SERVICE MANUAL

SM-2039

JOHN DEERE

4000

SERIES

TRACTORS

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4000 SERIES

TRACTORS

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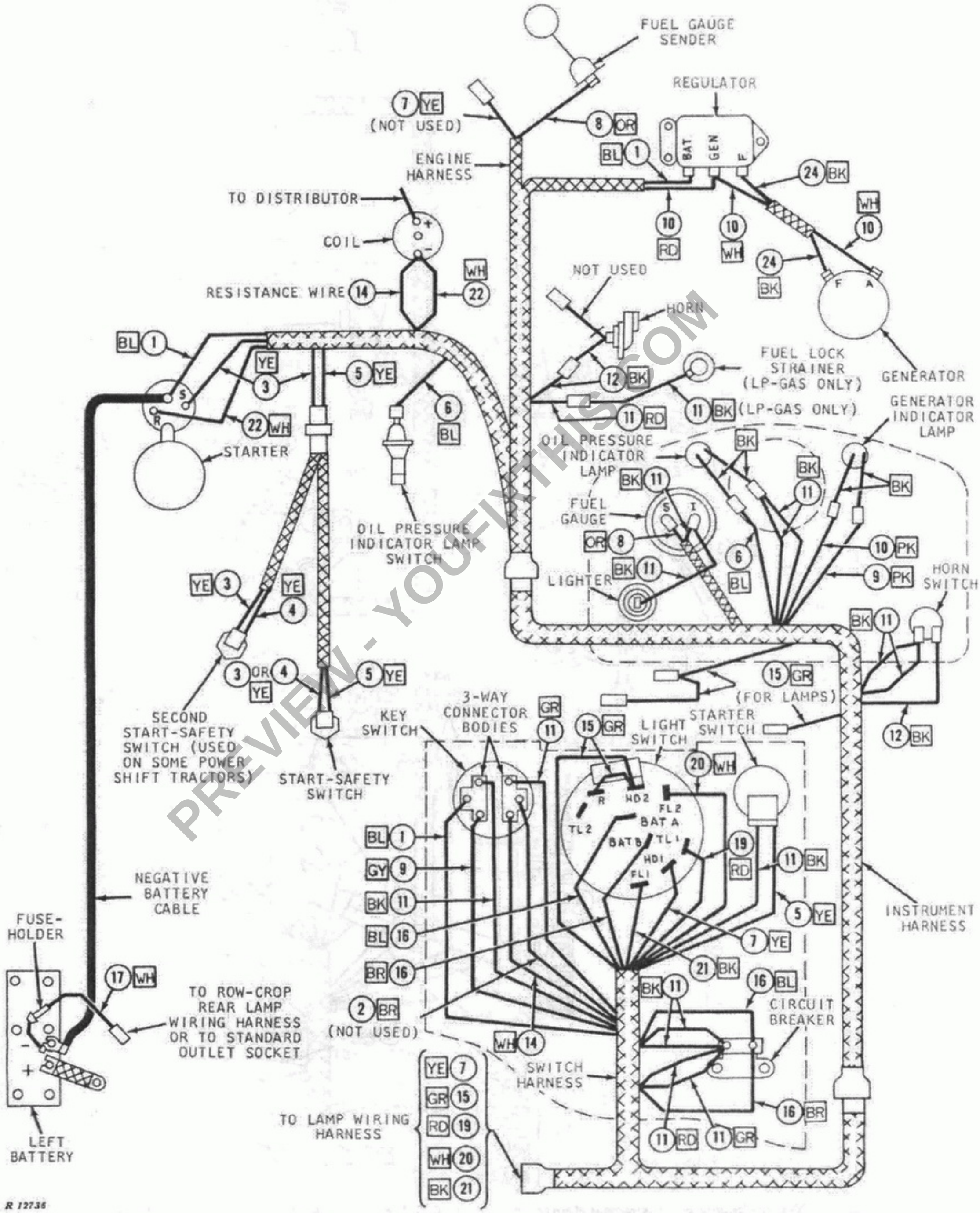


Fig. 190-40-6—Engine and Instrument Harness Wiring for 4020 Tractors 91000 and After with Spark Ignition Engine

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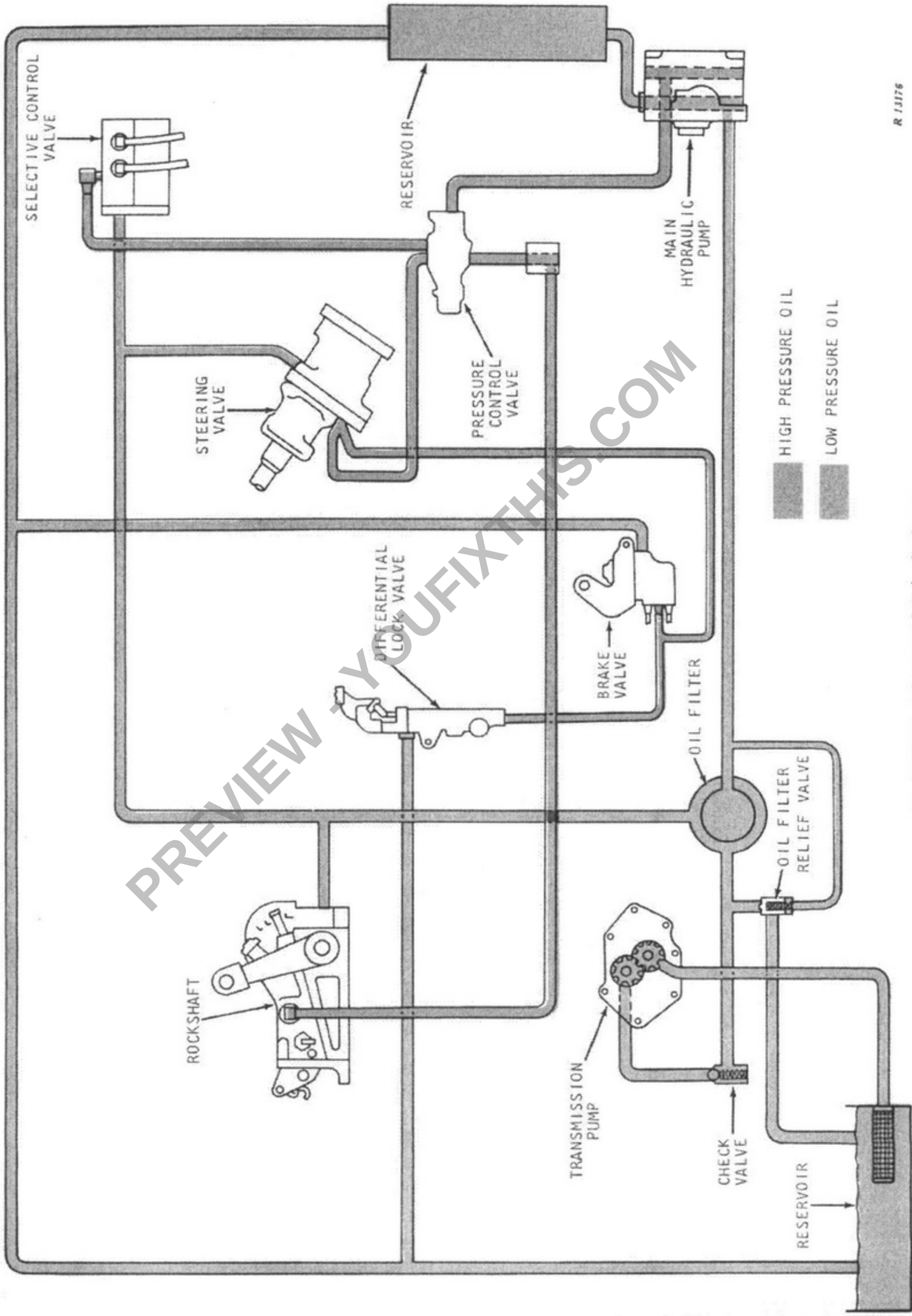


Fig. 230-5-11-Schematic of Hydraulic System

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Disconnect convertor-to-carburetor fuel pipe at hose connection (Fig. 50-15-5) and water by-pass pipe.

Remove water manifold and thermostat housings.

Remove cylinder head as previously instructed.

DISASSEMBLY

ROCKER ARM ASSEMBLY

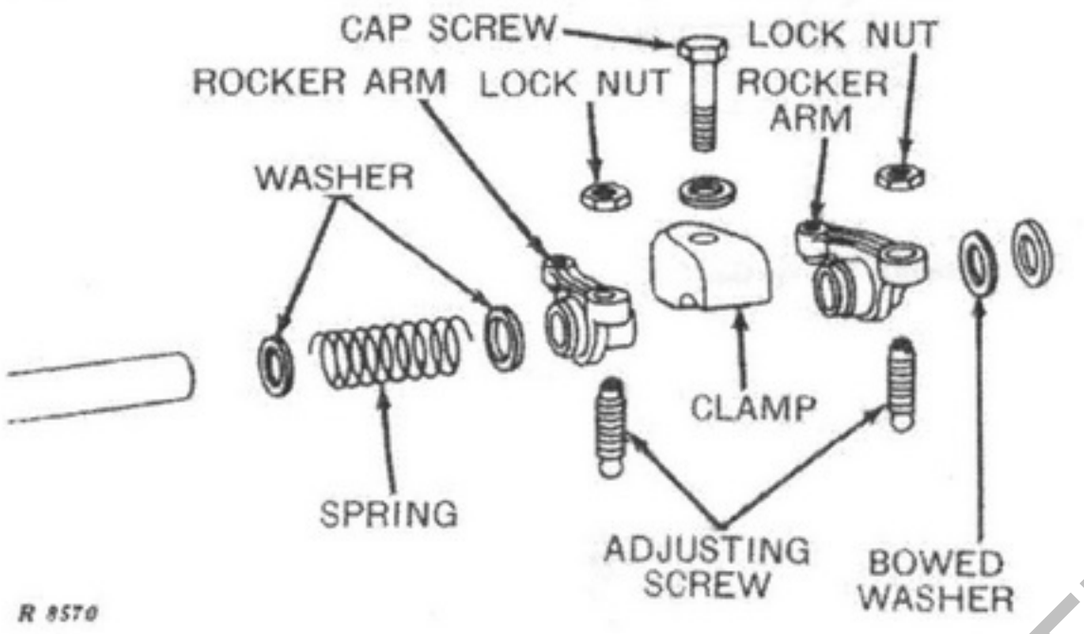


Fig. 50-15-6—Rocker Arm Assembly

Remove snap ring and cotter pin from end of rocker arm shaft and slide all parts from the end of the shaft (Fig. 50-15-6). Identify rocker arms for assembly purposes. Clean entire assembly in solvent. Check bushings and rocker arms for wear.

CYLINDER HEAD AND VALVES

Using a valve spring compressor, remove valve spring, valves, and related parts. Identify each valve so that it can be reinstalled into the same guide from which it was removed.

INSPECTION AND REPAIR

CYLINDER HEAD AND VALVES

Clean carbon from cylinder head and inspect for cracks. If any cracks are found, the head must be replaced.

Check inside diameter of valve guides with telescope gauge and micrometer (Figs. 50-15-7 and 50-15-8). New guide measurement is 0.3745 to 0.3755 inch. If clearance between guide and valve stem exceeds 0.006 inch, replace the guide.

Press out old guides from bottom of head using JDE-7 tool and press in new guides from top of head using JDE-7 and JDE-9 tools (Fig. 50-15-9). Guides are installed 1-3/4 inches from face of head on diesel engines and 2-1/8 inches on gasoline engines (Fig. 50-15-10).

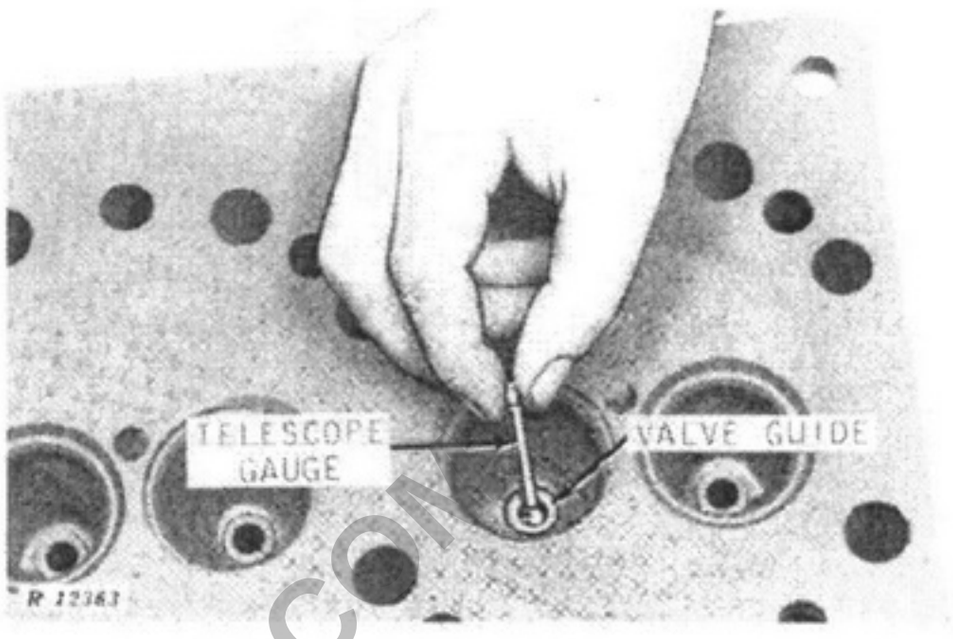


Fig. 50-15-7—Checking Inside Diameter of Valve Guide

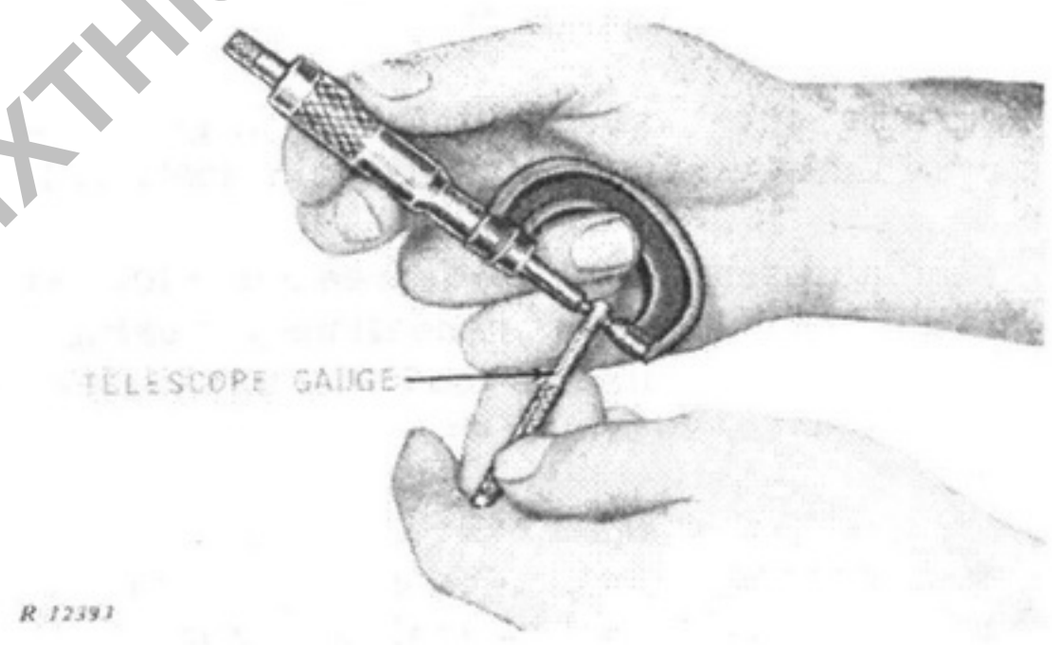


Fig. 50-15-8—Measuring Telescope Gauge

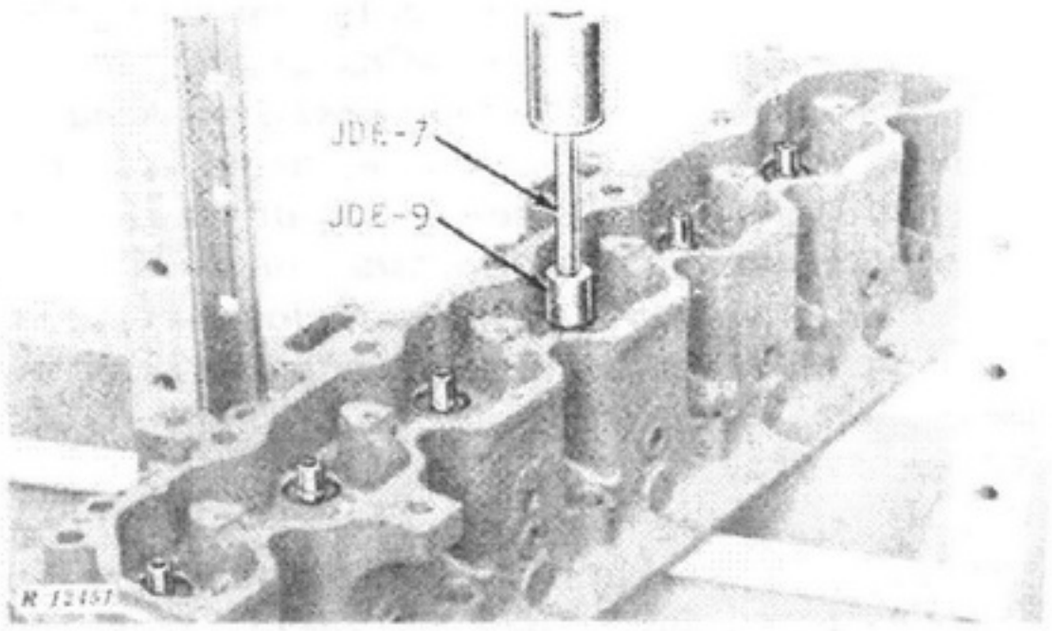


Fig. 50-15-9—Installing Valve Guide in Head

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Section 20
SPECIFICATIONS

Group 5
DETAILED SPECIFICATIONS

PURPOSE

This section contains detailed specifications for various parts in the tractor. If desired, a tab or marker can be added to aid future reference to this section.

