ST30X EFF "L" S/N TRACTOR SERVICE MANUAL 79021617

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FIG. 3: Snap-rings

- Snap-ring installers should be designed so as not to permanently deform the snap-rings.
- Installed snap-rings should be seated securely in the groove.
- Be careful not to overload the snap-ring to the extent that it is permanently deformed.
- How to install the snap-ring:

  When installing a snap-ring, install it as shown in the figure with its round edge side turned toward the part to be retained. This round edge is formed when the snap-ring is pressed out.

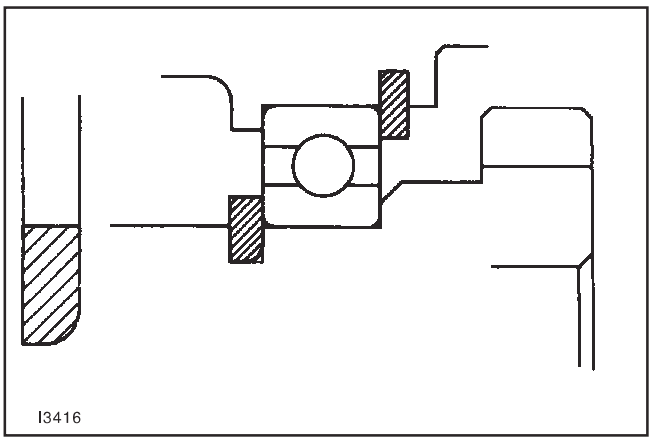

FIG. 3

FIG. 4: Spring (roll) pins

- Spring pins should be driven in properly and tightly.
- Spring pins should be installed so that their seams face the direction from which the load is applied.
- The roll pins installed in the transmission or other parts where much force is applied should be retained with wire.

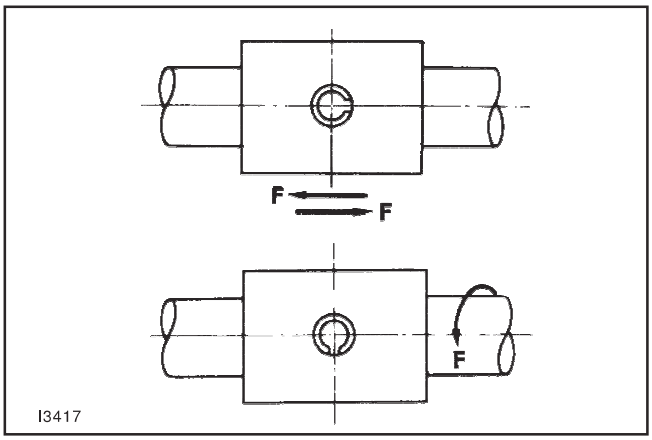

FIG. 4

FIG. 5: Cotter pins

- When installed, cotter pins should be bent securely at the ends as shown.

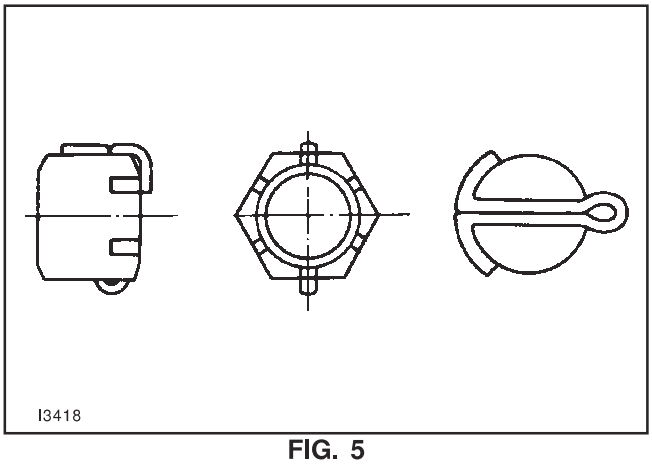

FIG. 5

FIG. 9: Remove the platform and platform mount brackets (RH and LH).

Disconnect the coupler of the rear light harness.

Remove the ROPS if required.

Remove the rear wheel fenders (RH and LH) if required.

NOTE: The tires can be removed ahead of time for easier servicing.

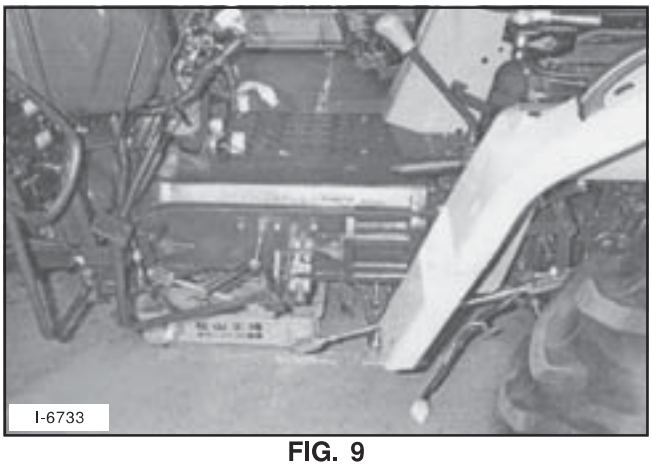

FIG. 9

Radiator

FIG. 10: Remove the engine hood, front grille, etc., ahead of time referring to "ENGINE HOOD AND FRONT GRILLE."

Drain the coolant.

Disconnect the upper hose and lower hose.

Disconnect the drain pipe.

Remove the bolts from both radiator supports.

Remove the bolts from the shroud and move it behind the fan.

Lift the radiator upward.

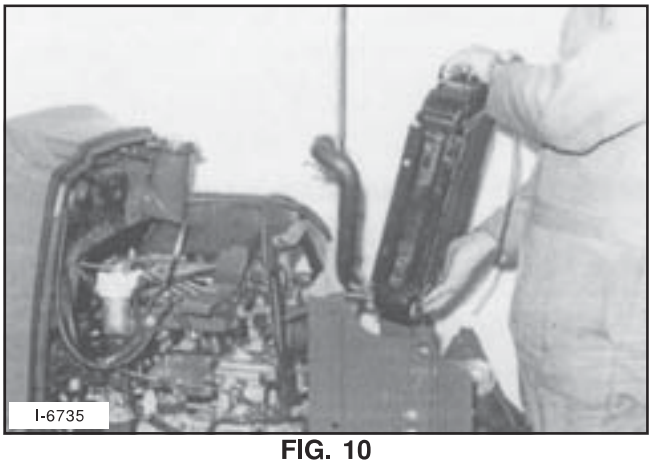

FIG. 10

SEPARATION OF FRONT TRANSMISSION CASE FROM REAR TRANSMISSION CASE

FIG. 41: It is possible to separate between the front transmission case and rear transmission case. However, we recommend separation at the spacer transmission first as mentioned at "SEPARATION OF CLUTCH HOUSING FROM SPACER TRANSMISSION CASE."

