INSTRUCTIONS

for the Installation, Care and Operation of Circuit Breakers and Accessories

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TYPE MCT-1 TEST DEVICE
(SPECIAL FOR CONSOLIDATED EDISON)

BOOK BWX-6693 -1 Blue Print Record

These instructions are not intended to cover all details or variations that may be encountered in connection with the installation, operation, and maintenance of this equipment.
Should additional information be desired contact the Allis-Chalmers Mfg. Company.

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GROUND & TEST DEVICE OPERATING INSTRUCTIONS

A. TESTING FEEDER FOR BACKFEED; GROUNDING OF FEEDER

1. Insert G & T device into cubicle. Rack G & T device into connect position.
2. Remove Key #24 from interlock #24 and insert key into interlock #25.
3. Push P.T. handle, connecting P.T.'s to feeder.
4. Check P.T. lights for backfeed.

   NOTE: If feeder is alive inform D.O. Follow D.O.'s orders.

5. If feeder is deenergized, open P.T. switch by pulling out P.T. handle.
6. Remove key from interlock #25 and hang key on hook provided.
7. Press latch lever #27.
8. Close AC & DC supply switches on operating panel.
9. Close G & T device electrically from control panel. - Feeder is now grounded.

B. FEEDER TESTING - HIGH VOLTAGE OR LOW VOLTAGE

10. To open ports for test probes, turn key in interlock #27, remove key #27.
11. Insert key #27 into interlock #28.
12. Take key #25 and insert into interlock #26.
13. Turn key in interlock #26, thus permitting all test ports to be opened.
14. Insert high tension or low tension test probes (depending on test required) into openings.
15. Lock-in probes by sliding panel to right and turning interlock key #29. Ascertain test leads are connected to test set.
16. To open G & T device, insert key #29 into interlock #27. Turn key to free interlock.
17. Turn key in interlock #27.
18. Lift up latch #27.
19. Trip G & T device electrically from control panel.

C. TO REMOVE TEST PROBES; DISCONNECT G & T DEVICE

1. Push in latch #27.
2. Close G & T device electrically from control panel. (This grounds the feeder).
3. Lock interlock #27 and remove key #27.
4. Insert key #27 into interlock #29.
5. Turn key in interlock #29, unlocking test probes.
6. Remove test probes.
7. After probes have been removed, close ports and turn key in interlock #26.
8. Remove key from interlock #28 and insert same key into interlock #27.
9. Turn key in interlock #27, releasing lock on G & T device.
10. Lift up latch #27.
11. Trip G & T device electrically from control panel, Open AC & DC supply switches.
12. Remove key from interlock #26 and insert same key into interlock #24. Turn key in interlock #24 to withdraw bolt.
13. Rack out G & T device from cubicle.

DESCRIPTION

SOLENOID OPERATOR (Fig. 4)

The breaker is equipped with a solenoid operator which is an integral part of the breaker unit. It is mounted in the lower section of breaker and is contained within the breaker frame. The operator is furnished with a mechanically trip-free mechanism consisting of a toggle linkage so designed as to provide quick and positive tripping at any position of the closing stroke. The mechanism is of low inertia, capable of quick acceleration and is equipped with a low energy trip device and opening coil, designed to provide high speed release of the trip mechanism upon energization of the trip coil.

CONTACT PRESSURE OF INSULATING SWITCH CONTACT BLADES (Fig. 7)

The contact pressure of the isolating switch contact blades should be adjusted with reference to Figure 7. Proper adjustment is obtained when the hinge joint will require a pull of 6 to 10 pounds to move the contacts toward the open position. To measure the pounds pull, the disconnect (3-53) is detached from operating rod (1-244) by removing pin (1-243) and moved to a position just short of contact make. A spring scale attached at the arcing contact radius may be used to measure pull. The pull must be made approximately perpendicular to the contact. Adjustment is made by positioning the "Stover" locknut (7-104) on cap screw (7-109) until the pull registers 6 to 10 pounds. Where "Stover" locknuts have been "staked" in position they should be restaked after any change in adjustment to insure permanence of setting.

TOGGLE SETTING (Fig. 4)

With the breaker closed and armature (4-210) against pole head (4-207), the armature must push the toggle roll (4-230) to a point which will provide a clearance of 1/32" plus or minus 1/64" with the prop latch (4-198), but must not push the toggle roll solid against the kick-off arm (11-163). When the breaker is in the open position, the clearance between the toggle roll (4-230) and the armature cap (4-204) should be a minimum of 1/8".

OPERATOR MECHANISM MAIN LATCH AND PROP LATCH (Fig. 4)

The main operator latch (4-141) is in proper adjustment when the latch roll (4-229) engages it at a point 3/16" + 0, - 1/16" from the bottom edge of the latch face. Changes in adjustment are made by positioning stop screw (9-142). The latch roll stop screw (4-224) should be positioned such that the latch roll will have a clearance of 1/32" plus or minus 1/64" between the stop screw and the latch face. The prop latch (4-198) is normally adjusted such that it engages the toggle roll (4-230) at a point 1/8" + 1/16" - 0" from the bottom edge of the latch. Adjustment is made by using spacers (4-199). Latch adjustments, once properly made, are permanent in nature and will not normally require readjustment in service.

