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WELL SHOOTING APPARATUS

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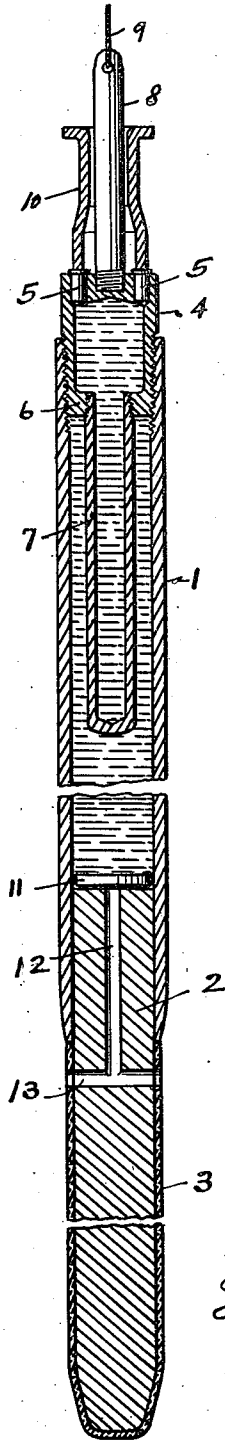


Fig. 1.

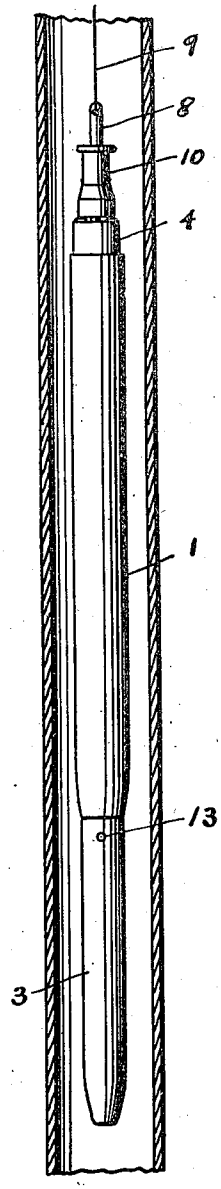


Fig. 2.

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WELL SHOOTING APPARATUS

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4 Claims. (Cl. 102—4)

This invention relates to a well shooting apparatus.

An object of the invention is to provide an apparatus of the character described designed to be lowered into a pipe in a well and containing an explosive charge with means for exploding the charge to cause the separation of the surrounding pipe whereby the upper portion of the pipe may be withdrawn from the well.

A further object of the invention is to provide an apparatus of the type referred to wherein provision is made for exposing the main charge to the pressure of the surrounding fluid in the well whereby the pressure will be equalized on the outside and inside of the jacket enclosing the main charge, to the end that the jacket will not be collapsed by outside pressure.

It often happens that a pipe becomes stuck in a well and cannot be withdrawn and in such case it is common practice to "shoot" the pipe, that is, to lower an explosive charge into the pipe and to explode the same at, or immediately above, the point where the pipe is stuck so that the shot off portion of the pipe in the well may be withdrawn and saved. It is an object of the invention to provide an apparatus to accomplish this purpose.

A still further object of the invention is to provide an apparatus of the character described having a cylindrical jacket to contain the main explosive charge and so constructed that the charge will be exposed to the pressure of the surrounding fluid in the well, with a primer charge completely enclosed and with percussion means for exploding the primer charge, whereby the main charge will also be exploded.

With the above and other objects in view, the invention has particular relation to certain novel features of construction, arrangement of parts, and use, an example of which is given in this specification and illustrated in the accompanying drawing, wherein:—

Figure 1 shows a longitudinal sectional view of the apparatus, and

Figure 2 shows a side elevation thereof shown located in a well pipe.

Referring now more particularly to the drawing, wherein like numerals of reference designate the same parts in each of the figures, the numeral 1 designates a cylindrical jacket preferably formed of brass, or other non-magnetic material. Attached to the lower end of this jacket there is an elongated weight 2 which may be formed of steel or iron, or other heavy metal, and which should be surrounded with a non-magnetic cover 3 so that when the apparatus is lowered into the well, it will not be held by magnetic influence against the wall of the pipe, as sometimes happens.

Attached to the upper end of the jacket and preferably threaded into said upper end, there is a cap 4 whose upper end is closed and is provided with one or more percussion cartridges 5. The lower end of this cap is inwardly thickened forming an internal flange 6 into which the upper end of the tubular shell 7 is screwed. The lower end of this shell is closed and the shell and cap, prior to their assembly, are filled with an explosive primer charge of nitroglycerin, or other suitable explosive.

Attached to the cap 4 and upstanding therefrom, there is a guide 8 to which a flexible line 9 may be attached for lowering the apparatus into the well pipe.

Supported on the cartridge 5 and around the guide 8, there is a tubular impact member such as 10. Within the jacket 10 at the lower end thereof, there is a disk-like plunger 11, and leading downwardly from the upper end of the weight there is a bore or channel 12 whose lower end is connected into a cross-bore 13 through said weight. As the apparatus is lowered into the well through the fluid therein, the pressure of the fluid surrounding the apparatus, and the pressure against the plunger 11 and the contents of the jacket will be equalized so that there will be no danger of the jacket collapsing due to external pressure against it as would be liable to occur in case the jacket 1 were closed to the outside pressure and the apparatus lowered into the deep well filled, or substantially filled, with drilling fluid.

This pressure is not liable to cause the shell 7 to collapse owing to the fact that it is of small diameter and will therefore stand great external pressure.

When the apparatus has been lowered to the desired point, a section of pipe of the required weight, and previously held at the ground surface for the purpose, may be released and dropped over the line 9, and this will strike the upper end of the impact member 10 causing the explosion of the cartridge 5 which, in turn, will explode the primer charge and the main charge will thereby be also exploded and the surrounding pipe separated for withdrawal.

The apparatus will be destroyed by the explosion, but the line 9 may be withdrawn for further use.

The drawing and description disclose what is

now considered to be a preferred form of invention by way of illustration only, while the broad principle of the invention will be defined by the appended claims.

What we claim is:

1. A well shooting apparatus comprising an outer jacket having an explosive charge therein approximately filling the jacket, said jacket having a passageway through which the pressure of the fluid surrounding the jacket may be exerted against said charge to equalize the pressures inside and outside the jacket, means for excluding the liquid from direct contact with the charge and means for exploding said charge.

2. A well shooting apparatus comprising a jacket having an explosive charge approximately filling the jacket, means closing one end of the jacket, means at the closed end of the jacket for exploding said charge, said jacket having a passageway through which the pressure of the drilling fluid against the outside of the jacket may be exerted also against the contents of the jacket whereby the said pressures will be equalized and means for preventing contact of the liquid with the charge.

3. A well shooting apparatus comprising an outer jacket closed at its upper end, a weight closing the lower end of and extended beneath the jacket, a non-magnetic covering for the weight, a main explosive charge in the jacket, said apparatus having a passageway whereby the pressure of the drilling fluid on the outside of the jacket may be exerted against the explosive charge to equalize the pressure on the outside and inside of the jacket, a shield within and spaced from the jacket and containing a primer charge and closed to the influence of said pressure and means for exploding said primer charge.

4. A well shooting apparatus comprising a jacket, a weight at the lower end thereof having a passageway therethrough terminating within the jacket, a plunger in the jacket above the plunger, a shell anchored to and extended within the jacket and containing a primer charge of explosive, a percussion cartridge for exploding the primer charge and means for exploding the cartridge.

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