

H. H. HIRSCH.
 PORTABLE ELECTRIC LIGHTING SYSTEM.
 APPLICATION FILED MAY 29, 1911.

1,055,746.

Patented Mar. 11, 1913.
 3 SHEETS—SHEET 1.

FIG. I.

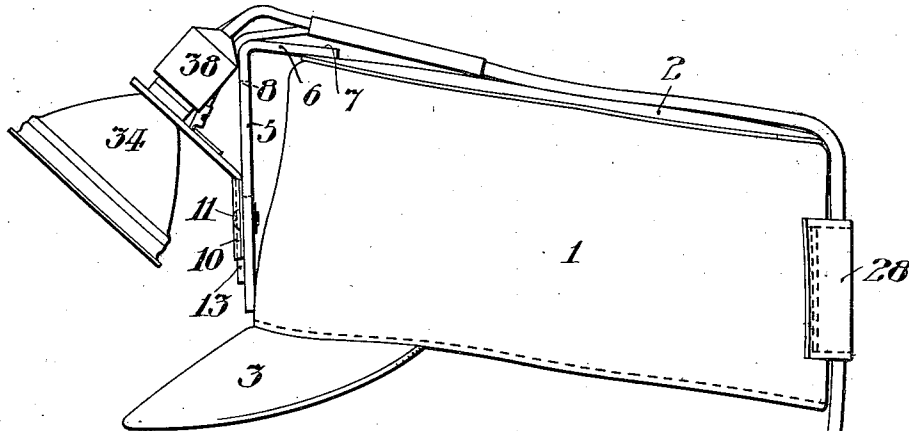
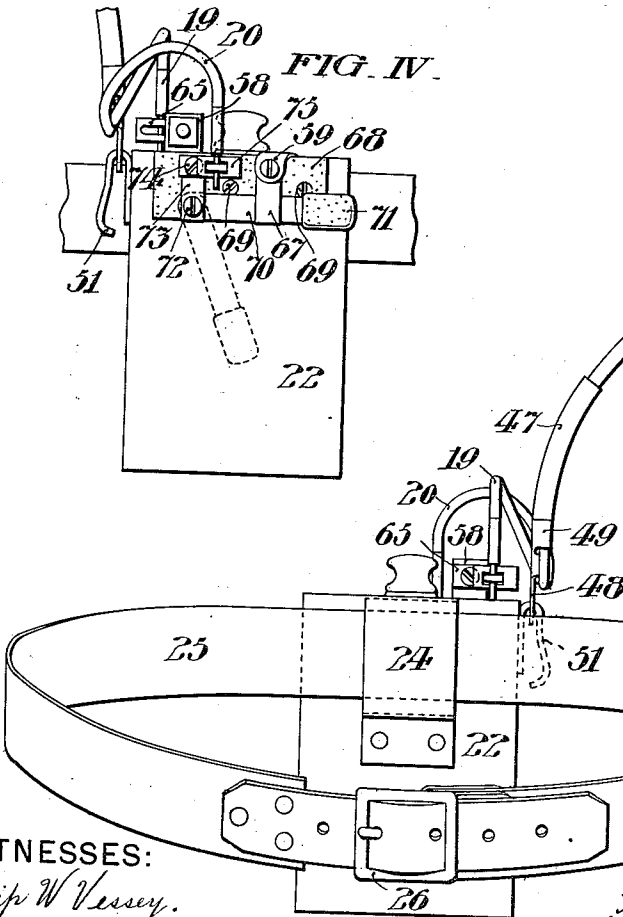


FIG. IV.



WITNESSES:
 Philip W. Versey.
 James M. Cady.

INVENTOR:
 Hiram H. Hirsch,
 by Arthur E. Paiz,
 Attorney.

