



Technical Manual

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SAFETY PRECAUTIONS — continued

Have sufficient service personnel available when removing or installing large heavy items to maintain control at all times.

Always use safety stands in conjunction with hydraulic jacks or hoists. Do not rely on the jack or hoist to carry the load, they could fail.

Use safety catch on all hoist hooks. Do not take a chance, the load could slip off of the hook.

If a heavy item begins to fall, let it fall, don't try to catch it.

When disassembling machine, be sure to use safety stands and adequate cribbing to prevent tipping or rollover of components.

Keep work area organized and clean. Wipe up oil or spills of any kind. Keep tools and parts off of the ground. Eliminate the possibility of a fall which could result in serious injury.

Floors, walkways and stairways must be clean and dry. After draining operations be sure all spillage is cleaned up. Electrical cords and wet metal floors make a dangerous combination.

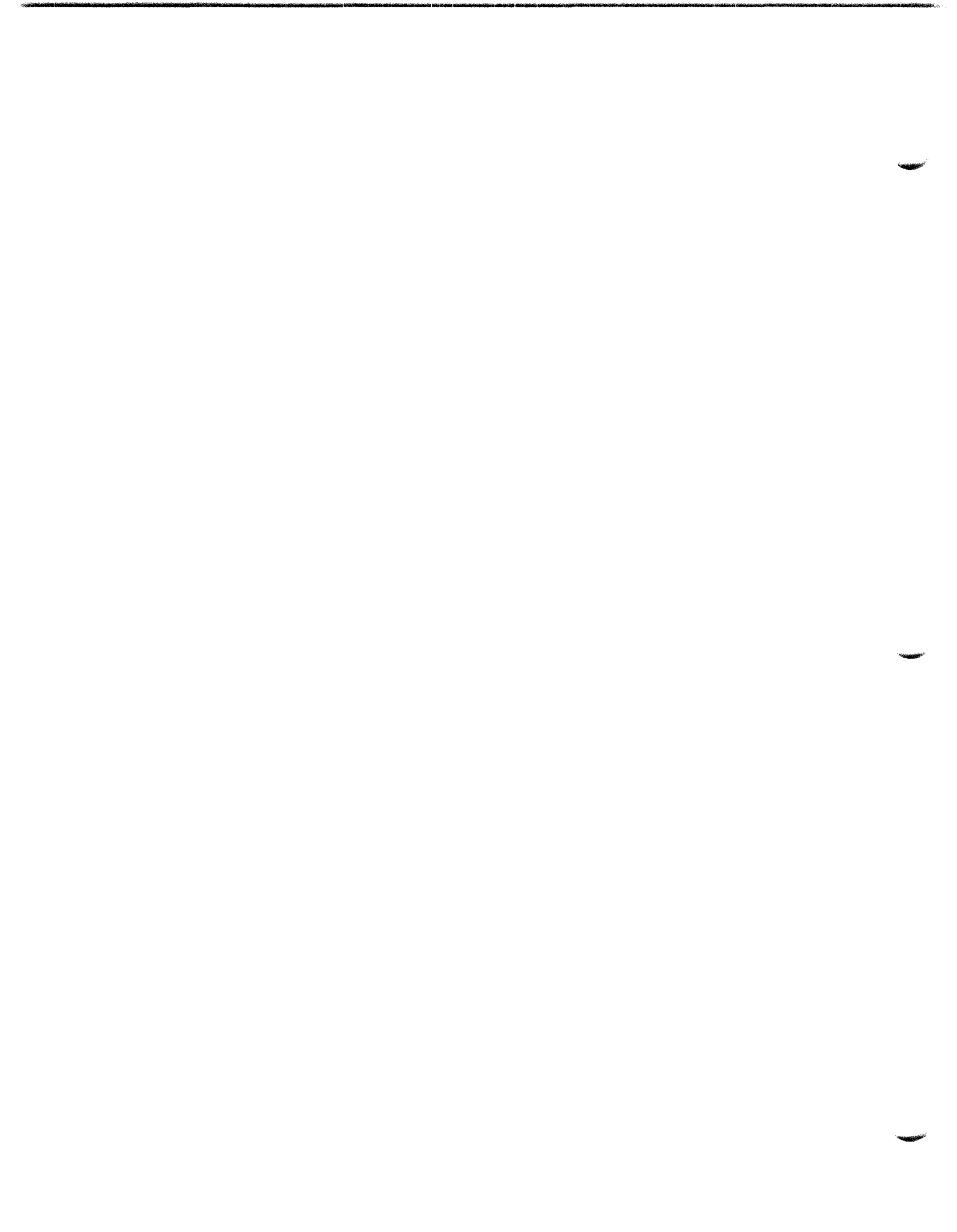
Check all wire ropes for telltale signs of early wear or failure. Look for and secure any loose bolts or locking devices.

Use extreme caution while working near any electrical lines or equipment whether it be high or low voltage. Never attempt electrical repairs unless qualified. Check limit switches for proper operation.

When using an acetylene torch, always wear welding goggles and gloves. Keep a "charged" fire extinguisher within reach. Be sure the acetylene and oxygen tanks are separated by a metal shield and are chained to the cart. Do not weld or heat areas near transformers or electrical cabinets and utilize proper shielding around lubrication lines.

Use pullers to remove bearings, bushings, gears, cylinder sleeves, etc. when applicable. Use hammers, punches and chisels only when absolutely necessary. Then, be sure to wear safety glasses.

Be careful when using compressed air to dry parts. Use approved air blow guns, do not exceed 207 kPa (30 psi), wear safety glasses or goggles and use proper shielding to protect everyone in the work area.



TELEPHONE SIGNAL – When the push button is depressed, a signal bell will ring in the electrical compartment at rear of machine.

ALARM SILENCE – Push button will deactivate the warning alarm when a red warning light comes on. The lamp will remain on until condition causing alarm has been corrected.

ALARM TEST – When depressing this button all red warning lights should be on. If not replace lamp that is out.

When any of the following red lights come on, the alarm will sound to alert the operator and the light will indicate where the malfunction is located.

The presence of a visual and audible alarm that does not stop motion is sufficient cause to SAFELY shut down the machine and investigate the reason for the alarm.

PCM AIR PRESS. – This light indicates air pressure is below the minimum reading in the PCM (Power Control Module) cabinets.

PCM XFMR TEMP, (Power Control Module Transformer) – Indicates that the operating temperature of the transformer is above normal.

SWG (Swing) MTR TEMP., CRD (Crowd) MTR TEMP., PROP (Propel) MTR TEMP., HST (Hoist) MTR TEMP. – These four lights will indicate if a motor is running over normal operating temperature.

COMPRESSOR AIR PRESS – Indicates compressed air system pressure dropped below 65 psi (448.11 kPa). Check gauge reading. Pressure switch in circuit set to turn light "ON" at 65 psi (558.11 kPa) and "OFF" at 95 psi (654.93 kPa).

NOTE: Full brake release requires 100 psi (689.4 kPa).

AUTO LUBE FAILURE – Indicates a malfunction in the auto-lube system.

MINE SIGNAL – An alert from personnel on mine floor, usually for "Boarding" request.

MTR FLD. LOSS (Motor Field Loss) – This lamp will come on to indicate current loss in the field of a D.C. motor. The motion at which the loss has occurred will shut down and that brake will set.

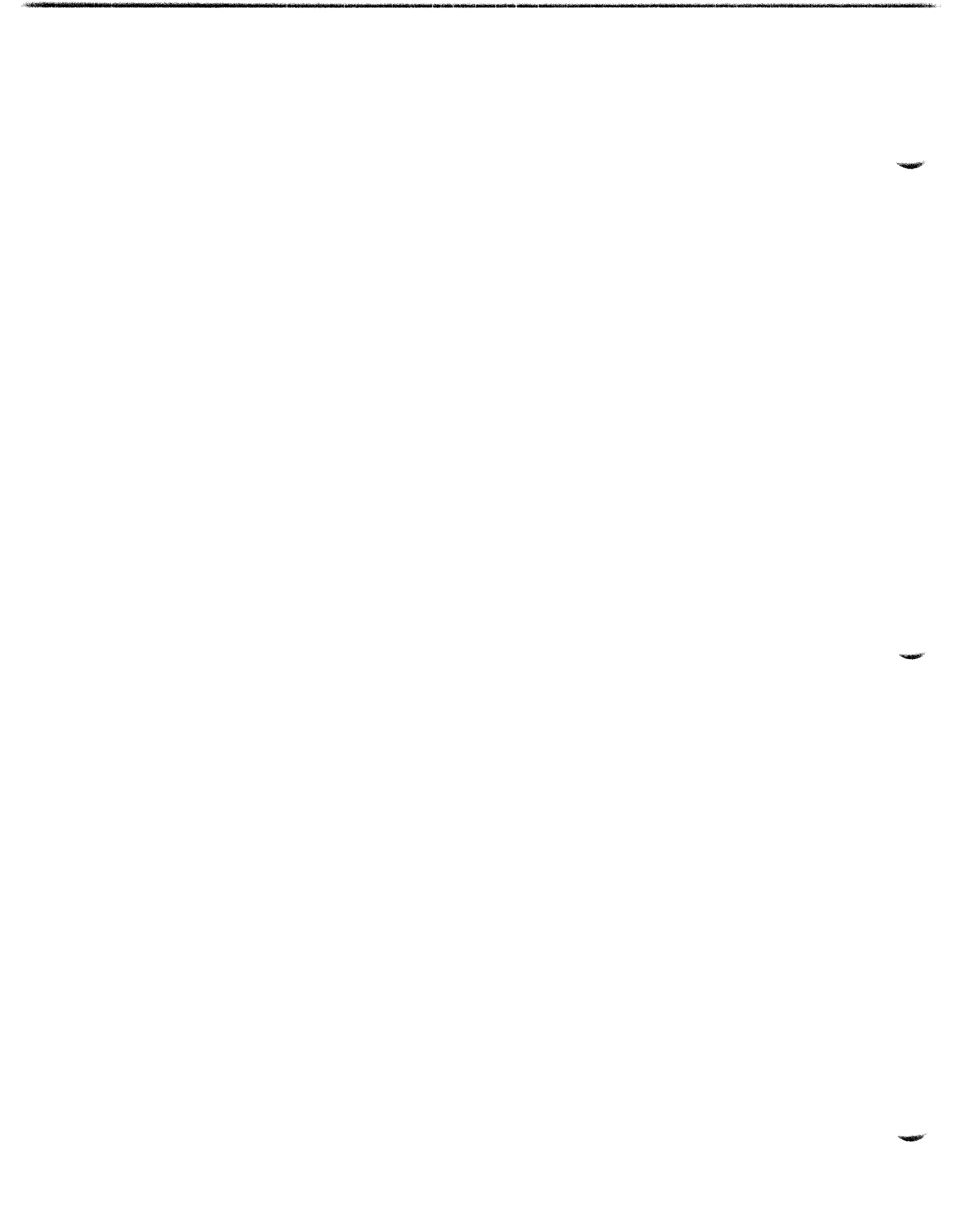
PCM FAULT – Indicates a trip of one or more of the power converter modules.

MOTOR BLOWERS – A warning that indicates one (or more) of the motor blowers has malfunctioned. The blower at fault will have to be determined.

