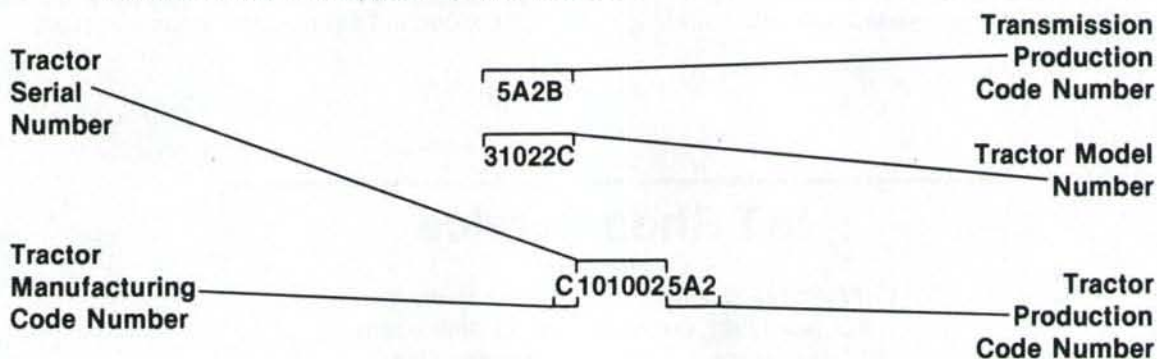


SHOP MANUAL

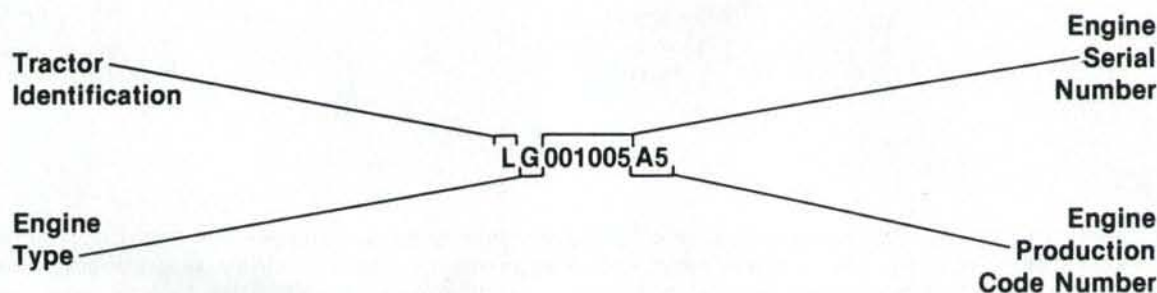
FORD

5000	6600	6710	7610
5600	6610	7000	7700
5610	6700	7600	7710

Tractor Series identification Plate is located under right hood panel. Tractor Serial Number, along with manufacturing and production code numbers and tractor model number, will appear on implement mounting pad at right front corner of transmission (directly behind engine starter). Numbers will be stamped on top of pad, on mounting face of pad, or partially on top of and partially on mounting face of pad. Refer to following explanation of the numbers that will appear at this location:



Engine Serial Number, along with tractor size identification, engine type identification and engine production code number, will appear on either the left or right pan rail of cylinder block casting approximately at mid-length of engine. Refer to following explanation of the numbers that will appear at this location:



Tractor Identification:

R – 5000 (Before 7-20-68)
 E – 5000 (After 7-19-68 through 1975)
 L – 5600-5610
 E – 6600-6610-6700-6710
 F – 7000-7600-7610-7700-7710

Engine Type:

(Early)	(Late)
D – Diesel	1 & 5 – Diesel
G – Gasoline	2 & 6 – Gasoline
P – LP-Gas	

The following tractor models are covered in this manual:

5100 (All-Purpose)	5600 (All-Purpose)	6610 (All-Purpose)	6700
5200 (Rowcrop)	5610 (All-Purpose)	7600 (All-Purpose)	6710
7100 (All-Purpose)	6600 (All-Purpose)	7600C (Rowcrop)	7700
7200 (Rowcrop)	6600C (Rowcrop)	7610 (All-Purpose)	7710

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DUAL DIMENSIONS

This service manual provides specifications in both the U.S. Customary and Metric (SI) systems of measurement. The first specification is given in the measuring system perceived by us to be the preferred system when servicing a particular component, while the second specification (given in parenthesis) is the converted measurement. For instance, a specification of "0.011 inch (0.28 mm)" would indicate that we feel the preferred measurement, in this instance, is the U.S. system of measurement and the metric equivalent of 0.011 inch is 0.28 mm.

CONDENSED SERVICE DATA

	Series 5000 (Prior to 7-20-68)	Series 5000 (After 7-19-68) 7000	5600	5610	6600 6700	6610 6710	7600 7700	7610 7710
GENERAL								
Engine Make	Own _____							
No. of Cylinders	4							
Bore, Inches:								
Non-Diesel	4.2	4.4	.....	.....	4.4	.....	.....	.....
Diesel	4.2	4.4	4.2	4.4	4.4	4.4	4.4	4.4
Bore, mm:								
Non-Diesel	106.7	111.8	.....	.....	111.8	.....	.....	.....
Diesel	106.7	111.8	106.7	111.8	111.8	111.8	111.8	111.8
Stroke, Inches:								
Non-Diesel	4.2	4.2	.....	.....	4.2	.....	.....	.....
Diesel	4.2	4.2	4.2	4.2	4.2	4.4	4.2	4.4
Stroke, mm:								
Non-Diesel	106.7	106.7	.....	.....	106.7	.....	.....	.....
Diesel	106.7	106.7	106.7	106.7	106.7	111.8	106.7	111.8
Displacement, Cubic Inches:								
Non-Diesel	233	256	.....	.....	256	.....	.....	.....
Diesel	233	256	233	256	256	268	256	268
Displacement, cc:								
Non-Diesel	3818	4195	.....	.....	4195	.....	.....	.....
Diesel	3818	4195	3818	4195	4195	4385	4195	4385
Compression Ratio:								
Non-Diesel	7.5:1	7.8:1	.....	.....	7.75:1	.....	.....	.....
Diesel	16.5:1	16.5:1	16.3:1	16.3:1	16.3:1	16.3:1	15.6:1	15.6:1
Compression, Test Gage, (Lbs. at 200 rpm):								
Non-Diesel (Spark plugs removed, WOT)	115-150	115-150	.....	.....	115-150	.....	.....	.....
Diesel (Stop control out, Throttle closed)	420-510	420-510	290-390	290-390	300-400	300-400	300-400	300-400
Max. Allowable Variation:								
Non-Diesel	25	25	.....	.....	25	.....	.....	.....
Diesel	50							
Firing Order	1-3-4-2							
Valve Tappet Gap (Warm):								
Intake	0.015 inch (0.381 mm)							
Exhaust	0.018 inch (0.457 mm)							
Valve Face Angle, Degrees:								
Intake	44	29	44.5	44.5	44.5	44.5	29.5	29.5
Exhaust	44	44	44.5	44.5	44.5	44.5	44.5	44.5
Valve Seat Angle, Degrees:								
Intake	45	30	45	45	45	45	30	30
Exhaust	45							
Ignition Timing	Par. 158, 159		.....	.....	Par. 158		.....	.....
Injection Timing	See Paragraph 133, 134							
Spark Plug Make	Motorcraft	Motorcraft	.....	.....	Motorcraft	.....	.....	.....
Spark Plug Type	AG-5	AG-5	.....	.....	AG-5	.....	.....	.....
Engine Low Idle, rpm:	600-650	600-700	600-700	600-850	600-700	600-850	600-700	600-850
Engine High Idle, rpm:								
Non-Diesel	2285-2335	2285-2385	.....	.....	2285-2385	.....	.....	.....
Diesel	2285-2335	2325-2375	2325-2375	2250-2300	2325-2375	2325-2375	2325-2375	2325-2375
Engine Rated rpm:								
Non-Diesel	2100	2100	.....	.....	2100	.....	.....	.....
Diesel	2100							
Grounded Battery Terminal ...	Negative							
SIZES-CAPACITIES-CLEARANCES								
Crankshaft Journal Diameter .	3.3713-3.3723 inches (85.631-85.656 mm)							
Crankpin Diameter	2.7496-2.7504 inches (69.839-69.860 mm)							

