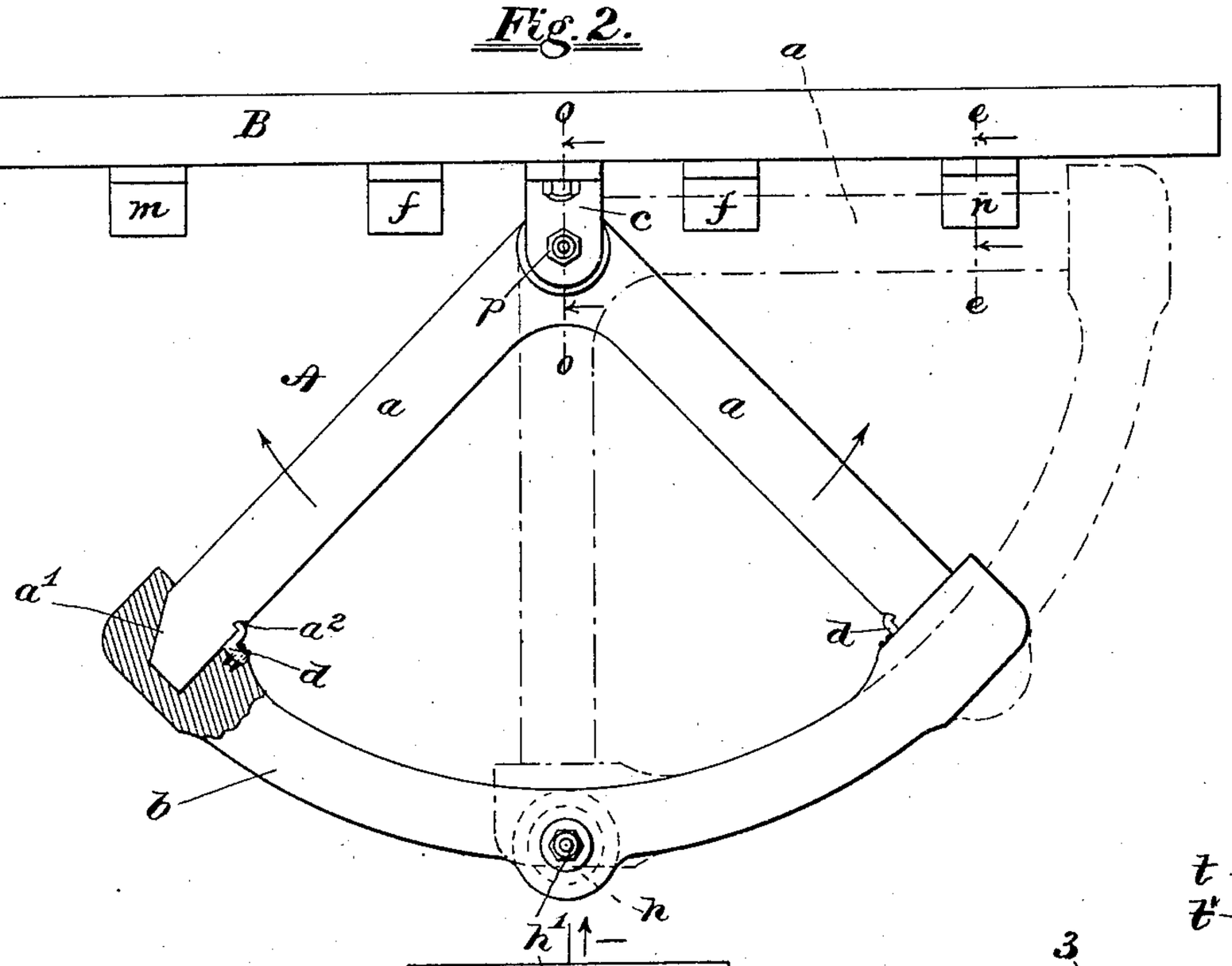
(No Model.) 2 Sheets—Sheet 1.

H. ROSS.

ELECTRIC SWITCH.

No. 548,819. Patented Oct. 29, 1895.

Fig. 2.