AUXILIARY SWITCH (Fig. 2 & 5)

The auxiliary switch, located on the lower right side of breaker has been adjusted at the factory and as normal installations should not require further

DESCRIPTION OF INTERLOCKS

KEY INTERLOCKS

Interlock 24 - Al Interchange

Key removable with bolt extended to lock ground and test device in cubicle. Coordinates with interlocks 25 and 26.

Interlock 25 - Al Interchange

Key removable with bolt extended to lock P.T. disconnect in open position. Coordinates with interlocks 24 and 26.

Interlock 26 - Al Interchange

Part of multiple interlock with interlock 28. Key removable with bolt extended to lock test port door in closed position. Prohibits exposing test ports unless P.T. disconnect is locked open and device is locked in cubicle. Coordinates with interlocks 24 and 25.

Interlock 27 - A2 Interchange

Key removable with bolt extended to lock ground switch in closed position. Coordinates with interlocks 28 and 29. Also contains two contacts (52C-1 and 52T-1) which are open with bolt extended (ground switch closed) to prevent tripping by control switch and to prevent energizing the closing solenoid.

Interlock 28 - A2 Interchange

Key removable with bolt extended to lock test port door in closed position. Part of multiple interlock with interlock 26. Prohibits exposing test ports unless grounding contacts are closed. Coordinates with interlocks 27 and 29.

Interlock 29 - A2 Interchange

Key removable with bolt extended to lock test probes in position. Prohibits ungrounding of circuit unless test probes are locked in place. Coordinates with interlocks 27 and 28.

MECHANICAL INTERLOCKS

Test Probe Interlocks

Prohibits moving test port door to probe locked position unless all three probes are fully inserted.

Manual Close Locking Bar

Prohibits inserting device in cubicle unless manual closing linkage is made inoperative.

AUXILIARY SWITCH (continued)

adjustments, care should be exercised in making any changes. However, before the breaker is placed in service a check should be made to see that the crank arm (5-14) throws approximately equal distances on either side of a horizontal centerline. The adjustment for throw of lever is made by positioning clevis (2-305) on connecting rod (2-300). After correct adjustment is made, make sure all fastenings and locknuts are secure. Each rotor (5-1) can be adjusted individually in steps of 22 1/2 degrees merely by pressing the contact to one side against the spring and rotating it within its insulated rotor housing until it snaps into the desired position.

Description of Interlocks - continued

Closing Mechanism Interlock

Prohibits release of key in interlock 27 until ground switch has reached the closed position.

Cubicle Lock Lever

Works with key interlock 24 to lock device in or out of cubicle. In pushed in position, cubicle locking pin is extended to lock device, and mechanism trip latch is in normal position. In extended position, cubicle locking pin is retracted for insertion and removal of device, and latch is held in trip free position to prohibit closing of ground switch.

Latch Lock Lever

Works with key interlock 27 to lock ground switch in closed position. In pushed in position it blocks the latch in the non-trip position and closes contact 52C-2 to permit closing the ground switch and locking it. In the extended position it frees the latch to permit opening the ground switch and closes contact 52T-2 to permit electrical tripping. Manual tripping is possible with the latch lock lever extended and is prohibited with it pushed in. Note that the cubicle lock lever and the latch lock lever work in opposition to each other - that is, one holds the latch open to prevent grounding while the other holds the latch closed to permit grounding. Thus, a grounding sequence cannot be completed if the device is not locked in or out of the cubicle.

SEQUENCE OF OPERATION
TYPE MCT-1 GROUND & TEST DEVICE

I. To permit inserting device in cubicle

1. Test probes must be removed and test port door closed and locked.

   a) Key A2 is held in interlock 29.

   b) Key A2 is released in interlock 28.

   c) Key A1 is released in interlock 26.

2. Potential transformer disconnect must be locked in open position.

   a) Key A1 is released in interlock 25.

3. Ground switch must be open.

   a) Use A2 key to withdraw bolt in interlock 27. Key is now held.

   b) Withdraw latch lock lever.

   c) Open ground switch, electrically or manually.

4. Cubicle lock must be open.

   a) Use A1 key to withdraw bolt in interlock 24. Key is now held.

   b) Withdraw cubicle lock lever.

   c) Cubicle lock is now open and closing solenoid is trip free. Contact in closing circuit is also open.

5. Device may now be inserted in cubicle or removed from cubicle.

   a) Ground switch is locked open.

   b) P.T. disconnect is locked open.

   c) Test port door is locked closed.

II. To permit phasing and back-feed checks (test probes not required).

1. Insert device in cubicle and lock in fully inserted position by removing key A1 in interlock 24.

   a) Cubicle locking pin prevents locking except in fully inserted position.

   b) Key can be removed only when cubicle lock lever is pushed in and locked by the extended bolt of interlock 24.

II. (continued)

2. Unlock P.T. disconnect from locked open position by inserting A1 key in interlock 25 and turning to withdraw bolt.

   a) Use A1 key released from interlock 24.

   b) When P.T. disconnect is unlocked, key A1 is held in interlock 25.

