April 25, 1933. G. WHEAT 1,905,774

PORTABLE ELECTRIC LAMP

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Fig. 1

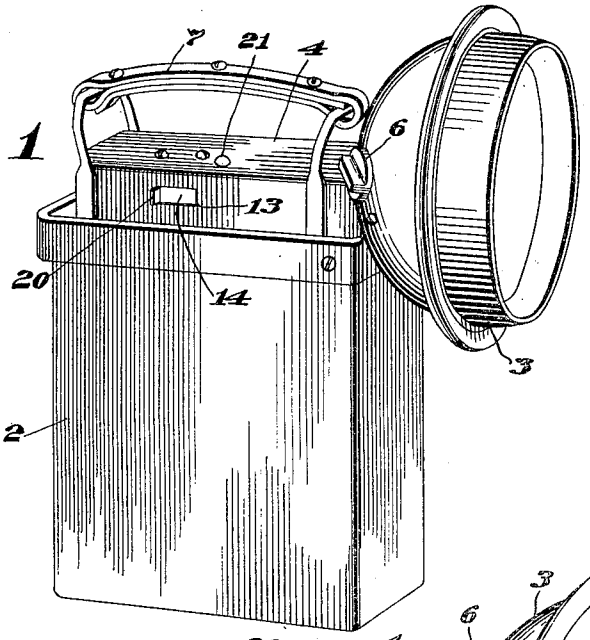
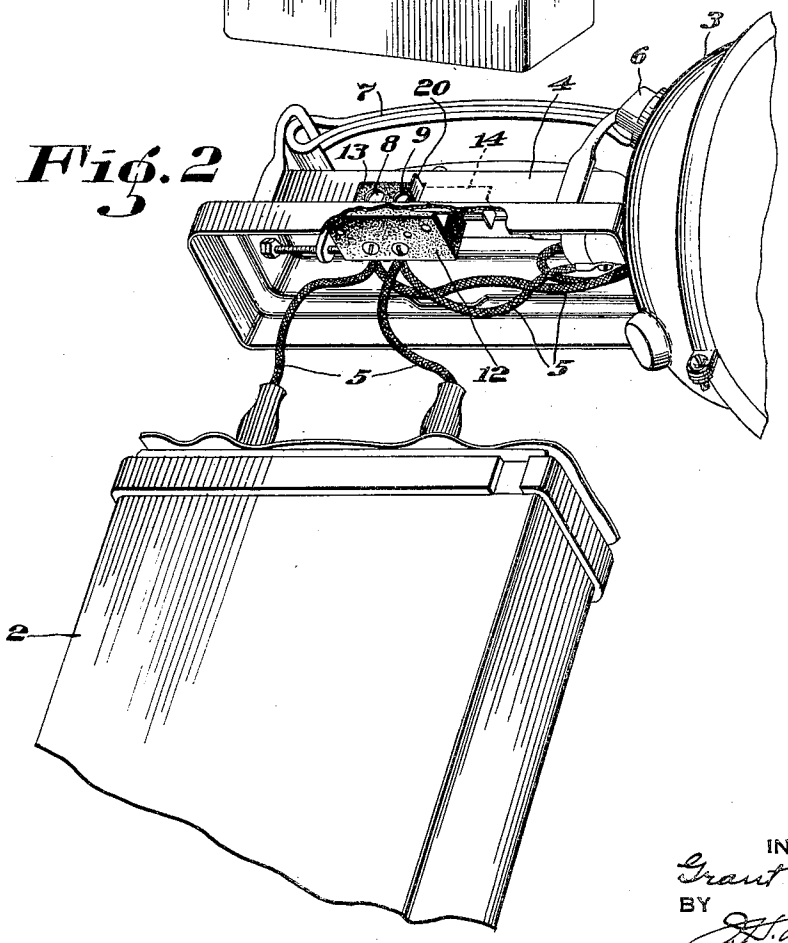



