

C O N T E N T S

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GENERAL

A one piece propeller shaft, with front and rear cross type universal joints, is used in all Kaiser models. A two-piece propeller shaft, with front, center, and rear ball and trunnion universal joints and center bearing and support is used in Frazer models, all with overdrive transmissions.

The propeller shaft installation on Kaiser models equipped with Hydra-Matic drive is essentially the same as with standard or overdrive transmissions, except for length and different dimensions in the slip yoke at the rear of the transmission.

The propeller shaft installation in Frazer models with Hydra-Matic drive is essentially the same as with overdrive transmissions, except for a longer front propeller shaft and the use of a cross type front universal joint (with slip yoke) at the rear of the transmission.

The procedures described in this manual are applicable to all models, regardless of transmission, except when otherwise noted.

DESCRIPTION

a. CROSS TYPE PROPELLER SHAFTS—KAISER (Fig. 227). The propeller shaft installation in Kaiser models consists of one tubular propeller shaft and two cross type universal joints. As shown in Fig. 227, the propeller shaft passes through the X-member of the frame.

In this type installation, both universal joints have a cross, or spider, connecting the yokes and use a roller bearing on each trunnion of the cross. The slip yoke of the front universal joint is splined and

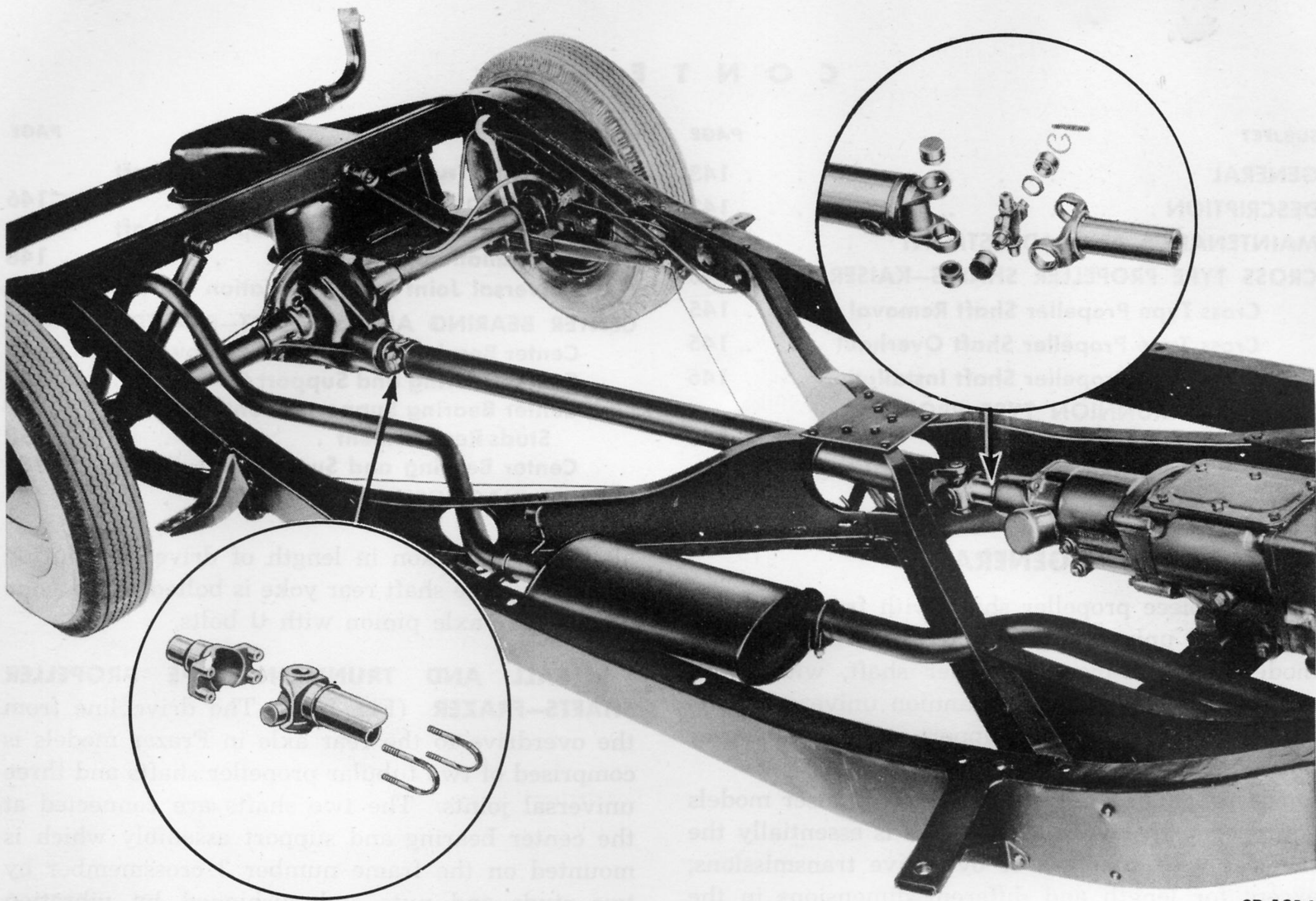
allows for variation in length of drive line during operation. The shaft rear yoke is bolted to the yoke on the rear axle pinion with U bolts.

b. BALL AND TRUNNION TYPE PROPELLER SHAFTS—FRAZER (Fig. 228). The drive line from the overdrive to the rear axle in Frazer models is comprised of two tubular propeller shafts and three universal joints. The two shafts are connected at the center bearing and support assembly which is mounted on the frame number 3 crossmember by two studs and nuts and cushioned by vibration dampening rubber insulators. This method of mounting the support assembly dampens the thrust and torque vibrations of the two propeller shafts. The front shaft used with the overdrive unit is shorter than the front shaft required when vehicle is equipped with Hydra-Matic transmission.

A universal joint connects the front shaft to a flange on the transmission (or overdrive). The opposite end of the shaft is mounted in a center bearing and support. The center support bearing, dust shields, and center flange are installed on the machined and splined end of the shaft and bolted in place.

The center bearing is mounted in the sleeve of the center bearing support by means of a rubber insulator which fits over the support bearing outer race and inside the support sleeve. The sealed type center support bearing is permanently lubricated and is protected by front and rear dust shields. The center flange, on the rear end of the front shaft, connects the front shaft to the universal joint at the front end of the rear propeller shaft.

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Fig. 227—Propeller Shaft Installation—Kaiser

Another universal joint connects the rear end of the rear propeller shaft to a flange on the rear axle pinion. Both the front and rear propeller shafts are carefully balanced to provide smooth operation. This spring loaded and balanced installation is designed to absorb the thrust and torque of the drive line at each of the three joints.

The ball joint of each universal joint is an integral part of the propeller shaft. The joint body fits over the ball joint and bolts to the flange to which the propeller shaft connects. Inside the joint body a pin, with a ball and rollers at each end, extends through the ball joint and rides in guide channels of the body to control movement of the joint.

Each joint is completely sealed by a special boot between the joint body and the shaft and by a metal cover and gasket between the joint body and the flange. The ball and trunnion type propeller shaft installation is illustrated in Fig. 228. Also, refer to Fig. 230.

MAINTENANCE AND ADJUSTMENT

a. CROSS TYPE PROPELLER SHAFTS—KAISER.

Each cross type universal joint is provided with a lubrication fitting to supply lubricant to the roller bearings. Lubricate periodically with the proper lubricant as recommended in Section 17, "Lubrication." No other maintenance or adjustment is necessary. No wear adjustments are provided; therefore, worn parts must be replaced. Inspect the propeller shaft installation periodically to be sure yoke bolts are tight and universal joints are in good condition.

b. BALL AND TRUNNION TYPE PROPELLER SHAFTS—FRAZER.

