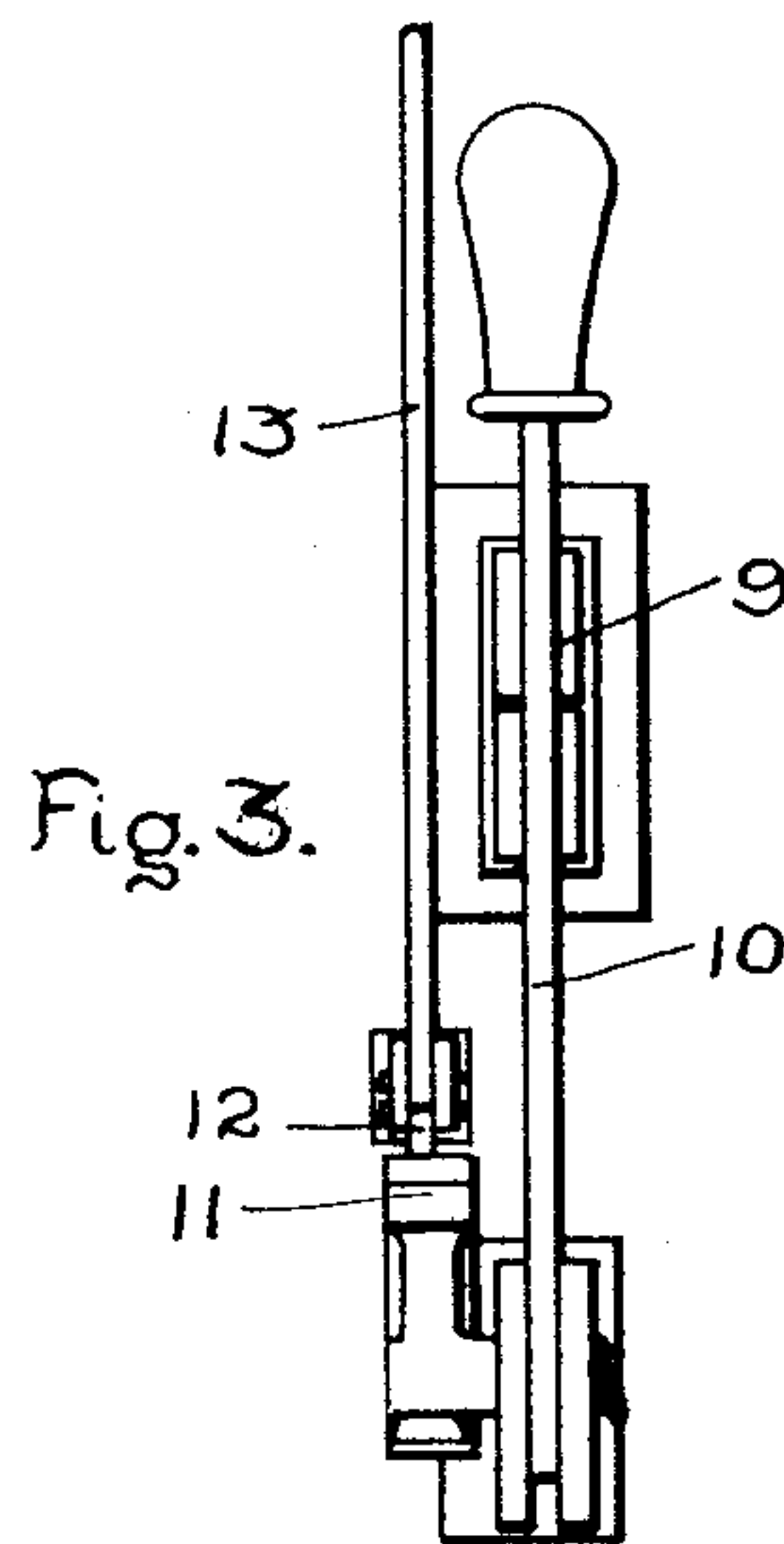
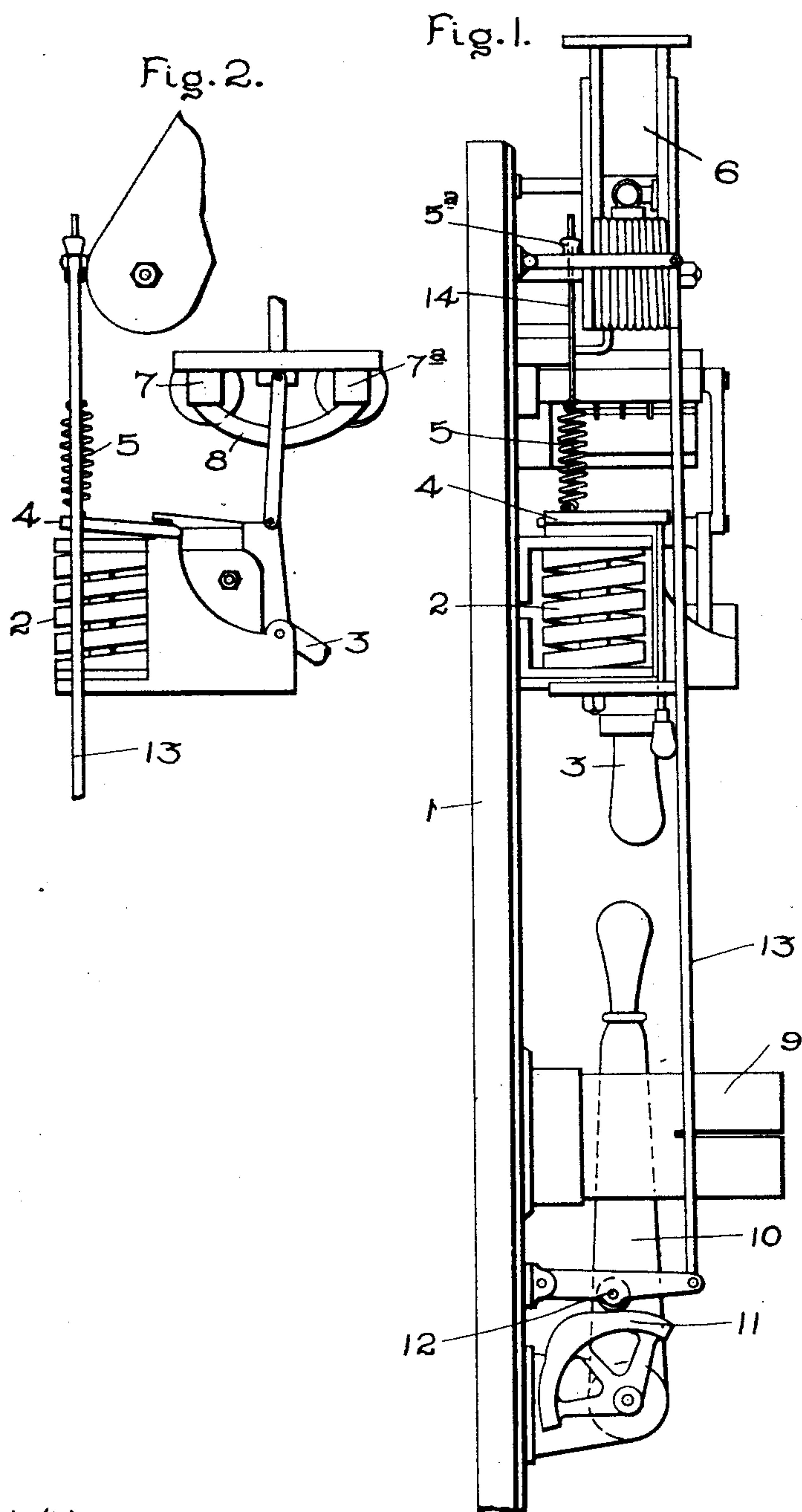


