

MOTOR-DRIVEN RHEOSTATS REPLACEMENT PARTS AND PROCEDURES

CONTENTS	PAGE	
1. GENERAL	1	KS-5385
2. REPLACEMENT PARTS	1	KS-5385-01
3. APPARATUS	6	KS-5445
4. REPLACEMENT PROCEDURES	7	KS-5501
		KS-5713
		KS-15743

Figures

1. KS-15571 and Mfr Disc. KS-5501, KS-5713, and KS-15743 Rheostats	3
2. KS-5385 Mfr Disc. Rheostat (200-800 Amperes)	4
3. Mfr Disc. KS-5349 and KS-5445 Rheostats (KS-5349 Rheostat Shown)	5
4. KS-5385 Mfr Disc. Rheostat (50 Amperes)	6

This reissue does not affect the Equipment Test List.

1.03 Part 2 of this section covers the parts which are practicable to replace in the field in the maintenance of the rheostats. No attempt should be made in the field to replace parts not designated. Part 2 (Replacement Parts) also contains explanatory figures showing the parts.

1.04 Part 4 (Replacement Procedures) of this section covers the approved procedures for the replacement of the parts listed in Part 2.

1.05 Before making any replacement of parts, remove the apparatus from service in accordance with approved procedures.

Danger: Extreme care must be taken when working on or near equipment with high current capability and/or high voltage is present. To prevent bodily injury, bracelets, rings, and wrist watches should not be worn while inspecting or maintaining electrical equipment. Insulated tools, gloves, and mats should be used at all times.

1. GENERAL

1.01 This section covers the approved procedure for replacing parts and information necessary for ordering parts to be used in the maintenance of the KS-15571 and for Mfr Disc. KS-5385, KS-5385-01, KS-5445, KS-5501, KS-5713, and KS-15743 motor-driven rheostats.

1.02 This section is reissued for the following reasons:

- (1) To add danger notes
- (2) To rate the following KS products Mfr Disc.
KS-5349

2. REPLACEMENT PARTS

2.01 Figures 1 through 4, included in this part of the section, show the various parts in

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SECTION 028-722-801

their proper relation to other parts of the rheostat together with names of the parts which are practicable to replace in the field.

2.02 Information enclosed by parentheses () is not ordering information. This information may be references to notes, parts referred to in other portions of the section and not considered replaceable, or part names in general use in the field if these names differ from those assigned by the manufacturer.

2.03 When ordering parts give the following information:

(a) Order motor brushes in accordance with applicable section.

(b) When ordering parts other than brushes, give the name of the part and complete nameplate data of the rheostat including the KS number and the name of the manufacturer. For example, Contact for KS-15743, L1, Rheostat, Ward-Leonard Electric Co., Type LB Catalog No. 5365641X, Ed No. 25822, 60 Ohms, 5.0-1.0 Amperes, 20-23 Volts.

