(No Model.)

J. A. NORTON.

ELECTRIC SWITCH.

No. 435,152. Patented Aug. 26, 1890.

Fig. 1.

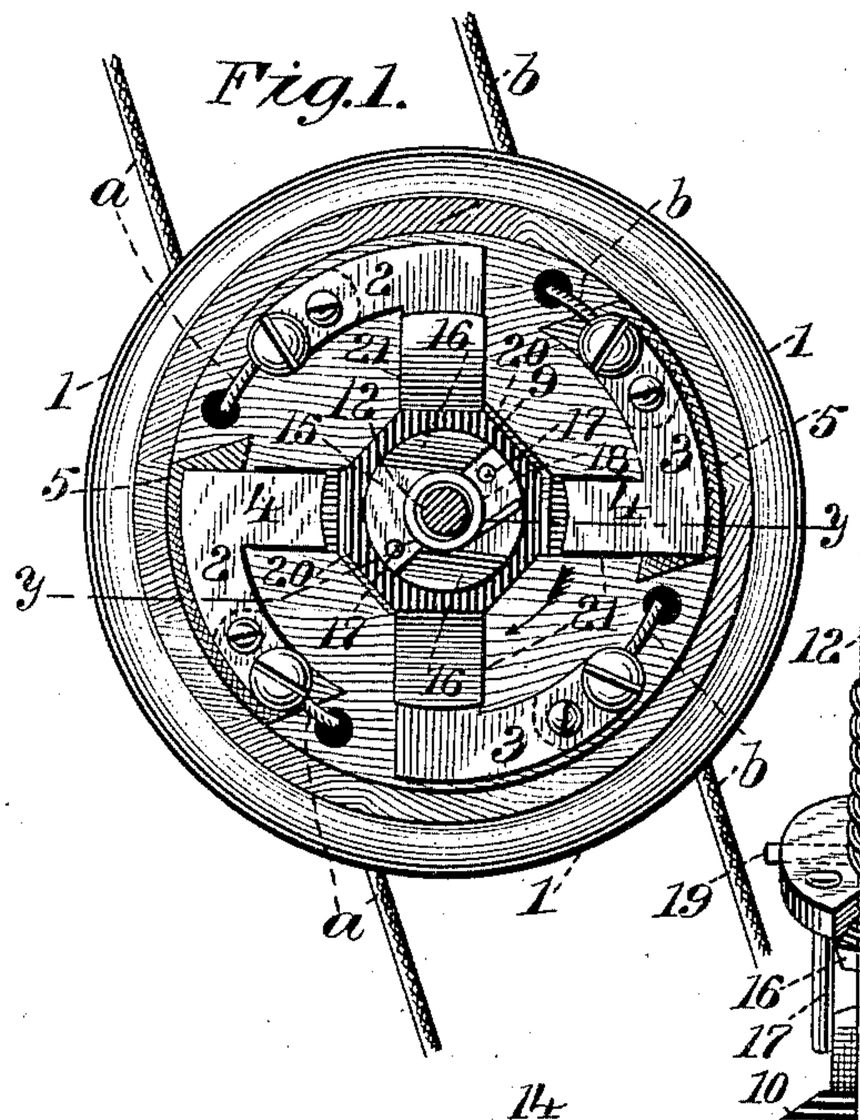
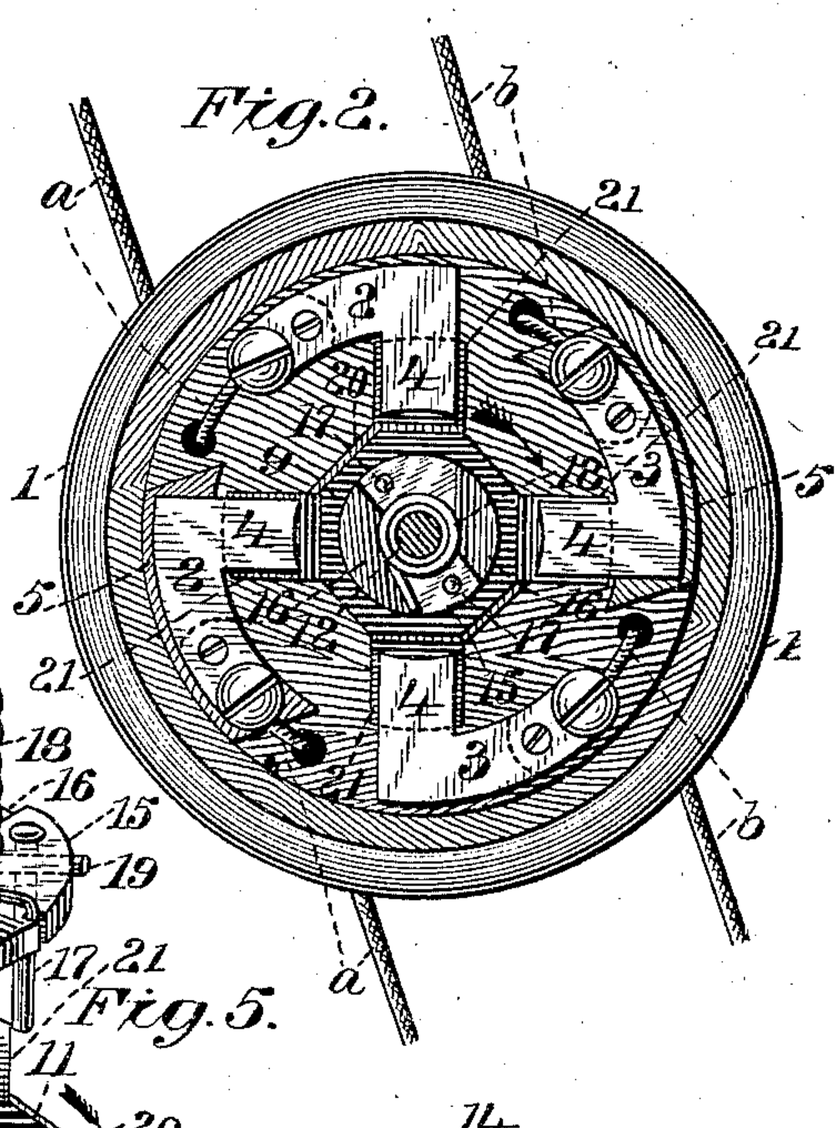