3. Close P.T. disconnect. Device is ready for use.

   a) Since key A1 is held in interlock 25, it is not possible to remove device from cubicle, nor is it possible to unlock and open the test port door.

III. To permit checks requiring use of test probes

1. Complete steps outlined in Sequence II.

2. Close ground switch electrically and lock closed by removing key A2 in interlock 27.

   a) Pushing in latch lock lever blocks latch in non-trip position and sets up electrical contacts to permit closing and prevent tripping. Manual trip is also blocked.

   b) After ground connection has actually been made (not before or during closing operation) key A2 in interlock 27 may be turned to extend bolt and release key. Extended bolt locks device in grounded position.

3. Insert key A2 in interlock 28.

   a) Use key removed from interlock 27.

4. Open P.T. disconnect and lock in open position by removing key A1 in interlock 25.

5. Insert key A1 in interlock 26 and open test port door.

   a) Key A2 is held in interlock 28 and key A1 is held in interlock 26.

   b) Test port door cannot be removed to probe lock position until all three test probes are fully inserted.

6. Insert all three test probes, move test port door to probe lock position, and lock test probes in by removing key A2 in interlock 29.

   a) P.T. disconnect switch is locked in open position since its key is held in interlock 26.

III. (continued)

b) Ground switch is locked closed until test probes are locked in, since one key is held in interlock 28 and the other key is held in interlock 29.

7. Insert key A2 in interlock 27 and open ground switch.

a) Use key A2 removed from interlock 29.

b) Turn key to hold and withdraw bolt in interlock 27.

c) Withdraw latch lock lever and open ground switch electrically or manually.

d) Probes are locked in, regrounding is permissible, and P.T. disconnect is locked open.

IV. To establish grounded circuit (test probes not required)

1. Insert device as per Section I.

2. Lock device in cubicle by removing key A1 in interlock 24. (Same as Step II-1).

a) Key is now available for use in interlock 25 to open or close P.T. disconnect as desired.

3. Close ground switch electrically. (Same as Step III-2 except it is not required to remove key A2 in interlock 27).

a) Ground switch can be opened or closed as desired by positioning of latch lock lever.

b) Safe ground can be maintained by workman or supervisor using personal padlock in latch lock lever (or by keeping possession of key A2 removed from interlock 27), thereby locking device in grounded position and also preventing removal from cubicle.

c) Test port door is locked closed by interlocks 26 and 28 and test probes cannot be inserted.

