Aug. 8, 1961 B. J. MANAGHAN 2,995,140

DRAIN-A-MATIC VALVE

Filed Sept. 8, 1960

FIG. 1

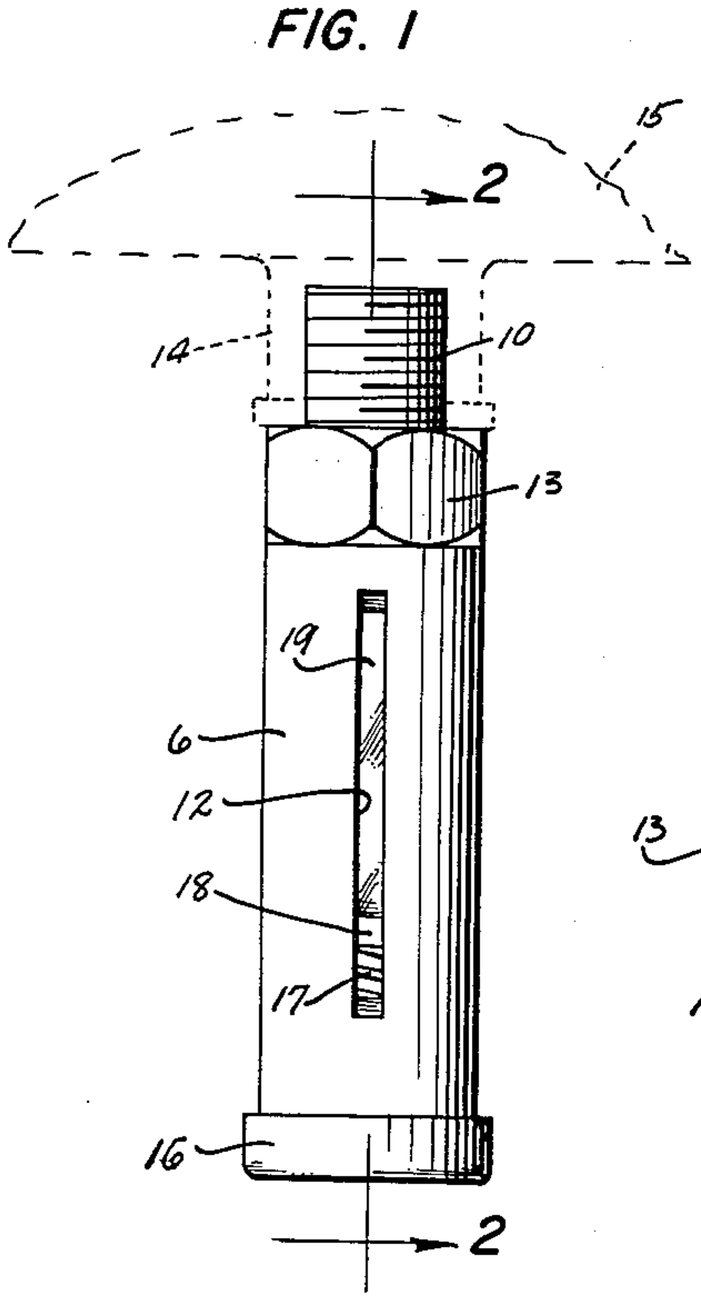
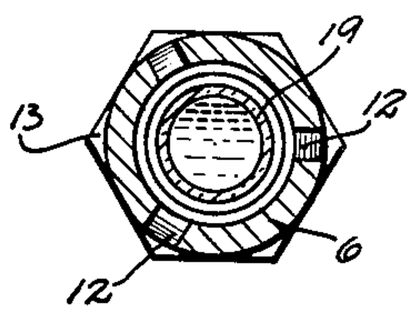


