(No Model.)

M. SETTLE.

WATER CARTRIDGE FOR BLASTING.

No. 343,497. Patented June 8, 1886.

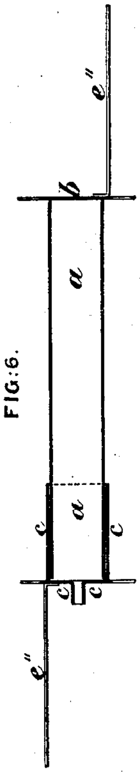

FIG:6.

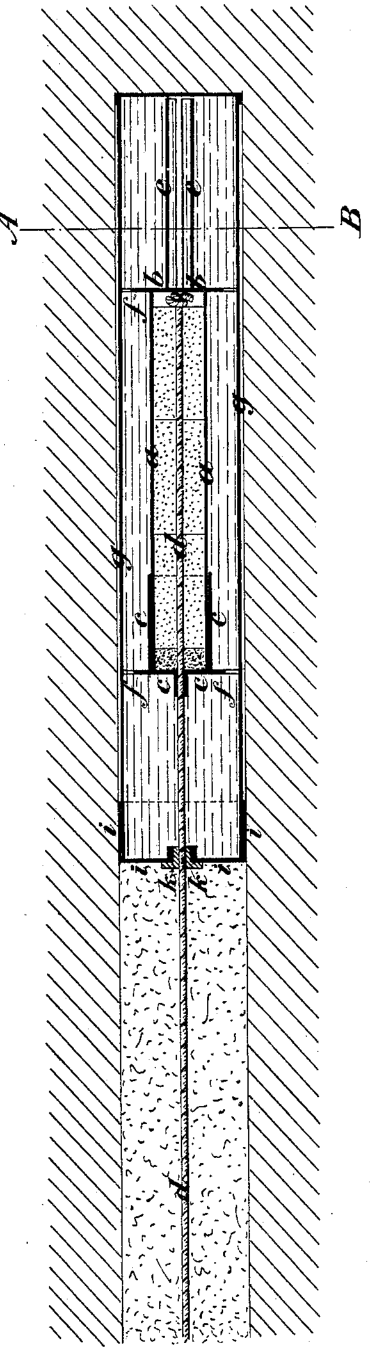

FIG.1.

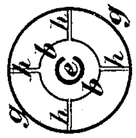

FIG.4.

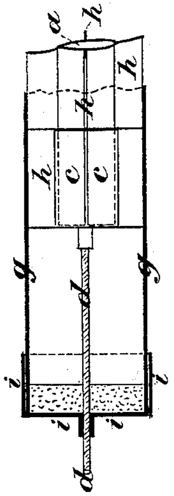

FIG.3.

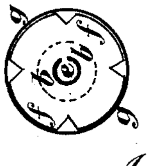

FIG.2.

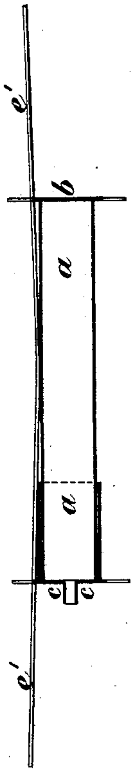

FIG:5.

Witnesses.
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UNITED STATES PATENT OFFICE.

MILES SETTLE, OF BOLTON, COUNTY OF LANCASTER, ENGLAND.

WATER-CARTRIDGE FOR BLASTING.

SPECIFICATION forming part of Letters Patent No. 343,497, dated June 8, 1886.

Application filed January 25, 1886. Serial No. 189,676. (No model.) Patented in England October 17, 1882, No. 4,945.

To all whom it may concern:

Be it known that I, MILES SETTLE, a subject of the Queen of Great Britain and Ireland, and residing at Bolton, in the county of Lancaster, England, have invented an Improved Water-Cartridge for Blasting, (for which I have obtained a patent in Great Britain, No. 4,945, dated October 17, 1882,) of which the following is a specification.

This invention relates to improvements in the means of blasting or rending coal, rock, and other minerals or substances, which improvements are also applicable to other useful purposes in which it is desirable to extinguish the flame arising from the combustion of gunpowder or other explosive substance, as in the firing of cannon or mortars, and the invention has especial reference to an improved form and construction of water-cartridge, by which the advantages attendant upon the use of such a contrivance are more fully attained than in water-cartridges as hitherto constructed.

