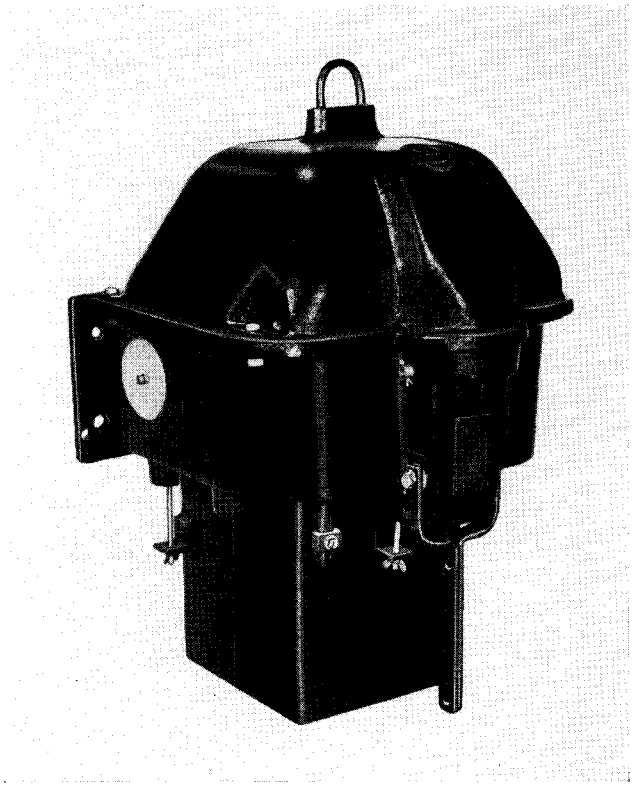
DESCRIPTION • INSTALLATION • MAINTENANCE

INSTRUCTIONS

TYPE F-10 OIL CIRCUIT BREAKER

Three-Pole **Single-Throw** **Wall Mounting**
2500 Volts **60 to 300 Amperes** **60 Cycles**



TYPE F-10 INDOOR OIL CIRCUIT BREAKERS are low-capacity, low-voltage devices designed primarily for industrial applications, such as motor control in mines where excessive moisture conditions require drip-proof construction. These breakers should not be connected directly to incoming lines without protection from lightning surges or other voltage disturbances.

RECEIVING

The nonautomatic breaker unit and the tripping devices are shipped separately. Check the package labels against shipping papers to be sure that all the parts ordered are received. Open the packages carefully and check identity of each assembly and see that no damage has occurred during shipment nor during storage previous to installation. The breaker unit can be lifted by the eye cast into the cover.

INSTALLATION

Nonautomatic Breaker Unit. Remove the cover and tank, and blow out all dirt that may have entered. Bolt the unit to a flat vertical surface of wall or frame. Check to be sure that it is level. Use care that the box is not stressed by bolting against an uneven surface.

Open and close the breaker several times to insure that all moving parts are free. See that the moving contacts enter centrally between the fingers of the stationary contacts and make good contact in the closed position.

Trip the breaker by raising the trip lever. See that the adjusting screw holds it up so that 1/32 to 1/16 inch of movement is required before touching the trigger. If force to move the tripping lever seems excessive, measure the pull with a spring balance at point where overload trips will strike. Force required to trip the breaker should not exceed four pounds. See Fig. 1.

Overload Trips. The tripping unit and the coils are shipped as units. To put them into the breaker, remove the coil connectors at the upper end of the stationary contacts. Put the right hand coil in place, pass the trip unit up through the hole in the base and fasten by replacing the nut and lock washer on top. Place wedges below coil and tap them into place. Assemble the left hand coil in a similar manner using both coil connectors to extend the coil leads. Variation in calibration is obtained by loosening the nut which holds the clamp to the tube of the trip unit. See Fig. 3.

