SERIAL NO. _____

MODEL HC-51

BOOK No. 353

CRANE SERIAL NUMBER

The crane serial number is written on the Crane Rating Manual or Capacity Plate which is located inside the operator's cab. The serial number should always be furnished when ordering parts for the crane or when corresponding with the distributor or factory concerning the crane. Providing the serial number is the only way of ensuring the correct parts and/or information can be furnished.

In the event the serial number is not readable, a number is stamped on the upper revolving frame which can be used to identify the crane. On cable cranes this number is located on the right hand boom foot mounting lug. On hydraulic cranes the number is stamped just below the boom hoist cylinder mounting lugs.

LINK-BELT SPEEDER SERVICE MANUAL

QUICK REFERENCE SYSTEM

TO LOCATE DESIRED INFORMATION, MATCH BLACK INDEX TAB WITH BLACK TABS ON APPROPRIATE PAGES.

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PREFACE

The productive life of any machine depends largely on the care and consideration given it. This especially holds true of such equipment as cranes and excavators. Link-Belt Speeder machines embody the best of engineering knowledge, years of experience, and construction in accordance with the high standards of the Company. In spite of this background, failures can be expected if machinery is abused, overloaded, or maintenance neglected. The present machine age and universal use of the automobile has taught most people to appreciate that systematic, periodical inspection and maintenance will be repaid with a longer period of satisfactory service.

This instruction book was compiled to explain the adjustments necessary for proper operation of the machine. A study of this book will acquaint operator or serviceman with the construction of this equipment and enable him to readily diagnose and remedy most troubles which may arise. It is advisable to correct minor troubles before they develop into costly major shut-downs.

Right hand and left hand parts, as referred to in this book, are determined by facing boom from rear of machine. Operator's position is located on left hand side of machine.

We do not attempt to tell you what part or parts of the house that it might be necessary to remove to perform your particular job as this will vary depending upon what equipment or tools that are available.

Any questions pertaining to the care and upkeep of this equipment which have not been covered in this book should be directed to your nearest Link-Belt Speeder distributors, or Link-Belt Speeder Corporation.

Link-Belt Speeder Corporation reserves the right to make alterations or modifications in this equipment at any time, which in their opinion may improve the performance or efficiency of the machine. The manufacturer shall not be obliged to make such alterations or modifications to machines already in service.

SECTION 2 - UPPER REVOLVING FRAME

CONICAL ROLLERS — Fig. 1

ADJUSTMENT OF CONICAL ROLLERS: For best operating conditions, clearance between Conical Rollers and Roller Path should not exceed 1/16". After machine has been in operation for some length of time, it may be necessary to adjust the rollers for proper clearance due to wear that has taken place on both the rollers and roller path. This clearance can be decreased by means of Shims in the following manner:

(1) Remove Keeper Bolt and Shaft Inner Cap.

(2) Remove Shaft Outer Cap.

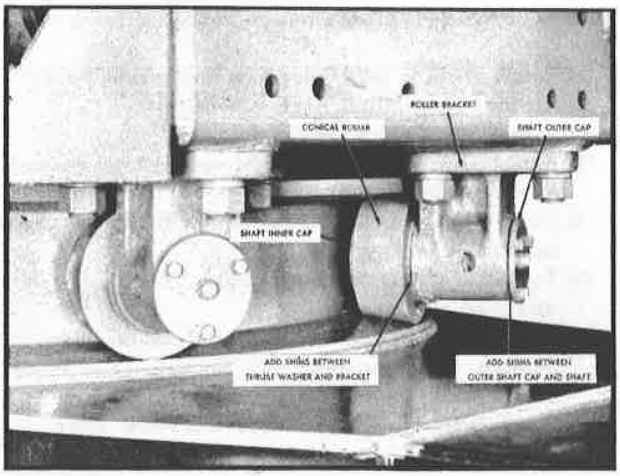


Fig. 1 CONICAL ROLLERS

(3) Remove Grease Fitting.

(4) Pull Roller Shaft out of Bracket far enough to add desired thickness Shim between Bronze Thrust Washer and inner surface of Roller Bracket. These shims are available in two different thicknesses and are listed below:

PX 89—Shim, Steel, 4½" x 2-25/32" x 1/16"

PX 90—Shim, Steel, 4½" x 2-25/32" x 1/8"

(5) Push Roller Shaft back through Bracket and Roller, making sure grease hole in Shaft lines up with hole in the Bracket, and replace grease fitting.

(6) Add equal thickness Shim between Shaft Outer Cap and outer end of Roller Shaft. This shim is available in one thickness only and is listed below:

BC-866—Shim, Steel, 1¼" x 13/16" x 1/16"

(7) Replace Shaft Outer Cap, making sure lug on Cap is in hole provided for same in Shaft.

(8) Position Shaft Inner Cap, with lug on Cap in hole provided for same in Shaft, and replace Keeper Bolt.

It might be well to point out that the original thickness of the Bronze Thrust Washer between Roller and inside edge of Roller Bracket is ¼". Should this washer show excessive wear replacement of same with a new one of original thickness may compensate for the excessive clearance between rollers and roller path.

The above described adjustment will not compensate for bushing or shaft wear.

