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PRESSURE CAP WITH INTEGRAL PRESSURE RELEASE
MECHANISM FOR SYRUP TANKS AND THE LIKE
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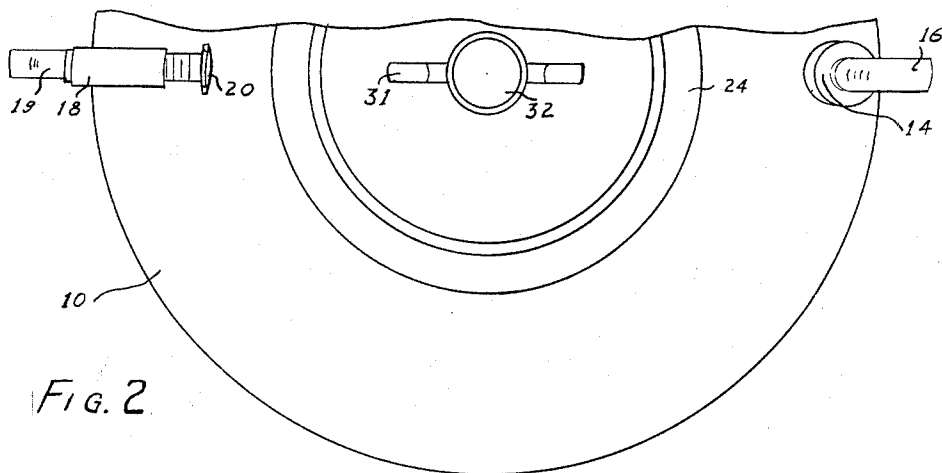


FIG. 2

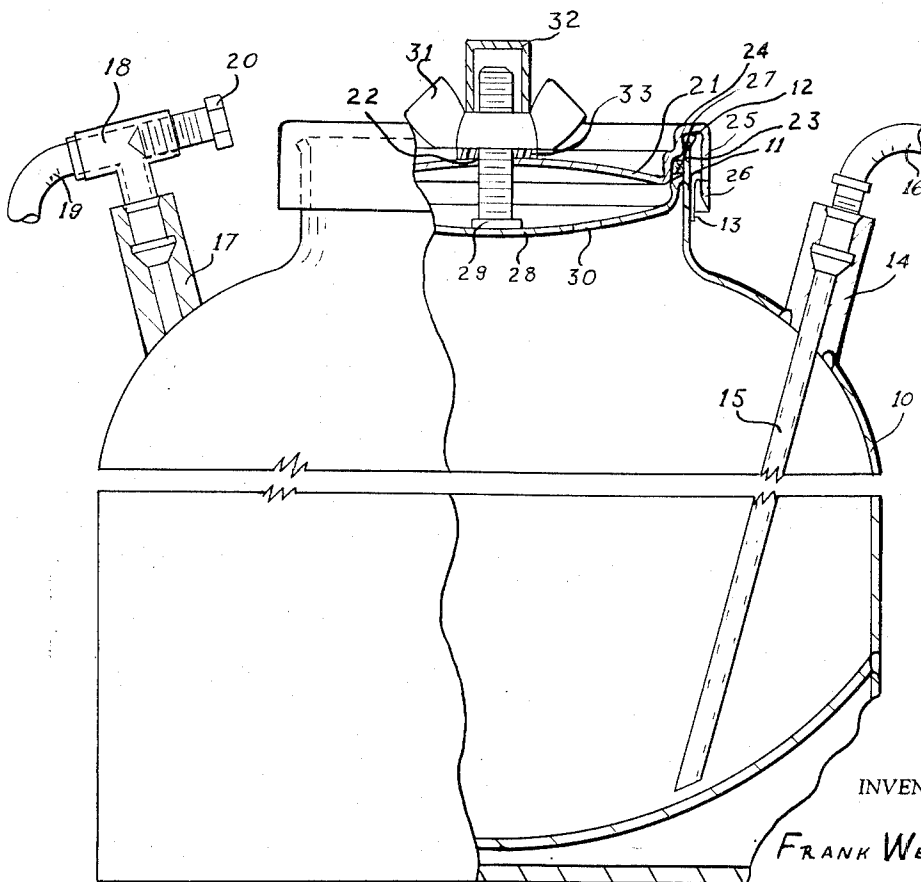


FIG. 1

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PRESSURE CAP WITH INTEGRAL PRESSURE RELEASE MECHANISM FOR SYRUP TANKS AND THE LIKE

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5 Claims. (Cl. 222—394)

This invention relates to the container art and more particularly to improvements for facilitating the opening and closing of containers which normally are maintained under fluid pressure. The invention has particular applicability to the beverage dispensing art and will be hereinafter described in connection therewith, although it should become apparent as the description proceeds that principles of the invention are equally applicable to other specific uses.

