(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 501 015 B1**

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **24.08.94**

(51) Int. Cl.[5]: **B65D 77/06**, B65D 25/16

(21) Application number: **91118018.0**

(22) Date of filing: **23.10.91**

(54) **Liquid transport drum with removable liner.**

(30) Priority: **25.02.91 US 661337**

(43) Date of publication of application:
02.09.92 Bulletin 92/36

(45) Publication of the grant of the patent:
24.08.94 Bulletin 94/34

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR IT LI LU NL SE

(56) References cited:
EP-A- 0 358 053
DE-U- 8 705 463
FR-A- 1 331 437
GB-A- 648 863
US-A- 3 167 210
US-A- 4 993 579

(73) Proprietor: **HOOVER GROUP INC**
2001 Westside Parkway,
Suite 155
Alpharetta, Georgia 30201 (US)

(72) Inventor: **Nichols, Dwight Ellis**
1807 Jefferson Street
Beatrice, Nebraska 68310 (US)

(74) Representative: **Hoeger, Stellrecht & Partner**
Uhlandstrasse 14 c
D-70182 Stuttgart (DE)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).

EP 0 501 015 B1

Description

The present invention deals with a container of the type defined in the preamble of attached claim 1.

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention is a container for the transportation of bulk liquid materials. More particularly, the present invention is a 208,2 ℓ (55 gallon) drum having an inner, disposable liner which is heat sealed at an aperture in its upper end to a bung which in turn may be secured to a fill opening in the top wall of the drum. When filled with a bulk liquid material, the liner conforms in shape to the shape of the inner surfaces of the tank and, upon being emptied, the liner collapses and is easily removed from the drum through the fill opening.

The most desirable and convenient method of transporting various liquid materials is in bulk quantities. While numerous containers may be used for such transportation, the 208,2 ℓ (55 gallon) drum has gained widespread acceptance by commercial suppliers and industrial consumers. A variety of materials, including such substances as solvents and grease, are transported in these 208,2 ℓ (55 gallon) drums. Regardless of the material being transported, if the drum is to be subsequently used for transporting a differing substance, the inside of the drum must be cleaned prior to the subsequent use.

U.S. Patent No. 4,044,912 discloses a container including a rigid outer tank having a collapsible bag liner for retaining viscous substances such as grease. A vane shaped spacer is disposed within the bag to provide a skeletal structure about which the bag can collapse as the viscous substances are removed. The skeletal structure thereby ensures a more complete evacuation of the viscous material contained in the tank.

GB-B-648 863 discloses a container with the features of the preamble of attached claim 1, wherein the cylindrical extension of the top wall of the outer drum has an inner thread being engaged by an outer thread of a first bung. This first bung has a central opening with an inner thread which is engaged by an outer thread of a second bung. The edge portion of the liner defining its aperture has a semi-circular cross-section and is bonded to a lower recessed portion of the outer circumferential surface of the first bung.

It is an object of the present invention to provide a drum having a liner which is reliably secured to a bung which is in turn mounted in an opening formed in the top wall of the drum.

The present invention provides for a drum which may be used to transport a bulk liquid material without having to be cleaned prior to such use, and has a disposable liner for the transportation of bulk liquid materials. It also provides a drum which allows for easy removal of the liner through an opening formed in the top wall of the drum.

The present invention provides for a 208,2 ℓ - (55 gallon) drum which may be formed of a plastic or metal and has two openings formed in its top wall. A plastic liner is disposed within the drum and has formed therein two apertures which are substantially aligned with the openings. At one aperture, a portion of the liner extending therearound is heat sealed to an outer bung which is then threaded into the appropriate opening. The body of the outer bung extends through the opening and has a threaded central opening which provides access to the interior of the liner. As the liner is filled with the materials to be transported, it conforms in shape to the shape of the inside surface of the drum. An inner bung is then positioned in the threaded opening of the outer bung to seal the drum. As the container is emptied, the liner collapses and is readily removed from the drum through one of the openings formed in the top wall.

Thus, the present invention facilitates the removal of the transported materials, the disposal of residue after discharge and the elimination of cleaning prior to reuse. In that the liner may be disposed of through burial, incineration or recycling, no large quantities of water are needed for cleaning purposes.

