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(54) Title: AN APPARATUS SUITABLE FOR PREPARING A CUSTOM PERSONAL CARE COMPOSITION

(57) Abstract: An apparatus is described for providing a customized, personal care product to a consumer at a location, typically the point of sale, that is remote from a second location in which a personal care product base composition is prepared. A selection of customizing agents of different classes with a common vehicle is made available to the consumer for custom formulation of a personal care product with the desired attributes.



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AN APPARATUS SUITABLE FOR PREPARING A
CUSTOM PERSONAL CARE COMPOSITION

The present invention relates to an apparatus for preparing
5 a customised personal care composition at a location remote
from a second location in which a personal care product base
composition is prepared.

Many personal care products such as body wash, facial
10 cleansing gel, hair shampoo, hair conditioner, face lotion
and other personal care products that are currently
available are provided as prepared formulations. A drawback
of such products is that the user cannot alter the
formulation to accommodate their particular skin and hair
15 characteristics, personal preferences, or to provide
specialized treatment. A further drawback is the
uncertainty of the age and freshness of the prepared
formulation which may have been prepared many months or
years before the product is sold.

20

Multiple-part product kits that contain separate components
of e.g. a hair shampoo, hair conditioner, cosmetics, or
other personal care products are available from many
professional salons and some retail personal care outlets.
25 However, the user is still unable to customize the
individual formulations in light of the consumer's unique
personal care preferences and requirements.

Therefore, one aspect of the invention is to provide an
30 apparatus that enables a user to formulate a variety of
personal care product compositions to best suit the needs of
the consumer. Another aspect of the invention is to provide

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an apparatus that is easy to use such that the user may be a lay-person who is able to formulate a customized personal care product. Another aspect of the invention is to provide an apparatus with a plurality of customizing agent
5 dispensing stations, and a plurality of personal care product base dispensing stations designed to efficiently prepare stable personal care product which are freshly blended while the consumer waits. Another aspect of the invention is to mix the typically viscous blends of personal
10 care products in an efficient manner.

An apparatus is provided for preparing a customized, personal care product for a consumer typically at a location remote from a second location in which a personal care
15 product base composition is prepared. The apparatus comprises a plurality of personal care base compositions each contained in a dispensing station and variants from two or more classes of customizing agents each contained in a dispensing station. The consumer is allowed to select, in
20 any sequence, one personal care base composition and at least two variants from separate classes of customizing agents, such as a fragrance and a benefit agent. The user doses, in any sequence, the consumer selected personal care base composition, customizing agents, and, if necessary,
25 sufficient liquid vehicle into a container, mixes the contents until uniform, and labels the container using the inventive dispensing apparatus.

A sufficient quantity of a blank composition having
30 substantially the same vehicle composition as that of the customizing agent may be dosed in the container if an

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insufficient number of customizing agents are selected by the consumer. This allows for maintaining the optimum concentration of product ingredients while providing many choices for the consumer in customizing the product.

5

The inventive dispensing apparatus is preferably used with personal care product base compositions including cleansing and conditioning product bases useful for formulating body wash, body lotion, body mist spray, hydroalcoholic toner, facial cleansing gel, waterless cleanser, hair shampoo, hair conditioner, face lotion and the like.

BRIEF DESCRIPTION OF THE DRAWINGS

15 Figure 1 is a cross sectional view of one embodiment of the inventive dispensing system having two dispensing devices positioned opposite each other.

Figure 1A and 1B are exploded diagrams of the storage container of the embodiment illustrated in Fig. 1 with its adapter and pump head.

Figure 1C is a perspective representation of the storage bottle depicted in Figs. 1A and 1B with its outlet-positioning fixture.

Figure 2 is a cross sectional view of another embodiment of the inventive dispensing system having a plurality of dispensing devices and storage bottles in a carousal type, over and under arrangement.

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Figure 3 is a top planar representation of the same embodiment of the inventive dispensing system illustrated in Figure 2. Also illustrated is the labeling device and external-mixing device.

5

Figure 4A is a perspective representation of the consumer storage bottle positioned in a consumer bottle holder in the embodiments depicted in Figs. 1 and 2.

10 Figures 4B and 4C are perspective representations of the consumer bottle holder depicted in Fig. 4A from above and below respectively.

15 Figures 5A and 5B are perspective representations of the outlet positioning fixture used in the embodiments depicted in Figs. 1 and 2 viewed from above and below respectively.

20 Figures 6A and 6B are perspective representations of the outlet guide used in the embodiments depicted in Figs. 1 and 2 viewed from above and below respectively.

Figure 6C is a perspective representation of the outlet guide depicted in Figs 6A and 6B engaged in the outlet positioning fixture depicted in Figs 5A and 5B.

25

Figures 7A, 7B and 7C are perspective representations of one embodiment of a useful bottle holder for a mixing device for the inventive dispensing system. Fig. 7A is a perspective representation of bottles contained in a bottle holder.

30 Fig. 7B is an exploded diagram of the bottle holder being received into a bottle holder container. Fig. 7C depicts

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the bottle holder and its container illustrated in Fig. 7B assembled.

Figure 7D is a perspective representation of a consumer
5 bottle in an adaptor sized to fit into the bottle holder
depicted in Figs 7A, 7B, and 7C. Also depicted is a
perspective representation of the adapter without the
bottle.

10 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figure 1, dispensing station 10 is depicted
having dispensing device 12, which contains measuring device
14, pump 16 and pump head 18. Storage bottle 24 is adapted
15 to fit dispensing device 12 by way of adapter 22. Storage
bottle 24 contains customizing agent 21, which is dispensing
via outlet tube 28 supported by outlet guide 26. Outlet
guide 26 is removably attached to pump head 18 and is also
supported by outlet positioning fixture 20 via outlet
20 positioning fixture arms 64 (not shown). Outlet positioning
fixture 20 is supported at its opposite end by dispenser
supporting member 44. Dispensing supporting member 44 also
supports storage bottle 24 by both a direct and biasing
arrangement via storage bottle holder 34, which is slidably
25 connected to dispenser supporting member 44 via slidable
mount 46. In operation, dispensing device 12 causes
customizing agent 21 to be dispensed from storage bottle 24
through outlet tube 28 into consumer bottle 30 via consumer
bottle neck 32. Consumer bottle 30, having consumer bottle
30 neck 32 is supported in a fixed position relative to outlet
28 via consumer bottle holder 33 which is removably attached

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to one end of consumer bottle holder supporting member 36. Consumer bottle holder supporting member 36 is connected via its other end to supporting member locking ring 38. Dispenser supporting member 44 is rotatably attached to shaft 45 by way of bearing 42 and supporting ring 43. Supporting member-locking ring 38 is fixably attached to shaft 45. Detent mechanism 40 allows dispensing station 10 to be rotated reproducibly into at least one predetermined position.

