

S. B. CONDIT, JR. & A. E. GREENE.

MANHOLE SWITCH.

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1,008,012.

Patented Nov. 7, 1911.

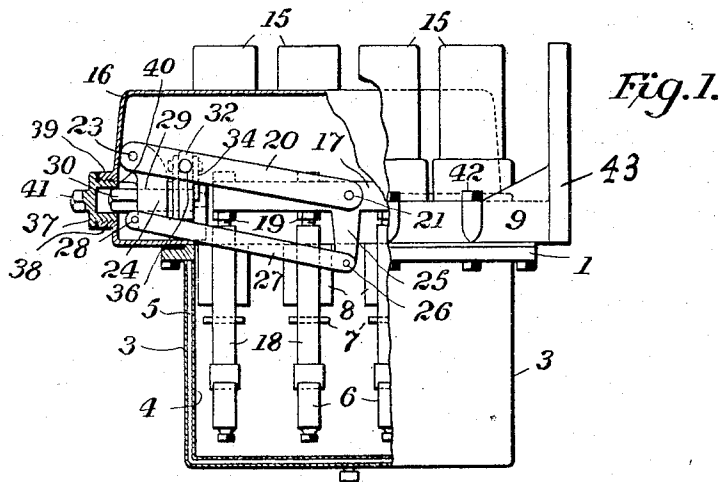


Fig. 1.

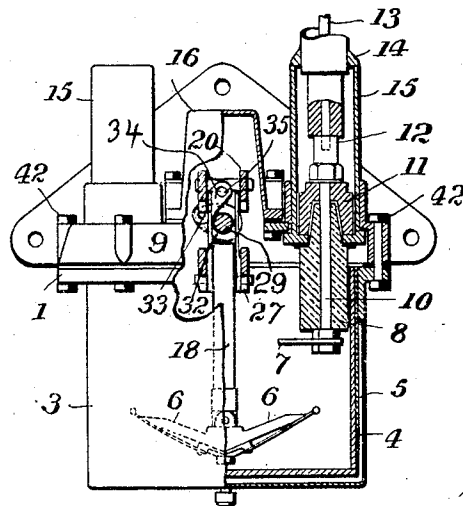


Fig. 2.

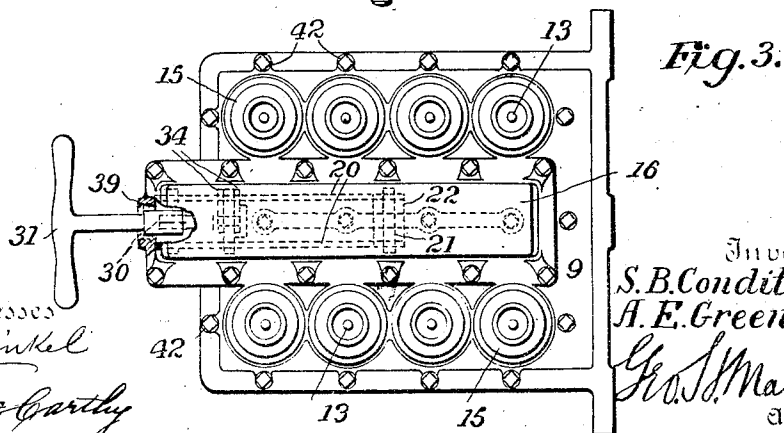


Fig. 3.

Witnesses

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MANHOLE-SWITCH.

1,008,012.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, SEARS B. CONDIT, JR., and AUSTIN E. GREENE, citizens of the United States, and residents of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Manhole-Switches, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

A manhole switch absolutely watertight, to be relied upon in flooded districts, has long been desired, but several practical difficulties have stood in the way of its accomplishment. For instance the size is necessarily limited, internal condensation must be prevented, the joints must be capable of expanding and contracting with the sudden changes of temperature without leaking, and the escape of gas must be provided for, lest the switch blow up under an accumulation of gas pressure from repeated operation.

