

## APPARATUS

### METHOD OF BLOCKING APPARATUS AND INSULATING CONTACTS

#### 1. GENERAL

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

**1.02** This section is reissued to include AL-, AM-, BF-, and BJ-type relays, to specify the use of KS-19578 L1 Trichloroethane instead of KS-8372 Trichlorethylene, and to add the 768A Blocking Tool for use in place of the 508A Armature Blocking Tool and the KS-16887 L1 Wedge.

**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; and Part 5 covers methods of insulating or blocking individual contacts.

#### 2. LIST OF TOOLS AND MATERIALS

CODE OS SPEC NO.	DESCRIPTION
<b>TOOLS</b>	
136B	Relay blocking tool
253B	Brake plate
267B	Contact spring insulator
324	Relay blocking tool
441A	Cutover tool
441B	Cutover 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
<b>MATERIALS</b>	
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.

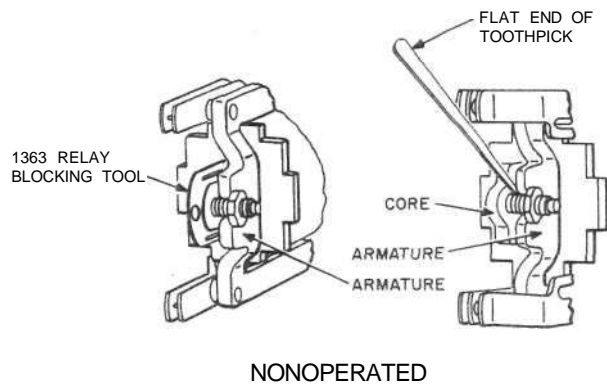


Fig. 1—Blocking Nonoperated A-, AB-, E-, F-, H-, M-, R-, T-, 236-, 266-Type and EA1- to EA13-Type Relays

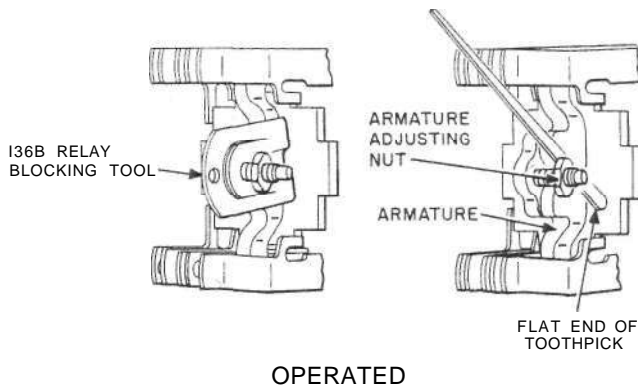


Fig. 2—Blocking Operated A-, AB-, E-, F-, H-, M-, R-, T-, 236-, 266-Type and EA1- to EA13-Type Relays

