

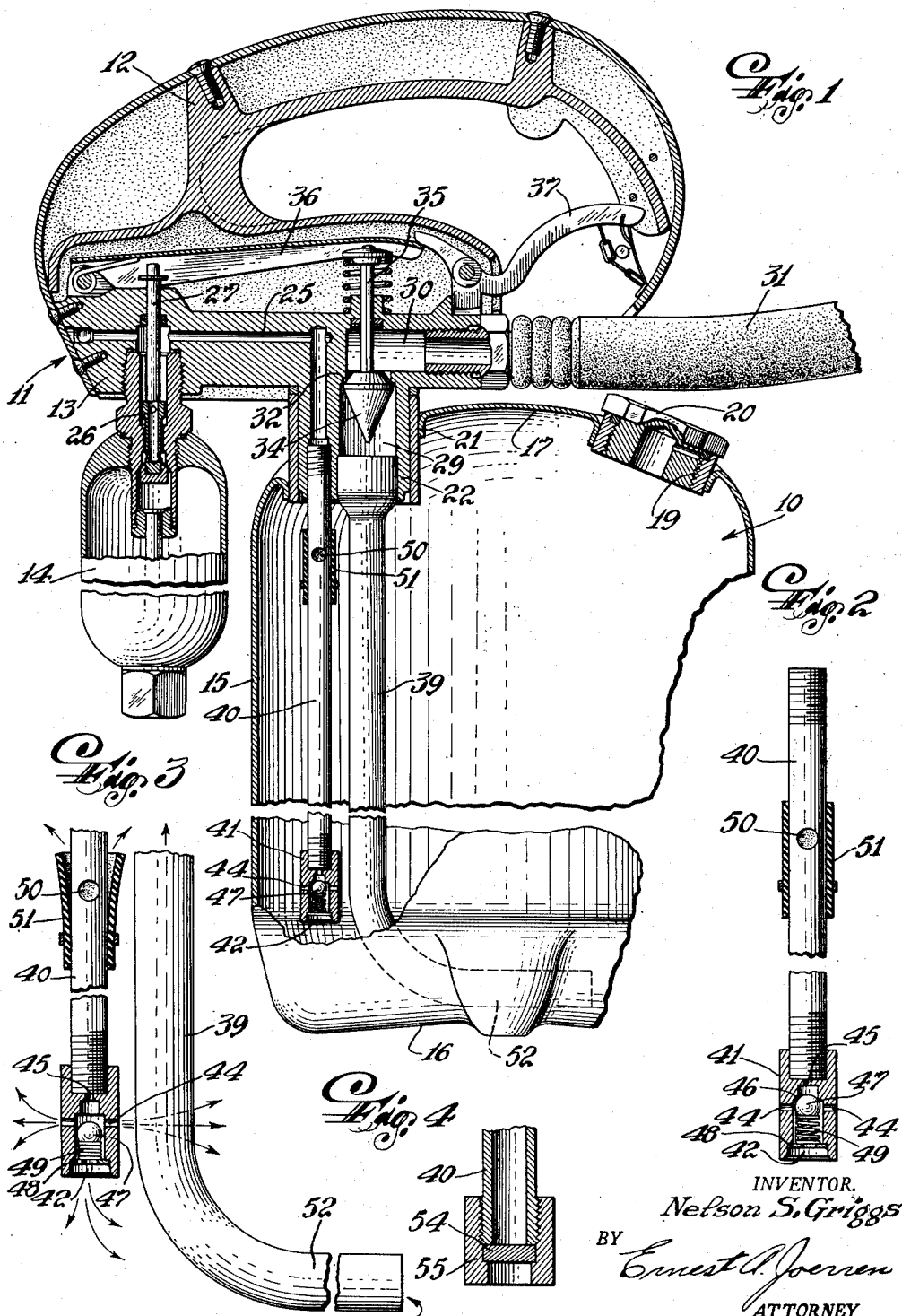
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FIRE EXTINGUISHING APPARATUS

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FIRE-EXTINGUISHING APPARATUS

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The present invention relates to fire extinguishing apparatus, and more particularly to improvements in the means for introducing pressure medium into a receptacle containing dry powder or the like to expel the same therefrom.

