

May 14, 1963

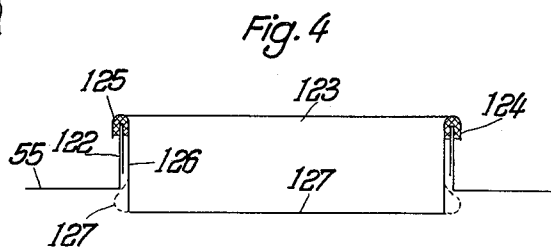
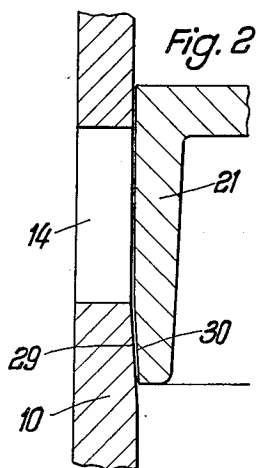
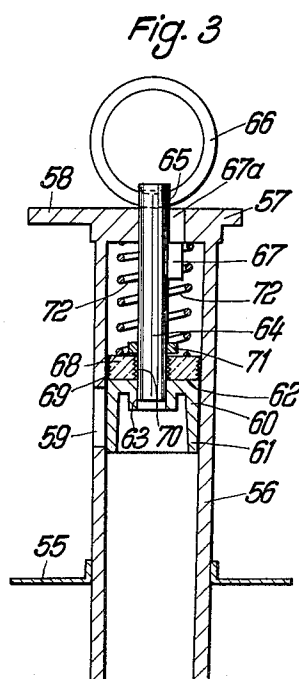
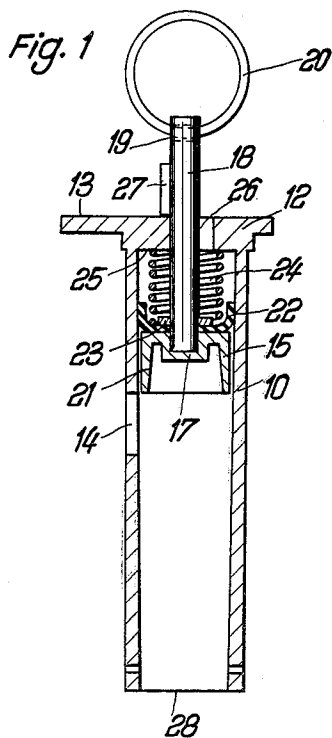
A. LIPPIG

3,089,627

CLOSURE MEANS FOR CONTAINERS

Filed Sept. 15, 1959

2 Sheets-Sheet 1



May 14, 1963

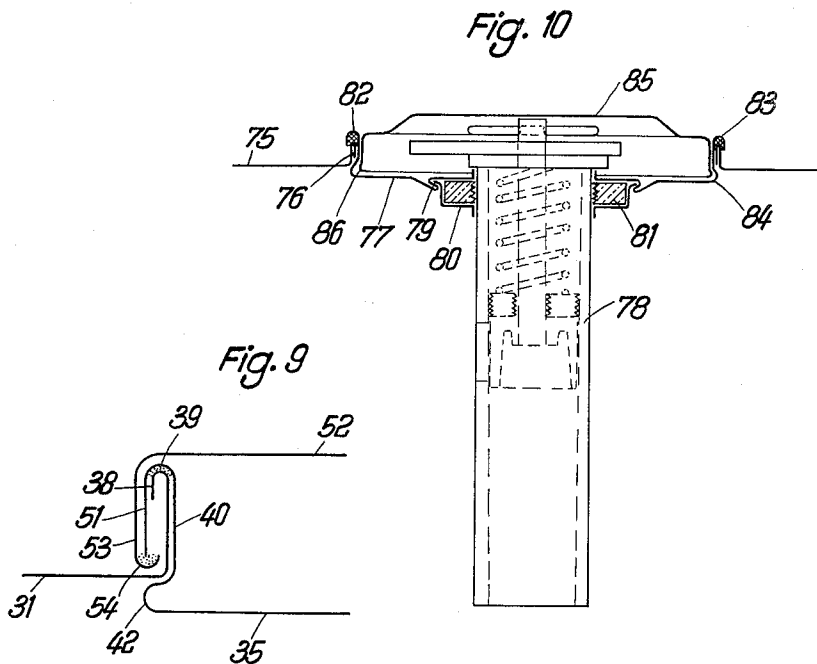
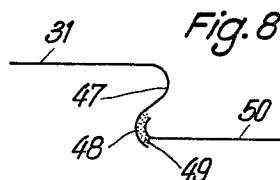
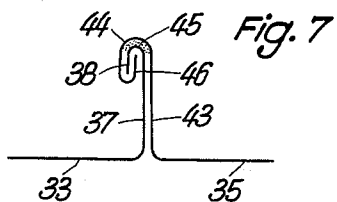
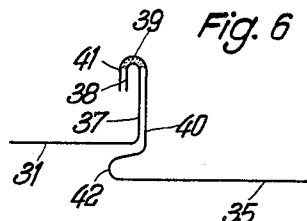
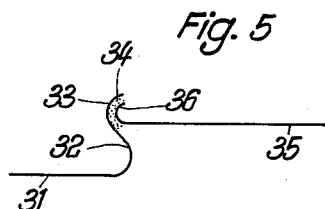
A. LIPPIG

