DESCRIPTION • INSTALLATION • OPERATION

INSTRUCTIONS

Types B-8-A and B-10-A

OIL CIRCUIT BREAKERS

Type B-8-A, 600 and 1200 Amperes, 13,800 Volts

Type B-10-A, 600, 1200 and 2000 Amperes, 13,800 Volts

WESTINGHOUSE ELECTRIC CORPORATION
SWITCHGEAR DIVISION
EAST PITTSBURGH, PA.

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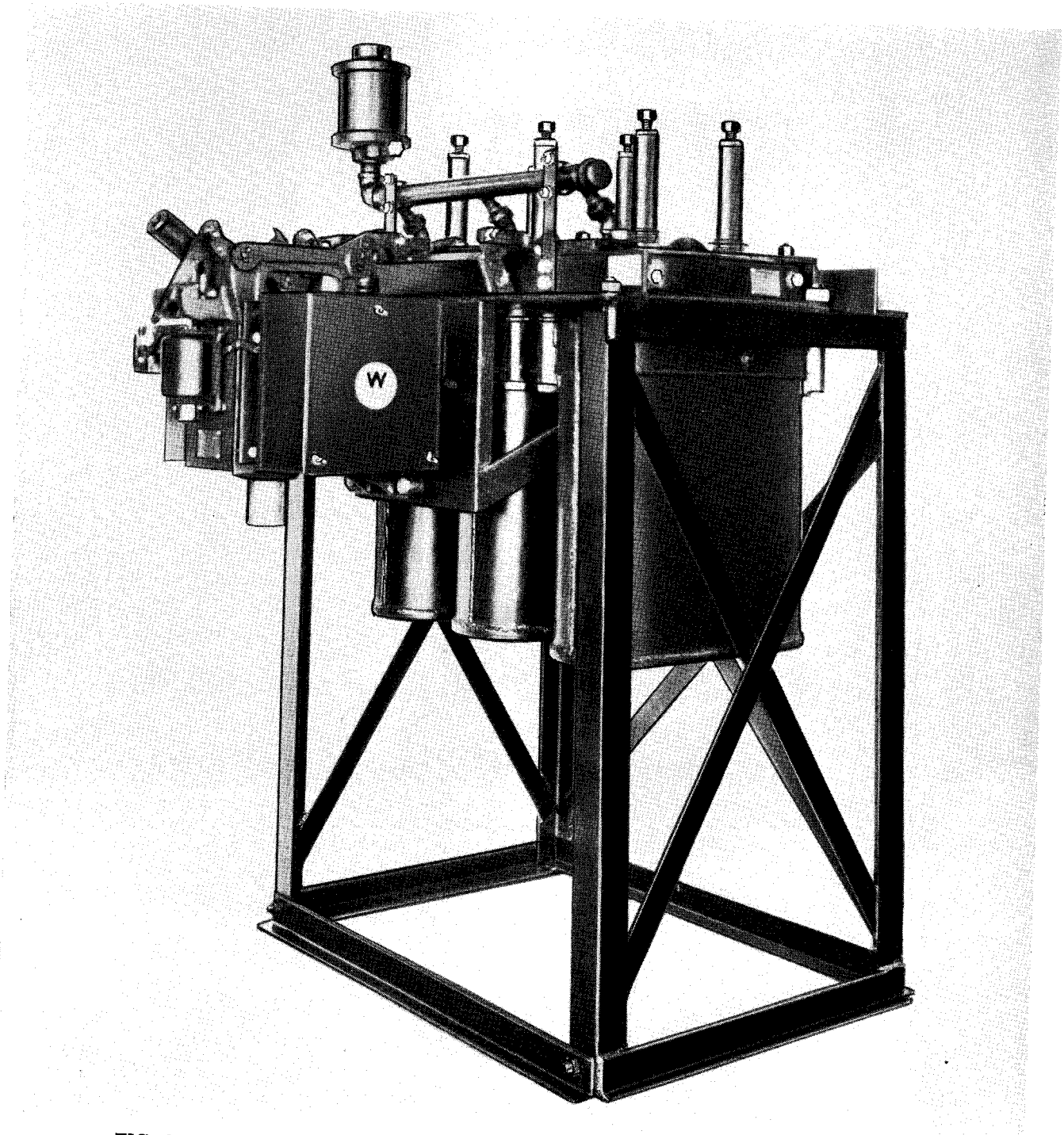


FIG. 1.—Type B-8-A Oil Circuit-Breaker, 600 Amperes, 13,800 Volts, Solenoid-Operated

OIL CIRCUIT BREAKERS

Types B-8-A and B-10-A

GENERAL DESCRIPTION

The Types B-8-A and B-10-A oil circuit breakers are of multiple single pole, non-oil throwing design. They are designed for a maximum of 15000 volt service in 600, 1200 and 2000 ampere sizes.

