PROPELLER SHAFT AND UNIVERSAL JOINTS

CONTENTS

Description

All models equipped with manual transmissions use propeller shafts with a ball and trunnion type universal joint at the front end (Fig. 1) and a cross and roller type universal joint at the rear (Fig. 2).

When the vehicle is in motion, the propeller shaft is free to move fore-and-aft in the front universal joint to compensate for the movement of the rear axle. A bellows type rubber dust cover is provided on the front joint to seal all working parts against road splash and other foreign matter.

AC-1, AC-2 Models equipped with TorqueFlite transmissions, use propeller shafts with a cross and roller type universal joint incorporating an inertia yoke and an internally splined yoke, at the front end (Figs. 3 and 4). A cross and roller type universal joint is used at the rear (Fig. 2).

When the vehicle is in motion, the propeller shaft is free to move fore-and-aft on the transmission output shaft splines to compensate for movement of the rear axle. A bellows type rubber seal is used in the opening in the extension housing to exclude road splash and other foreign matter.

The propeller shaft used on AC-3 models is provided with a constant velocity universal joint at the front end (Fig. 5). This joint is provided with a sliding type yoke, similar to that used on AC-1, AC-2 models. The rear joint is a single cross and roller type (Fig. 2).

The constant velocity joint incorporates two single joints connected with a center yoke. A centering ball and socket arrangement between the yokes maintains the relative position of the two joints. The centering ball causes each of the two joints to operate through exactly one-half of the complete angle between the two joints.

The universal joints, sliding spline yoke and centering ball and sockets, are permanently lubricated. They should be inspected for external seal leakage every time the car is serviced. The joints **should not be** relubricated unless leakage is observed. Refer to page 10 for servicing instructions.

SERVICE DIAGNOSIS

Condition	Possible Cause	Correction
PROPELLER SHAFT AND UNIVERSAL JOINT		
PROPELLER SHAFT VIBRATION	(a) Excessive grease in universal joint dust cover (AC-1, AC-2 models).	(a) Remove all grease and repack joint. Refer to page 6.
	(b) Undercoating or other foreign material on shaft.	(b) Clean shaft and wash with solvent.
	(c) Loose universal joint flange bolts.	(c) Tighten bolts to specifications.
	(d) Loose universal joint flange.	(d) Install new flange, if worn, and tighten to specifications.
	(e) Bent universal joint flange.	(e) Install a new flange.
	(f) Improper drive line angularity.	(f) Correct propeller shaft angularity.
	(g) Rear spring center bolt not in seat.	(g) Loosen U-bolts and reseat bolt. Tighten U-bolts to specifications.
	(h) Broken rear spring.	(h) Replace rear spring.
	(i) Rear springs not matched.	(i) Install correct spring.

Condition	Possible Cause	Correction
	(j) Worn trunnion pin (AC-1, AC-2).	(j) Recondition universal joint. Install new pin.
	(k) Trunnion pin not centered.	(k) Center trunnion pin or replace. See page
	(l) Worn universal joint bearings.	(l) Recondition universal joint.
	(m) Worn universal joint body (AC-1, AC-2).	(m) Recondition universal joint. Replace body.
	(n) Propeller shaft damaged (bent tube) or out of balance.	(n) Install a new propeller shaft.
UNIVERSAL JOINT NOISE	(a) Propeller shaft yoke nuts loose.	(a) Tighten to specifications.
	(b) Lack of lubrication.	(b) Inspect for worn parts. Recondition if necessary.
	(c) Worn trunnion pin or housing (AC-1, AC-2).	(c) Replace worn parts and recondition joint.

PART 1
SERVICE PROCEDURES

PROPELLER SHAFT ANGULARITY

The quiet, smooth operation of the propeller shaft depends upon proper alignment. Propeller shaft and rear axle housing angles on all Models may be measured, using propeller shaft alignment gauge Tool C-3976.

The vehicle should be in a level position and have no extra weight except that of a full tank of fuel.

CAUTION: The car must be supported by the

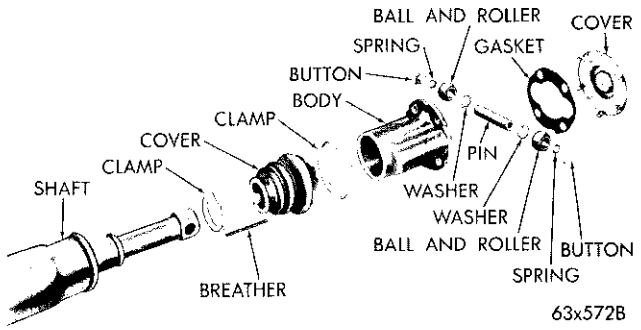

Fig. 1—Ball and Trunnion Universal Joint—Front (Manual Transmissions)

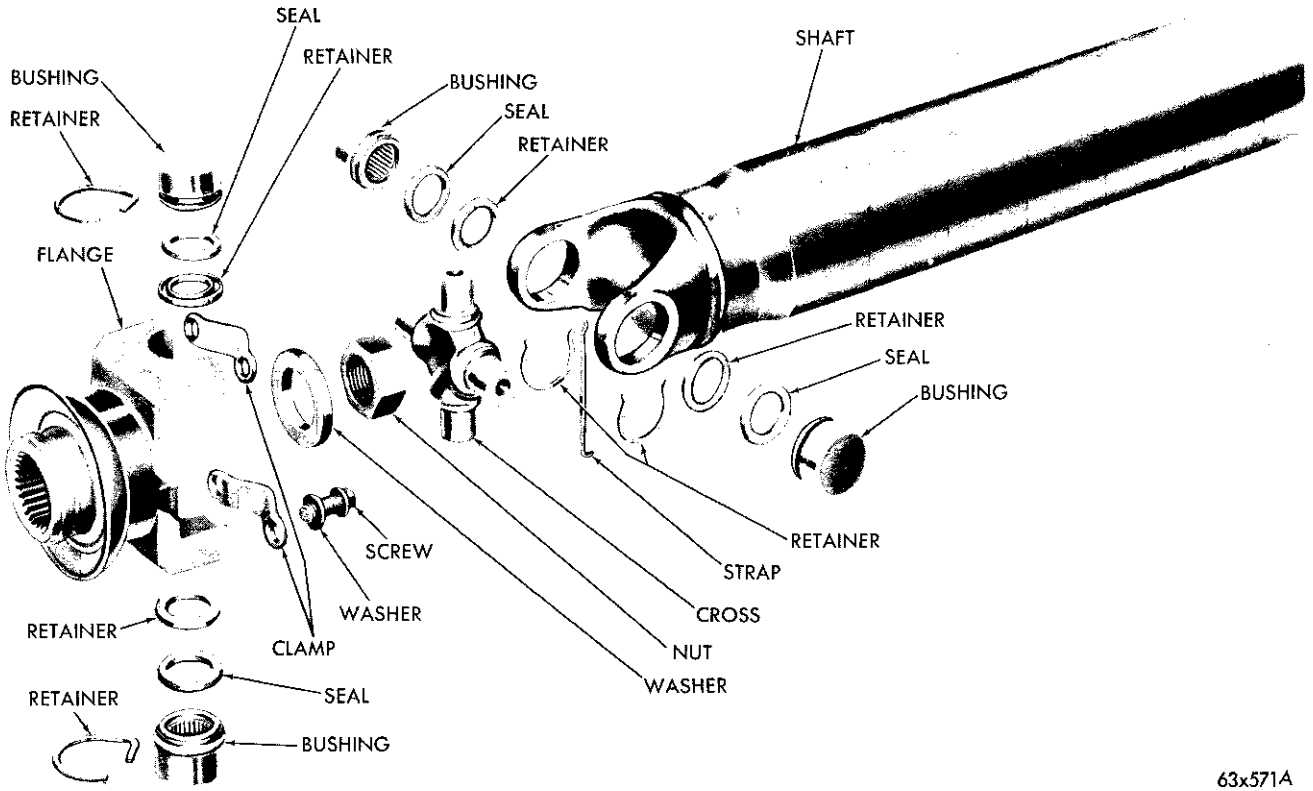

Fig. 2—Cross and Roller Universal Joint—Rear (All Models)

