INSTRUCTION MANUAL

FOR THE

IMPCO®

THICK STOCK PUMP SERIES 300

IMPROVED MACHINERY INC.
NASHUA, NEW HAMPSHIRE

INSTRUCTION MANUAL

FOR

SERIES 300 THICK STOCK PUMP

CHARMIN PAPER PRODUCTS COMPANY

MEHOOPANY STATION, PENNSYLVANIA

IMPCO S.O. B1415 SERIAL NUMBER G-461

NOTE

ILLUSTRATIONS USED IN THIS MANUAL SHOW A 400 SERIES THICK STOCK PUMP. EXCEPT FOR THE ROTORS AND PUMP HOUSING COVERS, 300 AND 400 SERIES PUMPS ARE ALIKE. THE 300 SERIES THICK STOCK PUMP HAS BEEN REDESIGNED TO INCLUDE THE ONE PIECE BEARING HOUSINGS AND TAPERED BORE BEARINGS USED ON THE 400 SERIES PUMP. ONE PIECE BEARING HOUSINGS ARE MORE RIGID THAN TWO PIECE HOUSINGS USED ON PREVIOUS PUMPS. TAPERED BORE BEARINGS ARE HYDRAULICALLY DISMOUNTED FOR EASIER DISASSEMBLY AND REASSEMBLY.

IMPROVED MACHINERY INCORPORATED
NASHUA, NEW HAMPSHIRE, U.S.A.

IMPROVED MACHINERY DIVISION OF
CANADIAN INGERSOLL-RAND LIMITED
SHERBROOKE, QUEBEC, CANADA

MARCH 25, 1968

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FOREWORD

This manual provides installation, operating, maintenance, and lubrication instructions. A Series 400 Horizontal Thick Stock Pump is used to illustrate this manual. The vertical pump, which is not shown, differs from the horizontal pump only in external mounting arrangements. Illustrations used are typical and show the principal design features of the Series 400 Thick Stock Pump.

These instructions have been prepared as a service to our customers and are offered as suggested methods for the customer to follow, to install, and maintain the equipment properly. Should further information be desired, contact Improved Machinery Inc., Nashua, New Hampshire; or in Canada, Improved Machinery Division of Canadian Ingersoll-Rand Limited, Sherbrooke, Quebec. Include machine serial number with any inquiries or requests for spare parts.

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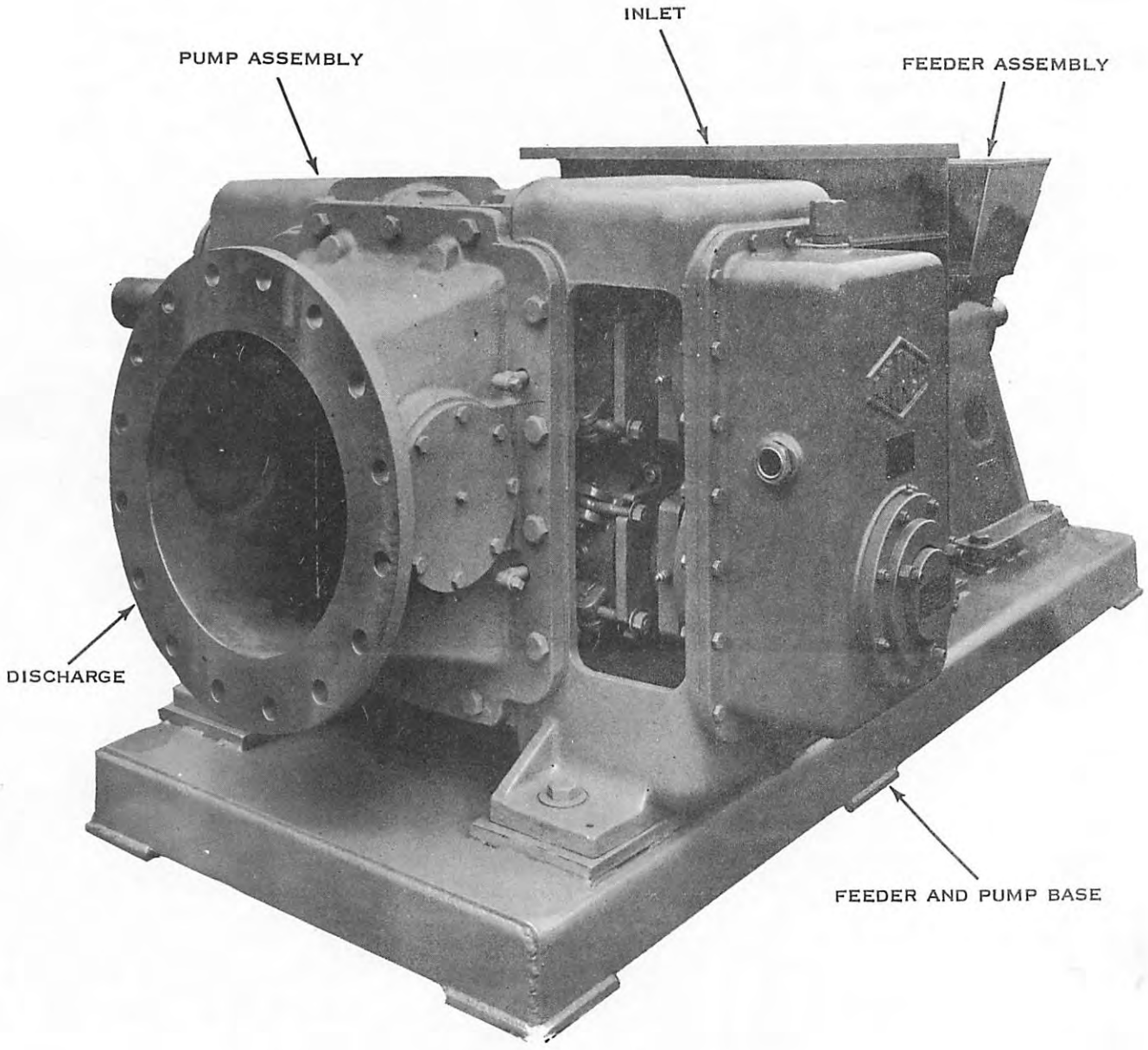


FIGURE 1. HORIZONTAL THICK STOCK PUMP – 400 SERIES

Duiv - Design 125 max 200% shear Pins

THICK STOCK PUMP – 400 SERIES

PUMP

THE IMPCO 400 SERIES THICK STOCK PUMP IS A POSITIVE DISPLACEMENT GEAR TYPE PUMP. IT PUMPS 8 TO 20 PERCENT CONSISTENCY PULP WITHOUT DAMAGING THE FIBER. UNIFORM FEEDING IS PROVIDED BY THICK STOCK PUMPS. ANY AIR, ENTRAINED IN THE STOCK, RETURNS TO THE INFEED SECTION RESULTING IN DISCHARGE OF AIR-FREE STOCK. THICK STOCK PUMPS HAVE MILD STEEL OR STAINLESS STEEL ROTORS AND HOUSINGS AS REQUIRED TO RESIST CORROSION AND EROSION. THIS PUMP HAS TWO ROTORS WHICH ARE MOUNTED IN SPHERICAL ROLLER BEARINGS AND ARE SYNCHRONIZED BY EXTERNAL TIMING GEARS.

FEEDING

TWO TYPES OF THICK STOCK PUMPS ARE MADE, ONE FOR HORIZONTAL STOCK FLOW THROUGH THE PUMP AND THE OTHER FOR VERTICAL STOCK FLOW THROUGH THE PUMP. THE HORIZONTAL PUMP IS FED BY A SCREW TYPE FEEDER. PUMP AND FEEDER ARE GENERALLY MOUNTED ON THE SAME BASE AND HAVE MATING FLANGED FACES THAT ARE BOLTED TOGETHER. THE VERTICAL PUMP IS NORMALLY MOUNTED AT THE BOTTOM OF A VERTICAL LEG AND GRAVITY FED OR, FOR UNUSUAL FEEDING CONDITIONS, FED WITH AN INCLINED FEEDER.

BACK STOP ASSEMBLY

AS REVERSE FLOW MAY OCCUR IF THE PUMP IS STOPPED WITH POSITIVE PRESSURE ON THE DISCHARGE SIDE, THE PUMP SHOULD BE EQUIPPED WITH A BACK STOP WHEN THIS CONDITION WOULD BY A SAFETY HAZARD OR UNDESIRABLE FOR OTHER REASONS. IF PUMP DOES NOT HAVE A BACK STOP AND IT IS FOUND THAT ONE IS NEEDED, THE BACK STOP MAY BE INSTALLED IN THE FIELD.

SHEAR PIN COUPLING AND ZERO SPEED SWITCH

THE SHEAR PIN COUPLING (NOT SHOWN) AND ZERO SPEED SWITCH PROTECT THE PUMP AND FEEDER IF FOREIGN OBJECTS ENTER THE PUMP AND CAUSE A PUMP STOPPAGE. THE SHEAR PIN COUPLING COUPLES THE PUMP ROTOR SHAFT TO THE PUMP DRIVE REDUCER. PUMP AND REDUCER SHAFTS ARE UNCOUPLED IMMEDIATELY IF THE SHEAR PINS FAIL. THE ZERO SPEED SWITCH IS MOUNTED ON THE PUMP GEAR CASE, COUPLED MECHANICALLY TO THE PUMP ROTOR, AND CONNECTED ELECTRICALLY TO THE PUMP AND FEEDER MOTORS. IF THE PUMP ROTOR STOPS TURNING WHILE THE PUMP MOTOR IS RUNNING, THE ZERO SPEED SWITCH WILL STOP THE PUMP AND FEEDER MOTORS.

INSTALLATION

USE ONLY CERTIFIED PRINTS FOR CONSTRUCTION LAYOUTS AND INSTALLATION OF THE PUMP IN THE MILL. BE SURE PRINTS ARE CERTIFIED IN THE BOX HEADED WITH "DIMENSIONS CERTIFIED CORRECT".

UNLOADING PRECAUTIONS

Each thick stock pump is carefully packed to prevent damage in transit. When shipment arrives, carefully inspect each item listed on the shipping papers to assure that no damage or loss has occured in transit. If loss or damage is detected, notify the carrier of loss or damage immediately and file claim with the carrier.

PROTECTIVE COATINGS

Thick stock pumps are protected with anti-corrosive greases and oils when shipped. Under ordinary conditions, this protection lasts for three months. For severe conditions or longer periods, the customer should inspect the machine and renew the protection as required. Anti-corrosive greases and oils used to protect the bearings are compatible with recommended lubricants but should be purged during the initial lubrication. Exposed machined surfaces are protected with a rust preventative compound that can be removed with kerosene.

PUMP AND FEEDER INSTALLATION, HORIZONTAL STOCK FLOW

1. Refer to the General Arrangement Drawing for the anchor bolt locations, inlet and outlet flange dimensions, and installation notes.
2. Shim under the base so that the base is level. Machined surfaces on the top of the base may be used for leveling. Shim under the base so that the pump is level within 0.005 inch. Measure with a precision level on surfaces shown in Figure 2.
3. Check the flatness of the base mounting pads with a straight edge. Mounting pads should be flat or in the same plane within 0.005 inch. The base must be supported properly to prevent base deflection when the bolts are tightened.
4. Secure the base with the foundation bolts.
5. Check the level of the pump and flatness of the base.

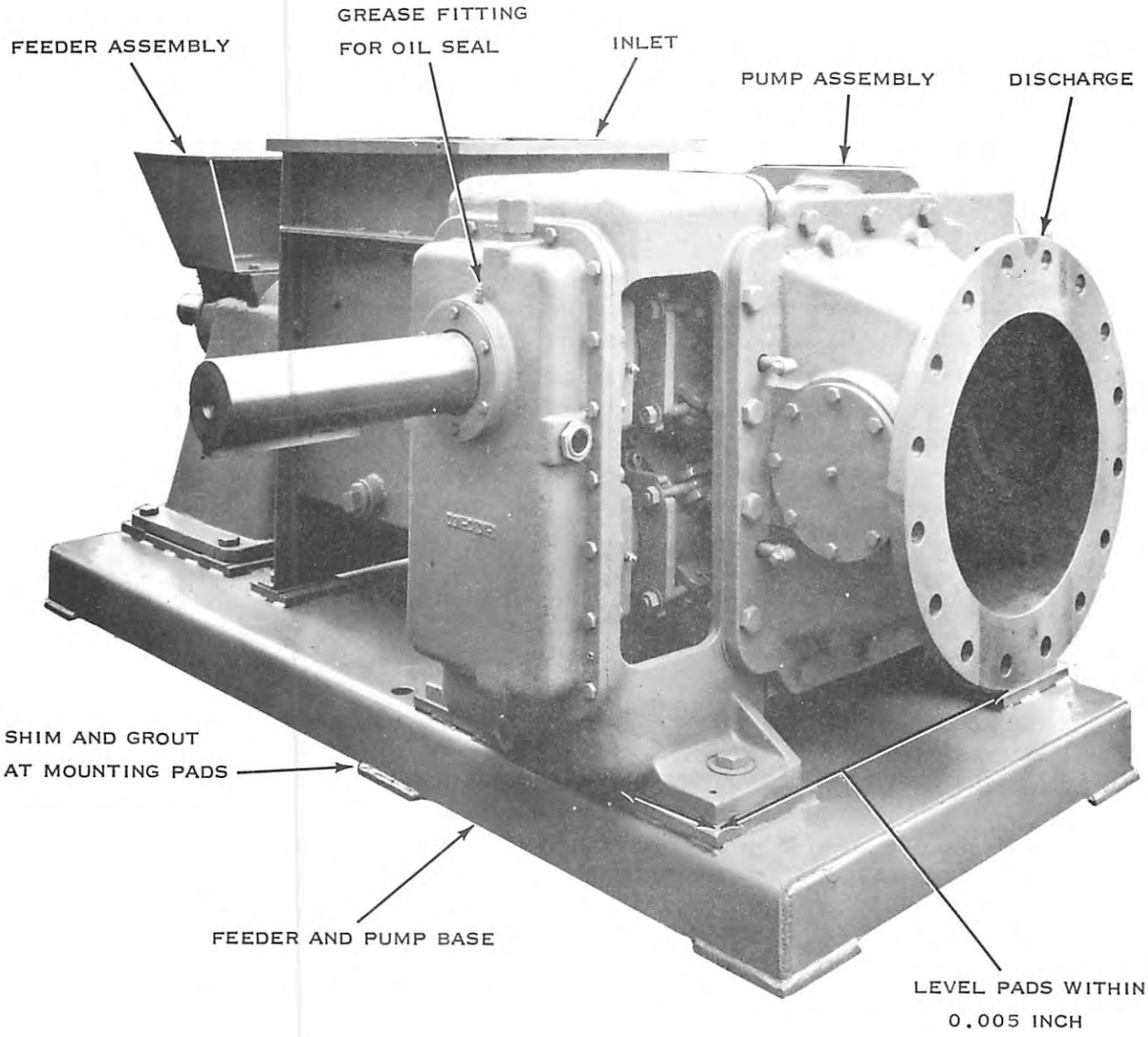


FIGURE 2. PUMP INSTALLATION

PUMP AND FEEDER INSTALLATION, HORIZONTAL STOCK FLOW – (CONTINUED)

6. CHECK CLEARANCE BETWEEN THE ROTOR AND PUMP CASING TO ASSURE THAT THE EDGES AND SIDES OF THE ROTOR VANES CLEAR THE PUMP CASING.

7. GROUT UNDER THE PADS IN THE BASE. THERE IS A PAD UNDER THE BASE AT EACH FOUNDATION BOLT HOLE.

8. LOCATE THE FEEDER BEARING PEDESTAL SO THAT THE FEEDER SHAFT IS CENTERED IN THE STUFFING BOX OF THE FEEDER HOUSING. MEASURE BETWEEN THE SHAFT AND STUFFING BOX WITH A FEELER GAGE. LOCATE AND SHIM THE BEARING PEDESTAL SO THAT THE SHAFT IS CENTERED IN THE STUFFING BOX WITHIN 0.005 INCH. INSTALL TAPER PINS IN PEDESTAL.

9. INSTALL THREADED TAPER PINS IN MOUNTING PADS ON DRIVE SIDE OF THE PUMP ONLY.

PUMP INSTALLATION, VERTICAL STOCK FLOW

1. REFER TO THE GENERAL ARRANGEMENT DRAWING FOR THE ANCHOR BOLT LOCATIONS, INLET AND DISCHARGE FLANGE DIMENSIONS, AND INSTALLATION NOTES.

2. CHECK LEVEL AND PLANE OF THE SOLE PLATES WITH A STRAIGHT EDGE AND PRECISION LEVEL. IF SOLE PLATES ARE NOT LEVEL AND IN THE SAME PLANE WITHIN 0.005 INCH, SHIM AS REQUIRED TO LEVEL SOLE PLATES SO THAT PUMP CASING IS SUPPORTED PROPERLY AND NOT DEFLECTED WHEN THE MOUNTING BOLTS ARE TIGHTENED.

3. SECURE PUMP WITH MOUNTING BOLTS.

4. CHECK CLEARANCE BETWEEN THE ROTOR AND PUMP CASING TO ASSURE THAT THE EDGES AND SIDES OF THE ROTOR VANES CLEAR THE PUMP HOUSING.

5. INSTALL THREADED TAPER PINS IN MOUNTING PADS ON DRIVE SIDE OF PUMP ONLY.

DISCHARGE PIPING

SEE THE DISCHARGE PIPING DETAILS ON CERTIFIED DRAWINGS OR ON FIGURE 22. INSTALL PIPING SO THAT THE PUMP IS NOT AFFECTED BY PIPE EXPANSION, CONTRACTION, OR DEFLECTION. PIPE EXPANSION AND CONTRACTION IS CAUSED BY CHANGES IN THICK STOCK TEMPERATURE. PIPE DEFLECTIONS MAY BE CAUSED BY THERMAL EXPANSION OR THE RELATIVELY HIGH FRICTIONAL FORCES OCCURRING WHEN THE THICK STOCK IS PUMPED. ANCHOR PIPE SO THAT EXPANSION AND CONTRACTION FORCES ARE NOT TRANSMITTED TO THE PUMP. SUPPORT PIPE SO THAT PIPE ALIGNMENT IS MAINTAINED AT THE PUMP FLANGE AND TOWER OR MIXER. INSTALLATION SUGGESTIONS FOLLOW.

1. THE PIPE SHOULD BE ANCHORED TO A CONCRETE PIER REINFORCED WITH STEEL BARS SO THAT PIER, CONCRETE PUMP BASE AND FLOOR ARE TIED TOGETHER TO FORM A RIGID UNIT. THE PIER MUST SUPPORT THE PIPE SO THAT PUMP AND PIPE FLANGES ARE PARALLEL AND BOLT HOLES ALIGNED. SECURE FLANGE AND ANCHOR BOLTS CAREFULLY TO PREVENT EITHER PUMP OR PIPE DEFLECTION.

DISCHARGE PIPING – (CONTINUED)

2. PIPE SUPPORTS MUST MAINTAIN PIPE ALIGNMENT AT THE PUMP FLANGE. PIPE SUPPORTS OTHER THAN THE ANCHOR SUPPORTS MAY ALLOW EXPANSION OR CONTRACTION AS LONG AS STRAINS ARE NOT TRANSMITTED TO THE PUMP.

3. LONG STRAIGHT RUNS OF PIPE MAY REQUIRE EXPANSION JOINTS. IN CASES WHERE EXPANSION JOINTS ARE REQUIRED, ANCHOR PIPE SO THAT EXPANSION FORCES ARE NOT TRANSMITTED TO PUMP, TOWER OR MIXER. IF BENDS ARE REQUIRED, A LONG RUN BETWEEN ADJACENT BENDS MAY ALLOW ENOUGH DEFLECTION TO TAKE CARE OF THERMAL EXPANSION AND CONTRACTION.