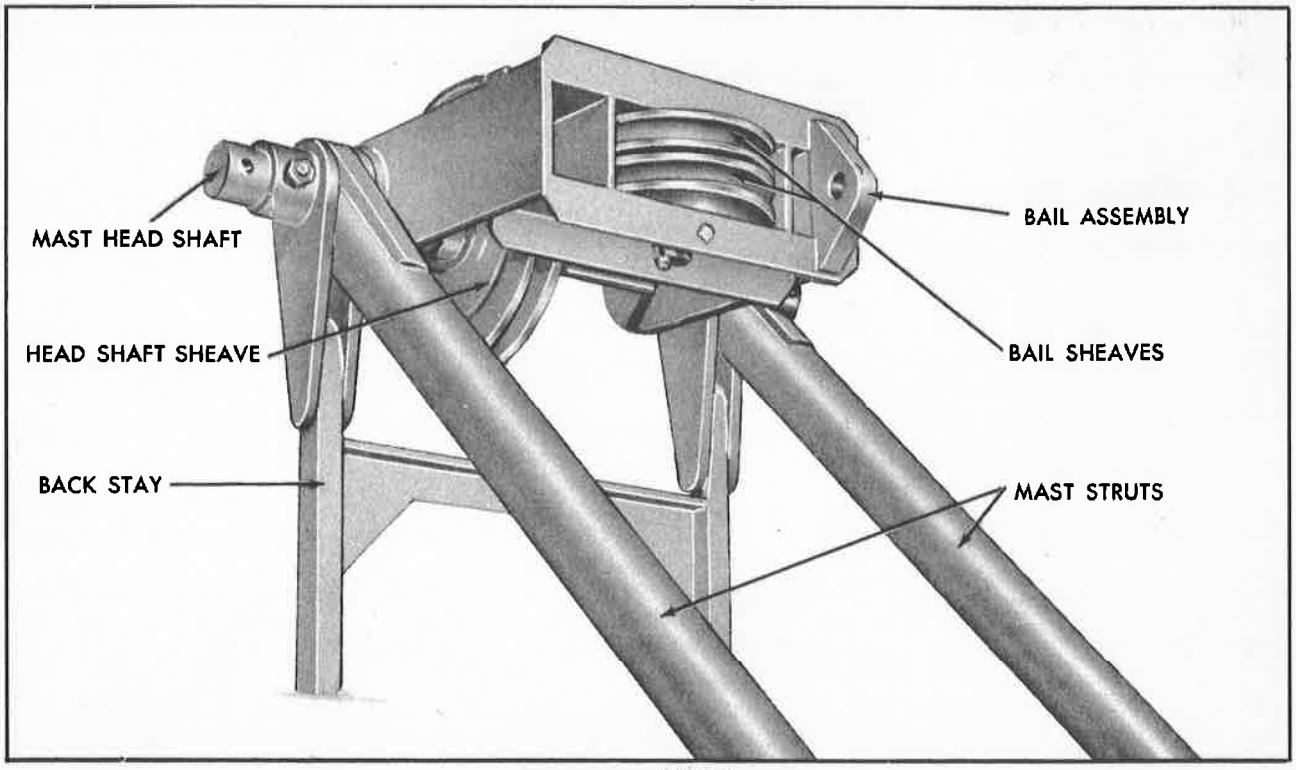


Fig. 2 LOW MAST UNIT

SECTION 2 – UPPER REVOLVING FRAME – Continued

REMOVAL AND REPLACEMENT OF CONICAL ROLLERS: Should it be necessary to remove Rollers to install new Bushings, or to separate Upper Frame from Lower Frame, proceed in the following manner:

(1) Remove Keeper Bolt and Shaft Inner Cap.
(2) Remove Shaft Outer Cap.
(3) Pull Roller Shaft out of Bracket far enough to allow roller to be removed.
(4) For instructions on removal and replacement o Conical Roller Bushings refer to "Section 13 — Bronze Bushings."
(5) Reassembly of the Roller Unit is in above reverse order. When positioning shaft end caps make sure lugs on the caps are in holes provided for same in the shaft.

MAST UNIT — Fig. 2

GENERAL DESCRIPTION: The Low Mast (also commonly known as the A-Frame or Gantry) consists of two Mast Struts, Back Stay, Mast Head Shaft and Bail Assembly. The Mast Struts are fastened to the rotating base directly behind the boom feet by Mast Strut Pins. The Back Stay is anchored to the rotating base directly in back of side housings by Back Stay Anchor Pins. The Mast Head Shaft, when fastened in place with bolts through hubs on backstay, fasten the Mast Struts and Backstay together. Head Shaft Sheave is kept in place on shaft by a Set Collar.

In case of 4-part boom hoist line arrangement, Bail Frame is equipped with only one Bail Sheave. In case of 6-part boom hoist line arrangement two Bail Sheaves are employed. Bail Sheave Pin is held to Bail Frame by a bolt projecting through flange on frame and shaft.

REMOVAL AND REPLACEMENT OF HEAD SHAFT SHEAVE OR BAIL ASSEMBLY: To remove Head Shaft Sheave or Bail Assembly, proceed in the following manner:

(1) Lower Boom to relieve load on boom hoist lines.
(2) Remove Head Shaft Anchor Bolts.
(3) Loosen Head Shaft Set Collar.
(4) Bump Head Shaft to the right and remove through hole provided in cab.
(5) Head Shaft Sheave and Set Collar will be removed as shaft is bumped out.
(6) To remove Bail Sheave remove Sheave Pin Bolt and then remove pin.
(7) For instructions on removal and replacement of Sheave Bushings refer to "Section 13 — Bronze Bushings."
(8) Reassemble Mast Unit in above reverse order.

SECTION 3 - VERTICAL SHAFT ASSEMBLIES

CENTER PIN UNIT

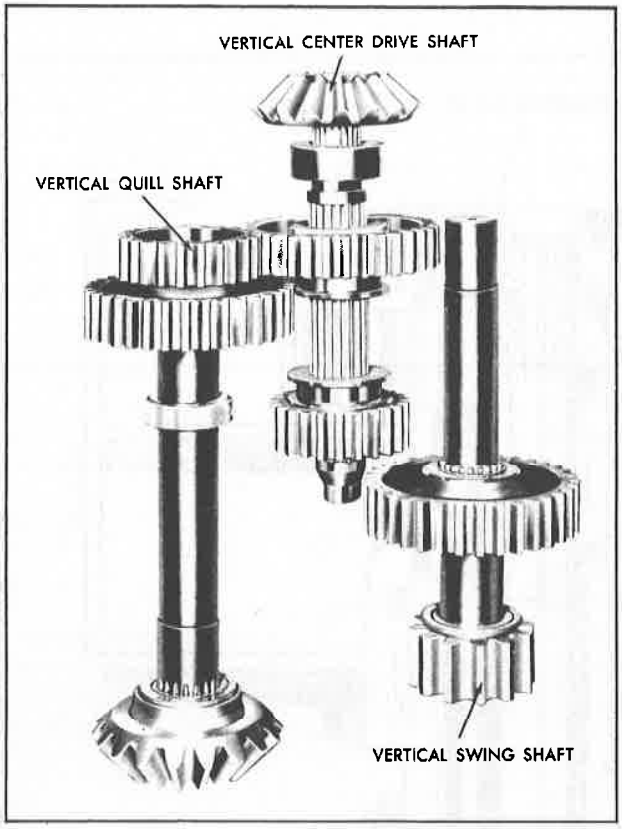


Fig. 1 VERTICAL SHAFT ASSEMBLIES (WITHOUT INDEPENDENT SWING)

