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(54) Title: Anti Drip Device for Liquid Dispensers

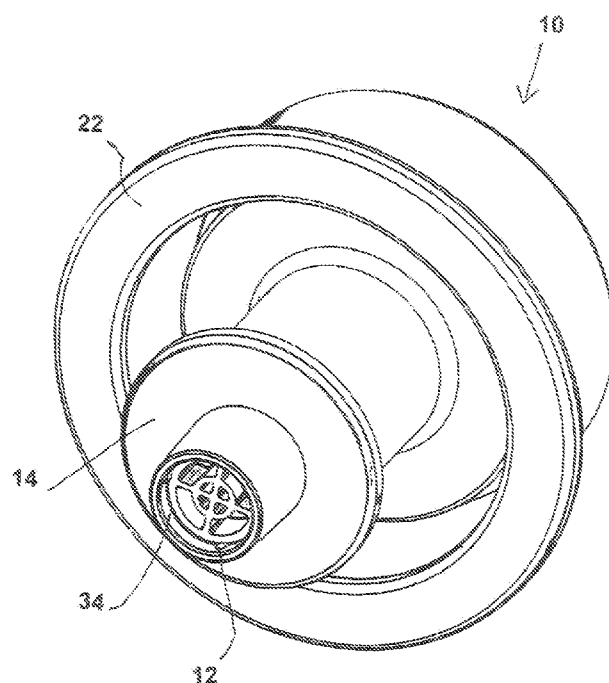


Figure 1

(57) Abstract: An anti-drip device (12) is for use in association with a liquid dispenser having a nozzle (10). The anti-drip device (12) is adapted to fit into the nozzle (10). The device has an outer cross sectional dimension, an inner cross sectional dimension and an inner surface. The anti-drip device (12) provides a zone in the nozzle (10) with increased surface area.



MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), **Published:**

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MR, NE, SN, TD, TG).

ANTI DRIP DEVICE FOR LIQUID DISPENSERS

FIELD OF THE INVENTION

This invention relates to dispensers and in particular anti-drip
5 devices for dispensers that reduce the drip after operation.

BACKGROUND OF THE INVENTION

Liquid dispensers are almost ubiquitous. Liquid dispensers are
found in many public restrooms, hospitals, restaurants and other establishments.
10 More recently there has been a trend towards liquid dispensers which dispense
foam. These dispensers have the distinct advantage of reducing the amount of
liquid dispensed in each shot when compared to non-foaming dispensers. Many
of these dispensers drip somewhat after use. This is particularly true for inverted
dispensers. Generally the amount of drip is dependent on the type of dispenser
15 and the viscosity of the liquid. Accordingly, the drip problem is more of an issue
with foam dispensers since the low viscosity soap that is used with foam
dispensers is more prone to drip.

Accordingly it would be advantageous to provide a device that
would decrease the drip after use.

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SUMMARY OF THE INVENTION

The present invention relates to an anti-drip device for use in
association with a liquid dispenser having a nozzle. The anti-drip device is
adapted to fit into the nozzle. The device has an outer cross sectional
25 dimension, an inner cross sectional dimension and an inner surface. The inner

cross sectional dimension is the sum of a length of the inner surface and the inner surface is shaped such that the inner cross sectional dimension is larger than a length of the outer cross sectional dimension.

Further features of the invention will be described or will become
5 apparent in the course of the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described by way of example only, with reference to the accompanying drawings, in which:

10 Fig. 1 is a perspective view of a nozzle with an anti-drip device of the present invention installed therein;

Fig. 2 is a blown apart perspective view of the nozzle of figure 1;

Fig. 3 is a perspective view of the anti-drip device as shown in figures 1 and 2;

15 Fig. 4 is a perspective view of the anti-drip device of figure 3 with a porous member attached to one side thereof;

Fig. 5 is a perspective view of a nozzle similar to that shown in figure 1 but showing an alternate embodiment of the anti-drip device of the present invention installed therein;

20 Fig. 6 is a perspective view of the anti-drip device as shown in figure 5;

Fig. 7 is a perspective view of another alternate view of an anti-drip device of the present invention;

25 Fig. 8 is a broken away perspective view of the embodiment of the anti-drip device shown in figure 7 and a circular anti-drip device both positioned

in a nozzle;

Fig. 9 is a broken away perspective view of the embodiment of the anti-drip device shown in figure 6 and a circular anti-drip device positioned in a nozzle but in a different configuration than that shown in figure 8;

5 Fig. 10 is a broken away perspective view of the embodiment of the anti-drip device shown in figure 6 positioned in a nozzle;

Fig. 11 is a broken away perspective view of the embodiment of the anti-drip device shown in figure 6 positioned in a nozzle but in a different configuration than that shown in figure 10;

10 Fig. 12 is a broken away perspective view of the embodiment of the anti-drip device shown in figure 6 with a porous member attached thereto and a circular anti-drip device positioned in a nozzle in a configuration similar to that shown in figure 8

Fig. 13 is a perspective view of an alternate embodiment of anti-drip device that is integrally formed in the nozzle;

Fig. 14 is a broken away perspective view of the embodiment of the anti-drip device shown in figure 13;

Fig. 15 is a perspective view of a soap dispenser including a nozzle and having a portion of the outer shell broken away;

20 Fig. 16 is a side view of figure 15;

Fig. 17 is a perspective view of an alternate soap dispenser;

Fig. 18 is a perspective view of the nozzle portion of the dispenser of figure 17; and

Fig. 19 is a perspective view of the nozzle portion of the dispenser of figures 17 and 18 but showing the anti-drip device separated therefrom.

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DETAILED DESCRIPTION OF THE INVENTION

Referring to figures 1 and 2, the nozzle is shown generally at 10. Nozzle 10 includes at least one anti-drip device 12 that may have a variety of different cross sectional configurations, some examples of which are shown hereafter. The common feature in all of the different configurations is that the anti-drip device includes inner walls that increase the surface area. In use, the anti-drip device provides a zone in the nozzle with an increased surface area. By increasing the surface area there is more surface for the liquid to cling to when the dispenser is not in use thereby reducing the likelihood of drips.

Nozzle 10 includes an anti-drip device 12 that is positioned foam cone 14. A foam piston 20 is positioned in the foam cone 14 with a top hat valve 18 at one end thereof. The foam cone 14 is connected to a bottle seal 22 which is in turn connected to a collapsible bottle 24 which is inside a dispenser 26 (shown in figures 15 and 16). A cap 28 is provided to seal the nozzle 10 particularly during transit.

The anti-drip device 12 as best seen in figures 1 and 3 has an external surface 30 and inner walls which define an internal surface 32 (shown in figure 3). The cross sectional dimension of the external surface 30 corresponds with the internal cross sectional dimension of the exit portion 34 of the nozzle 10. The internal surface 32 has an increased surface area when compared to the external surface 30.

In the anti-drip device shown in figures 1 to 3 the inner surface includes an inner portion or ring 36 bisected by intersecting arms 38 forming a pattern referred to as a cruciform pattern. Anti-drip device 12 may have a porous member 40 attached thereto on one or both sides thereof.

