April 6, 1954 N. H. SIEBENS 2,674,325

DISCHARGE VALVE FOR FIRE EXTINGUISHERS

Filed July 21, 1951 2 Sheets-Sheet 1

Fig. 1.

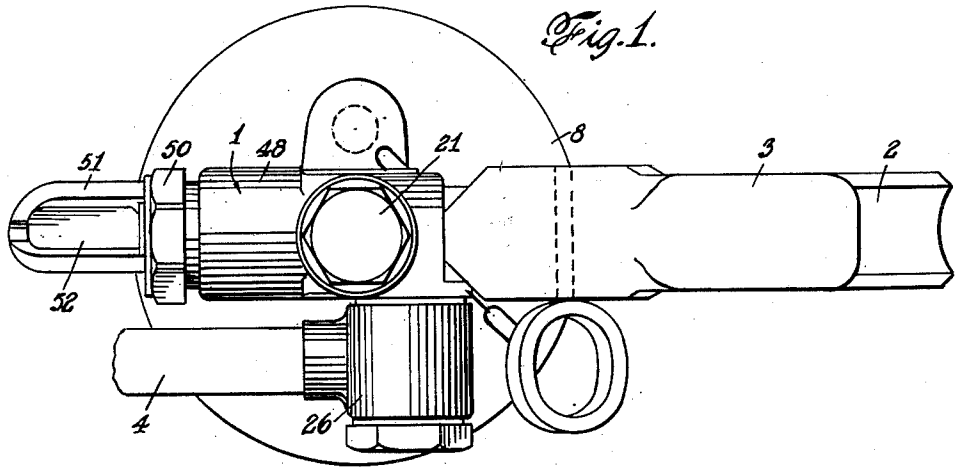
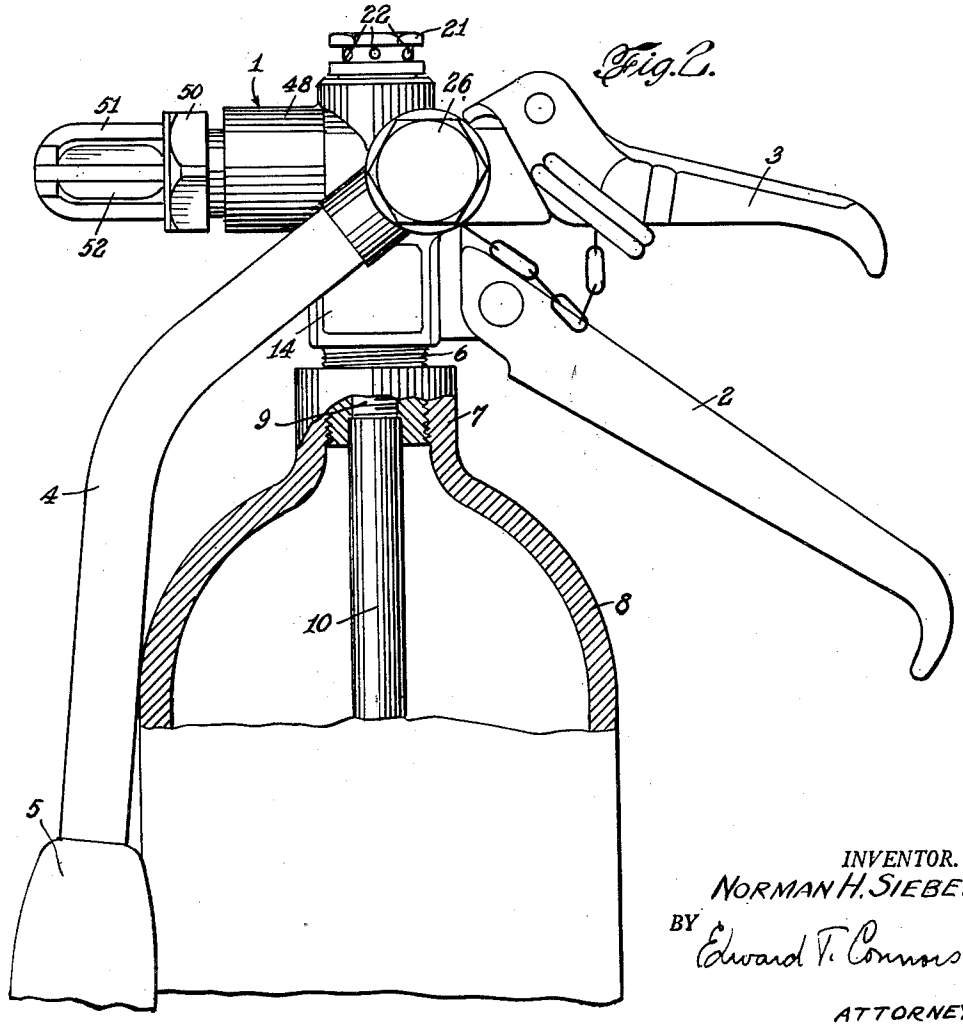


Fig. 2.



