R. KOCH.

MINER'S SAFETY ELECTRIC LAMP.

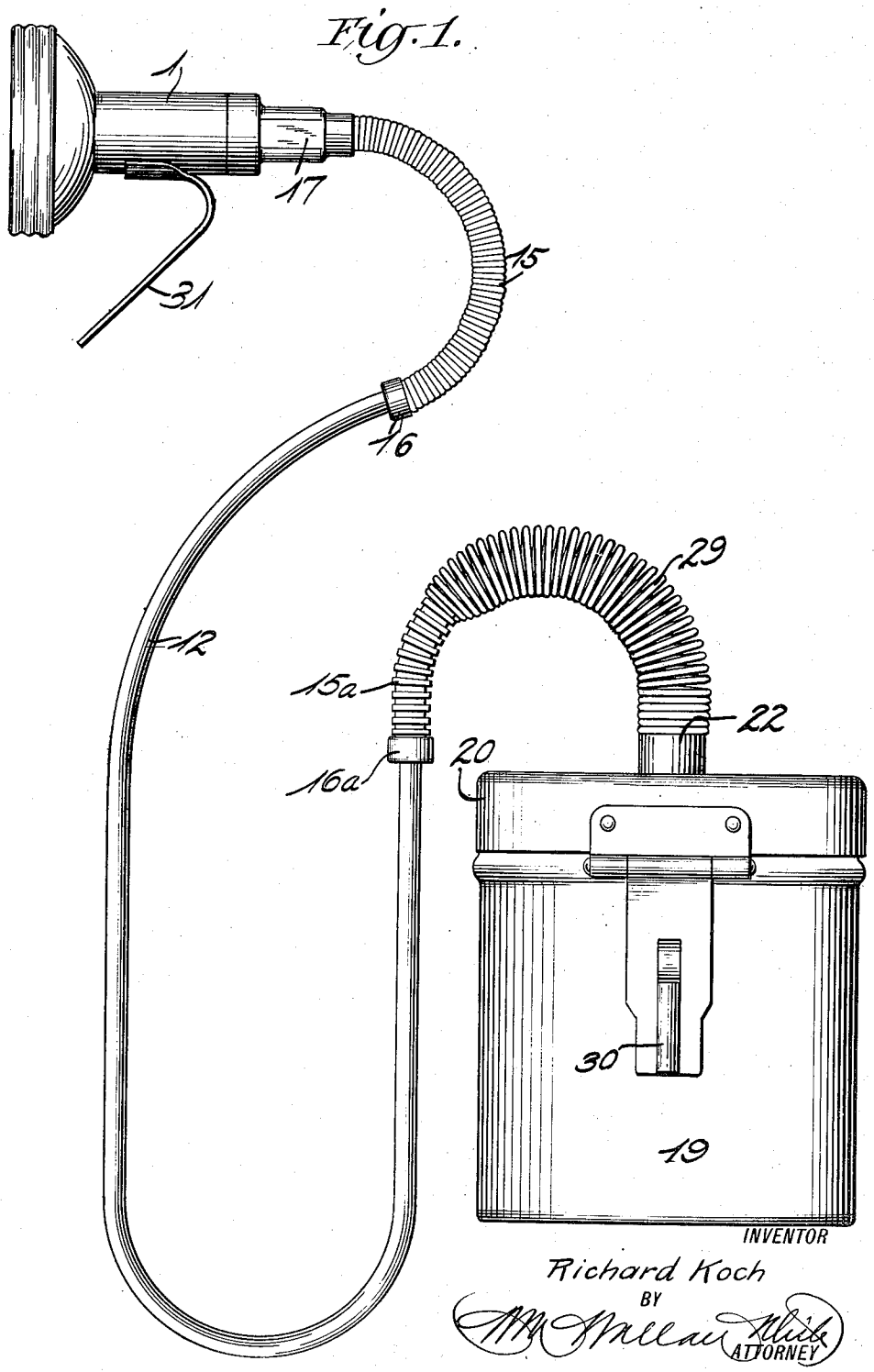
APPLICATION FILED AUG. 17, 1916.

1,218,570.

Patented Mar. 6, 1917.

