

SHOP MANUAL FORD

MODELS 3230, 3430, 3930, 4630, 4830

The tractor identification plate is located under the tractor hood. Serial and model numbers of the tractor, engine, transmission, rear axle, hydraulic pump and the hydraulic lift are recorded on this identification plate. If equipped with Front-Wheel Drive, a similar plate is attached to the rear surface of the front drive axle housing.

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CONDENSED SERVICE DATA

	3230	3430	3930	4630	4830
GENERAL					
Engine Make			Own		
Number of Cylinders.....	3	3	3	3	4
Bore.....			111.8 mm (4.4 in.)		
Stroke.....	106.7 mm (4.2 in.)	106.7 mm (4.2 in.)	111.8 mm (4.4 in.)	111.8 mm (4.4 in.)	106.7 mm (4.2 in.)
Displacement	3147 cc (192 cid)	3147 cc (192 cid)	3294 cc (201 cid)	3294 cc (201 cid)	4186 cc (256 cid)
Compression Ratio.....			16.3:1		
Firing Order.....	1-2-3	1-2-3	1-2-3	1-2-3	1-3-4-2
Valve Clearance (Cold):					
Inlet			0.36-0.46 mm (0.014-0.018 in.)		
Exhaust			0.43-0.48 mm (0.017-0.019 in.)		
Valve Face Angle, Degrees					
Inlet and Exhaust			44.25-44.5		
Valve Seat Angle, Degrees					
Inlet and Exhaust			45-45.5		

CONDENSED SERVICE DATA (Cont.)

	3230	3430	3930	4630	4830
GENERAL (Cont.)					
Injection Timing			See Paragraph 88		
Engine Low Idle, rpm	600-700	600-850	600-850	600-850	600-850
Engine High Idle, rpm			See Paragraph 92		
Engine Rated Speed, rpm	2000	2000	2000	2200	2200
Battery Terminal Grounded			Negative		
SIZES					
Crankshaft Main Journal Diameter. .			See Paragraph 62		
Crankshaft Crankpin Diameter			See Paragraph 61		
Camshaft Journal Diameter			See Paragraph 54		
Piston Pin Diameter			38.092-38.100 mm (1.4997-1.5000 in.)		
Valve Stem Diameter-					
Inlet			9.426-9.444 mm (0.3711-0.3718 in.)		
Exhaust			9.400-9.418 mm (0.3701-0.3708 in.)		
CLEARANCES					
Main Bearing Diametral Clearance ..			See Paragraph 62		
Rod Bearing Diametral Clearance - Copper-Lead Material			0.043-0.096 mm (0.0017-0.0038 in.)		
Aluminum-Tin Alloy			0.053-0.107 mm (0.0021-0.0042 in.)		
Camshaft Bearing Diametral Clearance			0.025-0.076 mm (0.001-0.003 in.)		
Crankshaft End Play			0.10-0.20 mm (0.004-0.008 in.)		
Piston Skirt to Cylinder Clearance			0.069-0.094 mm (0.0027-0.0037 in.)		
CAPACITIES					
Cooling System-					
With Cab & Heater	11.4 L (12 qts.)	11.4 L (12 qts.)	11.4 L (12 qts.)	11.6 L (13 qts.)	13.5 L (14 qts.)
Without Cab	10.4 L (11.2 qts.)	10.4 L (11.2 qts.)	10.4 L (11.2 qts.)	10.4 L (11.2 qts.)	12.5 L (13.2 qts.)
Crankcase With Filter	6.6 L (7 qts.)	6.6 L (7 qts.)	6.6 L (7 qts.)	6.6 L (7 qts.)	7.7 L (8 qts.)
Transmission, Constant Mesh (8 × 2)			12 L* (3.2 gal.*)		
Transmission, Synchronized (8 × 8)			9.4 L (2.5 gal.)		
Transmission, Synchronized with Dual Power (16 × 8)			8.4 L (2.2 gal.)		

CONDENSED SERVICE DATA (Cont.)