Fig. 2

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PORTABLE ELECTRIC LAMP

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Fig. 3

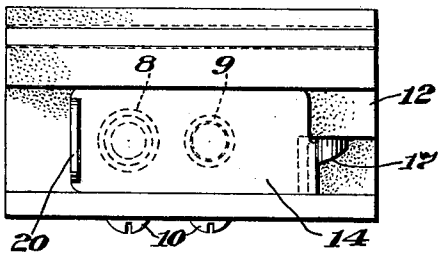



Fig. 4

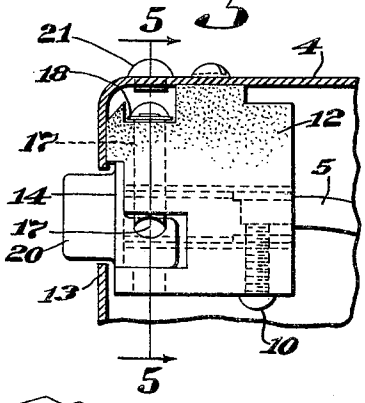



Fig. 5

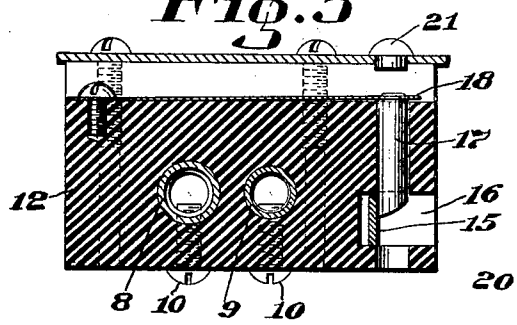



Fig. 6

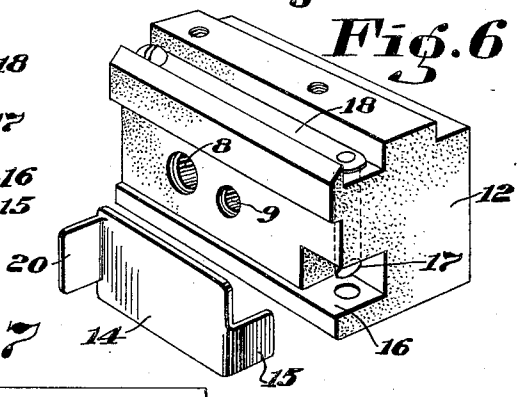



Fig. 7

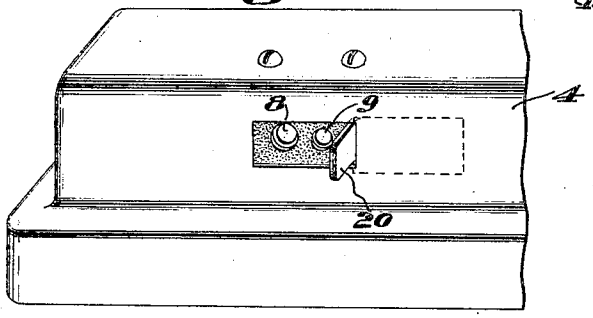
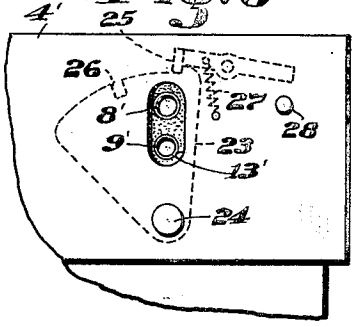



