



SERVICE INSTRUCTIONS HEAVY DUTY - SCOTCH YOKE ROBOTARM ACTUATOR

INTRODUCTION:

This service pamphlet is offered as a guide to enable general maintenance to be performed on Bettis Heavy Duty "Scotch-Yoke" type actuators. For item numbers refer to current Heavy Duty Parts List

BASIC TOOLS

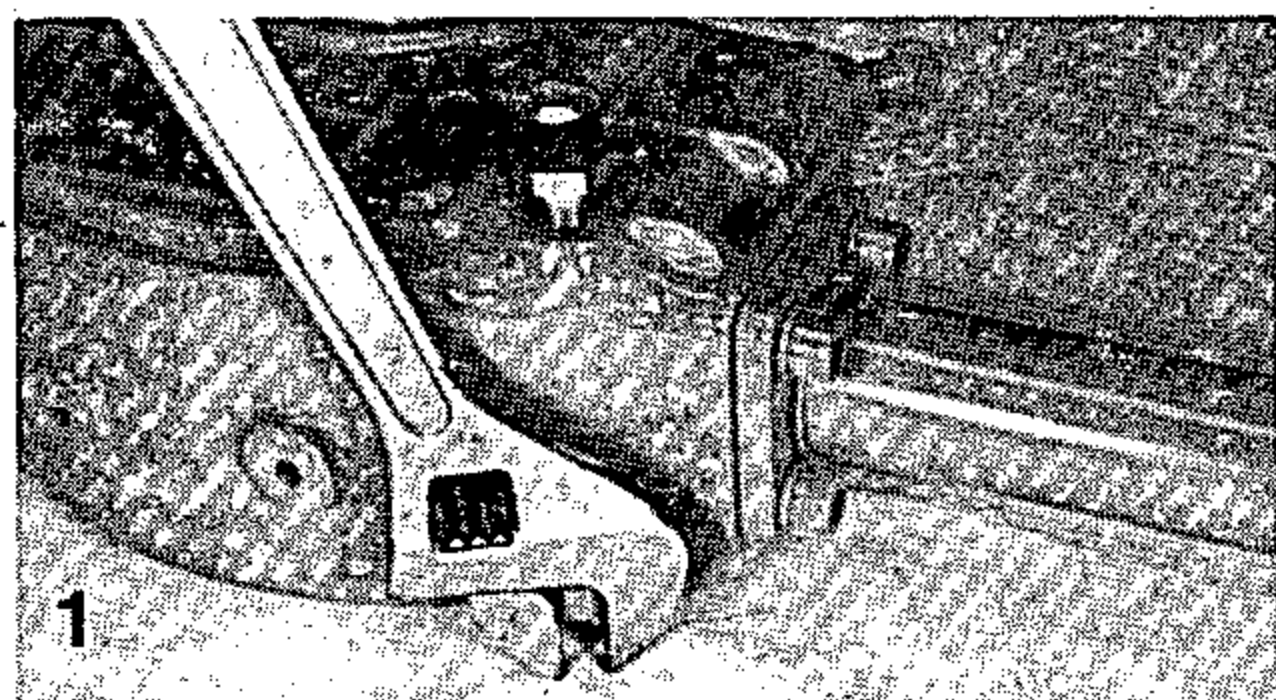
- a). Chain wrench
- b). Screw driver
- c). Adjustable wrench
- d). Allen wrench
- e). Rubber or leather mallet.

PRELIMINARY DISASSEMBLY

TURN OFF AIR OR POWER GAS and remove all piping and accessories mounted on unit.

DISASSEMBLY

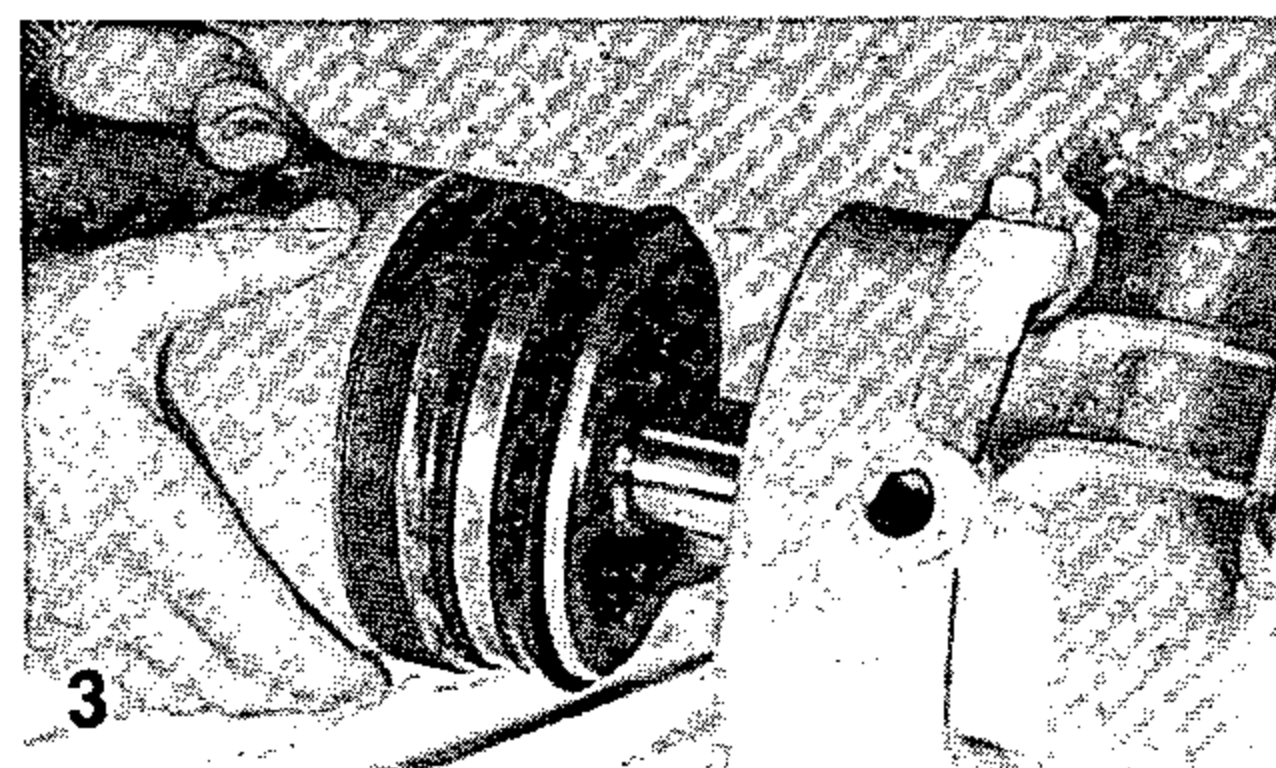
If actuator has been furnished with an oil bath or if body has been filled with oil, remove lower plug (Item 23) and drain.



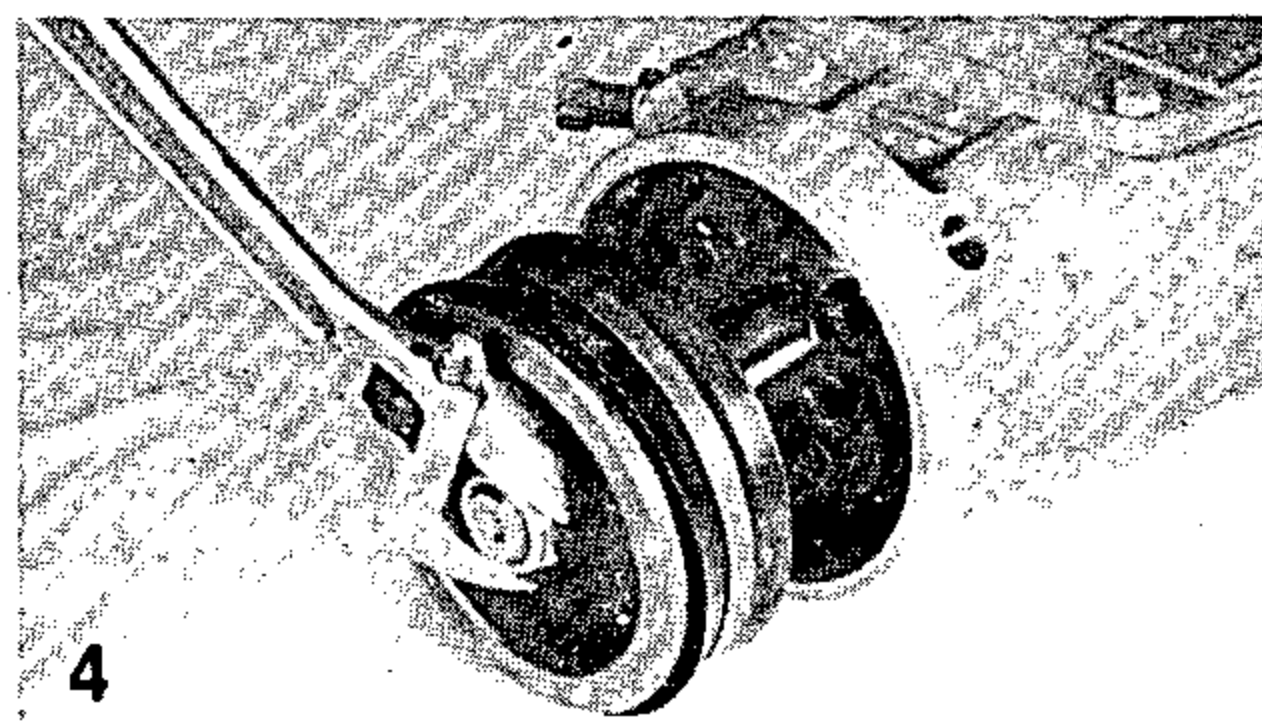
1. PRESSURE CYLINDER GROUP: Secure the chain wrench around the cylinder (Item 9) as close to the welded end cap as possible. Using the mallet, break the cylinder loose sufficiently so that it can be removed.



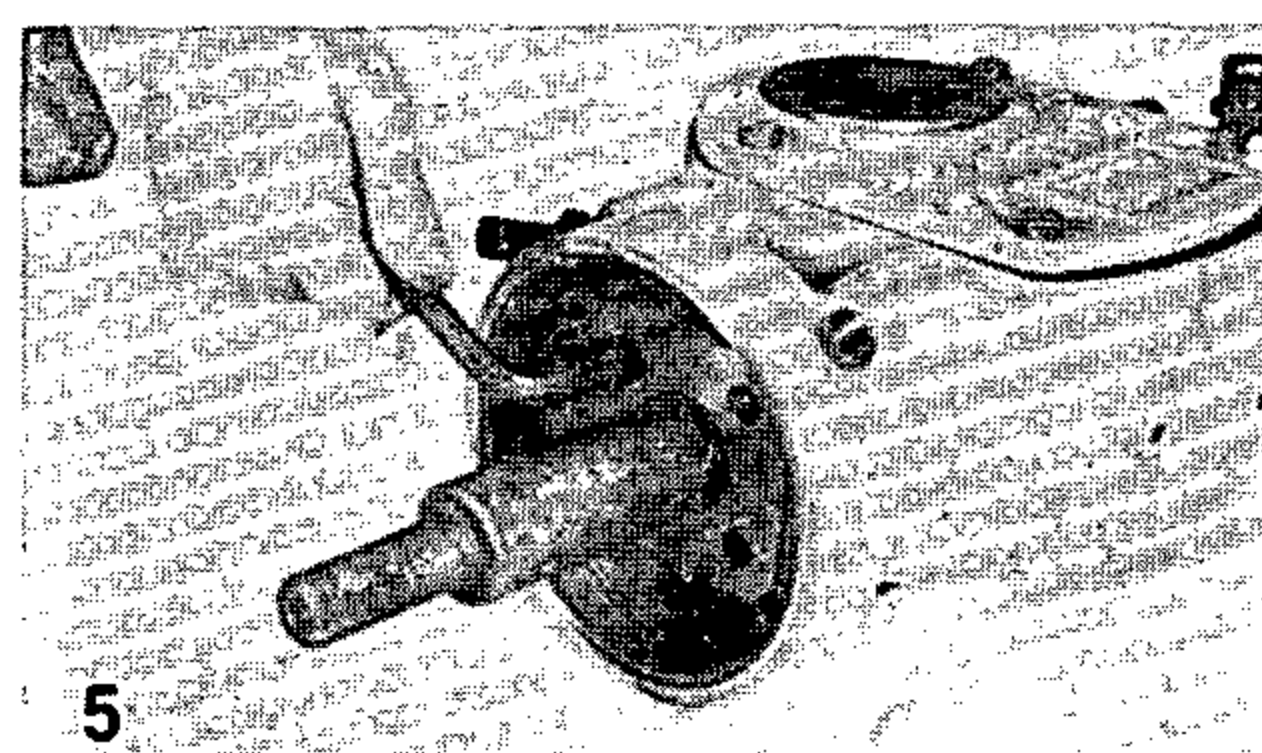
NOTE: When setting the cylinder aside, care should be taken to protect the chamfered edge and cylinder threads.



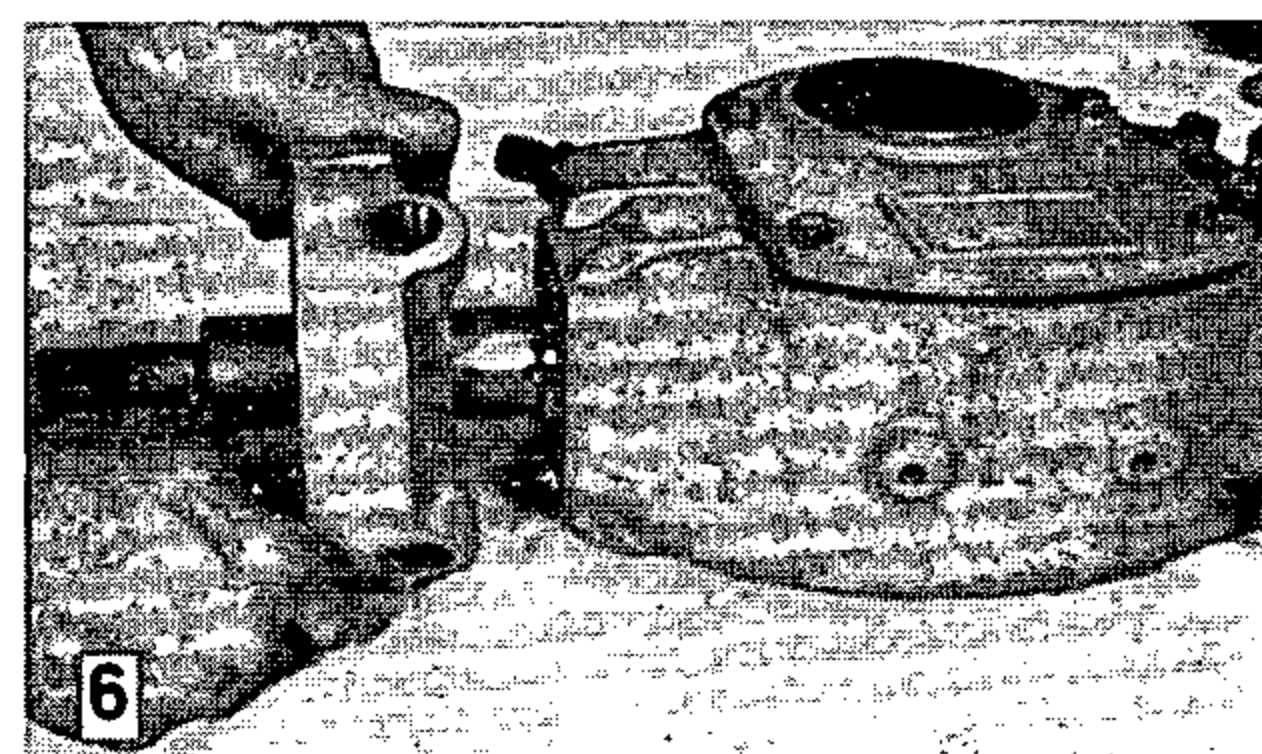
Unscrew piston nut (Item 11) and remove the piston (Item 7) and piston head seal (Item 26).