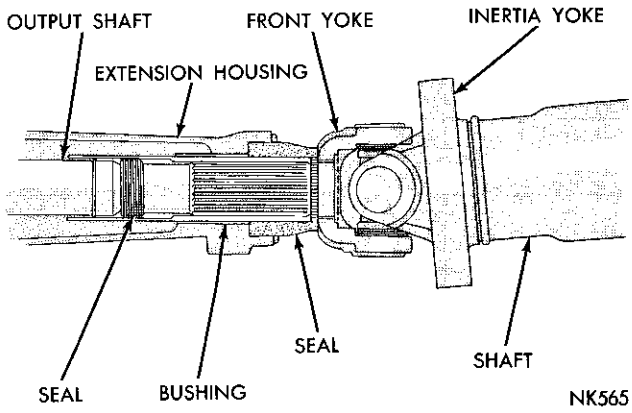

Fig. 3—Front Universal Joint Sliding Yoke (AC-1, AC-2 Models with Automatic Transmission)

wheels, or front suspension lower control arms and rear axle housing. Do not use a frame contact hoist when measuring propeller shaft angularity.

Use a twin post or drive-on hoist, pit or wheel or frame alignment rack. Measure the level at the body sill at the center of the front door.

(1) Remove the rebound bumper and plate assembly from the top of the differential carrier.

(2) Hold the gauge on the machined surfaces of the rebound bumper plate bosses (Fig. 6). Adjust the spirit level to center the bubble. The axle pinion housing should be pointing downward at a slight angle.

NOTE: Each time the gauge is used, the level must be on the same side of the propeller shaft.

(3) Hold the gauge on the underside of the propeller shaft near the rear universal joint (Fig. 7) and note the location of the bubble in the spirit level. The entire bubble should be within one and three graduations forward from center (Fig. 8).

(4) If it is necessary to adjust the rear joint angle, loosen all the U-bolts and install two-degree tapered wedges between both rear springs and axle housing spring pads (Fig. 9).

(5) If the bubble is forward of the third graduation (Fig. 8), install the wedges with the thick edge of the wedge toward the front of the car. If the bubble is centered, or **behind** the center graduation (Fig. 10), install the wedges with the thick edge of the wedge toward the rear of the car. Tighten the U-bolt nuts to 55 foot-pounds.

(6) Remeasure rear joint angle, reinstall rebound bumper and plate assembly on the differential carrier. Tighten the screws to 200 inch-pounds.

PROPELLER SHAFT

Removal—Rear Joint (All Models)

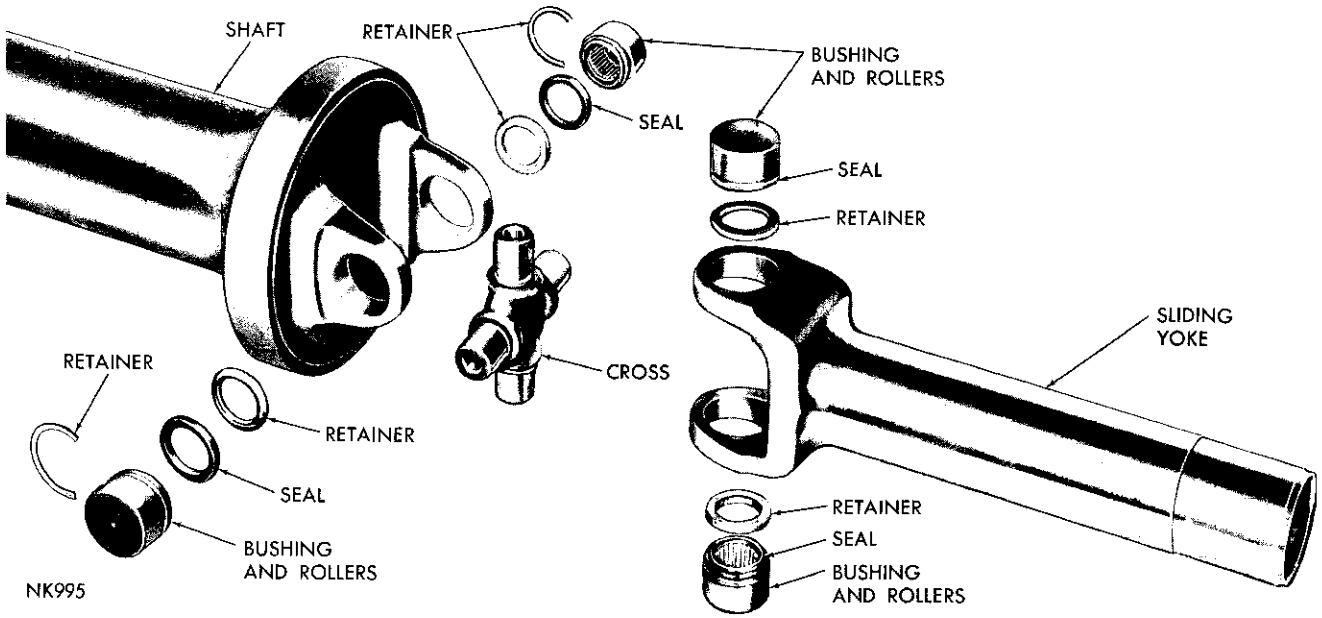

Fig. 4—Propeller Shaft and Universal Joint—Front AC-1, AC-2 (Models with Automatic Transmission)

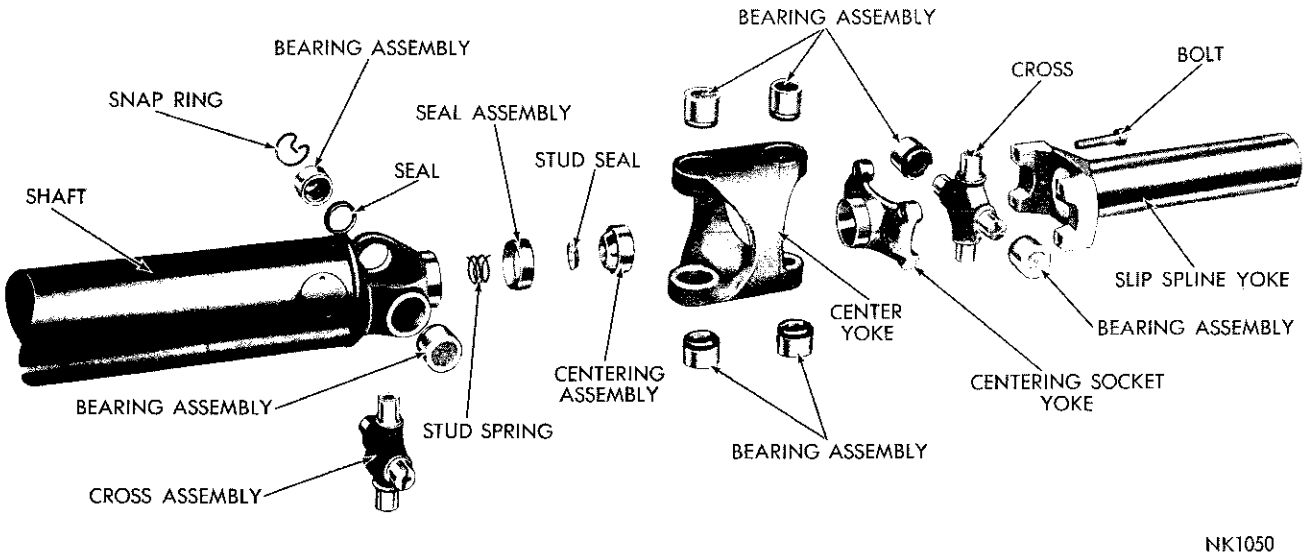

Fig. 5—Propeller Shaft and Front Universal Joint (AC-3 Models)

(1) Remove both rear universal joint roller and bushing assembly clamps from the drive pinion flange (Fig. 2).