It will be appreciated by those skilled in the art that there are a wide variety of different configurations that may be used for the internal surface in order to increase the surface area in at least one portion of the exit nozzle.

Some alternate examples are shown in figures 6 and 7. However, clearly these configurations are just by way of example and many other configurations could also be used. As well, one or more anti-drip device may be used. In addition to the anti-drip device a plain insert with a porous member attached to one or both sides thereof may also be inserted into the nozzle. As well, the anti-drip device may have a porous member attached thereto on one or both sides thereof.

Figures 5 and 6 show an alternate anti-drip device 50 wherein the inner surface 52 has different configuration. Inner surface 52 includes a central octagonally shaped ring or portion 54 with plurality of arms 56 extending between the central ring 54 and the outer portion of the anti-drip device. The arms 56 create shapes somewhat like a fat "T" 58 and a barn shape 60.

However, it will be appreciated by those skilled in the art that any suitable shapes may be used. In general the surface area created by the fat "T" 58 and the barn shape 60 are similar.

Another alternative configuration for the anti-drip device is shown in figure 7 at 62. Anti-drip device 62 has a plurality of arms 65 extending inwardly from the outer portion. As discussed above arms 62 serve to increase the surface area of the anti-drip device. The configuration of anti-drip device 62 is similar to anti-drip device 50 shown in figures 5 and 6 but not including the central ring 54.

Figures 8 through 12 show different combinations of the anti-drip devices and positions of the porous member 40 attached to the anti-drip device.

Figure 8 shows anti-drip device 62 positioned in the foam cone 14 upstream of a plain insert 64. Plain insert has an outer cross sectional shape that is generally the same as its inner cross sectional shape. Plain insert 64 has a porous member 40 attached to the downstream side of the anti-drip device. No porous member is attached to anti-drip device 62. Anti-drip devices 62 and insert 64 are press fit into foam cone 14. In addition a detent 66 extends inwardly from the inside of foam cone 14 to further hold anti-drip device 62 and plain insert 64 in place. Figure 9 shows a configuration wherein plain insert 64 with a porous member attached to the upstream side thereof is upstream of anti-drip device 50 which also has a porous member attached to the upstream side thereof. Figure 10 shows a configuration wherein anti-drip device 50 with a porous member on the upstream end thereof is at the downstream end of foam cone 14. Figure 11 is similar to the configuration shown in figure 10 but anti-drip device 50 is at the upstream end of foam cone 14. Figure 12 shows anti-drip device 50 with a porous member attached to the upstream end thereof upstream of plain insert 64 with a porous member attached to the downstream end thereof. Preferably the porous member 40 is gauze. It will be appreciated by those skilled in the art that in the configurations with more than one gauze attached to the anti-drip devices the gauze may have either the same gauge or a different gauge. Where a different gauge is used typically the upstream gauze will have a coarser gauge than the downstream gauze.

It will be appreciated that the same advantages may be achieved with a nozzle having an exit portion that is integrally formed as part of the nozzle. Such an example is shown in figures 13 and 14 wherein anti-drip device 70 is integrally formed in foam cone 72. Anti-drip device 70 has a configuration similar

to that of anti-drip device 50 shown in figures 5 and 6 but it is integrally formed as a portion of foam cone 72.

Nozzle 10 described above is particularly of use with foam dispenser 26 shown in figures 15 and 16. Nozzle 10 is attached to collapsible bottle 24 housed in foam dispenser 26. It will be appreciated that this dispenser is included by way of example only and that the anti-drip device of the present invention could be used with a wide variety of liquid and foam dispensers. This dispenser has a self cleaning aspect that when the actuator 80 is released air is sucked back up through the nozzle. Another example of a foam dispenser that the anti-drip device of the present may be use with is shown in figures 17 to 19. As shown herein the anti-drip device 90 is press fit into the nozzle 92. Anti-drip device 90 has a honeycomb pattern 94 formed on the inside thereof to increase the surface area at the exit of the nozzle 92.

It will be appreciated by those skilled in the art that the particular configuration of the anti-drip device or anti-drip devices and the position of the gauze will depend on the dispenser being used and the viscosity and other properties of the soap being dispensed. As well, the particular configuration chosen may depend on the method of manufacture that is chosen.

Generally speaking, the systems described herein are directed to anti-drip devices for use with liquid soap dispensers and in particular with foam dispensers. As required, embodiments of the present invention are disclosed herein. However, the disclosed embodiments are merely exemplary, and it should be understood that the invention may be embodied in many various and alternative forms. The Figures are not to scale and some features may be exaggerated or minimized to show details of particular elements while related

elements may have been eliminated to prevent obscuring novel aspects.

Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present invention. For purposes of teaching and not limitation, the illustrated
5 embodiments are directed to anti-drip devices.

As used herein, the terms "comprises" and "comprising" are to be construed as being inclusive and opened rather than exclusive. Specifically, when used in this specification including the claims, the terms "comprises" and
10 "comprising" and variations thereof mean that the specified features, steps or components are included. The terms are not to be interpreted to exclude the presence of other features, steps or components.

WHAT IS CLAIMED AS THE INVENTION IS:

1. An anti-drip device for use in association with a liquid dispenser having a nozzle, the anti-drip device having an outer cross sectional dimension, an inner cross sectional dimension and an inner surface, the anti-drip device being adapted to be positioned in the nozzle, the inner cross sectional dimension being the sum of a length of the inner surface and wherein the inner surface is shaped such that the inner cross sectional dimension is larger than a length of the outer cross sectional dimension.
2. The anti-drip device as claimed in claim 1 wherein the inner surface has a honeycomb configuration.
3. The anti-drip device as claimed in claim 1 wherein the inner surface has a plurality of arms extending inwardly.
4. The anti-drip device as claimed in claim 3 wherein the inner surface further includes an inner portion that connects the plurality of arms.
5. The anti-drip device as claimed in any one of claims 1 to 4 further includes a porous member attached to the anti-drip device.
6. The anti-drip device as claimed in any one of claims 1 to 4 further including a plain insert having an outer cross section and an inner cross section and wherein the outer cross section has generally the same shape as

the inner cross section and the plain insert has a porous member attached to one side thereof.

7. The anti-drip device as claimed in claim 6 wherein the porous member is attached to an upstream side of the plain insert and the plain insert is upstream of the anti-drip device.

8. The anti-drip device as claimed in claim 6 wherein the porous member is attached to an downstream side of the plain insert and the plain insert is downstream of the anti-drip device.

9. The anti-drip device as claimed in claim 7 further including a porous member attached to the anti-drip device.

10. The anti-drip device as claimed in claim 8 further including a porous member attached to the anti-drip device.

11. The anti-drip device as claimed in claim 9 wherein each porous member is gauze and the gauze attached to the anti-drip device is of a finer mesh than the gauze attached to the plain insert.

12. The anti-drip device as claimed in claim 10 wherein each porous member is gauze and the gauze attached to the plain insert is of a finer mesh than the gauze attached to the anti-drip device.

