

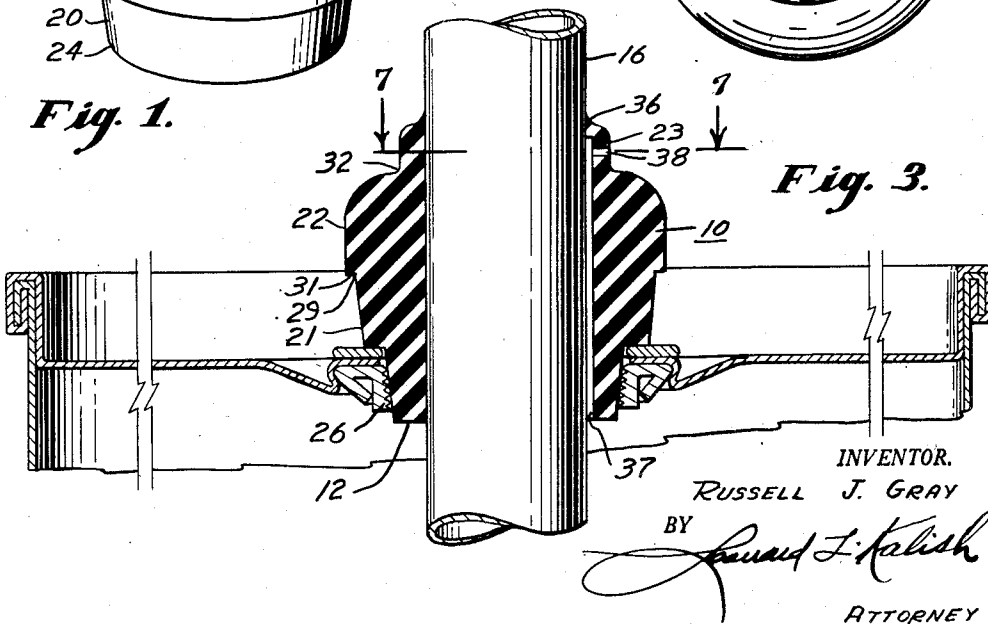
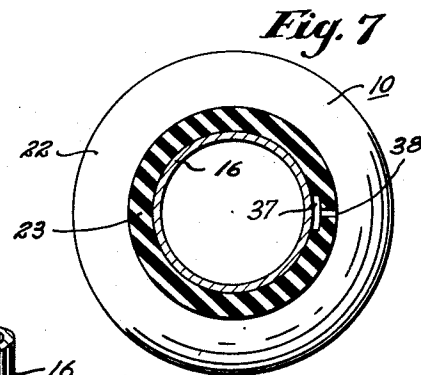
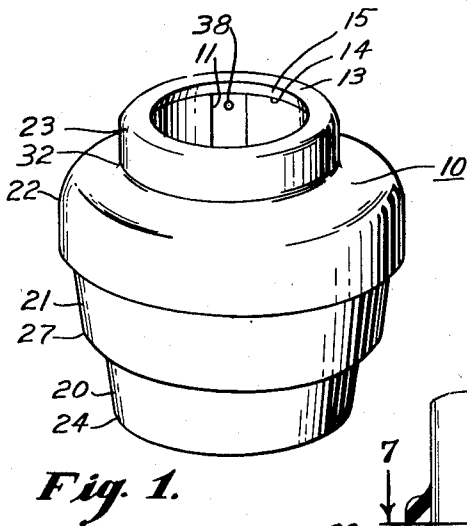
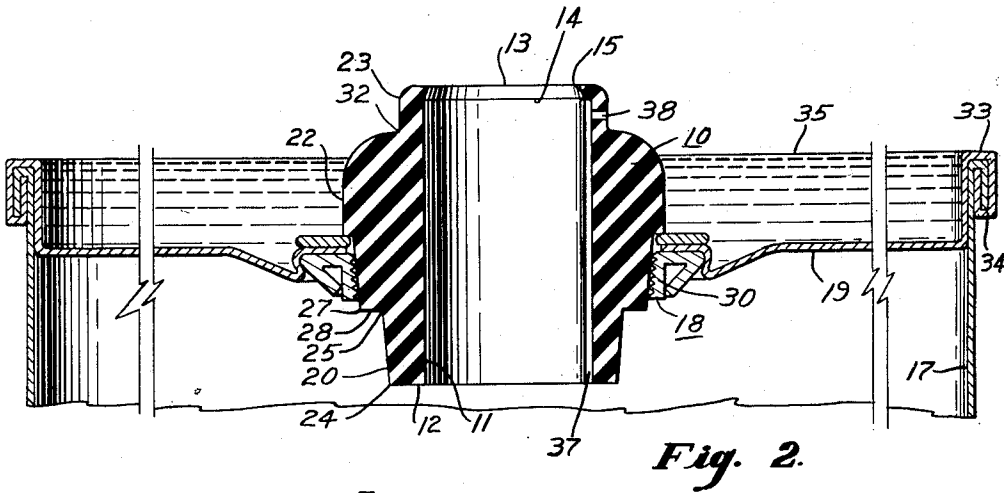
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R. J. GRAY
BUNGHOLE ADAPTER

