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(54) Title: MILK FROTHER

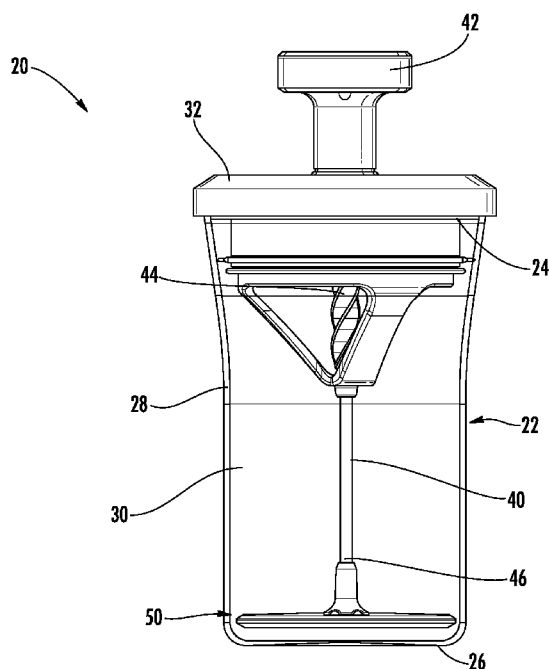


FIG. 4

(57) Abstract: A frothing device (20) includes a lid (32) configurable with a container (22) and a rod (40) extending through an opening (34) provided in the lid (32). The rod (40) is movable relative to the lid (32). An alignment features (70) is offset from the lid (32). The alignment feature (70) and the lid (32) cooperate to facilitate movement of the rod (40) along an axis defined by the rod (40). A whisk (50) is coupled to the rod (40).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

- *with international search report (Art. 21(3))*

MILK FROTHER

BACKGROUND

[0001] Exemplary embodiments of the present disclosure relate to a frothing device, and more particularly, to a milk frothing device which produces frothed milk of improved quality.

[0002] Frothed or aerated milk is typically used in hot beverages, such as various styles of coffee and tea. Frothing can be accomplished by injecting steam into a reservoir of milk, or alternatively, through aggressive stirring. Several frothing devices available have a whisk that may be manipulated manually or automatically to agitate the milk. However, conventional frothing devices having a whisk do not achieve the same quality of froth as a steam device.

SUMMARY

[0003] According to one embodiment, a frothing device includes a lid configurable with a container and a rod extending through an opening provided in the lid. The rod is movable relative to the lid. An alignment feature is offset from the lid. The alignment feature and the lid cooperate to facilitate movement of the rod along an axis defined by the rod. A whisk is coupled to the rod.

[0004] In addition to one or more of the features described above, or as an alternative, in further embodiments the container has a first end, a second end, and at least one sidewall extending between said first end and the second end to define a chamber, said lid being removably coupled to said container such that said alignment feature and said whisk are positioned within said chamber.

[0005] In addition to one or more of the features described above, or as an alternative, in further embodiments said whisk has at least one of a size and shape complementary to said chamber adjacent said second end of said container.

[0006] In addition to one or more of the features described above, or as an alternative, in further embodiments said whisk is disc shaped and includes a plurality of spokes extending between a hub and an outer periphery, and a mesh material positioned between said plurality of spokes.

[0007] In addition to one or more of the features described above, or as an alternative, in further embodiments said alignment feature includes a plurality of connecting members extending at an inward angle to form a triangle.

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[0008] In addition to one or more of the features described above, or as an alternative, in further embodiments another opening for receiving said rod is positioned at an apex of said triangle.

[0009] In addition to one or more of the features described above, or as an alternative, in further embodiments application of a force to said rod causes said whisk to move vertically and to rotate about said axis defined by said rod simultaneously.

[0010] In addition to one or more of the features described above, or as an alternative, in further embodiments at least a portion of said rod includes a spiral channel, and at least one engagement feature extends from said lid, wherein said engagement feature cooperates with said spiral channel.

[0011] In addition to one or more of the features described above, or as an alternative, in further embodiments a handle is coupled to an end of said rod.

[0012] In addition to one or more of the features described above, or as an alternative, in further embodiments said handle is movably connected to said rod.

[0013] In addition to one or more of the features described above, or as an alternative, in further embodiments said lid and said alignment feature restrict bending of said rod about said axis.

[0014] According to another embodiment, a method of frothing a liquid includes installing a frothing device about a container. The frothing device includes a lid removably coupled to said container and a rod extending through said lid. The rod is movable along an axis relative to the lid. A whisk is mounted to said rod. The method additionally includes supporting the rod at at least two distinct positions such that bending of said rod about the axis is restricted. A force is applied to the rod causes a translation of the rod along the axis and a rotation of the rod about the axis. A liquid within the container is frother via said translation and rotation.

[0015] In addition to one or more of the features described above, or as an alternative, in further embodiments said translation and rotation occur simultaneously

BRIEF DESCRIPTION OF THE FIGURES

[0016] The accompanying drawings incorporated in and forming a part of the specification embodies several aspects of the present disclosure and, together with the description, serves to explain the principles of the disclosure. In the drawings:

[0017] FIG. 1 is a front view of a frothing device according to an embodiment;

[0018] FIG. 2 is a perspective view of a frothing device according to an embodiment;

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[0019] FIG. 3 is a perspective view of a portion of the frothing device of FIG. 2 according to an embodiment;

[0020] FIG. 4 is a front view of the frothing device of FIG. 2 according to an embodiment

[0021] FIG. 5 is a schematic cross-sectional view of the frothing device of FIG. 2 taken through the axis of the rod according to an embodiment;

[0022] FIG. 6 is another perspective view of a portion of the frothing device according to an embodiment;

[0023] FIG. 7 is a perspective view of a portion of the frothing device according to an embodiment; and

[0024] FIG. 8 is a perspective view of the whisk of the frothing device according to an embodiment.

