July 18, 1961 E. P. SOMMERS, SR 2,992,761

VENTED LIQUID DISPENSING DEVICE

Filed Sept. 8, 1958

FIG. 1.

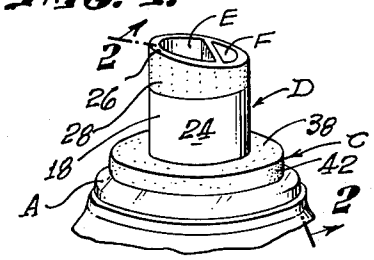


FIG. 2.

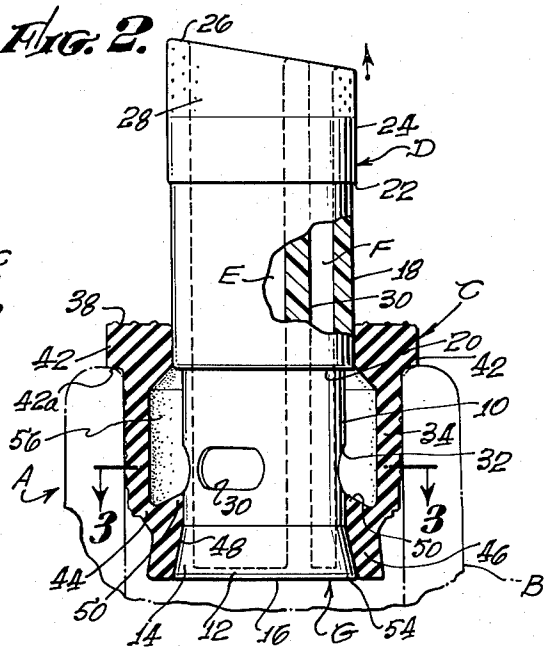


FIG. 3.

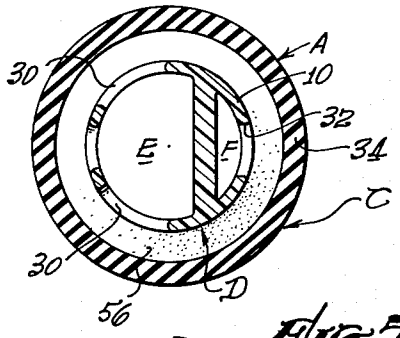


FIG. 4.

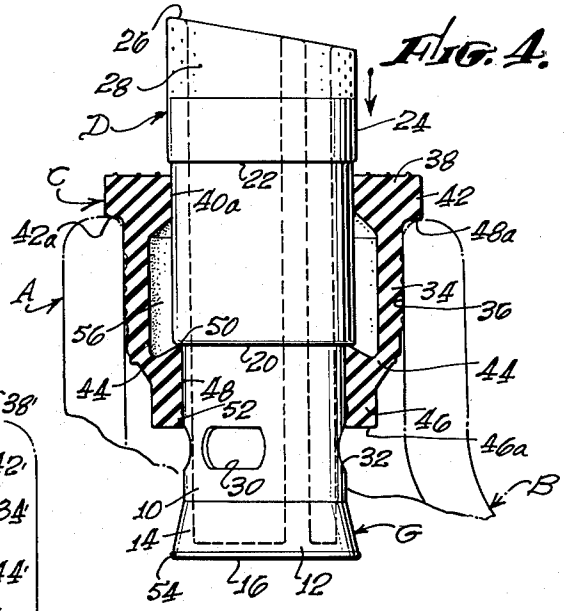
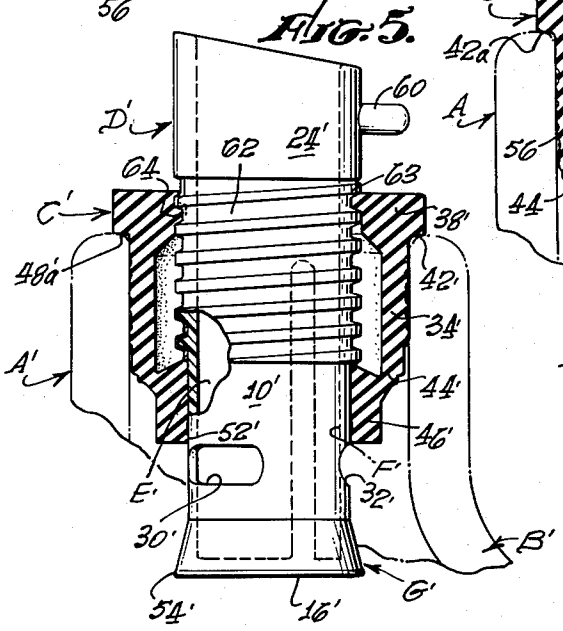


