

BOTTLE ACCESSORY FOR ATTACHING A RETRACTABLE SPOUT TO A BOTTLE USING A CAP

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FIELD AND BACKGROUND OF THE INVENTION

The invention relates to a bottle accessory for application with a cap to a bottle by using conventional capping machines, while permitting the cap to be later detached from the bottle with the accessory retained within the bottle. The invention is particularly useful for applying a retractable spout assembly to bottles, and is therefore 10 described below with respect to such an application.

The present invention is especially useful in the retractable spout assemblies disclosed in my prior US Patents 6,026,994 and 6,976,610, the contents of which are hereby incorporated reference.

My prior US Patent 6,026,994 describes a retractable spout assembly for 15 application to the neck of a bottle to be closed by a cap. The assembly includes a sleeve-like housing fixedly receivable within the bottle neck, and a spout movable within the housing from a retracted position, when the housing is fixed within the bottle neck and the bottle neck closed by the cap, to an extended position projecting outwardly of the housing and the bottle neck for pouring out contents of the bottle. To make the 20 spout automatically extendible upon removing the cap, the assembly further includes a spring biasing the spout to its extended position. Such a spring could be omitted, whereupon the spout would be manually movable to its extended position with or after removal of the cap. An air-return passageway is provided for returning air into the bottle when its liquid contents are being poured out through the spout.

25 My prior US Patent 6,976,610 describes improvements in the construction of that retractable spout assembly which not only make the assembly more compact in construction and more reliable in operation but, by including a connector disc, also enable the assembly to be accommodated by existing bottle-capping machines so that virtually no change is required in such expensive machines to enable them also to be 30 used for applying caps incorporating retractable spout assemblies.

A drawback found to exist in the construction described in my prior US Patent 6,976,610 is the possibility that, after the cap and spout assembly have been

applied to the bottle, removal of the cap with the connector disc may also tend to pull out the spout housing from the bottle.

OBJECTS AND BRIEF SUMMARY OF THE INVENTION

5 An object of the present invention is to provide a bottle accessory for application with a cap to the neck of a bottle, which assembly better assures the release of the housing from the connector disc when the cap is removed with the connector disc from the bottle neck.

According to a broad aspect of the present invention, there is provided a bottle 10 accessory for application with a cap to the neck of a bottle, comprising: a housing dimensioned to be fixedly received within the bottle neck; and a connector disc attached to the upper end of the housing and receivable within the cap to enable the disc and housing to be applied with the cap to the neck of the bottle; characterized in that the upper end of the housing is formed with an annular groove spaced inwardly of the outer 15 peripheral edge of the housing and extending axially of the housing, and in that the connector disc includes a lower face having an annular peripheral surface dimensioned to be fixedly received within the cap to serve as a liner therefor, and further characterized in that the lower face of the connector disc also includes an annular rib spaced inwardly of the periphery of the disc, the annular rib extending axially of the 20 housing and being dimensioned to be releasably retained within the annular groove in the upper end of the housing such that the disc facilitates the attachment of the housing with the cap to the bottle neck, and releases from the housing upon removal of the cap from the bottle neck, to thereby enable the connector disc to also serve as a liner for the removed cap while the housing remains within the bottle neck.

25 According to the preferred embodiments of the invention described below, the annular groove in the upper end of the housing includes an outer annular side wall and an inner annular side wall spaced inwardly from the outer annular side wall, the outer annular side wall having an inner surface formed with a radially-extending annular groove, and the outer surface of the annular rib in the lower face of the connector disc 30 having a radially-extending annular bead receivable in the annular groove. The upper end of the housing includes an upper section formed with the axially-ending annular recess, and an underlying section formed with threads for receiving the cap. The upper

section of the housing further includes an elastic juncture between the upper and underlying sections of the housing.

Two embodiments of the invention are described below for purposes of example. In one described embodiment, the upper section of the housing has a smaller outer diameter than that of the underlying section of the housing to define an annular space for accommodating radial deflection of the upper section at the elastic juncture and thereby to facilitate release of the connector disc from the housing upon removal of the cap from the bottle neck after insertion of the housing within the bottle neck. In this embodiment, the spout housing is dimensioned such that the outer end of its upper section is substantially flush with the outer end of the bottle neck when the spout housing is inserted therein.

In a second described preferred embodiment, the upper section of the housing has a larger outer diameter than that of the underlying section of the housing and the housing includes an axially-extending annular recess inwardly of its underlying section to define an annular space permitting inward radial deflection of the underlying section, and thereby outward radial deflection of the upper section, at the elastic juncture. This facilitates release of the connector disc from the housing upon removal of the cap from the bottle neck after insertion of the housing within the bottle neck. In this embodiment, the spout housing is dimensioned such that the outer end of its upper section projects outwardly of the outer end of the bottle neck when the spout housing is inserted therein.