It has been a common practice to expel from receptacles free flowing fluids of the liquid type such as aqueous solutions or chemical compounds which are in liquid state at the usual atmospheric temperature by providing a pressure head above the level of the liquid to cause the same to be forced through an outlet either at the bottom or top of the receptacle, a syphon tube being associated with the outlet, if located at the top, and extending substantially to the bottom of the receptacle.

Dry powder extinguishing agents, which at present are utilized more extensively than heretofore, cannot be expelled in such a simple manner. The application of a pressure head alone above the powder level, is not sufficient to induce the flow through the outlet, primarily because the powder upon prolonged storage tends to cake or settle whereby its free flowing characteristics are impaired. Numerous devices have been designed to overcome this difficulty but have been found to be objectionable because of complicated construction and cost of manufacture, and because the pressure medium intended to agitate the powder to induce its flow was applied with a sudden blast thereby enabling all or substantial quantities of the pressure medium to channel through the powder and escape through the outlet without serving to expel the powder.

Accordingly, an object of the present invention is to provide improved apparatus for effecting the discharge of dry powder and the like.

Another object is to provide such apparatus which is simple in construction, economical to manufacture, can readily be assembled, and is reliable in operation.

Another object is to provide such apparatus which serves to agitate the powder adjacent the outlet to induce its flow without channelling of the pressure medium therethrough.

Another object is to provide such apparatus wherein a portion of the pressure medium is utilized to agitate the fire extinguishing agent and another portion thereof is utilized to provide a pressure head for forcing the agent through the outlet.

Another object is to provide such apparatus wherein entry of the fire extinguishing agent into the pressure medium introducing means is prevented.

A further object consists in constructing the parts and arranging the elements of the apparatus in a manner whereby the foregoing objects are attained.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will

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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 drawing, forming a part of the specification, wherein:

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

Figure 2 is an enlarged fragmentary sectional view of pressure medium introducing means illustrating the movable elements in their normal position prior to the discharge of the contents from the apparatus.

Figure 3 is an enlarged fragmentary sectional view of the pressure medium introducing means and a syphon tube associated therewith and the outlet of the receptacle, illustrating the position of the movable elements and the effect of the pressure medium during initial discharge of the contents from the apparatus.

Figure 4 is a fragmentary sectional view of the lower end of the pressure medium introducing means illustrating another form of flow metering or retarding means.

Referring to the drawing in detail and more particularly to Figure 1 thereof, there is shown a portable fire extinguisher generally comprising a container 10 for storing a charge of dry powder or the like, a discharge control head or unit 11 including a carrying handle 12 and a valve body 13, and a cartridge 14 for storing pressure medium which is supported by the unit 11.

The container 10, as illustrated herein, may be generally cylindrical, having a side wall 15, a lower end wall 16 formed to support the container in upright position and an upper end wall 17. The wall 17 has a filling opening 19 normally closed by a cap 20, and has an opening 21 in which a cylindrical portion 22 of the valve body is secured.

The valve body 13 has a duct 25 extending from the cartridge 14 to the interior of the container 10 through which the flow of pressure medium is controlled by a valve 26 associated with the cartridge and provided with a stem 27 extending upwardly through the valve body. The valve body further has a discharge passage which is provided with an inlet 29 in communication with the interior of the container, an outlet 30 to which a discharge nozzle horn or shield (not shown) may be connected by a hose 31, and a valve seat 32 between the inlet and outlet. A valve controls the discharge passage which includes a valve member 34 for the seat 32, and a stem 35 extending upwardly through the valve body is connected to the valve member.

The valve for controlling the flow of pressure medium through the duct 25 and the valve for

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controlling the discharge passage may be actuated in any suitable manner, for example, these valves may be actuated simultaneously by a lever 36 pivotally mounted at one end on the valve body and positioned for depressing the valve stems 27 and 35. A manually operable lever 37 is provided for rocking the lever 36 with mechanical advantage.

Referring more specifically to the features of the present invention, there is shown in Figure 2 improved pressure medium introducing means and a syphon tube 39 constructed and arranged to cooperate with these means whereby better discharge of the powder or liquid from the container is effected.

The pressure medium introducing means, in the form illustrated herein, comprise a tube 40 adjacent the interior of the side wall 15 of the container having its upper end connected to the duct and having its lower end adjacent but spaced from the lower wall 16, outlet means associated with the tube at the lower end, and outlet means associated with the tube above the level of the powder or the top of the container.

