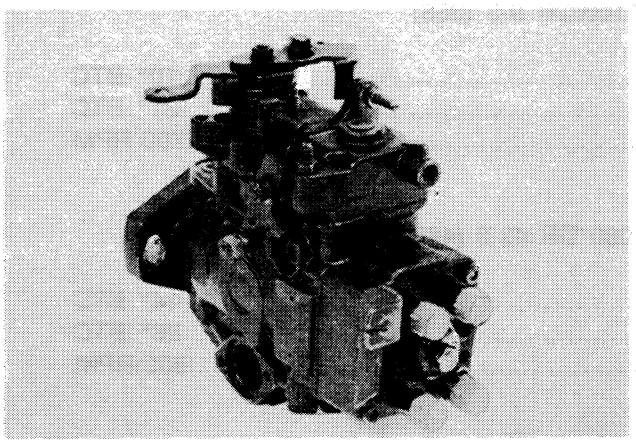
Fuel Injection Pump - VE Type



Type . . . . . Single Plunger With Rotary Distributor
Rotation . . . . . Clockwise (When Looking At Drive Gear)
Mounting . . . . . Left Hand Side Of Engine
Drive . . . . . Gear Drive At 1/2 Engine Speed
Governor . . . . . Internal Hydraulic
Lubrication . . . . . Fuel Oil Under Pressure
Hand Primer Pump (Tractors With XL Cab Only) . . . . . Before Fuel Filters

Tractor Model	Engine Type/ Identification N°.	Injection Pump Identification N°. (See Individual Specifications)
385	D-155 3 Cylinder	Bosch EP/VE3/10F 1100 R276-1 (Case Part N°. 1 329 101 C91)
485	D-179 3 Cylinder	Bosch EP/VE3/10F 1090 R276-2 (Case Part N°. 1 329 100 C91)
585	D-206 4 Cylinder	Bosch EP/VE4/10F 1150RV 10 484-6 (Case Part N°. 1 329 137 C1)
685	D-239 4 Cylinder	Bosch EP/VE4/10F 1150RV 10 484-3 (Case Part N°. 1 329 127 C1)
685 NAO	D-239 4 Cylinder	Bosch EP/VE4/10F 1200RV 10 484-4 (Case Part N°. 1 329 128 C1)
785	D-246 4 Cylinder	Bosch EP/VE4/11F 1200RV 10 459-3 (Case Part N°. 1 329 169 C1)
885	D-268 4 Cylinder	Bosch EP/VE4/11F 1200 R-277 (Case Part N°. 1 329 107 C91)
248	D-179 3 Cylinder	Bosch EP/VE3/10F 1090 R276-2 (Case Part N°. 1 329 100 C91)
258	D-206 4 Cylinder	Bosch EP/VE4/10F 1150RV 10 484-6 (Case Part N°. 1 329 137 C1)
380B	D-179 3 Cylinder	Bosch EP/VE3/10F 1090 R276-2 (Case Part N°. 1 329 100 C91)

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ENGINE TROUBLESHOOTING CHART

GIVE A SUMMARY OF THE PROBLEM AND FIND THE EXACT SIGNS.

- ENGINE WILL NOT TURN (SEE PAGES 1 THROUGH 4)
- ENGINE DIFFICULT TO START OR WILL NOT START (SEE PAGES 5 THROUGH 7)
  - NO SMOKE FROM EXHAUST (SEE PAGE 5)
  - SMOKE FROM EXHAUST (SEE PAGES 6 AND 7)
- ENGINE STARTS BUT WILL NOT RUN (SEE PAGES 8 AND 9)
- ENGINE DOES NOT FIRE CORRECTLY (SEE PAGES 9 THROUGH 11)
- ENGINE NOISE (SEE PAGES 11 THROUGH 13)
- ENGINE TEMPERATURE ABOVE NORMAL (SEE PAGES 14 THROUGH 15)
- ENGINE DOES NOT HAVE POWER (SEE PAGES 16 AND 17)
- HIGH ENGINE OIL CONSUMPTION (SEE PAGES 18 AND 19)
  - EXTERNAL LEAKAGE (SEE PAGE 18)
  - INTERNAL LEAKAGE (SEE PAGES 18 AND 19)
- LOW ENGINE OIL PRESSURE (SEE PAGES 20 AND 21)
  - EXTERNAL PROBLEMS (SEE PAGE 20)
  - INTERNAL PROBLEMS (SEE PAGE 20 AND 21)

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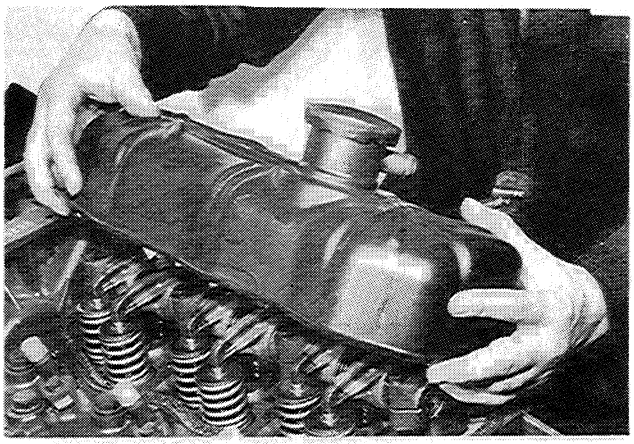
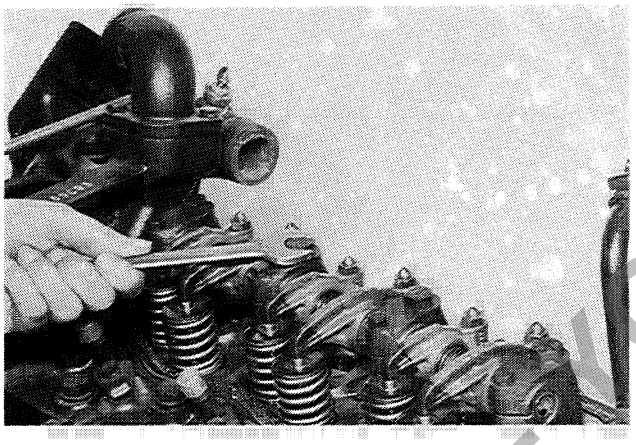
STEP 24



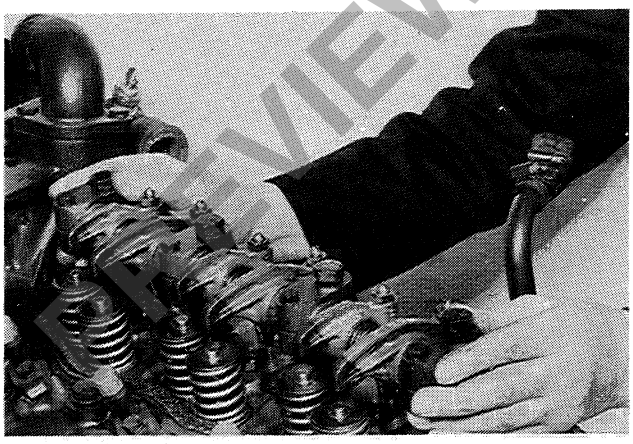
Remove the rocker arm cover.

STEP 25



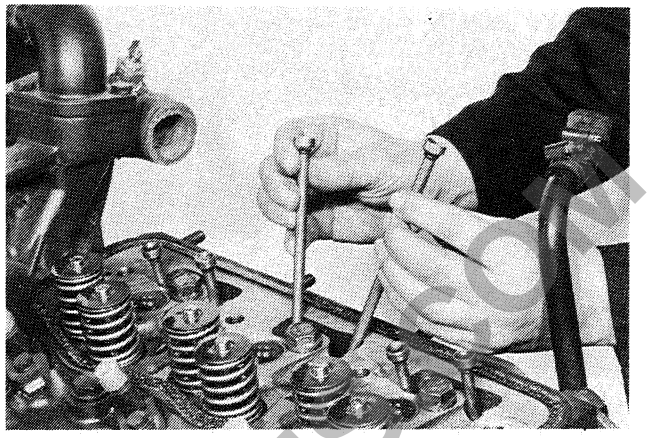
Remove the rocker arm pedestal bolts.

STEP 26



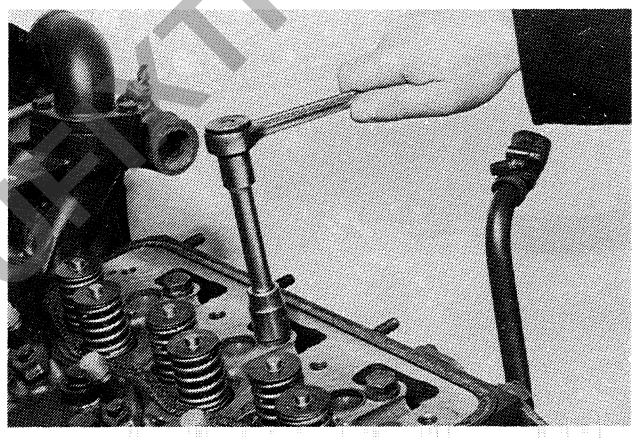
Lift off the rocker arm shaft assembly.

STEP 27



Remove the push rods.

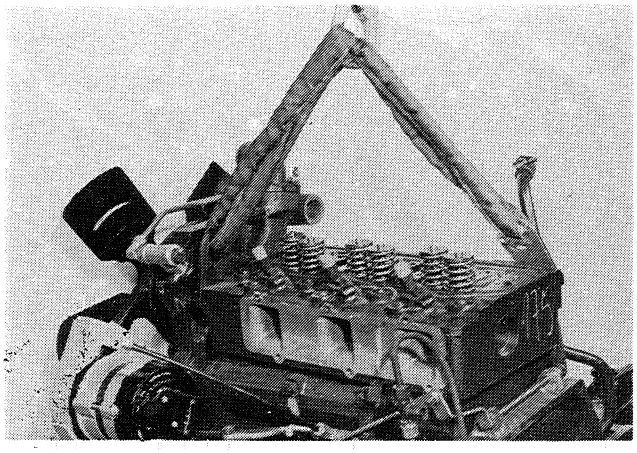
STEP 28



Remove the cylinder head bolts.

NOTE: *The cylinder head bolts are of two different lengths. The two outer rows are shorter than the two inner rows.*

STEP 29



Attach the cylinder head to a lifting hoist and lift off the cylinder head.

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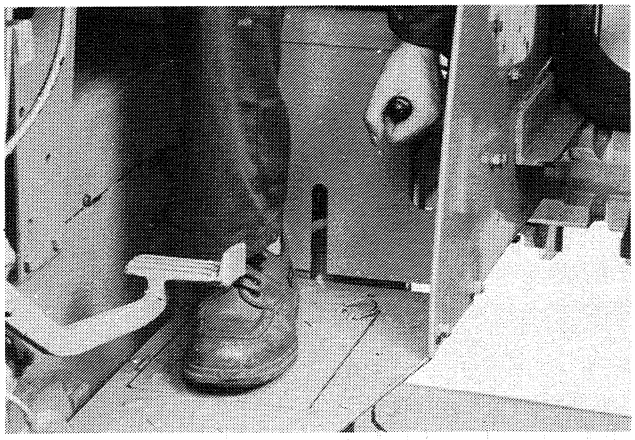
SEPARATING THE TRACTOR

IMPORTANT: *Remove front ballast weight and any front mounted equipment before separating the tractor.*

STEP 1



Move the tractor onto level ground then apply the parking brake.

