March 29, 1932. V. MERRITT 1,851,202

DEVICE FOR PREVENTING VESSELS FROM BURSTING

Filed Dec. 5, 1929

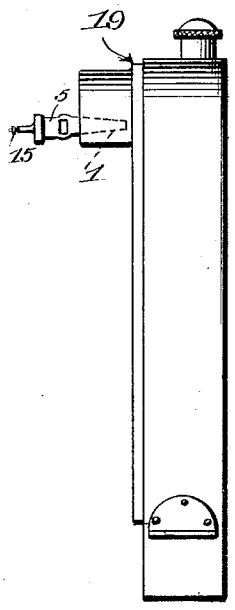

Fig. 4.

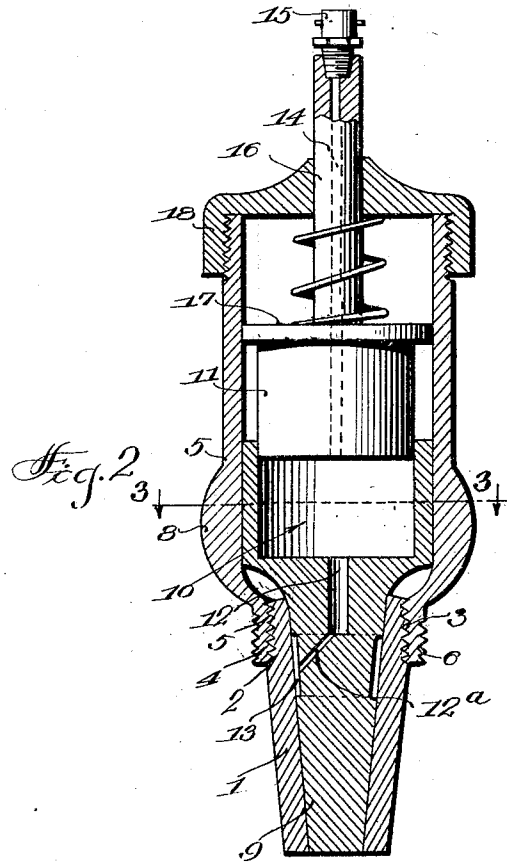

Fig. 2.

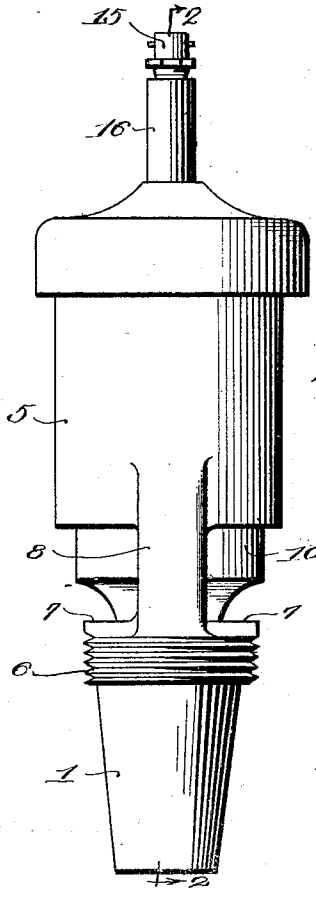

Fig. 1.

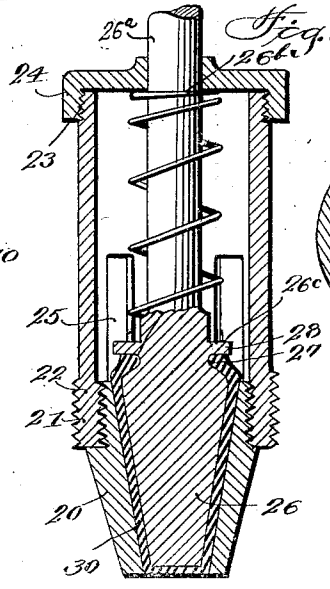

Fig. 5.

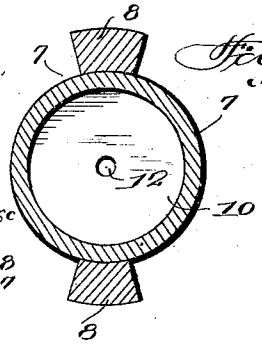

Fig. 3.

INVENTOR
Vernon Merritt
BY
Munn & Co.
ATTORNEY

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UNITED STATES PATENT OFFICE

VERNON MERRITT, OF MONTGOMERY, ALABAMA

DEVICE FOR PREVENTING VESSELS FROM BURSTING

Application filed December 5, 1929. Serial No. 411,926.

