clean paper or lint-free cloth after they have been cleaned and blown dry, and after they have been inspected.

a. Inspect pistons for scoring, wear or scratches. Be certain oil passage is open.

b. Inspect slippers for severe scratches or embedded material. A slight wear pattern, where slippers ride, is normal. Discard if badly worn.

NOTE

If cylinder bores or pistons are badly worn or scored, a block assembly with pistons is available for replacement. Pistons or block are NOT serviced as individual parts.

c. Inspect cylinder block valve face for damage and the piston bores for excessive wear. Check piston fit in bores.

NOTE

Any linear scratches along length of bore will reduce efficiency.

8. Inspect thrust plate (39, Figure 5-86) for wear. Use fingernail or sharp pencil across face of thrust plate. If wear is felt, replace thrust plate.

9. Inspect bearings (33, 47, 49 and 52) for damage or wear. Replace worn bearings.

10. Inspect shafts (45 and 48) for cracks, distortion or damage to splined areas. Replace distorted shafts.

11. Inspect transmission housing (34) for cracks.

12. Inspect that all gasket and sealing surfaces are clean and smooth.

13. Inspect tube (4) for damage. Replace if damaged.

5-55.5 **Repair.**

1. Deburr and dress damaged threads.

2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

3. Check valve assembly kit (B) is available.

4. Center relief valve kit (C) is available.

5. Side relief valve kit (D) is available.

6. Charge pump kit (A) is available.

7. Slippers may be lapped, but do not remove more than .005 inch. All slippers must be within .002 inch thickness of each other.

8. Transmission housing kit (E) is available.

9. Repair minor damage to splined areas.

5-55.6 **Reassembly.**

1. Thoroughly lubricate all parts with *Cub Cadet* hydraulic fluid.

2. Use all new O-rings, seals and gaskets.

3. Assemble transmission housing (34) as follows:

   a. Install pins (53).

   b. Install needle bearing (52), lip seal (51) and washer (50).

   c. Install roller bearing (49) and motor shaft (48).

   d. Install lip seal (26).

   e. Install ball bearing (47) and pump shaft (45).

CAUTION

Install swashplate (44) with the thin pad, located on rear end of plate, toward top of the transmission housing.

   f. Position swashplate (44) in transmission housing.

g. Assemble trunnion shafts (40 and 41) as follows:

(1) Install trunnion shafts (40 and 41) and retaining ring (43).

(2) Secure trunnion shaft (41) to swashplate (44) with one pin (42). Secure trunnion shaft (40) to swashplate with two pins (42).

h. Install thrust plate (39) on motor shaft (48) and pump shaft (45).

i. Assemble cylinder blocks (38, Figure 5-86 and 1, Figure 5-81) as follows:

(1) Install spring washer (2, Figure 5-81) (bevel side in), spring (5) and spring retainer (3). Place assembly in a press.

(2) Compress spring (5) using a step plate (3, Figure 5-80). Install retainer ring (2).

(3) Install slipper retainer and pistons.

(4) Install a cylinder block on motor shaft (48, Figure 5-86) and pump shaft (45).

NOTE

Motor valve plate (36) has four notches. Pump valve plate (35) has two notches. Refer to Figures 5-83 and 5-84.

4. Assemble center section (7, Figure 5-86) as follows:

NOTE

If new roller bearings (33) are installed, they must extend .1 inch above machined surface of center section (7).

a. Install roller bearings (33).

b. Assemble exterior of center section (7) by installing pipe (32), pipe plug (31), O-ring (30), plug (29) and pipe plugs (28).

c. Assemble side relief valve (D) by installing relief valve cone (19), center relief valve spring (20), shim pack kit (17), O-ring (16) and plug (15).

d. Assemble center relief valve (C) by installing relief valve cone (19), implement relief spring (18), shim pack kit (17), O-ring (16) and plug (15).

e. Assemble check valve (B) by installing O-ring (14), back-up ring (13), O-ring (12) and valve (11).

f. Install pins (37) and then valve plates (35 and 36). A thin coat of petroleum jelly applied to steel side of valve plate will assist in holding plate in place during assembly.

NOTE

Be sure valve plates (35 and 36) are indexed onto pins (37) when placed on center section (7).

g. Install gasket (54) and secure center section (7) to transmission housing (34) with hex screws (9 and 10) and 12 point screws (8). Tighten alternately and evenly.

5. Assemble charge pump as follows:

a. Install needle bearing (27) and lip seal (26) in charge pump housing (21).

b. Install O-ring (25), pin (24) and gerotor (23).

CAUTION

Charge pump could be installed incorrectly resulting in low charge pressure. Observe previous match mark. If new charge pump is being installed, see following NOTE.

NOTE

The flat side of the pump housing (21), located by the mounting bolt hole, should face the right side of the machine.

6. Assemble exterior of hydrostatic transmission by installing O-ring (6), connector (5) and front gasket (3). Install tube (4) onto transaxle housing.

7. Install a new oil filter.

CAUTION

DO NOT rotate either shaft upon reassembly. Damage to the transmission could result.

5-55.7 **Installation.**

1. Squirt *Cub Cadet* hydraulic fluid into suction line fitting. Turn unit upside down to allow oil to flow into passages. Rotate pump input shaft and motor output shaft to insure free rotation.
2. Position hydraulic transmission in tractor and secure to adapter housing with four hex patch lock bolts.
3. Rotate tube (4) into place and secure with compression nut.
4. Connect hydraulic inlet tube and return tube per paragraph 5-35.7.
5. Connect damper spring plate and cam pivot bracket per paragraph 5-47.7.
6. Install drive shaft per paragraph 5-50.5.
7. Adjust cam bracket per paragraph 6-7.
8. Refill transmission with *Cub Cadet* hydraulic fluid.

5-56. TRANSMISSION – REAR TRANSAXLE AND ADAPTER HOUSINGS (Models 1340, 1541, 1860 and 1862).

5-56.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-56.2 **Removal.**

1. Remove drive line per paragraph 5-48.2 (Models 1340, 1541, 1860 and 1862) or 5-49.2 (Models 1541 and 1860).
2. Remove hydrostatic transmission per paragraph 5-53.2 (Models 1340 and 1860) or 5-54.2 (Models 1541 and 1862).
3. Remove rear axles and rear axle carriers per paragraph 5-51.2.

WARNING

After completion of step 4, following, rear transaxle housing and adapter housing will be free of tractor frame. Support underside of rear transaxle housing and adapter housing BEFORE performing step 4 to prevent equipment from falling and injuring repair personnel.

4. Remove rear transaxle housing (2, Figure 5-87) and adapter housing (1) as follows:
   a. Support underside of rear transaxle housing and adapter housing with a suitable device.
   b. Remove hex cap screws which secure right and left transmission mounting brackets (19 and 20) to the tractor frame.

5-56.3 **Disassembly.**

1. Disassemble rear transaxle housing (2) as follows:
   a. Disassemble rear transaxle housing by removing dipstick (31) and dipstick tube (32).
   b. Remove bearing retainer (3) and roller bearing cup (4) from rear transaxle housing (2) by removing hex cap screws and lock washers.
   c. Remove shim package (5).

CAUTION

Keep shim package [5 (containing shims 6, 7, 8 and 9)] with bearing retainer (3) and mark left and right for identical reinstallation.

   d. Remove differential per paragraph 5-52.2.
2. Disassemble adapter housing (1) as follows:
   a. Separate adapter housing from rear transaxle housing as follows:
      (1) Remove drain plug (10) and drain oil into container.
      (2) Remove expansion plug (11) from front of adapter housing (1) by drilling a hole into center of plug. Insert a tool into hole and pry out without damaging bore needed for resealing. Discard plug.
      (3) Remove and discard front bearing retainer (12).
      (4) Remove hex cap screw (13), spring washer (14) and flat washer (15) from front of adapter housing (1).
      (5) Remove hex cap screws (16) and spring washers (14).
      (6) Tap adapter housing (1) lightly and carefully remove from transaxle housing.

NOTE

Two hex cap screws (16) are located INSIDE transaxle housing (2).

   b. Remove hex patch bolts (17) and lock washers (18) from right and left transmission mounting brackets (19 and 20).

c. Remove bevel pinion shaft (24) as follows:

(1) Remove reduction gear (21) by removing front retaining ring (22) and gear spacer (23).

(2) Remove rear retaining ring (22). Remove bevel pinion shaft (24), roller bearing cone (25), roller bearing cup (26) and rear bearing cup shim (27).

d. Remove roller bearing cone (28) and roller bearing cup (29) from housing.

e. Remove dowel pins (30).

5-56.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect bearings (25 and 28) for damage or wear. Replace worn bearings.
4. Inspect reduction gear (21) for chipped or missing teeth.
5. Inspect splined area of reduction gear (21) for damage. Replace badly worn gear.
6. Inspect adapter housing (1) and transaxle housing (2) for cracks.
7. Inspect that all gasket and sealing surfaces are clean and smooth.
8. Inspect bevel pinion shaft (24) for cracks, distortion or damage to splined area or retaining ring grooves. Replace cracked or distorted shaft.

NOTE

Damage to the ring gear or bevel pinion shaft usually causes the mate also to be damaged or destroyed. Be sure to inspect both parts carefully.

9. Inspect dipstick tube (32) for cracks. Replace if badly damaged.

5-56.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to gear teeth and splined areas.

5-56.6 **Reassembly.**

1. Reassemble adapter housing (1) as follows:

a. Install dowel pins (30).

CAUTION

It is not recommended to reuse roller bearing adjacent to the damaged area of the bevel pinion shaft. Replace with new bearing. Make sure to reuse shim package (5) below outer race as it is factory selected to make up for housing variation.

b. Install roller bearing cup (29) and roller bearing cone (28).

c. Install bevel pinion shaft (24) as follows:

(1) Install rear bearing cup shim (27), roller bearing cup (26), roller bearing cone (25) and bevel pinion shaft (24). Install rear retaining ring (22).

(2) Install reduction gear (21), gear spacer (23) and front retaining ring (22).

d. Set bevel pinion shaft bearing preload as follows:

(1) Turn pinion shaft. A slight drag should be noticed (approximately 2 in-lbs).

(2) If shaft spins freely, a thicker rear bearing cup shim (27) is needed.

(3) If shaft is too tight, a thinner rear bearing cup shim (27) is needed.

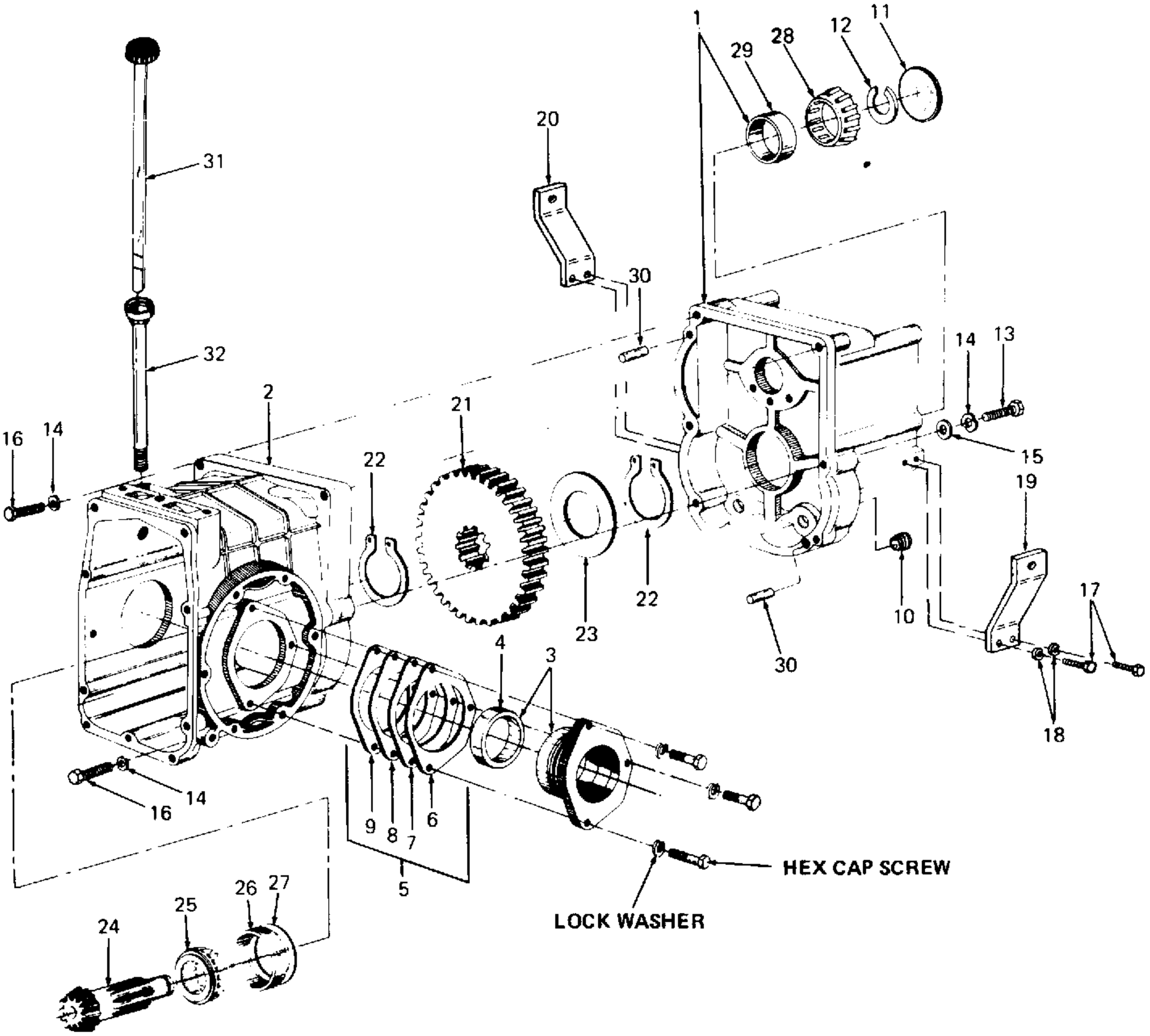
e. Secure adapter housing (1) to rear transaxle housing (2) as follows:

(1) Spray mating surfaces of rear transaxle housing (2) and adapter housing (1) with Lock-Tite primer and apply a thin but uniform coat of #515 liquid gasket.

(2) Position housings, line up with pinion shaft and dowels and tap down with plastic hammer. Make sure surfaces approach each other parallel. Stop as soon as gap is 1/8 inch.

(3) Install spring washers (14) and hex cap screws (16). Torque screws alternately and evenly.

(4) Install flat washer (15), spring washer (14) and hex cap screws (13). Tighten alternately and evenly.



1. Adapter Housing Assembly
2. Rear Transaxle Housing Assembly
3. Bearing Retainer Assembly
4. Roller Bearing Cup
5. Shim Package
6. Bearing Retainer Shim
7. Bearing Retainer Shim
8. Bearing Retainer Shim
9. Bearing Retainer Shim
10. Drain Plug
11. Expansion Plug
12. Front Bearing Retainer
13. Hex Cap Screw
14. Spring Washer
15. Flat Washer
16. Hex Cap Screw
17. Hex Patch Bolt
18. Lock Washer
19. Transmission Mounting Bracket, RH
20. Transmission Mounting Bracket, LH
21. Reduction Gear -66T
22. Retaining Ring
23. Gear Spacer
24. Bevel Pinion Shaft
25. Roller Bearing Cone
26. Roller Bearing Cup
27. Rear Bearing Cup Shim
28. Roller Bearing Cone
29. Roller Bearing Cup
30. Dowel Pin
31. Dipstick Blade Assembly
32. Dipstick Tube

Figure 5-87. Transmission – Rear Transaxle and Adapter Housings (Models 1340, 1541, 1860 and 1862).

f. Install left and right transmission mounting brackets (20 and 19) with lock washers (18) and hex patch bolts (17).

g. Install front bearing retainer (12) as follows:

(1) If no gear, shaft or bearings were replaced, install a new front bearing retainer (12) with exact thickness as retainer previously removed.

(2) If gear, shaft or bearings were replaced, a new front bearing retainer (12) thickness must be established to make up for the difference in size of the new parts installed. Proceed as follows:

(a) Available bearing retainer sizes are .131, .125, .119, .113, .107 and .10.

(b) After pushing or lightly tapping pinion assembly to a stop, use available retainers until one fits the open portion of the ring groove, then pick the next thicker retainer (+.006) and press into groove.

h. Set bevel pinion shaft bearing preload as follows:

(1) Turn pinion shaft. A slight drag should be noticed (approximately 2 in-lbs).

(2) If shaft spins freely, a thicker retainer (12) is needed.

(3) If shaft is too tight, a thinner retainer (12) is needed.

i. Install expansion plug (11) and deform center evenly until sealed.

j. Install drain plug (10).

2. Reassemble rear transaxle housing (2) as follows:

a. Install differential per paragraph 5-52.7.

b. Install shim package (5).

c. Install bearing retainer (3) and roller bearing cup (4) to rear transaxle housing (2) with lock washers and hex cap screws.

d. Install dipstick tube (32) using teflon tape, and install dipstick (31).

5-56.7 Installation.

1. Install assembled rear transaxle housing (2) and adapter housing (1) onto tractor as follows:

a. Support assembled housings on a suitable device and position under tractor.

b. Secure left and right transmission mounting brackets (20 and 19) to frame with hex cap screws.

2. Install rear axles and rear axle carriers per paragraph 5-51.7.

3. Install hydrostatic transmission per paragraph 5-53.7 (Models 1340 and 1860) or 5-54.7 (Models 1541 and 1862).

4. Install drive line per paragraph 5-48.5 (Models 1340, 1541, 1860 and 1862) or 5-49.7 (Models 1541 and 1860).

5. Refill with *Cub Cadet* hydraulic fluid.

5-57. TRANSMISSION – REAR TRANSAXLE AND ADAPTER HOUSINGS (Models 1782, 1882, 2082 and 2182).

5-57.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-57.2 Removal.

1. Remove drive line per paragraph 5-50.2.

2. Remove hydrostatic transmission per paragraph 5-55.2.

3. Remove rear axles and rear axle carriers per paragraph 5-51.2.

WARNING

After completion of step 4, following, rear transaxle housing and adapter housing will be free of tractor frame. Support underside of rear transaxle housing and adapter housing BEFORE performing step 4 to prevent equipment from falling and injuring repair personnel.

4. Remove rear transaxle housing (2, Figure 5-88) and adapter housing (1) as follows:

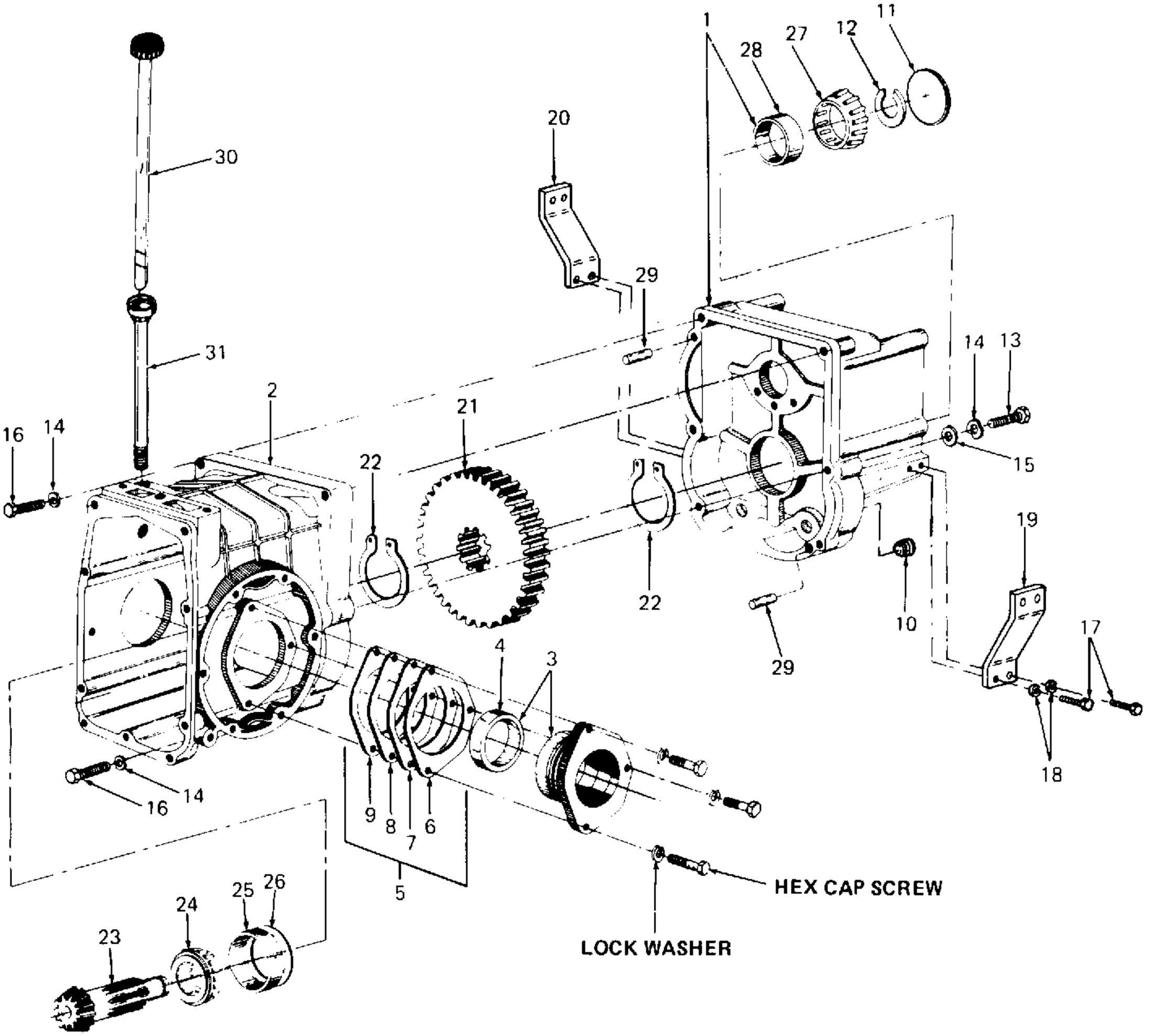
a. Support underside of rear transaxle housing and adapter housing with a suitable device.

b. Remove hex cap screws which secure right and left transmission mounting brackets (19 and 20) to the tractor frame.

5-57.3 Disassembly.

1. Disassemble rear transaxle housing (2) as follows:

a. Disassemble rear transaxle housing by removing dipstick (30) and dipstick tube (31).



1. Adapter Housing Assembly
2. Rear Transaxle Housing Assembly
3. Bearing Retainer Assembly
4. Roller Bearing Cup
5. Shim Package
6. Bearing Retainer Shim
7. Bearing Retainer Shim
8. Bearing Retainer Shim
9. Bearing Retainer Shim
10. Drain Plug
11. Expansion Plug
12. Front Bearing Retainer
13. Hex Cap Screw
14. Spring Washer
15. Flat Washer
16. Hex Cap Screw
17. Hex Patch Bolt
18. Lock Washer
19. Transmission Mounting Bracket, RH
20. Transmission Mounting Bracket, LH
21. Reduction Gear -68T
22. Retaining Ring
23. Bevel Pinion Shaft
24. Roller Bearing Cone
25. Roller Bearing Cup
26. Rear Bearing Cup Shim
27. Roller Bearing Cone
28. Roller Bearing Cup
29. Dowel Pin
30. Dipstick Blade Assembly
31. Dipstick Tube

Figure 5-88. Transmission – Rear Transaxle and Adapter Housings (Models 1782, 1882, 2082 and 2182).

b. Remove bearing retainer (3) and roller bearing cup (4) from rear transaxle housing (2) by removing hex cap screws and lock washers.

c. Remove shim package (5).

CAUTION

Keep shim package [5 (containing shims 6, 7, 8 and 9)] with bearing retainer (3) and mark left and right for identical reinstallation.

d. Remove differential per paragraph 5-52.2.

2. Disassemble adapter housing (1) as follows:

   a. Separate adapter housing from rear transaxle housing as follows:

      (1) Remove drain plug (10) and drain oil into container.

      (2) Remove expansion plug (11) from front of adapter housing (1) by drilling a hole into center of plug. Insert a tool into hole and pry out being careful not to damage bore of expansion plug. Discard plug.

      (3) Remove and discard front bearing retainer (12).

      (4) Remove hex cap screw (13), spring washer (14) and flat washer (15) from front of adapter housing (1).

      (5) Remove hex cap screws (16) and spring washers (14).

      (6) Tap adapter housing (1) lightly and carefully remove from transaxle housing.

NOTE

Two hex cap screws (16) are located INSIDE transaxle housing (2).

   b. Remove hex patch bolts (17) and lock washers (18) from right and left transmission mounting brackets (19 and 20).

   c. Remove bevel pinion shaft (23) as follows:

      (1) Remove reduction gear (21) by removing front retaining ring (22).

      (2) Remove rear retaining ring (22). Remove bevel pinion shaft (23), roller bearing cone (24), roller bearing cup (25) and rear bearing cup shim (26).

   d. Remove roller bearing cone (27) and roller bearing cup (28) from housing.

   e. Remove dowel pins (29) only if housing is to be replaced.

5-57.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect bearings (24 and 27) for damage or wear. Replace worn bearings.
4. Inspect reduction gear (21) for chipped or missing teeth.
5. Inspect splined area of reduction gear (21) for damage. Replace badly worn gear.
6. Inspect adapter housing (1) and transaxle housing (2) for cracks.
7. Inspect that all gasket and sealing surfaces are clean and smooth.
8. Inspect bevel pinion shaft (23) for cracks, distortion or damage to splined area or retaining ring grooves. Replace cracked or distorted shaft.

NOTE

Damage to the ring gear or bevel pinion shaft usually causes the mate also to be damaged or destroyed. Be sure to inspect both parts carefully.

9. Inspect dipstick tube (31) for cracks. Replace if badly damaged.

5-57.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to gear teeth and splined areas.

5-57.6 **Reassembly.**

1. Reassemble adapter housing (1) as follows:

   a. Install dowel pins (29).

CAUTION

It is not recommended to reuse roller bearing adjacent to the damaged area of the

bevel pinion shaft. Replace with new bearing. Make sure to reuse shim package (5) below outer race as it is factory selected to make up for housing variation.

b. Install roller bearing cup (28) and roller bearing cone (27).

c. Install bevel pinion shaft (23) as follows:

(1) Install rear bearing cup shim (26), roller bearing cup (25), roller bearing cone (24) and bevel pinion shaft (23). Install rear retaining ring (22).

(2) Install reduction gear (21) and front retaining ring (22).

d. Set bevel pinion shaft bearing preload as follows:

(1) Turn pinion shaft. A slight drag should be noticed (approximately 2 in-lbs).

(2) If shaft spins freely, a thicker rear bearing cup shim (26) is needed.

(3) If shaft is too tight, a thinner rear bearing cup shim (26) is needed.

e. Secure adapter housing (1) to rear transaxle housing (2) as follows:

(1) Spray mating surfaces of rear transaxle housing (2) and adapter housing (1) with Lock-Tite primer and apply a thin but uniform coat of #515 liquid gasket.

(2) Position housings, line up with pinion shaft and dowels and tap down with plastic hammer. Make sure surfaces approach each other parallel. Stop as soon as gap is 1/8 inch.

(3) Install spring washers (14) and hex cap screws (16). Torque screws alternately and evenly.

(4) Install flat washer (15), spring washer (14) and hex cap screws (13). Tighten alternately and evenly.

f. Install left and right transmission mounting brackets (20 and 19) with lock washers (18) and hex patch bolts (17).

g. Install front bearing retainer (12) as follows:

(1) If no gear, shaft or bearings were replaced, install a new front bearing retainer (12) with exact thickness as retainer previously removed.

(2) If bearings, gear or shaft were replaced, a new front bearing retainer (12) thickness must be established to make up for the difference in size of the new parts installed. Proceed as follows:

(a) Available bearing retainer sizes are .131, .125, .119, .113, .107 and .10.

(b) After pushing or lightly tapping pinion assembly to a stop, use available retainers until one fits the open portion of the ring groove, then pick the next thicker retainer (+.006) and press into groove.

h. Set bevel pinion shaft bearing preload as follows:

(1) Turn pinion shaft. A slight drag should be noticed (approximately 2 in-lbs).

(2) If shaft spins freely, a thicker retainer (12) is needed.

(3) If shaft is too tight, a thinner retainer (12) is needed.

i. Install expansion plug (11) and deform center evenly until sealed.

j. Install drain plug (10).

2. Reassemble rear transaxle housing (2) as follows:

a. Install differential per paragraph 5-52.7.

b. Install shim package (5).

c. Install bearing retainer (3) and roller bearing cup (4) to rear transaxle housing (2) with lock washers and hex cap screws.

d. Install dipstick tube (31) using teflon tape, and install dipstick (30).

5-57.7 **Installation.**

1. Install assembled rear transaxle housing (2) and adapter housing (1) onto tractor as follows:

a. Support assembled housings on a suitable device and position under tractor.

b. Secure left and right transmission mounting brackets (20 and 19) to frame with hex cap screws.

2. Install rear axles and rear axle carriers per paragraph 5-51.7.

3. Install hydrostatic transmission per paragraph 5-55.7.

4. Install drive line per paragraph 5-50.5.

5. Refill with *Cub Cadet* hydraulic fluid.

5-58. CLUTCH AND CONTROLS (Model 1535)

5-58.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-58.2 **Removal.**

1. Chock front and rear wheels.
2. Disconnect negative battery cable.
3. Remove side panels per paragraph 5-4.2.
4. Remove frame cover.
5. Release clutch/brake pedal.
6. Remove drive shaft (6, Figure 5-89) as follows:
   a. Remove clutch release rod (1) as follows:
      (1) Remove rear end of rod from clutch and brake arm. Refer to paragraph 5-42.2.
      (2) Remove front end of rod from release lever (17) by removing hex insert lock nut (2), flat washers (3), compression spring (4) and cotter pin (5).
   b. Release drive shaft (6) from creeper drive as follows:
      (1) Remove tie strap (7), hex patch lock nuts (8), flat washers (9), socket head cap screws (10) and lock washers (11). Slide coupling boot (12) and front drive coupling (13) forward on shaft. Remove and replace O-ring (38).

NOTE

Tractors prior to the 1991 model year (Serial Number 811,671 and below) were not equipped with O-rings (38). In some instances, these tractors may be upgraded during repair by installing grooved drive coupling (13A) with O-rings (38) seated.

      (2) Remove rear drive coupling (13), steel balls (14) and drive hub (15).
      (3) Remove adapter (16) from creeper drive shaft by removing cotter pin.
      (4) Move drive shaft to side of creeper input shaft.
   c. Disconnect release lever (17) from clutch lever hanger (27) by removing hex center lock nut (18), socket head shoulder screw (19) and flat washers (20).
   d. Remove driving disc spring (21).
   e. Remove drive shaft by drawing it rearward.
7. Remove clutch driving disc (22) and drive shaft flange assembly (26) by removing hex cap screws (23) and lock washers (11).
8. Remove clutch lever hanger (27).

5-58.3 **Disassembly.**

1. Disassemble drive shaft (6) as follows:
   a. Remove pressure plate locating hub assembly (28) by removing spiral spring pin.
   b. Remove clutch friction disc (29) and pressure plate hub assembly (30), and release lever (17).
   c. Clamp drive shaft (6) snugly in a vise equipped with brass jaws. Refer to Figure 5-90.
   d. Tap drive shaft (6, Figure 5-89) down enough to slightly compress compression springs (32 and 36), and remove spiral spring pin (31).

WARNING

Drive shaft is under spring tension. Sudden release from vise could cause injury. Slowly release vise to remove drive shaft.

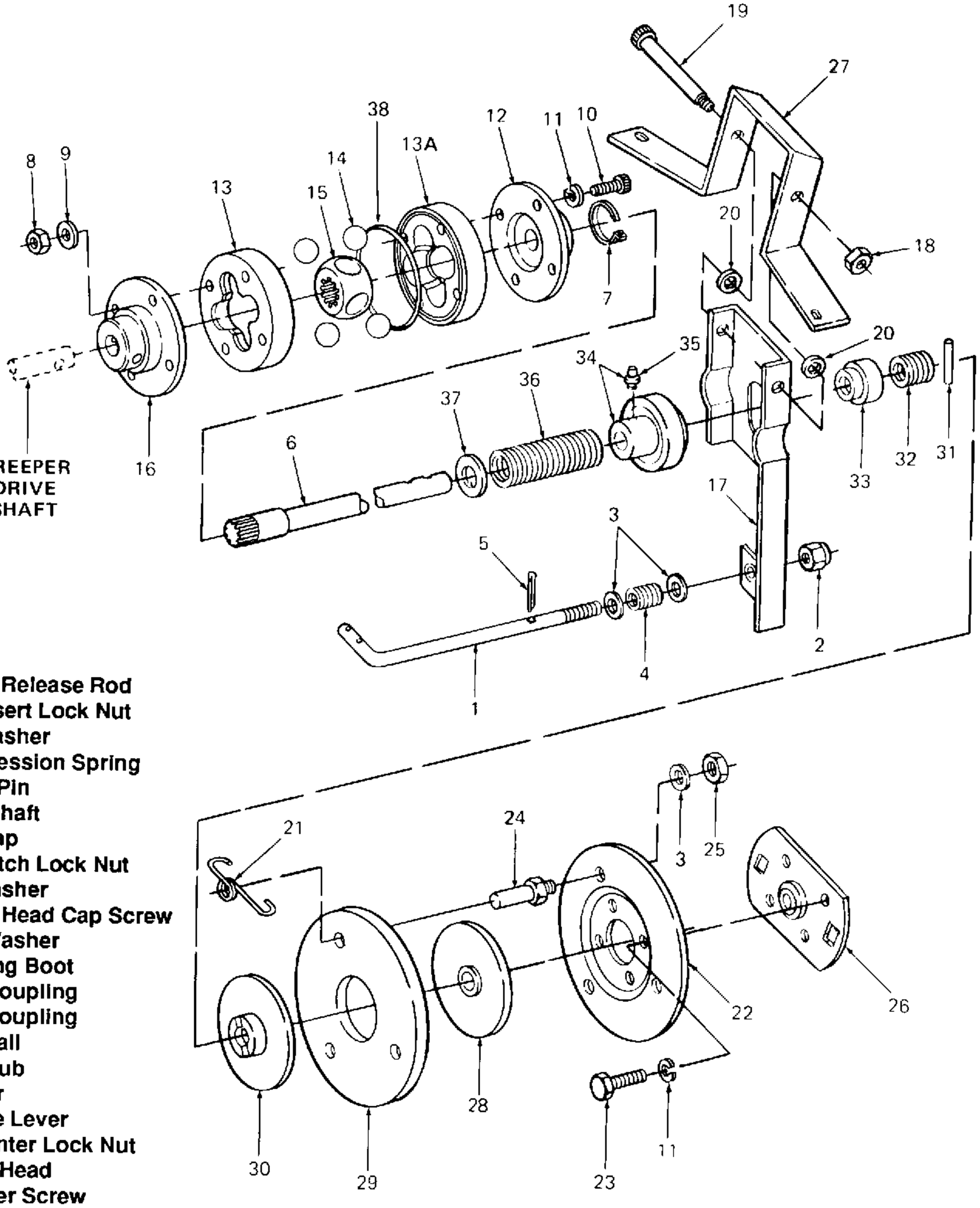
   e. Slowly release vise to allow compression springs to expand as the drive shaft slips through the vise jaws.
   f. Remove compression spring (32), spacer (33), throwout bearing assembly (34), lube fitting (35), compression spring (36) and flat washer (37).
2. Disassemble clutch driving disc (22) by removing hex jam nut (25), flat washer (3) and drive stud (24).

5-58.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect drive shaft (6) for cracks or distortion. Replace if bent.
4. Inspect splined areas of drive shaft (6), drive hub (15) and adapter (16) for damage.
5. Inspect drive hub (15) as follows:

NOTE

When assembling the drive hub for inspection in step 5a, DO NOT lubricate parts and DO NOT install steel balls (14).



1. Clutch Release Rod
2. Hex Insert Lock Nut
3. Flat Washer
4. Compression Spring
5. Cotter Pin
6. Drive Shaft
7. Tie Strap
8. Hex Patch Lock Nut
9. Flat Washer
10. Socket Head Cap Screw
11. Lock Washer
12. Coupling Boot
13. Drive Coupling
13A. Drive Coupling
14. Steel Ball
15. Drive Hub
16. Adapter
17. Release Lever
18. Hex Center Lock Nut
19. Socket Head Shoulder Screw
20. Flat Washer
21. Driving Disc Spring
22. Clutch Driving Disc
23. Hex Cap Screw
24. Drive Stud
25. Hex Jam Nut
26. Drive Shaft Flange Assembly
27. Clutch Lever Hanger
28. Pressure Plate Locating Hub Assembly
29. Clutch Friction Disc
30. Pressure Plate Hub Assembly
31. Spiral Spring Pin
32. Compression Spring
33. Spacer
34. Throwout Bearing Assembly
35. Lube Fitting
36. Compression Spring
37. Flat Washer
38. O-Ring

Figure 5-89. Clutch and Controls (Model 1535).

a. Assemble drive hub (15), O-ring (38) and drive couplings (13 and 13A), and firmly secure with four socket head cap screws (10), lock washers (11), flat washers (9) and hex patch lock nuts (8).

b. Clamp assembled joint in a vise and insert drive shaft (6) into drive hub (15).

c. Rotate free end of drive shaft in an approximate four-inch circle.

NOTE

Drive hub should rotate freely in response to movement of drive shaft.

d. If drive hub (15) is hard to move, or is tight at a particular position, discard and replace hub. If drive couplings (13 and 13A) are damaged, discard and replace.

CAUTION

Following the inspection described in preceding step 5, the joint must be disassembled for reassembly onto the drive shaft and installation of the steel balls.

5-58.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to splined areas.

5-58.6 **Reassembly.**

1. Reassemble clutch driving disc (22) by installing drive studs (24), flat washers (3) and hex jam nuts (25).
2. Reassemble drive shaft (6) as follows:
   a. Install flat washer (37), compressions spring (36), lube fitting (35), throwout bearing (34), spacer (33) and compression spring (32).
   b. Clamp drive shaft snugly in a vise equipped with brass jaws. Refer to Figure 5-90.
   c. Tap drive shaft (6, Figure 5-89) down enough to slightly compress compressions springs (32 and 36), and install spiral spring pin (31). Remove drive shaft (6) from vise.
   d. Install release lever (17), pressure plate hub (30) and clutch friction disc (29).
   e. Install pressure plate locating hub (28) with a spiral spring pin.

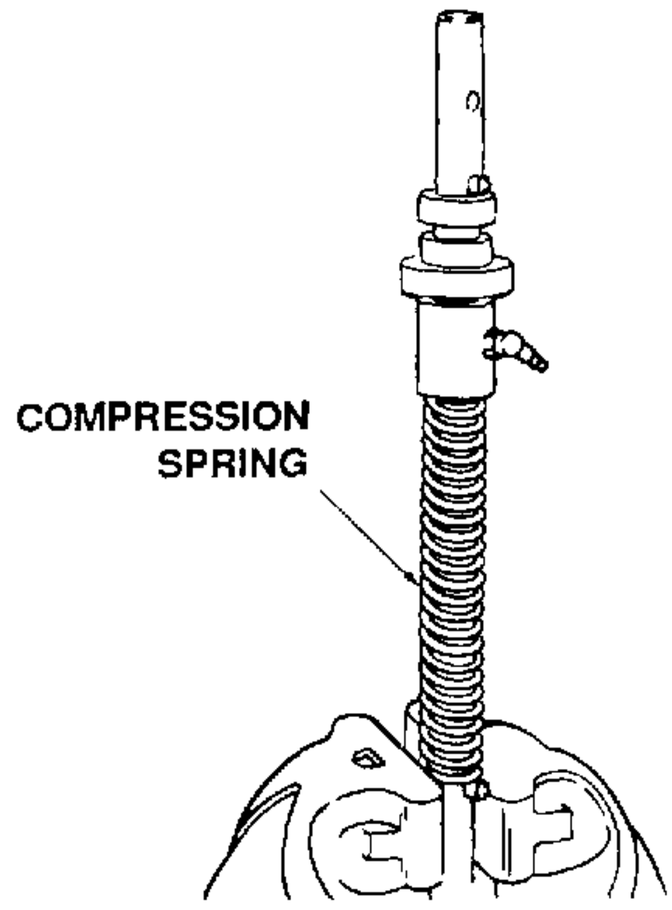


Figure 5-90. Clamping Drive Shaft In Vise.

5-58.7 **Installation.**

1. Install clutch lever hanger (27).
2. Install drive shaft flange (26) and clutch driving disc (22) with lock washers (11) and hex cap screws (23).
3. Install drive shaft (6) as follows:
   a. Place drive shaft (6) in tractor and position release lever (17) in clutch lever hanger (27).
   b. Install driving disc spring (21).
   c. Secure release lever (17) to clutch lever hanger (27) with flat washers (20), socket head shoulder screw (19) and hex center lock nut (18).
   d. Connect drive shaft (6) to creeper drive as follows:
      (1) Install adapter (16) to creeper drive shaft with a spiral spring pin.

CAUTION

Apply C-V Joint grease to drive couplings (13 and 13A), steel balls (14) and drive hub (15), prior to installation.

      (2) Install coupling boot (12) and grooved drive coupling (13A) onto rear of drive shaft (6).
      (3) Install drive hub (15), steel balls (14) and rear drive coupling (13).
      (4) Install lock washers (11), socket head cap screws (10), flat washers (9), hex patch lock nuts (8) and tie strap (7).

e. Install clutch release rod (1) as follows:

(1) Install front end of rod to release lever (17) with hex insert lock nut (2) by first installing cotter pin (5), compressions spring (4) and flat washers (3).

(2) Install rear end of clutch release rod (1) to clutch and brake arm. Refer to paragraph 5-42.7.

4. Grease lube fitting (35).
5. Install frame cover.
6. Install side panels per paragraph 5-4.7.
7. Connect negative battery cable.

5-59. CREEPER DRIVE (Model 1535).

5-59.1 **General.** Before servicing the creeper drive, refer to Appendix D for a list of mandatory replacement items.

5-59.1.1 Creeper drive maintenance applies only to Model 1535 garden tractor.

5-59.2 **Removal.**

CAUTION

Clean the area around the creeper drive before removal to prevent dirt from entering the assembly.

1. Disconnect drive line from creeper drive assembly per paragraph 5-58.2.
2. Drain oil from creeper housing (1, Figure 5-91) by removing bottom oil drain plug (2).
3. Remove creeper housing (1) from reduction housing by removing hex cap screws (3 and 4), lock washers (5) and flat washers (6).
4. Remove driven coupling (7) from input shaft of reduction housing by removing spiral spring pin (8). Discard spiral spring pin (8).
5. Scrape any gasket material which may have adhered to reduction housing cover plate.
6. Remove two dowel pins (9) from reduction housing.

5-59.3 **Disassembly.**

1. Disassemble front plate (10) as follows:

a. Remove front plate (10) by pulling on plate while constantly rotating shaft to allow alignment of internal parts.

b. Pry out oil seal (11), remove shaft spacer (12) and snap ring (16).

c. Place plate (10) with shaft on a press with input end of shaft (14) pointing up and press shaft out of assembled plate (10) and bearing (13).

d. Turn plate (10) over and press bearing (13) out of plate (10).

2. Remove planet carrier assembly (18) from input shaft (14) by driving pin (8) out of direct drive coupling (17) and removing gear from shaft. Slide planet carrier assembly (18) from shaft (14). Remove planetary gears (19) from planet carrier by sliding off pins.
3. Remove planetary race (20).
4. Remove shift lever (21) by removing roll pin (22), detent plate (23), O-ring (24), flat washer (25), cotter pin (26) and knob (27). Discard roll pin (22) and O-ring (24).
5. Remove set screw (28), detent spring (29) and detent ball (30).
6. Remove wire (31), roll pin (32), shift yoke (33) and shifter collar (34). Retain wire (31). Discard roll pin (32).
7. Remove breather (35).
8. Remove and discard gasket (36).

5-59.4 **Inspection.** Clean all parts prior to inspection.

1. Scrape sealing surfaces clean.
2. Inspect all threaded areas for damage.
3. Inspect parts for cracks, scoring, distortion, corrosion and wear.
4. Inspect ball bearing (13) for roughness, noise or looseness within the wheel hub. If worn or damaged, remove from wheel; discard ball bearing and replace.
5. Inspect all gears for chipped or missing teeth. Discard and replace gears damaged beyond repair.
6. Inspect dowel pins (9) for cracks. Discard and replace if damaged.

5-59.5 **Repair.**

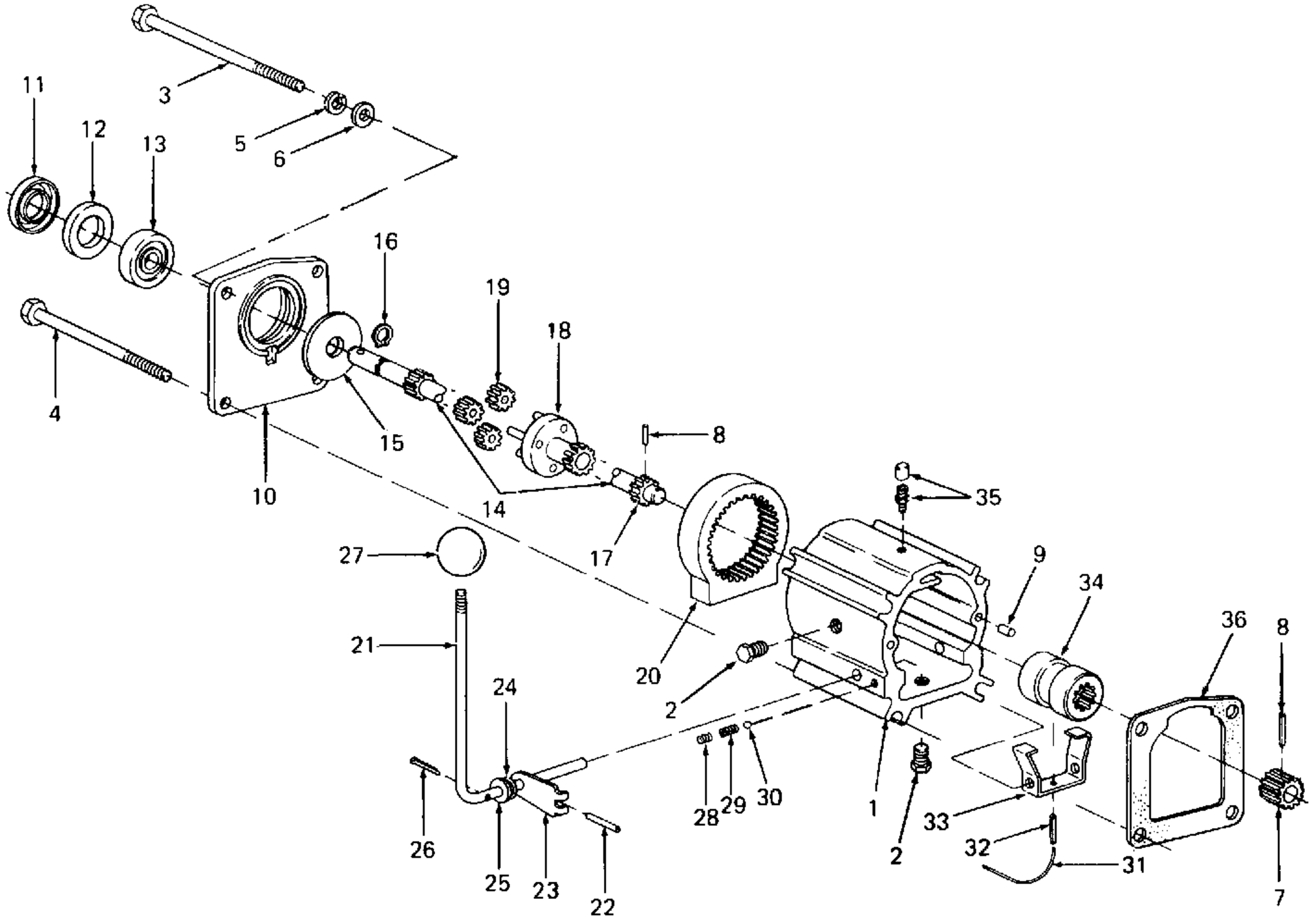
1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to gear teeth and splined areas.

5-59.6 **Reassembly.** Reassemble the creeper drive as follows:

1. Reassemble breather (35) on creeper housing (1).

CAUTION

Install a new roll pin (32) during reassembly of shifter collar (34).



1. Creeper Housing
2. Oil Drain Plug
3. Hex Cap Screw
4. Hex Cap Screw
5. Lock Washer
6. Flat Washer
7. Driven Coupling
8. Spiral Spring Pin
9. Dowel Pin
10. Front Plate
11. Oil Seal
12. Shaft Spacer
13. Ball Bearing
14. Input Shaft
15. Flat Washer
16. Snap Ring
17. Direct Drive Coupling
18. Planet Carrier Assembly
19. Planetary -12T
20. Planetary Race
21. Shift Lever
22. Roll Pin
23. Detent Plate
24. O-Ring
25. Flat Washer
26. Cotter Pin
27. Knob
28. Set Screw
29. Detent Spring
30. Detent Ball
31. Wire
32. Roll Pin
33. Shift Yoke
34. Shifter Collar
35. Breather
36. Gasket

Figure 5-91. Creeper Drive (Model 1535).

2. Reassemble shifter collar (34), shift yoke (33), roll pin (32) and wire (31).

3. Reassemble detent ball (30), detent spring (29) and set screw (28).

CAUTION

Install a new spiral spring pin (8) during reassembly of input shaft (14).

4. Reassemble shift lever (21) with knob (27), cotter pin (26), flat washer (25), O-ring (24), detent plate (23) and roll pin (22).

CAUTION

Install a new roll pin (22) and O-ring (24) during reassembly of shift lever (21).

5. Install planetary race (20).

6. Slide planetary gears (19) onto pins of planet carrier (18) and slide onto input shaft (14). Slide direct drive coupling (17) onto shaft and insert spiral spring pin (8).

7. Assemble front plate (10) as follows:

   a. Press bearing (13) into plate (10).

   b. Rotate assembled plate and bearing and press in input shaft (14).

   c. Assemble snap ring (16) to shaft (14) and insert spacer (12) and oil seal (11) into front plate (10).

   d. Apply thin and continuous bead of gasket eliminator to front edge of creeper housing (1) and install front plate (10).

8. Install oil drain plug (2).

5-59.7 **Installation.**

1. Install dowel pins (9) in reduction housing.

CAUTION

Install a new spiral spring pin (8) during installation of driven coupling (7).

2. Install driven coupling (7) on input shaft of reduction housing with spiral spring pin (8).

CAUTION

Install a new gasket (36) on reduction house cover plate when reinstalling creeper gear assembly.

3. Install gasket (36) on reduction house cover plate.

4. Install creeper housing (1) to reduction housing by installing flat washers (6), lock washers (5) and hex cap screws (4 and 3).

5. Connect drive line to creeper drive assembly per paragraph 5-58.7.

6. Refill creeper housing with 3 ounces of SAE 85W-140W gear lube.

5-60. **TRANSMISSION – GEAR SHIFT (Model 1535).**

5-60.1 **Removal.**

CAUTION

Clean the area around the gear shift before removal to prevent dirt from entering the assembly.

NOTE

Shift forks must be in neutral position before installing shift lever assembly.

1. Place shift lever in neutral position. Refer to Figure 5-92.

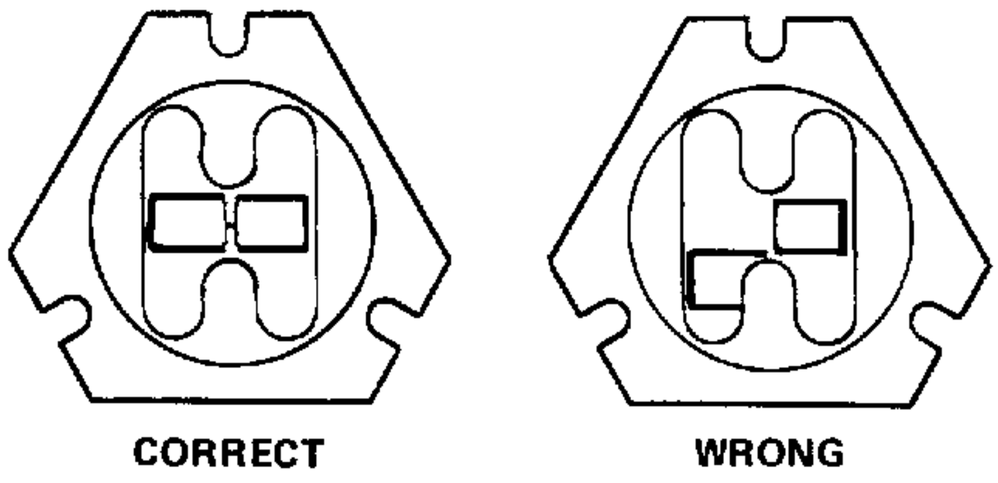


Figure 5-92. Position of Shift Forks.

2. Remove shift lever assembly (1, Figure 5-93) by removing hex cap screws (2) and lock washers (3).

3. Remove bell housing gaskets (4) and shift guide (5).

5-60.2 **Disassembly.**

1. Disassemble shift lever assembly (1) by removing shift knob (6), swivel retainer pin (7), swivel spring retainer (8), swivel spring (9), swivel spring retainer (8), O-ring (10), lever shield (11) and bell housing (12).

5-60.3 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.

2. Inspect parts for cracks, scoring, distortion, corrosion and wear.

3. Inspect swivel spring (9) for damage or distortion. Discard if damaged.

4. Inspect bell housing gaskets (4) for damage. Discard and replace if damaged.

5-60.4 **Repair.**

1. Deburr and dress damaged threads.

2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-60.5 **Reassembly.**

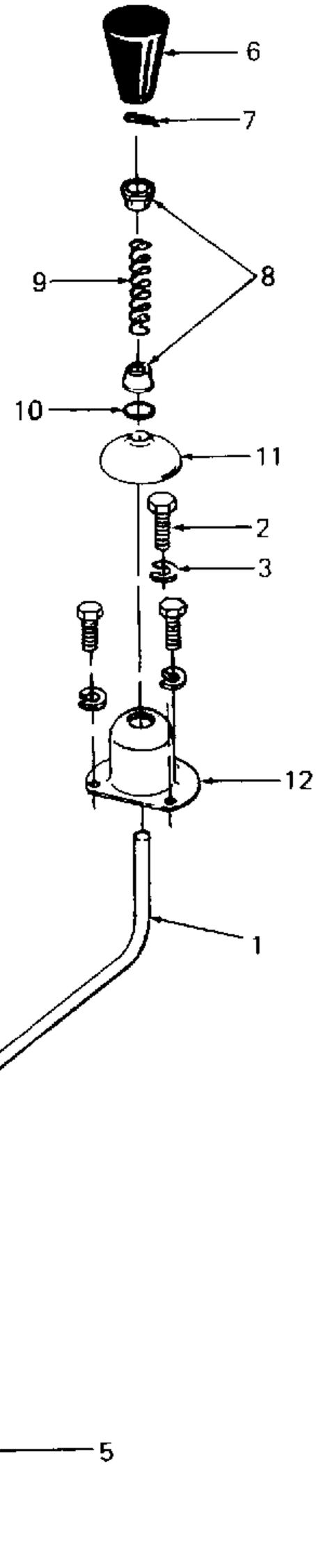
1. Reassemble shift lever assembly (1) by installing bell housing (12), lever shield (11), O-ring (10), swivel spring retainer (8), swivel spring (9), swivel spring retainer (8), swivel retainer pin (7) and shift knob (6).

5-60.6 **Installation.**

1. Place shift forks in neutral position. Refer to Figure 5-92.

2. Install bell housing gaskets (4, Figure 5-93) and shift guide (5).

3. Install shift lever assembly (1) and secure with lock washers (3) and hex cap screws (2).



1. **Shift Lever Assembly**
2. **Hex Cap Screw**
3. **Lock Washer**
4. **Bell Housing Gasket**
5. **Shift Guide**
6. **Shift Knob**
7. **Gear Shift Swivel Retainer Pin**
8. **Gear Shift Swivel Spring Retainer**
9. **Swivel Spring**
10. **O-Ring**
11. **Gear Shift Lever Shield**
12. **Bell Housing Assembly**

Figure 5-93. Transmission – Gear Shift (Model 1535).

5-61. **TRANSMISSION – REDUCTION HOUSING (Model 1535).**

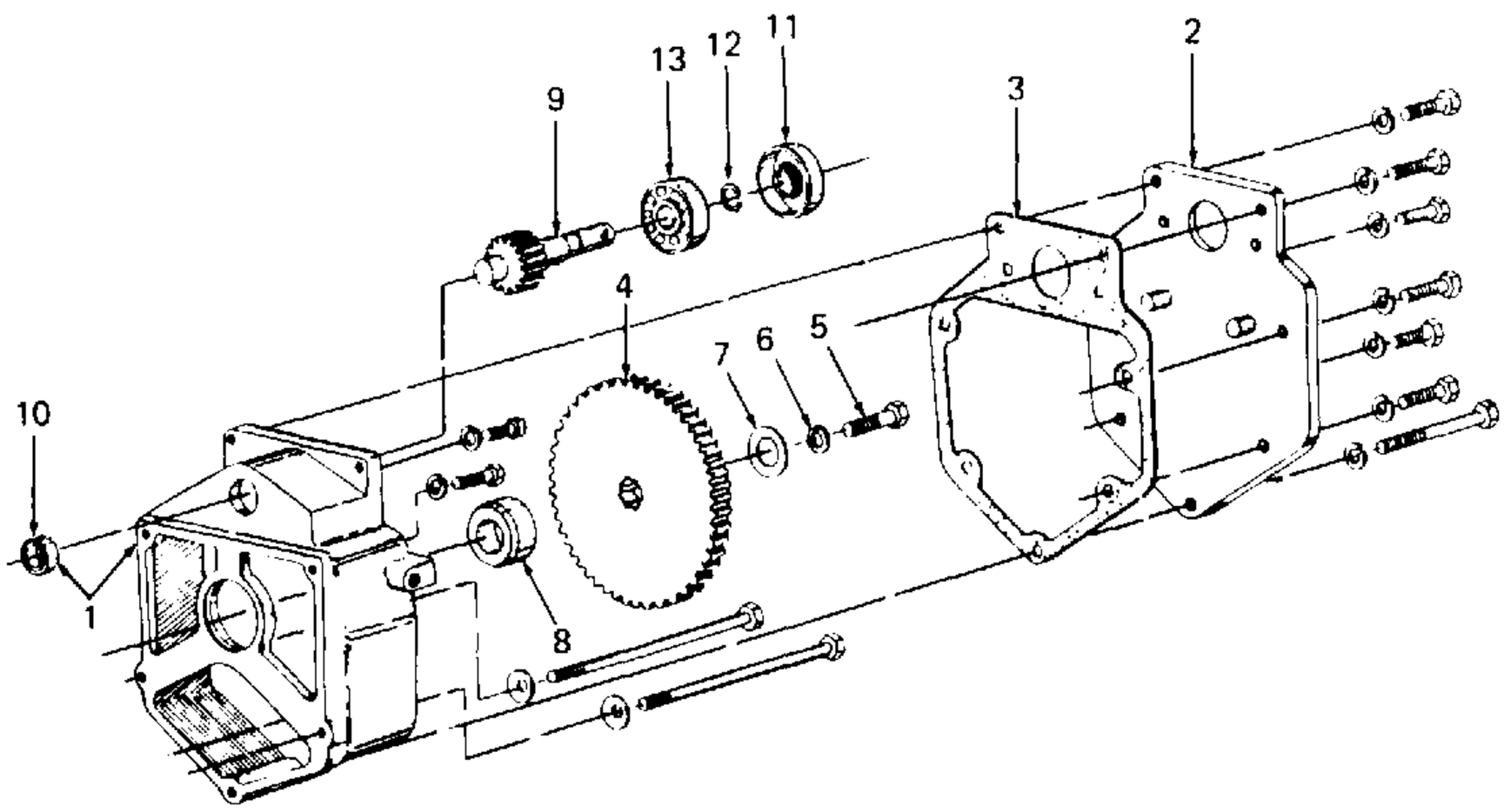
5-61.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-61.2 **Removal.**

CAUTION

Clean the area around the transmission before removal to prevent dirt from entering the assembly.

1. Remove creeper drive per paragraph 5-59.2.
2. Drain *Cub Cadet* hydraulic fluid from gear housing.
3. Remove front cover plate (2, Figure 5-94) and gasket (3) from reduction drive housing (1) by removing seven hex cap screws. Discard gasket (3).
4. Remove reduction gear (4) and gear spacer (8) by removing hex cap screw (5), lock washer (6) and flat washer (7). Lift gear up as high as possible then tip on side of gear opposite input shaft (9).
5. Remove two hex cap screws securing reduction housing to frame.
6. Remove reduction drive housing (1) from gear housing by removing hex cap screws.



1. **Reduction Drive Housing**
2. **Front Cover Plate**
3. **Front Cover Gasket**
4. **Reduction Gear -84T**
5. **Hex Cap Screw**
6. **Lock Washer**
7. **Flat Washer**
8. **Gear Spacer**
9. **Input Shaft**
10. **Needle Bearing**
11. **Oil Seal**
12. **Retaining Ring**
13. **Ball Bearing**

Figure 5-94. Transmission – Reduction Housing.

5-61.3 **Disassembly.**

1. Remove input shaft (9) as follows:

   a. Insert punch, smaller than 1 inch diameter, as shown in Figure 5-95.

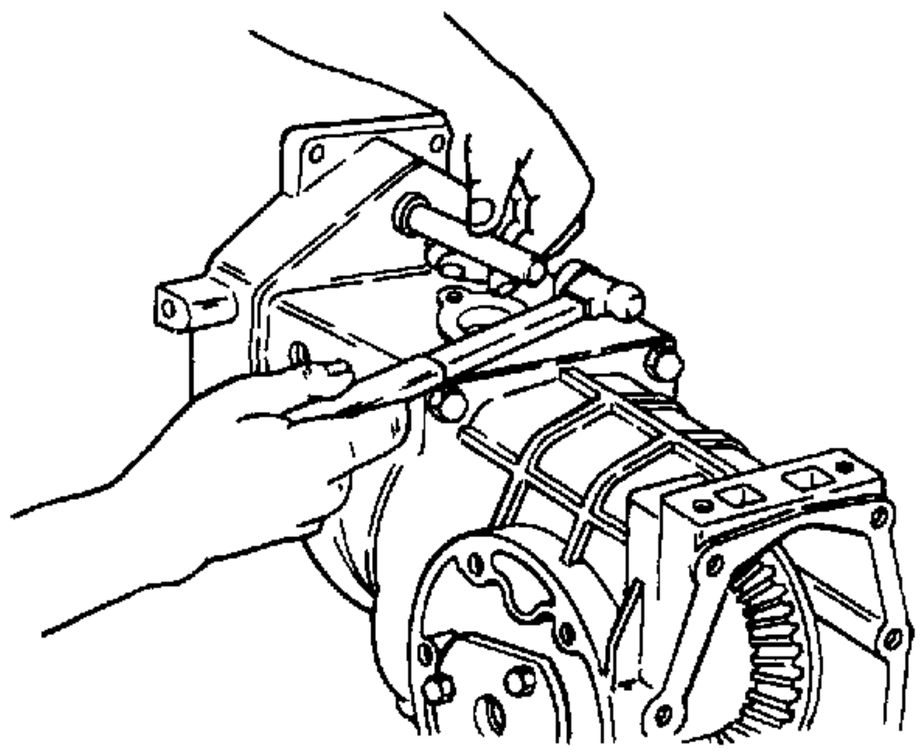


Figure 5-95. Using Punch to Remove Input Shaft.

   b. Punch out and remove needle bearing (10, Figure 5-94), oil seal (11), retaining ring (12) and ball bearing (13). Discard needle bearing (10) and oil seal (11).

NOTE

The following step is an alternative method for removal of input shaft (9) if removal of reduction housing from gear housing is not desired.

2. Alternative method for input shaft removal is as follows:

   a. Install splined coupling and impact puller on input shaft as shown in Figure 5-96.

   b. Impact until input shaft (9, Figure 5-94), oil seal (11), retaining ring (12) and ball bearing (13) are extracted. Discard oil seal (11).

5-61.4 **Inspection.** Clean all parts prior to inspection.

1. Clean sealing surfaces of reduction housing and gear housing.
2. Inspect all threaded areas for damage.
3. Inspect parts for cracks, scoring, distortion, corrosion and wear.
4. Inspect ball bearing (13) for damage. Replace if damaged.
5. Inspect reduction gear (4) for chipped or missing teeth. Inspect splined area for damage or wear. Discard and replace gear if damaged beyond repair.
6. Inspect input shaft (9) for cracks in shaft or damage to splined area. Discard and replace if badly damaged.
7. Inspect housing (1) for cracks.

5-61.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to gear teeth and splined areas.

5-61.6 **Reassembly.**

1. Assemble input shaft (9) as follows:

NOTE

If the input shaft has been removed by alternative method (paragraph 5-61.3, step 2), installation of a new needle bearing (10) may not be necessary.

   a. Press a new needle bearing (10) in reduction housing (1).

   b. Install ball bearing (13) and retaining ring (12) on input shaft (9).

   c. Install input shaft (9) and oil seal (11).

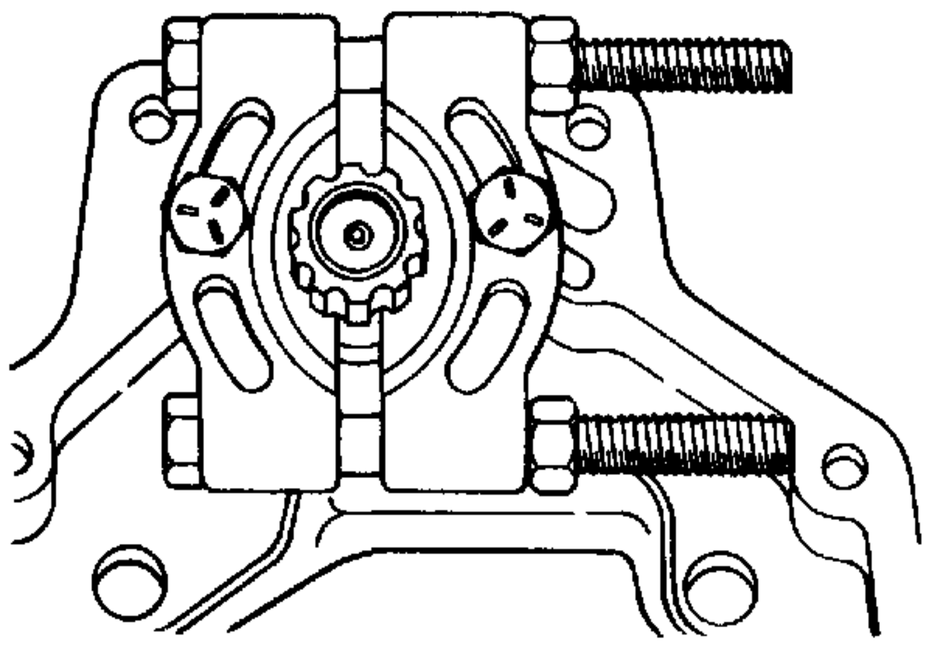


Figure 5-96. Using Splined Coupling and Impact Puller to Remove Input Shaft (Alternative Method).

5-61.7 **Installation.**

1. Install reduction housing (1) onto gear housing as follows:
   a. Apply gasket eliminator to sealing surface of gear housing.
   b. Attach reduction housing to gear housing with hex cap screws.
2. Secure reduction housing (1) to frame with two hex cap screws.
3. Install gear spacer (8) and reduction gear (4), and secure with flat washer (7), lock washer (6) and hex cap screw (5).
4. Install a new gasket (3) and front cover plate (2), and secure with hex cap screws. Tighten screws alternately and evenly to 360 in/lbs.
5. Install creeper drive per paragraph 5-59.7.
6. Refill with *Cub Cadet* hydraulic fluid.

5-62. TRANSMISSION – REAR HOUSING AND GEAR HOUSING (Model 1535).

5-62.1 **General.** Refer to Appendices C, D and E prior to servicing this equipment.

5-62.2 **Removal.**

CAUTION

Clean the area around the transmission before removal to prevent dirt from entering the assembly.

1. Remove drive line per paragraph 5-58.2.
2. Remove creeper drive per paragraph 5-59.2.
3. Remove gear shift per paragraph 5-60.2.
4. Remove rear axles and rear axle carriers per paragraph 5-51.2.
5. Drain oil from rear housing (1, Figure 5-97). Drain oil from gear housing (2) by removing drain plug (3).

WARNING

After completion of paragraph 5-62.2 step 6, rear housing assembly and gear housing will be free of tractor frame. Support underside of rear transaxle housing and adapter housing BEFORE performing step 6 to prevent equipment from falling and injuring repair personnel.

6. Remove rear housing (1), gear housing (2) and reduction housing from tractor as follows:
   a. Support underside of rear housing, gear housing and reduction housing with a suitable device.
   b. Remove hex cap screws which secure reduction housing to tractor frame.

5-62.3 **Disassembly.**

1. Remove reduction housing from gear housing per paragraph 5-61.2
2. Disassemble rear housing (1, Figure 5-97) as follows:
   a. Remove dipstick (4) and dipstick tube (5).
   b. Remove bearing retainer (6) and roller bearing cup (7) from rear housing (1) by removing hex cap screws and lock washers.
   c. Remove shims (8, 9, 10 and 11).

CAUTION

Keep shims (8, 9, 10 and 11) with bearing retainer (6) and mark left and right for identical reinstallation.

   d. Remove differential per paragraph 5-52.2.
3. Disassemble gear housing (2) as follows:
   a. Separate gear housing from rear housing as follows:
      (1) Remove hex cap screws (12) and spring washers (13).

NOTE

Two hex cap screws (12) are located INSIDE rear housing (1).

      (2) Remove hex jam nut (14).
      (3) Remove bearing retainer (15) and bearing (16) by removing hex cap screws and lock washers.

(4) Remove shim(s) (17). Tape and keep in order for reassembly to assure unchanged pinion shaft ring gear contact.

(5) Remove set screw (18), detent spring (19) and detent ball (20).

(6) Tap down left and right shift forks (21 and 22) which can be reached through front end of gear housing.

CAUTION

Use care when prying housings apart to avoid damaging sealing faces.

(7) Tap side of housing to break seal and pull up to gain sufficient separation to insert two pry bars and separate housings.

b. Disassemble pinion shaft (23) as follows:

(1) Remove spacer (24), 3rd gear (25), spacer (26), 2nd gear (27), spacer (28), 1st gear (29), spacers (30) and reverse gear (31).

(2) Remove pinion shaft (23) through rear of rear housing (1).

(3) Remove roller bearing assembly (32).

c. Disassemble main shaft (33) by removing sliding gear (34), sliding gear (35) and snap ring (36).

d. Disassemble reverse idler shaft (37) by removing spacer (38), reverse gear assembly (39), bearing sleeve (40), flat washer (41), sleeve (42) and retaining ring (43).

e. Remove dowel pins (44).

f. Remove bearing (45).

Legend for Figure 5-97

1. Rear Housing Assembly w/Needle Bearing
2. Gear Housing
3. Drain Plug
4. Dipstick Blade Assembly
5. Dipstick Tube
6. Bearing Retainer Assembly
7. Roller Bearing Cup
8. Bearing Retainer Shim
9. Bearing Retainer Shim
10. Bearing Retainer Shim
11. Bearing Retainer Shim
12. Hex Cap Screw
13. Spring Washer
14. Hex Jam Nut
15. Bearing Retainer
16. Ball Bearing w/Ring
17. Bearing Retainer Shim
18. Set Screw
19. Detent Spring
20. Detent Ball
21. Shift Fork - LH
22. Shift Fork - RH
23. Pinion Shaft -10T
24. Spacer
25. 3rd Speed Gear -26T
26. Spacer
27. 2nd Speed Gear -35T
28. Spacer
29. 1st Speed Gear -39T
30. Spacer
31. Reverse Gear -35T
32. Roller Bearing Assembly
33. Main Shaft
34. 1st and Reversed Speed Sliding Gear -13T
35. 2nd and 3rd Speed Sliding Gear -17 and 26T
36. Snap Ring
37. Reverse Idler Shaft
38. Spacer
39. Reverse Gear Assembly -22T
40. Bearing Sleeve
41. Flat Washer
42. Sleeve
43. Retaining Ring
44. Dowel Pin
45. Ball Bearing

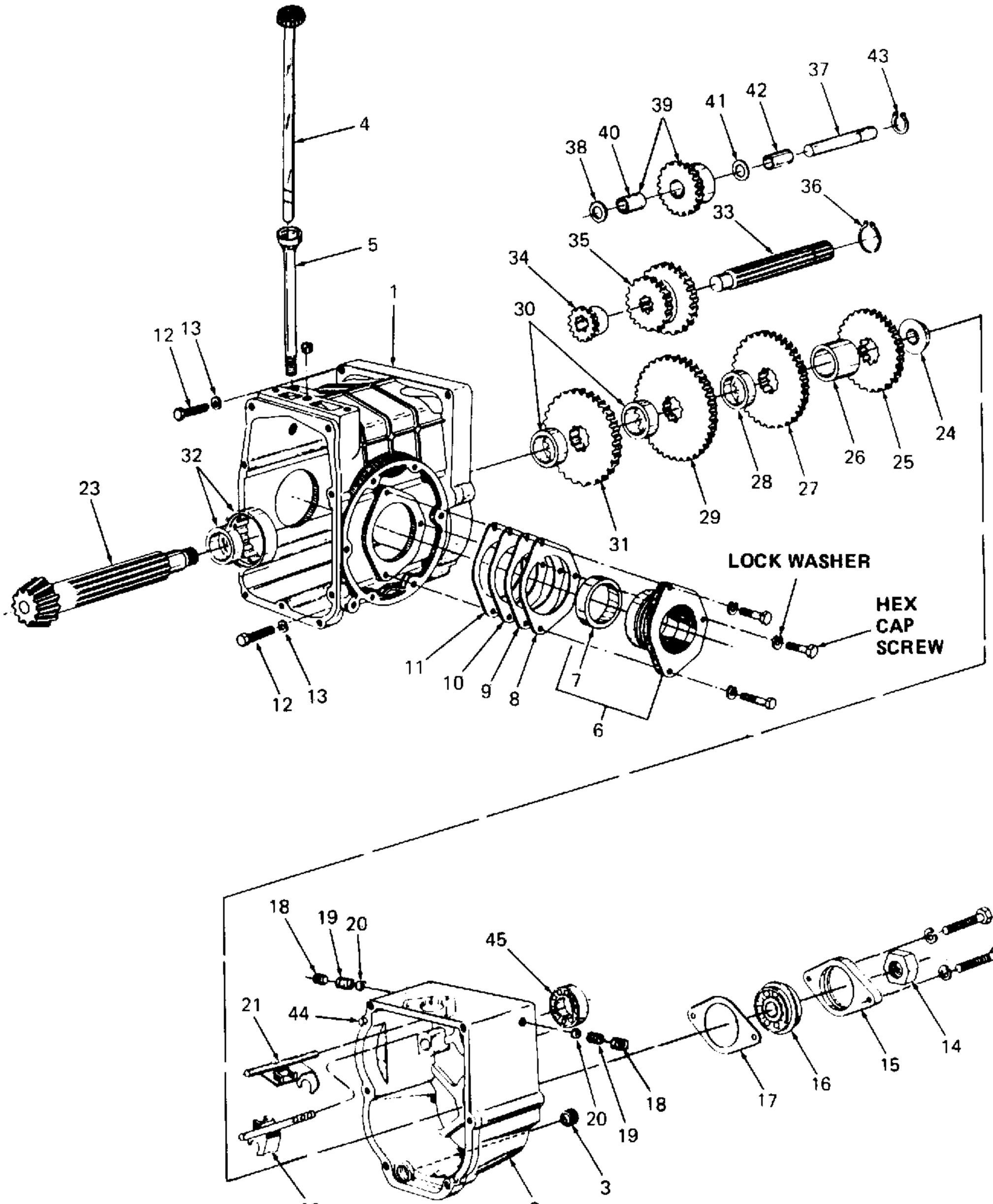
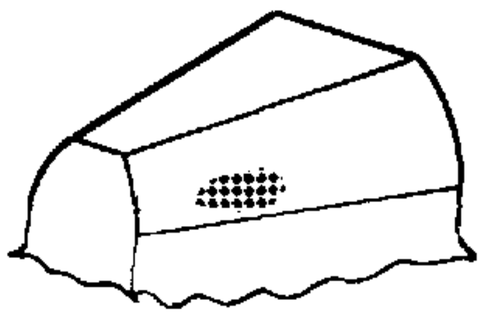


Figure 5-97. Transmission – Rear Housing and Gear Housing.

5-62.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect bearings (16, 32 and 45) for damage. Replace worm bearings.
4. Inspect all gears for chipped or missing teeth or damage to splined areas. Also inspect gear tooth bearing position. Refer to Figure 5-98. Tooth bearing position from root to crown of tooth is controlled by lateral position of pinion shaft. If adjustment is necessary, it will be done during reassembly. Replace badly damaged gears.



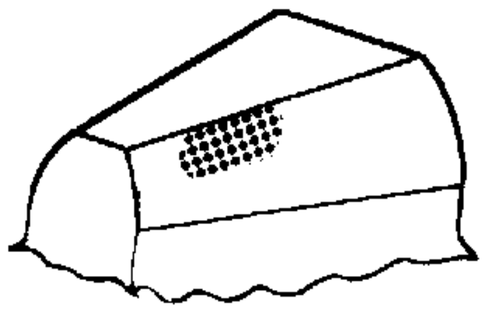


Figure 5-98. Inspecting Gear Teeth.

5. Inspect shafts for cracks or damage to splined areas. Replace badly worn or damaged shafts.
6. Inspect rear housing (1, Figure 5-97) and gear housing (2) for cracks.
7. Inspect that all sealing surfaces are clean and smooth.
8. Inspect dipstick tube (5) for cracks. Replace if badly damaged.
9. Inspect left and right shift forks (21 and 22) for squareness to the shaft (1/64 inch maximum). Shaft may not run out more than 1/32 inch when chucked up on one end. Refer to Figure 5-99.

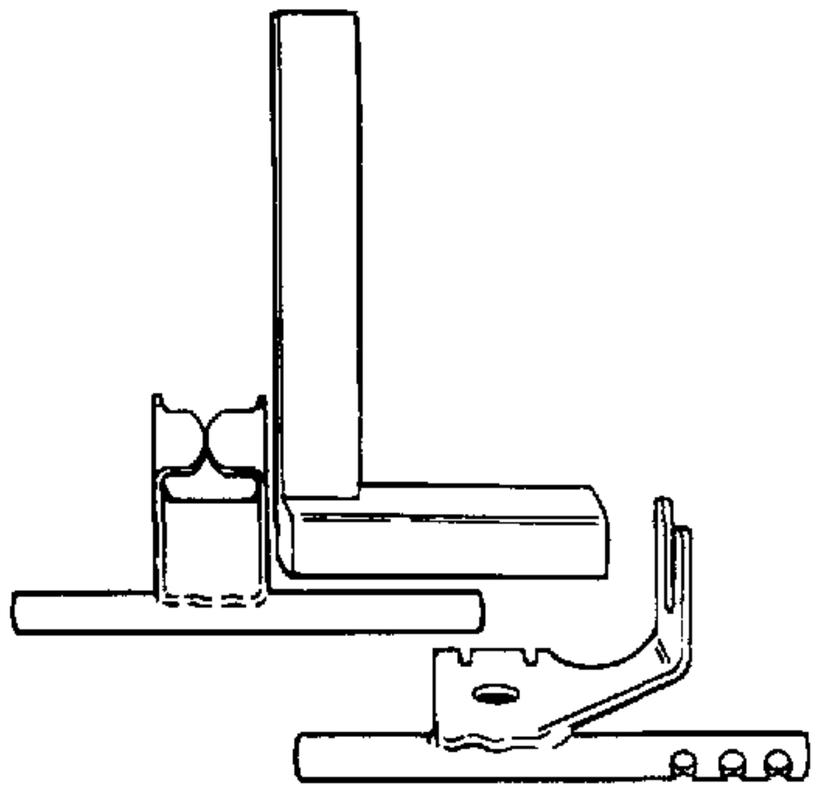


Figure 5-99. Inspecting Shift Forks.

10. Inspect spring (19, Figure 5-97) for damage or distortion. Replace if damaged or distorted.
11. Inspect detent bore endings inside housing for damage. Refer to Figure 5-100.

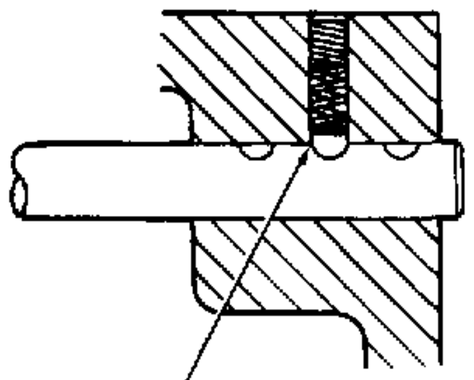


Figure 5-100. Inspecting Housing.

5-62.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair minor damage to gear teeth and splined areas.

5-62.6 **Reassembly.**

1. Reassemble gear housing (2, Figure 5-97) as follows:
   a. Install dowel pins (44) and bearing (45).
   b. Assemble reverse idler shaft (37) by installing retaining ring (43), sleeve (42), flat washer (41), bearing sleeve (40), reverse gear assembly (39) and spacer (38).

c. Assemble main shaft (33) by installing snap ring (36), sliding gear (35) and sliding gear (34).

d. Assemble pinion shaft (23) as follows:

(1) Install roller bearing assembly (32).

(2) Install pinion shaft (23) through rear of rear housing (1).

(3) Install spacer (30), reverse gear (31), spacer (30), 1st gear (29), spacer (28), 2nd gear (27), spacer (26), 3rd gear (25) and spacer (24).

e. Install left and right shaft forks (21 and 22).

f. Install detent balls (20), springs (19) and set screws (18).

g. Secure gear housing (2) to rear housing (1) as follows:

(1) Spray mating surfaces of rear housing (1) and gear housing (2) with Lock-Tite primer and apply a thin and uniform coat of #515 liquid gasket.

(2) Position housings, line up shafts and dowels and tap down with plastic hammer. Make sure surfaces approach each other parallel. Stop as soon as gap is 1/8 inch.

(3) Install spring washers (13) and hex cap screws (12). Torque screws alternately and evenly.

CAUTION

If tooth contact was found to be either too high or too low during inspection of gear teeth, adjust using shims (17) in following paragraph.

(4) Install shims (17), bearing (16), bearing retainer (15) and hex jam nut (14).

h. Install drain plug (3).

2. Assemble rear housing (1) as follows:

a. Install differential per paragraph 5-52.7.

b. Install shims (8, 9, 10 and 11).

c. Install bearing cup (7) and bearing retainer (6) on rear housing with lock washers and hex cap screws.

d. Install dipstick tube (5) using teflon tape and install dipstick (4).

3. Secure reduction housing to gear housing per paragraph 5-61.7.

5-62.7 **Installation.**

1. Install assembled rear housing, gear housing and reduction housing onto tractor as follows:

a. Support assembled housings on a suitable device and position under tractor.

b. Secure housings to tractor frame with hex cap screws.

2. Install rear axles and rear axle carriers per paragraph 5-51.7.

3. Install gear shift per paragraph 5-60.7.

4. Install creeper drive per paragraph 5-59.7.

5. Install drive line per paragraph 5-58.7.

6. Refill with *Cub Cadet* Hydraulic Fluid.

5-63. MUFFLER AND AIR DUCT (Model 1340).

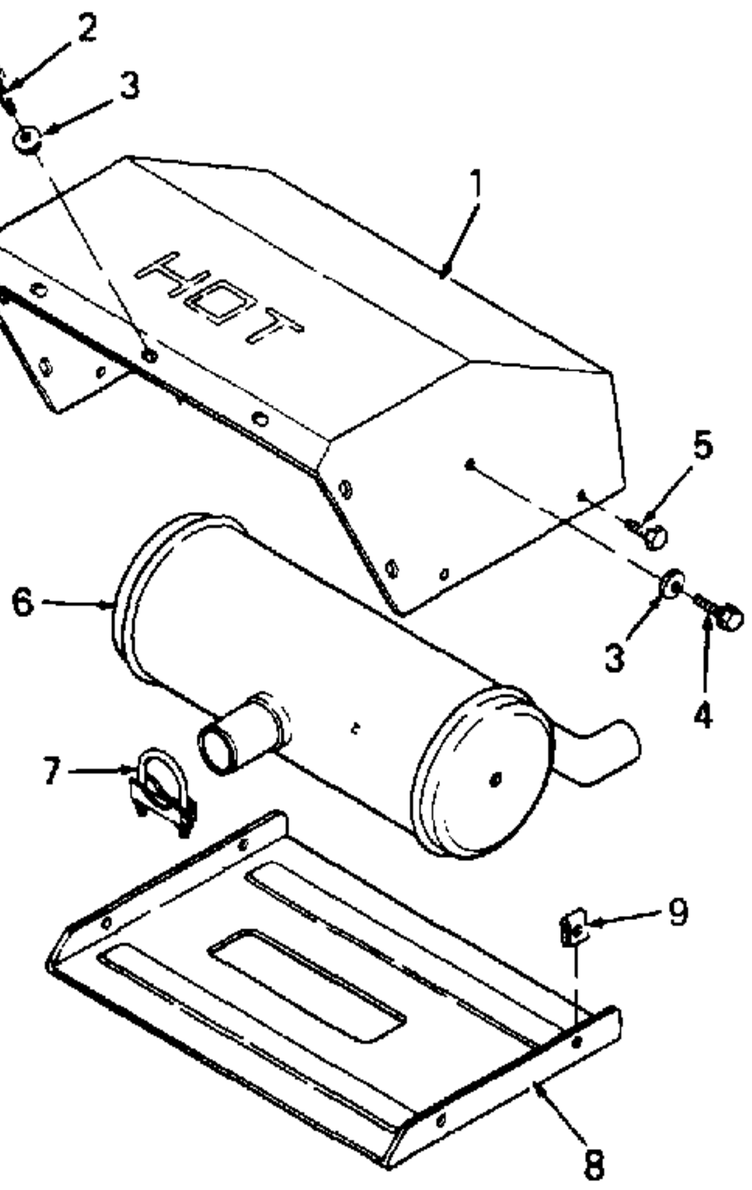
5-63.1 **General.** Related muffler information may be available in the manuals listed in Appendix A.

5-63.2 **Removal.**

WARNING

Engine must be cool before muffler and/or air duct removal is begun.

1. Remove side panels and grille per paragraph 5-4.2.
2. Remove top heat shield (1, Figure 5-101) by removing hex head bolts (2), bell washers (3), hex cap screws (4) and hex head screws (5).



1. Top Heat Shield
2. Hex Head Bolt
3. Bell Washer
4. Hex Cap Screw
5. Hex Head Screw
6. Muffler
7. Muffler Clamp Assembly
8. Bottom Heat Shield
9. Speed Nut

Figure 5-101. Muffler and Air Duct (Model 1340).

3. Remove muffler (6) by removing muffler clamp (7).
4. Remove bottom heat shield (8) and speed nut (9).

5-63.3 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect top heat shield (1) for peeling paint or bluing metal which may signal excessive heat build up.
4. Inspect muffler (6) for cracks or holes. Refer to engine maintenance manual for replacement of muffler.

5-63.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-63.5 **Installation.**

1. Install bottom heat shield (8) and speed nut (9).
2. Install muffler and secure with muffler clamp (7).
3. Install top heat shield (1) and secure with hex head screw (5), hex cap screws (4), bell washers (3) and hex head bolts (2).
4. Install side panels and grille per paragraph 5-4.7.

5-64. ENGINE MOUNTING, MUFFLER AND AIR DUCT (Models 1535, 1541, 1860, 1862, 1882 and 2082).

5-64.1 **General.** Related information may be available in the manuals listed in Appendix A.

5-64.2 **Removal.**

WARNING

Engine must be cool before engine mounting, muffler and/or air duct removal is begun.

1. Remove side panels and grille per paragraph 5-4.2.

2. Remove top air duct (1, Figure 5-102) by removing hex head screws (2) and hex flange lock nuts (3).
3. Remove spacer (4) and speed nut (5).
4. Remove muffler (6) by removing muffler clamp (7).
5. Remove bottom cooling duct (8).
6. Remove engine mounting plate assembly (9) and spacers (10) after the engine has been removed per paragraph 5-65.2.

5-64.3 **Inspection.** Clean all parts prior to inspection.

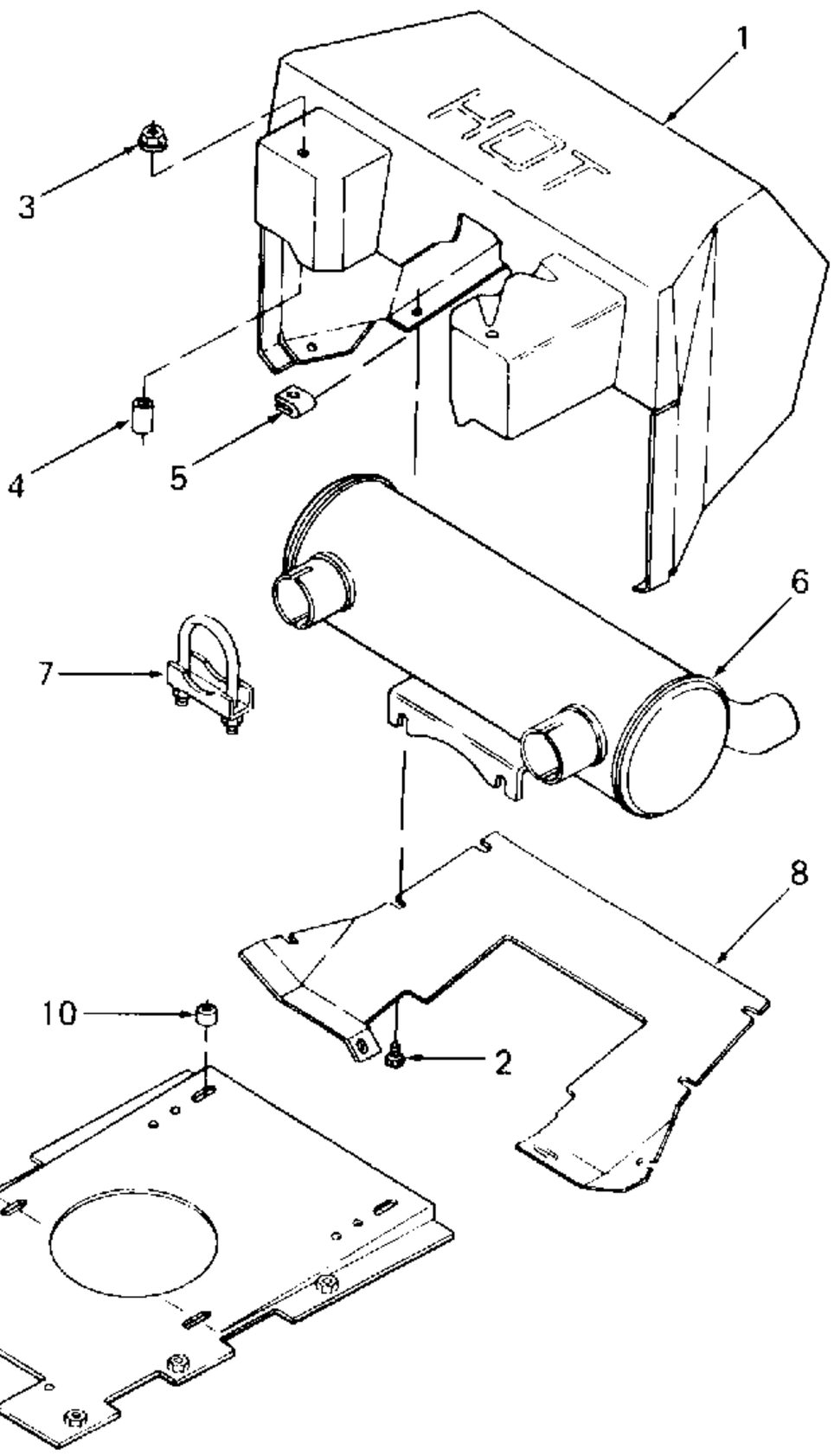
1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect top air duct (1) for peeling paint or bluing metal which may signal excessive heat buildup.
4. Inspect muffler (6) for cracks or holes. Refer to engine maintenance manual for replacement of muffler.

5-64.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-64.5 **Installation.**

1. Install engine mounting plate assembly (9) and spacer (10).
2. Install engine per paragraph 5-65.3.
3. Install bottom cooling duct (8).
4. Install muffler (6) and secure with muffler clamp (7).
5. Install speed nut (5) and spacer (4).



1. **Top Air Duct**
2. **Hex Head Screw**
3. **Hex Flange Lock Nut**
4. **Spacer**
5. **Speed Nut**
6. **Muffler**
7. **Muffler Clamp**
8. **Bottom Cooling Duct**
9. **Engine Mounting Plate Assembly**
10. **Spacer**

Figure 5-102. Engine Mounting, Muffler and Air Duct (Models 1535, 1541, 1860, 1862, 1882 and 2082).

6. Install top air duct (1) and secure with hex head flange lock nuts (3) and hex head screws (2).

7. Install side panels and grille per paragraph 5-4.7.

5-65. ENGINE REMOVAL (Models 1340, 1535, 1541, 1860, 1862, 1882 and 2082).

5-65.1 **General.** Refer to Appendix A for a list of manuals which address engine repair.

5-65.2 **Removal.**

1. Remove hood, grille and side panels per paragraph 5-4.2.

2. Remove battery per paragraph 5-7.2 (Model 1340 only) or paragraph 5-8.2 (Models 1535, 1541, 1860, 1862, 1882 and 2082).

3. Remove battery tray and heat baffle per paragraph 5-11.2 (Model 1340 only).

4. Remove battery tray and air baffles per paragraph 5-12.2 (Models 1535, 1541, 1860, 1862, 1882 and 2082).

5. Disconnect throttle control and choke cable from engine.

6. Disconnect electrical connections from engine. Refer to paragraph 5-13 (Models 1340, 1541, 1860, 1862, 1882 and 2082) or paragraph 5-14 (Model 1535).

7. Disconnect drive line (or clutch on Model 1535) from engine per:

   Paragraph 5-48.2 Model 1340; Model 1541, tractor serial numbers 800,000 through 800,349 and 800,534 and above; Model 1860, tractor serial numbers 800,000 through 800,461 and 800,596 and above; and Model 1862.

   Paragraph 5-49.2 Model 1541, tractor serial numbers 800,350 through 800,533 and Model 1860, tractor serial numbers 800,462 through 800,592.

   Paragraph 5-50.2 Models 1882 and 2082.

   Paragraph 5-58.2 Model 1535.

8. Remove mounting hardware which secures engine to tractor.

   WARNING

   Use a suitable lifting device, with a minimum lifting capacity of at least 150 pounds, to remove engine from tractor.

9. Secure suitable lifting device to engine and lift engine out of tractor.

5-65.3 **Installation.**

   WARNING

   Use a suitable lifting device, with a minimum lifting capacity of at least 150 pounds, to install engine in tractor.

1. Secure suitable lifting device to engine, and position engine in tractor.

2. Secure engine to tractor with mounting hardware.

3. Connect drive line (or clutch, Model 1535) to engine per:

   Paragraph 5-48.5 Model 1340; Model 1541, tractor serial numbers 800,000 through 800,349 and 800,534 and above; Model 1860, tractor serial numbers 800,000 through 800,461 and 800,596 and above; and Model 1862.

   Paragraph 5-49.7 Model 1541, tractor serial numbers 800,350 through 800,533 and Model 1860, tractor serial numbers 800,462 through 800,592.

   Paragraph 5-50.5 Models 1882 and 2082.

   Paragraph 5-58.7 Model 1535.

4. Connect electrical connections to engine. Refer to paragraph 5-13 (Models 1340, 1541, 1860, 1862, 1882 and 2082) or paragraph 5-14 (Model 1535).

5. Connect throttle control and choke cable to engine.

6. Install battery tray and heat baffle per paragraph 5-11.7 (Model 1340).

7. Install battery tray and air baffles per paragraph 5-12.5 (Models 1535, 1541, 1860, 1862, 1882 and 2082).

8. Install battery per paragraph 5-7.5 (Model 1340) or paragraph 5-8.5 (Models 1535, 1541, 1860, 1862, 1882 and 2082).

9. Install hood, grille and side panels per paragraph 5-4.7.

5-66. **ENGINE REMOVAL (Models 1782 and 2182).**

5-66.1 **General.** Refer to Appendix A for a list of manuals which address engine repair.

5-66.2 **Removal.**

1. Remove hood, grille and side panels per paragraph 5-5.2.
2. Remove battery and battery tray per paragraph 5-9.2 (Model 1782 only) or paragraph 5-10.2 (Model 2182).
3. Disconnect electrical connections from engine. Refer to paragraph 5-15.2
4. Disconnect throttle control and choke cable (Model 2182 only) from engine.
5. Remove radiator per paragraph 5-6.2
6. Disconnect drive line from engine per paragraph 5-50.2.
7. Remove mounting hardware which secures engine to tractor.

WARNING

Use a suitable lifting device, with a minimum lifting capacity of at least 150 pounds, to remove engine from tractor.

8. Secure suitable lifting device to engine and lift engine out of tractor.

5-66.3 **Installation.**

WARNING

Use a suitable lifting device, with a minimum lifting capacity of at least 150 pounds, to install engine in tractor.