Remove the platform and platform mount brackets (RH and LH).

Put main transmission and range transmission into neutral.

Drain the transmission oil.

Detach the suction pipe.

Remove the brake rods (RH and LH).

Disconnect the delivery pipe to the cylinder case from the main relief valve housing on the front transmission case.

Remove the 4WD-shift rod from the 4WD-shifter housing. Remove the 4WD lever housing. (If equipped)

Remove the range shift lever.

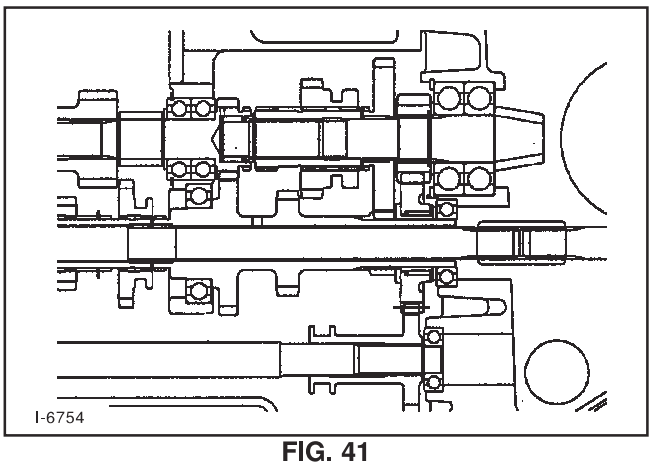

FIG. 41

FIG. 42: Remove the bolts, which hold the front and rear transmission cases together.

Separate the front transmission case from the rear transmission case.

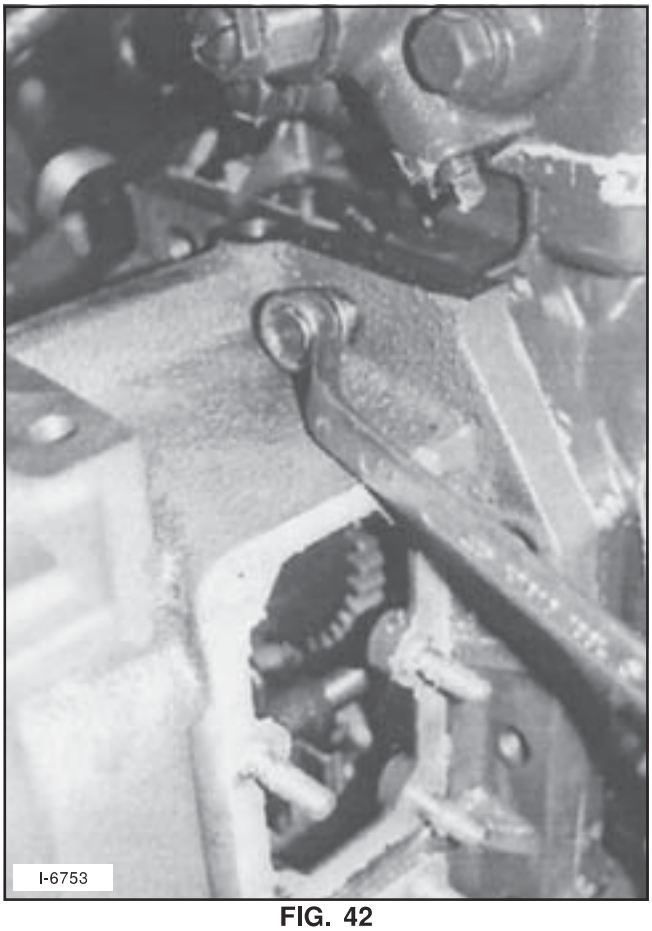

FIG. 42

AIR CLEANER

Removal and Re-Assembly

FIG. 9: The air cleaner is located above the engine. To gain access, remove right side panel.

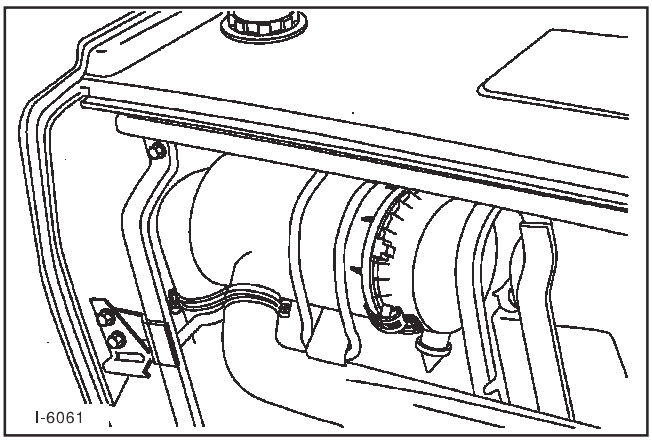

FIG. 9

FIG. 10: Release clips, 1, on the cover. Remove the element. Examine the element and seals for damage and brittleness. If the element is damaged in any way, it must be replaced. Re-assembly in reverse order of removal and clip securely.

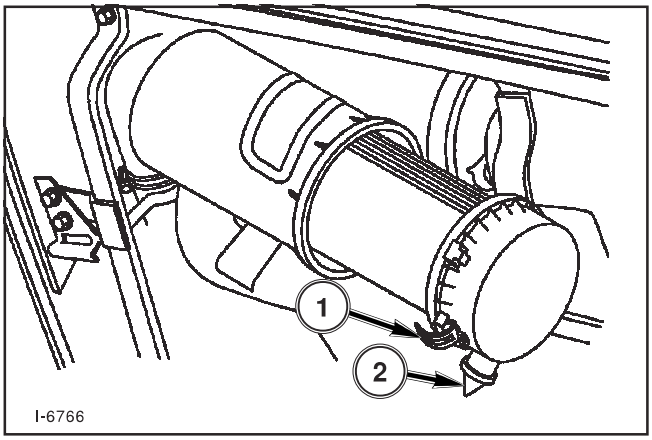

FIG. 10

Inspection

Inspect the air cleaner visually for cracks, deformation, or other damage.

Check the rubber packing at each joint, rubber pipes and the evacuator valve, 2.

Inspect the paper element.

Cleaning Element

FIG. 11: The element may be cleaned (if in serviceable condition) using the following procedures.

