

March 31, 1931.

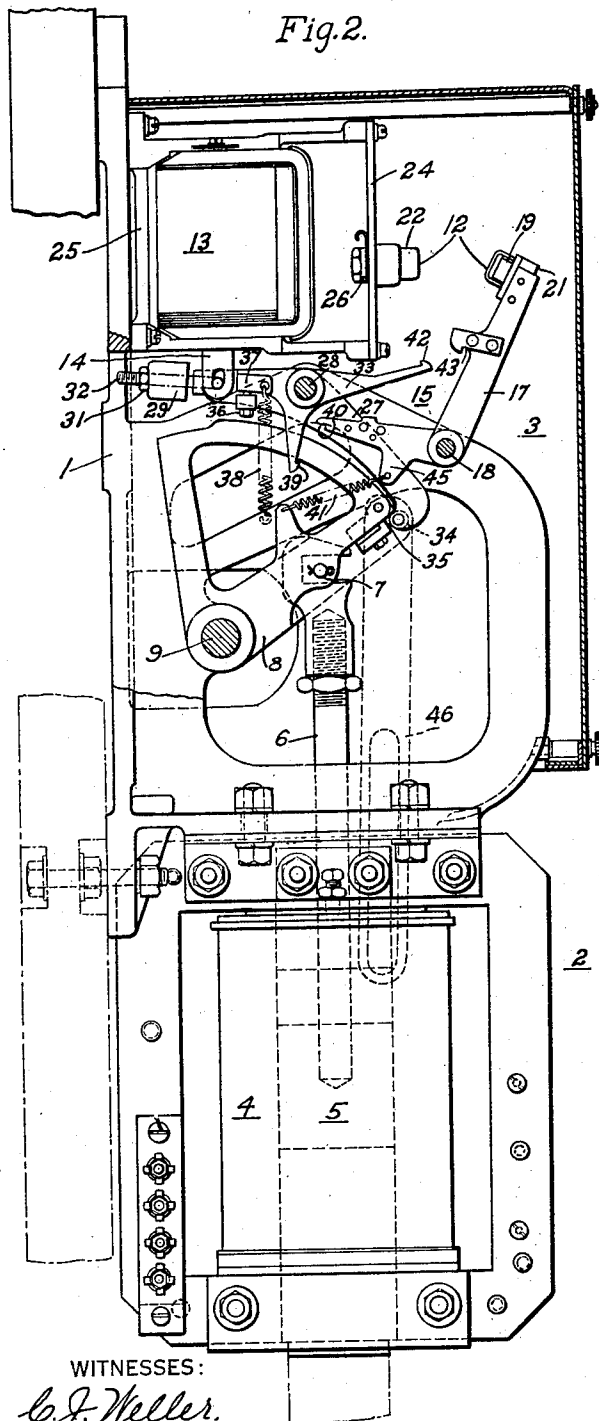
G. G. GRISSINGER

1,798,667

NETWORK PROTECTOR

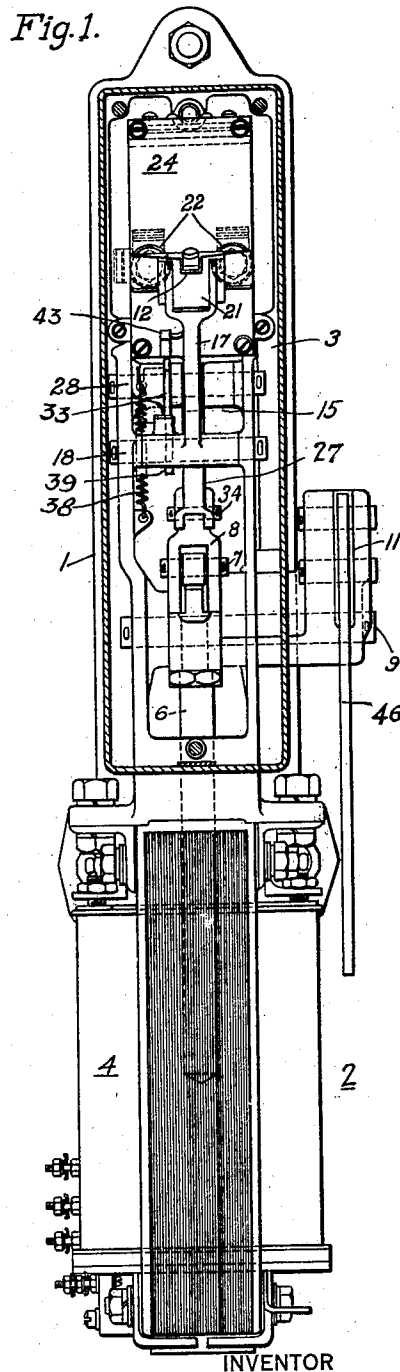
Filed April 12, 1926

2 Sheets-Sheet 1



WITNESSES:

G. J. Keller.
H. D. Connor



INVENTOR

George G. Grissinger.

