P.T.O. Clutch Service Manual

Win. Form No. 9-99653

J I Case
A Tenneco Company

PART I - CLUTCH ASSEMBLIES, PART NUMBER C19005, C17620, C19276 and C18910

Clutch, part number C19005 replaces number C18241 and C17302 clutches on the following machines:

210-9668500, 220-9656747,
222-9658189, 224-9667000,
444-9661261.

This clucth replaces, as a unit, all clutches on prior 200 and 400 series tractors.

Clutch, part number C17620 replaces number C18254 on the model 644 S.N. 9662820 and after, and will replace, as a unit, all clutches on prior model 644 tractors. It is the same as the C19005 clutch except for the shape of the engaging arm.

Clutch, part number C19276 replaces number C18255 on the model 646 S.N. 9663323 and will replace, as a unit, all clutches on prior model 646 tractors. The hub and bolt are different on clutch see figure 1A insets A + B clutch part number C18910 is used on the model 446, and is the only clutch used on this model. The hub on this clutch is different see figure 1A, inset B., it is similar to the 646 hub but is 1/8" longer, and drilled and tapped for the C18940 bolt.

These clutches are designed so that each component is individually serviceable. The only reason to replace a complete clutch would be if the combined cost of the damaged, worn or defective components would exceed the cost of the complete clutch assembly. Unauthorized replacement of a complete clutch assembly is not acceptable under Warranty.

The C19005 clutch is interchangeable as an assembly with the C14152 clutch used on Model 220, 222, 442 and 444 tractors prior to serial number 9641001. Therefore, if the cost of repairing the C14152 clutch exceeds the cost of the C19005 clutch assembly, the new assembly should be used.

NOTE Refer to this service procedure on page 7 for the C14152 clutch assembly and note that a Spacer Kit, part number C16483 is available to replace the snap ring in event the groove in the mounting hub is worn.

REMOVAL

See Figure 1A for present production, see Figure 1B for prior models.

1. Remove the tractor hood.

NOTE On loaders only remove grill and headlight panel.

2. Remove the four bolts which hold the heat exchanger support to the frame but leave the hose connected to the valve return tube.

NOTE On loaders, remove four screws from support. Heat exchanger must be removed from hose to reservoir and hose must be plugged.

3. Rotate the heat exchanger ahead for access to the clutch.

4. Disconnect the PTO control rod from the engaging arm (18).

NOTE At this point, check friction disc clearance, so that proper number of shims can be installed upon reassembly. Refer to paragraphs 5 and 12 under ASSEMBLY for correct procedure.

5. Back off special Left Hand Thread Bolt (17) and remove the bolt, fan (19) if furnished, spacer hub, springs (13), outer cam (12) and engaging arm (18).

NOTE The bolt on the Model 646 tractor clutch, part number C18291 has a Right Hand Thread.

