



# Technical Manual

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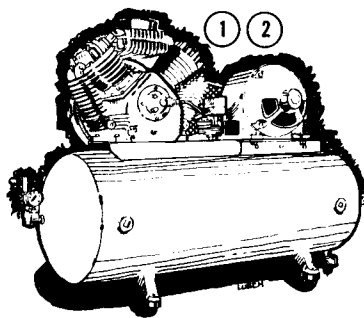
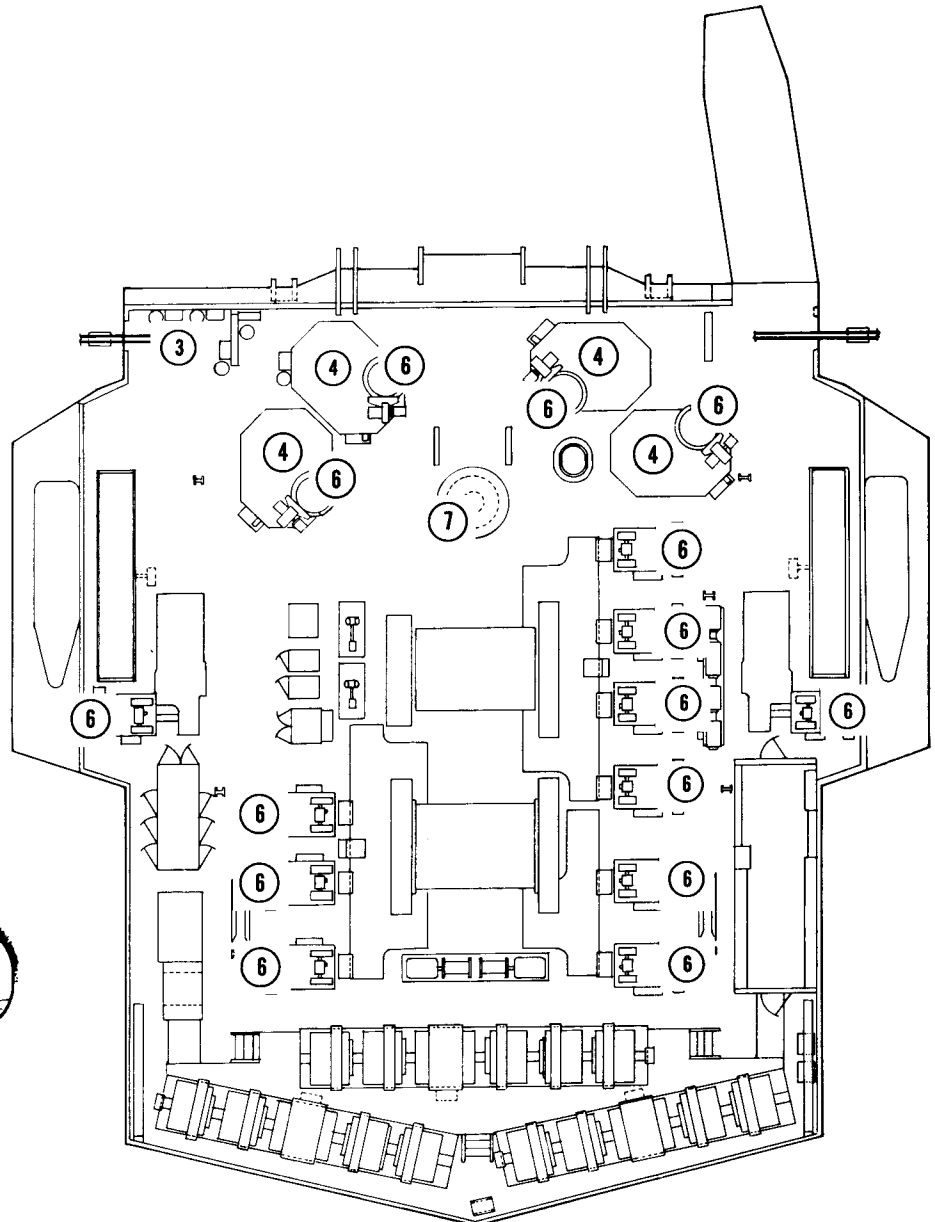
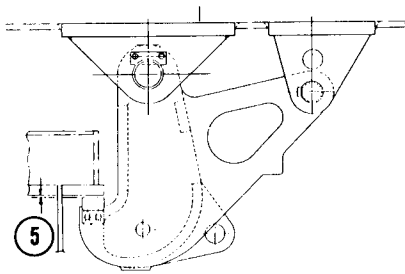
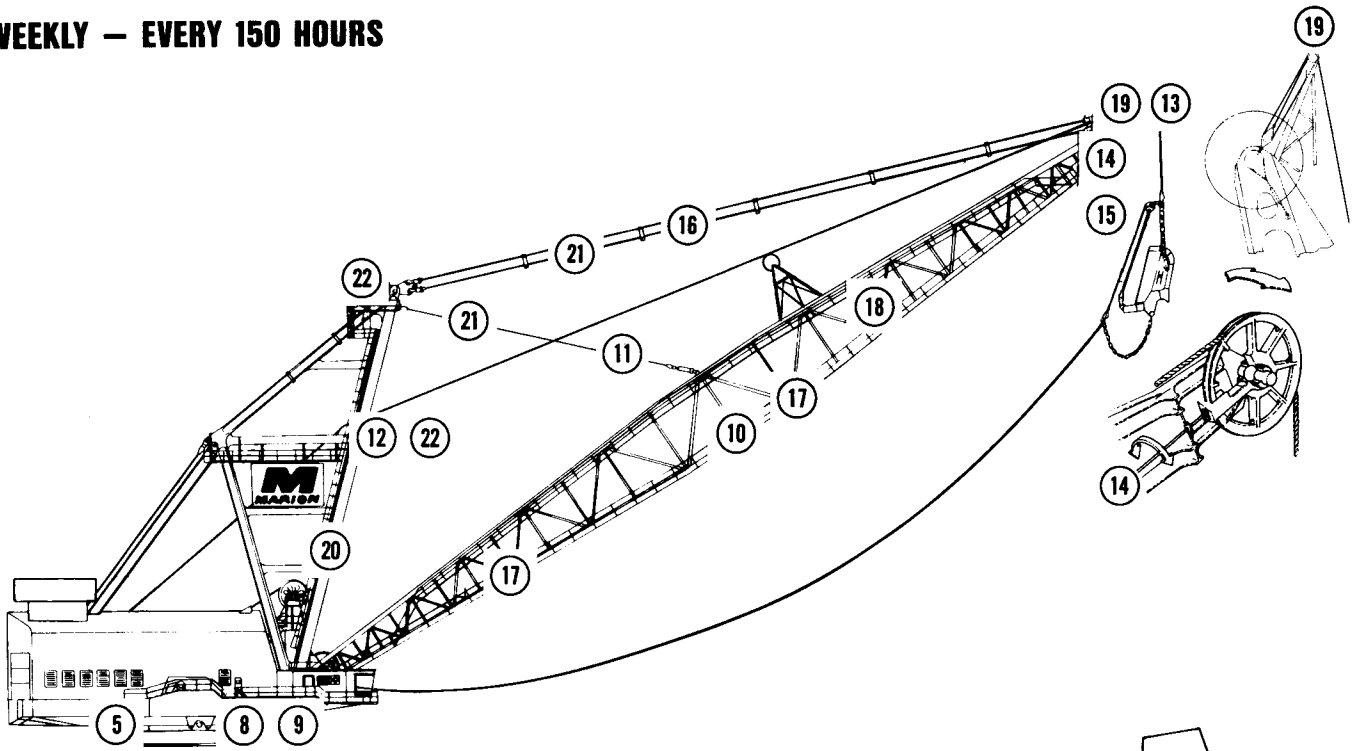
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WEEKLY — EVERY 150 HOURS



**25,000 HOUR MAINTENANCE INSPECTION SCHEDULE**  
**OPERATIONAL CHECK POINTS**  
**SEMI-ANNUAL—EVERY 3,600 HOURS**

MACHINE IDENTIFICATION			
MODEL	S/N		
SHIFT	1	2	3
OPERATOR			
INSPECTOR			

DESCRIPTION	STATUS		ACTION / REMARKS
	YES	NO	
1. Enclosed Gear Cases	<input type="checkbox"/>	<input type="checkbox"/>	Open all cases and inspect condition of all gears, teeth and shafts.
2. Open Gear Systems	<input type="checkbox"/>	<input type="checkbox"/>	Clean thoroughly — dye check root sections.
3. Gear Segments	<input type="checkbox"/>	<input type="checkbox"/>	Clean thoroughly — dye check all welded joints.
4. Motor Couplings	<input type="checkbox"/>	<input type="checkbox"/>	Inspect for lubrication.
5. Propel Coupling	<input type="checkbox"/>	<input type="checkbox"/>	Inspect for fit and spline wear.
6. Hoist and Drag Drum Ends and Barrels	<input type="checkbox"/>	<input type="checkbox"/>	Clean thoroughly to locate any cracks and repair as required.
7. Walking Arms and Eccentrics	<input type="checkbox"/>	<input type="checkbox"/>	Clean thoroughly to locate any cracks — repair as required.
8. Sheaves	<input type="checkbox"/>	<input type="checkbox"/>	Inspect all sheaves — identify candidates for replacement.
9. Hook Rail Flatness	<input type="checkbox"/>	<input type="checkbox"/>	Clean — measure and record.
10. Boom Support Rope	<input type="checkbox"/>	<input type="checkbox"/>	Remove socket dampener and lubricate.
11. Hoist Drum Shaft, Intermediate Hoist Drum Shaft, Drag Drum Shaft, Intermediate Drag Drum Shaft and Main Propel Drive Pinion Shaft	<input type="checkbox"/>	<input type="checkbox"/>	Inspect fit of bearing housing pins to pedestals at each shaft.