As indicated above, the invention is particularly useful for retractable spout assemblies to be applied to the bottle neck, and is therefore described below with respect to that application.

Accordingly, according to a more specific aspect of the present invention, there is provided a retractable spout assembly for application with a cap to the neck of a bottle, comprising: a spout housing dimensioned so as to be fixedly received within the bottle neck; a spout movable within the spout housing from a retracted position within the spout housing, when the housing is fixed within the bottle neck and the cap is applied over the bottle neck, to an extended position projecting outwardly of the spout housing and the bottle neck for pouring out contents of the bottle; and a connector disc attached to the upper end of the housing to be applied with the cap to the neck of the bottle; characterized in that the upper end of the spout housing is formed with an

annular groove spaced inwardly of the outer peripheral edge of the spout housing and extending axially of the housing, and in that the connector disc includes a lower face having an annular peripheral surface dimensioned to be fixedly received within the cap to serve as a liner therefor; and further characterized in that the lower face of the 5 connector disc also includes an annular rib spaced inwardly of the periphery of the connector disc; the annular rib extending axially of the spout housing and being dimensioned to be releasably retained within the annular groove in the upper end of the spout housing, such that the connector disc facilitates the attachment of the spout housing with the cap to the bottle neck, and releases from the spout housing upon 10 removal of the cap from the bottle neck, to thereby enable the disc also to serve as a liner for the removed cap while the spout housing and spout remains within the bottle neck.

Further features and advantages of the invention will be apparent from the description below.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates one form of retractable spout assembly constructed in accordance with the present invention to be received within a bottle neck;

FIG. 2 illustrates the retractable spout assembly of FIG. 1 after removal of the cap and with the spout in its projected position for pouring out contents from the bottle;

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FIG. 3 is an enlarged fragmentary view of a portion of FIG. 1 more clearly showing the manner in which its connector disc is attached to the spout assembly to better assure release of the housing from the connector disc when the cap, with the connector disc serving as a liner therefor, is detached from the bottle neck; and

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FIGs. 4 and 5 are views corresponding to those of FIGs. 1 and 3, but illustrating a second embodiment of the invention.

It is to be understood that the foregoing drawings, and the description below, are provided primarily for purposes of facilitating understanding the conceptual aspects of the invention and possible embodiments thereof, including what is presently considered to be a preferred embodiment. In the interest of clarity and brevity, no attempt is made 30 to provide more details than necessary to enable one skilled in the art, using routine skill and design, to understand and practice the described invention. It is to be further

understood that the embodiments described are for purposes of example only, and that the invention is capable of being embodied in other forms and applications than described herein.

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DESCRIPTION OF PREFERRED EMBODIMENTS

The embodiment of FIGs. 1-3

FIGs. 1-3 illustrate a retractable spout assembly of the type described in my prior US Patent 6,976,610 applied to a bottle, schematically illustrated at 2, formed with a neck 4 closed by a cap 6 (FIG. 2). The spout assembly, generally designated 8 in FIGs. 1 and 2, is fixedly received within neck 4 of the bottle 2 so that it does not have to be repeatedly applied and removed. Thus, whenever cap 6 is removed, the spout within the assembly 8 automatically moves to an extended position (FIG. 2) to enable it to be used for pouring out the bottle contents; and whenever the cap is re-applied, it automatically moves the spout back to its retracted position (FIG. 1).

15 The spout assembly 8 includes a housing, generally designated 10, to be fixedly receivable within the bottle neck 4; a spout, generally designated 20, extending through the housing and movable therein to an extended position (FIG. 2) projecting outwardly of the bottle neck to facilitate pouring the contents from the bottle, and to a retracted position (FIG. 1) disposed within the bottle neck when closed by the cap 6; and a coiled 20 spring, generally designated 30 (FIG. 2), normally urging the spout 20 to its extended position, but compressible to automatically move the spout to its retracted position upon application of the cap to the bottle neck 4.

Housing 10 includes a cylindrical section 11 having, at its lower end, an insert 12 formed with an opening 13 to communicate with the interior of the bottle 2 when the 25 spout assembly is applied to the bottle neck.

Spout assembly 20 includes two telescoping sections 21, 22. The outer end 21a of the outer telescoping section 21 is of a tapered cross-section to facilitate discharging the liquid from the bottle into a glass or other receptacle. The opposite end of telescopic section 21 is formed with an annular shoulder 21b on its inner surface to serve as a seat 30 for spring 30, and with an outer annular shoulder 21c engageable with a corresponding shoulder in the inner surface of telescopic section 22, to limit the outward movement of telescopic section 21.

