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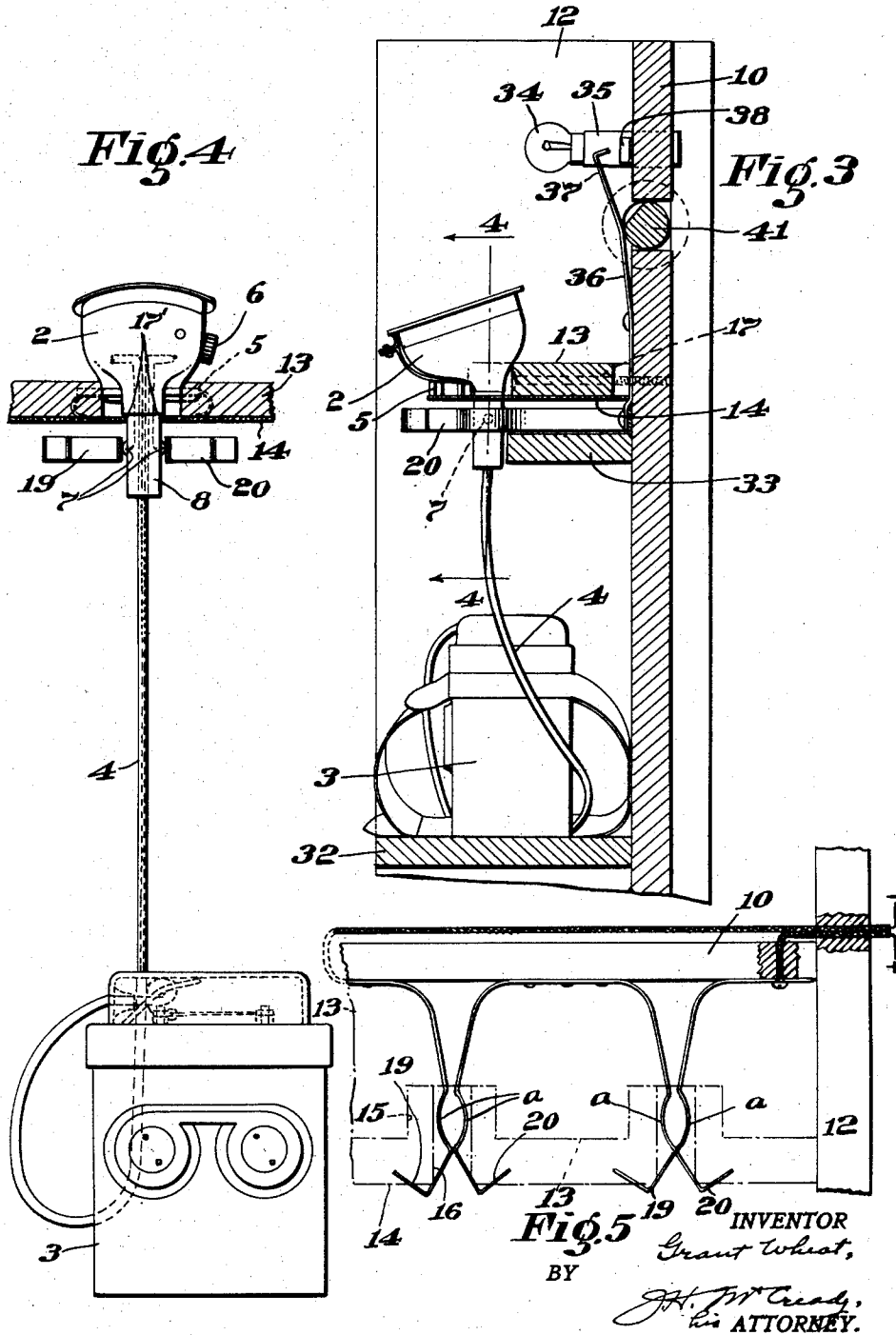
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CHARGING RACK FOR MINERS' LAMPS

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## CHARGING RACK FOR MINERS' LAMPS

Application filed February 2, 1929. Serial No. 337,106.

This invention relates to miners' lamps and more especially to apparatus for charging the batteries of such lamps.

A miner's lamp usually consists of a head piece intended to be worn on the cap or some convenient part of the person, a storage battery which usually is slung from the belt, and a cord for connecting the lamp with the battery and having electrical conductors for supplying current from the battery to the lamp or lamps mounted in the head piece. It is the usual practice for the miners to turn in their lamps at the lamp house when they leave the mine in the evening or during the day, the batteries are charged during the night, and the lamps are delivered again to the miners as they go into the mine the next morning. The present invention aims to facilitate the handling of the lamps in the lamp house and the charging of the batteries.