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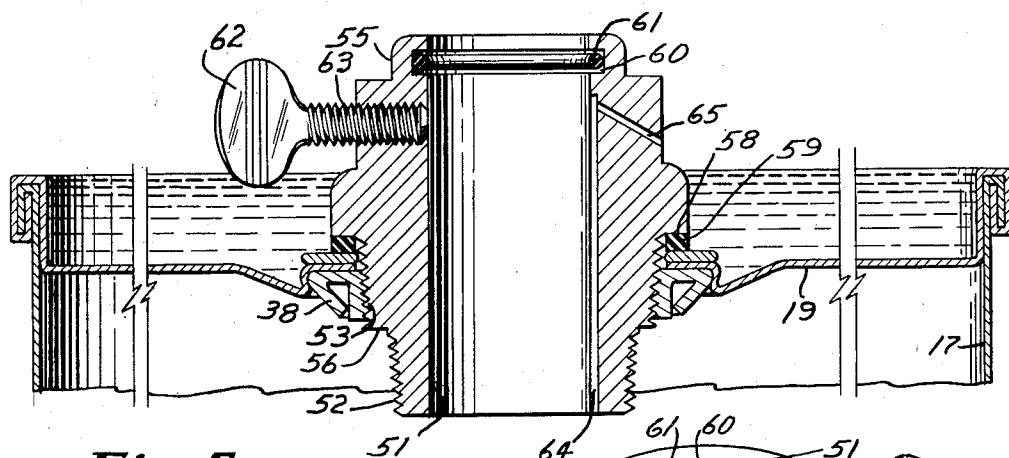


Fig. 5.

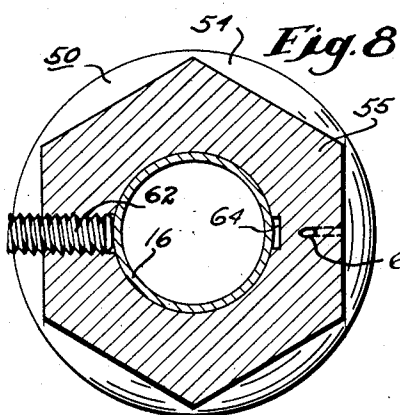


Fig. 8

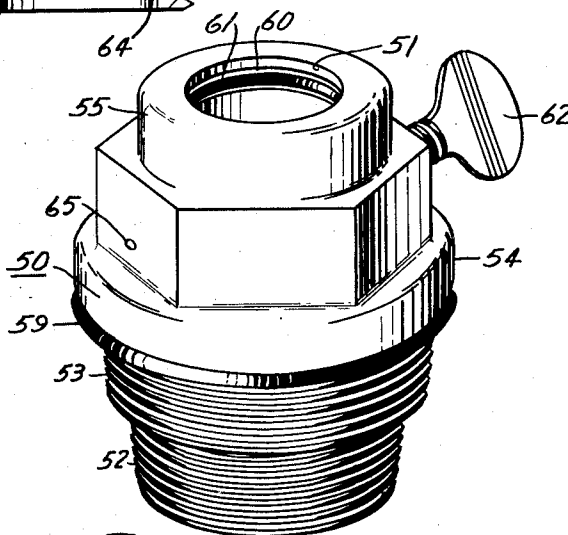


Fig. 4.

