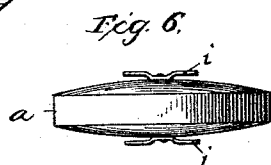
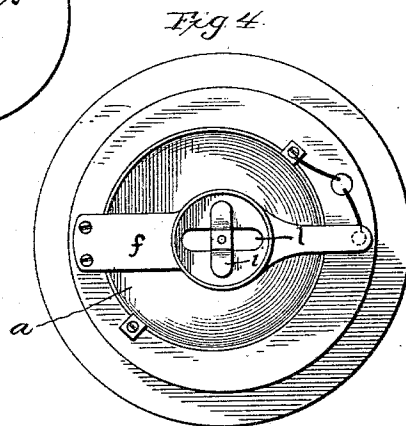
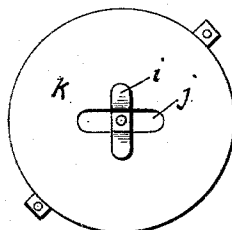
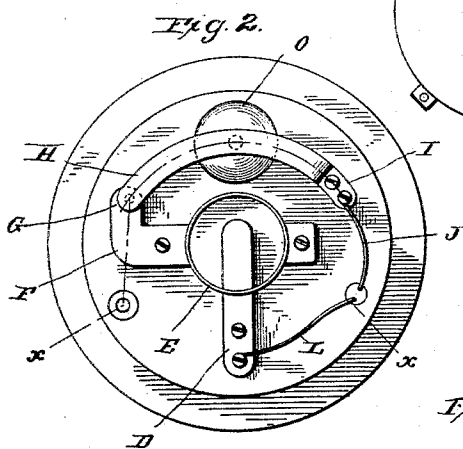
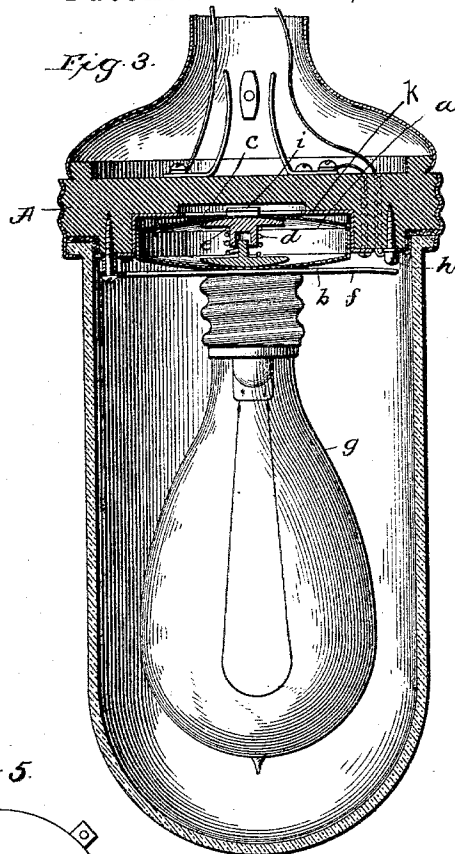
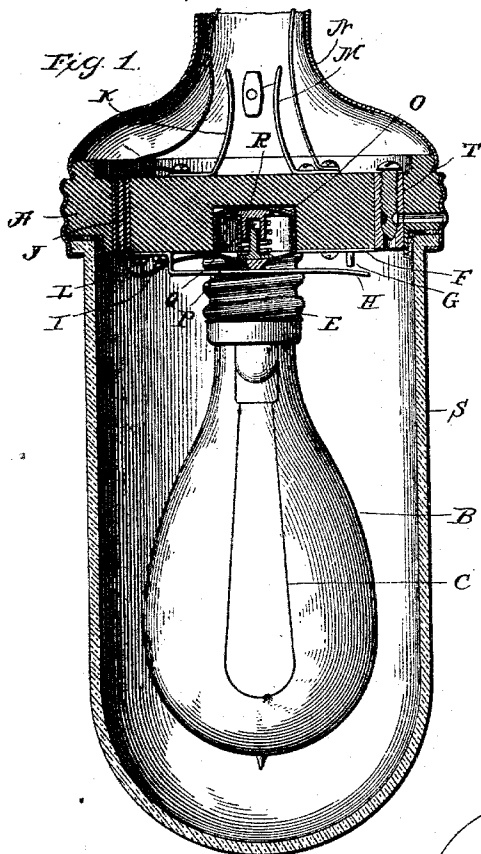


(No Model.)