Ball and trunnion universal joints should be disassembled, cleaned and repacked, periodically with the proper lubricant as recommended in Section 17, "Lubrication." No provision is made for wear adjustment; therefore, worn parts must be replaced. Inspect the propeller shaft installation periodically to be sure the universal joint

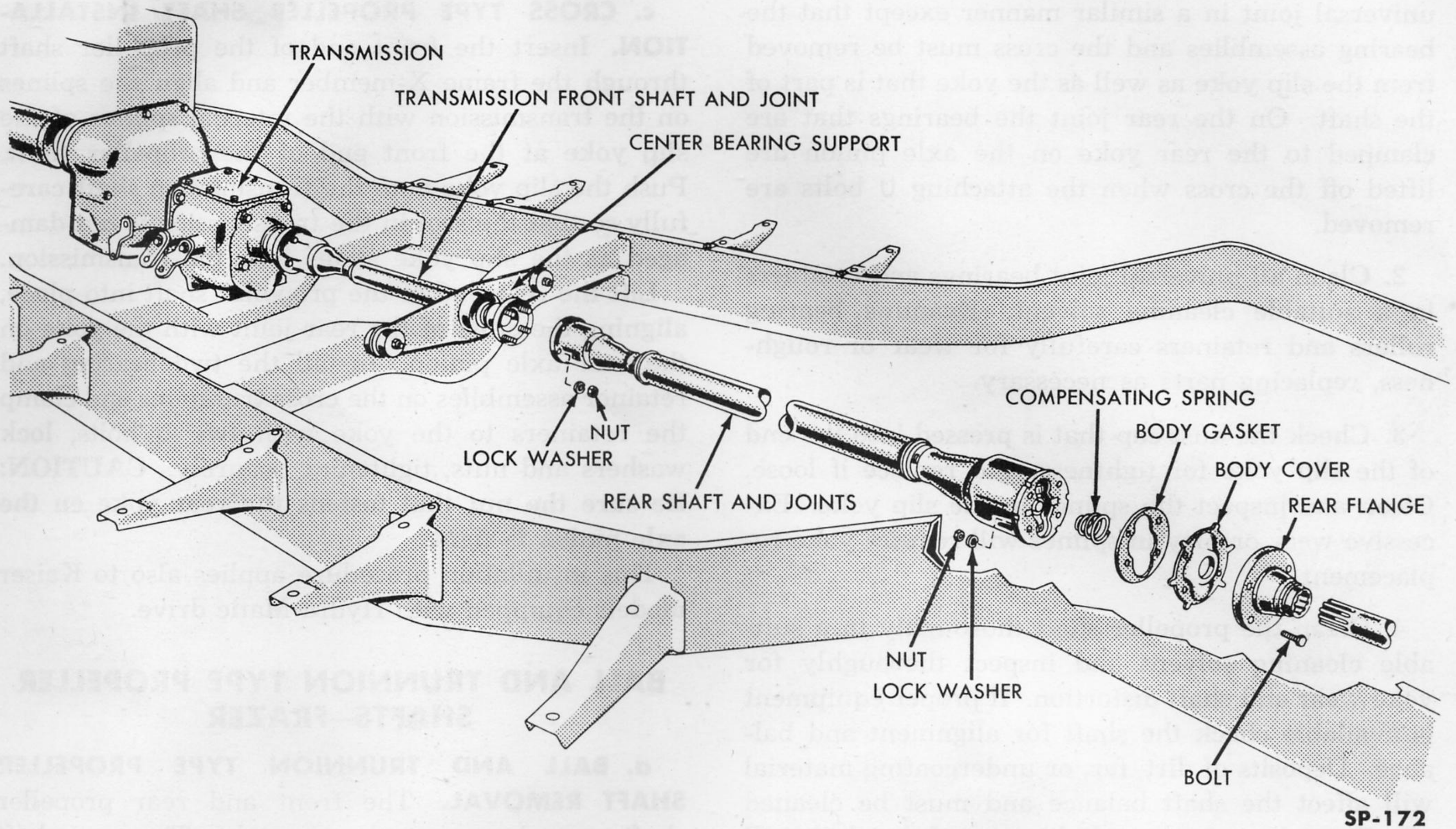


Fig. 228—Propeller Shaft Installation—Frazer

boots are intact, that the joints are not worn or loose, and that flange bolts are tight.

CROSS TYPE PROPELLER SHAFTS—KAISER

a. CROSS TYPE PROPELLER SHAFT REMOVAL (Fig. 227). Remove the U bolts that attach the rear joint to the yoke on the rear axle pinion. Hold the two bearing retainers on the cross while removing the U bolts and then remove the retainers and bearings from the cross. Lower the rear end of the shaft and pull rearward until free at the slip joint and out through the frame X-member.

b. CROSS TYPE PROPELLER SHAFT OVERHAUL. Overhaul of the propeller shaft includes disassembly and repair of the universal joints and slip yoke (Fig. 227) and inspection of all components.

1. Disassemble the rear universal joint by removing the snap rings and pressing the bearing and retainer assemblies out of the yoke, using Clamp and Adapter Tool W-148 (Fig. 229). Remove the cross or spider from the yoke and the oil seals and oil seal retainers from the cross. Disassemble the front

