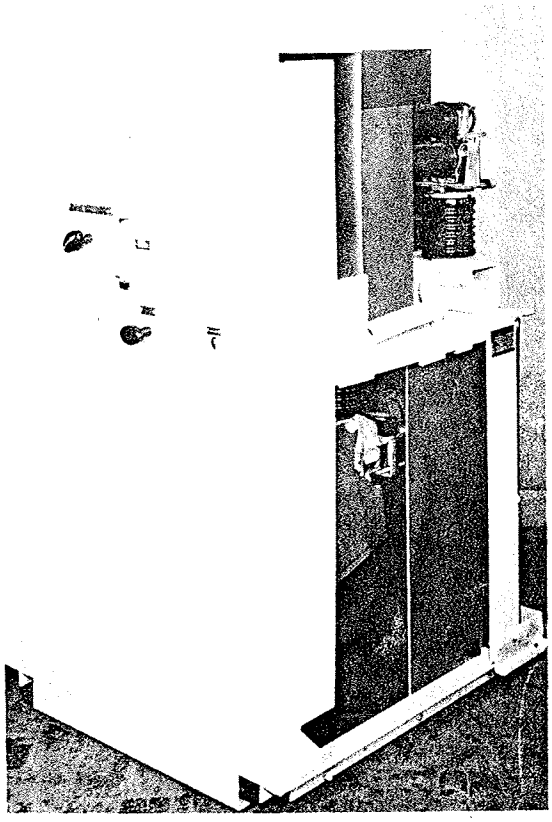
INSTRUCTIONS
AND
RENEWAL PARTS

GEI-50144C
SUPERSEDES GEI-50144B

SE-8
FUSED LOAD-BREAK SWITCH



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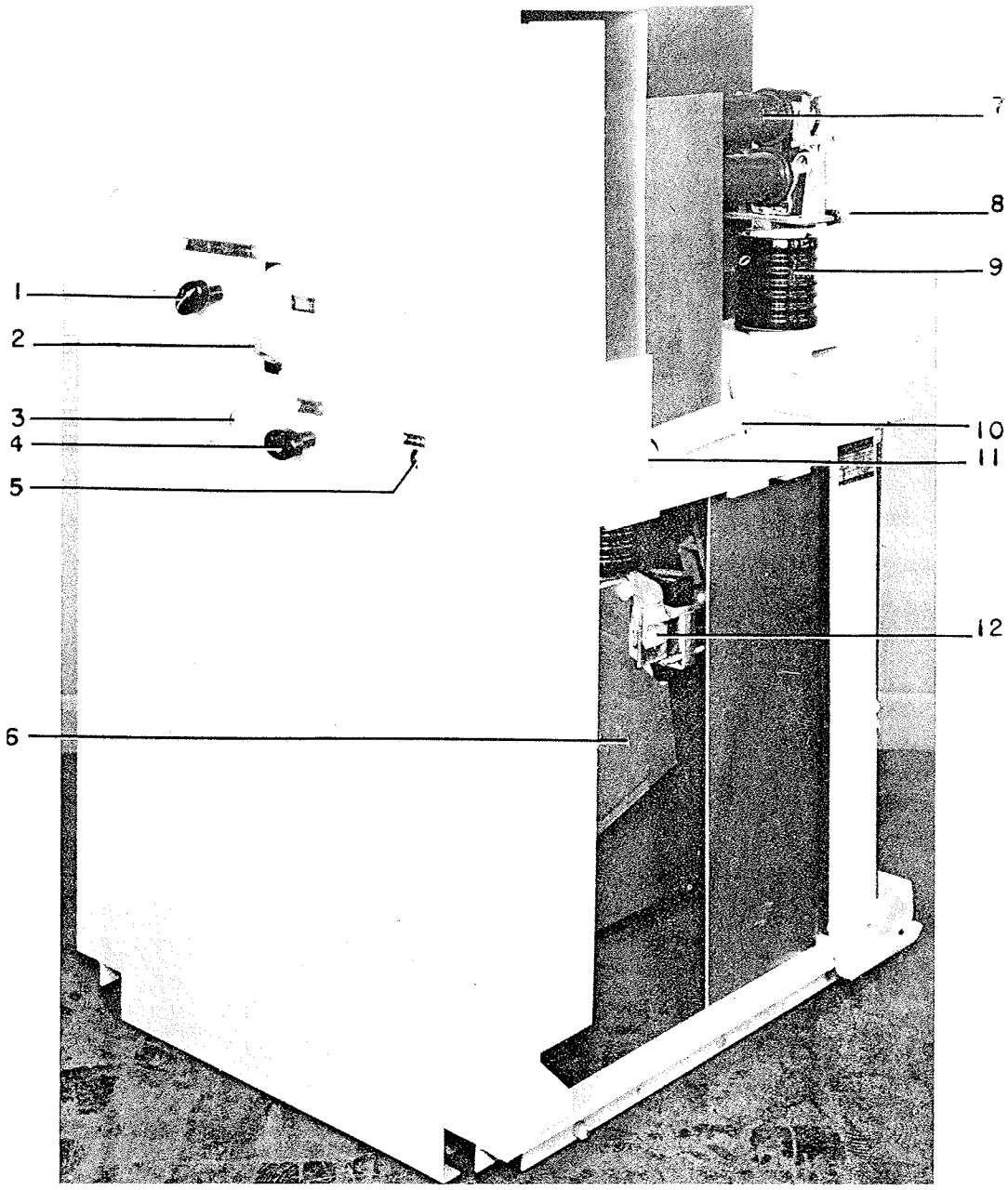

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Fig. 1 SE-8 Fused Load-break Switch Assembly

Cover (8025513)

Fig. 1 (8025513)

SE-8

FUSED LOAD-BREAK SWITCH

INTRODUCTION

The Type SE-8 fused load-break switch is the removable element for use with both Types SEF and SEM fused load-break switch equipments. The unit is a manually operated, triple pole device capable of successfully closing as well as interrupting all currents within the short circuit rating of the equipment. The removable arrangement of the device provides such advantages as ease in inspection, reduced maintenance, simplified installation as well as complete interchangeability with other units.

The interrupting ability of the device is accomplished by a combination of current limiting type power fuses working in conjunction with an interrupter switch. The fuses are used to clear all short circuit and overload currents above the interrupting ability of the switch. The fuses are so arranged on the device that they are located on the source side of the switch thereby providing maximum protection for the switch. The size and rating of the fuses depends upon the individual application and are such that proper co-ordination with other devices connected to the equipment is achieved.

A full load-interrupter switch is provided to interrupt all load currents ranging from transformer magnetizing current to the full load continuous current rating of the equipment. The interrupting ability of the switch is accomplished by the use of an arc chute type interrupter working in conjunction with an auxiliary blade, booster cylinder and magnetic blow-out coil.

A manually operated mechanism located on the front of the device is used for both opening as well as closing of the switch contacts. In closing, the mechanism is of the stored energy type and provides the high closing speed and force necessary to successfully close and latch the switch against the full momentary current rating of the equipment. In opening, the mechanism is designed so that the contact speed is at a high consistent value completely independent of the operator.

RECEIVING, HANDLING AND STORAGE

RECEIVING AND HANDLING

Immediately upon receipt of the switch, an examination should be made for loss or damage sustained in transit. If injury or rough handling is evident, a damage claim should be filed immediately with the transportation company and the nearest General Electric Apparatus Sales Office should be notified.

It is expected that due care will be exercised during the unpacking and installation of the switch so that damage will not occur from careless or rough handling, or from exposure to moisture or dirt. Care should also be taken to prevent tools from striking the crate as well as any part of the switch. Loose parts associated with the switch are always included in the same crate. Check all parts against the packing list to be sure that nothing has been overlooked.

STORAGE

It is recommended that the switch be placed into service immediately in its permanent location.

If this is not possible, the following precautions should be taken to insure proper storage conditions:

1. The switch should be carefully protected against condensation, preferably by storing it in a warm dry room since water absorption has an adverse effect on the insulation parts. Switches for use in outdoor equipment should be stored in the equipment only when power is available and the heaters are in operation to prevent condensation.

2. The switch should be stored in a clean location free from corrosive gases or fumes. Particular care should be taken to protect the equipment from moisture and cement dust, as this combination has a very corrosive effect on many parts.

3. Machine parts of the operating mechanism, etc., should be coated with heavy oil or grease to prevent corrosion.

If the device is stored for long periods of time, periodic inspections should be made to insure that corrosion of metallic parts or deterioration of insulation parts has not begun. Should the switch be stored under unfavorable conditions, steps should be taken to dry out or replace insulation parts before placing in service.

DESCRIPTION

The SE-8 fused load-break switch is a triple pole device consisting of current limiting type power fuses, an interrupter switch and an operating mechanism, as shown in Fig. 1. The assembly is mounted on its own wheels so that it can easily be inserted into or removed from the stationary housing of the equipment.

Each pole of the interrupter switch consists of a primary blade assembly, an auxiliary or arcing blade assembly and an arc chute type interrupter. The manual operating mechanism located on the front of the device is used for both closing and opening of the switch contacts. For closing, this mechanism is of the stored energy type while for opening it is direct drive but is such that the contact speed during interruption is completely independent of the operator.

Primary connection of the load-break switch assembly with the stationary housing is made through ball end type studs located on the rear of the device. A set of guides mounted on the wheel supports correctly align the primary studs while inserting the roll-out assembly into the housing. Grounding of the device is accomplished through a ground shoe that engages the ground bus of the stationary equipment. Secondary disconnects are also included on those devices where auxiliary switches are required.

The roll-out assembly is pulled into and held in engagement with the stationary housing by a jackscrew type racking mechanism. A positive interlock connected to the racking mechanism permits insertion or removal of the roll-out assembly only when the switch is open and the operating mechanism completely uncharged. The interlock also prevents closing the switch or charging of the operating mechanism unless the device is either completely engaged in the housing or in the test position where the primary terminals are isolated.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

A time delay device connected to the operating mechanism prevents immediate reopening of the switch after closing to allow sufficient time for the power fuses to operate in the event that the switch is closed in on a fault or overload. This results in a completely co-ordinated arrangement where the fuse and switch combination is capable of interrupting all currents up to and including the available short circuit capacity of the equipment. A complete set of isolating barriers are provided to insulate the current carrying parts from ground as well as from phase to phase. In addition, sufficient covers and barriers are included to make the moving parts of the operating mechanism inaccessible even with the device in the test position.

INSTALLATION

Before placing the switch in service within the stationary housing, a check should be made to insure proper operation. This should include a review of all adjustments as well as a thorough inspection of both the switch and operating mechanism.

DO NOT WORK ON OR MAKE ANY ADJUSTMENTS TO THE SWITCH OR MECHANISM WHEN EITHER THE CLOSING SPRING OR BOOSTER SPRING IS CHARGED. Removal of the booster spring is easily accomplished when the switch is in the closed position.

ADJUSTMENTS

Although the switch has been completely adjusted, operated and inspected at the factory, it is possible that unusually rough handling during transportation may have caused some loosening or disturbance of parts of the apparatus. It is therefore advisable to review all adjustments before placing the switch in service, making readjustments wherever necessary.

When making adjustments or checking the various clearances, the switch should be operated slowly by hand using the maintenance operating handle as shown in Fig. 2. The closing release latch (5) Fig. 8, must be withdrawn from the closing spring assembly before the shaft can be rotated. Also, the booster spring (9) Fig. 13 and opening spring (8) should be removed before manual operation is attempted. Closing of the switch with the stored energy mechanism should not be attempted until the blades have been manually operated several times through their entire stroke and final inspection is complete.

All adjustments should be checked not only during the initial installation of the switch, but also during periodic inspections and whenever repair or replacement of parts becomes necessary.

The following adjustments are listed in the order in which they should be checked. Before checking the adjustments, remove the front cover and necessary barriers so that all parts are accessible.

ARCING CONTACT ALIGNMENT

Open and close the switch slowly and observe the arcing tip (4) Fig. 3, as it enters the arc chute assembly (5). The arcing tip should pass completely through the lower arc runner (9) without touching and be centrally located as it makes contact with the upper arc runner (8). If the travel of the arcing tip is parallel to the center line of the arc chute, but not centered, adjustment can be made by loosening the hinge mounting bolts (3) and rotating the hinge block slightly in the proper direction. If the arcing tip travel is not parallel to the center line of the arc chute, adjustment can be made by loosening the arc chute mounting bolts (7) and swinging the lower end of the arc chute in the proper direction while retightening the bolts.

NOTE: Shifting of the hinge block may change the location of the primary stud. Shifting of the arc chute assembly may change the trip roller clearance.