Fig. 8

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PORTABLE ELECTRIC LAMP

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Fig. 9

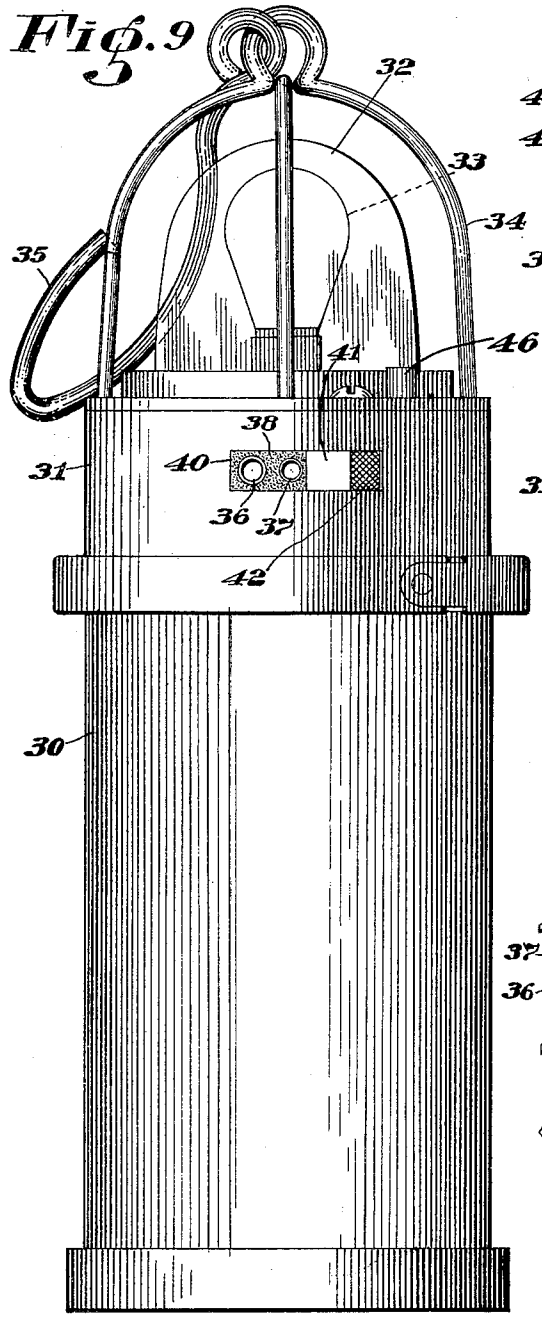



Fig. 10

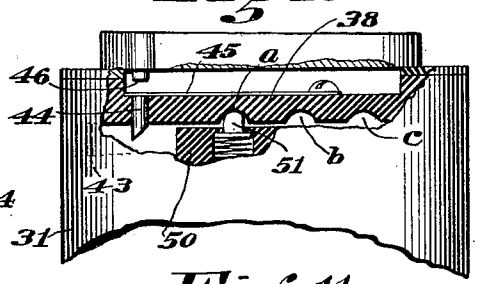



Fig. 11

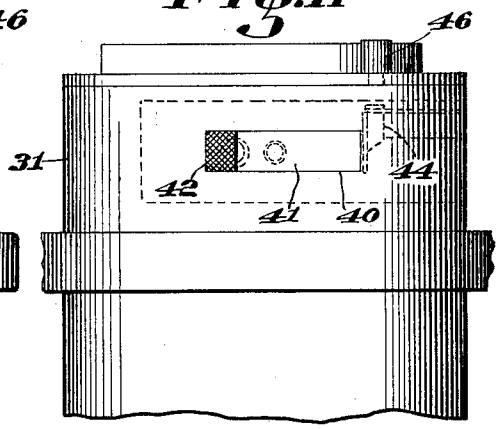
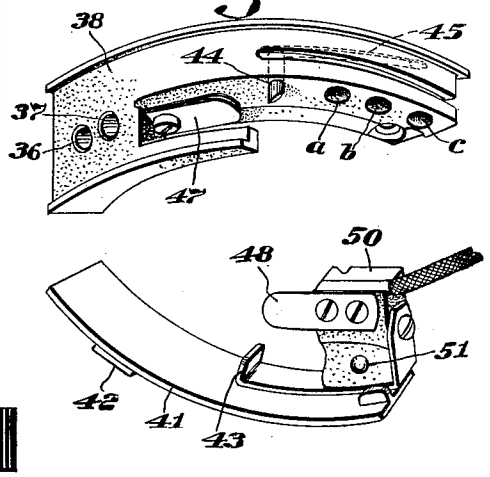