4. USE AS FEW BENDS IN THE PIPE AS POSSIBLE.

5. AVOID SHORT RADIUS BENDS.

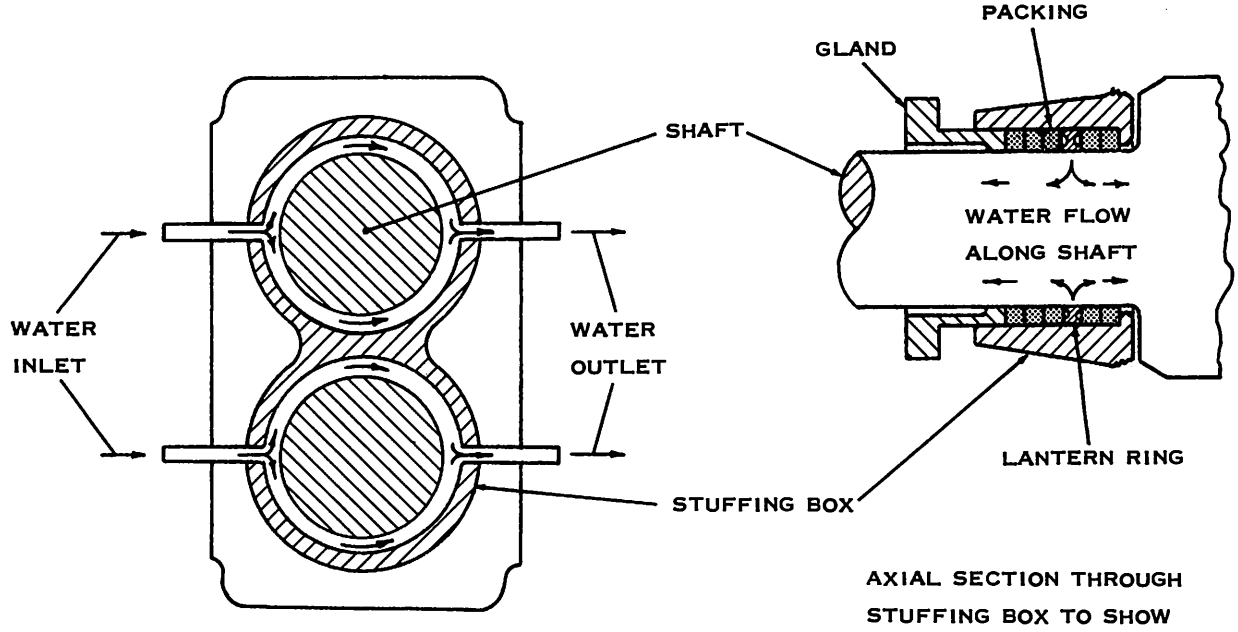
6. USE 45 DEGREE BENDS INSTEAD OF 90 DEGREE BENDS IF POSSIBLE.

7. AVOID A SHORT 90 DEGREE CROSS RUN AT THE END OF A LONG RUN.

8. BRACE ELEVATED BRIDGES CARRYING THICK STOCK PIPING TO PREVENT LONGITUDINAL MOVEMENT OF THE BRIDGE.

STUFFING BOX SEAL WATER PIPING

WATER MUST BE FLOWING THROUGH EACH OF THE FOUR STUFFING BOXES WHENEVER THE PUMP IS RUNNING TO PROVIDE SHAFT LUBRICATION AS SHOWN.



CROSS SECTION THROUGH STUFFING BOX TO SHOW SEAL WATER FLOW AROUND SHAFT

AXIAL SECTION THROUGH STUFFING BOX TO SHOW SEAL WATER LUBRICATION OF SHAFT

FIGURE 3. SECTIONS THROUGH STUFFING BOX

STUFFING BOX SEAL WATER PIPING – (CONTINUED)

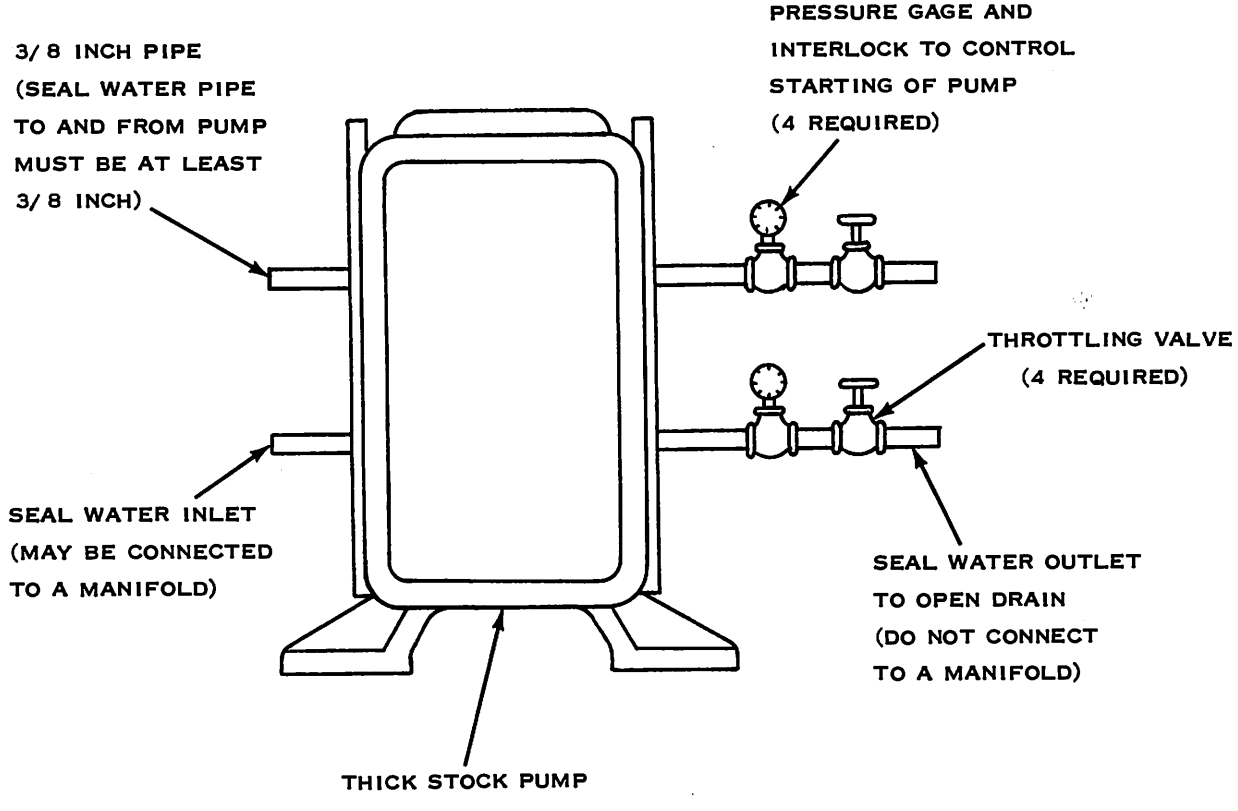
THE STUFFING BOXES MUST BE PRESSURIZED WITH SEALING WATER WHENEVER THERE IS ANY STOCK PRESSURE ON THE PUMP AND WHENEVER THE PUMP IS RUNNING. INSTALL SEAL WATER PIPING AS FOLLOWS TO ASSURE THAT THE PUMP IS NOT STARTED OR OPERATED WITH INSUFFICIENT SEAL WATER PRESSURE IN THE STUFFING BOX.

1. SUPPLY SEAL WATER AT PRESSURE OF 5 TO 10 PSI GREATER THAN STOCK DISCHARGE PRESSURE OF PUMP. MINIMUM QUANTITY OF SEALING WATER REQUIRED IS 5 GPM FOR EACH PUMP. SEAL WATER INLETS MAY BE MANIFOLDED IF DESIRED.

2. INSTALL INTERLOCK ON EACH OUTLET TO PREVENT PUMP START UP BEFORE ALL STUFFING BOXES ARE PRESSURIZED.

3. INSTALL THROTTLING VALVE ON EACH OUTLET.

4. RUN EACH SEAL WATER OUTLET PIPE TO AN OPEN DRAIN TO ASSURE THAT SEAL WATER IS FLOWING THROUGH EACH STUFFING BOX. VISIBLE CONTINUOUS FLOW MUST BE MAINTAINED AT ALL TIMES.



SEAL WATER PIPING

FLUSHOUT PIPING

INSTALL FLUSHOUT PIPING AS SHOWN IN DIAGRAM OR CERTIFIED DRAWINGS AND INSTRUCTIONS SENT WITH DRAWINGS. PUMP, DISCHARGE LINE, AND ANY EQUIPMENT SUCH AS MIXERS IN THE LINE SHOULD BE FLUSHED CLEAN BEFORE THE PUMP IS SHUT DOWN SO THAT STOCK DOES NOT HARDEN AND CAUSE TROUBLE AT START-UP. HIGH PRESSURE FRESH WATER MUST BE SUPPLIED AT APPROXIMATELY 10 PSI HIGHER THAN PUMP DISCHARGE PRESSURE.

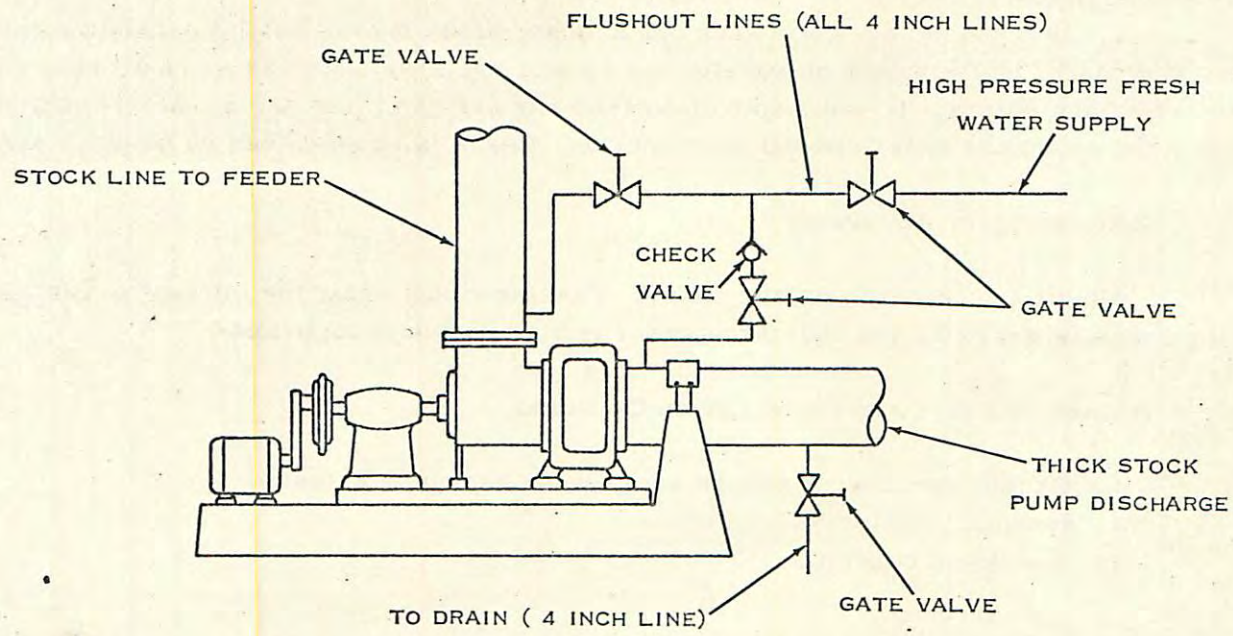


FIGURE 5. FLUSHOUT PIPING DIAGRAM

INSTALLATION OF DRIVE COUPLING

BE SURE TO CHECK THE MOTOR ROTATION BEFORE THE MOTOR IS COUPLED TO THE PUMP. IF THE PUMP HAS A BACK STOP, THE BACK STOP WILL BE DAMAGED IF THE PUMP IS TURNED BACKWARD BY THE MOTOR. BEFORE CHECKING PUMP ROTATION, REMOVE CAP SCREWS AND TAPER PINS FROM THE CAM CLUTCH HOUSING. SEE "BACK STOP CHECKOUT OR INSTALLATION" ON THE NEXT PAGE. REVERSE THE BACK STOP CAM CLUTCH WHENEVER THE PUMP ROTATION IS CHANGED.

ALIGN THE DRIVE AND DRIVEN SHAFTS AS ACCURATELY AS POSSIBLE FOR MAXIMUM COUPLING LIFE. INSTRUCTIONS FOR INSTALLING AJAX COUPLINGS ARE INCLUDED IN THE APPENDIX. ANY OTHER COUPLING SHOULD BE INSTALLED AS SPECIFIED BY THE MANUFACTURER. IF NO ALIGNMENT INSTRUCTIONS ARE GIVEN, USE THE FOLLOWING TO ALIGN THE COUPLING.

INSTALLATION OF DRIVE COUPLING – (CONTINUED)

PARALLEL ALIGNMENT OF COUPLING FACES

1. IF COUPLING HAS LARGE FLANGED HUBS, ASSEMBLE THE HUBS ON THE SHAFTS AND ALIGN SO THAT THE FACES OF THE HUBS ARE PARALLEL. MEASURE BETWEEN THE FACES WITH A FEELER GAGE OR AN INDICATOR. IF A FEELER GAGE IS USED, MEASURE AT FOUR PLACES, 90 DEGRESS APART. IF AN INDICATOR IS USED, ATTACH AN INDICATOR TO ONE HUB, TAKE READINGS FROM THE FACE OF THE OPPOSITE HUB AS THE INDICATOR HUB IS TURNED ONE REVOLUTION.
2. IF COUPLING DOES NOT HAVE LARGE HUBS, ALIGN SHAFTS WITH A STRAIGHT EDGE AND FEELER GAGE. IF THE SHAFT DIAMETERS ARE EQUAL, THE STRAIGHT EDGE SHOULD TOUCH THE SHAFT AT ALL POINTS. IF THE SHAFT DIAMETERS ARE UNEQUAL, THE GAP BETWEEN THE STRAIGHT EDGE AND SMALLEST SHAFT SHOULD BE PARALLEL. CHECK IN FOUR PLACES 90 DEGREES APART.

CONCENTRICITY ALIGNMENT

MOUNT AN INDICATOR ON ONE SHAFT. TAKE READINGS FROM THE OUTSIDE DIAMETER OF THE OPPOSITE SHAFT AS THE INDICATOR SHAFT IS TURNED ONE REVOLUTION.

ANCHORING DRIVE AND INSTALLATION COUPLING

1. SECURE DRIVE WITH ANCHOR BOLTS WHEN PROPERLY ALIGNED.
2. INSTALL DOWEL PINS.
3. ASSEMBLE COUPLING.

INITIAL LUBRICATION

LUBRICATE THE EQUIPMENT AS DESCRIBED IN LUBRICATION.

BACK STOP CHECKOUT OR INSTALLATION

BACK STOP FUNCTION MUST BE CHECKED SINCE ROTATION SPECIFIED IN PURCHASE ORDER MAY DIFFER FROM THAT DESIRED AT THE TIME OF PUMP INSTALLATION IN THE MILL. CHECK THE CAM CLUTCH HOUSING TO BE SURE THAT THE TAPER PINS AND 3/8 –16 UNC X 1-1/2 CAP SCREWS ARE REMOVED BEFORE ROTATING PUMP. ROTATE PUMP IN CORRECT DIRECTION. CAM CLUTCH HOUSING SHOULD NOT TURN WHEN ROTOR IS TURNING IN THE CORRECT DIRECTION. IF HOUSING ROTATES WHEN PUMP IS ROTATING CORRECTLY, REMOVE HOUSING AND CAM CLUTCH, TURN CAM CLUTCH END FOR END AND REASSEMBLE. INSTALL THE TAPER PINS AND MOUNTING CAP SCREWS AFTER MOTOR ROTATION IS CHECKED. FOLLOW THE FIELD INSTALLATION INSTRUCTIONS IN THE MAINTENANCE SECTION WHEN INSTALLING A BACK STOP ON AN EXISTING PUMP IN THE MILL.

WIRING

CONNECT ZERO SPEED SWITCH, PUMP AND FEEDER MOTORS AS SHOWN BY FIGURE 24 IN THE APPENDIX.

OPERATING INSTRUCTIONS

SEAL WATER FOR STUFFING BOXES

1. Maintain seal water pressure at 5 to 10 psi greater than stock discharge pressure of pump. A pressure differential of less than 5 psi may let pulp enter the stuffing box. Pressure differentials above 10 psi may cause excessive stock dilution. Maintain pressure whenever the pump is running or when there is any discharge pressure in the pump.
2. Maintain a continuous visible flow of sealing water whenever pump is running.

START-UP

1. Turn on sealing water lines to the pump stuffing boxes. Sealing water must be on whenever pump is running.
2. Start up process equipment preceding and following the thick stock pump.
3. With flush out drain open, start up feeder and pump.
4. Close drain valve when heavy stock appears at discharge drain.

FLUSHOUT PROCEDURE

1. Shut down equipment leading to the feeder and pump.
2. With feeder and pump running, seal water on and drain valve closed, open fresh water valve to the discharge line. Run water until high density stock is flushed out of the discharge line or pre-retention tube.
3. Open 4-inch drain valve on discharge line.
4. Open 4-inch fresh water valve to feed stock line.
5. When all lines clear, shut off 4-inch fresh water valves for feed line and discharge line.

SHUT DOWN

1. Flush out pump.
2. When all lines are clean, shut off feeder and pump.
3. Shut off all fresh and seal water valves. Do not close drain valve.

REMOVAL OF FOREIGN MATERIAL

If foreign material becomes lodged in the pump, reverse the rotors to remove the foreign material. Do not attempt to reverse the rotors until the back stop is released. Follow the instructions below when reversing rotors.

1. Remove the three 3/8 -16 UNC x 1-1/2 cap screws that secure the cam clutch housing.
2. Remove threaded taper pins from housing.
3. Turn rotors backward to withdraw foreign material from the pump.
4. When rotors are free, turn housing until the housing and gear case holes are aligned.
5. Secure housing with cap screws and taper pins.

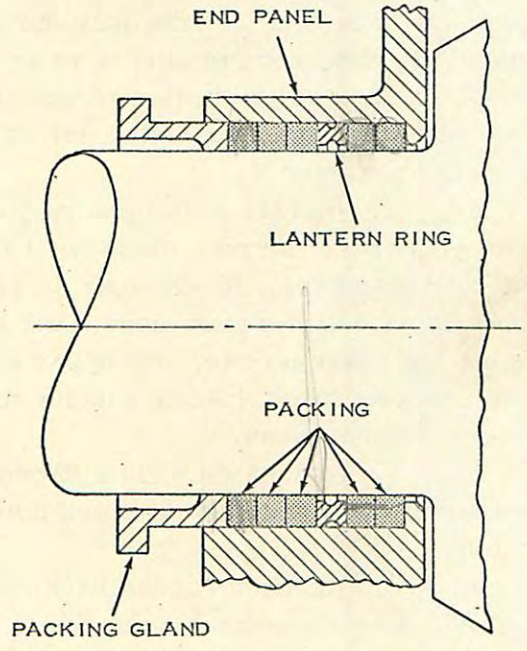
MAINTENANCE

PACKING STUFFING BOXES

IMPORTANT: THE MOST COMMON CAUSE OF PACKING FAILURE IS OVER-TIGHTENING OF THE GLAND. THE PACKING IS A THROTTLING DEVICE THAT CONTROLS THE LEAKAGE THROUGH THE STUFFING BOX. PUMP PACKING GLANDS ARE ADJUSTED TO ASSURE A MINIMUM DISCHARGE OF A "FEW DROPS PER MINUTE".

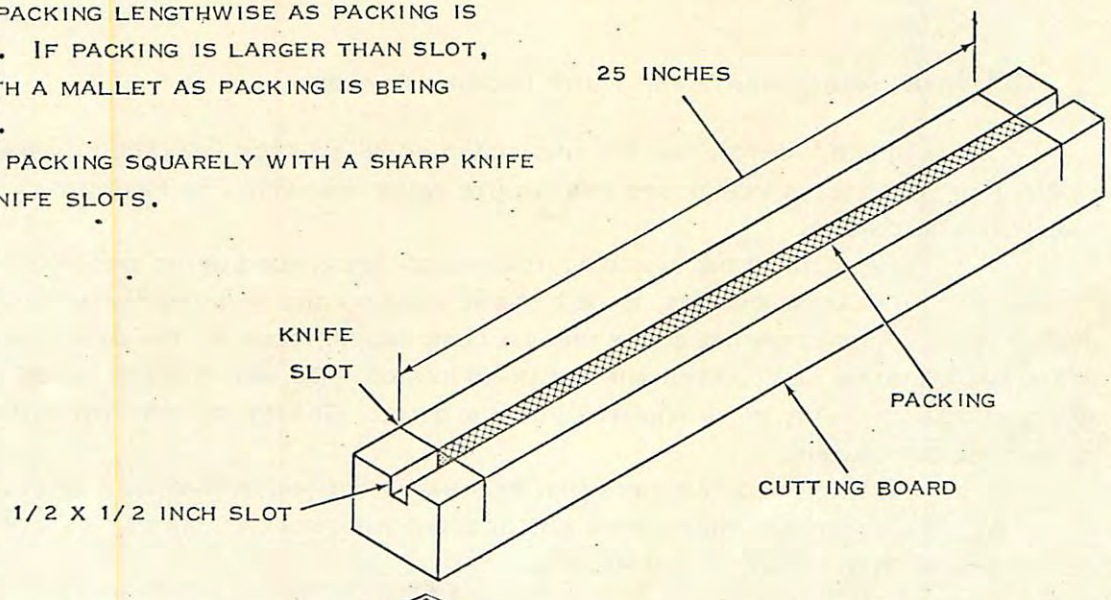
PACKING REMOVAL

1. REMOVE PACKING GLANDS OF PUMP OR PACKING RETAINER OR FEEDER.
2. REMOVE OLD PACKING. DO NOT SCRATCH OR MARK THE SHAFT WHEN USING A FLEXIBLE SHAFT PACKING HOOK OR TOOL. PUMP HAS FIVE PACKING RINGS AND A LANTERN RING AS SHOWN. EACH PUMP LANTERN RING HAS FOUR 3/16 INCH DIAMETER DRILLED HOLES FOR FLEXIBLE SHAFT DISASSEMBLY TOOLS. FEEDER HAS JUST THREE PACKING RINGS AND NO LANTERN RING.
3. CLEAN STUFFING BOX THOROUGHLY.



