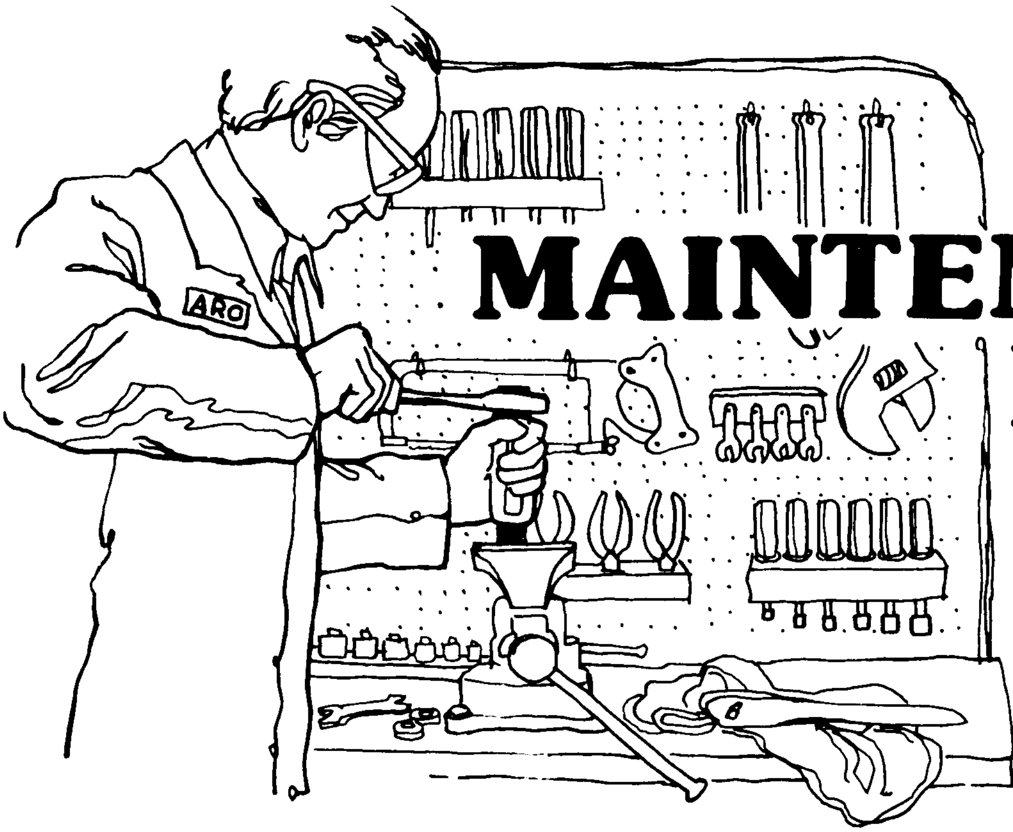


ARO

MAINTENANCE/ REPAIR

training program

FORM 1876-2

PRINTED IN USA

"790"

SERIES HO

REPAIR PROG

SLIDE 1

The following program is concerned with the maintenance and repair procedures for Aro's 7790 series hoists. The first portion reviews the disassembly procedures and the second portion, the assembly procedures for the hoist.

SLIDE 2

For a detailed description of the hoist, its opertion, lubrication requirements, inspection and maintenance procedures, refer to the operators manual for your specific hoist. These manuals are shipped with each tool and are available from The Aro Corporation upon request. Order either by section/manual number or by form number.

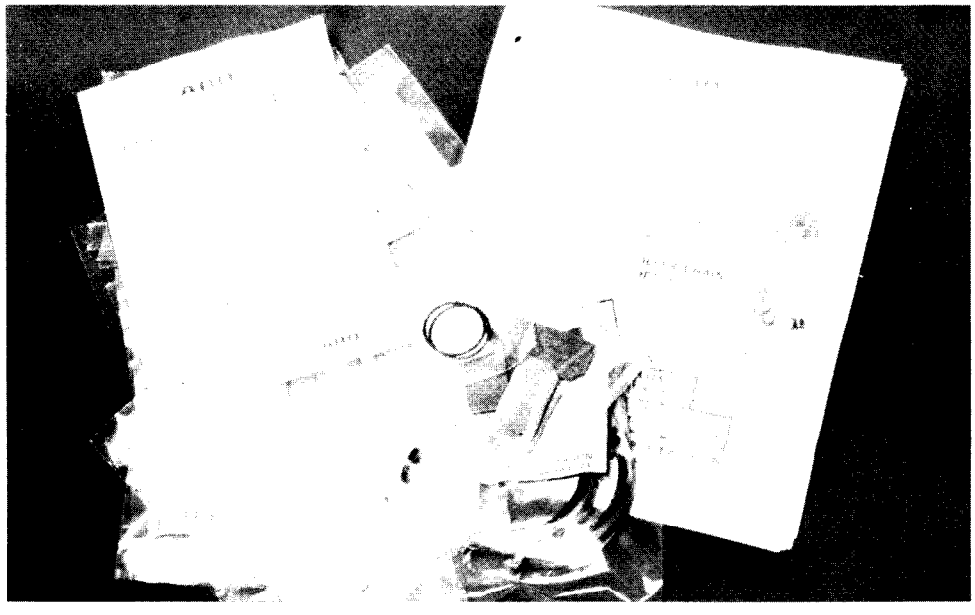
Keep in mind . . .

- Don't apply excessive pressure
- Apply even pressure on press fit
- Use proper tools
- Wash all parts at the same time
- Right hand threads
- Inspect for wear
- Use only ARO replacement parts

SLIDE 3

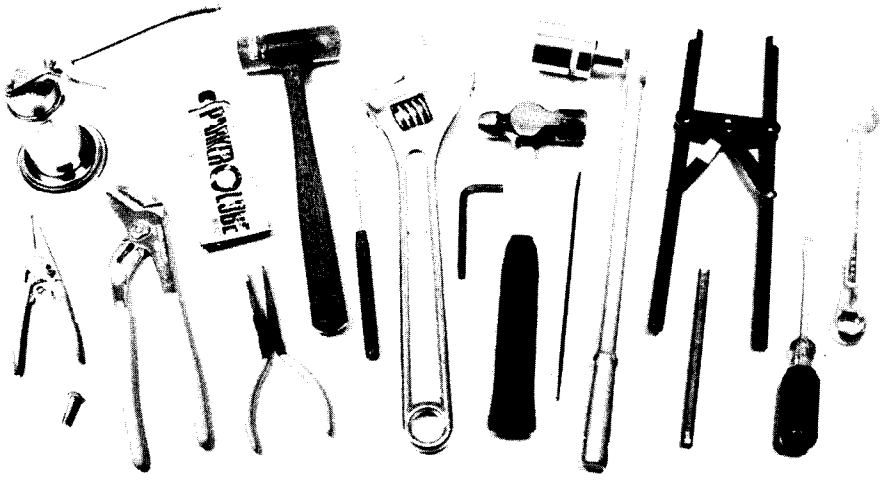
While repairing your Aro hoist there are several things to keep in mind:

1) **Whenever clamping parts, never apply excessive pressure that may cause distortion.**
2) **For parts with a press fit, apply pressure evenly when assembling.**
3) **Use only correct size tools.**
4) **Wash parts only after the tool is fully disassembled.**
5) **All threads in the hoist are right-handed.**
6) **Inspect all parts for wear as pointed out in this program.**
7) **Replace parts with Aro specified parts.**



SLIDE 4

In order to restore the hoist to its original quality, a service kit for the hoist is recommended. This kit contains items normally replaced during the repair procedure and is available from The Aro Corporation. The kit number for the basic hoist, excluding the chain or sprocket is 41619. For roller chain hoists, the sprocket and chain guide are available as kit number 41634. For link chain hoists the pocket wheel and chain guide are available as kit number 41759. Chain is not included in these kits and should be ordered separately.

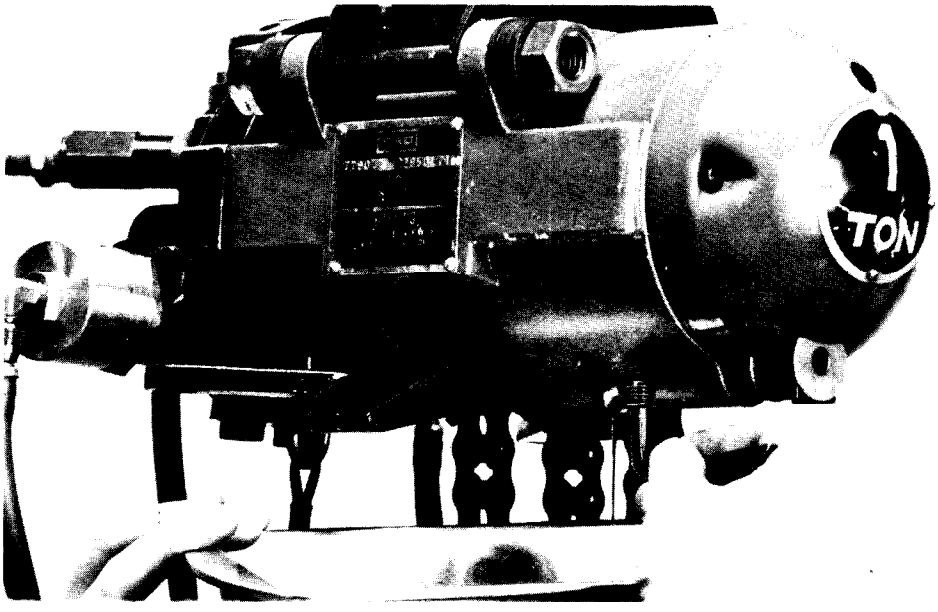


SLIDE 5

The tools needed for the repair of the hoists are:

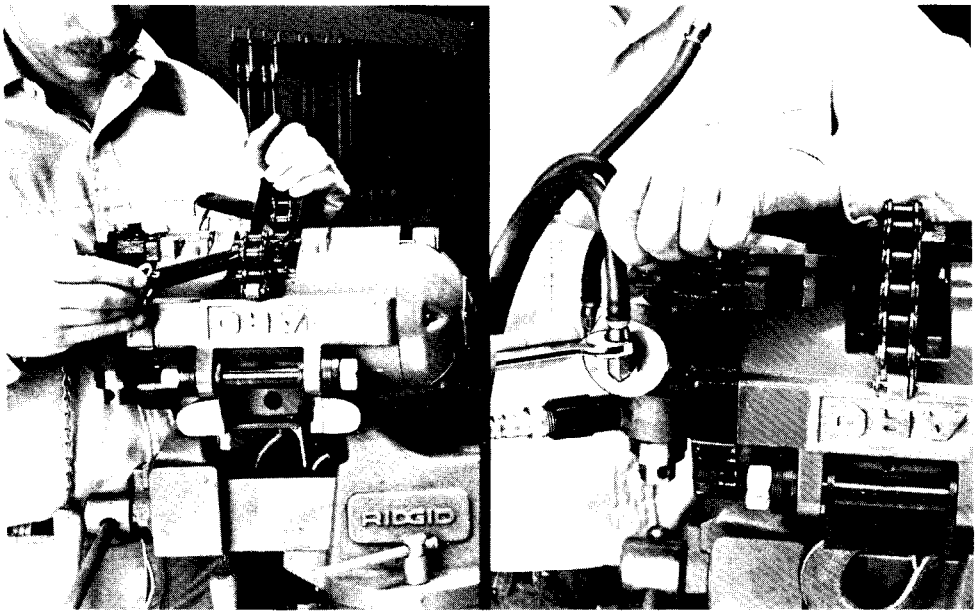
1 set of Allen wrenches	1 set of snap ring pliers
1 set of combination wrenches	1 pair of duck bill pliers
1 15'' adjustable wrench	1 o-ring pick
1 1-36 socket wrench	1 1/4'' brass rod
1 flat-bladed screwdriver	1 pair of channel locks
1 soft-faced hammer	1 5/16-18 machine screw
1 8 oz. ball peen hammer	1 brake spring spreader (#33541)
1 set of pin punches	1 2-ton (minimum) arbor press

Also needed are a can of spindle oil, gear oil, o-ring lubricant, and bearing grease.



SLIDE 6

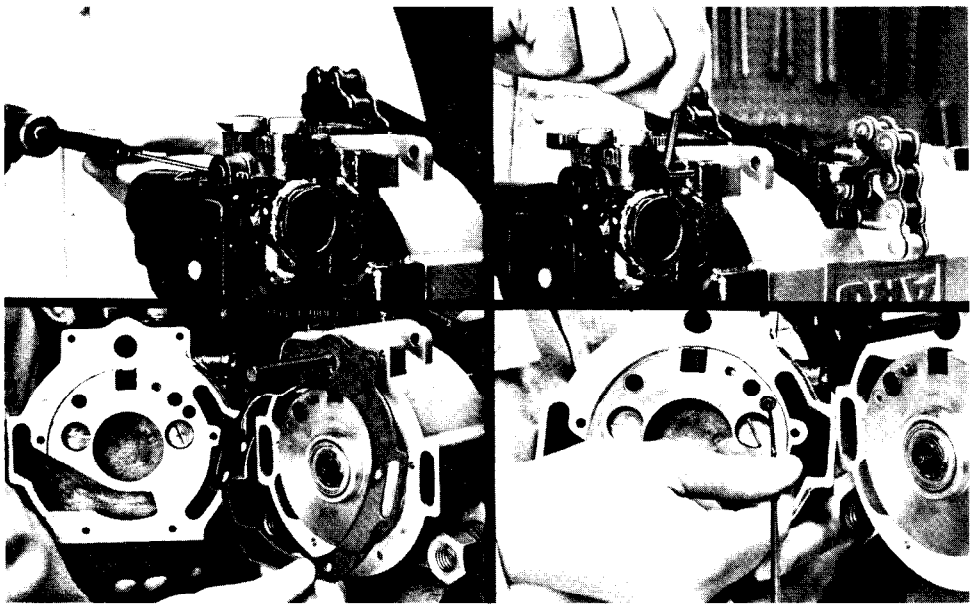
Before beginning to disassemble the hoist hang it from an adequate support by its upper hook and drain the oil from the gearing. Do so by removing the oil drain plug and the oil fill plug and catch the oil in a suitable container. This oil should be discarded and replaced with new oil during reassembly.



SLIDE 7

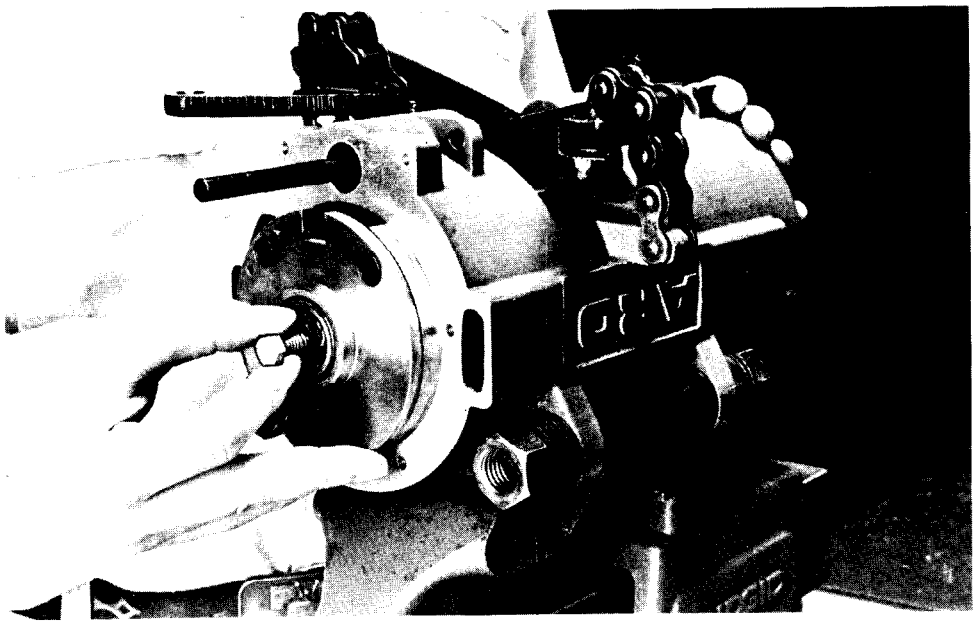
Clamp the hoist securely in the vise by the upper hook bracket, as shown. If your hoist is trolley mounted it will be helpful to attach an upper hook assembly for easier mounting in the vise. This assembly can be ordered from the Aro Corporation.

On chain control hoists remove the control handle and chain from the control arm by removing the "S" hooks. On pendant control hoist, remove the three hoses from the hoist with a 9/16" wrench. Then remove the adapter and cable from the hoist with the 9/16" wrench and set the pendant control and hose assembly aside. Also, remove the chain basket if one is being used.



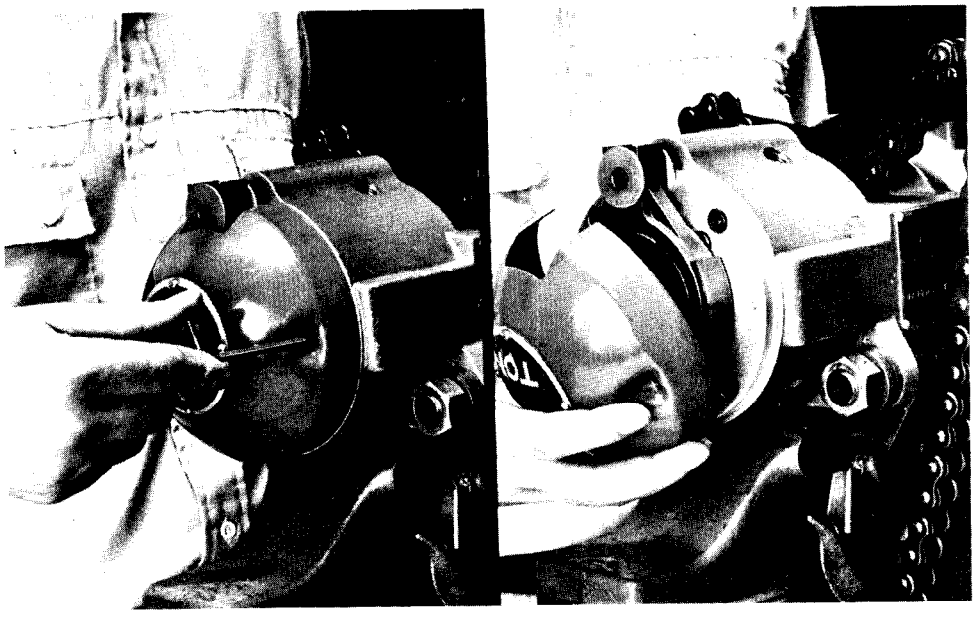
SLIDE 8

Remove the valve head from the hoist. To do so, drive the roll pin from the gear on the valving end of the hoist with a pin punch and ball peen hammer. Remove the six screws and washers with a 5/32" allen wrench and pull the valve housing from the hoist. Remove the gear from the valve head and set the gear and valve head aside. Also remove the gasket from the hoist or valve head, and the small o-ring from the valve head.



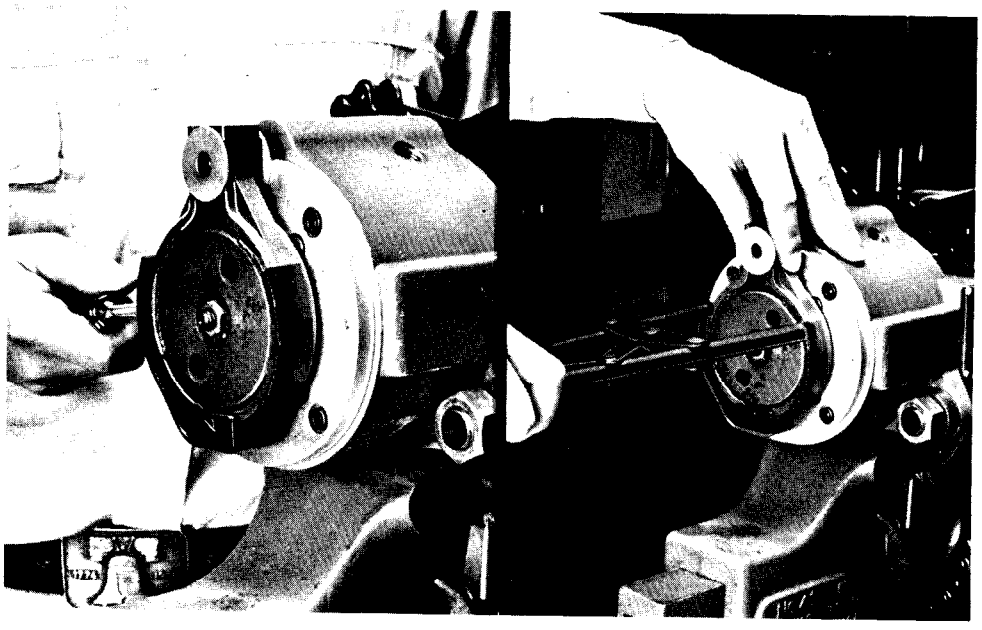
SLIDE 9

Next, remove the motor from the hoist, To do so, thread the 5/16-18 machine screw part away into the end of the motor spindle and using the screw pull the motor from the housing. Care should be taken to keep the motor aligned while drawing it from the housing to keep the front end plate from catching in the housing. Set the motor assembly aside.



