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(54) **An assembly for dispensing a product**

(57) An assembly for dispensing a product, comprising:
-at least one rigid aerosol container (1), having at least one reservoir (2) containing a propellant and a foodproduct, and an operable discharge valve (4) for discharging the foodproduct;
-a first manually operable discharge means (3), configured to cooperate with the discharge valve (4) to discharge the foodproduct;

wherein the aerosol container (1) is provided with a coupling member (10), configured to hold the manually operable discharge means (3)

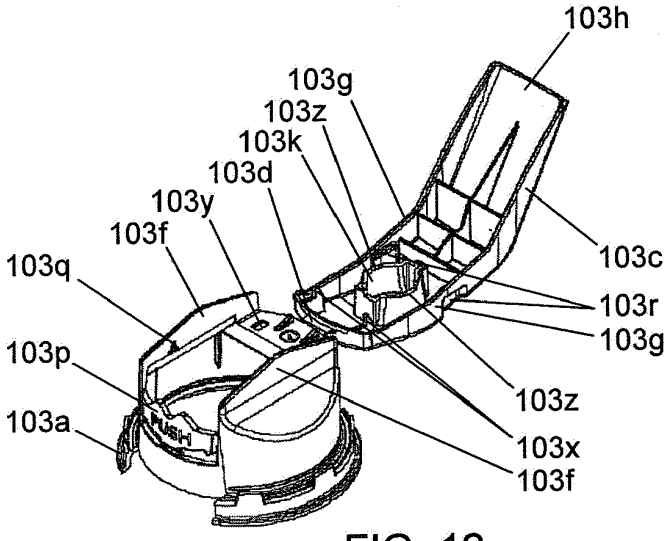

FIG. 12

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Description

[0001] The invention relates to an assembly for dispensing a product.

[0002] Aerosol containers as such are commonly known from the prior art. A container, containing a foodproduct, particularly cream, is currently marketed and sold by the applicant. The known container is lightweight, compact and designed to be disposed after being used-up. An example of the container, having an advantageous configuration, is disclosed in applicant's EP1916931A1.

[0003] The known container has manually operable discharge means, made of plastic. Particularly, during operation of the aerosol container, in case of operating the discharge means, cream is ejected via a distal dispensing head and undergoes a so called 'overrun', such that a 'spray cream' which resembles common whipped cream, is obtained. In the known device, the container comprises valve means and a small discharge nozzle. During activation, the nozzle sprays the cream into a foodproduct receiving space that is defined by the dispensing head, upon which the cream preferably expands to a desired degree and is agitated vigorously due to expanding propellant.

[0004] An object of the present invention is to improve the aerosol container. Particularly, the invention aims to provide a semi-professional, or even a professional, appearance of the container, wherein utilization of the container can be carried out in a straightforward manner, without leading to a considerable rise in the manufacturing costs. Moreover, it is desired that high hygiene standards are maintained, or even improved.

[0005] According to an embodiment, to this aim, there is provided an assembly that comprises:

- at least one rigid aerosol container, having at least one reservoir containing a propellant and a foodproduct, and an operable discharge valve for discharging the foodproduct;
- a manually operable discharge means, configured to cooperate with the discharge valve to discharge the foodproduct;

wherein the aerosol container is provided with a coupling member, configured to releasingly hold the manually operable discharge means, wherein the coupling member comprises an integral, removable covering to cover an external part of the discharge valve before the discharge means is coupled to the coupling member.

[0006] The aerosol container and discharge means can be sold separately. Also, the discharge means is preferably reusable, so that it can be used many times, to cooperate with a large number of aerosol containers. In this way, a discharge means providing a relatively professional appearance can be provided, and a large number of mass produced aerosol containers.

[0007] The reusable discharge means of the assembly can be a more expensive component compared to conventional operating parts of prior art foodproduct discharge means. However, since the discharge means can be used several times, the overall costs of its use can be relatively low, over time. Besides, the reusable discharge means can be at least partly made of one or more relatively expensive materials that has/have a relatively low susceptibility to contamination and bacterial growth, for example a material that can be cleansed repeatedly at a high temperature without damaging the respective part.

