

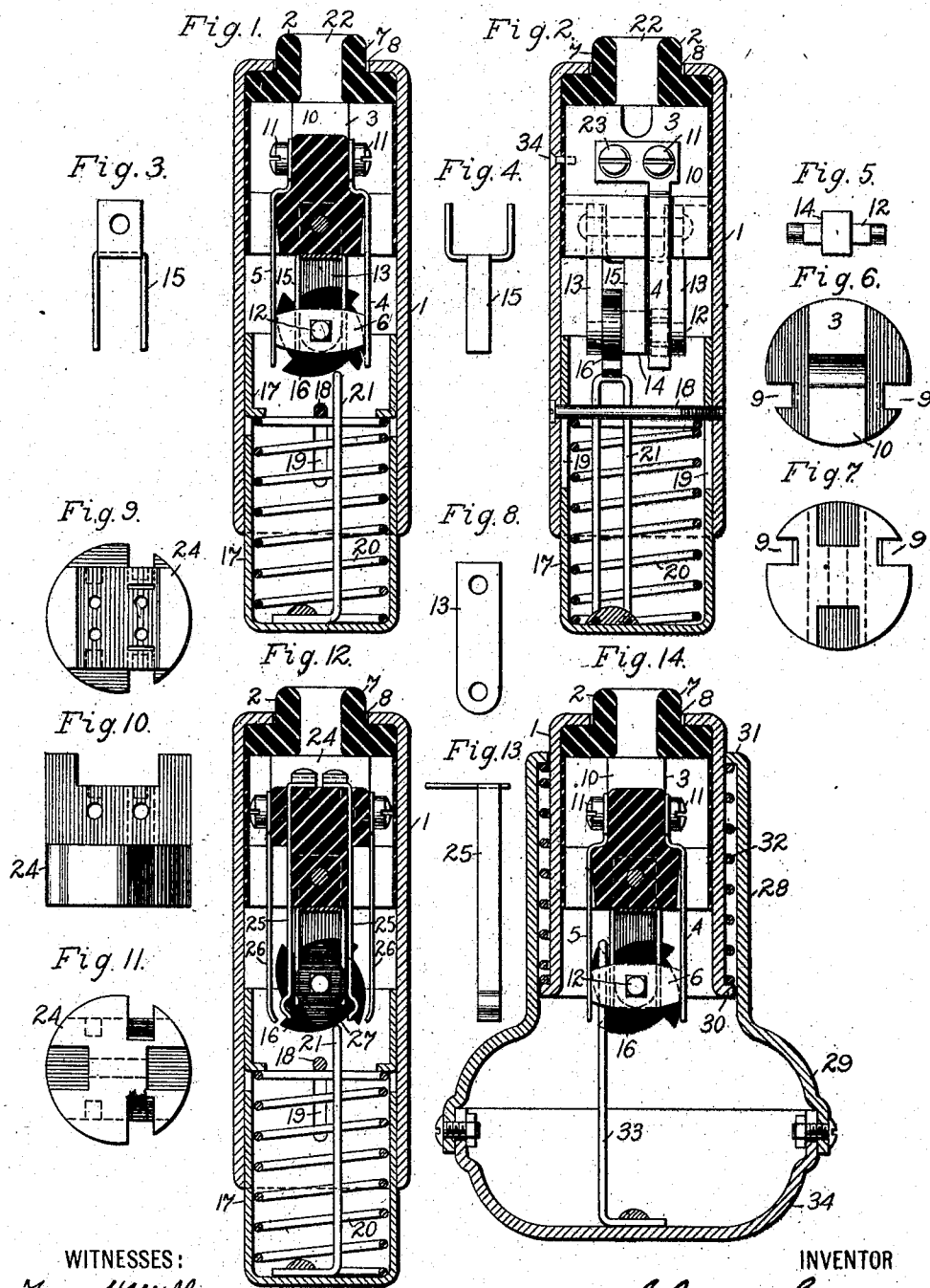
C. CARSON.

SWITCH.

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936,601.

Patented Oct. 12, 1909.



WITNESSES:
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SWITCH.

936,601.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed December 27, 1906. Serial No. 349,709.