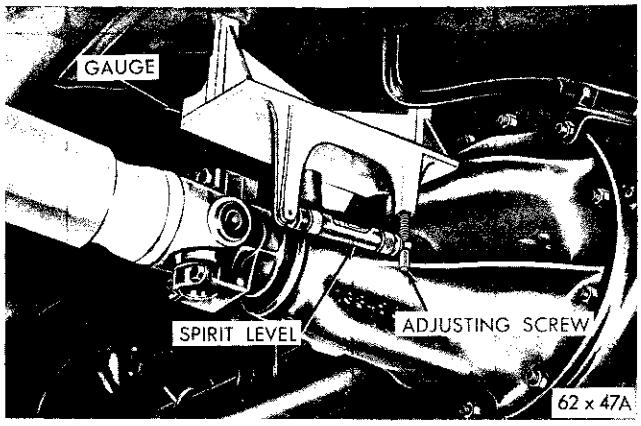

Fig. 6—Measuring Rear Axle Housing Angle

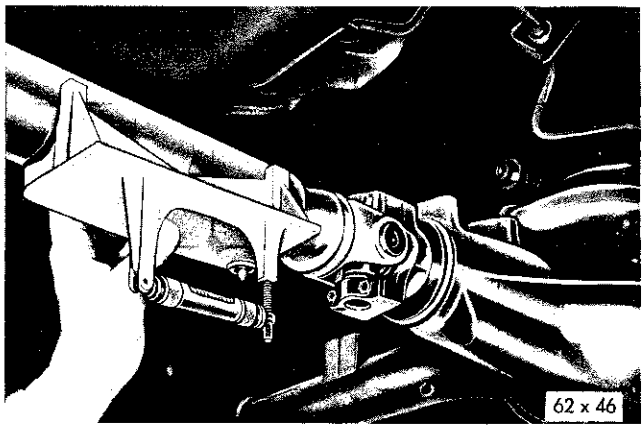

Fig. 7—Measuring Propeller Shaft Angle

NOTE: Do not disturb the retaining strap used to hold the bushing assemblies on the universal joint cross.

CAUTION: Do not allow the propeller shaft to drop or hang loose from either joint during removal. Wire up or otherwise support the loose end of the shaft to prevent damage to the joint.

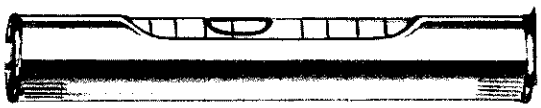

Fig. 8—Bubble Location (forward of center)

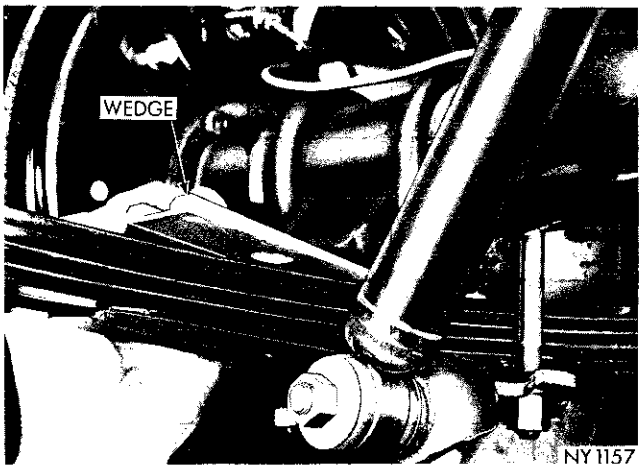

Fig. 9—Installing Tapered Wedge

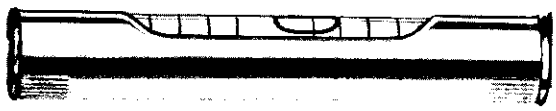

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Fig. 10—Bubble Location (Rear of Center)

Front Joint (AC-1, AC-2 Models with Ball and Trunnion Front Joint)

(2) Disconnect the joint from the transmission flange by removing the attaching bolt nuts (Fig. 1) and remove the propeller shaft from the vehicle.

Front Joint (All Models with Sliding Front Yoke)

(3) Slide the propeller shaft with the front yoke from the transmission output shaft (Fig. 3). Be careful not to damage splines on output shaft or yoke. Examine the sliding yoke seal for evidence of leakage. If no leakage is evident, do not disturb the seal. If necessary to replace the seal, refer to Transmission Group, 21.

CAUTION: It is important to protect the machined surface of the sliding yoke from damage after the propeller shaft has been removed.

Installation

Front Joint (AC-1, AC-2 Models with Ball and Trunnion Front Joint)

(1) Position the joint on the transmission flange bolts. Tighten the attaching bolt nuts to 30 foot-pounds.

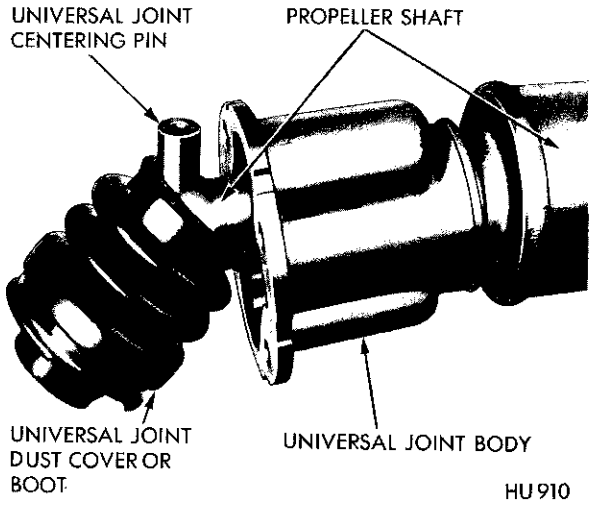

Fig. 11—Sliding Cover Over the Ballhead and Pin

Front Joint (All Models with Sliding Front Yoke)

(1) Before installing the propeller shaft clean the old lubricant from the splines of slip spline yoke (Fig. 4). Lubricate with approximately one-third ounce of Multi-Mileage Lubricant, Part Number 2298947, spread evenly over all the splined area of the yoke.

(2) Engage the yoke splines on the end of the output shaft, being careful not to burr the splines (Fig. 3).

Rear Joint (All Models)

(1) Install the rear universal joint cross roller bushings in the seats of the pinion yoke. Install the bushing clamps and attaching screws (Fig. 2). Tighten the screws to 170 inch-pounds.

