

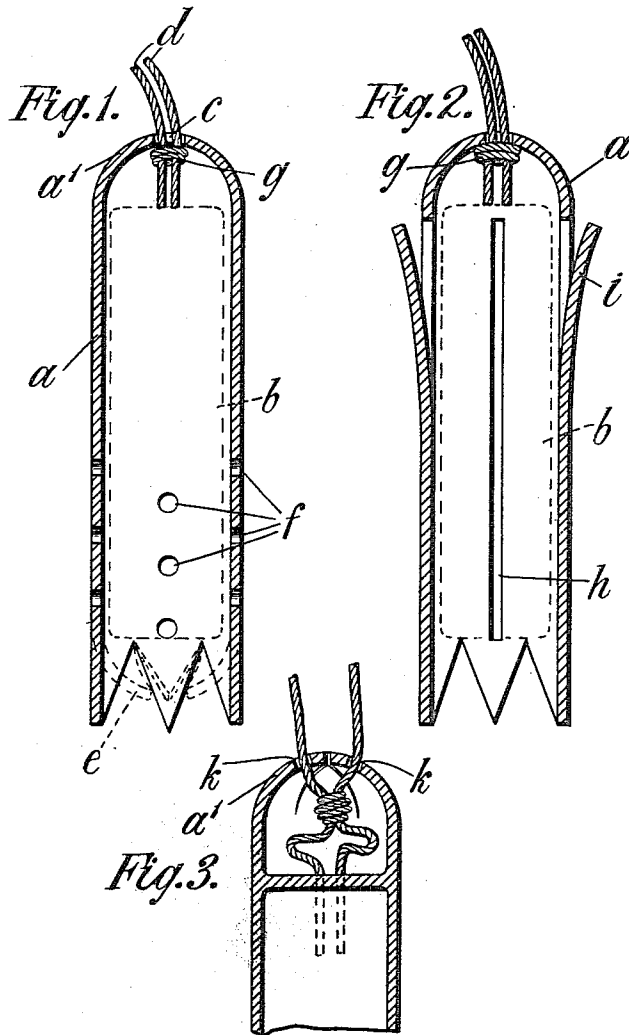
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SHIELD FOR DETONATORS WHICH ARE USED IN SHOT FIRING IN MINES OF ALL KINDS
AND IN QUARRIES.

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UNITED STATES PATENT OFFICE.

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SHIELD FOR DETONATORS WHICH ARE USED IN SHOT-FIRING IN MINES OF ALL KINDS AND IN QUARRIES.

1,049,143.

Specification of Letters Patent.

Patented Dec. 31, 1912.

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To all whom it may concern:

Be it known that we, ABRAHAM PRICE, timberman, of 10 Sunny Bank, Cwmpark, Treorky, Pontypridd, Glamorgan, England, and WILLIAM PRYSE, colliery fireman, of 41 Vicarage Terrace, Cwmpark, Treorky, Pontypridd, Glamorgan, England, have invented new and useful Improvements in Shields for Detonators Which are Used in Shot-Firing in Mines of all Kinds and in Quarries; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part hereof.

This invention has reference to detonators for use in shot firing in mines and quarries and has for its object to provide means which obviate the possibility of the detonator becoming detached from the firing wire while being placed in position or withdrawn after misfire and thus insure safety during the operations of charging and ramming shot holes, withdrawal of the detonators in the case of misfire, and re-insertion of fresh detonators into the charge.

With this end in view our invention consists in providing means in addition to the usual fastening for gripping the firing wires at a short distance from the back of the usual fastening and in securing the wires in such a manner that no tension can be exerted upon the length of firing wire intermediate the two fastenings. In this manner the strain exerted when withdrawing the detonator will be taken up wholly by the rear fastening and not as hitherto, by the usual connection where the wire enters the back of the detonator.

In order that our invention may be readily understood and carried into effect we will now proceed to describe the same fully for which purpose reference is to be had to the accompanying drawings in which:—

Fig. 1 illustrates a vertical section through one form of device embodying our invention and

Fig. 2 is a slightly modified form of the same.

Fig. 3 is a fragmentary view of a further modified form of the invention.

In carrying our invention into practice the said supporting means may comprise an extension at the back of the detonator herein-after more fully referred to or it may comprise a tubular shield *a* of suitable material

preferably copper and of a size adapted to readily receive the detonator *b*. The end *a'* of said shield *a* is closed as shown in the drawings and is provided with a hole *c* through which the firing wires *d* are adapted to pass. The opposite end of the shield *a* is serrated as at *e* and the body of the shield *a* is provided with apertures which in the form illustrated in Fig. 1 are shown as comprising holes *f* to admit of the charge being fired.

