APPARATUS

METHOD OF BLOCKING APPARATUS AND INSULATING CONTACTS

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1. GENERAL

1.01 This section covers the methods of insulating contacts and blocking apparatus.

1.02 This section is reissued for the following reasons:

- To add addendum 1 changes
- To add BM-type relays
- To add additional instructions for the use of the 773A tool
- To make other changes as required.

Change arrows are used to indicate the major changes. The Equipment Test List is not affected.

1.03 In order to check current flow requirements, it is sometimes necessary to block apparatus other than the apparatus under test in either the operated or unoperated position or to insulate the contacts of the apparatus under test or of other apparatus.

1.04 Whenever a BSP section, an X specification, or circuit requirement table specifies that apparatus be blocked or contacts be insulated, the work shall be done in accordance with this section unless the BSP section, X specification, or circuit requirement table specifically states how the apparatus should be blocked or the contacts insulated.

1.05 Blocking tools, orange sticks, toothpicks, and paper used in blocking apparatus and insulating contacts should be removed when the apparatus is to be placed again in service. The apparatus should be checked to ensure that no parts of toothpicks, orange sticks, or paper remain in the apparatus.

1.06 In blocking a relay equipped with an attachable armature stop or separator, take care not to dislodge the stop or separator when inserting or removing the blocking tool.

1.07 Part 3 of this section covers the methods of blocking apparatus other than at the time of cutover. Part 4 covers methods of blocking apparatus at the time of cutover. Part 5 covers apparatus at the time of cutover, and methods of insulating or blocking individual contacts.

2. APPARATUS

2.01 ***List of Tools and Materials:***

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
136B	Relay blocking tool
253B	Brake plate
267B	Contact spring insulator
324	Relay blocking tool
441A	Cutover tool

TOOLS	DESCRIPTION
441B	Contact blocking tool
550B	Cutover tool
558A	Armature blocking tool
569A	Spring support
601B	Cutover tool
608B	Cutover tool
768A	Blocking tool
773A	Blocking tool
KS-6320	Orange stick
KS-8511	Tweezers
KS-16369	Blocking tool
KS-19914	Wedge
ITE-4069	Blocking tool

MATERIALS

KS-2423	Cloth
KS-7187	Bell seal bond paper (substance 20)
KS-19578, L1	Trichloroethane
KS-14529	Paper insulator
KS-14737, L1	Paper insulator
—	No. 000 sandpaper
—	Toothpicks, hardwood, flat at one end and pointed at the other

3. BLOCKING APPARATUS OTHER THAN AT TIME OF CUTOVER

Relays and Drops

3.01 ***A-, AB-, E-, EA-, F-, H-, M-, R-, T-, 236-, and 266-Type, and Similar-Type Relays:*** Fig. 1 and 2—Block relays nonoperated by inserting the 136B relay blocking tool between the core and the armature. Block relays operated by inserting the 136B tool between the armature and the armature adjusting nut for all relays except EA-type relays coded EA25 and up. Toothpicks may be used instead of the 136B tool. Block EA-type relays coded EA25 and up operated with the 768A blocking tool as shown in Fig. 3.

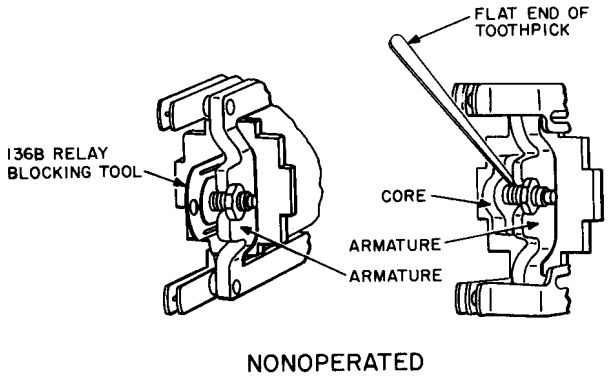

Fig. 1—Blocking Nonoperated A-, AB-, E-, F-, H-, M-, R-, T-, 236-, 266-Type and EA1- though EA13-Type Relays

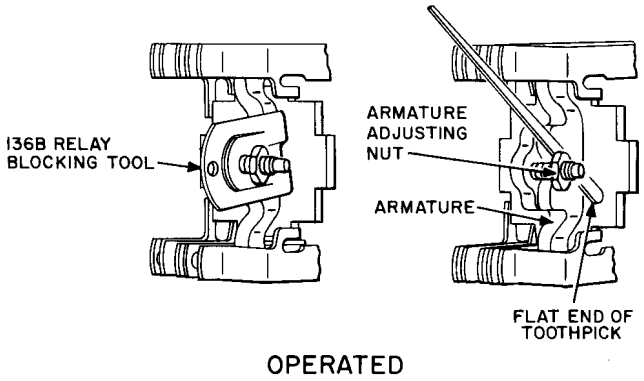

Fig. 2—Blocking Operated A-, AB-, E-, F-, H-, M-, R-, T-, 236-, 266-Type and EA1- through EA13-Type Relays

3.02 ***B-, G-, and J-Type Relays:*** Fig. 4—Block relays nonoperated by inserting a toothpick between the core and the armature. Block relays operated by inserting the flat end of a toothpick between the back contact spring or backstop and the upper part of the armature. Take care not to insert the toothpick between the contacts.

Caution: In blocking these relays nonoperated, do not force the toothpick

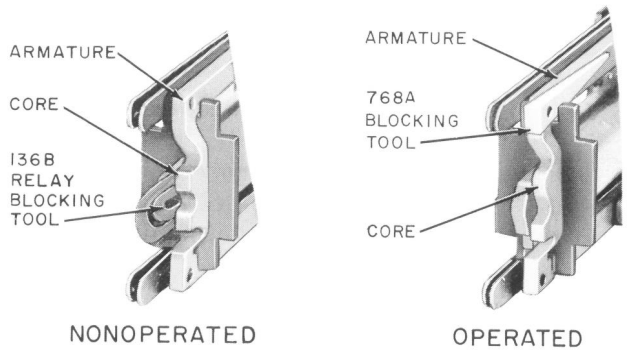

Fig. 3—Blocking Operated and Nonoperated EA-Type Relays Coded EA25 and Up

between the armature and core as the armature may become bent, thereby changing its adjustment.

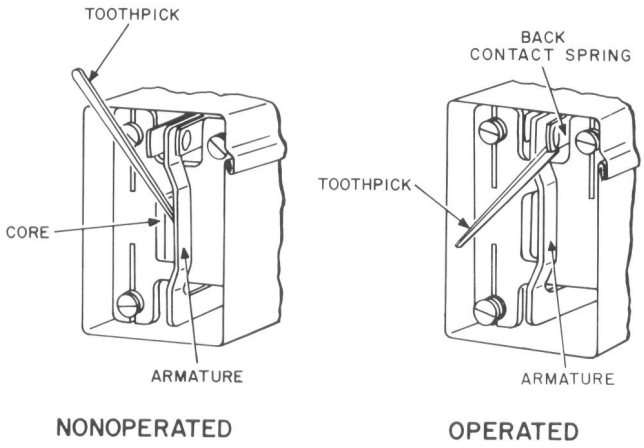

Fig. 4—Blocking B-, G-, and J-Type Relays

3.03 ***C-Type Relays:*** Fig. 5—Block relays nonoperated by inserting a toothpick between the left-hand core and the armature. Block relays operated by inserting a toothpick between the back contact spring and the upper part of the right-hand armature. Take care not to insert the toothpick between the contacts.

3.04 ***L-, N-, and S-Type Relays:*** Fig. 6—Block relays nonoperated by inserting the flat end of a toothpick between the core and the armature. Insert the toothpick from below the core. Block

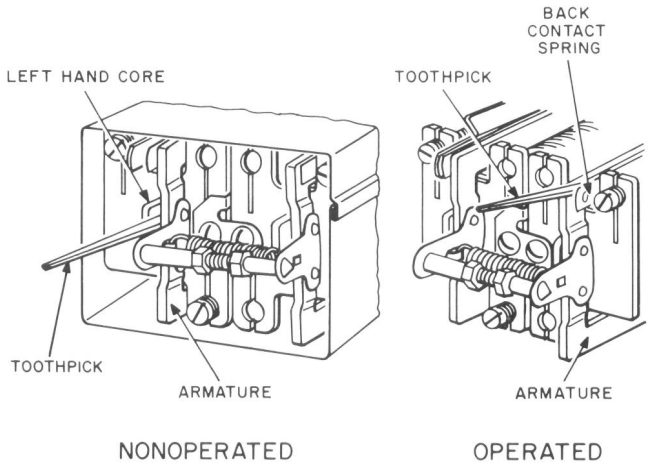

Fig. 5—Blocking C-Type Relays

relays operated by using a part of a KS-6320 orange stick prepared as follows. Cut approximately 1-5/8 inches from one end of the orange stick and then cut approximately 5/8 inch from the smaller end of this cutoff portion. Use the remaining 1-inch length for blocking the relay operated by inserting it between the armature and contact screw bracket, as shown in Fig. 6.

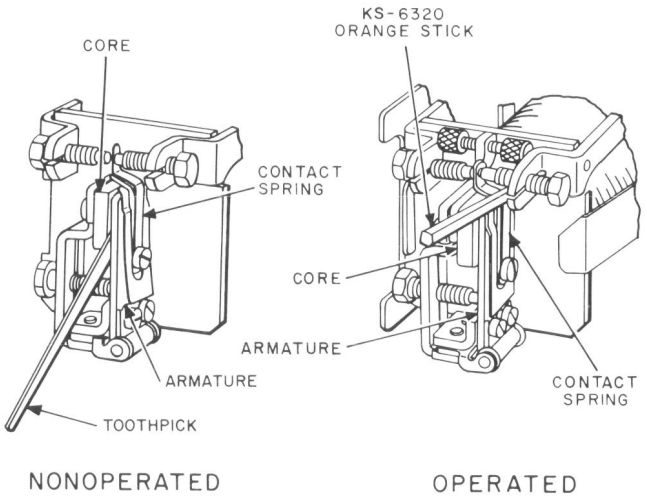

Fig. 6—Blocking L-, N-, and S-Type Relays

3.05 ***U-, Y-, UA-, UB-, 271-, and 282-Type Relays Not Equipped With Attachable Separators:*** Fig. 7—Block relays nonoperated

by inserting the 768A blocking tool between the core and the armature. Insert the tool, being careful not to push off the armature stop discs. Block relays operated by applying the blocking tool between the armature and adjusting nut as shown in Fig. 7.