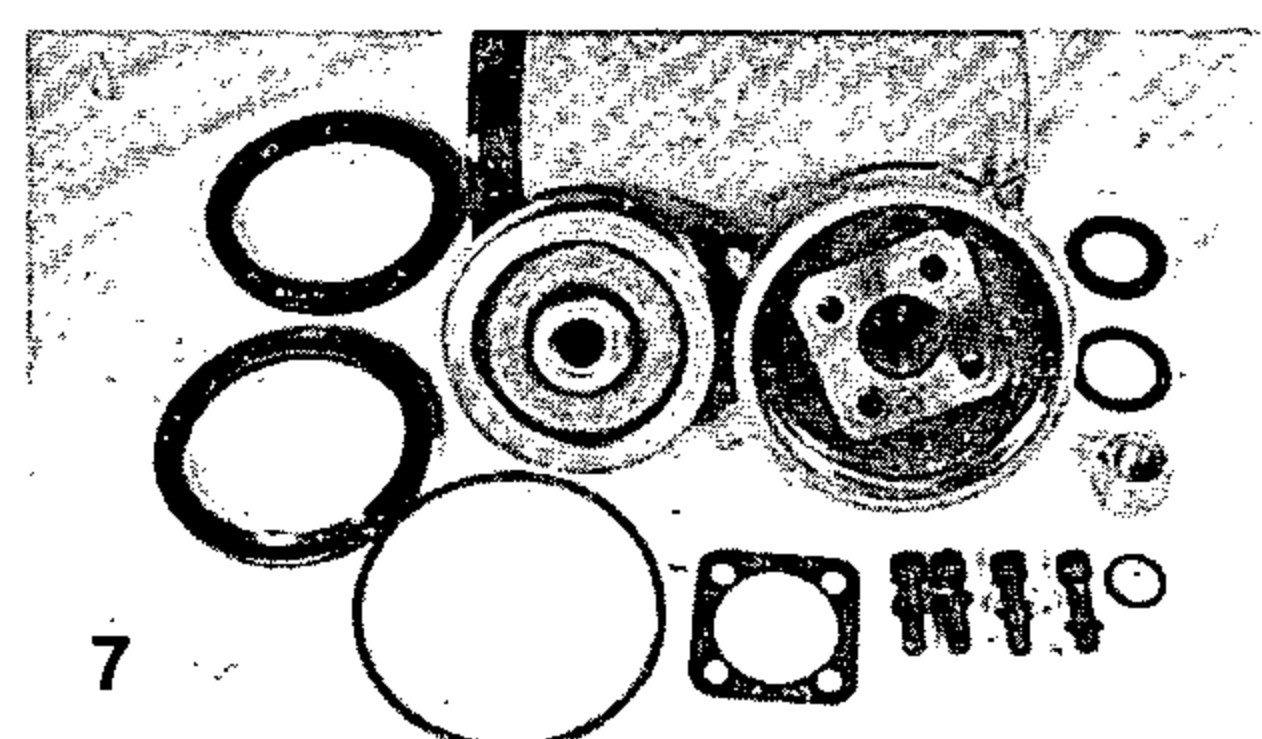
Unscrew the four cylinder adapter bolts (Item 21).



Remove the cylinder adapter (Item 8), taking care not to scratch the piston rod (Item 6) or disengage the rod bushing (Item 10).



DISASSEMBLED PRESSURE GROUP



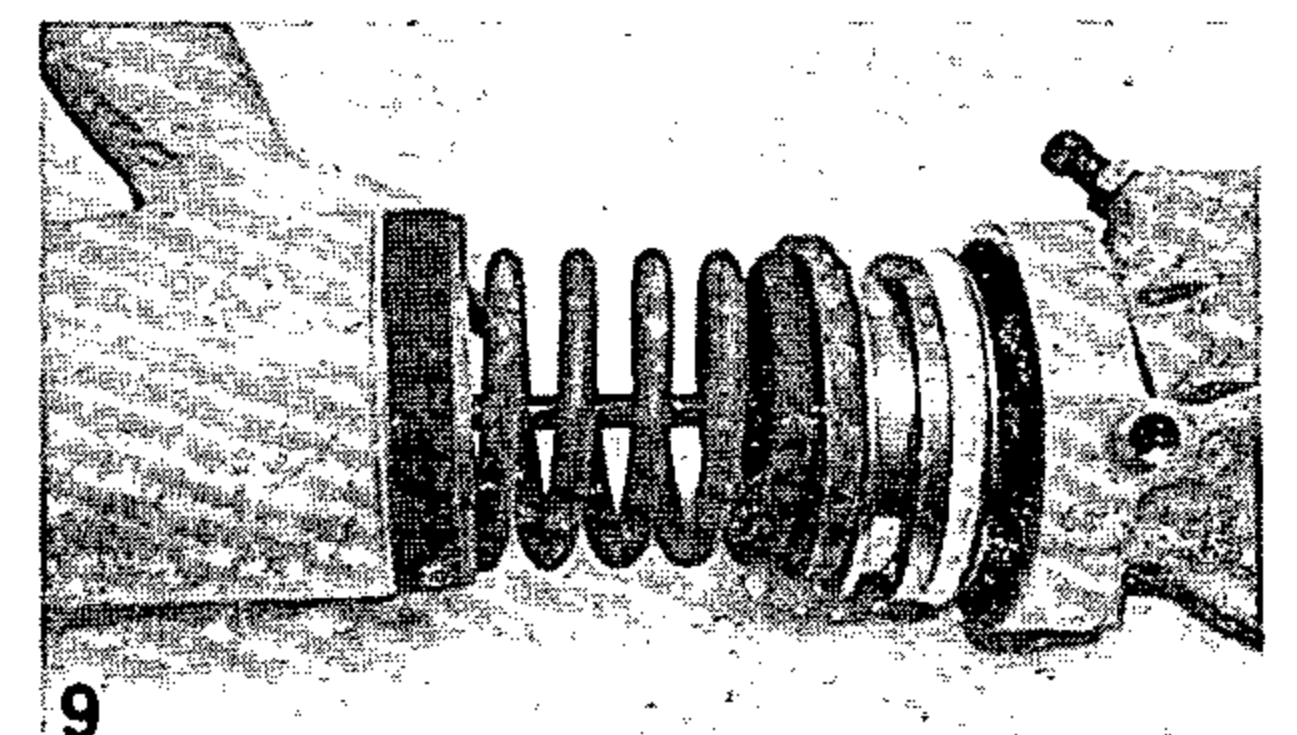
2. SPRING CYLINDER GROUP: Loosen the jam nuts (Item 13) and back off stop adjusting screw (Item 12) sufficiently to release "pre-load" from spring cartridge.



Secure the chain wrench around the cylinder (Item 9) as close to the welded end cap as possible. Using the mallet, break the cylinder loose sufficiently so that it can be removed.

NOTE: Due to added weight and the nature of a preloaded assembly, caution should be exercised when handling the spring cartridge. **DO NOT DROP OR TRY TO DISASSEMBLE.**

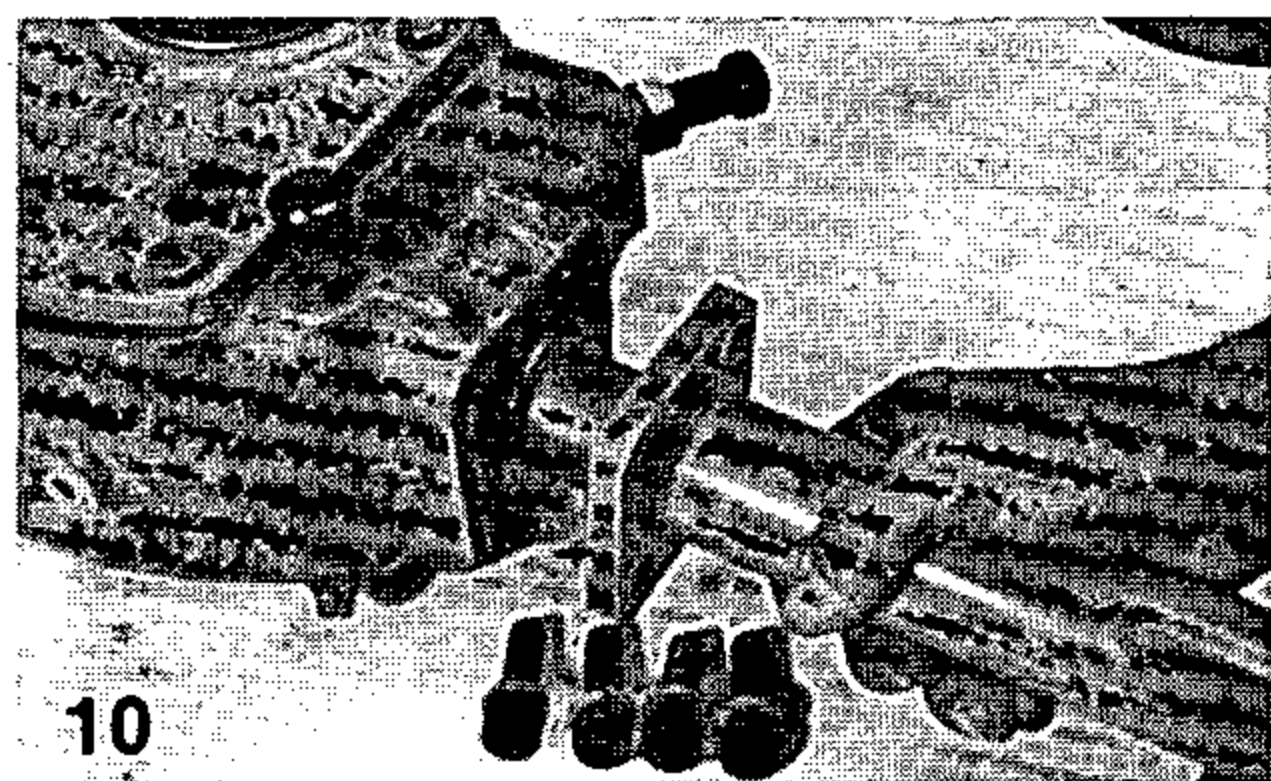
When setting the spring cylinder aside, care should be taken to protect the chamfered edge and cylinder threads.



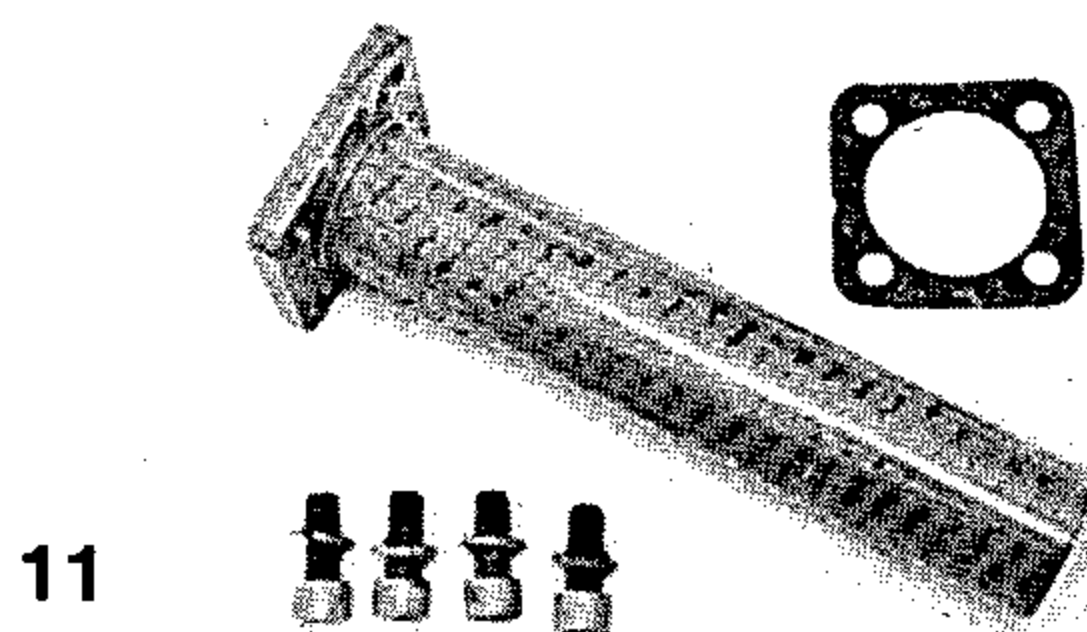
DISASSEMBLY (Continued)

NOTE. See page 1 for removal of piston nut, piston and cylinder adapter.

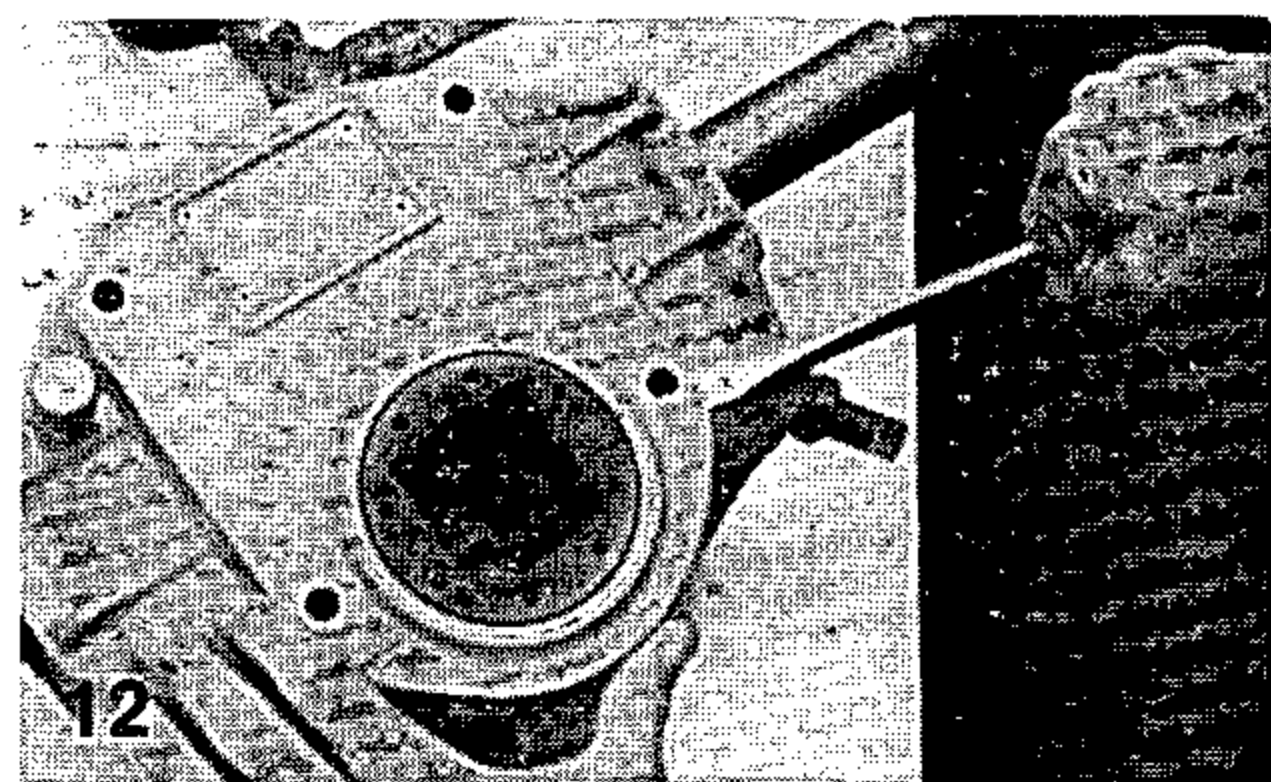
3. ROD COVER GROUP: Unscrew the four rod cover bolts (Item 30) and remove the rod cover (Item 29), taking care not to disengage the rod bushing (Item 32).



