

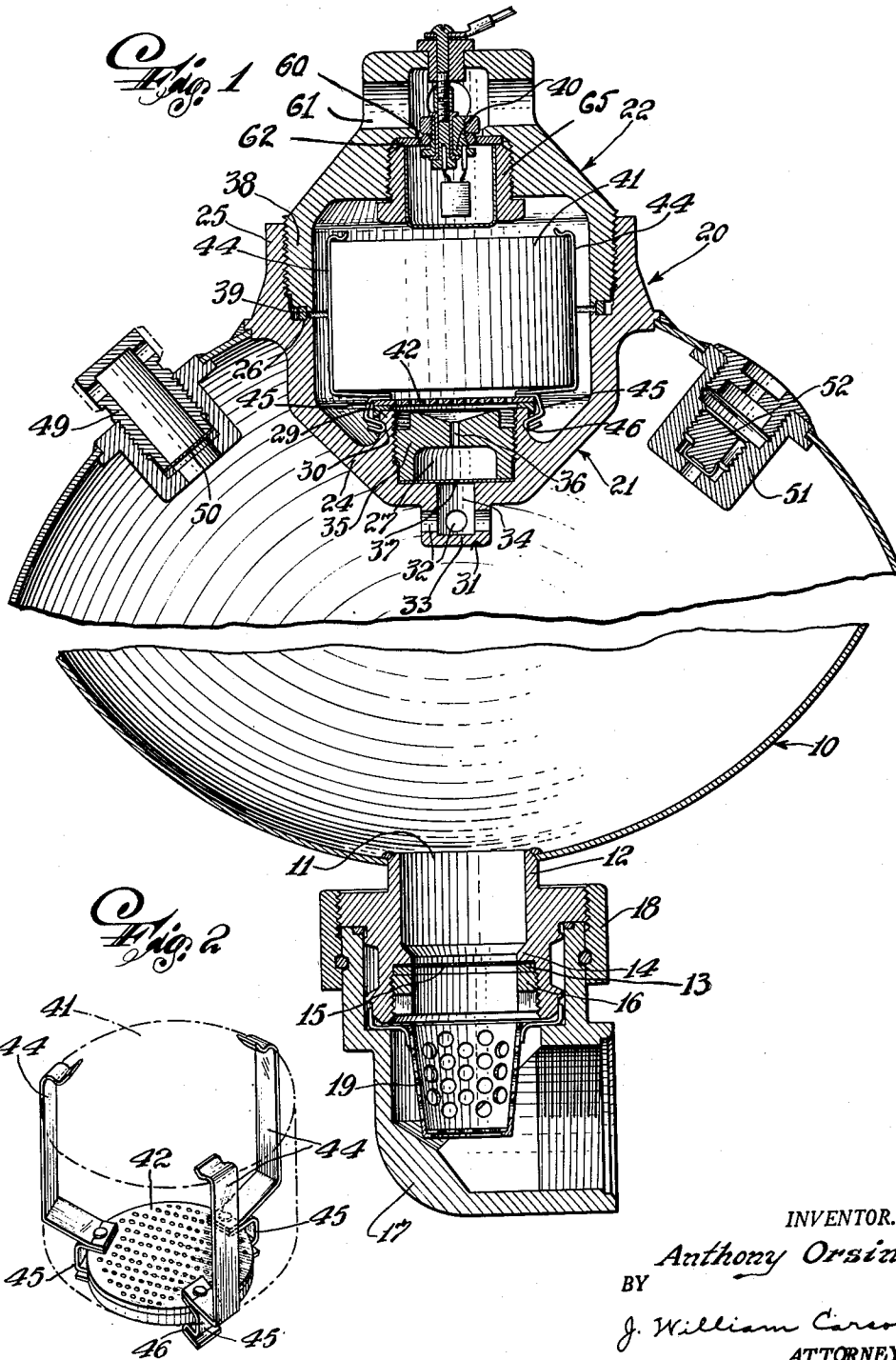
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DISCHARGE APPARATUS

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DISCHARGE APPARATUS

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The present invention relates to apparatus for discharging fluid material such as liquid or dry powder, and, more particularly, to the type wherein a charge of burning substance is utilized for developing pressure medium adapted to expel the material from a container.

Accordingly, an object of the present invention is to provide discharge apparatus of the foregoing type which is an improvement over such apparatus heretofore known.

Another object is to provide such apparatus wherein the pressure medium is metered into the container at a predetermined rate to prevent excessive pressure being developed which might burst the container.

Another object is to diffuse the medium upon introduction thereof into the container.

Another object is to provide such apparatus wherein a closure controls the opening of the outlet of the container which is adapted to burst upon the attainment of a predetermined pressure within the container which the container can safely withstand.

Another object is to provide such apparatus which can be readily cleaned and reloaded.

