

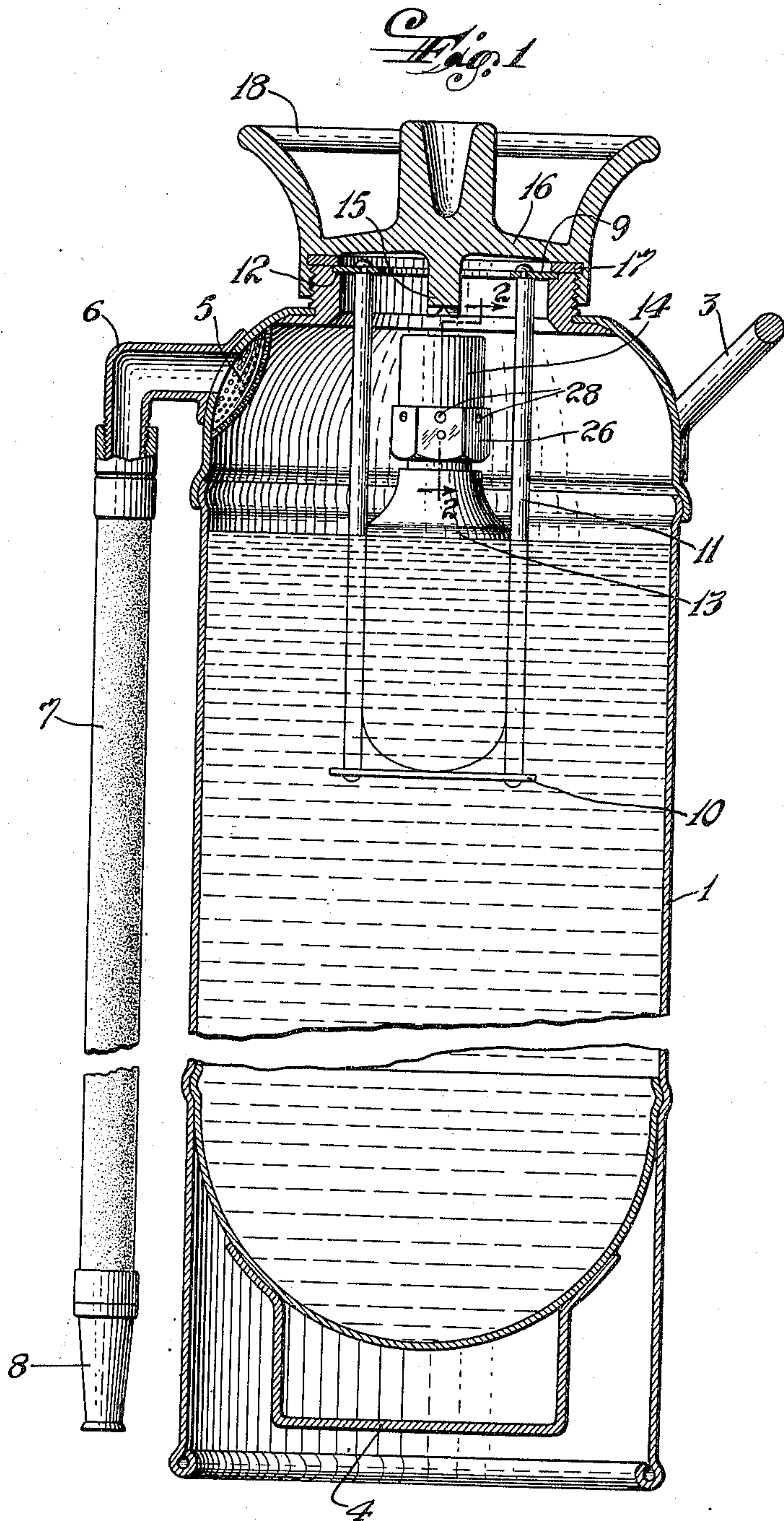
April 10, 1951

Filed March 25, 1947

D. MAPES ET AL
APPARATUS FOR DISCHARGING LIQUID BY
A MEDIUM STORED UNDER PRESSURE

2,547,954

2 Sheets-Sheet 1