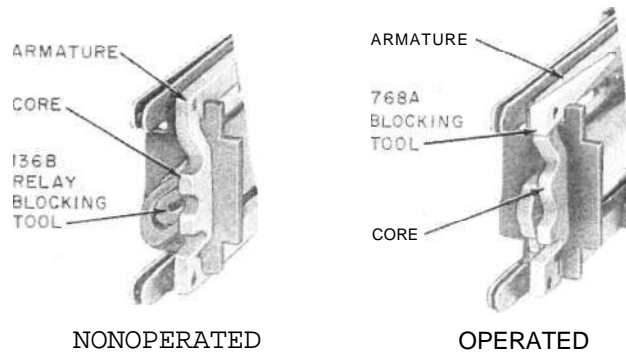


Fig. 3—Blocking Operated and Nonoperated EA-Type Relays Coded EA25 and Up

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

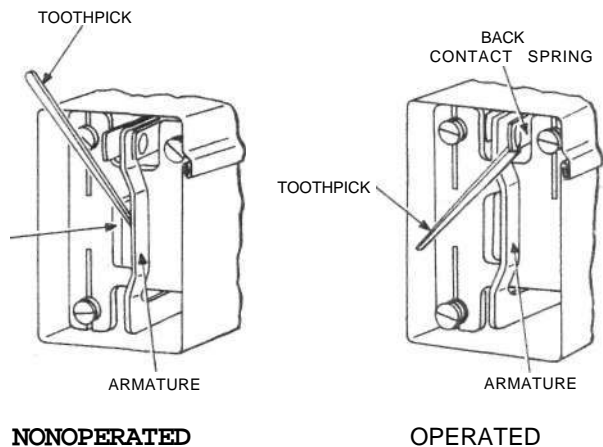


Fig. 4—Blocking B-, G, and J-Type Relays

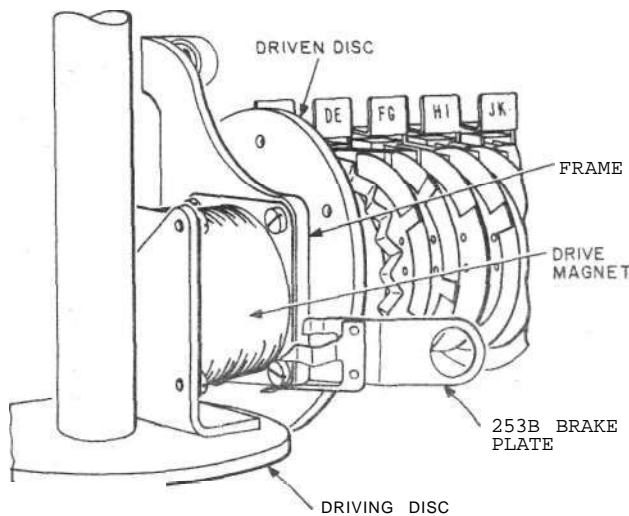


Fig. 29—Blocking A- and B-Type Sequence Switches

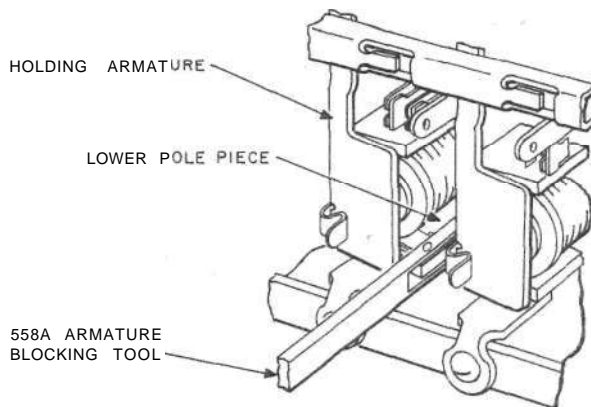


Fig. 30—Blocking 300-Through 303-, 314-, 315-, and 318-Type Switch Holding Magnets Nonoperated