CONDENSED SERVICE DATA (CONT.)

	Series 5000 (Prior to 7-20-68)	Series 5000 (After 7-19-68) 7000	5600	5610	6600 6700	6610 6710	7600 7700	7610 7710
SIZES-CAPACITIES-CLEARANCES (Cont.)								
Camshaft Journal Diameter . . .	2.3895-2.3905 inches (60.693-60.718 mm)							
Piston Pin Diameter	See Paragraph 97							
Valve Stem Diameter, Intake . . .	0.3711-0.3718 inch (9.425-9.443 mm)							
Valve Stem Diameter, Exhaust . . .	0.3701-0.3708 inch (9.400-9.418 mm)							
Main Bearing Diametral Clearance	0.0022-0.0045 inch (0.0559-0.1143 mm)							
Rod Bearing Diametral Clearance:								
Aluminum	0.0021-0.0042 inch (0.053-0.107 mm)							
Copper-Lead	0.0017-0.0038 inch (0.0431-0.0965 mm)							
Camshaft Bearing Diametral Clearance	0.001-0.003 inch (0.0254-0.0762 mm)							
Crankshaft End Play	0.004-0.008 inch (0.1016-0.2032 mm)							
Camshaft End Play	0.001-0.007 inch (0.0254-0.1778 mm)							
Piston Skirt-to-Cylinder Clearance	See Paragraph 96							
Cooling System (Less Heater):								
Quarts (U.S.)	15.3	15.3(1)	13.5	13.5	14.5(2)	14.5(2)	18.0(3)	18.0(3)
Liters	14.5	14.5	12.8	12.8	13.8	13.8	17.0	17.0
Crankcase With Filter:								
Quarts (U.S.)	8	8(4)	9	9	9	9	9	9
Liters	7.8	7.8	8.5	8.5	8.5	8.5	8.5	8.5
Transmission, 8-Speed:								
Quarts (U.S.)	19	10.8(5)	12(6)	.....	.....	.....	.....	.....
Liters	17.9	10.2	11.4	.....	.....	.....	.....	.....
Select-O-Speed:								
Quarts (U.S.)	11.8	11.8	.....	.....	.....	.....	.....	.....
Liters	11.2	11.2	.....	.....	.....	.....	.....	.....
Transmission & Rear Axle, Dual Power, 540 rpm pto:								
Quarts (U.S.)* . . . . .	.....	.....	56	56	56	56	56	56
Liters . . . . .	.....	.....	52.9	52.9	52.9	52.9	52.9	52.9
Transmission & Rear Axle, Dual Power With 2-Speed pto:								
Quarts (U.S.)* . . . . .	.....	.....	60	60	60	60	60	60
Liters . . . . .	.....	.....	56.8	56.8	56.8	56.8	56.8	56.8
Rear Axle, Less Dual Power:								
Quarts (U.S.)	33	34.8(7)	43	.....	.....	.....	.....	.....
Liters	31.2	32.9	40.7	.....	.....	.....	.....	.....
Steering Gear, Manual:								
Quarts (U.S.)	0.96							
Liters	0.90							
Power Steering:								
Quarts (U.S.)	1.87	2.35	2.3	2.3	2.3(8)	2.3(8)	2.3(8)	2.3(8)
Liters	1.76	2.22	2.2	2.2	2.2	2.2	2.2	2.2

(1) Model 7000: 14.5 Qts. (13.7 L). (2) Models 6600 and 6610: 13.5 Qts. (12.8 L). (3) Models 7700 and 7710: 19 Qts. (18 L). (4) Model 7000: 9 Qts. (8.5 L). (5) Model 7000: 55 Qts. (52 L). (6) Model 5600 w/o Dual Power. (7) Model 7000: 55 Qts. (52 L). (8) Models 6700, 6710, 7700 and 7710: 2.5 Qts. (2.4 L).

*Models with front-wheel drive refer to paragraph 55N or 69 and 286.

CONDENSED SERVICE DATA (CONT.)

