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 MEANS FOR CLEARING SERVICE PIPES OR EJECTING LIQUIDS.
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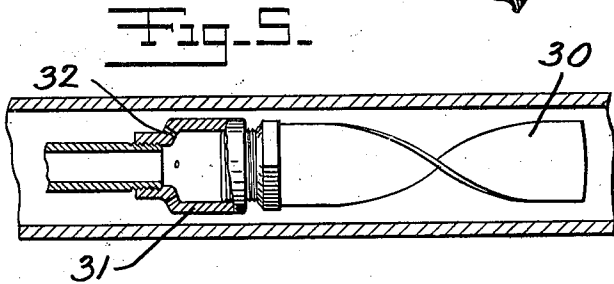
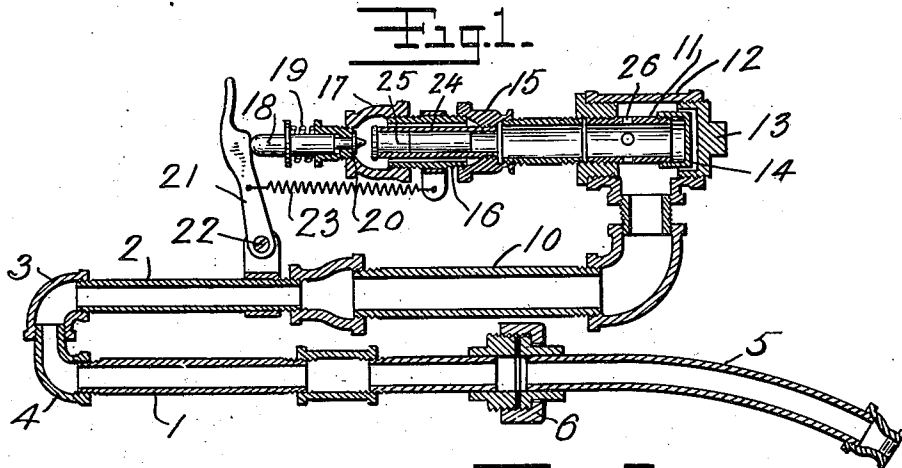


Fig. 3. Fig. 4.

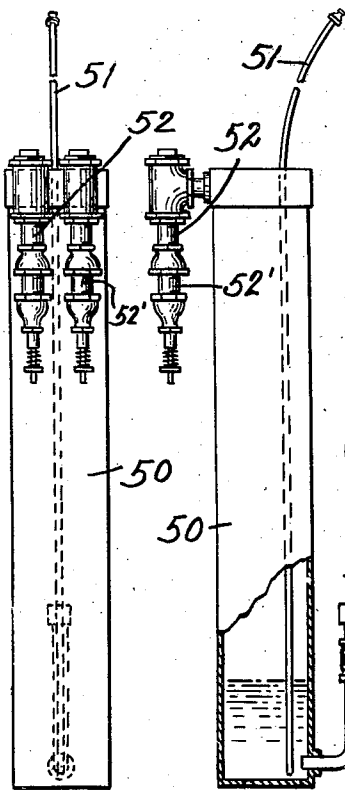


Fig. 2.

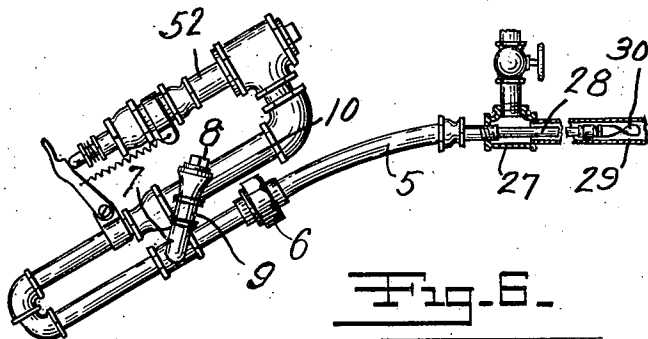


Fig. 6.

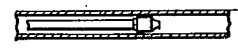
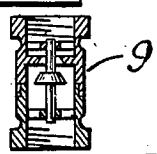


Fig. 7.



