

Jan. 15, 1929.

1,699,214

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ELECTRIC SWITCH

Filed Aug. 25, 1926

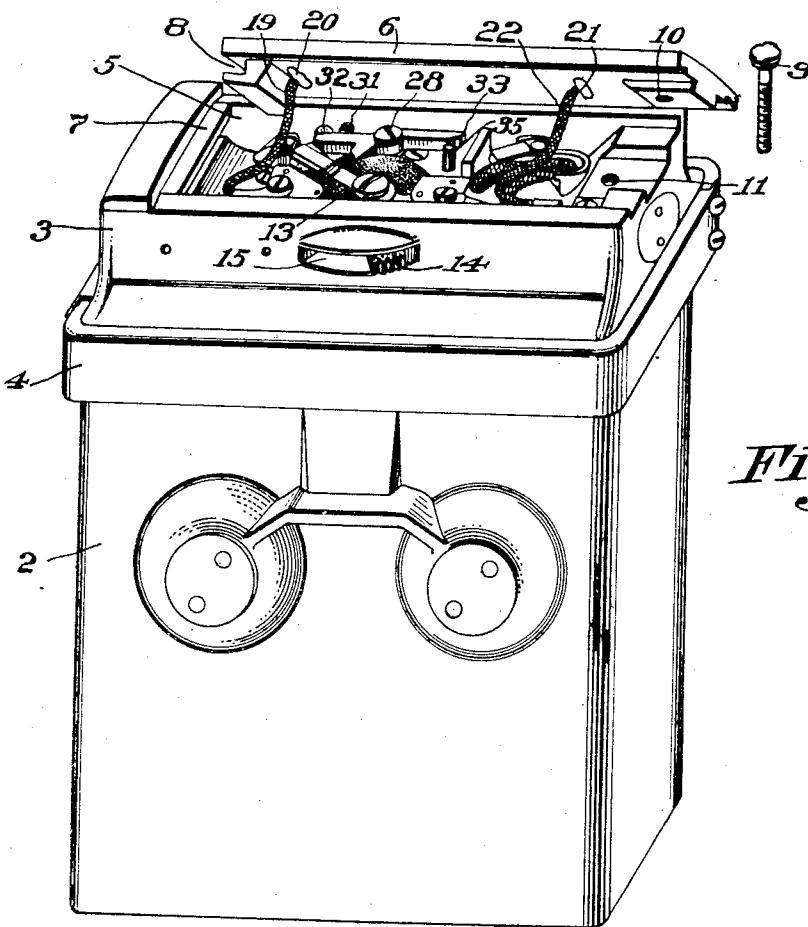


Fig. 1

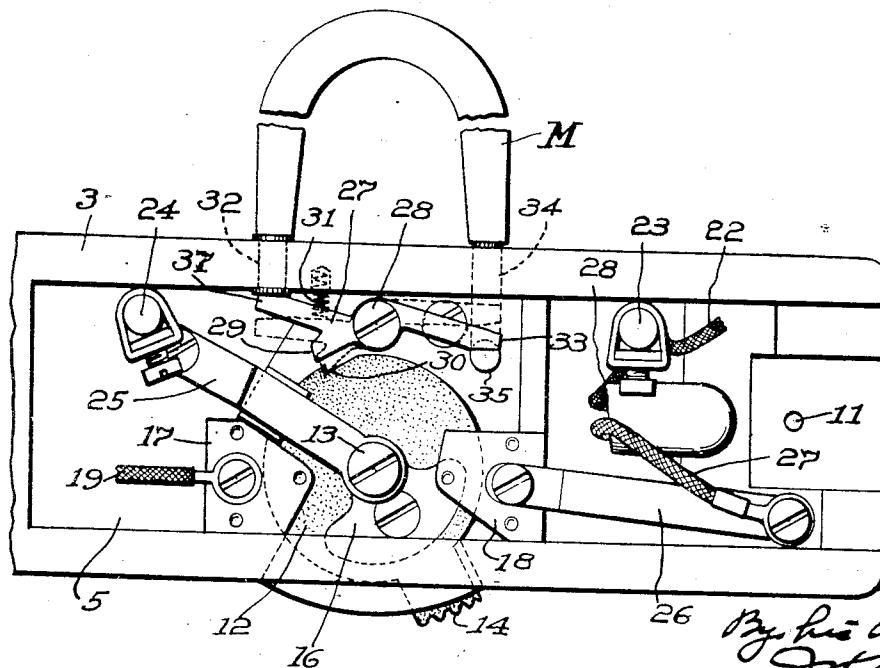


Fig. 2

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ELECTRIC SWITCH.