The dimensions given for new parts are intended to aid the service man in determining when a new part is necessary. This new part information should never be used as the only reason for part replacement. Satisfactory performance during the future service life of the tractor should be the main consideration. However, worn parts usually require more attention than new parts.

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TORQUE CHART

Under normal conditions, tighten nuts and cap screws to the torque values given in the following chart. When conditions are not normal (for example, when threads are lubricated, when cap screw or nut is plated, when bearing on aluminum or other soft metal, or when nut or cap screw is self-locking), the nut or cap screw should be tightened to some other torque value. See detailed specifications in this Group or in other Sections of this manual. Do not lubricate plated hardware threads unless specifically recommended.

RECOMMENDED TORQUE IN FOOT-POUNDS

Bolt Diameter	Plain Head*	Three Radial Dashes*	Six Radial Dashes*
1/4	6	10	14
5/16	13	20	30
3/8	23	35	50
7/16	35	55	80
1/2	55	85	130
9/16	75	130	185
5/8	105	170	250
3/4	185	300	420
7/8	160**	445	670
1	250	670	1000

**The types of bolts and cap screws are identified by head markings as follows:*

Plain Head: regular machine bolts and cap screws.

3-Dash Head: tempered steel high-strength bolts and cap screws.

6-Dash Head: tempered steel *extra* high-strength bolts and cap screws.

*** Machine bolts and cap screws 7/8 inch and larger are sometimes formed hot rather than cold, which accounts for the lower torque.*

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Group 10
DETAILED PERIODIC SERVICES

AS REQUIRED

1. AIR CLEANER (Dry)

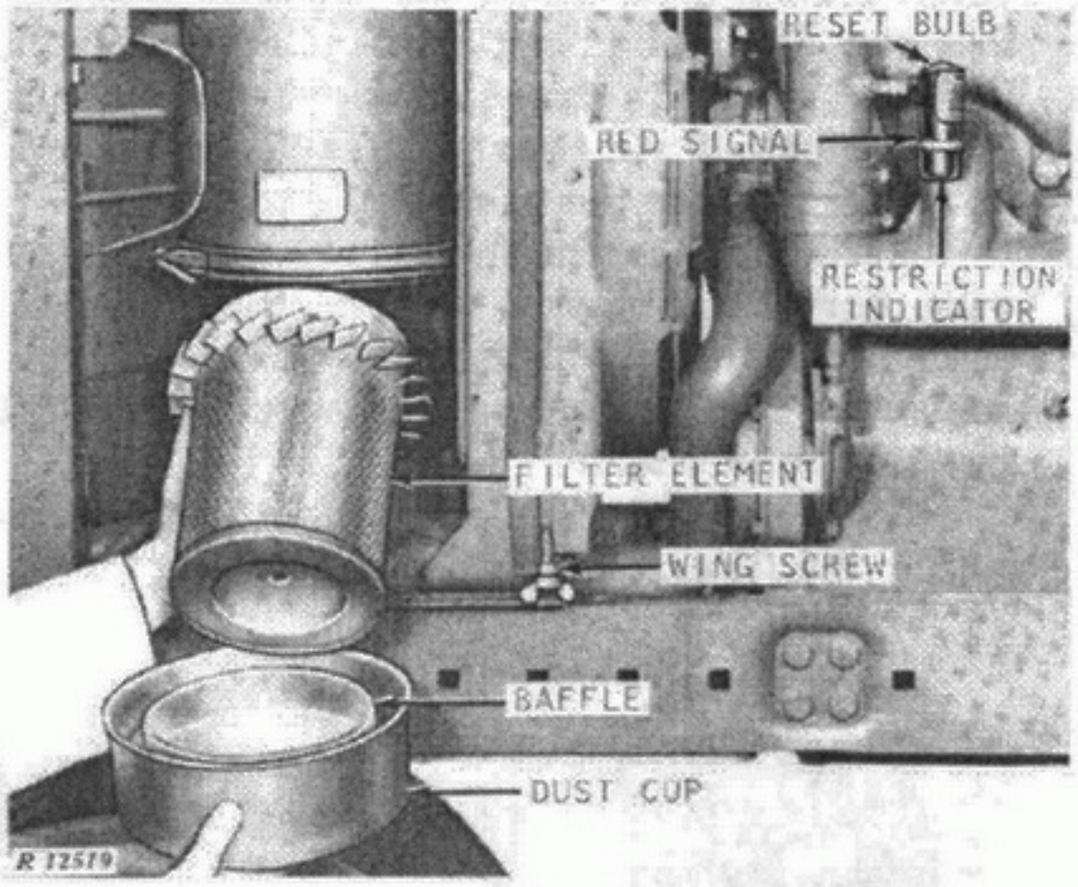


Fig. 30-10-1—Air Cleaner Dust Cup and Filter Element

Whenever the red signal in the restriction indicator (Fig. 30-10-1) is locked in full view, check the filter element restriction. (Overspeeding or accelerating the engine too rapidly may lock the signal in full view prematurely.) Reset the indicator by pushing down on the reset bulb at the top of the indicator. Operate the diesel engine at 2400 rpm. On spark-ignition engines, operate the engine under maximum load (hand throttle all the way down with the knob out and sufficient load applied to reduce engine speed to 2200 rpm). If the signal again rises and locks in view, the filter element must be serviced.

NOTE: Indicator will not signal correctly if filter element is ruptured or if element is not properly sealed in cleaner housing. Loss of power or excessive smoke may indicate a restricted element. If this happens, inspect the element and check the indicator for proper operation.

Remove dust cup (Fig. 30-10-1). Remove baffle from cup and empty out dust. Clean dust cup and install baffle. Remove wing screw and filter element. Wipe clean the inside of the cleaner body. If the filter element is dry and dusty, clean the element with compressed air. See next column. If the element is oily or sooty, wash the element in a filter element cleaner solution. See next page.

NEVER OPERATE THE ENGINE WITHOUT THE FILTER ELEMENT IN PLACE.

Temporary Field Service

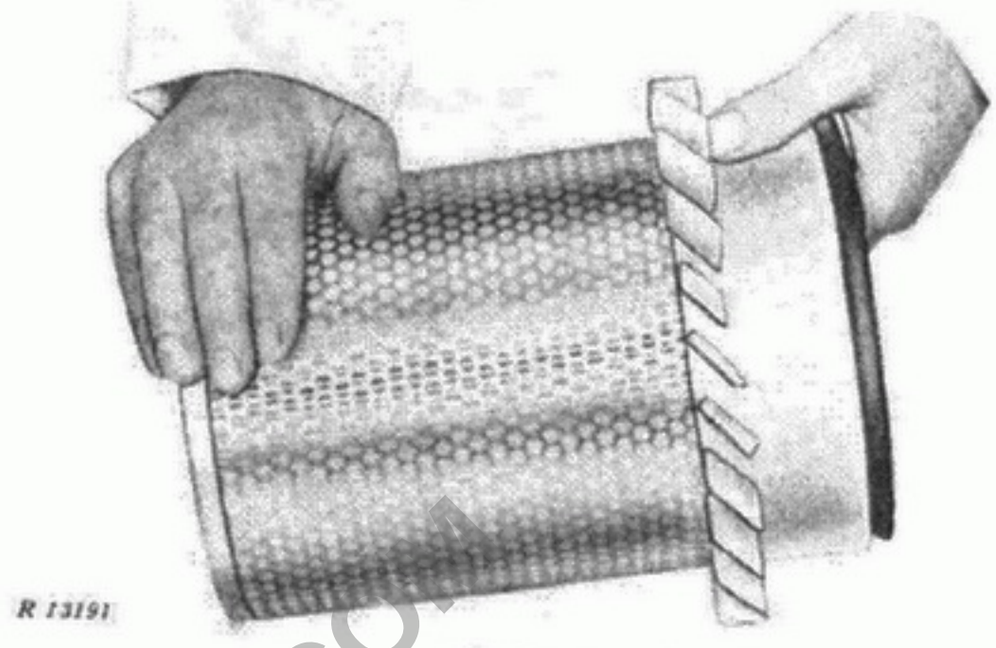


Fig. 30-10-2—Patting Element

When the element must be serviced in the field, install a spare element or pat the element gently on the end opposite the fins with the palm of the hand (Fig. 30-10-2) as a temporary service. Thoroughly clean the element after returning to the service area. Do not tap the element against a tire or a hard surface as this may dent or rupture the element.

Cleaning Dusty Elements

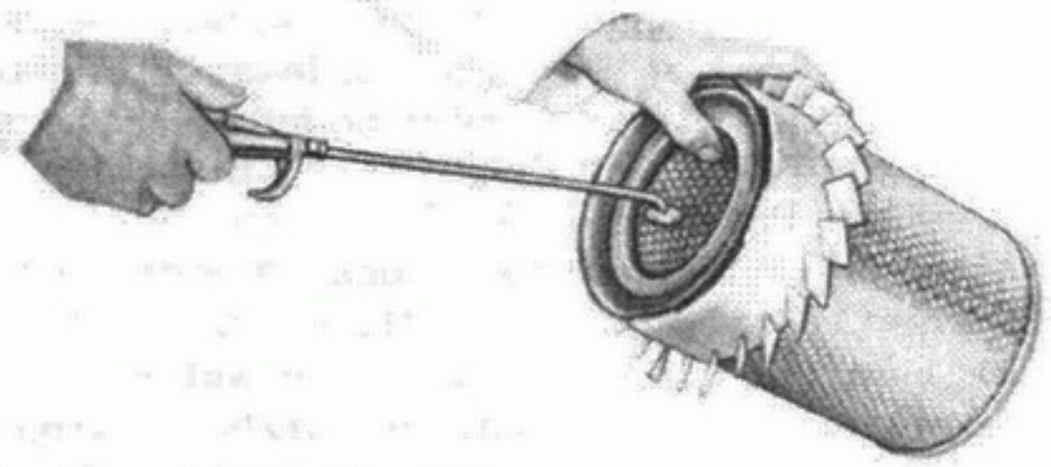
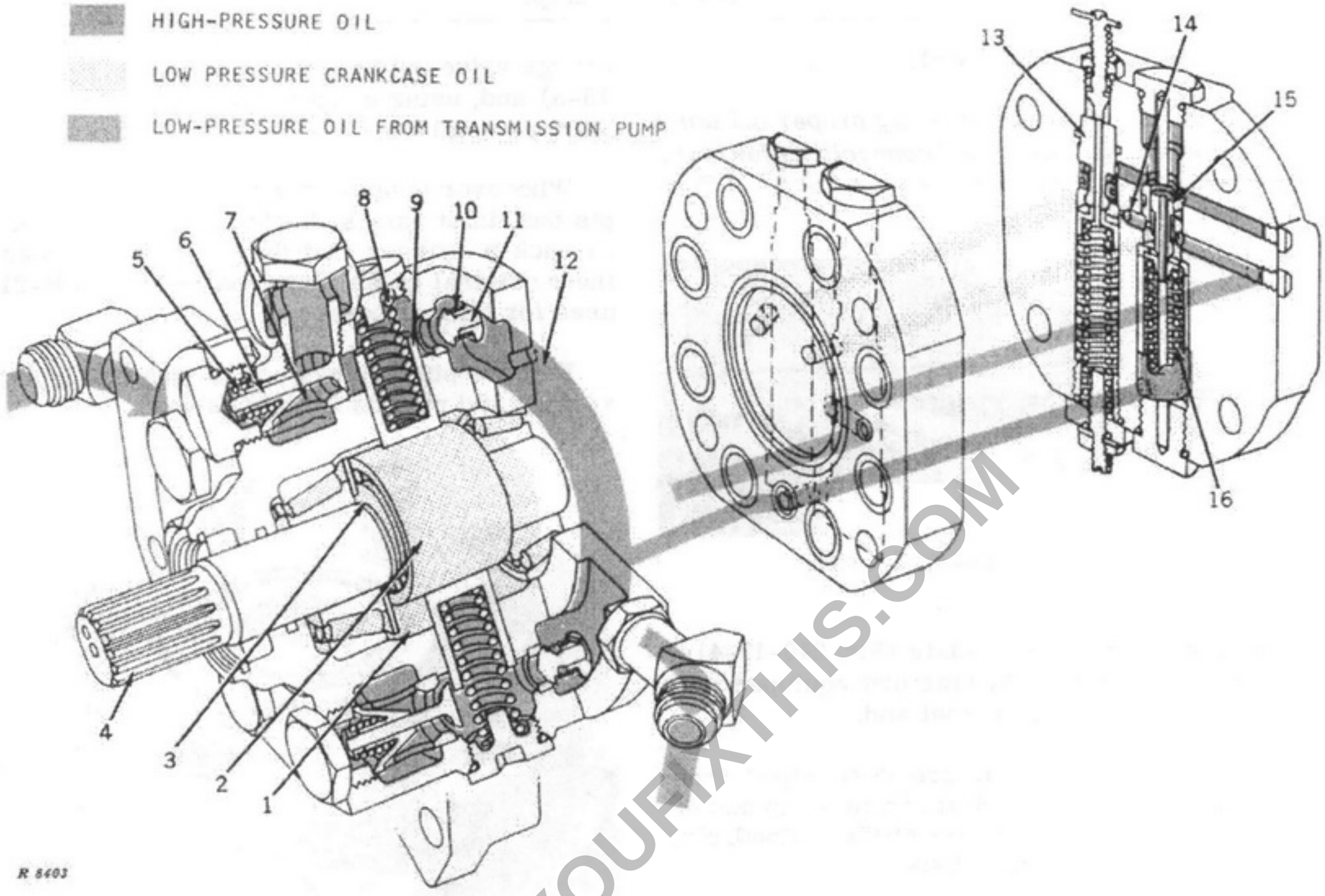


Fig. 30-10-3—Cleaning Element with Compressed Air

Pat element gently with the palm of the hand. Use compressed air under 100 psi and a nozzle with a curved extension to blow the dust from the element (Fig. 30-10-3). With a reasonable distance between air nozzle and filter, direct clean air up and down the pleats blowing from the inside of the filter to the outside. Be careful not to rupture the element with either the curved nozzle extension or the air jet. When clean, inspect the element.

