June 29, 1954 F. B. ALLEN 2,682,356

SIPHON DEVICE

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Fig. 1.

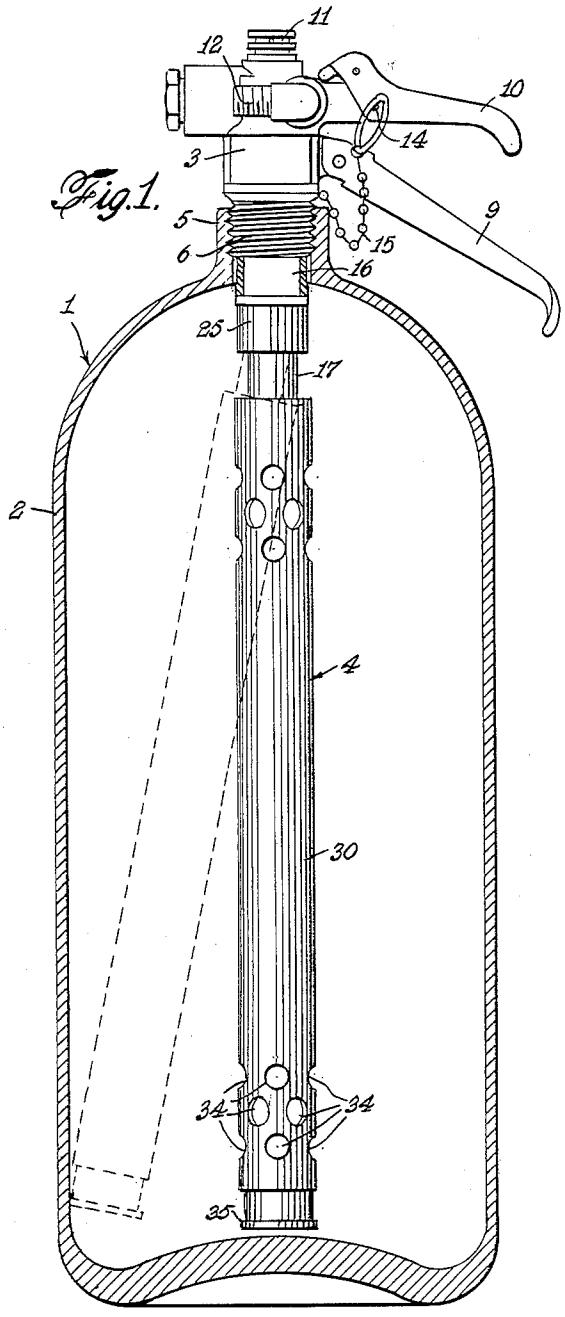
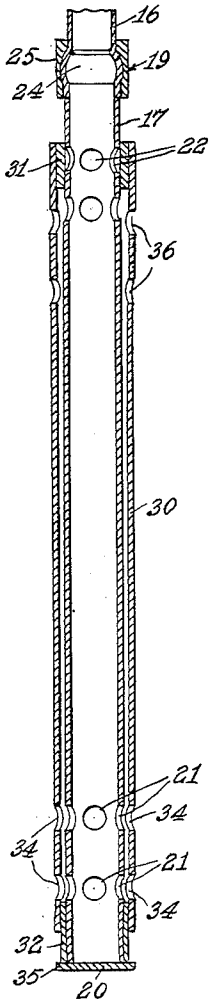


Fig. 2.



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SIPHON DEVICE

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8 Claims. (Cl. 222—396)

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The present invention relates to a syphon device for use with a container of fluid under pressure adapted to be placed in any position for the discharge of its liquid content prior to the discharge of the vapor above the liquid.

The syphon device is particularly suitable for use in a fire extinguishing system either of the fixed type such as might be used in an airplane or army tank or for a portable extinguisher. In such uses it is important that the extinguisher discharge its liquid content prior to the discharge of the vapor irrespective of the position in which the liquid container may be placed. This is necessary in the case of carbon dioxide extinguishing agent inasmuch as if the vapor is first discharged, the pressure within the container will be lowered to such an extent that the remaining liquid is solidified. It is also important that the liquid of pressurized liquid extinguishers be discharged before the vapor as it is essential that the vapor remain to provide pressure for the expulsion of the liquid.

Prior attempts have been made to solve the problem such as by utilizing ball check valves. However, difficulty has been had in some instances in that the balls have been found to jam or stick against their seats preventing the proper action.

The present invention aims to overcome the difficulties and disadvantages of prior devices by providing a syphon device for fluid under pressure in which a valve means is utilized which incorporates a sliding construction unaffected by the pressure of the discharge fluid.

In accordance with the invention this is accomplished by providing a syphon device utilizing the usual syphon tube for a guideway with a tubular member adapted to slide under the action of gravity to cover ports leading into the syphon tube from the vapor space and uncover ports leading into the syphon tube from the liquid space.

Another object of the invention is to provide a syphon device for fluid under pressure which is simple in manufacture, efficient in operation, and durable in use.

