CIRCUIT BREAKERS
KS-15910
REPLACEMENT PARTS AND PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering parts to be used in the maintenance of KS-15910 circuit breakers, manufactured by the General Electric Company. It also covers procedures for replacing these parts.

1.02 Part 2 of this section covers ordering information for those parts which it is practicable to replace in the field in the maintenance of the above apparatus. No attempt should be made to replace parts not designated except small items such as screws. Part 2 also contains explanatory figures showing the different parts. This information is called Replacement Parts.

1.03 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.

2. REPLACEMENT PARTS

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

2.02 When ordering replacement parts, give the name of the component part as shown in the figures of this section and the complete nameplate data and part number of the component or component part, where furnished. In addition, give the nameplate data of the circuit breaker. For example, one shunt trip device Part No. 622C502G1, 230 volts, 60 cycles, range 185 to 250 volts used on the General Electric Company AK-2-25 circuit breaker, No. 127A5999-222-TT per KS-15910, L2. Do not refer to this section number.

2.03 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.

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

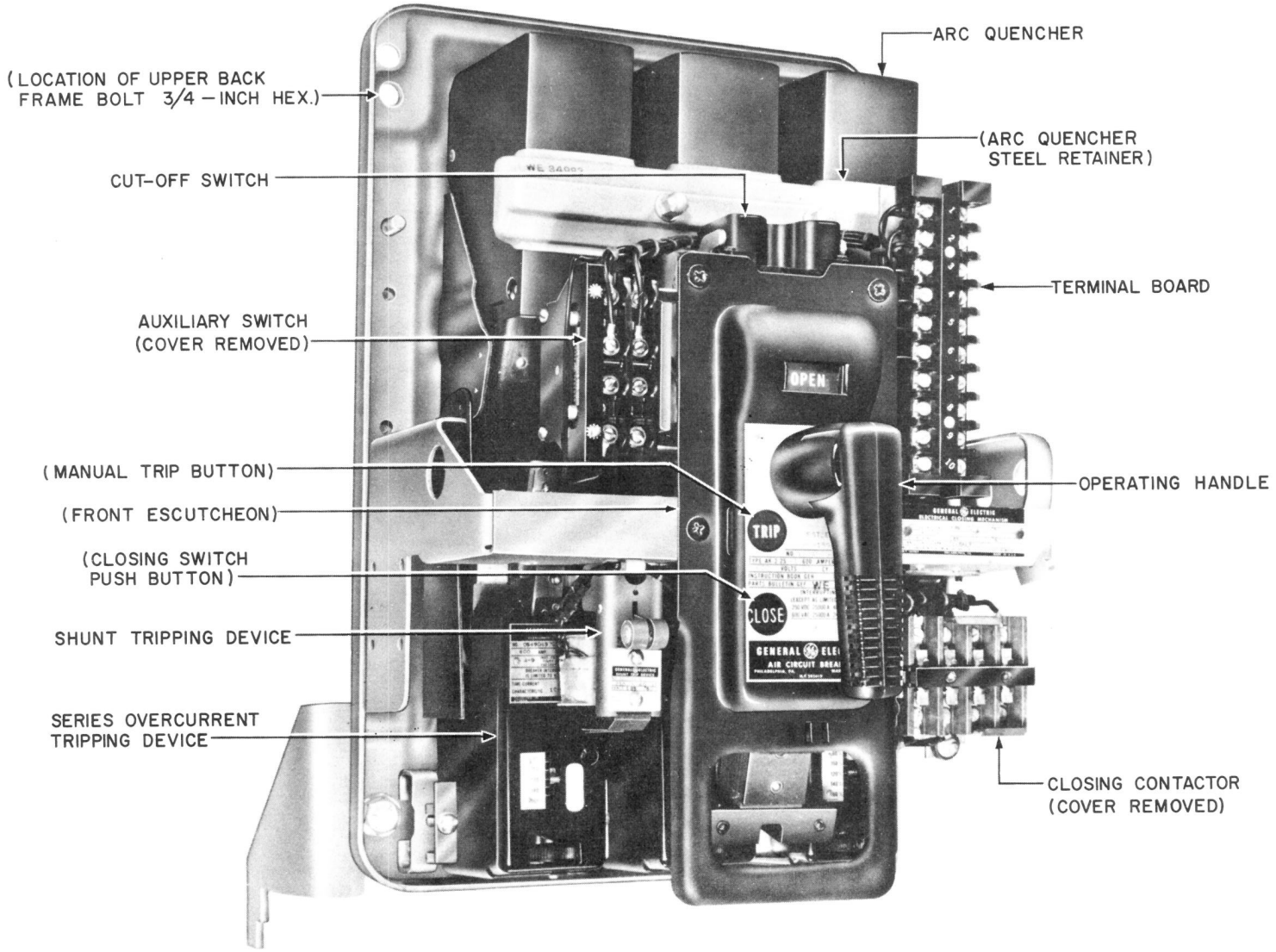

Fig. 1 – Front View of KS-15910, L2 Electrically Operated Breaker

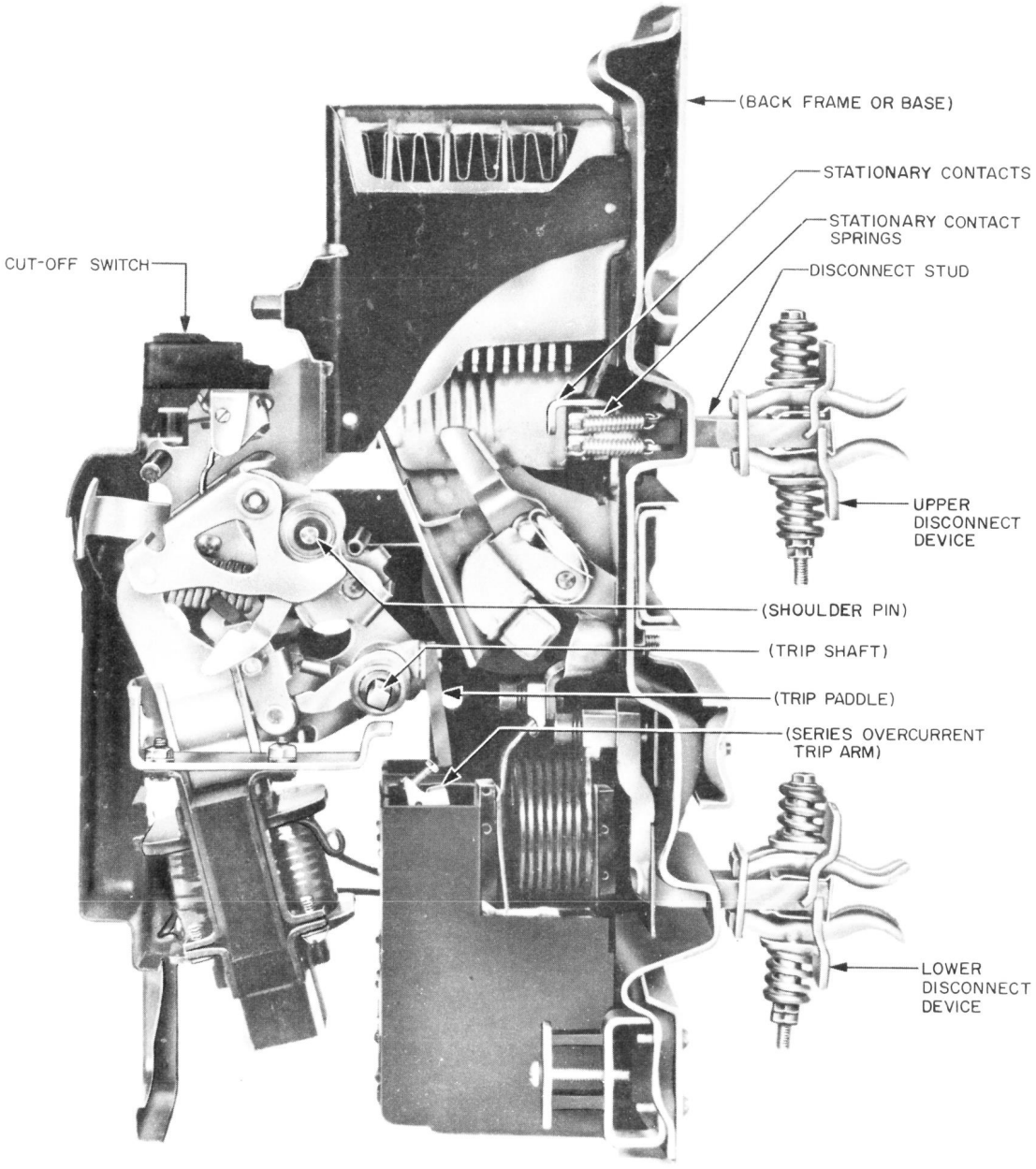

Fig. 2 – Cut-Away View of KS-15910, L1 and L2 Electrically Operated Breakers

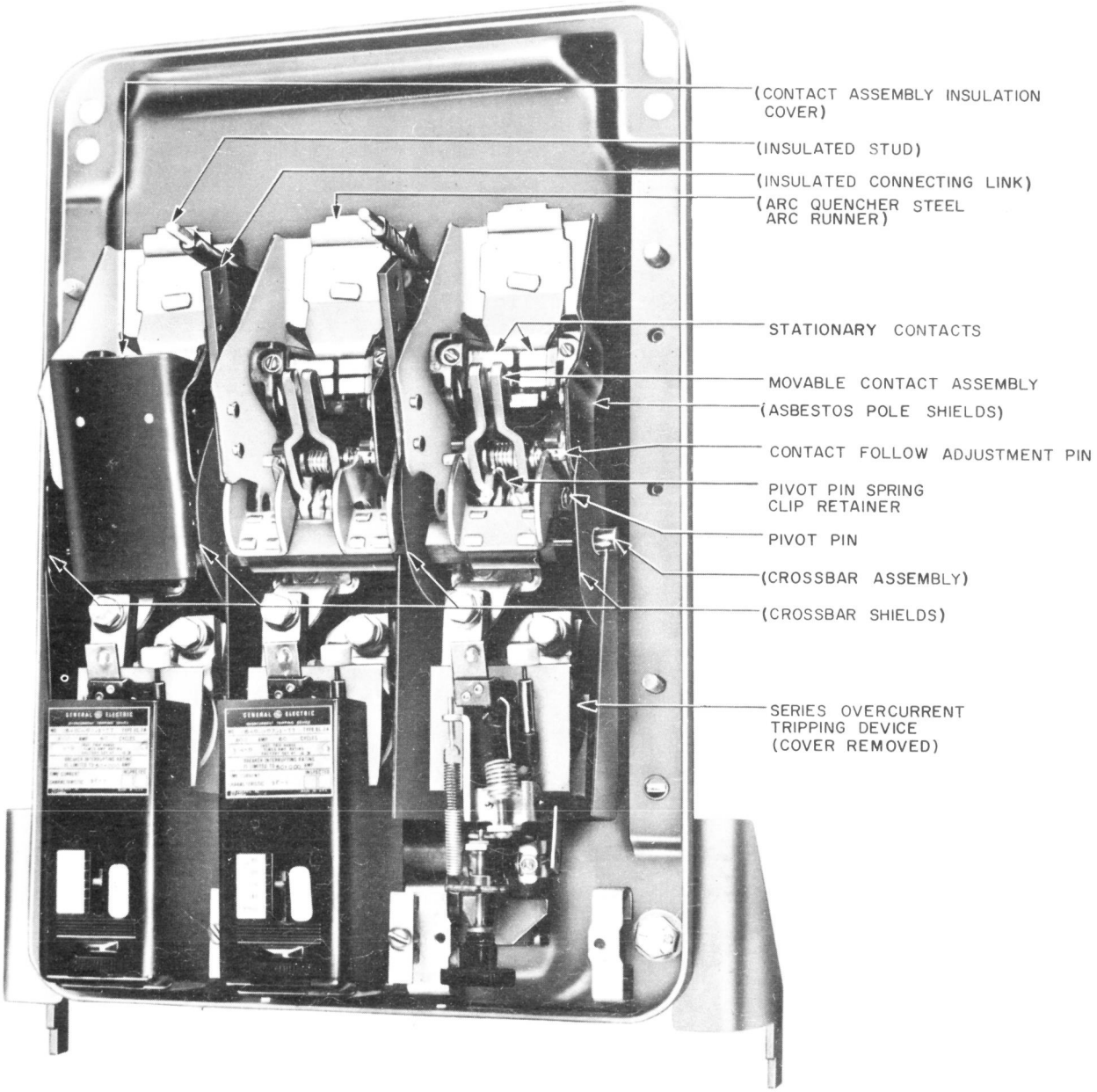

Fig. 3 – Back Frame or Base

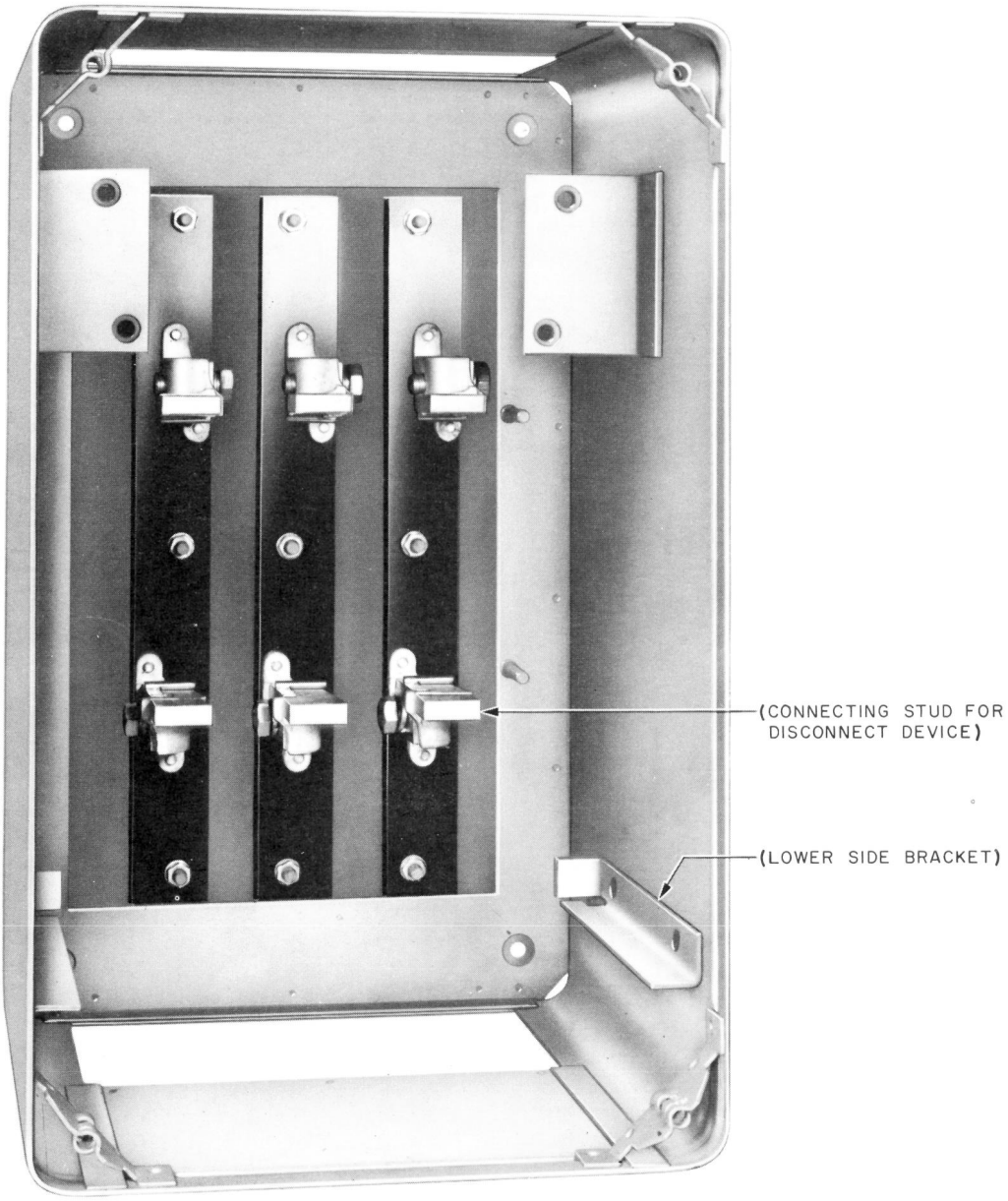

Fig. 4 – Circuit Breaker Enclosure

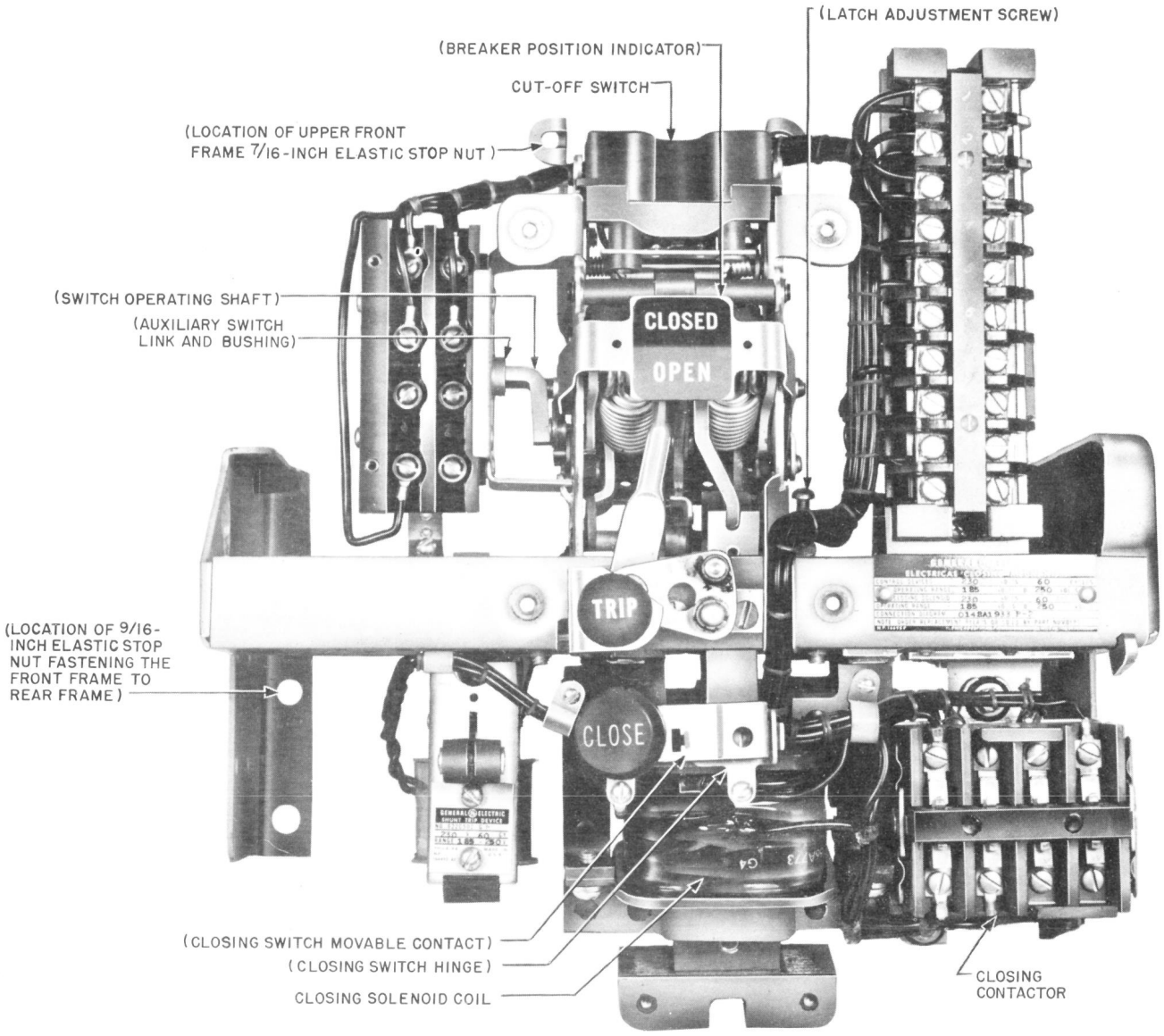

Fig. 5 – Front Frame and Mechanism (Front Escutcheon Removed)

