

**GOULD I-T-E AIR SWITCHES — OUTDOOR**

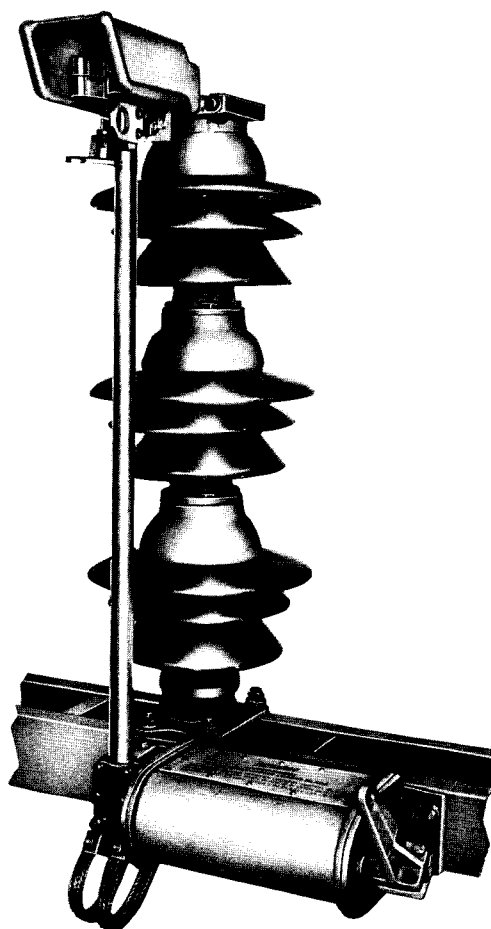
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**INSTRUCTIONS**

**HSG HIGH - SPEED GROUNDING SWITCH**

**14.4 THRU 345 KV NOMINAL**

**15.5 THRU 362 KV MAX. DESIGN**



**IMPORTANT**

**Make absolutely sure applicable equipment is de-energized and properly grounded before proceeding with any installation or maintenance.**

## INSTRUCTIONS FOR INSTALLATION AND MAINTENANCE OF HSG HIGH-SPEED GROUNDING SWITCH

### GENERAL

This manual provides instructions for the installation and maintenance of HSG high-speed grounding switches and it should be read and understood *before* attempting to install or service the equipment. A switch operating mechanism drawing is included in the shipment of each HSG switch and it will be referred to in these instructions.

### RECEIPT

Check the total shipment for completeness against the shipping notice, bill of material and installation drawings. Report any shortages or damages immediately to the carrier and file the proper claim.

### INSTALLATION

#### Step 1 - Mount Grounding Switch Jaw

The grounding switch jaw is shipped as a separate assembly. It should be mounted and bolted in place on the insulator as in Fig. 1.

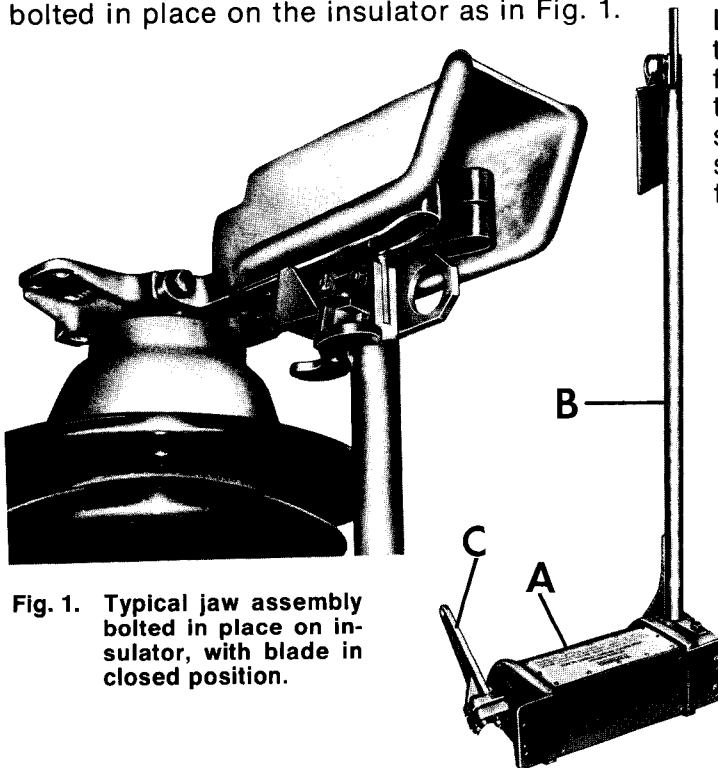


Fig. 1. Typical jaw assembly bolted in place on insulator, with blade in closed position.