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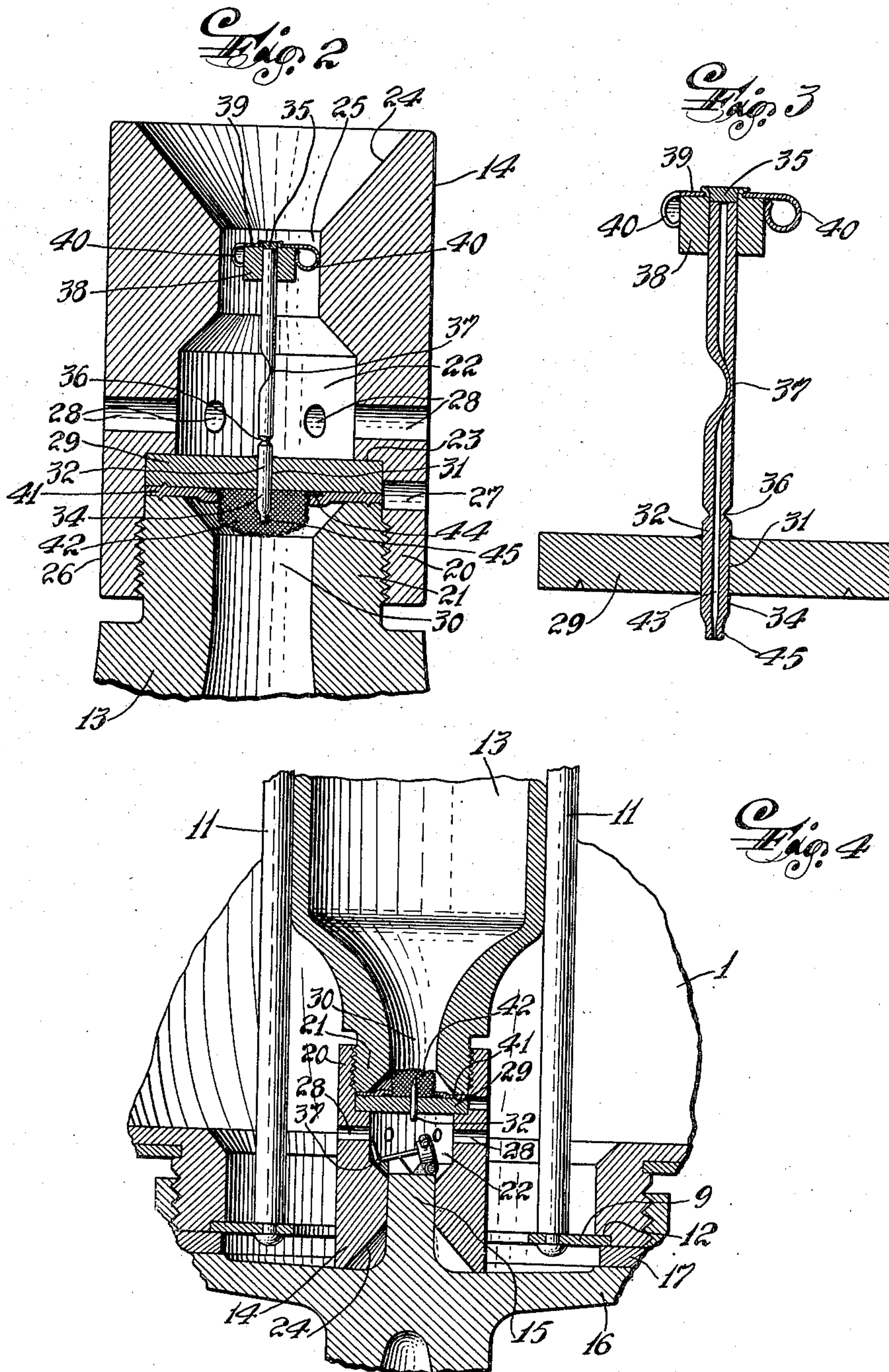
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APPARATUS FOR DISCHARGING LIQUID BY
A MEDIUM STORED UNDER PRESSURE