Additional benefits and advantages of the present invention will become apparent to those skilled in the art to which this invention relates from the subsequent description of the embodiment and the appended claims, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a plan view of a bulk liquid material transportation container incorporating the principles of the present invention.

Figure 2 is a sectional view taken substantially along line 2-2 in Figure 1 illustrating the position of the liner within the drum when filled with a bulk liquid material.

Figure 3 is an enlarged sectional view of a portion of Figure 2 detailing one of the openings of the container.

Figure 4 is an enlarged sectional view of a portion of Figure 2 illustrating the embodiment of the liner and bung construction of the present invention applied to the other opening of the container.

DETAILED DESCRIPTION OF THE DRAWINGS

Now with reference to the drawing, Figure 1 illustrates a plan view of a container 10 embodying the principles of the present invention. An outer drum 12, in the shape of a standard 208,2 ℓ (55 gallon) drum, is formed of metal, plastic or other material and includes a base 14, upright side walls 16 and a top wall 18 which combine to define a central cavity 19. Formed in the top wall 18 and rising thereabove are two ports or openings 20 and 22. In the event of an object falling on top of the container 10 or the container 10 being toppled onto its side, the top wall is further provided with a rim 24 designed to prevent damage to the openings 20 and 22.

Disposed within the central cavity 19 of the drum 12 is a liner 26. The liner 26 is constructed of a thin plastic material having a thickness approximately three times that of a common household garbage bag. Two apertures 28 and 30 are formed in the top of the liner 26 and are substantially aligned with the openings 20 and 22 of the drum 12.

While the container 10 is illustrated as having two openings 20 and 22, the present invention could also be constructed with a single opening. However, a 208,2 ℓ (55 gallon) drum provided with two openings is standard within the industry and permits all of the normal operations required of the drum 12. The larger 20 of the two openings 20 and 22 is generally used for filling and emptying the container 10 while the smaller of the openings 22 is typically used as a vent opening.

When the liner 26 of the present invention is to be incorporated into a drum 12 having two openings 20 and 22, a portion 27 of the liner 26 defining one of the two apertures 28 and 30 is fixably secured to an outer bung 32. The outer bung 32 may be formed of rigid plastic or similar material. In that the outer bung 32 is also formed of plastic, this securement can be achieved by heat sealing or welding the liner 26 to the outer bung 32.

Two bung structures are shown in Figures 2 to 4; however, only one of the openings 20 or 22 will incorporate an embodiment of the invention at a given time. The present invention may be incorporated into either of the two openings 20 or 22, however, for the sake of clarity, in the drawings only opening 22 is shown as incorporating the present invention. Nevertheless, where appropriate, corresponding features of the bung structures of openings 20 and 22 have been given like designations in Figures 3 and 4.

As seen in Figure 3, in the bung structure 31 of the opening 20, the portion 27 of the liner 26 forming the larger aperture 28 is heat sealed to a lower portion 34 of the outer bung 32. The outer bung 32 includes a cylindrical body 40 which extends downward through the opening 20 thereby constricting the opening 20. However, outer bung 32 does not fully constrict the opening 20 in that a threaded portion 41 of the cylindrical body 40 defines an access opening 39 to the interior of the liner 26. Integrally formed with the cylindrical body 40 is an outwardly extending flange 36 which engages an upper portion 38 of the opening 20. The resting engagement of the flange 36 with the upper surface 38 of the opening 20 thus supports and prevents the outer bung 32 and attached liner 26 from passing through the opening 20 and into the cavity 19 of the drum 12.

The liner 26 is installed in the drum 12 by inserting it through the opening 20. When the liner 26 is fully inserted, the flange 36 of the outer bung 32 will engage the upper surface 38 of the opening 20 and support the liner 26 hanging therebelow in the central cavity 19. To align the second aperture 30 with the remaining opening 22, the liner 26, along with the outer bung 32, is rotated. The second aperture 30 may be secured to the drum 12 by various methods. One possible method is to draw the portion defining the aperture 30 up through the second opening 22 and securing it therearound by means of a threaded engagement with a cap or conventional bung.