**Electrical Maintenance**  **Danger — Disconnect Power**

12. High Voltage Collector Ring Assembly	<input type="checkbox"/>	<input type="checkbox"/>	Check general condition by <u>qualified and licensed electrician.</u>
13. Motor Generator Set	<input type="checkbox"/>	<input type="checkbox"/>	Megger check wiring/insulation integrity by <u>qualified and licensed electrician.</u>
14. Synchronous Motors	<input type="checkbox"/>	<input type="checkbox"/>	Megger check ground continuity by <u>qualified and licensed electrician.</u>

## SAFETY PRECAUTIONS



This safety alert symbol is used here and throughout this manual to call your attention to instructions concerning your personal safety. Carefully read and follow these instructions and observe all safety and danger, and caution graphics mounted on various areas of the machine.

Be certain anyone servicing this machine is aware of these SAFETY PRECAUTIONS. In the event you question your ability to safely perform any of the enclosed maintenance and operational procedures contact your regional Marion service representative or the factory.

The following defines distinctions between safety instructions. In all these definitions the safety alert signal is used.



**DANGER:** Denotes extreme intrinsic hazard which exists and could result in high probability of death or irreparable injury if proper precautions are ignored.



**CAUTION:** Denotes a reminder of safety practices or directs attention to unsafe practices which could result in personal injury if proper precautions are ignored.

An example of a safety alert symbol and special safety instructions is shown below.



**DANGER:** Inherent danger exists in the operation of any high voltage electrical equipment. A safe grounding system includes ground conductors in the power cable, a neutral grounding resistor and related relays and switchgear. A ground continuity check system is required by law in many parts of the world.

Operating, maintaining or servicing this machine can be dangerous unless performed properly. Each person must satisfy himself and his employer that he is alert and has the necessary skill and information, proper tools and equipment, and all methods are safe and correct. Factory service representatives and specialists are available to provide additional information or technical assistance.

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Operating the Walking Mechanism .....	2–19
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Typical Partial Shutdown .....	2–21
Completely Shutdown .....	2–21

18. Rope Limit Light indicates that bucket has either entered a final hoist or drag limit position or is in a final tightline limit. This warning will also include an audible alarm.
19. Limitrol Fault Light (Marion Programmable System) indicates that the electronic rope limit control system self-diagnostic feature has detected a malfunction in one of the central processing units (CPU) of this control.
20. Brake Set Light indicates that one of the motion brakes is not fully released.
21. Left Shoe Pushbutton. Pressing this button will display the left shoe position in degrees of rotation from top dead center (TDC).
22. Right Shoe Pushbutton. Pressing this button will display the right shoe position in degrees of rotation from top dead center (TDC).
23. Shoe Error Pushbutton. Displays left/right shoe position error in degrees.
24. Hoist Drum Pushbutton. Displays distance of bucket from boom point in feet.
25. Drag Drum Pushbutton. Displays distance of bucket from fairlead in feet.
26. Limit Bypass Pushbutton. This button is used to back out of a final hoist, drag or tightline limit.
27. Lamp Test Pushbutton. Operate to check all warning lights on panel. Replace burned out lamps prior to operating machine.
28. Alarm Silence Pushbutton. Operate to shut off audible alarm. Warning light will remain on until malfunction has been corrected.
- 29,30 Hoist and Drag Zero Set Pushbuttons are used to calibrate the rope limit control system. See Marion Programmable System operations manual for details.
31. L.E.D. three digit display for items 21 thru 25.

NOTES:

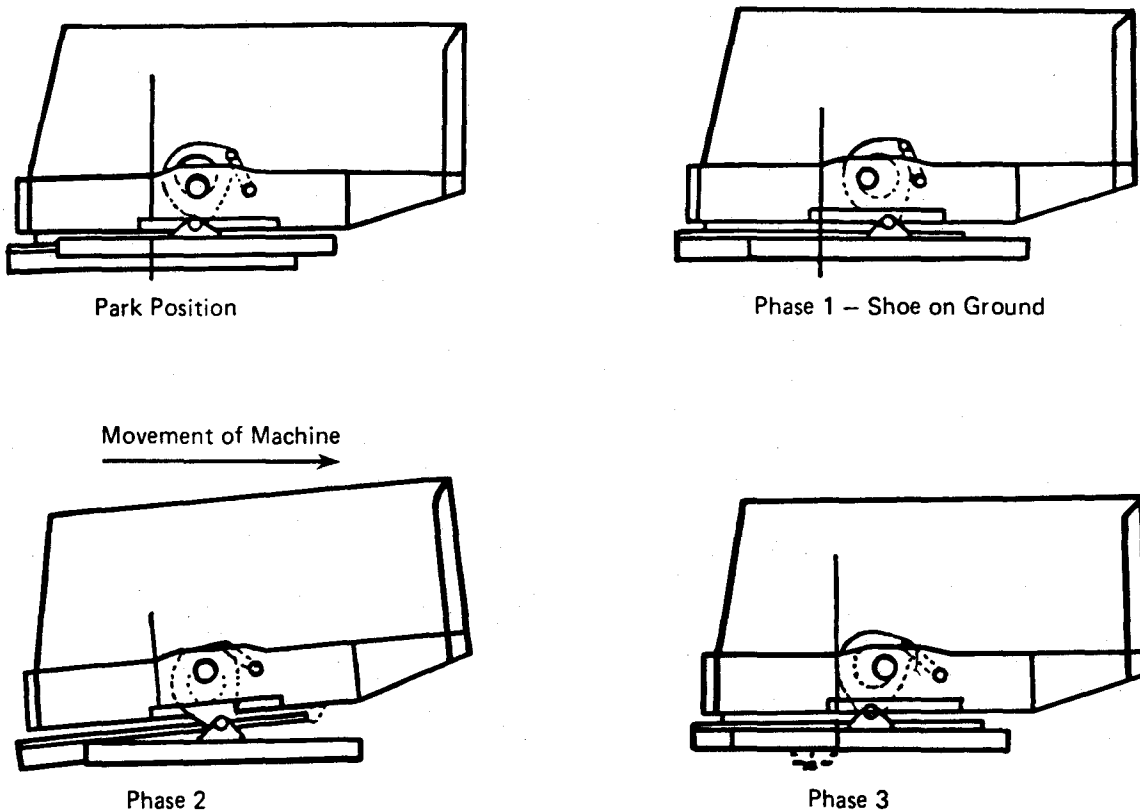
The shoes may be automatically stopped in PARK position in the following manner:

When the shoes leave the ground after the last desired step, press the SHOE PARK push button and hold until the shoes reach the PARK position. The brakes automatically set and the drag controller de-energizes. While holding the SHOE PARK push button depressed, move the drag-propel brake selector switch to SET and return the master switch to neutral.

The propel machinery can be moved in either forward (normal) or reverse direction. The selsyn position indicators located in the operator's cab, on warning panel, show the position of each mechanism on a dial.

If at any time the walking mechanism is not synchronized, the propel error warning light on warning panel will light up. To synchronize mechanism the propel error bypass push button, on drag stand, is used to override the synchronization circuit. The shoes are then realigned for parking.

**WALKING MACHINERY** – Two propel machine assemblies are located at each machine side. These assemblies operate independently except for an electrical (selsyn) connection that synchronizes the walking step.



CODE	NAME	DESCRIPTION
OGL	Open Gear Lubricants	<p>2. Type H is usually an asphaltic type product requiring heat or a diluent for application. Diluents used in solvent cut-back products must have a fast evaporation rate and be non-flammable. They must not show separation in storage or service and should be suitable for use in automatic dispensing systems at low ambient temperatures.</p> <p>USES – Open gears.</p>
EO	Engine Crankcase	<p>Diesel engine crankcase oils may be one of two (2) viscosity grades, SAE 20-20W or 30.</p> <p>1. Oil suitable for use in Cummins Engines of at least MIL-L-2104A, Sup. 1 level.</p> <p>2. A qualified series 3 oil for use in Caterpillar Engines.</p>
MO	Motor Oil	<p>A rust and oxidation inhibited non-detergent motor oil suitable for use in DeVilbiss and/or Ingersoll Rand piston type reciprocal air compressor crankcase lubrication.</p>
HL	Hand Lubrication	<p>Use oil (MO) above or a general machine oil (S-SAE 30, W-SAE 20W).</p>
GL	Enclosed Gear Case	<p>Use the same weight oil throughout the year if possible. Use as viscous a product as possible for maximum gear life.</p> <p>Loading shovels and smaller machines of crawler type:</p> <p>1. Use GL-140 in lower frame propel gear cases and other gear cases outside machinery house.</p> <p>2. For gear cases inside machinery house in older machines where oil is pumped, use GL-90 in winter and GL-140 in summer.</p>