2 SHEETS—SHEET 1.

Fig. 1.



INVENTOR

Richard Koch

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2 SHEETS—SHEET 2.

Fig. 2.

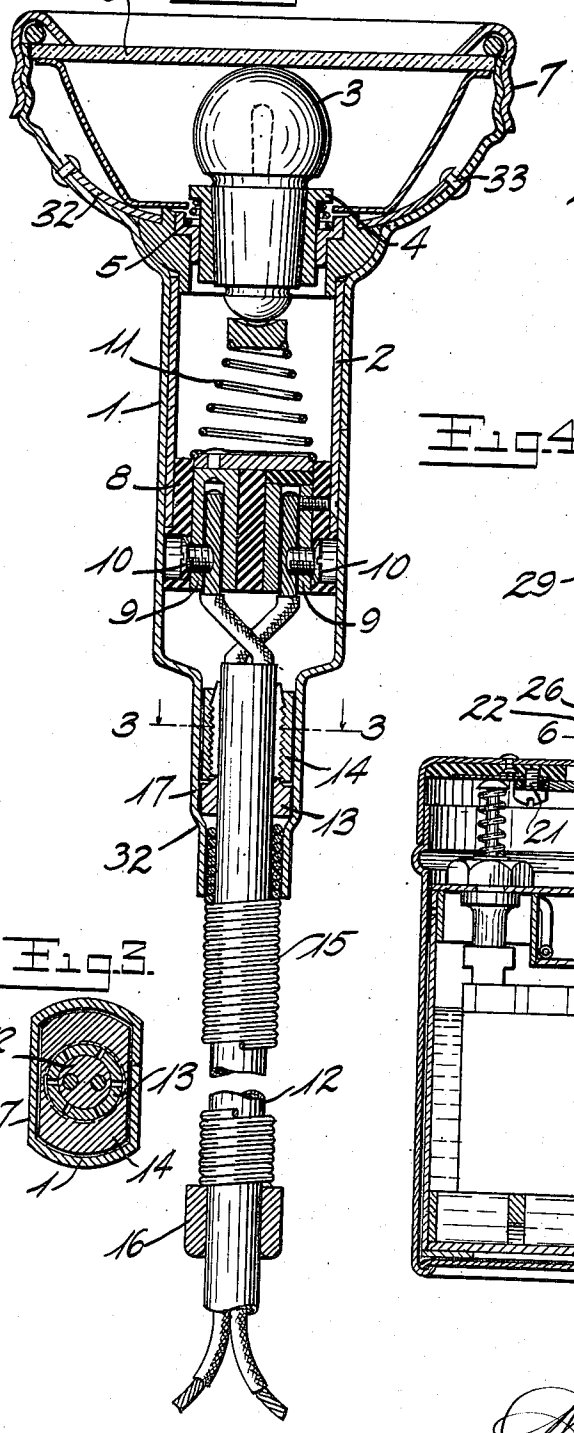


Fig. 3.

Fig. 5.

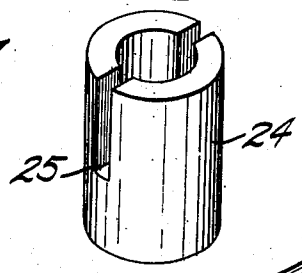


Fig. 4.