INVENTOR.
NORMAN H. SIEBENS
BY Edward T. Connors
ATTORNEY.

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2 Sheets-Sheet 2

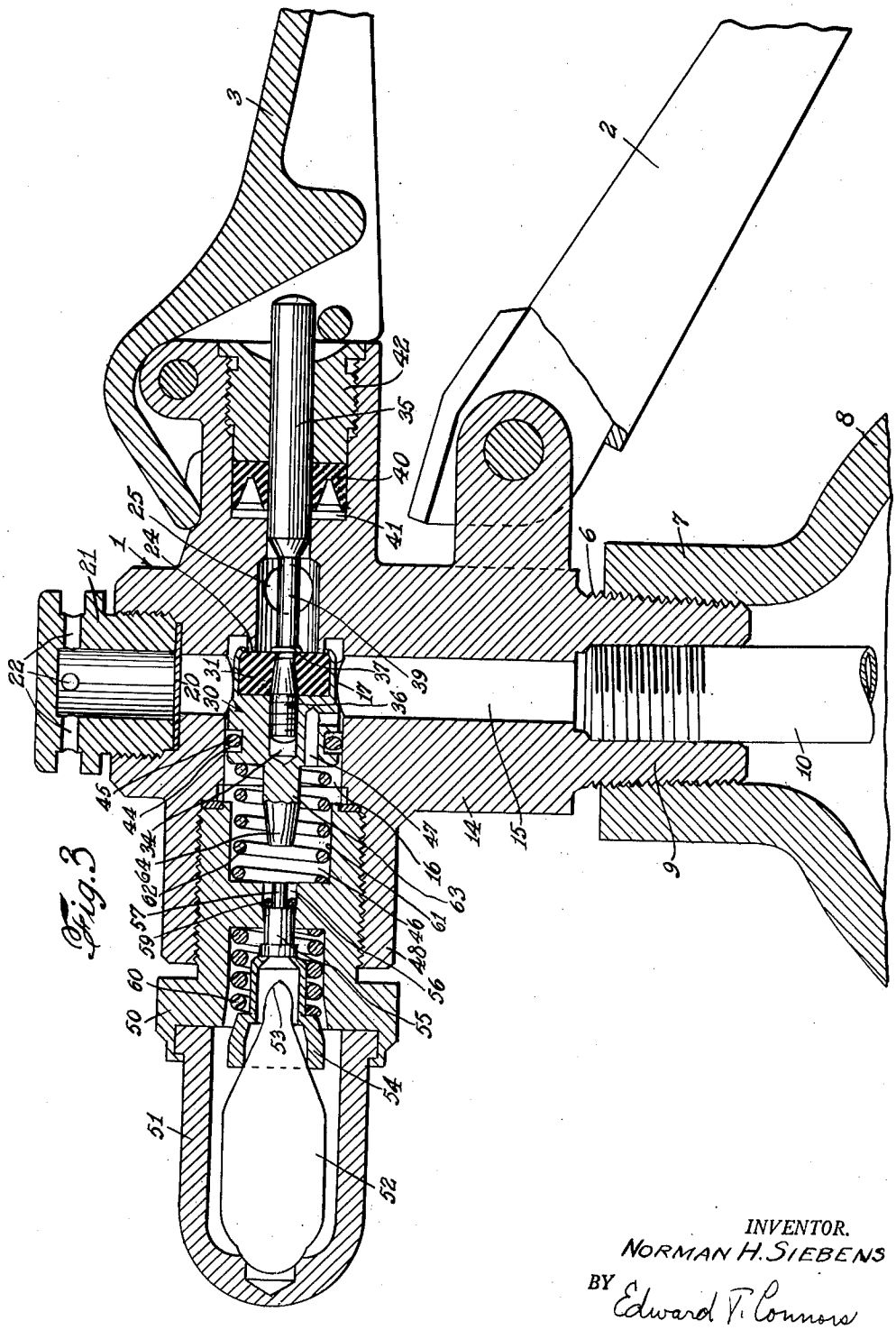


Fig. 3

INVENTOR.
NORMAN H. SIEBENS
BY Edward F. Connors
ATTORNEY

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DISCHARGE VALVE FOR FIRE EXTINGUISHERS

Norman H. Siebens, Cedar Grove, N. J., assignor to C-O-Two Fire Equipment Company, Newark, N. J.

