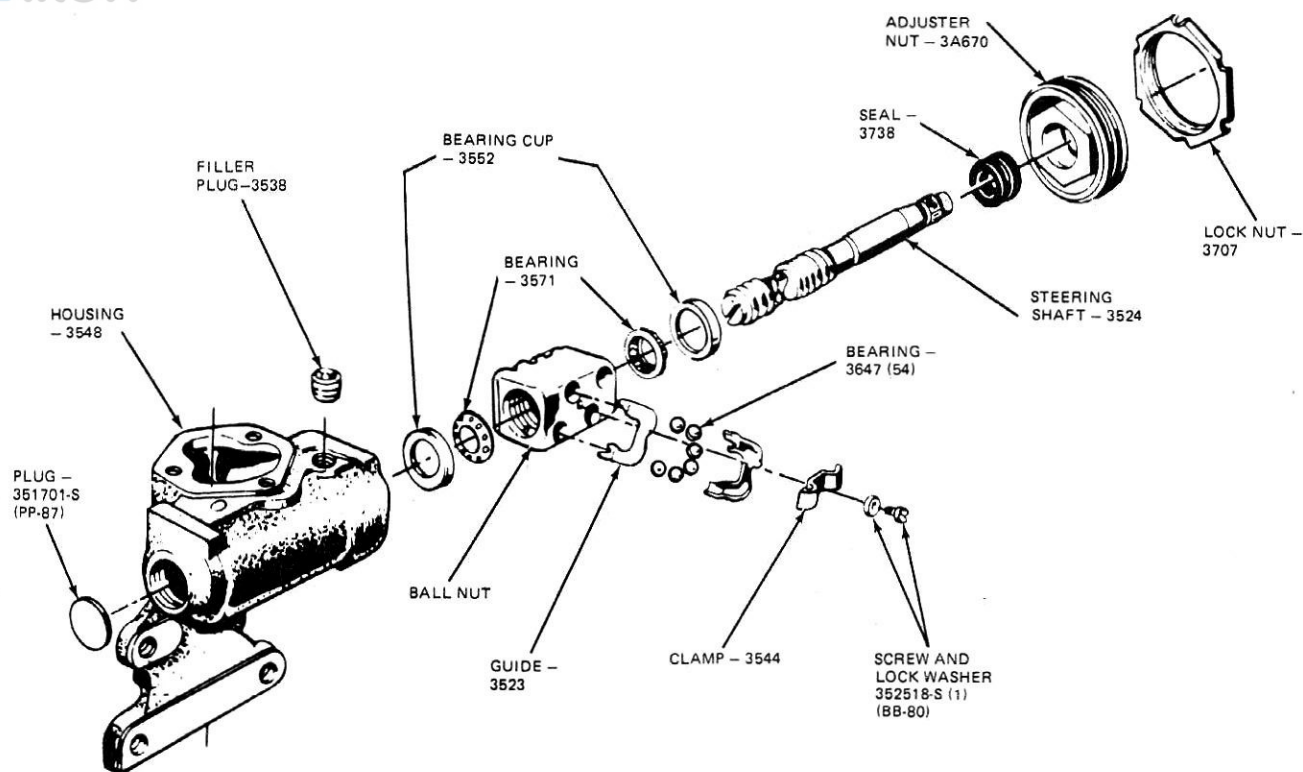




G1624-2C

FIG. 6 Steering Shaft and Related Parts Disassembled

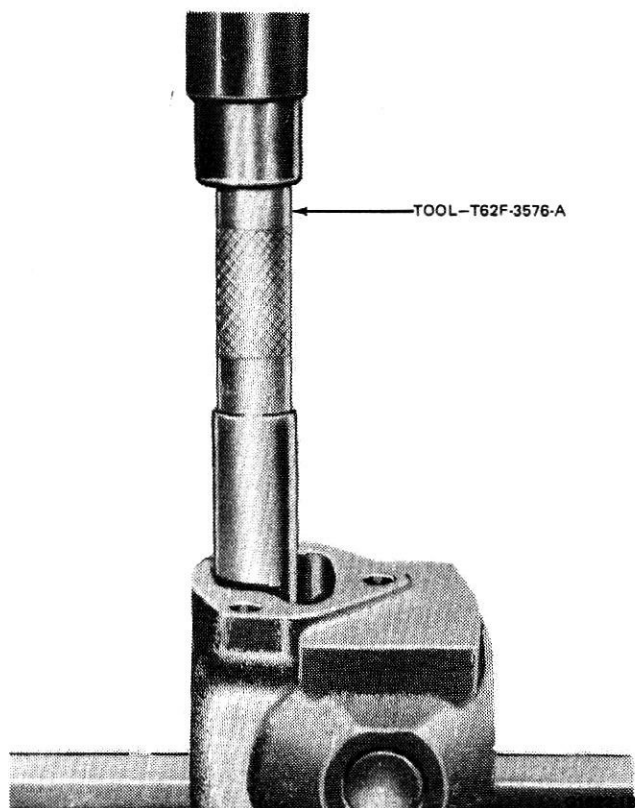


FIG. 7 Removing Oil Seal and Bearing

solvent (Fig. 6). Lubricate the bearing and seals with the recommended lubricant.

2. Install one bearing cup in the lower end of the housing, and the other in the adjuster.

3. If the seal in the bearing adjuster was removed, install a new seal and lubricate.
4. Slide ball nut over worm and check for proper alignment of the V-shaped spaces, as they will be mated with the sector teeth. The larger dimension of the ball nut gear teeth should be at the bottom. Insert the ball guides into the holes in the ball nut, tapping them lightly with the wood handle of a screw driver, if necessary.
5. Insert half of the balls into the hole in the top of each ball guide. It may be necessary to rotate the shaft slightly one way, then the other to distribute the balls in the circuit. A total of 50-54 balls is required per assembly.
6. After the balls are installed, install the ball guide clamp. Torque the screws to specification. Check the worm shaft to be sure that it rotates freely.
7. Coat the worm bearings, sector shaft bearings, and gear teeth with steering gear lubricant.
8. Clamp the housing in a vise, with the sector shaft bore horizontal, and place the worm shaft lower bearing in its cup.
9. Place the worm shaft and ball nut assemblies in the housing.
10. Place the worm shaft upper bearing on the top of the worm, and install the worm shaft bearing adjuster and adjuster nut, and bearing cup. Do not tighten the locknut.