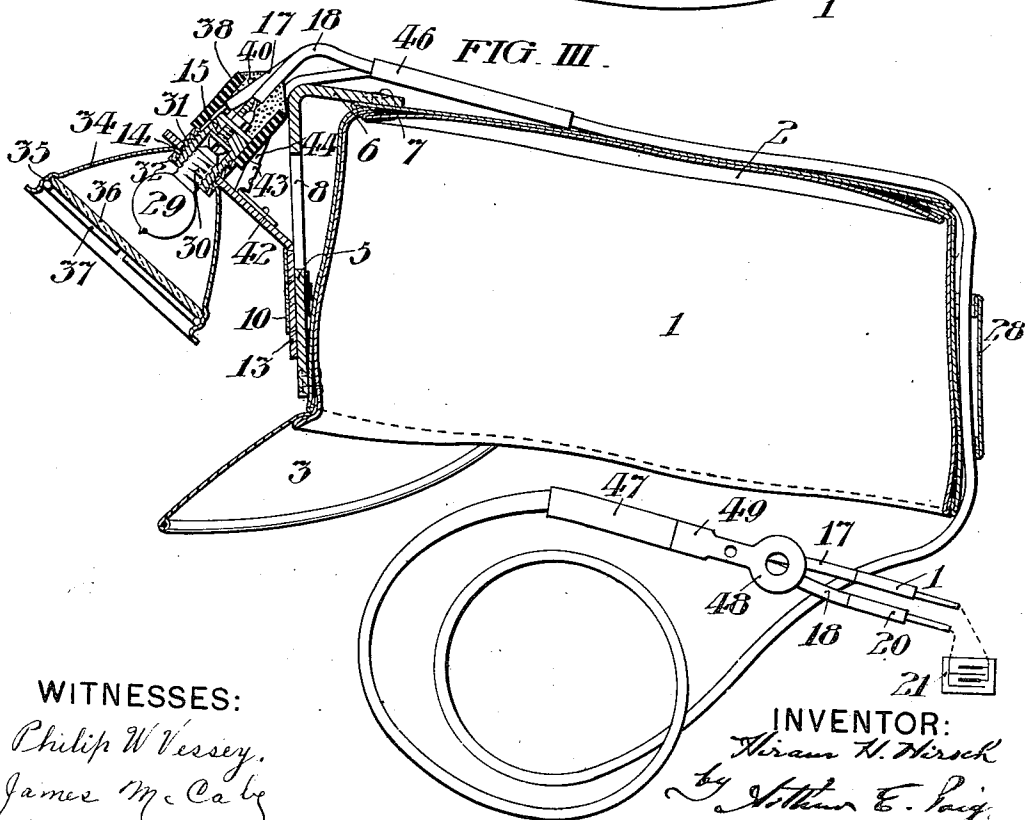
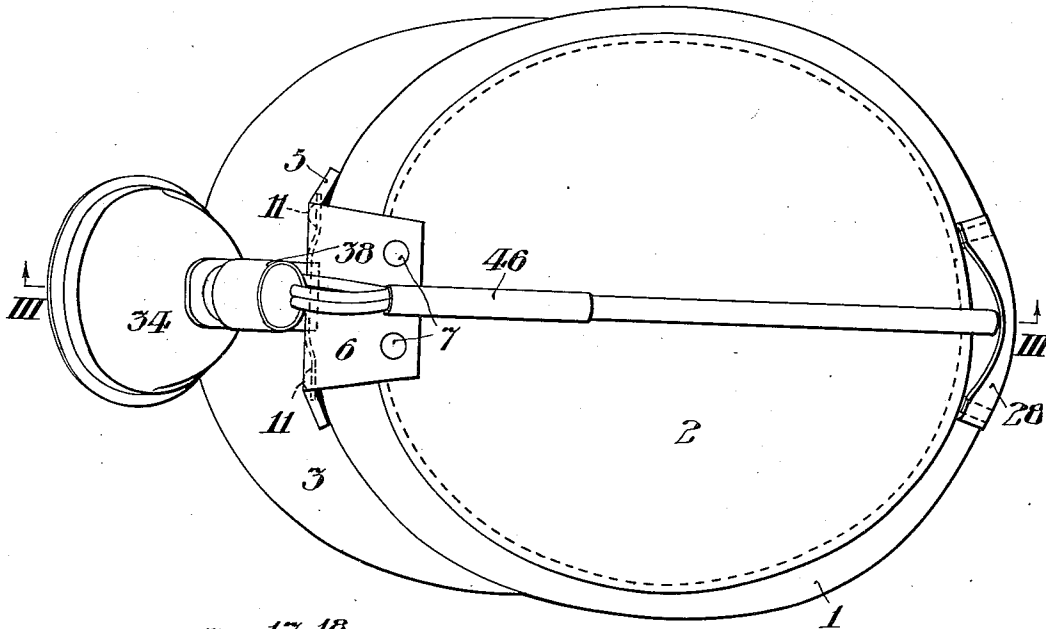
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3 SHEETS—SHEET 2.

