No. 791,100. PATENTED MAY 30, 1905.

E. W. KEITH & A. H. BOYD.

WATERPROOF EXPLOSIVE CAP FOR BLASTING PURPOSES.

APPLICATION FILED MAR. 29, 1904.

Fig. 1.



Fig. 2.

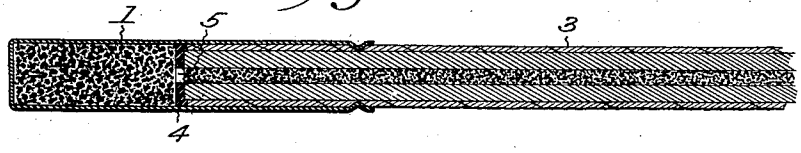


Fig. 3.

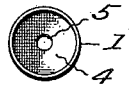
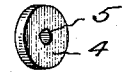


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDWARD W. KEITH, OF DENVER, AND ALBERT H. BOYD, OF LEADVILLE, COLORADO.

WATERPROOF EXPLOSIVE CAP FOR BLASTING PURPOSES.

SPECIFICATION forming part of Letters Patent No. 791,100, dated May 30, 1905.

Application filed March 29, 1904. Serial No. 200,584.

To all whom it may concern:

Be it known that we, EDWARD W. KEITH, a resident of the city and county of Denver, and ALBERT H. BOYD, residing at Leadville, in the county of Lake, State of Colorado, citizens of the United States of America, have invented certain new and useful Improvements in Waterproof Explosive Caps for Blasting Purposes; and we 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.

Our invention relates to improvements in waterproof explosive caps used in blasting; and the objects of our invention are, first, to provide a waterproof explosive cap in which a resilient or pliable gasket is employed between the explosive charge of the cap and the end of the fuse; second, to provide a simple waterproof explosive cap that thoroughly protects the fuse from any moisture or water that might get into the cap; third, to provide a waterproof explosive cap that is very easily and quickly operatively connected to a fuse; fourth, to provide a waterproof cap in which the waterproofing device is wholly within the cap. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a connected cap and fuse embodying our invention. Fig. 2 is an enlarged sectional view of an explosive cap embodying our invention. Fig. 3 is a view looking in at top of the cap, the fuse being removed; and Fig. 4 is a perspective view of the rubber gasket which rests upon the explosive within the cap.

Similar numerals of reference refer to similar parts throughout the several views.

Referring to the drawings, the numeral 1 designates the cap, which comprises a small metal shell closed at one end, which is partially filled with fulminate of mercury or with such other suitable explosive material as is used in explosive caps for discharging charges of powder in blasting rock and other materials and in mining and engineering operations. The explosive material is packed down in the bottom of the shell, and the balance of the shell is left empty to receive the end of the fuse 3, which is made of a diameter to fit loosely but snugly into the shell of the cap. In the shell of the cap we place an elastic or pliable gasket 4, which contains a hole or perforation 5 through its center. We preferably make the gasket of soft rubber; but it may, however, be made of any elastic or pliable material—such as asbestos, soft felt, or cotton—pressed into disks, or these gaskets may be made of chemical compounds formed into disks that are capable of an elastic or expansive property under slight pressure. This gasket comprises a thin disk-shaped ring, the aperture 5 of which forms a passage for the fire of the burning powder of the fuse to the explosive charge of the cap. The disk gasket is made perfectly round and to fit loosely but closely the inner diameter of the cap and is inserted and placed on top of the explosive charge. The end of the fuse is then inserted in the cap and is pressed down against the top of the gasket by the fingers of the operator with sufficient pressure to expand the gasket against the inner peripheral shell of the cap and at the same time embed or impress the end of the fuse into the soft surface of the gasket, thus effecting a perfectly waterproof connection between the explosive and the fuse within the cap. At the same time that the fuse is being held under pressure against the top of the gasket by the operator the top edge of the shell of the cap is crimped or bent against and into the sides of the fuse, which effectually clamps the fuse under the pressure applied to it against the top of the gasket. The crimping of the top of the shell may be done by the teeth of the operator or with the heel of a knife or with any of the crimping-machines used especially for crimping explosive caps.

It requires but a few minutes to insert a gasket and connect a fuse in a thoroughly waterproof manner to a cap, and the waterproofing is entirely within the cap, where it cannot be accidentally disarranged. When

the fuse is lighted, the fire of the burning powder passes through the central aperture in the gasket and ignites the explosive material in the cap.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In fuse and explosive caps, the combination of a loaded explosive cap, an elastic or pliable ring-gasket inserted on top of the explosive load of said cap, a fuse for said cap, and means for securing said fuse with a fixed pressure against the top of said gasket in said cap.

2. In fuse and explosive caps, the combination of a cap loaded with a charge of explosive material, a soft rubber or pliable gasket provided with a central aperture placed in said cap on top of said explosive material, a fuse for said cap, and means, including the indentation or crimping of the entrance edges of said cap against said fuse, for securing said fuse under a fixed pressure against the top of said gasket in said cap.

3. In fuse and explosive caps, the combination of a cap loaded with an explosive charge, an elastic or pliable disk-shaped gasket provided with a central aperture through it, resting loosely on top of said explosive charge in said cap, and a fuse inserted in said cap and pressed against the top of said gasket and secured under pressure against the top of said gasket.

4. In fuse and explosive caps, the combination with the loaded explosive cap and the fuse, of a soft elastic gasket provided with an aperture through its center, and means for securing the fuse to said cap in bearing pressure against the top of said gasket.

5. In fuse and explosive caps, the combination of a cap loaded with an explosive charge, a soft pliable or elastic gasket placed on said explosive charge, a fuse inserted in said cap against said gasket, crimpings or indentations in the edge of said cap against said fuse arranged and adapted to hold said fuse under pressure against the top of said gasket, and a hole through said gasket in axial alinement with the powder in said fuse, substantially as described.

6. In fuse and explosive caps, the combination of a shell charged with a charge of explosive material in its bottom portion, a gasket or disk-shaped ring of soft rubber adapted to be dropped loosely in said shell on top and against the said covering of said explosive charge, a fuse adapted to be inserted in said shell against the top of said ring-shaped gasket, and indentations in the entrance edge of said cap arranged to clamp said fuse to said cap and under pressure against the top of said gasket, substantially as described.

7. In fuse and explosive caps, the combination of the cap and the charge of explosive material in said cap with the elastic or pliable and centrally-perforated rubber or pliable gasket on top of said charge of explosive material, the fuse inserted and embedded against the top surface of said gasket, and the crimped edge of said cap arranged to secure said fuse with a fixed pressure against the top of said gasket and said charge of explosive material, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

EDWARD W. KEITH.
ALBERT H. BOYD.

Witnesses:
G. SARGENT ELLIOTT,
BESSIE THOMPSON.