Feb. 11, 1958 R. W. SHORE 2,822,964

CLOSURE FOR CONTAINERS

Filed Feb. 14, 1956 2 Sheets-Sheet 1

FIG. 1.

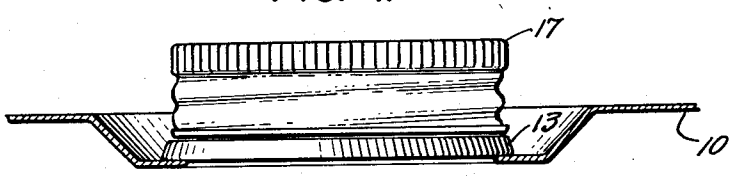


FIG. 2.

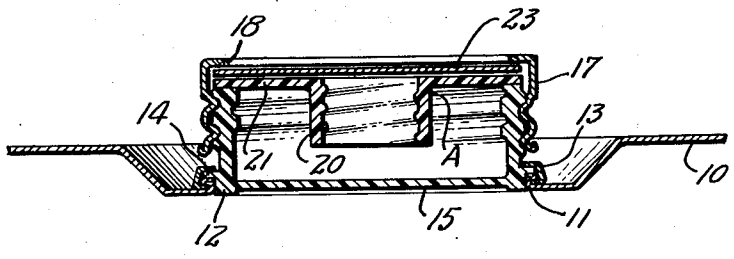


FIG. 3.

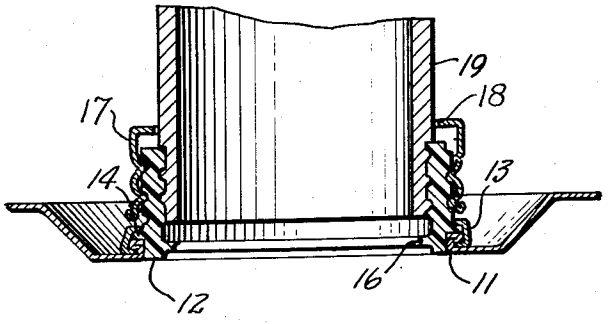
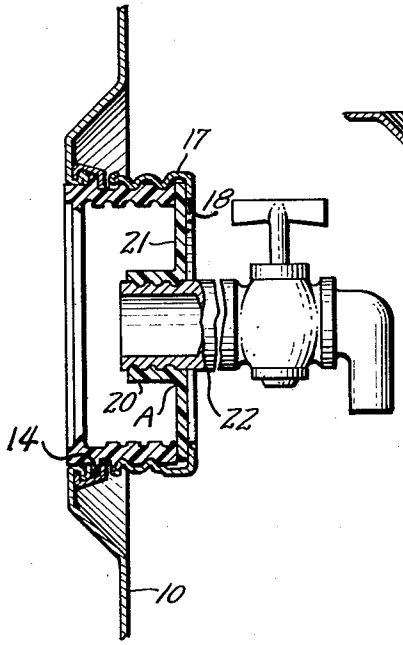


FIG. 4.



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Feb. 11, 1958 R. W. SHORE 2,822,964

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Filed Feb. 14, 1956 2 Sheets-Sheet 2

FIG. 5.

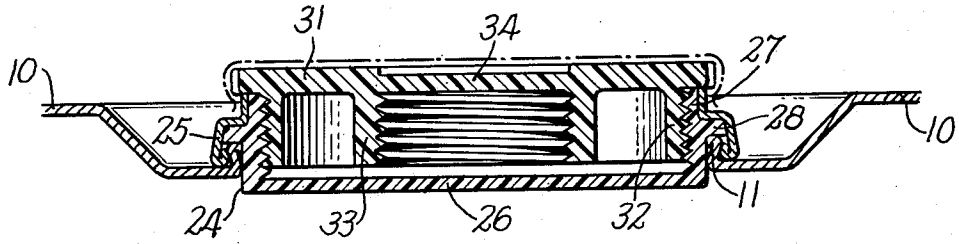


FIG. 6.