11. Using an in-lb. torque wrench, adjust the worm bearing preload (Fig. 8). Refer to the table at the end of this Part.
12. Position the sector adjusting screw and adjuster shim, and check clearance between the screw head

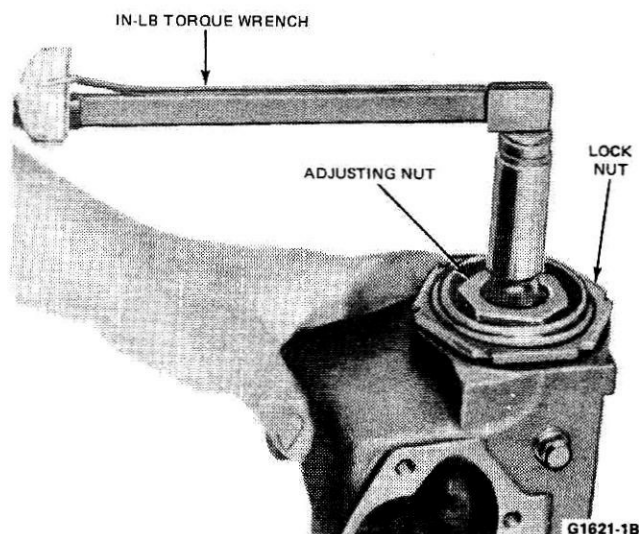


FIG. 8 Checking Steering Shaft Bearing Preload

and the end of the sector shaft to be sure it does not exceed 0.004 inch. If clearance is greater than 0.004 inch, add enough shims to reduce end play to within the 0.004 inch tolerance.

13. Start the sector shaft adjusting screw in the housing cover.
14. Install a new gasket on the housing cover.
15. Tilting the housing so the ball nut tips toward the housing cover opening, rotate the steering shaft until the ball nut teeth are in position to mesh with sector gear.
16. Lubricate the sector shaft journal and install the sector shaft and cover. When assembling, align the sector center tooth with the ball nut center space.
17. With the housing cover turned out of the way, fill the gear with the specified amount of gear lubricant. Push the housing cover and sector shaft assemblies into place, and install the top housing cover bolts. **Do not tighten the cover bolts until there is some lash between the ball nut and sector gear teeth. Hold or push the cover away from the ball nut, and torque the bolts to specification.**
18. Loosely install the sector shaft adjusting screw lock nut, and adjust sector shaft mesh load to specification. Tighten the adjusting screw lock nut.

