CHARGING SETS
DIVERTER POLE TYPE
REPLACEMENT PARTS AND PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering parts to be used in the maintenance of the KS-5500, KS-5500-01, and KS-5547 diverter pole-type charging motor-generators. It also covers the approved procedures for replacing these parts.

1.02 This section was not given general distribution for issue 1.

1.03 Part 2 of this section covers the various parts which it is practicable to replace in the field in the maintenance of this equipment. No attempt should be made to replace parts not designated. Part 2 also contains explanatory figures showing the different parts. This information is called Replacement Parts.

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.

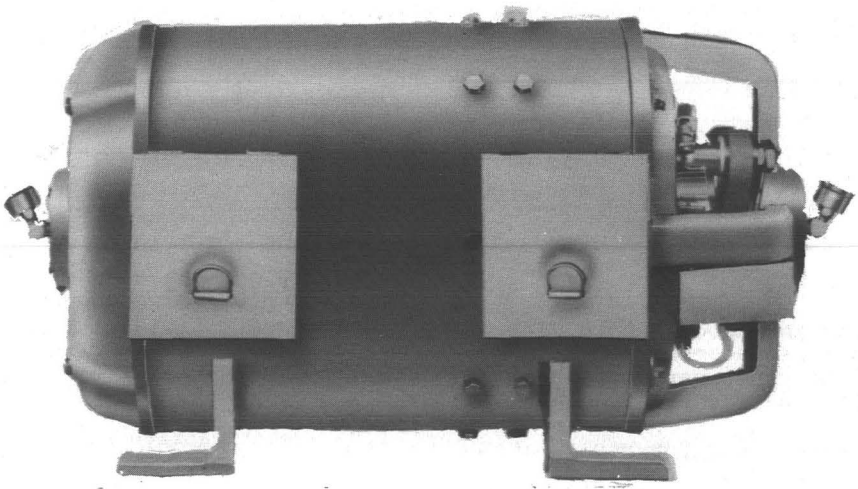
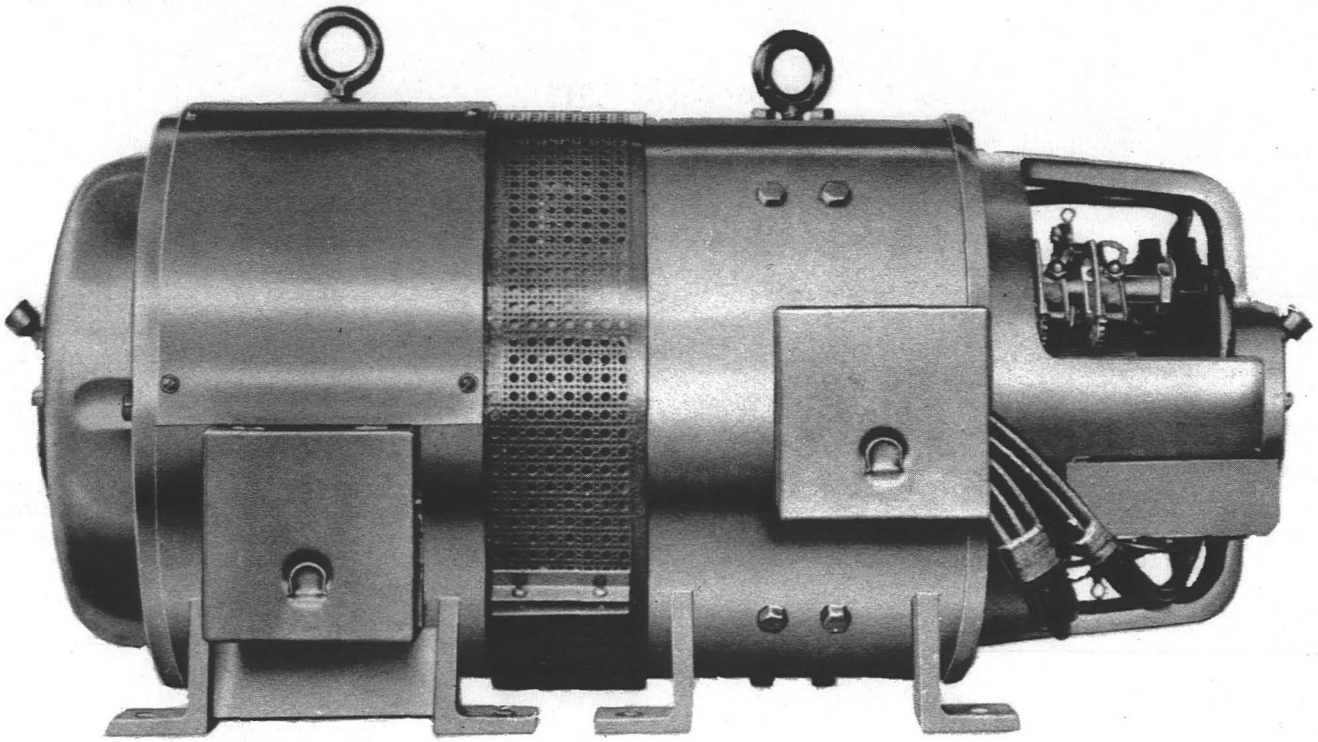


