I.B. 36-250-9-A

DESCRIPTION • INSTALLATION • ADJUSTMENT

INSTRUCTIONS

TYPE V-2
DISCONNECTING SWITCH

69 (HD) through 196 KV., 600 and 1,200 Amperes
7.2 through 196 KV., 2,000 Amperes

WESTINGHOUSE ELECTRIC CORPORATION
Assembled Switchgear Devices Division
EAST PITTSBURGH PLANT • EAST PITTSBURGH, PA.

AUGUST, 1963

SUPERSEDES I. B. 36-250-9
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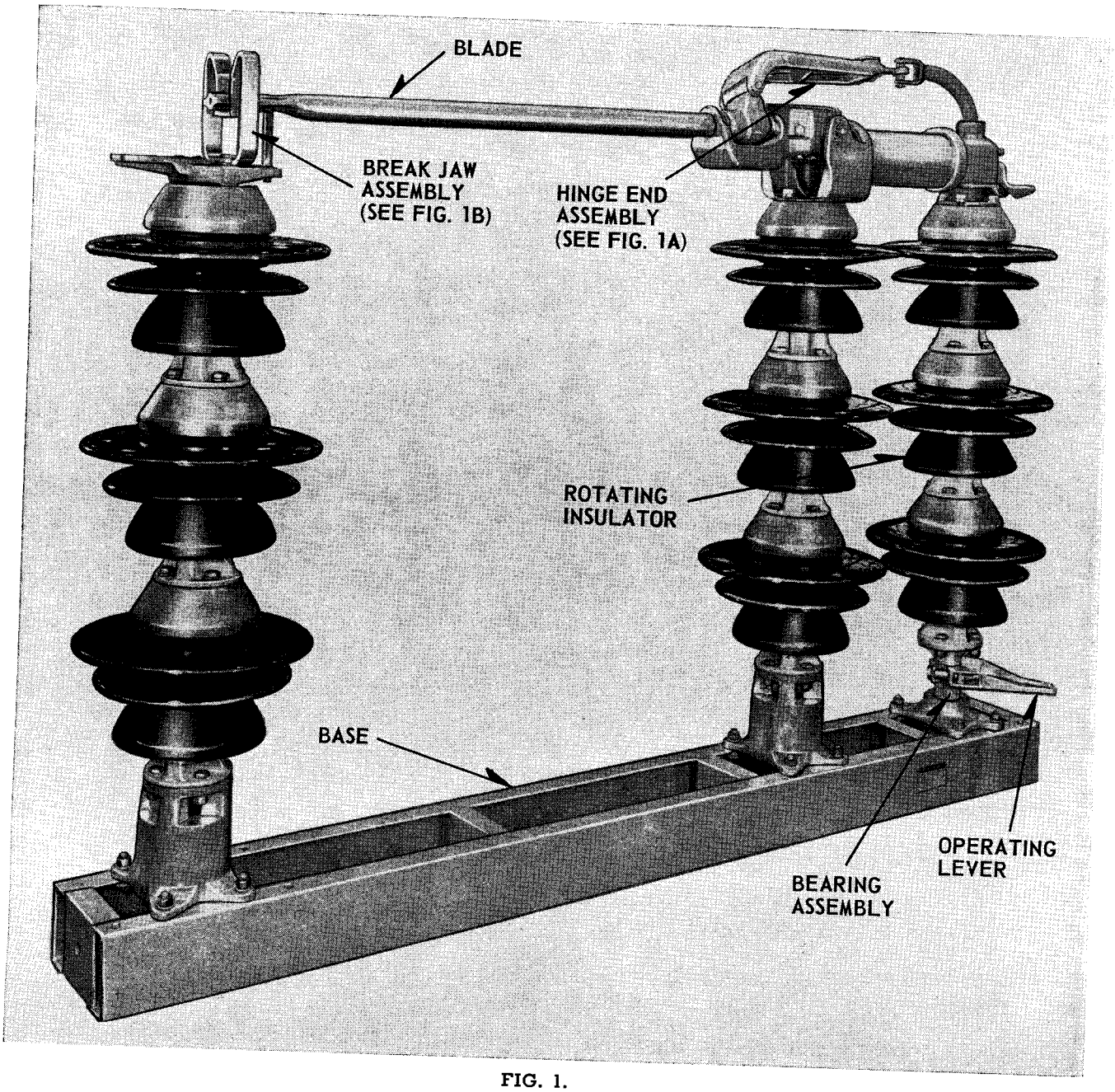


FIG. 1.

INTRODUCTION

It is the purpose of this book to assist in the proper installation, alignment, and adjustment of type V-2 switches of ratings 69 (HD) thru 196 KV 600 and 1200 amperes, and 7.2 thru 196 KV 2000 amperes.

By closely following the instructions in this book the purchaser will, in a minimum amount of time, be able to install these switches correctly and insure proper performance and long term low operating effort.

DESCRIPTION

The type V-2 is an end rotating insulator, vertical break, high pressure wiping contact, remote gang operated switch for disconnecting or air break applications. Refer to Figs. 1, 1A, and 1B for pictures of V-2 pole unit. These pictures give location and proper nomenclature of the pole unit Components.

HANDLING AND STORAGE

When the equipment is received, it should be carefully examined to determine any loss of parts or damage incurred in shipment. The carrier should be notified immediately of any claims.

Since these are outdoor switches, they may be stored either indoors or outdoors. When storing outdoors, all components of the switch should be

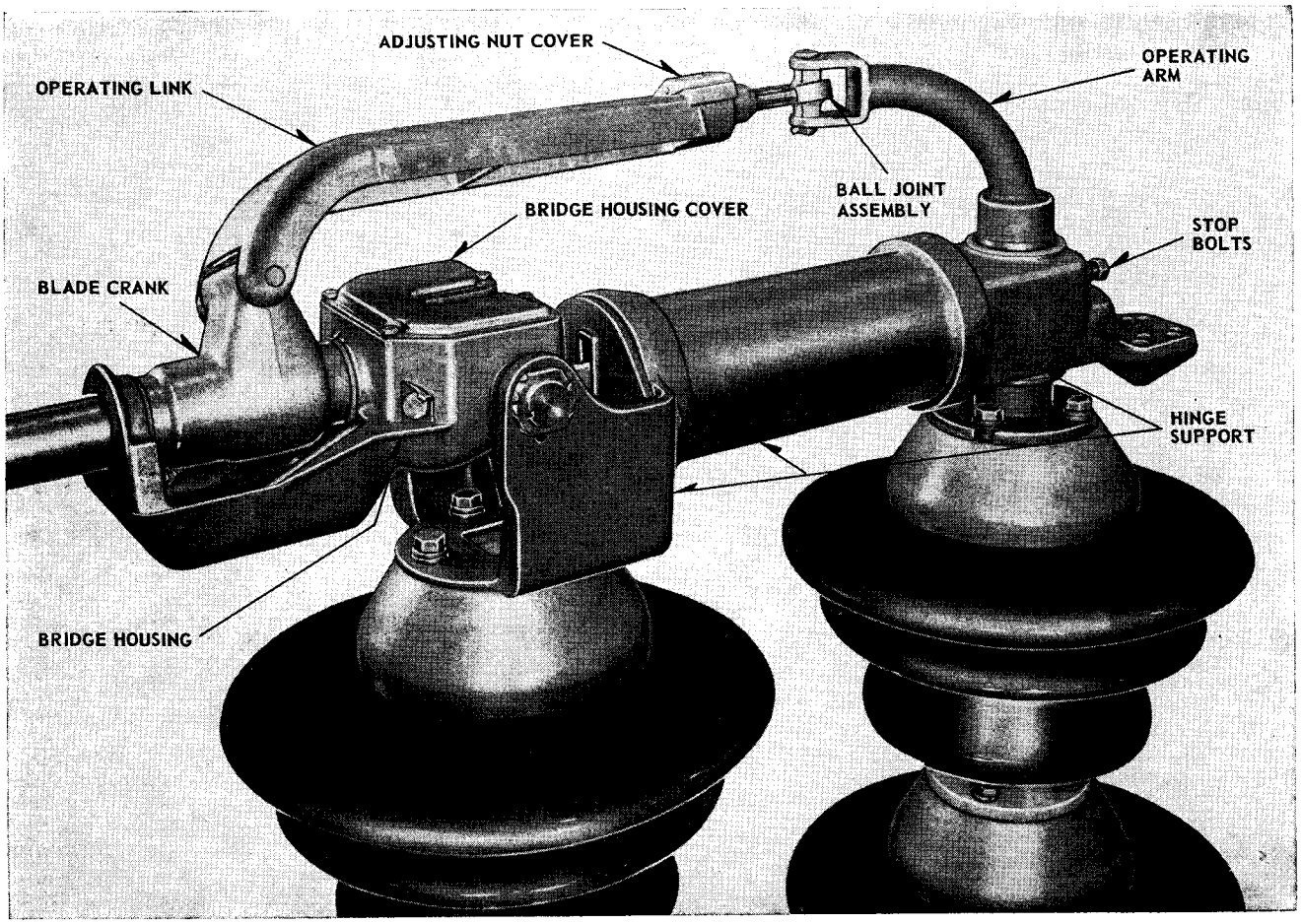


FIG. 1A.

removed from their packing. The cap and pin insulators should not be stored upside down, so that water can collect inside of the skirts, when the possibility of freezing weather exists.

ADJUSTMENT PROCEDURE

IN ORDER TO MINIMIZE INSTALLATION TIME AND ASSURE PROPER ALIGNMENT AND LONG TERM DEPENDABLE OPERATION, IT IS VERY IMPORTANT THAT THESE SWITCHES BE ADJUSTED IN ACCORDANCE WITH THESE INSTRUCTIONS AND IN THE FOLLOWING SEQUENCE:

(1) Individually adjust all three pole units.

(2) Set pole unit blades in the full open position against the stops BEFORE connecting any pipe linkages.

(3) Install the pipe link between the outboard bearing and the driven pole unit and adjust the radius of the outboard bearing lever so that the one pole unit can be operated properly from the handle or crank at ground level.

(4) With all three pole unit blades in the full open position, against the stops, install the two interphase pipes.

POLE UNITS INSTALLATION AND ADJUSTMENTS

These pole units are shipped from the factory minus the insulators. The insulators are shipped separately and must be assembled onto the pole units in the field. Instructions for assembling these insulators are given on the pole unit field assembly outline drawing which is supplied in the drawing and instructions envelope tied to the switch blade.

If arcing horns are to be used on the pole unit the stationary arcing horn should be bolted to the break jaw support **before** this break jaw assembly is bolted to the top of the insulator stack. See Fig. 15 for details of this assembly.

Important—The individual pole units must each be properly adjusted before connecting any pipe linkages. These adjustments should be made after the pole units are mounted on the structure if possible. They can be made on the ground if desired. The pole unit adjustment procedure is as follows:

(A) Rotate the rear insulator stack to operate the blade to the closed position, and observe the action of the blade tip as it enters the break jaw.

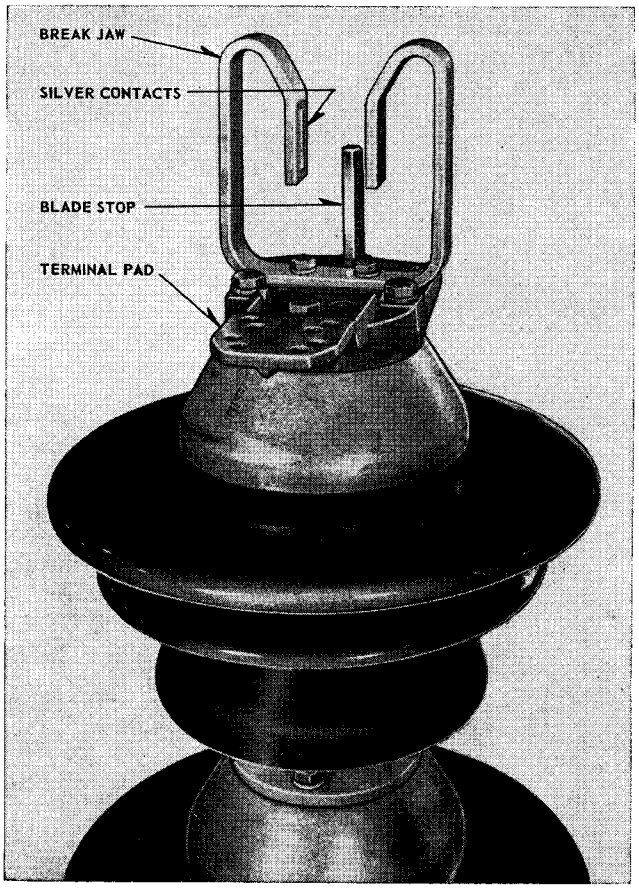


FIG. 1B.