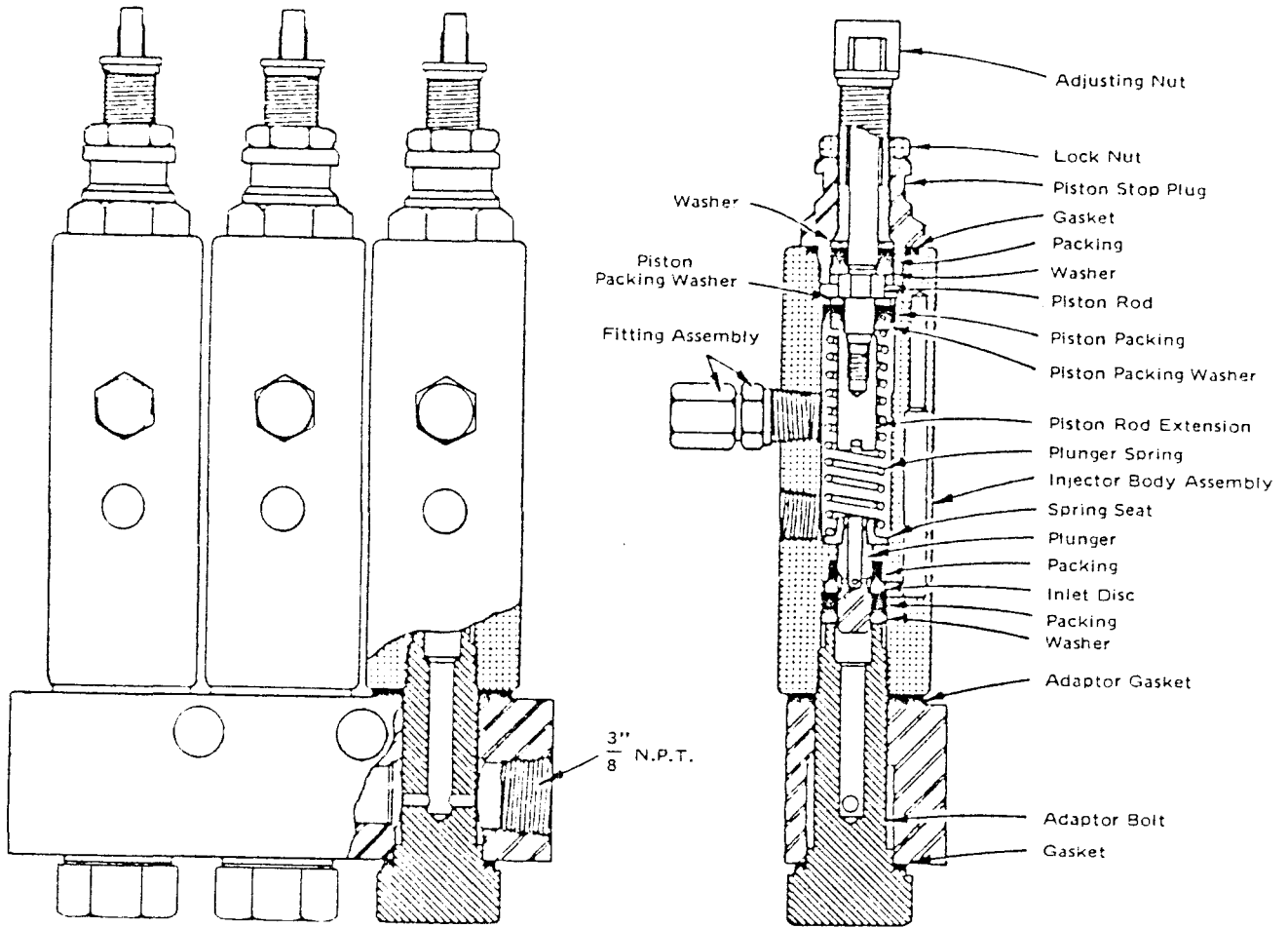
LOOP GROUND – Indicates a ground condition exists in hoist or swing or crowd or propel armature circuits.

LADDER DOWN – Indicates the access ladder is in the down position and the Primary Controls are deactivated.

FILTER FANS – Indicates a malfunction at one (or more) of the filter fan(s) located on the house roof.



CODE	NAME	DESCRIPTION
continued. . .		
GL	Enclosed Gear Case	<p data-bbox="778 415 1419 558">3. Inside machinery house, where oil is not pumped, use GL-200 except where freezing temperatures rarely or never occur, use GL-250.</p> <p data-bbox="778 604 1419 785">On new machines, oil should be drained after first 60 days of operation and replaced with new oil. Thereafter, change oil once a year, or when determined necessary by oil supplier. Oil should be checked for contamination every 30 days.</p>
PO	Pneumatic Oil	<p data-bbox="778 867 1419 1085">Petroleum oil especially compounded for use in air lines oilers or built in lubricators having the correct viscosity, low pour point, emulsifying ability, film strength and free of deposit forming tendencies. It should not cause swelling or deterioration of rubber or leather seals and gaskets.</p>
EMG	Electric Motor Grease	<p data-bbox="778 1167 1419 1272">Electric motor bearing grease meeting the requirements of G.E. Specification D6A2C5 or Westinghouse equivalent.</p>



LUBE INJECTOR ASSEMBLY

4. Attach crane sling to lift hoist ropes off sheaves and support them on the bearing boss between the sheaves.
5. Remove one sheave at a time. Run wire rope or sling thru sheave and take up slack. Remove lock pins securing sheave shafts to boom, then pull out shaft far enough to release sheave and sleeve assembly. Lift sheave at right angle to boom. Sheave weight is approximately 3200 pounds. Shaft weight is 788 pounds.
6. Remove other sheave in same manner.
7. Lower sheave to ground and support with axis vertical to remove bearings. Loosen bolts and remove lock bar from split nut and sleeve. Remove nut from sleeve. Remove spacers and grease retainer. Invert sheave and remove second grease retainer, sleeve, bearings and spacer. Check bearing cones and cups for pitting, scoring and wear. Check for evidence of inadequate lubrication.
8. Replace damaged bearings. To install new bearings: thoroughly clean sheave hub bore. Press bearing cups in each side, making sure cups seat against shoulder in bore. Assemble and lightly lubricate bearing cones and insert in bearing bore without spacer. Clamp cones with tool J-14077 until bearing binds slightly when rotated. Use inside micrometer to measure between cones at three points 120 degrees apart. Calculate average dimension and machine spacer to this dimension $+0.001$, -0.000 . Remove clamp and bearing cones.
9. Pack cones with multi-purpose grease (MPG). Insert sleeve with bearing cone in bore and carefully install grease retainer. Invert sheave and install machined spacer, second bearing cone, grease retainer and external spacer. Place split nut on sleeve. Tighten nut with spanner wrench until bearings are firmly seated. With assembly tight, remove one nut bolt and insert lock bar in nearest slot, then replace bolt.
10. To install sheave, use crane to lift sheave to point. Position sheave and drive shaft into place. Secure shaft with lock pin. Use crane to lift hoist ropes into position on sheave. Make sure rope towards center of drum is in inside groove of sheave.

NOTES:

LATCH BAR AND/OR WEAR PLATE REPLACEMENT — Position dipper so that door hangs free and high enough to allow removal of latch bar from door bottom. Support latch bar weight enough to permit removal of trip lever pin. Lower the latch bar out of door when support is removed.



CAUTION: Use care to avoid injury from heavy latch bar.

Remove worn wear plates. Install new wear plates and tack weld them to hold while assembling latch. Reassemble latch bar, trip lever and pin.

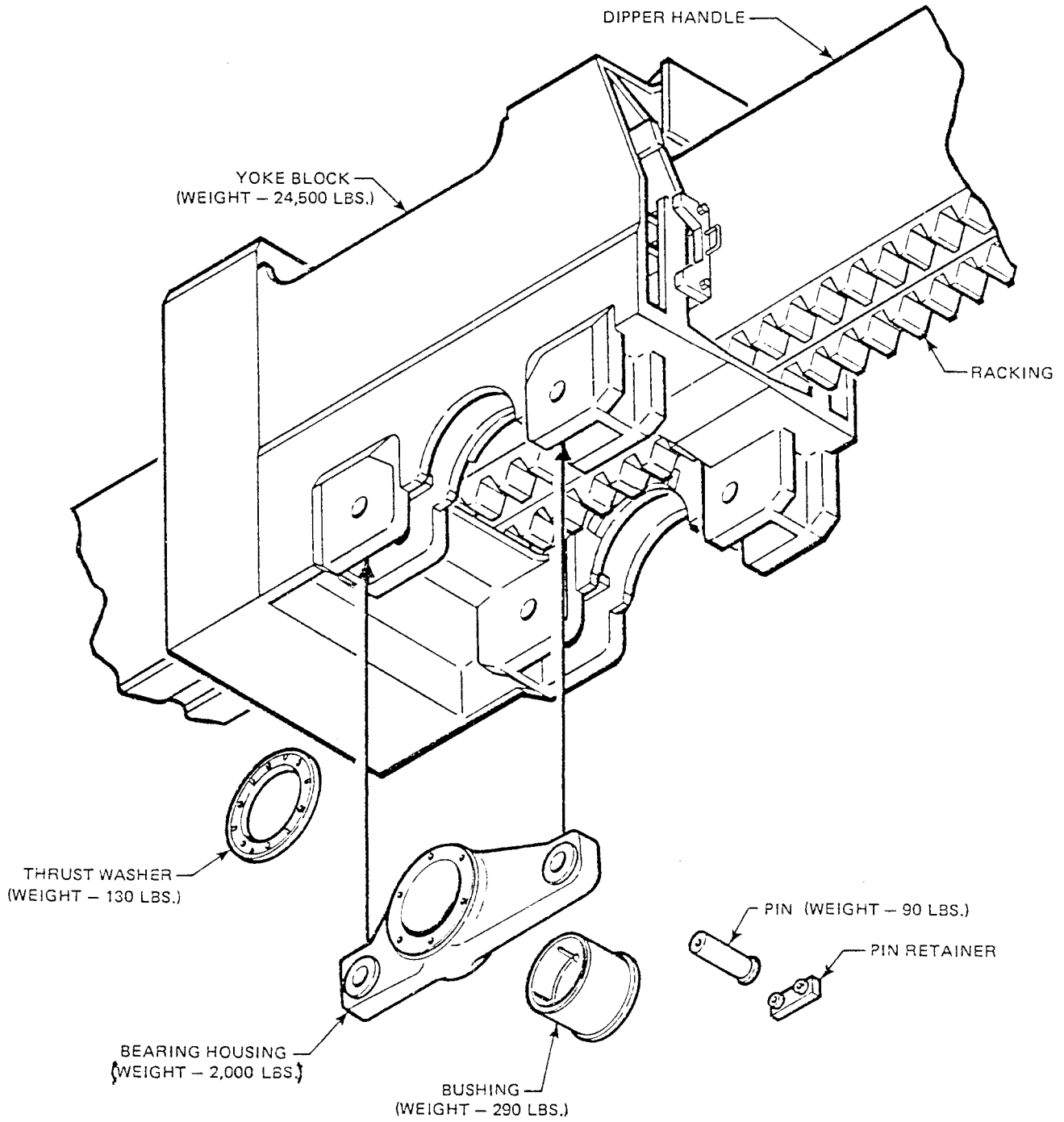
Maintain good film of lube on latch bar. Most operators pour used motor oil on latch bar frequently to keep it lubed.

DIPPER TRIP motor and the gear-driven rope drum are located on the boom top plate. The trip rope is reeved from the drum thru a boom-mounted fairlead to the trip lever mounted on right side of dipper handle. This lever is connected by trip chain to trip lever on dipper door.

The trip motor is constantly energized by a low voltage current which is just strong enough to apply a slight torque to reel, keeping the rope taut. The rope unreels as the dipper crowds out. As the dipper retracts, motor torque rewinds the rope. When the operator actuates the dipper trip switch, additional voltage is applied to pull the dipper latch bar. The combined weight of the dipper trip lever and latch bar returns the bar to the latch position when the trip switch is released. Weight of the dipper door swings the door shut as the dipper is lowered.

