Nov. 20, 1934. G. WHEAT 1,981,210

APPARATUS FOR CHARGING MINERS' LAMPS

Filed Dec. 28, 1932 2 Sheets-Sheet 1

Fig. 1

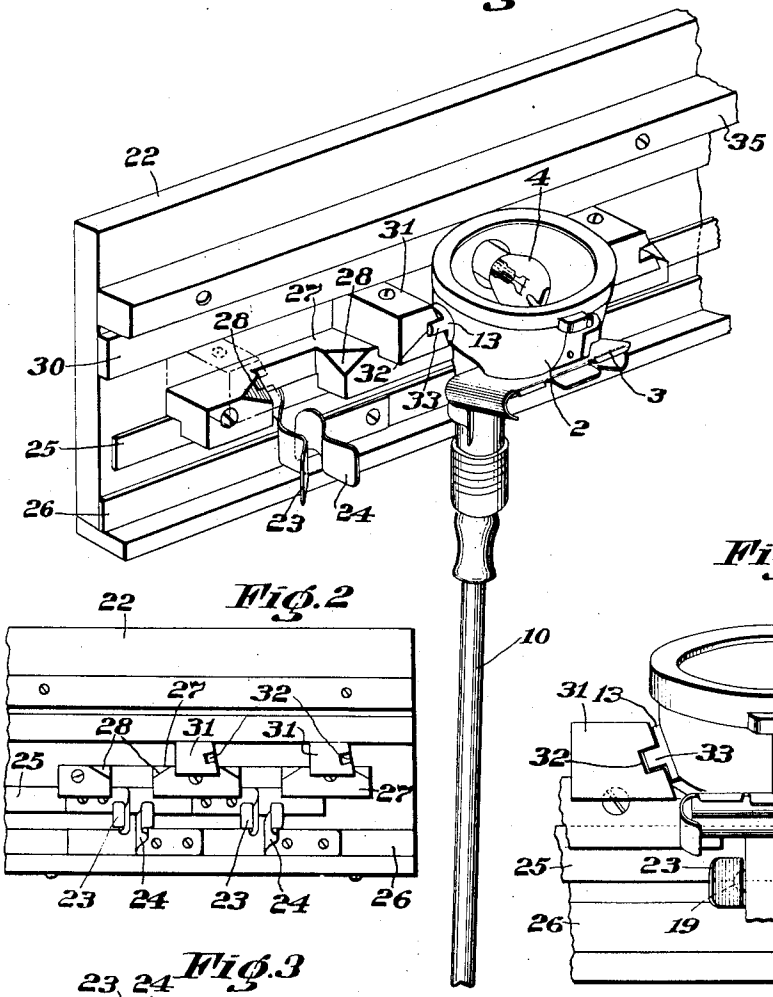


Fig. 2

Fig. 4

Fig. 3

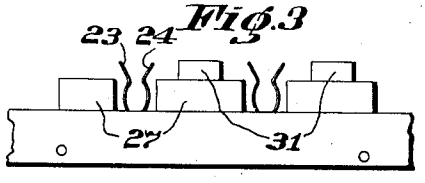


Fig. 6

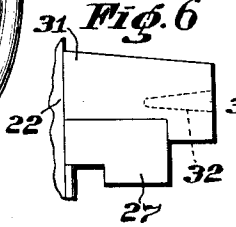
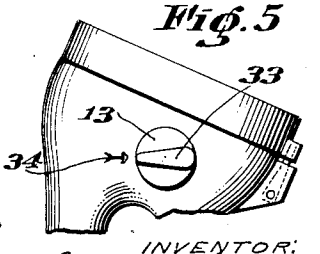
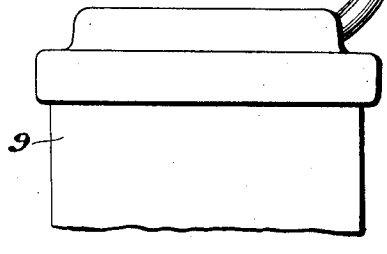