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

In the drawings:

Figure I is a side view of a container and discharge valve for a portable fire extinguisher incorporating a syphon device in accordance with the invention. In this figure the container is

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broken away to show the syphon device in position.

Figure II is a vertical sectional view of the syphon device shown in Figure I.

Referring to the drawings, there is shown in Figure I a fire extinguisher 1 comprising a container 2 having a squeeze grip type discharge valve 3 to which is attached a syphon device 4.

The container 2 is made of a suitable material such as steel to withstand the pressure of the confined fire extinguishing agent which may be carbon dioxide, or a fluid of low vapor pressure such as carbon tetrachloride pressurized by air, nitrogen, or the like. The container 2 has a neck 5 with a threaded interior surface to receive a threaded inlet 6 of the discharge valve 3.

The discharge valve 3 is made with a carrying handle 9 having a discharge handle 10 positioned thereover so that the valve may be moved into the discharge position by squeezing handle 10 towards handle 9. A conventional recoil preventing safety discharge outlet 11 is positioned at the top of the discharge valve in fluid communication with the interior of the container to safely relieve any excess pressure which might be developed. An outlet elbow 12 is provided on the side of the discharge valve 3 for connection with a discharge hose and nozzle (not shown). A safety pin 14 extends through the discharge handle 10 and the body of the discharge valve to prevent accidental discharge of the system, it being necessary to withdraw the safety pin 14 before the fire extinguisher may be discharged. A short chain 15 is used to secure the safety pin 14 to the discharge nozzle 3.

The syphon device assembly 4 includes a syphon tube in two parts 16 and 17 connected by a ball connection joint 19. The upper part 16 of the syphon tube is adapted to be received in the inlet 6 of the discharge head 3 and secured by a press fit or by threaded engagement therewith or by any other suitable construction. The lower part 17 of the syphon tube extends practically to the bottom of the container and may be made with a closed lower end 20. Inlet means for the syphon tube are provided by openings or ports 21 positioned adjacent the bottom thereof. Other inlet openings or ports 22 are positioned adjacent the upper end of the lower part 17. A bulbous end 24 is provided for the lower part 17 adapted to be received in an enlarged lower end 25 of the upper part 16 to provide the ball joint swivelling means 19.

A tubular valve member 30 is adapted to overlie the lower part 17 preferably having an inner

diameter somewhat larger than the outer diameter of the lower part 17 to provide a space for annular bearing members 31 and 32 for contact means between the tubular member 30 and the exterior surface of the lower part 17 to assure an easy sliding contact irrespective of possible unevenness in the matching surfaces of these members. The tubular member 30 has inlet ports 34 at its lower end so located that when the tubular member is in position on the lower part 17 and the syphon tube is positioned with the ball joint means 19 upwardly the ports 34 and 21 are in alignment. It should be noted that the cap member 20 extends outwardly as indicated at 35 providing abutting means for the lowermost position of the tubular member 30. At the upper end of the tubular member 30 are positioned ports 36 so located with respect to the lower portion 17 of the syphon tube that when the container is inverted and the ball joint means 19 is positioned downwardly the tubular member 20 will slide under the action of gravity to abut against the enlarged portion 25 of the ball means 19 and the ports 36 and 22 will be in alignment.

As the fire extinguisher 1 is tipped to one side, the syphon tube assembly 4 will swing to the positions indicated by the dotted lines in Figure 1. It has been found that any slight leakage between the closed ports of the tubular member and the syphon tube is immaterial in so far as the operation of the extinguisher is concerned, such leakage being so small in proportion to the discharge through the syphon tube that it is negligible.

While the invention has been described and illustrated with reference to specific embodiments thereof, it will be understood that other embodiments may be resorted to without departing from the invention, for example, while the tubular member 30 has been illustrated as being slideably positioned on the outer surface of the lower portion 17 of the syphon tube, an alternative construction might be used wherein the tubular member is positioned within the syphon tube in which case the annular bearing members 22 would be placed on the exterior of the tubular member 30. Likewise, in an alternative construction, the tubular member 30 might be provided with a closed end movable therewith so as to open and close the lower end of the syphon tube to provide inlet means. In addition, an alternative construction might be provided in which the tubular member 30 is split into upper and lower portions each slideable independently of the other under the influence of gravity and adapted to respectively cover and uncover ports in the syphon tube in the manner described herein. Therefore, the form of the invention set out above should be considered as illustrative and not as limiting the scope of the following claims.

I claim:

1. A syphon device for use with a container for fluid under pressure to discharge liquid in all positions of the device comprising a syphon tube having an outlet at one end and having one inlet adjacent the outlet and having another inlet adjacent its other end, and a tubular member, the wall of the tubular member forming a gravity valve closing the upwardly positioned inlet irrespective of the position of the container, the syphon tube acting as a guideway for the tubular member.

