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METHOD OF AND APPARATUS FOR OBTAINING DISRUPTIVE EFFECTS

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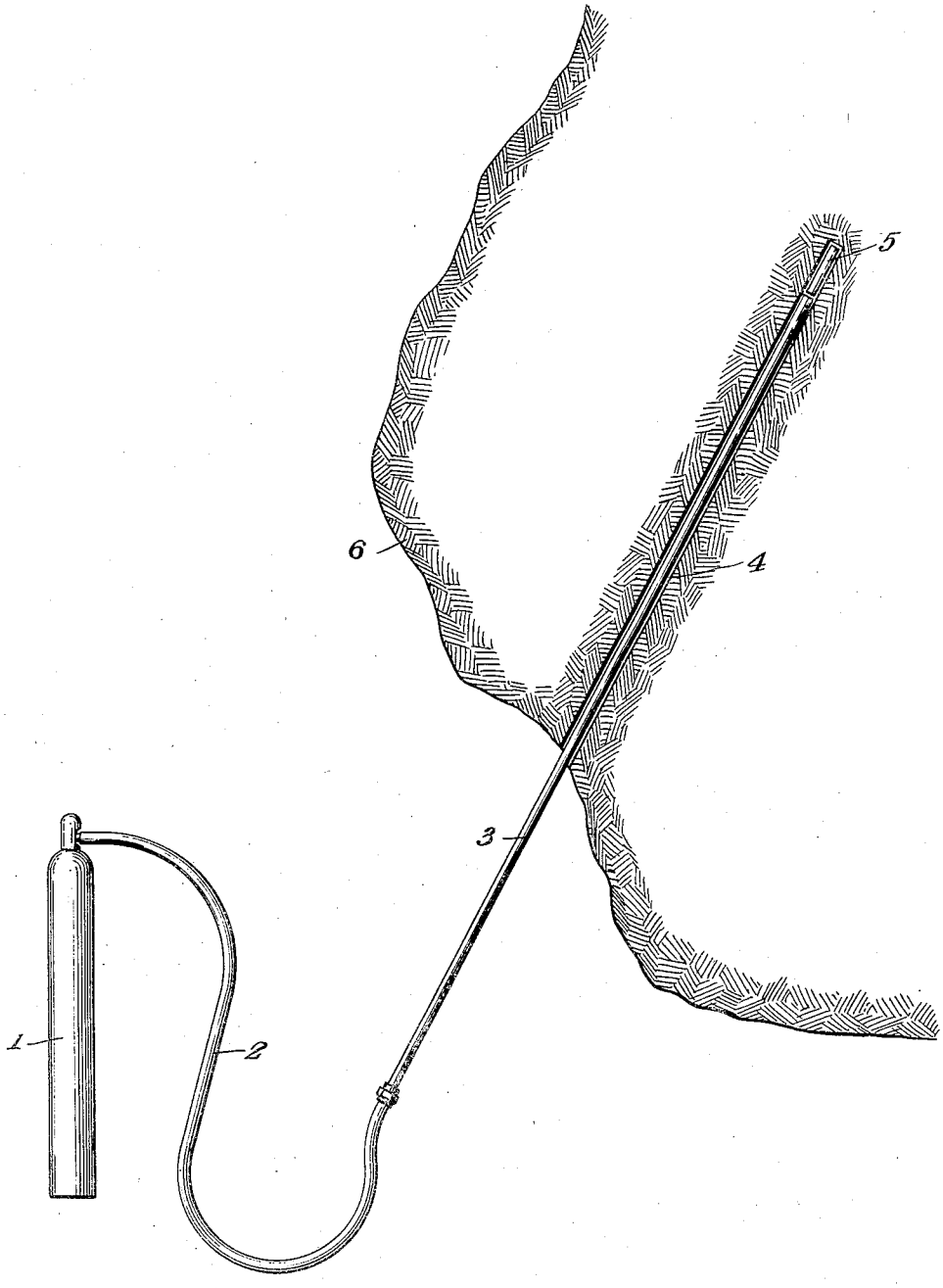

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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR OBTAINING DISRUPTIVE EFFECTS.

Continuation of application Serial No. 78,257, filed December 30, 1925. This application filed February 11, 1927. Serial No. 168,248.