13. The anti-drip device as claimed in any one of claims 1 to 12 wherein the anti-drip device is integrally formed in the nozzle.
14. The anti-drip device as claimed in any one of claims 1 to 12 wherein the anti-drip device is adapted to be press fit into the nozzle.
15. The anti-drip device as claimed in claim 14 wherein the nozzle has at least one detent extending inwardly to hold the insert in position in the nozzle.
16. The anti-drip device as claimed in any one of claims 1 to 15 further including a plurality of anti-drip devices.
17. The anti-drip device as claimed in claim 16 wherein at least one of the plurality of anti-drip devices has a porous member attached thereto.
18. The anti-drip device as claimed in claim 16 wherein each anti-drip device has a porous member attached thereto.

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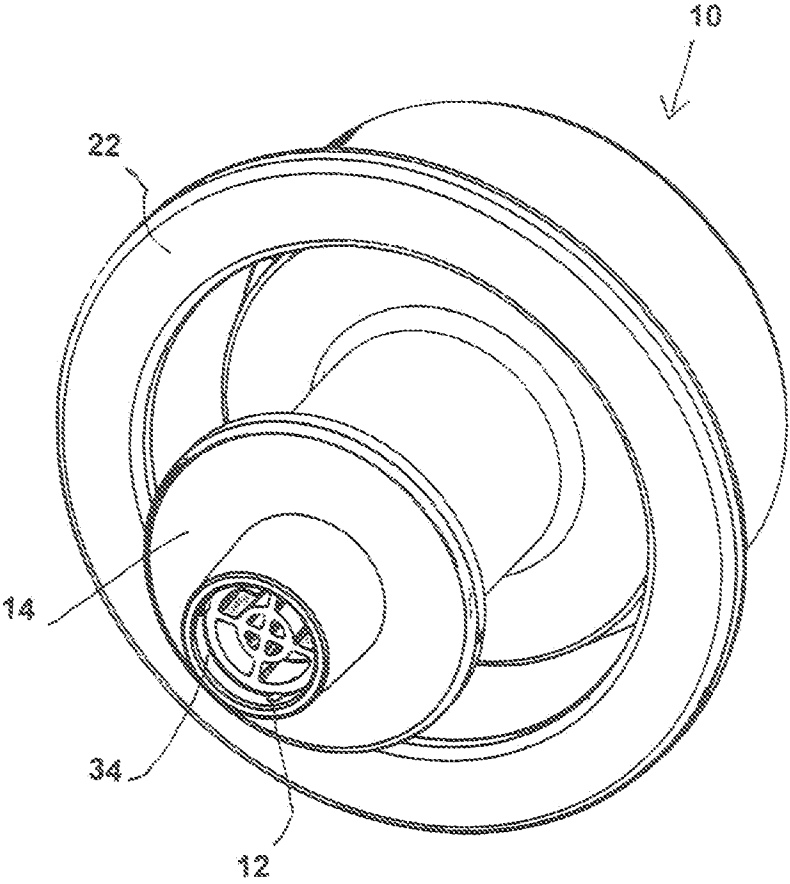