The breakers may be mounted in cells, trucks, on steel frames, or as lift-up units.

Electrical operation may be by solenoid, when direct current is available or by solenoid plus Rectox when alternating current is available. The breakers may also be operated manually.

The breakers are equipped with "De-ion Grid" contacts, Fig. 4. The arc interruption takes place in the "De-ion Grid" chamber supported from the terminals. This device consists of a series of insulating plates, having interspersed plates of magnetic material, all so disposed and vented that the arc is moved laterally into oil pockets where it vaporizes the oil. The resultant gases are then forced transversely through the conducting gases of the arc stream in such a manner as to de-ionize them and extinguish the arc.

SHIPMENT

The breaker is shipped in the following manner:

1. Breaker and operating mechanism are assembled as a complete switching unit with the breaker tied in the closed position.

2. For remote control, the breaker and operating mechanism will be crated separately.

INSTALLATION

1. Attach the breaker to the supporting structure, first making sure that the structure is level.

2. Remove the tank and examine the inside for evidence of moisture and foreign matter. Flush with benzine.

3. Remove the wire which holds the breaker in the closed position and allow the breaker to open slowly.

4. When the mechanism is mounted separately from the breaker, connect the breaker and operating mechanism, making sure that full contact is secured and that the breaker rests on the bumpers when open.

5. Examine the contacts and note that they are clean and in alignment. For adjustment, see section covering Adjustment.

6. Operate the circuit-breaker by hand several times, watching each pole and the operating mechanism to be sure that all parts move freely.

7. Install connections to the breaker studs.

8. Insulate the connections with varnished cambric and non-elastic webbing in accordance with Westinghouse Standards for the various operating potentials. See Fig. 8.

9. Connect the vent pipe to the top of the venting valve. This pipe should be connected to the main venting header pipe, or outside the cell or truck in which the breaker is mounted. It should be so arranged that it will not be possible for rain or condensation to enter the piping. The piping should also be free of any pockets which would retard the drainage of any oil that might be discharged, back to the circuit-breaker.

10. With the tank removed, fill it with oil to within two inches of the top, or if more desirable, the excess oil can be drawn off through the drain valve after the tank has been bolted in place, Fig. 1.

11. Connect the breaker frame through one of the mounting bolts to ground. The National Electric Code requires grounding cable to have one-fifth of the main circuit capacity, except that it must never be smaller than No. 8 and need not be larger than No. 0, B & S gauge.

12. Check the operation of the breaker by operating it electrically in accordance with the instructions covering the mechanism used.

ADJUSTMENTS

Breaker Mechanism Fig. 2 or 7

The operating toggles and levers are all inside the breaker tops, with connection to the outside by a square shaft running in bronze bushings. No adjustment is required on the toggle stop as this is set at the factory. The setting is such that with

