(No Model.)

# H. H. BLADES.

## ELECTRIC SWITCH.

No. 457,339. Patented Aug. 11, 1891.

Fig-1-

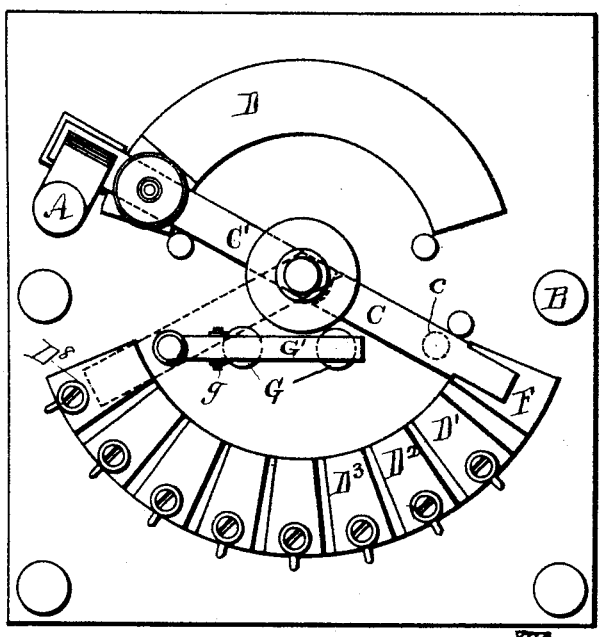



Fig-2-

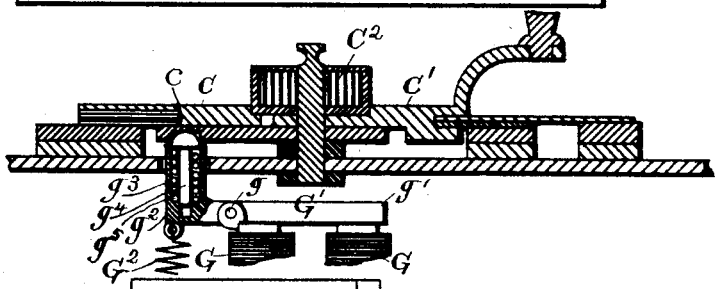
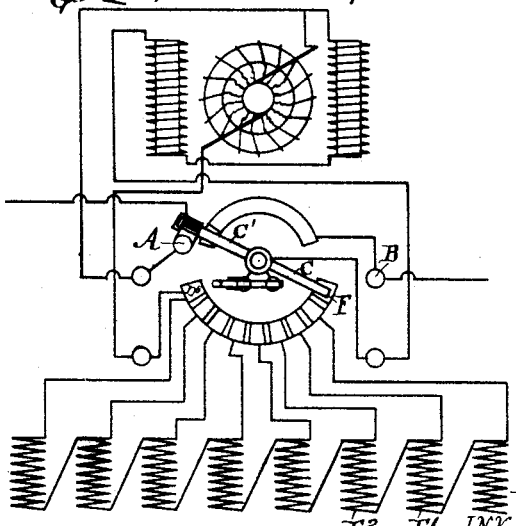



Fig-3-




WITNESSES

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# UNITED STATES PATENT OFFICE.

HARRY H. BLADES, OF DETROIT, MICHIGAN.

## ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 457,339, dated August 11, 1891.

Application filed November 10, 1890. Serial No. 370,897. (No model.)

*To all whom it may concern:*

Be it known that I, HARRY H. BLADES, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Electric Switches; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention has for its object the production of a switch for governing the admission of operative current into and cutting the same off from an electric motor or an electric machine, and is designed more particularly as a variation or improvement on the mechanism shown and described in my application for electrical switch, filed November 3, 1890, Serial No. 370,171, the arrangement of the circuits and mechanism being very similar to that shown in my above-named application, the difference being the manner of holding the switch-lever in its closed position by means of the magnet until the armature practically ceases its motion.

In the drawings, Figure 1 is a plan view of a switch embodying my invention. Fig. 2 is a vertical section on the line $x\,x$. Fig. 3 is a diagrammatic view showing how the switch is connected into the circuits.

In carrying out my invention, A and B represent the terminals for the outgoing and the incoming main-line circuit, as shown and described in my previous application.

C is the switch-lever, and D the segment on which the lever C rides after having broken from the terminal A.

D′ $D^2$ $D^3$, &c., represent a series of terminals corresponding with the series of resistances E E′ $E^2$, &c., F being a dead terminal.