Telescoping section 22 is formed, at its opposite end, with an outwardly tapered surface 22a cooperable with an inwardly-tapered surface 11a at the corresponding end of the housing cylindrical section 11, to limit the projected position of telescopic section 22.

5 The cylindrical section 11 of housing 10 is formed with two passageways, namely: a first passageway 14 for the liquid (or other pourable material) to be poured from the bottle 2; and an air passageway 15 for returning air into the interior of the bottle when its contents are being poured.

It will thus be seen that each time cap 6 is removed, the spout 20 is
10. automatically moved to its extended position by spring 30 to enable the spout to be used for pouring out contents of the bottle via passageway 14 of the spout, while air is returned into the interior of the bottle via passageway 15. When cap 6 is re-applied to the bottle neck 4, spout 20 is automatically moved by the cap to its retracted position, which is permitted by the compression of spring 30. Accordingly, each time the cap is
15 to be re-applied to a bottle containing the spout assembly, it is not necessary to remove the spout assembly as in conventional spout constructions.

In the construction illustrated in FIGs. 1-3, the assembly further includes a connector disc, generally designated 40. Disc 40 actually serves two functions: Its primary function is to serve as a connector for connecting the retractable spout
20 assembly to cap 6 and for retaining the assembly within the cap, to thereby enable the cap, with the retractable spout assembly, to be handled by existing bottle-filling and capping machines. Disc 40 also serves as a liner for the cap when attached to the bottle which seals the bottle when the cap is applied with the spout 20 in its retracted position, as illustrated in FIG. 1.

25 According to the present invention, the upper end of the spout housing 10, and the under surface of the connector disc 40, are constructed in a manner to enable the connector disc 40, with the spout housing 10, to be applied to the cap using conventional capping machines, while at the same time better assuring the release of the spout housing from the connector disc when the cap is detached from the bottle, such
30 that the connector disc will be retained within the cap to serve as a liner therefor, and the spout housing will be retained in the bottle neck to thereafter facilitate pouring contents therefrom when the cap is removed.

Thus, as shown particularly in the enlarged fragmentary view of FIG. 3, the upper part of cylinder 11 of the housing 10 is integrally formed with an annular groove or recess 16 defined by an annular outer side wall 16a, an inner annular side wall 16b, and a bottom wall 16c. The inner surface of the outer annular side wall 16a is formed 5 with a radially-extending groove 16d.

The inner face of connector disc 40 is formed with an annular wall or rib 42 receivable within annular groove 16 and of smaller thickness than the width of the groove. The outer surface of annular rib 42 is formed with a radially-extending enlarged, rounded bead formation 42a receivable within annular groove 16d of the outer 10 annular wall 16a at the upper end of the housing cylinder 11.

The upper end of housing cylinder 11 is further formed with a section 17 underlying side wall 16a and formed with thread 17a for receiving the bottle cap (6, FIG. 2). Section 17 of the housing is radially spaced from the upper end of housing cylinder section 11 by a deep annular recess 18. Preferably, section 17 has a thickness at 15 its threaded portion 17a greater than the thickness of the bottom wall 16c of recess 16, such that an elastic juncture 17b is formed between bottom wall 16c of the upper housing section and the underlying section 17.

In the embodiment of FIGs. 1–3, the outer surface of annular wall 16a of the housing is reduced in outer diameter to define an annular space 19 between it and bottle 20 neck 4, for accommodating outward radial deflection of wall 16a of the housing, as will be described below

The embodiment of FIGs. 1–3 thus operates as follows: Initially, the spout housing 10, including the spout assembly 20, is attached to the connector disc 40 by merely snapping annular rib 42 of the connector disc into recess 16 of the housing. In 25 such case, rib 42d of wall 42, received within annular groove 16d of wall 16a, firmly but releasably retains the spout assembly attached to the connector disc. Thus, the connector disc 40, with the spout assembly releasably attached thereto, may be used in conventional capping machines for capping the connector disc and spout assembly to the cap.

30 When the cap, and the spout assembly attached thereto, are inserted into a bottle neck 4, the forceful insertion of the upper end of the housing causes the upper end to be flexed outwardly, this being permitted by the elastic juncture 17b between the upper and

underlying sections of the housing. This outward flexing of outer annular wall 16a is accommodated by space 19 and moves the annular groove 16d, in the upper end of annular wall 16a, away from the bead 42a in the annular rib 42 of the connector disc 40.