Inverse Time Delay Trip. Assemble this attachment in the same manner as the instantaneous trips are assembled. Calibration of current tripping is obtained by screwing the dash-pot into or out of the support casting. Variation in time delay of tripping is obtained by rotating the washer inside

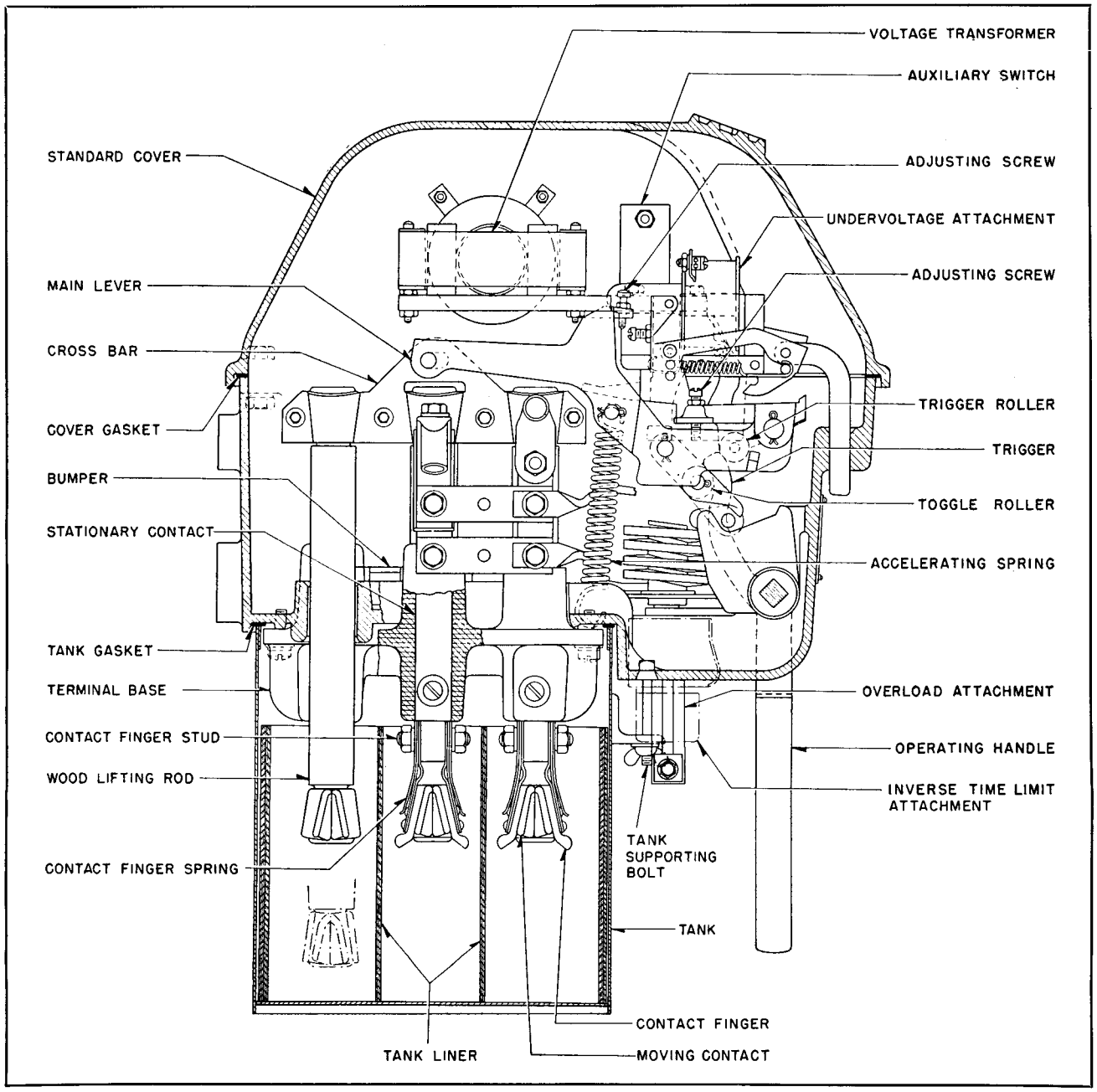


FIG. 1. Sectional View of Breaker Unit

of the dash pot piston to change the number of holes exposed for passage of the oil. Before placing breaker in service fill the dash pot with oil to the level indicated. Use the oil that is furnished. See Fig. 4. The curves in Fig. 6 show how changing temperature or changing viscosity of the oil will change the time delay.

Undervoltage Release. This attachment mounts on the machined pads in the base. A link connects with the trip lever to trip the breaker if armature is not held in the closed position. The coil is connected to the selected phase when the circuit voltage is 550 or below. Be sure coil rating matches circuit voltage. If coil is connected to the load side of the breaker the hand reset lever must be added to hold the armature retrieved until the contacts touch. The armature drops when the voltage in the coil falls to between 65% and 35% of normal.