SPECIFICATIONS

MANUAL STEERING GEAR SERVICE SPECIFICATIONS

Description	Granada/Monarch, Versailles	
Model	SMA-Y	SMA-F
Gear Ratio	16:1	22:1
Turns (Lock to Lock) 1	4	5½
Lube Type	ESW-M1C87-A	
Lube Capacity (Lb.)	.70 ± .07	
Warm Bearing Preload (In-Lb) 2	2-4	3-8
Total Center Meshload (In-Lb) 3	5-7	10-16
Minimum Meshload over Preload (In-Lb)	2	
Adjustments (All Models)	Adjusting screw to bottom of sector shaft T. Slot clearance: .000-.004	

① Gear only — not attached to Pitman arm.
 ② Torque required to rotate input shaft at approximately 1½ turns either side of center (gear out of vehicle or Pitman arm disconnected).
 ③ Required to rotate input shaft and worm assembly past the center point.
 ④ Minimum of one thread must remain exposed when installed.

MANUAL STEERING GEAR TORQUE LIMITS (FT-LB)

Description	Granada/Monarch, Versailles
Sector Shaft Cover Bolt	17-25
Ball Return Guide Clamp Screw	SMA-Y18-4Z (In-Lb)
Preload Adjuster Locknut	60-80
Meshload Adjusting Screw Locknut	32-40
Lubricant Fill Plug and Vent	3-9 ④
Steering Gear to Side Rail	50-60
Pitman Arm to Sector Shaft	150-225

SPECIAL SERVICE TOOLS

Tool No.	Description
T64P-3590-F	Steering Pitman Arm Remover
T62F-3576-A	Sector Shaft Bushing Remover and Replacer

CG1848-2H

Manual Steering Gear— Rack And Pinion

**PART
13-32**

Applies To Mustang II/Pinto/Bobcat, Fairmont/Zephyr

SUBJECT	PAGE	SUBJECT	PAGE
ADJUSTMENTS		DISASSEMBLY AND ASSEMBLY (Cont'd.)	
Pinion Bearing Preload	32-2	Rack Support Yoke, Spring, Gasket	
Support Yoke to Rack	32-2	Shims and Cover	32-6
Tie Rod Articulation Effort	32-2	Tie Rod Ends, Bellows and Tie Rod	
DESCRIPTION		Ball Joint Sockets	32-3
Steering Gear	32-1	REMOVAL AND INSTALLATION	
DISASSEMBLY AND ASSEMBLY		Steering Gear	32-2
Input Shaft Seal	32-6	SPECIFICATIONS AND	
Pinion Cover, Gasket, Pinion Shaft, Spacer, Shims,		SPECIAL TOOLS	32-7
Upper Bearing, Rack, Lower Bearing and			
Housing	32-6		

CG2408-28

DESCRIPTION STEERING GEAR

The steering gear is of the rack and pinion type (Fig. 1). The gear input shaft is connected to the steering shaft by a U-joint shaft and flexible coupling. A pinion gear, machined on the input shaft, engages the rack, and rotation of the input shaft pinion causes the rack to move laterally.

Tie rods, attached at each end of the rack joint, move with the action of the front suspension. The gear is sealed at each end with a rubber bellows. The Pinto, Bobcat and Mustang steering gear is filled with approximately 7 oz. of lubricant D2AZ-19580-B or equivalent at initial assembly and need not be checked unless leakage is evident or the unit is drained for repair. The Fairmont and Zephyr steering gear lubricant is a fluid type. If the unit is drained for repair, refill with 5 oz. of the specified lubricant.

Couplings attaching the tie rods are pinned to the rack and can be disassembled for service on Pinto, Bobcat and Mustang. The Fairmont and Zephyr ball housings and tie rods are not adjustable for preload and feature a simple torquing and pinning service procedure.