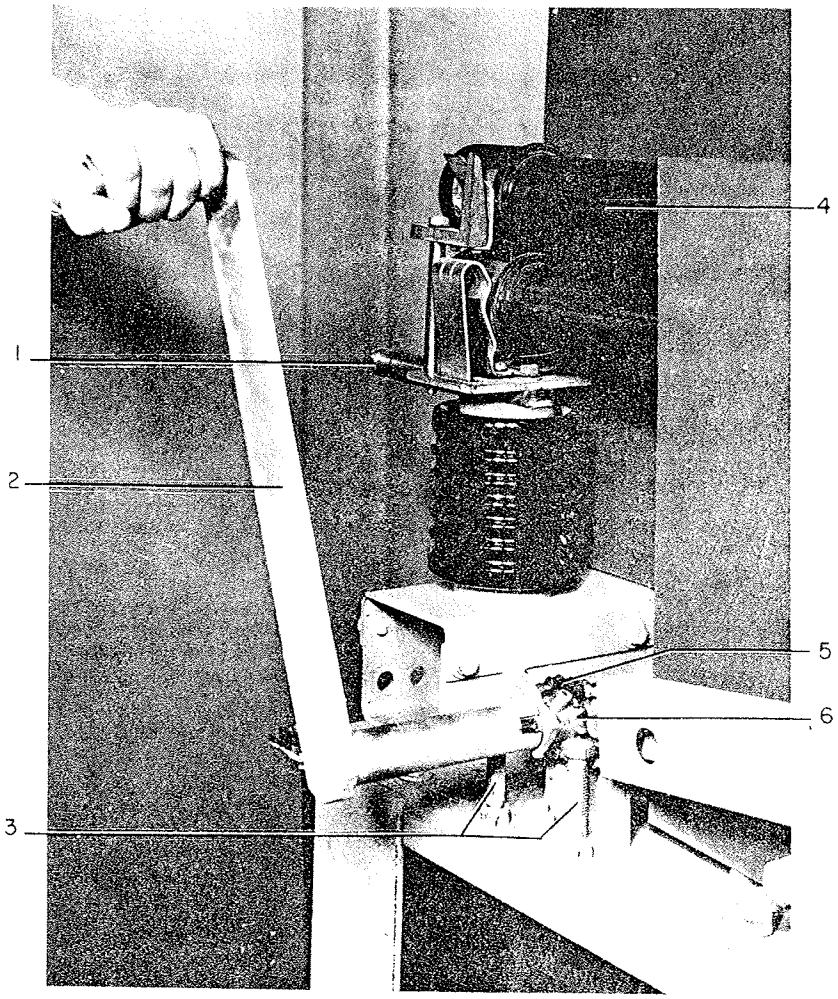
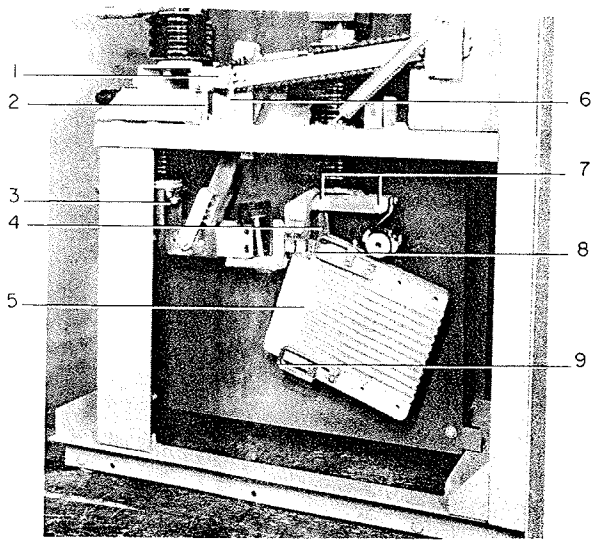


Fig. 2 (8025865)

1. Upper Stud
2. Maintenance Handle
3. Stop Bolts
4. Fuse
5. Chain
6. Switch Cross Shaft

Fig. 2 Method of Manually Operating Switch

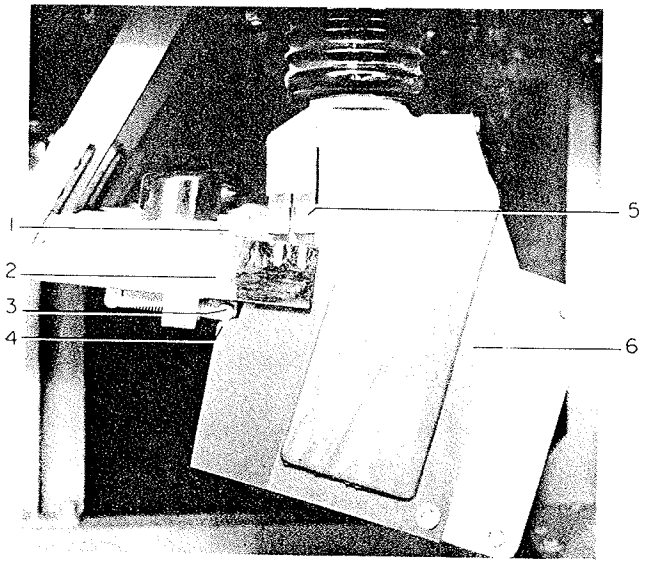
Fig. 3 (8024175)



1. Switch Cross Shaft
2. Closed Stop
3. Mounting Bolts
4. Arcing Tip
5. Arc Chute Assembly
6. Open Stop
7. Arc Chute Mounting Bolts
8. Upper Arc Runner
9. Lower Arc Runner

Fig. 3 Cross Section of Interrupter Switch on SE-8 Assembly

Fig. 4 (8023812)



1. Auxiliary Blade Assembly
2. Primary Blade
3. Trip Roller
4. Trip Latch
5. Primary Contact Fingers
6. Arc Chute Assembly

Fig. 4 Interrupter Switch in Latched Position

ARCING CONTACT WIPE

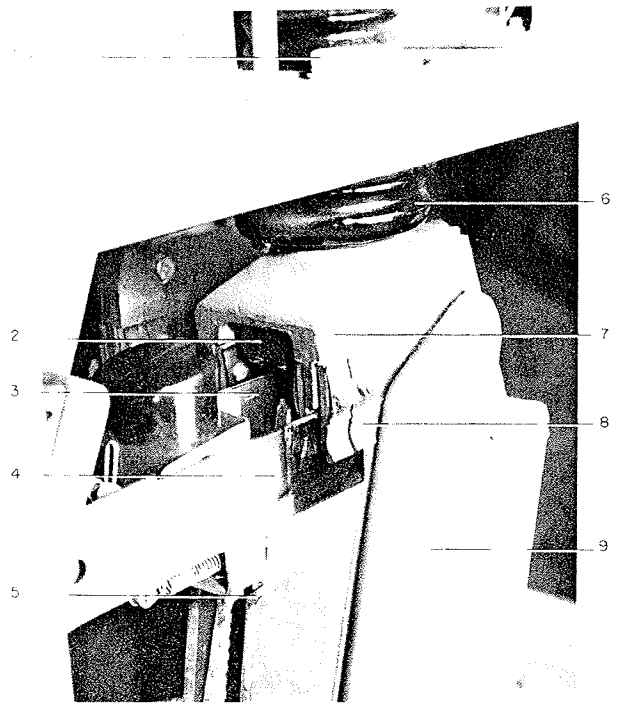
With the switch in the latched position as shown in Fig. 4, there should be electrical contact between the arcing tip (4), Fig. 3, and the upper arc runner (8). This can be checked using a light indicator or bell set. If contact is not present with the switch in this position, the arcing tip has become sufficiently worn to require replacement.

PRIMARY CONTACT ALIGNMENT

Open and close the switch slowly and observe the position of the primary blades (4), Fig. 5, on each pole as they enter the primary contact fingers (8). The blade should be centrally located within the fingers. To adjust for this, loosen the bushing mounting bolts (1) and shift the bushing assembly laterally until correct alignment is obtained. Tighten the mounting bolts and recheck for correct alignment.

PRIMARY CONTACT BEARING

Check that each primary contact finger is making contact with the primary blade when in the closed position. This can be checked using a .002" feeler gauge or a thin film of grease. In the closed position, each finger should be pulled away



1. Mounting Bolts
2. Buffer Block
3. Arcing Tip
4. Primary Blade
5. Trip Latch
6. Bushing
7. Contact Block
8. Contact Fingers
9. Arc Chute Assembly

Fig. 5 Blade and Arc Chute Assembly

from the lower edge of the contact block as shown in Fig. 5. To adjust for correct bearing, loosen the bushing mounting bolts (1), and rotate the bushing assembly slightly in the proper direction. Tighten the mounting bolts and recheck for correct bearing.

PRIMARY CONTACT WIPE

When the switch is closed slowly by hand, the clearance between the edge of the primary blades (4) Fig. 5 and the contact block (7) should be 1/8" - 3/16". This can be adjusted by re-positioning the bolted connection between the operating rod and crank on the switch cross shaft.

TRIP ROLLER CLEARANCE

With the switch in the open position, depress the toggle linkage (2), Fig. 6, on the auxiliary blade as far as possible towards the hinge and slowly close the switch until the trip roller is directly opposite the trip latches on the arc chute as shown in Fig. 6. In this position there should be a minimum of 1/16" clearance between the latch and roller. This can be varied by loosening the arc chute mounting bolts (1) and sliding the arc chute assembly in the proper direction.

TRIP ROLLER BEARING

Open the switch slowly until the arcing blade is in the latched position as shown in Fig. 4. In this position there should be a minimum of 3/16" engagement between the latch and roller. Also check that all three poles of the switch trip at the same time. This can be checked by opening the switch very slowly until the blades trip. Both the trip roller bearing and timing can be varied by loosening the arc chute mounting bolts (1) Fig. 6, and sliding the arc chute assembly in the proper direction.

BOOSTER CYLINDER PRESSURE

The pressure in the booster cylinder can be checked as shown in Fig. 7 by holding a finger over the nozzle (2) in the booster cylinder when the auxiliary blade is held in its highest position relative to the primary blade. Under this condition the auxiliary blade should be stationary or move very slowly towards the primary blade. If the return of the auxiliary blade is rapid, the piston has become worn or damaged and should be replaced.

PRIMARY FINGER PRESSURE

The pressure of the primary contact fingers can be checked by the use of a small spring balance. With the switch in the open position, place a 3/16" bar between the contact finger on each pole and measure the force required to slide the bar from the fingers.

The force necessary to do this should be 7 to 9 pounds. A thin film of G.E. Type D50H47 lubricant should be applied to the contact fingers before making this measurement. The pressure on the fingers can be varied by loosening or tightening the bolts holding the fingers in position.

NOTE: When adjusting finger pressure loosen or tighten both bolts. Never loosen the bolts to the point where the fingers are loose when the blade is in the open position or tighten the bolts to the point where the springs are completely flat when the blade is in the closed position.

PRIMARY BLADE HINGE PRESSURE

The pressure at the hinge of the primary blade can be checked by measuring the torque required to rotate the blade assembly. With the blade in the open position, measure the torque required to rotate the blade towards the closed position. The torque should measure 60 to 70 inch pounds.

NOTE: In order to measure this torque, it is first necessary to disconnect the operating rods from the operating shaft. Adjustment can be made by loosening or tightening the nuts on the hinge stud.

STOPS

The stop bolts (2 & 6), Fig. 3 have been set at the factory for the correct relationship between the various cams and latches of the mechanism, the over-center position of the switch operating rod and the position of the switch contacts. They should not be changed unless they have been disturbed and it becomes necessary to obtain other adjustments within the mechanism.

NOTE: A change in the closed stop (2), Fig. 3, affects the amount of over-center locking of the operating rods as well as the opening interlock latch overtravel, therefore the stops should never be changed to the extent that the operating rods reach an on-center position. Likewise, a change in the open stop (6) affects the closing release latch clearance.

CLOSING RELEASE LATCH OVERTRAVEL

With the closing release handle (12), Fig. 8, pulled to its fullest extent, the closing release latch (5) should have a minimum of 1/16" overtravel after releasing the closing spring as seen in Fig. 10. This clearance has been set at the factory and no adjustment has been provided. If insufficient clearance is present, examine the mechanism for insufficient travel of the closing release handle, binding or damaged parts.

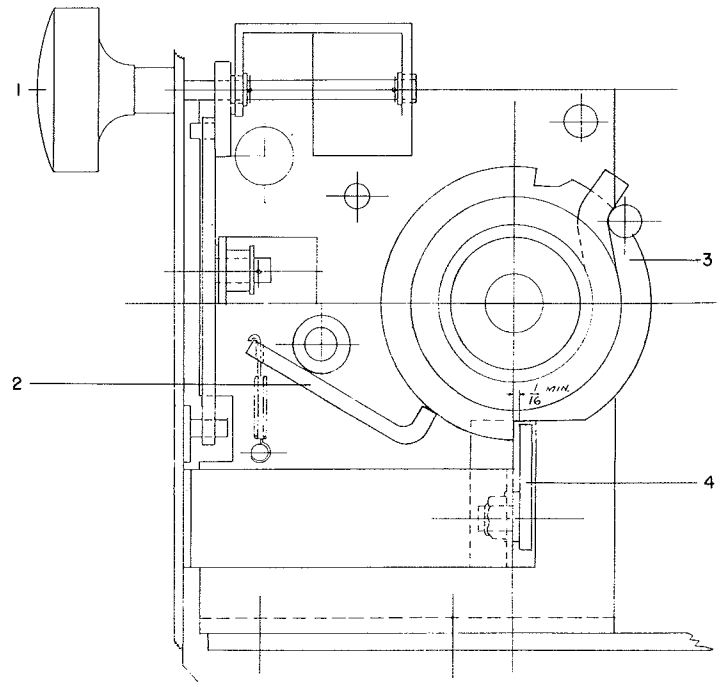
CLOSING RELEASE LATCH CLEARANCE

With the switch in the fully open position there should be 1/16" - 3/32" clearance between the bearing surfaces of the closing release latch (5) Fig. 8, and the notch in the closing spring assembly as seen in Fig. 10. This clearance can be increased by reducing the height of the open stop bolt (6), Fig. 3.

CLOSING RELEASE LATCH BEARING

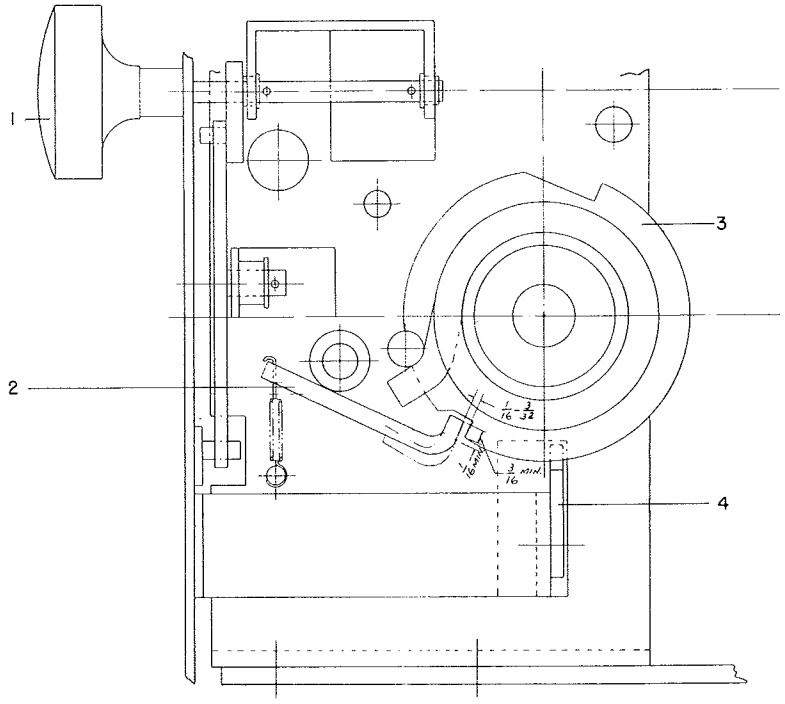
With the switch in the fully open position there should be at least 3/16" engagement between the closing release latch (5), Fig. 8, and the notch in the closing spring assembly as seen in Fig. 10. This clearance has been set at the factory and no adjustment has been provided. If insufficient bearing is present, check that the closing release handle is completely reset or examine the mechanism for binding or damaged parts.

