C. A. BLILEY.

ELECTRIC PULL SWITCH.

APPLICATION FILED JAN. 28, 1914.

1,132,154. Patented Mar. 16, 1915.

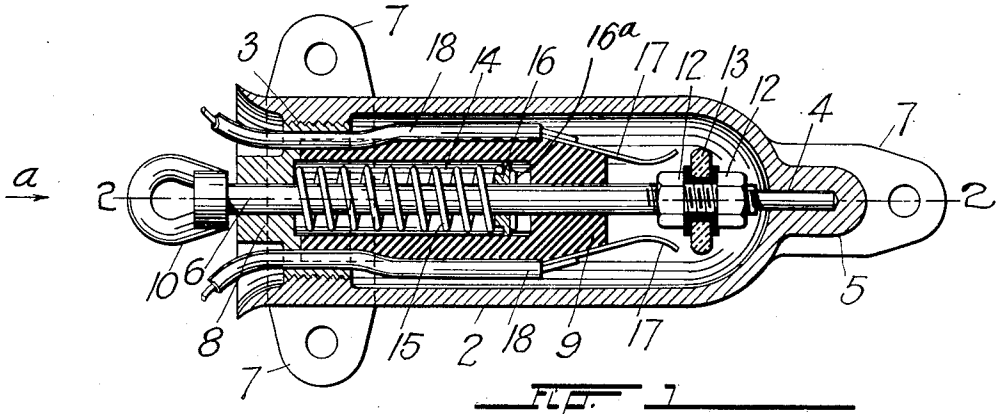


FIG. 1

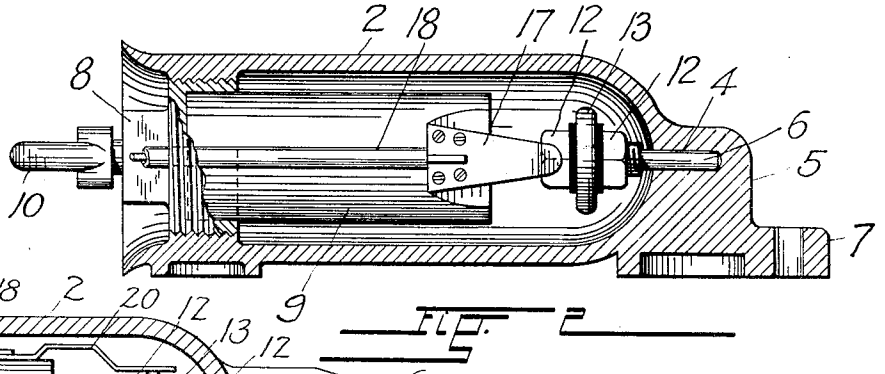


FIG. 2

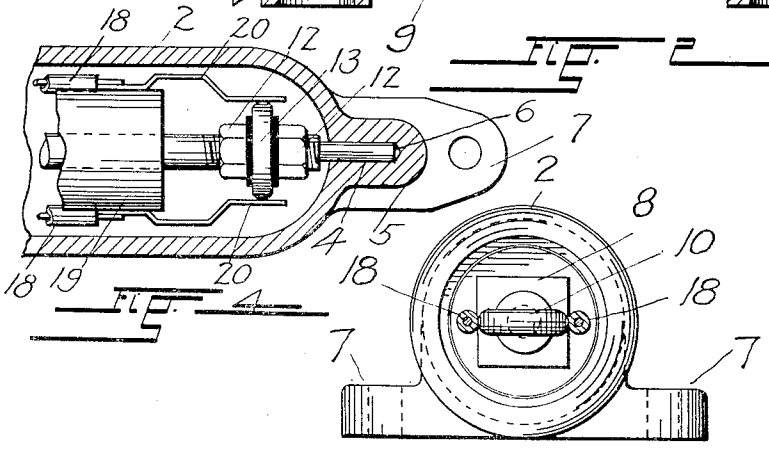


FIG. 4

FIG. 3

WITNESSES:
F. H. Cuno
C. Pearce

INVENTOR.
C. A. Bliley.