Do not turn the steering wheel quickly or forcefully from lock to lock when the front wheels of the vehicle are off the ground. This could cause a build-up of hydraulic pressure within the gear, which could damage or blow off the bellows.

With the front suspension and linkage in good condition and the gear in proper adjustment, there

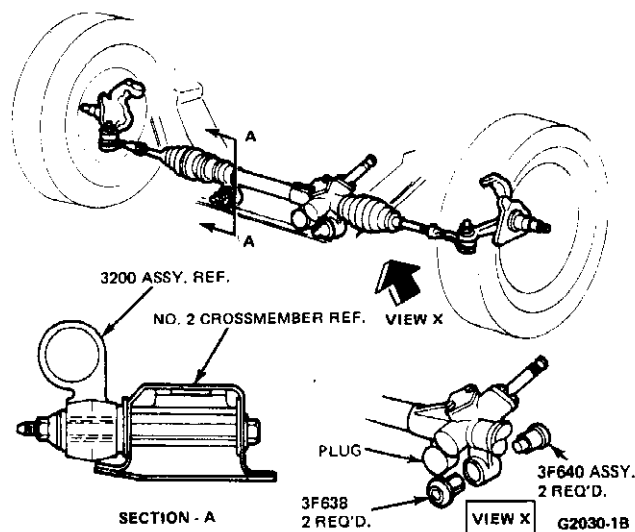


FIG. 1 Typical Rack and Pinion Steering Gear and Linkage

should be no more than 3/8 inch of free play at the rim of the steering wheel.

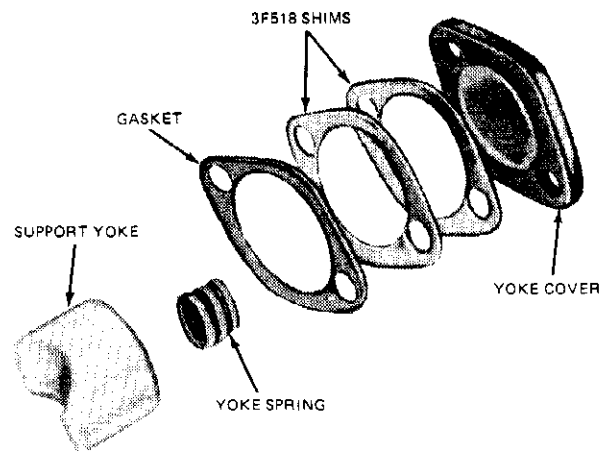
In a stationary vehicle, there should be no knock in the steering gear when the steering wheel is turned from stop to stop. If a knock is experienced, check adjustment of rack preload and pinion bearing preload. A faint knock produced by the steering gear while driving on an extremely rough road is acceptable, and in no way affects the proper functioning of the gear.

ADJUSTMENTS

The rack and pinion gear provides two means of service adjustment. The gear must be removed from the vehicle to perform both adjustments.

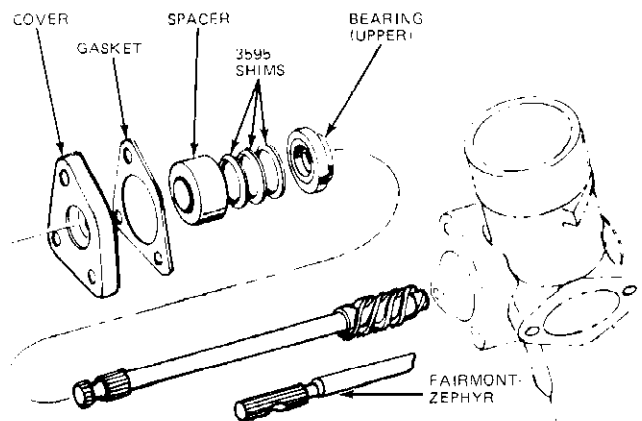
SUPPORT YOKE TO RACK

1. Clean the exterior of the steering gear thoroughly and mount the gear, by installing two long bolts and washers through the mounting boss bushings and attaching to Bench Mounted Holding Fixture, Tool T57L-500-B.
2. Remove the yoke cover, gasket, shims, and yoke spring (Fig. 2).
3. Clean the cover and housing flange areas thoroughly.
4. Reinstall the yoke and cover, omitting the gasket, shims, and the spring.
5. Torque the cover bolts lightly until the cover just touches the yoke.
6. Measure the gap between the cover and the housing flange. **With the gasket**, add selected shims (3F518) to give a combined pack thickness .005-.006 inch greater than the measured gap.
7. Remove the cover.
8. Assemble the gasket next to the housing flange, then the selected shims, spring, and cover.
9. Install cover bolts, sealing the threads with ESW-M46-132A or equivalent and torque to specification.
10. Check to see that the gear operates smoothly without binding or slackness.