Fig. 5 (8023813)



1. Operation Selector Handle
2. Closing Release Latch
3. Closing Spring Assembly
4. Opening Interlock Latch

Fig. 9 Partial Cross Section of Operating Mechanism Shown in Closed Position



1. Operation Selector Handle
2. Closing Release Latch
3. Closing Spring Assembly
4. Opening Interlock Latch

Fig. 10 Partial Cross Section of Operating Mechanism Shown in Open Position

OPENING INTERLOCK LATCH OVERTRAVEL

With the switch in the fully closed position, check that a minimum of 1/16" clearance is present between the bearing surfaces of the opening interlock latch (4), Figs. 9 and 11, and the notch in the closing spring assembly (3), Fig. 9. This clearance is dependent upon the degree of over-center of the switch operating rods and has been set at the factory. If insufficient clearance is present and the closed stop (2), Fig. 3, is set correctly, examine the mechanism for worn or damaged parts.

With the switch fully closed and the operation selector (1), Fig. 9, in the "TO CHARGE AND CLOSE" position, check that the opening interlock latch prevents opening of the switch.

OPENING INTERLOCK LATCH CLEARANCE

With the switch fully closed and the operation selector set to "TO OPEN", the opening interlock latch (4), Fig. 9 should be completely disengaged from the notch in the closing spring assembly (3). This clearance has been set at the factory and no adjustment has been provided. If insufficient clearance is present, examine the mechanism for binding or damaged parts.

CHARGING LATCH CLEARANCE

With the switch fully closed and the operation selector set in the "TO OPEN" position, the charging latch (5), Fig. 11, should completely disengage the charging cam (1) a minimum of 1/16". Tnis clearance can be increased by lowering the slider guide located on the opposite side of the support from the latch (5).

Do not lower the guide to the point where the bearing between the latch and charging cam is reduced to less than 3/16".

FULLY CHARGED INTERLOCK CLEARANCE

With the mechanism completely uncharged and the closing release handle (12), Fig. 8, fully depressed, there should be a maximum of 1/16" clearance between the interlock arm (9) and the disc on the closing spring assembly. This clearance can be decreased slightly by raising the support guides for the closing rlease handle. Also check that with the closing spring fully charged, the interlock arm (9) lines up with the cutout in the disc so that the closing release handle can be operated to its fullest extent.

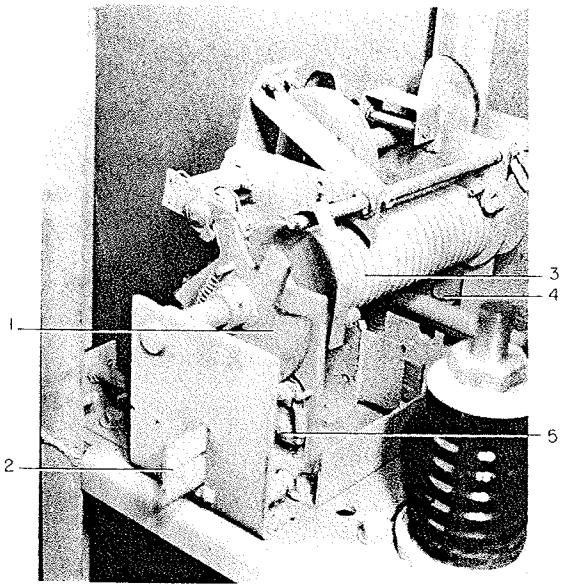
NOTE: Under this condition, if the closing release handle is pulled, the energy in the spring will be released closing the switch.

INTERLOCK STUD ALIGNMENT

With the mechanism in the fully charged position and the operating handle removed, the interlock stud (6), Fig. 8, should lineup with the 1/2" hole in the operating handle socket (4). This alignment is set at the factory and no adjustment is provided. If misalignment is present examine the mechanism for damaged parts or excessive binding.

Fig. 9 (688C525)

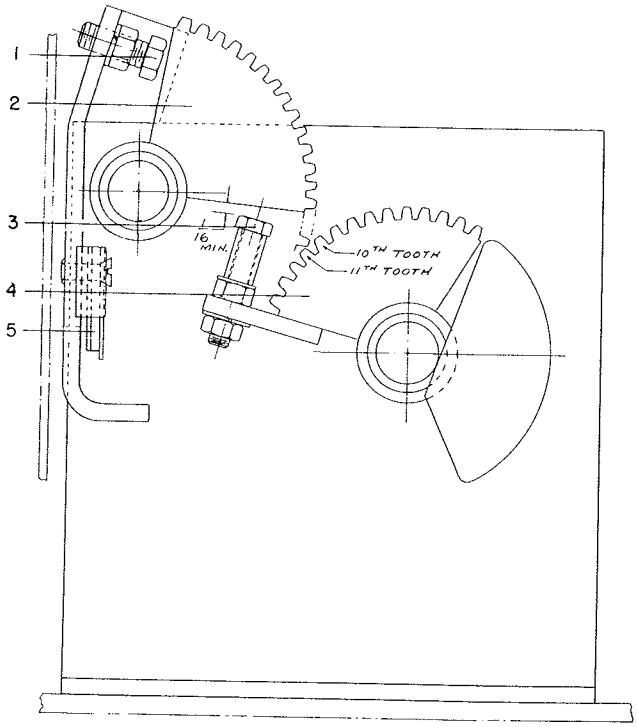
Fig. 10 (828C794)



1. Charging Cam
2. Positive Interlock Slide
3. Closing Spring
4. Opening Interlock Latch
5. Charging Latch

Fig. 11 (8023809)

Fig. 11 Operating Mechanism



1. Stop Bolt
2. Driving Gear
3. Adjusting Screw
4. Driven Gear
5. Buffer

Fig. 12 (8286795)

Fig. 12 Partial Cross Section of Operating Mechanism in Closed Position Showing Opening Gears

OPENING GEAR MESH

Check the mesh of the opening gears (6) Fig. 13 during the first part of the opening operation. The initial rotation of the driven gear (4) Fig. 12 should be done through the adjusting screw (3) so that the first tooth on the driving gear 2 meshes correctly between the tenth and eleventh tooth of the driven gear as shown in Fig. 12. Adjustment can be made using the adjusting screw (3) to obtain proper mesh. If the mesh is out of adjustment by a whole tooth or more check the fully closed position of the switch or the possibility of the chain being out of relation by a sprocket tooth or more.

OPENING GEAR CLEARANCE

With the switch fully closed and the operating handle removed there should be a minimum of 1/16" between the adjusting screw (3) Fig. 12 and the edge of the driving gear as shown in Fig. 12. This can be increased by raising the closed stop bolt (2) Fig. 3. Refer to the section on STOPS.

TIMER

Check that the time required for the closing release handle (12), Fig. 8, to completely return from its fully extended position is a minimum of 25 seconds. No provision is made to vary this time. If the time required to reset is less this value, check for oil leakage from the cylinder or misalignment between the timer crank and the slide linkage. If the time required is greatly in excess of this value, examine the linkage for binding or possible clogging of the orifice within the timer cylinder.

FINAL INSPECTION

Before placing the SE-8 into service, a final inspection should be made consisting of the following:-

1. Check all nuts, washers, bolts, cotter pins, and terminal connections for tightness.
2. See that all bearing surfaces of the mechanism have been lubricated. Refer to the section on LUBRICATION.
3. Operate the device slowly several times by hand and note that there is no excessive binding or friction.
4. Inspect all electrical wiring (if present) to make sure that no damage has resulted during installation and test for possible grounds or short circuits.
5. See that any place where the surface of the paint has been damaged during installation is repainted immediately.
6. Replace all barriers, covers and any other parts that may have been removed during installation.
7. Check that the current rating of the power fuse is correct for the particular application on which it is to be used.

HI-POTENTIAL TEST

If the device had been stored for a long period of time, it is recommended that the insulation be checked before it is placed in service. A standard 60 cycle high potential test at 14,000 volts RMS for the 4.8 kv switch and 27,000 volts RMS for the 13.8 kv switch will normally indicate whether the device is satisfactory for service. With the switch contacts in the fully opened position, apply the high potential to each terminal individually for one minute with all other terminals and the frame grounded. After high potential tests are made all organic insulating materials should be inspected for visible leakage current paths, and necessary action must be taken to replace insulation that may have been affected by moisture absorption. The high potential test is also recommended for devices which have been removed from service and stored over an extended period of time under unfavorable atmospheric conditions.

NOTE: Before applying a hi-potential test remove the power fuses, connecting the fuse clips with a suitable wire or conductor.

OPERATION

The various operations of the SE-8 load-break switch and its associate operating mechanism are all accomplished manually. To insure proper operation of the device, various interlocks are included, thus providing a maximum of safety at all times. In addition, the interlocks correctly position the roll-out assembly within the stationary housing before operation of the mechanism can be attempted.

In general, these interlocks are manually set by the use of an operation selector handle located on front of the device. As shown in Fig. 1, the operation selector handle has three positions: "TO RACK, TO OPEN, and TO CHARGE AND CLOSE." In order to accomplish any one of these operations, the selector handle must be in the corresponding position. Also, once a particular operation has been started, the selector handle cannot be moved to either of the other positions until the operation has been completed.

An emergency release (5), Fig. 1, is provided to release the energy stored in the closing spring without closing the switch. The purpose of this emergency release is to permit removal of the roll-out assembly from the housing after the closing spring has been charged or partially charged without completing the sequence of closing and opening the switch. The slot in the end of the operating handle is designed to engage the emergency release. Operation is accomplished by a clockwise rotation of the operation handle.

For ease in understanding the various interlocks and the method in which they prevent mis-operation, the following describes their function in the various positions of the operation selector handle.

In the "TO RACK" position:

1. The racking mechanism is accessible from the front of the device.
2. The positive interlock slide is withdrawn, thereby permitting insertion into or removal from the stationary housing.
3. The charging cam is positively blocked so that the mechanism cannot be charged.
4. The closing release handle cannot be operated.

In the "TO OPEN" position:

1. The racking mechanism is inaccessible.
2. The positive interlock slide is extended, preventing removal from or insertion into the stationary housing.
3. The opening interlock latch is removed.
4. The charging latch is depressed so that in opening, the charging cam will reset.
5. The closing release handle cannot be operated.

In the "TO CHARGE AND CLOSE" position:

1. The racking mechanism is inaccessible.
2. The positive interlock slide is extended preventing removal from or insertion into the housing.
3. The charging cam rachet arrangement is operable.
4. The closing release handle can be operated after the closing spring is fully charged.
5. The opening interlock latch is in position to prevent opening after the switch closes.

NOTE: The selector handle cannot be moved from the "TO CHARGE AND CLOSE" position to the "TO OPEN" position unless the switch has been closed. If the mechanism has been charged but the switch not closed, the force on the charging latch prevents rotation of the selector handle. Also, the selector handle cannot be moved from "TO CHARGE AND CLOSE" with the closing release handle extended.

In like fashion, the selector handle cannot be moved from "TO OPEN" to "TO RACK" unless the switch is open. This is accomplished by interference between the charging cam and the positive interlock slide except when the switch is open and the charging cam reset.