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MEANS FOR CLEARING SERVICE-PIPES OR EJECTING LIQUIDS.

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To all whom it may concern:

Be it known that I, RICHARD L. DEZENDORF, a citizen of the United States, residing at Richmond Hill, county of Queens, State of New York, have invented a certain new and useful Improvement in Means for Clearing Service-Pipes or Ejecting Liquids, of which the following is a full, clear, and exact description.

My invention relates to means for clearing service pipes or for ejecting liquid and has for its object to provide a simple and effective means for ejecting from a container gas or liquid at a high pressure by the ignition of an explosive charge. It further has for its object to provide a combustion chamber for the consumption of the ignited charge and a simple breech mechanism removable for inserting the charge.

The following is a description of an embodiment of my invention, reference being had to the accompanying drawings, in which—

Figure 1 shows a section of an apparatus embodying my invention;

Fig. 2 shows the same being used to clear the service pipe of a gas system;

Fig. 3 is a front elevation, and Fig. 4 a side elevation of a modification of my apparatus;

Fig. 5 shows an improved nozzle and chisel forming part of my invention and within a service pipe;

Fig. 6 is a detail of an ordinary nozzle which may be used in my apparatus, and

Fig. 7 is a detail of a check valve used in embodying my invention in its preferred form.

Referring more particularly to the drawings, 1, 2 are two pipe sections connected together by couplings 3 and 4 so as to form a U-shaped chamber for containing liquid. 5 is a discharge pipe leading therefrom having thereon a union coupling 6 so as to permit the chamber formed by the parts 1 to 4 and the pressure-producing devices carried thereby to be angularly adjusted relatively to the part 5, as may be necessary when the device is used in cramped places. 7 is a filling pipe having a plug or stopper 8 and a normally open check valve 9 adapted to close so as to prevent the passage of liquid when the pressure in the liquid container suddenly rises and the plug 8 by any chance is not inserted. Connected to the liquid container by an enlarged section 10, constitut-

ing an expansion chamber, and suitable couplings is a combustion chamber 11 held within a housing 12 which is closed by a plug 13. This combustion chamber has on its outer end a cap 14 which can be removed for cleansing purposes upon the removal of the plug 13. Connected to the lower end of the explosion chamber is a coupling 15 to which is secured a housing 16 on the lower end of which is screwed a breech block 17 carrying a firing pin 18 normally pressed outward by a spring 19, its outward movement being limited by a flange 20. 21 is a firing hammer pivoted at 22 and actuated by a spring 23 so that by pulling backward the hammer and releasing it a blow is delivered to the firing pin. In advance of the firing pin is a cartridge holding chamber 24 screwed into the coupling 15 and adapted to receive a cartridge 25 which is adapted to be discharged by the action of hammer 21 upon the firing pin 18. The cartridge contains at its rear end a firing charge powder and in its front end a roll of nitro-cellulose which, from its character, burns comparatively slowly but sufficiently rapid to quickly produce a large volume of gas under pressure, which is relied upon for ejecting the liquid. The combustion chamber is provided with orifices 26 somewhat removed from its upper end. When the cartridge is discharged the nitro-cellulose lodges in the upper end of the combustion chamber and having been ignited by the powder charge continues to burn, the gases being discharged through the ports 26 and passing to the liquid container. These gases produce a heavy pressure upon the top of the liquid in the container formed by the parts to 4 and eject that liquid at a rapid rate through the nozzle 5.

When the device is used to clean service pipes it is connected to the head 27 of a service connection, as shown in Fig. 2, a tubular extension 28 being provided which extends for a considerable distance into the service pipe 29 until it reaches the obstruction therein. If the obstruction is such that it can not be blown forward the nozzle shown in Fig. 5 is used, which is provided with a chisel 30, whereby the obstruction can, if necessary, be broken up to some extent and worked backward until some portion of it is behind the rearwardly discharging nozzle 31. This rearwardly discharging nozzle is provided with rearwardly opening

orifices 32, which, when the liquid discharged through the pipe 5 discharges backwardly through the openings 32, tends to carry the dislodged material back toward the head 27 of the service pipe. With this arrangement by using one or more discharges of liquid from the liquid container accumulations in the service pipe can be forced back to the head 27 and removed therefrom.

