

RESTORING DETERIORATED TELEPHONE

LOADING COIL CASES

1. GENERAL

1.01 This section is a cover sheet for the REN Communications Products Practice Manual for Restoring Deteriorated Telephone Loading Coil Cases. GAEL 1909 authorizes the use of this equipment in Pacific Company.

1.02 (Reserved for future use)

1.03 The REN practice provide procedures required to restore and repair all types of metal loading coil cases without removing the coils from service.

1.04 If corrections are required in the manufacturer's instruction, use Form E 3973-1PT as described in Section 000-010-901PT to process the correct information.

2. ORDERING PROCEDURES

2.01 Order REN products direct from the manufacturer:

REN Communications Products
5656 S. Cedar
Lansing, Michigan 48909

2.02 When ordering REN products, use the Purchase Order Form GTP-2, as specified in SI 70, Section 2. Enter Contract No. 78-50 on all orders. Send the blue copy of the Purchase Order as follows:

- For Northern California and Nevada —

RPO
221 W. Winton Avenue, Room 140
Hayward, CA 94544

- For Southern California —

RPO
2420 Yates Avenue, Room 210
Commerce, CA 90040

Note: Additional ordering information is contained in the GTP Catalog.

Attachment:

REN Communications Products a CIBA-GEIGY Corporation, Practice Manual Form 976, 8/77

NOTICE

Not for use or disclosure outside the
Bell System except under written agreement

PRACTICE MANUAL for RESTORING DETERIORATED TELEPHONE LOADING COIL CASES

1. GENERAL

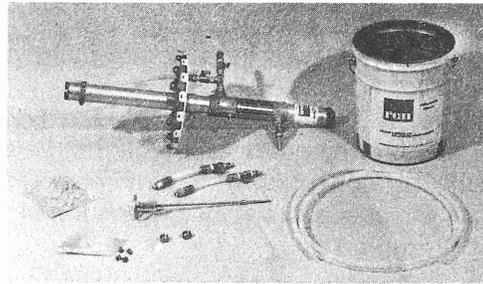
1.01 The information covered within this practice manual describes a technique which permits in-service repair of deteriorated telephone loading coil cases which are leaking air, or those which are experiencing high resistance cable conductor faults.

1.02 The repair technique is applicable to all types of metal loading coil cases. The technique varies only slightly depending upon whether the case is in a vertical or horizontal position.

1.03 The repair is made by pumping REN's RP-6018, a liquid polyurethane compound, into the loading coil case. As the compound fills the case, the leaks in the case shell are sealed and all interior case components are totally encapsulated. The compound cures to a firm, flexible mass in approximately 90 minutes (@ 25°C) thus preventing air loss and moisture damage even though corrosion may continue to attack the exterior metal for several years.

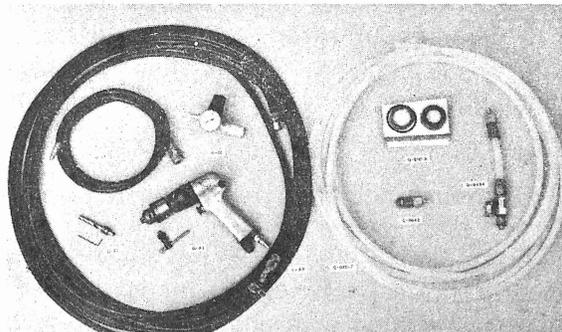
2. G-810-LCR RESTORATION PUMP KIT

2.01 The G-810-LCR Pump Kit consists of: a pump, equipped with air input and fluid output assemblies; an empty 5 gallon cleaning container; a compound mixing assembly; a 1/2" nylon fluid output (injection) hose; No. 4 and No. 5 valve assemblies for attachment to the loading coil case; a riser drain tube; a cleaning rod; a package of metal plugs; and a packaged assortment of nylon locking sleeves (for the special adapter fittings), nylon compression rings (for the nylon hose connection fittings) and pivot washers.



2.02 The pump is a reciprocating 1:1 ratio piston displacement type which is pneumatically powered using dry air or nitrogen. The pump operates from 60 to 125 psi pressure; however, full pressure will not be required unless the compound has thickened as the result of being exposed to temperatures of below 15°C (59°F), or has thickened due to extremely high temperature in which the compound has started to gel prematurely.