	Series 5000 (Prior to 7-20-68)	Series 5000 (After 7-19-68) 7000	5600	5610	6600 6700	6610 6710	7600 7700	7610 7710
SIZES-CAPACITIES-CLEARANCES (Cont.)								
Front Axle Differential								
Housing:								
Pints (U.S.)	11.0	13.0	11.0	13.0	13.7	13.0
Liters	5.2	6.0	5.2	6.0	6.5	6.0
Front Axle Drive Hubs:								
Pints (U.S.)	1.6	1.3	1.6	1.3	2.1	1.3
Liters	0.75	0.6	0.75	0.5	1.0	0.6

FRONT SYSTEM AND STEERING (All-Purpose Models 5100-7100-5600-5610-6600-6610-7600-7610)

FRONT AXLE ASSEMBLY AND STEERING LINKAGE

All Models

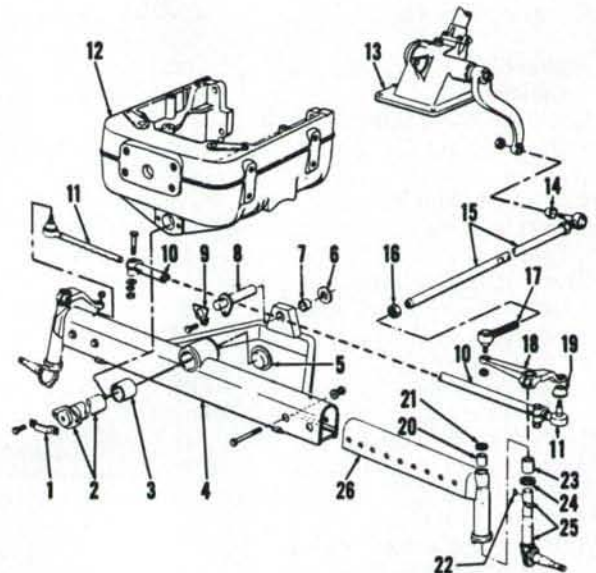
1. SPINDLE BUSHINGS. To renew spindle bushings (20 and 23—Fig. 1), support front of tractor and disconnect steering arms from wheel spindles (25). Slide wheel and spindle assemblies (remove wheels from hubs if desired for clearance) out of front axle extensions (26). Drive old bushings from front axle extensions and install new bushings with piloted drift or bushing driver. New bushings are final sized and should not require reaming if carefully installed. Renew thrust bearing (24) if worn or rough. Refer to Fig. 2 for correct installation of thrust bearing and spindle dust seal.

2. AXLE CENTER MEMBER, PIVOT PINS AND BUSHINGS. To remove axle center member, first support front of tractor and remove clamping bolt from tie rod (both tie rods, power steering models). Disconnect drag link front end (17—Fig. 1) from left steering arm (18) on manual steering models. Remove bolts securing axle extensions (26) to axle center member (4), and slide extensions, spindles and wheels as a unit from center member.

Suitably support center member, remove pivot pin retainers (1 and 9) and pivot pins (2 and 8), then lower center member from front support unit.

Fig. 1—Exploded view of typical front axle, front support and steering linkage for manual steering Models 5100, 7100, 5600, 5610, 6600, 6610, 7600 and 7610.

1. Retainer
2. Front pivot pin
3. Bushing
4. Axle center member & radius rod Assy.
5. Cap
6. Thrust washer
7. Bushing
8. Rear pivot pin
9. Retainer
10. Tie rod
11. Tie rod end Assy.
12. Front support
13. Steering gear Assy.
14. Dust cover
15. Drag link
16. Locknuts
17. Drag link end Assy.
18. Steering arm (L.H.)
19. Dust cover
20. Spindle bushing (upper)
21. Dust seal
22. Woodruff key
23. Spindle bushing (lower)
24. Thrust bearing
25. Spindle (L.H.)
26. Axle extension (L.H.)



Pivot pin bushings (3 and 7) are final sized and may be renewed at this time if scored or worn. Reinstall by reversing the removal procedure.

3. FRONT SUPPORT. To remove front support, proceed as follows: Drain cooling system and remove hood, grille and radiator. Support front end of tractor.

On models with manual steering, disconnect rear of drag link (15—Fig. 1) from steering gear (13) and remove

pivot pins (2 and 8). Raise front of tractor and roll complete front axle unit away from tractor. Attach a hoist to front support and remove bolts securing front support to engine block and oil pan. Be careful not to lose or damage any shims that may be located on bolts securing front support to oil pan.

Reinstall by reversing the removal procedure, observing the following: Install the four bolts securing front support to engine block and tighten to a torque of 250-270 ft.-lbs. (340-367 N·m). Do



Fig. 2—Top view shows proper installation of dust seal on spindle after spindle is installed in axle extension. Lower view shows proper installation of thrust bearing on spindle prior to installing spindle in axle extension.

not install the two lower front support bolts at this time. Using a feeler gage, measure any existing clearance between front support and oil pan at the two attaching points; then install shims equal to measured clearance when bolts are installed. Shims are available in thicknesses of 0.014, 0.017, 0.021, 0.024 and 0.027 inch (0.357, 0.432, 0.533, 0.610 and 0.686 mm). Tighten the two lower bolts to 250-270 ft.-lbs. (340-367 N·m) after shims are installed.

Front support service on Model 5100 or 7100 with power steering is the same as that for manual steering models except for removal of center steering arm and valve unit (early 5100 models) or center steering arm (late 5100 models and 7100 models) and service on steering arm and pivot pin. Refer to paragraph 19 for service on steering arm and pivot pin and to the preceding paragraph for service on support unit.

4. DRAG LINK, TIE ROD AND TOE-IN. Front wheel spindle arm tie rod ends and drag link ends are of the non-adjustable automotive type and procedure for renewing is self-evident.

Toe-in should be correct for each tread width position when tie rod clamp bolt is placed in corresponding notch of rod end assembly. If toe-in is not within limits of 0 to 1/4-inch (6.35 mm), check for bent or excessively worn parts.

Length of drag link between steering gear arm and right front spindle arm should be adjusted for different tread width positions as follows: When right front axle extension is in innermost position or extended 2 inches (5.08 cm) (one adjustment hole), drag link should be in shortest position. Then, lengthen drag link one notch for each additional 2-inch (5.08 cm) extension of right front axle.

STEERING GEAR UNIT

All Manual Steering Models; Early 5100 Models With Power Steering

Refer to Fig. 3 for exploded view of steering gear unit used on all manual steering models and early Model 5100 tractors with power steering.