The wires *d* having been formed into a knot *g* are threaded through the hole *c* the ends being attached to the detonator *b*. The wires are then pulled up until the knot *g* which is waxed jams against the closed end *a'* of the shield *a* as shown in Fig. 1 the serrated ends *e* of the shield being turned inward so as to confine the detonator *b* within the shield as shown by broken lines in Fig. 1 said detonator being thus supported and held in position by the waxed knot *g*.

In the slightly modified form of device illustrated in Fig. 2 instead of providing the shield *a* with circular holes *f* we provide slots *h* and two or any suitable number of the partitions between said slots *h* in the body of the shield are cut free at the upper end and then turned slightly outward forming spring tongues *i* so that when the shield with its detonator located therein has been inserted in the casing of the cartridge said spring tongues *i* will engage with the cartridge case and prevent the shield and its detonator being displaced when the tube used for insertion of the shield into the cartridge is withdrawn. The spring tongues *i* are of sufficient strength to effect this purpose but are yet fragile enough to collapse if a pull of about 10 pounds is applied to the wires in case it is necessary to withdraw the detonator owing to misfire.

If desired the form of shield shown in Fig. 1 may also be provided with spring catches similar to those illustrated in Fig. 2, by punching them out of the wall of the shield and in suitable position.

It will be seen that under our invention we have provided means whereby any tension on the firing wires will be taken up between the knot and the shield and this is an essential feature of the invention which is not limited to the precise form of construction herein shown and described as many modifications may be made in the same with-

out departing from the spirit and scope of the invention, for instance instead of constructing the shield of copper we may make the shield of some combustible but flameless material or material of a very low melting point which would not obstruct the escape of gases from the detonator to the charge. Our shields can also be constructed so as to form an extension of the detonator casing and be substituted for or used in combination with the thin copper tube now used by the detonator makers, or the cylindrical portion of the shield may be integral with the detonator casing. When the shields are in the form of an extension of the detonator casing or combined with the thin copper tube now used by the detonator makers or is an integral part of the casing the end *a'* of same is, during manufacture formed cylindrical instead of closed and with a serrated edge. Two of the points constituting part of the serrated edge are provided with holes *k* each of sufficient diameter to permit one of the wires *d* passing through and the knot *g* having been tied a short distance from the usual fastening, the wires are then threaded separately through each hole, the slack portion tucked in and the serrations turned over to close the end of the casing as shown in Fig. 3. It will be obvious that although the knotting of the wires as above described is the simplest way of attaining the object in view we may provide a clip of suitable construction and material in lieu of the knot, adapted to be attached to the wires.

Any suitable and known form of clip may be used a preferred kind being formed of a short wire link given a twist to form a loop at each end through which the wires attached to the detonator can be threaded and given half a turn bringing the wires to the center on each side. The clips may be fixed in position by wax.

It will be seen that by the use of our improved device perfect protection is assured against firing the cap by friction upon the withdrawal or reinsertion thereof in the case of misfire while owing to the provision of the waxed knot which becomes wedged in the end of the shield the wires cannot become disconnected from the detonator. The detonator being effectually supported by the shield can never become lost even should a fall occur due to pressure or the firing of another shot in the immediate vicinity.

What we do claim as our invention and desire to receive by Letters Patent, is:—

1. A detonator of the character described comprising a tubular shield adapted to receive the detonator proper, firing wires passing through an opening in the end of said shield, means to prevent the withdrawal of said firing wires from said shield, means to permit the firing of the charge through said shield, and means engaging the base of the detonator to prevent a displacement of the shield and detonator, substantially as described.

2. A detonator of the character described, comprising a tubular shield adapted to receive the detonator proper, firing wires passing through a hole in the end of said shield, a waxed knot connecting the firing wires to prevent the withdrawal of the same from said shield, openings within the tubular shield to permit the firing of the charge, and tongues engaging the base of the detonator to prevent a displacement of the shield and detonator, substantially as described.

3. A detonator of the character described comprising a tubular shield closed at one end and having serrated edges at its opposite end turned inwardly adapted to receive and hold the detonator proper, firing wires passing through a hole in the closed end of said shield, means connecting the firing wires within the shield to prevent their withdrawal therefrom, tongues integrally formed with the wall of said shield to prevent a displacement of the shield and detonator, and means to permit the firing of a charge through said shield.

4. A detonator of the character described comprising a casing for the reception of the detonator proper, an extension of said casing having serrated edges turned inward, holes within said edges to allow the passage of the firing wires, a waxed knot connecting said firing wires within said extension, and means to permit the firing of a charge through said shield and its extension, substantially as described.

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

ABRAHAM PRICE.
WILLIAM PRYSE.

Witnesses:

WILLIAM D. REES,
FREDERICK JOHN MORGAN.