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Patented Nov. 14, 1899.

W. E. MILLER.

DEVICE FOR APPLYING PROTECTORS TO FULMINATING CAPS FOR EXPLOSIVE CHARGES.

(No Model.)

(Application filed May 23, 1899.)

Fig. 1.

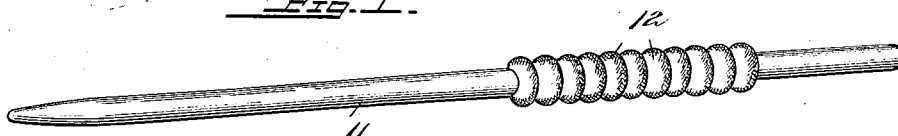


Fig. 2.

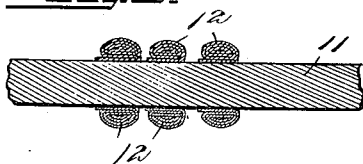
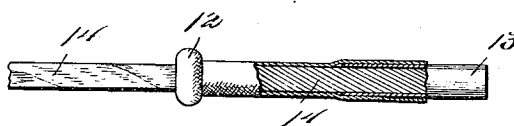


Fig. 3.



Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM ELIAS MILLER, OF DENVER, COLORADO.

DEVICE FOR APPLYING PROTECTORS TO FULMINATING-CAPS FOR EXPLOSIVE CHARGES.

SPECIFICATION forming part of Letters Patent No. 636,919, dated November 14, 1899.

Application filed May 23, 1899. Serial No. 717,937. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ELIAS MILLER, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented a new and useful Device for Applying Protectors to the Fulminating-Caps of Explosive Charges, of which the following is a specification.

My invention relates to a device for applying protectors to the fulminating-caps of explosive charges used in mining operations, particularly in wet mines; and said improvement is designed more particularly for use in connection with the cap and protector disclosed in my pending application for a patent for improvements in cartridges filed December 8, 1898, Serial No. 698,662.

It is well established by statistics that the majority of accidents in mining operations are due to the failure of blasts to explode, and in wet mines this serious objection is caused by the fulminating-cap or the charge becoming saturated with moisture. In my application to which reference has been made I overcome this objection by employing a highly-elastic protector of rubber, which is fitted to the fulminating-cap and to the fuse in a manner to closely hug the same by frictional contact and to inclose the joint therebetween for the purpose of thoroughly excluding water and moisture from the cap. Practical experience with devices embodying my invention has demonstrated its efficiency and thoroughly reliable character, and I may state that in tests involving the use of several thousand protectors used principally under conditions where moisture is liable to enter the charge there has not been a single instance where the protector as invented and used by me has been found to be faulty.

To secure maximum efficiency in the service of the protector of my invention, it has been found necessary to supply each miner or operator with a number of the devices in order that fresh and elastic protectors may be kept on hand by the miner to be used and applied by him to the caps previous to attaching the cap and fuse to the explosive charge.

The present invention has for its object the provision of means by which the elastic protectors may be easily carried by a miner or operator in a condition for expeditious appli-

cation to the cap and fuse; and to this end the invention consists of a holder in the form of a staff and a series (two or more) of protectors applied in the form of collars to the staff or rod, said protectors adapted to retain themselves in place by frictional engagement with the staff and arranged in a condition to be slipped off the staff onto the cap and from thence uncoiled to inclose and fit the fuse, all as will be hereinafter more fully described and claimed.

In the accompanying drawings, Figure 1 is a perspective view of a holder equipped with a plurality of protectors and embodying my invention. Fig. 2 is an enlarged sectional view through the staff and a series of protectors fitted thereon. Fig. 3 is a view showing a fuse having a cap applied thereto and a protector on the cap. Fig. 4 is a view showing the application of the protector to the cap and the fuse for the purpose of tightly closing the joint between said parts in order to exclude the admission of moisture to the cap.

The same numerals of reference are used to indicate like and corresponding parts in each of the several figures of the drawings.

My invention is a holder comprising a staff or rod 11 and a series of protectors 12, which are fitted frictionally on the staff to hold themselves in place thereon in a condition for readily transferring said protectors to the cap 13.