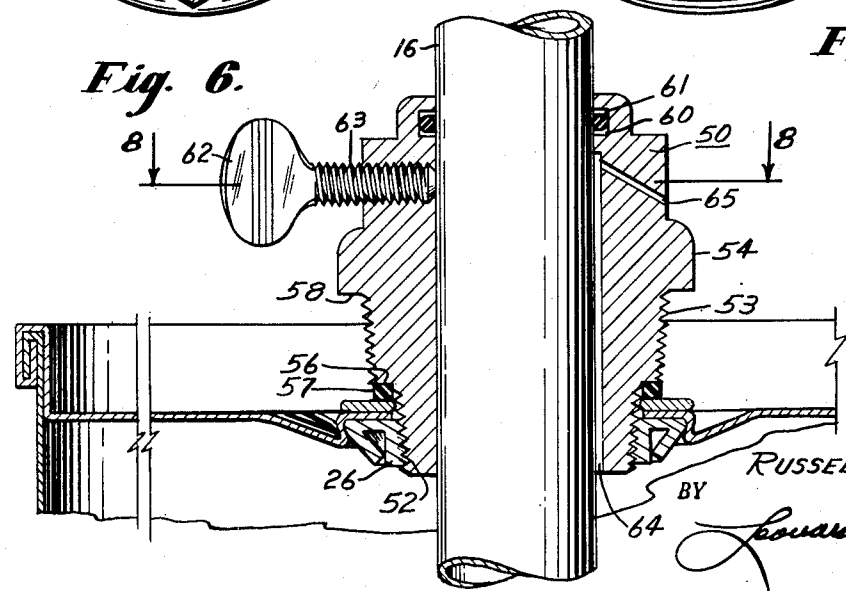


Fig. 6.

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BUNGHOLE ADAPTER

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2 Claims. (Cl. 285—30)

1 The present invention relates to container closure-members and particularly to closure-members or caps or plugs which have an aperture therethrough by which a tube, pipe or other conduit may be inserted into a container through the closure-member so as to permit the withdrawal of the contents of said container through said conduit but preventing the entry of foreign material into said container.

An object of the present invention is to provide a bung-hole adapter or closure-member for insertion into the bung-hole or opening in a barrel, such as an oil drum or like fluid container, which will effectively seal off said opening or bung-hole while permitting the insertion through said adapter or closure-member of a conduit or fluid-withdrawal hose or pipe through which the contents of said barrel may be evacuated.

A further object of the present invention is to provide a bung-hole adapter which will engage bung-holes or barrel-openings of varying diameters.

A further object of the present invention is to provide a bung-hole adapter or container closure-member which will prevent the entry into said container of foreign matter and particularly water or other fluid entrapped around the exterior surface of said barrel; i. e., the water which may collect on top of the head of an oil barrel below the upper edge of the chime when said barrel is standing upon one end thereof.

A further object of the present invention is to provide a bung-hole adapter having a vent therethrough whereby the interior of said container to which said bung-hole adapter is attached may be vented to permit the contents thereof to "breathe" and prevent the formation of a vacuum therein when the contents of said container are withdrawn.

Further objects and purposes of the present invention will be apparent by reference to the accompanying specification, claims and drawings.

For the purpose of illustrating the invention, there are shown in the accompanying drawings forms thereof which are at present preferred, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangements and organizations of the instrumentalities as herein shown and described.

Referring to the drawings wherein like reference characters indicate like parts:

Figure 1 represents a perspective view of one

2 embodiment of the bung-hole adapter of the present invention.

Figure 2 represents a vertical cross-sectional view of the upper end of a barrel with the bung-hole adapter of the embodiment of Figure 1 inserted into the opening thereof.