1. Secure suitable lifting device to engine, and position engine in tractor.
2. Secure engine to tractor with mounting hardware.
3. Connect drive line to engine per paragraph 5-50.5.
4. Install radiator per paragraph 5-6.2
5. Connect throttle control and choke cable (Model 2182 only) to engine.
6. Connect electrical connections to engine. Refer to paragraph 5-15.5.
7. Install battery and battery tray per paragraph 5-9.5 (Model 1782) or paragraph 5-10.5 (Model 2182).
8. Install hood, grille and side panels per paragraph 5-5.7.

5-66A. OIL FILTER (Models 1535, 1541, 1862, 1882 and 2082).

5-66A.1 Removal.

1. Disconnect oil lines (7 and 8, Figure 5-102A) from reducing connectors (6 and 12) and hex nipple (5).
2. Remove reducing connectors (6 and 12) and hex nipple (5).
3. Remove oil filter (1). Unbolt and remove oil filter adapter (4) by removing hex cap screws (2) and bell washers (3)
4. Remove oil filter cover kit (9) by removing hex socket screws (11).

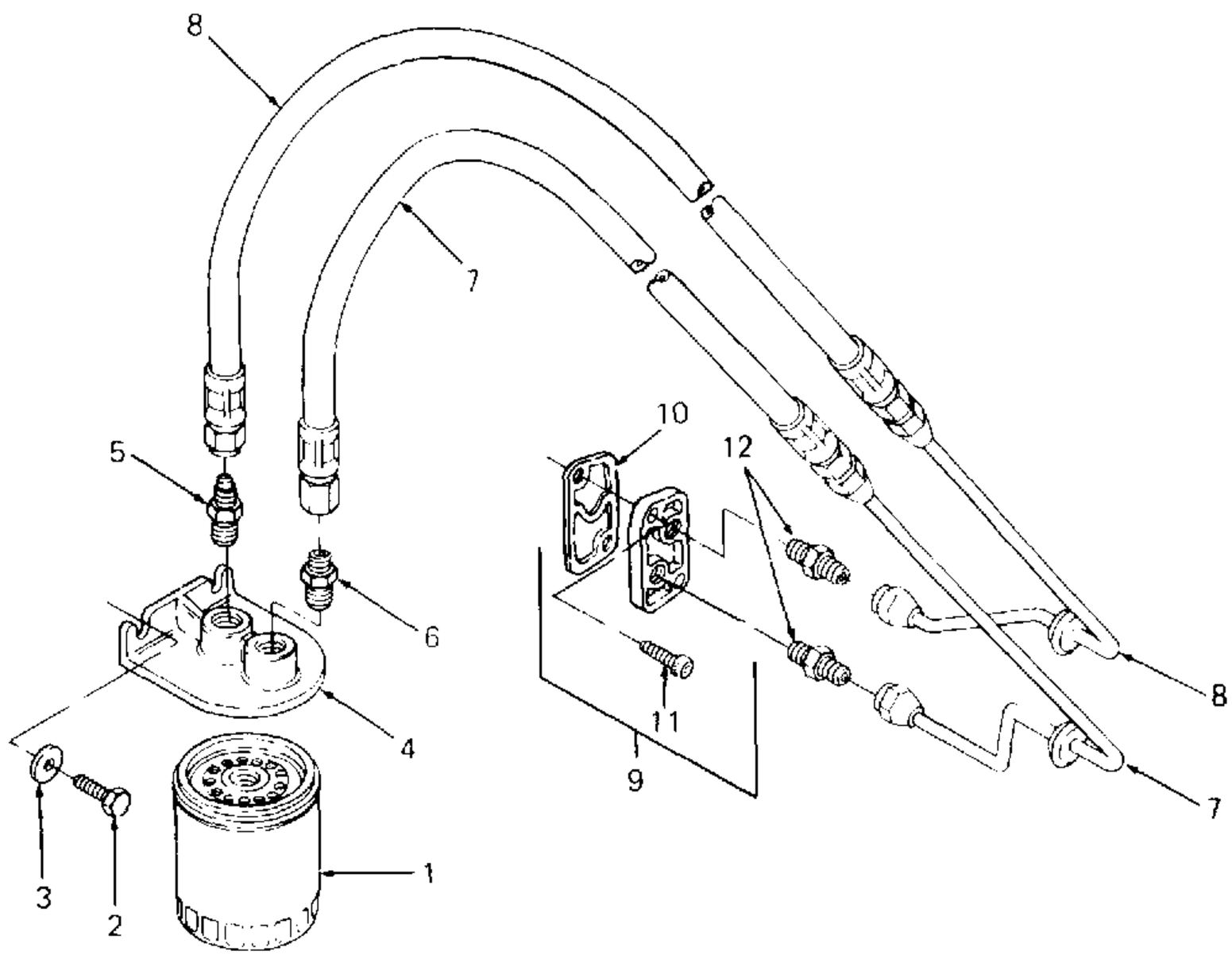
5-66A.2 **Inspection.** Clean all parts prior to inspection.

1. Inspect oil filter for dirt or wear. Discard and replace after __ hours of operation.
2. Inspect oil lines (7 and 8) for wear or damage. Replace damaged or worn parts.
3. Inspect reducing connectors (6 and 12) for wear or damage. Replace if worn or damaged.

5-66A.3 **Repair.** No repairable parts. Replace damaged or worn parts.

5-66A.4 Installation.

1. Secure oil filter adapter (4) and oil filter cover kit (9).
2. Install reducing connectors (6 and 12) and hex nipple (5).
3. Connect oil lines (7 and 8) to oil filter adapter (4) and filter cover (9).
4. Install oil filter (1).



1. Oil Filter
2. Hex Cap Screw
3. Bell Washer
4. Oil Filter Adapter
5. Hex Nipple
6. Reducing Connector
7. Oil Line, 20.5"
8. Oil Line, 22.5"
9. Oil Filter Cover Kit
10. Oil Filter Cover Gasket
11. Hex Socket Screw
12. Reducing Connector

Figure 5-102A. Oil Filter (Models 1535, 1541, 1862, 1882 and 2082).

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5-67. ENGINE MOUNTING (Model 1340).

5-67.1 **General.** Related information may be available in the manuals listed in Appendix A.

5-67.2 **Removal.**

WARNING

Engine must be cool before engine mounting, muffler and/or air duct removal is begun.

1. Remove side panels and grille per paragraph 5-4.2.
2. Remove muffler and air duct per paragraph 5-63.2.
3. Remove engine per paragraph 5-65.2
4. Remove engine mounting plate (1, Figure 5-103) by removing hex flange lock nut (2), cable clip (3), hex cap screw (4) and lock washer (5).
5. Remove engine mount cradle (6) by removing pan head machine screws (7), hex cap screws (10), rubber mount inserts (8), rubber mounts (9), snubbing bumpers (11) and snubbing mount shim (12).

5-67.3 **Inspection.** Clean all parts prior to inspection.

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect rubber mount inserts (8) and rubber mounts (9) for wear. Discard and replace if worn.

5-67.4 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.

5-67.5 **Installation.**

1. Install engine mount cradle (6) with snubbing mount shim (12), snubbing bumpers (11), hex cap screws (10), rubber mounts (9), rubber mount inserts (8) and pan head machine screws (7).
2. Install engine mounting plate (1) with lock washers (5), hex cap screws (4), cable clips (3) and hex flange lock nuts (2).
3. Install engine per paragraph 5-65.3.
4. Install muffler and air duct per paragraph 5-63.5
5. Install side panels and grille per paragraph 5-4.7.

1. **Engine Mounting Plate**
2. **Hex Flange Lock Nut**
3. **Cable Clip**
4. **Hex Cap Screw**
5. **Lock Washer**
6. **Engine Mount Cradle**
7. **Pan Head Machine Screw**
8. **Rubber Mount Insert**
9. **Rubber Mount**
10. **Hex Cap Screw**
11. **Snubbing Bumper**
12. **Snubbing Mount Shim**

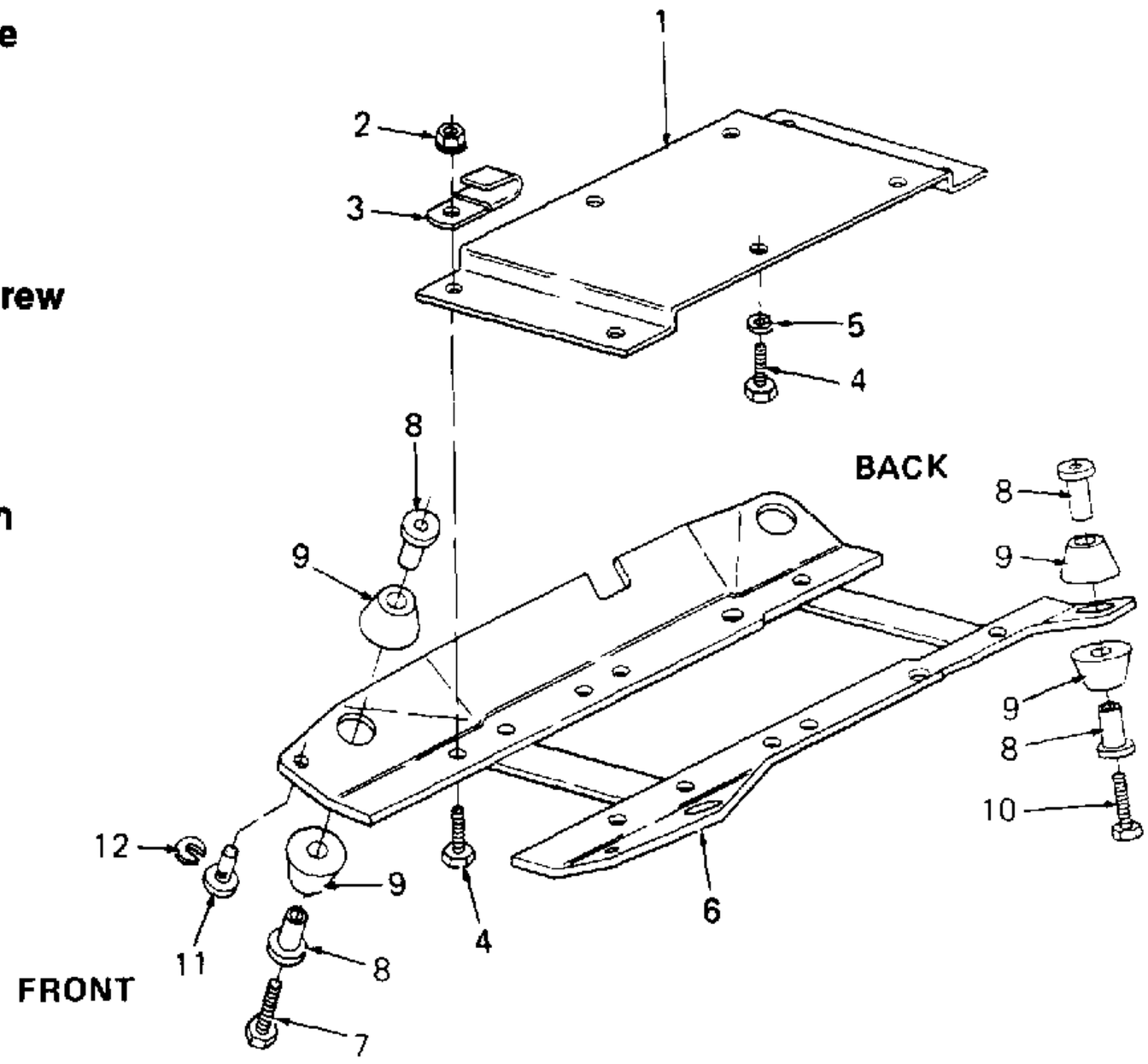


Figure 5-103. Engine Mounting (Model 1340).

5-68. **FRAME (All Models).**

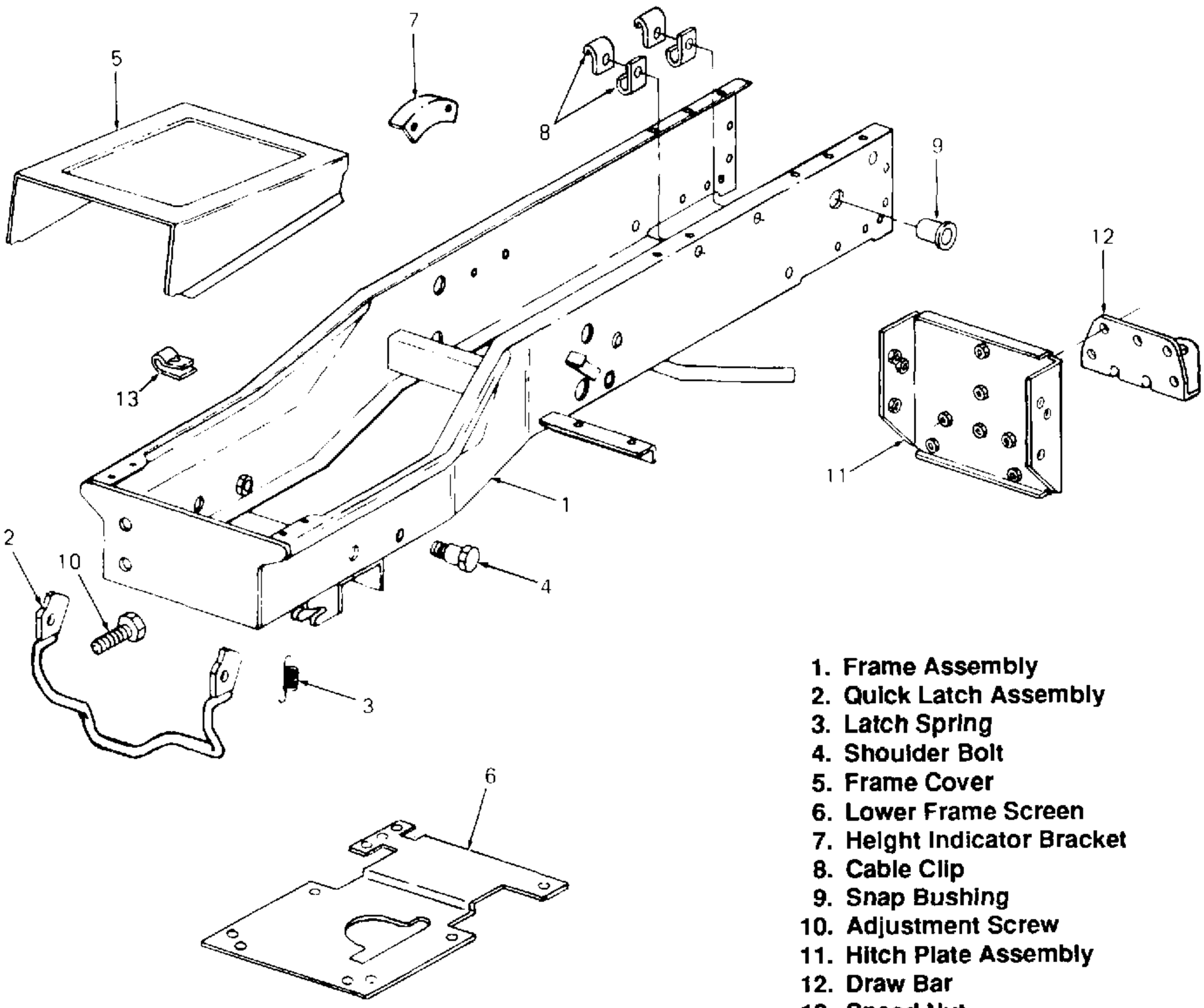
5-68.1 **General.** Instructions for removal, disassembly, reassembly and installation of the frame may be easily understood by review of the following figures. The frame should be inspected each year and anytime the transmission is removed.

5-68.2 **Inspection.** Clean all parts prior to inspection. Refer to Figure 5-104 (Models 1340, 1541, 1860 and 1862), Figure 5-105 (Model 1535), Figure 5-106 (Models 1782 and 2182) or Figure 5-107 (Models 1882 and 2082).

1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect all frame welds for cracks.
4. Inspect latch spring (3) for damage. Discard and replace damaged spring.
5. Check head of adjustment screw for damage. Discard and replace if damaged.

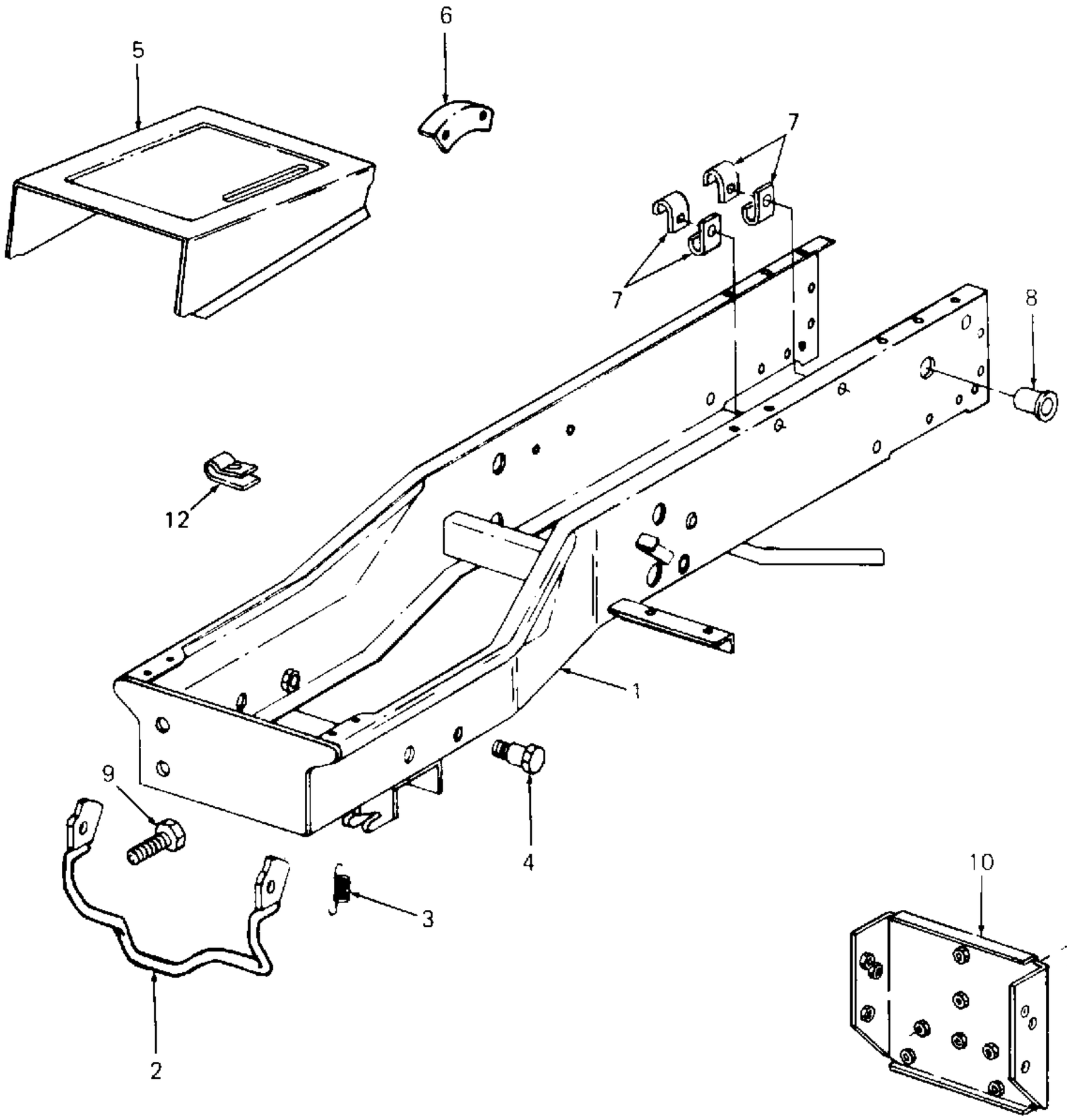
5-68.3 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Repair damaged welds.



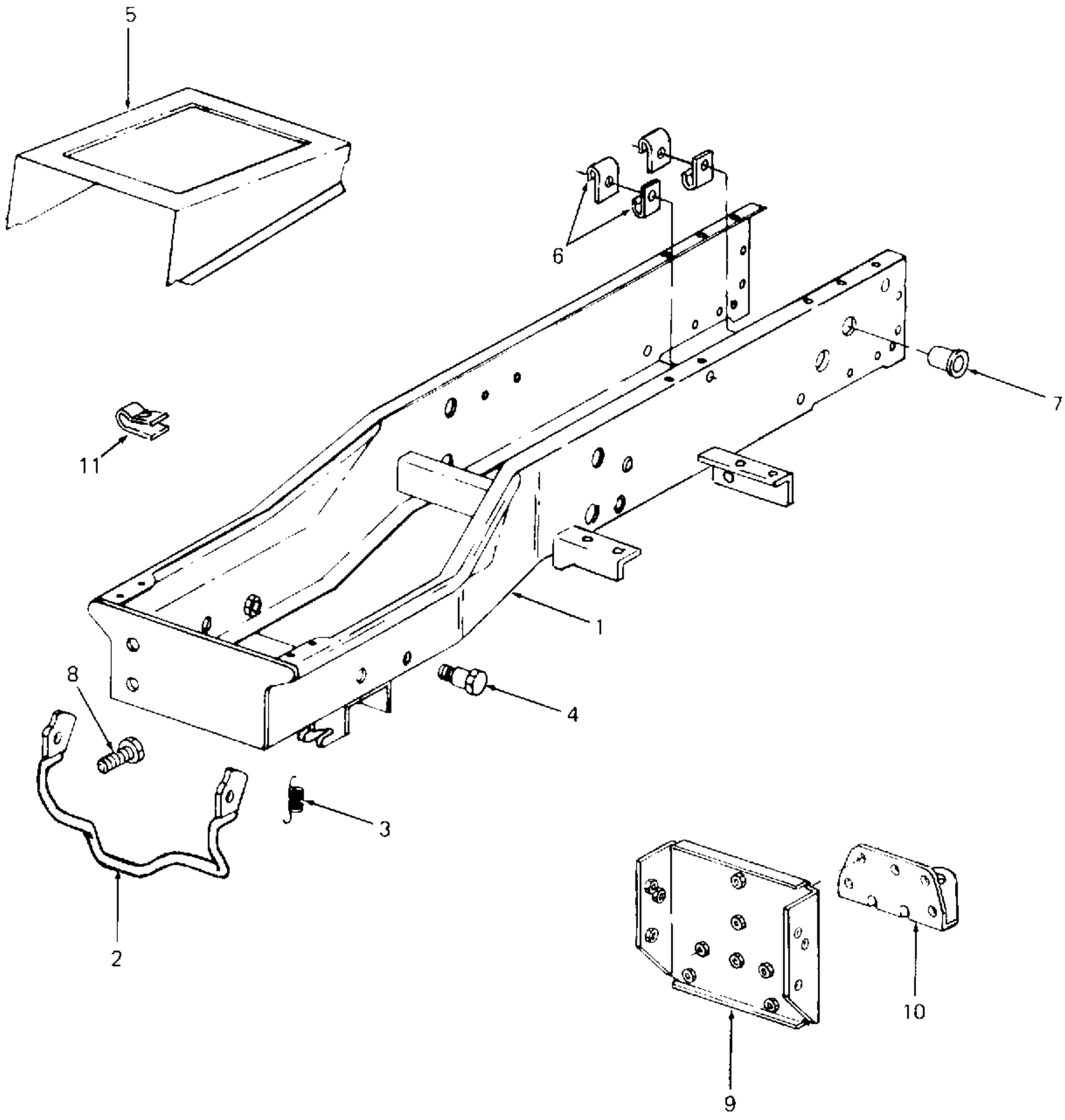
1. **Frame Assembly**
2. **Quick Latch Assembly**
3. **Latch Spring**
4. **Shoulder Bolt**
5. **Frame Cover**
6. **Lower Frame Screen**
7. **Height Indicator Bracket**
8. **Cable Clip**
9. **Snap Bushing**
10. **Adjustment Screw**
11. **Hitch Plate Assembly**
12. **Draw Bar**
13. **Speed Nut**

Figure 5-104. Frame (Models 1340, 1541, 1860 and 1862).



1. **Frame Assembly**
2. **Quick Latch Assembly**
3. **Latch Spring**
4. **Shoulder Bolt**
5. **Frame Cover**
6. **Height Indicator Bracket**
7. **Cable Clip**
8. **Snap Bushing**
9. **Adjustment Screw**
10. **Hitch Plate Assembly**
11. **Draw Bar**
12. **Speed Nut**

Figure 5-105. Frame (Model 1535).



1. **Frame Assembly**
2. **Quick Latch Assembly**
3. **Latch Spring**
4. **Shoulder Bolt**
5. **Frame Cover**
6. **Cable Clip**
7. **Snap Bushing**
8. **Adjustment Screw**
9. **Hitch Plate Assembly**
10. **Draw Bar**
11. **Speed Nut**

Figure 5-106. Frame (Models 1782 and 2182).

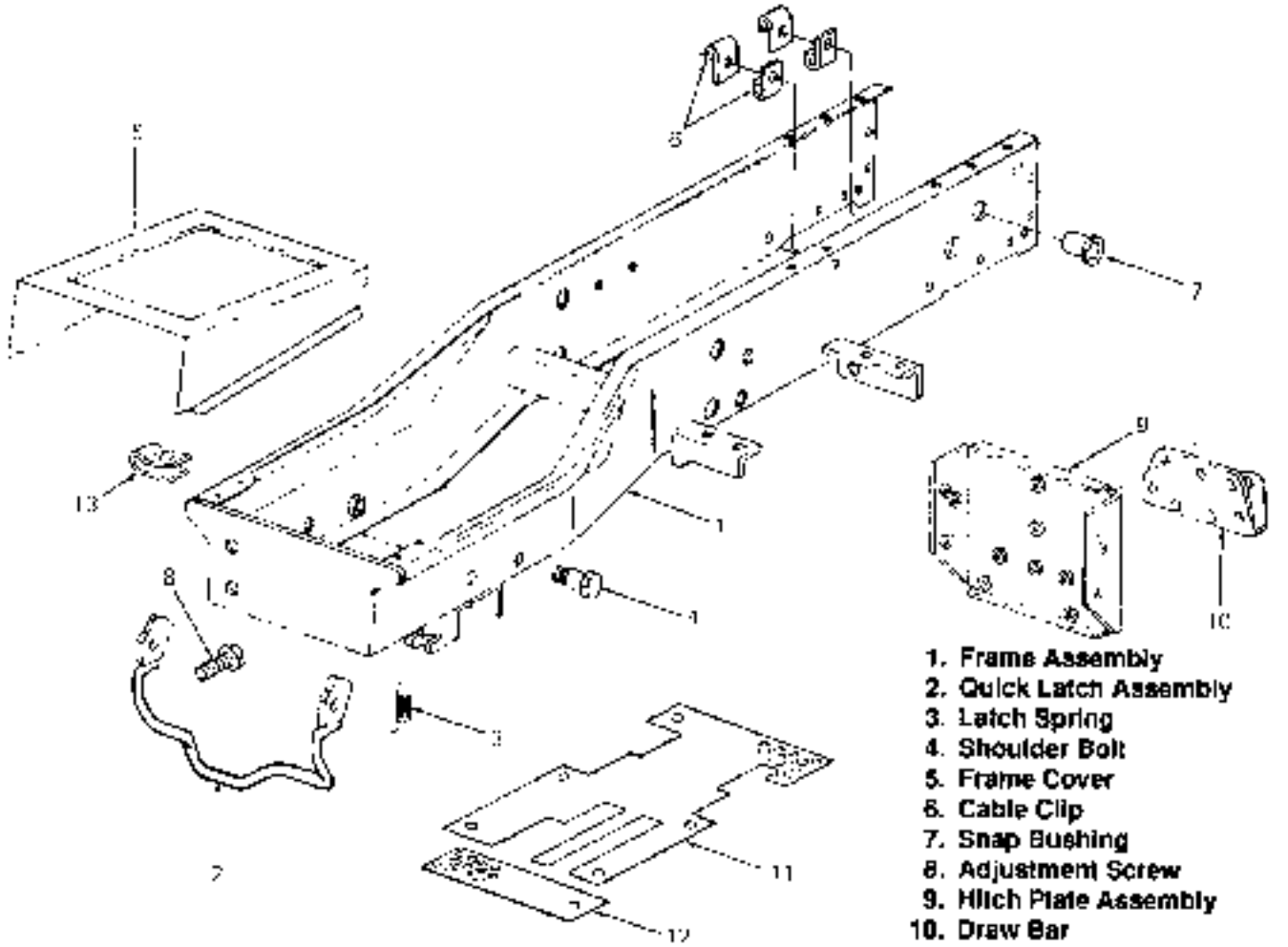


Figure 5-107. Frame (Models 1882 and 2082).

5-69. 38 INCH MOWER DECK ASSEMBLY (Model 190-328).

5-69.1 **General**. The mower deck assembly contains two identical spindle assemblies. Replacement of these assemblies requires use of spindle service kit Part No. 759-3294 which also includes a pulley. For basic overhaul of spindle assemblies, order seals and other parts as required.

5-69.1.1 Additional information regarding deck belts and related problems is contained in Appendix I.

5-69.2 **Removal.** Removal of the spindle assemblies from the deck is not necessary in order to repair and/or overhaul the unit. The following text describes such repair and/or overhaul conditions.

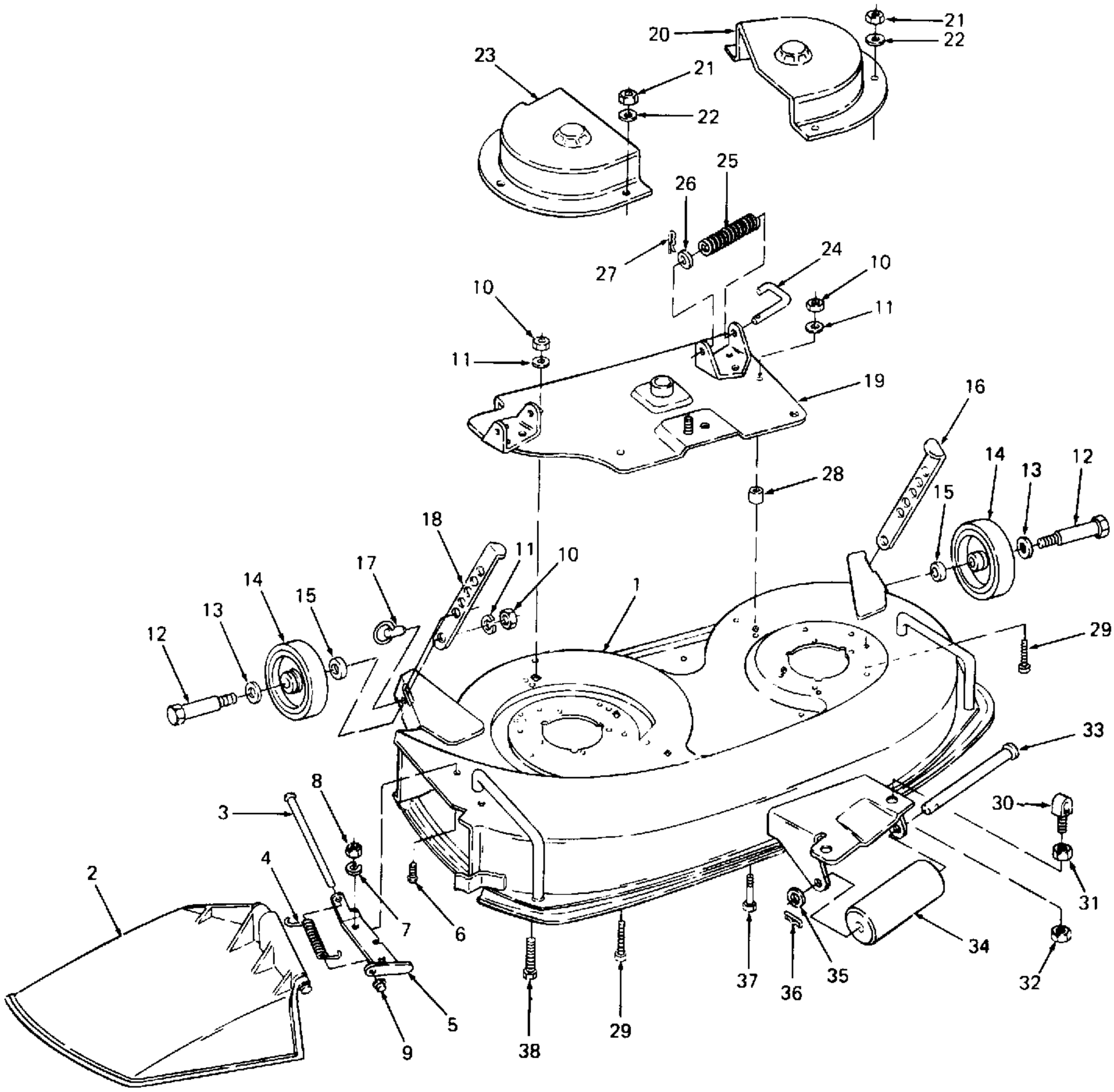
NOTE

Figures in this paragraph that are not referenced in text are included for information only.

5-69.3 **Disassembly.** Refer to Figure 5-108 and disassemble deck to level necessary to perform spindle repair and/or overhaul. Then refer to Figure 5-109 and disassemble spindle assemblies (7) as follows:

CAUTION

Thoroughly clean the outside of the spindle assembly before disassembling.



1. Deck Assembly
2. Chute Kit
3. Hinge Pin
4. Torsion Spring
5. Hinge Mounting Bracket
6. Truss Machine Screw
7. Lock Washer
8. Hex Jam Nut
9. Speed Nut Cap
10. Hex Nut
11. Lock Washer
12. Shoulder Bolt
13. Flat Washer
14. Gauge Wheel
15. Spacer
16. Height Adjustment Bar - LH
17. Clevis Pin
18. Height Adjustment Bar - RH
19. Adapter Plate Assembly
20. Belt Cover - LH
21. Hex Nut
22. Flat Washer
23. Belt Cover - RH
24. Mower Support Pin
25. Compression Spring
26. Flat Washer
27. Spiral Spring Pin
28. Spacer
29. Hex Head Cutting Screw
30. Front Mower Support Hanger
31. Hex Jam Nut
32. Hex Insert Top Lock Nut
33. Clevis Pin
34. Front Roller
35. Flat Washer
36. Cotter Pin
37. Hex Cap Screw
38. Short Neck Carriage Bolt

Figure 5-108. Deck and Attachments (Model 190-328).

1. Mower Blade
2. Hex Nut
3. Flat Washer
4. Blade Spacer
5. Spindle Cup
6. Spindle Mounting Plate
7. Spindle Service Kit
8. Spindle Housing
9. 4L V-Pulley
10. Hex Jam Nut
11. Woodruff Key
12. Spindle Kit
13. Spacer
14. Oil Seal
15. Bearing Cone
16. Bearing Spacer
17. Hex Cap Screw
18. Flat Washer
19. Lock Washer
20. Hex Nut
21. Deck Drive Double Pulley Assembly
22. Ball Bearing
23. Pulley Spacer
24. PTO Drive V-Belt
25. Lock Washer
26. Hex Nut
27. Hex Bolt
28. Flat Washer
29. Shoulder Bolt
30. Idler Arm Assembly
31. Flat Idler Pulley
32. Flat Washer
33. Hex Center Lock Nut
34. Flat Washer
35. V-Belt
36. Torsion Spring
37. Flat Washer
38. Lube Fitting

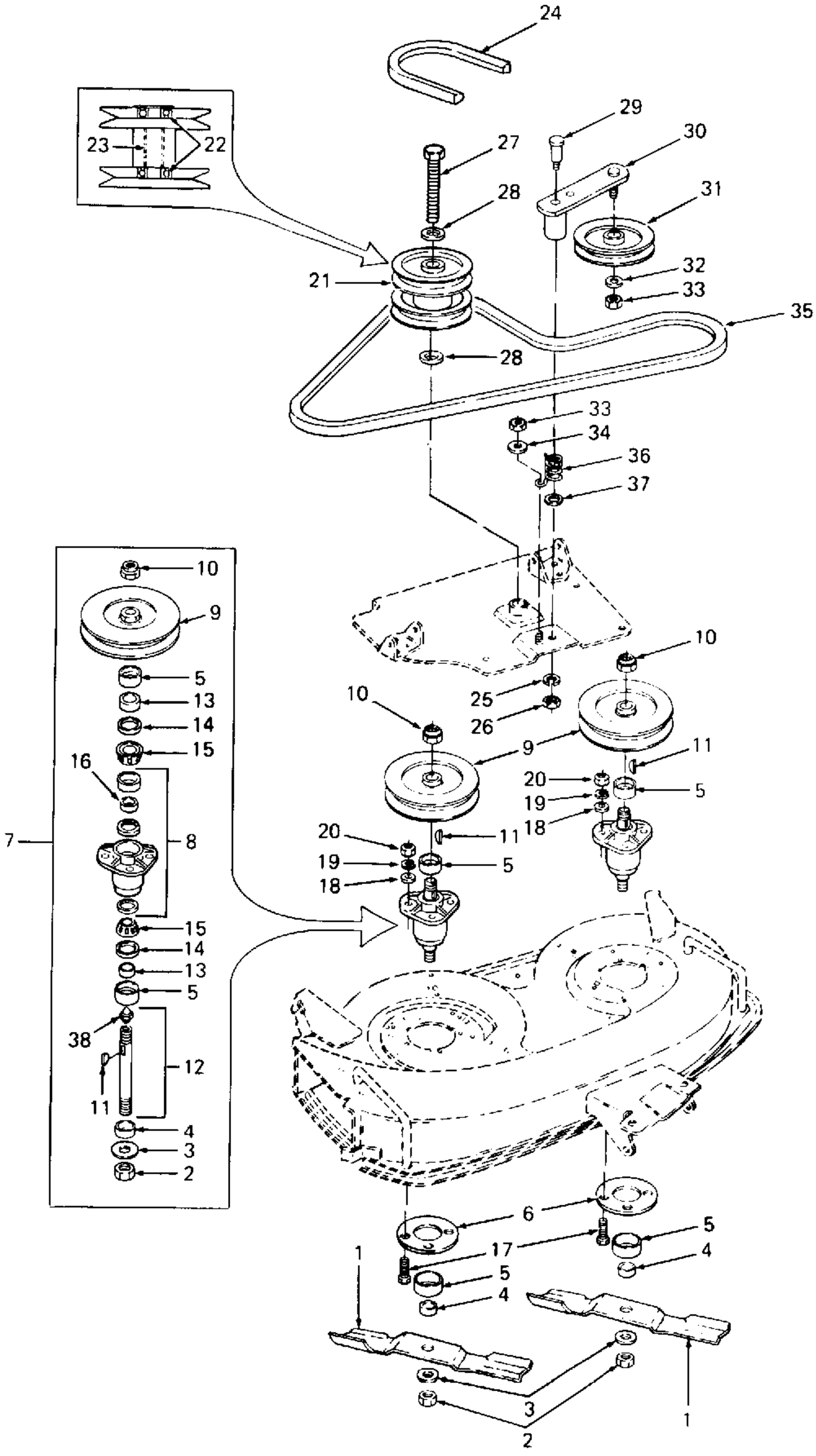
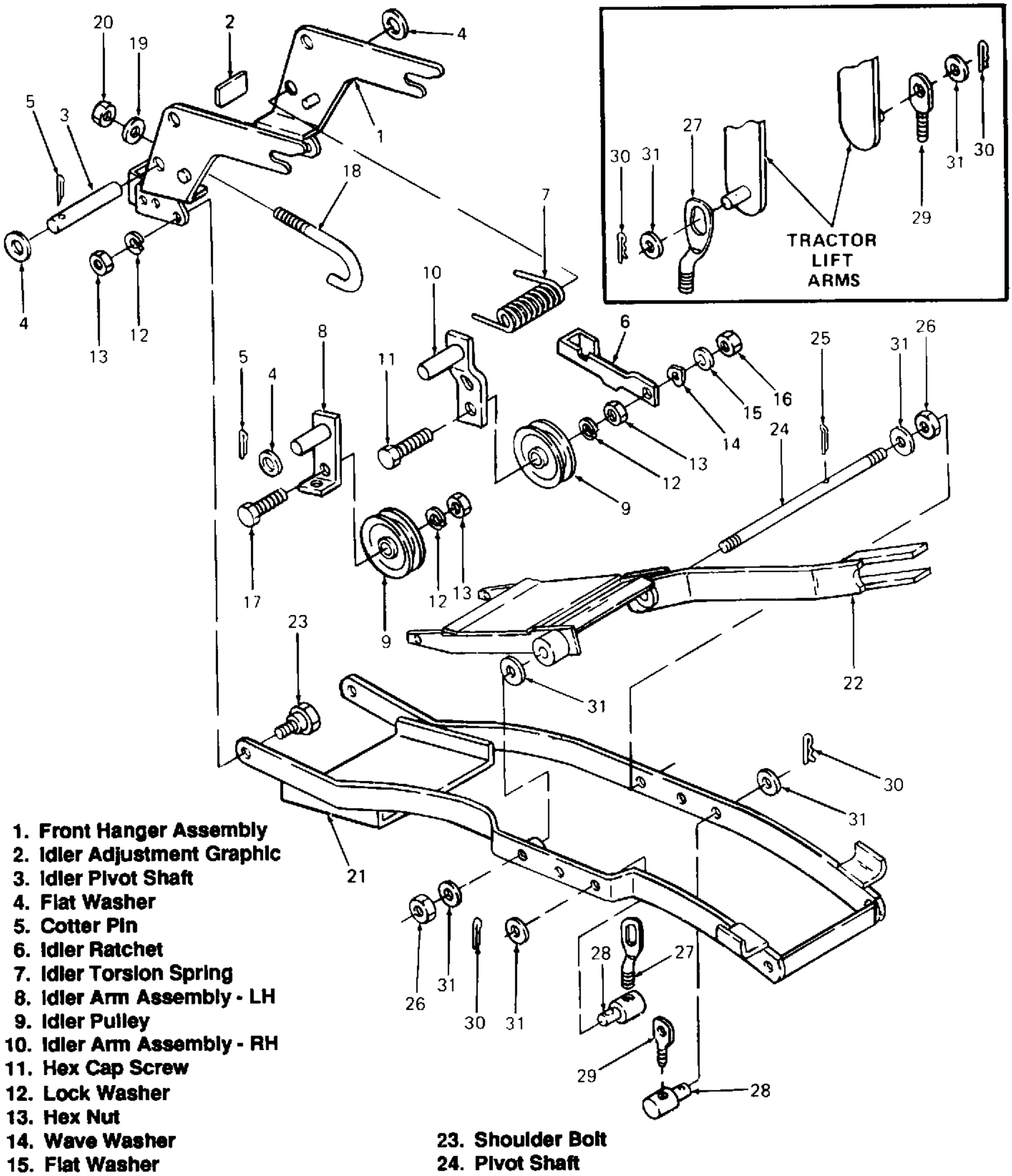


Figure 5-109. Spindles, Pulleys and Blades (Model 190-328).



1. Front Hanger Assembly
2. Idler Adjustment Graphic
3. Idler Pivot Shaft
4. Flat Washer
5. Cotter Pin
6. Idler Ratchet
7. Idler Torsion Spring
8. Idler Arm Assembly - LH
9. Idler Pulley
10. Idler Arm Assembly - RH
11. Hex Cap Screw
12. Lock Washer
13. Hex Nut
14. Wave Washer
15. Flat Washer
16. Hex Center Lock Nut
17. Hex Cap Screw
18. Idler Adjuster Bolt
19. Flat Washer
20. Hex Center Lock Nut
21. Lift Frame Assembly - Outer
22. Center Frame Assembly - Center
23. Shoulder Bolt
24. Pivot Shaft
25. Cotter Pin
26. Hex Jam Nut
27. Offset Adjustable Link
28. Adjustment Ferrule
29. Adjustable Link
30. Internal Cotter Pin
31. Flat Washer

Figure 5-110. Hanging Frame and Mule Drive (Model 190-328).

1. Remove drive pulleys (9) by removing hex jam nuts (10).

CAUTION

When mower blade or jam nut is removed from blade shaft, blade shaft is free to fall from spindle housing. Blade shaft must be held in place when mower blade or jam nut is removed.

NOTE

To prevent blade shaft from turning during disassembly, place a 1-1/8 inch open-end wrench on hex part of pulley hub.

2. Remove hex nuts (2), flat washers ( ), blades (1) and blade spacers (4).
3. Remove spindle shaft (12) from spindle assembly.
4. Remove spindle cups (5), spacers (13) and oil seals (14) from top and bottom of spindle assembly. Discard oil seals (14).
5. Remove both bearing cones (15) using care not to lose bearing spacer (16).

NOTE

Do not attempt to remove bearing cups from spindle housing.

5-69.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect each spindle (12) as follows:
   a. Inspect threads for damage and check for cracks or distortion to shaft.
   b. Examine key (11) and keyway for damage.
   c. Apply 251H EP grease through lube fitting (38) to check if lube holes are open and to flush lube channels.
2. Inspect bearing spacers (16) for wear.
3. Inspect spacers (13) for wear especially in area where oil seal (14) contacts.
4. Inspect bearing cones (15) for cracks in roller bearings, excessive wear or check marks in roller bearings or damaged or excessively bent roller bearing cages.
5. Inspect spindle housing (8). If any of the following problems exist, replace spindle housing:
   a. Bearing cups fit loosely in housing.
   b. Damaged bearing cups.
   c. Cracked or damaged housing.
6. Inspect pulleys (9) for damage to keyway or excessive wear or damage to belt groove.

5-69.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Replace badly damaged parts with new parts from service kit.
4. Pack bearing cones (15) with 251H EP grease using a bearing packer. If bearing packer is not available, refer to Figure 5-111 and pack by hand as follows:

WARNING

Wear gloves to protect your skin when performing the following steps 4.a through 4.c.

   a. Place approximately one tablespoon of 251H EP grease in palm of one hand.
   b. In free hand, place bearing between thumb and forefinger and scrape bearing along edge of grease. Continue until grease comes out of top of bearing between bearing race and roller cage and bearing is completely filled.

NOTE

This action will cause grease to go into bearing assembly and lodge between bearing and bearing race.

   c. Completely cover outside of bearing with grease.

5-69.6 **Reassembly.** Install each spindle assembly as follows:

1. Install bearing spacer (16, Figure 5-109) and bearing cones (15).

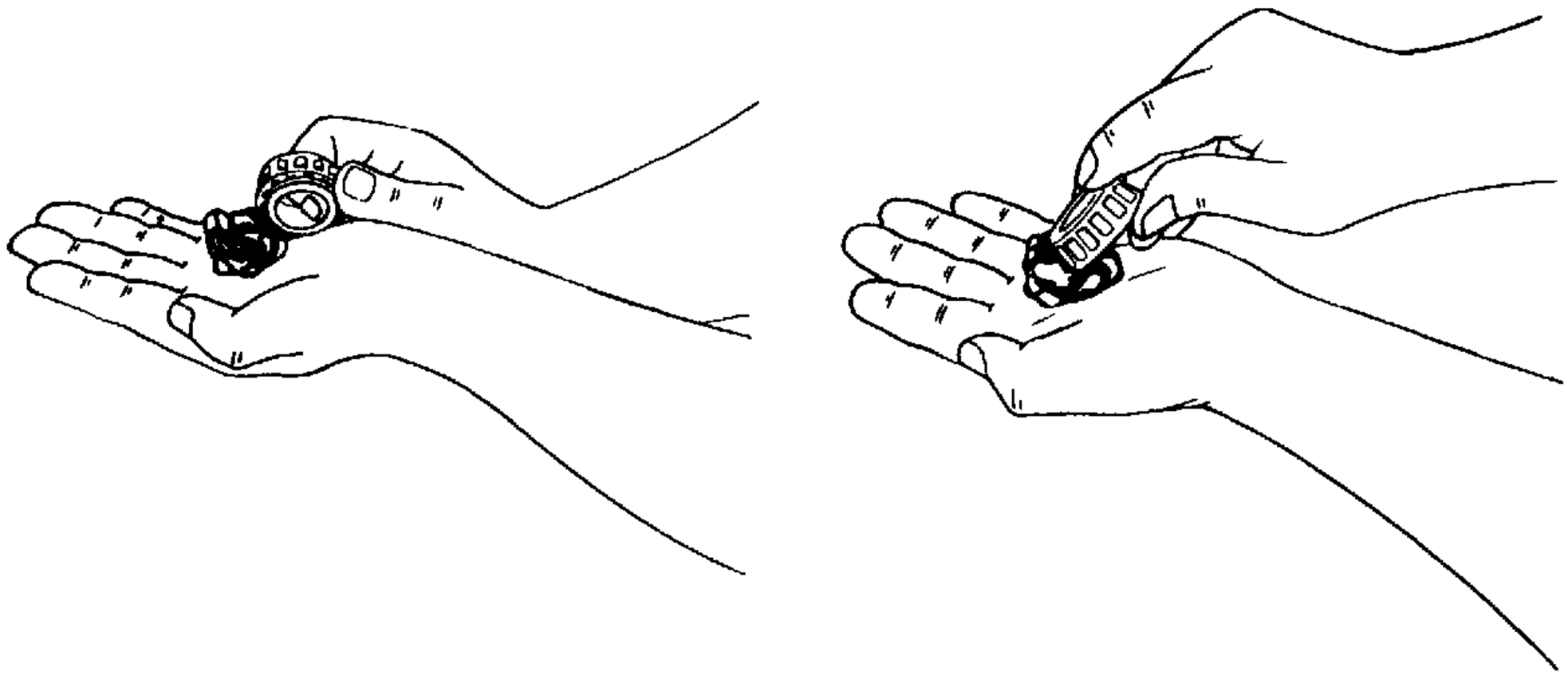


Figure 5-111. Packing Bearing Cones With Grease.

CAUTION

When installing oil seals (14) in following step 2, lip of top seal must face up; lip of bottom seal must face up. Seals must be installed flush with spindle housing (8).

NOTE

If seals are not installed as described you could experience a hydraulic lock in the spindle assembly.

2. Install oil seals (14), spacers (13) and spindle cups (5).
3. Install spindle (12) in assembly and place key (11) in keyway.
4. Install drive pulleys (9) and secure with hex jam nuts (10). Torque nuts (10) to 50 to 60 ft-lbs.
5. Install blade spacers (4), blades (1), flat washers (3) and hex nuts (2). Torque hex nuts to 90 to 100 ft-lbs.
6. Lubricate spindle with 251H EP grease.
7. Complete remaining reassembly using Figure 5-109 as a guide.

5-70. 46 INCH MOWER DECK ASSEMBLY (Model 190-336).

5-70.1 **General.** The mower deck assembly contains three identical spindle assemblies. Replacement of these assemblies requires use of spindle service kit Part No. 759-3294 which also includes a pulley. For basic overhaul of spindle assemblies, order seals and other parts as required.

5-70.1.1 Additional information regarding deck belts and related problems is contained in Appendix I.

5-70.2 **Removal.** Removal of the spindle assemblies from the deck is not necessary in order to repair and/or overhaul the unit. The following text describes such repair and/or overhaul conditions.

NOTE

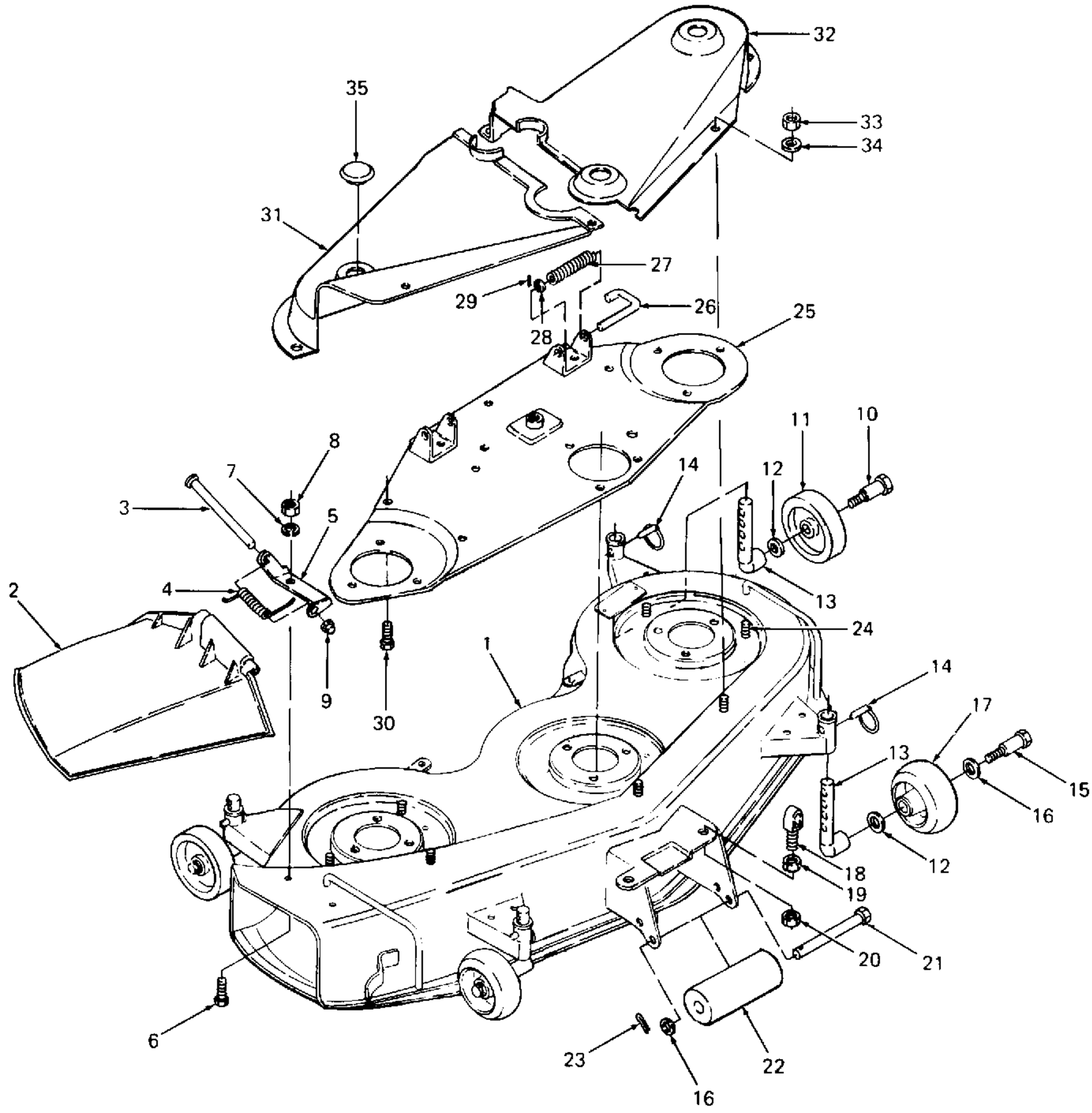
Figures in this paragraph that are not referenced in text are included for information only.

5-70.3 **Disassembly.** Refer to Figure 5-112 and disassemble deck to level necessary to perform spindle repair and/or overhaul. Then, refer to Figure 5-113 and disassemble spindle assemblies (6) as follows:

CAUTION

Thoroughly clean the outside of the spindle assembly before disassembling.

1. Remove drive pulleys (16) by removing hex jam nuts (17).



1. Deck Assembly
2. Chute Kit
3. Hinge Pin
4. Torsion Spring
5. Hinge Mounting Bracket
6. Truss Machine Screw
7. Lock Washer
8. Hex Nut
9. Cap Speed Nut
10. Shoulder Screw
11. Gauge Wheel
12. Bell Washer
13. Deck Axle
14. Clevis Pin
15. Shoulder Screw
16. Flat Washer
17. Ball Wheel
18. Front Mower Support Hanger
19. Hex Jam Nut
20. Hex Insert Top Lock Nut
21. Clevis Pin
22. Front Roller
23. Cotter Pin
24. Hex Cutting Screw
25. Adapter Plate
26. Mower Support Pin
27. Compression Spring
28. Flat Washer
29. Spiral Spring Pin
30. Hex Cutting Screw
31. Belt Cover - RH
32. Belt Cover - LH
33. Hex Nut
34. Flat Washer
35. Button Plug

Figure 5-112. Deck Assembly (Model 190-336).

1. Mower Blade
2. Mower Blade
3. Hex Nut
4. Flat Washer
5. Blade Spacer
6. Spindle Service Kit
7. Spindle Housing
8. Bearing Spacer
9. Spindle Kit
10. Woodruff Key
11. Lube Fitting
12. Spindle Cup
13. Spacer
14. Oil Seal
15. Bearing Cone
16. 4L V-Pulley
17. Hex Jam Nut
18. Hex Cap Screw
19. Flat Washer
20. Lock Washer
21. Hex Nut
22. Hex Center Lock Nut
23. Hex Nut
24. Lock Washer
25. Hex Cap Screw
26. Hex Cap Screw
27. Flat Washer
28. Extension Spring
29. Idler Bracket
30. Shoulder Spacer
31. Bell Washer
32. Hex Cap Screw
33. Flat Idler
34. Flat Washer
35. V-Belt
36. Hex Cap Screw
37. Double Pulley Assembly
38. Ball Bearing
39. Pulley Spacer
40. Flat Washer
41. Hex Bolt

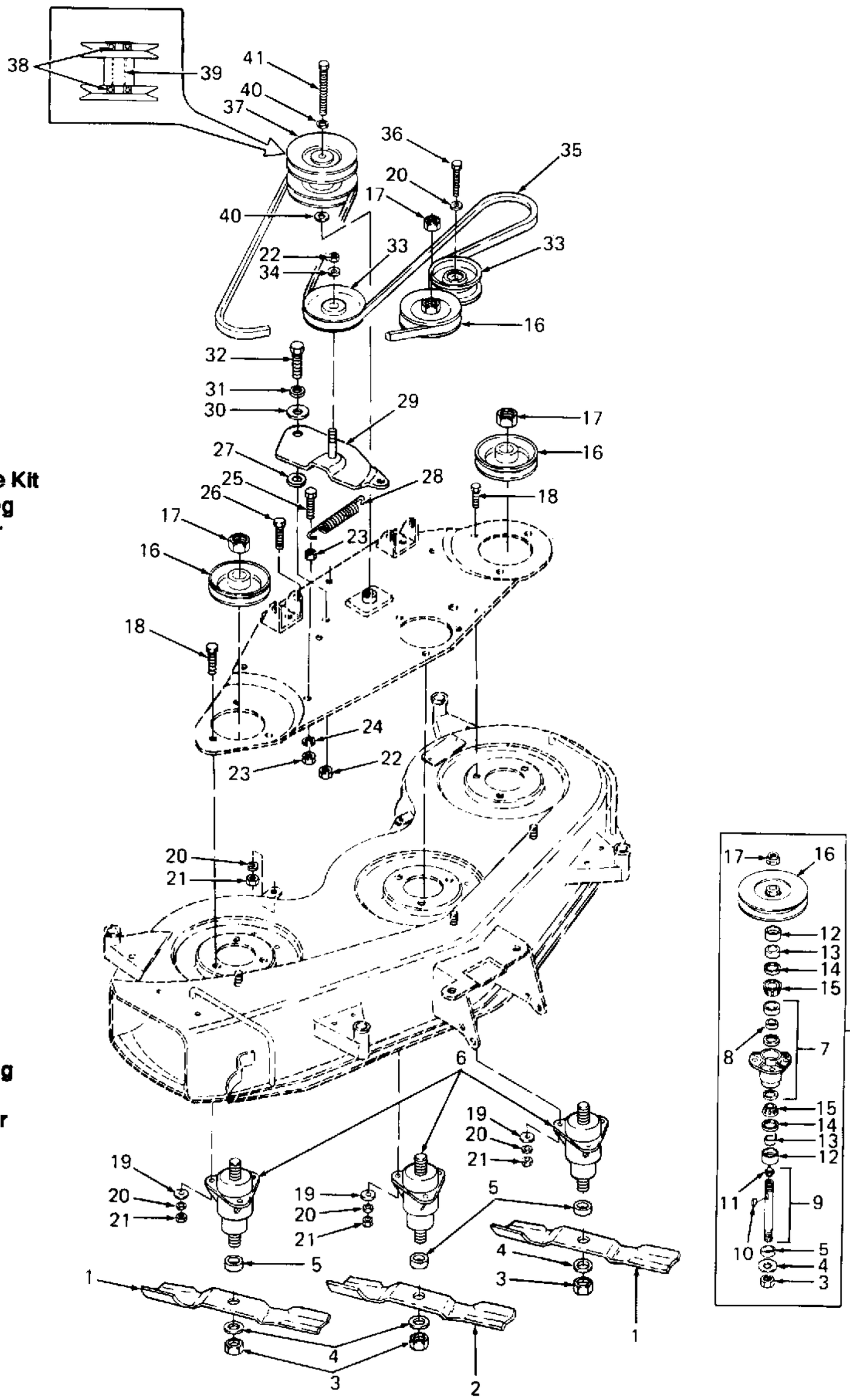


Figure 5-113. Spindles, Blades and Pulleys (Model 190-336).

CAUTION

When mower blade or jam nut is removed from blade shaft, blade shaft is free to fall from spindle housing. Blade shaft must be held in place when mower blade or jam nut is removed.

NOTE

To prevent blade shaft from turning during disassembly, place a 1-1/8 inch open-end wrench on hex part of pulley hub.

2. Remove each cutting blade (1 and 2) by removing hex nut (3), flat washer (4) and blade spacer (5).

3. Remove spindle shaft (9) from spindle assembly.

4. Remove spindle cups (12), spacers (13) and oil seals (14) from top and bottom of spindle assembly. Discard oil seals (14).

5. Remove both bearing cones (15) using care not to lose bearing spacer (8).

NOTE

Do not attempt to remove bearing cups from spindle housing.

5-70.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect each spindle (6) as follows:
   a. Inspect threads for damage and check for cracks or distortion to shaft.
   b. Examine key (10) and keyway for damage.
   c. Apply 251H EP grease through lube fitting (11) to check if lube holes are open and to flush lube channels.
2. Inspect bearing spacers (8) for wear.
3. Inspect spacers (13) for wear especially in area where oil seal (14) contacts.
4. Inspect bearing cones (15) for cracks in roller bearings, excessive wear or check marks in roller bearings or damaged or excessively bent roller bearing cages.
5. Inspect spindle housing (7). If any of the following problems exist, replace spindle housing:
   a. Bearing cups fit loosely in housing.
   b. Damaged bearing cups.
   c. Cracked or damaged housing.
6. Inspect pulleys (16) for damage to keyway or excessive wear or damage to belt groove.

5-70.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Replace badly damaged parts with new parts from service kit.
4. Pack bearing cones (15) with 251H EP grease using a bearing packer. If bearing packer is not available, refer to Figure 5-111 and pack by hand as follows:

WARNING

Wear gloves to protect your skin when performing the following steps 4.a through 4.c.

   a. Place approximately one tablespoon of 251H EP grease in palm of one hand.
   b. In free hand, place bearing between thumb and forefinger and scrape bearing along edge of grease. Continue until grease comes out of top of bearing between bearing race and roller cage and bearing is completely filled.

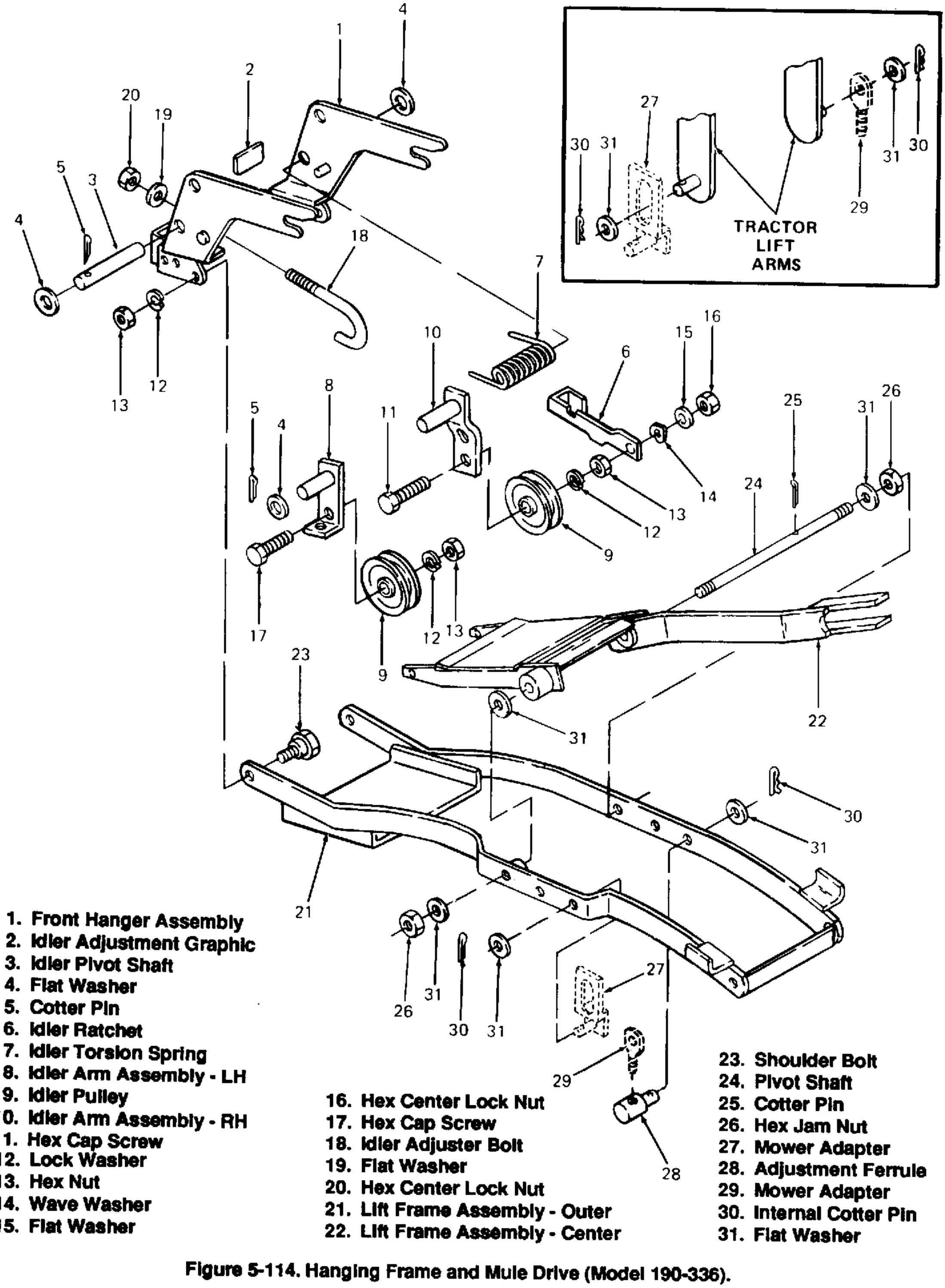
NOTE

This action will cause grease to go into bearing assembly and lodge between bearing and bearing race.

   c. Completely cover outside of bearing with grease.

5-70.6 **Reassembly.** Install each spindle assembly as follows:

1. Install bearing spacer (8, Figure 5-113) and bearing cones (15).



1. Front Hanger Assembly
2. Idler Adjustment Graphic
3. Idler Pivot Shaft
4. Flat Washer
5. Cotter Pin
6. Idler Ratchet
7. Idler Torsion Spring
8. Idler Arm Assembly - LH
9. Idler Pulley
10. Idler Arm Assembly - RH
11. Hex Cap Screw
12. Lock Washer
13. Hex Nut
14. Wave Washer
15. Flat Washer
16. Hex Center Lock Nut
17. Hex Cap Screw
18. Idler Adjuster Bolt
19. Flat Washer
20. Hex Center Lock Nut
21. Lift Frame Assembly - Outer
22. Lift Frame Assembly - Center
23. Shoulder Bolt
24. Pivot Shaft
25. Cotter Pin
26. Hex Jam Nut
27. Mower Adapter
28. Adjustment Ferrule
29. Mower Adapter
30. Internal Cotter Pin
31. Flat Washer

Figure 5-114. Hanging Frame and Mule Drive (Model 190-336).

CAUTION

When installing oil seals (14) in following step 2, lip of top seal must face up; lip of bottom seal must face up. Seals must be installed flush with spindle housing.

NOTE

If seals are not installed as described you could experience a hydraulic lock in the spindle assembly.

2. Install oil seals (14), spacers (13) and spindle cups (12).
3. Install spindle (6) in assembly and place key (10) in keyway.
4. Install drive pulleys (16) and secure with hex jam nuts (17). Torque nuts (17) to 50 to 60 ft-lbs.
5. Install each blade (1 and 2) as follows: Install blade spacer (5), blade (1 or 2), flat washers (4) and hex nuts (3). Torque hex nuts (3) to 90 to 100 ft-lbs.
6. Lubricate spindle with 251H EP grease.
7. Complete remaining reassembly using Figure 5-112 as a guide.

5-71. 42 INCH REAR PTO MOWER (Model 190-349).

5-71.1 **General.** The following information describes corrective maintenance for the mower gearbox of the 42 inch rear PTO mower. Before disassembling the gearbox assembly, refer to Appendix D for a list of mandatory replacement parts.

5-71.2 **Removal.** Remove the spindle assembly from the mower deck as follows:

WARNING

Disengage mower from tractor rear PTO and remove mower from tractor before servicing mower. Servicing mower while it is attached to tractor could result in severe injury.

1. Disengage drive shaft assembly from gearbox input shaft as follows:
   a. Remove screw (9, Figure 5-118) from shield. Turn shield to align holes with lugs. Push shield back to expose universal joint.
   b. Remove cover plate on shield (9, Figure 5-115) and loosen two set screws (26, Figure 5-118) on drive shaft hub (25). Remove drive shaft.
2. Remove shield (9, Figure 5-115) by removing cap screws (7) and flat washers (8).
3. Remove blade (1, Figure 5-116) by removing cotter pin (19), castle nut (18), spring washer (3), blade (1) and attached blade support (2) and spacer (6).
4. Remove gearbox by removing cap screws (8) and flanged lock nuts (7).

5-71.3 **Disassembly.** Refer to Figure 5-117.

CAUTION

Thoroughly clean the outside of the gearbox before disassembling.

1. Remove plug (23), bolts (8), cover (21) and gasket (20). Drain and discard lubricant and gasket.
2. Remove pinion shaft (18) as follows:
   a. Remove cap (15), snap ring (17), bearing (14) and shims (19).
   b. Remove key (5), oil seal (3), snap ring (2), bearing (4) and shims (26). Remove pinion shaft from gearbox housing.
3. Remove shaft (7) as follows:
   a. Remove gear (13), shims (26) and key (10).
   b. Remove keys (24), snap ring (11), lower oil seal (12), snap ring (22) and lower bearings (6). Remove shaft (7) from gearbox housing.

5-71.4 **Inspection.** Clean all parts prior to inspection.

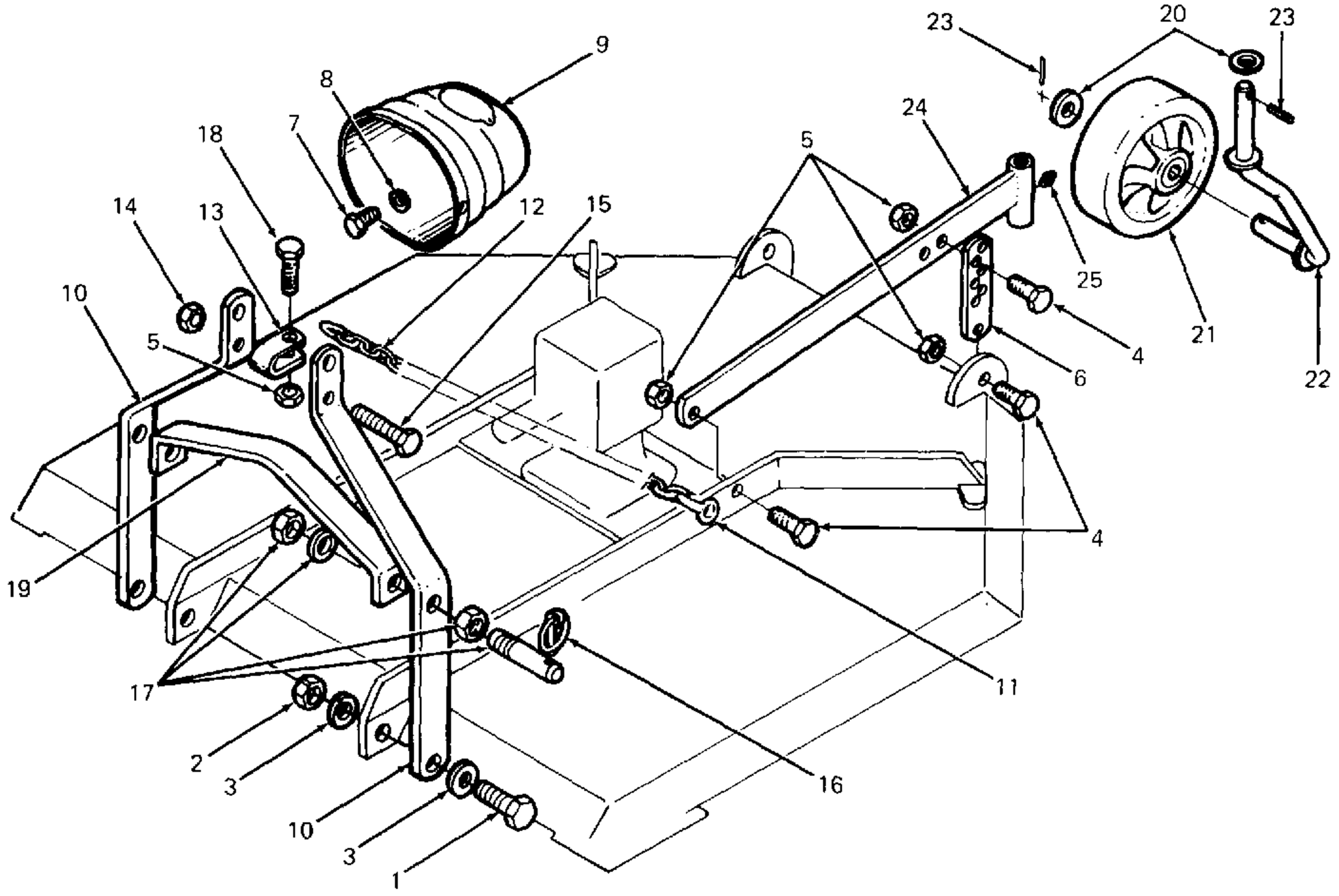
1. Inspect all threaded areas for damage.
2. Inspect parts for cracks, scoring, distortion, corrosion and wear.
3. Inspect bearings (4, 6 and 14) for damage or wear. Replace worn bearings.
4. Inspect shafts (7 and 18) for cracks, distortion or damage to splined areas. Replace distorted shaft.
5. Inspect that all gasket and sealing surfaces are clean and smooth.
6. Inspect gears for damaged or missing teeth.
7. Inspect keys (5, 10 and 24) for damage. Replace severely worn keys.

5-71.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Flush any debris from gearbox housing.

5-71.6 **Reassembly.**

1. Install shaft (7) as follows:
   a. Place shaft in gearbox housing. Install lower bearings (6), snap ring (22), lower oil seal (12), snap ring (11) and keys (24).
   b. Install key (10), shims (26) and gear (13).



1. **Cap Screw**
2. **Lock Nut**
3. **Flat Washer**
4. **Cap Screw**
5. **Lock Nut**
6. **Adjusting Strap**
7. **Cap Screw**
8. **Flat Washer**
9. **Shield**
10. **Mast Half**
11. **Chain Shackle**
12. **Chain**
13. **Spacer**
14. **Lock Nut**
15. **Cap Screw**
16. **Lynch Pin**
17. **Adjustable Lift Pin**
18. **Cap Screw**
19. **Cross Brace**
20. **Flat Washer**
21. **Tire Assembly**
22. **Caster Leg**
23. **Roll Pin**
24. **Caster Arm**
25. **Grease Fitting**

Figure 5-115. "A" Frame and Tailwheels (Model 190-349).

2. Install pinion shaft (18) as follows:

   a. Install pinion shaft into gearbox housing. Install shims (26), bearing (4), snap ring (2), oil seal (3) and key (5).

   b. Install shims (19), bearing (14), snap ring (17) and cap (15).

3. Add 30 ounces of EP80W-90 gear oil (*Cub Cadet* Part No. 737-3033) to gearbox housing.

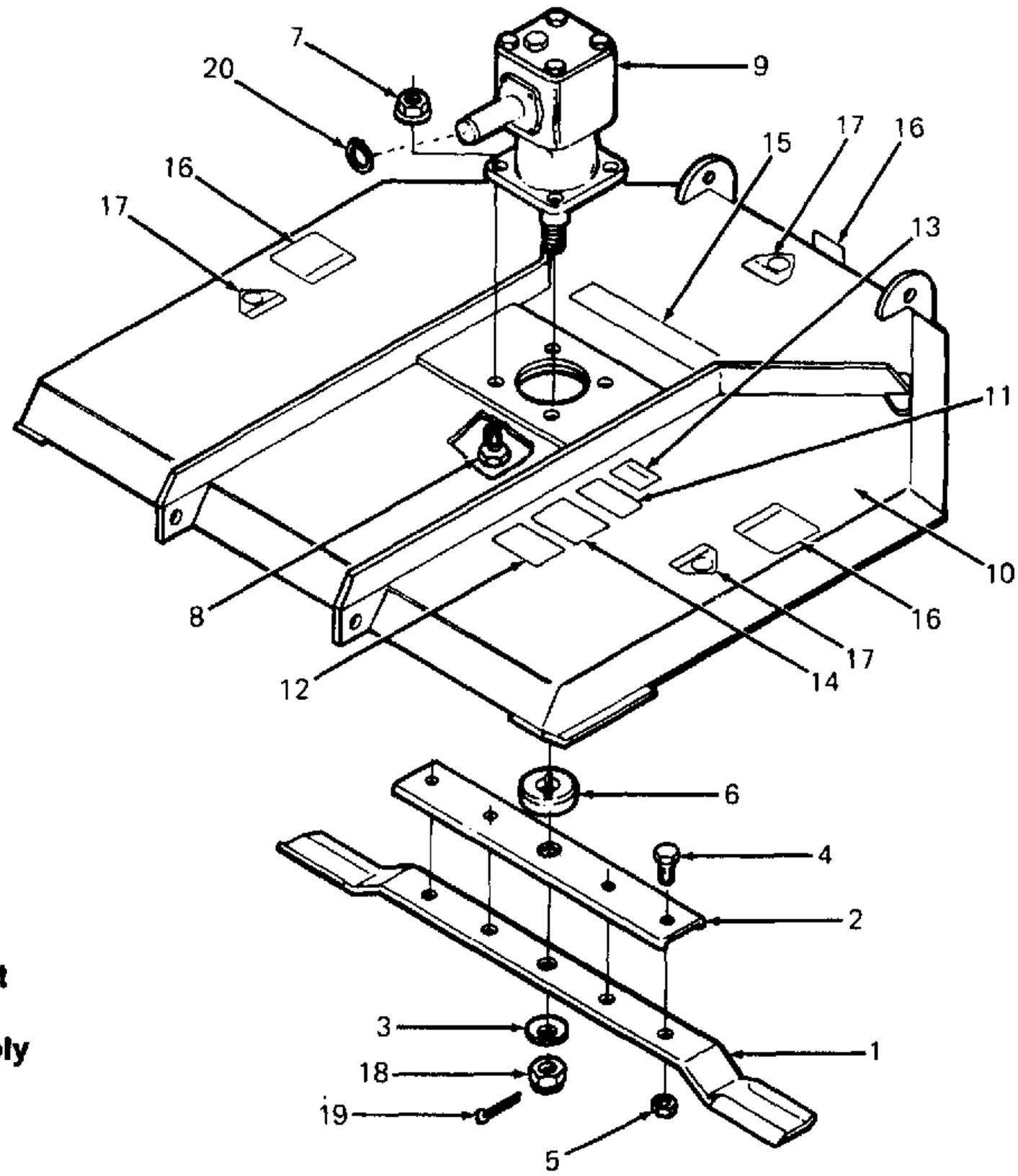
4. Install new gasket (20), cover (21), bolts (8) and plug (23).

5-71.7 **Installation.**

1. Secure gearbox assembly to deck with cap screws (8, Figure 5-116) and flanged lock nuts (7).

2. Install blade (1) by installing spacer (6), blade (1), and attached blade support (2), spring washer (3), castle nut (18) and cotter pin (19).

3. Attach shield (9, Figure 5-115) with flat washers (8) and cap screws (7).



1. **Blade**
2. **Blade Support**
3. **Spring Washer**
4. **Cap Screw**
5. **Lock Nut**
6. **Spacer**
7. **Flanged Lock Nut**
8. **Cap Screw**
9. **Gearbox Assembly**
10. **Base**
11. **Warning Decal**
12. **Danger Decal**
13. **Caution Decal**
14. **Warning Decal**
15. **Cub Cadet Logo Decal**
16. **Thrown Object Decal**
17. **Danger Decal**
18. **Castle Nut**
19. **Cotter Pin**
20. **Snap Ring**

Figure 5-116. Mower Deck (Model 190-349).

1. Casing
2. Snap Ring
3. Oil Seal
4. Bearing
5. Key
6. Lower Bearing
7. Shaft
8. Bolt
9. Castle Nut
10. Key
11. Snap Ring
12. Lower Oil Seal
13. Gear
14. Bearing
15. Cap
16. Plug
17. Snap Ring
18. Pinion Shaft
19. Shim
20. Gasket
21. Cover
22. Snap Ring
23. Plug
24. Key
25. Cotter Pin
26. Shim

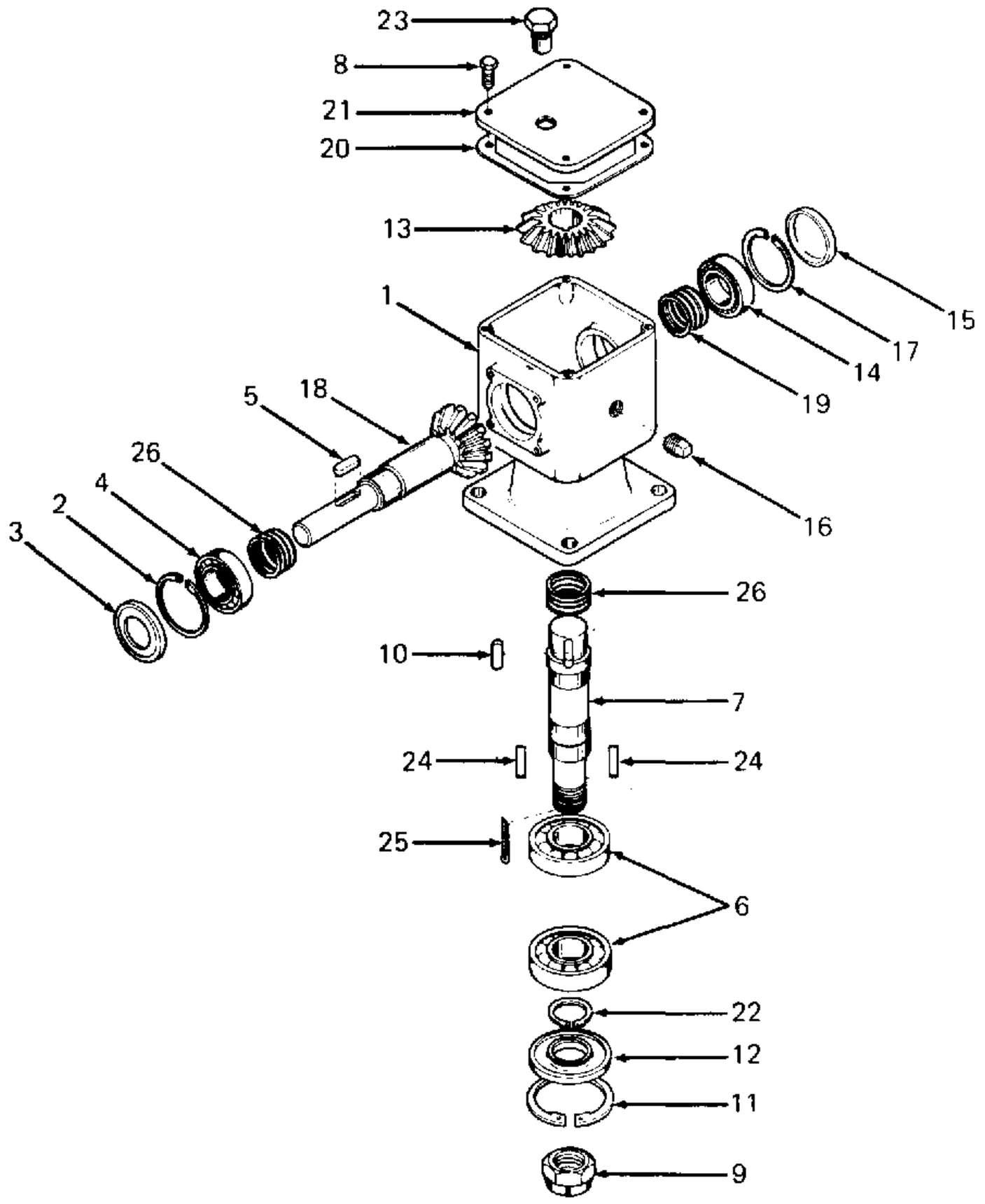


Figure 5-117. Mower Gearbox (Model 190-349).

4. Attach drive shaft to gearbox input shaft as follows:

CAUTION

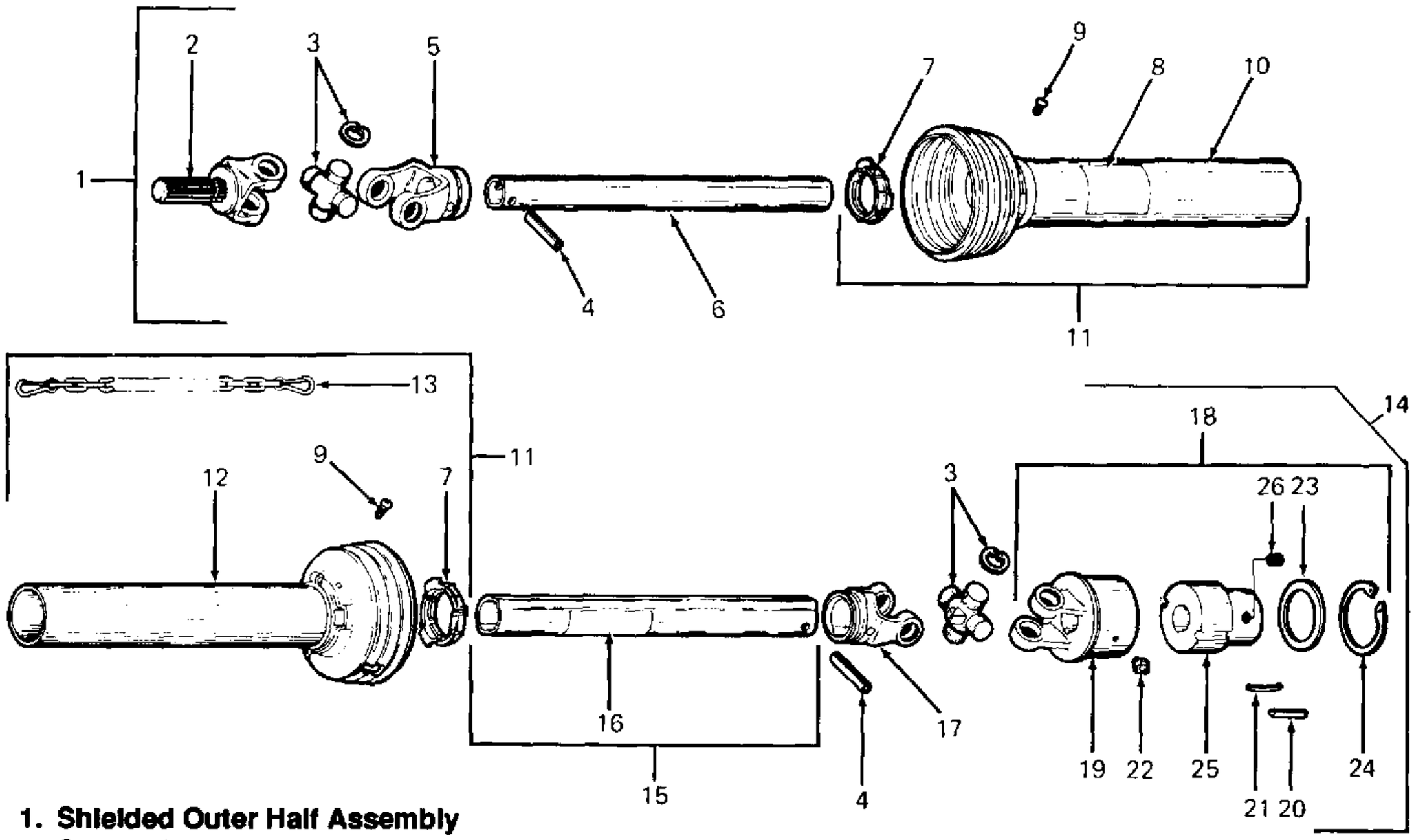
Application of Lock-Tite to set screws (26, Figure 5-118) is necessary before securing drive shaft to gearbox input shaft.

a. Position drive shaft on gearbox input shaft. Apply Lock-Tite on set screws (26) and secure drive shaft with two set screws.

b. Slide shield over lugs and into original position over universal joint. Secure with screw (9).

5-72. 38 INCH MOWER DECK ASSEMBLY (Model 190-357).

5-72.1 **General.** The mower deck assembly contains two different spindle assemblies. Replacement of these assemblies requires use of spindle service kit Part No. 759-3366 for the center spindle assembly and spindle service kit Part No. 759-3294 for each of the two outer spindle assemblies. Each kit also includes a pulley. For basic overhaul of spindle assemblies, order seals and other parts as required.



1. Shielded Outer Half Assembly
2. Spline Yoke
3. Cross Bearing Kit
4. Spring Pin
5. Inboard Yoke
6. Inner Profile
7. Bearing Ring
8. Decal
9. Screw
10. Outer Shield
11. Shield Kit
12. Inner Shield
13. Safety Chain
14. Shielded Inner Half Assembly
15. Outer Profile
16. Decal
17. Inboard Yoke
18. Overrunning Clutch
19. Housing
20. Key
21. Leaf Spring
22. Grease Fitting
23. Supporting Ring
24. Retaining Ring
25. Hub
26. Hex Socket Cup Set Screw

Figure 5-118. Drive Shaft Assembly (Model 190-349).

5-72.1.1 Additional information regarding deck belts and related problems is contained in Appendix I.

5-72.2 **Removal.** Removal of the spindle assemblies from the deck is not necessary in order to repair and/or overhaul the unit. The following text describes such repair and/or overhaul conditions.

NOTE

Figures in this paragraph that are not referenced in text are included for information only.

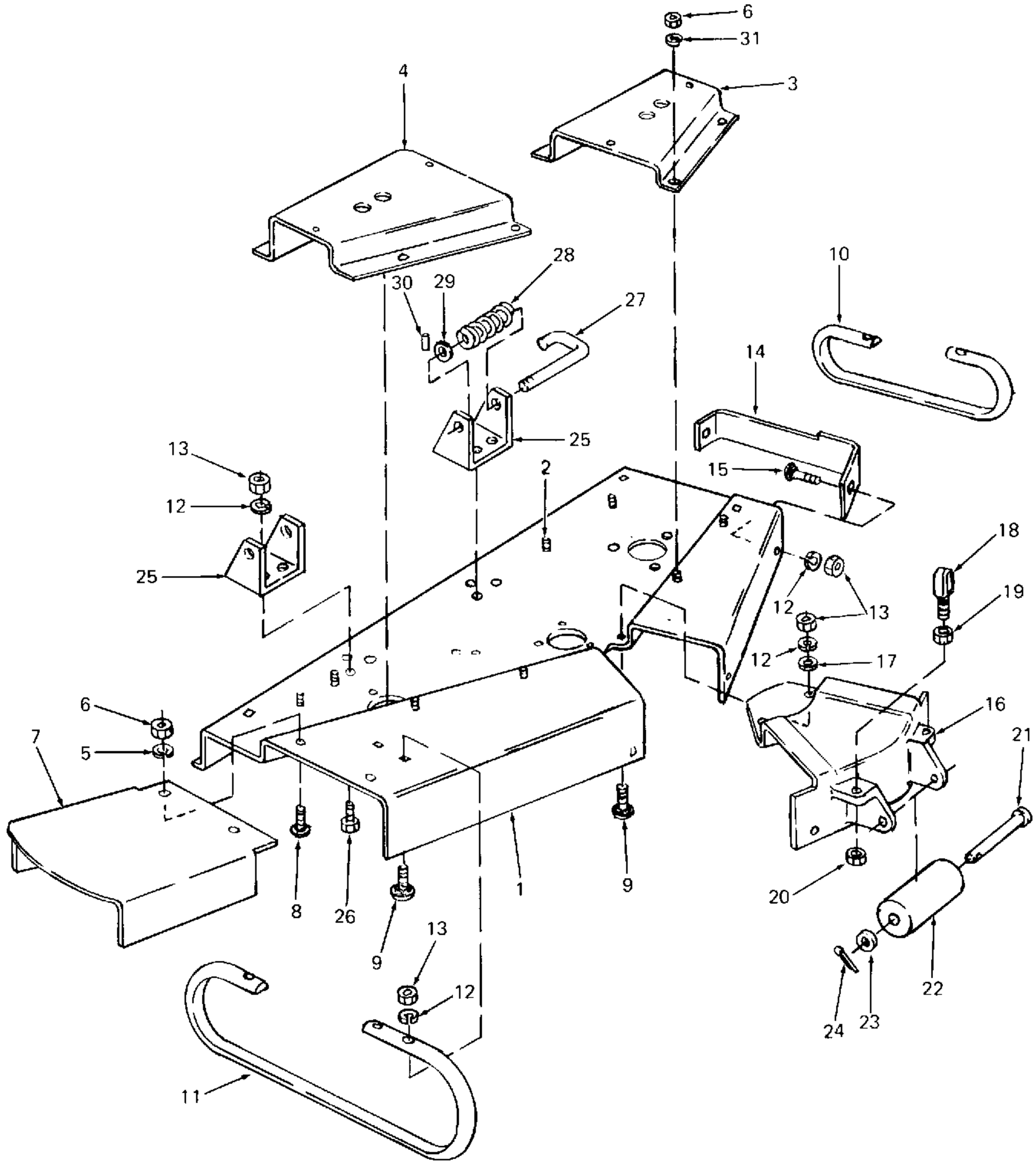
5-72.3 **Disassembly.** Refer to Figure 5-119 and disassemble deck to level necessary to perform spindle repair and/or overhaul. Then, refer to Figure 5-120 and disassemble spindle assemblies (6 and 7) as follows:

CAUTION

Thoroughly clean the outside of the spindle assembly before disassembling.

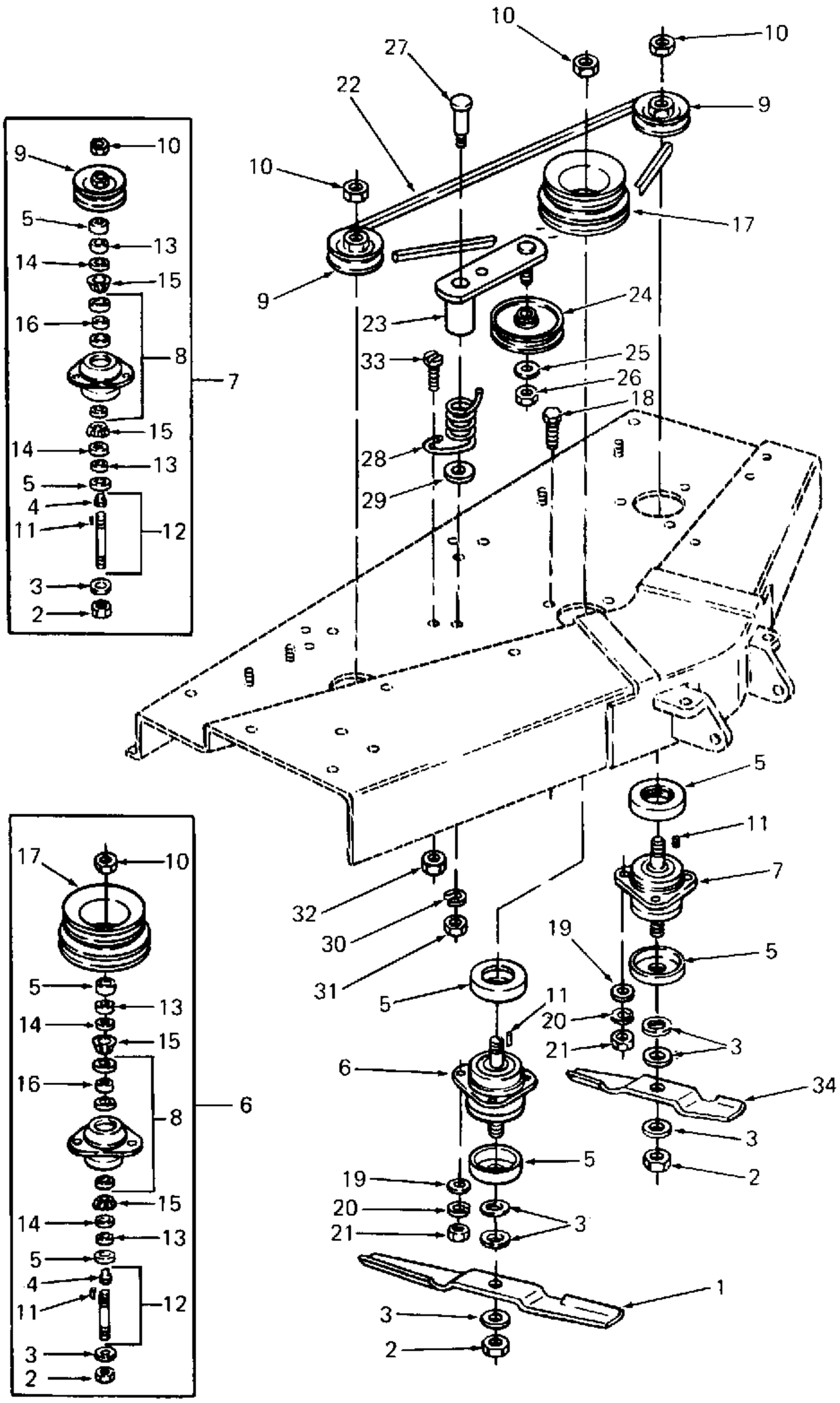
CAUTION

When mower blade or jam nut is removed from blade shaft, blade shaft is free to fall from spindle housing. Blade shaft must be held in place when mower blade or jam nut is removed.