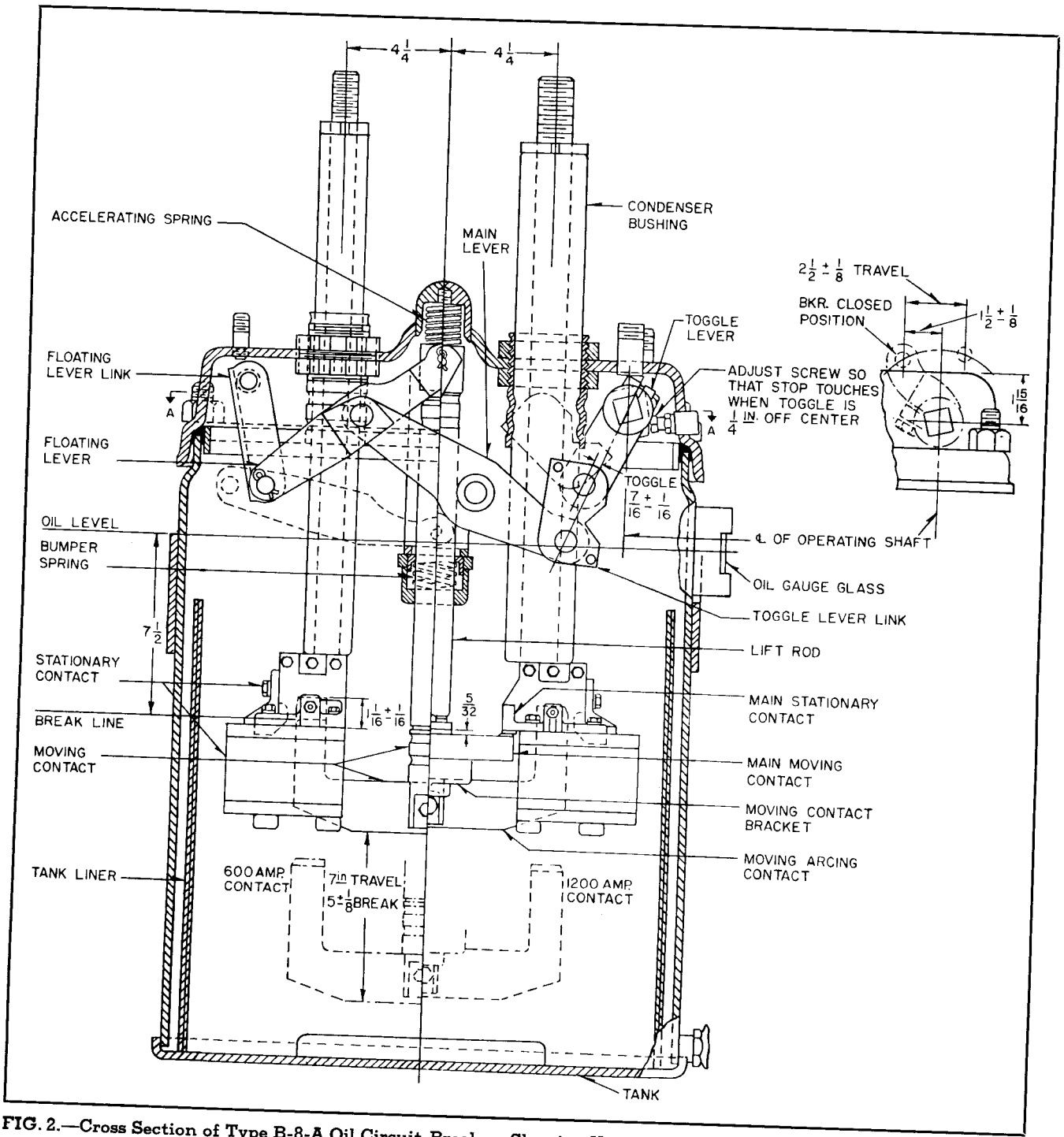


FIG. 2.—Cross Section of Type B-8-A Oil Circuit-Breakers Showing Various Arrangements of Toggle Levers and Links

the breaker in the closed position the stops come in contact with the toggle 1/4 off center. When connecting the breaker to the operating mechanism the toggle should be set at 7/16 ± 1/16 by means of the adjustable linkage between the breaker and mechanism.

CAUTION—*Do not interchange links, levers, cross bars or tanks between breakers of different ampere capacities, as certain parts are made of non-magnetic material. To interchange these parts may result in excessive heating.*

The hydraulic bumper action is secured by reaction of the rod end on the upper end of the lift rod, in the lift rod guide. This action is non-adjustable and requires no attention. Do not operate breaker excessively without oil.

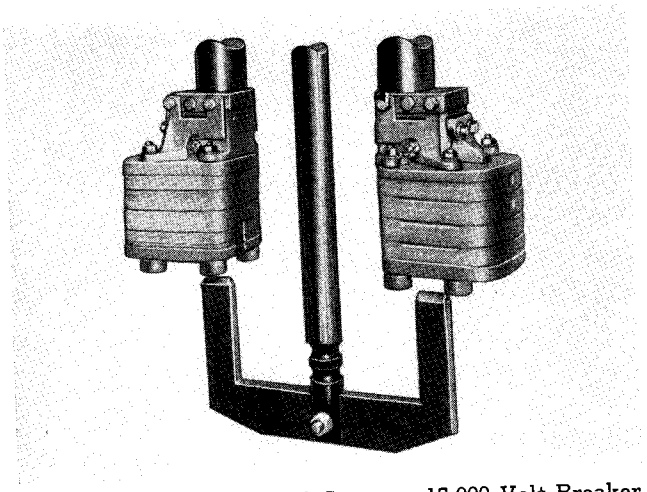


FIG. 3.—Type B-10-A, 600 Ampere, 15,000 Volt Breaker with "De-ion Grids"