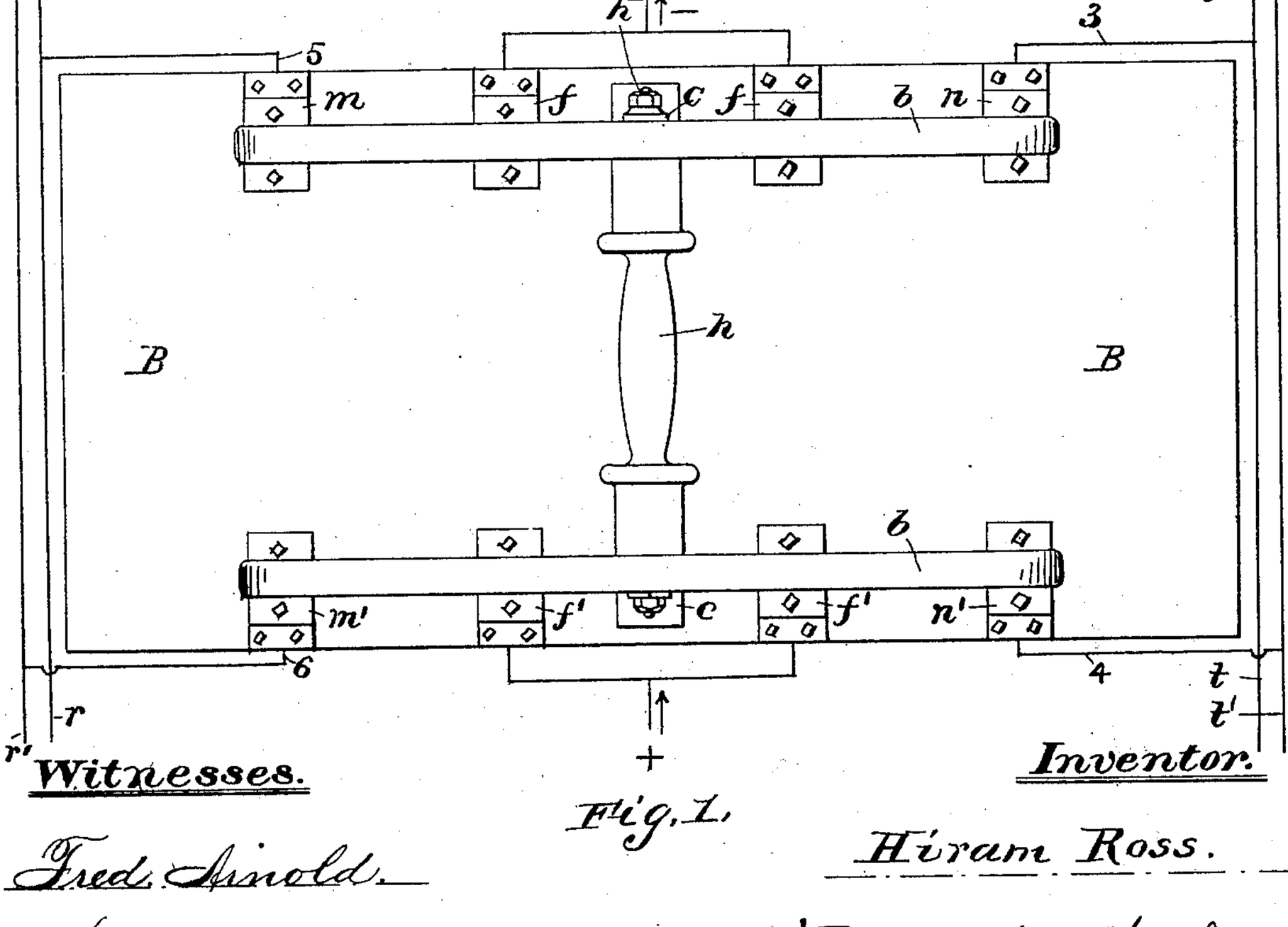


Fig. 1.

Witnesses.

Fred. Arnold.

Remington Sherman

Inventor.

Hiram Ross.

by Remington & Hamilton
Attys.

(No Model.) 2 Sheets—Sheet 2.