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5 Claims. (Cl. 169—31)

1

The present invention relates generally to fire extinguishers and more particularly to a discharge valve for a container of fire extinguishing fluid such as carbon dioxide, and is an improvement over the invention disclosed and claimed in my U. S. Patent Serial No. 2,464,268, issued March 15, 1949.

An object of the invention is to provide novel and improved heat actuated means for automatically releasing fire extinguishing fluid from its container upon a predetermined increase in temperature in the vicinity of the heat actuated device.

Another object of the invention is to provide a fire extinguisher discharge valve which is simple and economical in manufacture, efficient in operation and durable in use.

In utilizing a discharge valve constructed in accordance with the disclosure of the above patent, a certain amount of the fire extinguishing fluid may leak out through the release passage opened by the frangible bulb after it has been ruptured by an excessive temperature rise. In some cases this has been found undesirable and a preferred construction would insure that all of the fire extinguishing fluid is delivered through the outlet.

This invention aims to overcome the foregoing difficulties and disadvantages by providing a fire extinguisher discharge valve in which means are incorporated to close the opening resulting from the rupture of the frangible bulb. In accordance with the invention this is accomplished by providing the piston-valve of the patent with means which act as a valve member to close the opening during the discharge through the valve.

Other objects and advantages of the invention will be apparent from the following description and from the accompanying drawings which show, by way of example, an embodiment of the invention.

In the drawings:

Figure 1 is a top view of a discharge valve in accordance with the invention attached to a container for fire extinguishing fluid, the discharge horn being shown broken away.

Figure 2 is a side view of the discharge valve shown in Figure 1, a portion of the container being broken away to show its siphon tube extending downwardly therein.

Figure 3 is a vertical sectional view of the discharge valve.

Referring to the drawings, there is shown in Figure 1 a discharge valve 1 in accordance with the invention fitted with a carrying handle 2, a

2

squeeze grip operating member 3, and a discharge hose 4 which may have at its outer end a conventional discharge horn 5. The valve has its lower end threaded as indicated at 6 to be secured in neck 7 of a suitable container 8. Inlet 9 of the discharge valve 1 is fitted with a siphon tube 10 threadedly engaged therewith and extending to the bottom of the container 8 so that fire extinguishing fluid may be expelled by vapor pressure.

As may be seen in Figure 3, the discharge valve 1 is formed of a housing 14 provided with intersecting passages 15 and 16, the intersection of the passages providing a valve chamber 17. At the upper end of the vertical passage 15 is a frangible sealing disc 20 secured by a conventional anti-recoil plug 21 having opposed outlets 22 for a balanced discharge in the event of the rupture of the sealing disc. The safety disc 20 is adapted to rupture at a predetermined pressure so as to prevent the building up of excessive pressure within the container 8. The anti-recoil plug 21 distributes the discharge in opposite directions to prevent recoil.

A valve seat 24 is formed on the wall of the valve chamber 17 about the horizontal passage 16, a side outlet 25 being provided in fluid connection with the passage 16 for a suitable swivel connection 26 to which is attached the hose 4. Within the valve chamber 17 is a combination piston-valve member 30 having its valve end recessed to receive a suitable seating material 31 for contact with the valve seat 24. Any suitable seating material 31 may be utilized which will provide a leak-proof seal, such as corprene, nylon, or the like. In order to provide means so that the seating material 31 will be held in position against the valve seat 31, a recess is made axially of the piston-valve member 30 to receive an operating rod 35 having one end threaded as indicated at 36 to be received in the recess 34, the rod having a flanged portion 37 to engage the surface of the sealing material 31 to hold it in its recess. The operating rod 35 is reduced in diameter as indicated at 39 to provide space in the passage 17 for fluid passing to the outlet 25. A seal is provided about the outer end of the operating rod 35 by a gasket 40 positioned in a recess 41 and secured in position by a packing nut 42.