PACKING LENGTH, PUMP STUFFING BOX

1. FIT PACKING INTO THE CUTTING BOARD. PACKING MUST COMPLETELY FILL SIDES OF SLOT AND BE FLUSH WITH TOP OF BOARD. IF PACKING IS LOOSE IN SLOT, COMPRESS PACKING LENGTHWISE AS PACKING IS FITTED INTO SLOT. IF PACKING IS LARGER THAN SLOT, TAMP PACKING WITH A MALLET AS PACKING IS BEING FITTED INTO SLOT.
2. CUT PACKING SQUARELY WITH A SHARP KNIFE AT THE 25-INCH KNIFE SLOTS.



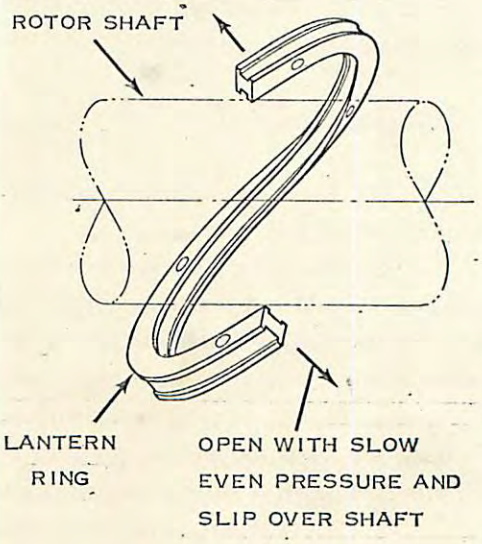
PACKING STUFFING BOXES – (CONTINUED)

Packing Installation

1. Wrap packing around shaft. Packing must be cut so that it is slightly larger than circumference of shaft; ends must be butted and pressed into stuffing box to start repacking. Never wind packing into a stuffing box.

2. Starting at the butt joint, insert the first packing ring into the box. Keep packing clean to prevent shaft scoring by foreign material imbedded in packing.

3. Fully seat the first packing ring with a tamping sleeve using the packing gland to apply a steady pressure. Fully seat the second ring with the joint at least 90 degrees from the joint in the first ring. When packing pump, insert lantern ring (feeder does not have a lantern ring). (If new lantern ring is to be installed, heat in clean hot water at approximately 140 F for 1/2 hour.) Install while hot as shown to prevent breaking.



4. Install remaining packing rings one at a time. Install rings with the joints 90 degrees apart. Rings must be seated individually and the ends must make a butt joint and leave no gap. Pump has a total of five packing rings. Feeder has a total of three packing rings.

5. Reassembly pump packing gland. Set packing gland firmly against packing and then take up gland nuts one complete turn, then back off nuts and retighten finger tight.

6. Replace feeder packing gland or retainer. Gland is adjusted as described above. Non-adjustable retainer is bolted securely on the stuffing box.

Operating Adjustments for Pump Packing Glands

1. Never tighten the packing gland so as to stop leakage completely. Allow leakage of at least a few drops per minute when operating to prevent excessive friction and shaft wear.

2. Check stuffing boxes at 15 minute intervals during the first few hours of operation. If heating occurs, back off the nuts on the packing gland studs to prevent overheating. The stuffing boxes should leak excessively at the start-up and be adjusted for a normal slow leak after the break-in period. Do not tighten gland nuts more than 1/6 of a turn (1 flat) in 15 minutes running time. Adjust so that the shaft is always wet at the packing gland.

3. Replace old packing when packing is compressed to 2/3 of the original volume. At this point the shaft does not receive the proper lubrication and may be damaged. Replace with new clean packing.

PACKING STUFFING BOXES – (CONTINUED)

PERIODIC PACKING REPLACEMENT

PULP FIBERS MAY ENTER THE STUFFING BOX; THEREFORE, CLEAN OUT THE STUFFING BOX AND REPLACE THE PACKING AT LEAST ONCE EVERY THREE MONTHS. INSPECT THE PACKING CLOSELY TO SEE IF PACKING PERIOD IS SATISFACTORY. DO NOT EXTEND THE PACKING PERIOD UNTIL MILL EXPERIENCE INDICATES THAT THE PERIOD COULD BE LENGTHENED SAFELY.

OIL SEAL REPLACEMENT

THIS PROCEDURE IS USED TO REPLACE ANY SET OF SEALS IN THE THICK STOCK PUMP. OIL SEALS ARE LOCATED IN ALL THE INNER BEARING COVERS AND IN THE DRIVE END COVER AT THE DRIVE ROTOR SHAFT. ORIGINAL EQUIPMENT SEALS ARE SOLID; REPLACEMENT SEALS ARE SPLIT TO FACILITATE REPLACEMENT.

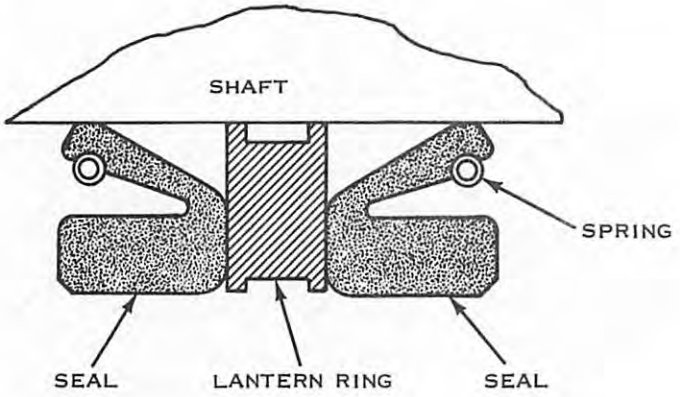
1. REMOVE THE CAP SCREWS FROM THE RETAINER PLATE (SEE FIGURE 3). PACKING GLAND MAY BE REMOVED FOR WORKING SPACE.

FIGURE 3. INNER BEARING COVER DISASSEMBLED

2. CAREFULLY WITHDRAW OUTER SEAL, LANTERN RING AND INNER SEAL. CUT AND DISCARD SEALS.
3. FLUSH GREASE FITTING WITH FRESH GREASE AND WIPE HOUSING CLEAN.
4. LIGHTLY GREASE SHAFT AND SPRING GROOVE OF SEALS.
5. WRAP SEAL AROUND SHAFT AND HOOK ENDS TOGETHER.

SEAL REPLACEMENT – (CONTINUED)

6. PLACE SEALS ON SHAFT AS SHOWN BELOW.



SECTION THROUGH SEALS

7. WITH SEAL AND GARTER SPRING JOINTS STAGGERED, PRESS SPRING INTO SEAL GROOVE. PRESS ASSEMBLY INTO SEAL CAVITY WITH SEAL JOINT AT TOP OF SHAFT.
8. ATTACH SEAL RETAINER PLATE WITH THE CAP SCREWS.
9. LUBRICATE FOLLOWING INSTRUCTIONS IN LUBRICATION.

BEARING REMOVAL ON DRIVE END

THE ROTOR BEARINGS ARE TAPERED BORE, SPHERICAL ROLLER BEARINGS. TOOLS REQUIRED FOR BEARING REMOVAL ARE AS FOLLOWS:

1. HYDRAULIC OIL PUMP – 10,000 PSI CAPACITY. (BALCKHAWK P39 OR EQUAL, BLACKHAWK INDUSTRIAL PRODUCTS CO., BUTLER, WISCONSIN)
2. PUMP HOSE – FLEXIBLE HOSE WITH A MALE END FITTING FOR THE 3/8 INCH – 18 NPTF HOLE IN THE ROTOR. DO NOT USE ANY CAST IRON FITTINGS. ALL FITTINGS AND HOSE MUST WITHSTAND HIGH PRESSURE.
3. SPACERS. WHEN ONLY ONE BEARING IS TO BE REMOVED, MAKE UP TEN HARDBOARD SPACERS 8–3/4 INCH OD, 8 INCH ID, 1/4 INCH WALL THICK AND SPLIT IN HALF.

TAPERED BORE BEARINGS ARE REMOVED WITH HYDRAULIC ASSISTANCE AS FOLLOWS:

1. DISCONNECT DRIVE, DRAIN OIL FROM THE DRIVE END COVER AND REMOVE COVER.
2. PRY LOCK WASHER TANG OUT OF LOCK NUT SLOT (SEE FIGURE 4).

BEARING REMOVAL ON DRIVE END – (CONTINUED)

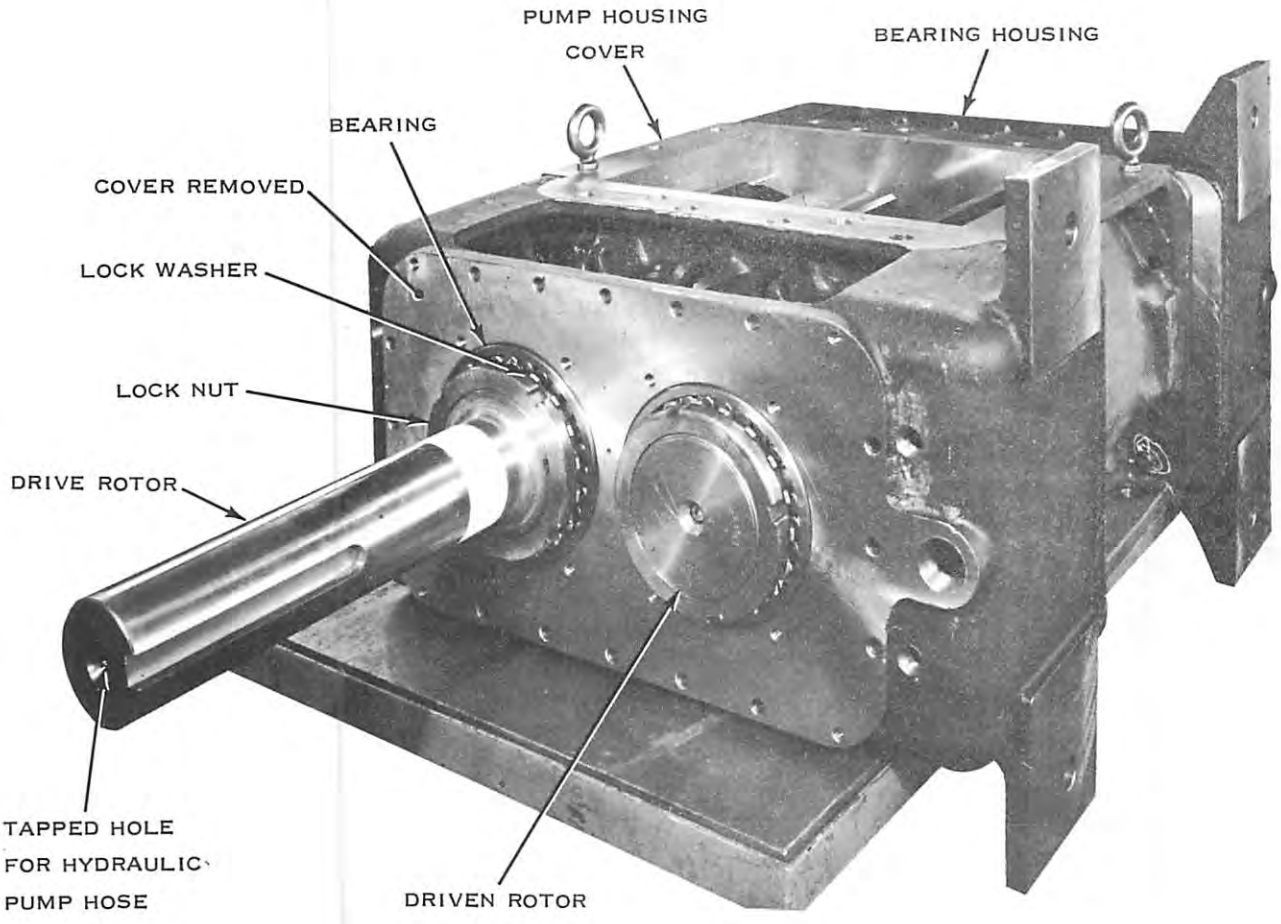


FIGURE 4. DRIVE END BEARING COVER REMOVED

3. BACK OFF THE LOCK NUT TWO OR THREE TURNS. AS A SAFETY MEASURE, DO NOT REMOVE THE LOCK NUT UNTIL THE BEARING IS RELEASED WITH HYDRAULIC PRESSURE.

4. ATTACH HYDRAULIC PUMP TO THE END OF THE ROTOR AND APPLY OIL PRESSURE UNTIL THE BEARING IS RELEASED FROM THE TAPERED SHAFT SEAT.

5. REMOVE PUMP PIPE, LOCK NUT AND LOCK WASHER. IF BOTH BEARINGS ARE TO BE REMOVED, RELEASE BOTH BEARINGS, UNBOLT BEARING HOUSING FROM PUMP HOUSING COVERS, AND PULL BEARINGS OFF SHAFT WITH BEARING HOUSING. IF ONLY ONE BEARING IS TO BE REMOVED, PRESS BEARING OUT AS FOLLOWS.

6. REMOVE THE STUFFING GLAND.

7. TAKE OUT THE SCREWS IN THE INNER BEARING COVER.

8. PLACE SPACERS BETWEEN THE INNER BEARING COVER AND THE BEARING.

BEARING REMOVAL ON DRIVE END – (CONTINUED)

9. REPLACE SCREWS AND PRESS BEARING OUT OF THE BEARING HOUSING USING INNER BEARING COVER AND SPACERS. TIGHTEN SCREWS UNIFORMLY SO THAT THE BEARING IS NOT COCKED IN THE BORE OF THE BEARING HOUSING.

BEARING REMOVAL ON TIMING GEAR END

THE ROTOR BEARINGS ARE TAPERED BORE SPHERICAL ROLLER BEARINGS. TOOLS REQUIRED FOR BEARING REMOVAL ARE AS FOLLOWS:

1. HYDRAULIC OIL PUMP – 10,000 PSI CAPACITY. (BLACKHAWK P39 OR EQUAL, BLACKHAWK INDUSTRIAL PRODUCTS CO., BUTLER, WISCONSIN)
2. PUMP HOSE – FLEXIBLE HOSE WITH A MALE END FITTING FOR THE 3/8 INCH – 18 NPTF HOLE IN THE ROTOR. DO NOT USE ANY CAST IRON FITTINGS. ALL FITTINGS AND HOSE MUST WITHSTAND HIGH PRESSURE.
3. SPACERS. WHEN ONLY ONE BEARING IS TO BE REMOVED, MAKE UP TEN HARDBOARD SPACERS 8–3/4 INCH OD, 8 INCH ID, 1/4 INCH THICK AND SPLIT IN HALF.

TAPERED BORE BEARINGS ARE REMOVED WITH HYDRAULIC ASSISTANCE AS FOLLOWS:

1. DISCONNECT DRIVE, DRAIN OIL FROM THE GEAR CASE AND REMOVE GEAR CASE.
2. REMOVE THE 5/8 INCH – 11 UNC SOCKET HEAD CAP SCREWS FROM THE TIMING GEAR. IF ROTOR HAS A BACK STOP, PULL BACK STOP EXTENSION WITH JACK SCREWS WHICH ARE SCREWED INTO THE 1/2 INCH – 13 UNC HOLES IN THE EXTENSION (SEE FIGURE 5).
3. PULL THE FOUR THREADED TAPER PINS OUT OF THE TIMING GEAR AND PULL THE GEAR WITH 1/2 INCH – 13 UNC JACK SCREWS.
4. REMOVE THE OUTER COVER FOR THE HELD BEARING.
5. PRY LOCK WASHER TANG OUT OF THE LOCK NUT SLOT.
6. BACK OFF THE BEARING LOCK NUT TWO OR THREE TURNS. AS A SAFETY MEASURE, DO NOT REMOVE THE LOCK NUT UNTIL THE BEARING IS RELEASED WITH HYDRAULIC PRESSURE.

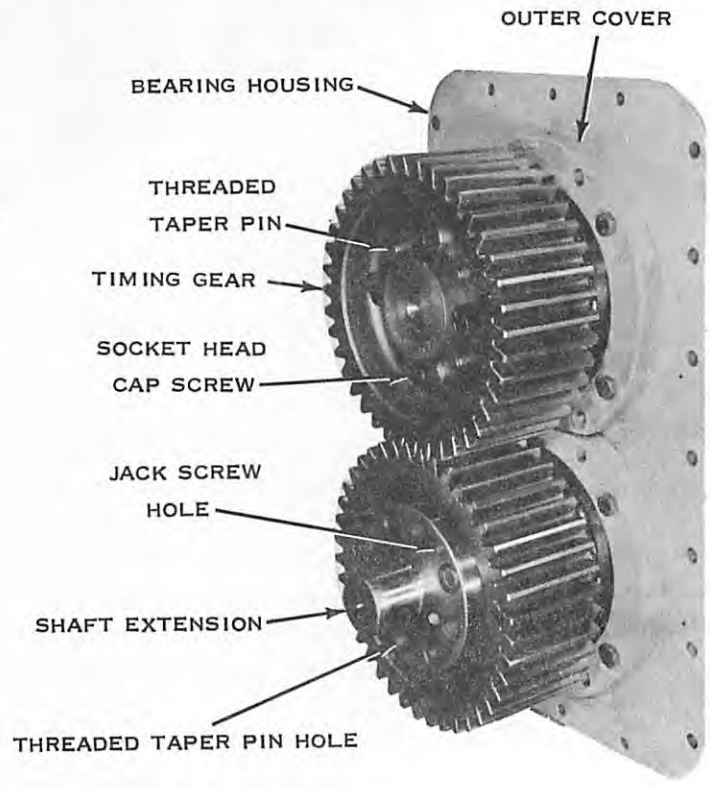


FIGURE 5. TIMING GEARS

BEARING REMOVAL ON TIMING GEAR END – (CONTINUED)

7. ATTACH HYDRAULIC PUMP TO THE END OF THE ROTOR SHAFT AND APPLY OIL PRESSURE UNTIL THE BEARING IS RELEASED FROM THE TAPERED SHAFT SEAT.

8. REMOVE PUMP PIPE, LOCK NUT AND LOCK WASHER. IF BOTH BEARINGS ARE TO BE REMOVED, RELEASE BOTH BEARINGS, UNBOLT BEARING HOUSING FROM PUMP HOUSING COVERS, AND PULL BEARINGS OFF SHAFT WITH BEARING HOUSING. IF ONLY ONE BEARING IS TO BE REMOVED, PRESS BEARING OUT AS FOLLOWS.

9. REMOVE THE STUFFING GLAND.

10. TAKE OUT THE SCREWS IN THE INNER BEARING COVER.

11. PLACE SPACERS BETWEEN THE INNER BEARING COVER AND THE BEARING.

12. REPLACE SCREWS AND PRESS BEARING OUT OF THE BEARING HOUSING USING INNER BEARING COVER AND SPACERS. TIGHTEN SCREWS UNIFORMLY SO THAT THE BEARING IS NOT COCKED IN THE BORE OF THE HOUSING.

DISASSEMBLY OF ROTORS

FOLLOW THIS PROCEDURE TO DISASSEMBLE PUMP IF ROTOR SHAFT SLEEVES OR ROTORS ARE TO BE REPLACED. ROTORS AND TIMING GEARS ARE ASSEMBLED AND TIMED AT IMPCO. NEVER INTERCHANGE ROTORS OR TIMING GEARS.

