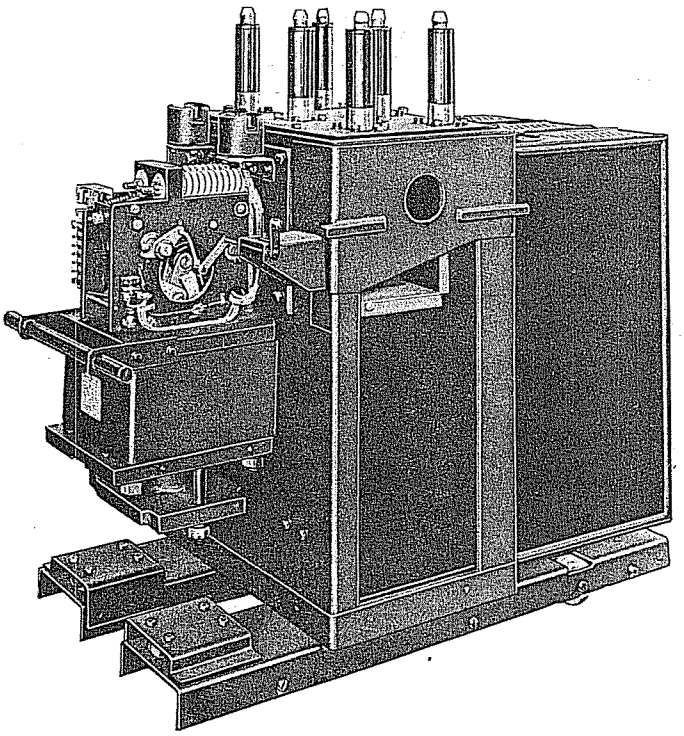
GEI-23949D

INSTRUCTIONS *Switchgear*

POWER CIRCUIT BREAKERS



Magne-blast Breakers

Type AM-15-500-2
1200 and 2000 Amperes
With MS-12 Mechanism

GENERAL ELECTRIC

CONTENTS

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 the General Electric Company.

MAGNE-BLAST AIR CIRCUIT BREAKER

TYPE AM-15-500-2.

WITH MS-12 MECHANISM

INTRODUCTION

The Magne-Blast Air Circuit Breaker shown on the cover is a triple pole single throw breaker with integral operating mechanism and is arranged for application in Vertical Lift Metal Clad Switchgear.

This breaker is available in 1200 and 2000 ampere current ratings and is designed for application at a maximum circuit voltage of 15,000 volts. Within the published interrupting current range, the breaker has an interrupting capacity of 500,000 KVA on a duty cycle basis consisting of two closing-opening operations with a time interval of 15 seconds between them.

The Breaker-Mechanism combination is designed only for electrical closing and the Maintenance Closing Lever is supplied only for use in making adjustments. NEVER ATTEMPT MANUAL CLOSING WITH THE BREAKER IN SERVICE, for under such conditions, sufficient closing force and speed cannot be applied.

RECEIVING, HANDLING AND STORAGE

RECEIVING

Each Circuit Breaker is carefully inspected and then is packed by workmen experienced in the proper handling of electrical switchgear.

Immediately on receipt of a Circuit Breaker, an examination should be made for any damage sustained during shipment. If injury or rough handling is evident, a damage claim should be filed at once with the Transportation Company, and the nearest General Electric Company's Sales Office should be notified promptly.

HANDLING

The breaker should be removed from the crating with sufficient care so that no damage will result from rough handling. It frequently happens that "loose parts" associated with the apparatus are included in the crate. Care should be taken to make certain that these parts are not overlooked.

After the Breaker has been removed from the crating, the brace and steel hooks, holding the Box Barriers in position, should be removed and discarded. The red painted hex, head shipping bolts holding the top of the box barrier to the frame should be replaced by the thumb screws as shown in Fig. 4.

STORAGE

It is advisable that the Breaker be set up immediately, but if it must be stored, it should be kept in a clean dry place, free from corrosive gases or fumes. During construction work, particular care should be taken to protect this apparatus from moisture and cement dust as this combination has very corrosive effects on many parts. All machined parts except those on the contacts should be coated with heavy oil or grease to prevent rusting.

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DESCRIPTION

The Magne-Blast Air Circuit Breaker Type AM-15-500-2 with MS-12 mechanism may be seen in a cross-sectional view in Fig. 4.

They are composed of a solenoid operated mechanism bolted to a fabricated frame; six *Herkolite bushings with ball ends for good contact and easy installation in vertical lift metal clad switchgear; three operating rods of insulating material; three movable contact arms with primary, intermediate and arcing contacts; three stationary contact blocks and the upper arc runner assembly containing the three upper blow-out coils are mounted on the back bushings; the lower arc runner assembly, containing the three lower blow-out coils which are mounted on the arc chute; three moulded plastic "boosters" which supply air for aiding in the interruption of the low values of current; three arc chutes of arc-resisting and insulating material, where the arc is interrupted; and three box barriers, of insulating compound, which segregate the three interrupting units.

INSTALLATION

Outline, wiring and all other drawings relating to dimensions, electrical connections, and control should be on hand so that points in question are readily settled as they arise. Before any installation work is done, consult these drawings and the Instruction Book for the "Metal-Clad Switchgear".

The complete Breaker Mechanism unit has already been assembled, adjusted, inspected and tested at the factory in accordance with the detailed adjustments listed under the section OPERATION. It is possible, however, that unusually rough handling or transportation may have caused some loosening or disturbance of the apparatus to warrant a rechecking and in some cases, readjustment.

Before proceeding, the following precautions should be noted:

PRECAUTIONS

Make certain that all Control Circuits have been de-energized.

Make certain that the Primary Breaker Circuits are open and effectively grounded.