For safe operation of the drum 12, the outer bung 32 of the opening 20 is secured to said opening formed in the top wall 18 by providing an interiorly threaded closure cap 42 which engages the exterior threads of the opening 20. Upon full engagement, the flange 36 of the outer bung 32 is securely retained between the upper surface 38 of the opening 20 and the cap 42.

The closure cap 42 is also provided with an central opening 44. The opening 44 permits the contents of the container 10 to be accessed while the outer bung 32 is retained securely in position. To seal the opening 20 for transportation of the drum 12, an inner bung 46 is provided which engages the threaded portion 41 of the cylindrical body 40.

As described above, when two openings 20 and 22 are incorporated into the top wall 18, filling of the container 10 is easily achieved by providing two points from which the liner 26 may hang. The side walls 16 or top wall 18 of the drum 12 may be further provided with vent openings (not shown) to allow air contained between the drum 12 and the liner 26 to evacuate during filling and expansion of the liner 26. To further assist in the filing of the liner 26, the cap securing the second aperture 30 in position may be provided with a vent opening which permits the evacuation of air from the liner 26 itself.

As previously mentioned, the container 10 can be constructed without a second opening 22. When constructed in this manner, the liner 26 may be provided with a tab (not shown) designed to fit into a corresponding tab opening (not shown) and thereby secure the liner 26 during filling of the container 10.

When being transported, both bung openings 20 and 22 of the container 10 may be completely sealed or provided with a vent opening 48. One such vent opening 48 is illustrated on the inner bung 46 of Figure 3 and another is further described below in the description of the preferred embodiment, of the invention.

The embodiment shown in Figure 4 illustrates a bung structure 50 where the cap, flange and cylindrical body are integrally formed to produce an outer bung or bulkhead 52. In this embodiment, the portion 27 of the liner 26 forming the aperture 28 is heat sealed to the outer surface of an inner cylindrical body 54 haying an access opening 55 with internal threads 56. The cylindrical body 54 is integrally formed with an overhang structure 58 having internal threads 60. Prior to the engagement of the threads 60 with those of the opening 20, the liner 26 must be oriented so that, upon full engagement of the overhang structure 58 and the opening 20, the second aperture 30 will be in alignment with the second opening 22. Again, if it is desired that a single opening be incorporated into the container 10, the liner 26 may be provided with a tab (not shown) for securing the liner 26 during filling.

To enable sealing of the container 10, an inner bung 62 is provided which engages the inner cylindrical body 54 and restricts the access opening 55. To provide for venting, the inner bung 62 may be further provided with an interiorly threaded opening 64 capable of acceptance of a threaded vent means 66 to further restrict the opening 20. The vent means 66 is opened by rotating a vent plug 68 some amount until the container 10 vents through the engagement of the threaded opening 64 and the vent plug 68.

After delivery of the container 10 to an industrial consumer, the materials contained therein may be extracted by removing the inner bung 46 (or 62) and engaging a suction pump (not shown) with the outer bung 32 (or 52). Once the contents have been consumed and the liner 26 is empty, the second aperture 30 may be released from the second opening 22 and the outer bung 32 (or 52) disengaged from the first opening 20. The liner 26 may then be removed through the first opening 20 and disposed of properly. The insertion of a new liner 26 immediately enables the container 10 for reuse.

With a removable liner 26, the necessity of cleaning the interior of the drum 12 has been eliminated. By removing the liner 26 through an opening 20 in the top wall 18, the detailed procedure of removing the top wall 18 or lid of the drum 10 is also eliminated. Additionally, the present invention also prevents a plastic drum 12 from becoming permeated with the transported liquid materials or cleaning materials. The final result is a drum 12 which experiences no down time for cleaning purposes.

