SERVICE DATA

	500 Diesel	600 Diesel	600 LP-Gas	900B Diesel	900B LP-Gas
GENERAL					
Engine Make	Own	Own	Own	Own	Own
Engine Model	500	600	600	377	377
Cylinders	6	6	6	6	6
Bore—Inches	4	4	4	4	4
Stroke—Inches	5	5	5	5	5
Displacement—Cubic Inches	377	377	377	377	377
Compression Ratio	15:1	15:1	7.5:1	15:1	7.5:1
Pistons Removed From:	Above	Above	Above	Above	Above
Main Bearings, Number of	7	7	7	7	7
Main Bearings, Adjustable?	No	No	No	No	No
Rod Bearings, Adjustable?	No	No	No	No	No
Cylinder Sleeves	Wet	Wet	Wet	Wet	Wet
Forward Speeds	4	6	6	6	6
Generator Make	Auto-Lite			Auto-Lite or Delco-Remy	
Starter Make	Auto-Lite			Auto-Lite or Delco-Remy	
TUNE-UP					
Firing Order	1-5-3-6-2-4		1-5-3-6-2-4	1-5-3-6-2-4	
Valve Tappet Gap—Inlet	0.012C	0.012C	0.012C	0.012C	0.012C
Valve Tappet Gap—Exhaust	0.012C	0.012C	0.020C	0.012C	0.020C
Inlet Valve Face Angle—Degrees	45	45	45	45	45
Exhaust Valve Face Angle—Degrees	45	45	45	45	45
Inlet Seat Angle—Degrees	45	45	45	45	45
Exhaust Seat Angle—Degrees	45	45	45	45	45
Ignition Distributor Model (Auto-Lite) (Wico)					IAD 6010-1 DB6 X30170
Ignition Timing, Retard (Dist.)					2°BTDC
Ignition Timing, Advance (Dist.)					26°BTDC
Breaker Contact Gap (Dist.)					0.018-0.022
Ignition Magneto Make			Own		Own
Ignition Magneto Model			601		601
Ignition Timing, Retard (Mag.)			3° BTDC		3° BTDC
Ignition Timing, Advanced (Mag.)			23° BTDC		23° BTDC
Breaker Contact Gap (Mag.)			0.008-0.012		0.008-0.012
Timing Mark Location			Crankshaft Pulley		
Spark Plug Make			AC/Champ		AC/Champ
Model, Champion			8 Comm.		8 Comm.
Model, AC			855 Comm.		855 Comm.
Electrode Gap			0.025		0.025
Carburetor Make, LP-Gas			Ensign		Ensign
Carburetor Model, LP-Gas			Kgl.		Kgl.
Engine Low Idle—rpm	600	600	600	600	600
Engine High Idle—rpm	1500	1635	1500	1635	1500
Engine Loaded—rpm	1350	1500	1350	1500	1350
Belt Pulley Low Idle—rpm	425	378	377	378	377
Belt Pulley High Idle—rpm	1062	1029	945	1029	945
Belt Pulley Loaded—rpm	956	944	850	944	850
PTO Low Idle—rpm	240	219	240	219	240
PTO High Idle—rpm	600	598	600	598	600
PTO Loaded—rpm	540	549	540	549	540
SIZES—CAPACITIES—CLEARANCES (Clearances in Thousandths)					
Crankshaft Journal Diameter	2.998-2.999		2.998-2.999	2.998-2.999	
Crankpin Diameter	2.748-2.749		2.748-2.749	2.748-2.749	
Rod Center to Center, Length	10.5	10.5	10.5	10.5	10.5
Camshaft Journal Diameter	2.121-2.122		2.121-2.122	2.121-2.122	
Piston Pin Diameter	1.3583-1.3586		1.3583-1.3586	1.3583-1.3586	
Valve Stem Diamter—Exhaust	*	.400-.401	.400-.401	.400-.401	.400-.401
Valve Stem Diameter—Inlet	.402-.403	.402-.403	.402-.403	.402-.403	.402-.403
Compression Ring—Width	3/32	3/32	3/32	3/32	3/32
Oil Ring—Width	1/4	1/4	1/4	1/4	1/4
Main Bearings, Diameter Clearance	1.6-4.6	1.6-4.6	1.6-4.6	1.6-4.6	1.6-4.6
Rod Bearings, Diameter Clearance	1.3-3.8	1.3-3.8	1.5-3.6	1.3-3.8	1.5-3.6
Desired Piston Skirt Clearance	3.5-4.5	4.5-5.5	3.5-4.5	4.5-5.5	3.5-4.5
Crankshaft End Play	4-12	4-12	4-12	4-12	4-12
Camshaft Bearing Clearance	1.4-5.4	1.4-5.4	1.4-5.4	1.4-5.4	1.4-5.4
Cooling System—Gallons	14	14	14	14	14
Crankcase Oil, Including Filter—Quarts	14	14	14	14	14
Transmission and Differential—Quarts	63	64	64	64	64
Hydraulic System Reservoir—Quarts	14	14	14	14	14
Power Steering—Quarts	2	2	2	2	2

