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SELF ENERGIZING FLUID RELEASE DEVICE

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FIG. 1

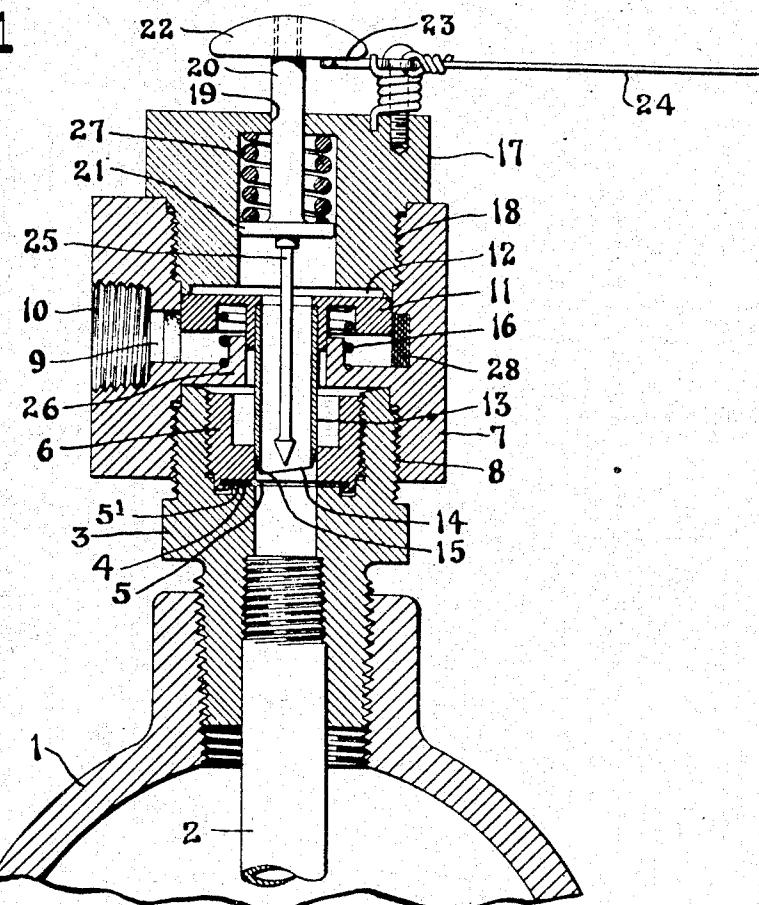
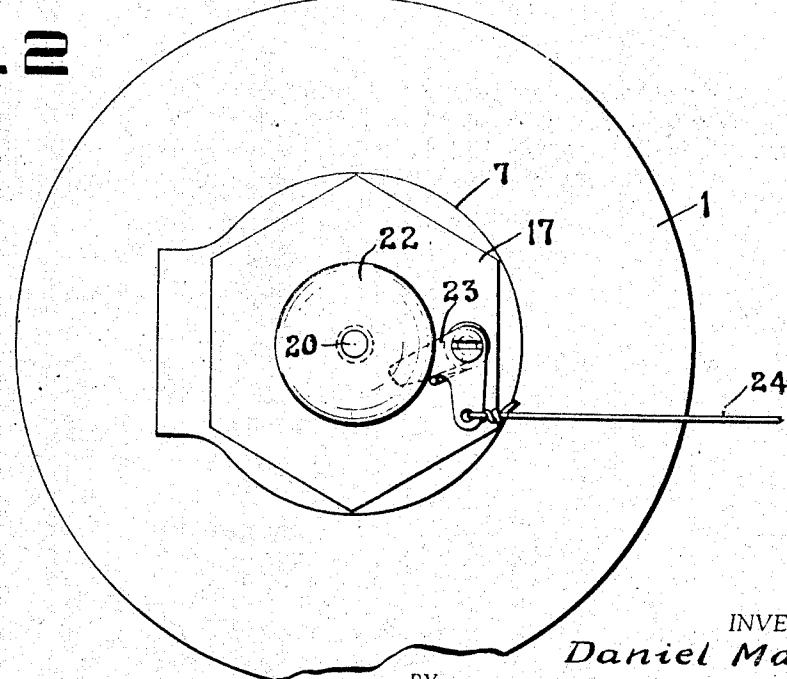


FIG. 2



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## UNITED STATES PATENT OFFICE

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## SELF-ENERGIZING FLUID RELEASE DEVICE

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9 Claims. (Cl. 169—11)

The present invention has been developed with particular reference to the release of carbon dioxide under pressure for the purpose of extinguishing fire, but, as will be readily understood, is capable of application for other purposes. In its broader aspect the invention relates to a device for releasing a fluid medium under pressure normally restrained by a pressure operable main fluid flow controlling member, in which an auxiliary or pilot member is provided to release a portion of the fluid medium under pressure to act on the pressure operable main fluid flow controlling member to thereby actuate the same. In a more limited aspect the invention relates to a device of the type referred to in which a sealing disc is interposed between the fluid under pressure and the delivery passage, which sealing disc, so long as it is intact, prevents release of the fluid, and in which main and auxiliary disc penetrating members are provided, fluid released by the auxiliary disc penetrating member acting on the main penetrating member to actuate the same.

