H. R. HIRST.

ELECTRIC SWITCH.

APPLICATION FILED NOV. 5, 1909.

1,001,032. Patented Aug. 22, 1911.

2 SHEETS—SHEET 1.

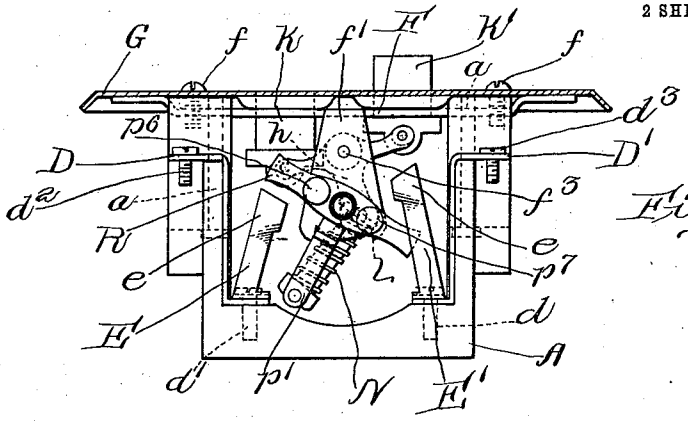


Fig. 1.

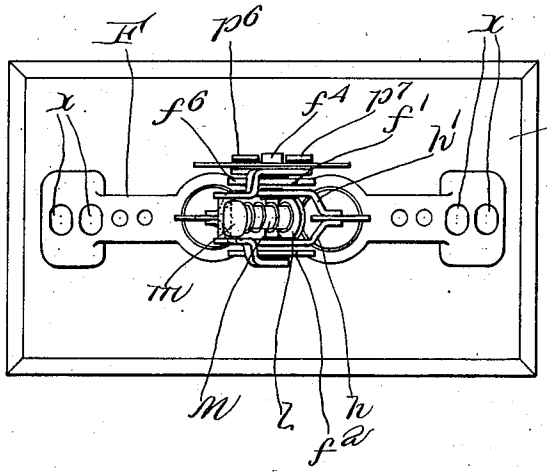
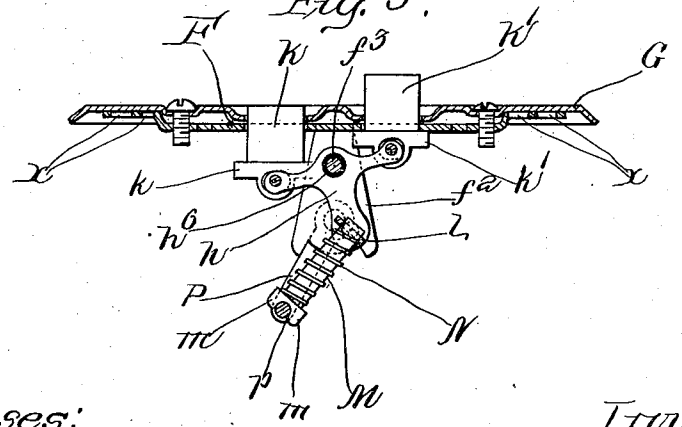


Fig. 2.

Fig. 3.



