ELEVATOR APPARATUS

PANEL LINE FINDER AND PANEL TRUNK FINDER

PIECE-PART DATA AND REPLACEMENT PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering parts to be used in the maintenance of panel line finder elevator apparatus and panel trunk finder elevator apparatus used with centralized "A" boards. It also covers approved procedures for replacing these parts.

1.02 This section is reissued to omit the procedures covering the repair of brush rods since the information is covered in Section 026-125-821, to revise piece-part data covering the No. 1 compensator, and to amplify the procedures covering multiple brush rod replacement. Detailed reasons for reissue will be found at the end of the section.

1.03 Part 2 of this section covers the piece-part numbers and the corresponding names of the parts which it is practicable to replace in the field in the maintenance of panel line finder and panel trunk finder elevator apparatus. No attempt should be made to replace parts not designated. Part 2 also contains explanatory figures showing the different parts. This information is called Piece-part Data.

1.04 Part 3 of this section covers the approved procedures for the replacement of the parts covered in Part 2. This information is called Replacement Procedures.

1.05 In general, before making replacements of any part of the apparatus covered herein, make busy in the approved manner the associated circuit and the circuits associated with the brush rods which are adjacent to it.

1.06 A brush rod which is worn excessively at the bottom where it rests on the rack shoulder or which is cracked or broken at the rack tongue slot should be repaired in accordance with Section 026-125-821.

2. PIECE-PART DATA

2.01 The figures included in this part show the various piece parts in their proper relation to other parts of the elevator apparatus. The piece-part numbers of the various parts are given together with the names of the parts as listed by the Western Electric Company Merchandise Department. When these names differ from those in general use in the field, the latter names, in some cases, are shown in parentheses.

2.02 When ordering piece parts for replacement purposes, give both the number and name of the piece part. For example, P-173971 Screw. Do not refer to the BSP number or to any information shown in parentheses following the piece-part numbers.

2.03 Information enclosed in parentheses ( ) is not ordering information. It may be references to notes, parts referred to in other portions of the section and not considered replaceable, and where the name in general use in the field differs from the part name assigned by the manufacturer.

2.04 ***Brush Rods:*** Brush rods are coded both with and without multiple and commutator brushes. When a completely assembled rod (including multiple and commutator brushes) is required, order the rod by the code number as shown in the second column of Table A. When an individual item is required, order the item as shown in the table under the proper heading.

TABLE A

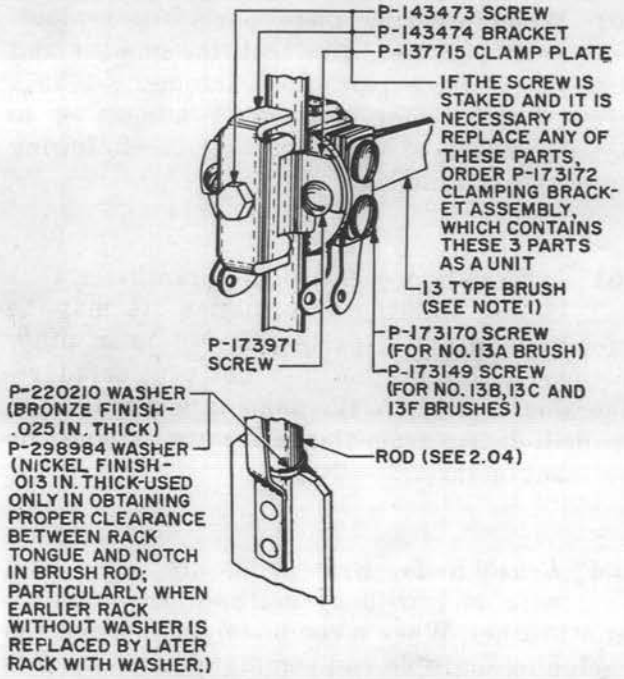
USAGE	CODE NO. OF ROD ASSEMBLED	CODE NO. OF ROD ONLY*	CODE NO. OF BRUSH (MULTIPLE)	CODE NO. OF BRUSH (COMMUTATOR)
Line Finder				
300 Point	1010B**	10A	13F	14A
400 Point	1012B	12A	13F	14A
Trunk Finder				
All	1012B	12A	13F	14A

*Includes stop collars.

**Does not include No. 1A compensator.

2.05 ***Trip Rods:*** The following is a list of rod code numbers (complete assemblies) and corresponding piece-part numbers of the trip rods only (rod without trip fingers, etc).

CODE NO. OF ROD	PIECE-PART NO. OF TRIP ROD	CODE NO. OF ROD	PIECE-PART NO. OF TRIP ROD
4A	P-154391	4G	P-154659
4B	P-154391	4H	P-154659
4C	P-154392	4L	P-160436
4D	P-154392	4M	P-160436
4E	P-154393	4N	P-160435
4F	P-154393	4P	P-160435



NOTE 1: 13 TYPE BRUSHES ARE FURNISHED LESS THE P-173971 SCREWS OR P-173172 CLAMPING BRACKET ASSEMBLY IF SPECIFIED IN ORDER.