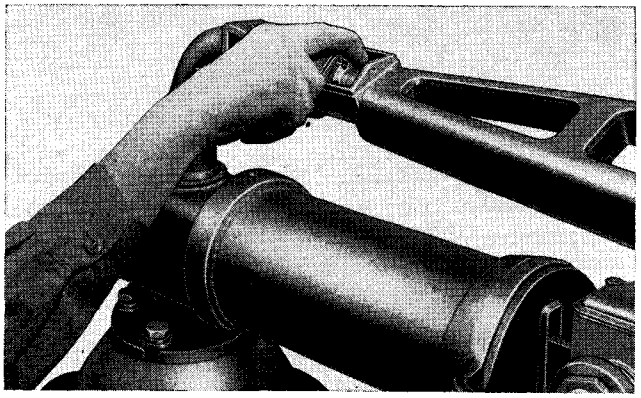


FIG. 2.

The blade tip should enter the break jaw freely and should rotate to establish contact pressure. All contact surfaces should engage in parallel alignment. To obtain this proper alignment, loosen the break jaw mounting bolts. Close the switch blade and align the break jaw so that both sides of the blade tip engage with the break jaw contact surfaces. If proper alignment cannot be obtained by shifting the break jaws, it may be necessary to loosen the bolts holding the hinge support to the two rear insulator stacks and shift the blade in the required direction. After the blade tip is aligned with the break jaw, the blade should be closed and rotated into full contact engagement, and all bolts holding the live parts to the insulators should be tightened securely.

(B) The next step is to close the switch blade slowly by rotating the rear insulator stack and again observe the blade tip as it enters the break jaw. The blade tip should enter the break jaw until it touches the blade stop and then rotate to establish full contact pressure. The blade tip should seat firmly against the blade stop before it rotates, but should not be forced too tightly against the stop. If it is forced too tightly against the stop, the effort required to rotate the blade becomes very high. This positioning of the blade tip in the break jaw is controlled by the adjusting nut in the blade operating linkage. Refer to Fig. 2 for this adjustment. First remove the adjusting nut cover. Rotating the adjusting nut so that it moves toward the blade tip will cause the blade tip to go farther down into the break jaw. To raise the blade tip higher in the break jaw the nut should be rotated so that it moves away from the blade tip. When this nut is adjusted correctly it will be pushed firmly against the forward surface of its housing when the blade operating linkage is in toggle or on a straight line with the switch blade. As a final check on this adjustment, close the blade rapidly by rotating the rear insulator stack. When the nut is properly adjusted, blade tip will come to rest on or within 1/4 inch of the blade stop at any closing reasonable speed. When the correct setting of this nut is obtained replace the cover and the cover holding bolt. This cover holding bolt will lock the adjusting nut in position.

(C) The next step is to set the open position blade stop. (If these checks and adjustments are being made on the ground, the three pole units should be lined up side by side on a plane surface.) Open all three pole units, and stand back and sight across the three blades. The blade stops, should be set so that the blades are lined up uniformly when they are in the vertical position. If the blades do not line up uniformly it will be necessary to readjust the stops. Refer to Fig. 3 for this adjustment. The open position stop is the stud on the left as shown on Fig. 3. Turning this stud in will cause the blade to move toward the break jaw. Turning the stud out will allow the blade to be opened farther. When the proper setting of this stop is obtained, tighten the lock nut securely.

(D) The closed position stop on the right hand side, see Fig. 3, should be set so that the blade tip can be turned over flat in the break jaw.

(E) The operating lever must be mounted on the rotating bearing shaft. The proper setting of this

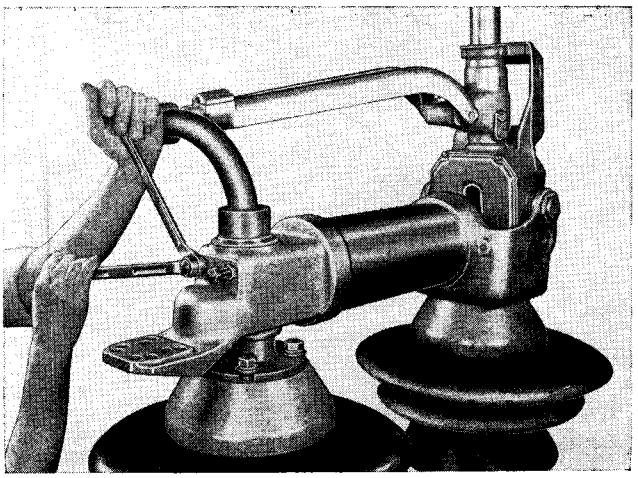


FIG. 3.

lever is very important and the following procedure should be followed:

(1) Open the blade to the fully open position against the stop.

(2) Check the three pole field erection drawing furnished with this order, for the approximate angular position of the operating lever when the switch is in the open position. (The erection drawing normally shows the switch in the closed position, but the open position of the levers is also shown.)

(3) Clamp the locating tool onto the base as shown on Fig. 4. This locating tool can be attached to the base in any one of four positions. The stud on the locating tool should be placed in the proper hole on the top of the base near the bearing, and the other end of the tool clamped to the side of the base.

(4) Clamp the operating lever in place so that the bottom of the lever just touches the top of the locating tool, and position the lever so that the hole in the lever is at a position nearest to the hole in the locating tool, as shown on Fig. 4.

(5) When installing these levers it is important that each pole unit blade is in the same fully open position, against the stop, when the lever is positioned. Improper settings of these levers will result in the three blades not "tracking" when they are ganged together.

(F) Apply a small amount of silicone base grease to the break jaw contacts. Rotate the blade about its axis in the break jaw several times to wipe some grease into the pores of the metal, then wipe off the excess grease with a clean cloth.

(G) If arcing horns are used on the switch, they should be adjusted so that they make a light sliding contact as the switch is operated. Too much pressure on the arcing horns will result in excessive effort required to operate the switch.

(H) This completes the pole unit adjustments. The pole units should now be mounted on the structure if this has not already been done. When the pole units are being mounted on the structure, care should be exercised to see that the bases are not warped due to uneven mounting surfaces on the structure. Use shims, if necessary, when bolting the bases in place. When making bus or line connections to the pole units, avoid placing stress on the terminal pads. Use bus supports or strain insulators dead ended to the structure to avoid undue stresses on the pole units.

OPERATING MECHANISM INSTALLATION AND ADJUSTMENT

Important—Do not connect any pipe linkages to the pole unit levers until the individual pole units have each been properly adjusted.

(1) The operating mechanism components should be mounted in place as shown on the three pole field erection drawing furnished with the order. Make certain that these components are in correct mechanical alignment. The outboard bearing should be reasonably level, the guide bearings and operating handle should be positioned properly so that the vertical pipe is free to rotate easily.

(2) If the connecting pipe and the interphase pipes are in a straight line when the switch is closed, (Fig. 5-A or Fig. 5-B), the universal lever is not required. If the connecting pipe is not in line with the

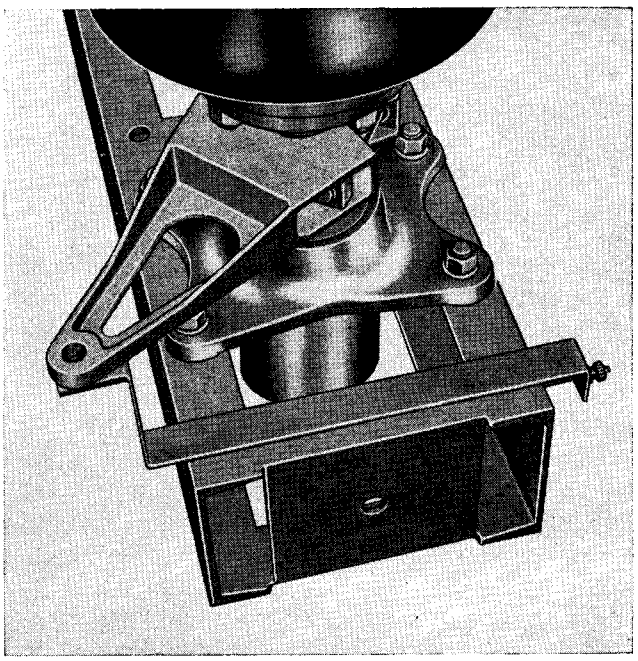


FIG. 4.

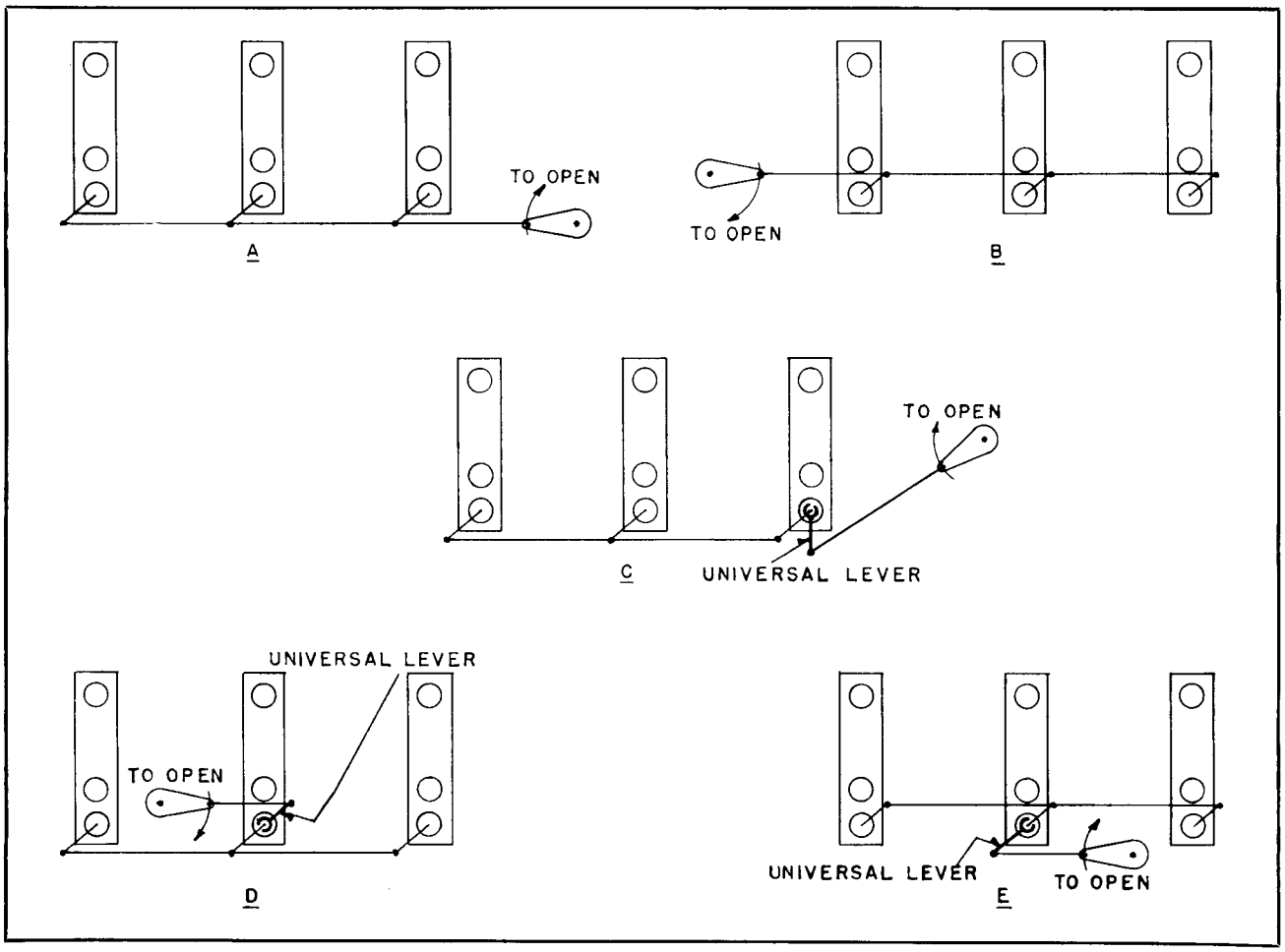


FIG. 5. Schematic Views showing several possible Arrangements of the Outboard Bearing, Connecting Pipe and Universal Lever

interphase pipes, (Figs. 5-C, 5-D, & 5-E) a fourth lever, called the universal lever, must be used.