Fig. 2.



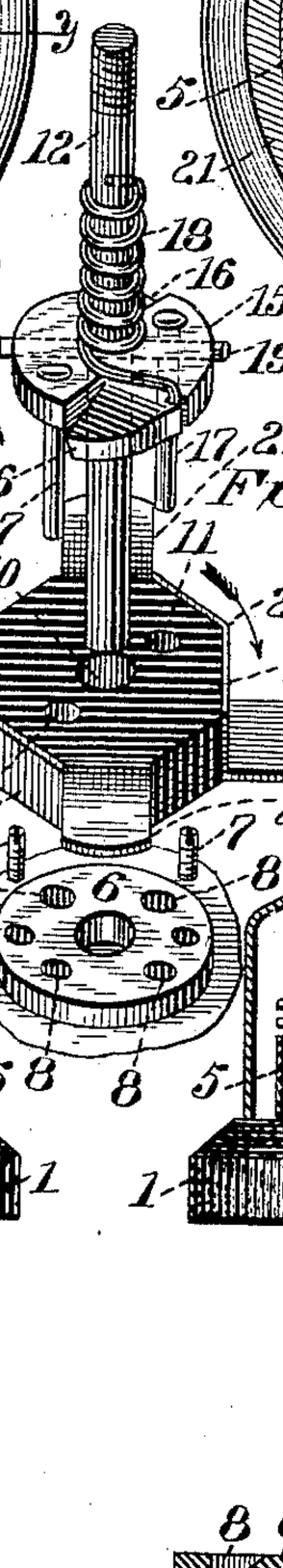


Fig. 5.

Fig. 3.