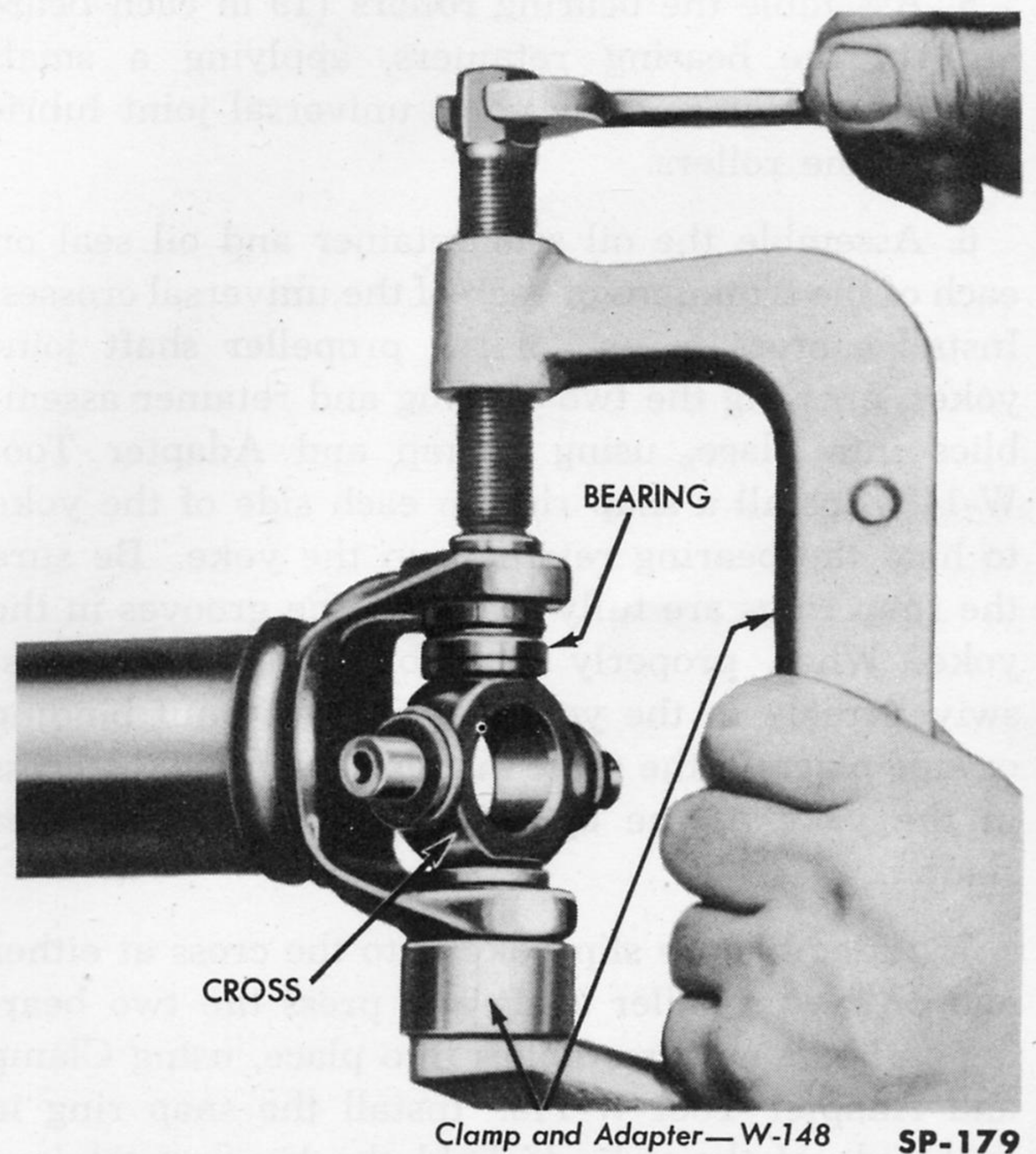


Fig. 229—Removing Cross Type Universal Joint Bearings

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universal joint in a similar manner except that the bearing assemblies and the cross must be removed from the slip yoke as well as the yoke that is part of the shaft. On the rear joint the bearings that are clamped to the rear yoke on the axle pinion are lifted off the cross when the attaching U bolts are removed.

2. Clean all universal joint bearings and retainers in a suitable cleaning solvent. Examine bearing rollers and retainers carefully for wear or roughness, replacing parts as necessary.

3. Check the dust cap that is pressed into the end of the slip yoke for tightness, and replace if loose. Clean and inspect the splines in the slip yoke. Excessive wear or play in splines will require yoke replacement.

4. Clean the propeller shaft thoroughly in a suitable cleaning solvent and inspect thoroughly for yoke wear and shaft distortion. If proper equipment is available check the shaft for alignment and balance. Deposits of dirt, tar, or undercoating material will affect the shaft balance and must be cleaned off. Deep dents in the tubular part of the shaft will also affect the alignment and balance, necessitating shaft replacement.

5. Assemble the bearing rollers (19 in each bearing) in the bearing retainers, applying a small amount of high melting point universal joint lubricant to the rollers.

6. Assemble the oil seal retainer and oil seal on each of the trunnions of each of the universal crosses. Install a cross in one of the propeller shaft joint yokes, pressing the two bearing and retainer assemblies into place, using Clamp and Adapter Tool W-148. Install a snap ring in each side of the yoke to hold the bearing retainers in the yoke. Be sure the snap rings are fully seated in the grooves in the yoke. When properly assembled the cross must swivel freely in the yoke bearings without binding or side play. In the same manner assemble the cross in the yoke at the opposite end of the propeller shaft.

7. Assemble the slip yoke onto the cross at either end of the propeller shaft and press the two bearing and retainer assemblies into place, using Clamp and Adapter Tool W-148. Install the snap ring in each side of the yoke to hold the bearing retainer in place.

c. CROSS TYPE PROPELLER SHAFT INSTALLATION. Insert the front end of the propeller shaft through the frame X-member and align the splines on the transmission with the internal splines of the slip yoke at the front end of the propeller shaft. Push the slip yoke onto the transmission shaft carefully so that the seal in the transmission is not damaged as the slip yoke slides into the transmission.

Lift the rear end of the propeller shaft into place, aligning the cross of the rear joint with the yoke on the rear axle pinion. Install the two bearing and retainer assemblies on the cross trunnions and clamp the retainers to the yoke with two U bolts, lock washers and nuts, tightening securely. **CAUTION: Be sure the nut that fastens the rear yoke on the axle pinion is tight.**

This installation procedure applies also to Kaiser models equipped with Hydra-Matic drive.

BALL AND TRUNNION TYPE PROPELLER SHAFTS—FRAZER

a. BALL AND TRUNNION TYPE PROPELLER SHAFT REMOVAL. The front and rear propeller shafts may be removed separately. The rear shaft is removed by detaching at the universal joint flanges. The front shaft is removed by disconnecting at the two universal joint flanges and detaching the center bearing support from the frame crossmember. The following procedure covers the removal of the complete installation; use only the instructions which are applicable if only part of the installation is to be removed.

1. Remove the four bolts, nuts, and lock washers attaching the front and rear universal joints at the center and rear flanges respectively and remove the rear propeller shaft (refer to Fig. 228).

2. Remove the two center bearing support lock nuts, flat washers, and rear insulators so that the support assembly is free from the frame crossmember for removal.

3. Remove the four bolts, nuts, and lock washers attaching the front shaft universal joint to the front flange on the transmission (or overdrive). On vehicles equipped with Hydra-Matic drive, there is a slip yoke. Move the front propeller shaft and the center bearing support assembly to the rear to clear the crossmember and remove as a unit.

b. BALL AND TRUNNION TYPE PROPELLER SHAFT OVERHAUL. Overhaul of the propeller shafts

includes disassembly and repair of the universal joints and inspection of all components (Fig. 230). Refer to **CENTER BEARING AND SUPPORT** later in this Section for instructions on overhaul of the center bearing. The front universal joint on vehicles equipped with Hydra-Matic drive is the cross type and overhaul information is given under **CROSS TYPE PROPELLER SHAFTS**.

1. From each universal joint, remove the joint body metal cover and gasket by bending the attaching tabs of the cover away from the joint body. Remove the compensating spring.

2. Slide the joint body onto the propeller shaft to expose the end of the shaft. Remove the two centering buttons and springs from the ends of the trunnion pin.

3. Slide the two balls, rollers, and thrust washers off the trunnion pin.

4. Press the trunnion pin out of the joint ball at end of the propeller shaft using Pin Remover and Replacer C-552 (Fig. 231).

5. Remove the boot clamps and slide the joint body and boot off the end of the propeller shaft. Discard the boot and clamps as a new boot and clamps should be used at assembly.

6. Clean all parts in a suitable solvent and inspect for wear and shaft distortion. Worn or damaged parts must be replaced. If proper adjustment is available check the propeller shafts for alignment and balance. The center bearing and support must be disassembled from the front propeller shaft as described under **CENTER BEARING AND SUPPORT OVERHAUL** prior to balancing. Deposits of dirt, tar, or undercoating material will affect the shaft balance and must be cleaned off. Deep dents

in the tubular part of the shaft will also affect the alignment and balance necessitating shaft replacement.

7. For each universal joint install a new rubber boot on the shaft and fasten the clamp to attach the boot to the shaft. **NOTE:** A special split type leather replacement boot, which can be installed without disassembling the universal joint, is available as a service part for use only when replacement of the boot alone is necessary.

8. Slip the joint body over the joint ball and onto the propeller shaft. Press the trunnion pin into place in the hole in the joint ball, using Pin Replacer C-552. Since endwise location of the pin controls run-out and balance of the shaft, proper installation of this pin is important. The trunnion pin must be a tight press fit and its ends must protrude equally from each side of the joint ball (within .006 of an inch). Mount the propeller shaft on "V" blocks and check the pin extension with a dial indicator.

9. Install the balls, rollers (31 in each ball), thrust washers, centering button springs and the centering buttons on the ends of the trunnion pin in accordance with relative positions shown in Fig. 230.