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13 Claims. (Cl. 169—31)

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The present invention relates to apparatus wherein a liquid stored in a receptacle is discharged therefrom by a medium stored under pressure in a container, such as a cartridge, and more particularly relates to improvements in fire extinguishing apparatus of the type shown in United States Patent No. 2,059,969.

Accordingly, an object of the present invention is to provide an improved apparatus of the aforementioned type.

Another object is to provide a discharge releasing means for such apparatus which is constructed of a minimum number of parts adapted to be manufactured and assembled in an economical manner.

Another object is to provide a discharge releasing means which is reliable in operation and is readily actuated.

A further object is to provide metering means for accurately controlling the flow of pressure medium upon actuation of the releasing means.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawings, forming a part of the specification, wherein:

Figure 1 is a sectional view of a fire extinguisher of the type in which the present invention may be embodied.

Figure 2 is an enlarged sectional view taken along the line 2—2 on Figure 1, illustrating the discharge releasing means in accordance with the invention.

Figure 3 is a sectional view of a portion of the discharge releasing means, illustrating a detail thereof.

Figure 4 is a fragmentary sectional view of the extinguisher shown in Figure 1, illustrating the operation of the discharge releasing means.

Referring to Figure 1 of the drawings, there is shown a standard receptacle or shell 1 for storing a liquid fire extinguishing medium, such as water, calcium chloride solution or other suitable fire extinguishing medium. The receptacle is provided with a handle 3 for carrying the extinguisher in an erect position, another handle 4 for carrying the extinguisher in an inverted position, a strainer 5, an outlet elbow 6, and a stand-

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ard hose 7 coupled to the outlet elbow and having a discharge nozzle 8.

A cage comprising an upper flange 9, a bottom plate 10, and suspension rods 11 is supported upon a shoulder 12 in the neck of the receptacle. The cage in turn serves as guide means and a support for a container or cartridge 13 containing a medium under pressure, such as liquid carbon dioxide, nitrogen or air for propelling the liquid fire extinguishing medium from the shell.

The cartridge is provided with a coupling 14 containing means shown in Figure 2 and described in detail hereinafter for effecting release of the pressure medium from the container 13, the releasing means becoming operative upon inversion and jarring of the receptacle whereby to cause forcible engagement of the releasing means with a projection 15 formed on a cap or closure 16 for the receptacle and extending within the interior of the receptacle.

The cap 16 is threaded to the neck of the receptacle with an intervening gasket 17 which not only effects a fluid pressure-tight joint with the receptacle but secures the flange 9 of the cage against movement. The cap 16 is otherwise standard, being provided with a rim 18 for carrying the extinguisher in an erect position and for effecting rotation of the cap.

As shown in Figure 2, the coupling 14 is provided with a longitudinal bore or passage comprising a threaded lower end portion 20 for securing the coupling member to the threaded neck 21 of the container 13, a chamber 22 above the threaded portion, a shoulder 23 between the chamber and the threaded portion 21, an upwardly and outwardly flared funnel-shaped portion 24 at the upper end adapted to serve as a guide for the projection 15, and a constricted zone 25 between the chamber and the portion 24. The coupling is further provided with a hexagonal lower exterior 26 adapted to be engaged by a wrench or the like to facilitate application and removal of the coupling to and from the container. The coupling also has an aperture 27 in its side wall below the shoulder 23 for charging the container and has a plurality of apertures 28 in the side wall communicating with the chamber 22.