Fig. 12

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PORTABLE ELECTRIC LAMP

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Fig. 13

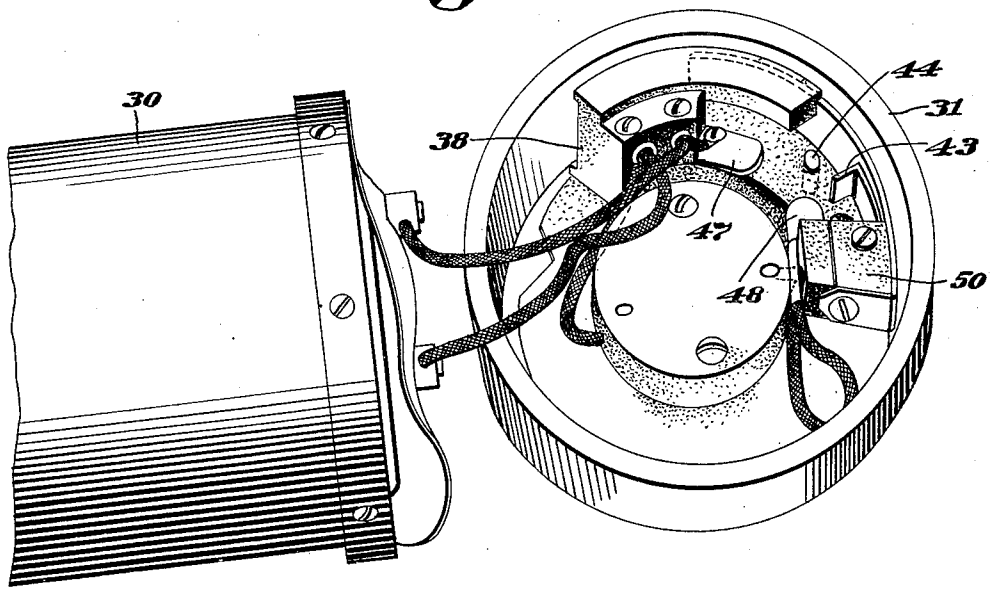



Fig. 14

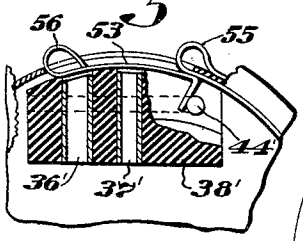



Fig. 15

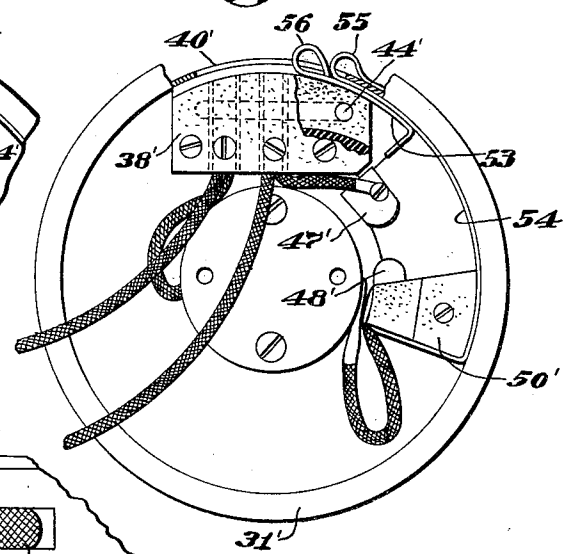
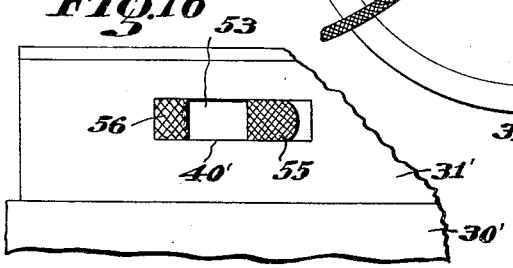



Fig. 16

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# UNITED STATES PATENT OFFICE

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## PORTABLE ELECTRIC LAMP

Application filed June 30, 1931. Serial No. 547,814.