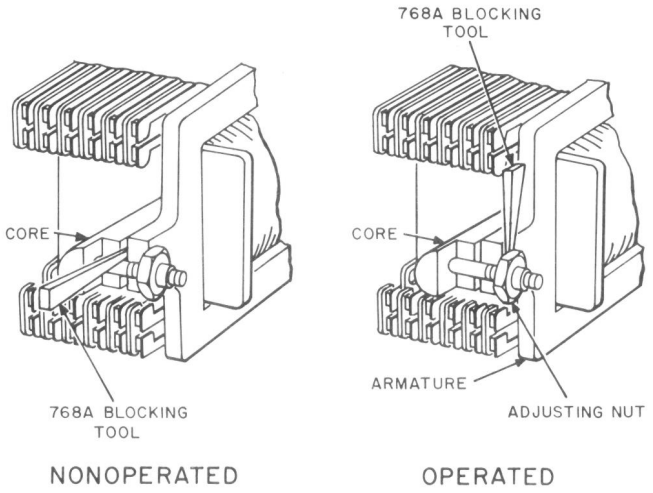

Fig. 7—Blocking U-, Y-, UA-, UB-, 271-, and 282-Type Relays

3.06 ***U-, UA-, and UB-Type Relays Equipped With Attachable Separators:*** Block relays nonoperated by inserting the 768A blocking tool between the flap of the attachable separator and the armature. Take care when inserting or removing the tool not to crease or otherwise damage the separator. If the separator is creased or damaged, replace it. Block relays operated by inserting the tool between the armature and the adjusting nut.

3.07 ***Y-Type Relays Equipped With Magnetic Separators:*** Block relays nonoperated by inserting the 768A blocking tool between the armature and the separator on the core, taking care not to disturb the separator. Block relays operated by inserting the blocking tool between the adjusting nut and the armature.

3.08 ***AF-, AG-, AJ-, AK-, AL-, AM- 286-, 287-, and 288-Type Relays:*** Fig. 8, 9, and 10.

(1) Block relays nonoperated as covered in (2) and operated as covered in (3) using the 768A blocking tool. It is not objectionable if the tool causes the inner end of the armature legs to move slightly away from the core.

(2) To block relays nonoperated, insert the 768A tool between the armature and core. In blocking AK-type relays nonoperated, insert the tool through the hole in the core plate in order to enter the gap between the armature and core.

(3) To block relays operated, insert the 768A tool between the armature and backstop for AF-, AG-, AJ-, AK-, AL-, and AM-type relays and between the armature and core plate for 286-, 287-, and 288-type relays. When both halves of the AK-type relays are blocked operated at the same time, it will be necessary to use two tools.

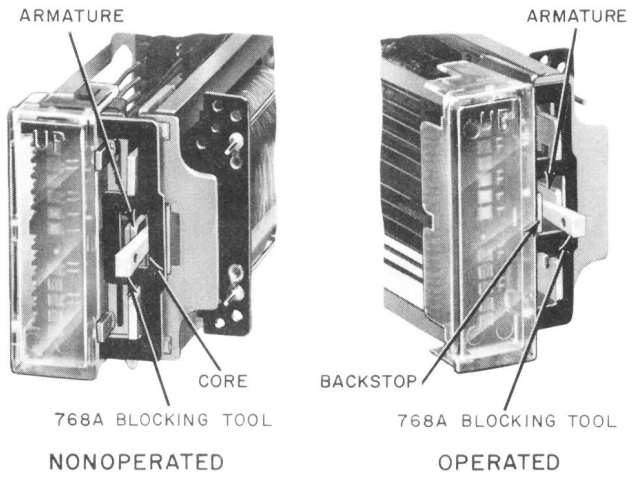

Fig. 8—Blocking AF-, AG-, AJ-, and AL-Type Relays

3.09 ***BF-, BG-, BJ-, BL-, and ◗BM◖ - Type Miniature Wire Spring Relays:*** Fig. 11 and 12—Block relays operated as covered in (1) and nonoperated as covered in (2) using the KS-19914 wedge. The wedge is a "U" shaped tool having two legs each terminating in beveled edges. In using the tool, the legs are deflected toward each other to permit the outer edge of each leg to pass the backstop side legs.

(1) To block relays operated, deflect the legs of the KS-19914 wedge toward each other and insert them between the core and the

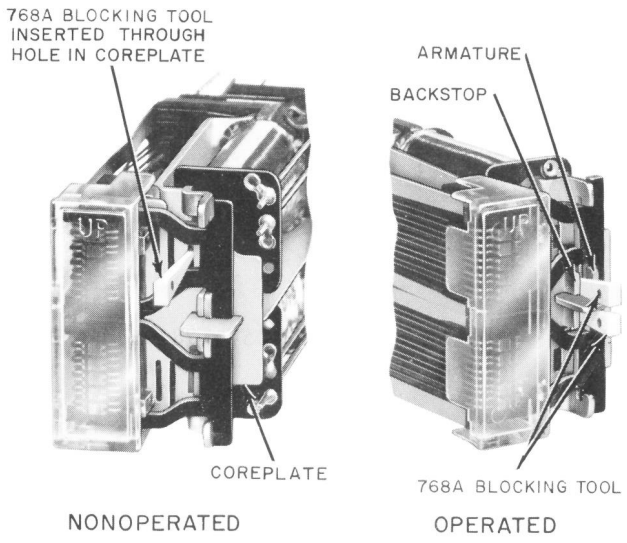

Fig. 9—Blocking AK- and AM-Type Relays

backstop with the beveled edges toward the backstop.

(2) To block relays nonoperated, deflect the legs of the KS-19914 wedge toward each other and insert them between the armature and the core with the beveled edges toward the core.

3.10 ***44-Type Relays and 22-, 35-, and 56-Type Drops:*** Fig. 13—Block this apparatus nonoperated by inserting a toothpick between the armature and the frame or shell.

3.11 ***89-, 101-, 105-, 108-, and 172-Type Relays:*** Fig. 14—Block relays operated by inserting a toothpick between the armature and the adjusting nut.

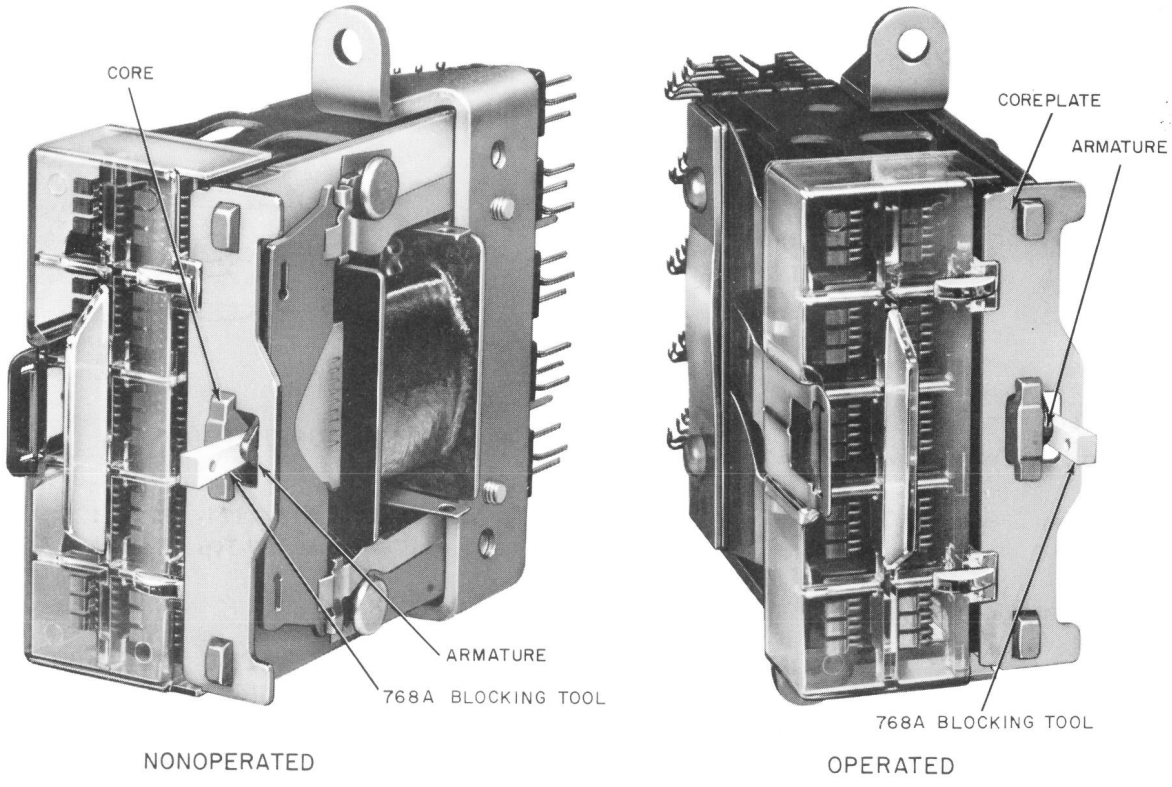

Fig. 10—Blocking 286-, 287-, and 288-Type Relays

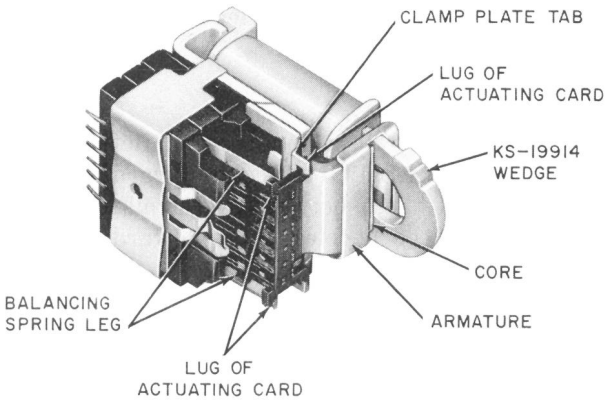

Fig. 11—Blocking BF-, BG-, BJ-, BL-, and BM-Type Miniature Wire-Spring Relays - Operated