Fig. 5





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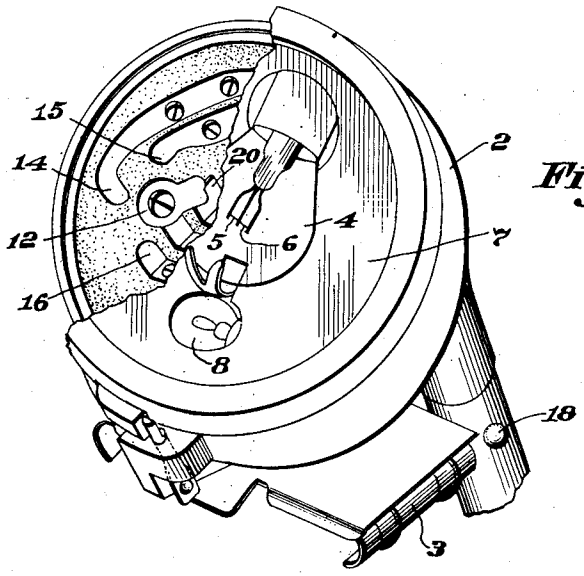


Fig. 7

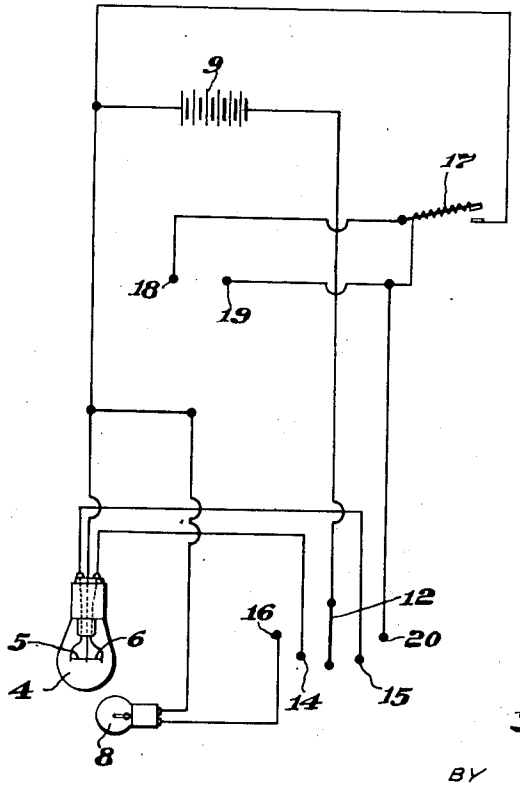


Fig. 8.

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APPARATUS FOR CHARGING MINERS' LAMPS

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Application December 28, 1932, Serial No. 649,145

7 Claims. (Cl. 171—314)

This invention relates to miners' lamps and is more especially concerned with the charging apparatus for such lamps.

A miner's lamp comprises a headpiece carrying one or more electric lamps and equipped with means for fastening the headpiece on a miner's cap. It also includes a storage battery which usually is slung from the miner's belt, and a cord provided with suitable conductors for supplying current from said battery to the electric lamp in the headpiece. It is necessary to recharge the battery at intervals, and it is the usual practice for the miner to turn in his lamp at the lamp house upon leaving the mine so that the battery can be charged during his absence and will be in proper working order when he again goes into the mine. In order to reduce the duties of the lamp house attendant it is a common practice in some mines to require the miner to place his lamp properly in the charging rack and to do the simple acts necessary to put the battery on charge. Either due to carelessness or ignorance, or both, some miner frequently neglects to perform these operations properly, with the result that he goes into the mine with a poorly charged battery.

The present invention deals especially with these conditions. It aims to devise a charging apparatus of such a nature that it will be practically impossible for a miner to place his lamp improperly in it. In other words, it is the chief object of the invention so to improve lamp charging apparatus that the proper mounting of the lamps in charging position will be facilitated, and the failures to so place the lamps will be minimized.

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 portion of a charging rack constructed in accordance with this invention and illustrates a miner's lamp in charging position;

Fig. 2 is a front elevation of parts of the rack shown in Fig. 1;

Fig. 3 is a bottom view of certain of said parts;

Fig. 4 is a front view of the more important elements at one station of the rack shown in Fig. 1, and illustrates a lamp headpiece in charging position;

Fig. 5 is a side view of a portion of the lamp headpiece;

Fig. 6 is a side view on a larger scale of the guide for receiving the operating element of the switch;

Fig. 7 is a perspective view of a headpiece with some of the parts broken away; and

Fig. 8 is a diagrammatic view of the wiring in the headpiece.