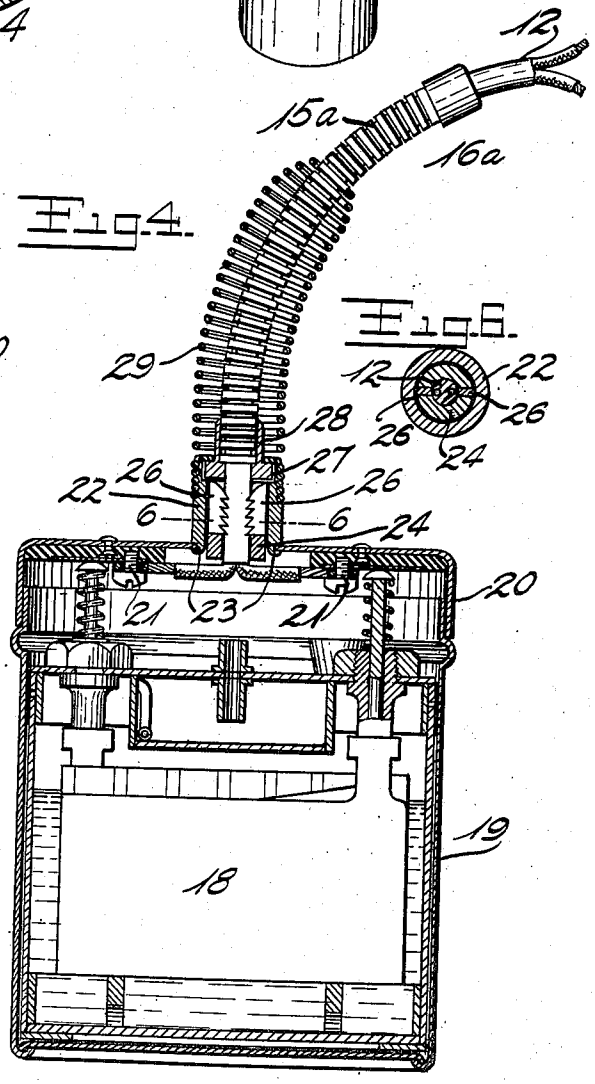


Fig. 6.

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UNITED STATES PATENT OFFICE

RICHARD KOCH, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO THE CONCORDIA SAFETY LAMP COMPANY, INC., OF PITTSBURGH, PENNSYLVANIA.

MINER'S SAFETY ELECTRIC LAMP.

1,218,570. Specification of Letters Patent. Patented Mar. 6, 1917.

Application filed August 17, 1916. Serial No. 115,525.

To all whom it may concern:

Be it known that I, RICHARD KOCH, a subject of the Emperor of Germany, residing at Pittsburgh, State of Pennsylvania, United States of America, have invented new and useful Improvements in Miners' Safety Electric Lamps, of which the following is a specification.

My invention relates to miners' safety electric lamps, and particularly to the type in which the lamp is carried upon the miner's cap, and is connected by a cable to the electric battery, which is carried in a box suspended from the miner's belt.

The main object of my invention is to provide a complete lamp of this type which shall be entirely safe for use in mines where explosive gases are present, and shall be so constructed as to render it substantially impossible for the workmen to tamper with the lamp and so produce a spark which might cause an explosion. With this end in view, one object of my invention is to provide a mounting for the lamp bulb, and the connected safety apparatus for breaking the circuit in case of breakage of lamp bulb or lens, which shall be sufficiently strong to withstand shocks or blows to which a miner's lamp may be subjected in use; and at the same time to render the parts constituting the safety device inaccessible from the exterior of the casing. A further object of my invention is to provide means for clamping the cable to the lamp casing and to the box containing the battery, which can be reached for adjustment only from the inside of the casing or the battery box, and which shall so clamp the cable that it cannot be pulled out from the end of the casing, and so that the clamp cannot be opened by twisting the cable. A further object is to provide means for protecting the cable against sharp bends where it enters the casing.

My invention consists in the construction, combination and arrangement of parts as herein illustrated, described and claimed.

In the accompanying drawings forming part hereof, I have illustrated a form of embodiment of my invention, in which drawings similar reference characters designate corresponding parts, and in which:

Figure 1 is a side elevation of a complete miner's lamp, constructed in accordance with the invention;

Fig. 2 is a longitudinal section of the lamp and casing therefor, taken approximately through the center;

Fig. 3 is a transverse section through the lamp bulb casing taken approximately on the line 3—3 of Fig. 2, looking in the direction of the arrow;

Fig. 4 is a transverse vertical section taken approximately through the center of the battery box, showing the battery in place;

Fig. 5 is a detail in perspective of the jaw retainer shown in Fig. 4; and

Fig. 6 is a section through the cable clamp taken approximately on the line 6—6 of Fig. 4.

Referring to the drawings, and particularly to Fig. 2, the lamp casing 1 is formed with a cylindrical body having a flaring end where the lamp bulb is inserted, and is reduced at the other end where the cable is clamped within the casing, having a flattened portion 17 to hold the clamp in place against twisting, and a shoulder 32 to prevent the clamp from being pulled out. A hook 31 is provided for attaching the lamp to the miner's cap.

