(No Model.)

C. H. BEDELL.

AUTOMATIC SWITCH.

No. 493,009. Patented Mar. 7, 1893.

Fig. 1.

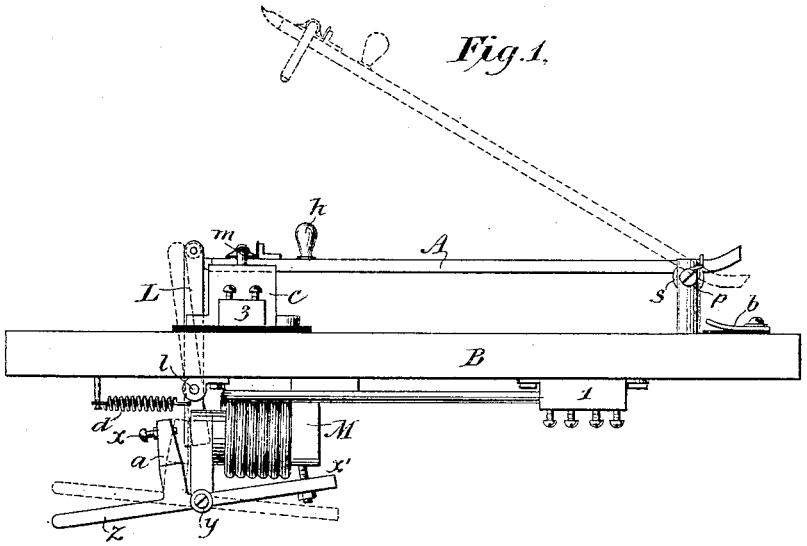


Fig. 2.

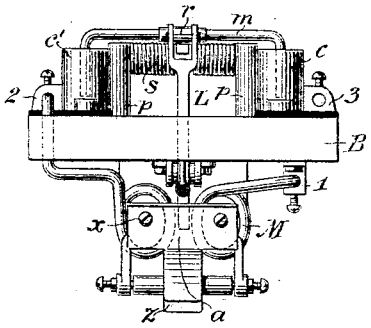
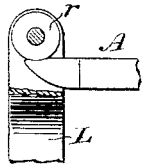


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES H. BEDELL, OF SWARTHMORE, PENNSYLVANIA, ASSIGNOR TO THE ELECTRO-DYNAMIC COMPANY OF PHILADELPHIA, OF PENNSYLVANIA.

AUTOMATIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 493,009, dated March 7, 1893.

Application filed June 25, 1892. Serial No. 437,930. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. BEDELL, a citizen of the United States, residing at Swarthmore, in the county of Delaware, in the State of Pennsylvania, have invented certain new and useful Improvements in Automatic Switches, of which the following is a specification.

The object of my invention is to facilitate the rapidity of action with which an automatic switch or circuit breaker operates in response to a predetermined strength of current or to a variation from the normal current. Such a switch is useful in preventing the overloading of a circuit or damage from an abnormally strong current.

I provide a spring retracted arm carrying at its free end a suitable double break point. This arm is normally held in position by a pivoted lever having a catch at one end which holds the free end of the first named lever in position to maintain the circuit closed. The contact between this holding lever and the circuit breaking lever is so arranged that there will be practically no friction at the point of contact and that the circuit breaking lever will be released upon the slightest movement of the second named lever. To this end I equip one of these levers with a roller which takes upon a flat surface of the other lever; by this device the surfaces in frictional contact are practically restricted to a geometrical line, and the roller facilitates the escape of one lever from contact with the other. The holding lever is held in position to maintain the first named lever in its normal position by a spring. In the same circuit with the circuit breaking points I place an electro magnet having a winding of sufficient conductivity to carry the normal current as well as an abnormal current of considerably increased volume. The armature of this electro magnet is normally retracted; it is pivoted at one end, and its free end is in position to trip the holding lever which in turn releases the circuit closing lever whenever said armature is attracted by its electro magnet.

The accompanying drawings illustrate the invention.

Figure 1 is a complete side elevation view of the switch. Fig. 2 is an end elevation. Fig. 3 is a detail view of the antifrictional contact between the holding lever and the lever carrying the break points.

B is a base of insulating material; at one end there are posts *p p* supporting an arbor carrying a long arm A; on this arbor there is a helical spring *s* operating to retract lever A. The shorter arm of A in its retracted position strikes upon the rubber buffer *b* which forms a limiting stop. On the opposite end of base B there are two mercury cups *c c'* Fig. 2.

m is a U-shaped copper strip fixed to the free end of lever A in position to plunge its two ends into the two mercury cups respectively.

L is the holding lever pivoted at *l* and retracted by spring *d*. The upper end of lever L carries a metal roller *r*. This roller takes upon and holds the free end of lever A. The lower end of lever L is in the path of movement of armature *a* next referred to.

M is an electro magnet wound with coarse wire; its armature *a* is pivoted at *y* and is retracted by the counterweight *z*. There are adjustable stops *x* and *x'* for limiting the extent of movement of the armature in either direction.

The electrical connection as shown in Fig. 1 are as follows: From screw cup 1 through magnet M to screw cup 2, thence to mercury cup *c'*, through the U shaped copper strip *m* to mercury cup *c* thence to screw cup 3. The terminals of the protected circuit are to be connected to cups 1 and 3. While a normal current is flowing the switch occupies the position shown by full lines in Fig. 1. Upon the occurrence of an abnormally increased strength of current the magnet M attracts armature *a* which in its movement toward the magnet strikes the lower end of the holding lever L overcoming the spring *d* and separating the contacting surfaces of lever L, that is, the roller *r*, and the free end of arm A. Arm A is released and immediately takes up the position shown in dotted lines in Fig. 1, the copper strip *m* being withdrawn from the mercury cups and the circuit is broken. The speed and freedom of action of this arrange-

ment of levers allows the circuit to be broken before any damage can occur from the complete establishment of an abnormally strong current.

What I claim, and desire to secure by Letters Patent, is—

1. The combination of an electric circuit, circuit breaking points in said circuit; a lever having circuit closing points in position to complete said circuits, a holding lever having at its free end a roller arranged in position to engage the free end of the circuit breaking lever, an electro magnet in the protected circuit, and an armature therefor in position to trip or move the holding lever and thus release the circuit closing lever upon an increase in the strength of current in the protected circuit, substantially as described.

2. The combination of an electric circuit, circuit breaking points in said circuit, a spring retracted lever having circuit closing points in position to complete said circuit, a spring controlled holding lever carrying at its free end a wheel or roller in position to engage the free end of the first named lever, an electro magnet in the protected circuit, and a normally retracted armature therefor in position to trip or move the second named lever and thus release the first named lever upon a predetermined increase in the strength of current in the protected circuit, substantially as described.

In testimony whereof I have hereunto subscribed my name.

CHARLES H. BEDELL.

Witnesses:
A. H. WINTERSTEEN,
GUSTAVE SIPES.