3.18 MUD PUMP DRIVE ASSEMBLY (Figure 3-23)

1. Lower Bearings - Removal and Replacement

A. Disassembly:

Remove Item 54 (pipe plug) and drain oil from case. Remove Item 6 (capscrews) and remove cover from Item 53 (case). Rotate Item 9 (chain) until master link (the one with the cotter pin) is on top of Item 13 (sprocket). Remove cotter pins and master link, disconnect Universal joint drive from Item 23 (flange). This will allow the chain to be unthreaded off Item 42 (lower sprocket). Disconnect case anti-rotation anchor from frame and remove lower drive assembly from the drilling rig. Remove Item 20 (cotter pin) and unscrew Item 21 (nut) and, utilizing a flange puller, remove Item 23 (flange) from Item 34 (shaft). Remove key from Item 34 (shaft), unscrew Item 49 (capscrews), which will allow the removal of Items 49 (capscrews) and Item 25 (snap ring), which will allow removal of Item 24 (seal), Item 26 (bearing) and Item 51 (seal and bearing retainer). In order to remove Item 41 (bearing), it will be necessary to remove Item 40 (snap ring). It should now be possible to remove Item 34 (shaft) and Item 32 (clutch) from the lower assembly. The shaft may need to be driven lightly with a plastic mallet or wooden block struck with a hammer. Care should be taken while disassembling these parts since this could effect the total cost of the overhaul since any damaged part will also need to be replaced. It will now be possible to remove Items 37 (capscrews) from Item 47 (seal retainer). This should allow removal of Items 39 through 48. In order to replace Item 45 (bearing) a hydraulic press will be necessary to pull Item 42 (sprocket) from Item 48 (clutch

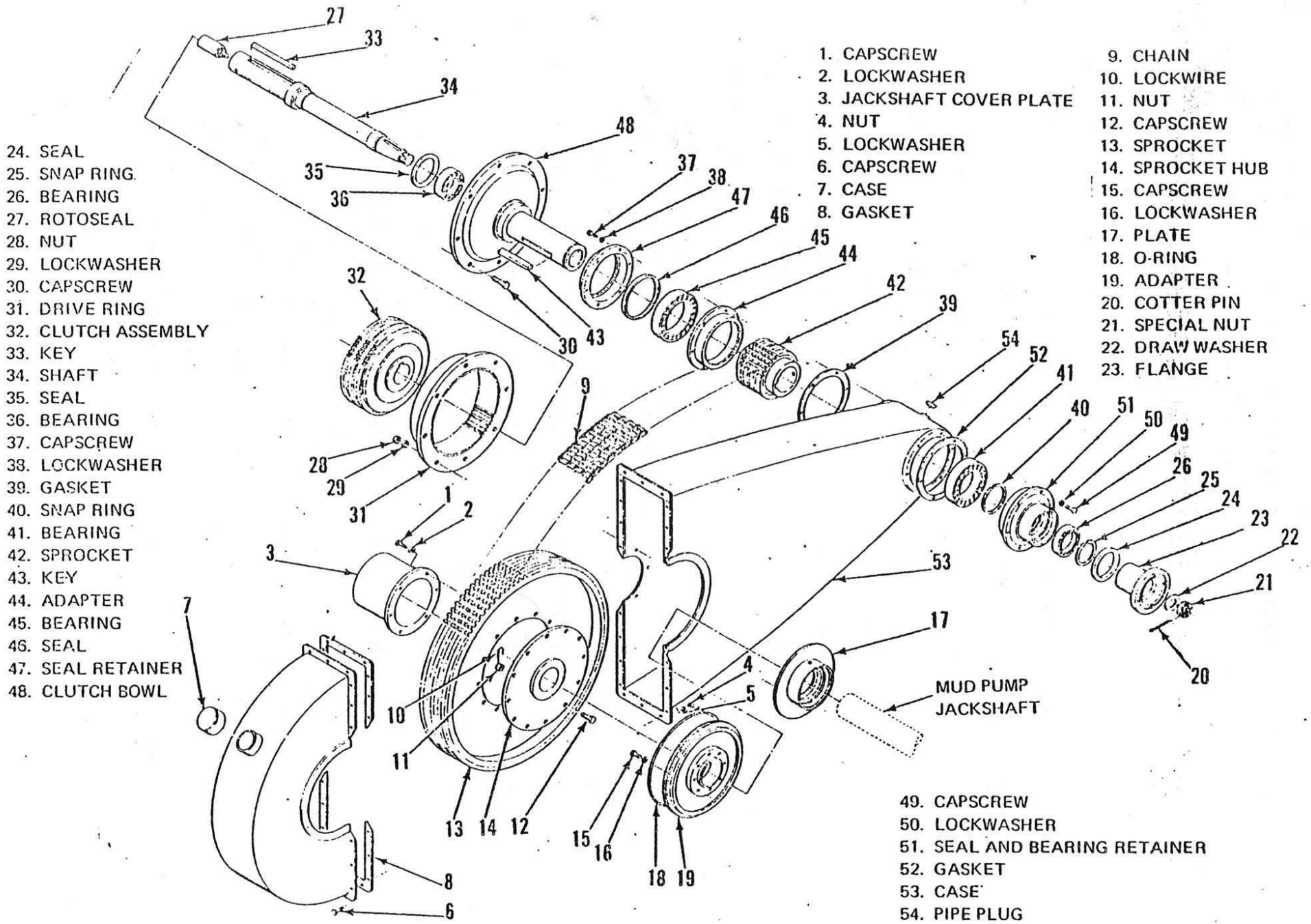

Figure 3-23. Mud Pump Drive Assembly

bowl). All parts should be cleaned thoroughly and inspected for damage. It would probably be well to replace all seals - Items 24, 35 and 46, at this time since the cost is nominal compared to the labor involved if any of these used seals leak upon reassembly. Also, it would be well to examine the clutch plates at this time and, if excessive wear, heat or distortion appears, it would be well to replace those parts.

