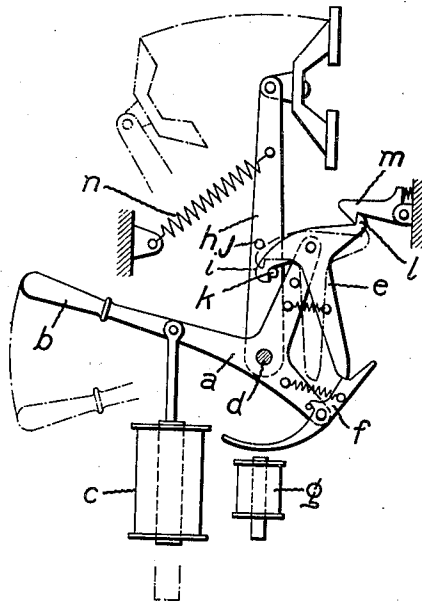


G. WOLFF.
ELECTRIC SWITCH.
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1,190,060.

Patented July 4, 1916.



Witnesses:

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His Attorney

UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

1,190,060.

Specification of Letters Patent.

Patented July 4, 1916.

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To all whom it may concern:

Be it known that I, GEORG WOLFF, a subject of the Emperor of Germany, residing at Hermsdorf, near Berlin, Germany, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

Automatic electric switches of the type which are non-closable on overload have the handle normally connected to the switch mechanism by a latching connection which permits the switch to open independently of the handle upon the occurrence of overload or similar abnormal conditions. Ordinarily the handle remains stationary as the switch opens, and when the switch is to be closed the handle must be subjected to a special preliminary manipulation, such as a movement away from the switch member to reset the latching connection and couple the handle to the switch member.

The object of my invention is to provide a non-closable on overload circuit breaker in which this special preliminary manipulation of the handle is unnecessary, and the opening of the switch immediately and automatically sets the latching connection to the handle so that the circuit can be closed merely by the switch closing movement of the handle.

A further object is to improve in details hereinafter pointed out the construction and operation of electric switches of the non-closable on overload type.

In accordance with the present invention these difficulties are avoided by making the releasable coupling or connection between the actuating member and the switch member act also as a latch for locking the coupled system to a stationary part of the switch in circuit closing position.

My invention will best be understood in connection with the accompanying drawing, which shows, merely for purposes of illustration, one form in which my invention may be embodied, and in which the figure represents diagrammatically an automatic switch embodying my invention and shown in circuit closing position.

The actuating member *a*, which is constructed in the form of a three arm lever and which may be rotated by the handle *b* or by the switch magnet *c* about the fixed fulcrum *d*, carries on one arm the rotatably mounted carrier pawl *e*, which is held in the full line position by means of a second pawl *f* likewise rotatably mounted on an adjacent arm of the actuating member *a*. This second pawl *f* is controlled by some suitable electromagnetic tripping mechanism, such as an overload coil *g*, which operates in response to maximum current to move the second pawl *f* about its pivot and thereby release the carrier pawl *e*. Like the actuating member *a* the lever or switch member *h* carrying the movable contact is, together with the contact secured to it, rotatable about the fulcrum *d*. The coupling or connection of the actuating member *a* to the switch member *h* is effected by a hook *i* on the carrier pawl *e* engaging a pin *k* on the switch member *h*. The switch member *h* also carries a pin *j* which coöperates with the hook *i* controlling the inner pawl *e*, as will be hereinafter described. A second hook *l* on the carrier pawl *e* engages a detent *m* suitably mounted on the switch framework or other fixed part of the switch and in this way the coupled system formed by the members *a* and *h* rigidly but releasably locked to each other, is held firmly in switch closing position against the action of the spring *n*, even after the handle *b* is released by the operator. The carrier pawl *e* and pawl *f* form two parts of a normally positive collapsible connection or releasable coupling for rigidly but releasably coupling the members *a* and *h* and also by coöperation of the pawl *e* with the detent it acts as a locking or latching member for holding the switch closed, and transmits the pull of the fixed detent *m* directly to the latched switch member *h*, thereby relieving the actuating member *a* almost completely from strain.