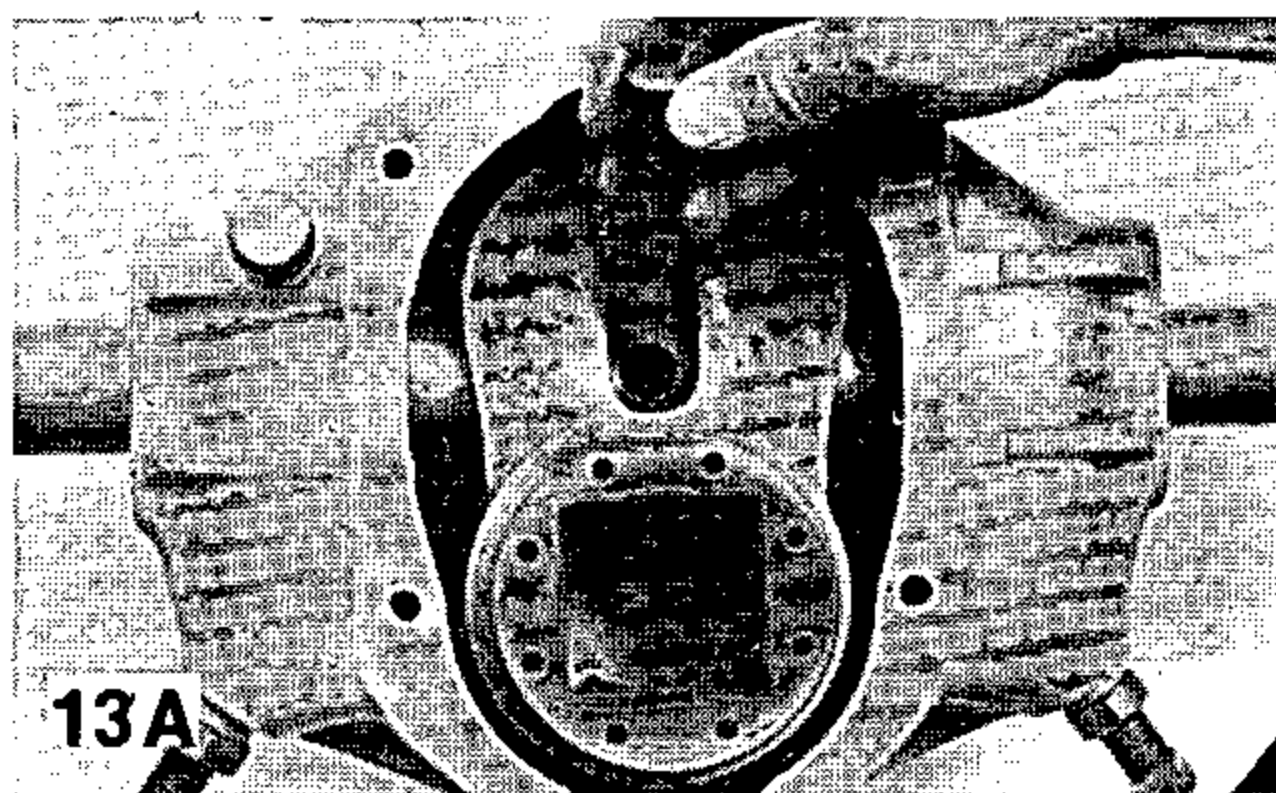
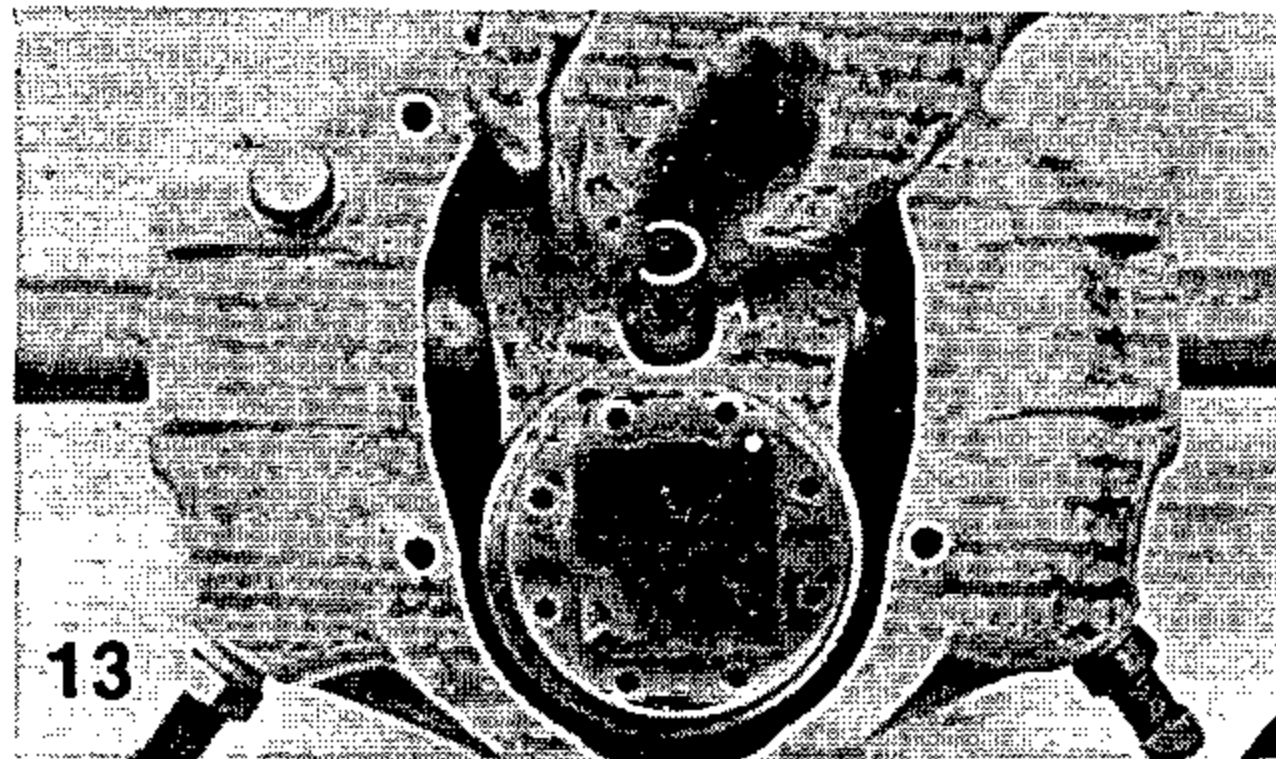
DISASSEMBLED ROD COVER GROUP



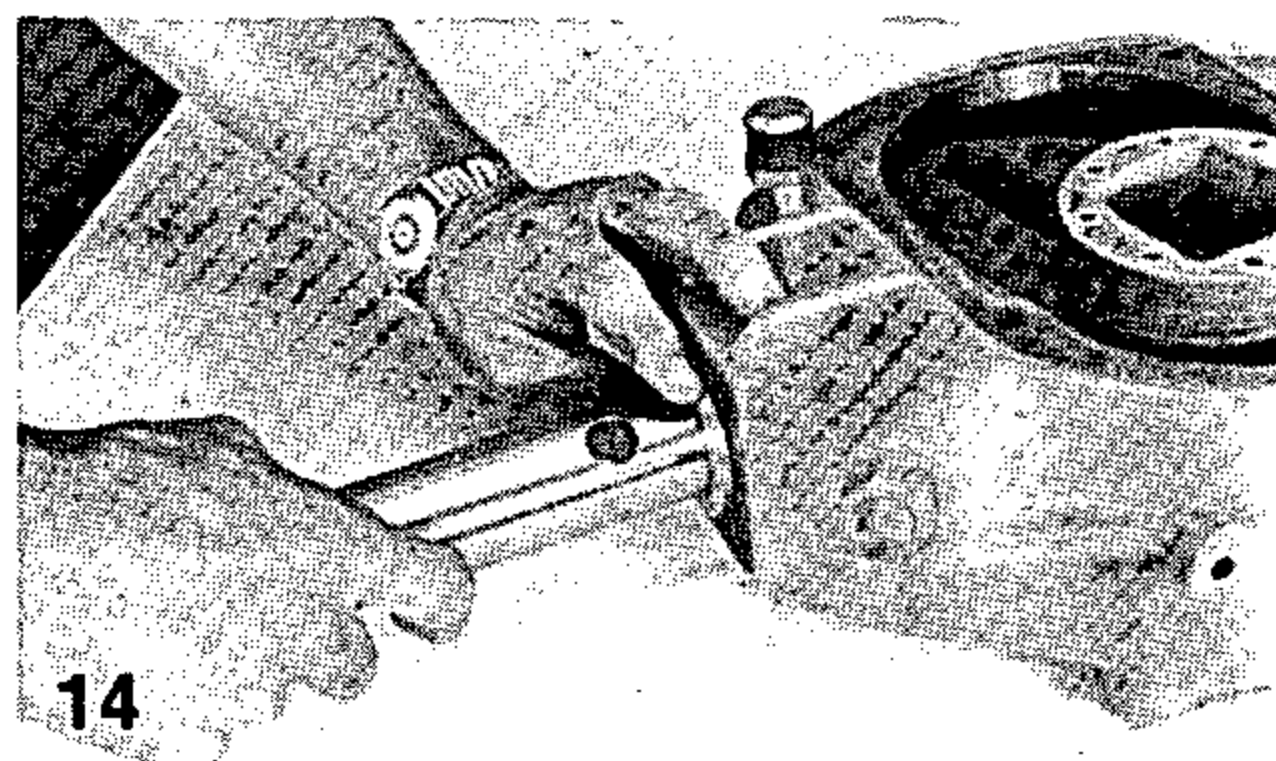
4. CENTER BODY GROUP: Remove the four housing cover bolts (Item 19) and lift the housing cover (Item 3) from the body.



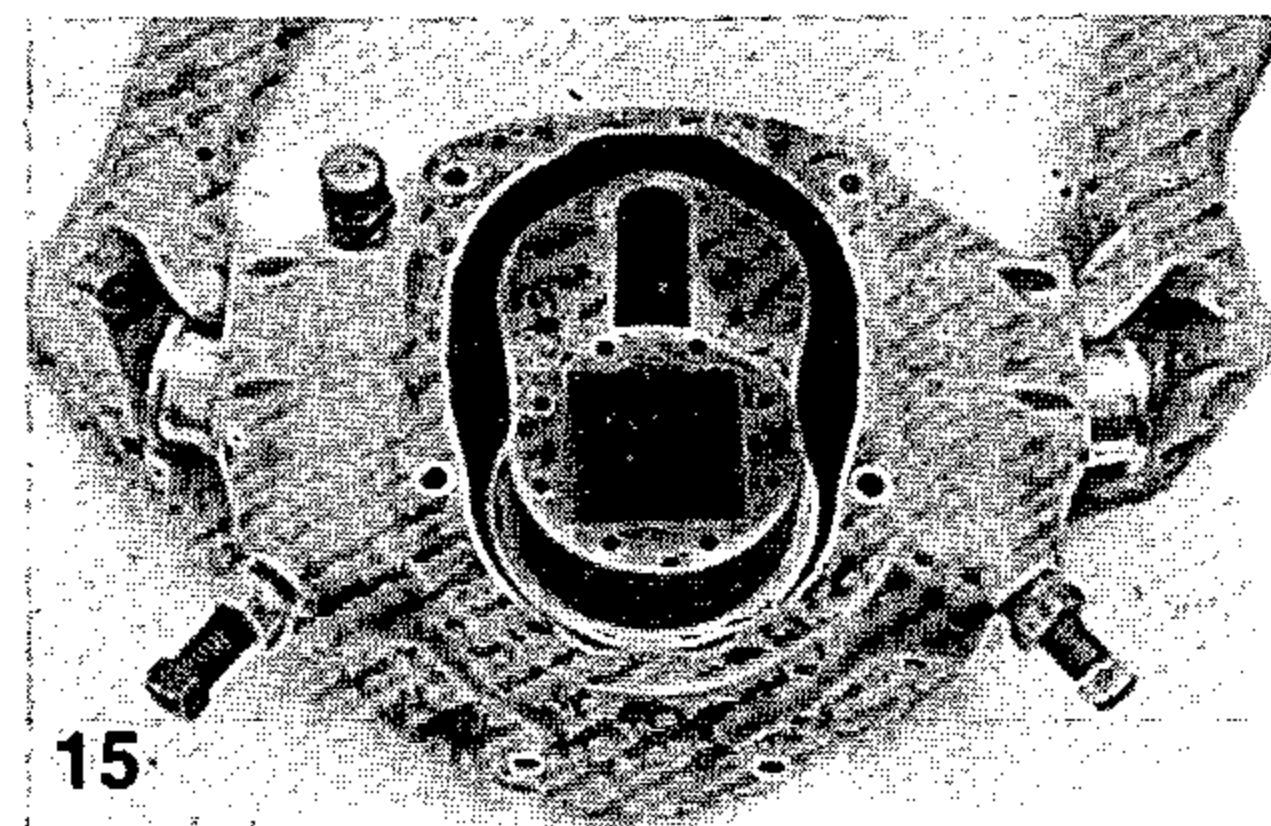
Remove the upper yoke pin roller (Item 5) and lift out the yoke pin (Item 4).