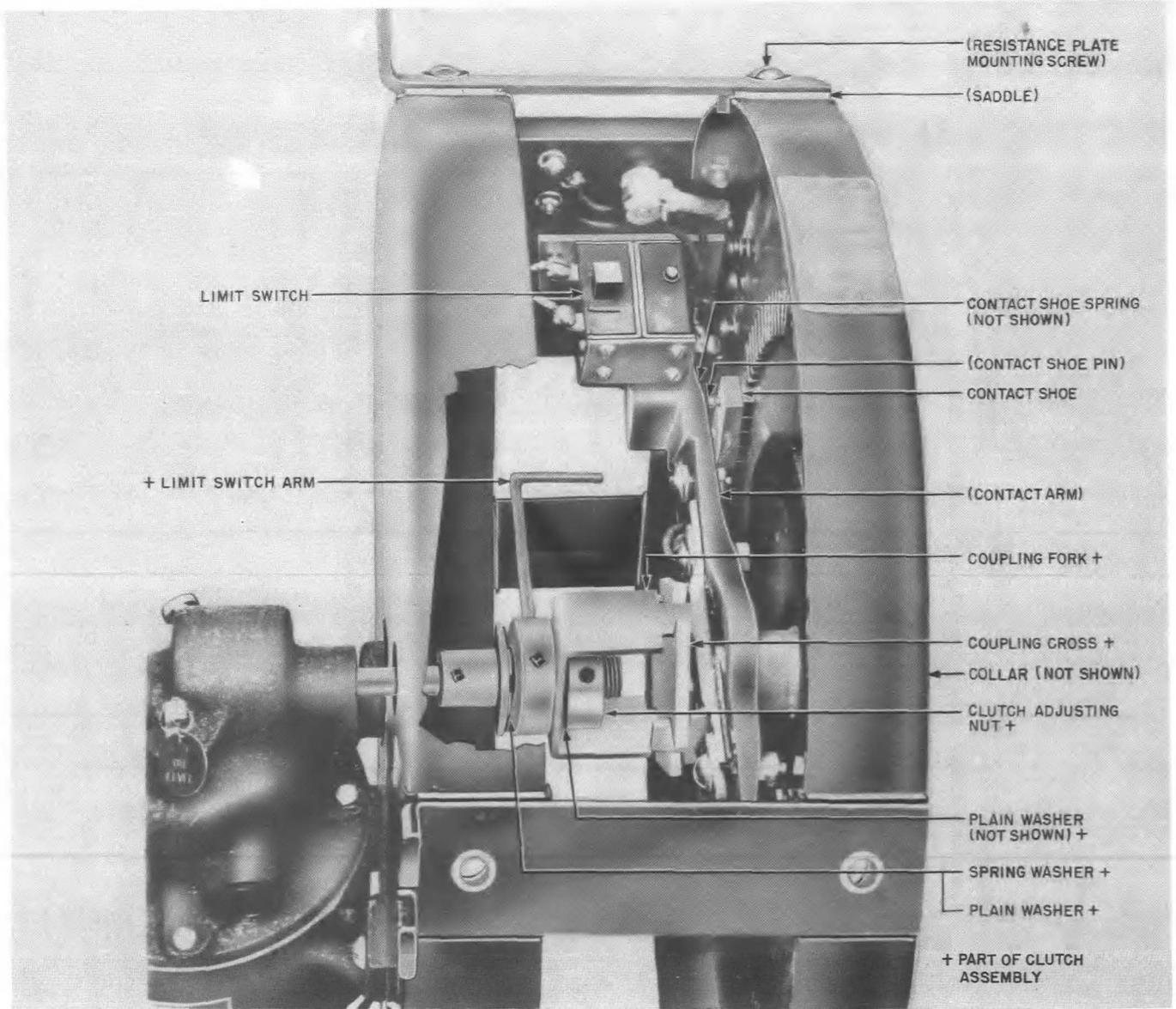


Fig. 1—KS-15571 and Mfr Disc. KS-5501, KS-5713, and KS-15743 Rheostats