5. ADJUSTMENT. If there is no perceptible end play of either steering (worm) shaft (6—Fig. 3) or rocker shaft (22) and a pull at outer edge of steering wheel of 1 to 2 3/4 lbs. (0.45 to 1.25 kg) is required to turn gear unit past mid-position (with drag link or power steering cylinder disconnected from steering arm), adjustment can be considered correct. Although usually performed only during reassembly of gear unit, adjustments for wormshaft and rocker shaft end play can be made to correct ex-

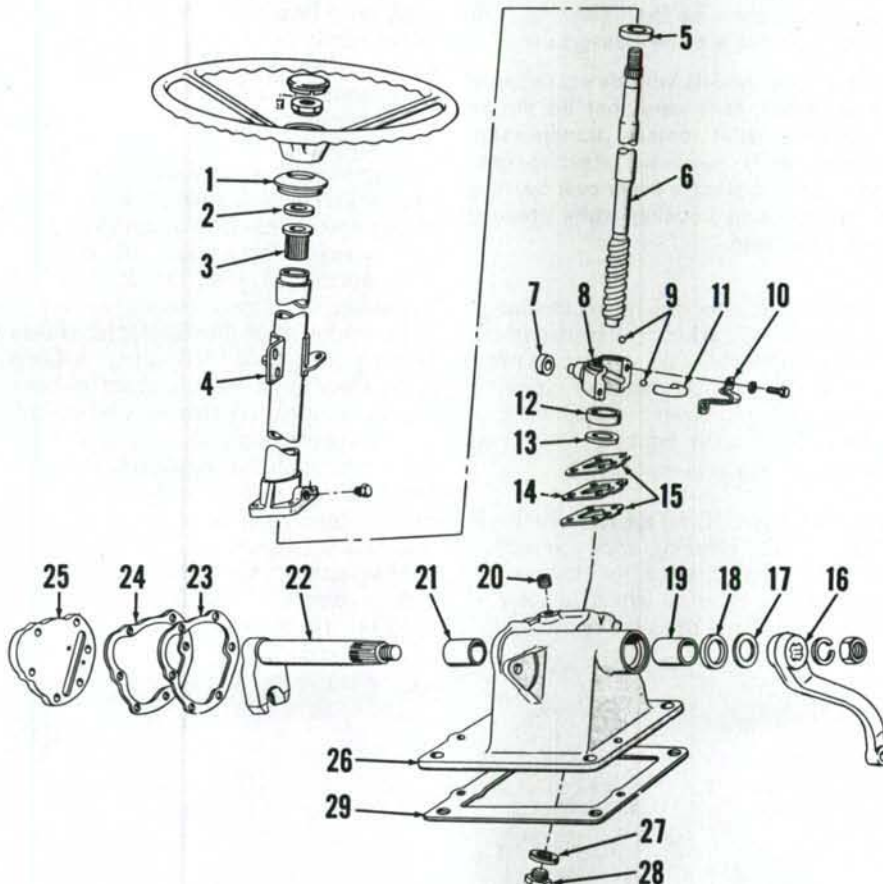


Fig. 3—Exploded view of steering gear unit of the type used on all manual steering models and on early 5100 models with power steering. Thirty-four 3/8-inch (9.53 mm) diameter steel balls are used in the assembly; 20 are used for steering shaft bearings and 14 are used in the ball nut (8) and tube (11) recirculating groove. Parts 27, 28 and 29 are not used on Models 5600, 5610, 6600, 6610, 7600 and 7610.

- | | | | |
|-----------------------|--------------------------|------------------|----------------------------------|
| 1. Grommet | 9. Steel balls (3/8-in.) | 16. Steering arm | 23. Shims |
| 2. Dust seal | 10. Retainer | 17. Dust seal | 24. Gasket |
| 3. Bushing | 11. Tube | 18. Oil seal | 25. Side cover |
| 4. Steering column | 12. Lower bearing race | 19. Bushing | 26. Gear housing |
| 5. Upper bearing race | 13. Spacer | 20. Plug | 27. Sealing washer |
| 6. Wormshaft | 14. Shims | 21. Bushing | 28. Plug |
| 7. Roller | 15. Gasket | 22. Rocker shaft | 29. Gasket (Select-O-Speed only) |
| 8. Ball nut | | | |

cessive end play or turning effort. With unit removed from tractor as outlined in paragraph 8, proceed as follows:

6. WORMSHAFT END PLAY. Remove side cover (25—Fig. 3) and inspect condition of unit. If no obvious damage or excessive wear is noted, add or remove shims (14) and gaskets (15) so wormshaft turns freely, but has no perceptible end play. Approximate shim and gasket thickness can be determined by installing steering column without shims or gaskets and measuring resulting gap between steering column and gear housing. Tighten column retaining nuts finger tight and measure gap at several points with feeler gage as shown in Fig. 7. Paper gaskets are 0.010 inch (0.254 mm) thick and steel shims are available in thicknesses of 0.003 and 0.010 inch (0.076 and 0.254 mm). Use one gasket on each side of shim pack and on final assembly, apply a light coat of sealer to gaskets. Tighten steering column retaining nuts to a torque of 25-35 ft.-lbs. (34-48 N·m).

7. ROCKER SHAFT END PLAY. First, adjust wormshaft end play as outlined in paragraph 6, then proceed as follows:

Be sure rocker arm shaft and ball nut are in mid-position and roller is in place as shown in Fig. 4, then install side cover (25—Fig. 3) without shims (23) or gaskets (24). Tighten retaining nuts and cap screws equally finger tight, then measure gap between side cover and steering housing at several points with feeler gage. Average gap measurement is approximate thickness of shims and gaskets required. Shims are available in thicknesses of 0.005 and 0.010 inch (0.127 and 0.254 mm). Use one 0.010 inch (0.254 mm) gasket on each side of shim pack and, on final assembly, apply a light coat of sealer to gaskets.

8. R&R STEERING GEAR ASSEMBLY. To remove steering gear assembly, proceed as follows: Disconnect battery ground cable and remove steering wheel. Remove sheet metal covers at each side of steering gear. Remove screws retaining instrument panel, disconnect ground terminal at left side of panel and rotate panel up out of opening in sheet metal. Disconnect wiring from instrument panel and remove the panel assembly. Remove light switch and choke or diesel shut-off cable. If equipped with Select-O-Speed transmission, refer to paragraph 220 for removal of controls. Remove engine hood and sheet metal surrounding fuel tank. Shut off fuel supply, disconnect fuel supply line and diesel fuel return line from tank, then remove fuel tank assembly. Thoroughly clean steering gear and surrounding area. Disconnect drag link or power steering cylinder from steering arm, then unbolt and remove steering gear assembly from transmission housing. Drain lubricant from steering gear housing if unit is to be disassembled.

NOTE: On models with Select-O-Speed transmission, take care that no dirt or foreign material enters transmission housing while removing steering gear assembly and place a cover over opening in transmission housing while steering gear is removed.

To reinstall steering gear assembly, place a new gasket on transmission housing (Select-O-Speed transmission models only), then reinstall steering gear assembly by reversing removal procedure. Refill gear housing with Ford 134 oil or a suitable equivalent.