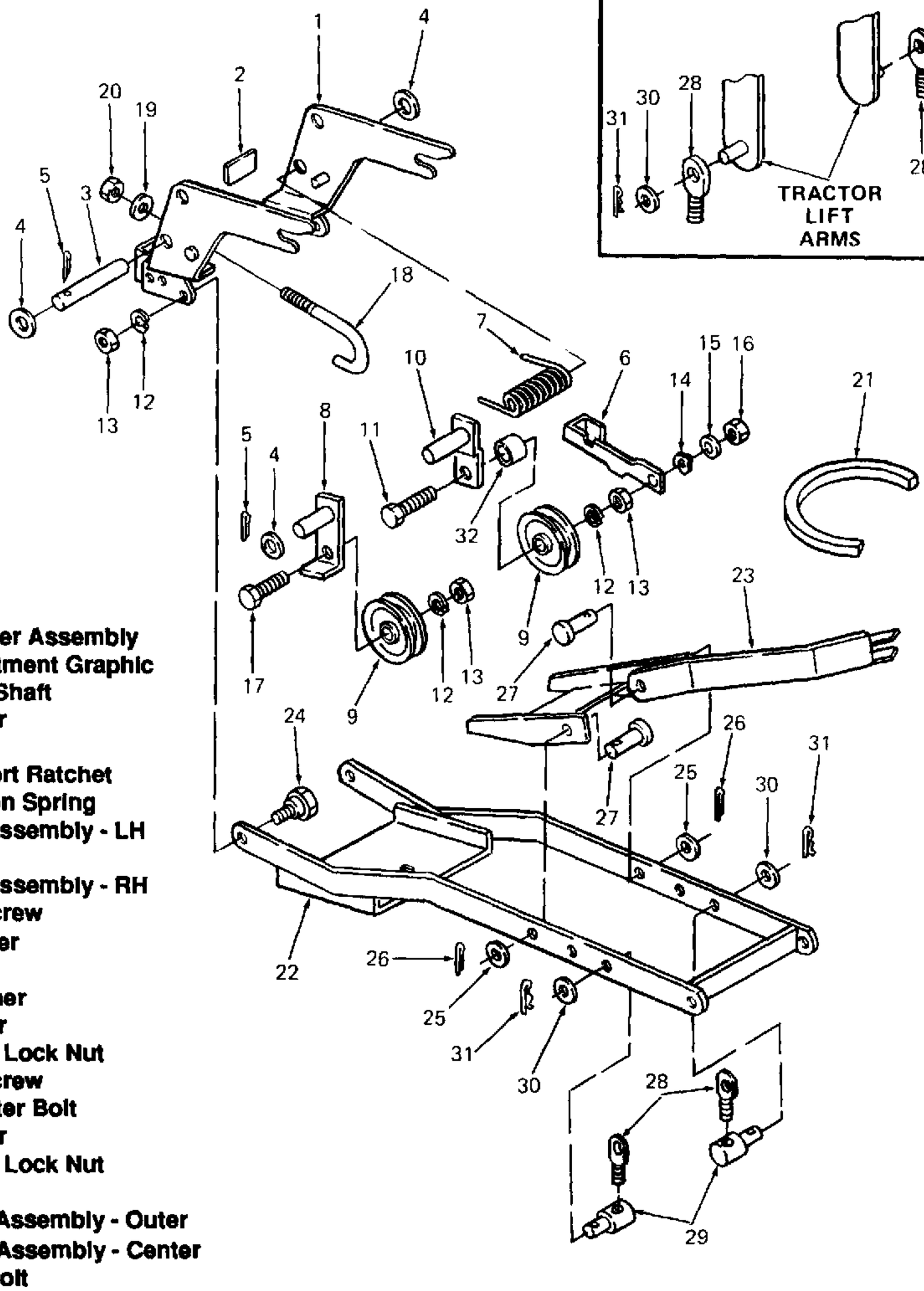
1. 38" Mower Housing Assembly
2. Hex Cutting Screw
3. Belt Cover - LH
4. Belt Cover - RH
5. Lock Washer
6. Hex Nut
7. Mower Deflector
8. Hex Cap Screw
9. Short Neck Carriage Bolt
10. Mower Runner - LH
11. Mower Runner - RH
12. Lock Washer
13. Hex Nut
14. Side Housing
15. Carriage Bolt
16. Center Housing
17. Flat Washer
18. Mower Support Front Hanger
19. Hex Jam Nut
20. Hex Insert Top Lock Nut
21. Clevis Pin
22. Front Roller
23. Flat Washer
24. Cotter Pin
25. Mower Support Bracket
26. Hex Cap Screw
27. Mower Support Pin
28. Compression Spring
29. Flat Washer
30. Spiral Spring Pin
31. Flat Washer

Figure 5-119. Housing and Runners (Model 190-357).



1. Mower Blade
2. Hex Nut
3. Flat Washer
4. Lube Fitting
5. Spindle Cup
6. Spindle Service Kit - Center
7. Spindle Service Kit - Outer
8. Spindle Housing
9. 4L V-Pulley
10. Hex Jam Nut
11. Woodruff Key
12. Blade Shaft
13. Spacer
14. Oil Seal
15. Bearing Cone
16. Bearing Spacer
17. Double Pulley
18. Hex Cap Screw
19. Flat Washer
20. Lock Washer
21. Hex Nut
22. V-Belt 4L
23. Idler Arm Assembly
24. Flat Idler Pulley
25. Flat Washer
26. Hex Center Lock Nut
27. Shoulder Bolt
28. Torsion Spring
29. Flat Washer
30. Lock Washer
31. Hex Nut
32. Hex Insert Top Lock Jam Nut
33. Truss Head Screw
34. Mower Blade

Figure 5-120. Blades and Spindles (Model 190-357).



1. Front Hanger Assembly
2. Idler Adjustment Graphic
3. Idler Pivot Shaft
4. Flat Washer
5. Cotter Pin
6. Idler Support Ratchet
7. Idler Torsion Spring
8. Idler Arm Assembly - LH
9. Idler Pulley
10. Idler Arm Assembly - RH
11. Hex Cap Screw
12. Lock Washer
13. Hex Nut
14. Wave Washer
15. Flat Washer
16. Hex Center Lock Nut
17. Hex Cap Screw
18. Idler Adjuster Bolt
19. Flat Washer
20. Hex Center Lock Nut
21. V-Belt
22. Lift Frame Assembly - Outer
23. Lift Frame Assembly - Center
24. Shoulder Bolt
25. Flat Washer
26. Cotter Pin
27. Clevis Pin
28. Adjustable Link
29. Adjustment Ferrule
30. Flat Washer
31. Internal Cotter Pin
32. Spacer

Figure 5-121. Hanging Frame and Mule Drive (Model 190-357).

NOTE

To prevent blade shaft from turning during disassembly, place a 1-1/8 inch open-end wrench on hex part of pulley hub.

1. Remove drive pulleys (9 and 17) by removing hex jam nuts (10).
2. Remove each cutting blade (1 and 34) by removing hex nut (2) and flat washers (3).
3. Remove blade shaft (12) from spindle assembly.
4. Remove spindle cups (5), spacers (13) and oil seals (14) from top and bottom of spindle assembly. Discard oil seals (14).
5. Remove both bearing cones (15) using care not to lose bearing spacer (16).

NOTE

Do not attempt to remove bearing cups from spindle housing.

5-72.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect each shaft (12) as follows:
   a. Inspect threads for damage and check for cracks or distortion to shaft.
   b. Examine key (11) and keyway for damage.
   c. Apply 251H EP grease through lube fitting (4) to check if lube holes are open and to flush lube channels.
2. Inspect bearing spacers (16) for wear.
3. Inspect spacers (13) for wear especially in area where oil seal (14) contacts.
4. Inspect bearing cones (15) for cracks in roller bearings, excessive wear or check marks in roller bearings or damaged or excessively bent roller bearing cages.
5. Inspect spindle housing (8). If any of the following problems exist, replace spindle housing:
   a. Bearing cups fit loosely in housing.
   b. Damaged bearing cups.
   c. Cracked or damaged housing.
6. Inspect pulleys (9 and 17) for damage to keyway or excessive wear or damage to belt groove.

5-72.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Replace badly damaged parts with new parts from service kit.
4. Pack bearing cones (15) with 251H EP grease using a bearing packer. If bearing packer is not available, refer to Figure 5-111 and pack by hand as follows:

WARNING

Wear gloves to protect your skin when performing the following steps 4.a through 4.c.

   a. Place approximately one tablespoon of 251H EP grease in palm of one hand.
   b. In free hand, place bearing between thumb and forefinger and scrape bearing along edge of grease. Continue until grease comes out of top of bearing between bearing race and roller cage and bearing is completely filled.

NOTE

This action will cause grease to go into bearing assembly and lodge between bearing and bearing race.

   c. Completely cover outside of bearing with grease.

5-72.6 **Reassembly.** Install each spindle assembly as follows:

1. Install bearing spacer (16, Figure 5-120) and bearing cones (15).

CAUTION

When installing oil seals (14) in following step 2, lip of top seal must face up; lip of bottom seal must face up. Seals must be installed flush with spindle housing.

NOTE

If seals are not installed as described you could experience a hydraulic lock in the spindle assembly.

2. Install oil seals (14), spacers (13) and spindle cups (5).
3. Install spindle (6) in assembly and place key (11) in keyway.
4. Install drive pulleys (9 and 17) and secure with hex jam nuts (10). Torque nuts (10) to 50 to 60 ft-lbs.
5. Install each blade (1 or 34) as follows: Install two flat washers (3), blade (1 or 34), flat washers (3) and hex nuts (2). Torque nuts (2) to 90 to 100 ft-lbs.
6. Lubricate spindle with 251H EP grease.
7. Complete remaining reassembly using Figure 5-119 as a guide.

5-73. 44 INCH MOWER DECK ASSEMBLY (Model 190-358).

5-73.1 **General.** The mower deck assembly contains two different spindle assemblies. Replacement of these assemblies requires use of spindle service kit Part No. 759-3367 for the center spindle assembly and spindle service kit Part No. 759-3293 for each of the two outer spindle assemblies. Each kit also includes a pulley. For basic overhaul of spindle assemblies, order seals and other parts as required.

5-73.1.1 Additional information regarding deck belts and related problems is contained in Appendix I.

5-73.2 **Removal.** Removal of the spindle assemblies from the deck is not necessary in order to repair and/or overhaul the unit. The following text describes such repair and/or overhaul conditions.

NOTE

Figures in this paragraph that are not referenced in text are included for information only.

5-73.3 **Disassembly.** Refer to Figure 5-122 and disassemble deck to level necessary to perform spindle repair and/or overhaul. Then, refer to Figure 5-123 and disassemble spindle assemblies (6 and 7) as follows:

CAUTION

Thoroughly clean the outside of the spindle assembly before disassembling.

CAUTION

When mower blade or jam nut is removed from blade shaft, blade shaft is free to fall from spindle housing. Blade shaft must be held in place when mower blade or jam nut is removed.

NOTE

To prevent blade shaft from turning during disassembly, place a 1-1/8 inch open-end wrench on hex part of pulley hub.

1. Remove drive pulleys (9 and 17) by removing hex jam nuts (10).
2. Remove each cutting blade (1) by removing hex nut (2), flat washer (3), blade (1) and flat washer (3).
3. Remove shaft (12) from spindle assembly.
4. Remove spindle cups (5), spacers (13) and oil seals (14) from top and bottom of spindle assembly. Discard oil seals (14).
5. Remove both bearing cones (15) using care not to lose bearing spacer (16).

NOTE

Do not attempt to remove bearing cups from spindle housing.

5-73.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect each shaft (12) as follows:
   a. Inspect threads for damage and check for cracks or distortion to shaft.
   b. Examine key (11) and keyway for damage.
   c. Apply 251H EP grease through lube fitting (4) to check if lube holes are open and to flush lube channels.
2. Inspect bearing spacers (16) for wear.
3. Inspect spacers (13) for wear especially in area where oil seal (14) contacts.
4. Inspect bearing cones (15) for cracks in roller bearings, excessive wear or check marks in roller bearings or damaged or excessively bent roller bearing cages.

1. 44" Mower Housing Assembly
2. Spindle Mounting Plate
3. Mower Belt Cover
4. Flat Washer
5. Hex Nut
6. Plastic Wheel
7. Shoulder Screw
8. Lock Washer
9. Hex Nut
10. Shield Deflector
11. Hex Cap Screw
12. Lock Washer
13. Hex Nut
14. 5" Deck Wheel
15. Shoulder Bolt
16. Flat Washer
17. Hex Cutting Screw
18. Front Roller
19. Clevis Pin
20. Cotter Pin
21. Front Mower Support Hanger
22. Hex Jam Nut
23. Hex Insert Top Lock Nut
24. Mower Support Bracket
25. Short Neck Carriage Bolt
26. Hex Nut
27. Mower Support Pin
28. Compression Spring
29. Flat Washer
30. Spiral Spring Pin

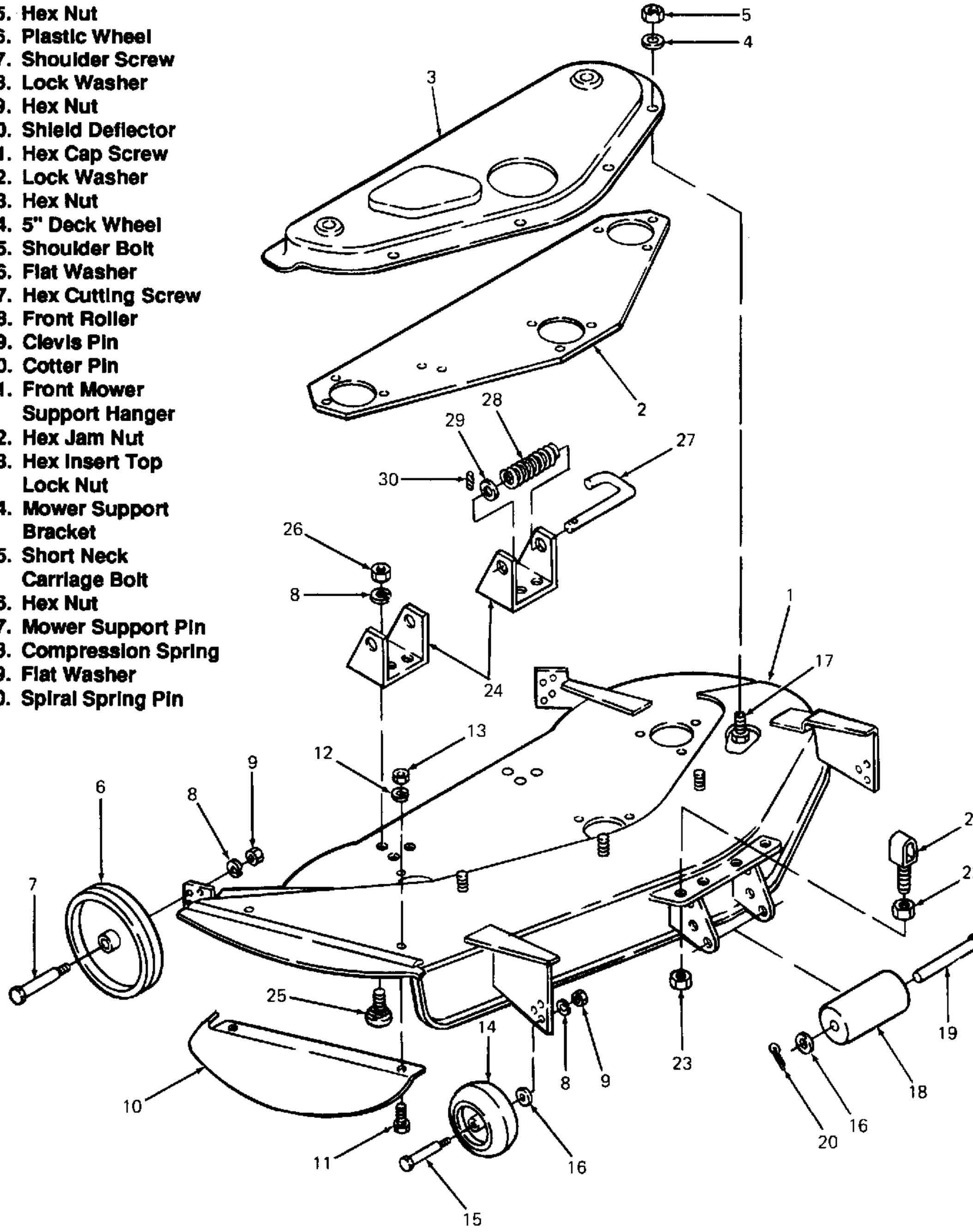
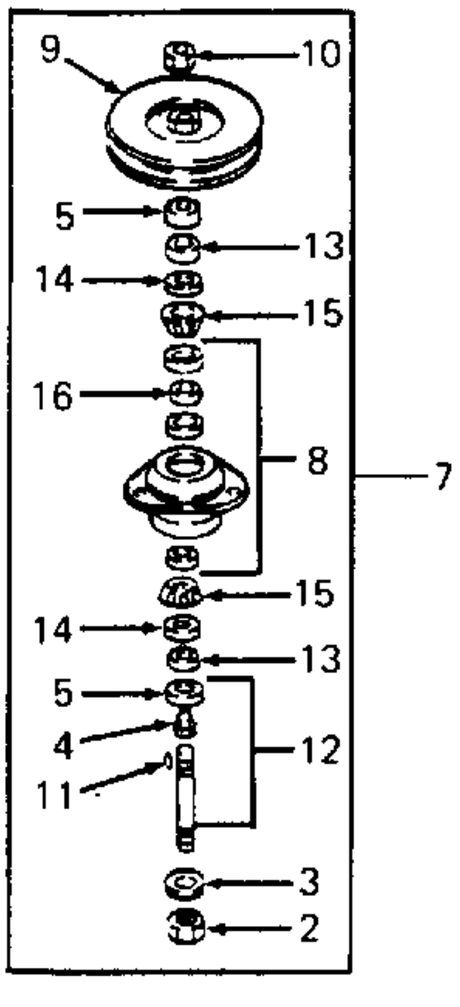
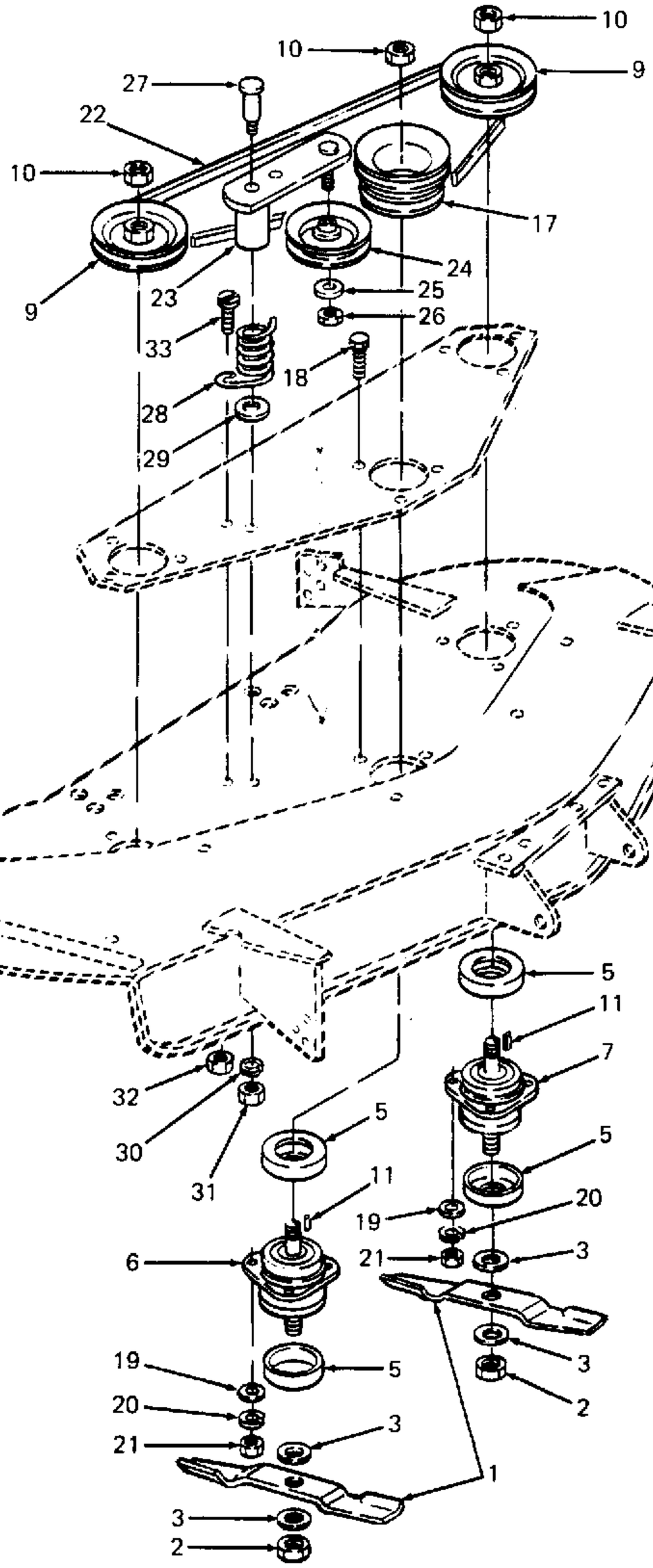
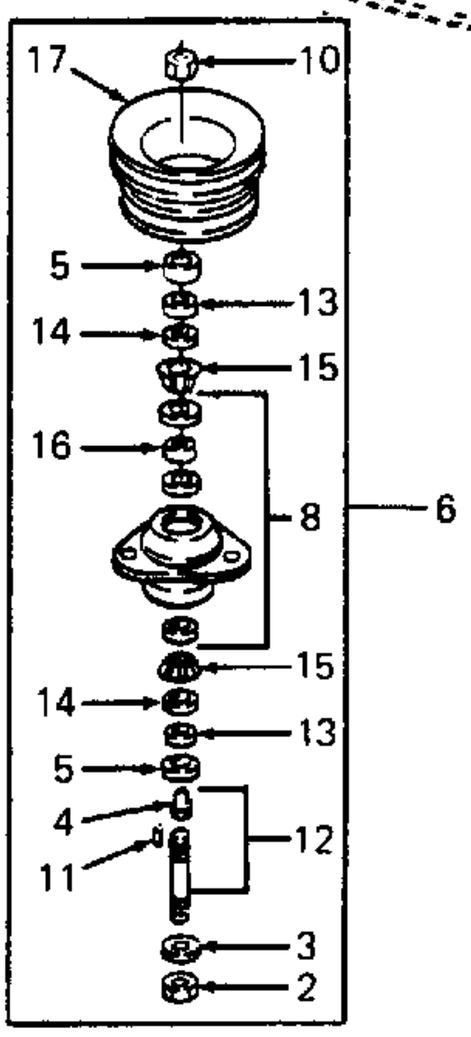


Figure 5-122. Wheels and Mounting Brackets (Model 190-358).

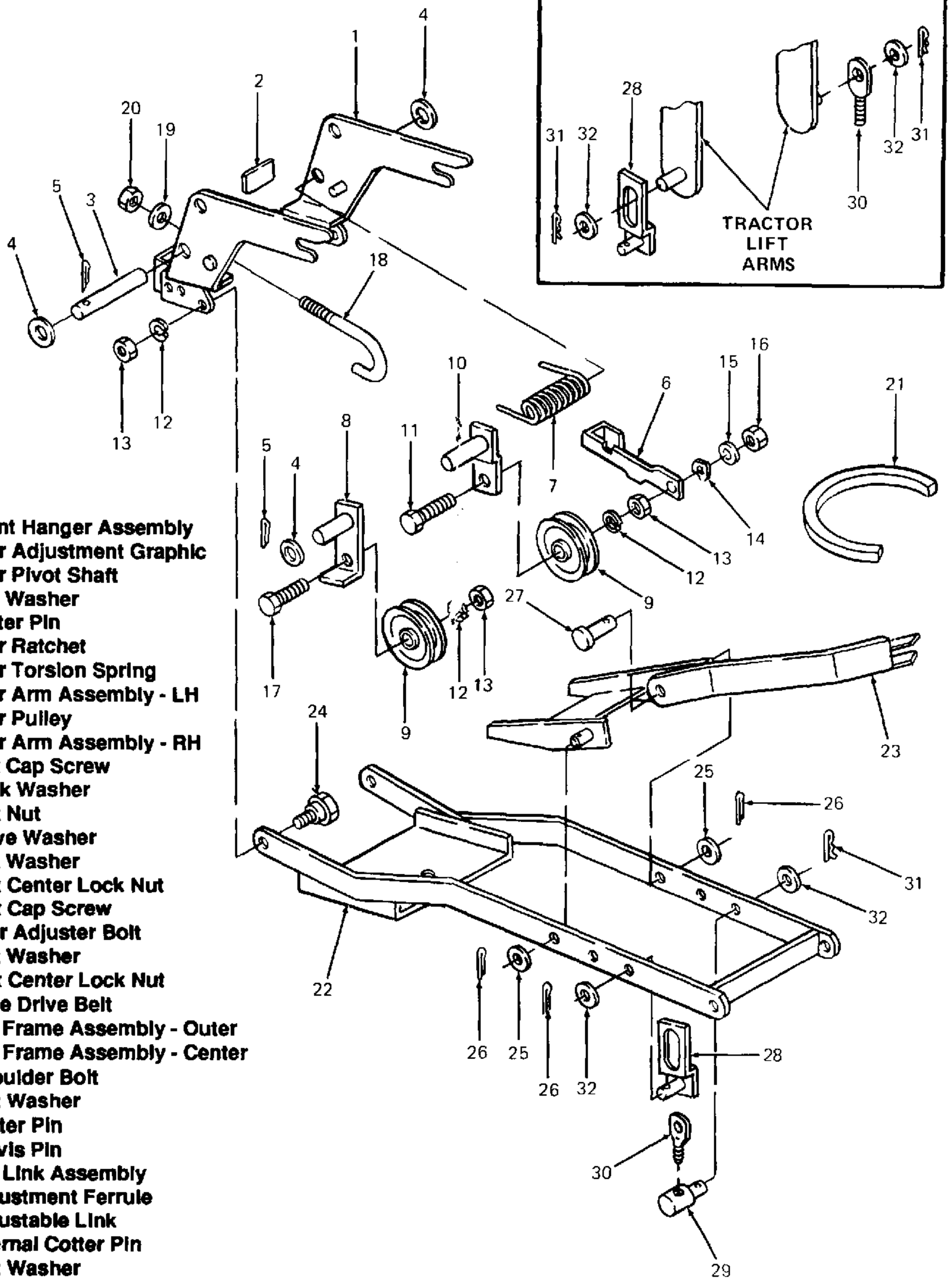






1. Mower Blade
2. Hex Nut
3. Flat Washer
4. Lube Fitting
5. Spindle Cup
6. Spindle Service Kit - Center
7. Spindle Service Kit - Outside
8. Spindle Housing
9. 4L V-Pulley
10. Hex Jam Nut
11. Woodruff Key
12. Blade Shaft
13. Spacer
14. Oil Seal
15. Bearing Cone
16. Bearing Spacer
17. Double Pulley
18. Hex Cap Screw
19. Flat Washer
20. Lock Washer
21. Hex Nut
22. Spindle Drive Belt
23. Idler Arm Assembly
24. Flat Idler Pulley
25. Flat Washer
26. Hex Center Lock Nut
27. Shoulder Bolt
28. Torsion Spring
29. Flat Washer
30. Lock Washer
31. Hex Nut
32. Hex Insert Top Lock Jam Nut
33. Truss Head Screw

Figure 5-123. Blades and Spindles (Model 190-358).



1. Front Hanger Assembly
2. Idler Adjustment Graphic
3. Idler Pivot Shaft
4. Flat Washer
5. Cotter Pin
6. Idler Ratchet
7. Idler Torsion Spring
8. Idler Arm Assembly - LH
9. Idler Pulley
10. Idler Arm Assembly - RH
11. Hex Cap Screw
12. Lock Washer
13. Hex Nut
14. Wave Washer
15. Flat Washer
16. Hex Center Lock Nut
17. Hex Cap Screw
18. Idler Adjuster Bolt
19. Flat Washer
20. Hex Center Lock Nut
21. Mule Drive Belt
22. Lift Frame Assembly - Outer
23. Lift Frame Assembly - Center
24. Shoulder Bolt
25. Flat Washer
26. Cotter Pin
27. Clevis Pin
28. Lift Link Assembly
29. Adjustment Ferrule
30. Adjustable Link
31. Internal Cotter Pin
32. Flat Washer

Figure 5-124. Hanging Frame and Mule Drive (Model 190-358).

5. Inspect spindle housing (8). If any of the following problems exist, replace spindle housing:

   a. Bearing cups fit loosely in housing.

   b. Damaged bearing cups.

   c. Cracked or damaged housing.

6. Inspect pulleys (9 and 17) for damage to keyway or excessive wear or damage to belt groove.

5-73.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Replace badly damaged parts with new parts from service kit.
4. Pack bearing cones (15) with 251H EP grease using a bearing packer. If bearing packer is not available, refer to Figure 5-111 and pack by hand as follows:

WARNING

Wear gloves to protect your skin when performing the following steps 4.a through 4.c.

   a. Place approximately one tablespoon of 251H EP grease in palm of one hand.

   b. In free hand, place bearing between thumb and forefinger and scrape bearing along edge of grease. Continue until grease comes out of top of bearing between bearing race and roller cage and bearing is completely filled.

NOTE

This action will cause grease to go into bearing assembly and lodge between bearing and bearing race.

   c. Completely cover outside of bearing with grease.

5-73.6 **Reassembly.** Install each spindle assembly as follows:

1. Install bearing spacer (16, Figure 5-123) and bearing cones (15).

CAUTION

When installing oil seals (14) in following step 2, lip of top seal must face down; lip of bottom seal must face up. Seals must be installed flush with spindle housing.

NOTE

If seals are not installed as described you could experience a hydraulic lock in the spindle assembly.

2. Install oil seals (14), spacers (13) and spindle cups (5).
3. Install spindle (6) in assembly and place key (11) in keyway.
4. Install drive pulleys (9 and 17) and secure with hex jam nuts (10). Torque nuts (10) to 50 to 60 ft-lbs.
5. Install each blade (1) as follows: Install flat washers (3), blade (1), flat washer (3) and hex nut (2). Torque nut (2) to 90 to 100 ft-lbs.
6. Lubricate spindle assemblies with 251H EP grease.
7. Complete remaining reassembly using Figure 5-122 as a guide.

5-74. 50 INCH MOWER DECK ASSEMBLY (Model 190-359).

5-74.1 **General.** The mower deck assembly contains two different spindle assemblies. Replacement of these assemblies requires use of spindle service kit Part No. 759-3367 for the center spindle assembly and spindle service kit Part No. 759-3293 for each of the two outer spindle assemblies. Each kit also includes a pulley. For basic overhaul of spindle assemblies, order seals and other parts as required.

5-74.1.1 Additional information regarding deck belts and related problems is contained in Appendix I.

5-74.2 **Removal.** Removal of the spindle assemblies from the deck is not necessary in order to repair and/or overhaul the unit. The following text describes such repair and/or overhaul conditions.

NOTE

Figures in this paragraph that are not referenced in text are included for information only.

5-74.3 **Disassembly.** Refer to Figure 5-125 and disassemble deck to level necessary to perform spindle repair and/or overhaul. Then, refer to Figure

5-126 and disassemble spindle assemblies (6 and 7) as follows:

CAUTION

Thoroughly clean the outside of the spindle assembly before disassembling.

CAUTION

When mower blade or jam nut is removed from blade shaft, blade shaft is free to fall from spindle housing. Blade shaft must be held in place when mower blade or jam nut is removed.

NOTE

To prevent blade shaft from turning during disassembly, place a 1-1/8 inch open-end wrench on hex part of pulley hub.

1. Remove drive pulleys (9 and 17) by removing hex jam nuts (10).
2. Remove each cutting blade (1) by removing hex nut (2), flat washer (3), blade (1) and flat washer (3).
3. Remove shaft (12) from spindle assembly.
4. Remove spindle cups (5), spacers (13) and oil seals (14) from top and bottom of spindle assembly. Discard oil seals (14).
5. Remove both bearing cones (15) using care not to lose bearing spacer (16).

NOTE

Do not attempt to remove bearing cups from spindle housing.

5-74.4 **Inspection.** Clean all parts prior to inspection.

1. Inspect each shaft (12) as follows:
   a. Inspect threads for damage and check for cracks or distortion to shaft.
   b. Examine key (11) and keyway for damage.
   c. Apply 251H EP grease through lube fitting (4) to check if lube holes are open and to flush lube channels.
2. Inspect bearing spacers (16) for wear.
3. Inspect spacers (13) for wear especially in area where oil seal (14) contacts.
4. Inspect bearing cones (15) for cracks in roller bearings, excessive wear or check marks in roller bearings or damaged or excessively bent roller bearing cages.
5. Inspect spindle housing (8). If any of the following problems exist, replace spindle housing:
   a. Bearing cups fit loosely in housing.
   b. Damaged or checked bearing cups.
   c. Cracked or damaged housing.
6. Inspect pulleys (9 and 17) for damage to keyway or excessive wear or damage to belt groove.

5-74.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Replace badly damaged parts with new parts from service kit.
4. Pack bearing cones (15) with 251H EP grease using a bearing packer. If bearing packer is not available, refer to Figure 5-111 and pack by hand as follows:

WARNING

Wear gloves to protect your skin when performing the following steps 4.a through 4.c.

   a. Place approximately one tablespoon of 251H EP grease in palm of one hand.
   b. In free hand, place bearing between thumb and forefinger and scrape bearing along edge of grease. Continue until grease comes out of top of bearing between bearing race and roller cage and bearing is completely filled.

NOTE

This action will cause grease to go into bearing assembly and lodge between bearing and bearing race.

1. 50" Mower Housing Assembly
2. Spindle Mounting Plate
3. Mower Belt Cover
4. Flat Washer
5. Hex Nut
6. Plastic Wheel
7. Shoulder Screw
8. Lock Washer
9. Hex Nut
10. Shield Deflector
11. Hex Cap Screw
12. Lock Washer
13. Hex Nut
14. 5" Deck Wheel
15. Shoulder Bolt
16. Flat Washer
17. Hex Cutting Screw
18. Front Roller
19. Clevis Pin
20. Cotter Pin
21. Front Mower Support Hanger
22. Hex Jam Nut
23. Hex Insert Top Lock Nut
24. Mower Support Bracket
25. Short Neck Carriage Bolt
26. Hex Nut
27. Mower Support Pin
28. Compression Spring
29. Flat Washer
30. Spiral Spring Pin

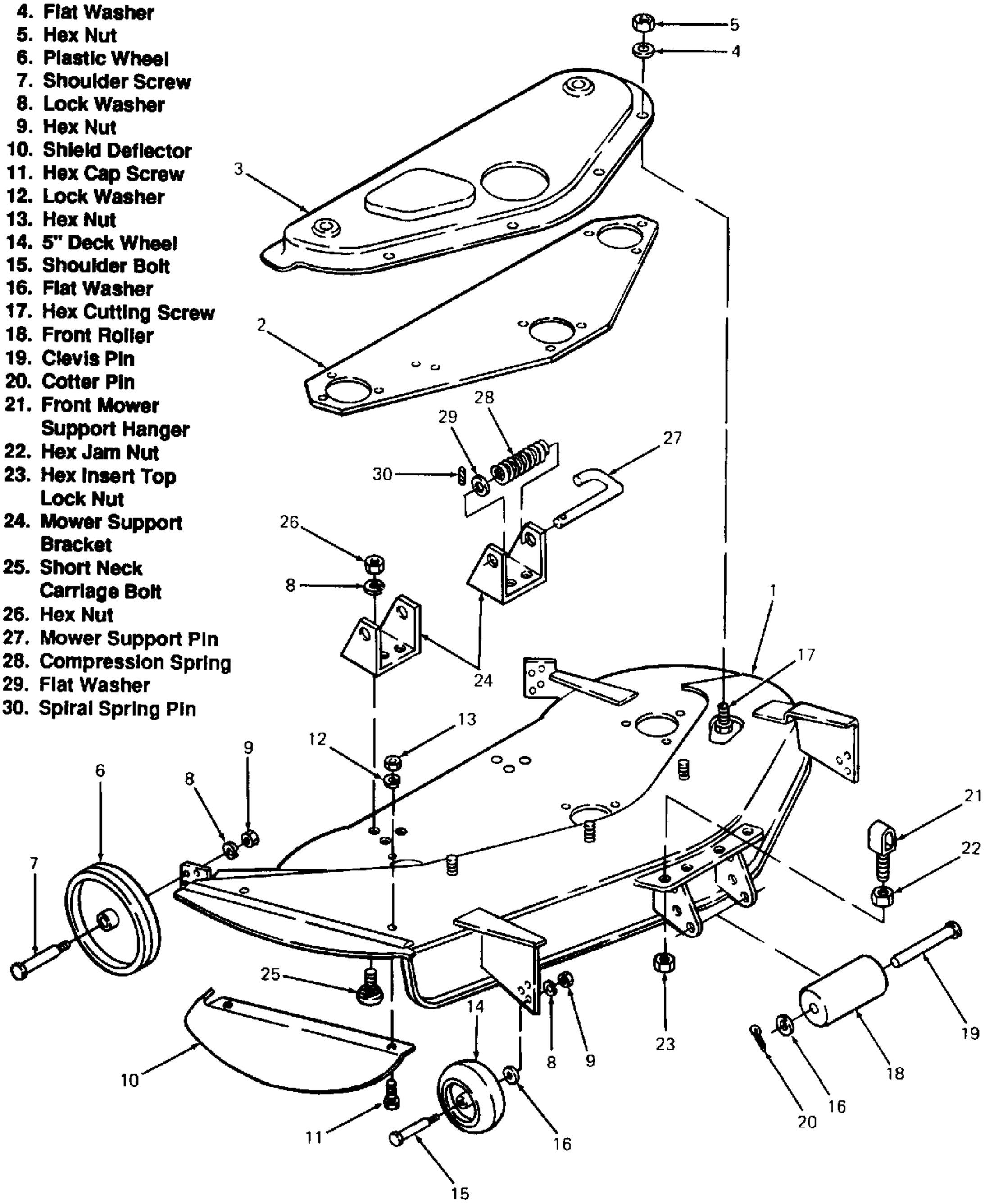
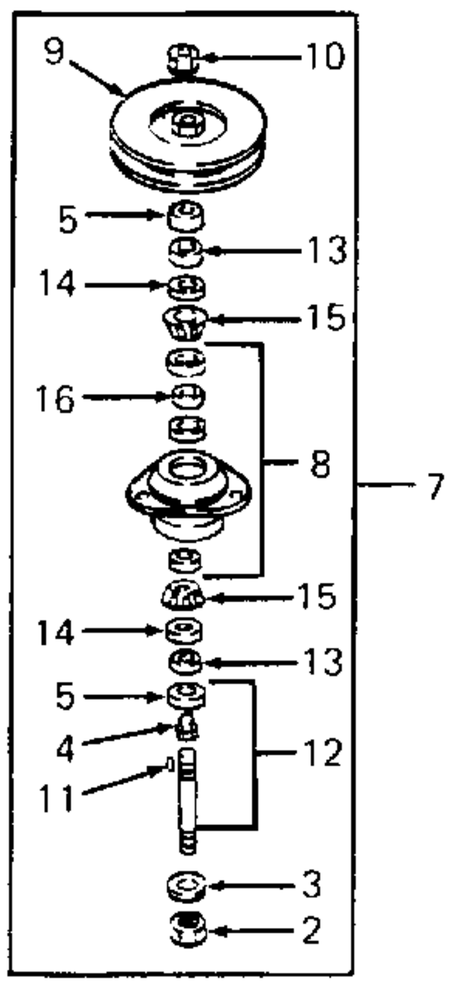
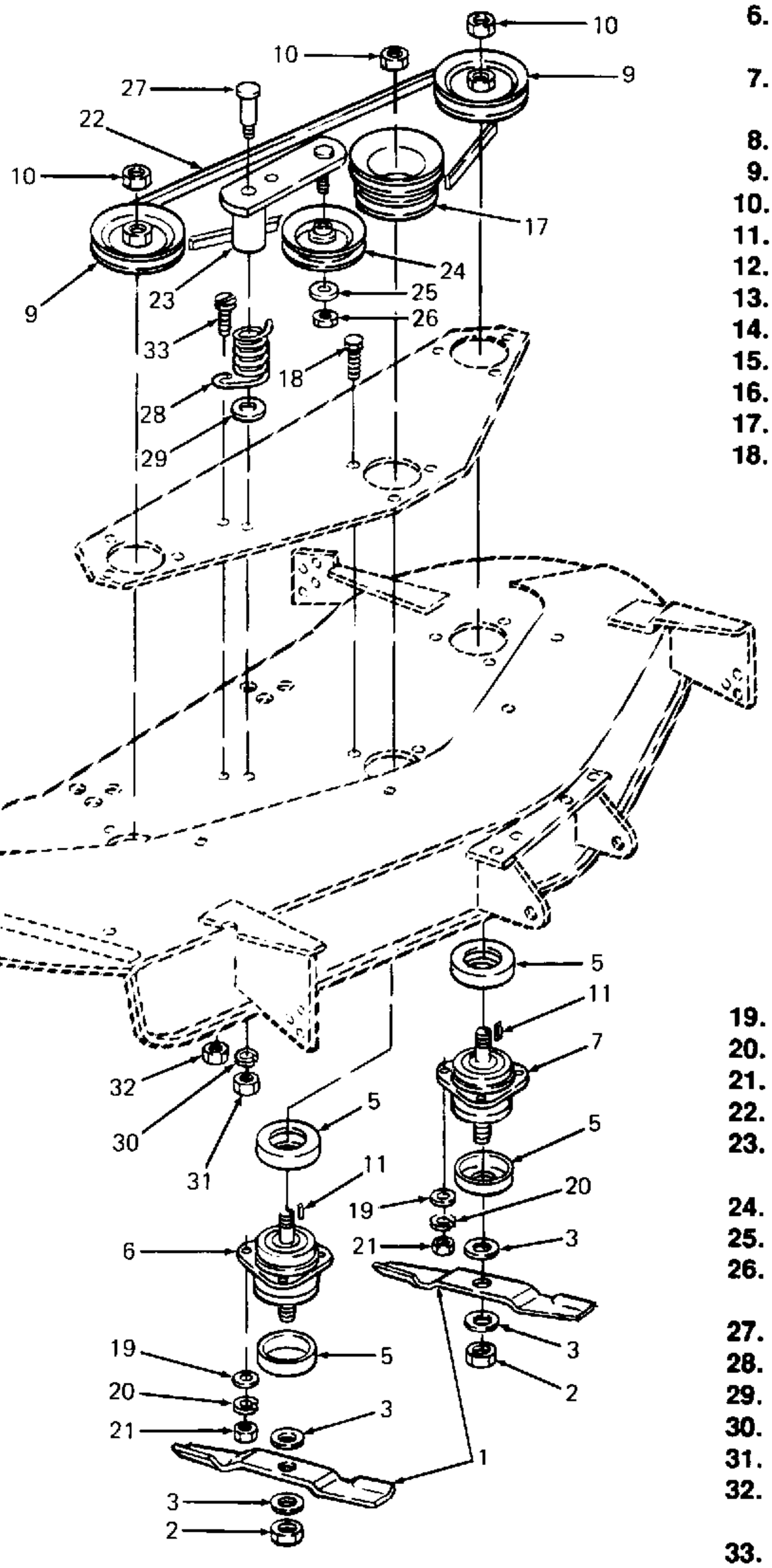
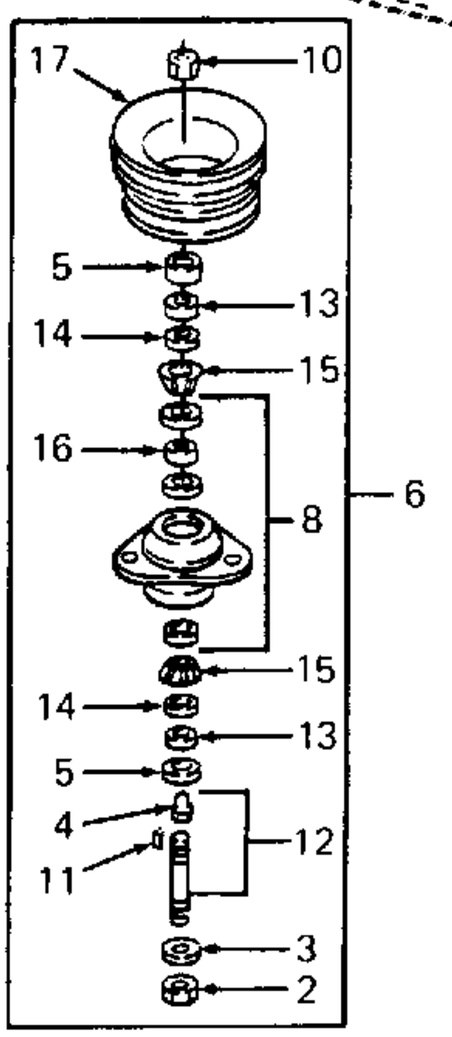


Figure 5-125. Wheels and Mounting Brackets (Model 190-359).

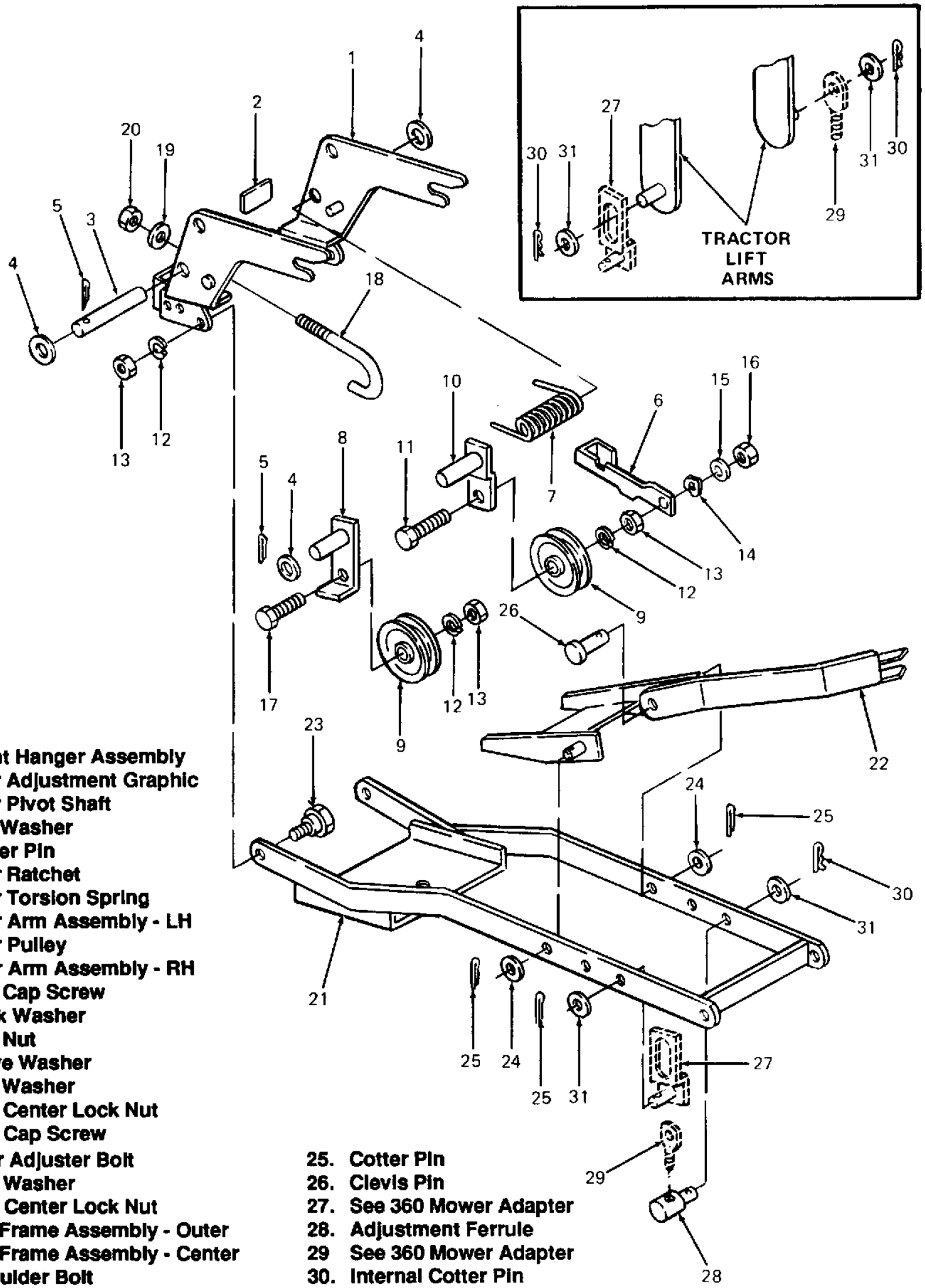






1. Mower Blade
2. Hex Nut
3. Flat Washer
4. Lube Fitting
5. Spindle Cup
6. Spindle Service Kit - Center
7. Spindle Service Kit - Outside
8. Spindle Housing
9. 4L V-Pulley
10. Hex Jam Nut
11. Woodruff Key
12. Blade Shaft
13. Spacer
14. Oil Seal
15. Bearing Cone
16. Bearing Spacer
17. Double Pulley
18. Hex Cap Screw
19. Flat Washer
20. Lock Washer
21. Hex Nut
22. Spindle Drive Belt
23. Idler Arm Assembly
24. Flat Idler Pulley
25. Flat Washer
26. Hex Center Lock Nut
27. Shoulder Bolt
28. Torsion Spring
29. Flat Washer
30. Lock Washer
31. Hex Nut
32. Hex Insert Top Lock Jam Nut
33. Truss Head Screw

Figure 5-126. Blades and Spindles (Model 190-359).



1. Front Hanger Assembly
2. Idler Adjustment Graphic
3. Idler Pivot Shaft
4. Flat Washer
5. Cotter Pin
6. Idler Ratchet
7. Idler Torsion Spring
8. Idler Arm Assembly - LH
9. Idler Pulley
10. Idler Arm Assembly - RH
11. Hex Cap Screw
12. Lock Washer
13. Hex Nut
14. Wave Washer
15. Flat Washer
16. Hex Center Lock Nut
17. Hex Cap Screw
18. Idler Adjuster Bolt
19. Flat Washer
20. Hex Center Lock Nut
21. Lift Frame Assembly - Outer
22. Lift Frame Assembly - Center
23. Shoulder Bolt
24. Flat Washer
25. Cotter Pin
26. Clevis Pin
27. See 360 Mower Adapter
28. Adjustment Ferrule
29 See 360 Mower Adapter
30. Internal Cotter Pin
31. Flat Washer

Figure 5-127. Hanging Frame and Mule Drive (Model 190-359).

c. Completely cover outside of bearing with grease.

5-74.6 **Reassembly.** Install each spindle assembly as follows:

1. Install bearing spacer (16, Figure 5-126) and bearing cones (15).

CAUTION

When installing oil seals (14) in following step 2, lip of top seal must face up; lip of bottom seal must face up. Seals must be installed flush with spindle housing.

NOTE

If seals are not installed as described you could experience a hydraulic lock in the spindle assembly.

2. Install oil seals (14), spacers (13) and spindle cups (5).
3. Install spindle (6) in assembly and place key (11) in keyway.
4. Install drive pulleys (9 and 17) and secure with hex jam nuts (10). Torque nuts (10) to 50 to 60 ft-lbs.
5. Install each blade (1) as follows: Install flat washers (3), blade (1), flat washer (3) and hex nut (2). Torque nut (2) to 90 to 100 ft-lbs.
6. Lubricate spindle assemblies with 251H EP grease.
7. Complete remaining reassembly using Figure 5-125 as a guide.

5-75. 60 INCH MOWER DECK ASSEMBLY (Model 190-374).

5-75.1 **General.** Information regarding deck belts and related problems is contained in Appendix I

NOTE

Figures in this paragraph that are not referenced in text are included for information only.

5-75.2 **Removal.** Removal of the spindle assemblies from the deck is not necessary in order to repair and/or overhaul the unit. The following text describes such repair and/or overhaul conditions.

5-75.3 **Disassembly.** Refer to Figure 5-128 and disassemble deck to level necessary to perform spindle repair and/or overhaul. Then, refer to Figure 5-130 and disassemble spindle assemblies as follows:

CAUTION

Thoroughly clean the outside of the spindle assembly before disassembling.

1. Remove each cutting blade (30) by removing hex cap screw (33), spring washer (32), mower blade washer (31), blade retainer (34) and blade.
2. Remove each drive pulley (8 and 17) as follows: Remove bolt assembly (12) with grease fitting (13), lock washer (11), washer (10) and pulley.
3. Remove spindle shaft (5) from spindle assembly.
4. Remove bearing cups (6), washers (7), bearings (1), internal snap rings (2) and bearing spacers (3) from top and bottom of spindle assembly.

5-75.4 **Inspection.** Clean all parts prior to inspection.

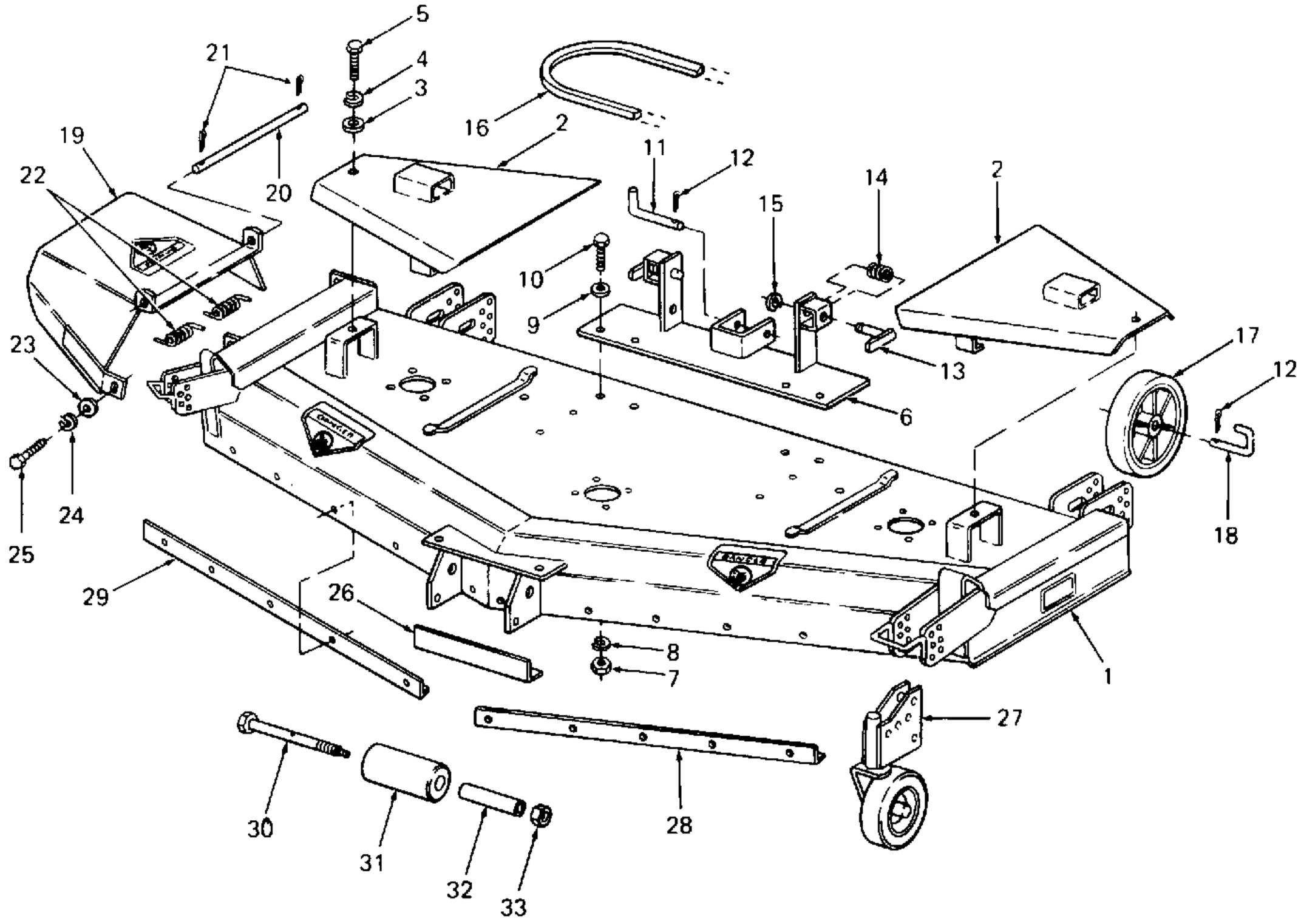
1. Inspect each shaft (5) as follows:
   a. Inspect threads for damage and check for cracks or distortion to shaft.
   b. Examine key (9) and keyway for damage.
   c. Install bolt assembly (12) with grease fitting (13) on shaft. Apply 251H EP grease through fitting (13) to check if lube holes are open and to flush lube channels. Remove bolt assembly with grease fitting from shaft.
2. Inspect bearing spacers (3) for wear.
3. Inspect bearing (1) for cracks in roller bearings, excessive wear or check marks in roller bearings or damaged or excessively bent roller bearing cages.
4. Inspect spindle housing (4) for cracked or damaged housing. Replace housing if cracked or damaged.
5. Inspect pulleys (8 and 17) for damage to keyway or excessive wear or damage to belt groove.

5-75.5 **Repair.**

1. Deburr and dress damaged threads.
2. Repair minor surface damage or corrosion with fine honing stone or emery cloth.
3. Replace badly damaged parts.

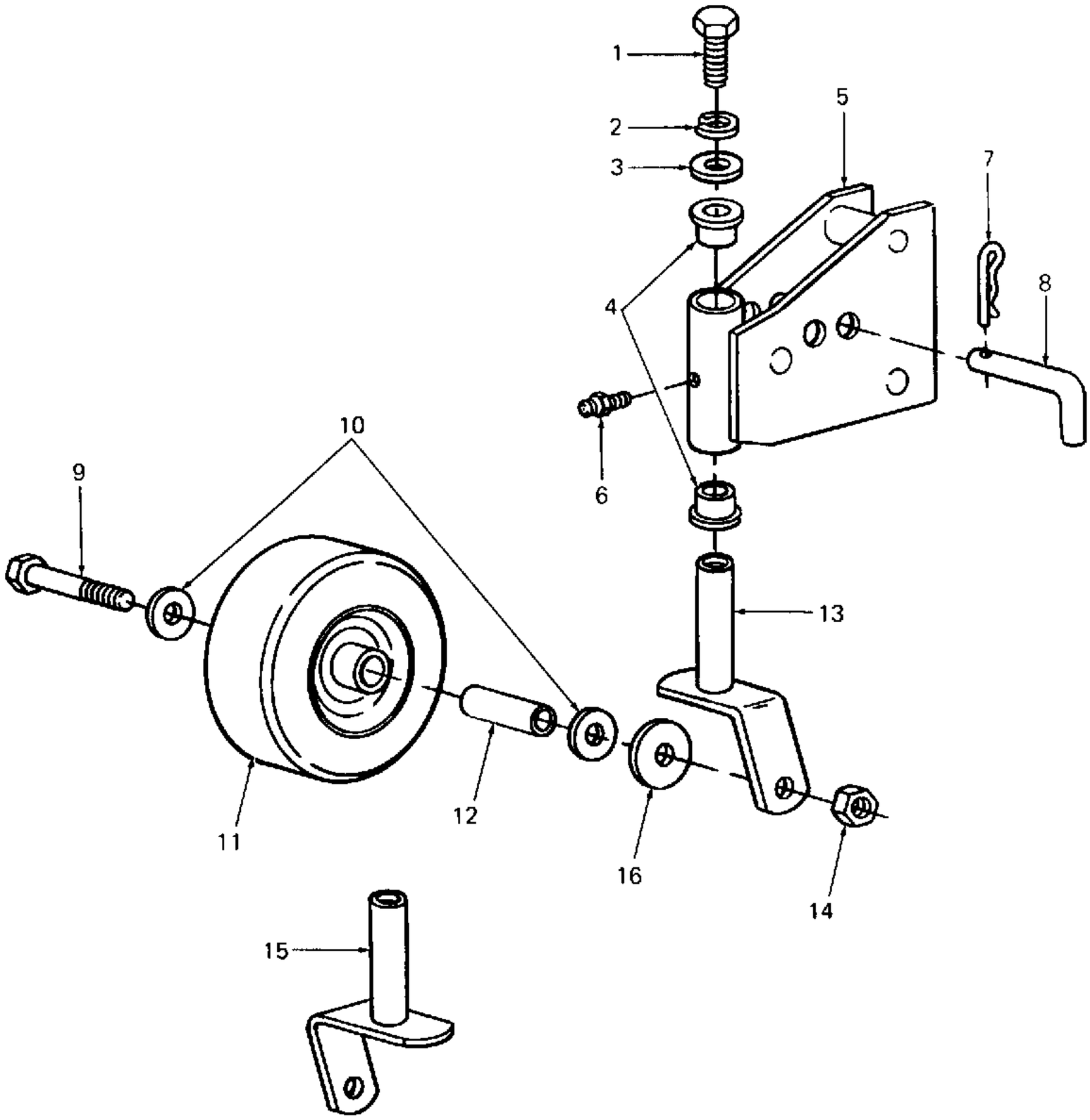
5-75.6 **Reassembly.** Install each spindle assembly as follows:

1. Install bearing spacer (3), internal snap rings (2), bearings (1), washers (7) and bearing cups (6).
2. Install spindle shaft (5) in spindle assembly.
3. Install each drive pulley (8 and 17) as follows: Install pulley, washer (10), lock washer (11) and bolt assembly (12) with grease fitting (13).
4. Install blade (30), blade retainer (34), mower blade washer (31), spring washer (32) and hex cap screw (33).
5. Lubricate spindle assemblies with 251H EP grease.
6. Complete remaining reassembly using Figure 5-128 as a guide.



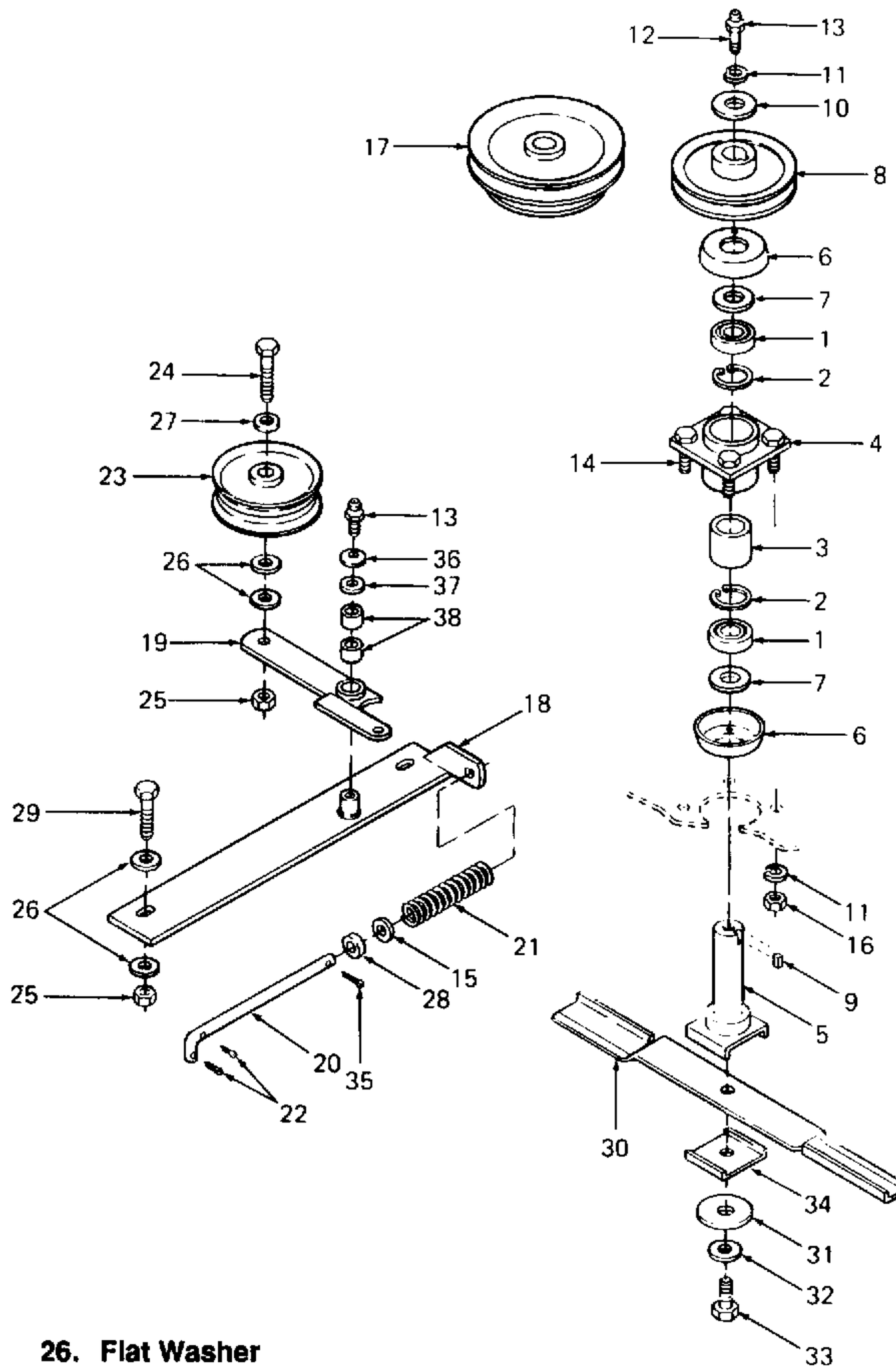
1. Deck Assembly
2. Deck Belt Cover
3. Flat Washer
4. Lock Washer
5. Hex Cap Screw
6. Rear Mounting Bracket Assembly
7. Hex Nut
8. Lock Washer
9. Flat Washer
10. Hex Cap Screw
11. Locating Pin
12. Quick Attach Pin
13. Coupler Pin
14. Coupler Spring
15. Snap Ring
16. Spindle Drive Belt
17. Rear Gauge Wheel
18. Rear Wheel Axle Pin
19. Chute Deflector
20. Chute Deflector Mounting Rod
21. Cotter Pin
22. Deflector Spring
23. Flat Washer
24. Lock Washer
25. Hex Cap Screw
26. Up Stop Angle
27. Pivoting Gauge Wheel Assembly
28. Front Mower Angle
29. Front Mower Angle
30. Bolt
31. Front Roller
32. Spacer
33. Hex Center Lock Nut

Figure 5-128. Deck Assembly (Model 190-374).



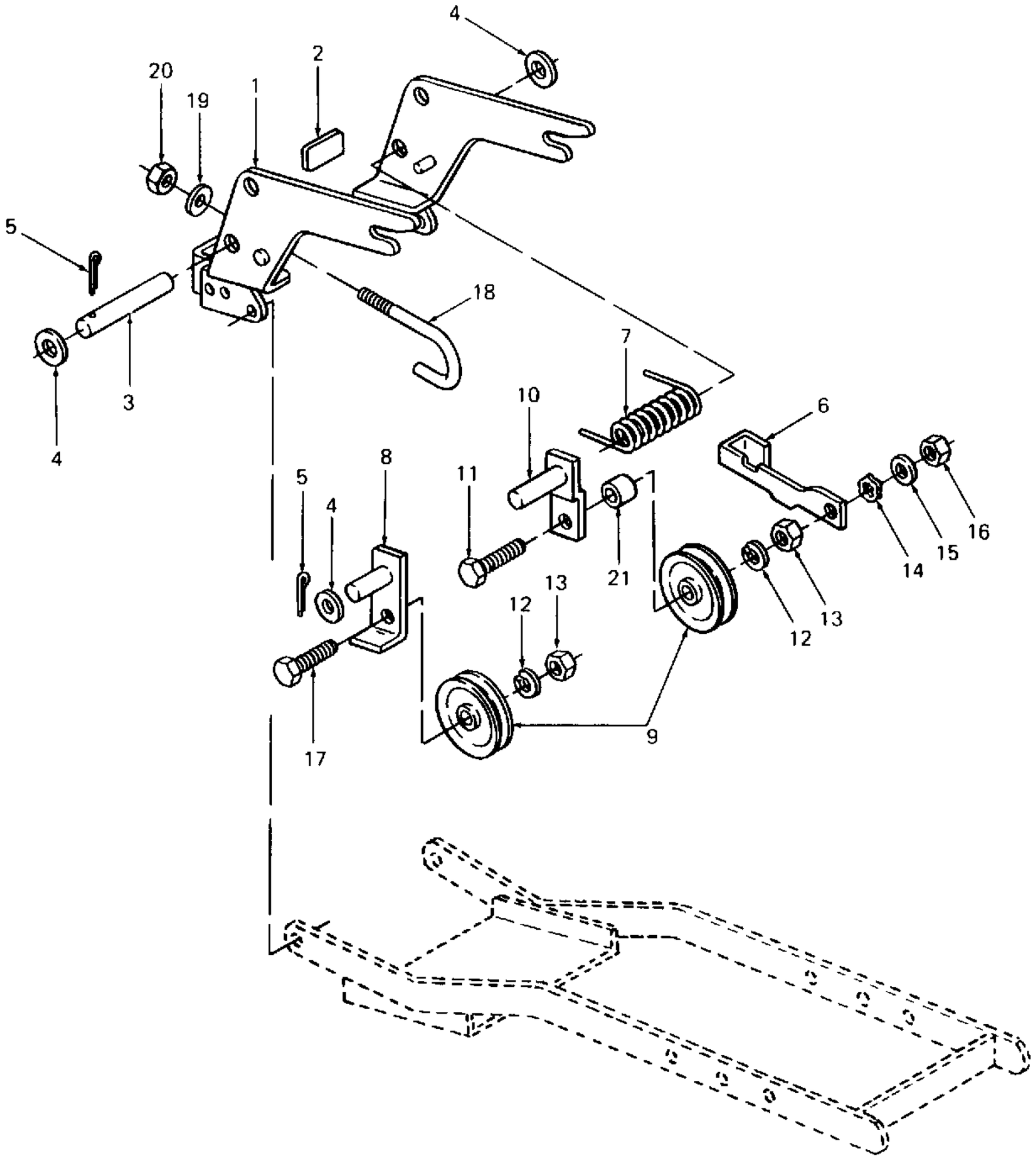
1. Hex Cap Screw
2. Lock Washer
3. Flat Washer
4. Flange Bushing
5. Front Caster Mounting Assembly
6. Grease Fitting
7. Quick Attach Pin
8. Front Wheel Axle Pin
9. Hex Cap Screw
10. Flat Washer
11. Front Gauge Wheel
12. Wheel Spacer
13. Front Caster Bracket - RH
14. Hex Center Lock Nut
15. Front Caster Bracket - LH
16. Flat Washer

Figure 5-129. Pivoting Gauge Wheel (Model 190-374).



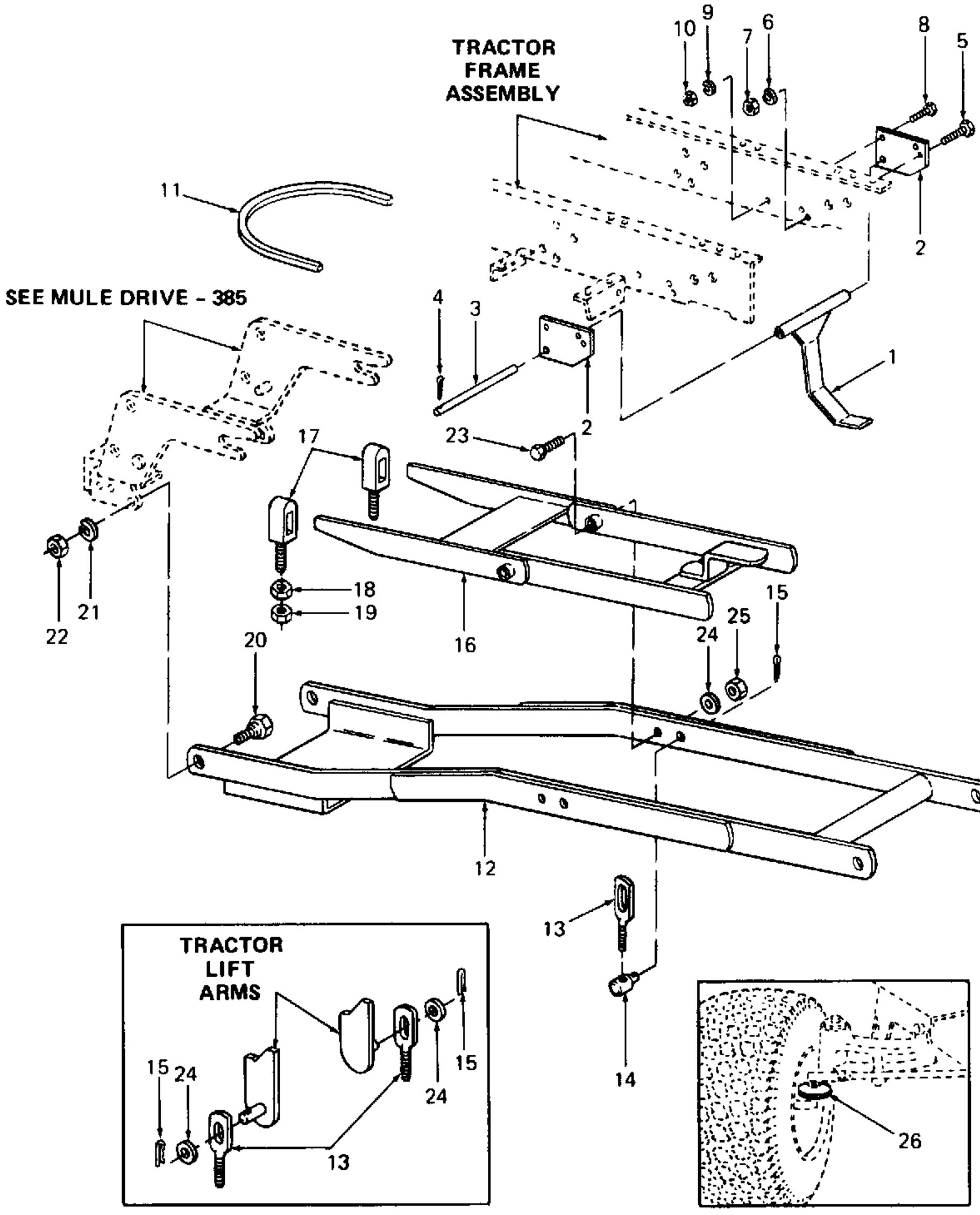
1. Bearing
2. Internal Snap Ring
3. Bearing Spacer
4. Spindle Housing
5. Spindle Shaft
6. Bearing Cup
7. Washer
8. Outer Pulley
9. Key
10. Washer
11. Lock Washer
12. Bolt Assembly
13. Grease Fitting
14. Bolt
15. Flat Washer
16. Hex Nut
17. Center Pulley
18. Idler Plate
19. Idler Arm
20. Idler Spring Rod
21. Idler Spring
22. Cotter Pin
23. Idler Pulley
24. Hex Cap Screw
25. Hex Center Lock Nut
26. Flat Washer
27. Lock Washer
28. Spacer
29. Hex Cap Screw
30. Mower Blade
31. Mower Blade Washer
32. Spring Washer
33. Hex Cap Screw
34. Blade Retainer
35. Quick Attach Pin
36. Spring Washer
37. Flat Washer
38. Oilite Bushing

Figure 5-130. Blade and Drive (Model 190-374).



1. Front Hanger Assembly
2. Idler Adjustment Graphic
3. Idler Pivot Shaft
4. Flat Washer
5. Cotter Pin
6. Idler Ratchet
7. Idler Torsion Spring
8. Idler Arm Assembly - LH
9. Idler Pulley
10. Idler Arm Assembly - RH
11. Hex Cap Screw
12. Lock Washer
13. Hex Nut
14. Wave Washer
15. Flat Washer
16. Hex Center Lock Nut
17. Hex Cap Screw
18. Idler Adjuster Bolt
19. Flat Washer
20. Hex Center Lock Nut
21. Spacer

Figure 5-131. Drive (Model 190-374).



1. Rear Stabilizer Bar
2. Anchor Plate
3. Pin
4. Quick Attach Pin
5. Hex Cap Screw
6. Lock Washer
7. Hex Nut
8. Hex Cap Screw
9. Lock Washer
10. Hex Nut
11. Mule Drive Belt
12. Mower Mounting Bracket
13. Adjustable Link
14. Adjustment Ferrule
15. Quick Attach Pin
16. Mower Lift Bracket
17. Front Mower Support Hanger
18. Hex Jam Nut
19. Hex Insert Top Lock Nut
20. Shoulder Bolt
21. Lock Washer
22. Hex Nut
23. Hex Cap Screw
24. Flat Washer
25. Hex Center Lock Nut
26. Wheel Stop Washer

Figure 5-132. Hitch and Mounting (Model 190-374).

SECTION 6
ADJUSTMENTS

6-1. **GENERAL.**

6-1.1 This section contains specific information on the proper adjustment of various components of the garden tractors discussed in this manual.

6-2. **PTO AIR GAP (All Models).**

6-2.1 Adjust the PTO air gap as follows. Refer to Figure 6-1 (Models 1340, 1535, 1541, 1860, 1862, 1882 and 2082) or Figure 6-2 (Models 1782 and 2182).

WARNING

To avoid possible injury, move speed control lever into neutral, engage single pedal brake lock and turn ignition OFF before working on PTO clutch.

WARNING

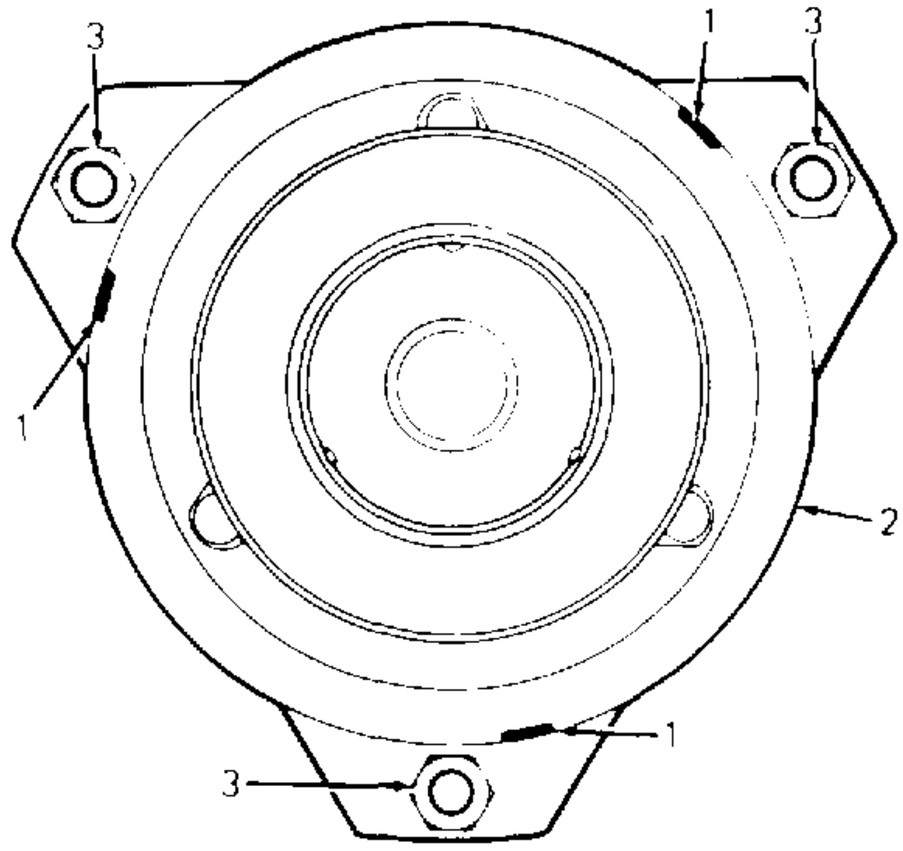
The clutch may be hot. Allow engine and clutch to cool before adjusting clutch.

1. Remove front grille per paragraph 5-4.2 (Models 1340, 1535, 1541, 1860, 1862, 1882 and 2082) or paragraph 5-5.2 (Models 1782 and 2182).
2. Check each of three access slots located around outside of brake plate for proper air gap of .017 inch.
3. Correct any improper air gap by adjusting self-locking nuts until proper clearance is obtained.
4. Install grille per paragraph 5-4.7 (Models 1340, 1535, 1541, 1860, 1862, 1882 and 2082) or paragraph 5-5.7 (Models 1782 and 2182).

6-3. **THROTTLE ADJUSTMENT (Models 1340, 1535, 1541, 1860, 1862, 1882, 2082 and 2182).**

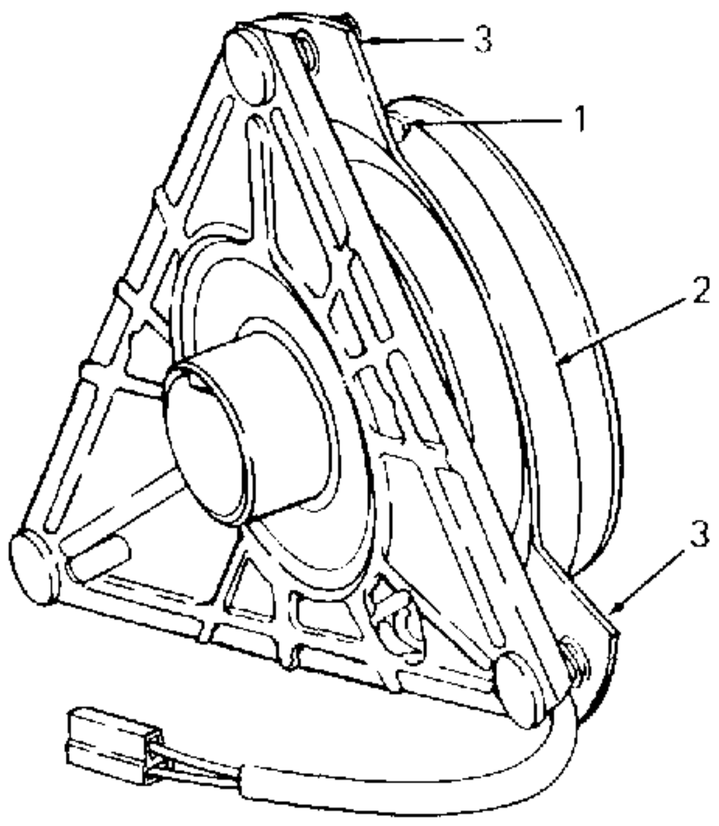
6-3.1 Adjust throttle cable as follows:

1. Loosen throttle cable clamp at engine.
2. Place throttle arm in FAST position.
3. Tighten throttle cable clamp.
4. Move throttle lever down and back up to FAST position to be sure throttle arm returns to FAST position.



1. Access Slots
2. Brake Plate
3. Self-Locking Nuts

Figure 6-1. Adjusting PTO Air Gap (Models 1340, 1535, 1541, 1860, 1862, 1882 and 2082).



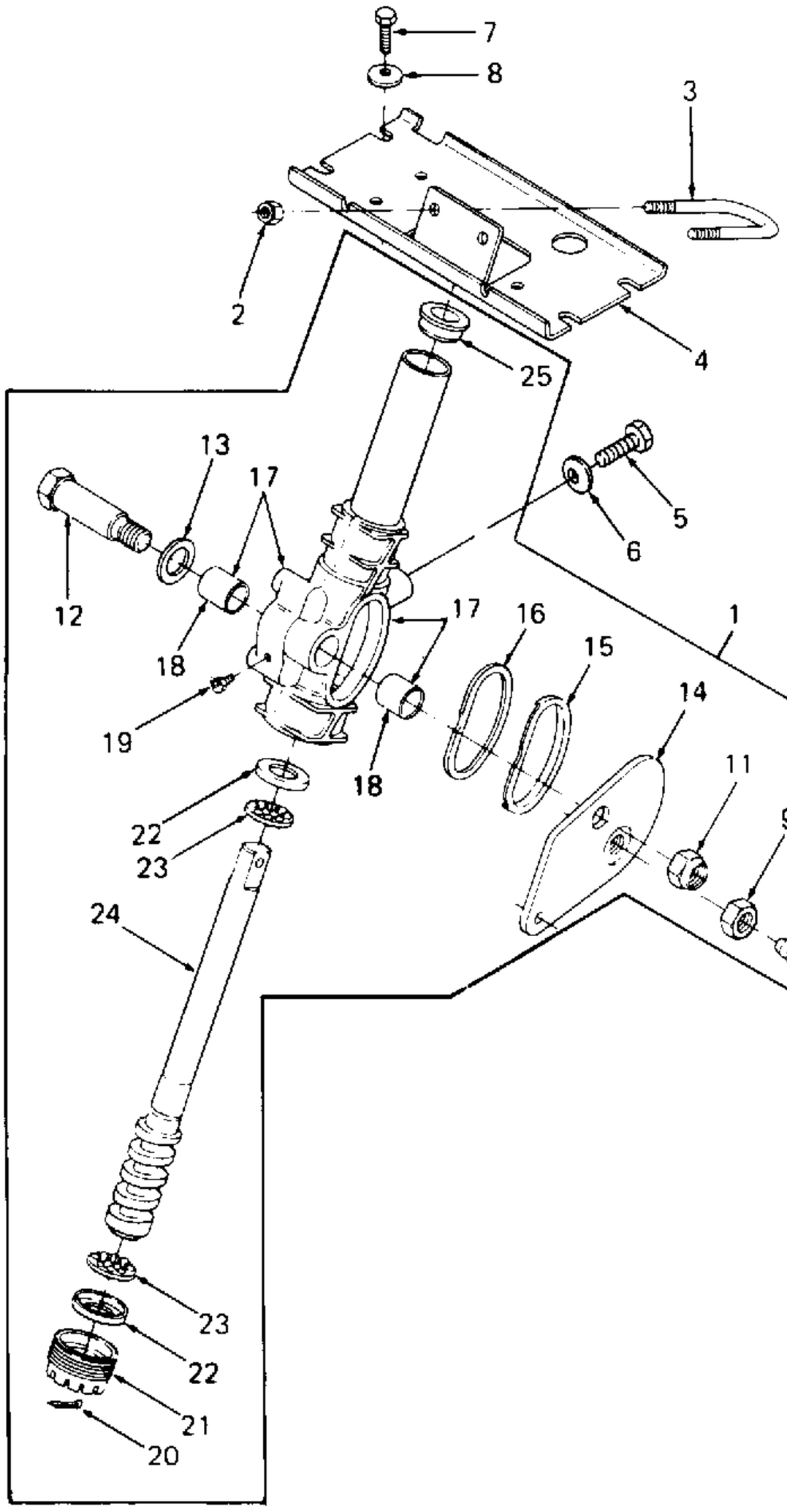
1. Access Slots (120° apart in 3 locations)
2. Brake Plate
3. Self-Locking Nuts

Figure 6-2. Adjusting PTO Air Gap (Models 1782 and 2182).

6-4. LOWER STEERING ADJUSTMENT (Models 1340, 1535, 1541 and 1860).

6-4.1 After reassembly of the lower steering and before installation, perform the following adjustment. Refer to Figure 6-3.

1. Remove cotter pin (20, Figure 6-3) and screw adjusting plug (21) inward until end play of camshaft (24) is removed, but it turns freely. Insert cotter pin in nearest hole.
2. Fill housing with *Cub Cadet* 251H EP grease.
3. Loosen hex jam nut (9) and back out cam follower (10) two turns.
4. Tighten hex jam nut (9) to 40 ft-lbs.
5. Center steering arm (14) by rotating steering shaft halfway between full right and full left turn.
6. Adjust cam follower (10) inward to eliminate backlash, then tighten hex jam nut (9) to 40 ft-lbs. Turn steering shaft full right and left to check for binding.



1. Steering Gear Assembly
2. Hex Center Lock Nut
3. Clamp
4. Steering Support Plate
5. Hex Cap Screw
6. Bell Washer
7. Hex Head Cutting Screw
8. Bell Washer
9. Hex Jam Nut
10. Cam Follower
11. Hex Crown Lock Nut
12. Pivot Shaft
13. Flat Washer
14. Steering Arm
15. Seal Retainer
16. Seal
17. Tube Assembly Housing
18. Bushing
19. Lube Fitting
20. Cotter Pin
21. Adjusting Plug
22. Bearing Cup
23. Ball Retainer Assembly
24. Camshaft Assembly
25. Column Bearing

Figure 6-3. Lower Steering (Models 1340, 1535, 1541 and 1860).

6-6. CROSS SHAFT FRICTION ADJUSTMENT (Models 1340, 1541, 1860, 1862, 1882, 2082 and 2182).

6-6.1 **Adjustment.** Refer to Figure 6-8.

1. Loosely secure hex top lock nut to cross shaft assembly.
2. Attach pull scale to top of speed control knob.
3. Tighten hex top lock nut until a 3 to 5 pound pull is achieved in order to achieve lever movement.

6-7. CAM PIVOT BRACKET ADJUSTMENT (Models 1340, 1541, 1860, 1862, 1882, 2082 and 2182).

6-7.1 **General.** Cam pivot bracket adjustment is detailed in the *Cub Cadet* Service Bulletin CC-188 which follows at the end of this section.

6-8. GEAR DRIVE ALIGNMENT (Model 1535).

6-8.1 **General.** Gear drive alignment is detailed in the *Cub Cadet* Service Bulletins CC-192 and CC-193 which follow at the end of this section.

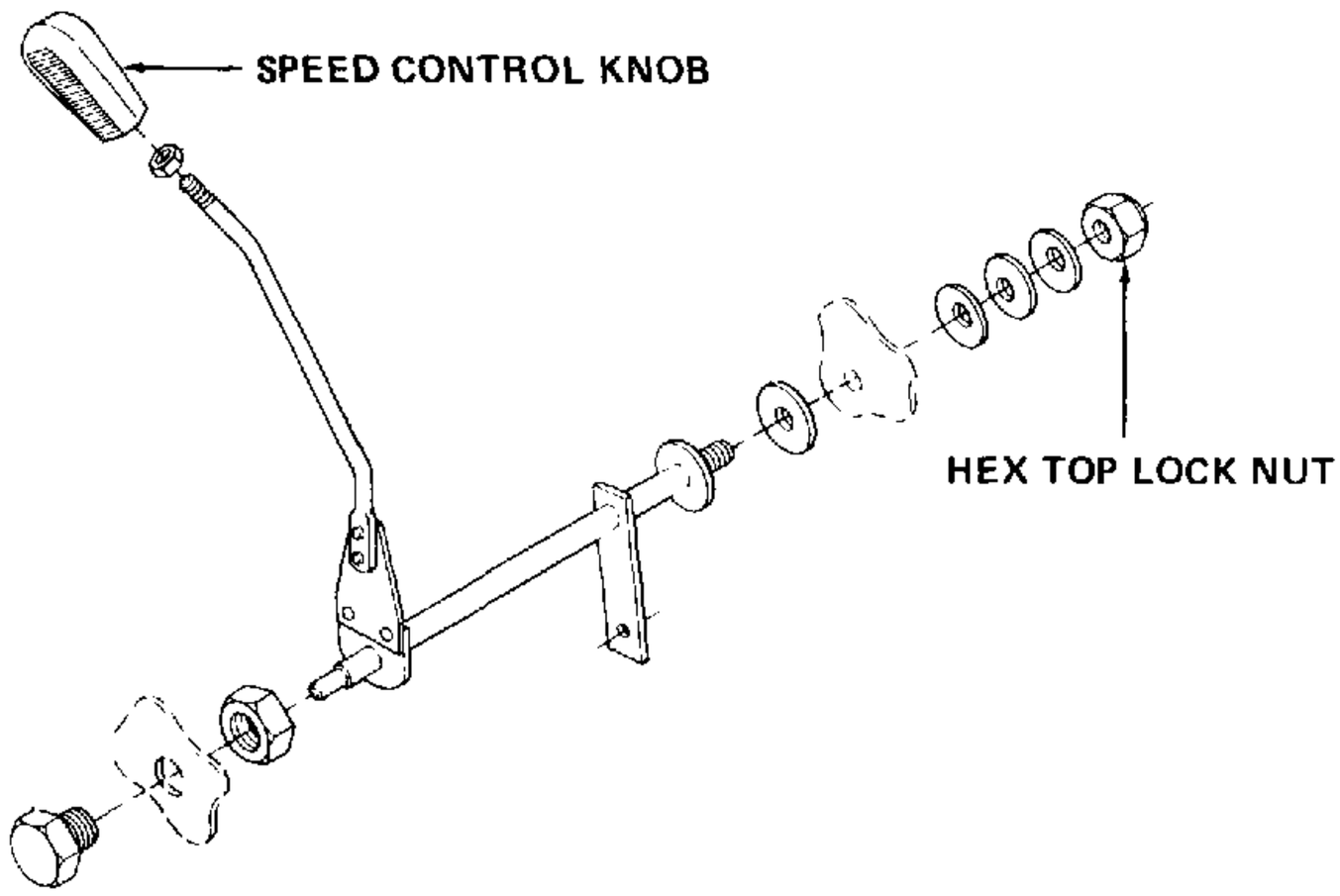


Figure 6-8. Cross Shaft Friction Adjustment (Models 1340, 1541, 1860, 1862, 1882, 2082 and 2182).

6-9. CHARGE PUMP RELIEF VALVE ADJUSTMENT (Models 1340, 1541 [Tractor Serial Number 816,508 and below], 1782, 1860, 1862, 1882, 2082 and 2182).

6-9.1 **General.** Charge pump removal and disassembly is described under **Hydrostatic Transmission** for each tractor model.

6-9.2 **Adjustment.**

1. Check charge pressure as described in paragraph 5-52B.
2. If charge pressure is not within specifications, remove the charge pump relief valve. Clean and inspect valve. Refer to specifications for spring length dimensions. Replace spring if necessary.
3. If spring is within specifications, add or remove spring shims to bring charge pressure within specifications.
4. If shimming the relief valve does not correct the problem, replace the relief valve and shim as necessary.
5. If replacing the relief valve does not solve the problem, inspect the charge pump. Change the O-ring and if necessary replace the charge pump.
6. Remove and overhaul the transmission, inspecting for scored valve plates.

6-10. IMPLEMENT LIFT RELIEF VALVE ADJUSTMENT (Models 1340, 1541 [Tractor Serial Number 816,508 and below], 1782, 1860, 1862, 1882, 2082 and 2182).

6-10.1 **General.** Implement lift relief valve adjustment and disassembly is described under **Hydrostatic Transmission** for each tractor model.

6-10.2 **Adjustment**

1. Check lift pressure as described in paragraph 5-52B.
2. If lift pressure is not within specifications, remove the implement lift relief valve. Clean and inspect the relief valve. Refer to specifications for spring length dimension. Replace the spring if necessary.
3. If the spring is within specifications, add or remove shims to bring lift pressure within specifications.
4. If shimming the implement lift relief valve does not correct the problem, replace the relief valve.

Cub Cadet
Power Equipment

SERVICE BULLETIN

CODE NO: CC-188

DATE: MARCH 5, 1990 (REVISED)

SUBJECT: SLOW REVERSE SPEED ON 1990 HYDRO GARDEN TRACTORS

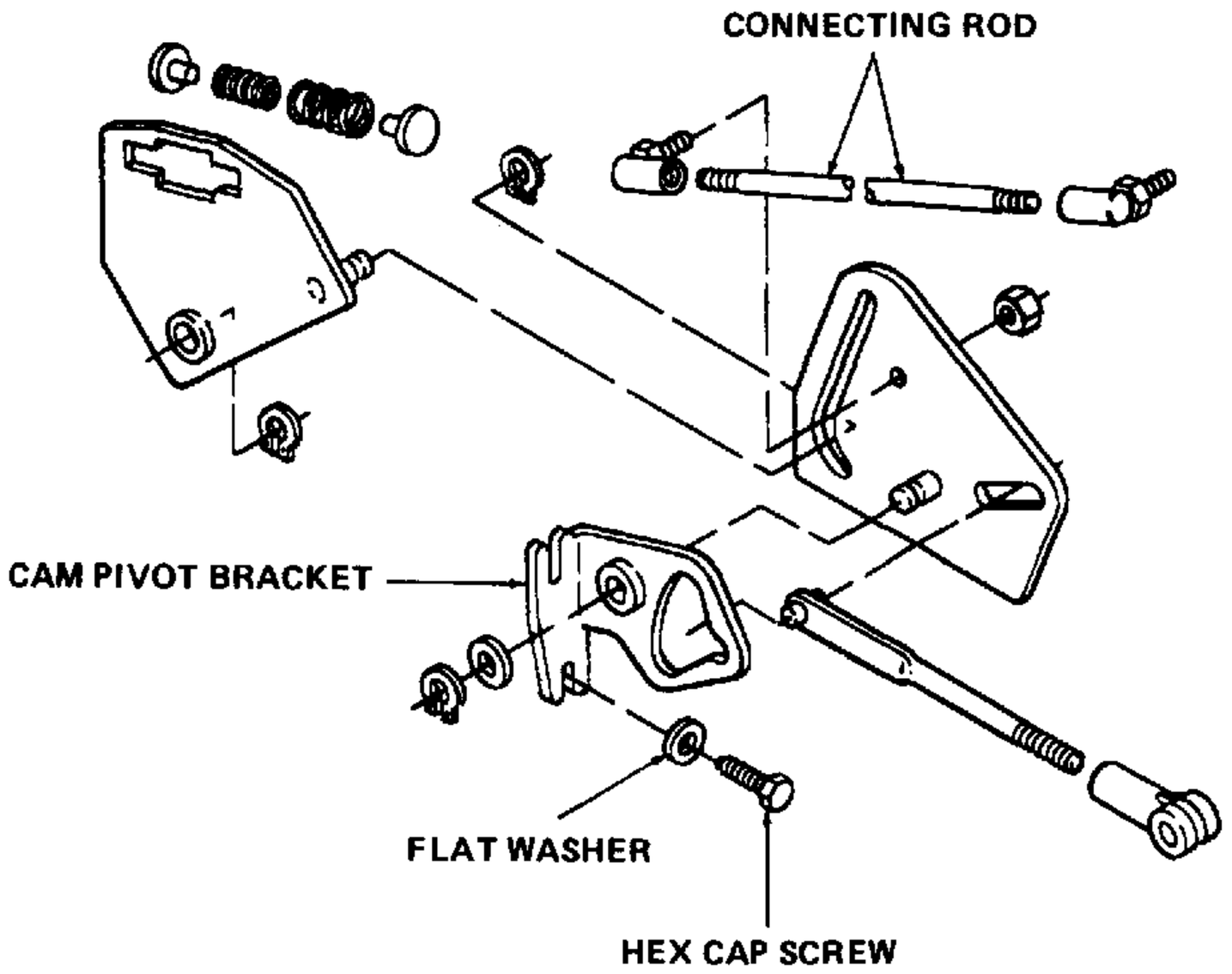
PROBLEM: CAM PIVOT BRACKET OUT OF ADJUSTMENT

SOLUTION: ADJUST CAM PIVOT BRACKET

If your reverse speed is too slow, the cam pivot bracket is out of adjustment. Insure proper linkage adjustment as follows:

Raise tractor rear wheels off the ground and disconnect the brake control linkage from the pedal assembly.