3,089,627

CLOSURE MEANS FOR CONTAINERS

Filed Sept. 15, 1959

2 Sheets-Sheet 2



1

3,089,627

CLOSURE MEANS FOR CONTAINERS

Alfons Lippig, Hamburg-Altona, Germany
(7 Am Berge, Resse, near Hannover, Germany)

Filed Sept. 15, 1959, Ser. No. 840,107

Claims priority, application Germany Apr. 17, 1959

1 Claim. (Cl. 222-511)

This invention relates to a closure means for containers, more particularly for drums, and in particular so-called one-way drums.

More recently there have been developed for the transport of oils and like liquids so-called "one-way" drums, which after being used once are not returned to the suppliers to be cleaned and refilled, but are utilized for other purposes or are discarded.

Drums of this kind having an outlet as stated and also a sealed filling aperture are usually stored for comparatively lengthy periods of time before the contents thereof are removed in measured quantities, and during this period of storage they are subjected to the effects of the atmosphere. If, for example, a drum of this character is subjected during the day time to the effects of the sun, the same expands, and there is produced in the interior of the drum an increased pressure, which is able to escape into the atmosphere, more particularly at the point of location of the sealed filling aperture, but also at the point of the movable outlet. When the drum again cools there occurs in the interior thereof a reduced pressure.

It has been shown in practice that even the smallest quantities of moisture may affect the useful value of highly developed oils, such as are used at the present time, and this applies not only to transformer and circuit-breaker oils but also to refrigerators, i.e., oils which include chemical additions.

Heretofore, it has not been possible in practice to provide a closure means for drums of the kind initially referred to in the above, in which, even under the possibility of "breathing," the penetration of liquid or moisture into the interior of the drum is safely precluded.

It is an object of the present invention to insure that despite a certain unavoidable "breathing" of the drum the penetration of liquid or moisture into the interior of the drum is avoided.

It is a further object of the invention to provide an outlet of the kind referred to, i.e., having a displaceable outlet pipe and lateral outlet aperture, which despite the breathing of the drum avoids the penetration of liquid and moisture into the interior of the drum.

A still further object of the invention is to provide a closure means or outlet for drums of the kind referred to, in which it is certainly possible if necessary that an increase in pressure within the drum is capable of compensation in relation to the atmosphere, but that any reduced pressure within the drum avoids the penetration of atmospheric air accompanied by moisture.

A further object of the invention consists in the provision of a closure means for drums, in which a discharge of liquid upon the occurrence of increased pressure within the drum is safely precluded.

A further object of the invention consists in the provision of a closure means for drums, in which the filling aperture for the contents of the drum remains, despite breathing of the drum, liquidproof and moistureproof.