Accordingly, when the connector disc 40 has been received within the cap, the 5 connector disc is firmly but releasably attached to the spout assembly. However, when the spout assembly and cap are inserted into the bottle neck, the connector disc is released from the spout assembly by withdrawal of rib 42a from groove 16d. Accordingly, whenever thereafter the cap is removed from the bottle, connector disc 40 will be retained within the cap, to serve as a liner thereof, while the spout assembly will 10 remain fixed within the bottle neck.

It will thus be seen that the construction illustrated in FIGs. 1–3 enables the spout assembly to be releasably attached to the connector disc 40 so that both can be applied to bottles using conventional capping machines, and that whenever the cap is thereafter to be removed from a bottle, the connector disc will be retained within the cap 15 to serve as a liner thereof, while the spout assembly will remain fixed within the bottle and will automatically move to its extended position.

The Embodiment of FIGs. 4 and 5

FIGs. 4 and 5 illustrate an embodiment similar to that of FIGs. 1–3, but with the following modification.

20 Thus, as described above, in the FIGs. 1–3 embodiment, the upper section of the housing formed with annular wall 16a has a smaller outer diameter than that of the underlying section 17 formed with the thread 17a, to define space 19 for accommodating the deflection of the annular wall 16a to release the spout assembly from connector disc 40 when the cap and spout assembly are forcefully applied to the 25 bottle neck. In such an arrangement, the housing 10 is dimensioned such that the outer end of its upper section, containing the annular wall 16a, is substantially flush with the outer end of the bottle neck so that the complete spout assembly is fixed flush with the bottle neck.

FIGs. 4 and 5 illustrate a modification wherein the upper section of the housing 30 containing the annular wall, therein designated 116a, has a larger outer diameter than the underlying section 117 formed with the threads 117a. In such a construction, the housing is dimensioned such that the outer end of its upper section projects outwardly of

the outer end of the bottle neck when the spout assembly is inserted therein. In this case, the deflection of the upper housing section is permitted by the space between it and the bottle cap (6, FIG. 2) since annular wall 116a of the upper housing section is not engaged by the bottle neck, which engages only threads 117a of the underlying housing 5 section.

In all other respects, the retractable spout assembly illustrated in FIGs. 4 and 5 is constructed and operates in substantially the same manner, as described above with respect to the embodiment of FIGs. 1–3.

While the invention has been described with respect to two preferred 10 embodiments, including a particular structure of a retractable spout assembly, it will be appreciated that the invention could be used with respect to other spout assemblies, and also with respect to other bottle accessories to be attached within a bottle neck, such as dosing devices, anti-drip devices, etc. Many other variations, modifications and applications of the invention will be apparent.

WHAT IS CLAIMED IS:

1. A bottle accessory for application with a cap to the neck of a bottle, comprising:

a housing dimensioned to be fixedly received within the bottle neck;

and a connector disc attached to the upper end of said housing and receivable within the cap to enable the connector disc and housing to be applied with the cap to the neck of the bottle;

characterized in that the upper end of said housing is formed with an annular groove spaced inwardly of the outer peripheral edge of the housing and extending axially of the housing, and in that said connector disc includes a lower face having an annular peripheral surface dimensioned to be fixedly received within said cap to serve as a liner therefor,

and further characterized in that said lower face of the connector disc also includes an annular rib spaced inwardly of the periphery of the connector disc, said annular rib extending axially of the housing and being dimensioned to be releasably retained within said annular groove in the upper end of said housing such that the connector disc facilitates the attachment of the housing with the cap to the bottle neck, and releases from the housing upon removal of the cap from the bottle neck, to thereby enable the connector disc to also serve as a liner for the removed cap while the housing remains within the bottle neck.

2. The accessory according to claim 1, wherein said annular groove in the upper end of said housing includes an outer annular side wall and an inner annular side wall spaced inwardly from the outer annular wall, said outer annular side wall having an inner surface formed with a radially-extending annular groove, and the outer surface of said annular rib in the lower face of said connector disc having a radially-extending annular bead receivable in said annular groove.

3. The accessory according to claim 1, wherein the upper end of said housing includes an upper section formed with said axially-ending annular recess, and an underlying section formed with threads for receiving said cap.

4. The accessory according to claim 3, wherein said upper section of said housing further includes an elastic juncture between said upper and underlying sections of the housing.

5. The accessory according to claim 4, wherein said upper section of the housing has a smaller outer diameter than that of said underlying section of the housing to define an annular space for accommodating radial deflection of said upper section at said elastic juncture and thereby to facilitate release of the connector disc from the housing upon removal of the cap from the bottle neck after insertion of the housing within the bottle neck.

6. The accessory according to claim 5, wherein said housing is dimensioned such that the outer end of its upper section is substantially flush with the outer end of the bottle neck when the housing is inserted therein.