Loosen the hex cap screws holding the cam pivot bracket and lower the bracket until it is flush with the top of the flat washer on the cap screw. Start the tractor and see if the rear wheels creep in reverse. If so, slowly raise the cam pivot bracket until wheel motion has stopped and there is no hydrostatic chatter from the pump. Tighten the hex cap screws on the cam pivot bracket and test the operation of the linkage. It may be necessary to adjust the connecting rod to get the proper shift lever position.



Cub Cadet
Power Equipment

SERVICE BULLETIN

CODE NO: CC-192

DATE: JANUARY 29, 1990

SUBJECT: SERVICE TOOL KIT (759-3426) — ALIGNMENT TOOL FOR CUB CADET GEAR DRIVE TRACTORS (MODELS 1050, 1535 AND 1806)

Cub Cadet Corporation is pleased to announce the first special tool for use with the Cub Cadet tractors.

This tool, 759-3426, is needed when replacing the clutch disc or other drive line components on the Cub Cadet (standard transmission) tractors. This tool, when used properly, will help increase the life of the new Cub Cadet drive clutch by making sure the engine is in proper alignment with the transmission.

Following is a brief description (CC-193) as to the proper use of this special tool.

Cub Cadet
Power Equipment

SERVICE BULLETIN

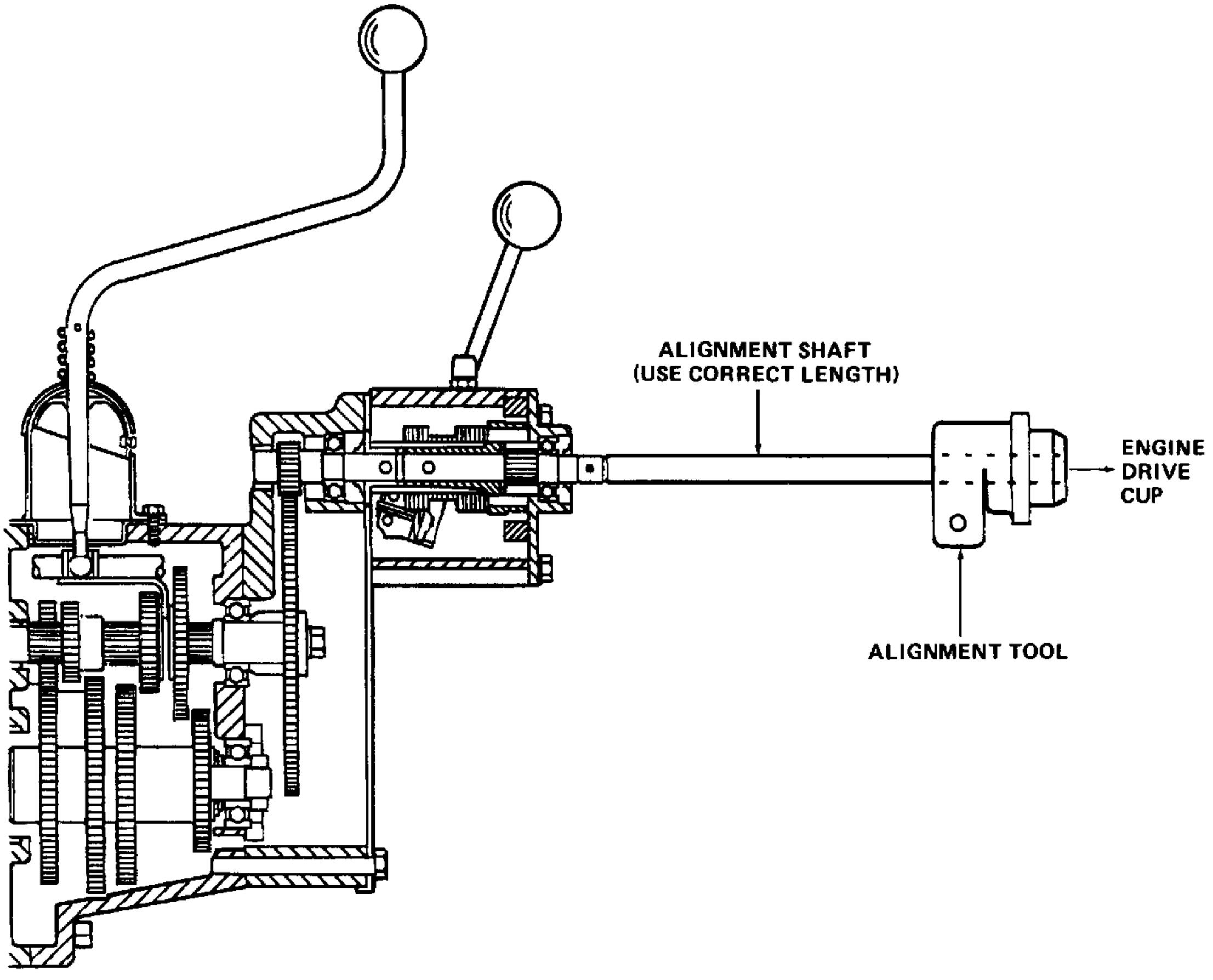
CODE NO: CC-193

DATE: JANUARY 29, 1990

SUBJECT: INSTRUCTION SHEET FOR SERVICE TOOL KIT (759-3426) — ALIGNMENT TOOL FOR CUB CADET GEAR DRIVE TRACTORS (MODELS 1050, 1535 AND 1806)

1. Remove the drive shaft and clutching parts from tractor.
2. Remove the drive plate and alignment bushing from the engine drive cup.
3. Attach alignment tool with appropriate alignment shaft already installed into tool: short shaft for Models 1535 or 1806; long shaft for Model 1050.
4. Using hardware included in kit (two 1/4"-20 thread x 7/8" long cap screws and two flat washers) secure alignment tool to engine drive cup.
5. Slide shaft through tool back toward the transmission input shaft, or creeper drive input shaft, until they almost touch.
6. Secure shaft with hardware provided in kit (one 5/16"-18 thread x 1.0 cap screw and 5/16" flat washer).
7. If shafts do not line up, both horizontally and vertically, as shown in attached drawing, the following steps should be taken.
8. Loosen the engine mounting bolts so engine can be shifted from side to side for horizontal alignment.
9. The addition of flat washers, located between the engine mounting plate and frame, may be used to assist in vertical alignment.
10. Once alignment has been achieved, retighten the engine mounting bolts and remove alignment tool and shaft.
11. Reinstall the drive shaft parts and secure both ends with proper pins, bolts and bushings.

The engine should now be properly aligned with the transmission and extended clutch life should be realized.


ALIGNMENT SHAFT
(USE CORRECT LENGTH)
ENGINE
DRIVE
CUP
ALIGNMENT TOOL

SECTION 7
ATTACHMENTS

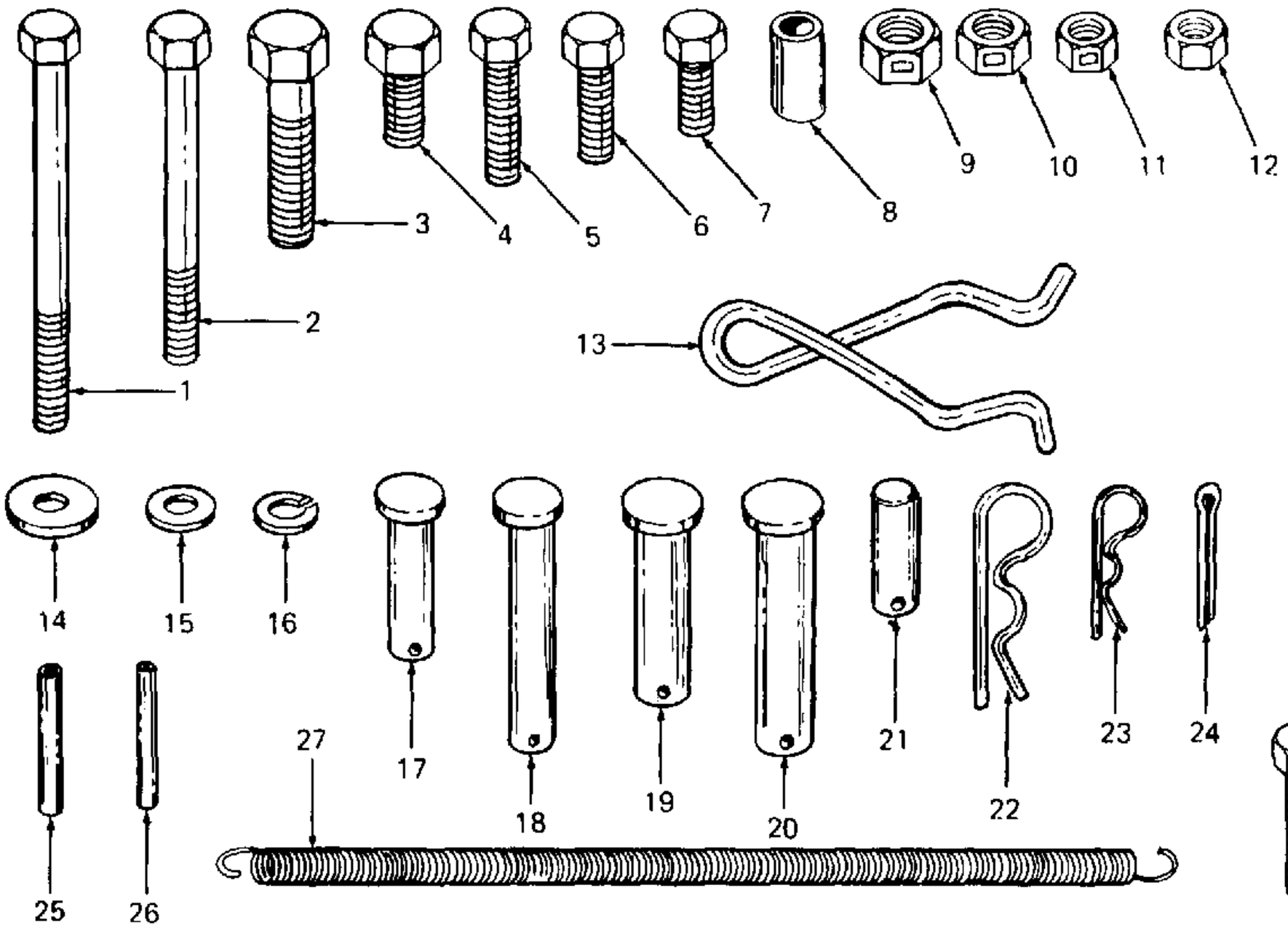
7-1. GENERAL.

7-1.1 This section describes installation of the following attachments which are available from *Cub Cadet* for selected tractors: Rear PTO Kit Model Number 433, 3-Point Hitch Kit Model Number 383, 3-Point Hitch Kit Model Numbers 388 and 389 and Front Hydraulic Outlet Kit Part Number 759-3493.

7-2. INSTALLATION OF REAR PTO KIT MODEL NUMBER 433 AND 3-POINT HITCH KIT MODEL NUMBER 383.

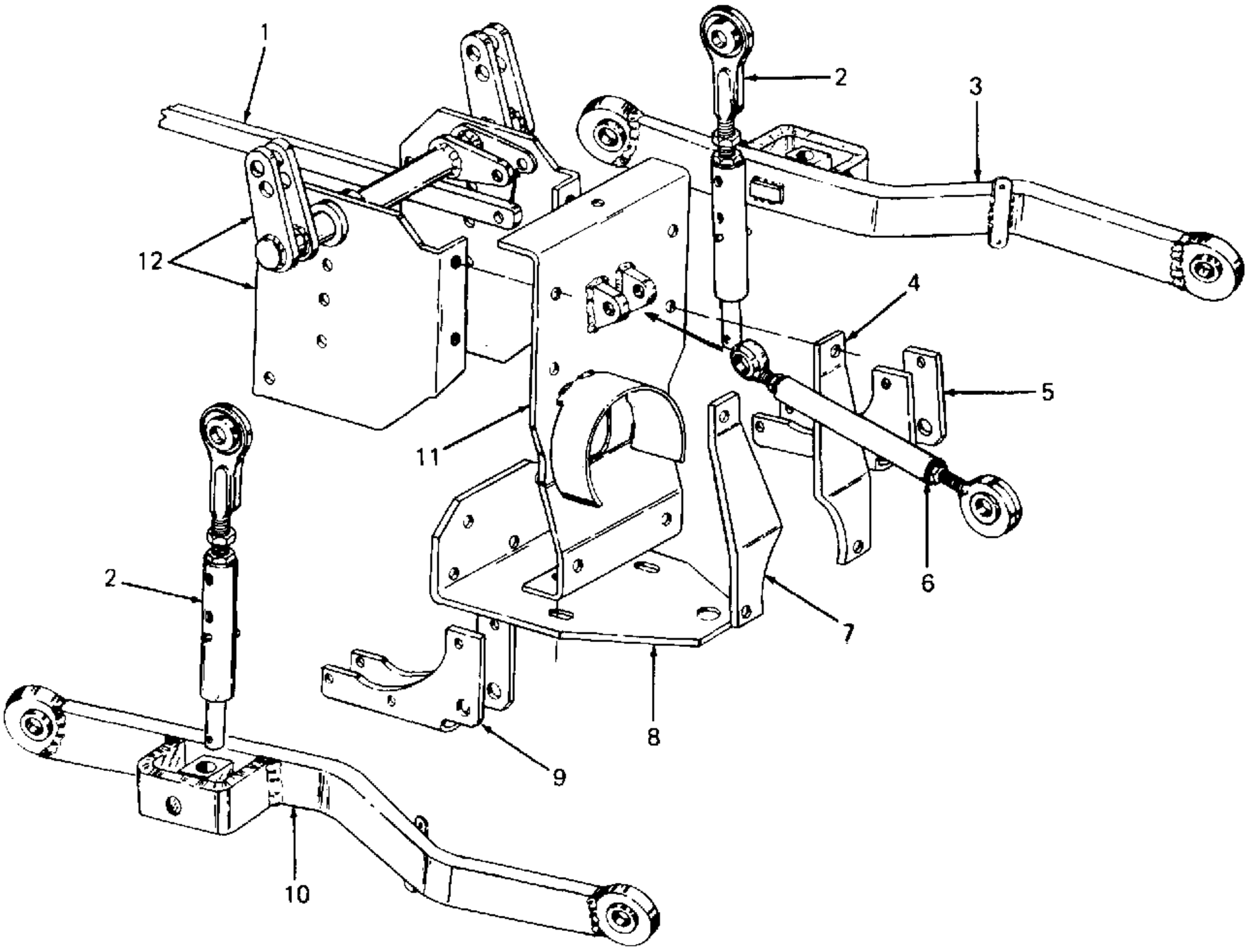
7-2.1 **General.** The rear PTO Model 433 and 3-point hitch Model 383 are for use on super frame garden tractors, serial number 800,000 and above. Before beginning installation, refer to Figures 7-1, 7-2,

NOTE: ALL PARTS SHOULD BE LAID OUT AND <u>NOT MIXED</u> FROM EACH KIT.



1. Hex Patch Bolt, 3/8-16 x 4" Long (6)
2. Hex Patch Bolt, 3/8-16 x 3-1/4" Long (2)
3. Hex Bolt, 1/2-13 x 1-3/4" Long (2)
4. Hex Bolt, 7/16-14 x 3/4" Long (4)
5. Hex Bolt, 3/8-16 x 1-1/4" Long (2)
6. Hex Bolt, 3/8-16 x 1" Long (7)
7. Hex Bolt, 3/8-16 x 3/4" Long (4)
8. Spacer (6)
9. Hex Lock Nut, 1/2-13 (2)
10. Hex Lock Nut, 7/16-14 (4)
11. Hex Lock Nut, 3/8-16 (8)
12. Hex Nut, 3/8-16 (1)
13. Storage Ball (1)
14. Flat Washer, 3/8 x 1" x .100 (1)
15. Flat Washer, .406 ID x .81 OD x .05 (8)
16. Lock Washer, 3/8" ID (9)
17. Clevis Pin, 1/2 x 1-1/2" Long (1)
18. Clevis Pin, 1/2 x 2-1/2" Long (1)
19. Clevis Pin, 5/8 x 1.9" Long (2)
20. Clevis Pin, 5/8 x 2-3/8" Long (1)
21. Clevis Pin (No Head) (1)
22. Hairpin Cotter, Large (1)
23. Hairpin Cotter, Small (3)
24. Cotter Pin, 3/16 x 7/8" Long (1)
25. Roll Pin, 1/4 x 1-1/2" Long (2)
26. Roll Pin, 3/16 x 1-1/2" Long (1)
27. Extension Spring (1)
28. Hex Patch Bolt, 3/8-16 x 1-1/4" (5)

Figure 7-1. 3-Point Hitch Kit Hardware, Model No. 383.



1. Implement Lift Bar
2. Lift Link Assembly
3. Lower Link Assembly
4. Cam Sway Limiter, RH
5. Lower Link Support Plate
6. Upper Link Assembly
7. Cam Sway Limiter, LH
8. Draw Bar Plate
9. Lower Link Support Plate
10. Lower Link Assembly
11. Draw Bar Support Plate Assembly
12. Rocker Shaft Assembly

Figure 7-2. 3-Point Hitch Kit Parts, Model No. 383.

7-3 and 7-4 to confirm that all parts are present and to acquaint yourself with parts nomenclature.

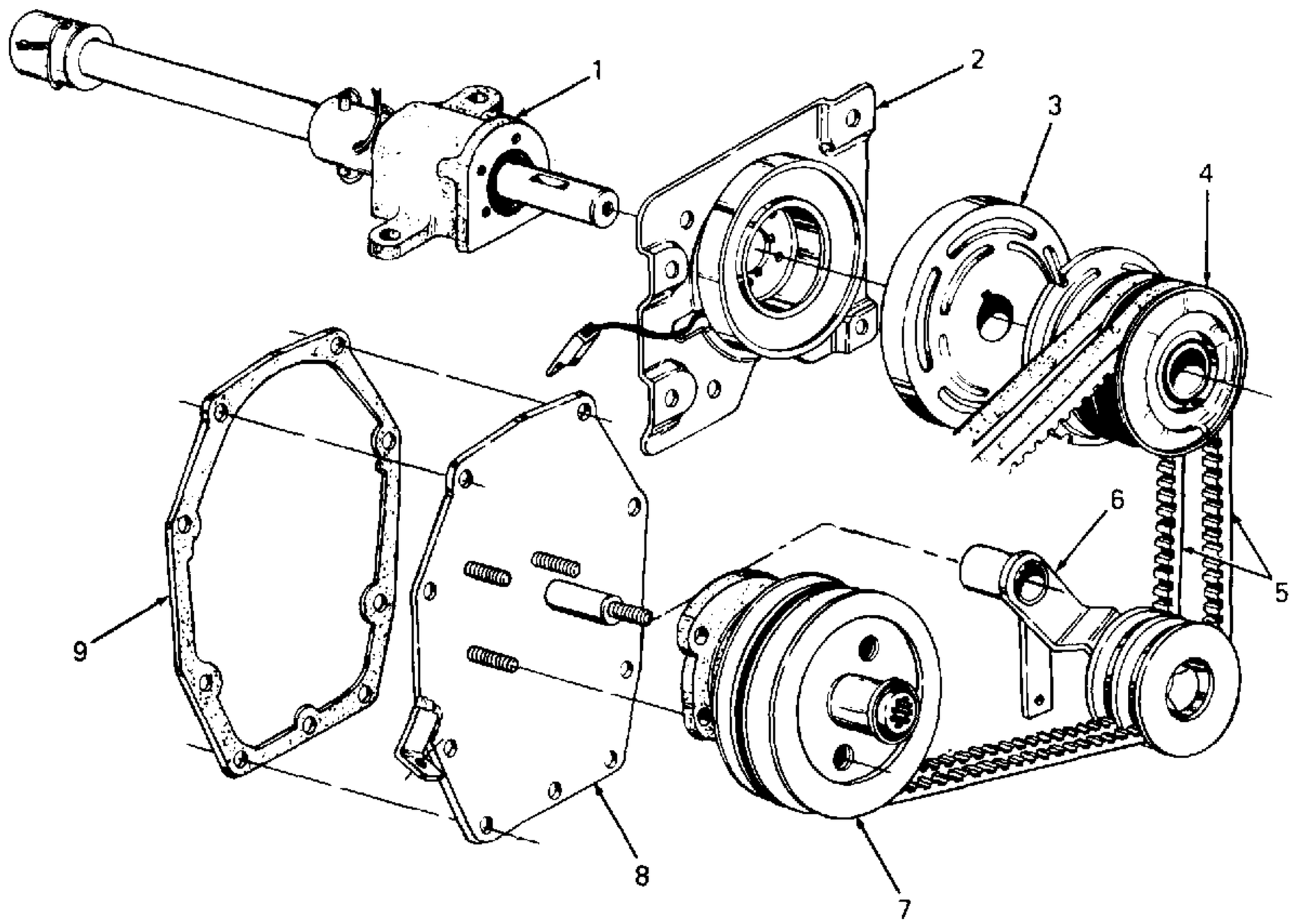
7-2.2 **Tractor Disassembly.**

1. Place tractor on a firm and level surface and chock tires.
2. Lower tractor lift to full down position. Check access hole to be sure headed pin is visible and positioned for later removal. Refer to Figure 7-5.

WARNING

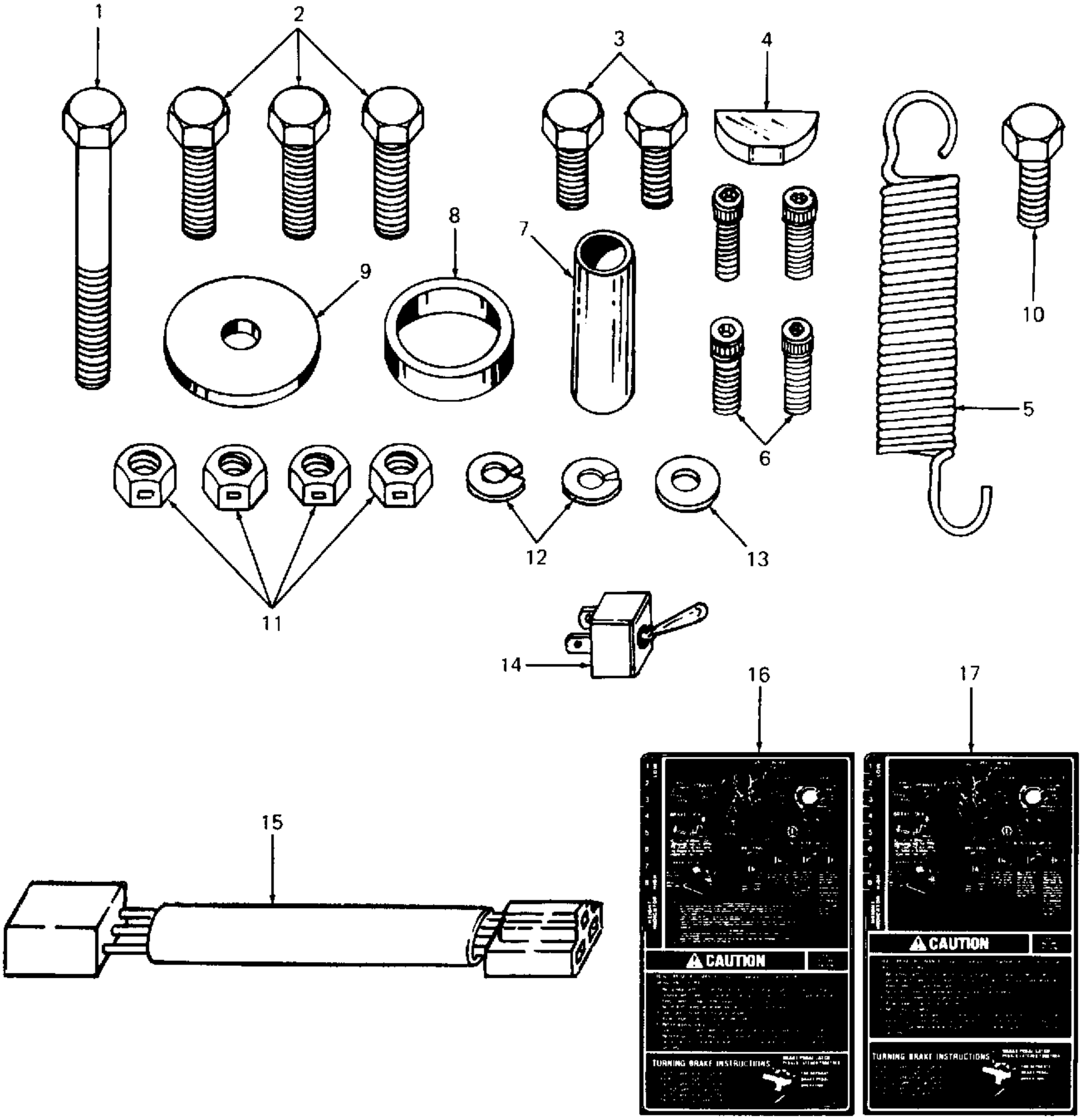
The battery must be disconnected in the proper sequence in order to avoid arcing.

3. Disconnect battery per paragraph 5-8.2 (Models 1882 and 2082), 5-9.2 (Model 1782) or 5-10.2 (Model 2182).
4. Remove steering wheel per paragraph 5-30.2.
5. Remove right side panel per paragraph 5-4.2 (Models 1882 and 2082) or 5-5.2 (Models 1782 and 2182).
6. Loosen left side panel and remove radiator screen (Models 1782 and 2182 only).
7. Remove center frame cover by removing four self-tapping hex screws. Refer to Figure 7-5.
8. Remove seat and track assembly per paragraph 5-24.2.



1. Rear PTO Clutch Shaft
2. Clutch Field Assembly
3. Clutch Rotor
4. Clutch Armature
5. Matched Set of Belts
6. Idler Bracket Assembly
7. Double Pulley and Rear PTO Bearing Housing
8. Rear Cover Plate Assembly
9. Rear Cover Plate Gasket

Figure 7-3. Rear PTO Kit Parts, Model No. 433.



1. Hex Bolt, 3/8-16 x 2-3/4" (1)
2. Hex Patch Bolt, 3/8-16 x 1" (3)
3. Hex Patch Bolt, 3/8-16 x 3/4" (2)
4. Woodruff Key (1)
5. Extension Spring (1)
6. Socket Head Screw, 1/4 x 1/2 (4)
7. Spacer, 1/2 x 11/16 x 1-3/8" Long (1)
8. Spacer, 1 x 1-1/4" x .36 (1)
9. Flat Washer, .406 x 1.50 x .094 Thk (1)
10. Hex Bolt, 3/8-16 x 1" Long GR8 (1)
11. Hex Center Lock Nut, 3/8-16 (4)
12. Lock Washer, 3/8" I.D. (2)
13. Flat Washer, .406 x 1.0 x .105 Thk (1)
14. PTO Directional Switch (1)
15. Directional Switch Adapter Lead (1)
16. Instrument Label (Model 1782) (1)
17. Instrument Label (Models 1882, 2082 and 2182) (1)

Figure 7-4. Rear PTO Kit Hardware, Model No. 433.

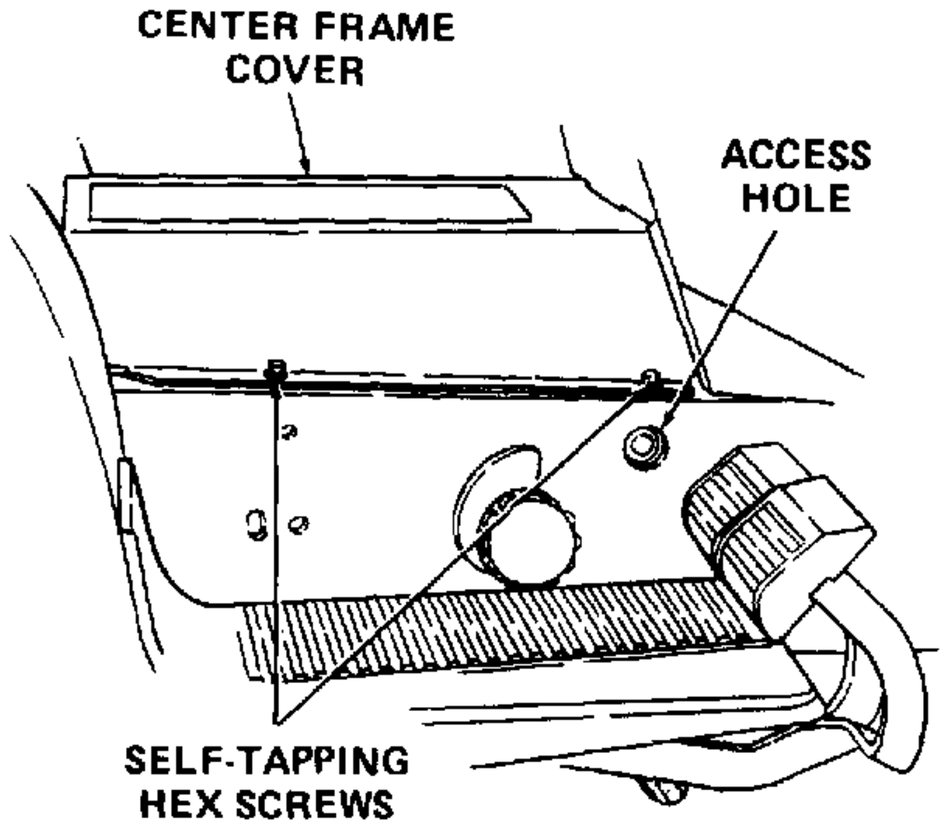


Figure 7-5. Checking Access Hole.

9. Remove fender per paragraph 5-27.2.
10. Remove fuel tank per paragraph 5-45.2 (Models 1882, 2082 and 2182) or 5-46.2 (Model 1782).
11. Remove seat support assembly per paragraph 5-27.2.
12. Remove hitch plate assembly and draw bar by removing four hex cap screws and lock washers. Refer to Figure 7-6.
13. Drain transmission fluid into container with capacity of more than seven quarts.

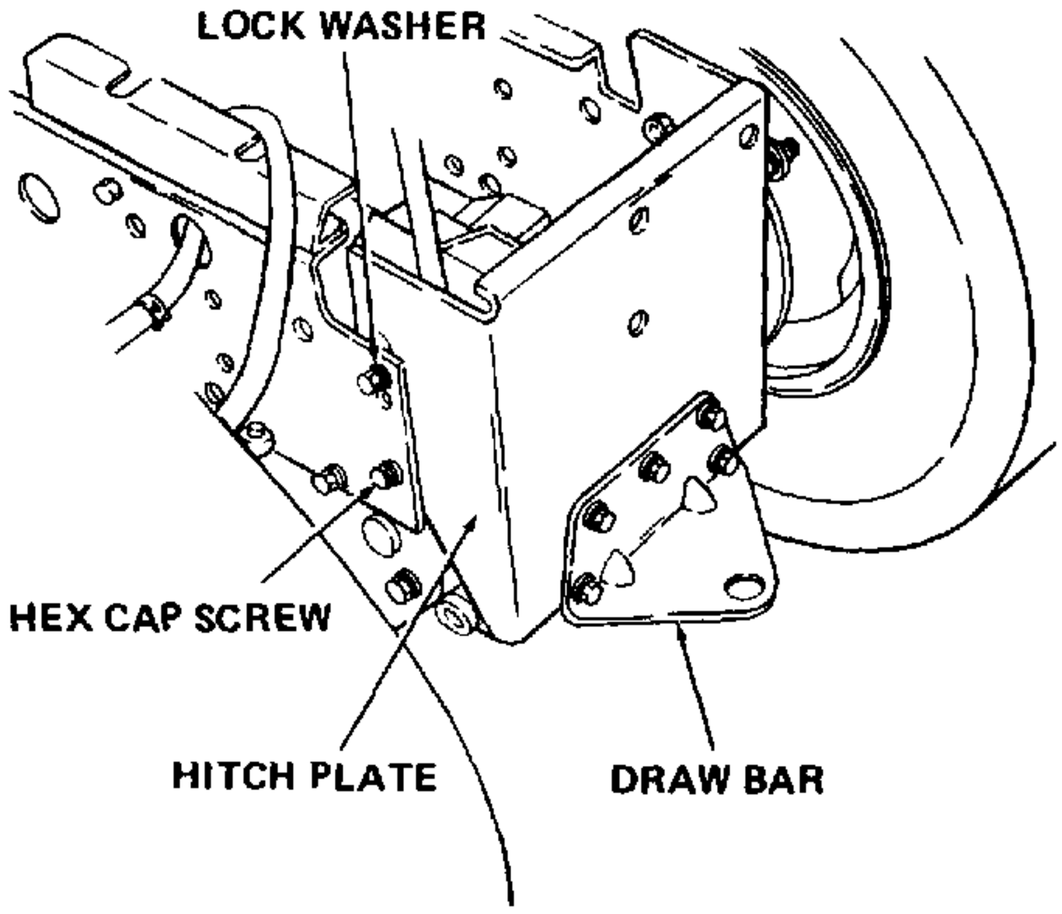


Figure 7-6. Removing Hitch Plate Assembly.

14. Remove rear cover plate from differential. Refer to Figure 7-7.
    a. Remove all nine hex patch bolts and bell washers. Discard bolts but retain all nine bell washers.
    b. Remove and discard the rear cover plate and gasket.

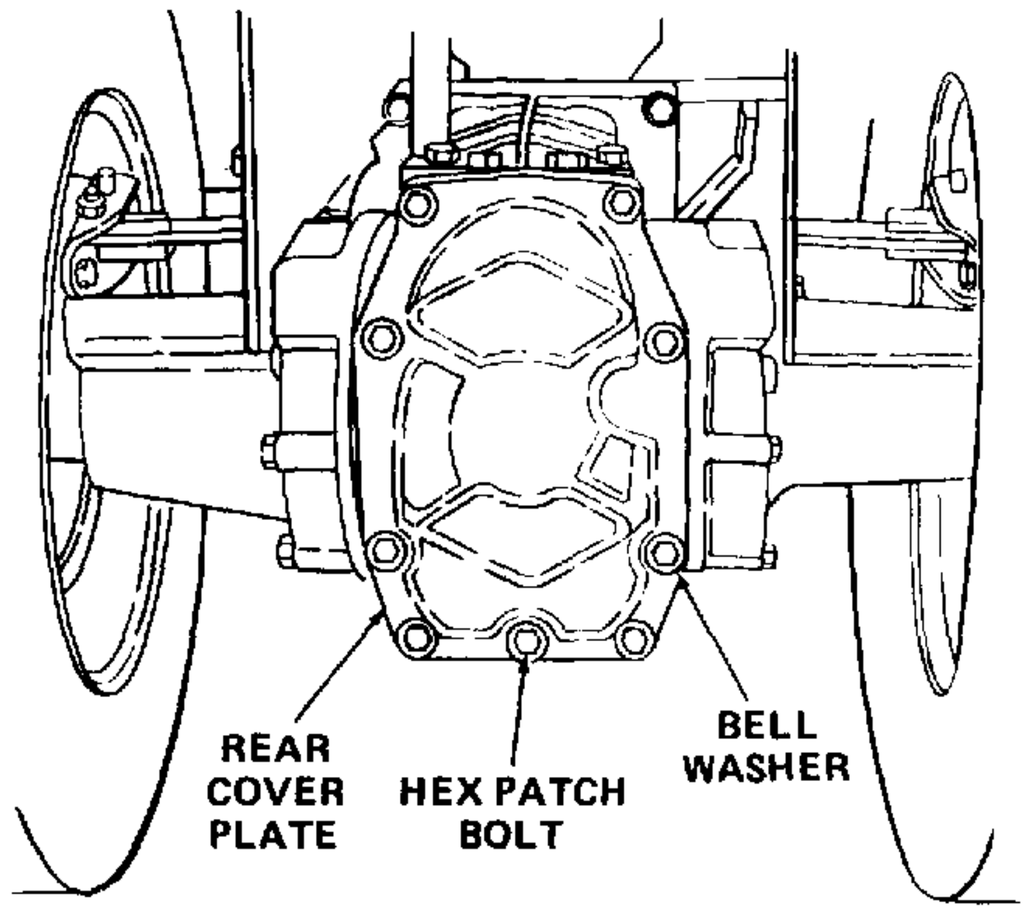


Figure 7-7. Removing Rear Cover Plate.

7-2.3 **Installation.** Installation is presented in two parts: paragraph 7-2.3.1 covers installation of the PTO and 3-point hitch; paragraph 7-2.3.2 covers installation of the PTO directional switch.

7-2.3.1 PTO and 3-Point Hitch.

1. Install new rear cover plate assembly (8, Figure 7-3) on differential. Refer to Figure 7-8.

NOTE

When securing rear cover plate with hex patch bolts, use bell washers retained per paragraph 7-2.2 step 14.a.

   a. Clean mounting surface of differential.
   b. Position new gasket (9, Figure 7-3) on rear cover plate assembly (8).
   c. Position rear cover plate (8) on differential and place two hex patch bolts (3, Figure 7-4) in top two holes of cover plate.

d. Use 1-inch long hex bolts (2) in the next two cover plate holes.

e. Position draw bar plate (8, Figure 7-2) on rear cover plate as shown in Figure 7-8, and secure with five 1-1/4-inch long bolts (28, Figure 7-1).

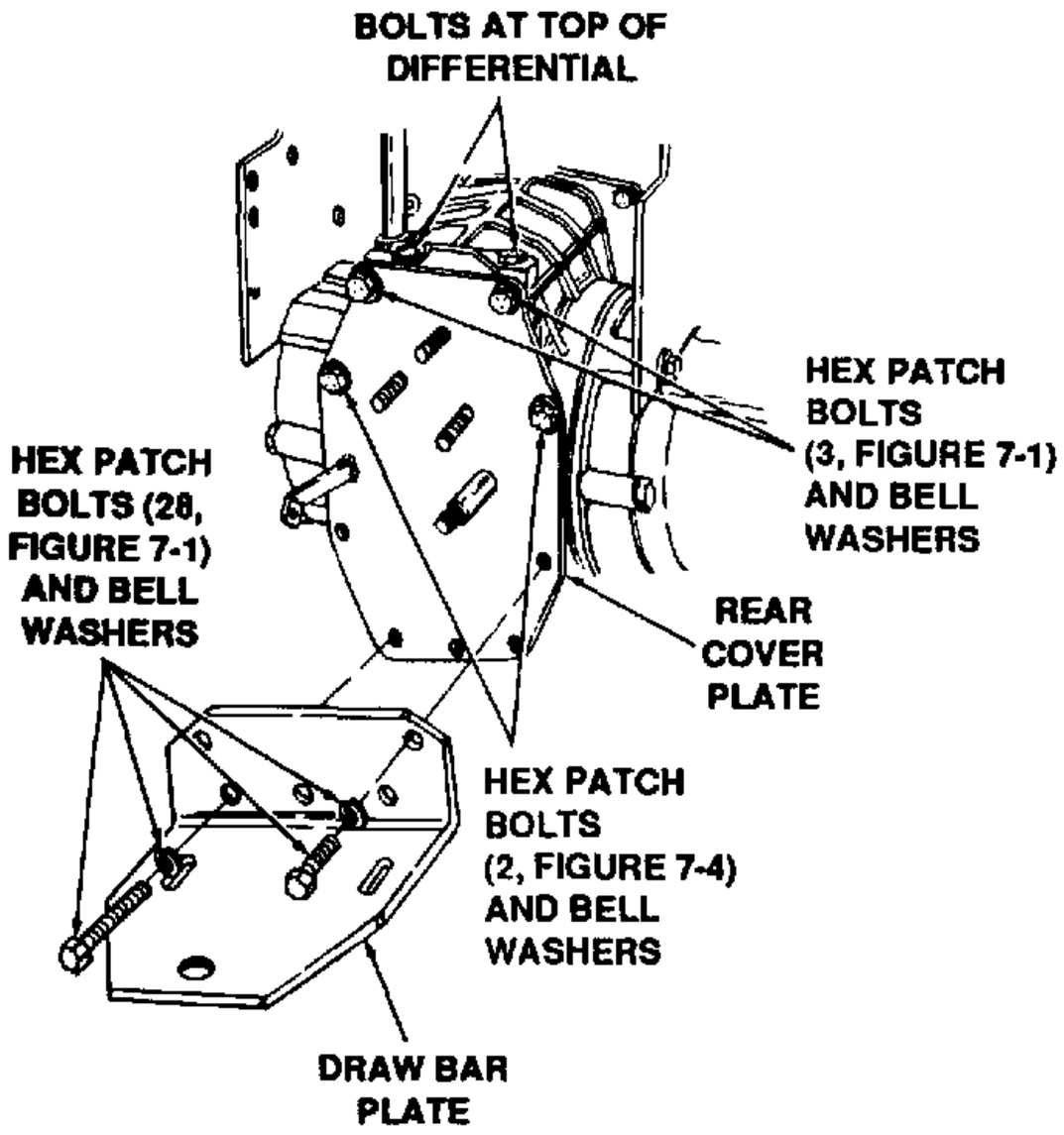


Figure 7-8. Installing Rear Cover Plate Assembly.

2. Install lower link support plates (5 and 9, Figure 7-2) on transaxle as follows:

   a. At each horn assembly on transaxle, remove lower three hex patch bolts and bell washers. Save bell washers and discard bolts. Refer to Figure 7-9.

   b. Secure a lower link support plate on each transaxle horn using bell washers retained from previous step, spacer (8, Figure 7-1), 3/8-inch ID lock washers (16) and 4-inch hex patch bolts (1). Torque bolts to 30 ft-lbs. Refer to Figure 7-10.

3. Install rear PTO clutch shaft (1, Figure 7-3) as follows:

   a. Remove two bolts from top of differential. Refer to Figure 7-8.

   b. Slide splined end of rear PTO clutch shaft over shaft on hydrostatic pump. Refer to Figure 7-11.

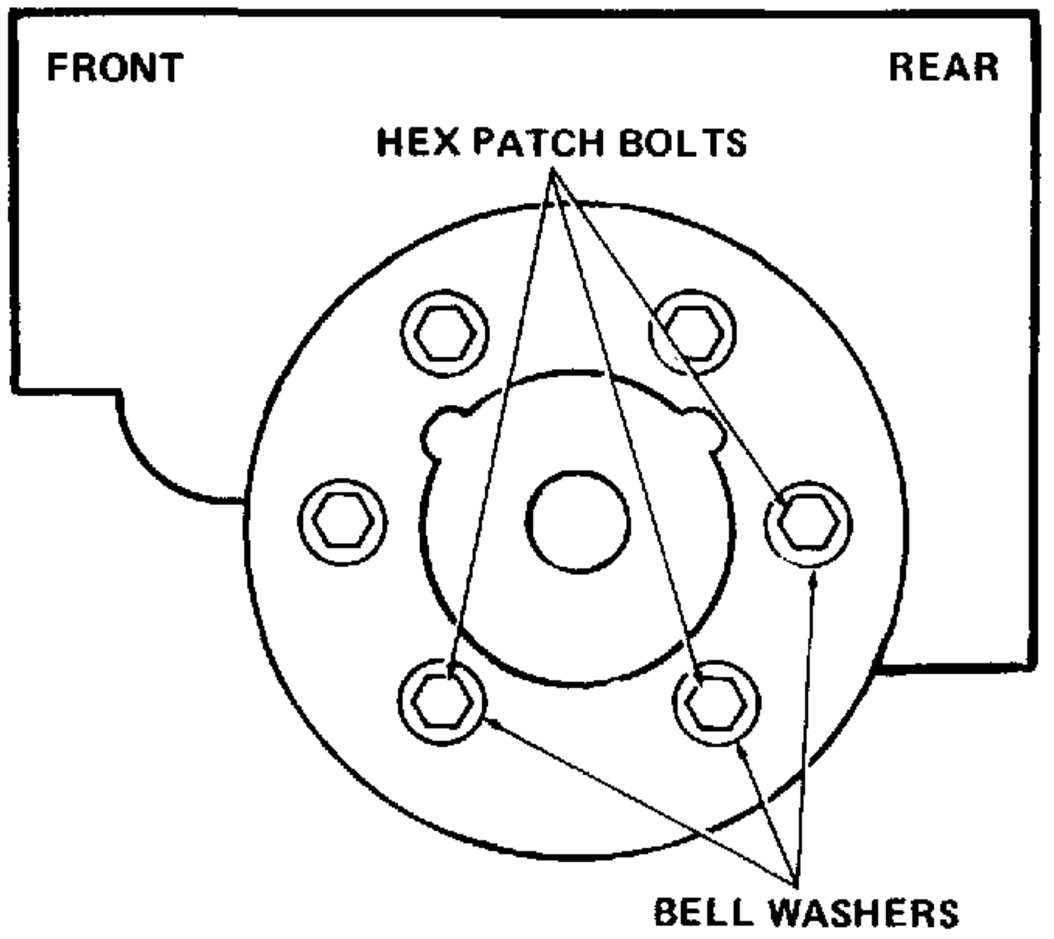


Figure 7-9. Lower Link Support Plate Hardware.

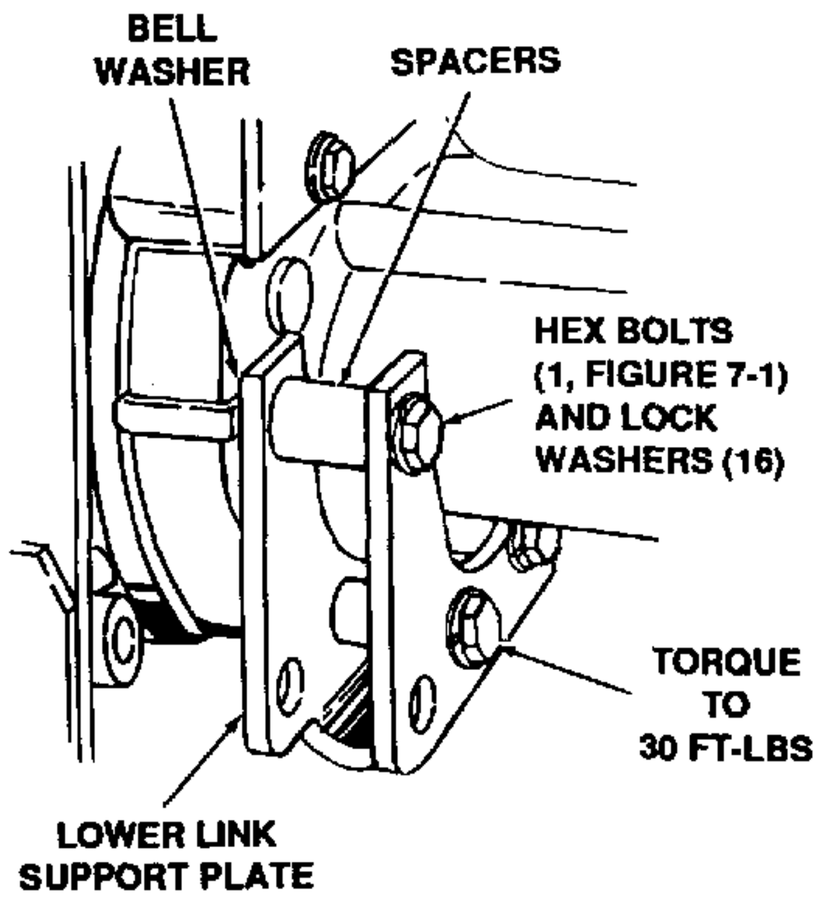


Figure 7-10. Installing Lower Link Support Plate.

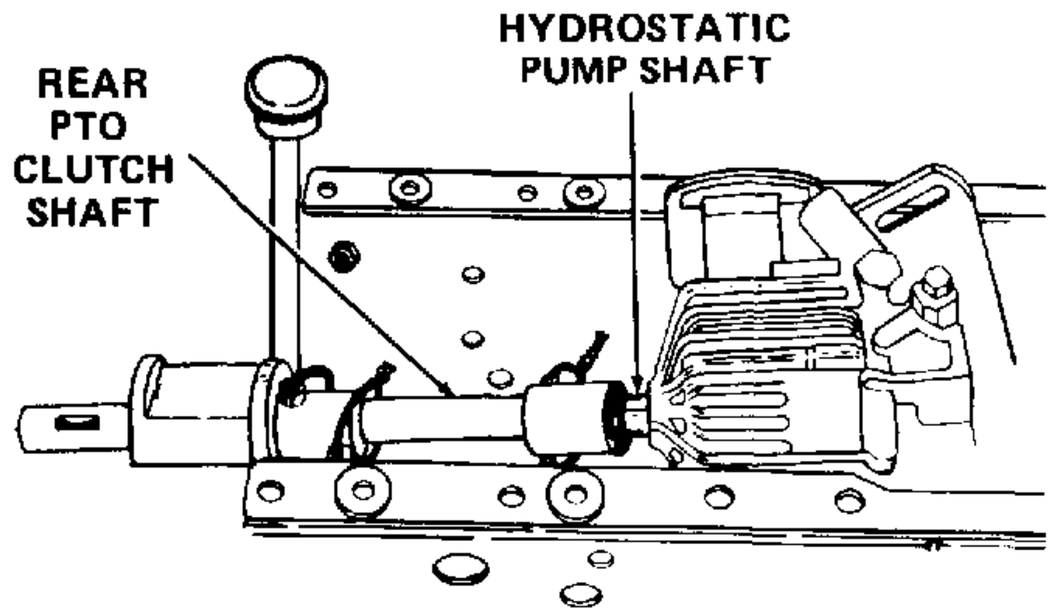


Figure 7-11. Installing Rear PTO Clutch Shaft.

c. Secure rear PTO clutch shaft to differential with 3/8-inch ID lock washers (11, Figure 7-4), 2-3/4-inch long hex bolt (1) and 1-inch long hex bolt (2). Refer to Figure 7-12.

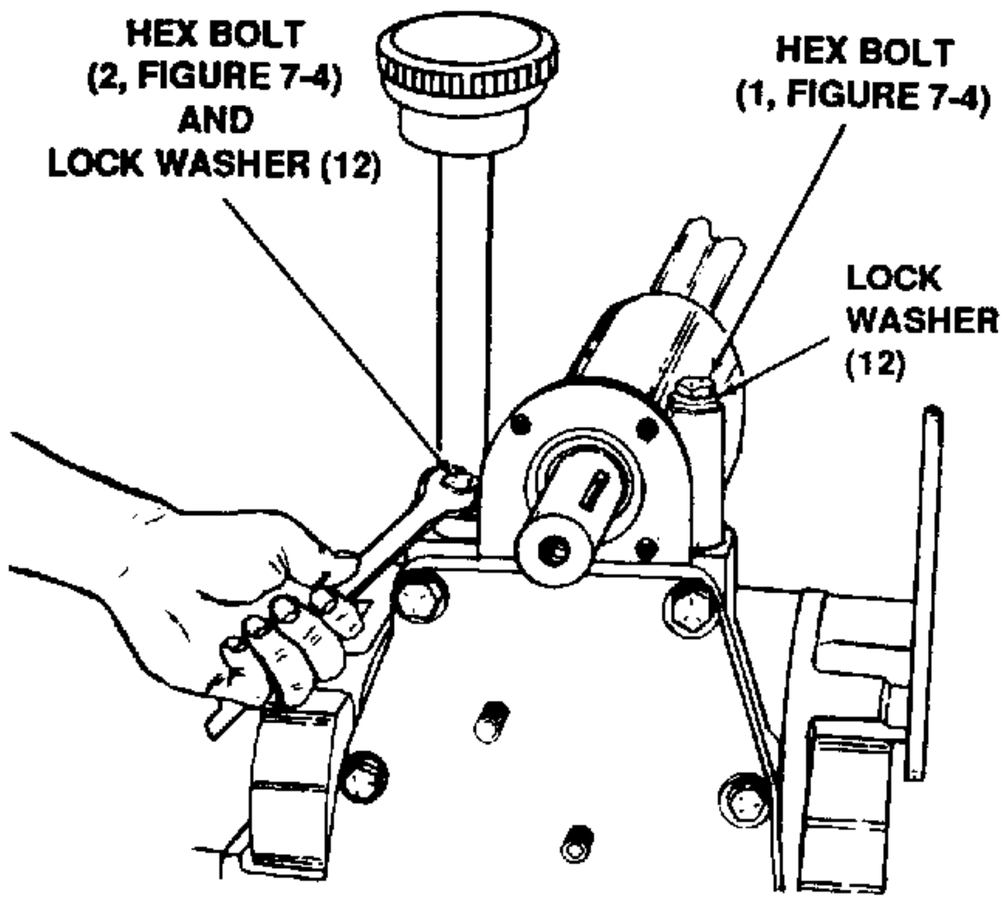


Figure 7-12. Securing Rear PTO Clutch Shaft.

4. Install rocker shaft assembly (12, Figure 7-2) to rear frame as follows:

   a. Remove one bolt, each side, from frame to transaxle horn.

   b. Position rocker shaft and support plate on frame and secure with 7/16 x 3/4-inch hex bolts (4, Figure 7-1) and lock nuts (10), and 3/8 x 3/4-inch grade 8 bolts (7) and lock nuts (11). Refer to Figure 7-13. Torque 7/16-inch bolts to 53 to 60 ft-lbs. Torque 3/8-inch bolts to 35 to 40 ft-lbs. Refer to Figure 7-13.

5. Install implement lift bar (1, Figure 7-2) as follows:

   a. Remove and discard headed pin through access hole in frame.

   b. From rear of tractor, place implement lift bar with countersunk hole towards the front of the tractor and facing the right side of the frame. Refer to Figure 7-14.

c. Attach front end of lift bar to hydraulic lift clevis assembly with 2-1/2-inch long headed pin (18, Figure 7-1) and 3/16 x 7/8-inch cotter pin (24).

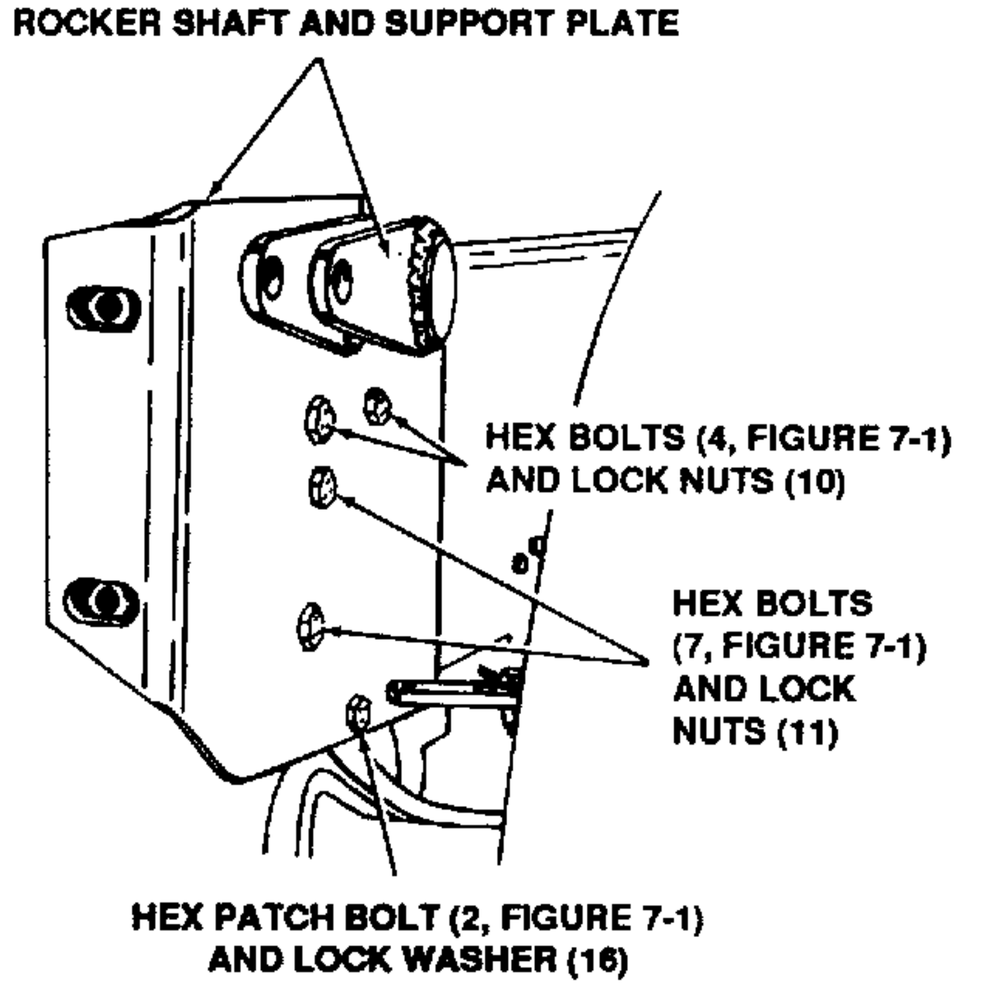


Figure 7-13. Installing Rocker Shaft Assembly.

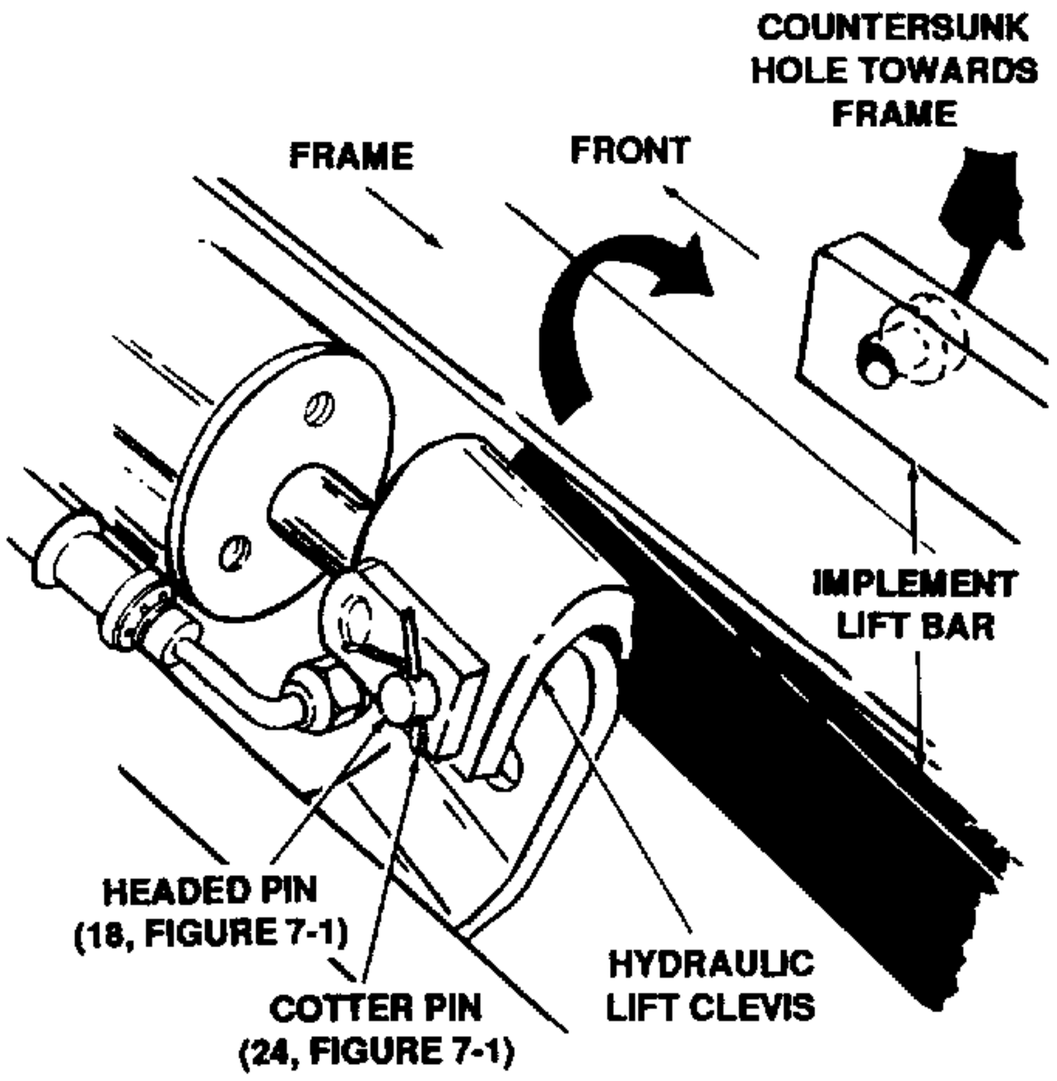


Figure 7-14. Installing Implement Lift Bar.

d. Attach rear end of implement lift bar to rocker shaft with straight unheaded clevis pin (21) and roll pin (26). Refer to Figure 7-15.

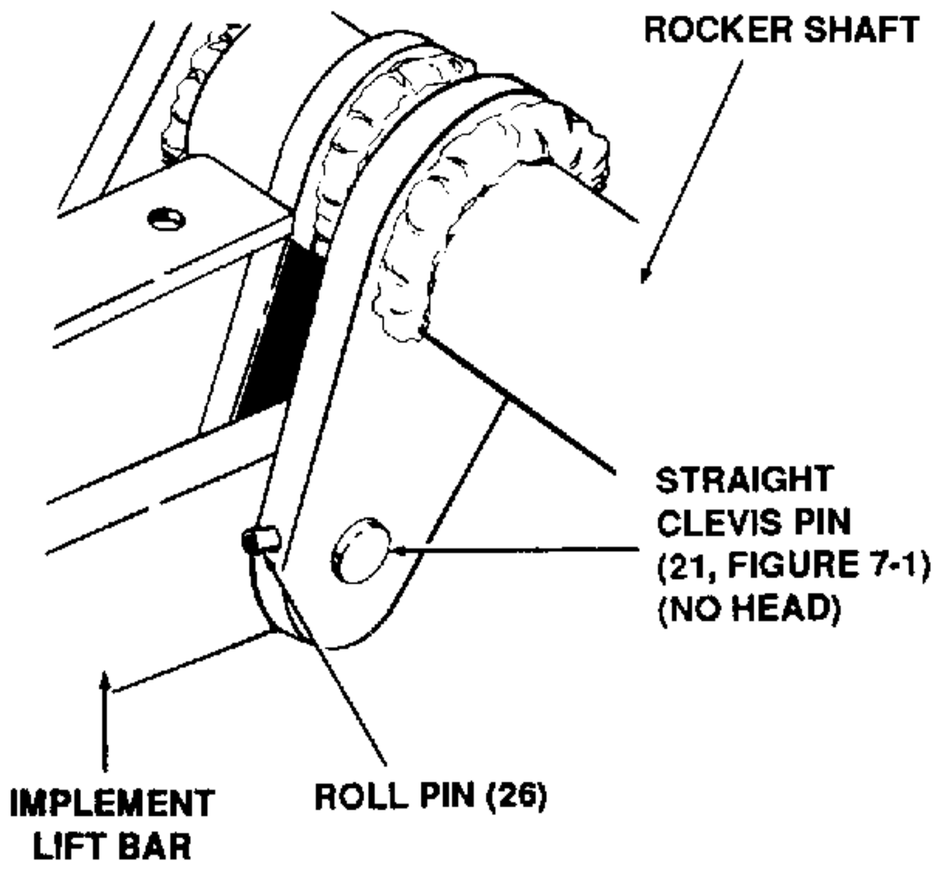


Figure 7-15. Securing Implement Lift Bar.

6. Install idler bracket assembly (6, Figure 7-3) on rear cover plate assembly (8) as follows:

   a. Place small amount of 251H EP grease on center shoulder bolt of rear cover plate assembly (8) and on exterior of spacer (7, Figure 7-4), and place spacer on shoulder bolt. Refer to Figure 7-16.

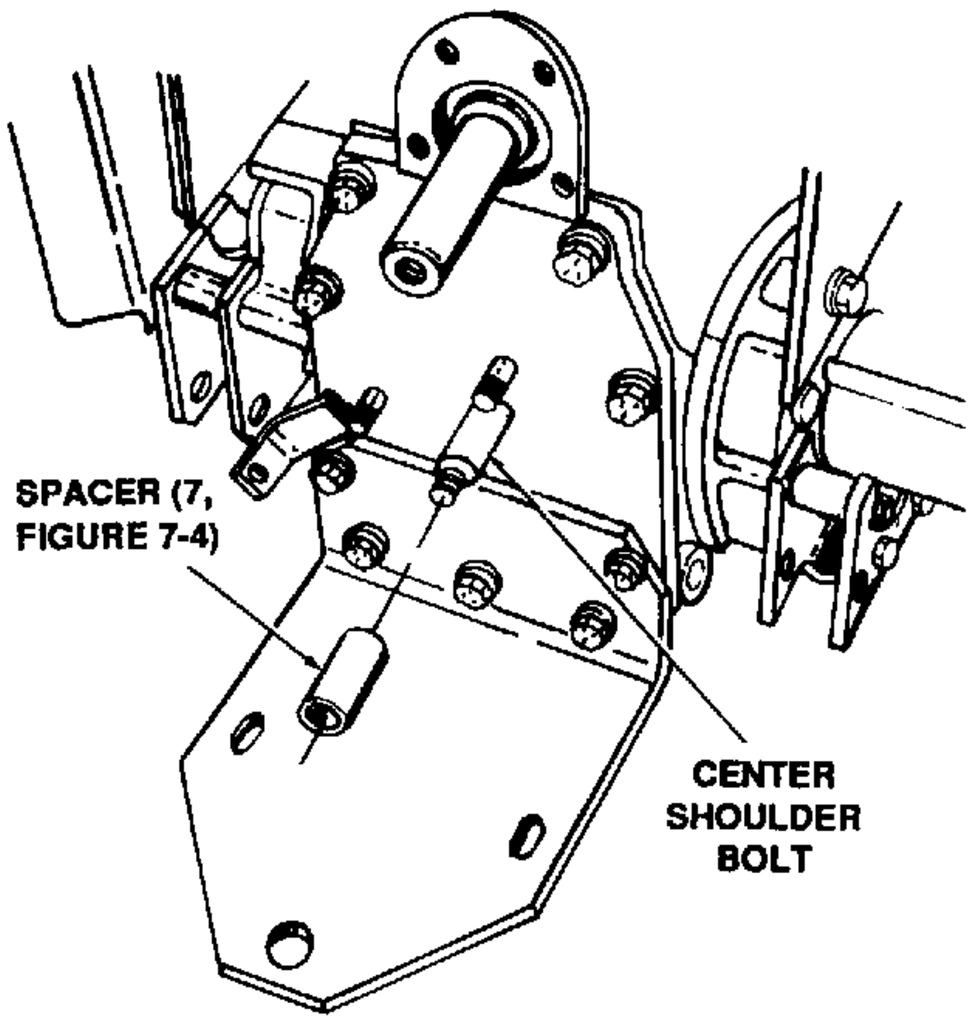


Figure 7-16. Installing the Idler Bracket Assembly.

   b. Grease interior of idler bracket assembly hub with 251H EP grease and install bracket over spacer (7, Figure 7-4).

   c. Secure idler bracket assembly with flat washer (13) and hex center lock nut (11). Refer to Figure 7-17.

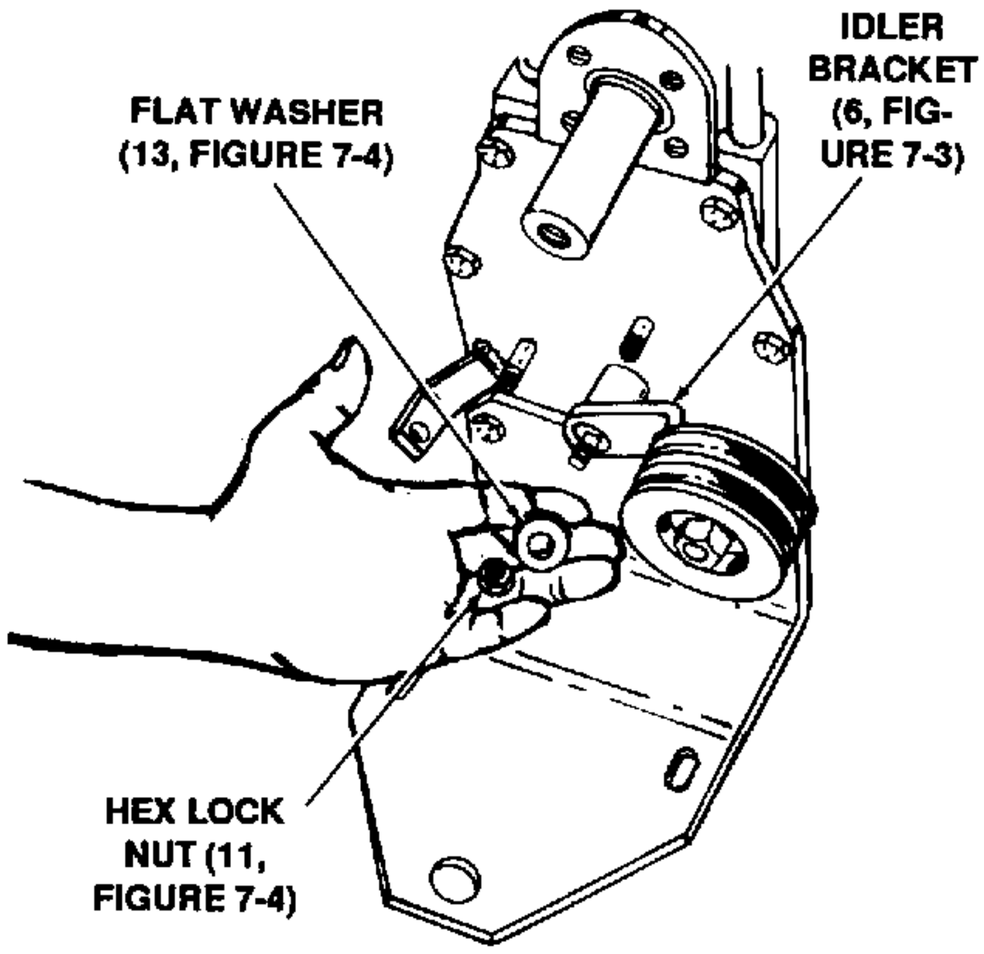


Figure 7-17. Securing the Idler Bracket Assembly.

7. Install clutch field assembly (2, Figure 7-3) onto rear PTO clutch shaft as follows:

   a. Grease rear PTO clutch shaft with 251H EP grease and slide spacer (8, Figure 7-4) onto shaft. Refer to Figure 7-18.

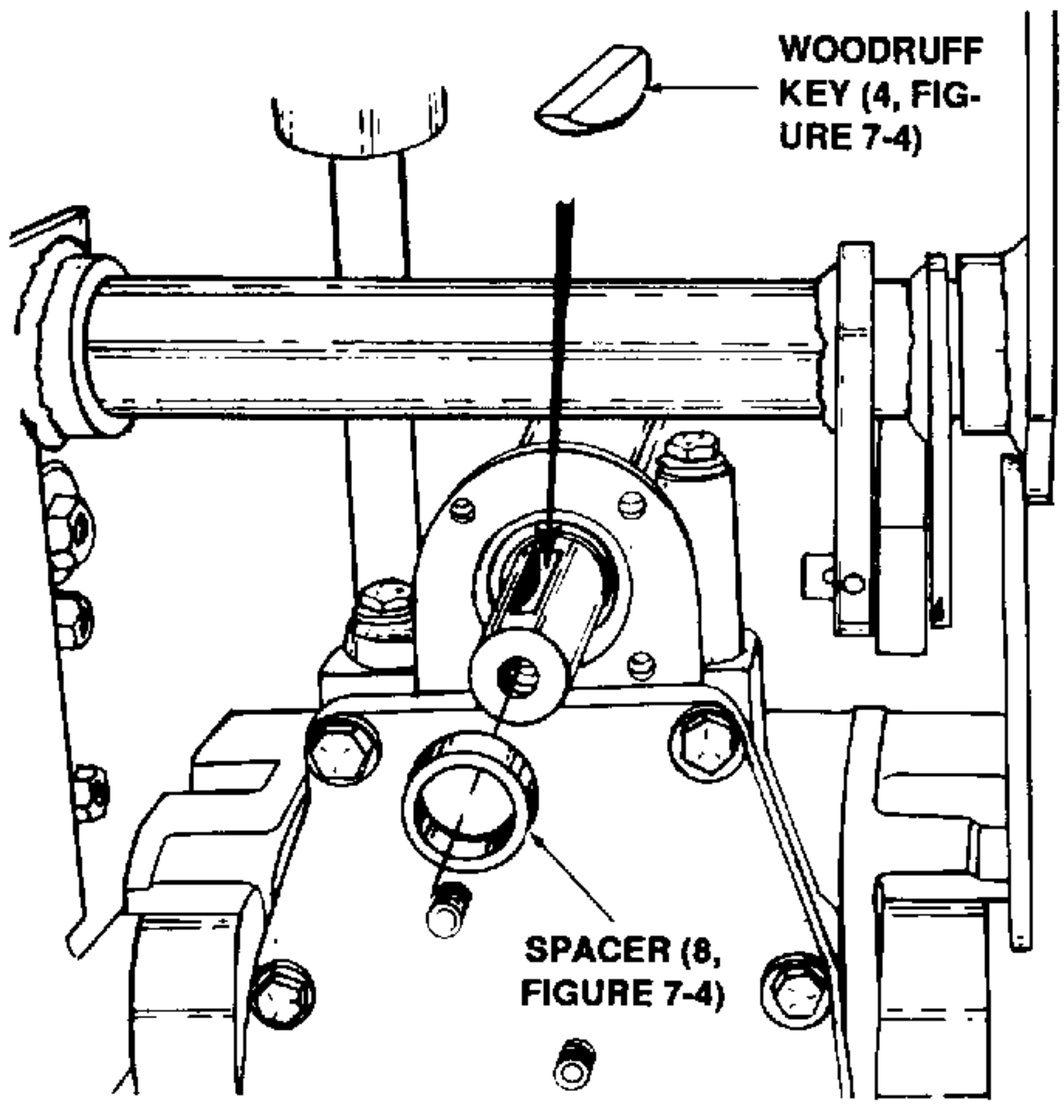


Figure 7-18. Installing the Clutch Field Assembly.

b. Insert woodruff key (4, Figure 7-4) in PTO clutch shaft and seat key by tapping with plastic mallet or block of wood.

c. Slide clutch field assembly onto rear PTO clutch shaft with clutch electrical connection on left hand side and cutout in clutch field to the bottom. Refer to Figure 7-19.

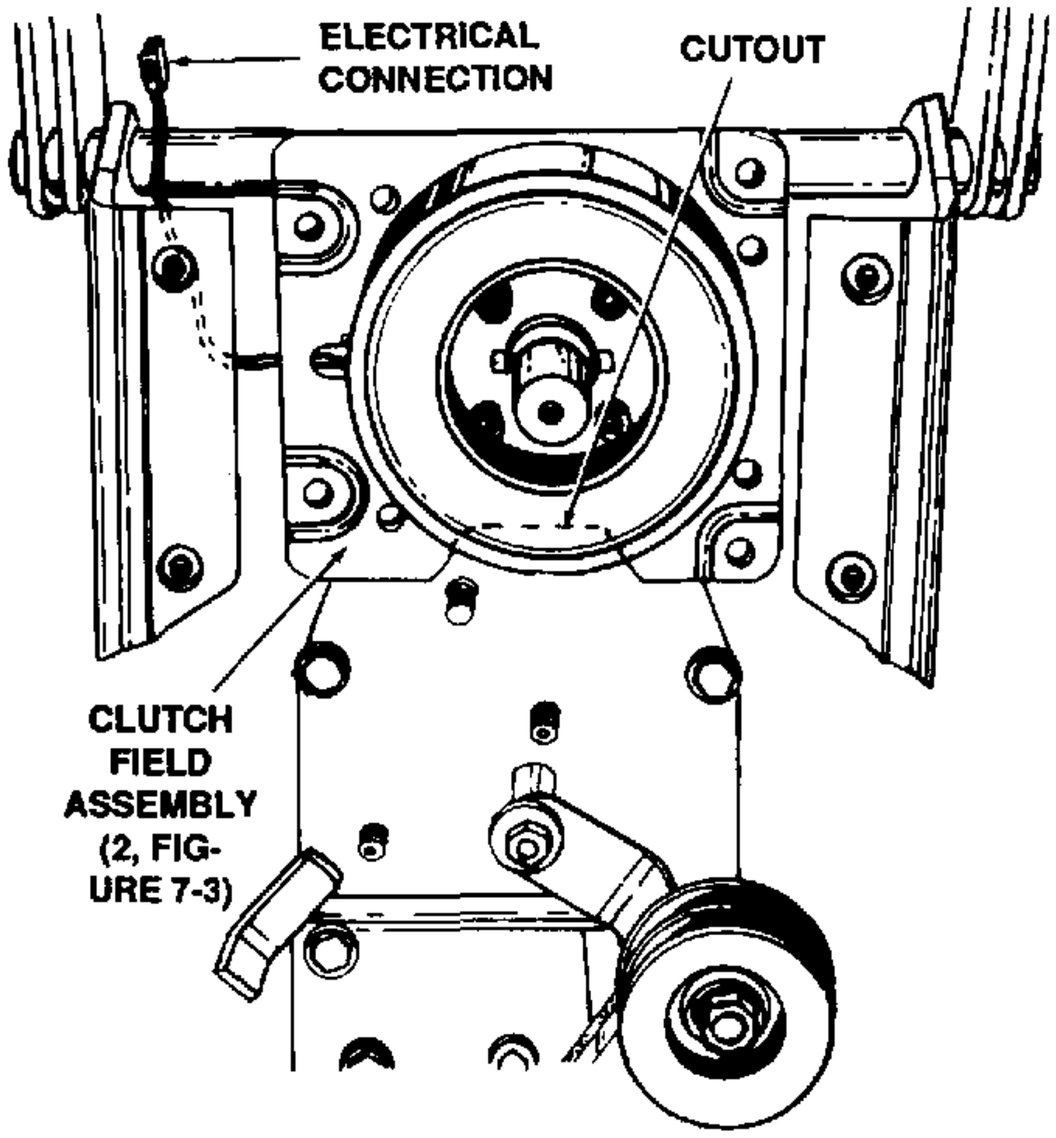


Figure 7-19. Installing Clutch Field Assembly on Rear PTO Clutch Shaft.

d. Secure clutch field assembly to rear PTO shaft casting with four socket head screws (6, Figure 7-4). Refer to Figure 7-20.

8. Slide clutch rotor (3, Figure 7-3) onto rear PTO clutch shaft (1) after lining up woodruff key with key slot in clutch rotor.

CAUTION

Use Lock-Tite 242 or 262 on hex bolt (10, Figure 7-4) prior to installation in step 9.

9. Slide clutch armature (4, Figure 7-3) over rear PTO clutch shaft (1) and secure with large flat washer (9, Figure 7-4) and 1-inch long hex grade 8 bolt (10). Refer to Figure 7-21.

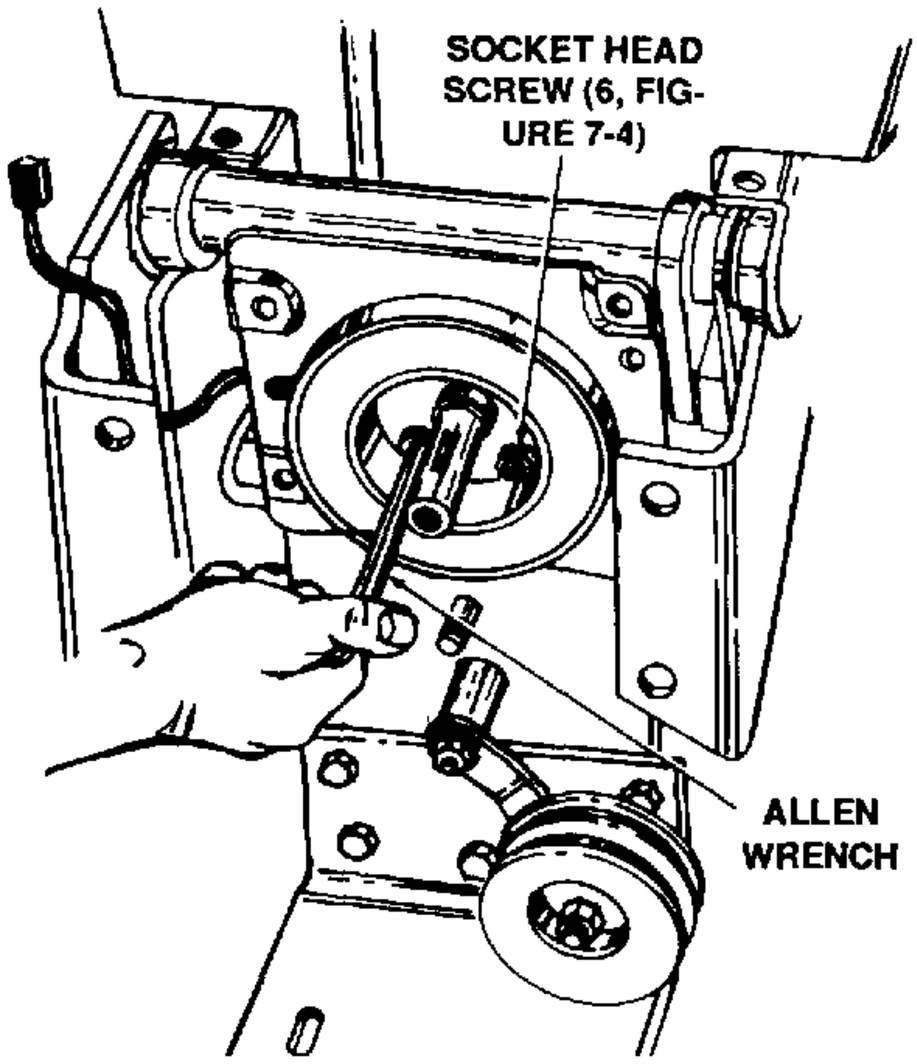


Figure 7-20. Securing Clutch Field Assembly.

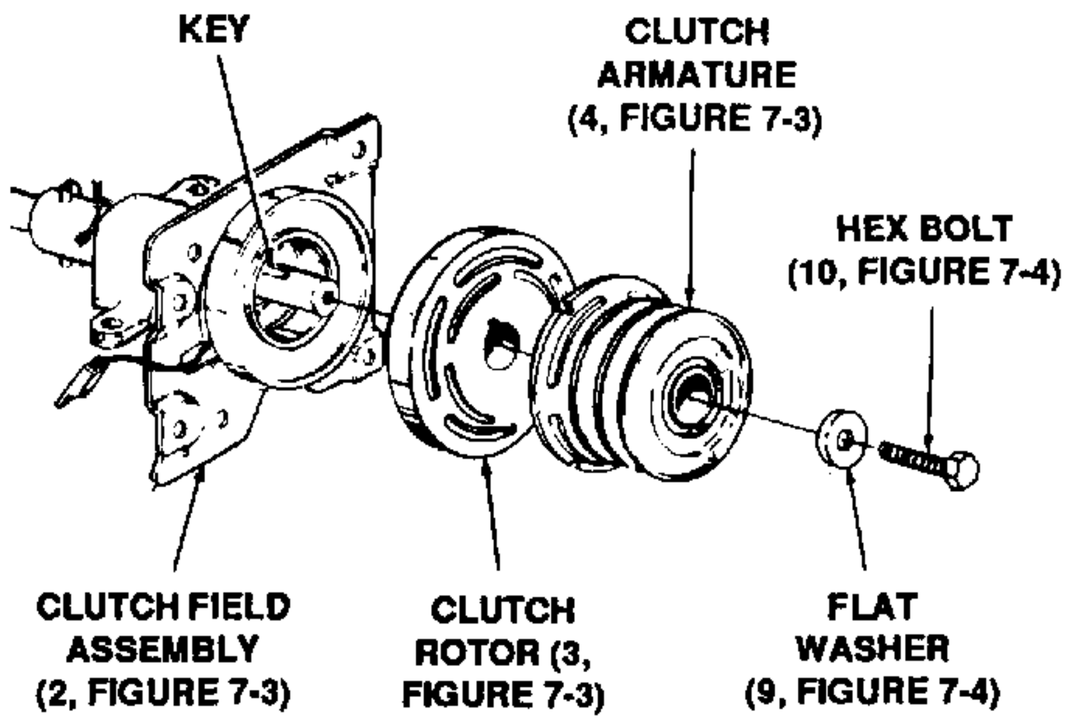


Figure 7-21. Installing Clutch Rotor on Rear PTO Clutch Shaft.

10. Install double pulley and rear PTO bearing housing (7, Figure 7-3) as follows:

a. Slide double pulley and rear PTO bearing housing onto studs in rear cover plate and

secure with three 3/8-inch hex center lock nuts (11, Figure 7-4). Refer to Figure 7-22.

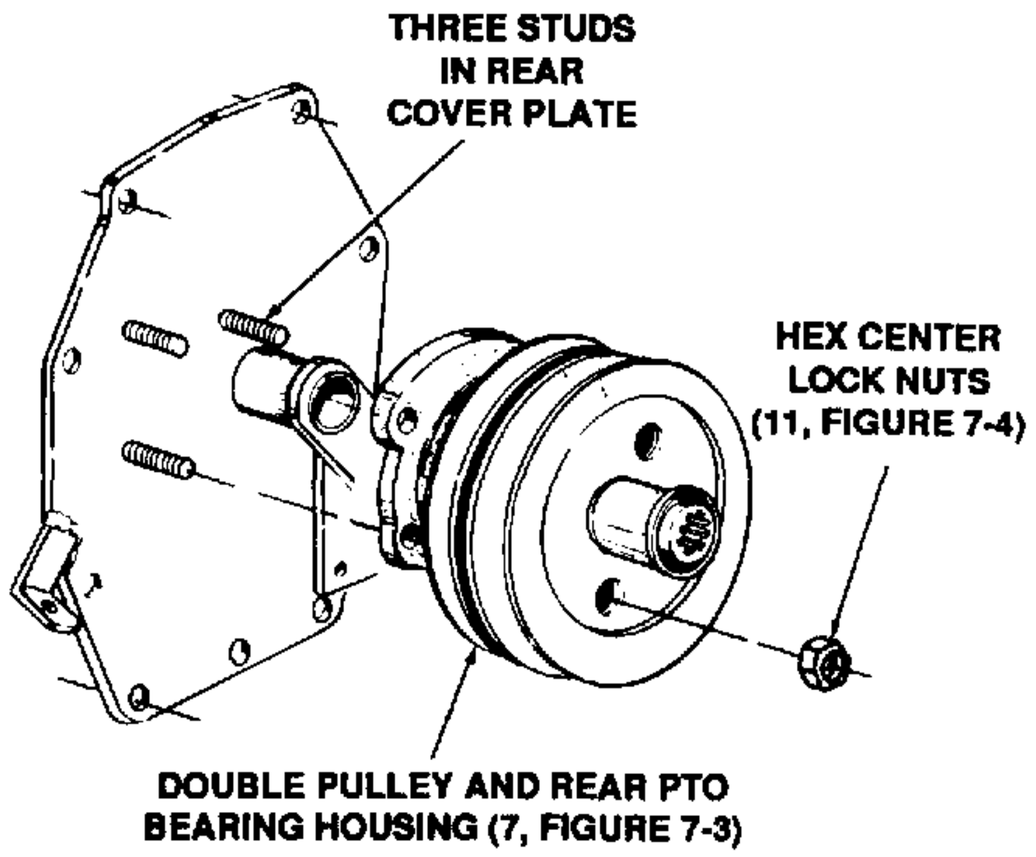


Figure 7-22. Installing Double Pulley and Rear PTO Bearing Housing.

b. Place socket head wrench through access holes in double pulley and tighten lock nuts. Refer to Figure 7-23.

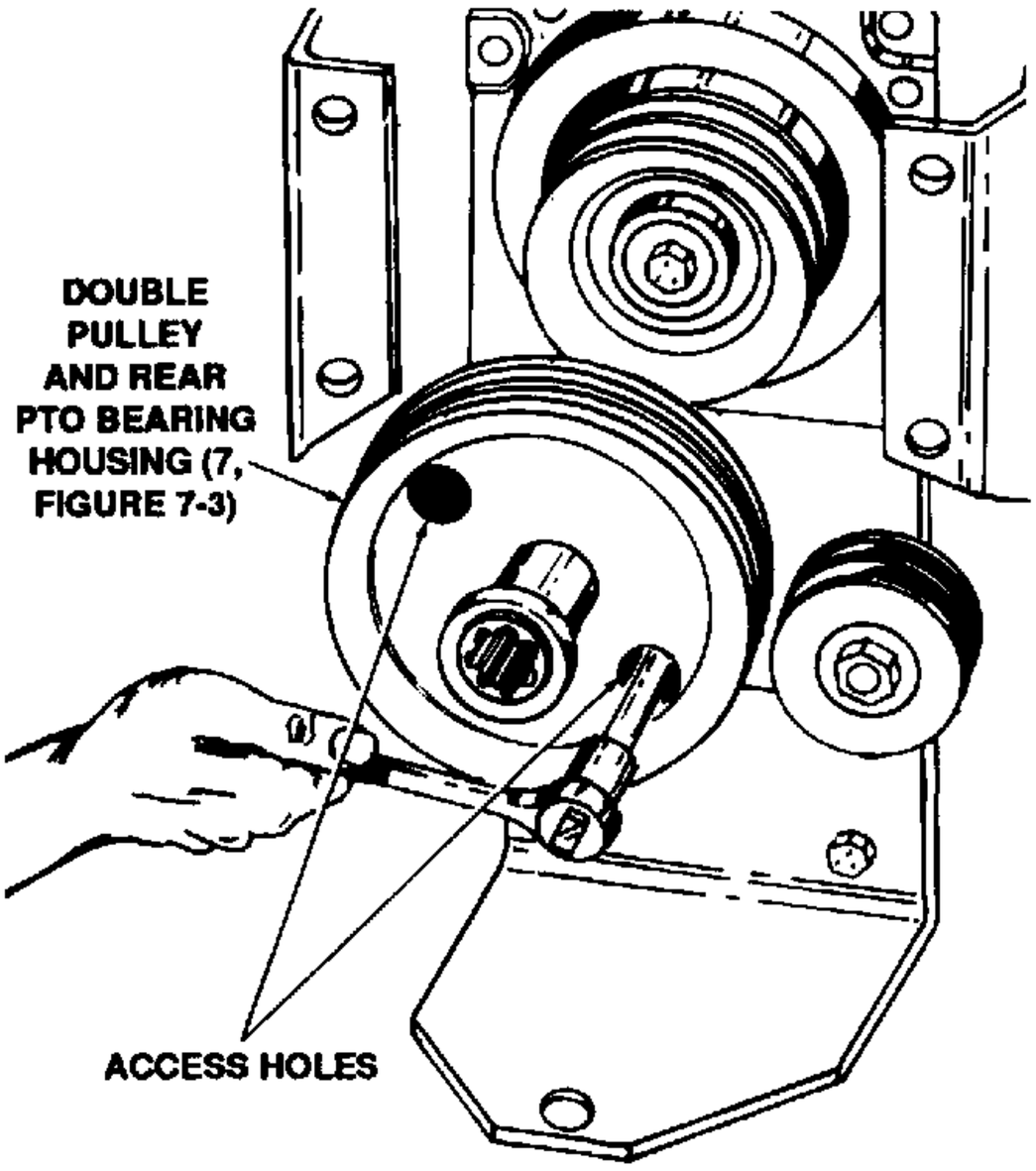


Figure 7-23. Tightening Lock Nuts In Double Pulley.

11. Install matched set of belts (5, Figure 7-3) onto pulleys as shown in Figure 7-24.

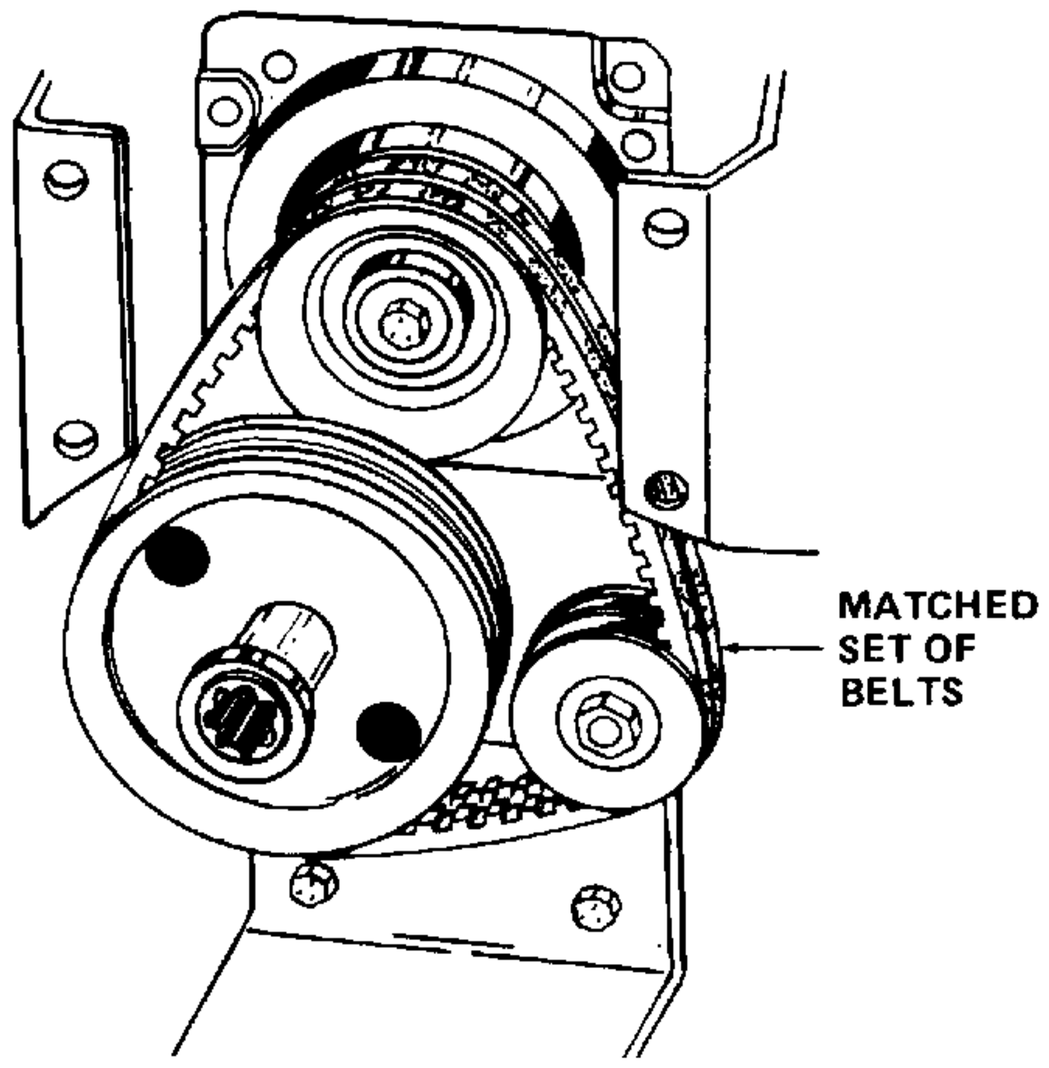


Figure 7-24. Installing Matched Set of Belts.

12. Install extension spring (5, Figure 7-4) as follows:
    a. Hook closed end of extension spring to welded tab on idler bracket assembly.
    b. Use a suitable tool to hook other end of spring to tab on rear cover plate. Refer to Figure 7-25.