This invention relates to a method of and an apparatus for disrupting or breaking down bodies of noninflammable matter, rock and similar substances without employing any so called "blasting" or "explosive" means for bringing about the desired end. This application is filed in place of our forfeited application, Serial No. 78,257, filed December 30, 1925.

In many instances, conditions are such that the shock of an "explosion" or "blast" must be avoided because of surrounding buildings or topographical conditions, and as our method and apparatus provide for a complete disruption in a very quick and efficient manner, without any explosion, shock or blast, they may be employed in large cities in disrupting rock in laying foundations and equally well in the country or on farms where explosion shocks might cause damage to surrounding buildings.

We are aware of the patents which have been issued covering the employment of electrical currents, liquid air, caustic lime, etc., for the general purpose of disruption of the nature referred to, but we disclose and claim herein a method and apparatus of an entirely different nature, in which the combined use of pure industrial or commercial oxygen, and the hereinafter described structural parts and process steps, accomplish a much greater and more effective disruption in a materially decreased period of time, and at a cost greatly below that of the previously known methods and apparatus.

In actual practice, we have demonstrated that in a few moments of time a huge boulder, exceeding a ton in weight, could be reduced to protable fragments, without any explosive jar or noise, and at a trifling expense.

Other details and advantages appear in the following specification, and are shown in the drawings, in which the figure shows a boulder or rock with a hole drilled therein and the oxygen lance inserted after the free end has been heated and just prior to the turning on of the oxygen.

In the said drawing the numeral 1 indicates an oxygen cylinder of the usual commercial type, to the head of which a flexible tube 2 of rubber or similar material is secured, the free end of this tube being connected to the oxygen lance 3. This lance, as shown, consists of a light gauge steel tube adapted to be inserted in the hole 4 drilled in the rock 6. We have also found it desirable in some cases to use, as an accelerator, a bolt 5 or similar article of steel or other material which would fuse and serve to aid in the disruption.

The operation of this method and apparatus is simple and easy of performance, as the latter is light in weight and can be transported with ease to the point where it is to be used. The hole 4 in the material is bored or drilled in the usual way and the bolt 5 is inserted therein. The free end of the lance 3 is then heated, the oxygen is turned on from the cylinder 1 and the said free end of the lance is inserted in the drilled hole 4.

The heat generated by the fusing of the bolt 5 and the steel lance 3 produces an expansion which gradually disrupts the material 6 in a slow but certain manner without any explosion or jar.

In this procedure the bolt 5 and the lance 3 are entirely consumed and as is obvious, if it is necessary the lance 3 may be gradually introduced into the drilled hole 4 as the free end is fused.

We do not wish to limit ourselves strictly to the preferred embodiment of our invention shown herein. The flexible tube 2 connecting the oxygen cylinder 1 and the lance 3 is not absolutely necessary as it is employed merely to facilitate and make easy the manipulation of the lance, and in addition, there are several other substitutes for steel as a material for the bolt and lance which could be utilized.

From the foregoing it will be obvious that this method, while simple and inexpensive, is highly efficient and superior to those hitherto employed. While oxygen will not burn, it is the greatest known supporter of combustion and for this reason our employment of the heated lance and the accelerator referred to, if desired, are positive and speedy in their action.

The older methods because of their costliness, difficulties of transportation, and likelihood of causing injury if carelessly handled lacked much of the efficiency disclosed herein.

We claim:—

1. The method of disrupting rock or similar material which consists in confining a non-explosive fusible body in the material to be acted upon and supplying oxygen thereto and thereby causing disruption of the material by expansion without explosion.

2. The method of disrupting rock or similar material which consists in drilling a channel in the material to be acted upon, inserting into the channel a heated fusible non-explosive oxygen lance, and supplying oxygen thereto, thereby causing disruption of the material by expansion without explosion.

3. The method of disrupting rock or similar material which consists in drilling a channel in the material to be acted upon, inserting into the channel an oxygen carrier heated at one end, and supplying oxygen to the said heated end of the carrier, thereby causing disruption of the material by expansion without explosion.

4. In an apparatus for the disruption of rock or similar material, a source of oxygen supply, and means connected therewith for the conveyance of oxygen to the interior of the material to be acted upon and comprising a fusible non-explosive oxygen lance adapted to be heated at its free end, whereby the said material may be disrupted by expansion without explosion.

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