[0008] The coupling member can provide a reliable connection between the discharge means and the aerosol container. The removable covering of the coupling member can protect the external part of the aerosol valve before use, for example during transport, storage and delivery of the container. Thus, it can prevent that the valve is accidentally actuated. Also the covering can insure maintenance of hygienic conditions, particularly by preventing people to touch the external valve part. Besides, the removable covering can provide tamper evidence.

[0009] According to another aspect, which aspect can be part of or combined with the above-described aspect, there is provided an assembly for dispensing a product, the assembly comprising:

- at least one rigid aerosol container, having at least one reservoir containing a propellant and a foodproduct, and an operable discharge valve for discharging the foodproduct;
- a manually operable discharge means, configured to cooperate with the discharge valve to discharge the foodproduct;
- a removable cap to substantially cover the discharge means;.

  wherein the cap has an opening, wherein a manually operating member of the discharge means reaches through the opening, preferably such that the cap blocks movement of the operating member in at least one direction.

[0010] Before an initial use, the cap substantially covers the discharge means that are mounted on the aerosol container. One part of the discharge means, the operating member, reaches through an opening that is defined by the cap. As a result, a relatively compact assembly having a relatively long operating member and a relatively small cap can be obtained. In this case, the cap can substantially protect the discharge means before use, for example against contamination and/or physical damage. Moreover, in a preferred embodiment, the cap blocks a movement, for example a pivoting movement, of the discharge means with respect to the container.

[0011] Besides, according to an aspect, which aspect can be part of or combined with the above-described aspects, there is provided an assembly for dispensing a product, the assembly comprises::

- at least one rigid aerosol container, having at least one reservoir containing a propellant and a foodproduct, and an operable discharge valve for discharging the foodproduct;

wherein the aerosol container is provided with a coupling member, having a first connector section configured to releasingly connect to a first component, and a second connector section configured to releasingly connect to a second component.

[0012] For example, each of the connector sections can be provided with respective screw thread, to connect to respective components. According to an advantageous example, one of the connector sections (particularly one that is faced-away from the container) is provided with means to allow a bayonet connection thereto. For example, one of the components to be coupled to the container via the mounting member can be a cap. Also, the components can include one or ore types of dispensing means.

[0013] Further advantageous embodiments of the invention are described in the dependent claims. These and other aspects of the invention will be apparent from and elucidated with reference to non-limiting embodiments described hereafter, shown in the drawings.

Figure 1 depicts a side view of a first embodiment of an assembly, before removal of the cap and covering;
Figure 2 depicts the first embodiment, after mounting of the operable discharge means;
Figure 3 depicts a side view of the coupling member, and respective covering;
Figure 4A is a perspective top view of the coupling member and covering;
Figure 4B is a perspective bottom view of the coupling member and covering;
Figure 4C is a perspective top view of the mounting member of the discharge means;
Figure 4D is a perspective bottom view of the mounting member of the discharge means;
Figures 5A-5E are a top view, bottom view, side view, rear view, and perspective view, respectively, of the operable discharge means;
Figure 6 is similar to Fig. 5C, showing a second position of the dispensing head;
Figure 7 is a bottom view of the handle;
Figures 8A-8C show a side view, front view and a cross-section over line A-A, respectively, of the duct section;
Figure 9 is a perspective view of part of a second embodiment;
Figure 10 is similar to Fig. 9, after removal of the cap;
Figure 11 is a cross-section of the embodiment of Fig. 9;
Figure 12 is a cross-section of part of the second embodiment, with an opened lever after removal of the dispensing head;
Figure 13 is a side view of the dispensing head of the second embodiment;
Figure 14 is similar to Fig. 11, and depicts a third embodiment;
Figure 15 shows the third embodiment, with an opened lever;
Figure 16 shows cross-section of a first part of a fourth embodiment;
Figure 17 shows a side view, of a second part of the fourth embodiment;
Figure 18 depicts a cross-section of part of a fifth embodiment;
Figures 19A, 19B, 19C show a perspective view, side view and top view of a coupling member of the fifth embodiment;
Figure 20 is a cross-section of the cap of the fifth embodiment;
Figures 21-23 depict a side view, bottom view and a detail Q of the operable discharge means of the fifth embodiment, joined with the coupling member;
Figures 24, 25 are a perspective view and cross-section of the operable discharge means of the fifth embodiment; and
Figures 26A, 26B show two alternative dispensing head examples, in perspective view.