	3230	3430	3930	4630	4830
CAPACITIES (Cont.)					
Final Drive & Hydraulic, with Constant Mesh Transmission			45.7 L** (12 gals.**)		
Final Drive & Hydraulic, with Synchronized Transmission			32.5 L** (8.5 gals.**)		
Steering Gear, Manual			0.6 L (1.3 pints)		
Hydrostatic Steering			2.2 L (2.3 qts.)		
Front Drive Axle Hubs (Each Side)			0.9 L (1 qt.)		
Front Drive Axle Housing			5.5 L (5.8 qts.)		

* Add 3 liters (3.3 qts.) if equipped with reduction (creeper) gearbox.

** Add 1.4 liters (1.5 qts.) if equipped with four-wheel drive.

DUAL DIMENSIONS

This service manual provides specifications in both the Metric (SI) and U.S. Customary 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; the second specification (given in parentheses) is the converted measurement. For instance, a specification of "0.28 mm (0.011 inch)" would indicate that we feel the preferred measurement, in this instance, is the metric system of measurement and the U.S. system equivalent of 0.28 mm is 0.011 inch.

FRONT AXLE SYSTEM (TWO-WHEEL DRIVE)

FRONT AXLE ASSEMBLY AND STEERING LINKAGE

Two-Wheel-Drive Models

1. WHEELS AND BEARINGS. To remove front wheel hub and bearings, raise and support the front axle extension, then unbolt and remove the tire and wheel assembly. Remove cap (13—Fig. 1), cotter pin (12), slotted nut (11), washer (10) and outer bearing cone (8). Slide hub assembly from spindle axle shaft. Remove grease retainer (2) and inner bearing cone (3). Hub is slotted to facilitate removal of bearing cups (5 and 7). Pack wheel bearings liberally with Ford M1C137-A, M1C75-B or equivalent grease. Reassemble by reversing disassembly procedure. Grease retainer (2) and inner bearing cone (3) should be positioned on spindle. Tighten slotted nut (8) to a torque of 27-40 N·m (20-30 ft.-lbs.), then rotate hub several turns. Retighten nut (8) to 61-74 N·m (45-50 ft.-lbs.), then back nut off less than two flats and install cotter pin (12). Be sure to install cap (13) securely.

2. TIE ROD, DRAG LINK AND TOE-IN. Models without hydrostatic steering are equipped with one drag link from the steering gear arm to the steering arm of the left spindle. A tie (connecting) rod connects the steering arms of the left and right spindles. Mod-

els with hydrostatic steering are equipped with one tie rod extending between left and right steering arms. The hydrostatic steering cylinder is attached between the front axle and the center of the tie rod. On all models, ends of tie rod, drag link and steering cylinder are automotive-type and should be renewed if wear is excessive. The procedure for removing and installing the ends is self-evident.

Recommended toe-in is 0-13 mm (0-1/2 inch) for all models. Spindle arms and axle extensions are marked as shown at (M—Fig. 2) to assist setting toe-in. To adjust length of tie rod when changing axle width, remove track adjusting screws (13—Fig. 3), slide rod inside tube until the appropriate hole is aligned, then install screw (13). To make small toe-in adjustments, loosen clamp bolt (B), remove screw (13), then turn the threaded section (T) until toe-in is correct. Reinstall screw (13) and tighten clamp bolt. On models with drag link, remove bolt from clamp (9—Fig. 4) and extend or retract drag link as required to correspond to axle width, then reinstall clamp bolt.

On all models, clamp bolts (B—Fig. 3) in tie rod ends (used to adjust toe-in) should be tightened to 45 N·m (33 ft.-lbs.) torque. Track adjusting screws (13) should be tightened to 105 N·m (78 ft.-lbs.) torque. Drag link adjusting clamp bolt should be tightened to 13 N·m (9 ft.-lbs.) torque if equipped with manual steering; 35 N·m (25 ft.-lbs.) torque if equipped with power steering. Tighten the track adjusting clamp screws (28—Fig. 4 or Fig. 5) that attach axle extensions inside the axle center section to 210 N·m (155 ft.-lbs.) torque.

