

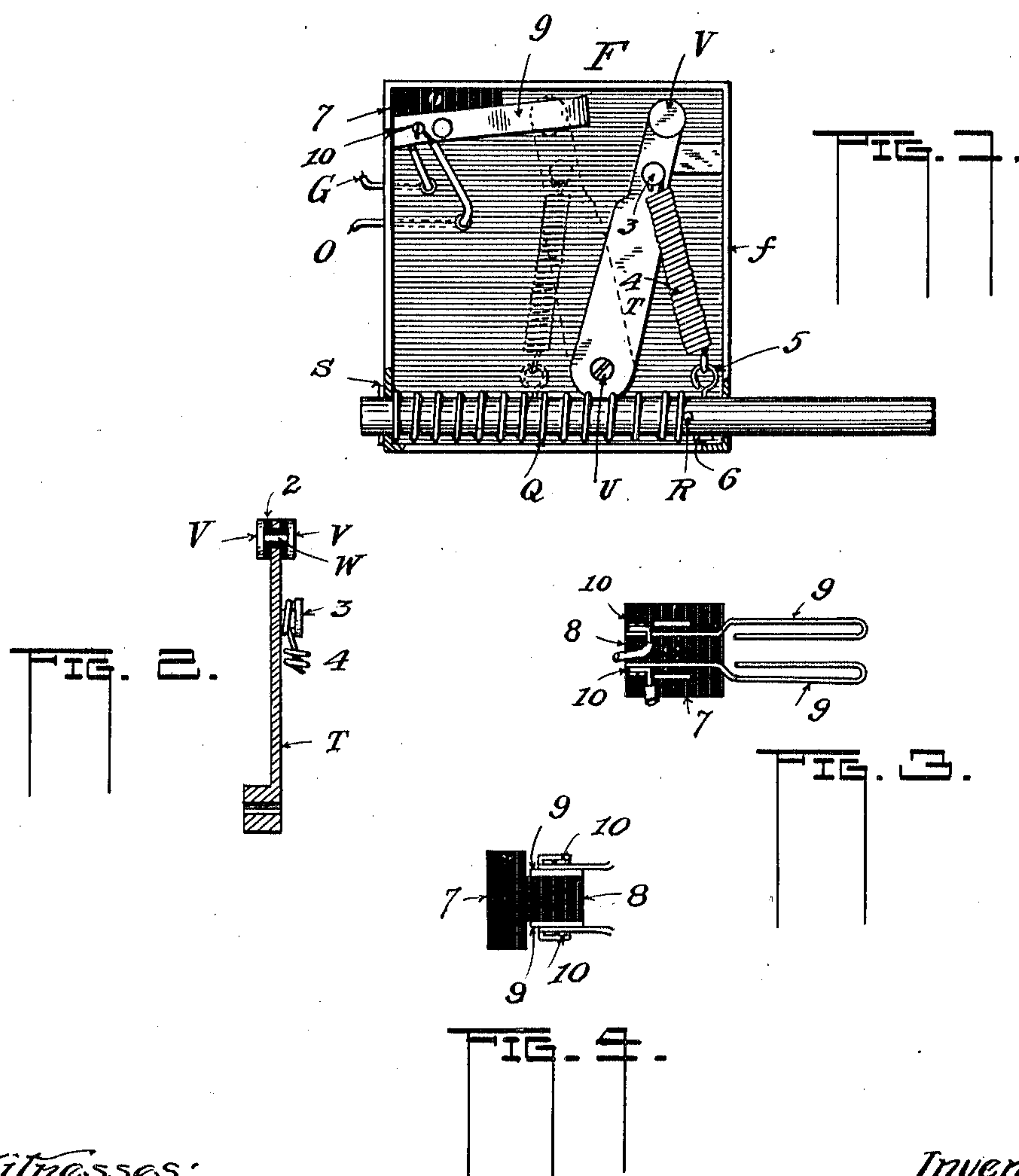
C. WOODS & W. H. SAYLES.

ELECTRIC SWITCH.

APPLICATION FILED DEC. 18, 1908.

986,958.

Patented Mar. 14, 1911.



Witnesses:
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UNITED STATES PATENT OFFICE.

COLUMBUS WOODS AND WHITMAN H. SAYLES, OF PEORIA, ILLINOIS.

ELECTRIC SWITCH.

986,958.

Specification of Letters Patent.

Patented Mar. 14, 1911.

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To all whom it may concern:

Be it known that we, COLUMBUS WOODS and WHITMAN H. SAYLES, citizens of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Electric Switches; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in electric switches particularly of that type known as snap-switches.