Never work on either the breaker or mechanism while in the closed position unless the Prop and Trip Latch have been wired or blocked to prevent accidental tripping.

INSPECTION

1. Check all nuts, bolts, screws, and cotter pins to make certain that they are properly tightened.

2. Inspect all wiring and make certain that no damage was done during installation. Check all terminals, screws, and connections and test the circuits for possible short circuits or grounds.

3. Position the maintenance closing lever under the solenoid coil as shown in Fig. 5. Push down on the handle to close the breaker. With a screw driver (CAUTION: Keep the finger clear of the linkage as accidental tripping or fast movement could cause severe injury) rotate the prop from under the closing roller pin with maintenance operating handle pushed all the way down, and then raise the handle to open the breaker. Operate in this cycle of slow close and slow open operation several times making certain that all parts are working freely.

4. Check the operating voltage for both the closing coil and trip coil to determine if, with line drop, it is within the limits specified on the nameplate. In the case of a rectifier operated mechanism, the D.C. voltage across the coil terminals with full closing coil current flowing should be 110 volts. Adjustment is possible by means of the tap resistor in the rectifier A.C. line. For detailed description of this adjustment refer to Instruction Book on Copper Oxide Rectifiers for Circuit Breaker Closing Service.

OPERATION

After the breaker has been closed and opened slowly with the maintenance closing lever and the voltage supply for both the closing and the trip coils checked as described under installation, check the following items:

1. The wipe of the primary contacts.
2. The gap between the primary contact fingers and the movable primary contact block with the intermediate contacts just touching.
3. The gap between the intermediate contacts with the arcing contact just touching.
4. The gap between the primary contacts with the breaker in the open position.
5. The latch wipe.
6. The prop clearance.
7. The latch clearance.
8. The plunger clearance.

All these dimensions are given under adjustments.

The MS-12 solenoid mechanism is trip free and will operate satisfactorily over the standard ranges for closing and tripping voltages as discussed below.

For electrical operation, control power may be from either an Alternating or Direct Current source. In the case of Alternating Current, it is necessary to use a Copper-Oxide Rectifier to supply the Direct Current required by the closing coil.

Operating ranges are given on the mechanism nameplate. Ordinarily, standard ranges apply and are as follows:

STANDARD CLOSING & TRIPPING VOLTAGE RANGE

Nominal Voltage	Closing Range	Tripping Range
125 V.DC.	90-130 V.DC.	70-140 V.DC.
250 V.DC.	180-260 V.DC.	140-280 V.DC.
230 V.AC.	190-250 V.DC.	190-250 V.AC.

PRINCIPLES OF OPERATION

The Magne-Blast Circuit Breaker utilizes magnetic forces produced by the load current through the blow-out coils to interrupt the arc. These magnetic forces together with an air stream from the "boosters" drives the arc from the contacts out along the diverging arc runners into the interleaving arc chutes. The tapered fins that project alternately from the two opposite inner surfaces of the chute deflect the arc into a gradually deepening serpentine path. This lengthening and consequent cooling action rapidly increases the electrical resistance of the arc to cause interruption. Hot exhaust gases are cooled while passing through the muffler at the end of the arc chute. Easily removable box barriers encase each phase separately, segregating the interrupting units and providing insulation between phases and from each phase to the grounded frame.

For following closing tripping and trip-free operation Fig. 4 may be readily consulted.

When the solenoid coil is energized, the armature is driven upwards and the plunger rod threaded into the armature raises the roller carried by the set of links fastened to the operating crank. This action rotates the crank and closes the breaker contacts. After the armature and linkage have reached the end of their travel, a prop rotates into position under each end of the pin through the roller and the mechanism is held in the closed position. The solenoid coil is de-energized by the relay which is actuated by the cut-off switch at the end of the armature stroke, and the armature is returned by gravity to its original position.

When the trip coil is energized, the trip plunger forces the latch off of the roller causing the linkage to collapse which allows the opening springs to rotate the main crank and open the contacts. During the opening stroke, auxiliary switch contacts open to interrupt the trip coil circuit. After the breaker is open, the mechanism linkage returns to its normal position, and a spring resets the trip latch.

In case the trip coil is energized while the breaker is closing, the trip plunger forces the latch off the trip roller allowing the mechanism linkage to collapse and the breaker to re-open. The armature completes its closing stroke, however, and the coil is de-energized as in a normal closing operation.

When the breaker is tripped under load or short circuit conditions, the opening springs act to swing the contact arms downward, parting first the primary contacts, then the intermediate contacts, and then the arcing contacts. The arc is then transferred to the arc runners and, as described before, into the arc chute where it is interrupted.

ADJUSTMENTS

Adjustments described herein should be referred to not only during placement of breaker in service but also during periodic inspection of the breaker and should be followed whenever it becomes necessary to repair or replace parts that have become worn or defective in service.

Instructions for the replacement of parts will be found under the later heading of **MAINTENANCE**.

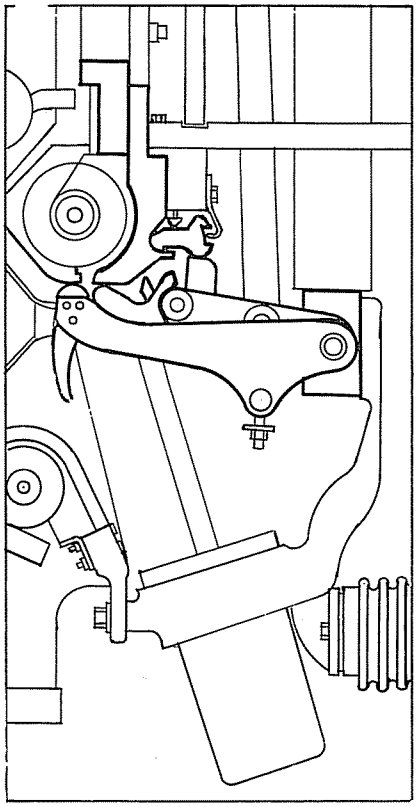

Fig. 1 Contacts Shown in Fully Closed Position

Primary Contacts (Fig. 1 and 4)

On closing the breaker, the primary contact fingers should raise 3/16" to 9/32". This can be adjusted by means of the operating rod adjusting screw. To adjust, open the breaker, and after removing the cotter pin in one end of the shaft through the top of the operating rods, slide the shaft free of the rod to be adjusted. Loosen the check nut on the operating rod adjusting screw and shorten the screw to increase the primary contact travel (1/2 turn of the eyebolt gives approximately 5/64" change in the contact). Replace the check nut, shaft, cotter pin, and close the breaker to check the adjustment.