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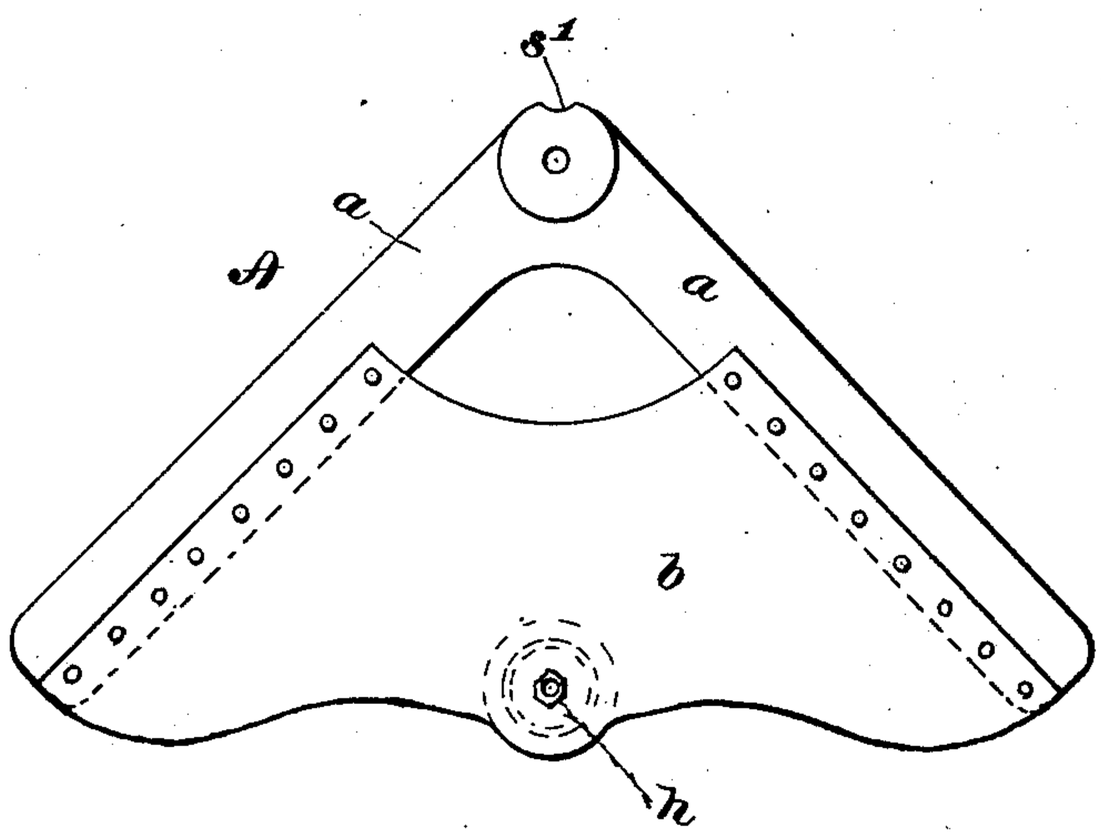

Fig. 6.

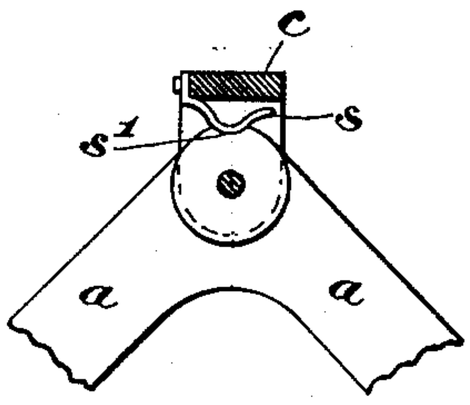

Fig. 3.

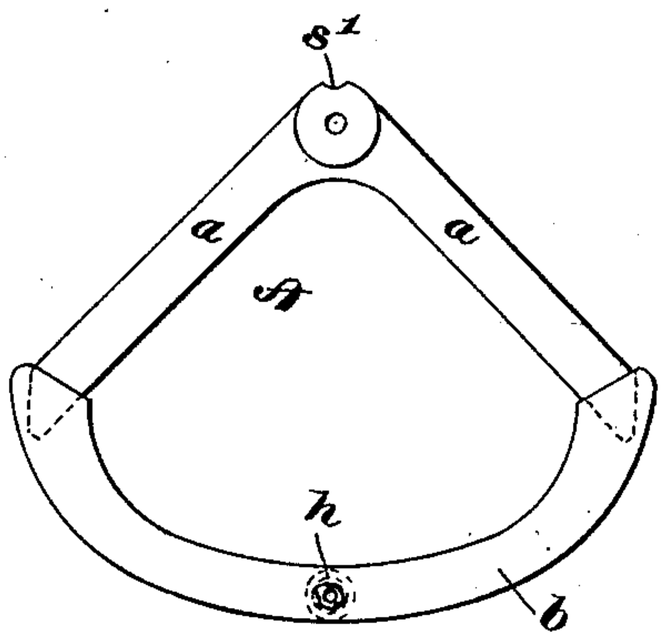

Fig. 7.