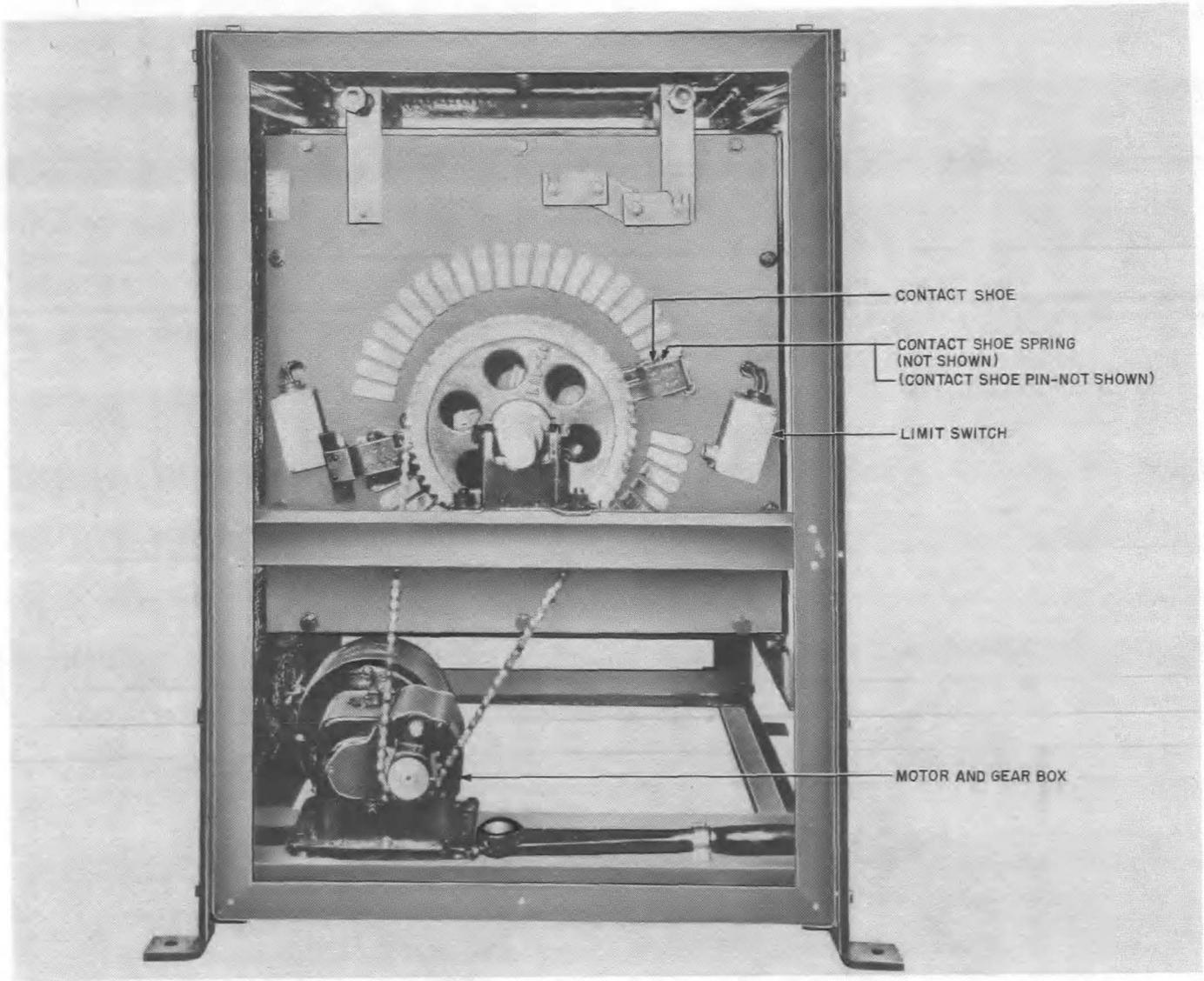


Fig. 2—KS-5385 Mfr Disc. Rheostat (200-800 amperes)