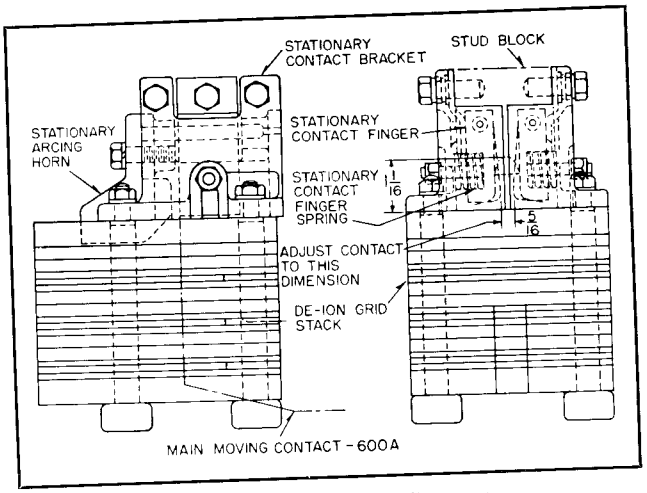


FIG. 4.—De-ion Grid Contacts

Contacts—The contact arrangement for the 600 ampere breaker is shown in Fig. 4. No adjustment is provided between the toggle linkage and moving arcing contact. With the toggle set at 7/16 ± 1/16 the distance between the top of the "De-ion Grid" top plate and the top of the moving contact should be 1 1/16 inch ± 1/16 inch, with the breaker closed. This dimension is only for new parts. Some allowance must of course be made when contacts burn.

When fitting new stationary contact fingers the adjustment should be so made that the distance between the fingers is 5/16 inch. See Fig. 4. These fingers should also be adjusted symmetrically with respect to the slot in the grids.

The main contacts of the 1200 and 2000 ampere capacity breaker (Figure 9) are adjustable by turning the bracket up or down on the lift rod. With the breaker in the closed position the distance between the contact cross bar and cross bar bracket should be 1/8 to 5/32 inch. It is important that this dimension be maintained.

These contacts make silver to silver contact and it is unnecessary to use an abrasive to keep them