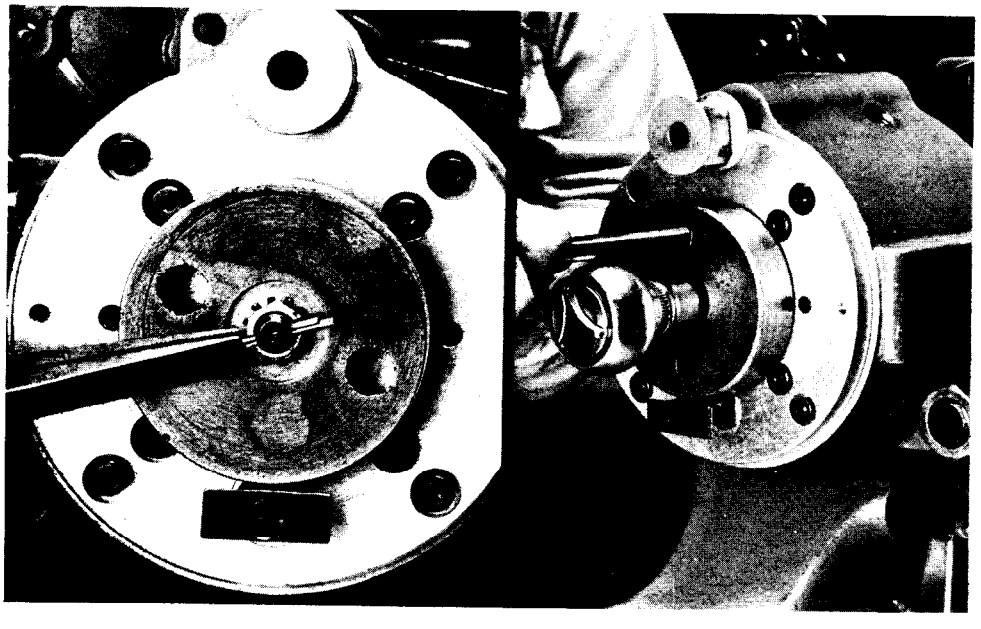
SLIDE 10

Now, remove the brake cap from the brake end of the hoist by removing the two screws with a 5/32" allen wrench. Then set the cap aside.



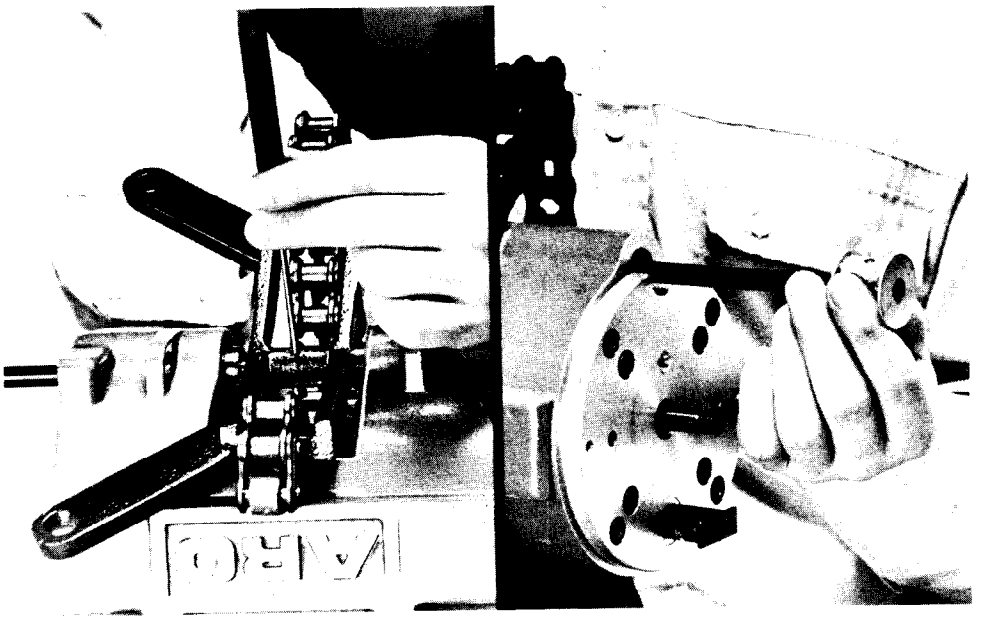
SLIDE 11

Remove the brake spring from the hoist. To do so, carefully pry the spring off the brake shoes far enough to use the brake spring spreader. Then, hold the brake shoes in place with one hand as shown and remove the brake spring with the brake spring spreader held in the other hand. This brake spring has considerable tension and should be removed carefully. Finally remove the brake shoes and balls and set them aside.



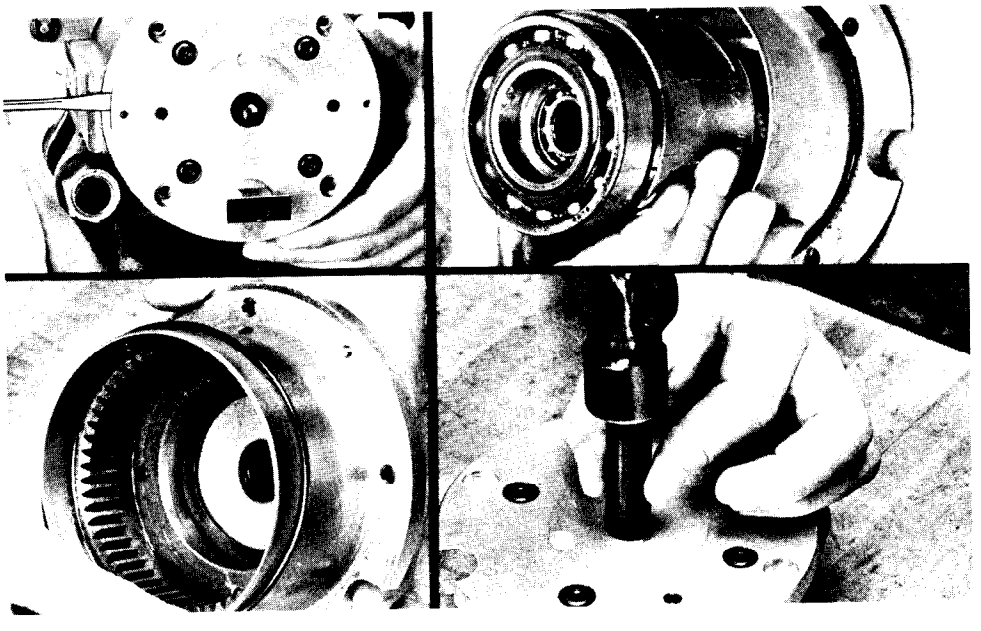
SLIDE 12

Remove the cotter pin from the shaft. Align one of the holes in the brake wheel with the hole in the end plate and insert a brass rod through the holes to keep the brake wheel from turning. Then remove the nut and washer with a 9/16" socket, and slide the brake wheel from the shaft.



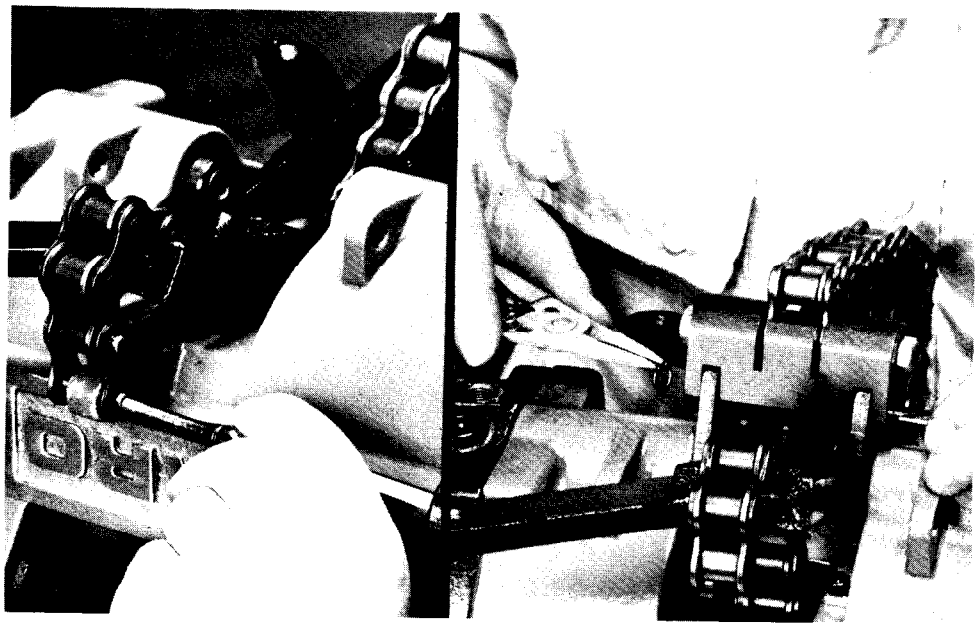
SLIDE 13

Next, drive the roll pin from the control arm with a pin punch. Then, pull the control rod from the hoist.



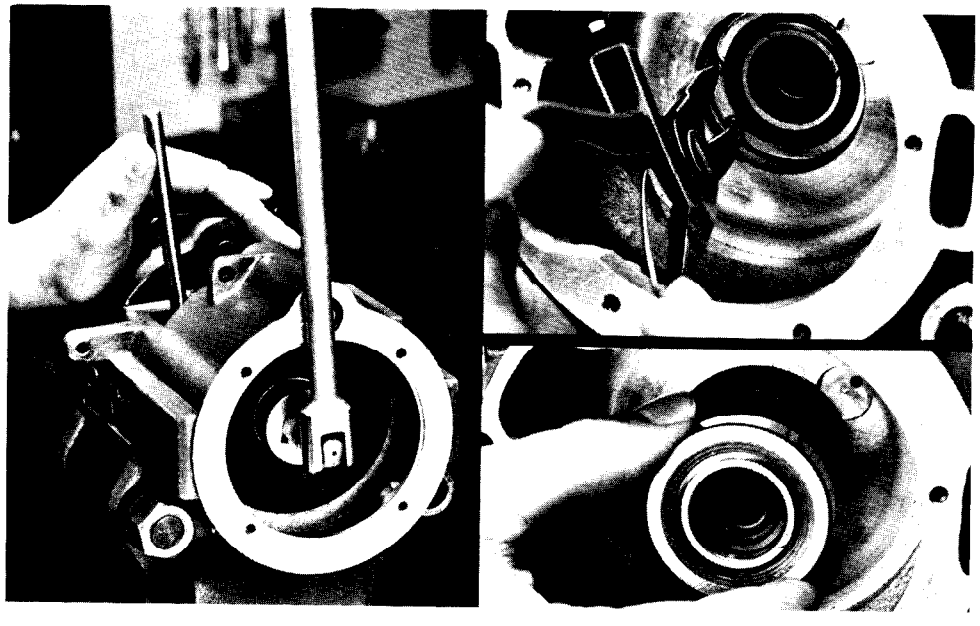
SLIDE 14

Remove the outer four screws and washers from the end plate with a 3/16 allen wrench. Carefully pry the end plate and ring gear from the housing with a screwdriver, as shown. Be prepared to catch any oil which may have remained in the gear. Then, slide the gearing from the ring gear or housing and set it aside. Remove the o-ring and press the seal from the end plate.



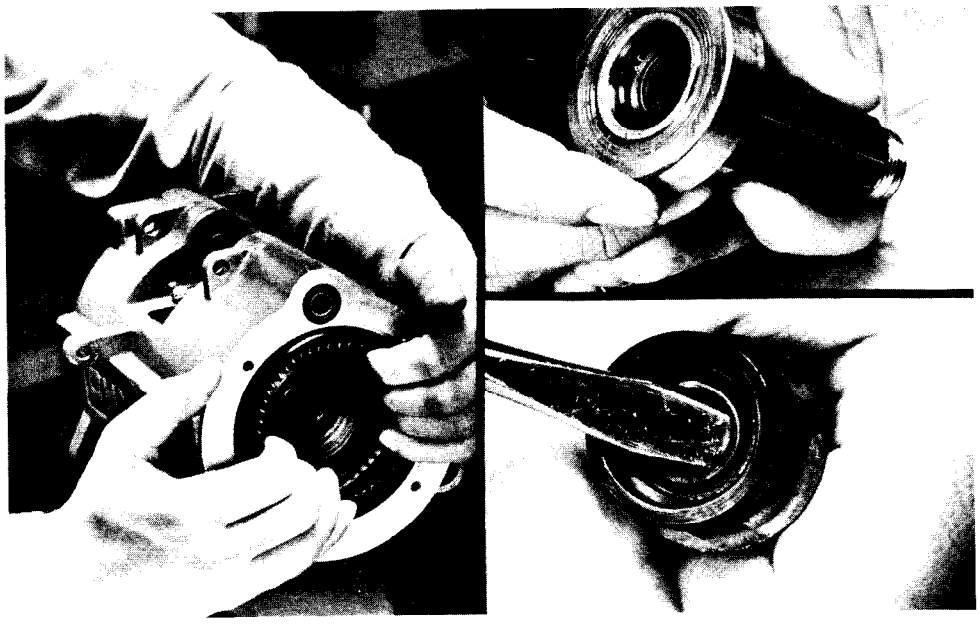
SLIDE 15

Now the chain can be pulled from the hoist. To do so, first remove the chain from the lug on the side of the hoist. On the link chain hoist this is done by driving the roll pin from the clevis and lug. On the roller chain hoist remove the connecting link by removing the spring clip and driving the link apart. Once the chain has been removed from the lug it can be pulled from the hoist by hand. If you are working on a 2-ton hoist the chain must also be removed from the hanger by removing the retaining ring and anchor pin from the anchor bracket. Once the chain is off, the control arm can be removed.



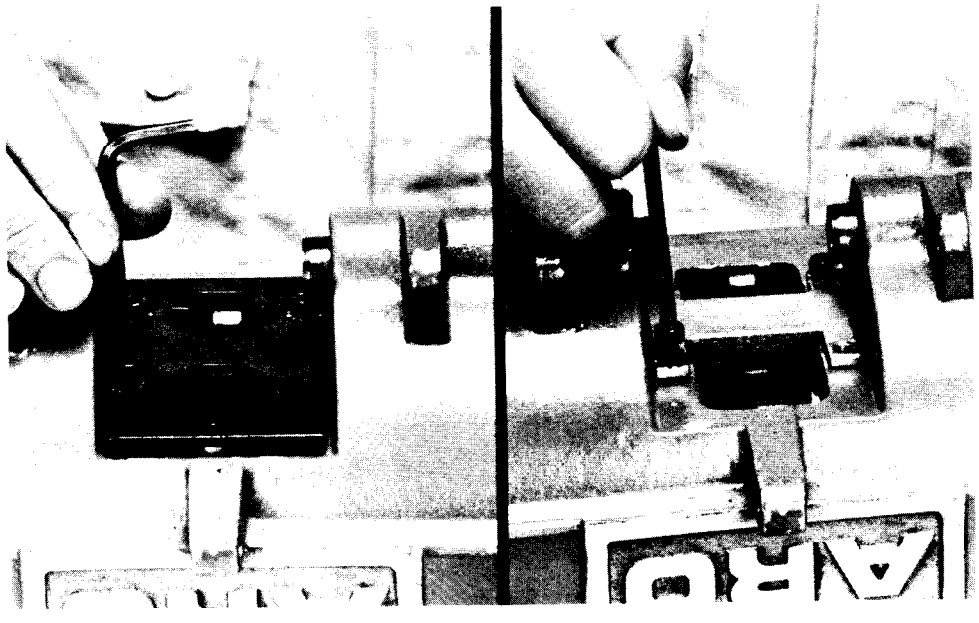
SLIDE 16

Now, remove the ring gear from the hoist housing. To do so, place a brass rod into the pocket wheel or sprocket to keep it from turning. Then remove the nut and washer from the ring gear with a 1-3/16 socket. Next, remove the retaining ring from the valve end of the hoist with #5 snap ring pliers. Use a wooden dowel or hammer handle to push the shaft and bearing from the hoist by pushing from the brake end.



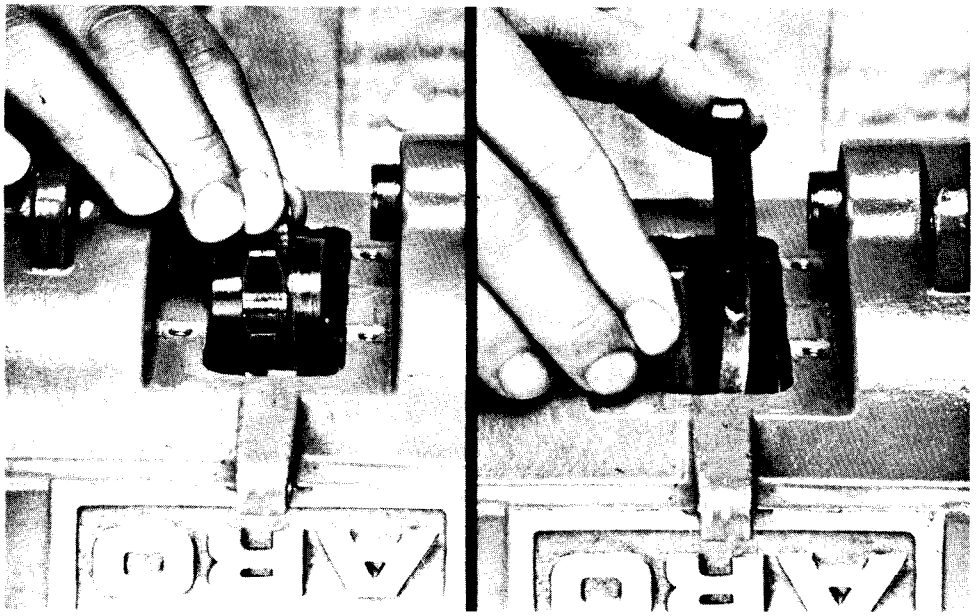
SLIDE 17

Now, remove the ring gear and o-ring from the hoist housing. Also, remove the bearing from the shaft and pry the seal from the shaft with a screwdriver.



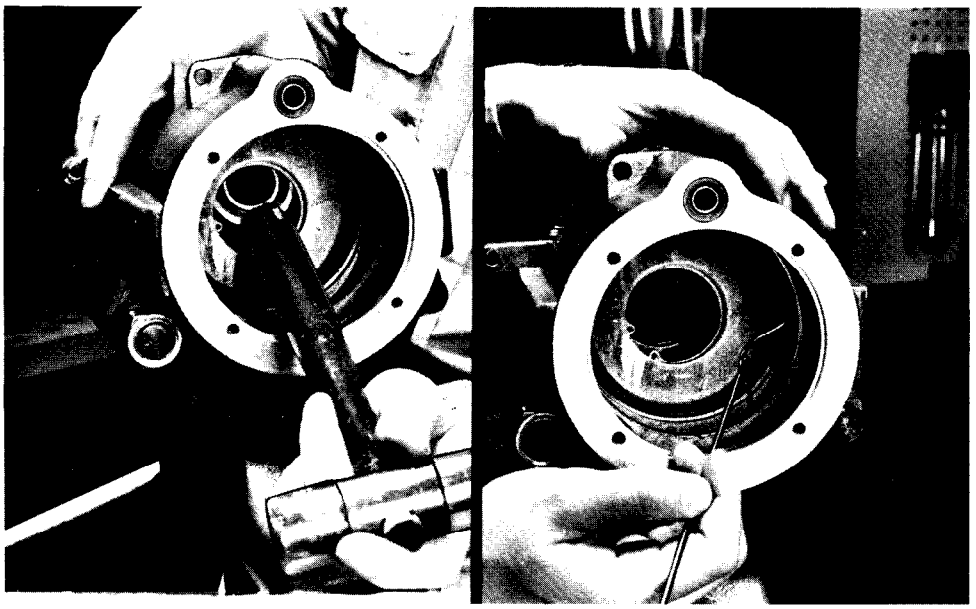
SLIDE 18

Remove the stripper plate from the hoist housing. On link chain hoists this plate is held in place with six screws while on roller chain hoists it is held by four screws.