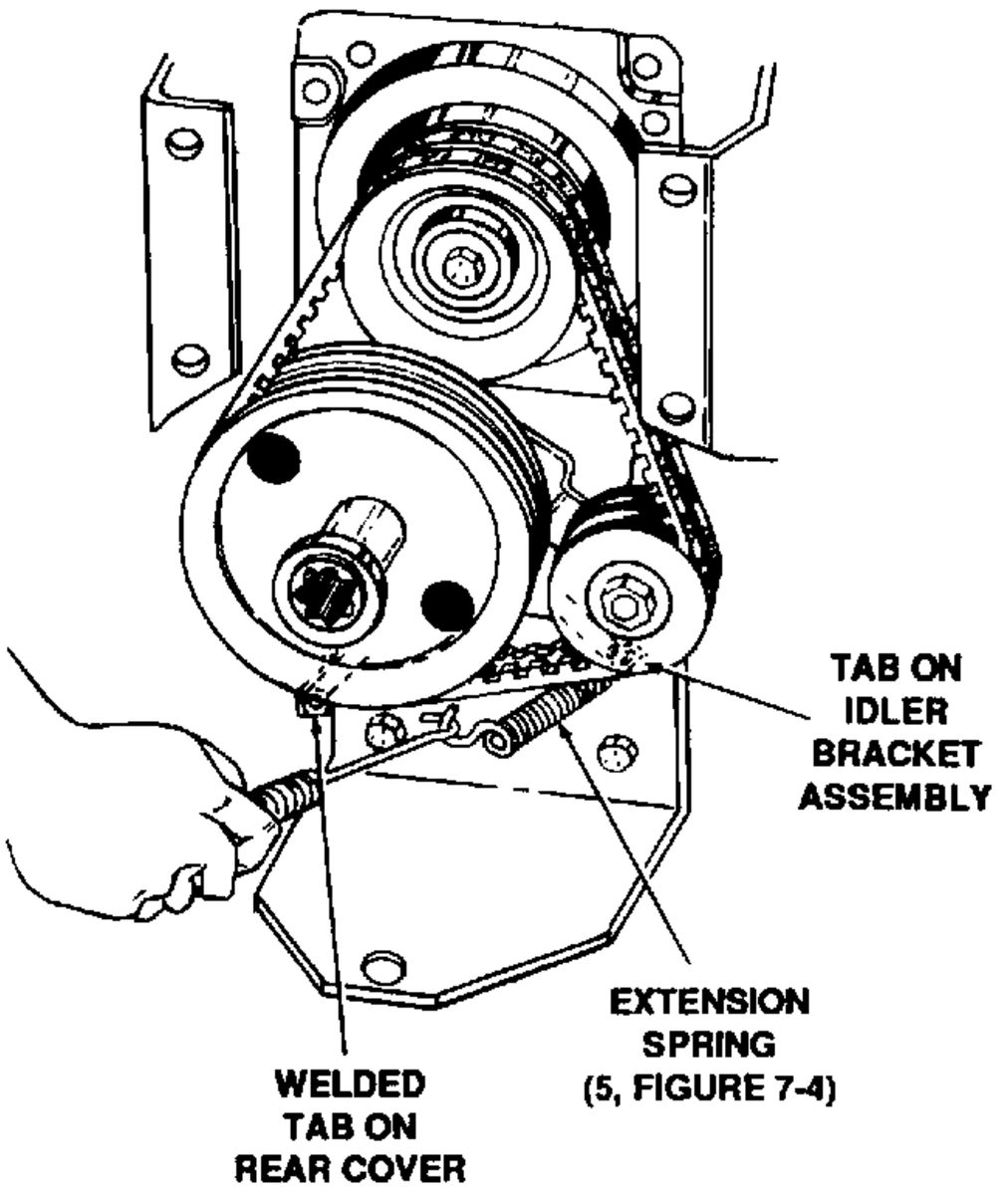


Figure 7-25. Installing Extension Spring.

13. Install lift link assemblies (2, Figure 7-2) into lower link assemblies (3 and 10) and secure with roll pins (25, Figure 7-1). Refer to Figure 7-26.

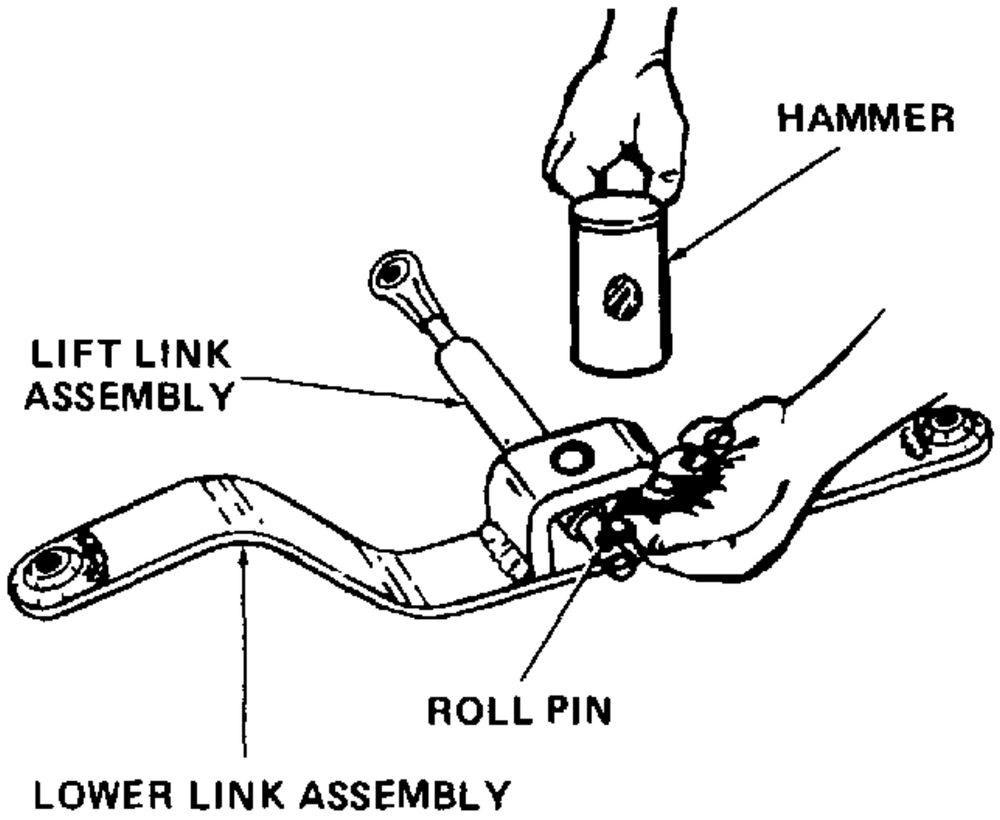


Figure 7-26. Installing Lift Link Assembly into Lower Link Assembly.

14. Install lower link assemblies (3 and 10, Figure 7-2) as follows:

    a. Secure both lower link assemblies to lower support plate with 1.9-inch long clevis pins (19, Figure 7-1) and small hairpin cotters (23). Refer to Figure 7-27.

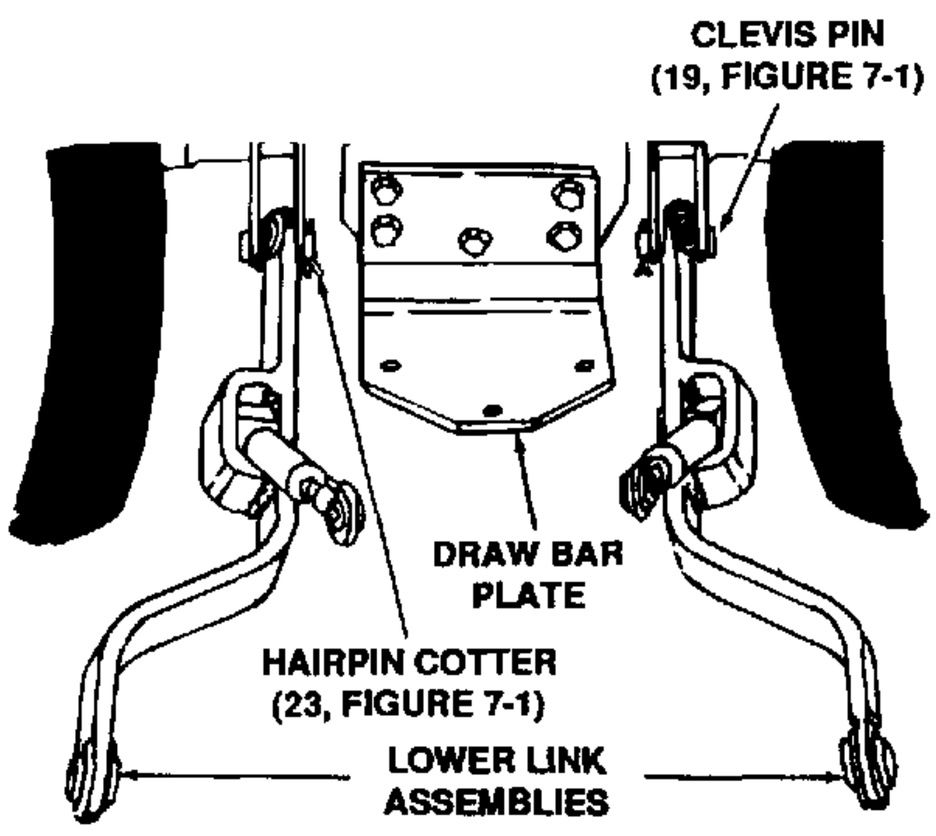
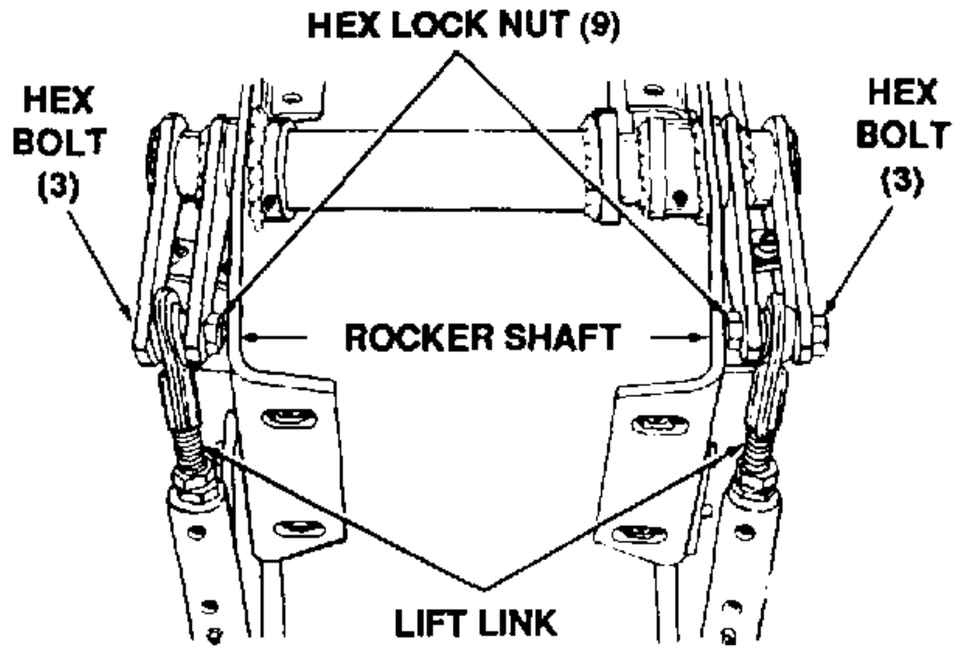


Figure 7-27. Installing Lower Link Assemblies.

    b. Secure lift links to rear holes in rocker shaft with 1/2 x 1-3/4-inch long hex bolts (3, Figure 7-1) and 1/2-inch hex lock nuts (9). Refer to Figure 7-28.



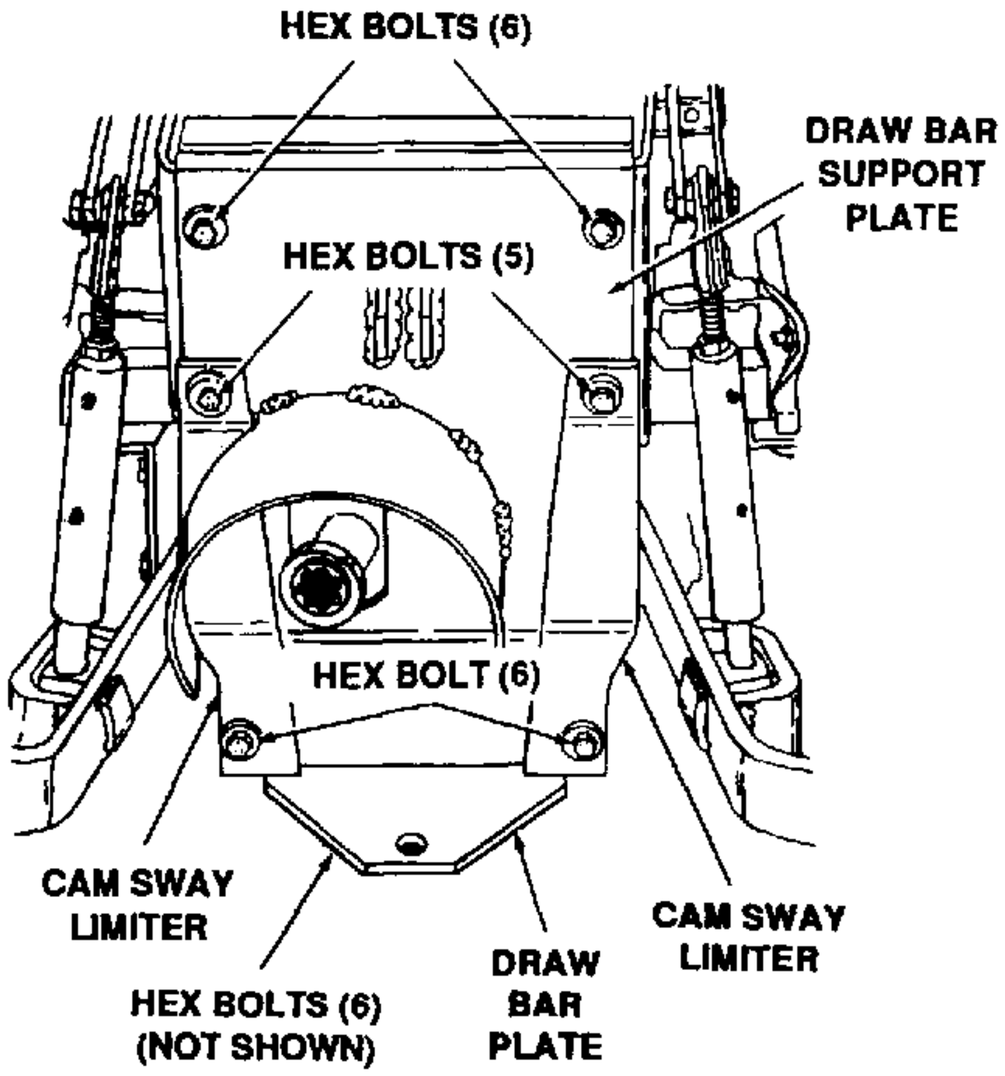
NOTE: ALL CALLOUT NUMBERS REFER TO FIGURE 7-1.

Figure 7-28. Securing Lift Links to Rocker Shaft.

15. Install draw bar support plate (11, Figure 7-2). Refer to Figure 7-29.

    a. Secure top holes of support plate to rocker shaft support plate with two 3/8 x 1-inch long hex bolts (6, Figure 7-1) and lock washers (16).

    b. Place cam sway limiters (4 and 7, Figure 7-2) in position as shown in Figure 7-29, and secure top holes with 3/8 x 1-1/4-inch bolts



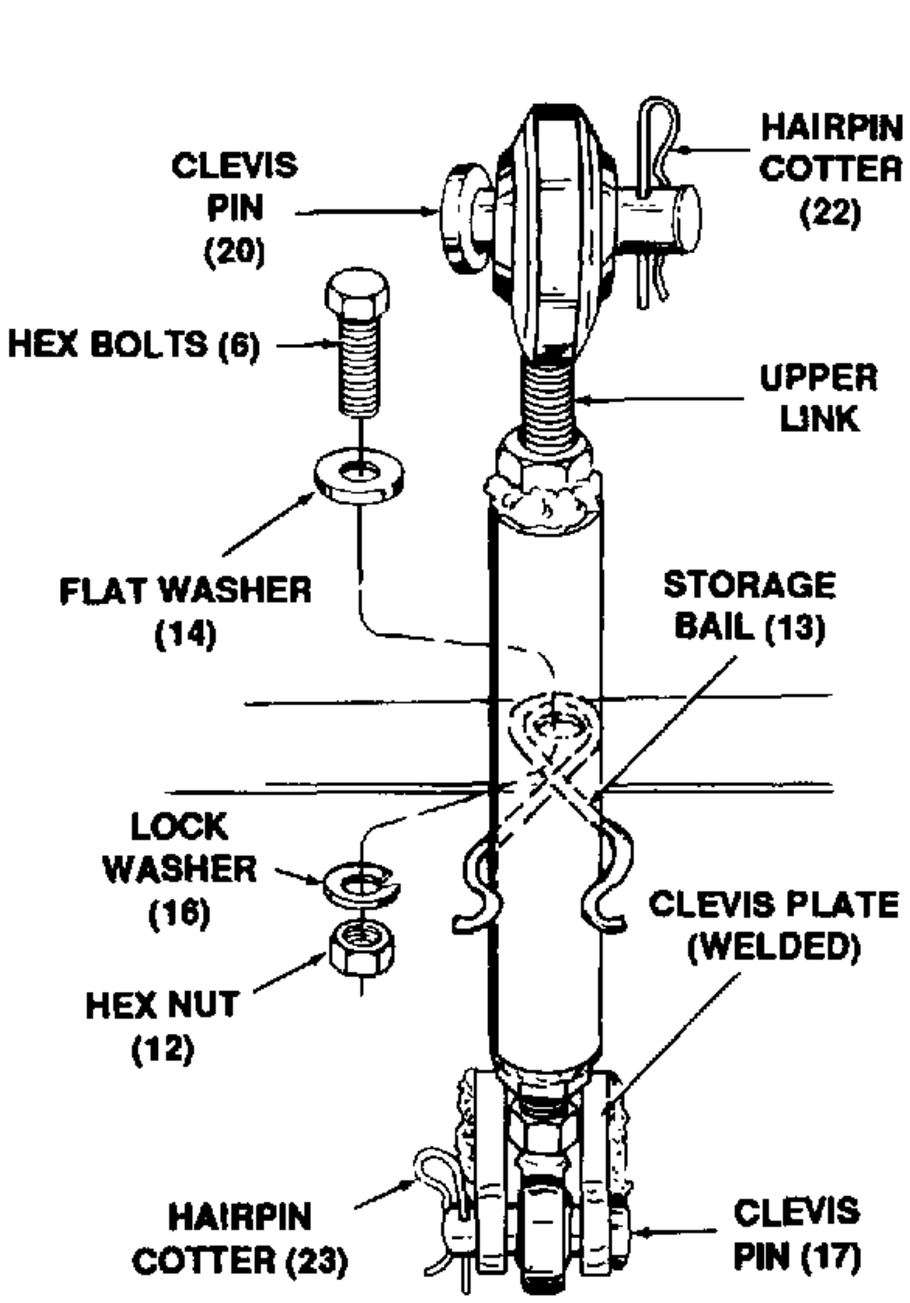
NOTE: ALL CALLOUT NUMBERS REFER TO FIGURE 7-1.

Figure 7-29. Installing Draw Bar Support Plate.

(5, Figure 7-1) and lock washers (16), and the bottom holes with 3/8 x 1-inch bolts (6) and lock washers (16).

c. Secure draw bar support plate to draw bar plate with two 3/8 x 1-inch long hex bolts (6) and nuts (11).

16. Install upper link storage bail (13) to draw bar support plate with a 3/8 x 1-inch hex bolt (6), 3/8 x 1-inch flat washer (14), 3/8-inch lock washer (16) and 3/8-inch hex nut (12). Refer to Figure 7-30.



NOTE: ALL CALLOUT NUMBERS REFER TO FIGURE 7-1.

Figure 7-30. Installing Upper Link Storage Bail.

17. Install upper link assembly (6, Figure 7-2) to draw bar support plate. Refer to Figure 7-30.

    a. Secure upper link to support plate with 1-1/2-inch long clevis pin (17, Figure 7-1) and small hairpin cotter (23).

    b. Install 5/8 x 2-3/8-inch long clevis pin (20) and large hairpin cotter (22) on end of upper link assembly.

18. Secure extension spring (27) to each lower link. Refer to Figure 7-31.

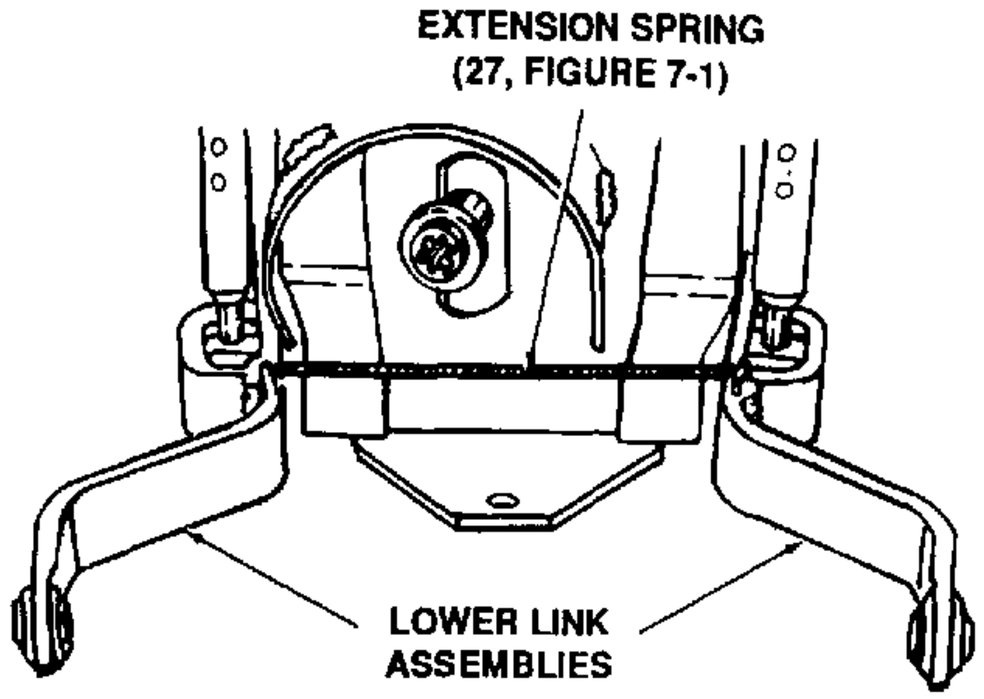


Figure 7-31. Securing Extension Spring.

7-2.3.2 PTO Directional Switch.

1. Prepare instrument panel for PTO directional switch (14, Figure 7-4) as follows:

    a. Disengage single pedal brake lock and push speed control lever fully forward.

    b. Position template (located on page 7-37) on instrument panel as shown in Figure 7-32 and tape to secure in place.

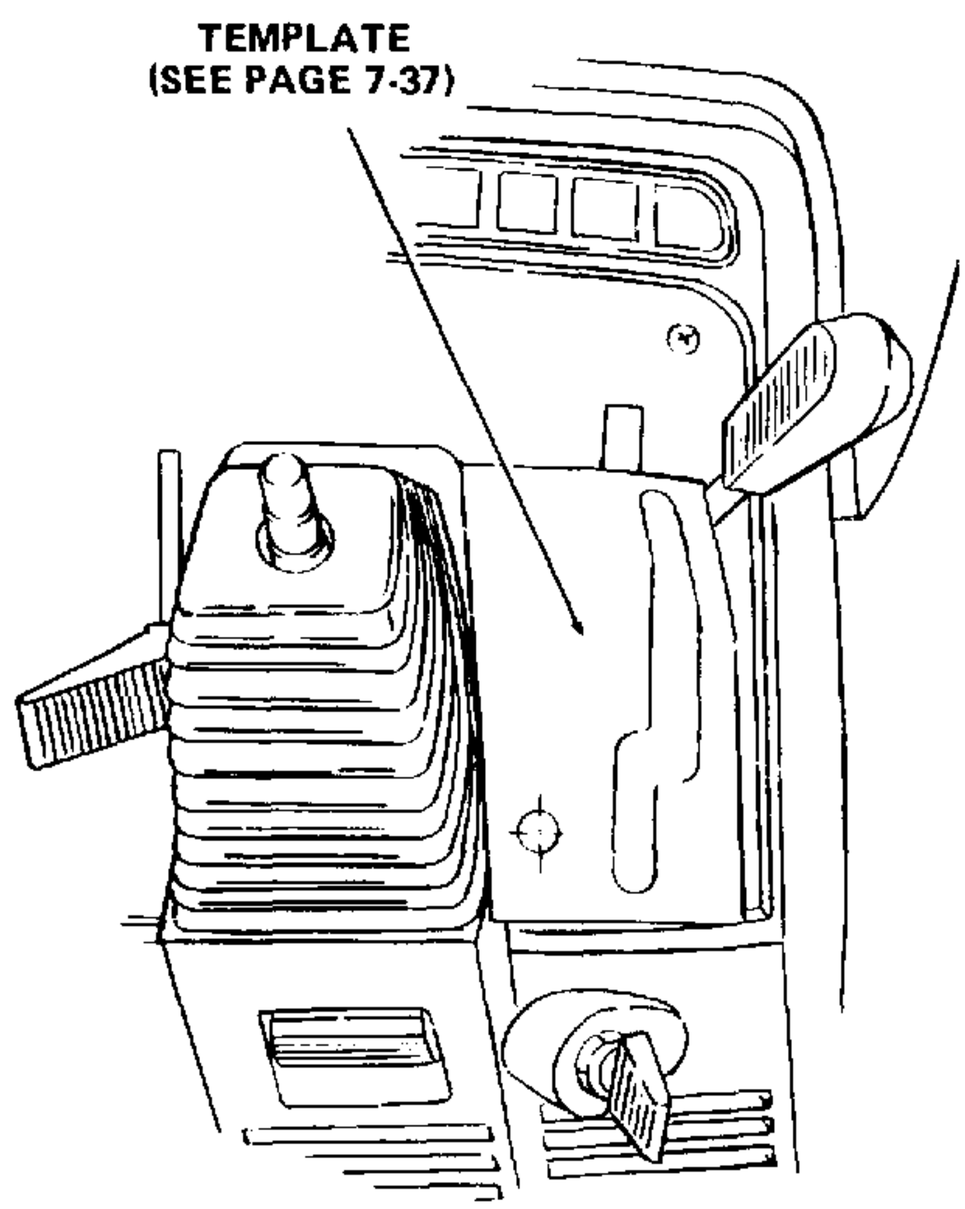


Figure 7-32. Positioning Template on Instrument Panel.

c. Align a 1/2-inch drill bit on template and drill hole through instrument panel.

d. Use a 1/2 x 13/16-inch spot face cutter to cut a recess approximately 1/16-inch deep in plastic surrounding 1/2-inch instrument panel hole.

e. Engage single pedal brake lock.

2. Locate and remove blue jumper wire and module in electrical harness beneath instrument panel. Refer to Figure 7-33.

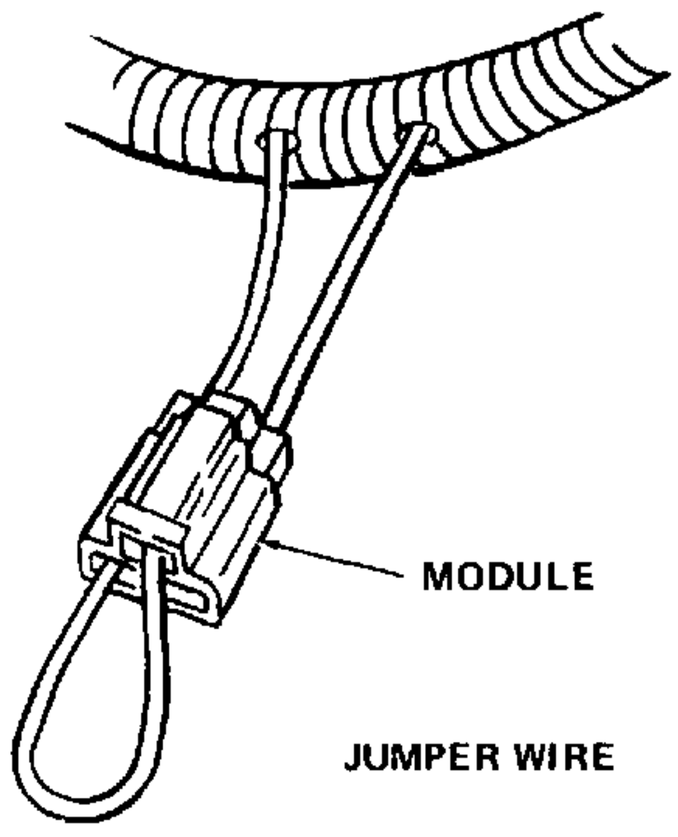


Figure 7-33. Removing Jumper Wire and Module.

3. Install supplied directional switch adapter lead (15, Figure 7-4) as follows:

   a. Connect one end of supplied adapter lead to harness from which jumper wire and module were removed.

   b. Connect other end of harness to PTO directional switch. Refer to Figure 7-34.

4. Install PTO directional switch in instrument panel as follows:

   a. Place switch through hole in instrument panel with electrical terminals on switch toward LEFT side of tractor.

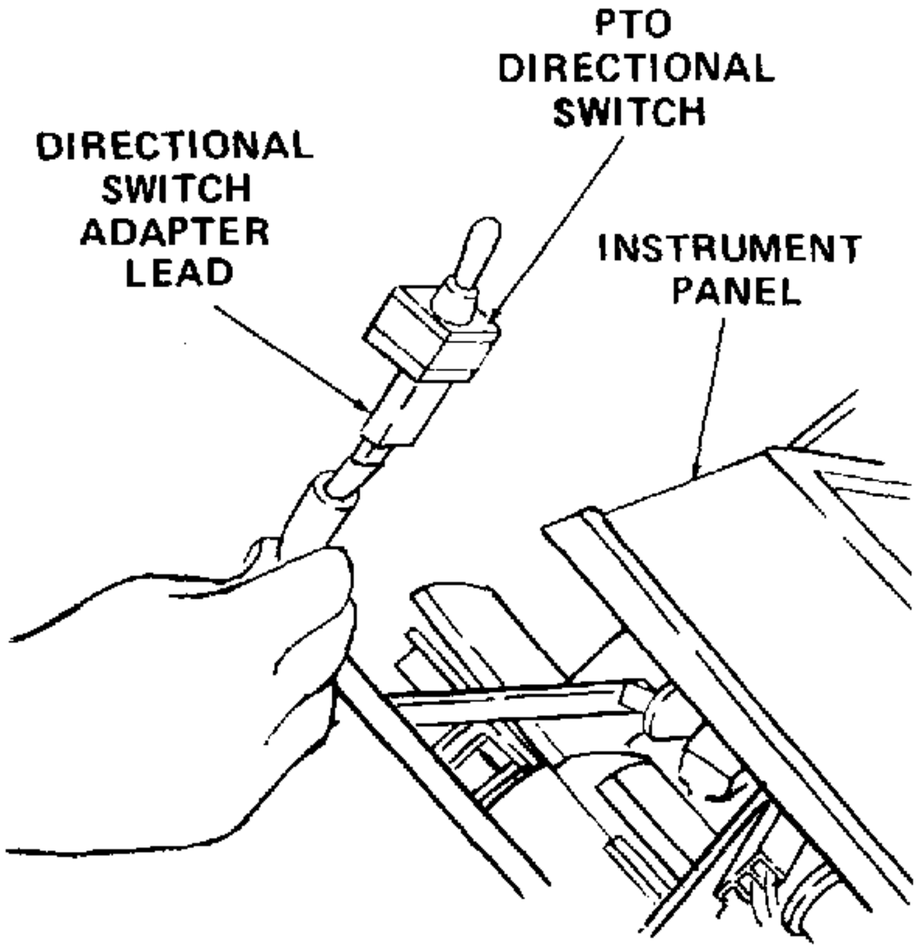


Figure 7-34. Installing Directional Switch Adapter Lead.

   b. Secure switch with nut.

5. Install appropriate frame cover instrument label (16 or 17, Figure 7-4) over existing label. See table below.

MODEL NO.	LABEL NO.
1782	779-3560
1882, 2082 and 2182	779-3561

7-2.4 **Tractor Reassembly.**

1. Install seat support assembly per paragraph 5-27.7.
2. Route electrical leads for PTO and tail lights and secure with tie straps.
3. Connect electrical lead for PTO to electrical connection on clutch field assembly (2, Figure 7-3).
4. Install fuel tank and connect fuel lines per paragraph 5-45.7 (Models 1882, 2082 and 2182).

5. Connect fuel tank for Model 1782 as follows:

   a. Install fuel tank per paragraph 5-46.7.

   b. Route return fuel line UNDER rocker shaft before connecting to T-fitting.

   c. Secure return fuel line and electrical lead for rear PTO to clutch field assembly with tie strap. Refer to Figure 7-35.

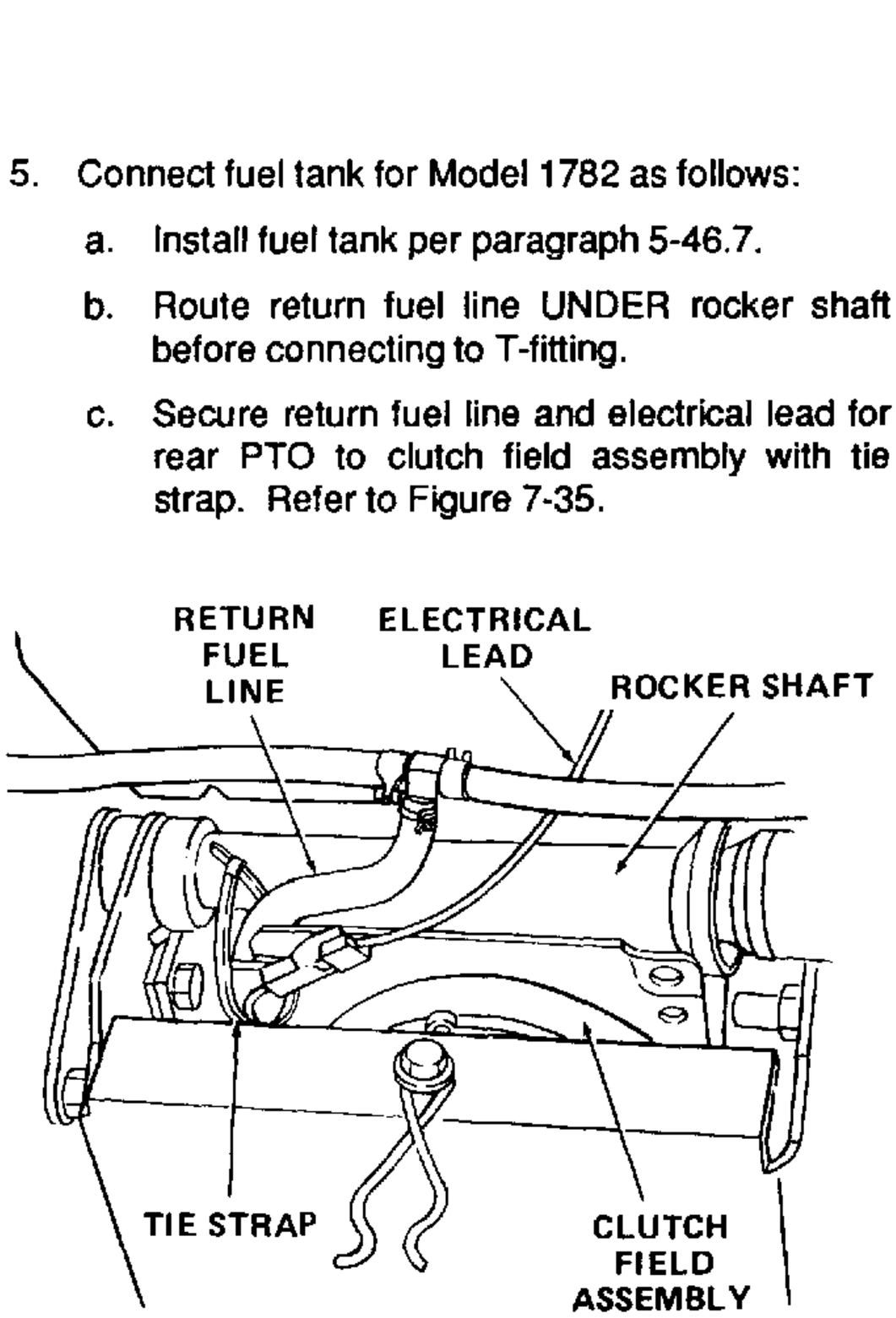


Figure 7-35. Securing Return Fuel Line and Electrical Lead.

6. Install fender and reconnect safety interlock and fuel sending unit electrical leads per paragraph 5-13.5 (Models 1882 and 2082) or 5-15.5 (Models 1782 and 2182).

7. Install seat and track assembly per paragraph 5-24.7.

8. Install center frame cover with four self-tapping screws.

9. Install radiator screen and secure left side panel.

10. Install right side panel per paragraph 5-4.7 (Models 1882 and 2082) or 5-5.7 (Models 1782 and 2182).

11. Install steering wheel per paragraph 5-30.7.

WARNING

The battery must be connected in the proper sequence to avoid arcing.

12. Connect battery per paragraph 5-8.5 (Models 1882 and 2082), 5-9.5 (Model 1782) or 5-10.5 (Model 2182).

7-2.5 **Adjustments.**

7-2.5.1 Lift Links. Lift links are adjustable to obtain desired position of lift links relative to one another. Adjust lift links as follows:

1. Loosen jam nuts and insert round bar in hole in lift link tube. Refer to Figure 7-36.

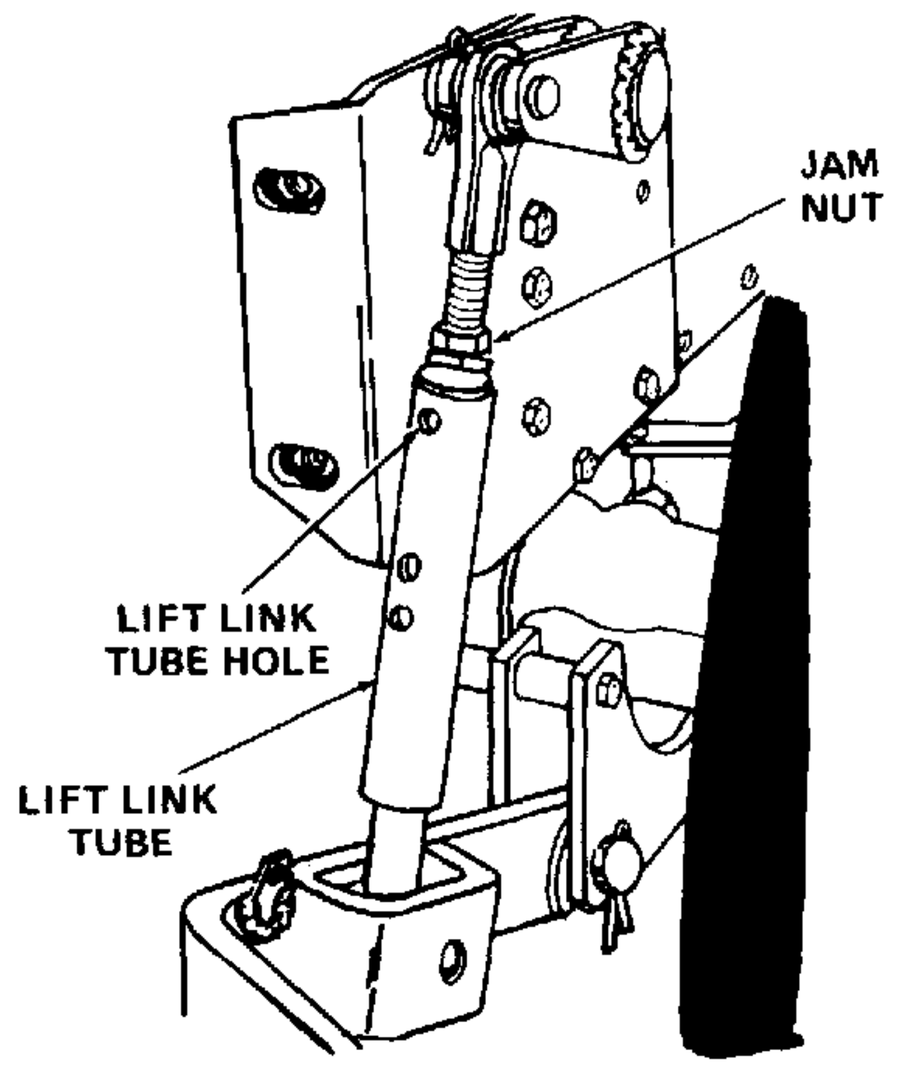


Figure 7-36. Adjusting the Lift Links.

2. Use round bar to turn lift link tube clockwise to lengthen link or counterclockwise to shorten link.

3. Tighten jam nut.

7-2.5.2 Upper Link. Upper link is adjustable to provide a way to level an implement. Adjust upper link as follows:

1. Loosen jam nut and turn upper link ball clockwise to shorten link or counterclockwise to lengthen link.

2. Tighten jam nut.

7-3. INSTALLATION OF 3-POINT HITCH KIT (Model 383).

7-3.1 **General.** The 3-point hitch kit Model 383 is for use on super garden tractors, serial number 800,000 and above. Before beginning installation, refer to Figures 7-1 and 7-2 to confirm that all parts are present and to acquaint yourself with parts nomenclature.

7-3.2 **Tractor Disassembly.**

1. Place tractor on a firm and level surface and chock tires.
2. Lower tractor lift to full down position. Check access hole to be sure headed pin is visible and positioned for later removal. Refer to Figure 7-5.

WARNING

The battery must be disconnected in the proper sequence in order to avoid arcing.

3. Disconnect battery per paragraph 5-8.2 (Models 1882 and 2082), 5-9.2 (Model 1782) or 5-10.2 (Model 2182).
4. Remove center frame cover by removing four self-tapping hex screws. Refer to Figure 7-5.
5. Remove seat and track assembly per paragraph 5-24.2.
6. Remove fender per paragraph 5-27.2.
7. Remove fuel tank per paragraph 5-45.2 (Models 1882, 2082 and 2182) or 5-46.2 (Model 1782).
8. Remove seat support assembly per paragraph 5-27.2.
9. Remove hitch plate assembly and draw bar by removing four hex cap screws and lock washers. Refer to Figure 7-6.
10. Drain transmission fluid into container with capacity of more than seven quarts.
11. Remove bottom five hex patch bolts and bell washers. Discard bolts but retain bell washers. Refer to Figure 7-7.

7-3.3 **Installation.**

1. Position draw bar plate (8, Figure 7-2) on rear cover plate as shown in Figure 7-37, and secure with five 1-1/4-inch long bolts (28, Figure 7-1) and bell washers retained per paragraph 7-3.2, step 11.

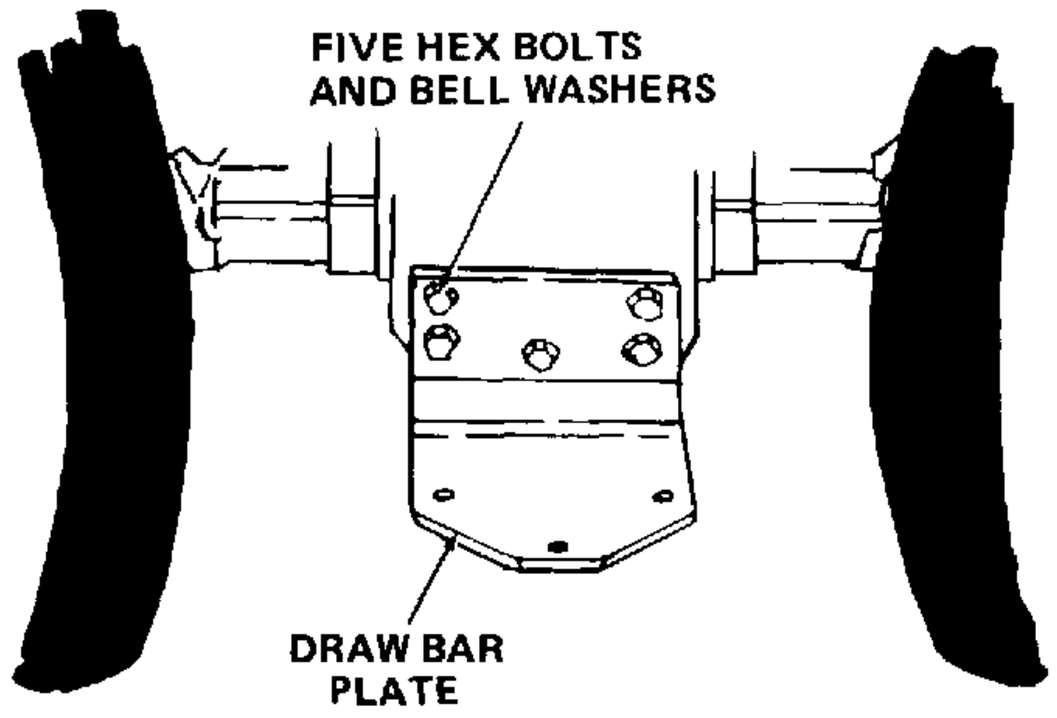


Figure 7-37. Installing Draw Bar Plate.

2. Install lower link support plates (5 and 9, Figure 7-2) on transaxle as follows:
   a. At each axle horn assembly on transaxle, remove lower three hex patch bolts and bell washers. Save washers and discard bolts. Refer to Figure 7-9.
   b. Secure a lower link support plate on left and right axle horn using bell washer retained per previous step, spacer (8, Figure 7-1), lock washers (16) and 4-inch hex patch bolts (1). Torque bolts to 30 ft-lbs. Refer to Figure 7-10.
3. Install rocker shaft assembly (12, Figure 7-2) to rear frame. Refer to Figure 7-13.
   a. Remove one bolt, each side, from frame to transaxle horn.
   b. Position rocker shaft assembly on frame and secure left and right sides with 7/16 x 3/4-inch hex bolts (4, Figure 7-1) and lock nuts (10), and 3/8 x 3/4-inch grade 8 bolts (7) and lock nuts (11). Torque 7/16-inch bolts to 53 to 60 ft-lbs. Torque 3/8-inch bolts to 35 to 40 ft-lbs.

4. Install implement lift bar (1, Figure 7-2) as follows:

   a. Remove and discard headed pin through access hole in frame.

   b. From rear of tractor, place implement lift bar with countersunk hole toward the front of the tractor and facing the right side of the frame. Refer to Figure 7-14.

   c. Attach front end of lift bar to hydraulic lift clevis assembly with 2-1/2-inch long headed pin (18, Figure 7-1) and 3/16 x 7/8-inch cotter pin (24).

   d. Attach rear end of implement lift bar to rocker shaft with straight unheaded clevis pin (21) and roll pin (26). Refer to Figure 7-15.

5. Install lift link assemblies (2, Figure 7-2) into lower link assemblies (3 and 10) and secure with roll pins (25, Figure 7-1). Refer to Figure 7-26.

6. Install lower link assemblies (3 and 10, Figure 7-2) as follows:

   a. Secure both lower link assemblies to lower support plate with 1.9-inch long clevis pins (19, Figure 7-1) and small hairpin cotters (23). Refer to Figure 7-27.

   b. Secure lift links to rear holes in rocker shaft with 1/2 x 1-3/4-inch long hex bolts (3, Figure 7-1) and 1/2-inch hex lock nuts (9). Refer to Figure 7-28.

7. Install draw bar support plate (11, Figure 7-2). Refer to Figure 7-38.

   a. Secure top holes of support plate to rocker shaft support plate with two 3/8 x 1-inch long hex bolts (7, Figure 7-1) and lock washers (16).

   b. Place cam sway limiters (4 and 7, Figure 2) in position as shown in Figure 7-38, secure top holes with 3/8 x 1-1/4-inch bolts (5, Figure 7-1) and the bottom holes with 3/8 x 1-inch bolts (6).

   c. Secure draw bar support plate to draw bar plate with two 3/8 x 1-inch long hex bolts (6).

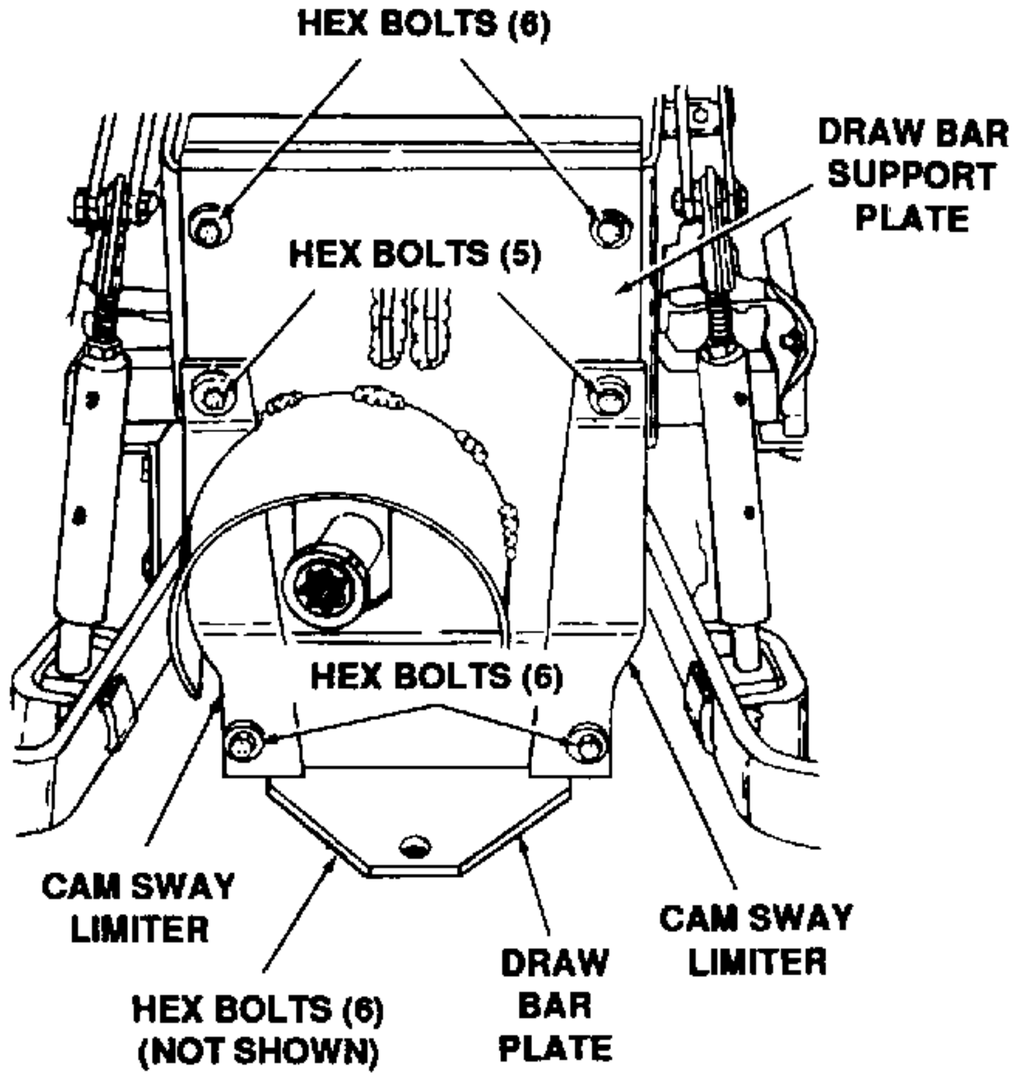
8. Install upper link storage bail (13) to draw bar support plate with a 3/8 x 1-inch hex bolt (6), 3/8 x 1-inch flat washer (14), 3/8-inch lock washer (16) and 3/8-inch hex nut (11). Refer to Figure 7-30.

9. Install upper link assembly (6, Figure 7-2) to draw bar support plate. Refer to Figure 7-30.

   a. Secure upper link to support plate with 1-1/2-inch long clevis pin (17, Figure 7-1) and small hairpin cotter (23).

   b. Install 5/8 x 2-3/8-inch long clevis pin (20) and large hairpin cotter (22) on end of upper link assembly.

10. Secure extension spring (27) to each lower link. Refer to Figure 7-39.



NOTE: ALL CALLOUT NUMBERS REFER TO FIGURE 7-1.

Figure 7-38. Installing Draw Bar Support Plate.

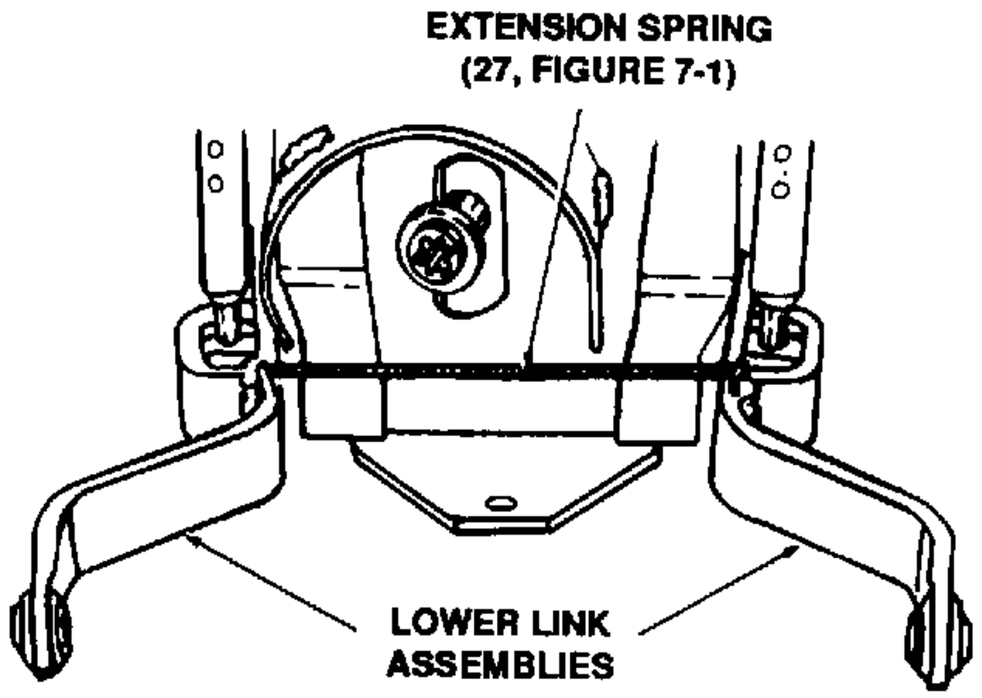


Figure 7-39. Securing Extension Spring to Lower Link Assemblies.

7-3.4 **Tractor Reassembly.**

1. Install seat support assembly per paragraph 5-27.7.
2. Route electrical leads for PTO and tail lights, and secure with tie straps.
3. Install fuel tank and connect fuel lines per paragraph 5-45.7 (Models 1882, 2082 and 2182).
4. Connect fuel tank for Model 1782 as follows:
   a. Install fuel tank per paragraph 5-46.7.
   b. Route return fuel line UNDER rocker shaft before connecting to T-fitting.
   c. Secure return fuel line with tie strap.
5. Install fender and reconnect safety interlock and fuel sending unit electrical leads per paragraph 5-27.7.
6. Install seat and tract assembly per paragraph 5-24.7.
7. Install center frame cover with four self-tapping screws.

WARNING

The battery must be connected in the proper sequence to avoid arcing.

8. Connect battery per paragraph 5-8.5 (Models 1882 and 2082), 5-9.5 (Model 1782) or 5-10.2 (Model 2182).

7-3.5 **Adjustments.**

7-3.5.1 Lift Links. Lift links are adjustable to obtain desired position of lift links relative to one another. Adjust lift links per paragraph 7-2.5.1.

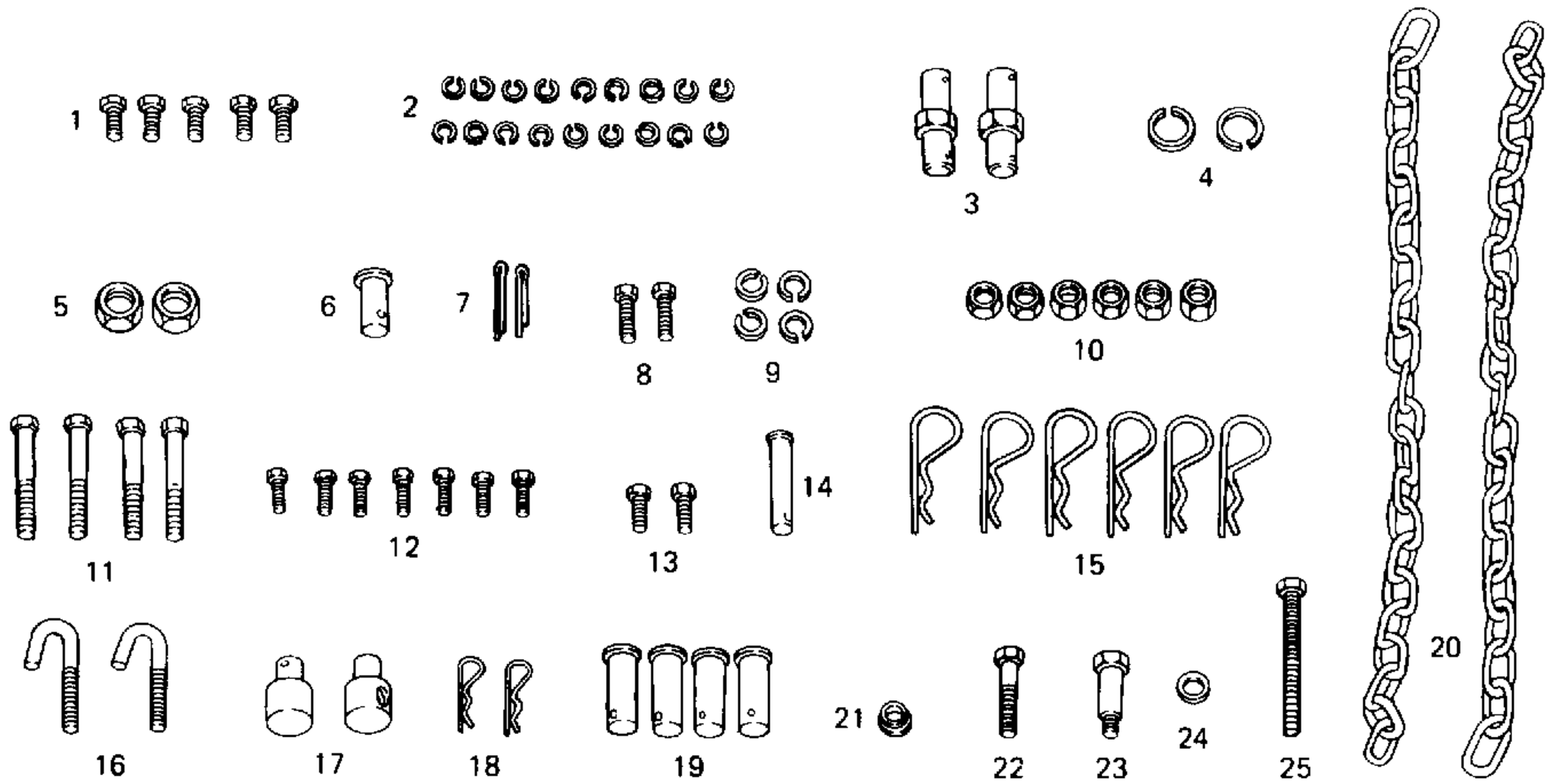
7-3.5.2 Upper Link. Upper link is adjustable to provide a way to level an implement. Adjust upper link per paragraph 7-2.5.2.

7-4. INSTALLATION OF 3-POINT HITCH KIT (Models 388 and 389).

7-4.1 **General.** The 3-point hitch kit Models 388 and 389 are for use on standard garden tractors, serial number 800,000 and above. Kit Model 388 is for use on tractors equipped with a manual lift. Kit Model 389 is for use on tractors equipped with a hydraulic lift. Before you begin to install the 3-Point Hitch Kit Model 388 or 389, remove all parts from the box. Refer to Figures 7-40 and 7-41 to confirm that all parts are present and to acquaint yourself with parts nomenclature.

7-4.2 **Tractor Disassembly.** The following tractor disassembly instructions apply to both manual lift tractors and hydraulic lift tractors, except where specifically noted.

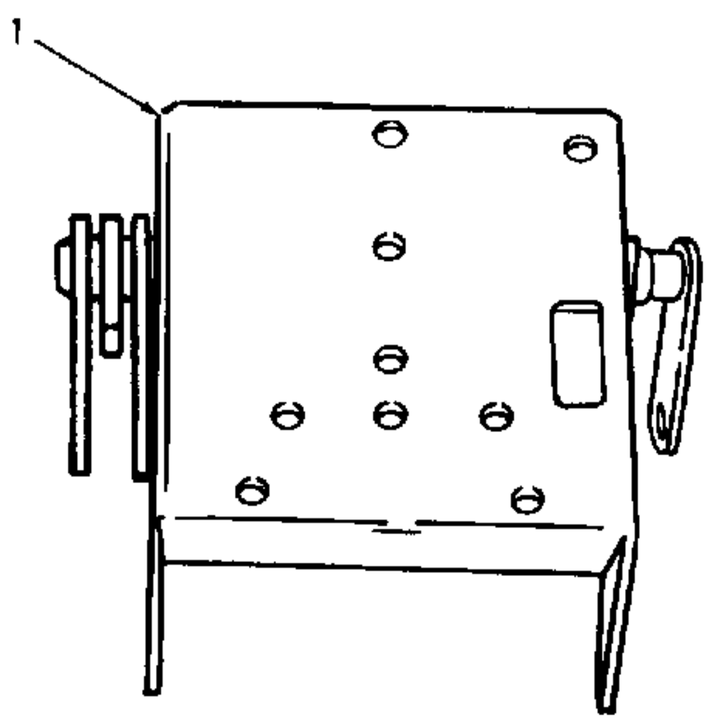
1. Place tractor on a firm and level surface and engage brake lock.

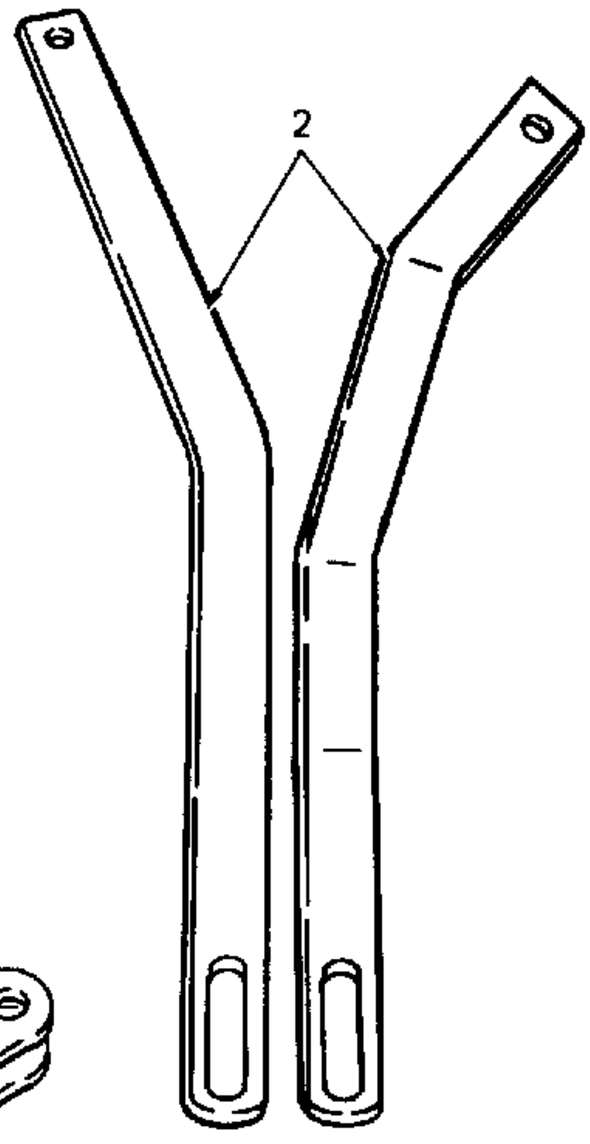


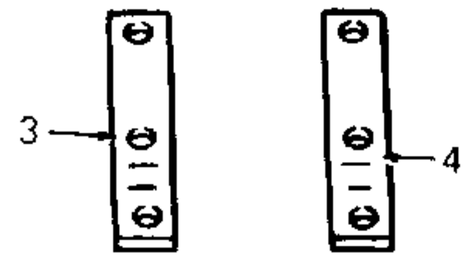
		QUANTITY	
		388	389
1.	Hex Patch Screw, 3/8-16 x 1.0 Lg GR5	5	5
2.	Lock Washer, 3/8"	20	18
3.	Link Clevis Pin	2	2
4.	Lock Washer, 5/8"	2	2
5.	Hex Center Lock Nut, 5/8-18	2	2
6.	Clevis Pin, .62 x 1.32" Lg	1	1
7.	Cotter Pin, 1/8" Dia x 1.0" Lg	1	1
8.	Hex Cap Screw, 7/16-14 x 1.0" GR5	3	2
9.	Lock Washer, 7/16"	5	4
10.	Hex Center Lock Nut, 7/16-14	7	6
11.	Hex Patch Screw, 3/8-16 x 2.5" Lg GR5	4	4
12.	Hex Bolt, 3/8-16 x .75" Lg GR5	7	7
13.	Hex Cap Screw, 3/8 x .88" Lg GR5	4	2
14.+	Clevis Pin, 1/2" Dia x 2.562" Lg	0	1
15.	Internal Cotter Pin	6	6
16.	Chain Hook	2	2
17.	Ferrule	2	2
18.	Hitch Pin	2	2
19.	Clevis Pin, .625" Dia	4	4
20.	Chain, 3/16" Dia x 2"	2	2
21.*	Sleeve	2	0
22.*	Hex Patch Screw, 1/2-13 x 1.0" Lg GR5	1	0
23.*	Shoulder Bolt, 1/2-13 x 2.5" Lg	1	0
24.*	Flat Washer, .40 x .88 x .06" HDN	1	0
25.*	Special Hex Screw	1	0

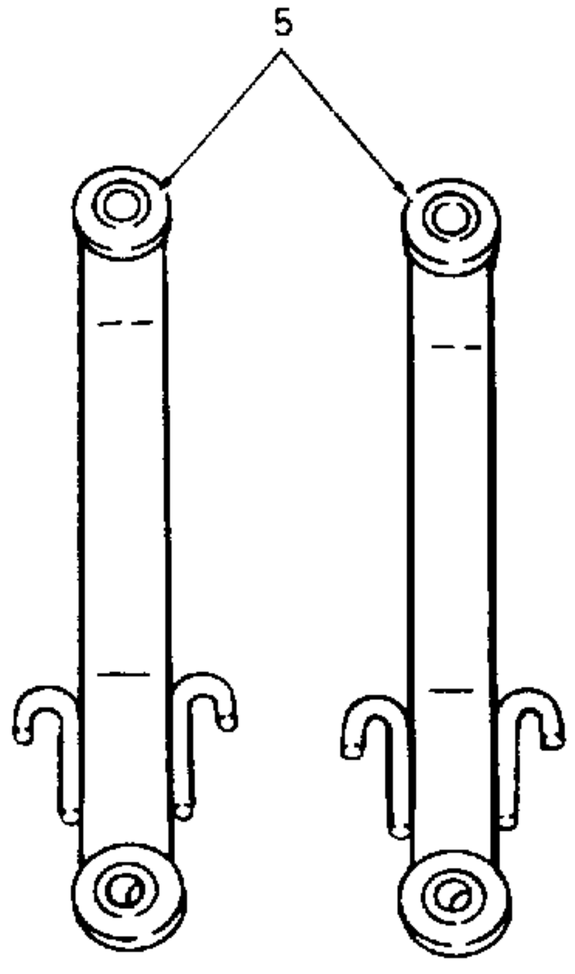
+ Included in the 389 kit only.
* Included in the 388 kit only.

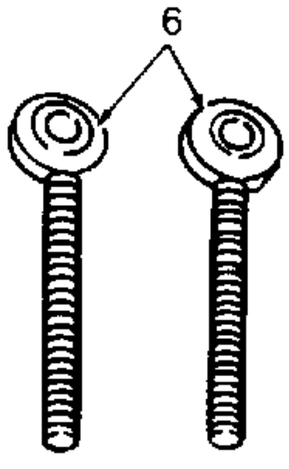
Figure 7-40. 3-Point Hitch Kit Hardware, Models 388 and 389.

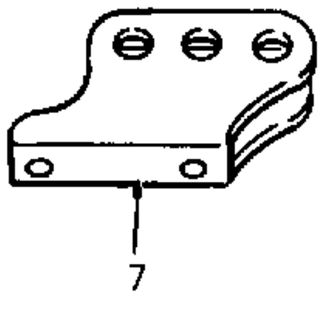


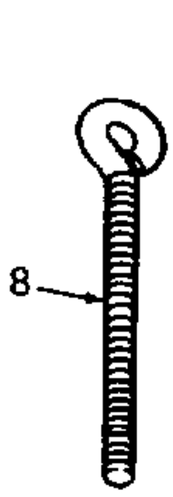


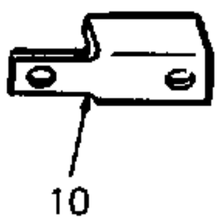


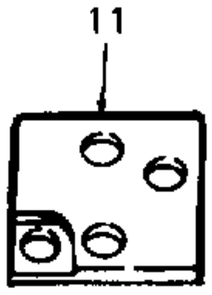


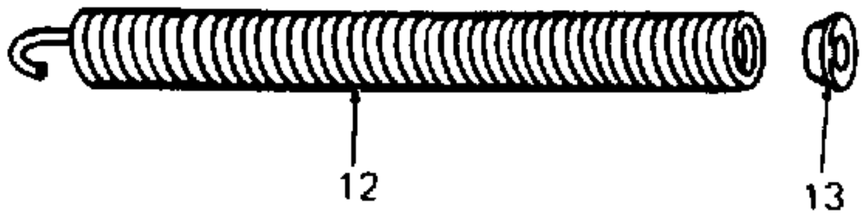












	QUANTITY 388	389		QUANTITY 388	389
1. 3-Point Hitch Plate	1	1	8. Clevis Screw	1	1
2. Lift Bar	1	1	9. Clevis Tubing	1	1
3. Mounting Strap, LH	1	1	10.* Spring Anchor Bracket	1	0
4. Mounting Strap, RH	1	1	11.* Lift Block Assembly	1	0
5. Draft Bar Assembly	2	2	12.* Lift Assist Spring	1	0
6. Adjustable Link Assembly	2	2	13.* Spring Insert	1	0
7. Hitch Bracket	1	1			

+ Included in the 388 kit only.

Figure 7-41. 3-Point Hitch Kit Parts, Models 388 and 389.

2. Lower tractor lift to full down position. Check access hole to be sure headed pin is visible and positioned for later removal. Refer to Figure 7-42.

WARNING

The battery must be disconnected in the proper sequence in order to avoid arcing.

3. Disconnect battery per paragraph 5-7.2 (Model 1340) or 5-8.2 (Models 1535, 1541, 1860 and 1862).
4. Remove center frame cover by removing four self-tapping hex screws. Refer to Figure 7-42.

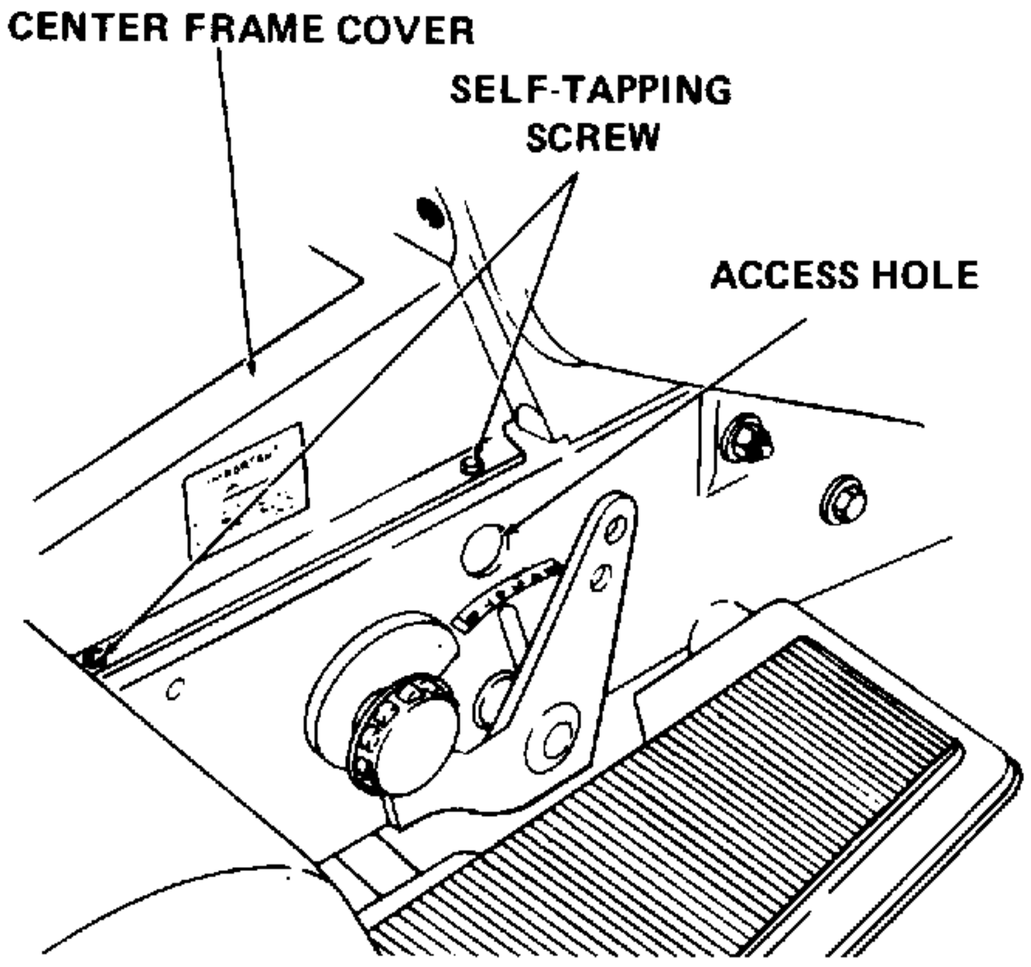


Figure 7-42. Checking Access Hole.

5. Remove draw bar from hitch plate by removing five hex cap screws and lock washers. Retain draw bar and mounting hardware. Refer to Figure 7-43.
6. Remove hitch plate assembly from tractor by removing four hex cap screws and lock washers. Refer to Figure 7-44.
7. Drain hydraulic fluid into a clean container having a capacity of more than seven quarts.

CAUTION

If drained hydraulic fluid is to be reused, cover container to prevent contamination.

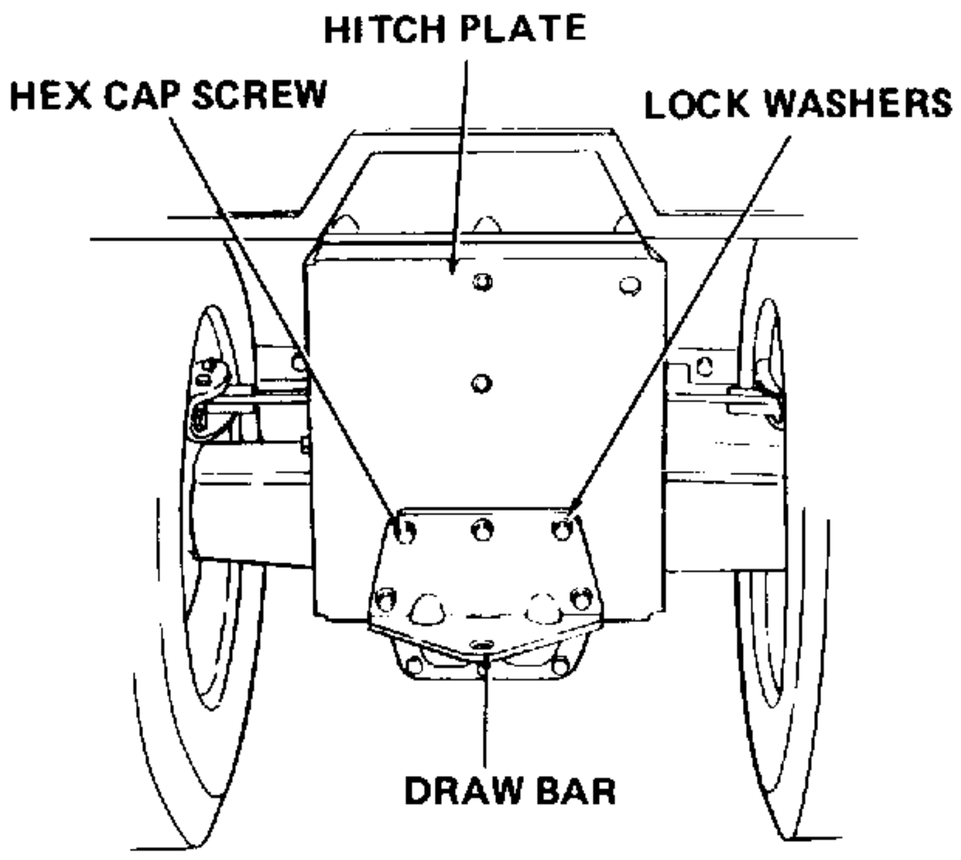


Figure 7-43. Removing Draw Bar From Hitch Plate.

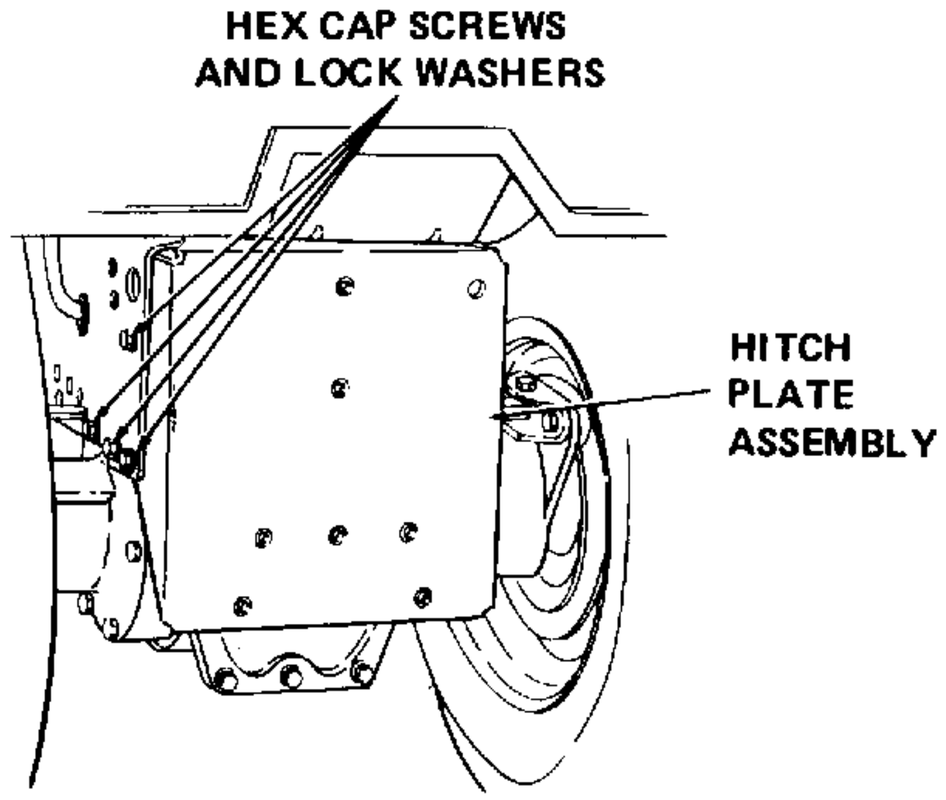


Figure 7-44. Removing Hitch Plate Assembly.

Use of contaminated hydraulic fluid could damage your unit.

7-4.3 **Installation.** The following installation instructions apply to both manual lift tractors and hydraulic lift tractors except where specifically noted.

1. Assemble 3-point hitch plate (1, Figure 7-41) as follows:
   a. Insert threaded ends of link clevis pins (3, Figure 7-40) into sides of 3-point hitch plate assembly and secure with lock washers (4) and hex center lock nuts (5). Refer to Figure 7-45.

Figure 7-45. Assembling 3-Point Hitch Plate.

b. Place slotted end of lift bar (2, Figure 7-41) inside internal arm of 3-point hitch plate assembly. Countersunk hole at front end of lift bar should face toward front of tractor, and toward right side of the frame. Refer to Figure 7-46.

Figure 7-46. Installing Lift Bar.

c. Align internal arm and lift bar with hole on right side of 3-point hitch plate assembly and insert .62 x 1.3-inch long clevis pin (6, Figure 7-40). Secure with 1/8-inch cotter pin (7). Refer to Figure 7-47.

NOTE

The following steps 1.d. and 1.e. apply ONLY to tractors with MANUAL LIFTS.

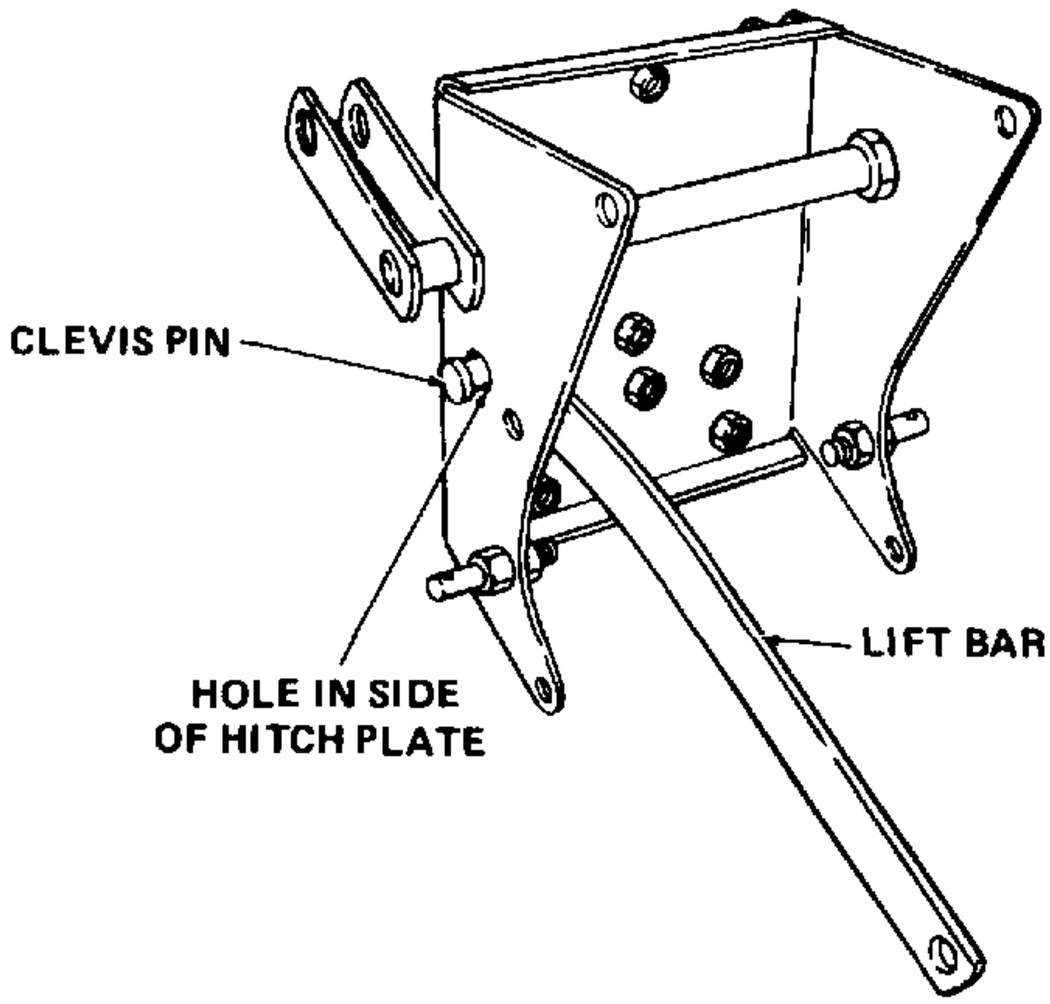


Figure 7-47. Inserting Clevis Pin in Hitch Plate Assembly.

d. Assemble spring anchor bracket (10, Figure 7-41) to 3-point hitch plate assembly with 7/16-14 x 1.0-inch long hex bolt (8, Figure 7-40), 7/16-inch lock washer (9) and 7/16-14 hex center lock nut (10). Refer to Figure 7-48.

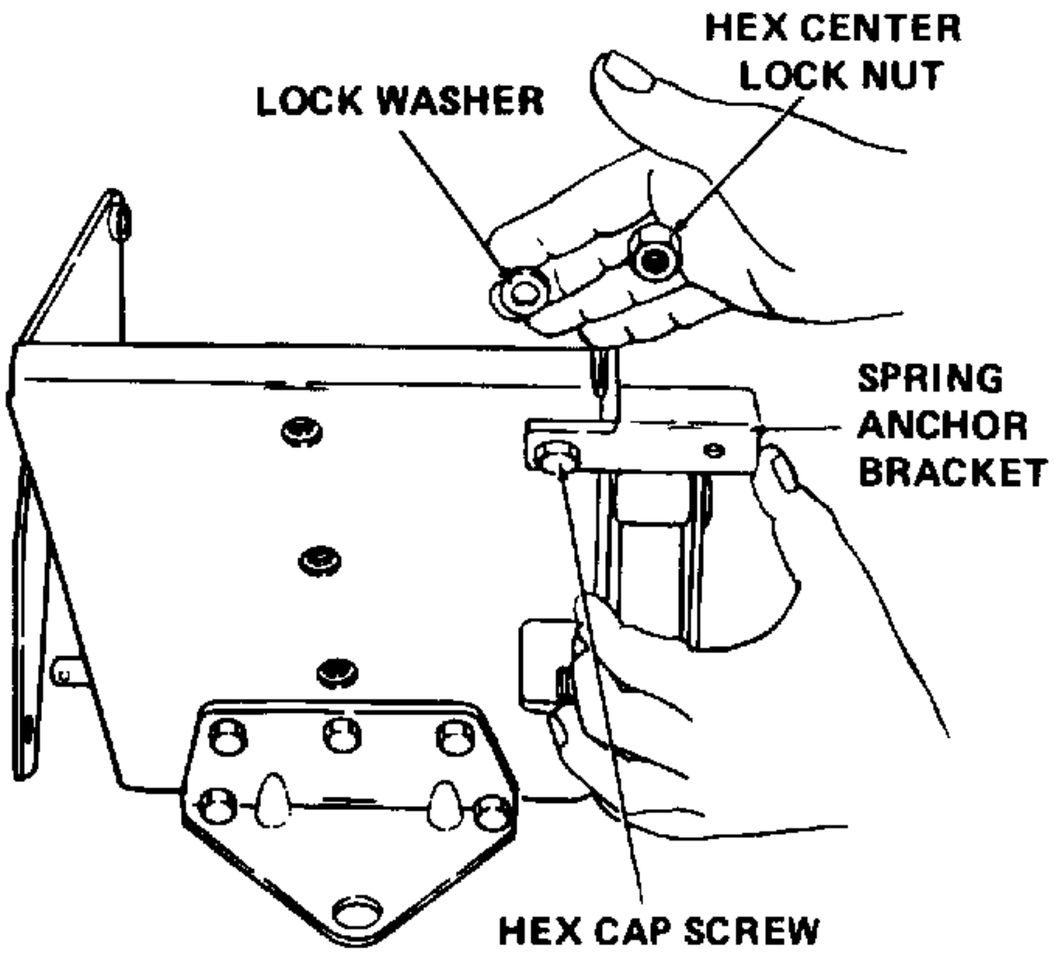


Figure 7-48. Assembling Spring Anchor Bracket to Hitch Plate Assembly (Manual Lift Tractors).

e. Lubricate countersunk hole in end of lift bar with 251H EP grease. Place sleeve (21, Figure 7-40) over hex patch screw (22) and insert through countersunk hole. Thread lift block assembly (11, Figure 7-41) onto hex patch screw until end is flush with lift block assembly. Refer to Figure 7-49.

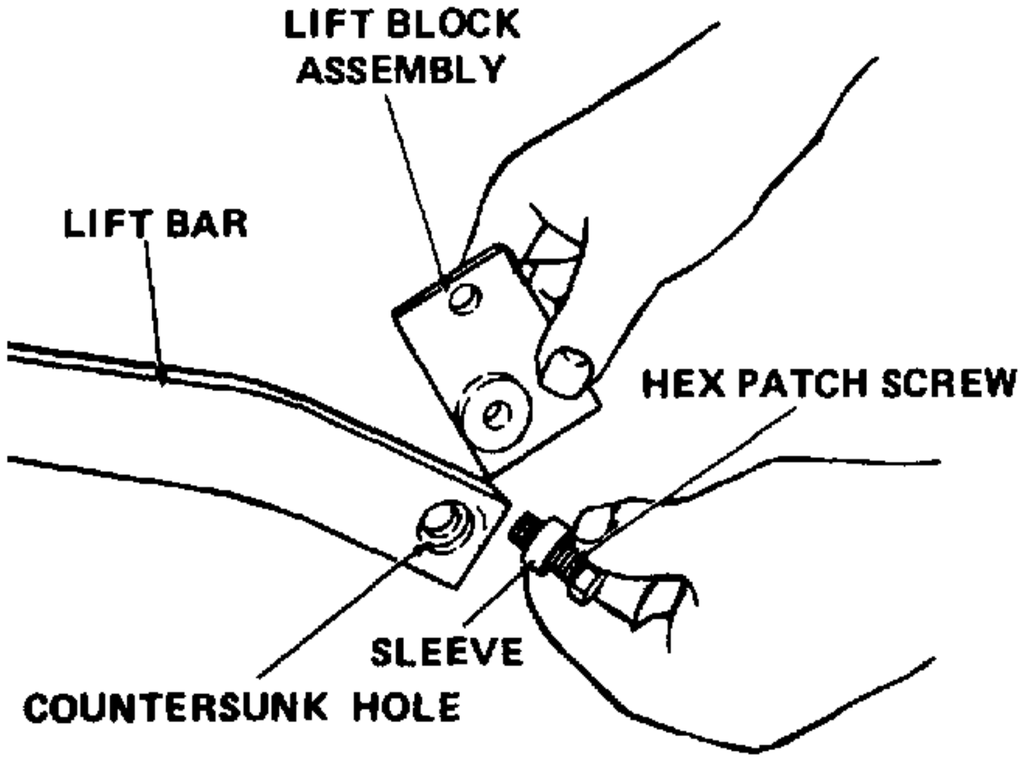


Figure 7-49. Installation of Lift Block Assembly on Lift Bar (Manual Lift Tractors).

2. Install right and left mounting straps (3 and 4, Figure 7-41) on transaxle housing as follows:

NOTE

Fluid loss can be expected during following step a.

a. Remove lower two hex patch bolts and bell washers from right transaxle housing. Save washers and discard bolts. Refer to Figure 7-50.

NOTE

Right mounting strap (4, Figure 7-41) mounting holes are located nearer bottom edge and with hole in end bent away from unit.

b. Position right mounting strap on transaxle housing with bell washers, retained in preceding step a., located between transaxle housing and right mounting strap. Secure strap to transaxle with 3/8-inch lock washers (2, Figure 7-40) and two 3/8-16 x 2.5-inch long hex patch screws (11). Refer to Figure 7-51.

c. Torque hex patch screws (11, Figure 7-40) to 30 ft-lbs.

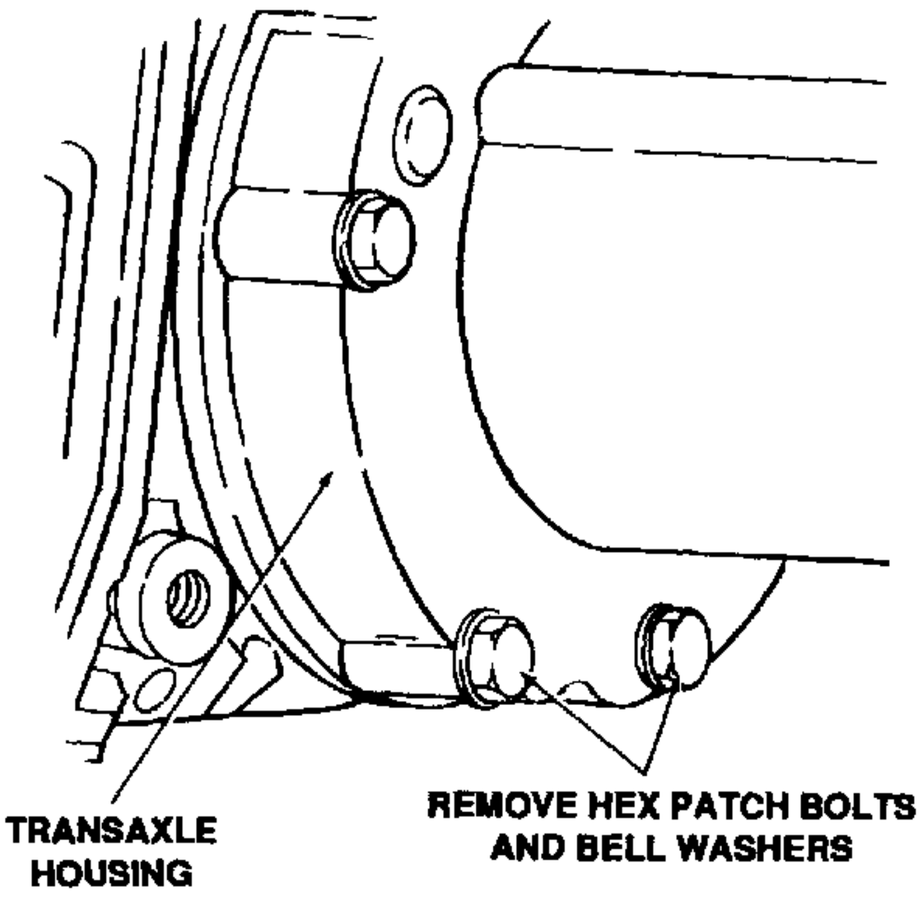
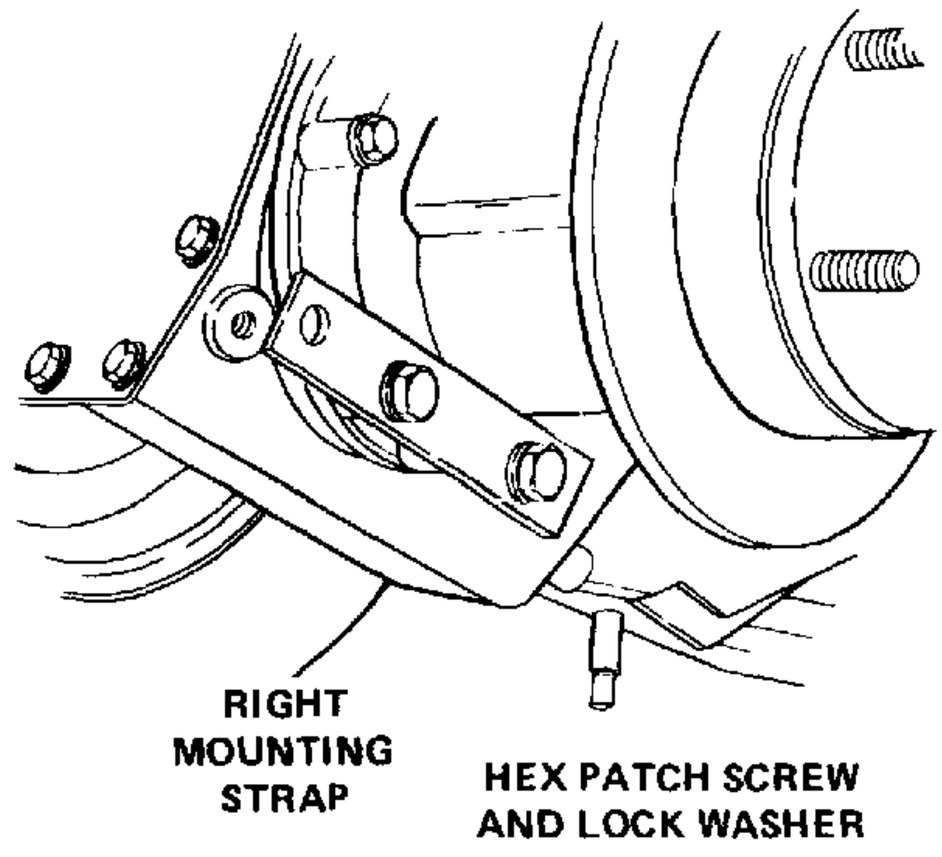


Figure 7-50. Removing Bolts and Bell Washers From Transaxle Housing.



NOTE: WHEEL SHOWN REMOVED FOR CLARITY

Figure 7-51. Securing Right Mounting Strap to Transaxle.

NOTE

Left mounting strap (3, Figure 7-41) mounting holes are located nearer bottom edge and with hole in end bent away from unit.

d. Repeat preceding steps a., b. and c. for installation of left mounting strap on left transaxle housing.

