R. C. HILL.

ELECTROHYDRAULIC GUN.

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1,167,178.

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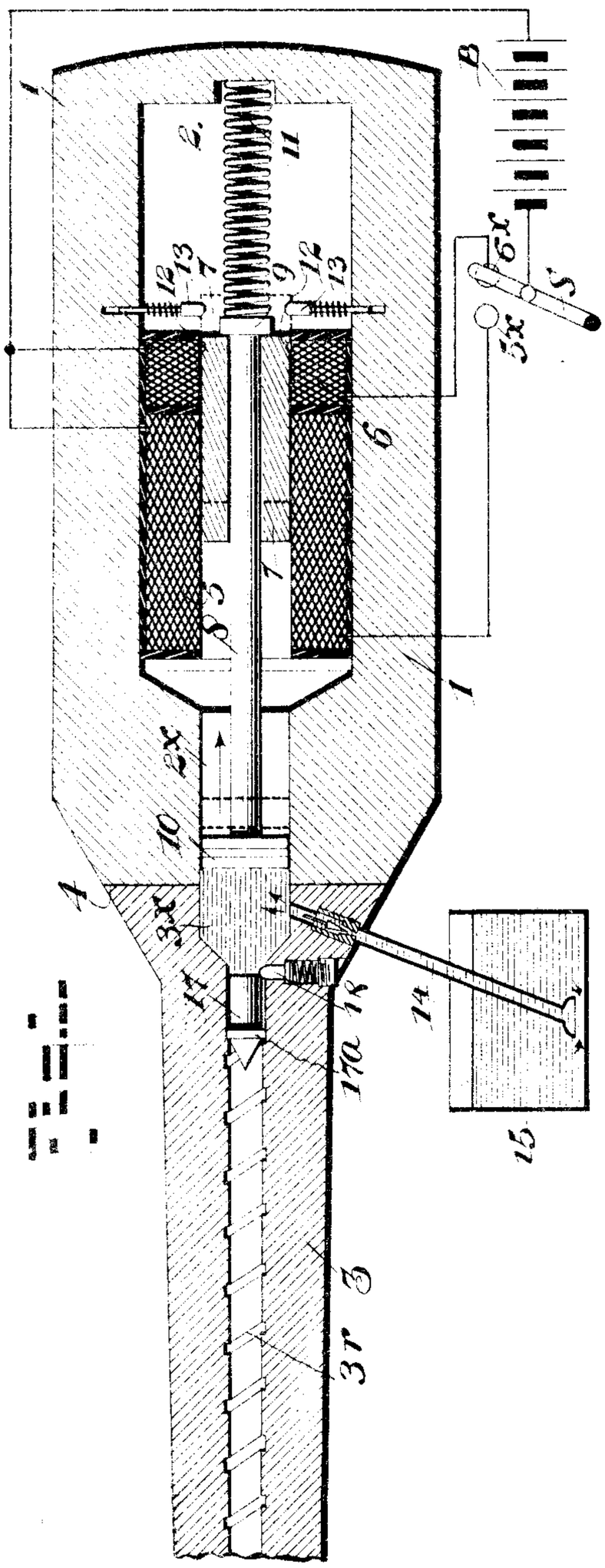

FIG. 1.