[0025] The detailed description explains embodiments of the disclosure, together with advantages and features, by way of example with reference to the drawings.

DETAILED DESCRIPTION

[0026] Referring now to the FIGS., an example of a frothing device 20 is illustrated. The frothing device 20 is used to “froth” a liquid by agitating the liquid to form a mass of small bubbles of air therein. The frothing device 20 includes a container 22 adapted (e.g. sized and dimensioned) to receive at least one liquid therein. The container 22 generally includes a first end 24, a second end 26, and one or more walls 28 extending between the first end 24 and the second end 26 to define an interior chamber 30 within which the at least one liquid is placed. As best shown in FIGS. 2 and 3, the first end 24 of the container 22 includes an opening (not shown) that provides access for inserting the at least one liquid into the chamber 30. The second end 26 of the container 20 is generally closed such that liquid contained within the chamber 30 is unable to escape there through.

[0027] A lid 32 is removably coupled to the first open end 24 of the container 22 prior to a frothing operation. In an embodiment, the lid 32 may connect to the container 22 by simply being press-fit into the opening at the first end 24, or alternatively may lock to the container 22, for example by rotating the lid 32 to engage one or more interlocks formed on the container 22.

[0028] An elongated rod 40 extends through an opening 34 formed at the center of the lid 32. As shown, a handle or other gripping mechanism 42 is connected to a first end 44 of the rod 40 to allow a user to easily manipulate the rod 40. In an embodiment, the rod 40 may

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be configured to rotate freely relative to the handle 42. Mounted at the second distal end 46 of the rod 40 is a whisk 50, best shown in FIG. 6. In the illustrated, non-limiting embodiment, the whisk 50 includes a plastic disc having a plurality of spokes 52 extending between a central hub 54 and an outer periphery 56. A material having a plurality of small openings 58, such as mesh for example, extends between the plurality of spokes 54 such that a fluid may pass there through.

[0029] When the lid 32 is connected to the container 22 and the rod 40 is operably coupled to the lid 32, the second end 46 of the rod 44, and therefore the whisk 50, is generally arranged adjacent the second end 26 of the container 22. A diameter of the whisk 50 may be substantially greater than its height, thereby maximizing the surface area of the whisk 50 while limiting the total space occupied by the whisk 50 within the chamber 30. In an embodiment, the size and shape of the whisk 50 are generally complementary to the chamber 30 at the second end 26 of the container 22. However, it should be understood that whisk 50 illustrated and described herein is intended as an example only and that alternative whisk configurations are also contemplated herein.

[0030] To perform a frothing operation, a fluid such as milk for example, is poured into the chamber 30 via the open first end 24. The lid 32 is then coupled to the container 22 with the rod 40 and the whisk 50 arranged within the chamber 30. The whisk 50 is then moved to agitate the fluid and form air bubbles therein. During a frothing operation, the whisk 50 is configured not only to move vertically between a first position (FIG. 2) and second position, but also to rotate about an axis defined by the rod 40. In an embodiment, at least a portion of the elongated rod 40 has a helical contour configured to define one or more spiral-like channels 60 on the surface thereof. One or more engagement features 62 (see FIG. 5), such as tabs for example, extend from the lid 32 towards the opening 34 and engage the corresponding channels 60 in the elongated rod. As a result, as the rod 40 moves vertically relative to the container 22, the engagement between the engagement features 62 and the channels 60 causes the rod 40 to simultaneously rotate about its axis. In the illustrated, non-limiting embodiment, only the portion of the rod 40 configured to engage the lid 32 as the whisk 50 moves between the first position and the second position has a spiral configuration. However, in other embodiments, an additional portion or the entire rod 40 may have a spiral configuration.

[0031] A centering feature 70 may be arranged within the chamber 30 to support the rod 40 at a location between the first end 44 and the second end 46. In the illustrated, non-limiting embodiment, the centering feature 70 extends from an underside of the lid 32 into to

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chamber 30. As a result, the centering feature 70 may define the second position to which the whisk 50 may be moved during a frothing operation. The centering feature 70 may be integrally formed with, or alternatively, may be removably connected to the lid 32. In addition, the centering feature 70 may be made from any type of material, including but not limited to a soft, compliant silicone for example.

[0032] The centering feature 70 includes an opening 72 spaced at a distance from the lid 32, such as at a distal end 74 of the centering feature 70 for example, through which the rod 40 extends. The centering feature 70 thereby provides another point of contact with the rod (in addition to the lid) to act as a guide to stabilize the rod 40 and also restrict motion of the rod 40 relative to the axis X. As a result, the centering feature 70 prevents the whisk 50 from contacting the sidewalls 28 of the chamber 30 as it moves between the first position and the second position. In the illustrated, non-limiting embodiment, the centering feature 70 includes three connecting members 76 that extend at an inward angle such that the centering feature 70 is generally triangular in shape with the opening 72 positioned at the apex of the triangle. However, any centering feature 70 configured to support the rod 40 at a position offset from the lid 32 is considered within the scope of the disclosure.