In a pending application Serial No. 334,526, filed January 23, 1929 (since matured into Patent No. 1,757,887, granted May 6, 1930) I have disclosed a novel construction of miner's lamp in which the apparatus has been simplified by placing the charging terminals on the head piece instead of on the battery, as has been customary heretofore; and it is an important object of this invention to devise a simple, efficient, and convenient piece of equipment for charging the batteries of lamps of this character.

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 showing a part of an apparatus constructed in accordance with this invention;

Fig. 2 is a plan view of the parts shown in Fig. 1;

Fig. 3 is a vertical sectional view of the apparatus shown in Figs. 1 and 2;

Fig. 4 is a sectional view on the line 4—4, Fig. 3; and

Fig. 5 is a plan view illustrating features

of a modified construction embodying the invention.

Referring first to Figs. 1, 3 and 4, it will be observed that the miner's lamp for which the apparatus is designed more especially, although not exclusively, comprises a head piece 2, a battery 3, and a cord 4 connecting the head piece with the battery. The head piece has rigidly secured to it a clip 5 by means of which it may be fastened to a bracket or relatively rigid strip of material worn on the cap. One or more lamp bulbs are mounted in the head piece, two usually being provided, and the head piece also is equipped with a switch controlled or operated by a knob 6, Fig. 4, by means of which either bulb may be lighted, as desired. In this apparatus the charging terminals 7—7, Fig. 4, are mounted on the neck 8 of the head piece, and in the preferred arrangement one of these terminals is always connected with one of the conductors in the cord 4, while the other terminal may be connected to or disconnected from the other conductor through the switch previously mentioned. In order to charge the battery 3, therefore, it is simply necessary to turn the switch knob 6 to the proper point and then to apply the contacts of a charging circuit to the terminals 7—7. For a more detailed description of the construction and operation of the specific lamp organization shown in the drawings, reference should be made to my patent above designated.

The rack shown in the drawings includes suitable back and end pieces 10 and 12, respectively, and one or more horizontal shelves for supporting a series of head pieces in position for the charging operation. In the illustrated construction each of these shelves includes an upper member 13 of wood and a lower member 14 of vulcanite, fibre, bakelite, or similar material, the lower member extending forward considerably beyond the upper member. These members 13 and 14 are slotted at intervals, as shown at 15 and 16, respectively, to provide recesses for receiving the respective head pieces 2. The upper member is secured to the back board by screws 17 while the lower member

is secured to the upper one. The slots in the upper member 13 are somewhat wider than those in the lower member 14, and the respective slots of the two members register with each other. The slots 16 are only slightly wider than the neck of one of the head pieces, but the slots 15 are made wide enough to receive a larger portion of the head piece 2. When a head piece is properly positioned in the rack it is supported chiefly by the clip 5 which rests on the lower member 14 of the shelf at opposite sides of the slot 16, but partly by the engagement of the walls of the slot 15 with the bulging portion of the head. It may be supported, also, at least in part, by the engagement of the shoulders 17, Fig. 4, on the neck of the head piece with the opposite margins of the slots 16.

When a head piece is supported in the shelf 13—14 in the manner just described, its charging terminals 7—7 will be located just below the shelf. Two spring contacts 19 and 20, respectively, are provided to engage the terminals 7—7 of each head piece. Preferably these contacts are connected in series in a charging circuit and for this reason they are so shaped, as shown for example in Figs. 2 and 5, that they remain in engagement with each other until the neck of a head piece is forced between them. This separates the contacts but connects the battery in the circuit. As shown, the contacts are provided with oppositely curved portions *a—b*, Figs. 2 and 5, to receive the neck of a head piece, and they lie just below the slot 16 in position to grip said neck when the head piece is in its charging position in the rack. In this arrangement, therefore, the act of placing one of the head pieces in charging position automatically connects it into the charging circuit. On the other hand, the removal of one of the head pieces from the rack takes it out of the charging circuit, and the contacts with which it was in engagement automatically snap together and complete the circuit again.

As best shown in Figs. 1 and 5, each of the contacts 19 and 20 (with the exception of the extreme right-hand contact 20) are formed on the opposite ends of a U-shaped strip of resilient metal which is secured to the back board 10 of the rack. The extreme right-hand contact 20 in the construction shown in Fig. 1 is connected by a metal strip 22 and a bolt 23, Figs. 1 and 2, to a stationary metal disk 24 which forms part of a switch for controlling the charging circuit. The blade 25 of this switch carries with it a metal disk 26 which is sprung at intervals so as to bear firmly against the disk 24 at all times, and both the parts 25 and 26 are secured to a handle or knob 27. A stationary switch contact 28 which is connected by suitable conductors with one terminal of a source of charging current is mounted on

the end piece 12 in position to be engaged by the blade 25. Also positioned on the end piece is a stop 30 to limit the movement of the blade away from the contact 28.