Figure 3 represents a vertical cross-sectional view, similar to that of Figure 2, but showing the adapter of the embodiment of Figure 1 disposed in a bung-hole of smaller diameter than the bung-hole of Figure 2, and with a riser-pipe or conduit passing through said adapter.

Figure 4 represents a perspective view of another embodiment of the bung-hole adapter of the present invention.

Figure 5 represents a vertical cross-sectional view across the top of a barrel with the bung-hole adapter of the embodiment of Figure 4 inserted into the bung-hole thereof.

Figure 6 represents a vertical cross-sectional view similar to that of Figure 5, but showing the bung-hole adapter of the embodiment of Figure 4 disposed in a bung-hole of smaller diameter than the bung-hole represented in Figure 5, and with a conduit or riser-pipe passing through said adapter.

Figure 7 represents a horizontal cross-sectional view along line 7—7 of Figure 3.

Figure 8 represents a horizontal cross-sectional view along line 8—8 of Figure 6.

The embodiment 10 of the present invention shown in Figures 1, 2, 3 and 7 is formed of resilient flexible grease and oil-resistant material which may be a synthetic rubber such as "neoprene," with an axial bore 11 therein. The greater portion of the axial bore 11 is uniform in diameter from the lower surface 12 upwardly to within a short distance of the upper edge 13, as at 14.

Below, the upper edge 13, as at 14, the bore 11 converges inwardly at a relatively small angle (approximately 15°) to form the inwardly-extending lip 15. The axial bore 11 is generally the same diameter as the outer diameter of a riser pipe or conduit 16 which may pass through the bore 11 of the adapter 10 into the barrel or container 17 when the adapter 10 is operatively disposed within a bung-hole or opening 18 in one end 19 of the barrel 17.

The external surface of the adapter 10 is multi-diametered, including the concentric tapered or generally frusto-conical portions 20 and 21, the cap portion 22 of greater diameter and the smaller rim portion 23.

The surface of the tapered portion 20 is dis-

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posed at a slight angle (approximately 2°) with the axis of the adapter 10, and may be proportioned to fit snugly and securely within a bung-hole 26 of approximately 1½" pipe size. The tapered surface 20, at the lower edge 24, has a diameter less than the internal diameter of the bung-hole 26, while the diameter of the tapered surface 20 at the upper corner 25 is in excess of the diameter of the same bung-hole opening. Thus the tapered surface 20 may be press-fitted snugly and securely into a bung-hole of appropriate size, in a secure and fluid-tight relationship. The bung-hole 26 is shown particularly in Figure 3, with the tapered surface 20 of the adapter 10 in operative engagement therewith.

The tapered surface 21 at its lower edge 27 has a diameter which is in excess of the diameter of the surface 20 at the upper corner 25, with a transverse shoulder 28 intervening. The surface 21 tapers upwardly and outwardly toward the upper end 29 at a slight angle (approximately 2°), as did the surface 20. As is shown particularly in Figure 2, the tapered surface 21 is adapted to fit snugly and securely within the bung-hole 30 which may be of approximately a 2" pipe size.

The shoulder 28 is adapted to abut the top of the bung-hole 26 and limit the inward movement of the tapered surface 20 therewithin. The shoulder 31, intervening the tapered surface 21 and the cap 22 is adapted to abut the upper surface of the larger bung-hole 30 and limit the inward movement of the tapered surface 21 therewithin.

The cap 22 converges upwardly and inwardly toward the edge 13, joining the smaller diametered neck portion 23 at the juncture zone 32. The neck portion 23 is spaced sufficiently above the shoulder 31 so that the juncture zone 32 will be disposed, at all times, above the upper edge 33 of the chime 34 of any barrel 17 into which the adapter 10 may be fitted. Thus, if water or other foreign fluid matter is deposited upon the cover 19 (as shown in Figure 2), the surface 35 of said liquid will always be below the annular neck portion 23.

The upper surface 36 of the neck portion 23 joins the lip or sealing ring 15 near the edge 13. The lip 15 is flexible and resilient and will adhere closely to the conduit 16 as is shown in Figure 3.

