

F. W. SMITH.
ELECTRIC SWITCH.
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970,963.

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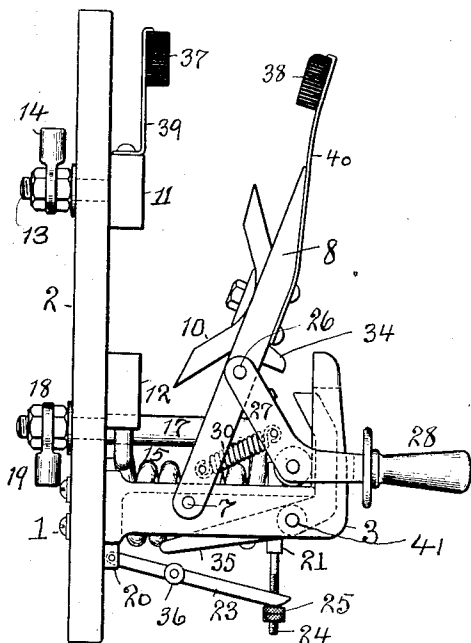


Fig. 1.

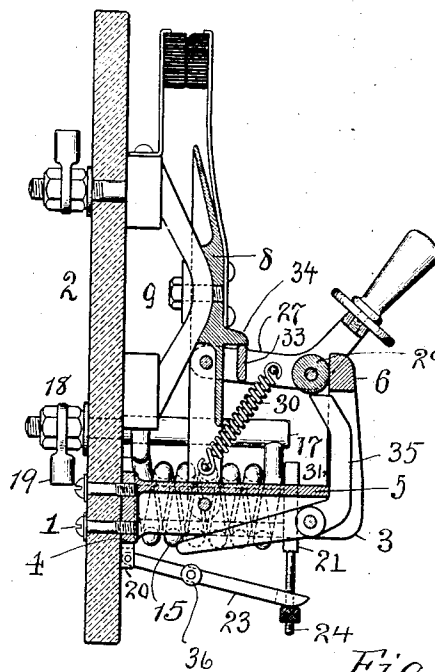


Fig. 3.

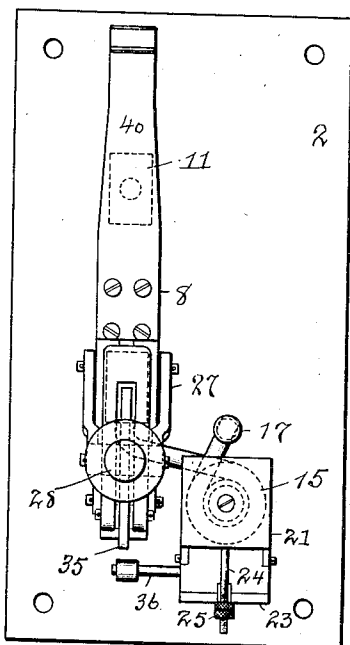


Fig. 2.

Witnesses:
May J. Mc Garry
Selma T. Porter.

Inventor
Frank W. Smith
By his Attorney
Karl Benjamin

UNITED STATES PATENT OFFICE.

FRANK W. SMITH, OF NEW YORK, N. Y., ASSIGNOR TO SUNDH ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC SWITCH.

970,963.

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To all whom it may concern:

Be it known that I, FRANK W. SMITH, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Electric Switches, of which the following is a specification.

The invention relates to circuit closing switches, and consists in the construction, whereby the switch lever is moved, supported and guided into close contact with the circuit terminal blocks on the panel, and whereby said lever having become locked in position, is automatically released by a current of predetermined strength on the circuit which it closes.

In the accompanying drawings—Figure 1 is a side elevation of my improved switch, Fig. 2, a face elevation, and Fig. 3 is a vertical section thereof.

Similar numbers of reference indicate like parts.

Secured by bolts 1 to the base panel 2, preferably of slate, is a metal bracket 3, which extends outward from and at right angles to the base and is then turned upward parallel to said base. Said bracket is formed of two similar members integrally united by cross plates at 4 and 5, and by a bar at 6, the bolts 1 being received in the cross plate 4. Pivoted at 7 on the outer sides of the bracket is a forked switch lever 8, to the solid upper portion of which is secured by the bolt 9, the contact piece 10 which, when the lever 8 is swung inwardly on its pivot, makes contact at its ends with the metal blocks 11, 12 secured on the panel 2. The fastening bolt 13 of block 11 extends through the panel and is threaded and provided with nuts to form a binding post for the metal terminal 14 of one of the circuit conductors leading to said switch. The block 12 is connected to the coil 15 of an electro-magnet, the core of which has its pole pieces 20, 21 in the form of quadrangular plates, the pole piece 20 being secured to the panel 2. The other end of coil 15 is attached to a metal rod 17 secured to the panel by a bolt 18 which forms a binding post for the terminal 19 of the other circuit conductor leading to the switch. To the lower edge of pole piece 20 is pivoted the end of the swinging armature 23. From the lower edge of pole piece 21, a threaded rod 24 ex-

tends downwardly through a notch in the end of armature 23, and below said armature carries nuts 25 which form a stop limiting the drop of said armature. By suitably adjusting said nuts on rod 24, the end of the armature can be normally placed as near to the lower edge of pole piece 21 as may be desired.

Pivoted at 26 to the switch lever 8 is a bifurcated bent operating lever 27, terminating in a handle 28. The upwardly extending portion of the bracket 3 comes between the arms of lever 27, and at the bend in said lever and between said arms is pivoted a roller 29. Also between said arms is a pin to which is secured one end of a helical spring 30, the other end of said spring being secured to a similar pin between the arms of switch lever 8.