3. Install 3-point hitch plate (1). Refer to Figure 7-52.

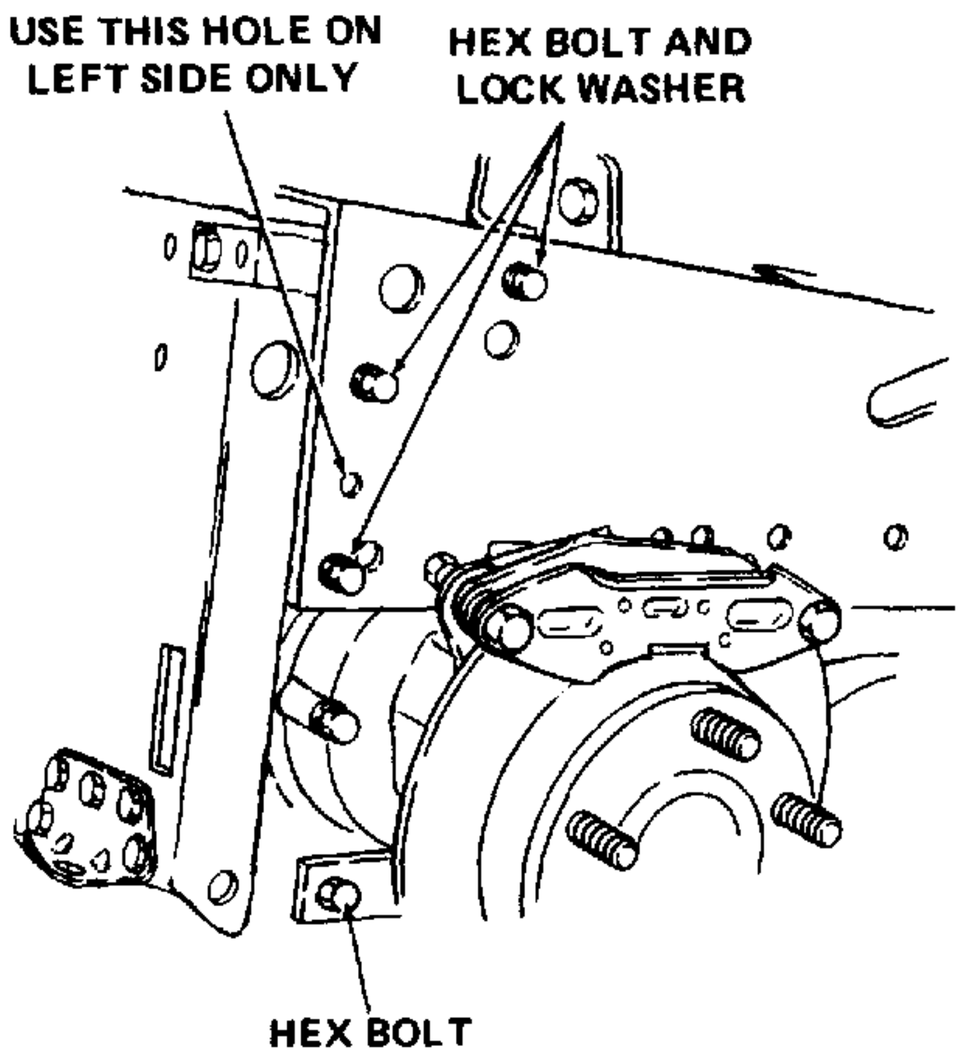


Figure 7-52. Installing 3-Point Hitch Plate.

a. From rear of tractor, slide end of lift bar (2, Figure 7-41) along inside of frame and over transaxle to rocker shaft assembly.

b. Position 3-point hitch plate (1) between tractor frame and secure to right side of frame with three 3/8-16 x 3/4-inch long hex head bolts (12, Figure 7-40) and 3/8-inch lock washers (2).

c. Secure 3-point hitch plate assembly to right mounting strap with 7/16-14 x 1-inch long hex head cap screws (8) and 7/16-14 hex center lock nuts (10).

NOTE

Four 3/8-16 x 3/4-inch long hex head bolts (12) and 3/8-inch lock washers (2) are used to secure 3-point hitch to LEFT side of tractor frame.

d. Repeat preceding steps a., b. and c. to secure the 3-point hitch plate assembly to left side of tractor frame.

NOTE

For kit Model 388, connect the front end of implement lift bar per step 4., and skip step 5. For kit Model number 389, skip step 4., and install the implement lift bar per step 5.

4. Connect front end of implement lift bar (2, Figure 7-41) as follows (applies to Model 388 only). Align holes in lift block assembly with rocker shaft assembly and secure with two 3/8-16 x .88-inch long hex cap screws (13, Figure 7-40) and 3/8-inch lock washers (2). Refer to Figure 7-53.

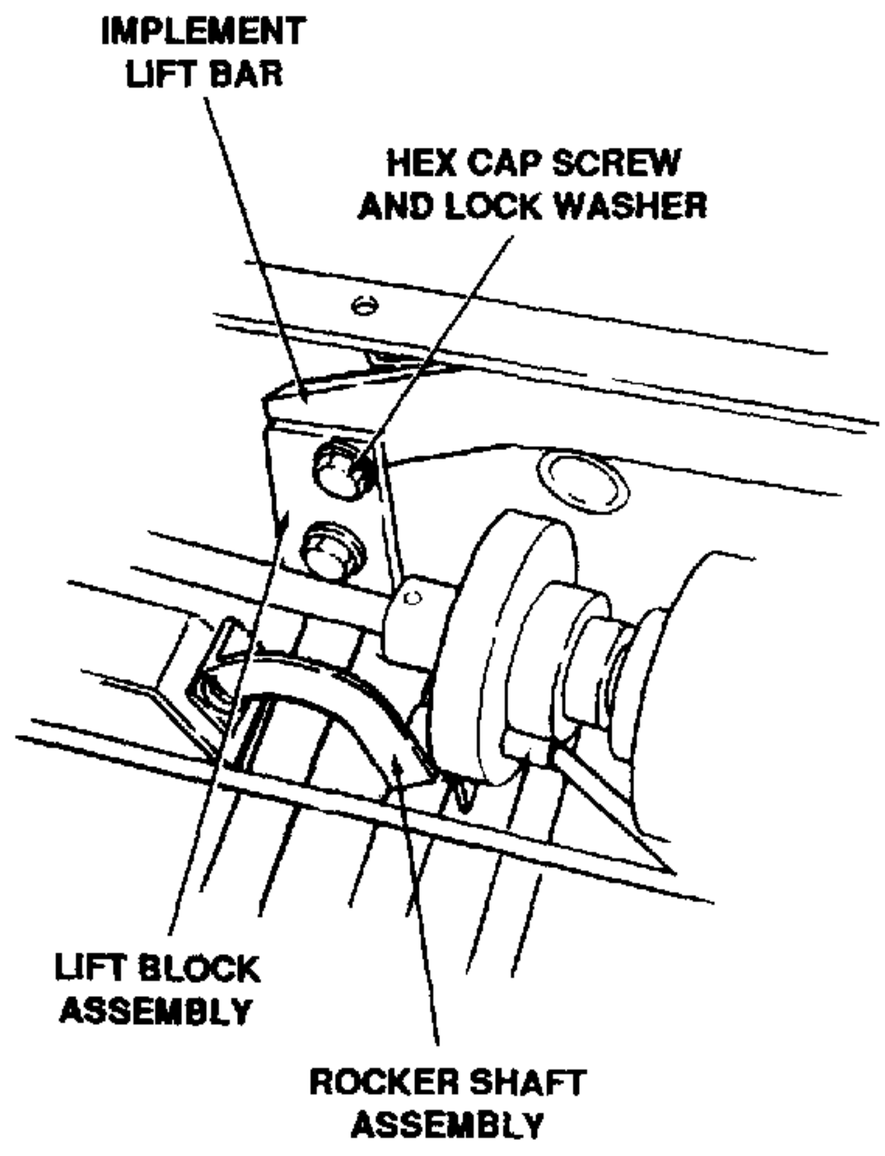


Figure 7-53. Connecting Implement Lift Bar (Model 388 Only).

5. Connect front end of implement lift bar (2, Figure 7-41) (applies to Model 389 only). Refer to Figure 7-54.

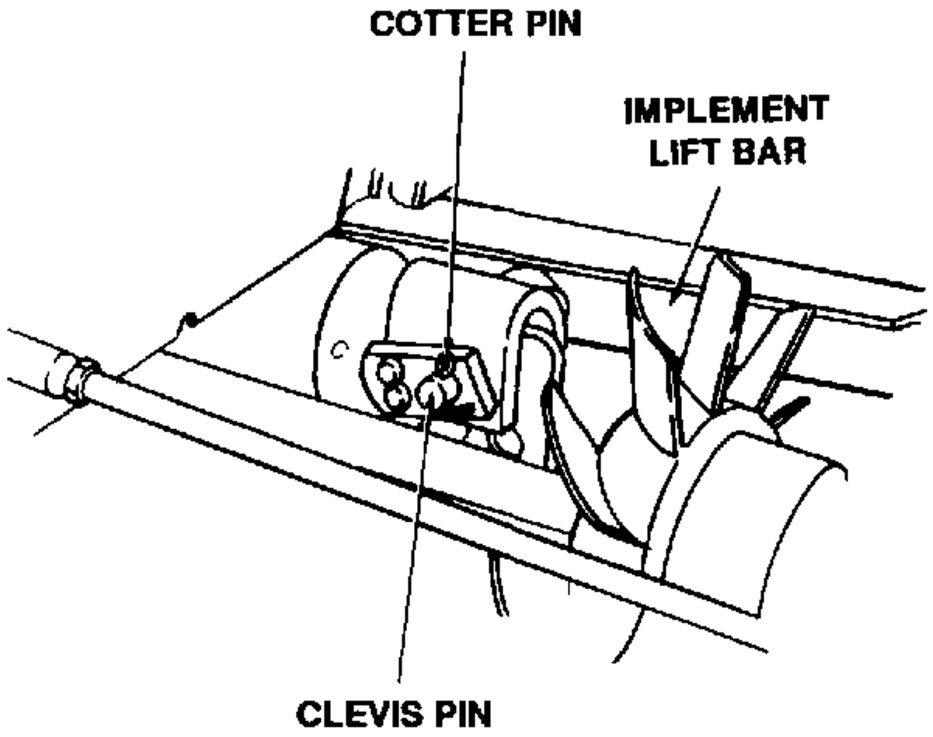


Figure 7-54. Connecting Implement Lift Bar (Model 389 Only).

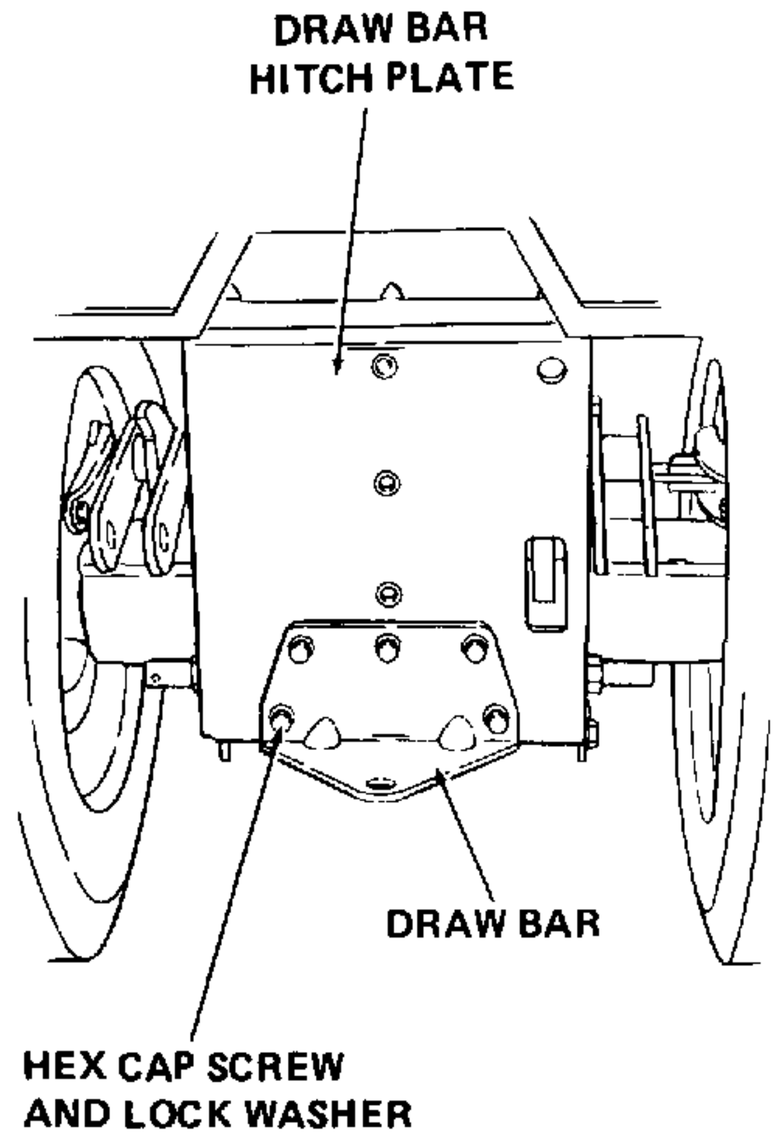


Figure 7-55. Installing Draw Bar Hitch Plate.

   a. Remove cotter pin from clevis pin; remove clevis pin through hole in frame. Retain cotter pin and discard clevis pin.

   b. Position lift arm between frame and lift bracket.

   c. Attach front end of lift bar to hydraulic lift clevis assembly by placing 2.562-inch long clevis pin (14, Figure 7-40) through hole in frame and securing with cotter pin retained per preceding step a.

6. Install draw bar hitch plate on 3-point hitch plate with five hex cap screws and lock washers. Refer to Figure 7-55.

7. Install draft bar assemblies (5, Figure 7-41) by positioning them over link clevis pin (3, Figure 7-40) and securing with 5/8-inch internal cotter pin (15). Refer to Figure 7-56.

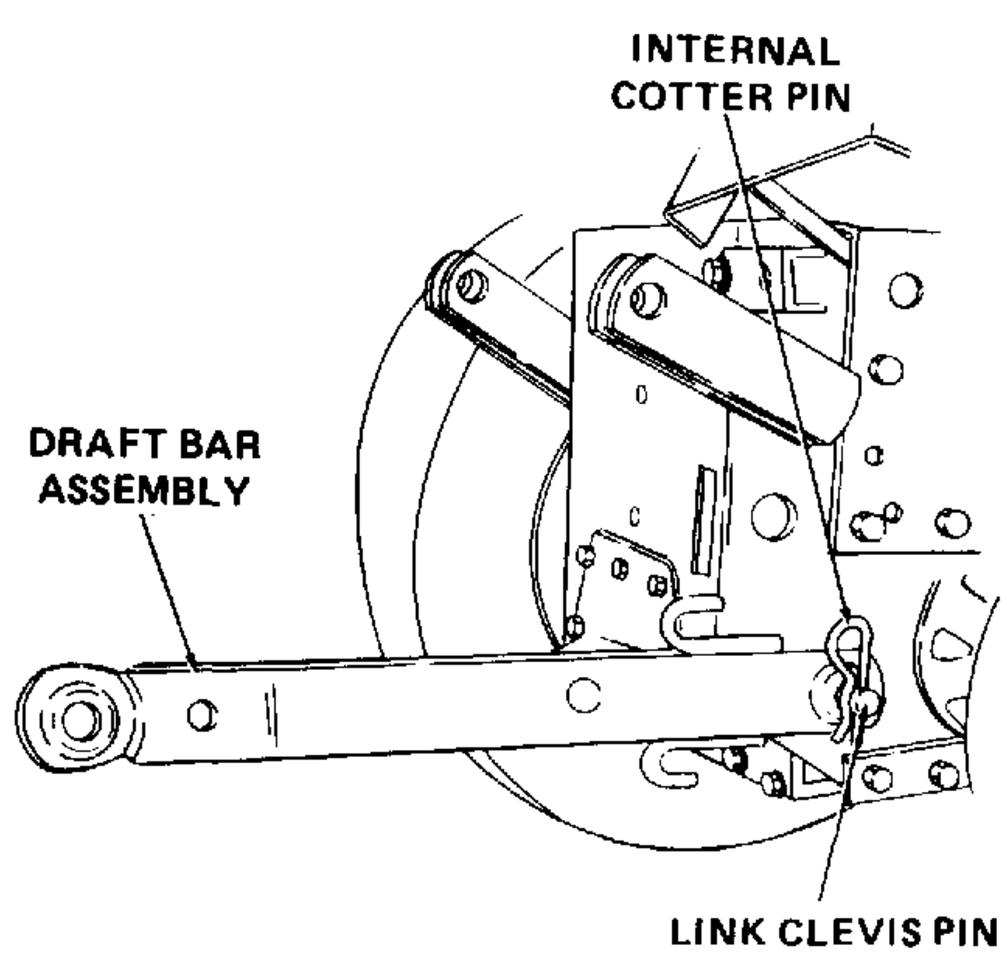


Figure 7-56. Installing Draft Bar Assembly.

8. Install hitch chain hook (16, Figure 7-40). Refer to Figure 7-57.

   a. Thread a 7/16-14 threaded hex center lock nut (10, Figure 7-40) onto hitch chain hook.

   b. Insert hitch chain hook into hole provided in draft bar assembly and secure with 7/16-inch lock washer (9) and 7/16-14 hex center lock nut (10).

9. Install adjustable link assembly (6, Figure 7-41) as follows:

   a. Thread adjustment ferrule (17, Figure 7-40) onto adjustable link assembly. Refer to Figure 7-58.

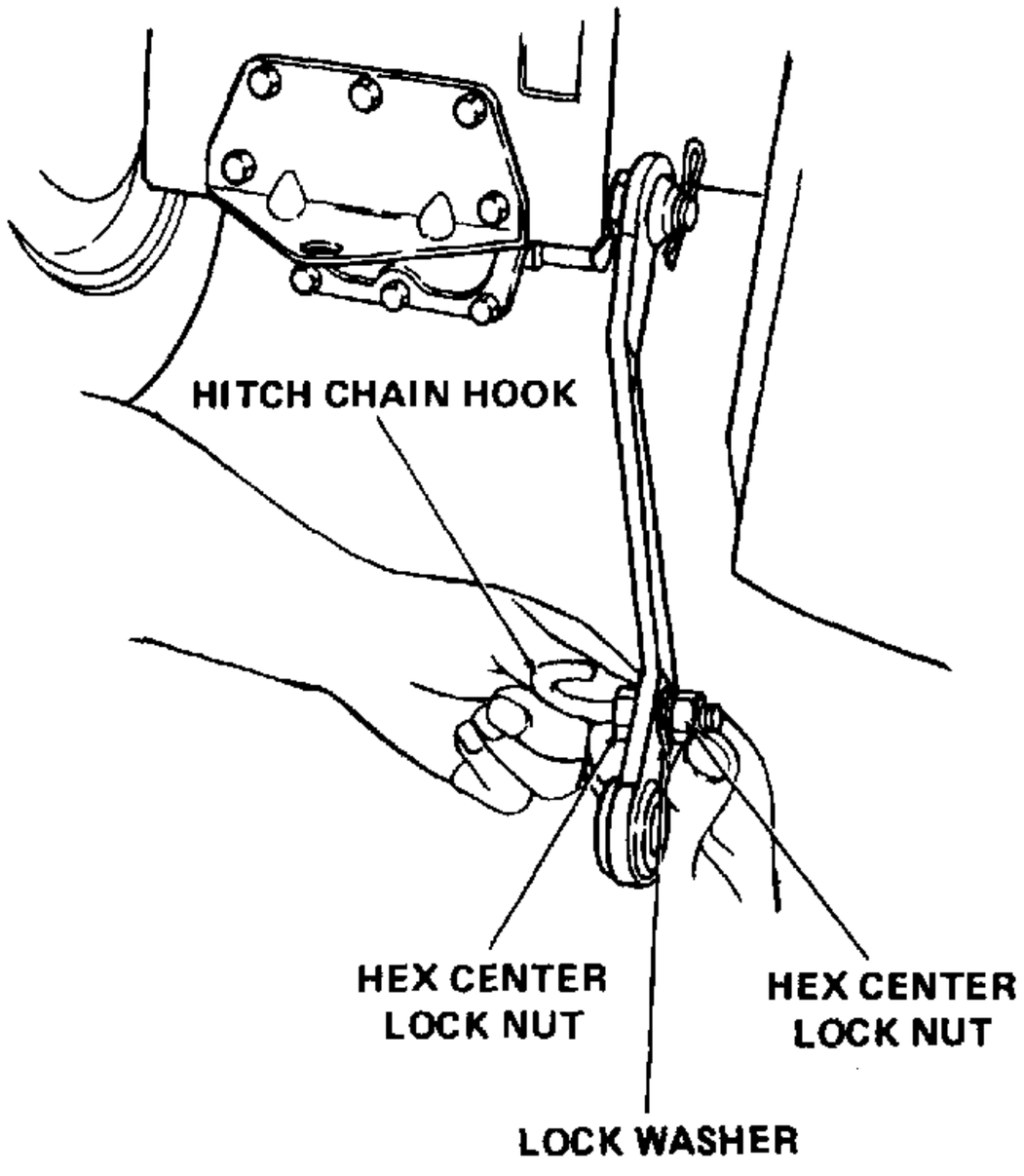


Figure 7-57. Installing Hitch Chain Hook.

Figure 7-58. Threading Adjustment Ferrule on Adjustable Link Assembly.

b. Secure adjustable link assembly to draft bar assembly by placing hitch pin (18, Figure 7-40) through adjustment ferrule. Refer to Figure 7-59.

c. Place looped end of adjustable link assembly inside external arm of 3-point hitch plate assembly and insert clevis pin (19, Figure 7-40). Secure with 5/8-inch internal cotter pin (15). Refer to Figure 7-59.

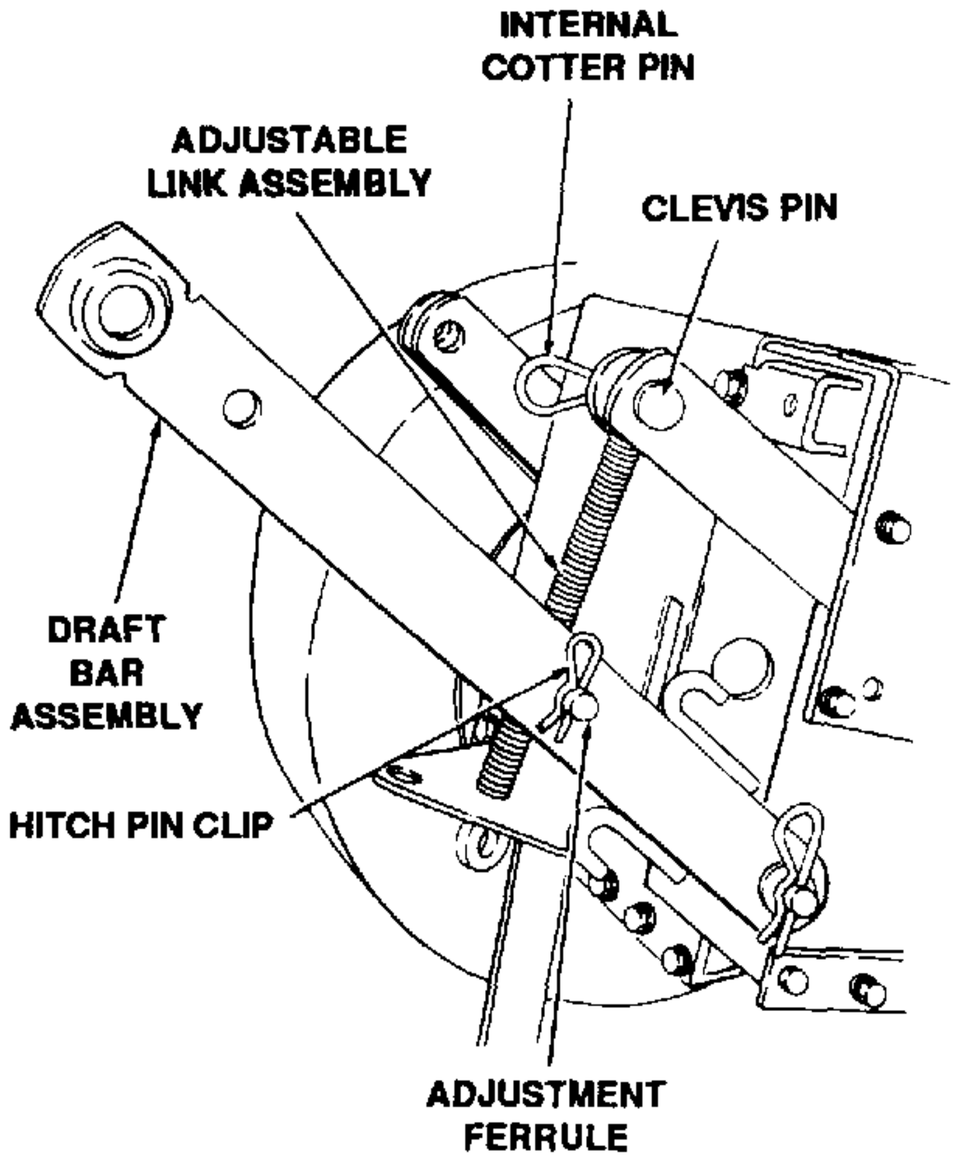


Figure 7-59. Securing Adjustable Link Assembly to Draft Bar Assembly.

10. Install hitch bracket (7, Figure 7-41) on 3-point hitch plate assembly with two 3/8-inch lock washers (2, Figure 7-40) and 3/8-16 x .88-inch long hex cap screws (13). Refer to Figure 7-60.

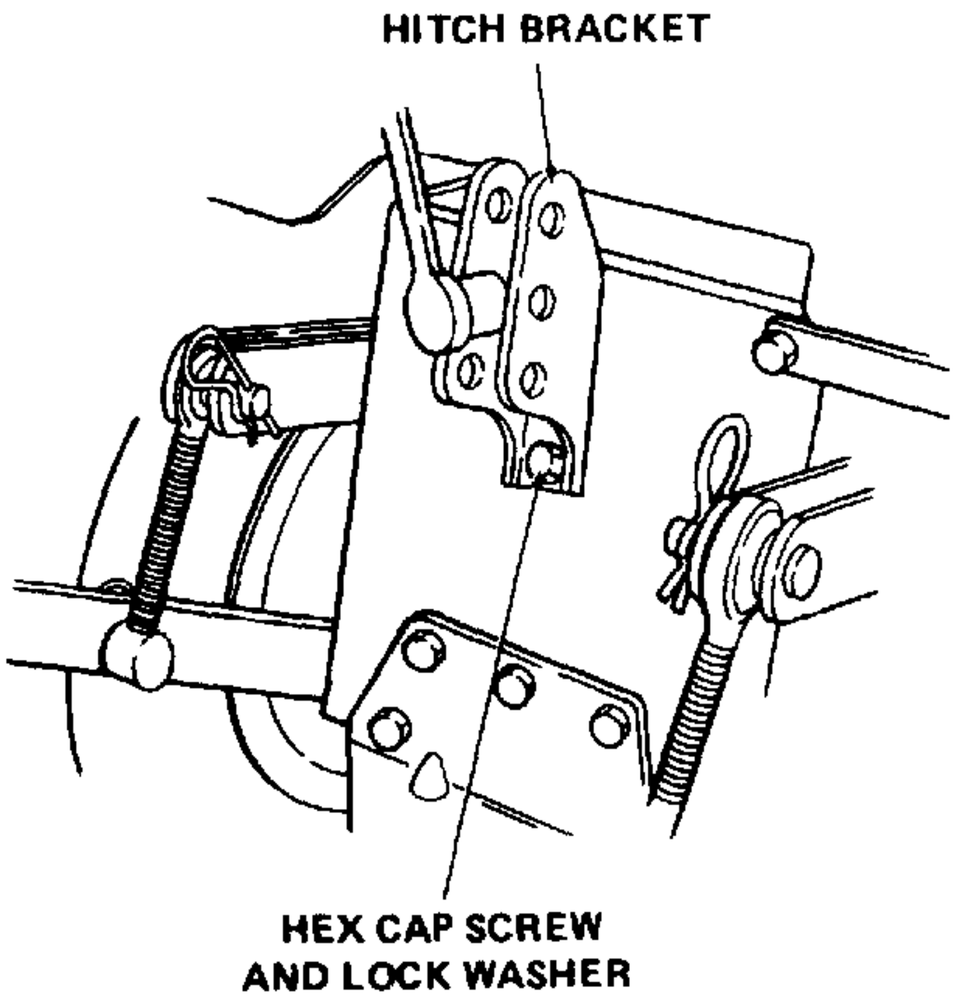


Figure 7-60. Installing Hitch Bracket on 3-Point Hitch Plate Assembly.

11. Install clevis screw (8, Figure 7-41) and clevis tubing (9) as follows:

    a. Lightly oil threads on clevis screw and thread clevis screw into clevis tubing. Refer to Figure 7-61.

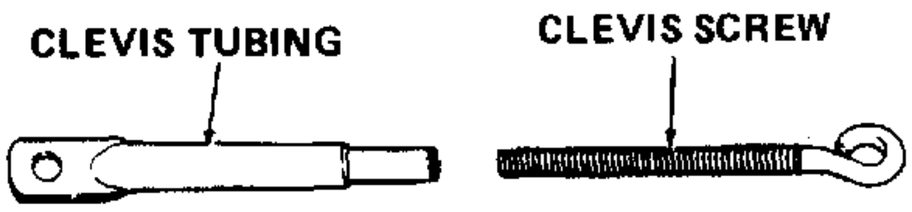


Figure 7-61. Threading Clevis Screw Into Clevis Tubing.

    b. Place clevis tubing inside hitch bracket, insert clevis pin (19, Figure 7-40) and secure with 5/8-inch internal cotter pin (15). Refer to Figure 7-62.

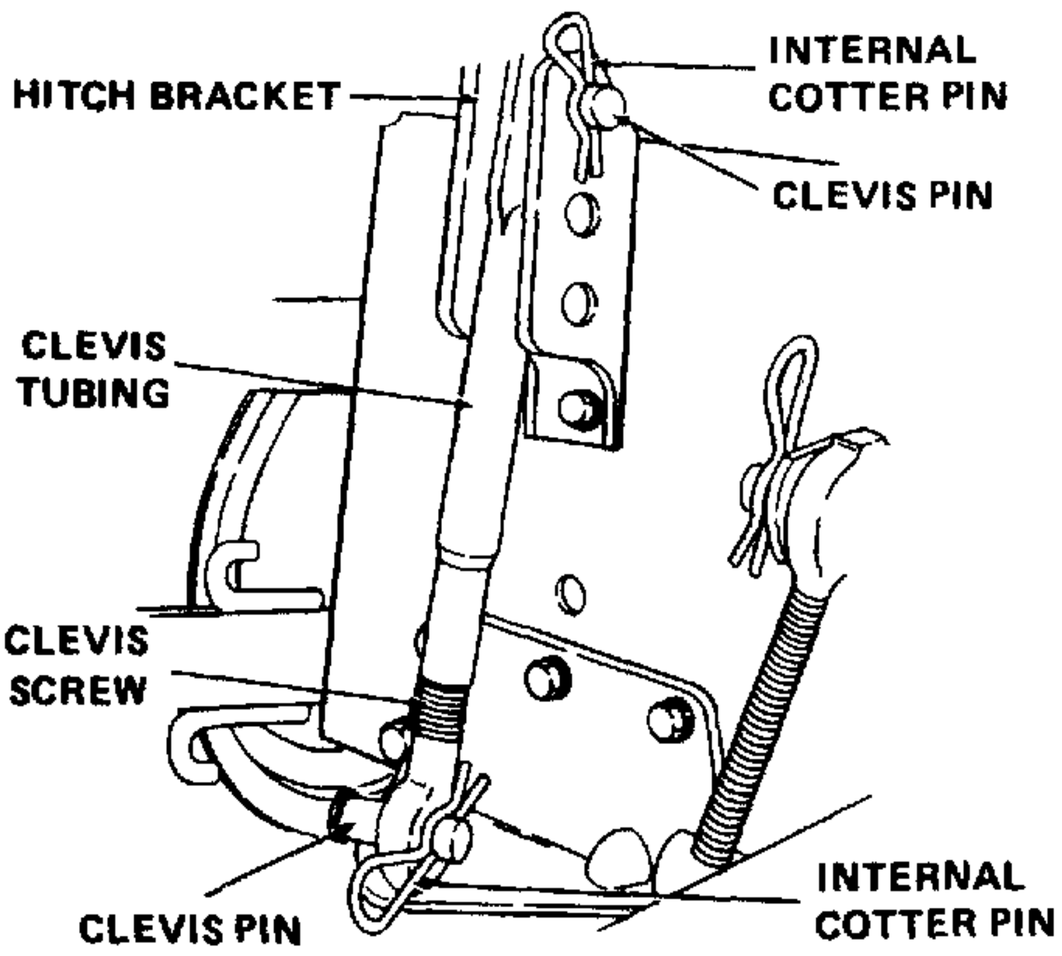


Figure 7-62. Securing Clevis Tubing Inside Hitch Bracket.

    c. Insert clevis pin (19, Figure 7-40) through looped end of clevis screw and secure with 5/8-inch internal cotter pin (15). Refer to Figure 7-62.

12. Attach chains (20, Figure 7-40) to hooks on draft bar assemblies as shown in Figure 7-63.

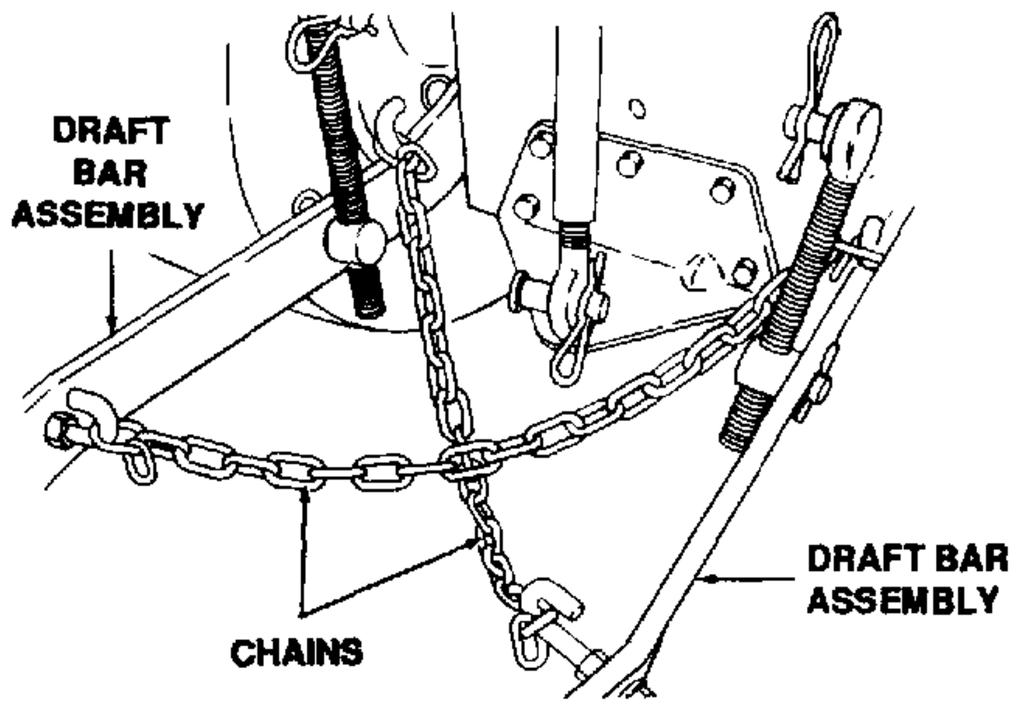


Figure 7-63. Attaching Chains to Draft Bar Assemblies.

NOTE

Installation of 3-Point Hitch Kit Model 389 is now complete. Proceed to paragraph 7-4.4. The remaining instructions are for 3-Point Hitch Kit Model 388.

13. Assemble lift assist spring (12, Figure 7-41) onto spring insert (13) as follows:

    a. Thread one 3/8-16 hex nut onto one 3/8-16 special hex screw (25, Figure 7-40). Refer to Figure 7-64.

    b. Thread special hex screw into spring insert and tighten hex nut against spring insert.

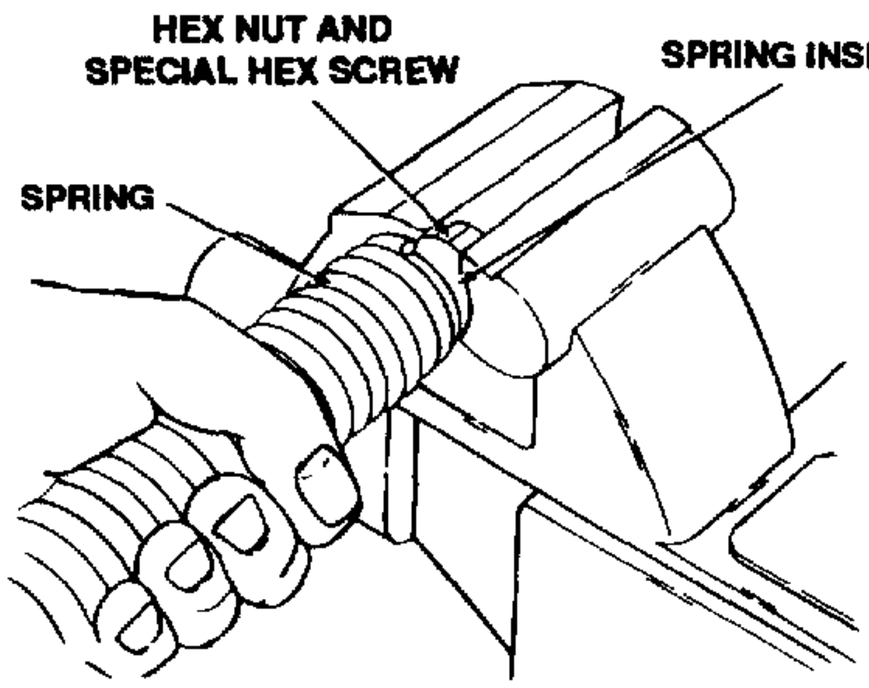


Figure 7-64. Assembling Spring Onto Spring Insert.

c. Place head of hex screw and hex nut into a vise. Lubricate spring insert lightly with 251H EP grease.

d. Screw spring onto spring insert until it is even with edge of spring insert. Refer to Figure 7-64.

NOTE

Spring insert cannot be removed once in place.

14. Install spring (12, Figure 7-41). Refer to Figure 7-65.

a. Thread socket head shoulder bolt (23, Figure 7-40) to lift bar through slot in frame. Refer to Figure 7-65.

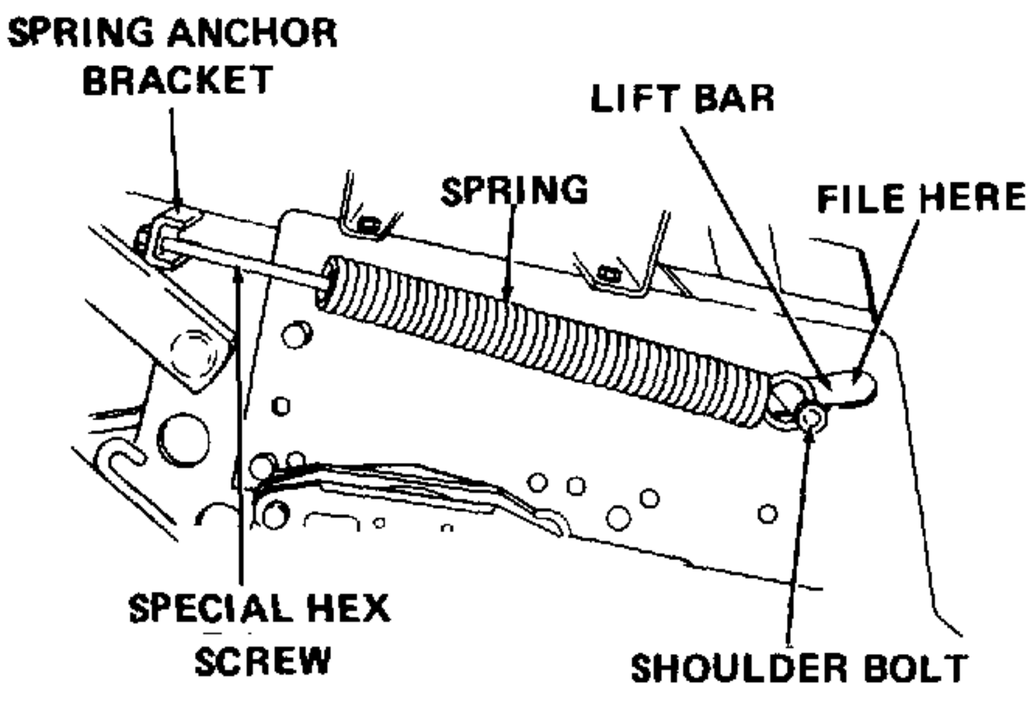


Figure 7-65. Installing Spring.

b. Place looped end of spring over socket head shoulder bolt.

c. Pull lift bar back to highest position.

d. Place one 3/8-inch flat washer (24, Figure 7-40) onto special hex screw (25) and insert assembly through hole in spring anchor bracket.

e. Thread special hex screw into spring insert finger tight.

WARNING

Spring must be disconnected from tractor before removing any attachments or when removing 3-point hitch from tractor.

f. Push lift bar forward. If bar does not engage lowest position, it may be necessary to file front end of slot in frame.

NOTE

Refer to attachment manuals for hitching instructions.

7-4.4 Tractor Reassembly.

1. Install center frame cover with four self-tapping screws.
2. Connect battery per paragraph 5-7.5 (Model 1340) or 5-8.5 (Models 1535, 1541, 1860 and 1862).
3. Install hydraulic fluid.

7-5. INSTALLATION OF FRONT HYDRAULIC OUTLET KIT (PART NUMBER 759-3493).

7-5.1 **General.** Front Hydraulic Outlet Kit, Part Number 759-3493, is designed for use on the following tractor models: 1541, 1862, 1782, 1882, 2082 and 2182. Before beginning installation, remove all parts from the box. Refer to Figure 7-66 to confirm that all parts are present and to acquaint yourself with parts nomenclature.

WARNING

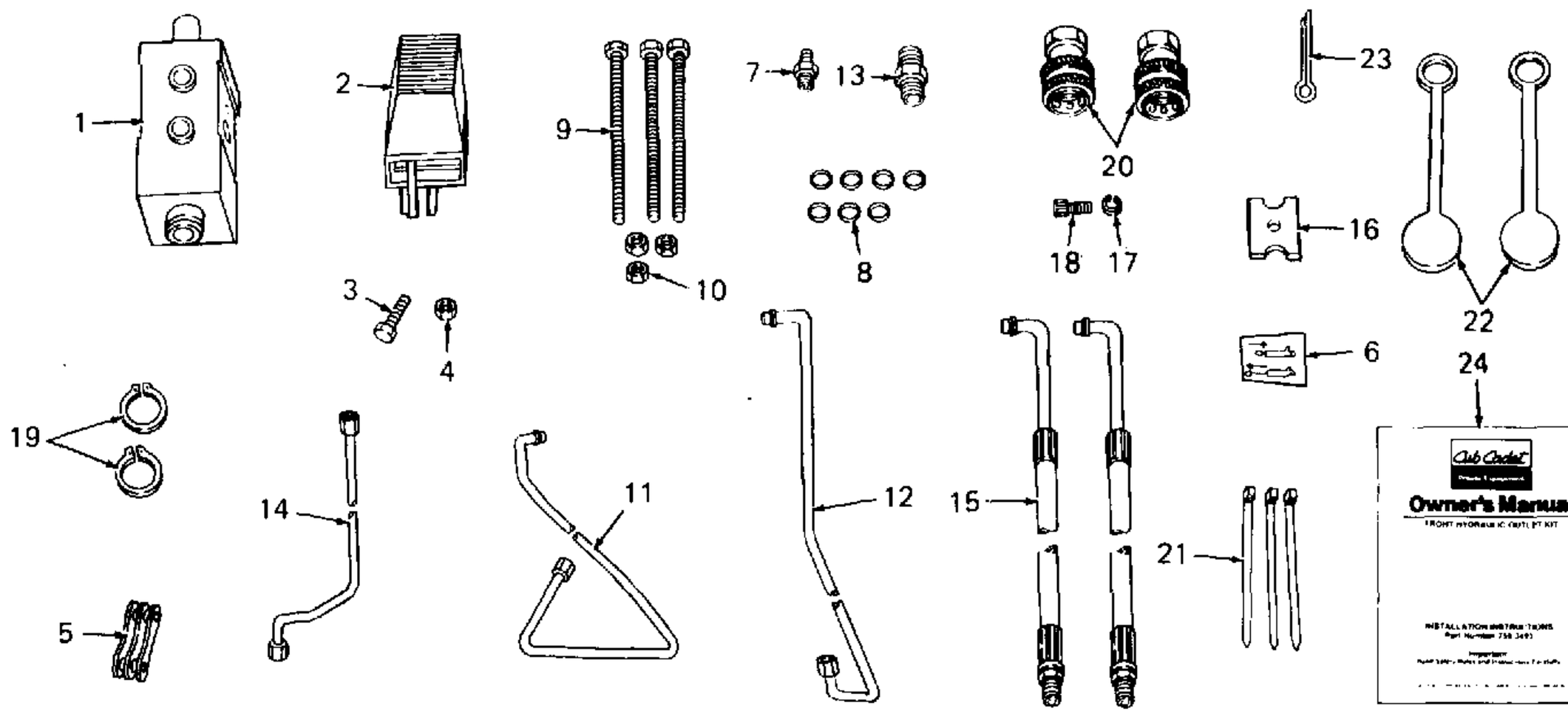
Do not install front hydraulic outlet kit while tractor is hot.

WARNING

During the installation process, use care to avoid skin or eye contact with hydraulic fluid.

NOTE

A notation will appear on illustrations which apply to specific tractor models only. Illustrations without this special notation apply to all tractor models covered; ignore minor differences, if any, between your tractor and that illustrated.



1. **Hydraulic Valve Assembly (1)**
2. **Valve Handle (1)**
3. **Hex Cap Screw, 10-24 x 1.0" Long (1)**
4. **Hex Center Lock Nut, 10-24 (1)**
5. **Chain Link (1)**
6. **Front Outlet Lever Label (1)**
7. **Valve Adapter (1)**
8. **O-Ring, .301 ID x .070 Dia. (7) (2 O-rings are extras)**
9. **Hex Cap Screw, 1/4-20 x 4.0" Long GR5 (3)**
10. **Hex Center Lock Nut, 1/4-20 (3)**
11. **Air Cooled Front Outlet Tube Assembly (1) (Models 1541, 1862, 1882 and 2082 only)**
12. **Liquid Cooled Front Outlet Tube Assembly (1) (Models 1782 and 2182 only)**
13. **Union Fitting (Model 1541 only) (1)**
14. **Lower Power Steering Return Tube (1) (Model 1541 only)**
15. **Front Outlet Hose (2)**
16. **Double Valve Clamp (1)**
17. **Lock Washer, 1/4" (1)**
18. **Socket Head Cap Screw, 1-4/20 x .62" Long GR8 (1)**
19. **External Retaining Ring (2)**
20. **Hydraulic Coupling Body (2)**
21. **Cable Ties, 7.0" Long (3)**
22. **Protective Plug (2)**
23. **Cotter Pin, 3/16 x .75" Long (1)**
24. **Installation Manual (1)**

Figure 7-66. Front Hydraulic Outlet Kit, Part No. 759-3493.

7-5.2 Tractor Preparation.

1. Place tractor on a firm and level surface and engage brake lock.
2. Remove side panels per paragraph 5-4.2 for Models 1541, 1862, 1882 and 2082, and 5-5.2 for Models 1782 and 2182.

WARNING

The battery must be disconnected in the proper sequence to avoid arcing.

3. Disconnect battery on Models 1782 and 2182 per paragraph 5-9.2 or 5-10.2.
4. Remove battery from Models 1541, 1862, 1882 and 2082 per paragraph 5-8.2.
5. Remove radiator screen from Models 1782 and 2182.
6. Remove center frame cover by removing four self-tapping hex screws. Refer to Figure 7-67.

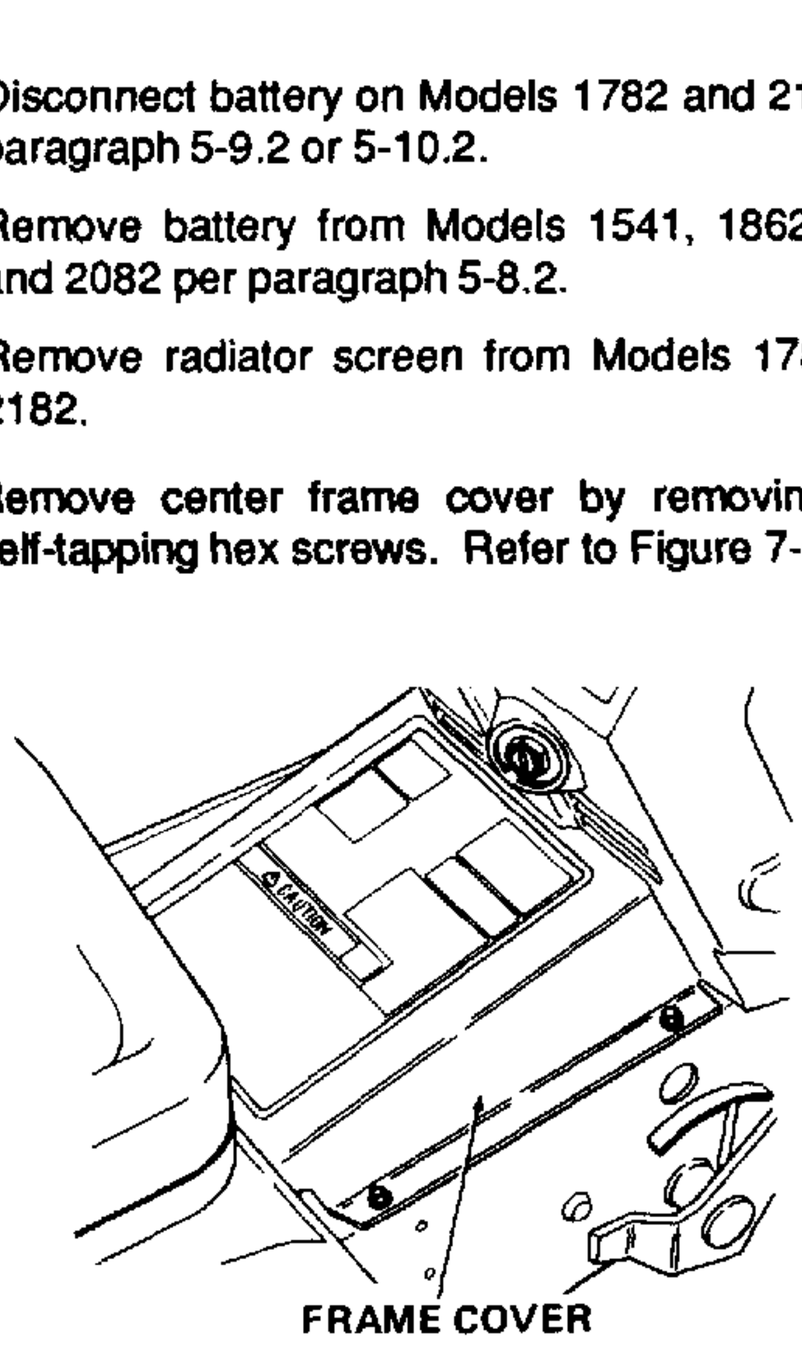


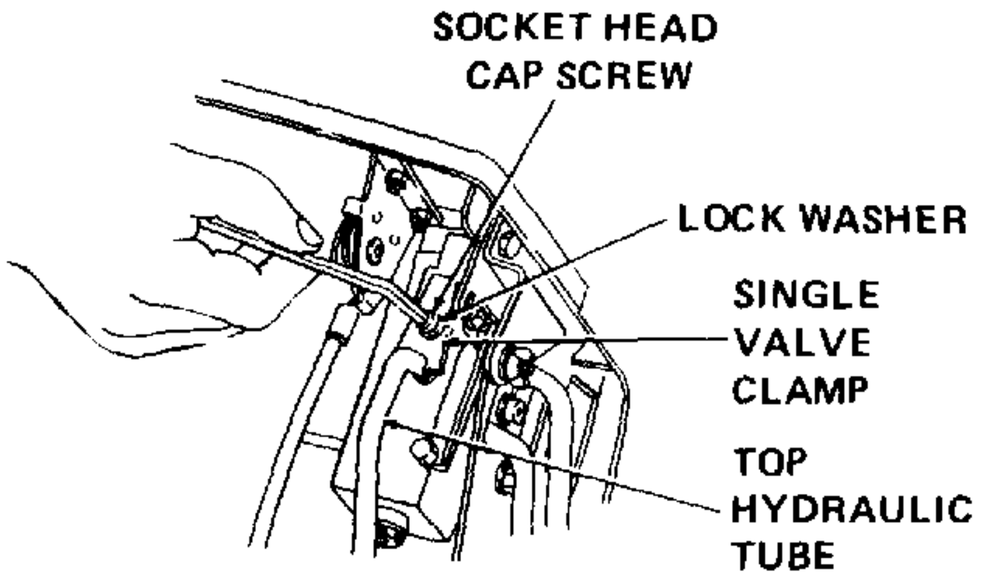
Figure 7-67. Removing Center Frame Cover.

7-5.3 Valve Preparation.

CAUTION

Small amounts of dirt can damage the hydraulic system. Use care to keep hydraulic fittings and the area around them clean.

1. Disconnect top hydraulic tube from installed hydraulic valve by removing socket head cap screw, lock washer and single valve clamp. Refer to Figure 7-68. Retain the hardware.



NOTE
AIR-COOLED TRACTOR IS SHOWN.

Figure 7-68. Disconnecting Top Hydraulic Tube.

2. Insert a plastic protective plug (taken from uninstalled hydraulic valve in kit) in open port on top of valve from which top hydraulic tube was removed. Use care to keep uninstalled hydraulic valve clean. Refer to Figure 7-69.

NOTE

Place a pan beneath tractor to catch any hydraulic fluid which may spill during valve preparation process.

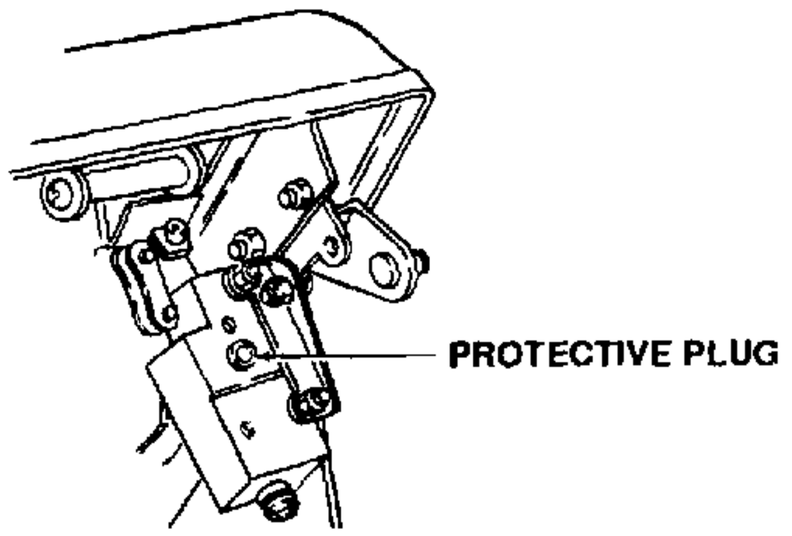


Figure 7-69. Inserting Protective Plug on Valve.

3. For all tractors except Model 1541, refer to Figure 7-70 and remove threaded end of top hydraulic tube from T-fitting.

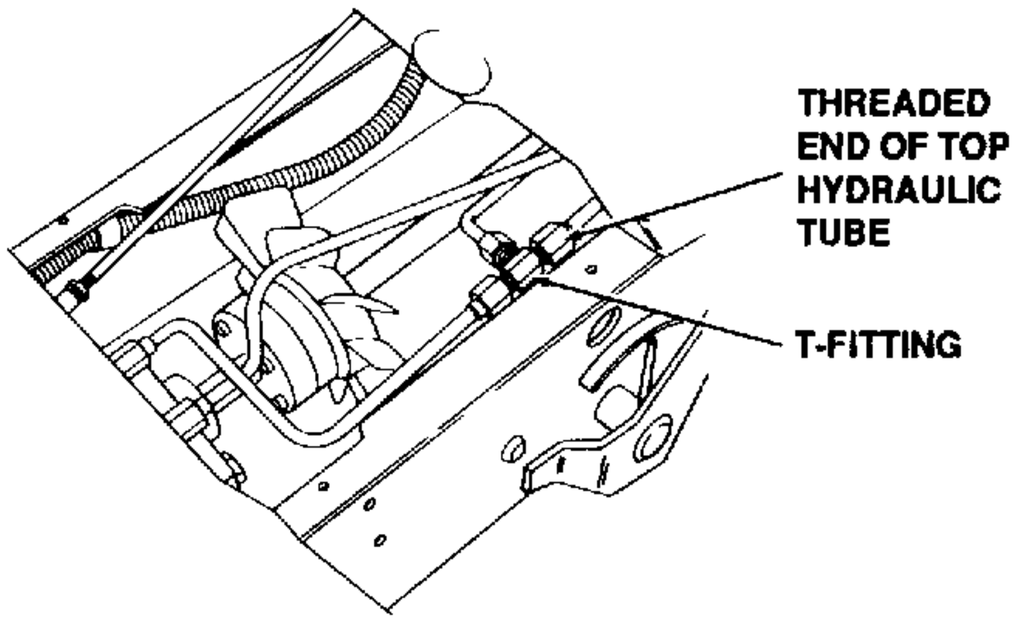


Figure 7-70. Removing Threaded End of Top Hydraulic Tube.

4. For tractor Model 1541 only, top hydraulic tube extends directly back to pump. Remove tube from pump. Refer to Figure 7-71.

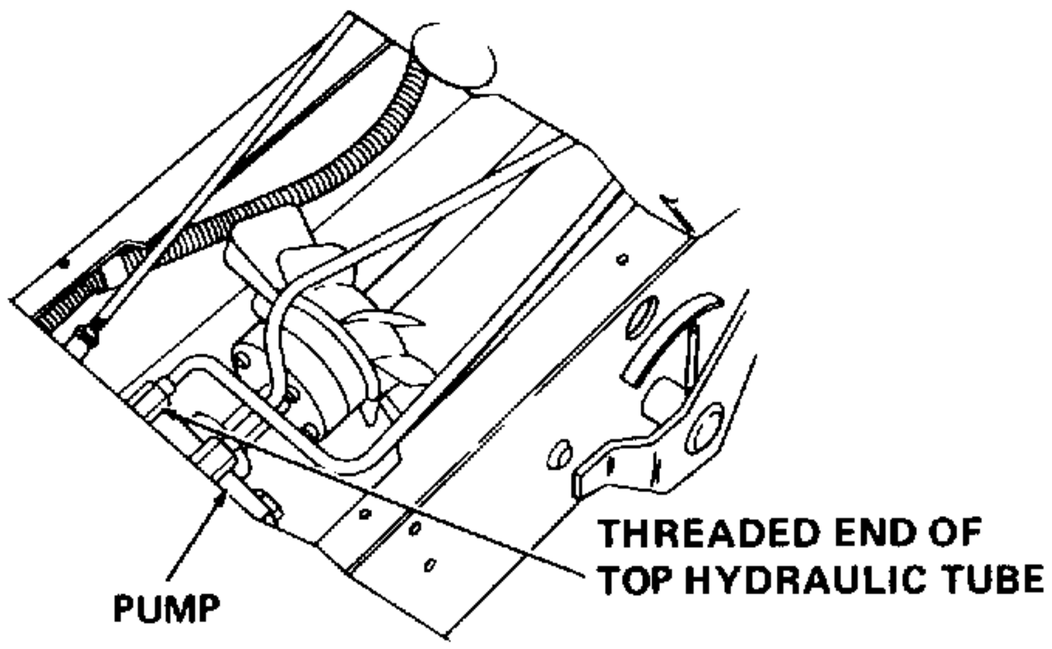


Figure 7-71. Removing Threaded End of Top Hydraulic Tube (Model 1541 Only).

5. Following removal of threaded end of top hydraulic tube in steps 3 or 4, stand on the left side of the tractor and work tube out of tractor. Discard tube and cover male fitting (at T-fitting or pump) to which the tube was attached.

6. Cut a hole in the dash panel immediately above the hydraulic lift control lever for new hydraulic valve handle as follows:

   a. Refer to Figure 7-72 and scribe an area extending approximately 1-3/4 inches above hydraulic lift control lever. Refer to Figure 7-72.

   b. Place masking tape around the outside of scribed lines in order to protect panel from scratches.

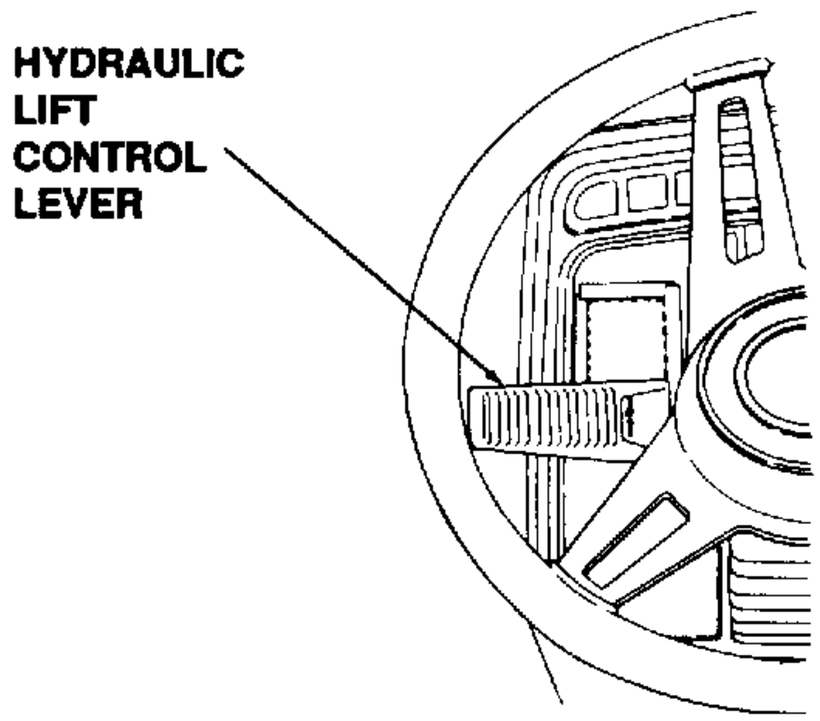


Figure 7-72. Preparing Dash Panel for New Hydraulic Valve Handle.

CAUTION

When cutting the plastic panel, use care not to cut into the metal pedestal underneath the scribed area.

NOTE

Depending on the tools used, prior removal of the steering wheel and/or the hydraulic lift control lever may ease removal of the scribed portion of the plastic dash panel.

   c. Carefully cut out scribed portion of the plastic.

   d. Install steering wheel and/or hydraulic lift lever if previously removed.

7-5.4 **Installation of Hydraulic Valve.**

1. For Models 1541, 1862, 1882 and 2082 only, the valve handle may be assembled to the hydraulic valve before valve is installed on the tractor. Proceed as follows:

   a. Turn the valve stem on hydraulic valve assembly (1, Figure 7-66) so curved portion

of the valve stem is at the top of the valve. Refer to Figure 7-73.

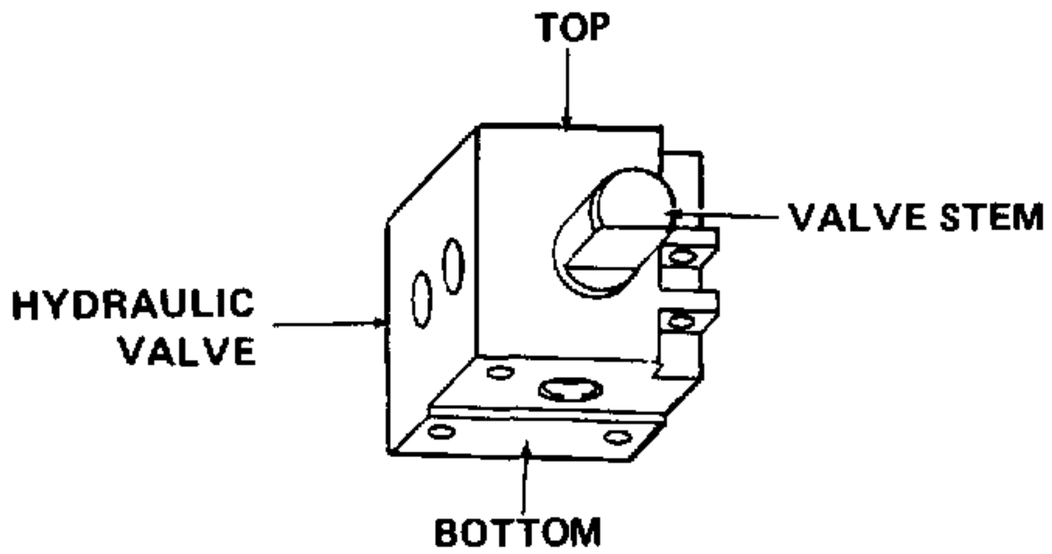


Figure 7-73. Turning the Valve Stem on the Hydraulic Valve.

b. Position valve handle (2, Figure 7-66) on the valve as shown in Figure 7-74, and secure with hex cap screw (3, Figure 7-66) and hex center lock nut (4).

c. Attach chain link to the valve and handle as shown in Figure 7-74.

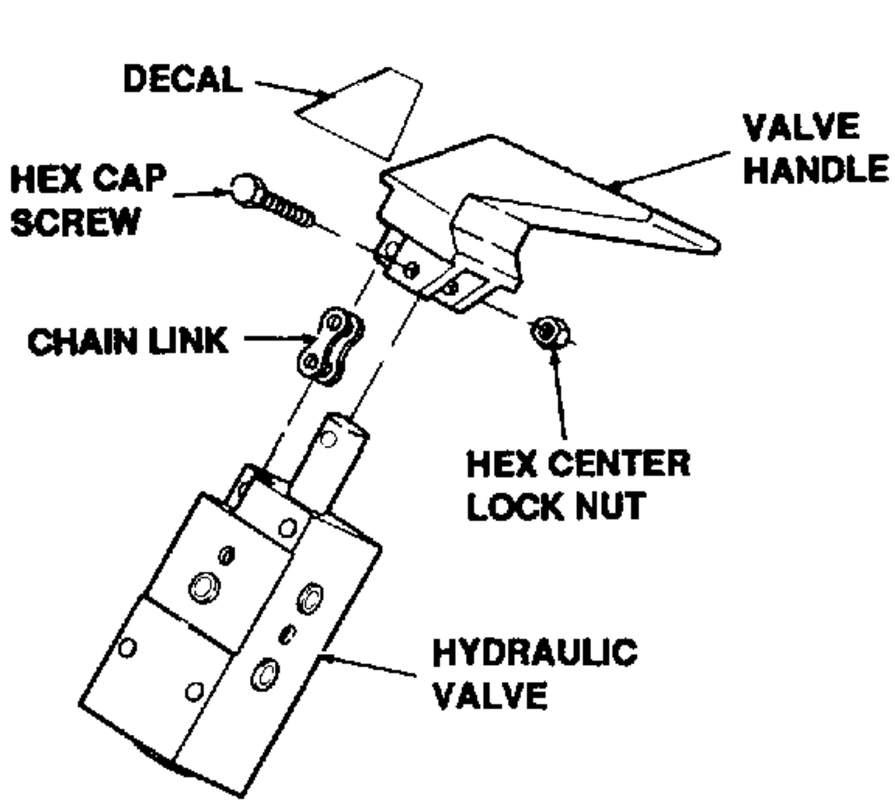
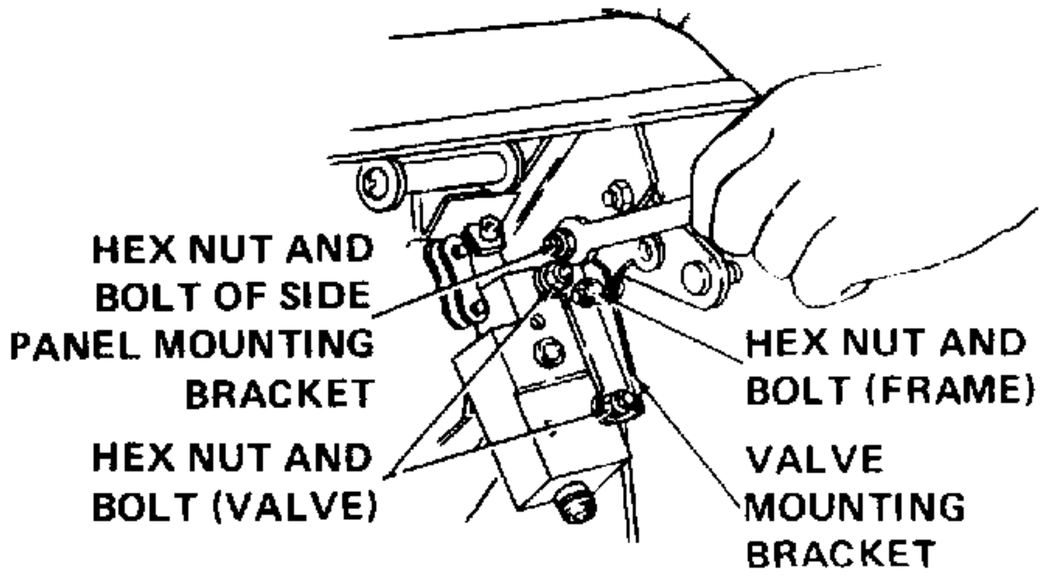


Figure 7-74. Positioning Valve Handle on Hydraulic Valve.

d. Attach label (6, Figure 7-66) with picture of closed cylinder on top, to valve handle. Refer to Figures 7-74 and 7-78.

2. Remove and discard lower hex nut and bolt (Figure 7-75) from left side panel mounting bracket.



NOTE
AIR-COOLED TRACTOR IS SHOWN.

Figure 7-75. Removing Hardware From Mounting Brackets.

3. Remove and discard two hex nuts and bolts securing the valve to valve mounting bracket.

4. Remove and retain hex nut and bolt securing top valve mounting bracket to frame. Retain bracket. Refer to Figure 7-74.

5. Install two O-rings (8, Figure 7-66) on valve adapter (7). Refer to Figure 7-76.

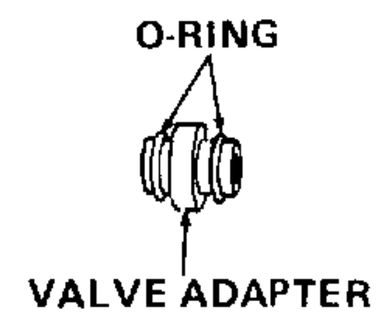


Figure 7-76. Installing O-Rings on Valve Adapter.

6. Carefully wipe any debris from top of installed valve, remove plastic protective plug from the top port and install valve adapter in the port.

7. Carefully wipe any debris from hydraulic valve (1, Figure 7-66) and remove plastic protective plug from the bottom of the valve. (Bottom of valve is identified in Figure 7-73.)

8. Align bottom port of hydraulic valve (1, Figure 7-66) with valve adapter (7) and position hydraulic valve on top of installed valve.

9. Position the valve mounting bracket on top of hydraulic valve and loosely secure valves together with three hex cap screws (9) and hex center lock nuts (10). Refer to Figure 7-77.

10. Loosely secure valve mounting bracket to frame with hex nut and bolt retained in step C.4. Refer to Figure 7-77.

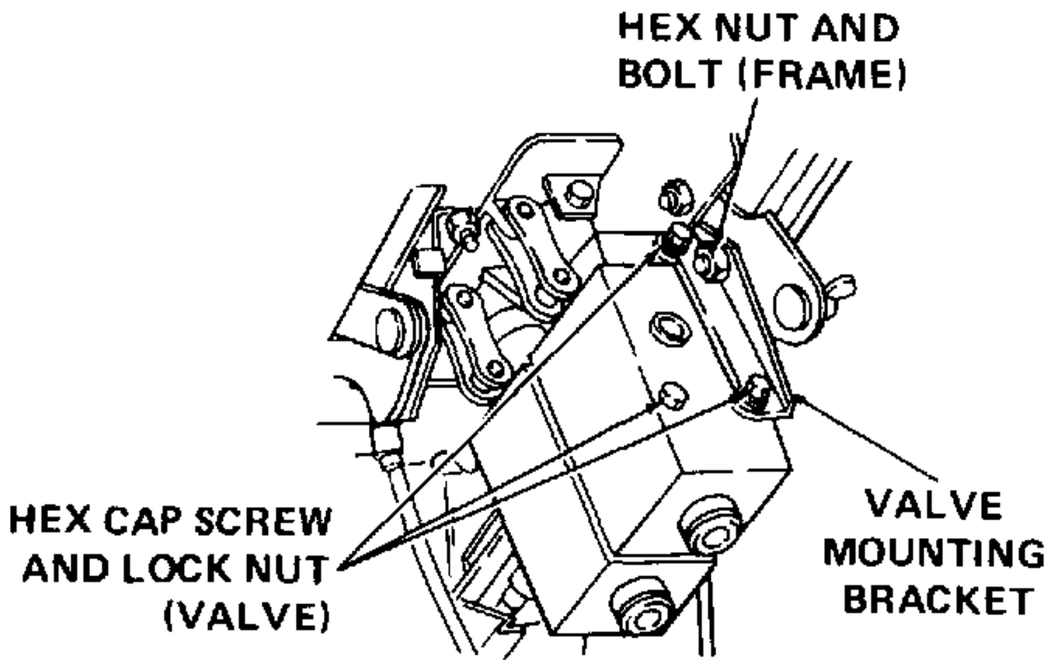


Figure 7-77. Installing Valve Mounting Bracket on Hydraulic Valve.

11. Alternately and evenly tighten three hex cap screws securing two valves together. Refer to Figure 7-77. Then tighten valve mounting bracket to frame.

NOTE

Be sure space between valves is even after tightening screws which secure valves.

12. For tractor Models 1782 and 2182 only, install hydraulic valve handle per paragraph 7-5.4, steps 1.a. through 1.d. Refer to Figure 7-78 for view of properly installed valve handle.

7-5.5 **Installation of Outlet Tubes and Power Steering Return Tube.** There are several variations, based on tractor model, for installation of the outlet tubes. Follow the sequence of instructions for your particular tractor.

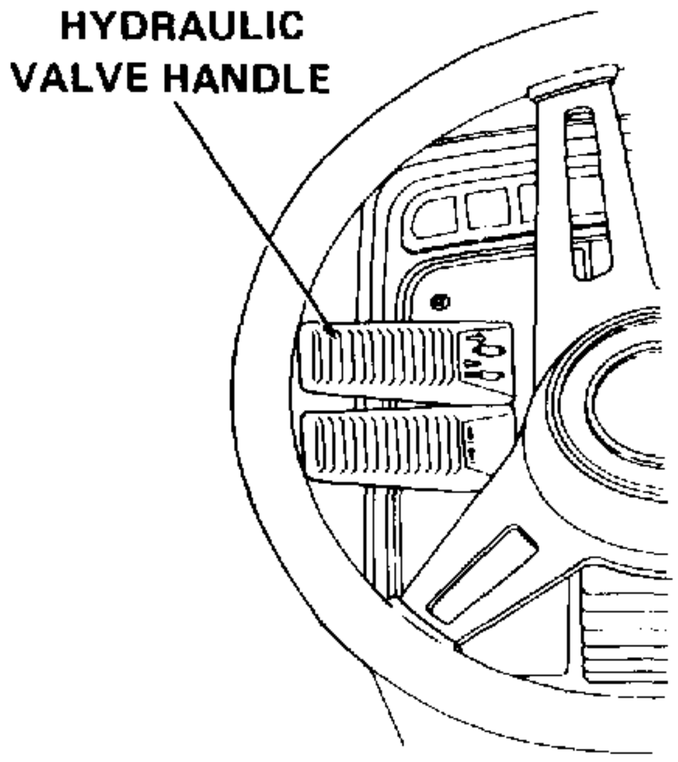


Figure 7-78. Properly Installed Hydraulic Valve Handle (Models 1782 and 2182 Only).

1. **For tractor Models 1782 and 2182 only,** install front outlet tube (11, Figure 7-66) to the hydraulic valve as follows:

   a. Install an O-ring (8) on the end of the outlet tube.

   b. Wipe any debris from the top of hydraulic valve, and remove the plastic protective cap from the top valve port.

   c. Position front outlet tube as shown in Figure 7-79 and manipulate the tube as shown in Figure 7-80 until threaded female end of tube passes through lower right side of pedestal near hydraulic T-fitting.

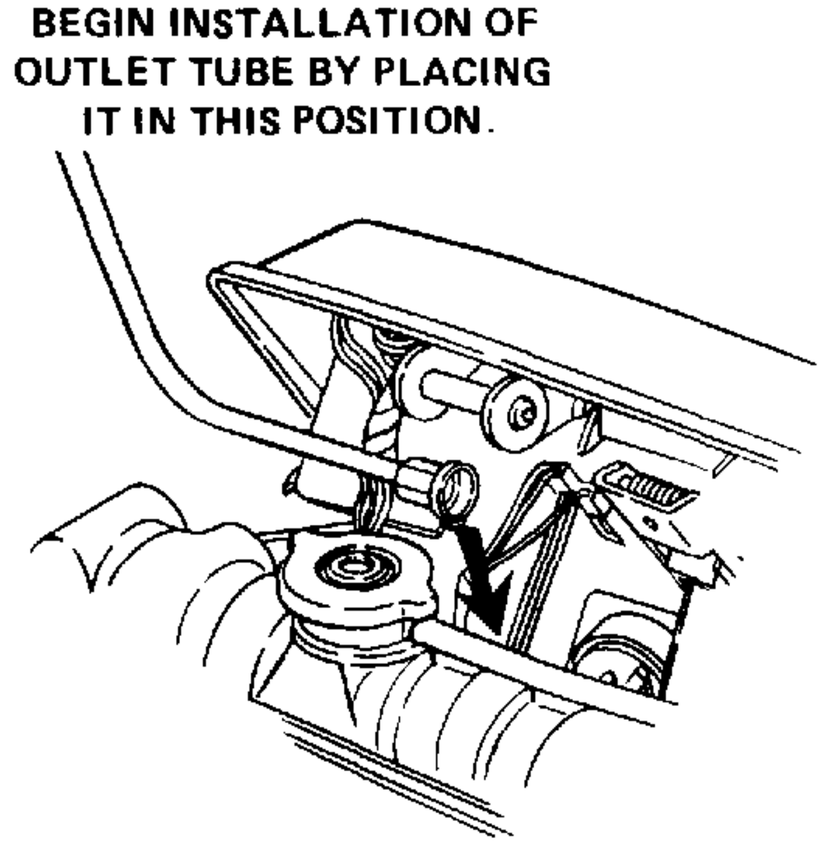


Figure 7-79. Placement of Front Outlet Tube (Models 1782 and 2182 Only).

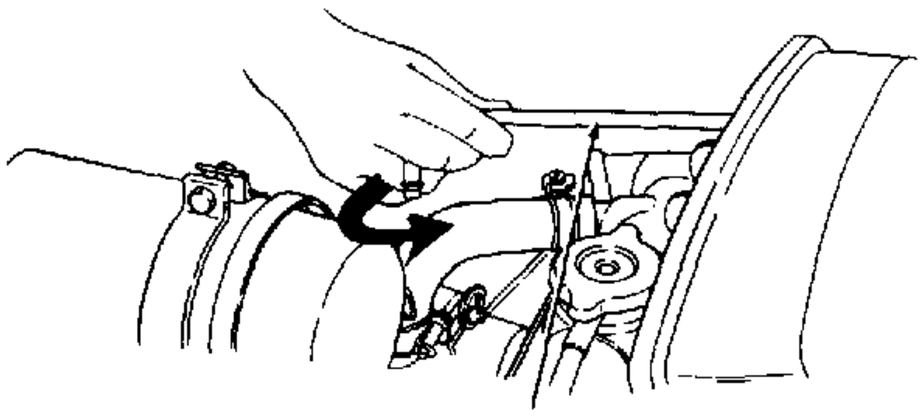


Figure 7-80. Installation of Front Outlet Tube (Models 1782 and 2182 Only).

d. Place upper end of front outlet tube in the top port of the hydraulic valve and loosely attach with the single valve clamp, lock washer and socket head cap screw retained in step 7-5.3.1. Refer to Figure 7-81.

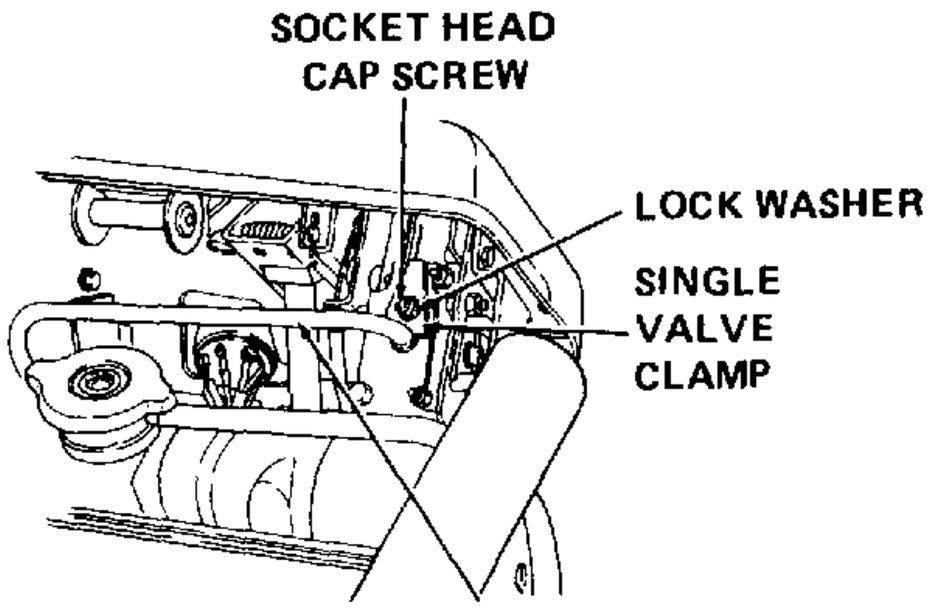


Figure 7-81. Further Installation of Front Outlet Tube (Models 1782 and 2182 Only).

e. Skip step 2 and proceed directly to step 3 to continue installation of front outlet tube (11, Figure 7-66).

2. **For tractor Models 1541, 1862, 1882 and 2082 only,** install the front outlet tube (12) to hydraulic valve as follows:

a. Install an O-ring (8) on the end of the outlet tube.

b. Wipe any debris from the top of the hydraulic valve, and remove plastic protective plug from top valve port.

c. Position the front outlet tube as shown in Figure 7-82 and manipulate the tube across the tractor until threaded female end of the tube passes through lower right side of the pedestal near the T-fitting.

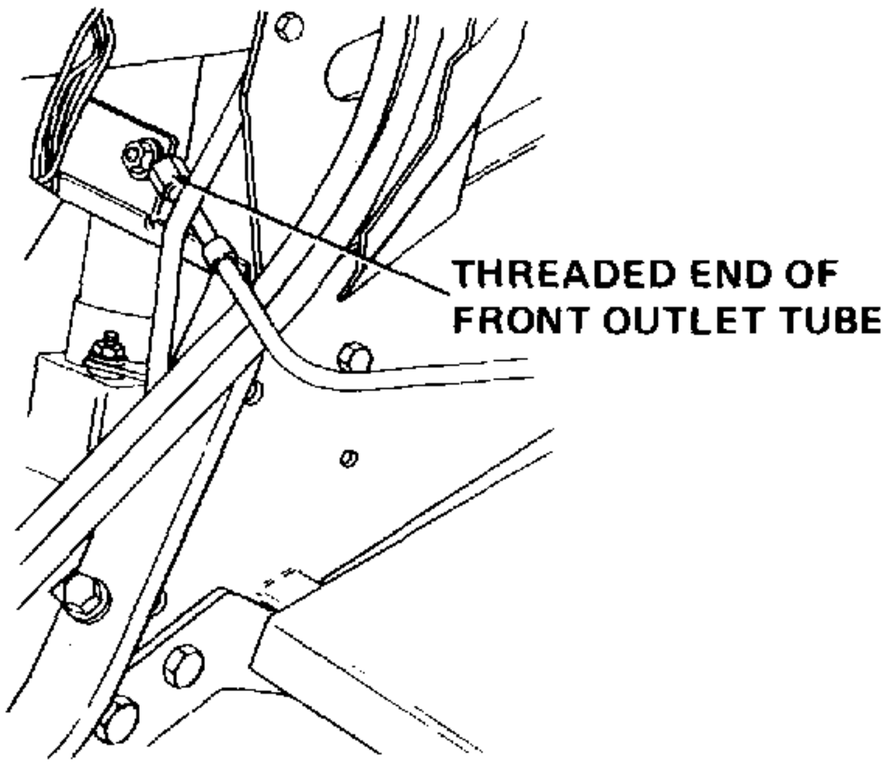


Figure 7-82. Placement of Front Outlet Tube (Models 1541, 1862, 1882 and 2082 Only).

d. Place upper end of front outlet tube in top port of the hydraulic valve and loosely attach with the spindle valve clamp, lock washer and socket head cap screw retained in step 7-5.3.1. Refer to Figure 7-83.

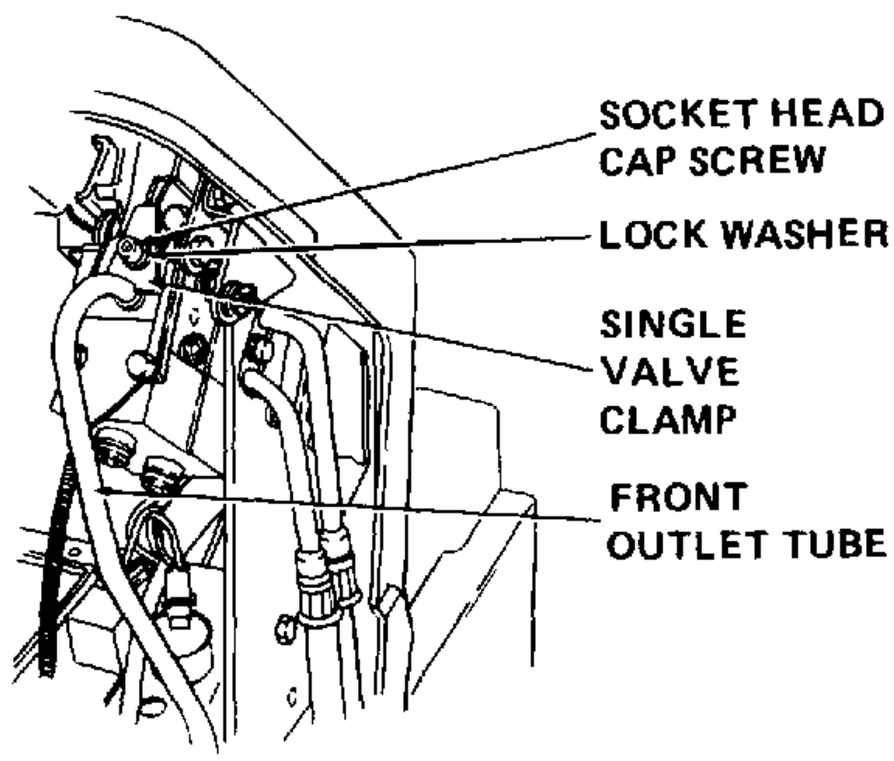


Figure 7-83. Installation of Front Outlet Tube (Models 1541, 1862, 1882 and 2082 Only).

e. **For tractor Models 1862, 1882 and 2082 only,** proceed directly to step 3 to continue installation of front outlet tube (12, Figure 7-66). For tractor Model 1541 only, skip step 3 and proceed directly to step 4.

3. **For tractor Models 1862, 1882, 2082, 1782 and 2182 only,** complete installation of front outlet tubes (11 or 12) as follows:

   a. Secure threaded female fitting on the front outlet tube to the T-fitting. Refer to Figure 7-84.

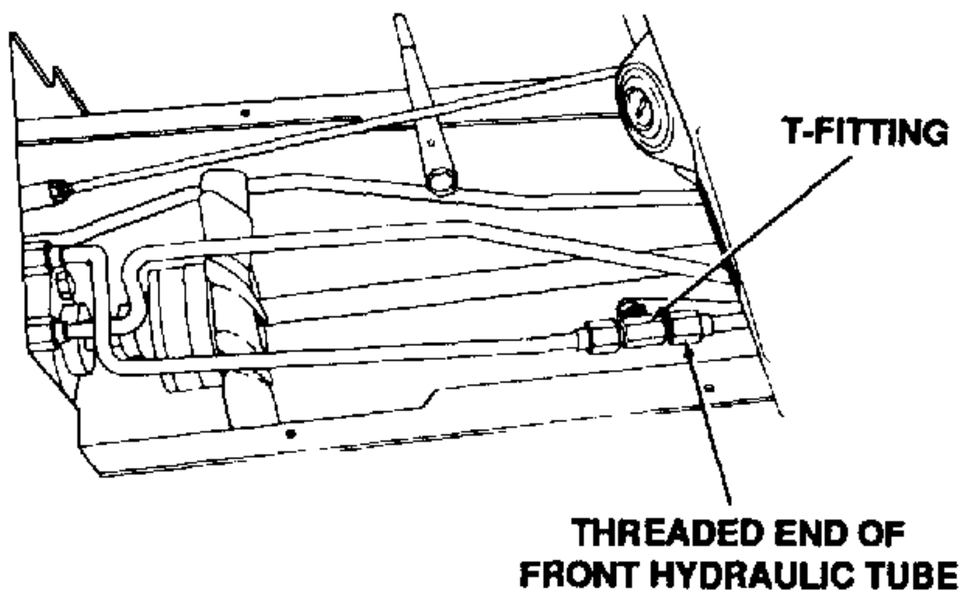


Figure 7-84. Final Installation of Front Outlet Tube (Models 1862, 1782, 1882, 2082 and 2182 Only).

   b. Securely tighten front outlet tube to hydraulic valve with socket head cap screw.

4. **For tractor Model 1541 only,** complete installation of front outlet tube (12, Figure 7-66) and power steering return tube (14) as follows:

   a. Secure threaded female fitting on front outlet tube to union fitting (13). Refer to Figure 7-85.

   b. Position front end of power steering return tube (14, Figure 7-66) as shown in Figure 7-85, and secure to union fitting (13).

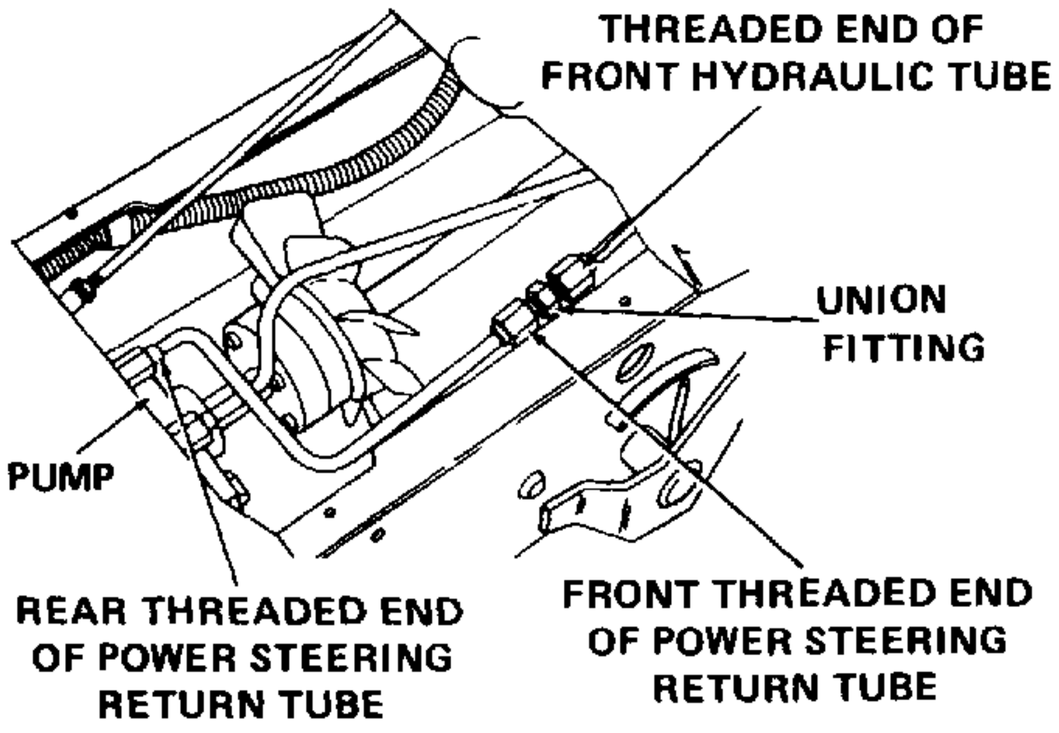


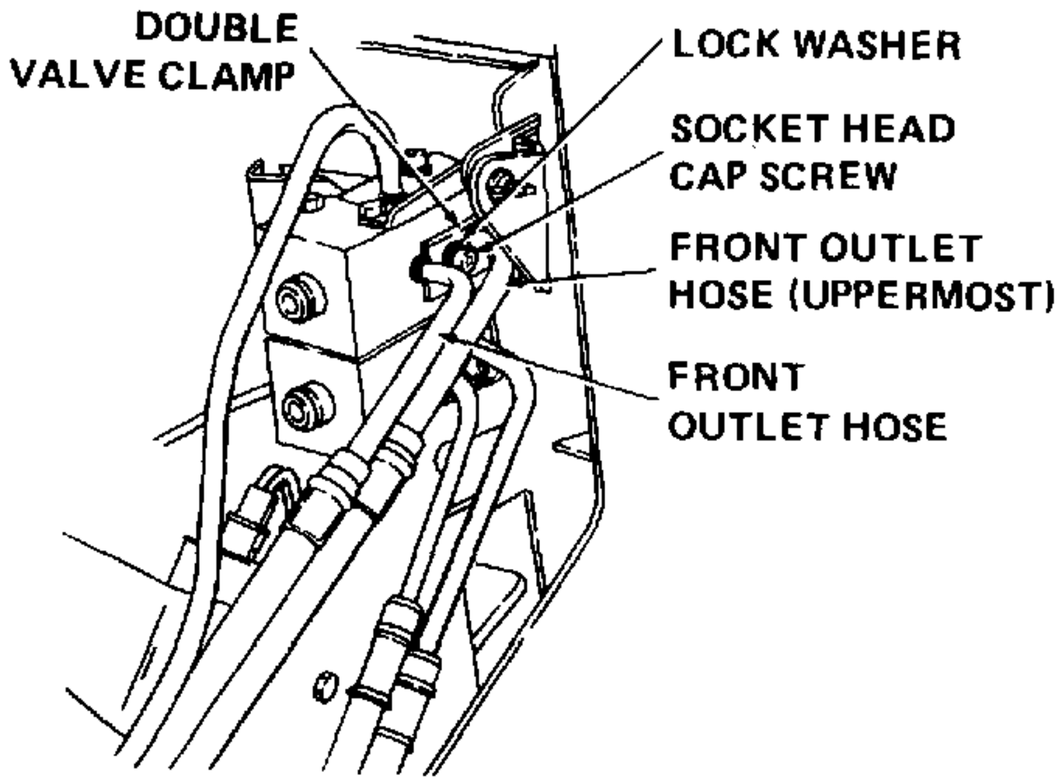
Figure 7-85. Final Installation of Front Outlet Tube (Model 1541 Only).

   c. Position rear end of power steering return tube as shown in Figure 7-85, and secure to threaded fitting on pump.

   d. Securely tighten front outlet tube to hydraulic valve with socket head cap screw.

7-5.6 Installation of Front Outlet Hoses.

1. Loosen valve mounting bracket from frame.
2. Wipe any debris from left side of top hydraulic valve and remove two plugs.
3. Install an O-ring (8, Figure 7-66) on each of front outlet hoses (15).
4. Position a front outlet hose in each of the side ports and secure with double valve clamp (16), lock washer (17) and socket head cap screw (18). Refer to Figure 7-86.



NOTE
AIR-COOLED TRACTOR IS SHOWN.

Figure 7-86. Positioning Front Outlet Hose in Side Ports.

5. Mark threaded end of uppermost front outlet hose with a piece of tape for later reference. Refer to Figure 7-86.
6. Tighten valve mounting bracket to frame.
7. Route two front outlet hoses to right front side of tractor as follows:

CAUTION

Do not position front outlet hoses directly against the engine.

a. **For tractor Models 1782 and 2182 only,** route the hoses through the opening shown in Figure 7-87. Push hoses across to right side of tractor and carry forward to front of tractor.

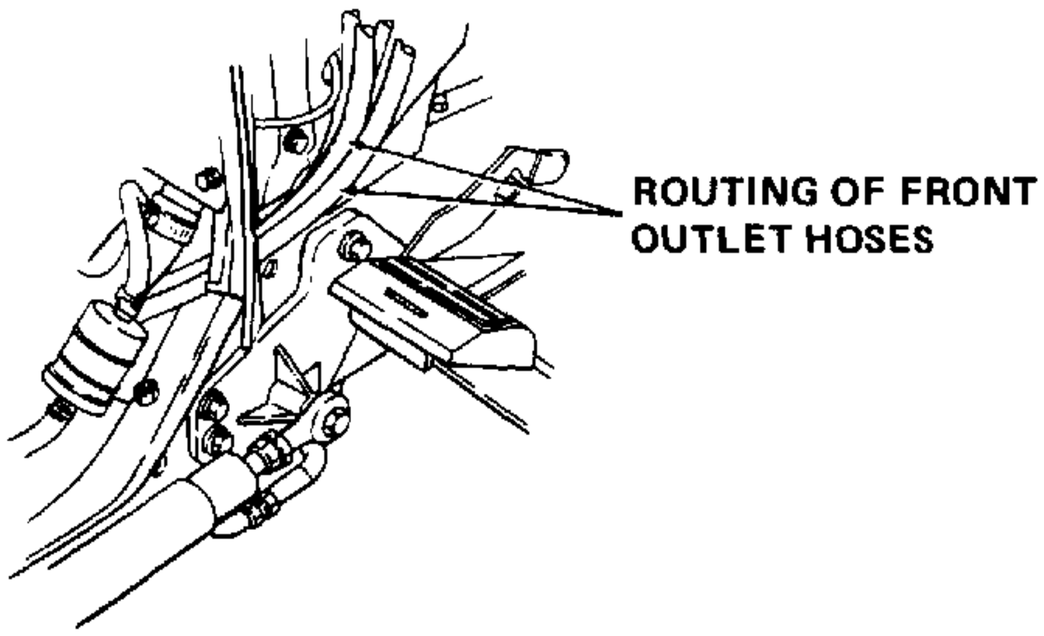


Figure 7-87. Routing of Front Outlet Hoses (Models 1782 and 2182 Only).

b. **For tractor Models 1541, 1862, 1882 and 2082,** route hoses through opening shown in Figure 7-88. Push hoses across to right side of tractor and carry forward to front of tractor.