The operation of the device is as follows: If under the influence of the electromagnetic coil *g* the pawl *f* releases the carrier pawl *e* then the normally positive

connection between the actuating member *a* and the switch member *h* is disabled and as the carrier pawl *e* immediately and automatically rotates, as a result of the position of its hooks *i* and *l* and the forces acting upon it, into the dotted line position, it simultaneously releases the detent *m* and the pin *k* on the switch member *h*. As soon as this occurs the switch member *h* springs back into the dotted line position under the influence of the spring *n*, whereby the circuit is opened. The actuating member *a* follows the switch member *h* under the influence of gravity or of a spring, if necessary, until it reaches a position where the handle *b* is in the position shown in dotted lines. When this occurs the hook *i* on the inner pawl *e* comes into engagement with the pin *j* which acts as a cam to force the hook *i* into firm engagement with the pin *k*, whereupon the pawl *f* catches the end of pawl *e*, the collapsible connection is again rigid, and the members *a* and *h* are rigidly coupled to each other. The relative position of the switch member *h* and of the actuating member *a* is therefore the same as shown in full lines, the carrier pawl *e* automatically coupling the actuating member *a* to the switch member *h*, whereupon the two members are rigidly connected and the circuit can be closed merely by moving the handle *d* to the full line position.

My invention may be embodied in many different forms and the principles of construction above described by way of example can, of course, be carried out mechanically in other different ways. It is an essential for the object of the present invention that the coupling of the actuating member to the switch member and the holding of said two members in circuit closing position be effected by the same constructive element.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. An electric switch comprising an actuating member and a switch member, said members being relatively movable and both biased to move out of closed switch position, a normally positive collapsible connection between said members set in non-collapsed position by movement of said actuating member away from closed switch position, restraining means coöperating with said connection to hold it and both said members in closed switch position while said connection is positive and to release both said members in response to collapse of said connection, and means for collapsing said connection.

2. An electric switch comprising an actuating member and a switch member, said members being relatively movable and both biased to move out of closed switch position,

a normally positive collapsible connection bodily movable with said members for normally establishing a rigid connection between them when said connection is positive, a resilient detent which yields when said connection while positive moves with said members under said detent and into switch closing position and which latches said connection and both said members in switch closing position only while said connection is positive, and means for collapsing said connection and thereby moving it out of engagement with said detent to release said connection and both said members.

3. An electric switch comprising relatively movable actuating and switch members both biased to move out of closed switch position, a detent to hold the switch closed, a normally positive collapsible connection between said members having a projection thereon in position to be engaged and held by said detent when the switch is closed with said connection in non-collapsed position and to be released from said detent as said connection collapses to release said connection and both said members when said connection is collapsed, and electro-responsive means for collapsing said connection.

4. An electric switch comprising relatively movable actuating and switch members both biased to move out of closed switch position, a normally positive collapsible connection set in non-collapsed position to rigidly connect said members to each other in response to movement of said actuating member away from switch closing position, a detent engaged by said connection while rigid to hold both said members in switch closing position and disengaged upon collapse of said connection, and electroresponsive means for collapsing said connection.

5. An electric switch comprising an actuating member and a switch member movable relatively to each other and biased to move away from switch closing position, a normally positive collapsible connection between said members comprising two relatively movable parts set in positive and rigid relation to each other by movement of said actuating members away from switch closing position, a hook on one of the parts of said connection, a detent engaged by said hook to hold said members in closed switch position when said connection is rigid, and electroresponsive means for moving the parts of said connection relatively to each other to release said hook from said detent and simultaneously collapse the connection between said members.

6. An electric switch comprising a switch member, a relatively movable actuating member, a detent in position to hold said members in closed switch position, a coupling pawl pivotally mounted on one of said

members and having at one end means to
normally connect it rigidly to the other
member and at the other end means to en-
gage said detent while connected to said
5 other member, latching means for normally
holding said pawl in connecting position,
and electroresponsive means for actuating
said latching means to permit said pawl to

move and thereby release said members from
each other and from said stationary detent. 10

In witness whereof, I have hereunto set
my hand this 9th day of May, 1913.

GEORG WOLFF.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.