The inner surface 31 of the upwardly projecting portion of bracket 3 forms a straight edge guide for the roller 29. The upper surface of bracket bar 5 forms a support for the roller 29, and hence for the switch lever 8 when said lever is in the position shown in Fig. 1 to open circuit. When the handle 28 is lifted, the roller 29 takes a bearing upon the straight edge 31, and the operating lever 27 being then constrained to move in a straight line, produces a powerful thrust upon the lever 8, so forcing the contact piece 10 against the blocks 11 and 12, so closing circuit between the conductors connected to binding posts 13 and 18. When this is done, the roller 29 finally bears upon the cross bar 6 of bracket 3. In order further to support the lever 8 in position, a bar 33 extending between the arms of lever 27 comes under a shoulder 34 formed on the switch lever 8. Upward movement of arm 27 is resisted by the retracting spring 30. Hence it is necessary to provide a means for supporting said arm in its elevated position. The bent latch 35 pivoted between the sides of bracket 3 forms such a means. The upper portion of said latch is inclined inwardly, and the upper edge is straight, so that the roller 29 in moving upward, strikes the inclined inner edge of said latch and moves it outwardly. When the roller passes above the upper extremity of the latch, said extremity swings inward beneath the roller and so locks the parts in position as shown in Fig. 3.

The pivoted armature 23 is adjusted by

means of the nuts 25 to stand normally at such a distance from the pole piece 21 as that the field created by a given current passing through magnet coil 15 will not be sufficient to lift said armature. When the current, however, increases to some predetermined extent, the magnet attracts said armature, and thus brings an arm 36 projecting from the side thereof against the lower arm of the latch 35, raising said latch arm, and so removing the support from beneath the roller 29. The retracting spring 30 is then free to operate, drawing down the lever 27, swinging the lever 8 outward and breaking circuit at the blocks 11 and 12.

At 37 and 38 are shown the usual carbon breaks common in devices of this class, for inserting high resistance on the break of current, consisting of carbon blocks supported by spring arms 39 and 40, which are respectively attached to block 11 and lever 8.

I claim:

1. The combination of a support, circuit contacts, a bracket projecting from said support, a guide bar on said bracket, a pivoted switch lever closing circuit at said contacts, an arm pivoted to said lever and bearing on said guide bar, a retracting spring connected to said lever and said arm, means for retaining said switch lever in circuit closing position, and means for releasing said retaining means.

2. The combination of a support, circuit contacts, a bracket projecting from said support, a guide bar on said bracket, a switch lever pivoted on said bracket and closing circuit at said contacts, an arm pivoted to said lever, a roller on said arm bearing on said guide bar, a retracting spring connected to said lever and said arm, a latch for retaining said switch lever in circuit closing position, and means for releasing said latch.

3. The combination of a support, circuit contacts, a bracket projecting from said support, a switch lever pivoted on said bracket and closing circuit at said contacts, a bent arm pivoted to said lever, a roller on said arm bearing on said bracket, a retracting spring connected to said lever and said arm, a latch pivoted on said bracket and engaging said roller when said arm is in position to cause said switch lever to close circuit, and means for releasing said latch.

4. The combination of a support, circuit contacts, a bracket on said support, a guide bar on said bracket, a pivoted switch lever closing circuit at said contacts, a shoulder on said switch lever, an arm pivoted on said lever, a bar on said arm engaging said shoulder, a roller on said arm bearing on said guide bar, a retracting spring connected to said lever and said arm, means for retaining said lever in circuit closing position, and means for releasing said retaining means.

5. The combination of a support, circuit contacts, a bracket on said support, a guide bar on said bracket, a switch lever pivoted on said bracket and closing circuit at said contacts, an arm pivoted to said lever, a roller on said arm bearing on said guide bar, a retracting spring connected to said lever and said arm, means for retaining said switch lever in circuit closing position, and means controlled by the circuit closed by said switch lever for releasing said retaining means.

6. The combination of a support, circuit contacts, a bracket on said support, a guide bar on said bracket, a switch lever pivoted on said bracket and closing circuit at said contacts, an arm pivoted to said lever, a roller on said arm bearing on said guide bar, a retracting spring connected to said lever and said arm, a latch for retaining said switch lever in circuit closing position, an electro-magnet in the circuit closed by said switch lever, and a pivoted armature for said magnet, the said armature operating said latch to release the same when attracted by said magnet.

7. The combination of a support, circuit contacts, a bracket on said support, a guide bar on said bracket, a switch lever pivoted on said bracket and closing circuit at said contacts, an arm pivoted to said lever, a roller on said arm bearing on said guide bar, a retracting spring connected to said lever and said arm, means for retaining said switch lever in circuit closing position, means controlled by the circuit closed by said switch lever for releasing said retaining means, and means for regulating the operation of said controlling means in accordance with a predetermined current strength on said circuit.

8. The combination of a support, circuit contacts, a bracket on said support, a guide bar on said bracket, a switch lever pivoted on said bracket and closing circuit at said contacts, an arm pivoted to said lever, a roller on said arm bearing on said guide bar, a retracting spring connected to said lever and said arm, a latch for retaining said switch lever in circuit closing position, an electro-magnet in the circuit closed by said switch lever, and a pivoted armature for said magnet, the said armature operating said latch to release the same when attracted by said magnet, and means for adjusting the normal distance of said armature from the pole of said magnet.

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

FRANK W. SMITH.

Witnesses:

GERTRUDE T. PORTER,
MAY T. MCGARRY.