#### Step 2 - Mount Actuating Mechanism Assembly

The second component of the HSG switch that is shipped as a separate assembly is the actuating mechanism (A) fitted with the switch blade (B) and the reset crank (C), Fig. 2. (The reset crank is not supplied with hook-stick reset switches.) The blade and the crank are mounted in the correct position and match-marked (E in Fig. 3) at the factory and do not require any further adjustment in the field. Although the complete assembly is shipped in the unlatched position, the main springs of the actuating mechanism are partially wound and store a considerable torque. This torque is retained by the blade stop (A in Fig. 3) against which the switch blade clamp (B) rests.

**CAUTION: Do not disturb the factory settings nor attempt to operate the actuating mechanism before the installation is completed.**

Lift the complete actuating mechanism assembly (actuating mechanism, switch blade and reset crank) into position and bolt to the supporting structure as shown in Fig. 4.

Loosen the blade stop nut (C in Fig. 3) and push the switch blade so that the blade contact bar is fully engaged with the switch jaw. Check to see that the blade stop (A) is firmly against the switch blade clamp (B) and retighten the blade stop nut. Do not turn blade stop bolt (D) during this adjustment.

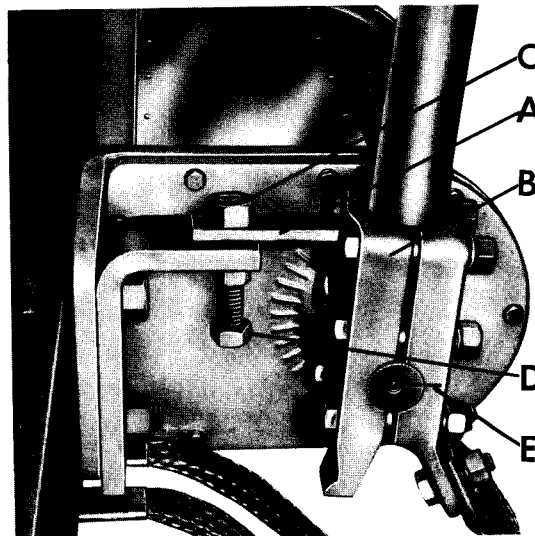


Fig. 3. Position of external blade stop as shipped.

Fig. 2. Actuating mechanism assembly as shipped.

### Step 6 - Mount Remote Reset Mechanism

HSG switches can be remotely reset with a pump handle, swing handle or worm gear reset mechanism. Each of these mechanisms requires a somewhat different mounting procedure. Details of the correct mounting procedure for this installation are shown on the switch operating mechanism drawing. After the remote reset mechanism has been mounted, proceed to Step 7.

### Step 7 - Connect Remote Reset Mechanism

Move the operating handle of the remote reset mechanism to the normal position . . . the position corresponding with the normally open position of the HSG switch (see switch operating mechanism drawing). Be sure that the handle stop of the remote reset mechanism is engaged, blocking further movement of the operating handle in this direction.

**CAUTION: Do not change the position of the reset crank. It must remain in the position set at the factory until Step 8.**

Without disturbing the fixed positions of the reset crank and operating handle, install the operating mechanism parts as shown on the switch operating mechanism drawing.

### Step 8 - Adjust Remote Reset Mechanism

Slowly move the operating handle of the remote reset mechanism away from the handle stop, observing the position of the reset crank. As shown in Fig. 7, an indicator (A) is provided on the reset crank and a reference mark (B) is provided on the housing of the actuating mechanism.