(3) If a universal lever is used, it should be mounted on the driven pole unit as shown in Fig. 6. The angular position of this lever should be as shown on the erection drawing furnished with the order. When this universal lever is properly positioned it should be at an angle of approximately 40 to 45 degrees to the connecting pipe when the switch is in the closed position, as shown in Fig. 7.

(4) Adjust the radius of the lever arm on the outboard bearing to be approximately 7¾ inches. To adjust this radius, loosen hex head bolt beneath the arm and move swivel as required. See Fig. 8. Set this outboard bearing lever in a position where it points directly toward or directly away from the hole in the driven pole unit lever, whichever setting is indicated for the "Open" position on the 3 pole field erection drawing. With the outboard lever in this position, and the driven pole unit in the open position, install the connecting pipe. Refer to Fig. 7. Only the clamping bolts on the rod ends should be tightened at this time. Do not sink in the set screws.

(5) Close the driven pole unit and observe the position of the outboard bearing lever. The lever should be in line or in toggle with the connecting pipe when the pole unit is fully closed. If the outboard bearing lever does not reach the toggle position when the pole unit is closed, the radius of the lever arm should be decreased slightly. If the lever passes the toggle position when the pole unit is closed, the radius of the lever arm should be increased slightly. If the radius of this lever arm is changed it is also necessary to reset the effective length of the connecting pipe. Small adjustments should be made in this manner until the outboard lever travels through 180 degrees and is in toggle in both the open and closed positions of the pole unit. After the correct setting is obtained, securely tighten the bolt holding the swivel assembly to the outboard bearing lever.

(6) Install the operating handle as shown in Fig. 10 or Fig. 11. Set the driven pole unit in the fully


WESTINGHOUSE

RECOMMENDED SPARE PARTS

KV	AMPERES	BLADE	BREAK JAW CONTACT	INSULATOR	ARCING HORNS
7.2	2000	S#308C601G01 (1)	S#308C480G02 (3)	S#1409 309 (3)	S#203B396G01 (1)
14.4	2000	S#308C601G01 (1)	S#308C480G02 (3)	S#1295 355 (3)	S#203B396G01 (1)
23	2000	S#308C601G02 (1)	S#308C480G02 (3)	S#1176 130 (3)	S#203B396G01 (1)
34.5	2000	S#308C601G02 (1)	S#308C480G02 (3)	S#1176 131 (3)	S#203B396G01 (1)
46	2000	S#308C601G03 (1)	S#308C480G02 (3)	S#548D248G01 (3)	S#203B396G01 (1)
69(HD)	600	S#308C482G05 (1)	S#308C480G01 (1)		S#203B396G01 (1)
69(HD)	1200	S#308C482G15 (1)	S#308C480G01 (2)	S#968 758 (6)	S#203B396G01 (1)
69(HD)	2000	S#308C601G04 (1)	S#308C480G02 (3)		S#203B396G01 (1)
115	600	S#308C482G06 (1)	S#308C480G01 (1)		S#203B396G01 (1)
115	1200	S#308C482G16 (1)	S#308C480G01 (2)	S#968 758 (9)	S#203B396G01 (1)
115	2000	S#308C601G05 (1)	S#308C480G02 (3)		S#203B396G01 (1)
138	600	S#308C482G07 (1)	S#308C480G01 (1)		S#203B396G01 (1)
138	1200	S#308C482G17 (1)	S#308C480G01 (2)	S#968 758 (6) S#548D248G01 (3)	S#203B396G01 (1)
138	2000	S#308C601G06 (1)	S#308C480G02 (3)		S#203B396G01 (1)
*161	600	S#308C482G08 (1)	S#308C480G01 (1)		S#203B396G01 (1)
*161	1200	S#308C482G18 (1)	S#308C480G01 (2)	S#968 758 (12)	S#203B396G01 (1)
*161	2000	S#308C601G07 (1)	S#308C480G02 (3)		S#203B396G01 (1)
196	1200	S#308C482G19 (1)	S#308C480G01 (2)	S#1409 412 (15)	S#203B396G01 (1)
196	2000	S#308C601G08 (1)	S#308C480G02 (3)		S#203B396G01 (1)

* For vertical base mounting applications, the insulator stack consists of (1) S#1409 412 and (3) S#968 758 units.
(1) Quantity shown after each style is required for one pole unit.
(2) Recommended ordering quantity is 3 complete sets of parts from this table for up to 10 complete 3 pole switches.

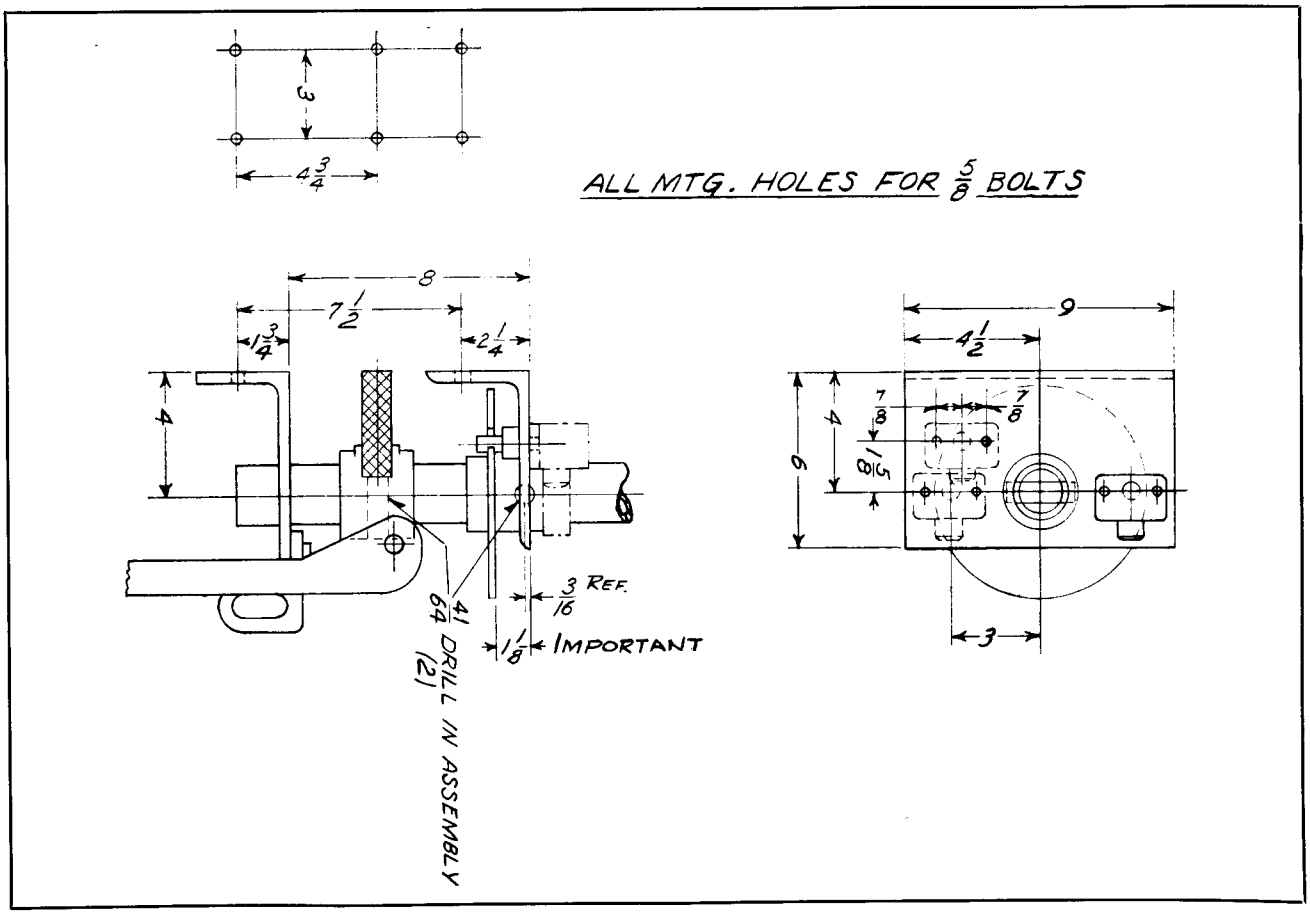
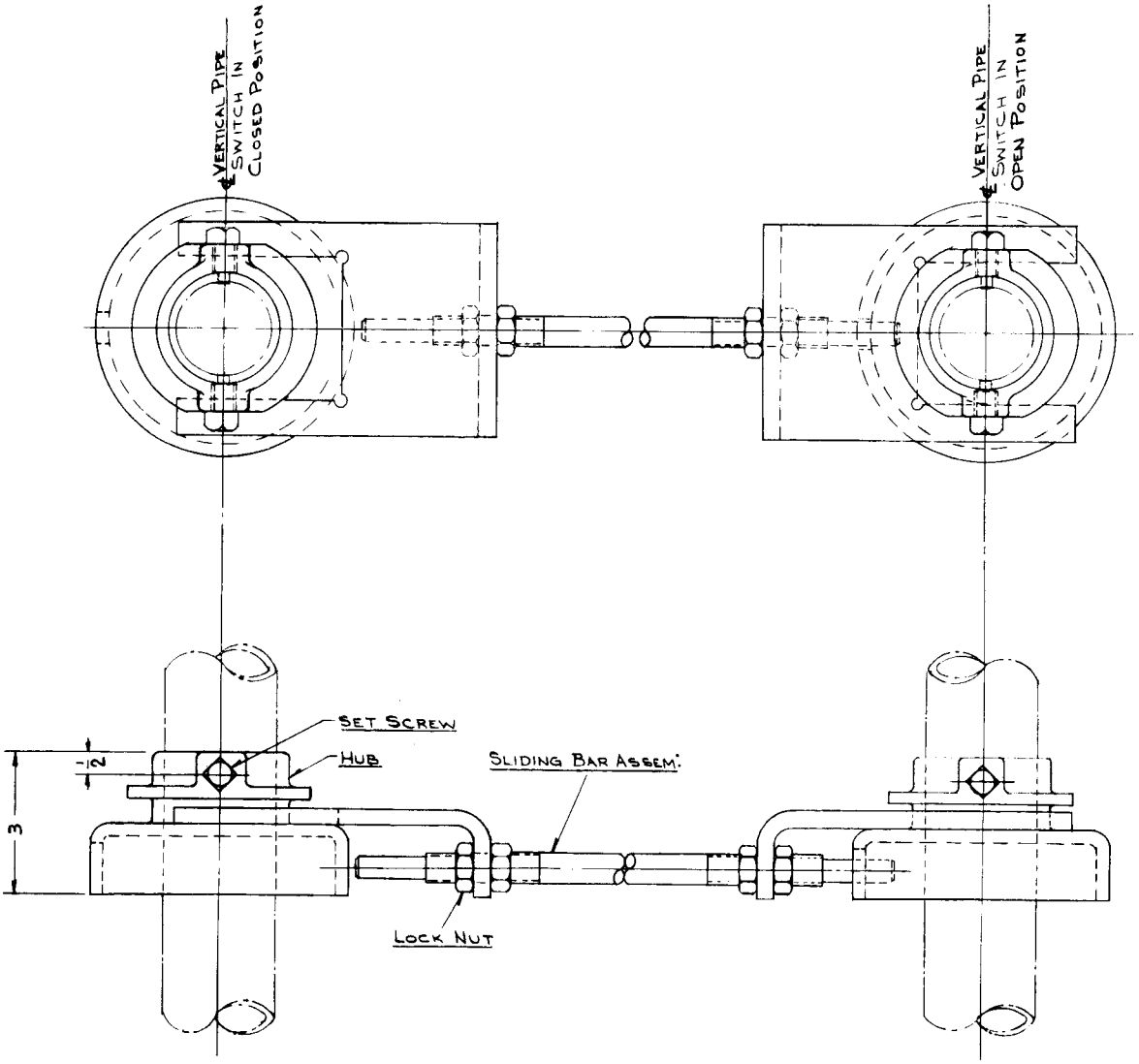


FIG. 17.