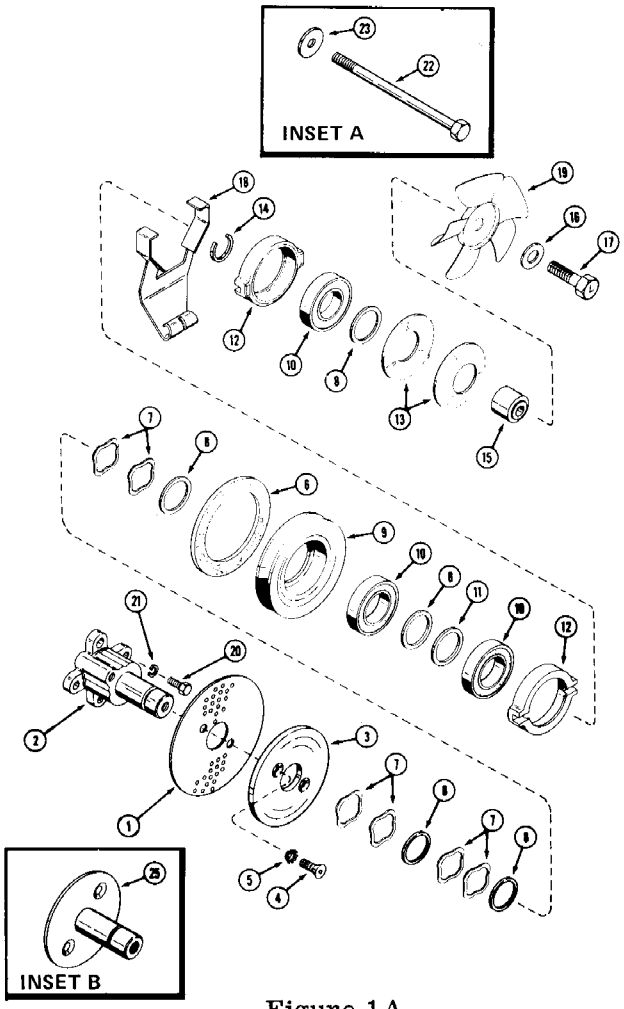

Figure 1A

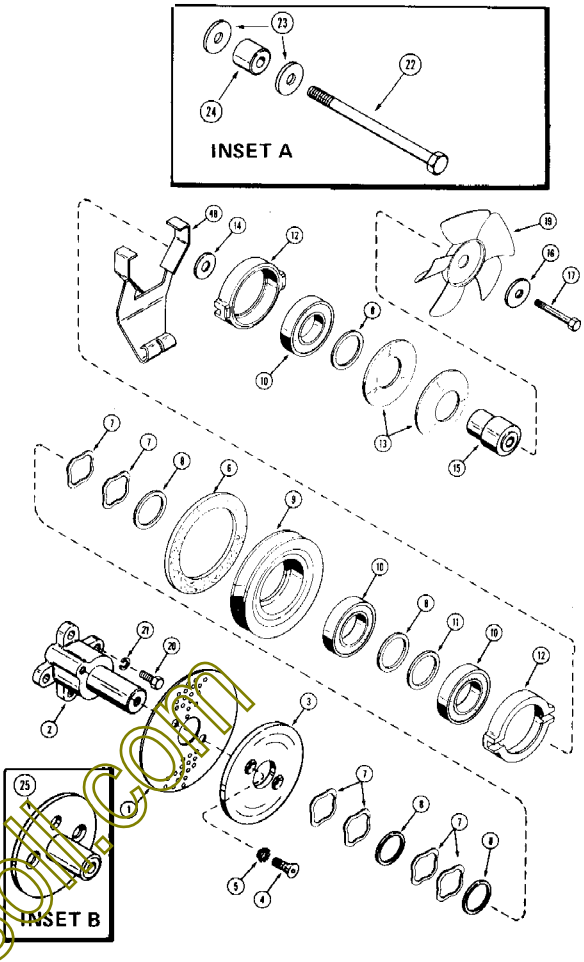

Figure 1B

6. Remove the snap ring, (spacer on older models) (14) and inner cam (12). Check for and remove any shim washers (8) or (11) which may have come off attached to the cam.

7. Remove the clutch pulley (9) with shim washers (8) and (11).

8. Remove the friction disc (6), six springs (7) and three washers (8) from the drive hub. (1) or (25).

NOTE Unless the clutch plate, screen (1) if furnished, or drive hub are damaged, worn or scored, further disassembly of the clutch is unnecessary and steps 9 and 10 can be disregarded.

9. Remove machine screws (4) lockwashers (5), clutch plate and grass screen (1), if furnished.

NOTE This completes removal of the 646 and 446 Clutch Assemblies.

10. All Clutches Except 646 and 446 models: Remove the four bolts (20) and lockwashers (21) to detach the drive hub (2) from the engine flywheel.

Check to see that none of the springs (7) and (13) are cracked or broken.

NOTE If clutch was slipping under heavy load even though friction disc clearance was within tolerance, new springs (13), part number C16786, should be installed.

Inspect the cam notches (12) and engaging arm (18) for excessive wear. Also check to make certain the bearing flanges in the cams are not cracked or damaged.

Rotate the three sealed bearings to check for freeness and quiet operation. Replace bearings which are rough and noisy or do not turn freely.

Inspect the friction disc (6) for glaze and wear. Replace if thickness measures less than 1/8" or if it is glazed.