10. Install the clamp to attach the boot to the joint body.

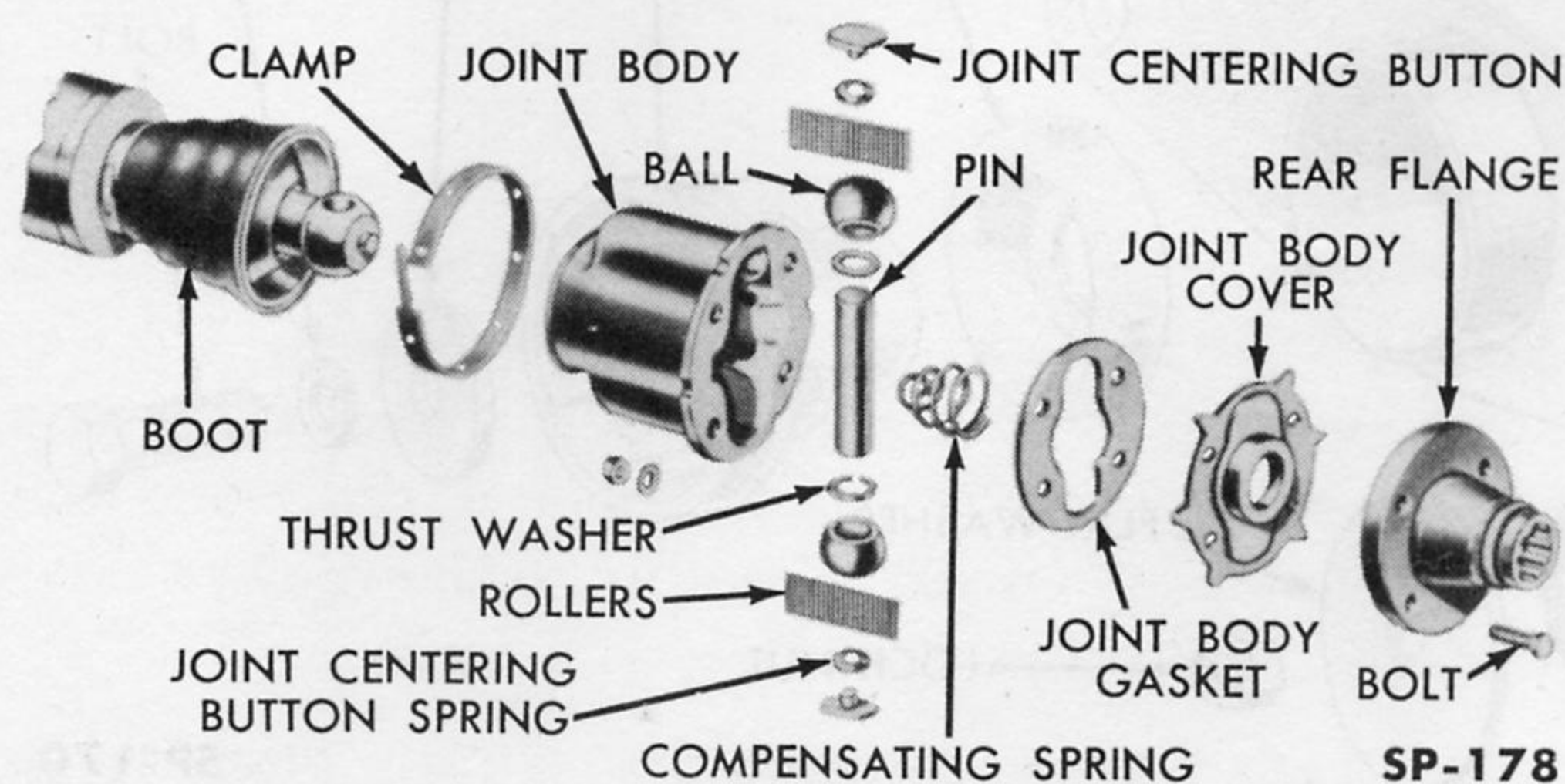


Fig. 230—Ball and Trunnion Universal Joint—Exploded View



Fig. 231—Removing Trunnion Pin

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11. Pack 1½ ounces of the proper lubricant, as specified in Section 17, "Lubrication," of this manual, into the joint body. Install the compensating spring, joint body gasket, and cover, bending the tangs of the cover over the joint body flange to fasten it tightly in place. Assemble all three of the universal joints in this manner.

c. BALL AND TRUNNION TYPE PROPELLER SHAFT INSTALLATION. The front propeller shaft should be installed first to provide for the rear shaft at the center bearing. Proceed as follows:

1. Fit the front propeller shaft, with the center bearing and support assembled on it, into place in the vehicle. The support must be mounted on the crossmember studs so that the sleeve in which the center bearing is installed slopes downward toward the rear to provide correct propeller shaft angularity. This is important and can be determined by visual inspection. Be sure the support spacer, bushing, inner insulator and flat washer are in place

on each support stud and located between the number 3 crossmember and the support (Fig. 232).

2. Install four bolts, lock washers and nuts to attach the universal joint body to the front flange on the transmission or the overdrive. Tighten the nuts with a torque wrench 30-35 foot pounds torque.

3. Install the two center bearing support rear insulators, flat washers and lock nuts on the frame crossmember studs to attach the support. Parts must be in the relative positions shown in Fig. 232. Tighten the nuts on the studs with a torque wrench to 15-20 foot pounds torque.

4. Fit the rear propeller shaft in place in the vehicle, either end toward the front. Install four bolts, lock washers and nuts to connect the rear universal joint body to the flange on the rear axle pinion. Tighten the nuts with a torque wrench to 30-35 foot pounds torque.