Claims

1. A container (10) for transporting and storing bulk liquid materials of the type including a rigid outer drum having a bottom wall (14), upright cylindrical side walls (16), and a top wall (18) defining an enclosed central cavity (19) of predetermined shape, said top wall (18) including a threaded cylindrical extension having an upper surface and defining at least one port (20, 22), said container comprising:

a thin walled removable liner (26) positioned in said cavity (19), being of a shape substantially conforming to said predetermined shape and further being substantially fully collapsible enabling removal through said port (20), said liner (26) having portions defining at least one aperture;

a first bung (52) which is in engagement with the threads of said threaded cylindrical extension thereby removably securing said first bung (52) which includes a body (54, 58) having a cylindrical sleeve (54) extending through said cylindrical extension and having an exterior surface being fixedly bonded to an interior surface of said liner (26) at said aperture so that said liner (26) is permanently attached to said body (54, 58) and in a collapsed condition removable through said port (20) upon disengagement of said first bung (52) from said top wall (18), said body (54, 58) also having a threaded portion (56) defining a first bung opening extending therethrough,

and a second bung (62) removably engaging said threaded portion (56) defining said first bung opening,

characterized in that said first bung (52) forms a closure cap having an integrally formed flange in engagement with said upper surface of the threaded cylindrical extension of said top wall (18), that said liner (26) has a cylindrical sleeve (27) defining said aperture, and that an interior surface of said sleeve (27) of the liner (26) is fixedly bonded to said exterior surface of the cylindrical sleeve (54) of said first bung (52).

2. Container as claimed in claim 1, wherein said interior surface of the sleeve (27) of the liner (26) is heat sealed to said sleeve (54) of the first bung (52).

3. Container as claimed in claim 1 or 2, wherein the cylindrical sleeve (27) of the liner (26) is in substantial alignment with said port (20).

4. Container as claimed in one or several of claims 1 to 3, wherein the cylindrical sleeve (54) of said first bung (52) is integrally formed with a fastening portion (58) in engagement with the threads of said threaded cylindrical extension.

5. Container as claimed in one or several of claims 1 to 4, wherein said second bung (62) includes a vent means (66).

Patentansprüche

1. Behälter (10) für den Transport und die Lagerung flüssiger Massenmaterialien, mit einem steifen äußeren Faß, welches eine Bodenwand (14), eine aufrechte zylindrische Seitenwand (16) und eine obere Wand (18) besitzt, die einen geschlossenen zentralen Hohlraum (19) vorgegebener Gestalt definieren, wobei die obere Wand (18) mit einem zylindrischen Gewindeansatz versehen ist, welcher eine obere Oberfläche hat und mindestens einen Durchlaß (20, 22) definiert, und wobei der Behälter umfaßt:
eine in dem Hohlraum (19) angeordnete, dünnwandige, entfernbare und mindestens eine Öffnung definierende Einlage (26) mit einer der genannten vorgegebenen Gestalt im wesentlichen angepaßten Gestalt, welche im wesentlichen vollständig zusammenfallen kann, um sie durch den Durchlaß (20) entfernen zu können;
einen ersten Spund (52), der sich im Eingriff befindet mit dem Gewinde des zylindrischen Gewindeansatzes und so abnehmbar befestigt ist sowie einen Körper (54, 58) aufweist, welcher eine zylindrische Hülse (54) hat, die sich durch den zylindrischen Ansatz erstreckt und eine Außenfläche besitzt, die an der genannten Öffnung fest an einer Innenfläche der Einlage (26) haftet, so daß die Einlage (26) dauerhaft an diesem Körper (54, 58) angebracht und in kollabiertem Zustand durch Abnehmen des ersten Spunds (52) von der oberen Wand (18) durch den Durchlaß (20) entfernbar ist, wobei dieser Körper (54, 58) auch einen Gewindeabschnitt (56) hat, welcher eine sich durch ihn hindurch erstreckende erste Spundöffnung definiert;
und einen zweiten Spund (62), der abnehmbar in den die erste Spundöffnung definierenden Gewindeabschnitt (56) eingreift,
dadurch gekennzeichnet, daß der erste Spund (52) eine Verschlußkappe bildet, welche einen einstückig geformten Flansch hat, der sich an die obere Oberfläche des zylindrischen Gewindeansatzes der oberen Wand (18) anschmiegt, daß die Einlage (26) eine die genannte Öffnung definierende zylindrische Hülse (27) hat und daß eine innere Oberfläche dieser Hulse (27) der Einlage (26) fest anhaftet an der äußeren Oberfläche der zylindrischen Hülse (54) des ersten Spunds (52).