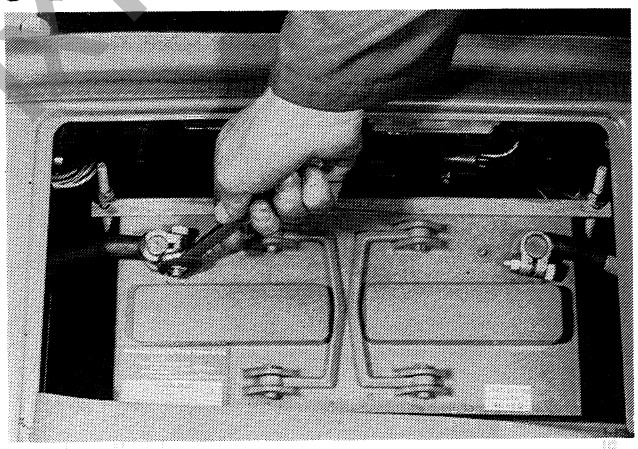
STEP 2

Put blocks in front of and behind the rear tires.

STEP 3

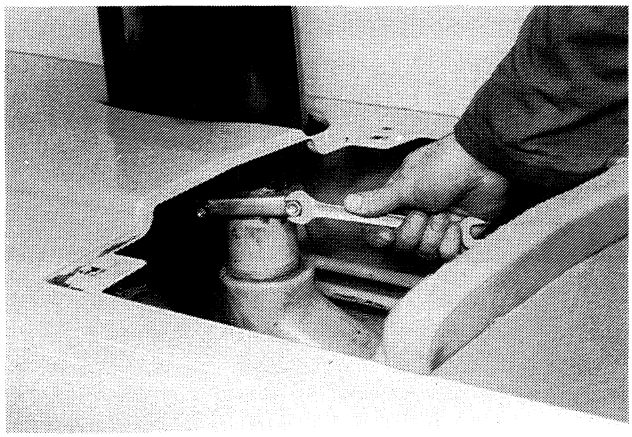
Remove the hood panel to have access to the battery.

STEP 4



Disconnect the cables from the negative (-) and then the positive (+) battery terminals.

STEP 5 Tractors With Vertical Muffler



Loosen the muffler clamp nuts.

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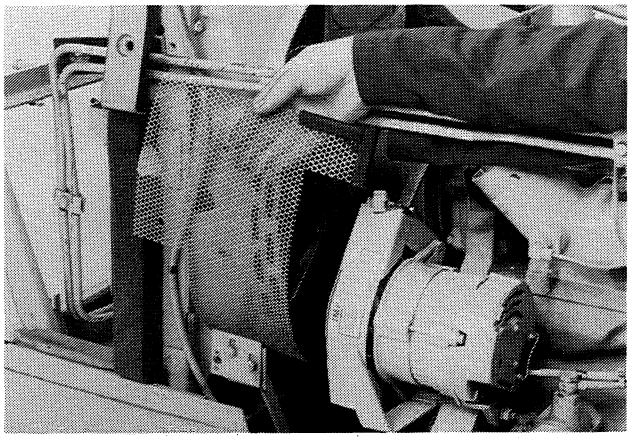
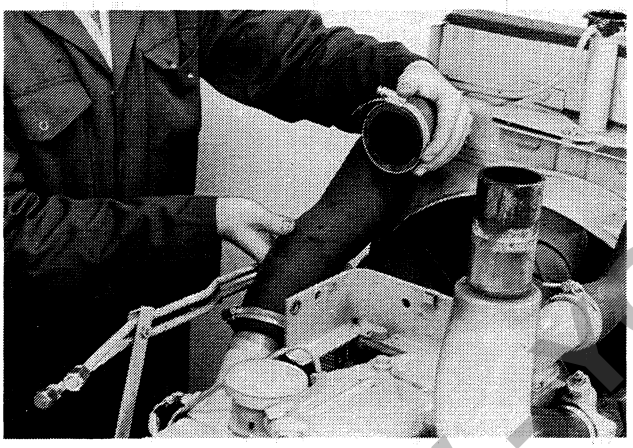
STEP 32



Repeat the procedure to install the fan guard on the left hand side.

STEP 33

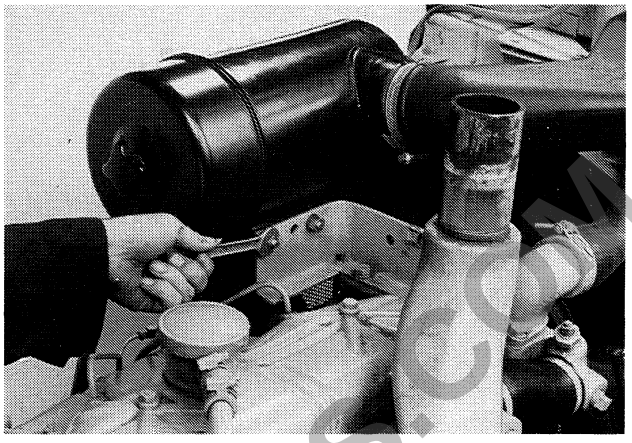


Remove the plug from the inlet manifold. Fit the air tube then tighten the clip.

STEP 34

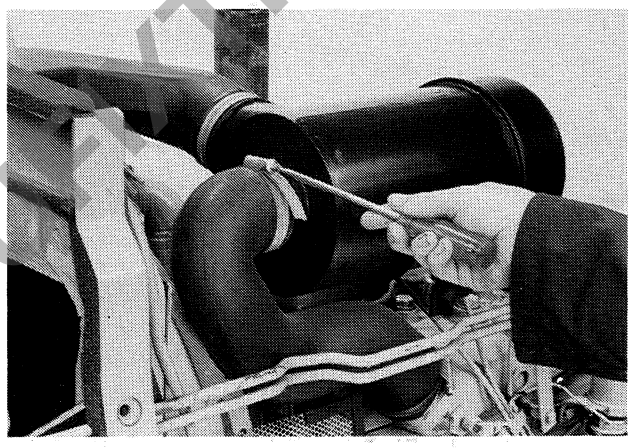
Install the air cleaner and inlet tube.

STEP 35



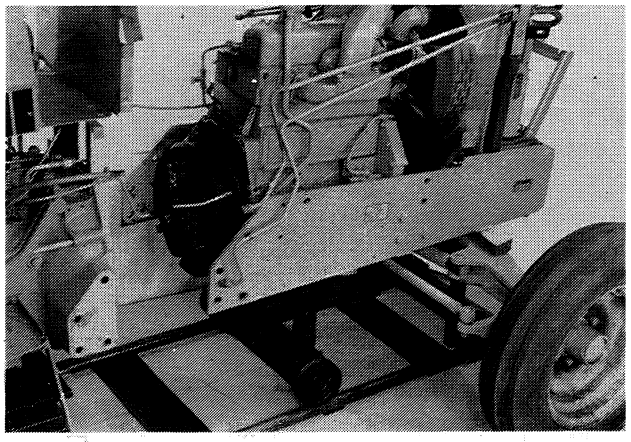
Install and evenly tighten the two nuts and spring washers onto the bracket bolts.

STEP 36



Tighten the clip on the air outlet tube from the air cleaner.

STEP 37



Move the splitting frame rearwards to support the engine then remove the axle stands from the bolster plates. If removed, install the rear guide rail of the splitting frame.

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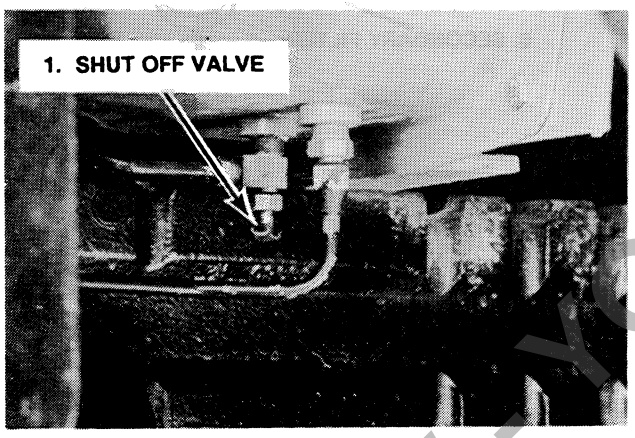
AIR REMOVAL

STEP 6

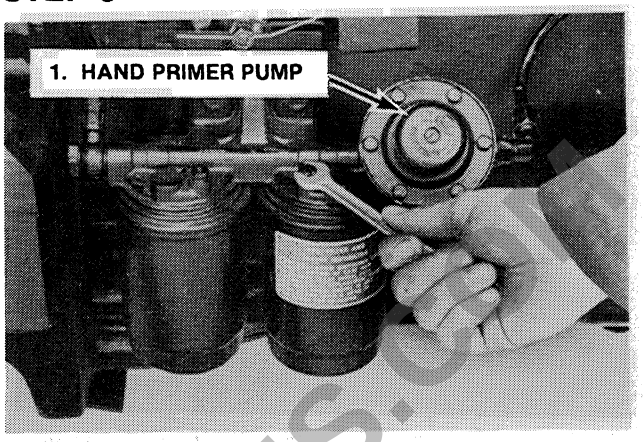
Make sure there is fuel in the fuel tank.

STEP 7



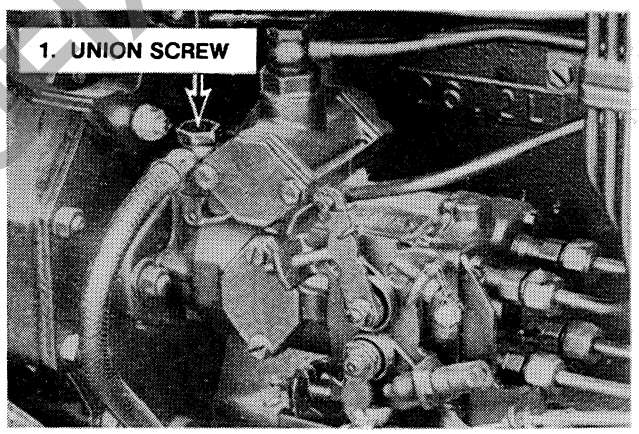
On Non Cab (ROPS) and L Cab Tractors open the fuel shut off valve.

STEP 8



Loosen the air removal screw above the filter head. On XL Tractors actuate the hand primer pump. Close the air removal screw when clear fuel with no air bubbles flows from the screw.

STEP 9



Loosen the union screw on the fuel injection pump. On XL Tractors actuate the hand primer pump. Close the air removal screw when clear fuel with no air bubbles flows from the screw. Actuate hand primer pump five more times to finish the air removal.