BALL AND TRUNNION UNIVERSAL JOINT

Disassembly

(1) Straighten the tabs on the cover (Fig. 1) and remove the cover and gasket. Push the body back and remove the buttons, springs, ball and rollers and washers from both ends of the trunnion pin.

(2) Remove the cover clamps and loosen the dust cover. Remove the cover and polished jute breather located between the shaft and rear end of the cover. Save the breather.

(3) Clean and examine the trunnion pin and raceways in the body for excessive wear. If wear is excessive, replace the body.

(4) If either part is to be replaced, use a hydraulic press and installing and removing jig Tool C-3567.

Cleaning and Inspection

(1) Clean all parts in a suitable solvent. If the trunnion pin, body or dust cover have not been removed, make sure that the body and cover are clean inside as well as outside.

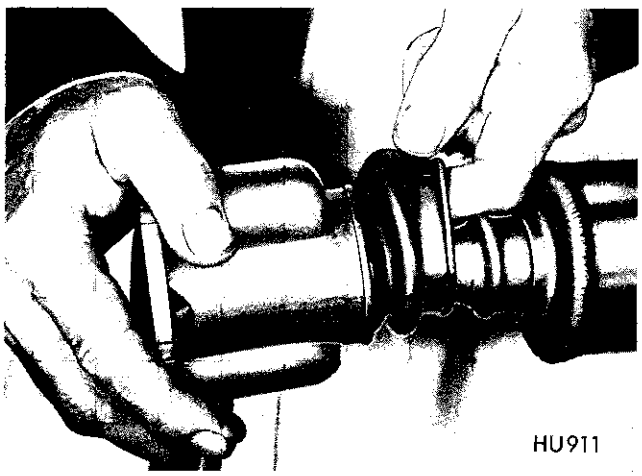

Fig. 12—Working the Dust Cover through the Body

Assembly

(1) When the trunnion pin and body have not been removed, a new dust cover can be installed, after coating all parts with Universal Joint Grease. Without using tools, stretch the cover over the pin (Fig. 11) and work it by hand through the body into position on the shaft (Fig. 12).

(2) If the trunnion pin was removed, install it, or a new pin in the propeller shaft, using a hydraulic press and the correct Jig, as specified above. The pin is properly centered when the press ram contacts the spacer portion of the Jig (Fig. 13).

(3) Pack the balls and rollers with Universal Joint Grease, NLGI Grade 2. Install a thrust washer, ball and rollers, button spring and centering button on each end of the trunnion pin (Fig. 1).

(4) Position the dust cover on the propeller shaft with the jute breather parallel to the shaft and extending one-half inch outside the small end of the cover. Install and tighten the small clamp. Position the dust cover on the body and install and tighten the large clamp.

(5) Lubricate the joint with two ounces of Universal Joint Grease NLGI Grade 2, applying it evenly in both raceways, one-half back of the trunnion pin and one-half between pin and cover.

NOTE: Two ounces of lubricant would be about ½ inch deep if placed on the grease cover. Do not use more than the specified amount and do not place lubricant in the dust cover.

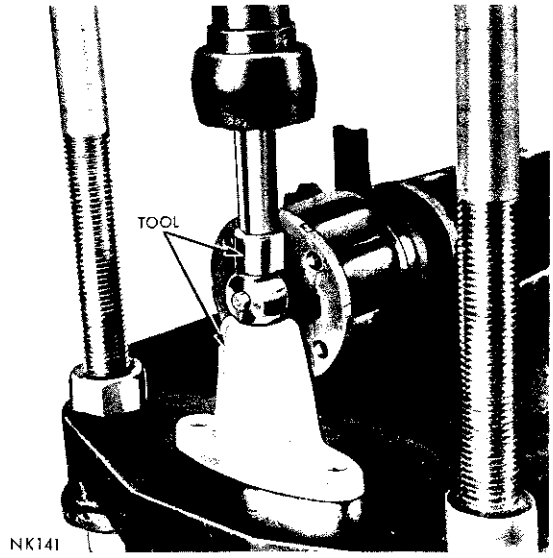

Fig. 13—Installing the Trunnion Pin

(6) Install a new gasket on the cover and position cover and gasket on the body with tabs in the grooves in the body. Bend the tabs to secure the cover to the body.

CROSS AND ROLLER UNIVERSAL JOINT

Disassembly

NOTE: Before disassembling universal joint, mark yoke, cross and bushings to facilitate reassembly if inspection discloses parts are serviceable.

(1) Remove the four bushing retainers from the yoke (Figs. 2 and 4). Press one roller and bushing out of the yoke by pressing the opposite bushing.

(2) Press out the remaining roller and bushing assembly by pressing on the end of the cross.

(3) Remove the cross assembly from the yoke. **Do not remove seal retainers from the cross.** The cross and retainers are serviced as an assembly.

Cleaning and Inspection

(1) Clean all parts in a suitable solvent and dry with compressed air. Examine bearing surfaces of the cross. They should be smooth and free from ripples and pits. If bearing surfaces or seal retainers are damaged, replace the cross assembly.

(2) Examine the rollers in the bushings. The bearings that have operated on a worn cross should be replaced. The bearings should have a uniformly good appearance and roll freely inside the bushings.

Assembly

(1) Lubricate the roller and bearing assemblies with Universal Joint Grease, NLGI Grade 0. Also, fill the reservoirs in the ends of the cross.

(2) Place the cross in the propeller shaft yoke, observing identification marks made at disassembly. Install the roller and bushing assemblies in the yoke, matching the identifying marks.

(3) Press both bushing assemblies into the yoke while guiding the cross into the bushings. Press until bushing retainers can be installed in the grooves in the bushings.

(4) Position the remaining two bushing assemblies on the cross. Install the retainer strap to hold the bushings on the cross during the installation of the shaft on the pinion flange. Lightly tap the outer ends of the bushings while rotating the cross to be sure the cross and bearings operate freely.

CONSTANT VELOCITY UNIVERSAL JOINT AC-3

NOTE: Before disassembling joint, mark all parts for easy identification at reassembly.

Disassembly

(1) Remove four screws and lockwashers which attach the spline yoke to the constant velocity joint and remove the spline yoke (Fig. 5). Slide the two loose bearings from the centering socket yoke.

(2) Remove the snap rings securing the two bearings in the front bores of the center yoke.

(3) Press the bearings from the yokes in the following manner: Use a short length of round bar stock ¾ inch in diameter, or a ¾ inch socket as a remover. As a receiver on the opposite bearing, use a short length of pipe or a socket with an inside diameter of not less than $1^1/_{16}$ inch. Clamp the joint, remover and receiver in a vise and press one of the bearings ⅜-inch out of the yoke. See method used in (Fig. 26).

(4) Securely clamp the exposed bearing in the vise and drive the yoke from the bearing, using a brass drift. See method used in (Fig. 27). Apply only light blows on the drift.

(5) Using the same procedure, press the exposed end of the cross to force the bearing on the opposite end approximately ⅜ inch out of the yoke. Remove bearing from yoke, using the brass drift as previously described.

(6) With the propeller shaft firmly held in the vise, press in on the cross and centering socket yoke and remove cross and socket yoke assembly from center yoke.

(7) Remove remaining four bearings from rear bores of center yoke and propeller shaft yoke in manner described in steps 3, 4, and 5.

(8) Remove cross from propeller shaft yoke. Remove spring from centering stud (Fig. 5).

Centering Socket Yoke Assembly

(1) Carefully pry centering ball seal assembly from socket yoke (Fig. 5).

(2) Remove seal and rollers from centering ball assembly.