10

Now referring to figure 1A, the bottom end of adapter 22 is positioned on storage bottle 24 with the aid of o-ring 23 to help seal the adapter 22 connection to the storage bottle 24. Pump head 18 is positioned on the top end of adapter 22. Now referring to figure 1B, as in figure 1A, adapter 22 is positioned onto storage bottle 24 using o-ring 23 to help seal the adapter 22 connection to the storage bottle 24. Pump head 18 is positioned onto the top end of adapter 22 and outlet guide 26 is positioned onto and supported by pump head 18. Now referring to figure 1C, adapter 22 is shown positioned on storage bottle 24, pump head 18 is positioned onto adapter 22 and outlet positioning fixture 20 is positioned onto pump head 18.

15
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Now referring to figure 2, four dispensing stations are illustrated, arranged in a carousel like arrangement in two layers. Four consumer bottles 30 are shown positioned in four consumer bottle holders 33 ready to accept customizing agents 21. Also shown are two product base dispensing stations 70 each consisting of product base measuring device 72 and product base pump 74. In operation, product base

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pump **74** draws product base from product base storage system **80** and dispenses it through product base outlet **76** into consumer bottle **30**. In this embodiment, product base **85** is typically dispensed into consumer bottle **30** before
5 customizing agents **21** are dispensed into the same container, although this procedure may be altered as desired. Product base storage system **80** comprises product base storage tank **82** containing product base **85**. Product base **85** flows through product base storage tank outlet **84**, through product
10 base storage tank adapter **86** and into one end of product base storage tank hose **88**, which is connected at its other end to product base dispensing station **70** via product base adapter **78**.

15 Now referring to figure 3, a plurality of dispensing stations **10** are shown positioned on a carousel type platform. Also shown, are a plurality of consumer bottle holders **33** each positioned at one end of a corresponding plurality of consumer bottle holding supporting members **36**.
20 Also shown in close proximity to dispensing station **10** are a plurality of product base dispensing stations **70**, external mixing device **180**, and labeling device **200**.

Now referring to figure 4A, consumer bottle **30** is shown
25 positioned in consumer bottle holder **33**. Now referring to figures 4B and 4C, consumer bottle holder **33** is illustrated from above and below respectively. Also depicted in figure 4C, is consumer bottle holder locating channel **35** situated on the bottom of consumer bottle holder **33**. Also shown in
30 figure 4B is consumer bottle holder aperture **37**, which receives consumer bottle **30**.

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Now referring to figures 5A and 5B, outlet positioning fixture 20 is shown from above and below respectively having outlet positioning fixture body 62 and outlet positioning fixture arms 64. In figure 5A, outlet positioning fixture fastener aperture 60 is shown. In figure 5B, outlet positioning fixture locating channel 66 is illustrated, which slidably engages both pump head 18 and outlet guide 26 preventing outlet guide 26 from rotating so that it remains in alignment with consumer bottle 30 when positioned in consumer bottle holder 33.

Now referring to figures 6A and 6B, outlet guide 26 is shown, from above and below respectively, having outlet guide positioning members 23 which engage complementary apertures (not shown) in pump head 18 so that outlet guide 26 is properly aligned with pump head 18. Outlet guide flanges 25 are fixedly attached to outlet guide 26. Now referring to Figure 6C, outlet guide 26 is removably engaged in outlet positioning fixture 20, and in pressing engagement with outlet positioning fixture arms 64 which are biased to hold outlet guide flanges 25.

Figure 7A illustrates consumer bottle mixer holder 126 containing at least one consumer bottle 30, having consumer bottle cap 31, positioned in consumer bottle mixer sleeve 110. The combination of consumer bottle 30 and consumer bottle mixer sleeve 110 is illustrated as consumer bottle and sleeve assembly 140. Depending on the size of consumer bottle 30, the bottle may be positioned in consumer bottle mixer holder 126 without an adapter 110, or it can be positioned with the adapter 110 if the bottle 30 is too

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small to fit into the consumer mixer bottle seat **127**, sized to contain consumer bottle mixer sleeve **110**.

Now referring to figure 7B, consumer bottle mixer holder **126**
5 is shown being received in consumer bottle mixer assembly holder **130**. Also shown is consumer bottle mixer assembly cover **122**, positioned onto consumer bottle mixer assembly shaft **124** being received into consumer bottle mixer holder **126** via consumer bottle mixer holder channel **134**, and
10 secured by consumer bottle mixer assembly shaft retaining ring **128** and threaded fasteners **132**.

Now referring to figure 7C, consumer bottle mixer assembly **120** is illustrated in an assembled positioned with consumer
15 bottle mixer holder **126**, containing 5 consumer bottle and sleeve assembly units **140**. Now referring to Figure 7D, consumer bottle **30** is shown in pressing engagement with consumer bottle mixer sleeve **110** sized to fit into consumer bottle mixer holder **126** depicted in Figs 7A, 7B, and 7C.
20 Also depicted is consumer bottle mixer sleeve **110** without the bottle.

Detailed Description of the Invention

25 In one aspect of the invention is an apparatus for providing a customized, personal care product to a consumer at a location remote from a second location in which a personal care product base is prepared, comprising:

30 a. a plurality of measuring devices for determining amounts of at least one product base and a

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plurality of customizing agents to be blended into a container;

b. a plurality of dispensing devices, each fluidly communicating with one of the measuring devices, for dispensing amounts of at least one product base and a plurality of customizing agents into the container;

c. an external mixing device for blending the product base and customizing agents after being dispensed into the container by agitating the container; and

d. a labeling device for labeling the container with only the ingredients contained in the custom blended product.

15 In another aspect of the invention is a kit for providing a customized, personal care product to a consumer at a location remote from a second location in which a personal care product base is prepared, comprising:

20 a. a plurality of measuring devices for determining amounts of at least one product base and a plurality of customizing agents to be blended into a container;

25 b. a plurality of dispensing devices, each fluidly communicating with one of the measuring devices, for dispensing amounts of at least one product base and a plurality of customizing agents into the container;

30 c. an external mixing device for blending the product base and customizing agents after being dispensed into the container by agitating the container; and

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d. an external-labeling device for labeling the container with only the ingredients contained in the custom blended product.

5 Preferably, the plurality of dispensing devices are situated in a carousel arrangement having at least two layers of devices oriented in an over and under relationship defined by an arc. Preferably, the dispensing devices are each supported by a holding device and an outlet positioning
10 fixture. Preferably, the holding device and the outlet positioning fixture are attached to a dispenser supporting member on a first end; and the supporting member, on its second end, is rotatably coupled to a shaft positioned at the center of the arc, and the shaft is oriented
15 perpendicular to the plane of the arc. Preferably the holding device or container holder is slidably attached to the dispenser supporting member for adjusting the outlet's vertical position in relation to the consumer bottle. More preferably, the dispensing and measuring devices are
20 removable as a single unit, thus facilitating the replacement and replenishment of performance and customizing agents, and the prevention of contamination.