FIG. 5.



EDWARD P. SOMMERS, SR.,
INVENTOR.

BY

William C. Babcock
ATTORNEY.

United States Patent Office 2,992,761 Patented July 18, 1961

2,992,761

VENTED LIQUID DISPENSING DEVICE

Edward P. Sommers, Sr., 721 N. Juanita Ave., Redondo Beach, Calif.

Filed Sept. 8, 1958, Ser. No. 759,529
3 Claims. (Cl. 222—479)

The present invention relates generally to liquid dispensing devices, and more particularly to a vented liquid dispenser that is adapted to be removably mounted in the mouth portion of a hollow-walled bottle, jug, or other container of the Dewar flask type commonly referred to as a Thermos bottle.

Although hollow-walled bottles, jugs, and containers having mouth portions varying in depth and width have long been used in which to maintain liquids in either a cold or hot state, dispensing liquids from such containers has been found unsatisfactory due to the bevelled configuration of the upper extremity of the mouth. This conformation of containers of the type described lends a tendency to liquids being discharged therefrom to not only gurgle as air from the ambient atmosphere flows thereinto, but upon cessation of the pouring operation, liquid adheres to the upper extremity of the mouth to subsequently run down over the exterior surface of the rigid container in which the Thermos bottle, jug or receptacle is encased. Furthermore, hollow-walled bottles of this type are of relatively fragile construction and have no threaded or other engageable means formed thereon. As a consequence, fluid-tight sealing of such bottles is extremely difficult, particularly with respect to carbonated beverages.

The primary purpose in devising the present invention is to provide a simple, inexpensive vented liquid dispenser that can be removably mounted in the interior mouth portion of a hollow-walled vessel of the Dewar flask type to effect a fluid-tight seal therewith, which by manual manipulation of the invention, a portion thereof is moved to such position that fluid may be freely dispensed therefrom as a steady stream, without lateral movement or gurgling and air from the ambient atmosphere is concurrently permitted to enter the bottle on which the invention is mounted.

A major object of the present invention is to supply a vented dispenser particularly adapted for removable mounting in the interior mouth piece of a Dewar type flask, irrespective of the width and depth of this mouth portion and without the use of tools or other accessories, with the invention when so disposed effecting a fluid-tight seal against escape of either hot or cold liquids from the hollow-walled container, yet upon manual movement of a portion of the invention permitting vented liquid discharge therefrom.

Yet another object of the invention is to provide an inexpensive dispenser of the character described that can be fabricated from standard, commercially available materials, which when used in sealing a hollow-walled bottle, jug or other container, substantially eliminates all operational disadvantages encountered in stoppers and dispensers heretofore available for this purpose.

These and other objects and advantages of the invention will become apparent from the following description of a preferred and alternate forms thereof, and from the accompanying drawing illustrating same, in which:

FIGURE 1 is a perspective view of the vented liquid dispenser assembly shown disposed in a sealing position in the interior mouth portion of a hollow-walled liquid container;

FIGURE 2 is a lengthwise cross-sectional view of the preferred form of the invention taken on line 2—2 of

FIGURE 1, showing the tubular member in a liquid sealing position;

FIGURE 3 is a transverse cross-sectional view of the invention shown in FIGURE 2, taken on line 3—3 thereof;

FIGURE 4 is a second lengthwise cross-sectional view of the invention in operative position in a container, showing the movable portion of the dispenser so disposed as to permit concurrent discharge of liquid from the vessel and entry of air from the ambient atmosphere; and,

FIGURE 5 is an alternate form of the invention in which the movable fluid dispensing and air venting member is moved longitudinally between a closed and open position upon rotation thereof relative to a stationary portion of the invention which is removably disposed in a stationary position in the interior mouth portion of a container.