(3) Fill cavity behind centering ball and inside the ball with Multi-Mileage Lubricant, Part Number 2298947.

(4) Insert a rod, slightly smaller than the inside diameter of the centering ball, into the ball and strike it smartly with a hammer by the method used in (Fig. 29). The hydraulic force applied by the initial hammer blow will force the ball and retainer from the yoke.

Cleaning and Inspection

(1) Clean all parts in a suitable solvent and blow dry.

(2) Carefully examine all parts for excessive wear or damage. Discard parts that are not serviceable. Examine bearing races for grooves and ridges. Rollers that have been operating in damaged races should not be reused. Examine seals on cross assemblies for damage. Seals are not serviced separately. They are included in the cross assembly. Replace with parts contained in replacement packages. **All parts in the package should be used.** If the propeller shaft is damaged or the center stud yoke slinger is bent out of shape, replace the shaft assembly to be assured of a balanced assembly.

Assembly

(1) Position the centering assembly in the yoke with the large diameter hole up and press it firmly to its seat.

(2) Apply a film of Automotive Multi-Purpose E.P. Grease, NLGI grade 2 on inside surface of centering ball. Install rollers (34 required). Install centering stud seal in ball.

(3) Install centering ball seal assembly on yoke and press firmly in place.

(4) Coat the inside surfaces of the bearing races with Automotive Multi-Purpose E.P. Grease, NLGI grade 2, and install the rollers (32 are required). Also, pack the reservoirs in the ends of the cross with the same lubricant.

(5) Place the cross in the shaft yoke. Insert one bearing assembly in the bearing bore of the shaft yoke. Using the bar stock or socket used as a remover when disassembling the joint, press the bearing into the bore, at the same time guiding the cross into the bearing. Press the bearing into the yoke approximately $^3/_{16}$ inch or far enough to install the snap ring. Install the snap ring. Reverse the position of the yoke and install the bearing and snap ring in the opposite bore in the same manner.

(6) Install the two bearings in the rear bores of the center yoke and on the cross, as previously described. Install the two snap rings.

(7) Install the centering stud spring on the centering stud, large end first. Apply a film of Automotive Multi-Purpose E.P. Grease, NLGI grade 2 on stud.

(8) Install the two slip spline yoke bearing assemblies on the cross and assemble in the bearing bores of the centering yoke.

(9) Install the centering yoke and cross as an assembly in the center yoke, guiding the centering ball on the stud.

(10) Apply slight pressure on the cross to align the cross in the front bores of the center yoke. Insert one bearing in the yoke and guide the end of the cross into the bearing.

(11) Press the bearing into the bore and install the snap ring.

(12) Install the remaining bearing in the center yoke. Install the snap ring.

(13) Install the slip spline yoke on the constant velocity joints with the screws and lockwashers and tighten to 300 inch-pounds.

PART 2

TWO-PIECE PROPELLER SHAFT AND UNIVERSAL JOINTS

MODEL AY-1

Description

The Imperial two-piece propeller shaft has a single cross and roller universal joint at the front end (Fig. 14) and constant velocity cross and roller universal joints at the center and rear end (Figs. 15 and 16). The shaft is supported by a ball bearing and bracket located forward of the center joint. The bracket height is non-adjustable.

Centering ball and socket arrangements are incorporated in the center and rear constant velocity joints (Figs. 17 and 18). The centering balls being located between the yokes of each joint maintain the relative position of the two joints. The centering balls cause each of the two joints to operate through exactly one-half of the complete angle between the two joints.

When the vehicle is in motion, the shaft yoke on the center joint is free to slide fore and aft inside the splines of the front shaft.

The joints and centering ball and sockets are permanently lubricated. They should be inspected for external leakage whenever the vehicle is serviced. The joints should **not be** relubricated unless leakage is observed. Refer to Paragraph "Propeller Shaft" for servicing instructions.

SERVICE PROCEDURES

PROPELLER SHAFT ANGULARITY

When measuring the propeller shaft angularity, the vehicle should be in a level position and have no extra weight except that of a full tank of fuel.

CAUTION: The vehicle must be supported by the wheels, or front suspension lower control arms and rear axle housing. Do not use a frame contact hoist when measuring propeller shaft angularity.

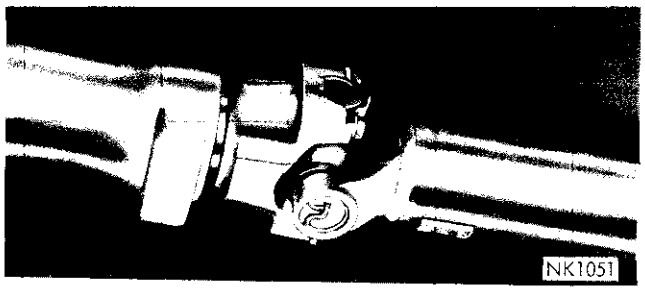

Fig. 14—Front Universal Joint—Single Cross Type (AY-1 Models)

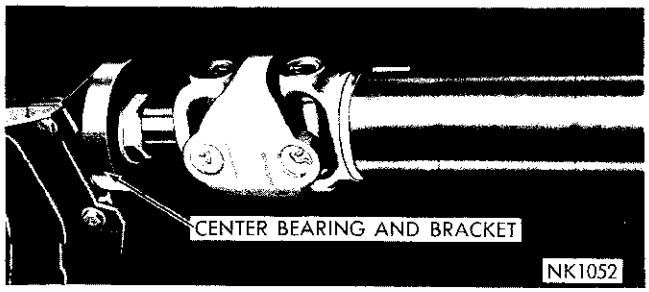

Fig. 15—Center Universal Joint—Constant Velocity Type (AY-1 Models)

(1) Remove the differential carrier rebound bumper and bracket assembly, also, remove spacers from both rear axle control strut hangers (Fig. 19).

(2) Hold alignment gauge C-3976 on the machined bosses of the differential carrier (Fig. 20). Adjust the

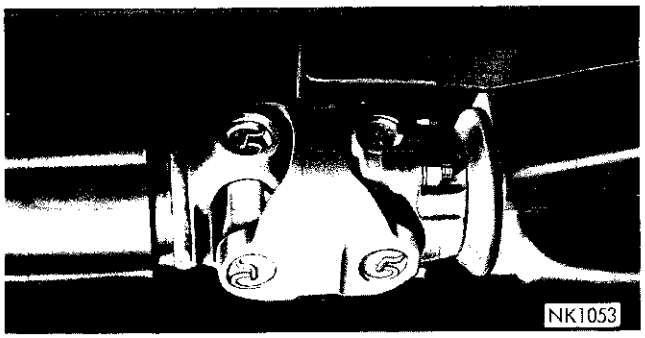

Fig. 16—Rear Universal Joint—Constant Velocity Type (AY-1 Models)