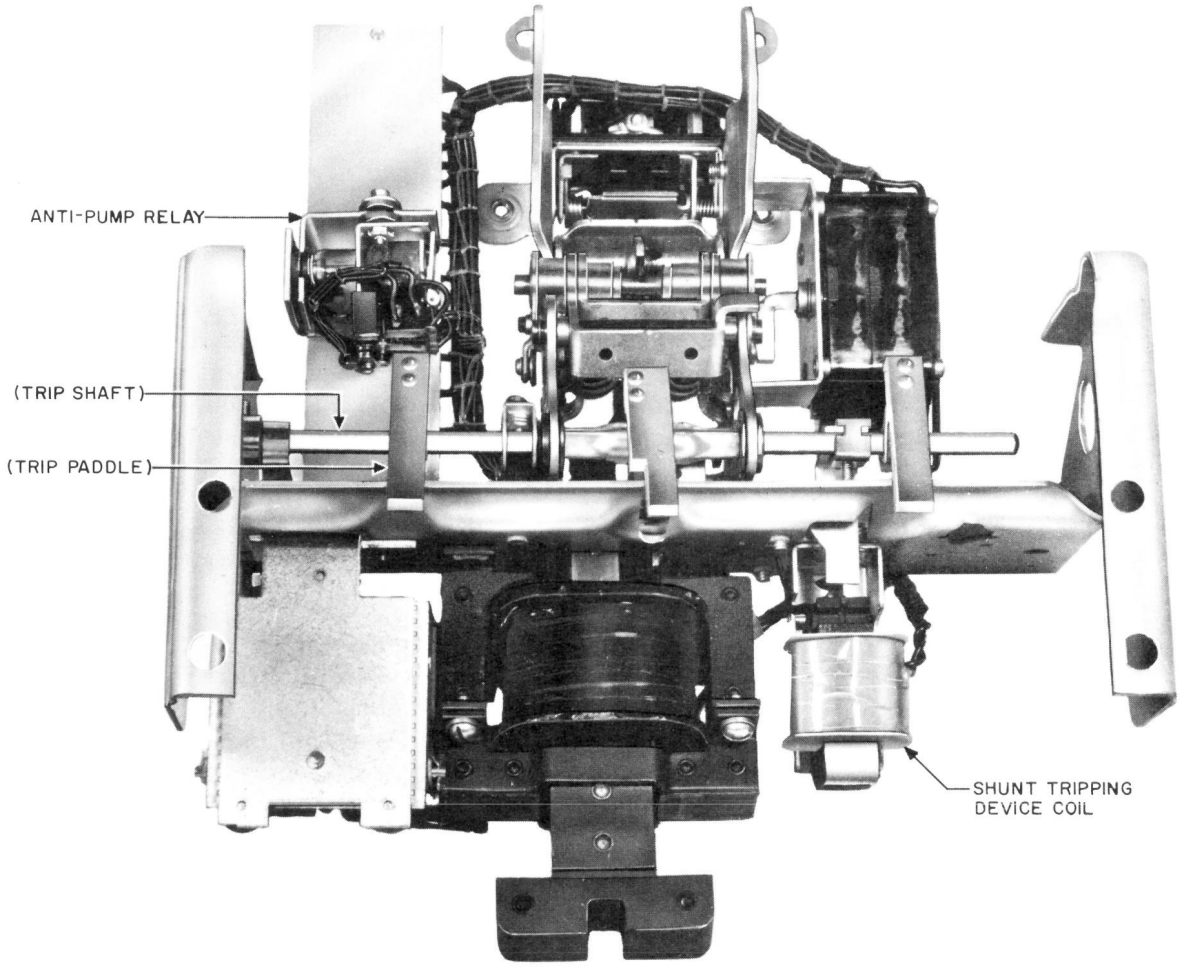

Fig. 6 – Rear of Front Frame

3. REPLACEMENT PROCEDURES

3.01 *List of Tools and Materials*

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
245	3/8- and 7/16-inch Open Double-end Wrench
KS-6015	Duck-bill Pliers
KS-8740	Electric Soldering Copper
KS-14220	Wrench
List 1	Sliding Tee Handle
List 7	6-inch Extension Bar
List 8	12-inch Extension Bar
List 12	3/8-inch 12-point Socket
List 14	7/16-inch 12-point Socket
List 18	9/16-inch 12-point Socket
List 24	3/4-inch 12-point Socket
R-1542	6-inch Adjustable Wrench
—	J. H. Williams & Co. No. 1160 3/8-inch Open-end and 3/8-inch 12-point Offset Box Wrench
—	Long-nose Pliers
—	Diagonal 5-inch Pliers
—	3-inch C Screwdriver
—	B Screwdrivers, No. 1, 2, and 3
—	4- and 5-inch E Screwdrivers
MATERIALS	
KS-14090	Gray Plastic Adhesive Tape
KS-14666	Cleaning Cloth
—	Rubber Tape
—	No. 8-32 RHM Screw (approximately 2 inches long)
—	Solderless Wire Connectors, Ideal

3.02 ***Caution: Disconnect the associated circuits before making replacements on the circuit breaker.***

3.03 Before making any replacement, tag all leads, if they are to be removed. After making any replacements, connect all leads to the proper terminals, making certain that they are secure.

3.04 After making any replacement of parts, an over-all check of the circuit breaker should be made and, when necessary, readjusted to meet the requirements specified in Section 026-315-701.

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

3.06 *Separation of Front and Rear Frames*

(1) In order to facilitate replacement of parts, it may be necessary to remove the breaker from its enclosure and to separate the front frame and mechanism from the back frame or base. The procedure for this operation is as follows.