FIG. II.



WITNESSES:

Philip W. Versey,
James M. Cable

INVENTOR:

Hiram H. Hirsch
By Arthur E. Paig,
Attorney.

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3 SHEETS-SHEET 3.

FIG. V.

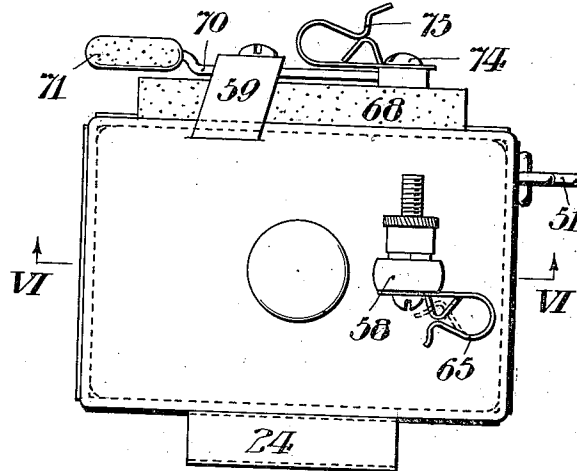
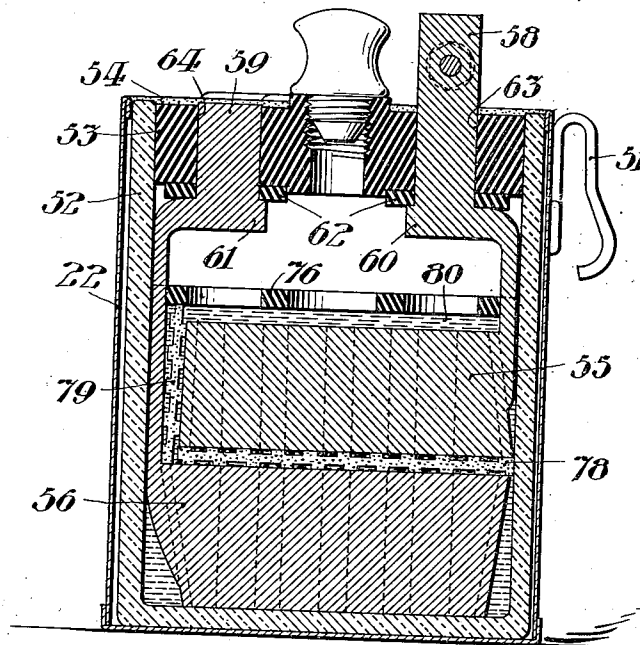


FIG. VI.



WITNESSES:
Philip W. Vessey.
James M. Cady.

INVENTOR:
Hiram H. Hirsch,
by Arthur E. Raig,
Attorney.

UNITED STATES PATENT OFFICE.

HIRAM H. HIRSCH, OF PHILADELPHIA, PENNSYLVANIA.

PORTABLE ELECTRIC-LIGHTING SYSTEM.

1,055,746.

Specification of Letters Patent.