A further object is to provide such apparatus which is simple and economical in construction.

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.

In accordance with the invention, the foregoing objects may be accomplished by providing apparatus comprising a container for storing the material having a discharge outlet, a closure for the outlet adapted to uncloze the outlet upon the attainment of a predetermined pressure within the container, a chamber for a charge of burning substance adapted to develop pressure medium, the chamber being constructed to withstand a much greater pressure than the container, and orifice means for establishing communication between the chamber and the container adapted to meter pressure medium into the container at a predetermined rate.

In an illustrative embodiment of the invention, a strainer is provided between the chamber and the orifice means to prevent clogging thereof by products of combustion, and a frangible disc is provided for preventing material in the container from entering the chamber by way of the orifice means. A plurality of lateral ports associated

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with the orifice means are utilized to introduce the pressure medium into the container to minimize recoil.

In this embodiment, the chamber is provided by a two piece construction including a removably secured cover member which facilitates access to the chamber for cleaning and reloading. The strainer has clip means for securing the charge of burning substance thereto and for securing the strainer in the chamber in proper relation to the orifice means.

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

Figure 1 is a fragmentary longitudinal sectional view of discharge apparatus in accordance with the present invention.

Figure 2 is a perspective view of the strainer and charge of burning substance assembly.

Referring to the drawing and more particularly to Figure 1 thereof, there is shown a container 10 for storing material such as liquid or dry powder adapted for use as a fire extinguishing medium or the like. The container may be spherical in shape or may be generally cylindrical, in either case having substantially hemi-spherical ends as shown. The container is constructed of suitable metal to safely withstand an internal pressure of about 800 pounds per square inch.

The container 10 is formed with an outlet opening 11 at the lower end or bottom thereof, in which an outlet spud or nipple 12 is secured. The nipple has an internal shoulder 14 defining an outlet port, which port is sealed by a closure 15 secured against the shoulder by a shear ring 13 and a screw ring 16. The closure 15 as illustrated may be a thin frangible or rupturable disc designed to burst and uncloze the outlet upon the attainment of a predetermined pressure within the container, for example, approximately 350 pounds per square inch.

An elbow 17 or other fitting for connecting the outlet of the nipple to the pipe (not shown) adapted to conduct the material in the container to its point of use is secured over the end of the nipple by a coupling ring 18. A strainer 19 is positioned in the elbow over the outlet of the nipple for preventing fragments of the closure 15 from being conducted into the pipe.

A chamber 20 for a charge of burning substance adapted to develop pressure medium is provided at the top or upper end of the container, and comprises a bottom or receptacle member 21

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and a top or cover member 22 removably secured to the member 21.

The receptacle member 21 is generally cup-shaped and is secured in an opening in the container. The member 21 has a lower portion 24 extending into the container and has an upper collar portion 25 extending outwardly of the container which has an internal screw thread and a shoulder 26. The bottom of the lower portion 24 is formed with a well 27 at the interior which is surrounded at its upper end by a collar portion 29 having an annular groove 30 extending about the exterior thereof. The bottom of the lower portion 24 is further formed with a boss or projection 31 at the exterior which has a plurality of lateral apertures 32 connected for fluid flow communication to the well 27 by a bore 34 and has a wall 33 facing the bore.

A member 35 having a metering orifice 36 therein is screw threadedly secured in the well 27 for metering pressure medium from the chamber to the container, and a rupturable or frangible disc 37 is positioned on the bottom of the well to seal the upper end of the bore 34 and is held in place by the member 35.

The cover member 22 has a skirt portion 38 threaded on the exterior for cooperation with the threads of the collar portion 25 of the receptacle member 21. A gasket 39 is positioned between the shoulder 26 and the lower end of the skirt portion 38 to provide a pressure tight seal between the members 21 and 22. The upper interior portion of the cover member is provided with charge igniting means 40 of any conventional design, but preferably, of the electrically actuated type.

A charge 41 of burning substance such as slow burning powder adapted to develop pressure is placed in the chamber over the well 27, and a strainer 42 is disposed between the charge and the well for preventing products of combustion of the charge from clogging the metering orifice 36.

As shown in Figure 2, the charge 41 and strainer 42 may comprise an assembly to facilitate loading thereof into the chamber 20. The strainer has spring clip elements 44 secured thereto for attaching the strainer to the charge, and has clips 45 on the under side for engaging the collar portion 29 surrounding the well 27. The clips 45 may have projections 46 at their ends for cooperating with the groove 30 to more securely lock the strainer over the well and thereby hold the charge in place within the chamber.

If desired, a conventional safety discharge fitting 49 containing a safety disc 50 may be connected to the container as shown. The safety disc is designed to burst at a pressure of about 750 pounds per square inch in the event such a pressure is established in the container by unusual circumstances.