Preferably the apparatus or kit has a plurality of
25 dispensing devices with at least one storage container for containing product; at least one measuring device for measuring product to be dispensed; at least one adaptor for removably coupling the measuring device to the container; and at least one pump fluidly communicating with the
30 measuring device for dispensing measured product. Especially preferred is the arrangement where the final

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product volume may be pre-selected and does not vary for any number of customizing agent variants for a single product form, preferably not in excess of three variants.

5 Preferably the measuring device has at least one outlet for dispensing product; at least one inlet for admitting air to replace dispensed product. Preferably the outlet is oriented in a fixed direction with an outlet-locating fixture along a radius of the arc. More preferably, the
10 outlet positioning fixture is a yoke assembly slidably attached to the dispenser supporting member to position the outlet along the radius of the arc.

Preferably, the apparatus or kit has a container holder and
15 a container supporting member having a first end and a second end; whereby the container holder is positioned so that the container may be placed in the holder and reproducibly positioned to receive the product dispensed through the outlet. Preferably the container holder is
20 attached to the first end of the container-supporting member; and the container-supporting member is attached on the second end to the shaft. More preferably, the dispenser supporting member is rigidly attached to a bearing collar rotatably coupled to the shaft; and the bearing collar has a
25 detent device for reproducibly positioning one or more dispensing device outlets at a predetermined position along its arc of motion.

Preferably, the inventive apparatus or kit has a holding
30 device which has a biasing member that releasably holds the storage container; and the holding device is slidably

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attached to the dispenser supporting member so as to adjust the position of the storage container and the outlet along the major axis of the supporting shaft. The holding device may be optionally removable for disassembly and cleaning.

5

Preferably the inventive dispensing apparatus has a plurality of user stations to allow the simultaneous preparation of customized personal care products.

10 The mixing motion providing agitation and mixing of product base and customizing agents may be generated by internal or external mixers providing a simple oscillatory or vibrating motion wherein the consumer container with the blended personal product is simply shaken rapidly back and forth
15 through a short distance. Preferably, more advanced mixers are used which provide a gyroscopic motion wherein a container is moved, usually rotated, about one axis while simultaneously being moved, usually spun, about a second axis perpendicular to the first such as is done by the Red
20 Devil twin axis orbital Speed Demon Mixer® available from the Red Devil Equipment Co. (Brooklyn Park, MN), or the like. Especially preferred are mixing devices disclosed in U.S. Patent No. 5,749,652 and U.S. Patent No. 5,383,163 both incorporated herein by reference. Preferably a circular
25 mixing motion having a relatively large diametric (and radial) displacement at a relatively slow speed to mix a viscous fluid, preferably a personal care product, in a short period of time without producing foaming or air entrapment in the fluid. Preferably the displacement and
30 speed is sufficiently large and slow to maintain any air pocket within the container substantially intact and cause

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it to move within the container along a path which includes both vertical and horizontal components.

Accordingly, one aspect of the preferred mixing method of the present invention takes advantage of the air pocket found in the consumer product bottle after filling. However, the mixing advantages of the preferred mixing method can be achieved without an air pocket. Thus, in contrast to mixers that try to achieve mixing by using high-speed oscillatory or vibratory motion over short distances, the preferred mixing apparatus of the present invention accomplishes mixing by using relatively slow speeds and large displacements. This substantially reduces wear and tear on the mixing device and significantly reduces the entrapment of air bubbles in the blended personal care product.

Preferably the internal or external mixer has a container holder that can accommodate a plurality of consumer containers of the same or different volumes, thus increasing productivity.

Preferably, the consumer container has a neck for facilitating the dispensing of a flowable or extrudable personal product. Especially preferred is a threaded or flanged neck for use with a cap (with or without an integrated orifice), or a pump dispenser, which is designed to securely fit on the neck, or the like. Preferably, the consumer bottle is filled with the selected base product, and the selected customizing agents, to a level below the bottle neck, a plug sized to fill at least 50% of the volume

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of the bottle neck is inserted inside the neck, the bottle is inserted into the mixer holder in a substantially inverted position, and the inverted bottle is agitated until the contents have been uniformly blended. This is done, in part, to improve mixing efficiency when the container's contents are blended by an external-mixing device. Preferably the container is situated in the mixer in a position at an angle of greater than 10 degrees, more preferably greater than 30 degrees, from its major axis vertical orientation, and most preferably in a position substantially inverted from its filling position. If the bottle is smaller than the mixer holder, the bottle may be slid into a bottle sleeve adapted to fit both the mixer holder and the bottle.

In another aspect of the invention, an internal or external labeling device applies a customized label to the container identifying only the components of the base formula and dosed customizing agents actually contained in the container. The labeling device may produce the label by any suitable means, preferably by a computer interfaced with a printer which allows for the user to input the consumer's custom product selections and accesses a database of ingredients contained in the available product bases and customizing agent compositions to produce a customized label. In another embodiment, the dispensing device may be electronically linked with an internal labeling device by techniques which would be well known to the skilled person, so that a signal is sent to the labeling device when such dispenser is activated identifying the component dispensed, and preferably the volume dispensed, so that a custom label

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is provided identifying only the components actually dispensed into the container.

The same or a different computer printer combination may
5 also be used to insert a code on the label, e.g. a machine
readable bar code or the like, capable of tracking the
identity of both the product and the consumer for later
reference. In this way, the consumer can easily reorder the
custom product from the same location the product was
10 purchased or from a remote location. The consumer may also
return to the store or kiosk and allow the previous label to
be scanned thus facilitating the purchase of additional
product.

15 In another aspect, the inventive apparatus or kit produces
custom products of convenient volume to facilitate consumer
use. Preferably, the apparatus is designed to accommodate a
consumer container for the final product having a volume
under about 1 liter, preferably under about 220 mls.

20

The foregoing description and examples illustrate selected
embodiments of the present invention. In light thereof
variations and modifications will be suggested to one
skilled in the art, all of which are within the scope and
25 spirit of this invention.

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CLAIMS

1. An apparatus for providing a customized, personal care product to a consumer at a location remote from a second
5 location in which a personal care product base is prepared, comprising:

10 a. a plurality of measuring devices for determining amounts of at least one product base and a plurality of customizing agents to be blended into a container;

15 b. a plurality of dispensing devices, each fluidly communicating with one of the measuring devices, for dispensing the amounts of at least one of the product base and a plurality of customizing agents into the container;

c. a mixing device for blending the product base and customizing agents after being dispensed into the container by agitating the container; and

20 d. a labeling device for labeling the container with only the ingredients contained in the custom blended product.