*See Paragraph 377

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SERVICE DATA (Continued)

TIGHTENING TORQUES—FOOT POUNDS	500 Diesel	600 Diesel	600 LP-Gas	900B Diesel	900B LP-Gas
Camshaft Nut	123-127	123-127	123-127	123-127	123-127
Rod Bearing Screws	95-105	95-105	95-105	95-105	95-105
Crankshaft Pulley Bolt	98-102	98-102	98-102	98-102	98-102
Cylinder Head Cover	5 Maximum	5 Maximum	5 Maximum	5 Maximum	5 Maximum
Cylinder Head	98-102	98-102	98-102	98-102	98-102
Flywheel Screws	95-105	95-105	95-105	95-105	95-105
Injector Hold Down (Diesel)	14-17	14-17		14-17	
Injector Cap Nut (Diesel)	50-55	50-55		50-55	
Main Bearing Screws	145-155	145-155	145-155	145-155	145-155
Manifold Clamps	23-27	23-27	23-27	23-27	23-27
Rocker Arm Brackets	38-42	38-42	38-42	38-42	38-42

FRONT SYSTEM

FRONT ASSEMBLY

Series 500-600-900B

360. Front assembly complete with wheel spindles, wheels, front support and radiator can be removed from the tractor as a single unit as follows: Remove the hood and drain the cooling system. Remove the fan blades and disconnect the radiator hoses. On tractors equipped with radiator shutters, remove the grille and disconnect the shutter cable. On all models, support the engine and the front assembly separately. Disconnect the drag link at either end and the radius rod at rear. Remove the four front support to engine cap screws and roll the front assembly forward, away from the tractor. In some cases it may be necessary to raise the engine as the front assembly is moved forward in order for the crankshaft pulley to clear the front support casting.

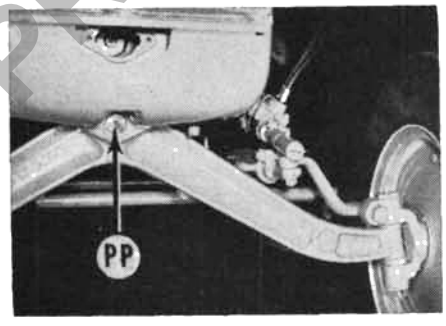


Fig. C316—Series 500, 600 and 900B industrial front axle pivot pin (PP) rides in renewable bushing.

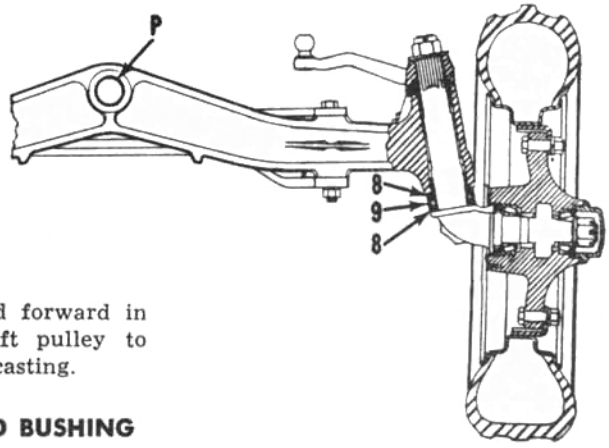


Fig. C316A — Front axle and wheel spindle used on series 900B tractors.

8. Thrust washers
9. Thrust bearing
P. Axle pivot pin

AXLE PIVOT PIN AND BUSHING

Series 500-600

361. The pivot hole in the center of the axle member is bushed, and the renewable pivot pin (PP—Fig. C316) is pressed into the front support. Pin and bushing can be renewed after detaching axle member from the front support. When inserting new bushing, prevent contraction of same by using a 1.498 sizing arbor. Desired running clearance of 0.002-0.004 is usually obtained without final sizing but may require use of a hone or a 1½-inch reamer.