A still further object of the invention consists in the provision of a closure means or outlet for drums which is not more expensive to produce than known closure means or outlets, in order thereby to be able to maintain the one-way principle above referred to.

The invention accordingly relates to a drum having an outlet in the form of a movable outlet pipe with a shift-

2

able and preferably spring-controlled piston in the outlet pipe, there being provided in conjunction with the piston sealing means which not only prevent the penetration of liquid or moisture into the interior of the drum, but if desired also prevent liquid from being discharged from the drum.

Some embodiments of the invention are illustrated by way of example in the accompanying drawing wherein:

FIG. 1 is a vertical longitudinal section through an outlet pipe with shiftable piston and lateral outlet aperture, the piston being situated in the open position;

FIG. 2 is a sectional view on enlarged scale of a part of FIG. 1;

FIG. 3 shows a further embodiment of the invention in vertical longitudinal section, the piston being located in the closed position;

FIGS. 4 to 9 show in cross-section fragmentary views of closure means for the filling aperture; and

FIG. 10 shows a further embodiment of the invention in which the closure means with outlet pipe is provided within the filling aperture for the contents of the drum.

According to the embodiment in FIG. 1 there is shown at 10 a displaceable outlet pipe, which is closed at one end by means of a cover plate 12, which is preferably furnished with a pointer 13 in order to indicate the direction in which is arranged an outlet opening 14 provided in the side wall of the outlet pipe 10.

Within the outlet pipe 10 there is displaceably arranged a piston 15 having a cup-like recess 17, to which piston there may be secured a piston rod 18, which is furnished at its outer end with opening 19 for the accommodation of a grip ring 20. The piston 15 is provided with a conically tapering flange 21 which bears in sealing fashion against the inner wall of the outlet pipe 10. The flange 21, in addition to a purpose which will be described later, has the object of forming in the open position of the piston a hollow space which, upon the opening of the outlet, intercepts a portion of the outflowing oil or the like, and thus prevents an oblique discharge thereof from the outlet aperture 14, and to a certain extent steadies the stream of liquid emerging from the outlet aperture. The piston 15 carries at its end a seal 22 in the form of a sealing sleeve, the flange of which is directed towards the outer end of the pipe 10. The sealing sleeve 22 is secured on the one hand by means of a ring 23 provided on the piston rod 18 and on the other hand by the end of a spring 24, which bears against the sealing sleeve 22 and the other end of which thrusts against the inner wall 25 of the outlet pipe 10. In this way there is obtained the considerable advantage that the sealing sleeve 22 is placed under tension and that an outward pressing of the sealing portions against the inner wall of the outlet pipe 10 is assisted.

In the end wall 12 of the outlet pipe 10 there is provided a slot 26 in which a projection 27 secured to the piston rod 18 is capable of moving, the projection acting as locking means for the piston 15 in the open position shown in FIG. 1.

The end wall 12 may be connected to the outlet pipe 10 in any desired manner which is not particularly shown (in the drawing the two plates are represented as being integral). The inner wall of the outlet pipe 10 is so formed that the same viewed from the outside towards the inside is slightly conically tapered, in such a way that the inner diameter of the outlet pipe 10 at the lower or inner end at 28 is somewhat smaller than at the upper end to which is secured the end wall 12.

In addition there is formed below the outlet aperture 14 in the wall of the outlet pipe 10 a conical seating (FIG. 2), which is shown at 29 and may form in relation to the inner wall of the outlet pipe 10 an angle of approximately 3°. This seating may extend over any de-

sired length in the interior of the outlet pipe 10. In FIG. 2 the same is indicated merely diagrammatically. The flange 21 of the piston is likewise formed in conically tapered fashion, as indicated at 30, so that in the closed position the seating portions 29 on the outlet pipe 10 and the piston 21 bear against each other in sealing fashion and thus form a further hermetic closure against the entry of moisture.