METHOD OF SETTING INTERLOCK

(1) MAIN SWITCH AND GROUNDING SWITCH MUST BOTH BE COMPLETELY ADJUSTED FOR PROPER OPERATION BEFORE TIGHTENING SET SCREWS ON MECHANICAL INTERLOCK HUBS.

(2) SET MAIN SWITCH MECHANISM IN THE "OPEN" POSITION AND SET THE GROUNDING SWITCH MECHANISM IN THE "OPEN" POSITION.

(3) ASSEMBLE THE "SLIDING BAR ASSEMBLY" SO THAT IT FITS BETWEEN THE TWO HUBS AS SHOWN.

(4) POSITION BOTH HUBS SO THAT THE "SLIDING BAR ASSEMBLY" FREELY ENTERS THE SLOT ON EACH HUB AND THEN TIGHTEN THE SET SCREWS UNTIL THEY PIERCE THE PIPE.

(5) MOVE THE "SLIDING BAR ASSEMBLY" UNTILL IT IS FULLY ENGAGED WITH THE HUB ON THE GROUNDING SWITCH MECHANISM.

(6) CLOSE THE MAIN SWITCH.

(7) THE FINAL LENGTH OF THE "SLIDING BAR ASSEMBLY" SHOULD BE ADJUSTED SO THAT THE GROUNDING SWITCH MECHANISM CAN NOT BE UNLOCKED WITH THE MAIN SWITCH IN THE CLOSED POSITION.

(8) SECURELY TIGHTEN THE LOCK NUTS ON THE "SLIDING BAR ASSEMBLY".

FIG. 16.

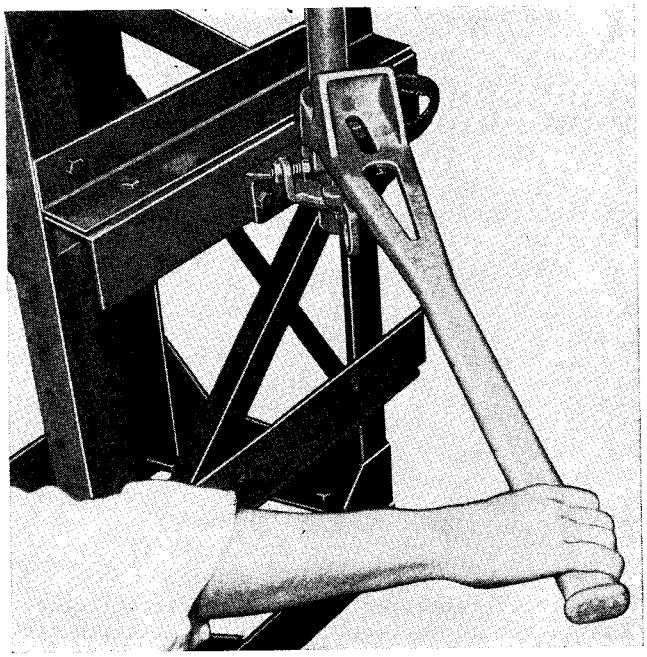


FIG. 13.

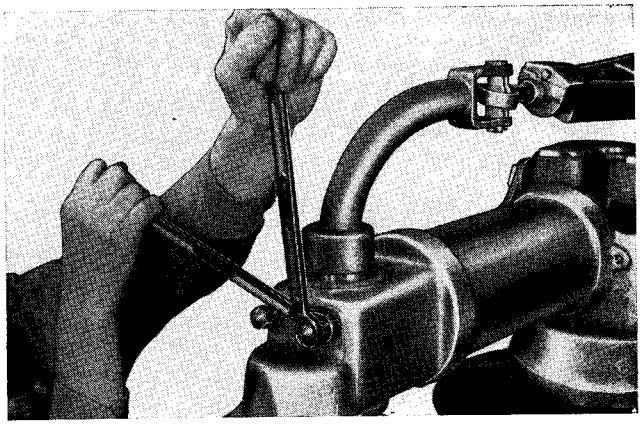
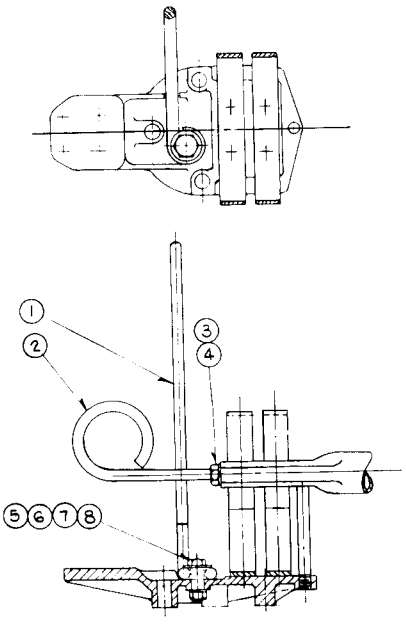


FIG. 14.



TITLE Type "V2" Air Sw. 69KV H.D. to 96K.V. Arcing Horn Assem.

DWG 204B147

SUB 1

FINISH CHART

NOTE	ITEM	DESCRIPTION & MATERIAL DIMENSIONS IN INCHES	PATT NO OR REF DWG	FIN CH LINE NO	STYLE NO	GROUP NO & GROUP STYLE NO 1	2	3	4	5	6
	1	Stationary Arc. Horn			203B396H01	1					
	2	Moving Arc. Horn			1649G71	1					
	3	1/2-13 Hex. Si. Brz. Nut				1					
	4	1/2 Si. Brz. Lockwasher				1					
	5	5/8-11 x 2 Hex. Si. Brz. Bolt				1					
	6	5/8-11 Hex. Si. Brz. Nut				1					
	7	5/8 Si. Brz. Lockwasher				1					
	8	Washer (11/16 I.D. x 1 1/2 O.D. x .129 Tk.)			1252615	1					

FIG. 15.

AUXILIARY EQUIPMENT

Various auxiliary and accessory equipment is supplied for the switches as required by specific order. The most common items are arcing horns, key interlocks or mechanical interlocks.

The installation of arcing horns has been mentioned previously and are shown in Fig. 15.

Key interlocks are applied in a manner which permit operating the switches only in a pre-arranged sequence. This will depend on the particular requirements of a specific installation, the details which will be shown on special order drawing or will be well known to the user. Fig. 17 shows the mounting details which will accomodate the key interlock.

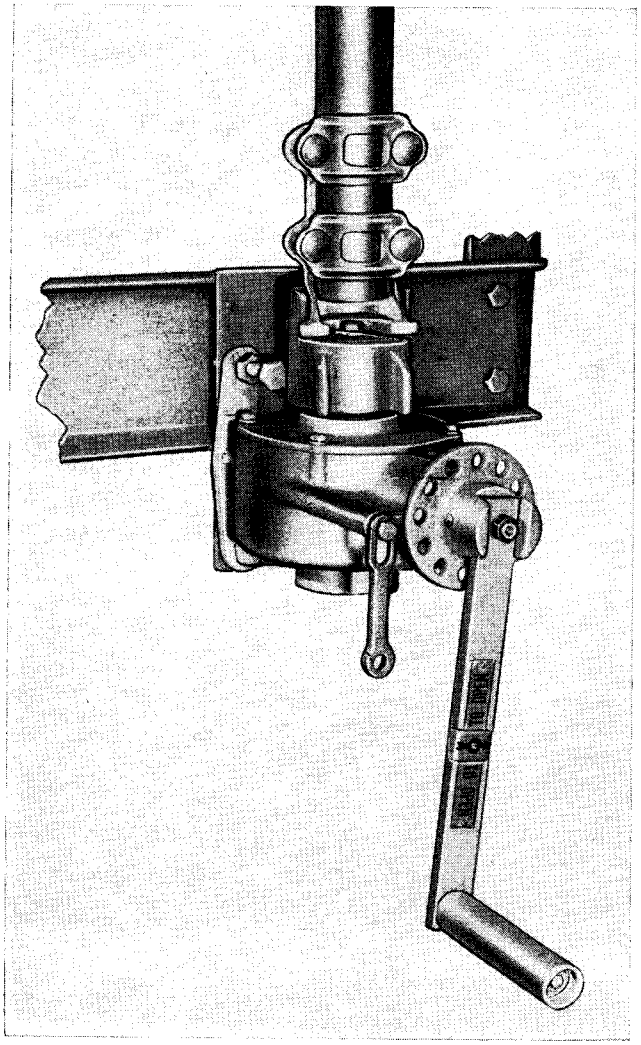


FIG. 10.

A mechanical sliding bar lock is often supplied to insure the correct sequence of operation by a main switch and a grounding switch. Fig. 16 shows this assembly and includes information on setting and adjusting this interlock.

Other less common auxiliary equipment if required by the order will have detail drawings of the auxiliary equipment supplied as part of the drawing package for that order.

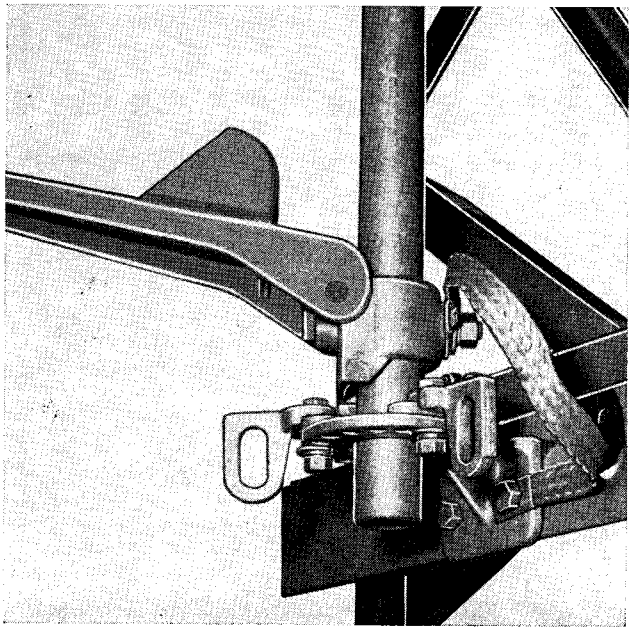


FIG. 11.

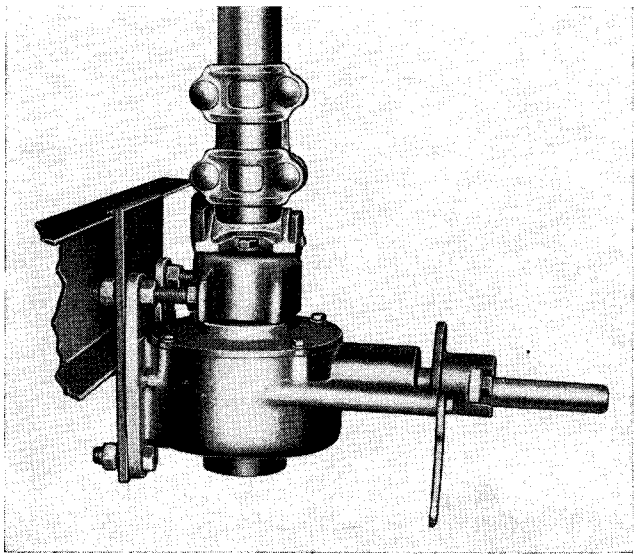


FIG. 12.