The outlet means at the lower end of the tube serve a two fold purpose, namely to retard or meter the flow of pressure medium into the lower end of the container while agitating the powder without channelling of the pressure medium therethrough, and to prevent powder from entering the tube and clogging the same to thereby delay discharge.

This may be accomplished, as illustrated herein, by a sleeve-like valve body 41 having its upper end connected to the lower end of the tube and comprising a downwardly facing outlet 42 and opposite side outlets 44, and a metering orifice 45 between the lower end of the tube 40 and these outlets. A valve seat 46 is provided between the orifice 45 and the outlets 42 and 44 for seating a valve member 47 normally urged on the seat by a spring 49 secured within the valve body 41 by an apertured disc 48.

The outlet means above the powder level include an aperture 50 in the side wall of the tube and a resilient or yieldable sleeve 51 having its lower end secured to the tube 40 and having a portion at its upper end normally overlying the aperture 50 to close the same. These means prevent the entry of powder into the tube tending to clog the same and thereby delay discharge.

The syphon tube 39 is positioned adjacent the tube 40 with its upper end connected to the inlet 29 of the discharge passage and its lower end extending downwardly beyond the lower end of the tube 40. The lower end of the syphon tube is in the form of a right-angle bend or elbow 52 having a section extending substantially diametrically across the bottom of the container in a direction away from the tube 40 whereby the opening at the lower end of the syphon tube faces in a direction opposite the outlets 42 and 44 associated with the tube 40.

In operation, when it is desired to expel the charge of fire extinguishing agent, the lever 37 is manually engaged and rocked in a counterclockwise direction, as viewed, to rock the lever 36 and cause the latter to depress the valve stems 27 and 35 whereby the valves 26 and 34 are opened. Pressure medium in the cartridge 14 is released and flows through the duct 25 into the tube 40.

As shown more particularly in Figure 3, the pressure medium in the tube 40 causes the sleeve 51 to yield and uncloze the opening 50 whereby pressure medium enters the container above the

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level of the charge to establish a pressure head. The pressure medium in the tube substantially simultaneously unseats the valve member 47 whereby pressure medium flows through the metering or flow retarding orifice 45 and into the lower end of the container by way of the apertures 42 and 44 at a rate to agitate the charge of fire extinguishing agent to induce free flow thereof without sudden blasts resulting in the channelling of the pressure medium through the charge. The pressure head is then effective to force the charge into the inlet of the syphon tube 39, upwardly through the syphon tube, through the open discharge control valve, and into the hose 31.

In accomplishing the foregoing, the flow of pressure medium through the charge and into the syphon tube is further minimized by positioning the syphon tube inlet away from the apertures 42 and 44 whereby the pressure medium introduced through these apertures is retained within the container and tends to work its way upwardly through the charge, while agitating the same, to above the level of the charge and to become part of the pressure head for effecting discharge of the apparatus.

By preventing channelling and loss of pressure medium through the syphon tube, substantially the entire charge of fire extinguishing agent is expelled from the container at a uniform rate of discharge. Likewise, blasts of gas are prevented from accompanying the fire extinguishing agent and causing blasts tending to fan the fire or interrupting the flow of the agent or decreasing the rate of discharge of the agent to lessen its effectiveness.

In Figure 4, a modified form of blast or channelling preventing device is illustrated, which comprises a disc 54 of porous metal or ceramic material positioned over the lower open end of the tube 40 by an apertured cap 55. The porosity of the disc 54 is such that it retards or meters the flow of pressure medium but prevents the entry of dry powder fire extinguishing agents into the tube 40.

From the foregoing description it will be seen that the present invention provides improved fire extinguishing apparatus for storing and discharging dry powders or the like. The apparatus is simple and practical in construction and overcomes the difficulties heretofore encountered.

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. In fire extinguishing apparatus, a container for a charge of fire extinguishing medium, discharge outlet means for said container at the upper end thereof, means for introducing pressure medium to expel the fire extinguishing medium from said container including a tube extending from the upper end to substantially the lower end of said container, said tube having an outlet at the lower end thereof, and a syphon tube in fluid flow connection with said outlet means extending downwardly adjacent said first tube to the bottom of said container, said syphon tube having a section extending along substantially the bottom of said container in a direction away from said first tube and provided with an inlet facing in a direction opposite said first tube.