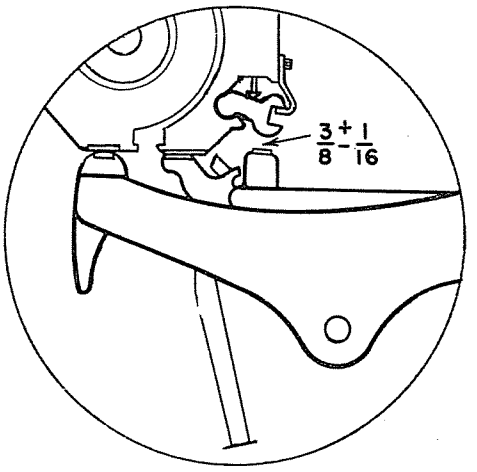

Fig. 2 Primary Contact Gap with Intermediate Contact Just Touching

Intermediate Contacts (Fig. 2)

Close the breaker until the intermediate contacts first touch. The gap between the primary contact fingers and the movable primary contact block should be 5/16" to 7/16". This dimension has been set in the factory and no adjustment is provided. If enough material has been eroded away to make this clearance too small, the contacts should be replaced.

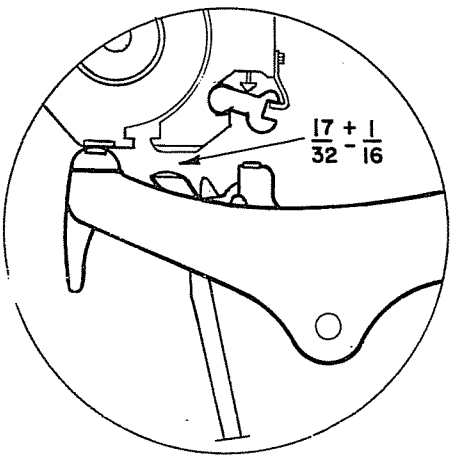

Fig. 3 Intermediate Contact Gap with Arcing Contacts Just Touching

Arcing Contacts (Fig. 3)

Close the breaker until the arcing contacts just touch, the gap at the intermediate contacts should be 15/32" to 19/32". Also the gap at the primary contacts should be approximately 11/16" to 13/16". The arcing contacts have been set in the factory and no adjustment is provided. If enough material has been eroded away to make this clearance too small, the contacts should be replaced.

Contact Gap

With the breaker tripped from the closed position, the gap between the primary contacts should be 4" or over. To increase this gap, close the breaker part way and remove a shim from under the two opening buffers located one on either side of the breaker frame on the inside near the top. Note: A change in this adjustment may require changes in the adjustment of the plunger rod in the mechanism as described later.

Latch Wipe (Fig. 5)

The wipe of the latch on the trip roller should be from 3/16" to 1/4". This can be determined easily by putting a film of grease on the latch, closing the breaker part way, and tripping. To adjust, add or remove washers under the head of the stop bolt located near the top of the latch on the trip coil frame.

Prop Clearance (Fig. 5)

With the breaker closed as far as possible with the manual handle, the clearance of the pin through the closing roller over the prop should be 1/32" to 5/64". This can be adjusted by dropping the closing coil and screwing the plunger rod into or out of the armature. Note: Two set screws are used to lock the plunger rod in position in the armature. If the rod adjustment is changed, the rod must be spotted in the correct position and the set screws replaced.

Latch Clearance (Fig. 5)

The clearance between the trip latch and roller with the breaker open should be approximately 1/16". This can be adjusted by means of the stop bolt in the front of the mechanism frame near the bottom. The lock nut should be fastened securely if any adjustment has been made.

Plunger Clearance

With the breaker in the open position, there should be at least 1/8" clearance between the plunger and closing roller. To increase this clearance, the nuts used to limit the downward travel of the armature bottom plate should be lowered.

After the foregoing items have been checked and any adjustments that may have been required are completed, the breakers may be placed in service.

MAINTENANCE

Dependable service and safety of power distribution equipment is based on the unfailing performance of the circuit breaker.

To maintain such service, it is recommended that a definite schedule be set up and adhered to for the purpose of properly lubricating the wearing parts. A dependable and observing attendent can be expected to forestall mishaps by reporting loosened nuts, scored surfaces, and other evidences of possible trouble.

In addition, but at less frequent intervals periodic inspection should be made at which time the apparatus should be given such servicing as may be found desirable or necessary. In case of highly repetitive operation it is recommended that the first Periodic Inspection be made after not more than 500 operations to determine whether there has been any loosening up of parts. The interval between later Periodic Inspections should depend on operating conditions and should be determined by experience.

PERIODIC INSPECTION

At this time a thorough inspection should be made of all parts of the breaker and mechanism.

Contacts

After removing the box barriers, the contacts on the two outside phases can readily be inspected. The contacts on the center phase can be seen with the aid of a mirror and flashlight. If the contacts are in good condition, there is no need of removing the arc chute. If, however, the surfaces of the contacts need smoothing up with a fine file or sand paper, the arc chutes can be removed as described under the heading REPLACEMENT OF PARTS.