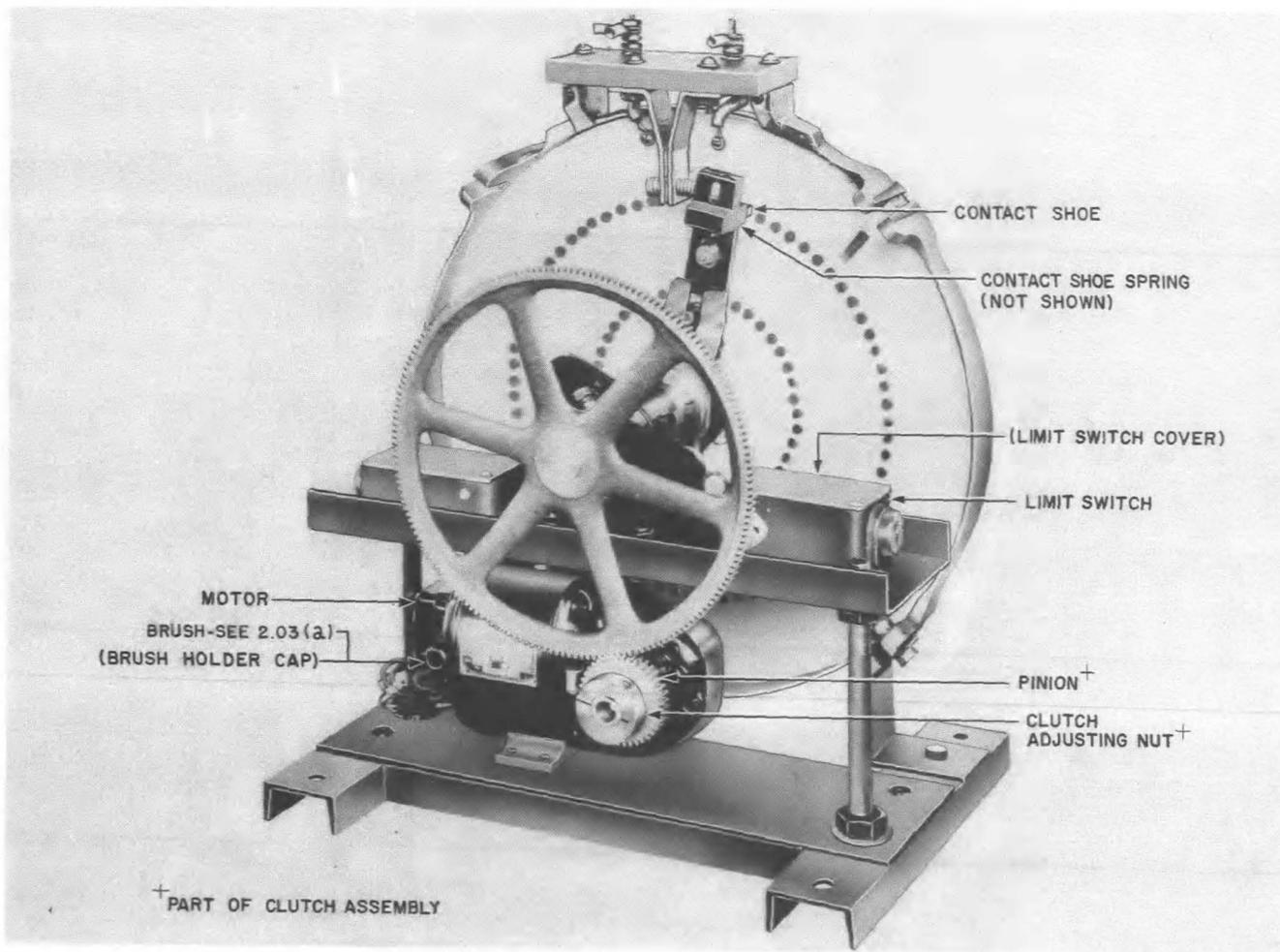


Fig. 3—Mfr Disc. KS-5349 and KS-5445 Rheostats (KS-5349 Rheostat Shown)