1. DISASSEMBLE DRIVE, INLET PIPING, OUTLET PIPING, AND STUFFING BOX PIPING.

2. PULL THREADED TAPER PINS, DISMOUNT PUMP, AND MOVE PUMP TO A WORK PLATFORM.

3. REMOVE END COVERS AND BEARINGS AS DESCRIBED IN THE PRECEDING SECTIONS.

4. TAKE PACKING OUT OF STUFFING BOXES.

5. REMOVE 7/8 – 9 UNC X 2-1/4 CAP SCREWS FROM THE BEARING HOUSINGS AND PUMP HOUSING COVERS.

6. SEPARATE THE BEARING HOUSINGS FROM THE PUMP HOUSING COVERS.

SLEEVE REPLACEMENT ON ROTORS

1. Remove old sleeves from the rotor. Packing sleeves are mounted with a shrink fit without Loctite sealant and oil seal sleeves with Loctite sealant without a shrink fit. Use care when removing worn packing sleeves as replacement sleeves cannot be shrunk on an undersize shaft. Outside diameter should not be turned down to remove tool marks. If packing has cut through the sleeve, the hub of the rotor may be scored or grooved. Do not fill grooves with circumferential welding. Any such grooves should be polished prior to replacing sleeves.

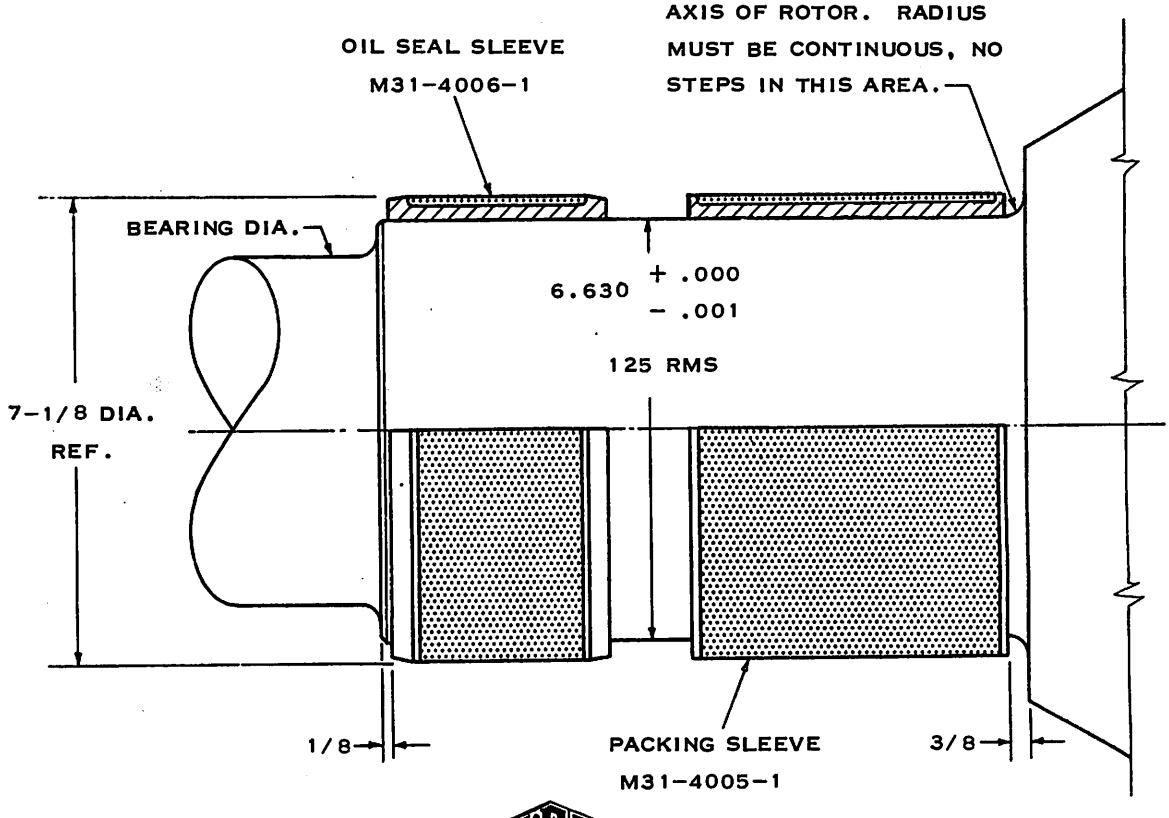
2. Heat packing sleeve in oven to 400-450 degrees F for three hours. Do not heat with a torch. Shrink sleeve on shaft with sleeve located as shown.

3. Clean inside of oil seal sleeve and sleeve mounting surface of rotor with "Locquic Primer" (either Grade N or Grade Q).

4. When Locquic Primer dries, apply Loctite Grade AV Sealant evenly, but sparingly, to mating surfaces of oil seal sleeve and rotor.

5. Place oil seal sleeve on shaft with a twisting motion to spread Loctite evenly between sleeve and shaft. Locate sleeve as shown and do not move the sleeve during the cure period specified in the Loctite Kit. The cure time can be shortened by heating sleeve to a maximum of 200 degrees F. Do not use torch on sleeve. Wrap rag around sleeve and soak with hot water to accelerate cure.

Section Through Rotor Sleeves
(Hard Faced)



REASSEMBLY OF PUMP HOUSING AND ROTORS

1. Inspect all parts and replace as required. Install new oil seals in the inner bearing covers to assure maximum protection of the bearings.

2. Support rotors on blocks. Be sure rotor match marks are properly aligned.

3. Slide one bearing housing over the rotor shaft replacing stuffing box lantern ring and inner bearing cover as housing is assembled. Be sure inner bearing cover is properly reassembled and has new oil seals and "O" ring. Slide bearing housing up to the block. Support rotors with slings in the bearing housing opening. Remove block at bearing housing end (see Figure 6).

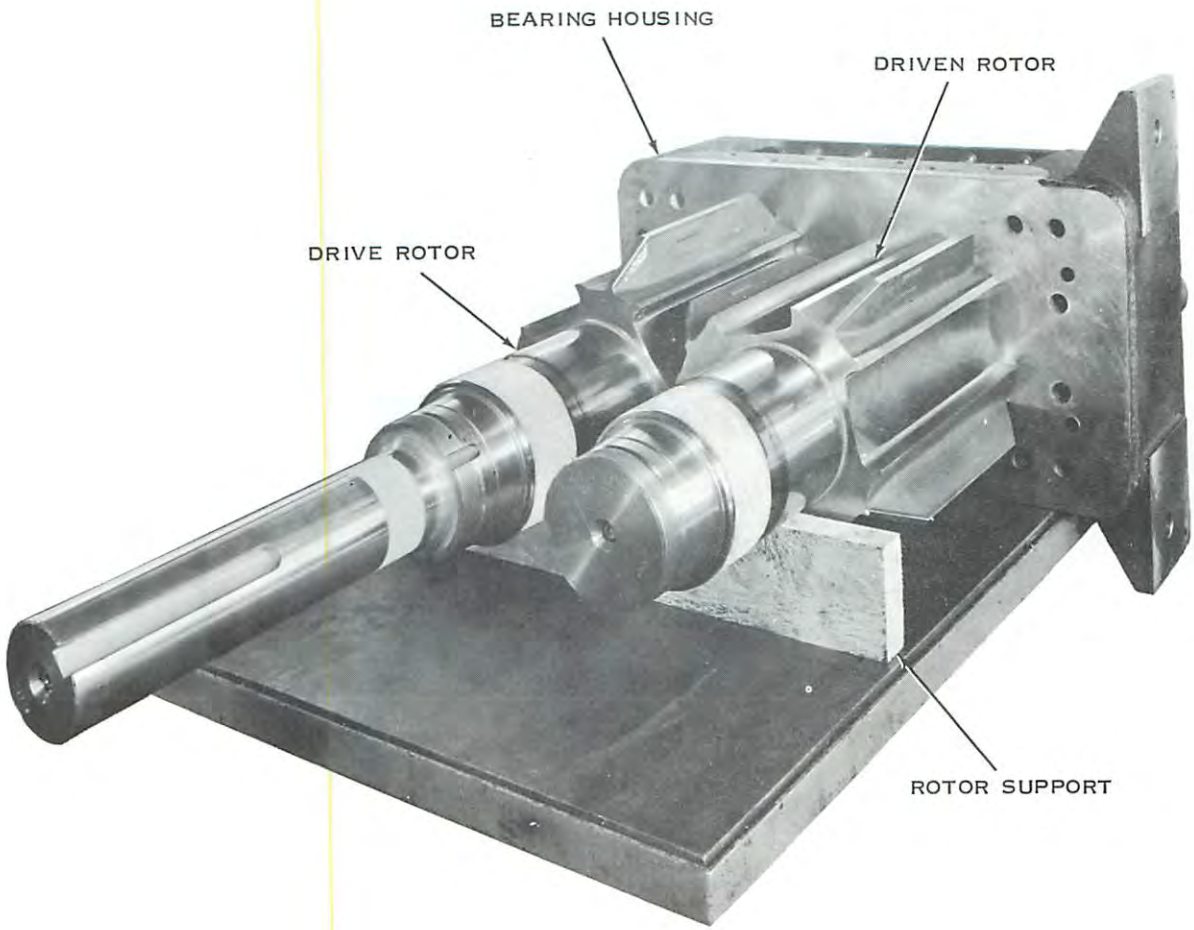


Figure 6. Rotors and Bearing Housing

REASSEMBLY OF PUMP HOUSING AND ROTORS – (CONTINUED)

4. SLIDE REMAINING BEARING HOUSING OVER THE ROTOR SHAFTS REPLACING STUFFING BOX LANTERN RINGS AND INNER BEARING COVERS AS HOUSING IS ASSEMBLED. BE SURE EACH INNER BEARING COVER IS PROPERLY REASSEMBLED AND HAS NEW OIL SEALS AND "O" RING (SEE FIG. 7).

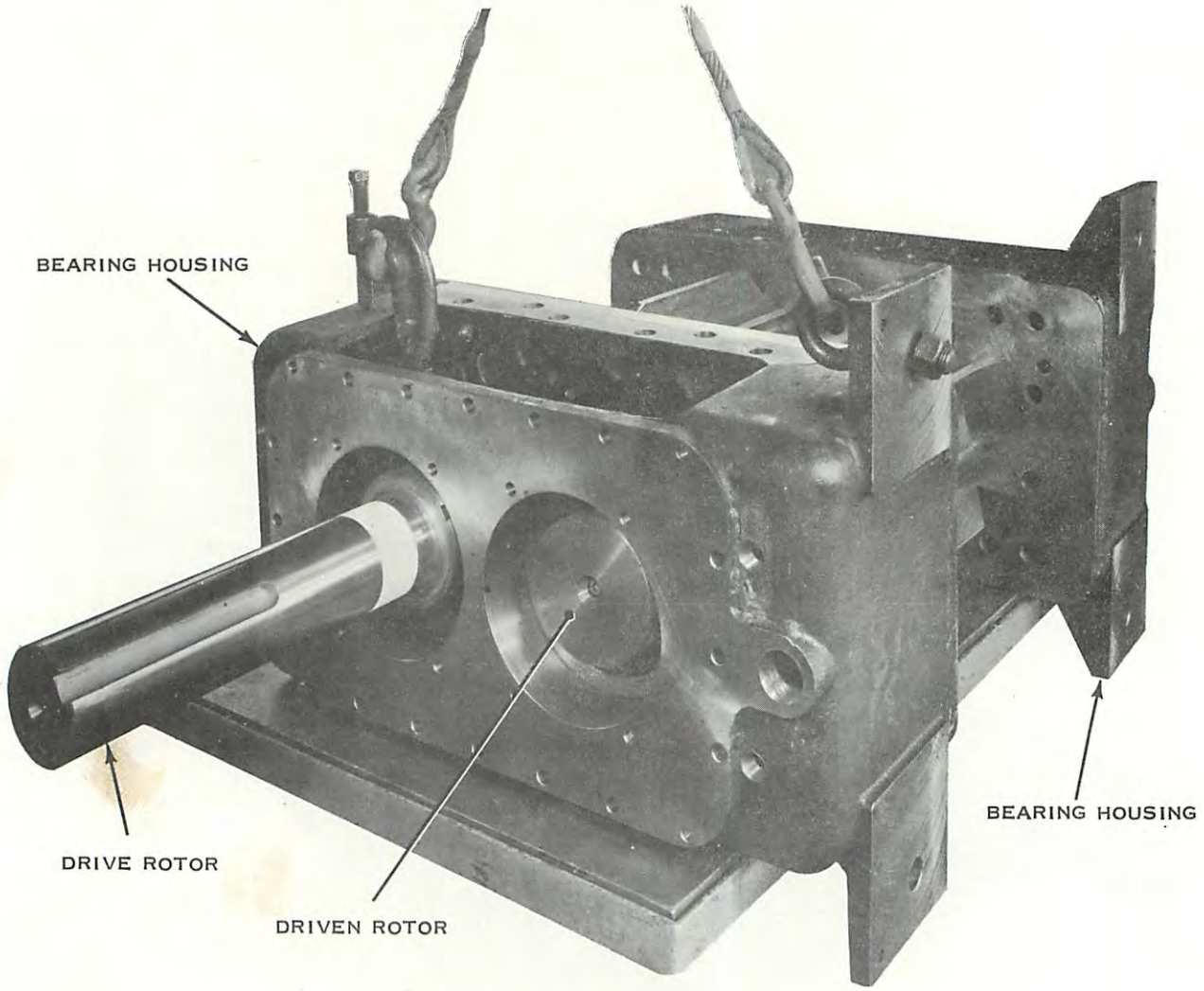


FIGURE 7. BEARING HOUSING ASSEMBLY

5. SUPPORT ROTORS WITH SLINGS AND REMOVE REMAINING SPACER BLOCK. BE SURE TO PROTECT THE SHAFT WITH BELTS OR PADDING WHEN HOISTING WITH A SLING.

REASSEMBLY OF PUMP HOUSING AND ROTORS – (CONTINUED)

6. BOLT PUMP HOUSING COVERS AND BEARING HOUSINGS TOGETHER WITH 7/8 – 9 UNC X 2-1/2 CAP SCREWS.

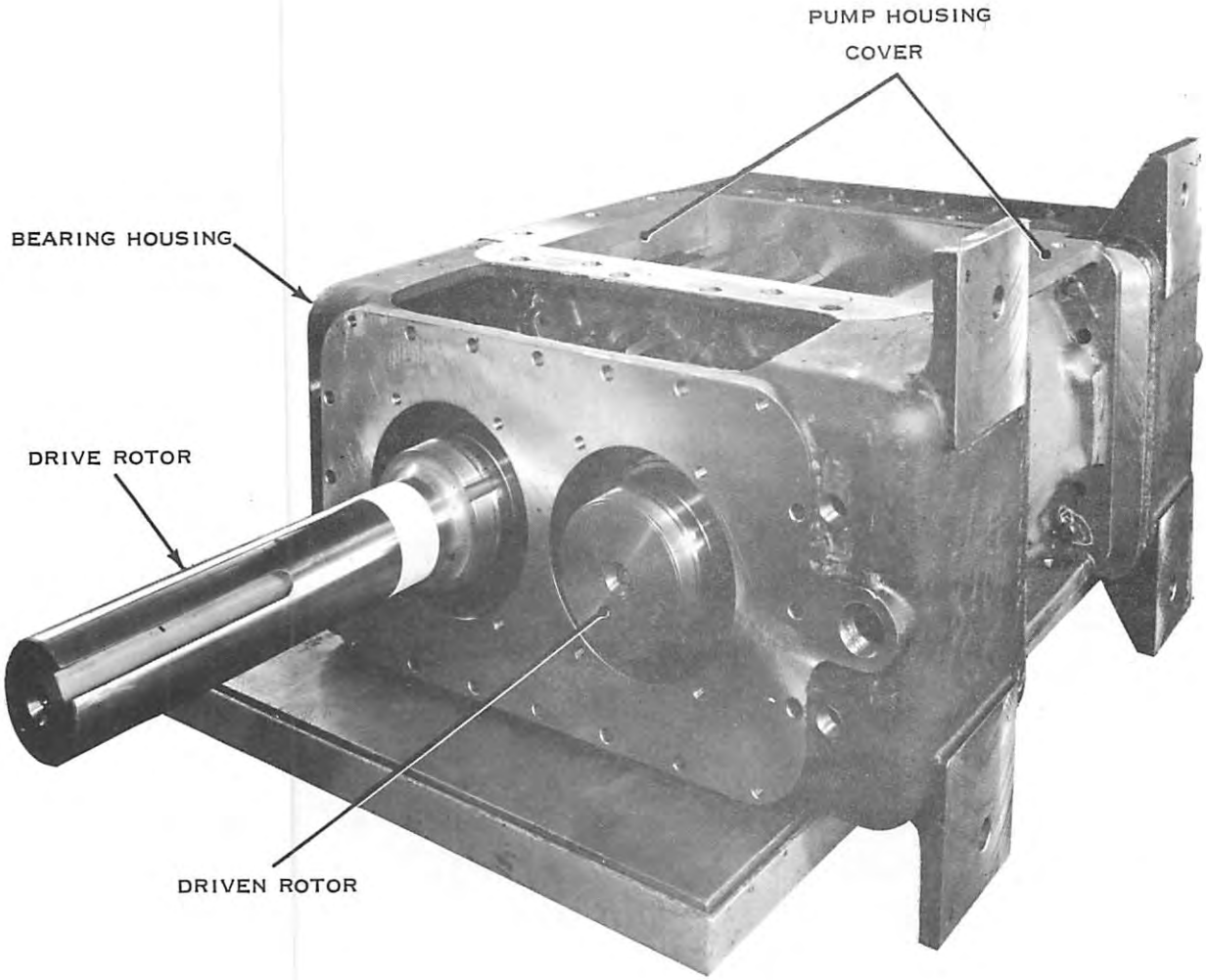


FIGURE 8. ASSEMBLY OF PUMP HOUSING COVERS

BEARING INSTALLATION ON ROTORS

1. Inspect bearing seat on rotor and the bore in the bearing housing. Be sure that housing bore and shaft seat are clean and free of burrs or physical damage.

2. Place bearing on a flat clean surface in an upright position.

3. Position bearing cages so that there is a roller on the top center of the bearing.

4. Press down on bore of inner race with thumbs and rock inner race axially back and forth to seat rollers in the outer race.

5. Measure the diametral clearance between the top rollers and outer race as shown. Slide feeler axially between roller and outer race. Do not force a feeler into the roller nip or rotate a roller onto the feeler. Measure diametral clearance at top roller on each side. The initial diametral clearance should be from 0.005 to 0.007 inch.