Referring to the drawing for the general arrangement of the invention, it will be seen to include a generally tubular member C fabricated from a resilient material such as rubber, polymerized resin, or other non-metallic resilient material that is inert relative to a liquid contained in a bottle, jug or other container B having a smooth-walled tubular mouth portion A in which member C is slidably, sealingly and removably insertable.

A combined liquid dispensing and air vent member D is also provided that is longitudinally movable in tubular member C and can be manually moved to a first position shown in FIGURE 2, or to a second position shown in FIGURE 4. When member D is in the first position the liquid contents of container B are completely sealed out of contact with the ambient atmosphere. However, when member D is in the second position liquid may be freely discharged from container B without gurgling or splashing through passage E formed in member D. Liquid flows smoothly in an unbroken stream through passage E due to the provision of an air vent passage F also defined in member D, which permits the inflow of air into container B. The interiorly disposed end portion of member D defines a tapered valve member G which is larger in transverse cross-sectional area than the balance thereof. Valve member G is adapted to sealingly engage the interiorly disposed end portion of member C, as can best be seen in FIGURE 2.

The detailed structure of the combination liquid discharge and air vent member D is best shown in FIGURE 2. Member D is preferably formed by injection molding or like forming process, from a polymerizable resinous material, which when cured, has substantial rigidity. Also, should it be desired, this member can be fabricated from a suitable metal. Member D includes a first tubular portion 10 that on one end develops into an outwardly tapering valve member 12. Valve member 12 has a tapered circumferential surface 14 and an end surface 16 that is substantially normal relative to the longitudinal axis of tubular portion 10.

The end of tubular portion 10 opposite that on which valve member 12 is formed develops into a second enlarged tubular portion 18, and the junction between these first and second tubular portions is defined by a circumferentially extending body shoulder 20 (FIGURE 2). The end of second tubular portion 18 that does not define shoulder 20 develops into a slight outwardly projecting, circumferentially extending second body shoulder 22 from which a third tubular portion 24 extends to terminate in a circumferential edge 26 that is angularly disposed relative to the longitudinal axis of member A.

The outer surface of tubular portion 24 is preferably roughened to provide a circumferential band 28 for gripping engagement by the fingers for easy rotation thereof,

even should band 28 be wet. A rigid longitudinally extending partition 30 is disposed within the confines of tubular member C, preferably to one side of the longitudinal axis thereof, to define a liquid discharge passage E and an air vent passage F. Partition 30 is so located as to provide a liquid discharge passage of considerably larger transverse cross-area than that of the air vent passage. One or more ports 30 are formed in the first tubular portion 10 that at all times communicate with discharge passage E. In addition, at least one port 32 is formed in tubular portion 10 that at all times communicates with air vent passage F. The combined area of ports 30 is preferably greater than the cross-sectional area of discharge passage E in order that liquid within the confines of container B will encounter no appreciable resistance as it flows through ports 30 into passage E to discharge from the invention when container B is held in an inverted position to facilitate fluid flow therefrom.

Member C, as can best be seen in FIGURE 4, includes a cylindrical wall section 34 that resiliently and sealingly engages the interior surface of second tubular portion 18. A flange 38 also includes a circumferentially extending portion 42 that projects outwardly and has a lower circumferential edge 42*a* which is adapted to seat on a portion of the upper extremity of the mouth portion A, as shown.

The edge portion of side wall 34 which is disposable within the mouth portion A, develops into a downwardly and inwardly tapering section 44 that supports a ring-shaped valve member 46 in coaxial alignment with the cylindrical side wall 34. Valve member 46 (FIGURES 2 and 4) is defined by a cylindrical interior surface 48, which on the end thereof adjacent flange 38, develops into a circumferentially extending pointed portion 50 that is adapted to seal against first body shoulder 20. The end of member 46 opposite that on which portion 50 is provided has a slight, inwardly projecting circumferentially extending lip 52 formed thereon that at all times pressure contacts either the exterior surface of first tubular portion 10 or the tapered surface 14 of valve member 12. The outer extremity of the outwardly tapered edge 14 of valve member 12 terminates in a slightly projecting circumferential lip 54, the purpose of which will be hereinafter explained.

