T. JOHNSON.

BLASTING.

APPLICATION FILED NOV. 25, 1911.

1,078,442. Patented Nov. 11, 1913.

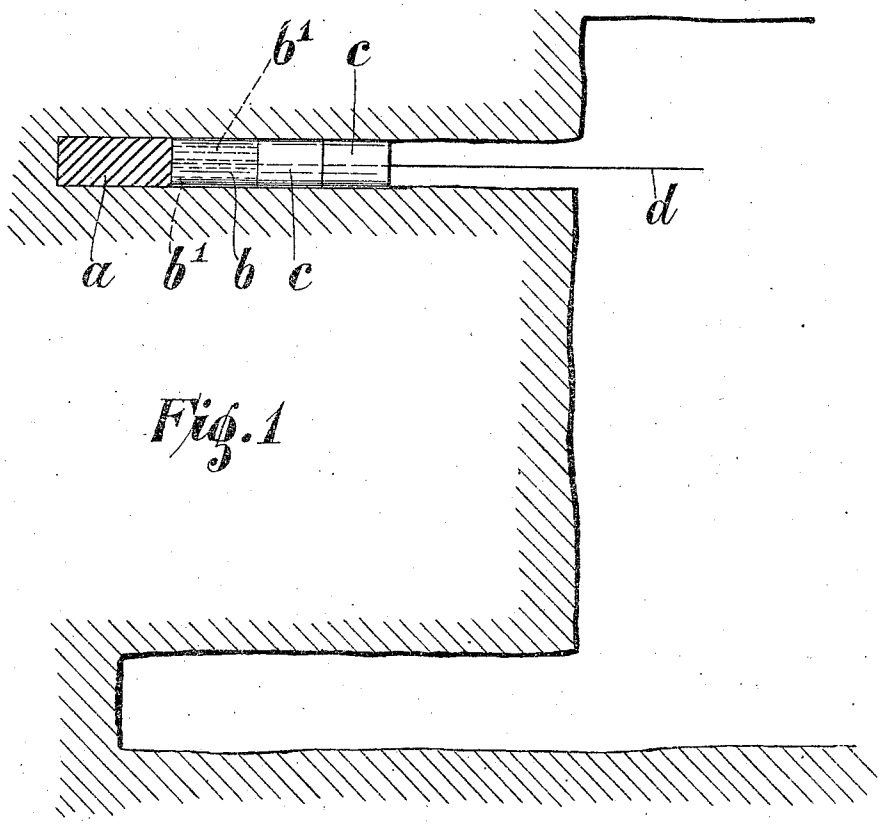


Fig. 1

Fig. 2.

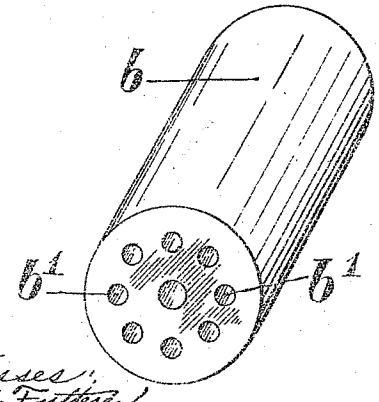
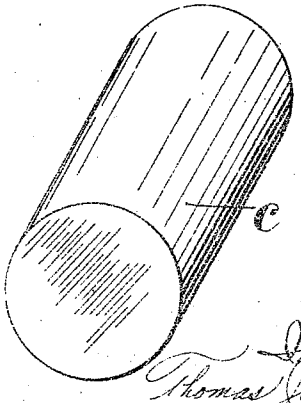


Fig. 3.



Witnesses,
M. V. Fuhrer
M. E. Rocke

Inventor
Thomas Johnson
by R. Singer
Atty

UNITED STATES PATENT OFFICE.

THOMAS JOHNSON, OF DUDLEY, ENGLAND.

BLASTING.

1,078,442. Specification of Letters Patent. Patented Nov. 11, 1913.

Application filed November 25, 1911. Serial No. 662,485.

To all whom it may concern:

Be it known that I, THOMAS JOHNSON, a subject of the Kingdom of Great Britain, residing at 7 Hill street, Kate's Hill, Dudley, in the county of Worcester, England, explosives expert, have invented certain new and useful Improvements in or Relating to Blasting, of which the following is a specification.

This invention relates to the process of blasting as carried on for instance in mines and it comprises a mode of and means for tamping or stemming the blasting hole after the explosive has been introduced.

The materials previously used or proposed as tamping media have been inefficient or inconvenient to use, and previously proposed tamping plugs have not been of a character enabling them to efficiently prevent "blowing out." To obviate this latter danger it has been proposed to use in addition various chemical compounds.

