No. 839,788. PATENTED DEC. 25, 1906.

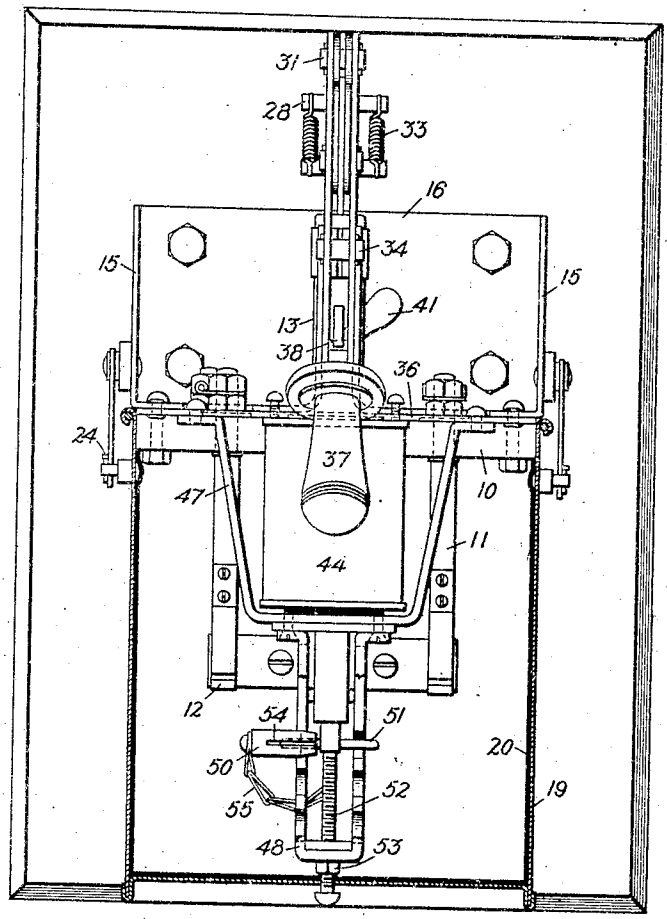
H. L. SMITH.

ELECTRIC SWITCH.

APPLICATION FILED MAY 15, 1905.

2 SHEETS—SHEET 1

Fig. 1.



Witnesses.

Nancy A. Tibbetts

Helen Alford

Inventor.

Henry L. Smith.

by Albert G. Davis

Atty

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ELECTRIC SWITCH.

APPLICATION FILED MAY 15, 1905.

2 SHEETS—SHEET 2.

Fig. 2.