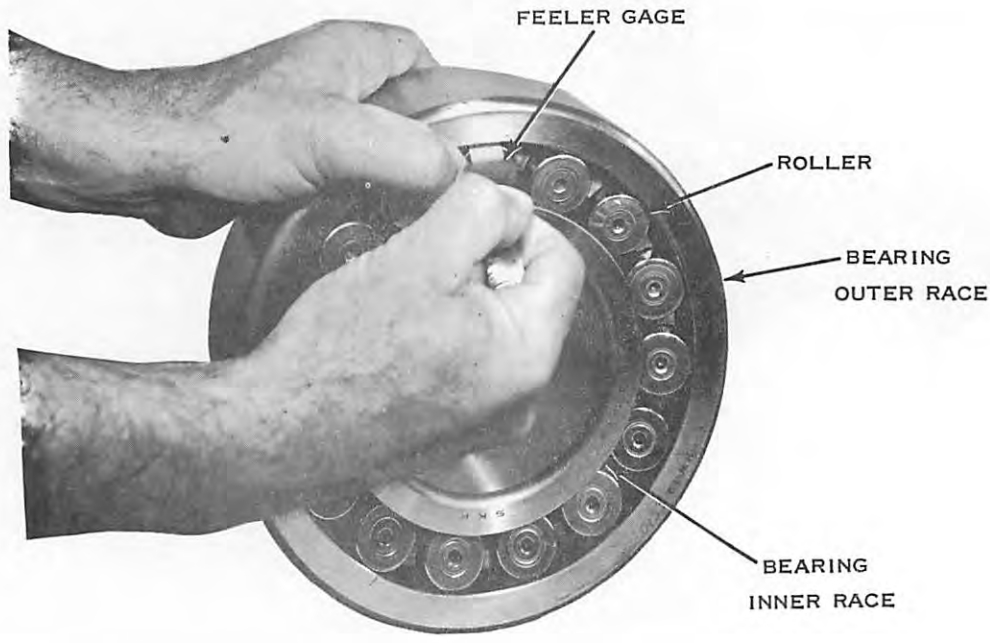


Figure 9. Measuring Initial Clearance

BEARING INSTALLATION ON ROTORS – (CONTINUED)

6. SUPPORT ROTOR IN CENTER OF BEARING HOUSING AS SHOWN IN FIGURE 10.

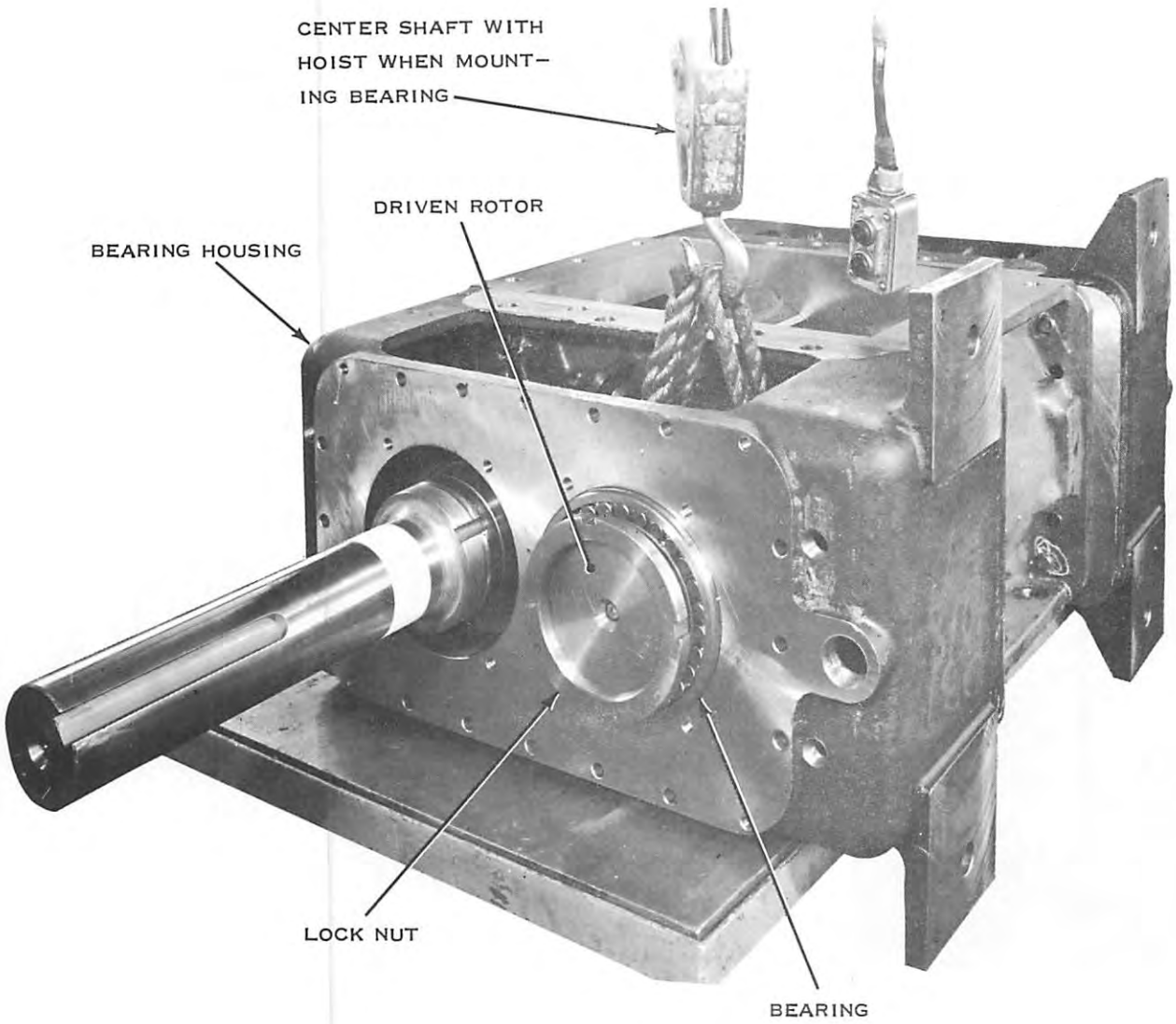


FIGURE 10. MOUNTING BEARING ON ROTOR

7. SLIDE THE BEARING UP THE TAPERED SEAT AS FAR AS IT WILL GO. SEAT BEARING FIRMLY ON SHAFT WITH LOCK NUT.

BEARING INSTALLATION ON ROTORS – (CONTINUED)

8. AFTER ALL BEARINGS ARE INSTALLED, SET PUMP IN AN UPRIGHT POSITION FOR FINAL BEARING ADJUSTMENTS (SEE FIGURE 11).

9. DRIVE BEARING UP THE SHAFT WITH THE LOCK NUT TO OBTAIN THE DIAMETRAL CLEARANCE SPECIFIED IN THE TABLE BELOW. IF BEARING IS DRIVEN UP TOO MUCH, BACK OFF THE LOCK NUT, RELEASE THE BEARING WITH HYDRAULIC PRESSURE AS SHOWN AND READJUST.

BEARING DIAMETRAL CLEARANCE

BEFORE MOUNTING	AFTER MOUNTING
0.005 INCH	0.002 INCH
0.006	0.0025
0.007	0.003

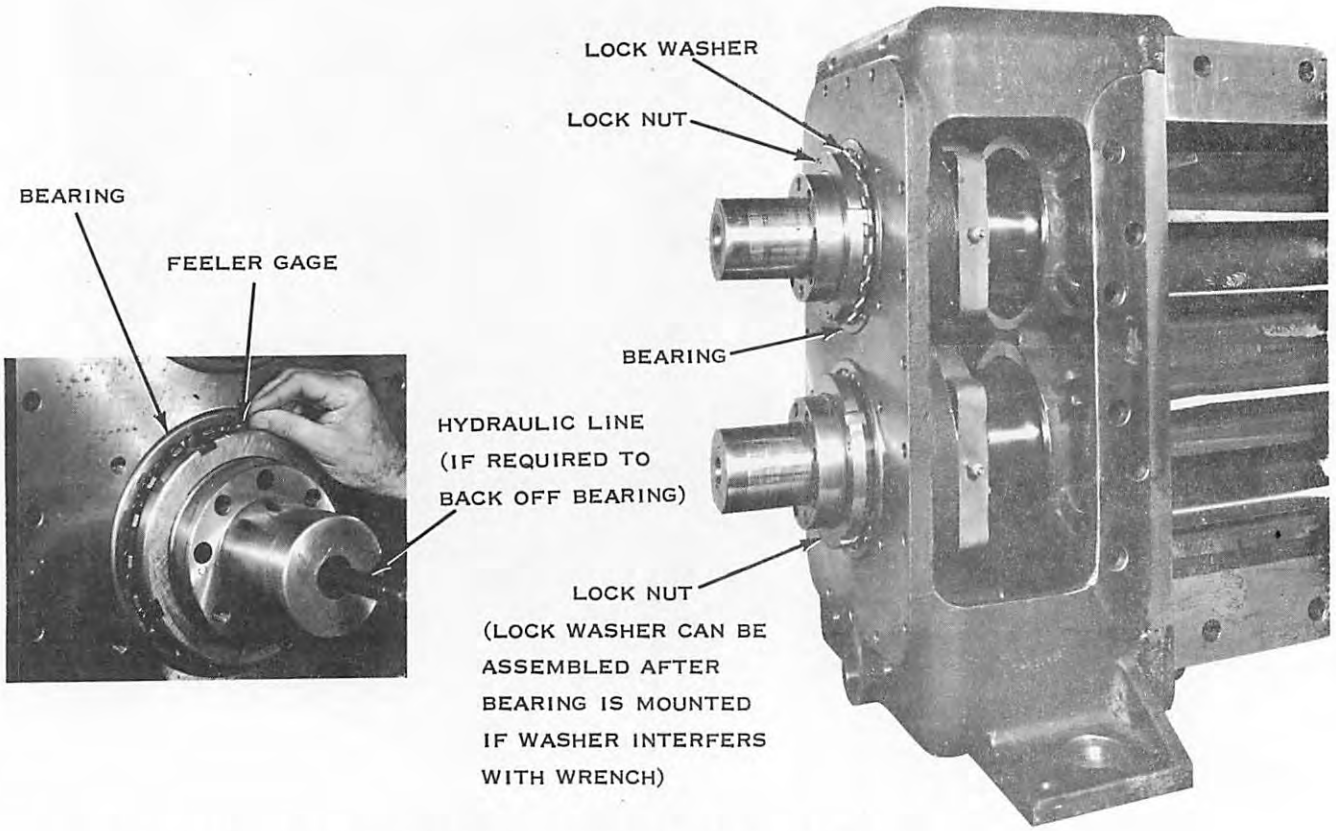


FIGURE 11. MEASURING BEARING DIAMETRAL CLEARANCE

10. CHECK THE DIAMETRAL CLEARANCE. MEASURE THE CLEARANCE AT AN UNLOADED ROLLER. BE SURE THERE IS NO HYDRAULIC PRESSURE ACTING ON THE INNER RACE WHEN CHECKING THE DRIVE FIT. SECURE LOCK NUT WITH LOCK WASHER.

REASSEMBLY OF COVERS, TIMING GEARS, AND GLANDS

OUTER RACES OF THE BEARINGS ON THE TIMING GEAR ENDS OF THE ROTORS ARE HELD WITH ADJUSTABLE INNER AND OUTER BEARING COVERS. THE CLEARANCE BETWEEN THE ENDS OF THE ROTOR BLADES AND BEARING HOUSINGS IS DETERMINED BY THE LOCATION OF THE HELD BEARINGS. ADJUST COVER CAP SCREWS CAREFULLY SO THAT THE GAPS AT THE ENDS OF THE ROTOR BLADES ARE EQUAL.

1. BOLT THE INNER BEARING COVERS LOOSELY ON THE BEARING HOUSING WITH 1/2 – 13 UNC X 1-3/4 SOCKET HEAD CAP SCREWS (SEE FIGURE 12).

2. BOLT THE OUTER BEARING COVER LOOSELY ON THE BEARING HOUSING WITH 1/2–13 UNC X 2 CAP SCREWS.

3. DRAW UP BEARING COVERS SO THAT ROTOR BLADES ARE LOCATED CENTRALLY BETWEEN THE BEARING HOUSINGS. GAPS AT THE ENDS OF THE ROTORS MUST NOT BE LESS THAN 0.005 INCH AND MUST BE EQUAL WITHIN 0.006 INCH. SINCE THERE IS SOME END PLAY IN THE BEARING, MOVE THE ROTORS BACK AND FORTH WITH A PINCH BAR WHEN CHECKING GAP.

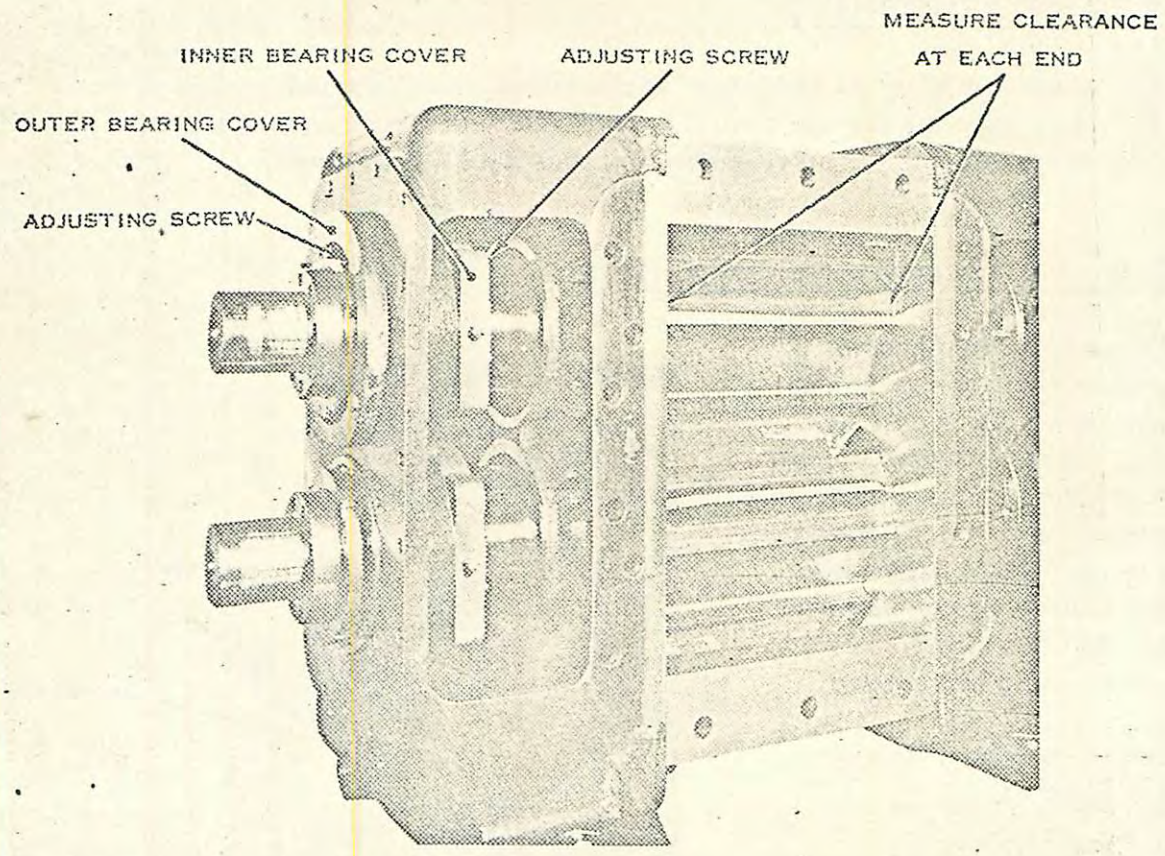


FIGURE 12. LOCATION OF HELD BEARING

REASSEMBLY OF COVERS, TIMING GEARS AND GLANDS – (CONTINUED)

4. REPLACE GEARS ON ROTORS. TIMING GEARS ARE MATCH MARKED AND IDENTIFIED BY DRIVE AND DRIVEN. GEAR AND ROTOR ALIGNMENT IS MAINTAINED BY FOUR TAPER PINS IN EACH GEAR. REASSEMBLE GEARS SO THAT TAPER PINS AND MATCH MARKS LINE UP. REPLACE SHAFT EXTENSION ON MACHINES WITH A BACK STOP AND SECURE EACH GEAR WITH TAPER PINS AND CAP SCREWS.

4. TURN ROTORS BY HAND AND CHECK ROTOR CLEARANCES. ROTORS MUST TURN FREELY WITHOUT ANY INTERFERENCE.

5. ASSEMBLY PACKING GLAND AND PACK STUFFING BOX FOLLOWING INSTRUCTIONS ON PAGE 17.

REASSEMBLY OF DRIVE END COVERS AND GLANDS

1. BOLT INNER BEARING COVER TO THE BEARING HOUSING WITH THE 1/2–13 UNC X 1–3/4 SOCKET HEAD CAP SCREWS.

2. REPLACE OIL SEALS IN DRIVE END COVER TO ASSURE MAXIMUM PROTECTION OF BEARINGS.

3. ATTACH DRIVE END COVER TO THE BEARING HOUSING WITH 1/2–13 UNC X 1–1/4 CAP SCREWS.

LUBRICATION AND REMOUNTING

1. LUBRICATE THE PUMP AS DESCRIBED IN THE LUBRICATION SECTION.
2. SET PUMP ON THE BASE AND SECURE WITH TAPER PINS AND MOUNTING BOLTS.
3. CONNECT INLET PIPING, DISCHARGE PIPING AND SEAL WATER PIPES.

BACK STOP, REPLACEMENT OR REMOUNTING

THE PUMP IS AMBI-DIRECTIONAL, BUT THE ROTOR ROTATION MUST NOT BE CHANGED UNTIL THE BACK STOP CAM CLUTCH IS REMOUNTED. THE CAM CLUTCH LETS THE ROTOR TURN IN ONE DIRECTION AND STOPS REVERSE ROTATION. USE THE FOLLOWING PROCEDURE TO REPLACE A DAMAGED CAM CLUTCH OR REMOUNT THE CAM CLUTCH WHEN THE ROTATION OF THE DRIVE ROTOR IS TO BE CHANGED.

1. DRAIN OIL FROM THE GEAR CASE (SEE FIGURE 13).

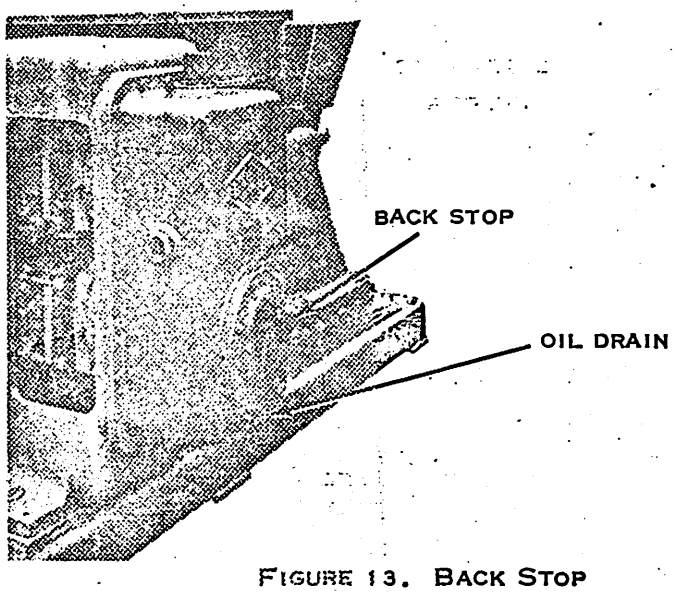


FIGURE 13. BACK STOP

BACK STOP REPLACEMENT OR REMOUNTING – (CONTINUED)

2. REMOVE HOUSING COVER FROM CAM CLUTCH HOUSING (SEE FIGURE 21).

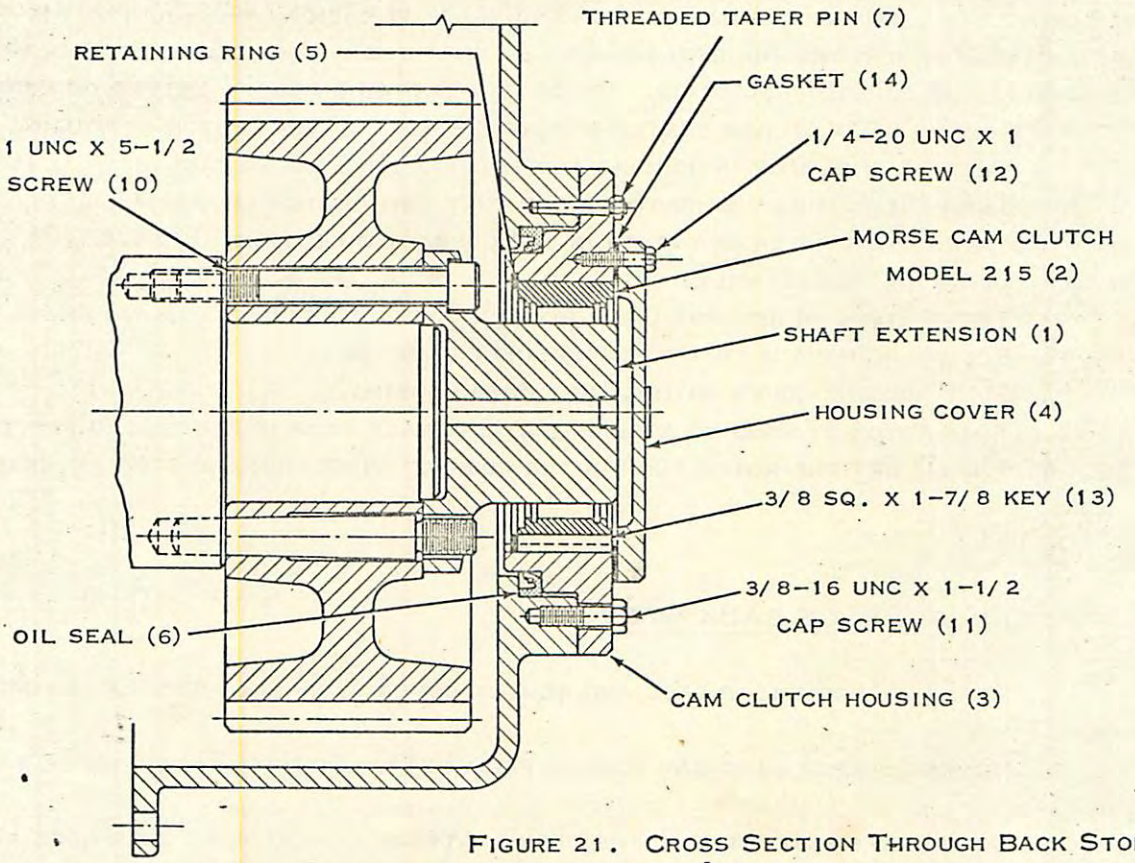


FIGURE 21. CROSS SECTION THROUGH BACK STOP

BACK STOP PARTS LIST

ITEM	NAME OF PART	PART NO.	QUAN.
1	SHAFT EXTENSION	H31-8008-1	1
2	MORSE CAM CLUTCH MODEL 215	A10274-03	1
3	CAM CLUTCH HOUSING	H31-0070-1	1
4	HOUSING COVER	M31-0032-1	1
5	RETAINING RING	A181-500	1
6	OIL SEAL	A218-211	1
7	THREADED TAPER PIN	A10297-14	2
8	INSTRUCTION PLATE	R31-0047-1	1
10	5/8-11 UNC X 5-1/2 LG. SOC. HD. CAP SCREW		4
11	3/8-16 UNC X 1-1/2 LG. HEX. HD. CAP SCREW		8
12	1/4-20 UNC X 1 LG. HEX. HD. CAP SCREW		6
13	KEY 3/8 X 3/8 X 1-7/8 LG.	S1003-1	1
14	GASKET 1/16 X 5-1/8 ID X 6-5/8 OD, VELLUMOID		1

BACK STOP, REPLACEMENT OR REMOUNTING - (CONTINUED)

3. REMOVE CAM CLUTCH HOUSING.

4. IF THE ROTATION DIRECTION OF THE ROTOR IS BEING CHANGED, PRESS THE CAM CLUTCH OUT OF THE HOUSING, INVERT THE CAM CLUTCH AND PLACE IT BACK IN THE HOUSING. IF THE CAM CLUTCH IS DAMAGED, INSTALL THE REPLACEMENT SO THAT THE CLUTCH DOES NOT LOCK WHEN THE ROTOR TURNS IN THE CORRECT DIRECTION. PLACE CAM CLUTCH ON SHAFT EXTENSION TO DETERMINE CORRECT ORIENTATION OF CAM CLUTCH BEFORE INSTALLING CAM CLUTCH IN HOUSING.

