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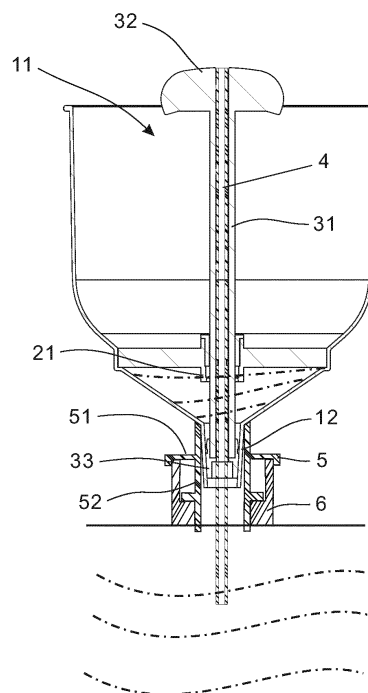
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(54) **Funnel apparatus for filling of liquids**

(57) The present invention relates to a funnel apparatus for filling of liquids, which comprises a funnel (1), a sealing means (3), a locking means (2), and a soft tube (4). The funnel apparatus has a fluid receiving member (11) and a tubular member (12) provided for carrying fluid. The latter has a passageway that has a top end portion installed with a handle (32), and a bottom end portion equipped with a stopper (33) provided for blocking movement of the tubular member. The plunger rod (31) has recessed portions patterned in a longitudinal orientation across its surface. The locking means has an assembly bore and a rim connected with a series of spokes; the assembly bore is fixedly disposed at an end of the receiving member so the plunger rod stretches over the assembly bore and can move axially thereby. The soft tube is inserted into the recessed portions on the plunger rod for providing an air exchange functionality.



**FIG. 6**

## Description

### BACKGROUND OF THE INVENTION

#### 1. Fields of the invention

**[0001]** The present invention relates to a funnel apparatus used for filling of liquids, including ones such as anti-freeze liquid or liquid for heat exchangers, and more specifically, for filling of oil into automobiles' motor generator tanks, cooling agent and anti-freeze liquid for automobiles' heat radiators. The present invention provides a more expedient and express way for introducing and filling of liquids into a specified container.

#### 2. Descriptions of Related Art

**[0002]** One known prior art is US Pat. No. 5,626,174, which comprises a funnel having a fluid receiving body and a tubular member adapted to extend to receive fluid therefrom; the tubular member is used to extend into the fill opening of the radiator of an automobile; and a stopper means having a stem, a plug portion integrally extending at one end thereof, and a handle integrally connected at the other end thereof, to close the bore through the spout of the funnel.

**[0003]** The function of the above-identified stopper is to close the tubular member, which translates to mean that when the fluid is at its fullest level inside the radiator after filling, and when the receiving body still has extra fluid, the stopper works to block the tubular member, in order to prevent fluid from proceeding to spill from the tubular member. The above-identified stopper is not fixedly connected to the funnel, this means there is a possibility that the stopper may be lost as a result of misplacement or insufficient care for storage. Furthermore, another problem with the prior art is that the tubular member of the funnel is not equipped with ventilating hole. As a consequence of this, when the receiving body of the funnel is fully filled with a fluid, the air content inside the automobile's radiator would not possibly and properly be released therefrom. This can lead to undesired hiccup or prolonged lead-time in introducing a fluid into the wished destination. For normal operation, the stopper would be required to be continually and repeatedly inserted into the tubular member, in order to make the air content inside the heat radiator to be released from the fluid.