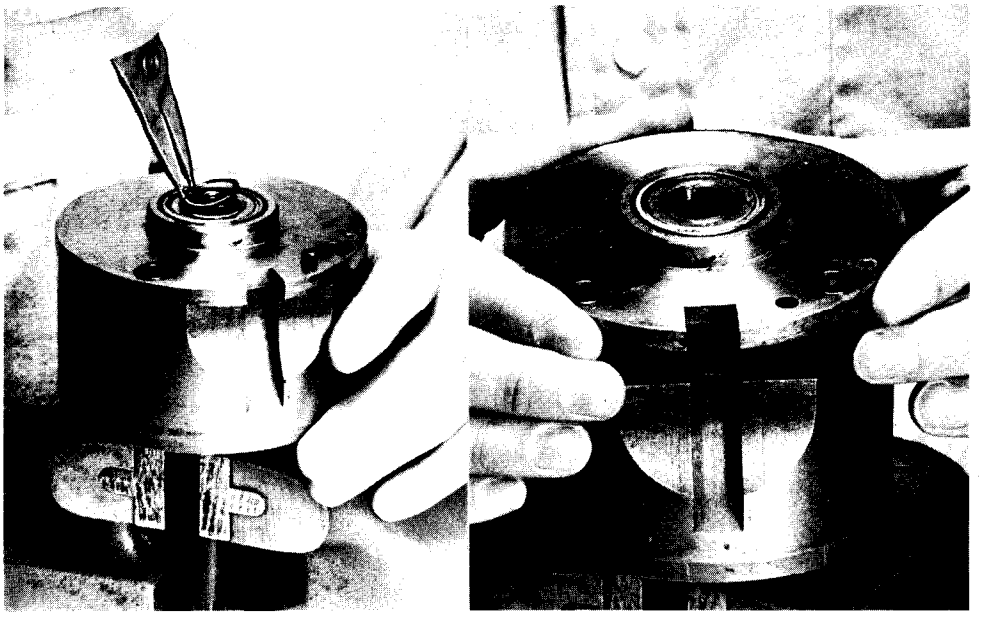
SLIDE 19

Lift the sprocket or pocket wheel and chain guide from the hoist. In roller chain hoists the chain guide is held in position by two screws from the outside of the housing. To remove these two screws it may be necesary to remove the hook assembly.



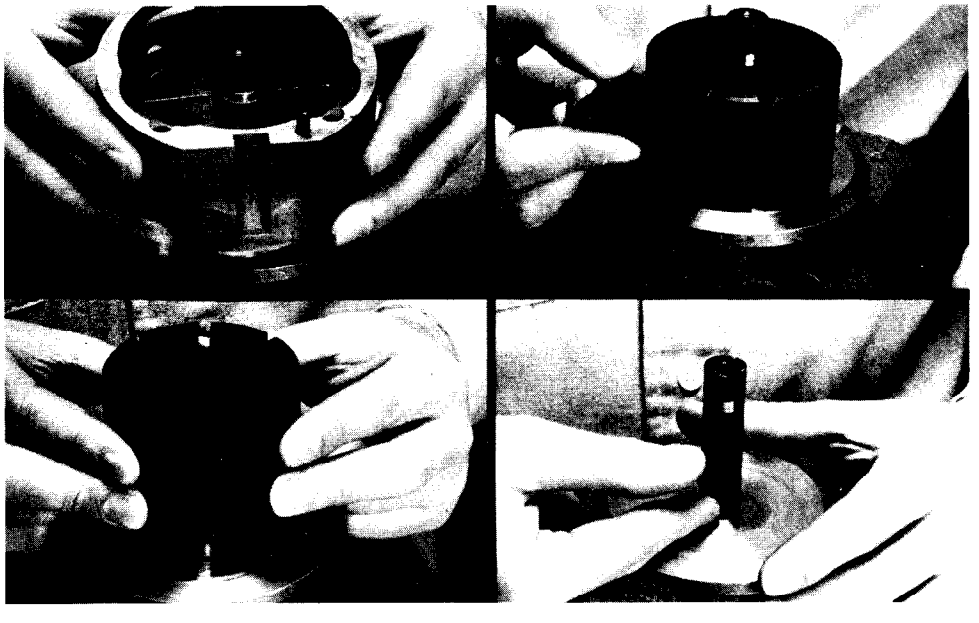
SLIDE 20

Push the bearing from the housing with the handle of a hammer. Also remove the o-ring from its seat in the hoist housing with an o-ring pick. Carefully inspect the lip seal on the inside of the hoist housing. This seal should not be changed without special equipment. If damage is apparent the hoist should be sent to the factory for repair. Remove the hoist housing from the vise and set it aside.



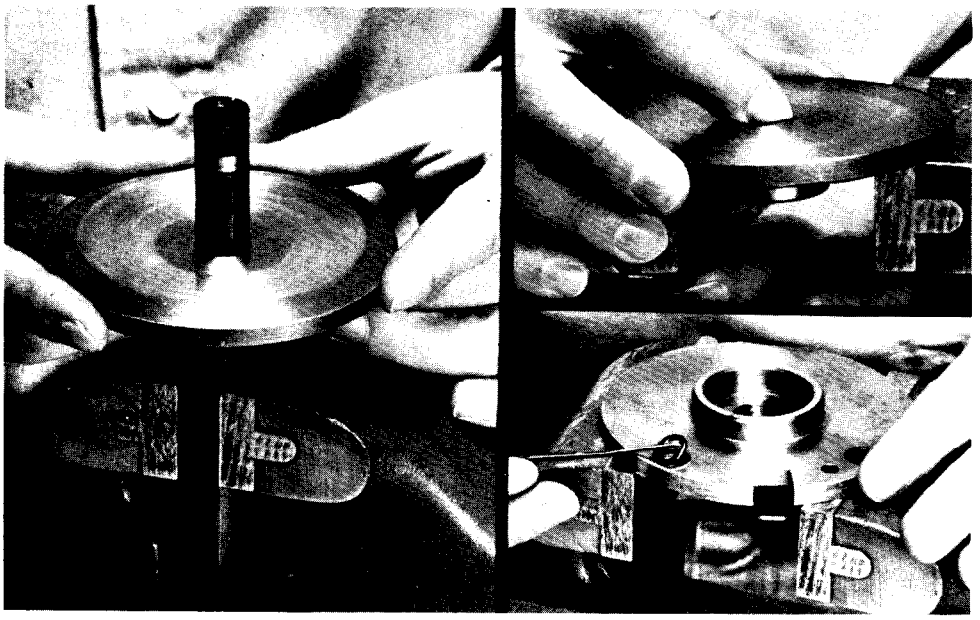
SLIDE 21

Place the motor in the vise by clamping on the rotor shaft just below the shoulder. Remove the retaining ring from the shaft with a pair of #2 snap ring pliers. Then, lift the rear end plate and bearing from the spindle and set it aside.



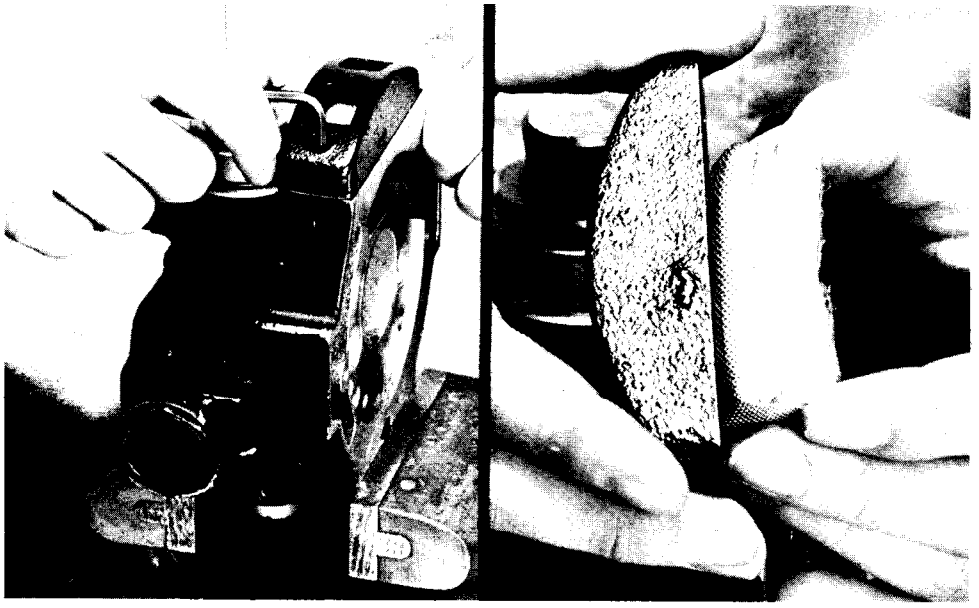
SLIDE 22

Lift the cylinder from the motor and set it aside. Then remove the eight rotor blades. Lift the rotor from the spindle and remove the rotor key.



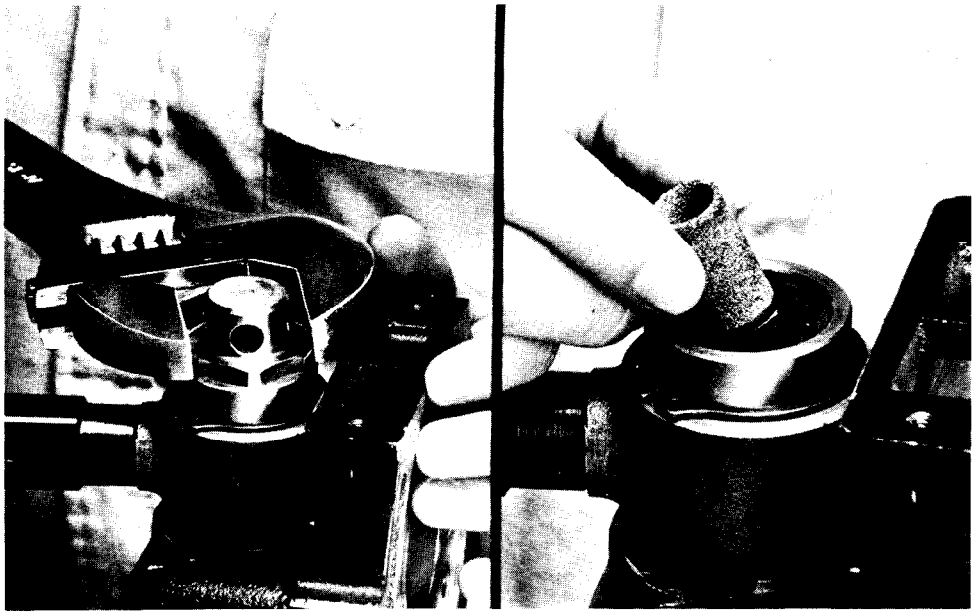
SLIDE 23

Pull the front end plate and bearing from the spindle and remove the spindle from the vise. Then remove the bearings from both end plates by tapping the end plates on open vise jaws as shown. Also remove the o-rings from the rear end plate.



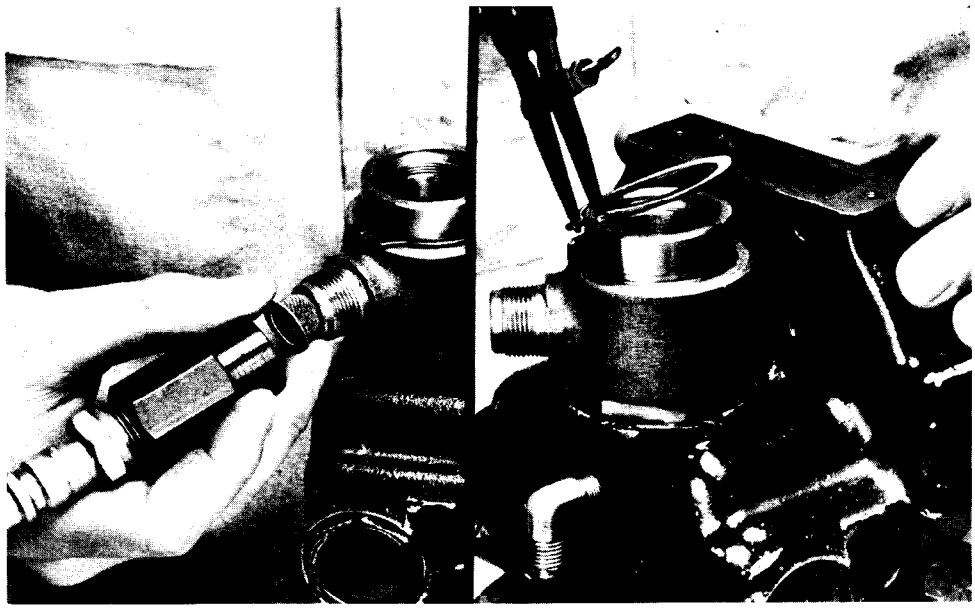
SLIDE 24

Clamp the valve housing in the vise, as shown. Remove the two screws and washers from the exhaust deflector with a 5/32" allen wrench. Then, remove the exhaust deflector, screen, and muffler filler.



SLIDE 25

Remove the cap by turning it counter-clockwise with an adjustable wrench. Then remove the o-ring from the cap and the filter from the swivel. This filter should be discarded and replaced with a new one if its dirty.

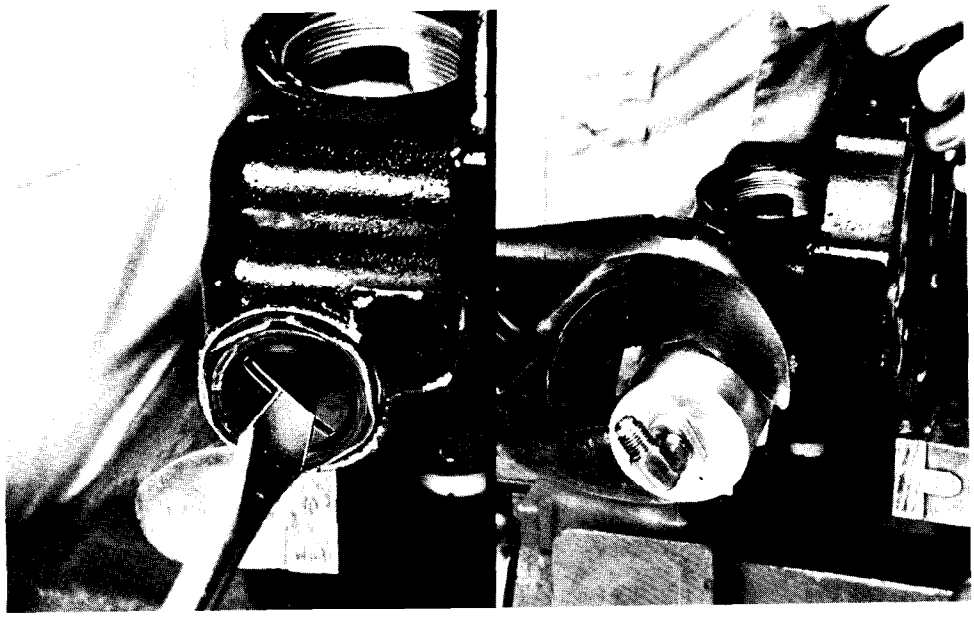


SLIDE 26

Remove the air inlet adapter from the swivel and push the screen from the adapter or swivel. Remove the retaining ring from the swivel with a pair of external snap ring pliers and pull the swivel from the swivel body.

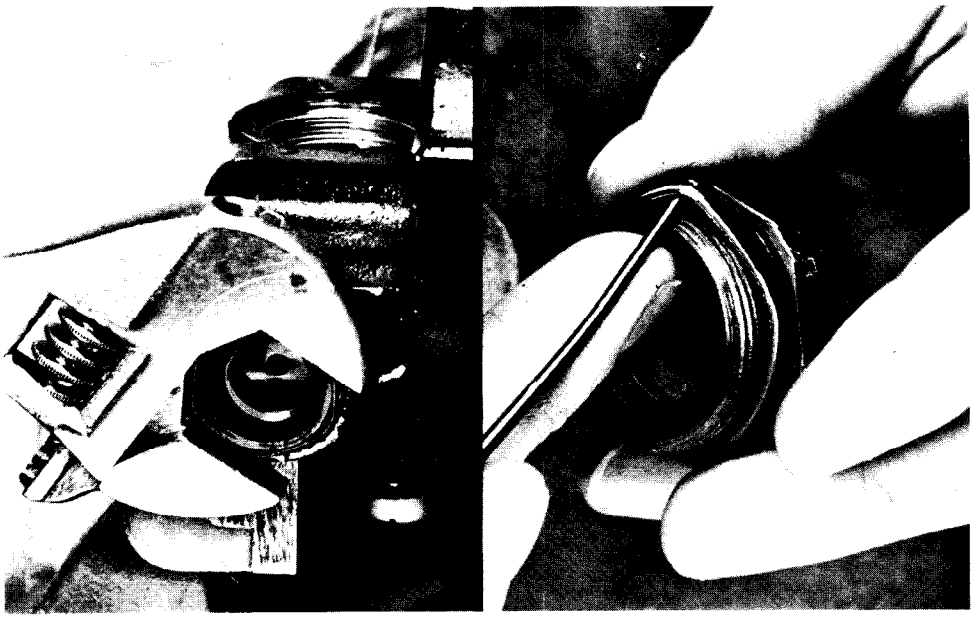
SLIDE 27

Remove the swivel body from the hoist by turning counter-clockwise with an adjustable wrench. Then unthread the cylinder from the swivel body. Finally, remove the three o-rings from the outside and the two o-rings from the inside of the swivel body with an o-ring pick.



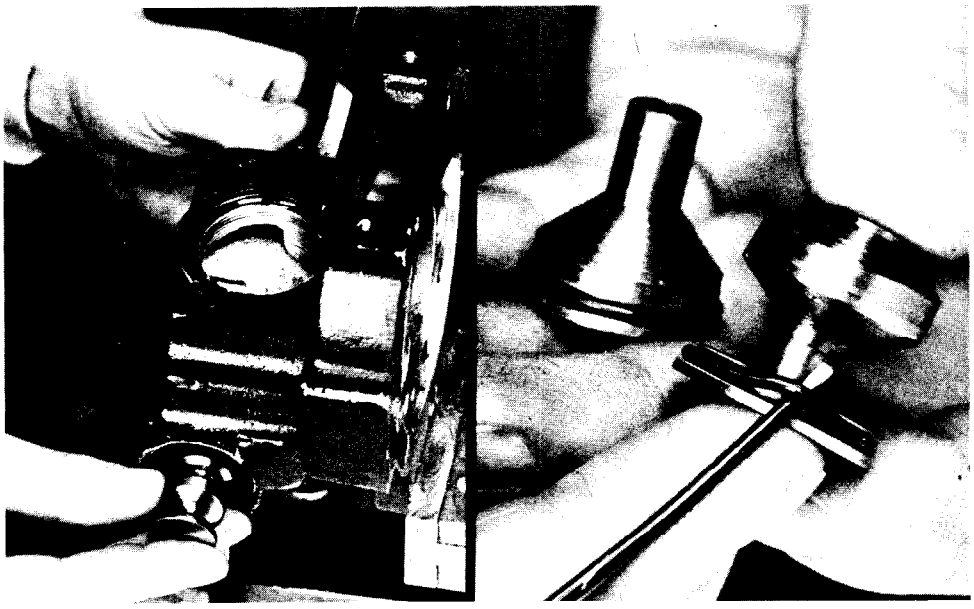
SLIDE 28

Now, remove the valve caps from each side of the valve housing. If your hoist has pendant control, remove the cylinder assembly instead of the valve caps. Then remove the o-ring from each valve cap or cylinder assembly.



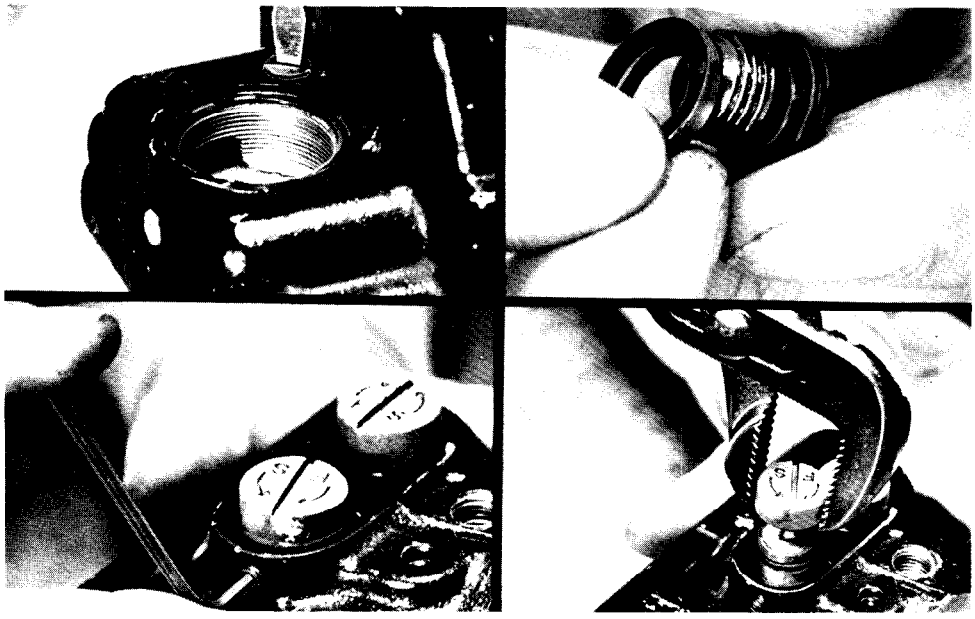
SLIDE 29

Next, remove the adapter from each side of the valve housing with an adjustable wrench. Then remove the o-ring from the adapter.



