

C. H. HILL.
ELECTRIC SWITCH.
APPLICATION FILED DEC. 30, 1918.

1,323,765.

Patented Dec. 2, 1919.

Fig. 1.

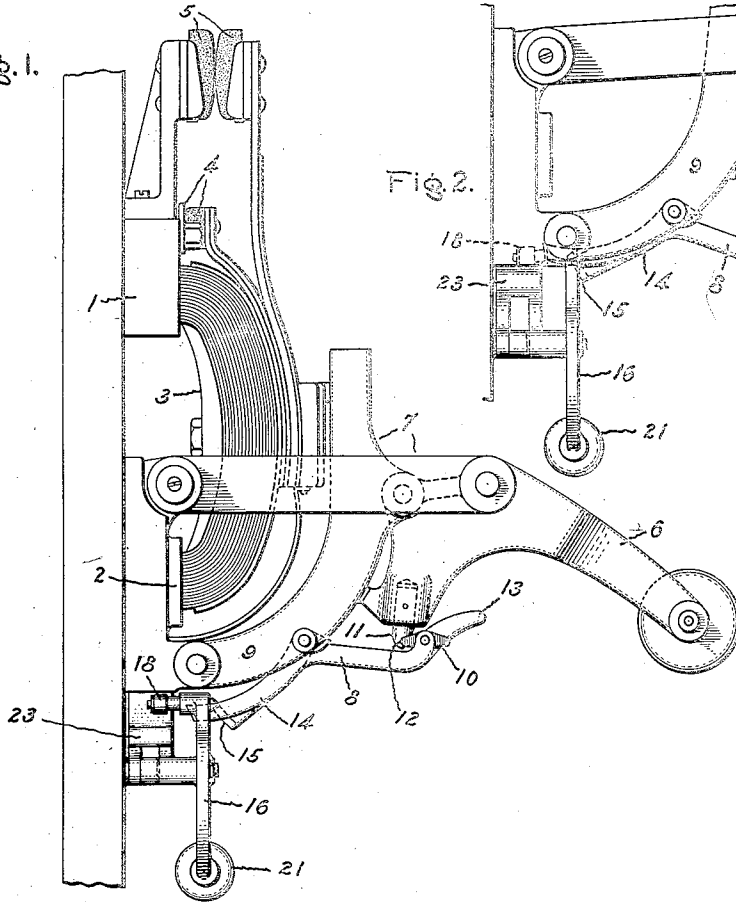


Fig. 2.

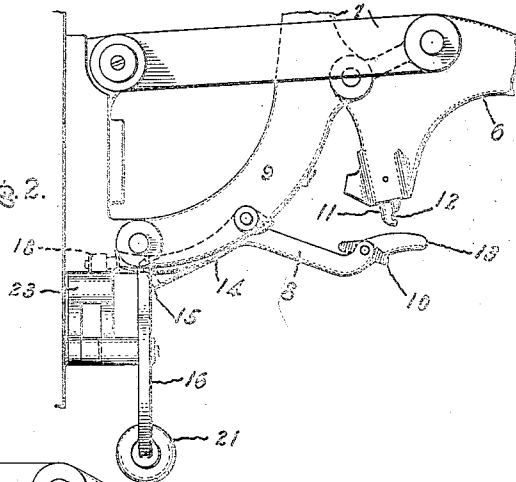


Fig. 3.

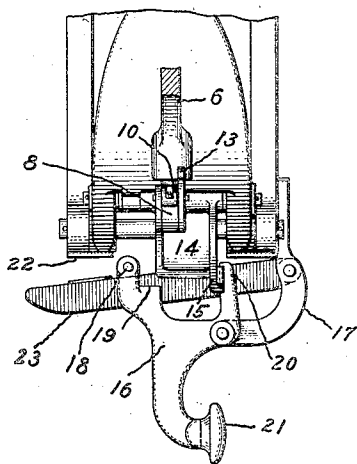
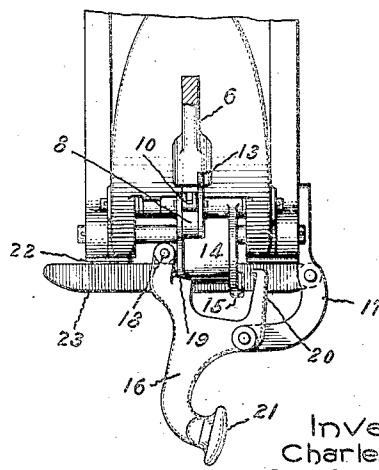


Fig. 4.