2.03 Accessory items available are: a G-30 Mini-Inline Regulator; a G-41 3/8" Air Drill; a G-42 3/8" Drill Bit with Stop; a G-49 25' Quick Change Hose; and a G-51 5' Quick Change Hose. Replacement parts available are: special adapter fittings (G-9642); 1/2" nylon tubing (G-810-7); No. 4, No. 5 injection or vent assembly (G-9644); and pump replacement packing kits (G-810-8).



3. RP-6018 POLYURETHANE COMPOUND

3.01 REN's RP-6018 Compound is a flexible two-component polyurethane. It contains no TDI and exhibits excellent electrical properties, excellent low temperature properties, and good impact resistance. Other outstanding features are:

- (a) Easy mixing and injecting
- (b) Fast gelling
- (c) No stress cracking
- (d) Thermal cycles without deterioration
- (e) Compatibility with all loading coil components

A technical data sheet is available on request.

3.02 RP-6018 Compound is offered in 1 gallon units (A Pkg.) and 5 gallon units (D Pkg.), with each unit consisting of a container of hardener (Part B) and a properly proportioned container of resin (Part A).



3.03 The total amount of compound to be used will depend upon the size of the loading coil case. For example, it will take approximately 12 gallons of compound to fill most 455 pair cases.

3.04 In hot weather, keep the RP-6018 Compound as cool as possible. Do not set the compound in direct sunlight. When pumping in hot weather, shade the pump and container to prevent the compound from becoming viscous or prematurely gelling. In cold weather, maintain the compound at a temperature above 15°C (59°F).

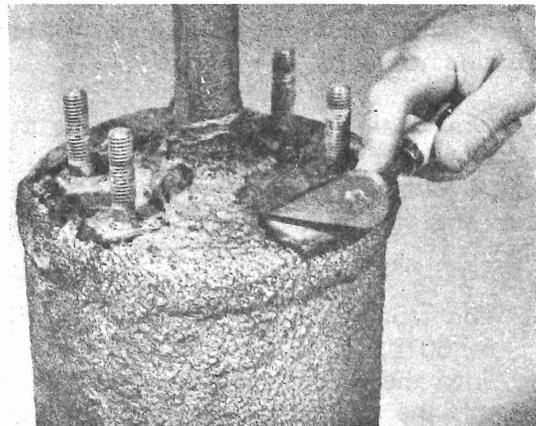
3.05 Although the REN technique for restoring deteriorated loading coil cases is designed to minimize the handling of the RP-6018 Compound, normal safety precautions should be taken when working with any such material. In following good work habits, goggles should be worn and gloves are recommended. Avoid prolonged inhalation of the vapors and wash hands

(or any area of the skin with which the compound comes in contact) using soap and water or REN RP-6021 Hand Cleaner.

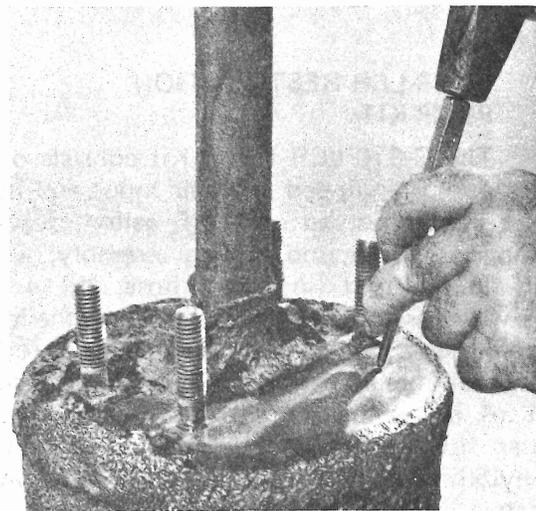
4. PREPARATION PROCEDURES FOR VERTICAL LOADING COIL CASES

4.01 Refer to Figure 2 (Page 8), in addition to the photographs, while following the instructions below.

4.02 Clean the top surface of the case to expose the bare metal in the area where the No. 4 and No. 5 valve assembly holes are to be drilled.