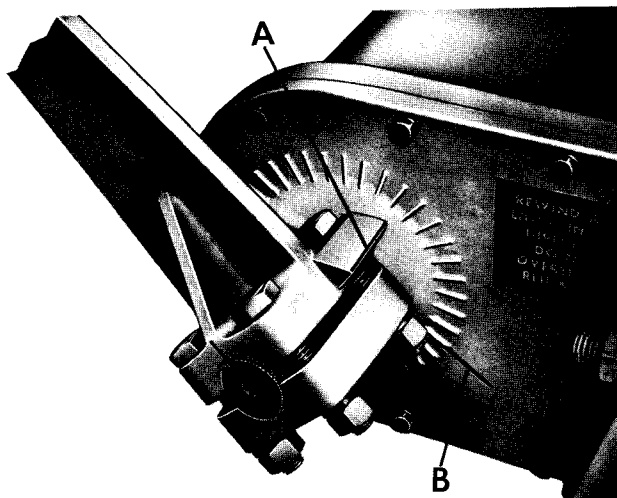


Fig. 7. Reset crank indicator and housing reference mark.

**During this reset operation, the indicator on the reset crank must not travel beyond the reference mark on the housing. To do so may cause damage to the internal parts of the actuating mechanism.**

When the reset crank indicator reaches the reference mark, the mechanism springs are rewound and latched. There should not be any counteracting force on the operating handle at this point. If the handle tends to return to the normal position, check the latch adjustment as described in Step 11.

Reverse the operating direction of the remote reset mechanism until the operating handle reaches the handle stop set in Step 7. In this position, the HSG switch is open and ready to close when electrically operated.

For two- and three-pole installations, adjust the pole closest to the operating base first, and then the second closest, and finally the third.

### Step 9 - Test Operation of Switch

With the HSG switch (or switches) in the normally open position, energize the solenoid in the actuating mechanism by momentarily applying nameplate voltage to terminals 1 and 3. Reopen the switch by means of a hook stick or remote reset mechanism. If the actuating mechanism fails to unlatch, check the latch adjustments as described in Step 11.

After the HSG switch is operating satisfactorily, permanently connect the normal tripping circuit to terminals 1 and 3. Trip the switch using normal tripping procedure.

If blade rebounds clear of jaw, rotate the blade stop (A in Fig. 3) clear of the blade clamp (B). For procedure, refer to Step 2.

**WARNING: Open remote tripping contact before attempting to reset HSG. Failure to do so may damage the HSG mechanism or may automatically trip HSG to the closed position.**

## MAINTENANCE

### Step 10 - After Each Fault Closure

Each time the HSG switch operates due to a fault, the contact areas should be inspected for possible damage. If contact burning has not been excessive, dress the contact surfaces and coat with DARINA 2 or equivalent. If burning has been excessive, replace the blade contact bar and/or the switch jaw contacts.

**Step 11 - Inspection (Two Men)**

It is recommended that once each year the HSG switch be test operated to check its mechanical function. If the actuating mechanism fails to trip or latch (switch blade fails to close or open properly), check the latch adjustment as follows, (see Figs. 8 and 9):

Firmly grasping the jaw end of the switch blade, pull the blade to the open position and with either a .007" or .011" feeler gauge on the head of the adjusting bolt (A in Fig. 9), attempt to latch the mechanism.

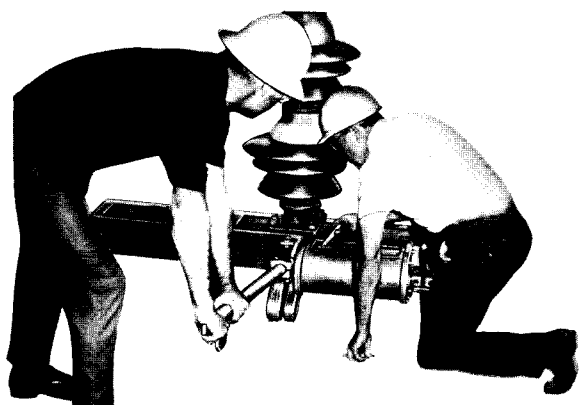


Fig. 8. Checking the latch adjustment.

**WARNING**

**STORED-ENERGY  
HIGH IMPACT SPRING LOADED BLADE**

STAY CLEAR OF AREA BETWEEN GROUND SWITCH BLADE & INSULATOR COLUMN WHEN BLADE IS IN OPEN POSITION. FAILURE TO DO SO MAY RESULT IN INJURY OR DEATH.

The actuating mechanism should latch with the .007" gauge on the bolt head, but should *not* latch with the .011" gauge in place. If the mechanism *does not* latch when using the .007" gauge, turn the adjusting bolt clockwise until the mechanism will latch when the latching operation is performed. If the mechanism *does* latch when using the .011" gauge, turn the adjusting bolt counter-clockwise until the mechanism will not latch when the latching operation is performed. Tighten the adjusting bolt locknut after each adjustment.