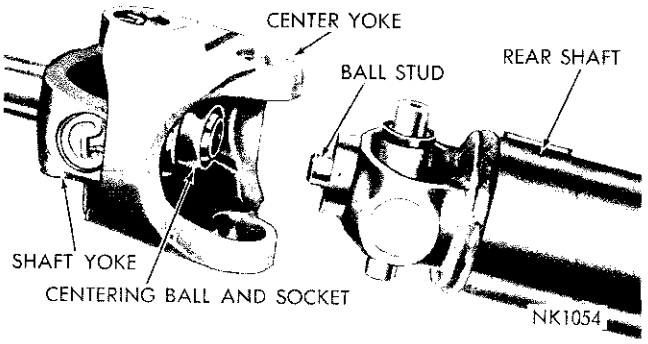

Fig. 17—Center Joint Centering Ball Arrangement

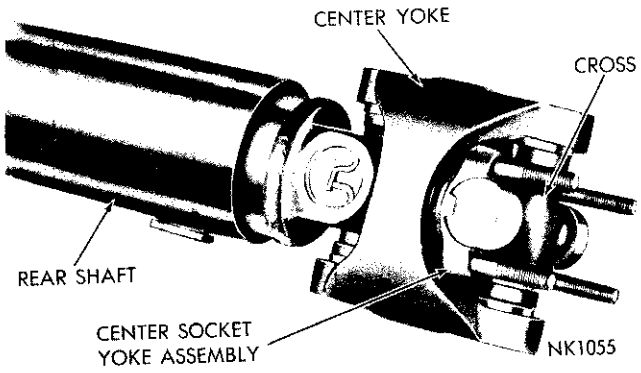

Fig. 18—Rear Joint Centering Ball Arrangement

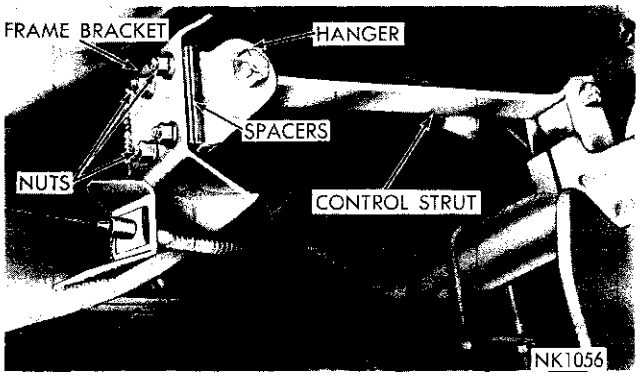

Fig. 19—Rear Axle Control Strut

gauge spirit level to center the bubble. The axle pinion housing should be pointing downward at a slight angle. **Each time the gauge is used, the level must be on the same side of the propeller shaft.**

(3) Hold the gauge on the underside of the propeller shaft near the rear universal joint (Fig. 21) and note the location of the bubble in the spirit level. The entire bubble should be within one and three graduations forward from center (Fig. 22).

(4) If it is necessary to adjust the rear joint angle, loosen all U-bolt nuts and install two-degree tapered

Fig. 20—Measuring Rear Axle Angle AY-1 Models

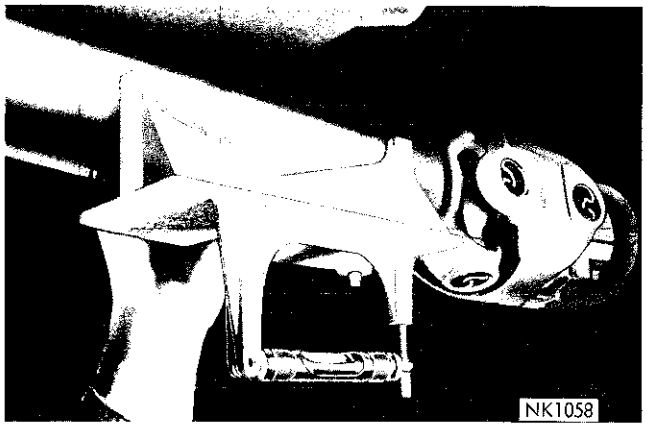

Fig. 21—Measuring Propeller Shaft Angle

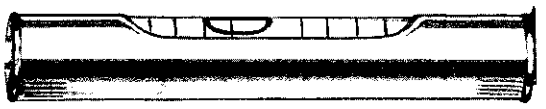

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Fig. 22—Bubble Location (Forward of center)

wedges between both rear springs and axle housing spring pads (Fig. 23). If the bubble is **forward** of the third graduation (Fig. 22), install the wedges with the thick edge of the wedge toward the front of the vehicle (Fig. 23).

(5) If the bubble is centered, or **behind** the center graduation (Fig. 24), install the wedges with the thick edge toward the rear of the vehicle. Tighten the U-bolt nuts to 55 foot-pounds.

(6) Temporarily place two passengers in the front seat and one in the rear to load the rear springs. In-

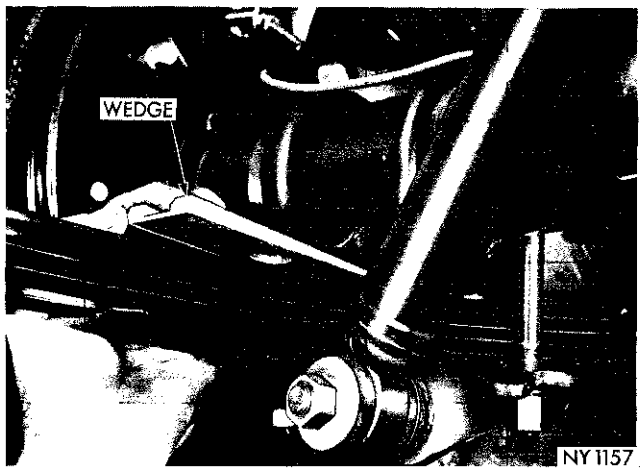

Fig. 23—Installing Tapered Wedge

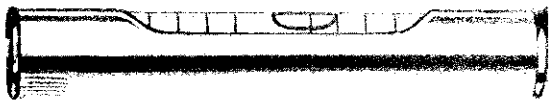

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Fig. 24—Bubble Location (Rear of Center)

stall sufficient spacers to fill the space between the strut hanger and frame brackets on both sides (Fig. 19). Install the bracket bolts, nuts and washers and tighten the nuts to 35 foot-pounds.

(7) Remeasure the rear universal joint angle, then install the rebound bumper and plate assembly. Tighten the attaching screws to 200 inch-pounds.

PROPELLER SHAFT

Removal

(1) Remove the screws and lockwashers attaching the cross and roller bushing clamps to the transmission yoke (Fig. 14). Disengage the front universal joint cross and roller bushings from the yoke.

NOTE: Tie up or otherwise support the front end of the propeller shaft to prevent damaging the center joint.

(2) Remove the stud nuts and washers attaching the rear universal joint to the rear axle pinion yoke (Fig. 16). Support the rear end of the shaft.

(3) Remove the bolts, nuts and washers attaching the center bearing bracket to the frame crossmember (Fig. 15).

(4) Remove the propeller shaft as an assembly toward the rear of the vehicle.

Installation

(1) Insert the forward section of the propeller shaft over the frame crossmember and connect the rear universal joint to the pinion yoke. Install the stud nuts and washers. Tighten the nuts to 300 inch-pounds.

(2) Connect the front universal joint to the transmission output shaft yoke. Install the cross and roller bushing clamps, bolts, and washers. Tighten the bolts to 170 inch-pounds.

(3) Position the center bearing bracket on the frame crossmember and align with bolt holes. Install bolts, nuts and washers and tighten nuts to 35 foot-pounds.

CENTER UNIVERSAL JOINT

NOTE: Mark all parts for easy identification at reassembly before disassembling the joint.