Fig. 1 – Brush Parts and Rack Bearing Washer

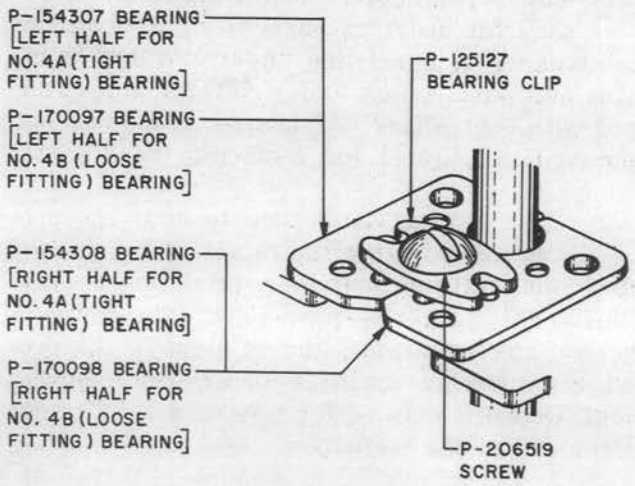


Fig. 2 – 4-type Bearing

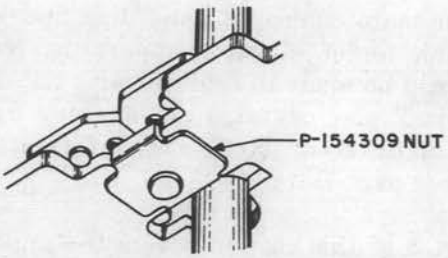


Fig. 3 – 4-type Bearing

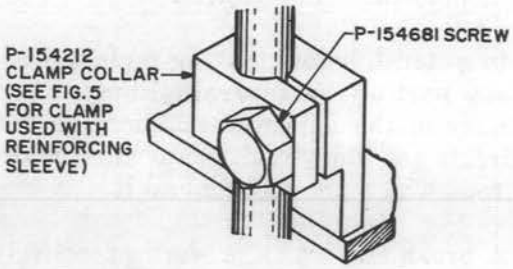


Fig. 4 – Downstop Collar

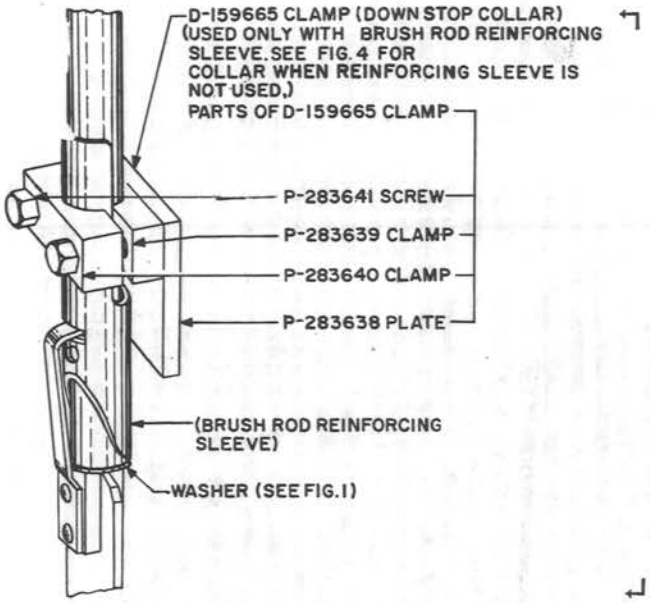


Fig. 5 – Downstop Collar Used With Brush Rod Reinforcing Sleeve

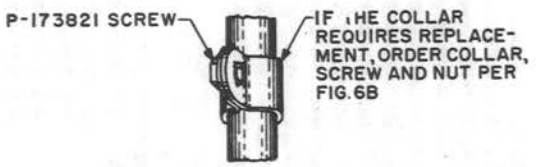


Fig. 6A – Brush Rod Upstop Collar Equipped With Clamping Screw

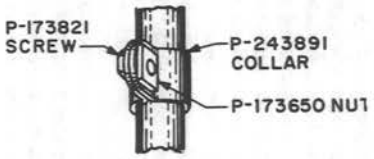


Fig. 6B – Brush Rod Upstop Collar Equipped With Clamping Screw and Nut

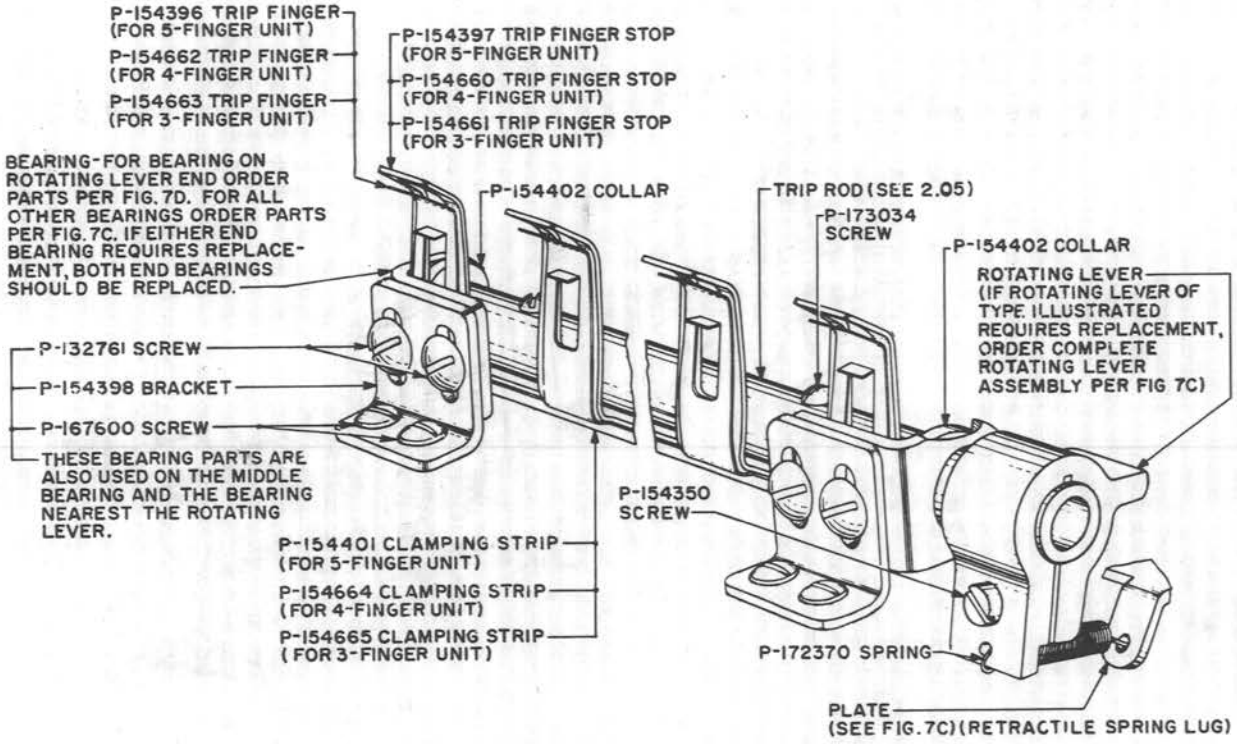


Fig. 7A – Trip Rod With One Collar at Each End of Rod

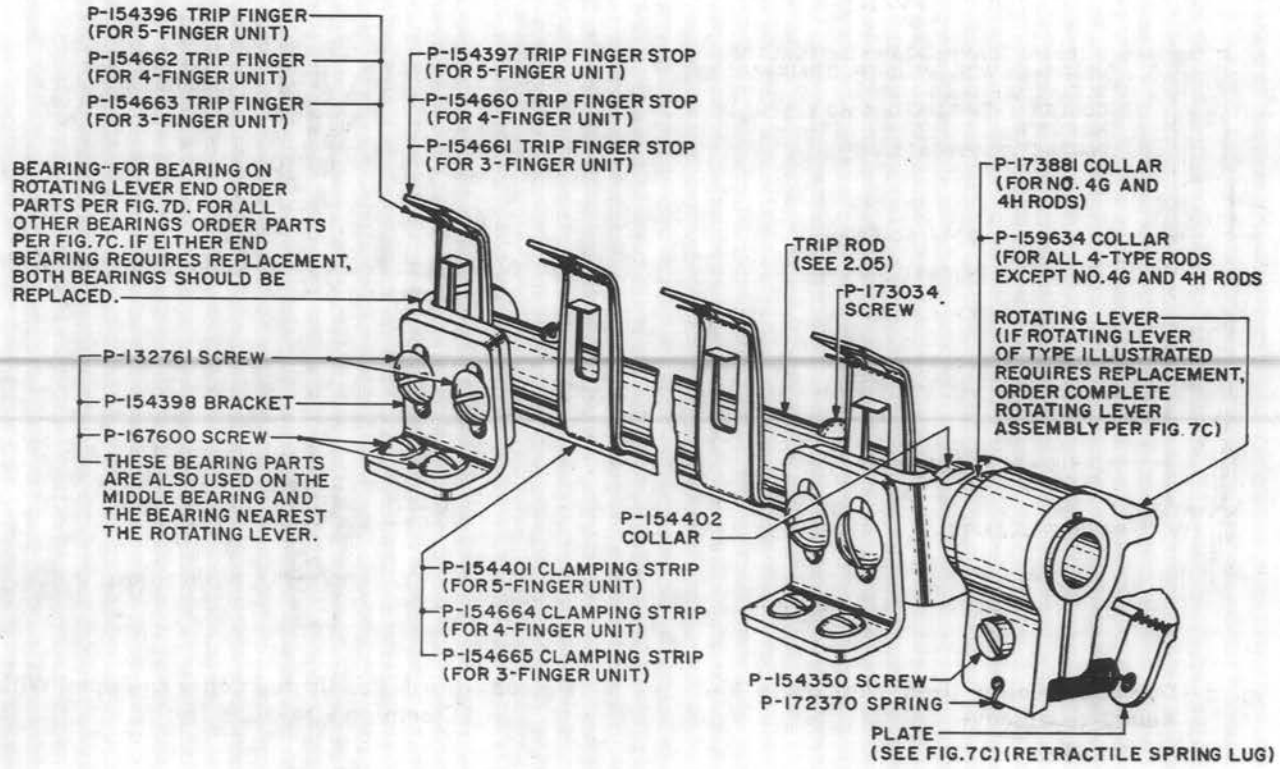


Fig. 7B—Trip Rod With Two Collars at Rotating Lever End of Rod

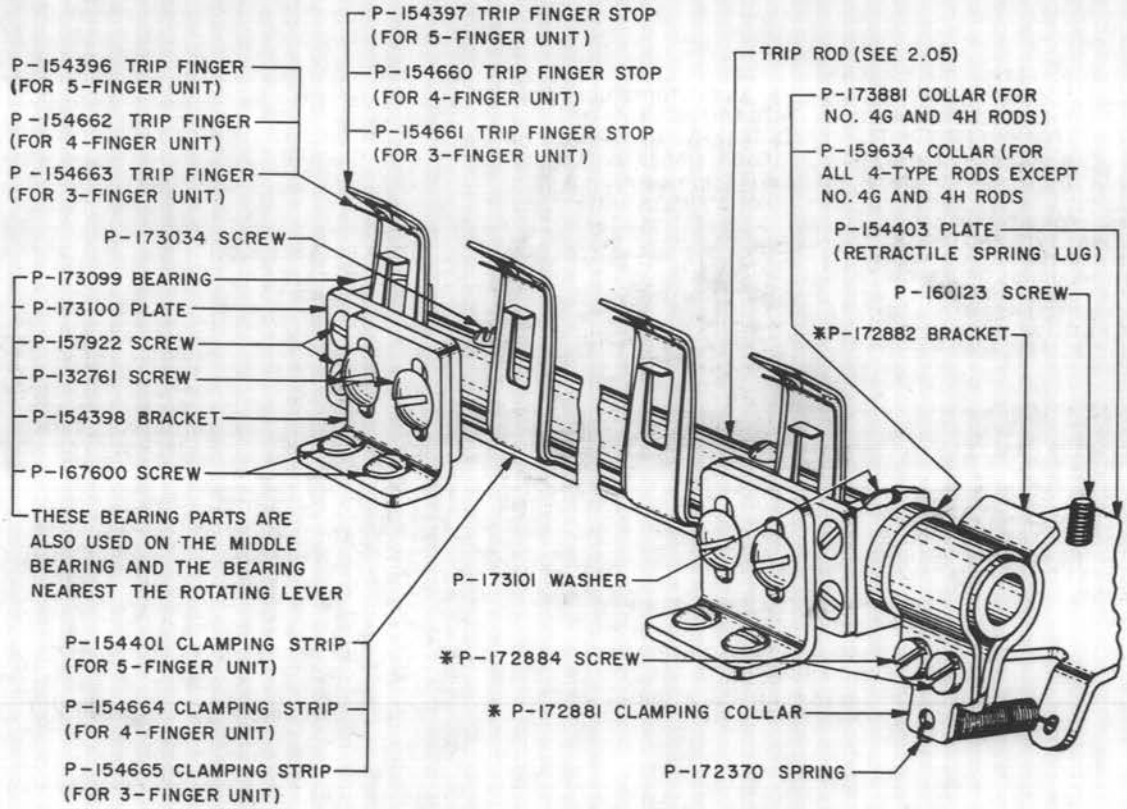