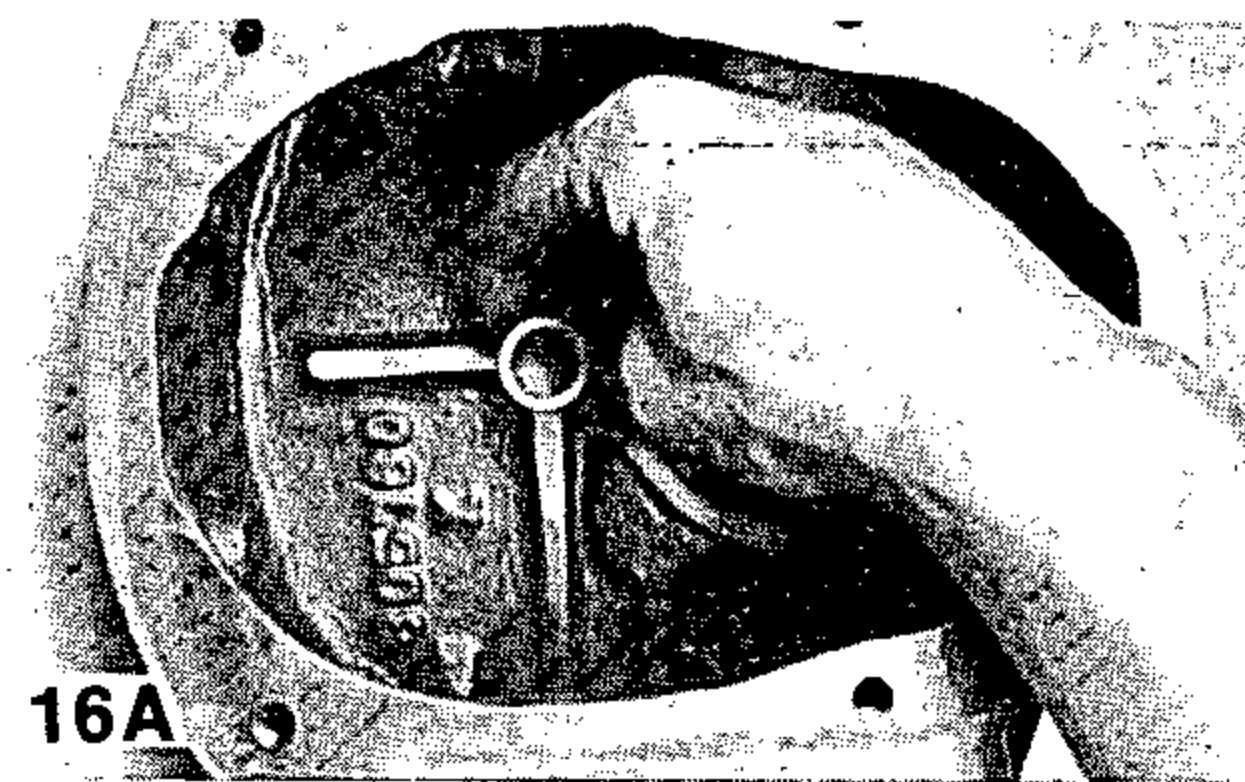
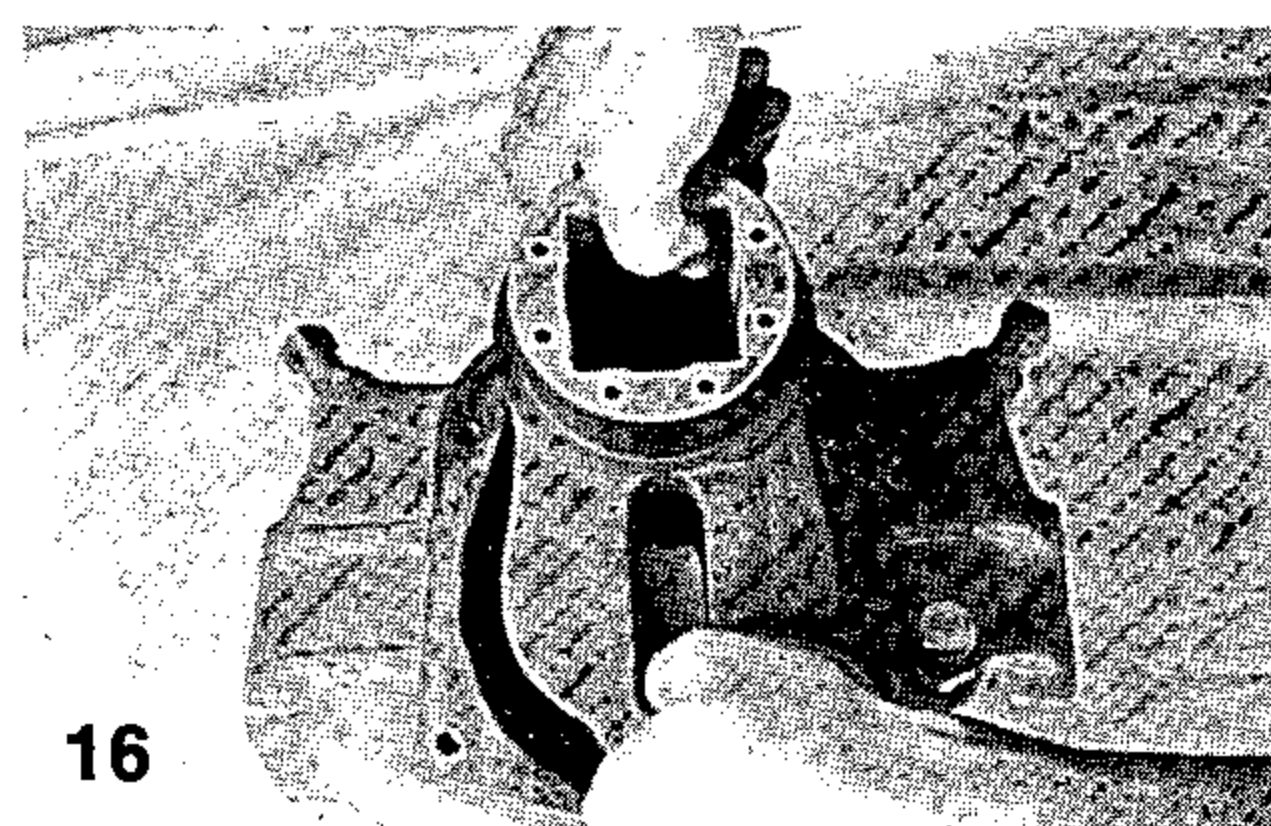
Pull the piston rod (Item 6) out through the rod bushings.



Remove both rod bushings (Item 10) from housing.



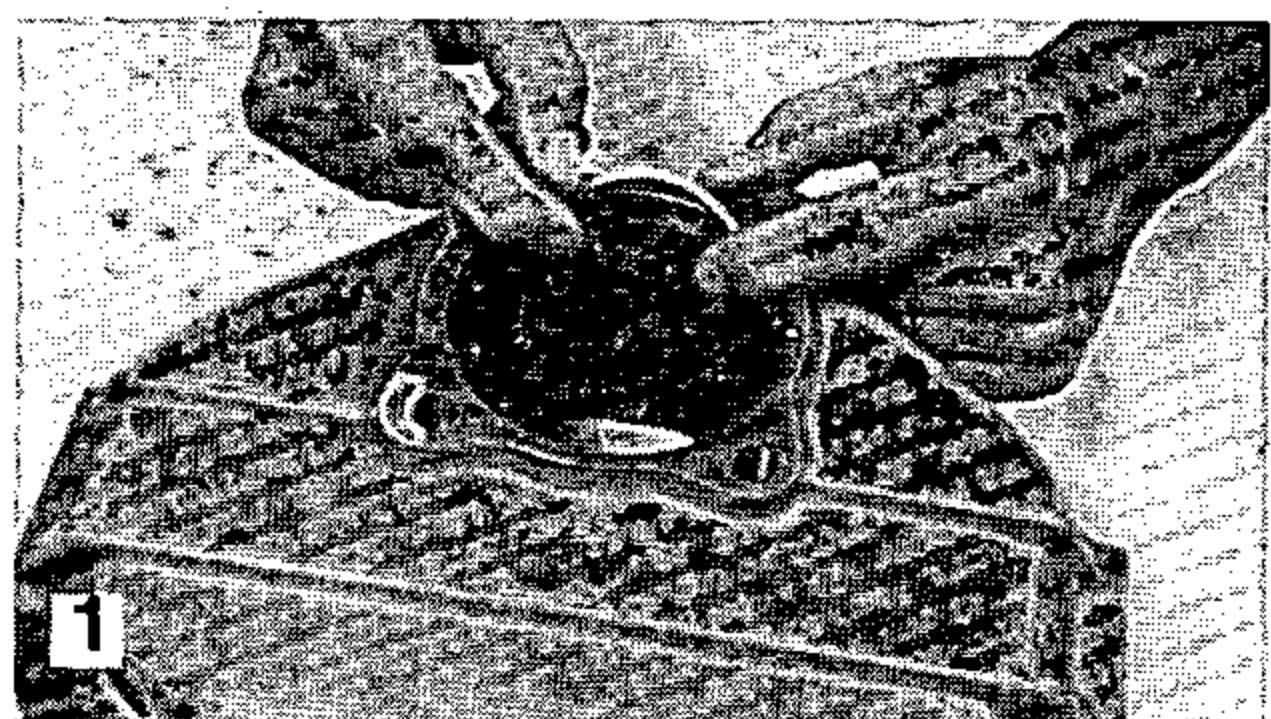
Lift the yoke (Item 2) from body cavity and remove the lower yoke pin roller (Item 5).



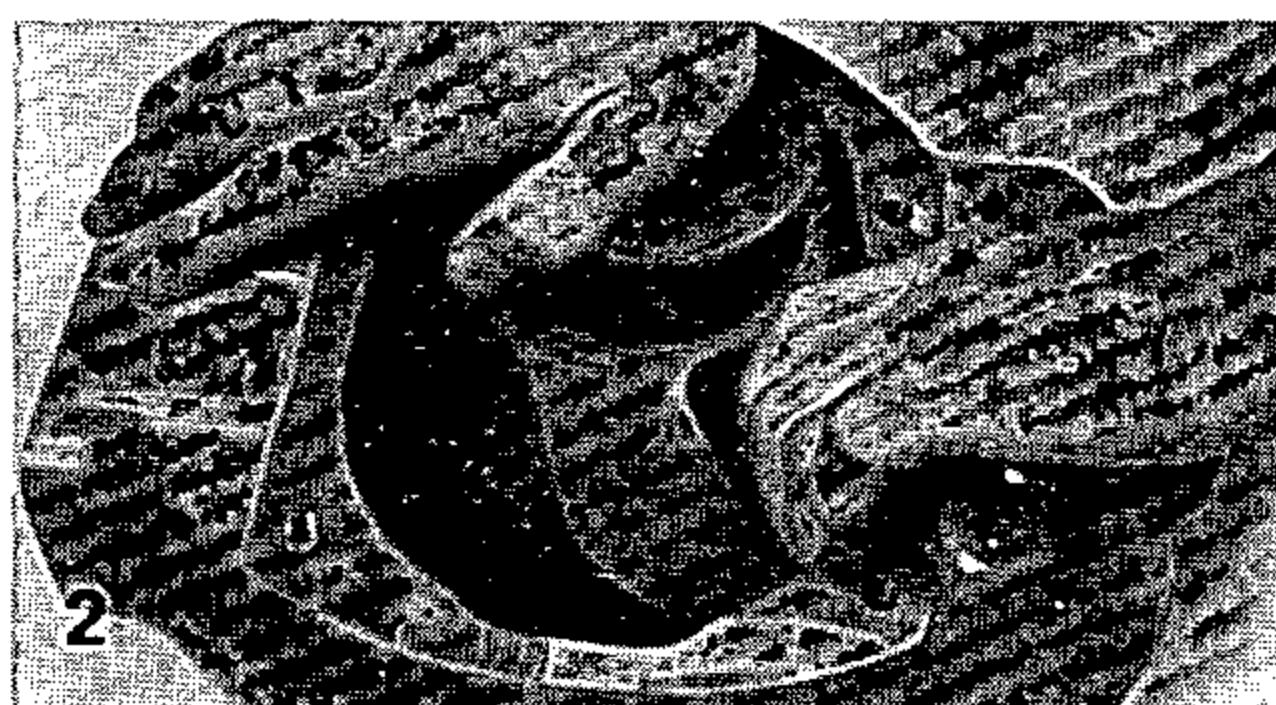
RE-ASSEMBLY

PRELIMINARY INSTRUCTIONS: Remove all old seals and gaskets, taking care not to scratch or damage seal grooves. Thoroughly clean all internal parts with cleaning solvent and inspect all bearing and sealing surfaces for nicks, scratches and excessive wear. Lubricate all threaded fasteners, bearing surfaces, cylinder bores, rollers, yoke pin, yoke bore, gaskets and all seal grooves with Nebula "EP" Grade O grease or equivalent. It is recommended that all old seals and gaskets be replaced with new ones. Note however, that seal materials may vary for special applications, i.e. SO2 service, CO2 service, etc. And therefore care should be taken when ordering seal kits to insure that correct seal compounds are furnished.

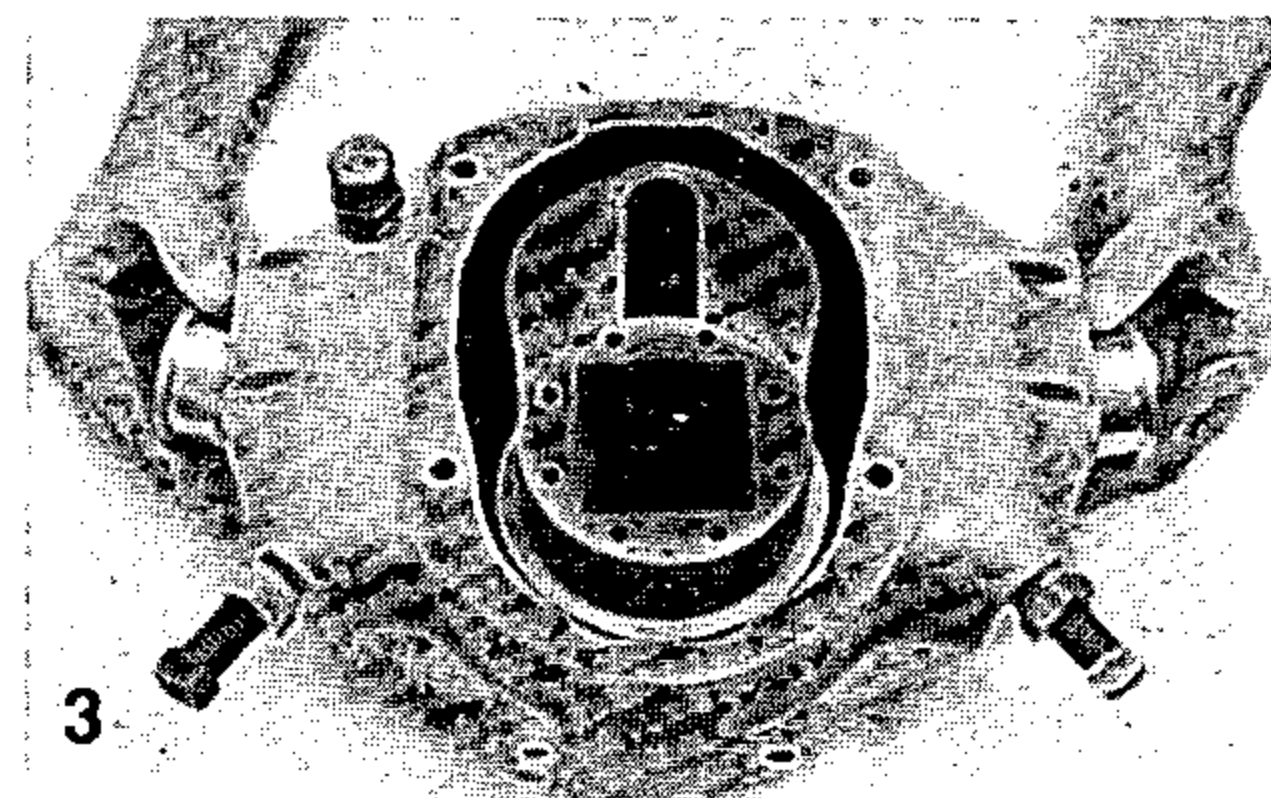
RE-ASSEMBLY OF CENTER BODY GROUP: Install the lower yoke seal (Item 15) in the body with the lip of the seal facing toward the inside of the body cavity.



Install the yoke (Item 2) in the body cavity with the eight drilled holes facing upward. While exerting force on the top of the yoke, rotate back and forth to seat the seal and position the yoke.

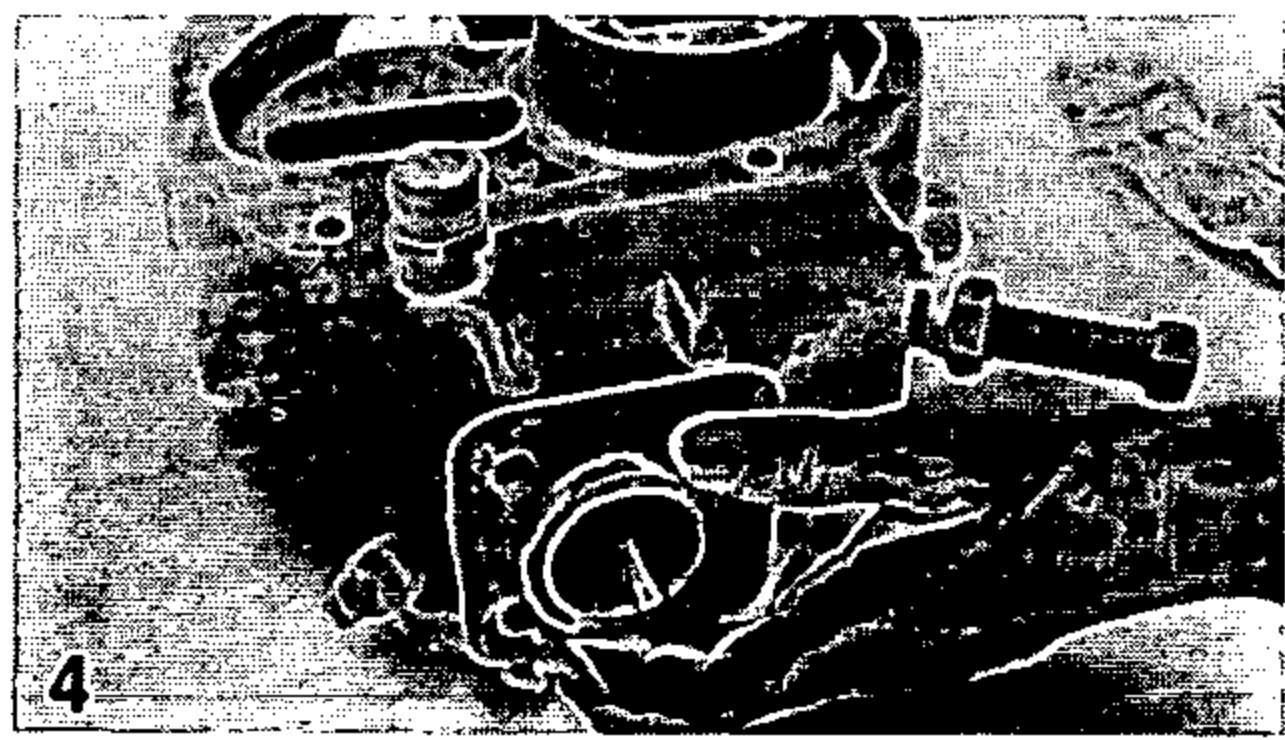


Install both piston rod bushings (Item 10).