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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

1,323,765.

Specification of Letters Patent.

Patented Dec. 2, 1919.

Application filed December 30, 1918. Serial No. 268,899.

To all whom it may concern:

Be it known that I, CHARLES H. HILL, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

My invention relates to electric switches and more particularly to circuit breakers and has for its object to provide a circuit breaking device which can be positively held in latched position during excessive shocks or vibrations of the device.

Circuit breakers heretofore known in the art have been held closed by a form of latching means which when subjected to jars and shocks, have been readily moved to release the circuit breakers and permit them to open. Particular instances of such excessive jars may be mentioned those occurring on battleships and similar war craft due to striking of shells and when firing heavy guns and especially broadsides. Under these conditions, circuit breakers of the type known to the prior art, when used on board ship to control signals, ammunition hoists and similar important apparatus have proved worthless, as such breakers are jarred open and severely cripple service.

The novel and improved form of circuit breaker embodying my invention overcomes these limitations of circuit breakers heretofore known and comprises a latching means which is positively held in latching position comprising a main and auxiliary latching mechanism adapted to remain in latching position unaffected by shocks or vibrations in more than one plane or direction.

The novel features which I believe to be characteristic of my invention will be definitely indicated in the claims appended hereto, while the features of construction and mode of operation will be understood by reference to the following description taken in connection with the accompanying drawing, which shows the preferred embodiments of my invention and in which:

Figure 1 is a side elevation of a circuit breaker embodying my invention shown in circuit closing position; Fig. 2 is a view of a portion of the breaker shown in Fig. 1, in circuit opening position, and Figs. 3

and 4 are front views of a portion of the circuit breaker, showing the latching means in latching and released positions respectively.

In Fig. 1, the circuit breaker is shown as comprising stationary main contacts 1 and 2 with which a movable current carrying member 3 coöperates to control the circuit through the breaker. As is usual in such devices, the breaker is also provided with co-operating secondary and tertiary contacts 4 and 5 to take the arc as the breaker opens. The circuit breaker is also provided with an operating member 6 which controls the current carrying member 3 through a suitable mechanism 7.

For restraining the circuit breaker in circuit closing position, I provide a novel and improved shock proof latching means which is unaffected by jars in more than one plane or direction. This latching means comprises a main latching means or mechanism for restraining the circuit breaker which is unresponsive or unaffected by shocks or jars in one plane or direction and a secondary or auxiliary latching means coöperating with the main latching means to prevent the release thereof from jars or shocks in another plane or direction, that is, the main and secondary latching means are so arranged that, irrespective of the direction of the shock, the two latching means can never be simultaneously jarred unlatched. The main latching means is thereby restrained or held in position by the auxiliary latching means and the circuit breaker held closed thereby.

The main latching means comprises a pivotally supported member or arm 8 preferably carried by the member 9 for the current carrying member 3. The arm 8 carries, preferably at one end thereof, a pivotally mounted dog or latching member 10 biased to latching position by a spring, not shown, and coöperating with a depending portion 11 on the operating member 6 to latch the operating member in circuit closing position. The portion 11 is provided with a latching means 12 adapted to engage with the latching pawl or member 10, the point of engagement, in circuit closing position, being below a line through the pivotal connections of arm 8 and member 10 forming thereby an underset device, the

member 10 being biased in this position. The arm 8 also carries, preferably integral therewith, an extended portion or finger 13 which coöperates with the dog or pawl 10, as will be later described. The opposite end of arm 8 is provided with a wide tail portion 14 carrying a lug 15.