G1826-1B

FIG. 2 Support Yoke Arrangement



G1827-1D

FIG. 3 Pinion Bearing Cover and Shim Arrangement

PINION BEARING PRELOAD

1. Clean the exterior of the steering gear thoroughly and place the gear in the bench mounted holding fixture as outlined under Support Yoke to Rack Adjustment.
2. Loosen the bolts of the yoke cover to relieve spring pressure on the rack.
3. Remove the pinion cover and gasket and clean the cover flange area thoroughly.
4. Remove the spacer and shims (Fig. 3).
5. Install a new gasket and fit shims (3595), between the upper bearing and the spacer, until the top of the spacer is flush with the gasket. Check with a straightedge, using light pressure.
6. Add one .005 inch shim to the pack in order to preload the bearings. The spacer must be assembled next to the pinion cover.
7. Install the cover and bolts. Torque the bolts to specification.

TIE ROD ARTICULATION EFFORT—FAIRMONT/ZEPHYR

1. Install hook end of pull scale, Tool T74P-3504-Y through the hole in the tie rod end stud. Effort to move the tie rod should be 1 to 5 lb. NOTE: Do not damage tie rod neck.
2. Replace ball joint/tie rod assembly if effort falls outside this range. Save the tie rod end for use on the new tie rod assembly.

REMOVAL AND INSTALLATION

STEERING GEAR

Removal

1. Disconnect the negative battery cable from the battery.

2. Remove the one bolt retaining the flexible coupling to the input shaft.
3. Leave the ignition key in the ON position and raise the vehicle on a hoist.

4. Remove the two tie rod end retaining cotter pins and nuts. Separate the studs from the spindle arms, using the ball joint separator tool. **Do not use a hammer** or similar tool as this may damage spindle arms or rod studs.
5. Support the steering gear and remove the two nuts, insulator washers and bolts retaining the steering gear to the No. 2 crossmember.

On the Mustang II, the No. 2A crossmember must be removed to allow access to the retaining nuts.

6. Remove the steering gear assembly from the vehicle.

Installation

1. Insert the input shaft into the flexible coupling and position the steering gear to the No. 2

crossmember. Install the two bolts, insulator. On the Mustang II reinstall the No. 2A crossmember.

On the Mustang reinstall the No. 2A crossmember.

2. Connect the tie rod ends to the spindle arms and install the two retaining nuts. Torque the nuts to specifications and install the two cotter pins.
3. Lower the vehicle and install the one bolt retaining the flexible coupling to the input shaft. Torque the bolt to specifications.
4. Turn the ignition key to the OFF position.
5. Connect the negative battery cable to the battery.
6. Check the toe and reset if necessary. Refer to Group 14.

DISASSEMBLY AND ASSEMBLY

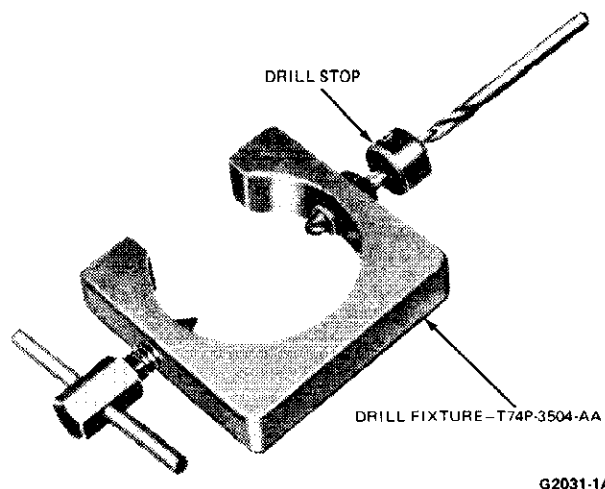
All disassembly must be performed with the gear removed from the vehicle.