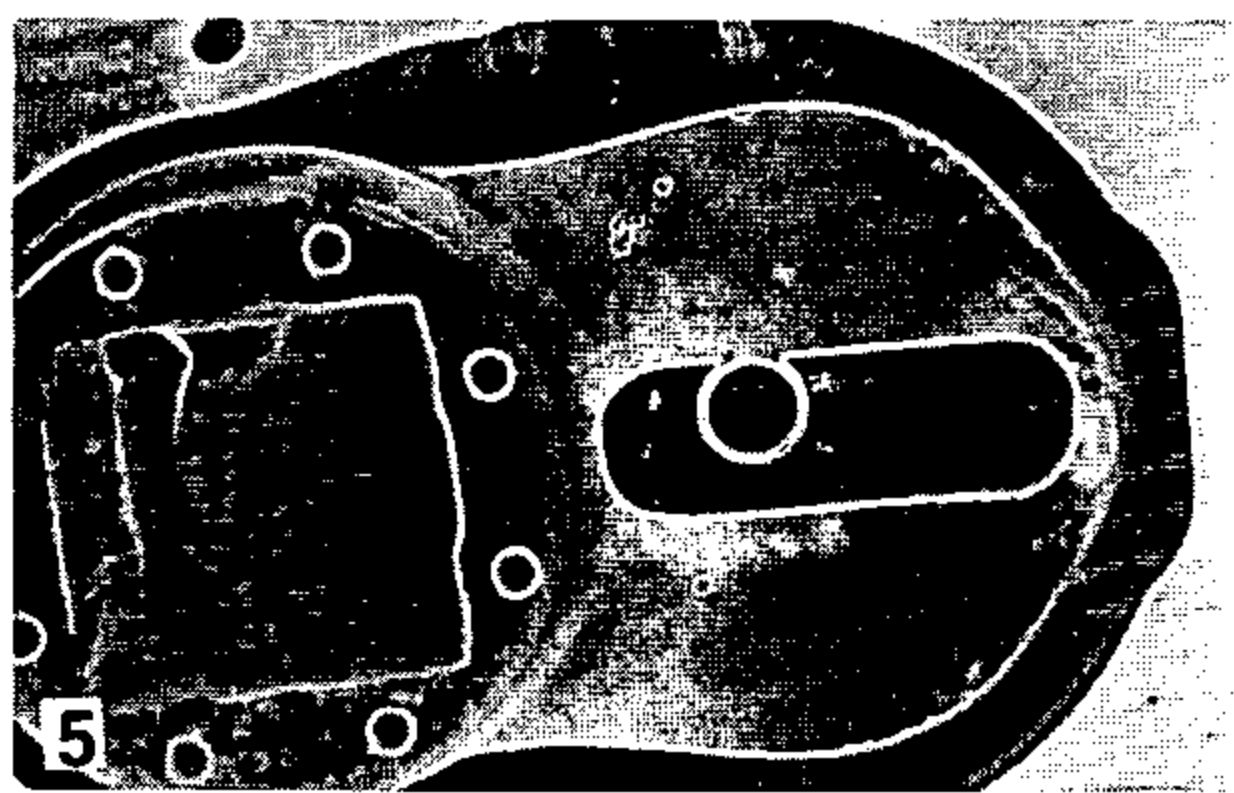


RE-ASSEMBLY (Continued)

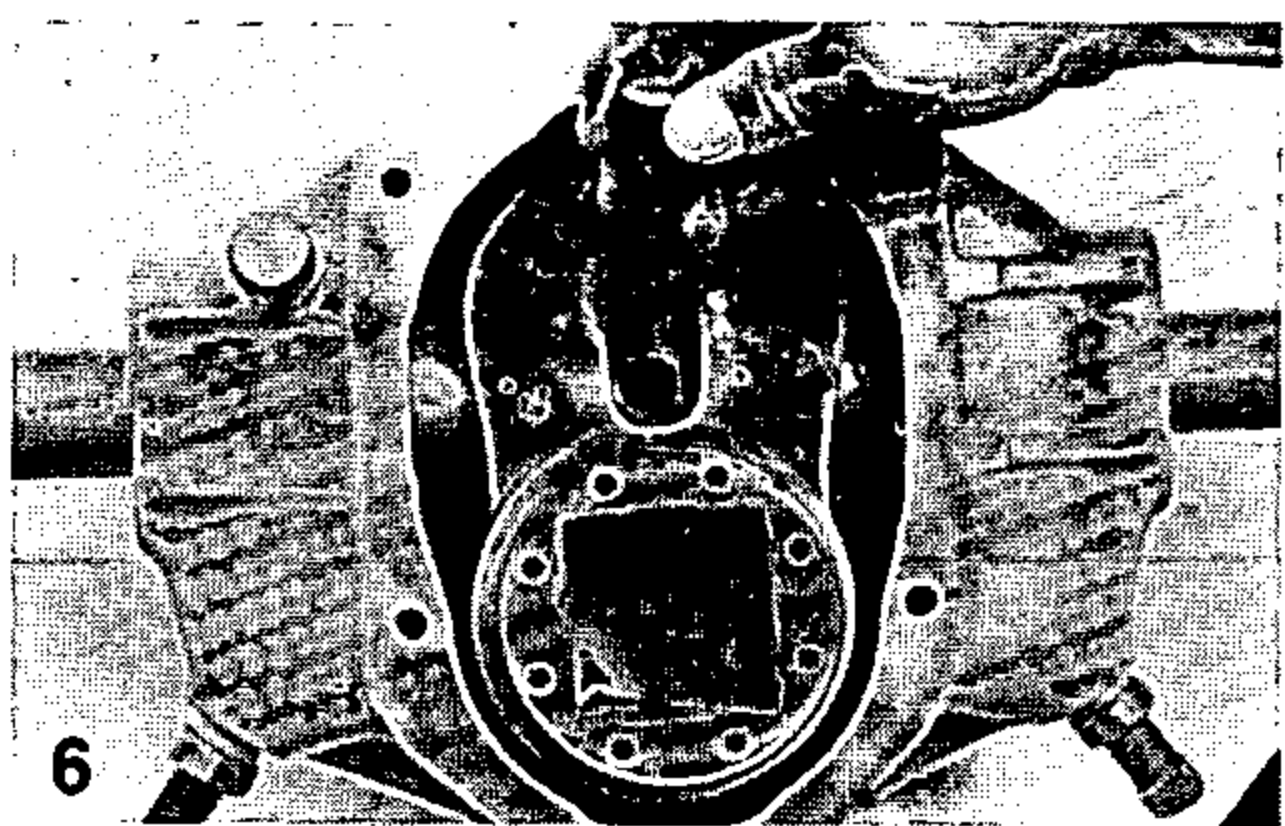
NOTE: For actuators furnished with rod cover group, install the piston rod bushing having two oil grooves (Item 32) on the left hand side. (as shown)



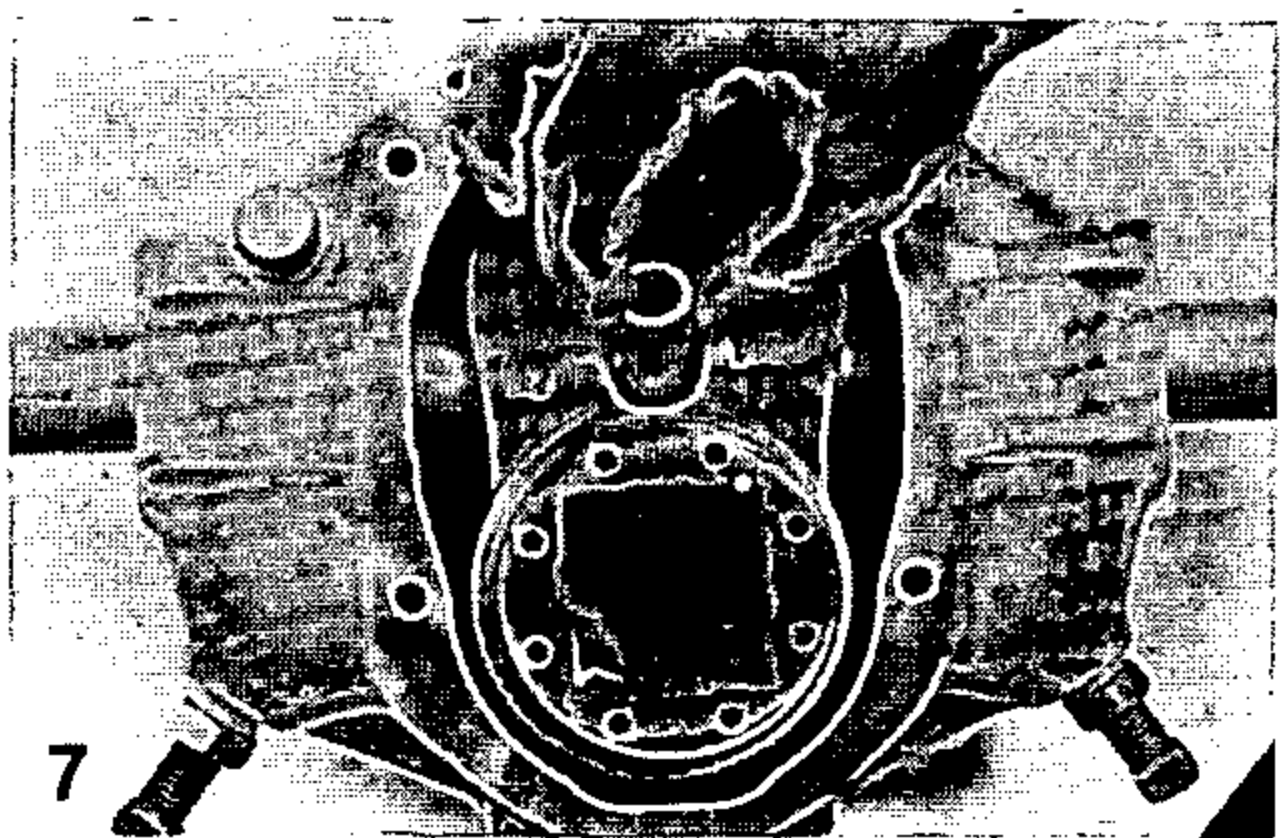
With the yoke rotated to the mid position, install the lower yoke pin roller (Item 5).



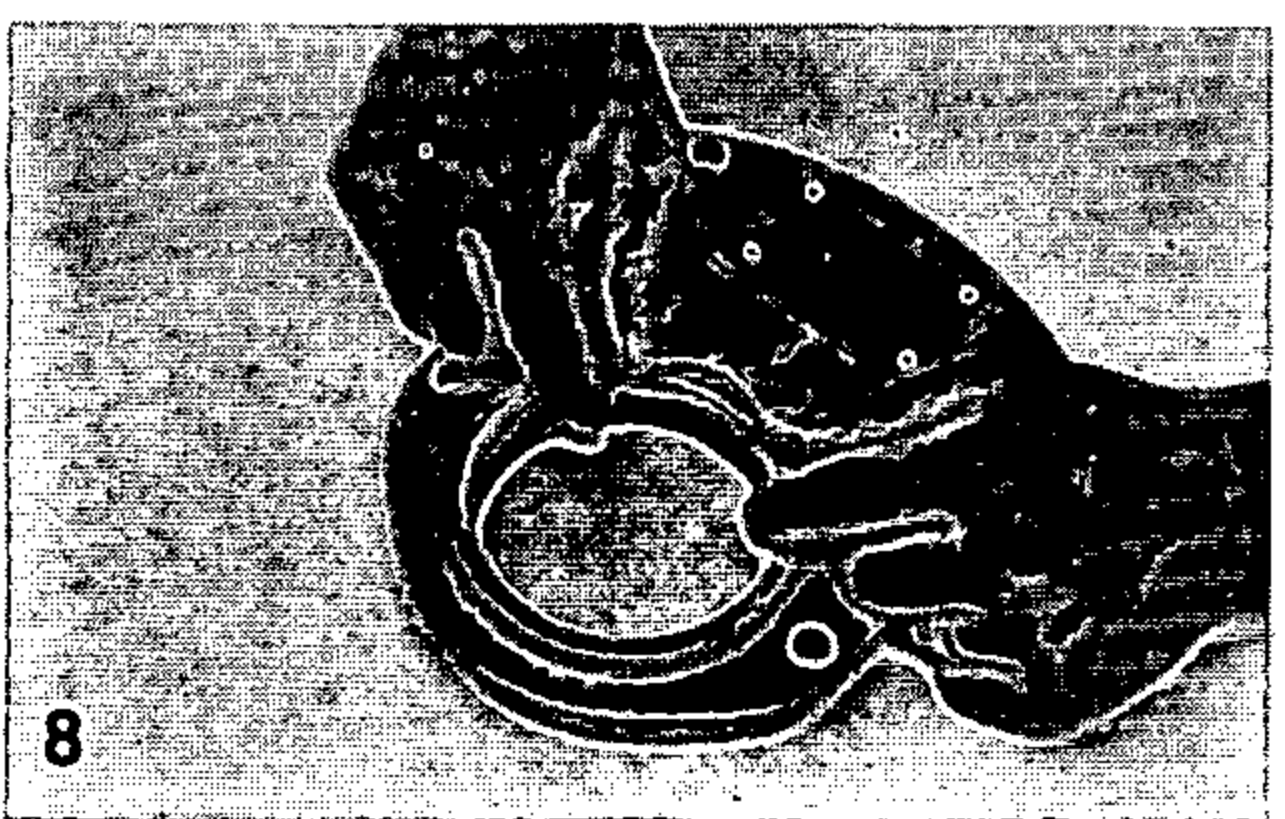
Insert the piston rod (Item 6) through the rod bushings, aligning the hole directly over the lower yoke pin roller and install the yoke pin (Item 4).