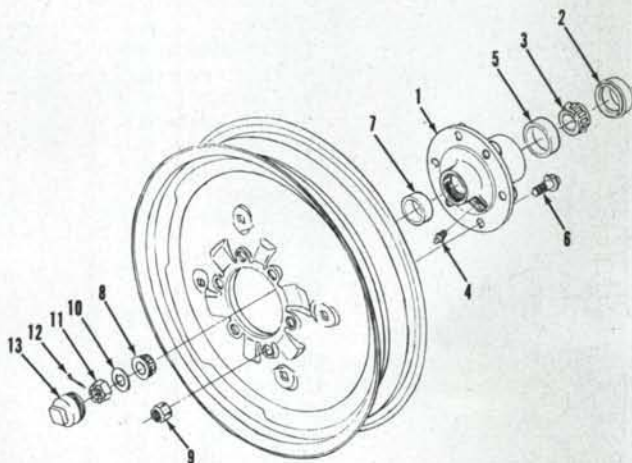


Fig. 1—Exploded view of front wheel hub used on two-wheel-drive models.

- | | |
|-----------------------|-----------------------|
| 1. Hub | 8. Outer bearing cone |
| 2. Grease retainer | 9. Wheel lug |
| 3. Inner bearing cone | 10. Tang washer |
| 4. Grease fitting | 11. Slotted nut |
| 5. Inner bearing cup | 12. Cotter pin |
| 6. Wheel stud | 13. Cap |
| 7. Outer bearing cup | |

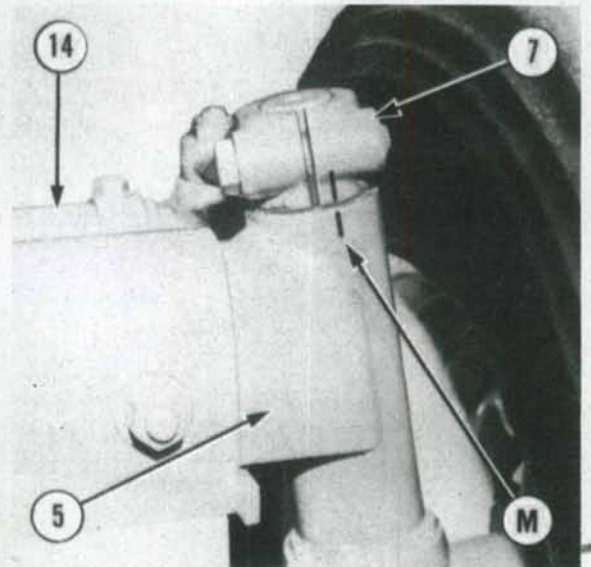


Fig. 2—Marks (M) are provided on the axle extensions and the steering arms to assist in setting toe-in.

3. SPINDLES, AXLE EXTENSIONS AND BUSHINGS.

To remove spindle (1—Fig. 4 or Fig. 5), first remove the wheel and hub. Disconnect tie rod end from steering arm (7 or 18). On models with manual or power steering, detach drag link if left side is being removed. On all models, remove clamp screw from steering arm, then remove steering arm. Remove key (2) and washers (6) from top of spindle, then lower spindle out of axle extension (5). Remove thrust bearing (3) from spindle. Clean and inspect parts for wear or other damage and renew as necessary.

When reassembling, install thrust bearing (3) on spindle so that numbered side of bearing is facing upward and insert spindle through axle extension. Install washer (6) and key (2), then locate steering arm on top of spindle. Tighten steering arm retaining clamping screw to a torque of 170 N·m (125 ft.-lbs.) for models with cab, 65 N·m (50 ft.-lbs.) torque for models without. Refer to paragraph 2 for track and toe-in adjustment and recommended torques. Balance of reassembly is the reverse of disassembly.