### SUMMARY OF THE INVENTION

**[0004]** The present invention presents a funnel apparatus for filling of liquid, comprising a funnel, a sealing member, a locking means, and a soft tube. The funnel has a fluid receiving body and a tubular member provided for carrying fluid. One end of the receiving body is disposed with a limiting portion, the limiting portion circles around the perimeter defined by the inner diameter of the receiving body, to fix a locking means hereto. The

above-identified tubular member is intended to be fixed at the filling opening of the automobile, which has top end portion and a bottom end portion that are used for allowing a fluid from being introduced from the receiving body into the filling opening. In addition, the above-identified sealing member has a plunger rod, which has a top end and a bottom end, the top end integrally extends to be disposed with a handle, the bottom end is disposed with a stopper for blocking the tubular member, wherein the plunger rod has recessed portions patterned toward a longitudinal orientation thereon. The above-identified locking means has an assembly bore and a rim. The rim is connected to the assembly bore with a series of spokes. All of which are locked in at one end of the receiving member of the funnel, to allow the plunger rod of the sealing means to stretch over the assembly bore, and to be configured to move axially on the assembly bore. The above-identified soft tube passes through the recessed portion of the plunger rod, to provide an air ventilation functionality during fluid transport.

**[0005]** A main objective of the present invention is to construct the sealing means to be fixed inside the receiving member of the funnel, making it to be interposed onto the locking means while also preserving axial mobility for the sealing means within the perimeter penned by the inner diameter of the assembly bore of the locking means. Another objective of the present invention is to insert a soft tube through the plunger rod of the sealing means. The soft tube extends to reach the tubular member and passes out therefrom. This design choice eliminates the above-identified shortcomings. For one aspect, the sealing means is fixedly disposed in the funnel, so the issue of likelihood of losing a device part would be non-existent. As a means for providing air ventilation, the above-identified soft tube can facilitate a fluid to flow from a receiving body through a tubular member and ultimately be introduced smoothly into the filling opening of the radiator. In other words, when a fluid is introduced into the filling opening of the radiator, the air content inside the radiator is conducted to flow out by mediation with the soft tube. Having the structural benefit thereof, a circulatory mechanism is established, and the fluid can be smoothly introduced into the radiator.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0006]** The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein:

FIG. 1 is an exploded diagonal perspective of the funnel apparatus;

FIG. 2 shows an assembled diagonal perspective of the funnel apparatus;

FIG. 3 is a cross-sectional view of the funnel apparatus along a Cartesian x-axis;

FIG. 4 is an exploded top perspective frontal view of the funnel apparatus;

FIG. 5 is an example of the funnel apparatus operates in an open installment;

FIG. 5-1 is an enlarged view of the plunger rod, showing an example for the situation when the stopper is pushing against the assembly bore; and

FIG. 6 shows an example for the situation when the funnel apparatus operates in a closed installment.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

**[0007]** In order to enable a person skilled in the relevant technology to practice the invention described in the specification, the objectives, technical features and effects will be further understood in connection with the Preferred Embodiments and in conjunction with the Drawings below. Further, the description presented below are not intended for use in limiting the technological scope of the present invention.

**[0008]** First, referring to the drawings in FIGs. 1 through 4, the assembled and exploded drawings for the funnel apparatus for filing of fluid of the present invention are presented, comprising a funnel 1, a locking means 2, a sealing means 3, and a soft tube 4. The funnel 1 has a fluid receiving member 11 and a tubular member 12 for passing fluid. One end of the receiving member 11 is disposed with a limiting portion 11a. The above-identified limiting portion 11a is configured to circle around the perimeter described by the inner diameter of the receiving member 11, to allow a locking means 2 to be fixedly locked hereto. The above-identified tubular member 12 is configured to be fixed at the filing opening 6 of the automobile, to allow the fluid be introduced from the receiving member 11 into the filing opening 6. The tubular member 12 has a top end portion 121a and a bottom end portion 121b.

