

J. B. EADS.  
Blasting Rocks under Water.

No. 16,473.

Patented Jan. 27, 1857.

Fig. 1.

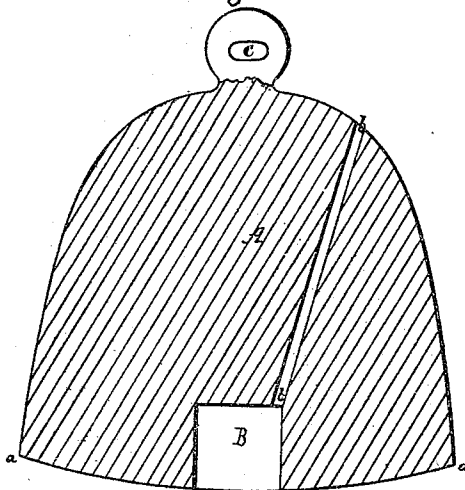


Fig. 3.

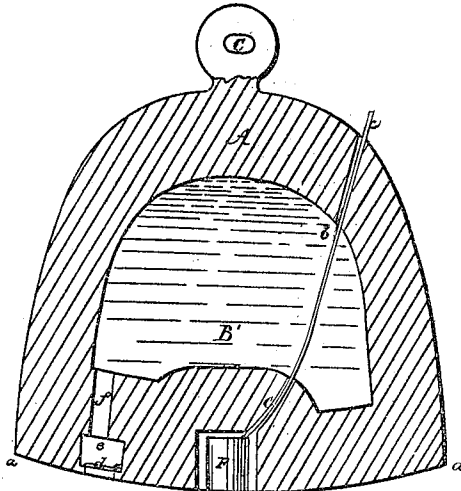
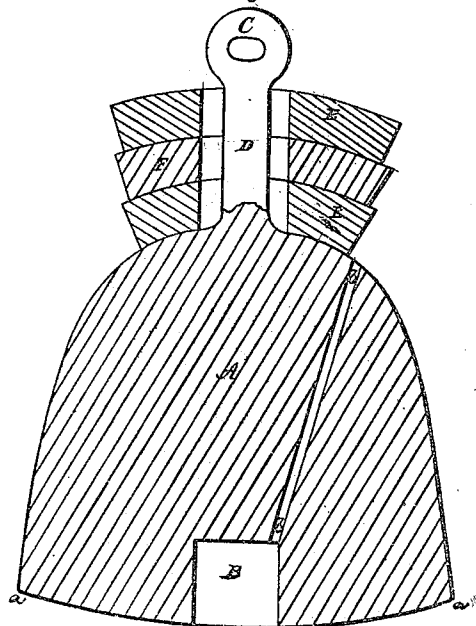


Fig. 2.



# UNITED STATES PATENT OFFICE.

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## IMPROVED APPARATUS FOR BLASTING ROCKS UNDER WATER.

Specification forming part of Letters Patent No. 16,473, dated January 27, 1857.

*To all whom it may concern:*

Be it known that I, JAMES B. EADS, of the city and county of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in the Manner of Blasting Rocks, Wrecks, or any other Matter or Material Under Water; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, marked, respectively, Figures 1, 2, 3, in which the principle is fully set forth, as will be described.

In the well-known plan of blasting rocks under water, by placing the charge of powder on or against the face of the rock, it is found that much of the effect depends upon the depth of water over the charge, and that as the height, and consequently the weight, of water diminishes, so in the same ratio does the effective force of the charge upon the rock diminish.

The object of my invention is to overcome this serious objection in the old method; and the nature of my invention consists in supplying weight, of greater specific gravity than the water, over or upon the charge to hold it more effectually to the rock or other material to be blasted, and thus supplying to the charge what is of necessity taken from it, as the rock or other material is nearer the surface of the water.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same in connection with the drawings.

A in Fig. 1 represents (mainly in section) what may be termed a "mortar," made of metal or any other heavy strong material, and of such shape and size as may suit the kind of material to be blasted. The bottom of the mortar may be rounded off, as shown by the line *a a*, so that its central portion shall more readily lie in close contact with the rock, or whatever is to be blasted. In the bottom of the mortar is a chamber, B, which incloses the charge of powder or other explosive compound, properly secured in a tight canister, in the usual well-known manner. From the chamber B an opening, *b*, may be made, so that a wire or fuse may connect with the charge in the canister, to let it off by an electric spark or otherwise. The top of the mortar is furnished with an eye, C, to which a cable may be at-

tached for raising and lowering the mortar. When a metal or chain cable is used, and the mortar or weight applied is also of metal, by proper insulation the electric spark for igniting the charge may be transmitted through them, and the canister or charge may be placed in the chamber of the mortar before it is lowered down; or the mortar may be lowered upon the charge previously placed. The chamber may vary in form or size as the character of the material to be blasted or the charge of powder may require.

In Fig. 2 a modification of the mortar is shown, it only differing from that shown in Fig. 1 in having a neck or shank, D, upon it, over which any number of additional weights, E E E, may be placed, so as to add or take away weight from the mortar as the rock approaches or recedes from the surface of the water, and thus make one mortar serve for a greater or less depth of water.

Fig. 3 represents another modification, though embracing the same general principle with those represented at Figs. 1 and 2. In this case the mortar is made with a large space, B', over the chamber containing the canister F, the space within the chamber B' being filled with water. In this figure *c* represents a wire which may extend from the interior of the canister to a battery, so that a spark may be transmitted along or through it to ignite the charge. If the wire *c* passes through the space B', it must be packed to prevent leakage. It may, however, pass out through the solid metal and avoid packing.

In the modification, Fig. 3, the water in the chamber B' serves as weight, instead of using solid metal. The water can be admitted through the valve *d*, opening upward in the chamber *e*, and thence through the opening *f*. When the mortar is raised, the weight of the water within it will hold the valve shut, and thus retain the water in it. When the charge is to be exploded against the side of the rock instead of upon top, which may occasionally happen, then the mortar should be constructed so as to stand perpendicular to that face, which is readily done; and the mortar may be suspended by the cable, which, however, should be so arranged as to run free when the mortar recoils by the explosion of the charge, to prevent its parting by any over sudden strain.

The particular amount and quality of the

superincumbent weight that is laid over the charge, to take the place of the water which is lost when the rock, &c., rises nearer the surface, can be readily applied, and in many varieties of forms and material; but I have shown sufficient to fully explain the nature and object of the invention.

I would state that I am aware that weights and braces have been essayed as auxiliaries in blasting rocks on land. These I do not claim; nor do I claim blasting on land, or dry blasting at all; but

What I do claim as new, and desire to secure by Letters Patent, is—

In combination with the column of water over the rock or other material to be blasted, a mortar or weight of greater specific gravity than the water, to act as an auxiliary in holding the blast to the rock, as set forth.

JAMES B. EADS.

Witnesses:

A. B. STOUGHTON,  
THOS. H. UPPERMAN.