TIE ROD ENDS, BELLOWS AND TIE ROD BALL JOINT SOCKETS

Pinto/Bobcat/Mustang II

Disassembly

1. Clean the exterior of the gear thoroughly and place the gear in the bench mounted holding fixture as described under "Adjustments."
2. Loosen the jam nuts on the outer ends of the tie rods adjacent to the tie rod ends.
3. Remove the tie rod ends and jam nuts.
4. Remove the four clamps, retaining the bellows to the gear housing and the tie rods. Drain the lubricant and remove the bellows. **Use care so as not to damage or contaminate the inside of the bellows.**
5. The lock pin drill fixture, Tool T74P-3504-AA, (Fig. 4) doesn't have a depth gauge used to set the stop on the drill. Use the gauge on Tool T74P-3504-Z to set the drill stop. Insert the 5/32 inch drill in the depth gauge, butt the stop against the tool and secure firmly with the set screw.
6. Tape cloths around the rack end on both sides of the ball socket, to prevent chip contamination. Install Tool T74P-3504-AA on the ball socket. Position the fixture so that the pin in the ball socket is in line with the guide hole in the drill fixture. The cone points of the alignment and locking screws are to be positioned between the locknut and the ball socket and tightened firmly (Fig. 5).
7. Place the drill in the fixture guide hole and drill out the retaining pin. The drill guide prevents the hole from being drilled too deep (Fig. 5). (Both right and left tie rods and sockets are removed in this manner.)
8. Remove the tie rod and ball socket with the ball housing wrench, Tool T74P-3504-CC.



G2031-1A

FIG. 4 Setting Drill Stop

9. Remove the locknut, inner thrust bearing (seat) and the rack spring from the recess in the end of the rack, and discard.
10. All of the removed components must be examined and replaced if worn or damaged.

Assembly

1. Install a new rack spring in the recess in the end of the rack.
2. Assemble the ball socket to the tie rod.
3. Install a new inner thrust bearing (seat) in the ball socket.
4. Apply D2AZ-19580-B lubricant or equivalent to the spring, thrust bearing, tie rod ball and the ball socket.
5. Thread the ball joint locknut on the end of the rack.
6. Thread the ball socket onto the rack until the tie rod articulation becomes stiff.
7. Before measuring tie rod articulation effort, the rod must be rotated at least seven times to obtain a true reading.

8. Install a tie rod end on the tie rod. Place the hook of the pull scale Tool T74P-3504-Y through the hole in the threaded area of the ball joint.
9. With the tie rod in the mid-position of its range of articulation, parallel to the rack, adjust the position