SLIDE 30

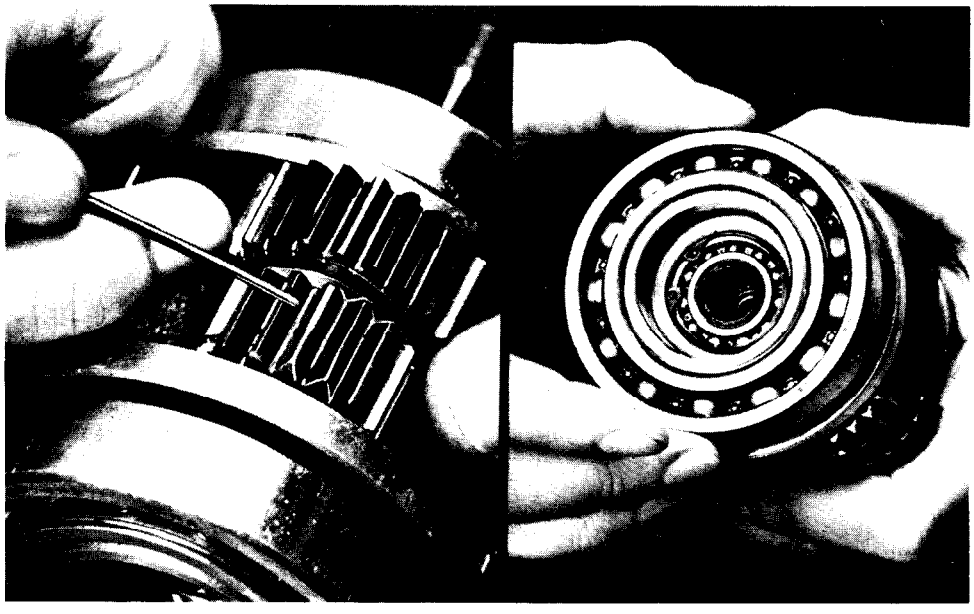
Push the valves and valve body from the housing with a small punch as shown. Then remove the o-rings from the valves with an o-ring pick.



SLIDE 31

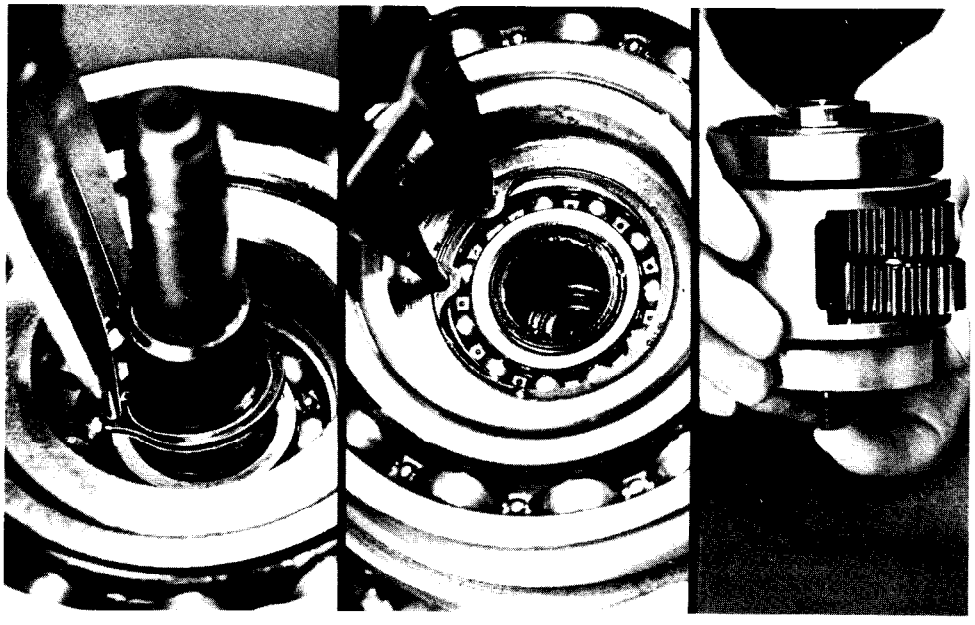
Remove the oil screws from the top and left side of the valve housing and remove the washer from the screw. Then remove the valve housing from the vise and place it upside down on the bench.

Remove the two set screws from the valve housing with a 3/32 allen wrench. Then pull the valves from the valve housing with a pair of channel lock pliers and remove the o-rings from the valves. NOTE: On spark resistant hoists these valves are permanently set and should not be removed.



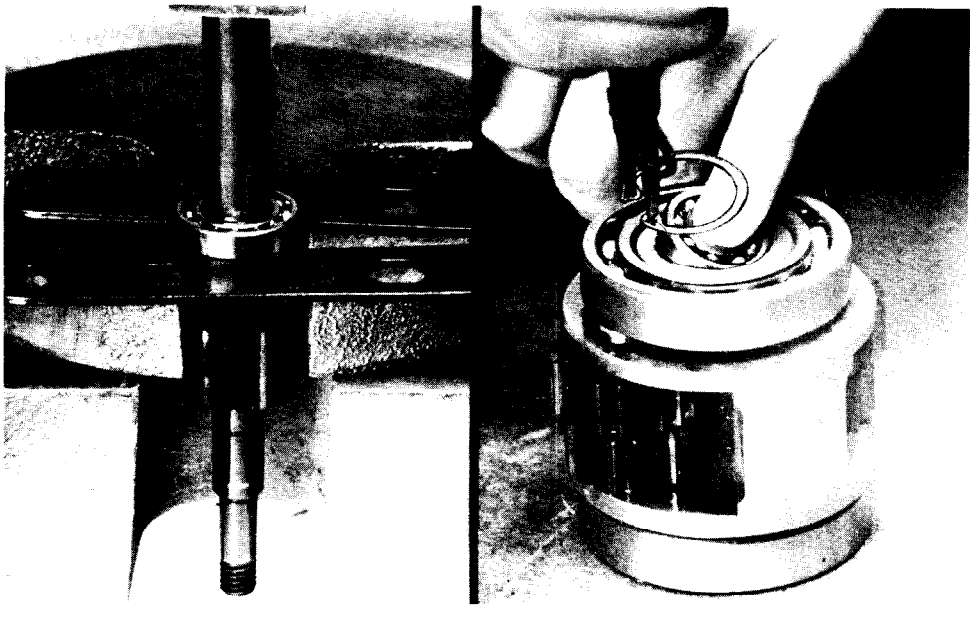
SLIDE 32

Carefully inspect the gearing assembly for wear. Check the surfaces of the planet gears and ring gears. Also inspect the bearings for smoothness of opeation by holding the gearing and turning the outer bearing race by hand. Also check for side play. It is extremely rare for this gearing to experience significant wear. This gearing should not be disassembled unless wear is detected. If the gearing shows wear, proceed to disassemble the gearing as follows.



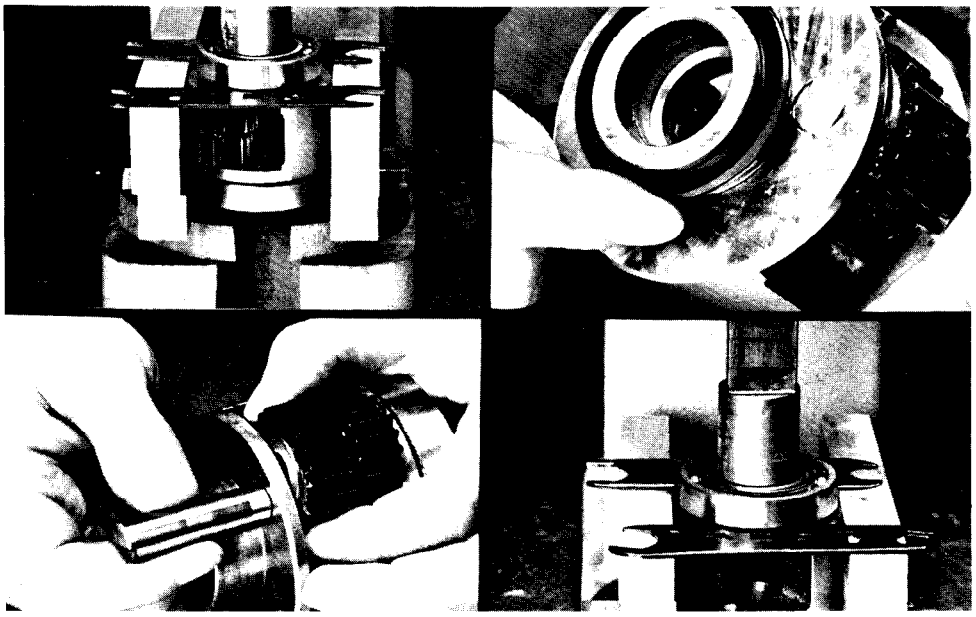
SLIDE 33

Remove the small retaining ring from the threaded end of the shaft with a pair of #2 external snap ring pliers. Also remove the retaining ring from the splined end of the gearing with a pair of #3 internal snap ring pliers. Then push the shaft out of the gearing from the threaded end.



SLIDE 34

Press the bearing from the splined end of the shaft. Then remove the retaining ring and pull the bearing from inside the end of the gearing with smaller planet gears.



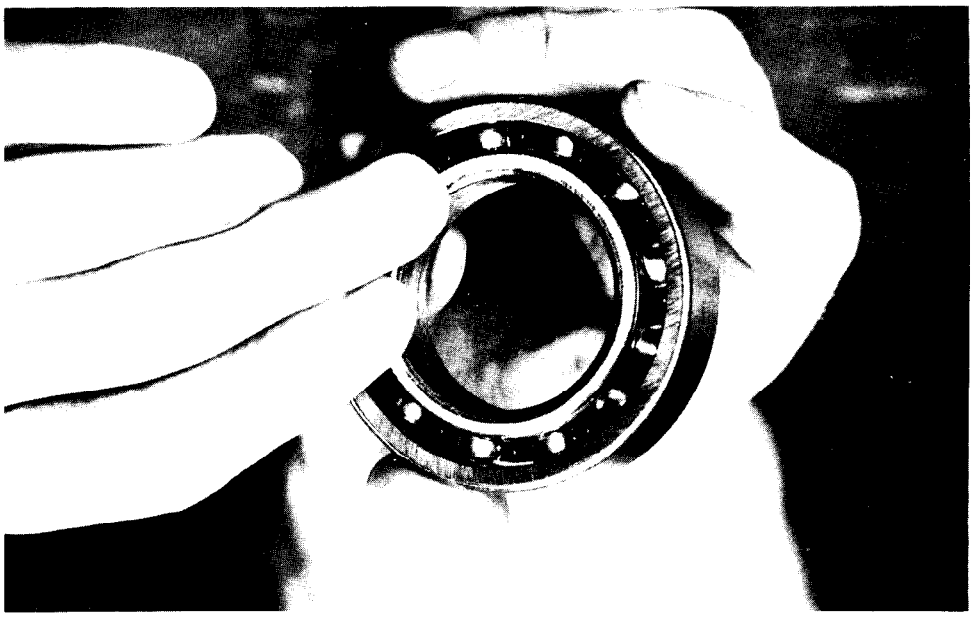
SLIDE 35

To remove the planet gears, press the bearing from the end of the gearing having the larger planet gears by placing a pair of flat wrenches between the bearing and the carrier and pressing on the carrier with an arbor press as shown. Once the bearing is removed, remove the spacer and slide the shafts from the gears. This will allow the planet gears and bearing races to be removed. If the bearing remaining on the carrier must be replaced, press it from the carrier in the same manner as the one removed from the other end of the carrier. If this bearing is not damaged, it need not be removed.

1. WASH PARTS IN CLEAN SOLVENT
2. AVOID WASHING SEALED BEARINGS
3. DO NOT ALLOW OPEN BEARINGS TO SPIN WHILE DRYING
4. INSPECT ALL PARTS
5. REPLACE WITH ARO SPECIFIED PARTS

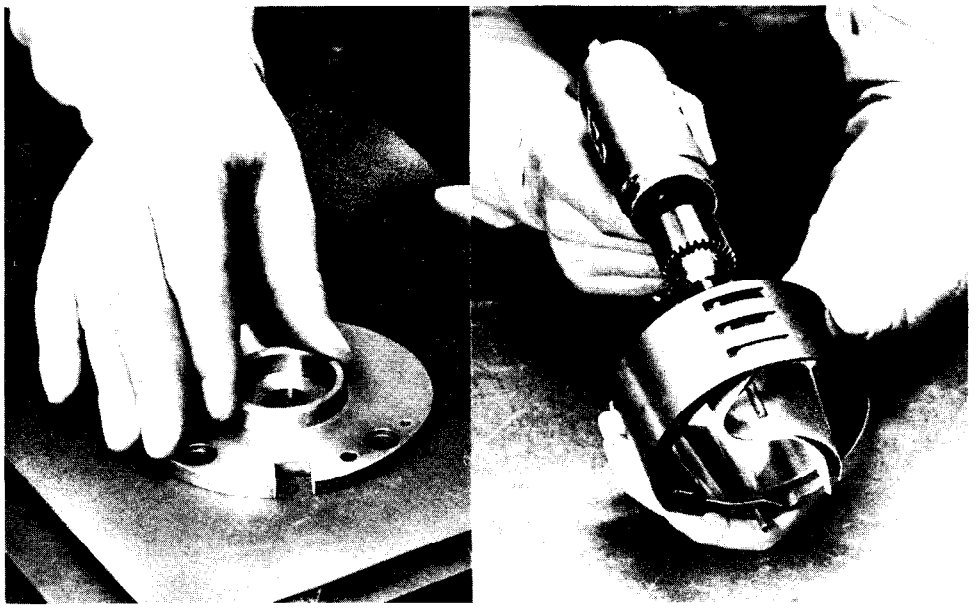
SLIDE 36

Now that the hoist has been disassembled, thoroughly wash all parts in solvent except for the sealed ball bearings. Open ball bearing may be washed in clean solvent but should not be allowed to spin while being blown dry. Inspect all parts for wear. Also, obtain new o-rings, gaskets, and rotor blades to replace those removed from the tool. If you are using a service kit, these items will be included.



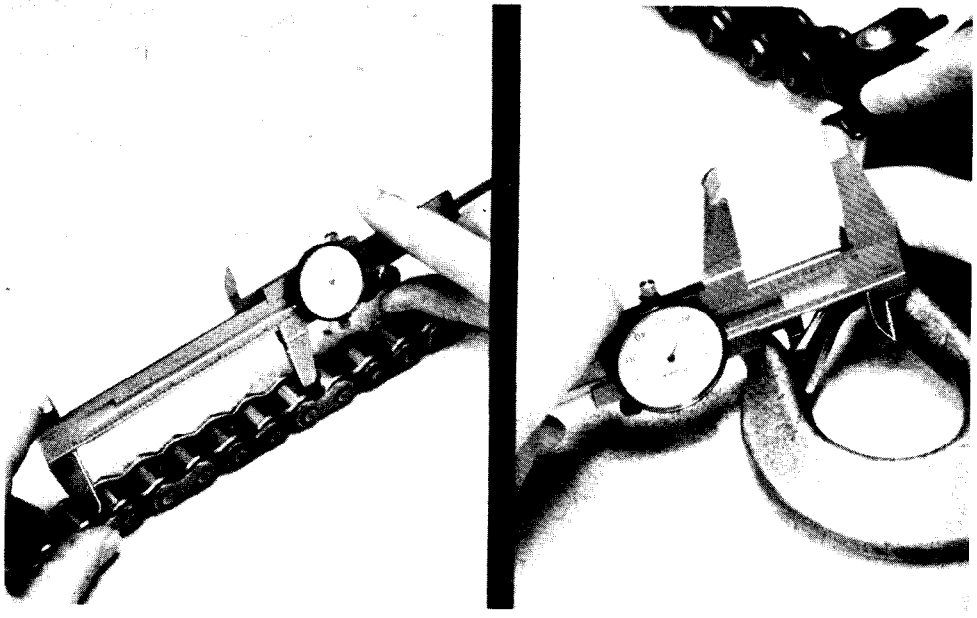
SLIDE 37

Inspect the bearings for smoothness of operation by holding the inner race of each bearing and turning its outer race. Also check for side play. If you suspect that the bearing is bad, compare it with a new bearing or replace it.



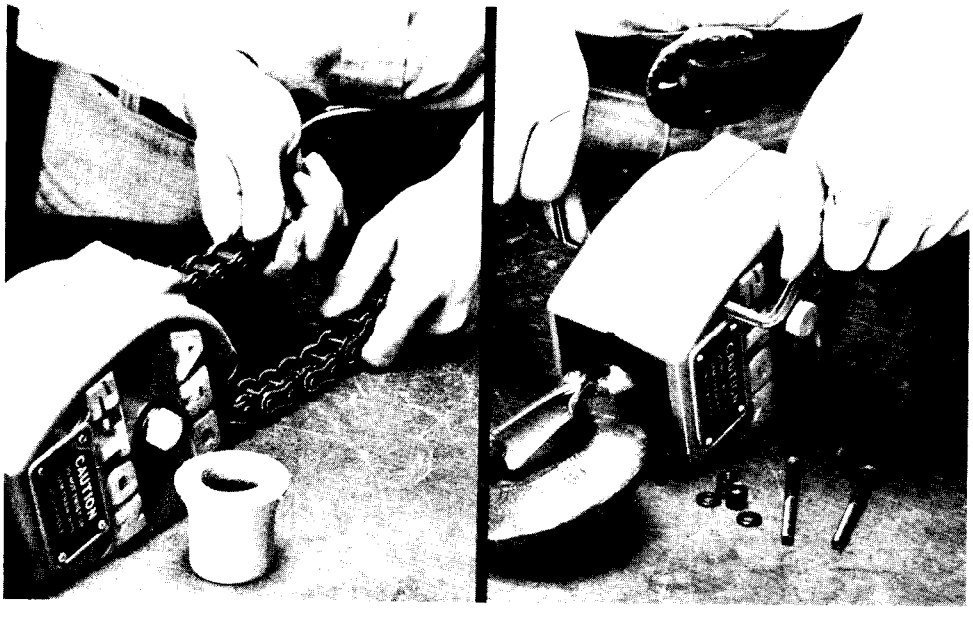
SLIDE 38

Next, visually inspect the flat surfaces of the end plates and the interior of the cylinder for scoring. If mild scoring of the end plates has taken place, hand-lap the end plates using 150 grit emery-cloth sandpaper and finishing with 400 grit wet/dry abrasive on a flat surface. Mild scoring of the cylinder can be removed with a flybur tool. If severe scoring is apparent, the part must be replaced.



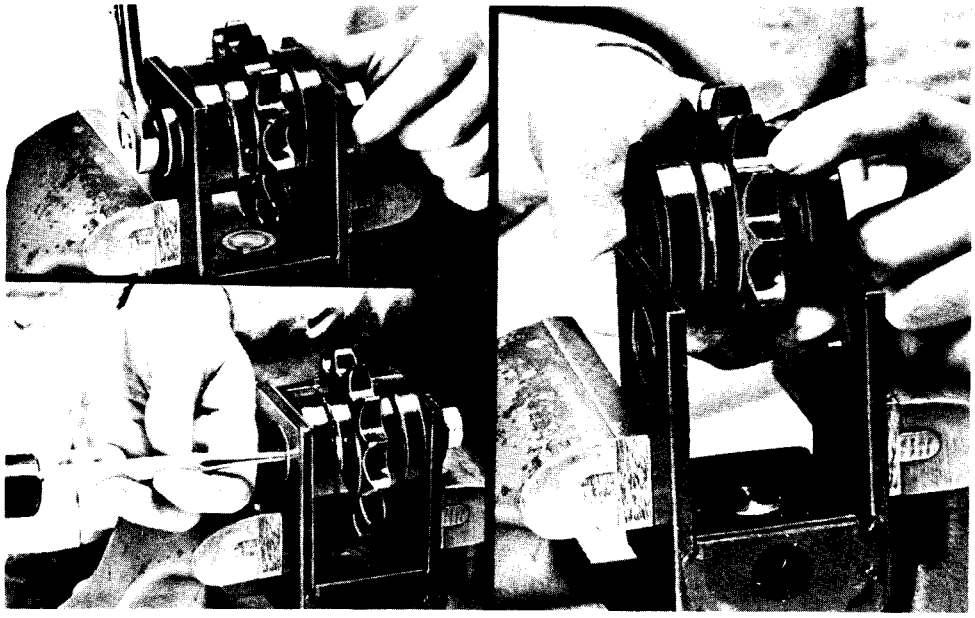
SLIDE 39

Inspect the chain and hooks for signs of wear. Carefully follow the inspection procedures on page 5 of the Operators Manual. To insure operator safety, the chain and hooks must be inspected each time the hoist is repaired and more often where the hoist is used heavily. If the chain needs to be replaced, replace the pocket wheel or sprocket as well. Never use new chain with an old pocket wheel or sprocket.



