

929,635.

Patented July 27, 1909.

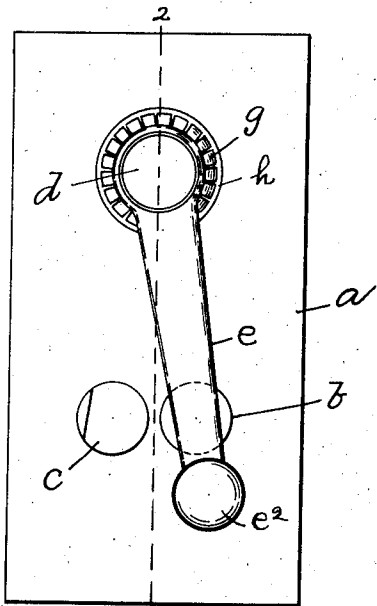


Fig. 1.

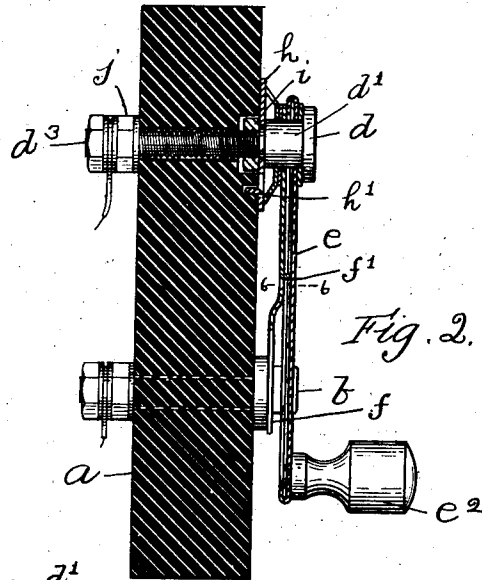


Fig. 2.

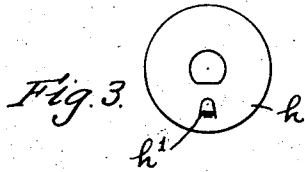


Fig. 3.

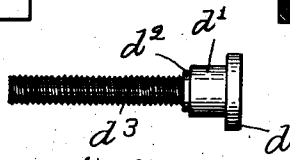


Fig. 7.

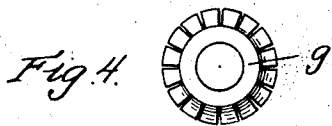


Fig. 4.

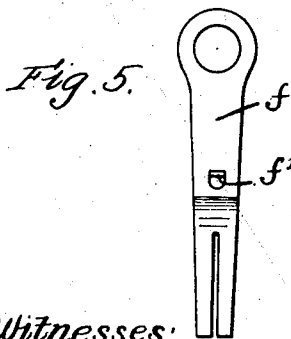


Fig. 5.

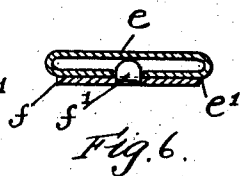


Fig. 6.

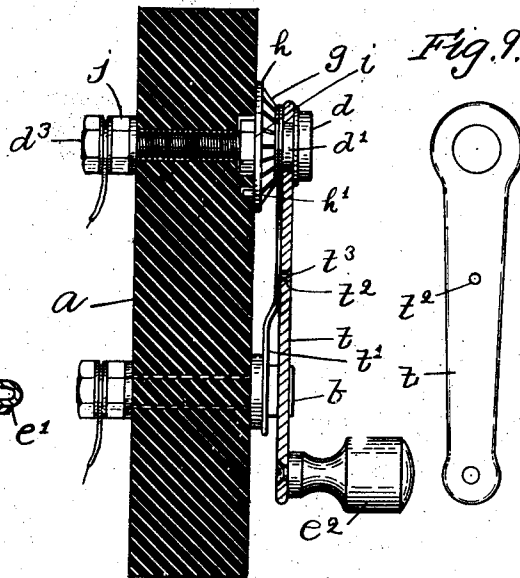


Fig. 8.

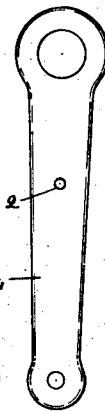


Fig. 9.

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UNITED STATES PATENT OFFICE.

NATHAN H. SUREN, OF NEEDHAM, MASSACHUSETTS, ASSIGNOR TO THE GAMEWELL FIRE ALARM TELEGRAPH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ELECTRIC SWITCH.