Fitting the main cylindrical portion of the casing 1, which may be of brass, is a sleeve 2 formed preferably of steel or other strong and rigid material. The lamp bulb 3 fits a flanged sleeve 4 which fits slidably in a reduced portion of the sleeve 2, and is held outward by the spring 5 carried by the sleeve 2. This sleeve 2 is held in place in the casing 1 by the flange 32 having slots or notches coöperating with the studs 33 to form a bayonet joint.

The lamp is held in operative position against the pressure of the spring 5 by means of the glass or lens 6 which bears against the bulb 3 and is held in place by the cap or lens clamp 7, screwed upon the casing 1.

At the other end of the sleeve 2 is provided an insulation plug 8 carrying connecting sleeves 9 of suitable conducting material. One of these connecting sleeves is in communication with the casing sleeve 2, and the current is thus conducted to the exterior of the lamp 3, and the other connecting sleeve is connected to the spring 11 which contacts with the other terminal of the lamp bulb 3 and thus completes the circuit.

The cable enters the lamp casing from

the end opposite to the bulb, and the wires of the cable are attached to the connecting sleeves 9 and held in place by the binding screws 10.

The means for clamping the cable within the casing 1 consists of the clamping member 13 which consists of a nut portion and a body portion, the body portion having its external surface screw-threaded, and having a plurality of radial slits extending the full length thereof, but stopping short of the nut portion. The nut portion is circular, but has two diametrically opposite flattened surfaces to correspond with the flattened portion 17 of the casing 1. The end of the body portion opposite to the nut end is provided with a taper. The nut 14 is screw-threaded for a portion of its interior surface, and the remainder of the inner surface is tapered to correspond with the taper on the clamping member 13. The nut 14 is screwed upon the member 13, and the tapered portion acts upon the tapered portion of the member 13, pressing the jaws formed by the slits in the last mentioned member inward against the cable, thus clamping the cable tightly. The nut 14 has also two flattened sides to correspond with the flattened portion 17 of the casing 1, so that when the clamp has been made up and is inserted into the casing 1 from the flared end the clamp bears against the further reduced portion of the casing as shown and is held against outward pull, and neither the nut 14 nor the clamp 13 can be turned in the casing or with respect to each other, so the clamp cannot be opened without being removed from the lamp casing.

Where the cable emerges from the casing, it is protected by the helical spring 15 which is soldered or otherwise fastened to the casing 1. This flexible spring extends far enough from the casing 1 to avoid the possibility of sharp bends being made in the cable 12, and is provided at its other end with a bushing 16, which has its inner surface rounded off at the outer end in order to reduce the wear upon the cable 12.

Passing now to the other end of the cable, and having particular reference to Figs. 4, 5 and 6, the cable is here clamped to the casing of the battery box by a somewhat different clamp from that used to clamp the cable to the lamp casing 1. The battery 18 is carried in the box 19 which has a cover 20 locked in place by the usual magnetic lock 30. The cover is provided with binding posts 21, insulated from the cover, to which the wires of the cable are attached. The circular hole in the cover through which the cable enters has inserted therein the cable clamp casing 22, the end of which is upset at 23 to hold it in place. Closely fitting the interior of this casing 22 is placed the jaw retainer 24 having slots 25 cut through its wall for a portion of its length into which the clamping jaws 26 fit. These clamping jaws have substantially parallel sides, but the inner side which contacts with the cable is provided with inwardly and rearwardly projecting teeth arranged to grip the cable. The forward ends of the jaws taper to permit of readily assembling the clamp. These jaws are placed in the slots and against the cable, and the retainer 24 is then pushed into the casing 22, causing the jaws to grip the cable and hold it rigidly against any pull from the outside. The pull upon the cable causes the jaws to grip more tightly, so that there is no possibility of pulling the cable 12 from the box.