The use of the preferred form of the invention shown in FIGURES 2 and 4 is extremely simple. The container B is filled with liquid, and the resilient tubular body C with the member D slidably mounted therein is supported as an integral unit within the confines of the smooth-walled mouth portion A. Inasmuch as the mouth portion A and the container B are of fragile, double-walled structure, it is essential that a minimum radially directed force be exerted on the interior wall surface of the mouth in effecting a liquid seal therewith. Also, it is essential that no force be placed on the liquid in container B by the insertion of the invention in mouth A that would cause the double-walled container B to shatter or rupture. To this end it is highly desirable that the invention be inserted into the mouth A when in the open position shown in FIGURE 4, for if the container B has inadvertently been filled with liquid to the extent that the liquid level is in the mouth portion A, this surplus liquid can flow through ports 30 or 32 into passages E or F, without exerting a strain on the interior wall surface of the container. It will be particularly noted that when the invention is inserted into the mouth portion A, no excessive force is exerted on the interior surface thereof for as seen in FIGURES 2 and 4, the cylindrical wall portion 34 is separated from the first tubular portion 10 and second tubular portion 18 at all times by an annulus shaped space 56.

After insertion of the invention into the mouth portion A as above described, to the extent that the lower ring-shaped surface of flange 42 abuts against the upper interior extremity of the mouth portion, the tubular member D is grasped and moved upwardly relative to tubular member C until valve member G assumes the closed position shown in FIGURE 2.

Frictional resistance between the tubular member D and resilient member C is minimized due to the slidable sealing engagement between lip 52 and the first portion 10 rather than having the entire surface area 48 in fluid sealing pressure contact therewith. When member D is moved to the closed position shown in FIGURE 2, it will be seen that the ring-shaped section 46 is radially expanded by contact with the valve member G and a fluid-tight seal thus effected. The taper of the valve surface 14 is relatively slight and substantially below that taper at which the expanded ring-shaped member 46 would exert a force thereon sufficient to tend to move member D relative to member C after a fluid seal had been effected between valve member 12 and ring-shaped member 46. When tubular member D is in the closed position, it will be seen that the lip 54 abuts firmly against the inner extremity of ring-shaped member 46 and further effects a fluid-tight seal therewith.

Outward movement of member D relative to resilient member C is, of course, limited by valve member G upon physical contact with the ring-shaped member 46 which radially expands same and forms a fluid seal therewith. Inward movement of member D relative to member C is limited when the first body shoulder 20 moves from the position shown in FIGURE 2 to that shown in FIGURE 4 wherein the first body shoulder is in physical fluid-sealing contact with the circumferentially extending pointed portion 50 of member 46.

When it is desired to dispense liquid from container B by means of the invention, the member C is first moved downwardly to the open position shown in FIGURE 2 where the ports 30 and 32 are fully positioned below the ring-shaped surface 46*a* of member 46, as best seen in FIGURE 4. The container B may then be inverted into a position to cause fluid to flow through the passage E and in a direction that this flow will occur over the outermost portion of the edge 26. As fluid flows from the interior of container B through ports 30 and passage E to discharge from the invention as above described, air flows inwardly from the ambient atmosphere through passage F and port 32 into the confines of container B to equalize the pressure therein with that existing outside the container.

This equalization of air pressures within and without container B permits free flow of liquid from the passage E in a smooth stream that is free of gurgling or other lateral movement. After the desired quantity of fluid has been discharged from container B, member D is grasped by the roughened band 28, and the member D is moved relative to the resilient member C from the open position to the closed position. A combined rotary and outwardly directed force is preferably employed in moving member D relative to member C.