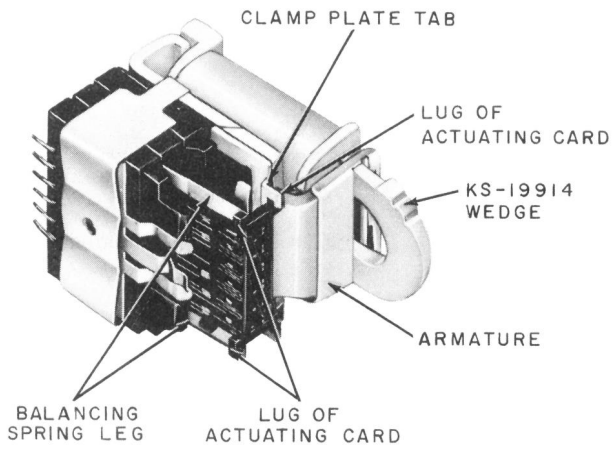

Fig. 12—Blocking BF-, BG-, BJ-, BL-, and BM-Type Miniature Wire-Spring Relays - Nonoperated

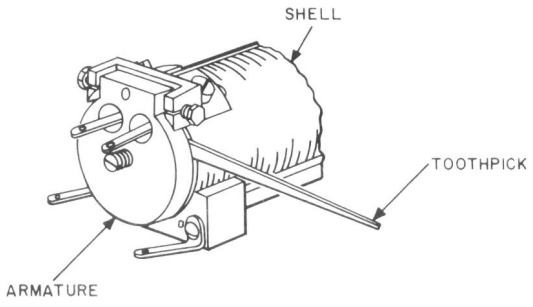

Fig. 13—Blocking 44-Type Relays - Nonoperated

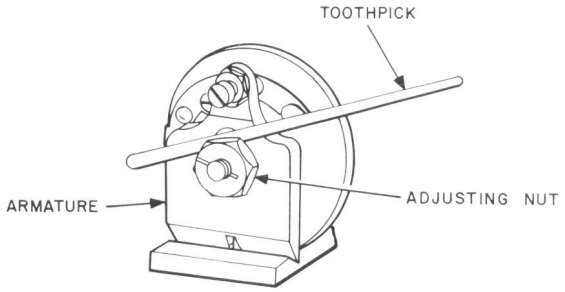

Fig. 14—Blocking 89-, 101-, 105-, 108-, and 172-Type Relays - Operated

3.12 ***111-, 121-, 122-, 125-, 149-, 162-, 178-, and 179-Type Relays:*** Fig. 15—Block relays nonoperated by inserting the flat end of a toothpick between the armature and the pole piece. Block relays operated by inserting the flat end of a toothpick between the armature and the armature adjusting screw. Break the toothpick if necessary in order to insert it.

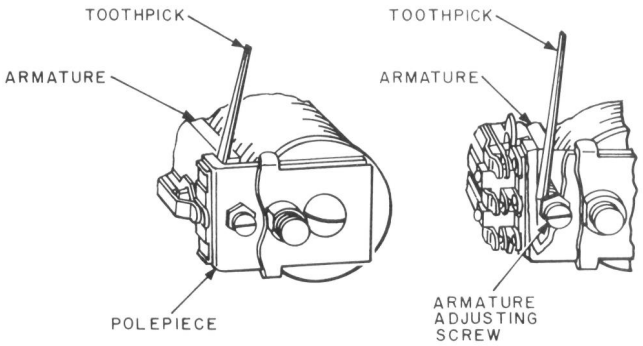

Fig. 15—Blocking 111-, 121-, 122-, 125-, 149-, 162-, 178-, and 179-Type Relays

3.13 ***114-, 124-, 126-, 174-, and 198-Type Relays:*** Fig. 16—Block relays nonoperated by inserting the flat end of a toothpick between the armature and the shell. Block relays operated by inserting a KS-6320 orange stick between the armature and the back contact screw support. Insert the orange stick between the support and the edge of the armature, being careful not to strain any of the parts.

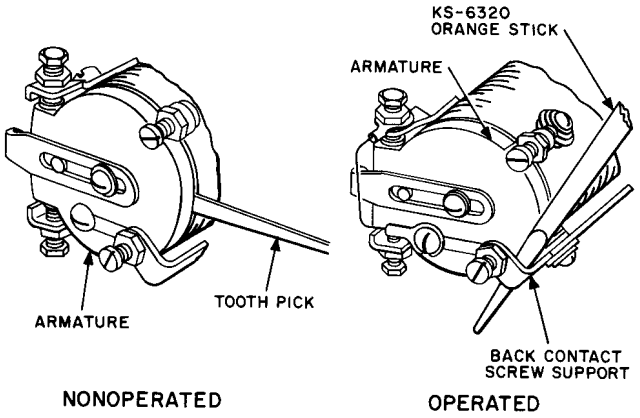

Fig. 16—Blocking 114-, 124-, 126-, 174-, and 198-Type Relays

3.14 ***118-Type Relays:*** Fig. 17—Block relays nonoperated by inserting a toothpick between the armature and the core. Block relays operated by inserting a toothpick between the armature backstop bracket and the armature.

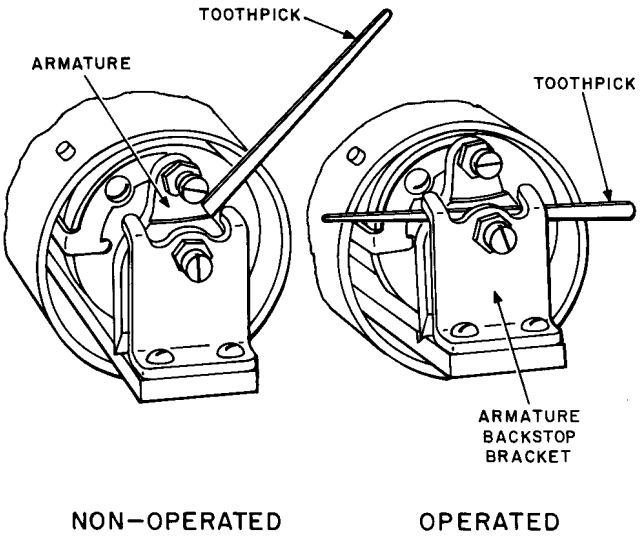

Fig. 17—Blocking 118-Type Relays

3.15 ***186-Type Relays:*** Fig. 18—Block relays nonoperated by inserting the flat end of a toothpick between the armature and the frame. Take care to insert the toothpick at the corner of the armature, as shown in Fig. 18, and make sure that the toothpick is resting against the circular opening of the frame at a point above its center. Block relays operated by inserting the flat end of a toothpick above the counterweight pin and below the axis pin with the toothpick resting against the circular opening in the frame.

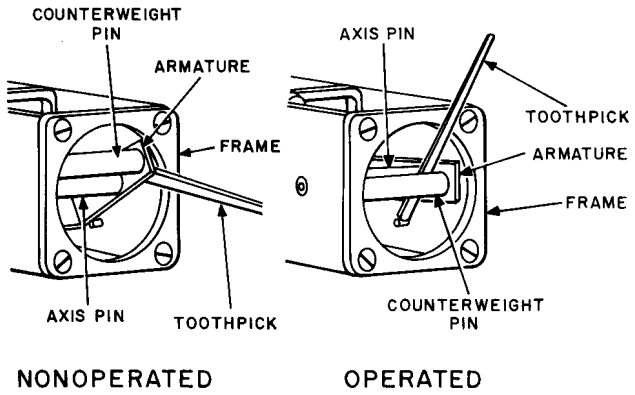

Fig. 18—Blocking 186-Type Relays

3.16 ***190-Type Relays:*** Fig. 19—Block relays nonoperated by inserting the flat end of a toothpick between the armature and the core. Block relays operated by inserting a toothpick between the armature and the back contact screw.

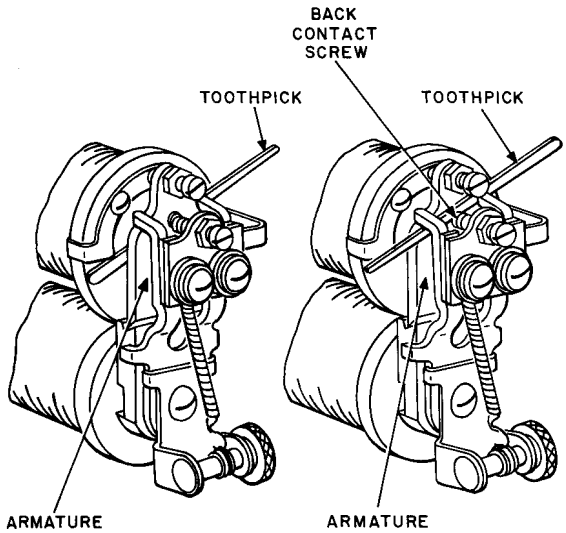

Fig. 19—Blocking 190-Type Relays

3.17 ***196-Type Relays:*** Fig. 20—Block relays nonoperated by inserting the pointed end of a toothpick between the armature and the core. Block relays operated by inserting the flat end of a toothpick between the armature and the back contact.