NOTE: *If the hand primer pump cannot be actuated turn engine over until the pump can be actuated.*

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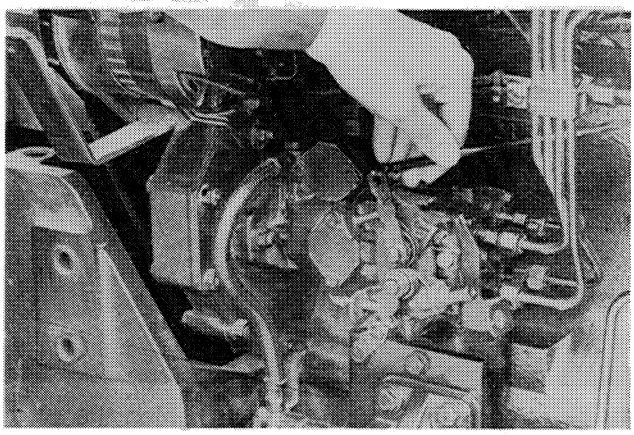
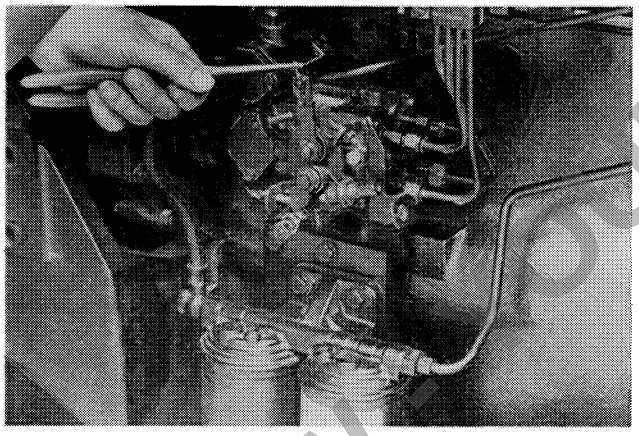
STEP 79
Tractors Without XL Cab



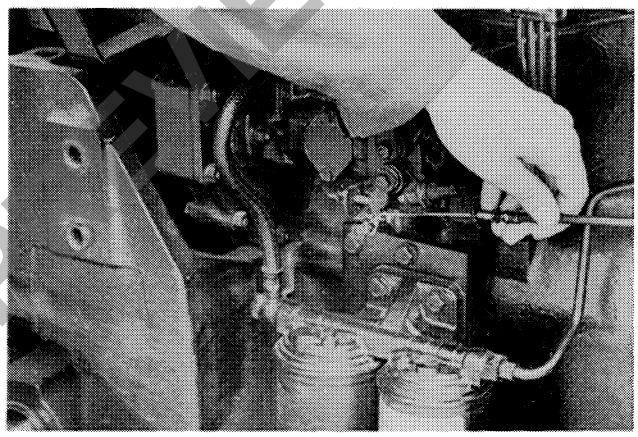
Fit the throttle rod to the lever on the injection pump.

STEP 80



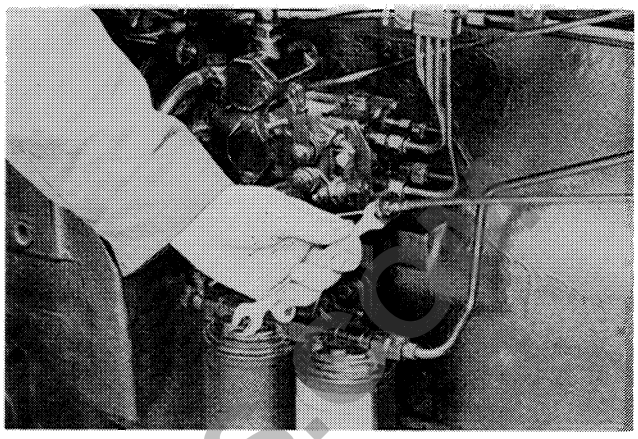
Fit the split pin.

STEP 81



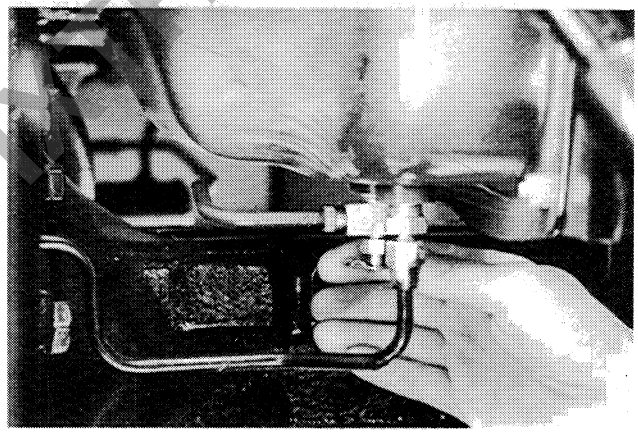
Fit the engine stop cable onto the injection pump.

STEP 82



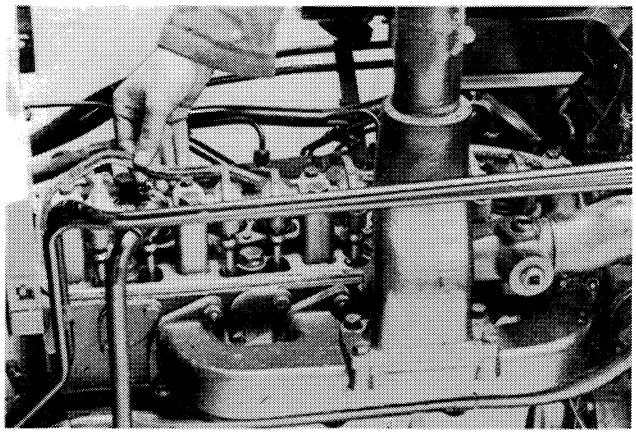
Tighten the locknut.

STEP 83



Open the fuel tap under the right hand fuel tank.

STEP 84
All Tractors



Fit a new rocker cover gasket onto the cylinder head.

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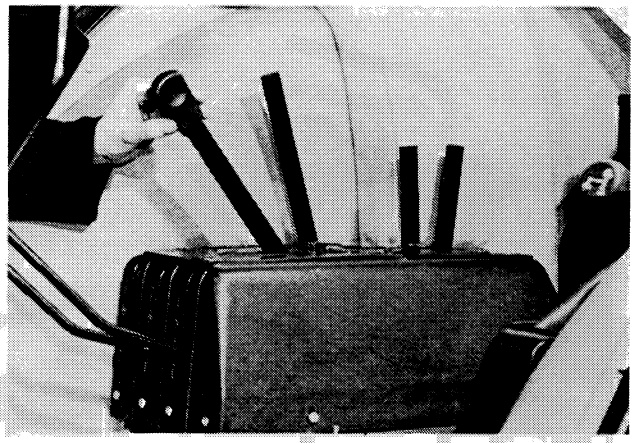
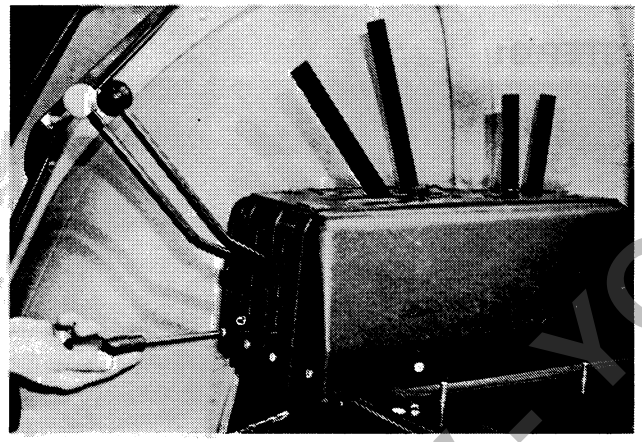
Automatic Hitch Lock Warning Switch

STEP 92



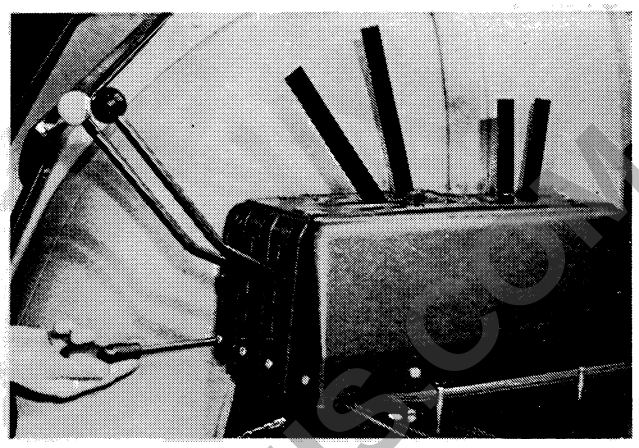
Pull the knobs from the hydraulic control levers.

STEP 93



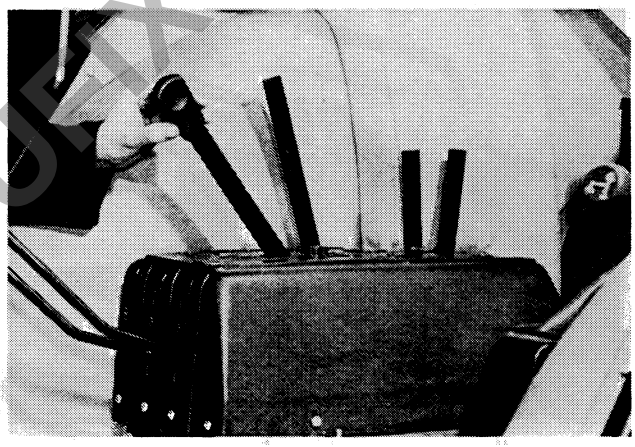
Remove the screws that hold the console in position then remove the console to have access to the automatic hitch lock warning switch.

STEP 94



When the testing is complete, fit the console into position. Install and evenly tighten the console screws.

STEP 95



Fit the knobs onto the hydraulic control levers.