25 2. An apparatus according to claim 1 wherein the plurality of dispensing and measuring devices are removable as a single unit.

30 3. An apparatus according to claim 1 or claim 2 wherein the plurality of dispensing devices each having an outlet are situated in a carousel arrangement having at least two layers of devices oriented in an over and

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under relationship; the layer arrangement defined by an arc; the dispensing devices each being supported by a holding device and an outlet positioning fixture; the holding device and the outlet positioning fixture being
5 attached to a dispenser supporting member on a first end; the supporting member, on its second end, being rotatably coupled to a shaft positioned at the center of the arc, the shaft being oriented perpendicular to the plane of the arc.

10

4. An apparatus according to claim 3, wherein the outlet is oriented in a fixed direction with the outlet positioning fixture along a radius of the arc.

15 5. An apparatus according to any of the preceding claims, wherein the plurality of dispensing devices each has at least one storage container for containing product; at least one measuring device for measuring product to be dispensed; at least one adaptor for removably coupling
20 the measuring device to the container; at least one pump fluidly communicating with the at least one measuring device for dispensing measured product; at least one outlet for dispensing product; and at least one inlet for admitting air to replace dispensed
25 product.

25

6. An apparatus according to any of the preceding claims, having a container holder and a container supporting member having a first end and a second end; the
30 container holder being positioned so that the container may be placed in the holder and reproducibly positioned

30

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to receive the product dispensed through the outlet;
the container holder being attached to the first end of
the container supporting member; the container
supporting member being attached on the second end to
the shaft.

5

7. An apparatus according to any of claims 3 to 6, wherein
the holding device has a biasing member that releasably
holds the storage container; the holding device being
slidably attached to the dispenser supporting member to
adjust the position of the storage container and the
outlet along the major axis of the supporting shaft.

10

8. An apparatus according to any of the preceding claims,
wherein the mixing device is a twin axis orbital mixer.

15

9. An apparatus according to any of the preceding claims,
wherein the mixing device simultaneously agitates the
containers having different volume capacities.

20

10. An apparatus according to any of claims 3 to 9, wherein
the outlet positioning fixture is a yoke assembly
slidably attached to the dispenser supporting member to
position the outlet along the radius of the arc.

25

11. An apparatus according to any of claims 3 to 10,
wherein the dispenser supporting member is rigidly
attached to a bearing collar rotatably coupled to the
shaft; the bearing collar having a detent device for
reproducibly positioning at least one of the dispensing

30

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device outlets at a predetermined position along the arc.

12. An apparatus according to any of claims 6 to 11,
5 wherein the container holder is removable from the dispenser supporting member.

13. An apparatus according to any of the preceding claims,
10 wherein the final product volume may be pre-selected and does not vary for the customizing agent variations for a single product form.

14. A kit for providing a customized, personal care product
15 to a consumer at a location remote from a second location in which a personal care product base is prepared, comprising:

e. a plurality of measuring devices for determining
20 amounts of at least one product base and a plurality of customizing agents to be blended into a container;

f. a plurality of dispensing devices, each fluidly
communicating with one of the measuring devices, for
dispensing amounts of at least one product base and
25 a plurality of customizing agents into the container;

g. an external mixing device for blending the product
base and customizing agents after being dispensed
into the container by agitating the container; and

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h. an external-labeling device for labeling the container with only the ingredients contained in the custom blended product.

Fig.1.

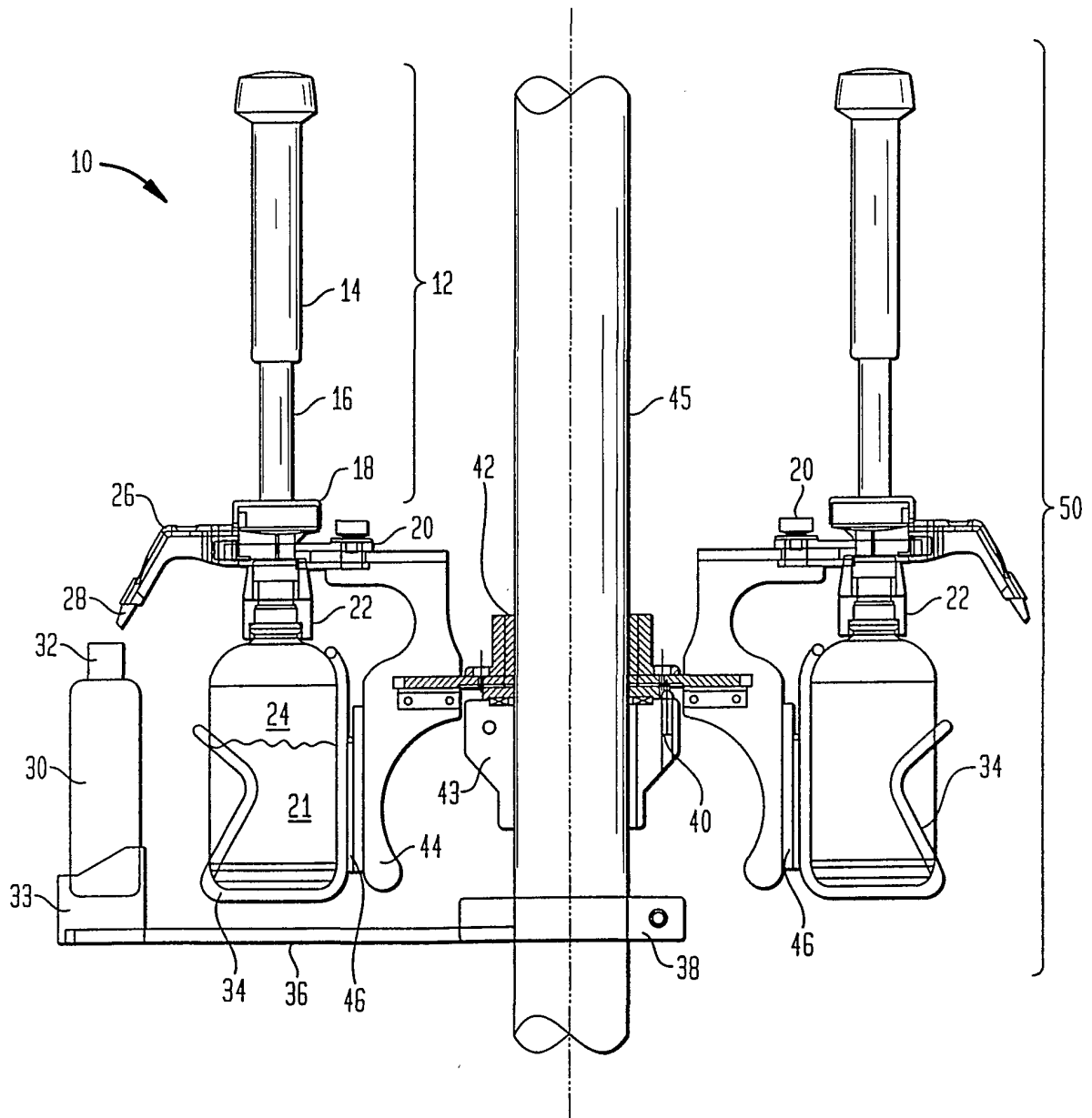


Fig.1C.

