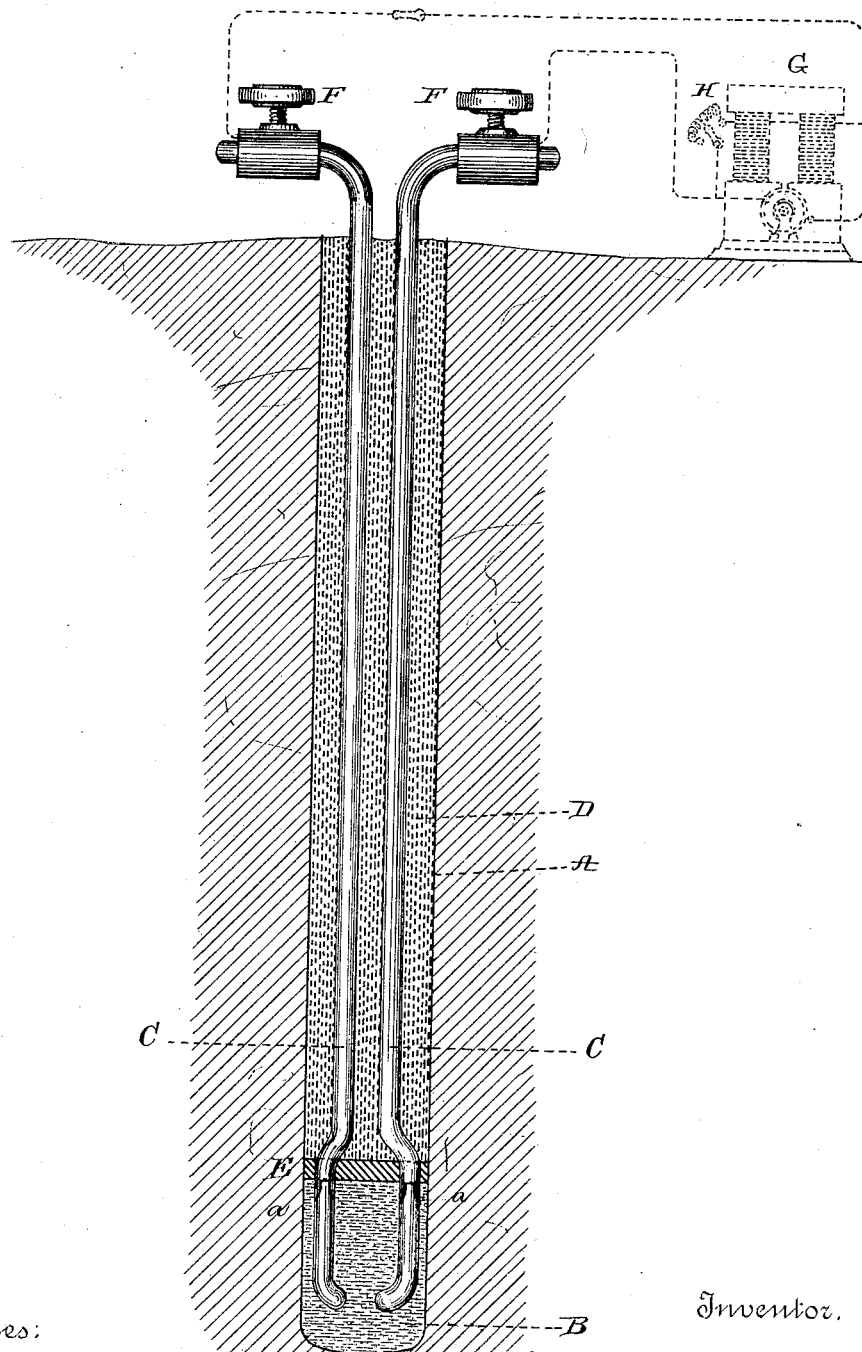


(No Model.)

M. WADDELL.  
METHOD OF BLASTING.

No. 386,281.