E. M. HEWLETT.
ELECTRIC SWITCH.

(Application filed Aug. 16, 1901.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

EDWARD M. HEWLETT, OF SCHENECTADY, NEW YORK, ASSIGNOR TO
GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 696,969, dated April 8, 1902.

Application filed August 16, 1901. Serial No. 72,235. (No model.)

To all whom it may concern:

Be it known that I, EDWARD M. HEWLETT, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric Switches, (Case No. 1,851,) of which the following is a specification.

In starting up electric motors considerable annoyance is often created by tripping of the circuit-breaker by the first rush of current when the circuit is closed. Motors are very often used without rheostats for graduating the starting-current, and in such cases the first closure of the switch permits a large volume of current to flow through the armature much in excess of that which the motor normally draws, and as a result the circuit-breaker which is calibrated for an ordinary overload is tripped when it is unnecessary. The armature of the motor will usually stand a heavy current for a very short period, such as is occupied in the motor climbing up to its normal speed, and it is therefore desirable to prevent the tripping of the circuit-breaker while closing the switch. My invention involves means for accomplishing this result and comprises, essentially, means of any character by which the circuit-breaker is rendered less sensitive while the switch is being shifted from its first position of contact to its full-closed position.

I am of course aware that rheostats are frequently employed in starting electric motors; but my invention relates more particularly to simple switches in which there is no graduation of the circuit resistance.