[0033] Because milk is forced through the whisk 50 at the same time that shearing is occurring, the frothing device described herein is improved relative to the milk foam produced by a regular whisking operation.

[0034] All references, including publications, patent applications, and patents cited herein are hereby incorporated by reference to the same extent as if each reference were individually and specifically indicated to be incorporated by reference and were set forth in its entirety herein.

[0035] The use of the terms “a” and “an” and “the” and similar referents in the context of describing the disclosure (especially in the context of the following claims) is to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The terms “comprising,” “having,” “including,” and “containing” are to be construed as open-ended terms (i.e., meaning “including, but not limited to,”) unless otherwise noted. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary

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language (e.g., “such as”) provided herein, is intended merely to better illuminate the disclosure and does not pose a limitation on the scope of the disclosure unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the disclosure.

[0036] Exemplary embodiments of this disclosure are described herein, including the best mode known to the inventors for carrying out the disclosure. Variations of those embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventors expect skilled artisans to employ such variations as appropriate, and the inventors intend for the disclosure to be practiced otherwise than as specifically described herein. Accordingly, this disclosure includes all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the disclosure unless otherwise indicated herein or otherwise clearly contradicted by context.

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CLAIMS:

What is claimed is:

1. A frothing device comprising:
a lid configurable with a container;
a rod extending through an opening provided in said lid, said rod being movable relative to said lid;
an alignment feature offset from said lid, wherein said alignment feature and said lid cooperate to facilitate movement of said rod along an axis defined by said rod; and
a whisk coupled to said rod.
2. The frothing device according to claim 1, wherein the container has a first end, a second end, and at least one sidewall extending between said first end and the second end to define a chamber, said lid being removably coupled to said container such that said alignment feature and said whisk are positioned within said chamber.
3. The frothing device according to claim 2, wherein said whisk has at least one of a size and shape complementary to said chamber adjacent said second end of said container.
4. The frothing device according to claim 1, wherein said whisk is disc shaped and includes a plurality of spokes extending between a hub and an outer periphery, and a mesh material positioned between said plurality of spokes.
5. The frothing device according to claim 1, wherein said alignment feature includes a plurality of connecting members extending at an inward angle to form a triangle.
6. The frothing device according to claim 5, wherein another opening for receiving said rod is positioned at an apex of said triangle.
7. The frothing device according to claim 1, wherein application of a force to said rod causes said whisk to move vertically and to rotate about said axis defined by said rod simultaneously.
8. The frothing device according to claim 7, wherein at least a portion of said rod includes a spiral channel, and at least one engagement feature extends from said lid, wherein said engagement feature cooperates with said spiral channel.
9. The frothing device according to claim 7, wherein a handle is coupled to an end of said rod.
10. The frothing device according to claim 9, wherein said handle is movably connected to said rod.

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11. The frothing device according to claim 1, wherein said lid and said alignment feature restrict bending of said rod about said axis.

12. A method of frothing a liquid comprising:

installing a frothing device about a container, said frothing device including:

a lid removably coupled to said container;

a rod extending through said lid, said rod being movable along an axis relative to said lid; and

a whisk mounted to said rod;

supporting said rod at at least two distinct positions such that bending of said rod about said axis is restricted;

applying a force to said rod create a translation of said rod along said axis and rotation of said rod about said axis; and

frothing a liquid within said container via said translation and rotation.

13. The method according to claim 12, wherein said translation and rotation occur simultaneously.

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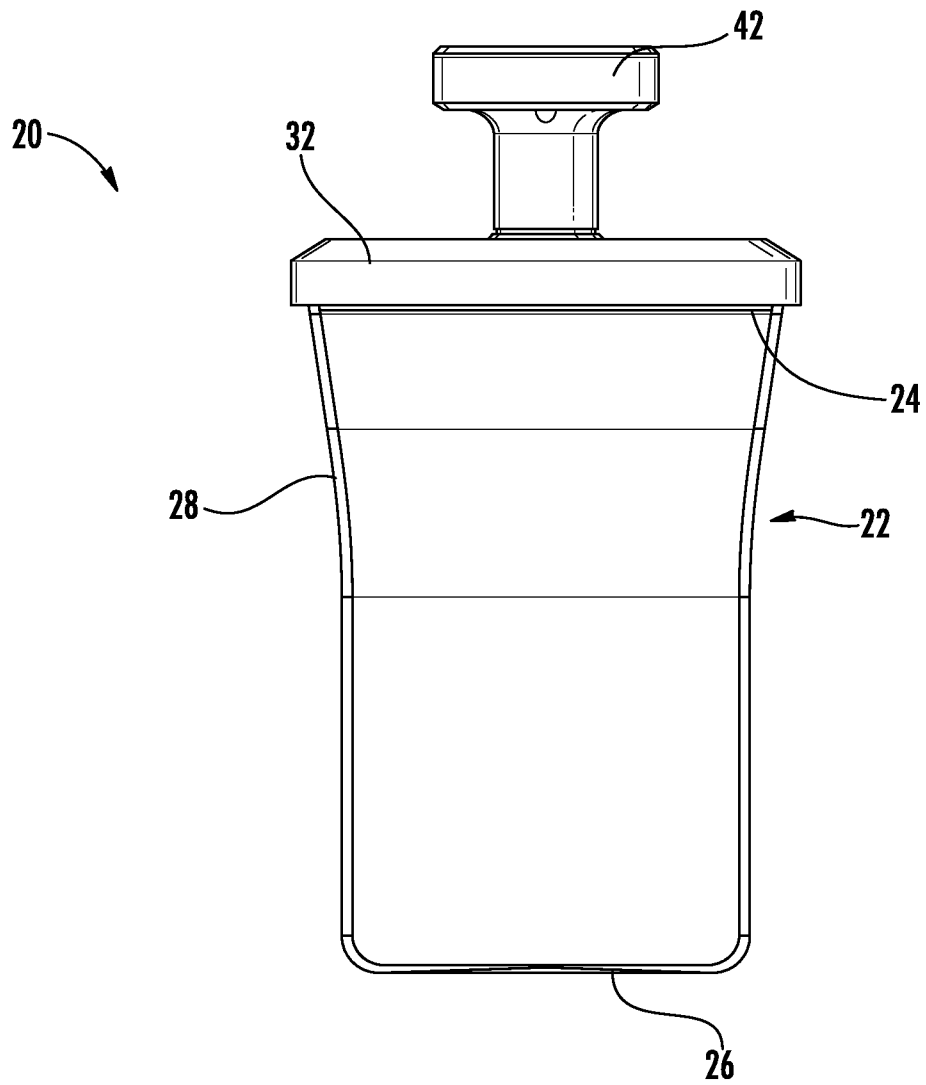