Along one side of the axial bore 11, and air-vent or groove 37 is disposed, the upper end of which terminates within the neck portion 23, somewhat below the lip portion 15, and the lower end of which is exposed at the lower surface 12. A transverse hole 38 passes radially through the neck portion 23 above the juncture zone 32 whereby to connect the upper end of the groove 37 with the exterior surface of the adapter 10.

As is shown in Figure 3, the riser pipe or conduit 16 may be supported within the axial bore 11, with the lip 15 in fluid-tight contact with the outer surface of the conduit 16 whereby to prevent the entry of any foreign matter between the conduit 16 and the adapter 10. However, the groove 37 is not obstructed by the conduit 16, as shown particularly in Figure 7, and the groove 37 and the transverse hole 38 provide a vent from the lower edge 12 to the outer surface of the neck member 23. Thus, the interior of the barrel will be vented, with the outer end of the vent disposed sufficiently above the top 33 of the chime 34 to prevent any foreign

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matter or fluid trapped on the top of the barrel from entering through the hole 38.

The adapter of the embodiment in Figures 1, 2 and 3 will operate equally well upon a bung-hole 26 or 30 having a threaded bore therein, as shown in Figures 2 and 3, or upon a bung-hole having a smooth interior surface (not shown), if the hole is of such diameter as to permit the tapered portion of the adapter to be securely press-fitted therein.

With reference now to the embodiment of the present invention shown in Figures 4, 5, 6 and 8, the adapter 50 is a metallic member having an axial bore 51 therethrough, similar to the axial bore 11 within the adapter 10. A multi-diametered outer surface includes the smaller threaded portion 52, the larger threaded portion 53, the cap portion 54 and the neck portion 55. The threaded portion 52 is generally adapted to engage a smaller bung-hole such as a bung-hole 26 heretofore described, with a shoulder portion 56 intervening the threaded portions 52 and 53, against which a sealing gasket 57 may be seated to create a fluid-tight and air-tight seal between the shoulder 56 and the bung-hole 26 when the adapter 50 is disposed therewithin, as is shown in Figure 6.

The threaded portion 53 is of a larger diameter than the threaded portion 52 and is adapted to engage a larger bung-hole such as the bung-hole 30, as shown in Figure 5. The shoulder portion 58 intervenes the threaded portion 53 and the cap portion 54. A sealing gasket 59 may be disposed between the shoulder 58 and the bung-hole 30 when the adapter 50 is engaged therewithin, thereby to create a fluid-tight and air-tight seal between the adapter 50 and the bung-hole 30.

Within the neck portion 55 is an annular internal groove 60 having an O type sealing ring 61 therein to create a fluid-tight and air-tight seal between the pipe or conduit 16 and the adapter 50.

A locking-screw or similar fastening member 62 may be screw-threadedly inserted, as at 63 within the cap portion 54 whereby to secure the conduit 16 to the adapter 50 and to prevent relative axial movement therebetween.

A groove 64 is disposed along one side of the axial bore 51 (as shown in Figure 8), parallel thereto, with its upper end terminating within the cap portion 54 or the neck portion 55 beneath the sealing ring 61. A transverse aperture 65 is adapted to interconnect the upper end of the groove 64 and the outer surface of the adapter 50, whereby to provide an air-vent or air-passageway between the interior of the barrel 17 and the exterior of the adapter 50 when the adapter 50 is operatively inserted within a bung-hole, and the conduit 16 is operatively disposed within the axial passageway 51. The transverse aperture 65 may be inclined slightly toward the cap portion 57 so as to prevent liquid from flowing therethrough into the groove 64.

The operation of the present invention is as follows:

When it is desired to remove the contents of a barrel 17, the customary closure or cap-member (not shown) may be removed from the bung-hole and one of the adapters, 10 or 50, may be inserted therein. If the adapter 10 is used, it may be press-fitted along its appropriate tapered surface into the bung-hole so as to be held securely therewithin. The riser pipe or conduit 16 may be inserted into the axial bore 11 of the adapter

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10 before the insertion of the adapter into the bung-hole, whereby the conduit 16 will be rigidly held at the upper end of the barrel in a fluid-tight relationship with the barrel, while yet permitting the interior of the container to be vented through the air-passageways 37 and 38.