Series 900B

361A. The radius rod is bolted to axle main member. To renew the axle pivot pin and bushing, place a floor jack under clutch housing and raise front of tractor enough to just take weight off of front wheels. Detach the radius rod at rear end, remove the axle pivot pin retaining snap ring and remove pivot pin (P—Fig. C316A). Raise front of tractor, allowing axle to drop down far enough to remove the pivot pin bushing from axle main member. New bushing should be final sized after installation to provide a free fit for the pivot pin.

RADIUS ROD AND BUSHINGS

Series 500-600-900B

362. On series 500 and 600, the radius rod is bolted to axle main member and pivots at the rear on a sta-

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MANUAL AND POWER STEERING SYSTEM

A hydraulic power steering attachment of the linkage booster type is installed on some tractors as optional equipment. Procedure for adjusting and overhauling the steering gear is for the most part the same with or without power steering.

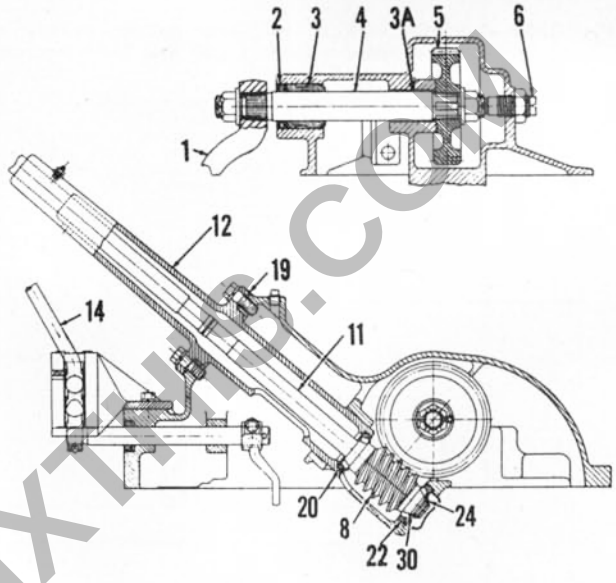


Fig. C319 — Exploded view of series 500 steering gear. The steering gear housing is integral with the transmission top cover.

1. Steering pitman (drop) arm
2. Oil seal
3 & 3A. Bushings or bearings
4. Worm wheel (sector) shaft
5 & 5L. Worm wheel (sector)
6. Adjusting screw
8. Steering worm
11. Worm shaft
12. Shaft column
14. Shifter lever
19. Adjusting shims
20. Bearing
22. Bearing
24. Snap ring
30. Washer

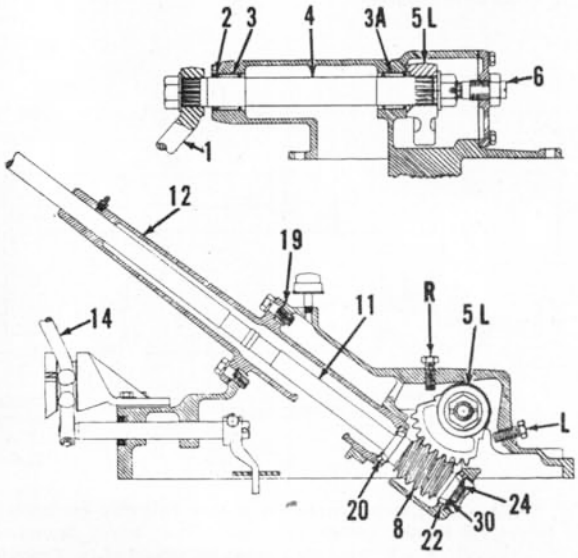


Fig. C319A — Exploded view of series 600 and 900B steering gear. The steering gear housing is integral with the transmission top cover. Cap screw (R) limits the right turn, while cap screw (L) limits wheel movement to the left. Refer to Fig. C319 for legend.

ADJUSTMENT OF GEAR UNIT

Series 500-600-900B

370. **WORM SHAFT END PLAY.** Refer to Fig. C319 or 319A. Steering gear worm and shaft (8) rotates in two taper roller bearings. To reduce play in worm shaft bearings, remove steering wheel and the cap screws which retain steering shaft column to transmission cover. Slide column away from transmission cover. Add or remove shims (19), until worm shaft has zero end play, but rotates freely. Shims are available in 0.003, 0.005 and 0.0156 thickness.