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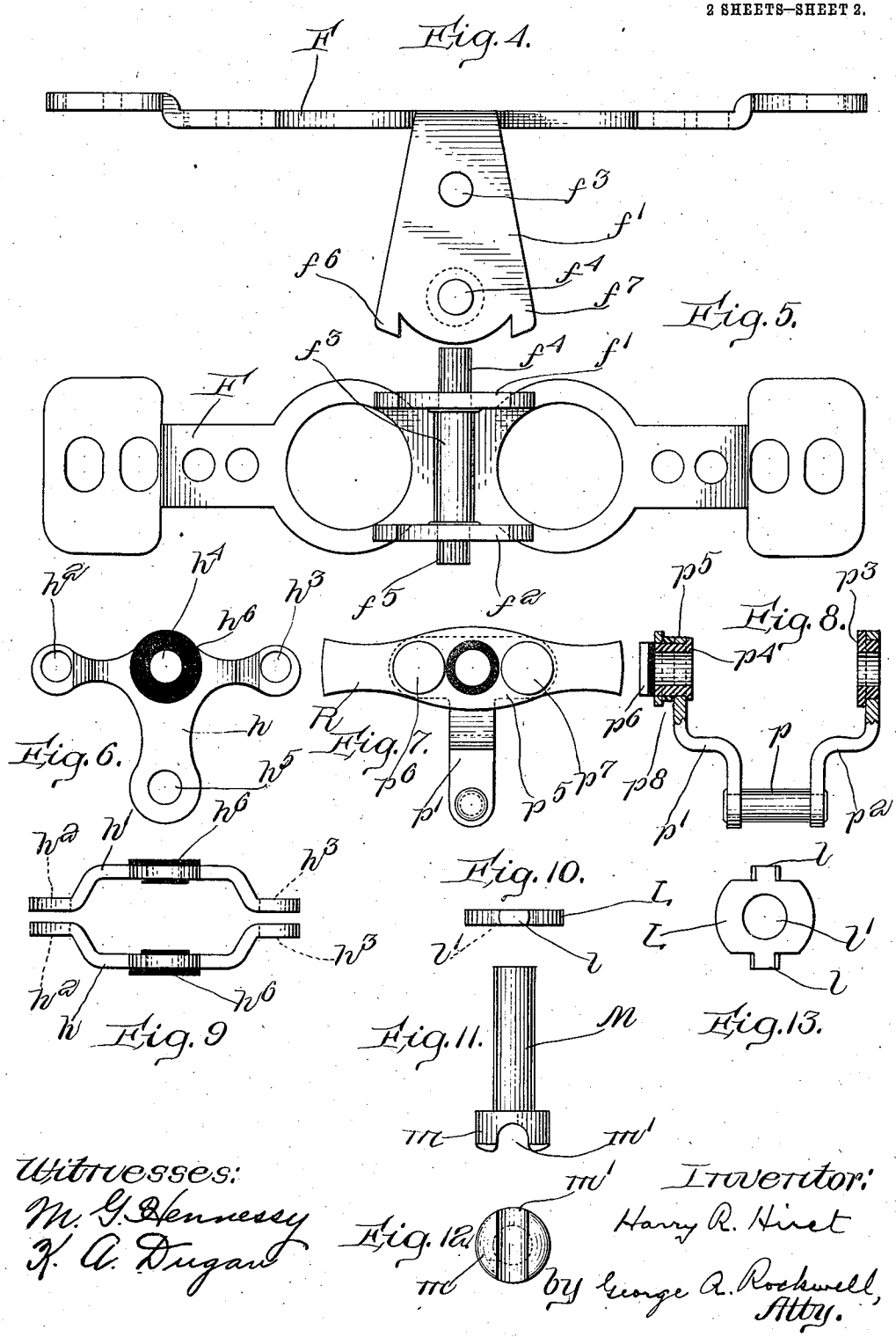

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

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UNITED STATES PATENT OFFICE.

HARRY R. HIRST, OF NEW BEDFORD, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO CHARLES S. KNOWLES, OF NEW BEDFORD, MASSACHUSETTS, AND ONE-HALF TO JOHN H. PARKER, OF SAUGUS, MASSACHUSETTS.

ELECTRIC SWITCH.

1,001,032. Specification of Letters Patent. Patented Aug. 22, 1911.

Application filed November 5, 1909. Serial No. 526,343.

To all whom it may concern:

Be it known that I, HARRY R. HIRST, of New Bedford, in the county of Bristol and State of Massachusetts, have invented a new and useful Electric Switch, of which the following is a specification.

My invention relates to electric switches and the main objects of my invention are to increase the speed of action and to make the operation easier.

Other objects will be pointed out below.

My invention consists in the general arrangement and construction of the switch and also in the arrangement of the pivot of the rock arm relatively to the other elements of the switch.

In the drawings Figure 1 is an elevation, partly in section, of a switch embodying my invention; Fig. 2 is a bottom plan view of the same without the casing; Fig. 3 is a central vertical section without the casing; Fig. 4 is an enlarged elevation of the supporting plate; Fig. 5 is an enlarged bottom plan of said plate; Fig. 6 is an enlarged elevation of the rock arm; Fig. 7 is an enlarged elevation of the oscillating lever; Fig. 8 is an enlarged end elevation of said lever, partly in section; Fig. 9 is an enlarged top plan of the rock arm; Figs. 10 to 13 are details of the spring mechanism.

Casing A is of insulating material, such as porcelain. Within the casing are the binding posts D and D′, and the contact terminals E and E′. Each contact terminal has a right-angled foot portion resting on the foot of the binding post and at its opposite end has a contact portion *e*. The terminals and binding posts are held in position by screws *d* and *d′*. The upper ends of the binding posts carry the binding screws d^2 and d^3. Cover G has perforations for push buttons and for screws *f f*, the latter holding cover G to plate F, which in turn is held to the casing by screws *a a*. Plate F supports the switch mechanism and has screw holes for screws *f f* and *a a* and other screw holes *x x* through which may pass screws to attach the switch to the wall. Plate F has made integral with it two arms f' f^2 and this integral construction is an important feature of my invention. Pin f^3 connects arms f' f^2 and upon this pin the rock arm is pivoted. Arm f' carries pin f^4, the arm f^2 carries pin f^5. The rock arm comprises two members *h h′* formed as shown in Figs. 6 and 9, and perforated at h^2, h^3, h^4 and h^5. The perforated ends of the push buttons K and K′ are placed between the ends of the rocking members and are connected to said members by rivets passing through perforations h^2 and h^3. In perforations h^4 are fiber bushings h^6 h^6, the diameter of the bushings being greater outside the members *h h′* than inside. Perforations h^2, h^3 and h^4 are substantially in line and members *h* and *h′* are extended at right angles to this line and near the end of this extension are perforated at h^5 to receive the ears *l l* of abutment L which is pivoted by means of said ears to the rocking members. Abutment L has a perforation *l′* through which may move pin M which has an enlarged head *m* notched at *m′* to engage pin *p* and about this pin M is coiled spring N bearing at one end against abutment L and at the other end against head *m*. It will be clear that the spring may be removed by forcing the head *m* off from pin *p* and then withdrawing pin M from abutment L.