(a) To remove the breaker from its enclosure, remove the upper two back frame bolts (see Fig. 1) and associated collars using the KS-14220 3/4-inch wrench. Lift the upper part of the breaker forward disconnecting the disconnect devices (see Fig. 2) from the connecting studs mounted in the enclosing case (see Fig. 4). Move the breaker upward until the lower brackets of the breaker are free from the lower side brackets which they engage. Because of the size and weight of the breaker, it is recommended that two men perform this operation.

Note: Carefully note the position of the nut and bolt holding the disconnect assembly together so that in reassembling the original amount of compression can be maintained.

(b) On a suitable work table disconnect the front mechanism from the base as follows. Remove the arc quenchers as covered in 3.07. Disconnect the two insulated connecting links (see Fig. 3) between the mechanism and the crossbar by removing the tie bolt and slipping the ends of the links off the ends of the shoulder pin (see Fig. 2). Use the B screwdriver, No. 2 and the J. H. Williams and Co. No. 1160 wrench to remove the tie bolt.

(c) With the KS-14220 7/16-inch wrench, remove the elastic stop nuts which fasten the upper ends of the front mechanism to the back frame of the breaker (see Fig. 5) by means of two insulated studs (see Fig. 3).

With the KS-14220 9/16-inch wrench, remove the two elastic stop nuts which fasten the wrap-around portion of the front frame to the back frame (see Fig. 5). The two frames are now disconnected.

(d) Care should be exercised in separating the two frames to avoid damage to the trip shaft arms and paddles (see Fig. 6). While the back frame is held steady, lift the front frame and mechanism up and out so that the trip paddles on the trip shaft clear the trip arms of the overcurrent trip devices. After making the necessary replacements and adjustments, reassemble the breaker in the reverse order.