B. Reassembly:

Slip Item 44 (adapter), Item 45 (bearing), Item 46 (seal) and Item 47 (seal retainer) over the shaft on Item 48 (clutch bowl). Reinstall Item 43 (key) and press Item 42 (sprocket) until it bottoms against the bearing. Slide this assembly through the bottom hole of the case in the reverse order to which it was removed and install Item 47 (bearing), Item 40 (snap ring) and Items37 (capscrews) and torque to recommended limits. Install Item 51 (seal and bearing retainer) with Items 49 (capscrews) and torque up to recommended limits. Install Item 36 (bearing) and 35 (seal) into backside of Item 48 (clutch bowl) and slide Item 34 (shaft) through the inner bore until it bottoms. Install Item 26 (bearing), Item 25 (snap ring) and Item 34 (seal) over the shaft where it protrudes through the Item 51 (seal and bearing retainer). Reinstall Item 23 (flange), Item 22 (draw washer), Item 21 (nut) and torque to recommended limits. Install Item 20 (cotter pin) to lock. Item 39 (gasket) and Item 52 (gasket) are used to retain oil within the case and should probably be replaced in any overhaul operation. They can also be used as shims in case of endloading on the ball bearings. These bearings should not be assembled with any preload. In fact, they should have at least 1/32" clearance in the axial direction. Relocate

the lower drive assembly on the drilling rig in the same position from which it was removed and rethread Item 9 (chain) around Item 42 (sprocket). It may help to use a wire to assist in pulling the chain around the sprocket. Pull both ends of the chain over Item 13 (sprocket) and reinstall chain master link with new cotter pins. Reinstall Item 53 (cover) with Item 6 (capscrews) and Item 3 (cover) with Items 1 (capscrews). If Item 18 (O ring) is damaged, it should be replaced prior to reassembly of chain case. Item 13 (large sprocket) and Item 14 (hub) must be removed from shaft to replace Item 18 (O ring). When reassembling, 1-7/16" dim should be held between Item 14 (hub) and Item 19 (adapter).

C. Tools Required:

1 - set Allen wrenches
1 - 20 ton press, to remove sprocket
1 - 10" adjustable wrench
1 - pr. standard pliers
1 - set std. 3/8" drive sockets w/ratchet handle speed handle, 3" & 8" extensions
2 - 9/16" box to open end combination wrenches
1 - 1/8" round end punch x 5" min. length including body
1 - 2# ball pein hammer
1 - can #3 Permetex
1 - tube #1 Permetex
1 - 1/2 ton hoist
1 - 5# plastic or rubber mallet
1 - pr. snap ring pliers
1 - 3/8" round end punch
1 - 3/4" box to open end wrench combination
1 - 11/16" box to open end wrench combination
1 - 10" draw puller
1 - 10" vise grip pliers
1 - 8" "C" clamp, to clamp chain
1 - 2' long pry bar to lift and tighten chain
1 - pc. bailing wire 6' long

D. Estimated Time Required to Complete Repair

8 to 10 hours.

2. Clutch Friction Disc Removal and Replacement:

A. Disassembly:

Remove air lines. Pull set screw in clutch hub and remove nut. Pull clutch apart and replace clutch discs. Pay close attention to correct angular relationship. When doing so, examine the clutch for cracks, heat distrotion or other defects prior to installing the new plates. Excessive damage, such as distortion, cracking, etc., will necessitate the replacement of the complete clutch.

B. Reassembly:

Complete reassembly in reverse order.

C. Tools Required:

1 - 11/16" box to open end wrench combination
1 - 3/4" box to open end wrench combination
1 - set Allen wrenches
1 - 12" heavy screwdriver
1 - 2# ball pein hammer
1 - 3/8" drift punch

D. Estimated Time Required to Complete Repair:

3. Chain Removal and Replacement

A. Disassembly:

See Item 1-A above but proceed only sufficiently to remove the chain.

B. Reassembly:

See Item 1-B above but proceed only sufficiently to replace the chain.

C. Tools Required:

1 - pr. standard pliers
1 - set std. 3/8" drive sockets w/ratchet handle speed handle, 3" and 8" extensions
2 - 9/16" box to open end wrench combination
1 - 1/8" round drift punch
1 - 2# ball pein hammer
1 - can #3 Permetex
1 - 10" vise grip pliers
1 - 8" "C" clamp
1 - 2" pry bar
1 - pc. bailing wire 6' long
1 - hydraulic jack to support case while top is off

3.18 MUD PUMP DRIVE ASSY (FIGURE 3-23)(CONT'D):

D. Estimated Time Required to Complete Repair:

2 to 3 hours