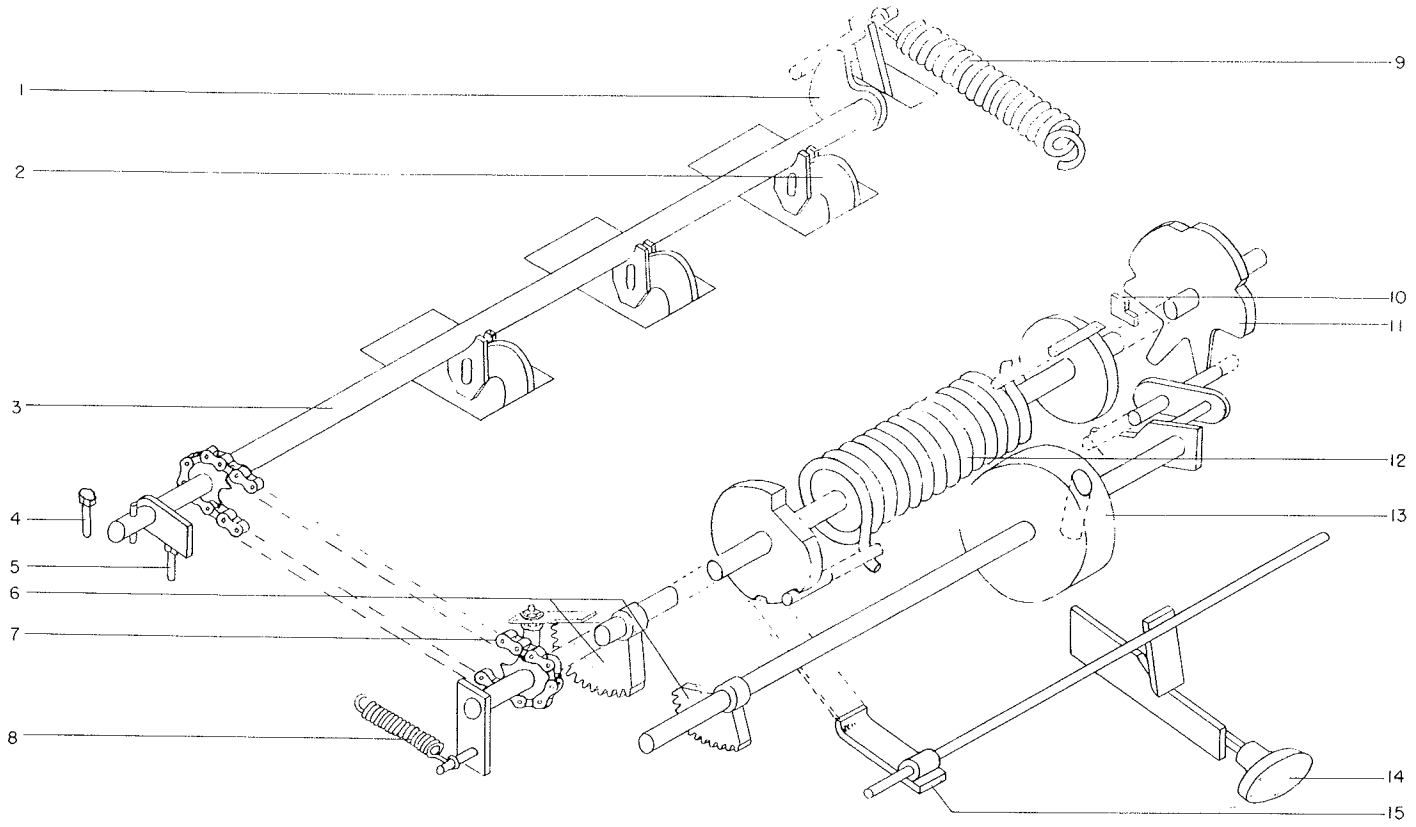


Fig. 13 (2540777)

1. Booster Cam
2. Operating Rods
3. Switch Cross Shaft
4. Closed Stop
5. Open Stop
6. Opening Gears
7. Chain
8. Opening Spring
9. Booster Spring
10. Charging Latch
11. Charging Cam
12. Closing Spring
13. Handle Socket
14. Closing Release Handle
15. Closing Release Latch

Fig. 13 Schematic Diagram of Operating Mechanism in the Open and in Uncharged Position

RACKING OPERATION

The load-break switch assembly is racked into and out of contact with the stationary housing by use of a floating type jackscrew mechanism. This mechanism is manually operated from the front of the roll-out assembly and is used only for producing electrical contact between the removable and stationary elements of the equipment during the last portion of travel of the roll-out assembly. Before operating this mechanism, the roll-out assembly must be positioned within the stationary housing in the location where the racking mechanism takes effect. The floating design of the mechanism permits considerable engagement of the jackscrew with the stationary portion before overcoming the pressure of the primary disconnect studs as well as permitting some degree of misalignment between the mating parts.

To insert the roll-out assembly in the stationary house, the operation selector handle (1), Fig. 1, must be placed in the "TO RACK" position. In this position, the positive interlock slide (11) is withdrawn permitting the roll-out assembly to be placed in the position where the racking mechanism is operable. Also, the end of the jackscrew shaft is uncovered so that the racking crank handle may be inserted.

In order to place the operation selector handle in the "TO RACK" position the switch must be open and the operating mechanism completely uncharged. It should be noted that the roll-out assembly can be placed in the stationary housing up to the test position with the operation selector handle in either the "TO OPEN" or "TO CHARGE AND CLOSE" positions.

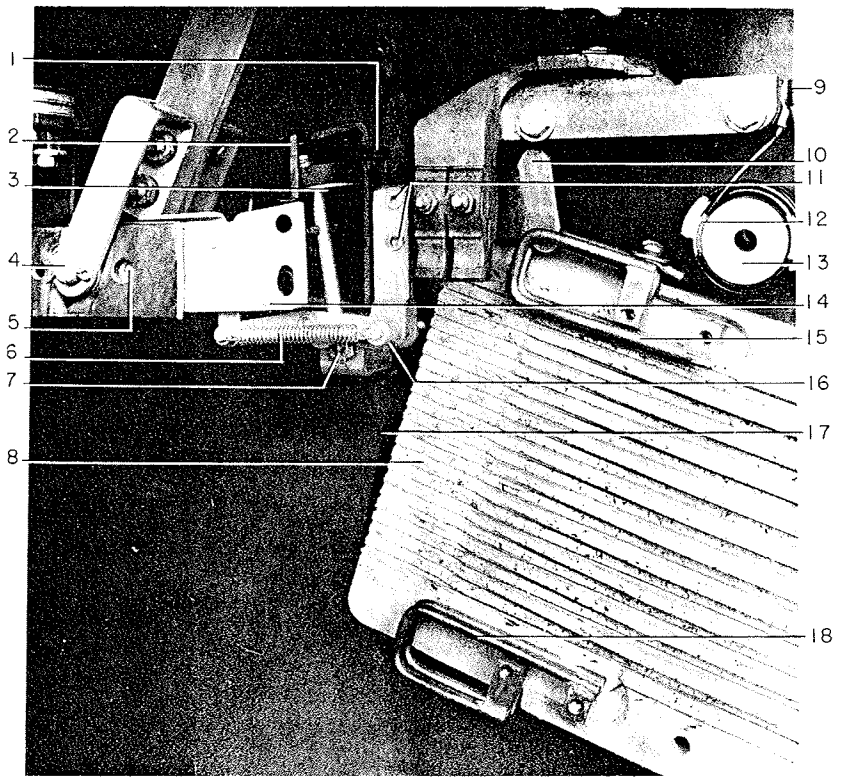
CHARGING OPERATION

Charging of the closing spring is manually accomplished by three downward pumps of the operating handle. Referring to Fig. 13, this motion rotates the right hand end of the closing spring (12) through the rachet arrangement of the charging cam (11) thus charging the spring. The left hand end of the spring is held from rotating by the closing release latch (15).

In order to charge the closing spring, it is first necessary to place the operation selector in the "TO CHARGE AND CLOSE" position. In this position, the charging latch (10) is released making the rachet arrangement of the charging cam operable.

Charging of the booster spring (9) is automatically accomplished during the opening stroke of the switch and is described in detail under Opening Operation.

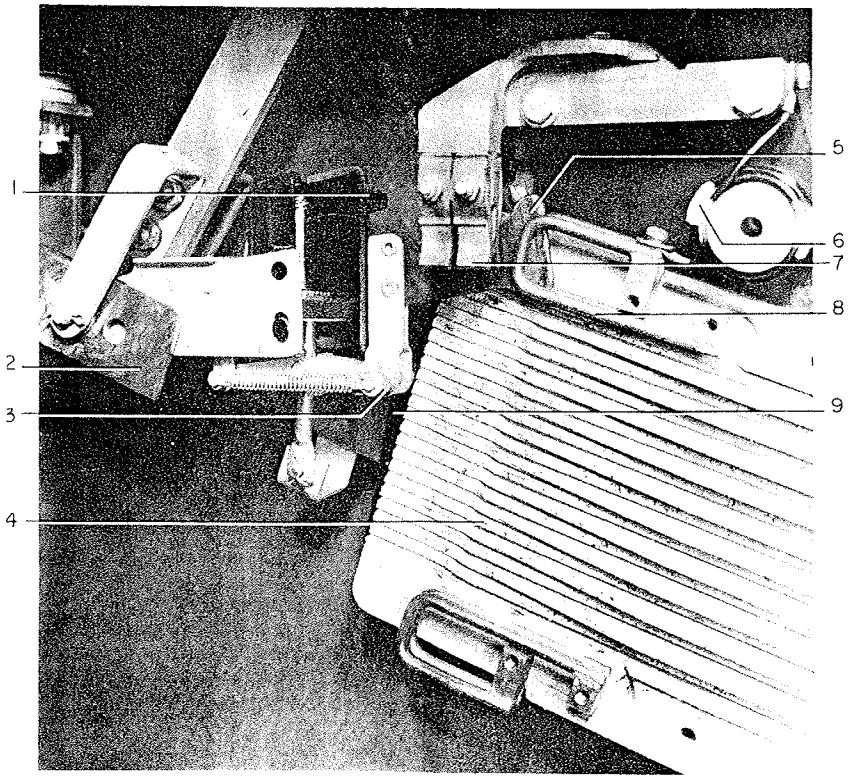
It should be noted that during the charging operation, the relative positions



1. Nozzle
2. Booster Cylinder
3. Piston
4. Hinge Pin
5. Pin
6. Spring
7. Pin
8. Arc Chute
9. Connection Bolt
10. Arcing Tip
11. Rivets
12. Blowout Coil
13. Core
14. Pin
15. Upper Arc Runner
16. Trip Roller
17. Trip Latch
18. Lower Arc Runner

Fig. 14 (8024176)

Fig. 14 Cross Section of Interrupter Switch in Closed Position



1. Nozzle
2. Primary Blade
3. Trip Roller
4. Arc Chute
5. Arcing Tip
6. Blowout Coil
7. Contact Fingers
8. Upper Arc Runner
9. Trip Latch

Fig. 15 (8024178)

Fig. 15 Cross Section of Interrupter Switch Shown in Latched Position

of the opening gears (6) are such that no engagement is present allowing complete freedom for the motion of the operating handle.

CLOSING OPERATION

Closing of the switch contacts is initiated by pulling the closing release handle. Referring to Fig. 13 this action removes the release latch (15) from the closing spring assembly thereby permitting the energy stored in the spring (12) to rotate the switch cross shaft (3) through the connecting chain (7). This in turn closes the switch blades by use of the switch operating rods (2).

A booster spring (9) connected directly to the switch cross shaft is provided to aid in closing. It is arranged in such a manner that its energy is utilized only during the last portion of the closing stroke to help overcome the resistant magnetic forces of the short circuits currents. This is accomplished by the cam arrangement allowing the spring to take effect just prior to the "making" of the switch contacts.

Pulling of the closing release handle initiates a time-delay mechanism to prevent immediate reopening of the switch after closing. This is to insure that the power fuses have sufficient time to clear all fault and load currents above the interrupting rating of the switch. The time delay mechanism prevents immediate return of the closing release handle which in turn prevents rotating the operation selector to the "TO OPEN" position. This in turn prevents opening of the switch.

Before operation of the closing release handle (14) may be attempted, the operation selector must be in the "TO CHARGE AND CLOSE" position, the closing spring must be completely charged and the operating handle must be in the extreme lower position. This latter requirement is to position the opening gears correctly so that the energy delivered from the closing spring is not transferred to the operating handle. This is accomplished by the interlock stud connected to the release handle engaging the handle socket (13) only when in the correct position.

OPENING OPERATION

Opening of the switch contacts is manually accomplished by a single upward stroke of the same handle used for changing the closing spring. This motion produces rotation of the switch cross shaft by action of the opening gears (6), Fig. 13 through the connecting chain (7). As the switch opens, the trip latch, as seen in Fig. 15, holds the arcing contacts closed as the primary blades part. As the primary blades continue to open, opening springs located on each pole are charged by the relative displacement of the arcing blade and primary blade assemblies. At a predetermined position the latch is released as shown in Fig. 16 and the arcing contact snaps open at a high speed.

At this point in the opening operation, the gears (6) Fig. 13 disengage thereby permitting the switch to open completely with no further action of operating handle. Also at this point, the operating handle reaches the limit of its stroke therefore making the remainder of the opening stroke completely independent of the operator. During the early portion of the opening stroke, the opening spring (8), is charged and in combination with the momentum of the arcing blade assemblies snapping open, provide the energy to completely open the switch.

As the arcing contact snaps open, the arc is established between the arc runners (15 & 18), Fig. 14, within the confines of the arc chute assembly (8). By action of the magnetic blow-out coil (12) and booster cylinder (2) the arc is forced into the interleaving fins of the arc chute where it is elongated and cooled sufficiently to produce interruption.

During the early portion of the opening stroke, the booster spring (9), Fig. 13, is automatically charged by action of the booster cam (1) and is in readiness for the next closing operation.

It should be noted that at any time during the opening operation prior to the snapping of the arcing blade assembly the primary contact blades can be completely reclosed by merely returning the operating handle to its lowest position. This is accomplished by reversing the motion of the opening operation through the opening gears which, prior to the snapping of the arcing blade, are in full engagement.

Before an opening operation can be attempted, the operation selector handle must be placed in the "TO OPEN" position. This can only be done after the time-delay mechanism has completely reset following a closing operation.

MAINTENANCE

Dependable service and safe operation of the equipment is contingent upon proper operation of the SE-8 load-break switch assembly. To maintain such service, it is recommended that a definite inspection and maintenance schedule be set up and followed, as serious shutdowns can often be avoided by locating potential sources of trouble in an early stage.

BEFORE ANY MAINTENANCE WORK IS PERFORMED ON THE SWITCH OR OPERATING MECHANISM MAKE CERTAIN THAT BOTH THE CLOSING SPRING AND BOOSTER SPRING ARE COMPLETELY UNCHARGED.

INSPECTION

The frequency of the inspection and maintenance schedule is dependent upon the individual application and will differ on various installations. Operating experience gained after a short time will be of great help in determining this schedule. The following instructions list the main points to be included in an inspection and a few general recommendations.

CONTACTS

With the switch in the open position, the arcing tip should be examined carefully for smoothness. If rough spots are present due to arcing, they can be smoothed off by the use of a fine file and crocus cloth.

NOTE: Do not remove more metal from the tip than is necessary.

Also, examine the primary fingers and blades for burns or pits. If excessive burns are present the contacts should be replaced.

After completing inspection of the contacts, check all contact adjustments and clearances as listed under INSTALLATION, ADJUSTMENTS.