3.07 *Arc Quenchers — See Fig. 1 and 3*

(1) To replace an arc quencher, remove the steel retainers across the arc quenchers using the KS-14220 7/16-inch wrench and lift the arc-quencher assembly up and out. The upper edge of the steel arc runner, fastened to the back plate of the breaker, fits into a recess in the back portion of the arc quencher and locates it in its proper position. Make sure the steel retainer is firmly fastened to its mounting studs.

3.08 *Main Contacts — See Fig. 3*

General

(1) To replace the main contacts, remove the breaker from its enclosure and separate the front mechanism from the back frame as covered in 3.06. Although the stationary contacts can be replaced with the breaker intact, it would normally be necessary to replace both movable and stationary contacts at the same time.

Movable Contacts

(2) Remove the contact assembly insulation cover by lifting and pinching the sides together so that the enlarged portion of the slotted hole in each side of the cover clears the head of the rivet which holds it in place.

(3) Release the pivot pin spring clip retainer. On the outer poles the retainer is similar to a safety pin and is released by opening its ends as with a safety pin. The center pole is equipped with a clothespin-type retainer which can simply be pulled off the pivot pin.

(4) The pivot pin of the outer poles is tapped on its outer end for a No. 8-32 screw. Use a No. 8-32 round head machine screw, 2-inches long, to engage the threads and drift out the pin.

(5) After the pivot pins have been removed from the outer poles, the movable contact assemblies may be pulled free of the crossbar assembly. A small amount of force will be required to do this as the springs on the contact follow adjustment pin will offer some resisting force.

(6) Using a small amount of force, pull the crossbar assembly free from the center pole contact assembly. The pivot pin of the center pole is shorter than its counterpart in the outer poles and does not engage the bracket on the crossbar assembly. Drift out the pivot pin as in (4) and free the contact assembly.

(7) Reassemble the new movable contacts in the reverse order. When reassembling the crossbar assembly, the crossbar shields should be located with respect to the asbestos pole shields as shown in Fig. 3. If the crossbar shields are not located as shown, breakage may occur when the breaker is operated.

Stationary Contacts

(8) With the 5-inch E screwdriver, force a stationary contact away from the center stop pin and toward its own pivot point until the contact stop surface is free of the center stop pin. The contact can then be removed with the fingers by disengaging the contact from its spring.

(9) In reassembling, the stationary contacts must be arranged in the pole units as shown in Fig. 7. Note the position of the back projection of each contact. If the contacts are not arranged as shown in Fig. 7, the back of the contacts will bear against the stud supports, causing possible damage to the contacts or failure of the breaker to latch in, when the breaker is closed.

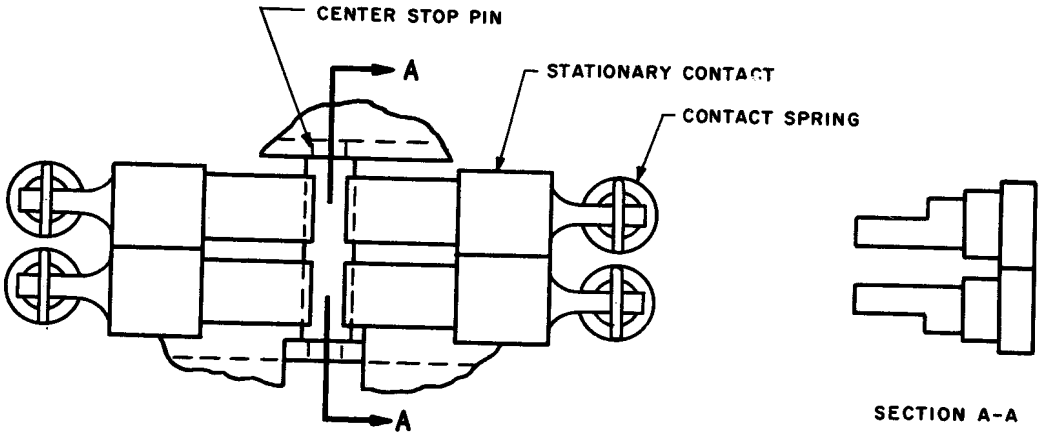

Fig. 7 – Positioning of Stationary Contacts

(10) In replacing the stationary contacts, first place the hook on the end of the contact in the hole of the contact spring; then push sideways until the back projection on the opposite end of the contact can be slipped behind the stop pin in the center of the contact assembly.

Stationary Contact Springs

(11) In order to replace the contact springs, the upper disconnect device stud must be removed (see Fig. 2). The stud is fastened to the breaker base by means of two screws and a nut located on the rear of the base. Remove the two screws using the 4-inch screwdriver and remove the nut using the R-1542 adjustable wrench. The stud can then be withdrawn from the base in a forward direction. After the stud is removed, disconnect the two ends of the contact spring and replace it with a new one.