FIG. 1

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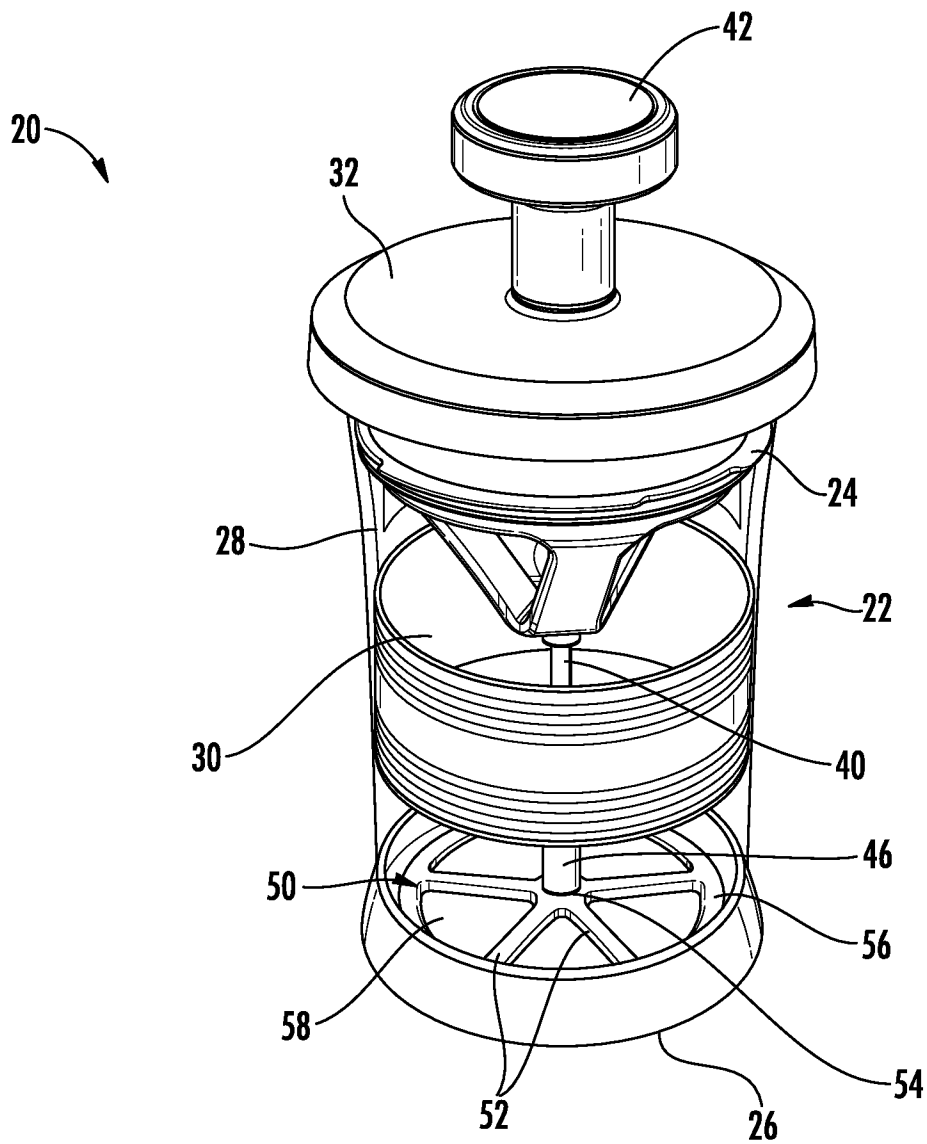