4.03 Make two indentations with a steel punch in the top of the case in the previously cleaned area. Make these indentations 1¼" in from the case edge and spaced a few inches apart.

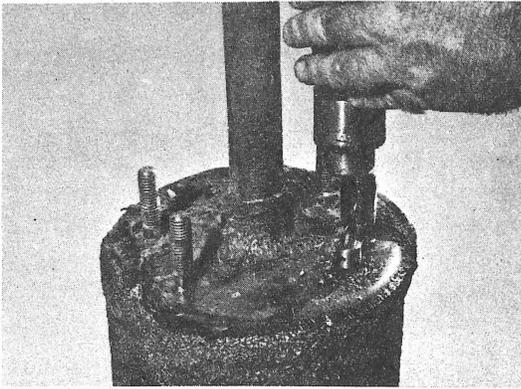


Note: If it is difficult or impossible to work on the top plate of the loading coil case, per-

form these operations on the side of the case, 1¼" down from the top lip. In any case, always make certain the intended vent hole is as high on the case as possible.

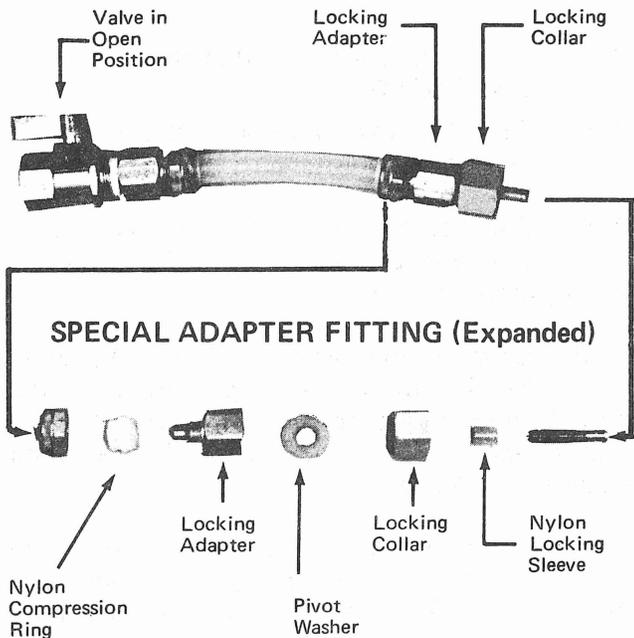
4.04 Prepare the No. 4 and No. 5 valve assemblies by placing them in the "off" position.

4.05 Place two drops of oil in one indentation. Using the G-41 Air Drill and the G-42 Bit (with the bit stop set for a depth of 3/8"), drill through the case housing. Immediately press the end of the special adapter fitting into this hole to a depth of half of the length of the nylon locking sleeve.



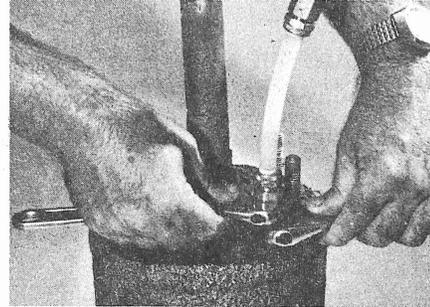
Note: The special adapter fitting is part of the No. 4 and No. 5 valve assemblies (which are identical) and does not need to be threaded into the drilled hole to make a pressure tight seal.

NO. 4 & NO. 5 VALVE ASSEMBLY (Assembled)



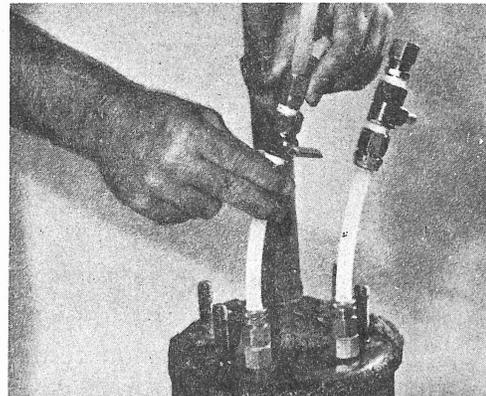
4.06 Secure the fitting in place by holding the locking collar and turning the locking adapter in a clockwise direction by hand until it is tight, then use a wrench to just snug it into position by turning the locking adapter another half turn or so.