FIG. 3



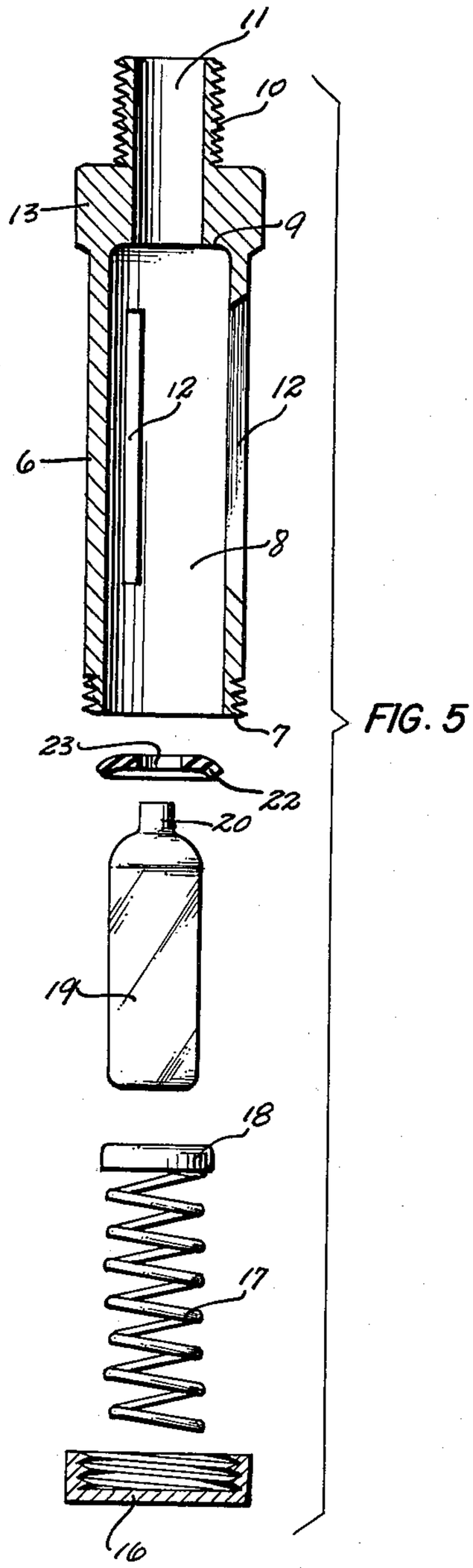


FIG. 5

FIG. 2

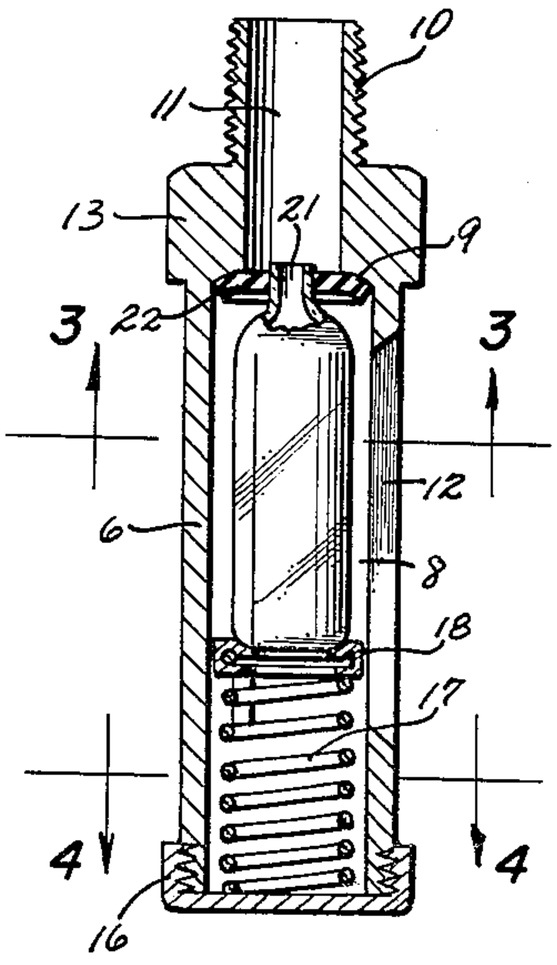
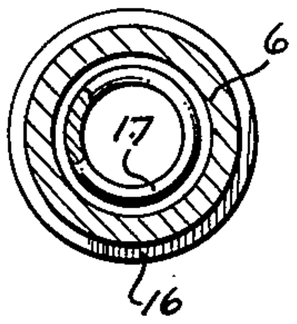


FIG. 4



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DRAIN-A-MATIC VALVE

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3 Claims. (Cl. 137—60)

This invention relates to safety devices and more specifically to a safety valve for the protection of liquid cooled systems in frigid weather.

It is a well known fact that most liquids expand slightly upon freezing. This phenomena results in costly losses each year in the replacement or repair of cylinder blocks, radiators and other liquid containers which may be subjected to temperatures below the freezing point of the contained liquid.

A primary object of this invention is to provide a safety valve means which effectively protects such systems from damage by freezing.

It is a further object of this invention to provide a safety valve of the above class which is operative to drain the system as the temperature of the contained liquid approaches the temperature of solidification.

It is a still further object of this invention to provide a safety valve of the above class which is operative in conjunction with any liquid.

It is yet a further object of this invention to provide a safety valve of the above class which is rugged in construction, effective in operation, and may be manufactured at low cost.

The invention consists of a cylindrical casing having a concentric bore which is closed at its lower end by a removable cap. The upper end of the bore is formed into an annular valve seat which communicates with a tubular plug threadably connecting the sleeve to a liquid containing system. A valve having a central hole is adapted to engage over the seat and is urged into such engagement by one end of a glass bottle. The neck of the bottle is open and sealingly extends through the central hole in the valve. The other end of the bottle is urged by a compression spring located between the bottle and the removable cap. Vertical slots formed through the casing provide drainage means for liquid contained in the system upon fracture of the glass bottle.

A full understanding of the construction of this invention, together with further novel features and advantages, will be had from the following detailed description of a preferred embodiment thereof, taken in conjunction with the attached drawings wherein:

FIG. 1 is a side elevation of the safety valve shown assembled beneath the underside of a tank or cooling system indicated by broken lines.

FIG. 2 is a cross sectional side elevation of the device taken along the line 2—2 of FIG. 1.

FIG. 3 is a cross sectional end elevation taken along the line 3—3 of FIG. 2.