When the outlet is fitted in the wall of a drum with the assistance of a sealing means, and individual quantities are to be removed, the piston 15 is drawn outwards by means of the ring 20 until the flange 21 thereof commences to uncover the aperture 14, and liquid then flows out. In the open position the piston 15 may be locked by the projection 27 (see FIG. 1), which then bears against the outside of the end wall 12. In this condition the spring 24 is placed under tension. If the outlet pipe is again to be closed, the ring 20 and accordingly the piston 15 and the parts connected thereto are rotated until the projection 27 is aligned with the slot 26, whereby a release of ring 20 results in the automatic movement of the piston into the closed position, under the action of spring 24. In the closed position of the piston the conical seating 30 of the flange 21 bears against the seating 29 in the outlet pipe 10.

In this position the piston may be locked against an outward movement by rotating the ring 20 with the piston rod and the piston to such an extent that the upper side of the projection 27 then bears inwardly against the end wall 12.

If now in consequence of fluctuations in pressure in the interior of the drum an increased pressure is brought about, this is unable to move the piston 15 outwards against the force of the spring 24, as the projection 27 bears in locking fashion against the inner side of the end wall 12, so that accordingly no liquid is able to pass out of the drum when the latter is disposed horizontally.

If on the other hand the locking member 27 is not engaged, the piston 15 in the event of an increased pressure would be able to move at the most to a small extent and a small amount of oil would be able to pass out through the outlet aperture 14. Any increase in pressure is then balanced out between the wall of the pistons 15, 21 and the inner wall of the outlet pipe 10, this increase in pressure pressing the sealing sleeve 22 to a certain extent inwards until a compensation of the pressure is brought about.

If on the other hand in consequence of fluctuations in temperature a reduced pressure is produced within the drum and the higher pressure on the outside seeks to enter the drum, this takes effect on the walls of the sealing sleeve 22 and forces these walls against the inner wall of the outlet pipe 10, so that air and moisture are effectively prevented from penetrating to the interior of the drum. If nevertheless a certain amount of moisture has been able to advance between the inner wall of the outlet pipe 10 and the sealing sleeve 22, this is further blocked by means of the seal at 29 and 30.

In the modified embodiment according to FIG. 3 an outlet pipe 56 is mounted to be movable in the upper end 55 of a drum. Between the side wall of the outlet pipe 56 and the end 55 there may be provided a suitable sealing means.

The outlet pipe 56 possesses an upwardly closed end wall 57, in which is provided on one side a pointer 58 indicating the direction in which is located an outlet aperture 59 provided in the wall of the outlet pipe 56.

Within the outlet pipe 56 there is arranged to be shiftable a piston, which is indicated generally at 60 and possesses a flange 61, which is somewhat tapered (not shown) towards its inwardly directed end and co-operates in the closed position with a correspondingly tapered seating on the inner wall of the outlet pipe 56, in such a way that when the piston 60 is in the closed position a reliable seal is obtained by reason of the conical form of the pis-

ton 60 and the tapered seating on the inner wall of the outlet pipe 56.

On the end wall 62 of the piston 60 there is formed a socket 63 which serves partly to receive a piston rod 64, which by means of suitable sealing and securing means is firmly fitted in the socket 63. The piston rod 64 is furnished at its outer end with an opening 65, through which there is passed a pull ring shown at 66. On one side the piston rod 64 is made integral with a locking projection 67, which may be passed through a slot 67a provided in the end wall 57 of the outlet pipe 56.

To the end wall 62 of the piston 60 there is applied a seal 68 consisting of a resilient material, and preferably rubber, which seal is furnished on the outside with a series of annular ribs or laminations 69, which bear in sealing fashion against the inner wall of the outlet pipe 56. The inner wall of the central opening in the sealing washer 68 also possesses a series of ribs or laminations 70. The sealing washer 68 is secured on the piston rod 64 by means of a collar or disc 71. A spring 72 bears with one end against the sealing washer 68 and with its opposite end against the inner side of the end wall 57 of the outlet pipe 56.

For the removal of individual amounts from the drum the outlet pipe 56 is pulled out from the end 55 of the drum by a desired amount, or into its extreme position, and is actuated, as described in conjunction with FIG. 1. In this embodiment there may also be employed the additional sealing means according to FIG. 1.