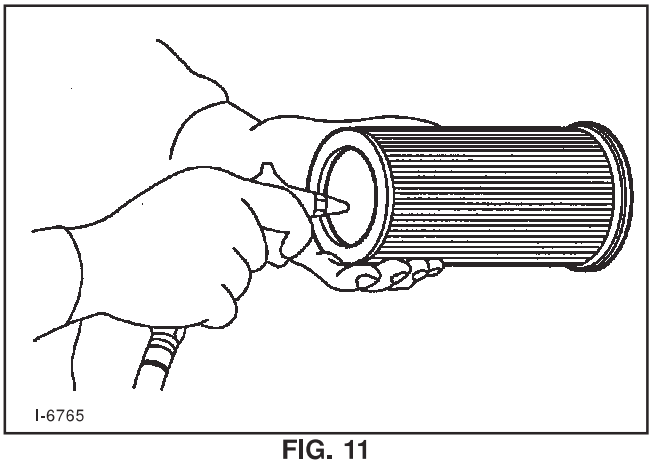

FIG. 11

Using compressed air not exceeding 200 kPa (30 psi) from the inside of the element, remove loose dirt, grass, chaff, etc.

Be careful not to damage element pleats with airflow.

If the element is coated with oil or soot:

Prepare solution of warm water and nonfoaming detergent.

Soak the element for thirty minutes.

Agitate the element in solution until oil and soot are loosened.

Rinse the element until rinse water is clear.

Allow the element to completely dry. Do not dry by using compressed air or heat.

After cleaning (or washing) the element examine for pin holes, punctures, or tears. If the element paper, canister or seal show any signs of physical damage, the element must be replaced.

NOTE: Replace an element which has already been washed five times.

Insert tapered pin in clutch fork using a hard plastic hammer. Secure tapered pin in place with a wire.

Apply a thin coat of molybdenum disulfide based grease to the splined parts of the input shaft and clutch disk in advance.

Pack the inside of the sleeve with grease and apply grease to the outer circumference of the sleeve guide in advance. After installation, make sure they slide smoothly. Use heat-resistant grease.

Apply even coat of adhesive (THREE BOND TB 1215) to the contact surfaces of the engine rear plate and clutch housing before assembling them.

FIGS. 10 & 11: Check clutch pedal free-play regularly and adjust as necessary. Correct clutch pedal free-play, 1, is 7/8" to 1-1/8" (20 to 30 mm) when measured at the end of the pedal as shown.

NOTE: Through use, clutch free-play will be reduced.

IMPORTANT: Correct free-play must be maintained to reduce wear on clutch and release bearing and allow complete disengagement when pedal is depressed.

To adjust clutch pedal free-play, locate linkage, 2, under left foot step. Loosen lock nuts. Adjust turnbuckle on linkage until free-play is correct. Lengthening linkage will increase free-play, shortening linkage will reduce free-play.

Secure by tightening lock nuts.

NOTE: Lock nuts are right-hand and left-hand thread.

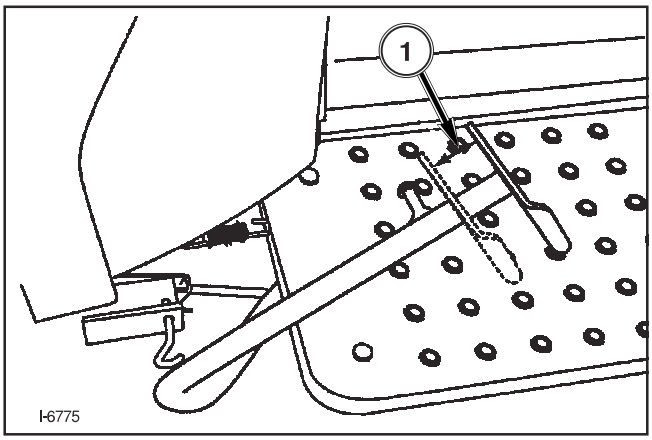

FIG. 10

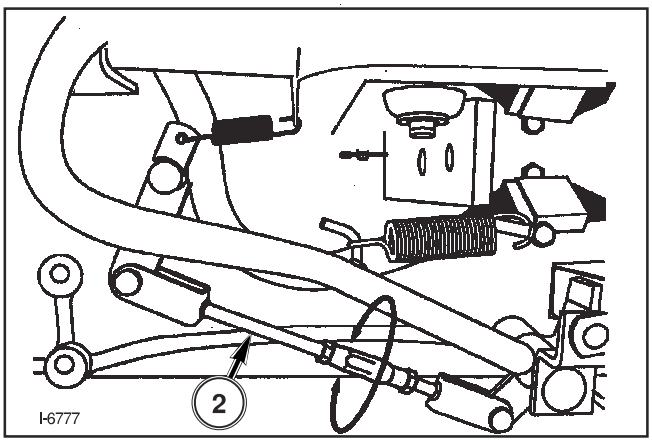

FIG. 11

INSPECTION

Check each gear and shaft for damage, tooth bearing, etc.

Make sure that all radial roller bearings turn smoothly and are free from flaws.

Make sure that the oil lips and lip contact surfaces on shafts are free from flaws.

PRECAUTIONS FOR REASSEMBLY

FIG. 15: When assembling, pay attention to the installing direction of the gears, collars, etc. Never forget to install bearings and collars.

Assemble the range gears and related parts following the next instructions:

- Install the 4WD gear and the range shift gear on drive pinion. (Shown in Fig. 14).

NOTE: The 4WD gear should be installed with the recessed side facing the bearing.

- Sub-assemble the range shift gears and range shift counter gear and then the sub-assembled range shift gears into the rear transmission case.
- Install the shifter.
- Install the 4WD shaft.
- If the PTO shaft joint coupling inside the rear transmission case fell during disassembly, reinstall it on the PTO shaft ahead of time.
- Install the 4WD shift lever and the range shift lever.

Assemble the main gears and related parts following the next instructions:

- Install the reverse gear.
- Install the main counter gear on the drive pinion.
- Sub-assemble the main shift gears and shifter. Then insert the sub-assembled main shift gears into the front transmission case.
- Install the input metal (support) along with the PTO shaft.
- Install the PTO gear, the needle bearings and collar, retain them with a snap ring.

NOTE: The collar should be installed with the oil groove side facing the needle bearing.

- Install the PTO gear and input gear together.

Install the spacer transmission case on the front transmission case and then install the main shift lever. Use silicone.

After assembly, make sure that each shift lever moves smoothly.

Check each shift lever for operating load.

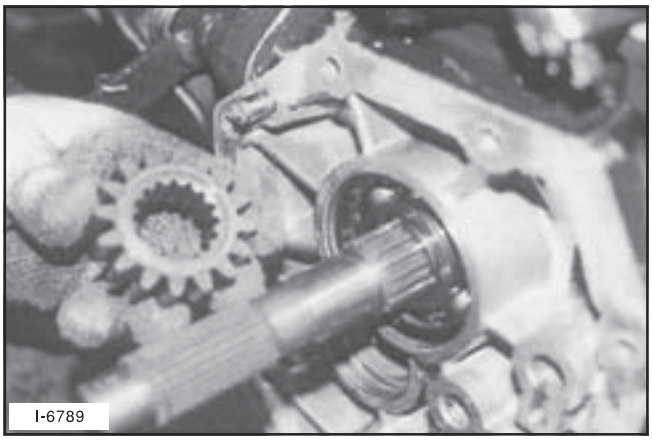

FIG. 15

	Operating load at lever top
Main shift lever and 4WD shift lever	Less than 5 kgf (11lb)
Range shift lever and PTO shift lever	Less than 7 kgf (15 lb)

FIG. 10: Remove the snap ring from the pinion shaft.