2. Behälter nach Anspruch 1, bei dem die innere Oberfläche der Hülse (27) der Einlage (26) durch Heißsiegeln mit der Hülse (54) des ersten Spunds (52) verbunden ist.

3. Behälter nach Anspruch 1 oder 2, bei dem die zylindrische Hülse (27) der Einlage (26) mit dem Durchlaß (20) im wesentlichen fluchtet.

4. Behälter nach einem oder mehreren der Ansprüche 1 bis 3, bei dem die zylindrische Hülse (54) des ersten Spunds (52) einstückig geformt ist mit einem Befestigungsabschnitt (58), der sich im Eingriff befindet mit dem Gewinde des zylindrischen Gewindeansatzes.

5. Behälter nach einem oder mehreren der Ansprüche 1 bis 4, dessen zweiter Spund (62) Entlüftungsmittel (66) aufweist.

Revendications

1. Récipient (10) pour transporter et stocker des matières liquides en vrac, du type qui comprend un fût externe rigide présentant une paroi de fond (14), des parois latérales (16) cylindriques dressées et une paroi supérieure (18) déterminant une cavité centrale (19) fermée de forme prédéterminée, la paroi supérieure (18) comprenant un prolongement cylindrique fileté présentant une surface supérieure et déterminant au moins un orifice (20, 22), le récipient comprenant:
   - une doublure (26) amovible à paroi mince, positionnée dans la cavité (19), ayant une forme qui s'adapte sensiblement à la forme prédéterminée et de plus pouvant être sensiblement complètement repliée en permettant un retrait à travers l'orifice (20), la doublure (26) comportant des parties déterminant au moins une ouverture,

- une première bonde (52) qui est en prise avec les filets du prolongement cylindrique fileté précité en fixant par cela de façon démontable la première bonde (52) qui comporte un corps (54, 58) ayant un manchon cylindrique (54) s'étendant à travers le prolongement cylindrique et ayant une surface extérieure jointe fixement à une surface intérieure de la doublure (26) à l'endroit de l'ouverture de façon que la doublure (26) soit attachée en permanence au corps (54, 58) et puisse être retirée dans un état replié, à travers l'orifice (20), lors d'une libération de prise entre la première bonde (52) et la paroi supérieure (18), le corps (54, 58) comportant également une partie filetée (56) déterminant une première ouverture de bonde qui s'étend là à travers, et
- une seconde bonde (62) qui est en prise de façon libérable avec la partie filetée (56) déterminant la première ouverture de bonde,

caractérisée en ce que la première bonde (52) forme une coiffe de fermeture ayant un flasque formé d'une pièce, et en prise, avec la surface supérieure du prolongement cylindrique fileté de la paroi supérieure (18), en ce que la doublure (26) comporte un manchon cylindrique (27) déterminant l'ouverture et en ce qu'une surface interne du manchon (27) de la doublure (26) est jointe de façon fixe à la surface externe du manchon cylindrique (54) de la première bonde (52).

2. Récipient suivant la revendication 1, caractérisé en ce que la surface interne du manchon (27) de la doublure (26) est soudé à chaud au manchon (54) de la première bonde (52).

3. Récipient suivant l'une ou l'autre des revendications 1 et 2, caractérisé en ce que le manchon cylindrique (27) de la doublure (26) est sensiblement en alignement avec l'orifice (20).

4. Récipient suivant l'une ou plusieurs des revendications 1 à 3, caractérisé en ce que le manchon cylindrique (54) de la première bonde (52) est formée d'une pièce avec une partie de fixation (58) qui est en prise avec les filets du prolongement cylindrique fileté.

5. Récipient suivant l'une ou plusieurs des revendications 1 à 4, caractérisé en ce que la seconde bonde (62) comporte des moyens d'évent (66).