5. In the same manner connect the universal joint

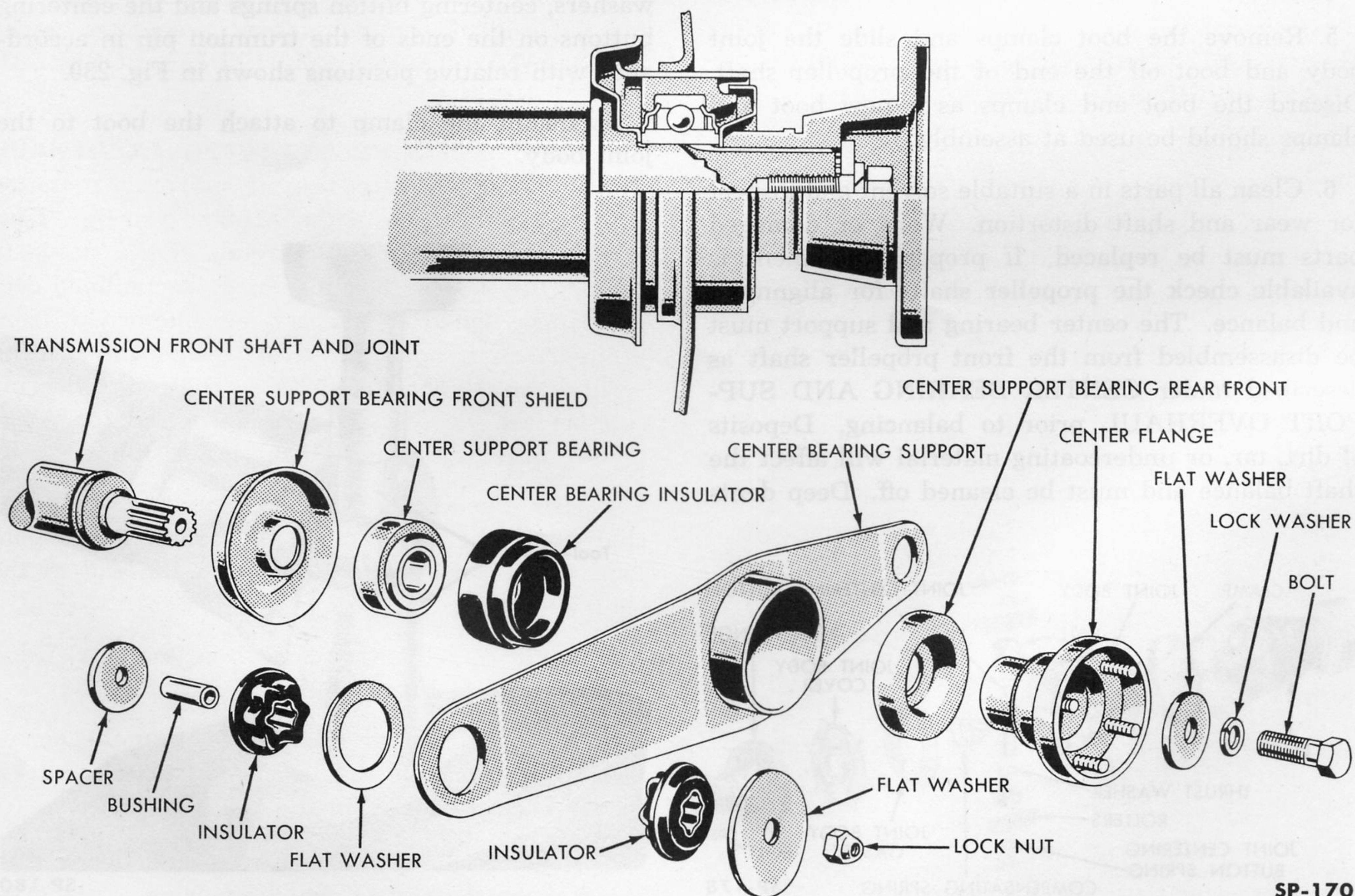


Fig. 232—Center Bearing and Support Assembly

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body at the front end of the rear propeller shaft to the center flange on the front shaft, rotating the front shaft as necessary to align the bolt holes.

d. UNIVERSAL JOINT BOOT INSTALLATION (Fig. 233). The following is the procedure for installing the production type rubber universal joint and propeller shaft boot in the 1951 Frazer (Fig. 233) without removing the trunnion pin and joint body from the propeller shaft. This permits changing the boot without totally disassembling the universal joint. Do not confuse this operation with boot replacement using the leather split type boot that is for use when only the boot is to be replaced and no work is necessary on the universal joint.

1. Remove the propeller shaft assembly from the chassis as described under BALL AND TRUNNION TYPE PROPELLER SHAFT REMOVAL.

2. Clamp the shaft lightly in a vise with one end of the shaft resting on a bench so that the shaft is approximately horizontal.

3. Disassemble the universal joint, removing all parts except the body and pin, as described under BALL AND TRUNNION TYPE PROPELLER SHAFT OVERHAUL.

4. Clean all of the universal joint parts thoroughly.

5. Apply a coat of clean grease to the inside of the joint body, joint ball and pin. Coat the inside and outside of the new late type boot with clean grease.

6. Stretch the boot over the joint ball and pin (Fig. 233).

7. Work the boot into the joint body as far as possible, then pull the body back over the pin. Pull

the end of the boot which protrudes through the end of the body and at the same time work the body back and forth until the entire boot has passed through the body. **NOTE: If the cone on the boot (Fig. 233) was inverted during the foregoing operation, pull it out to its normal position.**

8. Attach the boot to the body and shaft with the clamps that are provided with the boot.

9. Pack the body with 1½ ounces of the proper lubricant, specified in Section 17, "Lubrication," and then reassemble the universal joints as described under BALL AND TRUNNION TYPE PROPELLER SHAFT INSTALLATION.

10. Install the propeller shaft assembly in the chassis as described under BALL AND TRUNNION TYPE PROPELLER SHAFT INSTALLATION.

CENTER BEARING AND SUPPORT—FRAZER

a. CENTER BEARING AND SUPPORT REMOVAL.

The center bearing and support should be removed as a unit together with the front propeller shaft. Refer to propeller shaft removal procedure under BALL AND TRUNNION TYPE PROPELLER SHAFT REMOVAL.

b. CENTER BEARING AND SUPPORT OVERHAUL.

The sleeve of the center bearing support is mounted over the rubber insulator of the bearing. Dust shields are mounted at both ends of the sleeve to protect the bearing and insulator. The splined center flange, bolted on the splined end of the front propeller shaft holds the dust shields and bearing securely on the shaft (Fig. 232). The center bearing support can be disassembled, inspected, parts replaced as required, and assembled as follows:

1. Using wood clamp blocks, mount the propeller shaft in a vise and remove the center flange bolt, lock washer and flat washer from the end of the shaft.

2. Remove the center flange from the shaft using Universal Joint Flange Puller C-452 (Fig. 234).

3. Remove the rear dust shield, pull the center bearing support off the bearing insulator and remove the insulator from the bearing.