The releasing means referred to herebefore includes closure means such as a disc 29 which is disposed across the neck opening or outlet 30 of the container 13 and is engaged by the shoulder 23 of the coupling to secure the same on the container. The disc has an aperture 31 at the center thereof in which a member formed with a passage

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such as a tube 32 is secured with a fluid pressure leakproof seal.

The tube extends through the disc, and has a lower end 34 in fluid flow communication with the interior of the container and has a closed upper end 35 extending through the constricted zone 25 of the bore. The tube has a weakened zone 36 just above the disc, formed by thinning the wall of the tube at the exterior, and has a flattened zone 37 between its upper end and the weakened zone 36. This flattened zone is offset with respect to the central longitudinal axis of the tube to facilitate bending of the tube when the upper end thereof is subjected to an axial force.

An enlargement in the form of a head or cylindrical member 38 is provided at the upper end of the tube which serves as a target for the projection 15. If desired, a spider 39 is secured to the tube at the upper end which has resilient arms 40 for engaging the walls of the constricted zone 25 of the bore to hold the tube and disc in assembled relation with the coupling prior to application of the latter to the container.

In order to effect a fluid pressure tight seal between the disc 29 and the upper end of the container, an annular sealing washer 41 is placed between the disc and the container.

If desired, a strainer 42 may be provided to protect the passage 43 of the tube. As shown, the strainer is substantially cup-shaped to enclose the lower end of the tube and has a flange 44 disposed between the disc 29 and the washer 41 adjacent the aperture thereof whereby the strainer is retained in assembled relation.

In Figure 3, the passage of the tube at its lower end is illustrated in detail. As shown, the extreme end portion is constricted to form a metering orifice 45 of accurately controllable dimensions adapted to provide a desired low rate of flow of the pressure medium from the container into the receptacle without danger of clogging of the passage due to freezing. Because of its short length, there is not sufficient expansion to lower the temperature of the medium to its freezing temperature.

In operation, when it is desired to discharge the liquid stored in the receptacle, the extinguisher is inverted, is grasped by the handle 4, and is jarred as by striking it on the floor or ground, so as to cause the target or upper end of the tube to forcibly engage the projection 15 and have an end thrust exerted thereon. Such force causes the tube to bend (Figure 4) at the flattened zone 37 and translate the end thrust to a bending force acting on the section of the tube between the flattened zone 37 and the weakened zone 36 to effect rupture of the tube at the zone 36.

Upon breaking of the tube, the fluid medium flows through the metering orifice 45, the passage 43 of the tube, into the chamber 22, and through the apertures 23 into the receptacle to expel the liquid from the latter.

From the foregoing description, it will be seen that the present invention provides an improved fire extinguisher or the like. The discharge means is constructed of a minimum number of parts which are economical to manufacture and are readily assembled. The tube can be easily provided with an accurately dimensioned metering orifice to control the flow of the pressure medium from the container to the receptacle at a desired low rate. The discharge means is reliable in operation because the projection, target

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and guide cooperate to effect positive breaking of the tube with a minimum of effort.

While the present invention has been described in connection with an extinguisher which is inverted to cause the container 13 therein to slide and effect forceful engagement between the projection 15 and the tube 32 to bend and rupture the latter, it will be understood that the container, the coupling 14 and the releasing means associated therewith are adapted to be utilized together with other forms of means constructed and arranged for forcibly engaging the tube to effect bending and rupture thereof.

As various changes may be made in the form, construction and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in any limiting sense.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

We claim:

1. In combination, a container, a member connected to said container provided with a passage having a metering orifice at one end in fluid flow communication with the interior of said container and having its other end closed, said member having a weakened zone intermediate its ends and having a bendable zone intermediate said closed end and said weakened zone.

2. In combination, a container, and a tubular member connected to said container provided with a passage having a metering orifice at one end in fluid flow communication with the interior of said container and having its other end closed, said tubular member having a weakened zone intermediate its ends and having a flattened zone intermediate said closed end and said weakened zone.