BY *Wesley G. Carr*
ATTORNEY

March 31, 1931.

G. G. GRISSINGER

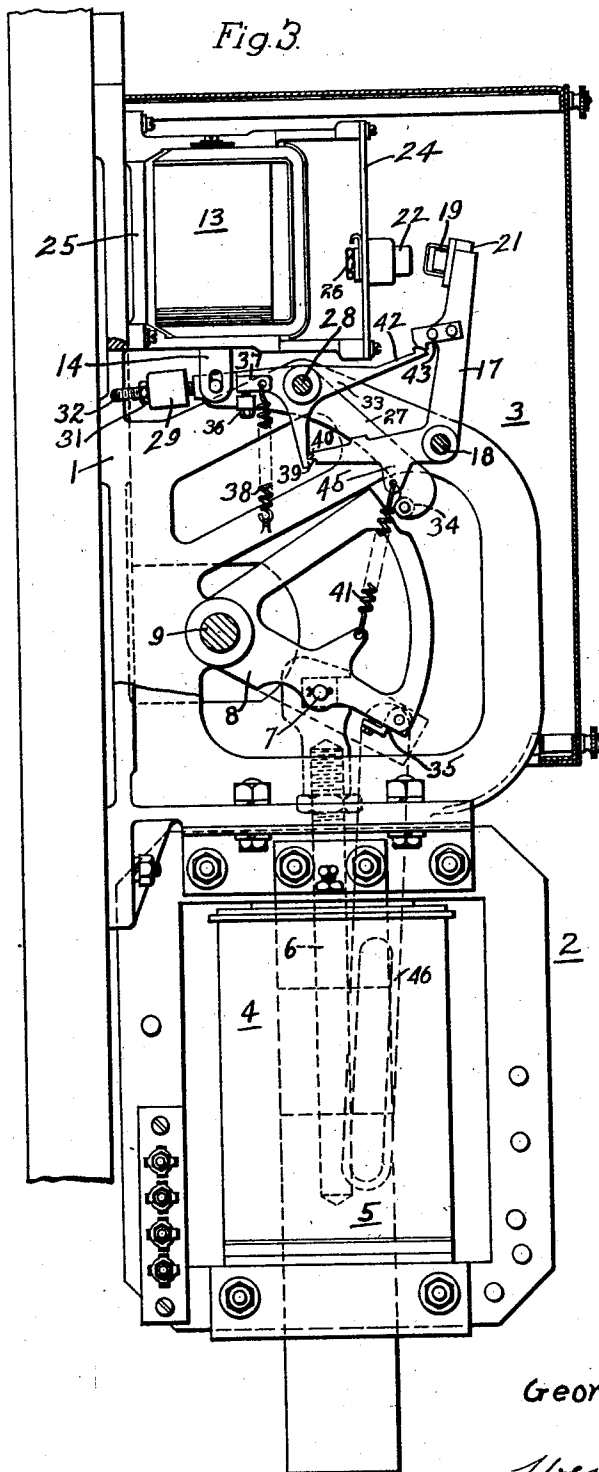
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Fig. 3.



INVENTOR
George G. Grissinger

BY
Wesley E. Sloan
ATTORNEY

UNITED STATES PATENT OFFICE

GEORGE G. GRISSINGER, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA

NETWORK PROTECTOR

Application filed April 12, 1926. Serial No. 101,567.

My invention relates to protective devices for alternating-current distribution systems and particularly to electrical network protective devices.

5 An object of my invention is to provide an improved operating mechanism for a network protective device.

The invention resides in an operating mechanism for a switch to be used in an alternating-current network protective device. It comprises a main operating magnet, a control magnet and contactor, and a latch mechanism in which the armature of the control magnet directly actuates the latch mechanism.

In the accompanying drawings, Fig. 1 is a front view, in elevation of a mechanism embodying the invention, and enclosing casing being shown in section; and

20 Fig. 2 is a view, partially in section and partially in side elevation of the mechanism of Fig. 1 in the position corresponding to a closed position of the line switches it actuates.

25 Fig. 3 is a similar view corresponding to the open position of the line switches.

Referring to the drawing, a base member 1 has secured thereon a switch operating mechanism 2 and a protective device 3.