It is now rather common practice in dispensing carbonated beverages to mix the flavoring syrups and the carbonated water directly at the dispensing location and this method requires, in addition to other apparatus, the presence of a sanitary, usually stainless steel container for each of the different syrups utilized. Such containers are of the pressure type in order that the syrups contained therein may be propelled to the mixing valve or valves, and inert gas such as carbon dioxide being employed to effect the pressure while minimizing oxidation of the syrups in the containers. During normal use, these syrup tanks require refilling from time to time and it then becomes necessary to cut off the supply of pressuring gas after which the filling caps of the tanks or containers may be removed.

In order that the syrup tanks may be thoroughly scoured and cleaned when required and that they may be quickly filled with the viscous syrups without spilling, it is common practice to utilize wide smooth-mouthed structures for which the closure caps are of the expansion plug type, normally using an O-ring or its equivalent as the expandable sealing member. Further, the means to expand the sealing ring into pressure contact with the smooth inner periphery of the mouth of the container or tank must necessarily be an inner disc-like clamp which engages the inner end of the ring throughout its circumference to force the same axially along a conical section of the outer cap proper and thus into pressure engagement with the inner periphery of the mouth of the container or tank. This results in a self-sealing assembly with the gas pressure in the tank always tending to force the sealing ring into sealing relation even after the clamping disc is loosened.

While the above outlined apparatus is best suited for the specific application involved, it has the disadvantage of requiring the pressure in the tank remaining after the supply of pressuring gas is cut off to be purged before the tank can be safely opened or indeed be opened at all. This requires a separate purging valve for each of the syrup tanks of the dispensing installation.

It is the primary object of the present invention to eliminate, in a pressurized syrup tank of the kind outlined above, the need for the separate purging valve discussed whereby manipulation of the tank when refilling is simplified, the complete tank assemblies are more cheaply produced, and scouring and cleaning of the tank assemblies is made easier.

The above object is accomplished by incorporating directly into the filling cap assemblies for the pressure tanks,

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means to automatically release the pressure within the tanks and consequently the fluid pressure exerted against the sealing rings upon loosening the clamping discs normally used to force the sealing rings into pressure engagement with the mouths of the tanks. The manner in which this is accomplished will become apparent from the following specification and the accompanying drawing wherein there is disclosed a preferred embodiment of the invention.

In the drawing:

Figure 1 is a vertical section of a conventional syrup tank utilizing the improved pressure cap of my invention; and

Figure 2 is a partial top plan view of the assembly of Figure 1.

Referring to the drawing, reference numeral 10 designates the principal body portion of reduced diameter terminating in a mouth section having a smooth inner periphery 11. At the upper extremity of the mouth is a small upwardly and outwardly flaring flange 12, and welded or otherwise rigidly secured to the outer periphery of the mouth section are discontinuous thread flanges 13. Mounted on the upper tapering section of the tank 10 is a fitting 14 adapted to receive, in fluid sealing relation, a dip tube 15 extending to the bottom of the tank through which the syrup may be discharged outwardly through a flexible conduit 16 leading to the mixing and dispensing apparatus, not shown. A similar fitting 17 is also mounted on the upper portion of the tank to detachably receive a terminal fitting 18 of a gas supply conduit 19 and, as shown, the fitting 18 incorporates a valve having an operator 20 by which the flow of gas under pressure into the tank may be shut off when desired.

The closure cap of my invention comprises a flanged cup-like outer disc 21, preferably a stamping, which has a centrally disposed aperture 22, an annular recess 23 inwardly of the flange (24), and depending downwardly from the outer periphery of the flange 24 is a skirt 25 from which is punched out a plurality of discontinuous thread elements 26 which cooperate with the discontinuous thread members 13 to lock the cap onto the mouth 11 but without, however, providing any fluid sealing means. It should be understood, that, in accordance with usual practice, the thread section 26 may be moved downwardly intermediate the ends of the thread sections 13 when applying the cap so that a bayonet-like quick-releasable interconnection is provided between the cap and mouth of the tank. As shown, the annular recess 23 is positioned well within the end of the mouth 11 when the cap is fully applied by interengagement of the thread elements 13 and 26, and housed within this recess is a yieldable O-ring 27 which provides the fluid seal between the cap and mouth in the manner to be hereinafter described. For this purpose, the axial outer end of the recess 23 is flared upwardly and outwardly so that upon pressure being applied to the axial inner end of the O-ring the O-ring will be stretched radially outward and moved into tight continuous pressure contact with both the cap member 21 and the mouth 11 of the tank whereby an effective fluid seal will be provided.

To initially expand the O-ring 27 and to insure the maintenance of continuous sealing pressure between the O-ring and parts 11 and 21, I provide a cup-shaped disc 28 having a flattened peripheral edge portion which engages the inner axial end of the O-ring 27. Concentricity of the parts is insured by contiguous overlapping cylindrical portions of the discs 21 and 28 as shown.

All of the above structure is old in the prior art where to complete the assembly a flat-headed stud 29 welded to the upper surface of disc 28 was extended through the central aperture in disc 21 and thereabove provided with a wing nut whereby the O-ring clamping disc could be

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forcibly moved upward relative to the upper disc 21 to extrude the O-ring radially outward into pressure contact with the disc 21 and mouth 11. To effect a continuing pressure-tight seal in this structure, it is obvious that the disc 28 must be fluid impervious—otherwise, pressure could leak off about the threads of studs 29. Therefore, the pressure existant in the tank, even after the incoming supply is shut off, would act against the disc 28 and O-ring 27 to maintain the seal even after the wing nut is loosened. In the prior art, it was therefore necessary to provide additional valving means to purge the pressure from the tank before the cap could be opened.