[0014] Similar or corresponding features are denoted by similar or corresponding reference signs in this application.

[0015] Figures 1-25 show embodiments of assemblies, each assembly including one or more rigid aerosol containers 1 (one shown), to discharge (and shape/model) a foodproduct. The rigid container 1 can be made of various materials, for example a rigid plastic, a metal, or an alloy.

[0016] Each container 1 has a reservoir 2 containing a propellant and a foodproduct, and an operable discharge valve 4 for discharging the foodproduct. The cross-sections of Figures 11, 18 show examples of the container valve 4 (in this case being located in an upper section of the container).

[0017] The present container 1 is configured to be used upside down, and therefore does not comprise a dip-tube dispensing mechanism. As an example, the container can be provided with operable valve means, comprising a downwardly (i.e. towards a container bottom) depressible foodproduct ejection nozzle 4 and spring means to counteract the depressing of the nozzle, such as in a currently marketed spray foodproduct aerosol container, as will be appreciated by the skilled person. For example, depressing of the foodproduct ejection nozzle 4 leads to opening of the valve means so that foodproduct and part of the propellant can be ejected towards the dispensing head, to be dispensed thereby. Mentioned spring means can urge the valve to a closed position (such position is shown in Fig. 18).

[0018] Each container 1 is compact (for example with an overall volume less than 1 l), of a lightweight construc-

tion. Also for example, initially, a packed container 1, comprising the foodproduct, can weigh less than 1 kg, such as about 750 or 250 g. According to an embodiment, the container as such is made of tinplate or aluminium, coated on the inside, and has a substantially cylindrical shape. As follows from the above, the container can also be made of a different material, for example a rigid plastic. Also, the present aerosol container 1 is of a non-refillable type, to be discarded after being used up. The present container 1 is of a relatively inexpensive, durable construction, having few components. Generally, an upper end of the container may include a circumferential flange 18 (see figures 11, 18).

[0019] The container 1 comprises at least one reservoir 2 containing the foodproduct, the foodproduct being safe for consumption, and a suitable propellant. As a non limiting example, the aerosol container can be packed with foodproduct and propellant, the initial pressure in the container being for example in the range of 7-18 atmospheres, depending on the amount of packed foodproduct, as will be appreciated by the skilled person. The propellant can consist of one or more gasses acceptable from the viewpoint of food technology, for example a gas which substantially dissolves in the foodproduct, a gas which substantially does not dissolve in the foodproduct and a combination of these gasses. Particularly, the propellant can comprise CO2, nitrogen (N2), laughing gas (N2O) or a combination of these gasses (such as nitrogen and laughing gas). For example, 15-25 w% (weight%) of the propellant can be N2 and the remainder of the propellant (i.e. 85-75 w%) can be N2O.

[0020] At least part of the propellant can be packed separately from the foodproduct, for example in the case that the container is provided with separate reservoirs, for example with a movable or flexible partition to provide such separation (such as in European patent application EP 1 061 006 A1). For example, the container can include a first reservoir containing the product, and a second reservoir containing the propellant (separate from the product)

[0021] In another embodiment, the propellant and foodproduct are packed together, in the same reservoir, in the aerosol container (for example in case the container is provided with a single reservoir).

[0022] In a particular embodiment, the foodproduct comprises cream. In that case, as will be appreciated by the skilled person, a "spray cream" that is obtained from use of the present aerosol container 1 generally differs from conventional whipping cream (obtained from manually or automatically whipping common cream without using a cream propellant) to a high degree. Also, in the case the foodproduct comprises cream as an ingredient, the foodproduct can comprise various other ingredients, for example sugar, emulsifier, stabiliser, aroma. Preferably, the cream has a fat content in the range of about 5%-50%, for example about 40%. Another cream composition can include a fat milk constituent (particularly cream, or common cream) and a non-fat milk constituent (for example skimmed milk), see EP 1 061 006 A1. Generally, a cream foodproduct can comprise at least 80 w% of one or more milk constituents, and preferably at least circa 90 w%.