2. A syphon device for use with a container for fluid under pressure to discharge liquid in all positions of the device comprising a syphon tube having an outlet at one end and having one inlet adjacent the outlet and having another inlet adjacent its other end, and a tubular member, the wall of the tubular member forming a gravity valve closing the upwardly positioned inlet irrespective of the position of the container, the syphon tube acting as a guideway for the tubular member, the wall of the tubular member having ports therein positioned so that the lowermost opening is in alignment with the lowermost inlet of the syphon tube and the wall of the tubular member closes the uppermost inlet.

3. A syphon device for use with a container for fluid under pressure to discharge liquid in all positions of the device comprising a syphon tube having an outlet at one end and having one inlet adjacent the outlet and having another inlet adjacent its other end, and a tubular member, the wall of the tubular member forming a gravity valve, the outer surface of the syphon tube acting as a guideway for the slideable support of the tubular member, the tubular member wall having ports therein positioned so that the lowermost opening is in alignment with the lowermost inlet of the syphon tube and the wall of the tubular member closes the uppermost inlet.

4. A syphon device for use with a container for fluid under pressure to discharge liquid comprising a syphon tube having an outlet at one end and having one inlet adjacent the outlet and having another inlet adjacent its other end, and a tubular member forming a gravity valve guided by the syphon tube and automatically closing the uppermost positioned inlet irrespective of the position of the container, the tubular member having one opening adjacent its end towards the outlet of the syphon tube and having another opening adjacent its other end whereby when the syphon tube outlet is downwardly positioned the inlet adjacent the outlet of the syphon tube and the corresponding opening of the tubular member are in alignment while the wall of the tubular member closes the other inlet of the syphon tube, while when the syphon tube outlet is upwardly positioned, the inlet adjacent the outlet of the syphon tube is closed by the wall of the tubular member and the other inlet of the syphon tube is in alignment with the other opening in the tubular member.

5. A syphon device for use with a container for fluid under pressure of gas and adapted to discharge liquid in all positions of the device comprising a syphon tube having an outlet at one end thereof and having two inlets, one inlet positioned adjacent the outlet, the other inlet positioned at the other end of the syphon tube, and a tubular member reciprocably supported by the syphon tube, the tubular member having inlet openings adjacent each end thereof so located that when the outlet is positioned upwardly the inlets at the lower ends of the tubular member and syphon tube are in alignment and when the outlet is positioned downwardly the inlets at the normally upper ends of the tubular member and syphon tube are in alignment, the tubular member moving from one position to another under the action of gravity.

6. A syphon device for use with a container for fluid under pressure of gas and adapted to discharge liquid in all positions of the device comprising a syphon tube having an outlet at one end thereof and having two inlets, one inlet positioned adjacent the outlet, the other inlet positioned at the other end of the syphon tube,

and a tubular member reciprocably supported by the syphon tube, the tubular member having inlet openings adjacent each end thereof so located that when the outlet is positioned upwardly the inlets at the lower ends of the tubular member and syphon tube are in alignment and the inlet of the syphon tube at the outlet end is closed by the wall of the tubular member, and when the outlet is positioned downwardly the inlets at the normally upper ends of the tubular member and syphon tube are in alignment and the inlet of the syphon tube away from the outlet end is closed by the wall of the tubular member, the tubular member moving from one position to another under the action of gravity.

7. A syphon device for use with a container for fluid under pressure of gas and adapted to discharge liquid in all positions of the device comprising a syphon tube having an outlet at one end thereof and having two inlets, one inlet positioned adjacent the outlet, the other inlet positioned at the other end of the syphon tube, stop means, and a tubular member reciprocably supported by the outside of the syphon tube, the tubular member having inlet openings adjacent each end thereof so located that when the outlet is positioned upwardly the lower end of the tubular member abuts against the stop means and the inlets at the lower ends of the tubular member and syphon tube are in alignment, and when the outlet is positioned downwardly the inlets at the normally upper ends of the tubular member and syphon tube are in alignment, the tubular member moving from one position to another under the action of gravity.

8. A syphon device for use with a container

for fluid under pressure of gas and adapted to discharge liquid in all positions of the device comprising a syphon tube having an outlet at one end thereof and having two inlets, one inlet positioned adjacent the outlet, the other inlet positioned at the other end of the syphon tube, stop means, a tubular member reciprocably supported by the outside of the syphon tube, the tubular member having inlet openings adjacent each end thereof so located that when the outlet is positioned upwardly the lower end of the tubular member abuts against the stop means and the inlets at the lower ends of the tubular member and syphon tube are in alignment, and when the outlet is positioned downwardly the inlets at the normally upper ends of the tubular member and syphon tube are in alignment, and annular bearing members interposed between the syphon tube and the tubular member to facilitate the sliding of one with respect to the other, the tubular member moving from one position to another under the action of gravity.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
963,633	Newland	July 5, 1910
1,460,208	Mohn	June 26, 1923
2,394,345	Werner	Feb. 5, 1946
2,432,261	Thompson	Dec. 9, 1947
2,569,975	Conc	Oct. 2, 1951

FOREIGN PATENTS

Number	Country	Date
29,040	Great Britain	Dec. 17, 1912