In my invention, the disc 28 is made pervious to passage therethrough of the pressuring gas by providing therein an aperture 30, for example, so that upon loosening of the wing nut 31 the gas pressure within the entire body of the tank and cap structure can be purged directly out about the threads of the stud 29. As shown, the wing nut 31 is formed with an integral cap 32 to receive upper projecting end portion of the stud 29 and it should therefore be obvious that outward passage of gas through the threaded interconnection between the stud and the wing nut is effectively prevented. To complete the seal the nylon washer 33 is interposed between the top surface of the disc 21 and the bottom surface of the wing nut 31 to prevent the outer passage of gas between aperture 22 and stud 29 when the wing nut is tightened.

When using the above described assembly of my invention, when it is desired to remove the closure cap for refilling the tank, for example, it is only necessary to close off the valve 18, 20 and to loosen the wing nut 31 after which the cap may be safely rotated to disengage the threads 13 and 26 after which the cap may be lifted off. Closure of valve 18, 20 stops the flow of gas pressure to the tank and loosening of the wing nut releases the clamping pressure applied to the O-ring 27 through disc 28 and allows the gas pressure in the tank to be purged off through aperture 22 and outwardly across the axial ends of the washer 33. In this manner, the operation of the apparatus is substantially simplified even though the apparatus employed is simpler in design and more economical to produce than the structures of the prior art.

Another meritorious feature of my invention is the fact that since the nylon plastic of the washer 33 is inherently lubricating, the wing nut 31 is much easier to turn under the loading effected by flexure of the clamping disc 28 which disc, of course, must be of substantial strength to impart adequate clamping pressure to the rather large circumference of the O-ring 27.

It should now be apparent that I have provided an improved removable pressure cap assembly for syrup tanks and the like which accomplishes the objects initially set out. In actual practice, the invention overcomes one of the more annoying problems encountered in servicing pressure tanks for flavoring syrups and the like. Since a number of changes may be made in the specific design of the apparatus herein illustrated and described without departing from the spirit or scope of the invention, reference should be had to the appended claims in determining the scope of the invention.

What I claim is:

1. A pressure cap for a container having a wide mouth

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provided with a smooth inner periphery and means on its external diameter to releasably lock the cap onto the container comprising a cup-shaped disc adapted to fit partially within the mouth and having an outwardly directed flange overlying the end of the mouth together with a skirt depending from the outer periphery of the flange to overlie said outer diameter of the mouth and carrying means cooperating with said locking means, said cup-shaped member having an annular recess in its inner face adjacent the smooth inner periphery of said mouth, an elastic O-ring positioned within said recess and adapted to have continuous sealing contact with the surfaces of said recess and the smooth inner periphery of said mouth, a fluid pervious clamping disc on the inner side of said cup-shaped member and having an outer peripheral portion adapted to be brought into pressure contact with the inner axial end of said O-ring, an aperture in the center of said cup-shaped member, a stud having its inner end portion secured to said clamping disc and having a threaded free end extending outwardly through said aperture, a wing nut having a flat inner end threaded onto the free end of said stud and having an integrally attached fluid impervious cap portion enclosing the outer extremity of said stud, and gasket means between the flat inner face of said wing nut and the adjacent outer surface of said cup-shaped member to thereby seal said aperture and stud passing therethrough from the space outside said cap.

2. An assembly according to claim 1 further characterized in that said gasket means comprises a washer formed of yieldable material having inherent lubricating properties.

3. Apparatus for delivering syrup under pressure to a beverage dispensing station comprising a tank, a fitting in an upper wall portion of said tank for receiving a dip tube extending into said tank whereby syrup may be propelled outwardly from the bottom portion of said tank by gas pressure applied to the upper portion of said tank, a second fitting in an upper wall portion of said tank to supply gas pressure to said tank, said tank having an upper enlarged filling mouth, an expandable plug-type closure for said mouth, means on said closure to expand the same into pressure engagement with the inner periphery of said mouth whereby said mouth is effectively sealed against leakage of gas pressure, and means on said closure to purge the pressure existant in said tank upon retraction of said expanding means.

4. Apparatus according to claim 3 further characterized in that said closure includes an elastic O-ring and an inner clamping disc adapted to engage the inner axial end of said O-ring to force the same radially into continuous pressure engagement with the inner periphery of said mouth, and further including a stud secured at its inner end to said disc and extending outwardly of the cap and a wing nut threaded onto the outer free end of said stud and having an integral cap enclosing the said outer free end of said stud in fluid type relation.

5. Apparatus according to claim 4 further including a yieldable washer made of material having inherent self-lubricating qualities interposed between said wing nut and the outer surface of said cap.

No references cited.