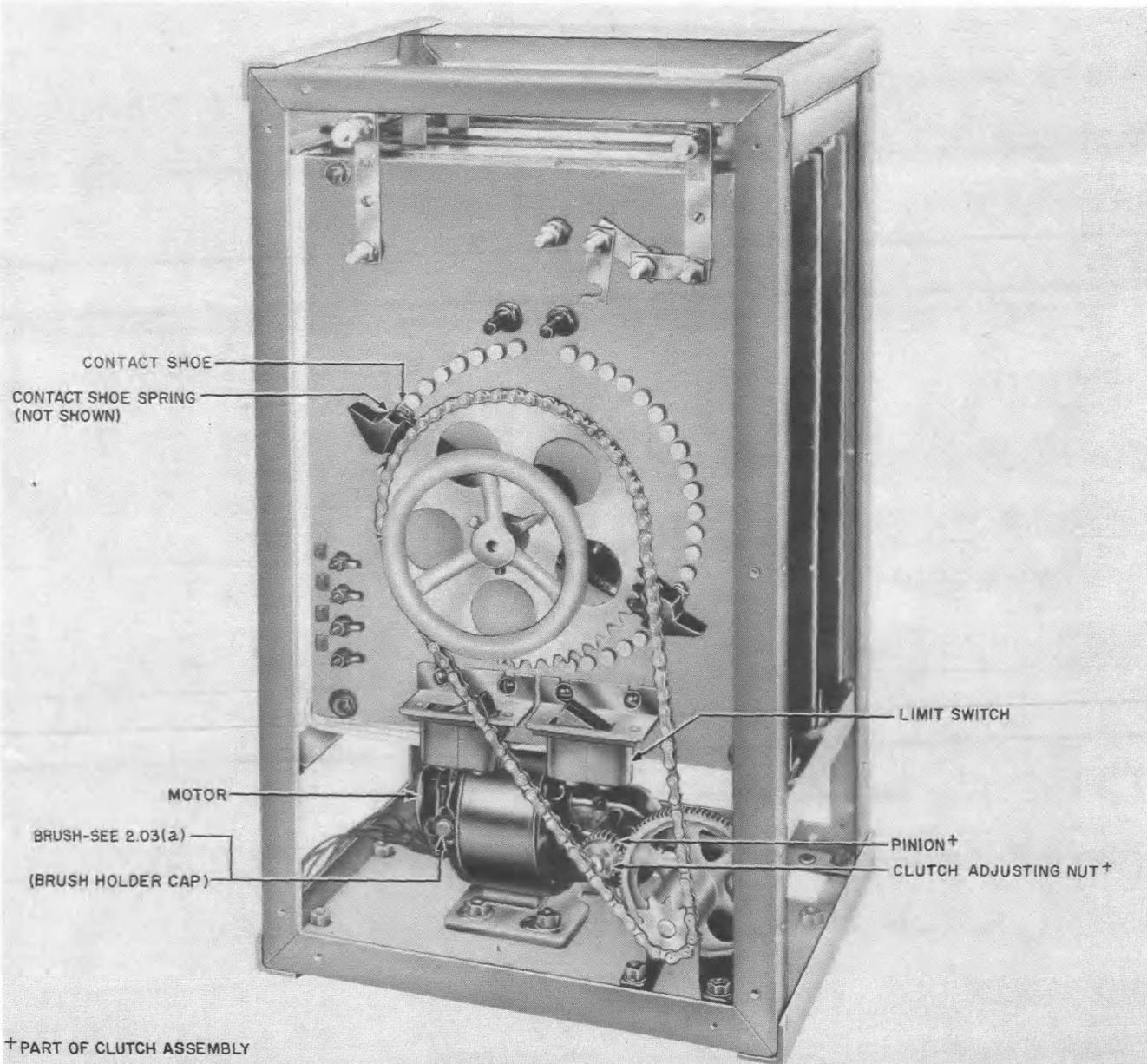


Fig. 4—KS-5385 Mfr Disc Rheostat (50 Amperes)

3. APPARATUS

46

3/8-Inch Hex Single-End Socket Wrench

3.01 List of Tools and Materials

565A

90-Degree Offset Screwdriver

CODE OR
SPEC NO.