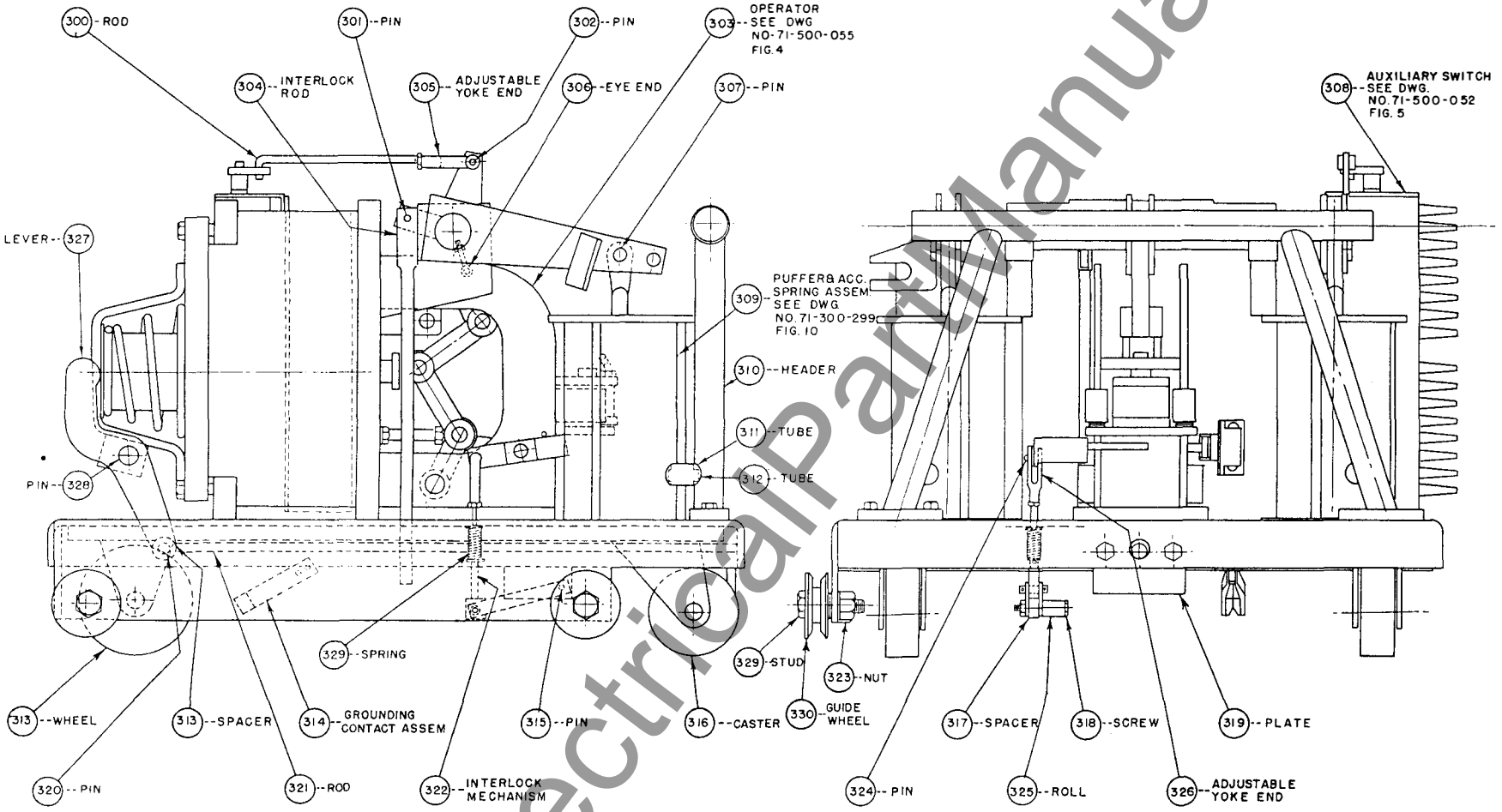

FIG. 2

TYPICAL BASE AND OPERATOR ASSEMBLY

JULY 6, 1953 71-500-056

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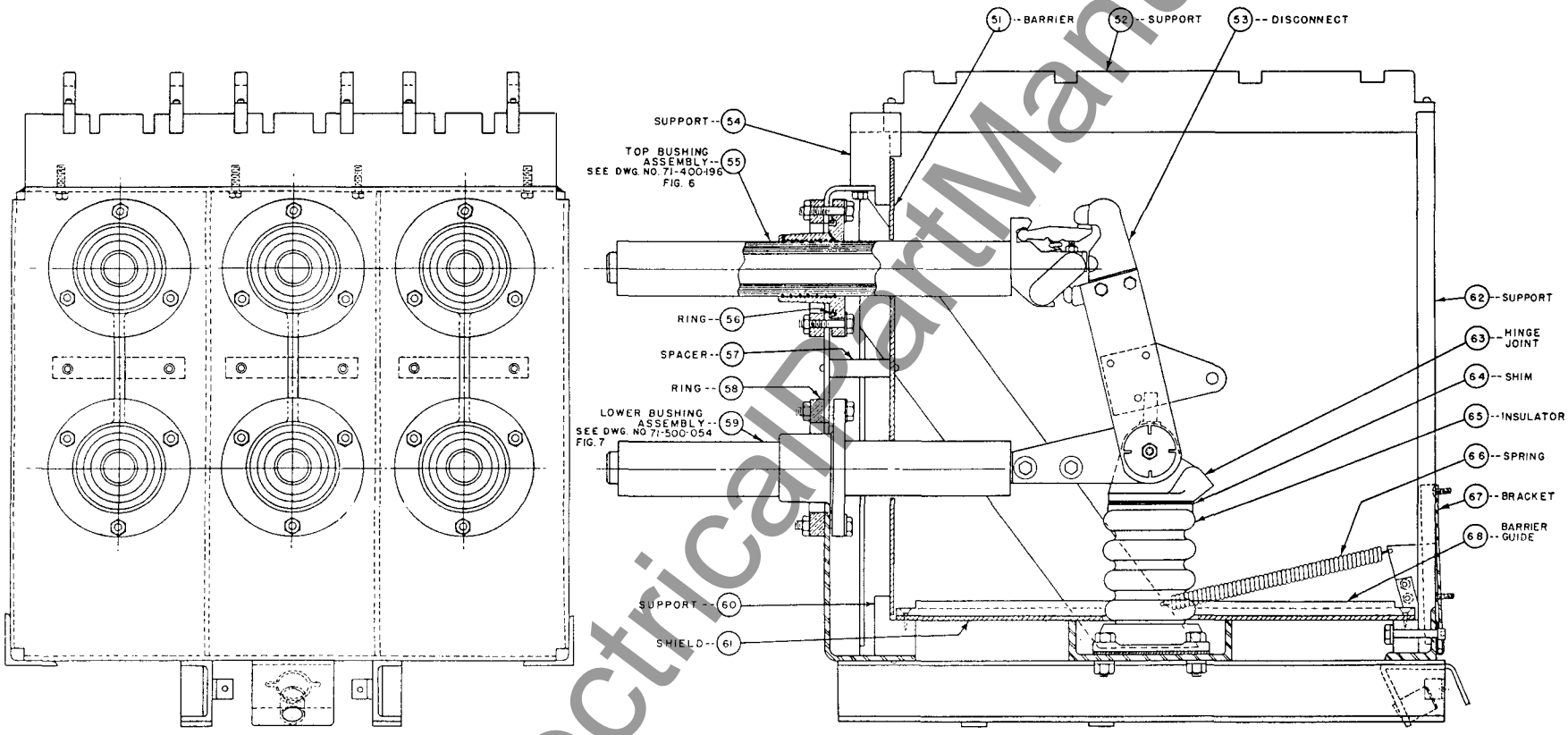