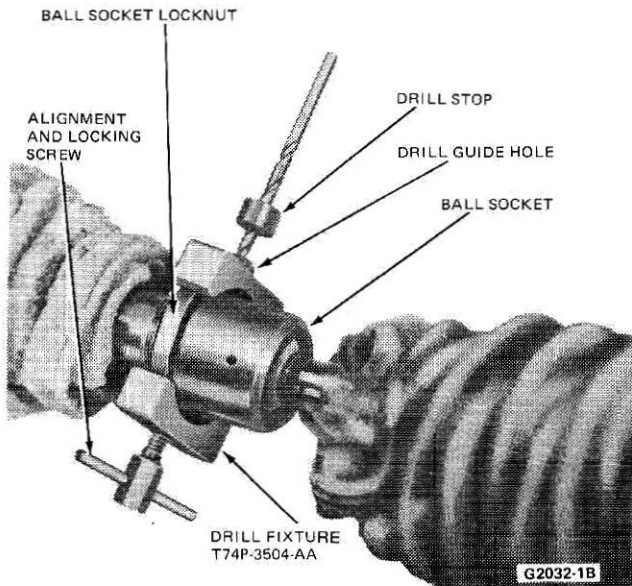


FIG. 5 Drilling Out Retaining Pin - Pinto/Bobcat/Mustang II

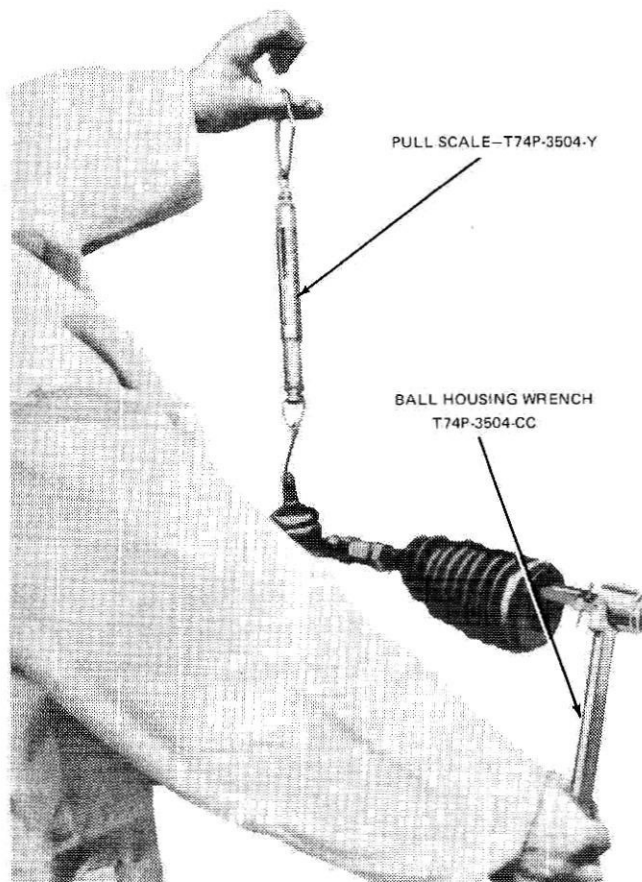


FIG. 6 Adjusting Tie Rod

of the ball socket on the rack with Tool T74P-3504-CC, until the effort required to move the tie rod, measured on the pull scale, is 4-6 lbs (Fig. 6).

10. Secure the unit by holding the ball housing with Tool T74P-3504-CC, and tighten the locknut against the ball socket with the locknut torque adapter, Tool T74P-3504-BB, to 35-40 ft-lb.

The ball housing wrench is equipped with a locking screw which must be located in the hole in the ball socket (Fig. 7).

11. Remove the spanner wrenches and using the procedure contained under disassembly, install the drill fixture on the ball socket. Drill the hole on the line of contact of the locknut and the ball socket. **A new hole must be drilled even if the halves of the existing holes align.**

A total of only two drilled holes are allowed on one end of the rack. If further removal of the ball socket is necessary, then the ball socket, locknut and rack must be replaced.

12. Insert the retaining pin into the drilled hole and tap it in flush with the ball housing and locknut surfaces. With Tool T74P-3504-X, stake the metal of the ball housing and the locknut over the pin to secure the tie rod adjustment. The staking tool has four points which perform the staking in one operation (Fig. 8).

Thoroughly clean the rack and housing bores of any metal chips, shavings or any foreign material.

13. To test the pinning operation, use Tool T74P-3504-BB, to apply a reverse torque of 35 ft-lb on the

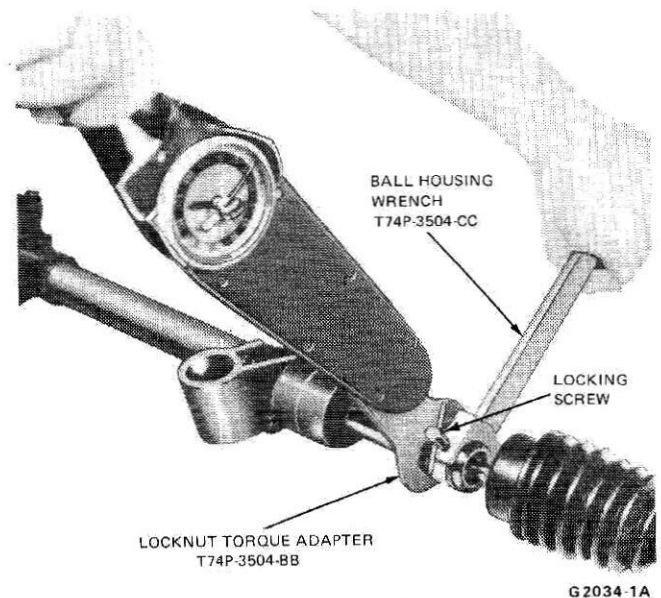


FIG. 7 Securing Ball Socket—Pinto/Bobcat/Mustang II