4. Remove the center bearing and front dust shield from the end of the shaft using a universal puller (Fig. 235).

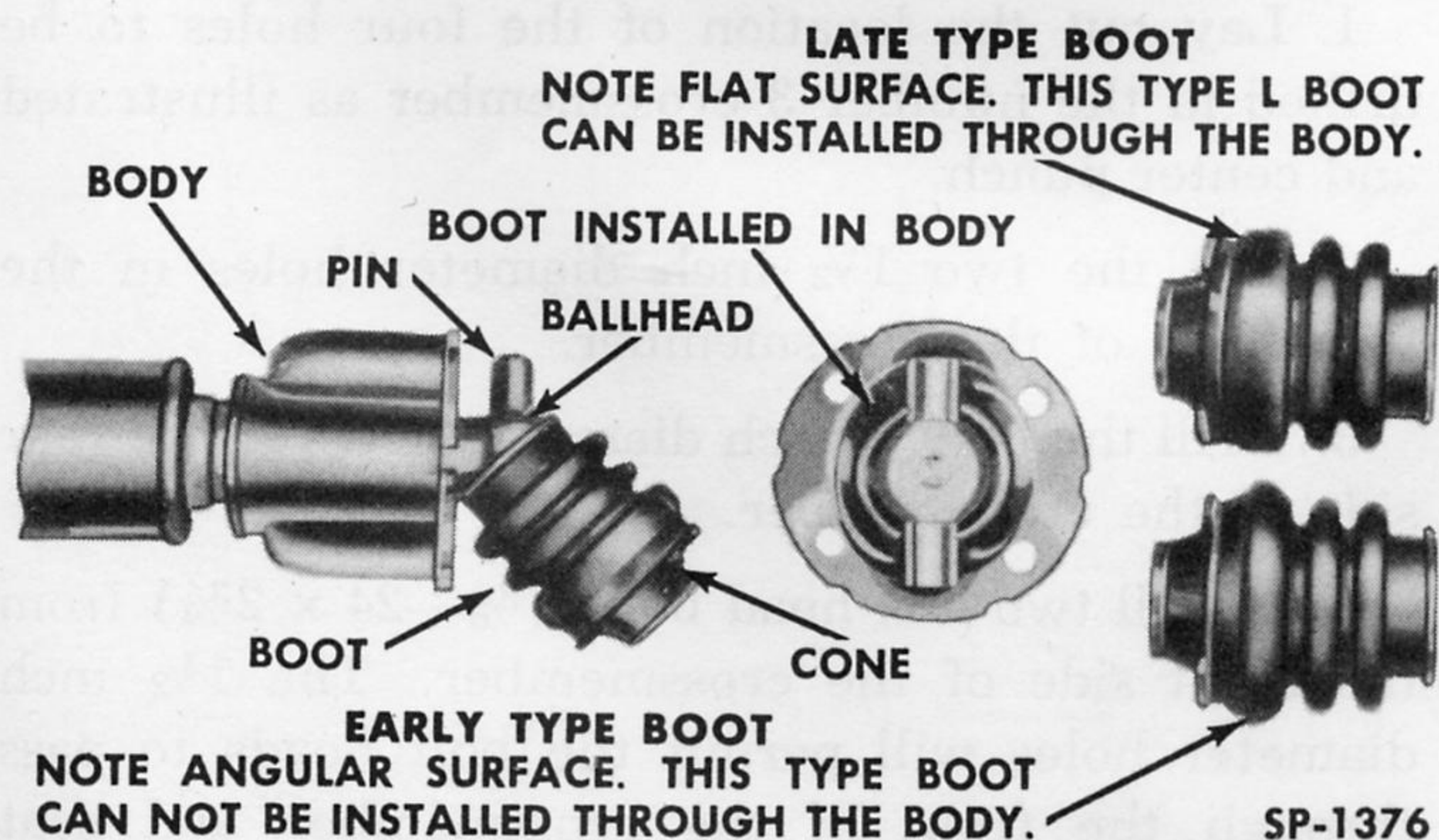


Fig. 233—Frazer Universal Joint Boot Installation

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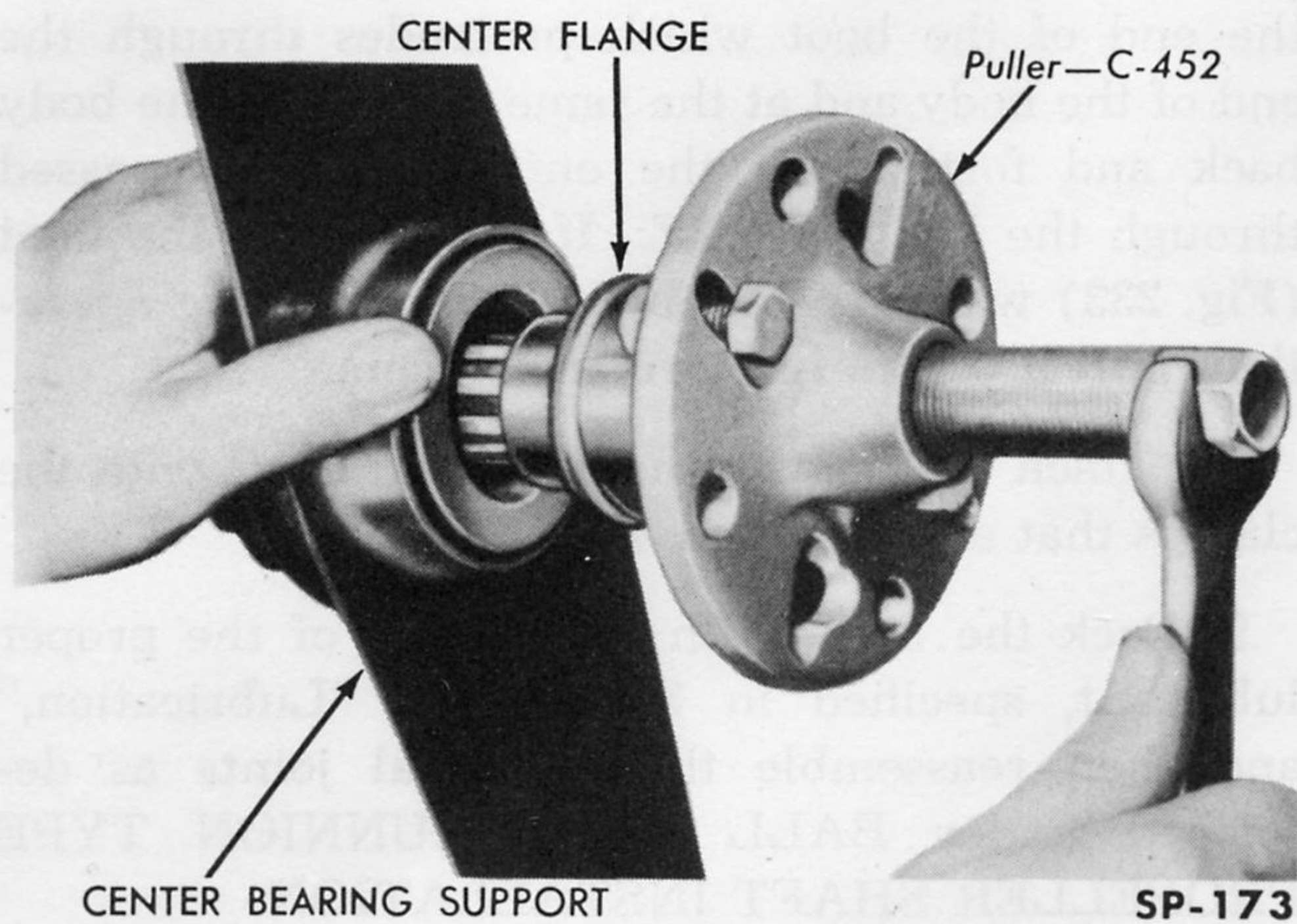


Fig. 234—Removing Center Flange

5. Clean all components except the center bearing in a suitable solvent and inspect all parts carefully. Worn or damaged parts must be replaced. The center bearing is permanently lubricated and sealed; if there is evidence of a lubrication leak, or if the bearing is loose or rough, it must be replaced.

6. Install the front dust shield and the bearing on the splined end of the front propeller shaft. Drive the bearing on the shaft, using a special Driver KF-11 (Fig. 236), until the bearing is fully seated and supports the dust shield firmly in place. Refer to Fig. 232 for the relative position of parts on the propeller shaft.

7. Fit the rubber insulator over the outer race of the bearing and apply liquid soap on the outside of the insulator to facilitate installation of the support sleeve. Press the support and sleeve into place on the bearing insulator (the flanged end of the sleeve