Arc Chute

If the arc chutes are removed for contact maintenance, and are for any reason disassembled for inspection, the following points should be noted:

1. Scale formed over the surface of the chute must not be removed but loose particles collected in the muffler should be blown out.

2. Cracks which have formed in the fins of the arc chute are to be expected in ceramic materials of this type when subjected to the severe heat of an arc. These cracks do not interfere with the operation of the device in any way and should be disregarded. If the chute has had any mechanical injury due to dropping or accidental striking which has resulted in actual breaking off of fins, replacement of the chute is necessary.

Insulation Parts

The insulation parts on the breakers should be kept clean and dry. Smoke or dust collected between inspection periods should be wiped off, and if dampness is apparent, heater should be installed to insure dryness.

Bushings

The surface of the bushings should be smooth and unscratched. If the insulation surface should

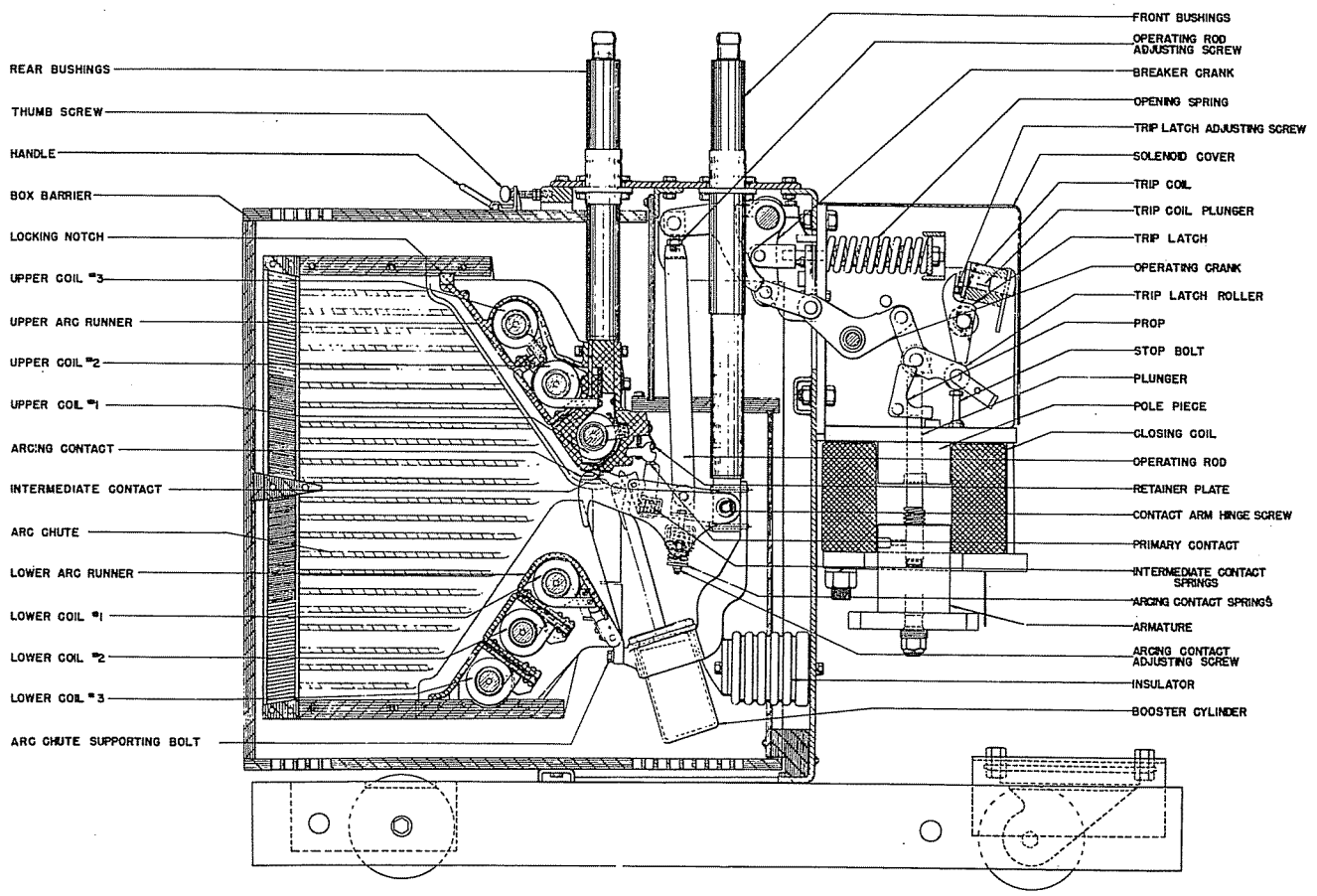

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FIG. 4
CROSS SECTION VIEW OF MAGNE-BLAST AIR CIRCUIT BREAKER TYPE AM-15-500-2 & AM-15-250-2

AHP

become damaged, it should be well cleaned and then re-touched with either 1170 clear varnish or 1202 (clear) or 1210 (brown) glyptal. Allow to dry smooth and hard.

Mechanism

Careful inspection should be made to check for loose nuts or bolts and broken cotter pins. The latch surface should be inspected for wear and the surfaces of the rollers should be inspected for chipping or other evidences of damage.

LUBRICATION

At regular maintenance periods, use machine oil SAE-20 or 30 on bearings. Wipe ground surfaces clean and apply a thin coat of G.E. Lubricant D50H15. When disassembling the breaker, or when operation becomes sluggish, proceed as follows: Remove pins from bearings and, to remove the old oxidized grease from the parts, soak in kerosene or a similar cleaner. Do not use carbon-tetrachloride. If the grease in the bearings is badly oxidized, use alcohol for removal. Spin the bearings in clean machine oil until the cleaner is removed. Allow this oil to drain and repack immediately with G.E. D50H15. D50H15 is available only in cartons containing 12 collapsible tubes.