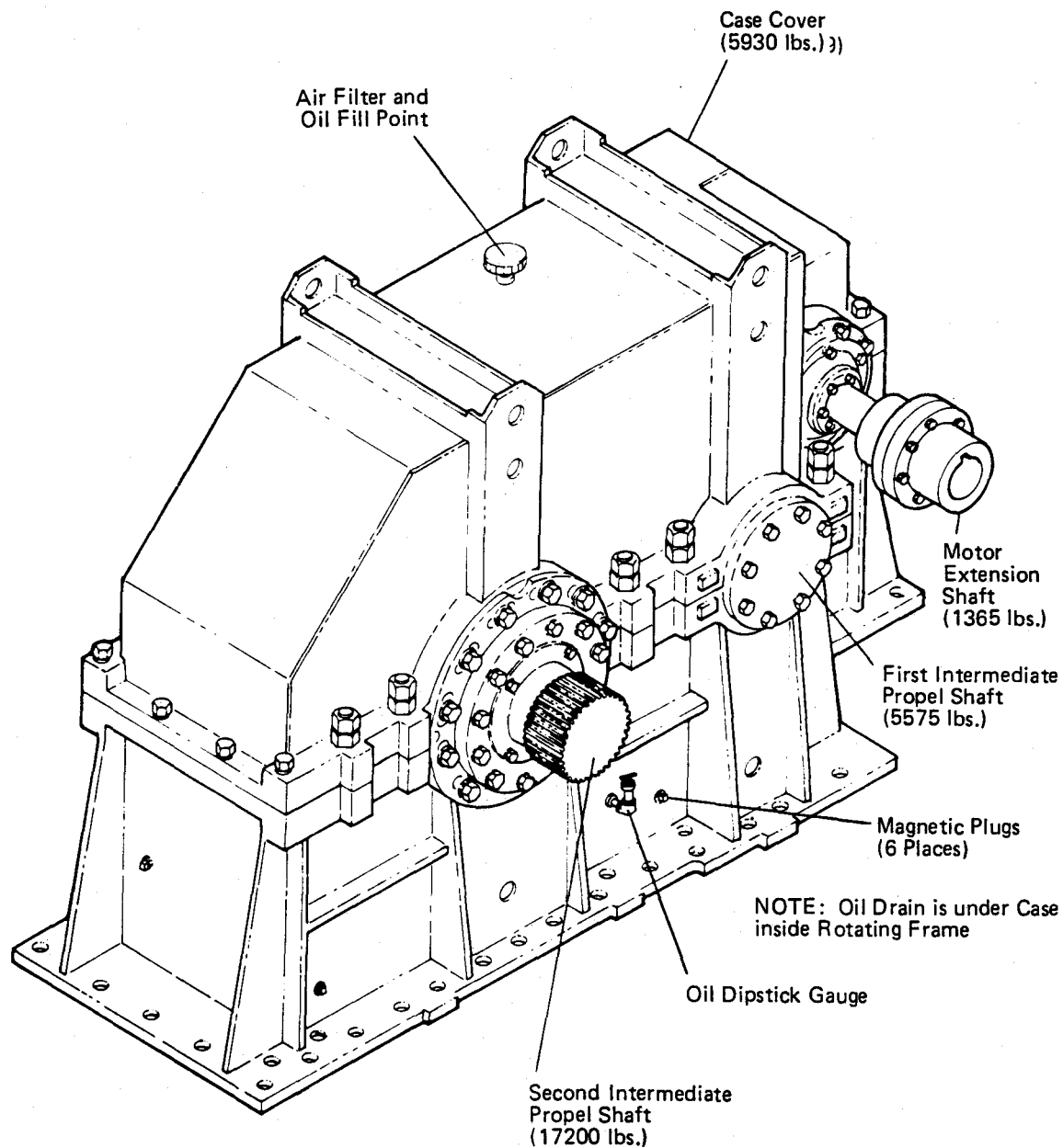
<b>NAME OF PART</b>	<b>TYPE</b>	<b>NO. OF POINTS</b>	<b>LOCATION</b>	<b>LUB. SYM.</b>	<b>RECOMMENDED METHOD</b>
Rope Damper	—	8	2 Each Damper	MPG	Hand, 6 Mo.
Boom Support Ropes Connection	Bushing	4	End of Pins	MPG	Automatic
Boom Foot Pins	Plain	2	End of Pins	MPG	Hand, 6 Mo. & Before Use

#### LUBRICATION OF MISCELLANEOUS POINTS

Filter House	Anti-Friction	5	In Motor End Bell	EMG	Hand (see Electrical Section)
Filter Ducts	Anti-Friction	10	In Motor End	EMG	Hand (see Electrical Section)
Fans	Pillow Block Bearing	10	In Bearing Housing	MPG	Hand, 500 Hrs.
Operator's Seat	Jack Screw Shaft	1	Under Seat	Light Oil	Hand, as Required
Operator's Seat	Swivel Joint	1	Base	Light Oil	Hand, as Required
Swing Pedals	Needle Bearings	2	Under Floor	MPG	Hand, 500 Hrs.
Main Traveling Crane	Anti-Friction	8	End of Axle Pins	MPG	Hand, as Required
Jib Crane	Bushing	4	End of Shaft	MPG	Before Use
Rear House Doors Cam Followers	Anti-Friction	32	End of Shaft	MPG	Hand, 12 Mo. & Before Use

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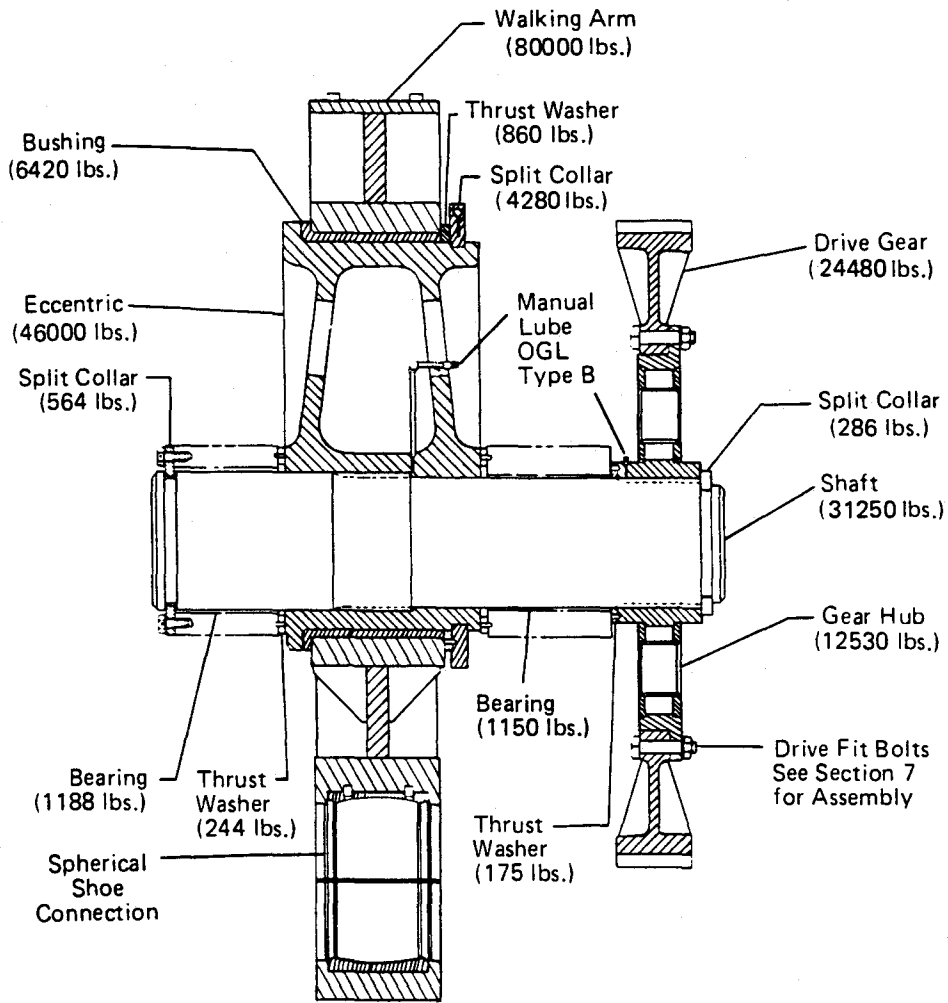
**PROPEL GEAR CASES** are oil tight and enclose first three shaft assemblies of propel gear train. These shaft assemblies are propel motor extension shaft, first intermediate propel shaft and second intermediate propel shaft.



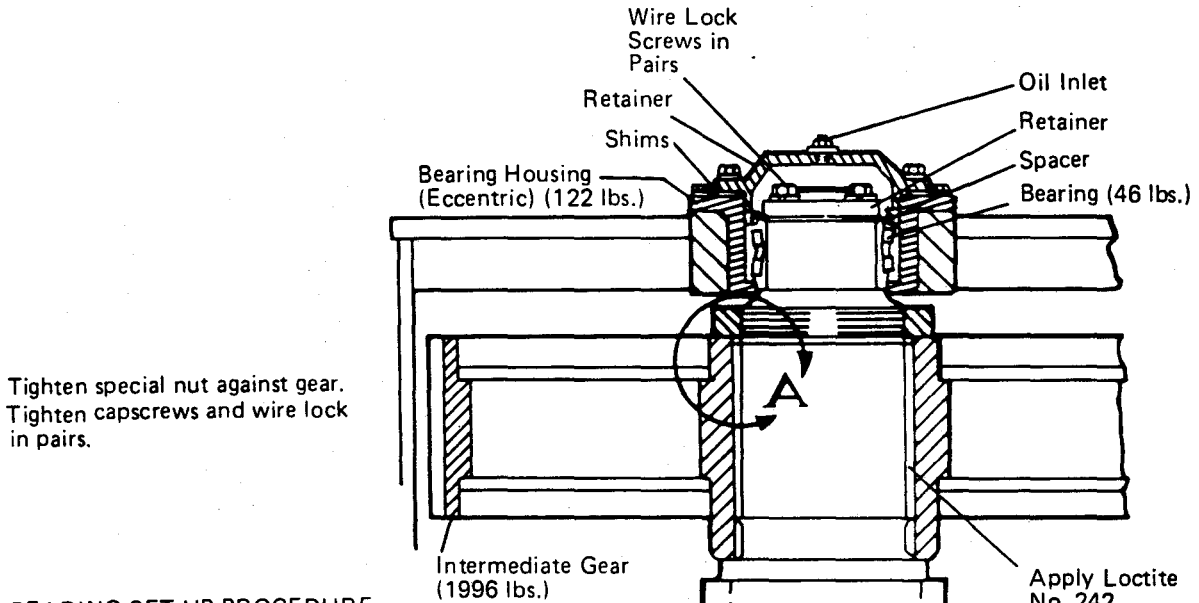
NOTE: Gear Case capacity is 360 U.S. gallons (1362.7 liters)

### PROPEL GEAR CASE

**MAIN PROPEL SHAFT** assembly consists of main drive gear, propel shaft and walking eccentric. Gear hub and walking eccentric are splined to shaft with involute splines. Shaft is supported by two large diameter bronze bushings. Propel shaft is inserted thru assembly from outside after gear hub and eccentric have been blocked in place. Shaft is locked in place with two split collars.