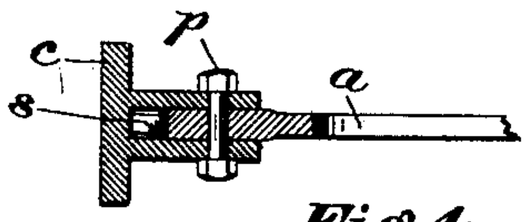

Fig. 4.

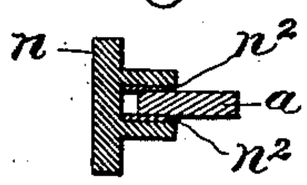

Fig. 5.

Witnesses.

Fred. Arnold.

Remington Sherman

Inventor.

Hiram Ross.

by Remington & Hawthorn
Atty's.

UNITED STATES PATENT OFFICE.

HIRAM ROSS, OF PROVIDENCE, RHODE ISLAND.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 548,819, dated October 29, 1895.

Application filed July 17, 1895. Serial No. 556,292. (No model.)

To all whom it may concern:

Be it known that I, HIRAM ROSS, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, 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, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in the class of electric switches adapted more particularly for use in switchboard construction; and it consists, essentially, of a pivotally-mounted lever composed of a pair of laterally-separated quadrant-shaped current-conducting members or arms, a pair of non-conducting members each forming a tie secured to and uniting the ends of said conducting members, and a handle interposed between and fixed to said ties, through which the lever is adapted to be actuated, all as will be more fully hereinafter set forth and claimed.

The object I have in view is to provide a safe, efficient, and comparatively inexpensive switch for electrically connecting the poles of a circuit, with which the switch is arranged to simultaneously engage, with one or the other of two pairs of feeders or conductors, as desired.

Hitherto in stations having switches or circuit-changers of the "double-acting" type, as it may be termed, especially those employed for transferring the heavy currents produced by large direct-current generators, it has been usual for the operator or electrician in charge to manipulate them by a comparatively long lever or handle, thereby requiring considerable time and imposing a degree of risk upon the operator. At the same time the liability of flashing was ever present, with its attendant disadvantages to the operator and switch. Moreover, in such former devices, when communicating with lamp-circuits, the act of switching was rendered apparent in the lamps for the time being by the unsteadiness of the lights.

In the accompanying two sheets of drawings, Figure 1, Sheet 1, is a side elevation of my improved electric switch in its normal position. Fig. 2 is a plan view of the same. Fig. 3, Sheet 2, is a partial plan view showing the pivot construction, &c. Fig. 4 is a transverse sectional view taken on line *o o* of Fig. 2. Fig. 5 is a similar view taken on line *e e* of Fig. 2, and Figs. 6 and 7 are plan views showing modifications of the switch-lever.

A, again referring to the drawings, indicates the switch-lever as a whole, B a portion of a non-conducting switchboard, and *c* insulated stands secured to the switchboard, having the switch-lever pivotally mounted therein on the bolts or pins *p*.

The lever A is quadrant-shaped and is provided with upper and lower current-conducting metallic arms *a*. Each of said arms is composed of two integral bars or blades arranged in the form of a quadrant, as stated, the included angle being, say, ninety degrees. To the outer ends of the arm-blades is removably secured a curved rim or tie *b*, wholly of wood or other suitable non-conducting material. The said ends are inserted in correspondingly shaped sockets *a'*, Fig. 2, formed in the adjacent portions of the rim *b*. As drawn, the ends are provided each with a notch a^2, having a hook or catch *d* therein, the latter in turn being secured to the rim *b*. Thus it will be apparent that the rim or tie *b*, of insulating or non-conducting material, is firmly secured to the blade, the ends of the latter being concealed therein, as well as being wholly protected and insulated. By referring to Fig. 1 it will be seen that there are two arms, one above the other, the two insulating-rims *b* thereof being united by a central wooden operating-handle *h*, having a bolt *h'* passing through them. It is apparent that while the two arms form one lever A, capable of simultaneous movement, they are completely insulated from each other. The hub portion of the arms *a* is provided each with a notch *s'*, capable of receiving a spring-catch *s*, secured to the respective stands *c*. By this arrangement the lever is maintained in the normal or central position (shown in Fig. 2) when it is not in actual service.