The best means I have yet devised for carrying out the invention comprises a mechanical device operated by the movement of the switch-blade by which the calibrating-spring of the circuit-breaker is put under increased tension for a short period after the circuit is first closed by the switch, and then a reduction of tension is effected. By this means the heavy current passing at the first instant of closure of the circuit is unable to overcome the tension of the calibrating-spring and cannot therefore trip the circuit-breaker; but after the motor has acquired its normal work-

ing speed the tension is relaxed, permitting it to respond to the designed overload for which the circuit-breaker was set or calibrated. Various means for effecting this result will occur to those skilled in the art; but the particular means I employ comprises a cam actuated by the switch by which a lever connected with the calibrating-spring is shifted to increase the tension of the spring at the moment when the switch-blade enters the clip, and then after the movement has progressed sufficiently to permit the motor to acquire speed a slope on the cam permits a relaxation of the spring tension. I desire to have it understood, however, that many other mechanical devices for effecting an increased tension and subsequent relaxation of the spring or of otherwise decreasing the sensitiveness of the circuit-breaker until the switch is fully closed are within the scope of my invention.

My invention therefore comprises a motor-starting switch and connections therewith by which the sensitiveness of the circuit-breaker is reduced for a short period during circuit-closure. In a more specific sense it comprises a switch provided with connections for putting increased tension on the calibrating-spring of the circuit-breaker during circuit-closure.

Other features of novelty will be more particularly hereinafter described and will be definitely indicated in the claims appended to the specification.

In the accompanying drawings, which illustrate the invention, Figure 1 is a side elevation of a motor-switch and circuit-breaker embodying my improvements. Fig. 2 is a partial view of the tripping device of the circuit-breaker on a plane at right angles to that of Fig. 1. Fig. 3 is an elevation of the switch on a plane at right angles to that of Fig. 1.

1 represents a supporting board of insulating material, preferably slate or some other fireproof insulating material as commonly employed in devices of this kind, in the upper part of which is mounted a trip-coil 2, a setting-handle 3, a trip-armature 4, a calibrating-spring 5, and an adjusting device 5^a therefor. These parts are of known con-

struction, representing a well-known type of circuit-breaker, and do not require further description.

6 represents the blow-out chute, the circuit-breaker shown in the drawings being of a magnetic blow-out type for extinguishing the arc of circuit rupture.

7 7^a represent the circuit-terminals, and 8 a bridging-contact commonly employed to close the main circuit.

9 represents a switch-clip of the ordinary type, except that it is longer than those commonly employed, and 10 a knife-blade switch-lever adapted to enter between the elastic jaws of the clip to effect good contact.

It will be understood by those familiar with the art without further description or illustration that the switch is employed to close a circuit including a counter-electromotive-force translating device—as, for example, an electric motor—through the circuit-breaker and that the latter is calibrated, by special adjustment of the spring 5, to open the circuit upon a definite overload. In starting up the motor, however, there is a great rush of current through its armature, since the armature has at the instant of starting no counter electromotive force, and this is sufficient to trip the circuit-breaker if the latter is set to respond to a moderate overload. This of course creates great annoyance, as the circuit-breaker must be held down in some way until the motor is at speed. I effect the result automatically by an attachment to the switch which renders the circuit-breaker less sensitive immediately after circuit-closure. One mode of effecting this comprises a cam 11, secured to the switch-blade at its axis, coöperating with a lever upon which is mounted a roller bearing on the periphery of the cam. The free end of the lever connects with a rod 13, which is connected at its upper end to a lever, through which passes freely the rod 14, upon which the adjusting-nut 5^a is mounted. The cam is set with relation to the axis of the switch-lever, so that when the latter first engages

the clip the roller 12 will bear upon the highest point of the cam, which adds to the tension of the spring, and of course renders the circuit-breaker less sensitive. Progressive movement of the switch-lever toward the board then gradually relaxes the tension of the spring by permitting the roller 12 to roll down an incline on the cam, so that when the switch is fully closed, as indicated in Fig. 1, the extra tension is fully relaxed and the circuit-breaker will be responsive to the overload for which it is normally set. In order to permit these results, the switch-clip is lengthened so as to give a considerable range of movement during contact with the switch-blade.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination with a motor-starting switch, of an automatic circuit-breaker in circuit therewith, and connections with the switch for temporarily raising the tripping-point of the circuit-breaker when the circuit is first closed.

2. The combination with a switch, of an automatic circuit-breaker in circuit therewith, and connections for temporarily increasing the tension of a calibrating-spring when the circuit is first closed.

3. The combination with a switch, of an automatic circuit-breaker in circuit therewith, and connections for temporarily increasing the retractile force of the tripping-armature when the circuit is first closed.

4. The combination with a switch, of an automatic circuit-breaker in circuit therewith, and mechanical connections between the switch and calibrating-spring of the circuit-breaker for temporarily increasing the tension of the latter during circuit-closure.

In witness whereof I have hereunto set my hand this 14th day of August, 1901.

EDWARD M. HEWLETT.

Witnesses:

BENJAMIN B. HULL,
MARGARET E. WOOLLEY.