### 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.

### 3.28 >CA Through CFSmall 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. 32.1).<

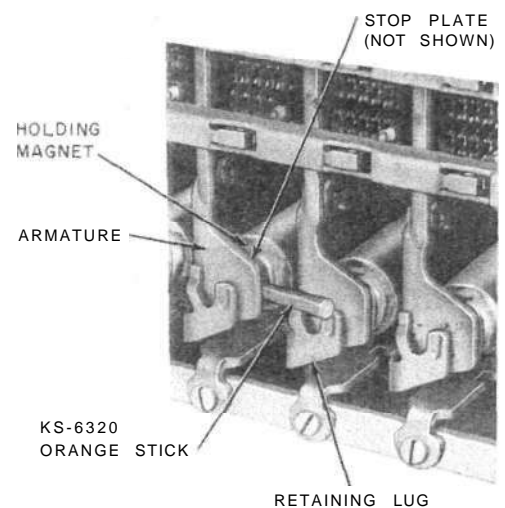
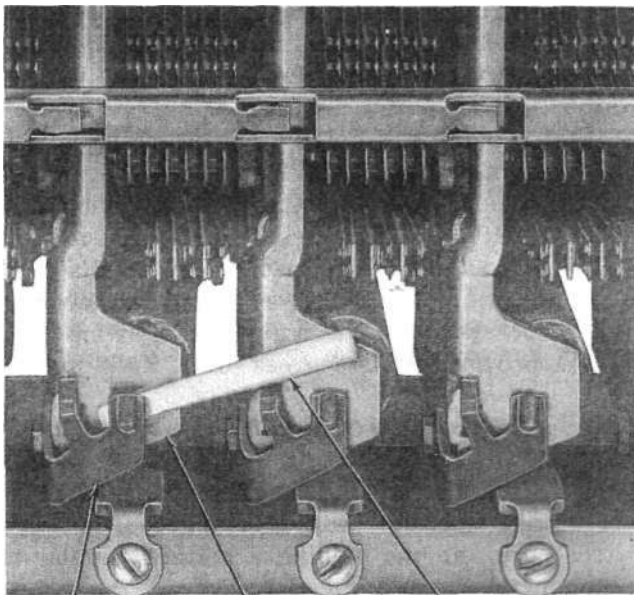
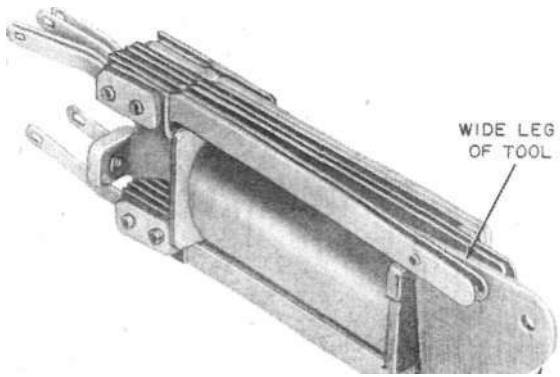


Fig. 31—Blocking 324-, 325-, 328-, 334-, and 338-Type Switch Holding Magnets Nonoperated



RETAINING LUG      ARMATURE      KS-6320 ORANGE STICK

Fig. 32—Blocking 324-, 325-, 328-, 334-, and 338-Type Switch Holding Magnets Operated



NARROW LEG OF TOOL

6088 CUTOVER TOOL

Fig. 33—Blocking EA6, EA12, and EA35 Relays for Cutover Purposes

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.

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. 33—Using the 608B Cutover tool, block open the contacts controlling the circuit through the line relay.

(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. 34—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

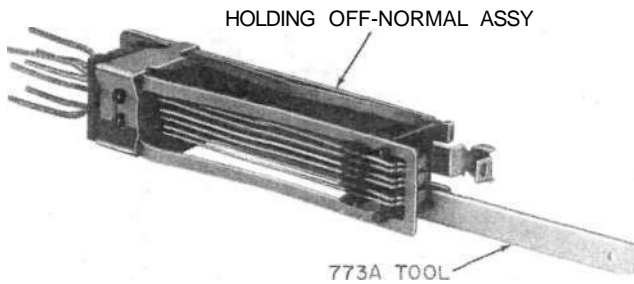


Fig. 32.1—Method of Blocking Holding Off-Normal Assembly

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).

- (4) *EA41 Relay*: Fig. 35—Using the 441B Cutover 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.