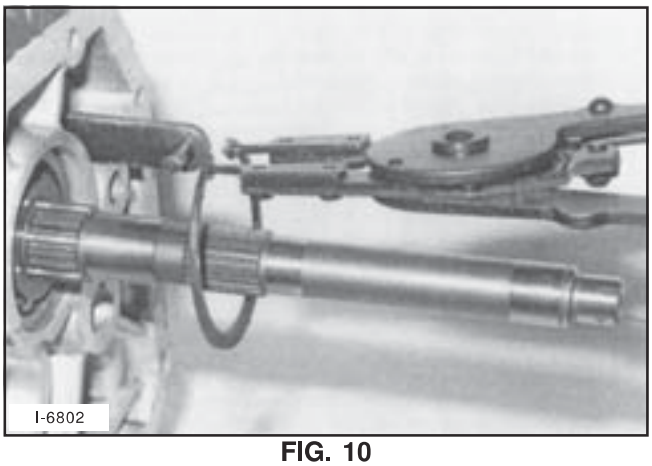

FIG. 10

FIG. 11: Remove the pinion shaft.

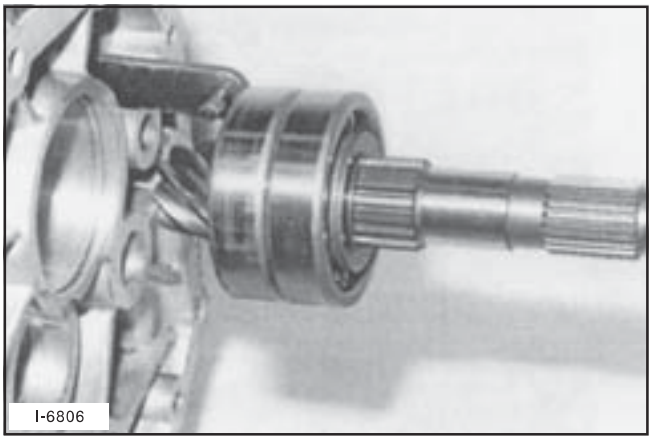

FIG. 11

FIG. 12: Remove snaprings securing bearings on both LH & RH differential cases. Remove heavy washer and shims from both sides. Do not mix up shims stacks from the LH & RH sides.

NOTE: When the differential case metal is too tightly fit into the rear transmission case to be removed manually, use push bolts. The push bolts should be screwed in evenly and gradually.

Remove the differential case.

NOTE: Push bolts, 1, may be required to aid in removing the case.

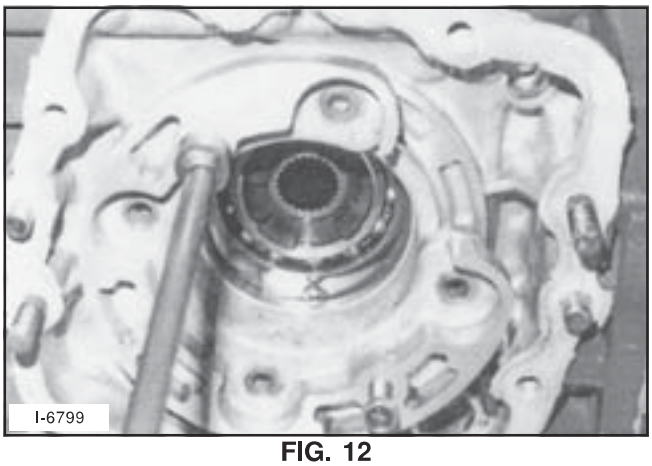

FIG. 12

FIG. 13: Remove the differential assembly.

Remove the bearings from both sides of the differential assembly.

Remove the ring gear.

The differential assembly can be disassembled by removing the differential pinion shaft.

NOTE: The lock pin should be removed ahead of time.