This invention relates to portable lamp structures such as those used in mines, by firemen, mechanics, and others.

Lamps of this general type usually are supplied with power from a storage battery and consequently it is necessary to make provision for recharging the battery. In some of these portable lamps, especially those which are to be used in mines, it is highly important that the charging terminals be protected from short circuiting, either accidentally or intentionally, not only because such short circuiting may deprive the workman of his source of light, but more especially because of the danger of creating a spark which may cause an explosion in the mine. The problem is complicated in the case of mine lamps because of some strain of perversity, or lack of other interests, which compels a large percentage of the miners to experiment with their lamps.

The present invention deals particularly with these problems. It aims to improve portable lamp structures with a view to providing for the convenient recharging of the batteries, while at the same time effectually protecting the charging terminals from mischievous or intentional tampering.

The nature of the invention will be readily understood from the following description when read in connection with the 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 portable lamp embodying features of this invention;

Fig. 2 is a perspective view of the lamp illustrated in Fig. 1 showing the top of the battery casing removed;

Fig. 3 is a side elevation of the insulating block in which the charging terminals are mounted and the cover which protects said terminals;

Fig. 4 is an end view of the parts shown in Fig. 3;

Fig. 5 is a sectional view approximately on the line 5—5, Fig. 4;

Fig. 6 is a perspective view of the parts shown in Fig. 3;

Fig. 7 is a perspective view on a larger scale of a part of the battery casing top;

Fig. 8 is a front view showing a modification;

Fig. 9 is a side elevation of a tail lamp or trip lamp used in mines;

Fig. 10 is a side view, partly in cross-section, illustrating details of the arrangement for protecting the charging terminals;

Fig. 11 is a side view looking at the parts shown in Fig. 10 from a different position;

Fig. 12 is a perspective view showing the switch and cover parts;

Fig. 13 is a perspective view of parts of the construction shown in Figs. 9 to 12;

Fig. 14 is a horizontal sectional view showing details of the apparatus illustrated in Fig. 15;

Fig. 15 is a plan view of the lower side of a casing top similar to that shown in Fig. 13, some of the parts being shown in section; and

Fig. 16 is a side elevation of the parts shown in Fig. 14.

Referring first to Figs. 1 and 2, the lamp structure there shown comprises a casing 2 adapted to hold a storage battery and a lamp casing 3 which usually contains a main electric lamp bulb and a smaller emergency bulb. This lamp casing is secured to the removable top 4 of the battery casing. Electric conductors, such as those shown in Fig. 2 at 5, connect the battery with the lamp bulbs, this connection being made through a switch, the handle for which is shown at 6, by means of which the workman can turn on either lamp, as desired. A handle 7 is secured to the cover 4 and provides a convenient means for carrying the entire assembly and directing the beam of light on any desired object.

The charging terminals for the battery are shown in Figs. 2, 3, 5 and 6 at 8 and 9, respectively. In the particular construction shown these terminals consist of metal tubes into which screws 10 are threaded for the purpose of clamping the ends of the conductors in the tubes. The two terminals are connected, respectively, to the battery terminals and one of the charging terminals, in this case the terminal 8, is made larger than the terminal 9. These terminals are designed to receive the two pins of a charging terminal plug, these pins being shaped to fit the respective terminals 8 and 9. By making one of these terminals larger than the other it is impossible to place the pins in the wrong terminal sockets. Both terminals 8 and 9 are mounted in an insulating block 12 which is secured rigidly inside the casing top 4, and an aperture 13 is formed in the side of the casing top to afford access to both charging terminals.

Normally the aperture 13 is closed and access to the charging terminals is therefore prevented by a cover plate 14 which is mounted to slide horizontally just inside the casing and across the front of the insulating block 12, the block being grooved, as shown in Figs. 3, 4 and 5, for this purpose. When the plate is in its closed position, as shown in Figs. 1 and 3, it prevents access to the charging terminals 8 and 9 and when it is open it permits such access.