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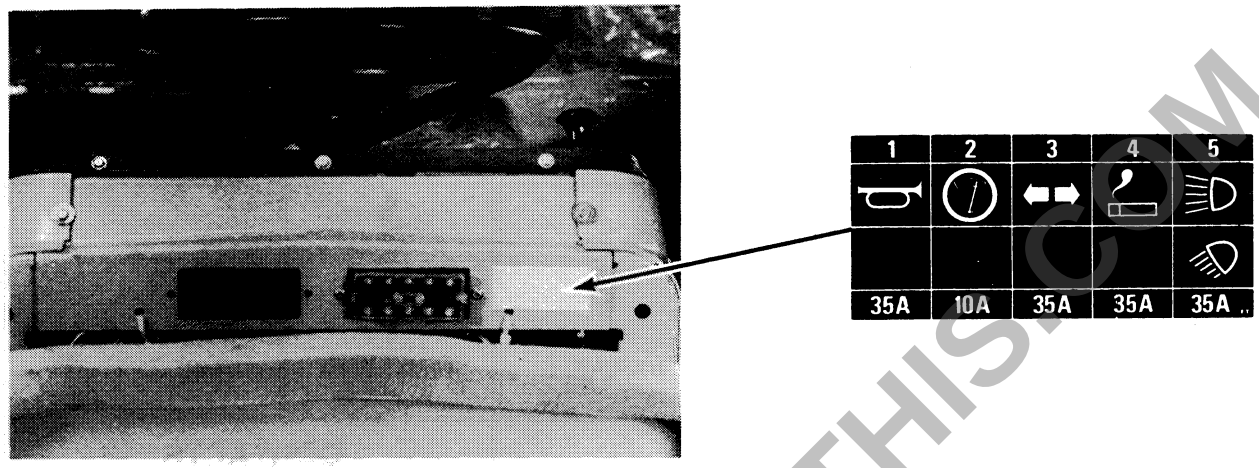
FUSE LOCATIONS



FUSE CIRCUIT(S) AND RATINGS

FUSE NO.	CIRCUIT(S)	FUSE RATING
1	ETHER START/HORN	35 AMP
2	GAUGE AND LIGHT CLUSTER	10 AMP
3	FLASHER/TURN SWITCH	35 AMP
4	CIGAR LIGHTER (IF FITTED)	35 AMP
5	HEADLIGHTS/TAIL LIGHTS	35 AMP

NOTE: *DO NOT try to repair a fuse. If a fuse fails, it must be replaced with a new one of the rating specified in the above table AFTER the cause of the failure has been located and corrected.*

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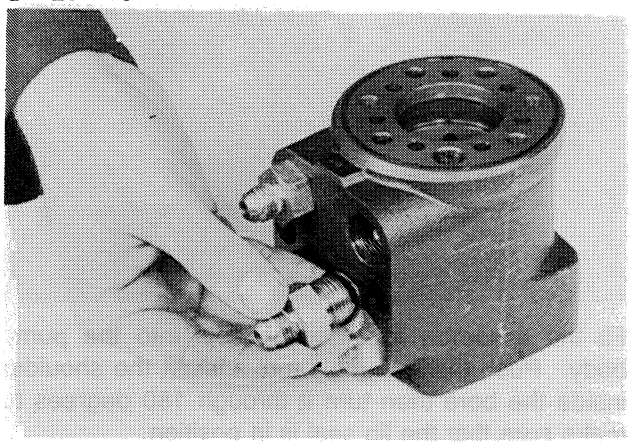
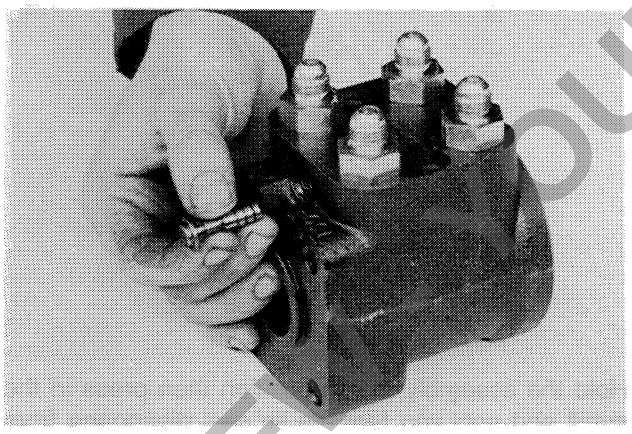
IMPORTANT: *Before assembly, lubricate all parts with clean transmission oil of the correct specification.*

STEP 40



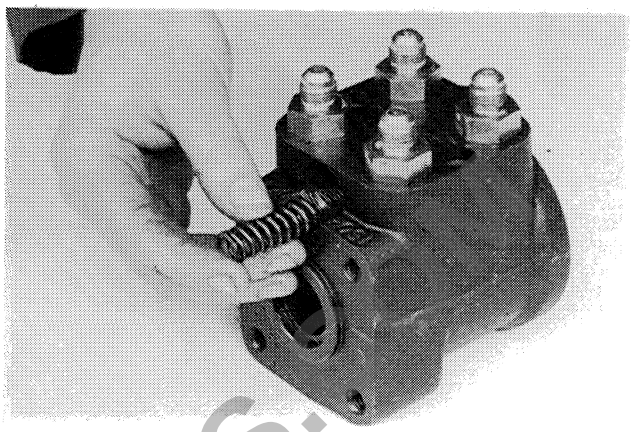
If removed, fit a new o-ring onto the union. Install the union into the pump body and tighten.

STEP 41



Fit the relief valve into the pump body. Make sure that the end with the large diameter is outwards.

STEP 42



Install the relief valve spring.

STEP 43

Inspect the locking material on the adjusting plug threads. If there is damage install a new adjusting plug. Use a key to turn the plug into its original position.

IMPORTANT: *The relief valve pressure must be set before operating the steering system. Refer to Section 5025 for correct testing and adjusting procedure when the steering hand pump is installed on the tractor.*

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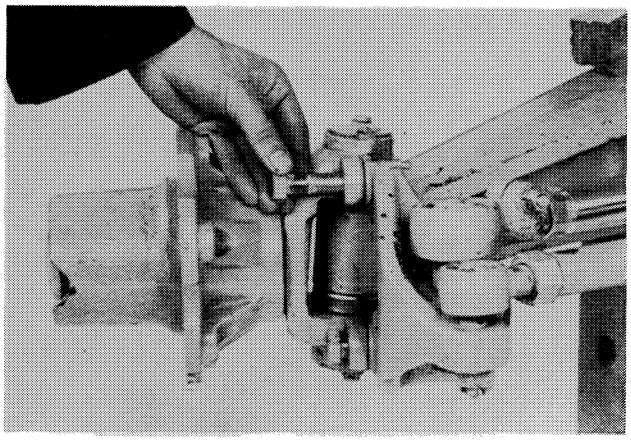
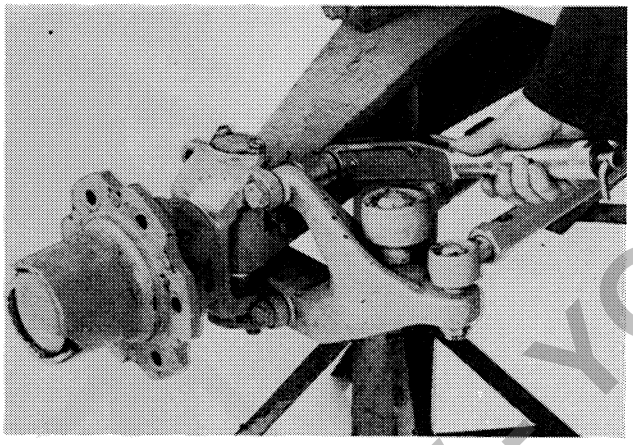
STEP 87



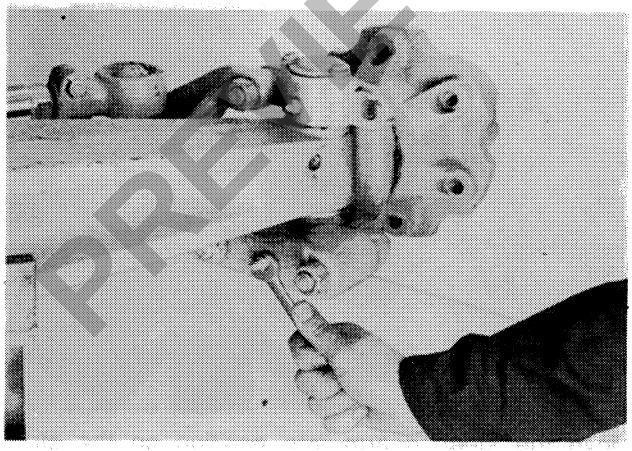
Install the three nuts and bolts through the steering arm and stub axle.

STEP 88



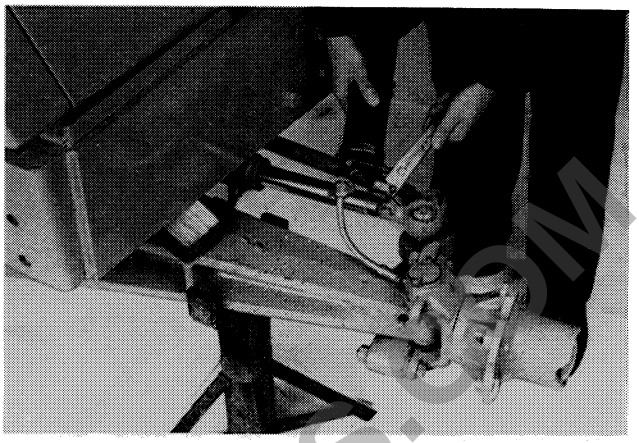
Evenly tighten the bolts to a torque of 160 to 180 lb ft (217 to 244 Nm).

STEP 89



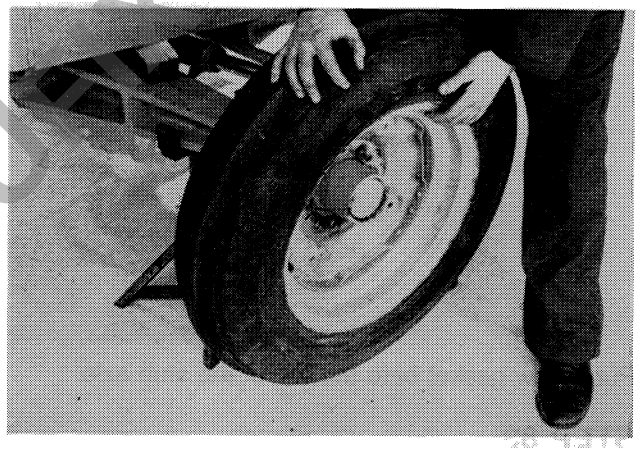
Install the bottom grease fitting through the steering arm into the stub axle.

STEP 90



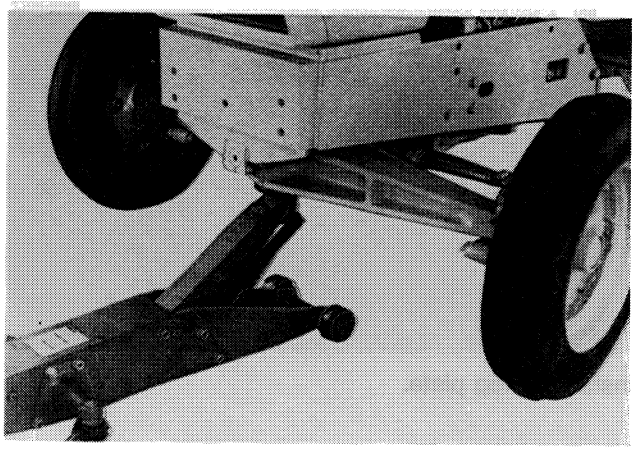
Use a grease gun to lubricate the king pin and bushes through both grease fittings. Do this until grease flows from the stub axle at the front axle 'joints'.

STEP 91



Install the front wheel and wheel bolts.

STEP 92



Remove the axle stands and wedges from the axle.