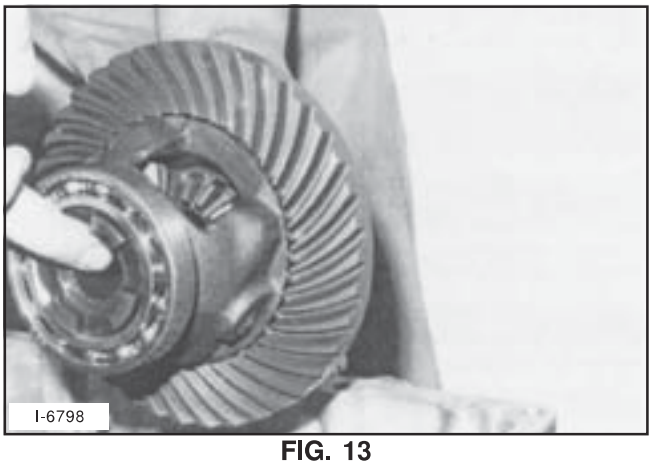

FIG. 13

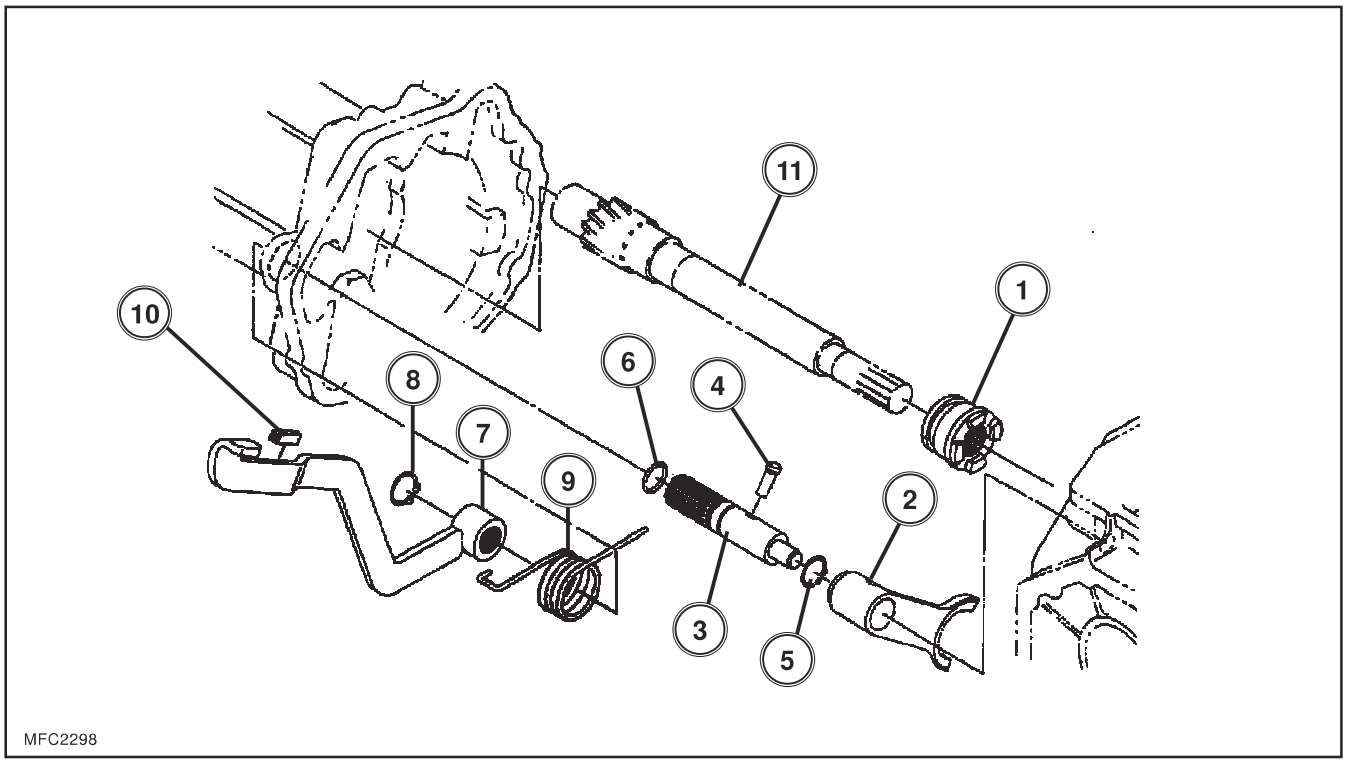

FIG. 3

FIG. 3: Diff. lock.

1. Diff lock
2. Diff lock fork
3. Diff lock shaft
4. Diff lock pin
5. Snap ring
6. O-ring
7. Pedal
8. Snap ring
9. Spring
10. Insulator
11. Wheel Pinion

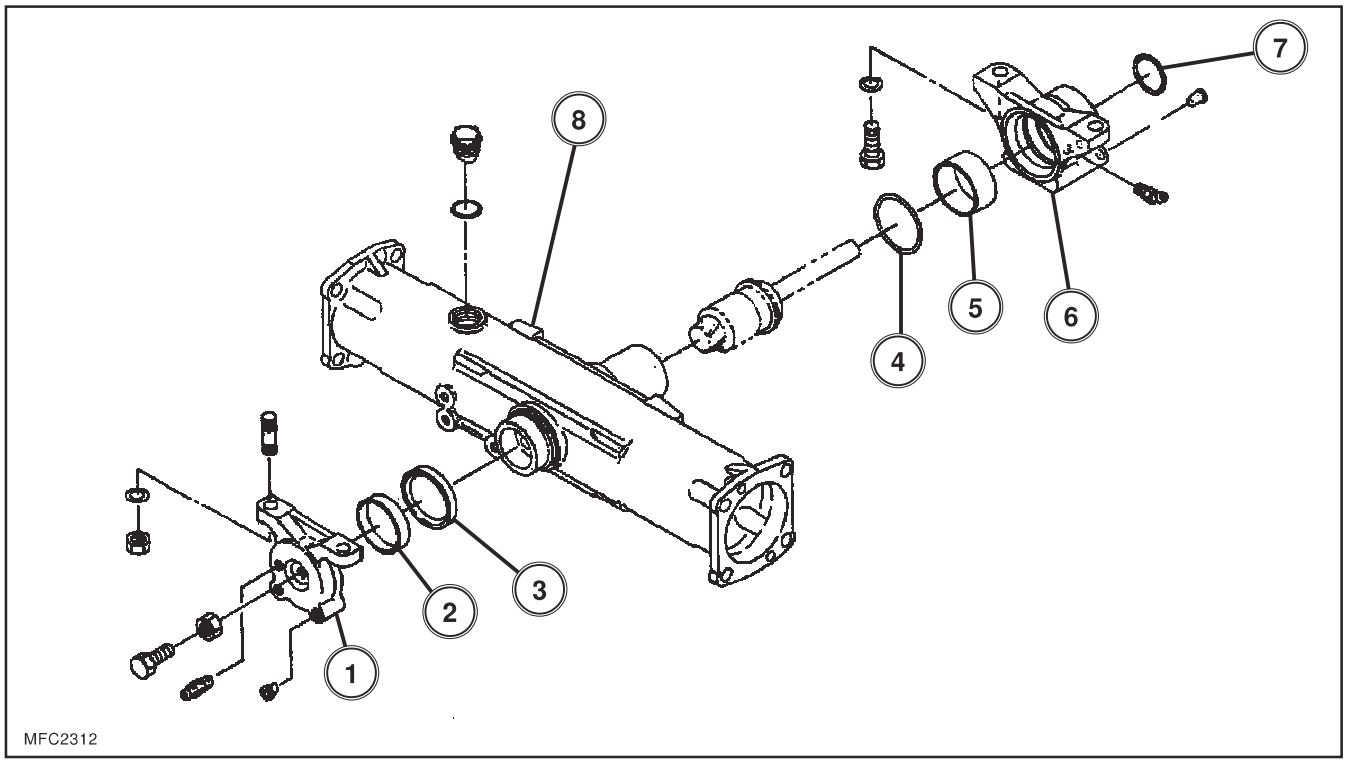

FIG. 3

FIG. 3: Axle pivot

1. Front pivot
2. Bushing 62 x 67 x 15
3. Seal
4. O-ring
5. Bushing 62 x 67 x 30
6. Rear pivot
7. O-ring
8. Axle housing

Front Wheel Bearings (2-WD Only)

Front wheel bearings should be checked for looseness every 300 hours of operation. Front wheel bearings should be disassembled, cleaned and repacked with grease once a year or more frequently when operating in extremely wet or muddy conditions.

FIG. 19: To check grease or adjust front wheel bearings, proceed as follows:

Jack up front of tractor and check each wheel for looseness. Ball bearings, 5, are used in hubs. If looseness exists remove cap, 1, cotter pin, 2, and tighten castellated nut, 3, to remove looseness in wheel hub if possible.

IMPORTANT: Do not over-tighten castellated nut, to side load the bearings. If looseness still exists it will be necessary to replace the bearings.