MECHANISM

A careful inspection should be made for loose bolts, nuts, etc., within the mechanism. All cam, latch and roller surfaces should be checked for evidence of excessive wear or damage. Lubricate the entire mechanism as listed under LUBRICATION and check the operation for binding or excessive friction.

Upon completing the inspection, check all mechanism adjustments and clearances as listed under INSTALLATION, ADJUSTMENTS.

INSULATION

The surface of the Self-X insulation should be kept clean and unmarred to prevent moisture absorption. Smoke or dust collected between inspection periods should be wiped off with a clean dry cloth and if dampness is apparent, heaters should be installed to insure dryness.

LUBRICATION

In order to maintain reliable operation, it is important that the switch assembly be properly lubricated at all times. During assembly at the factory, all bearing surfaces, machined surfaces, and all other parts of the switch and mechanism subject to wear have been properly lubricated using the finest grade of lubricants available. However, even the finest oils and greases have a tendency to oxidize with age, as evidenced by hardening and darkening in color. Elimination of the hardened lubricant is essential for proper operation. Also frequent operation of the device causes the lubricant to be forced out from between the bearing surfaces. A simple lubrication will often clear up minor disturbances which might be mistaken for more serious trouble.

A definite lubrication schedule should be set up taking into consideration the frequency of operation of the switch and local conditions. Until such a schedule is worked out, it should be lubricated at each periodic inspection and also whenever overhauling or replacement of parts becomes necessary. It is also recommended that the device be operated at regular intervals to insure it is operating freely.

CONTACT SURFACES

Apply a thin film of G. E. lubricant D50H47 to all silvered contact surfaces.

1. Nozzle
2. Primary Blade
3. Trip Roller
4. Arc Chute
5. Arcing Tip
6. Blowout Coil
7. Contact Fingers
8. Upper Arc Runner
9. Trip Latch

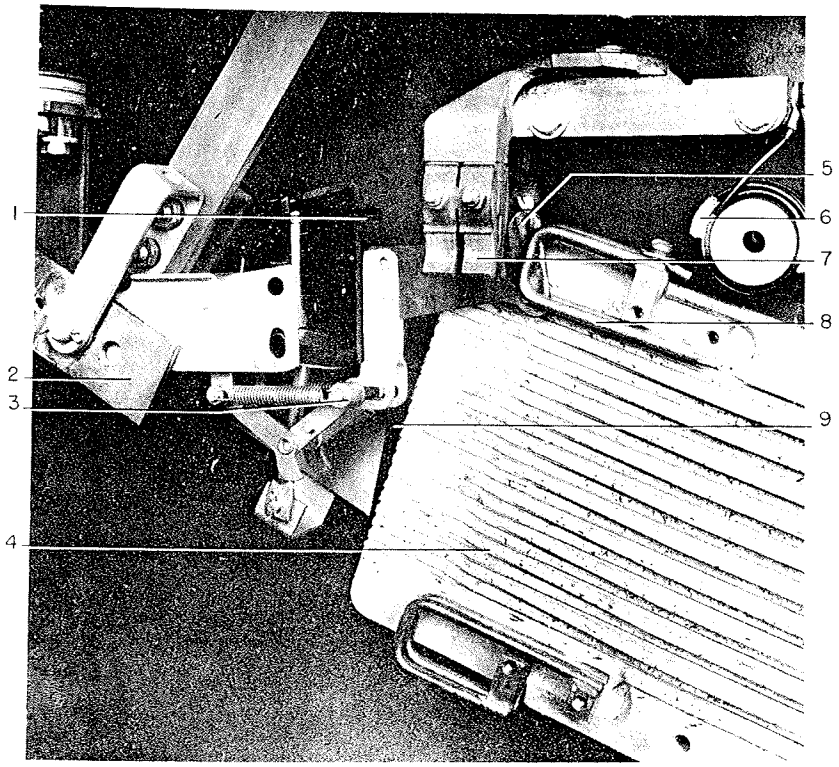


Fig. 16 Cross Section of Interrupter Switch Shown in Tripped Position

Fig. 16 (8024181)

1. Nozzle
2. Primary Blade
3. Trip Roller
4. Arc Chute
5. Arcing Tip
6. Blowout Coil
7. Contact Fingers
8. Upper Arc Runner
9. Trip Latch

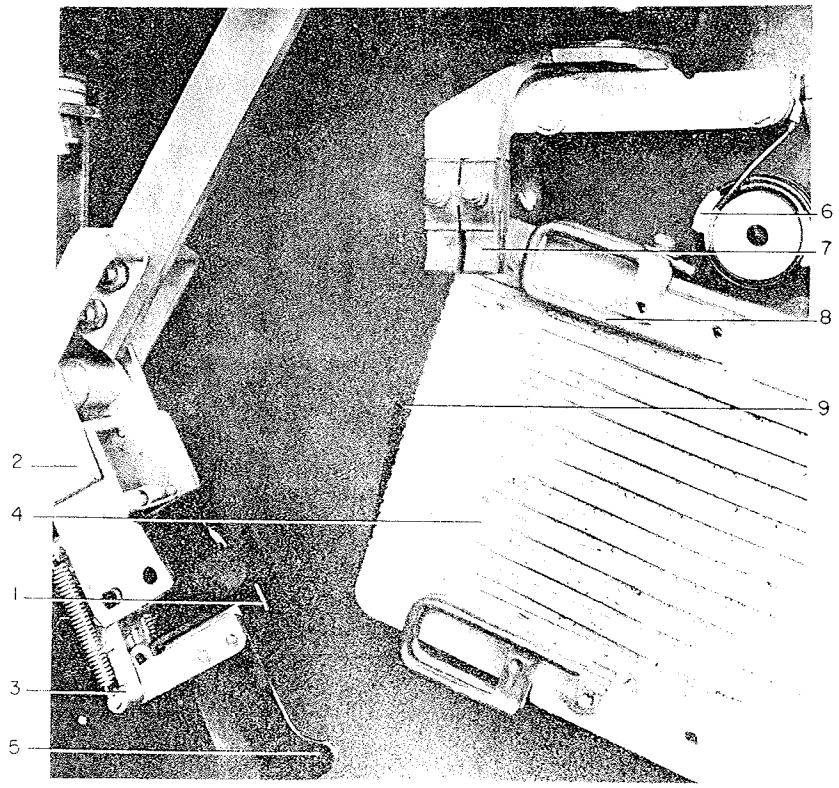


Fig. 17 Cross Section of Interrupter Switch Shown in Open Position

Fig. 17 (8024182)

Before applying new grease to the contacts, remove any old grease that may be present with a clean, dry cloth. A thin film of D50H47 should also be applied to the contact surfaces between the primary and auxiliary blade assembly whenever disassembly is necessary. Also apply a thin film of D50H47 to the ground shoe and primary disconnect studs.

NOTE: Do not apply lubricant to the arcing contacts.

GROUND SURFACES

Apply a thin film of G. E. lubricant D50H15 to all cams, latches and rollers. Before applying new grease, wipe off all old grease that may be present.

SLEEVE BEARINGS

During periodic inspections apply a few drops of light machine oil SAE-20 or 30 to all sleeve bearings within the switch and mechanism. During a major overhaul or whenever it becomes necessary to replace parts, remove all pins and apply a thin film of D50H15 after first removing all old grease.

BOOSTER CYLINDER

Apply a thin film of D50H15 to the inner surface of the booster cylinder. Do not apply excessive grease as this tends to clog the nozzle.

NEEDLE BEARINGS

During periodic inspections apply a few drops of light machine oil SAE-20 or 30 to all needle bearings in the mechanism. Whenever it becomes necessary to replace parts or during a major overhaul it is recommended that the bearings be removed, thoroughly cleaned and repacked with D50H15. Care should be taken in removing and replacing the bearings so that the needles are not damaged. A petroleum solvent or similar cleaner should be used to remove all old grease. DO NOT USE CARBON-TETRACHLORIDE. If the grease is badly oxidized it may be necessary to use alcohol to remove it. After the bearings have been thoroughly cleaned, spin them in clean light machine oil to remove all cleaner or solvent. Allow the oil to drain and immediately repack with G. E. Lubricant D50H15 being sure all metal parts are greased.

REPLACEMENT OF PARTS

The following information covers the detailed assembly instruction for the removal of various parts of switch assembly in order to make necessary repairs or replacements. This section includes only those parts that during the life of the switch are most subject to damage or wear.

DO NOT WORK ON THE SWITCH OR OPERATING MECHANISM WITH EITHER THE BOOSTER SPRING OR CLOSING SPRING CHARGED.

NOTE: Upon completion of any assembly work on the switch or mechanism, all adjustments and clearances must be checked as listed under INSTALLATION, ADJUSTMENTS.

BLADE ASSEMBLY

To remove the primary blade assembly, proceed as follows:-

1. Open the switch.
2. Remove the assembly bolts (19), Fig. 18, from the operating rod.
3. Remove the cotter pins, nuts and spring washers from the hinge stud (20).
4. Remove hinge stud (20) allowing the complete blade assembly to be removed.

Reassemble in the reverse order checking that set screws are tight after correct hinge pressure is obtained. Refer to the section on LUBRICATION before reassembly. Recheck all blade adjustments.

AUXILIARY BLADE ASSEMBLY

To remove the auxiliary blade assembly, proceed as follows:

1. Open the switch.
2. Remove pin (5), Fig. 14, and release main spring pressure.
3. Remove pin (7), connecting the piston to the primary blade.
4. Remove hinge pin (4) allowing the auxiliary blade to be removed.

The same method of disassembly should be followed when removing the auxiliary blade after first removing the complete blade assembly from the switch. Reassemble in the reverse order referring to the section on LUBRICATION. Recheck all adjustments pertaining to the auxiliary blade.

PISTON

To remove the piston, refer to Fig. 14, and proceed as follows:

1. Open the switch.
2. Remove pin (5) releasing the main spring pressure.
3. Remove pin (7) connecting the piston to the primary blade. The auxiliary blade can now be rotated relative to the primary blade towards a closed position.
4. Remove the two toggle springs (6).
5. Remove the trip rollers (16) and slide the pin from the toggle link.
6. Remove piston.

Reassemble in the reverse order placing a thin film of grease on the inner surface of the cylinder as stated under LUBRICATION. Check for proper air pressure as described under ADJUSTMENTS.

ARCING TIP

To remove the arcing tiop(10) Fig. 14, from the auxiliary blade, proceed as follows:

1. Remove the auxiliary blade assembly as previously described.
2. Remove the rivets (11) from the base of the arcing tip. With the rivets removed, the arcing tip can be removed.

A new arcing tip can be installed by re-riveting in place.

NOTE: When replacing the arcing tip, it should lean slightly towards the nozzle in the cylinder so that the nozzle is directed at the tip.

BOOSTER CYLINDER

To remove the booster cylinder, the auxiliary blade must first be removed as previously described. Grind or file off the riveted ends of pin (14), Fig. 14. Under this condition, the legs of the auxiliary blade can be spread for removal of the cylinder. Reassembly can be accomplished by replacement of pin (14) and re-riveting. When replacing the cylinder, apply a thin film of grease as stated under LUBRICATION.

ARC CHUTE ASSEMBLY

The arc chute (10), Fig. 18, can be removed from the switch by disconnecting the blowout coil from the contact block and removing the mounting bolts (9). Further disassembly of the arc chute may be accomplished by removal of assembly bolts (11) after removing the pole pieces.

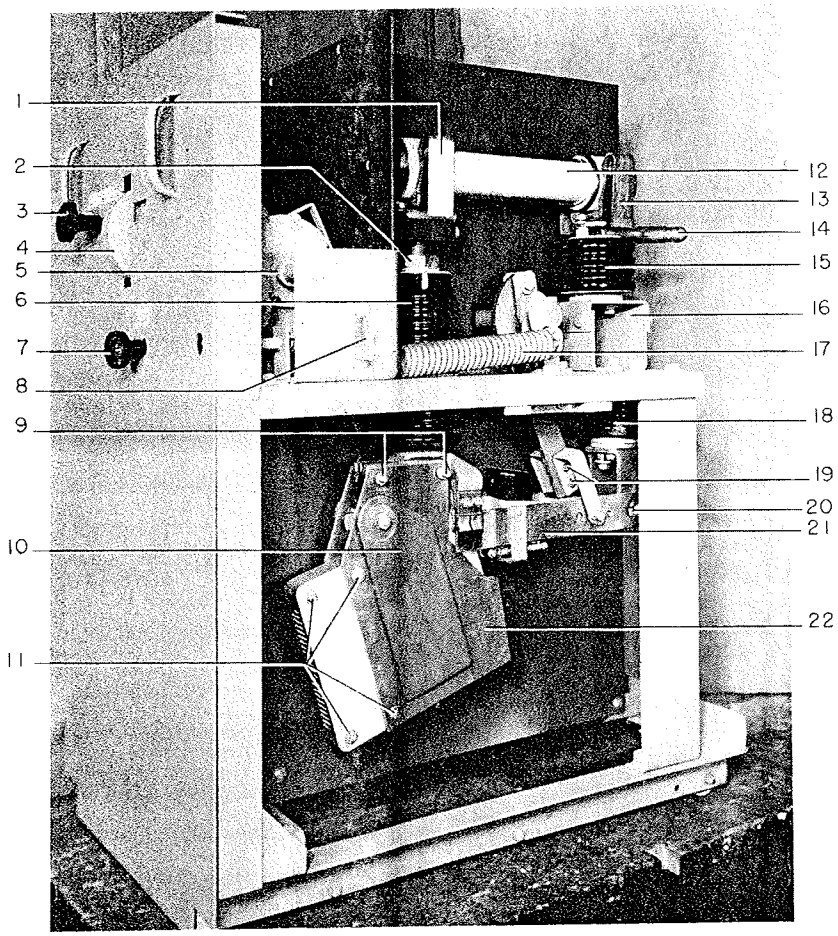
When reassembling the arc chute, care should be taken to insure that the fins of the arc chute sides are equally spaced throughout their length. Care should also be taken when bolting the side barriers (22), Fig. 18, in place that the trip latches are opposite each other to obtain proper tripping of the auxiliary blade. After remounting the arc chute, check all adjustments as outlined under ADJUSTMENTS.