The piston end of the piston-valve member 30 is made with a recess 44 to receive a suitable packing such as O ring 45. The horizontal passage 16 acts as a cylinder 46 for the piston end of the piston-valve member 30. In order that

fluid from the inlet passage 15 may enter the cylinder 46, the piston-valve member 30 is made with a pressure equalizing passage 47 of comparatively small diameter therethrough. An extension 48 of the housing 14 is internally threaded to receive thermoresponsive plug member 50 having a spider guard or frame 51 to receive a bulb 52 formed of quartz or other suitable material capable of withstanding high temperatures and filled with a liquid having a low freezing point adapted to be expanded by a predetermined temperature rise so as to rupture the bulb 52. At the base 53 of the bulb 52 is a valve member 54 having its tip end 55 slideably carried in an opening 56 through the bottom of the thermo-responsive plug member 50. The opening 56 is of comparatively large diameter as compared to the diameter of the pressure-equalizing passage 47 so that pressure fluid may be bled from the face of the piston-valve member 30 faster than it enters through the passage 47. A leak-proof seal is made by forming outer end 57 of the tip end 55 of further reduced section and placing thereabout an O ring sealing gasket 59. A spring 60 is adapted to urge the valve member 54 outwardly from the opening 56 upon the rupture of the quartz bulb 52. The end of the plug member 50 is recessed as indicated at 61 to receive a spring 62 to urge the piston member 30 against the valve seat 24.

In accordance with the invention, in order to prevent leakage of fire extinguishing fluid through the opening 56, the piston-valve member is provided with a projecting valve portion 63 having a tapered tip end 64 adapted, to slide into the opening 56 and seal it against leakage during the discharge of the valve.

In the operation of the valve 1 it is attached to the container 8 and charged with fire extinguishing fluid under pressure, the pressure fluid flowing through the pressure-equalizing passage 47 to the rear of the piston-valve member 30 to assist the spring 62 to urge the piston-valve member 30 against its seat 24. Upon the discharge of the valve by the rupture of the frangible bulb 52, the valve member 54 is expelled from the opening 56 and the pressure against the face of the piston valve member 30 in the cylinder 46 is reduced practically to atmospheric pressure, and under the action of the fluid pressure from the inlet 15, the piston valve member 30 is urged away from the valve seat 24 by reason of its greater area than the area encompassed by the valve seat 24. As the piston valve member 30 moves to the left, the tapered tip end 64 of the projecting portion 63 enters the opening 56 to seal it to maintain the piston-valve member 30 in the open position against the action of the spring 62 by reason of the pressure differential existing between the valve chamber 17 and the atmosphere. After the container 8 has been discharged and the pressure within the valve chamber 17 has dropped to atmospheric pressure, the piston-valve member 30 will be returned to its seat 24 under the action of the spring 62.

While the invention has been described and illustrated with reference to a specific embodiment thereof, it will be understood that other embodiments may be resorted to without departing from the invention. For example, while the valve member 63 has been described as having a tapered end to slide into the opening 56, it is obvious that equivalent constructions might be utilized such as by facing the piston-valve member 30 with a seating material and arranging the proportions of the parts of the valve so that the face of the piston member abuts against the bottom of the thermo-responsive plug member 50 to close the opening 56. Therefore, the form of the invention as set out above should be considered as illustrative and not as limiting the scope of the following claims.

I claim:

1. A fire extinguisher discharge valve comprising a housing having a fluid passage therethrough, a main valve seat defining inlet and outlet portions of the fluid passage, a valve member adapted to engage the valve seat from the inlet side, a piston member to urge the valve member against its seat, cylinder means in the housing for the piston, the piston having an effective area greater than the area encompassed by the main valve seat, the valve end of the piston exposed to inlet fluid pressure, means providing pressure equalizing fluid communication from the inlet side of the passage to the face end of the piston so that the piston is normally urged into valve closing position by fluid pressure in the inlet, vent means for the cylinder to relieve pressure from the face of the piston, the vent means having a greater area than the area of the pressure equalizing fluid communication means so that the pressure fluid may be bled off at a greater rate than it enters, a valve seat about the vent means, a normally closed first vent valve member to engage the vent valve seat adapted to be opened to release the pressure from the face of the piston so that the main valve member is opened responsive to inlet pressure, and a second vent valve member positioned within the cylinder and operative by the piston to close the vent means responsive to the opening of the main valve.