To replace grease in front wheel bearings, proceed as follows:

- Remove wheel and tire.
- Remove castellated nut, 3.
- Remove hub, 4, with bearings and seal.
- Remove bearings, 5, and seal, 6, from hub.
- Clean and inspect all parts and replace as necessary.
- Repack and install bearings in hub.
- Install new seal, 6.
- Adjust castellated nut, 3, to remove all end play without side loading bearings, and install new cotter pin, 2.
- Install new gasket with a small amount of sealant on each side.
- Replace cap, 1, and install wheel with tire.

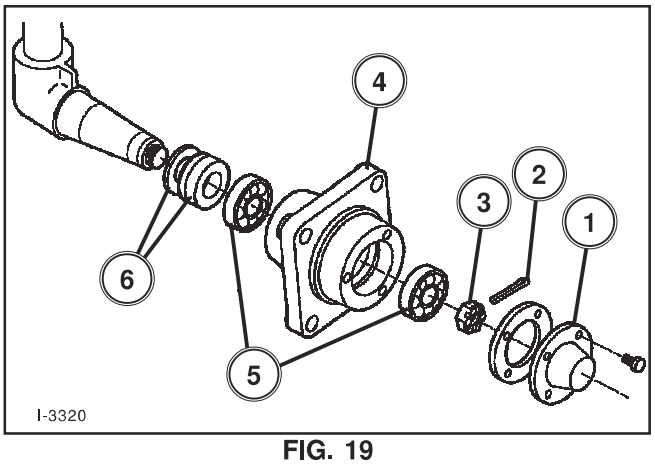

FIG. 19

FIG. 12: Assemble the lift shaft and lift crank in accordance with the aligning marks.

Install the lift arm into the lift shaft by aligning the splines so that the lowest position of the lift arm is 10° below horizon.

NOTE: Aligning marks should be made on both parts before disassembling.

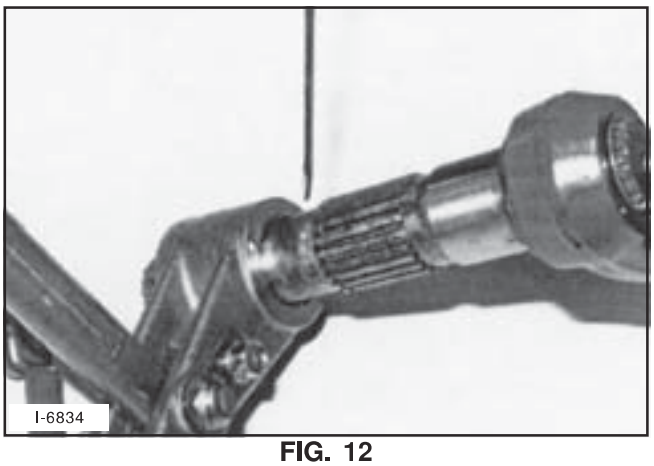

FIG. 12

FIG. 13: The control valve bolts should be tightened evenly to the specified torque.

NOTE: Excessive tightening or uneven tightening will lead to irregular movement of the control valve spool. After installation, make sure that the spool moves smoothly.

Tightening torque	130 - 180 kg·cm (9.34 - 13.01 ft-lb)

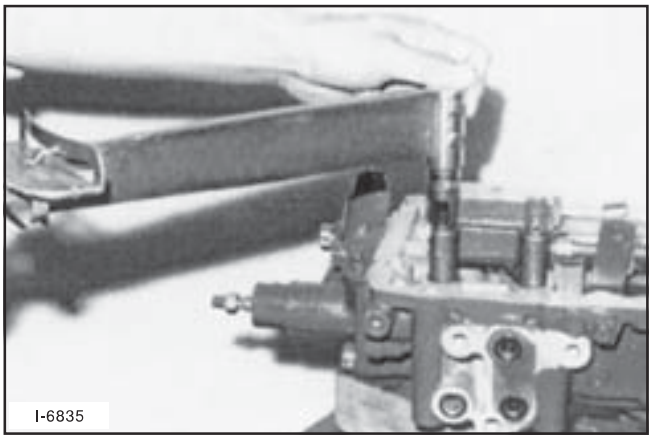

FIG. 13

FIG. 14: Set the position arm and support link correctly.

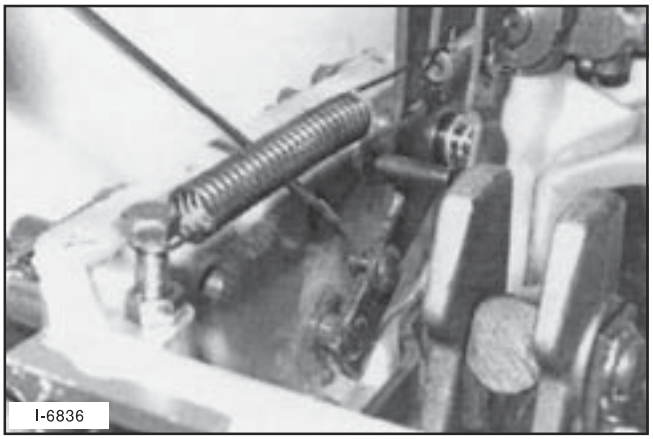

FIG. 14

FIG. 15: Hook the spring, 1, as shown on the end of the main control valve spool, 2, so that the spring becomes level paying attention to the installed direction of the spring.

NOTE: If the spring is not level, the smooth movement of the spool will deteriorate.

Tighten the bolts for each valve to the specified torque.

Main control valve	130 - 180 kgf·cm (9.3 - 13.0 ft-lb)
Safety valve	600 - 700 kgf·cm (43.4 - 50.6 ft-lb)
Slow return valve	1000 - 1200 kgf·cm (72.3 - 86.8 ft-lb)

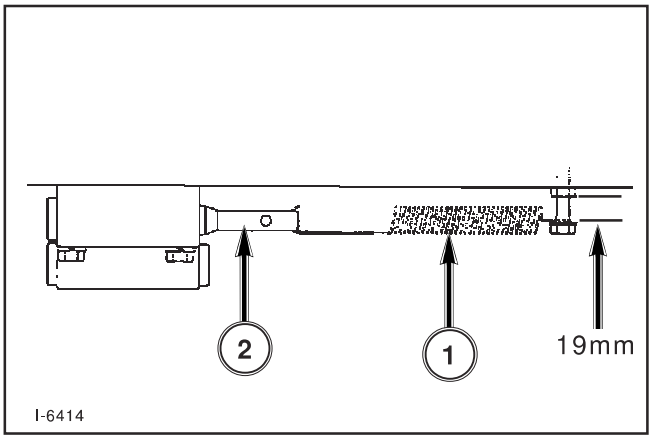

FIG. 15

FLOW CONTROL (SLOW RETURN) VALVE

General Description

FIG. 27: This valve controls the flow returning from the cylinder while the lift arm is lowering and as a result regulates the maximum lowering speed of the lift.