FIG. 3

TYPICAL TOP FRAME ASSEMBLY

JUNE 23, 1953 71-500-053

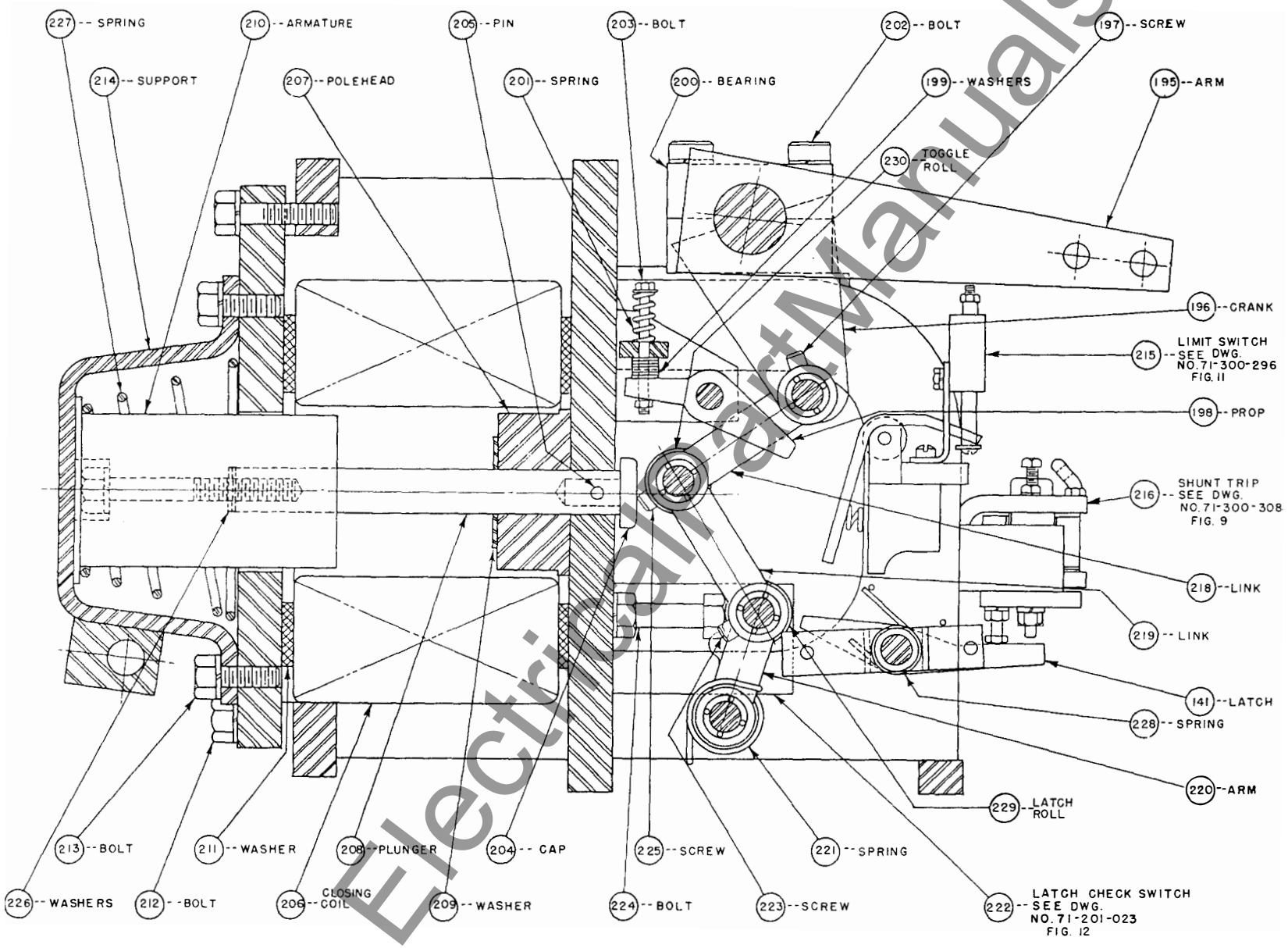

FIG. 4
TYPICAL OPERATOR ASSEMBLY