Fig. 1 - Charging Set



AC MOTOR END

DC GENERATOR END

Fig. 2 - Charging Set

2. REPLACEMENT PARTS

2.01 The figures included in this part show the various replacement parts in their proper relation to other parts of the apparatus together with their corresponding names.

2.02 When ordering parts for replacement purposes, except brushes, give the name of the part, as shown in the figure of this section, and also the nameplate data of the charging set for which the part is ordered, including the manufacturer's name, type and frame designation, serial number, and the KS specification and list number. For example, one armature for Electric Products Company type No. 50, serial No. 12345, 50-volt, 200-ampere-generator; 230-volt, 62.8 full-load amperes, 3-phase motor; KS-5500-01 motor-generator, List 107. Do not refer to the section number.

2.03 Brush replacements shall be ordered in accordance with Section 171-110-802.

2.04 Miscellaneous parts, such as screws, which are not named in the figures and which cannot be obtained locally, should be ordered by describing the part giving complete nameplate data as referred to in 2.02.

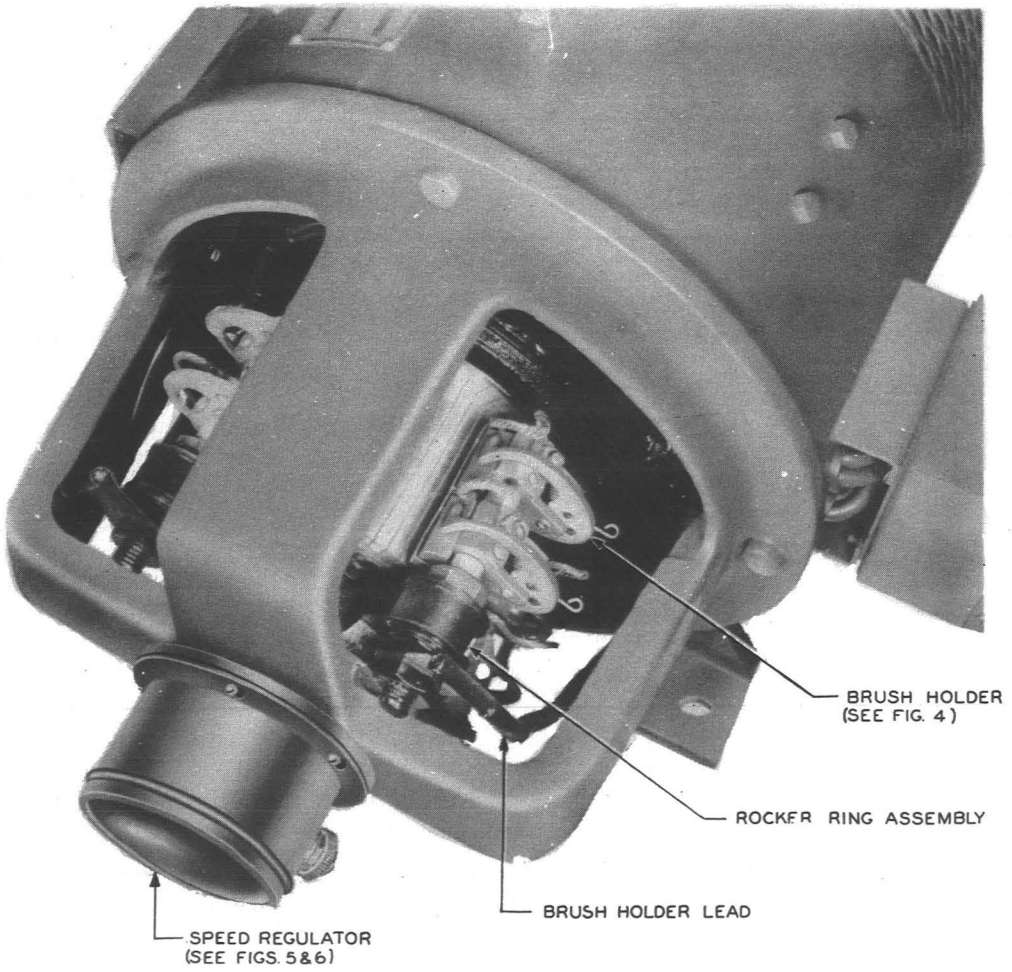


Fig. 3 - DC Motor End Charging Set (Equipped With Speed Regulator)

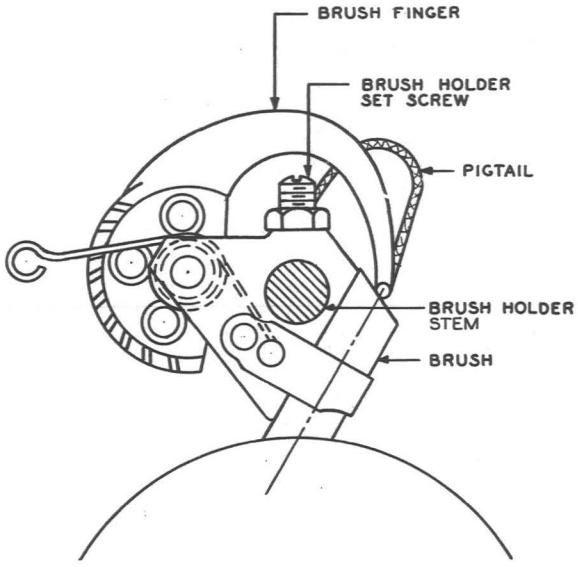


Fig. 4 - Baylis-type Brush Holder

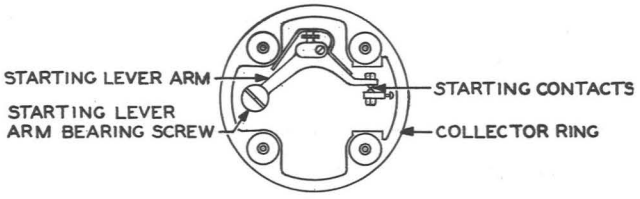


Fig. 5 - Regulator Starting Contacts

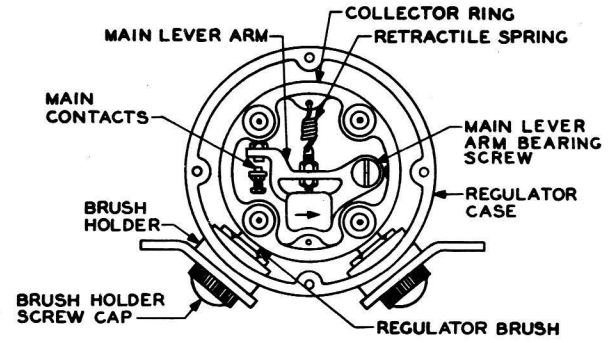


Fig. 6 - Regulator Main Contacts (Front View)