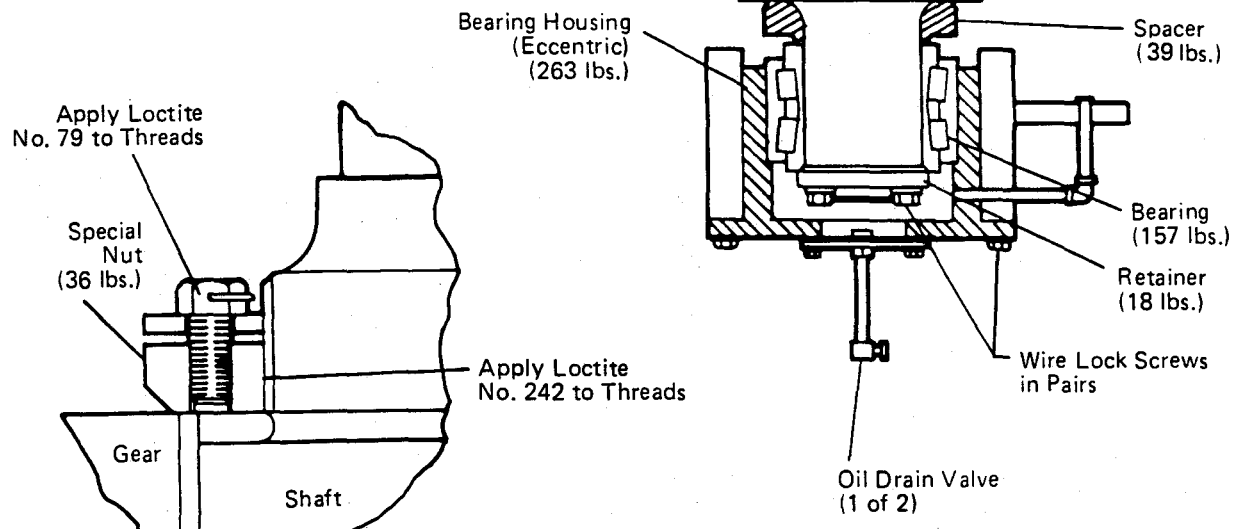
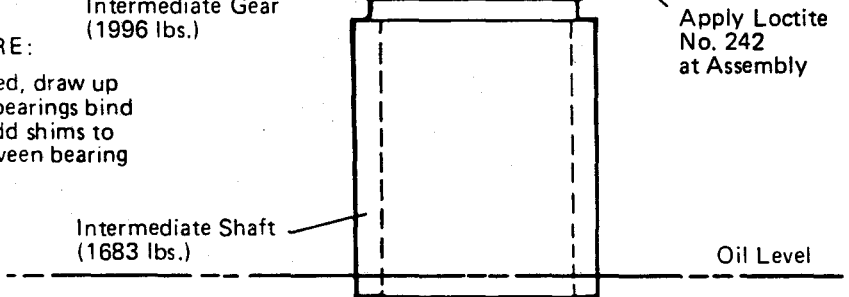


Coat shaft, bushings, eccentric splines and gear hub splines with Molycote M-8800 (MPSD No. 109569-2) at assembly. After assembly, fill cavities at eccentric splines and gear hub splines with OGL Type "B" grease.



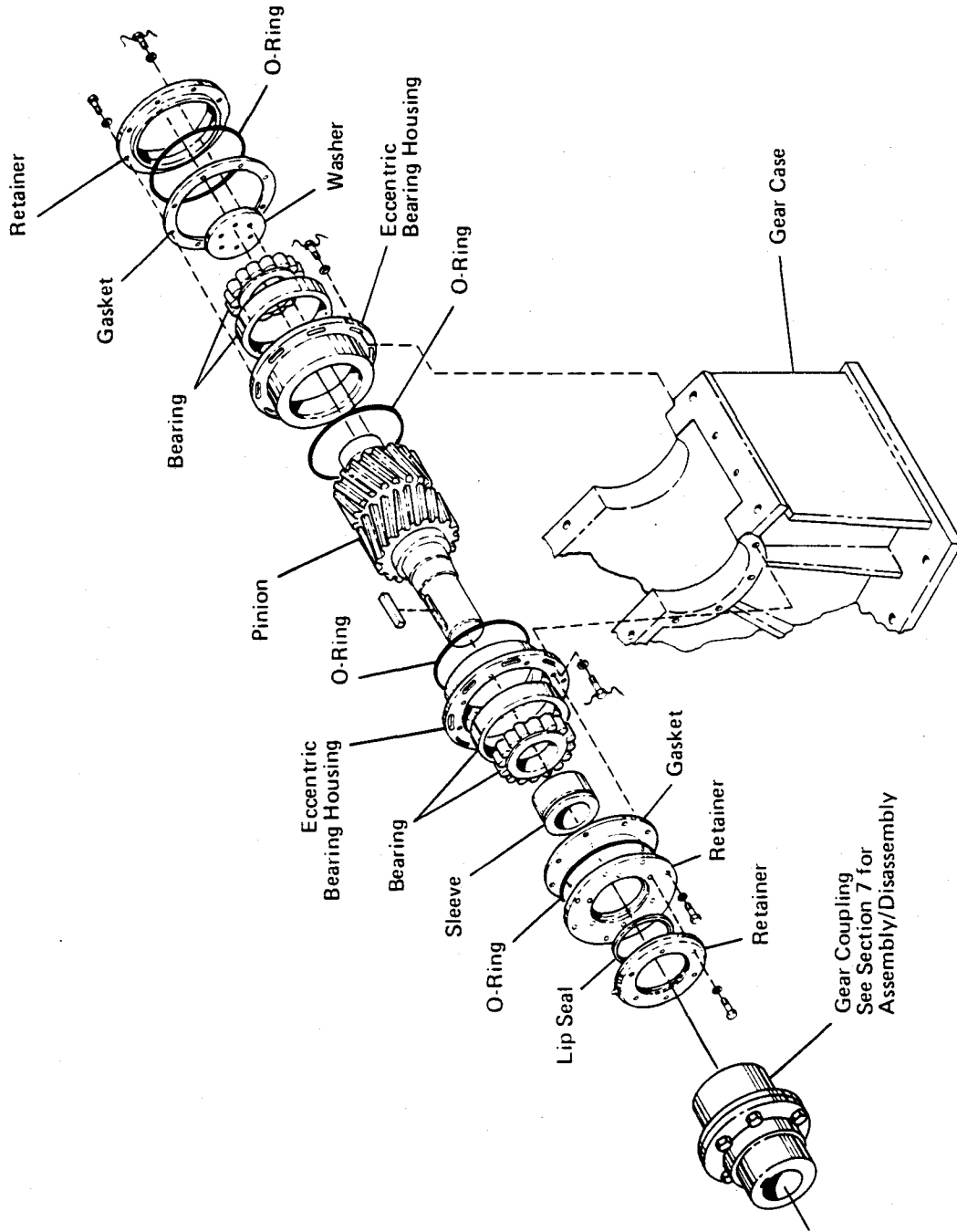
Tighten special nut against gear.  
Tighten capscrows and wire lock  
in pairs.

**BEARING SET-UP PROCEDURE:**  
With main rotating shaft removed, draw up  
top bearing retainer until both bearings bind  
slightly while rotating shaft. Add shims to  
give .030 to .040 clearance between bearing  
and retainer.



**VIEW A**

**INTERMEDIATE SHAFT ASSEMBLY**



HOIST OR DRAG MOTOR EXTENSION SHAFT ASSEMBLY

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6. Reassemble springs, clamp tubes, discs, and reaction plate



**CAUTION:** Springs are to be assembled on every other stud. Improper assembly will result in cocking of the reaction plate and uneven brake release.

7. Reassemble wear spacers, end plate, spring housing and pressure plate as an assembly.
8. Lubricate stud threads with 30 weight oil or "Never Seez". Assemble locknuts using assembly sequence shown in Figure G. Torque locknuts to 200 ft.-lbs. (271 Nm).



**CAUTION:** While reassembling the end plate, spring housing, and pressure plate assembly, take care to install wear spacers in the proper position. See Figure D.

9. Reinstall shield.

E. REPLACEMENT OF SPRINGS is done by the following steps:



**DANGER:** Prior to removal of the brake, make sure that the machinery will remain in a safe position.

1. Remove the brake from the machine, place it on a clean working surface with the end plate facing up and remove the shield.
2. Remove locknuts in alternating sequence (as shown in Figure G) in increments of 1/4 of exposed stud thread length. If a stud comes loose, clean threads thoroughly, then apply Loctite 277 or equivalent. Thread stud back in until it bottoms in mounting flange.
3. Remove the end plate, spring housing and the pressure plate as an assembly.
4. Remove hex head screw and lockwasher from end plate in alternating (see Figure H) sequence two turns at a time. The end plate diaphragm, outer clamp ring and inner-clamp ring can be removed as an assembly.