My invention consists in so constructing such cartridges that a case containing the blasting substance or explosive charge is completely surrounded by water, in lieu of having water at but one end or but partly around, as hitherto practiced, and, as an especial advantage of my improved construction, the complete extinction of the flame follows immediately upon the firing of the charge, avoiding all danger in the most fiery mines.

Figure 1 in the annexed drawings (which form part of this specification) is a longitudinal section, and Fig. 2 a transverse section, through the line A B on Fig. 1, showing one modification of my improved water-cartridges. Fig. 3 is a transverse section of part of one of my improved cartridges somewhat modified, as hereinafter described; and Fig. 4 is a transverse section of the same, taken similarly to Fig. 2. Figs. 5 and 6 show longitudinal sections of other modifications in the construction of the casing for the blasting-charge hereinafter referred to.

The blasting-charge is placed in a case, *a a*, closed at one end, *b b*, and over the open end thereof is passed a tubular cap, *c c*, with a central aperture for the passage of the fuse *d d*, leading from the blasting-charge, which aperture is subsequently closed with clay or otherwise so as to make the case *a a*, containing the blasting-charge, water-tight. The closed end *b b* of the case is made with an open projecting tube, *e e*, and the outer circumference of the case *a a* (or of the case and its cap) is made with projecting diaphragms *f f* at the ends, which have through-openings, (see section Fig. 2,) so as to hold the case *a a* in the center of the outer casing, *g g*, and at the same time to allow of free communication from side to side. Instead of these diaphragms, longitudinal webs or vanes *h h*, as shown at sections, Figs. 3 and 4, or projecting pins may be employed to keep the case *a a* central, so as to be surrounded by water on all sides, and instead of the tube *e e*, I sometimes hold the case *a a* in position by means of a wire, *e′ e′*, soldered or otherwise fixed thereto, as shown at Fig. 5, or by means of projections of sheet metal, *e″ e″*, (or wire,) soldered or otherwise fixed to or forming part of the cap *c c* and the end *b b*. (See Fig. 6.)

The case *a a*, containing the explosive charge, is (as thus or otherwise equivalently fitted) inserted into the open end of a tube or outer casing, *g g*, which is closed at the other end; the end of the case having the projection *e e* being first inserted, so as to leave the fuse end outward. The outer tube, *g g*, is then filled with water, which (owing to the said projecting part *e e* of the inner case, *a a*, and to the perforated diaphragms *f f* or webs *h h* thereof, which keep the explosive case *a a* central in the outer tube) completely surrounds the explosive case *a a*. Over the open end of the outer tube, *g g*, is then passed a tubular cap, *i i*, with a central aperture for the passage of the fuse *d d*, which aperture, when all is in order and ready to be used, is properly closed by a screw-cap, *k k*, or otherwise tamped with clay, as shown at Fig. 3, for preventing the escape of the water. The water-cartridge (as thus or otherwise equivalently fitted) is then ready for use, and in its use it is inserted and pushed up to the inner end of an ordinary bored hole in the coal, rock, or other substance, (see Fig. 1,) and its fuse *d d* is led out at the open end. The hole is then properly tamped with stemming clay or earth in the usual manner. The improved water-cartridge may then be fired or exploded in the ordinary way, or it may be exploded by electricity or otherwise. Upon the explosion occurring the flame in passing out in all directions is everywhere met by the surrounding water, and thus the desired rending action of the charge is attained, and all danger of communicating fire to the surrounding coal or any escaping gas is avoided.

I am aware that it has heretofore been proposed to make a blasting-cartridge with a water-casing around it on all sides, except at the end nearest the mine; but in practice it has been found that such a construction of cartridge is ineffective for the purpose of preventing the issuance of sparks and flame on the firing of the cartridge. In my cartridge the case containing the explosive charge is surrounded by water on all sides and at both ends, including the end nearest the mine, and all sparks are thereby extinguished when the cartridge is discharged.

I claim as my invention—

1. A water-cartridge consisting of an outer case containing water and an inner case containing the explosive charge centrally within the outer case and surrounded by water on all sides and at both ends, substantially as and for the purpose set forth.

2. A water-cartridge consisting of an outer case containing water and an inner case containing the explosive charge and provided with projections to maintain it centrally within the outer casing, and surrounded on all sides and at both ends by water, substantially as set forth.

3. A water-cartridge having an outer case containing water and an inner case containing the explosive charge, the inner case being entirely surrounded by water, and having perforated diaphragms *f* and projections at opposite ends to maintain the inner case centrally within the outer one.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MILES SETTLE.

Witnesses:
CHARLES DAVIES,
JNO. HUGHES.