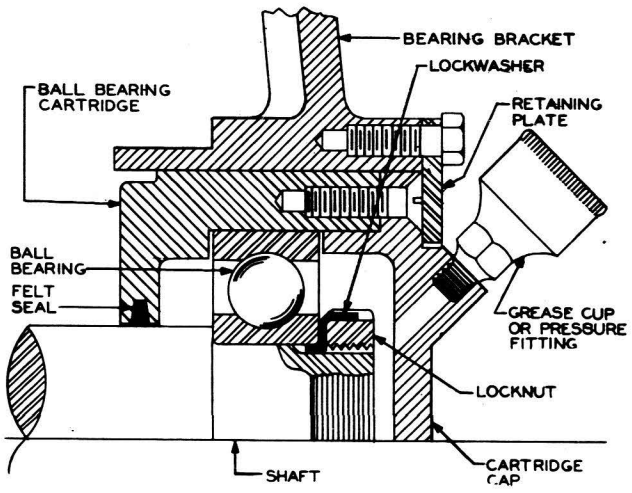


Fig. 7 - Ball Bearing

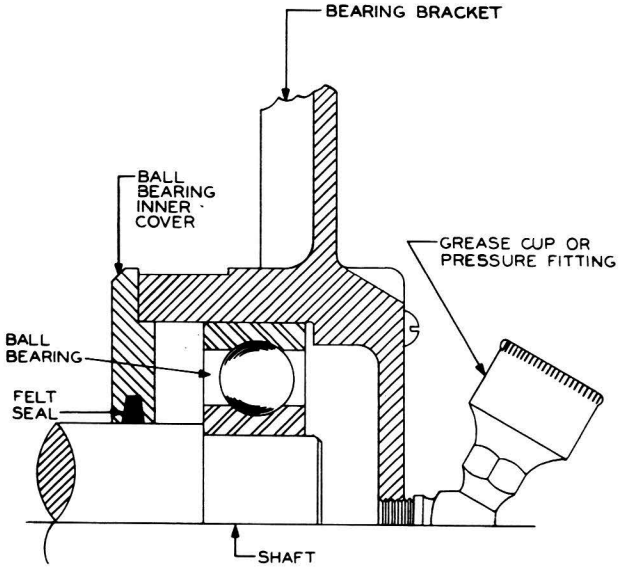


Fig. 8 - Ball Bearing

3. REPLACEMENT PROCEDURES

3.01 List of Tools and Materials

Code or Spec No.	Description
Tools	
247	1-1/4-inch Hex. Open Single-end Flat Wrench
R-1255	31/32-inch and 1-1/16-inch Open Double-end Flat Wrench
R-1279	1/2-ton Chain Hoist
R-2512	15/16-inch Adjustable Wrench
-	6-1/2-inch P-Long-nose Pliers
-	1-pound Ball Peen Hammer
-	Puller, Grip-O-Matic, Owatonna Tool Co., No. 1001
-	4-inch Regular Screwdriver
-	5-inch Regular Screwdriver
Materials (See Sections 065-330-101 and 065-370-101)	
KS-14666	Cleaning Cloth
-	Petroleum Spirits
-	Wooden Wedges
-	Wood Block
-	Rope Sling, 1-inch Diameter Rope or Equivalent

3.02 Before making any replacements be sure that service will be maintained by means of temporary wiring or in some other suitable manner. Remove the apparatus from service.

3.03 After making any replacement of parts the part or part replaced shall meet the readjust requirements involved, as specified in Section 155-612-701. Other parts, whose adjustments may have been directly disturbed by the replacing operations, shall be checked to the readjust requirements and an over-all operation check shall be made of the charging set before restoring it to service.

3.04 When using petroleum spirits for cleaning purposes in the power room, provide as much ventilation as practicable. After using the petroleum spirits, the commutators of all dc machines in the power room should be burnished in accordance with approved procedures for the machines involved, since the fumes from the petroleum spirits may soften commutator film and thus adversely affect commutation.

Brushes

3.05 Generator End or DC Motor End: Fig. 4 - To replace a brush, loosen the screw which fastens the pigtail to the brush holder, raise the brush finger, and withdraw the old brush with its pigtail. Insert a new brush and connect the pigtail. New brushes shall be fitted and cleaned as outlined in Section 155-612-701.

3.06 Speed Regulator (General Electric Co GSR type): Fig. 6 - To replace a brush on the speed regulator, remove the brush holder screw cap with the fingers, and withdraw the old brush and spring. Insert the new brush and spring and replace the screw cap.

Brush Holders

3.07 Generator End and DC Motor End:Fig.4 - To replace the brush holder, remove the brush as outlined in 3.05. Disconnect all leads necessary to free the bearing bracket and rocker ring assembly from the frame. Wrap the commutator with heavy paper to prevent scratches. Support the armature by means of wooden wedges inserted between the armature and the field pole face or by other means so as to support the armature when the bearing bracket is removed. Mark the bearing bracket and frame to insure proper replacement. Remove the speed regulator, if present, as outlined in 3.20. If the motor or generator has a retaining plate, as shown in Fig. 7, remove it. If the motor does not have a retaining plate (Fig. 8), remove the screws which secure the inner bearing cover to the bearing bracket. Remove the cap screws which hold the bearing bracket to the frame. Remove the bearing bracket and rocker ring assembly as a unit being careful not to damage the commutator. Loosen the brush holder set-screw and slide the holder off the brush holder stem. Slip the new complete holder on the stem and reassemble in the reverse order. Adjust brush holder spacing in accordance with Section 155-612-701. Clean and lubricate the bearing housing and lubricate the bearing, if required, in accordance with Section 155-612-701.