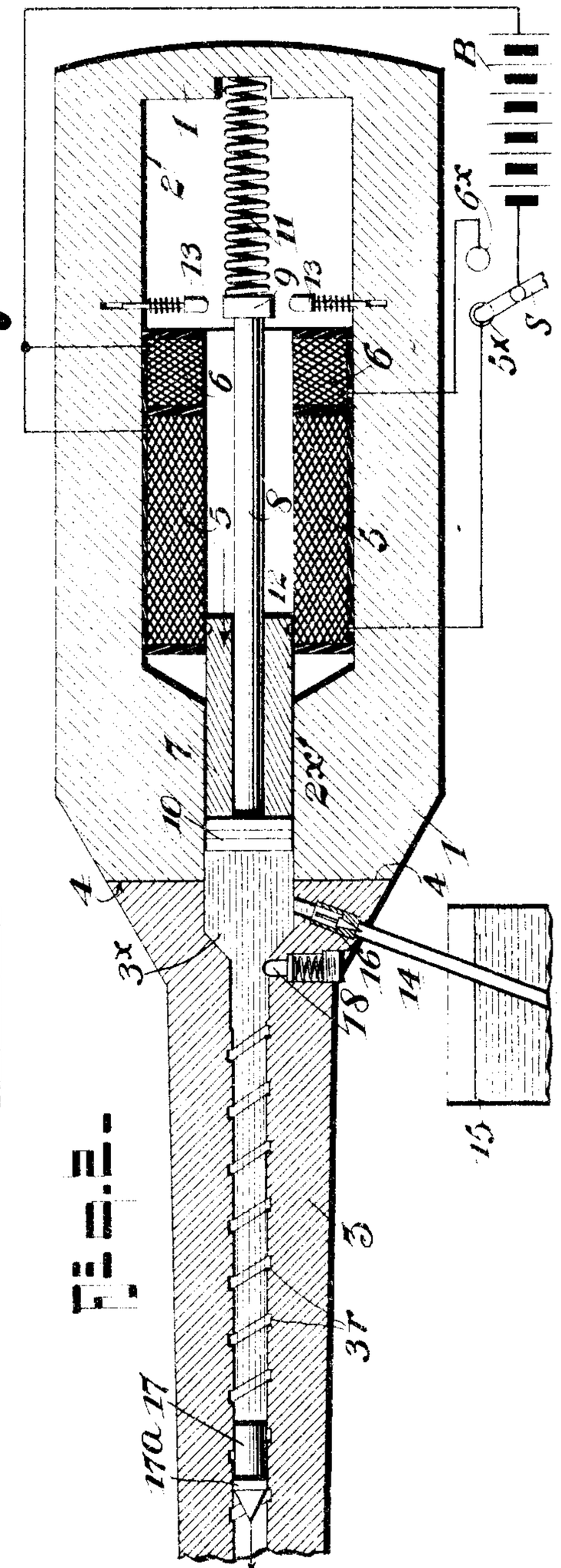

FIG. 2.

WITNESSES:

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ELECTROHYDRAULIC GUN.

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To all whom it may concern:

Be it known that I, ROLLIE C. HILL, a citizen of the United States, and a resident of Memphis, in the county of Shelby and State of Tennessee, have invented a certain new and useful Improvement in Electrohydraulic Guns, of which the following is a specifieation.

My invention relates to improvements in electro-hydraulic guns, and it consists in the combinations, constructions, and arrangements herein described and claimed.

An object of my invention is to provide a gun whose action is effected jointly by means of electricity and hydraulics.

A further object of my invention is to provide a gun which may be operated without the necessity of using an explosive charge.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming part of this application, in which—

Figure 1 is a section through the device showing the parts in one position, and Fig. 2 is a similar section showing the parts in another position.

In carrying out my invention I provide a casing 1 having a chamber 2. A barrel 3 is hinged at the part 4 to the casing so that the latter may be "unbreeched" to permit the placing of the projectile in the barrel.

As will be seen from the drawings the chamber 2 consists of a cylindrical bore. Within this bore are disposed two solenoids 5 and 6 respectively. These solenoids are provided with a common core 7 which is slidable longitudinally upon a rod or stem 8. The movement of the core 7 upon the rod 8 is limited by a head 9 attached to the rod 8 at one end and by a piston or plunger 10 attached to the other end. In order to cushion the impact of the solenoid core 7 upon the head 9, a spring 11 is disposed between the head and the end of the casing 1, whereby the inertia of the moving parts is taken up. It will be observed that the core 7 is provided with recesses 12 into which the spring actuated detents 13 may enter as shown in dotted lines in Fig. 1 when the core 7 of the solenoid has been retracted far enough.