370A. **WORM WHEEL (DROP ARM) SHAFT END PLAY.** End play is controlled by adjusting screw (6) which is located on right side of transmission (gear housing) cover. To adjust, loosen locknut and turn adjusting screw clockwise to reduce end play. All end play in worm wheel shaft should be eliminated but gear should not bind. Relock set screw after making the adjustment.

370B. **GEAR MESH.** On series 500 tractors, excessive backlash between worm (8) and worm wheel (5) may be corrected by meshing an unused portion of the worm wheel with the worm. To mesh unused portion of worm, remove steering pitman (drop) arm from worm wheel shaft after first removing the battery and the battery carrier. Rotate steering wheel until unworn worm wheel teeth are coming into mesh with worm. With front wheels in straight ahead position reinstall steering arm to worm wheel shaft.

On series 600 and 900B tractors, excessive backlash between worm (8) and sector gear (5L) can be corrected only by renewing the worm and/or the sector gear.

OVERHAUL

Series 500-600-900B

370C. Procedure for disassembly is readily evident after an examination of the unit and removal of the transmission (gear housing) top cover as outlined in paragraph 432 or 434A.

On series 500 tractors, the worm wheel cross shaft inner bushing in cover requires final sizing to 1.376-1.377 after installation to provide a diametrical clearance of 0.001-0.004. Outer bushing (3—Fig. C319) does not require final sizing and should be inserted ⅜-inch beyond flush to allow room for the oil seal (2). Worm shaft rotates in two taper roller bearings.

On 600 and 900B series tractors, the sector gear cross shaft needle bearings (3 & 3A—Fig. C319A) should be installed using the correct size arbor. Outer bearing (3) should be installed far enough beyond flush to allow room for the oil seal (2).

When reassembling, install worm and shaft assembly, and adjust worm shaft bearings before assembling balance of steering gear.

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type lengthwise mounted cylinders to the dimensions shown in upper view of Fig. C321 and the early 500 cross mounted cylinders to the dimensions shown in lower view of same illustration.

POWER CONTROL VALVE & DRAG LINK

Series 500-600-900B

372B. Procedure for removal of the control valve unit is self evident. To remove the end covers, straighten both legs of each lock ring (Fig. C323 or C323A) and unscrew the covers, using a strap type wrench or water pump pliers. If the valve body or the mating valve spool or glands are scored, rusted or corroded, install a new valve assembly. If the control valve spool and/or drag link are bent or broken refer to Figs. C322 and C322A. Install all new "O" rings.

When reassembling, insert the valve spool into the valve body with threaded end of spool nearest the rear of the tractor. Install new end cover lock rings if available. One leg of each lock ring engages the slot in valve body; other leg engages slot in cover. Screw short drag link into valve body until bottomed, then back-off until one thread is visible and grease fitting is at top as shown in Figs. C322 and C322A. Place clamp over split end of long drag link and install the rubber dust seal over threaded projection on valve body, after applying a light coat of glycerine or palm oil to end faces of seal. Thread valve body to long drag link until center distance between grease fittings in opposite ends of drag link is as shown in Fig. C322 or Fig. C322A. Do not tighten clamp bolts until unit is installed on tractor.

To prevent control valve from striking the radiator bracket when traveling over rough ground, it is important that the hose connections on the top of the valve point outward at an angle of approximately 20 degrees as shown in Fig. C324. Check the position by jacking up front of tractor and making sure that when left wheel is raised to limit of possible travel, that a full left turn can be negotiated without the valve striking the bracket. Tighten the drag link clamp at each end of valve body.

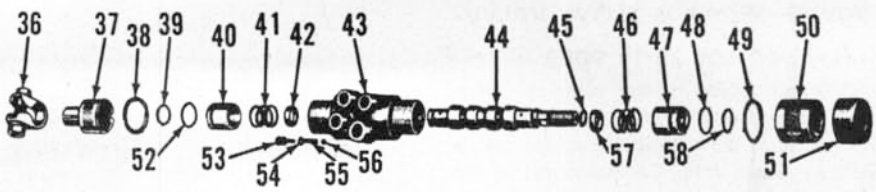


Fig. C323A—Exploded view of the drag link mounted type power steering control valve used on series 600 and 900B tractors. For the type used on series 500 tractors, refer to Fig. C323.