Oscillating lever P comprises two arms *p′* and p^2 connected by pin *p*. Arm *p′* is pivoted to pin f^4 and arm p^2 is pivoted to pin f^5. An important feature of these bearings are the fiber bushings p^3 and p^4 constructed as shown. Contact member R is connected to the extension p^5 of arm *p′* by rivets p^6 p^7, there being suitable insulation p^8 between the contact member R and extension p^5.

In using my switch to make the circuit the button K′ is pushed down swinging the rock arm until the center of abutment L crosses the line between pivot f^4 and pin *p* whereupon the spring will operate the oscillating lever with a snap to make the circuit, projections f^6 and f^7 limiting the movement of the oscillating lever, and projections *k k* and *k′ k′* limiting the movement of the rock arm. The reverse operation by means of button K will break the circuit.

A very important feature of my invention consists in having the pivot of the rock arm close to plate F. In one respect the importance is that I may use with a switch of a given depth a very long extension of members *h* and *h′* so that with a slight pressure on the push buttons I get a very strong com-

pression of spring N with the result that a very quick as well as strong snap action is had which is important both in breaking and making the circuit. Not only is the snap action much increased but this with less effort than heretofore on the part of the user and the arrangement of leverage is such that the snap will occur much more quickly than heretofore. In another respect the importance is that only a very short stroke of the push button is necessary with the result that even the outermost button will be, comparatively speaking, flush with the cover. Another important advantage is that for a given switch there need not be as much compression as heretofore which, of course, will increase the life of a given spring.

The fiber bearings are important, not only because they reduce friction, and increase the efficiency of the switch, but because the bearing may be wider without interfering with the efficiency of the switch. This wideness of the bearings is highly desirable because otherwise the parts, on account of their frequent reciprocation, get out of true and the engagement between the stationary and movable contacts becomes imperfect.

Another feature of importance consists in the extension p^5 which forms a rigid and firm backer for the movable contact so that said contact will always reciprocate in the same plane and consequently insure a perfect engagement with the stationary contact.

What I claim is:

1. An electric switch of the character described comprising a push button; a pivoted rock arm connected with the push button; and a pivoted lever connected with the rock arm, the distance from the pivot of the rock arm to the point of connection between the rock arm and button being less than the distance from said pivot to the point of connection between the lever and rock arm.

2. An electric switch of the character described comprising a push button; a pivoted rock arm connected with the push button; a pivoted lever; and a spring connection between the lever and the rock arm, the distance from the pivot of the rock arm to the point of connection between the rock arm and button being less than the distance from said pivot to the point of connection between said spring and the rock arm.

3. A supporting member for electric switches comprising arms integral therewith, and depending therefrom.

4. A supporting member for electric switches comprising a perforated cross bar and arms in the form of a yoke integral with, and depending from, said cross bar.

5. In an electric switch of the character described the combination of push buttons; and a pivoted rock arm connected with the buttons, the pivot of the rock arm and the points of connection between the rock arm and buttons being in a line at substantially a right angle with the line of movement of the push buttons when the latter are at rest.

6. In an electric switch the combination of a supporting member with a projecting pin; a bushing on said pin and consisting of a bearing portion and an enlarged portion; and a lever mounted on that bearing portion, the enlarged portion being between the supporting member and the lever.

7. An electric switch of the character described comprising two parallel supporting plates having projections; a rock arm pivoted to the supporting plates; a contact-carrying member comprising two levers rigidly connected to each other at one end and at their other ends pivoted to the supporting plates at the outside of the latter, said levers being adapted to engage said projections to limit their movement.

8. An electric switch of the character described comprising two parallel supporting plates having projections; a rock arm pivoted to the supporting plates; a contact-carrying member comprising two levers rigidly connected to each other at one end and at their other ends pivoted to the supporting plates at the outside of the latter, said levers being bent midway of their length to engage said projections, and a compression spring abutting at one end against said rock arm and at the other against said rigid connection of the levers.

9. An electric switch of the character described comprising push buttons; a support with projections; a rock arm pivoted to, and within, the support and connected with the push buttons; a lever having a spring connection with the rock arm, the distance from the pivot of the rock arm to the point of connection between the rock arm and button being less than the distance from said pivot to the point of connection between said spring and rock arm, said lever being pivoted to the outside of said support and having a bent portion to engage said projections.

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Witnesses:
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