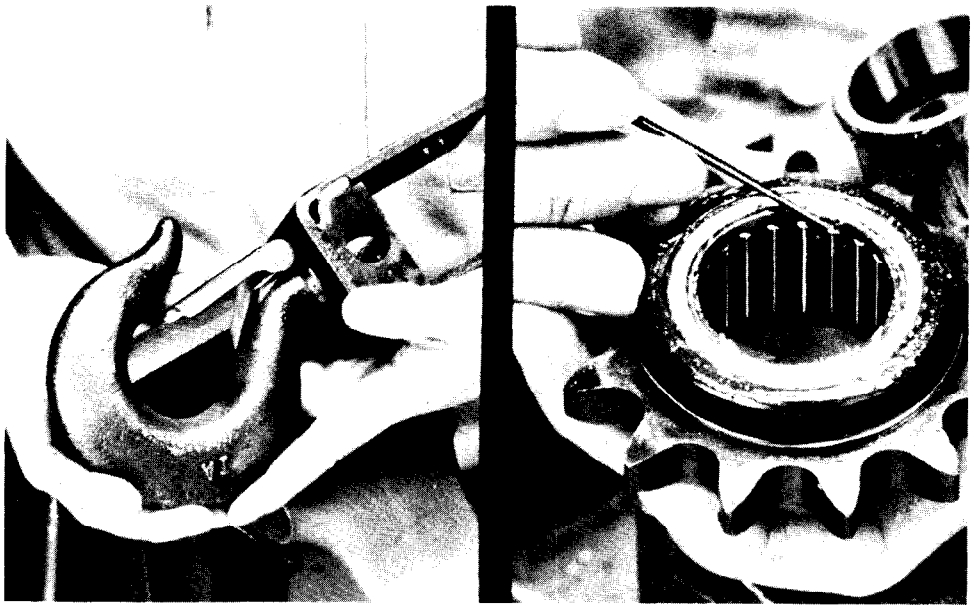
SLIDE 40

This slide and the next 5 slides will not apply for one-ton models. On 2-ton hoists inspect the lower hook assembly at this time. To do so, slide the chain stop from the chain and pull the chain from the lower hook assembly. Remove the three bolts from the shroud with a 3/16" and 1/4" allen wrench and remove the shroud from around the block assembly.



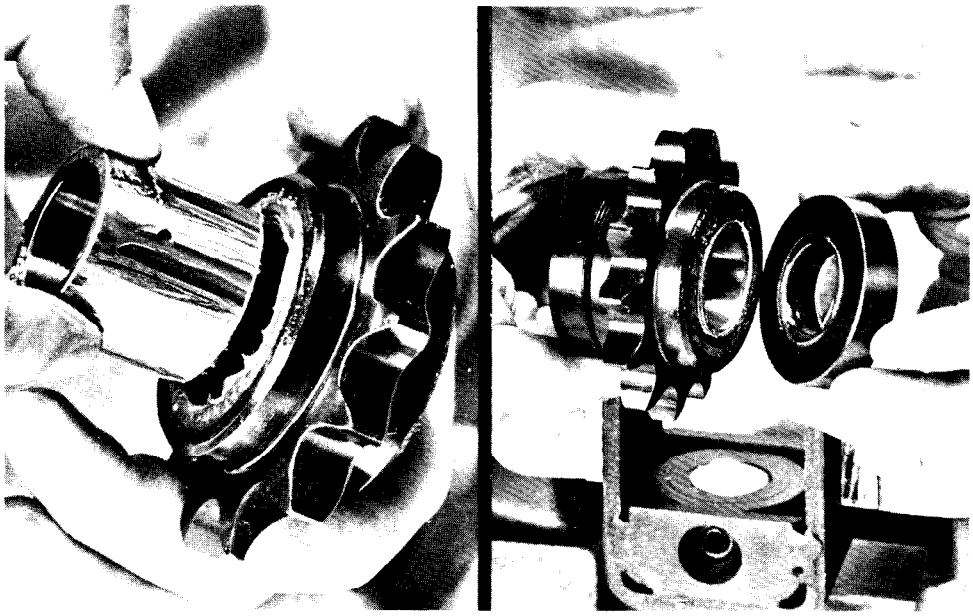
SLIDE 41

Clamp the hook assembly in the vise as shown. Remove one of the two bolts with a 3/4" wrench. Also remove the washer and spacer. Then drive the shaft out of the hook assembly from the side that the bolt was removed from. This will allow the spacers, the sheave or sprocket, bearing, and bearing race to be removed.



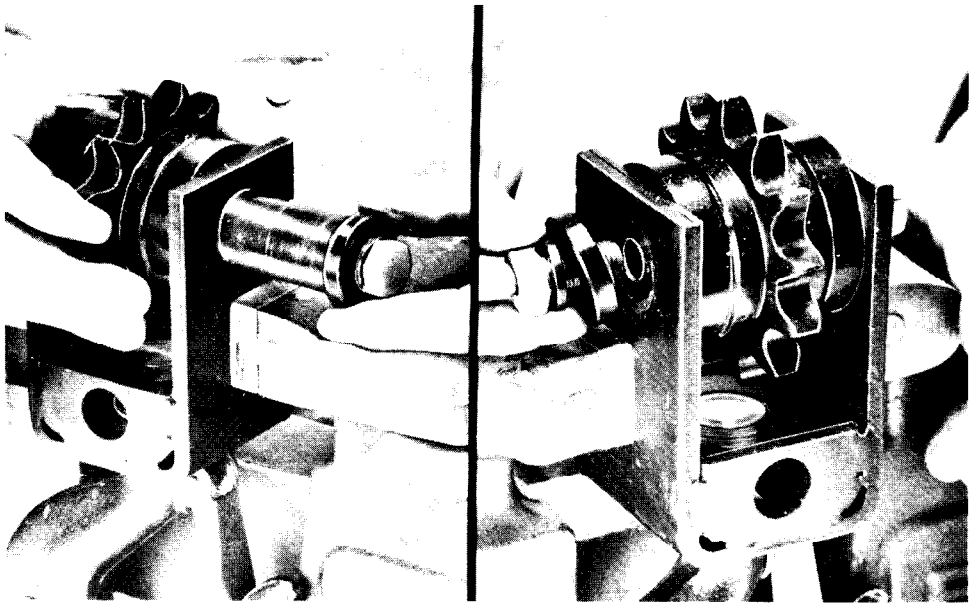
SLIDE 42

Inspect all parts of the lower hook assembly for wear or damage. Check the hook and latch as outlined on page 5 of the Operators Manual. Check the sheave or sprocket for wear. If the chain has been replaced, the sheave or sprocket should be replaced also. Inspect the bearing inside the sheave or sprocket. If this shows wear, press the bearing out and replace it with a new one.



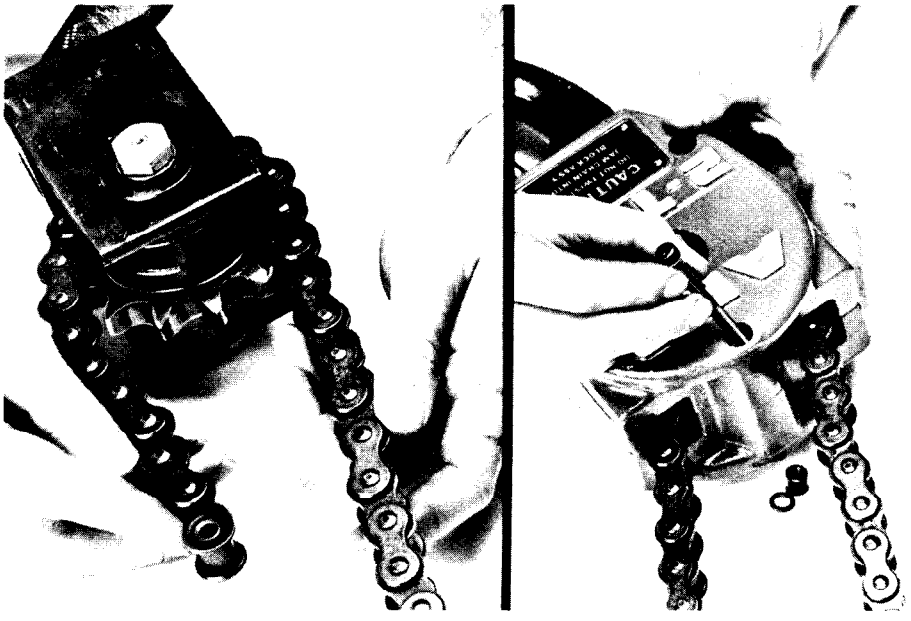
SLIDE 43

To reassemble the lower hook section, lubricate the roller bearing in the sheave or sprocket and insert the bearing race. Place a spacer on each side of the sprocket or sheave. Be sure that the side of the spacer having the boss is against the bearing race.



SLIDE 44

Place the sheave or sprocket and spacers between the yoke and insert the shaft to secure them. Place the washer and spacer on the bolt and thread it into the shaft. Tighten the bolt with a 3/4'' wrench. Fill the shaft with grease through the fitting in the bolt.

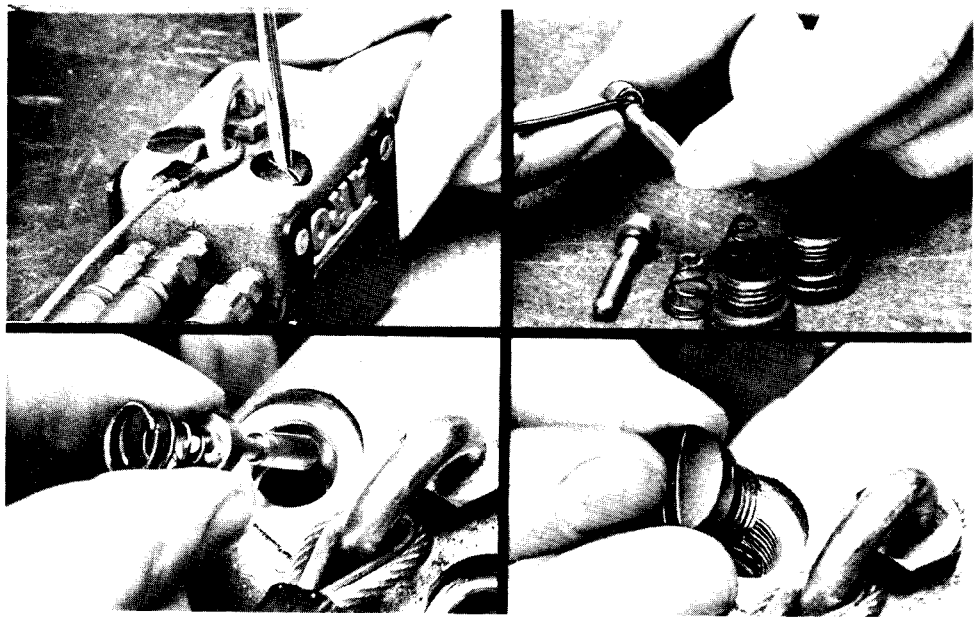


SLIDE 45

Feed the chain through the sheave or sprocket being careful not to twist the chain. On link chain hoists, be certain the welds on the links are to the outside of the sheave. Then, place the shrouds around the hook assembly and secure in place with the three nuts, washers, and bolts.

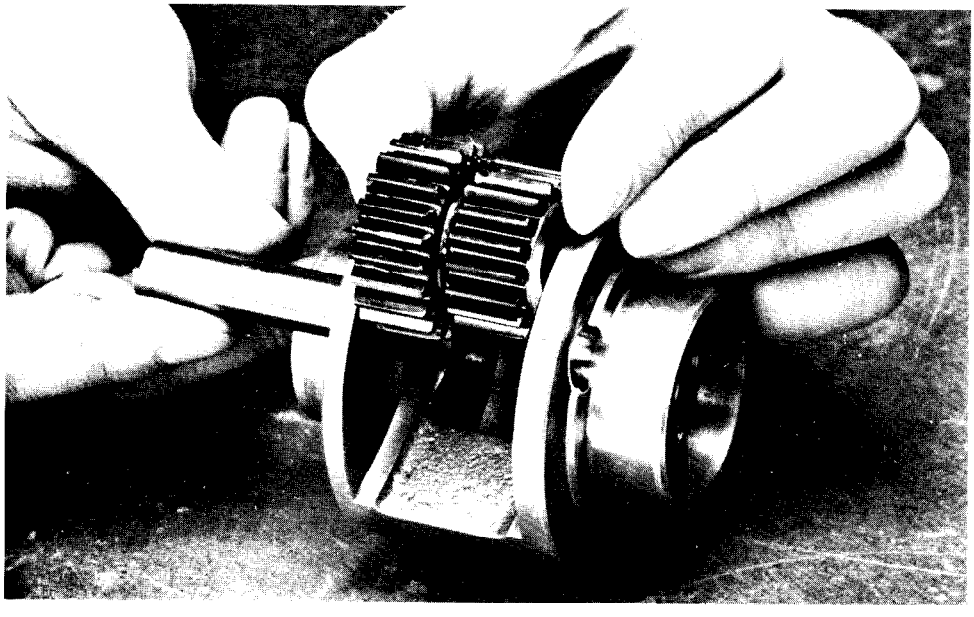
SLIDE 46

Also, on pendant control hoists, disassemble the cylinder. To do so, clamp the adapter in the vise by the flats and turn the cylinder counter-clockwise with a 5/8" wrench. Pull the piston from the cylinder. Replace o-ring on the piston and in the adapter. Then, place the spring on the piston and the piston into the adapter. Finally thread the cylinder onto the adapter.



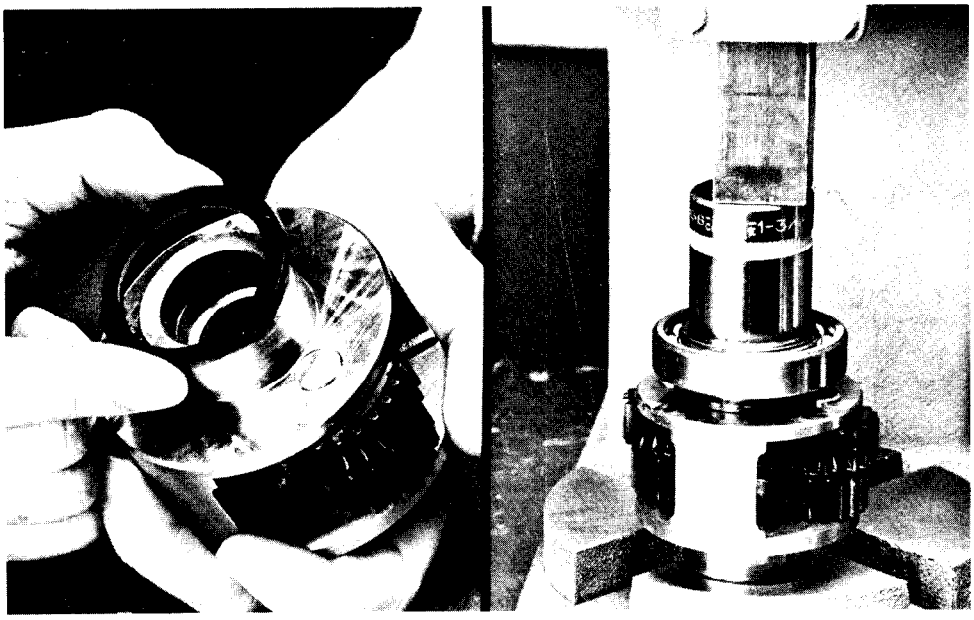
SLIDE 47

For pendent control hoists, remove the screws from the pendant control handle. This will allow the springs and valves to be removed. Replace the o-rings on the valves and screws. Then place the valves and springs back into the control handle. Be sure to place the springs into the handle small end first. Secure the valves and springs with the screws. Also inspect the hoses for cracks or wear. If the hoses show signs of excessive wear they should be replaced.



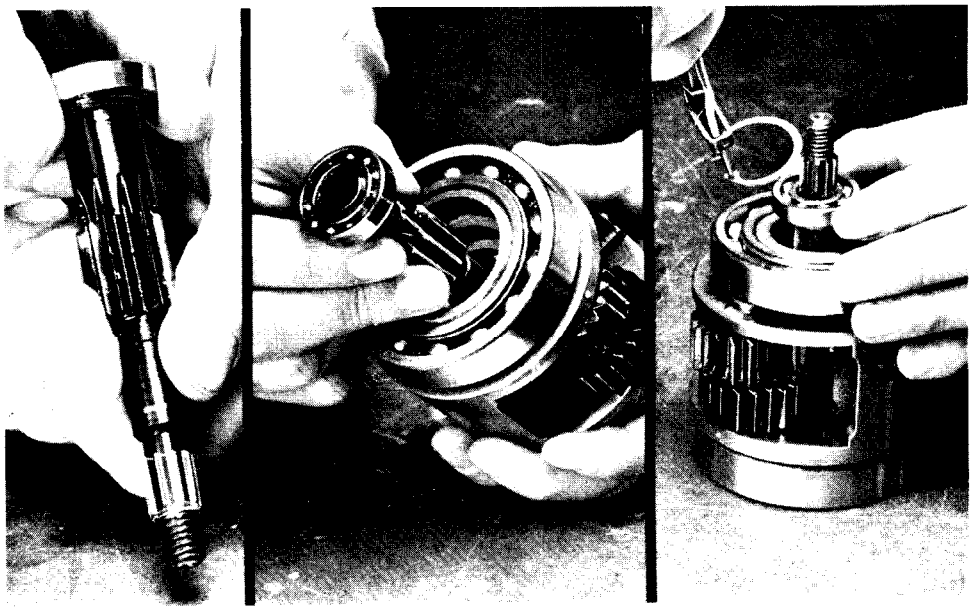
SLIDE 48

Now that all parts have been washed and inspected and any worn parts have been replaced begin the reassembly of the hoist. If the gearing has been disassembled, reassemble it at this time. Place a bearing race at each end of the planet gear and insert the planet gear into the carrier so that the small end of the gear is closest to the punch mark on the carrier. Then insert a shaft through the carrier, gear, and bearing races to secure them. Be certain that the end of the shaft with the mill flat is at the end oposite that with the punch mark. Repeat the procedure with the other gear.



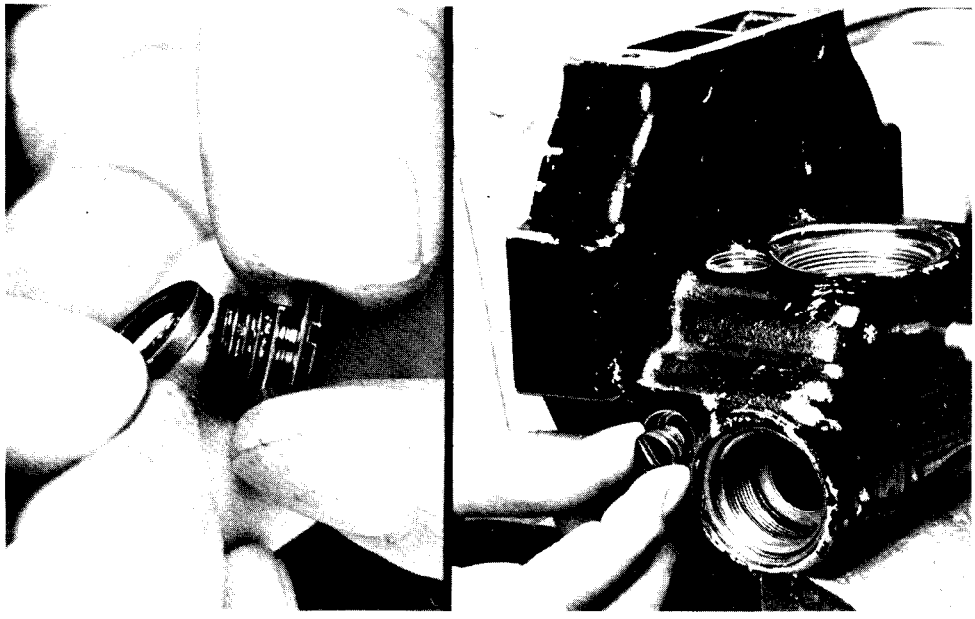
SLIDE 49

Place the spacer on the carrier and align the shafts to allow the spacer to rest between the flats of the shafts. Then press the bearings on to each end of the carrier being careful to apply pressure evenly and only to the inner race.