36. Clamp
37. End cover and reducer
38. Lock ring
39. "O" ring
40. Gland
41. Spring
42. Reaction ring
43. Valve body
44. Valve spool
45. Spacer washer
46. Spring
47. Gland
48. "O" ring
49. Lock ring
50. End cover
51. Dust cover
52. "O" ring
53. Relief valve plug
54. "O" ring
55. Spring
56. Relief valve ball

POWER SYSTEM PRESSURE TEST

Series 500-600-900B

372C. A pressure test of the hydraulic circuit will disclose whether the pump or some other unit in the system is malfunctioning. To make such a test proceed as follows:

Connect pressure test gauge provided with a shut-off valve into system as shown in Fig. C326. Note that shut-off valve is connected in the circuit between the gage and the control valve on the drag link.

Run the engine at idle speed with the shut-off valve open until oil is warmed; then, rotate the front wheels of the tractor to extreme right or extreme left turn position and note gage reading which should be 575-625 psi. (To avoid heating the steering fluid excessively, don't hold wheels in this test position for more than 45 seconds.)

If the pressure is 50-100 psi higher than specified, the relief valve is probably stuck in the closed position. If the pressure is less than 525 psi, turn the wheels to straight ahead position; at which time, the gage reading should drop considerably. Now slowly close the shut-off valve and retain in closed position only long enough to observe the gage reading. **Pump may be seriously damaged if valve is left in closed position for more than 15 seconds.** If the gage reading increases to 575-625 psi with valve closed, the pump is O.K. and the trouble is located in the control valve, the power cylinder and/or connections.

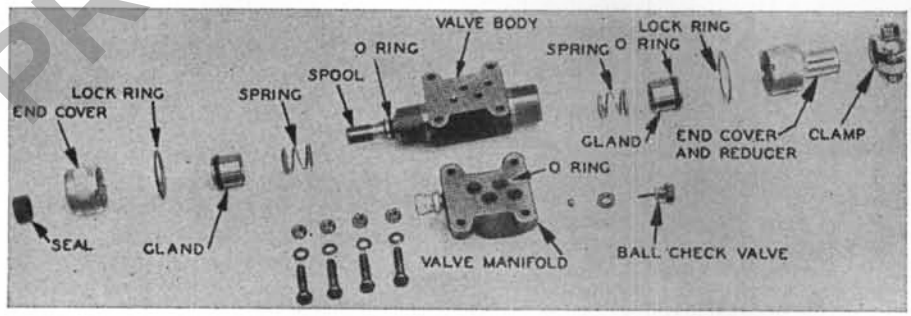


Fig. C323—Partially disassembled view of control valve mounted in the steering drag link on series 500 tractors equipped with power steering. For an exploded view of the control valve used on series 600 and 900B tractors refer to Fig. C323A.

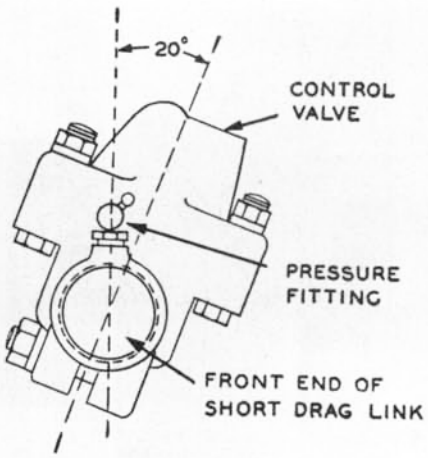


Fig. C324 — Front view showing correct mounting angle of control valve on drag link to prevent valve from striking radiator bracket. The type used on series 500 tractors is shown; however, series 600 and 900B are similar.

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SHOP MANUAL

J. I. CASE

SERIES 500-600-900B

IDENTIFICATION

The serial number is stamped on name plate located near the instrument panel and on left rear side of engine block in the vicinity of the air cleaner.

Series 500 tractors were built with diesel engines only. Series 600 and 900B tractors are available with either a diesel or a LP-Gas engine. All are available with a standard, non-adjustable front axle only.