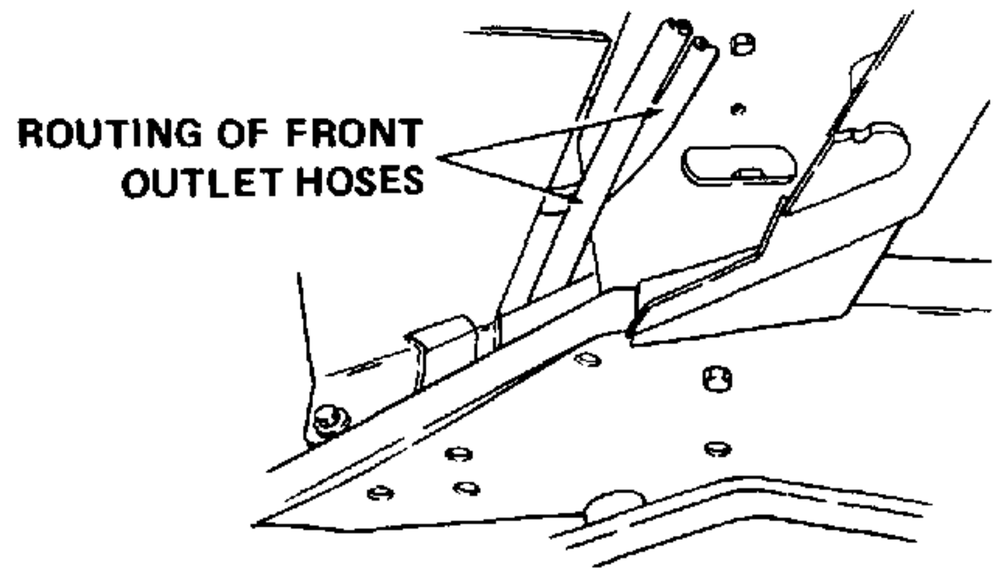


Figure 7-88. Routing of Front Outlet Hoses (Models 1541, 1862, 1882 and 2082 Only).

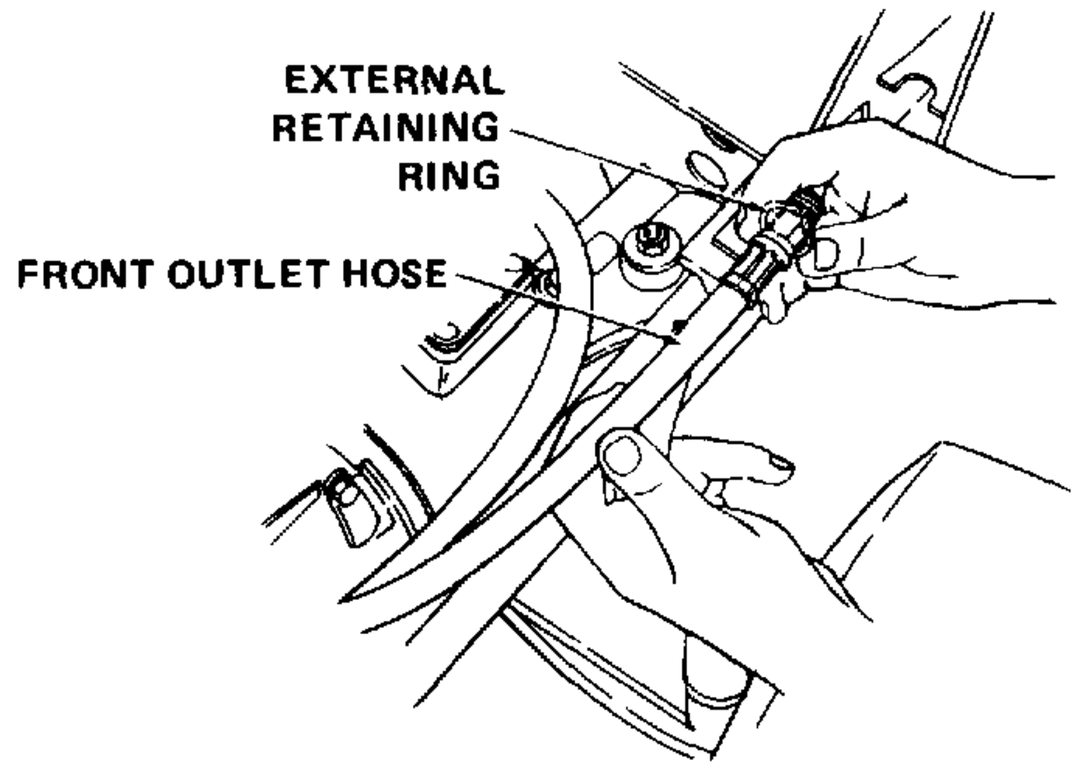


Figure 7-89. Installing Front Outlet Hoses.

10. Thread a hydraulic coupling body (20, Figure 7-66) securely onto each of the front outlet hoses. Refer to Figure 7-90.

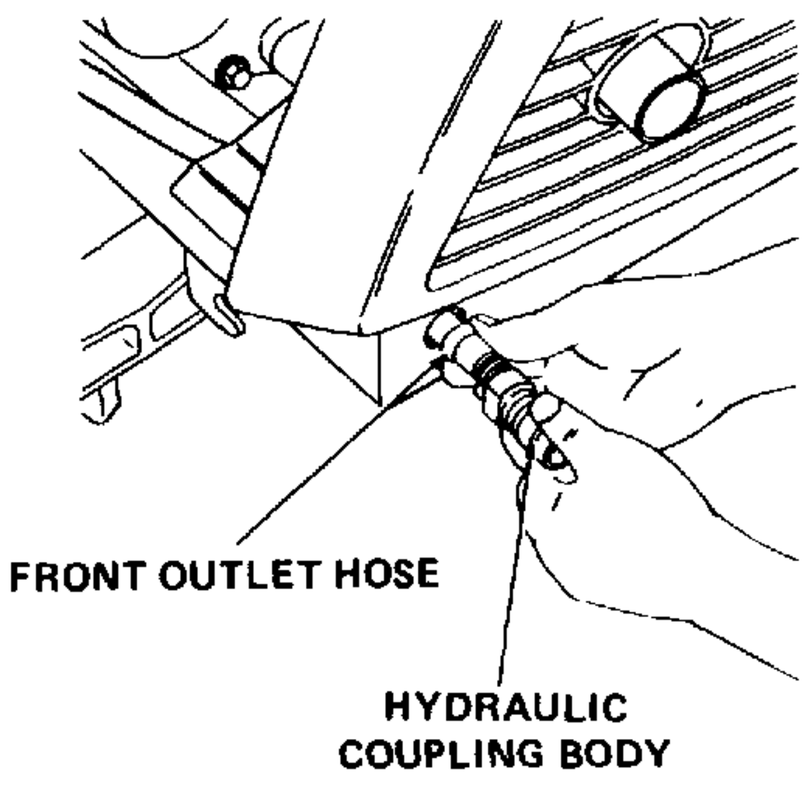


Figure 7-90. Threading Hydraulic Coupling Body Onto Front Outlet Hose.

8. Place an external retaining ring (19, Figure 7-66) on each of front outlet hoses as shown in Figure 7-89.
9. Place outlet hose marked with tape in preceding paragraph 7-5.6.5 through TOP hydraulic outlet opening. Place unmarked hose through BOTTOM hydraulic outlet opening.
11. Position hydraulic coupling bodies into openings and secure with external retaining rings placed in groove of hydraulic coupling body. Refer to Figure 7-91.
12. Secure two front outlet hoses using cable ties (21, Figure 7-66).
13. Attach two protective plugs (22) to cotter pin (23).

14. Secure cotter pin to tractor frame as shown in Figure 7-91.

CAUTION

Protective plugs should be installed whenever hydraulic couplings are not in use. Always wipe debris from plugs before inserting in couplings.

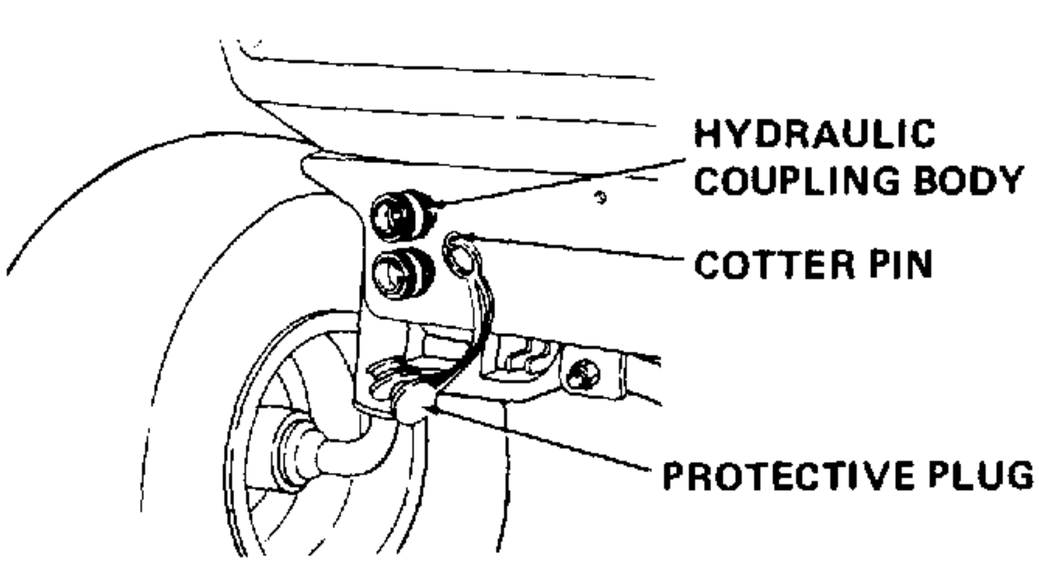


Figure 7-91. Installing Hydraulic Coupling Bodies.

7-5.7 **Reassembly.**

1. Install center frame cover with four self-tapping screws.
2. Install radiator screen on Models 1782 and 2182.
3. Install battery in Models 1541, 1862, 1882 and 2082 per paragraph 5-8.5.

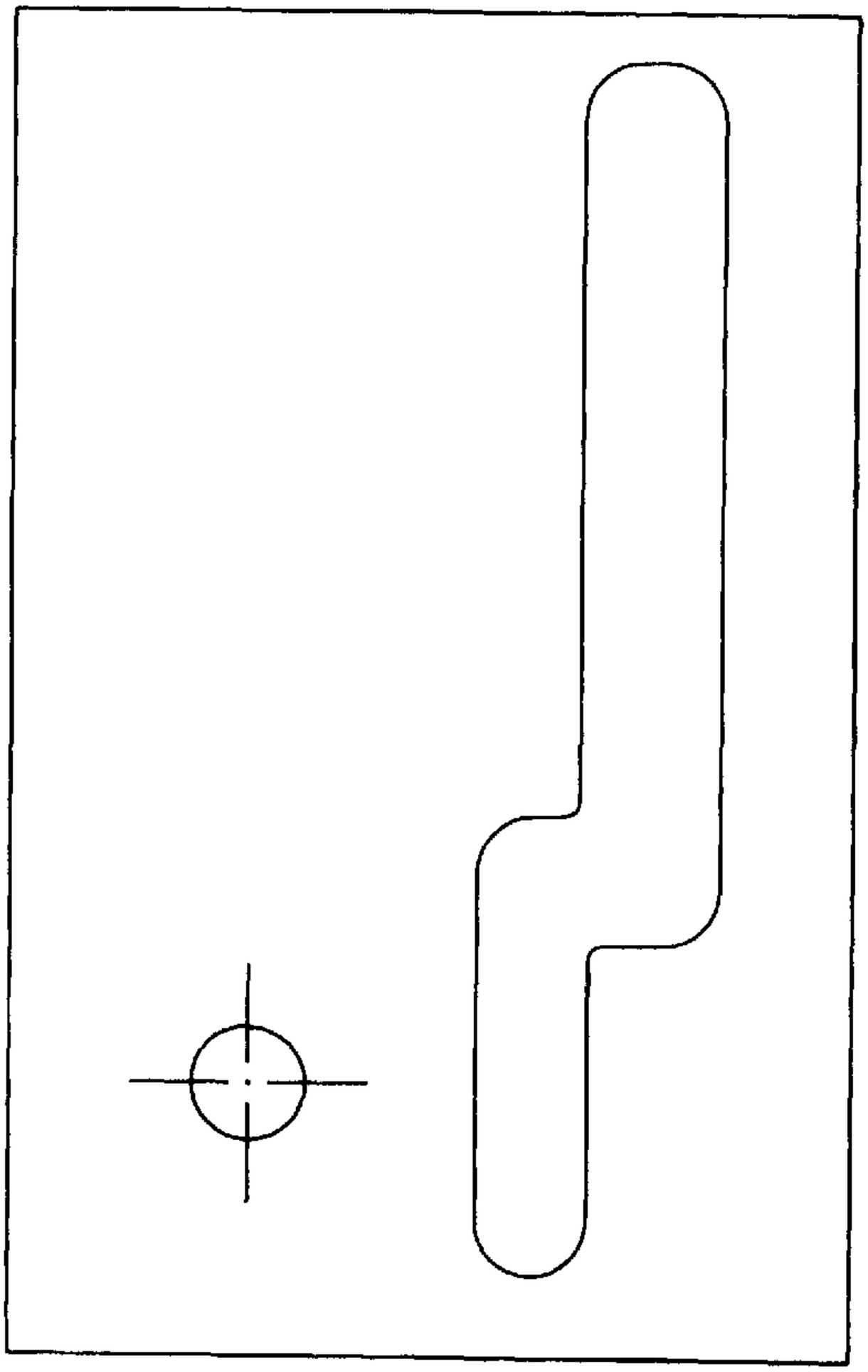
WARNING

The battery must be connected in the proper sequence to avoid arcing.

4. Connect battery in Model 1782 per paragraph 5-9.5 and Model 2182 per paragraph 5-10.5.
5. Install side panels on Models 1541, 1862, 1882 and 2082 per paragraph 5-4.7; on Models 1782 and 2182, per paragraph 5-5.7.
6. Operate hydraulic valve several times. Check hydraulic fluid and replace if necessary.
7. Start tractor and check for leaks at hydraulic fittings.

TEAR OUT

TEMPLATE



NOTES: THIS TEMPLATE IS USED TO PREPARE THE INSTRUMENT PANEL FOR MOUNTING DIRECTIONAL SWITCH WHEN INSTALLING REAR PTO KIT (MODEL 433) AND 3-POINT HITCH KIT (MODEL 383).

REMOVE TEMPLATE ON DOTTED LINE.

AFTER REMOVAL SAVE FOR FUTURE USE.

APPENDIX A
RELATED SERVICE MANUALS

A-1. GENERAL.

A-1.1 Appendix A lists service manuals for engines used in tractors covered in this manual. Refer to Table A-1.

Table A-1. Related Service Manuals

Item	Service Manual No.
Kohler M-18 and M-20 Engines	TP-2204A
Kohler 13 Command Engine	TP-2402
Kubota Diesel Engine	70109-0
Kubota Gas Engine	60172-0

APPENDIX B
SPECIAL TOOLS AND EQUIPMENT

B-1. **GENERAL.**

B-1.1 Refer to Table B-1 for a list of special tools and equipment for use on the equipment covered in this manual.

Table B-1. Special Tools and Equipment

Item	Part Number	Application
Alignment Tool	759-3426	Model 1535 – Replacement of Clutch Disc
Holding Fixture	See Figure B-1	Hydrostatic Transmission
Holding Fixture	See Figure B-2	Power Steering Box
Hydraulic Gauge	759-3593	Hydraulic System Pressure Check
Spring Installation Tool	759-3596	Upper Steering Torsion Spring (24, Figure 5-36)

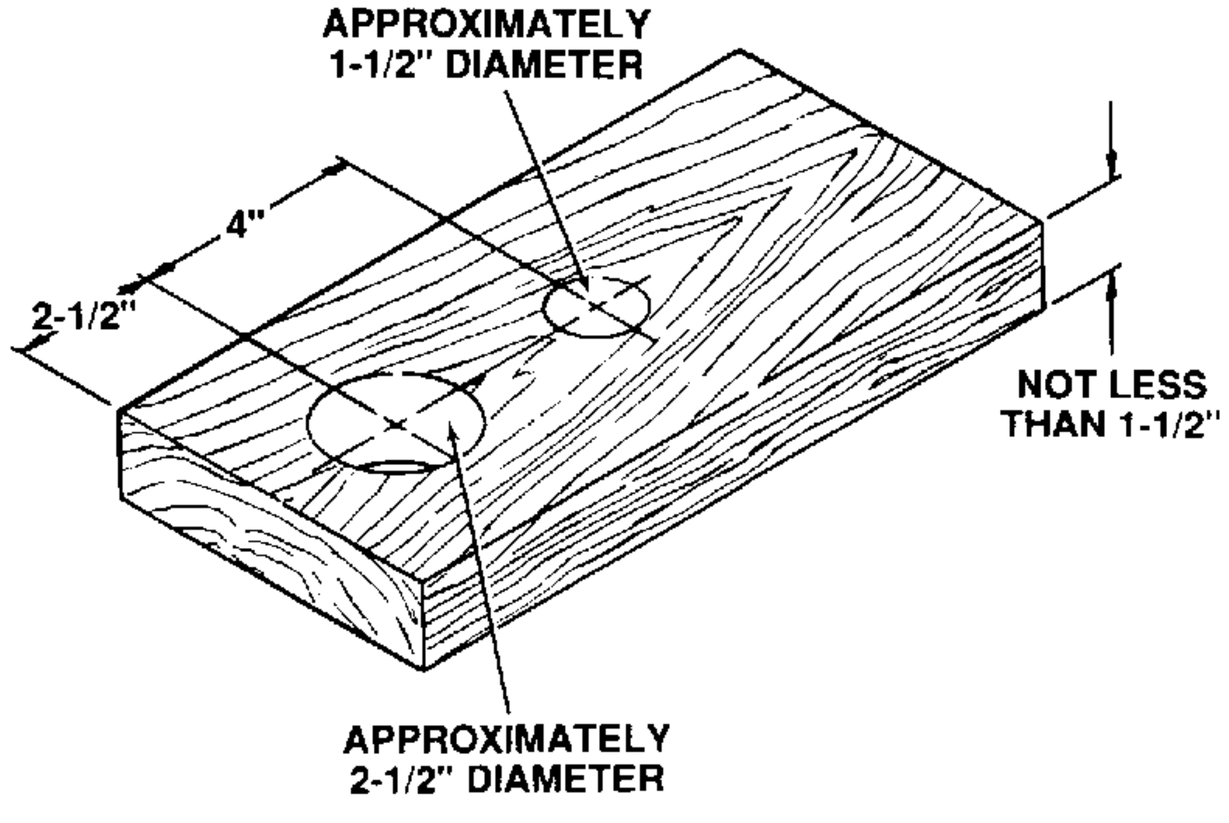


Figure B-1. Holding Fixture, Hydrostatic Transmission.

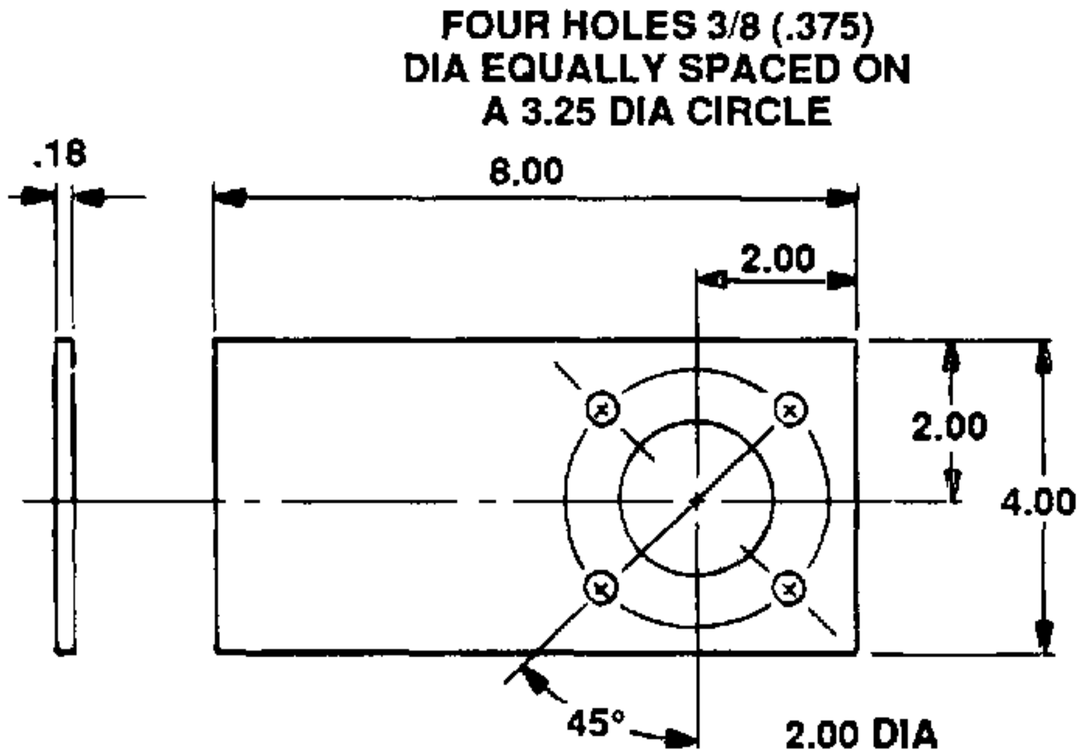


Figure B-2. Holding Fixture, Power Steering Box.

APPENDIX C
BULK SERVICE ITEMS

C-1. **GENERAL.**

C-1.1 This appendix lists bulk service items needed for maintenance of equipment covered in this manual. Refer to Table C-1.

Table C-1. Bulk Service Items

Bulk Item	Part Number
ENGINE OIL	
–Low Ash SAE 10W SF (gasoline)	737-3028 (1 qt.) 737-3044 (55 gal.)
–Low Ash SAE 30 SF (gasoline)	737-3029 (1 qt.) 737-3043 (55 gal.)
–Low Ash 10W/40 SF (gasoline)	737-3030 (1 qt.) 737-3045 (55 gal.)
–#1 Diesel SAE 10W CD/SE (diesel)	737-3031 (1 qt.)
–#1 Diesel SAE 30 CD/SE (diesel)	737-3032 (1 qt.) 737-3040 (55 gal.)
–#1 Diesel SAE 15W/40 CD/SE (diesel)	737-3039 (1 qt.) 737-3042 (55 gal.)
HYDRAULIC FLUID	
–*Cub Cadet*	737-3025 (1 qt.) 737-3026 (5 qts.) 737-3035 (5 gal.) 737-3027 (55 gal.)
GEAR LUBE	
–135H EP 85W/140	737-3033 (5 qts.) 737-3046 (55 gal.)
MULTI-PURPOSE GREASE	
–251H EP	737-3034 (14.5 ozs.) 737-3020 (4 oz. can) 737-3019 (4 oz. can with adapter) 737-3018 (8 oz. can with adapter)
CHAIN LUBRICANT	737-3038 (14.5 ozs.)
PENETRATING OIL	737-3037 (11.75 ozs.)
SEALANTS	
–Gasket Eliminator	723-3034 (24 cc.)
–Gasket Primer	723-3036 (6 ozs.)
–Gasket Remover	723-3035 (12 ozs.)
CV JOINT GREASE	737-3023 (6 oz. can with adapter)

Table C-1. Bulk Service Items (Continued)

Bulk Item	Part Number
PAINTS	
–Cadet Yellow	759-3258 (aerosol) 759-3263 (quart)
–Cadet Yellow*	759-3588 (aerosol) 759-3589 (quart)
–Cadet White	759-3259 (aerosol) 759-3264 (quart)
–Cadet Red	759-3260 (aerosol) 759-3265 (quart)
–Cadet Gloss Black	759-3262 (aerosol)
–Hi-Temp Black	759-3261 (aerosol)

* 1990 paint is a darker yellow. Used on Garden Tractors with Serial Number 800,000 and above.

APPENDIX D
MANDATORY REPLACEMENT PARTS

D-1. **GENERAL.**

D-1.1 This appendix contains a list of items which must be replaced following removal or disassembly of the related component. Refer to Table D-1.

Table D-1. Mandatory Replacement Parts

Item	Part Number	Reference Item and Figure Number	Quantity
Boot	735-3029	18, 5-36	1
		2, 5-70	2
		5, 5-72	2
		12, 5-89	1
Tie Strap	725-0157	17, 5-36	1
		5, 5-70	2
		4, 5-72	2
		9, 5-89	1
Seal	723-3039	16, 5-38	1
Dust Seal, Column	RG402405	27, 5-40	1
Kit, Seal	RG-SK000011	5-40	1
O-Ring	721-3025	17, 5-36	1
		17, 5-70	2
		18, 5-72	2
		38, 5-89	1
O-Ring	721-3021	3, 5-50	2
		3, 5-51	4
O-Ring	721-3001	12, 5-50	2
		8, 5-51	2
O-Ring	721-3002	14, 5-51	2
Seal Kit	759-3431	5-56	1
Roll Pin	715-3029	2, 5-57	3
Roll Pin	715-3025	4, 5-57	1
Roll Pin	715-3002	18, 5-57	2
Spiral Spring Pin	715-3002	18, 5-57	1
Spiral Spring Pin	715-0114	8, 5-62	1
		1, 5-64	1
Flexible Disc	722-3000	3, 5-71	4
Spiral Spring Pin	715-3000	5, 5-71	1

Table D-1. Mandatory Replacement Parts (Continued)

Item	Part Number	Reference Item and Figure Number	Quantity
Seal	721-3020	6, 5-73	2
Gasket	721-3014	9, 5-73	2
Gasket	721-3015	12, 5-74	1
Gasket	721-3004	3, 5-79	1
		3, 5-85	1
		3, 5-86	1
Lip Seal	SU-9008000-6201	25, 5-79	2
		26, 5-85	2
		26, 5-86	2
Lip Seal	SU-9008000-6701	49, 5-79	2
		50, 5-85	2
		51, 5-86	2
Lip Seal	SU-2000036	6, 5-85A	1
Lip Seal	SU-2000037	9, 5-85A	1
Lip Seal	SU-9008000-0124	34, 5-85A	1
Ball	SU-9001214-3700	43, 5-85A	2
Gasket	SU-3102875	52, 5-79	1
Gasket	SU-2000061	33, 5-85A	1
Gasket	KH-52 755 67	10, 102A	1
O-Ring	SU-9004100-0360	24, 5-79	1
		25, 5-85	1
		25, 5-86	1
O-Ring	SU-9004100-0160	14, 5-79	2
		14, 5-85	2
		14, 5-86	2
O-Ring	SU-9004201-6200	12, 5-79	2
		12, 5-85	2
		12, 5-86	2
Back-Up O-Ring	SU-9006110-0160	13, 5-79	2
		13, 5-85	2
		13, 5-86	2
O-Ring	SU-9004201-5000	12, 5-79	2
		30, 5-85	2
		30, 5-86	2
O-Ring	SU-9004100-1430	45, 5-85A	2
O-Ring	SU-9004175-0027	56, 5-85A	1
O-Ring	SU-9004201-2500	57, 5-85A	1
O-Ring	SU-9004201-3100	50, 5-85A	1
O-Ring	SU-9004201-3700	41, 5-85A	3

Table D-1. Mandatory Replacement Parts (Continued)

Item	Part Number	Reference Item and Figure Number	Quantity
Oil Filter	KH-52 050 02	1, 5-102A	1
Expansion Plug	726-0216	11, 5-87	1
Front Bearing Retainer	717-3127	12, 5-87 12, 5-88	
Roller Bearing Cone	741-0371	25, 5-87 24, 5-88	1 1
Roller Bearing Cone	741-0373	28, 5-87 27, 5-88	1 1
Spiral Spring Pin	715-3011	8, 5-91	2
Seal	721-0193	11, 5-91	1
Roll Pin	715-3034	22, 5-91	1
O-Ring	721-3008	24, 5-91	1
Roll Pin	715-0248	32, 5-91	1
Gasket	721-3019	36, 5-91	1
Needle Bearing	741-0362	10, 5-94	1
Oil Seal	721-0193	11, 5-94	1
Gasket	BU-70152	20, 5-117	1

APPENDIX E
CONTINGENCY REPLACEMENT PARTS

E-1. GENERAL.

E-1.1 This appendix contains a list of items which are subject to wear. As such, they may need to be replaced at some point in their service life. Refer to Table E-1.

Table E-1. Contingency Replacement Parts

Item	Part Number	Reference Item and Figure Number or Model Numbers	Quantity
Front Wheel Bearing	741-3002	6, 5-22	1
Brake Puck Kit	759-3185	2, 5-65	1
Engine Belt	KB-15841-64420	Models 1782 and 2182	1
Air Filter	759-3359	Models 1535, 1541, 1860, 1862, 1882 and 2082	1
	KB-70000-11221	Models 1782 and 2182	1
Oil Filter	KH-52-050-02	Models 1535, 1541, 1860, 1862, 1882 and 2082	1
	KB-70000-15241	Models 1782 and 2182	1
Transmission Filter	723-3014	All Models	1
Fuel Filter	KH-25-050-02	Models 1535, 1541, 1860, 1862, 1882 and 2082	1
	KB-1335-43010	Model 1782	1
	KB-12691-43010	Model 2182	1
Mower Spindle Bearing	741-3028	15, 5-109 15, 5-113 15, 5-120 15, 5-123 15, 5-126 1, 5-130	2
Double Pulley Bearing	741-0155	38, 5-113	2
Spindle Shaft	759-3369	12, 5-109 9, 5-113	3
	759-3372	12, 5-120 12, 5-123 12, 5-126	3
	HA-14237	5, 5-130	3
Front Deck Wheels	703-1890	17, 5-112	2
	734-3058	14, 5-122 14, 5-125	2
	HA-14501	11, 5-129	2
Rear Deck Wheels	734-3061	14, 5-108	2
	734-3062	11, 5-112	2
	BU-80916	21, 5-115	2
	734-3000	6, 5-122 6, 5-125	2
	759-3510	17, 5-128	2

APPENDIX F
ELECTRICAL COMPONENTS – SERVICE METHODS AND EQUIPMENT

F-1. **GENERAL.**

F-1.1 This appendix lists methods for testing selected electrical components.

F-2. **TESTING SOLENOID ON ELECTRIC START TRACTORS.**

F-2.1 Through examination of returned warranty parts, we have found instances of solenoids being replaced unnecessarily on electric start tractors.

F-2.2 **Solenoid Problems.** The following are solenoid problems that require replacement of the solenoid.

1. Solenoid is stuck; unit will start with ignition key in OFF position.
2. Coil wire (inside solenoid) is bad; solenoid will not function.
3. Bad washer (inside solenoid); solenoid clicks but starter motor does not turn.

F-2.3 **Other Problems Which Can Appear To Be a Defective Solenoid.**

1. Faulty ground
2. Defective safety switch
3. Discharged battery
4. Defective starter motor
5. Blown circuit breaker
6. Defective ignition switch
7. Defective wire harness

F-2.4 **Testing the Interlock System.**

1. The basic procedure for testing the interlock system on electric start tractors is listed in Table F-2. The following tests are specifically to check for a defective solenoid. These tests assume that all safety switches are in working order.
2. Before replacing the solenoid, disengage the blades or PTO, depress the clutch pedal and check as follows.

NOTE

When using a jumper wire between any terminals on the electrical system, use a wire only as heavy as the wire which you are bypassing. A 12-volt continuity tester may also be used.

F-3. **TESTING THE REVERSE RELAY USING A MULTIMETER.**

F-3.1 Refer to Table F-2 for testing procedures.

F-4. **BATTERY INSPECTION AND TESTS.**

F-4.1 A visual inspection cannot be expected to effectively substitute for an instrument check when diagnosing a battery problem or evaluating its condition. An inspection will, however, uncover tell-tale clues which can direct the service technician toward the selection of instrumentation which will most efficiently test a battery under a given set of conditions.

F-4.2 Where there is an indication that there is a need for further service, it is advisable that the technician check the installation date. (Length of service could be a factor — it would certainly be an aid in determining whether trouble is premature or the result of normal degeneration.)

F-4.3 The following are items which may be checked visually for symptoms of trouble in-the-making:

1. Battery date coding
2. The condition of the battery case and its one-piece cover or individual cell covers
3. The top surface of the cover for acid accumulation
4. The color and odor of the electrolyte in the battery
5. A gassing condition when the charging circuit is operating
6. The condition and size of cables
7. Corrosive deposits
8. All surfaces of the battery for any indications of abuse
9. Missing vent plugs
10. The level of the battery's electrolyte

F-4.4 **Condition of Case and Cover.**

1. Check for cracks or buckling which could result from one of the following:
   a. Excessive tightening of hold-down attachments.
   b. Hold-down attachments too loose, causing vibration damage.

Table F-1. Tests for Solenoid Problems

Test	Results	Possible Causes(s)
1. Using a jumper wire, jump from the positive terminal of the battery to the starter motor.	Engine cranks	The battery, starter motor and ground cables are O.K. Proceed to Test 2.
	Engine fails to crank	A. Ground cables are not making good contact. Check ground by jumping from the negative terminal of the battery to the mounting bolt on the engine (on iso-mounted engines, check for proper ground on wire from engine to frame). Turn key to start position. If engine cranks, a bad ground is the problem. If engine does not crank, proceed to step B.
		B. Battery may be defective. Check for defective battery. If the battery is O.K., proceed to step C.
		C. Starter motor may be defective. Check starter motor. If starter motor is O.K., proceed to Test 2.
2. Jump between the two large terminals on the solenoid using a cable as heavy as the wire from the solenoid to the starter motor.	Engine cranks	Cable connections between battery, solenoid and starter motor are O.K. Proceed to Test 3.
	Engine fails to crank	Check the connections from the battery to the solenoid, and the solenoid to the starter motor. If connections are O.K., proceed to Test 3.
3. Using the jumper wire, jump between the positive terminal of the battery and coil primary of the solenoid.	Engine cranks	Solenoid is O.K. and is grounded.
	Engine fails to crank	Go to Test 4 to check solenoid base of proper ground.
4. Jump from the negative terminal to the battery to the base of the solenoid. Turn the key to the start position.	Engine cranks	Solenoid base is not properly grounded to mounting surface. ➡ NOTE Star washers should be used between solenoid base and mounting surface to obtain proper ground.
	Engine fails to crank	The solenoid is defective and should be replaced.

➡ NOTE

Solenoid should not be replaced until all of the above tests have been completed, and the solenoid has been proven to be defective.

Table F-2. Testing the Reverse Relay

Problem	Test	Conclusion
PTO clutch will not stay on when the PTO Switch is released to the RUN position.	1. Check the green wire (Figure F-1) at the relay for proper ground.	If properly grounded go on to Test 2.
	2. Check for continuity between the brown wire at the relay and ground.	If there is no continuity, the coil is bad. Replace the relay. If the relay has continuity, check the seat and reverse switches.

c. Excessive temperatures in the engine compartment, or internally, due to a high charging rate.

d. Buckled plates as a result of the battery standing in an undercharged condition for long periods of time.

e. Freezing of the electrolyte. (A battery with 3/4 state of charge is in no danger of freezing. Refer to paragraphs F-4.7 and F-4.9 for more information about electrolyte under temperature extremes.)

2. Check the cell covers; they could be raised as a result of operating an undercharged battery over a long period of time, then subjecting it to prolonged overcharging.

3. Again, check the cell case and cover. One or both could be broken as a result of an open flame or spark being brought too close to a gassing battery.

F-4.5 **Evidence of Acid on Cover.**

F-4.5.1 If acid deposits are noted on the cover, it is quite possible that leakage, spillover or gassing due to a high charging rate is a contributing cause. (A voltmeter check will determine whether leakage is taking place.) If these conditions are not serviced, they can result in an increase in the rate of self-discharge.

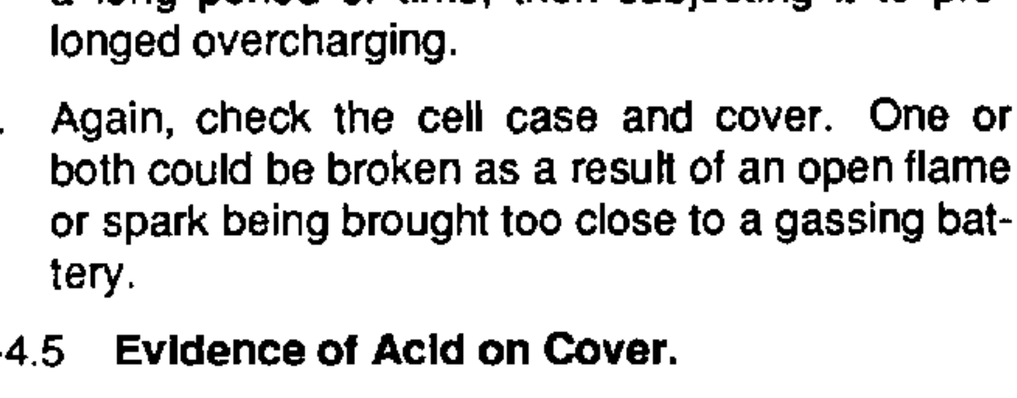


Figure F-1. Typical Relay Schematic.

F-4.6 **Color and Odor of the Electrolyte.**

F-4.6.1 Separately or in combination, discoloration of normally clear electrolyte and/or the presence of an odor similar to that of rotten eggs suggests one or more of the following:

1. The existence of an excessively high charging rate.
2. The adverse affects of deep cycling.
3. The presence of impurities in the electrolyte solution.
4. An aged battery which is approaching the end of its useful life.

F-4.7 **Electrolyte Level.**

F-4.7.1 Battery capacity is reduced in direct proportion to the amount of active material which is exposed to the air. If inspection reveals a low supply, pure water should be added to bring the electrolyte to the proper level. Most batteries will have an electrolyte level indicator near the base of the filler opening. For batteries which do not have a level indicator, add water to restore the level to 1/4 to 1/2 inch above the top of the plates. Never add electrolyte to the battery to restore the proper electrolyte level. This would disrupt the predetermined sulfuric acid to water ratio and cause destruction of the plate separators.

F-4.7.2 The need to add water in excess of this amount suggests the need to check and adjust the voltage limiter.

F-4.8 **Signs of Abuse.**

F-4.8.1 Surface indications of abuse to the battery are a clue to the cause of some troubles. Check for the following:

1. Battery posts which have been damaged as a result of:
   a. Hammering.

b. Flashing tools or wires across the terminals.

c. Stretching short cables or applications that require longer lengths.

d. Improper cable removing techniques.

e. Improper connections of booster or charging equipment.

F-4.9 **Hydrometer Test.**

F-4.9.1 Test Procedure.

1. Raise hood.
2. Remove all vent plugs.
   a. Visually check vent openings.
   b. If a plugged vent is suspected, blow out with compressed air.
3. Make sure the electrolyte level is high enough to withdraw proper amount of acid into hydrometer barrel.
   a. Take no readings immediately after adding water.
   b. Water must be thoroughly mixed with underlying electrolyte, by charging, before hydrometer readings are reliable.
4. Insert hydrometer pick-up tube into cell with bulb squeezed tightly by thumb pressure.
5. Slowly release thumb pressure until bulb is fully expanded and float is suspended freely in the barrel.
   a. Always hold barrel vertically to prevent float from binding or sticking to sides.
      (1) Wash barrel and float assembly periodically with soap and water.
      (2) While disassembled, inspect float assembly for leaks.
   b. Float assembly should not touch top or bottom stoppers of barrel.
6. With the hydrometer at eye level, read the float scale at the electrolyte level. (Hydrometer floats are calibrated at 80°F.)
7. Record the specific gravity reading.
8. Repeat this procedure (steps 3 through 7) for each cell in the battery.
9. If all cells are even at 1.165 or above, the state of charge is probably good.
10. If all cells are even, but less than 1.165, the state of charge is doubtful. Recharge according to manufacturer's recommendations and retest.

APPENDIX G
ELECTRICAL SCHEMATICS AND TESTING

G-1. **GENERAL.**

G-1.1 This appendix contains electrical schematics and related electrical testing for all tractors covered in this manual.

G-2. **ELECTRICAL TESTING AND SCHEMATICS (Models 1340, 1541, 1860, 1862, 1882 and 2082.)**

G-2.1 **Testing.** The wiring schematics for Models 1882 and 2082 are slightly different from those for Models 1340, 1541, 1860 and 1862. The difference consists of the addition of a jumper to the rear PTO in Models 1882 and 2082.

G-2.2 Therefore, separate electrical schematics are included which represent Models 1882 and 2082. However, the testing procedures for Models 1882 and 2082 are virtually identical to those for Models 1340, 1541, 1860 and 1862.

G-2.3 **Function – Engine Cranking (Models 1340, 1541, 1860 and 1862 refer to Figure G-1) (Models 1882 and 2082 refer to Figure G-6).** Observe the following to start engines.

1. Operator must be in seat.
2. Transmission must be in neutral.
3. Clutch/brake pedal must be depressed.
4. PTO switch must be in the off position.
5. Key switch must be turned to start position.
   a. Current flows from the battery through the starter solenoid and fuse to terminal B on the key switch. Current then passes from terminal B to terminal S of the key switch. From terminal S current passes through a red/black wire to terminal 1 on the clutch switch. With the clutch switch in the depressed position, current passes from terminal 1 to terminal 2 of the clutch switch. Current then passes through a red wire to terminal 1 on the PTO switch.
   b. With the PTO switch in the off position, current passes to terminal 2 of PTO switch. From terminal 2 of PTO switch current passes through a red wire to the starter solenoid. The starter solenoid then supplies power to the starter which cranks the engine over.

G-2.4 **Function – Engine Run (Models 1340, 1541, 1860 and 1862 refer to Figure G-2) (Models 1882 and 2082 refer to Figure G-7).** To run engine, key switch must be in the run position.

1. With the engine running, current is supplied from the engine alternator to terminal R on the key switch by a red/white wire. Current passes to terminal B on the key switch and passes through a black wire to the fuse. From the fuse it passes through a red wire to the starter solenoid. Current then passes to the positive terminal on the battery.
2. Current is also supplied from the red/white wire to terminal 5 on the PTO switch and terminal 30 on the reverse relay. The red/white wire also provides power to the voltage sensor, hourmeter and the amp, low fuel and low oil indicator lamps.

G-2.5 **Function – Normal and Safety Engine Shutdown (Models 1340, 1541, 1860 and 1862 refer to Figure G-3) (Models 1882 and 2082 refer to Figure G-8).**

1. Normal Engine Shutdown. A yellow wire runs from the grounding side of the ignition module to the key switch. With the key switch in the off position, terminals M and G are connected supplying a ground to kill the engine.
2. Safety Engine Shutdown.
   a. The system combines the seat switch and clutch switch to shut the engine down.
   b. A yellow wire also runs to the normally closed seat switch (grey). If the operator is not in the seat, the circuit continues to the clutch switch which is normally closed. If the clutch/brake pedal is not depressed, the circuit is completed to ground and the engine is shut down. The operator cannot leave the seat without locking down clutch/brake pedal or the engine will be shut down.

G-2.6 **Function – PTO Start (Models 1340, 1541, 1860 and 1862 refer to Figure G-4) (Models 1882 and 2082 refer to Figure G-9).** Observe the following to start PTO.

1. The operator must be in the seat.
2. PTO switch must be in the start position.
3. Transmission must be in either forward or neutral, but not reverse.

a. With the engine running and the PTO switch moved to the start position, current is supplied to terminal 5 by a red/white wire. Current passes from terminal 5 to terminals 3 and 4 on the PTO switch. Current passes through a brown wire to the PTO clutch and starts the PTO. (Note that on super frame tractors the brown wire connects to the jumper for the rear PTO. Wire color to the front PTO may change to blue or grey.)

b. The current supplied to terminal 4 of the PTO switch passes through a violet wire to the seat switch. When the seat switch is depressed, current passes through a black wire to terminal 86 on the reverse relay. Current passes to terminal 85 of the reverse relay and passes through a grey wire to the reverse indicator (switch). With the transmission lever in either neutral or forward, the reverse indicator (switch) completes the circuit to ground and the reverse relay activates. Current to terminal 30 on the reverse relay is.supplied by a red/white wire. Once the reverse relay is activated, current is supplied to terminal 87 of the reverse relay. As long as current is able to pass between terminals 86 and 85 the relay will stay on and supply power from terminal 30 to terminal 87. Current then passes through a brown wire to the rear PTO jumper (if equipped), then to the front PTO.

G-2.7 **Function – PTO Run (Models 1340, 1541, 1860 and 1862 refer to Figure G-5) (Models 1882 and 2082 refer to Figure G-10).**

1. Once the PTO switch is moved back to the run position, terminal 5 on the PTO switch no longer supplies current to the circuit. The current is supplied by a red/white wire to terminal 30 on the reverse relay. Current then passes to terminal 87 on the reverse relay and passes through a brown wire to the rear PTO jumper (if equipped), then to the front PTO. Current to keep the circuit closed then runs through a brown wire to terminal 3 on the PTO switch. Current then passes to terminal 4 on the PTO switch. From there current passes through a violet wire to the seat switch.

2. With the operator in the seat, the switch passes current through a black wire to terminal 86 on the reverse relay. (This current keeps the circuit between terminal 30 and 87 closed and the PTO continues to run.) Current then passes to terminal 85 of the reverse relay. From terminal 85 a grey wire passes the current to the reverse indicator. This switch completes the circuit to ground. If the transmission lever is moved into reverse, the reverse indicator opens and breaks the circuit, thus shutting down the PTO. If the operator leaves the seat, the seat switch opens and will also shut down the PTO.

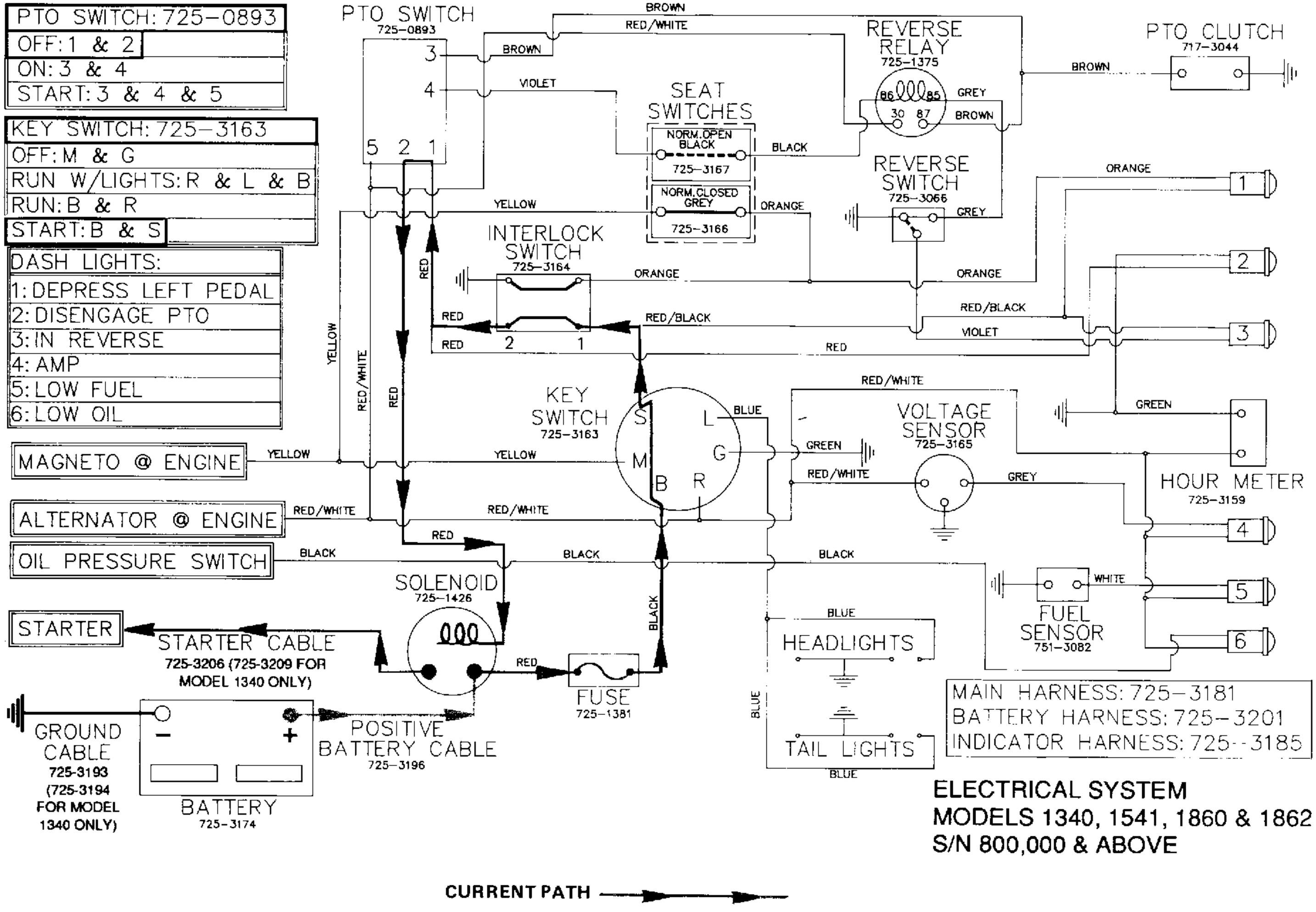


Figure G-1. Engine Crank, Models 1340, 1541, 1860 and 1862.

ELECTRICAL SYSTEM
MODELS 1340, 1541, 1860 & 1862
S/N 800,000 & ABOVE

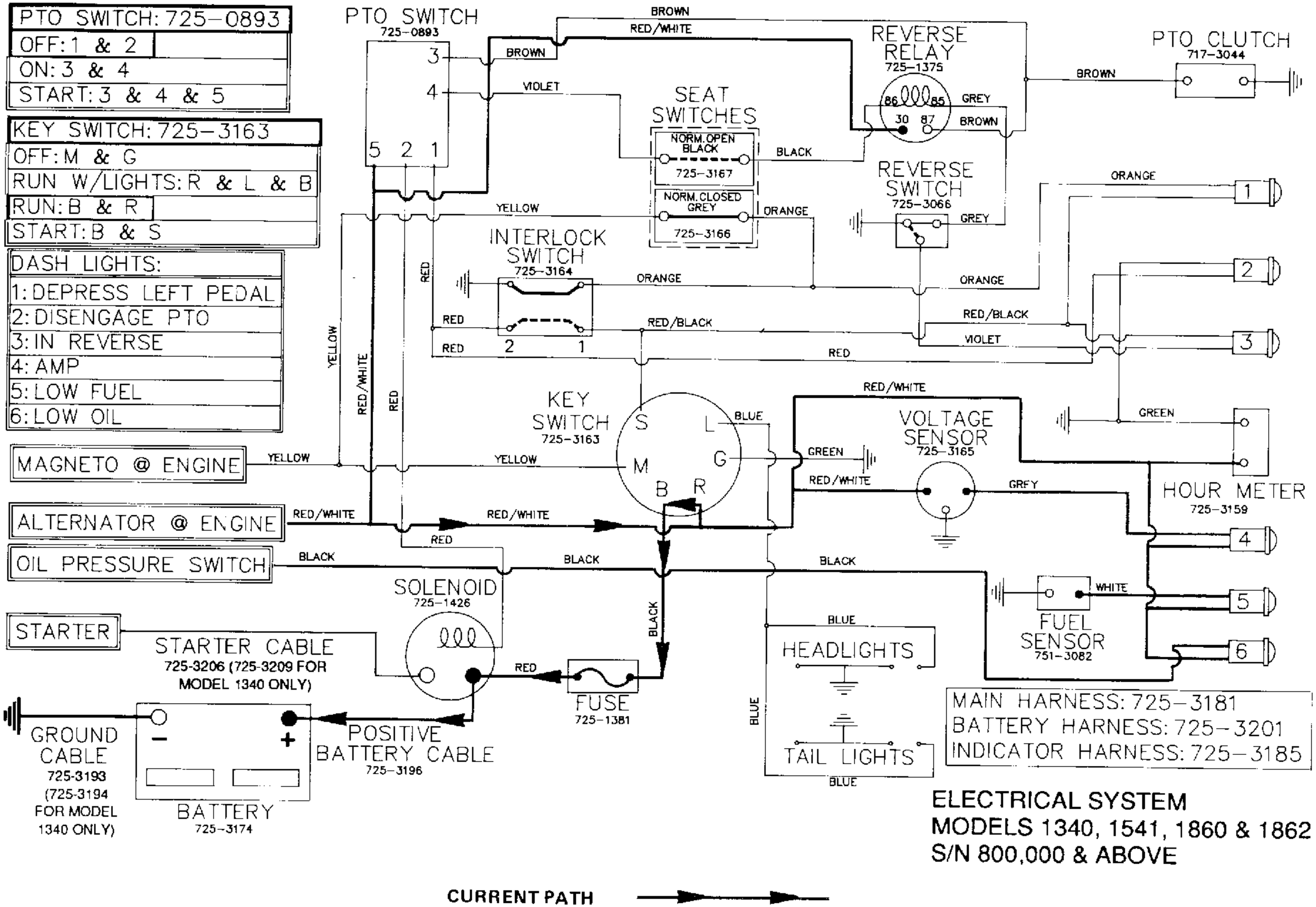


Figure G-2. Engine Run and Charging Circuit, Models 1340, 1541, 1860 and 1862.

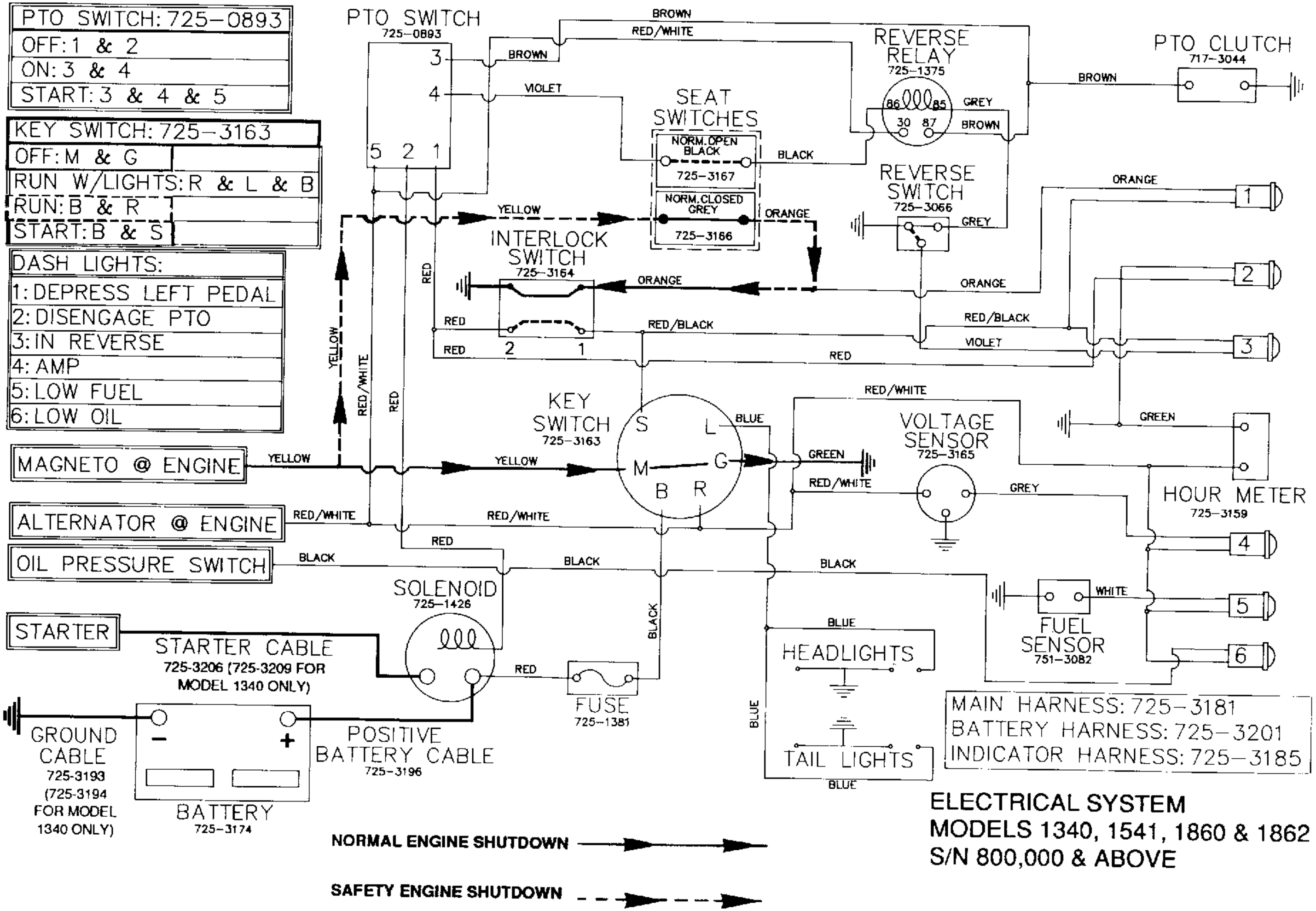


Figure G-3. NORMAL/SAFETY Engine Shutdown, Models 1340, 1541, 1860 and 1862.

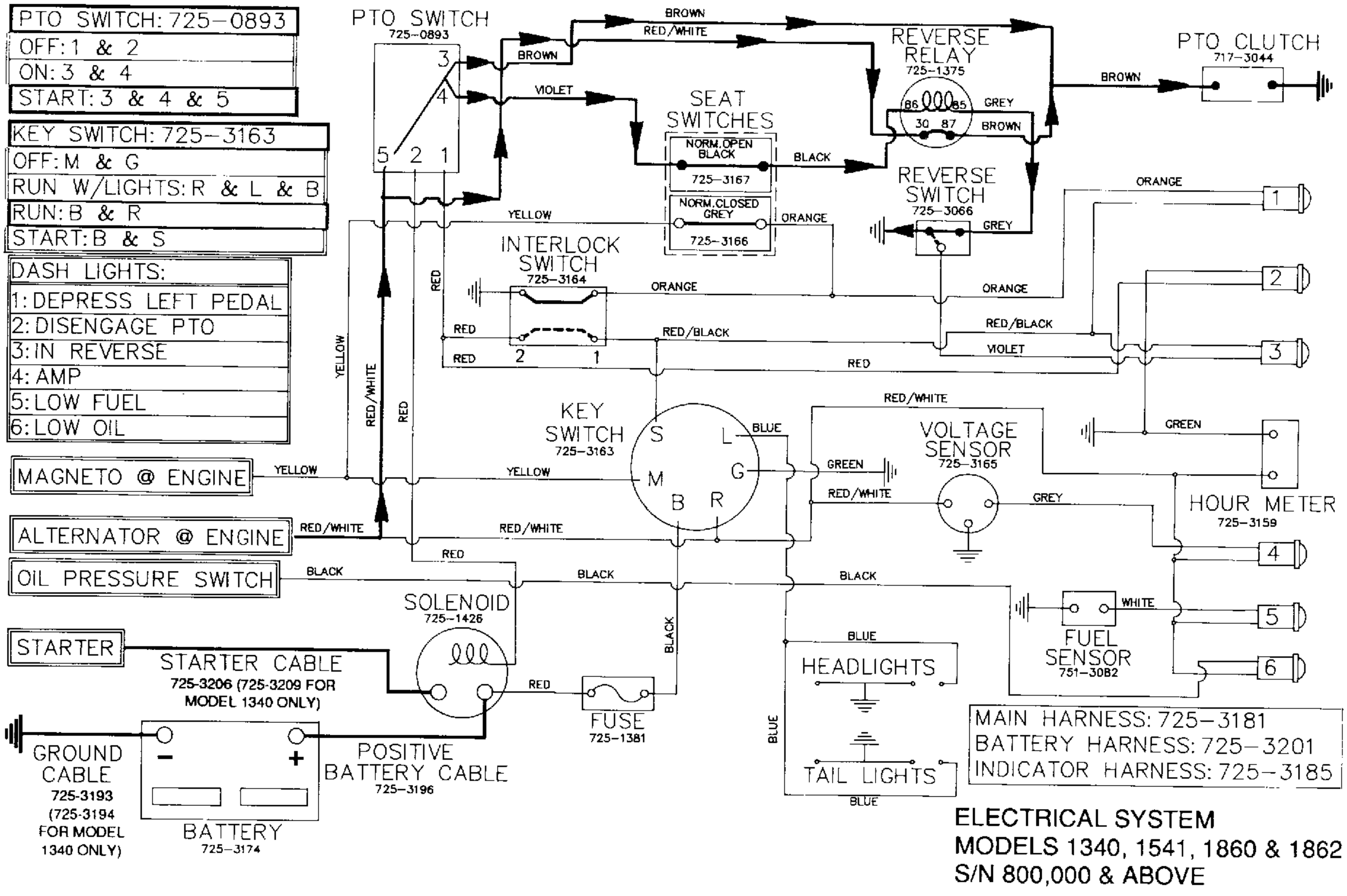
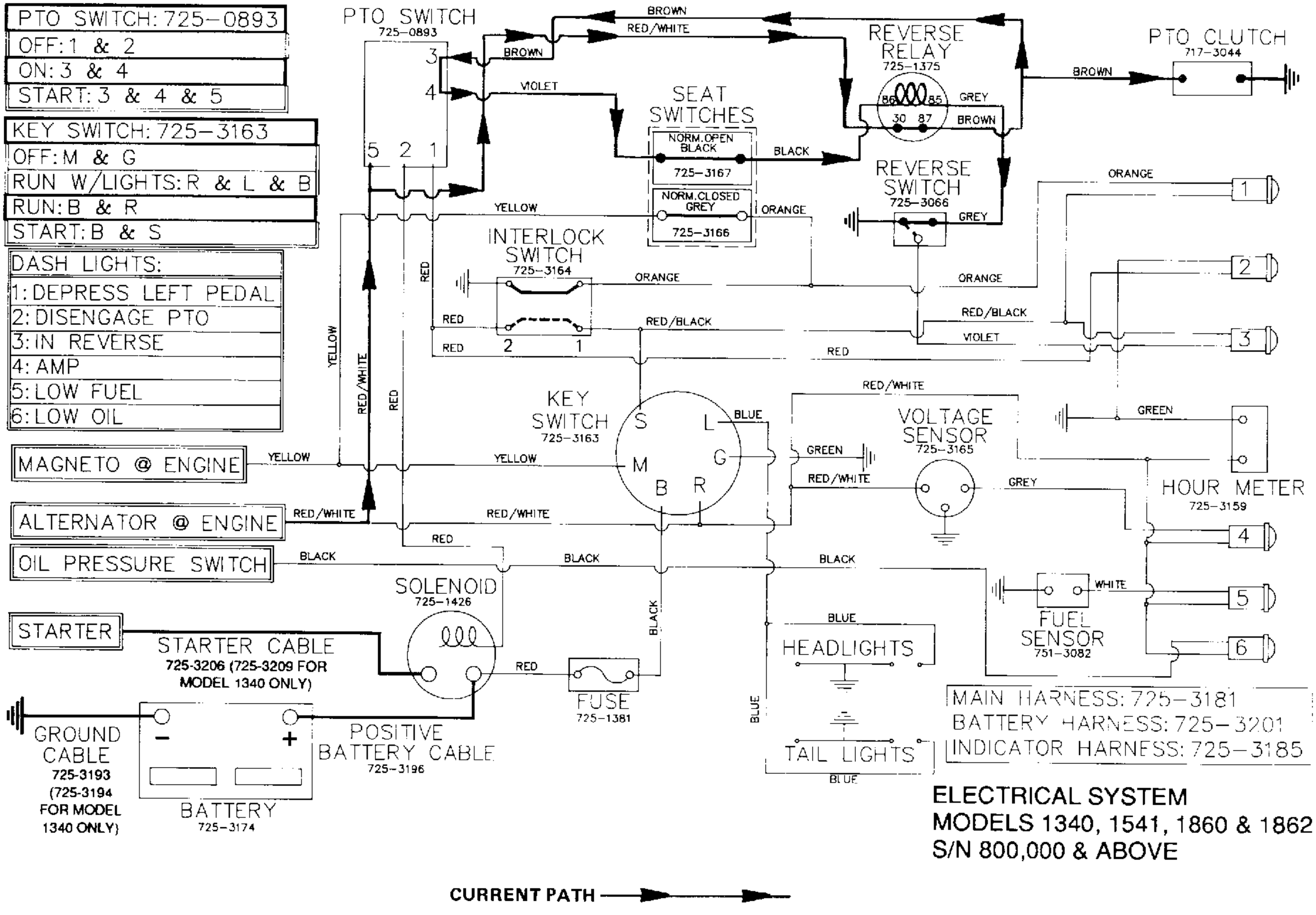


Figure G-4. PTO Start, Models 1340, 1541, 1860 and 1862.



ELECTRICAL SYSTEM
MODELS 1340, 1541, 1860 & 1862
S/N 800,000 & ABOVE

CURRENT PATH

Figure G-5. PTO Run, Models 1340, 1541, 1860 and 1862.

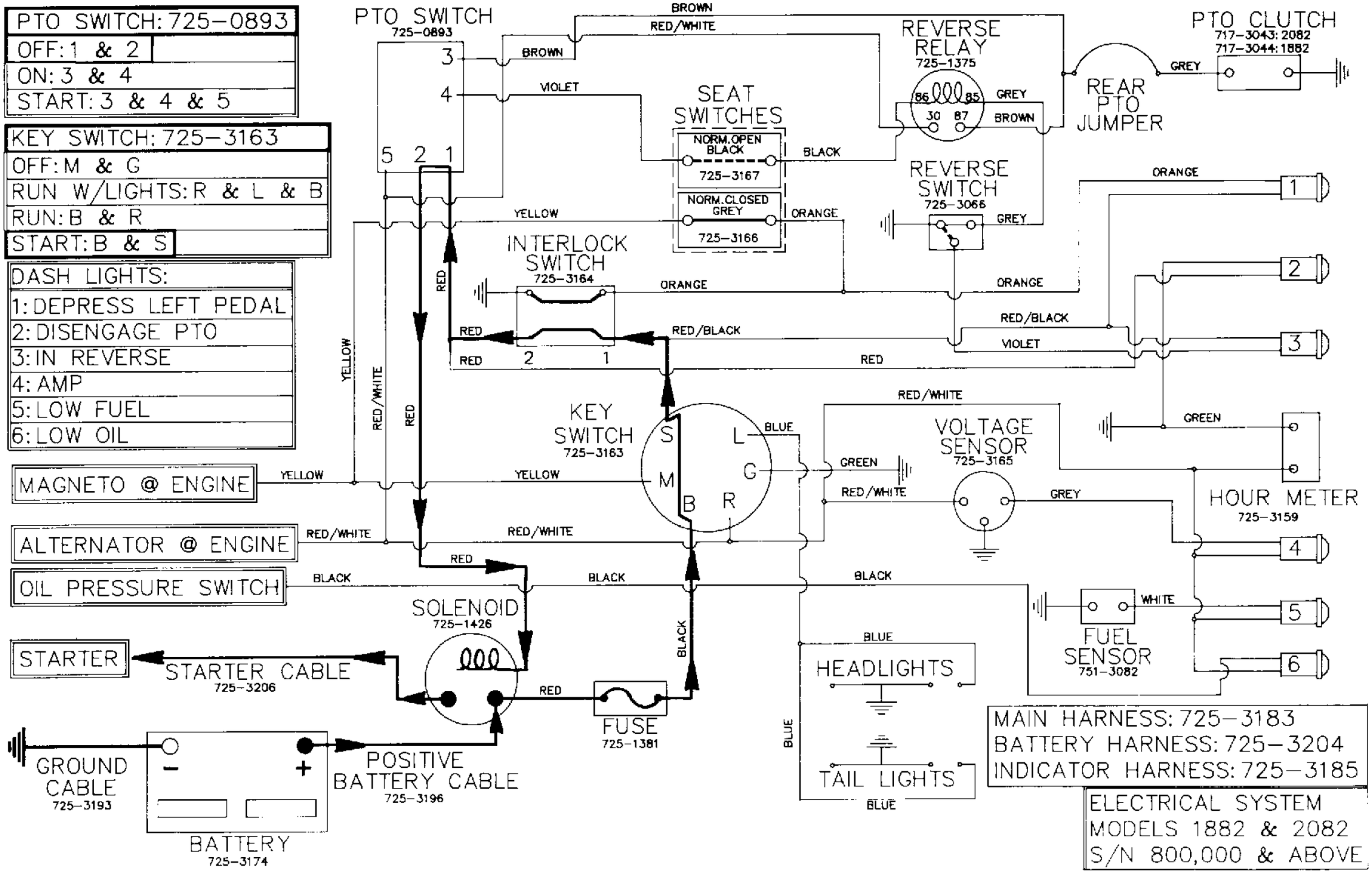


Figure G-6. Engine Crank, Models 1882 and 2082.

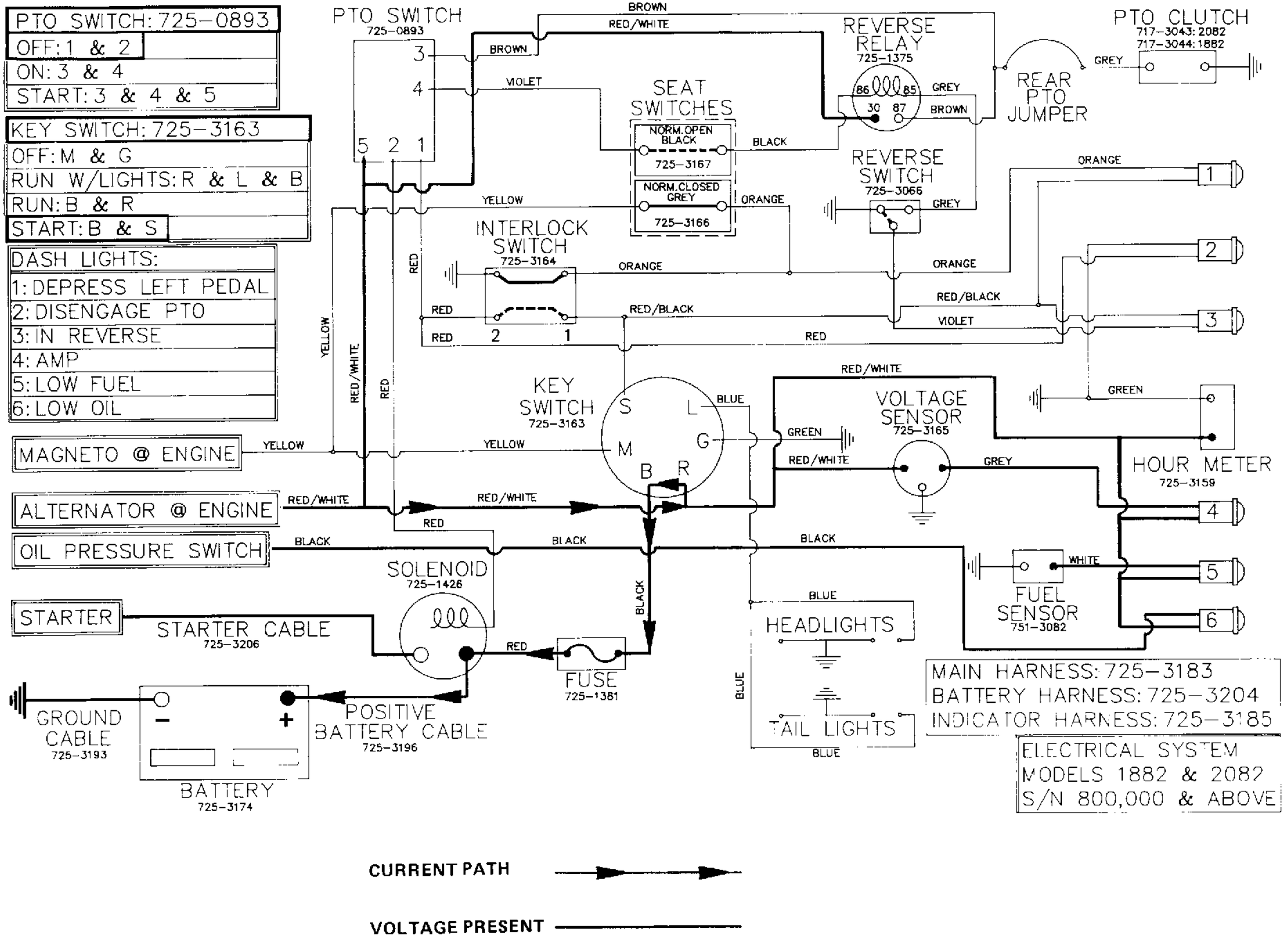


Figure G-7. Engine Run and Charging, Models 1882 and 2082.

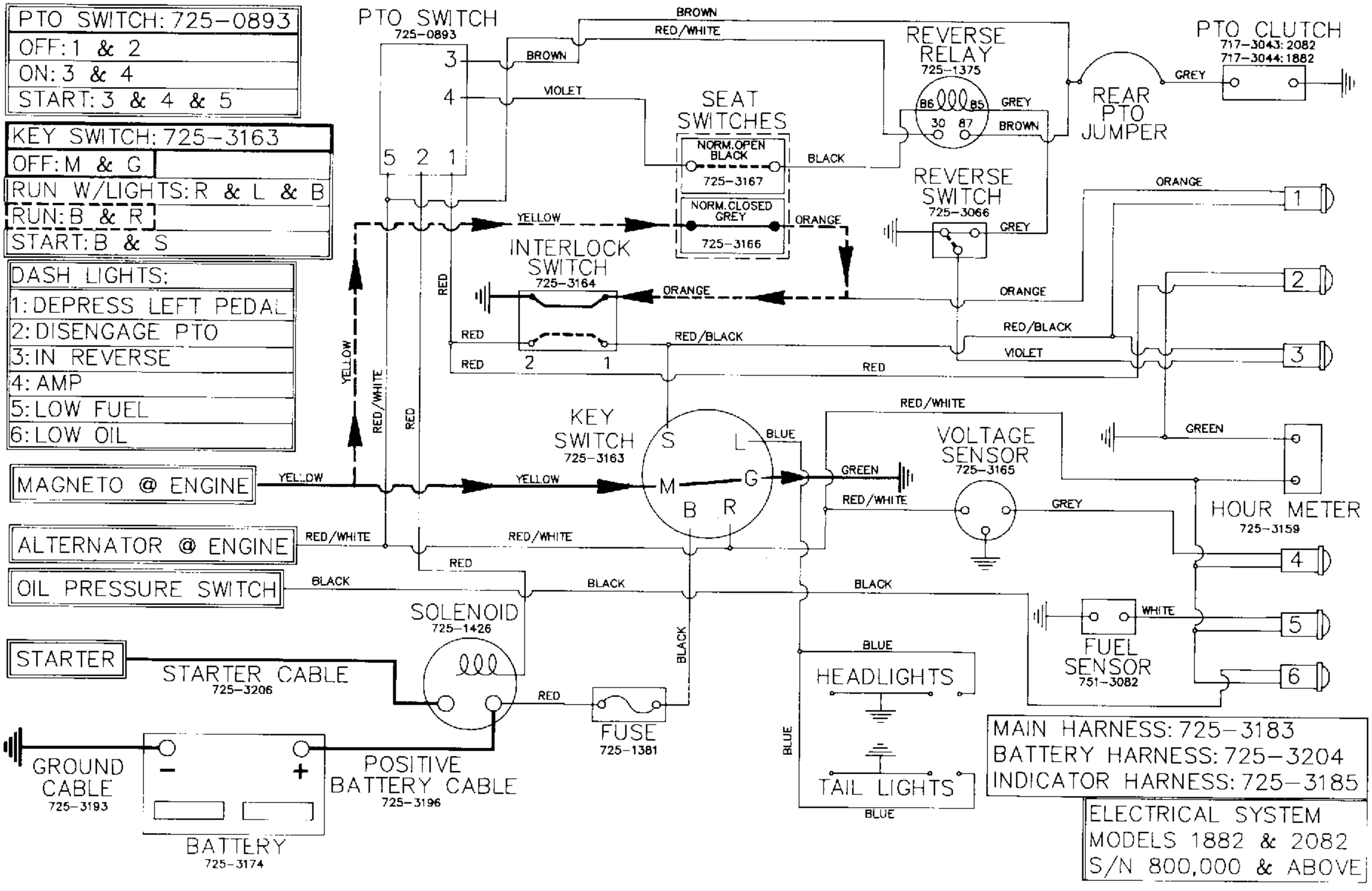


Figure G-8. NORMAL/SAFETY Engine Shutdown, Models 1882 and 2082.

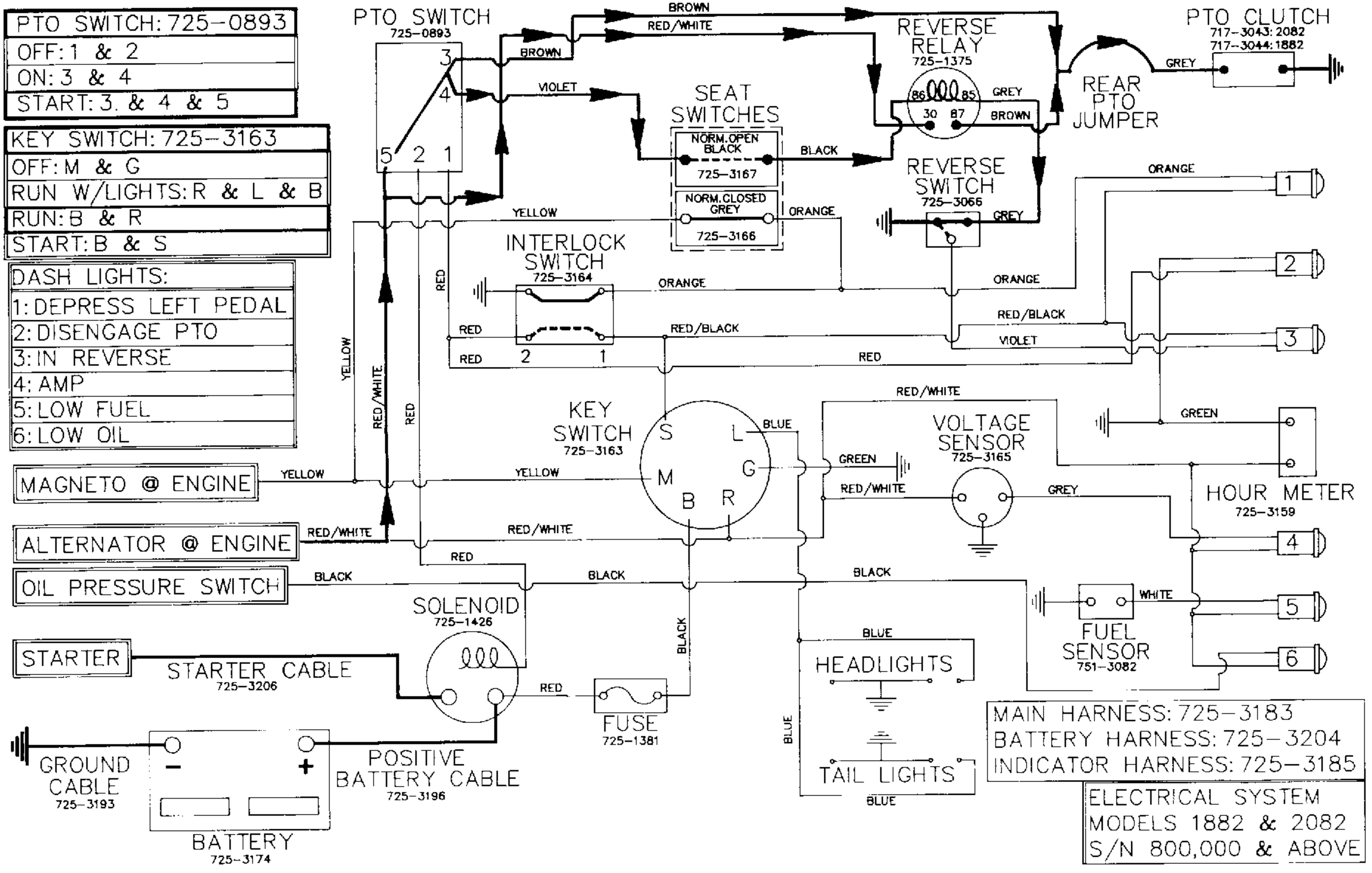


Figure G-9. PTO Start, Models 1882 and 2082.

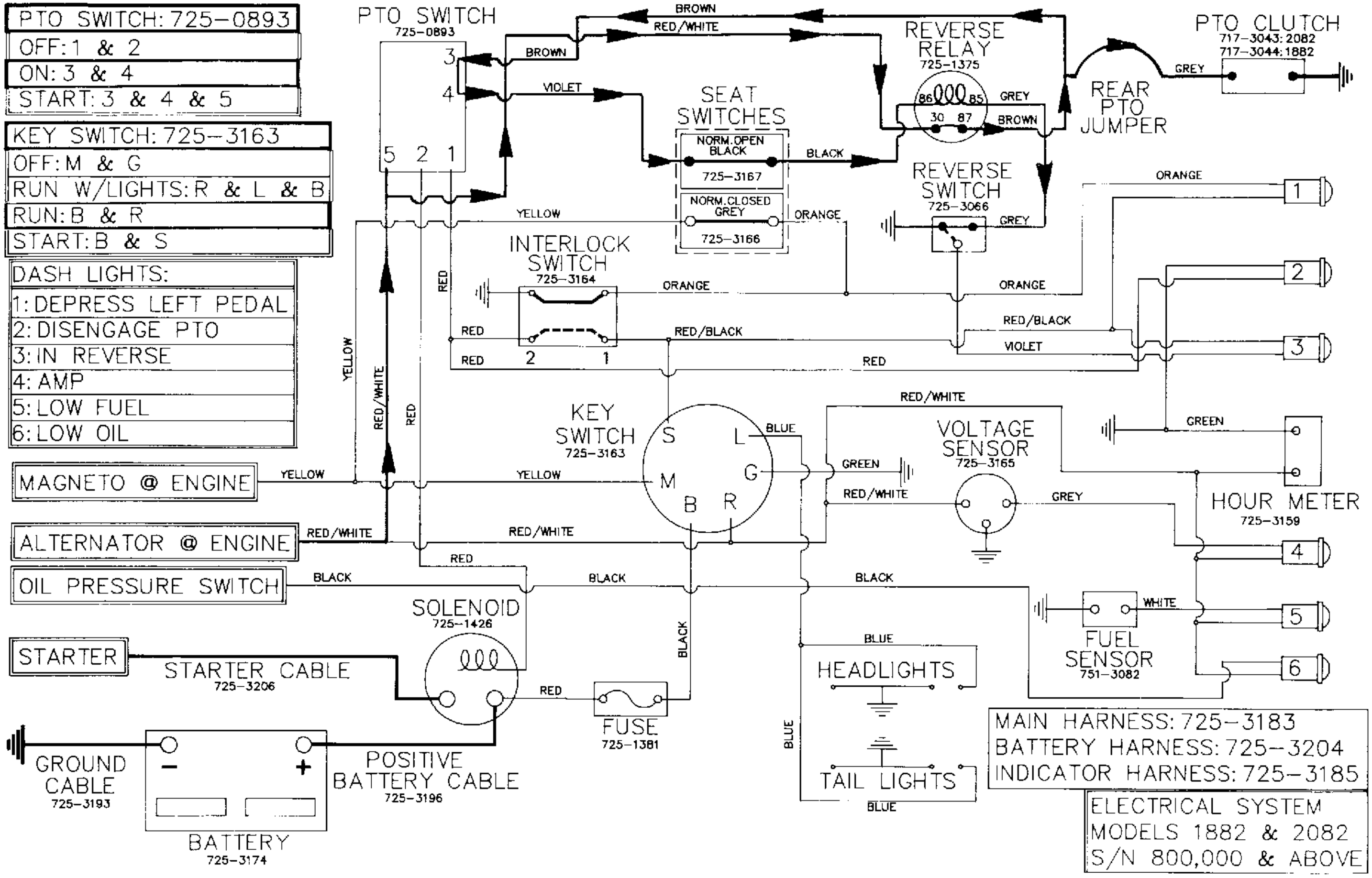


Figure G-10. PTO Run, Models 1882 and 2082.

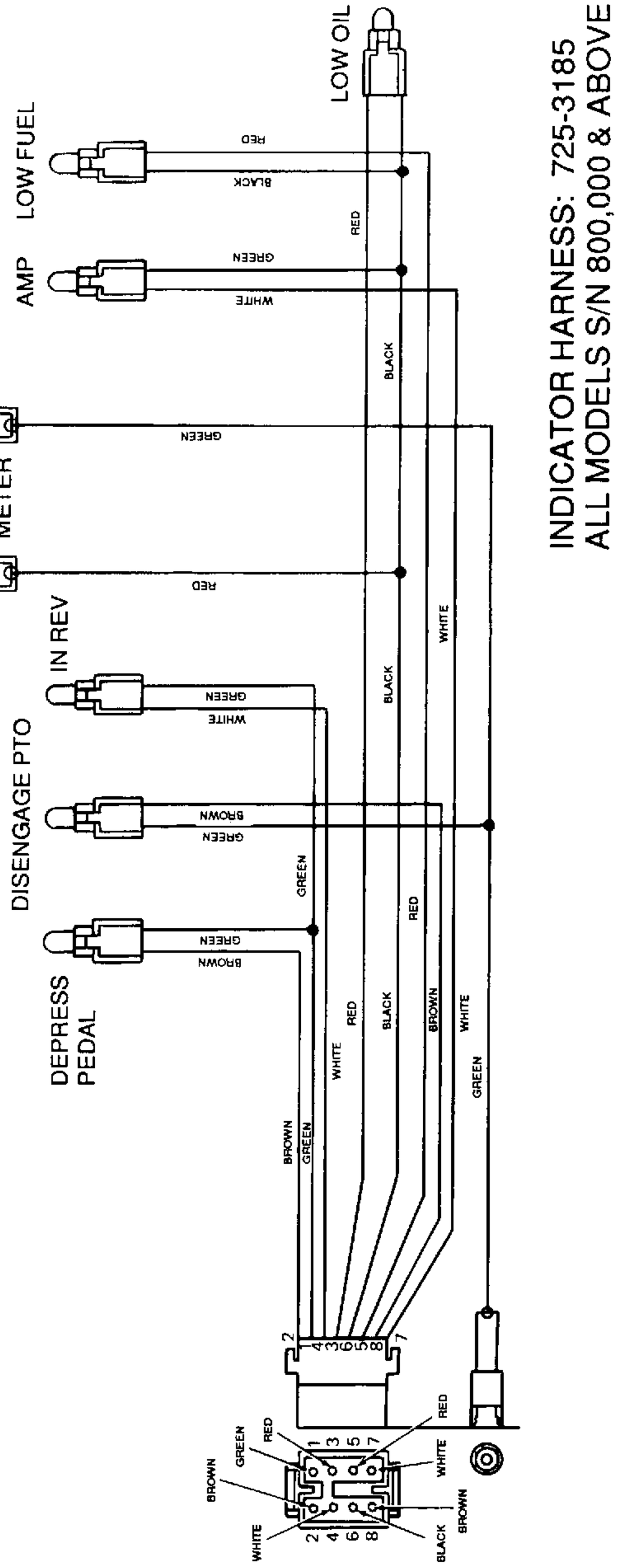


Figure G-11. Indicator Harness, All Models.

G-3. ELECTRICAL TESTING AND SCHEMATICS (Model 1535.)

G-3.1 Testing.

G-3.2 **Function – Engine Cranking.** Observe the following:

1. Operator must be in seat.
2. Transmission must be in neutral.
3. Clutch/brake pedal must be depressed.
4. PTO switch must be in the off position.
5. Key switch must be turned to start position.

   a. Current flows from the battery through the starter solenoid and fuse to terminal B on the key switch. Current then passes from terminal B to terminal S of the key switch. From terminal S current passes through a red/black wire to terminal 1 on the interlock switch. With the clutch switch in the depressed position, current passes from terminal 1 to terminal 2 of the interlock switch. Current then passes through a red wire to terminal 1 on the PTO switch.

   b. With the PTO switch in the off position, current passes to terminal 2 of the PTO switch. From terminal 2 of the PTO switch current then passes through a red wire to the starter solenoid. With the solenoid energized, current flows through the starter cable to the starter, and then cranks the engine over.

G-3.3 **Function – Engine Run and Charging (Refer to Figure G-13).**

1. With the engine running, direct current (DC) is supplied from the engine alternator to terminal R on the key switch via a red/white wire. With the key switch in the run position, current passes to terminal B and then flows through a black wire to the fuse. From there current flows through a red wire to the starter solenoid. Current then passes to the positive terminal on the battery.
2. Current is also supplied from the red/white wire to terminal 5 on the PTO switch and to terminal 30 on the reverse relay. Current is also supplied to the amp light, low fuel light, low oil light and their corresponding sensors.

G-3.4 **Function – Normal and Safety Engine Shutdown (Refer to Figure G-14).**

1. Normal Engine Shutdown. A yellow wire runs from the grounding side of the ignition module to the key switch. With the key switch in the off position, terminals M and G are connected, supplying a ground to kill the engine.
2. Safety Engine Shutdown.

   a. This system combines the seat switch and clutch switch to shut the engine down.

   b. A yellow wire runs to the normally closed side of the seat switch. If the operator is not in the seat, the circuit continues to the interlock switch which is normally closed. If the interlock switch is not depressed, the circuit continues to ground and shuts down the engine.

G-3.5 **Function – PTO Start (Refer to Figure G-15).** Observe the following:

1. The operator must be in the seat.
2. PTO switch must be in the start position.
3. Transmission must be in either forward or neutral, but not reverse.

   a. With the engine running and the PTO switch moved to the start position, current is supplied to terminal 5 by a red/white wire. Current passes from terminal 5 to both terminals 3 and 4 on the PTO switch. Current then passes through a brown wire to the PTO clutch and starts the PTO.

   b. The current supplied to terminal 4 of the PTO switch passes through a violet wire to the seat switch. When the seat switch is depressed, current passes through a black wire to terminal 86 on the reverse relay. Current passes to terminal 85 of the reverse relay and passes through a grey wire to the reverse switch. With the transmission lever in either neutral or forward, the reverse switch completes the circuit to ground and the reverse relay activates. Current to terminal 30 on the reverse relay is supplied by a red/white wire. Once the reverse relay is activated, current is supplied to terminal 87 of the reverse relay. As long as the current is able to pass between terminals 86 and 85, the relay will stay on and supply power from terminal 30 to 87. Current then passes through a brown wire to the PTO.

G-3.6 **Function – PTO Run (Refer to Figure G-16).**

1. Once the PTO switch is moved back to the run position, terminal 5 on the PTO switch no longer supplies current to the circuit. The current is supplied by a red/white wire to terminal 30 on the reverse relay. Current then passes to terminal 87 on the reverse relay and passes through a brown wire to the PTO. Current to keep the circuit closed flows through a brown wire to terminal 3

on the PTO switch. Current then passes to terminal 4 on the PTO switch. From there current passes through a violet wire to the seat switch.

2. With the operator in the seat, the switch passes current through a black wire to terminal 86 on the reverse relay. (This current keeps the circuit between terminals 30 and 87 closed and the PTO continues to run.) Current then passes to terminal 85 on the reverse relay. From terminal 85 a grey wire passes the current to the reverse switch. This switch completes the circuit to ground. If the transmission lever is moved into reverse, the reverse switch opens and breaks the circuit, thus shutting down the PTO. If the operator leaves the seat, the seat switch opens and will also shut down the PTO.

G-4. ELECTRICAL TESTING AND SCHEMATICS (Model 1782).

G-4.1 **Testing**.

G-4.2 **Function – Engine Pre-Heat (Refer to Figure G-18).**

1. Primary Pre-Heat Circuit (Shown With Directional Arrows on Figure G-18).

   a. Current passes from the battery to the starter solenoid and fuse to terminal 30 on the key switch. Current then passes from terminal 30 to terminals 19 and AC of the key switch. From terminal 19, current travels in the yellow wire to the glow plug indicator dash light. From the light, current travels through an orange wire to the glow plug indicator.

   b. The glow plug indicator is an electrical timer and is responsible for letting the operator know how long to use the glow plugs. The glow plug indicator completes the circuit to ground, lighting the indicator light. Current is also provided to the glow plugs from the orange wire that is connected to the yellow wire off terminal 19.

2. Secondary Pre-Heat Circuit (Shown Without Directional Arrows on Figure G-18).

   a. Current from the AC terminal travels through a red/white wire to terminal 1 of the black seat switch. With the switch in the depressed position (operator in the seat), current is transferred to terminal 2 of the switch and then flows through an orange wire to energize the fuel solenoid.

   b. Current from the red/white wire (connected to the AC terminal) also supplies terminal 5 on the PTO switch and terminal 30 on the reverse relay. The red/white wire also supplies voltage to the hourmeter, water temperature, amp light, low fuel and low oil indicator dash lights.

G-4.3 **Function – Engine Crank (Refer to Figure G-19).** Observe the following to start the engine:

1. Operator must be in the seat.
2. Transmission must be in neutral.
3. Clutch/brake pedal must be depressed.
4. Engine warmed by glow plugs for correct time.

   a. Primary Cranking Circuit (Shown With Directional Arrows on Figure G-19).

      (1) Current passes in a red wire from the battery to the starter solenoid and fuse to terminal 30 on the key switch. Current then passes from terminal 30 to terminals 50, AC and 17. From terminal 50, current passes through a red/black wire to terminal 1 on the PTO switch. With the PTO switch in the off position, the current passes to terminal 2 of the PTO switch. Current then passes through a red wire to position 1 on the interlock switch. With the interlock switch in the depressed position, current passes to terminal 2 and flows through a red/black wire to the starter solenoid.

   b. Secondary Cranking Circuit (Shown Without Directional Arrows on Figure G-19).

      (1) The secondary cranking circuit starts at the AC terminal of the key switch. From there current passes through a red/white wire to supply voltage to the hourmeter, water temperature light, amp light, low fuel and low oil indicator lights and their corresponding sensors. Current also flows through the red/white wire to the black seat switch. With the switch depressed, current flows to the orange wire and joins the current from the interlock switch going to the fuel solenoid.

      (2) Current is also supplied to the fuel pump from a red/white wire connected to the AC terminal on the key switch. This same wire also supplies current to terminal 30 on the reverse relay. The light switch also gets its current from this red/white wire.

      (3) Current is supplied from terminal 17 on the key switch to the glow plugs while the engine is cranking.

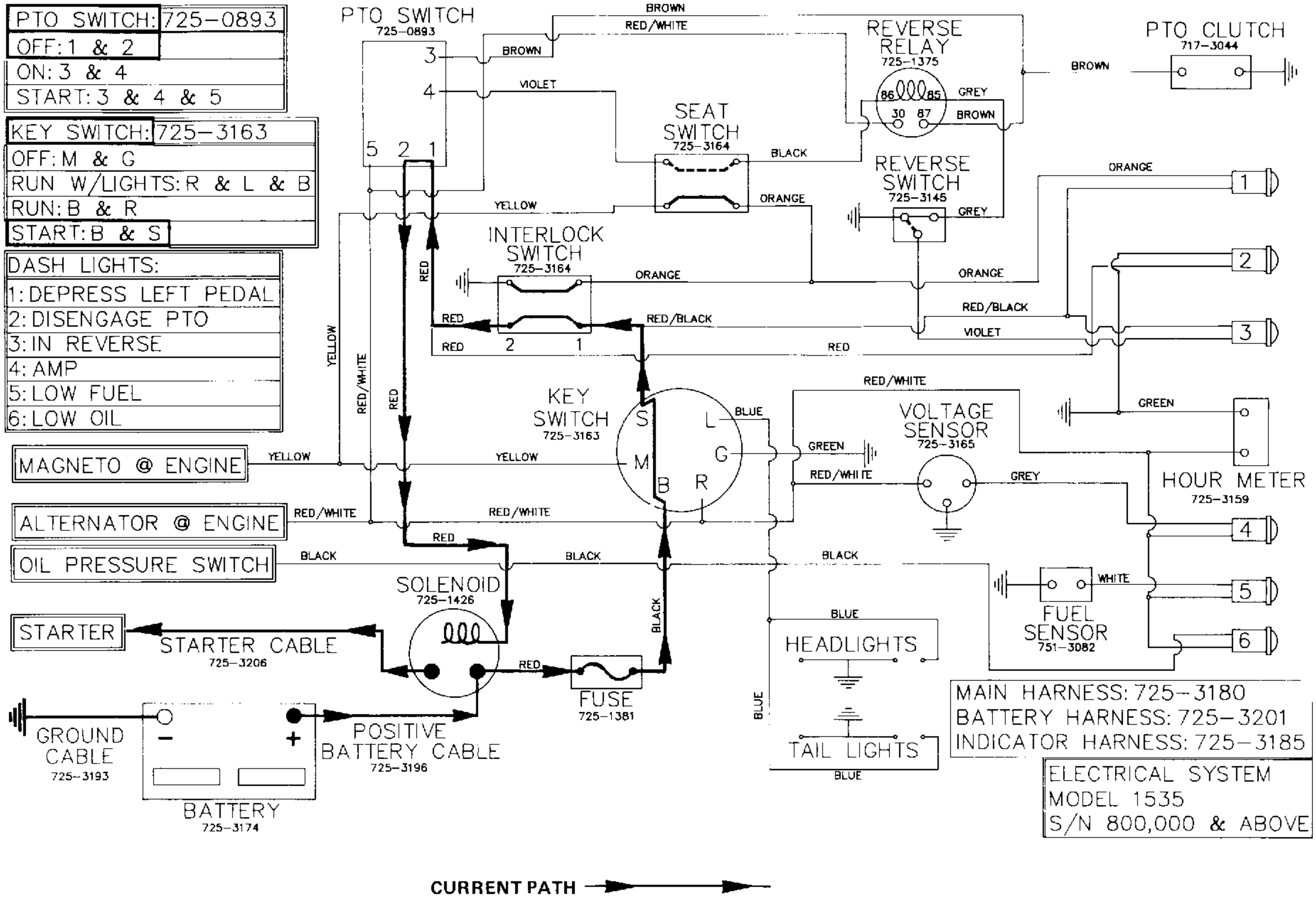


Figure G-12. Engine Crank, Model 1535.