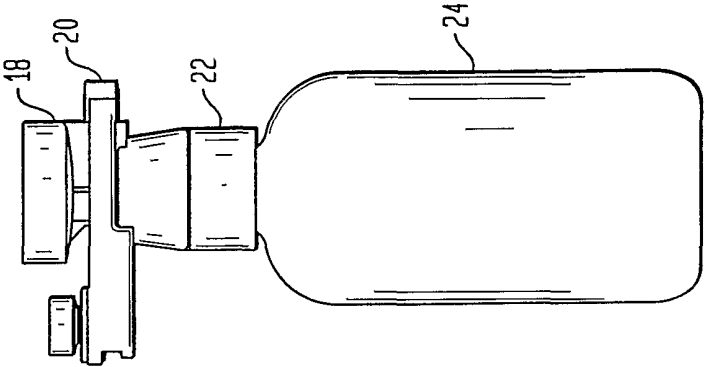


Fig.1B.

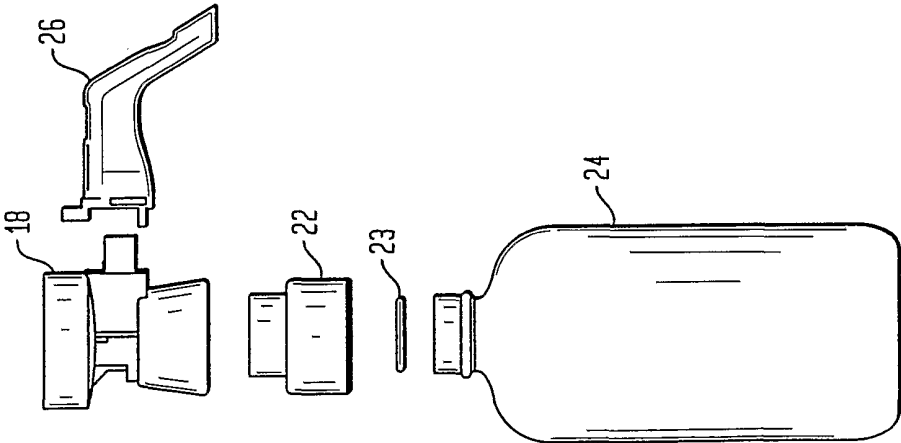


Fig.1A.

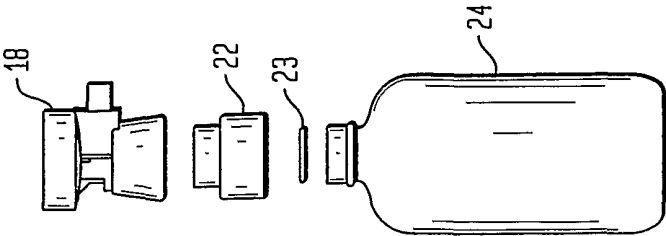
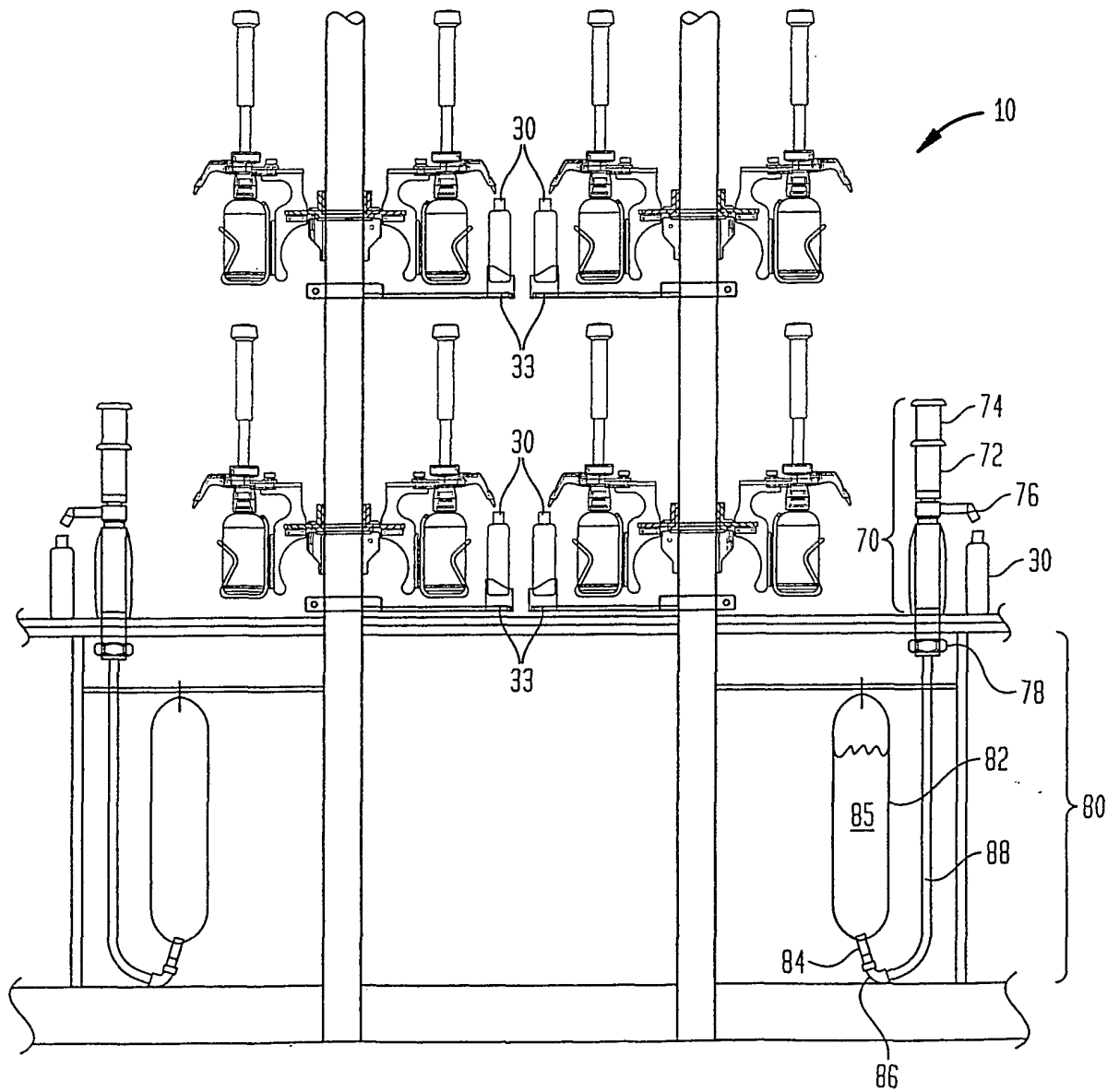


Fig.2.