JUNE 26, 1953

71-500-055

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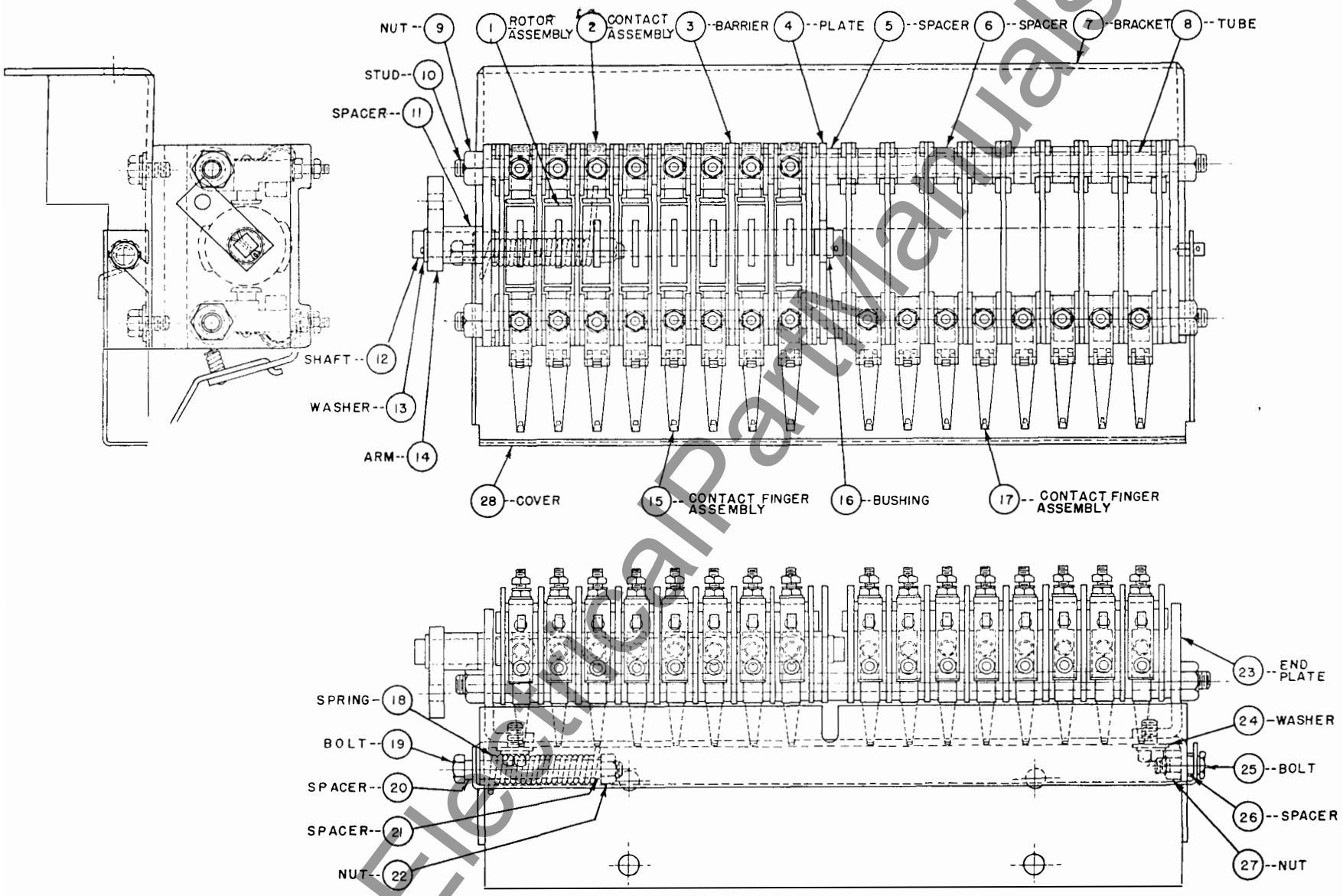