Fig. 7C—Trip Rod With Shim Washer

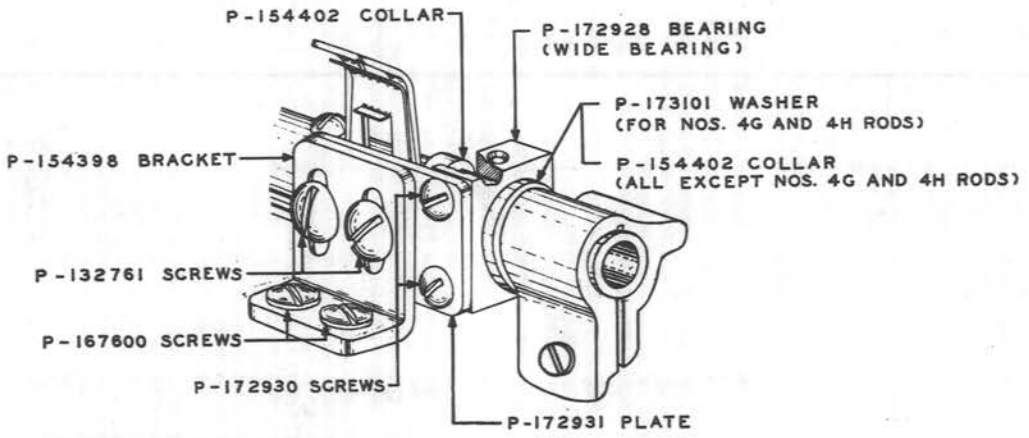


Fig. 7D – Bearing Parts – Rotating Lever End of Earlier-type Trip Rods

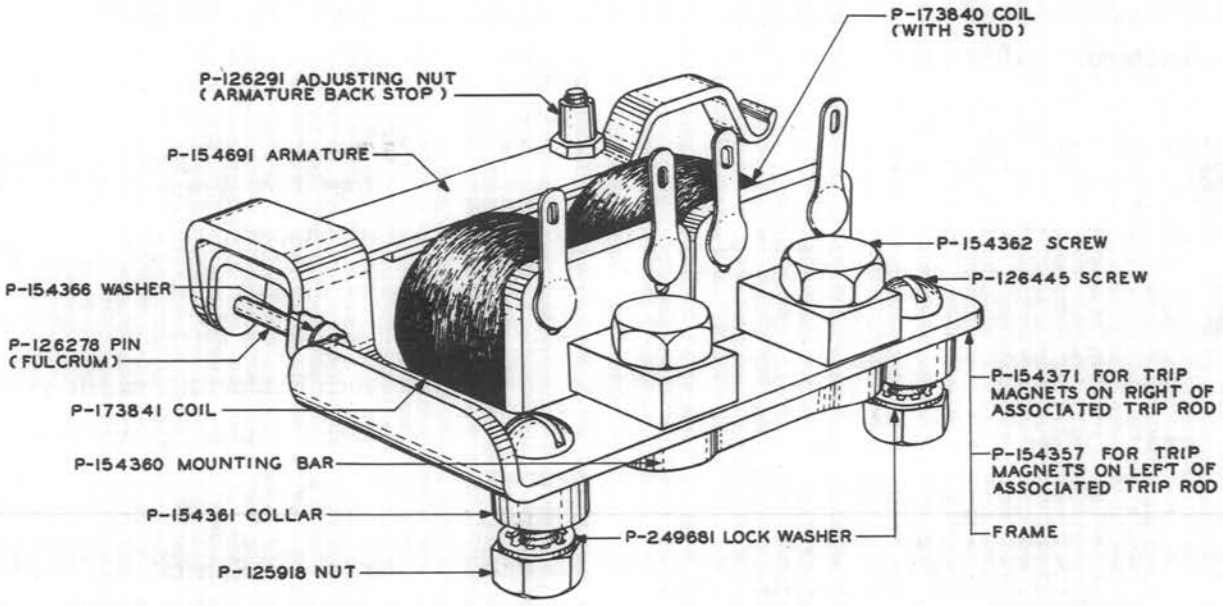


Fig. 8 – 1-type Trip Magnet Parts

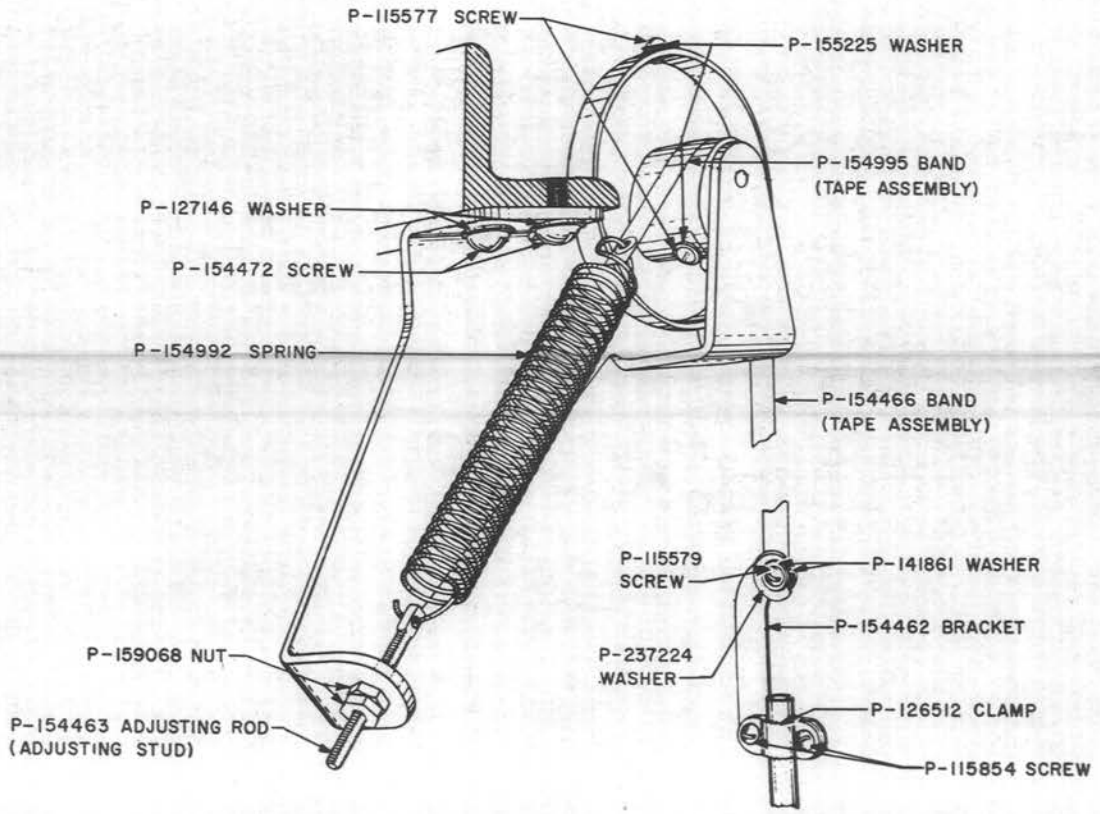


Fig. 9 – No. 1A Compensator

3. REPLACEMENT PROCEDURES

3.01 *List of Tools and Materials*

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
48	7/32-inch and 1/4-inch Hex. Double-end Socket Wrench and Screwdriver
240	Scriber
310B (2 required)	9/32-inch Hex. Open Double-end Offset Wrench
344	Offset Screwdriver
400A	Commutator Brush Spacer
417A	1/4-inch and 3/8-inch Hex. Open Double-end Flat Wrench
555A	3/16-inch Hex. Single-end Socket Wrench
KS-2630	5/16-inch Hex. Offset Socket Wrench
KS-2631	Screwdriver
KS-8097	5/8-inch and 7/16-inch 12-point Offset Box Wrench