Disassembly

(1) Straighten the staked areas of the center bearing locknut lockwasher (Fig. 25) and unscrew the

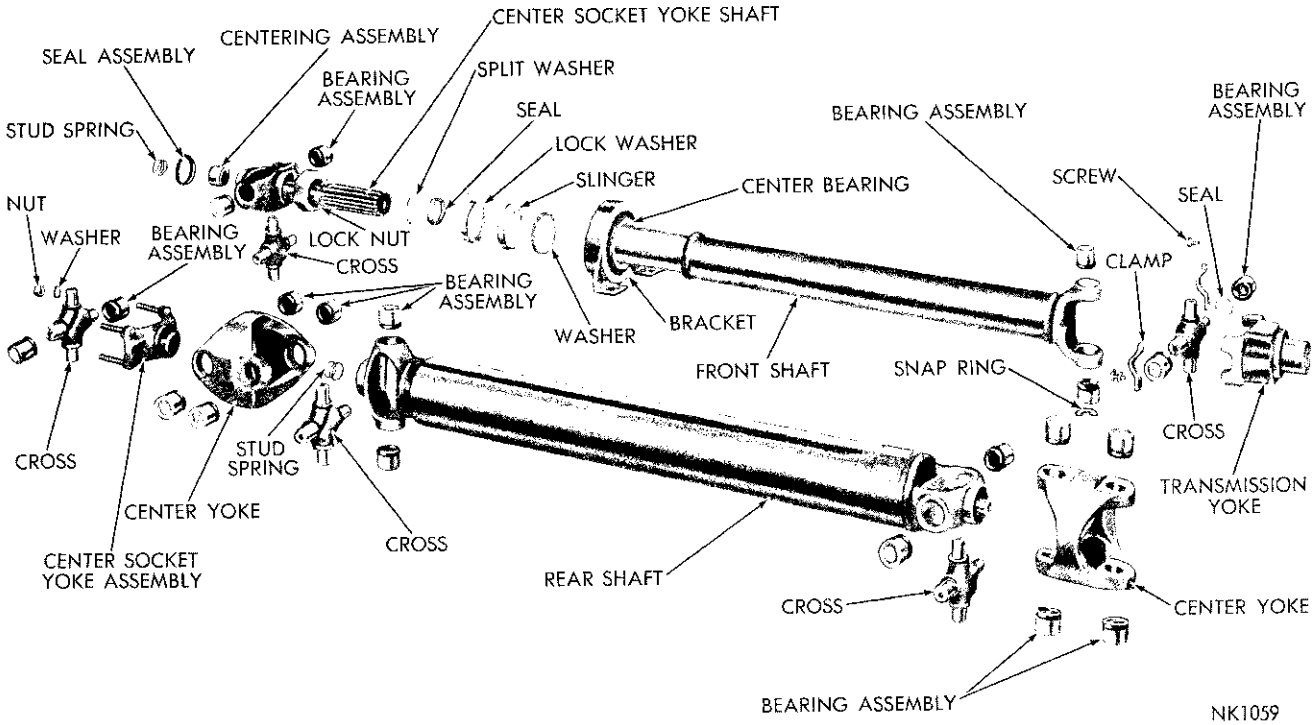

Fig. 25—Propeller Shaft and Universal Joints—Constant Velocity Type (AY-1 Models)

locknut from the front propeller shaft.

(2) Slide the front shaft from the rear shaft.

(3) Remove the snap rings securing the roller bearing assemblies in the center socket yoke shaft and center yoke bores (Fig. 25).

CAUTION: If the joints are heavily coated with rust or corrosion, apply penetrating oil in the bearing bores before attempting to press out the bearings.

(4) Press the bearing assemblies from the yokes in the following manner: Use a short length of round bar stock ¾ inch in diameter, or a ¾ inch socket as a remover. As a receiver on the opposite bearing, use a short length of pipe or a socket with an inside diameter of not less than $1^{1}/_{16}$ inch. Clamp the joint with remover and receiver in a vise (Fig. 26) and press one of the rear yoke bearings approximately ⅜ inch out of the yoke.

(5) Securely clamp the exposed bearing in the vise and drive the yoke from the bearing, using a brass drift (Fig. 27). Apply only light blows on the drift.

(6) Using the same procedure, press the exposed end of the cross to force the bearing on the opposite end approximately ⅜ inch out of the yoke. Remove bearing from the yoke, using the brass drift as previously described.

(7) With the propeller shaft firmly held in the vise, press in on the yoke shaft and work the center joint off the cross (Fig. 28).

CAUTION: Be careful to avoid damaging cross seals and center stud yoke slinger.

(8) Remove the remaining set of bearings from the propeller shaft yoke.

(9) Remove the cross from the propeller shaft yoke. Remove the centering stud spring from the propeller shaft (Fig. 25).

(10) Remove the four roller bearing assemblies to separate the yoke shaft from the center yoke, as previously described.

CENTERING BALL AND SOCKET ASSEMBLY

(1) Carefully pry the centering ball seal assembly from the yoke shaft (Fig. 25).

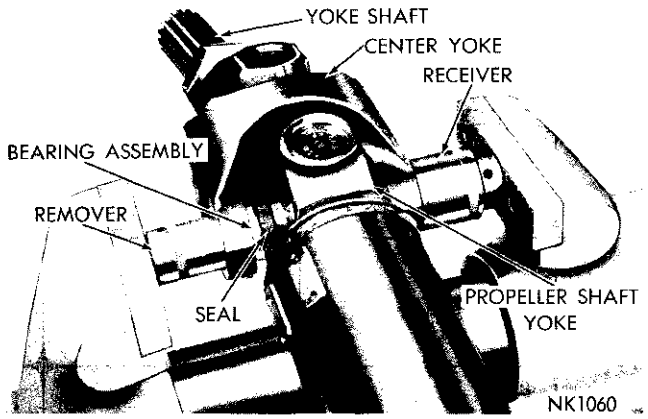

Fig. 26—Pressing Bearing from Center Yoke

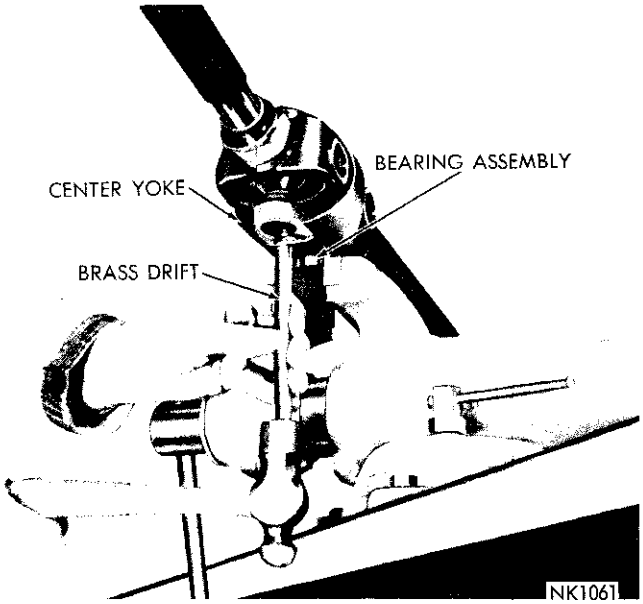

Fig. 27—Removing Bearing From Center Yoke

(2) Remove the seal and bearing rollers from the centering ball.

(3) Fill the cavity behind the centering ball and inside the ball with Multi-Mileage Lubricant, Part Number 2298947.

(4) Insert a rod, slightly smaller than the inside diameter of the centering ball, into the ball and strike it sharply with a hammer (Fig. 29). The hydraulic force applied by the initial hammer blow will force the ball and retainer assembly from the yoke.

Cleaning and Inspection

(1) Clean all the parts in a suitable solvent and blow dry.