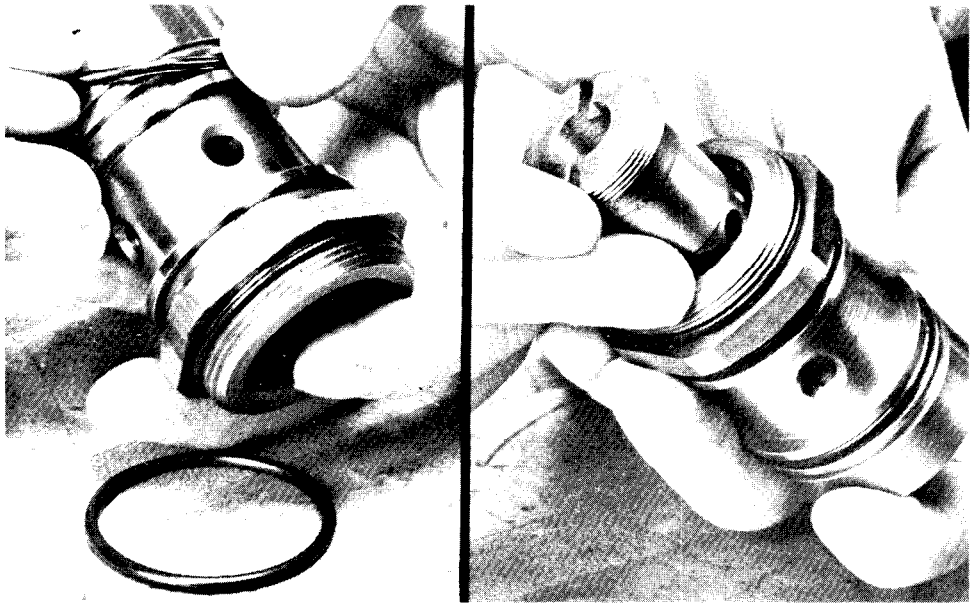
SLIDE 50

Place the bearing onto the end of the shaft having the internal spline. Align the punch mark on the gears with the punch marks on the carrier. Then insert the shaft into the end of the gearing with the punch mark, threaded end first. Press the bearing into the other end of the gearing and place the retaining ring into the carrier to hold the bearing. Also place the retaining ring onto the shaft and one into the other end of the carrier. Recheck to be sure that the punch marks on the gears align with those on the carrier. Then set the gearing assembly aside.



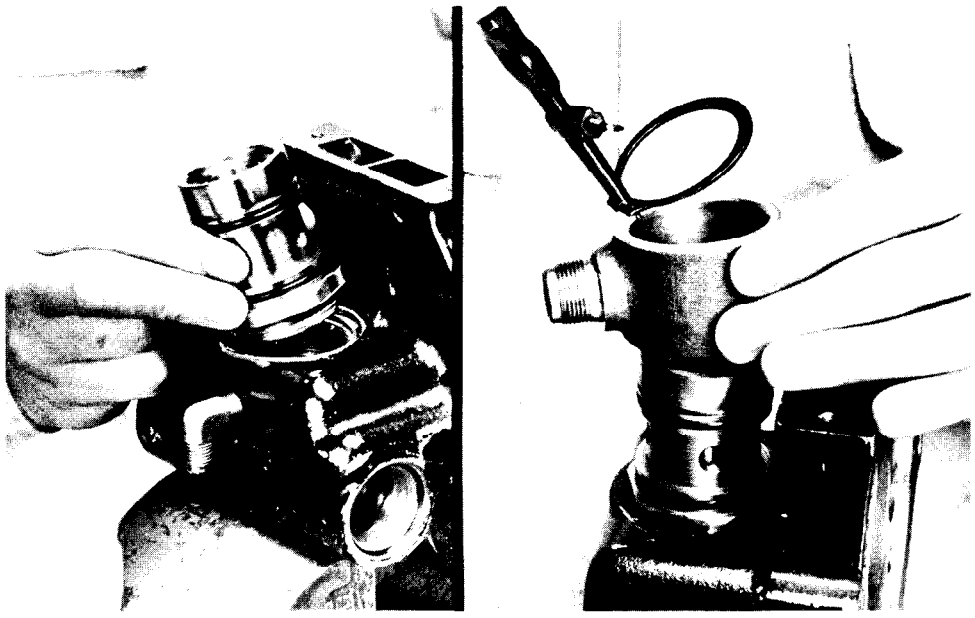
SLIDE 51

Clamp the valve housing in the vise as shown. Place the washer around the oil screws and place one of the oil screws into the hole in the left side of the housing. Fill the reservoir with spindle oil through the top opening and place the other oil screw into this opening.



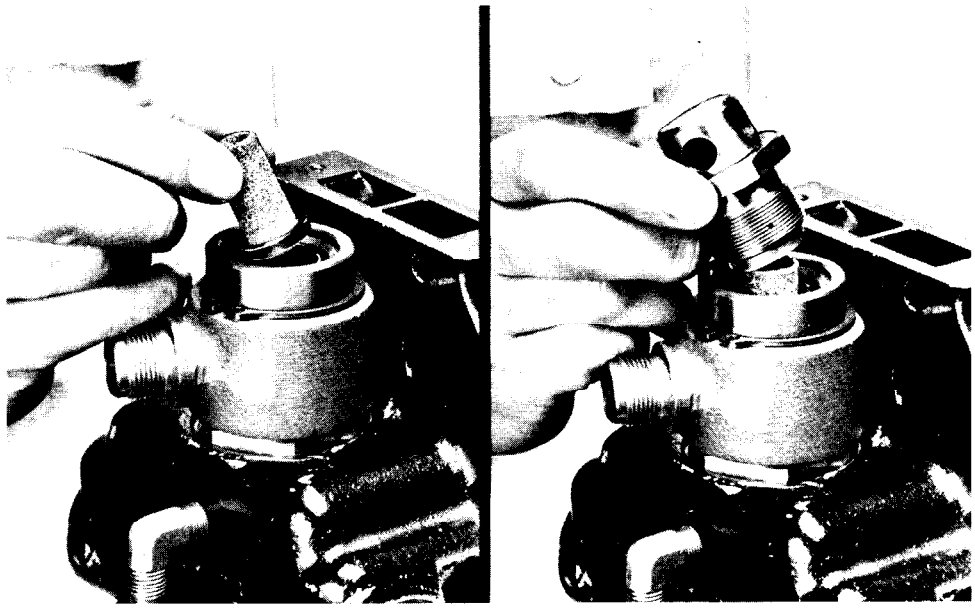
SLIDE 52

Lubricate the o-rings and place them into and around the swivel body and on the cap. Then, thread the cylinder all the way into the end of the swivel body having the external threads.



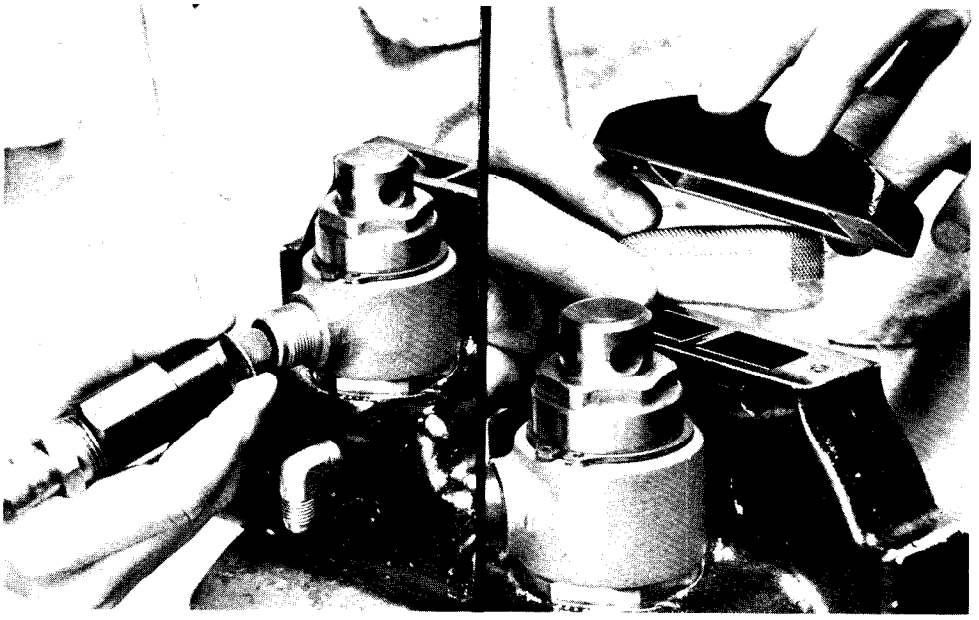
SLIDE 53

Thread the swivel body into the valve housing and tighten with the adjustable wrench. Then, slide the swivel over the swivel body and secure it with the retaining ring.



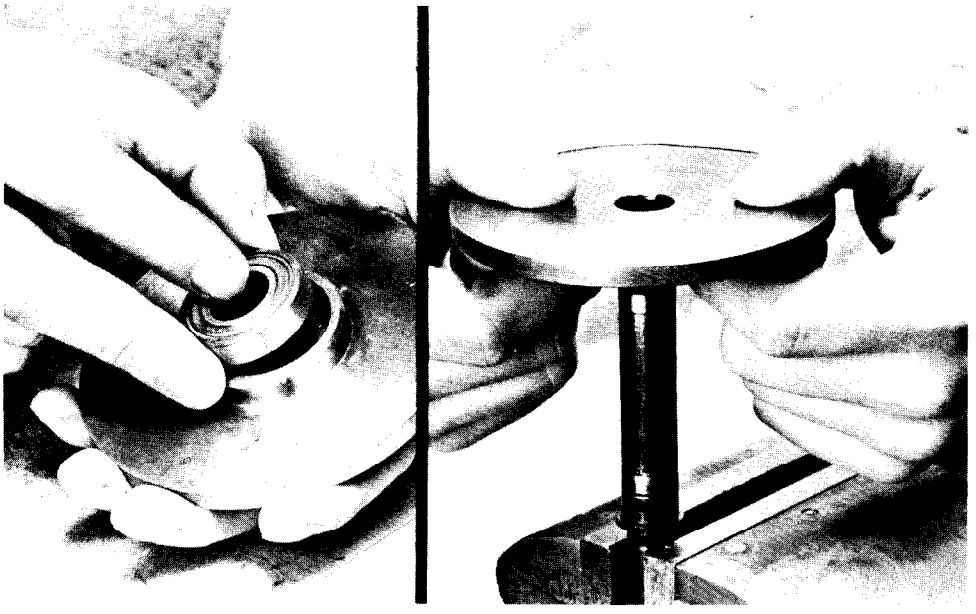
SLIDE 54

Place a clean filter into the swivel assembly with the lips on the cup facing up. Then, place the cap into the swivel assembly and turn it counter-clockwise until the lugs on the cap drop into the notches in the cylinder. Then turn it clockwise and tighten with an adjustable wrench.



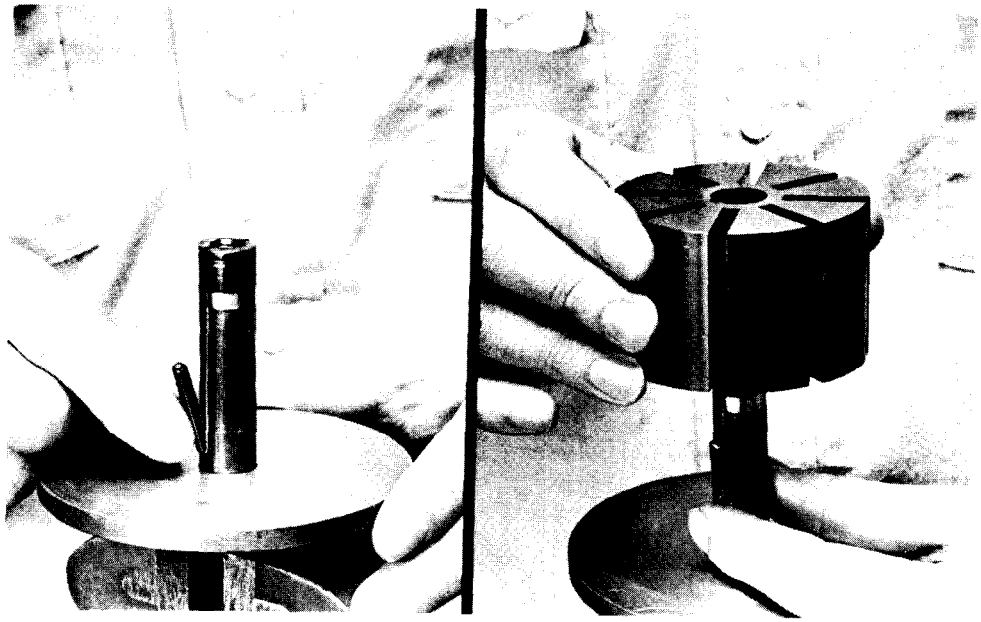
SLIDE 55

Place a clean screen into the opening of the swivel and secure it with the air inlet adapter. Then place the screen and new muffler fillers into the exhaust deflector. Place the exhaust deflector on the housing and secure it with the screws and washers. Remove the valve housing from the vise and set it aside.



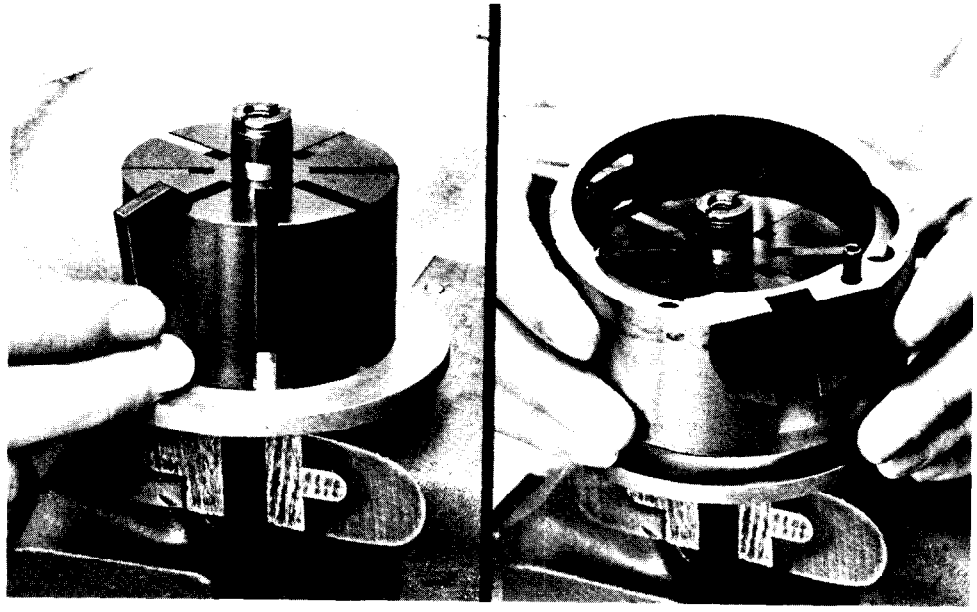
SLIDE 56

Clamp the motor spindle in the vise, just below the shoulder. Place the bearing into the front end plate with the shield out and place the end plate and bearing over the shaft and down against the shoulder. This is the end plate without the air inlet ports.



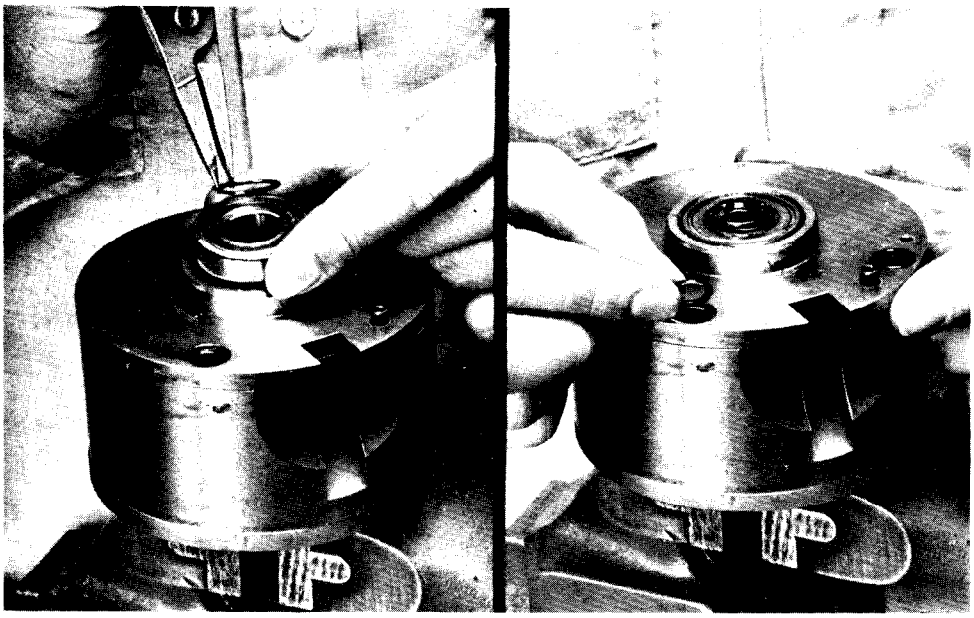
SLIDE 57

Place the key into the keyway in the spindle. Then slide the rotor over the spindle and key. Make sure that the rotor floats freely up and down on the spindle. If binding is detected check the key, spindle, and rotor for nicks or burrs. The key can be lapped slightly to remove nicks or burrs but the rotor and spindle should be replaced if damaged.



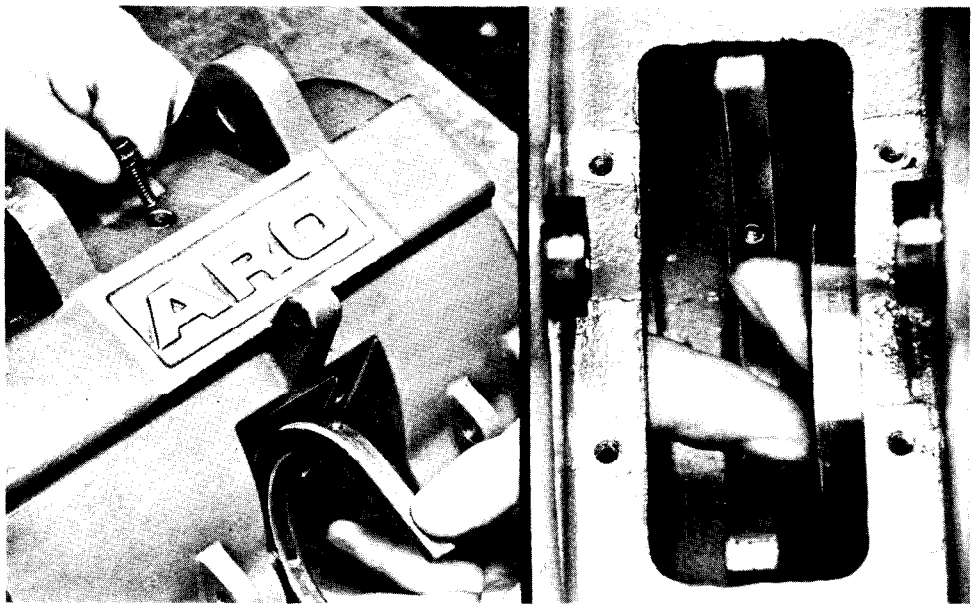
SLIDE 58

Place a new rotor blade in each slot of the rotor with the straight edge out. Then place the cylinder over the rotor with the roll pin up.



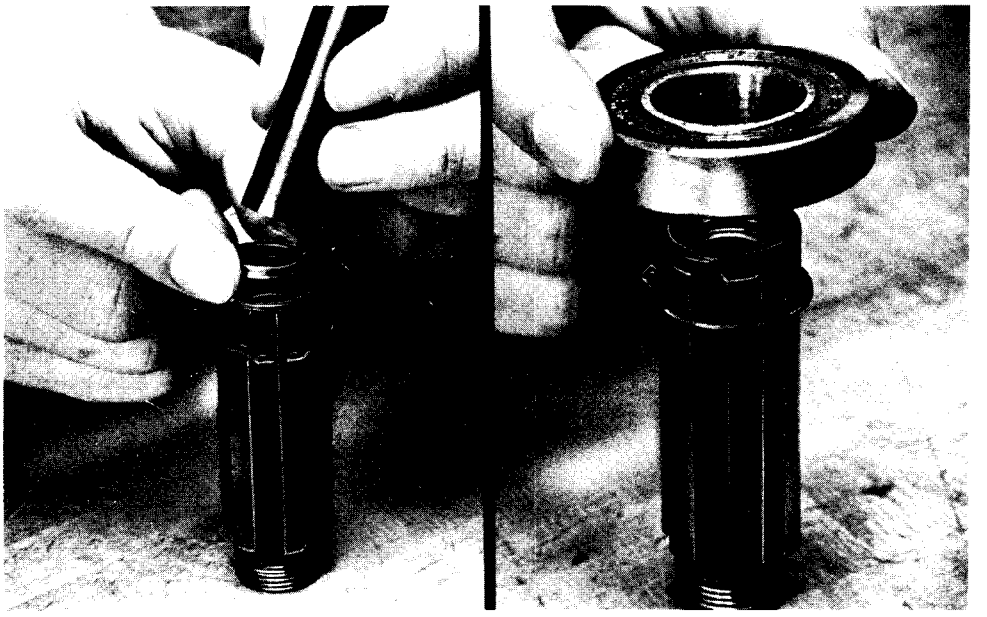
SLIDE 59

Place the rear end plate over the spindle, aligning the roll pin in the cylinder with the small hole in the end plate. Press the bearing over the spindle and into the end plate and secure with the retaining ring. Also place o-rings into the ports of the end plate and set the motor assembly aside.