The lever C is provided with a handle-section C′, pivoted to the portion C at the pivotal point of the switch, and a spring $C^2$ exerts its tension to hold the two sections of the lever in line with each other, so that if the handle-section C′ is moved around independently of the lever C, the said latter section will when released instantly fly around into line with the section C, the arrangement of this portion of the apparatus being substantially the same as shown and more fully described in my previous application.

G is an electro-magnet located on the circuit of the motor in substantially the same manner as the electro-magnet in my previous application. Upon the under face of the switch-lever C is an orifice or depression *c*. (Shown by dotted lines in Fig. 1 and shown also in Fig. 2.) The armature G′ of the electro-magnet is pivoted, as at *g*, beyond the poles of the magnet. The pivot *g* is independent of the hand-switch lever, and thus the armature G′ is supported independent of the hand-switch, so that one end *g′* of the armature may rest upon both poles of the magnet. The other end $g^2$ of the magnet is provided with an upwardly-projecting pocket $g^3$, within which is located a plunger $g^4$, the plunger being held up by the spring $g^5$. The top of the plunger is rounded so that it will fit into the orifice *c* in the under face of the lever C.

$G^2$ is a spring adapted when the current ceases to magnetize the electro-magnet to pull down the end $g^2$ of the armature and thus withdraw the plunger from the orifice *c*.

The operation is as follows: Before starting the motor the switch is in the position shown by the full lines in Figs. 1 and 3. The operation of starting the motor and the arrangements of the circuits are substantially the same as shown in my prior application above mentioned, current shunting through the electro-magnet G in the same manner as it shunted through the electro-magnet G in my former application, and current passing through the switch-lever terminals D′ $D^2$ $D^3$, &c., and resistances E E′ $E^2$, &c., the same as it did in my prior application. In my present application, however, when the lever C reaches the terminal $D^8$ it will have ridden onto the plunger $g^4$ and will be snugly held in place by the plunger entering the orifice *c*, instead of the switch-lever C carrying the armature of the magnet and being held by the armature resting on the magnet. In stopping the motor the section C′ of the switch is thrown back to its initial position by grasping the handle, the same as in my former application, thus cutting off the current. The magnetism in the electro-magnet is, however, maintained as in the former case until

the motor has come nearly to a rest, so that there is not sufficient magnetism within the magnet to hold the armature down. When this is the case the spring $G^2$ will pull the armature away from the magnet, thus dropping the plunger $g^4$ away from the switch-lever C and allowing the spring $C^2$ to return the lever to its initial position. It is thus apparent that the same object is attained both in this application and my former one, the two differing only that in my former application the switch-lever became the armature of the electro-magnet, while in this one the armature is independent from the switch-lever, but which acts through intermediate mechanism to hold the lever.

It is of course obvious that in this case as well as in my former case the electro-magnet may be on a direct shunt between the terminals or upon the armature-circuit instead of upon the field-circuit, as shown and described.

What I claim is—

1. In an electric motor, the combination, with a hand-switch adapted to open and close the circuit of the motor, of the electro-magnet in the circuit of the motor, an armature carried by a support independent of the hand-switch, and mechanism connected with the armature of said magnet adapted to engage and hold the switch in its closed position until the magnet is de-energized by the cessation of current through the motor-circuit, substantially as described.

2. The combination, with the main line of an electric motor, a series of terminals and resistances, and an electro-magnet in the circuit of the motor, of a pivoted two-part switch-lever joined at the pivotal point, a spring acting to maintain the parts in line with each other, an armature supported independent of the switch-lever, and mechanism operated by the armature to engage one part of the switch-lever and retain the same after the other part has been moved to cut off the current from the main line until the motor has nearly come to rest, substantially as described.

3. A switch for an electric motor, consisting of the two-part lever C and C′ and spring $C^2$, the main-line terminals A and B maintained open or broken by the switch in its initial position, the electro-magnet G, a series of terminals D D′, &c., governing a series of resistances, the switch-section C, adapted to sweep said terminals, means on the armature of the electro-magnet adapted to engage and hold the switch-section C in its final position, the switch-section C′, adapted to move independently to cut off the current from the main line, and the spring $C^2$ for returning the switch-section C to its initial position when released by the magnet-armature, substantially as described.

4. The combination, with a switch for an electric motor consisting of the two-part lever C C′ and spring $C^2$ for returning the part C to its initial position when released, of the electro-magnet G, the armature of said magnet being provided with a yielding projection adapted, when the armature is held to the magnet by the energizing of the magnet, to engage and hold the switch-section C until the magnet is de-energized and the armature released, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

HARRY H. BLADES.

Witnesses:

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