FIG. 2

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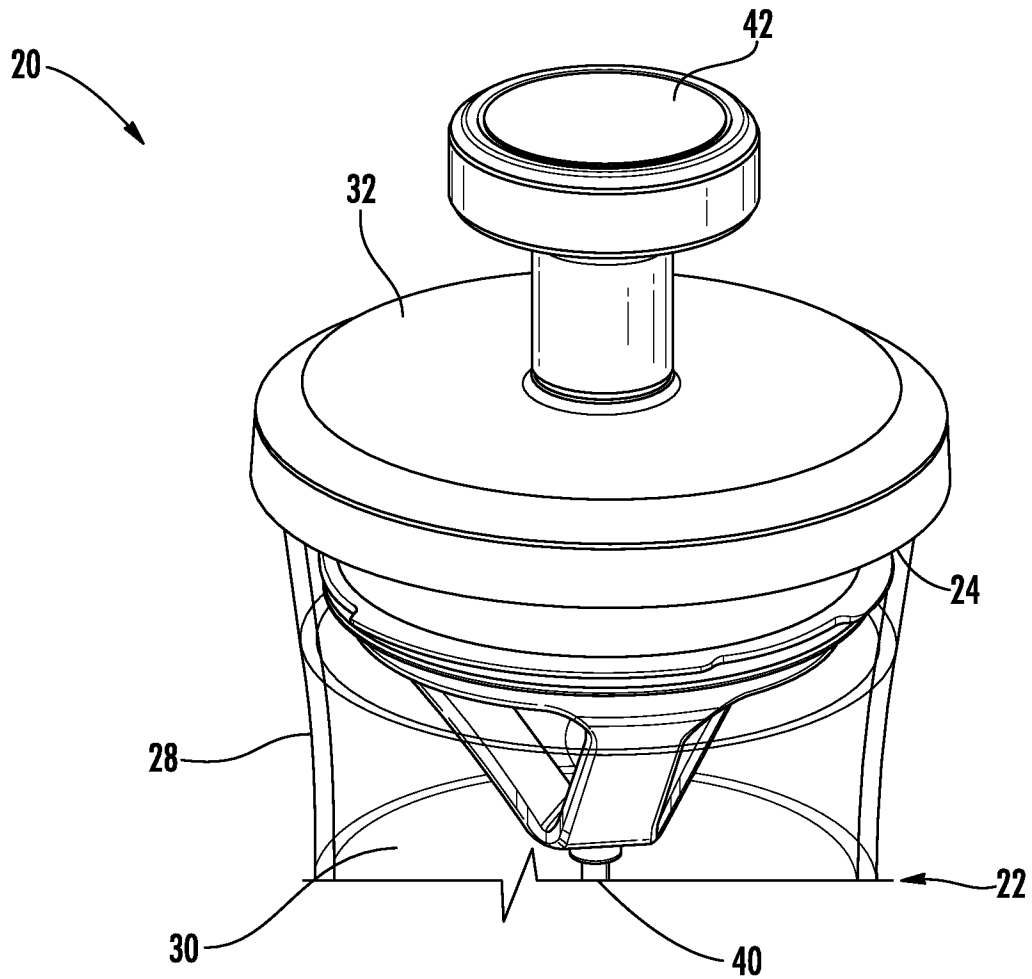


FIG. 3

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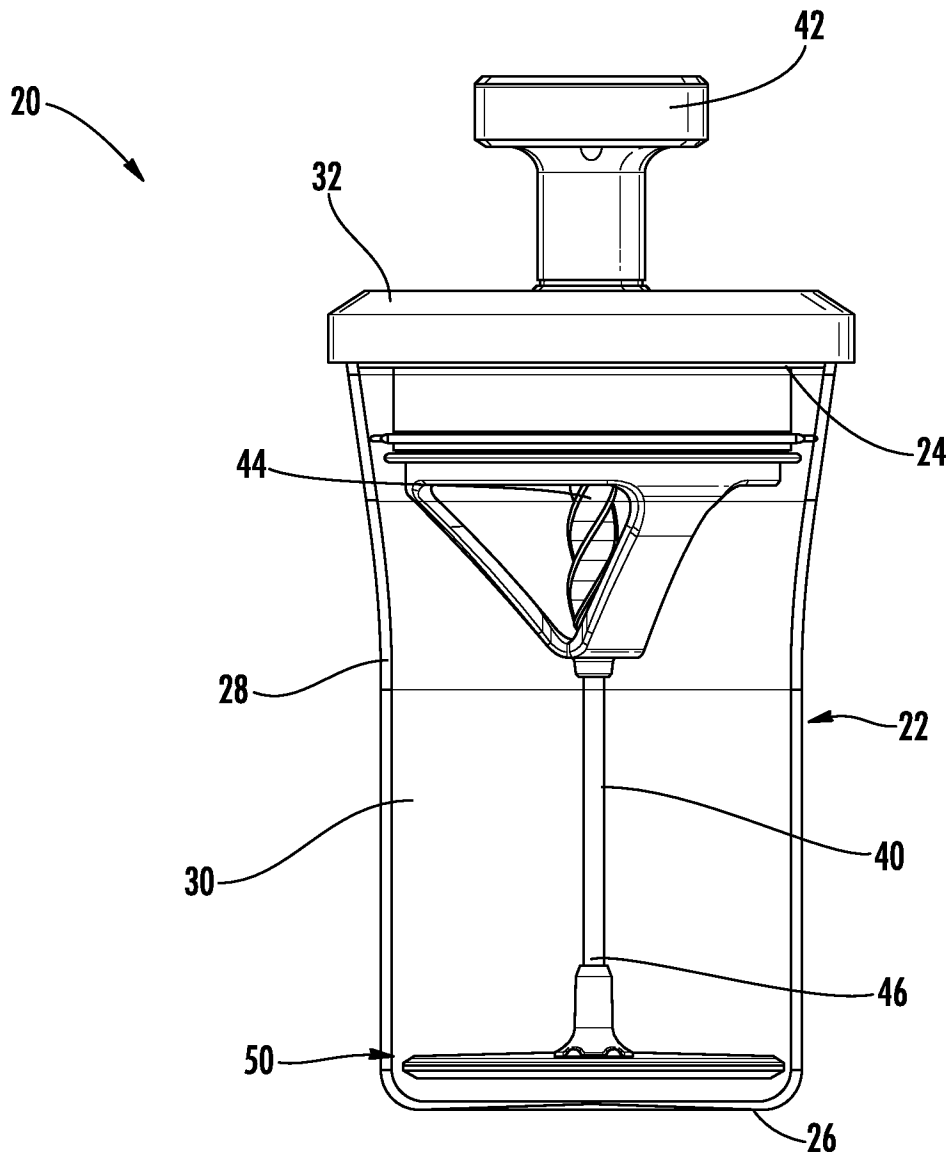