The actuating mechanism may be manually tripped by pushing against the latch with a screwdriver as shown in Fig. 10.

**WARNING: ALL PERSONNEL MUST BE CLEAR OF AREA BETWEEN SWITCH BLADE AND JAW INSULATOR COLUMN.**

**Step 12 - Replacing the Switch Blade**

With the switch blade in the normally open position and the actuating mechanism latched, block the latch with a screwdriver as shown in Fig. 11. Loosen the bolts of the switch blade clamp. Remove the old blade and insert the new blade, making sure that the blade contact bar is parallel to the switch jaw contacts. Also check to be sure that the match marks on the switch blade clamp and the actuating mechanism shaft line up exactly (E in Fig. 3) before tightening the bolts of the switch blade clamp. Unblock the latch.

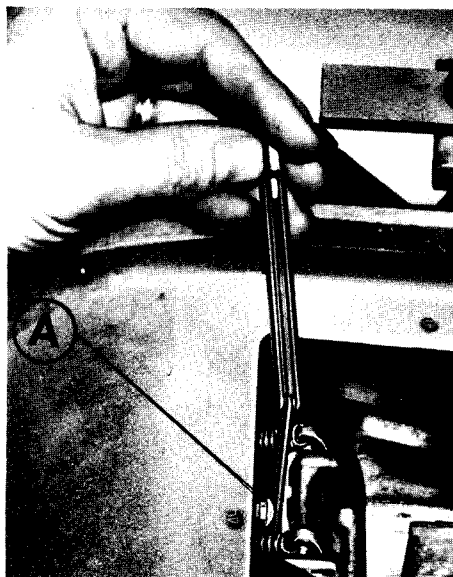


Fig. 9. Adjusting bolt is located under top cover between the two parallel tension springs.

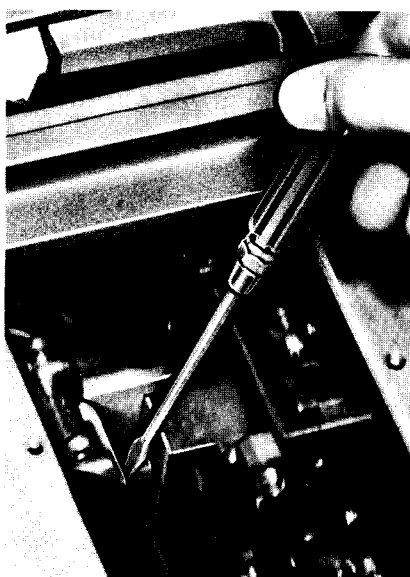


Fig. 10. Screwdriver being used to unlatch actuating mechanism.

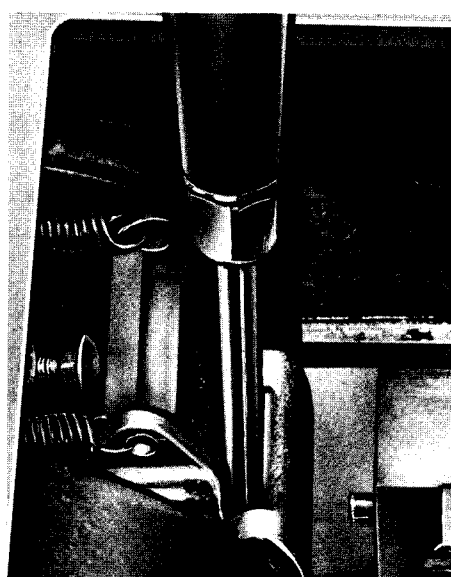


Fig. 11. Blocking the latch with a screwdriver.

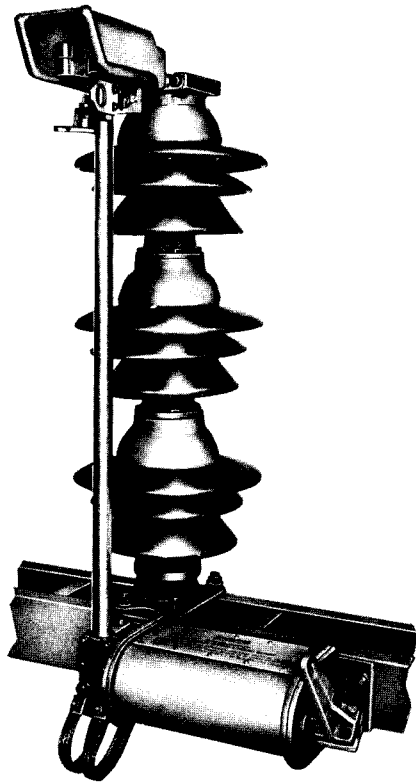


Fig. 4. Actuating mechanism assembly mounted in place.