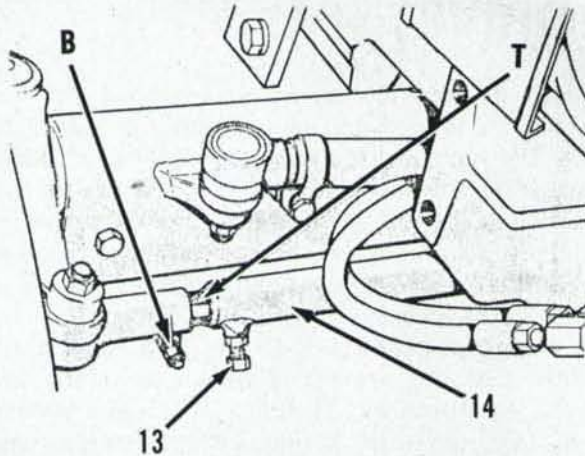


Fig. 3—View of track and toe-in adjusting points for two-wheel-drive models. Hydrostatic steering model is shown, but adjustment is similar for models with manual or power steering.

- B. Clamp bolt
- T. Threaded rod
- 13. Track bolt
- 14. Tie rod tube

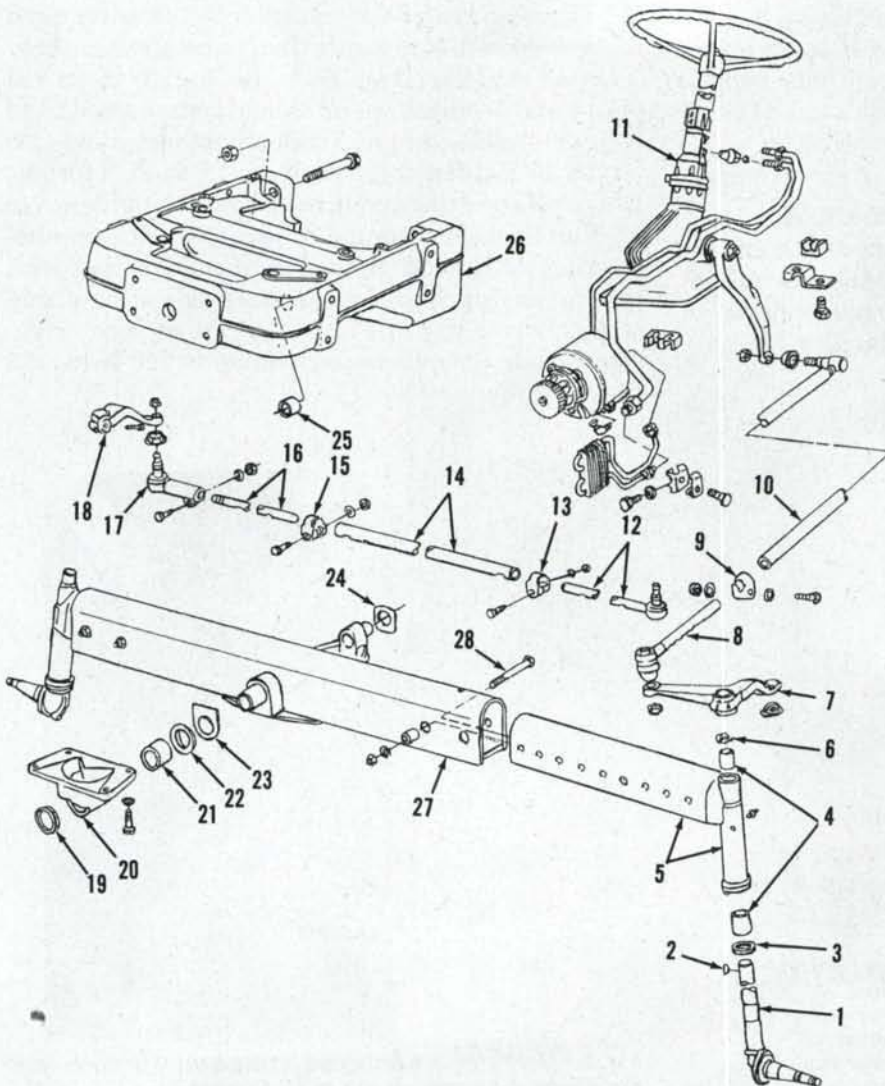


Fig. 4—Exploded view of row crop, two-wheel-drive front axle, typical of models with power steering (shown) and manual steering.

