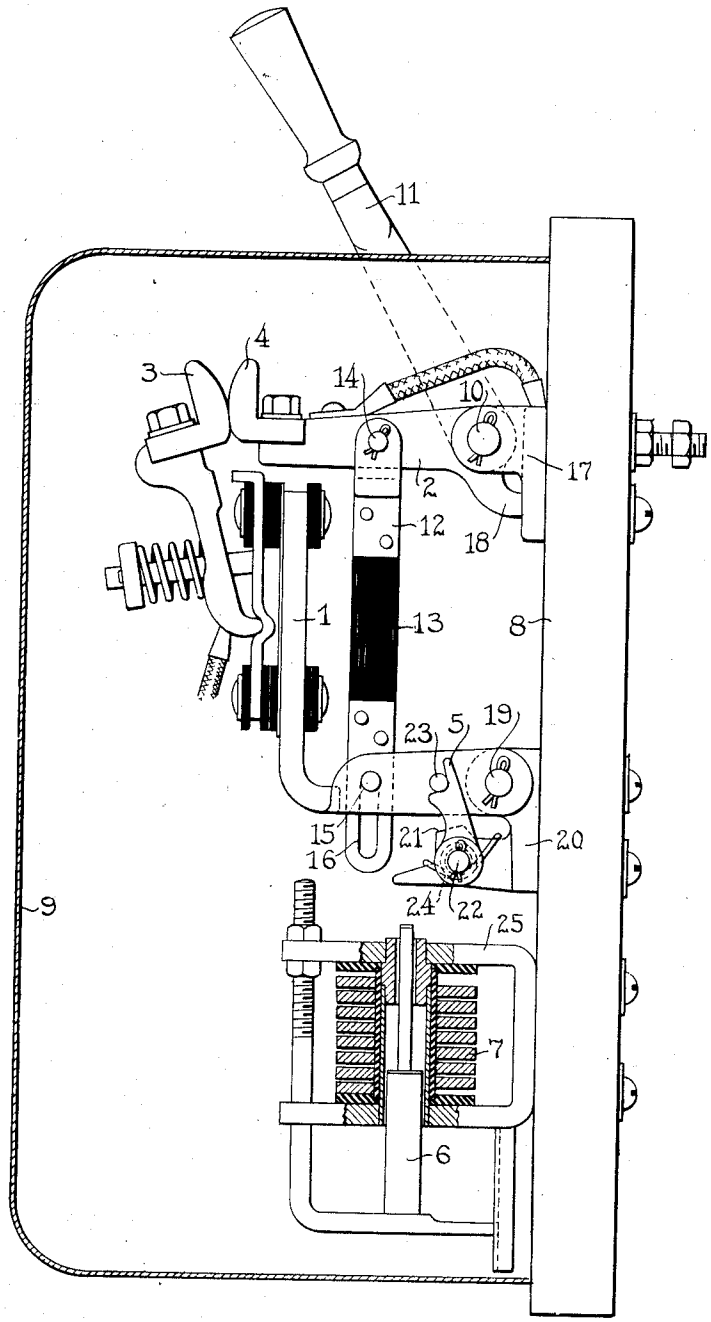
C. T. EVANS.

CIRCUIT BREAKER.

APPLICATION FILED JUNE 28, 1917.

1,360,280. **Patented Nov. 30, 1920.**



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CIRCUIT-BREAKER.

1,360,280. Specification of Letters Patent. Patented Nov. 30, 1920.

Application filed June 28, 1917. Serial No. 177,455.

To all whom it may concern:

Be it known that I, CLARENCE T. EVANS, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Circuit-Breakers, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

This invention relates to circuit breakers and more particularly to those which are non-closable on overload.

In circuit breakers of the aforesaid character it has heretofore been proposed to provide a collapsible connection between the movable switch member and the operating means therefor and to render said connection inoperative for maintaining the switch closed during overloads, and the present invention has among its purposes to obviate the necessity for such collapsible connection.

A further object is to provide a circuit breaker of simple construction, comprising few and rugged parts, which, moreover, is positive and wholly reliable in its action.

Other objects and advantages will hereinafter appear.

The accompanying drawing is a side elevational view partly in section, of an embodiment of said invention.

Referring to the drawing, the same illustrates a pair of switch arms 1 and 2 pivotally mounted in suitable relation to make and break an electric circuit through a pair of contacts 3 and 4 carried at their respective free ends, the arm 1 being biased to open circuit position by gravity or otherwise and being normally retained in closed circuit position by a spring-pressed latch 5 subject, however, to release by a plunger 6 actuated by an overload tripping coil 7, the afore-described parts being supported in suitable operative relation upon an insulating panel 8 and inclosed within a suitable casing 9.