REPLACEMENT OF PARTS

Before maintenance or replacement of contacts, the arc chutes must be removed.

Arc Chute Removal (Fig. 6)

If an arc chute lifter is available, Fig. 6, it should be attached to the frame of the breaker, and with the tongs inserted in the holes in the arc chute braces, adjusted to support the weight of the arc chute. The arc chute supporting bolt, and the three bolts through the cover of the blowout coils should be removed. The arc chute should now be raised to clear the locking notch on the end of the upper runner, and the chute withdrawn away from the breaker. If necessary, the two bolts at the top tieing the side braces together should be loosened but not removed.

To remove plastic cover over bolt heads turn counterclockwise using a gas pipe pliers. These covers are spotted lightly with glyptal for shakeproofing. If they break, they should be replaced as soon as possible.

Primary Contacts

The primary contacts are designed to carry the normal load current with a minimum amount of heating and are provided with an inlaid block of silver to minimize the effects of wear. The stationary contacts consist of fingers mounted along with associated springs and stop plate on the support casting carried by the rear bushing. The fingers may be replaced individually, or as is usually the case, the assembled casting may be replaced.

The movable primary contact is carried on the blade hinged at the front bushing. To replace because of wear or because of burning on the intermediate contact also carried by the blade, the following steps should be followed:

(a) Remove the dust cover from the top of the booster cylinder.

(b) Remove the cotter pins in the pin fastening the lower end of the operating rod to the primary contact blade and slide the pin through the holes in the arcing contact side flanges.

(c) Remove the bolt, springs and thimbles at the blade hinge being careful not to lose the rings between the arcing contact and primary contact blades.

(d) Close the breaker part way with the maintenance operating lever and withdraw the contact blade and puffer assembly.

Reassemble the replacement parts making certain that the rings are replaced between the primary contact and arcing contact side flanges and that all cotter pins are replaced. If a new hinge bolt has been used, or if it seems desirable for any other reason, the pressure at the hinge joint should be checked by measuring with a spring balance the force required to swing the contact arm. This torque should be between 40 and 60 pound-inches.

Intermediate Contacts

The movable part of the intermediate contacts is carried by the primary contact blade and may be replaced as described under Primary Contacts. The Stationary intermediate contact is the lower face of the primary finger support casting as previously described under Primary Contacts.

Arcing Contacts

The movable arcing contact is hinged at the front bushing and is removed along with the Primary Contact Blade as previously described under Primary Contacts.

The stationary arcing contact is carried by the first section of the upper arc runner. To remove this, the lead fastening the first blowout coil to the primary contact casting should be removed, and the bolts passing through the lower end of the rear bushing to support the runner assembly should be removed. With the upper runner assembly removed, the first section of the runner can be replaced. On reassembly of the runner assembly or the bushing, care must be taken to replace all insulation in the proper position.

RENEWAL PARTS

It is recommended that sufficient renewal parts be carried in stock to enable the prompt replacement of any worn, broken, or damaged parts. A stock of such parts minimizes service interruptions

caused by breakdowns, and saves time and expense. When continuous operation is a primary consideration, more renewal parts should be carried, the amount depending upon the severity of the service and the time required to secure replacements.

A complete list of renewal parts is contained in Renewal Parts Bulletin GEF-3567. Those parts subject to wear in ordinary operation, and to damage or breakage due to possible abnormal conditions, are marked as recommended renewal parts.

Ordering Instructions

When ordering renewal parts, address the nearest General Electric sales office, specify the quantity required, and give the catalog number from the renewal parts bulletin.

