No. 701,173. Patented May 27, 1902.

J. M. DOYLE.

SAFETY DEVICE FOR BLASTING PURPOSES.

(Application filed June 4, 1901.)

(No Model.)

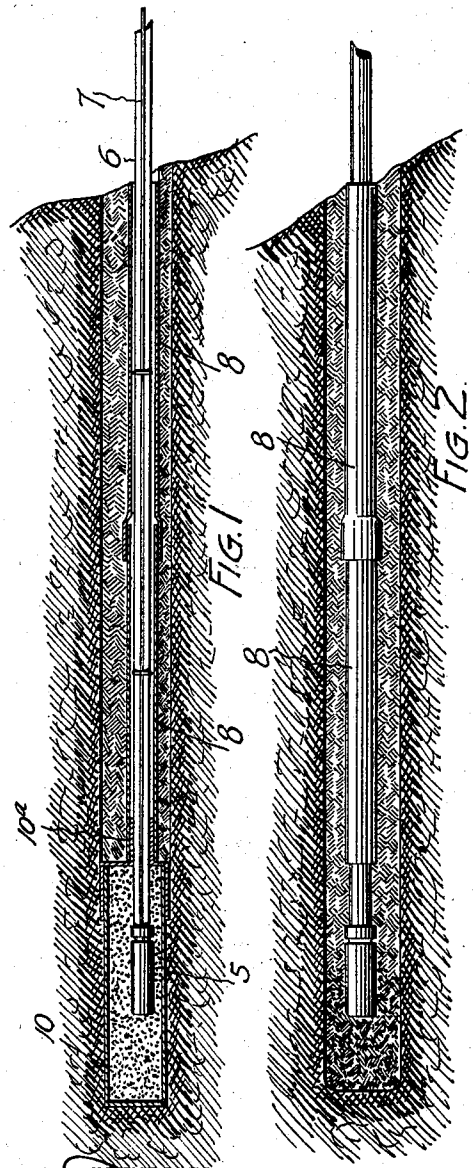


FIG. 1.

FIG. 2.

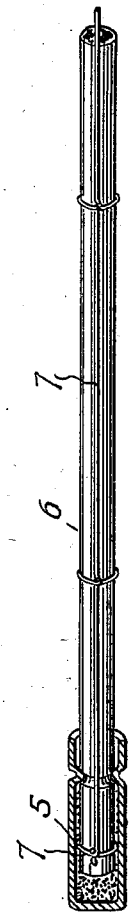


FIG. 3.



FIG. 5.

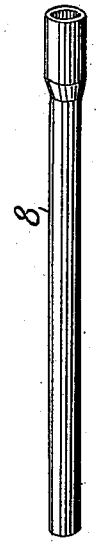


FIG. 4.

WITNESSES:

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SAFETY DEVICE FOR BLASTING PURPOSES.

SPECIFICATION forming part of Letters Patent No. 701,173, dated May 27, 1902.

Application filed June 4, 1901. Serial No. 63,141. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. DOYLE, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Safety Devices for Blasting Purposes; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in safety devices for blasting purposes, my object being to do away with the danger, or at least reduce to a minimum the danger, incident to "missed shots" or the failure of the powder charge to explode at the proper time. It is well known by those familiar with practical mining that after a hole is formed in the rock the powder charge is inserted and the cap and fuse placed in position, after which the hole is tamped full of dirt or any other suitable fine or granulated material that may be readily accessible, the tamping material being placed in direct contact with the fuse. It often happens by reason of the cutting or injury of the fuse by the tamping material or for some other reason that the powder charge fails to explode. It then becomes necessary to remove the tamping material in order to put a new fuse and cap in position. During this picking out of the tamping material the concussion or jar incident to the work very frequently explodes the charge and either kills or maims the workmen. As before intimated, my object is to do away with this danger and make it practicable to remove the old fuse and cap and insert new ones in their place, this work being quickly and easily accomplished and without danger to the workmen.