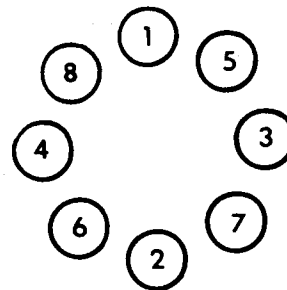


Figure H

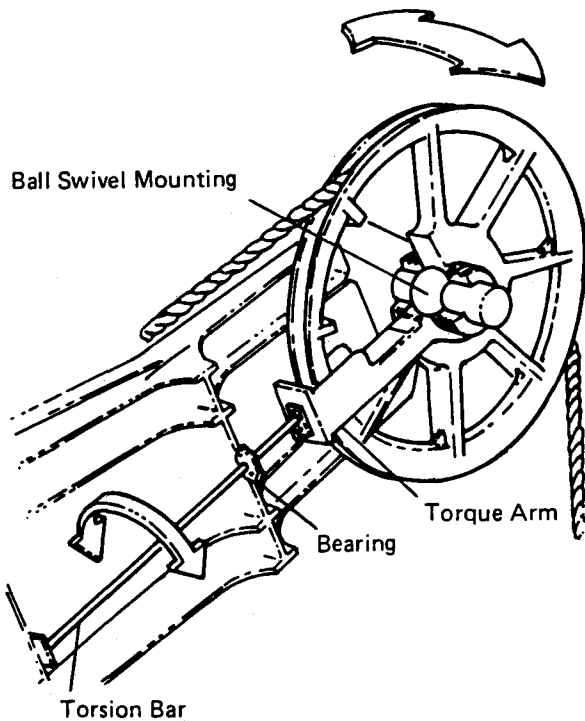


FIGURE 1

### BOOM POINT SHEAVE ASSEMBLY

contains two sheaves which rotate on a single shaft. Each sheave has two tapered roller bearings. Each sheave and bearing assembly is mounted on a spherical bushing which swivels on ball shaped part of shaft, allowing sheave to tilt or oscillate as hoist rope angle changes. Side movement of spherical bushing is limited by pins in sheave shaft.

A torsion bar assembly is attached to each sheave assembly. Torsion bar returns sheave to normal or vertical position when hoist rope aligns with centerline of boom. Live end of torsion bar is attached to sheave bearing retainers. Dead end of torsion bar is attached to bulkhead plate in boom structure.

**REMOVAL OF BOOM POINT SHEAVE ASSEMBLY** – Lower the bucket to the ground, then use auxiliary winch ropes to remove hoist ropes from machine. Auxiliary winch ropes will also be used to lower point sheave assembly and rope guard. Reeve winch ropes over hoist drum, then over hoist rope deflecting sheaves to boom point jib crane. Reeve ropes over jib crane sheaves and thru snatch blocks. See Figure 2. Use cable sling to attach snatch blocks to rope guard over point sheaves. Remove eight attaching bolts from rope guard and lower guard to ground. Weight of guard is 1600 pounds (726 kg).



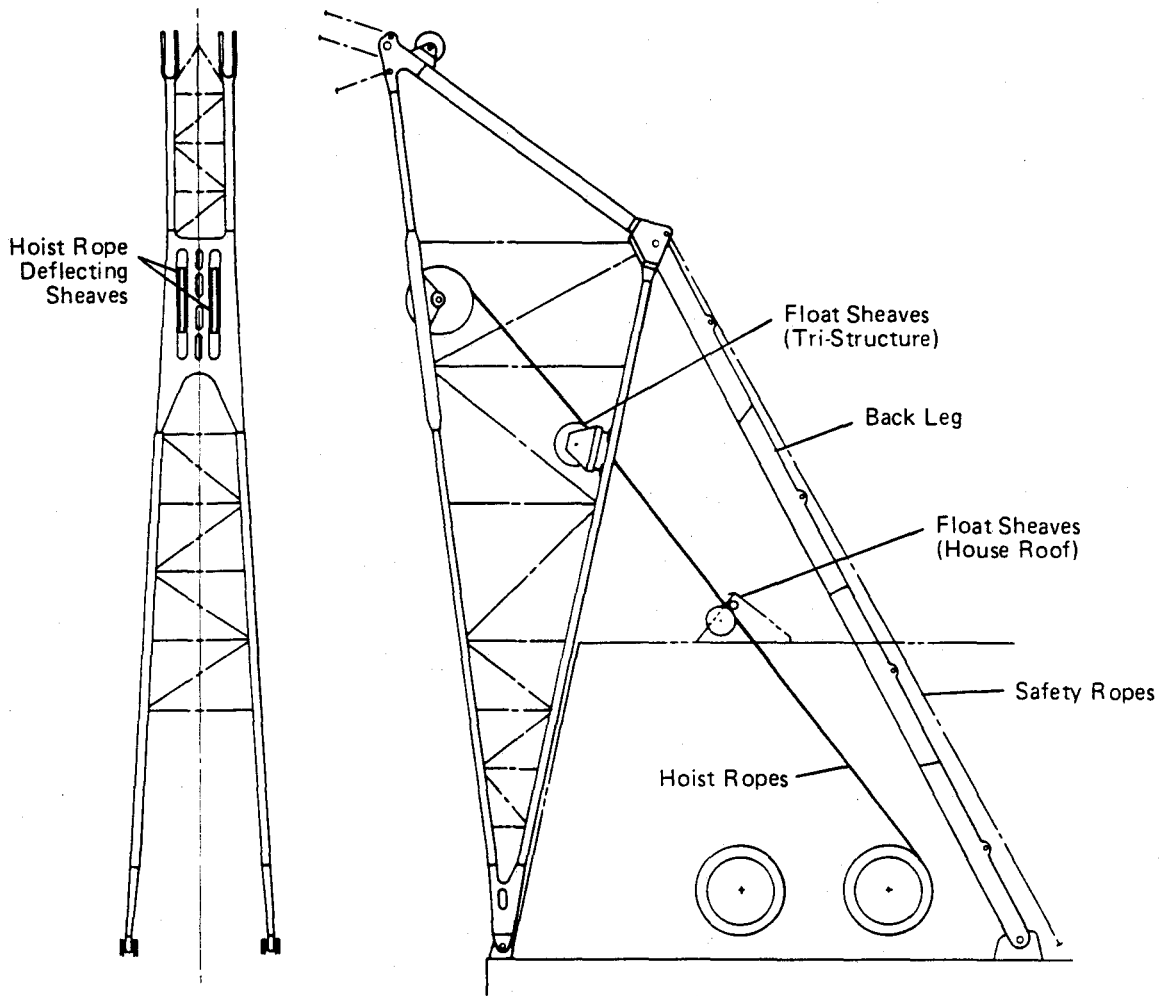
**CAUTION:** Good communication between personnel at point and those in house at winches is critical at this time.

Attach snatch blocks to two lifting lugs (eyebolts) at each end of sheave shaft. Pull winch ropes to tight condition. Remove special capscrews from torsion bar assemblies where torque arms attach to sheaves. Remove torque arms. Loosen outside dust boot clamps and slide boots toward sheaves. Wrap cable slings around sheave shaft and connect them to 6 ton (5.4 t) come-along on each side of shaft. Pull cable slings to tight condition. See Figure 2.

Disconnect lube lines, then cap lines and fittings to keep out dirt.

Remove six special capscrews and lock plate from each end of shaft. Then remove four capscrews from boom point caps which hold shaft in boom. Caps are match marked to boom point and must be reinstalled in same position.

**TRI-STRUCTURE ASSEMBLY** is a welded structure connected by pins to front girder of rotating frame and to back leg assembly. Back legs and four safety ropes anchor tri-structure assembly to rotating frame deck. Boom support rope bridles and intermediate support ropes are attached to top of tri-structure. Hoist ropes are routed thru tri-structure over deflecting sheaves.

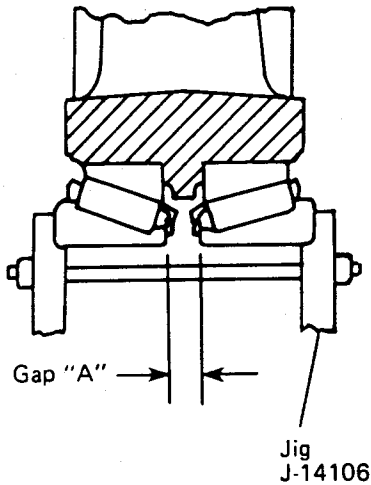


**TRI-STRUCTURE ASSEMBLY**

Two **HOIST ROPE DEFLECTING SHEAVES** are located in the upper front section of the tri-structure assembly. These sheaves lead the hoist ropes from the boom point to the hoist drum.

Each sheave is supported by a fixed shaft and rotates on two single row roller bearings. Bearings are assembled into the sheave with a machined spacer between the cones for accurate alignment and adjustment.

To REPLACE UPPER SHEAVE BEARINGS, the following procedure is applicable to each upper fairlead sheave and set of bearings. Remember to matchmark parts for assembly.



1. Chill and install bearing cups in sheave.
2. Assemble cone/roller assembly and clamp with jig J-14106 and tighten jig bolts until bearings bind slightly when rotated.
3. Measure distance between cones (gap "A") with inside micrometer at 3 places 120 degrees apart. Calculate average dimension. Machine bearing spacer to calculated average dimension minus 0.002 to 0.004.
4. Remove jig and install sheave and bearings on shaft with machined spacer between bearings.

Note: Hand pack bearings with multi-purpose grease before assembly.

5. Reinstall bearing retainers.
6. Lubricate shaft and bearing assembly thru shaft fitting.

NOTES:

Has speed increased or decreased for light loads?