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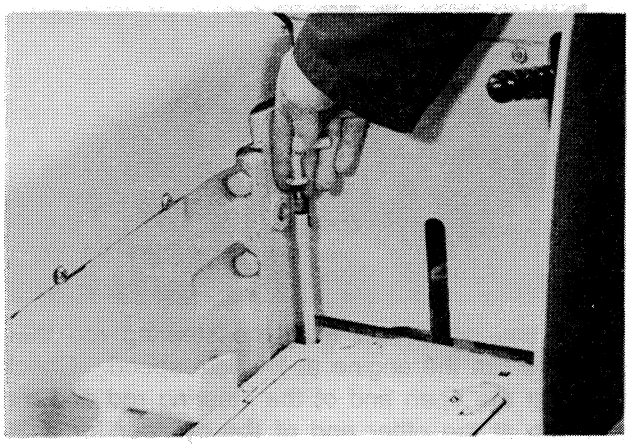
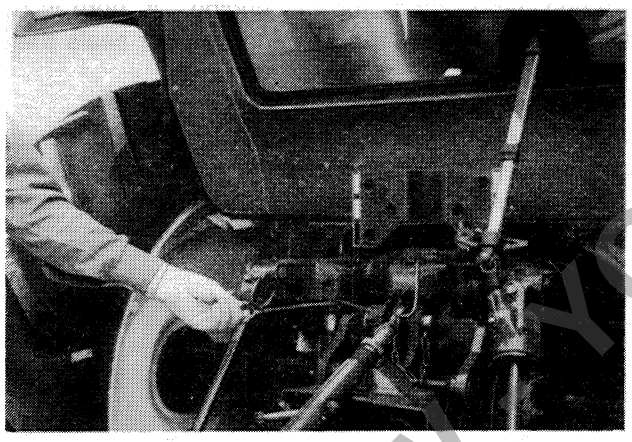
STEP 66

Repeat the test on the other end of the cylinder with the wheels turned fully to the right.

STEP 67





Check the oil level on the dipstick. Add transmission oil of the correct specification if the level is low.

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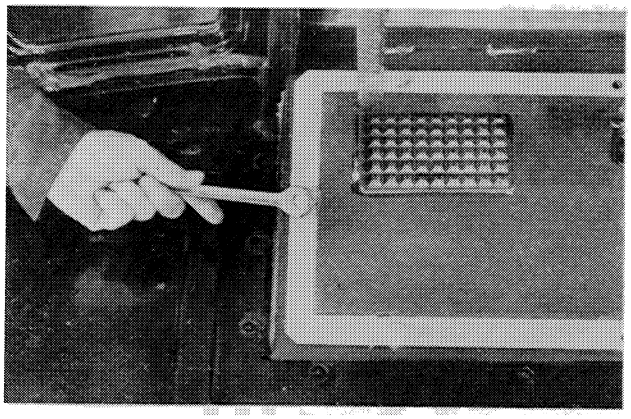
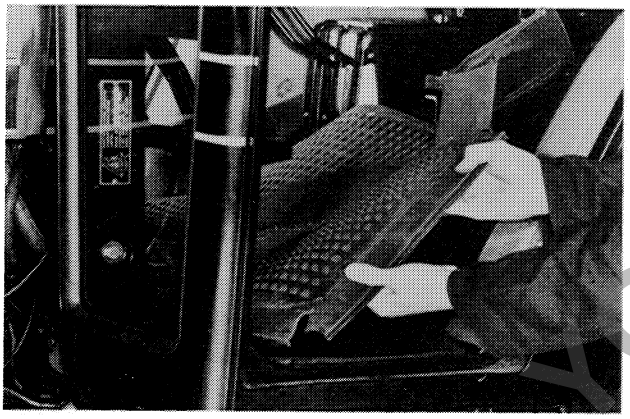
STEP 75



Install the floor inspection panel

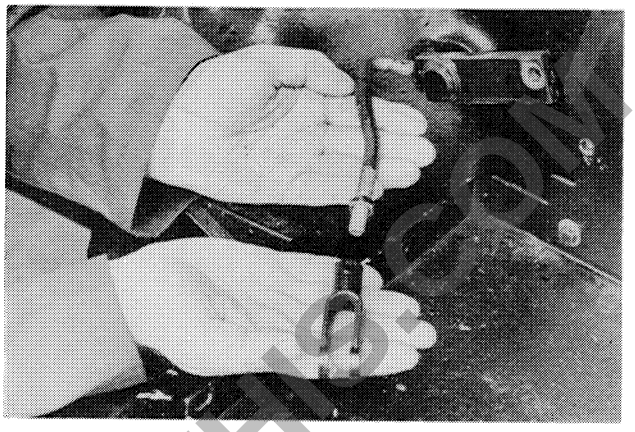
STEP 76



Install the cab floor cover and insulator.

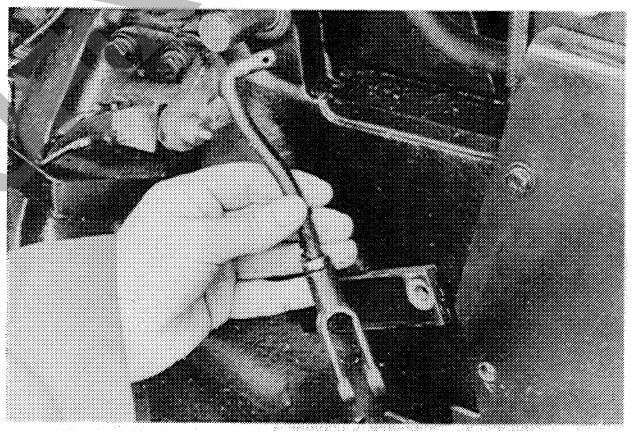
Tractors Without Cab (ROPS) Or With Cab

STEP 77



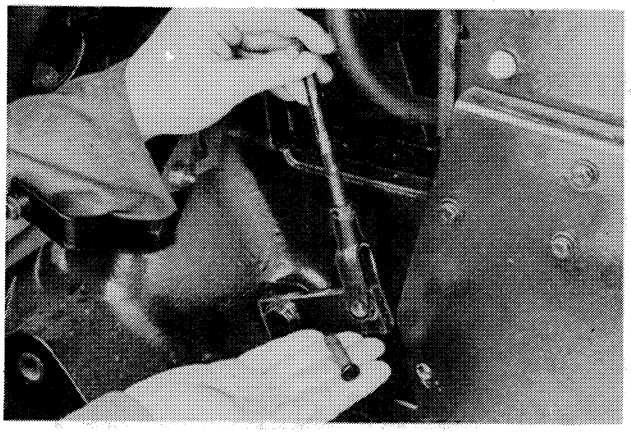
Install the clevis on the rod.

STEP 78



Install the rod and clevis.

STEP 79



Install the pin.

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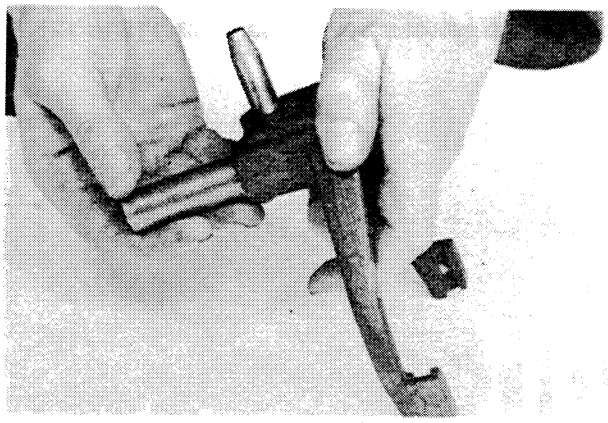
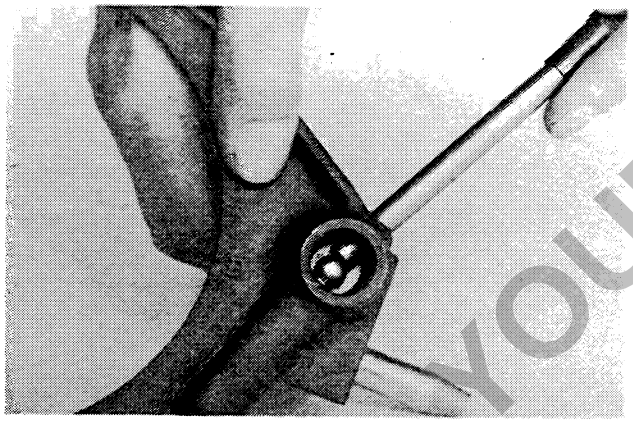
STEP 153



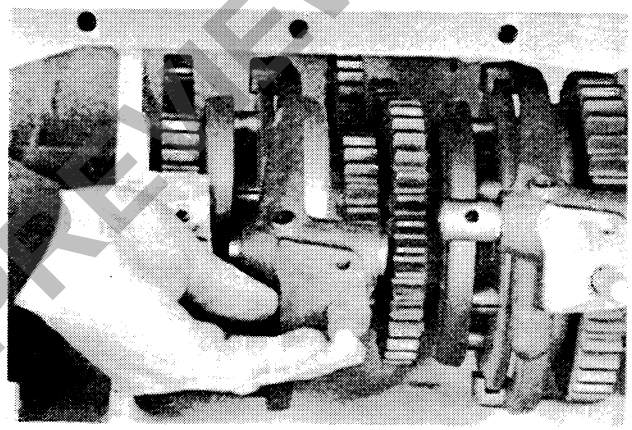
Install the special tool.

STEP 154



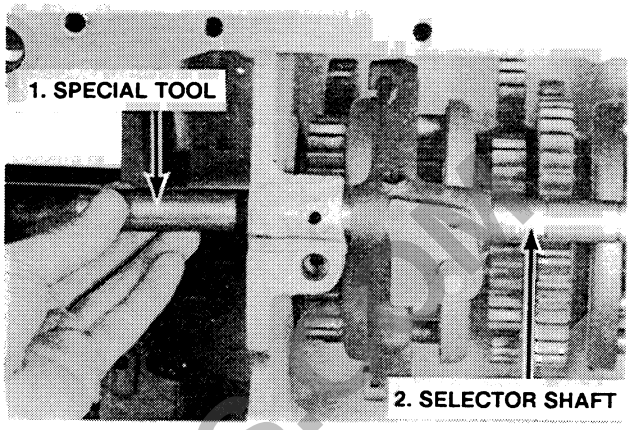
Use a punch to push down the spring and detent ball, and push the special tool fully in.

STEP 155



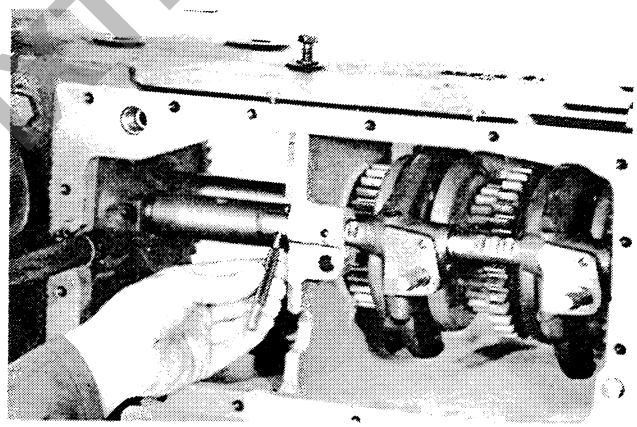
Install the 3rd/4th selector fork into the speedbox , making sure the selector fork slides onto the synchroniser ring.