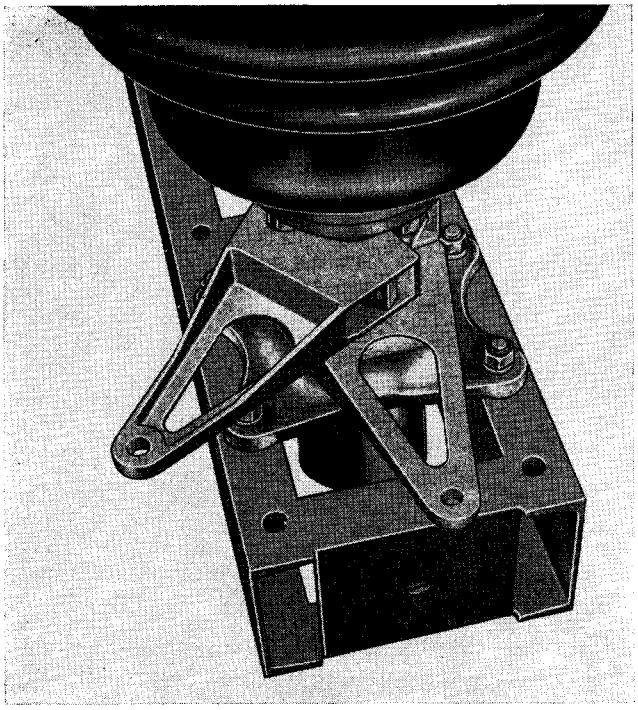


FIG. 6.

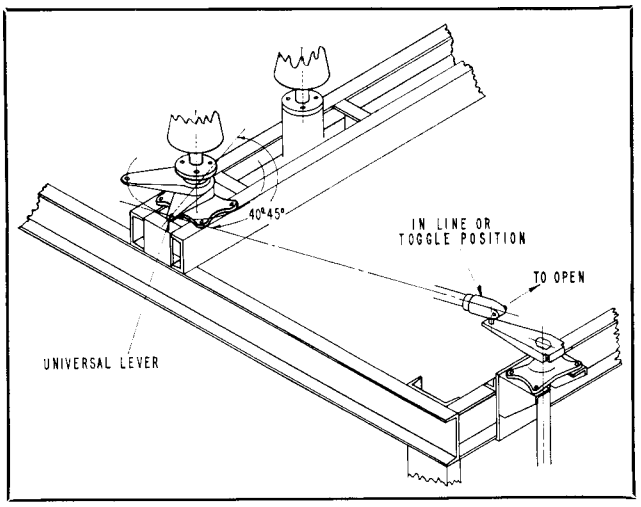


FIG. 7.

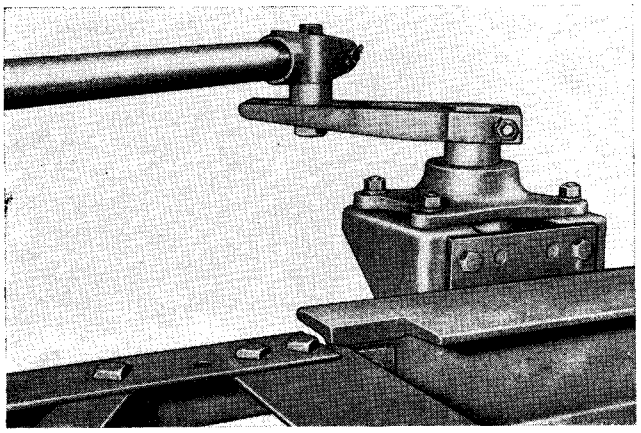


FIG. 8.

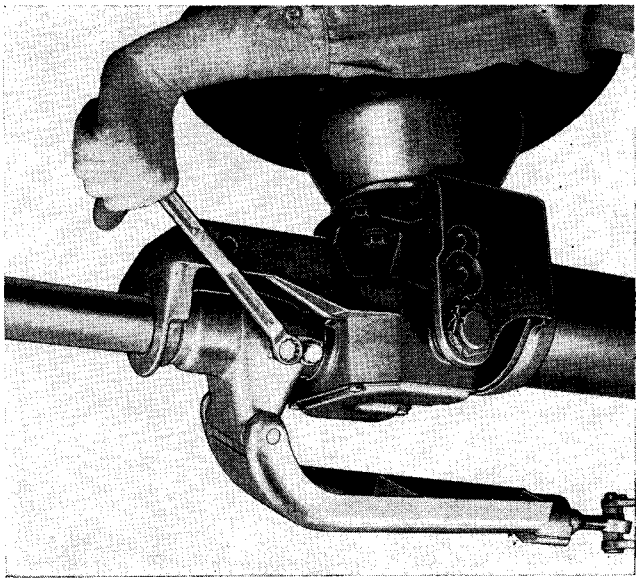


FIG. 9.

open position and set the handle accordingly before clamping the handle to the pipe.

(7) The driven pole unit can now be operated with the handle at ground level. Set the stops on the handle for the open and closed positions. See Fig. 12 or Fig. 13 for details of "Stops" on the operating handles.

(8) Position all three pole units in the fully open position. With all pole units open, connect the interphase pipes. Tighten the clamping bolts on the rod ends but do **not** sink the set screws at this time.

(9) The complete switch should now be operated by means of the handle at ground level. The three blades should open to a vertical position against the stops. When the switch closes, the blades should enter the jaws and rotate to a final position within plus or minus 5 degrees from horizontal. If one or two blade tips do not turn over far enough to come within the ±5 degree tolerance, the following adjustment can be made. Refer to Fig. 9. Loosen the two bolts at the pivot end of the blade. The blade can be rotated about its axis a few degrees in either direction. After making this adjustment, tighten these two bolts securely.

(10) With the pole units all closed, recheck the closed position pole unit stops to be sure they are seated. See Fig. 14 for location of these stops.

(11) Tighten down the set screws in all rod ends.

I.B. 36-250-9

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WESTINGHOUSE ELECTRIC CORPORATION

SWITCHGEAR APPARATUS DEPARTMENTS

EAST PITTSBURGH PLANT • EAST PITTSBURGH, PA.

MAY, 1961

NEW INFORMATION

Printed in U.S.A.

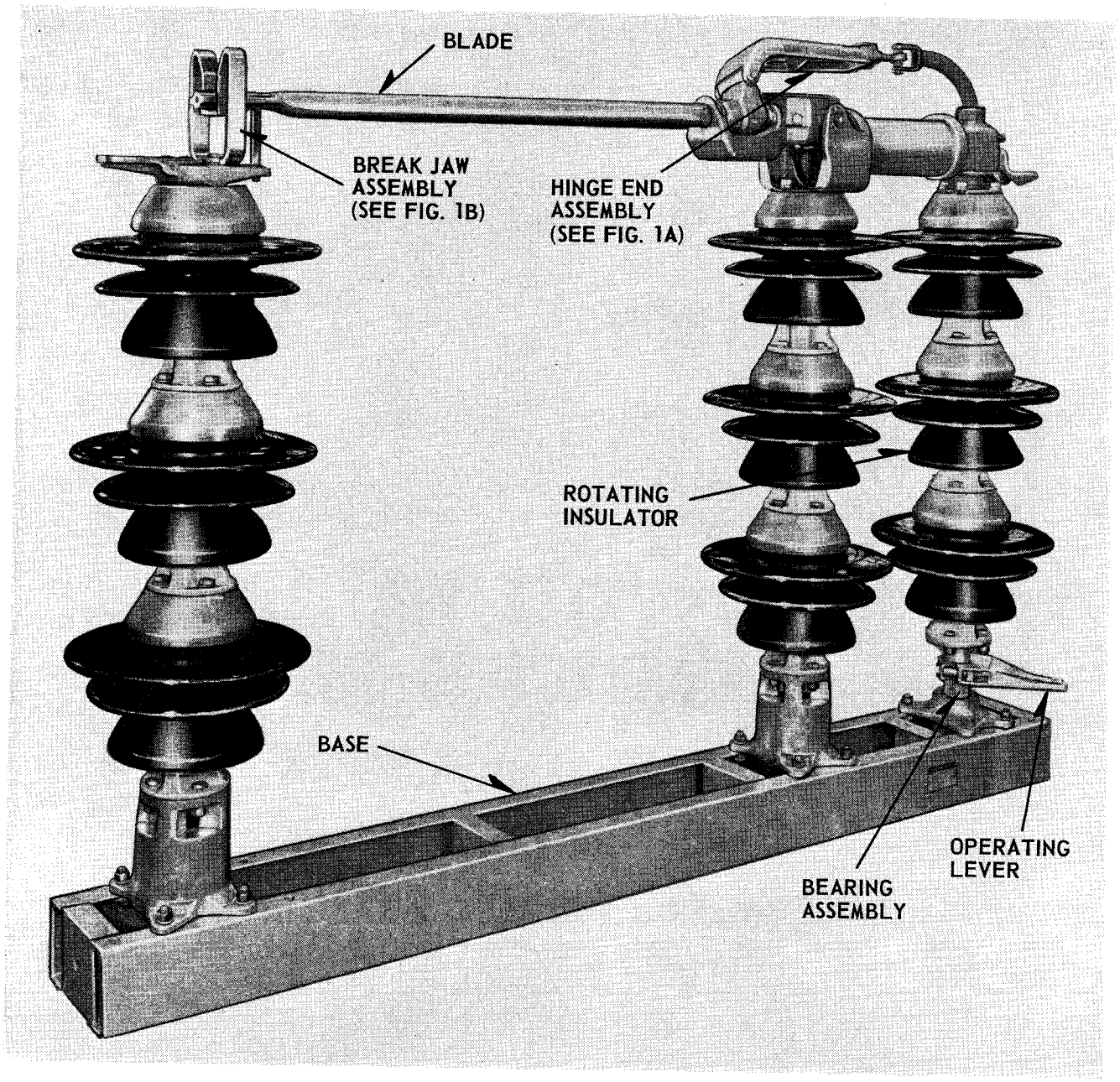

FIG. 1.