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1 – Pump Crankcase
2 – Race
3 – Cam
4 – Pump Shaft
5 – Inlet Valve Spring
6 – Inlet Valve
7 – Inlet Gallery
8 – Piston Spring
9 – Piston
10 – Discharge Valve Spring
11 – Discharge Valve
12 – Outlet Gallery
13 – Stroke Control Valve
14 – 0.060-Inch Bleed Hole
15 – Crankcase Outlet Valve
16 – Crankcase Outlet Valve Spring

Fig. 240-15-3 – Oil Flow Through Pump

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Group 10
ENGINE AND TRANSMISSION
ENGINE DIFFICULTIES
Lack of Power

Possible Cause	Possible Remedy	Section-Group Reference Spark-ignition	Diesel
Air cleaner dirty or obstructed.	Clean cup and check filtering element in body for dirt.	80-45	90-35
Obstruction in fuel line (frosted on LP-Gas engines).	Remove fuel line and check flow from tank.	80-10 80-25	90-10
Governor binds.	Relieve bind.	80-10	90-15
Dirt and oil restricting air intake passage.	Clean air cleaner and hoses. Also clean air cleaner intake pipe, precleaner, and oil trap.	80-45	90-35
Wrong type of fuel.	Use correct grade of fuel.	80-5	90-5
Valve failure.	Repair as necessary.	50-15	50-15
Incorrect valve clearance.	Adjust clearance.	50-15	50-15
Low engine speed.	Check and adjust.	40-10	40-10
Crankcase oil too heavy.	Change to proper viscosity of oil.	30-10	30-10
Poor compression.	Check engine for leaky valves and worn or stuck piston rings. Replace or recondition as necessary.	40-10	40-10
Improper hitching or belting to equipment.	Adjust as required.	. . . .	. . . .
Operating in a gear too high for load.	Advise operator to operate in lower gear.	. . . .	. . . .
Incorrect engine timing.	Time injection pump, injection pump advance, or distributor correctly.	190-10	90-15
Carburetor gummed up.	Clean and adjust carburetor.	80-15 80-20 80-40	. . . .
Carburetor load adjustment too rich (engine smokes under load).	Adjust load needle.	40-10	. . . .
Fuel filter or strainer clogged.	Replace filter or clean strainer.	80-10 80-30	90-10

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Group 15
SPECIFICATIONS

HORSEPOWER*	4020	4010
PTO		
Diesel	**91.17 hp.	84.00 hp.
Gasoline	**88.09 hp.	80.56 hp.
LP-Gas	**90.48 hp.	80.60 hp.
DRAWBAR		
Diesel	**78.04 hp.	71.93 hp.
Gasoline	**75.03 hp.	71.25 hp.
LP-Gas	**79.12 hp.	71.77 hp.
ENGINE		
Type	6-Cylinder, in-line, valve-in-head	
Bore and stroke		
Diesel	4-1/4 x 4-3/4 in.	4-1/8 x 4-3/4 in.
Gasoline and LP-Gas	4-1/4 x 4 in.	4 x 4 in.
Displacement		
Diesel	404 cu. in.	380 cu. in.
Gasoline and LP-Gas	341 cu. in.	302 cu. in.
Compression ratio		
Diesel	16.5 to 1	16.4 to 1
Gasoline	7.5 to 1	7.5 to 1
LP-Gas	9.0 to 1	9.0 to 1
Firing Order	1-5-3-6-2-4	1-5-3-6-2-4
Valve clearance		
Diesel:		
Intake	0.018 in.	0.018 in.
Exhaust	0.018 in.	0.018 in.
Gasoline and LP-Gas:		
Intake	0.015 in.	0.015 in.
Exhaust	0.028 in.	0.028 in.
Injection pump timing	TDC	14° BTDC
Distributor timing		
Gasoline (2000 rpm, engine speed)	20° BTDC	(1900 rpm) 20° BTDC
LP-Gas (2000 rpm, engine speed)	25° BTDC	(1900 rpm) 25° BTDC
Distributor point gap	0.016 in.	See Section 190
Spark plug gap		
Gasoline	0.025 in.	0.025 in.
LP-Gas	0.015 in.	0.015 in.
Engine speeds		
Idle for engine shut-off:		
Diesel	600 rpm	600 rpm
Gasoline	420 rpm	420 rpm
LP-Gas	500 rpm	500 rpm
Normal slow idle:		
Diesel	600 rpm	600 rpm
Gasoline and LP-Gas	650 rpm	650 rpm
Working range	1500 to 2200 rpm	1500 to 2200 rpm
Maximum transport speed	2500 rpm	2500 rpm

**Observed at 2200 engine rpm.*
***4020 Tractor with Power Shift transmission.*

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	4020	4010
CLUTCHES		
Syncro-Range Transmission		
Transmission	Single 12-inch disk, heavy-duty, foot operated	
PTO	Single 11-inch disk, lever operated, locks in or out	
Power Shift Transmission		
Transmission	Wet disk, hydraulically actuated, controlled by speed selector	. . . . .
PTO	Wet disk, hydraulically actuated, lever operated	. . . . .
Engine disconnect	Single 12-inch disk, lever operated clutch	. . . . .
ELECTRICAL SYSTEM		
Starter and generator voltage		
Diesel	24 volts	24 volts
Gasoline and LP-Gas	12 volts	12 volts
Lights and accessory voltage	12 volts	12 volts
12-volt, 78-plate, 75-ampere-hour battery		
Diesel (connected in series)	two	two
Gasoline and LP-Gas	one	one
COOLING SYSTEM		
Type	Pressurized system with centrifugal pump	
Engine temperature control	Two heavy-duty thermostats	
LUBRICATION SYSTEM		
Type	Force-feed, pressurized with full-flow oil filter	
FUEL SYSTEM		
Diesel	Direct injection, inlet metering, distributing type. Diaphragm type fuel pump.	
Gasoline	Pressure system, diaphragm type fuel pump, single barrel, updraft carburetor.	
LP-Gas	Updraft carburetor	
CAPACITIES		
Fuel tank		
Diesel and gasoline	34 U.S. gals.	34 U.S. gals.
LP-Gas (80% full)	39 or 45 U.S. gals.	39 U.S. gals.
Crankcase (dry measurement)	9 U.S. qts.	9 U.S. qts.
Hydraulic system (dry measurement)		
(Syncro-Range)	13 U.S. gals.	12-3/4 U.S. gals.
(Power Shift)	17 U.S. gals.	. . . . .
Air cleaner (oil-bath)		
Diesel	4-3/4 U.S. pints	4-3/4 U.S. pints
Gasoline and LP-Gas	2-3/4 U.S. pints	2-3/4 U.S. pints
Cooling system		
Diesel	24 U.S. qts.	23 U.S. qts.
Gasoline	24 U.S. qts.	24 U.S. qts.
Belt pulley	2-1/2 U.S. pints	2-1/2 U.S. pints

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meeting military specification Mil-L-2104B. Where Mil-L-2104B is not immediately available, supplement 1 or API Service DM oil may also be used. When fuel contains more than 0.5% sulfur, use oil meeting specification Mil-L-45199A, classification Series 3 (S-3), or API Service DS. As further assurance of quality, use only those oils bearing the following statement on the container or words to the effect, "Passes Car Manufacturers' MS Sequence Tests."

NOTE: If, during the first 100 hours of operation on a new or rebuilt tractor engine, the crankcase oil level is low, add proper single viscosity oil meeting specification Mil-L-2104B.

For Spark Ignition Engine. Use oil having an API service classification MS or Military specification Mil-L-2104A. Oils that are designated DM, Supplement 1 (S-1), or Mil-L-2104B may also be used. As a further assurance of quality, use only those oils bearing the following statement on the container, or words to the effect, "Passes Car Manufacturers' MS Sequence Tests."

NOTE: If, during the first 100 hours of operation on a new or rebuilt tractor engine, the crankcase oil level is low, add SAE 10W-30 Service MS oil to the crankcase.

TRANSMISSION-HYDRAULIC OILS

Use only John Deere Type 303 Special-Purpose Oil or its equivalent in the transmission-hydraulic system and belt pulley. Other types of oil will not give satisfactory service and may result in eventual damage. This special oil, available from your John Deere dealer, may be used in all weather conditions.

GREASES

SAE multipurpose-type grease is recommended for all grease fittings. Wheel bearing grease is recommended for front wheel bearings. Application of grease as instructed in the lubrication section will provide proper lubrication and will keep contamination out of bearings.

STORING LUBRICANTS

Your tractor can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture, and other contamination.

LUBRICATION AND SERVICE INTERVALS

Lubrication and periodic service periods are: As required, daily or every 10 hours, every 50 hours, every 200 hours, every 600 hours, every 1200 hours, and every spring and fall season. These intervals are based on operation under normal operating conditions. When operating under unusual conditions such as excessive heat, cold, or dust, the tractors should be checked and serviced at MORE FREQUENT intervals.

The charts which follow, list in condensed form, the components to be serviced at each interval and the service to be performed. Detailed instructions for performing each service are given in Group 10 of this Section, "Detailed Periodic Services." Each item in the chart is numbered and the corresponding detailed procedure in Group 10 has the same number.

PERIODIC SERVICE CHART

AS REQUIRED

Item No.	Component	Service	Capacity or Measurement	Type of Lubricant
1	Air cleaner (dry type)	Clean filter element	. . . . .	. . . . .
2	Fuel filters Serial No. 91000 and after	Replace both filters	. . . . .	. . . . .
3	Injection nozzles Serial No. 91000 and after	Remove, check, clean and service	. . . . .	. . . . .

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TO THE JOHN DEERE SERVICEMAN

This service manual contains maintenance instructions for John Deere 4000 Series tractors. Included are complete instructions for removal, disassembly, inspection, repair, assembly and installation of the major parts and assemblies of the tractor.

In addition, the manual contains brief descriptions of the more complicated systems of the tractor, and tells how they operate. Tests and adjustments, required to keep the tractor operating efficiently, are explained in detail.

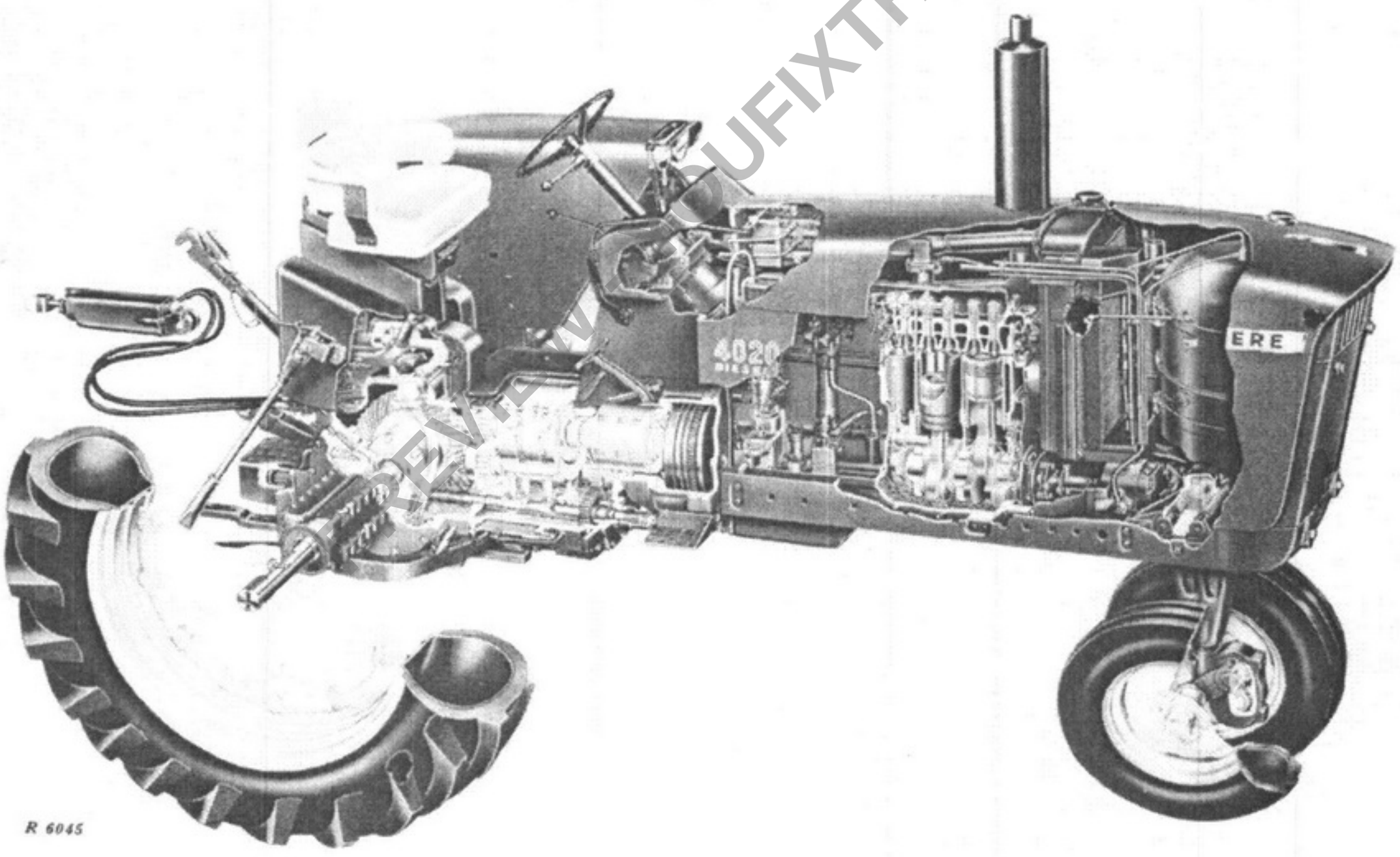
A section on "Specifications" lists dimensions of many new wearing parts as an aid in determining when parts replacement is necessary.

A section on "Tune-Up and Adjustment" contains instructions for performing the services necessary to help the tractor perform efficiently and economically after it has been in the field for some time.

A section on "Special Tools" lists special tool equipment which enables the serviceman to service the tractor efficiently with a minimum of time expended.

This manual was planned and written for the Service Department; its place is in the shop. Use the manual whenever in doubt about correct maintenance procedures. Use it as a text book for training new Service Department personnel who are unfamiliar with John Deere Tractors.

Daily use of the Service Manual as a guide for any and all service problems will reduce error and costly delay to a minimum and assure you the best in finished service work. In many instances your customer's confidence in your work will be improved when he sees you using the Service Manual. He knows you are following approved maintenance procedures and making proper adjustments. There is no guesswork when you use the manual.



R 6045

Cutaway of John Deere 4020 Row-Crop Tractor with Diesel Engine

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viscosity oil to the top of the inner bowl. Total oil cup capacity is 4-3/4 U.S. pints for diesel, or 2-3/4 U.S. pints for gasoline and LP-Gas engines. Assemble and install the oil tray and oil cup. Install the side grille screen.

15 ENGINE CRANKCASE

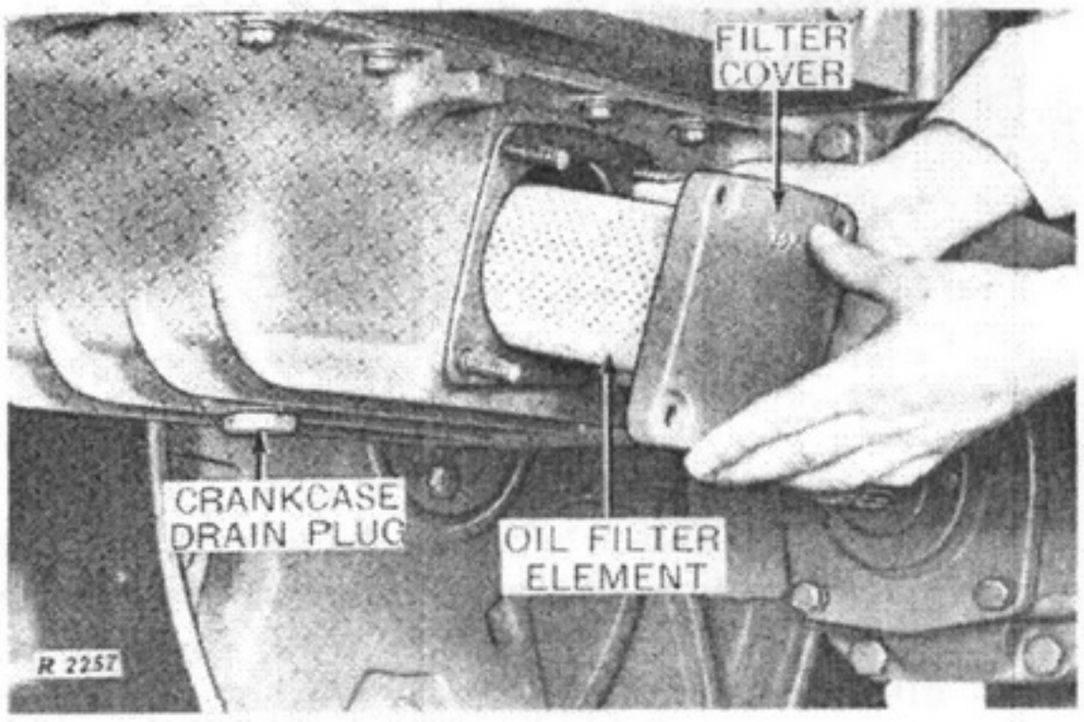


Fig. 30-10-18—Crankcase Drain Plug and Oil Filter Element

With the engine warm, remove the crankcase drain plug (Fig. 30-10-18) and drain the oil from the crankcase.

Remove the crankcase filter cover. Pull out the oil filter element and clean the filter compartment.

Install a new oil filter element and, if necessary, replace the filter cover gasket. Install the filter cover. Change the filter element each time the oil is changed.

Install crankcase drain plug and add new oil of the proper viscosity and service. See page 30-5-1.

After adding oil, run the engine a few minutes to fill the oil filter. Stop the engine, wait a few minutes, and recheck the oil level. The oil level should be to the "FULL" mark on the dipstick. Total capacity - 8 U.S. quarts.

NOTE: Certain operating conditions or changes in oil quality may necessitate a more frequent oil change period.