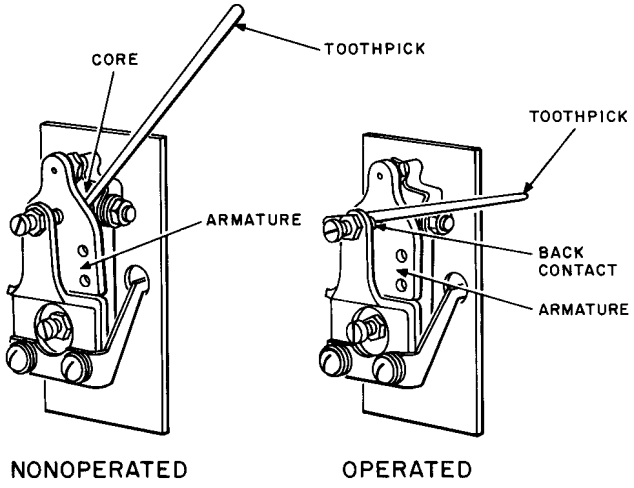

Fig. 20—Blocking 196-Type Relays

3.18 ***208- and 214-Type Relays:*** Fig. 21—Block relays nonoperated by inserting the flat end of a toothpick between the armature and the core. Block relays operated by inserting the flat end of a toothpick between the armature contact arm and the backstop. Insert the toothpick from below, taking care to insert it behind the contacts.

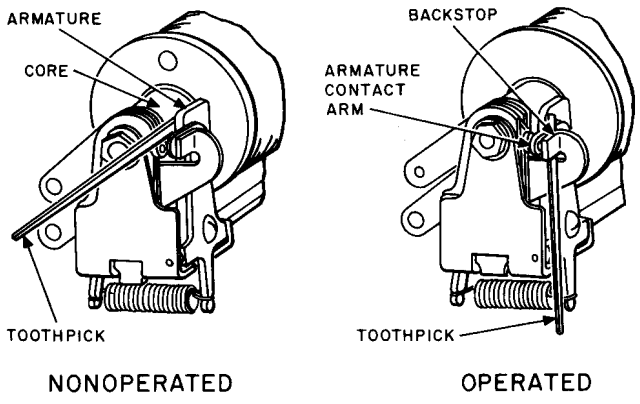

Fig. 21—Blocking 208- and 214-Type Relays

3.19 ***221-, 222-, 223-, 224-, 225-, 247-, and 248-Type Relays***

(1) ***Blocking Relay for Short Period:*** Fig. 22—If the relay is to be blocked for a short period as may be required in connection with testing, use a toothpick if the armature travel is small or a KS-6320 orange stick if the armature travel is large. To block the relay nonoperated, insert the toothpick or orange stick between the armature and core. To block the relay operated, manually operate the relay and then insert the flat end of the toothpick or orange stick between the armature lever and the armature backstop.

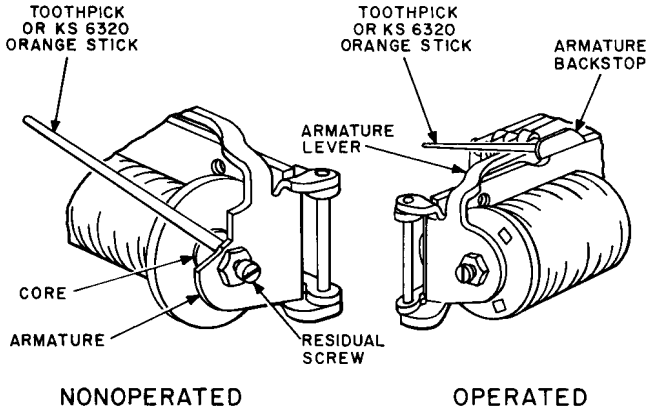

Fig. 22—Blocking 221-, 222-, 223-, 224-, 225-, 247-, and 248-Type Relays

(2) ***Blocking Relay Operated for Extended Period (except 225-type relay):*** Fig. 23—When introducing digit-absorbing features and when making trunking rearrangements in step-by-step offices, it is necessary to block certain selector relays operated for extended periods of time. To do this, use the KS-16369 blocking tool. Each end of this tool has a serrated surface on one side and a groove on the other. In blocking the relay, the groove at one end of the tool engages the armature lever, and the associated serrated surface on the tool engages the armature backstop of the relay. One end of the tool is used to block relays having the armature lever at the right and the other end to block relays having the armature lever at the left. To block the relays with the KS-16369 tool, first manually operate the relay.

Then hold the tool with the serrated surfaces vertical and extending downward from the insulated portion of the tool. Position the tool so that the groove at one end of the tool faces the backstop side of the armature lever of the relay. Then insert the tool between the armature lever and the backstop so the grooved portion of the tool engages the armature lever and the serrated surface engages the backstop. Insert the tool just far enough to hold the relay operated. Take care to avoid bending the backstop or causing adjacent springs to touch each other which may result if the tool is inserted too far. After the KS-16369 tool is removed, if there is any indication that the backstop has been bent through use of the tool, check for the armature travel, armature stud gap, and electrical requirements, referring to the appropriate section in the plant series covering requirements and adjusting procedures for this apparatus.

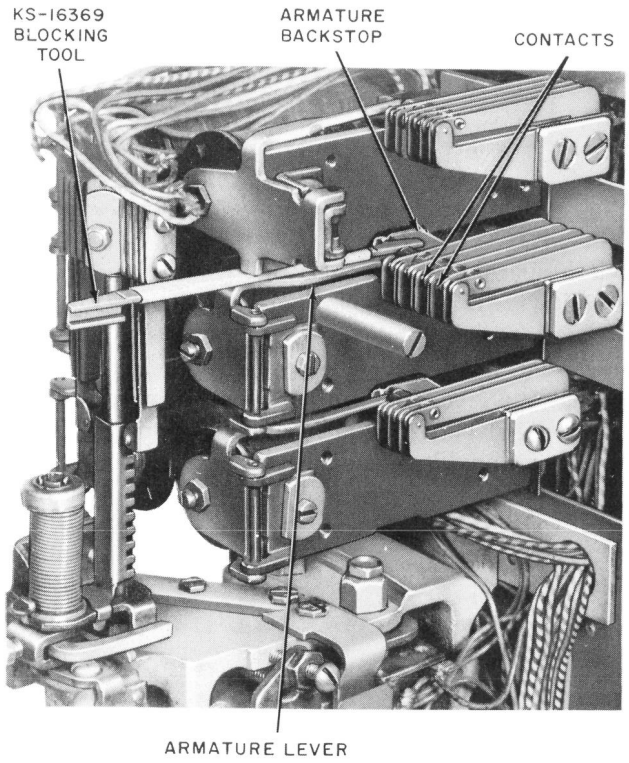

Fig. 23—Blocking 221-, 222-, 223-, 224-, 225-, 247-, and 248-Type Relays—Operated for Extended Periods

3.20 ***229-, 230-, and 232-Type Relays:*** Fig. 24—Block relays operated by inserting a toothpick between the armature and the armature travel adjusting screw.

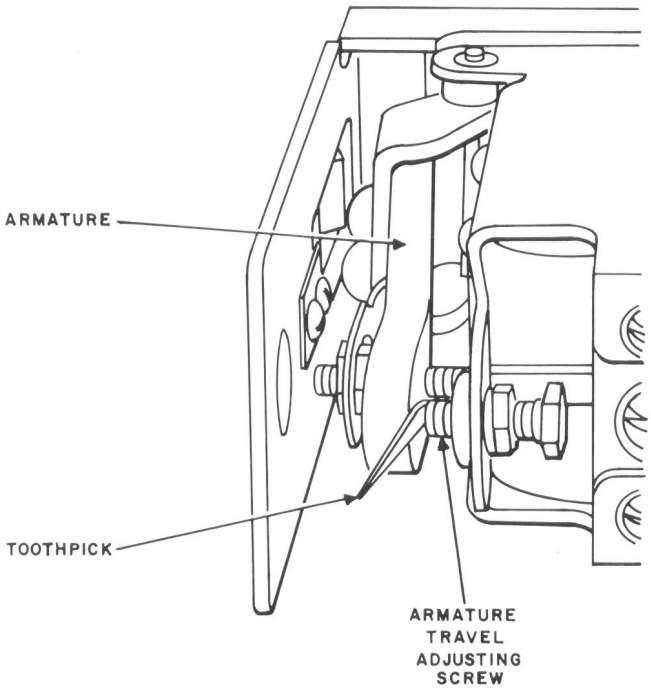

Fig. 24—Blocking 229-, 230-, and 232-Type Relays

3.21 ***245-, 254-, 263-, and 264-Type Relays:*** Fig. 25—Block either half of multicontact relays nonoperated by inserting a toothpick between the armature and core. Use two toothpicks to block both halves. Block either half of a relay operated with the ITE-4069 blocking tool. Insert the tool from the right of the middle armature retaining spring and between the armature and the upper or lower armature backstop lugs, depending on which half of the relay is being blocked. Use two ITE-4069 tools to block both halves of a relay.

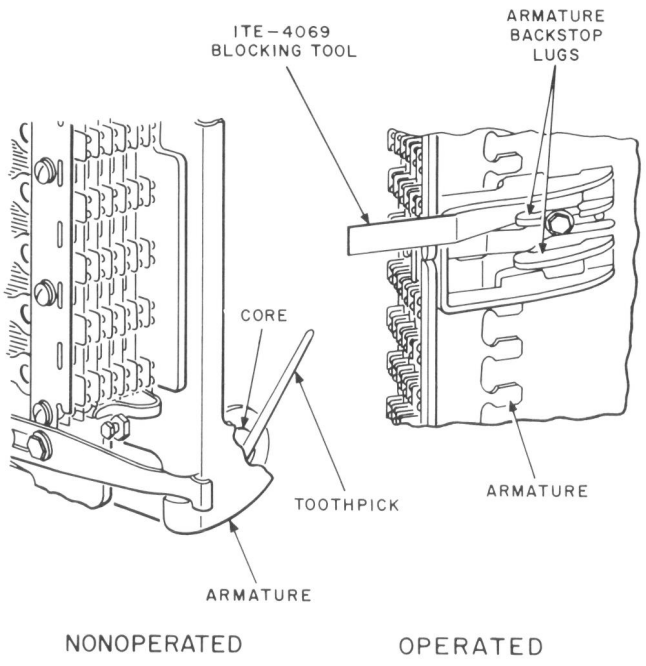

Fig. 25—Blocking 245-, 254-, 263-, and 264-Type Relays

3.22 ***251- and 252-Type Relays:*** Fig. 26—Block relays nonoperated by inserting a toothpick between the armature and the core. Block relays operated by inserting a toothpick between the armature and the backstop screw.