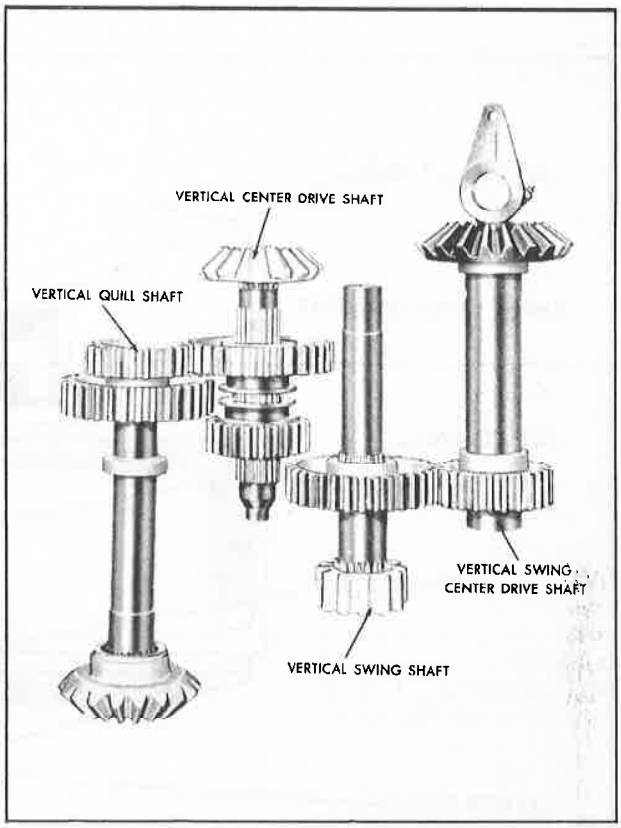


Fig. 2 VERTICAL SHAFT ASSEMBLIES (WITH INDEPENDENT SWING)

GENERAL DESCRIPTION: The Center Pin, which is welded in place on the lower frame, provides an axis of rotation for the upper frame in respect to the lower frame. The upper, which rotates about the Center Pin on a bronze bushing, is held to the lower by he Conical Rollers which ride on a double flange roller path.

In the center pin is housed the Vertical Quill Shaft which provides for driving power to traction shaft in lower frame. It will be noted that the Vertical Quill Shaft is free to rotate with respect to the center pin.

REMOVAL AND REPLACEMENT OF CENTER PIN BUSHING: To replace the Center Pin Bushing it will be necessary to separate the Upper Frame from the Lower Frame. This can be accomplished in either of the following two ways:

The following method, which will require upper to be raised a minimum of 19¾" to clear lower machinery, is the simplest and quickest way providing satisfactory lifting equipment is available.

(1) Remove Conical Rollers (Refer to Conical Rollers — Section 2).

(2) Remove 2-Way Rotating Joint Housing (Refer to 2-Way Rotating Joint). Place some sort of a protective cover over Rotating Joint Rotor to prevent same from being damaged when upper is raised from lower.

(3) Remove Snap Ring from top of Cluster Gear.

(4) Shift High Speed Travel Control to neutral or rear position. Then raise Cluster Gear until the large gear on Cluster Gear strikes the large gear on Vertical Center Drive Shaft and block in this position.

(5) Insert the straight set of Tips in Snap Ring Tool (Refer to Section 15 — Special Tools), leaving the tips protrude about ⅜" from side of Snap Ring Tool. Locate the Snap Ring Tool between the Cluster Gear and Lower Snap Ring with Tips pointing down. In this position snap ring can be spread enough to clear snap ring groove. Leaving the Snap Ring Tool in position to keep snap ring from seating in upper snap ring groove, hoist the upper until it clears the lower machinery.

Another method, which will require upper to be raised a minimum of 13½" to clear lower machinery, when lifting facilities are not available and upper has to be raised with jacks, is as follows:

(1) Remove Conical Rollers (Refer to Conical Rollers —

SECTION 3 – VERTICAL SHAFT ASSEMBLIES – Continued

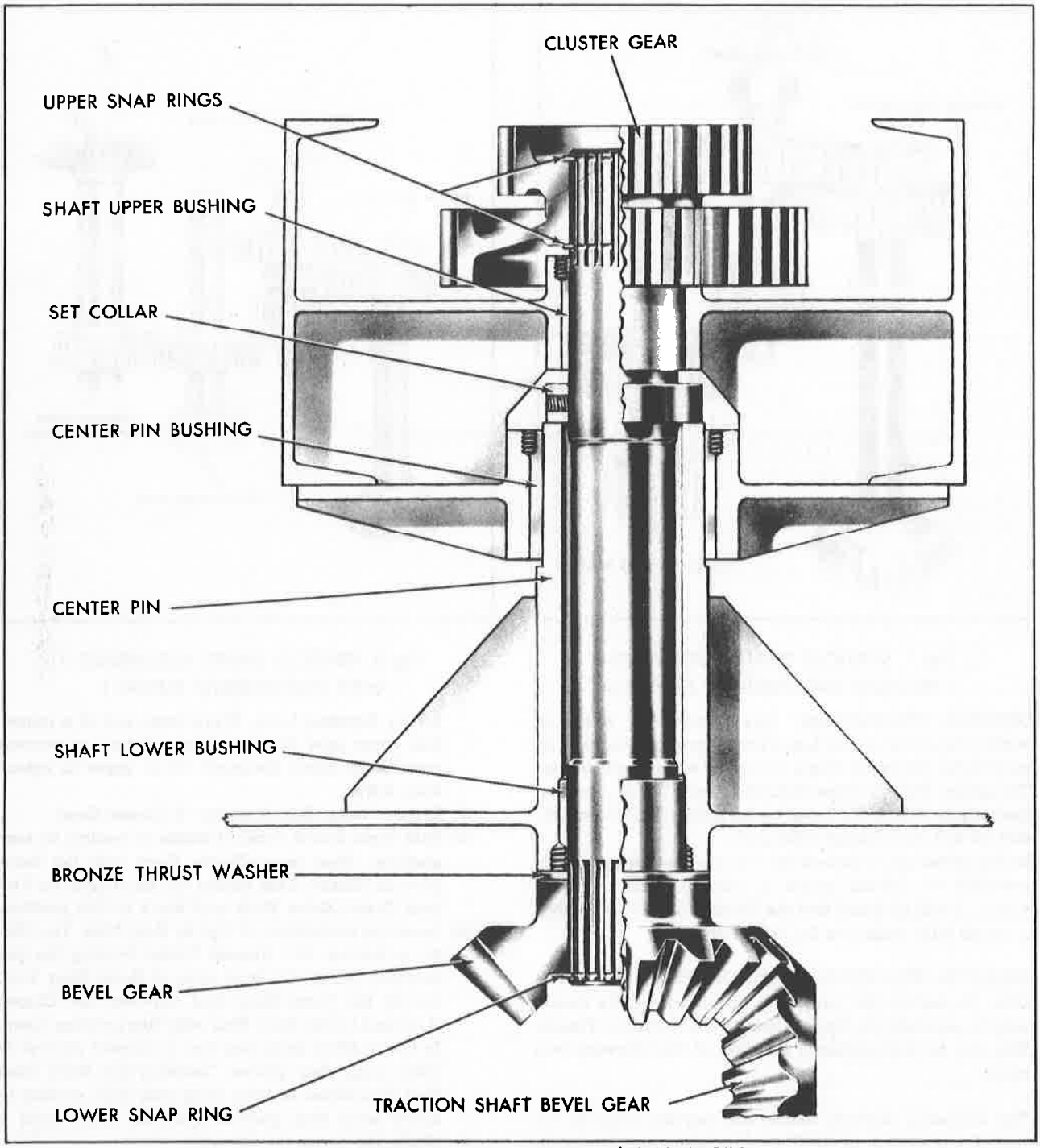


Fig. 3 VERTICAL QUILL SHAFT and CENTER PIN

Section 2).

(2) Remove entire 2-Way Rotating Joint Assembly (Refer to 2-Way Rotating Joint — this Section).

(3) Remove Snap Ring from top of Cluster Gear.

(4) Remove Cluster Gear. It will be necessary to tip this gear slightly to remove same after it has been lifted high enough to clear the shaft.

(5) Remove Snap Ring from under Cluster Gear.

SECTION 3 VERTICAL SHAFT ASSEMBLIES Continued

(6) Lift upper until it clears the lower machinery.

For instructions on removal and replacement of Center Pin Bushing after upper has been separated from lower refer to "Section 13 — Bronze Bushings."

VERTICAL QUILL SHAFT — Fig. 3

GENERAL DESCRIPTION: The Center Pin, which is welded to the lower frame, houses the Vertical Quill Shaft. By means of the High-Low Cluster Gear, which is splined to the top of shaft, and the Bevel Pinion, which is splined to the lower part of the shaft, drive to the traction shaft is provided.

REMOVAL OF VERTICAL QUILL SHAFT: Should it be necessary, the shaft may be removed from either the top or bottom of machine. To remove the shaft from top of machine, proceed as follows:

(1) Exhaust Hydraulic Pressure in system.
(2) Drain and remove Lower Transmission Case.
(3) Remove Hydraulic Lines from top and bottom of Rotating Joint.
(4) Remove Rotating Joint (For removal instructions see Rotating Joint — this Section).
(5) Remove Snap Rings from top and bottom of Shaft.
(6) Shift High Speed Travel Control to neutral or rear position.
(7) Remove Cluster Gear from top of shaft.
(8) Loosen Set Collar.
(9) Pull Shaft upward to remove.
(10) Reassembly of the Vertical Quill Shaft is in reverse order.

Should it be preferable to remove shaft downward, proceed as follows:

(1) Place machine over hole deep enough for Vertical Quill Shaft to drop clear of machine.
(2) Exhaust Hydraulic Pressure in system.
(3) Drain and remove Lower Transmission Case.
(4) Remove Hydraulic Lines from top and bottom of rotating joint.
(5) Remove Rotating Joint (For removal instructions see Rotating Joint — this Section).
(6) Remove Snap Rings from top and bottom of shaft.
(7) Shift High Speed Travel Control to neutral or rear position.
(8) Remove Cluster Gear from top of shaft.
(9) Remove Snap Ring from under cluster gear.
(10) Loosen Set Collar.
(11) Remove Traction Shaft.
(12) Remove Bevel Gear on bottom of shaft and drop shaft free of machine.

TWO-WAY ROTATING JOINT — Fig. 4

GENERAL DESCRIPTION: The 2-Way Rotating Joint contained within the vertical quill shaft transmits hydraulic pressure from the upper revolving frame to the lower