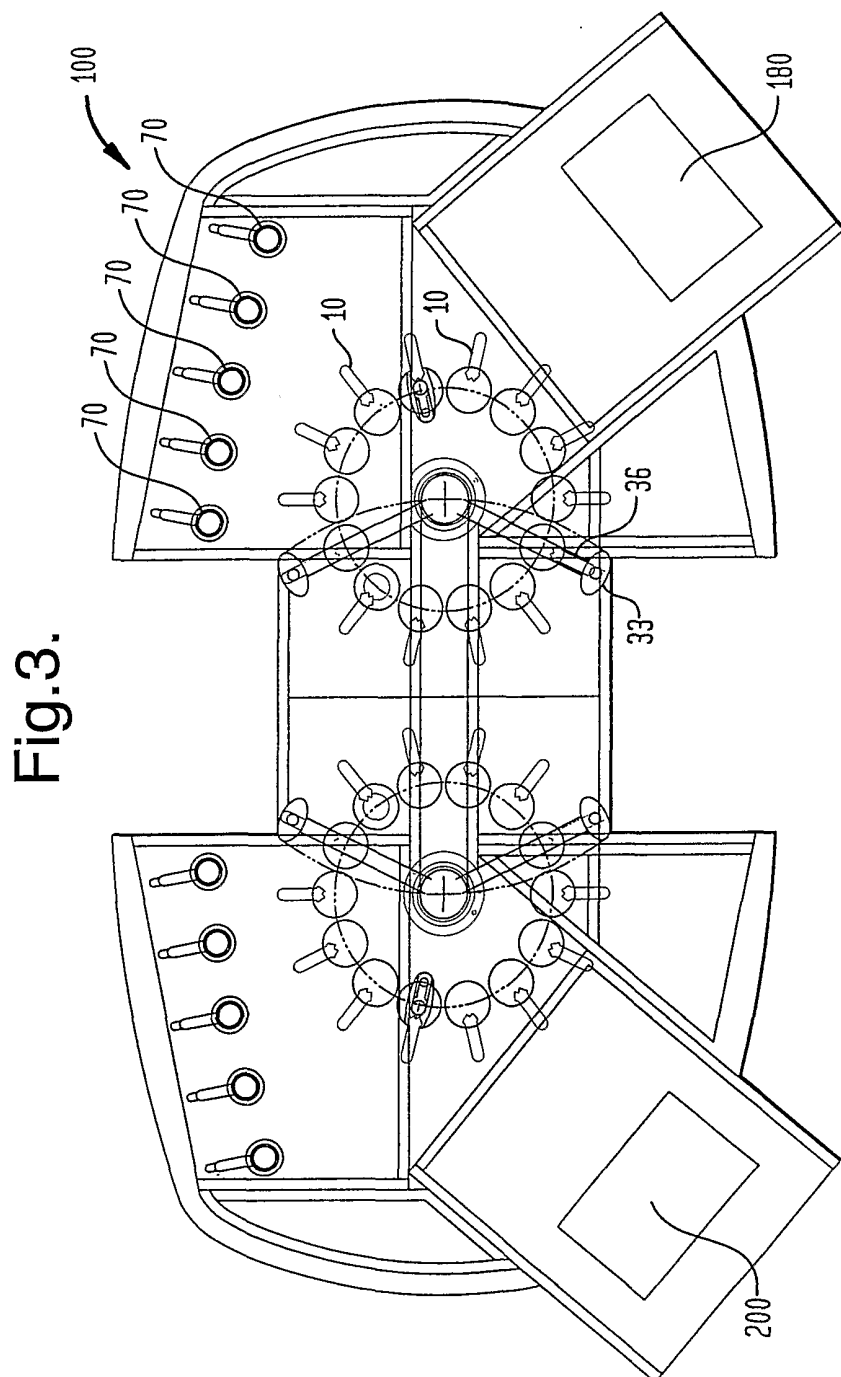


Fig.4A.

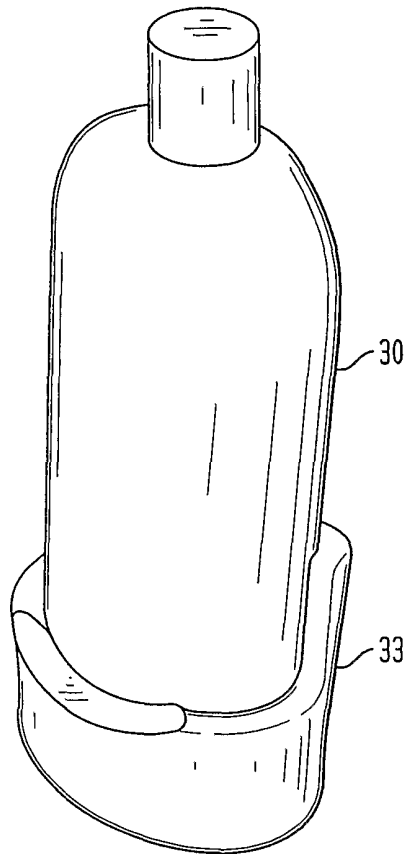


Fig.4B.

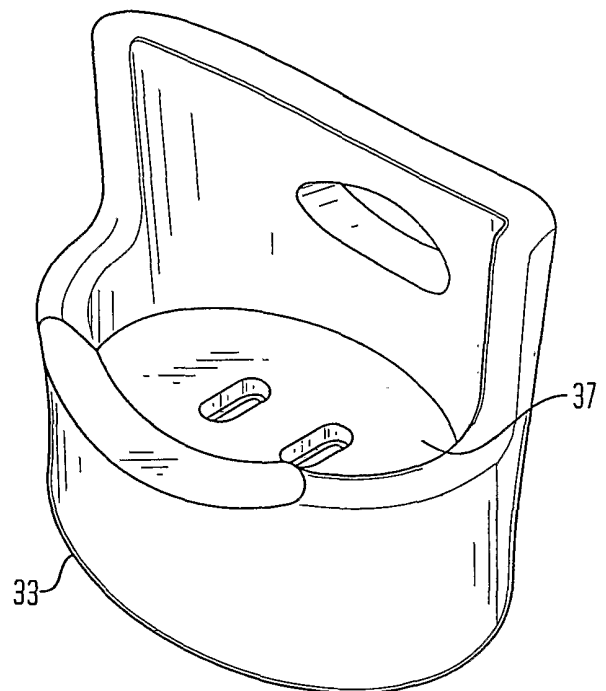
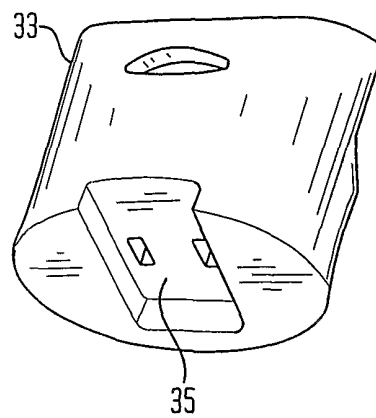


Fig.4C.