5. PRESS CAM CLUTCH IN HOUSING AND SET HOUSING IN GEAR CASE.

6. TURN THE ROTOR BY HAND TO ASSURE THAT CAM CLUTCH IS ASSEMBLED PROPERLY. IF HOUSING ROTATES WHEN ROTOR IS TURNED IN THE CORRECT DIRECTION, DISASSEMBLE HOUSING, INVERT CAM CLUTCH AND REASSEMBLE.

7. TURN ROTORS IN REVERSE UNTIL HOUSING AND GEAR CASE TAPER PIN HOLES LINE UP.

8. SECURE HOUSING WITH TAPER PINS AND CAP SCREWS.

9. BOLT HOUSING COVER WITH GASKET ONTO HOUSING.

10. TURN ROTOR BY HAND TO ASSURE THAT THE BACK STOP IS ASSEMBLED PROPERLY. THE BACK STOP MUST LET THE ROTOR TURN IN THE CORRECT DIRECTION AND STOP REVERSE ROTATION.

FIELD INSTALLATION OF BACK STOP

1. DRAIN OIL FROM GEAR CASE AND REMOVE COVER FROM BACK STOP MOUNTING FACE OF GEAR CASE.

2. REMOVE SOCKET HEAD CAP SCREWS FROM GEAR. DO NOT REMOVE TAPER PINS OR GEAR FROM ROTOR.

3. BOLT SHAFT EXTENSION TO THE GEAR. ATTACH INDICATOR TO GEAR CASE AND CHECK SHAFT EXTENSION FOR CONCENTRICITY. SHAFT EXTENSION MUST RUN CONCENTRICALLY WITHIN 0.001 TOTAL INDICATOR READING. IF SHAFT EXTENSION IS NOT CONCENTRIC, REMOVE GEAR CASE AND SHIM BETWEEN FACES OF GEAR AND EXTENSION UNTIL EXTENSION RUNS CONCENTRICALLY. REPLACE GEAR CASE WHEN EXTENSION RUNS CONCENTRICALLY.

4. INSERT OIL SEAL IN GEAR CASE (SEE FIGURE 21).

5. INSERT RETAINING RING IN CAM CLUTCH HOUSING.

FIELD INSTALLATION OF BACK STOP – (CONTINUED)

6. PLACE CAM CLUTCH HOUSING ON GEAR CASE USING CENTERING RING (SEE FIGURE 22) TO LOCATE HOUSING. GEAR CASE CAN BE REDOWELED IF NECESSARY TO ASSURE CENTERING OF HOUSING WITH EXTENSION.

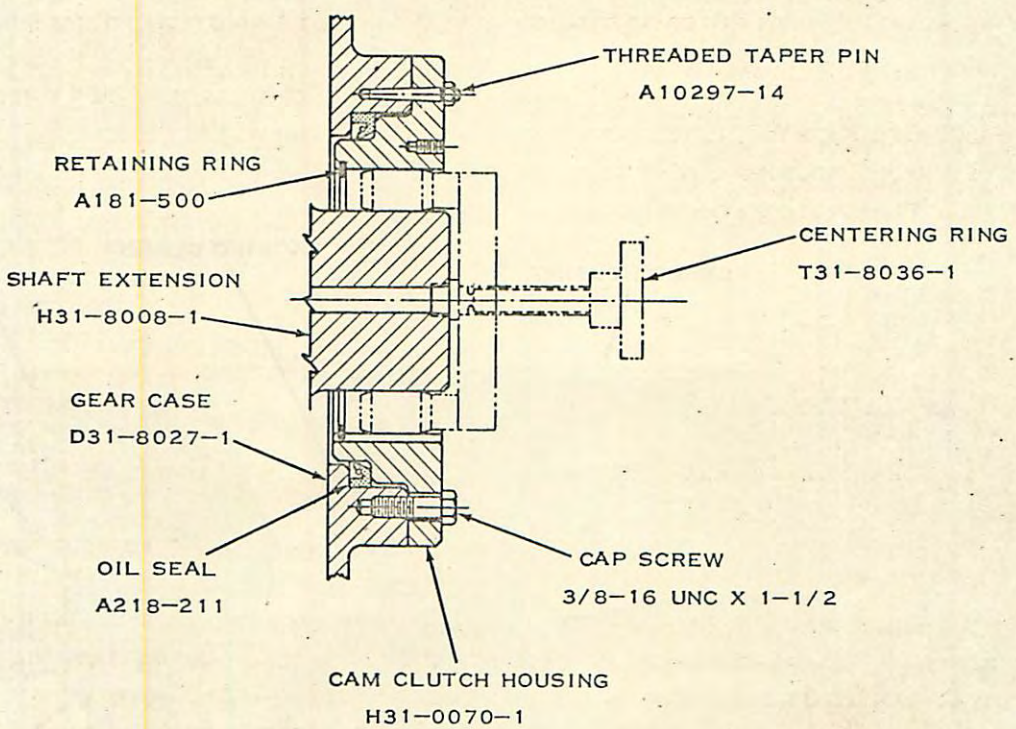


FIGURE 22. CENTERING CAM CLUTCH HOUSING

7. BOLT CAM CLUTCH HOUSING TO GEAR CASE.

8. DOWEL CAM CLUTCH HOUSING IN TWO PLACES BY DRILLING WITH 7/32 DIAMETER DRILL, 1-3/4 DEEP. TAPER REAM HOLES FOR NUMBER 7 TAPER PINS.

9. REMOVE CENTERING RING.

10. CHECK PUMP ROTATION AND INSTALL BACK STOP. ARROW ON CAM CLUTCH INDICATES SHAFT ROTATION.

11. INSTALL BACK STOP COVER WITH GASKET ON CAM CLUTCH HOUSING.

FEEDER DISASSEMBLY

1. REMOVE DRIVE SHEAVE.
2. UNBOLT THE COVER AND STUFFING BOX (SEE FIGURE 16).
3. PULL THE THREADED TAPER PINS OUT OF THE PEDESTAL.
4. UNSCREW THE PEDESTAL MOUNTING BOLTS.
5. MOVE THE PEDESTAL AND FEEDER ROTOR CLEAR OF THE FEEDER HOUSING.

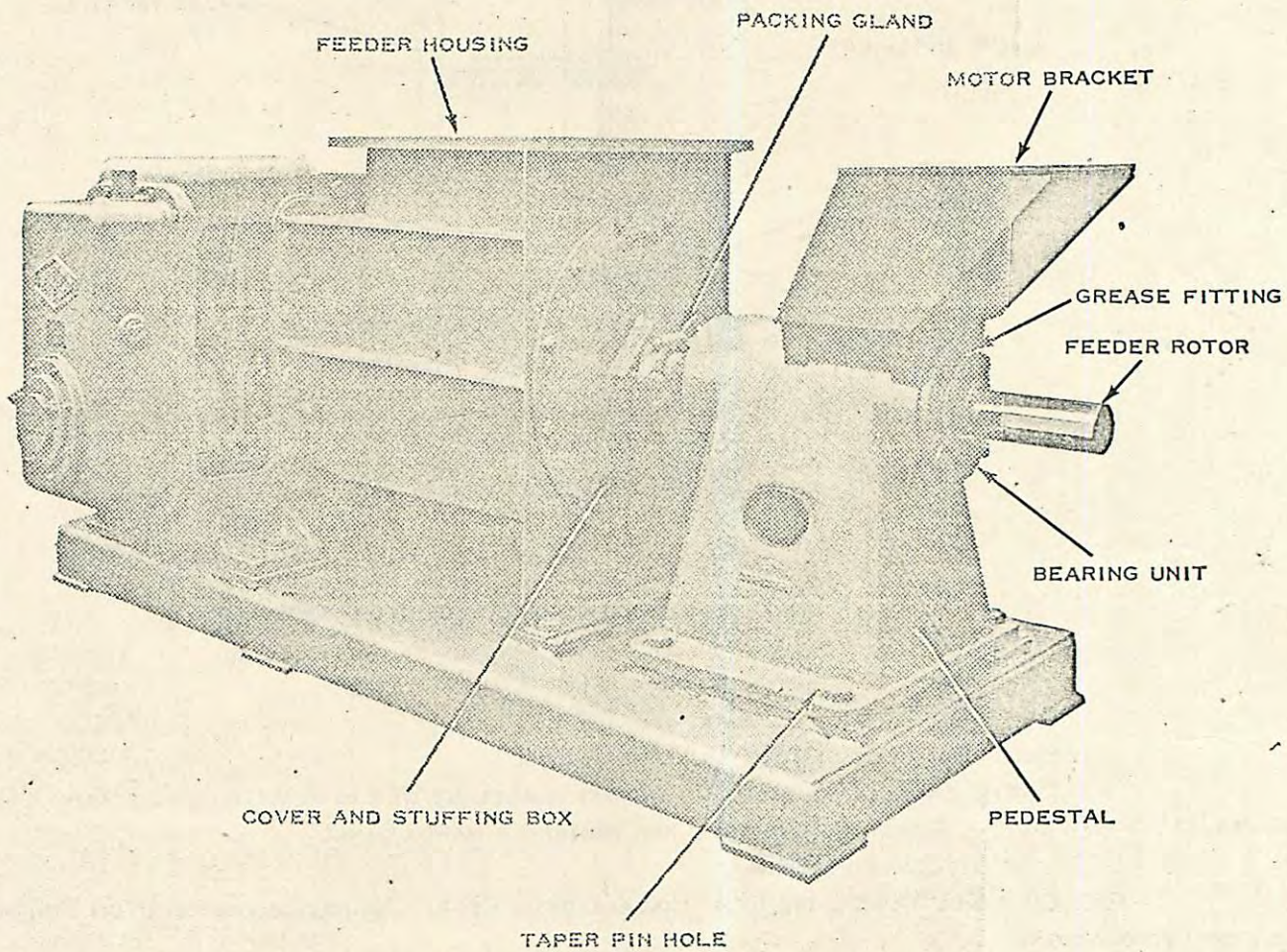


FIGURE 16. FEEDER

FEEDER DISASSEMBLY – (CONTINUED)

6. LOOSEN THE SET SCREWS IN THE COLLARS FOR THE FLANGED BEARING UNITS.

7. REMOVE THE 9/16 INCH – 12 UNC X 2 INCH LONG CAP SCREWS THAT FASTEN THE CARTRIDGE BEARING UNITS TO THE PEDESTAL (SEE FIGURE 17).

8. PULL THE PEDESTAL AND OUTER CARTRIDGE BEARING UNIT OFF THE SHAFT.

9. REMOVE THE INNER CARTRIDGE BEARING UNIT.

10. REMOVE PACKING AND PULL THE COVER AND STUFFING BOX OFF THE SHAFT.

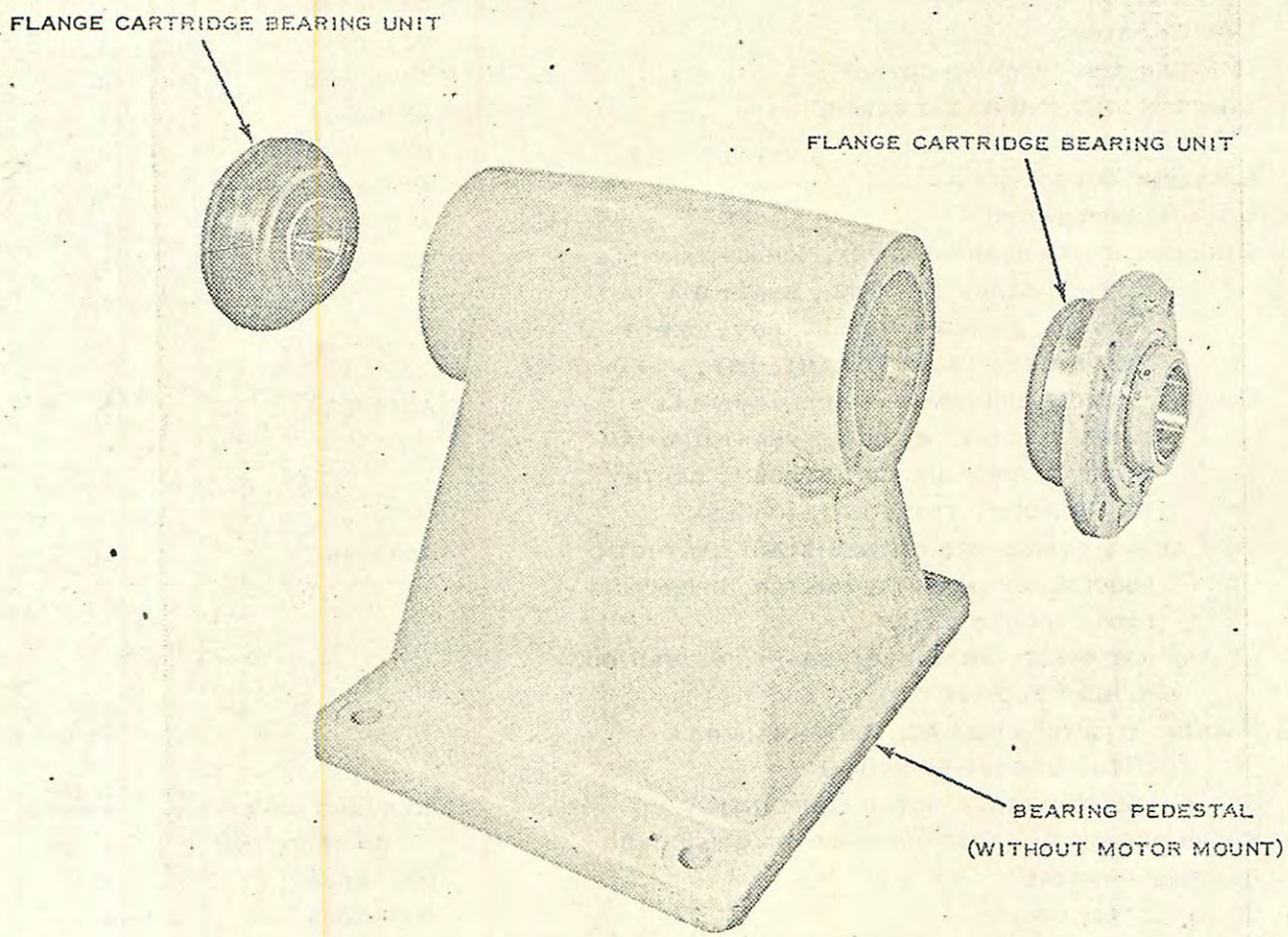


FIGURE 17. FEEDER BEARING HOUSING ASSEMBLY

FEEDER REASSEMBLY

REASSEMBLE THE FEEDER BY REVERSING THE PROCEDURE THAT WAS USED FOR DISASSEMBLY. AFTER ASSEMBLY, MAKE SURE THAT THE FEEDER SHAFT IS CENTERED IN THE STUFFING BOX WITHIN 0.005 INCH AND SECURE.

RECOMMENDED SPARE PARTS

THICK STOCK PUMP SPARE PARTS

NAME OF PART	IMPCO PART NO.	SUGGESTED STOCK
BEARING (SKF 23030K OR EQUAL)	A10210-530	4
DRIVE ROTOR	D31-0168-10	1
DRIVEN ROTOR	D31-0169-10	1
LANTERN RING (BEARING COVER)	26704-33	4
LANTERN RING (DRIVE END COVER)	26704-36	1
LANTERN RING (STUFFING BOX)	H31-0062	4
LOCK NUT (AN 30)	A10230-30	4
LOCK WASHER (W 30)	A10230-130	4
OIL SEAL (INNER BEARING COVER, JOHNS-MANVILLE CLIPPER SEALS OR EQUAL, SHAFT DIA "A" 7.125", BORE DIA "B" 8.500", DEPTH "C" 0.625, 13659 RPD, H1, L5)	A219-46	8
OIL SEAL (DRIVE END COVER, JOHNS-MANVILLE CLIPPER SEALS OR EQUAL, SHAFT DIA "A" 4.000", BORE DIA "B" 5.000", DEPTH "C" 0.500", 10175 RPD, H1, L5)	A219-29	2
"O" RING (ARP 568-268 OIL RESISTANT SYNTHETIC RUBBER, 70 SHORE DUROMETER, OPERATING RANGE -40 TO + 212F ASTM-D735-SB715B-E1-E3-F1, 8.762" OD, 0.139" SECTION DIA)	A497-46	4
PACKING (1/2 INCH SQUARE, JOHNS-MANVILLE CHEM PAC 2009 OR EQUAL)		45 FEET
SHEAR PINS (FOR DRIVE MOTOR COUPLING)	COUPLING SPECIFIED ON DRIVE DWG.	2 SETS
SHEAR PIN BUSHING (FOR DRIVE MOTOR COUPLING)	COUPLING SPECIFIED ON DRIVE DWG.	1 SET
SLEEVE, OIL SEAL	M31-4006	4
SLEEVE, PACKING	M31-4005	4
SOCKET HEAD CAP SCREW (5/8" - 11 UNC X 4" LONG)		8
THREADED TAPER PIN (WORCESTER TAPER PIN CO. NO. 10 TAPER PIN 4 INCHES LONG)	R31-0011-1	8
TIMING GEAR	H31-0024-1	2
WASHER	17078-22	8

FEEDER SPARE PARTS

NAME OF PART	IMPCO PART NO.	SUGGESTED STOCK
FLANGE CARTRIDGE BEARING UNIT (SHAFER ZBR 300 OR EQUAL)	A10238-102	2
PACKING (3/8 INCH SQUARE, ASBESTOS, MINERAL - FAT LUBRICATED, MICA FINISH, NO GRAPHITE)		3 FEET

- IMPORTANT -

WHEN ORDERING SPARE PARTS, BE SURE TO SPECIFY THE SERIAL NUMBER OF THE MACHINE.

LUBRICATION

PUMP BEARINGS RUN IN AN OIL BATH. PUMP OIL SEALS AND FEEDER BEARINGS ARE GREASE LUBRICATED THROUGH PRESSURE FITTINGS. THE CLAMP FOR THE CAM CLUTCH CAP IS GREASED TO PREVENT CORROSION AT THE CAP INTERFACE. THE CLAMP REQUIRES VERY LITTLE GREASE AS THE CAP IS NOT ROTATED UNLESS THE ROTORS ARE BEING REVERSED TO REMOVE FOREIGN MATERIAL FROM THE PUMP. LUBRICANT DESCRIPTIONS AND RECOMMENDED COMMERCIAL LUBRICANTS ARE INCLUDED IN THE APPENDIX.