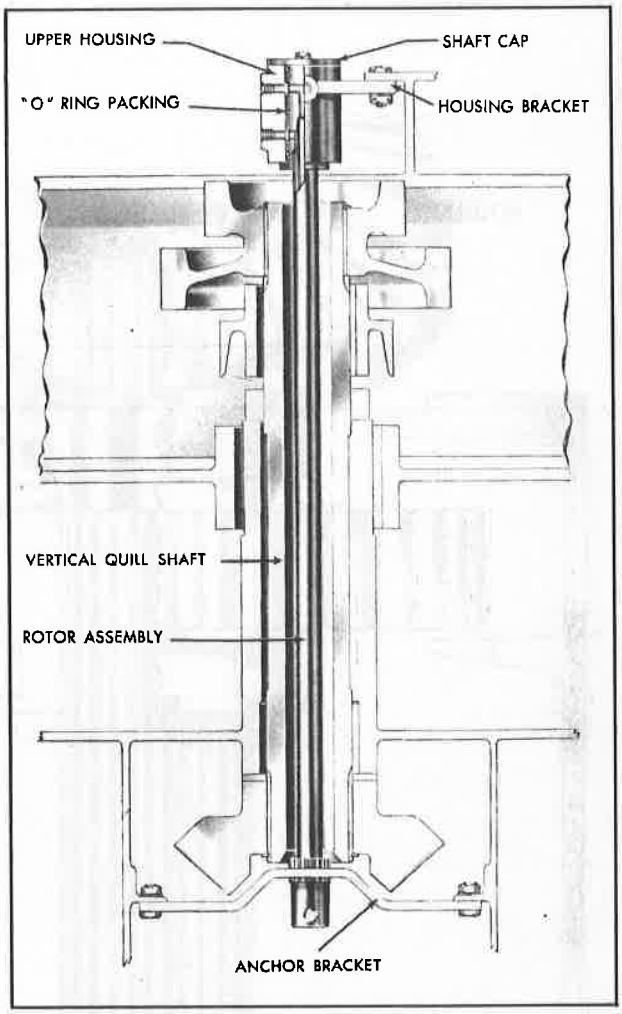


Fig. 4 TWO-WAY ROTATING JOINT

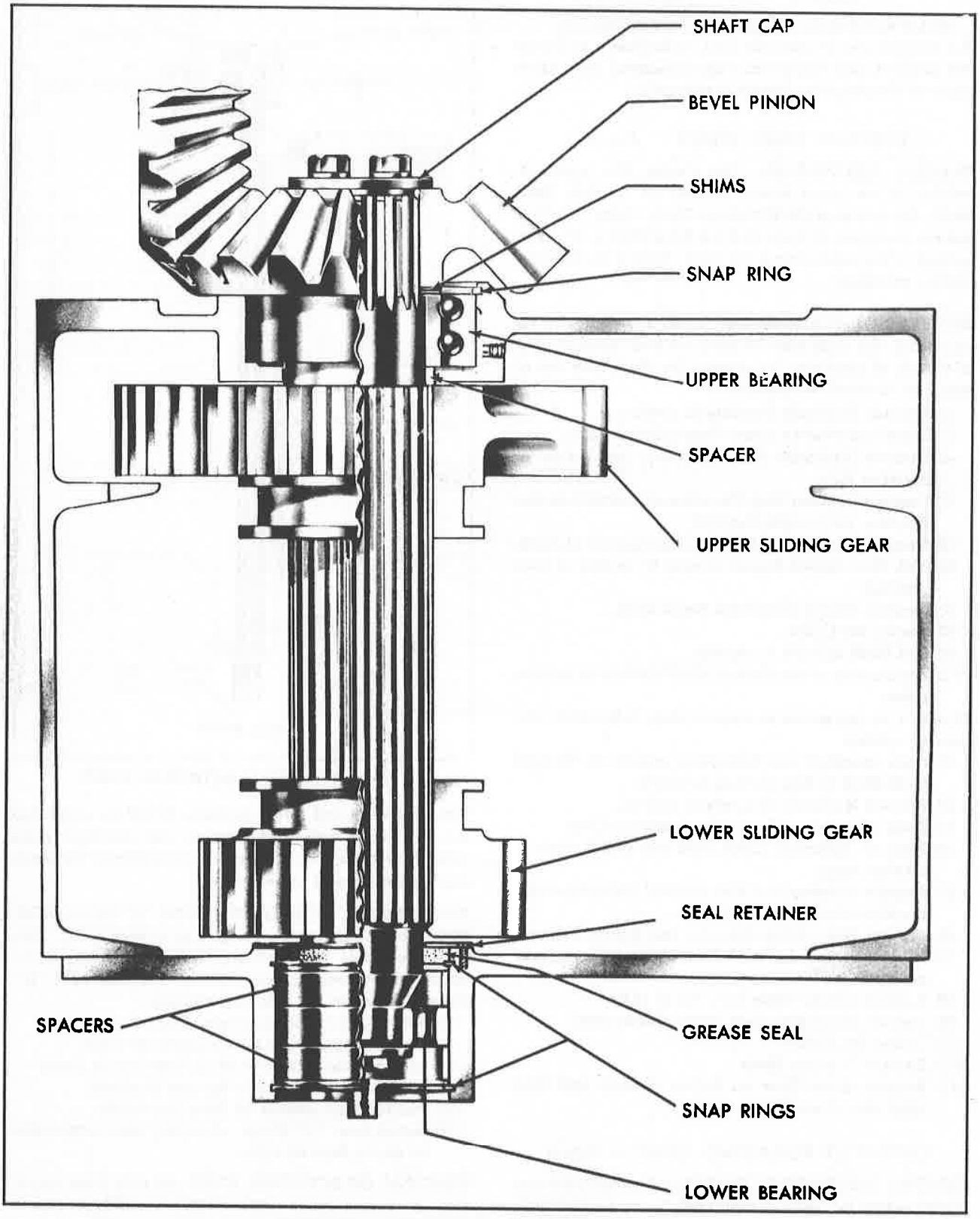
frame for steer and travel controls. It will be noted that the splines on bottom of rotating joint manifold locks joint in lower support bracket to hold rotating joint manifold stationary with lower frame.

REPLACEMENT OF ROTATING JOINT "O" RING PACKING: Should excessive seepage due to wear of "O" ring packings within the rotating joint be experienced, the rotating joint housing may be removed and new "O" Rings installed in the following manner:

(1) Exhaust Hydraulic Pressure in system.
(2) Remove Hydraulic Lines to upper housing.
(3) Remove Cap Screws holding End Cap in place.
(4) Remove Upper Housing Support Brackets.
(5) Pull Housing upward off Rotor Assembly.
(6) Install new "O" Rings, oil lightly and reassemble in above reverse order.

REMOVAL OF ROTATING JOINT: Should it be necessary to remove entire rotating joint assembly to permit removal of vertical quill shaft, proceed as follows:

SECTION 3 – VERTICAL SHAFT ASSEMBLIES – Continued



VERTICAL CENTER DRIVE SHAFT – Fig. 5

SECTION 3 - VERTICAL SHAFT ASSEMBLIES – Continued

(1) Exhaust Hydraulic Pressure in system.
(2) Drain and remove Lower Transmission Case.
(3) Disconnect Hydraulic Lines from top and bottom of rotating joint. It may be necessary to loosen lower support brackets and rotate same for access to fitting on bottom of rotating joint.
(4) Remove upper housing Support Brackets.
(5) Pull entire rotating joint assembly upward to remove.

VERTICAL CENTER DRIVE SHAFT — Fig. 5

GENERAL DESCRIPTION: The Vertical Center Drive Shaft, located directly under reverse shaft, transfers power from same to the vertical quill and vertical swing shaft through means of Sliding Gears. These sliding gears are controlled by the manual high-low travel and swing shift controls located on the right hand side of operator's compartment. The Upper Sliding Gear when meshed with the small gear on the vertical quill shaft provides for high speed travel. The Lower Sliding Gear when meshed with the large gear on the vertical quill shaft provides for low speed travel, or when the Lower Sliding Gear is in mesh with gear on vertical swing shaft the swinging cycle is made possible.

ADJUSTMENT OF BEVEL PINIONS AND SLIDING GEAR ALIGNMENT: Proper up and down clearance between Bevel Pinion on vertical center drive shaft and bevel pinion on reverse shaft is accomplished by the use of Shims under bevel pinion on vertical center drive shaft. Refer to Parts Catalog for part number of Shims. This adjustment is factory set and should not need further adjustment under normal conditions. Sliding gear alignment should be checked occasionally. Misalignment can be corrected by adjusting Control Linkage.