FIG. 4

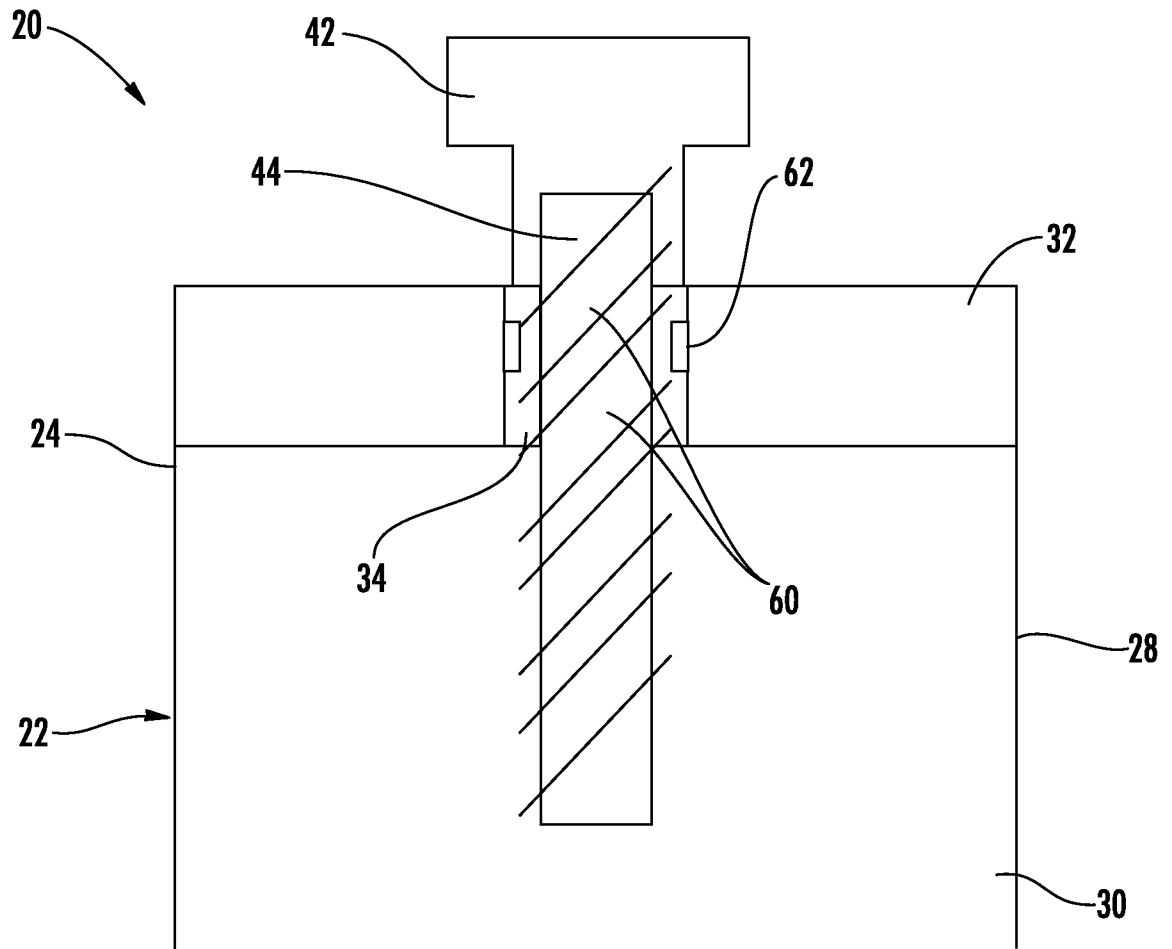


FIG. 5

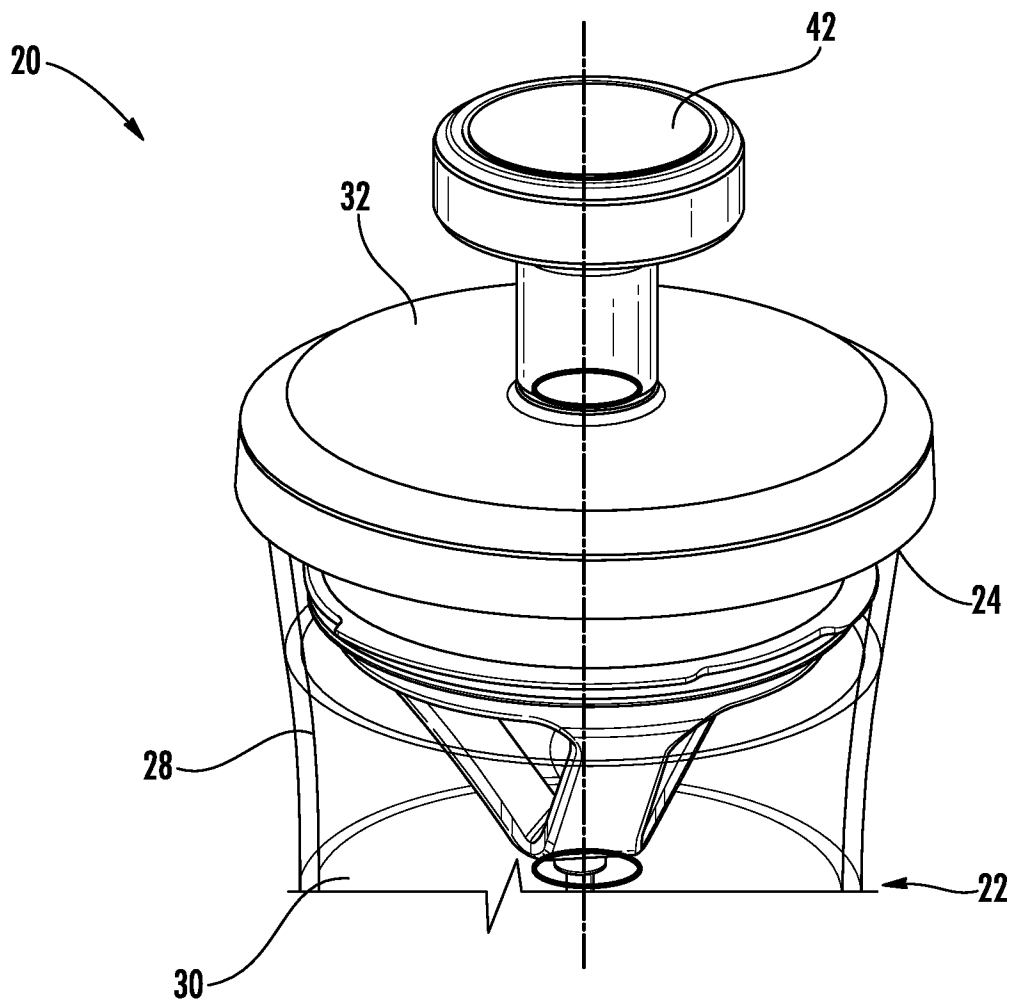