- 1. Spindle
- 2. Woodruff key
- 3. Thrust bearing
- 4. Bushings
- 5. Axle extension
- 6. Seal
- 7. Left steering arm
- 8. Drag link end
- 9. Clamp
- 10. Drag link tube
- 11. Steering gear
- 12. Tie rod end
- 13. Clamp
- 14. Tie rod tube
- 15. Clamp
- 16. Tie rod adjusting rod
- 17. Tie rod end
- 18. Right steering arm
- 19. Washer
- 20. Axle pivot bracket
- 21. Bushing
- 22. Shim
- 23. Washer
- 24. Washer
- 25. Pivot bushing
- 26. Front support
- 27. Axle center member
- 28. Track bolt

4. AXLE CENTER MEMBER, PIVOT PIN AND BUSHINGS. To remove front axle assembly, raise front of tractor in such a way that it will not interfere with the removal of the axle. A hoist may be attached to front support or special stands can be attached to sides. Removal of the axle center member may be easier if the axle extension and spindle assembly is first removed from each side; however, the complete assembly can be removed as a unit. Remove front wheels and weights, then support the axle with a suitable jack or special safety stand to prevent tipping while permitting the axle to be lowered and moved safely. Disconnect drag link from steering arm of models without hydrostatic steering. On models with hydrostatic steering, disconnect hoses from steering cylinder and cover openings to prevent entry of dirt. On all models, unbolt and remove pivot bracket (20—Fig. 4 or Fig. 5). Move axle forward until axle rear pivot is free from pivot in front support (26). Lower axle assembly and carefully roll axle away.

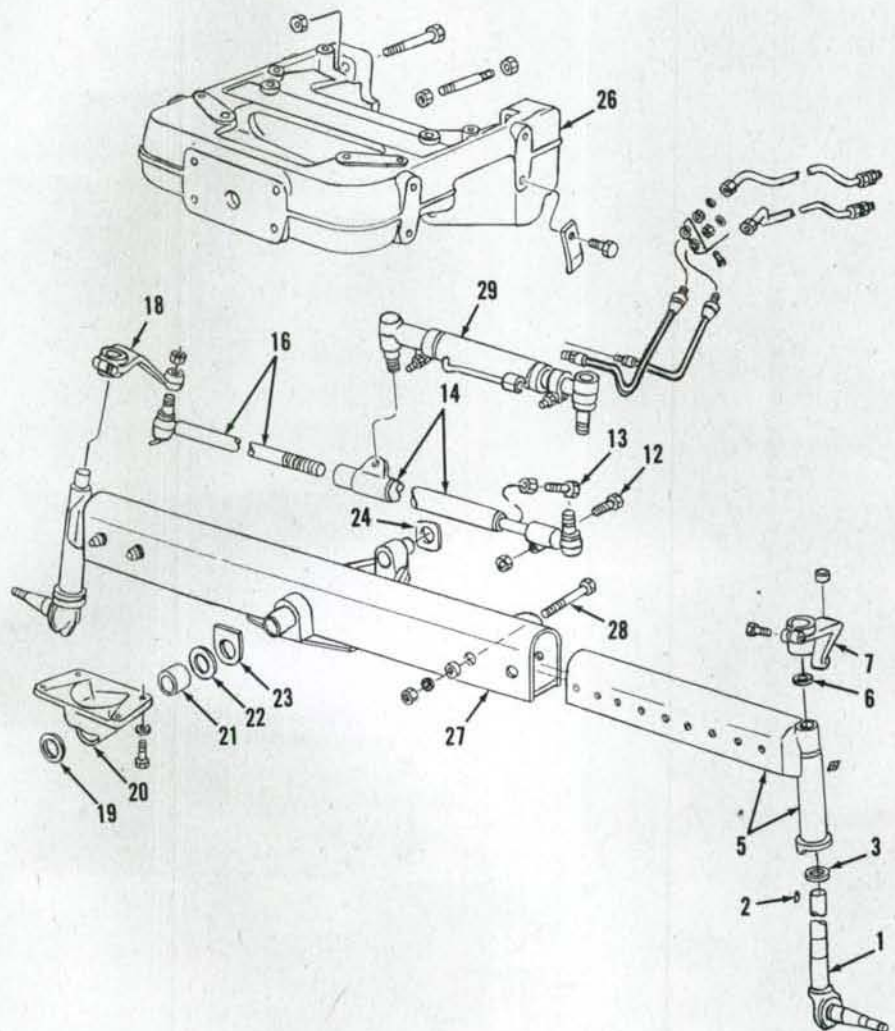
Check axle pivot bushings and renew if necessary. Reverse removal procedure when assembling. Tighten screws retaining the axle pivot bracket (20)