My invention relates to improvements in devices for the purpose of preventing the bursting by freezing of metal piping or other containers, such as steam fittings, water cooled engines, etc., and it consists in the combinations, construction and arrangement of parts as will be hereinafter more fully described and claimed.

The present invention is designed as an improvement over my invention disclosed in a co-pending application Serial No. 348,856, filed March 21, 1929.

An object of the invention is to provide a device of the class set forth which can readily be mounted on or incorporated in a container or piping containing liquid subject to freezing temperature.

Another object of the invention is to provide a device of the class described which will not be rendered inoperable by clogging of the parts thereof with ice formed from the freezing liquid.

A further object of the invention is to provide a simple means for the lubrication of the movable parts of the device as well as to exclude the freezing liquid from contact with those portions of the device that might be rendered inoperable by said frozen liquid.

A further object of my invention is to provide a device of the character described which is of simple construction, has few parts and is not liable to easily get out of order.

Other objects and advantages of the invention will appear in the following specification and the novel features will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming a part of this application, in which:

Figure 1 is an elevational view of the invention, showing means for mounting the same upon a liquid container;

Figure 2 is a sectional elevational view of my device substantially on the line 2—2 of Figure 1, with parts thereof being shown in elevation;

Figure 3 is a transverse sectional view of my device on the line 3—3 of Figure 2;

Figure 4 is an end elevational view, showing my device mounted for operation on the radiator of an automobile, and

Figure 5 is a sectional view of a modified form of my device.

In carrying out my invention in accordance with the form of Figures 1 to 4 inclusive, I make use of an extended valve seat member 1 of truncated cone shaped form provided at the outer extremity thereof with a reduced portion 2 with threads 3 thereon for engagement with the threads 4 upon the barrel housing portion 5.

This barrel housing is provided at the lower extremity thereof with the external threads 6 adapted to engage the threads in the wall of the container in which the device is operable.

Adjacent the inner end of this housing there are provided the semi-circular ports 7 separated by the supporting portions of said housing, indicated at 8, for a purpose presently to be described.

Engageable in the valve seat member 1 is a valve 9 of truncated cone-shape adapted to snugly engage its seat. The valve 9 is provided with the outwardly extending cylindrical portion 10 for engagement with piston means 11 constituting a portion of the means for lubrication by the supply of grease in the manner to be described hereinafter. Communicating with the cylindrical portion 10 is a passageway 12 leading to the passage 12^a and thence to the circular reduced portion 13 in the body of the valve. The piston 11 is provided with a longitudinally extending passage 14 communicating with the grease cup means 15 mounted on the end of the extension 16 of the piston. For forcing the piston into engagement with the cylinder 10, the spring 17 is provided surrounding the extension of said piston and operably engaging the upper portion of said piston and the innerside of the cap member 18 threadedly mounted on the barrel housing 5 and in which the extension 16 of the piston member 11 is slidably engaged.

Figure 4 shows my device mounted by means of its mounting threads 6 in the radiator of an automobile. If positioned at the center of the last place to freeze in said

radiator, the valve will operate to release the excess liquid, which will be forced through said valve and from the radiator due to the pressure exerted by the freezing liquid on the liquid in engagement with my device.

From the foregoing description of the various parts of the device the operation thereof may be readily understood. This device as has been previously stated is designed to be mounted upon a container for liquids subjected to freezing temperatures and should be so mounted on said container as to present the inner portion of the truncated cone member in that place in said container in which the water freezes last. This position is ordinarily the center of said container. As the liquid expands, due to the freezing thereof, the valve member 9 is forced outwardly upon its seat permitting the flow of liquid between the truncated cone portion and said seat to the semi-circular-shaped ports 7 which constitute the exit for said liquid. The reduced portion 13 is provided with grease from the grease cup 15 by means of the passageway in the piston member 11, grease compression chamber provided in cylinder 10 and passageways 12 and 12ª. The pressure of the spring 17 serves to insure a ready supply of said grease. This grease prevents seepage of water by capillary attraction between the walls of the members 1 and 9 when the valve is in closed position. It also serves to lubricate the valve with relation to its seat for easy operation thereof which is especially effective in my device, since ice will not adhere to the parts so lubricated.

It is therefore easy to be seen that a device is provided which will readily permit the liquid to flow from the container when the same expands, due to freezing, thereby preventing the container or vessel from bursting.