No. 929,635.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed May 23, 1908. Serial No. 434,515.

To all whom it may concern:

Be it known that I, NATHAN H. SUREN, of Needham, county of Norfolk, State of Massachusetts, have invented an Improvement in Electric Switches, of which the following is a specification.

This invention relates to electric switches, and has particular reference to electric switches wherein the switch arms are mounted on pivot-studs and are movable in the arc of a circle.

The invention has for its object to improve the construction of the switch in several particulars, as follows:—to provide an improved switch-arm which may be cheaply manufactured yet is strong, durable and efficient; to provide means for exerting a uniform pressure on the switch-arm at all points about the pivot-stud, thereby pressing said switch-arm against the head of the pivot-stud or other abutment which is provided for it with a firm, uniform pressure at all points in all positions of said arm; to provide a fixed bearing plate for the spring-plate which is employed to exert a uniform pressure on the switch-arm; to provide improved means for holding the pivot-stud in fixed position with respect to the base; to construct the parts of the switch in such manner that they may be assembled independent of the base to which they are subsequently attached, and the pressure on the switch-arm properly adjusted, so that when subsequently attached to the base said pressure will not be varied by the attaching means.

Figure 1 shows in front elevation an electric-switch embodying this invention. Fig. 2 is a vertical section of the switch shown in Fig. 1, taken on the dotted line 2—2. Fig. 3 is a detail of the retaining plate for the pivot-stud to be described. Fig. 4 is a detail of the spring-plate to be described. Fig. 5 is a detail of the contact-plate which is attached to the hand-lever and which in conjunction with said lever forms the switch-arm. Fig. 6 is a sectional detail of the switch-arm taken on the dotted line 6—6 Fig. 2. Fig. 7 is a side elevation of the pivot-stud. Fig. 8 is a vertical section of an electric-switch embodying my invention having a modified form of switch-arm. Fig. 9 is a detail of the hand-lever shown in Fig. 8.

a represents the base, and b and c the contact plugs which are set into the base and

adapted to be engaged by the switch-arm. The base a has a hole through it for a pivot-stud, which latter is made long enough to extend through said hole.

The pivot-stud, see Fig. 7, has a circular or other shaped head d , a cylindrical portion d' next the head which is made of lesser diameter than the head, a portion d^2 next the portion d' made smaller than said portion d' , but which is other than round, and a screw-threaded shank d^3 , of a lesser diameter than the portion d^2 . The portions d' and d^2 are herein referred to as shoulders. The shoulder d^2 may be made cylindrical, of lesser diameter than the shoulder d' , and then slabbed off on one side, or it may be otherwise made other than round. The switch-arm is mounted on the shoulder d' next the head, suitable washers being arranged on said shoulder at opposite sides of said arm, if desired. The switch-arm shown in Figs. 1, 2 and 6 comprises a hand-lever e and a contact-plate f .

The hand-lever e shown in said figures consists of a piece of sheet metal, cut to the desired shape, and having its edges turned over all around it, or nearly so, as represented at e' , Fig. 6, to stiffen it and give its edge a rounding finish. A knob e^2 is attached to the lever at its end. The contact-plate f , see Fig. 5, consists of a piece of sheet spring metal cut to the desired shape and having a projection f' struck up from it which is disposed at a right angle to the plate. This projection is arranged to enter the space between the overturned edges of the lever e and is of proper width to fit said space. Both the lever e and contact-plate have a circular hole at one end of suitable size to enable them to fit upon the cylindrical shoulder d' of the pivot-stud. When the parts are assembled the contact-plate is held in engagement with the lever, and as the projection on said plate enters the space between the overturned edges of said lever, said plate will be moved by said lever and as said plate is not attached to the lever it is free to move independently thereof, so that its inherent spring action may be utilized for its entire length. By making the hand-lever in this manner it may be cheaply manufactured, is very strong and durable, and provides, without additional expense, for connecting the contact-plate with it.

Referring to Figs. 8 and 9, the switch-arm

consists of a hand lever t and a contact-plate t' . The hand-lever is struck out of sheet metal of suitable thickness and its edge is finished, and it has a small hole t^2 through it, and the contact-plate has a projection t^3 which enters said hole when the parts are assembled. This alternative form of switch-arm may be employed in lieu of the form shown in Figs. 1, 2, 3 and 6.