**[0009]** The sealing means 3 has a plunger rod 31, the plunger rod 31 has recessed portions 311, slits 312, a handle 32 and a stopper 33. The above-identified recessed portions 311 are set to be formed in a longitudinal orientation along the body surface of the plunger rod 31. A top end 31a of the plunger rod 31 integrally extends to be disposed with a handle 32, to work as a facilitator in the form of a grip structure for aiding pulling or pressing during the axial movement of the sealing means 3. The bottom end 31b of the plunger rod 31 is disposed with a stopper 33, to serve in blocking the tubular member 12. The above-identified stopper is tightly attached onto the perimeter defined by the inner diameter of the bottom end 31b of the plunger rod 31. The plunger rod is equipped with holes and is designed to be matching with respect to the recessed portion 311 of the plunger rod 31. By way of the above, the soft tube 4 is provided to be inserted into the recessed portion 311 of the top end 31a of the plunger rod 31, passes through the stopper 33, extends to reach the tubular member 12, before pass-

es out of the funnel 1 to be exposed a section of the soft tube 4, to work for ventilating air during fluid transport. The slits 312 are disposed on the outer wall surface of the plunger rod 31 in a longitudinal orientation, which allows for the slits 312 to serve as an inspection tool for examining the soft tube 4 inserted in the recessed portion 311, such that the user can check to see whether the soft tube 4 is congestion-free.

**[0010]** The locking means 2 has an assembly bore 21 and a rim 22. The rim 22 is connected to the assembly bore 21 with a series of spokes 23. The rim 22 is fixedly locked onto the limiting portion 11a of the receiving member 11 of the funnel 1. The assembly bore 21 of the locking means 2 stretches over a connecting hub 24. An end of the connecting hub 24 has an extending lip 24a and the other end thereof has a tubing 24b. The extending lip 24a is configured to push against an end of the assembly bore 21, the tubing 24b is tightly attached to a perimeter defined by an inner diameter of the assembly bore, to allow for the bottom end 31b of the plunger rod 31 of the sealing means 3 to pass through the connecting hub 24 before the stopper 33 is tightly attached onto the bottom end 31b of the plunger rod 31. As a result of the above configuration, the plunger rod 31 can move in a direction co-axially to the locking means 2.

**[0011]** FIG. 5 shows an example for a embodiment of the present invention in its open state. In the open state, the fluid inside the receiving member 11 is introduced into the filing opening 6 of the radiator. The stopper 33 of the plunger rod 31 is pushed against the assembly bore 21. FIG. 5-1 provides an enlarged view detailing a portion of this limiting structure. An end of the perimeter defined by the inner diameter of the assembly bore 21 is disposed with extending fingers 211. The above-identified stopper 33 is disposed with a circular recessed groove 331. By way of the above, when the stopper 33 is fixed at the assembly bore 21, the extending fingers 211 of the assembly bore 21 works to push against the circular recessed groove 331. As a result, the passageway of the circular member 12 is presented to be in an open state. By the benefit of this structural design, the fluid can flow toward the tubular member 12 for exit, and from there the soft tube 4 that extends into the radiator can transfer the air therein for exit, to allow the fluid to be smoothly guided to enter the radiator.

**[0012]** In another aspect of the present invention, and in an effort to increase flexibility for the perimeter described by the inner diameter of the tubular member 12 to be adaptable for locking filing openings 6 of all sizes, there is further disposed an adaptor 5 with a matching opening diameter. The adaptor 5 has variable diameters, to help the funnel to be fixed in place and avoid disproportionate posture leading to fluid spillage. The adaptor 5 has a lid 51 and a tubular member 52. The outer diameter of the tubular member 52 thereof matches the inner diameter of the filing opening 6, and can be set to probe deeper into the opening diameter of the filing opening 6. The shape of the lid 51 is matching to the filing opening

6, and is configured to stretch over the outer perimeter of the filing opening 6.

**[0013]** FIG. 6 shows an embodiment for the funnel apparatus of the present invention in its closed state. In this state, the tubular member 12 of the receiving member 11 is closed, and the fluid is stopped from being introduced into the filing opening 6 of the radiator. As shown by the figure thereof, the handle 32 of the plunger rod 31 is pressed downward in an axial direction to cause the stopper 33 from detach from the assembly bore 21. Further, the stopper 33 works to block the passageway of the tubular member 12. As a result of this, the passageway of the tubular member 12 is presented to in a closed state, and in this state, the fluid can be stopped from flowing toward the tubular member 12 for exit. The funnel 1 can be parted from the filing opening 6, and the remaining fluid can be retained inside the receiving member 11.