BY
Attorney.

UNITED STATES PATENT OFFICE.

CHARLES A. BLILEY, OF CRIPPLE CREEK, COLORADO, ASSIGNOR OF ONE-HALF TO ERNEST A. COLBURN, JR., OF VICTOR, COLORADO.

ELECTRIC PULL-SWITCH.

1,132,154. Specification of Letters Patent. Patented Mar. 16, 1915.

Application filed January 28, 1914. Serial No. 814,914.

To all whom it may concern:

Be it known that I, CHARLES A. BLILEY, a citizen of the United States, residing at Cripple Creek, in the county of Teller and State of Colorado, have invented certain new and useful Improvements in Electric Pull-Switches, of which the following is a specification.

My invention relates to improvements in electric circuit-controlling devices of the type commonly known as pull switches and its primary object resides in the provision of a device of this character which while simple in construction, is effective and reliable in use, and constructed so that its operative parts are adequately protected against moisture and against their derangement or incapacitation by other extraneous causes.

The protective features in the construction of my invention are of particular importance in switches used to control circuits employed for the operation of signaling instruments and other electric devices in mines, in which they are in many instances exposed to water, which is liable to detrimentally affect the movements and coöperative relation of the switch-parts.

In the accompanying drawings in the various views of which like parts are similarly designated, Figure 1 represents a longitudinal, axial section through my improved switch, Fig. 2, a similar section partly in elevation, taken along the line 2—2, Fig. 1, Fig. 3, an end view of the switch, looking in the direction of the arrow *a*, Fig. 1, and Fig. 4, a longitudinal section of the closed end of the switch, showing the arrangement of the circuit-controlling members of the same, when the device is used to control a normally closed circuit.

The reference numeral 2 designates a casing made of metal, hard rubber or other material impervious to water. The casing which is open at one of its ends, has internally, adjacent said end, a concentric face 3 of reduced diameter provided with screw thread for the water-tight and detachable connection of the operating parts of the switch. At the opposite, closed end of the housing, an axial socket 4 is formed in an enlargement 5 of its wall for the guidance of the pull-rod included in the operating mechanism, and apertured lugs 7 which extend longitudinally and laterally from the casing in a plane preferably parallel to its longitudinal axis, provide means for mounting the switch upon a suitable support, by the use of screws or nails.

The operating mechanism of the switch is in its entirety connected with a screw plug 8 which has an external screw thread for coöperation with the internal thread on the casing. The plug has at its inner end a central socket into which is driven or otherwise secured, a block 9 of circular contour, which being made of nonconductive material, is provided for the support and guidance of the parts of the mechanism which in the operation, are either permanently or temporarily placed in the electric circuit in which the switch is connected.

The mechanism above referred to includes a pull-rod 6 which is slidably fitted in bores formed in the plug and the block in axial alinement with each other and the socket in the enlargement at the closed end of the casing. This rod has at its outer extremity a head 10 provided with an eye for the attachment of a rope, chain or other means employed for imparting a longitudinal movement to the rod, and adjacent its opposite end it has a threaded portion for the application of a pair of nuts 12 between which a circular contact member 13 is adjustably secured. The contact member is disposed in the space between the closed end of the housing and the inner end of the block 9 for its movement with the rod when the latter is partially withdrawn, and it is insulated from the rod and the nuts by means of a bushing and washers of nonconductive material. The block 9 has a longitudinal recess 14 which at its open, outer end is closed by the plug 8 and which provides an annular chamber around the rod, to receive a helical spring 15 which at one of its ends, bears against the inner surface of the socket in the head in which the block is inserted, while its opposite extremity is engaged by a piston 16 which is mounted on the rod within the recess by the use of a cotter 16ª or other suitable fastening means.