30 The switch operating mechanism 2 comprises an actuating solenoid 4 having an armature 5 that is connected to a rod 6 which is in turn connected by means of a pin 7 to a cam 8 that is mounted on a shaft 9. When solenoid 4 is energized, it pulls upward on armature 5 and rotates shaft 9 counter-clockwise. The shaft 9 also carries an arm 11 which opens and closes the associated line switches (not shown) through the agency of link 46.

40 The protective device 3 comprises a contactor 12, a control solenoid 13 energized through any desired control switch or line-protecting relay and having an armature 14 and a latch mechanism 15 and serves to control the energization of the main switch-actuating solenoid 4. The contactor 12 comprises a switch arm 17 that is loosely mounted on a shaft 18 and carries, at its upper end, a bridging contact member 19, which is sup-

ported on the switch arm 17 by an insulating block 21. The extension 45 is a portion of the arm 17 and its outer end is provided with a notch 40. The bridging member 19 cooperates with a pair of stationary contact members 22 that are supported by an insulating body 24 from a bracket 25. Suitable terminals 26 are attached to the rear ends of the stationary contact members 22 for the connection thereto of electrical conductors of its control circuit.

The armature 14 of the solenoid 13 is directly connected to a trigger 27 of the latch mechanism 15 that is loosely mounted on a shaft 28 and that may be adjusted by means of a counter weight 29 and a lock nut 31 mounted on a stud 32. The trigger 27 terminates in a roller 34 that engages an adjustable latch 35 in the cam 8. An adjusting screw 36, mounted upon the trigger 27 bears against a lug 37 of a trigger 33 also loosely mounted on the shaft 28 and a spring 38 serves to bias the trigger 33 in the counter clockwise direction.

Trigger 33 is provided with two engaging arms 39 and 42 which cooperate with notches 40 and 43, respectively, of the switch arm 17. When engaging arm 39 is cooperating with the notch 40, the switch arm 17 is in intermediate position. When the engaging arm 42 is cooperating with the notch 43, the switch arm 17 is in its forward position with the bridging member 19 completing a circuit across the contacts 2, thereby energizing the closing coil 4.

85 The electrical connections of a network protecting mechanism which my invention is adapted to operate, but which constitute no part of the present invention, are shown in the copending application of John B. MacNeill, filed Jan. 27, 1925, Serial No. 5,175 and which is assigned to the Westinghouse Electric & Manufacturing Company.

Assume the switch operating mechanism 2 to be in its open position, as shown in Fig. 3, and the associated line switches (not shown) also opened. Upon the occurrence of line conditions to which the above-mentioned protective relay is arranged to be responsive, the solenoid 13 is energized, draw-

ing the armature 14 upward. The upward movement of the armature 14 rotates the arm 27 in a clockwise direction about the pin 28. A similar clockwise rotation is imparted to the arm 33 by the action of the adjusting screw 36 upon the lug 37. Upon the rotation of the arm 33, the engaging arm 39 is moved out of contact with the notch 40 of the switch arm 17 and, due to the biasing action of the spring member 41, the switch arm 17 is rotated in counter-clockwise direction, completing a circuit to the solenoid 4 through the engagement of the bridging member 19 with the contact members 22. The switch arm 17 is locked in circuit closing position by the engaging arm 42 engaging the notch 43. When the solenoid 4 is energized, the armature 5 is moved upwardly, rotating the cam 48 in a counter-clockwise direction about the pin 9, carrying with it the link 46 which is the means for moving the associated line switches into closed position. At the end of the upper travel of the armature 5, the roller 34 on arm 27 drops over the roller 35 on the cam 48 and locks the apparatus in closed position. The movement of the arm 27, in thus latching the operating mechanism 2 to closed position, also actuates the trigger 33 through the adjusting screw 36 and the lug 37 to release the engaging arm 42 from the notch 43. The spring 41 is then in the position shown in Fig. 2, and its tension biases the arm 17 to its open position.

Upon the occurrence of any abnormal condition to which the protective device is arranged to be responsive the solenoid 13 is de-energized, the armature 14 drops and, in conjunction with the spring 38 and the weight 29, turns the triggers 27 and 33 counter-clockwise, thereby disengaging the roller 34 from the latch 35. Thereupon, a spring (not shown) throws the line switches open and, by means of the arm 11 turns the shaft 9 and the cam 8 clockwise, thus returning the armature 5 to its initial position.

The spring 41 is again swung into position to bias the switch arm 17 counter clockwise. However, the bridging member 19 is prevented from engaging with the stationary contact members 22 by the latch 40 engaging the notch 39 of the trigger 33. Accordingly, all of the parts are in the respective positions which they occupy at the beginning of the cycle of operations and the mechanism is in position to reclose the switch upon the re-establishment of the control voltage.