Patented July 17, 1888.



Witnesses:  
*W. H. Land*  
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# UNITED STATES PATENT OFFICE

MONTGOMERY WADDELL, OF NEW YORK, N. Y.

## METHOD OF BLASTING.

SPECIFICATION forming part of Letters Patent No. 386,281, dated July 17, 1888.

Application filed January 13, 1888. Serial No. 260,645. (No model.)

*To all whom it may concern:*

Be it known that I, MONTGOMERY WADDELL, a subject of the Queen of Great Britain, residing at New York city, in the county of New York and State of New York, have invented a certain new and useful Improvement in Blasting, of which the following is a specification.

The object of my invention is to provide a method of separating or blasting rock, coal, or similar materials, in mines or elsewhere, which shall be simple, cheap, and effective in operation, and shall also avoid the danger arising from the use of explosives. In accomplishing this I bore or drill in the usual manner into the rock or material to be operated upon, and I fill the bottom of the hole thus formed with a semi-electrical conducting material, such as powdered charcoal, charcoal and water, or other high-resistance material which will expand when heated. I then insert in the hole, so that their extremities enter the body of charcoal or other material, two metal rods, whose outer ends are provided with means for connecting them with conductors leading from a source of electricity. The hole is then tamped or filled in in the usual manner in blasting, and so that the rods remain separated throughout their length. On current from said source being passed through the circuit thus formed the high resistance offered by the semi-conducting material results in the generation of heat therein, and the consequent expansion is such as to cause the breaking or disruption of the rock or other material which surrounds it. In some cases I may employ water or other liquid which will be decomposed by the passage of the current, so that the expansion of the gases will cause the desired effect. I usually prefer, however, to depend on the effect of heat and to employ such a material as will be heated and expand by the current. In any case I employ a non-explosive material, by which I mean one which does not explode when the current is passed through it. I may employ either a continuous or an alternating current. I may in practice first send a weak current through the circuit in order to start the action, and then quickly increase it to cause the disruption.

In the accompanying drawing, which is a sectional view of the blasting-aperture, A is the drilled hole, which at its lower end is filled with charcoal or other suitable material, B.

C C are the metal rods, placed in the hole with their ends entering the material B. Such rods may be jointed, their ends being separable at *a a*, so that if they are injured by the operation new end pieces may be substituted. Above the charge is placed the filling or tamping material, D, in the usual manner. A disk, E, of non-conducting material, may be employed to separate the rods. The upper ends of the rods are provided with binding-posts F, for connecting them with an electrical circuit. Such circuit is shown as extending from a dynamo-electric machine, G, which is provided with a regulating-resistance, H, whereby the current supplied may be varied.

The operation of this apparatus is as already explained.

What I claim is—

1. The method of separating rock and like material, consisting in confining a non-explosive electrical conducting body within the mass of material to be acted upon, passing an electric current through said confined body, and thereby causing disruption of the material by the expansion of the confined body without exploding the same, substantially as set forth.

2. The method of separating rock and like material, which consists in boring a hole therein, placing in said hole an electrical conducting material, tamping the hole above said material, and passing an electric current through such material, so that the same is made to expand and to disrupt the rock by such expansion, substantially as set forth.

3. The method of separating rock and like material, which consists in boring a hole therein, placing in said hole an electrical conducting material of high resistance, tamping the hole above said material, and passing an electric current through such material, so that the same is made to expand and to disrupt the rock by such expansion, substantially as set forth.

4. The method of separating rock and like material, which consists in boring a hole

therein, placing in said hole an electrical conducting material of high resistance, inserting in said material the ends of electrical conductors, filling the hole with tamping material,  
5 so as to separate said conductors, and passing an electric current through said conductors, substantially as set forth.

This specification signed and witnessed this 11th day of January, 1888.

MONTGOMERY WADDELL.

Witnesses:

WILLIAM PELZER,  
E. C. ROWLAND.