Inspect the friction disc contact areas on the clutch plate (3) and pulley (9) for scratches or roughness. A polished surface is normal due to friction disc contact. Replace the clutch plate or pulley if score marks are present which cannot be polished out.

Check the fit of the cam bearings (10) and pulley bearings (10) on the drive hub (2). The bearings must slide back and forth freely for proper clutching and declutching. Polish off any nicks or burrs which could cause the bearings to bind.

NOTE On older models check fit of outer cam bearing (10) on the spacer hub (15).

On clutches part number C17307, C18241 and C18254, place the two load springs, one .050" spacer and bearing on the spacer hub as shown in Figure 2. The measurement from end of the hub to extreme edge of the bearing inner race should be .075" - .090". Use .010" or .050" shim washers, positioned between the load spring and the bearing inner race, as required to obtain the .075" .090" dimension.

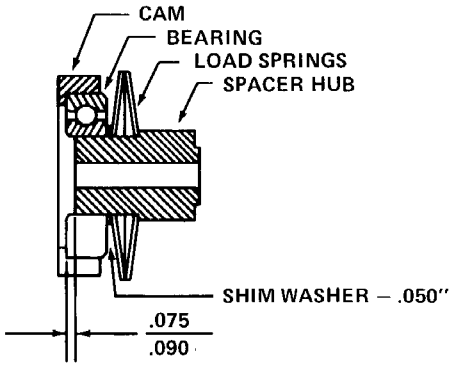

Figure 2

Check the edges of the engaging arm which contact the notches in the cams. To insure full clutch engagement, they must be rounded as shown in Figure 3. If required, edges of the arm can be rounded with a file or grinding wheel. Take care, however, not to reduce overall width of arm. See Figure 3.

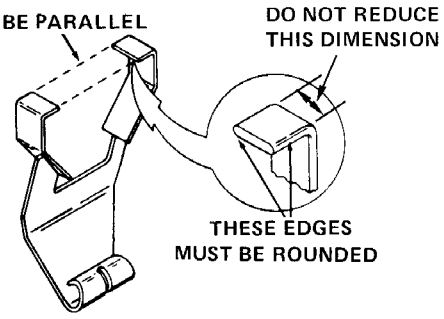

Figure 3

Both engaging arms must be square and parallel with each other as shown in Figure 3. If the arms are misaligned, the lever must be replaced.

Check the mounting face of engine flywheel for flatness. If necessary file or grind smooth to insure that runout at the end of the drive hub does not exceed .006". Pay particular attention to the mounting holes as the tapping operation will sometimes leave a high spot on the flywheel face.

See Figure 4A for present production. See Figure 4B for prior models.

1. All Clutches Except 646 and 446 models:

   a. Connect the drive hub (1) to the engine flywheel with original four cap screws (20) and new 3/8" lockwashers (21).

   b. Secure the screen and clutch plate to the drive hub with original machine screws (4) and new lockwashers (5). Tighten the machine screws securely.

2. All 646 and 446 Clutches Only: Secure the drive hub to the flywheel with original machine screws and new lockwashers.

3. Fit two springs (7) together and place on drive hub. Install .050" shim (8) then match two more springs and install. Place second .050" shim on hub and install the last two springs and .050" shim for a total of six springs and three shims.

4. Place friction disc (6) over the shoulder of clutch pulley (9) and place both on the drive hub.

5. Place original shim stack (8) and (11) on the drive hub.

NOTE If the friction disc clearance was measured and noted prior to clutch disassembly and no new parts were installed, adjust the shim stacks at this point to correct specification (.002" to .012") with clutch disengaged.