STEP 156



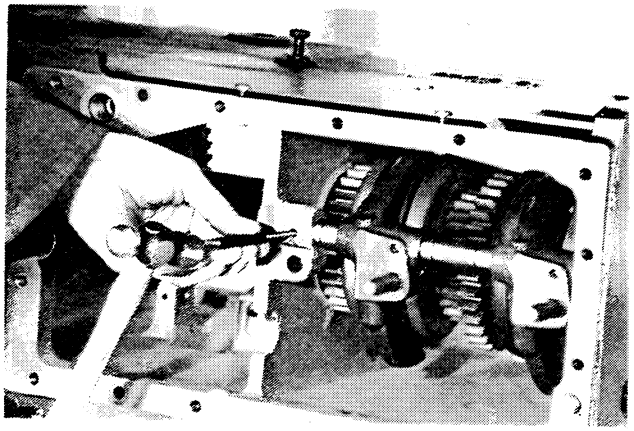
Push the selector shaft through the selector fork pushing out the special tool.

STEP 157



Turn the selector shaft half a turn until the detent balls locate in the detents in the shaft.

STEP 158



Line up the roll pin holes and drive in the roll pin.

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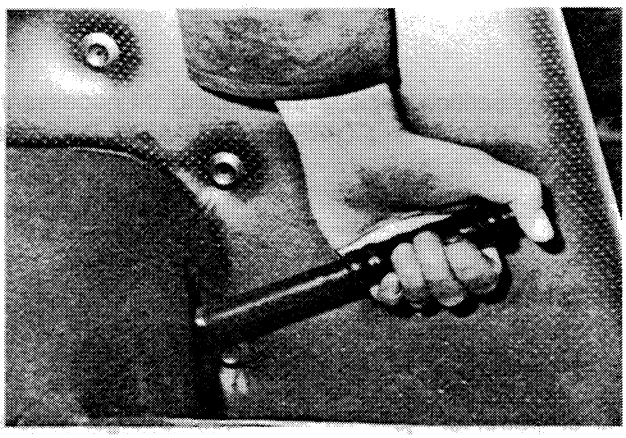
BASE PLATE AND REGULATOR VALVE
Removal

STEP 1

The regulator valve and baseplate can be removed from the tractor without removing the speed box from the tractor. All other steps require the speed box to be removed from the tractor.

STEP 2

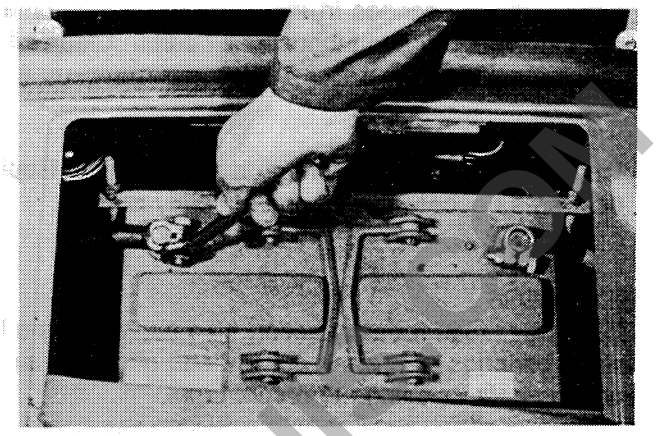


Engage the parking brake.

STEP 3

Put blocks in front of and behind the rear wheels.

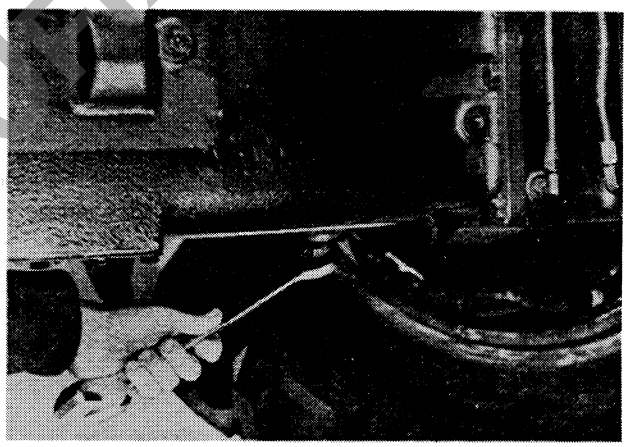
STEP 4



Remove the battery access panel and disconnect the battery terminals.

NOTE: *Negative (-) terminal first.*

STEP 5



Put a suitable container under the transmission drain plug, remove the drain plug and drain the transmission fluid. After draining install and tighten the transmission drain plug.

STEP 6

If fitted with MFD, see section 6485 for instructions on removing the drive shaft.

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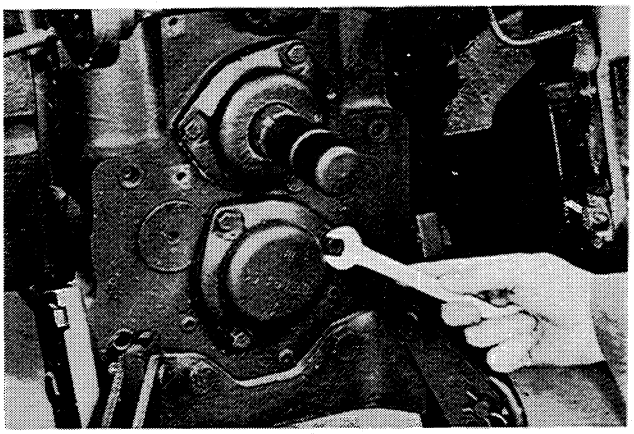
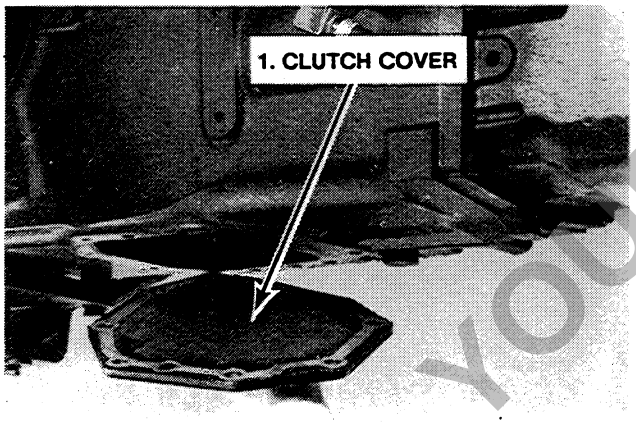
STEP 79



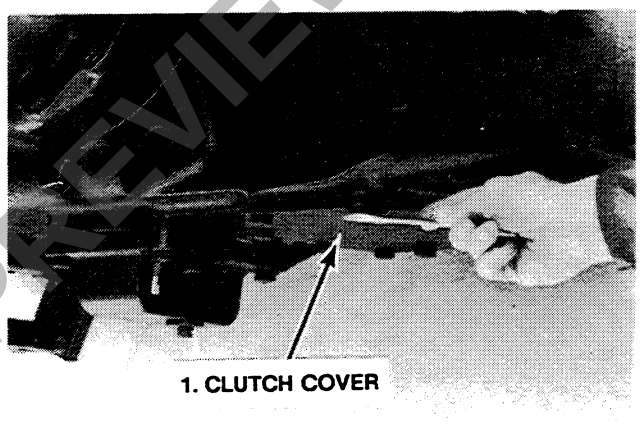
Install and tighten the cover or seal housing.

STEP 80



Clean the faces, fit a new gasket and install the P.T.O. clutch assembly cover.

STEP 81



Install and tighten the P.T.O. clutch assembly cover bolts.

STEP 82

Install the correct amount and grade of transmission oil to the tractor. Refer to the Operator's Manual.

STEP 83

Start the engine and check the operation of the hydraulic system, brakes and clutch and P.T.O.. Check for leaks and road test the tractor.

CAUTION: *Put all the operating controls in neutral before turning the engine over. Engage the parking brake. Put blocks in front of and behind the rear wheels.*

WARNING: Never operate the engine in a closed building. Proper ventilation is required under all circumstances.

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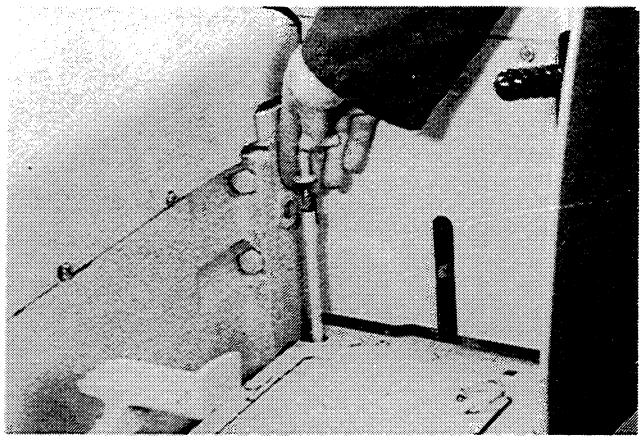
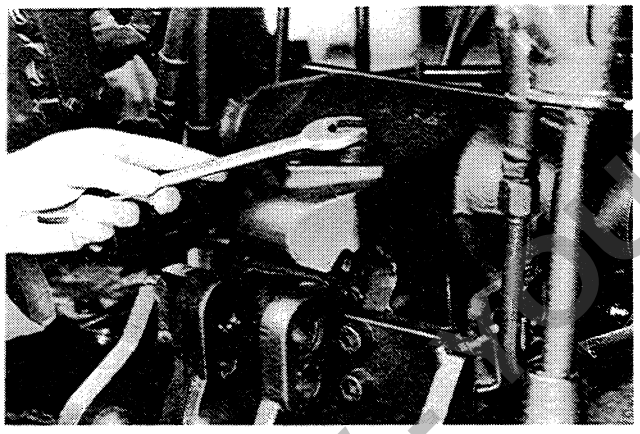
STEP 120



Check transmission oil level. Add oil if required. Refer to Operator's Manual.

STEP 121



Install and tighten the transmission filler plug.

STEP 123

Start the engine and check the operation of the hydraulic system,braking system, engine clutch and P.T.O. Check for leaks and road test the tractor.

CAUTION: ***Put all the operating controls in neutral before turning the engine over. Engage the brake. Put blocks under the wheels.***

WARNING: Never operate the engine in a closed building. Proper ventilation is required under all circumstances.

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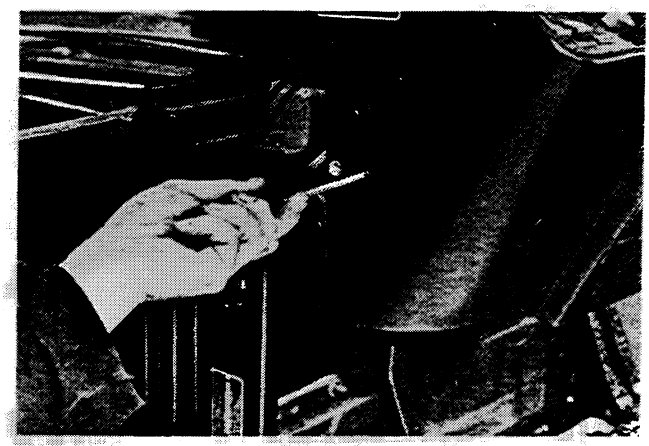
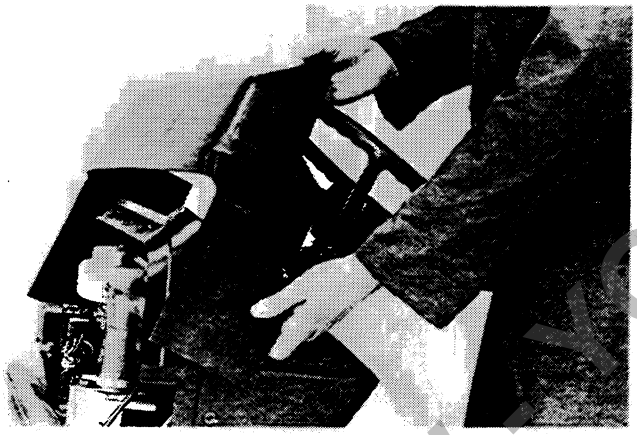
STEP 81



Install the two screws from both sides of the instrument panel.