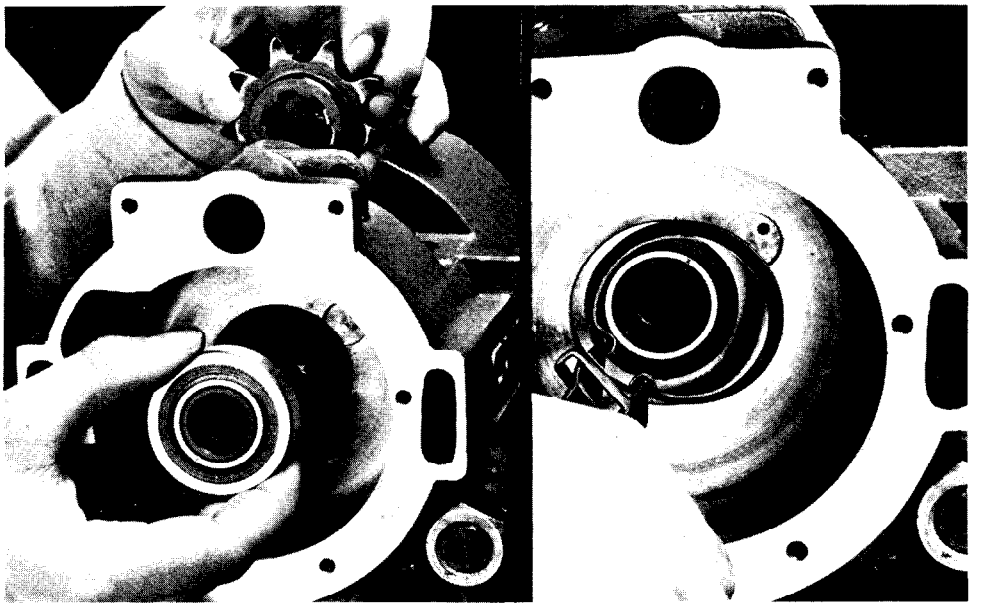
SLIDE 60

On roller chain hoists fasten the chain guide into the housing with the two cap screws and washers and re-attach the hook assembly. Then, on all hoists, clamp the hoist housing in the vise by the hook bracket. Place the ball bearing into the brake end of the housing and against the retaining ring.



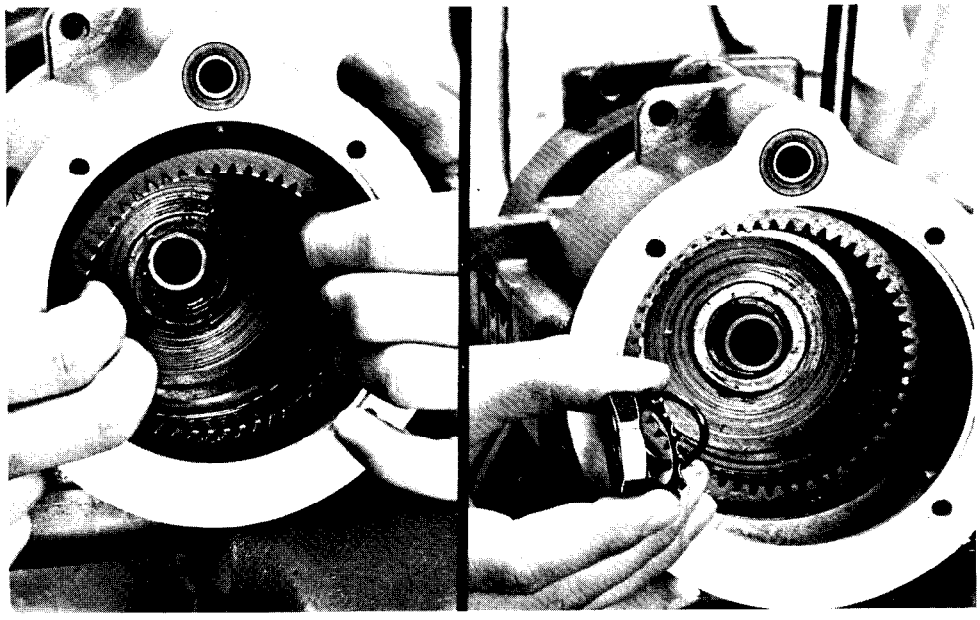
SLIDE 61

Press the new seal into the shaft with the lips out. Be certain to apply pressure evenly and to the metal outside ring of the seal. Then push the bearing on to the shaft and against the retaining ring.



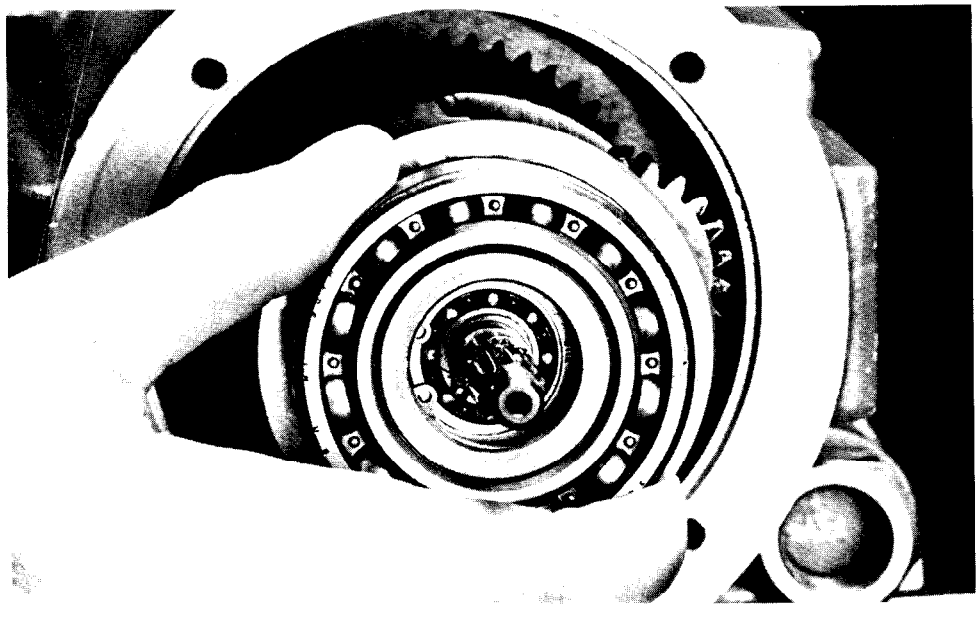
SLIDE 62

Place the pocket wheel and chain guide or the sprocket into the housing. On link chain hoists, the pocket wheel must be placed in the housing with the side having the part number stamped on it facing the valve end of the housing. Slide the shaft and bearing assembly through the sprocket or pocket wheel until the bearing seats in the housing. Secure this in place with the retaining ring. Remember, never use an old sprocket or pocket wheel with a new chain.



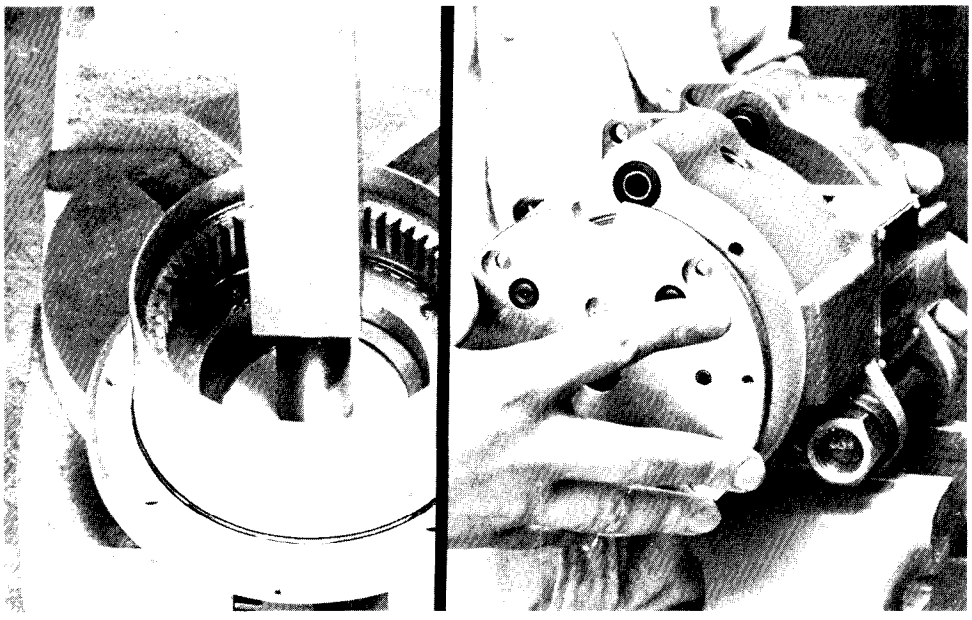
SLIDE 63

Place the o-ring into the groove in the brake end of the housing. Then place the ring gear into the brake end of the hoist and over the shaft, being careful not to turn over the lip of the seal. Then place the o-ring over the shaft and secure with the washer and nut. Tighten the nut by placing a brass drift into the sprocket or pocket wheel to keep the shaft from turning, and tightening with a 1-3/16" socket wrench. Check at this point to insure that the ring gear can be turned by hand. If it cannot be turned, disassemble and check for a damaged seal.



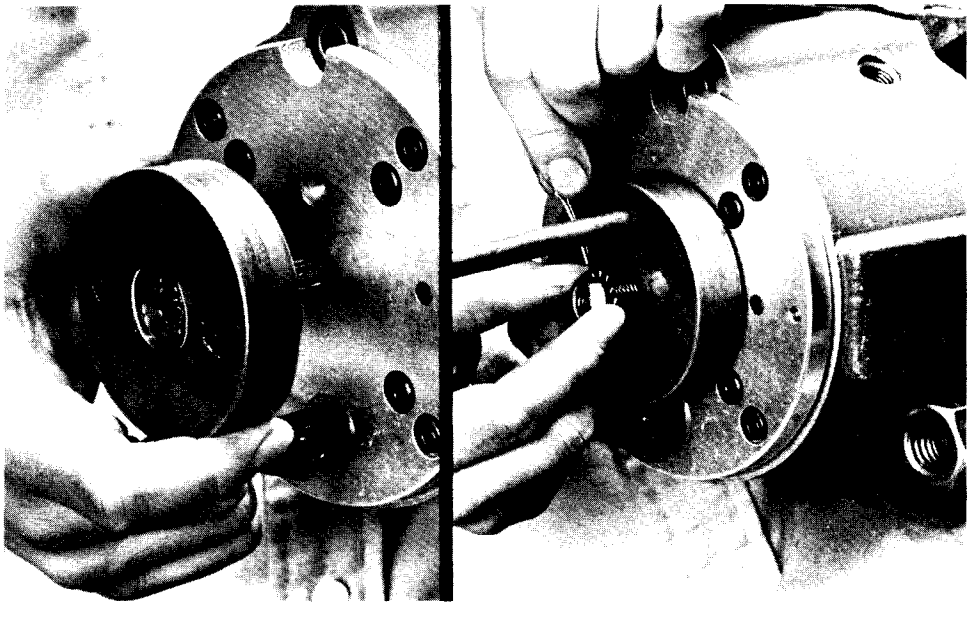
SLIDE 64

Place the gearing assembly in the hoist housing with the shaft end out. Align the teeth of the gears with the teeth in the ring gear and push the gearing in until the outer bearing is approximately flush with the housing. Avoid pushing on the shaft.



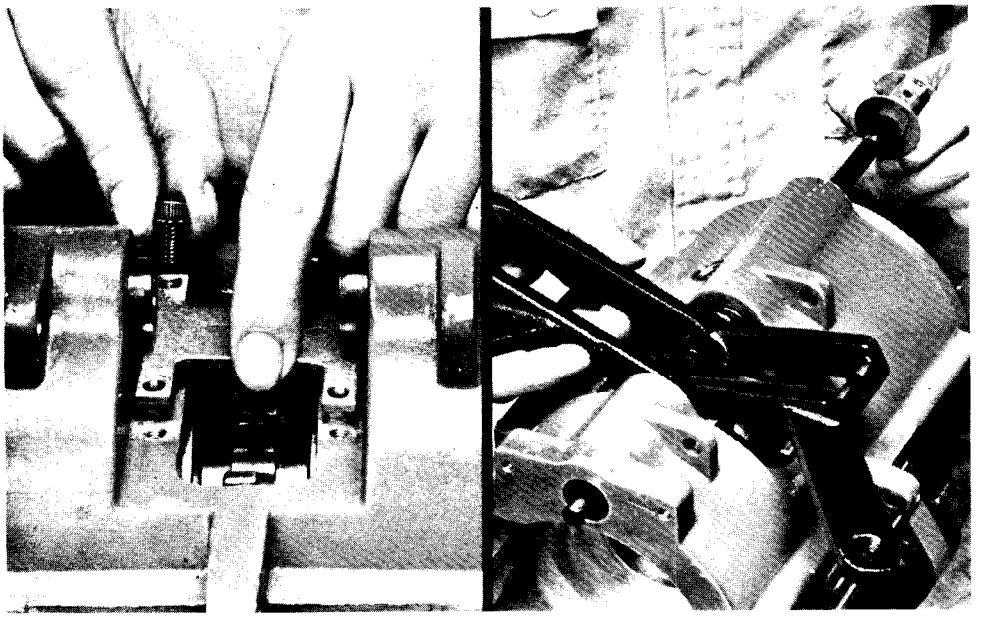
SLIDE 65

Place a new o-ring around the end plate. Press a new seal into the end plate with the lips up being careful to apply pressure only to the outer ring of the seal. Be certain to use an arobor press for this operation. Then place the end plate into the hoist housing with the notch up and the bolt holes aligned. It may be necesary to turn the pocket wheel or sprocket slightly to align the gear teeth. Use extreme caution to keep from damaging the seal in the center of the end plate. Tap the end plate into the housing and install the four screws with washers to secure it.



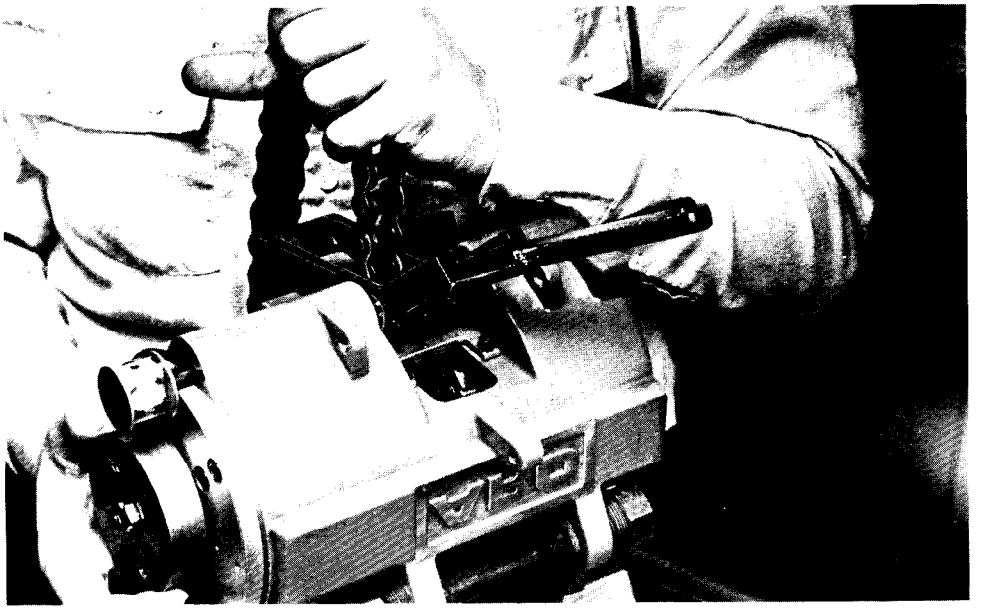
SLIDE 66

Place the brake wheel on the shaft with the flat side out, and secure with the washer and nut. Keep the brake wheel from turning by placing a brass rod through the hole in the ring gear and into the hole in the end plate and tighten the nut with a 9/16 socket. Then install the cotter pin.



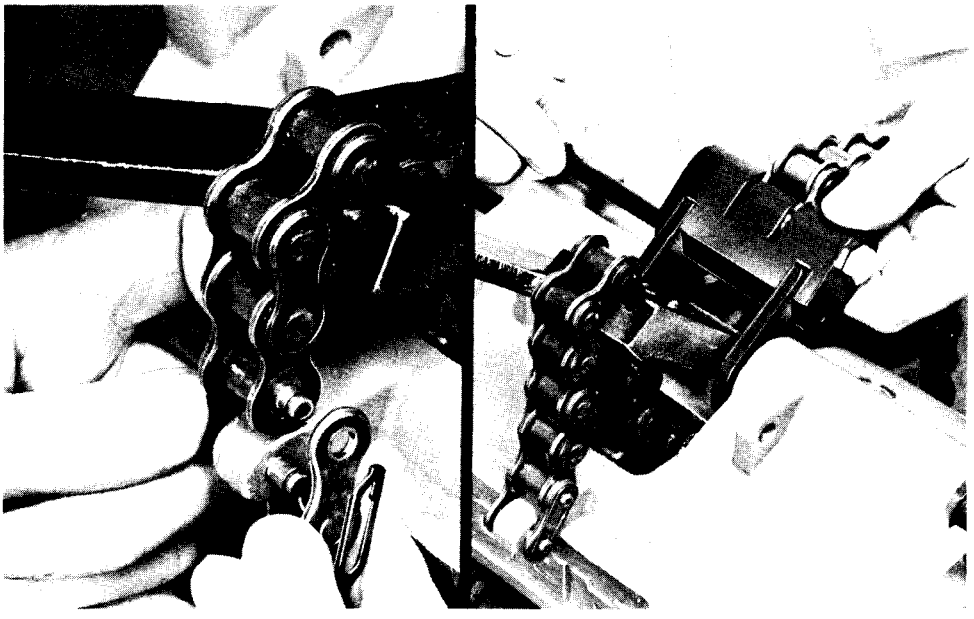
SLIDE 67

Place the stripper plate into position and secure it with the screws and washers. Then, attach the control arm to the housing with the lugs for the chain control toward the valve end of the hoist. On 2-ton hoists the hangers must also be placed into position. Finally, slide the control rod into the hoist to hold the control arm in place.



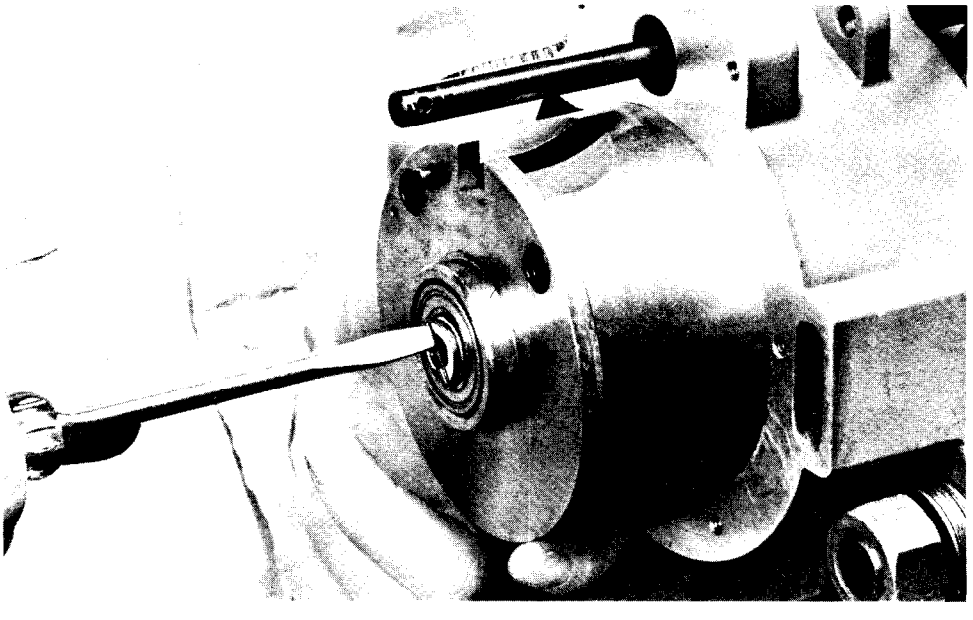
SLIDE 68

Now, install the chain into the hoist. To do so, place the chain into the pocket wheel or sprocket on the side opposite the chain lug. On link chain hoists, the chain must be positioned so that the weld on the links, rides on the outside of the pocket wheel. Then turn the brake wheel by hand to feed the chain through the sprocket or pocket wheel.