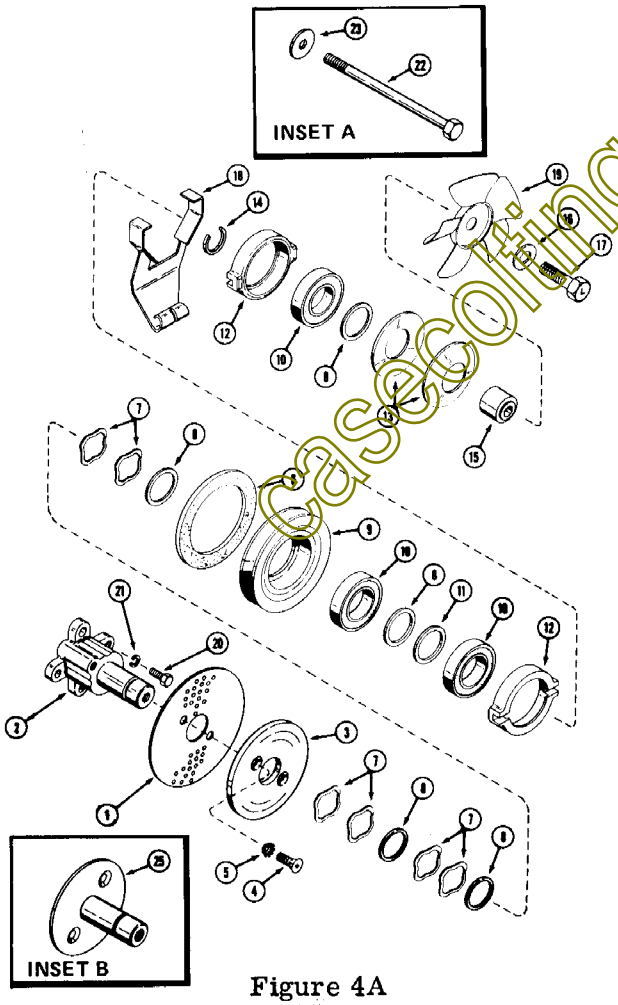

Figure 4A

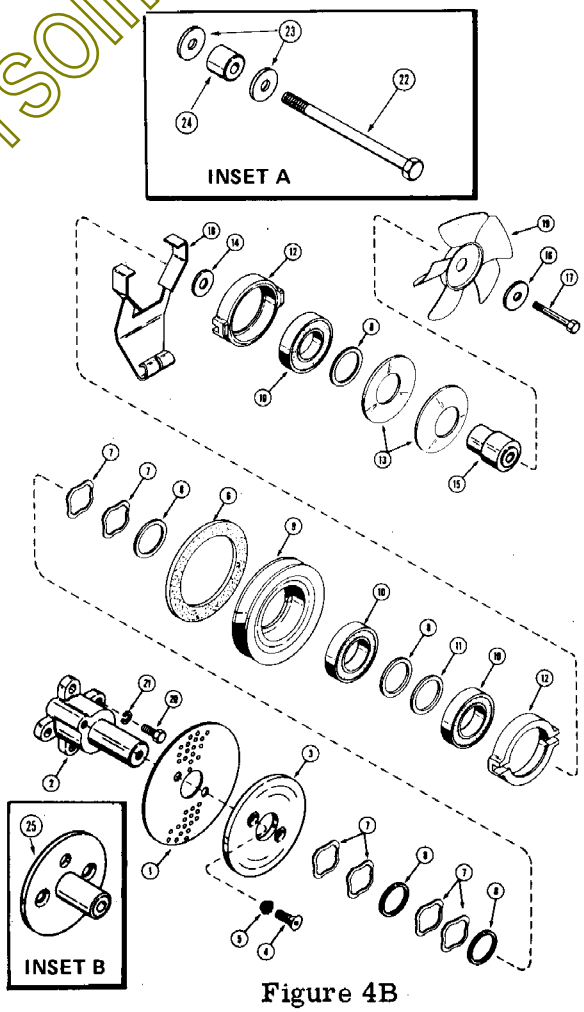

Figure 4B

6. Place inner cam (12) on drive hub (2) or (25) so that notch faces out, then install retaining ring (14) and outer hub with notch facing in.

7. See Figure 5. Rotate the cams until the lever notches are misaligned as shown. The inner cam on drive hub must be positioned so the shorter side is downward and the outer cam must have the shorter side upward.

8. Separate the cams enough to insert the engaging lever. The engaging lever must be installed so the bend for the control rod is toward the front of the tractor.

9. Install .050" shim (8) and bellevelle spring washers (13), dished out.

10. Assemble washer (16), fan if equipped (19) and spacer if equipped (15) on special bolt (17) or (22) and install on hub (2) or (25).