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INDEX (By Starting Paragraphs)

	500 Diesel	600 Diesel	600 LP-Gas	900B Diesel	900B LP-Gas
AXLE, FRONT	360	360	360	360	360
BELT PULLEY	447	448	448	448	448
BRAKES	445	445	445	445	445
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CLUTCH					
Engine (traction) clutch	429	429	429	429	429
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DIESEL SYSTEM					
Bleeding	401	401		401	
Filters	402	402		402	
Fuel relief valve	402C	402C		402C	
Injection pump APE and PES (internal drive)	409	409		409	
Injection pump PES (external drive)				407	
Injection pump PSB	404	404		404	
Injection pump timing APE and PES (internal drive)	409B	409B		409B	
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Injection pump timing PSB	406	406		406	
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Nozzle (injector) testing	411	411		411	
Nozzle servicing	410B	410B		410B	
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ENGINE					
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Cam followers	379	379	379	379	379
Camshaft	383	383	383	383	383
Connecting rods R&R	384	384	384	384	384
Connecting rod bearings	389	389	389	389	389
Crankshaft and bearings	390	390	390	390	390
Crankshaft front seal	391	391	391	391	391
Cylinder heads	375	375	375A	375	375A

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1. Fuel inlet strainer
2. Fuel inlet valve
3. Needle valve
4. Inlet pressure diaphragm
5. Inlet diaphragm lever
6. Inlet diaphragm spring
8. Outlet valve lever
9. Plug (¾)
11. Push pin
12. Outlet valve spring
15. Bleed screw
18. Outlet pressure diaphragm
20. Idle fuel adjustment
21. Pipe plug (⅛)
23. Regulator cover
30. Spring retainer
31. Pivot support
32. Drain cock
35. Outlet valve gasket
36. Outlet valve seat
37. Idle screw spring
38. Support plate
39. Partition plate
40. Partition plate gasket

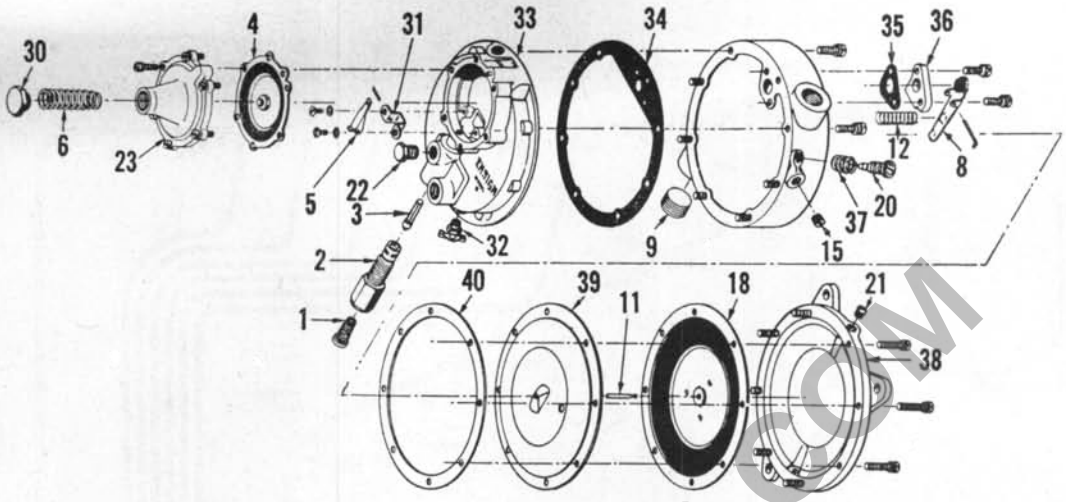


Fig. C342H—Exploded view of Ensign model R regulating unit.

TROUBLE-SHOOTING

397A. **SYMPTOM.** Engine will not idle with the idle mixture adjustment screw in any position.

CAUSE AND CORRECTION. A leaking valve or gasket is cause of the trouble. Look for leaking low pressure valve caused by deposits on valve or seat. To correct the trouble, wash the valve and seat in gasoline or other petroleum solvent.

If foregoing remedy does not correct the trouble, check for leak at high pressure valve by connecting a low reading (0 to 20 psi) pressure gage at point (22—Fig. C342F). If the pressure increases AFTER a warm engine is stopped, it proves a leak in the high pressure valve. Normal pressure is 4-5 psi.

397B. **SYMPTOM.** Cold regulator shows moisture and frost after standing.