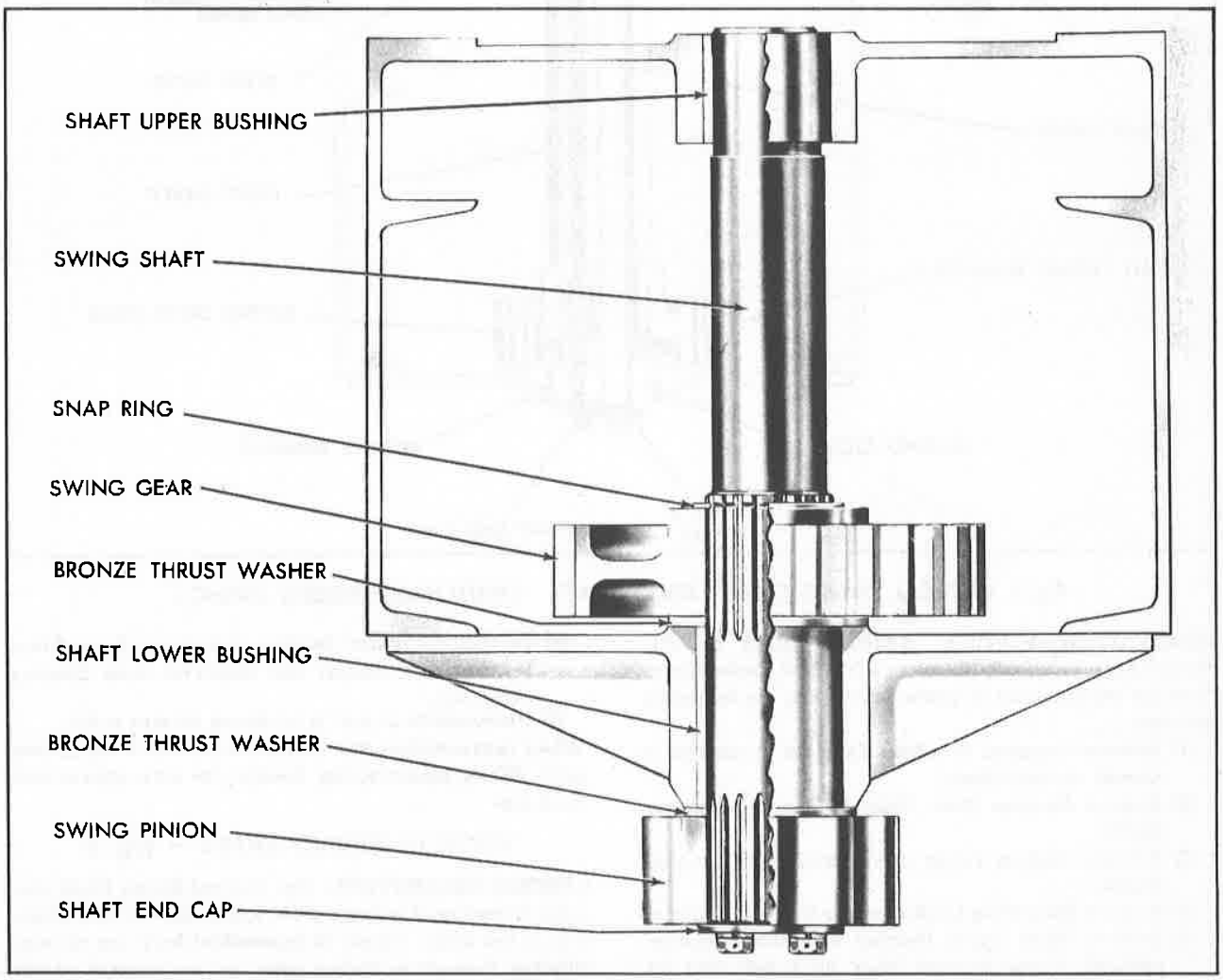


Fig. 6 VERTICAL SWING SHAFT

SECTION 3 VERTICAL SHAFT ASSEMBLIES Continued

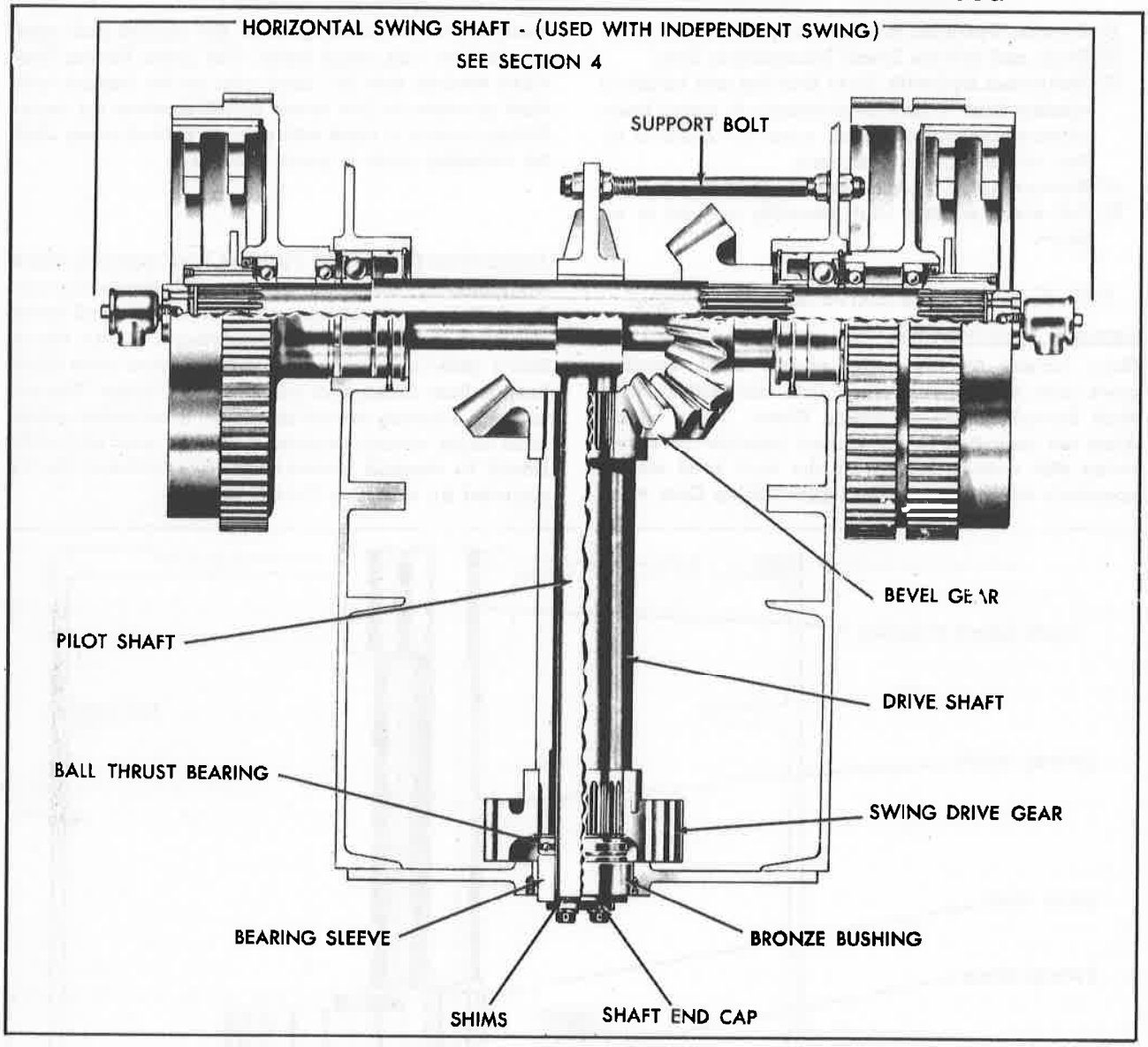


Fig. 7 VERTICAL SWING CENTER DRIVE SHAFT (WITH INDEPENDENT SWING)

REMOVAL OF VERTICAL CENTER DRIVE SHAFT: Should it be necessary to remove Vertical Center Drive Shaft for replacement of parts, proceed in the following manner:

(1) Remove Lagging, or Chain Sprocket in case of a shovel, on front drum.
(2) Remove Reverse Shaft (Refer to Sec. 4 — Reverse Shaft).
(3) Remove vertical center drive shaft End Cap and Pinion.
(4) Remove Snap Ring holding upper bearing in place.
(5) Remove Shaft Upper Bearing and Shaft together upward. Lower Bearing Inner Race will also be removed.
(6) To remove Lower Bearing, the upper Snap Ring, Washer and Spacer are removed, then Bearing taken out.
(7) Reassembly of unit is in above reverse order.

When reassembling it is advisable to renew the grease seal. When replacing top bearing be sure grease seal is on top.

VERTICAL SWING SHAFT — Fig. 6

GENERAL DESCRIPTION: The Vertical Swing Shaft provides a means of swinging the upper deck in one direction or the other. Power is transmitted from the reverse clutches through a sliding gear, on the vertical center drive shaft, to Swing Gear which is splined to upper end

SECTION 3 VERTICAL SHAFT ASSEMBLIES Continued

of swing shaft. The Swing Pinion which is splined to the lower end of the swing shaft transmits power against lower frame ring gear. The ring gear, being fixed to the lower frame, cannot move and therefore, the swing pinion and upper deck revolve around same.

Direction of swing is determined by the two reverse clutches, described under "Reverse Shaft." Before attempting to swing machine be sure "Hi-Low Travel" control is in low position and that the Swing Lock is disengaged. Refer to "Section 14 — Operating Instructions" for operation of these levers.

REMOVAL OF VERTICAL SWING SHAFT: Should servicing of the machine require the removal of the Vertical Swing Shaft, it can be done in the following manner:

(1) Rotate machine until Swing Pinion is lined up with hole provided in lower frame.
(2) Remove Shaft End Cap.
(3) Remove Swing Pinion.