It is thus apparent that I have provided an improved mechanism for operating a network protective device in which a trigger for effecting the opening of the circuit is directly connected to the armature of the control solenoid.

I do not wish to be restricted to the specific arrangement of parts herein set forth and various modifications thereof may be effected

without departing from the spirit and scope of my invention. I desire, therefore, that only such limitations shall be imposed as are indicated in the appended claims.

I claim as my invention:

1. A member to which it is desired to impart reciprocating motion, electric-motor means therefor, and control means for said motor comprising contacts controlling said motor, means adapted to bias said contacts to closed position when said member is at one end of its stroke, a latch adapted to prevent said bias means from closing said contacts, means for releasing said latch to permit said contact to close, a second latch adapted to hold said contact closed, and means adapted to release the tension of said bias means and also to release said second latch when said member reaches the other end of its stroke.

2. Operating mechanism for a circuit interrupter comprising electro-responsive means, a member reciprocated thereby and a contact member movable to complete a circuit to energize the electro-responsive means, bias means connecting the reciprocable member to the contact member to change the bias of the contact member with each change of position of the reciprocable member, a latch retaining the contact member in open-circuit position, and a second electro-responsive means associated with the latch to cause its release under predetermined conditions.

3. Operating mechanism for a circuit interrupter comprising electro-responsive means, a member reciprocated thereby and a contact member movable to complete a circuit to energize the electro-responsive means, bias means connecting the reciprocable member to the contact member to change the bias of the contact member with each change of position of the reciprocable member, a latch retaining the contact member in open-circuit position when the electro-responsive means is deenergized, a latch to retain the reciprocable member in the position to which it is moved when the electro-responsive means is energized and a second electro-responsive means controlling the position of the latch to move the reciprocable member under predetermined conditions.

4. The combination with a member to be reciprocated, of electro-responsive means for actuating the member to one position, a contactor for energizing said electro-responsive means, bias means for said contactor so associated with the reciprocable member that the direction of said bias reverses when said reciprocable member moves from one to the other of its extreme positions, a latch adapted to retain said contactor in open position and means for releasing the latch to permit said contactor to close.

5. The combination with a member to be reciprocated, of electro-responsive means for

actuating the member to one position, a contactor for energizing said electro-responsive means, bias means for said contactor so associated with the reciprocable member that the direction of said bias reverses when said reciprocable member moves from one to the other of its extreme positions, a latch adapted to retain said contactor in open position and a second electro-responsive means for operating the latch.

mechanism for controlling the position of the contactor, a cam provided with an adjustable face coacting with the latch mechanism to retain the cam in one position and to cause the latch mechanism to permit the contactor to open.

12. In combination, two switch-operating members, actuating means therefor, a latching mechanism operatively connected to said members, and means for controlling said latch mechanism comprising a cam movable with one of said members and having an adjustable portion for varying its cooperative relation to said latch mechanism.

In testimony whereof, I have hereunto subscribed my name this 30th day of March, 1926.

GEORGE G. GRISSINGER.

6. The combination with a member to be reciprocated, of electro-responsive means for actuating the member to one position, a contactor for energizing said electro-responsive means, latches for retaining said contactor in closed in and in open positions, bias means associated with the contactor and with the reciprocable member adapted to control the position of the contactor and a second electro-responsive means for actuating one of the latches to cause the contactor to close and retained by the second latch, whereby the first said electro-responsive means is energized and the reciprocable member is moved to its other position, thereby changing the direction of the bias and releasing one of said latches to cause the contactor to open.

7. In combination, a contactor, a plurality of latch members for controlling the position of the contactor, a plurality of electromagnets, one of the electromagnets being operatively connected to the latch members and a cam operatively connected to another electromagnet that is controlled by the contactor, the cam being arranged to retain the contactor in one position until the second electromagnet has performed a predetermined operation.

8. In combination, a contactor, a plurality of latch members for controlling the position of the contactor, a plurality of electromagnets, one of the electromagnets being operatively connected to the latch members and a cam operatively connected to another electromagnet, the cam having a notch for coacting with one of said latch members to latch the cam in a predetermined position and to release the contactor.

9. In combination, a contactor, a plurality of latch members for controlling the movement of the contactor, an electromagnet operatively connected to the latch members, a cam cooperating with one of said latch members to latch the cam in one position and to simultaneously permit the contactor to open, and a second electromagnet for controlling said cam.

10. In combination, a plurality of electromagnets, a contactor for controlling the circuit of one of the electromagnets, a cam actuated by one of the electromagnets, and a latch mechanism controlled by a second electromagnet and said cam for holding the contactor in its open or its closed position.

11. In combination, a contactor, a latch

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