It is already known, in apparatus of the type to which this invention relates, to utilize fluid released by an indefinite and uncontrolled partial operation of a disc penetrating member to act to complete the operation of the penetrating member, but such an apparatus lacks the positiveness and speed of operation so necessary in a fire extinguishing apparatus, and is accordingly unsatisfactory for use where life and property are at stake. This difficulty is overcome by the present invention by the provision of a device embodying independently, separately and positively acting main and auxiliary fluid flow controlling members, so that the necessary speed and certainty of operation are assured.

It is accordingly an object of my invention to provide a fluid releasing device, in which the pressure of fluid positively released from the container is utilized to operate the main fluid release device of the container.

It is a further object of the invention to provide a releasing device in which the main closure opening device of a fluid container is operated by a fluid pressure operated member actuated by fluid initially released from the container by means of a pilot fluid release.

A more specific object of the invention is to provide in connection with a container having an outlet opening normally closed by a penetrable closure member, a penetrating member to open said closure, a fluid pressure actuated piston for operating the penetrating member to open the closure member, and a pilot closure puncturing member to initially release fluid from the container to actuate the piston.

Other objects and advantages of the invention will become apparent as the more detailed description of the invention proceeds.

The invention will now be more fully explained with reference to the accompanying drawing, wherein:

Figure 1 is a vertical sectional view of my fluid medium release device as applied to a high pressure fluid container, while

Figure 2 is a top plan view of the same device. In Figure 1, 1 is a fluid pressure container for carbon dioxide of conventional design whose outlet is closed by a coupling member 3. A discharge syphon pipe 2 extending almost to the bottom of the container is threaded into coupling 3. This coupling is provided with a seat 4 for a sealing disc 5 and gasket 5' secured in position by a thimble 6. Secured to coupling 3, as by a thread 8, is a cylinder 7. This cylinder has a lateral discharge port 9 for the discharge of the fluid with means 10 for connecting to a discharge line not shown here.

Contained and operating within cylinder 7 in chamber 12 is a piston 11. Piston 11 has an axial opening wherein is secured a hollow tubular cutter 13. This hollow cutter is open at its upper end to permit therethrough the passage of any fluid released from the container. Cutter 13 terminates in an edge 14, sharpened and somewhat beveled so that a portion 15 will contact the disc in advance of the rest of the cutter edge. Piston 11 and with it cutter 13 are normally held in the upper end of chamber 12 by a light spring 16 disposed intermediate the nether side of piston 11 and bottom wall 26 of cylinder 7. A cap 17 is threaded secured to cylinder 7 at 18 forming a closure for chamber 12. Through a hole and a recess therein, 19, passes a stem 20 with a collar 21 against which bears an actuating compression spring 27, disposed in recess 19. Stem 20 on the outside of cap 17 has a knob 22, which in its unactuated position is supported by a pivoted bell-crank lever 23, which support may rotatively be removed by means of pull cable 24 attached to lever 23.

Attached to stem 20 is the harpoon-type pilot cutter 25 movable within hollow cutter 13. At 28 is shown a packing ring arranged in a corresponding recess in chamber 12, with an opening corresponding to port 9, which permits of an efficient utilization by piston 11 of any fluid pressure acting upon it in the upper part of chamber 12. It is, of course, understood that the relative disposition of the pilot cutter with respect to main cutter 13 and its specific form are here given in the illustrative sense only.

In the operation of my invention, a pull on cable 24 withdraws support 23 from knob 22, permitting compression spring 27 to actuate pilot cutter 25 which penetrates disc closure 5. As the harpoon tip of the pilot cutter is larger than its stem, fluid is now able to pass through the annular opening around the pilot cutter stem, 60

through hollow cutter 13 and into chamber 12, where pressure is built up rapidly to depress piston 11 and with it to drive downwardly main cutter 13, which now shears a circular segment 5 out of sealing disc 5, permitting the main body of fluid medium to discharge through port 9 via the hollow cutter 13 and chamber 12.