(4) Remove Snap Ring located on top of Swing Gear, allowing the shaft to drop free.
(5) Reassembly of vertical swing shaft is in above reverse order.

For instructions on removal and replacement of Swing Shaft Bronze Bushings refer to "Section 13 — Bronze Bushings."

VERTICAL SWING CENTER DRIVE SHAFT — Fig. 7
(WITH INDEPENDENT SWING)

GENERAL DESCRIPTION: On machines equipped with independent swing, we have an additional vertical shaft to those found on a standard machine. This shaft, the Vertical Swing Center Drive Shaft, transmits power from the horizontal swing shaft to the vertical swing shaft for the swinging operation. The shaft is of tubular steel construction with a Bevel Gear, which is in constant mesh with bevel gear on horizontal swing shaft, splined at the top, and a driving gear, which is in constant mesh with mating gear on vertical swing shaft, splined at the bottom. Thus at any time gear train is in motion and either of the clutches on horizontal swing shaft are engaged, the shaft will revolve on the non-rotating Pilot Shaft that passes through it, completing the flow of power for the swinging operation.

ADJUSTMENT OF BEVEL GEAR MESH: Proper up and down clearance between Bevel Gear on top of Vertical Swing Center Drive Shaft and Bevel Gear on Horizontal Swing Shaft is accomplished by adding or removing shims between shaft lower End Cap and Shaft. Refer to Parts Catalog for part numbers of shims. This adjustment must be made in conjunction with bevel gear adjustment on Horizontal Swing Shaft. Refer to "Section 4— Horizontal Swing Shaft — With Independent Swing."

REMOVAL OF VERTICAL SWING CENTER DRIVE SHAFT: To remove vertical swing center drive shaft, proceed in the following manner:

(1) Remove Horizontal Swing Shaft.
(2) Remove Pilot Shaft Support Bolt that anchors to side housing.
(3) To remove, pull entire shaft assembly upward.

To remove parts from shaft once shaft assembly has been removed from the machine, proceed in the following manner:

(1) Remove Pilot Shaft Lower End Cap.
(2) Remove Pilot Shaft.
(3) All parts are now free to be removed.

Reassembly of the vertical swing center drive shaft is in above reverse order. When replacing ball thrust bearing, be sure bearing race with smaller bore is installed on bottom side.