**[0014]** The above is only for the description of the preferred embodiments of the current invention, not for limiting the scope of the current invention. Any modifications, equivalent changes and improvements that are within the spirit and principles in the current invention should be included in the scope of protection of the current invention. In addition, the specific structure disclosed herein have only not been made in appearance in products of related kinds, neither have been published before the filing of this patent application. Having diligently fulfilled the requirements and conditions stipulated in the statute, the applicant hereby submits this application for patent and respectfully requests for timely examination.

## Claims

### 1. A funnel apparatus for filing of liquids, comprising:

a funnel, which has a liquid receiving member and a tubular member provided for carrying fluid, wherein an end of the receiving member has a limiting portion that encompasses an area defined by an inner diameter of the receiving member, and the tubular member has a passageway and has a top portion and a bottom portion configured to allow fluid to flow from the receiving member into a filing opening portion, whereby the limiting portion is provided in order for a locking means to be locked thereon, and the tubular member serves to be locked onto the filing opening portion of an automobile;

the locking means, which has an assembly bore and a rim, wherein the rim is connected to the assembly bore with a series of spokes, which are fixedly locked at the limiting portion of the receiving member, and the assembly bore is stretched into a connecting hub, which has an extending lip and a tubing, where the extending lip pushes an end of the assembly bore, the tubing is tightly attached onto the inner diameter of

the assembly bore, whereby a stopper is tightly attached onto a bottom end of a plunger rod of a sealing means after the bottom end of the plunger rod of the sealing means passes through the connecting hub, in such a way that the plunger rod is configured to move axially on the locking means;

the sealing means, which has the plunger rod, wherein the plunger rod has a top end, the bottom end, and recessed portions patterned in a longitudinal orientation, where the top end integrally stretches to be disposed with a handle and the bottom end is disposed with the stopper which is tightly fixed onto and encompasses the bottom end of the plunger rod that acts as a valve for blocking or opening the tubular member; and a soft tube having a long-strip shape, which is inserted into the recessed portion of the plunger rod to pass through the stopper to stretch toward the tubular member before passing through the funnel to have a predetermined length of the soft tube exposed.

2. The funnel apparatus for filing of liquids according to claim 1, wherein an end of the inner diameter of the receiving member is disposed with extending fingers.
3. The funnel apparatus for filing of liquids according to claim 1, wherein the stopper is provided with a circular recessed groove.
4. The funnel apparatus for filing of liquids according to claim 1, wherein the plunger rod has a plurality of slits disposed in a longitudinal orientation on an outer surface thereof, whereby the slits allow inspection on the soft tube inserted in the recessed portions.