By reason of the embodiment of the sealing washer 68 with the grooves or laminations about the outer periphery there is obtained with complete reliability a perfectly tight seal of the outlet not only in the case of increased pressure but also in the case of reduced pressure within the drum. Furthermore, by the provision of the grooves 70 in the inner wall of the opening in the sealing washer 68 a passing out of liquid is safely avoided in the event that connection between the socket 63 and the piston rod 64 is not airtight.

According to a subsidiary feature of the invention security against the penetration of liquid or moisture into the interior of a stored drum is also achieved by special sealing means in conjunction with the filling aperture of the drum.

It is known to provide in the filling aperture of the drum, which is usually furnished with a filling socket, a closure plate by means of which there is insured a temper-proof closure of the drum.

In the embodiment according to FIG. 4, which shows the filling socket in vertical longitudinal section, the upper end 55 of the drum is furnished with a socket 122. In the socket opening there is fitted a cap indicated generally at 123, the flange 124 of which is bent over towards the rear. In the annular portion thus formed there is located a seal or packing 125. In the position of application of the cap 123 the side wall 126 thereof extends to a certain extent into the interior of the drum, and in this position, by the use of a special tool (not shown) is spread outwardly, as indicated by the broken lines 127. In this manner the cap is secured in the filling socket 122 in airtight fashion and proof against breathing. When the drum is taken into use the bottom 127 of the cap 123 is pierced and the opening thus formed serves to admit the air.

The embodiment illustrated in FIG. 4 insures in reliable fashion that neither an increase in pressure nor a reduced pressure occurring in the drum is able to find compensation, as by the spreading of a part of the side wall 126 of the cap 123 there is obtained a very firm support against the socket 122 and at the same time the upper edge of the socket 122 is applied very firmly against or is pressed into the seal 125.

In the embodiment according to FIG. 5, for the purpose of obtaining a liquidproof or moistureproof seal, there is formed in a filling socket 32 provided in the

5

end 31 of the drum a groove 33, in which is arranged a sealing material 34, in which is force-fitted a closure plate 35 having a bent edge 36.

In the embodiment according to FIG. 6, in similar fashion to FIG. 4, the filling socket 37 is furnished with a bent over portion 38 having applied thereto a seal 39, which is embedded in the folded over portion 41 of a closure member 40. This closure member 40 is spread apart by suitable spreading means, as indicated at 42, so that in this way the closure member is fitted under tension in the filling socket 37 and the seal 39 bears firmly against or in the upper edge of the folded over portion 38. In the embodiment according to FIG. 7 the upper end of the drum, as in the embodiment according to FIG. 6, is furnished with a filling socket 37 and a flange 38, a closure member 43 is provided at its bent over portion 44 with a sealing material 45, which bears against the upper edge of the filling socket 37, and the flange 38 of the filling socket 37 and a flange 46 on the closure member are firmly connected together by a double fold. In this way the seal 45 is pressed firmly against the upper end of the filling socket 37.

The embodiment according to FIG. 8 corresponds in substance to the embodiment according to FIG. 5, with the exception that the filling socket 47 extends inwardly and accommodates in a groove 48 a sealing material 49, in which is fitted a closure plate 50.

It is naturally possible to provide over the upper end of the filling socket 37 a closure cap, which is not shown in the embodiments described above.

Such an embodiment is illustrated in FIG. 9 which, as regards the seal, corresponds in substance to the embodiment according to FIGS. 6 and 7. In this embodiment the flange of the closure plate or member 40 is extended, as indicated at 51, and bears against a seal 54 fitted in the flange of a closure cap 52.

When the drum is taken into use the closure plate 35 or 50 is pierced and, assuming a special closure cap is provided, this cap is also pierced, the cap preferably being rotatable in relation to the closure plate, so that the pierced holes are not aligned with one another.

An embodiment of outlet pipe illustrated in FIGS. 1 to 3 is shown in FIG. 10 in conjunction with a filling aperture in the upper end of a drum.