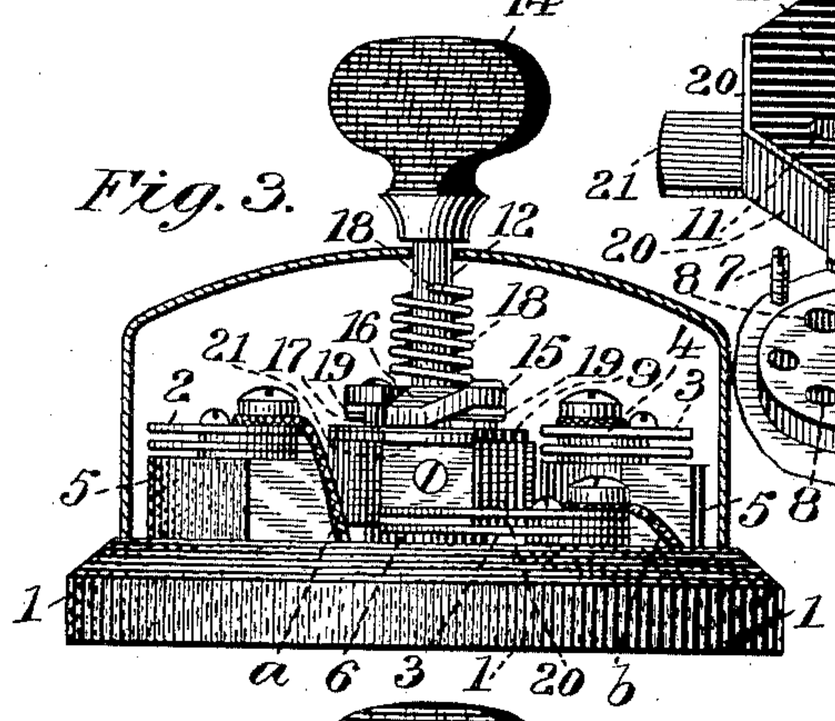


Fig. 4.

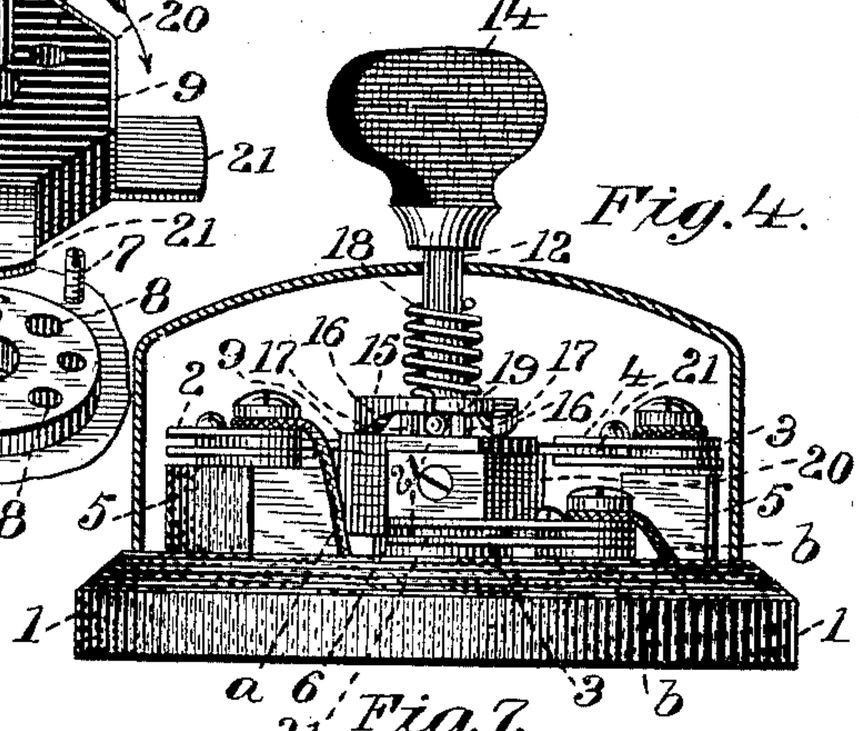


Fig. 6.