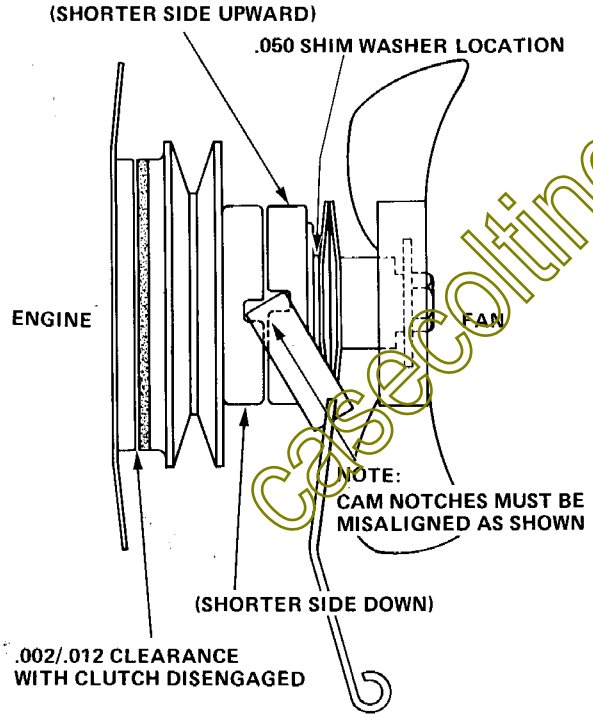

Figure 5

NOTE On prior models, assemble washer (16) or (23), fan (19) if equipped, spacer hub (15) or (24), belleville spring washers (13) dished outward, .050" shim washer (8), cam (12) and spacer (14) or (23) in that order on special bolt (17) or (22) and install on hub (2) or (25).

11. Hold the friction disc flush against the pulley so it is over the shoulder and tighten the assembly bolt. If the assembly bolt is 3/8", torque to 32-36 foot pounds. If the bolt is 1/2", torque to 45-50 foot pounds.

12. With the clutch disengaged, check the friction disc clearance. Clearance should measure between .002" and .012". Use two "blade-type" feeler gauges 180° apart when measuring. To increase clearance, remove shims (8) or (11) as required. To decrease clearance, add shims (8) or (11) as required between the pulley (9) and inner cam (12).

NOTE If clutch does not disengage, check for correct cam assembly according to steps 7 and 8 above. When correctly installed, the facing notches on the inner and outer cams are "out of alignment" in the manner shown in Figure 5 with the clutch in both the engaged or disengaged positions. Also check to make certain the friction disc did not come off the pulley shoulder. Repeat steps 7, 8 and 11 to correct either friction clearance or cam assembly.

13. Bolt the heat exchange supports back to the tractor frame and install the hood, or grill and headlight panel.

PART II - CLUTCH ASSEMBLY, PART NUMBER C14152

INTRODUCTION

The C14152 Clutch Assembly is furnished with Model 220, 222, 442 and 444 tractors prior to serial number 9641001.

This clutch is designed so that all components are serviceable. The only reason to replace a complete clutch would be if the combined cost of the damaged, worn or defective components would exceed the cost of a new clutch assembly.

Spacer Kit, part number C16483, is available to replace the snap ring (5) in the event the groove in the drive hub (10) is worn. See inset B reference 13 in Figure 6. Therefore, it is not necessary to replace the drive hub (10) because the snap ring does not hold.

If it should not be economical to repair this clutch, order clutch assembly, part number C19005, for the interchangeable replacement.