9. OVERHAUL STEERING GEAR UNIT. With steering gear assembly removed from tractor as outlined in paragraph 8, refer to exploded view of unit in Fig. 3 and proceed as follows:

Remove nut retaining steering arm (16) to rocker shaft (22) and, using suitable pullers, remove arm from shaft. Unbolt and remove side cover (25), shims (23) and gaskets (24). Remove roller (7) from ball nut (8) and slide rocker shaft from housing. Unbolt and remove steering column (4), shims (14) and gaskets (15) from gear housing (26). Remove bushing (3) from upper end of steering column. Pull wormshaft (6) upward, then remove upper bearing race (5) and the ten loose bearing balls (9). Remove wormshaft and ball nut assembly from gear housing as shown in Fig. 5, then remove the ten loose bearing balls from gear housing. Unscrew ball nut assembly from wormshaft and remove the 14 recirculating balls from nut. Tube (11—Fig. 3) can be removed from nut (8) if necessary. Remove lower bearing race (12), spacer (13), bushings (19 and 21) and oil seal (18) from gear housing (26).

To reassemble, proceed as follows: Install new bushings (19 and 21) using piloted drift or bushing driver, then install new seal (18) with lip to inside of gear housing. Install spacer (13) and lower bearing race (12) in gear housing, then stick the ten bearing balls in race with grease. Assemble tube (11) to ball nut (8) if removed, then stick the 14 recirculating balls in tube and groove of nut with grease. Thread ball nut assembly onto wormshaft, then install shaft and nut assembly in gear housing as in Fig. 5. Carefully insert wormshaft into lower bearing to avoid dislodging bearing balls, then while holding shaft in bearing, place upper bearing race over shaft and invert assembly allowing gear housing to rest against end of shaft. Stick the ten bearing balls in upper race with grease, then push bearing assembly up into housing as shown in Fig. 6. While holding against upper bearing, turn assembly upright. Install new bushings (3—Fig. 3) in steering column, then refer



Fig. 4—View of steering gear assembly with side cover removed. Roller moves in slot in side cover.

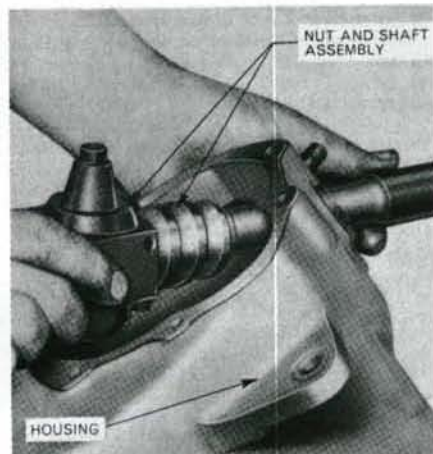


Fig. 5—Removing ball nut and steering shaft assembly from gear housing.

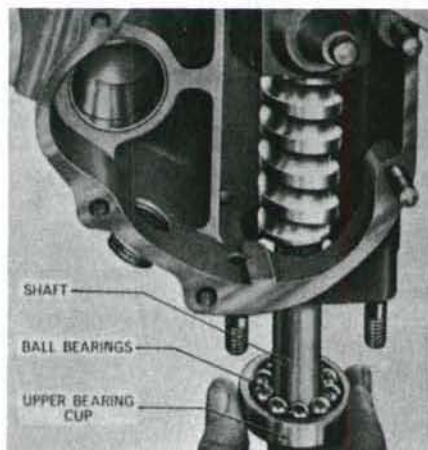


Fig. 6—Installing upper bearing race and ball bearings.

to paragraph 6 for wormshaft adjustment and column installation. Insert rocker shaft and place dust seal (17) on outer end of shaft. Install steering arm (16) and tighten retaining nut to a torque of 150-190 ft.-lbs. (204-258 N·m). Place roller on end of ball nut (Fig. 4) and install side cover with proper shims and gaskets from rocker shaft adjustment as outlined in paragraph 7.

**Late Power Steering Models
5100-7100-5600-5610-6600-
6610-7600-7610**

10. These later power steering models use the integral power assist unit shown schematically in Fig. 8 and exploded in Fig. 9. A piston is built into shaft ball nut and a cylinder machined into gear-case housing; and entire case unit is pressurized by steering oil. Control is by means of a rotary valve which is built into piston and ball nut unit (12) and is not available separately. Pressure passage to top of piston (P) is internal while lower end is pressurized by external flow through pressure tube (24). Manual operation of steering gear is made possible by a check ball (7) located in valve housing which recirculates oil within gear housing when pump is inoperative.

11. REMOVE AND REINSTALL.

To remove steering gear assembly, first disconnect battery ground cable and remove steering wheel. Remove sheet metal covers at each side of steering gear. Remove screws retaining instrument panel, disconnect ground terminal (left side) and rotate panel up and out of opening in cowl. Disconnect wiring and remove instrument panel. Remove light switch and choke (or diesel shut-off cable). On Select-O-Speed models, refer to paragraph 220 for removal of controls. Remove engine hood and cowl. Shut off fuel, disconnect and remove fuel tank. Clean steering gear unit.

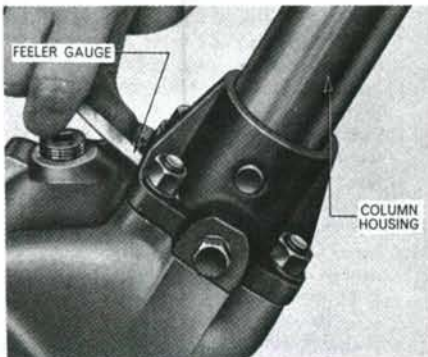


Fig. 7—Measuring clearance between gear housing and steering column housing to determine shim and gasket thicknesses needed. Shim and gasket thickness required between gear housing and side cover is determined in similar manner.

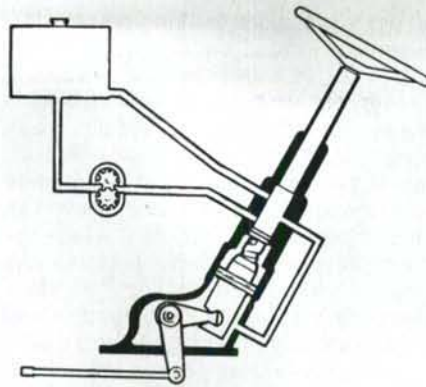


Fig. 8—Schematic view of late power steering gear unit used on some 5100 models and all others except 5200, 6600C, 7600C, 6700, 6710, 7700 and 7710. Steering cylinder is built on ball nut and gear unit is pressurized. Refer to Fig. 9 for exploded view.