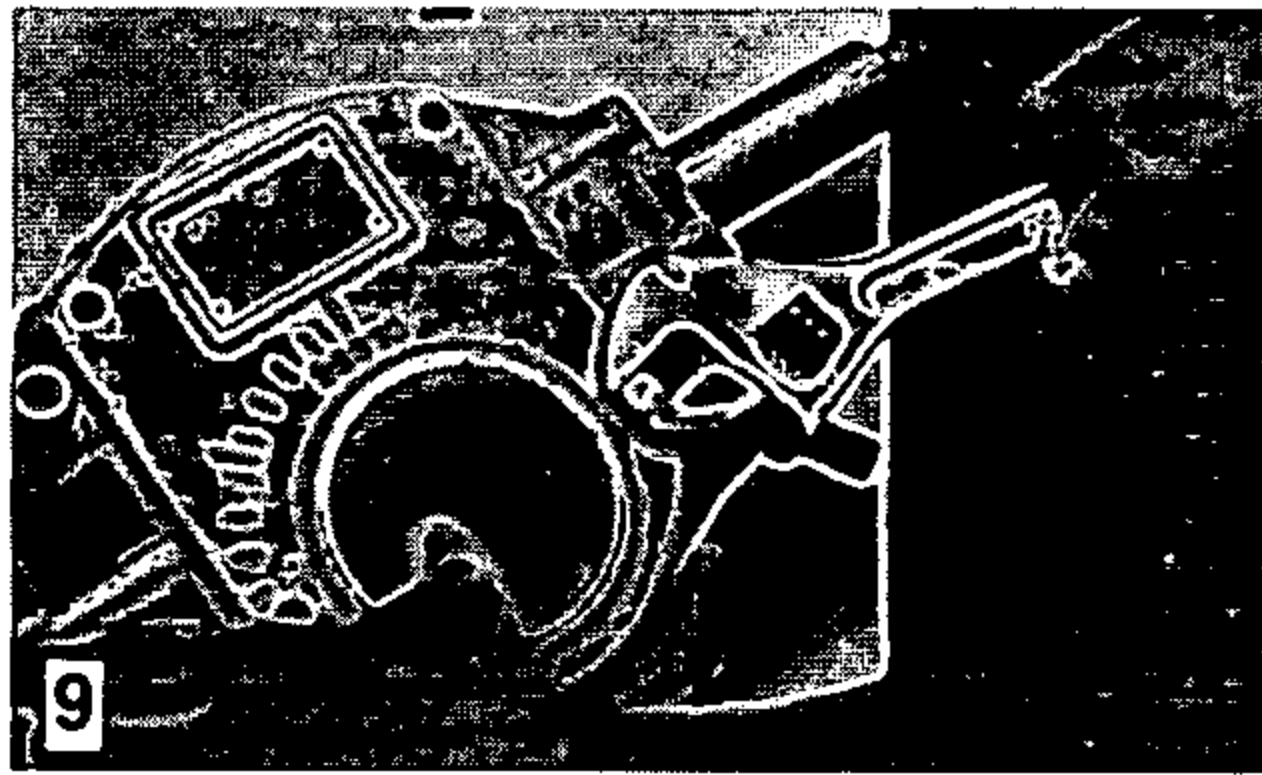
Install the upper yoke pin roller (Item 5).



Install the upper yoke seal (Item 15) in the housing cover with the lip of the seal facing down.

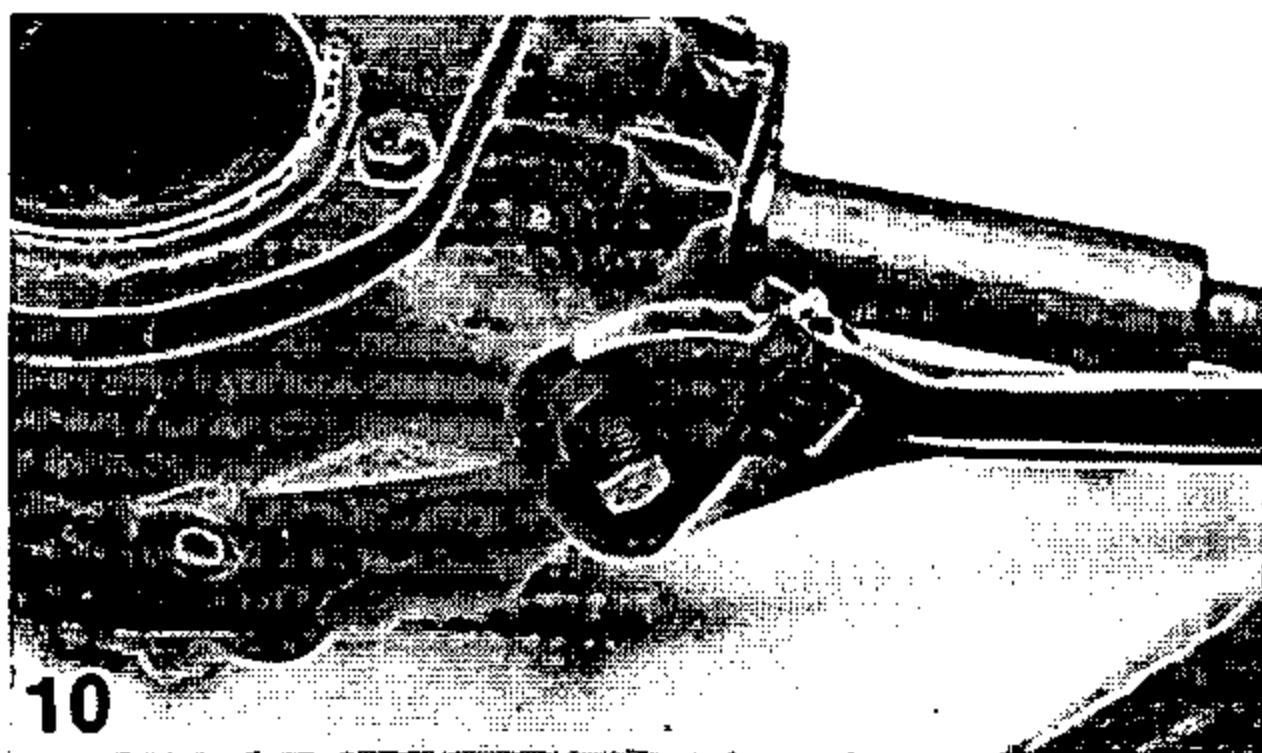


Place the housing cover gasket (Item 18) flush on the housing. Install the housing cover (Item 3) over the yoke, bringing it down flush with the housing. Install the four housing cover bolts (Item 19) and tighten securely.



If not already done, remove the stop adjusting screws (Item 12) and replace the stop screw seals (Item 25).

NOTE: See maintenance and Operating instructions for re-adjusting stops.



Replace drain plug (Item 23) if removed.

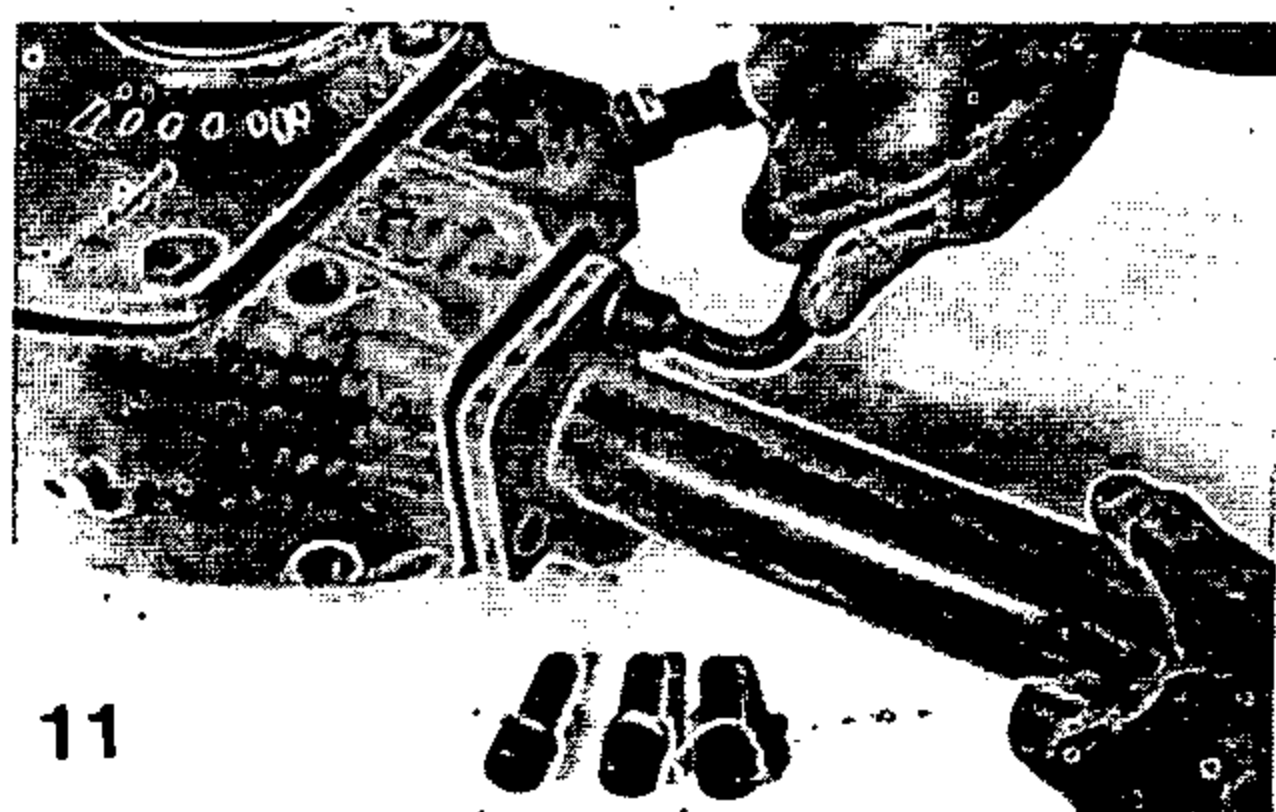
2. RE-ASSEMBLY OF ROD COVER GROUP:

NOTE:

For double acting and spring to open actuators, install the rod cover group on the left side of the body.

For spring to close actuators, install the rod cover group on the right side of the body.

Place the rod cover gasket (Item 20) over the piston rod and piston rod bushing. Slide the rod cover (Item 29) over the piston rod flush with the body and install the rod cover bolts and washers (Items 30 & 24). Tighten securely.



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3. RE-ASSEMBLY OF PRESSURE CYLINDER GROUP

NOTE:

For double acting and spring to open actuators, install the pressure cylinder group on the right side of body.

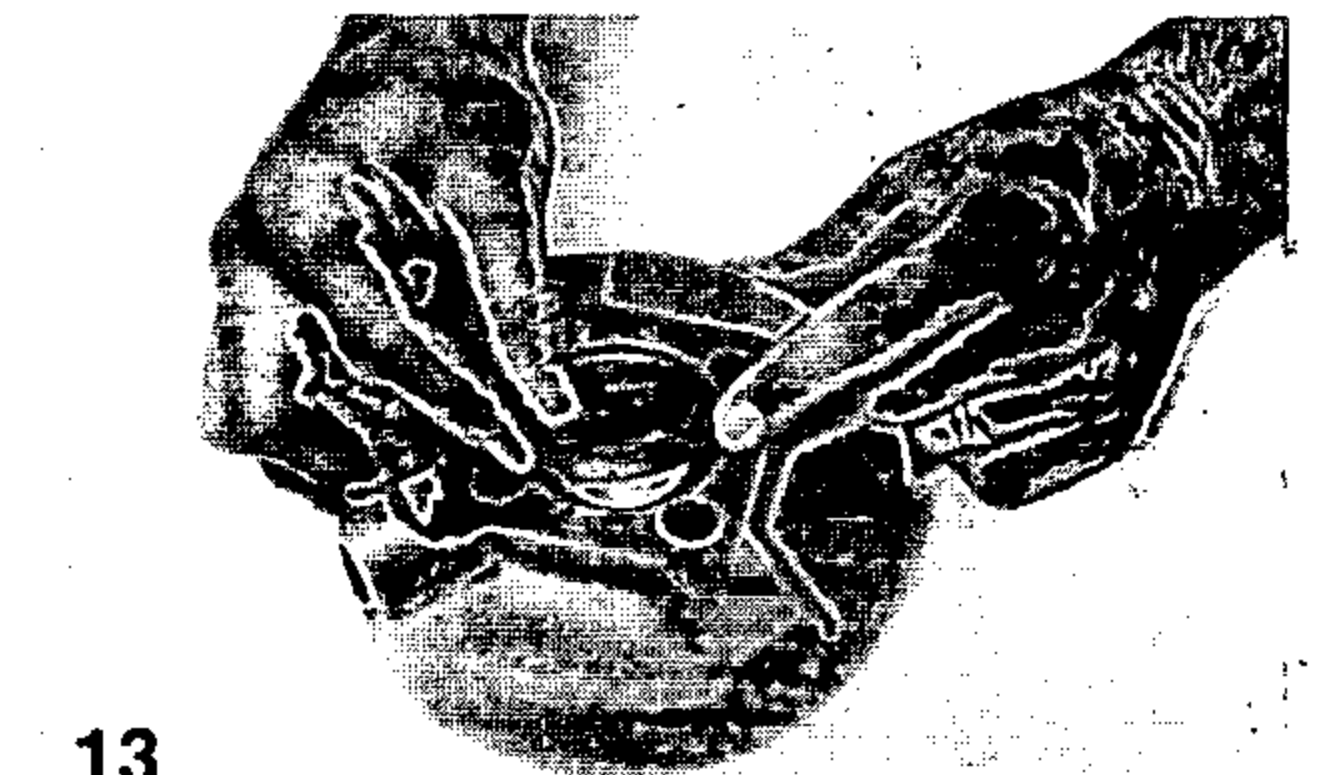
For spring to close actuators, install the pressure cylinder group on the left hand side of the body.

Install the piston rod seal (Item 16) into the seal groove of the cylinder adapter (Item 8).



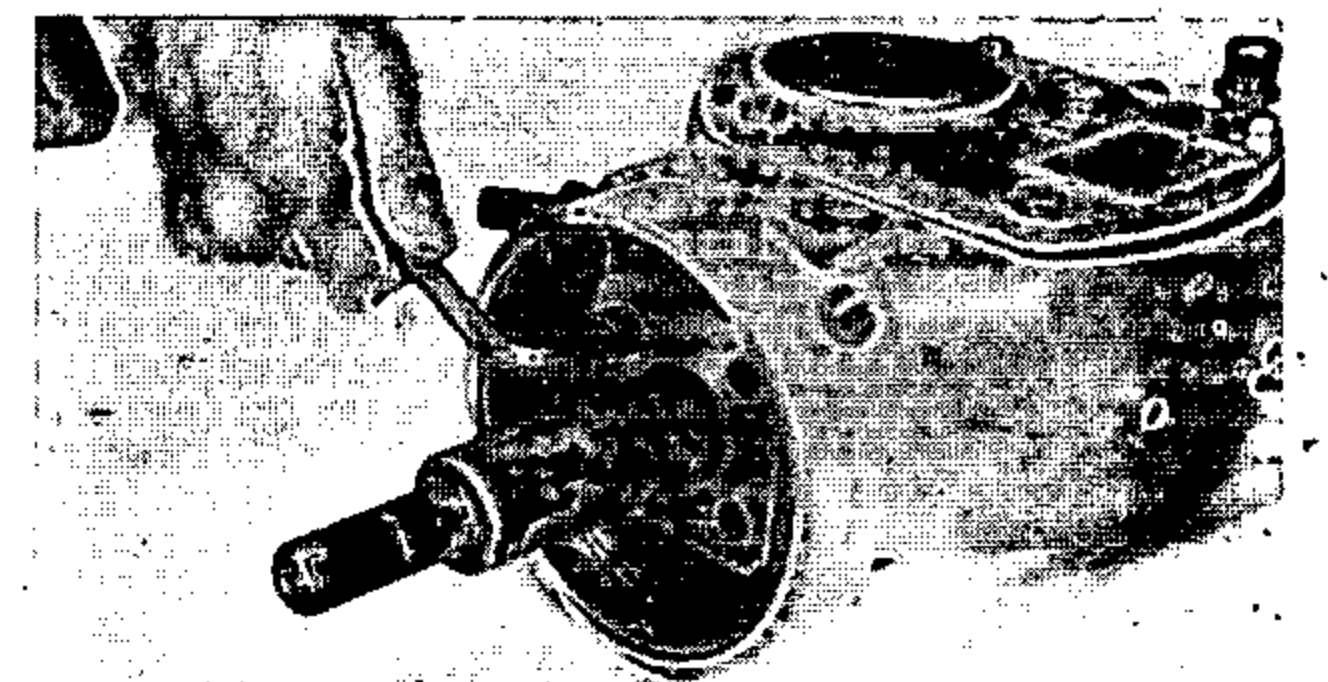
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Next install the piston rod anti-extrusion seal (Item 28) into the cylinder adapter with the lip of the seal facing the seal groove.