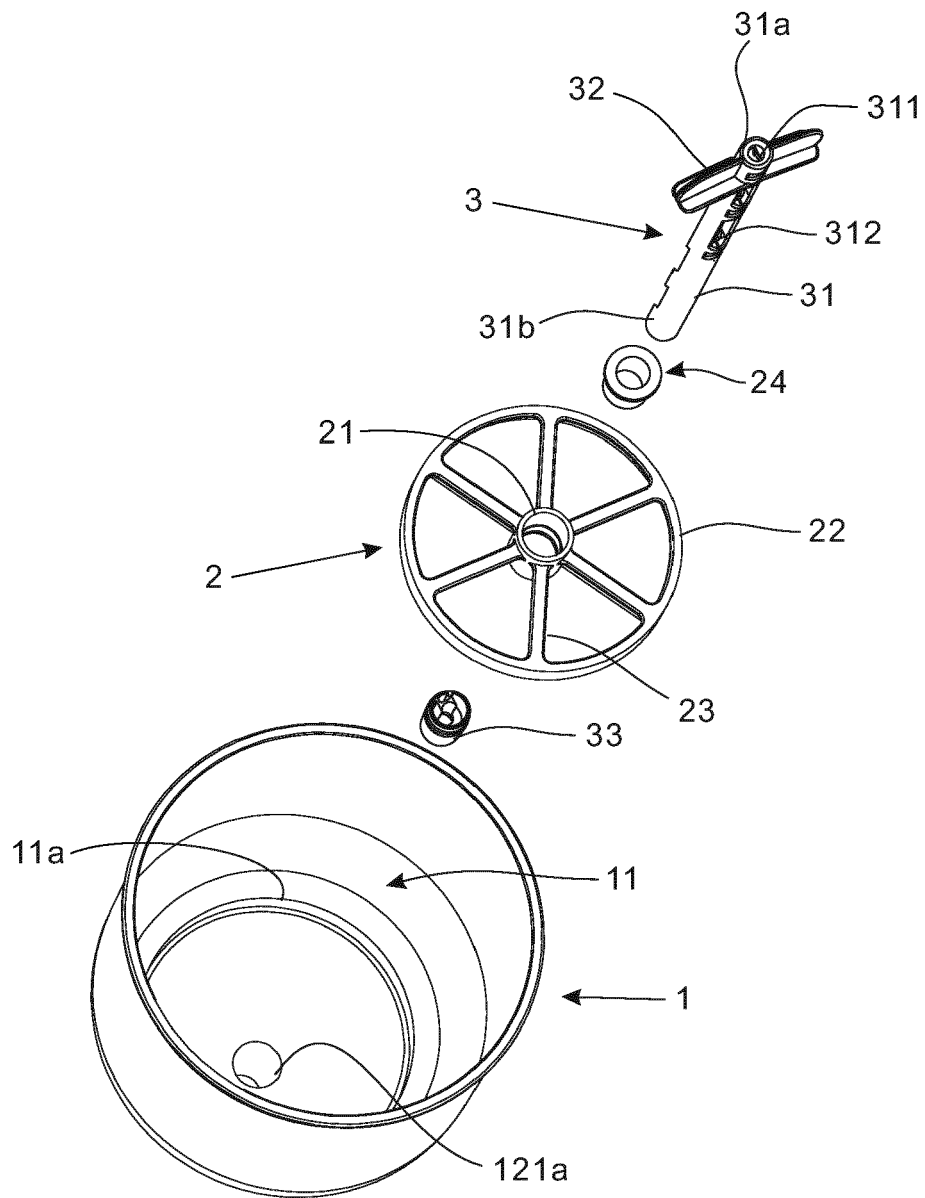


FIG. 1

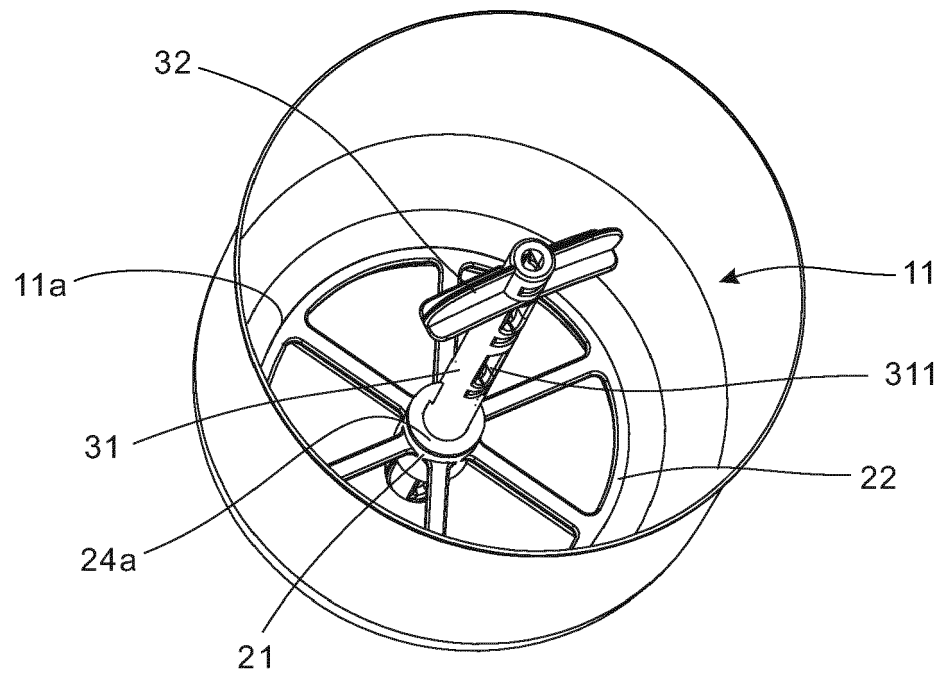