DESCRIPTION

R-1102

Spudger

TOOLS

R-1542

6-Inch Adjustable Wrench

TOOLS	DESCRIPTION
R-2671	1/8-Inch Hex Socket Screw Wrench
AT-7825	3-Inch C Screwdriver
AT-7825	6-Inch C Screwdriver
AT-7825	5-Inch E Screwdriver
AT-7739	No. 3B Screwdriver
—	3/32-Inch Drive Pin Punch, L.S. Starrett Co., No. 565
AT-8420	Combination Pliers
AT-7329	4-Ounce Riveting Hammer
—	Puller, Grip-O-Matic, Owatonna Tool Co., No. 1002 with No. 1002-L1 Arms
—	Bearing Pulling Attachment, Owatonna Tool Co., No. 950

MATERIALS

KS-7860	Petroleum Spirits
KS-14666	Cleaning Cloth
—	Shellac
—	Brass or Copper Tube (approximately 2-1/2 inches long with a diameter as required)

4. REPLACEMENT PROCEDURES

4.01 After making any replacement of parts, the part or parts replaced shall meet the requirements specified in Section 028-722-701. Other parts whose adjustment may have been directly disturbed by the replacement operation shall be checked to applicable requirements.

4.02 No replacement procedures are specified for screws or other parts if the replacement procedure consists of a simple operation.

4.03 Care should be exercised when using petroleum spirits in power rooms where there are dc machines, since commutation may be adversely affected by softening of commutator film by the fumes. To avoid the need for burnishing the

commutators of dc machines after doing any cleaning called for in this section, provide adequate ventilation. Use the absolute minimum amount of petroleum spirits required for the cleaning operation and keep the container closed when not in use.

Danger: Extreme care must be taken when working on or near equipment with high current capability and/or high voltage is present. To prevent bodily injury, bracelets, rings, and wrist watches should not be worn while inspecting or maintaining electrical equipment. Insulated tools, gloves, and mats should be used at all times.

4.04 If it is necessary to remove a motor brush from its holder, for reasons other than replacement of the brush, mark or record the position of the brush with respect to its associated brush holder to insure remounting the brush in its original position.

4.05 Contact Shoe

(1) Disconnect the pigtail of the contact shoe from the terminal on the contact arm using the R-1542 wrench and the No. 565A offset screwdriver to loosen the terminal nut.

(2) Using the R-1102 spudger, push one of the pins which press the shoe against the contacts, into the contact shoe holder and rotate the shoe from under the pin. Similarly, push back the other pin and slide the shoe from under it. Remove the shoe from the rheostat.

(3) Mount the new shoe, in reverse order of removal, taking care that the pins engage the holes in the shoe.

4.06 Contact Shoe Spring (KS-15571 and Mfr Disc. KS-5501, KS-5713, and KS-15743 Rheostats): These rheostats may be equipped with one or two resistance plates. To replace the contact shoe springs on rheostats having one plate, proceed as covered in (1). If the rheostat has two plates it is necessary to remove the outer plate to replace springs in the contact arm associated with either plate. Replace springs of rheostats having two plates as covered in (2).

(1) Rheostats Having One Resistance Plate

- (a) Loosen the motor mounting nuts, using the R-1542 wrench, and move the motor and gear box away from its mounting sufficiently to remove the coupling cross (Fig. 1). Remove the cross.
- (b) Remove the mounting screw from the collar on the outer end of the contact arm shaft and remove the collar.
- (c) Press the contact arm against the resistance plate and remove the retaining pin from the outer end of the contact arm shaft. Also, remove the washer adjacent to the pin.
- (d) Move the contact arm away from the plate and remove the contact pins and springs from the arm.
- (e) Replace defective springs and then reassemble the parts in reverse order of removal. Securely tighten the motor mounting nuts.

(2) Rheostats Having Two Resistance Plates

- (a) **Removing Outer Resistance Plate:** Using the R-1542 wrench, disconnect the electrical straps from the terminals on the outer resistance plate. Remove the outer resistance plate mounting screws with the wrench and the 5-inch E screwdriver, and remove the plate from the rheostat.
- (b) **Springs Associated With Outer Resistance Plate:** To replace these springs, proceed as covered in (1) (b) through (d) after removing the outer plate as covered in (a). Replace defective springs and reassemble the parts of the outer plate in reverse order of removal.
- (c) **Springs Associated With Inner Resistance Plate:** To replace these springs, proceed as covered in (1) (a) through (d) after removing the outer plate as covered in (a). Reassemble all parts of the rheostat in reverse order of removal.