FIG. 5

TYPICAL AUXILIARY SWITCH

JUNE 19, 1953 71-500-052

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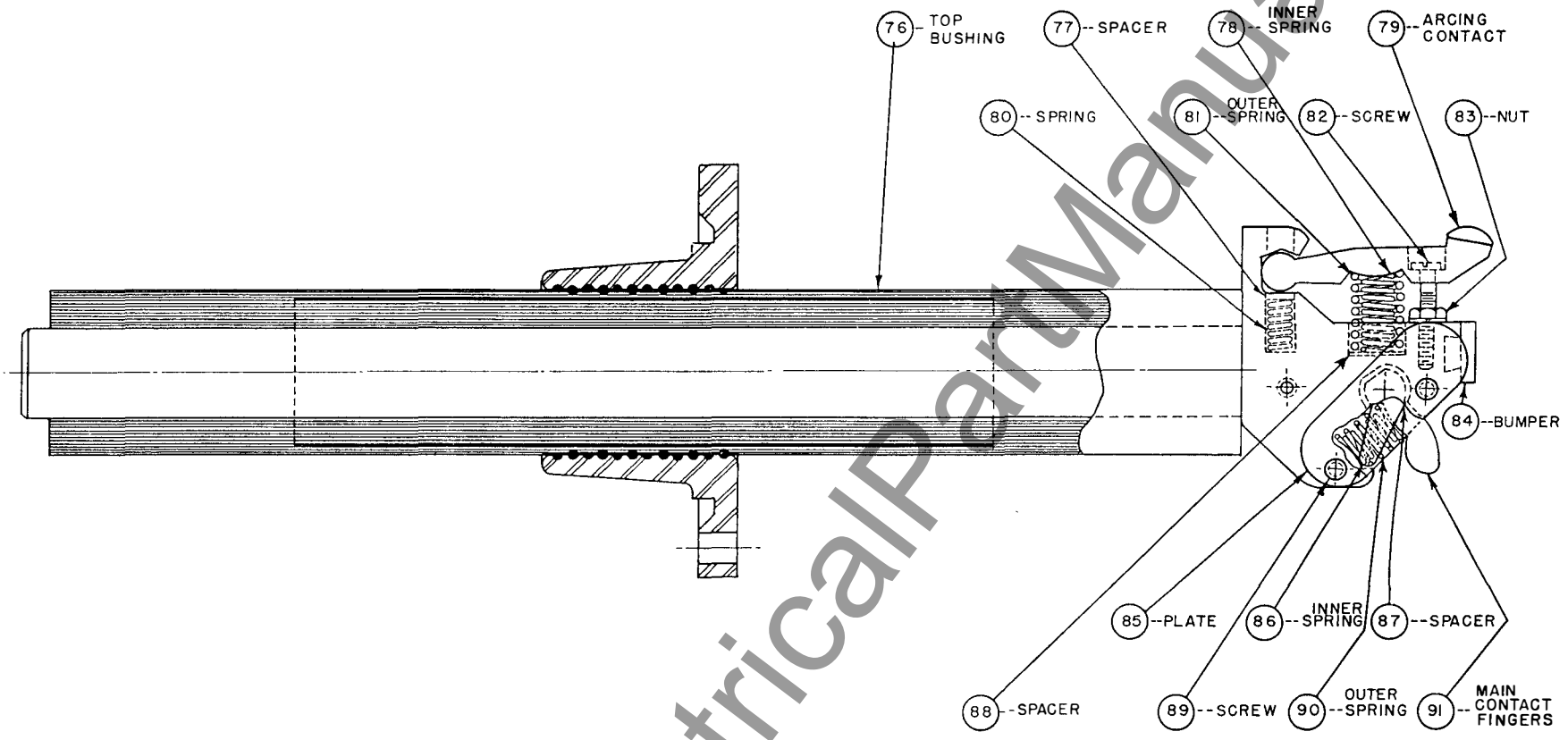

FIG. 6

TYPICAL TOP BUSHING ASSEMBLY

JUNE 24, 1953 71-400-196

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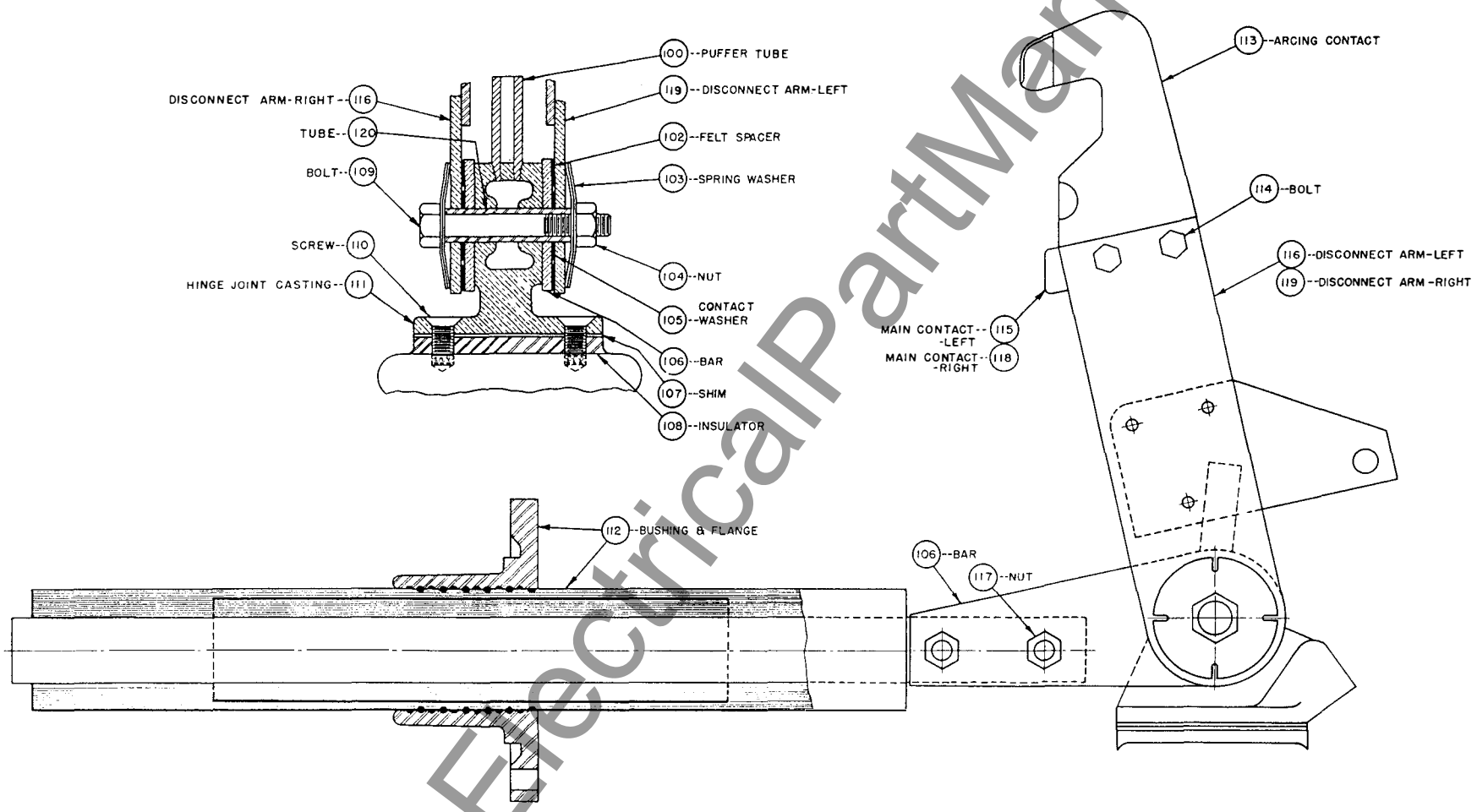