Caution: Be sure the armature is retrieved mechanically before the coil is energized. Watch this when coil is connected to the line side of the contacts. The linkage retrieves the armature as the breaker opens.

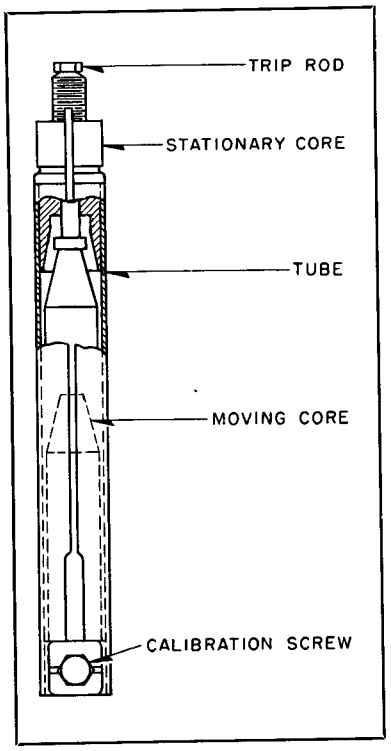


FIG. 3. Overload Attachment

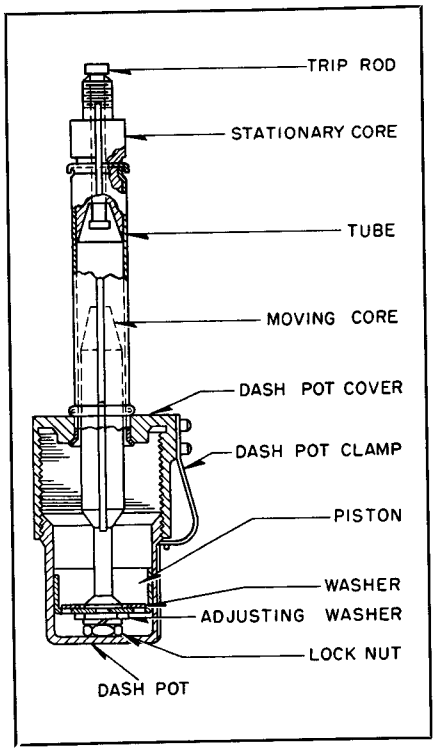


FIG. 4. Inverse Time Limit Attachment

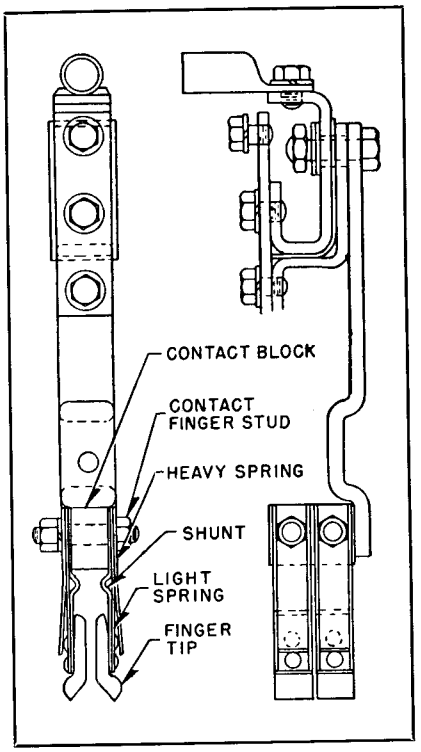


FIG. 5. Automatic Studs Connected for Nonautomatic Operation

OPTIONAL ATTACHMENTS

Voltage Transformer. A special 2200/1100 to 110 volt potential transformer mounts in same brackets as undervoltage device for use where circuit voltage is above 550.

Lockout Attachment. This is a special undervoltage device that prevents the breaker from being closed unless an auxiliary contact outside of the breaker in series with the coil is closed. It is always connected to the line side. An auxiliary switch that is part of the device parallels the external contact when the breaker is closed, after which the device acts like the regular undervoltage.

Auxiliary Switch. The auxiliary switch is SPST and, when furnished, is mounted above on one of the brackets used to support the undervoltage device.

Shunt Trip. The shunt trip shown in Fig. 9 replaces the undervoltage device. When mounting this device it is necessary to remove the tripping lever to drill two holes in it for #10-32 screws as shown.