In the outer end of the casing 22 is provided a groove 27, in which the flange of the flange bushing 28 is free to rotate. Rigidly attached to the flange bushing 28 is the helical protective winding 15^a corresponding with the similar winding 15 on the lamp casing, and this is provided with a bushing 16^a similar to the bushing 16 above mentioned. The helical winding 15^a is free to rotate upon the cable 12, and there is therefore no danger of the winding being twisted off, or of the clamp being loosened, by twisting the spring 15^a. In order to make the bushing 28 inaccessible and thus to prevent the workmen from tampering with the joint, an additional spring 29 is screwed or otherwise fastened upon the casing 22, and envelops the winding 15^a for a portion of its length.

Having now described one form of embodiment of my invention, I claim as new and desire to secure by Letters Patent:

1. In a miner's electric lamp, the combination comprising a tubular casing flared at one end, a protective sleeve disposed within the tubular portion of said casing, a spring mounting for a lamp bulb, carried by said sleeve, a lamp bulb, and a glass face clamped to the flared end of the casing and arranged to normally hold said bulb upon its mounting against the pressure of the spring.

2. In a miner's electric lamp, the combination comprising a tubular casing flared at one end, a protective sleeve disposed within said casing, a flanged sleeve slidably mounted in said protective sleeve, a bulb disposed in said flanged sleeve, and projecting within the flared space of the casing, electrical contacts for said bulb, a spring mounting for said flanged sleeve tending to hold said bulb away from one of said contacts, a glass fitting the flared end of the casing and bearing against said bulb, and a clamp to hold said glass in place and press said bulb against its said electric contact.

3. In a miner's electric lamp, the combination comprising a casing having a reduced

portion and an interior shoulder, a bulb mounted within said casing, a cable carrying electricity to said bulb, a clamp disposed within said reduced portion of the casing and bearing against said shoulder, said clamp being accessible for adjustment from the interior of said casing only, and means for preventing rotation of said clamp within the casing.

4. In a miner's electric lamp, the combination comprising a casing having a reduced and flattened portion and an interior shoulder, a bulb mounted within said casing, a cable carrying electricity to said bulb, and a clamp disposed within said reduced portion of the casing and bearing against the said shoulder, said clamp being flattened to correspond with the flattened portion of the casing within which it fits, and being accessible for adjustment from the interior of the casing only.

5. In a miner's electric lamp, the combination comprising a casing, a lamp bulb mounted therein, a cable extending into said casing, a clamping sleeve disposed within said casing about said cable, said sleeve being slitted from one end to form prongs, means for pressing said prongs against said cable, means for preventing said clamping sleeve from being pulled from said casing, and means for preventing rotation of said clamping sleeve within the casing.

6. In a miner's electric lamp, the combination comprising a casing having a flattened reduced portion, a lamp bulb mounted in said casing, a cable leading into said casing and in electrical connection with said bulb and means for clamping said cable within said casing comprising a sleeve slitted from one end for a portion of its length forming prongs, the remaining part being of greater diameter and formed with a flattened portion to fit within the said flattened portion of the casing, the exterior of the said slitted portion being provided with a screw thread, and the ends of the prongs formed by said slits having an exterior bevel, and a nut having a flattened exterior surface to correspond with the flattened portion of the casing, having its interior screw threaded for a portion of its length, and provided with an interior bevel to coact with the bevel of the sleeve to compress the said prongs upon the cable.

7. In a miner's electric lamp of the type described, the combination comprising a battery box, a cable leading therefrom, means for clamping said cable within said box adjustable from the interior of the box only, and a protective winding arranged about the cable where it emerges from said box, and rotatably carried by said box.

8. In a miner's electric lamp of the type described, the combination comprising a battery box, a cable leading therefrom, a cylindrical clamp retainer formed on said box, means for clamping the cable within said retainer, an annular groove being formed on the interior surface of said retainer, a bushing surrounding said cable and provided with a flange adapted to loosely fit said groove, and a protective winding surrounding said cable and attached to said bushing.

9. In a miner's electric lamp of the type described, the combination comprising a battery box, a cable leading therefrom, means for clamping said cable within said box adjustable from the interior of the box only, a protective winding arranged about the cable where it emerges from said box and rotatably carried by said box, and a further protective winding carried by the box and enveloping said first named winding.

In testimony whereof I have signed my name to this specification.

RICHARD KOCH.