Ref. No.	Part Names	Quantity
1	0-ring	1
2	Back-up ring	1
3	Snap ring	1
4	Spring	1
5	Poppet	1
6	Body	1
7	0-ring	1
8	0-ring	1
9	Snap ring (hole)	1
10	Dust seal	1
11	Bushing	1
12	Adjusting screw	1

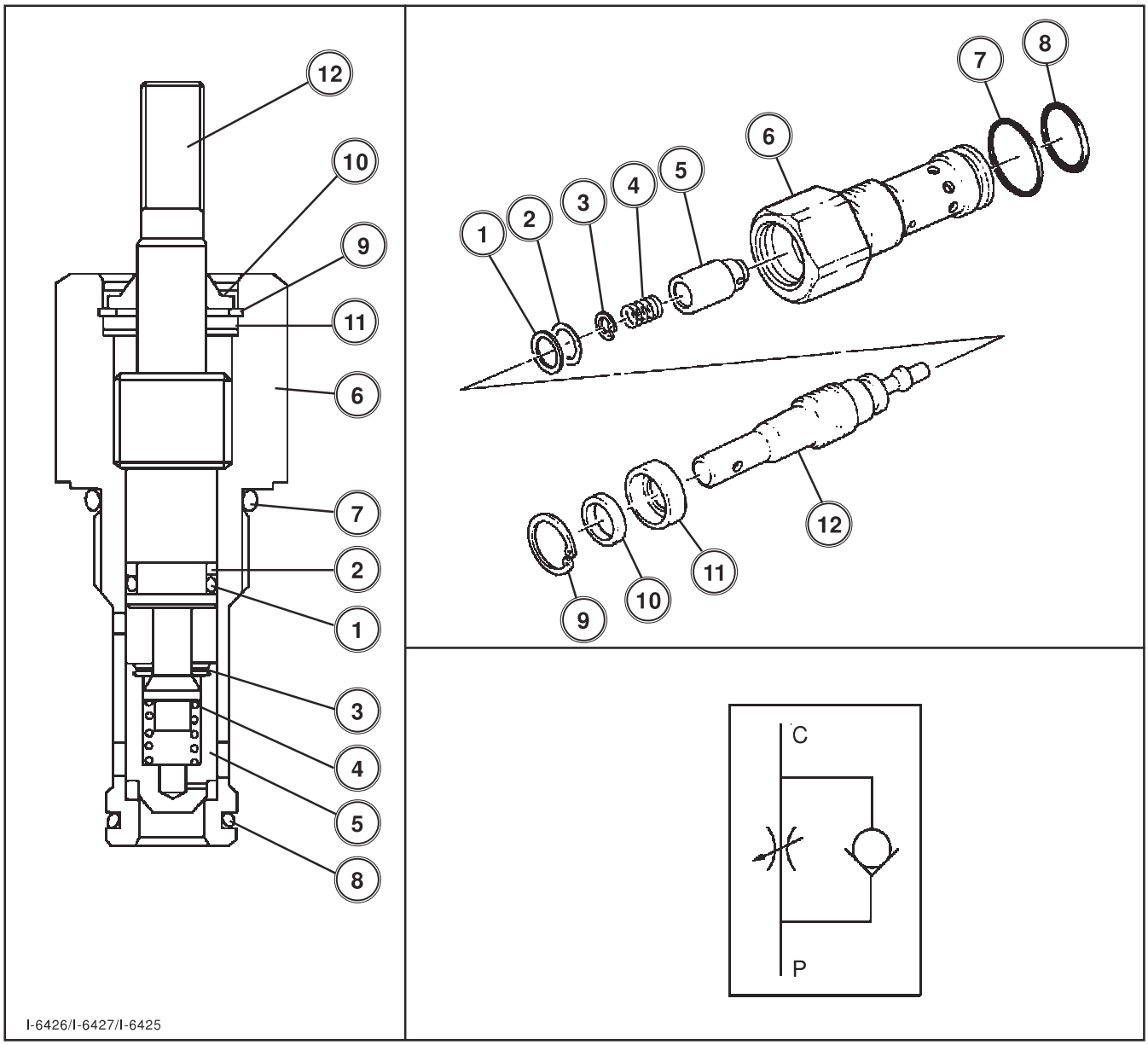

FIG. 27

TROUBLESHOOTING

Problems	Causes	Countermeasures
Lift does not rise.	Insufficient engine speed	Raise engine speed slightly.
	Insufficient transmission oil	Maintain oil level by replenishing with the same kind of oil.
	Air taken in through suction piping	Tighten securely or replace broken parts.
	Clogged suction filter	Clean.
	Broken or poor hydraulic pump if necessary. Pay particular attention to shaft seal because a broken seal sometimes intakes air.	Inspect Pump and repair or replace
	Poor link mechanism if necessary.	Inspect, adjust, repair, or replace
	Excessive load on lift	Decrease load.
	Broken cylinder	Replace.
	Too low viscosity of transmission oil.	Repalce with proper viscosity oil
	Mal-adjusted relief valve	Readjust.
	Excessive internal leaks damaged seals. (Check each part systematically.)	Inspect cylinder and valves. Replace
	Broken control valve (Even when spool is shifted to up position, lift does not rise.)	
	• Stuck compensator plunger stone.	Lap after repairing flaws with oil stone.
	• Clogged orifices or slanted orifices in pilot passage	Clean them with compressed air or a sharp point.
	• Broken or fatigued relief valve spring	Replace spring.
	• Marred or stuck check valve plunger	Lap after repairing flaws with oil stone.
	Broken flow-control valve Stuck poppet	Lap after disassembling, cleaning, and repairing flaws with oil stone.

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STEERING CYLINDER

FIG. 33: Steering Cylinder.