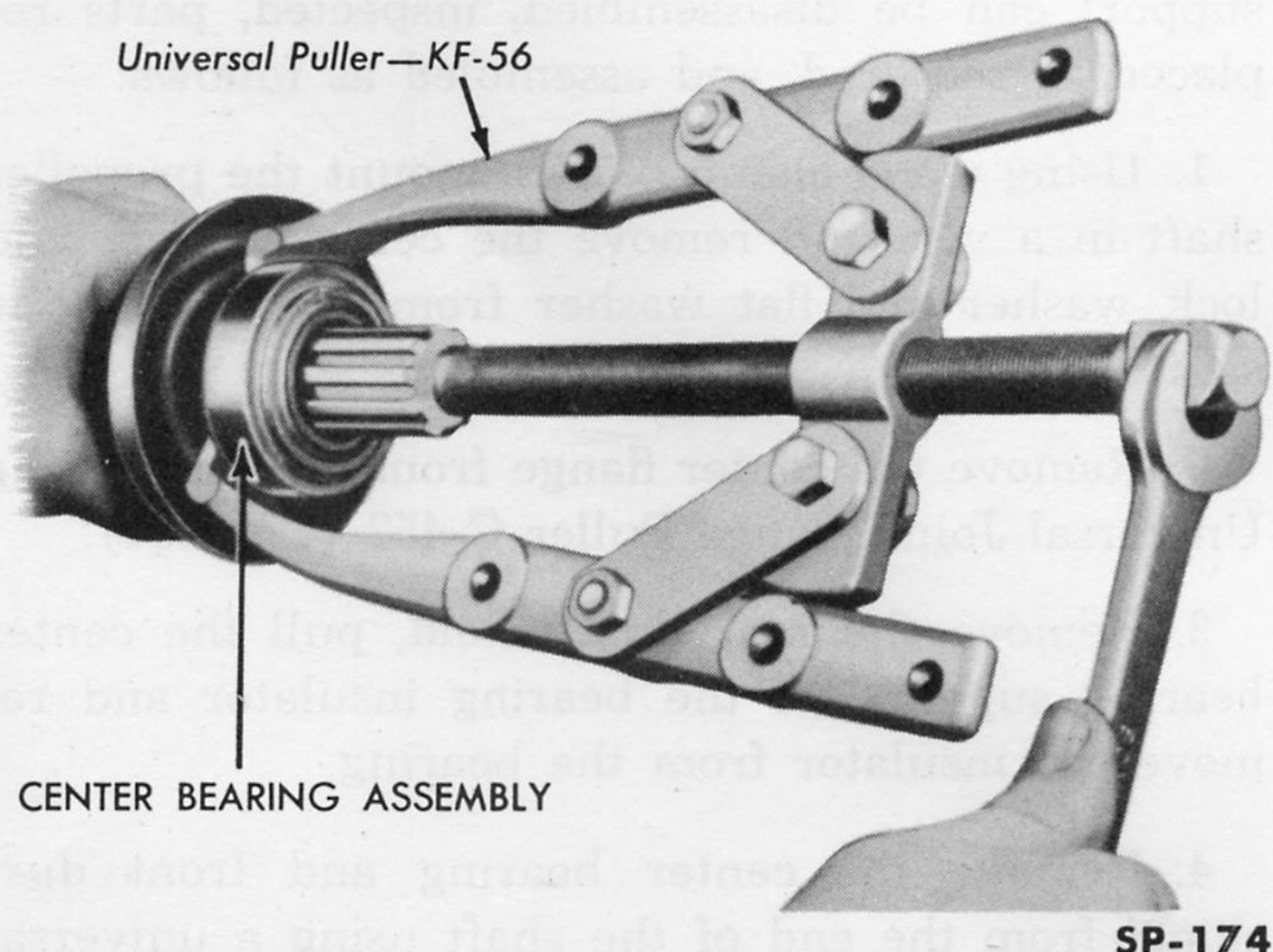


Fig. 235—Removing Center Bearing

toward the front end of the shaft and the insulator bottomed against the bead on the inside of the sleeve).

8. Install the rear dust shield and the center flange, driving flange onto splined end of shaft carefully. Install flat washer, lock washer, and bolt. The proper relationship and position of the parts is shown in Fig. 232. Tighten the flange bolt until the flange and dust shield bottom against shaft shoulder. Finally, tighten bolt with a torque wrench to 25-30 foot pounds torque.

c. CENTER BEARING SUPPORT MOUNTING STUDS REPLACEMENT. The following instructions are for the replacement of the Frazer propeller shaft center bearing support mounting studs. The original

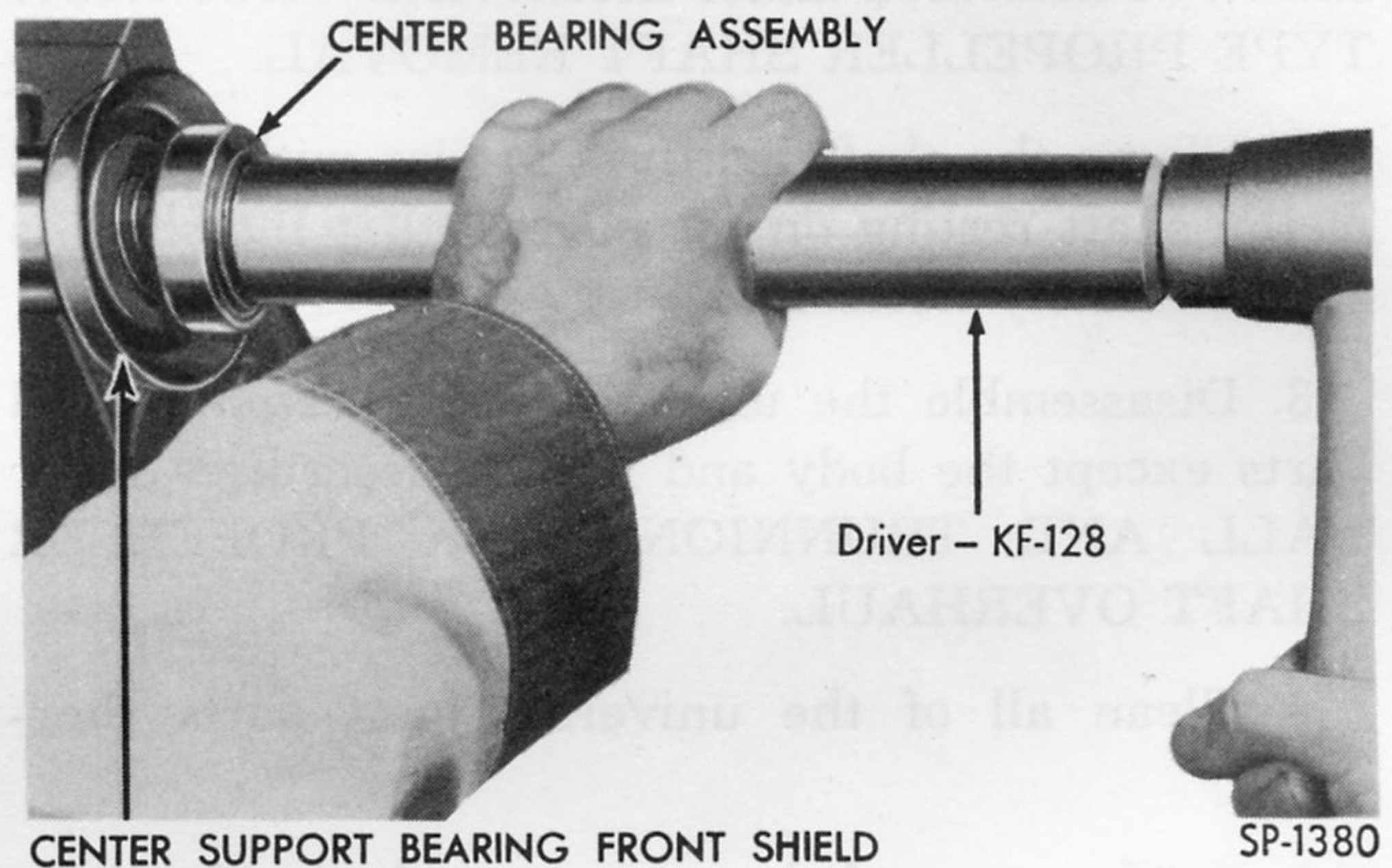


Fig. 236—Installing Center Bearing

studs are welded to the face of the number 3 frame crossmember.

Use of bolts (instead of studs) as described below and illustrated in Fig. 237 is recommended. Proper location of the bolts is essential to maintain propeller shaft alignment. Install the bolts as follows:

1. Lay out the location of the four holes to be drilled in the number 3 crossmember as illustrated and center punch.
2. Cut the two 1½ inch diameter holes in the front side of the crossmember.
3. Drill the two $\frac{13}{32}$ inch diameter holes in the rear side of the crossmember.
4. Install two hex head bolts ($\frac{3}{8}$ —24 x 2¾) from the front side of the crossmember. The 1½ inch diameter holes will permit the bolt heads to pass through the front of the crossmember and seat against the rear, from the inside.

d. CENTER BEARING AND SUPPORT INSTALLATION. Install the front propeller shaft and center bearing support assembly in the vehicle as a unit as described under BALL AND TRUNNION TYPE PROPELLER SHAFT INSTALLATION. Be sure to install the center bearing support on the cross-member studs right side up so that the sleeve slopes downward toward the rear.