16. CARBURETOR SUMP (LP-Gas)

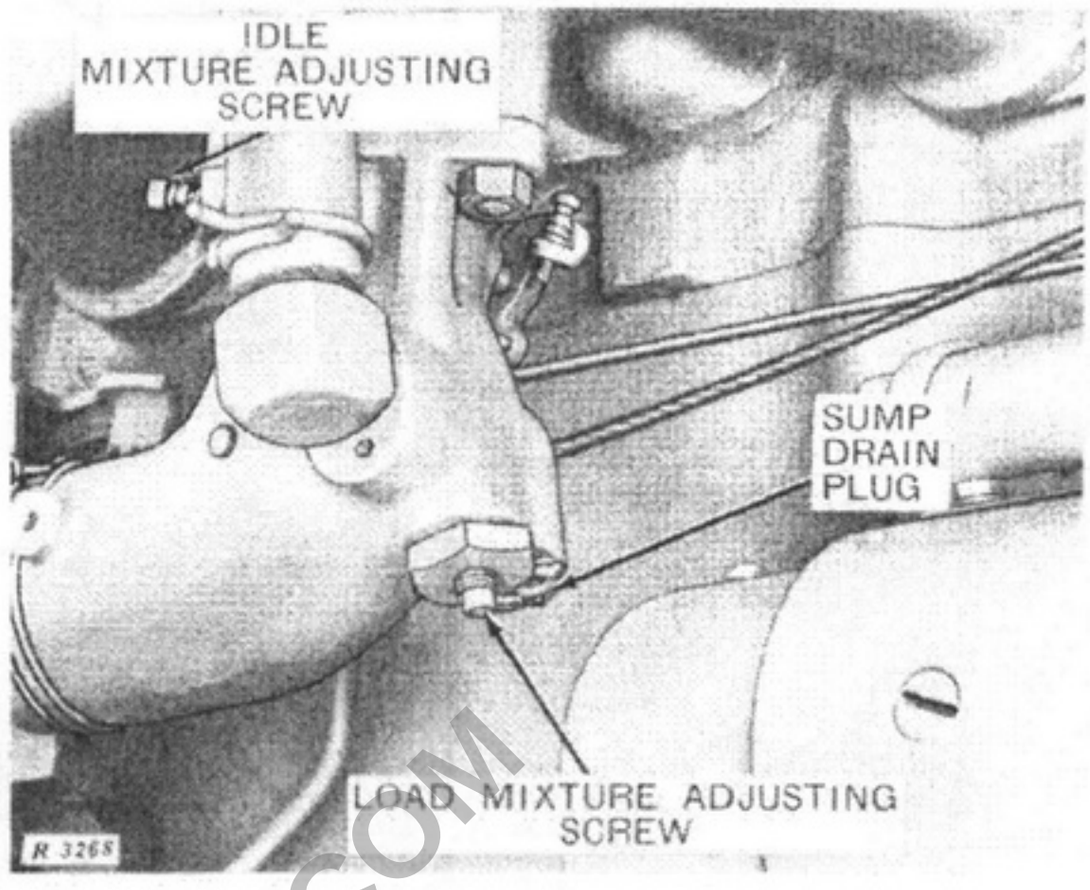


Fig. 30-10-19—LP-Gas Carburetor

On tractors with LP-gas carburetors (Fig. 30-10-19), remove the carburetor sump drain plug and drain the sump of any foreign material (usually an oily substance). Be sure both vapor and liquid withdrawal valves are closed, key switch is off, and the engine is cold before removing the drain plug.

17. FAN BELT TENSION

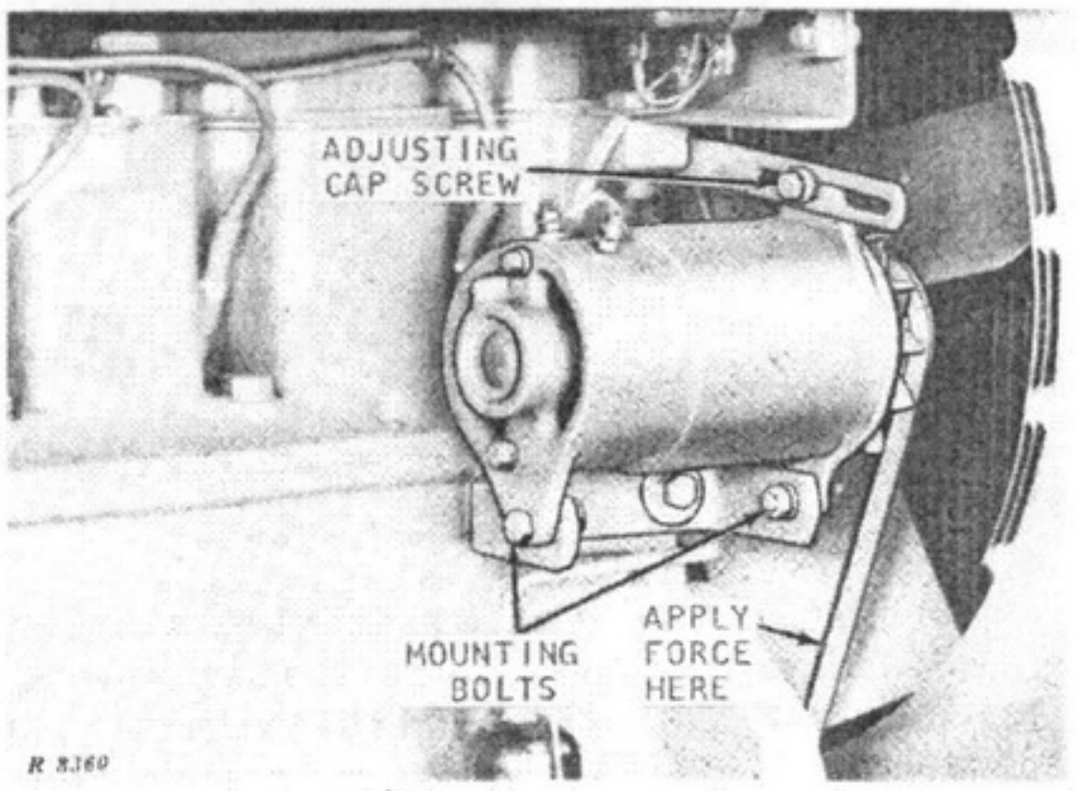


Fig. 30-10-20—Fan Belt Adjustment

Check fan belt tension. There should be 1 inch deflection of the belt when a 25 pound force is applied midway between generator pulley and the pulley at the end of the crankshaft.

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Group 25

CRANKSHAFT, MAIN BEARINGS, AND FLYWHEEL

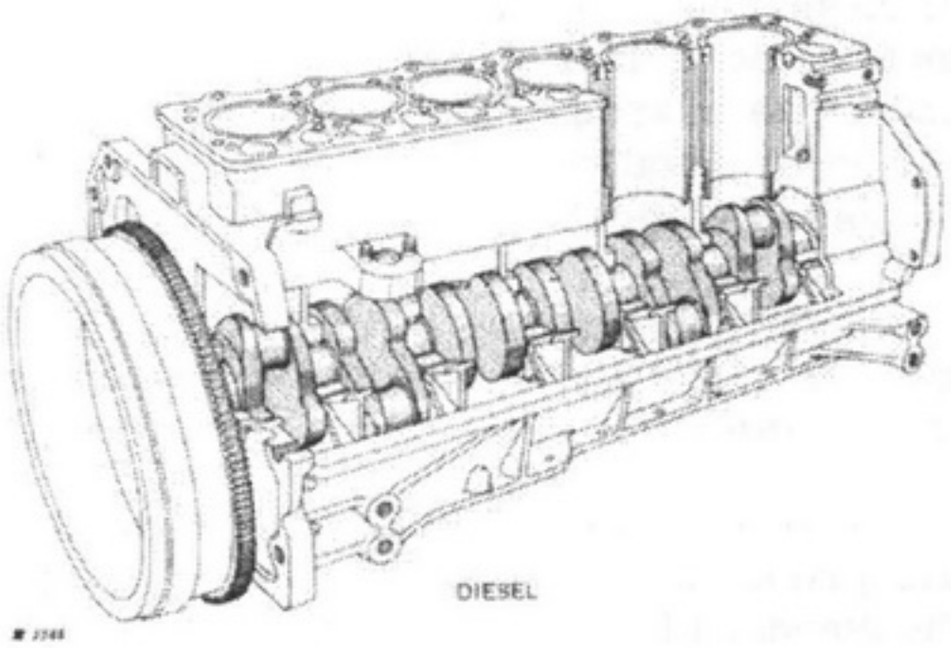


Fig. 50-25-1–Diesel Engine Crankshaft and Flywheel

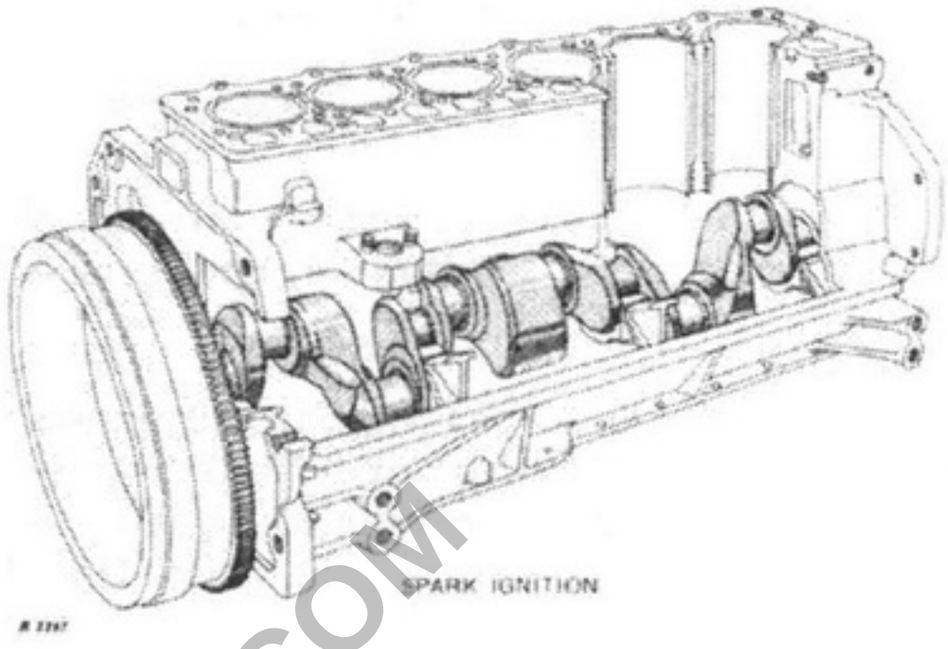


Fig. 50-25-2–Spark-Ignition Engine Crankshaft and Flywheel

DESCRIPTION

The crankshaft is a steel forging carried by four main bearings in spark-ignition engines and by seven main bearings in diesel engines. It is equipped with front oil seal wear sleeve and a rear oil slinger pressed on the shaft.

Crankshaft end thrust is taken up by the main bearing in all engines.

Both crankshafts are drilled for pressure lubrication from the main bearings to the connecting rods.

The diameter of the main bearing journal is 3.3715 to 3.3725 inches on both engines.

The flywheel bolting flange and crankshaft counterweights are forged integral with the shaft. The flywheel is positioned to the crankshaft by means of dowel pins and secured with cap screws, having nylon locking inserts.

The timing gear drive gear is located at the front of the crankshaft and is held in place by a press fit and Woodruff key. The crankshaft pulley (spark-ignition) or damper (diesel), which drives the fan belt, is secured to the crankshaft by a press fit, Woodruff key, and cap screw.

CRANKSHAFT END PLAY INSPECTION AND MAIN BEARING CLEARANCE

Crankshaft end play and main bearing clearance can be checked with the engine IN the tractor.

CRANKSHAFT END PLAY INSPECTION

To check end play, attach a dial indicator to the front of the crankcase with the indicator button against the inner face of the crankshaft pulley or damper.

Move crankshaft back and forth with a bar to determine end play. Designed end play in both gasoline and diesel engines is 0.0025 to 0.0085 inch.

NOTE: Do not apply too much pressure with bar as this could spring the timing gear cover.

If end play exceeds specifications, remove main thrust bearing. If the thrust surface on the crankshaft is smooth, replace the main thrust bearing with a new one of standard size. If the surface is scored, remove and grind the crankshaft (crankshaft removal is covered later in this group). Install a new bearing with an oversize flange.

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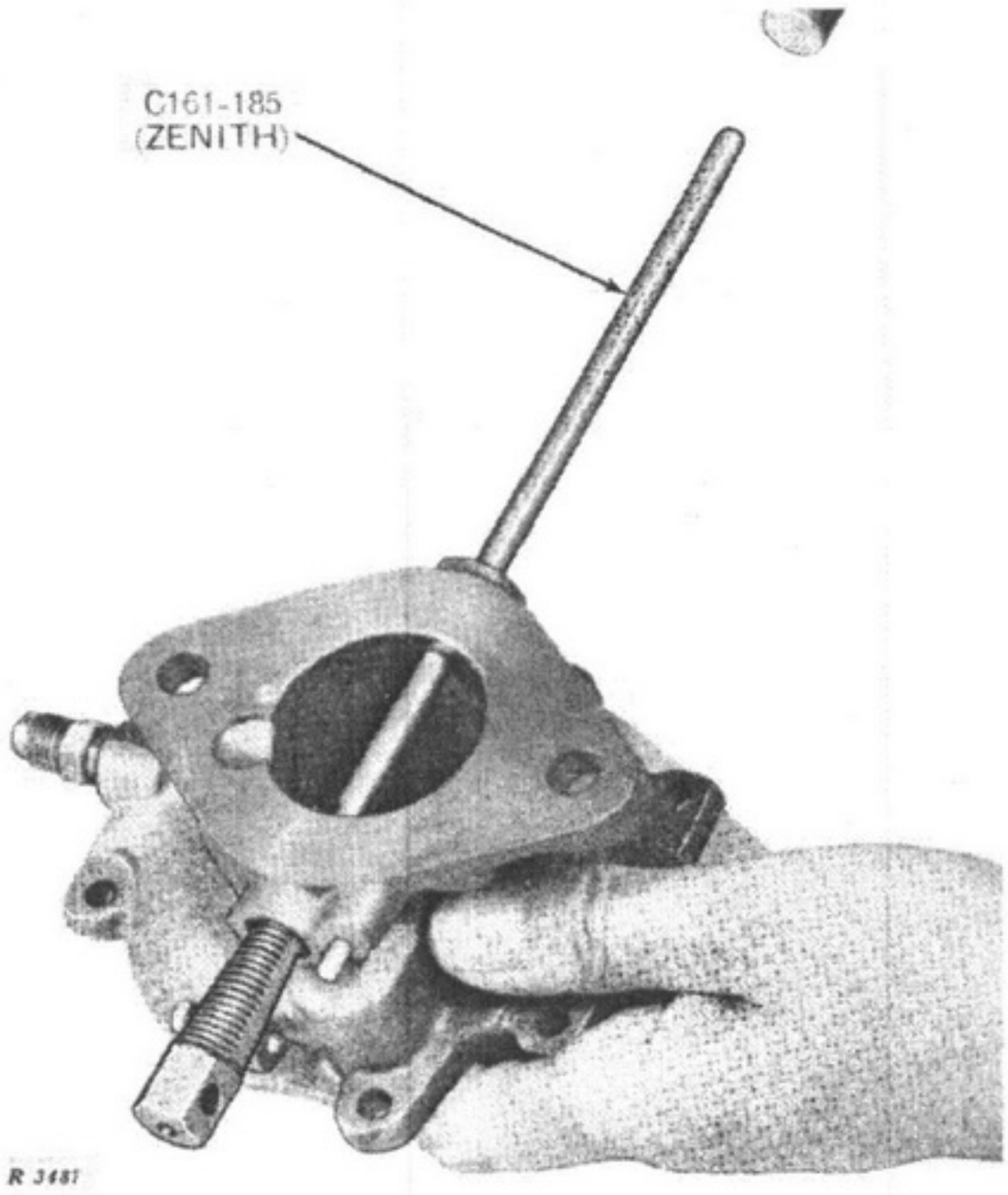


Fig. 80-20-10–Removing Needle Bearing

Remove needle bearing assemblies (10), only if necessary. To do so, insert Zenith service tool C161-185 into shaft hole. Screw threaded end into bearing assembly until it is firmly seated, and drive bearing out from opposite side (Fig. 80-20-10).

NOTE: Do not remove a needle bearing assembly unless it is damaged, or requires replacing due to excessive dirt or carbon deposit. Be sure new bearing assemblies are available to replace those being removed.

Remove fuel connector and screen assembly (61), using open end wrench.

CAUTION: Do not damage screen assembly during removal.

Remove throttle lever adjusting screw (60) and spring (59).