No mechanical adjustments are required. The only electrical adjustment is the controlled low voltage to the trip motor. Adjustment is made by an electrician only if control circuit components are replaced.

NOTES:



YOKE BLOCK AND BEARING HOUSING DETAILS

TO INSTALL INTERMEDIATE SHAFT:

1. Preassemble shaft, outer bearing, spacer and cone of inner bearing. See Section 7 for information on bearing installation. Attach shaft lifting tool.
2. **IMPORTANT:** Install inner bearing cup and bearing cage in boom housing. Do not install on shaft.
3. Pack shaft housing with MPG multi-purpose grease.
4. Insert shaft assembly into boom housing and inner bearing. Start outer bearing into housing, then remove lifting tool and complete shaft installation.
5. Install eight capscrews thru split retainer to secure outer bearing.
6. Install spacer over shaft splines and against cone of inner bearing.
7. Install inner bearing retainer with eight capscrews. Torque to specification (see Section 7).
8. Install intermediate gear on shaft splines and against spacer. Install gear retainer with three capscrews. Torque to specification (see Section 7).
9. Install shipper shaft gear and guard.

CROWD MOTOR REMOVAL – Disconnect electrical power from machine. Disconnect electrical wiring from crowd motor. Identify wires and cover connectors. Disconnect air line to crowd motor brake.

Remove gear and pinion guard. Remove motor as a unit with brake and pinion installed. Weight of unit is approximately 3,140 pounds. Weight of motor with blower is 2,755 pounds. Weight of brake is approximately 385 pounds.

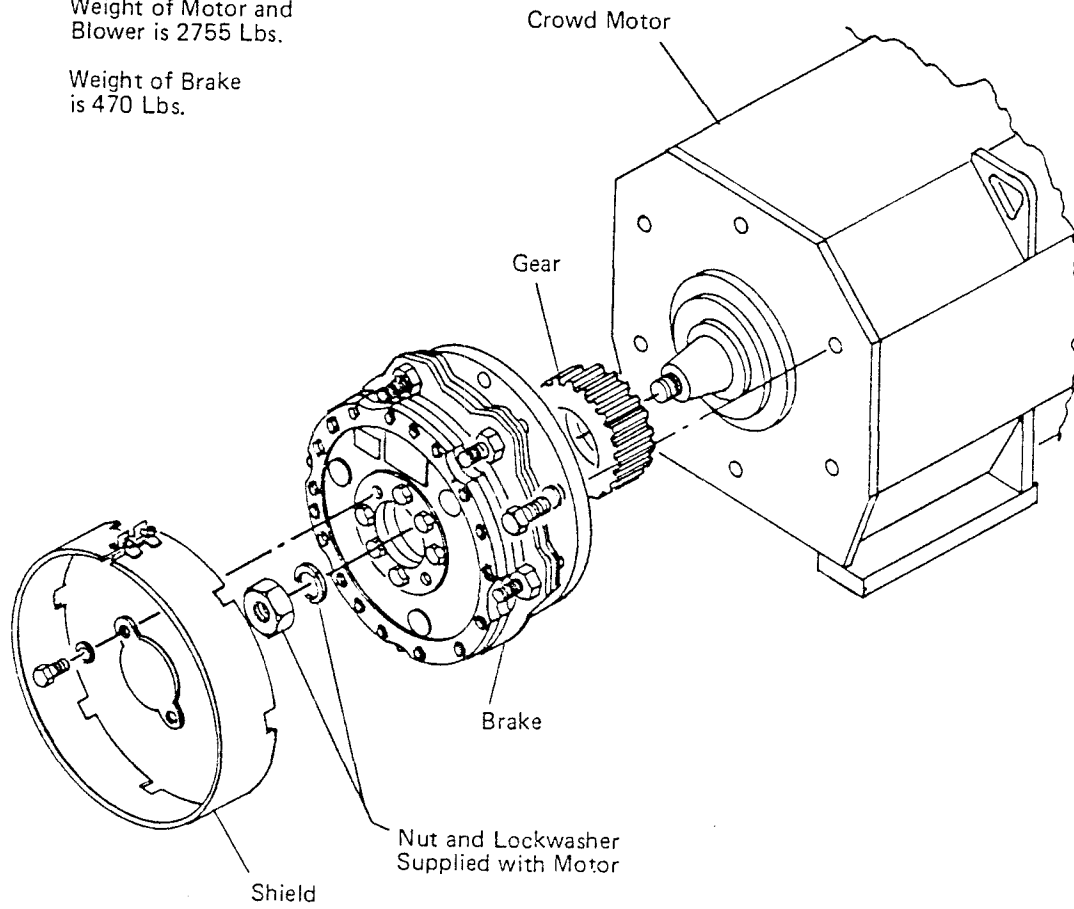


CAUTION: Carefully loosen and work motor from mounting to avoid damage to motor pinion.

Lower motor onto cribbing at ground level and protect it from weather and dirt.

Weight of Motor and Blower is 2755 Lbs.

Weight of Brake is 470 Lbs.



CROWD BRAKE INSTALLATION

Inspection of the cam-follower roller assembly can be made by removing the two forward bolts holding the cam-follower bracket, then swinging the entire bracket assembly back to provide access to the cam-follower parts.

The following procedures should be followed when replacing bearings or camshaft or reversing the camshaft extension (see figure 5).

Remove the cast cover. Remove both seal plates (1) (2), the cam follower bracket (3), and the four bolts which secure the internal switch to the cast box. Remove the internal switch from the box.

Remove three bolts holding flange on shaft extension side of switch. After removing the filler strips (5), loosen the thrust collars on each end of the shaft and slide them inward along the shaft. Lift entire cam shaft assembly up and out of the switch frame.

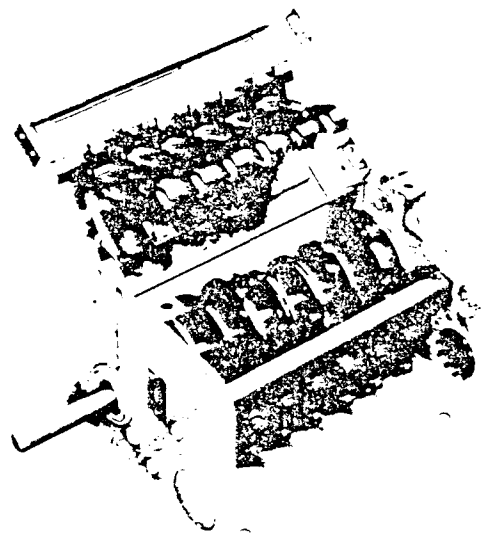


FIGURE 4. CAM FOLLOWER ROLLER ASSEMBLY AND INTERIOR OF SWITCH

After replacing parts as required, reassemble the filler strips (5) and the three bolts holding the flange.

Reinstall the internal switch into the cast box with the shaft extension protruding from the desired side and tighten the four mounting bolts (4) which secure the switch to the box. Reinstall the seal plates (1) (2).

Visually center the shaft in the seal plate hole and tighten the internal flange. Reassemble and tighten the cam follower bracket. Measure for proper shaft-extension length and position, and tighten the thrust collars.

The final step in the reassembly procedure is to reset the desired contact sequence by adjusting the cam and vernier adjustment.

heads tight against the flange and the lockwashers loose. Attach choker slings to the drum and place it in position on the base frame. Drive the four lock pins in place and secure them with pin retainers and wire lock. Tighten gear bolts in accordance with the following procedure:

BOLTING PROCEDURE FOR HOIST GEAR:

Keep drum shaft free to turn with ropes slack and brake released.

Loosen all bolts, one or two turns.

Tighten all nuts by hand.

Use air wrench; tighten the two topmost, center bolts ONLY.

Rotate drum 180°; tighten two topmost, center nuts.

Rotate drum 90°; tighten two topmost, center nuts.

Rotate gear 180°; tighten two topmost, center nuts.

Rotate gear 45°; tighten two topmost, center nuts.

Rotate gear 180°; tighten two topmost, center nuts.

Rotate gear 90°; tighten two topmost, center nuts.

Rotate gear 180°; tighten two topmost nuts.

Tighten ALL remaining nuts.

RETIGHTEN ALL nuts, advancing one nut each time. Rotate drum so each nut to be tightened is at top of drum in turn.

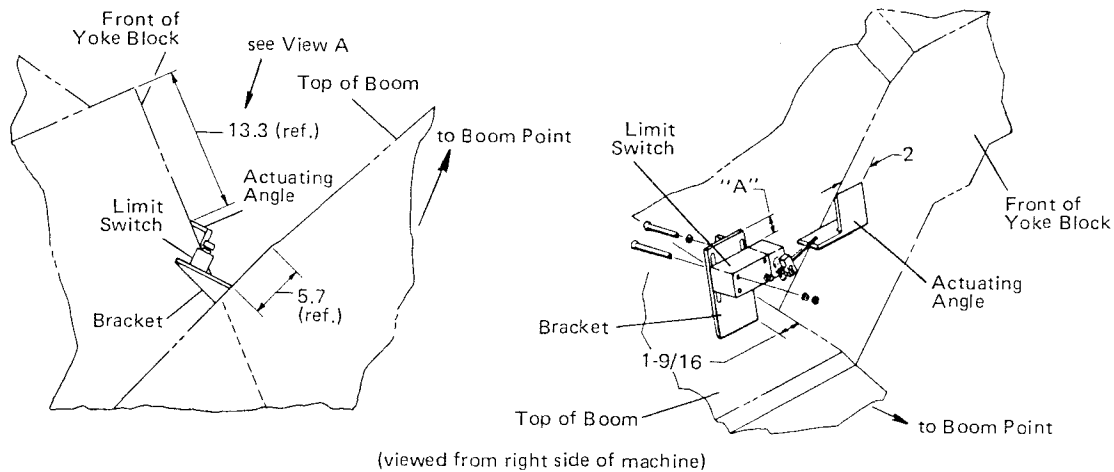
Operate machine 30 minutes under load and RETIGHTEN.

NOTE: Due to dead weight, it is possible that ALL bolts seem tight (nuts do not turn anymore) and still a gap exists at bottom of gear as gear rotates. The changing position under load causes the bolts to loosen with additional bending stress. RETIGHTENING IS IMPORTANT.

The **HOIST INTERMEDIATE GEAR** runs in an oil-tight gear case containing 60 gallons of GL type oil. This double helical gear is splined to the intermediate shaft and driven by the hoist motor pinion.

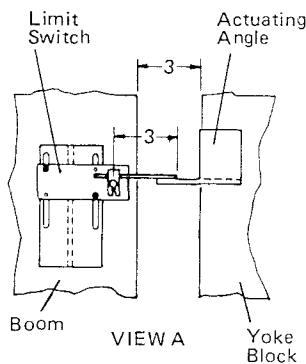
The **HOIST INTERMEDIATE SHAFT ASSEMBLY** consists of the intermediate gear, the intermediate shaft with integral pinion, and two sets of double row tapered roller bearings.

The **HOIST LIMIT SWITCH** is mounted on the right side of the boom in a position where it will be tripped by the yoke block when the handle reaches a predetermined angle above horizontal. This angle is 21 degrees on a 51 foot, 6 inch long boom set at 45 degrees. This limit is adjustable.