KS-14439	Cut Nippers
—	Smooth Cut Flat File
—	P-long-nose Pliers
—	3-inch Cabinet Screwdriver
—	4-inch Regular Screwdriver
MATERIALS	
KS-2423	Cloth
KS-7860	Petroleum Spirits
KS-14666	Cleaning Cloth
—	Canvas (Sufficient to cover all clutches on one side of a frame)
—	Spring Clothespin
—	Toothpicks, Hardwood, flat at one end and pointed at the other

3.02 Before replacing any part covered herein, check whether the replacing part is covered with a protective film of grease. If it is, remove the grease with KS-7860 petroleum spirits and then lubricate the part, if required, as outlined in Section 026-125-703.

3.03 After making any replacement of parts of panel line or trunk finder elevator apparatus, the part or parts replaced shall meet the readjust requirements involved as specified in Sections 026-125-703 and 026-120-701. Other parts whose adjustments may have been disturbed by the replacing operations shall be checked to the readjust requirements and an over-all operation check shall be made of the apparatus before restoring the circuit to service.

3.04 No replacement procedures are specified for screws and other parts where the procedure consists of a simple operation.

BRUSH PARTS

3.05 Raise the associated brush rod so that the brush is about halfway up the bank.

Brush Clamping Screw

3.06 Loosen this screw with the No. 555A wrench. If it is difficult to turn, the indications are that the screw is staked in the clamp plate. In this event, replace the clamping bracket assembly as covered in 3.08. If the screw is not staked, remove it. Substitute the new screw and tighten it securely.