7. The accessory according to claim 4, wherein said upper section of the housing has a larger outer diameter than that of said underlying section of the housing and said housing includes an axially-extending annular recess inwardly of said underlying section to define an annular space permitting inward radial deflection of said underlying section, and thereby outward radial deflection of said upper section, at said elastic juncture, facilitating release of the connector disc from the housing upon removal of the cap from the bottle neck after insertion of the housing within the bottle neck.

8. The accessory according to claim 7, wherein said housing is dimensioned such that the outer end of its upper section projects outwardly of the outer end of the bottle neck when the housing is inserted therein.

9. The accessory according to claim 4, wherein said elastic juncture is of smaller thickness than said threaded section to increase the elasticity of said juncture.

10. The accessory according to claim 1, wherein said accessory within said housing is a retractable spout assembly movable within said housing from a retracted position within the housing when the housing is fixed within the bottle neck with the cap applied over the bottle neck, to an extended position projecting outwardly of the housing and the bottle neck when the cap is removed therefrom for pouring out contents of the bottle.

11. The accessory according to claim 9, wherein said housing further includes an air-return passageway for returning air into the bottle when contents therein are being poured out through said spout.

12. A retractable spout assembly for application with a cap to the neck of a bottle, comprising:

a spout housing dimensioned so as to be fixedly received within the bottle neck;

a spout movable within said spout housing from a retracted position within the spout housing, when the housing is fixed within the bottle neck and the cap is applied over the bottle neck, to an extended position projecting outwardly of the spout housing and the bottle neck for pouring out contents of the bottle;

and a connector disc attached to the upper end of said housing to be applied with the cap to the neck of the bottle;

characterized in that the upper end of said spout housing is formed with an annular groove spaced inwardly of the outer peripheral edge of the spout housing and extending axially of the housing, and in that said connector disc includes a lower face having an annular peripheral surface dimensioned to be fixedly received within said cap to serve as a liner therefor;

and further characterized in that said lower face of the connector disc also includes an annular rib spaced inwardly of the periphery of the connector disc; said annular rib extending axially of the spout housing and being dimensioned to be releasably

retained within said annular groove in the upper end of said spout housing, such that the connector disc facilitates the attachment of the spout housing with the cap to the bottle neck, and releases from the spout housing upon removal of the cap from the bottle neck, to thereby enable the connector disc also to serve as a liner for the removed cap while the spout housing and spout remains within the bottle neck.

13. The assembly according to claim 12, wherein said spout housing further includes an air-return passageway for returning air into the bottle when contents therein are being poured out through said spout.

14. The assembly according to claim 12, wherein said annular groove in the upper end of said spout housing includes an outer annular wall and an inner annular wall spaced inwardly from the outer annular wall, said outer annular side wall having an inner surface formed with a radially-extending annular groove, and the outer surface of said annular rib in the lower face of said connector disc having a radially-extending annular bead receivable in said annular groove.

15. The assembly according to claim 12, wherein the upper end of said spout housing includes an upper section formed with said axially-ending annular recess, and an underlying section formed with threads for receiving said cap.

16. The assembly according to claim 15, wherein said upper section of said spout housing further includes an elastic juncture between said upper and underlying sections of the spout housing.

17. The assembly according to claim 16, wherein said upper section of the spout housing has a smaller outer diameter than that of said underlying section of the spout housing to define an annular space for permitting radial deflection of said upper section at said elastic juncture and thereby facilitating release of the connector disc from the spout housing upon removal of the cap from the bottle neck after insertion of the spout housing within the bottle neck.

18. The assembly according to claim 12, wherein said spout housing is dimensioned such that the outer end of its upper section is substantially flush with the outer end of the bottle neck when the spout housing is inserted therein.

19. The assembly according to claim 16, wherein said upper section of the spout housing has a larger outer diameter than that of said underlying section of the spout housing and said spout housing includes an axially-extending annular recess inwardly of said underlying section to define an annular space permitting inward radial deflection of said underlying section, and thereby outward radial deflection of said upper section, at said elastic juncture, facilitating release of the connector disc from the spout housing upon removal of the cap from the bottle neck after insertion of the spout housing within the bottle neck.

20. The assembly according to claim 19, wherein said spout housing is dimensioned such that the outer end of the upper section projects outwardly of the outer end of the bottle neck when the spout housing is inserted therein.