Note: Overtightening will cause the nylon locking sleeve to bulge and become loose.

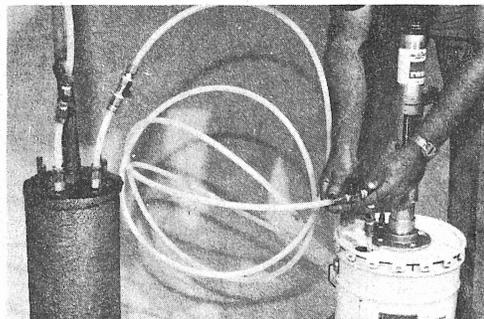


4.07 Repeat steps 4.04 through 4.06 to install the other valve assembly.

4.08 Attach the riser drain tube to the end of the No. 5 vent assembly.



4.09 Attach one end of the ½" nylon fluid output hose to the No. 4 valve assembly, and attach the other end of the hose to the fluid output valve No. 3 on the G-810-LCR Pump. Turn valves No. 2 and No. 3 to a closed position at this time.



4.10 Close valve No. 1 (air input) and attach an air input hose equipped with a pressure regulator (such as the G-30 Mini-Regulator) capable of adjustment between 0 and 100 psi.

4.11 Refer to Sections 6 and 7 for compound mixing and injecting procedures.

5. PREPARATION PROCEDURES FOR HORIZONTAL LOADING COIL CASES

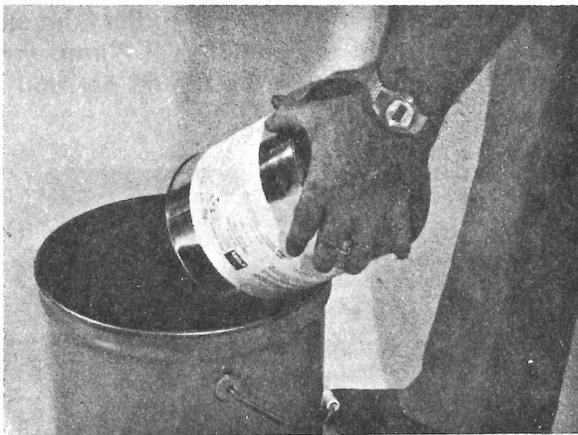
5.01 Block the case up to as level a position as possible. If the case remains slanted, remember to place the No. 5 valve vent assembly at the highest end of the case.

5.02 The two holes will be drilled on the top side of the case 1¼" in from each end. Install the No. 4 and No. 5 valve assemblies as discussed in steps 4.05 through 4.11.

Note: If it is difficult or impossible to place the No. 4 and No. 5 valve assemblies at opposite ends of the case, they may be placed at the same end with the No. 4 valve injection assembly positioned a few inches below the No. 5 valve vent assembly, and both 1¼" in from the case end.

6. MIXING — REN RP-6018 COMPOUND

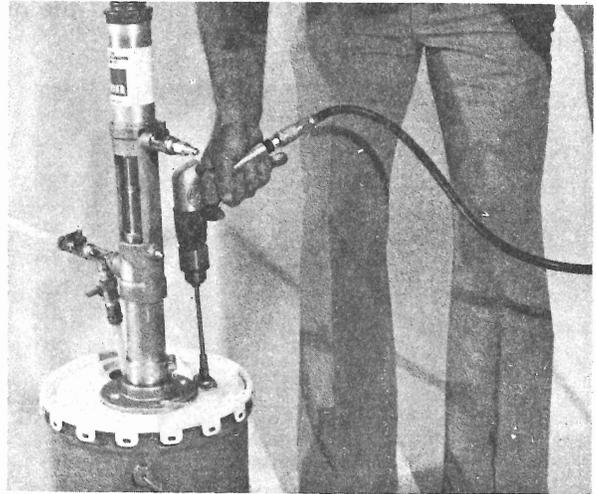
6.01 Pour the smaller container of resin (Part A) into the larger 5 gallon container of RP-6018 hardener (Part B). When gallon units of RP-6018 are being used, pour both resin and hardener into a clean 5 gallon container.