Whereas in the embodiments described in the above there is provided in addition to the outlet pipe and its support a special filling aperture, the closure means for the filling aperture for the contents of the drum is in this embodiment also employed at the same time as a support for an outlet according to the invention.

For this purpose the end 75 of a drum is furnished with a socket 76, the end of which may be bent over inwardly. Into the opening, after the filling of the drum, there is fitted a support 77 for the outlet indicated generally at 78. This support is furnished with a groove 79, which is engaged by a sheet metal portion 80, which constitutes a support for a laminated packing 81 composed of rubber or the like. In this connection the embodiment is such that the rubber laminated seal 81 is preferably introduced into the support 77 with a certain amount of preliminary tension. The support 77 is bent over at its upper edge at 82 and carries a seal 83 which bears against the upper edge of the socket 76.

After the container has been filled the support 77 together with the outlet 78 is introduced into the opening in the end 75 and is secured in the end 75 by being spread, so that the support 77 then assumes the form shown in the drawing at 84, in which spread portions are located in close proximity below the end 75 and thus secure the closure. At the same time, by reason of the secure attachment of the spread closure, the support 77 is pressed downwards and the seal 83 is accordingly drawn firmly against the socket 76.

6

Finally a cap 85 may be applied to the closure which, as indicated at 86, is furnished with a small groove which is located in the closed position behind the spread portion of the support 77, so that in this way the contents of the drum are protected by a tamperproof seal. The cap 85 can be removed from the support 77 of the closure means only after being destroyed, and this may take place by means of a tearing lug or the like formed on the upper wall of the cap 85 and not shown.

The outlet or the closure itself may be of the kind disclosed in the embodiments described above. Preferably there is selected for the outlet an embodiment according to FIG. 3, i.e., an embodiment in which the piston of the outlet pipe is furnished with a laminated seal.

I claim:

Apparatus for a container adapted for storing substances, said apparatus comprising: a hollow outlet pipe adapted for being sealably inserted into said container, said outlet pipe having a longitudinal axis and an outlet opening directed transversely to said axis, a piston slidably supported in said pipe for movement along said axis, said piston including a flange, said outlet pipe including an inner surface facing said flange of the piston and including a tapered portion adjacent said opening and lying to one side of the opening in the longitudinal direction, said flange including a tapered portion corresponding to that of the pipe for being engaged thereagainst in a first limit position in which the flange and pipe provide an airtight seal, said flange having an axial length exceeding the axial length of the opening to project beyond the opening to the other side of the pipe with the flange in said first position, sealing means on said flange at an end thereof, remote from said tapered portion in sealing engagement with the inner surface of the outlet pipe on said other side of the opening to provide a second airtight seal, means for controlling movement of said piston between said first position and a second position whereat said flange is axially located entirely on said other side of the opening to expose the opening to permit emptying of the substance in the container, and elastic means between said piston and said outlet pipe urging the piston towards said first position, said outlet pipe including an end wall provided with an opening through which said piston rod is slidable and rotatable, said means for controlling movement of said piston including a projection on said piston rod, said end wall of the outlet pipe being provided with a slot contiguous with the latter said opening for accommodating said projection and permitting sliding of said projection there-through, said projection being located on said rod to engage said end wall of the outlet pipe to hold said piston in said first position against the action of the elastic means with the rod rotated and said slot and projection misaligned.

References Cited in the file of this patent

UNITED STATES PATENTS

586,434	Greene	July 13, 1897
855,800	Mitchill	June 4, 1907
960,081	Fearon	May 31, 1910
1,262,327	Graham	Apr. 9, 1918
1,268,820	Depew et al.	June 11, 1918
1,304,409	Thompson	May 20, 1919
1,471,475	Demuth	Oct. 23, 1923
1,540,406	Lang	June 2, 1925
1,619,126	Hundemer	Mar. 1, 1927
2,722,029	Barnes et al.	Nov. 1, 1955

FOREIGN PATENTS

554,823	Italy	Jan. 16, 1957
---------	-------	---------------