10 When the obstruction is of such a nature that it can be blown forward into the main, an ordinary nozzle such as indicated in Fig. 6 is used, discharging at its forward end, by which a charge passing through the pipe 15 5 can be caused to blow the obstruction from the service pipe into the main.

In the modification shown in Figs. 3 and 4 an apparatus is shown in which one explosive charge can be followed by another at a proper interval, thus enabling the pressure upon the surface of the liquid to be restored or increased after the pressure due to the first explosion has become reduced. In this modification 50 is the container having 25 a discharge pipe 51 leading to the bottom thereof so that its lower end is below the liquid to be discharged; 52, 52' are two cartridge receiving and firing devices such as shown in Figs. 1 and 2; 53 is a sealing cap and 54 is a check valve such as shown at 30 9 and in Fig. 7. These devices are connected to the liquid container 50 and, if not provided with discharging hammers similar to 21 for actuating their firing pins, the firing 35 pins may be actuated by an ordinary hammer or mallet of suitable size. This form is adapted to discharge a larger quantity of liquid.

The apparatus shown in Figs. 1 and 2 can 40 be used without a liquid for clearing out some stoppages in service pipes, the pressure and heat of the gas developed being sufficient for that purpose. Where liquid is not used the liquid container is not necessary. 45

The cartridge chamber 24 extends outward so that when the breech 17 is removed the cartridge shell is accessible and easily removed.

50 When used for clearing service pipes the liquid used in the container is preferably alcohol or kerosene or a mixture depending on conditions. When used for ejecting a flaming stream of liquid, known as liquid 55 fire, alcohol or other suitable inflammable liquid is used.

As will be evident to those skilled in the art, my invention permits of various modifications without departing from the spirit 60 thereof or the scope of the appended claims.

What I claim is:

1. In an apparatus for ejecting liquids, the combination of a container, a discharge pipe leading therefrom, an explosion cham-

ber connected to the upper portion of said 65 container, and means for igniting an explosive charge within said explosion chamber.

2. In an apparatus for ejecting liquids, the combination of a container, a discharge 70 pipe leading therefrom, an explosion chamber connected to the upper portion of said container, means for igniting an explosive charge within said explosion chamber, and a combustion chamber in line with said explosion chamber. 75

3. In an apparatus for ejecting liquids, the combination of a container, a discharge pipe leading therefrom, an explosion chamber connected to the upper portion of said 80 container, means for igniting an explosive charge within said explosion chamber, said explosion chamber being adapted to hold a cartridge, a breech block removable for the insertion of said cartridge, and a firing pin 85 in said breech block.

4. In an apparatus for ejecting liquids, the combination of a container, a discharge pipe leading therefrom, an explosion chamber connected to the upper portion of said 90 container, means for igniting an explosive charge within said explosion chamber, a filling tube for introducing liquid into said container, and a check valve in said filling tube. 95

5. In an apparatus for ejecting liquids, the combination of a container, a discharge pipe leading therefrom, a plurality of explosion chambers connected to the upper portion of said container, and means for igniting 10 explosive charges in said chambers one after the other.

6. In an apparatus for ejecting liquids, the combination of a container, a discharge 10 pipe leading therefrom, an explosion chamber connected to the upper portion of said container, means for igniting an explosive charge within said explosion chamber, an extension connected to said discharge pipe and adapted to enter a gas service pipe, and a 11 rearwardly discharging nozzle on the end of said extension.

7. An apparatus for clearing service pipes comprising an explosion chamber, means for firing a charge therein, and means for connecting 11 the explosion chamber to the service pipe to be cleared, said means comprising an expansion chamber.

8. An apparatus for clearing service pipes comprising an explosion chamber, means for firing a charge therein, means for connecting 12 the explosion chamber to the service pipe to be cleared comprising a discharge pipe and an extension from said pipe adapted to be inserted into the service pipe so as to discharge at a point adjacent to the stoppage. 12

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