It is desirable to lock the cover 14 in its closed position in some manner so that it cannot be opened by unauthorized persons. Many arrangements may be used for this purpose. I prefer, however, to use a latch which may be released electro-magnetically. As shown in Fig. 6 the plate 14 is provided with an inturned end 15 which is adapted to slide into and out of a recess 16 provided in the block 12. The latch shown consists of a pin 17 mounted to slide vertically in the insulating block 12 and having a lower bevelled end to engage the part 15. A leaf spring 18 which is secured in a groove formed in the upper surface of the block 12 has one end secured to the pin 17 and is so biased that it presses the pin downwardly into its locking position as shown in Figs. 5 and 6. The cover plate 14 also has a thumb piece 20 extending outwardly through the aperture 13 by means of which the workman may move the cover. When he slides the cover into its closed position the bent over end 15 strikes the lower bevelled end of the pin or latch 17, lifting this latch as the part 15 slides under it. The latch then drops down behind the lug 15 and locks the cover 14 in its closed position where it protects the charging terminals 8 and 9.

The latch or locking device is located in a concealed position in the top 4 of the battery casing where it is normally inaccessible. The latch may, however, be released by placing a magnet against the casing top 4 immediately over the pin 17. The casing preferably is made of some non-magnetic metal, such as brass, aluminum, or the like. In order to indicate the location of the latch a rivet or stud 21 is located in the casing top 4 immediately over the pin 17, this stud being made of iron, or some other magnetic metal so that it will transmit lines of force from a magnet into a position closely adjacent to the upper end of the latch 17 and thus facilitate the release of the latch.

It is contemplated that a battery equipped with charging terminals protected in the manner above described can also be used with that type of miner's lamp in which the lamp casing is supported on the miner's cap and the battery is slung from his belt, the battery and lamp casing being connected by a cord which includes the electric conductors for carrying current from the battery to the lamp. In such lamps, as well as that shown in Figs. 1 and 2, a common arrangement is for the entire lamp structure to be turned in at the lamp house when the miner leaves the mine. The attendant there takes each lamp, unlocks the cover plate 14 and slides it back, and then plugs it into the charging circuit to recharge the battery. He closes the cover 14 again before allowing the miner to take the lamp away. This arrangement, therefore, effectually prevents the accidental or mischievous short circuiting of the charging terminals, while at the same time providing for the convenient charging of the battery when that becomes necessary.

Other forms of covers can be substituted for the sliding cover used in the construction above described. Fig. 8 shows a swinging cover 23 pivoted in the casing at 24 so that it can be moved across the aperture 13′ provided to expose the charging terminals 8′ and 9′. This cover is provided with an aperture to register with the aperture 13′. In Fig. 8 the cover is shown in its open position. It is swung into its closed position by turning the pivot stud 24 to the right, this stud forming a handle. When it arrives in its closed position the end 25 of a pivoted latch drops into a notch 26 in the cover and locks it. A spring 27 actuates the latch. This latch also may be released electro-magnetically by placing one pole of a magnet against an iron pin 28 which projects through the cover and performs the same functions as the stud 21 in the construction above described. It should be understood that the end 25 of the latch is offset laterally with reference to the main body of the latch so that the latch does not interfere with the swinging movements of the cover 23.

In some lamp structures it is desirable to make provision for ensuring that the lamp circuit will be kept open during the charging

operation and a construction designed to accomplish this object, while at the same time embodying features above described, is shown in Figs. 9 to 13. The particular lamp illustrated in these figures is intended to be used on the rear end of a car, cart, or the like, such as those used in mines. It includes a battery casing 30 provided with a removable top 31. The casing top includes a glass globe 32 in which the incandescent lamp 33 is mounted, the globe usually being made of red glass. A wire guard 34 protects the globe 32 and has a supportig hook 35 secured to it. The connections between the battery and the electric lamp 33 are similar to those shown in Figs. 1 and 2.