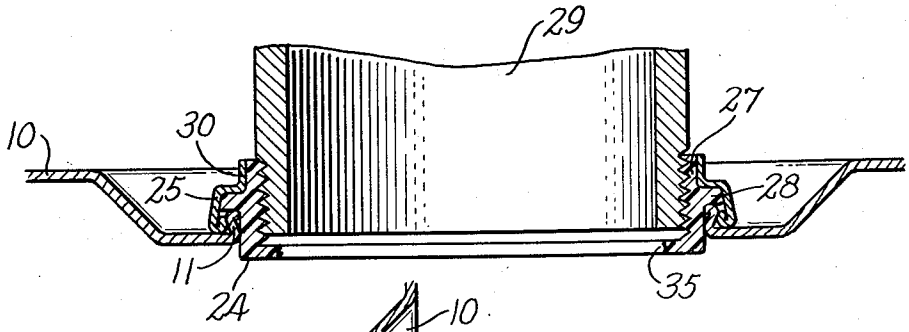
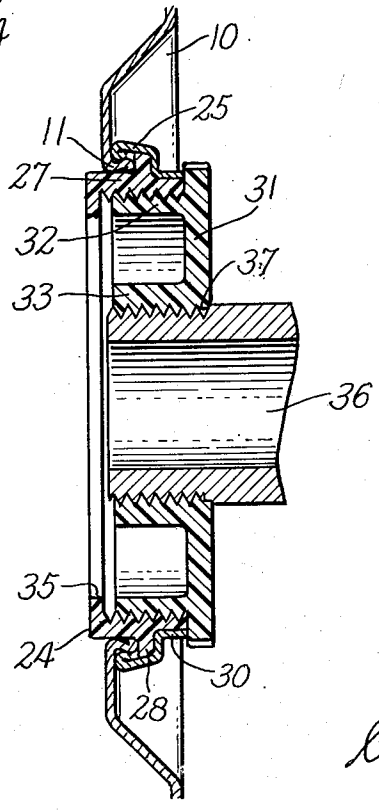


FIG. 7.



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CLOSURE FOR CONTAINERS

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6 Claims. (Cl. 222—541)

The present invention relates to a closure and discharge device for application to containers of the type conventionally formed with a loading and discharge opening defined or rimmed by a flange or collar. Well known forms of containers such as 55 gal. sheet metal drums, or the like, for example, are widely used for transporting and storing various kinds of liquids such as hydrocarbon oil products in connection with which contamination and leakage have presented continuing problems.

In the distribution of some liquids, as petroleum, supplied in such drums, circumstances sometimes require that the liquid be drawn from the drum by a pump or the like; whereas, under other conditions it is more convenient to draw off the liquid by gravity through a suitable spigot. In certain known types of drums two separate openings, one conventionally of 2" diameter and the other ¾" diameter, are provided for this purpose with corresponding increased cost as well as greater possibility of leakage in transit. In other known types of drums for a similar purpose, provision is made for using both kinds of dispensing devices in conjunction with a single opening. These containers cannot be effectively resealed against leakage after the initial closure of the single opening has been removed or modified to permit discharge of the liquid contents. In some instances, where the drums are made of precoated sheet material, metal or other edges are left exposed to contact with the drum contents which, depending on their character, may themselves be impaired, as by contamination, or may impair the drum closure.

An object of the present invention, accordingly, has been to provide in commercially acceptable form what may conveniently be considered as a "dual purpose" or "convertible" closure whereby the drum contents are effectively contained without leakage and protected against contamination by the closure as initially applied to and used on the loaded or liquid containing drum; whereby the liquid contents may be conveniently and effectively withdrawn either by power or by gravity; whereby thereafter, if desired, the drum opening may be closed or resealed wholly by parts included in the closure assembly; and whereby outwardly located parts of relatively more durable material or construction may provide effective protection for less durable or relatively weaker parts covered by said outer parts.

My invention, accordingly, comprises a closure device wherein a bushing adapted to be secured in the drum opening provides an initial or temporary plug or seal including a diaphragm or thin wall which can be pierced or cut out to afford access to the drum contents through said bushing. Said bushing is adapted to receive a cover and is interiorly threaded to operatively receive a power discharge (pump) fitting. A gravity discharge adapter interiorly threaded to receive a suitable gravity discharge fitting is retained in the bushing by said cover both when initially applied and when used with a gravity discharge fitting, such as a spigot or faucet. Means are provided to protect the gravity discharge adapter prior to breaching or removing the bushing diaphragm; and thereafter to effectively seal and protectively cover the container opening in case of a need or desire to again close and transport the drum or to prevent evaporation, contamination or deterioration of its contents.