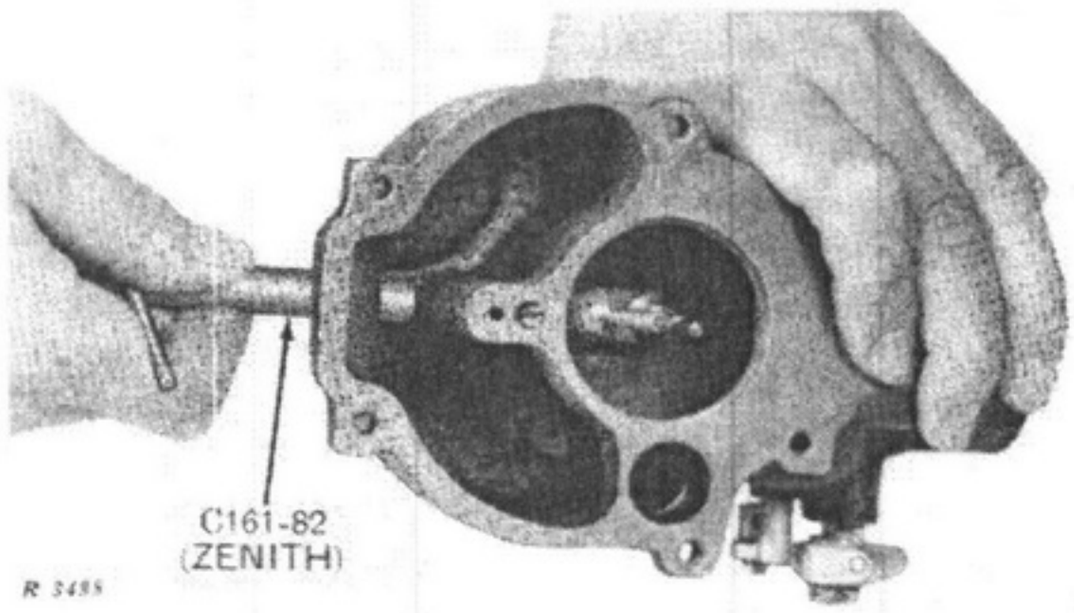


Fig. 80-20-11–Removing Main Jet

Remove load adjusting needle assembly (48) and fiber washer (42), using a 5/8-inch wrench.

Remove main jet (41) and fiber washer (40) from threaded passage, using a wide blade screwdriver or Zenith tool C161-82 (Fig. 80-20-11).

Remove the small (hex.) drain plug (39) from bottom of bowl using 7/16-inch wrench or Zenith tool C161-10 (Fig. 80-20-12).

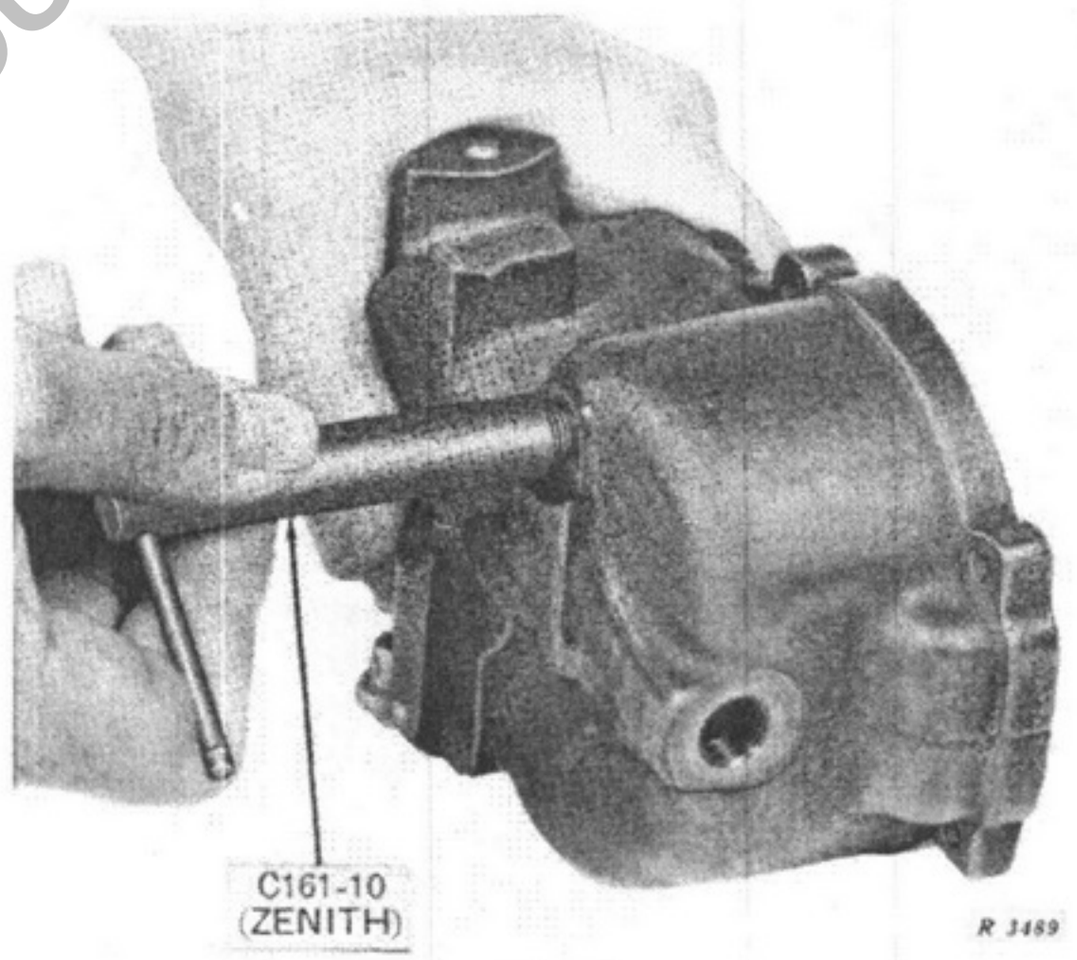


Fig. 80-20-12–Removing Drain Plug

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REMOVAL

NOTE: The tools mentioned in this Group are illustrated in Section 320 of this manual.

1. Remove the tractor cowl and hood. Clean the cylinder head area around the nozzles and blow off with compressed air. Use hose clamp pliers (No. 16429) to loosen lower clamps on the leak-off boots and move clamps up adjacent to the upper clamps. Remove the leak-off pipe, together with the leak-off boots.

2. Disconnect high pressure pipes. Remove nozzle clamp cap screws, clamps, and spacers.

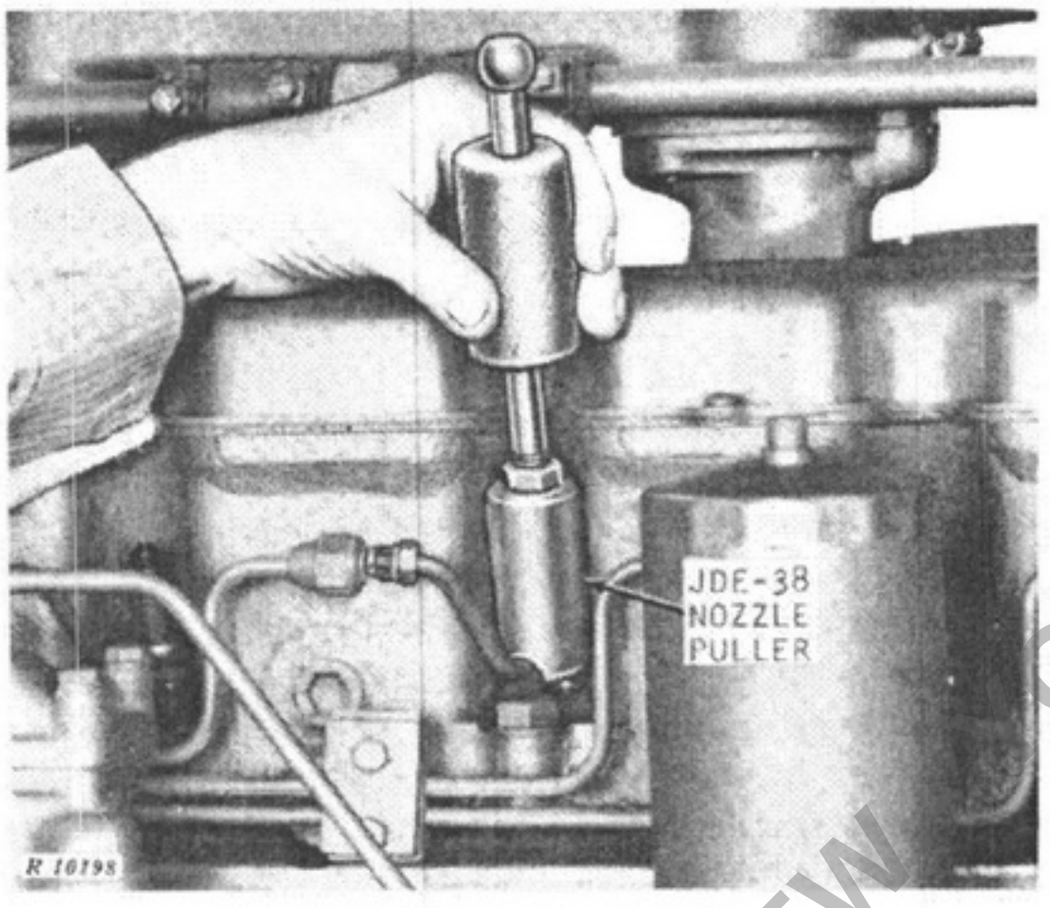


Fig. 90-30-3–Using Nozzle Puller to Remove Nozzle

3. Remove nozzles from the cylinder head. If they cannot be removed easily by hand, use OTC JDE-38 nozzle puller (Fig. 90-30-3) to remove them.

Use care when attaching the puller to the nozzle. Be sure to operate the puller to pull the nozzle straight out of the bore.

CAUTION: Never attempt to remove a stuck nozzle by prying with a screw driver or similar tool. Such practice will result in distortion and possible damage to the nozzle.

4. Cap the nozzle inlet pipe, leak-off opening, and spray tip to prevent damage in handling. Cap the engine high-pressure fuel pipes and plug the cylinder head nozzle openings to prevent entrance of dirt or other foreign matter.

CLEANING

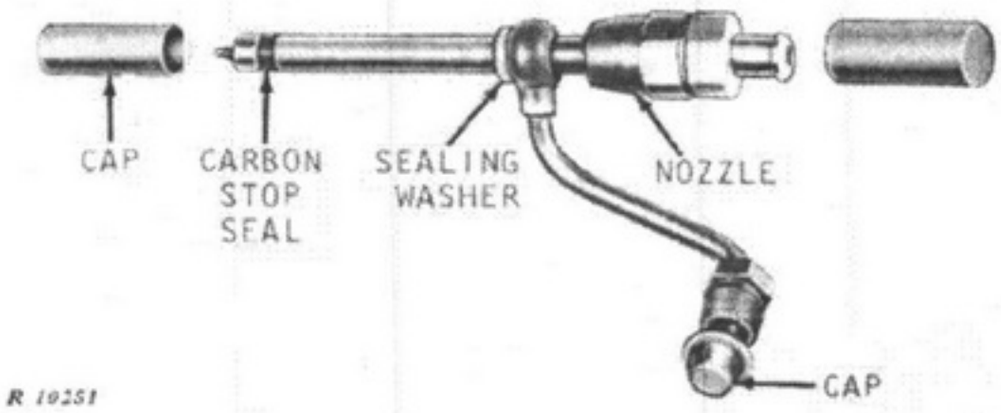


Fig. 90-30-4–Scintilla 9.5-Millimeter Injection Nozzle

Remove the carbon stop seal (Fig. 90-30-4) and sealing washer from the nozzle body and discard. Soak the nozzle in clean solvent or diesel fuel and clean the nozzle body above the spray tip with a BRASS wire brush (Bacharach No. 66-0030 from nozzle cleaning kit No. 66-5056).

CAUTION: Do not scrape or otherwise damage the Teflon coating on the nozzle body above the carbon stop seal groove. This coating will become discolored during normal service but this is not objectionable.

Use a small amount of Bendix 11-5325 lapping compound on a piece of hard felt (Bacharach No. 66-0076) to polish the spray tip.

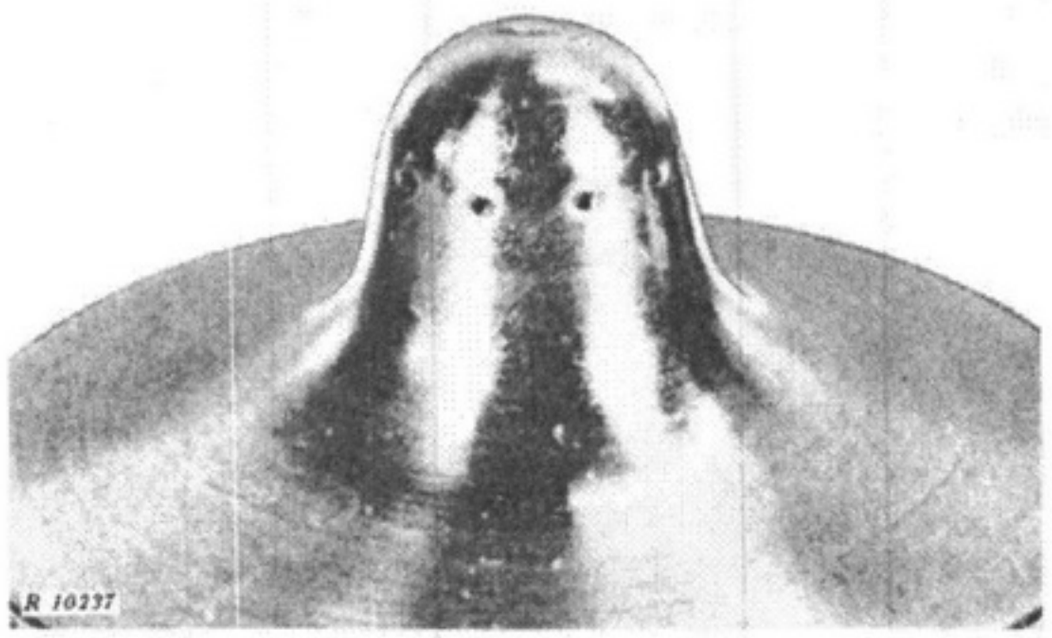


Fig. 90-30-5–Nozzle Orifices Eroded by the Use of a Wire Brush

CAUTION: Do not use emery cloth or any form of steel wire brush on the spray tip. This will cause bell mouthing (Fig. 90-30-5) and will roughen the surface. A rough surface promotes rapid carbon build up, causing smoking and inefficient engine performance.

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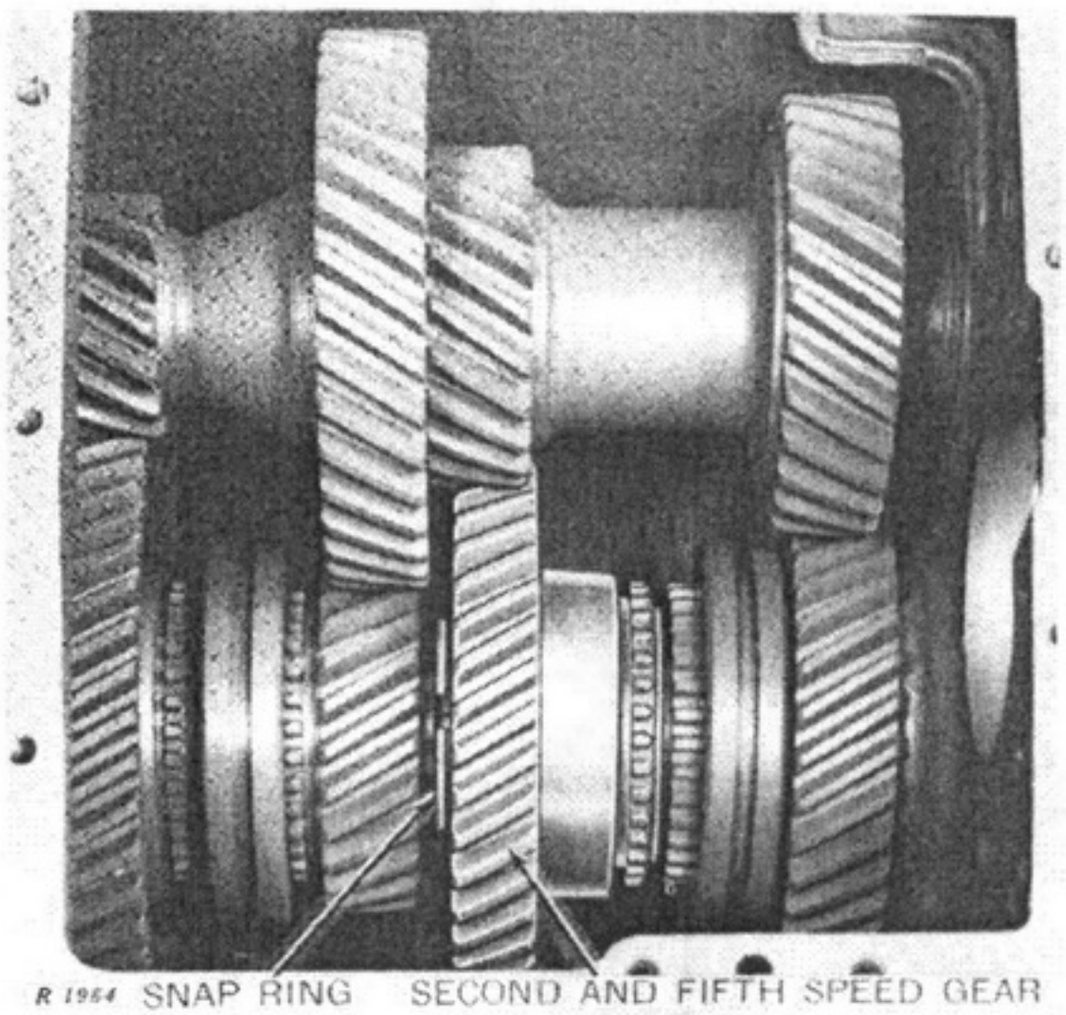


Fig. 120-15-9–Expanding Center Snap Ring

Slide second and fifth speed gear forward on shaft (Fig. 120-15-9). Expand the snap ring, and move it forward on the shaft.