INITIAL LIMIT SWITCH INSTALLATION — for 51'-6" Boom at 45 degrees

1. Assemble switch on its bracket with dimension "A" at .90 inches and rod lever extending 3 inches from trip shaft — see View A.
2. Locate bracket on boom at dimensions given, and tack weld it in place.
3. Layout position of actuating angle on yoke block.
4. Position handle/dipper as described in steps 1 and 2 under Limit Adjustment.
5. Locate actuating angle on yoke block so it contacts switch rod lever as shown in View A, and tack weld it in place.
6. Lower dipper and move switch down on its bracket so dimension "A" is 1-5/16 inches.
7. Raise dipper until switch is tripped. There should be a minimum of about 12 inches between bail sheaves and boom point sheaves.
8. Adjust position of either the actuating angle on yoke block or the switch bracket on boom as required to obtain this initial setting, or a close proximity to it.
9. Weld bracket to boom and angle to yoke block, using 1/8 inch fillet welds. Fill bevel joint at front of switch bracket between boom with weld. Do not overweld.
10. Final adjust limit switch as described under Limit Adjustment.



LIMIT ADJUSTMENT — For 51'-6" Boom at 45 degrees

1. Position handle in yoke block so there is 12-3/8 inches between its rear bumper and rear of yoke block. At this position, third tooth from rear of crowd rack on handle should be on centerline of shipper shaft pinions.



CAUTION: Final crowd out limit will be activated during this operation. If handle position described above cannot be obtained, contact your electrical maintenance personnel to reset or bypass limit. Extreme care must be exercised while operating crowd drive if crowd out limit is deactivated.

2. Hoist dipper until bail sheaves are 12 inches from boom point sheaves.
3. Hoist limit should trip at this point. If it does not, or if it trips too soon, loosen capscrews holding switch, and move it up or down on its bracket as required. Up will decrease distance between sheaves; down will increase it. Tighten capscrews. Dimension "A" should be about 1-5/16 inches for proper limit setting.
4. Lower dipper and raise it again to check limit setting.

REINSTALLATION OF MAIN SWING SHAFT — Screw eyebolt into end of main shaft and attach suitable lifting cable. Shaft weight is 1,746 pounds. Assemble bearings and spacers on shaft and lower shaft thru opening in gear case cover. Install bearing retainer with new seal (lip toward bearing) and gasket.

Replace O-ring in swing pinion. Coat pinion on lip seal area with BEL RAY silicone valve seal. Jack pinion onto main shaft and secure with retainer. Wire lock retainer capscrews.

Reinstall drain pipe plug in shaft bearing housing. Reinstall pinion guard.

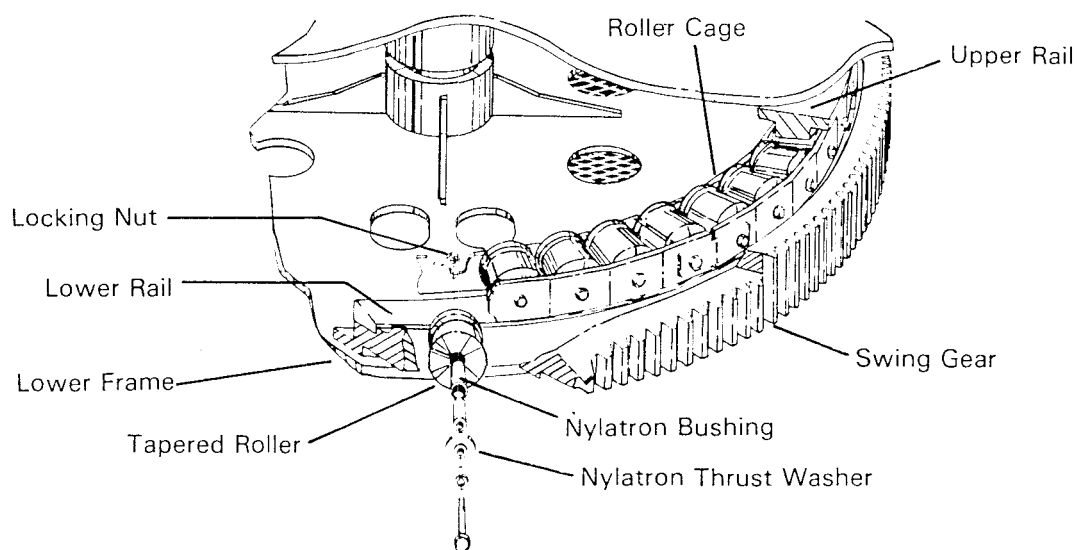
Reinstall drain pipe in bottom of gear case. Close globe drain valve and fill gear case with 190 gallons of gear lube. Check oil level on gauge on side of gear case.

THE ROLLER CIRCLE AND RAILS WITH THE MAIN ROTATING (SWING) GEAR support the rotating frame and machinery deck, plus front end equipment.

THE ROLLER CIRCLE consists of 45, 9 inch (228.6 mm) hardened steel, single flanged rollers. This is a thrust bearing composed of tapered rollers held in position by inner and outer circular cages and thru pins.

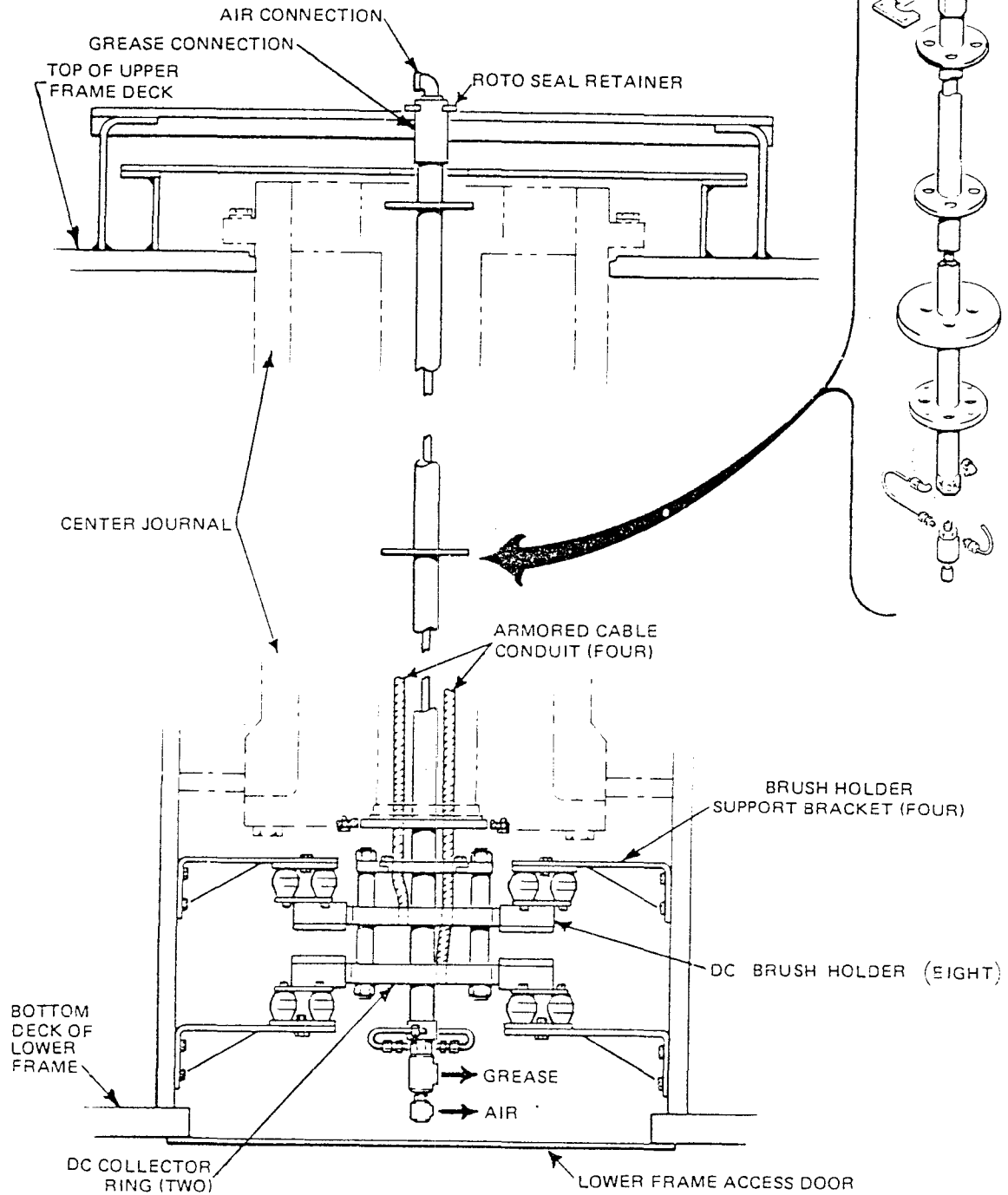
Normal operation provides smooth rotation of the upper frame about the center journal with respect to the lower frame. The thrust load imposed on the roller(s) is resolved thru the flange(s) to the rail(s).

The roller circle rides on the lower rail.





DANGER: High voltage in this area. DISCONNECT electrical power to machine BEFORE removing protective guards and entering this area for any reason.



DANGER: DISCONNECT ELECTRICAL POWER PRIOR TO ENTERING LOWER FRAME

ROTO SEAL ASSEMBLY

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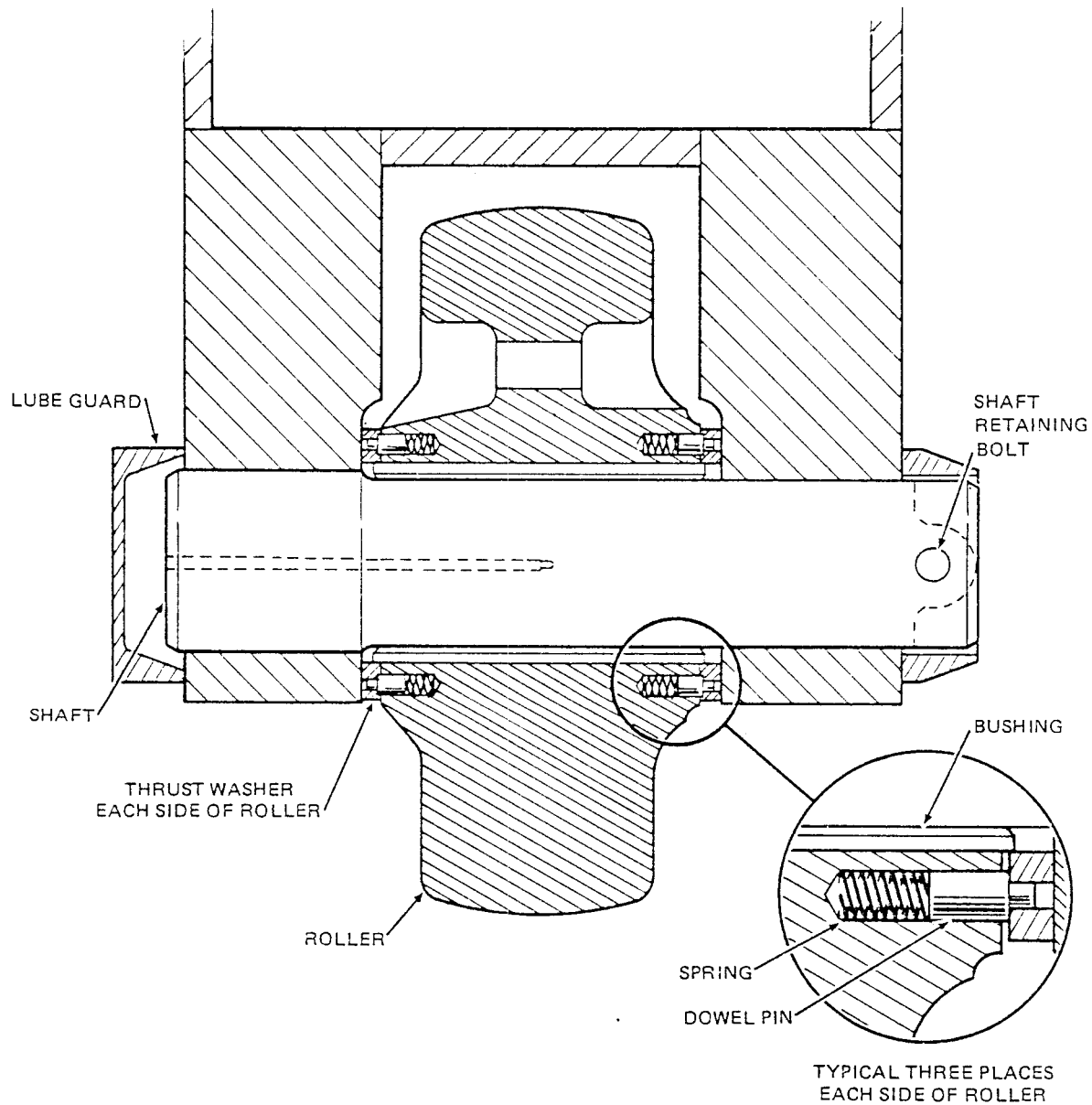


