

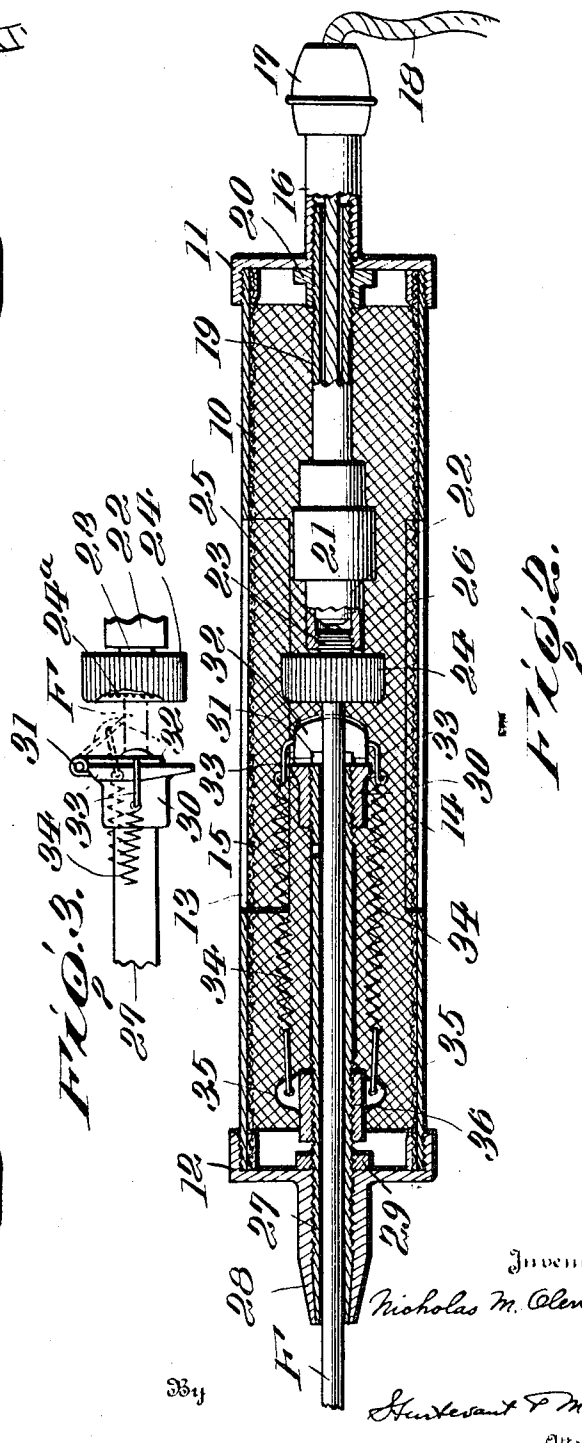
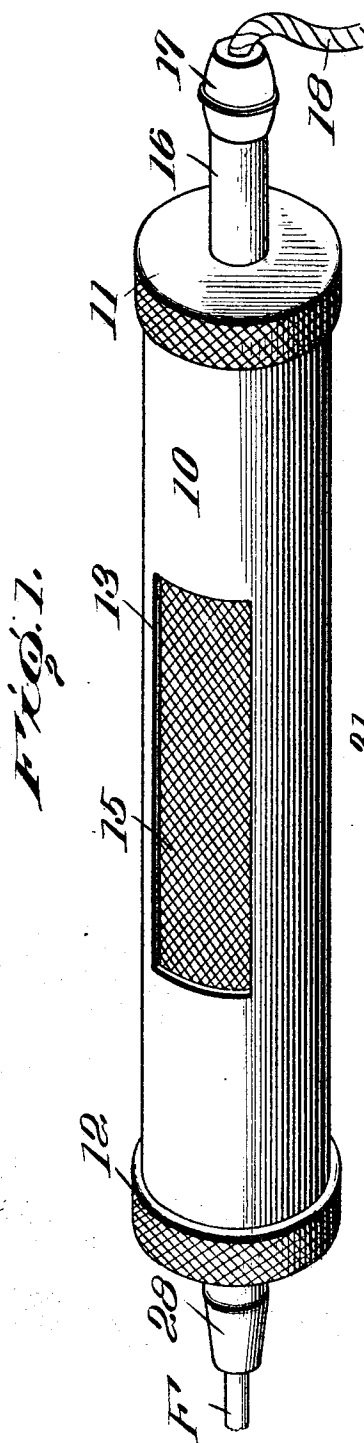
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SAFETY ELECTRIC FUSE IGNITER

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SAFETY ELECTRIC FUSE IGNITER.

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This invention relates to improvements in electric fuse lighters, and relates particularly to a safe construction of such devices which makes it possible for them to be employed in explosive gaseous atmospheres.

It has heretofore been proposed to employ the electric spark or an electrically energized heater for igniting a detonating fuse: but such devices were not safe for employment in the presence of an atmosphere of explosive gases, since the fuse itself, or the spark for igniting it, might easily set fire to the surrounding explosive atmosphere and cause disaster.

The present invention proposes a safe construction of such devices by which it is possible to observe the progress of combustion of the fuse, and to retain it under safe conditions against causing ignition of gases until it ceases to emit igniting sparks: and further the gaseous atmosphere is prevented from contact with the heater element proper under conditions which might lead to a general explosion.

The device is simple, readily operated, safe and easily repaired in case of damage.

On the accompanying drawings, which illustrate one form of construction of a device according to this invention:

Figure 1 is a perspective view of the exterior of such a device.

Fig. 2 is a longitudinal axial section through the device.

Fig. 3 is a side elevation of certain details of the device, substantially at right angles to the position shown in Fig. 2.