10 A spring-plate g , see Fig. 4, preferably of circular form, has a center hole through it adapting it to be placed upon the shoulder d' of the pivot-stud. The spring-plate is made as a disk having radially extended
15 spring-fingers, such a spring-plate being sometimes called a spider-spring. The central portion or crown of the spring-plate is flat and the radial fingers are arranged to occupy positions oblique to the plane of the
20 central portion or crown. The diameter of the central portion or crown is approximately the same as the diameter of the head of the pivot-stud, hence is coextensive therewith. The spring-plate is arranged on the
25 shoulder d' , with its crown or central portion next the switch-arm or a washer, if a washer is employed. This form of spring exerts a strong yet yielding pressure upon the switch-arm and possesses the important
30 advantage of exerting a uniform pressure upon the switch-arm at all points about the pivot-stud, so that said switch-arm is pressed against the head of the pivot-stud or other abutment which is or may be provided for
35 it with a uniform pressure at all points and in all positions it may occupy. The switch-arm is thus not only firmly held but is prevented from wobbling on the pivot stud in
40 all its different positions and furthermore requires the same force to move it.

The retaining-plate h for the pivot-stud, see Fig. 3, is arranged on the shoulder d^2 thereof. It consists of a flat plate of circular or other form, having an other than
45 round center hole of a shape corresponding to the shape of the shoulder d^2 , so as to snugly fit upon said shoulder. This plate has a projection h' struck up from it or otherwise formed on it, which is adapted to
50 enter a hole in the base. The other than round center hole in the plate, fitting the correspondingly shaped shoulder causes said plate to be non-rotatably connected with the
55 pivot-stud, and the projection h' serves as a means for engaging the base to prevent the plate from turning. Said retaining-plate therefore holds the pivot-stud in fixed position with relation to the base. When the
60 parts are assembled the under side of said retaining-plate engages the base while its upper side presents a flat surface for engagement therewith of the spring-fingers of the spring-plate, therefore said plate not only
65 acts to hold the pivot-stud but also serves as a bearing plate for the spring-plate. The

retaining plate is made larger in diameter than the spring plate, especially for the purpose of providing a bearing for the spring fingers of said spring plate. By arranging the spring plate with its crown in engagement
7 with the switch-arm and with its spring fingers in engagement with the retaining plate h , a large spring plate and a narrow switch-arm may be employed. Furthermore, the resistance offered by the spring-plate
8 when thus disposed relative to the switch-arm is greater than if its position was reversed and the switch-arm engaged the outer ends of its spring fingers. The depth of the
9 shoulder d^2 is not greater than the thickness of the retaining-plate, so that when the parts are assembled the shoulder d' will engage said retaining-plate. It is desirable to
10 assemble the parts thus described before mounting them on the base a , so that the pressure on the switch-arm may be adjusted with due care. To accomplish this result
11 a nut i is turned on the screw-threaded shank of the pivot-stud, and is brought to bear against the retaining-plate h , and forces
12 said retaining-plate firmly against the end of the shoulder d' . This nut is counter-bored at the side adjoining the retaining-plate to receive the end of the shoulder
13 d^2 , in case said shoulder should project through the hole in said retaining-plate when the retaining-plate is forced against
14 the shoulder d' , and into position to compress the spring-plate. To connect the assembled parts thus described to the base in
15 such manner that the attaching-means will not act to vary the pressure on the switch arm the screw-threaded shank of the pivot-stud is extended through the hole in the base
16 and a nut j is turned on the screw-threaded end of said stud which engages the bottom
17 of the base. By turning up this nut the retaining-plate will be brought into firm engagement with the base and held in such position, without altering the pressure on the
18 switch-arm, and the circuit wire connection can be made without disturbing or revolving the stud d . The base will be provided with a recess for the nut i , so that the retaining-plate may be brought into direct
19 contact with it and a hole will be provided for the projection h' of plate h . As the parts are assembled before being attached to the base they cannot be removed except in
20 assembled condition, hence their relative positions cannot be changed after they have been attached to the base, so that the adjustment having once been made is at all times preserved.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In an electric-switch, a switch-arm composed of a hand-lever having overturned edges, and a contact-plate having a projec-

tion which enters the space between the overturned edges of said lever, substantially as described.

2. In an electric switch, a switch-arm composed of a hand-lever having overturned edges, and a contact-plate having an integrally formed ear which enters the space between the overturned edges of said lever, substantially as described.