FIG. 4 is a second cross sectional end elevation taken along the line 4—4 of FIG. 2.

FIG. 5 is an exploded view shown partly in cross section, and indicating the several related parts which comprise the invention.

Similar reference characters indicate corresponding parts throughout the several views in the drawing.

Referring now to the drawing in detail, the numeral 6 represents a cylindrical casing open and externally threaded at the lower end 7. The casing has a concentric bore 8 which is reduced in section towards the upper end to provide an annular valve seat 9. The upper end of the casing consists of a threaded plug 10 which has a smaller bore 11 communicating concentrically of the valve seat 9 with the bore 8. The casing is also provided with four diametrically opposed slots 12 formed longitudinally through the wall of the casing. A hexagonal

nut 13 is formed at the base of the threaded plug 10 for the purpose of threadably securing the casing 6 and plug 10 within a drain opening 14 of a fluid containing tank 15. The lower end of the casing is selectively closed by a threaded cap 16.

Received within the bore 8 of the casing 6 is a compression spring 17 which is seated at the lower end within the threaded cap 16. The upper end of the spring is capped with a disc shaped platform 18 adapted to receive the base of a cylindrical glass bottle 19. The glass bottle terminates upwardly with a reduced neck portion 20 which provides an opening 21 into the bottle. Sealingly engaging around the neck of the bottle 19 is a circular washer or valve 22 having a concentric hole 23. The washer is made of flexible and resilient material and is adapted to sealingly engage with the valve seat 9 under compression supplied by the compression spring 17 through the glass bottle 19.

In operation, the valve casing is secured by the threaded plug 10 to a lower portion of a system to be protected. Liquid from the system will immediately fill the bottle to charge the device. The valve should preferably be located in an area which will most readily be subject to temperature change. As the temperature drops, the contained liquid will freeze prior to the liquid contained in the system, due both to the exposed location of the valve and the small volume of liquid involved. Upon freezing, the glass bottle 19 will break, thereby permitting the compression spring to destroy the frozen liquid formed and cause the valve 22 to release from engagement with the valve seat 9. The contents of the system will now be free to pass through the valve opening and drain through the slots 12. The valve may be reset by removing the broken glass and replacing with a new glass bottle. This system will operate regardless of the type of liquid involved, since the glass bottle will fracture as the temperature reaches the freezing point of the liquid, thus preventing the liquid from freezing within the system and causing serious damage thereto.

If desired, the valve may be connected to an alarm circuit which would be tripped into operation to warn or otherwise indicate the fact that the system is in the process of draining due to the critical temperature conditions.

It will be appreciated that the glass bottle will contain and remain filled with whatever liquid is used in the system, thereby ensuring that a sample will freeze at the same temperature as that in the system.

From the foregoing, it is believed that the construction, operation and advantages of this invention will be fully apparent. However, since numerous modifications will occur to those skilled in the art, it is not desired to limit the construction exactly to that shown and described, and accordingly, modifications and equivalents may be resorted to, falling within the scope of the appended claims.

I claim:

1. A safety valve for systems containing liquids subject to freezing, and comprising a cylindrical casing having a concentric bore, a valve seat formed at one end of the bore communicating with the system through a tubular plug disposed outwardly of the system, a valve engaging with the seat and having a concentric hole formed therethrough to sealingly receive the open end of a glass bottle, and a compression spring urging against the other end of the bottle such that the valve sealingly engages with the seat, said bottle filled with the same liquid as is contained in the system, said open neck providing communication between the bottle and the system, and an opening formed through the casing providing drainage for the system upon fracture of the bottle as

a result of the expansion of the liquid freezing in the bottle.

2. A safety valve for systems containing liquids subject to freezing, and comprising a cylindrical casing having a concentric bore at the lower end and communicating through a valve seat and a tubular plug at the upper end, said plug adapted for sealingly connecting the casing to the outside of the system, a valve having a central hole received in the bore for engaging on the seat, a glass bottle open at one end through a reduced neck portion, said neck portion projecting upwardly through the bore such that the neck portion sealingly engages through the central hole, a compression spring engaging with the other end of the bottle for urging the valve into sealing engagement with the valve seat, said reduced neck portion providing communication between the liquid in the bottle and the liquid in the system, and an opening formed through the casing providing drainage for the system upon fracture of the bottle as a result of the expansion of the liquid freezing in the bottle.

3. A safety valve for systems containing liquids subject to freezing, and comprising a cylindrical casing having a concentric bore sealed at the lower end by a threaded

cap, said bore communicating at its upper end through a valve seat and a tubular plug with the system, a valve having a central hole for engaging with the seat inwardly of the tubular plug, a glass bottle having an opening at one end through a reduced neck portion, said portion adapted to project through and sealingly engage in the central hole, a compression spring located between the cap and the other end of the bottle for urging the valve into sealing engagement with the seat, said bottle adapted to be filled with liquid from the system through the opening in the bottle, and an opening formed through the casing providing drainage for the system upon fracture of the bottle as a result of the expansion of the liquid in the bottle.

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