Application filed August 25, 1926. Serial No. 131,401.

This invention relates to electric switches and will be herein disclosed as embodied in a switch designed especially for use in the battery casing of a miner's lamp.

5 The miners' lamps used in the more progressive districts include a battery which is slung from the miners' belt and an electric lamp supplied with current from said battery and mounted on the miners' cap. These 10 batteries are charged at a station or "lamp house" provided for that purpose, and for convenience in charging the battery a switch usually is mounted in the battery casing, this switch being operable to connect the 15 battery terminals either with the lamp or with the charging terminals as desired.

It is desirable that the miners be prevented from operating this switch but that it be readily operable by the attendant at the 20 lamp house. To this end the present invention aims to provide a simple and reliable lock for the battery switch, it being understood, however, that constructions embodying this invention are not limited in their 25 application to switches designed for the particular use above described.

The nature of the invention will be readily understood from the following description when read in connection with the 30 accompanying drawings and the novel features will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a battery casing with the cover removed to show a switch construction embodying this invention, and Fig. 2 is a plan view of the casing and switch mechanism, the cover being removed.

40 In the construction shown the casing comprises a main section 2 and a top 3 which is secured to the part 2 by a metal band 4. A chamber 5 is formed in the top 3 to receive the switch and its connections, this chamber normally being closed by a cover 6. The cover is secured to the casing at one 45 end by a tongue 7, integral with the casing and entering a groove 8 in the end of the cover. At its opposite end the cover is fastened by a screw 9 passing through a hole 50 10 and into a hole 11, this screw having a specially shaped head which fits in a socket in the top of the cover so that it is necessary to use a special tool in order to remove it

and permit the opening of the cover. Preferably the battery casing and the cover 6 are 55 made of vulcanite or some other insulating material.

The switch mechanism provided by this invention comprises a disk 12 of insulating material mounted on a pivot screw 13 which is threaded into the top 3. This disk is provided with an extension 14 which projects through a slot 15 formed in the wall of the top 3, the outer end of the extension being grooved or roughened to afford a better grip 60 for the thumb or finger. The disk carries a metal plate 16, preferably set into the face of the disk substantially flush therewith, and forming the movable contact of the switch. Stationary contacts 17 and 18 are located 65 at opposite sides of the disk. A conductor 19 connects the contact 17 with a stud 20 which projects through the cover 6 and terminates at the outer face thereof, this stud forming a charging terminal. Another 70 charging terminal 21 is connected by a conductor 22 to one terminal 23 of the battery. The opposite terminal 24 of the battery is electrically connected by a metal strap 25 to the pivot 13 for the switch disk 12. Another 75 strap 26 connects the stationary contact 18 with a conductor 27 which runs to the lamp (not shown) the opposite terminal of this lamp being connected by the conductor 28 to the battery terminal 23. 80

85 The disk 12 and the extension 14 constitute, in effect, a switch lever. When this lever is in the position shown in Fig. 2, current flows from the battery terminal 24 through the strap 25, movable contact 16, stationary contact 18 and conductors 26 and 27 to the lamp, returning through the conductor 28 to the opposite battery terminal 23. This is the position in which the switch 90 remains while the miner is using the lamp. 95

In order to charge the battery, the switch handle or thumb-piece 14 is thrown to the left, bringing the contact 16 into engagement with the contact 17. This cuts off the flow of current to the lamp and connects the 100 battery terminal 24 with the charging terminal 20. The opposite battery terminal 23 is always connected through the conductor 22 with the charging terminal 21. In this position of the switch, therefore, the battery 105 may be charged by placing it in a suitable

charging apparatus, such apparatus having contacts to engage the outer ends of the terminals 20 and 21.