When the switch blade 25 engages its cooperating contact 28 current will flow through the entire charging circuit including each pair of contacts 19 and 20. In order to charge the battery of any miner's lamp, therefore, it is simply necessary to place the head piece of the lamp in one of the slots in the rack and force the neck piece between a pair of contacts 19 and 20 with the charging terminals 7—7 on the neck in engagement with the contacts. This act connects the battery in the charging circuit. If desired, a shelf 32, Fig. 3, may be provided to support the batteries 3. It is preferable also to provide a shelf-like member 33, Figs. 1 and 3, just below the entire series of contacts 19 and 20 to support these contacts against any downward thrust that may be imposed upon them, this shelf 33 being screwed to the back board 10.

Often the miners do not leave the mine together but come out at various times during the day. If some of the miners turn their lamps in at midday or in the early part of the afternoon and these lamps are given the same charge as those turned in at the end of the day, it is obvious that some of the batteries will be greatly over-charged. In order to provide for this condition the rack shown in Figs. 1, 2 and 3 is equipped with current consuming devices through which the batteries may be discharged for any desired period. Referring to the figures just mentioned it will be observed that a series of electric lamps 34 are mounted in sockets 35, respectively, which are supported on the back board 10 above the shelf 13—14, these lamps being aligned approximately with the slots in the shelf. Each of these lamps is connected in parallel with the pair of contacts 19 and 20 associated with its respective slot. That is, a resilient metal strip 36 is connected to each individual U-shaped contact strip and extends upwardly at the front side of the back board 10, and its upper end is bent inwardly, as shown at 37, to engage an oppositely bent end 38 of a metal strip 39 which is electrically connected with the lamp socket base 35 at its right. A conductor 40 connects the central contact of the lamp socket with the strip 36 at the right of it.

Considering the head piece 2 which is shown in charging position in Fig. 1, it will be evident that when the charging switch 25—28 is open the battery connected with said head piece will discharge through the lamp 34 which is located above and in alignment with it. This lamp preferably is of substantially the same candle power as that in the head piece. The parts 37 and 38 form a switch which controls the discharge of cur-

rent from each battery in charging position through its respective lamp 34. Normally the switch contacts 37 and 38 are held in engagement with each other by the resiliency of the strips 36. The contact 37, however, may be moved away from its cooperating contact 38 by rocking a shaft 41 of wood or other insulating material which is provided with one flattened or cut away side, as shown in Fig. 3. This rock shaft is supported horizontally in a slot in the back board and the switch knob 27 is secured fast on the end of it. It will be clear from an inspection of Fig. 3 that if the flattened side of the rock shaft 41 lies substantially flush with the front face of the back board 10 all the switches 37—38 will be closed. When, however, the rock shaft is turned into the position shown in Fig. 3 to close the charging switch 25—28, all of the switches 37—38 will be opened. The latter switches, therefore, are opened approximately simultaneously with the closing of the charging circuit.

It is contemplated that when the miners leave their lamps at the lamp house early in the day, the attendant will place them in the charging racks in the position shown after first turning the switch 6 of each head piece into charging position and thus extinguishing the lamp bulbs in the head piece. At this time the switches 37—38 are all closed and consequently the batteries will discharge through the lamps 34, the switch 25—28 at this time being open. When substantially all of the lamps have been brought in and it is desired to begin to charge the batteries, the attendant turns the knob 27 to close the charging circuit through the switch 25—28, thus opening simultaneously all of the switches 37—38. All of the lamps thus are given substantially the same discharge and receive approximately the same charge. When the charging operation has been completed the attendant can open the charging circuit through the switch 25—28 while still holding the switches 37—38 open, if he so desired.

This discharging arrangement can be omitted, if desired, and Fig. 5 shows a rack which is not equipped with this part of the apparatus.

The invention provides a simple construction of charging rack which is economical to manufacture, very convenient to use, and which thoroughly satisfies the practical requirements for apparatus of this character.

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

Another form of lamp which can be charged in the rack disclosed in this application is shown in my application Serial No. 155,199, filed December 16, 1926, and since is

sued as Patent No. 1,757,889, dated May 6, 1930. This patent also discloses simple forms of charging apparatus, but such apparatus is not claimed in said patent, the claims being limited to the lamp construction.

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

1. In a charging rack for miners' lamps having charging terminals on the head piece, the combination of a series of pairs of contacts, means for connecting said contacts in a charging circuit, and means for supporting a series of said head pieces in the rack with the charging terminals of each head piece operatively engaged with a pair of said contacts.