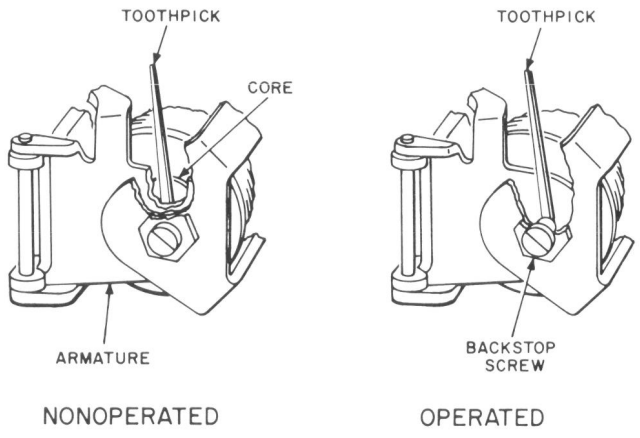

Fig. 26—Blocking 251- and 252-Type Relays

3.23 ***Stromberg-Carlson 200-Type Relays:*** Fig. 27—Block relays nonoperated by inserting a toothpick between the armature and the core. Block relays operated by inserting a toothpick between the armature and the return pole piece.

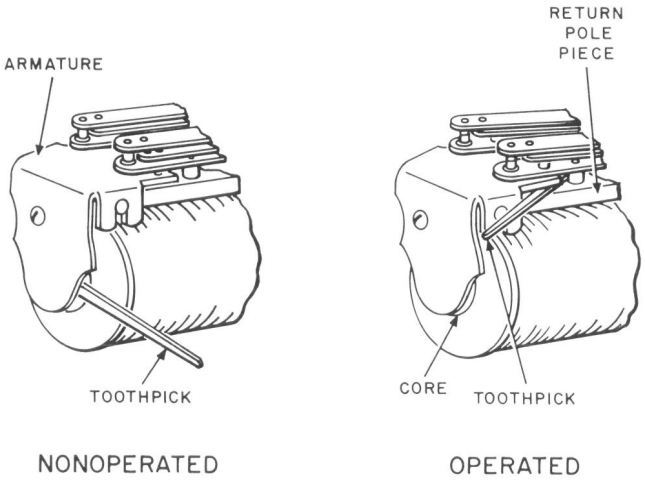

Fig. 27—Blocking Stromburg-Carlson 200-Type Relays

Apparatus Other Than Relays and Drops

3.24 ***Plunger-Type Primary Line Switches (BCO Relay):*** Fig. 28—To block the switch operated, block the BCO relay on the switch as follows. Place the pointed end of the 324 relay blocking tool behind the lever backstop adjacent to the end of the lever. Apply a sidewise pressure against the lever and pull the tool forward so that it is wedged between the lever backstop and lever. Do not manually operate the lever.

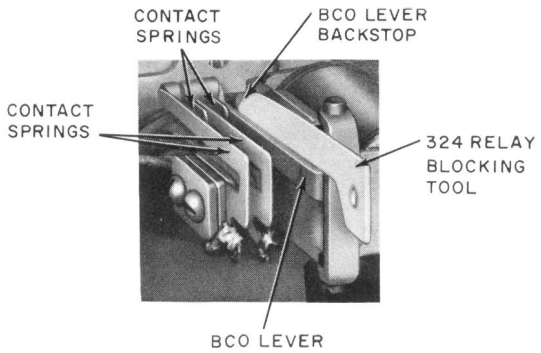

Fig. 28—Blocking Plunger-Type Line Switches - Operated

3.25 ***A- and B-Type Sequence Switches:*** Fig. 29—Block sequence switches from rotating by inserting the 253B brake plate between the sequence switch frame and the driven disc. The switch can then be turned manually to any desired position. Do not use any substitute for this brake plate and do not attempt to hold the sequence switch in a fixed position by hand or by any other method than with the brake plate when the drive magnet is energized.

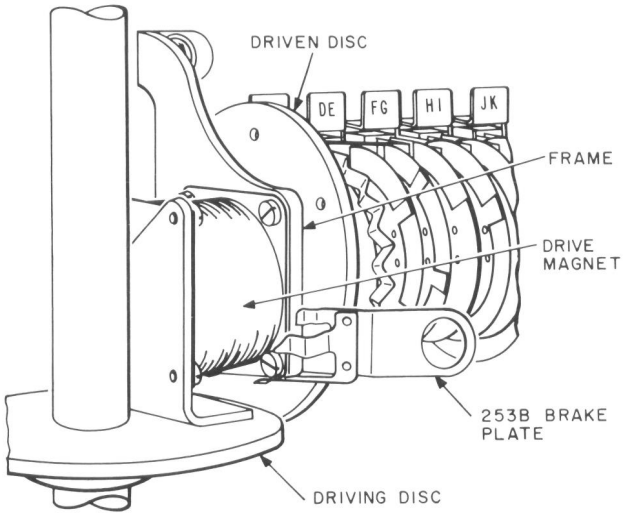

Fig. 29—Blocking A- and B-Type Sequence Switches

3.26 ***300-, 301-, 302-, 303-, 304-, 305-, 306-, 307-, 308-, 314-, 315-, and 318-Type Switches:*** Fig. 30—Block the holding magnet of switches nonoperated by applying the 558A armature blocking tool to the lower pole piece so the blocking finger of the tool is between the end of the pole piece and the holding armature.

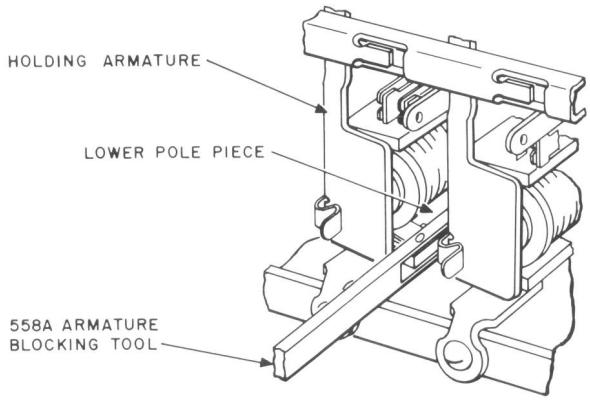

Fig. 30—Blocking 300- through 308-, 314-, 315-, and 318-Type Switch Holding Magnets - Nonoperated

3.27 ***324-, 325-, 328-, 334-, and 338-Type Switches:*** Fig. 31 and 32

(1) Using a 1-1/2 inch length cut from the end of a KS-6320 orange stick, block the holding magnet nonoperated by inserting the flat end of the orange stick between the core and the holding armature with the other end of the stick resting on the retaining lug of the adjacent holding magnet stop bracket, as shown in Fig. 31. When blocking the holding magnet at the right-hand side of the switch nonoperated, place the flat part of the orange stick between the core and the holding armature at an angle of approximately 45 degrees above horizontal.

Caution: Insert the orange stick at an angle so that it does not snag on the outer edge of the stop plate.

(2) To block the holding armature operated, insert either the 1-1/2 inch length of orange stick (see Fig. 32) or the 768A blocking tool between the armature and the armature backstop. If the orange stick is used, insert the flat part of the orange stick between the armature and the backstop with the orange stick at an angle of approximately 45 degrees to the right.

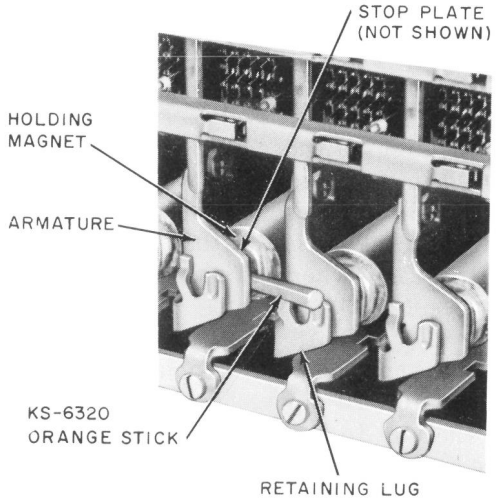

Fig. 31—Blocking 324-, 325-, 328-, 334-, and 338-Type Switch Holding Magnets - Nonoperated

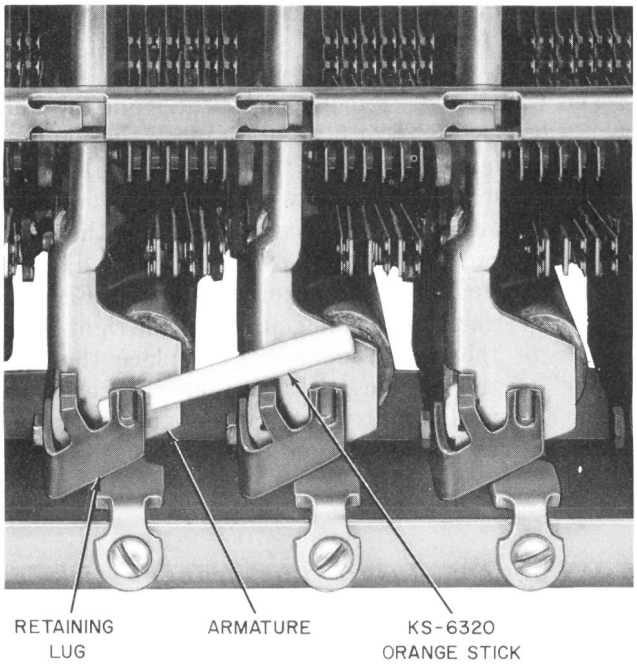

Fig 32—Blocking 324-, 325-, 328-, and 338-Type Switch Holding Magnets - Operated

3.28 *CA Through CF Small Crossbar Switches*

(1) Block the holding magnet nonoperated by inserting the 768A blocking tool between the core and the holding armature, similar to the method used in Fig. 31.