6.02 Place the pump into the 5 gallon container of compound.

6.03 Loosen the fitting which holds the rod of the mixing assembly in place and attach the chuck of the Air Drill to the rod.

6.04 Operate the Air Drill at 90 psi. As the mixing procedure starts, raise and lower the drill to obtain thorough mixing of the compound. Mix for approximately 5 minutes. Check the appearance of the compound after this time to make certain it is without streaks. When mixing is complete, remove the Air Drill from the mixing assembly rod.



Note: The compound will thicken in lower temperatures and its mixing and injecting will be slower. Refer to Section 3.02 for temperature considerations and recommendations.

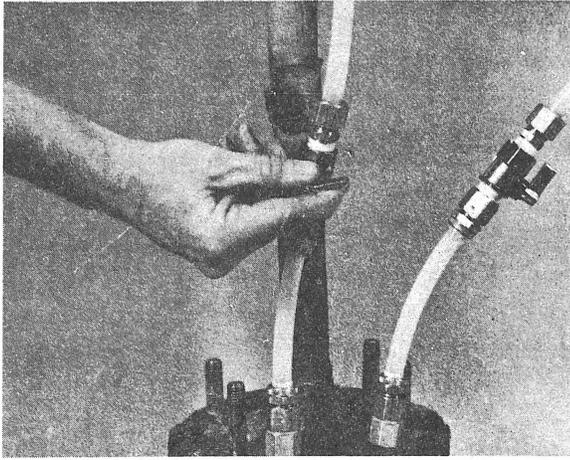
7. INJECTING — REN RP-6018 COMPOUND

7.01 All valves (No. 1 through No. 5) should be closed at this time.

7.02 Connect the air input hose from the air source to the air input valve No. 1 and set the regulator to 60 psi.

7.03 Open air input valve No. 1 and relief valve No. 2 to prime the pump by running compound through the recirculation hose. After a minute, close valve No. 2 and slowly open fluid output valve No. 3.

7.04 To start injecting compound into the loading coil case, first open injection valve No. 4, then crack open vent valve No. 5 slightly to maintain air pressure in the case.

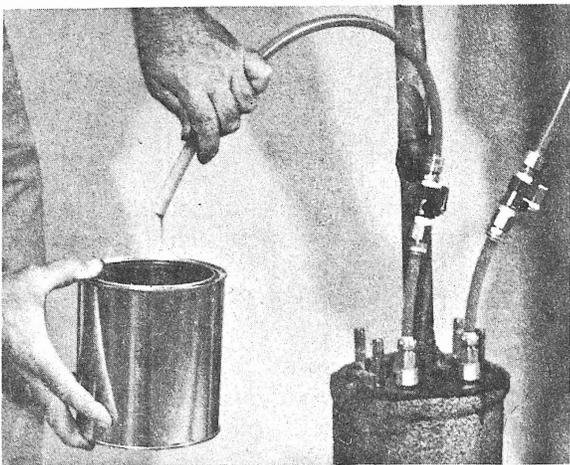


Note: Check all connections for any leakage.

7.05 Gradually increase the regulator pressure to 90 psi to provide increased flow of compound into the case.

7.06 If a second batch of compound is required, close valves No. 1, No. 3, and No. 5, mix the second batch as previously instructed in Section 6, and follow the pumping procedures outlined in steps 7.01 through 7.05.

7.07 When the loading coil case is full (indicated by a free flow of compound from vent valve No. 5 and the riser drain tube), shut off valve No. 5. Let the pump continue to run for two or three strokes after closing valve No. 5 in order to force compound into the stub for about 6" beyond the case.



7.08 Close air input valve No. 1 and injection valve No. 4.

7.09 Open relief valve No. 2 to release the compound back pressure in the fluid output hose, then close fluid output valve No. 3.

7.10 Disconnect the fluid output hose from injection valve No. 4 and place this free end into a container to drain off any retained compound.

7.11 Leave the No. 4 valve injection assembly and the No. 5 valve vent assembly in place on the case for approximately 60 – 120 minutes (depending on the ambient temperature) until the compound gels. This can be checked by cracking the No. 4 or No. 5 valve slightly to see if there is still a compound flow.