Coöperating with the main latching means and particularly with the arm 8 is the auxiliary latching means comprising a pivotally mounted latching member 16, best shown in Figs. 3 and 4, movable in a plane substantially at right angles to the plane of movement of arm 8 and pivotally supported on a bracket or arm 17 carried by a member secured to the support or base. This latching member 16 is provided with a pin 18, having preferably a roller bearing support, with a shoulder 19 coöperative to move arm 8 into releasing position and with a latching arm 20 adapted to engage with the lug 15 on the tail 14 of arm 8 to restrain the arm 8 and hence the main latching means in latching position.

The latching member 16 is adapted to be moved to releasing position either automatically or by hand, for hand operation the member 16 being provided with a handle portion 21. For automatic release of the latching means, an electroresponsive device is provided, responsive to predetermined abnormal conditions in the circuit of the breaker and comprising preferably a magnetic yoke 22 operatively related to one terminal or stud of the circuit breaker and controlling a movable armature or tripping member 23 as is well known in the art. Pin 18 of latching member 16 is adapted to extend into the path of movement of armature 23 so that upon the movement of the armature to tripping position, as shown in Fig. 4, the pin 18, by means of the roller support, rides along the surface of the armature to rock the latching member 16 about its pivot and cause latching arm 20 to move out of engagement with lug 15. Subsequent movement of the latching member 16 about its pivot causes shoulder 19 to engage the tail portion 14 of arm 8 to rock the arm about its pivot, thus causing the latching member 10 to move into a position to release the operating member 6. For releasing the latching means at will, the handle 21 is merely moved clockwise to rock the latching member 16 about its pivot, causing the release of arm 8 as before described.

In moving the handle from switch opening (shown in Fig. 2) to switch closing position (shown in Fig. 1), the finger 13 on the arm 8 is provided to guide and assist the portion 11 of the operation member in the proper direction to come into latching engagement with the dog 10.

It is thus apparent with the main latching means comprising arm 8 and dog 10 re-

straining the circuit breaker in closing position is unaffected by jars and shock in its plane of movement and also that the auxiliary latching means comprising member 16 with arm 20 restrain the main latching means and is unaffected by vibrations in its plane of movement which is at right angles to the plane of movement of the main latching means so that a circuit breaker is provided which is effectively maintained closed under the most excessive jarring and shocks which can occur on shipboard.

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

1. In a circuit breaker, the combination with a movable current carrying member, of an operating member therefor, and latching means for rendering said operating member unaffected by jars or vibrations in more than one plane and for holding said member in circuit closing position.

2. In a circuit breaker, the combination with a movable current carrying member, of an operating member therefor, and means for holding said member locked against vibrations in two different planes and for holding said member in circuit closing position.

3. In a circuit breaker, the combination with a movable current carrying member, of an operating member therefor, and latching means for restraining said operating member in circuit closing position comprising two coöperating latching mechanisms whose planes of movement are at substantially right angles.

4. In a circuit breaker, the combination with a movable current carrying member, of an operating member therefor, and means for restraining the breaker in circuit closing position comprising a main latching means coöperating with said operating member and unaffected by vibrations in one plane, an auxiliary latching means for restraining said main latching means and unaffected by vibrations in another plane.

5. In a circuit breaker, the combination with a movable current carrying member, of an operating member therefor, a main latching means comprising a pivotally supported arm, and a latching pawl pivotally supported at one end of said arm and coöperating with said operating member to restrain said member in circuit closing position, and a movable latching member having a plane of movement substantially at right angles to the plane of movement of said arm and coöperating to restrain said arm in latching position, said latching member being movable either automatically or at will to releasing position.

6. In a circuit breaker, the combination with a movable current carrying member, of an operating member therefor, a main latching means coöperating with said operating

member to restrain said member in circuit
closing position, and an auxiliary latching
means in a plane substantially at right an-
gles to the plane of said main latching
5 means for restraining said main latching
means in latching position, and an electro-
responsive means for moving said auxiliary

latching means to releasing position, said
auxiliary latching means being provided
with means for moving said main latching 10
means to releasing position.

In witness whereof, I have hereunto set
my hand this 28th day of December, 1918.

CHARLES H. HILL.