An embodiment of my invention is illustrated in the accompanying drawings wherein:

Figure 1 is a view in elevation of a closure assembly as initially applied to the opening in a wall of one form of drum or container to seal the contents therein;

Figure 2, a view in central vertical section on the line 2—2 of Fig. 1;

Fig. 3, a view in central vertical section, as in Figure 2, with screw cap removed, with sealing diaphragm cut out of the bushing and with a power discharge fitting engaged with the interiorly threaded portion of said bushing;

Figure 4, a similar view but with the gravity discharge adapter clamped to the bushing by the cap and a gravity discharge fitting engaged with the interiorly threaded portion of said adapter;

Figure 5 is a view in central vertical section of a modified form of closure wherein the adapter for receiving the spigot discharge pipe is of plastic and integral with the cover; and that portion of the bushing, where it is of plastic, which receives the power discharge pipe is embraced by a metal ring;

Figure 6, a view as in Fig. 5, with the cover and the sealing diaphragm of the bushing removed and a power discharge fitting engaged with the bushing; and

Fig. 7 is a similar view wherein the cover engages the bushing; and the adapter with its sealing diaphragm removed supports a spigot in gravity discharge position.

Referring to the drawings, a device according to my invention is there shown as secured to an end wall or other convenient part of a drum **10**. As seen in Figure 2, said drum has an opening defined by a rim or collar **11** to which a portion of the closure device, as the plug or bushing **12**, is permanently secured by suitable means such as the ring **13** which securely fastens or crimps bushing **12** to collar **11**, said bushing having a peripheral flange **14** which rests on the outer edge of collar **11** and is pressed or clamped down into sealing contact therewith by ring **13**.

Bushing **12** is closed by a transversely extending sealing wall or diaphragm **15** thus providing in effect a plug which seals or closes the drum opening. Said diaphragm **15** is preferably of readily pierceable material, or such that it can easily be cut out and removed, leaving an opening **16**, Figs. 3 and 4, through which to discharge or withdraw the drum contents. The choice of material for the bushing may depend in some cases on the nature or condition of the drum contents. Bushings including partitions or diaphragms of molded polyethylene, for example, have been found to be effective and to permit ready discharge access to drums containing certain petroleum products.

As seen in Fig. 2, the outer or projecting portion of bushing **12** is provided with means for retaining a protective cover being exteriorly threaded, for example, to receive the threaded flange of a screw cap **17** which may be of metal or other relatively rugged material. In this form of device, the end wall of said cap **17** is provided with an opening **18**, Fig. 3, of less diameter than bushing **12** and slightly greater in diameter than the interior opening of said bushing which is interiorly threaded to provide means for attaching thereto a pump or power discharge fitting, as a pipe **19**, Figure 3, through opening **18** when cap **17** is in place on bushing **12**.

As shown in Figures 2 and 4, a gravity discharge adapter A separate from the bushing and from cap **17**

comprises an interiorly threaded collar 20 and a peripheral flange 21 thereon which is of such diameter that, when the closure is initially applied, as in Fig. 2, or when employed for gravity discharge through a fitting or pipe 22, as in Fig. 4, said flange 21 seats closely on the outer end edge of said bushing 12 and is retained thereon by suitable means, such as said screw cap 17. The adapter A may with advantage be formed of polyethylene or other suitable moldable material for some purposes, although the choice of a material for this part as well as for the bushing 12 will in general rest upon the circumstances of ultimate use of the drum, the closure and its parts.

A sealing and protective disc 23, also of a diameter to extend across and close the open outer end of bushing 12, is assembled initially, Figure 2, between cap 17 and the adapter flange 21, where, as initially employed, it serves as a protecting element and as a sealing element supplementary to diaprahgm 15. After said diaphragm has been pierced or removed, said disc 23 may serve to re-seal or close the drum opening at times when the discharge fittings are not attached for use. It is also contemplated that where either the bushing 12 or the adapter A is made of relatively fragile material, or where diaphragm 15 is easily cut or pierced, disc 23 may advantageously be made of metal or other suitably strong material and thus, in combination with cap 17, provide an effective protective cover for less rugged parts enclosed thereby.