Clamping Bracket

3.07 Remove the brush clamping screw and the clamping bracket. Put the new bracket in place and remount the brush clamping screw.

Clamp Plate

3.08 Loosen the two clamp plate mounting screws with the 3-inch cabinet screwdriver. Raise and remove the clamping bracket assembly. A visual inspection will show whether or not the brush clamping screw is staked. If it is, replace the clamping bracket assembly. If not, remove the brush clamping screw and the clamping bracket and remount them on the new clamp plate. Turn the brush clamping screw out sufficiently to permit remounting the assembly on the brush frame. Remount the clamp plate on the brush frame and tighten the brush clamping screw.

UPSTOP AND DOWNSTOP COLLAR REPLACEMENT

Upstop Collar

3.09 Scribe a mark on the brush rod with the No. 240 scriber at the point where the top edge of the collar comes in contact with it. Remove the round head or hexagon head stop collar screw with the KS-2631 screwdriver or the No. 555A wrench. Spread the two flanges of the collar with the screwdriver blade until a pair of long-nose pliers can be inserted between them. Spread the flanges further apart with the pliers until the collar can be removed freely from the rod. In assembling the new collar on the rod, note that the hole through one flange of the collar is countersunk. When the collar, screw, and nut are assembled, the countersunk hole should be beneath the nut in order to insure proper clamping action. Set the new collar in approximately its correct position as indicated by the mark previously scribed on the brush rod. When properly positioned, securely tighten the clamping screw.

Downstop Collar

3.10 Scribe a mark on the brush rod at the point where the top edge of the collar comes in contact with it. Raise the brush rod part way up the bank and uncouple it from the rack by inserting the blade of the 3-inch cabinet screwdriver between the rack tongue and brush rod as shown in Fig. 10 and turning the screwdriver just enough to disengage the tongue from the brush rod.

Caution: Insert the blade of the screwdriver just below the horizontal portion or lip of the rack tongue so as to affect the tension of the rack tongue as little as possible.

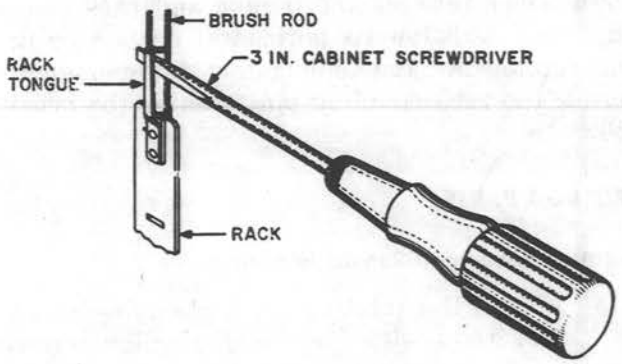


Fig. 10—Method of Uncoupling Rack From Brush Rod

3.11 Lift the brush rod away from the rack with the other hand. The rod now has no means of support so it will be necessary to hold it in place by clamping it with a spring clothespin just above a bearing plate as shown in Fig. 11.

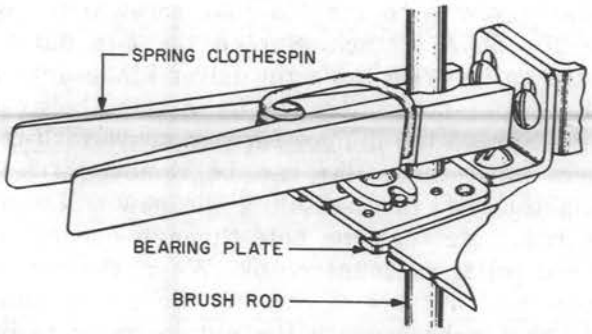


Fig. 11 – Method of Placing Spring Clothespin

3.12 Loosen the downstop collar screw or screws with the KS-2630 wrench or the No. 555A wrench, as required, and push the downstop collar off the bottom end of the rod. Replace the old collar with a new one, setting it in the correct position by the mark previously scribed on the brush rod.

3.13 When a downstop collar is mounted on a brush rod reinforcing sleeve and the sleeve is not soldered to the brush rod, make sure when mounting the new downstop collar that the sleeve is positioned so that the top of the slot lines up with the top of the slot in the brush rod as shown in Fig. 5.

3.14 Couple the rack to the brush rod by inserting the blade of the 3-inch cabinet screwdriver between the tongue and rack coupling pin just below its horizontal portion or lip and forcing out the tongue just far enough to permit the rack coupling pin to enter the brush rod.

TRIP ROD PARTS

Rotating Lever and Retractile Spring

3.15 Loosen the rotating lever clamping screw or screws with the 4-inch regular screwdriver and turn the rotating lever so that the tension is removed from the retractile spring. Uncouple the end of the spring where it loops around the retractile spring lug. A toothpick, inserted between the spring and the surface of the lug nearest the center of the frame and used as a pry, will assist in the removal of the spring without distorting it.

3.16 Remove the rotating lever from the end of the trip rod. If necessary, loosen the screws holding the trip magnet to the frame angle as covered in 3.22 so that the trip magnet may be raised to permit the removal of the rotating lever from the rod. Remove the other end of the spring from the rotating lever with the long-nose pliers exercising care not to distort the spring.

3.17 Place the rotating lever in its proper position on the rod and tighten the mounting screw with the 4-inch regular screwdriver. If the trip rod rotating lever retractile spring is defective, replace it with a new one. Mount the retractile spring on the lug so that the end of the loop passes through the hole in the lug of the plate from the front. Connect the retractile spring to the rotating lever so that the spring assumes a position similar to that of the springs on other levers. Make sure that when the spring is finally positioned, the end connected to the lug hooks over the outside edge of the lug at either side, but not at the bottom. Tighten the trip magnet screws which were loosened.