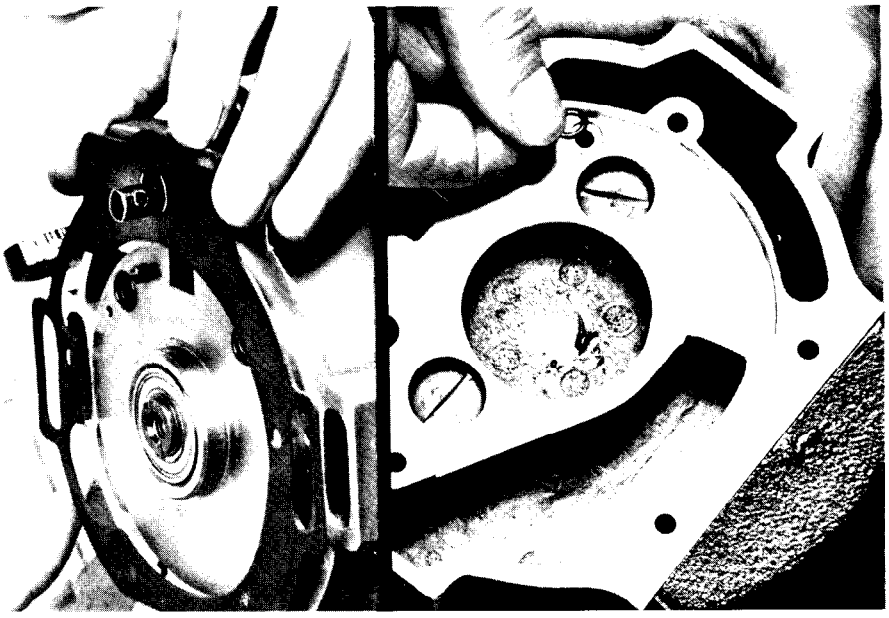
SLIDE 69

Thread the chain through the control arm and attach it to the chain lug, being careful not to twist the chain. On 2-ton models, attach the other end of the chain to the hangers with the anchor pin and retaining rings. Be certain that there are no twists in the chain.



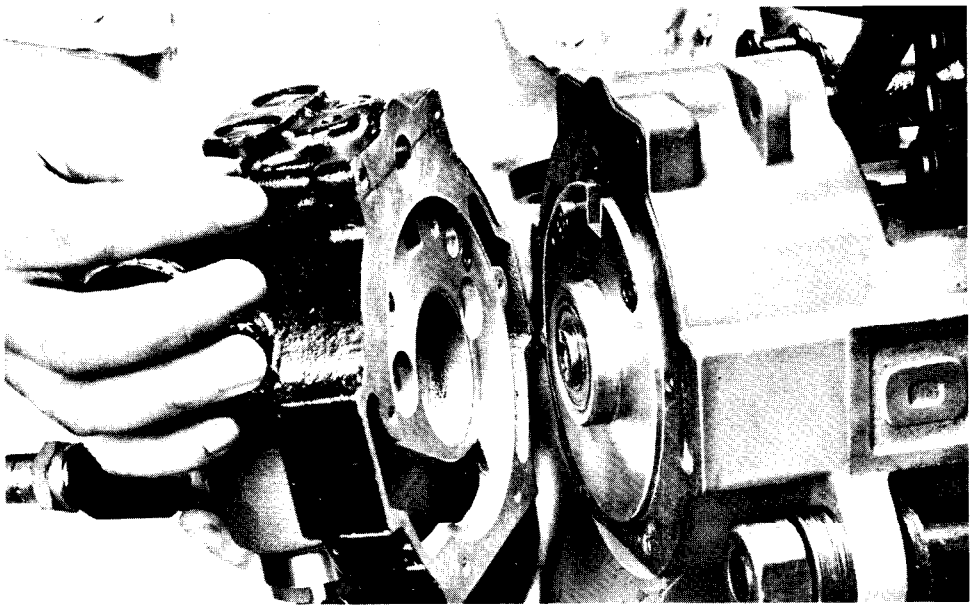
SLIDE 70

Install the motor at this time. To do so, carefully slide the motor spindle through the seal in the housing and slide the motor into position. A little grease on the motor and spindle will help it slide. Be sure that the slot and air inlet ports are up. A large screwdriver may be placed in the slot in the spindle and turned to allow the spline on the splindle to mate with the spline in the gearing. When the motor is in place the end plate should stick out of the housing approximately 1/8 of an inch.



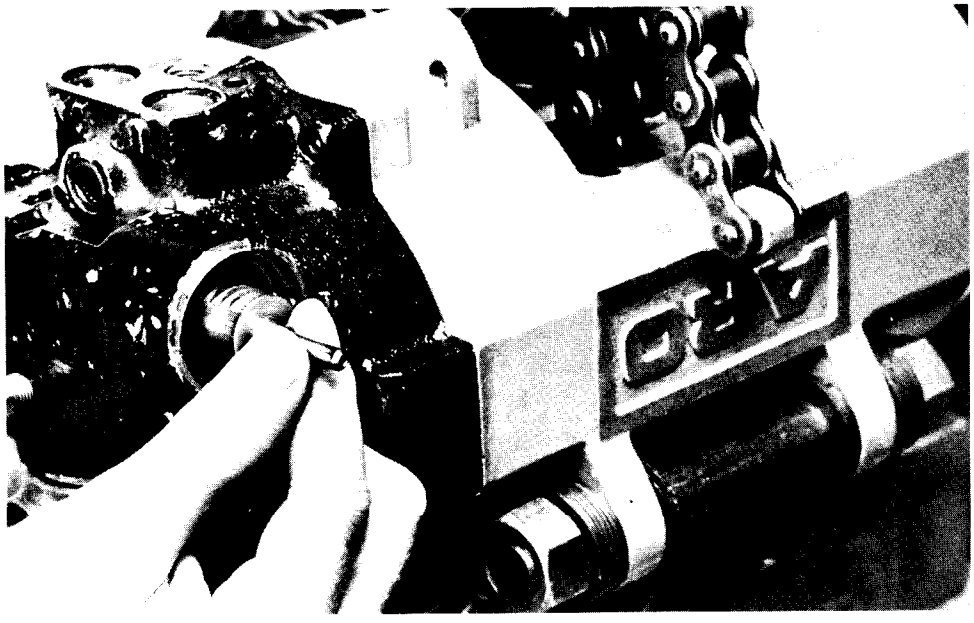
SLIDE 71

Place a new gasket around the motor so that all of the holes in the gasket align with ports in the housing. Then push the control rod back until it does not extend from the housing. Also place a new o-ring on the valve housing.



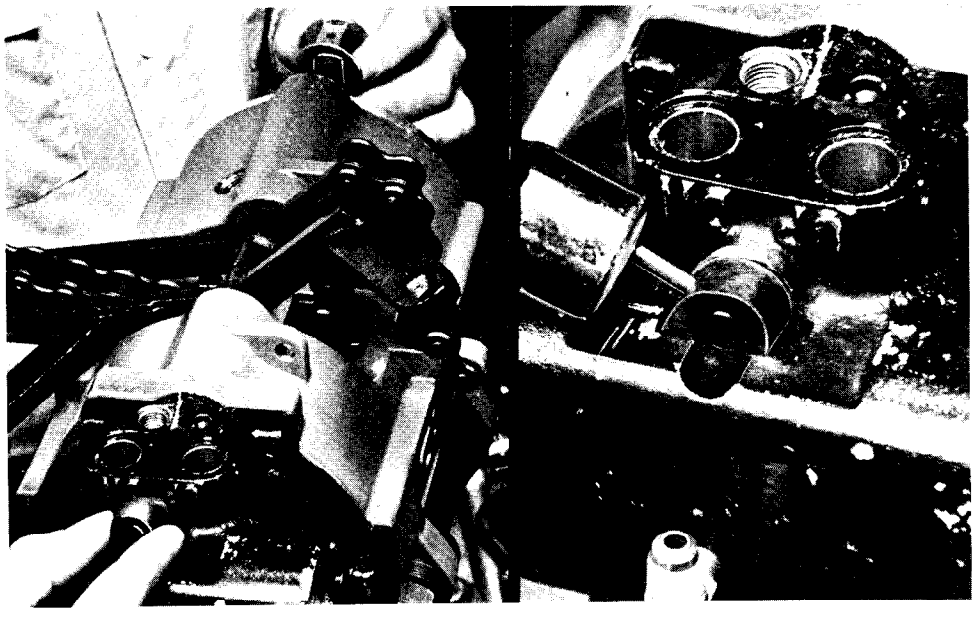
SLIDE 72

Place the valve housing in place on the motor housing and align the roll pin on the motor with the hole in the valve housing. Align the holes in the head, gasket, and housing and secure with the six cap screws and washers. Tighten the screws evenly and alternately with a 5/32" allen wrench.



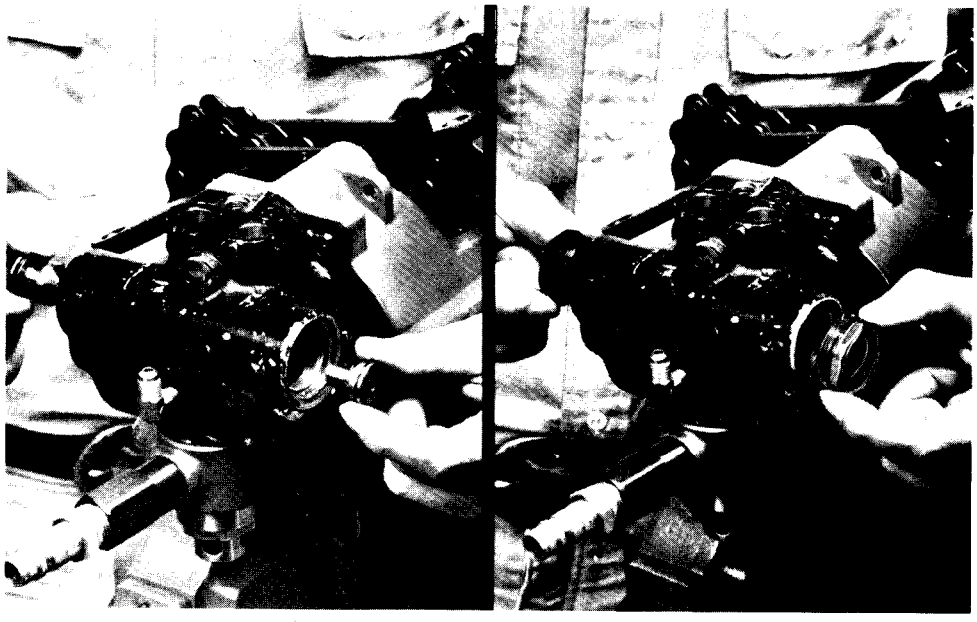
SLIDE 73

Slide the valve body into the valve head with the end of the valve body having an X etched into it to the side of the housing with the X. Be sure to have the teeth on the valve body facing up.



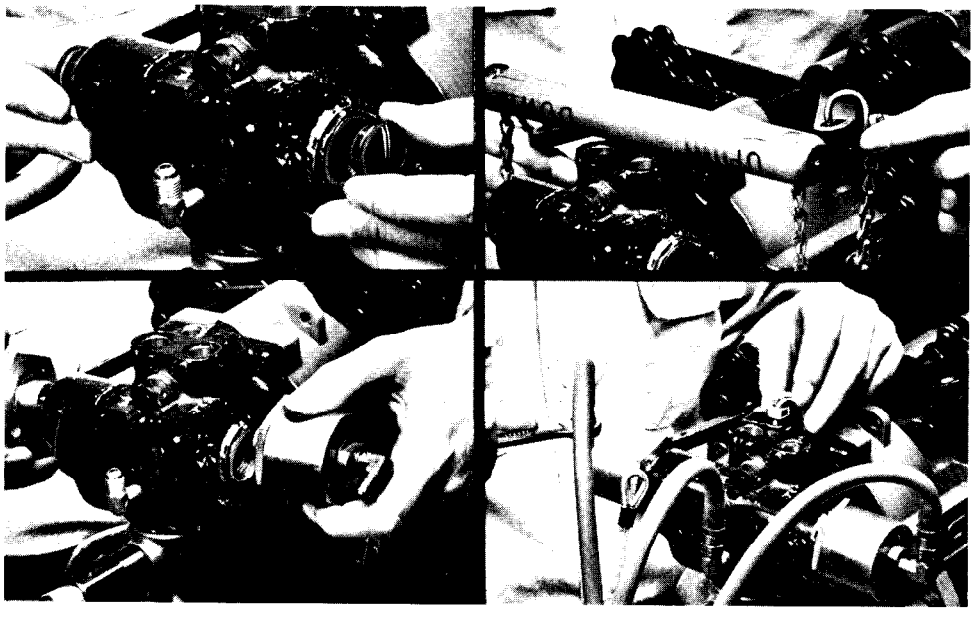
SLIDE 74

Center the tooth of the valve body with the lines on each side in the opening of the housing. Place the center tooth of the gear into this tooth and slide the control rod through the gear. Drive the roll pin into the gear and control rod. Then drive the roll pin into the control arm and control rod.



SLIDE 75

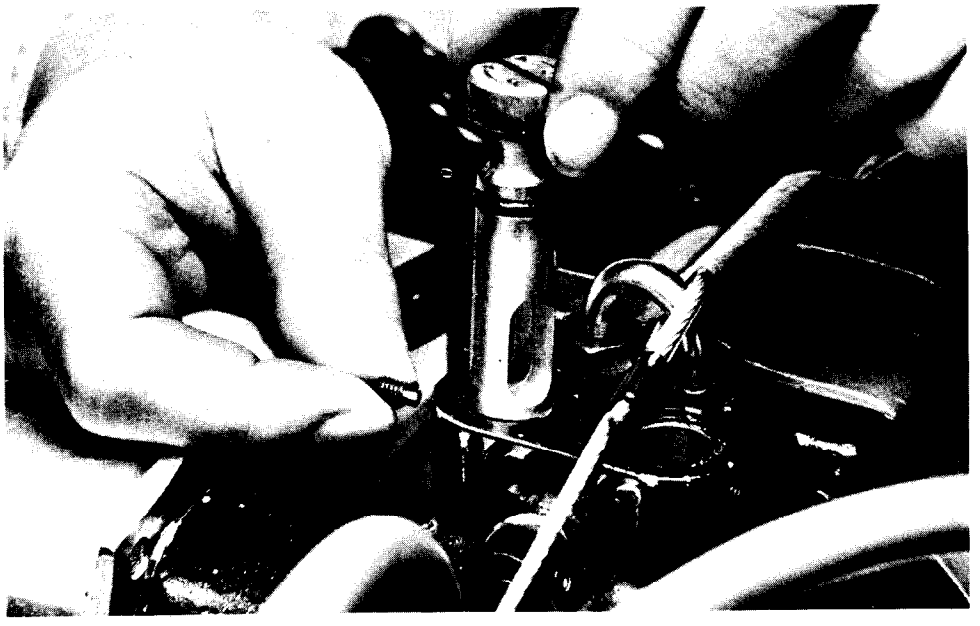
Lubricate the new o-rings and place them on the valves and adapters. Place the valves into the housing with the valve having the extra shoulder on the side opposite the X. Then thread the adapters into the housing and tighten.



SLIDE 76

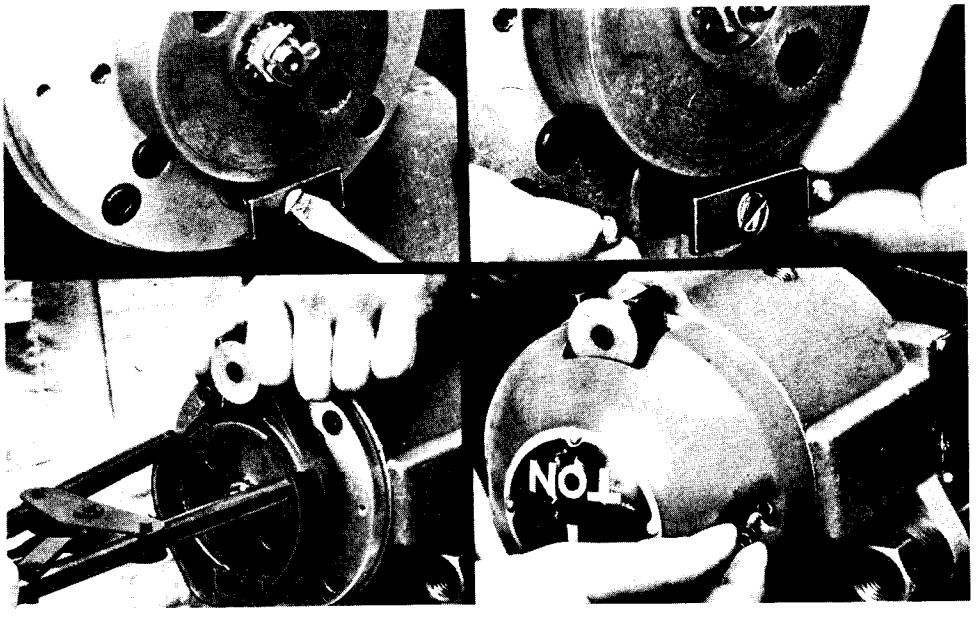
On chain control hoist, place a new o-ring on the valve caps and thread the valve caps into the adapters. Also attach the chain control to the control arms.

On pendent control hoists put a new o-ring on the cylinders and thread them into the adapters. Then re-attach the hose on the pendant control to the fittings on the hoist with the hose from the up valve going to the side with the X. Also, fasten the cable to the hoist with the adapter.



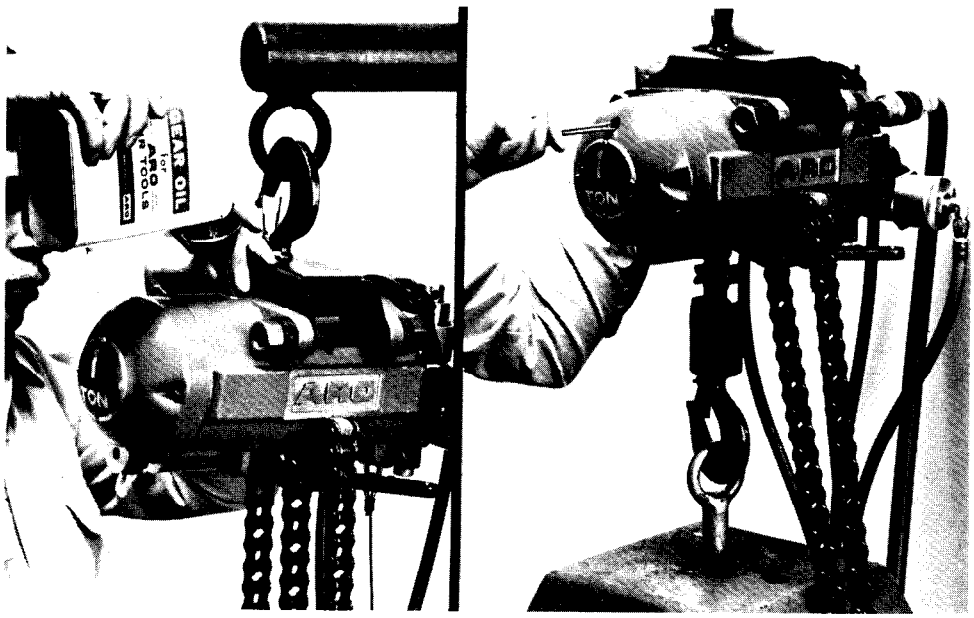
SLIDE 77

Place a new o-ring on each of the speed control valves. Insert these valves into the valve head with the slot in the valve toward the set screw holes. Then secure the valves with the set screws.



SLIDE 78

Next, install the brake on the hoist. To do so, back the screw out of the bracket a few turns. Place a small amount of grease on the balls and insert them into the holes on the bracket. Place the brake shoes around the brake wheel and fasten in place with the brake spring. Finally, place the housing cap over the brake and fasten with the two screws.



SLIDE 79

At this point the hoist should be hung from a suitable support. Place the oil plug in the bottom of the hoist and fill the gear chamber with 6 to 7 ounces of gear oil and replace the plug.

Attach an air supply to the hoist inlet and attach the rated load to the lower hook. Raise the load a few inches from the floor. Carefully turn the adjustment screw clockwise until the load starts to descend. Then turn the screw counter-clockwise 3 to 4 clicks. Again raise the load a few inches. The load should stay in position. Then very slowly pull on the up handle or push the up valve. The hoist should not allow the load to slip downward before raising it. If it does turn the adjustment counter-clockwise until no slippage is evident.

Finally check the work station where the hoist will be used to insure that the proper size filter, regulator, and lubricator are being used, and that the filter bowl is not filled with water or dirt.

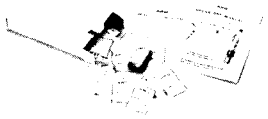
SLIDE 80

This completes the general maintanance and repair program for Aro's 7790 series hoist. If there are specific problems you may have encountered during the repair of the hoist, refer to the operators manual.

Three more ways to assure maximum productivity from your ARO air tools.

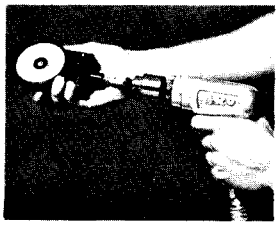
If you are presently servicing your ARO air tools in your own facilities we offer to you the following:

Genuine ARO SERVICE KITS



These kits are available for all of ARO's most popular portable tools, fixtured tools, and hoists. They contain all of the replacement parts necessary to properly perform preventative maintenance on a tool.

ARO's 5-POINT SERVICE PROGRAM



Factory trained distributor repairmen provide Fast, Complete repair service for your Aro air tools, hoists and self-feed drills, including teardown, inspection, rebuilding, testing and a new warranty.

ARO Air Tool Maintenance Seminar for Customers

The ARO Corporation offers regularly scheduled air tool maintenance schools at its main office in Bryan, Ohio. This two-day program is designed to review the proper repair procedures on the specific ARO air tools in your facilities.