(2) To block the holding armature operated, insert the 768A blocking tool between the armature and the backstop, similar to the method used in Fig. 32.

(3) The holding off-normal assembly may be blocked in its operated position by inserting the 773A tool between the operate card and mounting bracket with the tool straddling the arm of the card where it passes through the bracket (See Fig. 33).

➧ ***Note:*** Insert the 733A tool at an angle of approximately 20° above horizontal. This will allow the tool to be inserted to its full depth and be supported, thus avoiding the possibility of it falling out due to vibration.➧

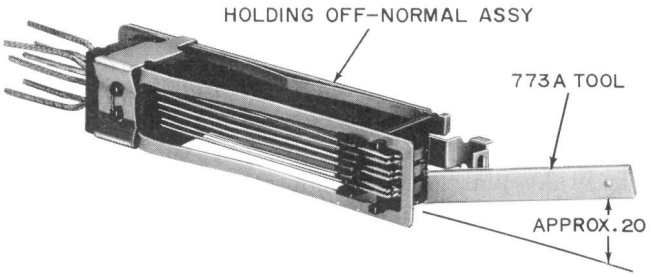

Fig. 33—Method of Blocking Holding Off-Normal Assembly

4. BLOCKING APPARATUS AT THE TIME OF CUTOVER

4.01 ***E-Type Relays:*** Fig. 1 and 2—Block the relay as required using the 136B relay blocking tool.

4.02 ***EA-Type Relays***

(1) ***EA6, EA12, and EA35 Relays:*** Fig. 34—Using the 608B cutover tool, block open the contacts controlling the circuit through the line relay. Insert the tool between the springs so the narrow leg of the tool holds open the proper contacts in the bottom spring combination and the wide leg holds open the proper contacts in the upper spring combination.

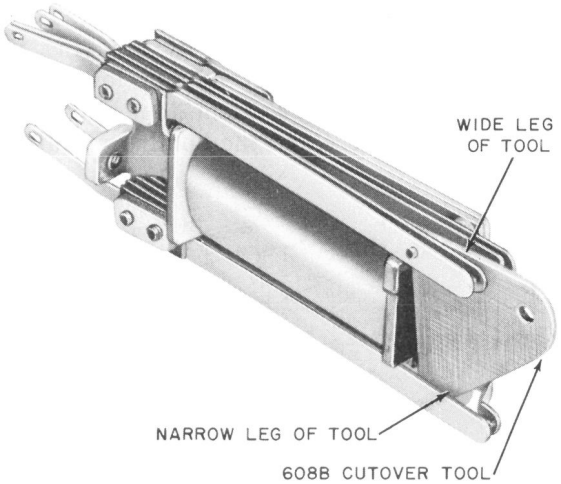

Fig. 34—Blocking EA6, EA12, and EA35 Relays for Cutover Purposes

(2) ***EA8, EA9, EA31, and EA32 Relays:*** Block the relay operated using the 136B or 768A blocking tool as required in accordance with Fig. 1, 2, or 3 of the section, as applicable.

(3) ***EA39 Relay:*** Fig. 35—Using the 608B cutover tool, block open the contacts controlling the circuit through the line relay. Insert the wide leg of the tool between contact spring 3 (bottom) and the stud projecting through contact spring 2, with the narrow leg of the tool to the right of contact spring 4 (top). Position the tool against the relay spoolhead with the top of the narrow leg against the bottom of the upper armature stud between the shoulder of the stud and contact spring 4. If this position of the tool does not provide at least 0.005-inch separation between contacts 4 and 5, reposition the tool as follows. Move the tool away from the spoolhead and raise it slightly so the narrow leg is against the front of the upper armature stud. Raise the tool only enough to obtain adequate separation between contacts 4 and 5 making sure that there is clearance between springs 3 and 4 (top).

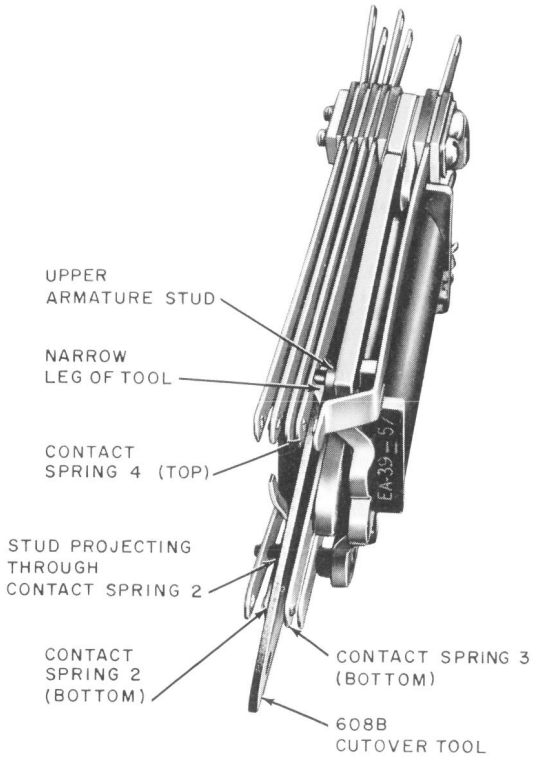

Fig. 35—Blocking EA39 Relay for Cutover Purposes

(4) ***EA41 Relay:*** Fig. 36—Using the 441B contact blocking tool, block open the contacts controlling the circuit through the line relay. Insert the legs of the tool under the tangs of the back contact springs. Position the legs against the projections at the top and bottom of the spoolhead and push the tool forward until the stop on each leg rests against the front of the spoolhead.

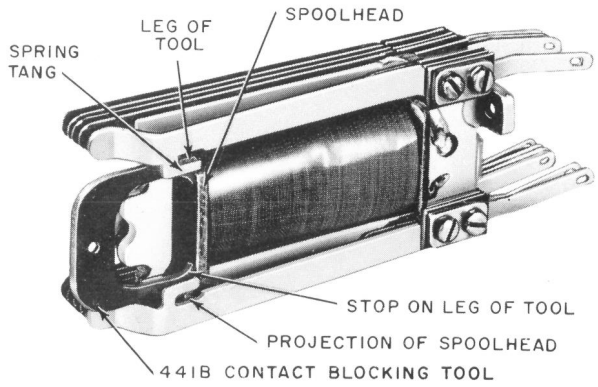

Fig. 36—Blocking EA41 Relay for Cutover Purposes

4.03 ***R1886 Relays:*** Fig. 37—Using the 441A cutover tool, block open the contacts controlling the circuit through the line relay. Insert the small legs of the tool under the tangs of the back contact springs, taking care that the slot in the center of the tool fits over the adjusting nut. Push the tool forward until the legs rest on the spoolhead.

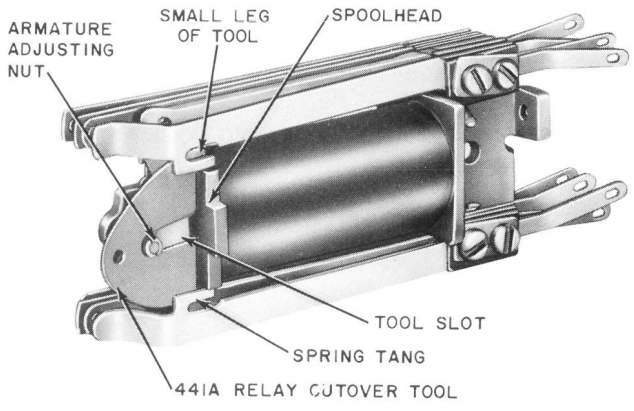

Fig. 37—Blocking R1886 Relay for Cutover Purposes

4.04 ***U676 and U680 Relays:*** Fig. 38—Using the 601B cutover tool, block open the contacts controlling the circuit through the line relay. With the beveled side of the legs of the tool facing away from the armature, insert the tool as far as it will go between the stud controlling the operation of the spring to be blocked open and the adjacent contact or buffer spring. On U676 relays, insert the tool between contact springs 2 and 3 (top) and contact spring 2 and buffer spring (bottom). On U680 relays, insert the tool between contact springs 2 and 3 (top) and contact spring 4 and buffer spring (bottom).

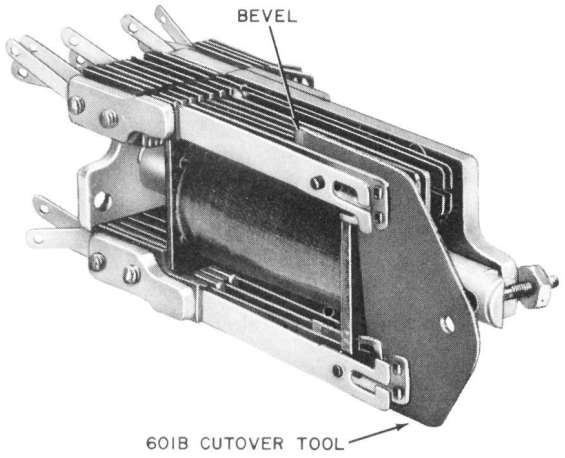

Fig. 38—Blocking U676 and U680 Relays for Cutover Purposes

4.05 ***Crossbar Switches:*** Insert the tip of the 550B cutover tool between the holding magnet off-normal contacts that are required to be blocked open. Before using the 550B tool, clean it with the KS-2423 cloth moistened with KS-19578, L1, trichloroethane.