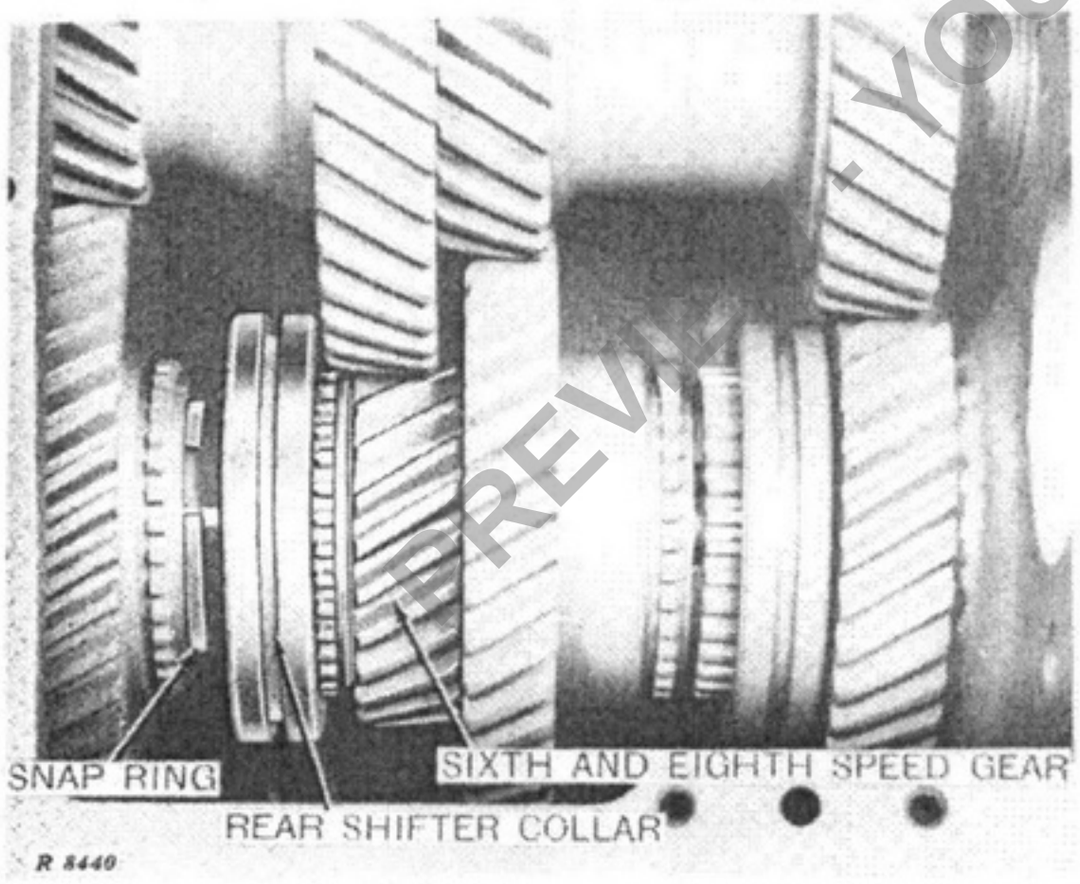


Fig. 120-15-10–Expanding Rear Snap Ring

Slide sixth and eighth speed gear, rear transmission shifter collar, and rear transmission shifter gear forward on shaft (Fig. 120-15-10). Expand the snap ring, and move it forward on the shaft. Use a long brass drift to drive the differential drive shaft to the rear, out of the transmission case. Remove gears, collars, and washers as they fall free of the shaft.

COUNTERSHAFT

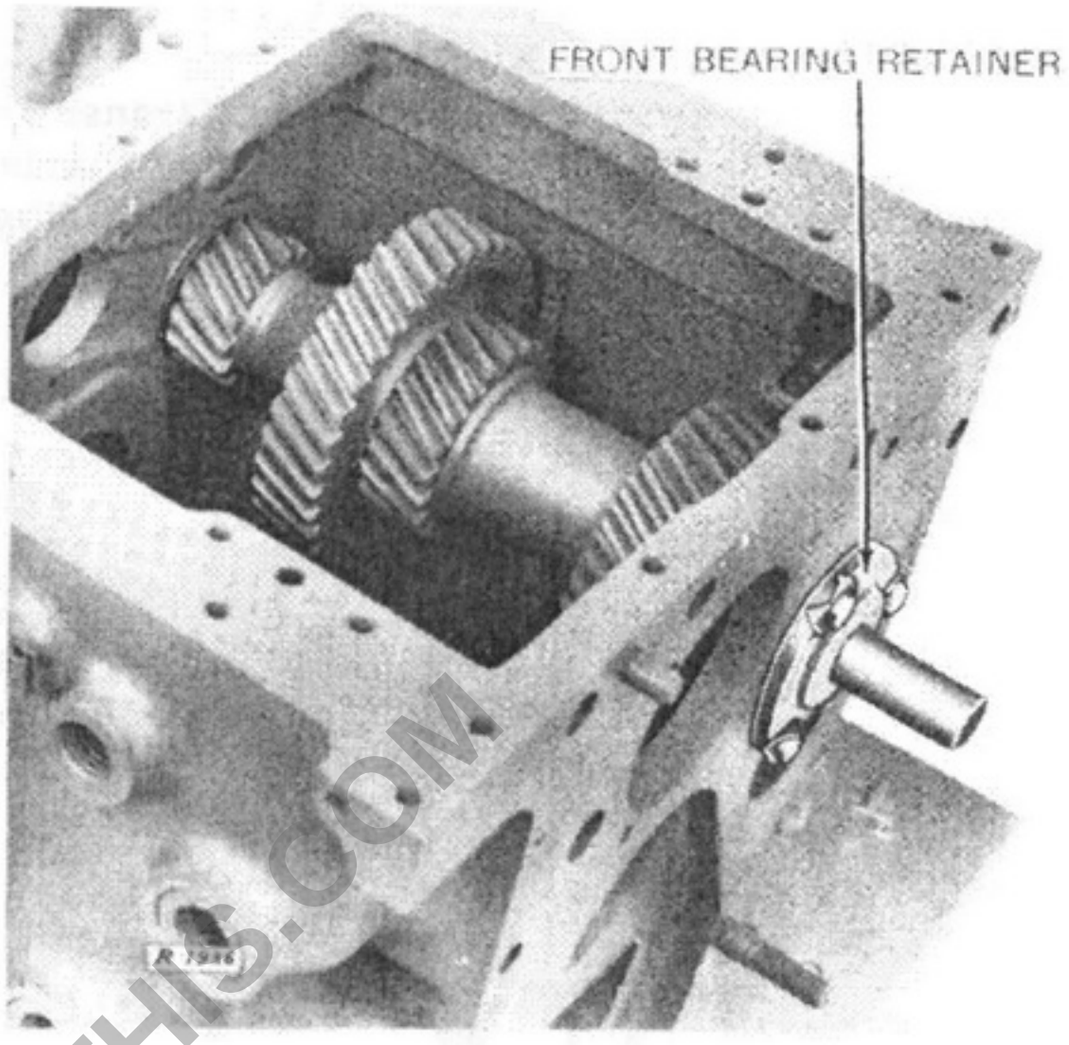


Fig. 120-15-11–Front Bearing Retainer

The transmission drive shaft and the differential drive shaft must be removed before the countershaft can be taken out of the tractor.

Remove the three cap screws and lock plates which secure the front bearing retainer (Fig. 120-15-11) to the transmission case. Remove the bearing retainer and steel shim.

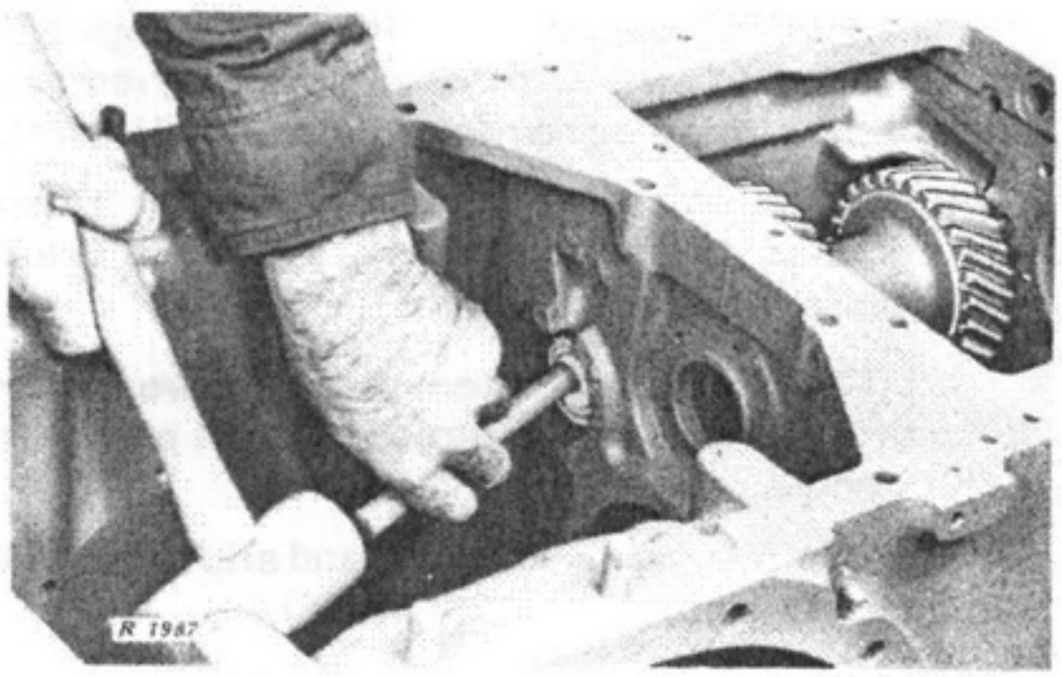
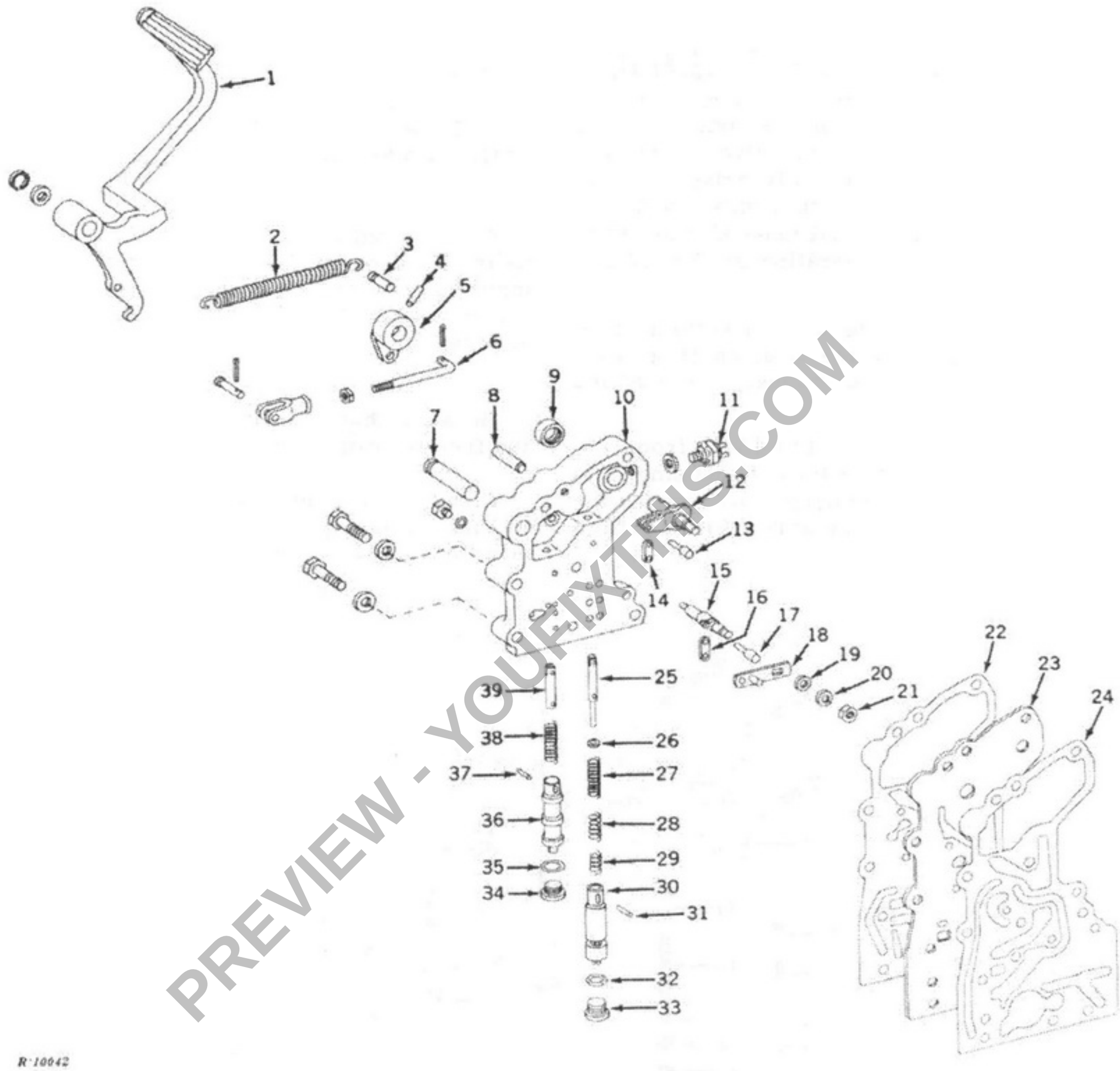


Fig. 120-15-12–Driving Countershaft Forward

Remove the front bearing cup by using a brass drift to drive the countershaft assembly forward as shown in Figure 120-15-12. Slide the countershaft assembly forward, turn and lift the assembly out of the transmission case.

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1–Pedal
2–Spring
3–Pin
4–Roll Pin
5–Valve Operating Arm
6–Valve Operating Rod
7–Pedal Shaft
8–Pedal Stop Pin
9–Oil Seal
10–Pedal Valve Housing
11–Start-Safety Switch
12–Valve Operating Shaft
13–Link Pin
14–Link
15–PTO Valve Operating Shaft
16–Link
17–Link Pin
18–PTO Valve Operating Arm
19–Washer
20–Lock Washer
21–Nut
22–Gasket
23–Gasket Plate
24–Gasket
25–Valve Rod
26–Spring Retainer
27–Spring
28–Spring
29–Spring
30–Pedal Valve
31–Roll Pin
32–O-Ring Seal
33–Plug
34–Plug
35–O-Ring Seal
36–PTO Valve
37–Roll Pin
38–Spring
39–PTO Valve Rod

Fig. 130-15-4–Pedal Valve Parts

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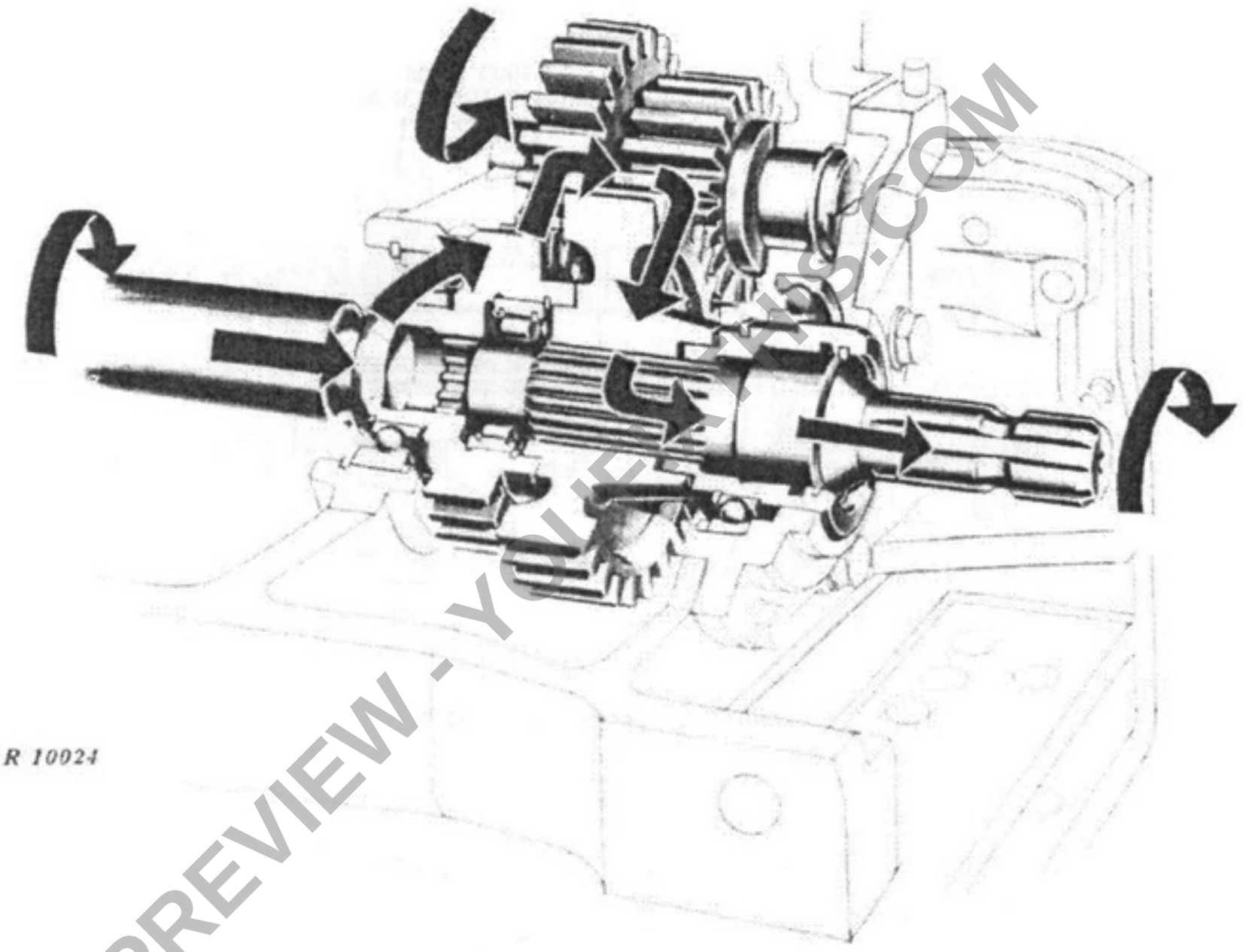
4020 TRACTORS

1000 Rpm Speed

When the 1000 rpm stub shaft is installed in the PTO (Fig. 160-5-3), splines on the end of the stub shaft engage splines inside the end of the PTO shaft. With the engine running at 1900 rpm and the PTO clutch engaged, engine power at 1000 rpm is transmitted directly to the stub shaft.