Accordingly the object of our invention is to provide an oil switch capable of fulfilling all these requirements. To this end we provide the switch with a double-walled oil tank, affording an extended dead-air space between the two walls as an efficient heat insulator for preventing condensation within the switch, and we provide an operating connection having a detachable handle, leaving a small handle opening normally closed by a removable plug, so that the switch is absolutely tight excepting at the moment when being operated by hand, at which time this plug is unscrewed, thereby permitting the operation of the switch and at the same time giving ample opportunity for the gas to escape as it is generated during said operation. By this means we avoid various difficulties of the usual stuffing box construction, and instead of providing elaborate means for overcoming the usual expansion and contraction and condensation, etc., to which this type of switch is prone, we prevent the variations in temperature and thereby avoid the difficulty. The dead-air space prevents the extreme differences of temperature between the outside and the inside, and the two walls which form said dead-air space give great strength of construction, while at the same time affording an additional protection against the possible entrance of water.

Further advantages of our invention will

appear in the course of the following detailed description, taken with reference to the accompanying drawings, in which we have illustrated a preferred embodiment of the invention.

In the drawings, Figure 1 shows partly in side elevation and partly in section a manhole switch constructed according to our invention; Fig. 2 is a view thereof in front elevation showing the same partly in end view and partly in transverse section; and Fig. 3 shows the switch in top plan.

Depending from a securing flange 1 is the oil well or tank, consisting of two walls 3, 4 having between them a dead-air space 5. In this oil well the movable brush member or contact maker 6 operates with reference to the stationary contacts 7, which depend into the oil from porcelain or other insulation bushings 8 carried by a top 9. The conductor from the stationary contact 7 is herein shown as a heavy rod 10 passing upwardly through a top bushing 11 and thence secured at 12 to an outgoing wire or cable 13, to which is clamped a collar 14 which closes against a protecting tube 15 which surrounds the joints and connections of the cable and conductor already mentioned. The switch herein shown contains eight of these connections, although it will be understood that any desired number may be employed. The top has an oblong raised portion 16 in which the switch operating parts move. As herein shown, the brush members depend vertically from a carrying frame 17, said brushes being supported by posts 18 adjustably secured in said frame at 19. The frame is moved bodily up and down and kept in correct position at all times by a parallel lever connection consisting of lifting bars 20 pivoted at 21 to bosses 22 at about the middle of said frame, and at 23 pivoted to a heavy bracket 24. Below the pivot 21 an arm 25 projects rigidly from the frame, and to this are pivoted at 26 links 27, being pivoted at their opposite ends at 28 to said bracket. Journaled in the bracket is a rock shaft 29 having a squared outer end adapted to receive a standard socket wrench 31 whenever it is desired to operate the switch. At its inner end the rock shaft 29 is provided with a crank 32 to whose outer end are pivoted at 33 link connections 34 pivoted at 35 to a cross bar 36 which joins the main lifting bars 20. Thus by rocking

the shaft 29, said lifting bars and the frame 17 and its movable contacts are raised or lowered. This construction also has the advantage of requiring that the switch be moved either to fully opened or fully closed position, as it will move by gravity from any position except when the pivots are vertical, *i. e.*, when the switch is in closed position, or when the toggle is flexed as shown in Fig. 2, *i. e.* with the switch in fully opened position. When the link pivots are vertical the friction or resistance of the movable parts is quite sufficient to hold the toggle connection in this position. A screw plug 37 fits the opening 38 in the front end 39 of the cover, being threaded at its inner end 40 and provided at its outer end with a squared projection 41 corresponding to the projection 30 so as to be removable by the socket wrench 31. The cover is secured by bolts 42, and suitable packing is used on all the joints. The cover has a back extension 43 whereby it can be bolted in place in the manhole.

From the foregoing description it will readily be understood that when the switch is closed it is absolutely tight, because of the construction whereby all the joints are held tight by heavy bolts and screws. In other words there is no externally projecting part passing through a stuffing box or any such construction. When the necessity arises for operating the switch, the screw plug 37 is simply screwed out from the opening 38 and then the socket wrench is inserted in said opening into engagement with the squared end 30 of the rock shaft 29, and the simple turning of the latter operates the switch. The socket wrench has a loose fit in the hole 38, affording ample opportunity for the gas to escape. As the only time that gas can accumulate is when the switch is being opened, this provision permits of the automatic escape or removal of the gas at the moment it is generated, and yet there is no outlet left for the entrance of moisture when the operator leaves the switch. Having operated the switch, and the gas having escaped, the operator removes the wrench and replaces the plug 37. The difference in temperature between the inside and the outside of the switch is prevented from seriously affecting the switch or producing condensation within the casing because of the dead-air space 5 surrounding the oil. The operating mechanism is all held in and housed by the separate cover away from the oil and oil tank.