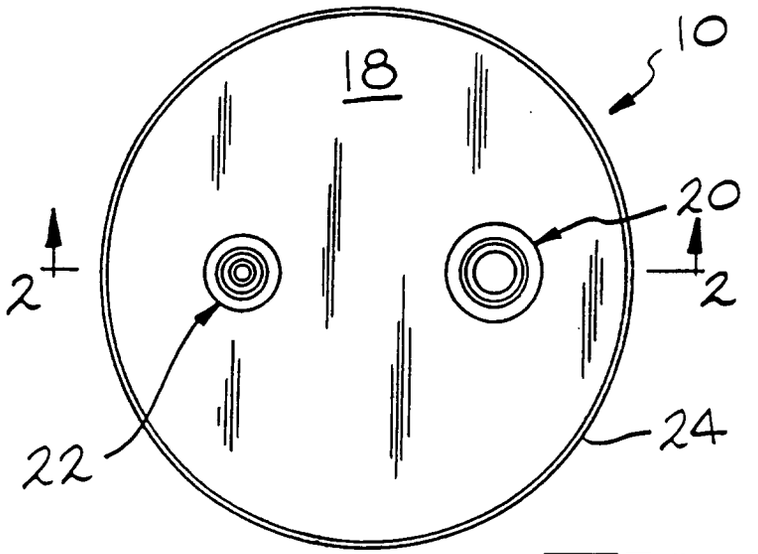


FIG. 1

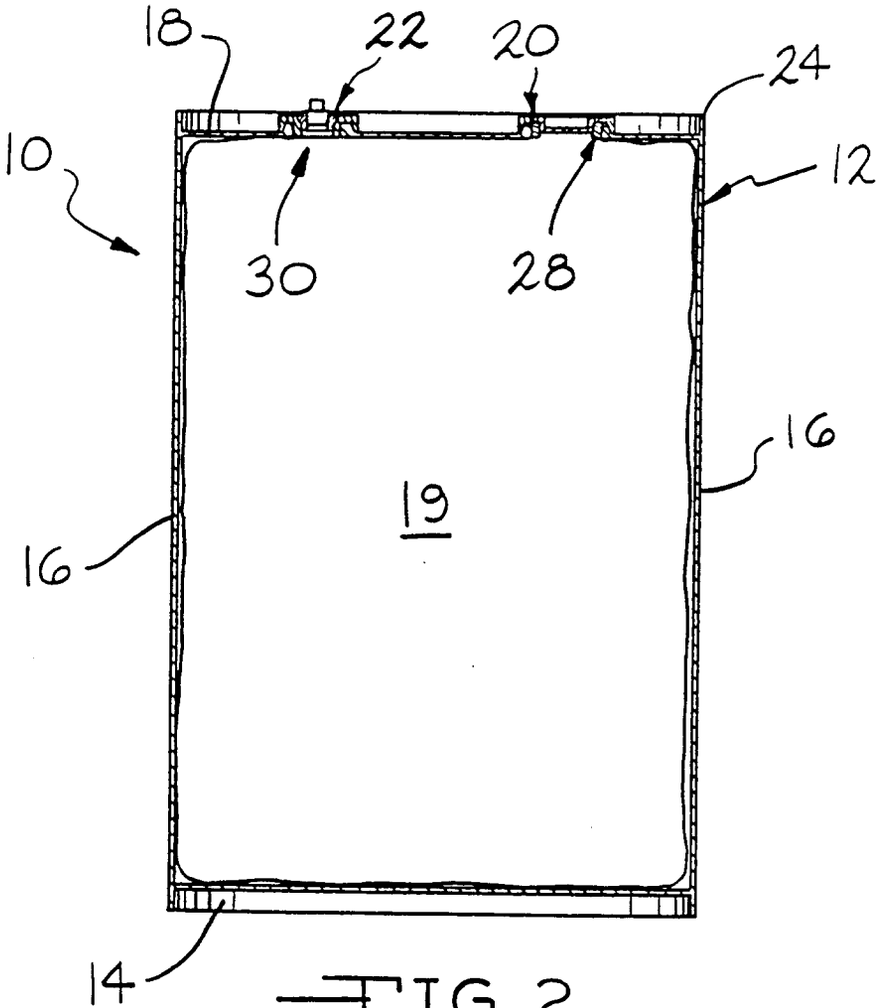


FIG. 2

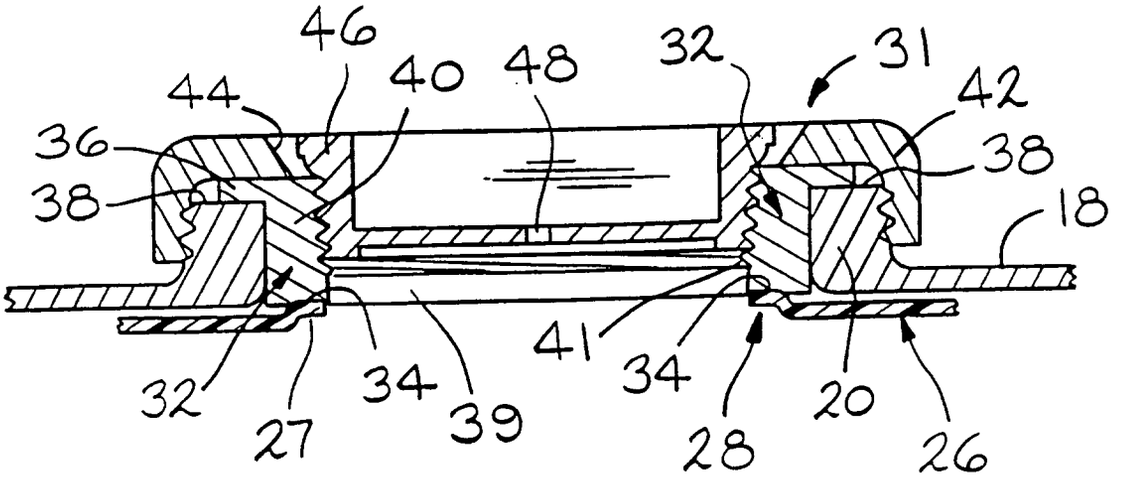

46
40
48
32