540 Rpm Speed

When the 540 rpm stub shaft is installed in the PTO (Fig. 160-5-4), splines on the body of the stub shaft engage splines inside the 540 rpm PTO drive gear. With the engine running at 1900 rpm and the PTO clutch engaged, engine power at 1000 rpm is transmitted from the PTO shaft to the idler gear, which in turn transmits engine power to the 540 rpm PTO drive gear and stub shaft.



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Fig. 160-5-4 – Operation of 4020 PTO at 540 RPM

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CLEANING CONTACT POINTS

A great majority of regulator malfunctions can be eliminated by a simple cleaning of the contact points.

Remove the regulator cover.

To expose the contact points for cleaning, remove the two nylon contact support nuts and the upper contact support on post-type regulators (Fig. 190-20-4). On 24-volt standard regulators, remove or tilt aside the contact point bracket (Fig. 190-20-5).

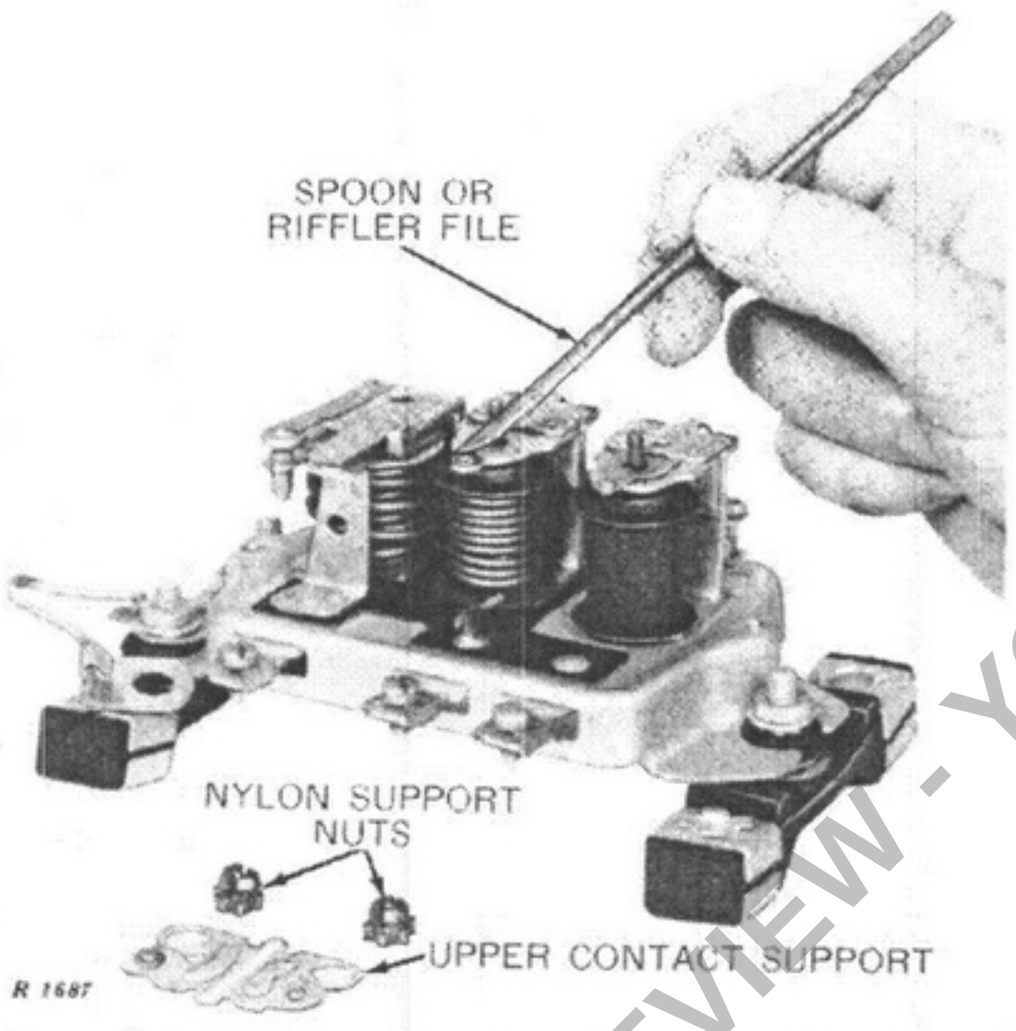


Fig. 190-20-4–Cleaning the Large Flat Contact Point on a Post-Type Regulator

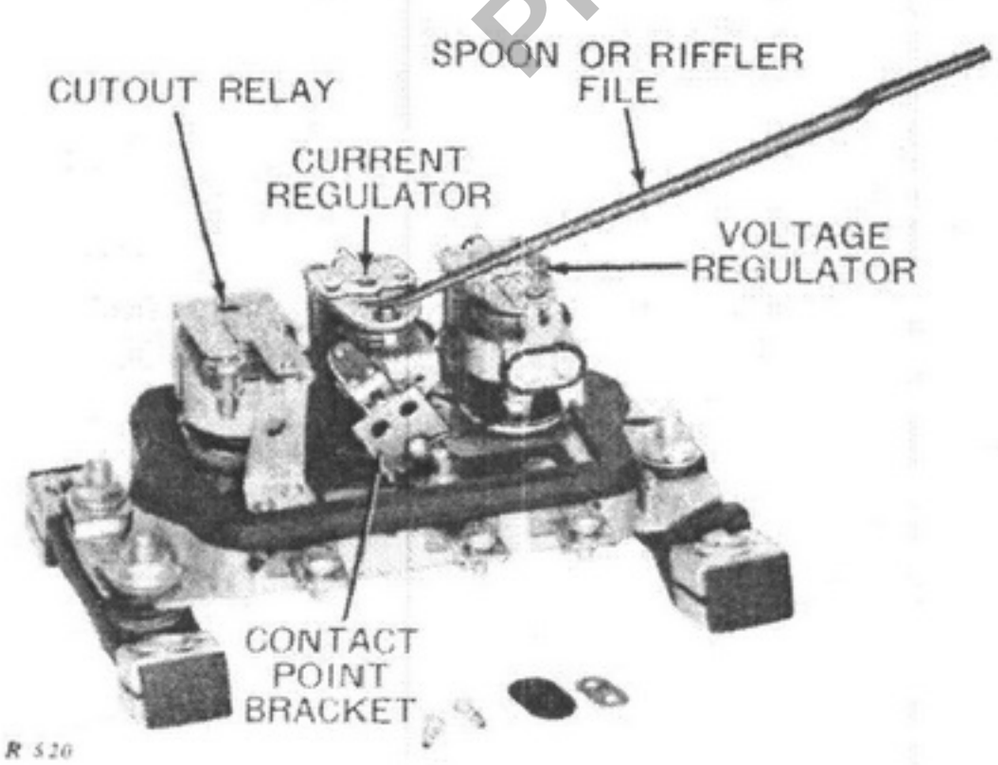


Fig. 190-20-5–Cleaning the Large Flat Contact Point on a 24-Volt Standard Regulator

Clean the larger flat points with a spoon or riffler file. It is not necessary to have a flat surface on this contact point, but all oxide should be removed so that pure metal is exposed.

CAUTION: Never use sandpaper or emery cloth to clean contact points.

The smaller soft-alloy contact points do not oxidize. Clean these contact points with crocus cloth.

After filing, dampen a strip of lint free cloth in lighter fluid or trichlorethylene and draw between the points. Then repeat with dry tape to remove the residue. Observe caution when using lighter fluid.

MECHANICAL ADJUSTMENTS

While making mechanical adjustments, do not connect the unit to an electrical source.

CUTOUT RELAY

The cutout relay has two mechanical adjustments: Air gap and point opening.

Air Gap Adjustment

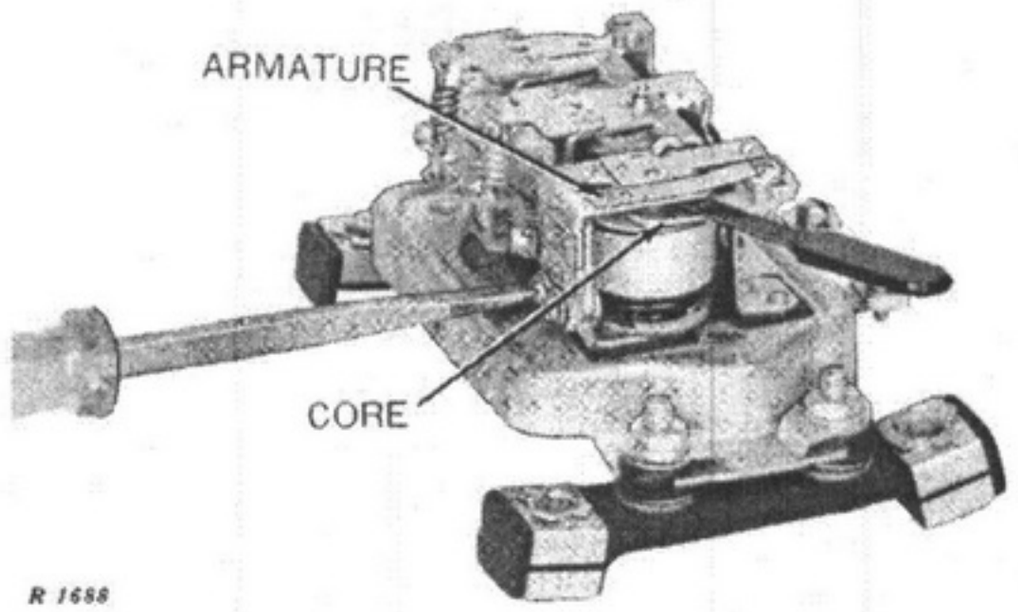


Fig. 190-20-6–Adjusting Cutout Relay Air Gap

Move the relay armature toward the core until the points just close. Your finger must be on the armature directly above the core. Insert a feeler gauge between the armature and the core. On a 12-volt regulator, use a 0.020-inch gauge; on a 24-volt regulator, use a 0.017-inch gauge (Fig. 190-20-6). Raise or lower the armature as required. Make sure points are aligned.

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Place the end of the brass drift in notch in hub shown in Figure 220-5-3.

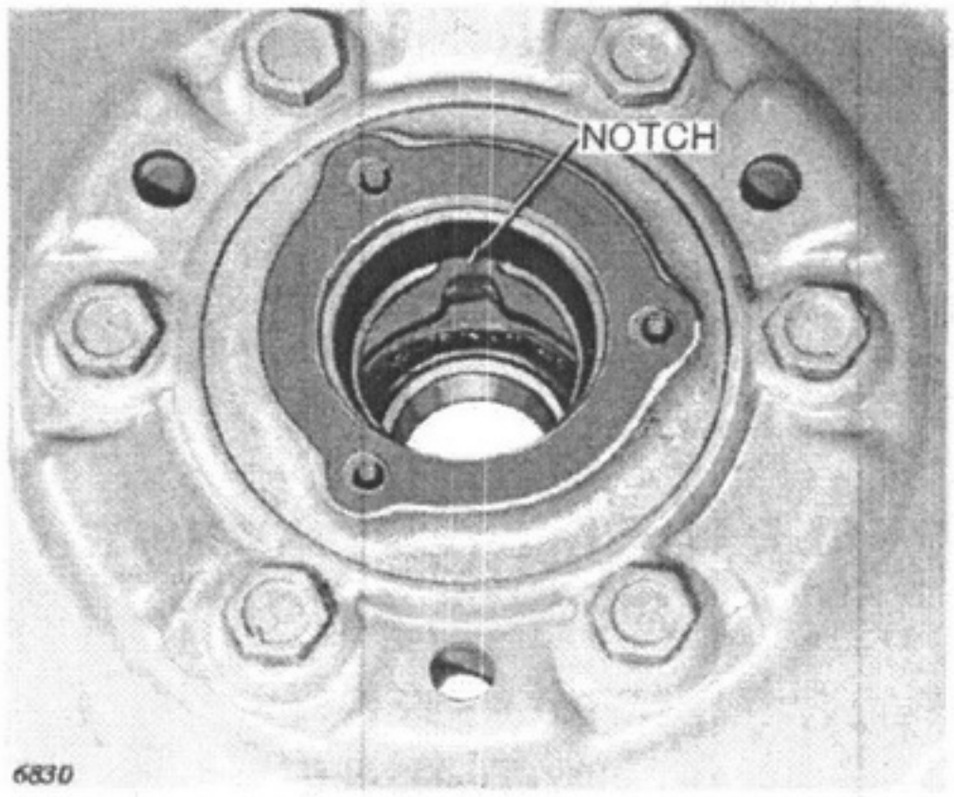


Fig. 220-5-3 – Notch in Hub for Bearing Cup Removal

The oil seal cup will be driven out by the bearing cup. If grooves are worn in oil seal cup or if the bearing grease is dirty, replace both the oil seal and the oil seal cup.

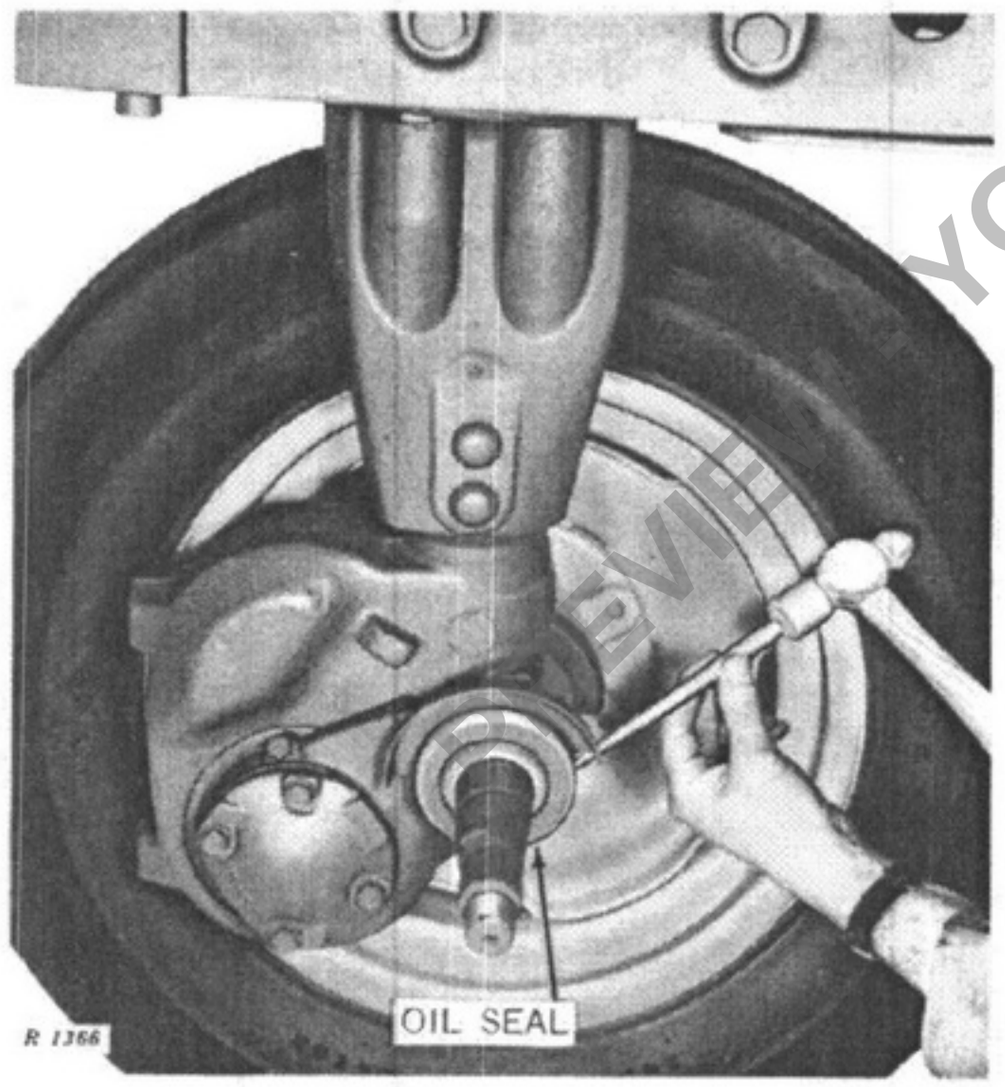


Fig. 220-5-4 – Removing Oil Seal

Remove oil seal from spindle (Fig. 220-5-4). Press new oil seal on spindle with the stamped numbers facing outward. Use JDH-7 driver (Fig. 220-5-5).