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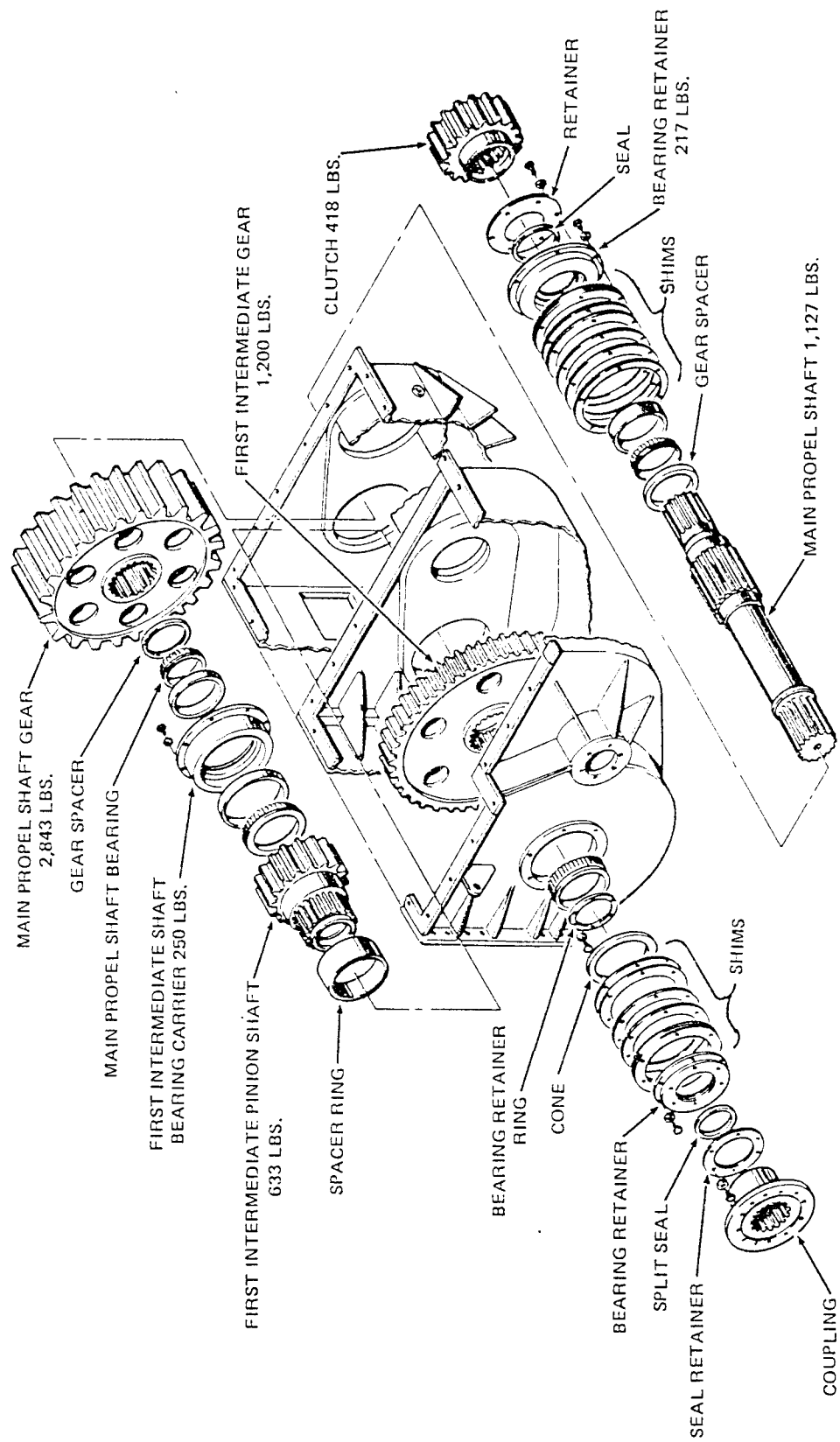
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jacks to raise roller into position, aligned with shaft bore. After thrust washers have been started between side frame bosses, remove clamp(s) holding thrust washers.

Insert roller shaft, small end first, from outside of frame. Install shaft retaining bolt and assemble lube piping and guard. Fill roller bushing with grease. Reconnect crawler belt and adjust belt tension. See tension adjustment procedure in this manual section.



LOAD ROLLER INSTALLATION DETAILS



PROPEL GEAR CASE
 (Sheet 2 of 2)

To convert from English measurements to Metric units —

ENGLISH	MULTIPLY X	METRIC
Inch	25.4	Millimeters
Feet	0.3048	Meters
Pounds (Mass/Weight)	0.454	Kilograms
Pounds (Force)	4.448	Newtons
Pounds Per Sq. In.	6.894	Kilopascals
Feet Per Minute	5.08×10^{-3}	Meters Per Second
Foot Pounds/Torque	1.355	Newton Meters
U.S. Gallons	3.785	Liters

TROUBLE SHOOTING GUIDE FOR AIR COMPRESSOR

A. **CONDITION:** Excessive noise.

CAUSE: Loose flywheel or motor pulley.

REMEDY: Tighten.

CAUSE: Loose valve.

REMEDY: Inspect valve for damage and tighten valve, both plug and cover.

CAUSE: If noisy only during starting check for loose belts.

REMEDY: Tighten until no slippage is apparent, allowing some slack.

CAUSE: Vibration of belt guard, piping or loose components.

REMEDY: Tighten.

CAUSE: Intercooler or aftercooler tubes out of place or not clamped securely.

REMEDY: Position properly and clamp tightly.

CAUSE: Improper level and grade of oil in crankcase.

REMEDY: See Lubrication of Compressor in this section.

CAUSE: Carbon or other foreign material on piston head.

REMEDY: Clean off piston tops. Inspect and clean valves.

CAUSE: Excessive motor or compressor shaft end play.

REMEDY: Check pulley or flywheel for lateral movement.

REMEDY: Read Item No. 1. Change oil frequently — avoid cylinder rusting and ring wear.

O. **CONDITION:** Excessive water in the air receiver or tank.

CAUSE: Condensation in the air receiver.

REMEDY: This is the natural result of compressing air and is not due to faulty equipment. This condition can be corrected by draining the air receiver daily.

P. **CONDITION:** Unloader pilot chatters or does not operate properly.

CAUSE: Dirt on screen in lower end of body.

REMEDY: Clean and repair as necessary.

CAUSE: Valve disc of the damaged valve seat will cause the pilot valve to chatter.

REMEDY: Replace pilot or parts. See Service Bulletin 31.101.

CAUSE: Pilot is at the bottom of the air receiver.

REMEDY: Install pilot valve in the center of the tank to prevent contaminants from clogging the valve.

Q. **CONDITION:** Unloader mechanism in the intake valves chatter or air pressure drops even though no air is being used. See "Automatic Unloader" under "Operation."

CAUSE: Broken or bent forks in compressor unloader mechanisms doesn't unload the compressor, although pilot is operating.

REMEDY: Repair or replace as necessary.

CAUSE: Dirt, chips or damaged valve plunger.

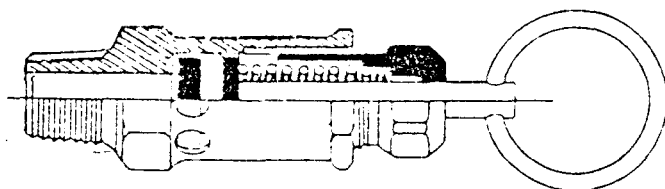
REMEDY: Clean and repair as necessary.

The domed end plate is disassembled by completely removing the locking screw and pulling the valve lever out of the end plate. The valve lever is located under the cover plate.

To assemble the CPR reverse the disassembly procedure. Coat the inside of the ball cup assembly and the ball cage with the crankcase oil. Heavy grease will retard the action of the CPR and should not be used.

On several compressors an adapter casting known as a pressure release housing is installed between the (CPR) and the crankcase. It is essential that the oil port for lubricating the (CPR) mechanism be pointing toward the bottom of the crankcase.

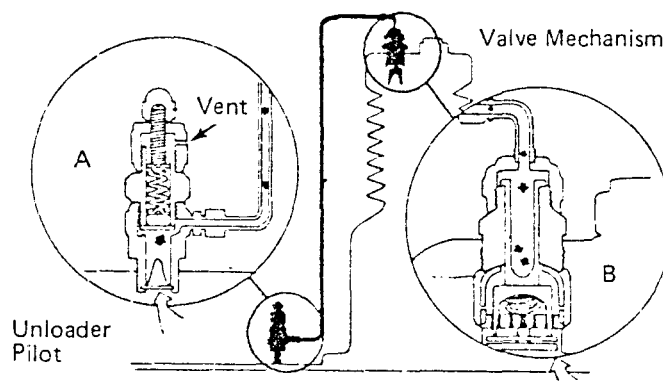
SAFETY VALVES — Safety valves on air receivers are set at the factory to a pressure approximately 15 lbs. higher than the rated pressure of the outfit to protect the air receiver against excessive pressure.



The safety valve is set at 50 to 55 lbs. on each innercooler casting. The valves serve to protect and prevent excess pressure from building up inside the innercooler. A heavy accumulation of carbon in the innercooler or possibly a carboned or leaking valve assembly in the compressor head will cause frequent popping of the safety valve. The reason for "popping" is usually not the fault of the safety valve.

AUTOMATIC UNLOADER — Compressors with unloaders can run constantly and maintain air pressure within set limits. The compression is removed when maximum desired pressure is achieved and the compression is automatically resumed when the minimum desired pressure is reached.

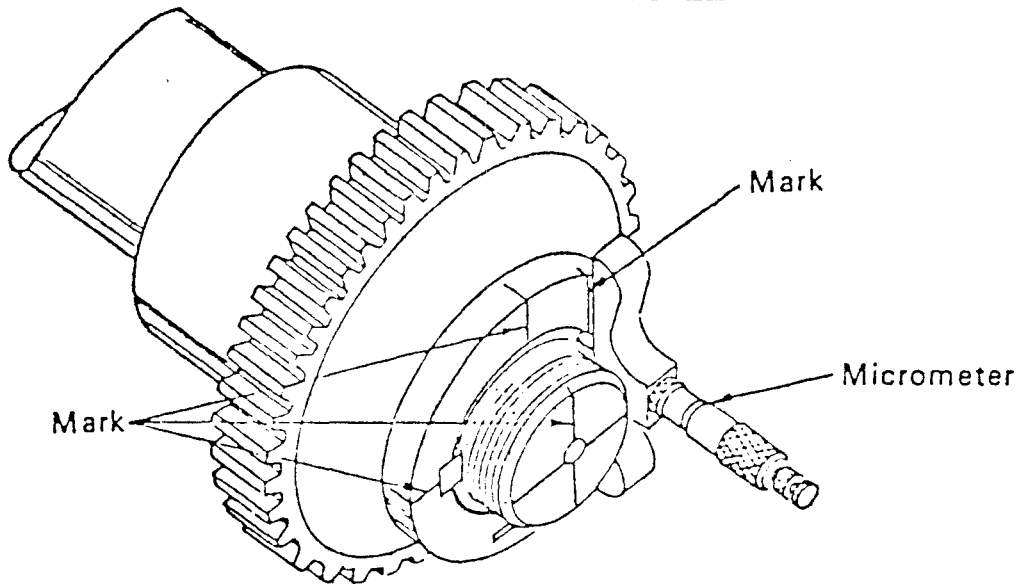
The automatic unloader is used when frequent starts and stops are impractical as with a gasoline engine or when air receiver capacity is so small, as with portable compressor outfits.