5. INSULATING AND BLOCKING CONTACTS AND SPRINGS

Relay Contacts

5.01 ***General***

(1) When it is necessary to insulate contacts, a good grade of bond paper shall be used, except when optional methods are specified, for insulating by blocking individual contacts. KS-7187 bell seal bond paper provided in strips 1/2 inch wide and 2-1/2 inches long is generally suitable for use on relays except wire spring and UB types for which a special shape of insulator is required.

(2) Procedures for insulating contacts and blocking springs on typical relays are given in the following paragraphs and illustrated in associated figures. Before removing a paper insulator from between contacts, relieve pressure of the contacts against the insulator. In preparing KS-7187 paper for insulating contacts, avoid lint by cutting instead of tearing the strips to the required size.

5.02 ***Insulating or Blocking Contacts of 239-, 280-, and Similar-type Relays:*** Because of their small contact gaps, care ***must*** be exercised when insulating or blocking the contacts of these relays to prevent bending the armature assembly and disturbing the relay adjustment. Insulate only one pair of contacts at a time using a single thickness of KS-7187 bell seal bond paper (substance 20) or a KS-14737, L1, paper insulator. Insulating one pair of contacts with a single thickness (0.004 inch normal) or KS-7187 or KS-14737, L1, paper will block the other pair of contacts in the closed position.

5.03 ***Insulating Contacts of Relays Except Wire Spring and UB Types:*** Cut the strip of KS-7187 paper to the required size. Fold the paper and insert it between the contacts, as shown for typical relays in Fig. 37 through 43. When insulating normally closed contacts, manually operate the relay before inserting the paper.

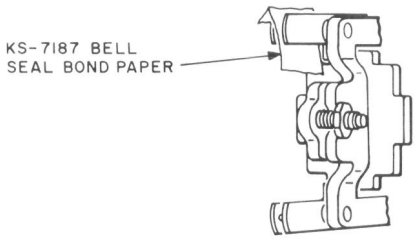

Fig. 39—Insulating Contacts of Relays in General (R-Type Relays Illustrated)

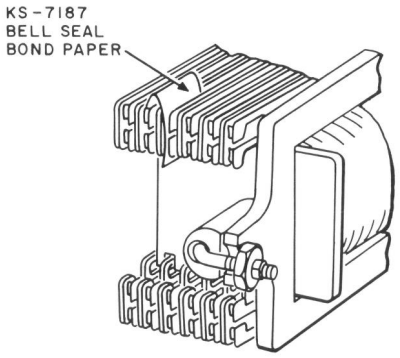

Fig. 40—Insulating Contacts of U-, UA-, and Y-Type Relays

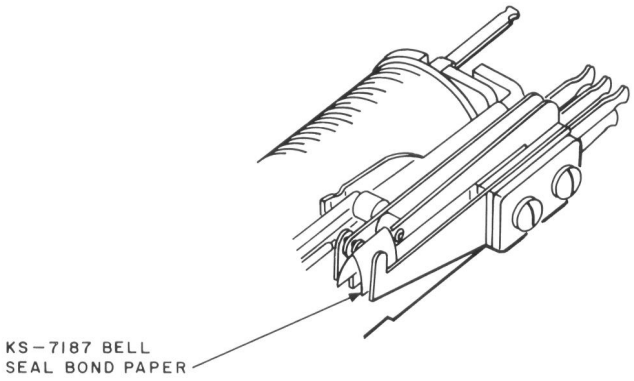

Fig. 41—Insulating Contacts of 221- and Similar-Type Relays

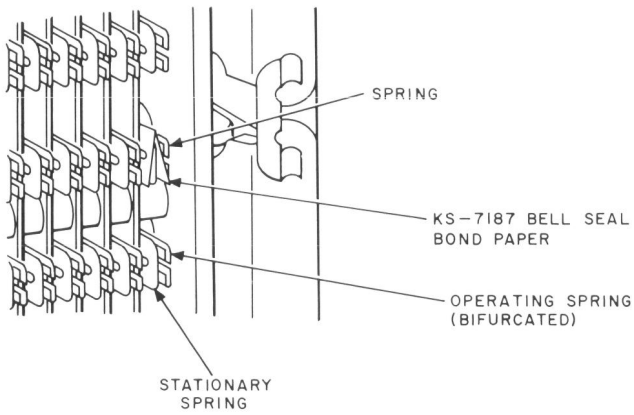

Fig. 42—Insulating Contacts of 245- and Similar-Type Relays

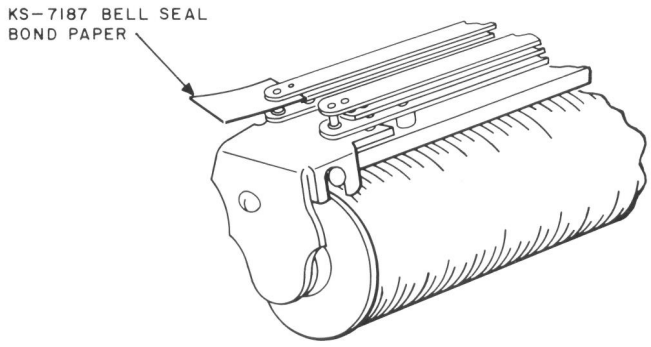

Fig. 43—Insulating Contacts of Stromburg-Carlson 200-Type Relays

5.04 ***Insulating Contacts on AF-, AG-, AJ-, AK-, AL-, AM-, BF-, BJ-, BL-, BM-, 286-, and 288-Type Relays (Wire Spring Types):*** Fig. 44.

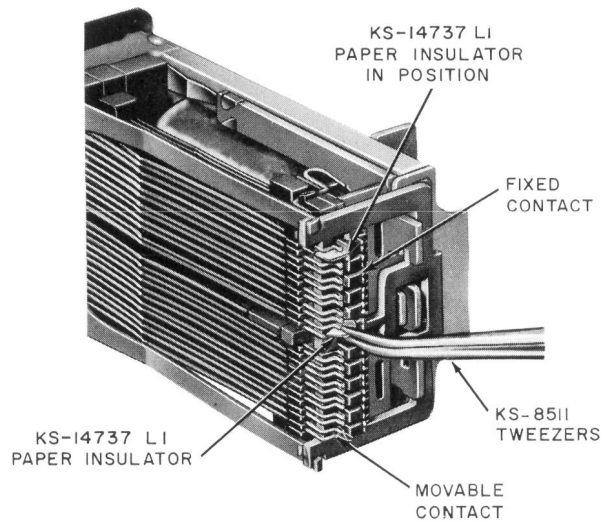

Fig. 44—Insulating Contacts of Wire-Spring Type Relays (AJ-Type Illustrated)

(1) Use the KS-14737, L1, paper insulator, as covered in (3). The procedures for insulating normally open or normally closed contacts are the same, except in the case of normally closed contacts, block the relay operated as covered in paragraph 3.08. Remove the blocking tool after the insulator has been positioned between the contacts.

(2) The KS-14737, L1, paper insulator, is a small bond paper insulator folded down the middle with two ears folded out at one end. When the main folds are held together, the insulator assumes the shape of a Y. In order to avoid contaminating these insulators, they should be kept in their container until required for use.

(3) To insulate a contact, first remove the contact cover from the relay. Remove an insulator from the container with the KS-8511 tweezers, taking care not to damage or soil the insulator. Hold the insulator with the tweezers from the side opposite the center fold with the tip of the tweezers approximately at the center of the insulator. Check that the ears are in a position so the insulator is in the form of a Y, and if necessary, bend the ears to this shape. Place the ears of the insulator against the fixed contact at an angle of approximately 45 degrees to the movable contacts, as shown in Fig. 44. Position the insulator so the main folds are between the twin movable contacts with the ears against the fixed contact. After the insulator has been partially inserted in this way, push it back against the card with the side of the tweezers. Remount the contact cover.

(4) To remove an insulator, first remove the contact cover. Then remove the insulator with the tweezers, manually operating the relay if the insulator is between break contacts. Remount the cover.

Note: Do not use an insulator more than once.

5.05 ***Insulating Contacts of UB-Type Relays:*** Fig. 45—Insulate contacts by inserting a KS-14529 paper insulator as follows. Insert the short leg of the insulator downward between the contacts, making sure that both of the twin contacts are insulated. Draw the insulator forward so the short leg rests against the rear of the card and the long leg rests on the top of the card. Before inserting or removing the insulator between normally closed contacts, manually operate the relay.

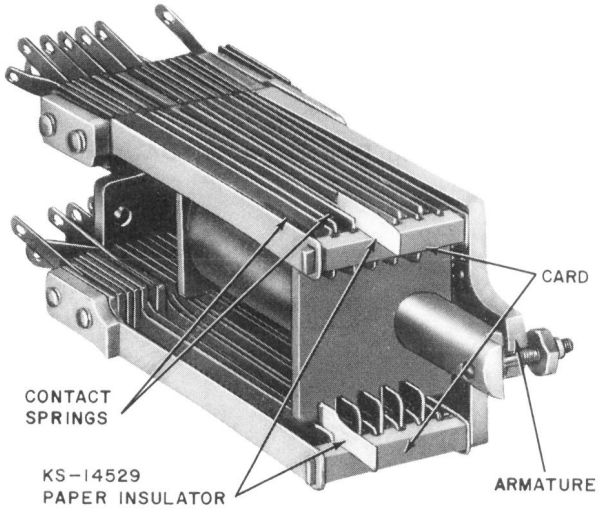

Fig. 45—Insulating Contacts of UB-Type Relays

5.06 ***Blocking Contacts of E- and Similar-Type Relays:*** Fig. 46-Block normally closed contacts open or normally open contacts so they cannot close by inserting a toothpick between the springs or between the spring tang and the spoolhead.