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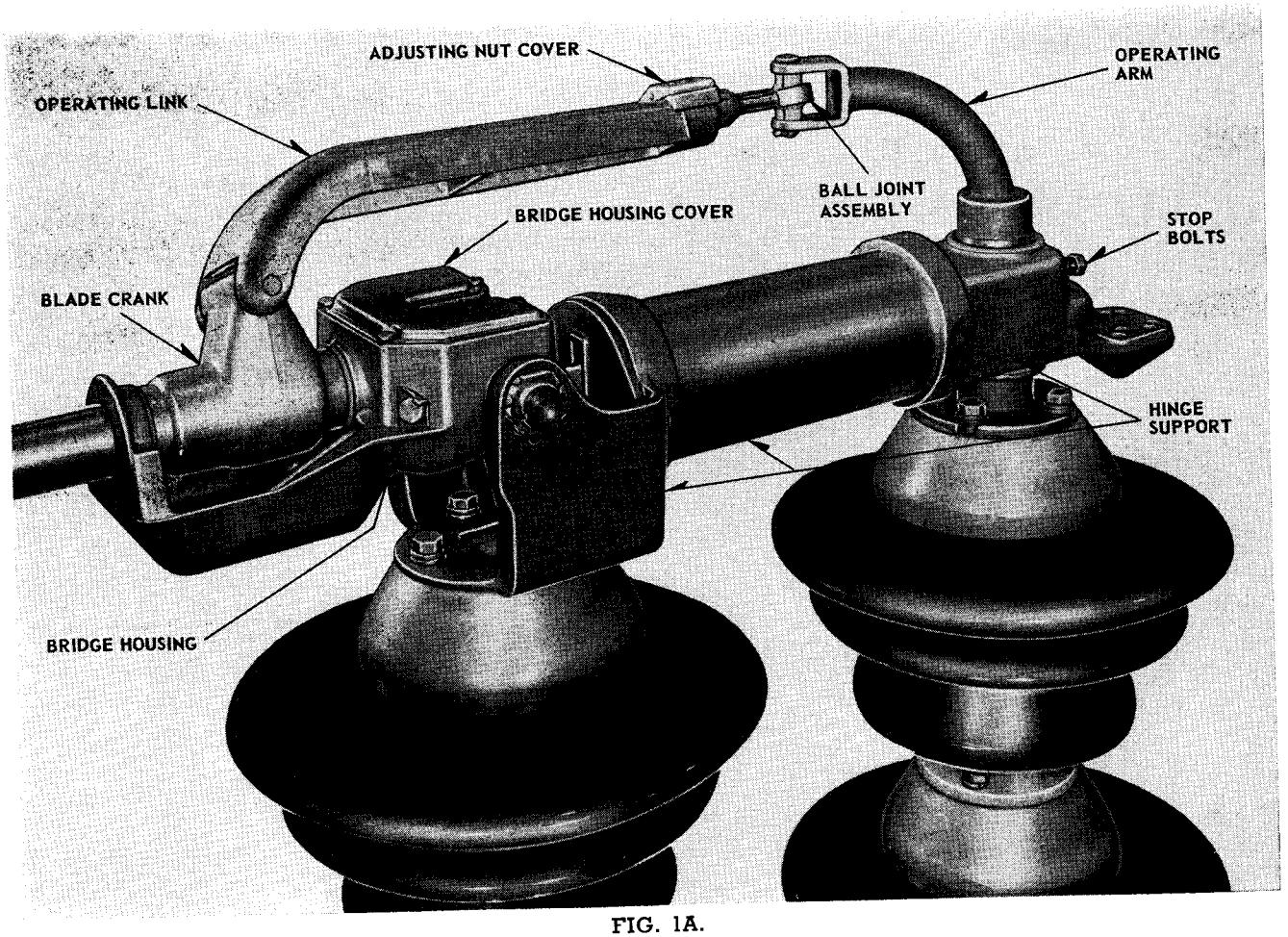

FIG. 1A.

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POLE UNITS INSTALLATION AND ADJUSTMENTS

These pole units are shipped from the factory minus the insulators. The insulators are shipped separately and must be assembled onto the pole units in the field. Instructions for assembling these insulators are given in instruction leaflet I.L. 36-250-1 which is supplied in the drawing and instructions envelope tied to the switch blade.

If arcing horns are to be used on the pole unit the stationary arcing horn should be bolted to the break jaw support **before** this break jaw assembly is bolted to the top of the insulator stack. See I.L. 36-250-8 for details of this assembly.

The complete procedure for adjusting the pole units will be explained so that the user may obtain a thorough understanding of the Type V-2 switch. However, since these switches are adjusted at the factory, it should only be necessary for the user to assemble the insulators onto the pole units, install and adjust the operating levers, and check the pole units for proper operation. These checks and adjustments should be made after the pole units are mounted on the structure if possible. They can be made on the ground if desired. The pole unit adjustment procedure is as follows:

(A) Rotate the rear insulator stack to operate the blade to the closed position, and observe the action of the blade tip as it enters the break jaw. The blade tip should enter the break jaw freely and should rotate to establish contact pressure. All contact surfaces should engage in parallel alignment. To obtain this proper alignment, loosen the break jaw mounting bolts. Close the switch blade and align the break jaw so that both sides of the blade tip engage properly with the break jaw contact surfaces. If proper alignment cannot be obtained by shifting the break jaws, it may be necessary to loosen the bolts holding the hinge support to the two rear insulator stacks and shift the blade in the required direction. After the blade tip is properly aligned with the break jaw, the blade should be closed and rotated into full contact engagement,

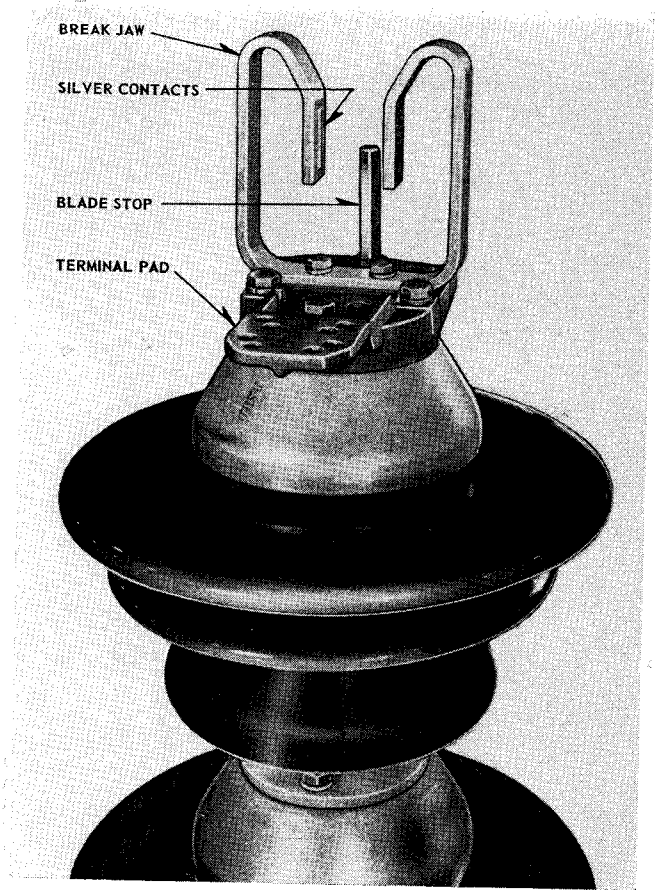

FIG. 1B.

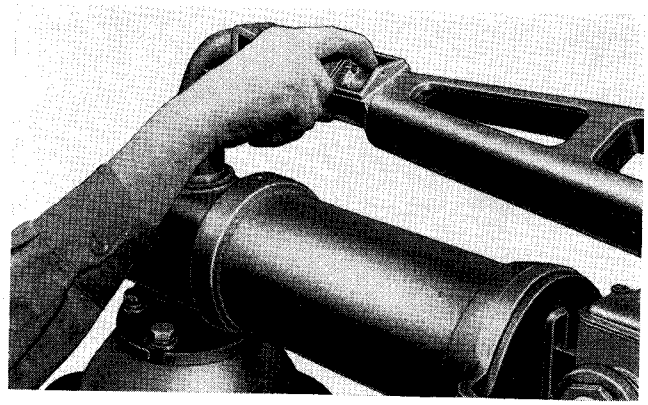

FIG. 2.

and all bolts holding the live parts to the insulators should be tightened securely.

(B) The next step is to close the switch blade slowly by rotating the rear insulator stack and again observe the blade tip as it enters the break jaw. The blade tip should enter the break jaw until it touches the blade stop and then rotate to establish full contact pressure. The blade tip should seat firmly against the blade stop before it rotates, but should not be forced too tightly against the stop. If it is forced too tightly against the stop, the effort required to rotate the blade becomes very high. This positioning of the blade tip in the break jaw is controlled by the adjusting nut in the blade operating linkage. Refer to Fig. 2 for this adjustment. First remove the adjusting nut cover. Rotating the adjusting nut so that it moves toward the blade tip will cause the blade tip to go farther down into the break jaw. To raise the blade tip higher in the break jaw the nut should be rotated so that it moves away from the blade tip. When this nut is adjusted correctly it will be pushed firmly against the forward surface of its housing when the blade operating linkage is in toggle or on a straight line with the switch blade. When the correct setting of this nut is obtained replace the cover and the cover holding bolt. This cover holding bolt will lock the adjusting nut in position.

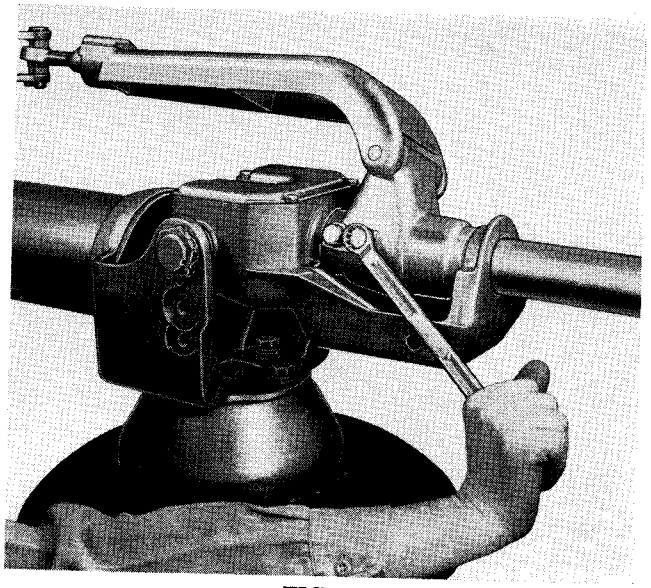

FIG. 3.

(C) If, after the adjusting nut is properly set, the blade tip does not pass freely between the contact surfaces of the break jaw, the following adjustment can be made. Loosen the two bolts at the pivot end of the blade. Refer to Fig. 3 for location of these bolts. With these bolts loose, the blade may be rotated about its axis a small amount in either direction. This will change the angle of the blade tip as it enters the break jaw. Do not change this angle any more than absolutely necessary.

(D) The next step is to set the open position blade stop. If these checks and adjustments are being made on the ground, the three pole units should be lined up side by side on a plane surface to check the setting of the open position blade stops. Open all three pole units, and stand back and sight across the three blades. The blade stops, should be set so that the blades are lined up uniformly when they are in the vertical position. If the blades do not line up

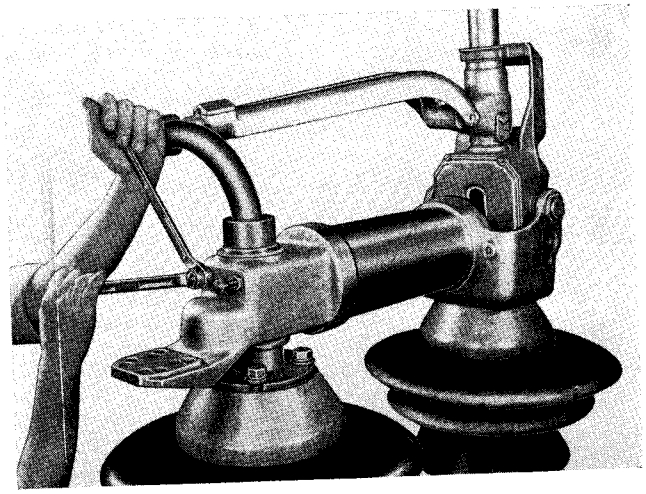

FIG. 4.

uniformly it will be necessary to readjust the stops. Refer to Fig. 4 for this adjustment. The open position stop is the stud on the left as shown on Fig. 4. Turning this stud in will cause the blade to move toward the break jaw. Turning the stud out will allow the blade to be opened farther. When the proper setting of this stop is obtained, tighten the lock nut securely.

(E) The operating lever must be mounted on the rotating bearing shaft. The proper setting of this lever is very important and the following procedure should be followed:

(1) Open the blade to the fully open position against the stop.

(2) Check the three pole field erection drawing furnished with this order, for the approximate angular position of the operating lever when the switch is in the open position. (The erection drawing normally shows the switch in the closed position, but the open position of the levers is also shown.)

(3) Clamp the locating tool onto the base as shown on Fig. 5. This locating tool can be attached to the base in any one of four positions. The stud on the locating tool should be placed in the proper hole on the top of the base near the bearing, and the other end of the tool clamped to the side of the base.

(4) Clamp the operating lever in place so that the bottom of the lever just touches the top of the locating tool, and adjust the angular position of the lever so that the hole in the lever is directly over the hole in the locating tool, as shown on Fig. 5.

(5) This lever is completely adjustable through 360 degrees. The holding clamp will mate with the bearing shaft in 15 degree steps. The fine positioning of the lever is then done by loosening one clamping bolt and tightening the other.