Figure 1

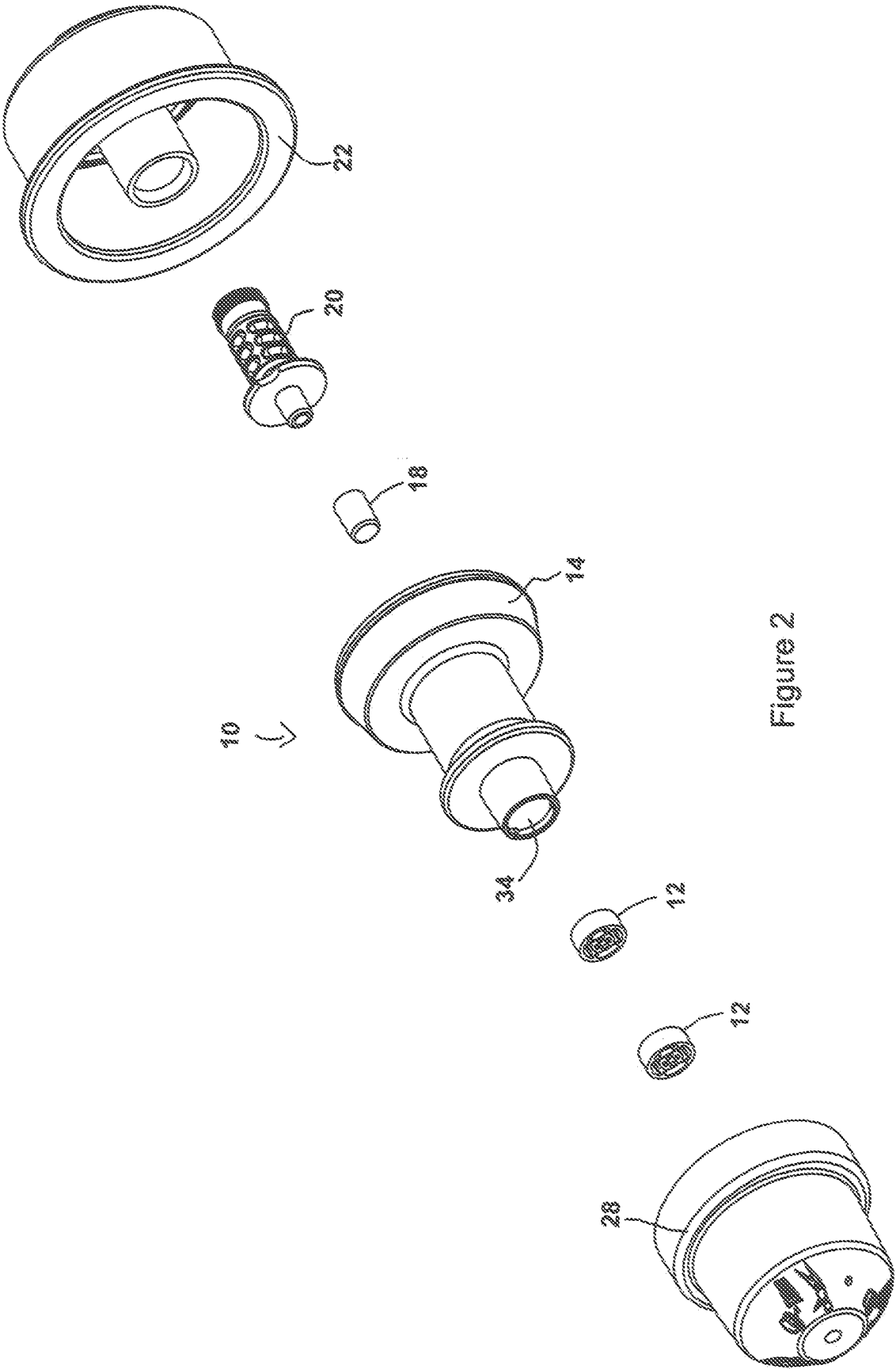


Figure 2

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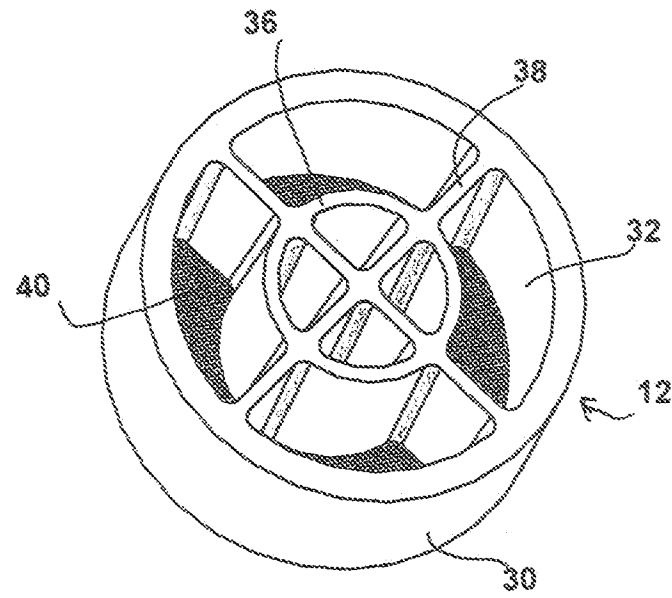


Figure 3

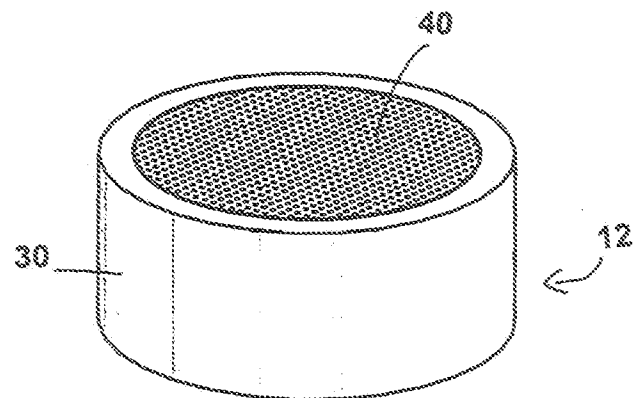


Figure 4

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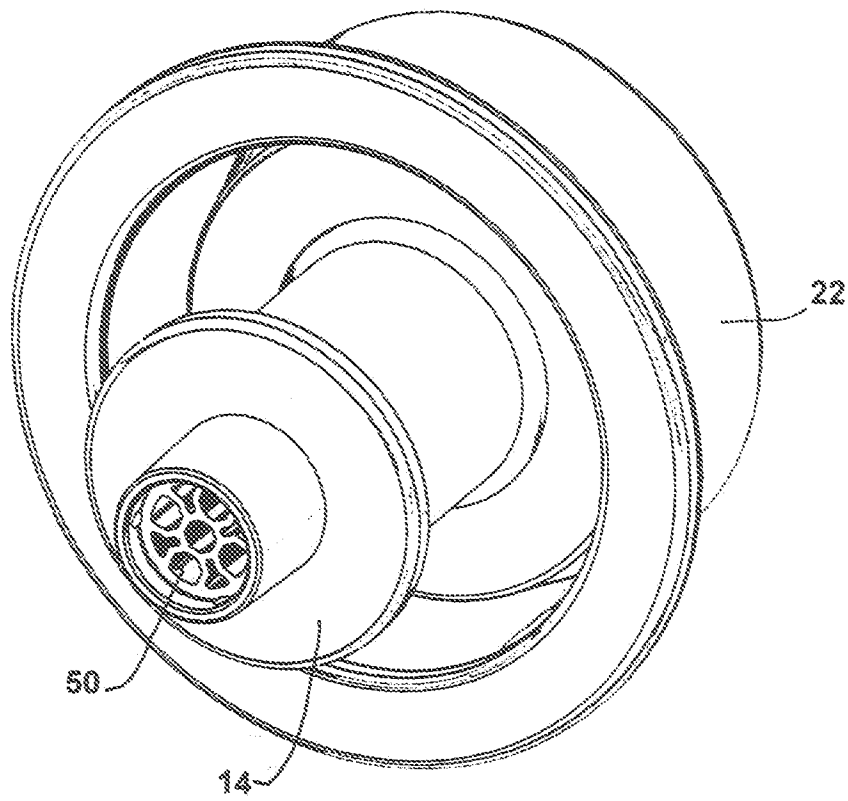