FIG. 6

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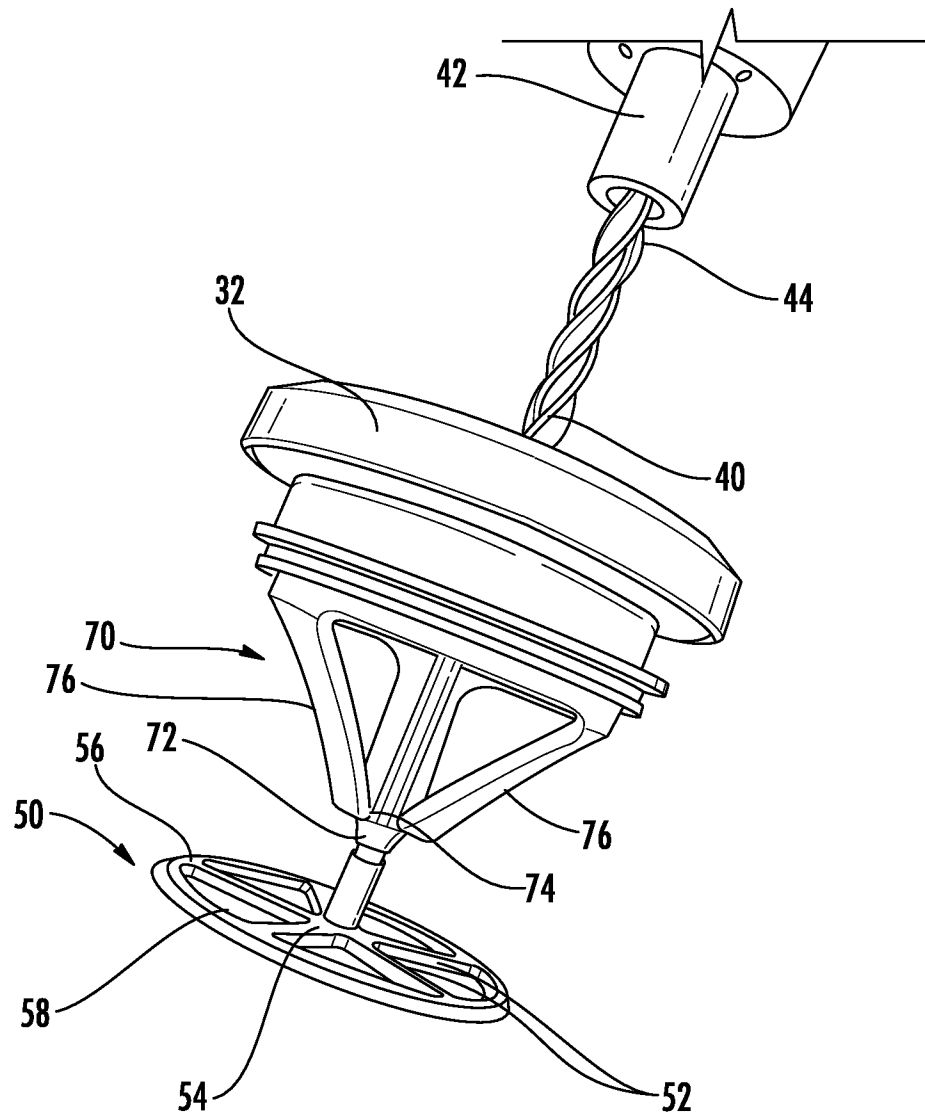