Patented Mar. 11, 1913.

Application filed May 29, 1911. Serial No. 630,008.

To all whom it may concern:

Be it known that I, HIRAM H. HIRSCH, of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Portable Electric-Lighting Systems, whereof the following is a specification, reference being had to the accompanying drawings.

My invention is particularly designed to operate an incandescent lamp in connection with a miner's cap and in coöperative relation with a storage battery provided with means to attach it to the miner's person.

The specific construction of the battery hereinafter described forms the subject matter of my application Serial #626,736, filed May 12, 1911, for Letters Patent of the United States.

My invention includes the various novel features of construction and arrangement hereinafter more definitely specified.

In the drawings: Figure I is a side view of an outfit including a miner's cap and belt and embodying my invention. Fig. II is a plan view of the cap and appurtenances thereof shown in Fig. I. Fig. III is a vertical sectional view, taken on the line III, III, in Fig. II. Fig. IV is a side elevation of the battery shown in Fig. I. Fig. V is a plan view of said battery. Fig. VI is a vertical sectional view of said battery, taken on the line VI, VI, in Fig. V.

In said figures; the miner's cap including the head band 1, top 2 and peak 3 is provided with a lamp supporting bracket 5 which is conveniently formed of leather having its upper end 6 extending horizontally and secured to the top 2 of the cap at the front thereof by the rivets 7. Said bracket 5 has the aperture 8 extending horizontally there-through adapted to receive the hook of an ordinary miner's lamp but is also provided with the metal plate 10 rigidly connected therewith by the rivets 11. As shown in Fig. III, the central portion of said plate 10 is maintained in spaced relation with the bracket 5 so as to form a recess to receive the hanger plate 13 which has its upper portion extending obliquely forward with respect to its lower vertical portion and provided with the opening 14 to receive the incandescent lamp socket 15. Said socket is mounted in said hanger plate in connection with the flexible conductors 17 and 18 having the battery terminals 19 and 20 at their opposite ends which are detachably con-

nected with the storage battery 21. Said battery is inclosed by the metal casing 22 which as shown in Fig. I, has the sheet metal loop 24 through which extends the belt 25 having the buckle 26 so as to be adjustable around the waist of the operator who wears said cap. The patch 28, conveniently stitched to the head band 1, holds said conductors at the back of said cap. As shown in Fig. III, said socket 15 holds the incandescent electric lamp 29, there being a screw connection 30 between them. Said socket is rigidly connected with said hanger plate 13 by the nuts 31 and 32 respectively upon opposite sides thereof, the latter also serving to retain in rigid relation with said socket, the parabolic reflector 34 having the flanged recess 35 at its larger end to receive the glass cover 36 which is detachably retained therein by the resilient split ring 37. I find it convenient to provide said socket 15 with the tubular casing 38 of insulating material and to surround said conductors 17 and 18 with insulating cement 40 in said casing 38; said cement being preferably water proof. As shown in Fig. III, said hanger plate 13 is provided with the clamp 42 which has its base portion conveniently soldered thereto, and its tubular extension 43 compressed upon the flexible connector 44, conveniently a braided extension of the covering 46 which binds the conductors 17 and 18 together; the function of said flexible connector being to flexibly mechanically connect said conductors 17 and 18 with said hanger plate 13 so that accidental tensile strain upon said conductors will not disturb their connection with said socket 15. As shown in Fig. III, the braided covering 47 of said conductors 17 and 18 adjoining the battery terminals 19 and 20 is provided with the eye plate 48 having the tubular extension 49 compressed upon said conductors so that, when said eye plate 48 is connected with the hook 51 on said battery casing 22 as shown in Figs. I and IV, accidental tensile strain upon said conductors will not disturb the connection of their terminals 19 and 20 with said battery 21. Said battery 21 includes the cell 52 and cover 53 of insulating material, and, the joint between said metallic casing 22, said cell 52 and said cover is preferably sealed by a plastic medium 54. The electrodes 55 and 56, conveniently perforated lead castings opposed in horizontally parallel position in said cell 52, have respective ter-