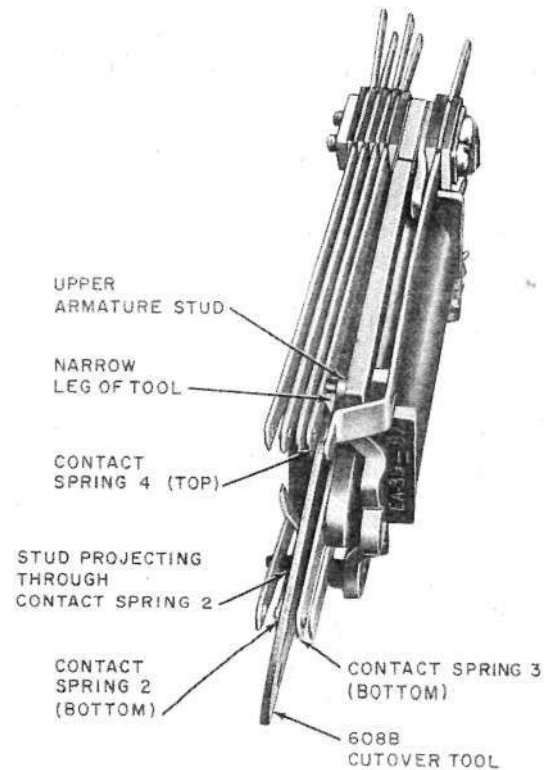


Fig. 34—Blocking EA39 Relay for Cutover Purposes

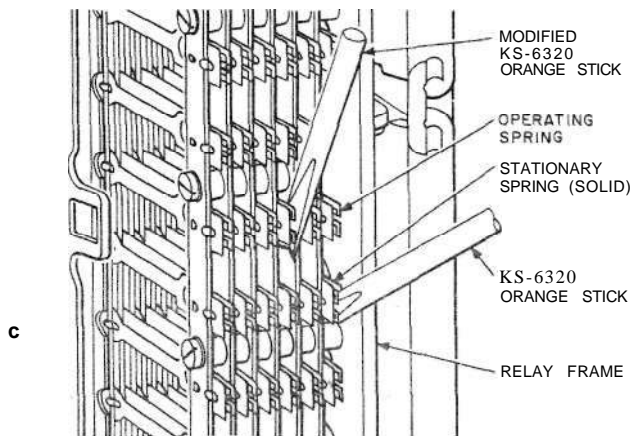


Fig. 49—Method of Blocking Individual Contacts on 263- and Similar-Type Relays

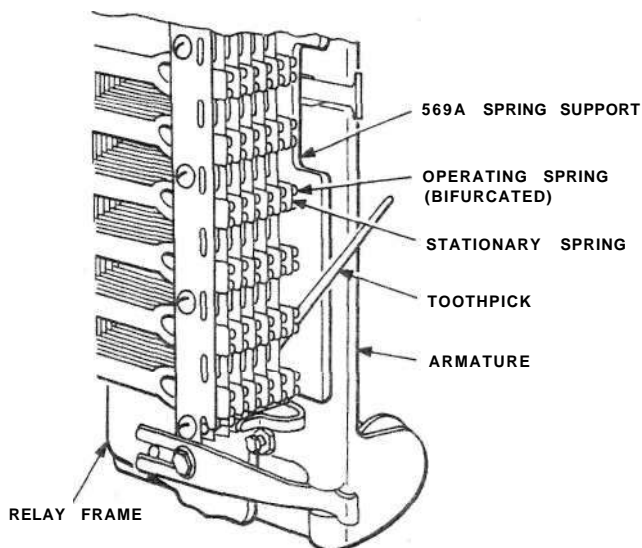


Fig. 50—Method of Blocking Individual Contacts Adjacent Jo Frame of 245- and 254-Type Relays

#### Contacts of Apparatus Other Than Relays

##### 5.10 A- and B-Type Sequence Switches:

Fig. 51—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

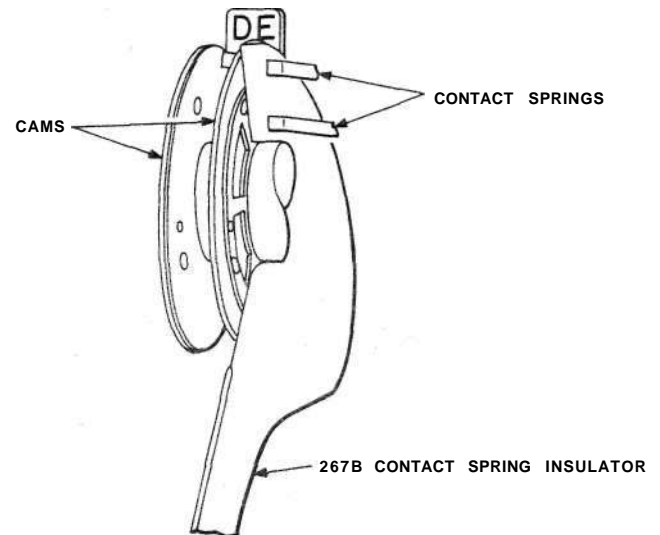


Fig. 51—Method of Using 267B Contact Insulator

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 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 >InsulatingContacts 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. 41.

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