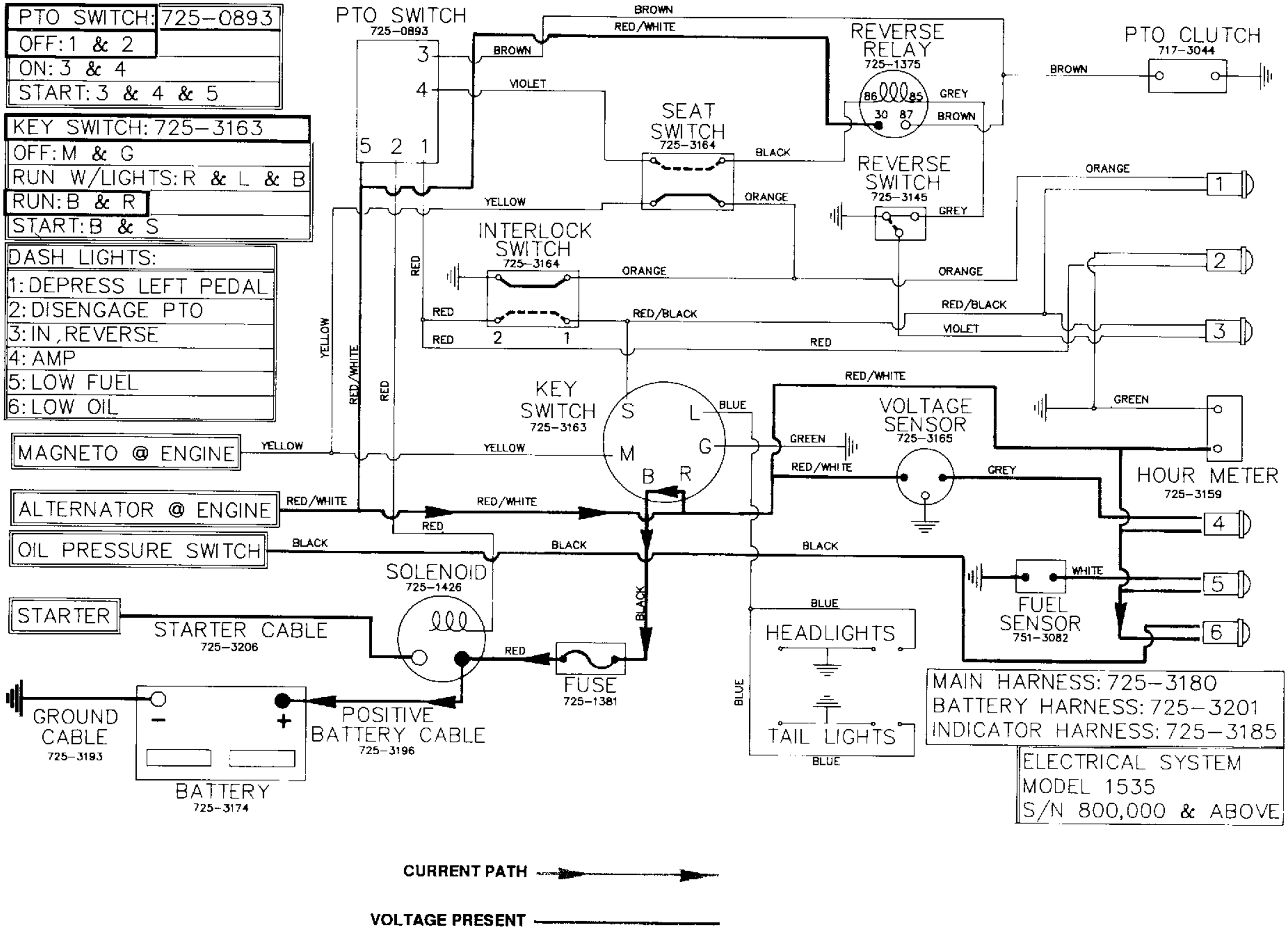


Figure G-13. Engine Run and Charging, Model 1535.

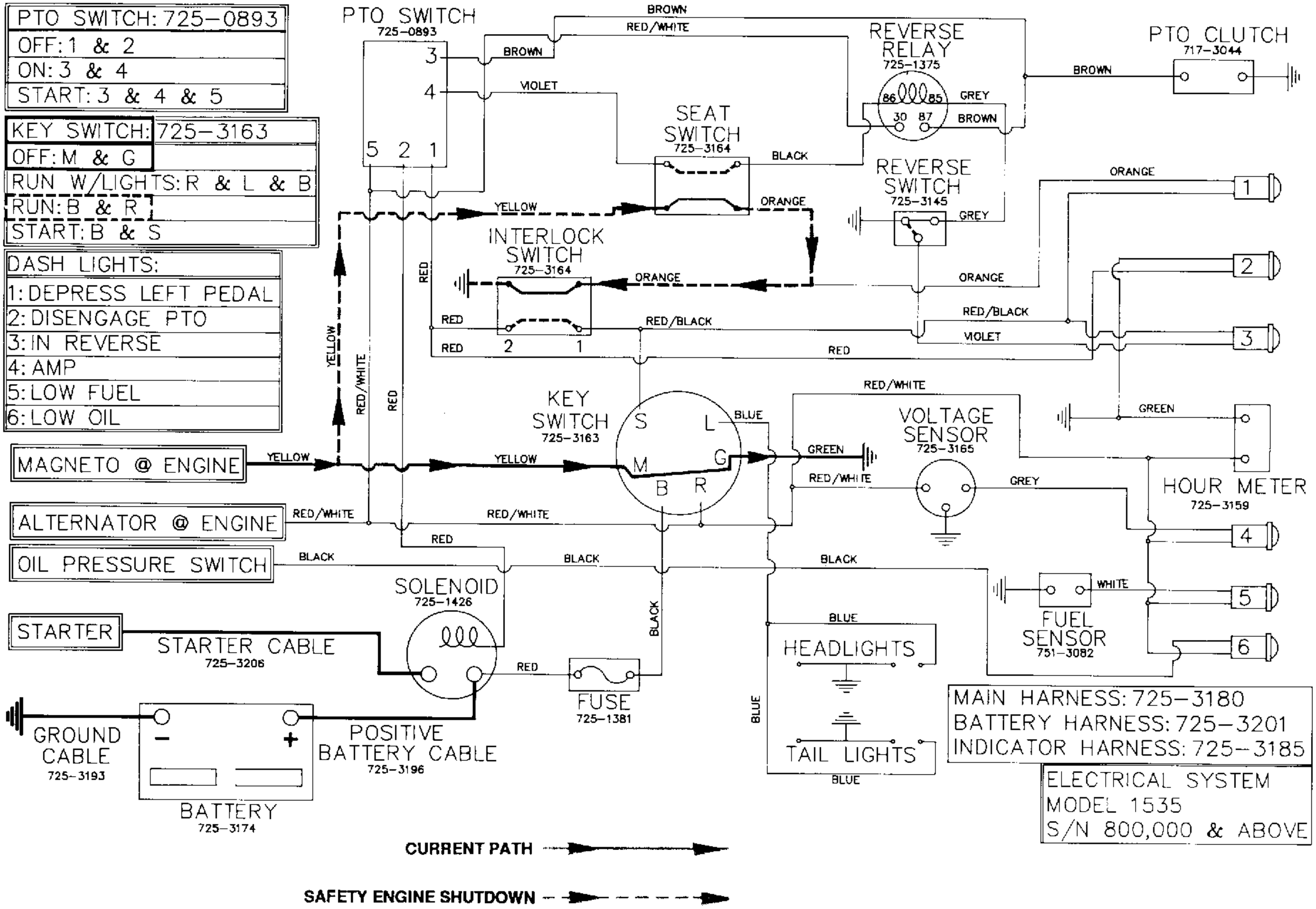


Figure G-14. NORMAL/SAFETY Engine Shutdown, Model 1535.

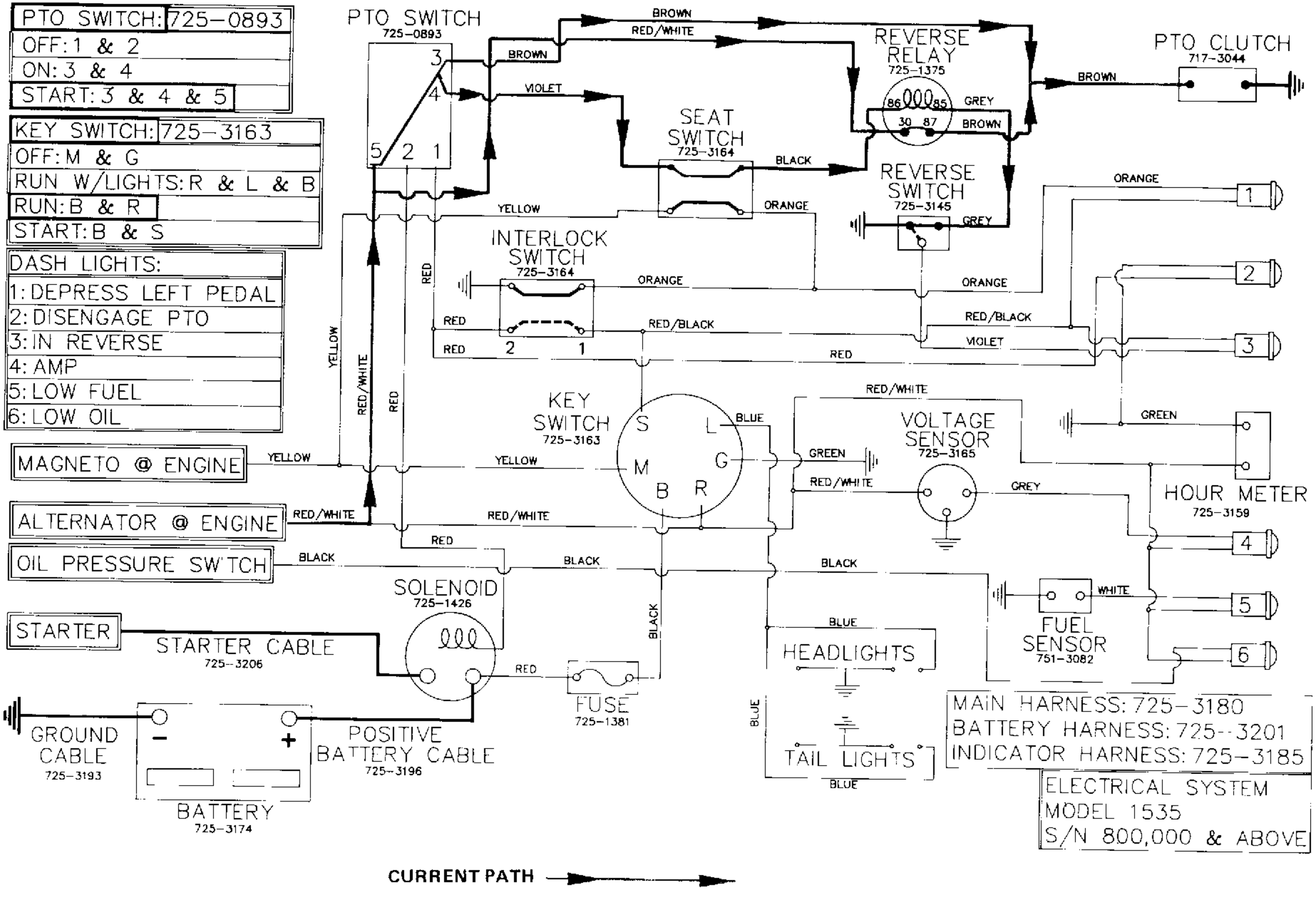


Figure G-15. PTO Start, Model 1535.

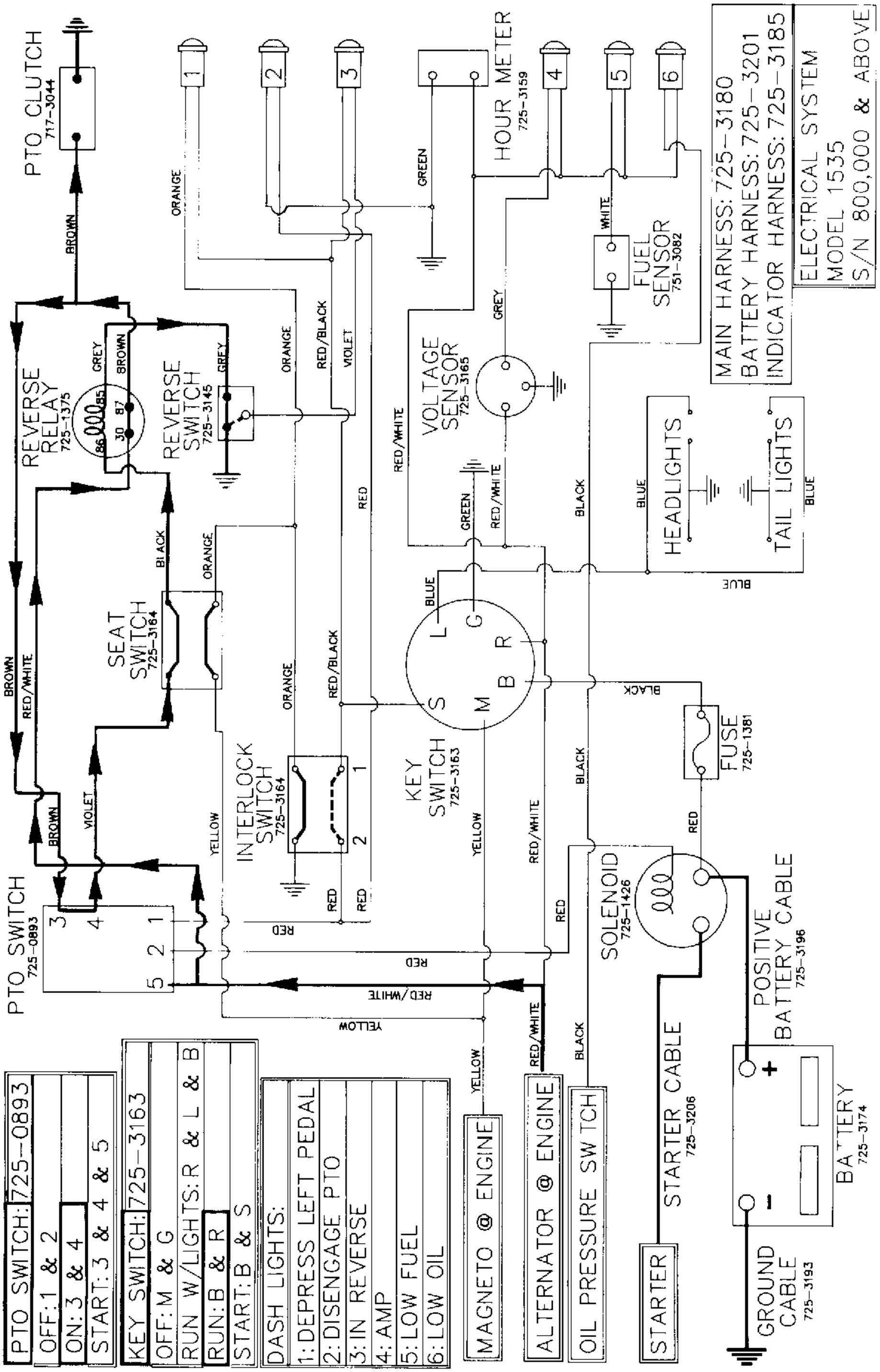


Figure G-16. PTO Run, Model 1535.

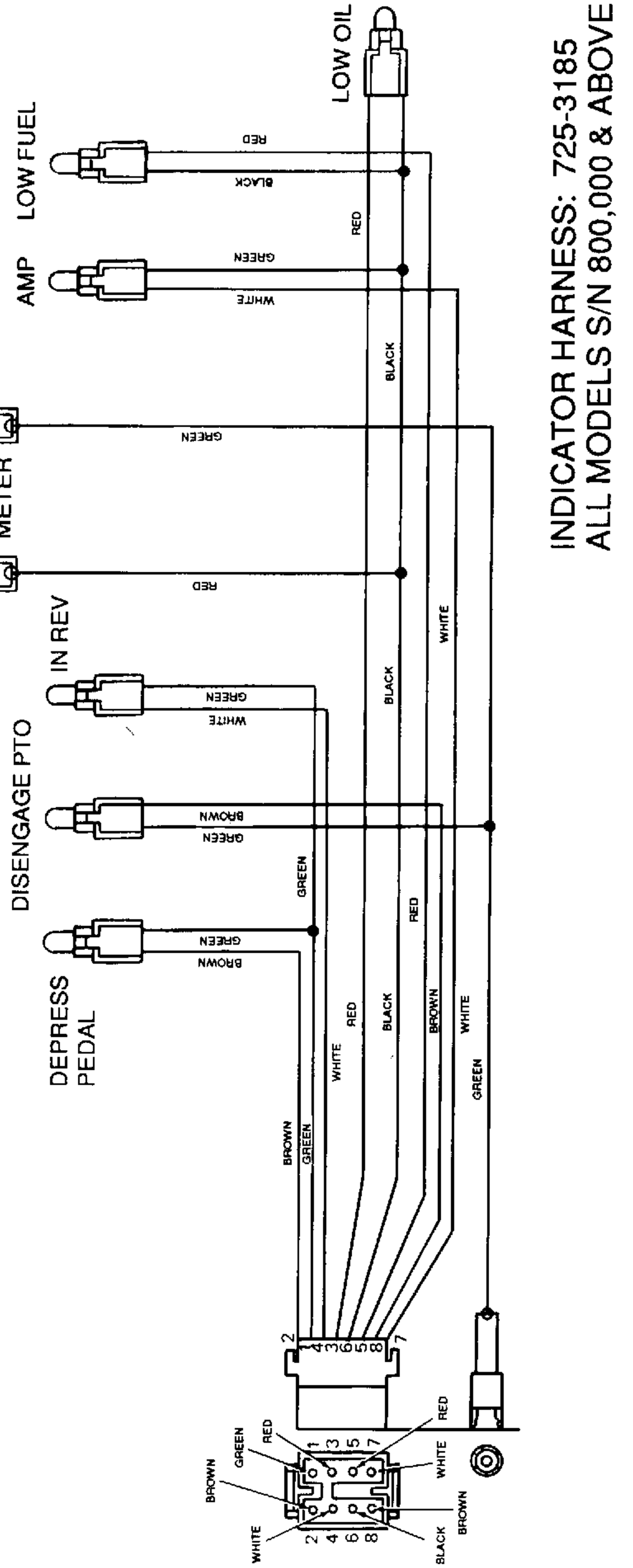


Figure G-17. Indicator Harness, All Models.

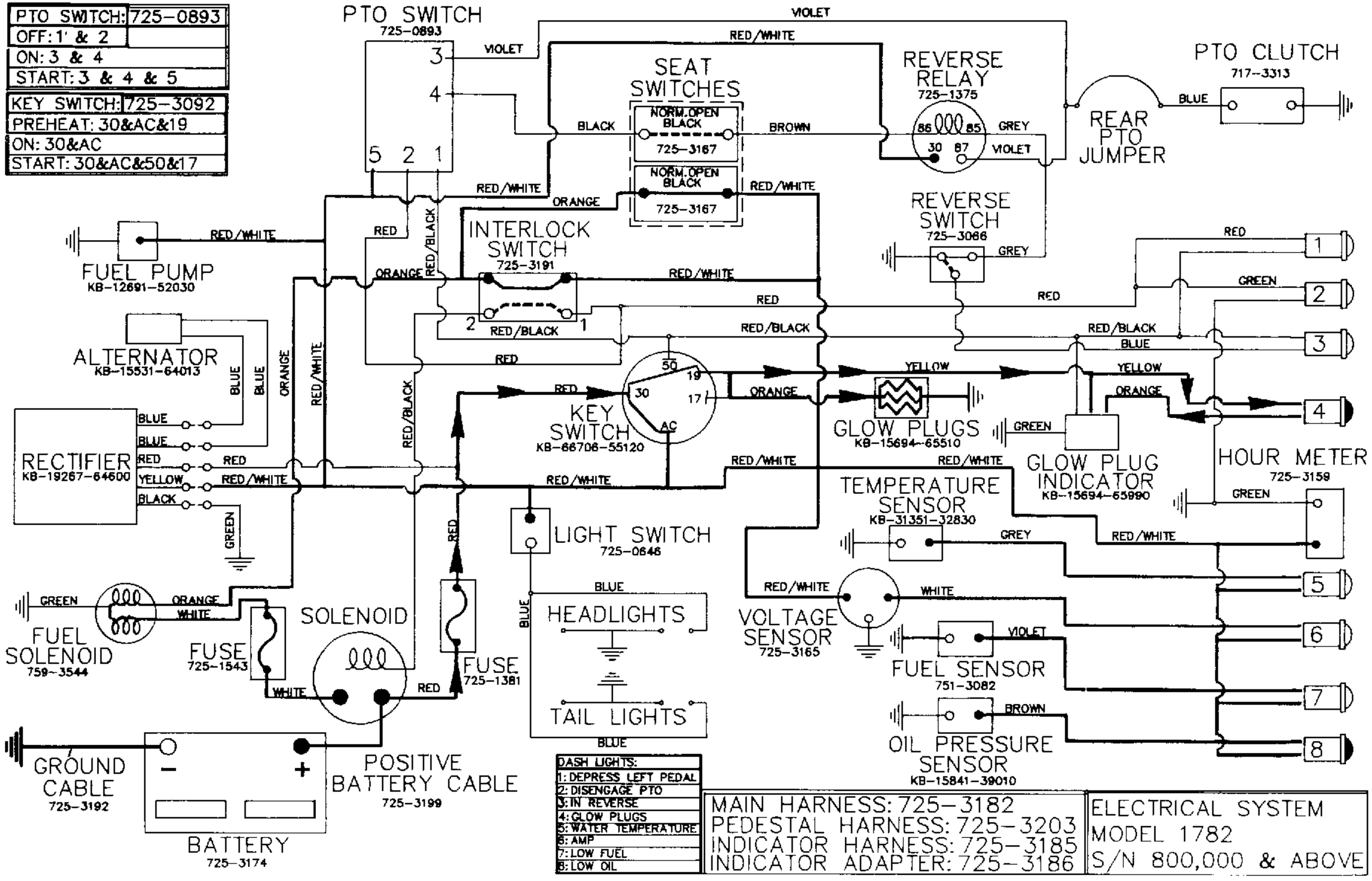


Figure G-18. Engine Preheat, Model 1782.

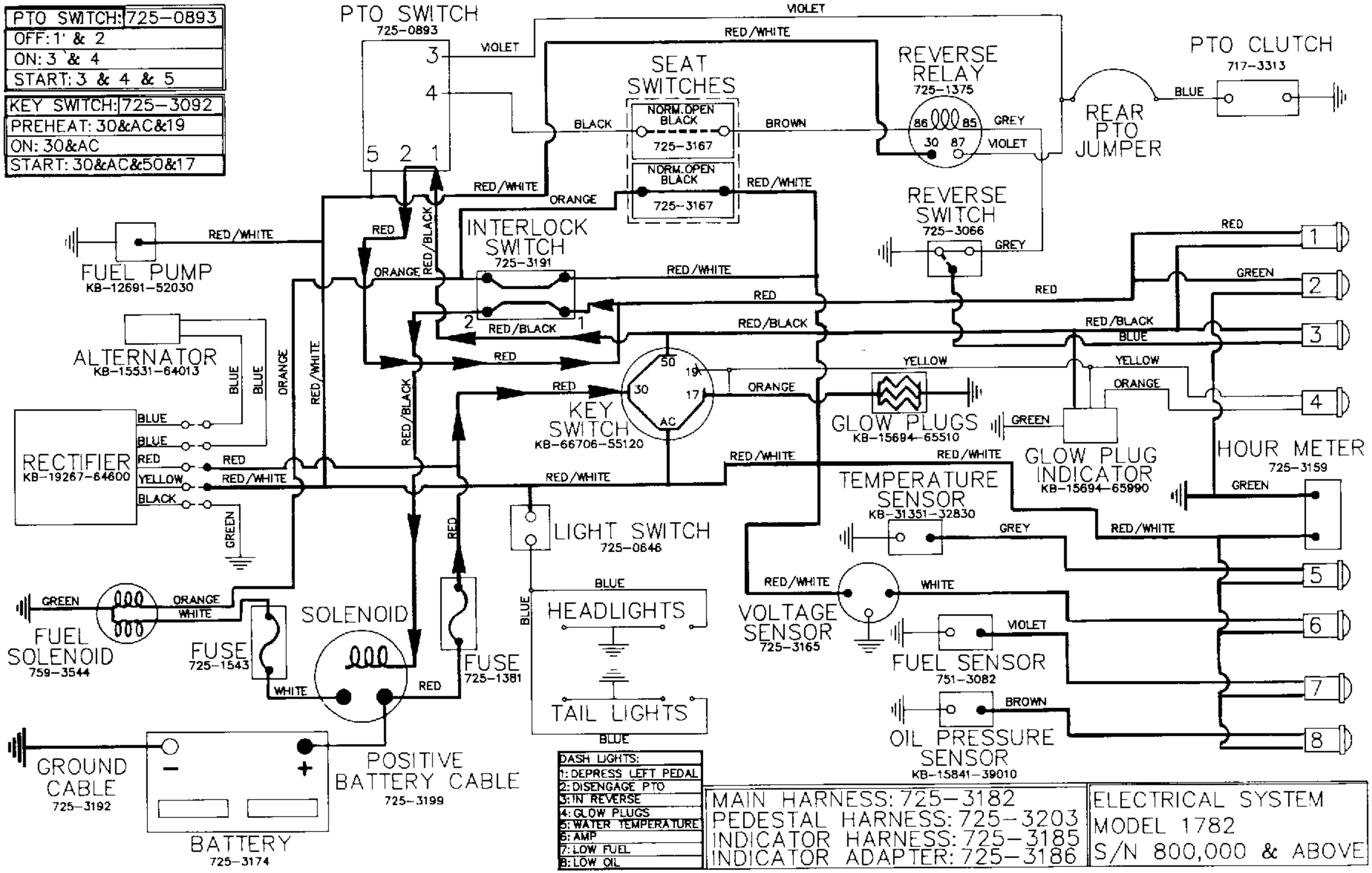


Figure G-19. Engine Crank, Model 1782.

G-4.5 **Function – Engine Run and Charging (Refer to Figure G-20).**

1. Primary Charging Circuit (Shown With Directional Arrows).
   a. Alternating current (AC) is provided to the rectifier/regulator from the alternator by the two blue wires. The rectifier/regulator changes this current to direct current (DC) and sends it out the red wire. Current then flows to the fuse and then passes through the red wire to the solenoid where it is then transferred to the battery as charging current.
2. Secondary Charging Circuit (Shown Without Directional Arrows on Figure G-20).
   a. Current for the following electrical components is provided by a red/white wire:
      (1) The PTO switch, reverse relay, fuel pump, voltage sensor, black seat switch, interlock switch, hourmeter, water temperature light, amp light, low fuel and oil lights and their corresponding sensors.
      (2) The fuel solenoid gets its current from either the interlock switch or the black seat switch, depending on which switch is depressed. One of them must be depressed in order for the fuel solenoid to work.

NOTE

The voltage rectifier/regulator has its own internal sensor that allows the regulator to know if the battery voltage is present. If no voltage is present, the regulator will not allow itself to release charging current. The yellow wire on the regulator is connected to a red/white wire and is used to sense battery voltage.

G-4.6 **Function – Normal Safety Shutdown (Refer to Figure G-21).**

1. Normal Engine Shutdown. This circuit starts at the rectifier/regulator where current is being supplied to the AC terminal on the key switch. When the key switch is turned to the off position, terminal 30 is not connected with any other terminals.
2. Safety Engine Shutdown. This circuit starts with a red/white wire supplying current to both the interlock switch and the black seat switch. Both of these switches are normally open and are closed by the operator being in the seat and the clutch pedal being depressed. Current supplied by both of these switches flows through an orange wire to the fuel solenoid. One of these switches must be closed at all times or the fuel solenoid loses current, causing the engine to stop.

G-4.7 **Function – PTO Start (Refer to Figure G-22).** Observe the following to start PTO.

1. Operator must be in seat.
2. PTO switch must be moved to the start position.
3. Transmission lever in either forward or neutral (not in reverse).
   a. With the PTO in the start position, current flows from terminal 5 to terminals 3 and 4. From terminal 3 current passes through a violet wire to the rear PTO jumper. Current is then passed to the PTO clutch. From terminal 4 on the PTO switch, current then passes through a black wire to the black seat switch. With the seat switch closed, current flows through a brown wire to terminal 86 on the reverse relay. Current passes through the relay coil and activates the relay. Current then passes to terminal 85 and passes through a grey wire to the reverse switch.
   b. Current is also supplied to terminal 30 on the reverse relay from the red/white wire. Current is transferred to terminal 87 when the relay contacts are closed by the energized coil mentioned above. Current then passes from terminal 87 through a violet wire to the rear PTO jumper. Current is then passed to the PTO clutch.

G-4.8 **Function – PTO Run (Refer to Figure G-23).**

1. Once the PTO switch is moved back to the run position, terminal 5 on the PTO switch no longer supplies current to the circuit. The current is supplied by the red/white wire to terminal 30 on the reverse relay. Current then passes to terminal 87 on the reverse relay and passes through the violet wire to the rear PTO jumper, then to the front PTO.
2. Current to keep the circuit closed is provided from the violet wire to terminal 3 of the PTO switch. Current then passes to terminal 4 of the switch and flows through the black wire to the seat switch. With the operator in the seat, the switch passes current through a brown wire to terminal 86 on the reverse relay. (This current keeps the circuit between terminals 30 and 87 closed and the PTO continues to run). Current then passes to terminal 85 of the reverse relay. From terminal 85 a grey wire passes the current to the reverse switch, which completes the circuit to ground.

3. If the transmission is moved into reverse, the reverse switch opens breaking the circuit, thus shutting down the PTO. Also, if the customer leaves the seat while the PTO is on, the seat switch will shut down the PTO.

G-5. ELECTRICAL TESTING AND SCHEMATICS (Model 2182.)

G-5.1 **Testing.**

G-5.2 **Function – Crank Engine (Refer to Figure G-26).** Observe the following to crank engine.

1. Operator must be in the seat.
2. Transmission must be in neutral.
3. Clutch/brake pedal must be depressed.
   a. Primary Cranking Circuit (Shown With Directional Arrows on Figure G-26).
      (1) Current passes through a red wire from the battery to the starter solenoid and fuse, then to terminal B of the key switch. Current then passes from terminal B to the S terminal of the key switch. From the S terminal, current passes through a red/black wire to terminal 1 of the PTO switch.
      (2) With the PTO switch in the off position, the current passes to terminal 2 of the PTO switch. Current then passes through a red/black wire to terminal 1 on the interlock switch. With the interlock switch in the depressed position, current passes to terminal 2 and flows through a red/black wire to the starter solenoid energizing the starter.
   b. Secondary Cranking Circuit (Shown Without Directional Arrows on Figure G-26).
      (1) The secondary cranking circuit starts at the S terminal of the key switch. From there current passes through a diode to terminal R on the key switch. Current then passes through a red/white wire to the black seat switch.
      (2) With the seat switch depressed, current then passes through an orange wire to the after fire solenoid, energizing it and opening the fuel flow to the carburetor. Current must be maintained at the solenoid to keep the engine running.
      (3) Current for the fuel pump and all of the indicator lights and sensors is provided by the red/white wires or the red/black wires.

G-5.3 **Function – Engine Run and Charging (Refer to Figure G-27).**

1. Primary Charging Circuit (Shown With Directional Arrows on Figure G-27).
   a. Alternating circuit (AC) is provided to the rectifier/regulator from the alternator by the two blue wires. The rectifier/regulator changes this current to direct current (DC) and sends it out the red wire.
   b. The red wire connects to the fuse holder which passes the current to the starter solenoid. From there charging current is passed to the positive side of the battery via the positive battery cable.
2. Secondary Charging Circuit (Shown Without Directional Arrows on Figure G-27).
   a. Current for the following electrical components is provided by a red/white wire:
      (1) Fuel Pump, PTO switch, reverse relay, fuel pump, voltage sensor, black seat switch, interlock switch, hourmeter, temperature light, amp light, low fuel and low oil dash lights and their corresponding sensors.
      (2) The after fire solenoid gets its current from either the interlock switch or the black seat switch, depending on which switch is depressed. One of these switches must be depressed in order for the after fire solenoid to work.

G-5.4 **Function – Normal and Safety Engine Shutdown (Refer to Figure G-28).**

1. Normal. This circuit starts at the rectifier/regulator where current is being supplied to terminal R of the key switch by the red/white wire. With the key switch turned to the off position, terminals R and G provide a ground to kill the engine by grounding the primary circuit on the engine coil and breaking the circuit for the fuel pump.
2. Safety. This circuit starts with a red/white wire supplying current to both the interlock switch and the black seat switch. Both of these switches are normally open and are closed by the operator being in the seat and the clutch pedal being depressed. Current supplied by both of these switches flows through an orange wire to the after fire solenoid. One of these switches must be closed at all times or the after fire solenoid closes, killing the engine.

G-5.5 **Function – PTO Start (Refer to Figure G-29).** Observe the following to start PTO.

1. Operator must be in the seat.
2. PTO switch must be moved to the start position.
3. Transmission must be in either forward or neutral (not in reverse).
   a. Current is supplied by the rectifier through a red wire to terminal B on the key switch. With the key switch in the on position, current flows to terminal R of the key switch and out a red/white wire. Current then flows to terminal 5 on the PTO switch.
   b. With the PTO in the start position, current flows from terminal 5 to terminals 3 and 4. From terminal 3 current passes through a violet wire to the rear PTO jumper. Current is then passed to the PTO clutch. From terminal 4 on the PTO switch, current passes through a black wire to the black seat switch.
   c. With the seat switch closed, current flows through a brown wire to terminal 86 on the reverse relay. Current passes through the relay coil and activates the relay. Current then passes to terminal 85 and passes through a grey wire to the reverse switch.
   d. Current is also supplied to terminal 30 on the reverse relay from the red/white wire. Current is transferred to terminal 87 when the relay contacts are closed by the energized coil mentioned above. Current then passes from terminal 87 through a violet wire to the rear PTO jumper. Current is then passed to the PTO clutch.

G-5.6 **Function – Run PTO (Refer to Figure G-30).**

1. Once the PTO switch is moved back to the run position, terminal 5 on the PTO switch no longer supplies current to the circuit. The current is supplied by the red/white wire to terminal 30 on the reverse relay. Current then passes to terminal 87 on the reverse relay and passes through the violet wire to the rear PTO jumper, and then to the front PTO.
2. Current to keep the circuit closed is provided from the violet wire to terminal 3 of the PTO switch. Current then passes to terminal 4 of the switch and flows through the black wire to the seat switch. With the operator in the seat, the switch passes current through a brown wire to terminal 86 on the reverse relay. (This current keeps the circuit between terminals 30 and 87 closed and the PTO continues to run).
3. Current then passes to terminal 85 of the reverse relay. From terminal 85 a grey wire passes the current to the reverse switch, which completes the circuit to ground. If the transmission is moved into reverse, the reverse switch opens, breaking the circuit, thus shutting down the PTO. If the operator leaves the seat while the PTO is on, the seat switch will shut down the PTO.

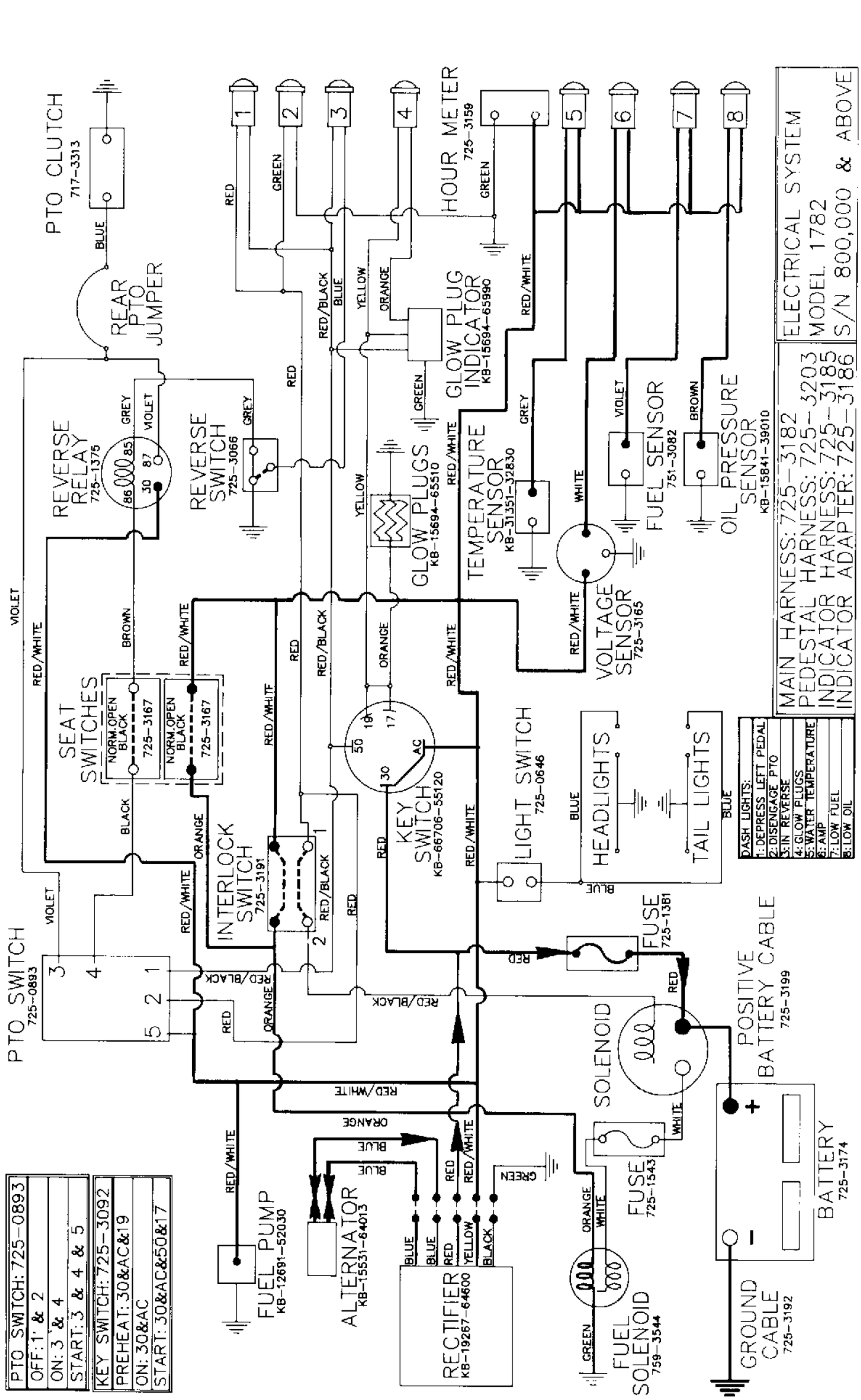


Figure G-20. Engine Run and Charging, Model 1782.

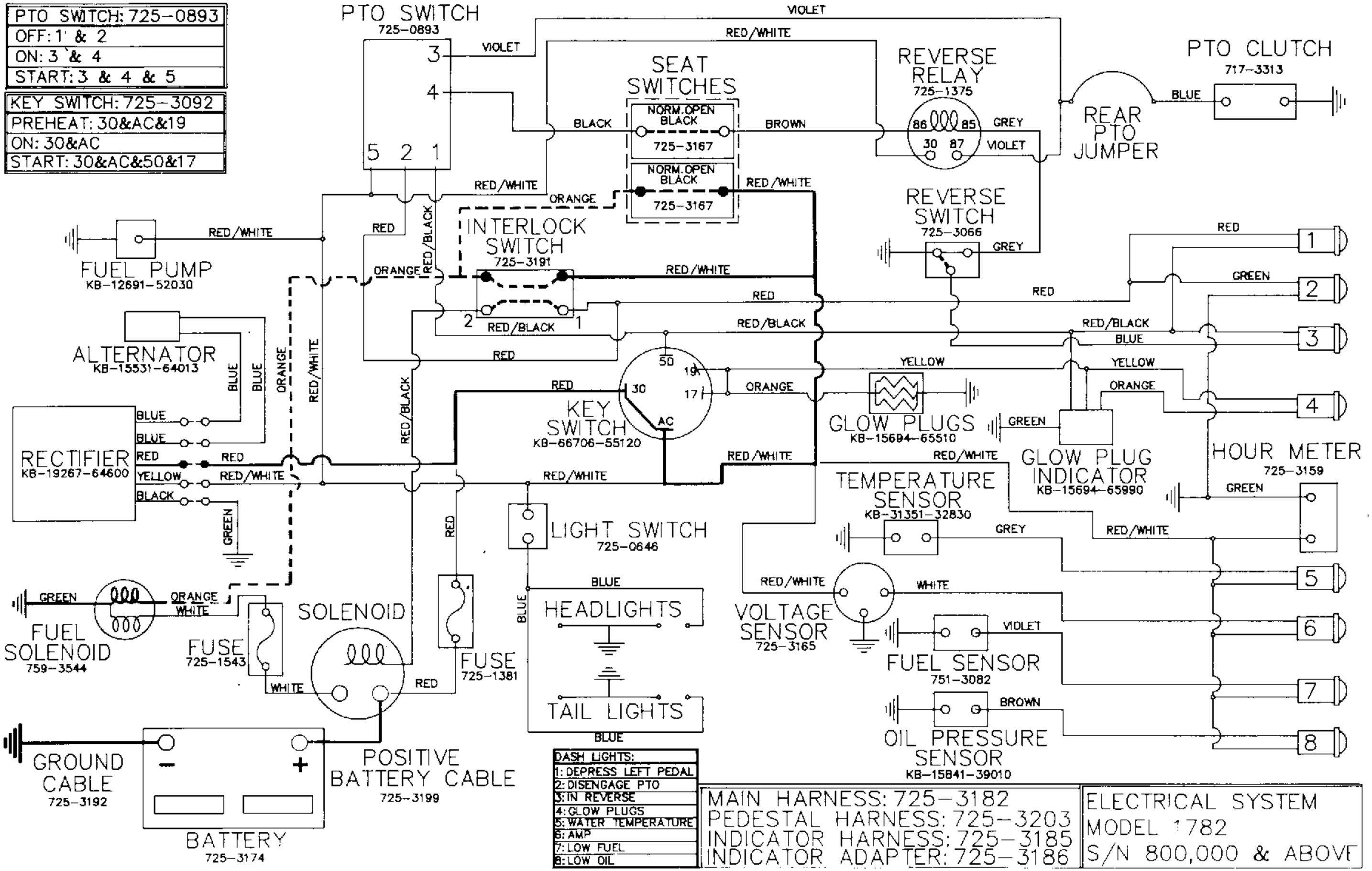


Figure G-21. Normal and Safety Engine Shutdown, Model 1782.

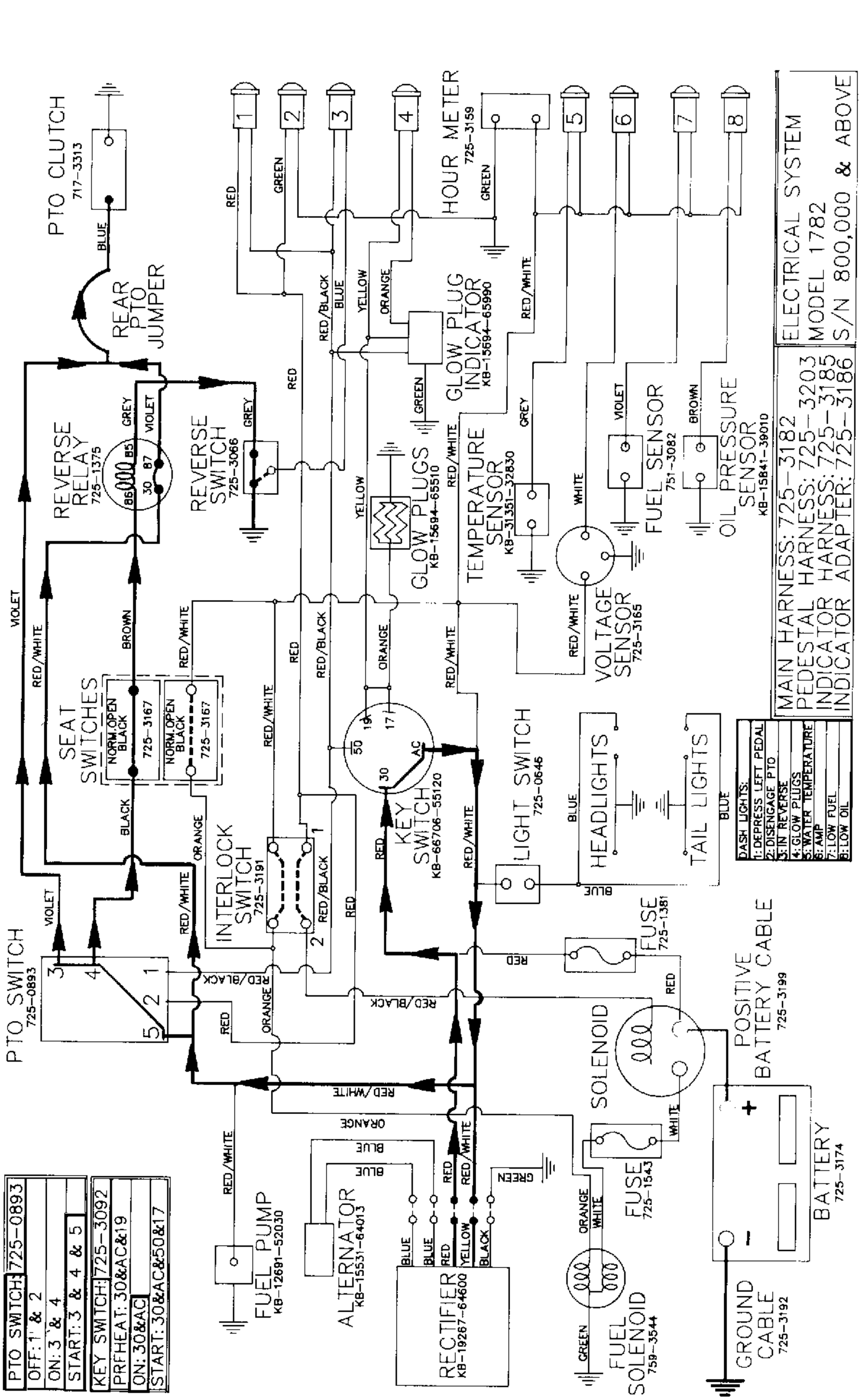


Figure G-22. PTO Start, Model 1782.

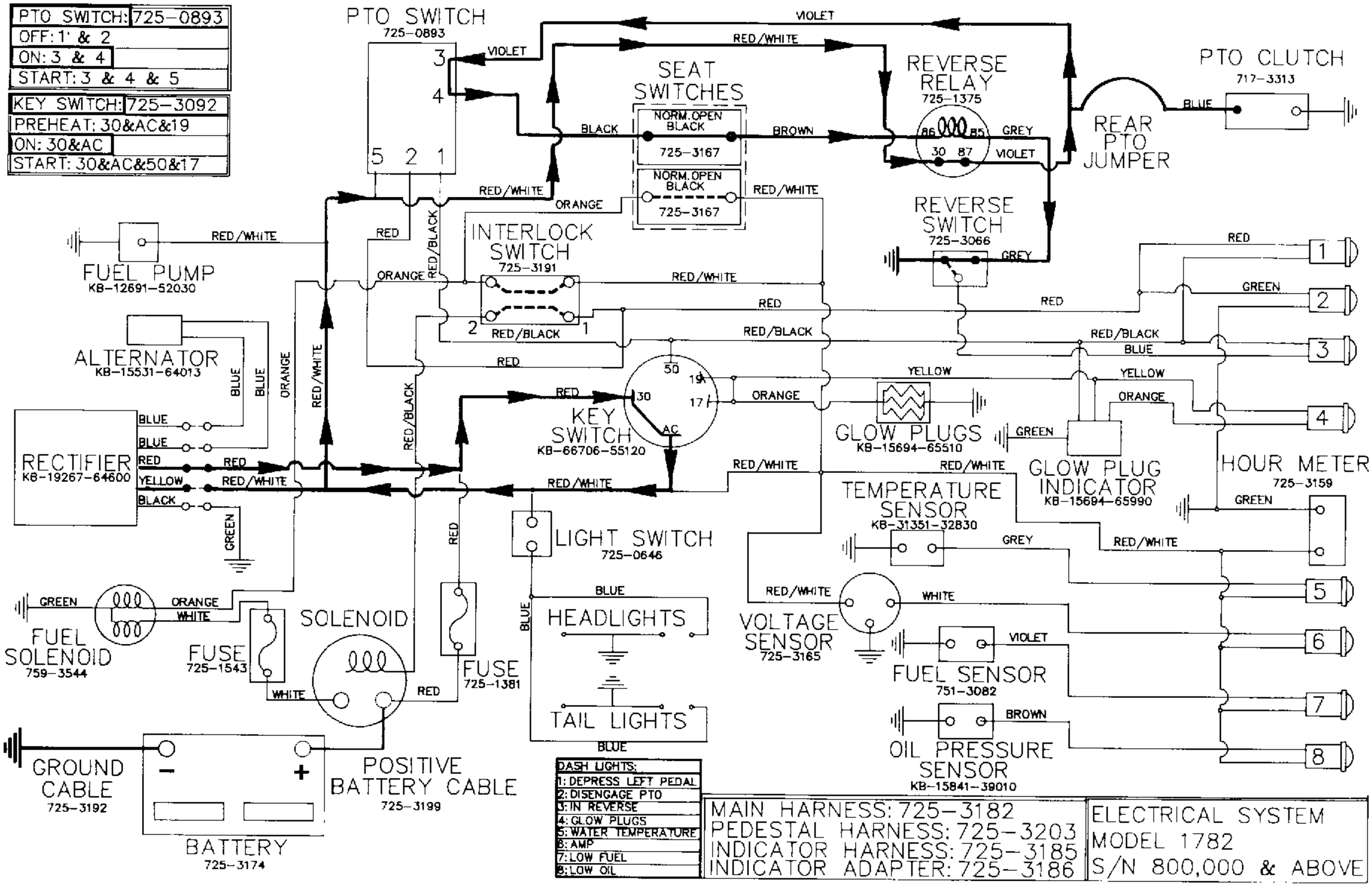


Figure G-23. PTO Run, Model 1782.

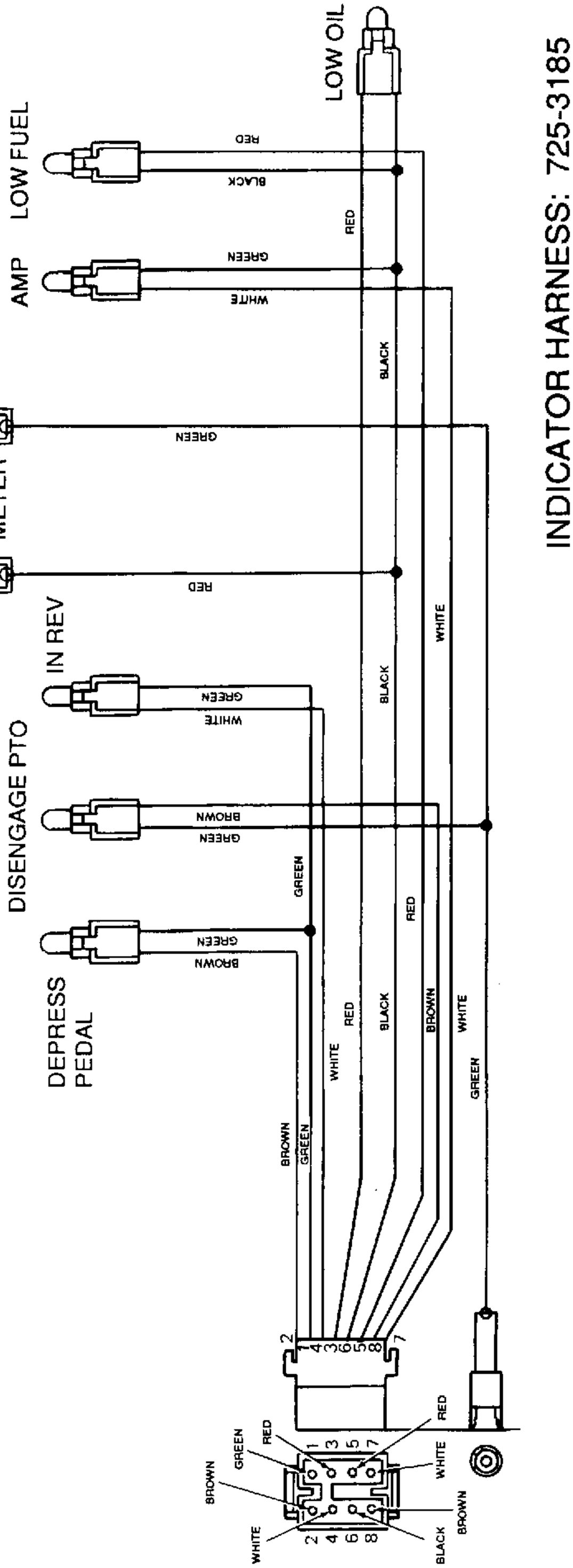


Figure G-24. Indicator Harness, All Models.

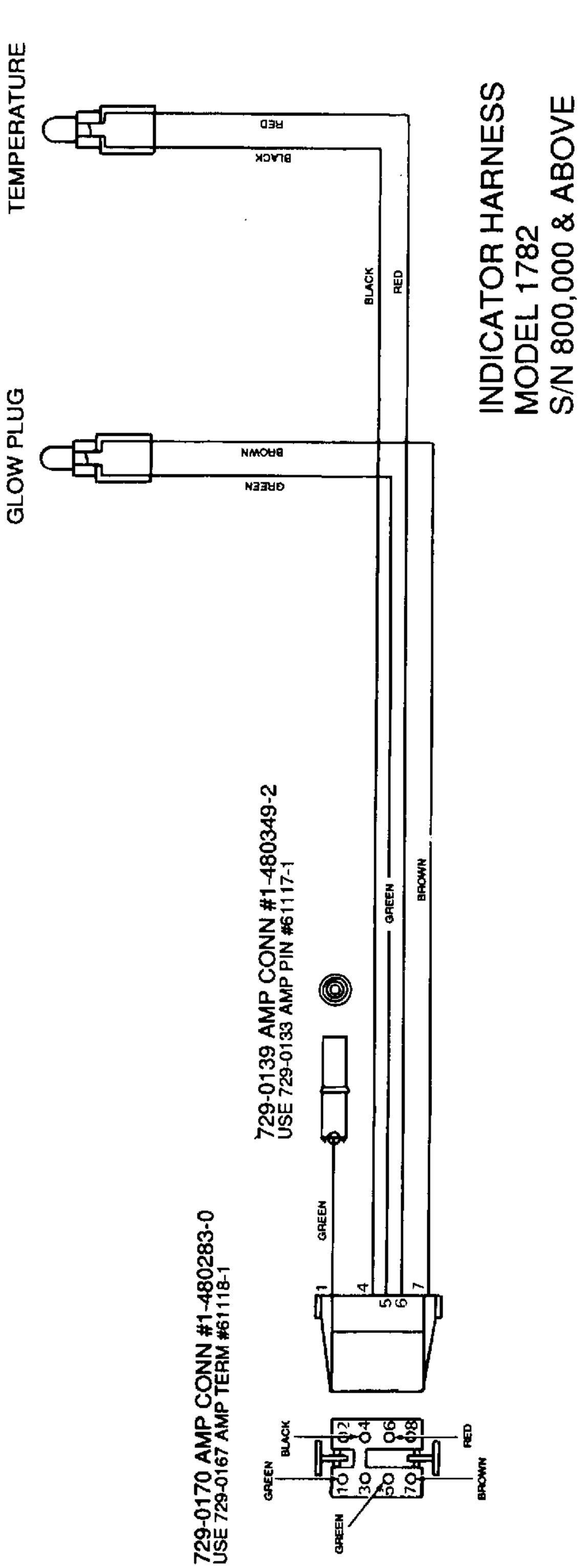


Figure G-25. Indicator Harness, Model 1782.

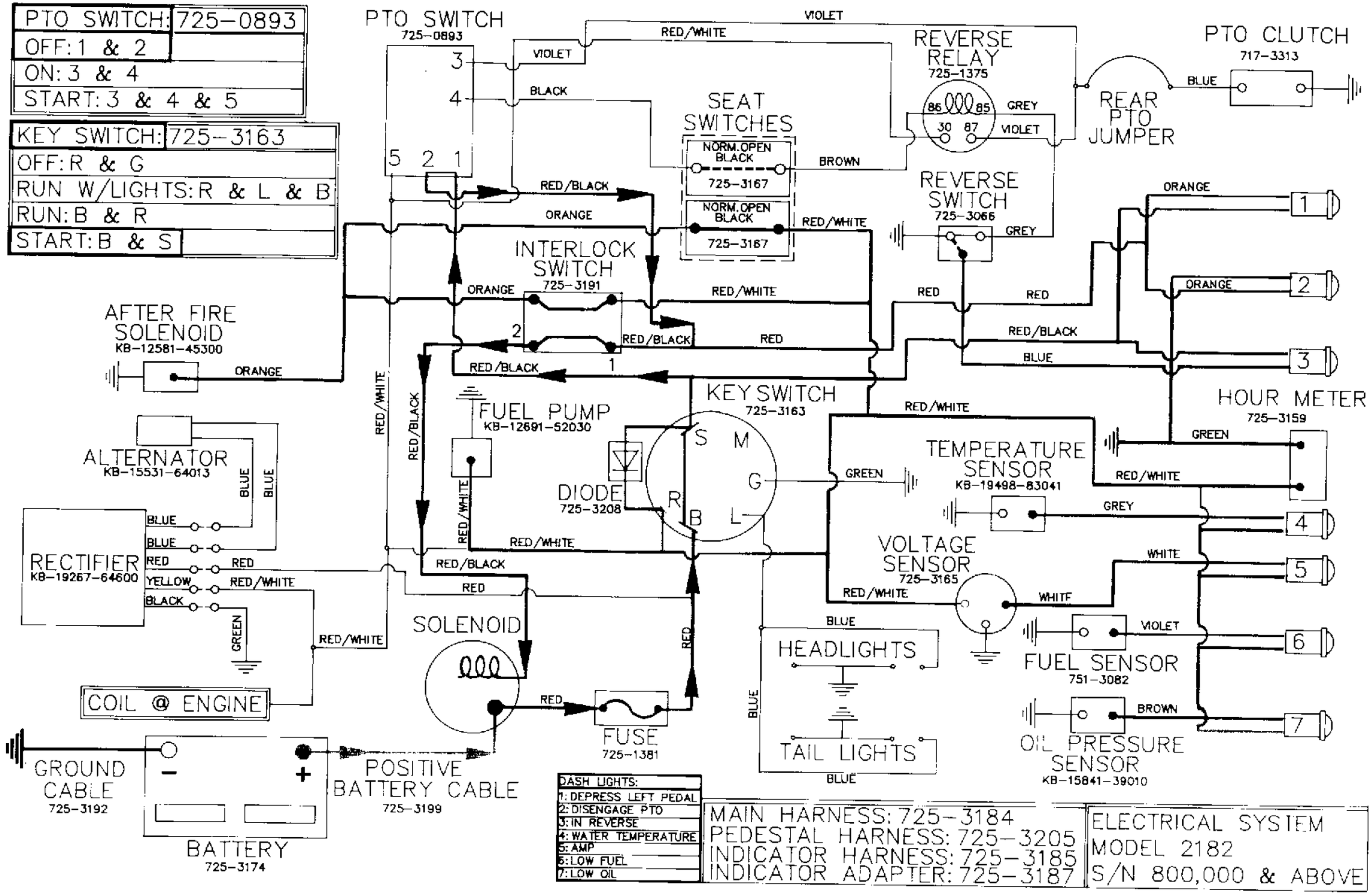


Figure G-26. Engine Crank, Model 2182.

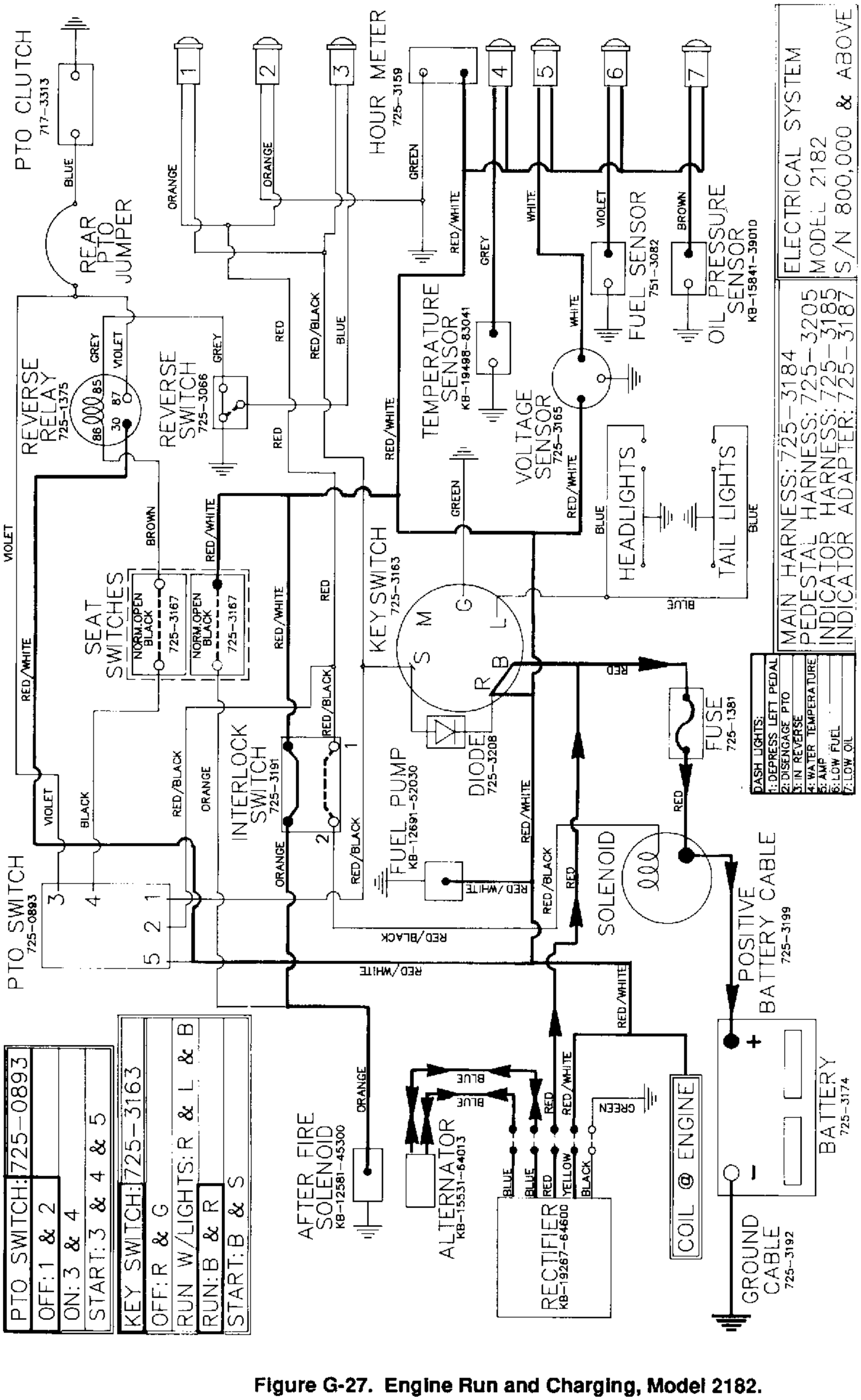


Figure G-27. Engine Run and Charging, Model 2182.

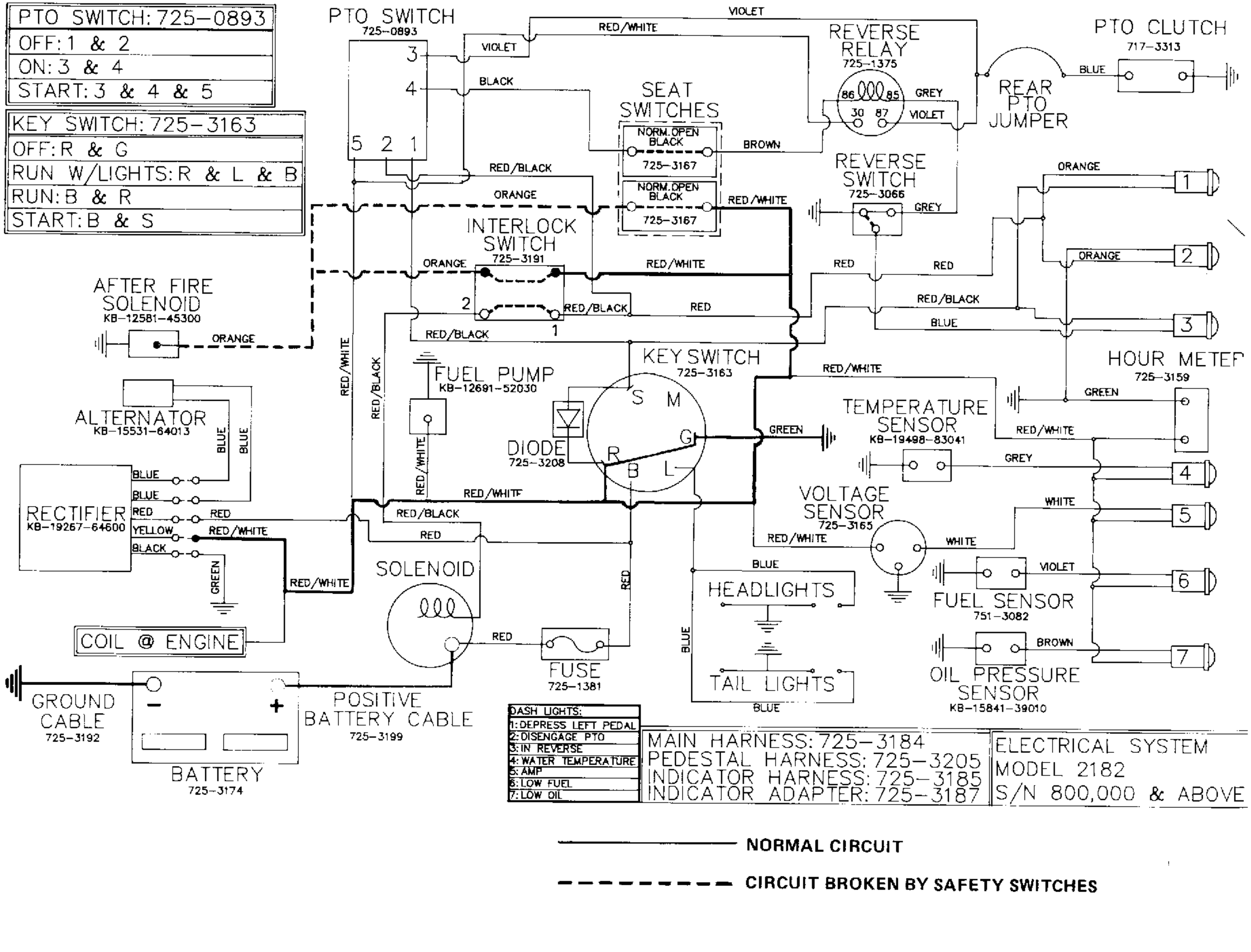


Figure G-28. Normal and Safety Engine Shutdown, Model 2182.

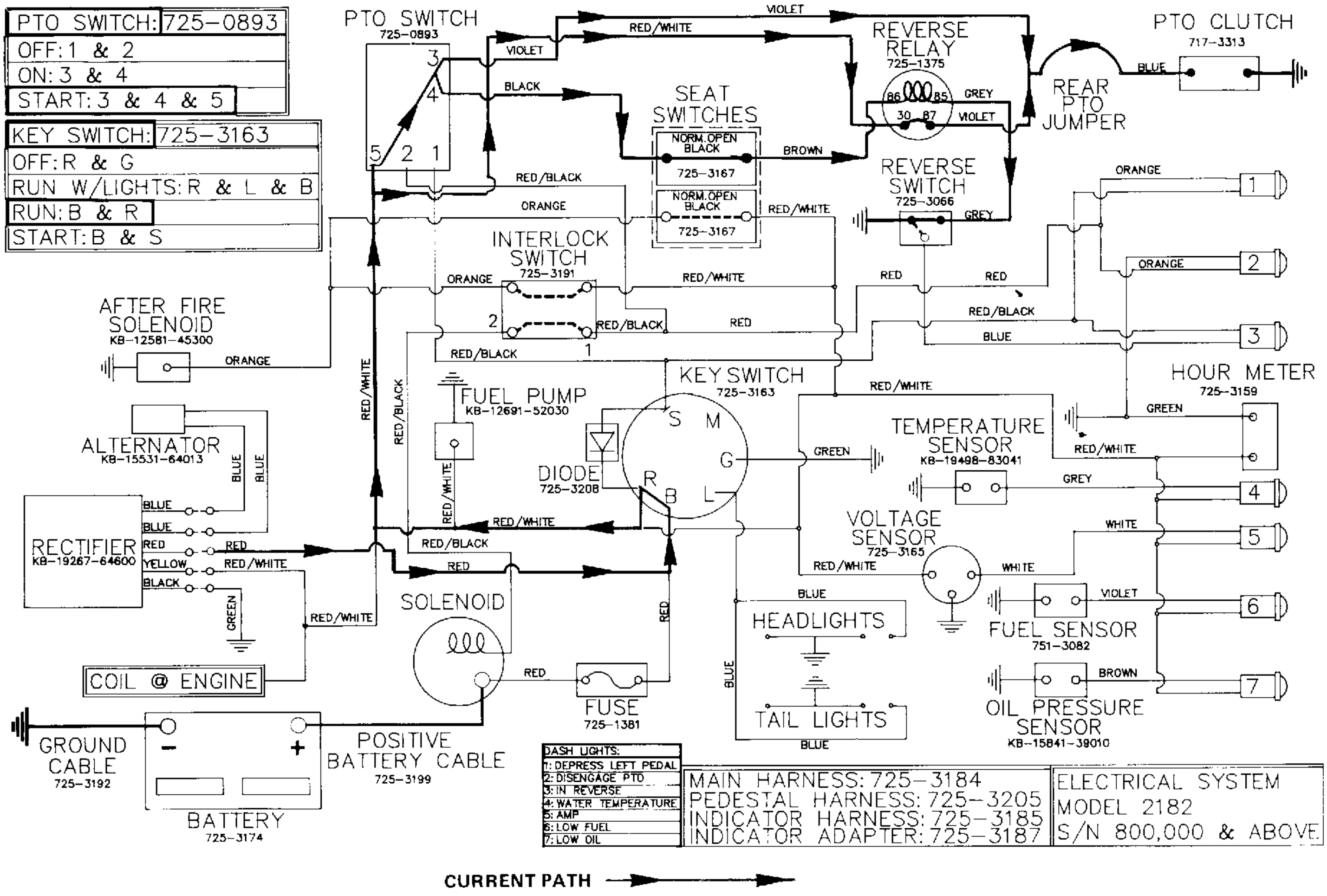


Figure G-29. PTO Start, Model 2182.

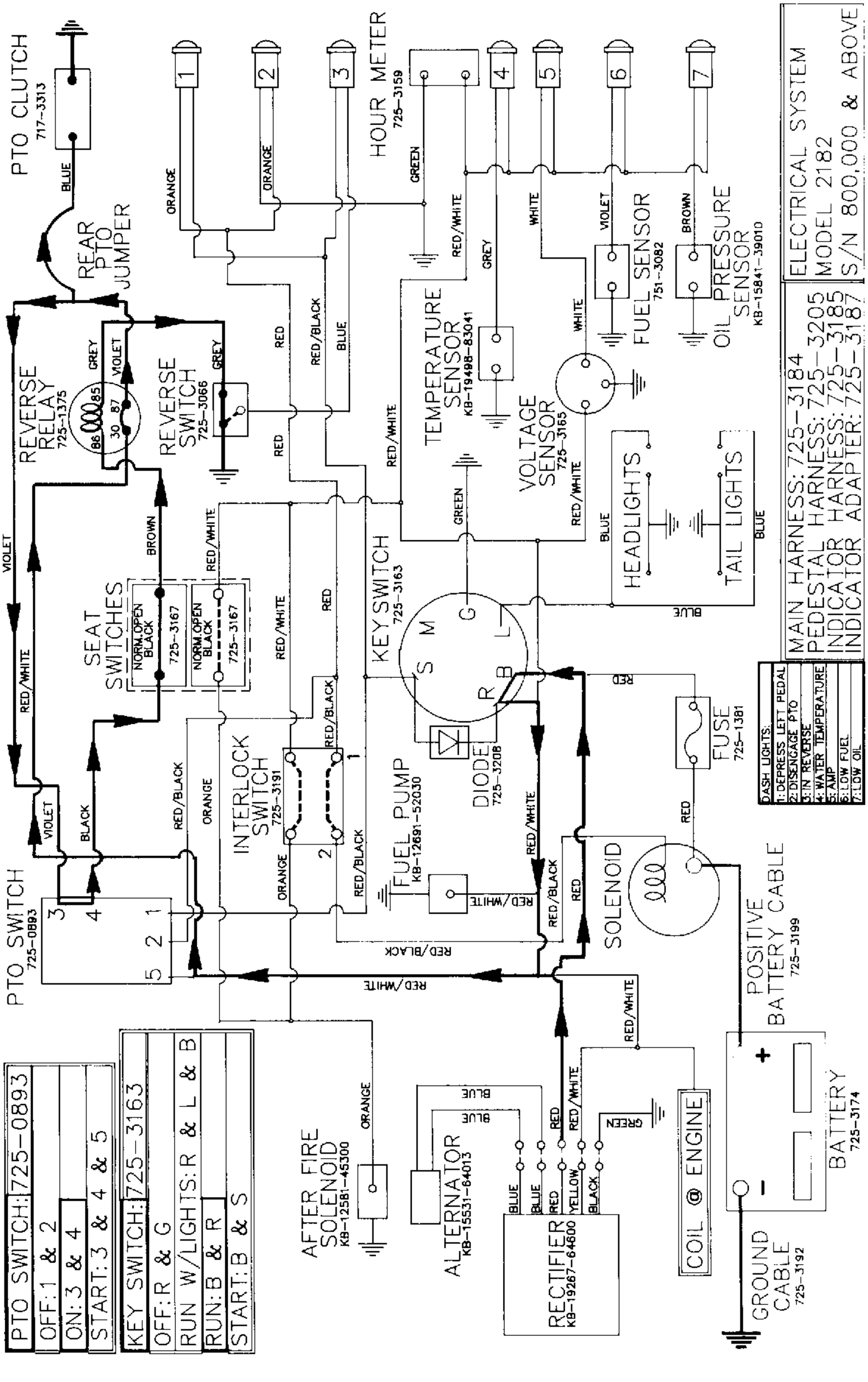


Figure G-30. PTO Run, Model 2182.

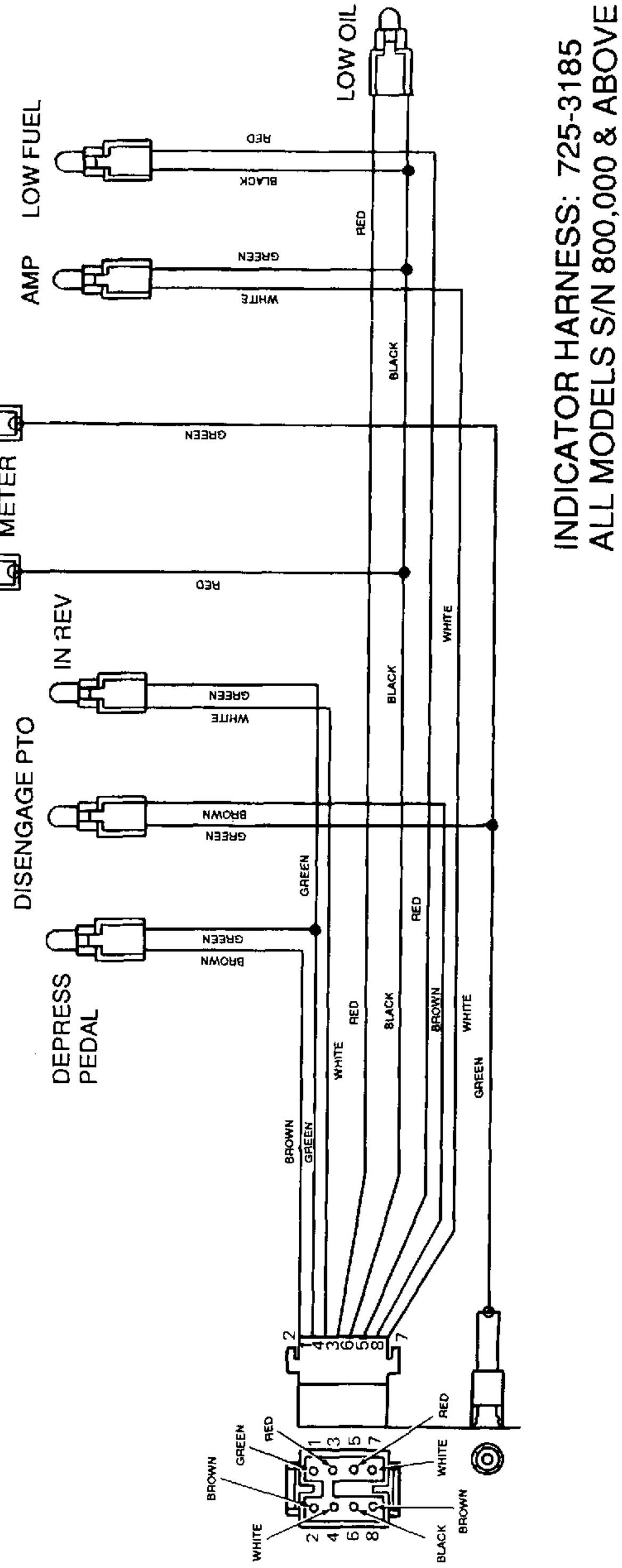


Figure G-31. Indicator Harness, All Models.

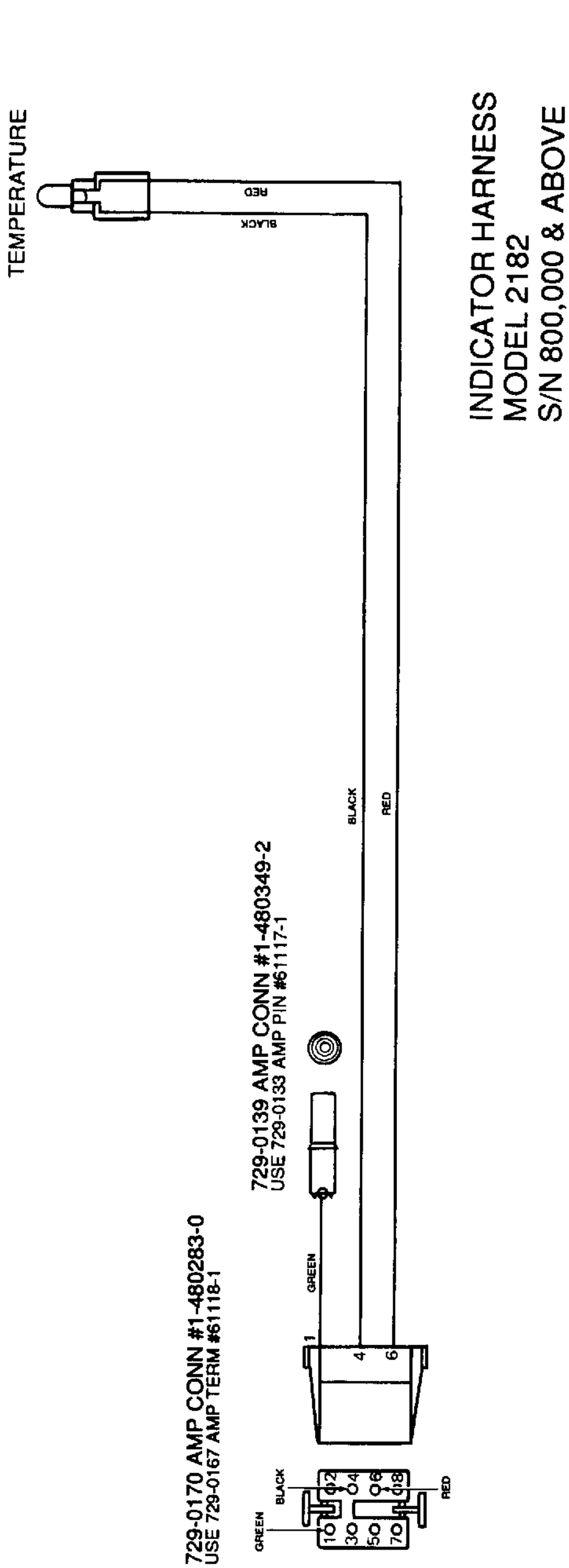


Figure G-32. Indicator Harness, Model 2182.

APPENDIX H
TORQUE DATA

H-1. GENERAL.

H-1.1 This appendix presents general torque information as follows: Table H-1, Standard Torque Data for Inch Nuts and Bolts – Foot Pounds; Table H-2, Standard Torque Data for Inch Nuts and Bolts – Newton Meters; Table H-3, Conversion Table – Inches to Millimeters; Table H-4, Conversion Table – Millimeters to Inches: Table H-4, Conversion Table – Millimeters to Inches.

Table H-1. Standard Torque Data for Inch Nuts and Bolts – Foot Pounds

Recommended torque for all standard unplated nuts and bolts, provided:

A. Surface finish is oxide coated, oil quenched or bright.

B. All thread surfaces are clean and lubricated with SAE-30 engine oil or equipment. (See NOTE.)

C. Joints are rigid, that is, no gaskets or compressible materials are used.

D. When reusing nuts or bolts, use minimum torque values.

NOTE: Multiply the standard torque by:
.65 when finished jam nuts are used.
.70 when Molykote, white lead or similar mixtures are used as lubricants.
.75 when phosphate coated and oiled bolts or nuts are used.
.85 when cadmium or zinc dichromate bolts or nuts are used.
.90 when hardened surfaces are used under the nut or bolt head
(this applies to standard unplated hardware only)

1 Foot Pound = 1.355 Newton Meters

Bolt or Stud Diameter	Type 1 Studs Only		Type 1 Bolts 6" length or less		Type 1 Bolts longer than 6"		Type 5 (all lengths)		Type 8 (all lengths)			
									Only when used † in cast (grey) iron		All other applications	
Inches	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/4	5	6	6	7	4	4	9	10	11	13	13	14
5/16	12	13	11	13	7	8	18	20	22	25	25	28
3/8	21	24	21	24	13	14	33	37	41	46	45	50
7/16	35	38	35	38	20	23	53	60	65	74	75	85
1/2	52	58	52	59	31	35	80	90	100	112	115	130
9/16	70	80	75	85	45	51	115	130	145	160	165	185
5/8	98	110	104	117	62	70	160	180	200	225	225	255
3/4	174	195	185	205	110	125	285	320	355	400	400	450
7/8	280	315	180	200	180	200	460	575	570	640	645	725
1	420	470	265	300	265	300	685	720	855	960	970	1090
1-1/8	595	670	380	425	380	425	850	950	1210	1360	1375	1545
1-1/4	840	945	535	600	535	600	1200	1350	1705	1920	1940	2180
1-3/8	1100	1240	700	785	700	785	1570	1760	2235	2515	2540	2860
1-1/2	1470	1640	925	1045	925	1045	2080	2340	2970	3340	3375	3795

†When bolt penetration is 1-1/2 times the diameter of the bolt.

Bolt Type Identification Chart

SAE Grade	Description	Bolt Head Marking*
Equivalent 1 or 2	WILL BE BLANK IN THE CENTER OF THE HEAD Low or Medium Carbon Steel Not Heat Treated	
5	WILL HAVE 3 RADIAL LINES Quenched and Tempered Medium Carbon Steel	
8	WILL HAVE 6 RADIAL LINES Quenched and Tempered Special Carbon or Alloy Steel	

*The center marking identifies the bolt manufacturer.

Table H-2. Standard Torque Data for Inch Nuts and Bolts – Newton Meters

Recommended torque for all standard unplated nuts and bolts, provided:

A. Surface finish is oxide coated, oil quenched or bright.

B. All thread surfaces are clean and lubricated with SAE-30 engine oil or equipment. (See NOTE.)

C. Joints are rigid, that is, no gaskets or compressible materials are used.

D. When reusing nuts or bolts, use minimum torque values.

NOTE: Multiply the standard torque by:
.65 when finished jam nuts are used.
.70 when Molykote, white lead or similar mixtures are used as lubricants.
.75 when phosphate coated and oiled bolts or nuts are used.
.85 when cadmium or zinc dichromate bolts or nuts are used.
.90 when hardened surfaces are used under the nut or bolt head
(this applies to standard unplated hardware only)

1 Newton Meter = 0.738 Foot Pound

Bolt or Stud Diameter	Type 1 Studs Only		Type 1 Bolts 6" length or less		Type 1 Bolts longer than 6"		Type 5 (all lengths)		Type 8 (all lengths)			
									Only when used † in cast (gray) iron		All other applications	
Inches	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/4	7	8	8	9	5	5	12	14	15	18	18	19
5/16	16	18	15	18	9	11	24	27	30	34	34	38
3/8	28	33	28	33	18	19	45	50	56	62	61	68
7/16	47	52	47	52	27	31	72	81	88	100	102	115
1/2	71	79	71	80	42	47	109	122	136	152	156	176
9/16	95	109	102	115	61	69	156	176	197	217	224	251
5/8	133	149	141	159	84	95	217	244	271	305	305	346
3/4	236	265	251	278	149	170	387	434	482	543	543	611
7/8	380	427	244	271	244	271	624	780	773	868	875	984
1	570	638	360	407	360	407	929	977	1160	1303	1316	1479
1-1/8	807	909	516	577	516	577	1153	1289	1642	1845	1866	2096
1-1/4	1140	1282	726	814	726	814	1628	1832	2313	2605	2632	2958
1-3/8	1492	1682	950	1065	950	1065	2130	2388	3033	3412	3446	3881
1-1/2	1995	2225	1255	1418	1255	1418	2822	3175	4030	4532	4579	5149

†When bolt penetration is 1-1/2 times the diameter of the bolt.

Bolt Type Identification Chart

SAE Grade	Description	Bolt Head Marking*
Equivalent 1 or 2	WILL BE BLANK IN THE CENTER OF THE HEAD Low or Medium Carbon Steel Not Heat Treated	
5	WILL HAVE 3 RADIAL LINES Quenched and Tempered Medium Carbon Steel	
8	WILL HAVE 6 RADIAL LINES Quenched and Tempered Special Carbon or Alloy Steel	

*The center marking identifies the bolt manufacturer.

Table H-3. Conversion Table – Inches to millimeters

Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters
1	25.4	26	660.4	51	1295.4	76	1930.4
2	50.8	27	685.8	52	1320.8	77	1955.8
3	76.2	28	711.2	53	1346.2	78	1981.2
4	101.6	29	736.6	54	1371.6	79	2006.6
5	127.0	30	762.0	55	1397.0	80	2032.0
6	152.4	31	787.4	56	1422.4	81	2057.4
7	177.8	32	812.8	57	1447.8	82	2082.8
8	203.2	33	838.2	58	1473.2	83	2108.2
9	228.6	34	863.6	59	1498.6	84	2133.6
10	254.0	35	889.0	60	1524.0	85	2159.0
11	279.4	36	914.4	61	1549.4	86	2184.4
12	304.8	37	939.8	62	1574.8	87	2209.8
13	330.2	38	965.2	63	1600.2	88	2235.2
14	355.6	39	990.6	64	1625.6	89	2260.6
15	381.0	40	1016.0	65	1651.0	90	2286.0
16	406.4	41	1041.4	66	1676.4	91	2311.4
17	431.8	42	1066.8	67	1701.8	92	2336.8
18	457.2	43	1092.2	68	1727.2	93	2362.2
19	482.6	44	1117.6	69	1752.6	94	2387.6
20	508.0	45	1143.0	70	1778.0	95	2413.0
21	533.4	46	1168.4	71	1803.4	96	2438.4
22	558.8	47	1193.8	72	1828.8	97	2463.8
23	584.2	48	1219.2	73	1854.2	98	2489.2
24	609.6	49	1244.6	74	1879.6	99	2514.6
25	635.0	50	1270.0	75	1905.0	100	2540.0

1 inch = 25.4 millimeters

To convert inches to millimeters, the inch value to be converted should be written down, carried to as many decimal places as the desired accuracy requires. It should then be split into groups of not more than two figures each. The equivalent of each group should then be taken from the table, proper regard being given to the position of the decimal point in each case, and the equipment of the inch value given.

For example, to convert 2.4635 inches to millimeters:

2.0000 inches = 50.80000 millimeters
.4600 inches = 11.68400
.0035 inches = .08890
2.4635 inches = 62.57290 millimeters
Correct to 3 decimal places.
2.4635 inches = 62.573 millimeters

Table H-4. Conversion Table – millimeters to inches

Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Index
1	.03937008	26	1.0236220	51	2.0078740	76	2.9921260
2	.07874016	27	1.0629921	52	2.0472441	77	3.0314961
3	.11811024	28	1.1023622	53	2.0866142	78	2.0708661
4	.15748031	29	1.1417323	54	2.1259842	79	3.1102362
5	1.9685039	30	1.1811024	55	2.1653543	80	3.1496063
6	.23622047	31	1.2204724	56	2.2047244	81	3.1889764
7	.27559055	32	1.2598425	57	2.2440945	82	3.2283465
8	.31496063	33	1.2992126	58	2.2834646	83	3.2677165
9	.35433071	34	1.3385827	59	2.3228346	84	3.3070866
10	.3937008	35	1.3779528	60	2.3622047	85	3.3464567
11	.4330709	36	1.4173228	61	2.4015748	86	3.3858268
12	.4724409	37	1.4566929	62	2.4409449	87	3.4251968
13	.5118110	38	1.4960630	63	2.4803150	88	3.4645669
14	.5511811	39	1.5354331	64	2.5196850	89	3.5039370
15	.5905512	40	1.5748031	65	2.5590551	90	3.5433071
16	.6299213	41	1.6141732	66	2.5984252	91	3.5826772
17	.6692913	42	1.6535433	67	2.6377953	92	3.6220472
18	.7086614	43	1.6929134	68	2.6771654	93	3.6614173
19	.7480315	44	1.7322835	69	2.7165354	94	3.7007874
20	.7874016	45	1.7716535	70	2.7559055	95	3.7401575
21	.8267717	46	1.8110236	71	2.7952756	96	3.7795276
22	.8661417	47	1.8503937	72	2.8346457	97	3.8188976
23	.9055118	48	1.8897638	73	2.8740157	98	3.8582677
24	.9448819	49	1.9291339	74	2.9133858	99	3.8976378
25	.9842520	50	1.9685039	75	2.9527559	100	3.937008

1 mm = .03937008 inch

To convert millimeters to inches, the millimeter value to be converted should be written down, carried to as many decimal places as the desired accuracy requires. It should then be split into groups of not more than two figures each. The equivalent of each group should then be taken from the table, proper regard being given to the position of the decimal point in each case, and the equipment of the several groups found by addition. This sum will be the inch equivalent of the millimeter value given.

For example, to convert 75.384 millimeters to inches:

75.000 millimeters = 2.9527559 inches
.380 millimeters = .0149606
.004 millimeters = .0001574
75.384 millimeters = 2.9678739 inches
Correct to 5 decimal places.
75.384 millimeters = 2.96787 inches

APPENDIX I
MOWER DECK BELT INFORMATION

I-1. GENERAL.

I-1.1 This appendix contains information relative to the causes and cures of belt problems occasionally encountered with belt-driven mower decks.

1. V-belt failures are not normally caused by a bad belt. Such failures are usually the result of the failure of another part.

2. Belts which are frayed or worn on the inside surfaces indicate defective or damaged pulley(s). A V-belt should not bottom out on the pulley sheave. If the belt bottoms out, the pulley is too wide or the sheave has spread apart. Refer to Figure I-1.

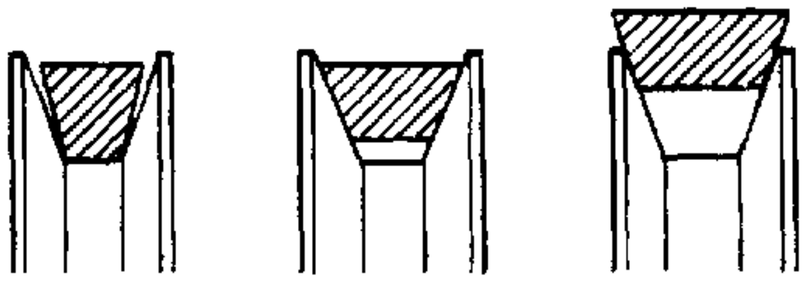


Figure I-1. Belt Positions on Pulley Sheaves.

3. If the sheave is too narrow, the belt will not have full contact on the V-surface. As a general rule, a belt should not ride out of the pulley more than 1/16 inch. A belt riding too far out of the pulley will appear too short.

4. Inspect the pulley for dents or nicks possible from trying to remove the pulley or prying the belt on with a screw driver. Also, check to determine if pulley has been mounted upside down, especially the double pulley on the mower deck.

5. Heavy wear on only one side of the PTO belt indicates misaligned pulleys. Figure I-2 shows the proper alignment of the drive belt on a garden tractor. If the idler pulley connected to the J-bolt tension rod is out of alignment, one side of the drive belt will scrub heavily against the PTO pulley. Refer to Figure I-3. With this idler adjusted properly, the idler ratchet will be close to its proper adjustment.

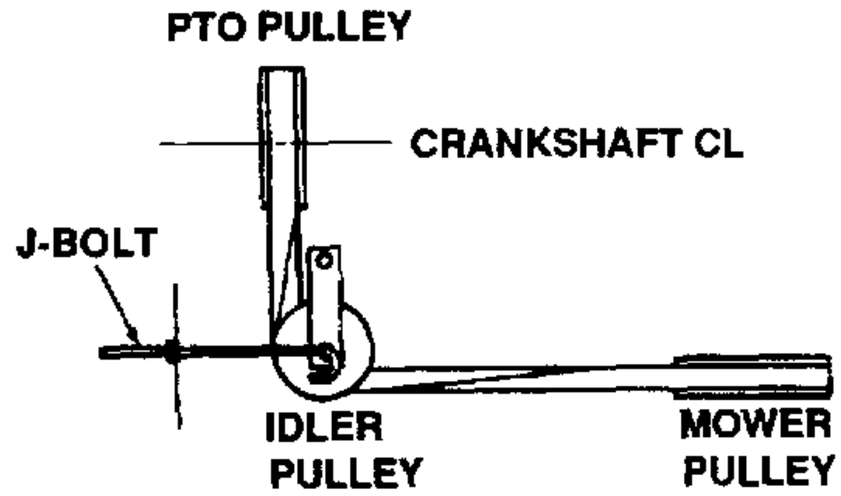


Figure I-2. Properly Aligned Drive Belt.

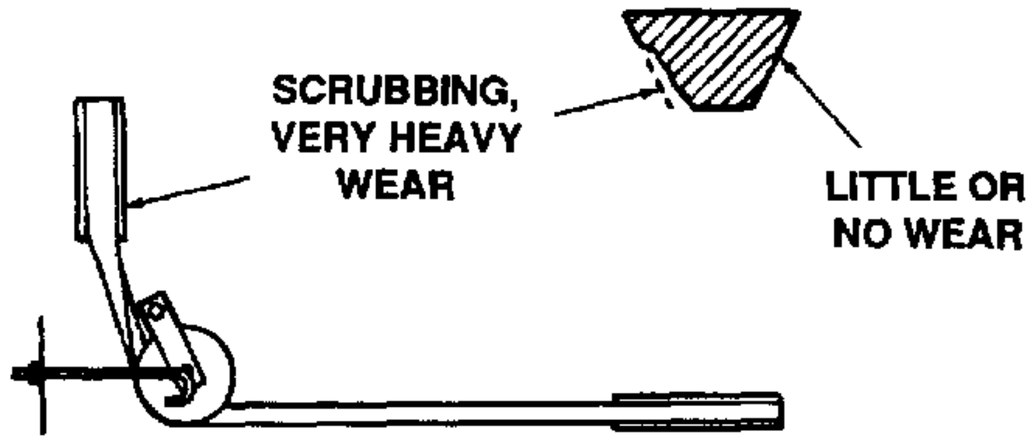


Figure I-3. Improperly Aligned Drive Belt.

6. A misaligned idler may also cause the belt to roll over on the pulley. A belt which has rolled over will have cracks throughout the length of the belt. Refer to Figure I-4. Once a belt has rolled over a pulley, it must be replaced.

7. As long as a belt is not slipping, it can be assumed that it has proper tension. An over-tightened belt will stress components and reduce service life.

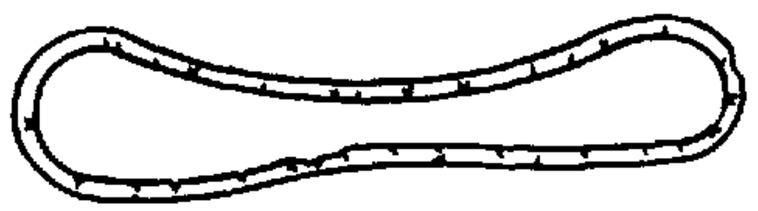


Figure I-4. Cracked Drive Belt.