Figure 5

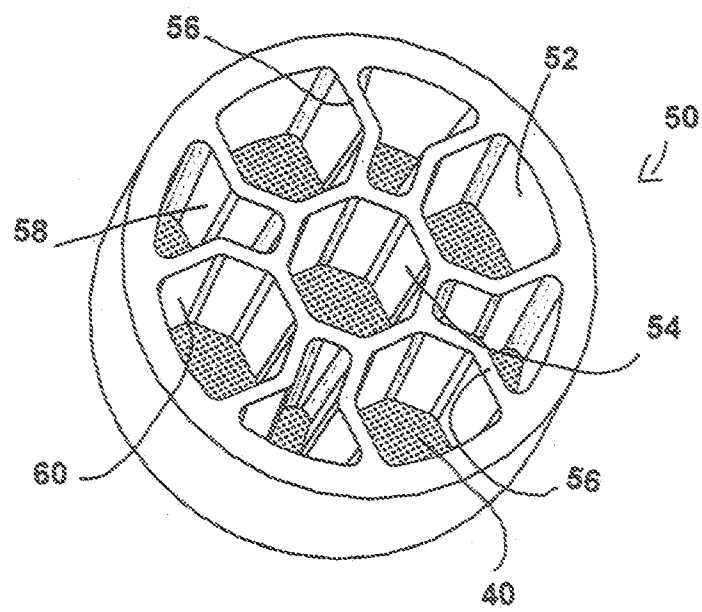


Figure 6

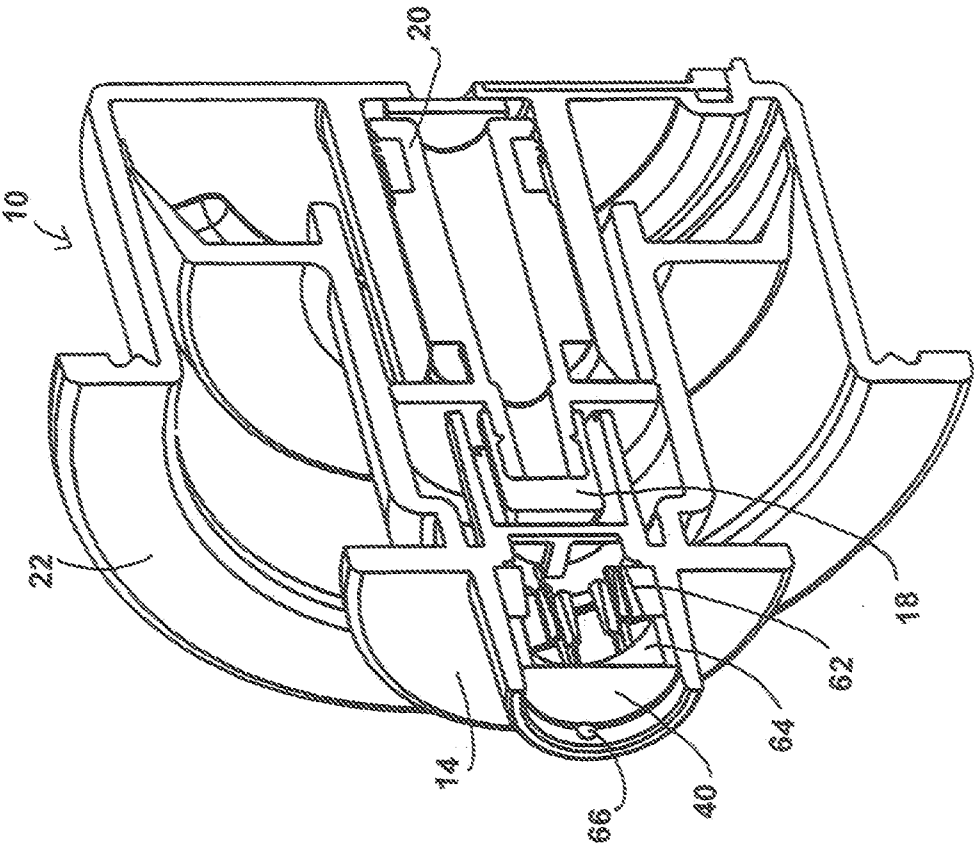


Figure 8

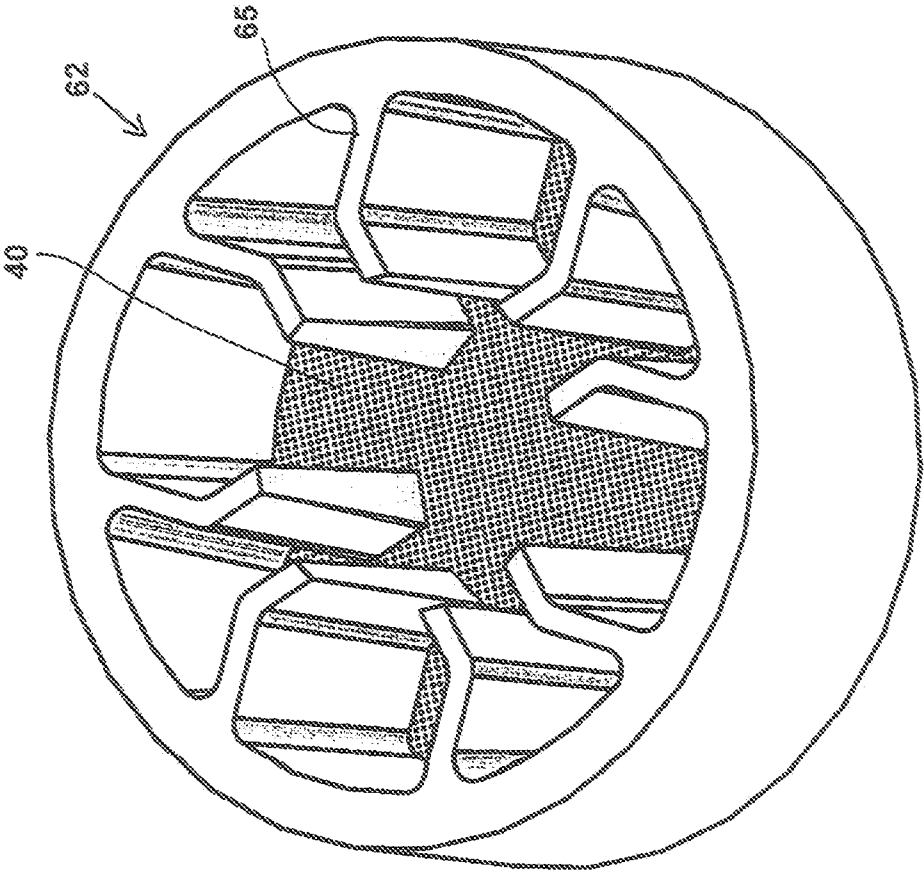


Figure 7

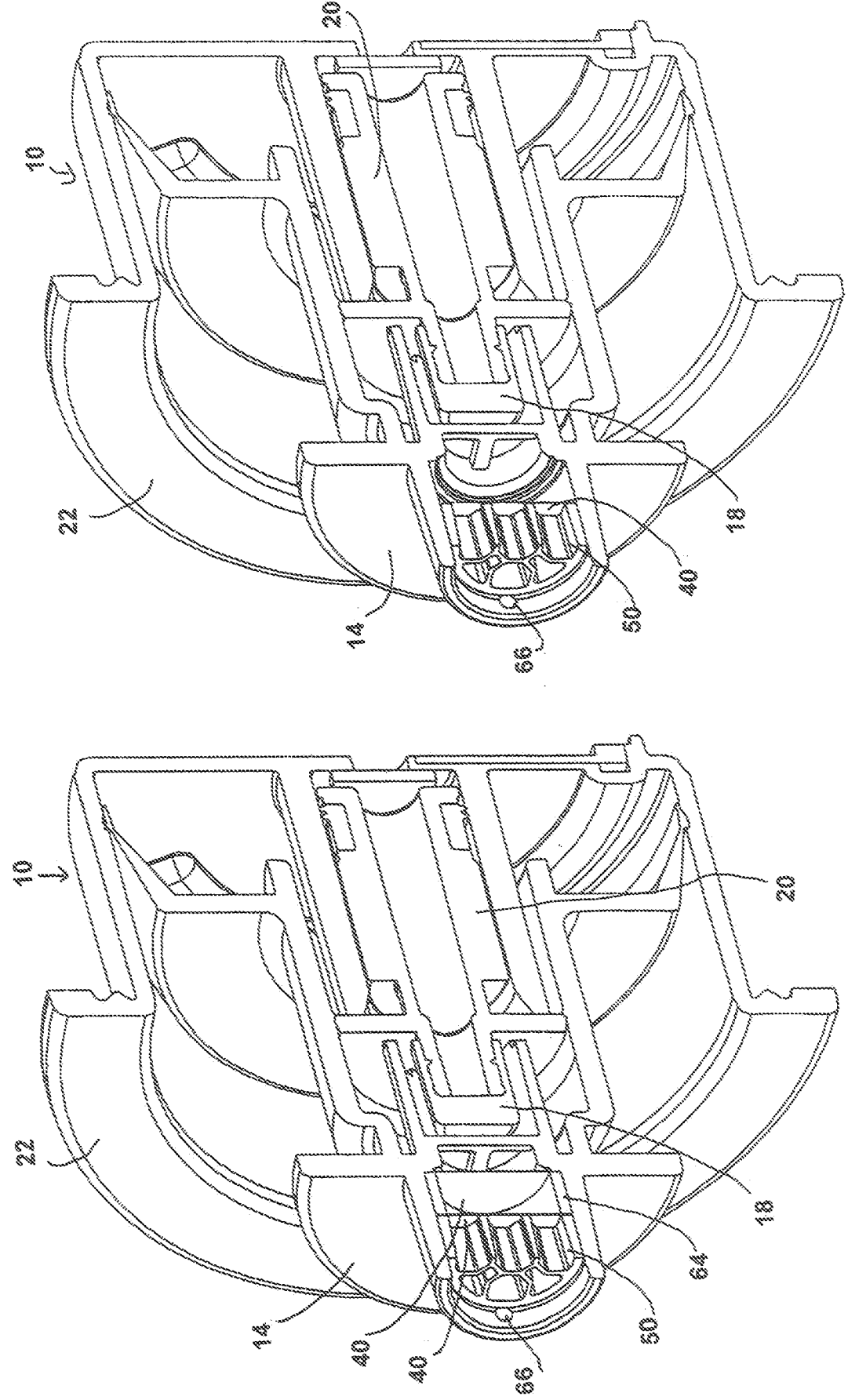


Figure 10