to 90 N·m (65 ft.-lbs.) torque. End clearance of axle center member should be 0.254 mm (0.010 inch) and is adjusted by changing thickness of shim (22).

5. FRONT SUPPORT. To remove the front support, the axle must be removed, the radiator must be removed from the support and the front support must be unbolted from the front of engine. The front axle, the front support and the remainder of the tractor must each be supported separately while removing, while separated and while assembling. Be sure that sufficient equipment is available before beginning.

Remove hood, drain cooling system and disconnect radiator hoses. Disconnect air inlet hose from the front-mounted air cleaner. Remove the grille and disconnect lines from oil coolers, if so equipped. Disconnect battery ground cable and wires to the headlights. Unbolt radiator shell upper support bracket from the shell. Disconnect steering linkage and steering hoses that would interfere with removal of the front axle or the front support. Support front of tractor in such a way that it will not interfere with removal of either the front support or the front axle.

Fig. 5—Exploded view of two-wheel drive, row crop front axle used with hydrostatic steering. Refer to Fig. 4 for legend except clamp bolt (12), track adjusting screw (13) and steering cylinder (29).



Paragraph 6

FORD

Remove axle as outlined in paragraph 4. Attach a hoist or other supporting device to the front support, then unbolt and separate front support from front of engine.

Reattach front support to engine. Tighten retaining screws to 339-420 N.m (250-310 ft.-lbs.) for models with stamped oil pan; to 240-298 N.m (180-220

ft.-lbs.) torque for models with cast oil pan. Complete assembly by reversing removal procedure.

6. STEERING GEAR. Refer to paragraph 18 for manual steering gear or 23 for the power steering gear. Refer to paragraph 30 and following for testing and service to the hydrostatic steering system used on some models in place of a gear unit.

FRONT-WHEEL DRIVE

7. The mechanical front-wheel drive available on these models uses a front drive axle unit manufactured by Carraro. There are some differences between the front-wheel drive systems used on these models, which will be referred to in the following servicing instructions.

The transfer gearbox is engaged on some models by moving mechanical linkage shown in Fig. 18. On 4630 and 4830 models, engagement is controlled by an electric solenoid/hydraulic valve that directs oil pressure to move the dog clutch (35—Fig. 20) and engage the front-wheel drive. The transfer gearbox is attached to the bottom of the rear axle center housing of all models. A drive shaft with two “U” joints connects the transfer gearbox to the front axle.

TIE RODS AND TOE-IN

All Models So Equipped

8. Tie rod ends may be one of several different types, but none are adjustable for wear; faulty units must be renewed.

To check toe-in, first turn steering wheel so front wheels are in straight-ahead position. Measure distance at front and rear of front wheels from rim flange to rim flange at hub height. Toe-in should be 0-6 mm (0-1/4 inch).