To the switchboard B is secured a series of current-conducting contact plates or members, the same being insulated from each

other and from the board itself substantially as usual in apparatus of this class. As drawn, one pole or terminal *l* of a source of electricity is connected with the two upper contact-plates *f f*, (which are practically one plate,) located contiguous to the lever-fulcrum, the other pole 2 being connected with the two corresponding lower plates *f' f'*. (See Fig. 1.)

r r' indicate the two branch or feeder conductors, say, of an electric-light circuit, and *t t'* the conductors of another circuit. The upper and lower left contact-plates *m m'* connect with said feeders *r r'*, respectively, by means of the short conductors 5 and 6. The other or right contact-plates *n n'* connect with the feeders *t t'* by means of the respective conductors 3 and 4. Now by swinging the lever A to the right to its limit, as indicated by dotted lines in Fig. 2, the poles 1 and 2 of the generated current will be transferred from the corresponding plates *f f'* through the conducting-arms *a a* of the lever to the plates *n n'*, and from the latter to the circuit-feeders *t t' via* the respective branch conductors 3 and 4. The circuit is interrupted or broken by simply swinging the lever to the central or normal position, and by swinging the lever A to the left to its limit the feeders *r r'* are energized from the poles 1 and 2 through the medium of the conducting-arms and the corresponding series of contact-plates.

By means of my improvement the operator is enabled to actuate the switch-lever with greater ease and safety. The lever itself is rendered light, yet strong, the outer ends of the blades or arms being fully insulated by means of the connecting-tie *b*, of non-conducting material. In lieu of connecting the ends of the light-conducting arms *a* by the rim shown in Fig. 2 I may employ the rim *b*, substantially as shown in Fig. 7, or the arms may be connected by a flat plate *b*, of insulating material, as wood or vulcanite, as shown in Fig. 6.

The upper and lower non-conducting ties or arm connections *b* are united by a central operating-handle *h*, of non-conducting material.

I would further add that in switches of the class to which my improvement is more particularly adapted for use the outer ends of the switch-levers have hitherto been unprotected or non-insulated, although in one case the switch-lever was provided with an insulating-handle or cross-bar extending between and secured to conducting-arms integral with the conducting-bars. In such former constructions the act of manipulating the switch-lever was attended with great risk to the operator, because the ends of the handle were in contact with the conductors. Consequently the person was liable to become injured by reason of the close proximity to the conductor and the possible flashing following the separation of the lever from the contact-plates.

In my improved switch accidents incident to manipulating it are wholly overcome, since the handle is not secured to conducting-arms, but to interposed ties made entirely of non-conducting material, which in turn are firmly secured to the current-conducting arms of the switch-lever.

It is to be understood that I make no claim to the construction of the contact-plates, and in fact the jaws of these may be provided with copper sides or cheeks, as at n^2, Fig. 5, substantially as usual.

I claim as my invention—

1. The switch-lever A, substantially as hereinbefore described, the same comprising a pair of laterally separated arms, as *a*, composed of current-conducting material, capable of being pivotally secured to a switch-board, each of said arms being substantially V-shaped and provided with two blades or wings; ties, as *b*, composed of suitable non-conducting material, firmly secured to and uniting the free ends of the wings of said conducting arms, and an operating-handle, as *h*, composed of non-conducting material interposed between and rigidly secured to said ties, whereby the handle and ties are wholly protected or insulated from the lever.

2. In a switch-lever for electric circuits, the switch-board or base, as B, a main series of upper and lower contact-plates secured to the base and connected with the poles of a generator of electricity or other primary circuit, and a plurality of upper and lower contact-plates connected with the poles of a pair of feeder or branch circuits, in combination with a switch-lever pivoted to said base, consisting of a pair of laterally separated V-shaped current-conducting arms capable of being swung into and out of engagement with said contact-plates, a pair of ties, as *b*, composed of non-conducting material firmly secured to and uniting the outer end portions of the said pair of current conducting arms, and a non-conducting operating handle secured to and uniting said non-conducting ties, substantially as described.

3. A switch-lever consisting of two current-conducting V-shaped pivoted arm members *a* located in different planes, a tie *b* composed wholly of non-conducting material for each of said arm members detachably secured to the outer ends thereof, and a handle composed of non-conducting material rigidly uniting both of said ties and through which handle the arm members are operated simultaneously, substantially as described.

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

HIRAM ROSS.

Witnesses:

GEO. H. REMINGTON,

REMINGTON SHERMAN.