PRIMARY DISCONNECT STUDS

Removal of either the upper primary studs (14), Fig. 18 or lower primary studs is easily accomplished by removing the 3/8" bolts mounting the studs to the insulators. When removing the upper stud, the rear fuse clip (13) is also removed. When reassembling, make certain that the fuse clip is correctly aligned.

Removal of the lower stud, removes the hinge block on the 4.8 kv switch and loosens the hinge block on the 13.8 kv switch. When reassembling, the lower studs check that the primary blades are aligned correctly.

IMPORTANT: DO NOT REMOVE ALL SIX STUDS AT ONCE. The studs have been carefully aligned with the frame during assembly at the factory, and it is important that this alignment be maintained to facilitate installation of the switch in the stationary housing. It is therefore recommended that they be removed and reassembled one at a time. Also, before removing any one stud, measure the distance from that particular one to adjacent studs in both directions, so that it may be reinstalled in the same location.



1. Front Fuse Clip
2. Nut
3. Operation Selector Handle
4. Operating Handle Socket
5. Operating Mechanism
6. Bushing
7. Closing Release Handle
8. Positive Interlock Slide
9. Arc Chute Mounting Bolts
10. Arc Chute Assembly
11. Assembly Bolts
12. Fuse
13. Rear Fuse Clip
14. Upper Stud
15. Upper Insulator
16. Insulator Support
17. Booster Spring
18. Lower Insulator
19. Assembly Bolts
20. Hinge Stud
21. Primary Blade
22. Arc Chute Side Brace

Fig. 18 SE-8 Fused Load-Break Switch Assembly

INSULATORS

Removal of either the upper insulators (15) Fig. 18 or lower insulators (18) is easily accomplished by removing the mounting bolts located within the insulator supports (16). The bolts for the center insulator on the 13.8 kv switch are accessible using a standard socket wrench through the cutout in the insulator support, the wrench may be positioned by inserting through the cutout from inside the support. When removing an insulator, the corresponding primary disconnect stud is also removed therefore only one insulator should be removed at a time. Refer to the section on the removal of the PRIMARY DISCONNECT STUDS before removing the insulators.

Care should be taken when reassembling the insulators that the primary studs, hinge block and rear fuse clip are correctly aligned. After replacing the lower insulators check all primary blade adjustments as listed under INSTALLATION, ADJUSTMENTS.

BUSHING

To remove the through bushing (6), Fig. 18, proceed as follows:

1. Open the switch.
2. Remove the bolted connection (9), Fig. 14, between the contact block and magnetic blow-out coil.
3. Remove the arc chute assembly by removing the mounting bolts (9), Fig. 18.
4. Remove the front fuse clip (1), Fig. 18.
5. Loosen the 1" nut (2), Fig. 18, allowing the switch contact block and stud assembly to be withdrawn from the bushing.
6. Removal of the bushing mounting bolts allows the bushing to be lifted from the switch assembly.

Reassemble in the reverse order taking care that the switch contacts, arc chute and fuse clips are correctly aligned. Review all switch adjustments and clearances.

Fig. 18 (8024185)

RENEWAL PARTS

It is recommended that sufficient renewal parts be carried in stock to enable the prompt replacement of any worn, broken, or damaged parts. A stock of such parts minimizes service interruptions caused by breakdowns, and saves time and expense. When continuous operation is a primary consideration, more renewal parts should be carried, the amount depending upon the severity of the service and the time required to secure replacements.

Renewal parts which are furnished may not be identical to the original parts, since improvements are made from time to time. The parts which are furnished, however, will be interchangeable.

NOTE: The listed terms "right" and "left" apply when facing the front of the switch.

ORDERING INSTRUCTIONS

1. ALWAYS SPECIFY THE COMPLETE NAMEPLATE DATA OF THE SWITCH.
2. SPECIFY THE QUANTITY, CATALOG NUMBER (IF LISTED), REFERENCE NUMBER (IF LISTED), AND DESCRIPTION OF EACH PART ORDERED, AND THIS BULLETIN NUMBER.
3. STANDARD HARDWARE, SUCH AS SCREWS, BOLTS, NUTS, WASHERS, ETC., IS NOT LISTED IN THIS BULLETIN. SUCH ITEMS SHOULD BE PURCHASED LOCALLY.
4. FOR PRICES, REFER TO THE NEAREST OFFICE OF THE GENERAL ELECTRIC COMPANY.

PARTS RECOMMENDED FOR NORMAL MAINTENANCE

In the tabulation below are listed the parts of the switch which are usually recommended for stock for normal maintenance. Other parts are listed on the following pages.

REF. NO.	CAT. NO. FOR 4.8	CAT. NO. FOR 13.8	NO. PER	DESCRIPTION
108	263C904G-1	263C904G-1	3	Primary Blade (left)
108	263C904G-2	263C904G-2	3	Primary Blade (right)
112	263C905G-1	263C905G-1	3	Auxiliary Blade Assembly
109	6057288	6057288	24	Contact Finger
134	619C433G-3	619C433G-3	3	Arc Chute Assembly
110	456A806	456A806	12	Contact Finger Spring

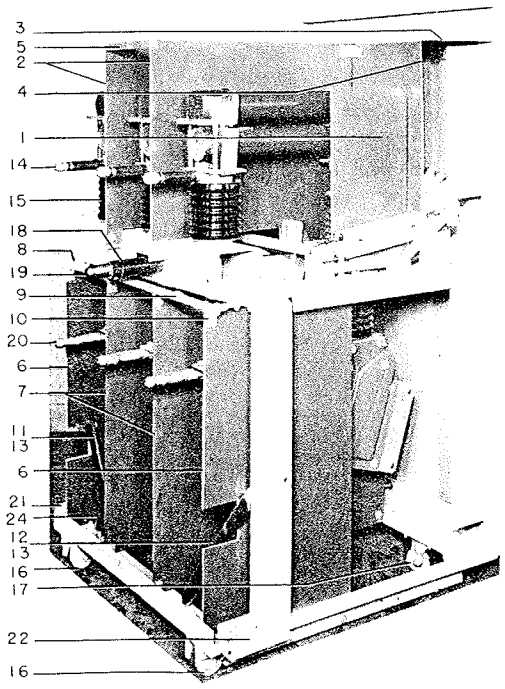


Fig. 19 (8025515)

REF. NO.	CAT. NO. FOR 4.8	CAT. NO. FOR 13.8	NO. PER	DESCRIPTION
1	688C546G-1	----	1	Barrier (Standard) (Left)
1	688C546G-2	----	1	Barrier (Auxiliary Switch) (Left)
1	688C546P-12	----	2	Barrier (Right)
1	----	688C548P-18	2	Barrier
2	688C546P-11	688C548P-10	2	Barrier
3	688C548P-11	688C548P-12	1	Cover (Standard)
3	688C548P-26	688C548P-24	1	Cover (Auxiliary Switch)
4	688C546P-5	688C548P-19	1	Barrier (Standard)
4	688C546P-18	688C548P-25	1	Barrier (Auxiliary Switch)
5	688C546P-14	688C548P-22	1	Support
6	688C548P-13	688C548P-17	2	Barrier
7	688C548P-7	688C548P-8	2	Barrier
8	----	688C548P-21	2	Support
9	----	688C548P-20	1	Support
10	688C548P-27	----	2	Clip Outside Barrier
10	688C546P-13	----	2	Clip Inside Barrier
10	----	688C548P-23	4	Clip
11	----	802B784P-4	1	Brace
12	----	802B784P-3	1	Brace
13	----	456A896P-19	2	Insulation
14	456A823P-1	456A823P-1	3	Upper Primary Stud
15	281B721G-2	281B721G-1	3	Insulator
16	688C570P-12	688C570P-12	2	Wheel (Rear)
17	104A2413G-1	104A2413G-1	2	Wheel (Front)
18	688C538P-21	688C538P-21	1	Insulating Tube (SE-8 only)
18	688C538P-24	688C538P-24	1	Insulating Tube (SE-8L only)
19	688C538G-1	688C538G-2	1	Shaft (SE-8 only)
19	688C538G-4	688C538G-4	1	Shaft (SE-8L only)
20	456A823P-2	456A823P-3	3	Lower Primary Stud
21	802B788P-4	802B788P-1	1	Shutter Cam (Right)
22	802B788P-5	802B788P-2	1	Shutter Cam (Left)
23*	456A859P-1	456A859P-1	1	Ground Shoe
24*	688C546P-10	----	1	Barrier

* Not Shown

Fig. 19

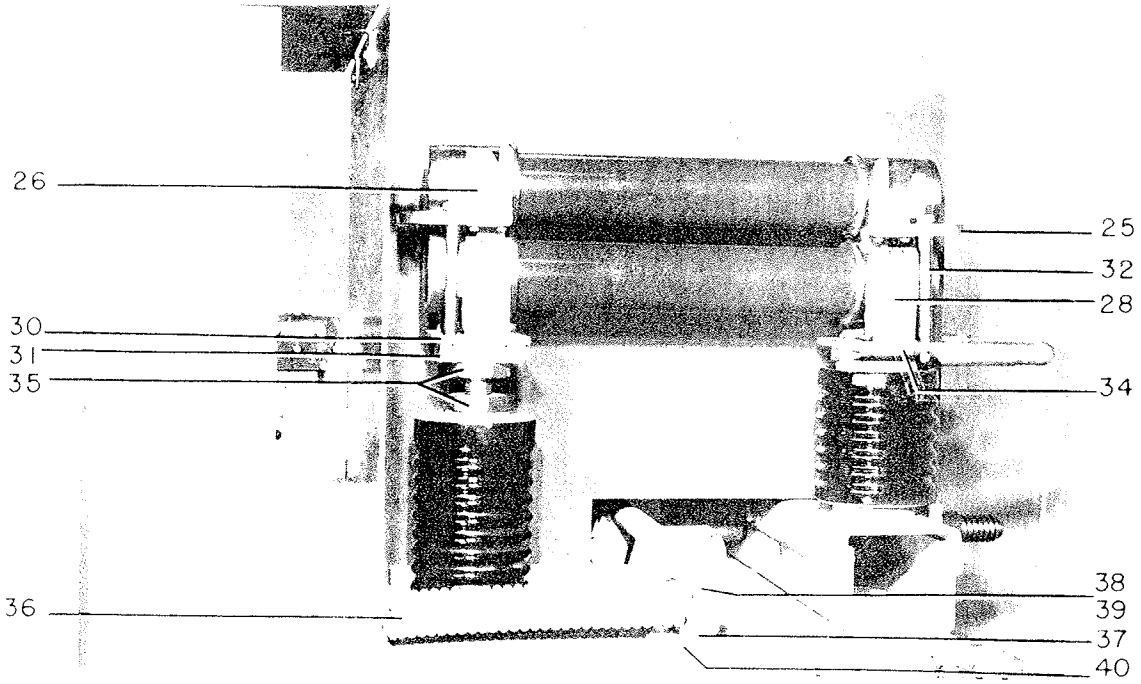


Fig. 20

Fig. 20 (8024917)

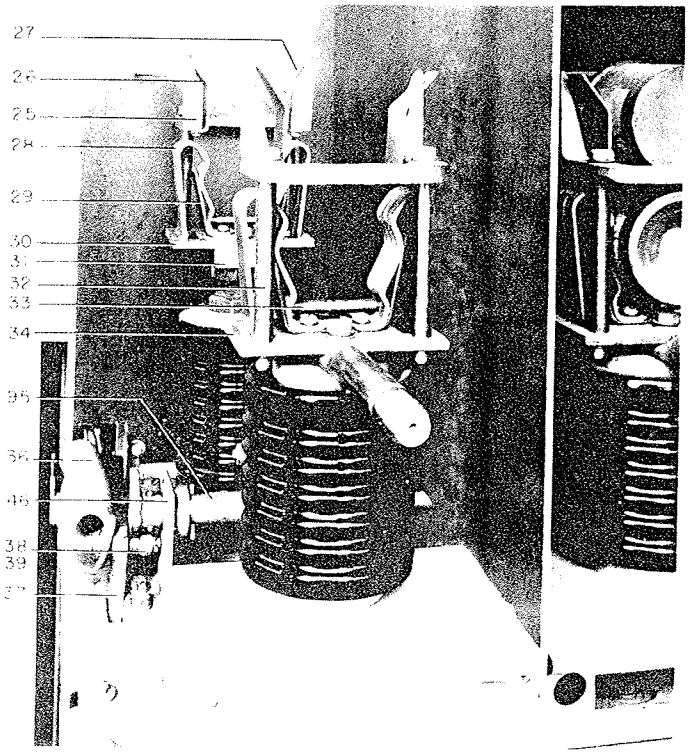


Fig. 21

Fig. 21 (8025866)

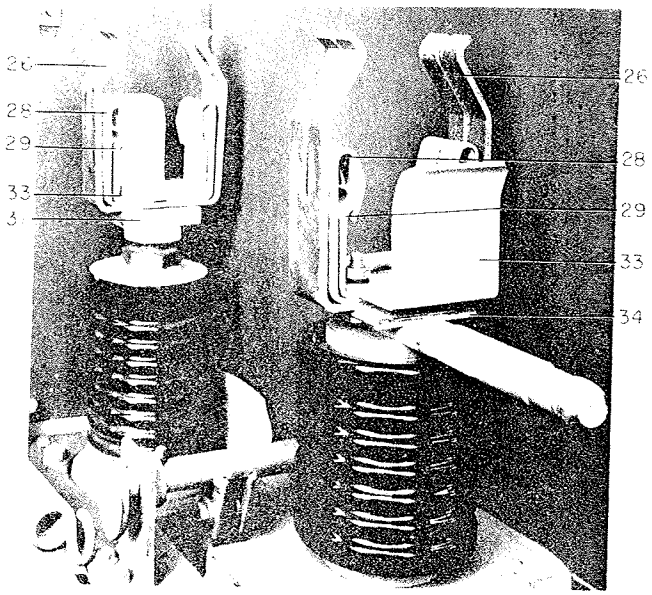


Fig. 21A

Fig. 21A (8027282)