3.08 Speed Regulator (General Electric Co GSR type): Fig. 6 - To replace a speed regulator brush holder, mark and remove the brushes as outlined in 3.06. Remove the locknuts. Mark and remove the regulator leads. Remove the screws which secure the regulator case to the adapter plate. Remove case and unscrew the regulator brush holder from the regulator case. Insert the replacing holder and reassemble in the reverse order.

Ball Bearings

3.09 Generator End: Fig. 7

(1) To replace a ball bearing, mark and remove the brushes as outlined in 3.05. Disconnect all leads necessary to free the bearing bracket and rocker ring assembly from the frame. Wrap the commutator with heavy paper to prevent scratches. Support the armature by means of wooden wedges inserted between the armature and the field pole faces or by other means so as to support the armature when the bearing bracket is removed. Mark bearing bracket and frame to insure proper replacement. Supplementary support of the armature after the bearing bracket is removed is desirable as there is a possibility of the supporting wedges becoming dislodged while the bearing is being removed.

(2) If the bearing bracket is equipped with grease cups or pressure fittings, remove the screws which fasten the retaining plate to the bearing bracket. Remove the four cap screws which hold the bearing bracket to the frame. Remove the bearing bracket and rocker ring assembly being careful not to damage the commutator. The ball bearing, bearing cartridge, and cartridge cap will remain in position. Remove the screws which hold the cartridge cap to the bearing cartridge. Remove the cartridge cap. The nut and lockwasher (if provided) which hold the ball bearing in position on the shaft are now accessible. Wipe away surplus grease with a clean cloth. With a screwdriver, carefully straighten the bent lip of the lockwasher so that the bearing nut may be removed. Remove the nut using an appropriate wrench. Remove the lockwasher and note the position of another lip which fits the keyway in the shaft. Remove the old ball bearing by removing the bearing cartridge and ball bearing using the puller. Be careful not to mar the outer surface of the bearing cartridge. When no grease cup or pressure fitting is provided it is only necessary to remove the bearing bracket.

(3) Clean the bearing cartridge cavity. Reassemble the bearing cartridge on the shaft. Place new bearing on the shaft using a short piece of clean pipe having a smooth end which will push against the inner but not the outer ball race and tap the bearing into place making certain that the bearing is tightly seated against the shoulder of the shaft. Lubricate bearing with grease in accordance with Section 155-612-701. The bearing housing cavity in the bearing bracket should be cleaned with petroleum spirits and wiped with a clean cloth. Reassemble the machine in the reverse order.

3.10 Generator End and DC Motor End: Fig. 8

(1) To replace a ball bearing, mark and remove the brushes and the brush holder leads, support the armature, and mark the bearing bracket as outlined in 3.09(1). If the bearing to be replaced is in the dc

motor end, it will be necessary to remove the speed regulator as covered in 3.20.

(2) If the bearing bracket is equipped with grease cups or pressure fittings, remove the screws which secure the bearing inner cover to the bearing bracket. Remove the four cap screws which hold the bearing bracket to the frame. Remove the bearing bracket and rocker ring assembly being careful not to damage the commutator Note the position of the bearing end play washer if present. The ball bearing and the inner bearing cover will remain in position on the shaft. Wipe away surplus grease with a clean cloth. Remove the ball bearing using the puller. When no grease cup or pressure fitting is provided, it is only necessary to remove the bearing bracket.

(3) Place the new ball bearing on the shaft and lubricate as outlined in 3.09(3).

3.11 AC Motor End

(1) Ball Bearing: Fig. 7 - To replace a ball bearing, proceed as outlined in 3.09; except for parts not common to the ac motor end such as brushes, brush holders, and leads.

(2) Ball Bearings: Fig. 8 - To replace a ball bearing, proceed as outlined in 3.10, except for parts not common to the ac motor end such as brushes, brush holders, and leads.

Rocker Ring

3.12 To replace the rocker ring, mark and remove the brushes and connecting leads. Remove the bearing bracket and rocker ring as a unit as outlined in 3.07. Remove the brush holders and stems. Remove the rocker ring lockscrew and remove the rocker ring. Replace with a new rocker ring and reassemble in the reverse order. Adjust brush holder spacing in accordance with Section 155-612-701.