To adjust toe-in of narrow tread models, loosen the lock nuts at each end of the tie rod, then turn the tie rod tube to set the toe-in. Tighten lock nuts at each end when adjustment is correct.

To adjust toe-in of all other models (standard tread four-wheel drive), loosen clamp bolt (2—Fig. 6), then

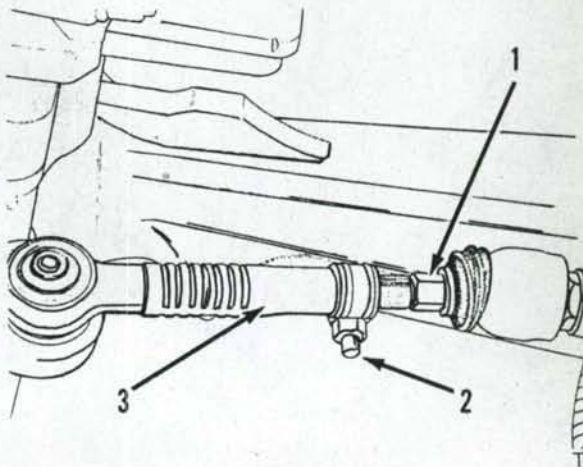


Fig. 6—View of toe-in adjustment points for four-wheel-drive models. Be sure to adjust both sides equally.

- 1. Adjuster
- 2. Clamp bolt
- 3. Tie rod end

turn tie rod (1) in or out of tie rod end (3) as required. Adjust both sides evenly. When adjustment is correct, tighten clamp bolt (2) to 25 N.m (18 ft.-lbs.) torque.

DRIVE SHAFT

All Models So Equipped

9. REMOVE AND REINSTALL. Standard and waterproof drive shafts have been installed. Refer to Fig. 7 or Fig. 8 and the appropriate following paragraphs.

To remove the standard drive shaft, first unbolt and remove the shield assembly (1—Fig. 7). Remove clamp bolts (3) from coupling, unbolt center bearing (9) from bracket, then slide couplings onto drive shaft and remove shaft. Grease couplings through fittings

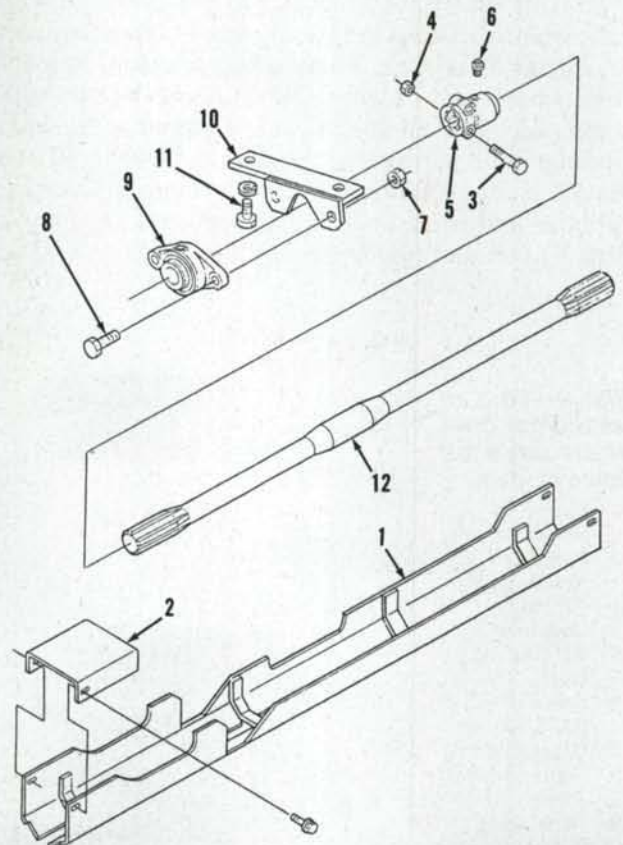


Fig. 7—View of drive shaft and shield used on most four-wheel-drive models. Waterproof drive shaft is shown in Fig. 8.