FIG. 2

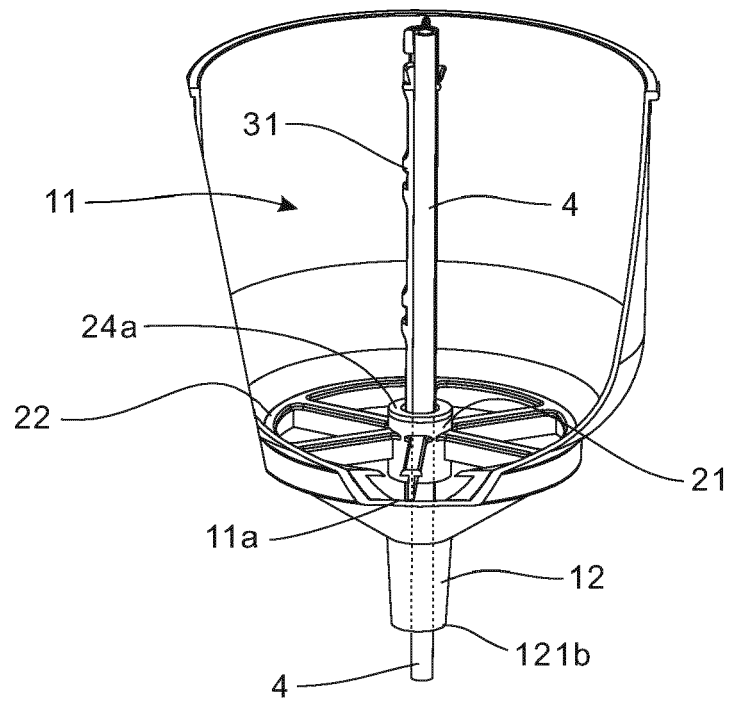


FIG. 3