4.07 Mfr Disc. KS-5349 and KS-5445 Rheostats: To replace the contact shoe

springs associated with any contact arm, proceed as follows:

- (1) Loosen the contact arm setscrews which secure the arm to the drive shaft. Move the arm away from the resistance plate and remove the contact shoe pins and springs from the arm.
- (2) Replace defective springs and reassemble the parts in reverse order of removal.
- (3) Slide the arm toward the plate and securely tighten the contact arm setscrews to the drive shaft.

4.08 Mfr Disc. KS-5385 and KS-5385-01

Rheostats: To replace the contact shoe springs associated with any contact arm on rheostats having a rated capacity of 50 amperes, proceed as covered in (1). To replace the contact springs on rheostats having a rated capacity of 200 amperes, or greater, proceed as covered in (2).

(1) Rheostats of 50-Ampere Capacity

- (a) Loosen the contact arm setscrews which secure the arm to the drive shaft. Move the arm away from the resistance plate and remove the contact shoe pins and springs from the arm.
- (b) Replace defective springs and reassemble the parts in reverse order of removal.
- (c) Slide the arm toward the resistance plate and securely tighten the contact arm setscrews to the drive shaft.

(2) Rheostats of 200-Ampere or Greater Capacity:

The contact arm of these rheostats are secured to the drive shaft by means of keys in the keyway of the shaft. Spacers are mounted in the keyway to hold the keys in position. To replace contact shoe springs, proceed as follows:

- (a) Using the 3-inch C screwdriver, remove the spacer associated with contact arm in which the springs are to be replaced.
- (b) Loosen the setscrew with sleeve which supports the contact arm.

- (c) Loosen the clamp screw of the adjusting collar on the contact arm. This collar is on the opposite end of the sleeve from the setscrew referred to in (b). Unscrew the collar from the sleeve.
- (d) Move the contact arm assembly away from the resistance plate and remove the contact shoe pins and springs.
- (e) Replace defective springs and reassemble the parts in reverse order of removal.

4.09 Limit Switch

- (1) **Mfr Disc. KS-5349, KS-5385, KS-5385-01, and KS-5445 Rheostats:** Remove the limit switch cover, using the 3-inch C screwdriver. Tag and remove the leads to the switch terminals. Remove the switch mounting screws, with the screwdriver, and remove the switch from the rheostat. Mount the new switch and securely tighten the mounting screws. Connect the leads to the proper terminals of the switch and then remount the switch cover.
- (2) **KS-15571 and Mfr Disc. KS-5501, KS-5713, and KS-15743 Rheostats:** Tag and remove the leads to the limit switch terminals. Remove the switch mounting screws, using the 3-inch C screwdriver, and remove the switch from the rheostat. Mount the new switch and securely tighten the mounting screws. Connect the leads to the proper terminals of the switch.

4.10 Clutch Assembly Parts

- (1) **Mfr Disc. KS-5349, KS-5385, and KS-5445 Rheostats (Adjusting Nut, Pinion, Spring and Plain Washers):** To replace any of these parts, loosen the adjusting nut clamping screw with the 3-inch C screwdriver and remove the adjusting nut and adjacent washer from the shaft. Carefully remove the pinion gear and remaining washers from the shaft. Replace the parts as required. Mount the parts in reverse order of removal.
- (2) **KS-15571 and Mfr Disc. KS-5501, KS-5713 and KS-15743 Rheostats (Adjusting Nut, Coupling Fork and Cross, Limit Switch Arm, and Spring and Plain Washers):** To replace any of these parts,

loosen the adjusting nut clamp screw with the 3-inch C screwdriver and remove the adjusting nut and adjacent washer from the shaft. Loosen the motor mounting nuts, using the R-1542 wrench, and move the motor and gear box away from its mounting sufficiently to remove the coupling cross, coupling fork, limit switch arm, and washers, from the shaft. Remove these parts. Replace the parts as required. Mount the parts in reverse order of removal.