(6) When installing and adjusting these levers it is important that each pole unit blade is in the same fully open position, against the stop, when the lever is positioned. Improper settings of these levers will result in the three blades not "tracking" when they are ganged together.

(F) Apply a small amount of silicone base grease to the break jaw contacts. Rotate the blade about its axis in the break jaw several times to wipe some grease into the pores of the metal, then wipe off the excess grease with a clean cloth.

(G) If arcing horns are used on the switch, they should be adjusted so that they make a light sliding contact as the switch is operated. Too much pressure on the arcing horns will result in excessive effort required to operate the switch.

(H) This completes the pole unit adjustments. The pole units should now be mounted on the structure if this has not already been done. When the pole units are being mounted on the structure, care should be exercised to see that the bases are not warped due to uneven mounting surfaces on the structure. Use shims, if necessary, when bolting the bases in place. When making bus or line connections to the pole units, avoid placing stress on the terminal pads. Use bus supports or strain insulators dead ended to the structure to avoid undue stresses on the pole units.

OPERATING MECHANISM INSTALLATION AND ADJUSTMENT

(1) The operating mechanism components should be mounted in place as shown on the three pole

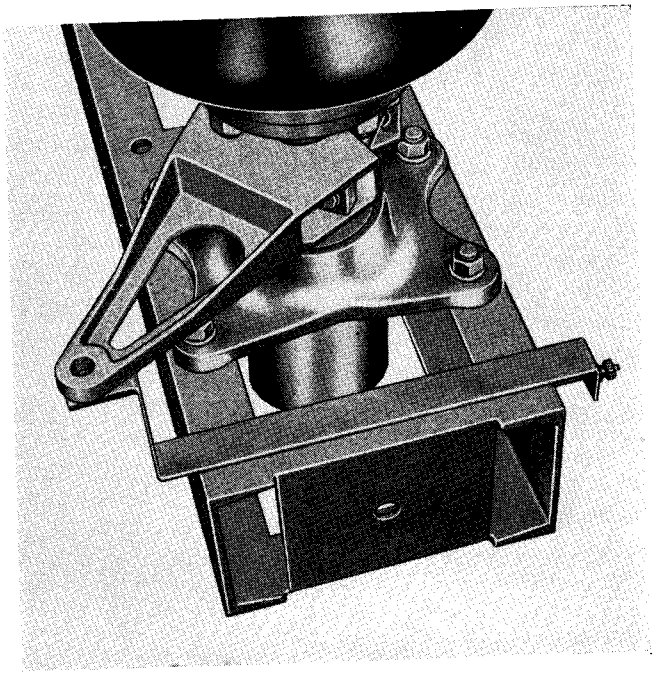

FIG. 5.

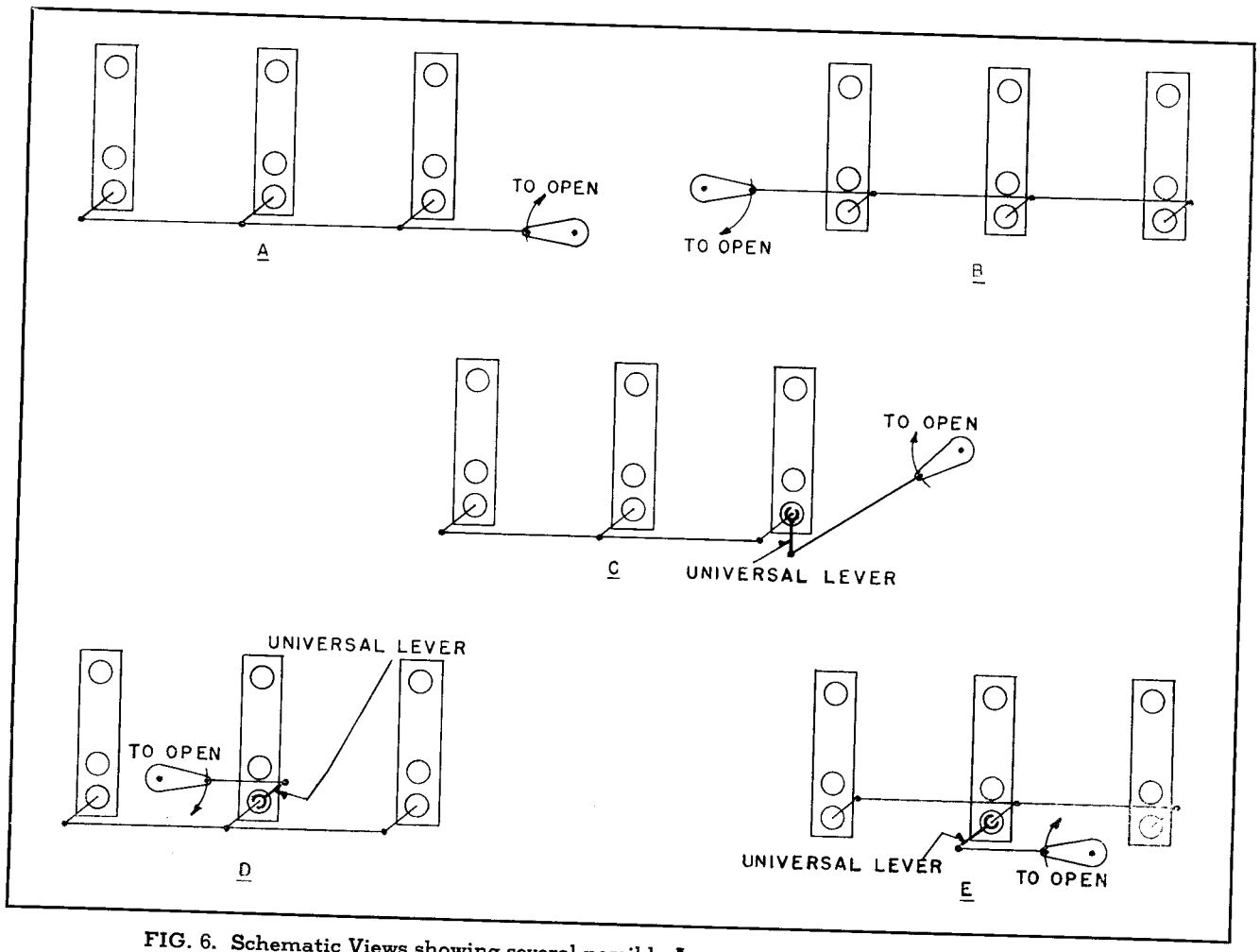

FIG. 6. Schematic Views showing several possible Arrangements of the Outboard Bearing, Connecting Pipe and Universal Lever

field erection drawing furnished with the order. Make certain that these components are in correct mechanical alignment. The outboard bearing should be reasonably level, the guide bearings and operating handle should be positioned properly so that the vertical pipe is free to rotate easily.

(2) IF the connecting pipe and the interphase pipes are in a straight line when the switch is closed, (Fig. 6A or Fig. 6B), the universal lever is not required. If the connecting pipe is not in line with the interphase pipes, (Figs. 6-C, 6-D, & 6-E) a fourth lever, called the universal lever, must be used.

(3) If a universal lever is used, it should be mounted on the driven pole unit as shown in Fig. 7. The angular position of this lever should be as shown on the erection drawing furnished with the order. When this universal lever is properly positioned it should be at an angle of approximately 40 to 45 degrees to the connecting pipe when the switch is in the closed position, as shown in Fig. 8. This lever is the same as the interphase levers, it is completely adjustable through 360 degrees. The holding clamp will mate with the bearing shaft in 15 degrees steps. The fine positioning of the lever is then done by loosening one clamping bolt and tightening the other.

(4) Adjust the radius of the lever arm on the outboard bearing to be approximately 7¾ inches. To adjust this radius, loosen hex head bolt beneath the arm and move swivel as required. See Fig. 9. Set this outboard bearing lever in a position where it points directly toward or directly away from the hole in the driven pole unit lever, whichever setting is indicated for the "Open" position on the 3 pole field erection drawing. With the outboard lever in this position, and the driven pole unit in the open position, install the connecting pipe. Refer to Fig. 8. Only the clamping bolts on the rod ends should be tightened at this time. Do **not** sink in the set screws.

(5) Close the driven pole unit and observe the position of the outboard bearing lever. The lever should be in line or in toggle with the connecting pipe when the pole unit is fully closed. If the outboard bearing lever does not reach the toggle posi-

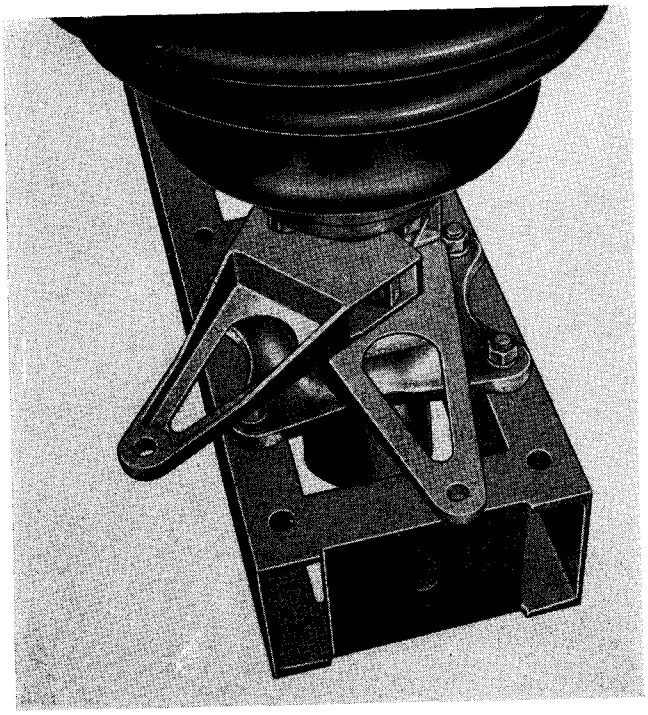

FIG. 7.

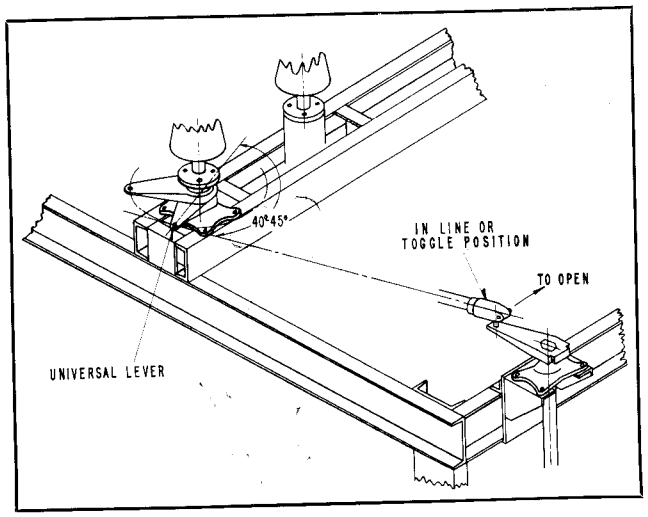

FIG. 8.

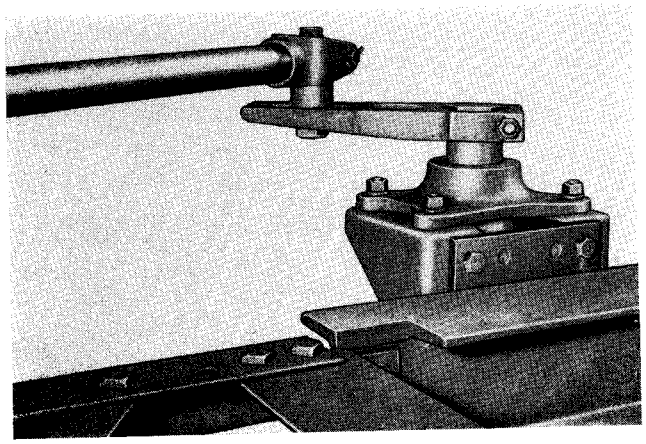

FIG. 9.

tion when the pole unit is closed, the radius of the lever arm should be decreased slightly. If the lever passes the toggle position when the pole unit is closed, the radius of the lever arm should be increased slightly. If the radius of this lever arm is changed it is also necessary to reset the effective length of the connecting pipe. Small adjustments should be made in this manner until the outboard lever travels through 180 degrees and is in toggle in both the open and closed positions of the pole unit. After the correct setting is obtained, securely tighten the bolt holding the swivel assembly to the outboard bearing lever.