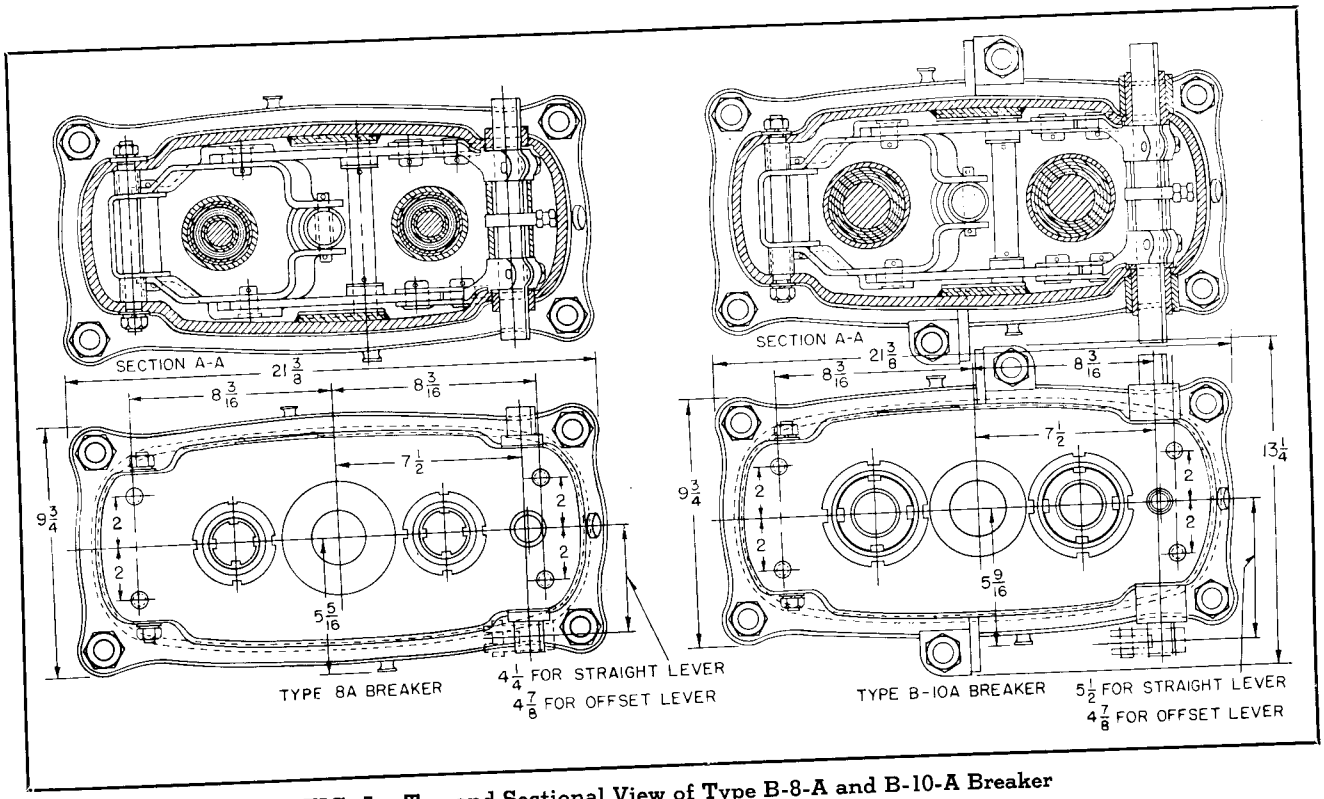
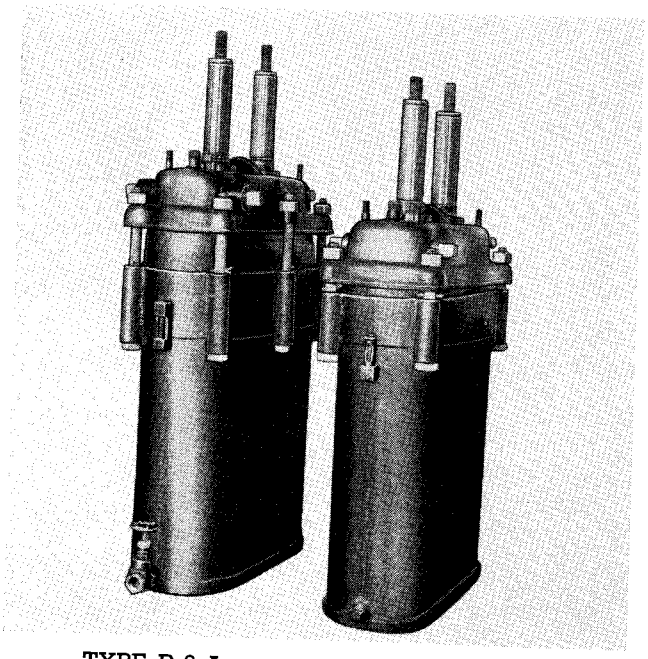


FIG. 5.—Top and Sectional View of Type B-8-A and B-10-A Breaker



TYPE B-8-A TYPE B-10-A

FIG. 6.—Breaker Pole Units

bright. In fitting new contacts it is unnecessary that perfect line contact be obtained. With the soft material (silver) good contact is obtained after a few operations.

The moving contacts are tipped with a special arc resisting tungsten alloy to insure long life.

"De-ion Grid" Stacks—It is important that the arrangement of the plates in the "De-ion Grids" be correct. Should it be necessary to renew parts of the stacks, it is recommended that they be returned to the factory for repair or complete new assembled stacks supplied.

CONNECTIONS TO OPERATING MECHANISMS

When the breaker unit and its operating mechanism are shipped separately it is important that the operating rods between the two units be properly adjusted. The adjustments should be made to meet the toggle setting as given in Fig. 2 or 7.

The adjustment should also be made so that the opening shock is absorbed on the bumpers and not on the operating mechanism.