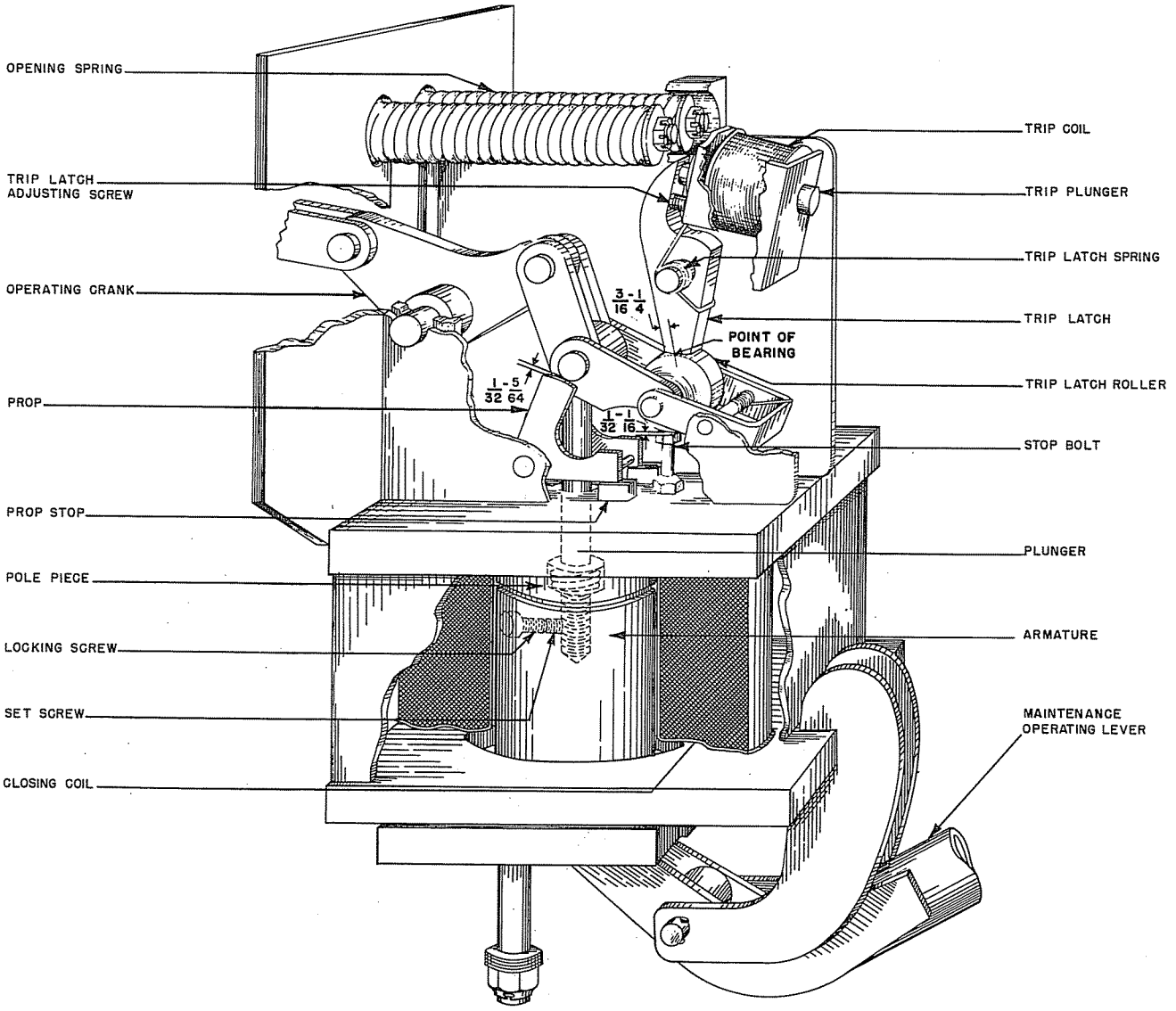

FIG. 5

CUTAWAY VIEW OF MS-12 SOLENOID MECHANISM SHOWN IN CLOSED POSITION

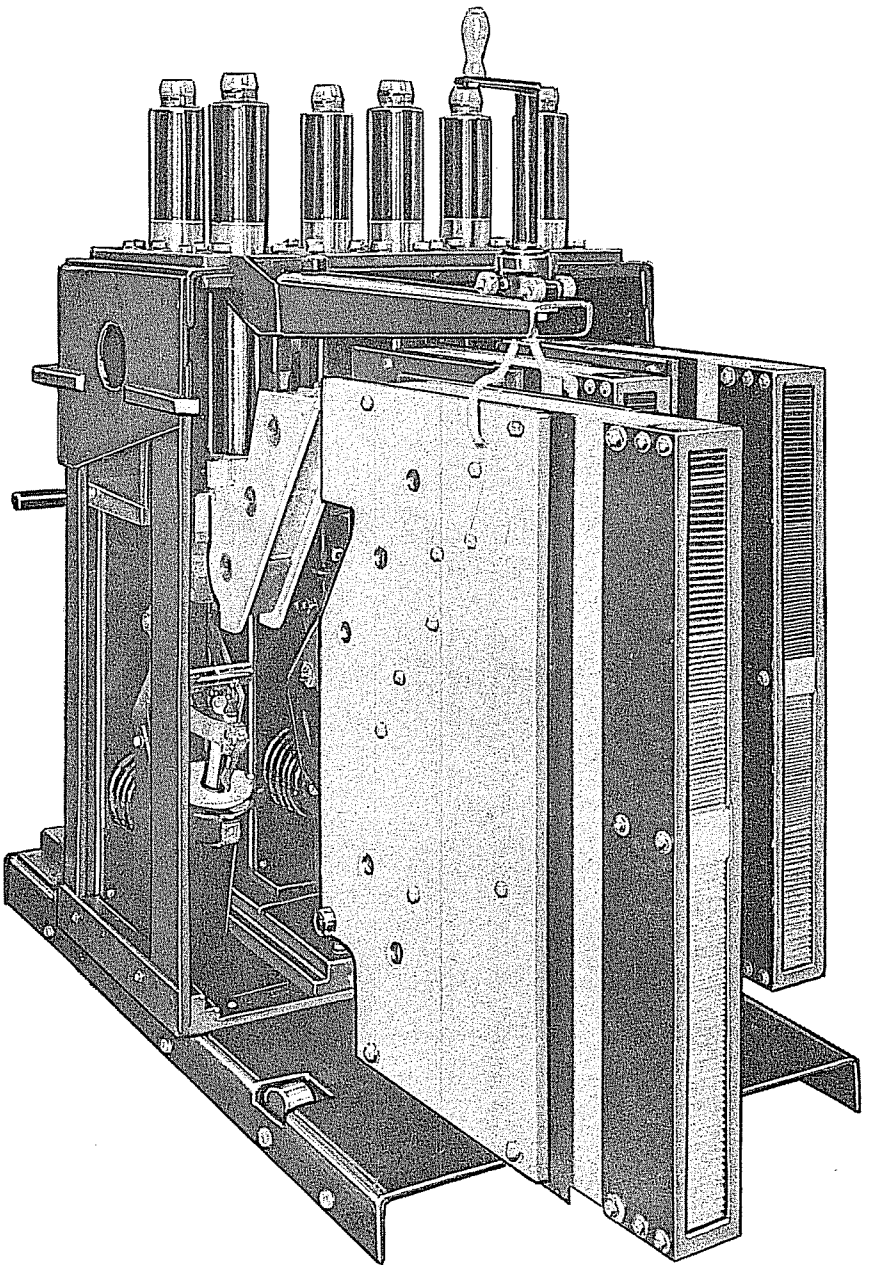

FIG. 6
MAGNE-BLAST AIR CIRCUIT BREAKER AM-15-500-2 WITH ARC CHUTE LIFTER SHOWN IN POSITION FOR USE IN THE REMOVAL OF AN ARC CHUTE