W. WAEGEL.
SAFETY LAMP.

No. 583,959.

Patented June 8, 1897.



Witnesses
E. C. Wurdeman
A. Williamson

Inventor
William Waegel
by Geo. H. Holgate
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM WAEGEL, OF PHILADELPHIA, PENNSYLVANIA.

SAFETY-LAMP.

SPECIFICATION forming part of Letters Patent No. 583,959, dated June 8, 1897.

Application filed September 5, 1896. Serial No. 604,984. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WAEGEL, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Safety-Lamps, of which the following is a specification.

My present invention relates to a new and useful improvement in safety-lamps for mines and other places where explosive gases exist, so that should said lamp become broken, thereby exposing the incandescent film, the passage of the electric current will be instantaneously cut off and said film surrounded by a non-combustible extinguishing-gas, thus preventing the explosive gas from coming in contact with said film until the latter has cooled.

With these ends in view this invention consists in the details of construction and combination of elements hereinafter set forth, and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, the construction and operation will now be described in detail, referring to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a section at the line *xx* of Fig. 2; Fig. 2, a bottom plan view of the head-block arranged to support the several parts of the lamp; Fig. 3, a central vertical section of a slightly-modified form of applying my invention; Fig. 4, a bottom plan of the head-block of such modifications; Fig. 5, a detail plan of socket used in modification, and Fig. 6 a side elevation of the same.

In carrying out this invention as shown in Figs. 1 and 2, A represents the head-block, which is of a suitable insulating material and here shown as circular in shape, and from this block depends an ordinary incandescent lamp B, having one end of the film C thereof in electrical contact with the strip D and the opposite end of this film in contact with the socket E, which latter in turn is secured to the strip F. The strip F has a contact-point G formed thereon, against which the spring-strip H is adapted to bear, and this last-named strip is secured to the head-block at

I and is connected by the wire J to the switch-arm K. The strip D is connected by the wire L to one feed-wire, while the other feed-wire is connected to the opposite switch-arm M, and between these two arms is the bridge N, arranged to be operated with the ordinary key located in the casing of the lamp.

O represents a compression-box hermetically closed, which is here shown as cylindrical in shape, the heads P of which consist of flexible sheet metal and are sustained in their normal position by the outward action of the spring Q, coiled about the plug R, which has a limited downward movement, so that when the head is forced inward, as herein-after described, it will not be strained past a certain limit. This plug consists of two sections, the upper one having a socket formed therein, while the lower section is provided with a shank which extends into said socket, thus giving guidance to the spring Q, as well as serving to transmit the action of the spring to the heads of the compression-box.

The incandescent lamp is surrounded by a glass globe S, cemented or otherwise secured to the head-block, and a valve T of any suitable construction is arranged for the admission of gas to the interior of this globe. From this it will be seen that when carbonic-acid gas or other suitable extinguishing fluid is forced within the globe under sufficient pressure this pressure will be exerted upon the head P of the compression-box, thereby deflecting said head inward, so as to permit the spring-strip H to bear against the contact-point G. This will make the circuit and permit the lamp to burn, but should at any time this pressure be removed the spring Q will force the head P outward, which in turn will force the strip H out of contact with the point G, thereby breaking the circuit and extinguishing the lamp.

When my improved lamp is placed in an atmosphere surcharged with explosive gases and from any cause the globe S and incandescent lamp be broken, the pressure which had previously maintained the electric circuit being destroyed this circuit will be broken and at the same time the carbonic-acid gas will so surround the film as to exclude the inflowing of the explosive gases until the film has cooled below a point where it can ignite

said gases. Thus a perfect safety-lamp will be provided which will preclude the possibility of explosions in mines and the like.