In this arrangement the charging terminals 36 and 37 which correspond to the terminals 8 and 9 of the construction above described are mounted in an insulating block 38 which is secured rigidly inside the casing top 31, an aperture 40 being formed through the side of this casing to expose these terminals. This aperture may be closed and the terminals protected by a cover 41 which is mounted to slide in the grooved front face of the insulating block 38, both this cover and said face of the block being curved to correspond to the curvature of the casing 31. A knurled piece 42 secured to the cover 41 projects through the aperture 40 and serves as a thumb piece to assist in moving the cover. Secured fast to the cover also is an inwardly projecting lug 43 which corresponds to the lug 15 on the cover 14 and is adapted to slide under the latch 44. A spring 45 serves to depress this latch, this pin and latch arrangement being like that above described in connection with Figs. 1 to 6, and acting to lock the cover in its closed position. An iron pin 46 projects through the casing top immediately over the latch 44 and performs the same functions as the stud 21 shown in Fig. 5.

Associated with the cover and its supporting parts is a switch which includes a split stationary spring contact 47, Fig. 12, secured to the insulating block 38 and a movable knife contact 48 which is carried by an insulating block 50 that is secured rigidly to the cover 41. This switch is connected in the lamp circuit between one of the charging terminals 36 and 37 and the lamp 33 so that the lamp will be lighted when the switch is closed and will be extinguished when the switch is open.

The insulating block 50 also carries a spring pressed plunger 51, Figs. 10 and 12, which is adapted to enter any one of three recesses *a*, *b*, or *c* formed in the lower side of the insulating block 38. It will be understood that in Fig. 12 the cover 41 is not shown in its normal position but has been turned downwardly and forwardly. When in its normal position it fits in the groove formed in the front face of the lock 38, as shown in Fig. 12, and the blade shaped contact 48 lies under the part of the block 38 in which the sockets *a*, *b* and *c* are formed and somewhat behind these sockets, so that when the cover 41 slides forward the contact 48 can slide between and into engagement with the members of the split contact 47. When in this position the plunger 51 rests in the socket *a*. The thumb piece 42 then is in the position shown in Fig. 11 and the lamp is lighted. If the slide 41 now is moved back far enough to cause the pin or plunger 51 to enter the socket *b*, the lamp 33 then will be extinguished since the contacts 47 and 48 then are out of engagement, but the cover 41 is long enough so that the charging terminals 36 and 37 will still be protected. In this position of the parts the lug 43 is against the locking pin 44. In this arrangement, therefore, the latch permits a limited movement of the cover sufficient to open and close the switch 47—48 but locks the cover against a sufficient opening movement to expose the charging terminals. When this latch is electromagnetically withdrawn, however, the cover may then be fully opened, as shown in Fig. 9, the terminals 36 and 37 at this time being exposed for the charging operation.

It will be observed that in this arrangement the cover 41 and switch 47—48 are so associated with each other as to ensure the opening of the lamp circuit before permitting access to the charging terminals. Also, the cover must be closed and locked before the switch can be operated to light the lamp. The plunger 51 cooperates with the three sockets *a*, *b* and *c* to determine the three operative positions of the cover 41.

Figs. 14 to 16, inclusive, illustrate an arrangement similar to that shown in Figs. 9 to 13, the corresponding parts being indicated by the same but primed numerals. In this construction a cover 53 which is locked in its closed position by the latch 44′ protects the charging terminals as in the construction above described. The switch block 50′ which carries the movable switch contact 48′ is provided with a curved operating plate 54 having a thumb piece 55 projecting through the aperture 40′ in the casing 30′. This thumb piece is so positioned with reference to the thumb piece 56 of the cover 53 that the act of moving the thumb piece 55 far enough to close the switch and light the lamp also serves to move the cover 53 into its closed position where it will be locked by the pin 44′.

While I have herein shown and described typical embodiments of my invention, it will be understood that portable lamps, even those used in mines, take a considerable variety of forms, and that the invention, therefore, may be embodied in other forms than those shown without departing from the spirit or scope thereof.

Having thus described my invention, what I desire to claim as new is:

1. A portable lamp structure comprising the combination with an electric lamp, a storage battery, a casing for one of said elements, and connections for supplying current from said battery to said electric lamp, of charging terminals in said casing, a cover for protecting said terminals, said cover being movable to expose said terminals, and means for locking said cover in position to prevent access to said terminals.