WHEN YOU NEED SERVICE

GEZ-85R

IF YOU NEED TO REPAIR, recondition, or rebuild any electric apparatus, a G-E service shop near you is available day and night, seven days a week, for work in the shops or on your premises. Latest factory methods and genuine G-E renewal parts are used to maintain the original performance of your G-E equipment. For full information about these services, contact the nearest service shop or sales office listed below:

APPARATUS SERVICE SHOPS

Atlanta—Chamblee, Ga.....4639 Peachtree Indus. Blvd.
Baltimore 30, Md.....920 E. Fort Ave.
Boston—Medford 55, Mass.....Mystic Valley Pkwy.
Buffalo 11, N. Y.....318 Urban St.
Charleston 28, W. Va..306 MacCorkle Ave., S.E.
Charlotte, N. C.....2328 Thrift Road
Chicago 80, Ill.....849 S. Clinton St.
Cincinnati 2, Ohio.....444 W. Third St.
Cleveland 4, Ohio.....4966 Woodland Ave.
Columbus 15, Ohio.....213 Cozzens St.
Dallas 9, Texas.....3202 Manor Way
Denver 5, Colo.....3353 Larimer St.
Detroit 2, Mich.....5950 Third Ave.
Houston 20, Texas..5534 Harvey Wilson Drive
Johnstown, Pa.....841 Oak St.
Kansas City 8, Mo.....819 E. 19th St.
Los Angeles 1, Calif.....6900 Stanford Ave.
Milwaukee 3, Wisc.....940 W. St. Paul Ave.
Minneapolis 12, Minn.....2025 49th Ave., N.
New York 14, N. Y.....416 W. 13th St.
Philadelphia 23, Pa.....429 N. Seventh St.
Pittsburgh 6, Pa.....6519 Penn Ave.
Portland 18, Oregon....2727 N.W. 29th Ave.
Richmond 24, Va.....1403 Ingram Ave.
St. Louis 10, Mo.....1115 East Road
San Francisco 3, Calif.....1098 Harrison St.

For service outside the United States, Canada, and Hawaii, consult the nearest office of the International General Electric Company.

Salt Lake City 4, Utah..301 S. Seventh West St.
Seattle 4, Wash.....3422 First Ave., S.
Spokane 3, Wash.....S. 155 Sherman St.
Toledo 4, Ohio.....1 So. St. Clair St.
York, Pa.....54 N. Harrison St.
Youngstown 5, Ohio....272 E. Indianola Ave.