7.12 When the compound has gelled, remove the No. 4 valve assembly by tightening the locking adapter of the special adapter fitting with a wrench until the nylon locking sleeve bulges and becomes loose. Pull out the special adapter fitting and insert a metal plug into the hole by tapping it with a hammer. Repeat this step for the removal of the No. 5 valve assembly.



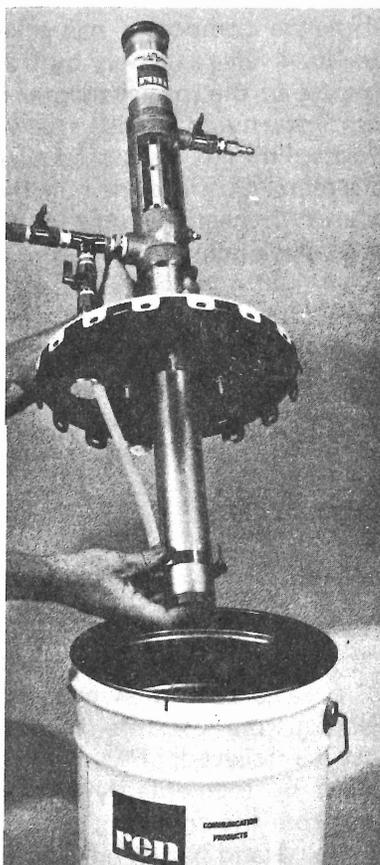
Note: If it is desired to remove the No. 4 and No. 5 valve assemblies immediately after injecting, the pressure within the case must be relieved. This may be accomplished by momentarily removing the F valve from the adjoining splice case while the No. 4 and No. 5 valve assemblies are being removed and by tapping the metal plugs into place.

7.13 Before leaving the job site, coat the metal plugs and the exposed metal areas on the loading coil case with RP-6025 Fast-Weld, REN's all-purpose, fast setting adhesive and protectant.

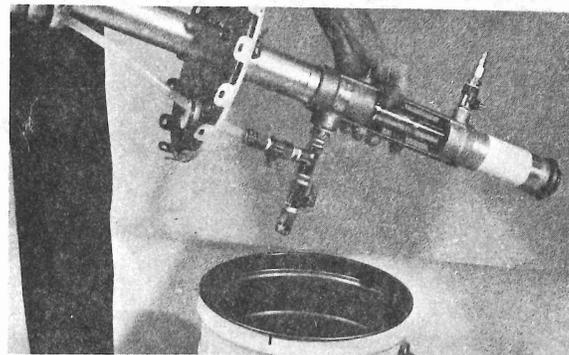


8. CLEANING THE PUMP

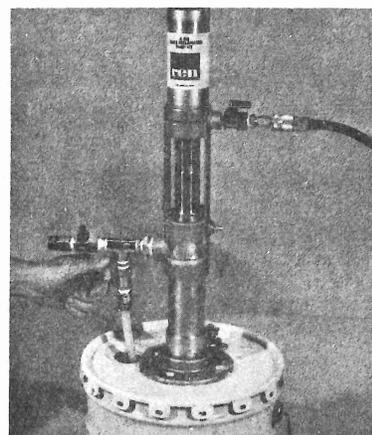
- 8.01 Disconnect the air input hose to the pump.
- 8.02 Disconnect the fluid output hose from valve No. 3 and drain off any remaining compound in it.
- 8.03 With the pump removed from the container, depress the small foot valve located inside the bottom of the pump housing to drain the compound from the lower chamber.



- 8.04 Tip the pump to a horizontal position and drain the remaining compound from the upper chamber through the opened valve No. 3. Properly dispose of any unused RP-6018 Compound.
- 8.05 Fill the empty 5 gallon container that is provided in the kit with approximately 2 gallons of kerosene, mineral spirits, or methylene chloride, then place the pump into this container.
- 8.06 Reconnect the fluid output hose to valve No. 3 and place the other end of the hose into the cleaning container.
- 8.07 Reconnect the air input hose to the pump. Close relief valve No. 2 while leaving fluid output valve No. 3 open.