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Fig.5A.

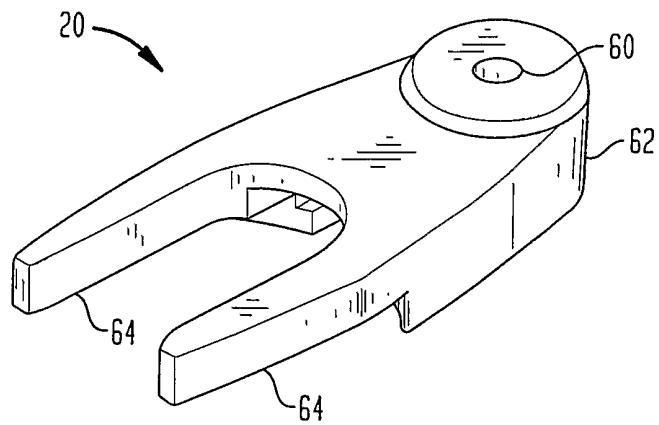


Fig.5B.

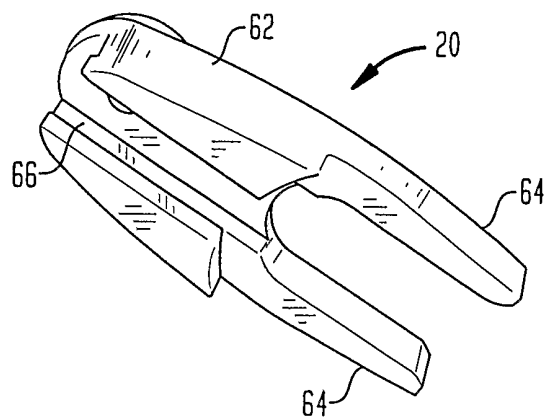


Fig.6A.

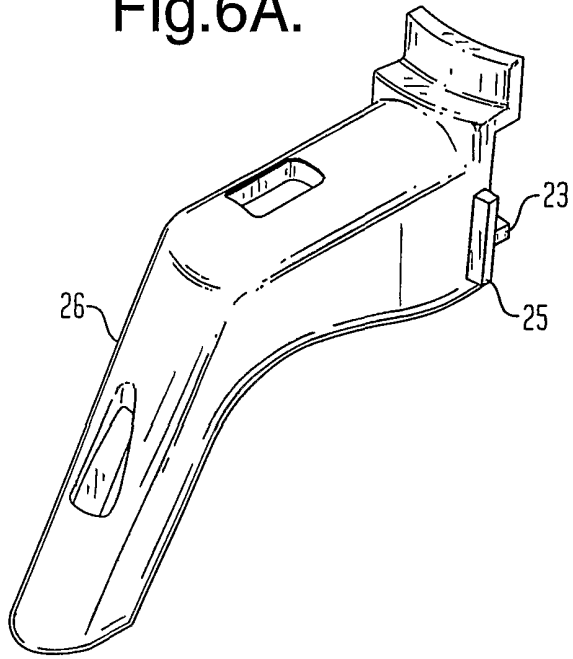


Fig.6B.

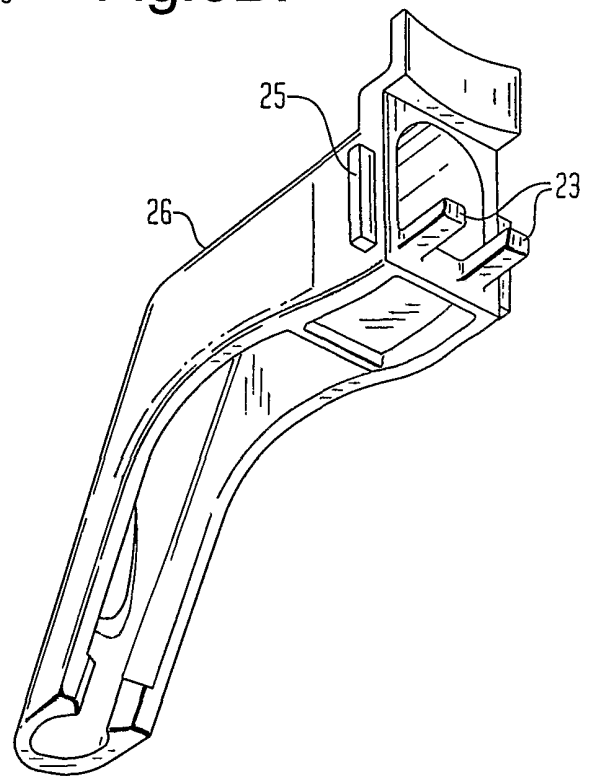


Fig.6C.

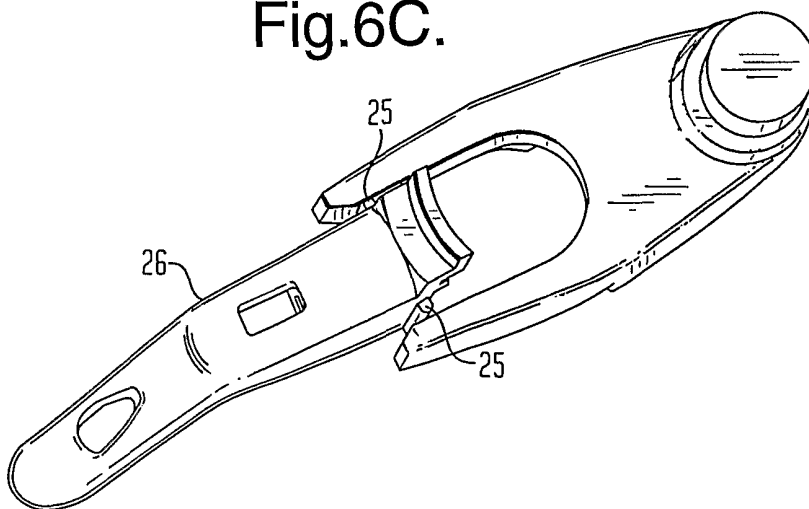


Fig.7A.