Bearings and Collars

3.18 Remove the rotating lever as covered in 3.15 and 3.16. Remove the bearing mounting screws with the 3-inch cabinet screwdriver. If a bearing other than either end bearing requires replacement, remove the trip rod assembly, the trip fingers, and associated parts as covered in 3.20. On earlier-type rods where one end bearing requires replacement, replace the other bearing as well. Also on earlier-type rods, on 0 banks when the bearing to be replaced is adjacent to the rotating lever and at the left side of the frame, check the clearance between the bearing and the frame of the adjacent brush. If interference is noted, file a small portion off the top rear corner of the bearing using the smooth cut flat file. Make the necessary substitutions of parts and reassemble all parts in their proper positions.

Trip Rod, Trip Finger Clamping Strip, Trip Finger, and Trip Finger Stop

3.19 Remove the rotating lever as covered in 3.15 and 3.16. Remove the middle bearing and the bearing on the rotating lever end of the trip rod as covered in 3.18. Move the trip rod assembly away from the bearing on the end opposite the rotating lever after which the trip rod assembly can be removed.

3.20 With the 3-inch cabinet screwdriver, remove the screws which fasten the trip fingers and associated parts to the trip rod. Replace the necessary parts and reassemble all parts in their proper positions.

Plate

3.21 To remove the plate to which the rotating lever retractile springs are attached, disengage the retractile springs as covered in 3.15. Remove the plate mounting screw with the KS-8097 wrench.

TRIP MAGNET PARTS

Trip Magnet Mounting Screws and Collars

3.22 Remove the mounting screws, collars, and hexagon nuts which mount the trip magnet on the frame with the No. 344 offset screwdriver and the No. 417A wrench. Substitute the new parts, placing them in their proper positions and tighten the nuts securely.

Mounting Bar

3.23 If the mounting bar is mounted underneath the frame and the core mounting screw heads rest on the magnet cores, remove these screws with the KS-8097 wrench. This will release the mounting bar. If the mounting bar is mounted on the upper side of the magnet cores and the heads of the screws are on the under side of the frame, remove the trip magnet mounting screws as covered in 3.22 and remove the trip magnet. Then remove the core mounting screws. In remounting the bar, always make sure that the mounting bar is placed beneath the frame with the screw heads on top. This will facilitate the adjustment and replacement of these parts in the future.

Armature Back Stop

3.24 Remove the armature back stop with the No. 48 wrench and substitute the new part.

Coils

3.25 Unsolder the wires from the terminals of the coils. Remove the trip magnet mounting screws as covered in 3.22 and remove the trip magnet. Then, as covered in 3.23, remove the core mounting screw which mounts the coil which is to be replaced. If the coil is the one further from the fulcrum, also remove the armature back stop with the No. 48 wrench. Substitute the new part, remount the trip magnet, and resolder the wires.

Fulcrum Pin, Armature, and Washers

3.26 Clip the fulcrum pin at the end furthest from the trip magnet mounting screws with the cutting edges of the KS-14439 cut nippers. Withdraw the pin with the long-nose pliers, shaping the cut end of the pin with these pliers, if necessary, to insure its easy removal. Exercise care to prevent the loss of the spacing washers which hold the armature from the frame. After the fulcrum pin has been removed, remove the armature back stop with the No. 48 wrench if it is necessary to remove the armature. Substitute the new armature and remount the armature back stop. Insert a sufficient number of spacing washers between each side of the armature and the frame to limit the side play of the armature without causing bind between the parts. Insert a new fulcrum pin from the side of the frame nearer the trip magnet mounting screws. Position the cut nippers on the unformed end of the pin approximately 1/16 inch from the frame so that the pin is centered in the rectangular notches in the jaws of the cut nippers. Crimp the pin by compressing the handles of the cut nippers.

Frame

3.27 Remove the trip magnet mounting screws and collars as covered in 3.22. Remove all of the parts except the armature back stop as covered in 3.23 to 3.26, inclusive. The removal of these parts will permit the replacement of the frame. Substitute the new frame, mounting the aforementioned parts in their proper positions

as covered above. Remount the trip magnet on the frame.

NO. 1A COMPENSATOR PARTS

Adjusting Stud and Spring

3.28 Raise the brush rod to its topmost position. Unhook the compensator spring from the tape attached to it and then from the adjusting stud. The adjusting stud may then be drawn through the compensator frame. Remove the two hexagon nuts with two No. 310B wrenches.

Tape

3.29 Unhook the spring as covered in 3.28. In the case of the tape connected to the retractile spring, remove the screw holding it to the cam with the 3-inch cabinet screwdriver. For the tape which connects to the brush rod, turn the compensator drum until the screw holding this tape to the drum can be engaged with the 3-inch cabinet screwdriver. Then release the other end by removing the screw by which the tape is attached to the bracket with the 3-inch cabinet screwdriver.

MULTIPLE BRUSH REPLACEMENTS

General

3.30 Cover the clutches on the side of the frame being worked on with a piece of canvas to protect against falling solder or screws.

3.31 Raise the brush rod until the brush to be removed is in approximately the middle of the bank. Scribe a mark on the brush rod with the No. 240 scriber as an aid in properly locating the new brush. Unsolder the wires at the brush terminals and remove the brush as outlined below.

3.32 After the brush has been replaced in accordance with the following procedures, solder the wires to the brush terminals. The proper colors can be ascertained by referring to a similar brush on an adjacent rod. If the rollers of the new brush bind due to the presence of excess wax in their bearings, manually rotate the rollers so as to free them.