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2. In fire extinguishing apparatus, a container for a charge of fire extinguishing medium, discharge outlet means for said container at the upper end thereof, means for introducing pressure medium to expel the fire extinguishing medium from said container including a tube extending from the upper end to substantially the lower end of said container, said tube having an outlet at the lower end thereof and having a second outlet adjacent the top of said container, and a syphon tube in fluid flow connection with said outlet means extending downwardly adjacent said first tube to the bottom of said container, said syphon tube having a section extending along substantially the bottom of said container in a direction away from said first tube and provided with an inlet facing in a direction opposite said first tube.

3. In fire extinguishing apparatus, a container for a charge of fire extinguishing medium, discharge outlet means for said container at the upper end thereof, means for introducing pressure medium to expel the fire extinguishing medium from said container including a tube extending from the upper end to substantially the lower end of said container, said tube having an outlet at the lower end thereof and having a second outlet adjacent the top of said container, a syphon tube in fluid flow connection with said outlet means extending downwardly to the bottom of said container, said syphon tube having a section extending along substantially the bottom of said container in a direction away from said first tube and provided with an inlet facing in a direction opposite said first tube, and a check valve for each of said outlets adapted to prevent fire extinguishing medium in said container from entering said outlets.

4. In fire extinguishing apparatus, a container for a charge of fire extinguishing medium having an opening at the upper end thereof, a control head for said opening having discharge outlet means, means for introducing pressure medium to expel the fire extinguishing medium from said container including a tube extending from the said control head to substantially the lower end of said container adjacent the side wall of said container, said tube having an outlet at the lower end thereof for introducing pressure medium adapted to agitate the fire extinguishing medium at the lower end of said container and having a second outlet above the fire extinguishing medium level in said container for introducing pressure medium to provide a pressure head, a syphon tube in fluid flow connection with said outlet means extending downwardly adjacent said first tube to the bottom of said container, said syphon tube having a section extending along substantially the bottom of said container in a direction away from said first tube and provided with an inlet facing in a direction opposite said first tube, and a check valve for each of said outlets adapted to prevent fire extinguishing medium in said container from entering said outlets.

5. In fire extinguishing apparatus, a container, discharge outlet means for said container including a syphon tube extending downwardly into said container having a horizontally extending section adjacent the lower end of said container provided with an inlet, a pressurizing tube extending downwardly into said container having vertically spaced ports adjacent the upper end and the lower end of said container respectively, and a check valve for each of said ports.

6. In fire extinguishing apparatus, a container

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for a charge of fire extinguishing medium, discharge outlet means for said container including a syphon tube extending downwardly into said container provided with an inlet adjacent the bottom of said container, and means for introducing pressure medium to expel the fire extinguishing medium through said outlet means including a tube extending downwardly into said container having an outlet adjacent the bottom of said container and having a second outlet adjacent the top of said container.

7. In fire extinguishing apparatus, a container for a charge of fire extinguishing medium, discharge outlet means for said container including a syphon tube extending downwardly into said container provided with an inlet adjacent the bottom of said container, means for introducing pressure medium to expel the fire extinguishing medium through said outlet means including a tube extending downwardly into said container having an outlet adjacent the bottom of said container and having a second outlet adjacent the top of said container, and check valve means for said second outlet adapted to prevent fire extinguishing medium in said container from entering said second outlet.

8. In fire extinguishing apparatus, a container for a charge of fire extinguishing medium, discharge outlet means for said container including a syphon tube extending downwardly into said container provided with an inlet adjacent the bottom of said container, means for introducing pressure medium to expel the fire extinguishing medium through said outlet means including a tube extending downwardly into said container having an outlet adjacent the bottom of said container and having a second outlet adjacent the top of said container, and check valve means for said second outlet adapted to prevent fire extinguishing medium in said container from entering said second outlet, said check valve means being a yieldable sleeve secured to said tube having a portion for normally closing said second outlet and adapted to expand when acted upon by the pressure medium to unclose said second outlet.

9. In fire extinguishing apparatus, a container for a charge of fire extinguishing medium, discharge outlet means for said container including a syphon tube extending downwardly into said container provided with an inlet adjacent the bottom of said container, means for introducing pressure medium to expel the fire extinguishing medium through said outlet means including a tube extending downwardly into said container having an outlet adjacent the bottom of said container and having a second outlet adjacent the top of said container, and check valve means for each of said outlets adapted to prevent fire extinguishing medium in said container from entering said outlets.

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