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SHRINK FIT MOUNTING DATA



All Dimensions in Inches

MOUNTING PINION

Motor Shaft Diam.	Motor Frame Size		Pinion Advance in Inches	Estimated Temperature Difference	
	600 Series	800 Series		Degrees Cent.	Degrees Fahr.
1-3/4	600	802	0.011 to 0.014	70	126
2	603	803	0.013 to 0.018	70	126
2	604	804	0.013 to 0.018	70	126
2-1/2	606	806	0.017 to 0.022	70	126
3	608	808	0.020 to 0.025	70	126
3-1/4	610	810	0.027 to 0.032	80	144
3 5/8	612	812	0.037 to 0.045	95	171
4-1/4	614	814	0.045 to 0.055	100	180
4-5/8	616	816	0.055 to 0.065	115	207
5	618	818	0.065 to 0.075	125	225

MOTOR COUPLING

Motor Frame Size	Coupling Advance in Inches	Temp. Diff.
602 802	.008 to .012	200° F
603 803	.009 to .013	200° F
604 804	.009 to .013	200° F
606 806	.011 to .015	200° F
608 808	.013 to .017	200° F
610 810	.014 to .018	200° F
612 812	.015 to .019	175° F
614 814	.017 to .021	175° F
616 816	.019 to .023	175° F
618 818	.020 to .024	175° F

GEAR MAINTENANCE PROCEDURES

OPERATION OF GEARS: After full load is applied, it is important to RECHECK tooth contact periodically during the first few hours of the running-in period. This determines the effect of any settling of foundations, initial bearing wear and assures proper lubrication. If minor adjustments are needed, follow procedures outlined on these pages for checking tooth contact during installation for final inspection and readjustments.

If conditions are satisfactory after the first operating week, make general inspections and observations every week to assure an adequate film of lube on pinion and gear teeth. Since some lube squeezes or wipes off contact areas, CHECK working areas of the teeth for adequate lube, not just general appearance of pinion and gear.

INSPECTION OF GEAR SPLITS: Check split ring gears after ONE month of operation. Make certain the two halves HOLD TIGHTLY TOGETHER AT THE SPLITS.

HANDLING: If it becomes necessary to dismantle the drive for any reason, USE GREAT CARE in handling the pinion and gear. Prevent damage to teeth. Protect teeth by placing wooden planks between chain and cable and ends of gear teeth when lifting with a crane. When placing the gear or pinion on the floor, use wooden planks or blocks to avoid tooth damage.

PINION REPLACEMENT: Installing a NEW pinion to mesh with a USED gear is difficult. Aligning pinion to suit the wear or contact pattern on the working face of the gear teeth is the problem. Therefore, the alignment of a NEW pinion is usually a CUT and TRY procedure.

The important steps in the installation and alignment of a replacement are: CAREFULLY inspect ALL teeth on the gear for possible burrs, ridges or high spots. File or grind these below the normal tooth curvatures to eliminate high load concentration. This only causes tooth surface distress or noisy operation.

ALIGN the pinion to the gear following the procedures outlined in these pages to obtain the BEST possible contact pattern on the loaded side of the gear teeth.

The **RIGHT WAY TO RECOIL**, after wire rope has been used, is in the direction of its lay. A Good Rule Here requires looking down at the rope on the floor, then coil right-lay rope clockwise and coil left-lay rope counter-clockwise. It is not difficult to determine when wire rope is being coiled in the **WRONG** direction; it soon becomes lively and hard to handle.

The **WRONG WAY TO UNCOIL WIRE ROPE** is when coil is placed on floor and uncoiled by pulling it straight off. Spirals and kinks occur. Torsions put into rope at every loop pulled off cause rope twists and makes hard to handle. Also wire rope cannot be uncoiled like hemp rope. Pulling one end thru the middle only results in severe kinking.

Once wire rope is improperly uncoiled, it is a waste of time to try to run out the kinks by twisting with one end loose on the floor. Once kinked, the rope is ruined in the area of the kink.

KINKS are places where the rope has been bent to a permanent set. Great stress has been placed on the care to take and avoid these kinks in wire rope. Loops of small diameter where rope is pulled, bending a rope around a sheave where radius is wrong and sharp objects are the general causes. No amount of restraightening will restore the wire where the kink has occurred. Normal service of this kinked wire cannot be expected, it has been permanently damaged thru lack of caution.

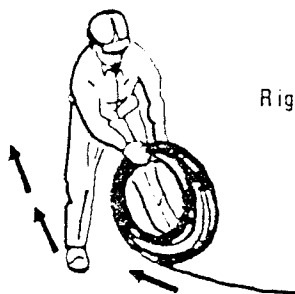
Information for these instructions and cautions obtained from MPSD CI-897.



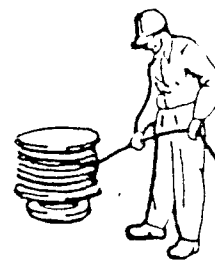
Wrong Way



Wrong Way



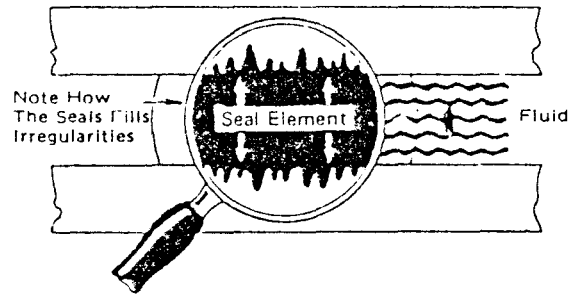
Right Way



Right Way

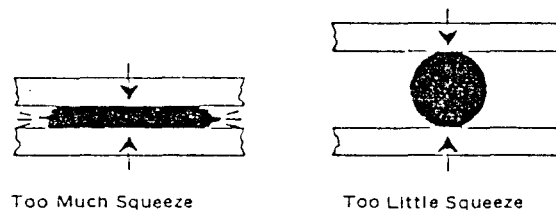
O-RING GUIDE

The dilemma of how to identify an O-ring generally derives from the question; "Is it a gasket, seal or packing?" Hence the confusion. One solution is to rely on the part number. Much like a Social Security number, it identifies even though the name may be confusing. If the part number (Social Security number) is correct, the name doesn't complicate the issue. Chasing down a part number takes a bit longer, but in the end; it is well worth it.

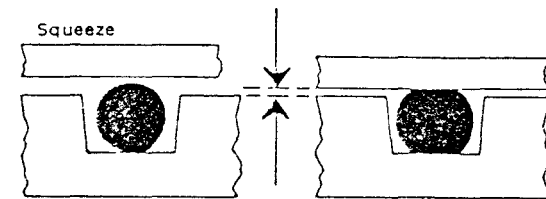


An O-ring's function is to confine and prevent passage of liquids and gasses under pressure from the part or joint. Perhaps simply stated; an O-ring closes off a passage to prevent loss or escape of fluid or gas.

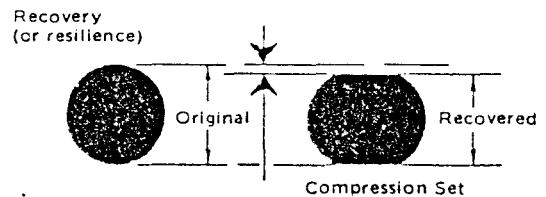
One basic principle of O-rings is compression under load to fill the machined surfaces in mating metal to block off fluid flow. Truly effective O-rings fill surface irregularities and maintain this ability. This is done in the following manners:



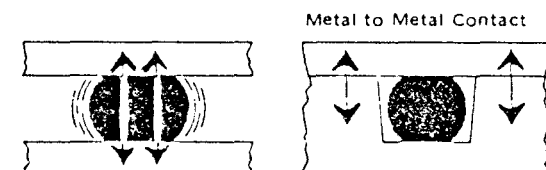
SQUEEZE is the ability of distortion while still blocking a passage. This does not mean **CRUSH**. Effective and usable squeeze is considered as from 12 to 35 percent. Insufficient squeeze causes leaks, almost always at low temperatures. Too much squeeze outright destroys the O-ring or causes it to cold flow to a premature set.

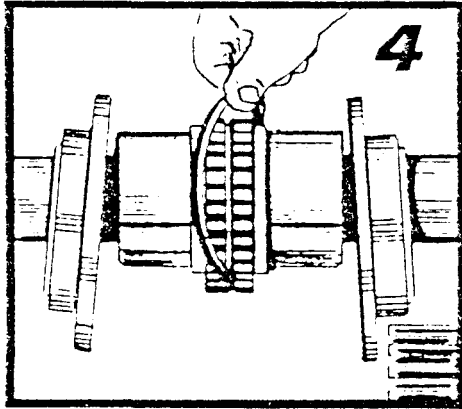


RECOVERY (or resilience) describes an O-ring acting as a surging spring over long periods. Failure to recover after deformation is called compression set.



METAL to METAL contact is vital in creating correct squeeze while preventing destruction. A well designed seal transmits torquing loads thru the metal **NOT** the O-ring.

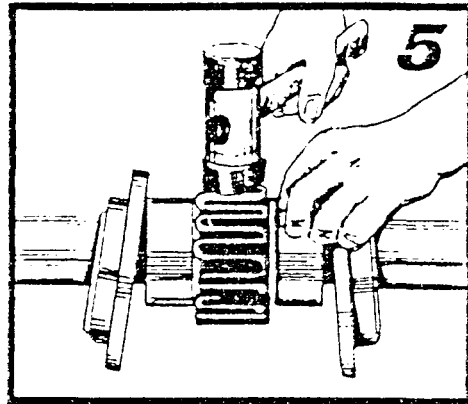




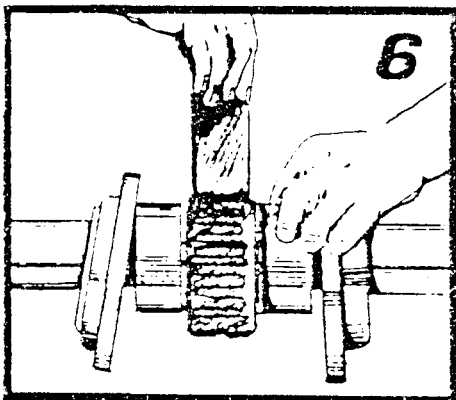
4. Once aligned, carefully insert gasket between hubs and hang it on either hub. **DO NOT DAMAGE** gasket. Force as much lube as possible into gap and gridmember grooves.

5. Insert gridmember. Coupling sizes 3 thru 11 use a single layer grid, painted aluminum. Size 12 thru 190 use a two layer grid with the inner layer painted aluminum and stamped IN while the outer layer is painted bronze and stamped OUT.