2. In a charging rack for miners' lamps having charging terminals on the head piece, the combination of a shelf for supporting a series of said head pieces, contacts mounted in said rack for engagement with the charging terminals of the respective head pieces so supported, and a charging circuit in which said terminals are connected.

3. In a charging rack for miners' lamps having charging terminals on the head piece, the combination of a series of resiliently mounted contacts arranged in pairs with the contacts of each pair positioned to engage the charging terminals on one said head piece, means for supporting said head pieces in operative relationship, respectively, to said contacts, and a charging circuit in which said contacts are connected.

4. In a charging rack for miners' lamps having charging terminals on the head piece, the combination of a series of spring contacts arranged in pairs, each pair being adapted to grip the part of the head piece provided with charging terminals and to make contact, respectively, with said terminals, a charging circuit in which said terminals are connected, and means for supporting a series of head pieces in operative relationship to said contacts.

5. In a charging rack for miners' lamps having charging terminals on the head piece, the combination of a shelf for supporting a series of said head pieces, said shelf having recesses to receive the respective head pieces, contacts associated with said recesses and positioned to engage the charging terminals on the respective head pieces supported on the shelf, and a charging circuit in which said contacts are connected.

6. In a charging rack for miners' lamps having charging terminals on the head piece, the combination of a shelf for supporting a series of said head pieces, said shelf having recesses to receive the respective head pieces, contacts associated with said recesses and positioned to engage the charging terminals on the respective head pieces supported on the shelf, said contacts being constructed to engage each other automatically when a head

piece is withdrawn from between them, and a charging circuit in which said contacts are connected.

7. In a charging rack for miners' lamps having charging terminals on the head piece, the combination of a shelf for supporting a series of said head pieces, said shelf having recesses to receive the respective head pieces, a pair of spring contacts alined with each of said recesses and positioned to engage, respectively, with the charging terminals on a head piece supported in said shelf, and a charging circuit in which said contacts are connected.

8. In a charging rack for miners' lamps having charging terminals on the head piece, the combination of a shelf having a series of slots therein to receive, respectively, the neck portions of said head pieces, and contacts mounted in the rack and associated with said slots to engage the charging terminals on the head pieces supported in said slots.

9. In a charging rack for miners' lamps having charging terminals on the head piece, the combination of a shelf for supporting a series of said head pieces, said shelf including a main portion having slots therein to receive the necks of the head pieces, and another part positioned on a lower level to support the main body portions of the respective head pieces, and a pair of spring contacts associated with each of said slots and arranged to grip a portion of the head piece positioned therein.

10. In a charging rack for miners' lamps having charging terminals on the head piece, the combination of a shelf for supporting a series of said head pieces, said shelf including a main portion having slots therein to receive the necks of the head pieces and another part positioned on a lower level to support the main body portions of the respective head pieces, a pair of spring contacts located immediately below said shelf and alined with each slot in position to grip a portion of a head piece located therein, and means immediately below said contacts for supporting them against a downward thrust but permitting the contacts of each pair to spring toward and from each other.

11. In a charging rack for miners' lamps, the combination of a series of charging contacts arranged in pairs, and each pair being positioned to engage the charging terminals on a miner's lamp, means for supporting said lamps in operative relationship to said respective pairs of contacts, a charging circuit in which said contacts are connected, current consuming devices on said rack connected, respectively, in parallel with the pairs of charging contacts, a switch controlling the connections between each of said devices and its respective pair of charging contacts, and means for operating all of said switches simultaneously.

12. In a charging rack for miners' lamps, the combination of a series of charging contacts arranged in pairs, and each pair being positioned to engage the charging terminals on a miner's lamp, means for supporting said lamps in operative relationship to said respective pairs of contacts, a charging circuit in which said contacts are connected, a series of lamps mounted on said rack and connected in parallel with the respective pairs of charging contacts, a switch for each lamp controlling the electrical connection between its respective lamp and the pair of charging terminals with which it is connected, and a single actuating device for operating all of said switches simultaneously.

13. In a charging rack for miners' lamps, the combination of a series of charging contacts arranged in pairs and each pair being positioned to engage the charging terminals on a miner's lamp, means for supporting said lamps in operative relationship to said respective pairs of contacts, a charging circuit in which said contacts are connected, a series of lamps mounted on said rack and connected in parallel with the respective pairs of charging contacts, a switch for each lamp controlling the electrical connection between its respective lamp and the pair of charging terminals with which it is connected, a charging switch in said circuit, and means for operating all of said switches simultaneously, said means being constructed and arranged to cause said lamp circuit controlling switches to remain open while said charging switch is closed.

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