Figure 9

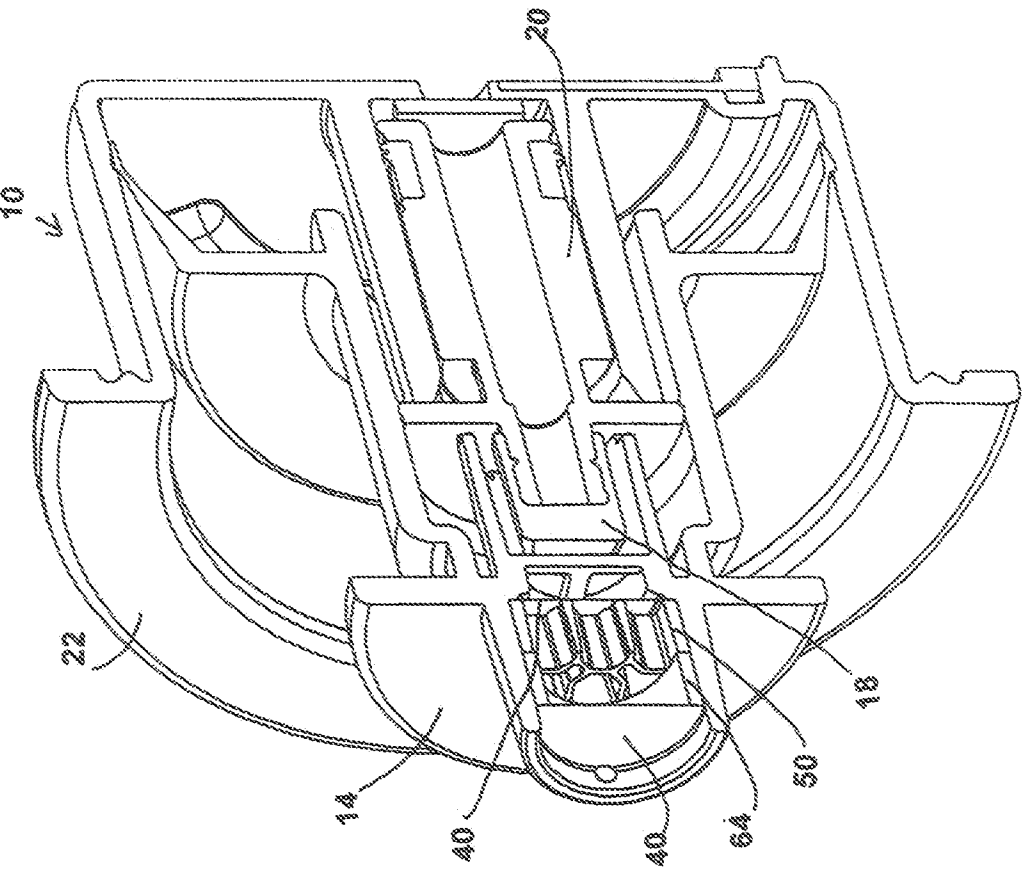


Figure 12

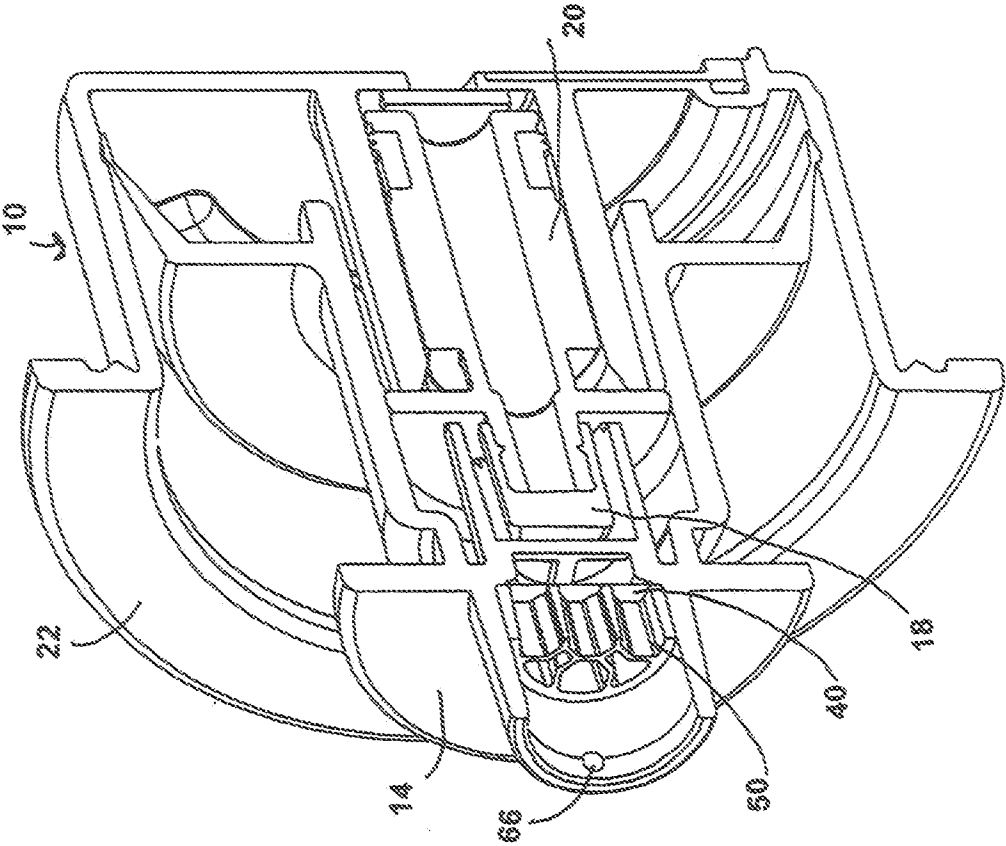


Figure 11

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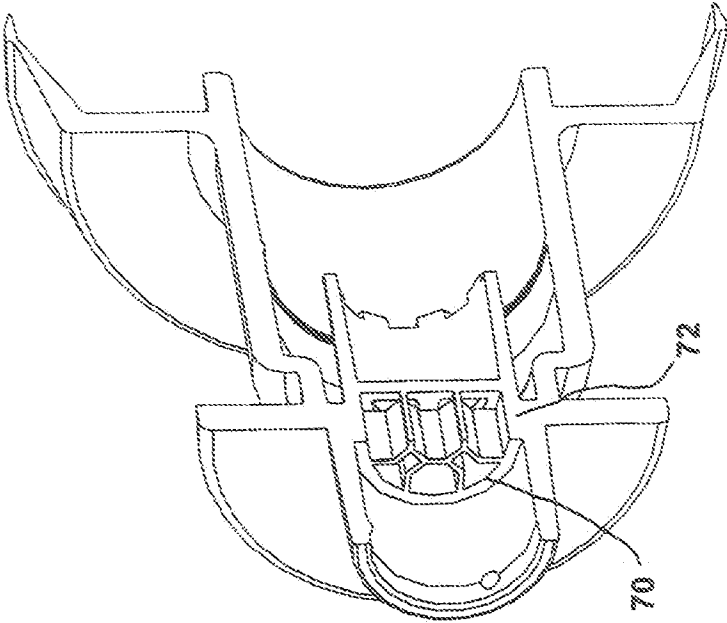