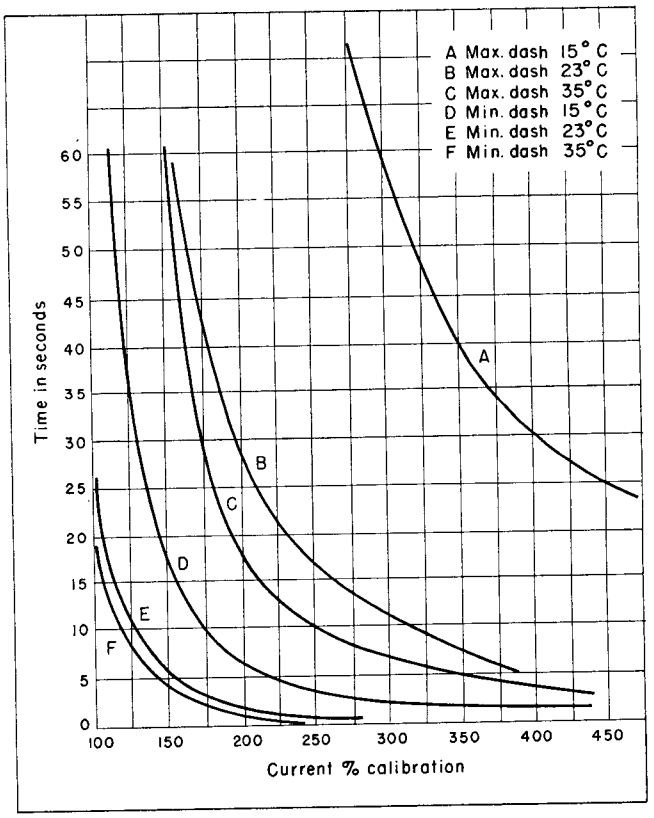


FIG. 6. Approximate Time Overload Characteristics of the Inverse Time Limit Attachment Used with Standard Dashpot Oil as Supplied

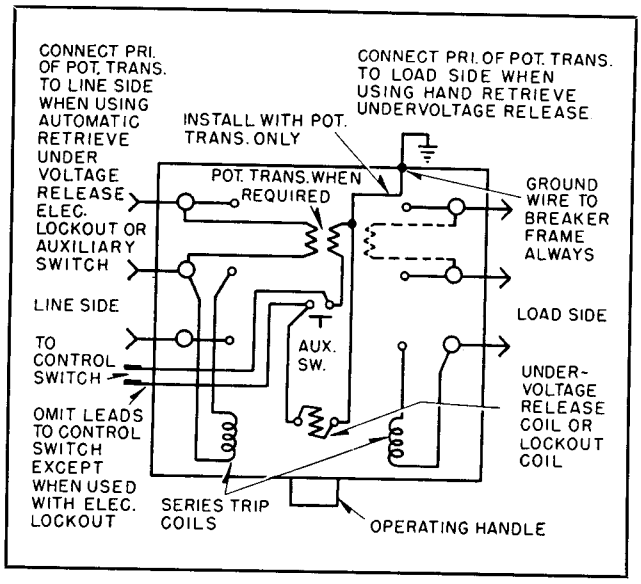


FIG. 7. Connections for Standard Breaker

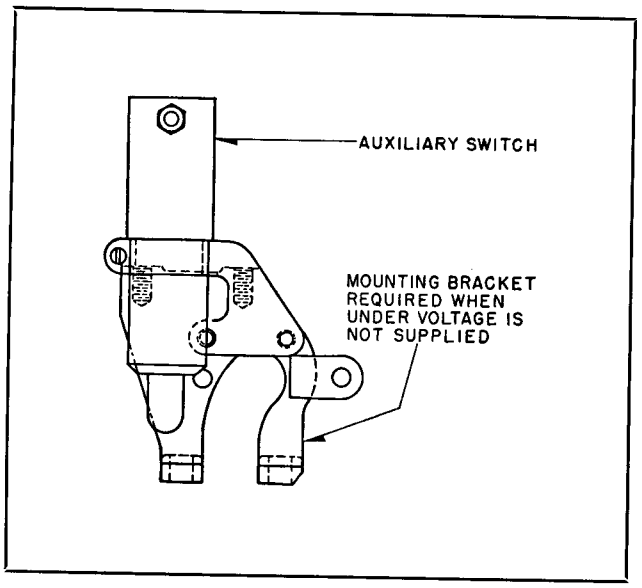


FIG. 8. Auxiliary Switch

Connecting Leads. Connections are made by inserting the power cables through the insulators in the overhang of the box and soldering them into the tube terminals on the stationary contacts. Standard practice requires that the exposed leads be taped on circuits of 2200 volts. First cover with one layer half-lapped treated cloth and then finish with one layer of cotton tape. Tuck the end under to fasten securely. Cover liberally with insulating varnish.