SECTION 4 – HORIZONTAL SHAFT ASSEMBLIES

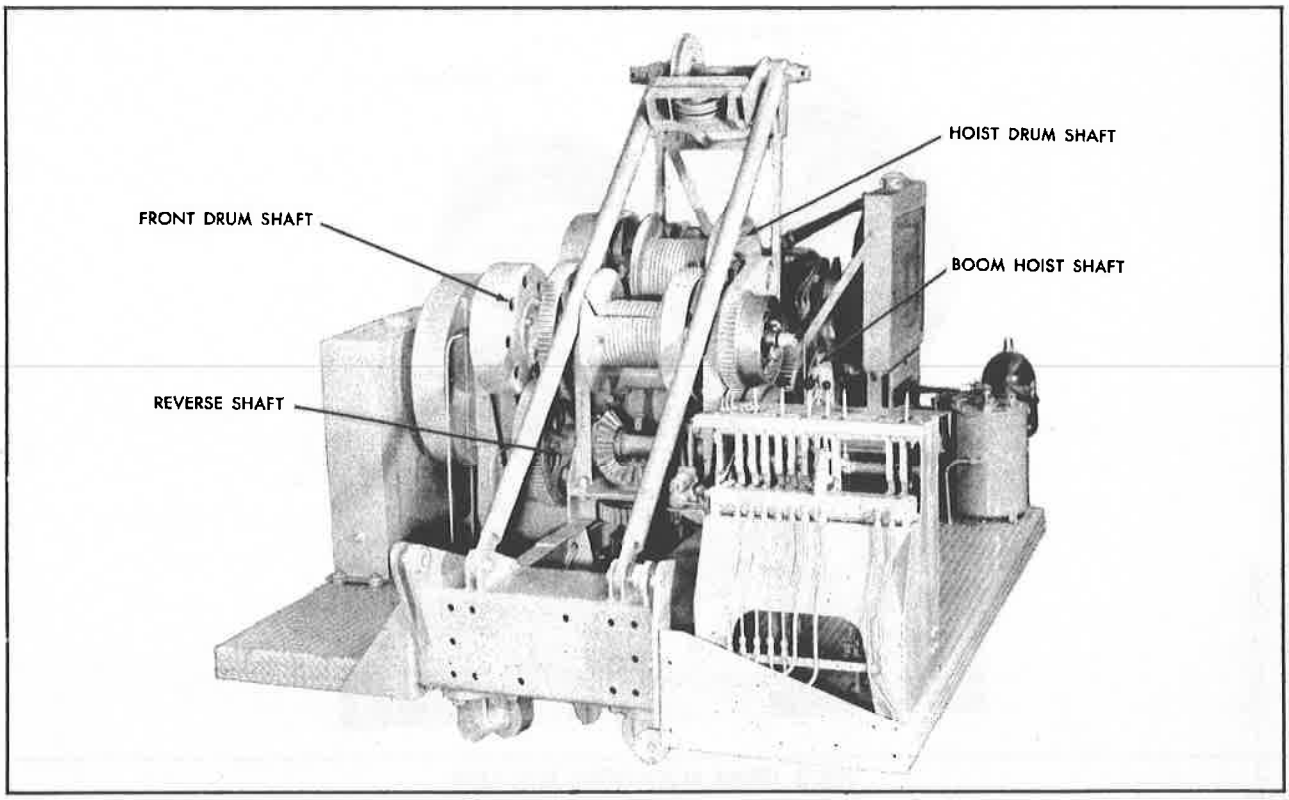


Fig. 1 UPPER REVOLVING FRAME

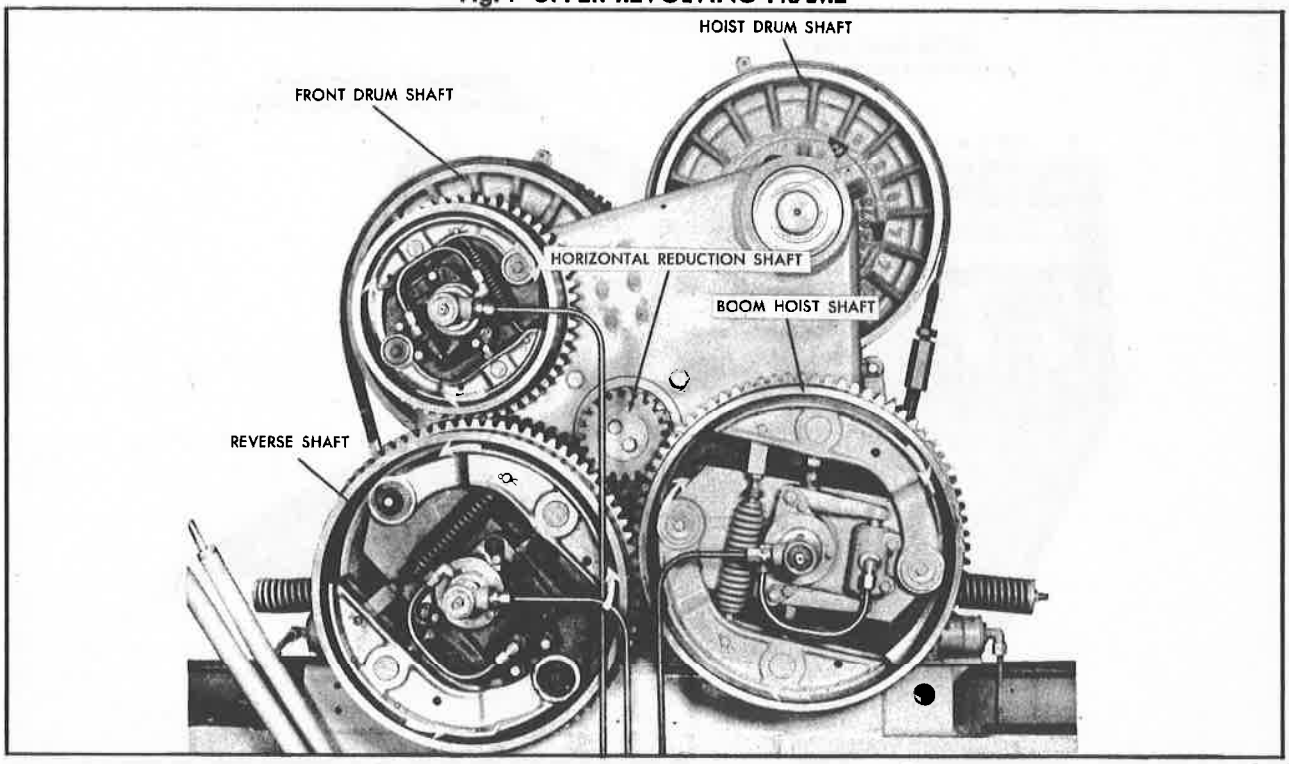


Fig. 2 GEAR ROTATION, L.H. SIDE