Has speed increased or decreased for heavy loads?

Next, question other witnesses and determine what they saw or heard; getting every detail. Then make a quick visual inspection of equipment for obvious things as flashover, smoke or other evidence of over-heating or broken components. (One electrician checked for hours—then noticed the generator stopped.) Moral — look for the obvious.

After listening to witnesses and making the first inspection, stop and consider ALL the facts before proceeding. Valuable time is lost by going off quickly in the wrong direction. So, carefully examine the problem logically, using what you know about the system. Consider all the data collected. Do not make hasty decisions on what to use or what info to discard. Give special value to obvious facts, easily confirmed (a stopped generator) and reserve opinion on contradictory facts.

Barring the obvious, you gain a direction from all this and knowledge of the system. For example, if no motion operates; look in circuits common to all motions, such as: D.C. exciter or A.C. circuits. Likewise, if one motion is normal in one direction; but not in the other, check the components for the separate directions. A few minutes spent analyzing here saves time spent in false, misled direction later.

Once a founded suspicion exists as to which set of components or circuits is faulty, select a starting point for tests that meets the following:

You know approximate value expected here for test conditions; whether at stall, no-load, neutral, hoist, lower, etc.

No false indications exist, you've avoided points where reading is effected by a sneak circuit.

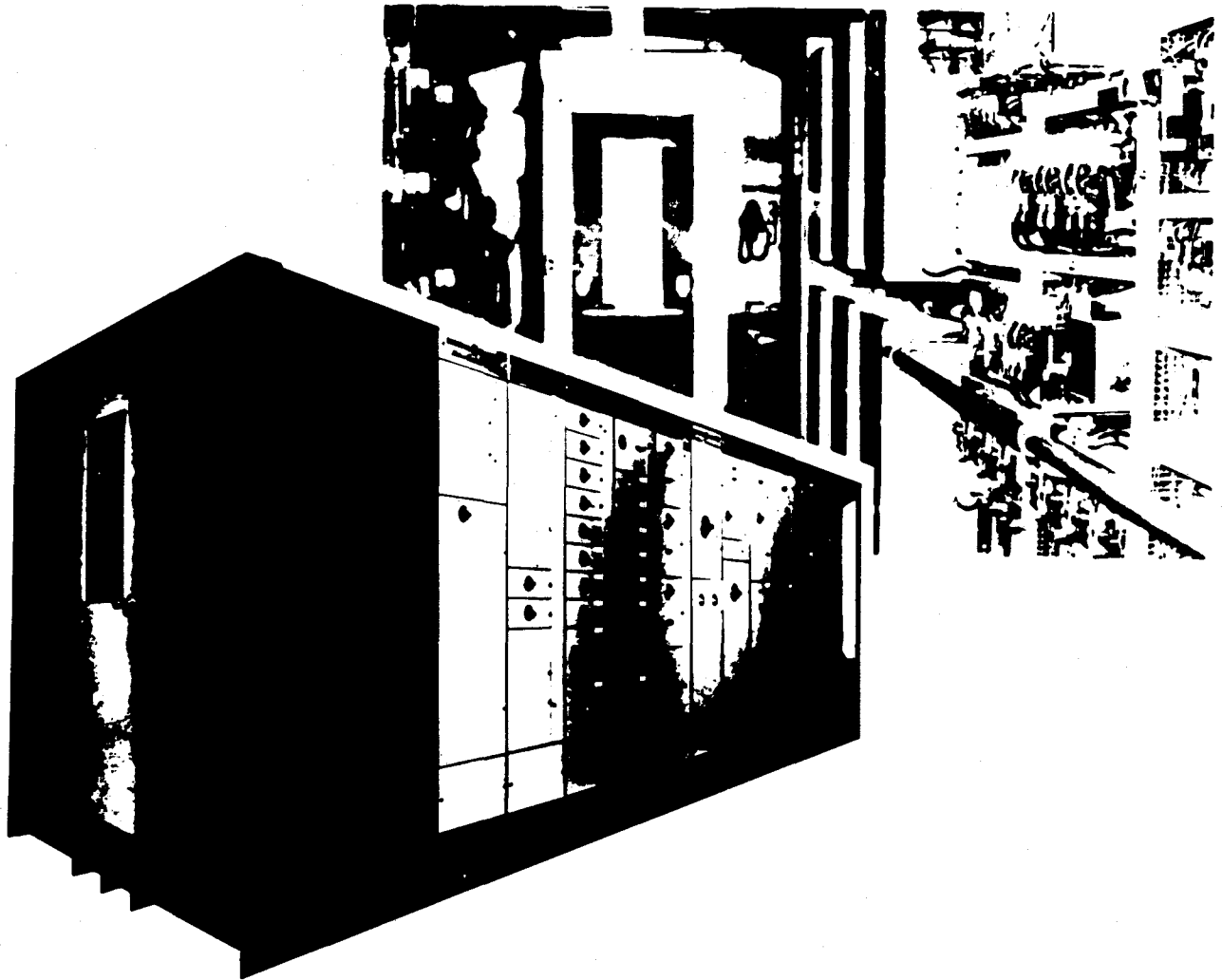
This point, logically, is in the suspected circuit.

Also, it allows checking as many circuits as possible at one time.

With proper instrument, measure at a selected point and compare to expected value. If measurement is correct, apparently all system parts leading to this point are correct. Trouble exists further down the line. With an incorrect reading, trouble probably lies further back toward start of the system.

Based on first test, proceed toward system start or end and seek expected reading. The trouble, of course, lies between points where correct and incorrect readings occur. In other words, the faulty stage has correct input, but incorrect output. Be positive the correct stage

Marion's **POWER CONTROL ROOM (PCR)** encloses electrical control components away from dirt, grease and dust. The segregation of control components into a room type module centralizes the responsibility of the electrician, thus improving control maintenance.



### **POWER CONTROL ROOM**

The PCR is supplied with a constant source of clean filtered air under pressure affording the ideal environment for efficient operation of electrical components.

PCR is completely factory wired and only the input and output connections must be made during field erection.



## SEALS

Oil and grease seals are critical to machine availability. Careless storage, handling, removal and installation can contribute to reduced service life of machine components and higher cost of operation.

Seals come in all sizes, shapes and materials.

All types of oil and grease seals have a limited shelf life. Store seals in a cool, dry location protected from direct sunlight. Keep in sealed containers or packaging until ready to use. Seals keep lubricant clean and contained in their respective housings, bearings or passageways. Always handle seals carefully to prevent exposure to nicks, bends or pinching. Do not wash them in solvents as some solvents may destroy properties of the seal.

## SEAL INSTALLATION

Solid molded seals are installed at time of manufacture with interference fit between seal and bore. This method of installation creates an oil tight fit. When partial disassembly of a machine component involves removal of solid molded seal before reassembly inspect it carefully for cuts, nicks, or cracking. Replace with a split seal if complete disassembly is inconvenient or with a new solid molded seal. Split seals, especially those made with interference fit at butt, also install with compression at the joint. Split seals used as substitutes for solid molded seals should be replaced at next major component overhaul.



**CAUTION:** Do not cut a solid seal and reuse for a split seal.

Check shaft for scratches, burrs or surface roughness that may cut or score the seal lip. Be aware of sharp threads, keyways or splines over which the seal must travel. Protect seal lip by covering these interferences with tape.

Inspect the bore area for surface roughness, dirt or burrs. Remove and clean as required. The bore and shaft need .06 in (1.5 mm) chamfer to accommodate a leak free installation. If shaft or bore do not have chamfer carefully provide one by trimming inside flange of seal.

Determine the correct direction for lip installation and start the seal into the cavity by finger pressure, then tap evenly all around until seated or flush with the housing face. (Tap only on outer edge of seal with hammer on wood block.)

A double seal, installed back to back can be used to retain grease or oil plus be more effective in preventing egress of contaminants.