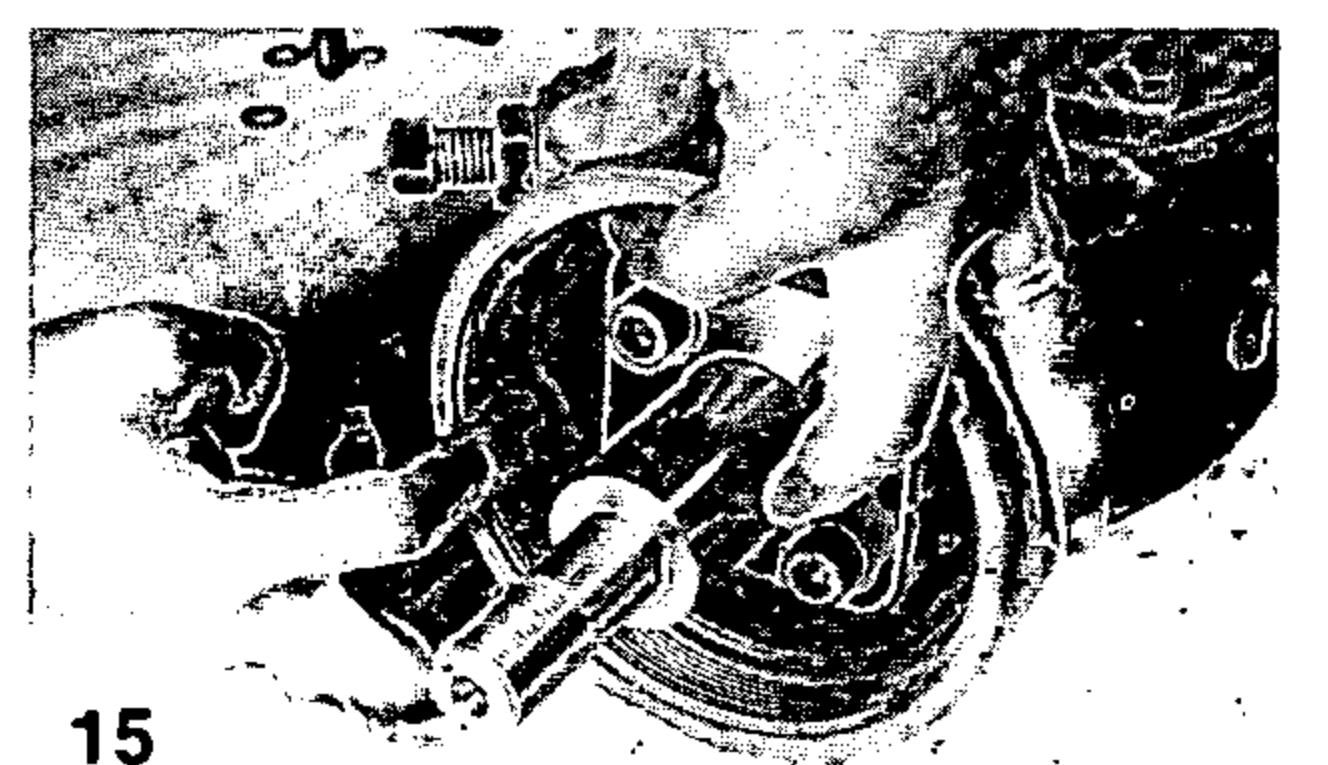
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Place the cylinder adapter gasket (Item 20) over the piston rod and rod bushing. Slide the cylinder adapter over the piston rod flush with the body. Install the cylinder adapter bolts and washer seals (Item 21 & 24). Tighten securely.



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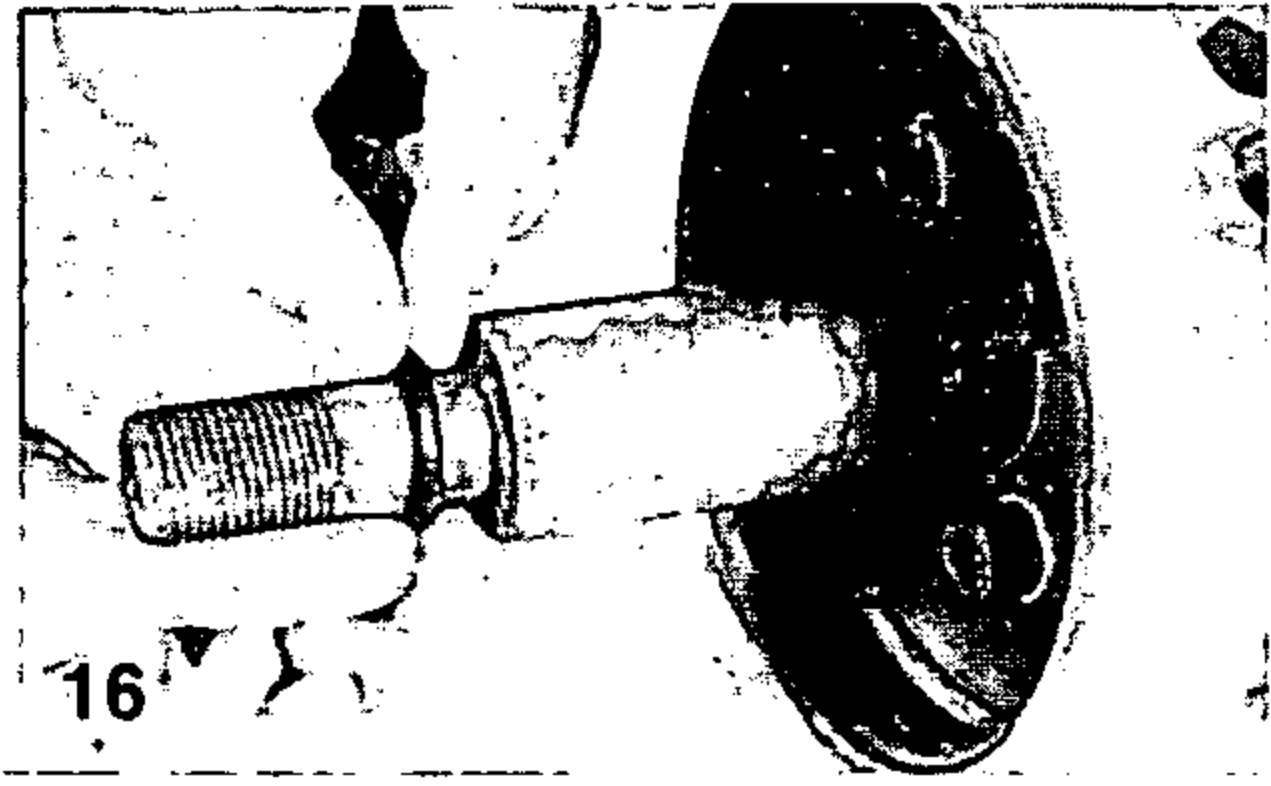
Install the cylinder seal (Item 17) into the machined groove of the cylinder adapter.



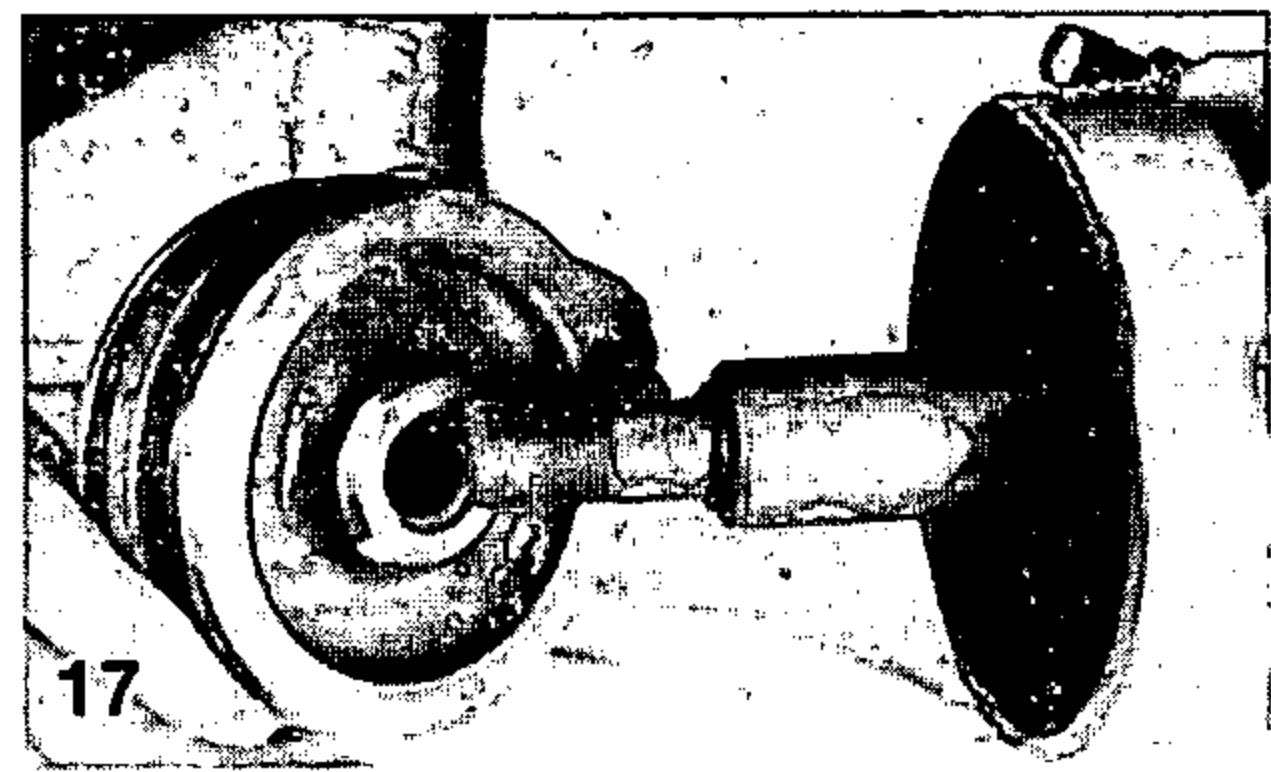
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RE-ASSEMBLY (Continued)

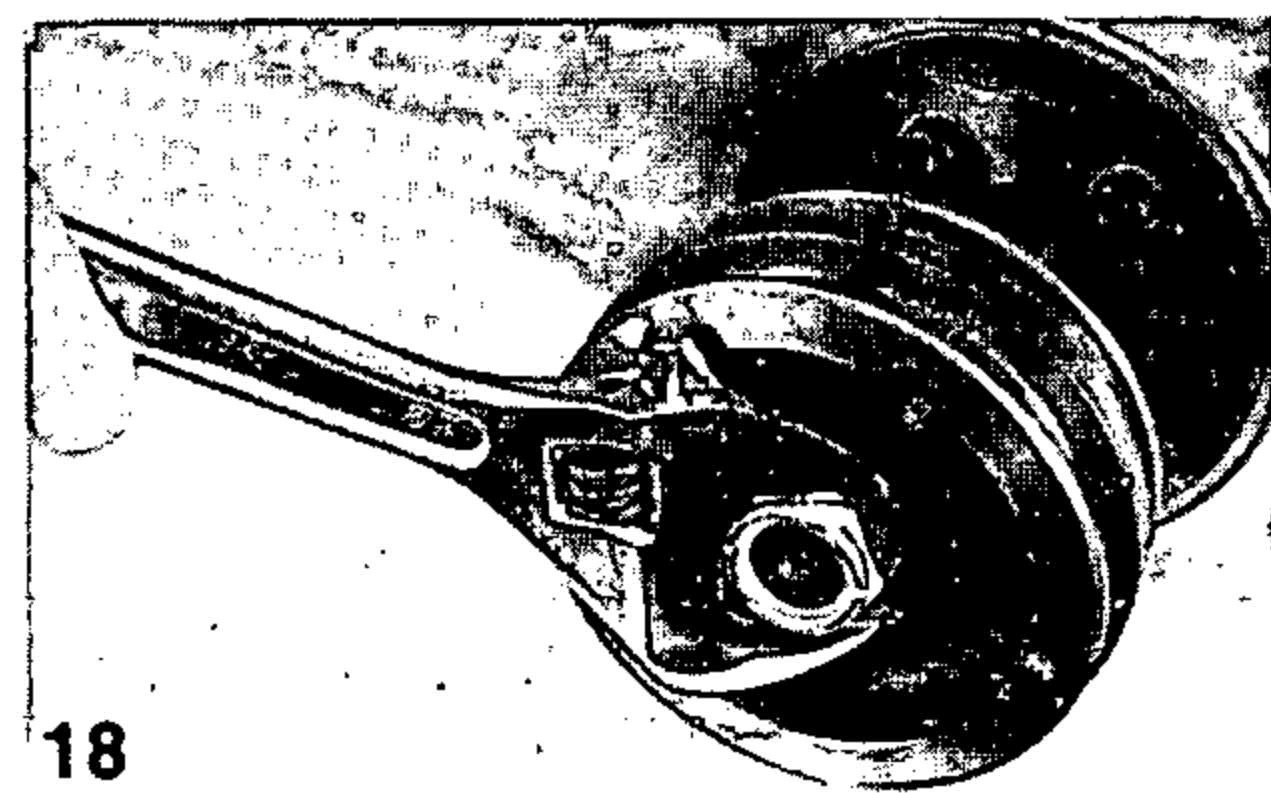
Install the piston head seal (Item 26) over the threaded end of the piston rod.



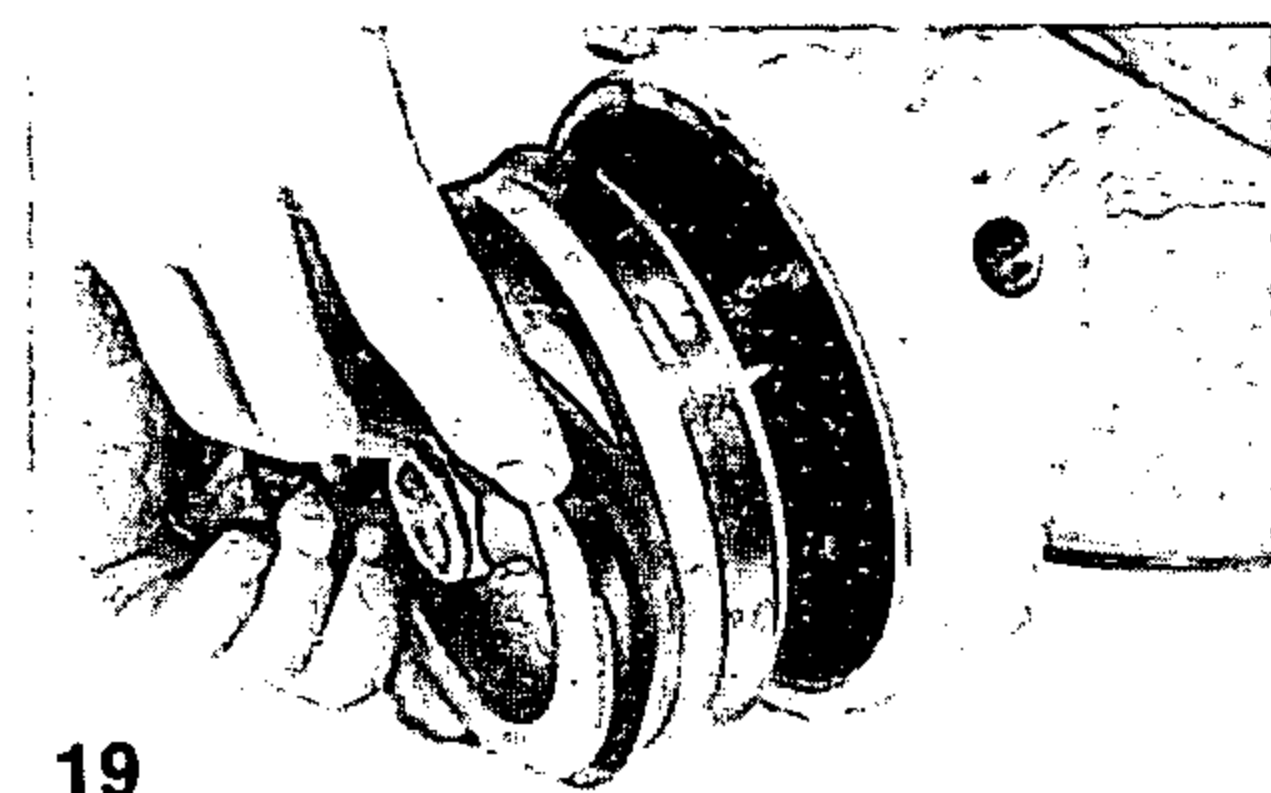
Slide the piston (Item 7) onto the piston rod with the piston head seal groove against the shoulder of the piston rod.