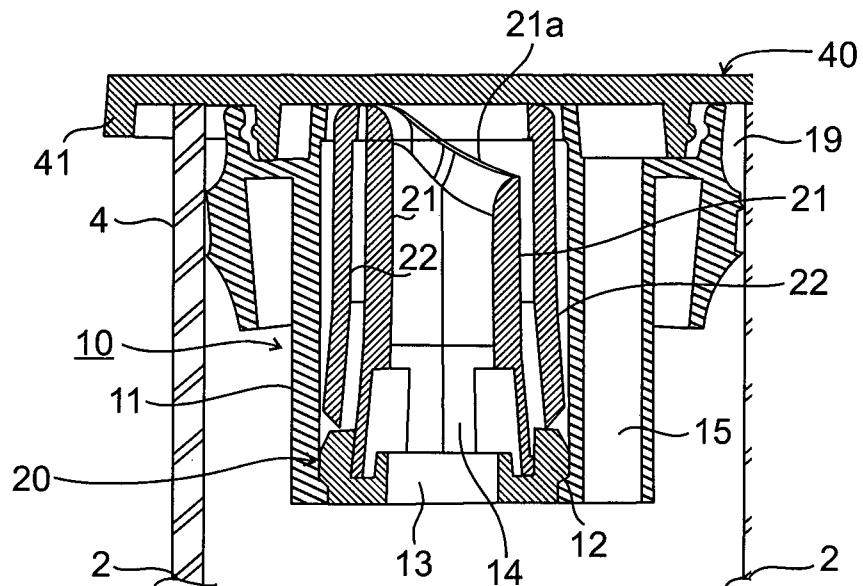


FIG. 1

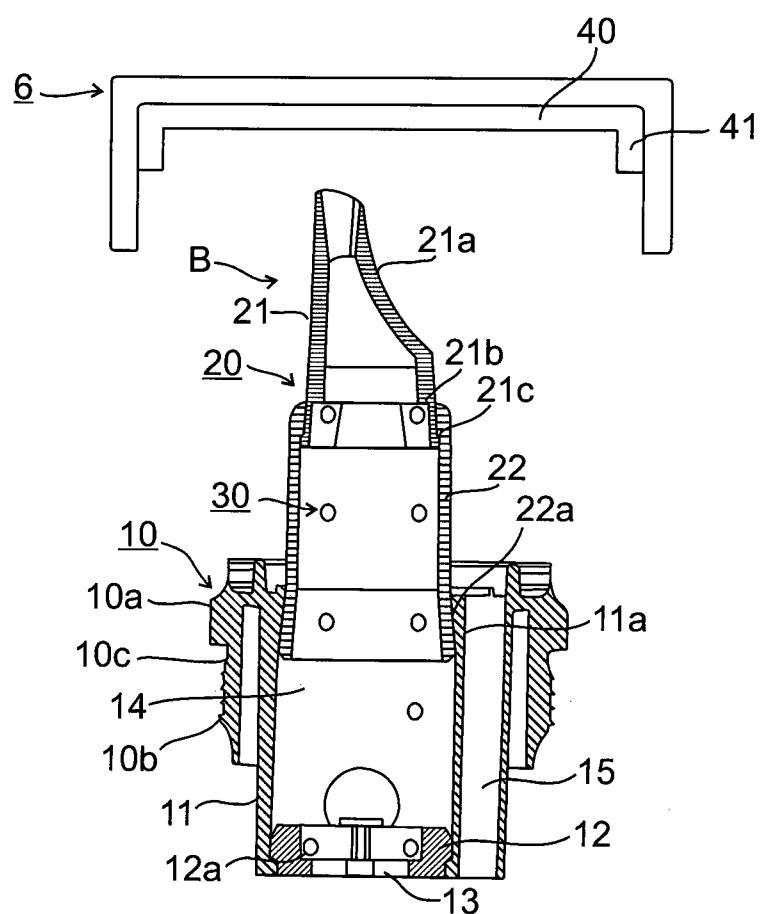


FIG. 2

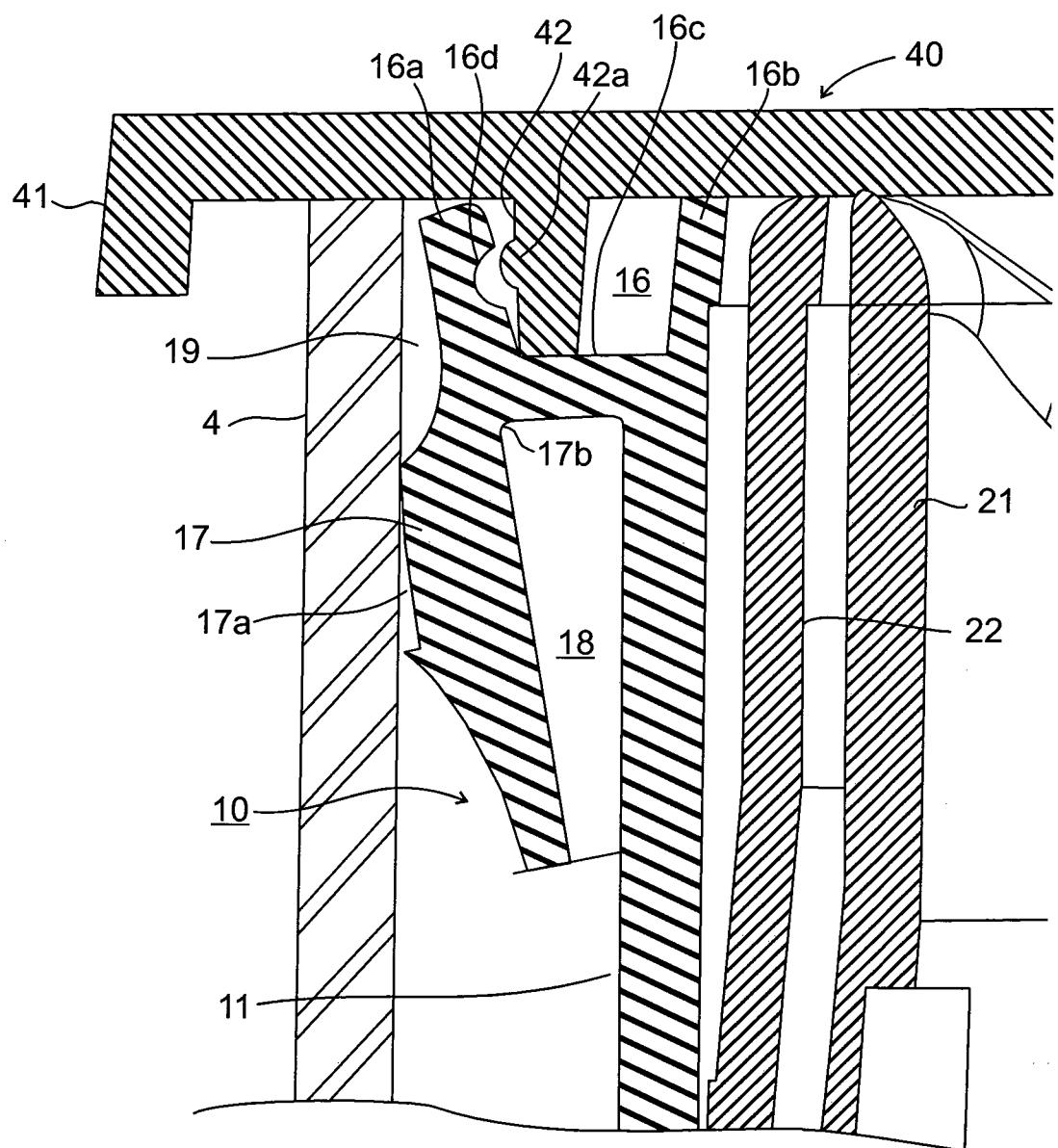


FIG. 3

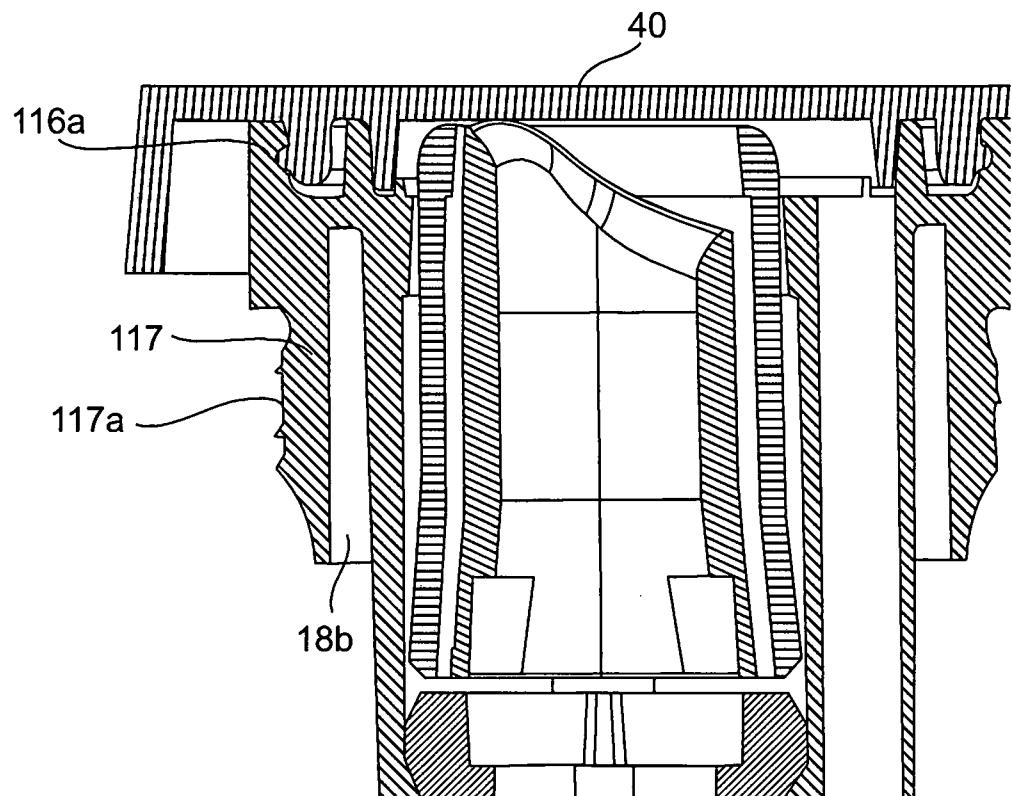


FIG. 4

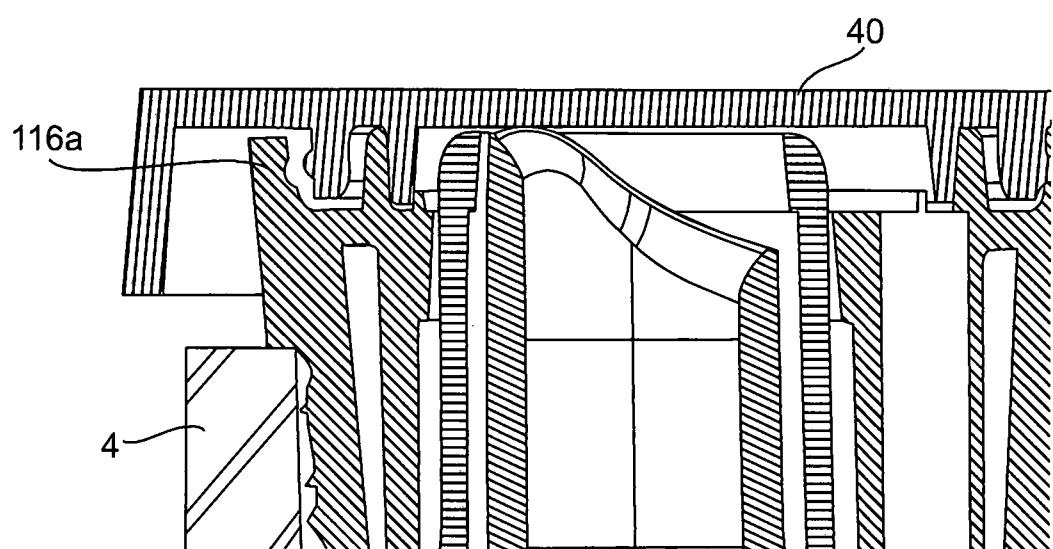


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL 11/00347

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B65D 5/72 (2011.01)

USPC - 222/566

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

USPC: 222/566

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 222/523, 569, 566, 74, 567, 575, 544, 545 (text search - see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PubWEST(USPT, PGPB, EPAB, JPAB); Google

Search Terms: cap, groove, rib, liner, pouring, spout, connector, disc, threads, seal, bead