Apply a thin coating of DARINA 2 or equivalent to the sliding surfaces of the switch jaw contacts and the blade contact bar to reduce sliding friction to a minimum.

Partially open and reclose the switch blade, checking to see that the blade contact bar (A in Fig. 5) enters the switch jaw contacts (B) squarely. Adjustment can be made by shifting the actuating mechanism relative to the mounting holes in the structure or by adjusting the insulators. If the switch blade must be rotated in the switch blade clamp, follow procedure outlined in Step 12. Tighten all mounting bolts when adjustment is satisfactory. **Leave the switch blade in the closed position.**

### Step 3 - Make Electrical Connections

Connect the housing heater as shown on the wiring diagram of Fig. 6. Connect the external tripping circuit to terminals 1 and 3 of the auxiliary switch. For d-c applications, user's external closing contact must be in the (+) side of the line.

Auxiliary switch contacts 1-2 and 3-4 will be closed when the actuating mechanism is latched and the switch blade open. The remaining auxiliary switch contacts are for customer's use. These contacts are factory adjusted and there are no field adjustments to be made.

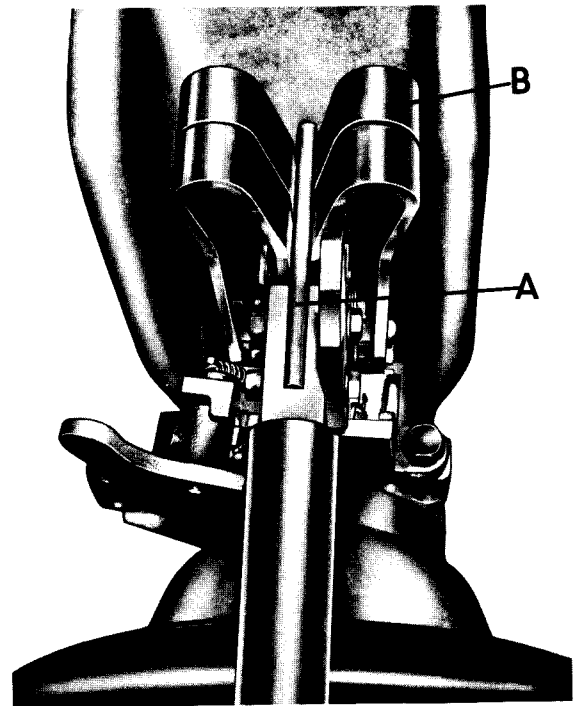


Fig. 5. Proper engagement of blade contact bar in switch jaw contacts.

### Step 4 - Operating Mechanisms

The HSG switch can be reset with either a hook stick or remote reset mechanism. If the hook-stick method is used, proceed to Step 5. If the remote reset method is used, proceed to Step 6.

### Step 5 - Hook-Stick Switch

To latch the switch, simply engage the hook stick in the eye provided on the switch blade and pull the switch blade down to its fully open position. This action automatically winds the power springs and engages the latching mechanism. The HSG switch is ready to close when electrically operated. Proceed to Step 9.

25 WATT HEATER-WIRE HALVES IN SERIES FOR 230V AND IN PARALLEL FOR 115V.

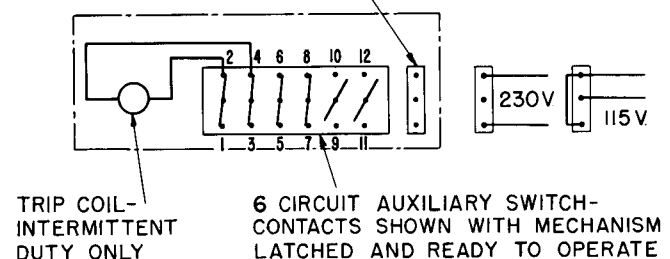


Fig. 6. Wiring diagram.