Referring first to Fig. 7 the headpiece 2 there shown is substantially like that shown and described in my copending application Serial No. 615,115, filed June 3, 1932, and includes an insulating casing carrying a spring clip 3 for securing it to the lamp attaching plate on the miner's cap. Mounted in the headpiece is a main electric lamp 4 equipped with two filaments 5 and 6, this lamp being located centrally in front of a reflector 7. A small electric lamp 8, intended simply for emergency use, also is supported in the headpiece. The two conductors which carry current from the storage battery 9, Fig. 1, to the headpiece extend through and form part of the insulated cord or cable 10, and one of these conductors leads to the central terminal of the lamp 4 while a branch leads to one terminal of the emergency lamp 8. The other conductor is connected directly to the rotating member 12 of a rotary switch which is mounted in the side of the headpiece, this switch being provided outside the headpiece with an operating element which consists of a rotary insulating button or handle 13. The outer terminals of the lamp filaments 5 and 6 lead, respectively, to switch terminals 14 and 15, Figs. 7 and 8, while the other terminal of the emergency lamp 8 is connected to a switch terminal 16. Consequently, by rotating the button or handle 13 either of the filaments 5 or 6 of the main lamp, or the filament of the emergency lamp, may be lighted, as desired.

One of the supply conductors leading from the battery is connected through a thermostatic switch 17, Fig. 8, to a charging terminal 18 which is mounted in an exposed position at one side of the neck or shank of the headpiece, as best shown in Figs. 4 and 7, while the other conductor is connected to a second charging terminal 19, Fig. 4, located at the opposite side of said shank. Additional conductors connect the latter terminal with a switch terminal 20 located in cooperative relationship to the rotary switch member 12. When the terminals 18 and 19 on the opposite sides of the shank of the headpiece are connected to a pair of charging terminals leading from a generator or other source of current supply, the charging current is for a time prevented from flowing through the battery for the reason that

the charging circuit is held open by the thermostatic switch 17. The heating coil of this switch is connected directly across the terminals 18 and 19, as shown in Fig. 8, and consequently, the current flows through this coil, thus heating the bi-metallic switch element and causing the latter to warp or bend until it finally closes this switch. If, at or prior to this time, the switch 12 is moved on to the contact 20, the current then will flow through the battery and will charge it, but current will also continue to flow through the coil of the thermostatic switch and will hold this switch closed so long as charging current is supplied to the terminals 18 and 19. These circuits and their uses are explained more fully in the specification of my pending application above referred to.

When the miner places his lamp in the charging rack to be charged, he is supposed to turn the switch 12 into contact with the charging terminal 20, thus extinguishing either lamp 4 or 8 which has been lighted, and placing the circuits in condition for charging. This he fails at times to do, with the result that his battery is not properly charged. The present invention provides an arrangement for preventing this difficulty.

Referring more especially to Figs. 1 to 6, inclusive, it will be observed that the charging rack includes an upright panel 22 provided with a series of stalls or stations each adapted to receive a headpiece 2. At each station two spring charging terminals 23 and 24 are provided to engage, respectively, with the charging terminals 19 and 18 on the shank of a headpiece. These spring terminals are of opposite polarities, all of the terminals 23 being connected to a bus bar 25 which extends horizontally along the panel, while all of the terminals 24 are connected to another bus bar 26 located below and parallel to the bar 25. The two bars are connected to opposite terminals of a charging circuit. Just above each pair of charging terminals and set backwardly away from them is a notched block 27 of insulating material provided with corners which are bevelled, as indicated at 28. The enlarged portion of the headpiece sets into this notch in the block 27 when the shank of the headpiece is forced between the charging terminals 23 and 24 into such a position that these terminals are engaged by the contacts 19 and 18, the weight of the headpiece being supported by the block. The headpiece should be pushed back until it brings up against a spacing strip 30, Fig. 1. The headpiece then is in proper position for the charging operation to proceed.