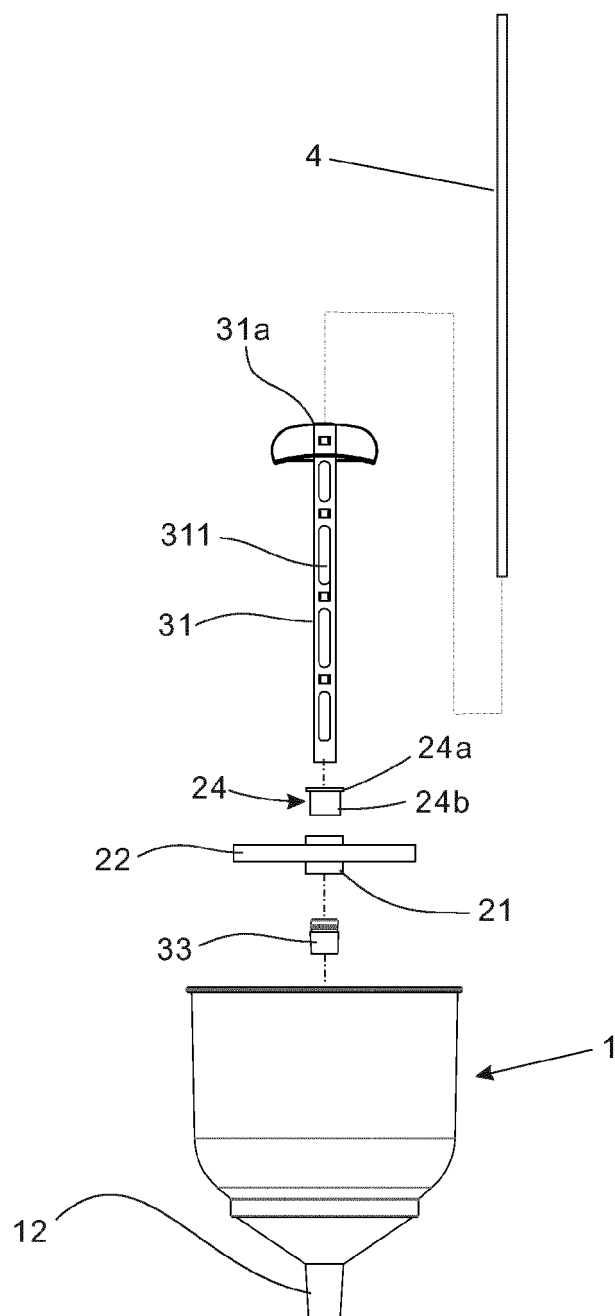
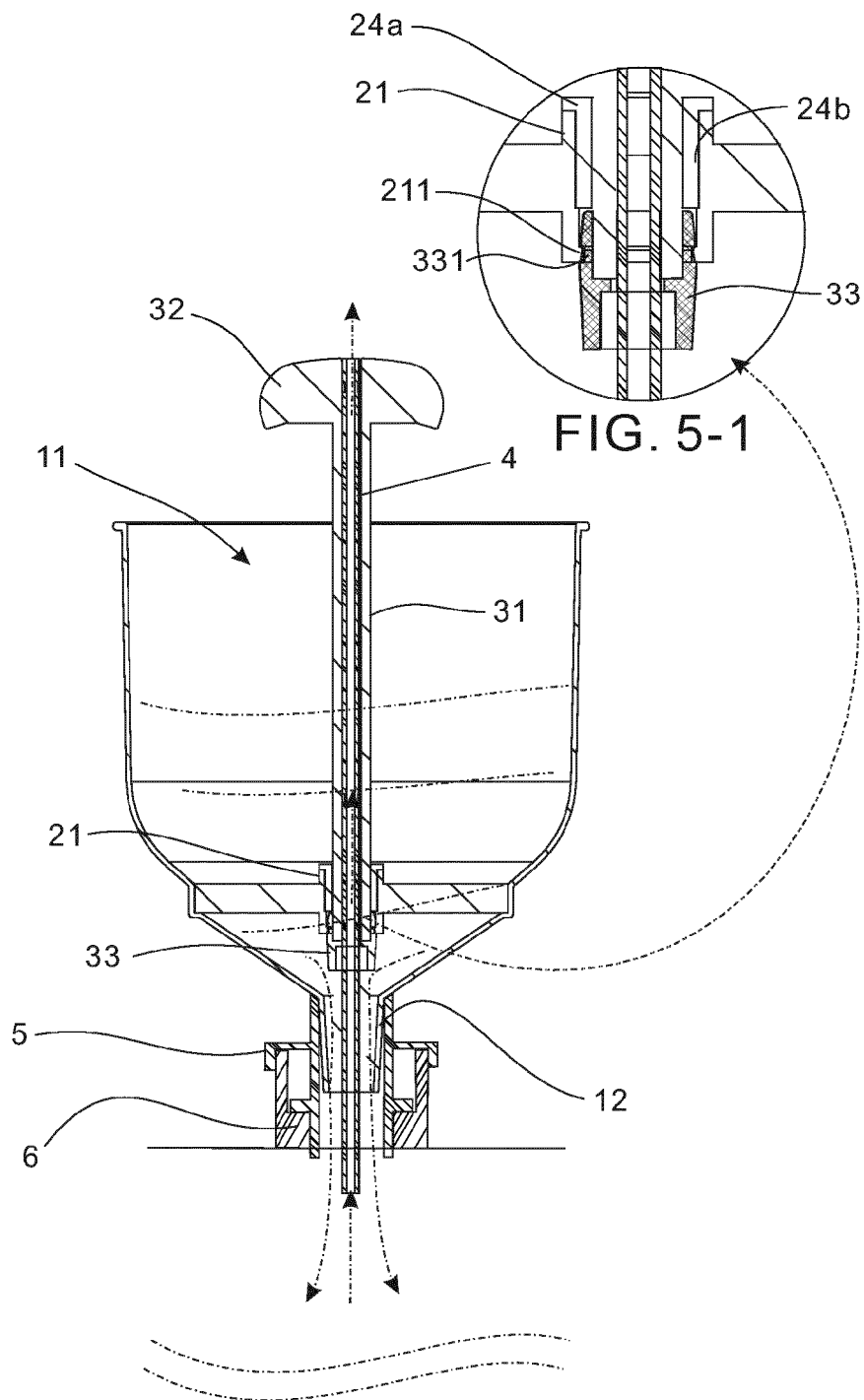