The block is flattened at its inner end to provide two convergent faces for the support of contact blades 17 of resilient material, the extremities of which curve outwardly to be engaged by the contact member 13 when it is moved toward the block by longitudinal movement of the rod. The

blades are electrically connected with the protruding ends of conductors of electricity 18 which are incased in coverings of insulating material, and which project through holes in the plug at diametrically opposite points, and lie in shallow depressions formed longitudinally in the exterior surface of the block.

The blades which thus are the terminals of the electric circuit in which the switch is connected, are normally when the circuit is open, insulated from each other by their connection with the block, while the spring by its pressure on the piston, maintains the rod in its retracted position in which the contact member 13 is separated from the circuit terminals a distance sufficient to prevent the passage of electric fluid between them. When it is desired to close the circuit, the rod is partially withdrawn from the casing by a longitudinal movement imparted thereto by means of the chain or other agent attached to the eye at its headed extremity. The contact member which by this movement is brought in engagement with the blades 17, completes a circuit of which they are the terminals as long as the rod is held in its withdrawn position or until the pull at its outer end is, diminished, when by the action of the spring it is returned to its original position and the circuit is in consequence reopened.

In the construction shown in Fig. 4, a switch is shown, which is capable for use in a normally closed circuit; the blades 20 are formed so that the contact-member is normally in engagement therewith to close the circuit of which said blades are the terminals, and when the rod 6 is pulled outwardly, the member 13 disengages the blades, whereby the circuit is opened.

It will be observed that by the construction as shown and described, the interior of the casing in which the coöperative conductive parts by which the circuit is controlled, are assembled, is rendered impervious to water, that the said parts are fully protected against damage by falling objects, and that their derangement by other causes and their electrical connection by any means other than the movement of the rod, are effectively prevented.

Inasmuch as all exterior parts of the switch are completely insulated from the electrically active parts of the same and the latter cannot be affected by moisture, it follows that operators are fully protected against shocks, when opening or closing a circuit in which the device is connected.

While my improved switch may be employed wherever the services of a circuit-controlling instrument of this character are required, it is, as mentioned hereinbefore, particularly adapted for use in mines in which the incapacitation of electric instruments by any of the causes above referred to, is a frequent occurrence.

Having thus described my invention what I claim and desire to secure by Letters-Patent is:

1. An electric pull-switch comprising a protective casing which is closed at one of its ends and which at its opposite, open end has an internal screw-thread, a bored plug having a screw-thread coöperative with that in the casing, a circuit-controlling mechanism mounted in its entirety on the said plug and including a pull rod which is slidably fitted in a bore of the plug, to extend exteriorly of the casing, and conductors of electricity which are fitted in other bores of the plug to connect with the aforesaid mechanism.

2. An electric pull-switch comprising a protective casing which is closed at one of its ends and has at the said end an interior axial socket and which at its opposite, open end has an internal screw thread, a bore plug having a screw-thread coöperative with that in the casing, a circuit-controlling mechanism mounted in its entirety on the said plug and including a pull rod which is slidably fitted in the said socket and in a bore of the plug to extend exteriorly of the casing, and conductors of electricity which project through other bores of the plug, into the casing for connection with the said mechanism.

3. An electric pull-switch comprising a protective casing which is closed at one of its ends and which at its opposite open end has an internal screw-thread, a bored plug having a screw-thread coöperative with that in the casing, a bored block of non-conductive material fastened on said plug within the casing, electric contacts fastened on said block, a spring-held pull rod slidingly fitted in alined bores in said block and said plug to extend outside the casing, an insulated contact-member fastened on said rod to be brought into conductive engagement with said contacts by a sliding movement of the rod, and conductors of electricity fitted in other bores of said plug to connect with the said contacts.

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

CHARLES A. BLILEY.

Witnesses:
P. J. HOLMES,
R. H. SUNDERLIN.