4.11 Motor Brushes: Remove the brush holder cap and remove the brush. Insert the new brush and remount the brush holder cap.

4.12 Motor Ball Bearings

- (1) If one bearing requires replacement, replace both bearings.
- (2) To replace the bearings, remove the motor and gear box from the rheostat as covered in (3) or (4) and remove the motor brushes as covered in paragraph 4.11. Drain the oil from the gear box as covered in (5) and remove the motor as covered in (6). Remove the bearings as covered in (7). Mount the new bearings as covered in (8) and then mount the parts in reverse order of removal. When mounting the motor on KS-15571 and Mfr Disc. KS-5501, KS-5713-01, and KS-15743 rheostats, position the lubrication packing gland against the bearing as covered in (9).
- (3) **Removing Motor and Gear Box (Mfr Disc. KS-5349, KS-5385, KS-5385-01, and KS-5445 Rheostats):** Remove the motor mounting nuts, using the R-1542 wrench, and carefully remove the motor and gear box from the rheostat.
- (4) **Removing Motor and Gear Box (KS-15571 and Mfr Disc. KS-5501, KS-5713, and KS-15743 Rheostats):** Remove the clutch assembly as covered in subparagraph 4.10(2). Remove the motor mounting nuts, using the R-1542 wrench, and carefully remove the motor and gear box from the rheostat.
- (5) **Draining Oil From Gear Box:** Remove the oil filler plug and drain the oil into a receptacle by tilting the gear box as necessary.

(6) **Removing Rotor:** Mark lines on the motor frame and the end shield (commutator end of motor) to insure remounting the shield in its original position. Remove the shield using the R-1542 wrench to remove the shield mounting nuts. Take care not to lose any of the washers which were mounted in the bearing housing of the shield. Remove the rotor from the motor frame and place it on several thicknesses of KS-14666 cloth laid on a work bench.

(7) **Removing Ball Bearings:** Remove the bearing using the No. 1002 bearing puller with the No. 950 bearing puller attachment, if necessary. After removing the bearing from the worm end of the rotor, examine the lubrication packing gland provided on the motors of the KS-15571 and Mfr Disc. KS-5501, KS-5713, and KS-15743 rheostats. If the gland is defective, replace before mounting the bearing.

(8) **Mounting Ball Bearings:** Start the bearing on the rotor shaft and position it against the shoulder as follows: Use a brass or copper tube approximately 2-1/2 inches long which just fits over the shaft and engages the inner race of the bearing only. The ends of the tube should be at right angles to the length

and one end of the tube should be smooth. Place the smooth end of the tube against the inner race of the bearing and tap the tube lightly with the 4-ounce riveting hammer to force the bearing into position against the shoulder.

(9) **Positioning Lubrication Packing Gland (KS-15571 and Mfr Disc. KS-5501, KS-5713, and KS-15743 Rheostats):** While positioning the rotor in the motor frame, hold the gland against the bearing with two 20-penny nails or two 4-inch lengths of No. 11 drill rod bent as follows: Bend the nails or drill rod approximately 1 inch from the end (pointed end of nail) at an angle of 45 to 60 degrees. Insert the bent ends between the gland and the fan, on opposite sides of the rotor. Insert the rotor in the frame, tapping the end of the shaft, if necessary, to properly position the bearing in its housing. Tap the ends of the nails or drill rods to position the gland firmly in its seat in the frame directly behind the bearing. Remove the nails or drill rods and mount the end shield on the motor frame.

(10) Remount the motor and gear box on the rheostat and relubricate the gear box as covered in Section 028-722-701.