The container 10 is further provided with a conventional fitting 51 having an opening for introducing the material into the container and having closure means 52 for sealing the opening.

The chamber 20 may also be protected against excessive pressure developed therein in the event orifice 36 is blocked or the disc 37 fails to burst for some unforeseen reason. Such safety means may be advantageously provided by forming the chamber cover 22 with an opening 60 in the top thereof and lateral anti-recoil openings 61 communicating with the opening 60, and positioning a safety disc 62 across the opening 60 which is held in place by a hollow plug 65 threaded to the

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cover at the interior thereof. The disc 62 has the charge igniting means 40 mounted thereon and the interior of the hollow plug 65 serves as a chamber for the charge igniting means.

The charge 41 when ignited, is adapted to develop a gaseous pressure medium in the chamber 20 which normally has a maximum pressure of about 3300 pounds per square inch, the chamber being constructed to safely withstand such pressure. The pressure medium passes through the strainer 42, is metered through the orifice 36 causing the disc 37 to burst, and is conducted through the bore 34, against the wall 33 and through the lateral apertures 32 to diffuse the medium and thereby prevent the medium from blasting through the fluid material in the container 10. As pressure builds up in the container to a value which the closure 15 cannot withstand, the closure 15 bursts to unclosethe outlet and to allow the material in the container to be expelled through the elbow 17 into a pipe (not shown) adapted to be connected to the elbow. The orifice continues to meter pressure medium into the container at a desired rate to provide a substantially uniform pressure head above the material during its entire discharge. The value of the pressure head depends on the resistance to the flow of the discharged material through the pipe, and normally is less than 750 pounds per square inch, whereby the safety disc 50 will not burst during normal discharge. Preferably, the apparatus and the distributing pipe (not shown) are so designed that, under normal conditions of discharge, the pressure head is about 200 pounds per square inch after the closure 15 has been burst. By controlling the pressure through the orifice, the container may be constructed of relatively light metal to thereby make its design more economical. In the event the orifice should be blocked whereby an excessive pressure may be developed in the chamber, the safety disc is adapted to burst and provide for discharge of the pressure medium through the safety vents.

From the foregoing description, it will be seen that the present invention provides novel discharge apparatus which is relatively light in weight, simple and economical in construction, and yet can withstand the rough usage to which it may be subjected.

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.

I claim:

1. Discharge apparatus comprising a storage container having a discharge outlet, a closure for said outlet adapted to unclosethe outlet upon the attainment of a predetermined pressure within said container, a chamber for a charge of burning substance adapted to develop pressure medium, said chamber being constructed to withstand a much greater pressure than said container, orifice means for establishing communication between said chamber and said container adapted to meter pressure medium into said container at a predetermined rate, and a strainer between said chamber and said orifice means.

2. Discharge apparatus comprising a storage container having a discharge outlet at its lower end, a closure for said outlet adapted to unclosethe outlet upon the attainment of a predeter-

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mined pressure with said container a chamber at the upper end of said container for a charge of burning substance adapted to develop pressure medium, said chamber being constructed to withstand a much greater pressure than said container, and means for establishing communication between said chamber and said container including an orifice adapted to meter pressure medium into said container at a predetermined rate and a wall and plurality of lateral ports on the downstream side of said orifice for diffusing the medium.

3. Discharge apparatus comprising a storage container having a discharge outlet, a closure for said outlet adapted to unclosure said outlet upon the attainment of a predetermined pressure within said container, a receptacle member secured to said container, a cover member removably connected to said receptacle member having a safety discharge outlet and safety disc means for said outlet, said members providing a chamber for a charge of burning substance adapted to develop pressure medium and being constructed to withstand a much greater pressure than said container, said receptacle member having means for establishing communication between said chamber and said container including an orifice adapted to meter pressure medium into said container at a predetermined rate, and charge igniting means mounted on said safety disc means.

4. In a combination, a charge of burning substance adapted to develop pressure medium, a strainer, and an assembly having a plurality of spring clip members for engaging said strainer and said charge and connecting said strainer to the underside of said charge.

5. A safety outlet device comprising a chamber in which a pressure producing charge is adapted to be ignited, said chamber having an opening, a safety disc closing said opening, and charge igniting means mounted on said safety disc.

6. A safety outlet device comprising a chamber in which a pressure producing charge is adapted to be ignited, said chamber having an opening and lateral anti-recoil apertures in communication with said opening, a safety disc closing said opening, and charge igniting means mounted on said safety disc.

7. Discharge apparatus comprising a storage container having a discharge outlet at its lower end; a cup-shaped chamber member mounted on said container for a charge of ignitable substance adapted to develop pressure medium at its upper end, said chamber member having passageway means leading from the interior thereof into said container including a metering orifice and a wall element supported in said container facing said metering orifice and spaced therefrom for preventing downward direction of the medium; and a closure for said chamber member.