LUBRICATION TABLE

PART	NUMBER OF FITTINGS	LUBRICATE	CHANGE LUBRICANT	LUBRICANT TYPE
PUMP BEARINGS (SEE FIGURE 18)	CAP, SIGHT GAGE AND DRAIN	MAINTAIN LEVEL, CHECK WEEKLY	DRAIN AND REFILL EVERY THREE MONTHS	II
PUMP BEARING OIL SEALS (SEE FIGURES 2 AND 18)	5	MONTHLY	–	A
FEEDER BEARINGS (SEE FIGURE 16)	2	MONTHLY, APPROX. 1 OUNCE	–	A
CAM CLUTCH CAP CLAMP (SEE FIGURE 13)	1	MONTHLY	–	A

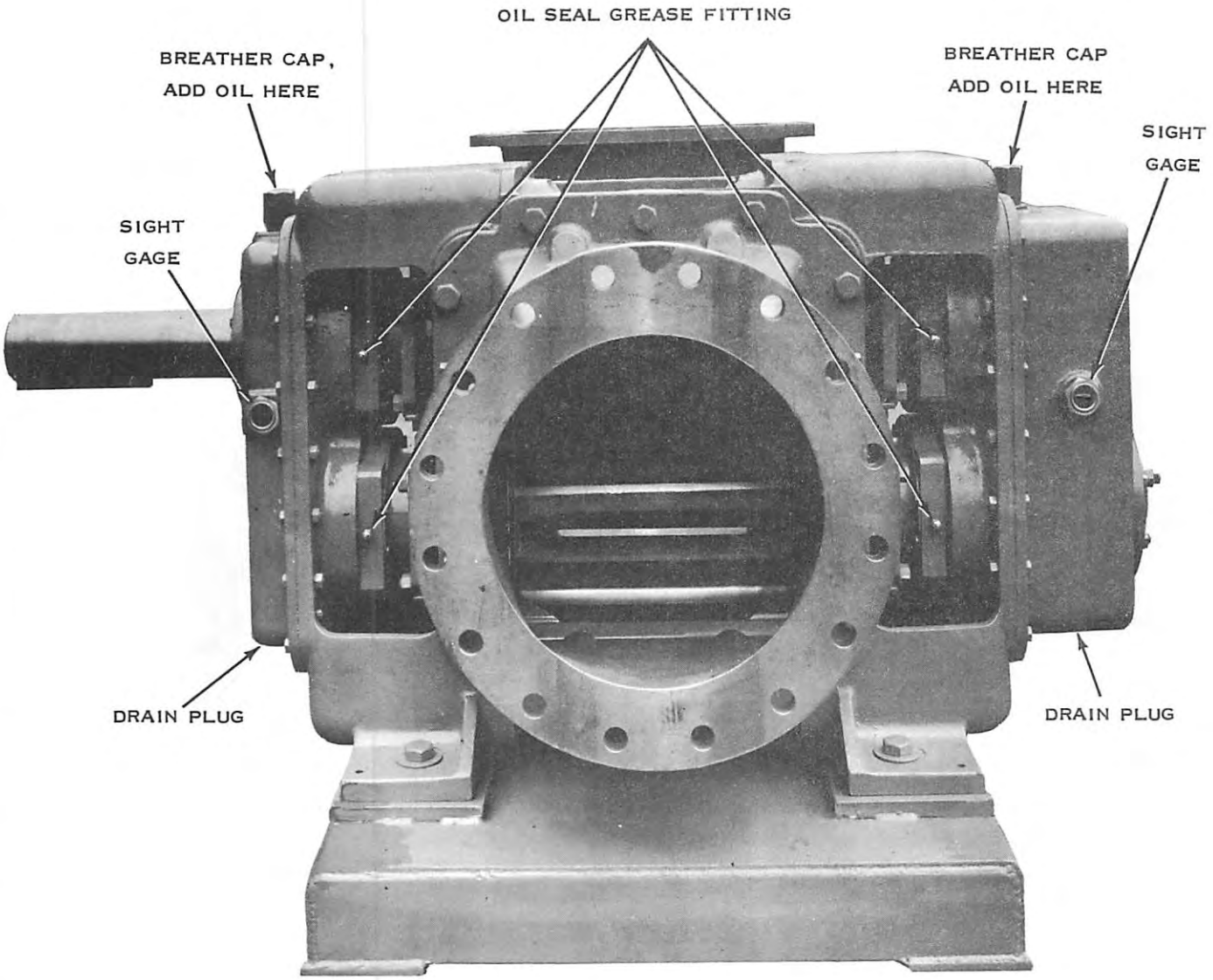


FIGURE 18. PUMP LUBRICATION FITTINGS

APPENDIX

RECOMMENDED COMMERCIAL LUBRICANTS

THE FOLLOWING TABLES OF RECOMMENDED COMMERCIAL LUBRICANTS INCLUDE LUBRICANT SPECIFICATIONS AS WELL AS NAMES OF COMMERCIAL LUBRICANTS. IN MOST CASES, LUBRICANT SUPPLIERS HAVE RECOMMENDED A PREFERRED LUBRICANT AND AN ALTERNATIVE LUBRICANT THAT MEETS THE LUBRICANT SPECIFICATIONS. SPECIFICATIONS WERE PREPARED TO MEET SEVERE MILL CONDITIONS AND WERE BASED ON PAST EXPERIENCE; HOWEVER, IT IS SUGGESTED THAT YOU WORK CLOSELY WITH YOUR LUBRICANT SUPPLIER AND FOLLOW HIS RECOMMENDATIONS FOR YOUR MILL.

TYPE A LUBRICANT

TYPE A LUBRICANT IS A MULTI-PURPOSE LITHIUM OR SODIUM SOAP GREASE WITH A NLGI (NATIONAL LUBRICATING GREASE INSTITUTE) CONSISTENCY OF NO. 1 OR NO. 2.

AS AN ALTERNATIVE, SUBSTITUTE A MILD EXTREME PRESSURE LUBRICANT FOR HEAVY DUTY SERVICE. THIS MUST BE A CALCIUM COMPLEX OR STABLE SOAP GREASE WITH HIGH CHEMICAL STABILITY, EXTREME PRESSURE PROPERTIES, HIGH RESISTANCE TO WATER WASHOUT WITH AN NLGI CONSISTENCY NO. 1 OR NO. 2. THIS LUBRICANT MUST BE COMPATIBLE WITH IRON, BRONZE AND OTHER NONFERROUS METALS, ALONE OR IN COMBINATION.

SUPPLIER - UNITED STATES	PREFERRED LUBRICANT	ALT. EP LUBRICANT
THE BROOKS OIL COMPANY	THERMO D	LEADOLENE 375 MEDIUM
	THERMO L-1	LEADOLENE 385-M
HUMBLE OIL AND REFINING CO.	ANDOK M-275	NEBULA EP 1
GULF OIL CORPORATION	GULF PRECISION GREASE NO.2 OR GULFCROWN NO.2	GULFCROWN GREASE EP NO. 2
MASTER LUBRICANTS CO.	M-6 (SODIUM)	M-6 EP
	L-206 (LITHIUM)	L-206 EP
MOBIL OIL CO., INC.	MOBILUX NO. 2 GREASE	MOBILPLEX EP NO. 1
N.Y. AND N.J. LUBRICANTS CO.	F NO. 925	G NO. 2
THE PURE OIL CO.	POCO HYPRONOX GREASE NO.2	POCO HT-EP GREASE NO. 2
AMERICAN OIL COMPANY	AMOBAR GREASE, AMOLITH GREASE NO. 1 OR NO. 2	RYKON GREASE NO. 1 EP
SUN OIL COMPANY	N-52X GREASE OR	PRESTIGE 741 EP
	PRESTIGE 42 GREASE	PRESTIGE 742 EP
TEXACO, INC.	TEXACO MULTIFAK 2	TEXACO MULTIFAK EP NO. 2
TIDEWATER OIL COMPANY		
EASTERN DIVISION:	VEEDOL ATWORTH 20	VEEDOL ALITHEX 20, OR ANEPRO 22.
WESTERN DIVISION:	VEEDOL ALL PURPOSE GREASE	VEEDOL ALITHEX 20, OR ANEPRO 22
SINCLAIR REFINING CO.	LITHOLINE INDUSTRIAL NO.2	LITHOLINE INDUSTRIAL EP NO. 2
BRIDGEPORT FABRICS, INC. CHEM. PRODUCTS DIV.	BFB-2	
SUPPLIER - CANADA		
SUN OIL COMPANY LTD.	N-52X GREASE OR	PRESTIGE 741 EP
	PRESTIGE 42 GREASE	PRESTIGE 742 EP
TEXACO CANADA LTD.	TEXACO MULTIFAK 2	TEXACO MULTIFAK EP 2
CANADIAN OIL COS. LTD.	WHITE ROSE ULTRALUBE	WHITE ROSE ULTRA MULTI PURPOSE GREASE EP 2
IMPERIAL OIL LIMITED	ESSO MP GREASE H	ESSO MP GREASE EP
SHELL OIL CO.OF CANADA LTD.	ALVANIA GREASE 2	ALVANIA GREASE EP 2
THE BRITISH AMERICAN OIL CO. LIMITED	B.A. DURALUBE HEAVY	B.A. HI LOAD NO. 2

TYPE II LUBRICANT

TYPE II LUBRICANT IS A HIGHLY REFINED INHIBITED MINERAL OIL WITH A VISCOSITY OF 90 TO 125 SSU AT 210 DEGREES F.

AS AN ALTERNATIVE, SUBSTITUTE A MILD EXTREME PRESSURE LUBRICANT FOR HEAVY DUTY SERVICE. THIS MUST BE A HEAVY DUTY GEAR OIL POSSESSING EXTREME PRESSURE PROPERTIES WITH A VISCOSITY OF 90 TO 125 SSU AT 210 DEGREES F. THIS LUBRICANT MUST BE COMPATIBLE WITH IRON, BRONZE AND OTHER NONFERROUS METALS, ALONE OR IN COMBINATION.

SUPPLIER – UNITED STATES	PREFERRED LUBRICANT	ALT. EP LUBRICANT (AGMA 5 OR 6 EP)
THE BROOKS OIL CO.		LEADOLENE 70
HUMBLE OIL AND REFINING CO.	TERESSO 120	PEN-O-LED EP 3
GULF OIL CORPORATION	GULF HARMONY 121	GULF EP LUBRICANT 95
MASTER LUBRICANTS CO.	MASTER NO. 9 GEAR OIL	MASTER NO. 9-EP GEAR OIL
MOBIL OIL COMPANY INC.	MOBIL DTE OIL AA	MOBIL COMPOUND DD
N.Y. AND N.J. LUBRICANT CO.	D NO. 19	D NO. 19-EPV
THE PURE OIL CO.	PUROPALE SUPER HEAVY	POCO PB LUBRICANT NO. 8
SHELL OIL COMPANY	VITREA OIL 74	MACOMA 73
AMERICAN OIL COMPANY	AMERICAN INDUSTRIAL OIL NO. 150	AMOGEAR COMPOUND NO. 3
SUN OIL COMPANY	SUNVIS 9120	SUNEP 110
TEXACO, INC.	TEXACO TEXOL H	MEROPA LUB. 3
TIDEWATER OIL COMPANY		
EASTERN DIVISION:	VEEDOL ATLINE 60	VEEDOL APRESLUBE 82, 86
WESTERN DIVISION:	VEEDOL ATLINE 60	VEEDOL APRESLUBE 86
SINCLAIR REFINING CO.	RUBILENE HD 50	PENNANT EP OIL NO. 4
BRIDGEPORT FABRICS, INC.	BFM-90	
CHEM. PRODUCTS INC.		

SUPPLIER – CANADA		
SUN OIL COMPANY LTD.	SUNVIS 9120	SUNEP 110
TEXACO CANADA LTD.	TEXACO TEXOL H	TEXACO MEROPA LUBRICANT 3
CANADIAN OIL COS. LTD.	WHITE ROSE DECOL 60	WHITE ROSE FILMAX 47
IMPERIAL OIL LIMITED	TERESSO 120	PEN-O-LED NO. 3
SHELL OIL CO. OF CANADA LTD.	VITREA OIL 73	MACOMA 73
THE BRITISH AMERICAN OIL CO. LIMITED	B.A. DURALENE 111	B.A.E.P. LUBRICANT 98

PARTS LIST

THICK STOCK PUMP, C31-0065

PARTS IDENTIFIED BY ITEM NUMBER ON FIGURES 19, 20, 21, AND 23.

ITEM	DESCRIPTION	PART NO.	QUAN.	FIGURE REF.
1	DRIVE ROTOR COMPLETE	D31-0168-10	1	19
2	DRIVEN ROTOR COMPLETE	D31-0169-10	1	19
3	BEARING HOUSING	D31-4019	2	19
4	COVER - PUMP HOUSING	D31-0161-10	2	19
5	GEAR CASE	D31-4040-1	1	21
6	DRIVE END COVER	D31-0101-1	1	20
7	GLAND	H31-4003-10	4	20, 21
8	TIMING GEAR	H31-0024-1	2	21
9	BEARING COVER - INNER (FIXED END)	H31-4004-1	2	21
10	BEARING COVER - INNER (FLOATING END)	H31-4005-1	2	20
11	BEARING 23030K	A10210-530	4	20, 21
12	LOCK WASHER	A10230-130	4	20, 21
13	LOCK NUT	A10230-30	4	20, 21
14	SEAL RETAINER	M31-0019-1	4	20, 21
15	LANTERN RING (SPLIT)	H31-0062-4	4	20, 21
16	LANTERN RING	26704-33	4	20, 21
17	LANTERN RING	26704-36	1	20
18	DRIVE END RETAINER PLATE	R31-0027-1	1	20
19	ROLL PIN	A266-18	4	
20	EYE BOLT	A10697-01	16	
21	OIL SEAL (DO NOT SPLIT)	A-218-81	2	
	SPLIT OIL SEAL (TO BE USED FOR REPLACEMENT ONLY WHEN SPLIT SEAL IS REQUIRED)	A-219-29	2	20
22	OIL SEAL (DO NOT SPLIT)	A-218-117	8	
	SPLIT OIL SEAL (TO BE USED FOR REPLACEMENT ONLY WHEN SPLIT SEAL IS REQUIRED)	A-219-46	8	20, 21
23	COVER - HELD BEARING - OUTER	M31-0004-1	2	21
24	"O" RING - SEAL	A497-46	4	20, 21
25	WASHER	17078-22	8	
26	THREADED TAPER PIN	R31-0011-1	8	
27	BACK STOP ACCESS COVER	R31-5002-1	1	21
28	EYE BOLT PIN	21883-3	16	
29	GEAR CASE GASKET	M31-0010-1	2	20, 21
30	ADAPTER AND FEEDER GASKET	13037-A	2	
31	BREATHER CAP	M30-2013-3	2	

PARTS LIST – (CONTINUED)

ITEM	DESCRIPTION	PART NO.	QUAN.	FIGURE REF.
32	OIL SIGHT GAGE- GITS	A175-32	2	
33	SERIAL AND PATENT NO. PLATE		1	
34	THREADED TAPER DOWEL PIN NO. 8 X 2'' LG.	A10297-25	2	
36	ADAPTER			
37	ACCESS HOLE COVER	R31-0022-1		
38	ACCESS HOLE GASKET	R31-0023-1		
39	LOCTITE ''CV'' BLUE	S8110-5		
40	LOCQUIC ACTIVATOR	S8110-2		
42	ZERO SPEED SWITCH SUB-ASSEMBLY	G31-0040-10	1	23
44	VELLUMOID GASKET 1/16 THICK X 5-1/2 I.D. X 9-1/2 O.D.		1	
45	GARLOCK LATTICE BRAID PACKING 1/2 SQUARE X X 25 S9988		20	20, 21
46	5/8'' PLAIN WASHER 316 ST. ST.		16	
47	1/4''-20 UNC X 1/2'' LG. HEX. HD. CAP SCR.		32	
48	3/8''-16 UNC X 1/2'' LG. HEX. HD. CAP SCR.		6	
49	3/8''-16 UNC X 3/4'' LG. HEX. HD. CAP SCR.		8	
50	1/2''-13 UNC X 1'' LG. HEX. HD. CAP SCR.			
51	1/2''-13 UNC X 1-1/4'' LG. HEX. HD. CAP SCR.		8	
52	1/2''-13 UNC X 2'' LG. HEX. HD. CAP SCR.		8	
53	1/2''-13 UNC X 1-3/4'' SOC. HD. CAP SCR.		16	
54	1/2''-13 UNC X 2-1/4'' LG. HEX. HD. CAP SCR.		32	
55	1/2''-13 UNC HEX. NUT		32	
56	5/8''-11 UNC X 4'' LG. SOC. HD. CAP SCR.		8	
57	5/8''-11 UNC ST'D HEX. NUT 316 ST. ST.		16	
58	1/8'' X 1'' LG. COTTER PIN 304 ST. ST.		32	
59	7/8''-9 UNC X 2-1/2'' LG. HEX. HD. CAP SCR.		24	
60	7/8''-9 UNC X 2-3/4'' LG. HEX. HD. CAP SCR.			
61	7/8''-9 UNC HEX. NUT			
62	DRIVE SCREW – TYPE ''U'' – NO. 2 X 1/8'' LG. (STEEL)		4	
63	1/8'' ST'D GREASE FITTING		5	
64	3/8'' I.P.S. NIPPLE X 5-1/2'' LG. 316 ST. ST.		4	
65	3/8'' I.P.S. NIPPLE X 6'' LG. 316 ST. ST.		4	
66	KEY 1'' X 1'' 8-1/2'' LG.		1	
67	3/8'' I.P.S. 45° ELBOW 316 ST. ST.		8	
68	3/8'' ST'D PIPE PLUG – MALLEABLE IRON		8	
69	1/4'' ST'D PIPE PLUG			
70	1-1/4'' ST'D PIPE PLUG		4	
71	7/8''-9 UNC HEX. NUT		24	

FEEDER PARTS LIST

ITEM	DESCRIPTION	PART NO.	QUAN.	FIG.
1	FEEDER HOUSING	D31-4043	1	16
2	FEEDER ROTOR		1	16
	(MILD STEEL)	D31-4033		
	(STAINLESS STEEL)	D31-4032		
3	COVER AND STUFFING BOX	H31-4008	1	16
4	COVER PLATE	M31-1009	1	
5	2" ST'D PIPE PLUG, ST. ST.		1	
6	FASTENER (317 ST. ST. FEEDERS ONLY)	R31-1007-1	6	
7	FASTENER (317 ST. ST. FEEDERS ONLY)	R31-1007-3	8	
8	5/8" -11 UNC X 1-1/2" LG. HEX. HD. CAP SCREW 316 ST. ST. (NOT USED ON 317 ST. ST. FEEDERS)		6	
9	3/8" -16 UNC X 1" LG. HEX. HD. CAP SCREW 316 ST. ST. (NOT USED ON 317 ST. ST. FEEDERS)		8	
10	PACKING RETAINER	30641-17	1	
11	BEARING PEDESTAL	D31-1017-1	1	17
12	GASKET	M31-4004-1	1	
13	COVER PLATE GASKET	M31-1010-1	1	
14	FEEDER AND PUMP BASE	D31-4026-10	1	
15	NO. 8 X 1-3/4" LG. THREADED TAPER PIN	A10297-05	4	
16	SHIM	A10096-11	6	
17	DIRECTIONAL ARROW	21180-2	1	
18	SHAFER FLANGED CARTRIDGE BEARING, ZBR 300	A10238-102	2	17
19	3/8" SQ. PACKING X 12" LG.	S9905	3	
20	ROLL PIN	A266-02	2	
24	NO. 2 X 1/4" LG. TYPE "U" DRIVE SCREW, ST. ST.		2	
25	3/8" -16 UNC HEX. NUT STEEL		8	
26	1/2" -13 UNC X 3/4" LG. HEX. HD. CAP SCR. 316 ST. ST.		6	
27	5/8" -11 UNC X 1-3/4" LG. HEX. HD. CAP SCR. 316 ST. ST.		8	
28	5/8" -11 UNC X 1-1/2" LG. HEX. HD. CAP SCR. STEEL		6	
29	5/8" -11 UNC HEX. NUT STEEL		12	
30	5/8" -11 UNC X 1-1/4" LG. HEX. HD. CAP SCR. STEEL		4	
31	7/8" -9 UNC X 2-1/4" LG. HEX. HD. CAP SCR. STEEL		14	
32	7/8" -9 UNC HEX. NUT STEEL		14	
34	1" -8 UNC X 2-1/4" LG. HEX. HD. CAP SCR. STEEL		8	
35	1/8" THICK X 1-1/16" I.D. X 2" O.D. ST'D WASHER STEEL		4	
36	1" -8 UNC X 1-1/2" LG. HEX. HD. CAP SCREW STEEL		2	

FEEDER PARTS LIST – (CONTINUED)