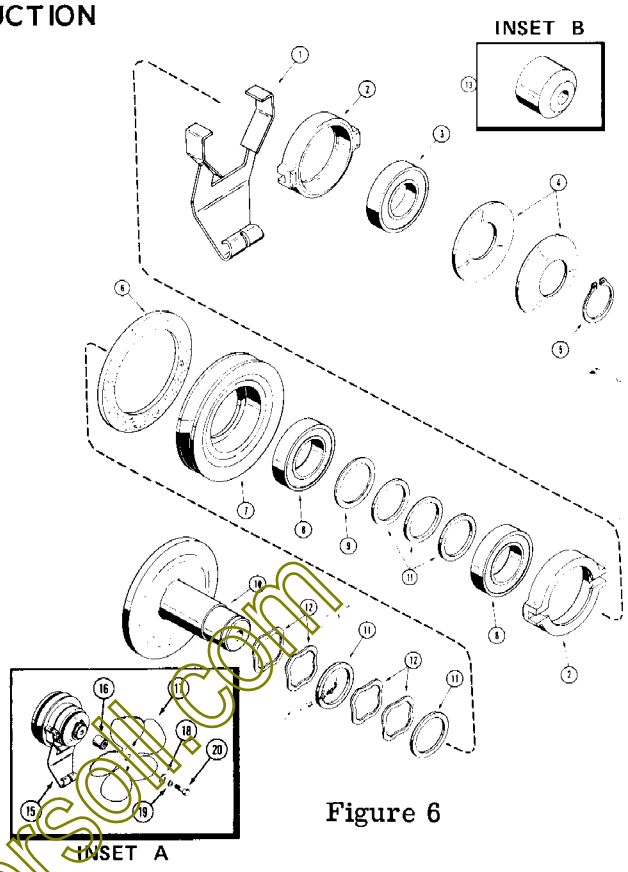

Figure 6

REMOVAL

1. Remove the tractor hood.
2. Remove the four bolts which hold the head exchanger support to the frame but leave the hose connected to the valve return tube.
3. Rotate the heat exchanger ahead for access to the clutch.
4. Disconnect the PTO control rod from the engaging arm (1), Figure 6.
5. Remove the right hand thread bolt, Inset "A", Figure 6 (20) with lockwasher and plain washer and remove the fan (17) and spacer (16).
6. Carefully remove the clutch with a "puller" using the original 3/8 x 3-1/2" long bolt as a guide on the engine shaft.
7. Before disassembling check and record the total clearance between the pulley and friction liner. Use two "blade-type" feeler gauges of the same thickness -- insert 180° apart. The proper total clearance is between .002" and .012" with clutch disengaged. This will determine the number of shims to be added during assembly providing a new friction liner is not installed.
8. Carefully clamp the clutch assembly in a vise and compress the load springs (4) enough to remove the snap ring (5).
9. Remove the clutch from the vise. Clean off paint and remove any burrs from the snap ring end of the hub assembly (10).
10. Remove the springs (4), outer cam (2) and engaging arm (1).
11. Remove the inner cam (2). Check for and remove any shim washers (9) or (11) which may have come off attached to the cam.
12. Remove the shim washers (9) and (11), pulley (7), friction disc (6), and shim washers (11) and springs (12) from the drive hub (10).

INSPECTION

Check to see that none of the springs (4) and (12) are cracked or broken.

NOTE If clutch was slipping under heavy load even though friction disc clearance was within tolerance, new springs (4), part number C16786, whould be installed. Also, if new springs are installed, the clutch must be reassembled with the spacer kit (13), part number C16483, instead of the snap ring.

Inspect the cam notches (2) and engaging arm (1) for excessive wear. Also check to make certain the bearing flanges in the cams are not cracked or damaged.

Rotate the three sealed bearings to check for freeness and quiet operation. Replace bearings which are rough and noisy or do not turn freely.

Inspect the friction disc (6) for glaze and wear. Replace if thickness measures less than 1/8" or if it is glazed.

Inspect the friction disc contact areas on the drive hub (10) and pulley (7) for scratches or roughness. A polished surface is normal due to friction disc contact. Replace the clutch plate or pulley if score marks are present which cannot be polished out.

Check the fit of the outer cam bearing (3) on the drive hub (10) and the fit of the inner cam and pulley bearings (8) on the drive hub (10). The bearings must slide back and forth freely for proper clutching and declutching. Polish off any nicks or burrs which could cause the bearings to bind.

Check the edges of the engaging arm which contact the notches in the cams. To insure full clutch engagement, they must be rounded as shown in Figure 3. If required, edges of the arm can be rounded with a file or grinding wheel.

Both engaging arms must be square and parallel with each other as shown in Figure 3. If the arms are misaligned, the lever must be replaced.

ASSEMBLY

1. Fit two springs (12) together and place on drive hub. Install a .050" shim (11), then match the other two springs and install. Place a second shim (11) on the hub for a total of 4 springs and 2 shims.