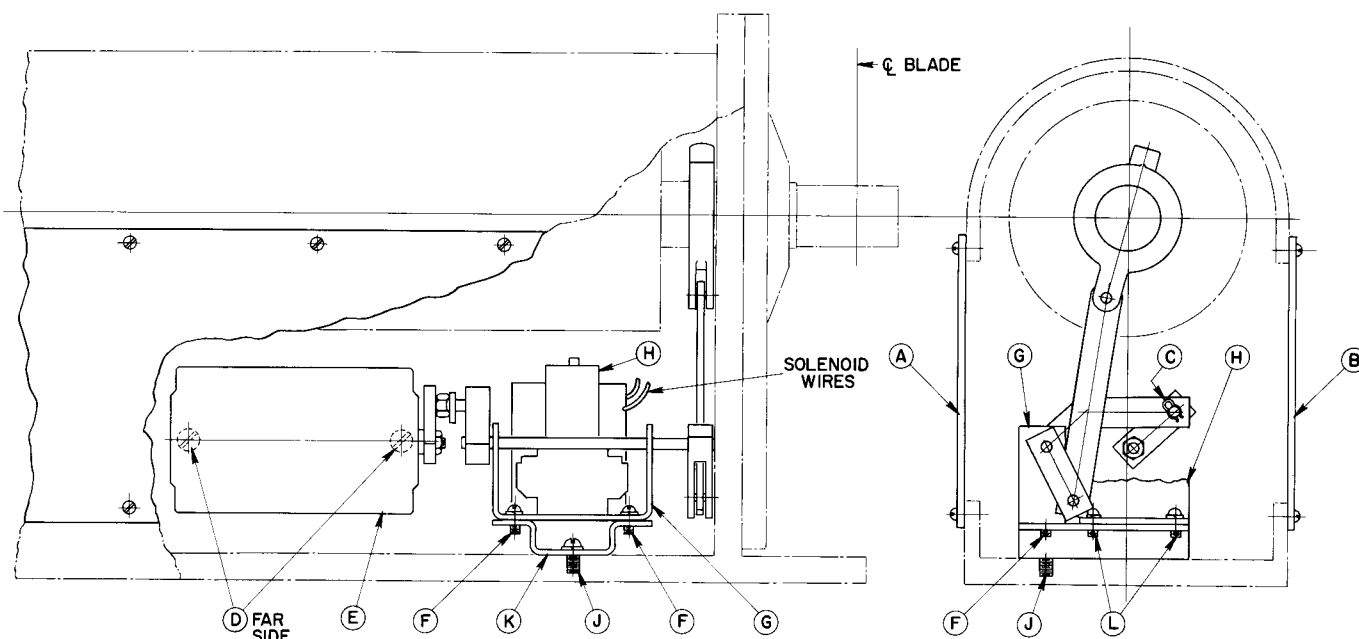


Fig. 12. Showing auxiliary switch and trip solenoid.

### AUXILIARY SWITCH REPLACEMENT

1. Remove top cover plate (A) and bottom cover plate (B).
2. Tag and disconnect auxiliary switch (E) wires.
3. Disconnect linkage from auxiliary switch crank by removing hairpin cotter pin (C).
4. Remove mounting screws (D) and auxiliary switch (E).
5. Assemble new auxiliary switch in place with mounting screws (D).
6. Reconnect linkage to auxiliary switch crank with cotter pin (C).
7. Reconnect wires and replace cover plates.

### ORDERING INFORMATION

In ordering parts or in correspondence regarding this equipment, contact nearest Gould I-T-E Sales Office and state the serial number as indicated on the name plate.

### TRIP SOLENOID REPLACEMENT

1. Remove top cover plate (A).
2. Disconnect trip solenoid wires from auxiliary switch (E) terminals.
3. Remove screws (F) and rotate bracket (G) and associated linkage away from trip solenoid (H).
4. Remove screw (J).
5. Remove trip solenoid and solenoid support (K).
6. Remove screws (L) and solenoid (H). Using same screws mount the new trip solenoid on the support. Looking at support (K) from the bracket (G) end, the solenoid wires must be on the right.
7. Reassemble trip solenoid (H) and support (K) in housing with screw (J). Rotate bracket (G) into place and secure with screws (F).
8. Check linkage alignment against illustration above.
9. Reconnect wires and replace top cover plate.

**NOTE: After completing replacements, retest HSG switch per Step 9, Page 4.**

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