(6) Install the operating handle as shown in Fig. 10 or Fig. 11. Set the driven pole unit in the fully open position and set the handle accordingly before clamping the handle to the pipe.

(7) The driven pole unit can now be operated with the handle at ground level. Set the stops on the handle for the open and closed positions. See Fig. 12 or Fig. 13 for details of "Stops" on the operating handles.

(8) Position all three pole units in the fully open position. With all pole units open, connect the interphase pipes. Tighten the clamping bolts on the rod ends but do **not** sink the set screws at this time.

(9) The complete switch should now be operated by means of the handle at ground level. The three blades should open to a vertical position against the stops. When the switch closes, the blades should enter the jaws and rotate to a final position within plus or minus 5 degrees from horizontal. If necessary, make small changes in the effective pipe lengths to achieve proper operation.

(10) With the pole units all closed, screw in the closed position pole unit stops until they are firmly seated. See Fig. 14 for location of these stops.

(11) Tighten down the set screws in all rod ends.

AUXILIARY EQUIPMENT

The following auxiliary equipment is available and will be supplied if specified on the order. Installation instructions for these accessories are contained in an individual instruction leaflet for each accessory. These instruction leaflets along with the field erection drawing and instruction book, are shipped in a large waterproof envelope tied to the blade of one pole unit.

(A) Grounding Blades	I.L. 36-250-9
(B) Mechanical Interlock	I.L. 36-250-3
(C) Key Interlock Mounting	I.L. 36-250-4
(D) Auxiliary Switch	I.L. 36-250-5
(E) Electrical Interlock	I.L. 36-250-6
(F) Quick Break Arc Horns	I.L. 36-250-7
(G) Standard Arcing Horns	I.L. 36-250-8

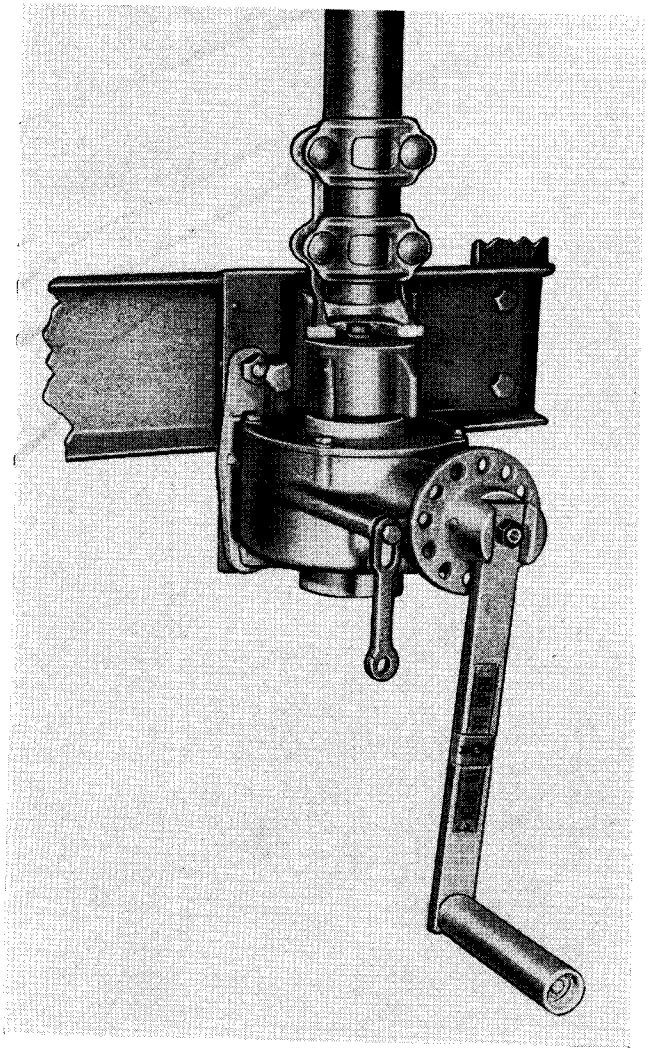

FIG. 10.

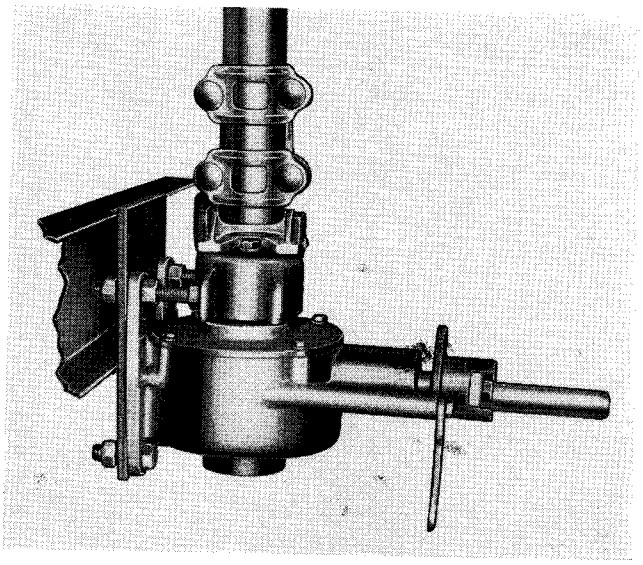

FIG. 12.

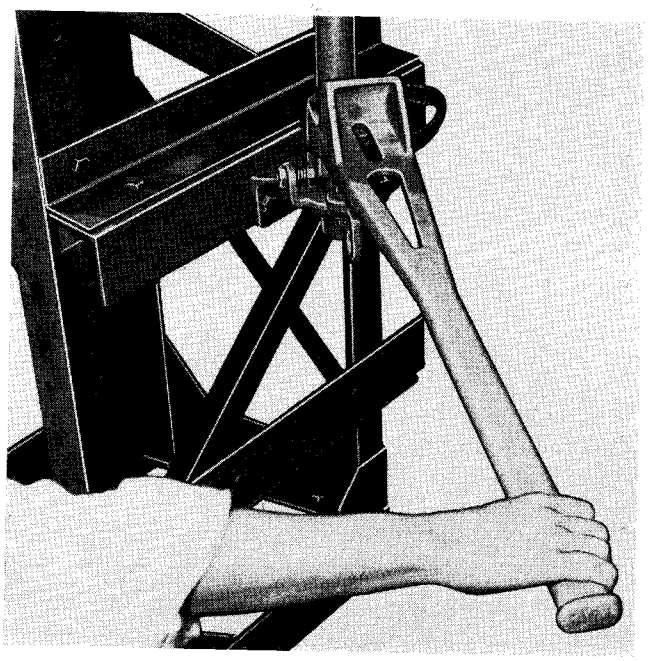

FIG. 13.

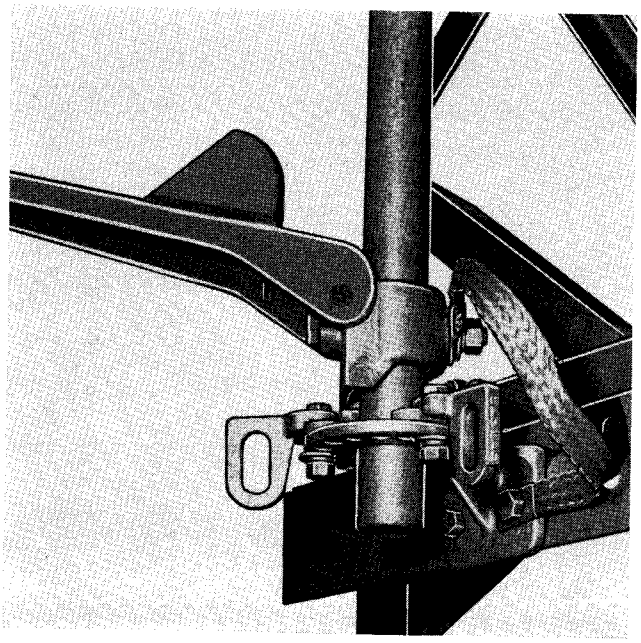

FIG. 11.

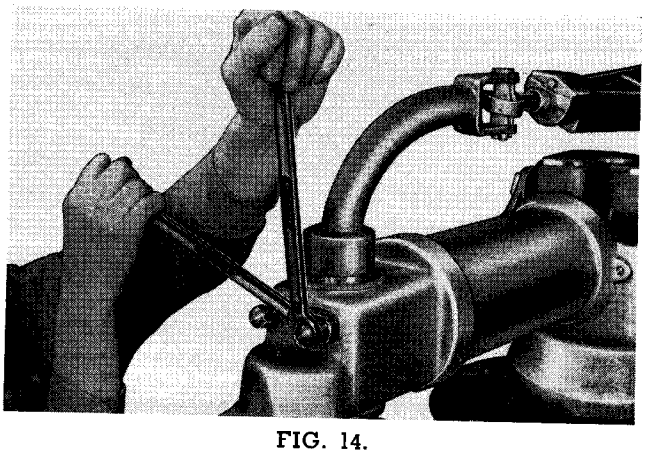

FIG. 14.

RECOMMENDED SPARE PARTS

KV	AMPERES	BLADE	BREAK JAW CONTACT	INSULATOR	ARCING HORNS
7.2	2000	S#308C601G01 (1)	S#308C480G02 (3)	S#1409 309 (3)	S#203B396G01 (1)
14.4	2000	S#308C601G01 (1)	S#308C480G02 (3)	S#1295 355 (3)	S#203B396G01 (1)
23	2000	S#308C601G02 (1)	S#308C480G02 (3)	S#1176 130 (3)	S#203B396G01 (1)
34.5	2000	S#308C601G02 (1)	S#308C480G02 (3)	S#1176 131 (3)	S#203B396G01 (1)
46	2000	S#308C601G03 (1)	S#308C480G02 (3)	S#548D248G01 (3)	S#203B396G01 (1)
69(HD)	600	S#308C482G05 (1)	S#308C480G01 (1)	S#968 758 (6)	S#203B396G01 (1)
69(HD)	1200	S#308C482G15 (1)	S#308C480G01 (2)		S#203B396G01 (1)
69(HD)	2000	S#308C601G04 (1)	S#308C480G02 (3)		S#203B396G01 (1)
115	600	S#308C482G06 (1)	S#308C480G01 (1)	S#968 758 (9)	S#203B396G01 (1)
115	1200	S#308C482G16 (1)	S#308C480G01 (2)		S#203B396G01 (1)
115	2000	S#308C601G05 (1)	S#308C480G02 (3)		S#203B396G01 (1)
138	600	S#308C482G07 (1)	S#308C480G01 (1)	S#968 758 (6)	S#203B396G01 (1)
138	1200	S#308C482G17 (1)	S#308C480G01 (2)	S#548D248G01 (3)	S#203B396G01 (1)
138	2000	S#308C601G06 (1)	S#308C480G02 (3)		S#203B396G01 (1)
*161	600	S#308C482G08 (1)	S#308C480G01 (1)	S#968 758 (12)	S#203B396G01 (1)
*161	1200	S#308C482G18 (1)	S#308C480G01 (2)		S#203B396G01 (1)
*161	2000	S#308C601G07 (1)	S#308C480G02 (3)		S#203B396G01 (1)
196	1200	S#308C482G19 (1)	S#308C480G01 (2)	S#1409 412 (15)	S#203B396G01 (1)
196	2000	S#308C601G08 (1)	S#308C480G02 (3)		

* For vertical base mounting applications, the insulator stack consists of (1) S#1409 412 and (3) S#968 758 units.

(1) Quantity shown after each style is required for one pole unit.

(2) Recommended ordering quantity is 3 complete sets of parts from this table for up to 10 complete 3 pole switches.

MEMORANDUM

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WESTINGHOUSE