Disconnect drag link and pump pressure and return lines, then unbolt and lift off steering gear assembly.

NOTE: On Select-O-Speed models, make sure no dirt or foreign material falls into transmission during removal or while steering gear is off.

To install steering gear, reverse removal procedure. Torque four housing

base bolts to 135-165 ft.-lbs. (184-224 N·m). Use a new transmission housing gasket on Select-O-Speed models. Refill steering gear after complete assembly by cycling power steering, engine running, while keeping pump reservoir filled.

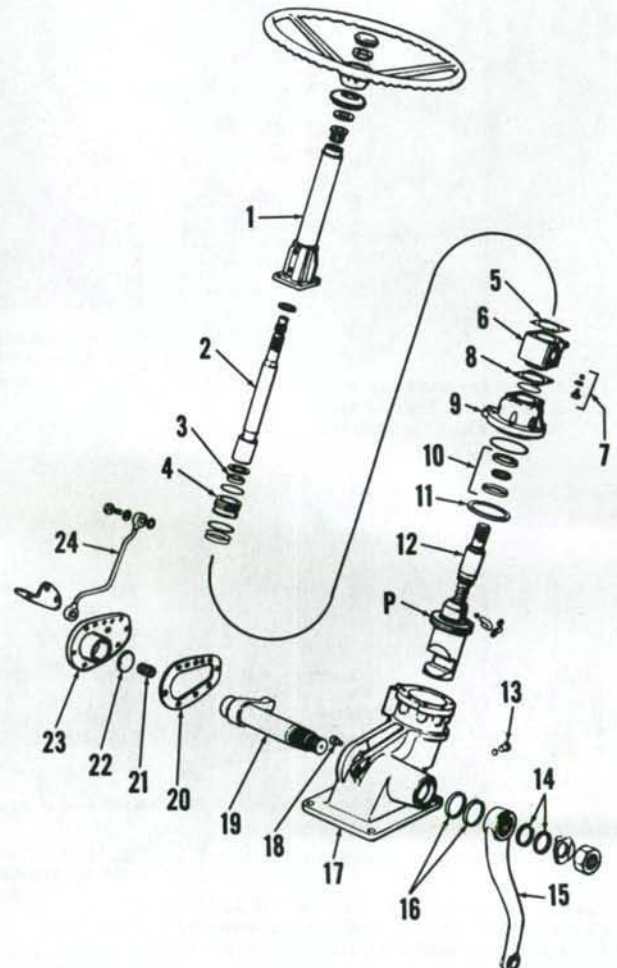
12. OVERHAUL. Before disassembling the removed steering gear, temporarily reinstall steering wheel and disconnect external oil feed pipe (24—Fig. 9). Turn steering wheel from lock to lock several times until as much fluid as possible is pumped from housing.

Remove steering arm (15) using Special Tool 1001 or other suitable puller. Remove side cover (23), gasket (20), and rocker shaft end float shim (22). Turn steering shaft until rocker shaft arm is centered in housing opening as shown in Fig. 10, then withdraw rocker shaft.

Remove the four stud nuts securing steering column (1—Fig. 9) and lift off column and shaft (2). Remove and save shim pack (5). Install oil seal protector sleeve (Tool SW 23/1 or FT.3147) over steering shaft spline as shown in Fig. 11, gently tap valve housing (6) away from

Fig. 9—Exploded view of late power assist steering gear.

- 1. Steering column
- 2. Steering shaft
- 3. Housing seal
- 4. Bushing sleeve
- 5. Shim pack
- 6. Valve housing
- 7. Check valve
- 8. Shim pack
- 9. Bearing housing
- 10. Bearing
- 11. Piston ring
- 12. Ball nut
- 13. Guide peg
- 14. Dust seal
- 15. Steering arm
- 16. Oil seal
- 17. Gear housing
- 18. Wear pin
- 19. Rocker shaft
- 20. Gasket
- 21. Spring
- 22. Float shim
- 23. Side cover
- 24. Pressure tube
- P. Piston



bearing housing (9) and lift off valve housing, saving bearing adjustment shims (8) as valve housing is removed.

Remove cap screws retaining bearing housing (9-Fig. 9); then, turning splined end of steering shaft clockwise, force bearing housing (9) and bearing (10) up and out of ball nut and main gear housing. Shaft bearing (10) contains fifteen 5/16-inch (7.94 mm) diameter loose steel balls which are free to fall as the parts are removed. Bearing balls are interchangeable with the 28 steel balls used in steering nut (N-Fig. 12).

Working through side opening, carefully push ball nut (N), piston and associated parts out of main housing. Note that ball nut is prevented from turning in housing by groove (G) which fits over guide peg (13). Be careful not to damage piston rings (11) as piston is withdrawn. Remove clamp bracket (B), transfer tube and the 28 bearing balls from main nut.

Examine all parts for wear or scoring and make sure parts are thoroughly cleaned. Renew all seals, gaskets and "O" rings when unit is disassembled, as

all parts are under system pressure. "O" rings are located on piston guide peg (13-Fig. 9); also between bushing sleeves in control valve housing as shown in Fig. 13. Carefully push bushings out top end of housing. Seal (3) must be installed from underside (chamfered) end of bushing sleeve (4), using Special Tool SW 23/2 which applies pressure in groove between the two seal lips. Coat sealing "O" rings sparingly with a suitable lubricant and install carefully using Fig. 13 as a guide.

Assemble steering gear as follows: Install piston rings (11-Fig. 12), if removed, and rotate rings until end gaps are 180 degrees apart. Align groove (G) with locating pin (13) and carefully install piston using a suitable ring compressor. Position ball nut assembly so rocker shaft arm slot is aligned with main housing side opening (Fig. 10) and install rocker shaft with spring (21) removed. Temporarily install main hous-

ing side cover (23-Fig. 9), using a new gasket (20) but omitting end float shim (22) at this time. Install and tighten side cover retaining cap screws to 35-45 ft.-lbs. (48-61 N·m); then using a dial indicator, measure and record rocker shaft end float. Remove side cover then reassemble, installing spring (21) and an end float shim (22) which most nearly equals measured end float minus 0.008 inch (0.203 mm). Shims (22) are available in thicknesses of 0.050, 0.060 and 0.080 inch (1.27, 1.52 and 2.03 mm). Retighten side cover cap screws to 35-45 ft.-lbs. (48-61 N·m).

Turn rocker shaft until ball nut and piston unit is at top of its stroke. Install wormshaft and lower half of transfer tube as shown in Fig. 14, then feed in the 28 bearing balls using clean grease. Install upper half of transfer tube and clamp bracket (B-Fig. 12).