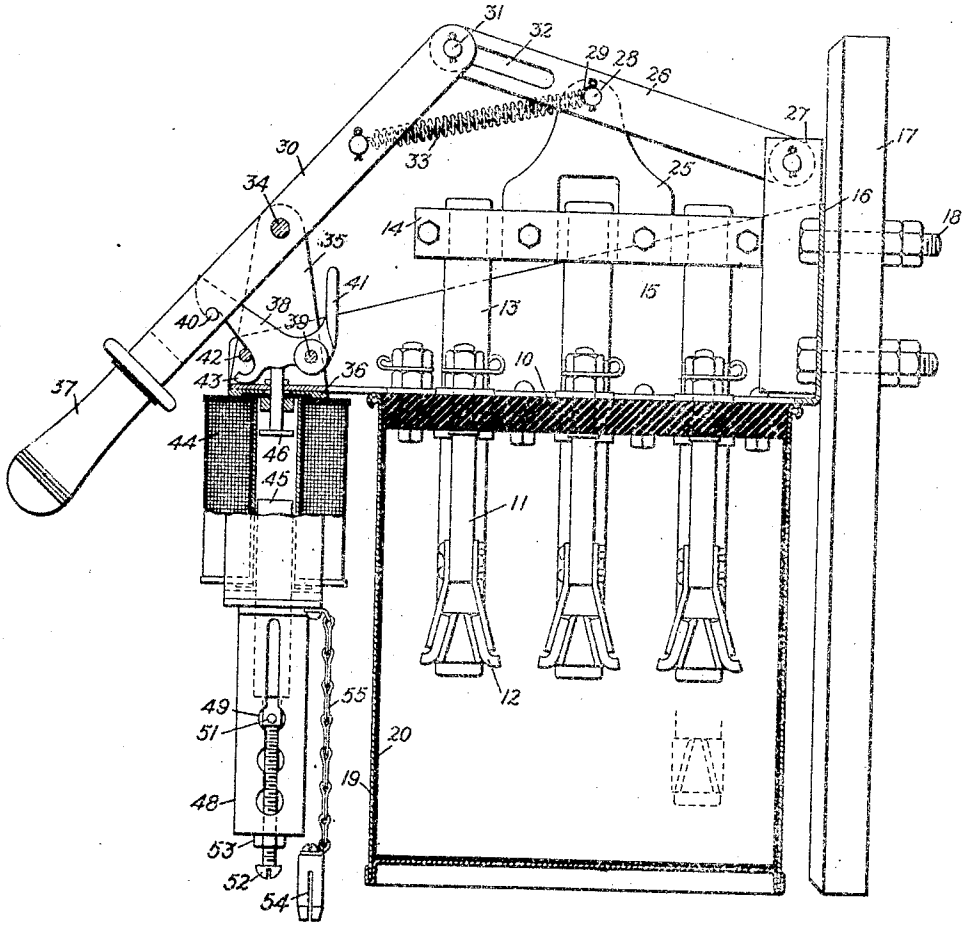
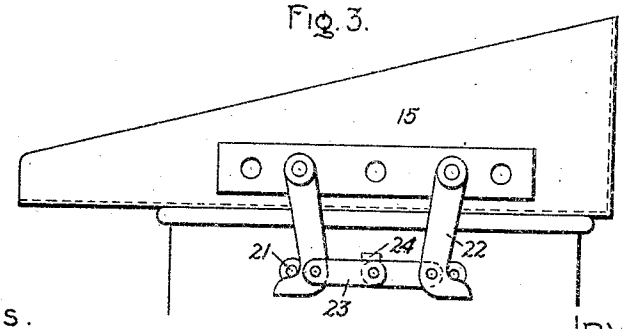


Fig. 3.



Witnesses.

Harry A. Tibbetts

Helen Alford

Inventor.

Henry L. Smith.

by Albert G. Davis

Atty.

UNITED STATES PATENT OFFICE.

HENRY L. SMITH, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC SWITCH.

No. 839,783. Specification of Letters Patent. Patented Dec. 25, 1906.

Application filed May 15, 1905. Serial No. 260,429.

To all whom it may concern:

Be it known that I, HENRY L. SMITH, a citizen of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

The present invention relates to electric switches, and more particularly to that type in which the arc is drawn under oil.

The principal object of the invention is to produce a switch of low cost which will be effective in operation and simple in construction.

To this end it comprises certain novel features. One of these consists in a novel arrangement of operating mechanism by which the moving contact is thrown into and out of engagement with its coöperating fixed contacts.

Another feature consists in a novel latch mechanism by which the oil-receptacle is attached to its support.

Still another feature resides in the novel mechanism employed for cutting the automatic trip-coil out of service. In certain classes of service, notably in connection with electric motors, it is necessary to prevent the motor-circuit from being opened by the switch upon the occurrence of an overload. For example, in well-drilling where an electric motor is used to operate the drill it is usual to employ a motor of sufficient capacity to care for the normal load resulting from the normal drilling operation and to overload the motor for a short time when removing the drill from the well. In such service it is desirable to have the circuit-breaker set to trip on overload during the normal working and to render the overload device inoperative at the time of removing the drill.

These various features of invention will be more fully understood upon reference to the following description, taken in connection with the accompanying drawings, in which I have illustrated the preferred embodiment of my invention.

Referring to the drawings, Figure 1 is a front elevation of a switch embodying the features of the invention, parts being broken away and shown in section. Fig. 2 is a side elevation of the same, also showing parts in section; and Fig. 3 is a detail of the latching means for holding the oil-can in place.