It will be understood that our invention is capable of a wide range of embodiments, and that accordingly we are not limited to the constructional details of the preferred switch as herein shown, excepting as required by certain of the more limited claims.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A manhole oil switch, comprising make-and-break mechanism, inclosing means normally sealing said switch air and water tight during the intervals between actuations of the switch, said sealing means providing an inclosure specially adapted for underground installation and including a double-walled oil tank to protect and inclose the same, having provision for heat insulation for counteracting the effects of the difference in temperature between the inside and outside of the switch, and a bath of insulating medium retained by said inclosing means and adapted to keep the contacts of said make-and-break mechanism immersed at the contact breaking position.

2. A manhole oil switch, comprising make-and-break mechanism, a container formed so as to be capable of sealing said switch air and water tight, said container providing an inclosure specially adapted for underground installation and including a protecting reinforcing construction having provision for a surrounding dead-air space for protecting the inclosed switch and oil from injury, the entrance of water and the effects of sudden changes of temperature, and a bath of insulating medium in said container adapted to keep the contacts of said make-and-break mechanism immersed at the contact breaking position.

3. A manhole oil switch comprising a container formed to normally seal the switch against the entrance of moisture, make and break mechanism therein, said container having an opening thereinto with a removable sealing closure and being normally open except for said closure, said opening being formed of a size to be only partially closed by an operating tool of normal size insertible therethrough to operate said make and break mechanism, and a tool adapted to be loosely inserted through said opening to operate the switch whereby vent is provided for the escape of gases as the switch is operated.

4. A manhole oil switch comprising make and break mechanism, an inclosure therefor constructed to normally seal the same against the entrance of moisture, means for effecting an opening into said inclosure of a size to receive an operating tool for the make and break mechanism without being wholly closed thereby permitting the escape of gases as the switch is operated, and a tool loosely insertible through said opening to operate said make and break mechanism.

5. A manhole oil-switch, comprising an inclosure constructed to normally seal the switch against the entrance of moisture, make-and-break mechanism therein, an operator therefor having a portion facing a wall of said inclosure, adapted to receive an operating tool, said inclosure provided with an opening thereinto facing the tool-receiv-

ing portion of the operator, of a size to loosely fit and be substantially closed by a normal operating tool, a removable closure arranged to normally seal said opening, and
5 a tool of a size to be loosely insertible through said opening for operating the switch.

6. A manhole oil-switch, comprising an inclosure constructed to normally seal the
10 switch against the entrance of moisture, make-and-break mechanism therein, an operating shaft connected therewith having an end facing a wall of said inclosure, adapted to receive an operating tool, said
15 inclosure having an opening thereinto facing said shaft end and of a size to loosely fit a tool sleeved over said shaft end, and a removable cap arranged to normally seal said opening.

20 7. A manhole oil-switch, comprising an inclosure constructed to normally seal the switch against the entrance of moisture, a switch and an operating device therefor within said inclosure, said operating device
25 having a portion adapted to receive a manipulating tool facing a side wall of said inclosure, said side wall having an opening

therethrough to receive such tool, a tool formed to loosely pass through said opening and to engage said operating device and
30 a closure arranged to cooperate with the wall of said opening to normally seal the same.

8. A manhole oil-switch, comprising an inclosure constructed to normally seal the
35 switch against the entrance of moisture, make-and-break mechanism therein, an operating shaft therefor extending horizontally of said inclosure, having an end facing
40 an upright wall of said inclosure to receive a tool, said upright wall having an opening therethrough of a size to loosely fit a tool for operating said shaft; a tool formed to loosely fit said opening and to engage said
45 operating shaft and a closure for said opening.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

SEARS B. CONDIT, JR.

AUSTIN E. GREENE.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."