STEP 82

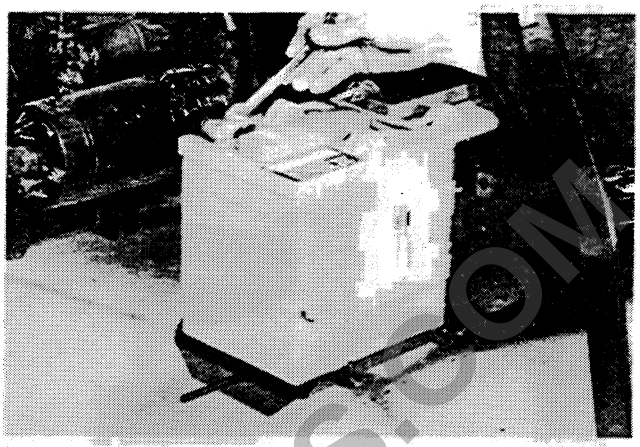


Install the front panel.

STEP 83

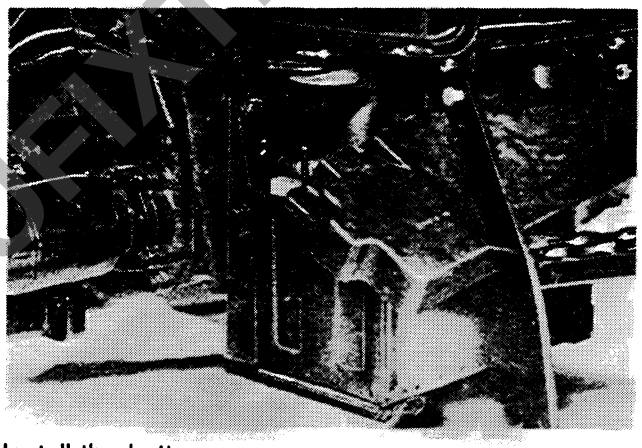
Press in the lockpin to secure the front panel (both sides).

STEP 84



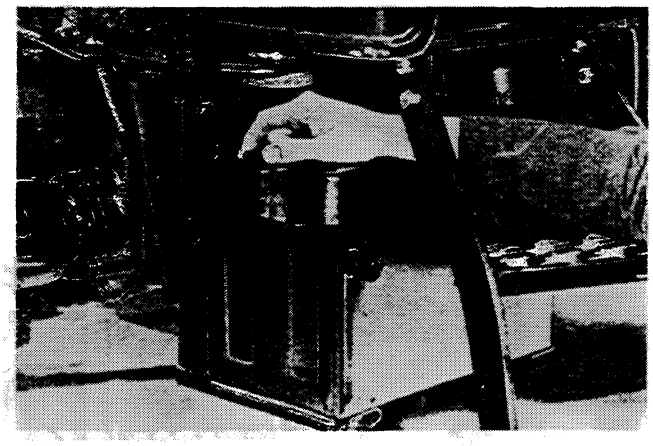
Connect the cables to the positive (+) and then the negative (-) battery terminals.

STEP 85



Install the battery cover.

STEP 86



Install the two wing nuts on the battery cover and tighten.

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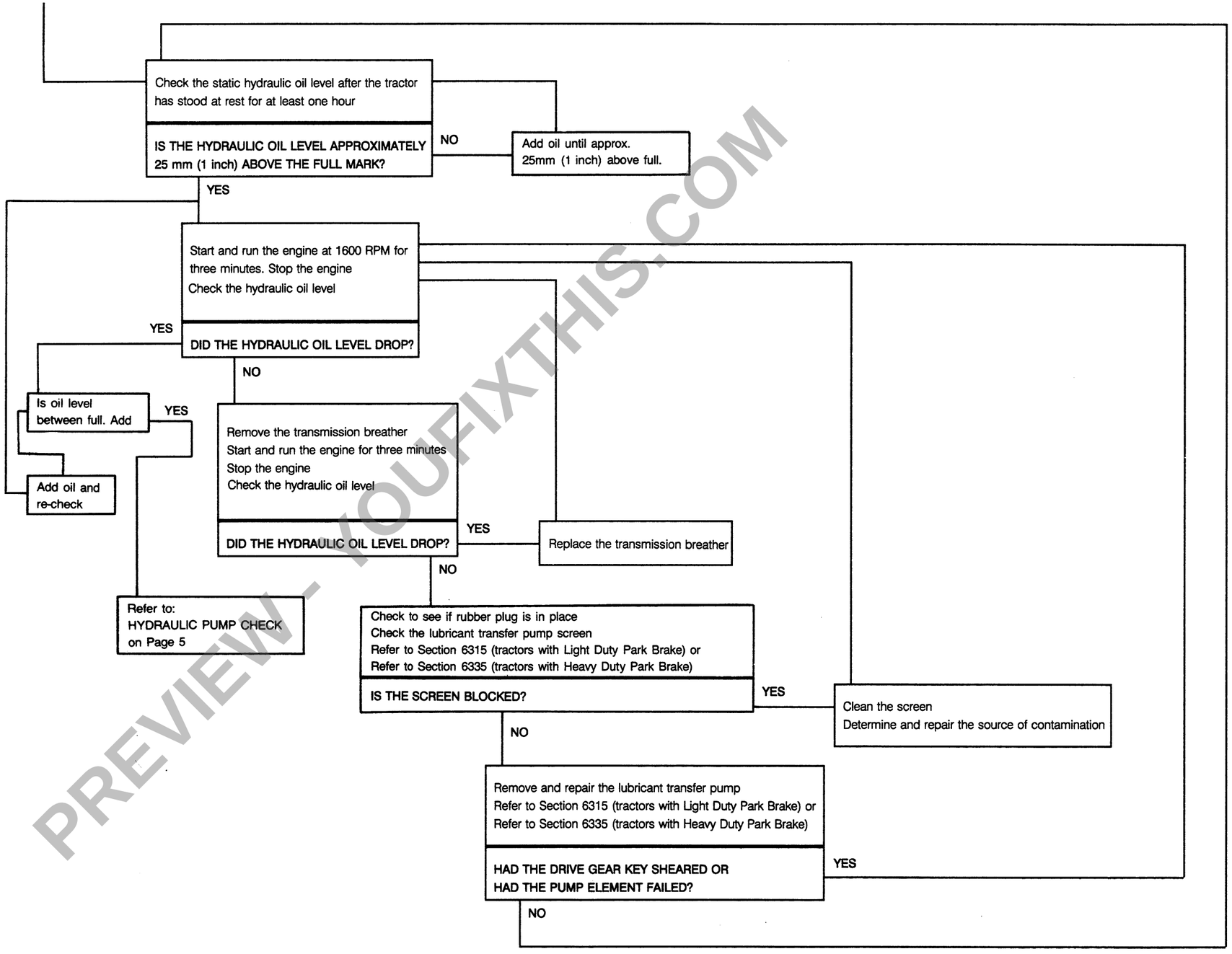
Hydraulic Oil Static and Dynamic Check



NOTE: *The priority circuit contains:*
Steering, power shift, MFD, F/R, PTO, oil cooling, brakes and transmission lubrication.

Don 8-57581 Issued 11-89 Printed in England

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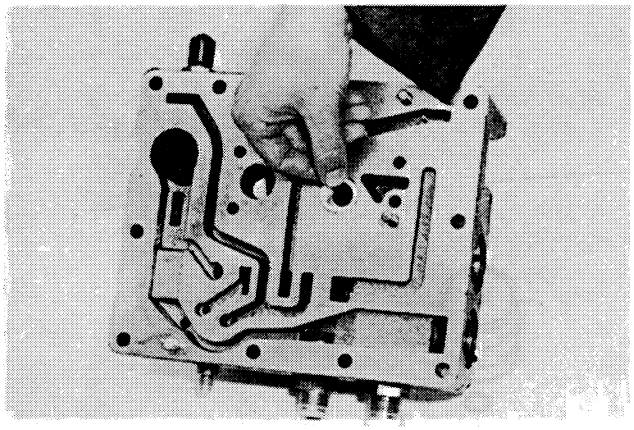
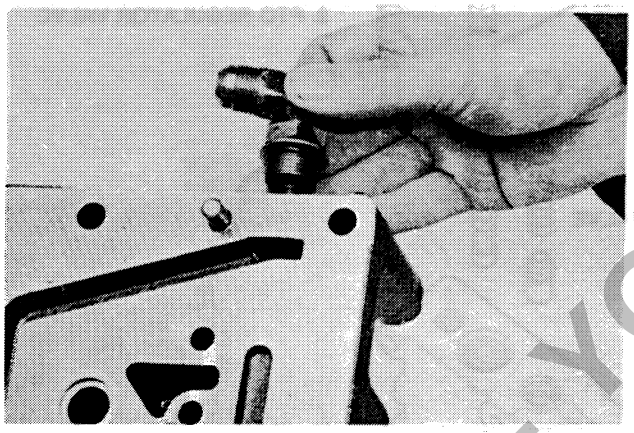
STEP 122



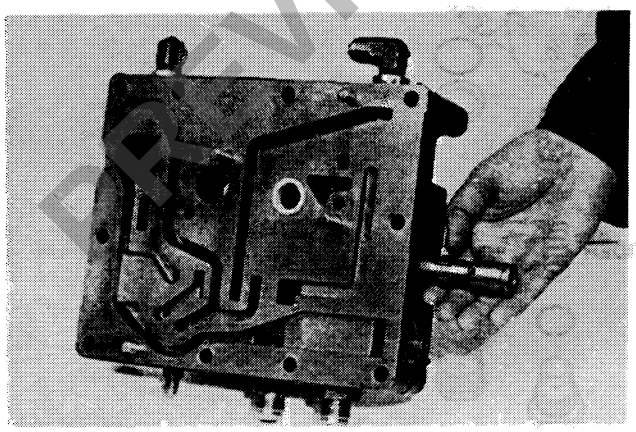
Fit a new nylon seal into the groove in the MCV body.

STEP 123



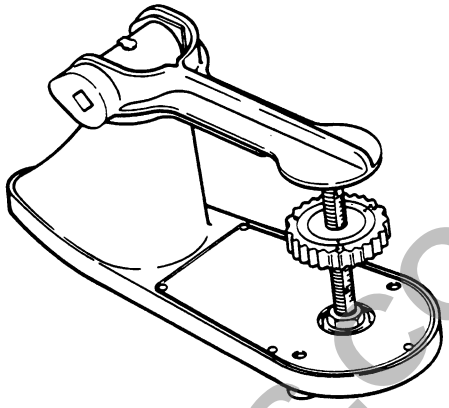
If a union has been removed fit a new o-ring onto the union. Lubricate the o-ring with clean transmission oil. Fit the union into its original position then tighten the locknut.