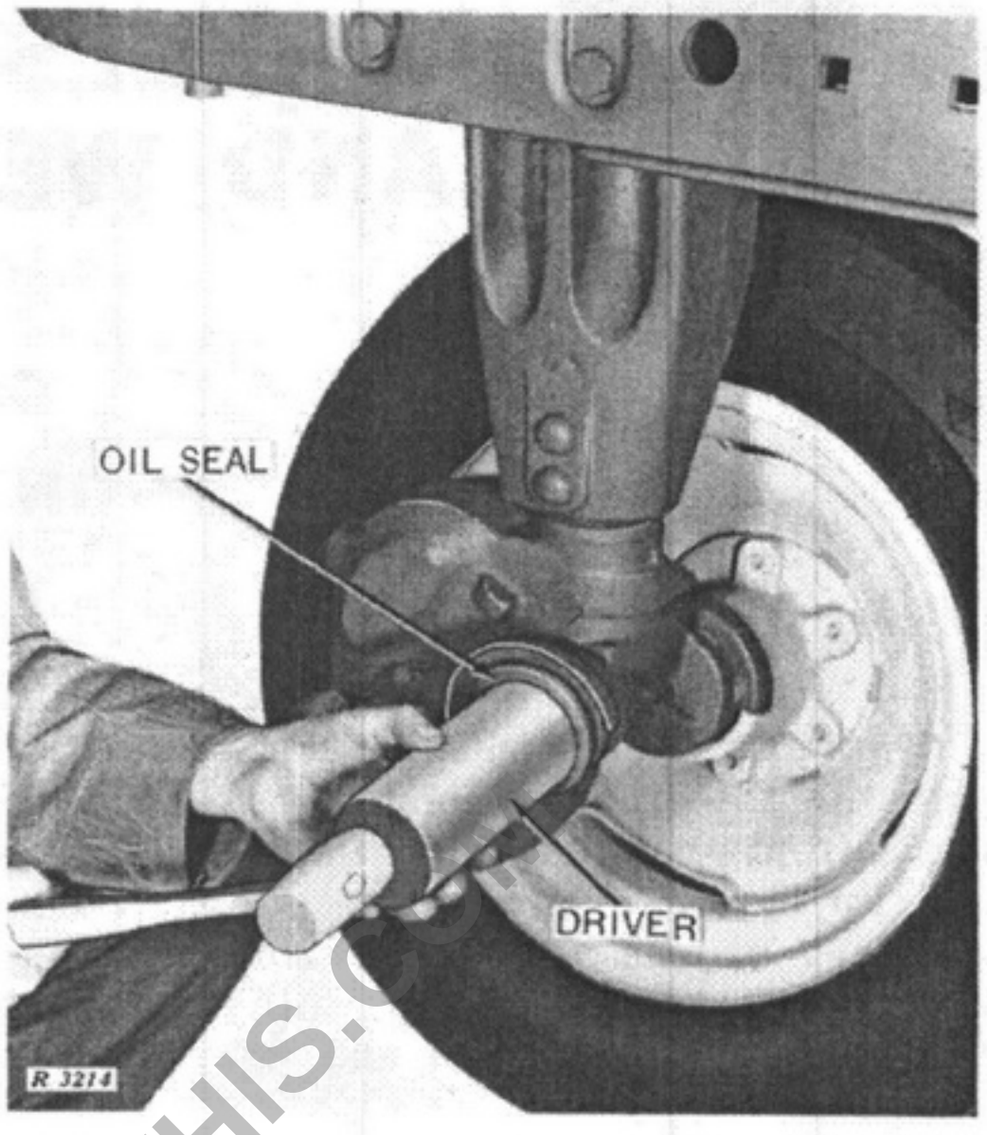


Fig. 220-5-5 – Installing Oil Seal

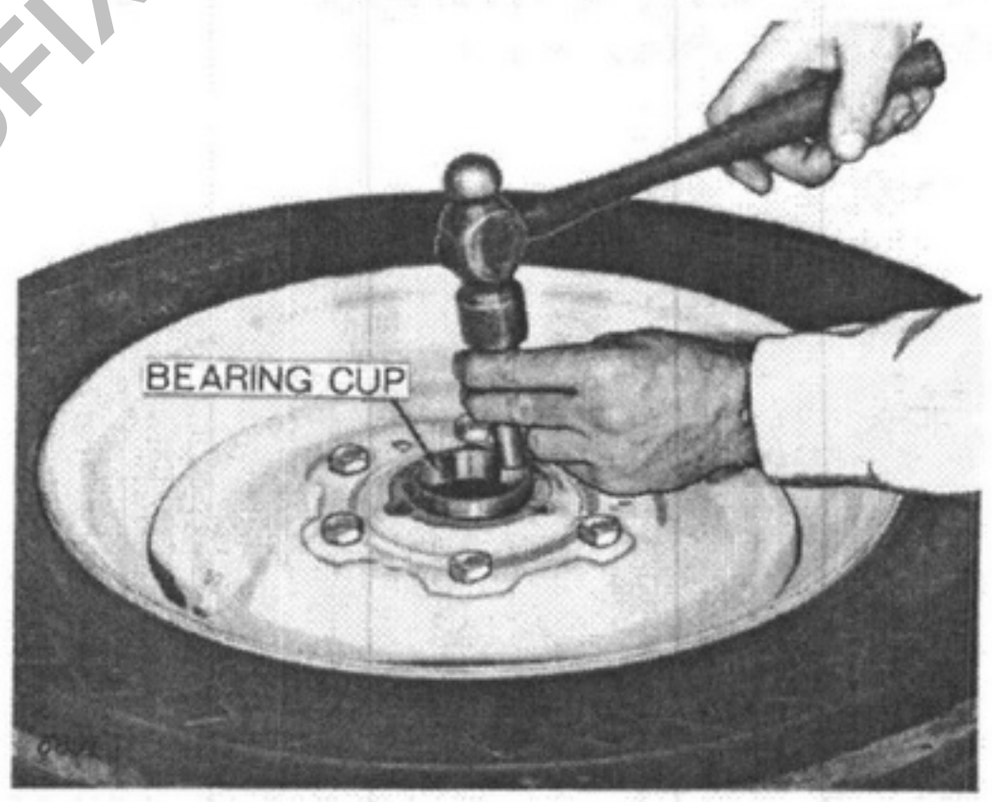


Fig. 220-5-6 – Installing Bearing Cup

Install new bearing cups (Fig. 220-5-6) with the small inside diameter in first.

Carefully install a new oil seal cup. Use a flat plate or block to press the cup in the hub.

CAUTION: If the oil seal cup inside diameter is dented or buckled the seal will not seal effectively.

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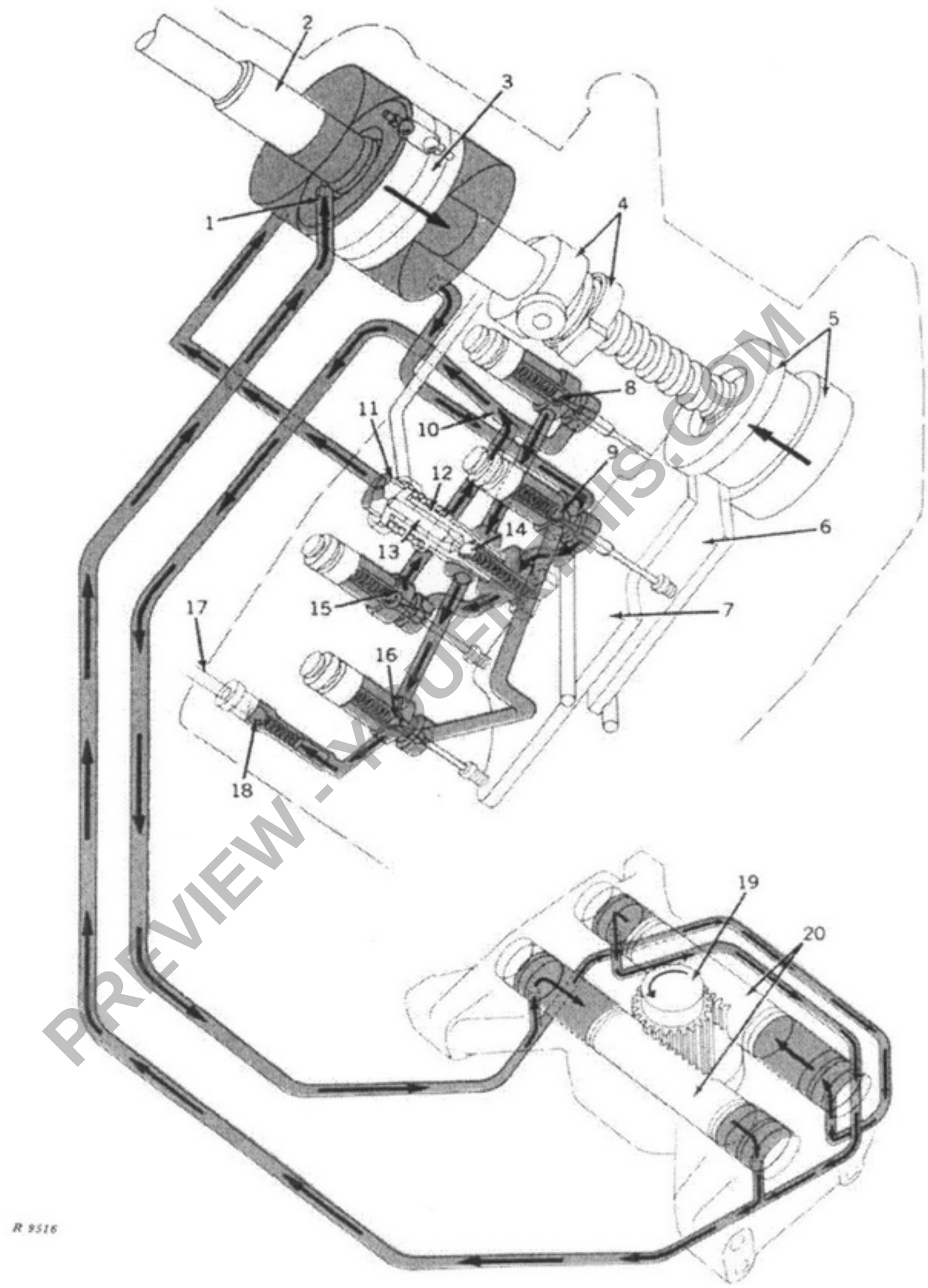
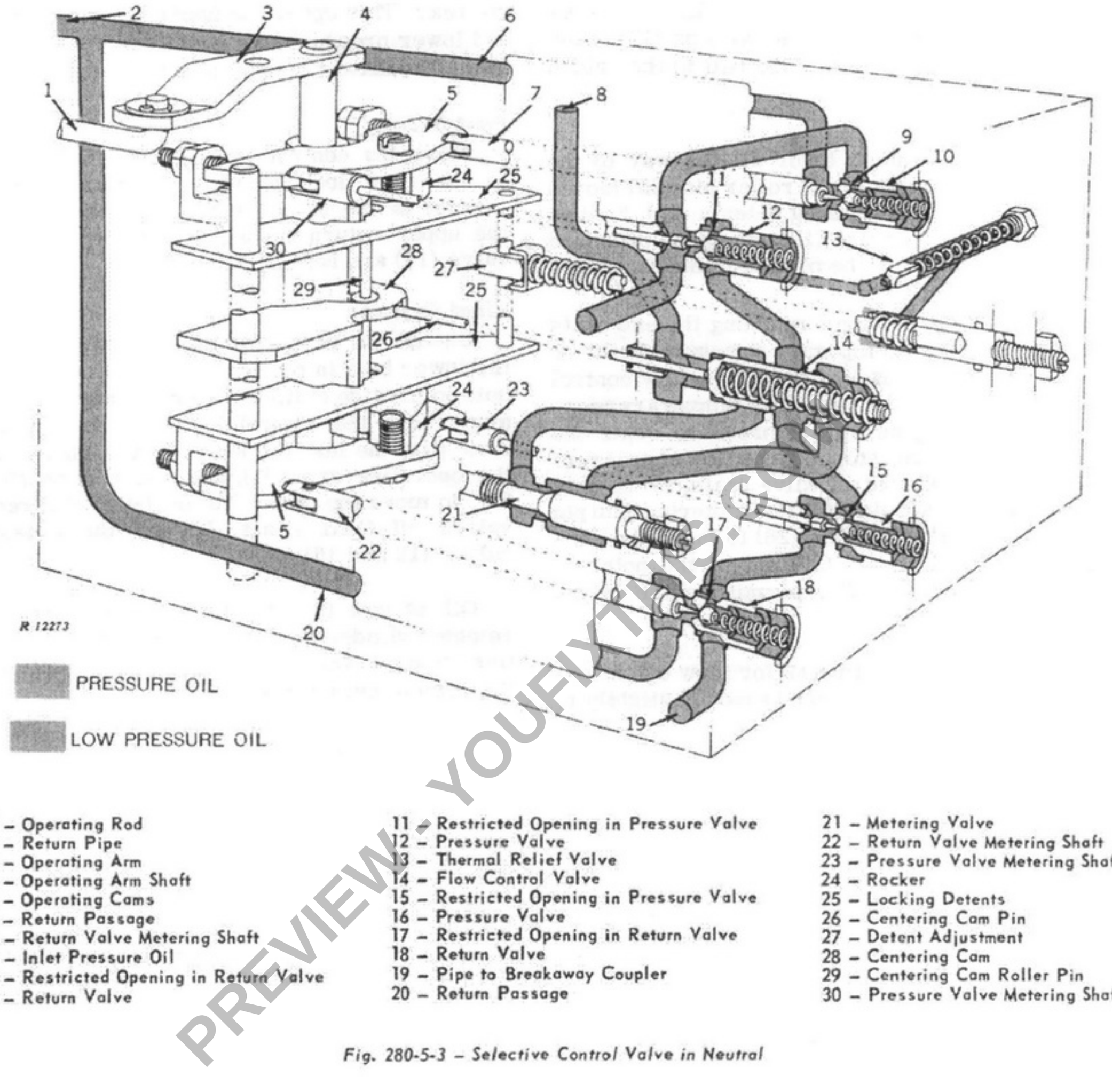


Fig. 250-5-8--4020 Left-Hand Manual Turn

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1 – Operating Rod
2 – Return Pipe
3 – Operating Arm
4 – Operating Arm Shaft
5 – Operating Cams
6 – Return Passage
7 – Return Valve Metering Shaft
8 – Inlet Pressure Oil
9 – Restricted Opening in Return Valve
10 – Return Valve
11 – Restricted Opening in Pressure Valve
12 – Pressure Valve
13 – Thermal Relief Valve
14 – Flow Control Valve
15 – Restricted Opening in Pressure Valve
16 – Pressure Valve
17 – Restricted Opening in Return Valve
18 – Return Valve
19 – Pipe to Breakaway Coupler
20 – Return Passage
21 – Metering Valve
22 – Return Valve Metering Shaft
23 – Pressure Valve Metering Shaft
24 – Rocker
25 – Locking Detents
26 – Centering Cam Pin
27 – Detent Adjustment
28 – Centering Cam
29 – Centering Cam Roller Pin
30 – Pressure Valve Metering Shaft

Fig. 280-5-3 – Selective Control Valve in Neutral

Resistance can be felt on the control lever indicating that the return valve ball is being lifted from its seat. The control lever must be held in position, against the resistance of the return valve spring, during slow extend operation.

Opening the pressure valve causes a momentary pressure drop behind the pressure valve (12) and flow control valve (14). Inlet pressure oil then overcomes spring and oil pressure on the back side of the flow control valve (14), moving the flow control valve off its seat. With the flow control valve off its seat, pressure oil flows past the metering valve (21) through the slotted skirt of the flow control valve and on to the pressure valve. Pressure oil moves the pressure valve back to the ball, unseating the valve, permitting the pressure oil to flow to the breakaway coupler and remote cylinder.

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