In practice, the liquid charge or load is fed into drum 10 through the opening defined by collar 11. An assembly of the bushing 12, the adapter A, screw cap 17 and disc 23 is then applied with the inner end portion of the bushing extending into said collar 11 and secured thereto by pressing ring 13 thereon by a conventional crimping tool or machine, or by other suitable attaching means.

To dispense the contents of a drum so equipped, cap 17, disc 23 and adapter A are removed; and diaphragm 15 is breached or preferably cut out to establish a discharge passageway, as 16, through bushing 12. Where the contents of the drum are to be pumped out, commonly with the drum standing on its closed end, the exteriorly threaded end of the pump fitting or pipe 19 is engaged with the interior threads of bushing 12. During this power discharge operation the adapter A, and disc 23 are laid aside and cap 17 is optionally used where it may at least in part protect or support outer portions of the plastic bushing 12.

If it is desired to discharge the drum contents by gravity instead of by a pump, fitting 22 which may be part of a conventional spigot or faucet assembly is engaged with the interiorly threaded collar 20 of adapter A while the latter is secured in position on bushing 12 by means of screw cap 17, Figure 4. Thus, said adapter operatively supports pipe or fitting 22 which in this position extends through opening 18 in the end wall of cap 17; and flange portion 21 of adapter A serves in part as a gasket pressed between cap 17 and the outer end edge of bushing 12. To use the faucet discharge as shown, drum 10 is conveniently positioned on its side with the pipe or fitting 22 extending outwardly horizontally from the end wall of the drum or, as indicated in Figure 4.

In the modification shown in Figs. 5, 6 and 7, bushing 24 which may advantageously for some purposes be formed of a moldable plastic, as polyethylene, is mounted in a ring 25 and thereby secured to collar 11 of can or drum 10. Bushing 24 comprises an end sealing wall or diaphragm 26, an interiorly threaded annular flange 27 and a peripheral flange 28. Said flange 28 is crimped or pressed between collar 11 and ring 25 to hold said bushing in drum sealing position on said collar 11. As seen in Fig. 6, annular flange 27 of bushing 24 is interiorly threaded to receive the threaded end of discharge pipe 29 forming part of a power discharge or pumping mechanism. Metal ring 25 is formed with an annular flange 30 which closely embraces and thus supports or reinforces the outer end of annular flange 27 of bushing 24.

A cover 31 which may also be formed of moldable plastic such as polyethylene has a top or outer wall, an outer annular flange 32 and an inner annular flange 33. Peripheral edge portions of the top wall form an annular shoulder adapted to bear against the outer edges of flanges 27 and 30 when the cover is in place. Outer annular flange 32 is exteriorly threaded to engage the interior thread of annular flange 27 of bushing 24 which thus serves to retain cover 31 in sealing position and, when said cover is removed, to support pipe 29 in power discharging position, as above described.

Cover 31 is also formed with a relatively thin or easily pierceable diaphragm 34 extending across and initially closing the outer end of the opening or passageway provided by said inner annular flange 33. Until the apparatus is to be discharged by gravity, as in Fig. 7, sealing wall or diaphragm 34 may remain intact, so that, even though bushing diaphragm 26 has been breached, as by removing a portion thereof to form an opening 35, Fig. 6, the drum may be re-sealed by again engaging cover 31 with the interior threads of bushing 24. Where the drum contents, or a portion thereof, are to be discharged by gravity through a spigot, or the like, diaphragm 34 is cut out or removed to form an opening 37 through which the threaded end of fitting 36 extends to engage flange 33 now serving as a gravity feed adapter, Fig. 7, for supporting the discharge spigot. It is contemplated that, in use, the cover 31 and connected parts will ordinarily be protected as by a snap-cap indicated in dotted lines, Fig. 5, of conventional design and of a material such as metal, thus effectively covering the more fragile plastic parts at least during transportation and handling.

From the foregoing description considered in connection with the accompanying drawings, it will be apparent that a closure and discharge device according to my invention supplies in simple and inexpensive form not only the basic function of sealing the drum against loss, deterioration and contamination of its liquid contents but also provides facilities for either power or gravity discharge thereof. These advantages are attained without sacrificing or destroying the effectiveness of the closure means to re-seal or securely close the drum opening after breach of its original sealing diaphragm. These favorable results in use are aided and more nearly assured by effectively enclosing and protecting less rugged parts by outer parts of more rugged reinforcing or covering material.