Throughout the views like characters refer to like parts.

The switch illustrated is the type known as a "wall" or "post" switch—that is, one in which the switch-contacts and the operating mechanism are located at one side of the point of support. The switch illustrated is also intended for use in three-phase circuits and comprises a horizontal member 10 of slate, fiber, or other suitable insulating material, through which extends the fixed switch-contacts 11, arranged in three pairs, each adapted to be bridged by a horizontal bridging-contact 12, supported by a wooden rod 13, extending upward through a suitable guide-opening in the horizontal member 10 and secured at its upper end to the yoke 14. With this organization the reciprocation of the yoke 14 carries each of the bridging-contacts 12 into or out of engagement with its pair of fixed contacts 11. The horizontal supporting member 10 is provided at its outer edges with metal plates which are turned up to form side flanges 15 15 and a rear flange 16. The latter flange is designed to be secured to the face of the switchboard 17 or like support by any suitable means, as the bolts 18. The switch-contacts make and break the circuit beneath the support 10 within an oil-receptacle 19, provided with an insulating lining 20 and adapted to contain a quantity of oil or other insulating liquid, as is well known in the art.

The receptacle 19 is provided on either side near its upper edge with a pair of projections or lugs 21. These lugs coöperate with a pair of depending members or latches 22, which are secured to the side flanges 15 of the supporting structure, and which together with the said links form latching means by which the oil-receptacle 19 is held in place. These latches 22 are moved into and out of engaging position by means of a toggle 23, which is adapted to be slightly overset to maintain the latches in engagement with the lugs 21. To stop the toggle at the proper point, a stop 24 upon one of the toggle-links engages the other toggle-link. This projection also provides a finger-hold by which the toggle may be moved in order to release the latch.

For the purpose of reciprocating the yoke 14 and the movable switch-contacts connected thereto said yoke is connected by means of a plate 25 to an intermediate point on the lever 26, which is pivotally connected at its rear end to suitable supporting-plates 27, projecting from the rear wall 16 of the main support. The lever 26 is made up of two separate plates which pass on opposite sides of the plate 25, and a connection therewith is made by means of a pin 28 and a slot 29. The slot is necessary to permit the switch-contacts to move vertically in response to the guiding action of the openings in the insulating-plate 10, through which the supporting-rods 13 pass. The forward end of the lever 26 is connected to an operating-lever 30 by means of a pin-and-slot connection comprising a pin 31 and a slot 32. The levers 26 and 30 are also connected by means of a coiled spring 33. The operating-lever 30 is pivoted at the point 34 between fixed uprights 35, carried at the front end of the side flanges 15, by means of a transverse plate 36, which connects these flange members. The free end of the lever 30 is provided with a suitable handle 37. Obviously as the lever 30 is rotated about its pivot 34 its movement is transmitted by means of the pin 31 and slot 32 to the lever 26 and thence to the movable contact of the switch. When the handle 37 is forced downward, so as to draw the switch-contacts upward into engagement into the position illustrated in Fig. 1, the parts are held from a return to the open position under the action of gravity by means of a latch 38, which is pivoted at 39 between the uprights 35. This latch engages the pin 40, connecting the two strips of which the lever 30 is composed. These strips are spaced apart, so that the latch 37 passes between them. The latch is also provided with a thumb-piece 41, by which it may be manually moved into and out of engaging position. It is normally held in engaging position by the action of gravity. Its upward movement, on the other hand, is limited by a stop 42, extending between the uprights 35, and a coöperating stop 43 on the latch. For the purpose of electrically tripping the switch an overload or other electrically-actuated coil 44 is provided. This coil is secured to the under side of the plate 36 at the forward end of the horizontal end of the horizontal switch-support and is provided with a movable core 45, which is adapted to be drawn upward by the energization of the coil into engagement with the tripping-pin 46, which projects through a suitable opening in the plate 36 into a position to engage the under side of the latch 38 and throw it out of engagement on the operating-lever 30, and thus free the switch, so that it will open under the action of gravity. The coil is held in place by means of the yoke 47, which extends beneath the lower end of the coil and is secured at its upper ends to the transverse plate 36. As previously pointed out, one of the features of the invention consists in the novel means for rendering the tripping-coil inactive. This consists generally in means for preventing the core 45 from responding to the pull of the coil 44 and specifically comprises a member 48, which extends parallel to the direction of movement of the core and is provided with a plurality of apertures 49, into which a hollow plug 50 may be seated, so as to embrace the end of a transverse pin 51, extending through the lower end of the movable core 45. The member 48 preferably takes the form of a yoke secured to the under side of the yoke 47, through the bottom of which extends an adjusting-screw 52, provided with a lock 53. By means of this screw the position of the core may be adjusted for different calibrations of the tripping-magnet. The removable plug 50 is split, as indicated at 54, so as to more readily seat itself within the apertures 49. These apertures are connected by a slot which is necessary for the passage of the transverse pin 51. The plug 50 is also attached to a fixed portion of the structure, as the yoke 47, by means of a chain 55.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. An electric switch comprising coöperating contacts, a pivoted arm, a pivoted manual lever having a pin-and-slot connection with said pivoted arm, a pin connecting one of said contacts to said arm between the pivot of said arm and said pin-and-slot connection, and a spring having one end secured to said pin and the other end to said lever.