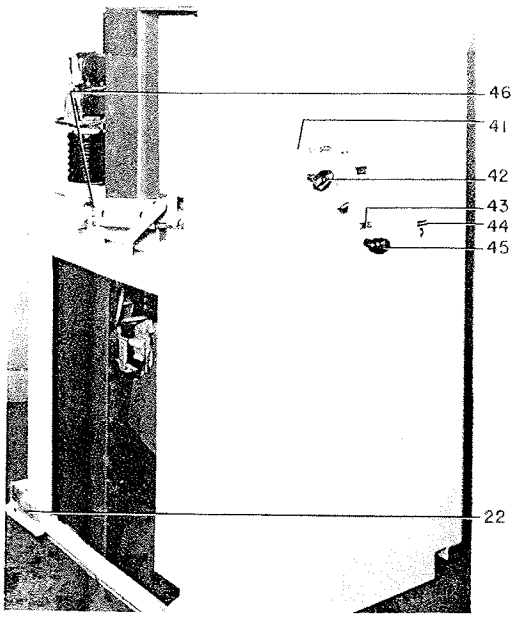


Fig. 22 (8025512)

Fig. 22

REF. NO.	CAT. NO. FOR SE-8	CAT. NO. FOR SE-8L	NO. PER	DESCRIPTION
25	6329923P-4	----------	6	Guide "D-D" Fuse
26	6149405P-2	688C577P-1	6	Fuse Clip "D-D" Fuse
27	6149405P-1	----------	6	Fuse Clip "D-D" Fuse
28	6124463P-3	688C577P-2	12	Fuse Clip "D" & "D-D" Fuse
28	6124463P-4	6124463P-4	12	Fuse Clip "C" Fuse
29	619C497P-8	688C577P-3	6	Spring Clip "D" & "D-D" Fuse
29	619C497P-9	619C497P-9	6	Spring Clip "C"
30	619C497P-5	----------	3	Contact Bar "D" Fuse (Except 12" Clip Spacing on 13.8 Switch)
30	619C497P-6	----------	3	Contact Bar "D-D" Fuse (Except 12" Clip Spacing on 13.8 Switch)
30	619C497P-7	619C497P-7	3	Contact Bar "C" Fuse (Except 12" Clip Spacing on 13.8 Switch)
30	619C497P-37	----------	3	Contact Bar "D" Fuse (12" Clip Spacing on 13.8 Switch)
30	619C497P-38	----------	3	Contact Bar "D-D" Fuse (12" Clip Spacing on 13.8 Switch)
30	619C497P-36	619C497P-36	3	Contact Bar "C" Fuse (12" Clip Spacing on 13.8 Switch)
31	619C497P-4	688C577P-10	3	Block "D" & "D-D" Fuse (Except 12" Clip Spacing on 13.8 Switch)
31	619C497P-4	688C577P-5	3	Block "D" & "D-D" Fuse (12" Clip Spacing on 13.8 Switch)
31	619C497P-4	619C497P-4	3	Block "C" Fuse
32	6179640P-29	----------	12	Sleeve "D-D" Fuse
33	619C497P-12	688C577P-4	6	Stop "D" & "D-D" Fuse
34	619C497P-5	688C577P-6	3	Contact Bar "D" Fuse
34	619C497P-6	688C577P-6	3	Contact Bar "D-D" Fuse
34	619C497P-7	619C497P-7	3	Contact Bar "C" Fuse
35	6179623P-9	6179623P-9	6	Locknut
36	421A250	421A250	1	Spring
37	254D779G-8	254D779G-8	1	Crank
38	254D779P-16	254D779P-16	1	Roller
39*	414A112P-11	414A112P-11	2	Bearing
40*	254D779P-17	254D779P-17	1	Bolt
41	NP202430A	NP202430A	1	Nameplate (Position)
42	6046075 P-12	6046075P-12	1	Handle
43	NP202430B	NP202430B	1	Nameplate (Manual Close)
44	NP104A2450P-1	NP104A2450P-1	1	Nameplate (Arrow)
45	6046075P-24	6046075P-24	1	Handle
46	414A112P-12	414A112P-12	2	Bearing
47*	619C497P-30	619C497P-31	3	Connection Bar (For No Fuse Arrangement)

* Not Shown

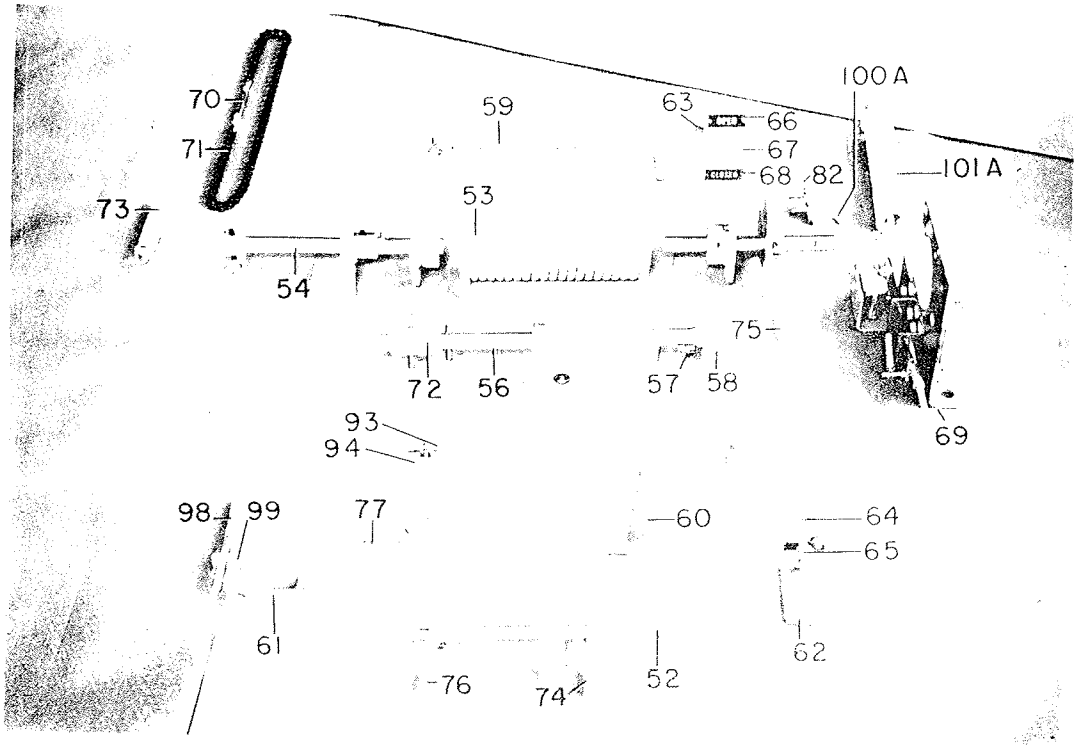


Fig. 23 (8025457)

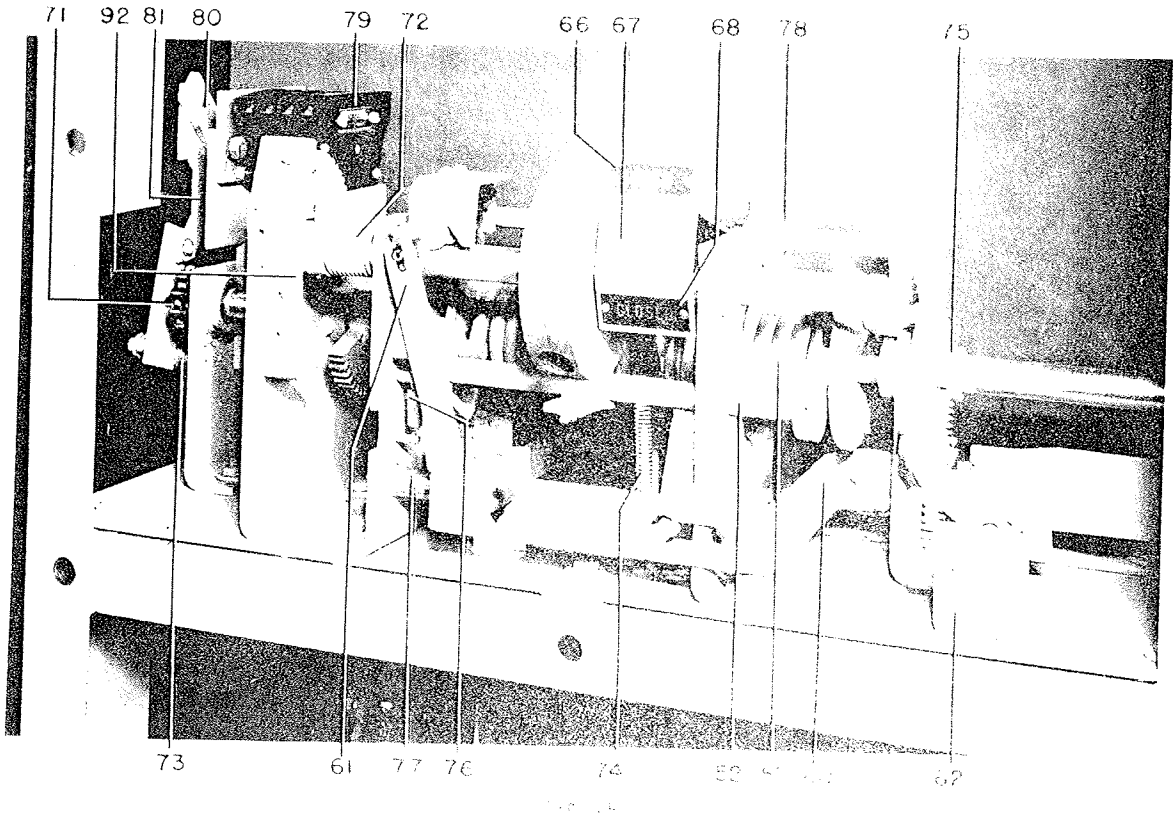


Fig. 24 (8024912)

REF. NO.	CAT. NO. FOR 4.8	CAT. NO. FOR 13.8	NO. PER	DESCRIPTION
50	802B766G-1	802B766G-2	3	Operating Rod (Including Reference 132 & 133)
51	456A876P-110	456A876P-110	3	Bushings
52	688C542G-1	688C542G-1	1	Shaft Assembly
53	421A228	421A228	1	Spring
54	688C541G-1	688C541G-2	1	Left Hand Cam Assembly (Standard)
54	688C541G-5	688C541G-6	1	Left Hand Cam Assembly (Auxiliary Switch)
55	688C545G-1	688C545G-4	1	Right Hand Cam Assembly
56	688C559G-1	688C559G-1	1	Shaft Assembly (Including Reference 57 & 58) (72 not included)
57	421A227	421A227	1	Spring
58	688C559G-3	688C559G-3	1	Crank
59	688C552G-1	688C552G-1	1	Shaft Assembly (Standard)
59	688C552G-3	688C552G-3	1	Shaft Assembly (Auxiliary Switch)
60	688C536G-6	688C536G-7	1	Slider Interlock (Including Reference 93 & 94)
61	688C544G-2	688C544G-2	1	Pivot Arm
62	688C543G-4	688C543G-4	1	Emergency Trip Assembly (Including Reference 64 & 65)
63	688C544G-4	688C544G-4	1	Target Arm
64	688C543G-5	688C543G-5	1	Shaft & Cam
65	104A2414	104A2414	1	Spring
66	NP202431A	NP202431A	1	Nameplate Open
67	NP202431C	NP202431C	1	Nameplate Charged
68	NP202431B	NP202431B	1	Nameplate Closed
69	688C537G-4	688C537G-4	1	Timer Assembly (Standard)
69	688C537G-2	688C537G-2	1	Timer Assembly (Auxiliary Switch)
70	802B759G-1	802B759G-1	1	Turnbuckle
71	456A864P-3	456A864P-3	1	Chain
72	104A2457	104A2457	1	Spring
73	6552989	6552989	1	Spring
74	6202632	6202632	1	Spring
75	104A2415	104A2415	1	Spring
76	104A2468	104A2468	1	Spring
77	688C536P-18	688C536P-18	1	Slider Guide
78*	456A866P-1	456A866P-1	1	Micro-switch
79	619C499G-4	619C499G-4	1	Auxiliary Switch
80	619C499G-3	619C499G-3	1	Crank (Auxiliary Switch Only)
81	619C499P-9	619C499P-9	1	Link (Auxiliary Switch Only)
82	688C543G-3	688C543G-3	1	Latch
83*	802B744G-1	802B744G-1	1	Secondary Coupler (7PT)
83*	802B744G-2	802B744G-2	1	Secondary Coupler (3PT)
84	414A112P-4	414A112P-4	6	Bearing
85	281B744G-1	281B744G-1	1	Timer
86	6202632	6202632	1	Spring
87	688C537G-3	688C537G-3	1	Sliding Cam
88	688C537P-4	688C537P-4	1	Bracket
89	688C537P-7	688C537P-7	1	Sleeve
90	688C537P-16	688C537P-16	1	Stud
91	688C537G-1	688C537G-1	1	Crank
92	121A5952G-1	121A5952G-1	1	Buffer
93	688C536G-4	688C536G-4	1	Latch
94	104A2469	104A2469	1	Spring
95	254D779G-12	254D779G-13	1	Shaft, Sprocket & Cam
96*	----------	688C587P-8	1	Barrier For 3PT Secondary Coupler
97*	----------	688C587P-7	1	Support For Reference 96
98	688C544P-5	688C544P-5	1	Shaft
99	688C544P-4	688C544P-4	1	Crank
100A	104A2416	104A2416	1	Spring
101A	421A250	421A250	1	Spring