minerals 58 and 59 at respectively opposite ends thereof. As shown in Fig. VI, said electrode terminals have respective shoulders 60 and 61 supporting the washers 62 of resilient insulating material, preferably soft rubber, sealing the openings 63 and 64 in said cover 53 through which said electrodes extend. Said electrode terminal 58 is provided with the spring clip 65 engaging the conductor terminal 19, and, said electrode terminal 59 is secured to the switch terminal 67 upon the insulating block 68 which is secured to said casing 22 by the screws 69. Said switch terminal 67 is adapted to resiliently engage the switch lever 70 which has the insulating handle 71 and is connected by the pivot screw 72 with the switch terminal 73 which is secured on said block 68 by the screw 74 which also holds the spring clip 75 by which the conductor terminal 20 is detachably engaged. The foraminous diaphragm 76 which is conveniently formed of insulating material like the cover 53 is fitted in said cell 52 above the upper electrode 55 in spaced relation with the latter. The corrugated porous insulating element 78, conveniently formed of wood, extends horizontally between said electrodes 55 and 56, and, the similar insulating element 79 extends between said upper electrode 55 and the terminal 59 of the lower electrode 56. Accidental contact of said electrodes with each other is prevented by said insulating elements 78 and 79 and the latter also serves to prevent the downward movement of said diaphragm 76 and maintain the latter in spaced relation with the upper electrode 55. Said insulating elements 78 and 79 permit access of the electrolyte to all sides of said electrodes 55 and 56 which are perforated grids filled with suitable active material which is also perforated as shown in dotted lines in Fig. VI. The electrolyte 80 is colloid, coherent and of such consistency that, at atmospheric temperature, it may be inverted without disturbing its coöperative relation with the electrodes, being retained by said foraminous diaphragm 76. It being frequently necessary for the miner to work in recumbent position; it may be observed that said battery 21 with its casing 22 and the appurtenances thereof, may be shifted around the belt 25 in accordance with the position which the miner desires to assume. For instance, it may be shifted to the back of the belt when the miner desires to lie upon either side, and, it may be shifted to either side when the miner desires to lie upon his back.

Outfits made in accordance with my invention as shown in Fig. I, are now in extensive practical use and it may be noted that it is the practice to provide the battery casings 22 with distinct numbers corresponding with the individual miners, and,

the electrical portion of each outfit is inspected and the battery recharged daily; each miner being required to surrender the electrical portion of the outfit when leaving the mine at the completion of his day's work. Therefore, it may be observed that the construction described is advantageous in that conductor terminals 19 and 20 may be instantly withdrawn and replaced with respect to the spring clips 65 and 75 upon the battery so that the latter may be slipped from the belt 25 which may be retained by the miner. When the conductors 17 and 18 are thus disconnected from the battery, they may be withdrawn through the patch 28 at the back of the cap and the bracket 13 may be instantly removed from the plate 10 on the cap, with the lamp and its appurtenances.

It may be noted that it was found practically impossible to employ caps with electric lamps either permanently secured thereto or connected therewith by attaching means requiring skilled labor to detach them; because the miners refused to surrender their caps, and, when allowed to retain them with the electric lamps attached thereto, the latter were frequently damaged during the intervals between the working hours. Therefore, the features of construction above described, which permit of the practically instantaneous removal of the electrical apparatus from the cap are of considerable practical importance.

I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention as defined in the appended claims.

I claim:—

1. In a portable electric lighting system, the combination with a battery; of a flexible connector including two flexible conductors having terminals respectively detachably connected with said battery; an incandescent lamp socket connected with the opposite ends of said conductors; an incandescent lamp fitted in said socket; a hanger plate; means connecting said socket with said hanger plate; a cap; and, a bracket permanently connected with said cap at the front thereof having a recess detachably engaging said hanger plate; whereby, the entire flexible connector may be removed from the cap without disconnecting said lamp socket therefrom.