STEP 124



Lubricate the priority flow divider with clean transmission oil. Install the priority flow divider into the MCV body.

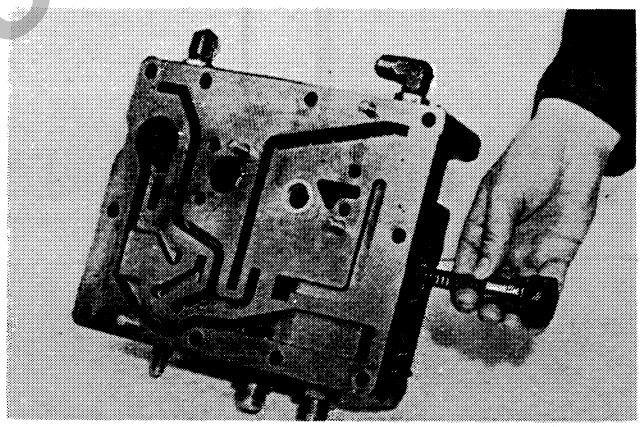
STEP 125



Check the spring for the priority flow divider with a spring compression tester. The spring must have the following specifications.

Free length . . . . . .3.253 inch (82.63 mm)
O.D. . . . . .0.500 inch (12.7 mm)
Wire diameter . . . . . 0.072 inch (1.83 mm)
Number of coils 22.5
Compress to . . . . . .2.017 inch (51.23 mm)
29.70 lb (132 N)

STEP 126



Fit a new o-ring onto the plug. Lubricate the o-ring with clean transmission oil. Install the spring and plug into the MCV.

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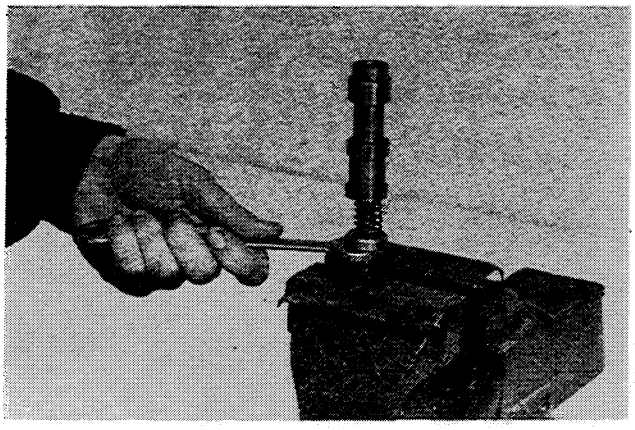
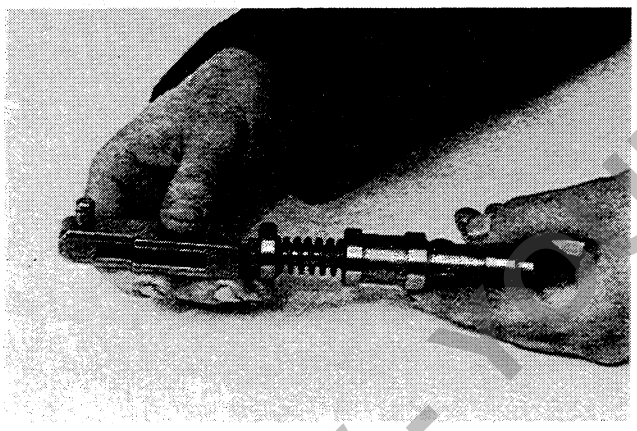
STEP 57



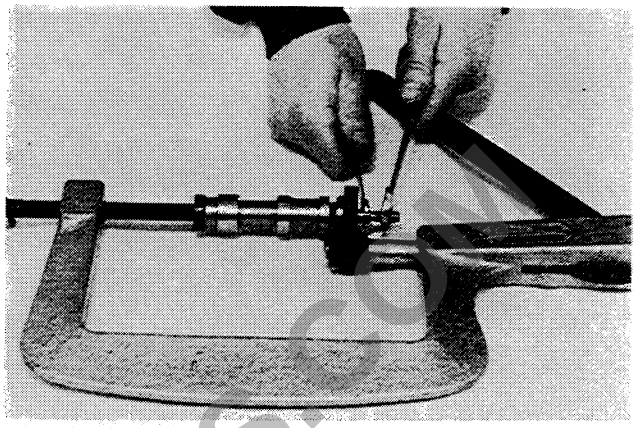
Carefully hold the clevis in a vice fitted with soft jaw plates. Loosen the locknut.

STEP 58



Remove the assembly from the vice. Remove the clevis from the threads.

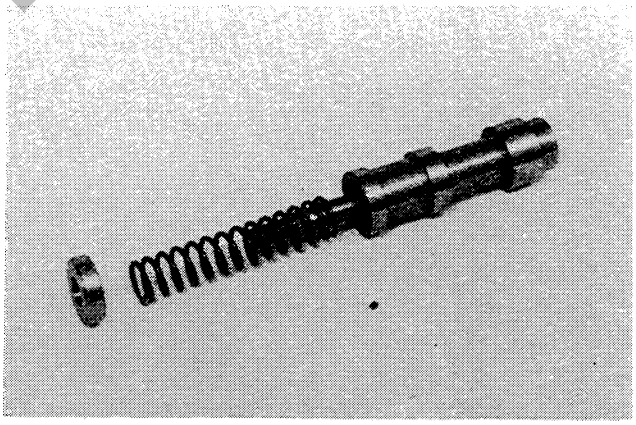
STEP 59



Use a spring compressor to compress the spring. Make a note of the position of the locknut on the threads. Hold the rod then remove the locknut.

NOTE: *The draft valve spring is strong. Take care when releasing the pressure on the spring.*

STEP 60



Remove the assembly from the spring compressor. Remove the collar and spring.

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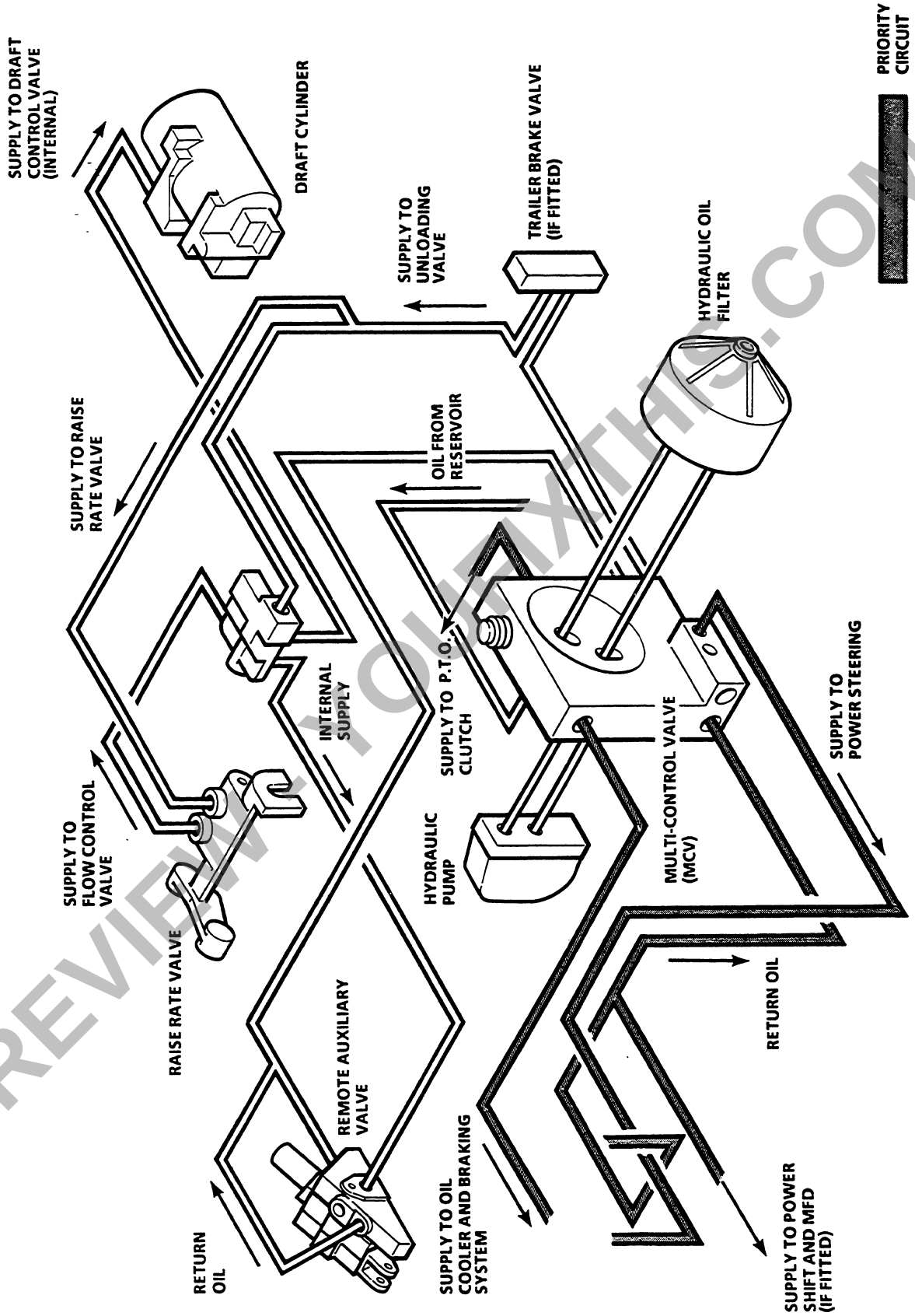

FIGURE 1

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HAND SIGNALS

For communication under noise conditions and for special operations, a system of standard hand signals has been devised which can decrease time loss and prevent accidents.

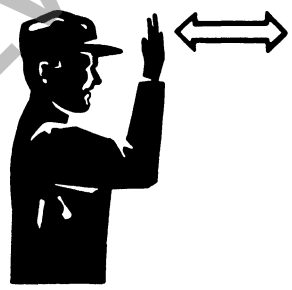
Start the Engine

Move arm in a circle at waist level.

Stop the Engine

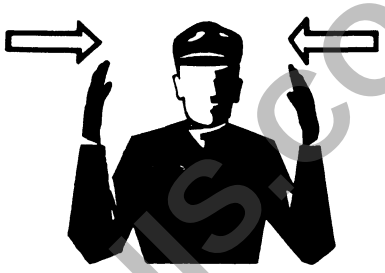
Move your right arm across your neck from left to right.

Move Toward Me - Follow Me



Look toward the person or vehicle you need to move. Hold one hand in front of you with the back of the hand toward the machine and move your arm from the elbow to the fingers backward and forward.

This Far To Go



Put your hands in front of your face with the backs of your hands outward. Move your hands in or out as an indication of how far to go.

Move Out

Face in the required direction of travel. Put your arm straight out behind you, then swing your arm over your head and forward until your arm is straight out in front of you with the back of your hand up.

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