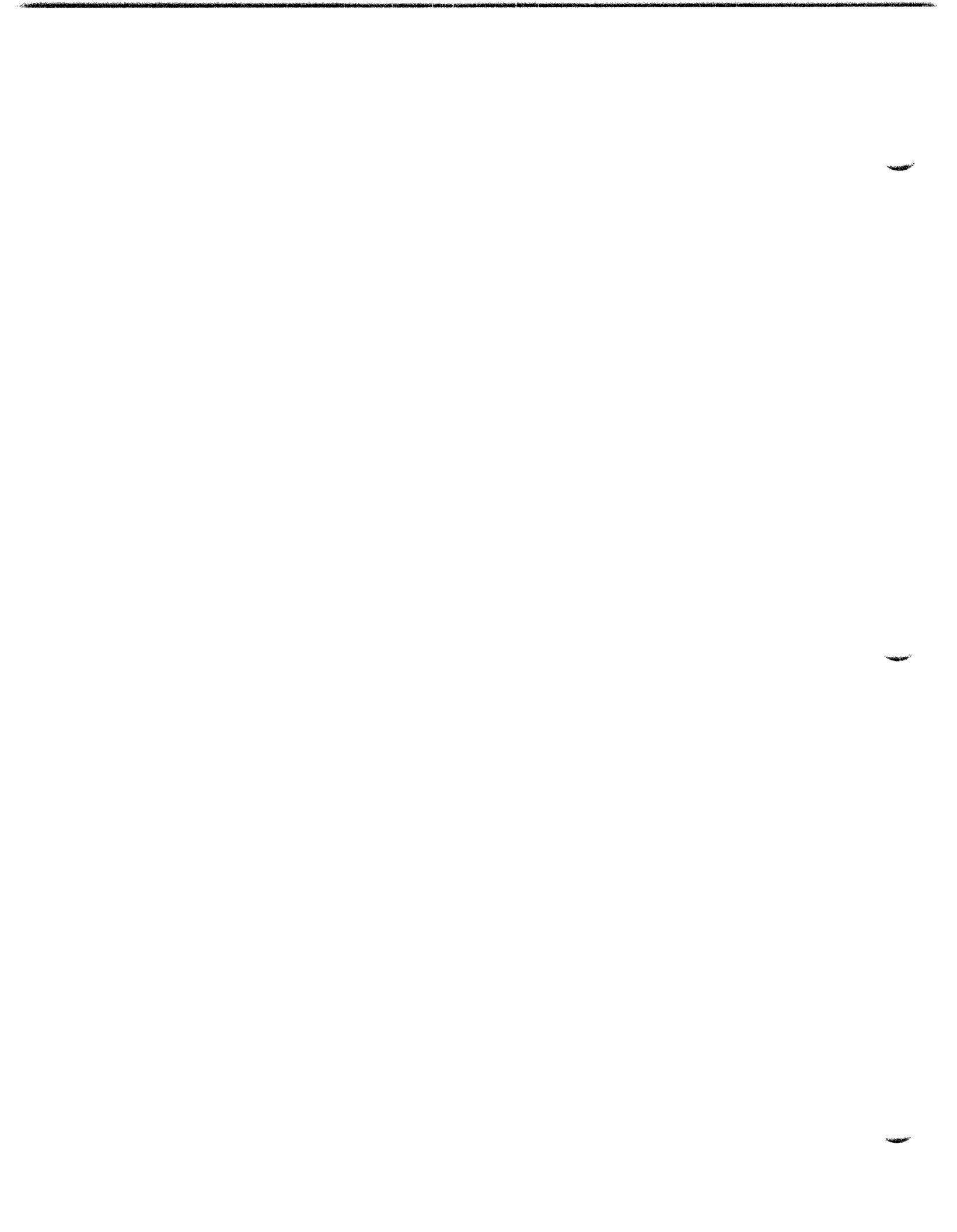
Installation — Gridmember rungs, truly radial, need spreading slightly to pass over coupling tooth at its O.D. To do this with minimum spreading, start grid at either end and tap rungs only part way into grooves. Once all rungs are partially into respective grooves, tap grid all the way in. When installing a two layer grid, center the outer layer sections over free ends of inner layer.

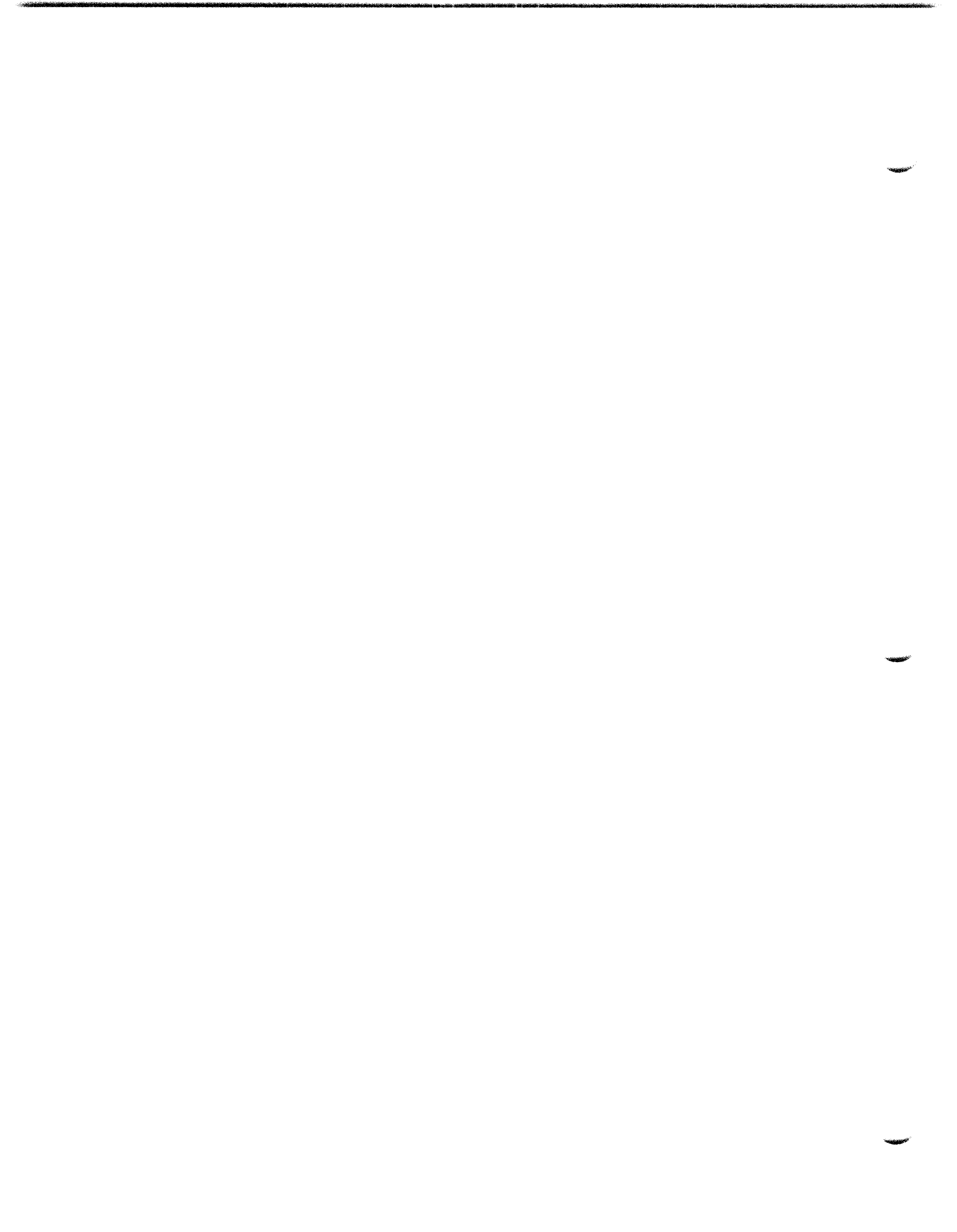


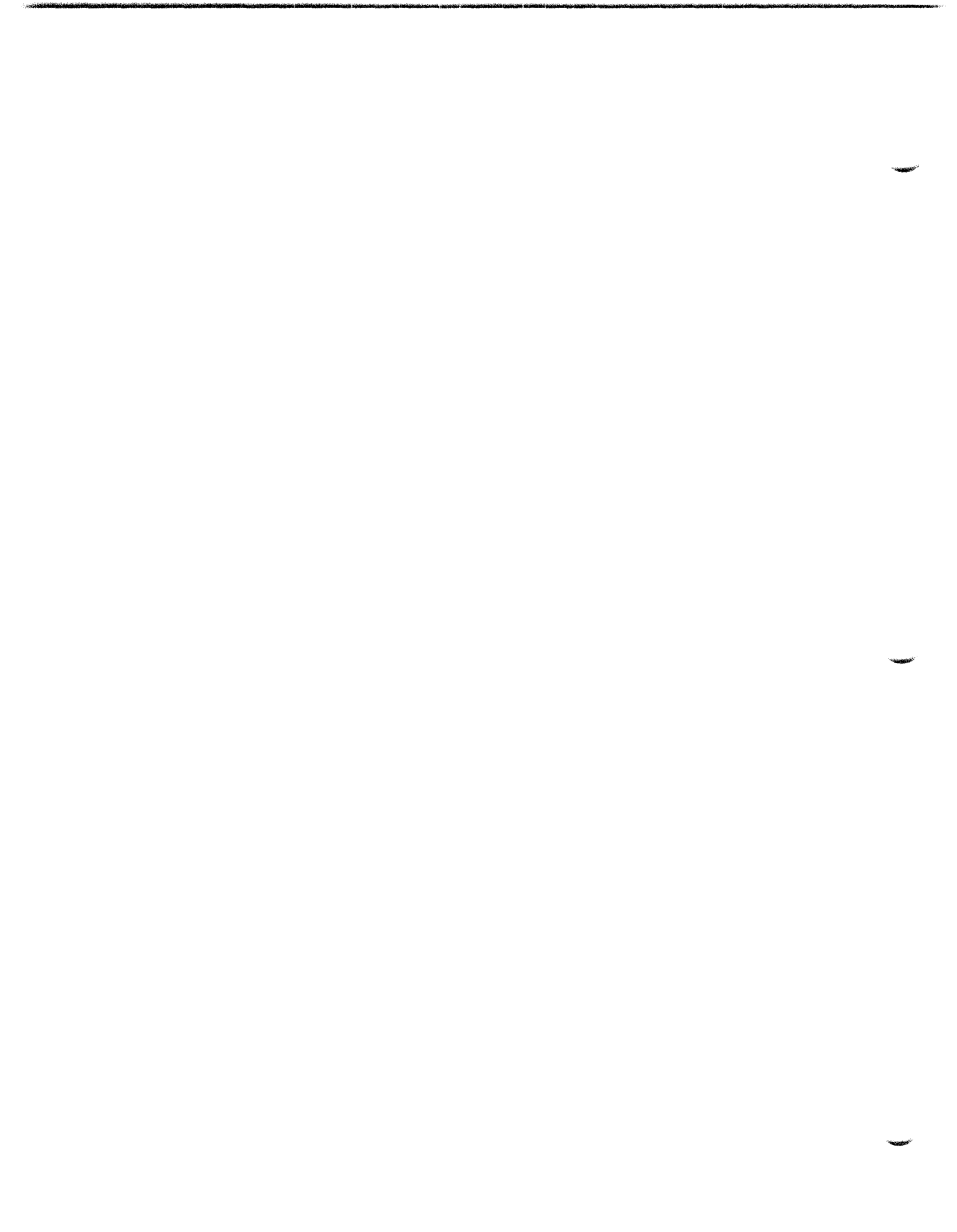
Removal — A round rod or screwdriver of a size to easily fit into open loop ends of grid is all that's needed. Begin at open end of grid section and insert rod into loop ends. Use next tooth as a pry point and pry grid out radially, in **EVEN** and gradual stages. Proceed alternately from side to side, lifting grid about halfway out until end of grid is reached. By repeating same steps again, grid clears teeth.