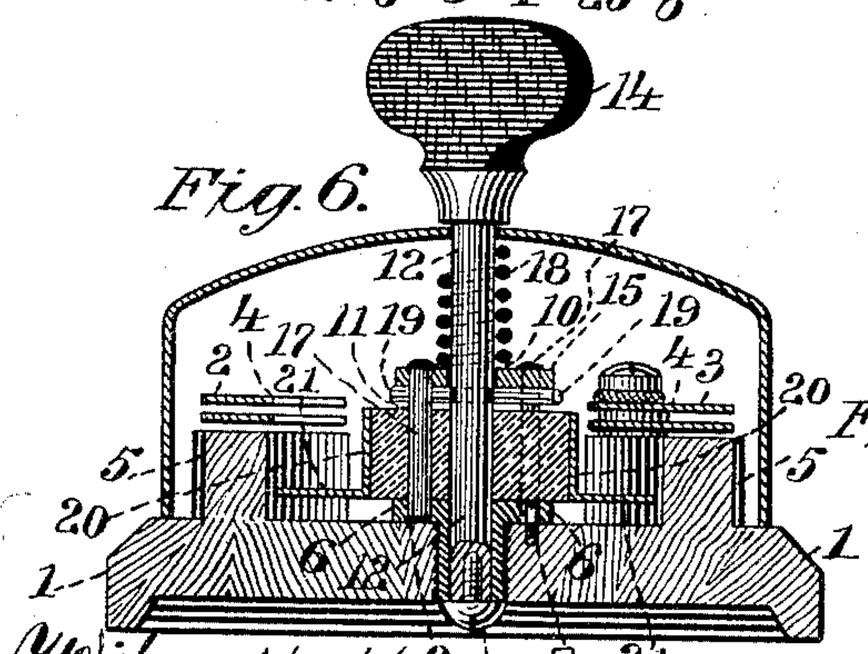


Fig. 7.

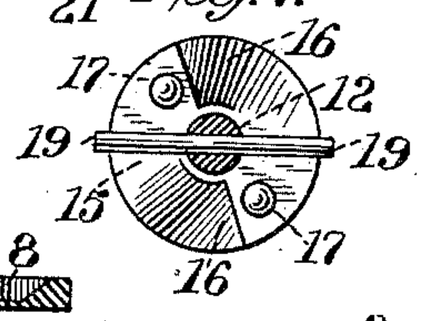


Fig. 8.

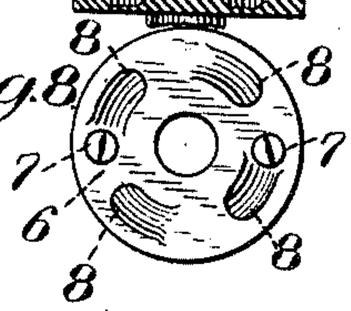
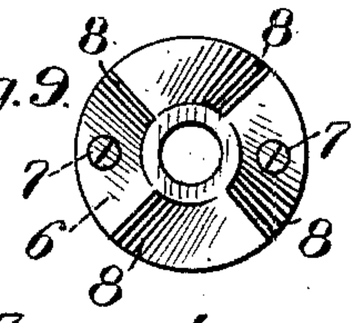


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN AMIDON NORTON, OF BRIDGEPORT, ASSIGNOR TO JOHN C. ENGLISH, OF NEW HAVEN, CONNECTICUT.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 435,152, dated August 26, 1890.

Application filed December 28, 1889. Serial No. 335,209. (No model.)

To all whom it may concern:

Be it known that I, JOHN AMIDON NORTON, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Electric Switches; and I do hereby 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 appertains to make and use the same.

My invention relates to certain new and useful improvements in electric switches, and is applicable either to switches of the single pole, double pole, or other variety, since my invention has to do with the means for actuating the contact making and breaking element rather than with any specific means for making or for breaking or for maintaining the electrical connection. Therefore in the ensuing description I do not desire to be understood as limiting my invention in the matter of any particular arrangements of contacts.

One of the objects of my invention is to provide an actuating-spring so connected to the contacting element as both to operate the latter and also to effect the arrest of said contacting element after it has completed the movement, which is the result of the first-named function of the spring.

Further objects are to provide means for effecting the tension of the actuating-spring, means for retaining the contacting element motionless during the process of straining the spring, and means for releasing said contacting element when the actuating-spring shall have reached the proper degree of tension. By these means I produce a switch in which the turning of the operating-handle effects no movement whatever of the contacting element until the release of the spring, when the change of contact is effected by means of said spring and with a degree of rapidity limited only by the strength thereof. Furthermore, should the spring be broken, or should it become incapable of any but its vertical exertion, still the switch is not, as is the case with other purely spring-actuated switches, utterly disabled, since there exists a connection between the spindle and the contacting element, whereby the latter may be operated with reasonable efficiency, and which will hereinafter be described. Moreover, the position of the contacting element when at rest in either position is not affected or insured by the spring.

With the ends hereinbefore set forth in view my invention consists in the construction and in the combination of mechanical elements hereinafter fully and in detail explained, and then recited in the claims, and particularly in the use in an electric switch of a contact-operating spring, means for straining said spring, and means for releasing the contact, so that the force imparted to the spring may be exerted on the latter.