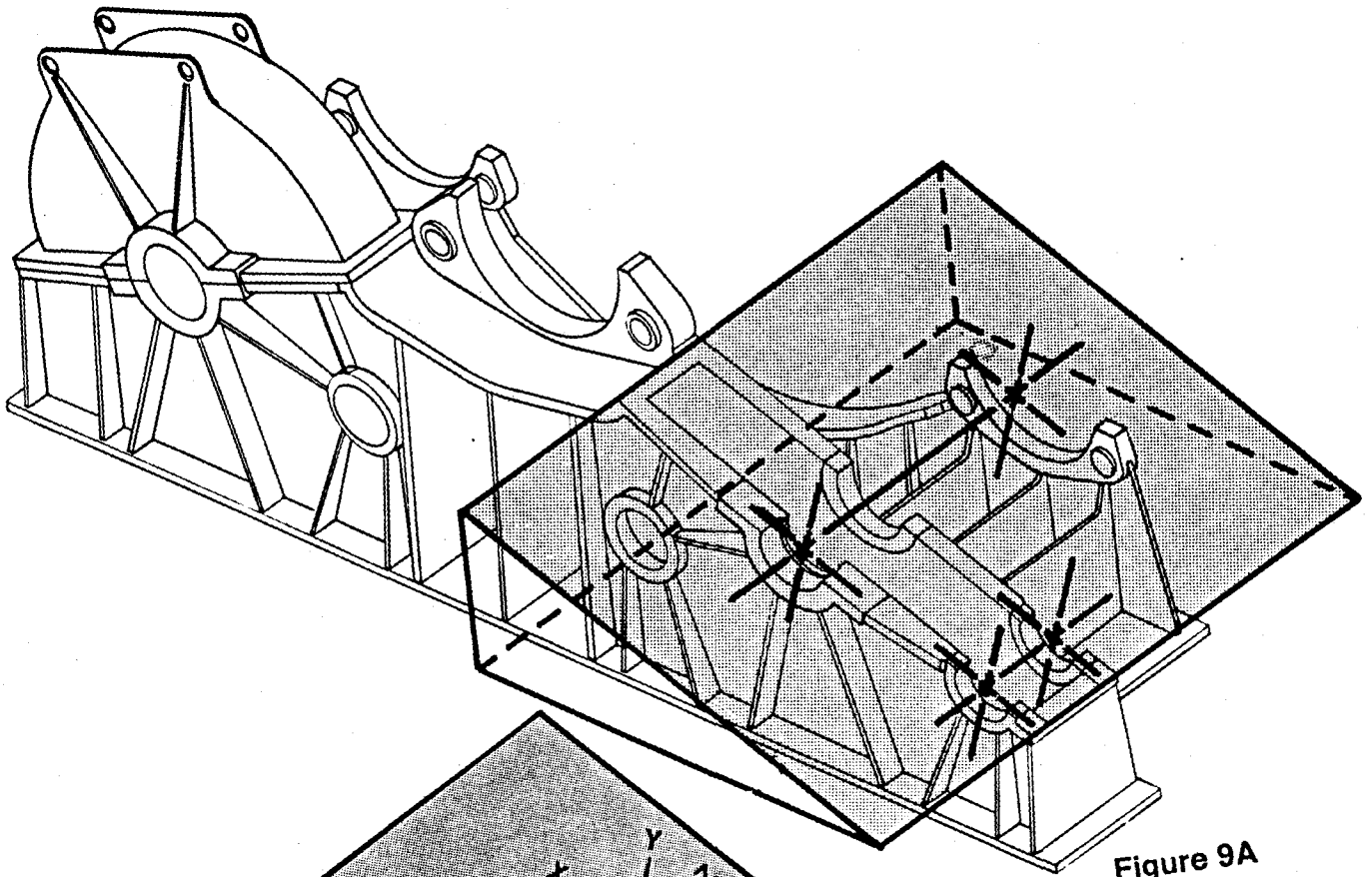


Figure 9A

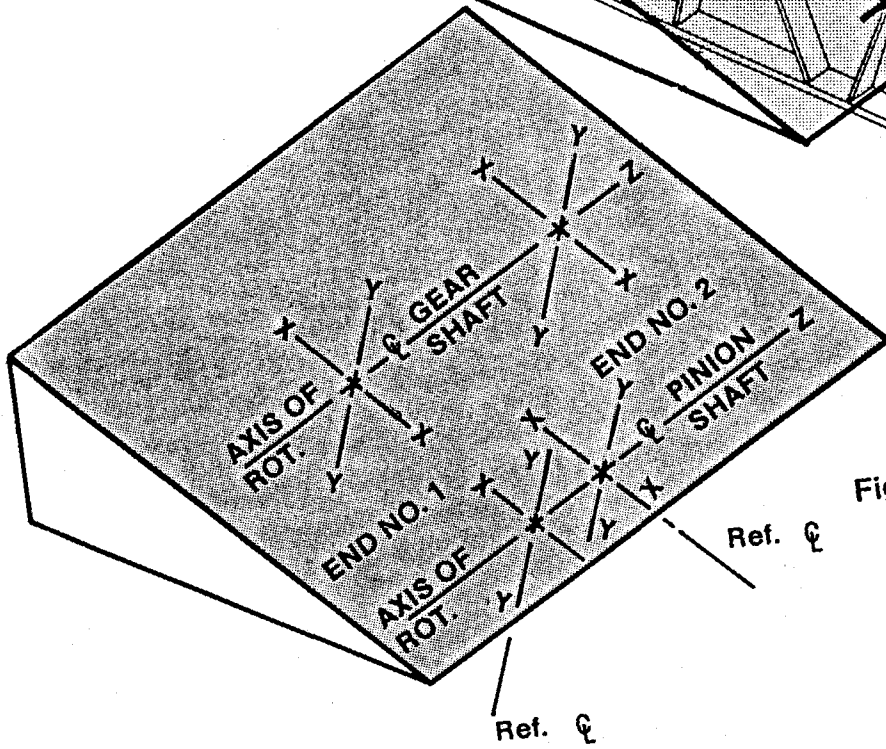
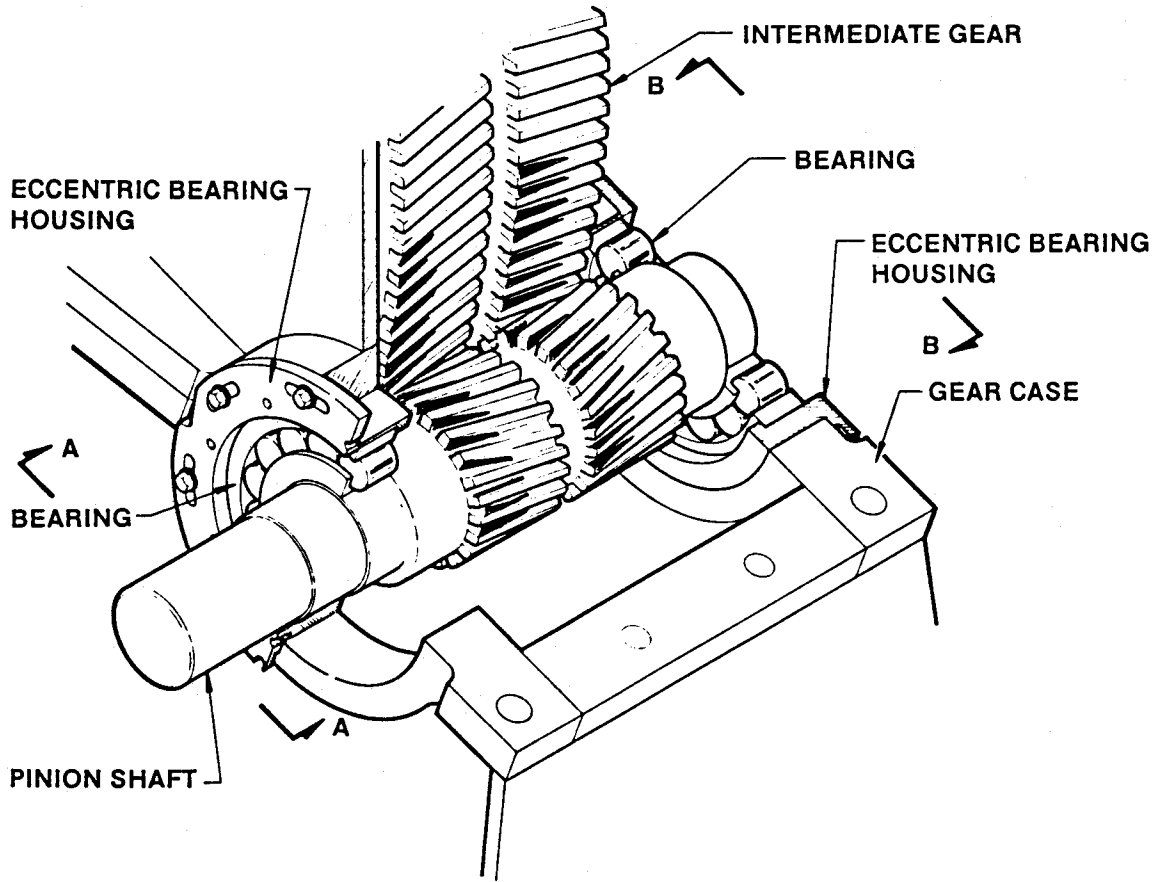
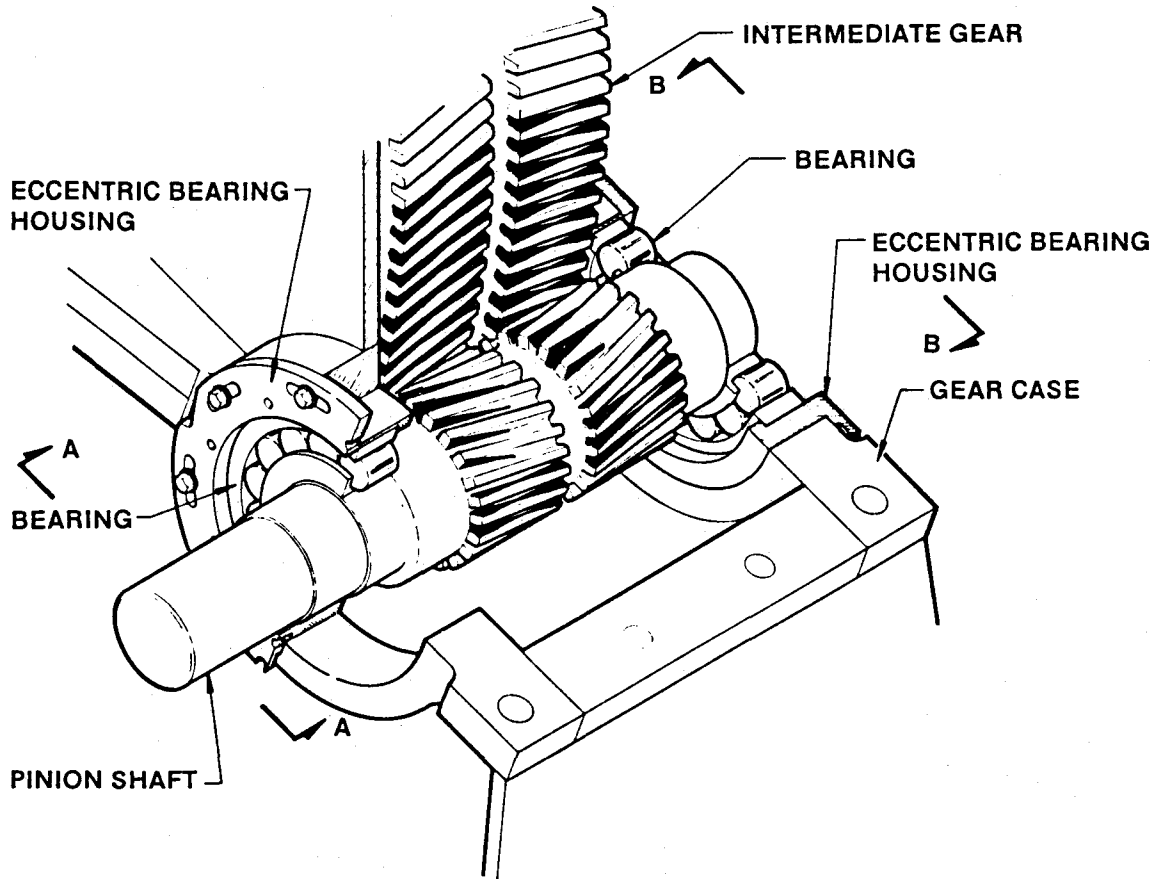
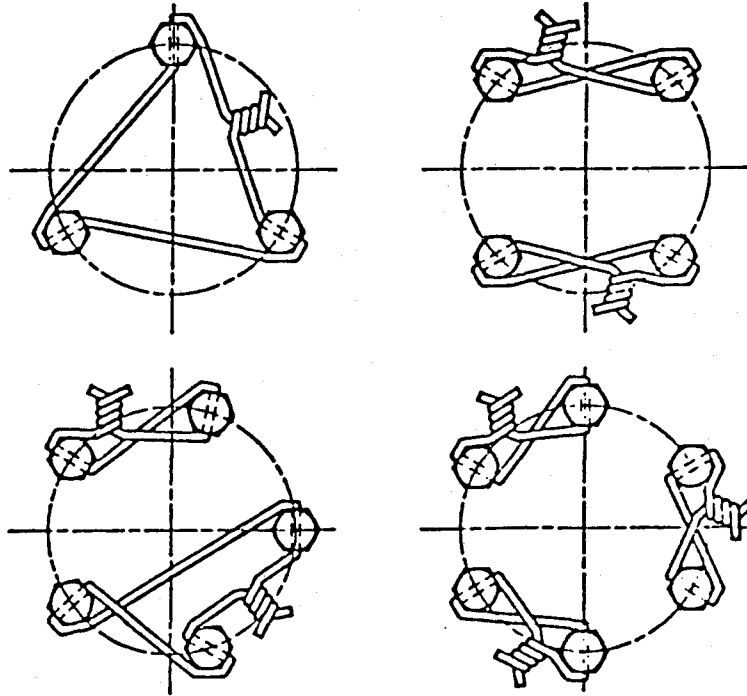