Placing In Service. After connecting the power cables and taping the terminals the cover should be put on and the bolts tightened. The tank should be filled with clean new oil to the level indicated and then put in place and the bolts holding it should be drawn up tight. Close and open the breaker several times to be sure everything is in working order. It can then be placed in service.

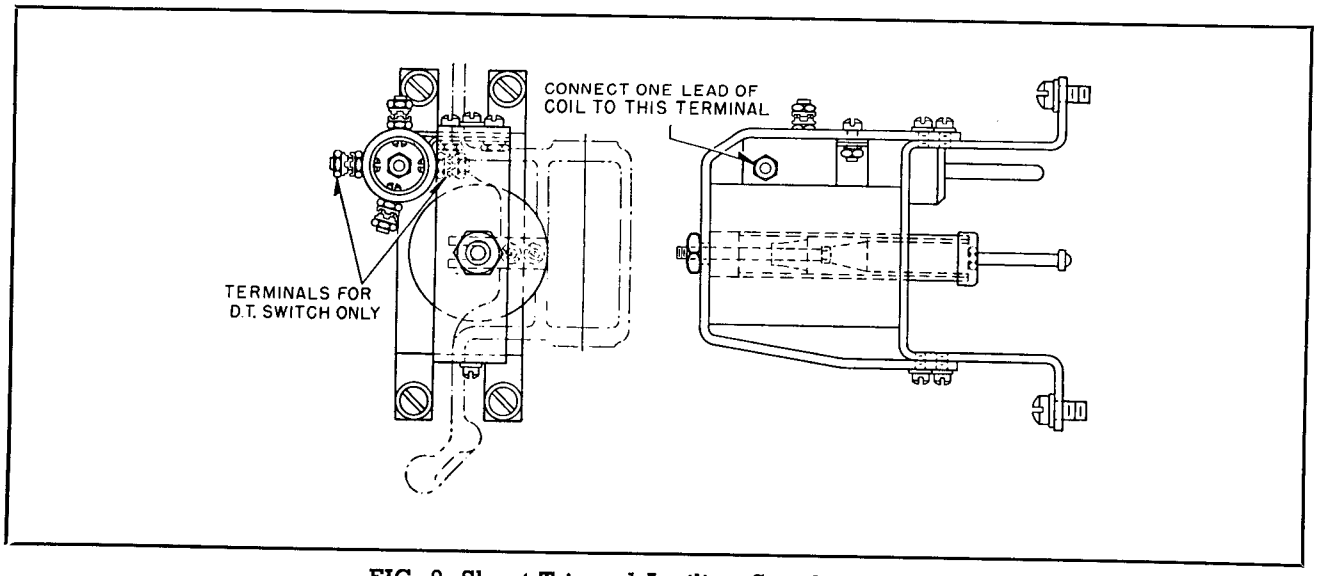


FIG. 9. Shunt Trip and Auxiliary Switch Assembly

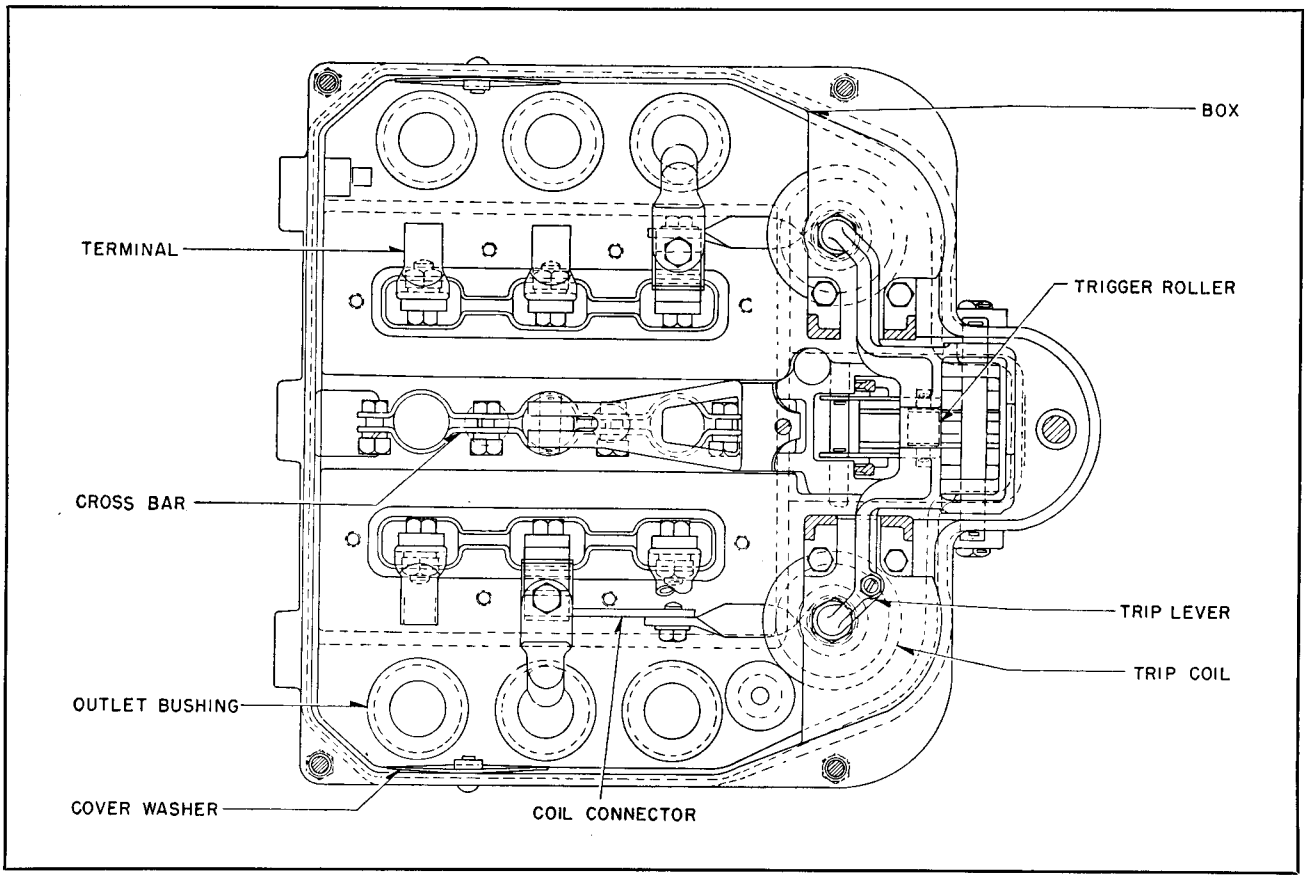


FIG. 2. Top View of Breaker Unit

MAINTENANCE

The tank and cover should be removed periodically and the breaker inspected to see that all parts are in good condition and free from collections of dirt and foreign substances.

After long service or frequent operation the fingers or moving contacts may become burned sufficiently to permit arcing on the contact face of the fingers. These fingers and moving contacts should be replaced when burns penetrating 1/16" or more are found.

Care of Circuit Breaker Oil. The care of insulating oil in circuit breakers is of the utmost importance in their successful operation. Contamination by dirt, moisture, metallic particles, lint, etc. all reduce the dielectric strength upon which the operation and current interrupting ability largely depend. Consequently, the most careful attention should be given to keeping the oil clean, not only in filling the tanks originally but in later maintenance, or other work on the breakers which might involve opening the tanks.

Oil used in the breakers should be only of the highest grade, such as Wemco C or other approved type. The oil should be new or at least thoroughly reconditioned by means of a filter press or centrifuge. In any case, before using, it should be given a dielectric test which should show a minimum of 22,000 volts (preferably 25,000 to 30,000) measured between 1-inch diameter discs spaced 0.1-inch apart.

Before filling, the tanks should be thoroughly cleaned and flushed out with insulating oil. The same treatment should be given the inside of the top of the breaker and the operating linkage and contact system. For cleaning, use washed rags which will leave no lint to absorb and hold moisture.

The same care should be used during inspection or maintenance work on the breaker. If the oil is to be reconditioned following operation of the breaker under short circuit; the tank, and entire inside of the breaker should be cleaned before oil is returned to the tank. If the work merely involves lowering or removal of the tank, care should be taken to keep the tank covered until it is replaced so that dirt, dust, metallic particles, etc. cannot fall into the oil.

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