When it is desired to bodily separate the invention from the mouth A in which it is disposed, member C is grasped, preferably when in the closed position, and an upward force is applied thereto with concurrent rocking lateral movement being exerted thereon to cause opposite portions of the ring-shaped surface 42*a* to pivot on the upper inner extremities of the mouth A. As such reciprocal movement takes place, that portion of the cylindrical wall 34 opposite the point of pivoting is compressed inwardly slightly to lessen the spacing between the inner surface thereof and the exterior surface of the second portion 18. Due to the annulus shaped space 56 and the resiliency of the material defining the wall 34, it will be found that the invention can be easily and quickly removed from the mouth A with a minimum of physical effort when the above described method is followed.

An alternate form of the invention is shown in FIGURE 5, which is identical structurally to that previously described, with the exception that the roughened band 28 is eliminated therefrom, and rotation of the member D' is

effected by gripping a small projecting thumb-engageable member **60** extending from an outwardly disposed portion of the invention, as shown. Inasmuch as the structural elements comprising this alternate form of the invention are substantially the same as those disclosed in the preferred form thereof, the same numerals are used in identifying corresponding structural elements, but a prime is added thereto.

The major difference between the preferred and alternate form is that the second tubular portion **18'** has a cylindrical shell **62** rigidly mounted thereon on which threads **63** are formed which engage complementary threads **64** formed on the interior surface of flange **42'** (FIGURE 5). Rotation of tubular member D' by use of the handle **60** previously mentioned, relative rotation of threads **63** and **64** is effected, together with concurrent longitudinal movement of member D' relative to member C'. Thus, by rotating member D' in a proper direction, member D' may be moved to either the closed position illustrated in FIGURE 2, or the open position shown in FIGURE 5. Operation of this alternate form of the invention is identical to that previously described in connection with the preferred form thereof and need not be repeated. Should it be desired, the partition **30'** need only extend part of the length of the tubular member D', as shown in FIGURE 5.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof, and therefore the invention is not limited by that which is shown in the drawing and described in the specification, but only as indicated in the appended claims.

I claim:

1. Discharge control apparatus for dispensing liquid from a closed container having a liquid opening therein comprising: a resilient tubular body, the exterior wall of said body being mateable in fluid sealing engagement with the fluid opening of said container, said tubular body having an interior wall defining a cylindrical opening longitudinally therethrough; an inwardly extending flange proximate one end of said tubular member, said flange defining an internal cylindrical wall of predetermined diameter less than the inside diameter of said cylindrical opening; a ring-shaped member of resilient material formed proximate the second end of said tubular member extending radially inwardly to said lesser predetermined diameter to define a cylindrical internal wall whereby the internal walls of said flange and said ring member are longitudinally spaced apart and coextensive at said predetermined diameter; an elongate rigid tubular member positioned through said resilient body within said cylindrical opening and slidably longitudinally movable with respect thereto from a first position to a second position, said tubular member being substantially greater in length than the length of said resilient body, said tubular member having an exterior cylindrical wall slidably mateable with said internal walls of said flange and said ring member for liquid sealing engagement therewith; a longitudinally extending partition in said tubular member defining a longitudinally extending liquid discharge passage and a longitudinally extending air vent passage therein, said tubular member having an inner closed end and an outer open end, said closed end being positioned at the second end of said tubular body, the exterior cylindrical wall of said tubular member defining a liquid opening therethrough in communication with said liquid discharge passage and an air vent opening in communication with said air vent passage, said openings being spaced from said closed end by a distance greater than the longitudinal extent of said ring member and less than the distance from the second end of said resilient body to said flange wall, such that said liquid discharge opening and air vent opening are withn the confines of the tubular body longitudinally between said flange and said ring member in said first position of said tubular member and outside of the confines of said tubular body and ring member in said second position to permit concurrent flow of liquid from said container through said liquid opening and discharge passage and inward flow of air into said container through said air vent passage and said air vent opening.