Install bearing housing (9-Fig. 9) and tighten retaining cap screws to a torque of 15-20 ft.-lbs. (20-27 N·m). Slide lower race of bearing (10) into bearing housing bore, grooved side up, then install the 15 steel balls in bearing groove using clean grease.

Position Oil Seal Protector Sleeve (SW 23/1 or FT.3147) over shaft splines as shown in Fig. 15; then, omitting bearing adjusting shim pack (8-Fig. 9), install control valve housing. Tap housing lightly into place until it bottoms and, using a feeler gage, measure clearance between bearing housing and valve housing as shown in Fig. 15. Install a shim pack (8-Fig. 9) equal to measured clearance minus 0.003 inch (0.076 mm). Shims (8) are available in thicknesses of 0.005, 0.010 and 0.025 inch (0.127, 0.254 and 0.635 mm). Shim pack must be accurate to within 0.0015 inch (0.0381 mm). Shim pack (8) controls preload of worm gear bearing (10).

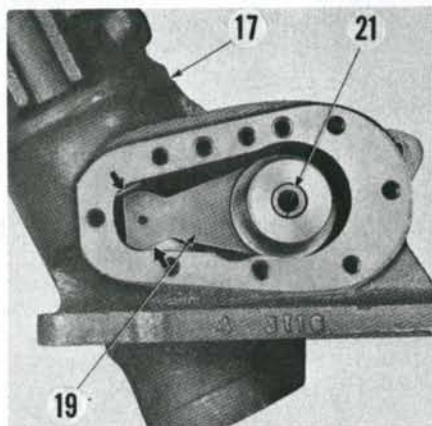


Fig. 10-Rocker shaft can be withdrawn when arm is centered in housing openings as shown. Refer to Fig. 9 for parts identification.

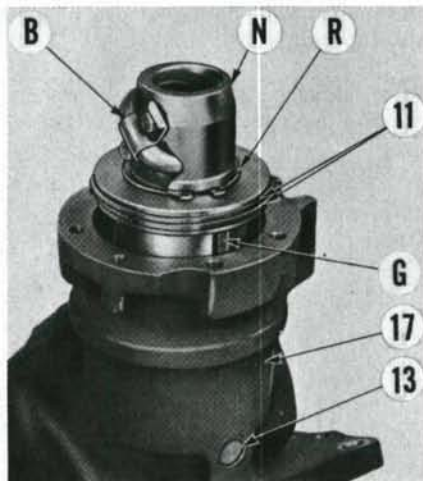


Fig. 12-Partially disassembled view of steering gear. Refer to Fig. 9 for parts identification except for the following:

- | | |
|--------------------|--------------|
| B. Clamp bracket | N. Ball nut |
| G. Locating groove | R. Snap ring |

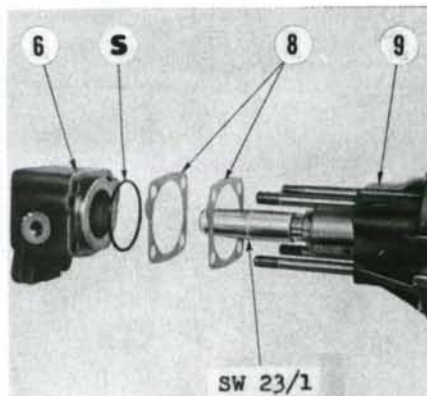


Fig. 11-Oil seal protector sleeve (SW 23/1 or FT.3147) should be used as shown. Refer to Fig. 9 for parts identification except for "O" ring seal (S).

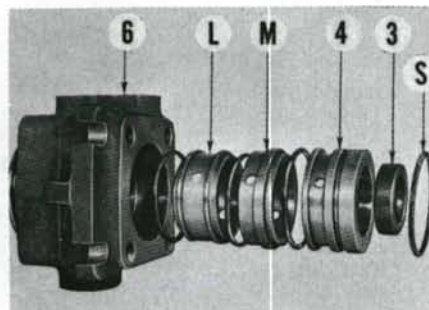


Fig. 13-Control valve housing partially disassembled, showing location of bushing sleeves and "O" ring seals.

- | | |
|-------------------|------------------|
| 3. Oil seal | L. Lower sleeve |
| 4. Bushing sleeve | M. Middle sleeve |
| 6. Valve housing | S. "O" ring |

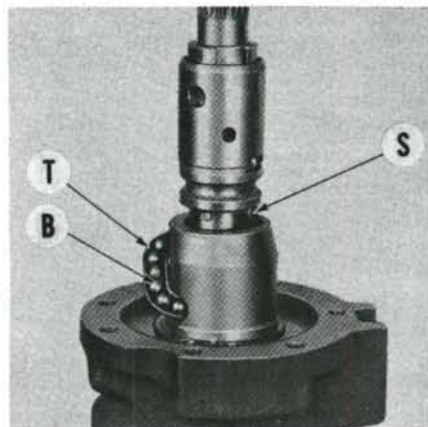


Fig. 14-With piston at top of stroke, install worm shaft (S) and lower half of transfer tube (T), then feed in the 28 loose balls (B) using clean grease. Refer to text.

With bearing preload correctly adjusted, assemble and install steering column, upper steering shaft and bearing washer. Omit shim pack (5) on trial assembly. Make sure steering column is bottomed on steering shaft splines; then measure clearance between steering column flange and valve housing as shown in Fig. 16. Install shim pack (5—Fig. 9) equal to measured clearance PLUS 0.005 inch (0.127 mm). Shim (5) is available in 0.005 inch (0.127 mm) thickness only. Tighten steering column stud nuts to a torque of 25-30 ft.-lbs. (34-41 N·m). Complete assembly by reversing disassembly procedure. Tighten external feed line banjo bolts to 25-30 ft.-lbs. (34-41 N·m), steering arm nut to 300-350 ft.-lbs. (408-476 N·m) and steering wheel nut to 60-80 ft.-lbs. (82-109 N·m). Install steering gear unit as outlined in paragraph 11.

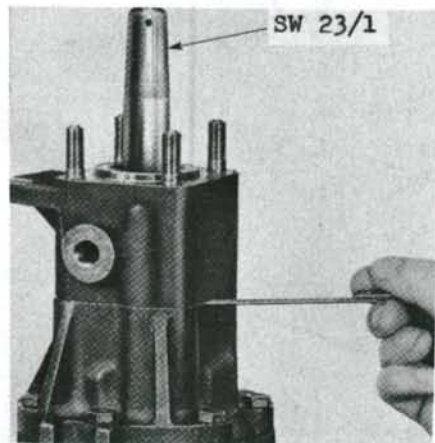


Fig. 15—Using protector sleeve (SW 23/1 or FT.3147), install and bottom valve housing without shims; then measure shim pack thickness as shown. Install shims equal to measured clearance minus 0.003 inch (0.0076 mm).