I claim:

1. A closure and discharge device for a container of the type which has a protruding outlet collar of sheet material, said closure including a bushing adapted to fit within said collar and having a transverse partition and an outer end portion which extends beyond the outer end edge of said collar, and a peripheral flange positioned to bear against said outer end edge of the collar, a ring peripherally embracing said collar and said flange to effectively secure said bushing in sealing engagement with said collar, said outer end portion of said bushing being exteriorly adapted to receive a cap and having an interior opening threaded to receive a power discharge fitting, an adapter comprising an interiorly threaded collar open at both ends to receive a gravity discharge fitting of less diameter than that of said interior opening of the bushing, and a peripheral flange having its outer edge portion arranged and adapted to bear upon the outer edge of said bushing, a sealing disc bearing on said flange of the adapter, and a closure cap having an end wall provided with an opening of less diameter than that of said disc and a lateral flange releasably engaging said exterior of said bushing whereby said sealing disc and said adapter are releasably secured in assembled sealing position between said bushing and said end wall of the cap.

2. A closure and discharge device for use with a

container wherein an outlet defining collar projects from a portion of a wall thereof, said device comprising a bushing having a transverse partition of readily frangible material, means including a clamping ring whereby said bushing is clamped in operative sealing position on said collar, said bushing having an open outer end portion exteriorly adapted to receive a cap and interiorly threaded to receive a power discharge fitting, a gravity discharge adapter comprising a laterally extending flange and a collar supported on said flange and interiorly threaded to receive a gravity discharge fitting, a cap having a peripheral flange portion adapted for operative engagement with an exterior portion of said bushing and an end wall portion cooperating with said bushing and said adapter to releasably retain said adapter in operative position across the open outer end portion of said bushing, when the container contents are to be drawn out through a gravity discharge fitting.

3. A closure and discharge device for a container of the type wherein a filling and discharge opening is defined by a collar which protrudes from a portion of a wall thereof, said closure including a bushing which fits within and is permanently secured to said collar and is closed by a pierceable diaphragm which is initially continuous and intact across the opening of said bushing, an outer end portion of said bushing comprising a wall extending beyond the outer end edge of said collar and being exteriorly adapted to receive a cap and interiorly threaded to engage and support a power discharge fitting, and a cap engageable with said wall of the bushing to enclose and protect said bushing when said parts are assembled for transportation and to re-inforce said wall when a discharge fitting is supported thereon and to seal said closure against leakage through the open end of said bushing after said diaphragm has been pierced.

4. A closure and discharge device for a container of the type having an opening defined by a protruding annular collar of sheet material, said closure including a bushing which fits within and is closely engaged by said collar, said bushing comprising a peripheral flange which bears closely against said collar, an interiorly threaded annular flange arranged and adapted to provide connection with power discharge apparatus and a diaphragm of readily frangible material initially extending across and closing the interior opening of said annular flange and leaving when pierced or removed an opening through said bushing to permit free passage of liquid from the interior of the container through said power discharge apparatus when the latter is applied to said interiorly threaded flange of the bushing, cover and discharge pipe supporting means cooperating with said bushing comprising a laterally disposed flange arranged and adapted to engage and be releasably retained on said bushing, and an inner annular flange of less diameter than said laterally disposed flange and arranged and adapted to engage and support a gravity discharge spigot in position to discharge liquid from said container when said diaphragm is pierced or removed to permit flow of liquid from the container through said bushing and said inner annular flange.

5. A closure and discharge device according to claim 4 and wherein the bushing is of plastic and is retained in sealing engagement on the container by a metal ring which clamps said peripheral flange of the bushing securely to said collar; and said ring has a flange which laterally encloses and overlaps outer end portions of said bushing to reinforce the same when operating as a connection between the container and power operated dispensing apparatus.

6. A closure and discharge device according to claim 4 and wherein the said outer and inner annular flanges of the cover and discharge pipe supporting means are embodied in a unitary plastic cover piece and said inner annular flange is initially closed by a diaphragm arranged transversely therein and which is pierced or removed to permit connection to said flange of a discharge spigot and discharge of liquid through said spigot.

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