(2) Carefully examine all the parts for excessive wear or damage. Discard parts that are not serviceable. Examine the bearing races for grooves and ridges. Rollers that have been operating in damaged races should not be reused. Examine the seals on the cross assemblies for damage. Seals are not serviced separately. They are included in the cross assembly. Replace with parts contained in replacement pack-

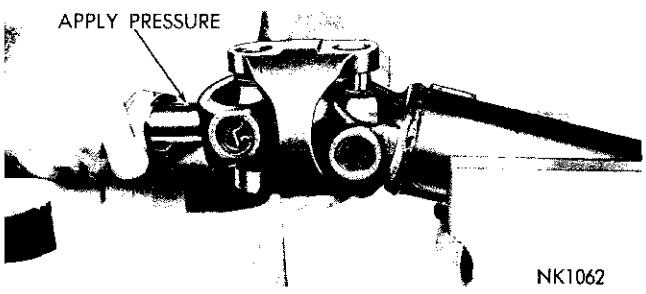

Fig. 28—Disengaging Center Yoke From Shaft

ages. **All parts in the package should be used.** If the propeller shaft is damaged or the center stud yoke slinger is bent out of shape, replace the shaft assembly to be assured of a balanced assembly.

Assembly

(1) Position the centering assembly in the yoke shaft with the large diameter hole up and press it firmly into its seat.

(2) Apply a film of Automotive Multi-Purpose E.P. Grease, NLGI grade 2 on the inside surface of the centering ball. Install rollers (34 required). Install the centering stud seal in the ball.

(3) Install the centering ball seal assembly on the yoke and press firmly in place.

(4) Coat the inside surfaces of the bearing races with Automotive Multi-Purpose E.P. Grease, NLGI grade 2, and install rollers (32 are required). Also, pack reservoirs in ends of cross with the same lubricant.

(5) Place the cross in the shaft yoke. Insert one bearing assembly in the bearing bore of the shaft yoke. Using the bar stock or socket used as a remover when disassembling the joint, press the bearing into the bore, at the same time guiding the cross into the bearing. Press bearing into yoke approximately $^{3}/_{16}$ inch or far enough to install the snap ring. Install the snap ring. Reverse the position of the yoke and install the bearing and snap ring in the opposite bore in the same manner.

(6) Place the center yoke on the cross installed in the shaft yoke. Install the two bearings and snap rings in the yoke, as previously described.

(7) Install the cross assembly and two bearing assemblies in the propeller shaft yoke, in the same manner as previously described. Install the snap rings.

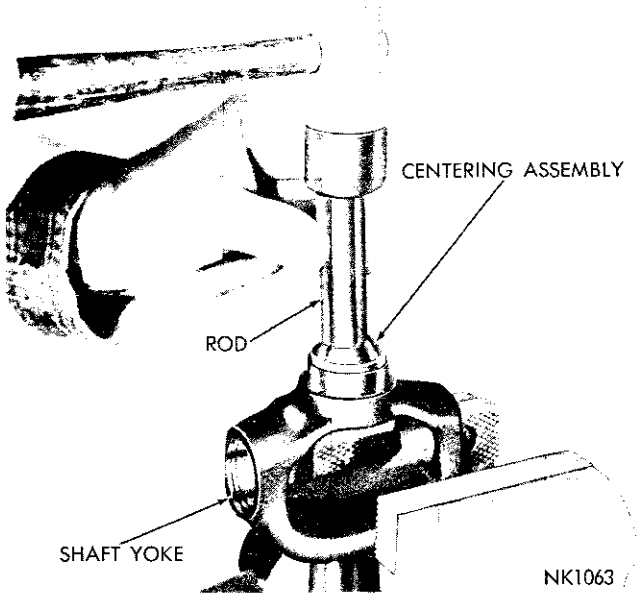

Fig. 29—Removing Centering Ball and Socket Assembly

(8) Install the centering stud spring on the centering stud, **large end first.** Apply a film of Automotive Multi-Purpose E.P. Grease, NLGI grade 2 on the stud.

(9) Position the center universal joint on the cross in the propeller shaft, guiding the centering ball on the centering stud, applying pressure at the same time. Work the center yoke over the cross, being careful not to damage the cross seals.

(10) Install the two bearing assemblies in the rear bores of the center yoke, as previously described. Install the snap rings.

(11) Coat the splines of the center socket yoke shaft with approximately one-ounce of Automotive Multi-Purpose E.P. Grease, NLGI grade 0.

(12) Slide the yoke shaft splines into splines of the front propeller shaft, aligning the index clip on the yoke spline with the wide spline in the propeller shaft.

(13) Turn the locknut with the seal and split washer on the end of the front propeller shaft. Tighten the nut to 65 foot-pounds.

FRONT UNIVERSAL JOINT

NOTE: Before disassembling the joint, mark all the parts for easy identification at reassembly.

Disassembly

(1) Slide the two transmission yoke bearing assemblies from the cross (Fig. 25).

(2) Remove the snap rings securing the two bearing assemblies in the propeller shaft yoke (Fig. 25).

(3) Remove the two bearing assemblies from the yoke as described in Center Universal Joint, Disassembly.

Cleaning and Inspection

(1) Clean all the parts in a suitable solvent. Carefully examine the bearing surfaces on the cross for grooves and ridges. Replace unserviceable parts. Rollers that have been operating on a grooved cross should not be reused.

Assembly

(1) Coat the inside surfaces of the bearing races with Universal Joint Grease, NLGI grade 0, and install rollers (32 are required). Also, pack reservoirs in ends of cross with the same lubricant.

(2) Place the cross in the propeller shaft yoke. Start one bearing in the yoke. Clamp the propeller shaft in the vise with round bar stock or socket and press bearing into yoke approximately $^{3}/_{16}$ inch or far enough to install the snap ring, as described in Center Universal Joint, Assembly. Install snap ring.

(3) Change the position of the shaft and install the second bearing in the yoke. Install the snap ring.

REAR UNIVERSAL JOINT

NOTE: Before disassembling the joint mark all parts for easy identification at reassembly.

Disassembly

(1) Remove the snap rings securing the two bearing assemblies in the rear bores of the center yoke. (Fig. 25). Remove the bearings as described in Center Universal Joint, Disassembly.

(2) Remove the cross and center socket yoke as an assembly. Remove the centering stud spring from the stud. Slide the bearings and cross from the socket yoke assembly.

(3) Remove the centering bearing and socket assembly from the yoke, as described in Centering Ball and Socket Assembly.

(4) Remove the four remaining bearing assemblies from the center yoke and propeller shaft yoke, as previously described.

Cleaning and Inspection

(1) Clean all the parts in a suitable solvent and blow dry.

(2) Carefully examine all the parts for serviceability as described in Center Universal Joint, Cleaning and Inspection.

Assembly

(1) Coat the inside surfaces of the bearing races with Automotive Multi-Purpose E.P. Grease, NLGI grade 2, and install rollers (32 are required). Also, pack reservoirs in ends of crosses with the same lubricant.

(2) Install the cross in the propeller shaft yoke and install the two bearing assemblies, as described in Center Universal Joint, Assembly. Install the snap rings.

(3) Position the center yoke over the cross in the propeller shaft yoke. Install the two bearings in the front bores of the yoke. Install the snap rings.

(4) Apply film of Automotive Multi-Purpose E.P. Grease, NLGI grade 2, on the centering stud.

(5) Install the cross and center socket yoke as an assembly in the center yoke. Guide the centering ball on the stud at the same time engaging the cross ends in the yoke bores.

(6) Apply pressure to the center of the cross to align the end of the cross in the yoke bore. Start one bearing in the yoke and press into place, as previously outlined. Install the snap ring. Change position of the joint in the vise and install the remaining bearing in the center yoke. Install the snap ring.