- 1. Shield
- 2. Cover
- 3. Clamp screw
- 4. Nut
- 5. Coupling
- 6. Grease fitting
- 7. Nut
- 8. Screw
- 9. Center bearing
- 10. Center bracket
- 11. Screw
- 12. Drive shaft

Paragraph 10

(6) after assembling. Tighten coupling clamp bolts (3 and 4) to 60 N·m (44 ft.-lbs.) torque.

To remove waterproof drive shaft, first clean the four parts of drive shaft housing (1, 2 and 13—Fig. 8) thoroughly. Unbolt front and rear sections (2) and slide front and rear sections onto center parts (1 and 13). Drive pins (3) from front and rear couplings (5), then slide couplings onto drive shaft. Unbolt center bearing housing (16) and drive shaft housings (1 and 13) from bracket (10), and remove shaft and housing. Grease caps and shields (14) and "O" rings (6 and 15) before assembling. Tighten screws (S) to 352 N·m (260 ft.-lbs.) torque and center bearing attaching bolts (7 and 8) to 57 N·m (42 ft.-lbs.) torque.

13) and drop housing (17). Lower axle until free, then carefully roll axle away.

Reinstall front drive axle by reversing the removal procedure. Tighten screws attaching front pivot (1) and drop housing (17) to 325 N·m (240 ft.-lbs.) torque.

FRONT DRIVE AXLE

All Models So Equipped

10. R&R ASSEMBLY. First remove drive shaft and shield as outlined in paragraph 9. Raise front of tractor in such a way that it will not interfere with axle removal. A hoist may be attached to front support or special stands can be attached to sides. Remove front wheels and weights, then support the axle with a suitable jack or special safety stand to prevent tipping while permitting the axle to be lowered and moved safely. Disconnect hoses from the steering cylinder and cover openings to prevent the entry of dirt. Unbolt and remove front pivot bracket (1—Fig.

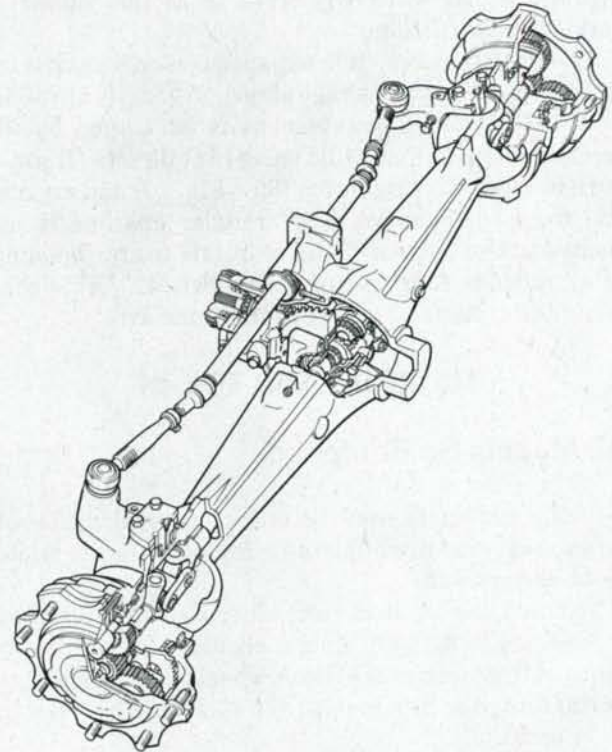


Fig. 9—Cross section of standard tread front drive axle.

Fig. 8—View of waterproof drive shaft used on some models.

- 1. Shield
- 2. Shield
- 3. Spiral pin (6 x 50 mm)
- 4. "O" ring
- 5. Coupling
- 6. "O" ring
- 7. Nut
- 8. Screw (M8 x 70)
- 9. Center bearing
- 10. Center bracket
- 11. Screw
- 12. Drive shaft
- 13. Shield
- 14. Cap & shield assy.
- 15. "O" rings
- 16. Center bearing support