Our switch is particularly designed for use at and operated by the door of an electrically operated elevator-car or a car having an electric motor as its driving means; a switch being used at each door of the elevator-shaft and forming part of the motor-circuit and acting to break said circuit, when a door is opened, so that the elevator-car cannot be operated so long as said door stands open or ajar. Said switch, however, is applicable to other uses as well and consists in certain new and novel structures as will be clearly pointed out herein aided by the accompanying drawing in which:—

Figure 1 shows the interior of our improved switch. Fig. 2 is a longitudinal section of a switch arm. Fig. 3 is a plan of certain contact portions of the switch, and Fig. 4 is an end elevation of the same.

A switch having a quick snap action for preventing as much as possible the forming of an arc by the heavy current between the terminals is one advantage of the structure and operation of our improved device thus making it of value for many purposes important among which, however, is its use on electrically controlled elevator-cars, or elevator-cars whose driving power is an electric motor the current for which is controlled by said switch through the movement of the elevator-door (not shown).

A suitable supporting base for the parts of the switch is provided and which, in this instance, is in the form of a containing case *f* to inclose the said parts. A plunger-rod or bolt *P* is mounted in said case and in the present instance extends through the walls thereof which are bored to receive it, said plunger-rod for elevator use being disposed horizontally and in one end is a stop *S* outside the wall of the case and within the latter the plunger carries a spring *Q* one end bear-

ing against the wall of said case nearest to which is the said stop *S*, the said spring being held under compression against said wall by a pin *R*, carried in the plunger or by some equivalent means thereon whereby said spring constantly tends to hold the said plunger in a positive manner with one of its ends extending some distance outside the case as shown in Fig. 1, the said stop *S* serving to limit the outward movement.

Pivoted to the back wall of the casing *f* is an arm *T* by means, for example, of a screw *U* which passes through the lower end of the arm, the said arm being placed substantially at right angles to the plunger and adapted to have a short extent of movement on its pivot and limited in one of its directions of movement by striking the casing or some suitable stop and limited in its other movement by passing into or between the electric terminals which said arm is adapted to connect and now to be described.

7 indicates an insulating block secured to the rear wall of the casing *f* and having two terminals 9 secured thereon and kept insulated from one another. To each of these terminals is connected a wire from the electric circuit in which the switch is placed.

The free end of the arm *T* as shown in section in Fig. 2 is provided with a contact piece or button *V* at each side both of which are electrically connected by a portion *W* but which are insulated from said arm.

4 is a spring attached in any good manner at one end to the plunger-rod *P* as for example by means of an eye 5 made adjustable in said plunger-rod by means of a nut 6. The other end of the spring is attached to the arm as by means, for instance, of a post 3 on that member.

In the position of the parts shown in Fig. 1 the plunger-rod is at its outermost position due to the spreading action of spring *Q*. In consequence of this the lower end of the spring 4 whose stationary position is either at one side or the other of the pivot *U*, in this instance lies at the left of the said pivot and has carried the arm to and holds it positively in the position at the left or away from and out of contact with the terminals 9. Said spring 4 is constantly under tension and must, therefore, hold the arm positively in either of its extreme positions since its lower end moves past the pivot *U* from side to side. When, now, the plunger-rod is pushed inward or to the right against

its spring Q the lower end of the spring 4 is carried beyond the pivot and the arm is moved suddenly between the said terminals 9.

5 A peculiarity in the construction of our switch F makes it imperative that when used, for instance, at an elevator door to control a motor circuit the door must be absolutely closed since if it were ever ajar the switch
10 will remain open and also the circuit of which it is a part, *i. e.* the spring 4 will not be carried beyond the pivot U where it can exert its pull on the arm to carry it between the terminals. This may be understood by ob-
15 serving that the plunger P when forced against the tension of the spring Q is given nearly its entire extent of movement in carrying the lower end of the spring 4 to a position opposite the pivot at U on the arm
20 T. A further very slight movement of the plunger beyond this point then carries the end of the spring beyond the pivot to a point where the spring will be brought into position to draw upon the arm T and sud-
25 denly snap it between the contacts 9 to close the circuit. The spring in moving toward the pivot is put more and more under strain until having reached the pivot the strain is nearly at its maximum so that as
30 the pivot is passed the arm is snapped between the contacts 9 and there remains as long as the plunger is held in the position described. It is to be observed that the pivot of the arm T is preferably quite near
35 the plunger P so that the point of connection of the spring 4 with the plunger will be quite close to the pivot and preferably beneath it. The pull of said spring is strongest when its lower end is nearest the pivot U,
40 for since that end moves in a straight line and the post 3 of the arm T moves in an arc described from said pivot U the greatest distance between said post and said lower end of the spring is when that end passes
45 beneath the pivot. The spring Q of the plunger is preferably quite strong so that unless the latter is positively held in some way, as for instance, by a latched door the force of the spring will cause the switch to
50 be opened and the door to be thrown open as well.