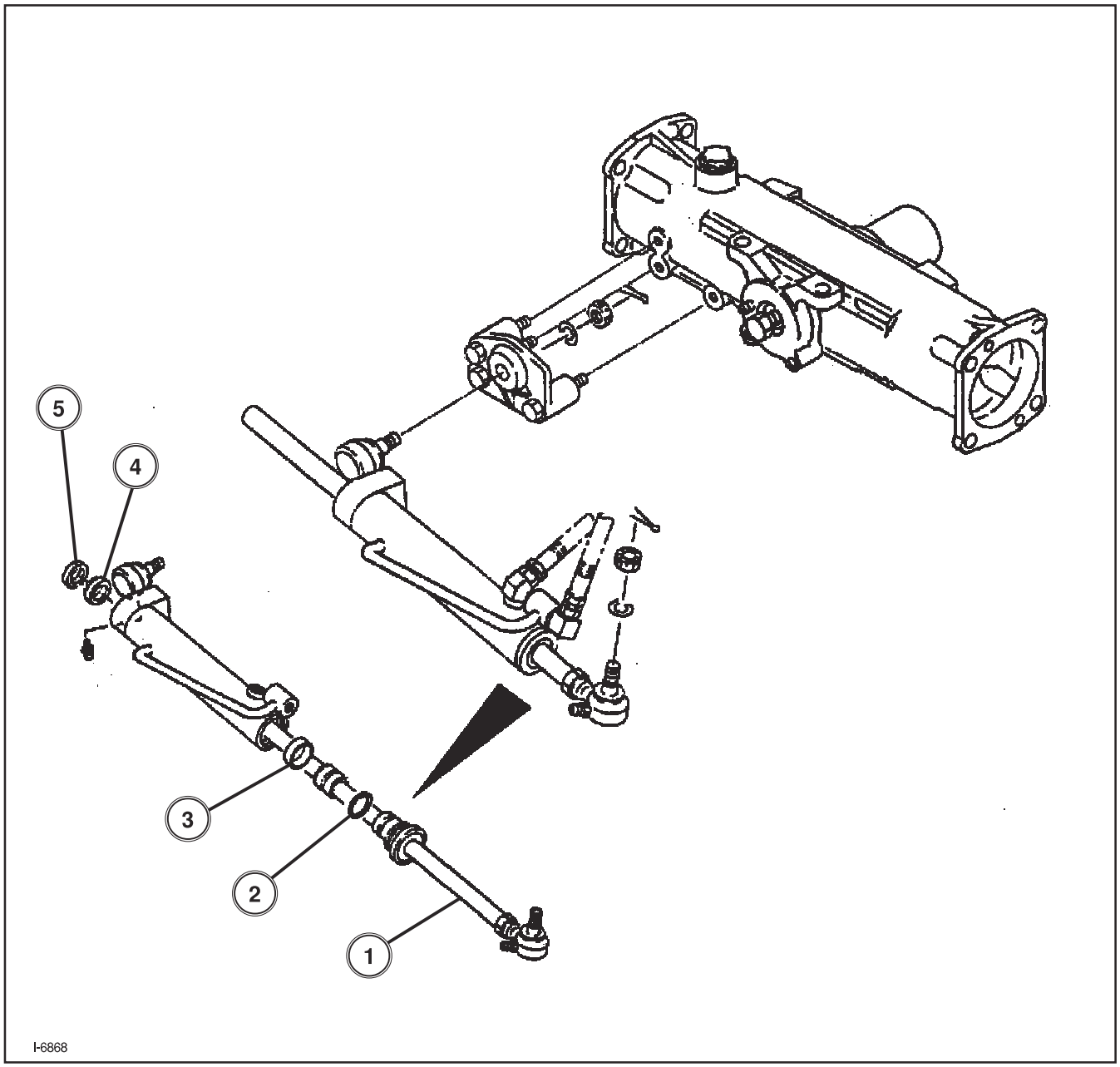

FIG. 33

1. Rod
2. Seal
3. Sleeve
4. Seal
5. Retainer

FIG. 12: Wire harness layout

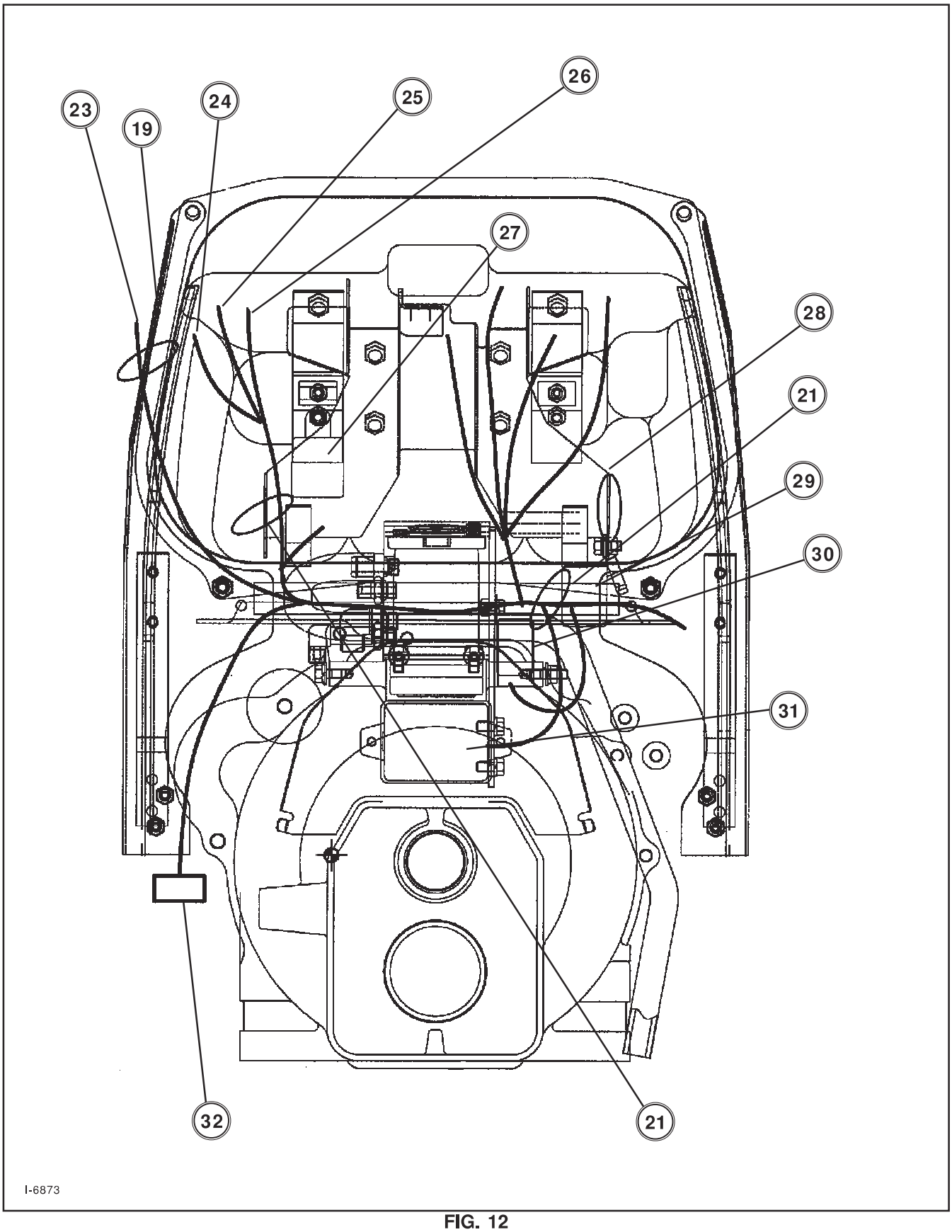

FIG. 12