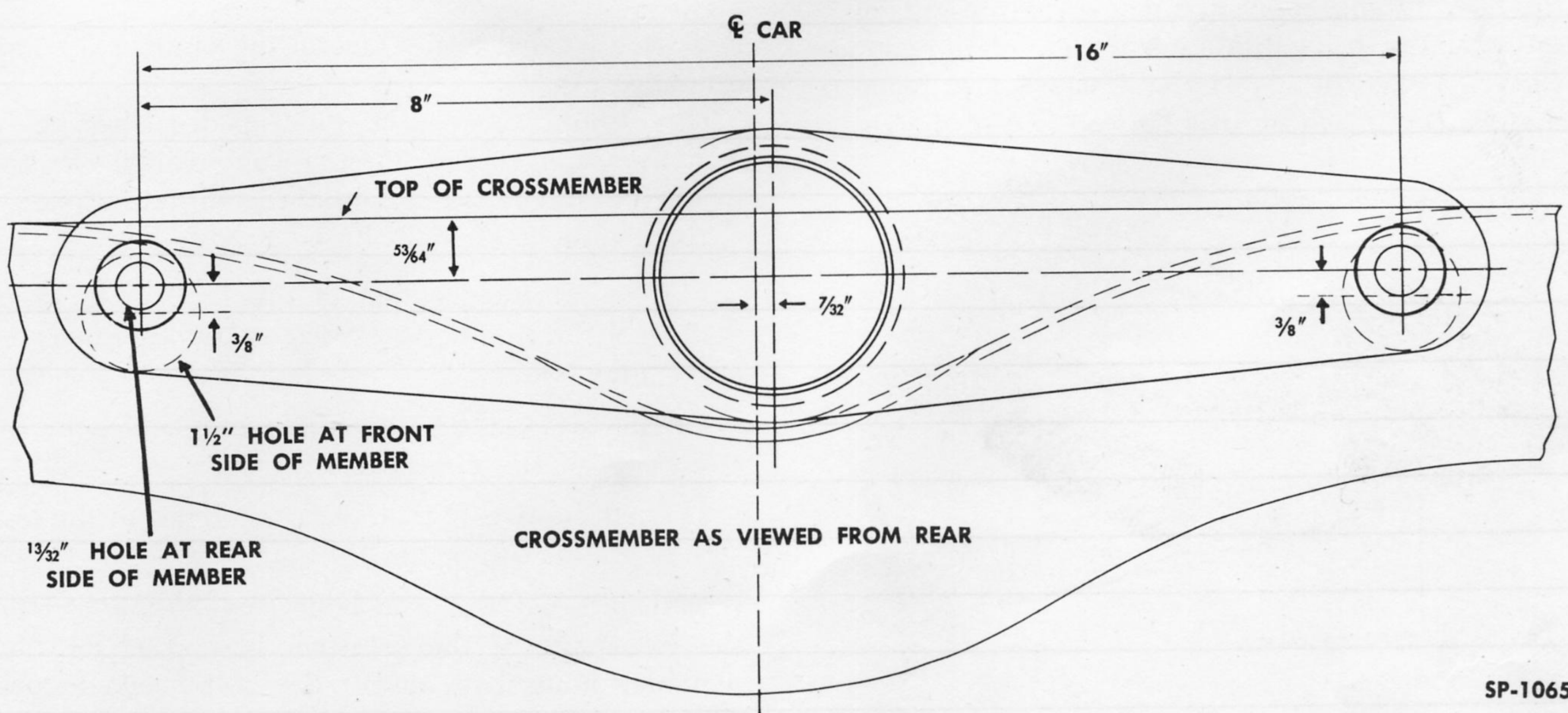
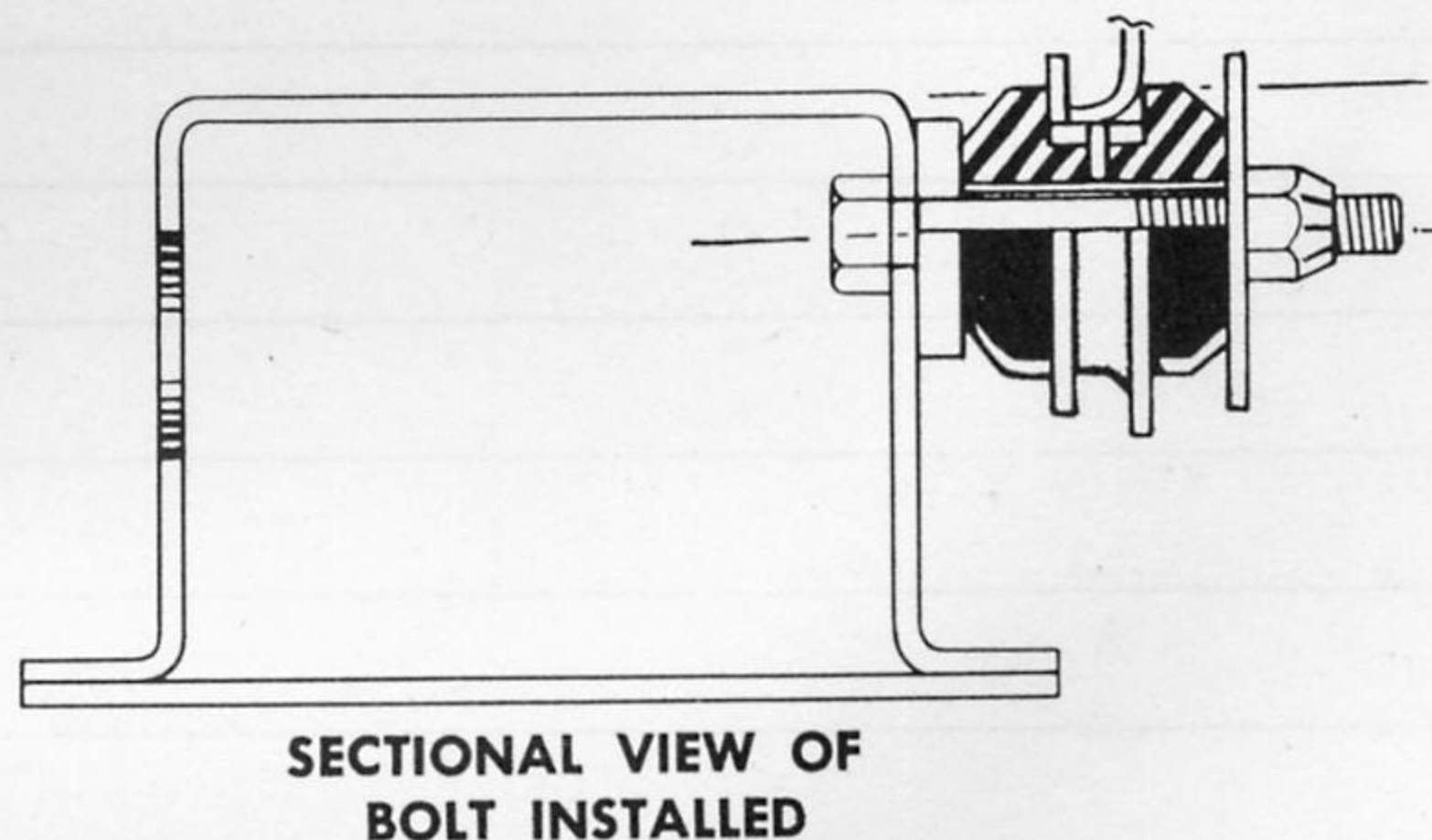
SERVICE DIAGNOSIS

Vibration and noise from the drive line are the usual symptoms of propeller shaft difficulty. However these conditions do not necessarily indicate that trouble is in the propeller shaft installation. Frequently vibration and noise seem to originate in the propeller shafts when actually the cause is to be found in some other unit or part as the clutch, transmission, rear axle or loosened sheet metal parts.

If vibration and noise are due to the propeller

shafts, probably the shaft installation is out-of-balance. Check for the following:

- a. Mud, tar or undercoating on the shafts.
- b. Bent or dented shafts.
- c. Worn or loose universal and/or slip joints.
- d. Loose propeller shaft flange.
- e. Lack of universal or slip joint lubrication.
- f. Loose or damaged universal joint boot.
- g. Center bearing and support.
 1. Worn, rough or loose center bearing.
 2. Bearing insulator worn deteriorated or otherwise damaged.
 3. Support mounting insulators worn or deteriorated.
 4. Crossmember to support mounting stud loose or broken.
 5. Support installed improperly.



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Fig. 237—Center Bearing Support Mounting Stud Replacement