ITEM	DESCRIPTION	QUAN.
27	5/8"-11 UNC X 2" LG. HEX. HD. CAP SCR. STEEL	6
28	5/8"-11 UNC X 1-1/2" LG. HEX. HD. CAP SCR. STEEL	6
29	5/8"-11 UNC HEX. NUT STEEL	12
30	5/8"-11 UNC X 1-1/4" LG. HEX. HD. CAP SCR. STEEL	4
31	7/8"-9 UNC X 2-1/4" LG. HEX. HD. CAP SCR. STEEL	14
32	7/8"-9 UNC HEX. NUT STEEL	14
34	1"-8 UNC X 2-1/4" LG. HEX. HD. CAP SCR. STEEL	8
35	1/8" THICK X 1-1/16" I.D. X 2" O.D. ST'D WASHER STEEL	4
36	1"-8 UNC X 1-1/2" LG. HEX. HD. CAP SCREW STEEL	2

1030

SUGGESTED DISCHARGE PIPING

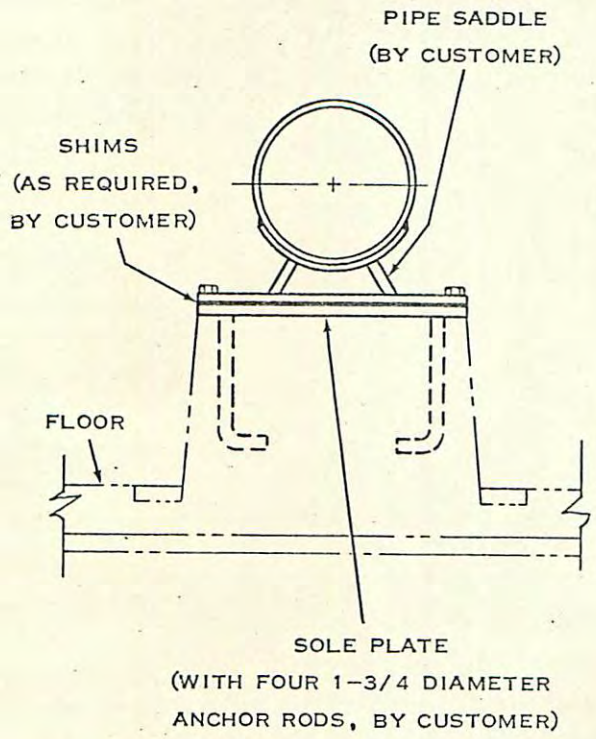
1. CONSTRUCT A RIGID PUMP BASE AND DISCHARGE PIPE PIER FOR ALL PUMPS WHETHER FED BY A FEEDER AS SHOWN OR A COAXIAL BREAKER CONVEYOR FOLLOWING A FILTER. PUMPS MOUNTED ON STEEL WORK SHOULD HAVE AN INTEGRAL BASE, PIER AND SUPPORT STRUCTURE. PUMPS INSTALLED ON CONCRETE SHOULD HAVE STEEL REINFORCING BARS TO TIE BASE, PIER AND FLOOR TOGETHER AS SHOWN. PIER SHOULD BE LOCATED A MINIMUM OF 5 INCHES FROM DISCHARGE ADAPTER FOR BOLT CLEARANCE. PROVIDE FOR ANY REQUIRED PIPE EXPANSION ON THE DOWNSTREAM SIDE OF THE PIER. INSTALL PIPE ON CONCRETE PIER AS FOLLOWS.

2. LOCATE DISCHARGE PIPE SO THAT FACES OF ADAPTER AND PIPE FLANGE ARE PARALLEL AND SO THAT BOLT HOLES ARE IN ALIGNMENT.

3. BOLT UP FLANGES SECURELY.

4. SHIM UNDER PIPE SADDLE AND TIGHTEN MOUNTING BOLTS.

5. WELD DISCHARGE PIPE TO SADDLE.



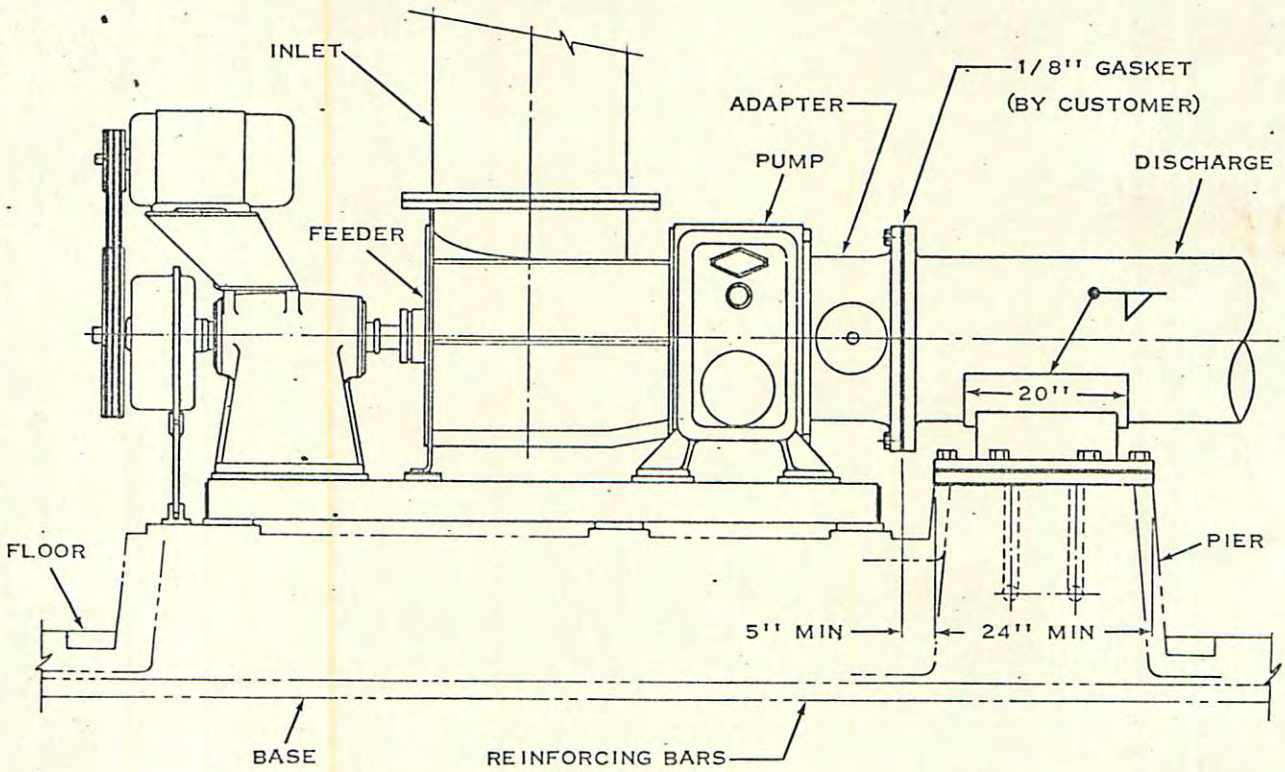


FIGURE 22.

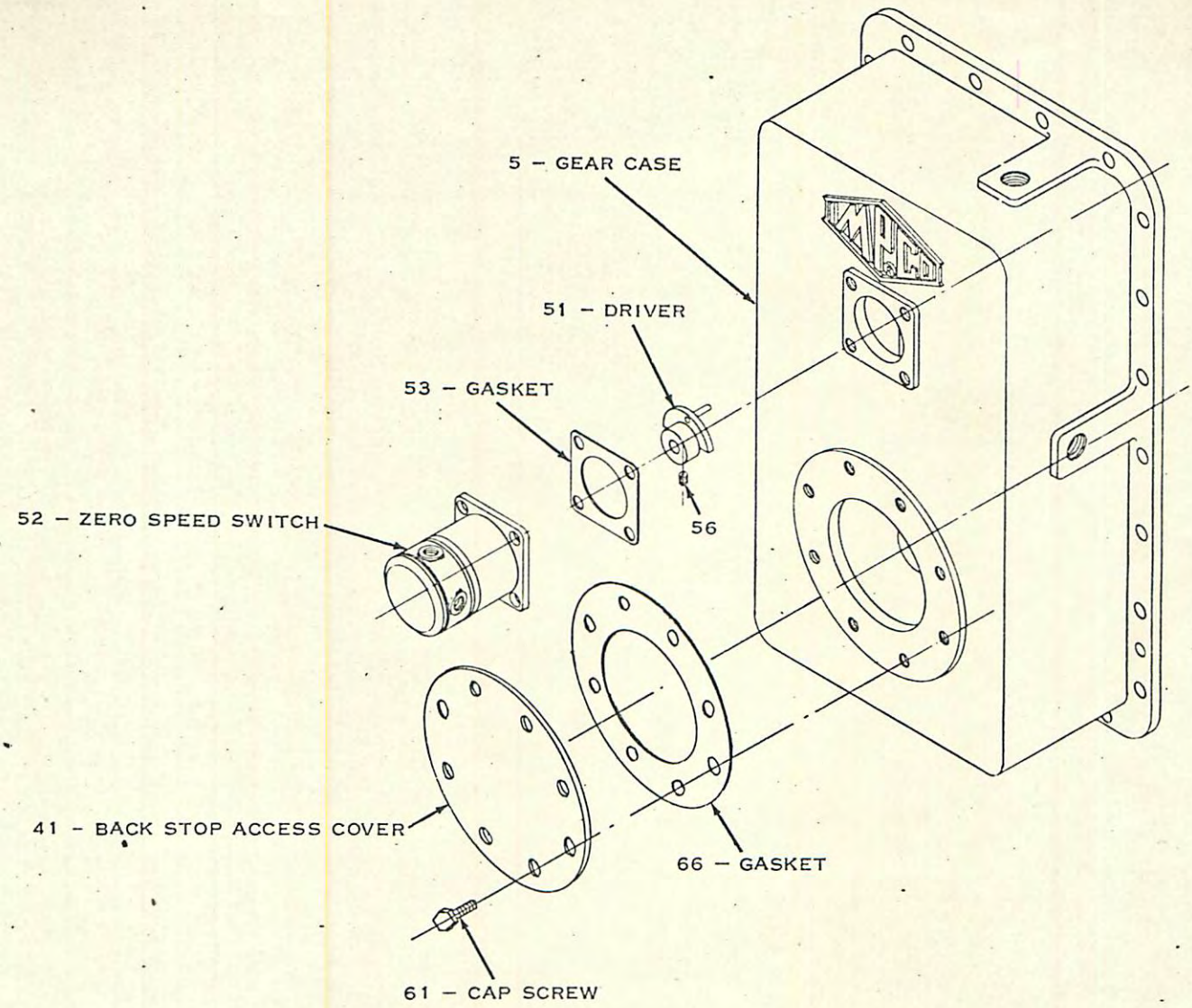


FIGURE 23. TIMING GEAR CASE GROUP

PARTS IDENTIFIED BY ITEM NUMBER AND PART NAME USED IN THE PARTS LIST. SEE PARTS LIST FOR PART NUMBER. WHEN ORDERING SPARE PARTS, BE SURE TO SPECIFY ITEM, PART NUMBER, PART NAME AND SERIAL NUMBER OF MACHINE.

WIRING

CONNECT ZERO SPEED SWITCH, PUMP, AND FEEDER MOTORS AS SHOWN ON THE WIRING DIAGRAM. PUMP MOTOR TO START FIRST.

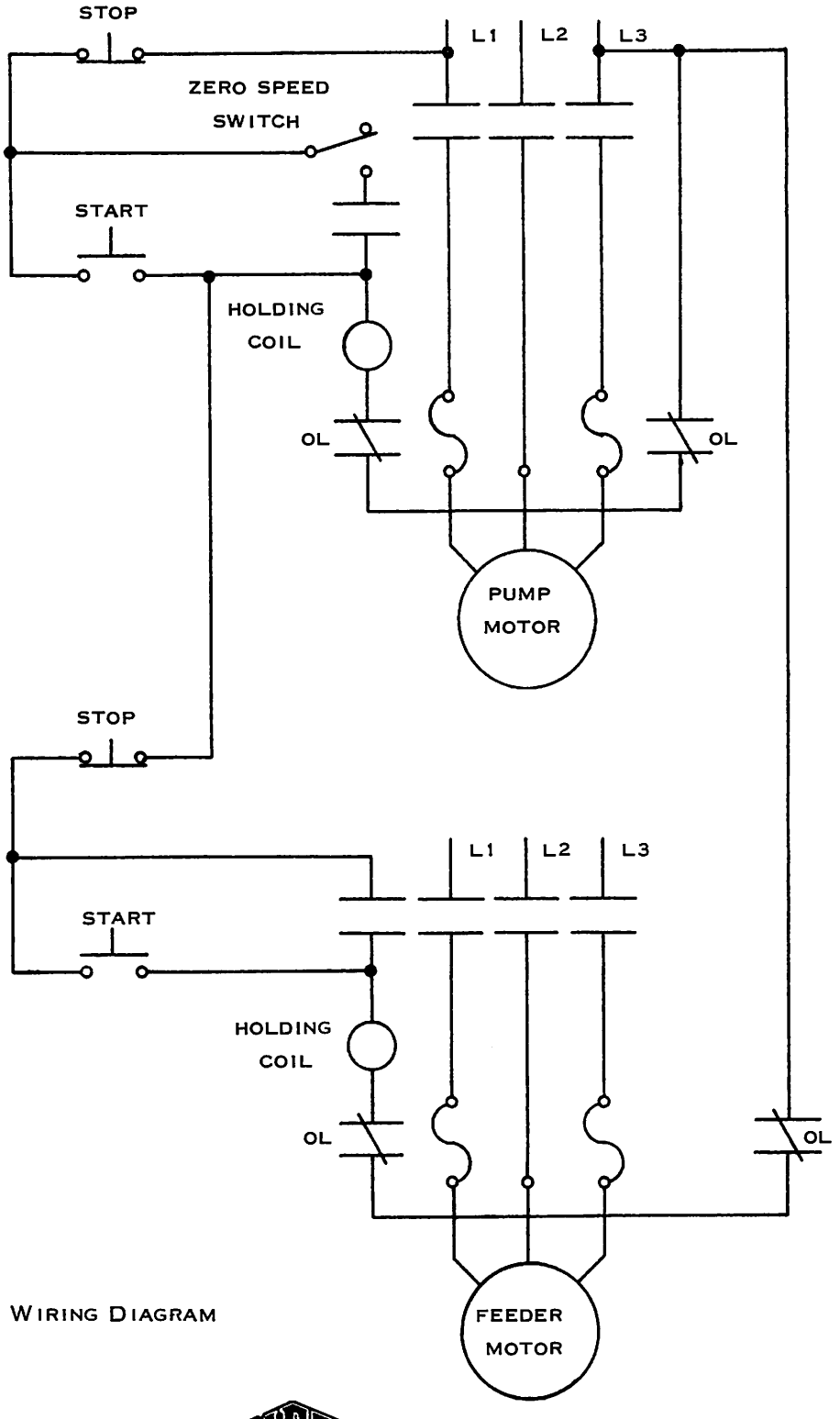


FIGURE 24. TYPICAL WIRING DIAGRAM

AJAX SHEAR PIN COUPLING

INSTALLATION

1. Mount coupling halves on shafts. Remove stud assembly (5) until coupling halves are aligned.

2. Locate coupling halves so that there is 1/8 inch space between the faces of the coupling halves.

3. Shim under reducer as required so that the reducer is at the correct elevation.

4. Measure space between the faces of the coupling halves to be sure space is 1/8 inch and faces are parallel. Check at four places 90 degrees apart.

5. Locate reducer so that the coupling halves are concentric within 0.005 inch. Mount an indicator on one coupling half and take readings from the opposite coupling half as the indicator coupling is turned one revolution.

6. Recheck alignment. Coupling halves must be concentric within 0.005 inch and parallel for maximum coupling life. Coupling is rated to handle shaft misalignment not exceeding one degree angular and 0.005 inch parallel; however, halves should be aligned as accurately as possible during initial installation.

7. Secure reducer and install stud assemblies (5).

MAINTENANCE

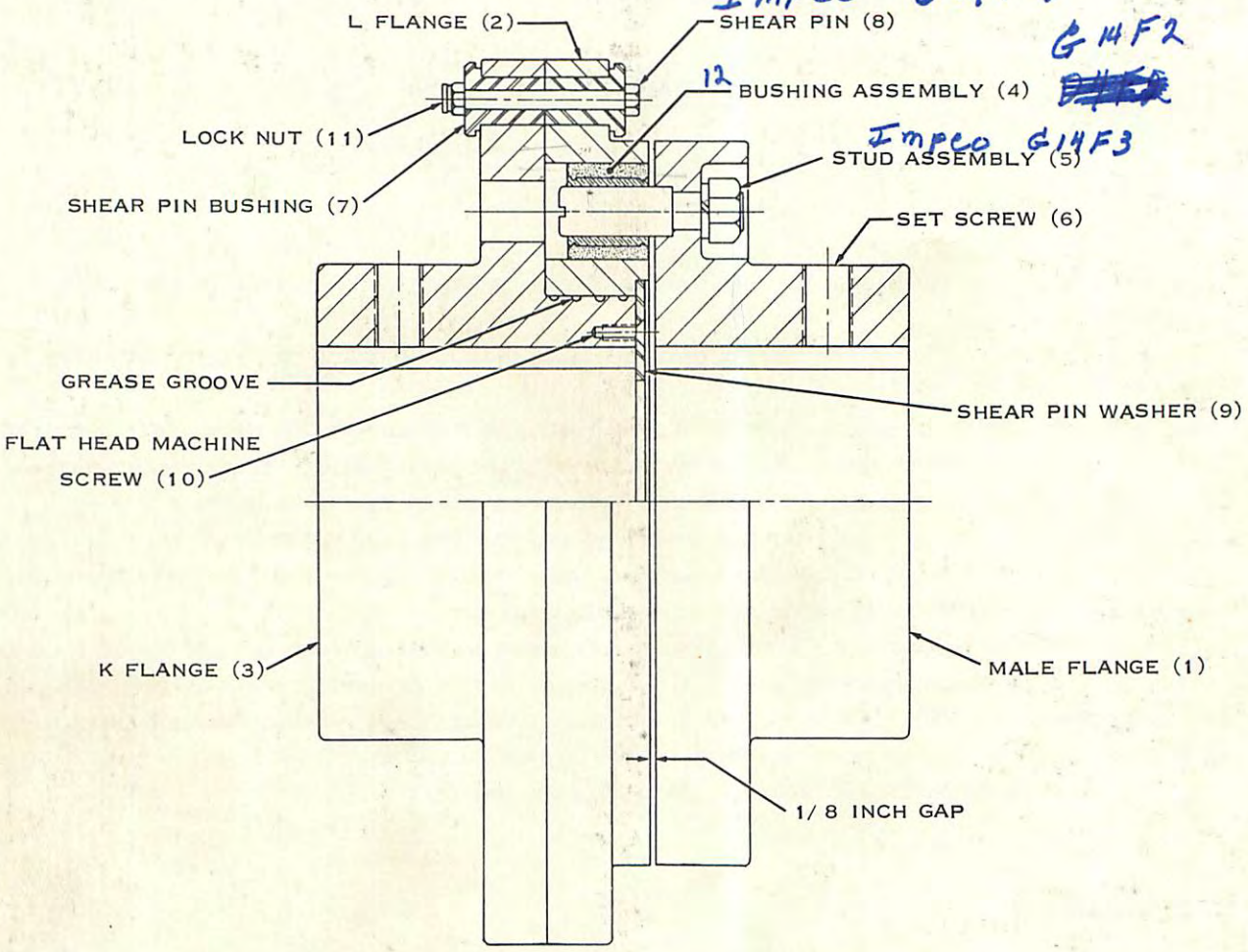
1. Inspect coupling periodically to be sure that coupling halves are still properly aligned. Be sure coupling halves never touch. Realign immediately if coupling halves contact each other.

2. Fill grease grooves in standard K flange (3) with waterproof grease whenever coupling is disassembled.

3. Inspect shear pin bushing (7) whenever shear pins are replaced. Shear corners of bushing must be square and undamaged.

SPARE PARTS

Orders for replacement parts must include description of item, Impco part number of coupling, and pump serial number as well as coupling rpm and connected horsepower when ordering shear pins. Coupling part number is stamped on the coupling and also shown on the drive drawing.



AJAX SHEAR PIN COUPLING

PARTS LIST

ITEM	PART	QUANTITY
1	STANDARD MALE FLANGE	1
2	STANDARD L FLANGE	1
3	STANDARD K FLANGE	1
4	BUSHING ASSEMBLY	12
5	STUD ASSEMBLY	12
6	SET SCREW	2
7	SHEAR PIN BUSHING	2
8	SHEAR PIN	2
9	SHEAR PIN WASHER	2
10	FLAT HD. MACHINE SCREW	6
11	LOCK NUT	2