3.09 *Series Overcurrent Tripping Device — See Fig. 3*

(1) To replace the series overcurrent tripping devices, remove the breaker from its enclosure and separate the front mechanism from the back frame as covered in 3.06.

(2) With the 4-inch E screwdriver, remove the steel clamps which fasten the cover of the device to the back of the breaker and lift off the cover. With the KS-14220 9/16-inch wrench, remove the two bolts which fasten the coil of the device to the breaker copper. Remove the round head screw which fastens the frame of the device to the breaker base. After reassembling, adjust the new device in accordance with Section 026-315-701.

3.10 *Auxiliary Switch — See Fig. 5*

(1) With the 3-inch C screwdriver, remove the auxiliary switch cover. Disconnect leads to the switch terminals using the 4-inch E screwdriver. Remove the front escutcheon by removing the four Phillips head screws from the flange of the escutcheon using the B screwdriver, No. 3. Remove two screws which fasten the switch to the side of the mechanism frame and remove the switch by moving it towards the left.

(2) Before mounting the replacement switch, turn the crank end of the switch operating shaft in position to engage the hole in the link connected to the breaker mechanism. Be sure the bearing washer is in place between the mechanism link and the switch operating shaft.

3.11 *Shunt Tripping Device — See Fig. 6*

(1) The only part of the shunt tripping device that might conceivably need replacement during the life of the breaker is the coil. To replace the coil, dismount the device by disconnecting the coil leads using the 4-inch E screwdriver and remove the two mounting nuts using the No. 245 wrench. Remove the two screws which fasten the magnet and coil to the frame. Remove the magnet from the

device and straighten the end of the coil clamp using the KS-6015 pliers. Remove the coil from the magnet and install a new coil, again forming the end of the coil clamp.

3.12 *Closing Switch — See Fig. 5*

(1) Remove the front escutcheon by removing the four Phillips head screws from the flange of the escutcheon using the B screwdriver, No. 3. With the 4-inch E screwdriver, disconnect the leads from the switch terminals. Deflect the left end of the hinge to left so that the movable contact may be disengaged from the switch assembly. Removal of the two screws completes the disassembly of the switch.

(2) In reassembling the new switch in the reverse order, be sure that the tab on the left end of the hinge is bent to the right far enough to avoid any possibility that the movable contact might become free of the assembly.

3.13 *Closing Solenoid Coil — See Fig. 5*

(1) To replace the coil, remove the closing switch as covered in 3.12 and cut off or disconnect the solenoid coil leads. With the 4-inch screwdriver, remove the four screws which fasten the lower section of the magnet to the upper section. Allow the lower section of the magnet and coil to slide downward until clear of the armature. Reassemble the new coil in the reverse order. Where existing leads are not long enough to reach the coil leads of the new solenoid coil, they must be spliced to increase the length of the lead. Flexible or solid wire of the same or larger size as the existing leads may be used. The splice may be made by using a solderless connector or the wires twisted together, soldered, and taped.

3.14 *Cut-off Switch — See Fig. 5*

(1) To replace the switch, remove the front escutcheon by removing the four Phillips head screws from the flange of the escutcheon using the B screwdriver, No. 3. With the 4-inch screwdriver, remove the cover on the top of the switch and mark and disconnect the leads from the switch terminals. Remove the two screws, one on each side, which fasten the switch to the mechanism side plates. Note that the one on the right hand side also holds a wiring cleat and spacer which serve to hold the wires clear of the link connecting the mechanism and breaker position indicator. Slide the switch out from between the steel side plates by pulling straight forward. Mount the new switch by reversing the order of procedure.

3.15 *Closing Contactor — See Fig. 5*

(1) To replace the contactor, pull off the contactor cover and mark and disconnect the leads from the terminals. Use the 4-inch E screwdriver to disconnect the leads. With a suitable wrench, remove the nuts from the three mounting studs. If the contactor unit includes the mounting bracket, remove the unit by removing the two screws which fasten the contactor bracket to the breaker frame.

3.16 *Anti-Pump Relay — See Fig. 6*

(1) Since the relay is located on the rear side of the terminal board, it will be necessary to remove the breaker from its enclosure and to separate the front mechanism from the back frame as covered in 3.06.

(2) Detach the relay from the terminal board support by removing the mounting nuts, using a suitable wrench. The leads to the relay should be cut off as closely as possible to the soldered connections so that enough wire will remain for connection to the new relay. Where existing leads are not long enough to reach the new relay, they must be spliced to increase the length of the lead. Flexible or solid wire of the same or larger size as the existing leads may be used. The splice may be made by using a solderless connector or the wires twisted together, soldered, and taped. After all connections are completed, remount the relay to its support.