8. Discharge apparatus comprising a storage container having a discharge outlet at its lower end; an open topped cup-shaped chamber member seated in an aperture in the upper end wall of said container and depending into said container for a charge of ignitable substance adapted to develop pressure medium, said chamber member having charge supporting means therein formed with an upwardly facing opening and having passageway means leading from said opening to the interior of said container including means for diffusing the medium and for preventing the same from being directed down-

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wardly into said container; and a closure for the open top of said chamber member.

9. Discharge apparatus comprising a storage container having a discharge outlet at its lower end; a cup-shaped chamber member mounted on said container at its upper end for a charge of ignitable substance adapted to develop pressure medium; charge supporting means within said chamber member at the bottom thereof including an opening; an annular wall portion beneath said opening having laterally directed pressure medium discharge apertures therein; and a closure for said chamber member.

10. Apparatus according to claim 9, wherein a charge of ignitable substance is positioned in said chamber member and rupturable sealing means are disposed between said charge and said apertures.

11. Apparatus according to claim 9, wherein strainer means extend across said opening.

12. Apparatus according to claim 9, wherein a charge of ignitable substance is positioned in said chamber and a strainer is positioned between said charge and said opening.

13. Apparatus according to claim 9, wherein a member formed with a pressure medium metering orifice is positioned in said opening.

14. Apparatus according to claim 13, wherein said opening is formed with a shoulder, a rupturable disc is supported by said shoulder, and said member formed with said orifice is removably secured in said opening and maintains said disc on said shoulder.

15. Discharge apparatus comprising a storage container having a discharge outlet at its lower end; a rupturable disc closure for said outlet; an open topped cup-shaped chamber member seated in an aperture in the upper end wall of said container and depending into said container for a charge of ignitable substance adapted to develop pressure medium, said chamber member having passageway means leading from the interior thereof into said container including radially directed apertures, a metering orifice and a wall element supported in said container facing said orifice and spaced therefrom for changing the direction of flow of the medium; a charge of said substance in said chamber member; means in said chamber member for supporting said charge and spacing the same from the bottom of said chamber member; rupturable means providing a seal between said charge and said apertures of said passageway means; and a closure for the open top of said chamber member.

16. Discharge apparatus comprising a storage container having a discharge outlet at its lower end; a cup-shaped chamber member mounted on said container at its upper end for a charge of ignitable substance adapted to develop pressure medium, said member having a well in the bottom thereof formed with a shoulder and having an annular wall portion depending from said well and formed with a laterally directed aperture and provided with an end wall facing said well; a rupturable disc mounted on said shoulder; a plug having a pressure medium metering orifice removably secured in said well for retaining said disc on said shoulder; a strainer element extending across said well above said plug; and a closure for said chamber member.

17. Apparatus according to claim 16, wherein means are provided for securing said strainer element to said chamber member adjacent said well.

18. Apparatus according to claim 17, wherein

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said securing means includes elements for attaching said strainer element to a charge of said substance.

19. Apparatus according to claim 16, wherein said well includes an upwardly facing tubular collar portion formed with recess means at its exterior and an assembly is provided having clip elements for attaching a charge of said substance and said strainer element and having means for cooperating with said recess means to attach said assembly on said collar portion.

20. Discharge apparatus comprising a storage container having a discharge outlet at its lower end; an open topped cup-shaped chamber member seated in an aperture in the upper end wall of said container and depending into said container for housing a charge of ignitable substance adapted to develop pressure medium, said chamber member having passageway means at the lower portion thereof leading from its interior into said container including orifice means for metering the medium into said container; and a closure for the open top of said chamber member.

21. Apparatus according to claim 20, wherein a charge of said substance is housed in said chamber member and rupturable means are positioned across said passageway means for forming a seal between said charge and said container.

22. Discharge apparatus comprising a storage container having a discharge outlet at its lower end; and a chamber member mounted on said container at its upper end for a charge of ignitable substance, said chamber member having

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passageway means including metering orifice means and an upwardly facing opening above which the charge is adapted to be positioned located between said orifice means and the interior of said chamber member.

23. Apparatus according to claim 22, wherein a strainer is positioned across said opening.

24. Discharge apparatus comprising a storage container having a discharge outlet at its lower end; a chamber member mounted on said container at its upper end for a charge of ignitable substance, said chamber member having passageway means leading from its interior into said container including an upwardly facing opening; a strainer; a charge of said substance; and an assembly having means for connecting said strainer beneath said charge and having means for connecting said strainer to said chamber member across said opening.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,510,843	Hawkins	Oct. 7, 1924
1,588,233	Kauch et al.	June 8, 1926
2,238,693	Geertz	Apr. 15, 1941
2,258,869	Towart, Jr.	Oct. 14, 1941
2,426,024	Jones et al.	Aug. 19, 1947