From the foregoing description, it will be seen that I have provided a quickly and positively 10 acting means for releasing fluid medium under pressure, where only a small initial operating force is required. It will be seen further that my invention accomplishes the various objects pointed out at the beginning of this specification. 15 Finally, while my invention has been illustrated and described with specific reference to the accompanying drawings, it will be apparent to those skilled in the art that the invention resides in certain principles of operation and construction 20 which may be embodied in various other forms of construction without departing in any manner from the spirit and scope of the invention, and I therefore do not wish to be limited to the specific disclosure, but rather to the scope of 25 the appended claims.

I claim:

1. A control device for a fluid medium under pressure comprising a chambered valve body formed with an inlet and an outlet, a sealing member in the valve chamber normally separating said inlet from the outlet, a fluid pressure operated member in the valve chamber, a main seal penetrating member in the valve chamber positioned between the sealing member and the 30 fluid pressure operated member and operable by the fluid pressure operated member, and a pilot seal penetrating member operable to establish a fluid medium conducting path between said inlet and the fluid pressure operated member. 35

40 2. A device for opening a fluid container having an opening, and a frangible closure for the opening, comprising: a main closure cutter, fluid pressure operated means to actuate said cutter, a connection between the container and said 45 means leading from above the frangible closure and allowing fluid released from the container to act on said means, and a pilot puncturing member arranged to puncture said frangible closure.

50 3. A device for opening a fluid container having an opening and a seal for the opening, comprising: a main seal cutter, fluid pressure operated means to actuate said cutter, a connection between the container and said means leading from 55 above the seal through said cutter and allowing fluid released from the container to act on said means, and a pilot puncturing member arranged to puncture said seal.

4. A releasing device for use in connection 59 with a fluid container having an opening and a closure for the opening, comprising: a body forming a chamber, an operating member in said chamber, a puncturing member associated with said operating member, said puncturing member being operable by said operating member to puncture said closure, there being means for utilizing the released fluid to actuate the operating member, and pilot fluid release means to cause the actuation of said operating member by initially releasing a flow of fluid. 65

70 5. A releasing device for use in connection with a fluid container having an opening and a closure for the opening, comprising: a body forming a chamber, an operating member in said chamber, a puncturing member associated with

said operating member, said puncturing member being operable by said operating member to puncture said closure, there being means for utilizing the released fluid to actuate the operating member, and a pilot puncturing member 5 operable to initially release a flow of fluid and cause actuation of the operating member.

6. A releasing device for use in connection with a fluid container having an opening and a closure for the opening, comprising: a body 10 forming a chamber, an operating member in said chamber, a puncturing member associated with said operating member, said puncturing member being operable by said operating member to puncture said closure, there being an opening in 15 said puncturing member located to receive released fluid and pass it to the chamber above the operating member to cause actuation of the operating member, and a pilot puncturing member operable to initially release a flow of fluid and 20 cause actuation of the operating member.

7. A releasing device for use in connection with a fluid container having an opening and a closure for the opening, comprising: a body 25 forming a chamber, an operating member in form of a piston in said chamber, a hollow tubular cutter associated with said piston, said cutter being operable by said piston to puncture said closure, a pilot cutter operable to initially puncture said closure disposed in the hollow cutter, 30 there being a fluid flow conducting path through the hollow cutter and the piston to pass fluid initially released by the pilot cutter to the chamber above the piston to cause actuation of the piston and release of the fluid medium, and 35 means to actuate said pilot cutter.

40 8. A releasing device for use in connection with a fluid container having an opening and a closure for the opening, comprising: a body formed with a chamber, an operating member in the form of a piston in said chamber, a puncturing member associated with said operating member, said puncturing member being operable by said operating member to puncture said closure, there being means for utilizing fluid 45 released from the container to actuate the operating member, an outlet port normally closed off from the space above the operating member and uncovered by movement thereof to release the fluid only after the opening of the closure member has been effectively completed, and pilot fluid release means to cause actuation of said operating member by initially releasing a portion 50 of the fluid from the container.

55 9. A releasing device for use in connection with a fluid container having an opening and a closure for the opening, comprising, a body formed with a chamber, an operating member in the form of a piston in said chamber, a hollow tubular cutter associated with said piston, 60 said cutter being operable by said piston to puncture said closure, a pilot cutter operable to initially puncture said closure disposed in the hollow cutter, there being a fluid conducting path through the hollow cutter and the piston to pass fluid initially released by the pilot cutter to the chamber to cause actuation of the piston and release of the fluid medium, and an outlet port normally closed off from the space above the operating member and uncovered by movement 65 thereof to release the fluid only after the opening of the closure member has been effectively completed. 70