The switch arm 2 is provided with an operating shaft 10 carrying a rigidly secured handle 11 located outside the casing 9 whereby the switch may be actuated manually, said handle being arranged to act as an overbalancing weight for maintaining said arm in either closed circuit or open circuit position. A link 12 having an insulating section 13, is pivoted at 14 to said arm and engages the arm 1 by means of a lost motion connection comprising a pin 15 projecting within a slot 16 whereby upon opening of the switch in response to overload, said last mentioned arm may be restored to closed circuit position by upward movement of the handle 11 following which the switch may be closed by reverse movement of said handle. Upon closure of the switch during continuance of the overload, the latch 5 is immediately tripped by the plunger 6 and the arm 1 returns to open circuit position in response to its bias, thus preventing permanent closure of the switch under such conditions.

More particularly the switch arm 2 is pivoted upon a support 17 projecting from the base 8, said arm being provided with a stop 18 to limit downward movement thereof. The arm 1 is similarly pivoted at 19 upon a support 20 also carried by the base and provided with a stop 21 to limit downward movement of said arm. The contact 3 is resiliently mounted upon said arm and is preferably insulated therefrom by means of a suitable non-conductive medium interposed therebetween.

The latch 5 is pivoted at 22 upon the support 20 the upper end of said latch being shaped to engage a pin 23 projecting from the side of the arm 1 while a helical spring 24 biases said latch to engagement therewith, movement of said latch in response to its bias being also limited by the stop member 21.

The tripping coil is of known construction and comprises a U-shaped magnetic support 25 secured to the base 8 below the switch mechanism and carrying the usual coil and plunger, the former being connected in the controlled circuit and provided with calibrating means of known character, and the latter being arranged to engage and trip the latch 5 upon response of said coil to overloads.

It is to be understood that during movement of the operating handle 11 to return the arm 1 to closed circuit position, the arm 2 is moved to open circuit position whereby engagement of the switch contacts during such operation is positively prevented. Furthermore, upon subsequent movement of the arm 11 to closed circuit position, the

slotted portion 16 of the link 12 is moved downwardly to disengage the pin 15 for permitting opening movement of the arm 1 upon tripping of the latch.

While the afore-described switch is single pole, it is obvious that the construction is equally adaptable to switches of the multipole type.

What I claim as new and desire to secure by Letters Patent is:

1. In a circuit breaker, the combination with a pair of coöperating contact elements, one of said elements having means for moving the same out of engagement with the other and means biasing the same to a position of engagement with the other and the other of said elements being also movable and tending at all times to disengage the former, of means to restrain said other element against such tendency but subject to automatic release under overload conditions.

2. In a circuit breaker, in combination, a pair of contact elements adapted to coöperate electrically, one of said elements being permanently biased to disengage the other and having retaining means to hold the same against such bias, the other of said devices being oppositely biased dependent upon its position with reference to a predetermined neutral position to move either toward or away from said former element when so held, overload tripping means for said former element and means whereby said former element may be reset after tripping thereof, by movement of said latter element to circuit interrupting position.

3. In a circuit breaker, in combination, a pair of contact arms extending substantially at right angles to each other and carrying contacts adapted to coöperate electrically, one of said contacts being spring-biased toward the other, the arm carrying said contact being permanently biased to cause separation of said contacts as abutment contacts, means for restraining said arm against such bias subject to release upon the occurrence of an overload, the other of said arms having a bias to contact engaging position and being movable from such position or returnable thereto to effect sliding engagement of said contacts.

4. In a circuit breaker, in combination, a pair of movable switch arms carrying contacts adapted to coöperate electrically, one of said contacts being spring pressed, said arms and said contacts being arranged relatively to one another to provide for wiping engagement of the latter and separation thereof as abutment contacts, one of said arms having a bias toward engaging position and the other of said arms being permanently biased to cause separation of said contacts and means for restraining said latter arm against such bias subject to tripping thereof under predetermined conditions of overload.

5. In a circuit breaker, in combination, a pair of movable switch arms carrying contacts adapted to coöperate electrically, one of said contacts being spring pressed, said arms and said contacts being arranged relatively to one another to provide for wiping engagement of the latter and separation thereof as abutment contacts, one of said arms having a bias toward contact engaging position and the other of said arms being permanently biased to cause separation of said contacts and means for restraining said latter arm against such bias subject to tripping thereof under predetermined conditions of overload, and resetting means for said latter arm including a link having a pin and slot connection therewith and a pivotal connection with said former arm for moving said latter arm to closed position during movement of said former arm to open circuit position and permitting return of said former arm to closed circuit position during restraint of said latter arm by said restraining means.

In witness whereof I have hereunto subscribed my name.

CLARENCE T. EVANS.