Terminal Bushings—The surface of the bushing insulation should be smooth and well varnished. If the varnished surface is damaged or questionable, it should be smoothed off with fine sand paper and revarnished with three coats of good quality, clear, air drying Spar varnish. Each coat should be allowed to dry for 24 hours.

OPERATION

Points to be Observed in Operating

1. Before making any adjustment to any oil circuit-breaker, make sure that all lines leading to it are electrically dead.

2. Be sure that the breaker frame is grounded.

3. Do not operate the breaker excessively by the operating mechanism when the oil tanks are removed.

4. Examine all contacts frequently, especially after severe short-circuits. See that the contacts are aligned properly.

5. After making any adjustments, operate the apparatus carefully by hand to make sure that it operates smoothly and correctly.

6. When testing, coat the contacts with a thin film of vaseline.

7. Inspect the oil regularly and after severe short-circuits. If it shows signs of moisture, carbonization of dirt, filter and retest it before replacing it in service. See that the oil level in the tanks is maintained at the proper height. See Fig. 2.

8. Remove all oil and thoroughly clean the tanks, tank liner, lift rod, terminal bushings, etc., at least once a year.

9. Occasionally inspect and tighten clamping nuts around the bushing on top the breaker.

10. Arrange for regular inspection to see that the apparatus is in adjustment as explained.

Insulating Oil—Dielectric tests of the oil should be made every three months, to show if it is reasonably good for circuit-breaker work. Samples should not be taken until the oil has remained undisturbed for at least four hours. In testing for indication of water, take the sample from the bottom through the tank drain. If for indication of carbon, and after a heavy short-circuit, take the sample from the surface of the oil.

Care of Circuit-Breaker Oil—The care of the 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.