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Abilene, Texas.....442 Cedar St.
Akron 8, Ohio.....335 S. Main St.
Albany 7, N. Y.....90 State St.
Albuquerque, N. Mex.....323 Third St., S.W.
Alexandria, La.....720 Murray St.
Allentown, Pa.....1014 Hamilton St.
Amarillo, Texas.....719 Amarillo Bldg.
Appleton, Wisc.....531 W. College Ave.
Atlanta 3, Ga..Peachtree Rd. at 28th St., N.W.
Augusta, Ga.....423 Masonic Bldg.
Augusta, Me.....15 Grove St.
Bakersfield, Calif.....211 E. 18th St.
Baltimore 1, Md.....111 Park Ave.
Bangor, Maine.....77 Central St.
Battle Creek, Mich.....25 W. Michigan Ave.
Beaumont, Texas.....1385 Calder Ave.
Binghamton, N. Y.....19 Chenango St.
Birmingham 3, Ala.....1804 Seventh Ave., N.
Bismarck, N. Dak.....117½ Fifth St.
Bluefield, W. Va. P.O. Box 447, Appalachian Bldg.
Boston 1, Mass.....140 Federal St.
Buffalo 3, N. Y.....535 Washington St.
Butte, Mont..P.O. Box 836, 103 N. Wyoming St.
Canton 2, Ohio.....700 Tuscarawas St., W.
Cedar Rapids, Iowa.....210 Second St., S.E.
Charleston 28, W. Va..306 MacCorkle Ave., S.E.
Charlotte 1, N. C.....112 S. Tryon St.
Charlottesville, Va.....123 E. Main St.
Chattanooga 2, Tenn.....832 Georgia Ave.
Chicago 80, Ill..P.O. Box 5970A, 840 S. Canal St.
Cincinnati 2, Ohio.....215 W. Third St.
Cleveland 4, Ohio.....4966 Woodland Ave.
Columbia 1, S.C..P.O. Box 1434, 1420 Lady St.
Columbus 15, Ohio.....40 S. Third St.
Corpus Christi, Texas.....205 N. Chaparral
Dallas 2, Texas.....1801 N. Lamar St.
Davenport, Iowa.....511 Pershing Ave.
Dayton 2, Ohio.....118 W. First St.
Denver 2, Colo.....650 Seventeenth St.
Des Moines 9, Iowa.....505 W. Fifth Ave.
Detroit 2, Mich.....700 Antoinette St.
Duluth 2, Minn.....14 W. Superior St.
Elmira, N. Y.....Main and Woodlawn Aves.
El Paso, Texas.....109 N. Oregon St.
Erie, Pa.....1001 State St.
Eugene, Ore.....29 W. Eleventh St.
Evansville 19, Ind.....123 N.W. Fourth St.
Fairmont, W. Va.....310 Jacobs Bldg., P.O. Box 1626
Fergus Falls, Minn.....108 N. Court Ave. P.O. Box 197
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Fort Wayne 2, Ind.....127 W. Berry St.
Fort Worth 2, Texas.....408 W. Seventh St.
Fresno 1, Calif.....407 Patterson Bldg. Tulare and Fulton St.
Grand Rapids 2, Mich..148 Monroe Ave., N.W.
Greensboro, N. C.....301 S. Elm St.
Greenville, S. C.....108 W. Washington St.
Hagerstown, Md.....Professional Arts Bldg.
Harrisburg, Pa.....300 N. Second St.
Hartford 3, Conn.....410 Asylum St.
Houston 1, Texas.....1312 Live Oak St.
Huntsville, Ala.....1107 Times Bldg.
Indianapolis 4, Ind.....110 N. Illinois St.
Jackson, Mich.....120 W. Michigan Ave.
Jackson 1, Miss.....203 W. Capitol St.
Jacksonville 2, Fla.....700 E. Union St.
Jamestown, N. Y...P.O. Box 548, 2 Second St.
Johnson City, Tenn....321-323 W. Walnut St.
Johnstown, Pa.....841 Oak St.
Joplin, Mo..P.O. Box 931, 220½ W. Fourth St.
Kansas City 6, Mo.....106 W. Fourteenth St.
Knoxville 08, Tenn.....602 S. Gay St.
Lansing 8, Mich.....106 W. Allegan St.
Lexington, Ky.....First National Bank Bldg.
Lincoln 8, Nebr.....1001 "O" St.
Little Rock, Ark.....103 W. Capitol Ave.
Los Angeles 54, Calif.....212 N. Vignes St.
Louisville 2, Ky.....455 S. Fourth St.
Macon, Ga.....682 Cherry St.
Madison 3, Wisc.....16 N. Carroll St.
Manchester, N. H.....875 Elm St.
Medford, Ore., P.O. Box 1349, 205 W. Main St.
Memphis 3, Tenn.....8 N. Third St.
Miami 32, Fla.....25 S.E. Second Ave.
Milwaukee 3, Wisc.....940 W. St. Paul Ave.
Minneapolis 3, Minn.....12 S. Sixth St.
Mobile 13, Ala.....54 St. Joseph St.
Montgomery 4, Ala.....205 Montgomery St.
Nashville 3, Tenn.....234 Third Ave., N.
Newark 2, N. J.....744 Broad St.
New Haven 6, Conn.....129 Church St.
New Orleans 12, La.....837 Gravier St.
New York 22, N. Y.....570 Lexington Ave.
Niagara Falls, N. Y.....253 Second St.
Norfolk 10, Va.....229 W. Bute St.
Oakland 12, Calif.....409 Thirteenth St.
Oklahoma City 2, Okla....119 N. Robinson St.
Omaha 2, Nebr.....409 S. Seventeenth St.
Paducah, Ky...P.O. Box 1001, 231 S. Fourth St.
Pasco, Wash.....421 W. Clark St.
Peoria 2, Ill.....309 Jefferson Bldg.
Philadelphia 2, Pa.....1405 Locust St.
Phoenix, Ariz..P.O. Box 4037, 303 Luhrs Tower
Pittsburgh 22, Pa.....535 Smithfield St.
Portland 3, Maine.....477 Congress St.
Portland 7, Ore.....920 S.W. Sixth Ave.
Portsmouth, Ohio..P.O. Box 37, 721 Sixth St.
Providence 3, R. I.....Industrial Trust Bldg.
Raleigh, N. C.....336 Fayetteville St.
Reading, Pa.....31 N. Sixth St.
Richmond 17, Va.....700 E. Franklin St.
Riverside, Calif.....3808 Main St.
Roanoke 16, Va.....920-924 S. Jefferson St.
Rochester 4, N. Y.....89 E. Ave.
Rockford, Ill.....110 S. First St.
Rutland, Vt.....38½ Center St.
Sacramento 14, Calif.....626 Forum Bldg.
Saginaw, Mich.....501 Bearinger Bldg.
St. Louis 2, Mo.....112 N. Fourth St.
Salt Lake City 9, Utah.....200 S. Main St.
San Antonio 5, Texas....310 S. St. Mary's St.
San Diego 1, Calif.....1240 Seventh Ave.
San Francisco 6, Calif....235 Montgomery St.
San Jose 10, Calif.....460 Park Ave.
Savannah, Ga.....4 E. Bryan St.
Seattle 4, Wash.....710 Second Ave.
Shreveport, La.....910 Shelby Bldg.
Sioux City 13, Iowa..572 Orpheum Electric Bldg.
Sioux Falls, S. D.....306 South Phillips Ave.
South Bend 1, Ind.....112 W. Jefferson Blvd.
Spokane 8, Wash.....S. 162 Post St.
Springfield, Ill.....607 E. Adams St.
Springfield 3, Mass.....1387 Main St.
Stockton, Calif.....11 So. San Joaquin St.
Syracuse 2, N. Y.....113 S. Salina St.
Tacoma 1, Wash.....1202 Washington Bldg.
Tampa 6, Fla.....1206 North A St.
Toledo 4, Ohio.....420 Madison Ave.
Trenton 8, N. J.....214 E. Hanover St.
Tulsa 3, Okla.....320 S. Boston Ave.
Tucson, Ariz..P.O. Box 710, 650 N. Sixth Ave.
Utica 2, N. Y.....258 Genesee St.
Washington 5, D.C.....777–14th St., N.W.
Waterbury 89, Conn.....111 W. Main St.
Waterloo, Iowa.....206 W. 4th St.
Wenatchee, Wash...328 N. Wenatchee Ave.
Wheeling, W. Va.....40 Fourteenth St.
Wichita 2, Kan.....200 E. First St.
Williamston, N. C.....115 E. Main St.
Wilmington 98, Del.....1326 N. Market St.
Worcester 8, Mass.....507 Main St.
York, Pa.....56 N. Harrison St.
Youngstown 5, Ohio....272 E. Indianola Ave.

Hawaii: American Factors, Ltd., P. O. Box 3230, Honolulu 1 **Canada: Canadian General Electric Company, Ltd., Toronto**

GENERAL ELECTRIC

4-54

Printed in U.S.A.

Supersedes GEI-23949C