3.33 ***To remove a brush,*** loosen the brush clamping screw with the No. 555A wrench and the clamping bracket assembly mounting screws with the 3-inch cabinet screwdriver and remove the clamping bracket assembly. The brush assembly can then be turned up and removed from behind the brush rod.

3.34 ***To mount the new brush,*** first transfer the two clamping bracket assembly mounting screws from the old brush to the new brush. Do not trip the brush. Pass the brush assembly to one side of the brush rod and back of the brush rod in a horizontal position. Tip the brush assembly with the shoes down until the rear portion can be moved behind the brush rod. The brush can then be brought back to a horizontal position in line with the bank terminals. Mount the clamping bracket assembly on the new brush and securely tighten the clamping bracket assembly mounting screws. Set the brush in approximately its correct position as indicated by the mark previously scribed on the brush rod. When the brush is positioned in accordance with the requirements specified in Section 026-125-703, securely tighten the brush clamping screw and lower the brush rod.

RACK REPLACEMENT

3.35 If an examination of the No. 3A or 4A rack indicates that the rack shoulder has been worn, replace the rack in accordance with Section 026-115-801.

> ***Note:*** When a No. 4A rack is replaced by a No. 4C rack, one washer of the required thickness in addition to the one with which the rack is equipped shall be added.

BRUSH ROD REPLACEMENT

3.36 Raise the brush rod. Uncouple the brush rod from the rack and support the rack with a spring clothespin as covered in 3.10 and 3.11.

3.37 Lower the rack to its lowest position. Lower the brush rod until it is about 2 inches above its normal (down) position.

3.38 Loosen the bearing clip mounting screws with the KS-2631 screwdriver and remove the bearing halves. Set the bearing halves aside keeping the two parts together so that when they are remounted the same halves that were removed will be mounted together. Observe that on the 400 point line finder there is a No. 4A tight-fitting bearing above each even-numbered bank, and a No. 4B loose-fitting bearing about each odd-numbered bank, and that on the 300 point line finder, there is a No. 4A tight-fitting bearing above each even-numbered bank only. When the bearings are remounted, mount them in the same order. Remove the frame cross-members so as to provide sufficient room to permit removal of the rod. Where a compensator is provided, loosen the compensator tape bracket clamping screws with the 3-inch cabinet screwdriver and disconnect the compensator tape bracket from the brush rod.

3.39 Unsolder the wire from the K segment of the associated commutator. Insert the No. 400A commutator brush spacer between the springs and commutator just above the brush frame and raise the spacer until it rests against the tips of the commutator springs.

3.40 Loosen the commutator latch plate clamping screws with the 3-inch cabinet screwdriver and remove the latch plate

3.41 Remove the spring clothespin, hold the top of the rod, move the top of the commutator forward to disengage the notch at the top crossmember. Raise the commutator until the bottom end is free from the frame. Pull the commutator upward so that it is freed from the brush rod and commutator brush.

3.42 Mount the commutator temporarily in position and carefully lower the rod to a horizontal position. Remove the No. 400A commutator brush spacer. Transfer the parts from the old rod to the new one.

Replacement of Brush Rod and Assembled Brushes (No. 1010B or 1012B Rods)

3.43 When the rod to be replaced is to be replaced by a rod to which the multiple and commutator brushes are attached, proceed as outlined in 3.45 to 3.51, inclusive.

Replacement of Brush Rod by Brush Rod Without Assembled Brushes (10- or 12-type Rods)

3.44 When the rod to be replaced is to be replaced by a rod on which the multiple or commutator brushes are not mounted, remove the brushes from the rod to be replaced and mount them in approximately the same positions on the new rod. Proceed as outlined in 3.45 to 3.51, inclusive.

Remounting Brush Rod

3.45 Insert the No. 400A commutator brush spacer between the springs of the commutator brush as outlined in 3.39.

3.46 Raise the rod carefully to a vertical position, move the commutator forward as outlined in 3.41, and insert the commutator into the No. 400A commutator brush spacer. Remount the commutator and press the top of the commutator against the back of the slot in the top plate so that the locating slot in the rear of the commutator engages the plate properly.

3.47 Allow the rod to come into position in the slots in the bearing plates and support the rod with a clothespin as outlined in 3.11.

3.48 Remount the commutator latch plate and insert and tighten the clamping screws securely. Solder all wires that were removed.

3.49 Remove the No. 400A commutator brush spacer by sliding it down until it rests on the commutator brush frame and then withdrawing it from the brush assembly.

3.50 Remount the bearings. Raise the rack, couple it to the brush rod, and remove the clothespin.

3.51 Position the commutator brushes, as required, in order to meet the requirements covered in Section 026-120-701 covering commutator brushes. Also check other apparatus as covered in Section 026-125-703.

REASONS FOR REISSUE

1. To add a paragraph referring to Section 026-125-821 covering repair of brush rods (1.06).

2. To add a paragraph defining the information enclosed in parentheses (2.03).

3. To revise Fig. 5.

4. To replace the P-125206 nut with the P-159068 nut (Fig. 9).

5. To omit the No. 108A brush rod gauge (3.01).

6. To amplify the procedure covering downstop collar replacement (3.13).

7. To amplify the procedure covering rack replacement (3.35).

8. To amplify the procedure covering brush rod replacement (3.38).

9. To omit the procedure covering brush rod reinforcing sleeve (covered in Section 026-125-821).

10. To omit the procedure and figure covering reconditioning brush rods worn by rack (covered in Section 026-125-821).