3. In an electric switch, a switch-arm composed of a hand-lever having a recess at a point intermediate its length, and a spring-acting contact plate having a projection at a point intermediate its length which enters said recess but which is not connected with the lever whereby said plate is movable independently of said lever in a direction toward and from the lever and its inherent spring action may be utilized for its entire length, and means for holding said lever and plate assembled and for pivotally supporting them, substantially as described.

4. In an electric switch, a pivot stud having a circular head, a switch-arm arranged on said stud next the head, a spring plate comprising a flat crown and a plurality of radially extended spring fingers arranged obliquely to the plane of the crown which is arranged on said stud with its flat crown next the switch-arm, a removable bearing-plate also arranged on said stud next the spring-plate which is made larger in diameter than the spring-plate, to be engaged by the spring fingers thereof, and means for moving said bearing-plate along on the stud to compress the spring-plate and hold it compressed, substantially as described.

5. In an electric switch, a pivot stud having a circular head, a switch-arm arranged on said stud next the head; a spring plate comprising a flat crown and a plurality of radially extended spring fingers arranged obliquely to the plane of the crown which is arranged on said stud with its flat crown next the switch-arm, a removable retaining-plate non-rotatably mounted on said stud next the spring-plate which is made larger in diameter than the spring plate and its upper side is engaged by the spring fingers thereof, and its under side has a projection adapted to enter a recess in the base, and means for moving said retaining-plate along on the stud to compress the spring-plate and hold it compressed, substantially as described.

6. In an electric switch, a pivot stud having a head, two reduced portions, and a screw-threaded shank, a switch-arm arranged on a reduced portion of said stud next the head, a spring plate arranged on said stud next the switch-arm, a bearing plate arranged on another reduced portion of said stud next the spring plate, and a nut arranged on the screw-threaded portion of said stud which presses the bearing-plate

against a shoulder formed at the junction of the two reduced portions, and compresses the spring-plate, and means for attaching the parts thus assembled to a base, substantially as described.

7. In an electric switch, a pivot stud having a head, two reduced portions, and a screw-threaded shank, a switch-arm arranged on a reduced portion of said stud next the head, a spring-plate arranged on said stud next the switch-arm, a retaining-plate arranged on another reduced portion of said stud next the spring-plate having a projection on its under side adapted to enter a recess in the base, and a nut arranged on the screw-threaded portion of said stud which presses the retaining-plate against a shoulder formed at the junction of the two reduced portions and compresses the spring-plate, and means for attaching the parts thus assembled to the base, substantially as described.

8. In an electric switch, a pivot stud having a head, a circular reduced portion, an other than circular reduced portion and a screw-threaded shank, a switch-arm arranged on the circular reduced portion of said stud; a spring plate also arranged on the circular reduced portion of said stud next the switch-arm, a retaining-plate arranged on the other than circular portion of said stud next the spring-plate having a projection on its under side adapted to enter a recess in the base, a nut arranged on the screw-threaded shank of said stud which presses the retaining-plate against a shoulder formed at the junction of the two reduced portions and compresses the spring-plate, and means for attaching the parts thus assembled to the base, substantially as described.

9. In an electric switch, a pivot stud having a threaded shank, a switch-arm movably mounted on said stud; a spring-plate on said stud engaging said arm, a removable bearing plate on said stud engaging said spring-plate, a nut turning on the threaded shank of said stud for moving said bearing-plate along on the stud to compress the spring-plate and for holding the parts assembled with the spring-plate compressed, and means for attaching the assembled parts to a base, substantially as described.

10. In an electric switch, a pivot stud having a screw-threaded shank, a switch-arm movably mounted on said stud, a spring-plate on said stud engaging said arm, a removable retaining-plate non-rotatably mounted on said stud engaging said spring-plate having a projection on its under side adapted to enter a recess in the base, a nut on the screw-threaded shank of said stud for moving said retaining-plate along on the stud to compress the spring-plate and for holding the aforesaid parts assembled with

the spring-plate compressed, and means for attaching the assembled parts to a base, substantially as described.

11. In an electric-switch, a pivot-stud, a
5 switch-arm movably mounted thereon, a
spring-pressure device mounted on said stud
adapted to exert its pressure on said switch-
arm, and means, movable along on said stud
for compressing said spring-pressure device
10 and for holding the parts assembled with

the spring-pressure device compressed, and
means for attaching the assembled parts to
a base, substantially as described.

In testimony whereof, I have signed my
name to this specification, in the presence of
two subscribing witnesses.

NATHAN H. SUREN.

Witnesses:

J. A. ABBOTT,

WM. L. THOMPSON.