In order that those skilled in the art to which my invention appertains may fully understand its construction and operation, I will describe the same in detail, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a plan view of a double pole-switch made in accordance with my invention and shown in its open position. The inclosing-cap is removed. Fig. 2 is a similar view showing the switch in its closed position. Fig. 3 is an elevation of Fig. 1. Fig. 4 is an elevation of Fig. 2. Fig. 5 is a perspective of the moving parts and a portion of the base, said parts being shown as in their proper relative position, but separated vertically so that the whole of each part is clearly visible. Fig. 6 is a vertical section taken through Fig. 1 at line *y y*. Fig. 7 is an inverted detail plan view of the cam-disk. Figs. 8 and 9 are modifications of the stationary locking element.

Like numerals denote the same parts in all the figures of the drawings.

1 is a base-block, which may be of wood, porcelain, or other suitable substance. For the purpose of making a double-pole switch I mount upon this base two pairs of terminals 2 3, which are suitably insulated from each other. When the switch is closed, the current flows between the terminals bearing the same numeral—that is to say, 2 and 2 are connected, and also 3 and 3. In construction

each of these terminals comprises two sheets or plates of suitable conductive metal whose body portions are curved to conform to a portion of a circle struck from the center of the base-block, and which bear inward projections 4, with which the contacting elements engage by passing between them.

In order to economize space upon the block, I arrange the members of each pair of terminals in different horizontal planes, and this I effect by means of upward projections 5, forming part of the base, one having secured thereon a terminal 2, and the other a terminal 3. The circuit-wires *a b* pass upward through holes in the base and connect by binding-screws or other suitable means with the terminals. In the middle of the base-block is a centrally-perforated hub 6, secured as against rotation relative to the block by means of pins or screws, as 7, or other suitable fastenings. In addition this hub has in its flanged upper surface four holes 8, which, as will hereinafter appear, serve as locking recesses.

At Figs. 8 and 9 there are shown slightly-modified devices, substantially equivalent in operation to the holes 8.

A block 9 is superposed and adapted to turn on the top surface of the hub 6, and said block, for the purposes of a double-pole switch, is preferably composed of insulating material, such as vulcanite. This block is shown as hexagonal in shape and has a central perforation 10, corresponding to the hole in the hub. It also has two smaller holes 11, one at either side the central hole, and whose purpose will presently appear.

12 is a vertical rotatable spindle, which passes downward through the block 9 and the hub, and is secured as against withdrawal by a screw 13 at its lower end. An operating-handle 14 is secured to the top of the spindle and constitutes the primary actuating element of the switch.

15 is a disk, having upon its lower side two inclined or cam faces 16, and having secured thereto two depending pins 17, adapted to slide freely within the holes 11 in the block. Said pins are longer than the vertical thickness of the block, and their ends take into the holes in the upper surface of the hub to a depth somewhat less than the height of the cam-surfaces on the disk. This disk when in assembled position rests as to its lowest portions on the top of the block and the spindle passes through it.

18 is a spiral spring, which is coiled loosely about the spindle. Its lower end is attached to the disk, its upper end to the spindle, and its central portion is vertically compressed so as to exert a downward pressure upon the top of the disk.

19 is a cross-pin, passed through and carried by the spindle beneath the disk.

The contacting devices in the double-pole switch, as shown in the drawings, consist of a pair of bent copper plates 20, secured upon opposite sides of the hexagonal block. Each plate has two outwardly-projecting contact points or arms 21, one at the top of the plate and adapted to engage either of the terminals in the higher plane, and the other at the bottom adapted to engage the terminals in the lower plane. The circuit-closer or contacting element, which consists of the block and plates just described, is continuously rotative, and it is apparent that when the switch is in its closed position the upper arms will be in contact with the upper terminals and the lower arms in similar contact with the lower terminals. (See Fig. 2.) A quarter-revolution from this position will carry the arms out of contact and to the position shown at Fig. 1—that is, with the upper contacts immediately over the lower terminals and the lower contacts immediately beneath the raised terminals. This position is seen at Fig. 1. Another quarter-turn will again carry the parts to their closed position, Fig. 2.