To all whom it may concern:

Be it known that I, CLARENCE CARSON, a citizen of the United States, and a resident of Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Switches, of which the following is a specification.

My invention relates to devices for making and breaking electric circuits, and has special reference to switches which are attached to the free ends of flexible pendent cables.

The object of my invention is to provide a device of the character above indicated that shall be simple and compact in construction and positive and reliable in operation.

Pendent switches have been largely employed in connection with electric lights, relatively small machinery, such as fan motors, and electrical measuring instruments for testing purposes and, as heretofore constructed, these switches have usually been provided with two control buttons, one for making and one for breaking the circuit.

According to my present invention, I provide a switch adapted for the aforesaid uses which is positive in operation; which provides a relatively large air gap between the current-carrying parts when the switch is open and which is provided with a single operating button or other means, successive operations of which effect the opening and closing of the switch.

Figures 1 and 2, of the accompanying drawing, are longitudinal sectional elevations at right angles to each other, of a switching device constructed in accordance with my invention, and Figs. 3 to 8, inclusive, are detail views of the structure shown in Figs. 1 and 2. Figs. 12 and 14 are views, similar to Fig. 1, of modified forms of switching devices which are included within the scope of my invention, and Figs. 9, 10, 11 and 13 are detail views of the structure shown in Fig. 12.

Similar parts are indicated by like reference numerals in all of the figures.

Referring to Figs. 1 to 8 of the drawings, the switch here illustrated comprises a tube 1 which forms the casing of the device and

one end of which is partially closed, an insulating bushing 2, an insulating block 3, stationary spring contacts 4 and 5, a rotatable bridging contact member 6 and means for moving the bridging contact member into and out of engagement with the spring contacts. The body of the insulating bushing 2 is fitted into the tube 1 and a projection 7 therefrom extends through an opening 8 in the partially closed end of the tube. The insulating block 3 which is, in general, of a cylindrical form, may be secured in position by a set screw 34 and is provided with longitudinal slots 9 through which the spring contacts 4 and 5 extend, and a substantially rectangular end projection 10 to which these contact members are attached by screws 11 or by other suitable means. The slots 9 are sufficiently deep and the projection 10 sufficiently narrow to materially separate the contact members 4 and 5 from the interior walls of the inclosing tube 1, which may be of conducting material. A shaft 12 is rotatably mounted mid-way between the free ends of the contact members 4 and 5, its center line being perpendicular to and in the plane of the axis of the tube. The bridging contact member 6 is substantially elliptical in form and is rigidly attached to the shaft 12, the arrangement of parts being such that a rotative movement of the shaft through a 90° angle will move this member from a position of engagement with the spring contacts 4 and 5, out of contact therewith, so that material air gaps exist between the spring contacts and the nearest points of the bridging contact members. The shaft 12 is supported by a pair of plates 13 which are attached to a projection from the block 3 and, in order to accentuate the quadrature positions of the shaft, a square enlargement 14 is provided which is engaged by a spring 15. A ratchet disk 16 of insulating material is rigidly attached to the shaft 12 and is provided with four notches. A tube 17 is loosely fitted into the open end of the tube 1 and is limited in its movement by a pin or stop 18 which extends across the tube 1 near one end and engages longitudinal slots 19 in the opposite sides of

the tube 17. A helical spring 20 is located between the stop 18 and the closed end of the inner tube and normally separates the tubes as far as the stop will permit. A spring pawl 21 is attached to the closed end of the inner tube 17 and projects inwardly therefrom so that a relatively slight inward movement of the tube 17 will cause a 90° movement of the bridging contact member 6 by reason of the engagement of the inner end of the spring pawl with the ratchet 16. In this way, successive actuations of the inner tube 17, in opposition to the spring 20, will open and close the switch. The flexible conducting leads may be brought in through a hole 22 in the bushing 7 and the electrical connection may be made to the contacts 4 and 5 by means of screws 23. The tube 1 is provided with an insulating lining adjacent to the point of connection with the leads so that the possibility of short-circuiting the switch is reduced to a minimum.