According to my present invention I provide the tamping or stemming in the form of a dry or comparatively hard plug but which plug has further the characterictic that when damped or immersed in water it becomes soft or plastic and afterward readily sets and binds with the adjacent coal or material so providing a stemming of resisting qualities substantially equal to those of the material to be blasted, and preventing "blowing out."

A suitable and cheap tamping material for the purpose of the present invention is argillaceous shale commonly known as "whitestone dirt" or "toccy." The argillaceous shale as found in nature is ground, treated with water, and in its plastic state formed into rods or circular lengths as for instance by being pressed through a perforated plate. The object of grinding or pulverizing the shale is to eliminate or reduce to a powder any grit present which might otherwise damage the detonator wires in the process of tamping. While in the plastic state the rods or lengths of treated shale are cut or divided into short cylinders and allowed to set or harden ready for use, in which form the material is portable, particularly convenient and quick to manipulate. It is further found that the grinding operation enables the plugs to be better formed since the finely ground material possesses a remarkable degree of cohesion.

In order to facilitate the damping throughout of the primer plug that is to say that part of the stemming which is placed next to the explosive, it is provided with a number of holes, grooves, passages or the like extending preferably throughout its length. The plug introduced after the first or primer plug may if desired be solid and undamped.

By reason of the smooth surface which is obtainable with plugs made as aforesaid the possibility of the plugs taking coal dust with them in the process of stemming is almost entirely removed, while the detonator wires or fuse may without risk of damage be accommodated in one or more grooves in the plug. Such a groove may commence at the side of the plug and incline to the center of the end nearest the charge, thereby avoiding as far as possible the necessity for the bending of the wires or fuse.

To facilitate an understanding of the invention reference is directed to the appended sheet of drawings, on which—

Figure 1 is a diagrammatic representation illustrating the holding and stemming of a blasting operation and in which a plug in accordance with the present invention is in use. Fig. 2 illustrates in perspective the primer part of a plug. Fig. 3 illustrates in perspective one of the solid parts of the plug introduced after inserting the primer plug.

In the drawings *a* represents the powder or charge, *b* the primer plug advantageously having the longitudinal perforations b^1 for the purpose aforesaid of facilitating damping, *c* the preferably solid plugs introduced after the primer plug has been inserted, *d* a detonator wire.

I have found in practice that argillaceous shale readily softens when wet or moistened and that it subsequently sets hard. Furthermore, after it has been wet to soften the same, and after subsequently hardening, it will readily soften when again dampened or wetted, and will not only set hard, but will coalesce with the coal, stone or other material in which the blast opening is formed. This property of the material greatly enhances its value when used in accordance with my invention since it permits of the plugs being completely formed in shape ready for use and this feature greatly facilitates transport and saves loss, and it also facilitates handling by the operator in plugging the blast opening.

In tamping, after the explosive *a* has been placed in position, one of the primer plugs *b*, as shown in Fig. 2, is inserted after being dampened. When the primer plug *b* is immersed in water in the opening b^1 admit water to the interior so that the softening process is greatly facilitated substantially throughout the cross-section of the plug. After insertion of the primer plug, any suitable number of solid plugs *c* may be inserted and the plugs are then subjected to a tamping or pressure action thereby closely confining the powder. Furthermore the dampened primer plug *c* is reduced in length by reason of this compression or tamping, and is spread outwardly against the wall of the blast opening into a solid mass, thereby closing all of the openings in the primer plug. Because of the plasticity of the plug, the powder is compressed and therefore the resultant blasting is much more efficient and the invention likewise permits of a greatly reduced amount of powder being used, as compared with former methods. It has been found that a plug, so tamped, will coalesce when hardening so as to form a substantial unitary structure with the material of the wall forming it.

The plugs *c* which may or may not be made of material of which the plugs *b* are made, will then be forced into the opening as illustrated in Fig. 1. If desired the plugs *c* may be made of argillaceous shale and may be dampened before being inserted.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a tamping or stemming plug composed of argillaceous shale, forming the primer plug with longitudinal passages substantially as and for the purpose specified.

2. A stemming or tamping plug for blasting openings formed of a solid shaped mass of homogeneous material adapted to soften when wet, and to subsequently set hard, said plug being provided with openings, substantially as and for the purpose set forth.

3. A tamping plug formed by grinding argillaceous shale, molding the same, and drying the molded plug.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

THOMAS JOHNSON.

Witnesses:
G. B. Bruckshaw,
R. L. Goold.