At one side of each station or stall in the rack a second block 31 is secured, this block projecting forward beyond the block 27 and overlying one end of the latter block. Formed in the block 31 is a tapered groove or guideway 32 which is so shaped and positioned as to receive the flange-like extension 33 which projects from the outer face of the switch handle or button 13. An arrow 34, Fig. 5, on the side of the headpiece cooperates with the flange 33 to designate the charging position of the switch button. In other words, when the flange 33 points to the arrow 34, as shown in Fig. 5, the rotary switch blade 12 then will be in contact with the charging switch terminal 20, Figs. 7 and 8. When the button is in this position the headpiece can be pushed freely into any one of the recesses or stalls provided to receive it in the rack, and the charging terminals 18 and 19 on the shank of the headpiece will then be in proper engagement with the charging terminals 24 and 23 on the rack. On the other hand, if it is attempted to place the headpiece in charging position when the switch operating button 13 is out of charging position by any substantial amount, the flange 33 then will engage the front face of the block 31 and it will be impossible to force the headpiece back far enough to push the shank between the charging terminals 23 and 24. If, however, the button is only slightly out of charging position, then the thin end of the extension 33 will enter the slot or guideway 32 and, as the backward movement of the headpiece is continued, the engagement of said flange with the walls of the guideway will rotate the switch button 13 into its charging position and the headpiece may be properly placed in the rack notwithstanding the faulty initial position of the switch. In other words, this error in position will be corrected automatically. It should also be noted that if it were attempted to place the headpiece in position by making it override the block 31, such an attempt would be prevented by the presence of the projecting strip 35, Fig. 1, which extends horizontally from the panel 22 into such a position that this strip closely overlies the upper edges of the headpieces when they are properly located in charging position. The invention thus provides a charging rack which facilitates the proper mounting of the lamps correctly for the charging of the batteries. It is so constructed that it positively prevents the placing of a headpiece in charging position unless the switch is substantially in the correct position to permit the charging operation to proceed. On the other hand, if the switch is only slightly out of the proper position, then the movement of the headpiece into the rack automatically moves the switch into correct charging position. This construction thus materially assists the miner in properly placing his lump on charge and definitely prevents a misplacement of it.

While I have herein shown and described a preferred embodiment of my invention, it will be understood that the invention may be embodied in other forms without departing from the spirit or scope thereof.

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

1. In a charging rack for miners' lamps of the type in which the headpiece is provided with a switch in the charging circuit, said switch including an operating element, the combination with means for supporting said headpiece in charging position, and means for preventing the movement of said headpiece into said position unless said switch is in substantially its charging position.

2. In a charging rack for miners' lamps of the type in which the headpiece is provided with a switch in the charging circuit, said switch including an operating element, the combination with means for supporting said headpiece in charging position, and means cooperating with said supporting means for engaging said operating element as said headpiece is moved into its charging position and moving it when it is misplaced to bring the switch into condition to enable the charging operation to proceed.

3. In a charging rack for miners' lamps of the type in which the headpiece is provided with a switch in the charging circuit, said switch including an operating element, the combination with means for supporting said headpiece in charging position, and means for engaging said operating element and moving it to correct a faulty position

of the switch when the headpiece is moved into its charging position.

4. In a charging rack for miners' lamps of the type in which the headpiece is provided with a switch in the charging circuit, said switch including an operating element, the combination with means for supporting said headpiece in charging position, a guide for said operating element arranged to receive said element when it is approximately in its charging position but operative to cause the movement of the headpiece into charging position to turn said element into the correct position when incorrectly positioned.

5. In a charging rack for miners' lamps of the type in which the headpiece is provided with a switch including an operating element and in which also the headpiece is equipped with charging terminals, said switch being operable to close the charging circuit, the combination with means for supporting a headpiece in charging position, charging terminals on said rack arranged to be engaged by the charging terminals on said headpiece, and means for preventing the engagement of the two sets of charging terminals with each other unless both said headpiece and said switch are properly positioned for the charging operation.

6. In a charging rack for miners' lamps of the type in which the headpiece is provided with a switch including an operating element and in which also the headpiece is equipped with charging terminals, said switch being operable to close the charging circuit, the combination with means for supporting a headpiece in charging position, charging terminals on said rack, said rack having a recess to receive the enlarged portion of said headpiece when said charging terminals on the headpiece are in proper engagement with the charging terminals on said rack, and means associated with said recess for receiving said headpiece and said operating element of said switch when said element is in proper position for the charging operation, said means being arranged to prevent the movement of said headpiece into charging position unless said switch is approximately in its charging position.

7. In a charging rack for miners' lamps of the type in which the headpiece is provided with a switch including an operating element and in which also the headpiece is equipped with charging terminals, said switch being operable to close the charging circuit, the combination with means for supporting a headpiece in charging position, charging terminals on said rack arranged to be engaged by the charging terminals on said headpiece, said rack having a recess to receive the enlarged portion of said headpiece when said charging terminals on the headpiece are in proper engagement with the charging terminals on said rack, the charging terminals on said rack being so located with reference to said recess as to compel the placing of the headpiece in a predetermined relationship to the rack, and a guide at one side of said recess for receiving said switch operating element, said guide being constructed to hold the switch in a predetermined relationship to said headpiece.

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