Referring particularly to Figs. 9, 10, 11, 12 and 13 of the drawings, an insulating block 24, which is substituted for the block 3 of Fig. 1, is adapted to support two instead of one pair of spring contact members 25 and 26 in order to interrupt both sides of the circuit when the switch is open, said members being held in engagement with each other, when the switch is closed, by means of a block 27 of insulating material which is substituted for the bridging contact member shown in Fig. 1. Figs. 9, 10 and 11 are detail views of the insulating block 24, and Fig. 13 is a detail view of one of the contact members 25. The operation of the modified structure is similar to that of Fig. 1 and will be readily understood from the foregoing description.

Referring especially to Fig. 14, a tube 28, which is fitted over the tube 1, corresponds to the inner tube 17 of Fig. 1 and may be provided with an enlargement 29 in order to facilitate the operation of the switch which is now effected by an outward pull exerted upon the tube 28. The inner end of the tube 1 is provided, in this structure, with a flange 30 and a corresponding end flange 31 is provided on the tube 28. A helical spring 32 is interposed between the walls of the tubes 1 and 28 and is held in position by the flanges 30 and 31. A spring pawl 33, which corresponds to the pawl 21 of Fig. 1, is adapted to effect the rotation of the bridging contact member 6 by engagement with the teeth of the ratchet disk 16 when an outward pull is exerted upon the tube 28. In order that the moving parts may be disclosed for inspection, the enlargement 29 of the tube 28 is preferably composed of two separable parts, one of which forms an end cap 34 to which the spring

pawl 33 is soldered or otherwise attached. It will be readily understood that various other structural modifications may be effected without departing from the spirit of my invention.

I claim as my invention:

1. In a pendent switch for electric circuits, the combination with a tube partially closed at one end, an insulating block seated in and supported by the partially closed end, a second tube movably fitted into the open end of the first tube and having longitudinal slots, a cross pin supported by the first tube and projecting through said longitudinal slots, a spring which tends to separate the tubes, a pair of spring contact fingers attached to the insulating block, a shaft rotatably mounted between the fingers, and a bridging contact member and an insulating ratchet disk attached to the shaft, of a spring pawl extending inwardly from the outer end of the inner tube and adapted to engage the ratchet disk.

2. In a pendent switch for electric circuits, the combination with a tube partially closed at one end, an insulating block seated in and supported by the partially closed end, a second tube movably fitted into the open end of the first tube and having longitudinal slots, a cross pin supported by the first tube and projecting through said longitudinal slots, a spring which tends to separate the tubes, a pair of spring contact fingers attached to the insulating block, a shaft rotatably mounted between the fingers, and a bridging contact member and an insulating ratchet disk attached to the shaft, of a spring pawl extending inwardly from the outer end of the inner tube and adapted to engage the ratchet disk, and means for accentuating the quadrature positions of the bridging contact member.

3. In a pendent switch for electric circuits, the combination with a tube partially closed at one end, an insulating block seated in and supported by the partially closed end, a second tube movably fitted into the open end of the first tube and having a slot and pin connection with the first tube, a spring which tends to separate the tubes, a pair of spring contact fingers attached to the insulating block, a shaft rotatably mounted between the fingers, and a bridging contact member and a ratchet disk attached to the shaft, of a spring pawl extending inwardly from the outer end of the inner tube and adapted to engage the ratchet disk.

4. In a pendent switch for electric circuits, the combination with a tube partially closed at one end, an insulating block seated in and supported by the partially closed end, a second tube movably fitted into the open end of the first tube and having a slot and pin

connection with the first tube, a spring which
tends to separate the tubes, a pair of spring
contact fingers attached to the insulating
block, a shaft rotatably mounted between
5 the fingers, and a bridging contact member
and a ratchet disk attached to the shaft, of
a spring pawl extending inwardly from the
outer end of the inner tube and adapted to
engage the ratchet disk, and means for ac-

centuating the quadrature positions of the 10
bridging contact member.

In testimony whereof, I have hereunto
subscribed my name this 21st day of Decem-
ber, 1906.

CLARENCE CARSON.

Witnesses:

OTTO S. SCHAIRER,
BIRNEY HINES.