July 24, 1928. 1,678,257

G. A. LIVERMORE

BLASTING CAP PROTECTOR

Filed Jan. 19, 1927

Fig. 1.

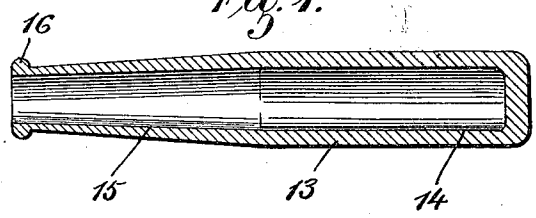
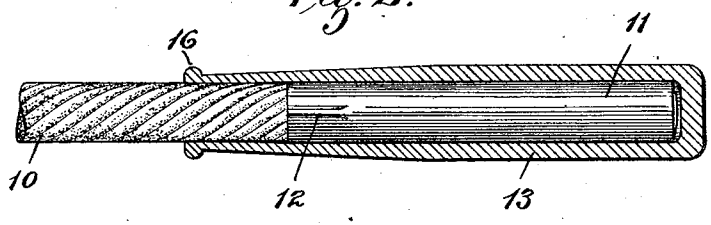


Fig. 2.



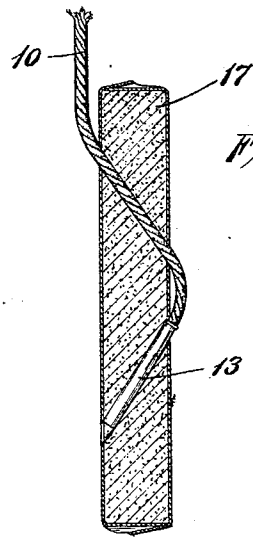


Fig. 3.

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UNITED STATES PATENT OFFICE.

GEORGE A. LIVERMORE, OF JOPLIN, MISSOURI, ASSIGNOR TO THE B. F. GOODRICH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

BLASTING-CAP PROTECTOR.

Application filed January 19, 1927. Serial No. 162,172.

This invention relates to the protection of detonating fuse elements used in blasting, such an element comprising a fuse with a detonating cap at the end thereof.

My object is to provide an effective means for protecting said detonating element against deterioration and accidental percussion, and more particularly against the effects of abrasion when placing the explosive charge containing the detonator in a blasting hole, or withdrawing the detonator from an unexploded charge.

Of the accompanying drawings, Fig. 1 is a longitudinal section of a protector constructed according to my invention.

Fig. 2 is a similar view showing the protector in place upon the detonating element.

Fig. 3 is a longitudinal section showing a blasting charge assembled with a detonating fuse having my protector applied thereto.

In the drawings, 10 represents a common form of blasting fuse with a water-proofed exterior and a detonating cap 11 on the end thereof, said cap comprising a metallic shell or cartridge containing a fulminate and having its mouth end crimped upon the fuse at 12.

13 is the protector made of vulcanized, soft-rubber composition and formed as a deep cup-shaped member adapted to be slipped over the fuse element and completely to enclose the exposed portion thereof, together with a part of the fuse 10 adjacent to the cap 11.

The protector 13 is formed with a chamber or aperture, of which the portion 14 for about one-half the length of said aperture at the closed end is cylindrical and provided with walls of suitable thickness to act as a cushion and to transmit the endwise thrust in applying the protector, while said aperture in its remaining portion 15 tapers slightly to a restricted diameter at the mouth end. The walls surrounding the tapered portion also taper to a reduced thickness toward the mouth end and at the mouth there is formed a circumferential reinforcing bead 16 which tends to keep the mouth edge from buckling or turning in as the protector is forced into place.

The cylindrical portion 14 of the aperture is made slightly larger and the tapered portion 15 at the mouth is made slightly smaller than the diameter of the fuse and cap so that the mouth will have to be stretched to get it on and when the protector is in place it will grip the fuse and resist being pulled off. The device may readily be applied by wetting the metal shell of the detonating cap to furnish lubrication while the protector 13 is being slipped thereover by pushing with endwise pressure of the fingers until it reaches the position substantially as shown in Fig. 2. The resistance to removal is very pronounced, as the constrictive force increases with any drawing out and consequent contraction of the mouth by a pull exerted at the closed end. If for any reason it should be desired to remove the protector when once applied, this may readily be done by rolling it back for about half its length from the mouth end and then slipping it off.

Fig. 3 illustrates the manner in which the detonator is commonly applied to a blasting charge, 17 representing a stick of dynamite in which, with a suitable probe are formed two holes slanting in opposite directions at successive longitudinal positions. A fuse 10 with the rubber protector 13 covering the detonating cap thereof is forced through the upper hole from one side to the other and then into the lower hole as shown. While the fuse is sometimes placed axially in one end of the charge, the method illustrated is better adapted to permit access to the end of the stick 17 with a tamping bar for ramming the charge into the blasting hole. On the other hand, this zigzag stringing of the fuse is more apt to expose the end of the cap and render it subject to abrasion and percussion by roughness on the sides of the blasting hole, a cause which sometimes produces premature explosion with resulting injury or loss of life. It also occasionally happens that a live fuse may have to be withdrawn from an unexploded charge which has been placed in a blasting hole, and the detonator is subject to abrasion and percussion under those conditions. The detonators are likewise at times subjected to accidental percussion or exposure to flame through the carelessness of the persons handling them.

Under all of these conditions my invention greatly contributes to safety in the use of blasting fuses, in addition to which, by sealing the joint between the metal shell of the cap 11 and the fuse 10 it avoids or delays

the entrance of moisture into the fulminate or into the powder in the fuse, and thus tends to prevent deterioration.

I claim:

1. A protector for blasting fuses comprising a deep, cup-shaped member of soft rubber composition, whose aperture tapers to a reduced diameter at the mouth end, the walls surrounding said tapering portion of the aperture also tapering to a reduced thickness toward the mouth end.

2. A protector according to claim 1, having a circumferential, reinforcing bead at its mouth.

In witness whereof I have hereunto set my hand this 12th day of January, 1927.

GEORGE A. LIVERMORE.