[0023] Referring to the drawings, each assembly is also provided with operable discharge means 3, 103, 203, 303, 403 to discharge the foodproduct from the reservoir 2. In certain embodiments, the discharge means are firmly, undetachably, attached to the container 1. In other preferred embodiments, the discharge means are detachably connected to the container 1.

First embodiment

[0024] Figures 1-8 depict a first embodiment of an assembly 1, 3, 8 for dispensing a product. The first embodiment includes an afore-mentioned container 1, and a first manually operable discharge means 3, configured to cooperate with the discharge valve 4 of the container to discharge the foodproduct. Also, the first embodiment preferably comprises a cap 8.

[0025] Fig. 1 depicts the first embodiment, wherein the cap 8 is joined with the container. In the example, the cap is made of a transparent material, for example a transparent plastic. Fig. 2 shows the embodiment after the cap 8 has been removed from the container 1, and after the discharge means 3 has been joined with the container 1.

[0026] Advantageously, the aerosol container 1 is provided with a dedicated coupling member 10, configured to releasingly hold the manually operable discharge means 3. The coupling member 10 is shown in more detail in Figures 3-4. According to a preferred example, the coupling member 10 is made of a different material than the material of the container. In the present embodiment, the coupling member 10 is made of plastic, for example (i.e. not limited to) polypropylene.

[0027] In this embodiment, the coupling member 10 as such has been made in a separate process (for example in a suitable plastic component manufacturing process, for example injection moulding) with respect to a container manufacturing process, and is therefore not made in one piece with the container 1. In this way, both the container and the coupling member can be manufactured in an efficient manner. For example, the container 1 as such is manufactured by a standard aerosol container manufacturing process. The coupling member 10 as such can be mass-produced, leading to a low cost-price thereof. Joining the coupling member 10 and the container 1 is preferably carried out after the container 1 has been filled with product (for example after the valve 4 has been mounted to the container 1).

[0028] The coupling member 10 defines an interior space that receives an upper section of the container 1 (as well as a distal part of the valve 4 that protrudes from the container 1). In the example, the coupling member 10 is integrally, preferably in a rotational fixed manner (i.e. with respect to a centre line of the container 10), and

preferably concentrically, connected to an upper end of the container 1.

[0029] For example, the coupling member 10 and the container flange 18 can firmly hold each other using a clamping force, and optionally using adhesive. In a further embodiment, the coupling member 10 can be made of a resilient material, which material provides a clamping force to firmly grip the container after assembly. Optionally, the coupling member 10 and the container 1 are provided with one or more blocking members and/or with a friction enhancing surface, interacting with each other to block turning/rotation of the coupling member 10 with respect to the container 1.

[0030] As follows from Figures 3-4, the present coupling member may include a (in the example substantially ring-shaped) lower section 11, which connects to the container flange 18 (and encloses that flange) after assembly. The present lower section 11 of the coupling member 10 is provided with a first circumferential rim 11a and a second circumferential rim 11b, the rims 11a, 11b being spaced-apart from each other. One or both of these rims 11a, 11b and a lower edge of the cap 8 may be configured to cooperate with each other, to removable connect the cap 8 via the coupling member 10 to the container 1. For example, the lower edge of the cap 8 may be provided with an internal rim, or internal cams, configured to releasably grasp one of the rims 11a, 11b of the coupling member 10. In yet a further embodiment, the coupling member 10 may comprise a breakable or tearable connection, to releasably hold the cap. For example, a connection between the cap 8 and coupling member 10 can include a breakable member that breaks when the cap is 8 removed for the first time from the coupling member 10, for example to provide a tamper evident connection. In a further embodiment, the breakable of tearable connection can be manufactured by a thermal process, for example by applying heat (to the cap and/or coupling member) to locally melt the cap to the coupling member, by ultrasonic welding, or differently.

[0031] The present coupling member also includes an (in the example substantially ring-shaped) upper section 12. A circumferential, cylindrical, surface (of the present upper section 12) of the coupling member 10 is provided with an outer screw thread 12a. Advantageously, a diameter of the upper section 12 is smaller than a diameter of the lower section 11. In the example, the lower section 11 of the coupling member 10 includes a top wall section 13, extending inwardly to join a lower end of the upper section 12.