Figure 9B

Figure 9







**Figure 16**  
**Wire Lock Patterns**

Use 14 gauge soft annealed lockwire. Thread wire through screw head so tightening stress on the wire will exert tightening torque on the direction of cap screw thread. (Illustrations show lock wire threading for right hand threaded cap screws. Reverse lock wire patterns shown for left hand cap screws.)

2. What is the service history? Length of service? Was an accident involved? Have there been other similar failures?
3. Examine the part visually. Prepare sketches and take photographs to provide a complete record.
4. Where is the failure located? (base metal? heat affected zone? weld metal?)

The every-day mechanic that is not familiar with metallurgy can look for certain defects in a fracture such as incomplete fusion of a weld, porosity, inclusions in the weld such as slag and oxides and inadequate penetration. If a part has completely fractured, you can see small chevron-like arrows pointing to the stress concentrator.

There are two non-destructive testing methods the average mechanic can learn to use to get a better idea of severity of the failure in a part or to help examine a visual indication.

Method one is dye penetrant testing where a red dye is sprayed over an indication. This red dye will penetrate into any crack. After the dye is left to penetrate for a time, it is wiped clean. A white developer is then sprayed over the indication area. If an indication is evident, the red dye will show through the developer. This is perhaps the easiest and quickest way of determining the extent of the problem.

Method two is magnetic particle inspection testing. An A/C yoke and iron powder is all that is required plus some training. The yoke, when placed across a suspected defect, will create a magnetic field. If there is a defect in the area, the magnetic field will be interrupted. The iron powder, when sprinkled over the area, will align with the defect.

### **STEP 3—Determine the Material that will be Repaired**

Most of the materials used to build mining equipment can be weld repaired. However, there are materials that are more difficult to weld successfully if their full service characteristics are to be retained. It is important to know the type of material so the repair procedure specifies the correct preheat and electrode.

Some methods of determining the material are:

1. Check the parts book.
2. Check with the manufacturer's service department.
3. Drill out shavings or cut off a small piece of material and take it to a lab for analysis.

**STEP 12:** Flame harden the groove.

A second example of weld repair is a broken tooth in a rotating gear of a shovel which needs repair and have available as a spare part.

**STEP 1:** Remove the gear and clean of grease, oil and any other contaminants.

**STEP 2:** Inspect the gear for any other fractures. The reason for the tooth breakage was a rock fell in between the gears as they meshed. The tooth broke out at the root. Since the tooth is the only serious problem, the decision is to repair it.

**STEP 3:** The material is AN AISI 8630 cast steel material per the manufacturer's service manual.

**STEP 4:** Since a local preheat of 500°F (260°C) to 550°F (288°C) is required for this material and weld metal shrinkage is involved, some type of fixture is required to control distortion. Burn, machine and drill a 1 1/2 inches (37.5mm) thick half moon plate that will fit the inside I.D. of the gear. Make a steel template that will cover the contour of three teeth to use to align the broken tooth. Double bevel the tooth at a 45°-50° angle leaving an approximate 1/8 inch (3 mm) root face. Grind any burning serrations on the tooth and any notches in the gear rim. Align the tooth with the steel templates. Tack a stiffener across three teeth on each side of the gear, one of them being the broken tooth, to hold it in alignment during welding.

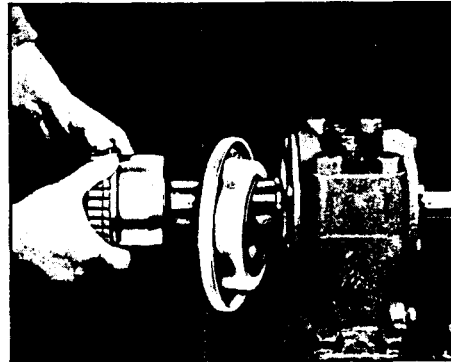
**STEP 5:** In Step 3 the material was determined to be AISI 8630 which, in its normalized condition, is about a 100,000 PSI. Therefore, it is recommended that a 100,000 PSI tensile strength electrode should be used because of the function of the tooth. Because of the length of weld and the shape of the gear, the shielded metal arc process would be recommended using an AWS E10018 type electrode. Use small diameter electrodes such as 1/8 inch (3 mm) and 5/32 inch (4 mm) diameter.

**STEP 6:** Slowly preheat the gear and tooth to 550°F (288°C) at the repair area. Pack insulation or heat blankets around the repair area to help hold in the heat. Do not concentrate the heat on the broken tooth or allow the heat to go above the heat treating properties or you will lose the hardness of the tooth. Make sure the repair can be completed once preheating has been started.

**STEP 7:** Weld two passes in one side of the groove and back gouge to sound metal. Weld second side to the same width as the first side and then

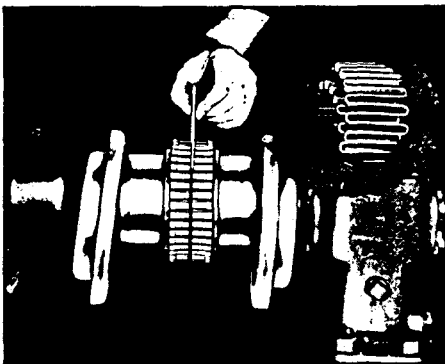
## GRID COUPLINGS (Type F and T)

1. Mount cover with seal ring and hub on shaft. Press or shrink hubs on respective shafts so hub face is flush with shaft end. Tighten set screws on BOTH hubs on sizes 3 thru 11.



**1 MOUNT COVER, SEAL RING AND HUB ON SHAFT**

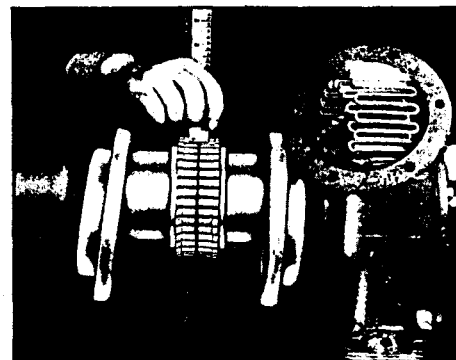
2. Check gap and angular alignment. Set coupling for normal gap. Align shafts by placing spacer block equaling gap between hub faces, and at right angles to it. Check using feelers.



**2 GAP AND ANGULAR ALIGNMENT**

Maintain normal coupling gap where possible. To insure best performance, DO NOT EXCEED minimum and maximum gaps. Consult company if limited axial float is needed. Provide for shaft end play in coupling gap when using sleeve bearing units. Once mounted, position free unit so coupling gap is between minimum and maximum limits with BOTH shafts in extended or retracted position. With gap set and shafts aligned, tighten unit foundation bolts and RECHECK alignment.

3. Check parallel alignment so a straight edge rests squarely on BOTH hubs at right angles. Fasten foundation bolts and RECHECK alignment and gap.



**3 OFFSET ALIGNMENT**

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