If the adapter 50 is used, an appropriate gasket may be placed around the bung-hole and the adapter 50 screw-threaded into the hole until the sealing gasket is tightly compressed between the gasket-shoulder of the adapter and the barrel. This creates an air-tight and fluid-tight seal between the adapter and the barrel. Thereafter the riser pipe or conduit 16 may be inserted through the axial passageway 51, with the O-ring 61 within the annular groove 60 creating an air-tight and fluid-tight seal between the adapter 50 and the conduit 16. The conduit 16 is rigidly supported at the upper end of the barrel with a fluid-tight seal between the adapter and the riser pipe and between the adapter and the bung-hole, and yet with the interior of the barrel vented through the passageways 63 and 64.

Thus the contents of the barrel 17 may be removed through the conduit 16 (through any appropriate pump or suction device or lifting mechanism, connected thereto, not shown) while yet venting and airing the interior of the barrel whereby to prevent the creation of any vacuum therein and prevent the entry of any foreign matter into said barrel while said riser pipe and adapter are operatively secured thereto.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

Having described my invention, I claim as new and desire to protect by Letters Patent the following:

1. A flexible, resilient, generally tubular bung-hole adapter for sealingly positioning a riser pipe in the bung-hole of a drum or barrel, said adapter being moulded of an oil-resistant synthetic rubber or like plastic and having a bore there-through, a resilient sealing ring formed near the upper end of said bore and having an inner diameter slightly less than the diameter of said bore, said adapter having a plurality of successive stepped bung-hole engaging bushing portions of successively larger outer diameters surrounding said bore, with the smallest diametered bushing portion at the bottom of the adapter and the largest diametered bushing portion being the uppermost of said bushing portions, a cap portion above the largest diametered bushing portion, said cap portion having an outer diameter larger than that of the uppermost bushing portion, and a small-diametered neck portion above said cap portion, said neck portion carrying the aforesaid sealing ring, a vent groove

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formed in said bore, longitudinally thereof from a point near the lower end of said adapter to a point near the upper end of said adapter but below said sealing ring, and a vent hole communicating with said vent groove; said bung-hole engaging bushing portions having tapered outer surfaces with the small end of each tapered surface at the lower end thereof, and a transverse shoulder intermediate the successive bushing portions and a transverse shoulder intermediate the uppermost bushing portion and said cap portion; the vertical distance between said vent hole and the transverse shoulder intermediate the cap portion and the uppermost bushing portion being greater than the effective depth of the drum-head on which said adapter is to be used.

2. A flexible, resilient, generally tubular bung-hole adapter for sealingly positioning a riser pipe in the bung-hole of a drum or barrel, said adapter being moulded of an oil-resistant synthetic rubber or like plastic and having a bore there-through, a resilient sealing ring formed near the upper end of said bore and having an inner diameter slightly less than the diameter of said bore, said adapter having a plurality of successive stepped bung-hole engaging bushing portions of successively larger outer diameters surrounding said bore, with the smallest diametered bushing portion at the bottom of the adapter and the largest diametered bushing portion being the uppermost of said bushing portions, a cap portion above the largest diametered bushing portion, said cap portion having an outer diameter larger than that of the uppermost bushing portion, and a small-diametered neck portion above said cap portion, said neck portion carrying the aforesaid sealing ring, a vent hole formed in said adapter, longitudinally thereof from a point near the lower end of said adapter to a point near the upper end of said adapter but below said sealing ring; said bung-hole engaging bushing portions having tapered outer surfaces with the small end of each tapered surface at the lower end thereof, and a transverse shoulder intermediate the successive bushing portions and a transverse shoulder intermediate the uppermost bushing portion and said cap-portion; the vertical distance between the upper end of said vent hole and the transverse shoulder intermediate the cap portion and the uppermost bushing portion being greater than the effective depth of the drum-head on which said adapter is to be used.

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