2. The combination with a cap; of a flexible leather bracket having its upper end extending horizontally and secured to the top of said cap at the front thereof, said bracket being vertically pendent in spaced relation with said cap at the top thereof, said pendent portion having an aperture extending horizontally therethrough and a metal plate

rigidly connected therewith forming a recess; a lamp socket in connection with flexible conductors having battery terminals at their opposite ends; means on said cap detachably holding said conductors thereon; a hanger plate having a portion extending at right angles to the axis of said lamp socket with an aperture therein for said socket and a portion extending obliquely with respect to the axis of said socket, said oblique portion being detachably fitted to the recess in said bracket; a reflector in axial alinement with said socket; an incandescent electric lamp in said socket; and, means detachably connecting said lamp socket, hanger and reflector in rigid relation, including a nut in said reflector engaging a screw thread projecting from said socket through said hanger plate.

3. The combination with a cap; of a flexible bracket having its upper end extending horizontally and secured to the top of said cap at the front thereof, said bracket being vertically pendent in spaced relation with said cap at the top thereof, said pendent portion having a plate connected therewith forming a recess; a lamp socket in connection with flexible conductors having battery terminals at their opposite ends; means on said cap detachably holding said conductors thereon; a hanger plate having a portion extending at right angles to the axis of said lamp socket and a portion extending obliquely with respect to the axis of said socket, said oblique portion being detachably fitted to the recess in said bracket; a reflector in axial alinement with said socket; an incandescent electric lamp in said socket; and, means detachably connecting said lamp socket, hanger and reflector in rigid relation, including a nut in said reflector engaging a screw thread projecting from said socket through said hanger plate.

4. The combination with a cap; of a flexible bracket secured to said cap at the front thereof, having a pendent portion with a recess; a lamp socket in connection with flexible conductors having battery terminals at their opposite ends; means on said cap detachably holding said conductors thereon; whereby, the entire flexible connector may be removed from the cap without disconnecting said lamp socket therefrom; a hanger plate having a portion extending at right angles to the axis of said lamp socket and a portion extending obliquely with respect to the axis of said socket, said oblique

portion being detachably fitted to the recess in said bracket; a reflector in axial alinement with said socket; an incandescent electric lamp in said socket; and, means detachably connecting said lamp socket, hanger and reflector in rigid relation.

5. The combination with a cap; of a bracket secured to said cap at the front thereof, having a recess; a lamp socket in connection with flexible conductors separable from said cap; means on said cap detachably holding said conductors thereon; whereby, the entire flexible connector may be removed from the cap without disconnecting said lamp socket therefrom; a hanger plate having a portion extending transversely to the axis of said lamp socket and a portion extending obliquely with respect to the axis of said socket, said oblique portion being detachably fitted to the recess in said bracket; an incandescent electric lamp in said socket; and, means detachably connecting said lamp socket and hanger in rigid relation.

6. The combination with a cap; of a bracket secured to said cap at the front thereof, having a recess; a lamp socket in connection with flexible conductors separable from said cap; whereby, the entire flexible connector may be removed from the cap without disconnecting said lamp socket therefrom; a hanger plate detachably fitted to the recess in said bracket; an incandescent electric lamp in said socket; and, means detachably connecting said lamp socket and hanger.

7. The combination with a cap having a recess; of an incandescent lamp provided with means detachably engaging said recess; flexible conductors independent of said cap connecting said lamp with a storage battery having means to engage a belt; whereby, the entire flexible connector may be removed from the cap without disconnecting said lamp socket therefrom; and, a belt detachably connected with said storage battery; whereby said lamp and its appurtenances may be readily attached to and separated from said cap and belt.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this twenty-fourth day of May, 1911.

HIRAM H. HIRSCH.

Witnesses:

ARTHUR E. PAIGE,
ANNA ISRAELVITZ.