31
44
42
36
38
38
18
41
32
27
34
39
34
28
20
26

FIG. 3

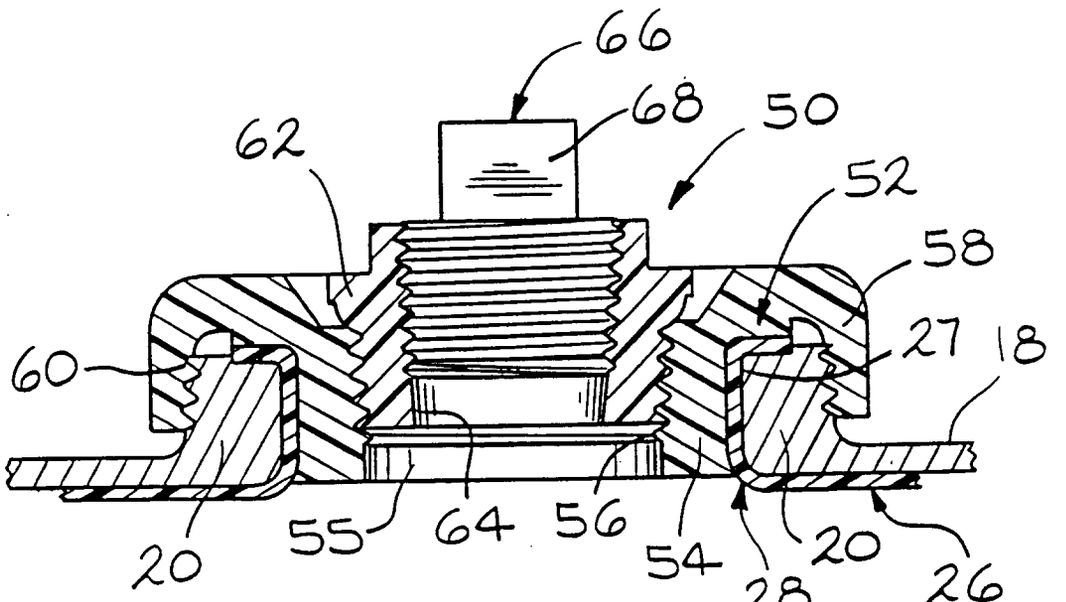

66
68
50
62
52
58
60
27
18
20
55
64
56
54
28
20
26

FIG. 4