2. Place friction disc (6) over the shoulder of clutch pulley (7) and place both on the drive hub.

3. Place original shim stock (9) and (11) on the drive hub.

NOTE If the friction disc clearance was measured and noted prior to clutch disassembly and no new parts were installed, adjust the shim stacks at this point to correct specification (.002" to .012") with clutch disengaged.

4. Place the two cam assemblies (2) on the drive hub.

5. See Figure 5. Rotate the cams until the lever notches are misaligned as shown. The inner cam must be positioned so the shorter side is downward and the outer cam must have the shorter side upward.

6. Separate the cams enough to insert the engaging lever (1). The engaging lever must be installed so the bend for the control rod is toward the front of the tractor.

7. Place the two springs (4) dished outward on the drive hub.

8. If the snap ring (5) is to be used rather than the spacer kit (13), compress the load springs enough in a vise to expose the groove.

NOTE Make certain the friction disc is flush against the face of the pulley so it is over the shoulder before compressing the springs and installing the snap ring.

9. With the clutch disengaged, check the friction disc clearance. Clearance should measure between .002" and .012". Use two "blade-type" feeler gauges 180° apart when measuring. To increase clearance, remove shims (9) or (11) as required. To decrease clearance, add shims (9) or (11) as required between the pulley (7) and inner cam (2).

NOTE If clutch does not disengage, check for correct cam assembly according to step 5 above. When correctly installed, the facing notches on the inner and outer cams are "out of alignment" in the manner shown in Figure 5 with the clutch in both the engaged or disengaged positions. Also check to make certain the friction disc did not come off the pulley shoulder. Repeat step 4 through 8 to correct either friction disc clearance or cam assembly.

10. Carefully install the clutch on the engine shaft with the spacer (13) or (16) and fan, and secure with 3/8 x 3-1/2" bolt and washers. Torque bolt to 32-36 foot pounds.

NOTE If spacer kit (13) is used instead of the snap ring, make certain the friction disc is flush against the face of the pulley so it is over the shoulder before tightening the bolt. Also check the friction disc clearance and proper disengagement as covered in step 9.

11. Bolt the heat exchanger supports back to the tractor frame and install the hood.

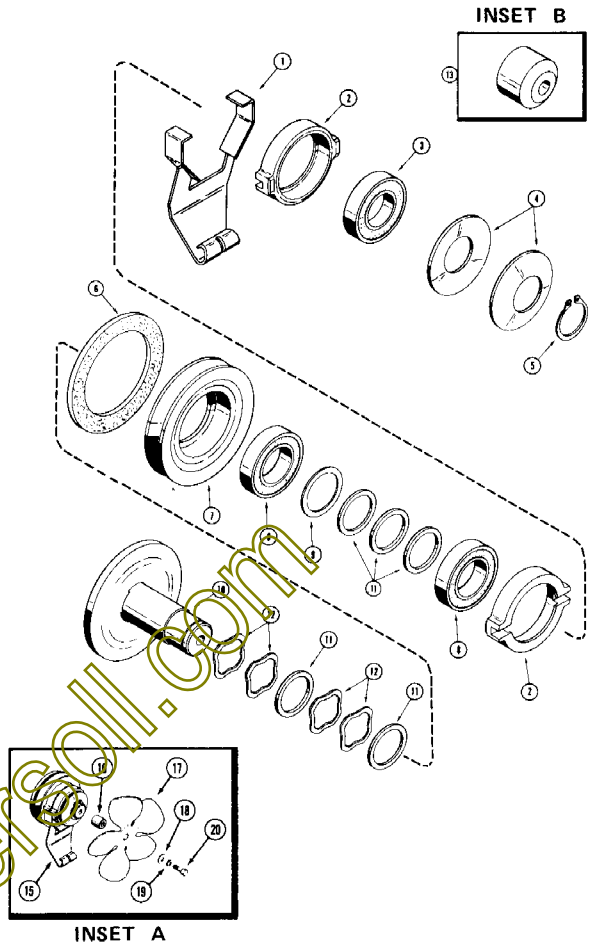

Figure 7