3. In combination, a receptacle having guide means and a projection at the interior thereof, a container slidably disposed in said guide means, a frangible member connected to said container provided with a passage having one end in fluid flow communication with the interior of said container and having its other end closed and being positioned adjacent said projection, a target on said member at said closed end adapted to be engaged by said projection, and guide means associated with said container and converging toward said target for guiding said projection into engagement with said target.

4. In combination, a container, a member connected to said container provided with a passage having one end in fluid flow communication with the interior of said container and having its other end closed, said member having a weakened zone intermediate its ends and having a bendable zone intermediate said closed end and said weakened zone, and a target on said member at said closed end.

5. In combination, a receptacle having guide means and a projection at the interior thereof, a container slidably disposed in said guide means, a tubular member connected to said container provided with a passage having a metering orifice at one end in fluid flow communication with the interior of said container and having its other end closed and being positioned adjacent said projection, said tubular member having a weak-

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ened zone intermediate its ends and having a flattened zone intermediate said closed end and said weakened zone, a target on said tubular member at said closed end adapted to be engaged by said projection, and guide means associated with said container for guiding said projection into engagement with said target.

6. In combination, a container having an outlet, closure means for said container having an aperture therein disposed across said outlet, a frangible member having one end thereof in said aperture provided with a passage in fluid flow communication with the interior of said container, and a coupling member having an end constructed for securing said closure means on said container and having a bore for housing said first member provided with an outwardly diverging zone adjacent the end opposite said container.

7. In combination, a container having an outlet; closure means for said container having an aperture therein disposed across said outlet; a frangible member in said aperture provided with a passage having an open end in fluid flow communication with the interior of said container formed with a metering orifice and having a closed end, said member having a weakened zone intermediate its ends and adjacent said passage; and means for securing said closure means on said container.

8. In combination, a container having an outlet, closure means for said container having an aperture therein disposed across said outlet, a frangible member extending through said aperture provided with a passage having one end in fluid flow communication with the interior of said container and a closed end, said member having a weakened zone intermediate its ends and adjacent said passage and having a bendable zone intermediate the other end of said member, and said weakened zone, and means for securing said closure means on said container.

9. In combination, a container having an outlet, closure means for said container having an aperture therein disposed across said outlet, a member extending through said aperture provided with a passage having a metering orifice at one end in fluid flow communication with the interior of said container and a closed end, said member having a weakened zone intermediate its ends and adjacent said passage and having a bendable zone intermediate the other end of said member and said weakened zone, and means for securing said closure means on said container.

10. In combination, a container having an outlet, closure means for said container having an aperture therein disposed across said outlet, a member having one end thereof in said aperture provided with a passage in fluid flow communica-

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tion with the interior of said container, a spider at the other end of said member having resilient arms, and a coupling member for securing said closure means to said container having a bore portion adapted to be engaged by said arms.

11. In combination, a container having an outlet, a disc having an aperture therein disposed across said outlet, an annular sealing washer between said outlet and said disc, a member having one end thereof in said aperture provided with a passage in fluid flow communication with the interior of said container, a strainer adjacent said passage having a flange disposed between said disc and said sealing washer, and means for securing said disc and said sealing washer on said container.

12. In combination, a container having an outlet, a disc having an aperture therein disposed across said outlet, an annular sealing washer between said outlet and said disc, a member having one end thereof in said aperture provided with a passage having a metering orifice at one end in fluid flow communication with the interior of said container, a strainer adjacent said passage orifice having a flange disposed between said disc and said sealing washer, and means for securing said disc and said sealing washer on said container.

13. In combination, a container, and a member connected to said container provided with a passage having a metering orifice at one end in fluid flow communication with the interior of said container and being closed at its other end and having a weakened zone intermediate its ends and having a bendable zone intermediate said closed end and said weakened zone, said closed end of said member being adapted to be forcibly engaged to effect bending thereof at said bendable zone and to rupture of said member at said weakened zone.

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