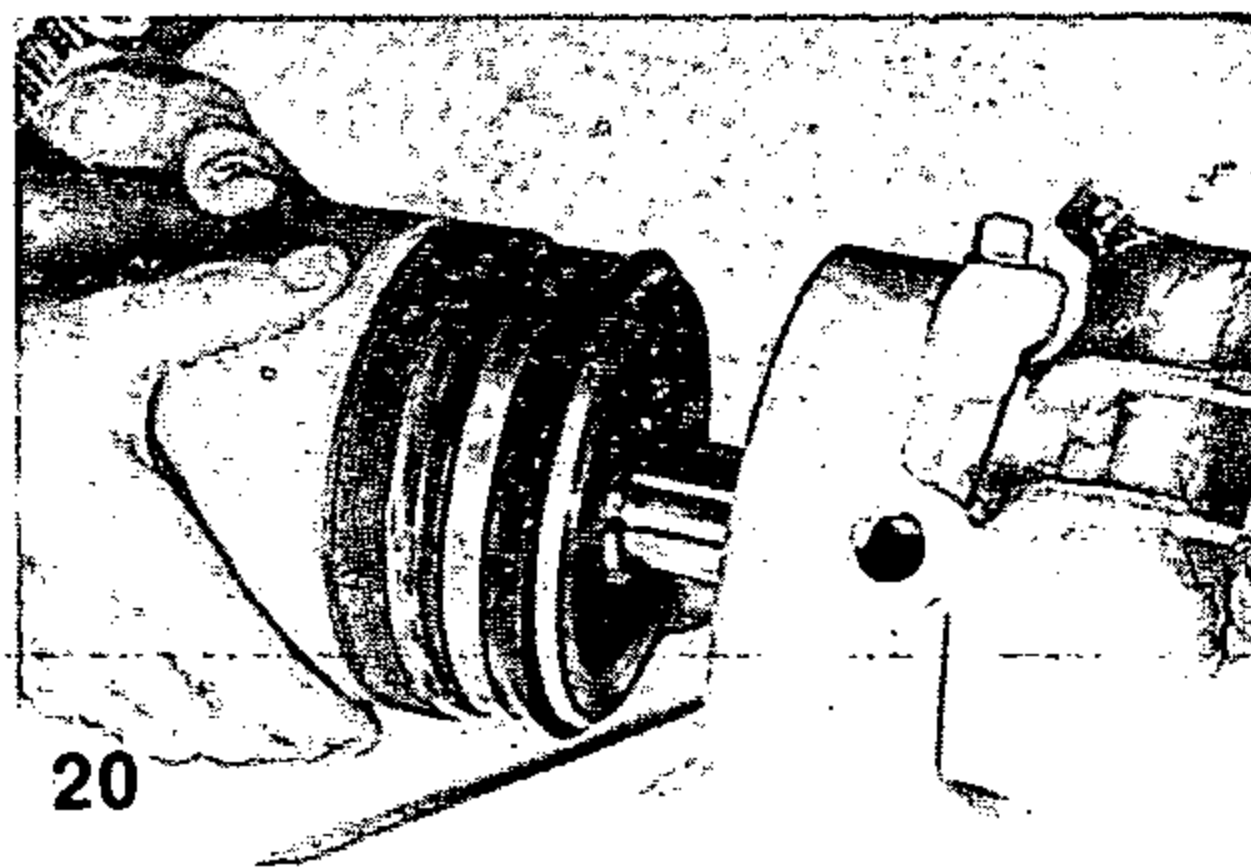
Install the piston nut (Item 11) and tighten securely.



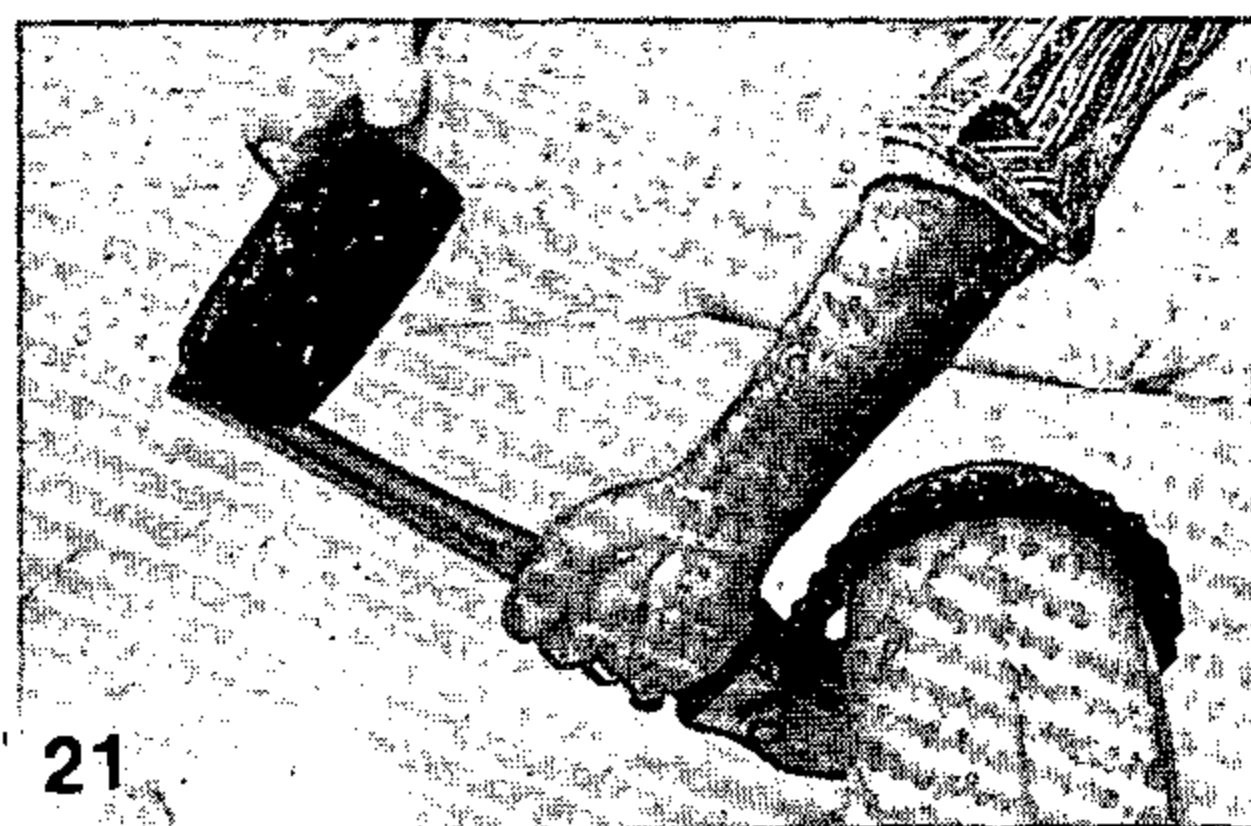
Thoroughly lubricate the two machined piston seal grooves and install the two piston seals (Item 14) taking care that the two seals are installed facing opposite of each other.



Coat the inside of the cylinder (Item 9) with grease and slide over the piston, taking care not to damage the piston seals.



Carefully screw the cylinder into the cylinder adapter, and using the chain wrench, tighten securely.



4. RE-ASSEMBLY OF SPRING GROUP

NOTE:

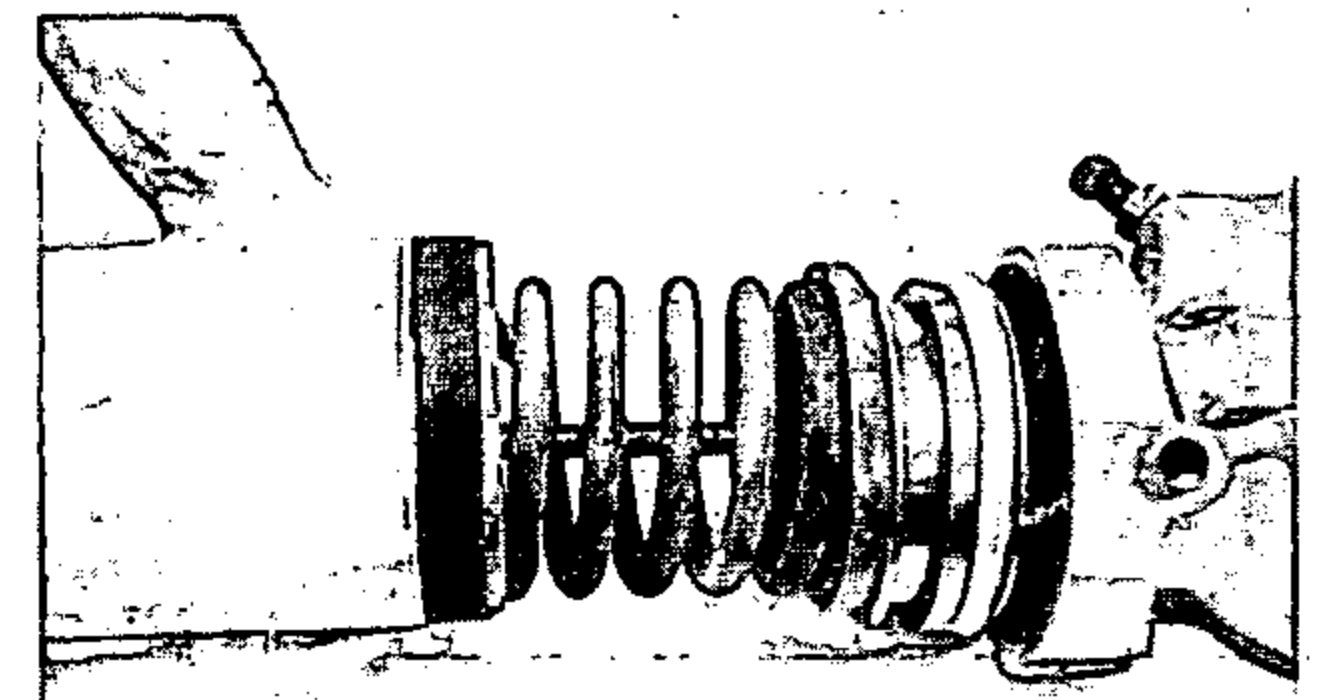
For spring to open actuators, install the spring group on the left side of the body.

For spring to close actuators, install the spring group on the right side of the body.

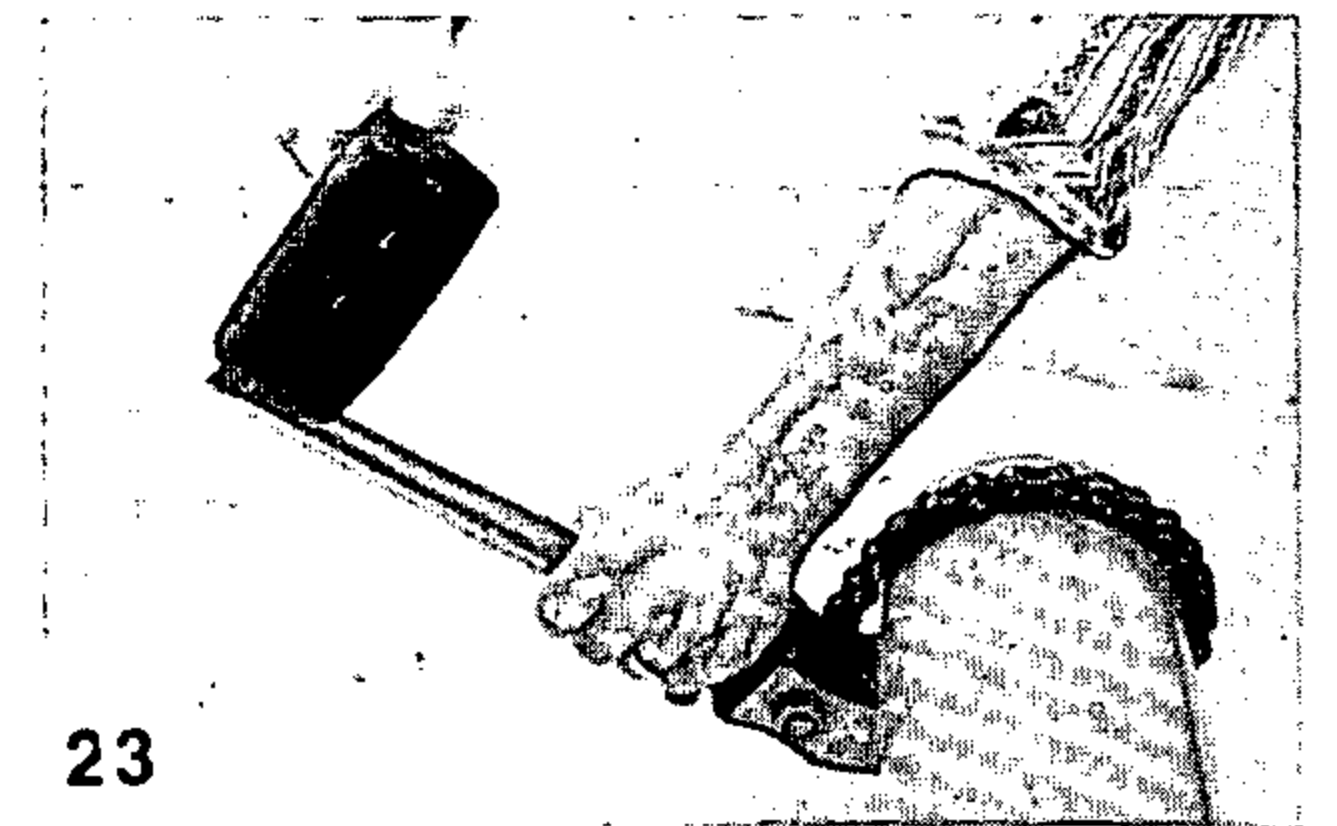
Install the piston rod seal (Item 16) into the seal groove of the cylinder adapter (Item 8).

Coat the inside of the spring cylinder (Item 9) with grease and carefully insert the spring cartridge (Item 31) with the tubular spring retainer against the cylinder end cap.

Next slide the spring cylinder over the piston, taking care not to damage the piston seals.



Carefully screw the cylinder into the cylinder adapter and using the chain wrench tighten securely.



5. RETURN ACTUATOR TO SERVICE

Re-install all tubing and accessories.

Thoroughly check all sealed components for leaks.

Check actuator for smooth operation.

NOTE: See Maintenance and Operating Instructions for start-up procedures.

NOTES:

**EUROPEAN SALES AND MANUFACTURING FACILITIES:
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