2. An electric switch comprising a horizontal support, fixed contacts carried thereby, an arm pivoted near the rear of said support, an operating-lever pivoted near the front of said support and having a power-multiplying connection with said arm, vertically-movable contacts coöperating with said fixed contacts and connected to said arm between the pivot of said arm and said power-multiplying connection, a latch for engaging said lever to hold the switch closed, and an actuating-magnet for said latch secured to the front of said support.

3. An electric switch comprising a horizontal support, fixed contacts carried thereby, an arm having one end pivoted near the rear of said support, an operating-lever pivoted to the front of said support and having a power-multiplying connection with the other end of said arm, vertically-reciprocating movable contacts coöperating with said fixed contacts and connected to said arm by a pin-and-slot connection between the pivot of said arm and said connection to the operating-lever.

4. In a circuit-breaker, the combination

with the fixed and movable breaker-contacts and latching mechanism, of a tripping-magnet, an armature therefor, and means for locking said armature against tripping movement comprising a member located adjacent to the path of movement of said armature and a stop removably secured thereto and projecting into the path of movement of said armature.

5. In a circuit-breaker, the combination with the fixed and movable breaker-contacts and latching mechanism, of a tripping-magnet, an armature therefor, and means for locking said armature against tripping movement comprising a member located adjacent to the path of movement of said armature and a stop securable to said member at a plurality of points and projecting therefrom into the path of movement of said armature.

6. In a circuit-breaker, the combination with the fixed and movable breaker-contacts and latching mechanism, of a tripping-magnet, an armature therefor, a member located adjacent to the path of movement of said armature and provided with a plurality of sockets, a pin projecting from said armature, and a hollow plug adapted to embrace said pin when inserted in said sockets thereby holding the armature against movement.

7. The combination with a solenoid, of a movable core therein, a pin projecting laterally from said core, an apertured bar extending downward from said solenoid, and a hollow plug adapted to be inserted into the apertures in said bar and over the end of said pin to hold the core against the magnetic pull of the solenoid.

8. In an electric switch, the combination of an oil-receptacle, a support therefor, and means for detachably connecting said receptacle to said support comprising relatively shiftable engaging members on said receptacle and support and a toggle for setting said members in engaging position.

9. In an electric switch, the combination of an oil-receptacle, a support therefor, and means for detachably connecting said receptacle to said support comprising coöperating engaging projections and latches on said receptacle and support and a toggle for setting said latches in holding position.

10. In an electric switch, the combination of an oil-receptacle, a support therefor, laterally-projecting lugs on said receptacle, pendent latches pivoted to said support and adapted to engage said lugs, and a toggle for setting said latches in holding position.

In witness whereof I have hereunto set my hand this 12th day of May, 1905.

HENRY L. SMITH.

Witnesses:
BENJAMIN B. HULL,
HELEN ALFORD.