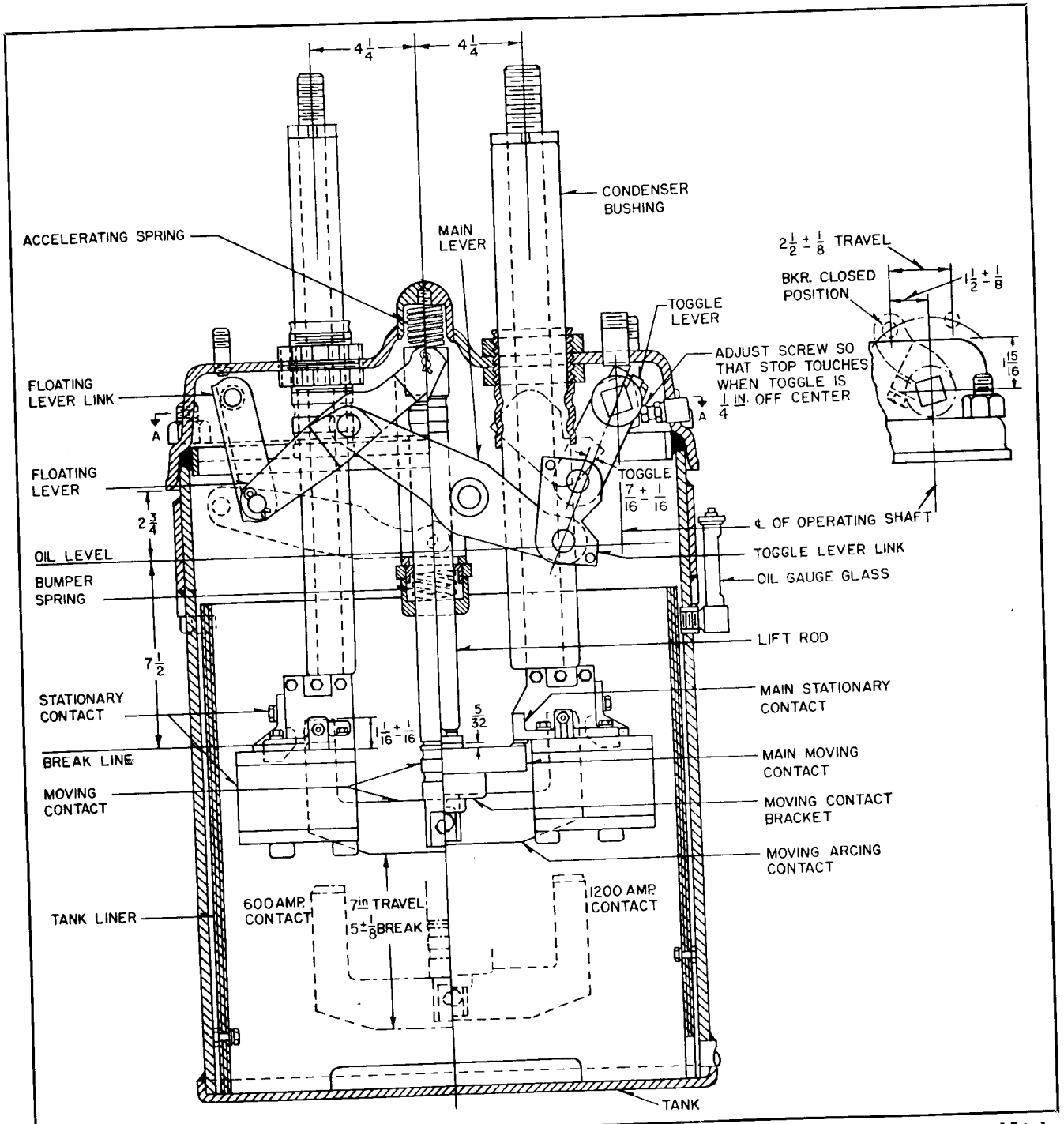


FIG. 7.—Cross Section of Type B-10-A Oil Circuit-Breaker Showing Various Arrangements of Toggle Levers and Links

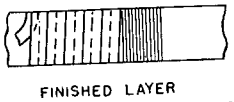
The following instructions should be followed in taping all main connections:-

For maximum safety of the equipment do not fail to complete taping before putting in service.

Wrap with half-lapped layers of .010 in. V. C. tape (W. E. Corp. No. 1266 tan treated fabric) applying as many layers as given in the table below. Apply a coat of No. 3395 insulating varnish between layers.

Tape over the above with one layer of .007 in. cotton tape 7560-1 & wrap the ends with cord to keep them in place. Finish with one coat of black shellac 1133-2 and one coat of black insulating enamel 7260-4.

LAYERS OF HALF-LAPPED V.C. TAPE (SEE TABLE)



FINISHED LAYER
HALF-LAPPED COTTON TAPE CORD OR SEW ENDS TAPING FOR PERMANENT FASTENING OR TAPE WITH FRICTION TAPE

SERVICE VOLTAGE	LAYERS OF V.C. TAPE	"A" CREEPAGE MIN.
750	3	1
5000	8	1½
15000	22	2

FIG. 8.—Instructions for Taping Connections

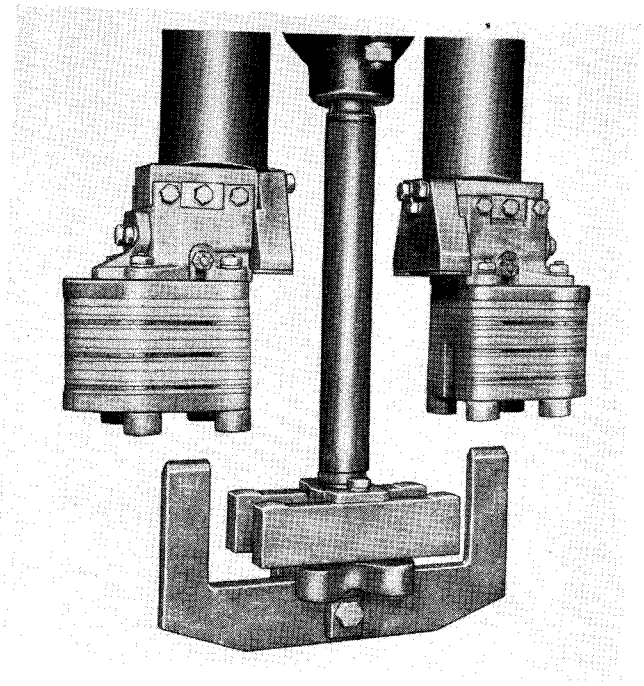


FIG. 9.—Main Contacts

Only the highest grade such as Wemco C or other approved oil should be used in the breakers. The oil should be new or at least thoroughly reconditioned by means of a filter press or centrigufe. 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″ diameter discs spaced .1″ 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. In doing this, rags which will leave lint should not be used as this absorbs and holds moisture.

The same care should be used during inspection or maintenance work on the breaker, which should preferably be done only under favorable weather conditions. 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 the 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.