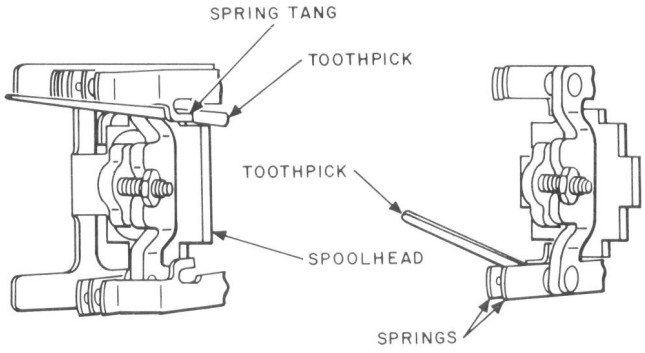

Fig. 46—Blocking Contacts of E- and Similar-Type Relays

5.07 ***Blocking Contacts of 125- and Similar-Type Relays:*** Fig. 47—Block individual contacts with a toothpick as shown in Fig. 47.

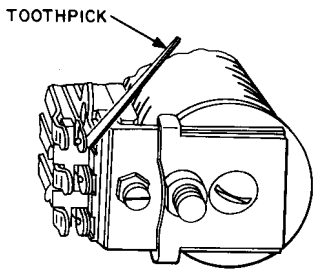

Fig. 47—Blocking Contacts of 125- and Similar-Type Relays

5.08 ***Blocking Contacts of 229- and Similar-Type Relays:*** Fig. 48—Block individual contacts with a toothpick, as shown in Fig. 48.

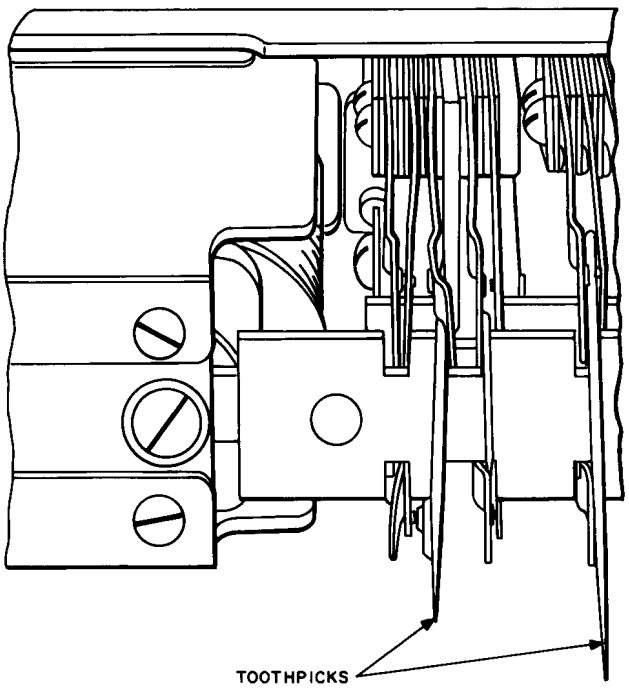

Fig. 48—Blocking Contacts of 229- and Similar-Type Relays

5.09 ***Blocking Individual Contacts on 245-, 254-, 263-, and 264-Type Relays and 216- and 217-Type Switches:*** Prepare a blocking tool as follows. Cut off a piece approximately 2-1/2 inches long from one end of a KS-6320 orange stick. Approximately 1/2 inch from the pointed end of this piece, cut off the point at an angle of approximately 30 degrees as indicated in Fig. 49. To block individual contacts closed, insert the modified orange stick between the bifurcated spring and the adjoining solid spring, as shown in Fig. 50. Take care that the tool is tight enough so operation of the relay will not dislodge it and other contacts are not closed. On the row of contacts nearest the frame on 263- and 264-type relays, insert the orange stick between the bifurcated spring and the frame. On the row of contacts nearest the frame of 245- and 254-type relays, use of the modified orange stick is not feasible. To block these contacts closed, place a 569A spring support in place between the inside row of contacts and the frame as shown in Fig. 51 and block the individual contacts closed by inserting a toothpick between the bifurcated spring and the spring support.

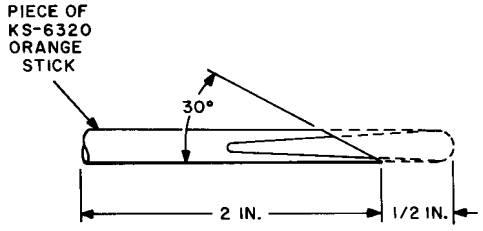

Fig. 49—Method of Preparing Blocking Tool

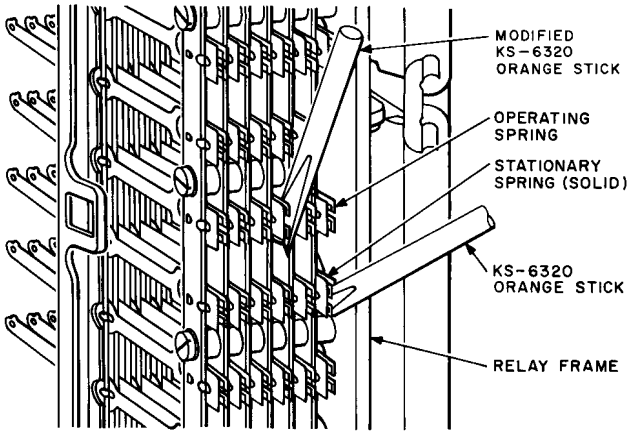

Fig. 50—Method of Blocking Individual Contacts on 263- and Similar-Type Relays

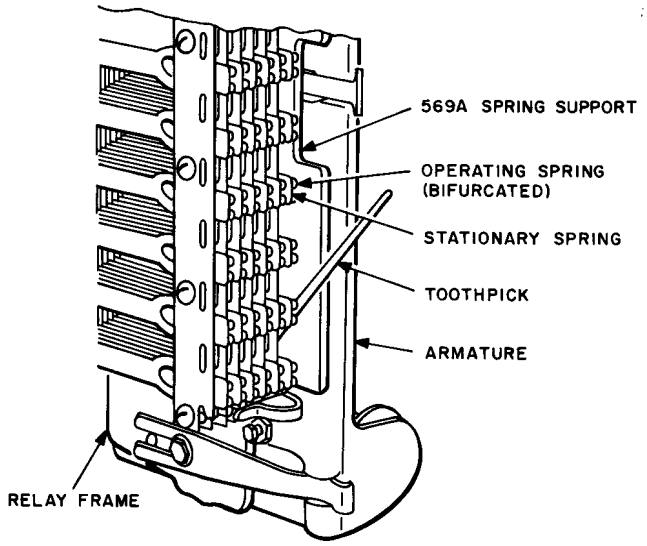

Fig. 51—Method of Blocking Individual Contacts Adjacent to Frame of 245- and 254-Type Relays

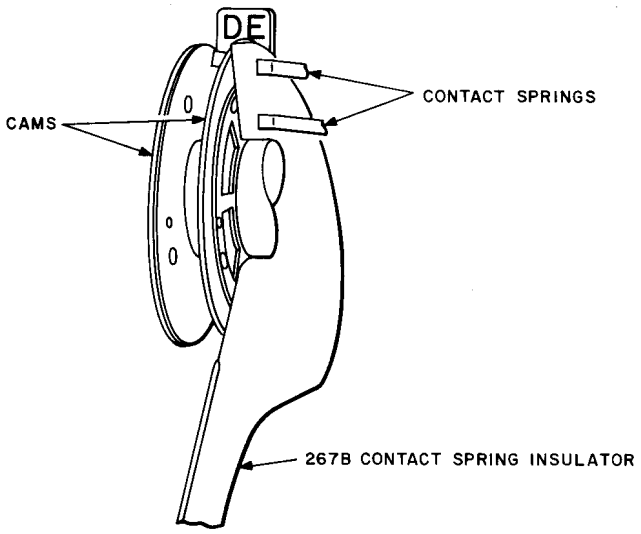

Fig. 52—Method of Using 267B Contact Insulator

Contacts of Apparatus Other Than Relays

5.10 ***A- and B-Type Sequence Switches:*** Fig. 52—Use the 267B contact insulator when it is desired to insulate the springs from the cams (except A springs and A cams) without interference with the normal operation of the sequence switch. To use the contact insulator, place it under and between the cam and the springs, halfway between the contact end of the springs and the spring mounting. Position the contact insulator between the springs and the cam and then rotate the handle down as far as it will go. Pull the contact insulator with sufficient force to lock it in place, but do not exert sufficient force to throw the springs out of adjustment.

5.11 ***Insulating and Blocking Contacts of 216- and 217-Type Switches:*** To block individual contacts closed, proceed as covered in paragraph 5.09 for 263- and 264-type relays.

5.12 ***Insulating Rotor Brushes on 200-, 206-, 209-, and 211-Type Selectors:*** To insulate a rotor brush, cut a strip of KS-7187 bell seal bond paper crosswise into two pieces of approximately equal length. Fold one of the pieces at the center by bringing the two ends together. Rotate the selector manually until the rotor brushes are approximately horizontal. Place the folded strip of paper over the feeder brush associated with the rotor brush to be insulated and the first bank terminal so that the sides of the V formed by the paper lie one on each side of the row of bank terminals, and the apex of the V rests against the feeder brush. Use of the KS-8511 tweezers and the KS-6320 orange stick will facilitate placing the paper in position. Manually step the selector until the tips (trailing edges) of the rotor brush rest on the paper over the first bank terminal. To remove the paper, step the selector manually until the brush is clear of the paper. Remove the paper with the tweezers.

5.13 ***Insulating Contacts on Holding Off-Normal Spring Assemblies Associated With Crossbar Switches***

(1) ***Flat-Spring Type:*** Cut the strip of KS-7187 paper to the required size. Fold the paper and insert it between the contacts as shown for typical relays in Fig. 42.

(2) ***Wire-Spring Type:*** Use the KS-14737, L1, paper insulator, and follow the procedure given in paragraph 5.04.