Each protector is a single tube of highly-elastic rubber of proper diameter to fit the cap 13 and the fuse 14, which is inserted in one end of the cap, and this protector is adapted to tightly fit on the cap and the fuse in order to hold itself in place by frictional contact and to thoroughly exclude moisture from entering through the joint which is formed by inserting the fuse in said cap, all as will more fully appear by reference to my prior application.

In order to supply the miner or operator with the number of protectors which may be required during a day's service in the field of mining operations, I provide the staff 11, which is adapted to carry the requisite number of protectors in a position for easy and convenient application to the fulminating-caps.

By reason of the elastic nature of the pro-

tectors some difficulty is experienced in slipping them over the caps and the fuses, and to overcome this difficulty I contemplate the coiling of each protector upon itself and fitting the protector to the staff in the form of a collar, as clearly represented by Figs. 1 and 2. Each coiled collar-like protector is slipped onto the staff 11 to hold itself in place by friction, and this staff may contain two or any desired number of the protectors, which occupy an exceedingly compact relation to the staff. This staff may consist of a piece of wood, metal, or any other appropriate material, and it may be either solid or hollow. I prefer to employ a cylindrical stick of wood to constitute the staff, and this staff is of a diameter slightly less than the interior diameter of the fulminating-cap 13 at one end thereof in order that the open end of said cap may receive one end of the staff, as shown by Fig. 3.

The cap is designed to be charged with the fulminate well known to those skilled in the art, and the fuse 14 may be of any suitable or preferred construction which is adapted to enter the open end of the cap and to explode the fulminate therein in order to discharge the blast in a manner familiar to the art.

In using the device of my invention previous to attaching the cap and fuse to the explosive charge I proceed to first transfer one of the collar-like protectors from the staff to the cap. As shown by Fig. 3, the open end of the cap is brought into juxtaposition to one end of the staff, or said cap may be slipped onto the staff, and the operator then proceeds to transfer one protector from the staff to the cap by rolling the protector over and over the staff until it passes from the staff onto or upon the cap. In this operation of transferring the protector from the staff to the cap said protector retains its rolled-up condition, so that it at once fits on the cap in the form of a collar, and the cap, with the protector thereon, is now detached from the staff. The next step in the operation is the assemblage of the fuse 14 with relation to the open end of the cap, as shown by Fig. 4, and finally the protector is uncoiled by turning the same in the opposite direction from the direction in which it was manipulated to transfer the protector in its collar-like condition from the staff to the cap. In unrolling or uncoiling the protector from the cap to the fuse a part of the protector adheres to and closely embraces the cap, while the other part of the protector is made

to embrace a part of the fuse where it enters the open end of said cap. This protector is thus adapted to closely embrace the cap and fuse, so as to cover the joint between the elements for protecting the fulminate against the admission of moisture at the joint between the fuse and cap. The cap, fuse, and protector applied in the manner described are now in a condition to be inserted in the hole which is drilled in the stone, rock, or mine and which contains the explosive charge, and the charge may be exploded in the usual manner familiar to those skilled in mining operations.

From the foregoing description, taken in connection with the drawings, it will be seen that I have provided a device adapted to carry a number of elastic protectors which may be easily and quickly transferred to the cap and the fuse used in connection therewith. The miner may thus be supplied with fresh and elastic protectors, and the staff may be easily carried in the pocket without inconvenience.

Changes in the form, proportion, size, and the minor details of construction within the scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having thus described the invention, what I claim is—

1. A device for applying protectors to mining-caps consisting of a staff, and a tubular protector rolled upon said staff and adapted to be transferred therefrom to the cap by rolling said protector along the staff.

2. A device for applying protectors to mining-caps, comprising a staff and a series of rolled tubular protectors rolled upon said staff and adapted to be removed successively and individually therefrom by rolling them in their rolled condition from the staff to a cap.

3. A device for applying elastic protectors to mining-caps comprising a staff or rod, and a series of rolled elastic protectors applied in collar-like condition to the staff or rod and retaining themselves thereon by frictional contact, each protector being removable from the staff by rolling the same in its collar-like condition upon the cap, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses:

WILLIAM ELIAS MILLER.

Witnesses:

C. A. PARSON,
RUDOLPH MILLER.