FIG. 4





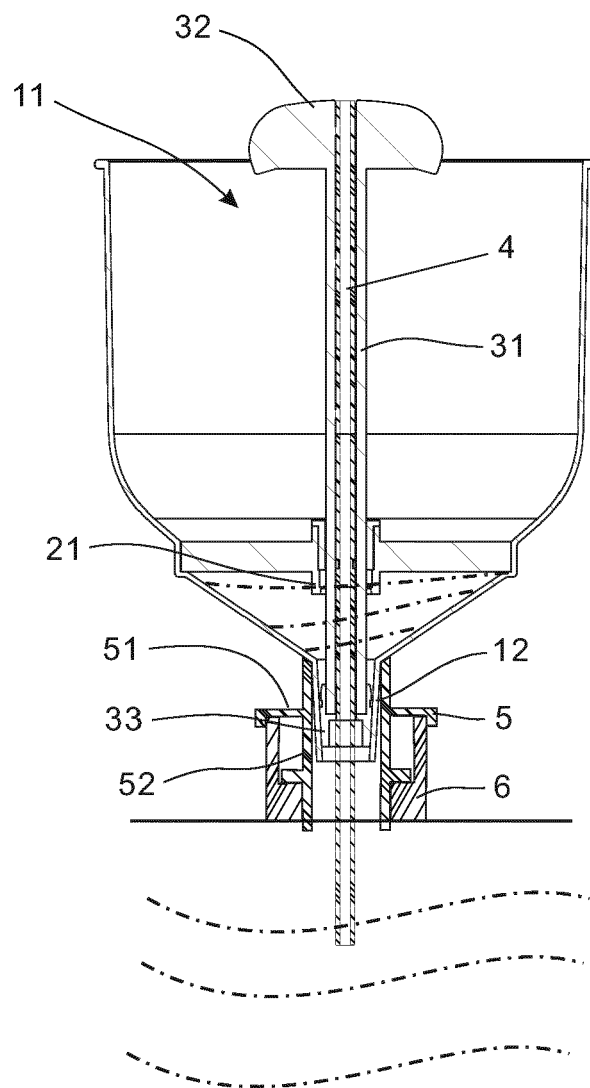


FIG. 6



## EUROPEAN SEARCH REPORT

Application Number  
EP 13 17 5934

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                            |                                  |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                                              | Relevant to claim                | CLASSIFICATION OF THE APPLICATION (IPC) |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US 1 942 282 A (LOUIS GREEN)<br>2 January 1934 (1934-01-02)<br>* the whole document *                                      | 1-4                              | INV.<br>B67C11/04                       |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                            |                                  | TECHNICAL FIELDS SEARCHED (IPC)         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                            |                                  | B67C                                    |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                            |                                  |                                         |
| Place of search                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                            | Date of completion of the search | Examiner                                |
| The Hague                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                            | 18 December 2013                 | Luepke, Erik                            |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                                            |                                  |                                         |

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 13 17 5934

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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18-12-2013

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**REFERENCES CITED IN THE DESCRIPTION**

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