CAUSE AND CORRECTION. Trouble is due either to leaking valves as per paragraph 397A or the valve levers are not properly set. For information on setting of valve levers refer to paragraph 397C.

REGULATOR OVERHAUL

If an approved station is not available, the regulator can be overhauled as follows:

397C. Remove the unit from the engine and completely disassemble, using Figs. C342F and 342H as a general guide. Thoroughly wash all parts and blow out all passages with compressed air. Inspect each part carefully and renew any that are worn.

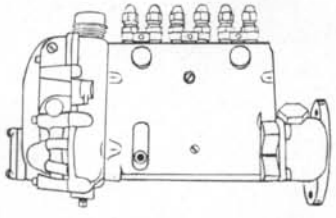
Before reassembling the unit, note dimension (X—Fig. C342F) which is measured from the face on the high pressure side of the casting to the inside of the groove in the valve lever when valve is held firmly shut. If dimension (X) which can be measured with Ensign gage No. 8276 or with a depth rule, is more or less than ½-inch, bend the lever until this setting is obtained. A boss or post (T—Fig. C342G) is machined and marked with an arrow to assist in setting the lever. Be sure to center the lever on the arrow before tightening the screws holding the valve block. The top of the lever should be flush with the top of the boss or post (T).

DIESEL FUEL SYSTEM

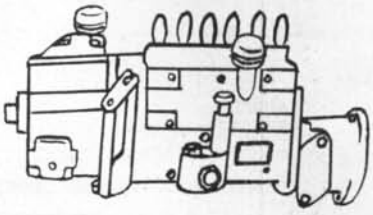
American Bosch PSB; American Bosch APE; German (Robert) Bosch PES internal drive and German (Robert) Bosch PES external drive injection pumps are used on series 500, 600 and 900B tractors. Before servicing any diesel tractor, it should be determined which type of pump is used; then, refer to the appropriate paragraphs concerning the system using that type of pump. Refer to the accompanying identifying illustration.

The diesel fuel system consists of three basic units; the fuel filters, injection pump and injection nozzles. When servicing any unit associated with the fuel system, the maintenance of absolute cleanliness is of utmost importance. Of equal importance is the avoidance of nicks or burrs on any of the working parts.

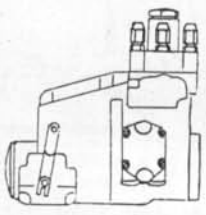
Probably the most important precaution that service personnel can impart to owners



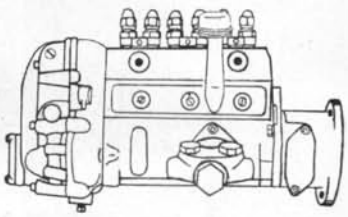
German Bosch
PES (External Drive)



American Bosch
APE



American Bosch
PSB



German Bosch
PES (Internal Drive)

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Disconnect the two wires and the two lines from the hour meter pressure switch, and the tail light wires from under the light switch.

Disconnect the ether starting aid tube. Disconnect the fuel stop wire at the injection pump. Disconnect throttle rod from hand lever by extracting the cotter pin, and at connector (TB-Fig. C333), by using a ⅛-inch Allen wrench on the set screw. Slide rear portion of throttle rod rearward.

Remove two cap screws from decompression bracket (DB) on right side of engine and disconnect the vertical link from lever. Lay instrument panel on top of engine.

Remove cap screws (two at each side) retaining fender front bracket to transmission case, raise bracket, reinstall the screws, then lower the bracket until same rests on the installed screws.

Remove retaining screws from top cover. Lift the cover and steering unit high enough to clear the pto drive gear, then withdraw rearward.

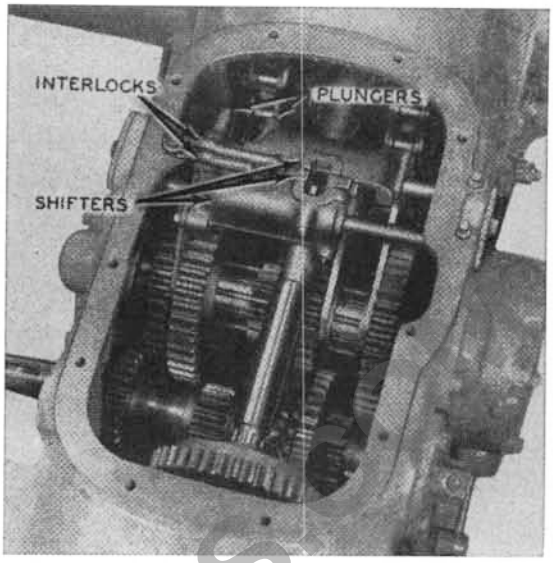


Fig. C381 — Top front view showing transmission details. Longitudinal shaft drives the pto.