2. A portable lamp structure comprising the combination with an electric lamp, a storage battery, connections for supplying current from said battery to said electric lamp, of charging terminals connected with said battery, a casing in which said terminals are mounted, a cover for protecting said terminals, said cover being mounted for movement into and out of position to protect said terminals, and a latch concealed in said casing for locking said cover in position to protect said terminals, said latch being arranged to be released electro-magnetically from a point outside the casing.

3. A portable lamp structure comprising the combination with an electric lamp, a storage battery, connections for supplying current from said battery to said electric lamp, of charging terminals connected with said battery, a casing in which said terminals are mounted, a cover for protecting said terminals, said cover being mounted for movement into and out of position to protect said terminals, a spring actuated latch located in a normally inaccessible position in said casing and serving to lock said cover in position to protect said terminals, said latch being arranged to be released by a magnet presented in a substantially predetermined position at the outside of said casing.

4. In a portable lamp structure the combination with an electric lamp, a storage battery, a casing for housing one of said elements, and conductors for supplying current from said battery to said electric lamp, of charging terminals connected with said battery and located in said casing, said casing having an aperture through which access to said terminals may be had, a cover mounted in said casing for movement across said aperture to protect said terminals, a spring actuated latch concealed in said casing and operative to lock said cover in position to protect said terminals, and means for conducting lines of force from a magnet presented in a predetermined position at the outside of said casing to a point closely adjacent to said latch to release the latch.

5. A portable lamp structure comprising the combination with an electric lamp, a storage battery, connections for supplying current from said battery to said electric lamp, of charging terminals connected with said battery, a casing in which said terminals are mounted, a cover for protecting said terminals, said cover being mounted for movement into and out of positions to protect said terminals, a spring actuated latch located in a normally inaccessible position in said casing and serving to lock said cover in position to protect said terminals, said latch being arranged to be released by a magnet presented in a substantially predetermined position at the outside of said casing, and a switch in said casing for controlling the flow of current to said lamp, said switch being associated with said cover to be operated by the movement of the cover.

6. A portable lamp structure comprising the combination with an electric lamp, a storage battery, connections for supplying current from said battery to said electric lamp, of charging terminals connected with said battery, a casing in which said terminals are mounted, a cover for protecting said terminals, said cover being mounted for movement into and out of position to protect said terminals, a spring actuated latch located in a normally inaccessible position in said casing and serving to lock said cover in position to protect said terminals, said latch being arranged to be released by a magnet presented in a substantially predetermined position at the outside of said casing, said switch and cover being so associated as to require the operation of the switch to open the lamp circuit in order to operate said cover to permit access to said charging terminals.

7. A portable lamp structure comprising the combination with an electric lamp, a storage battery, connections for supplying current from said battery to said electric lamp, of charging terminals connected with said battery, a casing in which said terminals are mounted, a cover for protecting said terminals, said cover being mounted for movement into and out of position to protect said terminals, a spring actuated latch located in a normally inaccessible position in said casing and serving to lock said cover in position to protect said terminals, said latch being arranged to be released by a magnet presented in a substantially predetermined position at the outside of said casing, said switch and cover being so associated with each other as to ensure the closing of the cover before the switch can be operated to light said lamp.

8. A portable lamp structure comprising the combination with an electric lamp, a storage battery, connections for supplying current from said battery to said electric lamp, of charging terminals connected with said battery, a casing in which said terminals are mounted, a cover for protecting said terminals, said cover being mounted for movement into and out of position to protect said terminals, a latch concealed in said casing for locking said cover in position to protect said

terminals, said latch being arranged to be released electro-magnetically from a point outside the casing, and a switch controlling the flow of current to said electric lamp, said lamp and cover being so associated with each other as to compel the opening of the lamp circuit before the cover can be moved to expose the charging terminals, and said lock permitting the normal operation of the switch to open or close said lamp circuit independently of the cover.

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