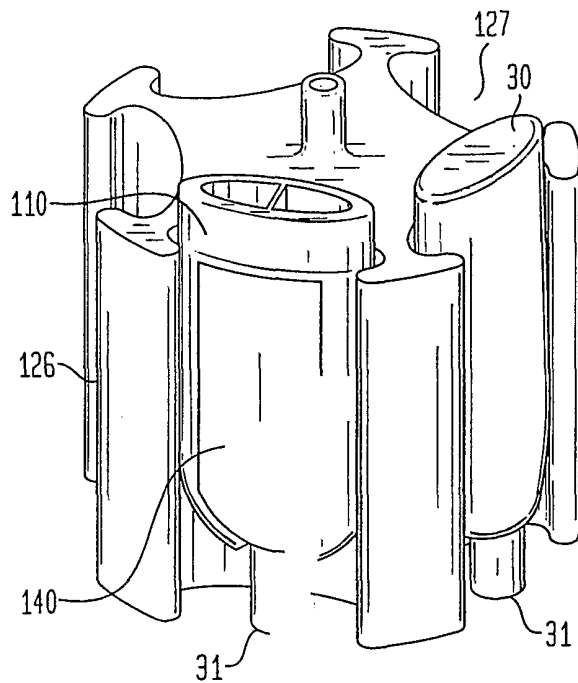


Fig.7B.

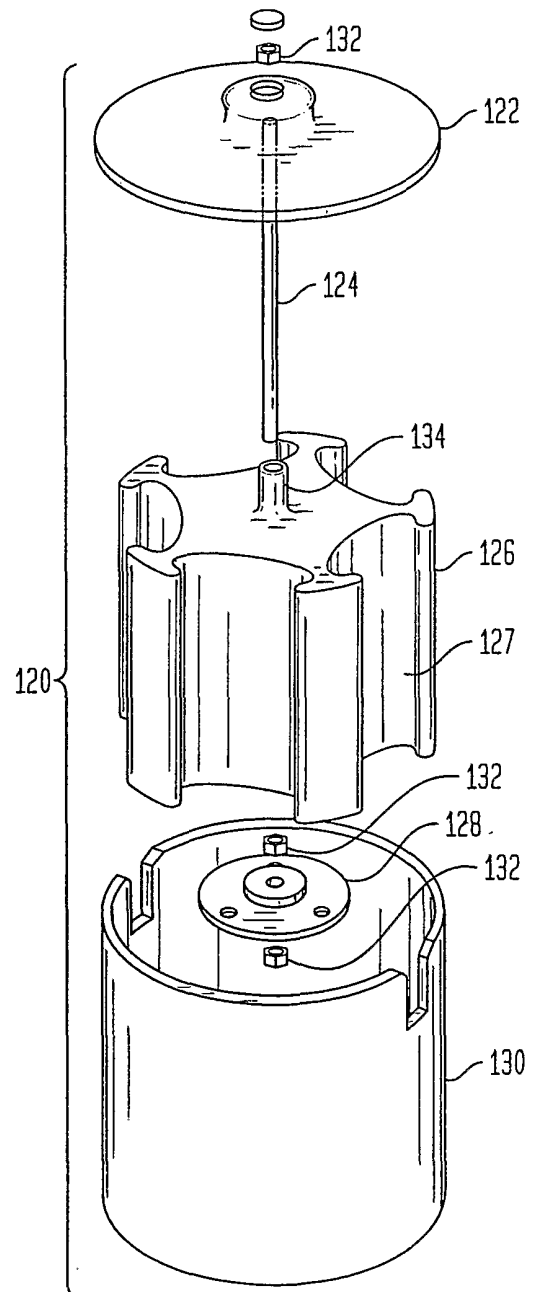


Fig.7C.

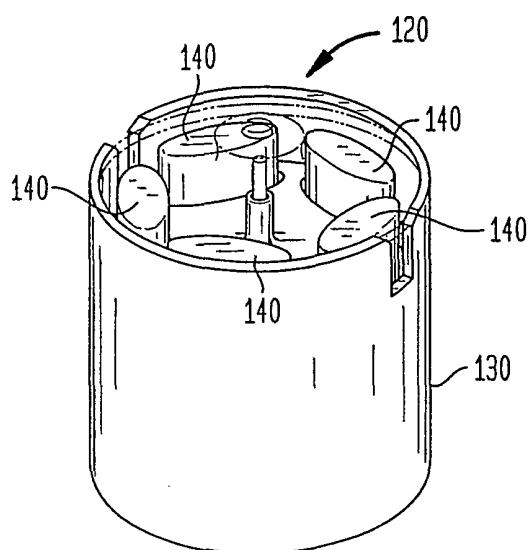
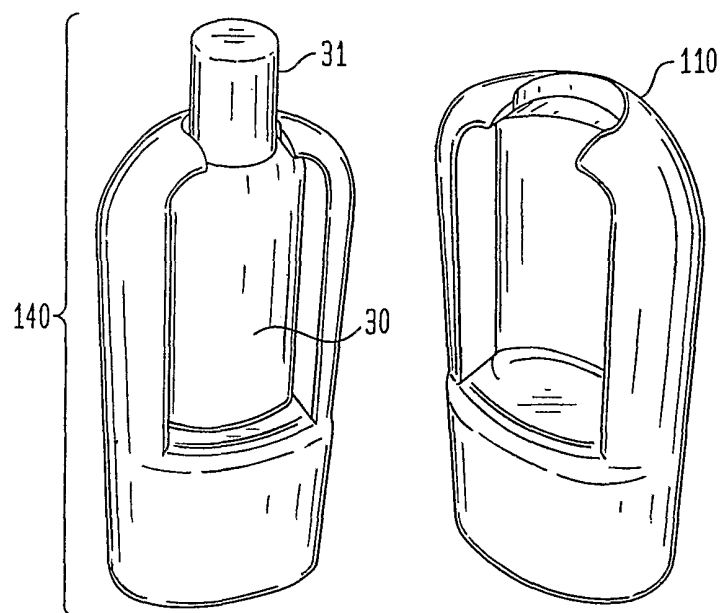


Fig.7D.



INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 01/07907

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B01F13/10 B44D3/00 B01F15/04 A45D19/02

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)
IPC 7 B01F B44D A45D

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)

WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	BE 626 531 A (ETABLISSEMENTS BOCQUILLION) 16 April 1963 (1963-04-16) claims; figures ---	2,3
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

12 December 2001

Date of mailing of the international search report

19/12/2001

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INTERNATIONAL SEARCH REPORT

Int'l Patent Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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