Figure 14

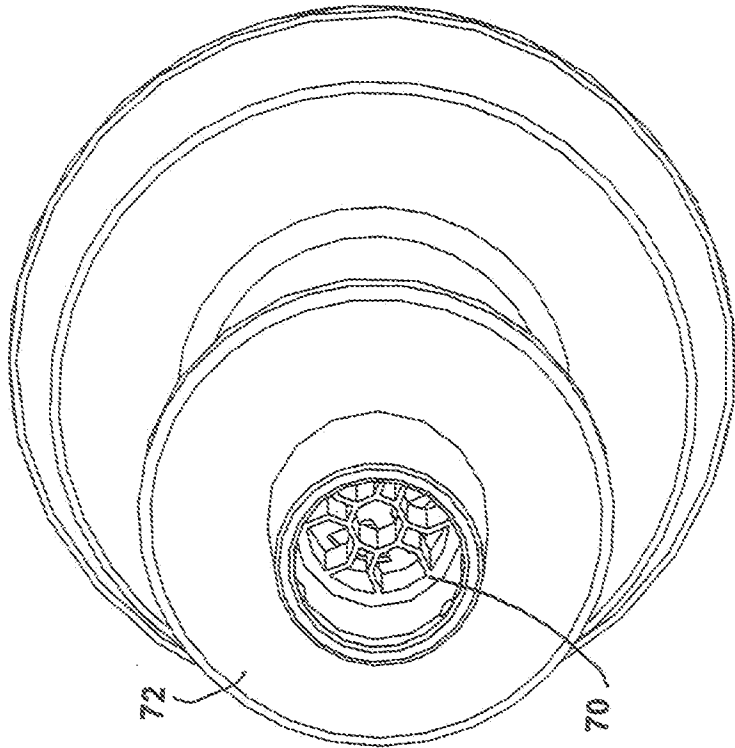


Figure 13

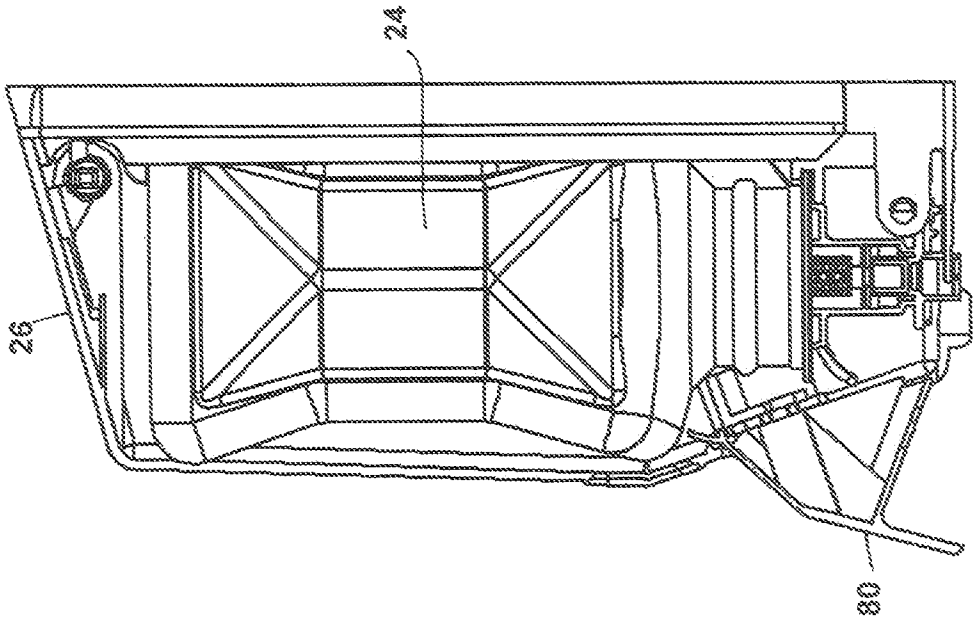


Figure 16

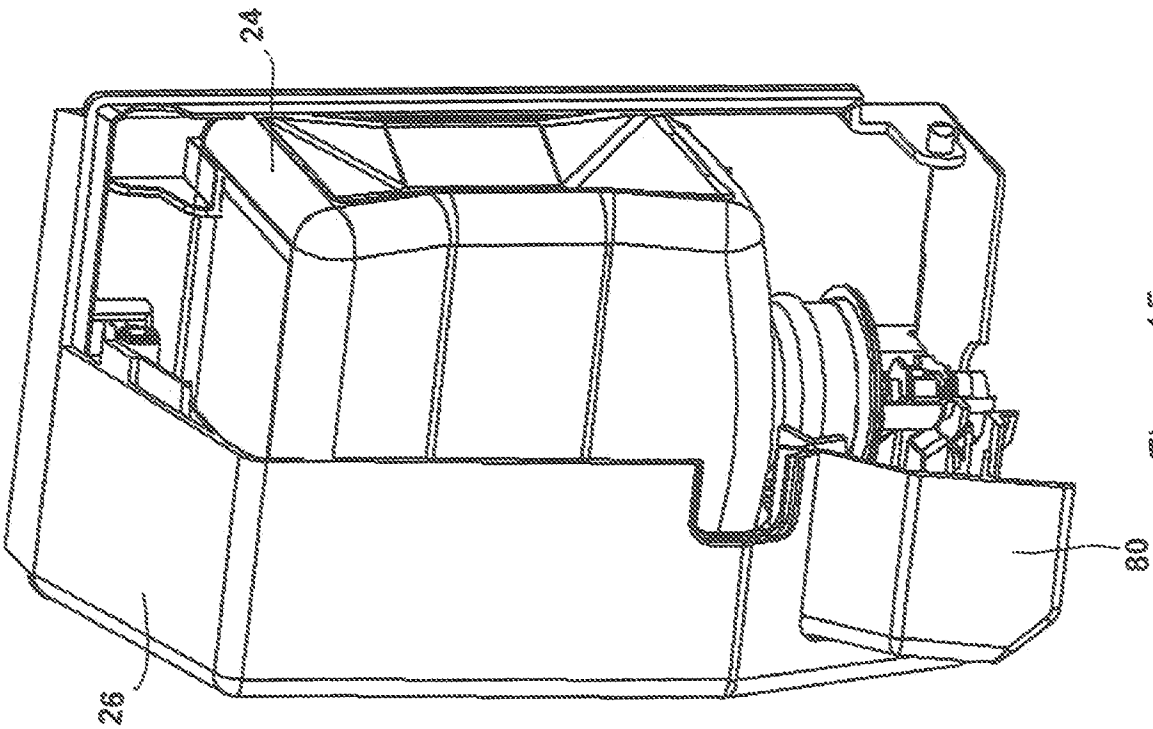


Figure 15

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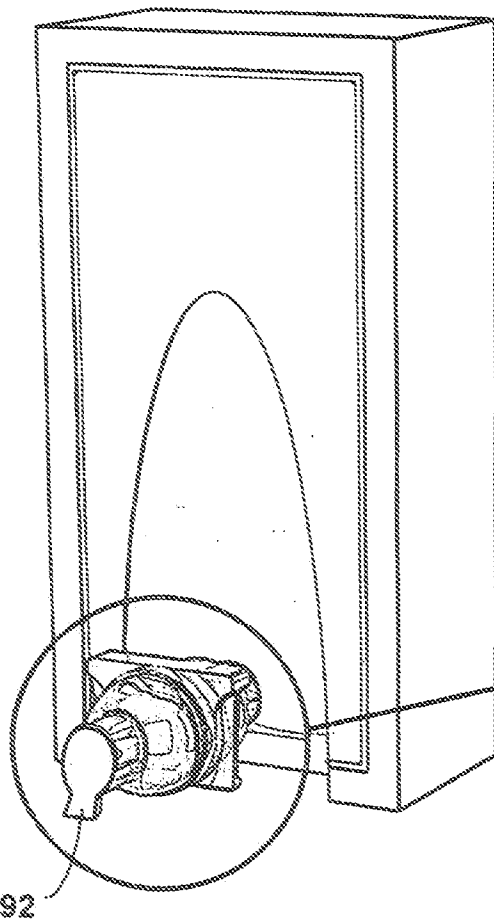


Figure 17

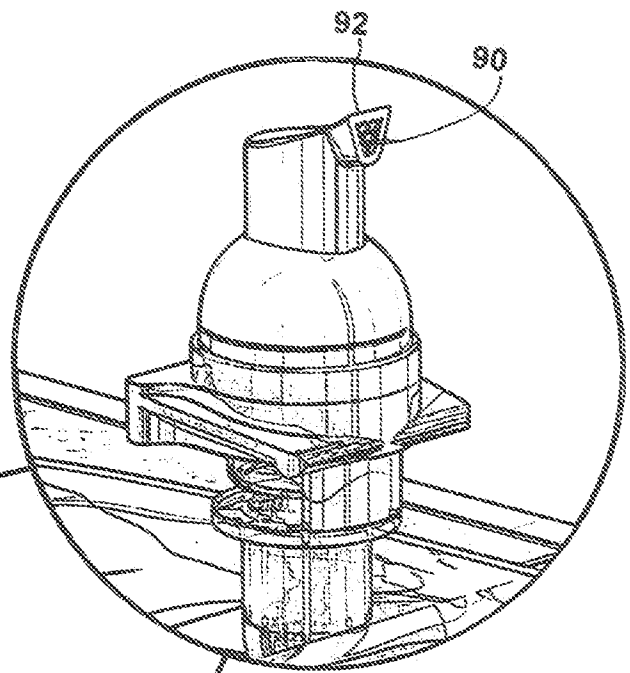


Figure 18

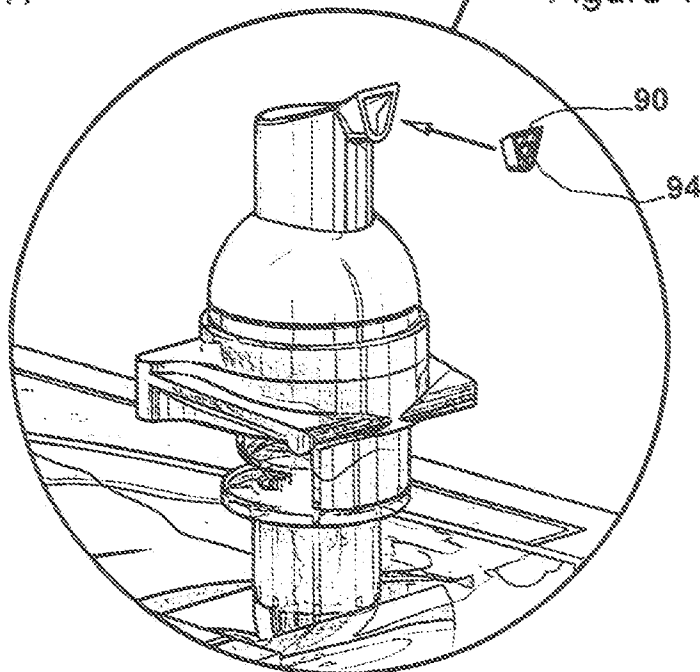


Figure 19

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2009/055673

A. CLASSIFICATION OF SUBJECT MATTER

INV. A47K5/14 B05B7/00 B05B11/00 B65D83/14

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)

A47K B05B B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 325 871 A (CANYON EUROP LTD [GB]) 9 December 1998 (1998-12-09) page 1, line 21 - line 23 page 6, line 4 - line 6 page 7, line 8 - line 15; figures 13,14	1,13-15
Y	abstract; figures 1-7 page 3, line 21 - page 4, line 12	3,4,6,7
Y	DE 44 23 036 A1 (MECKENSTOCK FRITZ GMBH [DE]) 5 October 1995 (1995-10-05) abstract; figures 1,2 column 5, line 11 - line 14 column 3, line 55 - line 68	3,4
Y	EP 1 494 818 B (RIEKE CORP [US]) 31 May 2006 (2006-05-31) column 7, paragraph 21; figures 1-3	6,7
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Further documents are listed in the continuation of Box C.



See patent family annex.

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O document referring to an oral disclosure, use, exhibition or other means

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

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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

9 September 2009

Date of mailing of the international search report

17/09/2009

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2009/055673

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7 004 356 B1 (SAYERS RICHARD C [US]) 28 February 2006 (2006-02-28) abstract; figures 1,2 column 1, line 65 - line 67 column 3, line 5 - line 20 -----	1-18
A	WO 2004/069418 A (R & D INJECTOR AG [CH]; BROUWER MARKUS FRANCISCUS [NL]; KELDERS JOHANN) 19 August 2004 (2004-08-19) abstract; figure 2 -----	1-18

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2009/055673

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