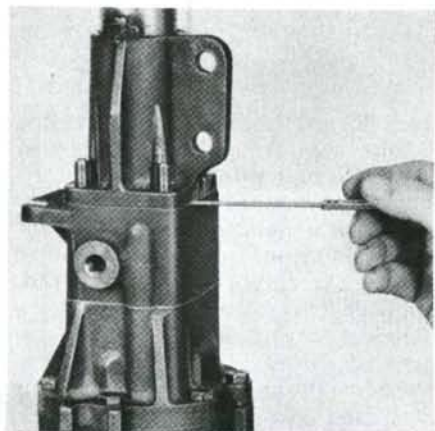


Fig. 16—Make sure steering column is bottomed in steering shaft splines, then measure clearance for upper shim pack as shown. Install shims equal to measured clearance PLUS 0.005 inch (0.125 mm).

FLUID AND BLEEDING

All Models

CAUTION: The maintenance of absolute cleanliness of all parts is of the utmost importance in the operation and servicing of the hydraulic power steering system. Of equal importance is the avoidance of nicks or burrs on any of the working parts.

13. Recommended power steering fluid is Ford M-2C41A oil. Maintain fluid level to full mark on dipstick on early models with separate reservoir; or bottom of filler neck on late models with integral pump and reservoir. After each 600 hours of operation, it is recommended that filter element and fluid be changed and reservoir cleaned.

The power steering system is self-bleeding. When unit has been disassembled, refill reservoir to full level, start and idle engine, and refill if level lowers. Cycle steering gear by turning steering wheel at least five times from lock to

lock, maintaining fluid level at or near full mark. System is fully bled when no more air bubbles appear in reservoir and fluid level ceases to lower.

14. **SYSTEM PRESSURE AND FLOW.** Power steering system pressure should be 1050-1150 psi (7.25-7.94 Mpa) for all models.

Early models with separate steering system reservoir were equipped with a flow control valve which maintained a regulated fluid flow of 3.5 gpm (13.25 liters/min.) at 1000 engine rpm. On late model pumps with integral reservoir used on Models 5600, 6600 and 7600, a flow control valve is not used and normal pump flow at 1000 engine rpm is 2.74 gpm (10.37 liters/min.). Normal pump flow at 1000 engine rpm on Models 5610, 6610 and 7610 is 3.6 gpm (13.6 liters/min.).

On all models, pressure and flow can be checked by teeing into pump pressure line. On early models, pressure relief valve cap plug (7—Fig. 17) is externally located and pressure can be adjusted

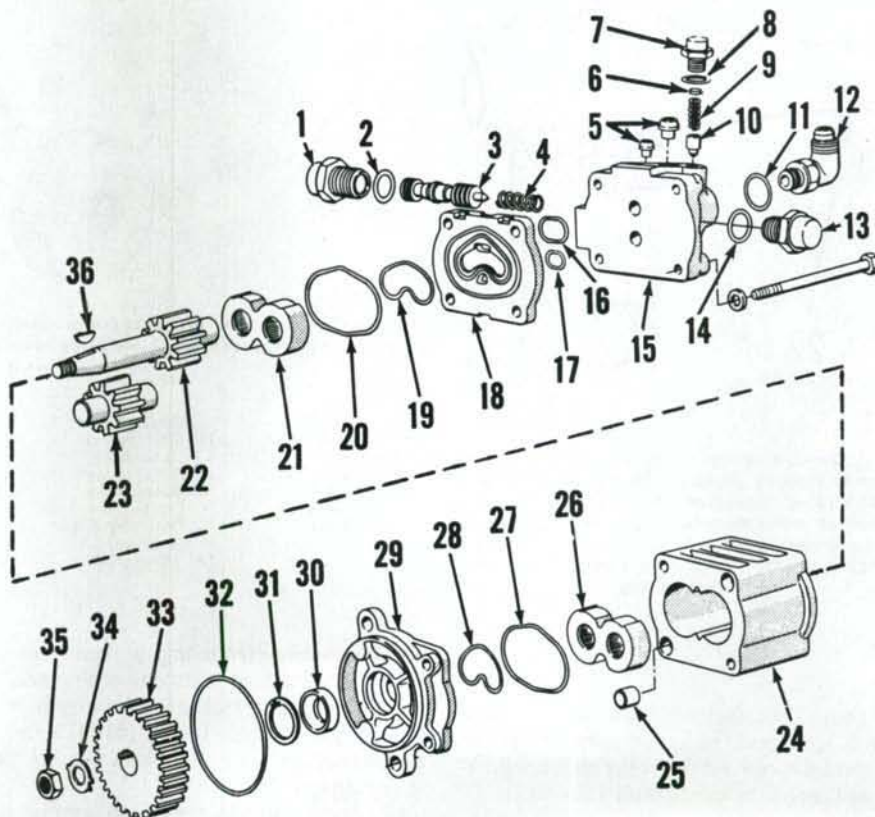


Fig. 17—Exploded view of early power steering pump. Note that flow control valve spring (4) and small tip end of valve (3) is towards side of rear cover (15) containing relief valve assembly (Items 6 through 10).

- | | | | |
|---------------------------|---------------------|----------------------------|----------------------------------|
| 1. Cap plug | 11. Seal ring | 20. Outer seal ring | 29. Front cover |
| 2. "O" ring | 12. Bearing block | 21. Bearing block | 30. Seal (except rowcrop models) |
| 3. Flow control valve | 13. Cap plug | 22. Drive gear & shaft | 31. Locating ring |
| 4. Spring | 14. "O" ring | 23. Driven gear & shaft | 32. "O" ring |
| 5. Tubing seats | 15. Rear cover | 24. Pump body | 33. Drive gear |
| 6. Shims | 16. "O" ring | 25. Bolt (dowel) rings (2) | 34. Tab washer |
| 7. Cap plug | 17. "O" ring | 26. Bearing block | 35. Nut |
| 8. "O" ring | 18. Rear plate | 27. Outer seal ring | 36. Woodruff key |
| 9. Spring | 19. Inner seal ring | 28. Inner seal ring | |
| 10. Pressure relief valve | | | |