2. Discharge control apparatus adapted to be removably mounted in liquid sealing engagement with the vertical walled cylindrical fluid opening of a liquid container comprising: a resilient tubular body, the exterior wall of said body being slightly greater in diameter than the inside diameter of said cylindrical fluid opening of said container, said tubular body having an interior wall defining a cylindrical opening longitudinally therethrough; an inwardly extending flange proximate one end of said tubular member, said flange defining an internal cylindrical wall of predetermined diameter less than the inside diameter of said cylindrical opening; a ring-shaped member of resilient material formed proximate the second end of said tubular member extending radially inwardly to said lesser predetermined diameter to define a cylindrical internal wall whereby the internal walls of said flange and said ring member are longitudinally spaced apart and coextensive at said predetermined diameter; an elongate rigid tubular member positioned through said resilient body within said cylindrical opening in sealing engagement with said resilient body and slidably movable with respect thereto from a first position to a second position, said tubular member being substantially greater in length than the length of said resilient body, said tubular member having an exterior cylindrical wall slidably mateable with said internal walls of said flange and said ring member for liquid sealing engagement therewith; a longitudinally extending partition in said tubular member defining a longitudinally extending air vent passage therein, said tubular member having an inner closed end and an outer open end, said closed end being positioned at the second end of said tubular body, the exterior cylindrical wall of said tubular member defining a liquid opening therethrough in communication with said liquid discharge passage and an air vent opening in communication with said air vent passage, said openings being spaced from said closed end by a distance greater than the longitudinal extent of said ring member and less than the distance from the second end of said resilient body to said flange wall, such that said liquid discharge opening and air vent opening are within the confines of the tubular body longitudinally between said flange and said ring member in said first position of said tubular member and outside of the confines of said tubular body and ring member in said second position to permit concurrent flow of liquid from said container through said liquid opening and discharge passage and inward flow of air into said container through said air vent passage and said air vent opening.

3. Discharge control apparatus adapted to be removably mounted in liquid sealing engagement with the vertical walled cylindrical fluid opening of a liquid container comprising: a resilient tubular body, the exterior wall of said body being slightly greater in diameter than the inside diameter of said cylindrical fluid opening of said container, said tublar body having an interior wall defining a cylindrical opening longitudinally therethrough; an inwardly extending flange proximate one end of said tubular member, said flange defining an internal cylindrical wall of predetermined diameter less than the inside diameter of said cylindrical opening; a ring-shaped member of resilient material formed proximate the second end of said tubular member extending radially inwardly to said lesser predetermined diameter to define a cylindrical internal wall whereby the internal walls of said flange and said ring member are spaced apart and coextensive at said predetermined diameter; an elongate rigid tubular member positioned through said resilient body within said cylindrical opening in sealing engagement therewith and longitudinally movable with respect thereto from a first position to a second position, said tubular member being

substantially greater in length than the length of said resilient body, said tubular member having an exterior cylindrical wall mateable with said internal walls of said flange and said ring member for liquid sealing engagement therewith; a longitudinally extending partition in said tubular member defining a longitudinally extending liquid discharge passage and a longitudinally extending air vent passage therein, said tubular member having an inner closed end and an outer open end, an outwardly tapered end portion of said tubular member extending to said closed end, said closed end being positioned at the second end of said tubular body, the longitudinal wall of said tubular member defining a liquid opening therethrough in communication with said liquid discharge passage and an air vent opening in communication with said air vent passage, said openings beng spaced from said closed end by a distance greater than the longitudinal extent of said ring member and less than the distance from the second end of said resilient body to said flange wall,

such that said liquid discharge opening and air vent opening are within the confines of the tubular body longitudinally between said flange and said ring member in said first position of said tubular member and outside of the confines of said tubular body and ring member in said second position to permit concurrent flow of liquid from said container through said liquid opening and discharge passage and inward flow of air into said container through said air vent passage and said air vent opening.

References Cited in the file of this patent

UNITED STATES PATENTS

2,565,954	Dey	Aug. 28, 1951
2,721,010	Meshberg	Oct. 18, 1955
2,731,978	Comer	Jan. 24, 1956
2,744,665	Carlson et al.	May 8, 1956
2,790,582	Halpern	Apr. 30, 1957
2,842,291	Duval et al.	July 8, 1958