At 2^{x} I have shown a reduced bore in which the piston 10 plays. This bore has a registering bore 3^{x} in the barrel 3. The latter bore communicates by means of a tube 14 with a tank of liquid 15, a check valve 16 being disposed in the tube 14.

The barrel 3 is rifled as shown at 3^{r}. The projectile 17 is provided with a soft metal ring 17^{a} which engages the rifling 3^{r}. A spring pressed stop member 18 is arranged to enter behind the projectile so as to hold the latter in position even if the gun is raised to quite an elevation.

A battery B or other suitable source of electric current is connected on one side to a switch S and on the other to the terminals of the solenoids 5 and 6. The opposite terminals of the solenoids are connected to the contacts 5^{x} and 6^{x} respectively.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. As will be seen from Fig. 1 the switch S is on the contact 6^{x}. Current is now flowing through the solenoid 6. This tends to attract the core 7 and to move it rearwardly. When the core engages the head 9 it moves the piston 10 in the direction shown by the arrow, thereby drawing liquid into the registering bores 3^{x} and 2^{x}, the projectile 17 having previously been placed in position by unbreeching the gun at 4 and then closing it.

The gun is fired by shifting the switch handle to the contact 5^{x}, whereupon the solenoid 5 will become energized, and the solenoid 6 deënergized. This will cause the core to be propelled in the opposite direction and striking the piston 10 will force the liquid and hence the projectile with it, out through the barrel, in the manner shown in Fig. 2. The check valve 16 will of course close, but will open when the piston is again retracted.

I claim:—

1. In a gun, a casing, a barrel connected therewith and arranged to receive a projectile, and electro-magnetic means disposed within the casing for drawing into the gun behind the projectile a propelling liquid.

2. In a gun, a casing, a barrel connected therewith and arranged to receive a projectile, electro-magnetic means disposed within the casing f drawing into the gun behind the projectile a propelling liquid, and for forcing said liquid in the direction of the projectile whereby the latter is projected.

3. In a gun, a casing, a barrel hingedly

connected therewith and arranged to receive a projectile, said casing and said barrel having registering bores, a receptacle having a liquid, means for establishing communication between said receptacle and the registering bores, a piston disposed in one of said registering bores, a pair of solenoids, and a common core for said solenoids arranged to engage said piston in its movement in one direction to force the latter against the liquid and to retract the piston in its movement in the other direction.

4. In a gun, a casing having a bore, a pair of solenoids disposed within said bore, a common core for said solenoids, a piston rod passing through said core and provided with a head at one end and having a piston at the other, said casing having a reduced bore, a barrel hingedly connected with said casing and having a bore arranged to register with said reduced bore, and a smaller bore for a projectile, a receptacle for a liquid, means connecting said receptacle with the registering bores, and means for energizing said solenoids independently.

5. In a gun, a casing having a bore, a pair of solenoids disposed within said bore, a common core for said solenoids, a piston rod passing through said core and provided with a head at one end and having a piston at the other, said casing having a reduced bore, a barrel hingedly connected with said casing and having a bore arranged to register with said reduced bore and a smaller bore for a projectile, a receptacle for a liquid, a pipe for establishing communication between said receptacle and said registering bores, a check valve in said pipe, and means for energizing said solenoids independently.

6. In a gun, a casing having a bore, a pair of solenoids disposed within said bore, a common core for said solenoids, a piston rod passing through said core and provided with a head at one end and having a piston at the other, said casing having a reduced bore, a barrel hingedly connected with said casing and having a bore arranged to register with said reduced bore and a smaller bore for a projectile, a receptacle for a liquid, a pipe for establishing communication between said receptacle and said registering bores, a check valve in said pipe, means for energizing said solenoids independently, means for retaining said core in a retracted position, and means for retaining the projectile in position prior to its ejection.

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Witnesses:

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