2. A fire extinguisher discharge valve comprising a housing having a fluid passage therethrough, a main valve seat defining inlet and outlet portions of the fluid passage, a valve member adapted to engage the valve seat from the inlet side, a piston member to urge the valve member against its seat, cylinder means in the housing for the piston, the piston having an effective area greater than the area encompassed by the main valve seat, the valve end of the piston exposed to inlet fluid pressure, means providing pressure equalizing fluid communication from the inlet side of the passage to the face end of the piston so that the piston is normally urged into valve closing position by fluid pressure in the inlet, vent means for the cylinder to relieve pressure from the face of the piston, the vent means having a greater area than the area of the pressure equalizing fluid communication means so that the pressure fluid may be bled off at a greater rate than it enters, a valve seat about the vent means, a normally closed first vent valve member to engage the vent valve seat adapted to be opened to release the pressure from the face of the piston so that the main valve member is opened responsive to inlet pressure, and a second vent valve member carried by the piston to close the vent means responsive to the opening of the main valve.

3. A fire extinguisher discharge valve comprising a housing having a fluid passage therethrough, a main valve seat defining inlet and outlet portions of the fluid passage, a valve member adapted to engage the valve seat from the inlet side, a piston member to urge the valve member against its seat, cylinder means in the housing for the piston, the piston having an effective area

greater than the area encompassed by the main valve seat, the valve end of the piston exposed to inlet fluid pressure, means providing pressure equalizing fluid communication from the inlet side of the passage to the face end of the piston so that the piston is normally urged into valve closing position by fluid pressure in the inlet, vent means for the cylinder to relieve pressure from the face of the piston, the vent means having a greater area than the area of the pressure equalizing fluid communication means so that the pressure fluid may be bled off at a greater rate than it enters, a valve seat about the vent means, a normally closed first vent valve member to engage the vent valve seat adapted to be opened to release the pressure from the face of the piston so that the main valve member is opened responsive to inlet pressure, and a second vent valve member having a tapered end and carried by the piston to close the vent means responsive to the opening of the main valve.

4. A fire extinguisher discharge valve comprising a housing having a fluid passage therethrough, a main valve seat defining inlet and outlet portions of the fluid passage, a valve member adapted to engage the valve seat from the inlet side, a piston member to urge the valve member against its seat, cylinder means in the housing for the piston, the piston having an effective area greater than the area encompassed by the main valve seat, the valve end of the piston exposed to inlet fluid pressure, means providing pressure equalizing fluid communication from the inlet side of the passage to the face end of the piston so that the piston is normally urged into valve closing position by fluid pressure in the inlet, vent means for the cylinder to relieve pressure from the face of the piston, the vent means having a greater area than the area of the pressure equalizing fluid communication means so that the pressure fluid may be bled off at a greater rate than it enters, a valve seat about the vent means, the vent means having its outlet in alignment with the axis of travel of the piston, a normally closed first vent valve member to engage

the vent valve seat adapted to be opened to release the pressure from the face of the piston so that the main valve member is opened responsive to inlet pressure, and a second vent valve member carried by the piston to close the vent means responsive to the opening of the main valve.

5. A fire extinguisher discharge valve comprising a housing having a fluid passage therethrough, a main valve seat defining inlet and outlet portions of the fluid passage, a valve member adapted to engage the valve seat from the inlet side, a piston member to urge the valve member against its seat, cylinder means in the housing for the piston, the piston having an effective area greater than the area encompassed by the main valve seat, the valve end of the piston exposed to inlet fluid pressure, means providing pressure equalizing fluid communication from the inlet side of the passage to the face end of the piston so that the piston is normally urged into valve closing position by fluid pressure in the inlet, vent means for the cylinder to relieve pressure from the face of the piston, the vent means having a greater area than the area of the pressure equalizing fluid communication means so that the pressure fluid may be bled off at a greater rate than it enters, a valve seat about the vent means, the vent means having its outlet in alignment with the axis of travel of the piston, a normally closed first vent valve member to engage the vent valve seat adapted to be opened to release the pressure from the face of the piston so that the main valve member is opened responsive to inlet pressure, and a second vent valve member having a tapered end and positioned on the face of the piston to enter the vent means outlet to close the vent means responsive to the opening of the main valve.

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Number	Name	Date
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