FIG. 7

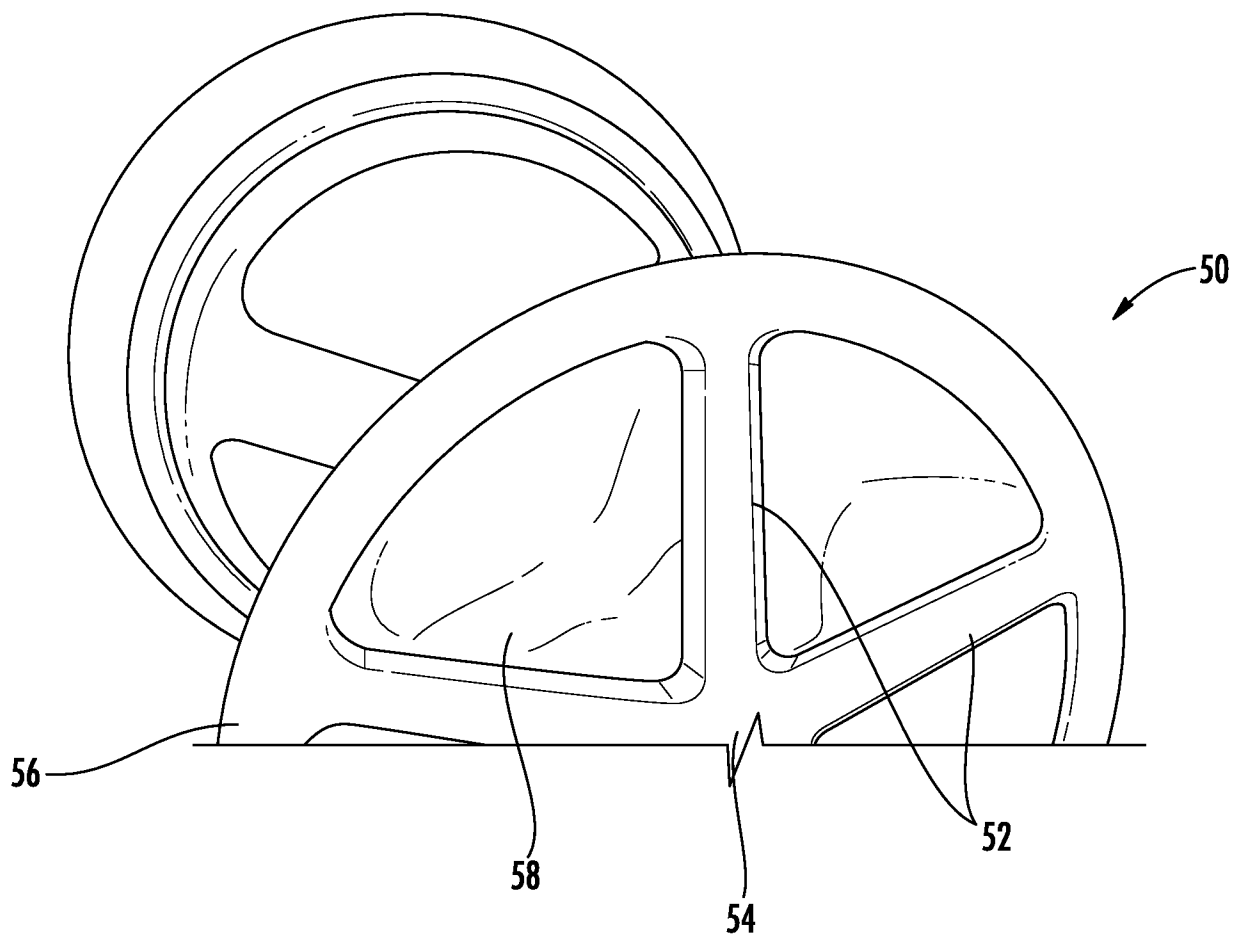


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2017/048212

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47J43/07 A47J43/10
ADD.

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)
A47J B01F

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 practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013/010568 A1 (BODUM JORGEN [CH]) 10 January 2013 (2013-01-10)	1-13
Y	paragraphs [0001], [0031] - [0034], [0041]; figures 1,2	1-13

X	FR 540 661 A (CHARLES-ERNEST MACCAUD) 15 July 1922 (1922-07-15)	1-13
Y	page 1, lines 7-56; figures 1-3	7,8,12, 13

X	EP 2 545 829 A1 (KONINKL PHILIPS ELECTRONICS NV [NL]) 16 January 2013 (2013-01-16)	1-13
Y	paragraphs [0023] - [0025], [0028], [0034], [0035]; figures 1-4	7,8,12, 13

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Further documents are listed in the continuation of Box C.



See patent family annex.

* 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

"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

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"&" document member of the same patent family

Date of the actual completion of the international search

28 November 2017

Date of mailing of the international search report

11/12/2017

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2017/048212

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	paragraphs [0001], [0013] - [0065]; figures 2,3 -----	1-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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