In that form of the device shown in Figure 5 the stationary valve seat member 20 threadedly engages a mounting collar 21 as in the preceding form. This mounting collar 21, however, is of much simpler form than the similar supporting means of the preceding form. It consists of a simple annulus having the threads 22 at one end thereof for engagement with the walls of the aperture in the chamber in which it is used and the threads 23 on the opposite end thereof for engagement with a cap member 24 for enclosing the end thereof. This annulus 22 has ports 25 of any suitable construction and which may be formed in an enlarged portion of the annulus as in the preceding form. The movable member 26 of the valve is of substantially similar construction to that of the preceding form except that it has a reduced portion 27, projecting portions 28, and a solid stem 26ª surrounded by spring 26ᵇ, which engages cap 24 and shoulder 26ᶜ to normally urge valve member 26 to closed position. Surrounding the portions of the movable member 26, which engage the walls of the valve seat member 20 is a jacket 30 composed of any suitable material to which ice will not adhere, such as rubber. The neck 31 of this jacket is made of a smaller circumference than the reduced portion 27 of the movable valve 26 with which it cooperates for securing the said jacket in close, fixed relation with said reduced portion. Since ice will not adhere to this material 30 and thereby tend to freeze the same to the valve seat, the sensitiveness of the valve is greatly increased over those forms of freeze valves using material in the valve engaging surfaces to which ice adheres.

The operation of this form of the device is substantially similar to that of the preceding form. The pressure exerted on the liquid adjacent the valve by the freezing of the liquid in other portions of the liquid container subjected to freezing temperature raises the movable portion 26 of said valve, thereby allowing the flow of the liquid between the walls of said movable member and the valve seat 20 and the emission of said fluid from ports 25, thus preventing the vessel from bursting due to freezing.

It is obvious that the jackets 30 are removable, thereby making it very easy to replace the same upon deterioration thereof, due to oxidation or decay.

I claim:

1. A valve responsive to the pressure exerted by a freezing liquid comprising a valve seat member, a movable valve member engaging the valve seat, and means for lubricating the engaging walls of said members and for sealing the space between said walls, whereby the seepage of liquid past said valve and consequent freezing between the valve and seat member is prevented when the valve is seated.

2. A sealing and lubricating means for the engaging walls of a movable member and a stationary member in a valve, comprising a reduced portion on said movable member, a passageway in said movable member communicating with said reduced portion, and resilient means for forcing sealing and lubricating material through said passageway, and into said reduced portion, for the purpose described.

3. A sealing and lubricating means for the engaging walls of a movable member and a stationary member in a valve, comprising a reduced portion on said movable member, a passageway in said movable member communicating with said reduced portion, and resilient pressure means for forcing sealing and lubricating material through said passageway, and into said reduced portion, said means comprising a cylinder formed on the top of said movable means, and communicating with said passageway, and a piston cooperating with said cylinder

upon the operation of said movable means.

4. A sealing and lubricating means for the engaging walls of a movable member and a stationary member in a valve, comprising a reduced portion on said movable member, a passageway in said movable member communicating with said reduced portion, resilient pressure means for forcing sealing and lubricating material through said passageway and into said reduced portion, said means comprising a cylinder formed on the top of said movable means and communicating with said passageway, and a piston cooperating with said cylinder upon the operation of said movable means, and means for feeding the sealing and lubricating material to said forcing means comprising a passageway extending through said piston and communicating with said cylinder and provided with a source of supply of the sealing and lubricating material for the purpose described.

5. A pressure valve for the release of liquid from a liquid containing vessel subjected to freezing temperatures, comprising a casing having an elongated valve seat member detachably mounted upon one end thereof, external screw threads formed at the junction of said casing and valve seat member for mounting in the liquid containing vessel, a reciprocable valve mounted within said casing and adapted to seat in said valve seat member, spring means for holding said valve in seated engagement, and said casing having ports extending outwardly from said valve seat member, whereby free movement of liquid through said valve will be permitted.

6. A pressure valve for release of liquid from a liquid containing vessel subjected to freezing temperatures, comprising a casing having an elongated valve seat member upon one end thereof, external screw threads upon said casing for mounting in the liquid containing vessel, said threads being formed at a point upon said casing to dispose the major portion of said valve seat member within said vessel, a reciprocable valve mounted within said casing and adapted to seat in said valve seat member, spring means for holding said valve in seated engagement, and said casing having ports extending outward from said seat member, whereby free movement of liquid through said valve will be permitted.

VERNON MERRITT.