From what has been said it is now seen that besides being constructed so as to have a quick snap action to prevent "arcing" the
55 switch demands positive action on the part of the user when employed in connection with an elevator-door in order that for that particular purpose it will be positive as to the results desired of it.

60 For other uses such as an ordinary circuit-closer for electric lighting circuits and the like, with the spring Q eliminated the plunger-rod P can be still moved in either direction so as to snap the arm to either of
65 its positions where it will remain since there

will be no tendency on the part of the spring 4 to shift it, the pull of said spring being almost directly at right angles to the line of movement of the said plunger-rod the snap action being as positive as before. If the
70 point of connection of said spring and eye were too far above the pivot U the arm would be properly held in its extreme position when the plunger-rod occupies its limits of movement but the proper snap-action
75 would not take place.

Such changes may be made in our device as will fall within the meaning of the invention and scope of the claims.

Having thus described our invention, we
80 claim:—

1. An electric switch consisting of a single pivoted arm adapted to have a free arcuate movement on its pivot, electric terminals in the path of movement of the arm at one of
85 the extremes of that movement, a member movable in a line substantially parallel to the chord of the arc described by said arm, and a contractile member connecting the arm and said member. 90

2. An electric switch consisting of a single pivoted arm adapted to have a free arcuate movement on its pivot, electric terminals in the path of movement of the arm at one of
95 the extremes of that movement, a member movable in a line substantially parallel to the chord of the arc described by said arm, and a contractile member connecting the arm and said member to swing said arm, the
100 pivot of the latter lying substantially midway between the extremes of its movements, the point of connection of the contractile member with the first described member lying beneath the arm in either of its said
105 extremes of movement.

3. An electric switch consisting of a single rigid arm pivoted at one end and adapted to have a free arcuate movement on its pivot and to have two extremes of positions, electric terminals at one of the extremes of
110 movement of the arm to receive said arm, a member movable in a line substantially parallel to the chord of the arc described by said arm, a contractile spring connected to both the arm and the member, both ends of
115 said spring lying at the same side of a line extending through the pivot of the arm and the middle position of said arm when the said arm is in either of its extreme positions.

4. An electric switch consisting of a single
120 arm pivotally supported at one end and adapted to have a free arcuate movement on its pivot to two extreme positions, electric terminals in the path of movement of the arm at one of its extreme positions, a mem-
125 ber movable in a line substantially parallel to the chord of the arc described by said arm, a contractile member connecting the arm and said member to swing said arm, the pivot of the latter lying substantially mid- 130

way between the extremes of its movement, the point of connection of the said contractile member with the first described member lying beneath the arm in either of its said extremes of movement, and means to yieldingly control the first said member.

5. An electric switch comprising a support, a single rigid arm pivoted thereto and having a free arcuate movement and having two extremes of movement, electric terminals in the path of movement of said arm at one of said extremes of movement, a member carried on the support and movable substantially parallel to the chord of the arc described by said arm, a contractile member connected between the arm and the first named member to swing said arm, the pivot of the latter lying substantially midway between the extremes of its movement, the point of connection of the contractile member with the first described member lying beneath the arm in either of its said extremes of movement.

6. An electric switch comprising a support, a single rigid arm pivoted thereto and having a free arcuate movement and having two extremes of such movement, electric terminals in the path of movement of said arm at one of such extremes, a member carried on the support and movable substantially parallel to the chord of the arc described by said arm, means normally tending to yieldingly hold said member in one of its extreme positions, a contractile member connected be-

tween the arm and the first named member to swing said arm, the pivot of the latter lying substantially midway between the extremes of its movement, the point of connection of the contractile member with the first described member lying beneath the arm in either of its said extremes of movement.

7. In an electric switch, the combination of a casing, a single rigid arm pivoted therein and adapted to have an arcuate movement on its pivot and having two extremes of position, a plunger rod carried in and normally extending partially outside said casing and adapted for movement in a line substantially parallel to the chord of the arc described by said arm in its movement, a contractile spring attached to the arm and connected to the said plunger rod at a position at one side of the pivot of said arm, said plunger rod when pushed inward carrying the end of the spring to the opposite side of the pivot whereby the arm is snapped from one of its extreme positions to the other, electric terminals connected by said arm in one of its positions, and means normally tending to hold the plunger rod in its outward or extended position.

In testimony whereof we affix our signatures, in presence of two witnesses.

COLUMBUS WOODS.

WHITMAN H. SAYLES.

Witnesses:

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L. M. THURLOW.