Having briefly outlined the function of the invention and the difficulties it is intended to overcome, I will proceed to describe the same in detail, reference being made to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a section taken through the rock, cutting the hole longitudinally, showing my improved device in place, a closed cartridge being used. Fig. 2 is a similar section showing the device in elevation without the cartridge. Fig. 3 is an elevation illustrating one feature of my improved device—namely, the wire for reinforcing the fuse—the parts being shown on a larger scale. In this view the cap is shown in section and crimped on the fuse. Figs. 4 and 5 illustrate the tube through which the fuse is passed, two sections being shown.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate the cap, and 6 the fuse, both being of ordinary make or manufacture. Before placing the cap on the end of the fuse I preferably wrap a piece of fine copper wire 7 around the fuse and tie it in place. The cap is then put on and crimped. The wire is stretched along the fuse and tied around it at suitable intervals to keep it in place and strengthen or reinforce the fuse. The fuse is then threaded or passed through a tube composed of one or more sections 8, according to the depth of the hole. The sections 8 are arranged to be easily coupled together by slipping the end of one section over the other. In this way the length of the tube may be regulated at will. This length is made sufficient to protect the fuse from direct contact with the tamping material the entire length of the hole. After the powder charge is placed in the inner extremity of the hole the cap is inserted therein, leaving the fuse and its tube or sheath projecting beyond the outer extremity of the hole in the rock, the arrangement being such that the tube is in contact with one side, preferably the bottom, of the hole. The dirt or other material is then tamped into the hole around the tube.

In the case of a missed shot the workman immediately pulls the fuse and cap out through the tube, the wire giving the fuse sufficient strength to prevent the possibility of its breaking or pulling apart. After the central combustible part of the fuse is consumed the latter, as a matter of course, is somewhat weakened, and the wire is employed to give the necessary strength to compensate for this weakness. The fuse is, however, clearly operative without the wire, so that it may be used or omitted at pleasure and according as circum-

stances or the judgment of the user may dictate. When dynamite is used for blasting purposes, no special cartridge need be employed. If black powder is used, it may be found preferable or advisable to employ a cartridge forming a suitable cylinder 10, (see Fig. 1,) composed of tin or any other suitable material, having a top 10^a, adapted to close the cartridge, said top being provided with a hole surrounded by a short stub-tube to which the inner extremity of the fuse-protecting tube may be fitted. The cap protruding from the inner extremity of the tube is inserted in the cartridge and the tube slipped over the stub of the top. The opening in the top and stub-tube must be large enough to permit the insertion and removal of the cap. The use of the device is then the same as heretofore described when no cartridge is employed.

A so-called "missed shot" frequently results from the slow burning of the central portion or combustible part of the fuse. When the charge does not explode within the specified time, the workman begins to remove the tamping material. In case it is a slow fuse and the latter is still burning the charge is sometimes exploded before the tamping material is removed. With my improved device the cap and fuse may be immediately removed, and in case the fuse is still slowly burning no harm will be done. During the burning of the central combustible part of the fuse the outer portion of the fuse is partially melted and expanded, whereby it fills the tube or sheath and closes the same tightly, as if the tube were not employed.

Having thus described my invention, what I claim is—

1. In a safety device for blasting purposes, the combination with a fuse and a cap attached to one extremity thereof, of a tubular open-ended sheath through which the fuse is passed, the cap being located beyond the inner extremity of the sheath, said sheath being of a size to fit the fuse quite closely, but at the same time to permit the easy insertion and removal of the cap and fuse, the arrangement being such that the tamping material is packed around and exterior to the sheath.

2. The combination with a fuse, and a cap applied to one extremity of the fuse, of a tubular open-ended sheath or conduit through which the fuse is passed, the cap being located beyond the inner extremity of the sheath which is of sufficient rigidity to maintain its form against the external pressure of the tamping material which is placed around and exterior to the sheath.

3. In a safety device for blasting purposes, the combination with a fuse and a cap attached to one extremity thereof, of a tubular open-ended sheath through which the fuse is passed, the cap being located beyond the inner extremity of the sheath, substantially as described.

4. The combination with a cap and fuse, of a wire fastened to the cap end of the fuse, the fastening or knot in the wire being inside the cap when the latter is applied to the fuse end, the said wire being carried along the fuse endwise and suitably connected therewith, and a tubular sheath through which the fuse and wire may be passed, and permitting the removal of the reinforced fuse and the cap, after the hole has been filled and tamped.

5. The combination with a cartridge, fuse and cap, the cartridge having an opening to receive the cap end of the fuse, and a tubular sheath for the fuse, said sheath being connected with the cartridge-case, and extending the entire length of the hole in the rock, whereby the fuse is protected and its removal together with the cap, made practicable.

6. The combination with a fuse and a cap applied to one end thereof, of an open-ended tube through which the fuse is passed, the cap being located beyond the inner extremity of the tube which is composed of sections and constructed and arranged to protect the fuse and permit its withdrawal after the hole is filled.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES M. DOYLE.

Witnesses:
A. J. O'BRIEN,
DORA C. SHICK.