FIG. 7

TYPICAL LOWER BUSHING ASSEMBLY

JUNE 26, 1953

71-500-054

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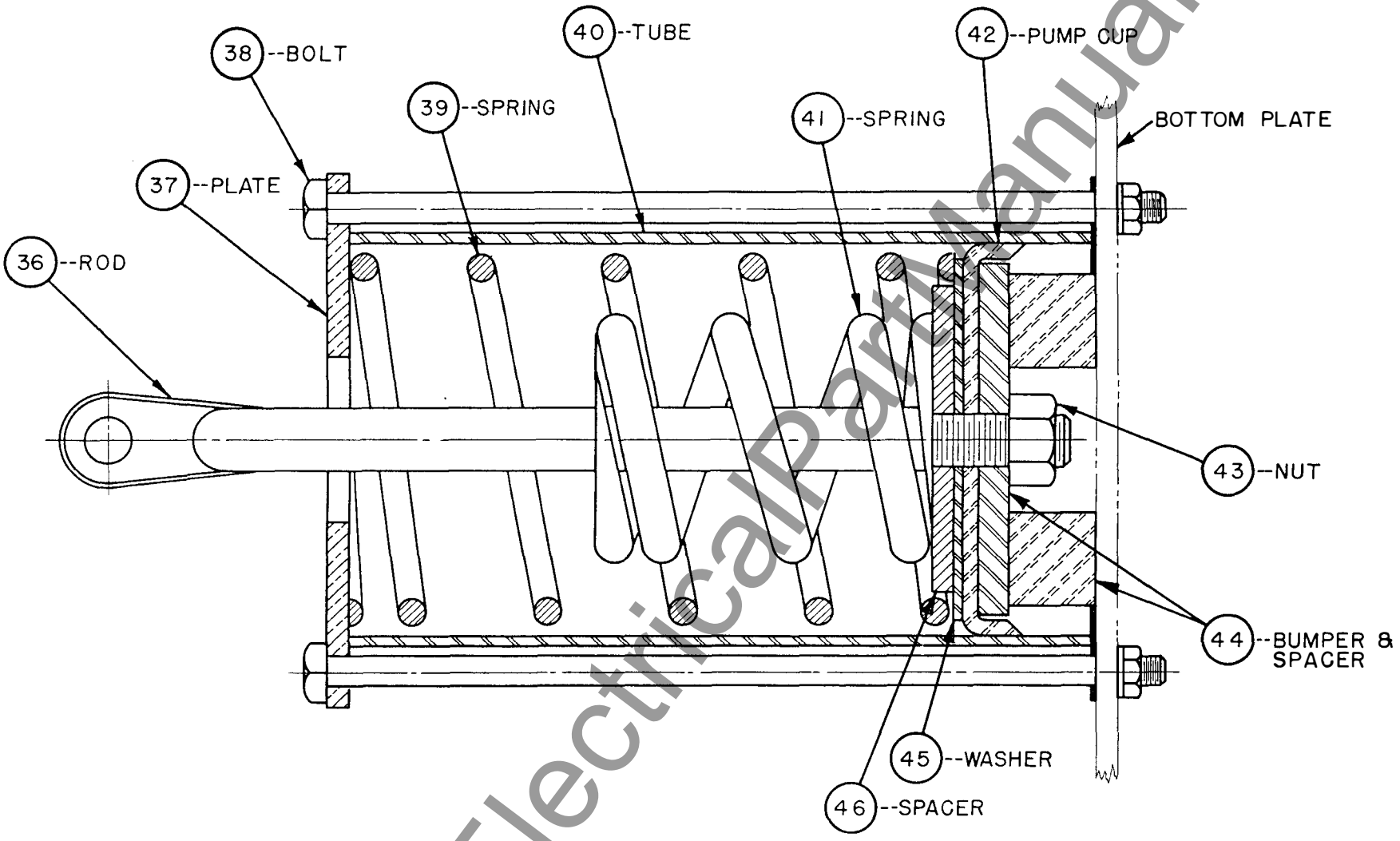

FIG. 10

PUFFER AND ACCELERATING SPRING ASSEMBLY

JUNE 22, 1953 71-300-299

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