- 8.08 Set the regulator pressure to about 30 psi, then open air input valve No. 1 and flush the cleaning solvent for two minutes through valve No. 3 and the fluid output hose. Close valve No. 1 after this period of time.
- 8.09 Close fluid output valve No. 3 and remove the fluid output hose from it.
- 8.10 Open relief valve No. 2 and air input valve No. 1 to circulate cleaning solvent for five minutes through valve No. 2 and the recirculation hose.



- 8.11 Disconnect the air source from the pump. Disconnect the recirculation hose from valve No. 2 and remove it from the container. Leave valves No. 2 and No. 3 wide open.
- 8.12 Remove the pump from the cleaning container and again depress the foot valve to drain the solvent from the chamber. Tip the pump to a horizontal position to drain the upper portion through valves No. 2 and No. 3.
- 8.13 Empty the cleaning solvent from the cleaning container. The solvent may be properly disposed of or saved for another cleaning.
- 8.14 Clean the gelled RP-6018 Compound from the No. 4 and No. 5 valve assemblies

with the cleaning rod. Replace the used nylon locking sleeve with a new one in preparation for the next job.

8.15 With a dry cloth, wipe clean the pump, associated attachments, and the cleaning container.

8.16 Coil the fluid output hose and place it in the cleaning container, then place the pump in the packaging carton for proper transportation and storage.

9. PUMP MAINTENANCE

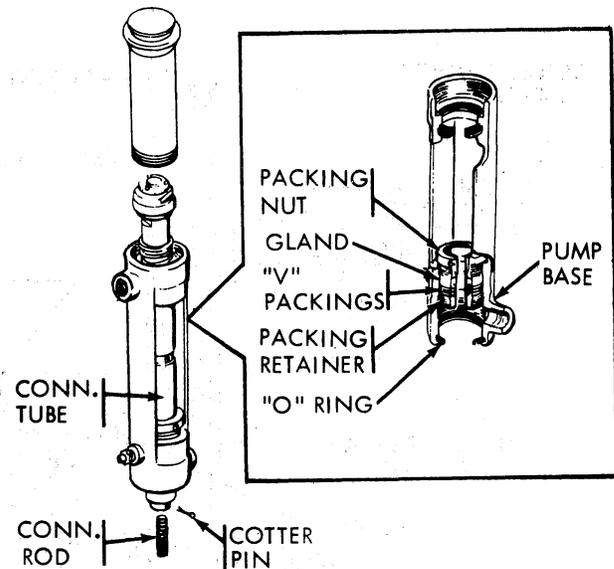
9.01 When using dry nitrogen, periodically place 15 drops of light oil into the air input port where the quick-connect fitting is attached. This provides lubrication for the driving piston, seals and "O" rings.

9.02 Periodically lubricate the ball (grease) fitting.

9.03 Should the leather packings on the pump become worn, order the G-810-8 Pump Replacement Packing Kit and install them in the following manner:

- (a) Remove cotter pin and unscrew connecting rod from connecting tube.
- (b) Remove air cylinder from base, loosen packing nut and carefully pull connecting tube from top of base (see Fig. 1).
- (c) Remove packing retainer from bottom of base.
- (d) Remove packing nut and push bearing gland and packings from bottom of base.
- (e) Clean and inspect all parts for damage or wear. Replace as necessary.
- (f) Soak new leather packings in light oil until flexible.
- (g) Push gland and packings one by one into base and hand tighten packing retainer.
- (h) Install packing nut loosely, lubricate connecting tube and carefully slide it through packings and base.
- (i) Draw up packing nut snugly; **do not overtighten.**
- (j) Reassemble remaining parts, reverse from disassembly.

Figure 1



9.04 After considerable usage of the pump, "weepage" of fluid may drip from hole or tube in bottom of pump base, or such "weepage" may occur at the throat packing nut. This is normal for this type of pump and does not impair the efficiency or the operation of the unit.

9.05 Should the pump stop during a pump cycle, it is possible that the reversing valve in the driving piston chamber is not making contact with the piston. This can be corrected by tightening the screw cap on top of the pump, or by turning the air cylinder further down into the housing. In either case, all that is usually required is approximately an 1/8 to 1/2 turn.

Turn to Page 8 for Figure 2.

Figure 2