The above precautions may appear academic to those familiar with the maintenance and operation of oil circuit-breakers, but a little more than ordinary care in oil handling will be well repaid in the reliable and dependable operation for which the breaker is designed and built.

For instructions as to the care and testing of insulating oil, see Instruction Book 44-820-1A.

Operating Mechanisms—For instructions covering the Type SA-3 solenoid mechanism, see Instruction Book 33-600-2.

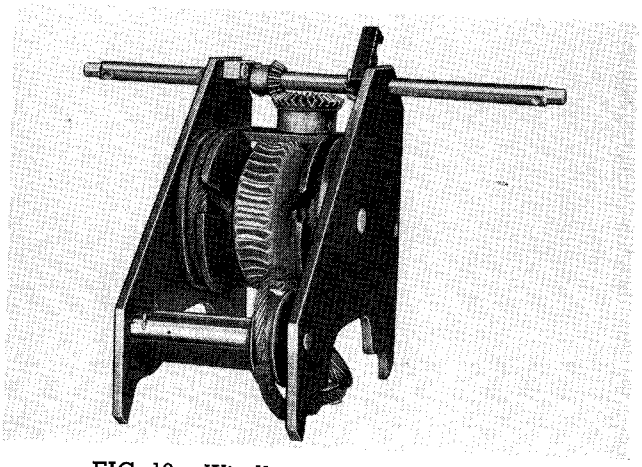
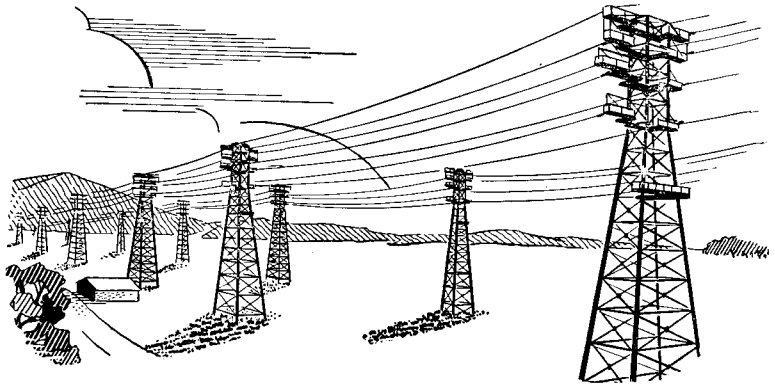


FIG. 10.—Windlass-Type Tank Lifter



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LOS ANGELES 17, CALIF., 600 St. Paul Ave.
LOUISVILLE 2, KY., 332 West Broadway
MEMPHIS 3, TENN., 130 Madison Ave.
MILWAUKEE 2, WIS., 538 N. Broadway
MINNEAPOLIS 13, MINN., 2303 Kennedy St., N. E.
NEWARK 2, N. J., 1180 Raymond Blvd.
NEW ORLEANS 12, LA., 288 St. Charles St.
NEW YORK 5, N. Y., 40 Wall St.
NORFOLK 10, VA., 915 W. 21st St.
PHILADELPHIA 4, PA., 3001 Walnut St.
PHOENIX, ARIZ., 1102 N. 21st Ave., P.O. Box 6144
PITTSBURGH 30, PA., 306 4th Ave.. P.O. Box 1017
PROVIDENCE 3, R. I., 16 Elbow St.
RICHMOND 19, VA., 1110 East Main St.
ROANOKE 4, VA., Kirk Ave., and First St.
ST. LOUIS, MO., 411 North Seventh St.
SALT LAKE CITY 1, UTAH, 235 W. South Temple St.
SAN DIEGO 1, CALIF., 525 E. St.
SAN FRANCISCO 8, CALIF., 410 Bush St.
SEATTLE 4, WASH., 3451 East Marginal Way
SPOKANE 8, WASH., 1023 W. Riverside Ave.
SPRINGFIELD 3, MASS., 26 Vernon St.
SYRACUSE 4, N. Y., 700 W. Genesee St.
TOLEDO 4, OHIO, 245 Summit St.
UTICA, N. Y., 241 N. Genesee St.
WASHINGTON 6, D. C., 1625 K Street, N. W.
WILKES-BARRE, PA., 267 N. Pennsylvania Ave.
YOUNGSTOWN 3, OHIO, 25 E. Boardman St.

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