One of the principal advantages of my present improvement is that every part of the lamp is hermetically sealed and therefore the pressure created therein by the extinguishing-gas will not deteriorate, since there is no avenue of escape therefor, and as the compression-box is wholly of metal and located within the globe there is no liability of said box failing to act in stopping the electrical current when the pressure is removed. Another advantage of this improvement is its simplicity and cheapness of construction and that there are no valves or rubber diaphragms to deteriorate and become useless.

By practical test it has been found that the construction just described gives most satisfactory results in its operation, and it is obvious that the construction shown in Figs. 3 and 4 will also accomplish the desired result, and is as follows:

a represents the compression-box, which is of considerably greater diameter than the compression-box in the first-described construction, and is provided with the diaphragm-heads *b* and *c*, forced apart by the action of the spring *d*, which is coiled around the plug *e* similar to the first-described plug, so as to prevent the collapsing of the diaphragms when undue pressure is brought to bear thereon. This compression-box is preferably located slightly to one side of the head-block of the lamp and serves to force downward the spring *f*, which is insulated from contact with compression-box, the latter having depending therefrom the incandescent lamp *g*, so that this lamp will have a slight movement when the diaphragms of the compression-box are forced inward. Each of the diaphragms of the box *a* has secured thereto the cleats *i*, the upper one of which is adapted to enter the slot *j*, formed in the bottom of the socket *k*, which latter is secured within a recess formed in the head-block, the arrangement of which is clearly shown in Fig. 5. The lower cleat *i* is adapted to pass through the slot *l*, formed in the spring *f*, so that when these cleats are thus passed through the two slots and the compression-box turns upon its axis they will lie crosswise of the slots, thus securely connecting the compression-box to the cleats at the top and to the spring *f* at the bottom, so that the movement of the diaphragm of this box will cause the spring *f* also to move, which in turn will raise or lower the incandescent lamp, as before set forth.

h is a contact-point with which the spring *f* acts in conjunction, and the remainder of this construction is similar in operation as that described in connection with Figs. 1 and

2. This last construction has an advantage for certain uses in that the compression-box therein contained is of larger diameter and thus more readily affected by lamp-pressures than would be the case with the first-named construction.

I do not wish to limit myself to the kind of gas or the amount of pressure within the globe, since these may be varied to suit the special requirements and any extinguishing fluid will serve the purpose.

Having thus fully described this invention, what is claimed as new and useful is—

1. In a device of the character described, a compression-box having flexible heads, means in said compression-box for forcing the flexible heads apart and limiting their compression consisting of a plug formed in two sections, one having a socket and the other having a shank to fit said socket, and a spring located between the sections of the plug, as and for the purpose described.

2. In a device of the character described, a head-block, a compression-box located in a recess thereof, said compression-box composed of a cylinder having flexible heads, one bearing on the bottom of the recess of the head-block, a plug between the flexible heads composed of two sections one having a socket and the other having a shank to fit said socket and a spiral spring forcing said sections apart, a spring-strip secured to the head-block and bearing on the other flexible head and a contact-point with which the spring-strip is adapted to make and break an electric circuit by means of the action of the compression-block, as and for the purpose described.

3. In a device of the character described, a head-block having a recess therein, a plate fitting in the recess having a slot, a compression-block composed of a cylinder having flexible heads, a plug fitting between the heads formed of two sections, one having a socket and the other having a shank to fit the socket, and a spiral spring located between the sections of the plug, a cleat on the upper head of the box fitting in the slot of the plate, a cleat on the lower head of the box, a spring carrying an incandescent lamp secured on the head of the block and having a slot to engage the second cleat and a contact-point adapted to be engaged by the spring, as and for the purpose described.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

WILLIAM WAEGEL.

Witnesses:

S. S. WILLIAMSON,
MORTIMER A. JONES.