OVERHAUL TRANSMISSION

Complete overhaul of the transmission requires the work described in paragraphs 433 through 433J.

433. **SHIFTER ASSEMBLY.** To remove shifter (rails and forks) assembly, first remove the transmission top cover as described in paragraph 432 then proceed as follows:

Remove the left rear wheel and tire as a unit. Lift out the interlocks and interlock pins located on right hand side as shown in Fig. C381.

Remove dust covers and gaskets (Fig. C382) from ends of shifter shafts, also the two set screws from upper left side of case. Using a drift on right hand ends of shafts, bump same toward left approximately 1½-inches then rotate shafts to bring the detents up. Bump shafts out of case while withdrawing the shifters.

The shifter assembly parts should be inspected for worn or damaged forks and interlocks, weakened or broken plunger springs, etc. Check also the wedge shaped recesses in the shifters and the depressions in the shifter shafts for wear. Make sure that lower end of shift lever arm in top cover is not worn at surfaces where it contacts the shifters, and that oil seal is in good condition. Renew any worn parts.

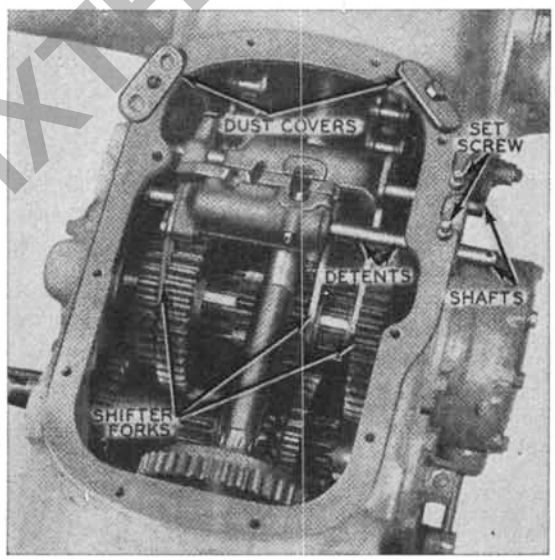


Fig. C382—Dust covers and set screws must be removed before the shifter rails and forks can be withdrawn.

433A. **PTO SUMP & DRIVE SHAFT.** To remove the pto sump and drive shaft as a unit as shown in Fig. C383, first remove the transmission top

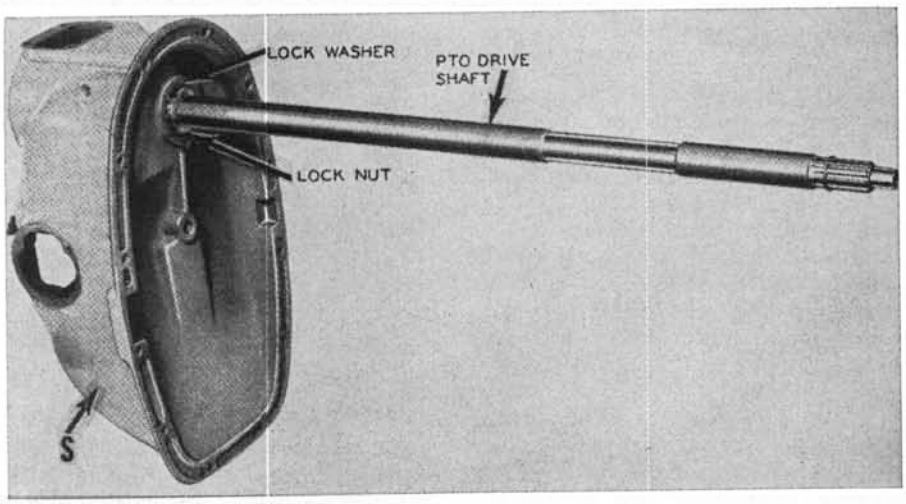


Fig. C383 — Housing (S) which attaches to rear face of case is called the pto sump. Right hand end (FRONT) of drive shaft carries the gear (DG) shown in Fig. C380.

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