Armature

Rear-ventilated-type Charging Set

3.13 To replace the armature in this type of set, remove the bearing brackets and ball bearings at both ends of the set as outlined in 3.09, 3.10, or 3.11.

3.14 Use a rope sling looped around both ends of the armature shaft, and with the vertical apex of the sling attached to a chain hoist or block and tackle, lift the armature sufficiently to support its weight and remove the wooden wedges between the armature windings and pole faces. Work the armature out of the frame from the motor end until one end of the rope sling holding the shaft is against the frame. In working the armature out of the frame, care should be taken not to injure the armature windings or the commutator. The armature should next be supported carefully on the pole faces or by grooved blocks placed beneath the shaft, and the end of the sling which is now against the frame should be removed from its position around the shaft and carried to the other side of the frame, passed back through the frame, and again looped around the shaft of the armature as close to its original position as possible.

3.15 Take up the weight of the armature carefully and work it clear of the magnet frame. Insert a spreader between the sides of the sling as close as possible to, but not touching, the armature windings to keep the sling from bearing against the commutator or the end turns of the armature windings. After removal, the armature should always be placed with the shaft resetting on grooved blocks to hold the armature and commutator clear of all other supports. Insert the new or reconditioned armature in the reverse order. Use new ball bearings in view of possible damage to the old bearings in removing them from the shaft. Clean the bearing housing cavities. Lubricate the bearing housing and the bearings, if required, in accordance with Section 155-612-701. The brushes shall be fitted and cleaned as outlined in Section 155-612-701.

Center-ventilated-type Charging Set

3.16 To replace the armature in this type of set, mark and remove the brushes and connecting leads as outlined in 3.05. Remove the speed regulator, if present, as outlined in 3.20. Wrap commutator with a protective cover of heavy paper. If the set has retaining plates, as shown in Fig. 7, remove them from both ends of the set. If the set does not have retaining plates (Fig. 8), remove the screws which secure the inner bearing covers to the bearing brackets at both ends of the set. Mark and disconnect the leads between the motor and generator and disconnect the conduit. Remove the expanded metal cover over the opening between the frames. Place a block under the generator frame close to the split between the frames. This will support the generator frame when the motor frame is removed. Unbolt the motor frame from the generator frame. Remove the motor frame and bearing bracket as a unit. The fan and the motor half of the armature will be exposed. Support the armature as required by using a rope sling looped around the shaft, about in the center, near the fan. With the rope sling in place around the armature shaft, counterbalance the armature and pull it out of the generator frame. Care should be taken not to damage coils. When desirable, use may be made of a chain hoist or block and tackle for removing the motor frame. After removal, the armature should always be placed with the shaft resting on grooved blocks to hold the armature and commutator

clear of all other supports. Insert the new or reconditioned armature in the reverse order. Use new ball bearings in view of possible damage to the old bearings in removing them from the shaft. Clean the bearing housing and the bearings, if required, in accordance with Section 155-612-701. The brushes shall be fitted and cleaned as outlined in Section 155-612-701.

Speed Regulator (General Electric Co GSR type): Fig. 5 and 6

3.17 Retractile Spring: Fig. 6 - To replace a retractile spring, mark and remove the brushes, as outlined in 3.06, and the speed regulator leads. Remove the regulator case from the adapter plate by loosening the case mounting screws and turning the case in a counterclockwise direction. Reassemble in the reverse order.

3.18 Main Lever Arm and Main Contacts: Fig. 6 - To replace a main lever arm or main contacts, remove the brushes, regulator case, and retractile spring as outlined in 3.16. Remove the main bearing screw and lift the main lever arm off. Remove contact screws, substitute new parts, and reassemble in the reverse order.

3.19 Collector Rings, Starting Lever Arm, and Starting Contacts: Fig. 5 and 6 - To replace the collector rings, starting lever arm or starting contacts, mark and remove the brushes and the speed regulator leads. Remove the regulator case as outlined in 3.17. Then remove the rotating element by removing the retractile spring, the main bearing screw, and the main lever arm in order to gain access to the three screws and the dowel pin fastening the rotating element to the motor shaft. Remove these screws and the dowel pin. Remove the rotating element and replace the starting lever arm and starting contacts. If the collector rings need replacing, a new rotating element will be required. Reassemble in the reverse order.

3.20 Assembly: To replace a complete speed regulator assembly, remove the regulator as outlined in 3.19. Replace with a complete new regulator and reassemble in the reverse order.