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,976,610 B2 (RIGEL) 20 December 2005 (20.12.2005), entire document especially the Abstract; figs 3, 8; col 4, lns 4-13; col 5, lns 7-8; col 6, lns 1-22	1-20
Y	US 4,427,138 A (HEINLEIN) 24 January 1984 (24.01.1984), entire document especially Figs 1-3; col 4, lns 1-6; col 4, lns 49-54	1-20
Y	US 2003/0213812 A1 (KARS et al.) 20 November 2003 (20.11.2003), entire document especially Figs 1, 5	2, 14
Y	US 3,543,973 A (BERINS) 01 December 1970 (01.12.1970), entire document especially Fig 4; col 3, lns 68-72; col 4, lns 53-66; col 4, ln 72-col 5, ln 6	3-9, 11, 15-20
A	US 3,369,710 A (LUCAS et al.) 20 February 1968 (20.02.1968), entire document especially the Abstract; Figs 1, 3	1-20
A	US 3,339,772 A (MILLER) 05 September 1967 (05.09.1967), entire document especially Figs 1, 2, 6; col 1, lns 50-65	1-20
A	US 4,696,416 A (MUCKENFUHS et al.) 29 September 1987 (29.09.1987) entire document especially Figs 10-11, 13	1-20

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance

“E” earlier application or patent but published on or after the international filing date

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“P” document published prior to the international filing date but later than the priority date claimed

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“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

20 September 2011 (20.09.2011)

Date of mailing of the international search report

30 SEP 2011

Name and mailing address of the ISA/US

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