In order to lock the switch against operation by the miner or any other unauthorized person, a lock consisting of a dog 27 is mounted closely adjacent to one edge of the disk 12, this dog being pivoted on the screw 28 and having a tooth 29 arranged to enter 10 a notch 30 formed in the edge of the disk 12. A spring 31 bears against the dog and tends to hold it in said notch, or in other words, tends to keep the switch locked. It will be observed that the lock is not only concealed 15 but that the miner cannot obtain access to it. Provision is made, however, for releasing the lock by placing a magnet in a predetermined position against the outer surface of the casing. It will be noted that the lock or 20 dog 27 has arms or extensions 33 and 37 projecting in opposite directions therefrom. A stud 32 of iron or other magnetic material projects through the wall of the casing top 3, its inner end being located closely adjacent to the position normally occupied by the end of the arm 37 of the lock 27. Another piece 34 of iron or other magnetic material is also set into the wall of the casing 25 3 and is L-shaped, including a horizontal arm indicated at 34 and an upright arm 35 which projects into the chamber 5 and normally lies just in front of the extension 33 of the dog 27. When a magnet M is placed against the outer ends of the metal pieces 32 and 34, these parts become, in effect, extensions of the poles of the magnet and they transmit lines of force to points closely adjacent the arms 33 and 37 of the locking dog, thus causing this dog to swing about its 40 pivot 28 and withdraw the tooth 29 from the notch 30. In other words, the lock is magnetically released. The thumb-piece 14 of the switch 12 may now be thrown to the 45 opposite position from that shown in Fig. 2 thus making the necessary circuit connections to permit charging of the battery.

It is contemplated that when the lamps are delivered to the lamp house the attendant will unlock the switch of each lamp in the manner above described, throw the switch into charging position and then place the battery in a charging rack. When the attendant removes a battery from a charging 50 rack to deliver it to the miner, he throws the switch into the position shown in Fig. 2 where it lights the lamp and it remains locked in this position until the miner again returns the lamp to the lamp house. In this 55 position of the switch the terminal 20 is "dead" and therefore the miner cannot short circuit the battery by connecting the terminals 20 and 21 together. The movement of the switch just described can be made freely 60 because it is not locked at this time, the dog 65

being arranged to lock the switch 12 in one position only.

It will now be appreciated that the invention provides a very simple switch construction and locking device which effectually 70 prevents the operation of the switch by unauthorized persons but which is readily operable by an attendant having a proper equipment. The parts are simple in construction, can be manufactured economically, and both 75 the switch and the locking device are sturdy and substantial in construction so that the apparatus is extremely reliable.

While I have herein shown and described the best embodiment of my invention that 80 I have so far devised, it will be evident that the invention may be embodied in other forms without departing from the spirit and scope thereof.

What I claim as new is:

1. In an apparatus of the character described, the combination of an electric switch comprising a switch member movable from one position to another, and inaccessible means for locking said member against unauthorized operation, said means being arranged to be released by placing a magnet in a readily accessible and substantially predetermined relationship to said means.

2. In an apparatus of the character described, the combination of an electric switch and a concealed lock for said switch arranged to be released by the application of a magnet to a readily accessible part of the apparatus.

3. In an apparatus of the character described, the combination of an electric switch, a casing in which said switch is located, and a lock for said switch located in said casing and releasable magnetically from outside the casing.

4. In an apparatus of the character described, the combination of an electric switch comprising a switch member movable from one position to another, a casing in which said member is located, a lock for said member, and a spring for holding said lock in its operative position, said lock being located in said casing and being arranged to be released by the field of a magnet placed in a substantially predetermined position at the outside of the casing.

5. In an apparatus of the character described, the combination of an electric switch comprising a switch member movable from one position to another, a casing in which said member is located, a lock for said member, a spring for holding said lock in its operative position, said lock being located in said casing, and means for conducting magnetic lines of force substantially to the lock from a magnet placed at the outside of, said casing to release the lock.

6. In an apparatus of the character described, the combination of an electric switch

comprising a pivoted switch member, contacts cooperating therewith, a casing in which said member and contacts are mounted, a spring-pressed dog mounted in said casing and arranged to engage said member to lock it, said dog having an extension, and a part in said casing for conducting magnetic lines of force from a magnet placed against the outside of the casing substantially to said extension to withdraw said dog and thereby release said member.

7. In an apparatus of the character described, the combination of an electric switch

comprising a switch member movable from one position to another, a casing in which said member is located, a lock for said member, a spring for holding said lock in its operative position, an operating device for said member projecting through said casing whereby said member may be moved from one position to another when it is unlocked, and means for conducting magnetic lines of force from a magnet placed at the outside of said casing to points closely adjacent to said lock to release the lock.

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