In these drawings, the casing 10 comprises a large tube having the closing end caps 11, 12 thereon which are sealed with respect to the tube against the admission of gas except in very minute quantities. Windows 13, 14 are provided on opposite sides of the tube 10. An inner tube 15 of close-mesh wire gauze is provided within the outer tube 10 and serves to prevent the propagation of an explosion by any combustion of gaseous atmosphere within the casing 10, in the same manner as this function is accomplished in the ordinary Davy safety lamp now employed in coal mines.

The end cap 11 has an outwardly extending hollow stem 16 having an electrical insulating bushing 17 thereon to guide the electrical conductors 18. Within the sleeve 16 is threadedly engaged the threaded metal tube 19 which is provided with a lock nut

20 to seat the member 19 fixedly with respect to the cap 11. At its inner end the tube 19 carries the head 21 having the threaded metal projection 22 to receive the threaded end 23 of a small electric heater 24, which may be of the cigar lighter type, and is provided with a central return contact terminal 25 which engaged with the metal central portion 26 of the head 21. It will be understood that by this means a circuit is completed from a battery connecting the ends of the conductors 18, through one of these conductors and the heater 24, and back through the other conductor 18 to the battery again.

The other end cap 12 is provided with an outwardly extending guiding sleeve 27 which is supported within the hub 28 of the cap 12. It is preferred to threadedly engage the guide sleeve 27 in the hub 28 and to secure the position of these members with respect to each other by the lock nut 29. The end of the guide sleeve 27 projecting within the casing 10 carries a valve head 30 threaded thereto, this valve head having a pivot 31 thereon extending substantially in a plane at right angles to the axis of the guide tube 27. Mounted on this pivot is the valve plate 32 which is rockable about the pivot between the positions shown in full lines and in dotted lines in Fig. 3. The valve plate 32 is provided with the ears 33 to receive the ends of the coil springs 34, whose other ends are engaged in the ears 35 of a bushing 36 which is likewise threadedly engaged along the length of the guide sleeve 27.

The operation of the device is very simple. The current from a battery, such as the electric light battery for the miner's lamp, is connected to the conductors 18, with the intercalation of a switch, if such be desired. The heater 24 attains an incandescent temperature, which may be observed through the windows 13, 14 from the exterior of the casing 10. The operator now knows that the device is ready to ignite fuses. The length of fuse, such as F in the drawings, is then pushed through the guide portion 28 from the exterior and passes freely down within the guide tube 27 and closes the same, except for a very small passage around the side walls which is insufficient for the propagation of an explosion, in accordance with the well known operation of the Davy safety lamp. As the end of the fuse reaches the valve plate 32, the latter is moved from posi-

tion shown in full lines to that shown in dotted lines in Fig. 3, and the end of the fuse passes further and into contact with the incandescent heater 24, and in particular into contact with the hot wires 24^a thereof, as shown in Fig. 3. A slight pressure on the fuse F is all that has been required for this operation, and the fuse is held in this position until the fire-transmitting core becomes ignited. As soon as this ignition occurs, the fuse delivers a shower of sparks, which are easily visible from the exterior of the casing 10 through the windows 13, 14. The fuse may be slightly withdrawn if so desired, and the course of this shower observed until the "fizzing" ceases. It is obvious that if there are no sparks, it is no longer dangerous to expose the end of the fuse to the atmosphere surrounding, even though the fuse has been lighted. The device is therefore pulled off the end of the fuse, during which the valve plate regains its position and closes the aperture through which the fuse entered the interior of the casing 10.

25 The device may then be employed to ignite another length of fuse, etc. without any danger arising of exploding a dangerous gaseous atmosphere. It will be particularly noted that the heater 24 may be kept at an incandescent temperature without any danger arising. The gaseous atmosphere enters and leaves the casing 10 freely through the windows 13, 14 as in the usual Davy safety lamp, and the mesh gauze cylinder 15 prevents any possibility of the propagation of an explosion to the exterior so long as the valve plate 32 is closed. This plate, however, can only be opened by the end of the fuse in normal operation and immediately closes, when the fuse is withdrawn from the guide sleeve 27. The full course of the ignition is observed from the exterior through the windows.

45 The parts of the igniter are simple, and may be easily removed one from another by unscrewing the end caps and the other threaded portions. In case of the burning out of the heater 24, this small separate ele-

ment may be easily unscrewed by the threads 23, and a new one substituted at a very low expense. The same is true of the other elements of the system.

It is obvious that the invention is not limited to the particular form of illustration employed, but that it may be modified in many ways within the scope of the appended claims.

I claim:

1. A safety fuse lighter comprising a casing, an igniter within said casing, and a guide conduit for the fuse passing through the wall of said casing and aligned with said igniter, the passage through said conduit being substantially closed by the fuse, said casing having explosion-proof windows therein whereby the ignition and course of combustion may be observed so that the operator may determine the time at which the fuse may safely be withdrawn from the lighter.

2. A safety fuse lighter comprising a casing, an igniter within said casing, a guide tube for the fuse passing through the wall of said casing and aligned with said igniter, and a valve to close said tube.

3. A safety fuse lighter comprising a casing, an electrically heatable igniter within said casing, a guide conduit for the fuse passing through the wall of said casing and aligned with said igniter, the passage through said conduit being substantially closed by the fuse, and an automatically closing valve at the inner end of said conduit, said valve being opened by the fuse in passing to the position for ignition and closing automatically prior to the withdrawal of the fuse from said conduit, said casing having apertures therein, and safety wire gauze closing said apertures against the propagation of an explosion therethrough, said apertures permitting the observing of the course of ignition and combustion of fuse, and said valve preventing the propagation of an explosion from said igniter through said tube.

In testimony whereof, I affix my signature.

NICHOLAS MICHAEL OLEVICH.