* Not Shown

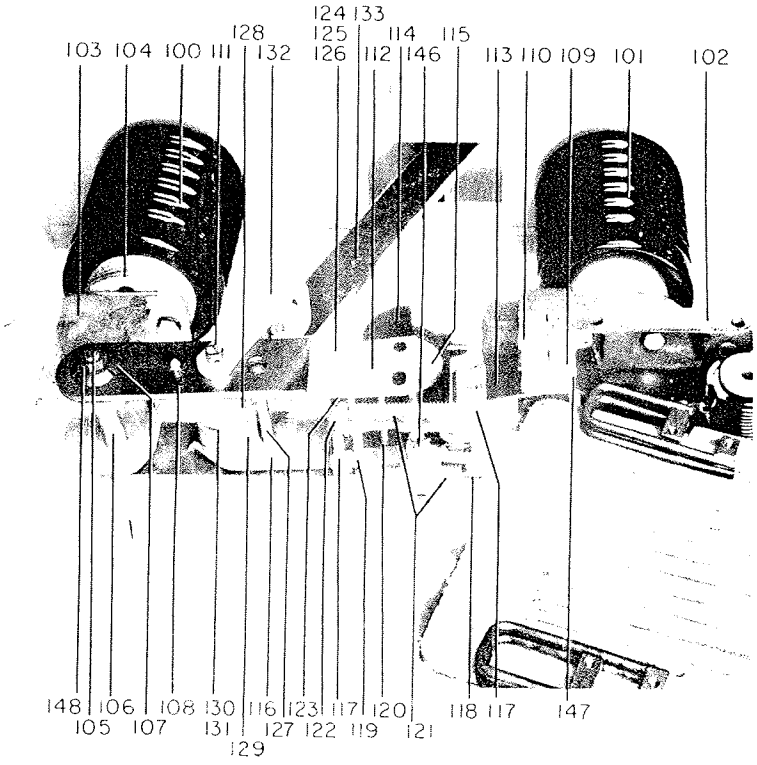


Fig. 25

Fig. 25 (8025461)

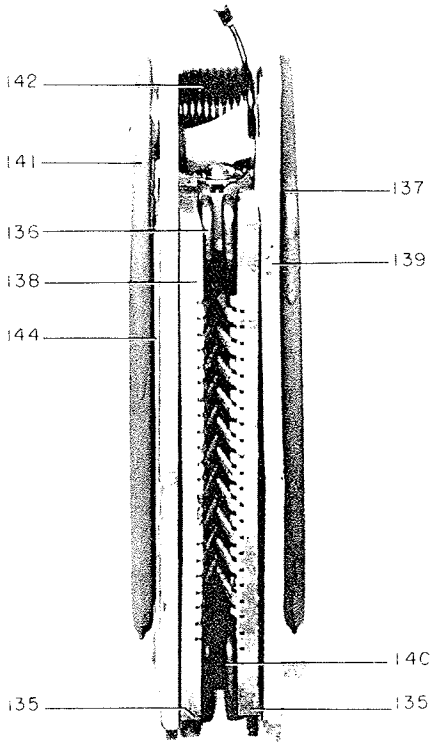


Fig. 26

Fig. 26 (8025999)

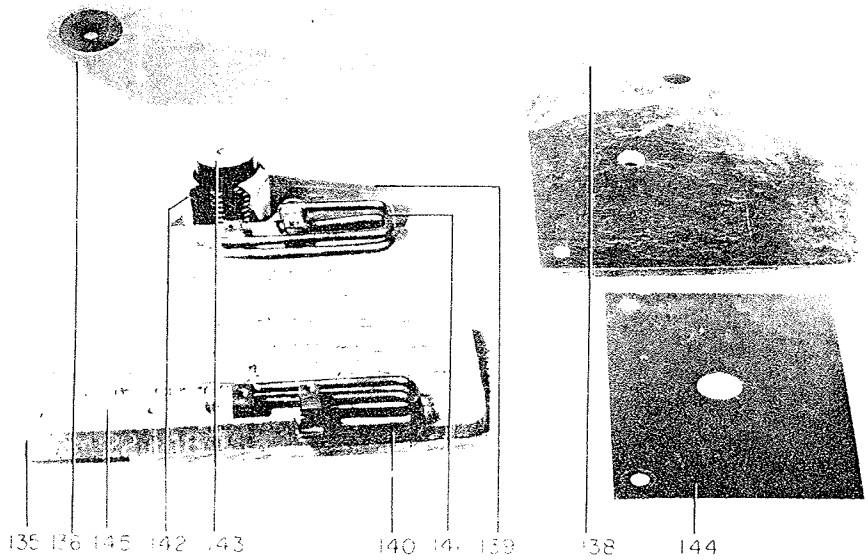


Fig. 27

Fig. 27 (8026000)

REF. NO.	CAT. NO. FOR 4.8	CAT. NO. FOR 13.8	NO. PER	DESCRIPTION
100	281B721G-2	281B721G-1	3	Insulator Front Connected
101	6411174G-1	6411174G-6	3	Bushing Back Connected
102	263C906G-12	263C906G-13	3	Contact Block Assembly
103	421A249G-1	6411850P-1	3	Hinge Block
104	236C927P-30	236C927P-30	3	Hinge Block Spacer
105	263C904P-5	263C904P-5	3	Hinge Stud
106	421A209P-72	421A209P-72	3	Spacer
107	2450821	2450821	6	Spring Washer
108	263C904G-2	263C904G-2	3	Primary Blade (Right)
108	263C904G-1	263C904G-1	3	Primary Blade (Left)
109	6057288	6057288	24	Contact Finger
110	456A806	456A806	12	Contact Finger Spring
111	6076405P-55	6076405P-55	3	Hinge Pin (Auxiliary Blade)
112	263C905G-1	263C905G-1	3	Auxiliary Blade Assembly (Including Reference Numbers 113 & 126)
113	263C907P-24	263C907P-24	3	Arcing Tip
114	281B707P-2	281B707P-2	3	Cylinder
115	263C906G-3	263C906G-3	3	Piston
116	263C902P-1	263C902P-1	3	Auxiliary Blade (Left)
116	263C902P-2	263C902P-2	3	Auxiliary Blade (Right)
117	6227834P-4	6227834P-4	6	Pin
118	6227835P-22	6227835P-22	6	Roller
119	263C906G-5	263C906G-5	3	Toggle Link
120	263C906P-17	263C906P-17	3	Pin
121	6202632P-1	6202632P-1	6	Spring For Toggle Link
122	421A208P-10	421A208P-10	6	Spacer
123	263C906G-4	263C906G-4	3	Guide Link
124	6227836P-15	6227836P-15	3	Pin
125	6202639P-1	6202639P-1	3	Spring For Guide Link
126	421A208P-11	421A208P-11	6	Spacer
127	6227834P-3	6227834P-3	3	Pin
128	6202633P-1	6202633P-1	3	Main Spring (Left)
129	6202634P-1	6202634P-1	3	Main Spring (Right)
130	456A876P-106	456A876P-106	3	Bushing
131	104A2475	104A2475	3	Spring
132	6411844P-5	6411844P-5	6	Yoke
133	802B766G-3	802B766G-4	3	Operating Rod (Including 132)
134	619C433G-3	619C433G-3	3	Arc Chute Assembly Complete
135	619C409P-1	619C409P-1	6	Arc Chute Side
136	619C431G-2	619C431G-2	3	Pole Piece
137	619C431G-1	619C431G-1	3	Pole Piece
138	619C431P-8	619C431P-8	3	Mounting Plate
139	619C431P-9	619C431P-9	3	Mounting Plate
140	619C432G-2	619C432G-2	3	Runner
141	619C432G-1	619C432G-1	3	Runner
142	456A342G-1	456A342G-1	3	Coil
143	619C432G-3	619C432G-3	3	Core
144	619C431P-10	619C431P-10	3	Insulation Plate
145	456A896P-10	456A896P-10	6	Shim
146	6227836P-17	6227836P-17	6	Pin
147	456A816G-1	456A816G-1	3	Buffer
148	6043618	6043618	6	Nut

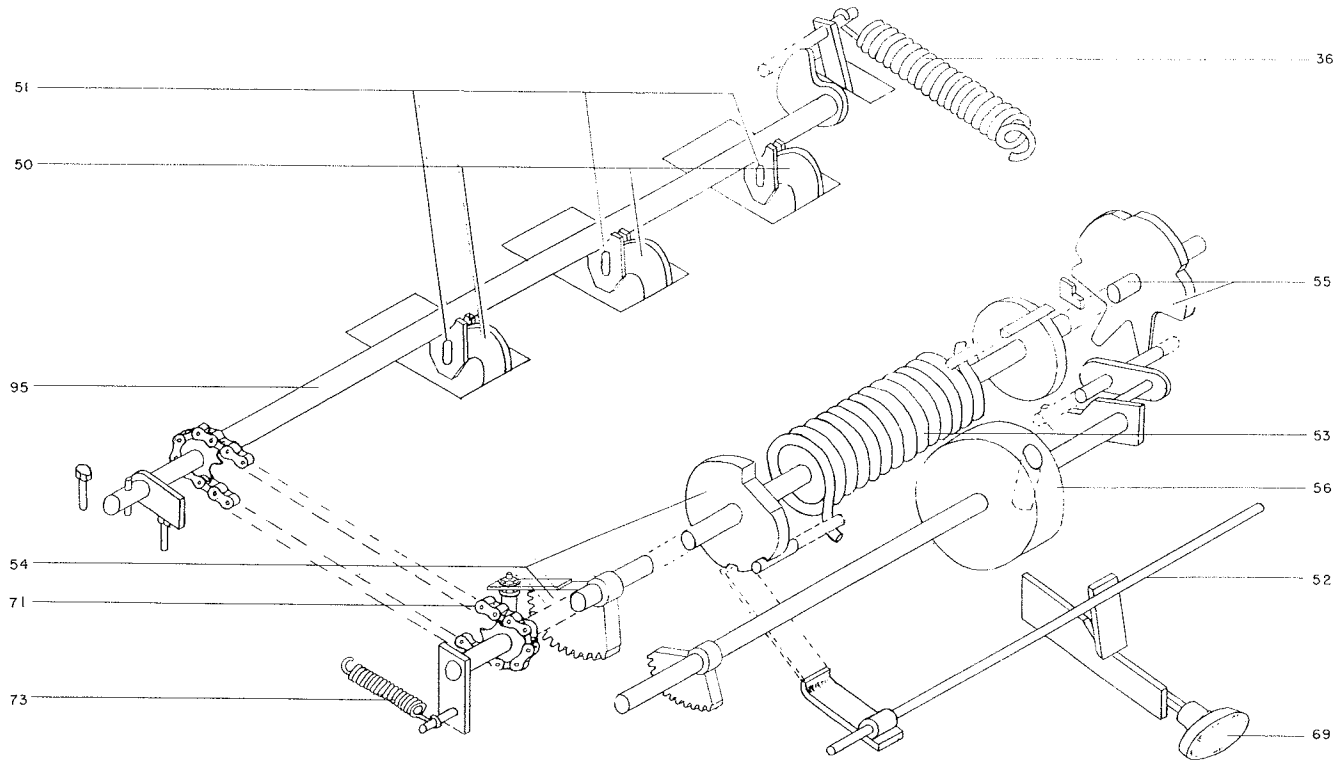


Fig. 28 (2540777)

Fig. 28

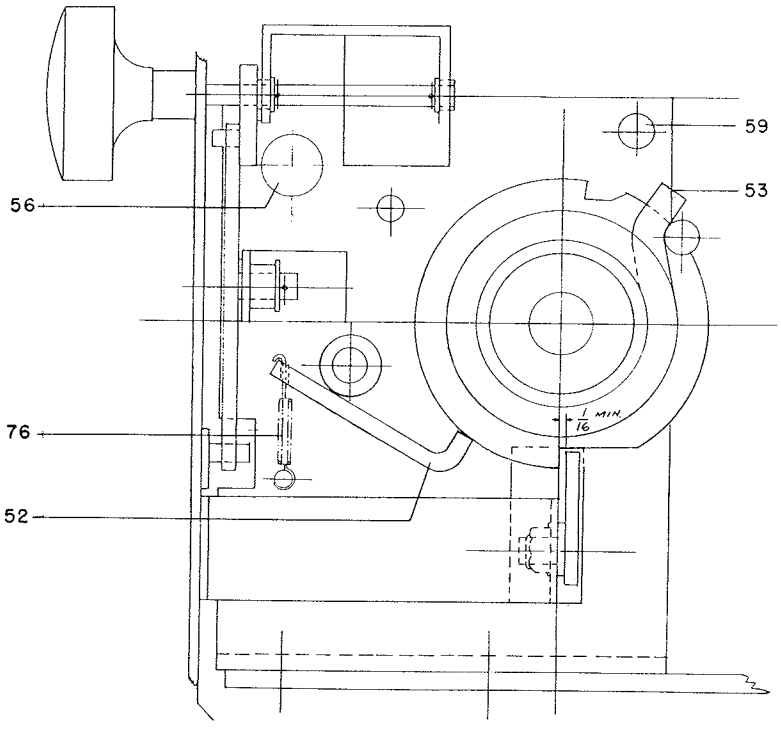


Fig. 29 (688C525)

Fig. 29

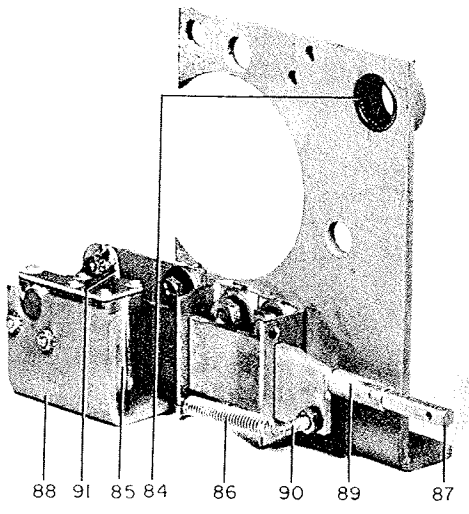


Fig. 30 (8025478)

Fig. 30