In the operation of my invention when it is desired to reverse the position of the switch, the spindle is turned by means of the handle. This operation, since the disk through which the spindle passes is held as against rotation by the engagement of its pins with the holes in the top of the hub, serves to wind the spring spirally about the spindle, thereby imparting to said spring a spiral tension proportional to the movement of the spindle. As the spindle turns it carries with it the cross-pin 19, which acts upon the cam-surfaces at the bottom of the disk to raise the latter against the vertical exertion of the spring. This upward movement of the disk operates to withdraw the pins that are carried by said disk from the locking-recesses in said hub, and when the cross-pin has passed under the disk to the highest point of the cam-surfaces of the latter the pins will have cleared the locking-recesses and the block be released, whereupon the spiral tension of the spring carries the disk and the block and the contacts around the spindle as an axis with great velocity. As the disk flies forward the cam-surfaces pass from the cross-pin and the vertical exertion of the spring forces the disk down, so that when the quarter of a turn which it is desired that the contacts shall make is completed the pins are forced downward into engagement with the two alternating locking-recesses, whereby the contacts are securely retained as against movement in either direction until the next operation of the handle, as heretofore described. In order that the switch may not be injured by turning the handle in the wrong direction, I prefer to attach said handle to the spindle by screw-threading. When attempted to be turned the wrong way, the handle will yield on its thread before sufficient power can be brought to bear to break the switch.

I have heretofore referred to the fact that the absence of the spring would not so cripple

the switch as to entirely prevent its operation, and this will be readily understood from the fact that in the absence of the spring the continued movement of the cross-pin after lifting the disk would bring said pin into contact with the depending locking pins or bolts, and by this means the contacting element may be turned with the handle.

In the foregoing description and drawings I have represented a certain exact form of construction in embodiment of my invention for the purpose of fully explaining the principle of operation; but I do not desire to be limited strictly to said construction, since many minor changes entirely within the province of mechanical skill may be made therein without departing from the spirit of my invention.

It will further be understood that the term "electric switch" is used in said claims in its most comprehensive sense, as signifying any form of device whereby an electric current is adapted to be switched, broken, or controlled.

I claim—

1. In an electric switch, the combination, with the base and the terminals, of a rotative circuit-closer, an independently-rotative spindle, a spiral spring coiled about the spindle and connected thereto as to one end and as to the other end with a locking and releasing device secured to the circuit-closer, and means carried by the spindle and adapted to lift the movable locking device and thereby release the circuit-closer, substantially as set forth.

2. In an electric switch, the combination, with the base and the terminals, of a rotative circuit-closer, a movable spindle having a handle, a movable locking and releasing element arranged around the spindle and connected to the circuit-closer, a stationary locking element secured to the base beneath the circuit-closer, and the spiral spring having its ends connected, respectively, to the spindle and to the movable locking element, said spring adapted both to effect the engagement of the locking element and to impart rotative movement to the circuit-closer.

3. In an electric switch, the combination, with the terminals, of a suitable circuit-closer, a rotative operating-spindle passing through said circuit-closer, locking and releasing devices connected with and carried by said circuit-closer, means for releasing the circuit-closer, and a spiral spring coiled about the spindle, said spring adapted to impart rotative movement to the circuit-closer and by its expansive action to effect the engagement of the locking devices, substantially as set forth.

4. In an electric switch, the combination, with the base and the terminals, of the rotative circuit-closer, the independently-rotative spindle, the spiral spring wound about the spindle and connected as to one end to said spindle and as to the other end with a movable locking device secured to the circuit-closer, and the cross-pin carried by the handle and adapted to raise the movable locking device and release the contacting element, substantially as set forth.

5. In an electric switch, the combination, with the base and the terminals, of the rotative block having the contact-arms secured thereto, the hub provided with locking recesses and arranged beneath the block, the rotative spindle extending through said block, the disk having the inclined surfaces and carrying the locking-pins, the spiral spring having its ends secured, respectively, to the disk and the spindle, and means carried by said spindle for raising said disk against the vertical pressure of the spring, substantially as described.

6. In an electric switch, the combination, with the base provided with locking-recesses, of the terminals mounted upon the base, the rotative perforated contact-carrying block, the spindle passing through said block and rotatable relative thereto, the disk about the spindle having the inclines on its lower surface, the locking-pins depending from said disk, the cross-pin carried by the spindle, and the spiral spring whereby rotary movement is imparted to the block and whereby downward pressure is applied to the disk, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN AMIDON NORTON.

Witnesses:

S. H. HUBBARD,

J. M. ORFORD.