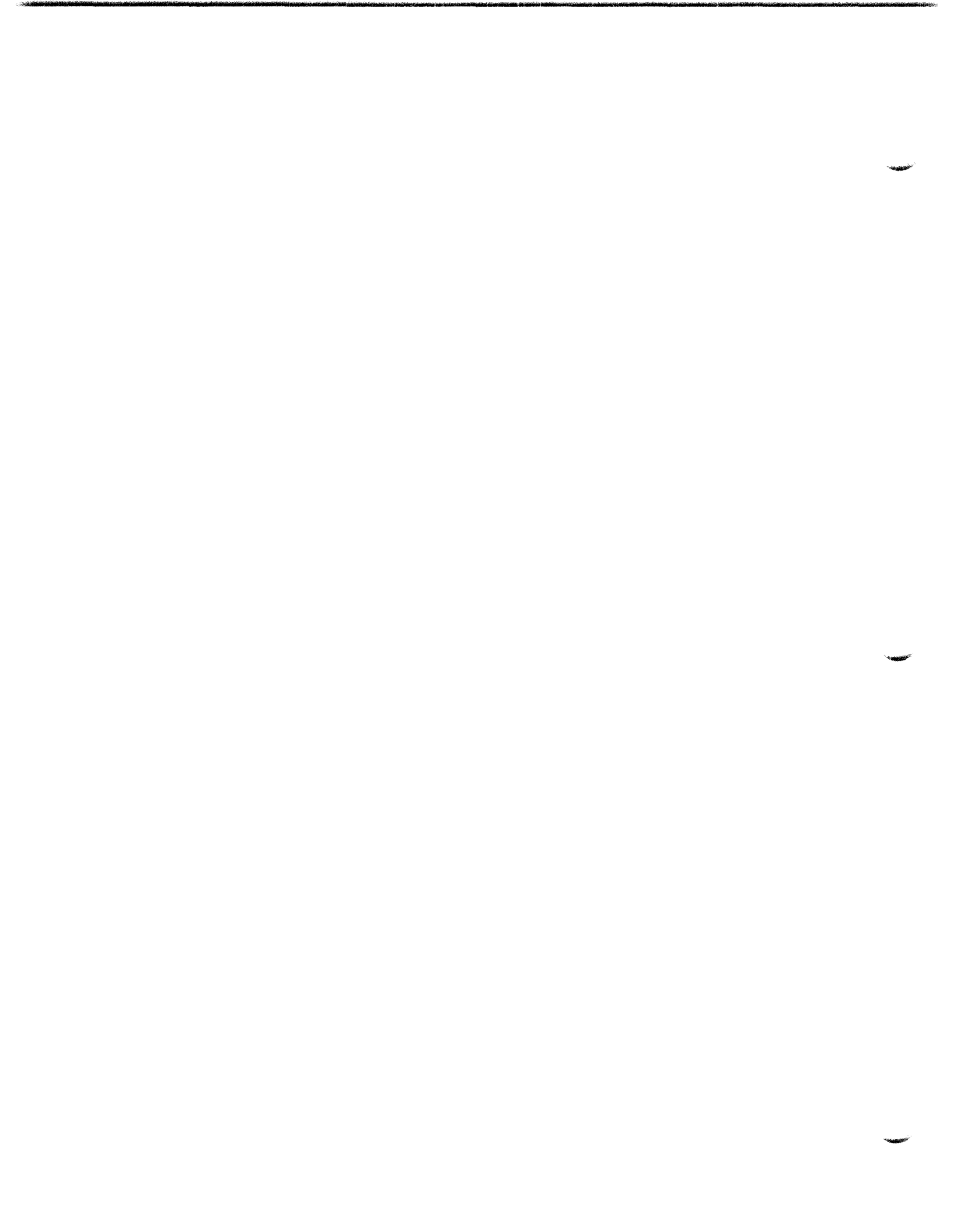


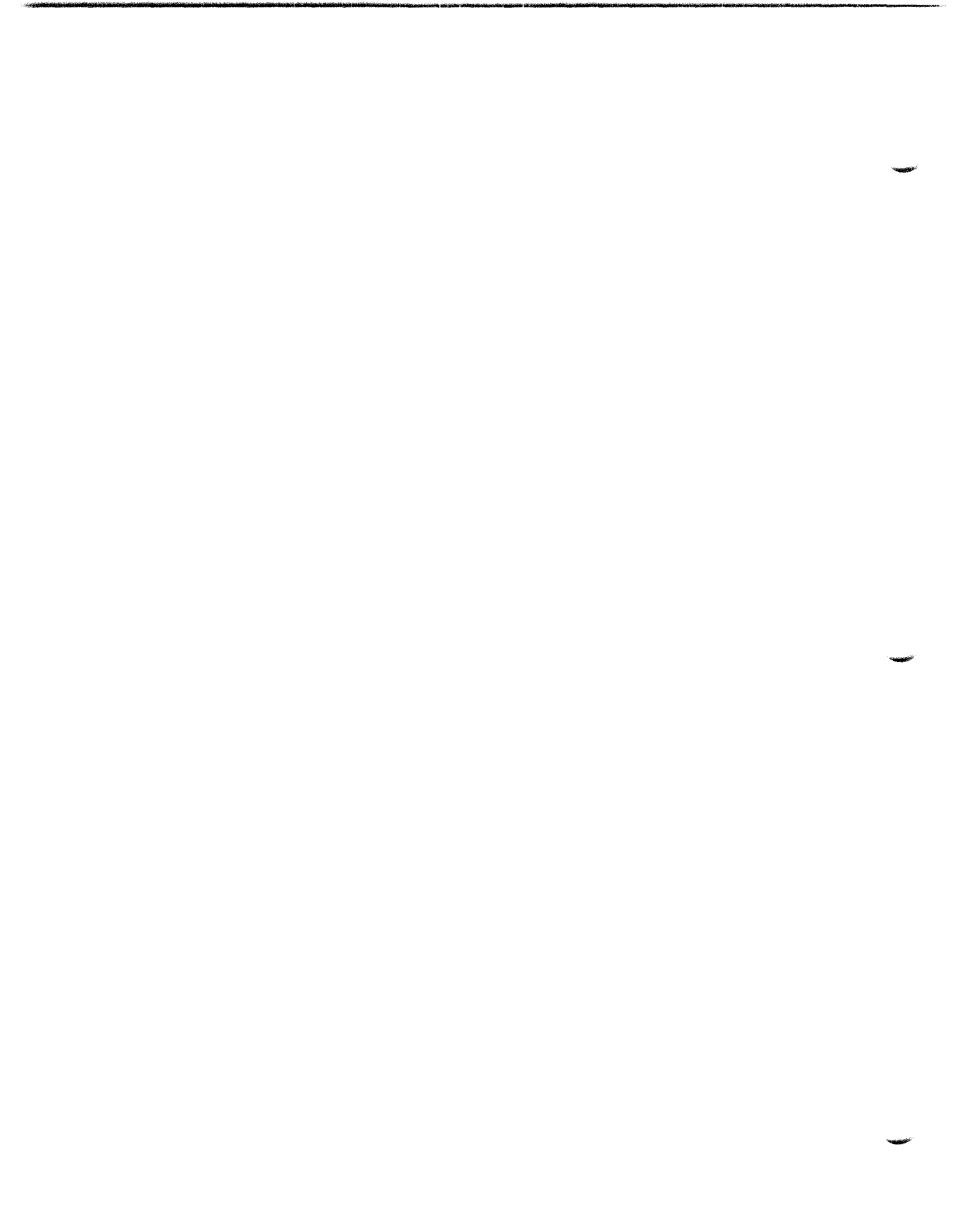
6. Pack spaces between and around grid with as much lube as possible. Scrape or wipe excess lube off flush with grid. Lightly oil hubs to ease sliding covers onto hubs.

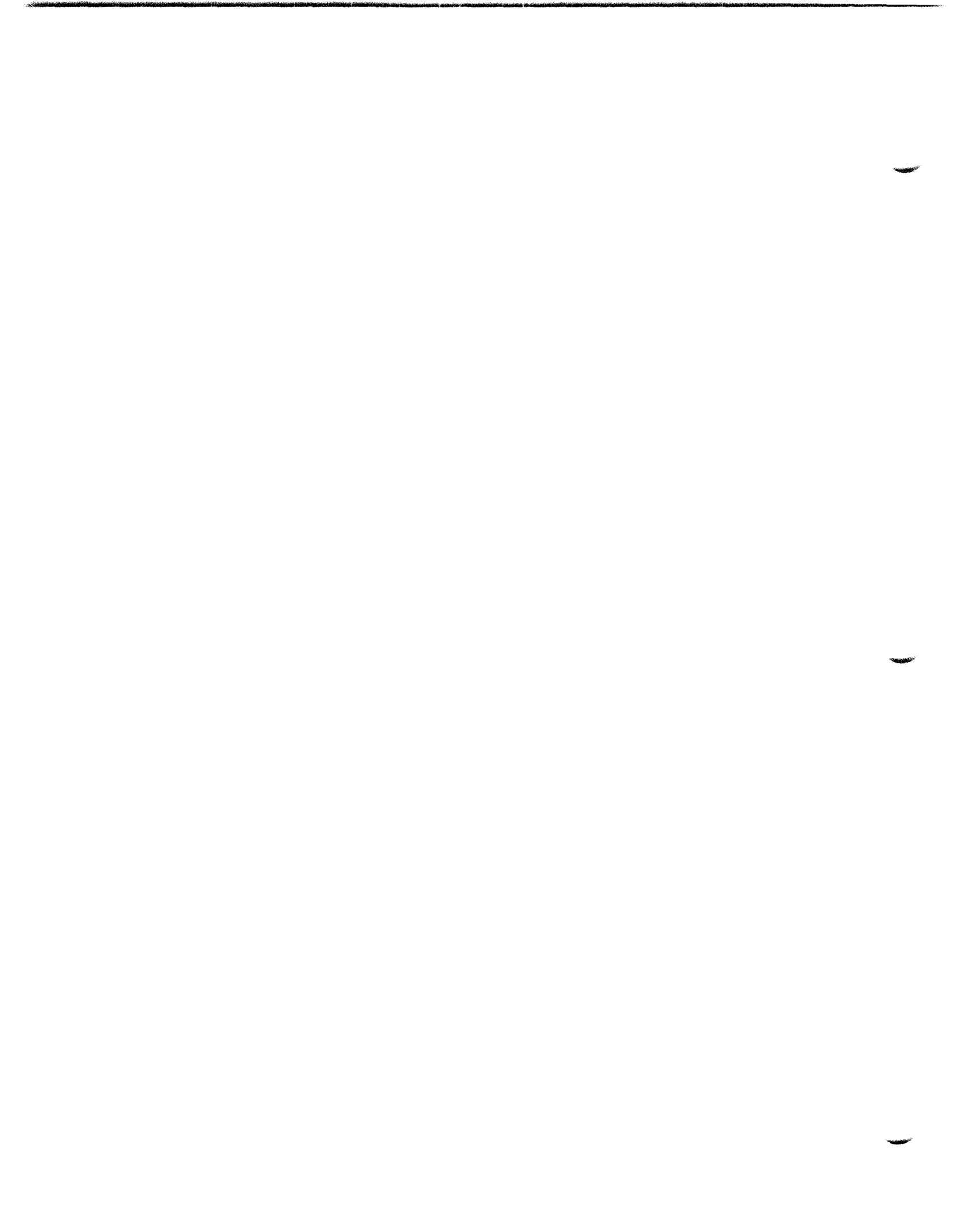












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