[0032] As follows from Figures 4A-4B, the coupling member 10 comprises an integral, removable covering 10a. The present covering 10a is a flat, disc shaped part of the coupling member 10, and is held by an upper edge of the upper section 12. Particularly, the coupling member 10 comprises a breakable or tearable connection 14, to releasably hold its covering 10a. Also, the present covering 10a is integrally provided with an operating member 10b, in this case an upstanding, preferably ring-shaped, operating member 10b. When the coupling member 10 has been joined with the container 1, and before removal of the covering 10a, the coupling member can cover an external part of the discharge valve 4. In this way, the coupling member 10 can shield the discharge valve 4 from an environment, even after removal of the cap 8, for example during transport and storage, before a first use of the container 1.

[0033] When the discharge means 3 is to be coupled to the coupling member 10 (after removal of the cap 8), the covering 10a can be removed to provide access to the discharge valve 4. In the present embodiment, the operating member 10b can be pulled, to tear the covering 10a from a remaining part of the coupling member 10.

[0034] Figures 4C, 4D, 5, 6 show a preferred embodiment of the manually operable discharge means (i.e. discharge mechanism) 3. It includes a mounting member (i.e. a main part) 3a, configured to be held by the coupling member 10, and a lever 3c that is pivotally connected to the mounting member 3a, via a pivot axis 3d that is located at or near a front side of the mounting member 3a. The lever 3c is an actuating member, configured to be manually moved for operating the discharge valve 4 when the discharge means 3 is held by the coupling member 10.

[0035] Besides, the present discharge means 3 comprises a distal product dispensing head 5, and a duct section 6 (depicted in Figures 8A-8C) to connect the dispensing head to a distal part of the container valve 4 after mounting, such, that product can flow from the valve via a channel access 6e of the duct section 6, a subsequent channel 6d and respective outflow openings 6f (see Fig. 8C) into the dispensing head 5.

[0036] Particularly, the mounting member 3a defines an interior space for receiving the coupling member 10, the interior space being accessible at a lower end of the mounting member 3a, and having internal screw thread 3b to detachably connect to the external thread 12a of the coupling member 10.

[0037] According to a preferred embodiment, the mounting member 3a of the operable discharge means 3 is made of a durable, rigid material, for example a metal, an alloy, steel, a rigid plastic, for example a fibre reinforced plastic. In this way, the operable discharge means 3 can provide a professional, sturdy and sleek appearance to the assembly.

[0038] For example, the lever 3c can be made of a durable, rigid material, for example a metal, an alloy, steel, or a plastic, for example fibre reinforced plastic. In a further embodiment, the lever 3c is made of the same material as the mounting member 3a.

[0039] As follows from Fig. 2, the mounting member 3a of the discharge means 3 covers the coupling member 10 when the mounting member 3a has been mounted thereon (i.e. when the coupling member 10 is held in the interior space defined by the mounting member 3a). Thus, the coupling member 10 can be enclosed between the container 1 and discharge means 3, for example to

be kept substantially out of sight. Particularly, the mounting member 3a can be dimensioned such, that a lower edge 3e abuts an external surface of the container reservoir 2, after mounting. Alternatively, the mounting member 3a can be dimensioned such, that a lower edge 3e abuts a rim 11b of the mounting member 11, after mounting.

[0040] Optionally, the coupling member 10 can act as a sealing means between the discharge means 3 and the upper section of the container 1. For example, to this aim, the coupling member 10 can be made of a plastic material having a certain resiliency. Such plastic material can also act to clamp the mounting member 3a of the discharge means to the coupling member 10, when they have been screwed together.

[0041] In the example, the mounting member 3a of the discharge means and the lever 3c are configured to cooperate, to guide the lever 3c along the mounting member 3a during operation. The mounting member 3a is provided with a top part, having an upstanding wall section 3f. In the example, the mounting member 3a (particularly the upstanding wall section 3f) is provided with a central aperture 3j (see Fig. 4c). Also, the interior of the mounting member 3a is provided with a cylindrical wall 3k (see Fig. 4D), that is spaced-apart from an outer circumferential wall of the mounting member 3a, the wall 3k enclosing an interior that is accessible from the central aperture 3j. In this example, after assembly, a distal part of the valve 4, which part protrudes from the container 1, reaches into the interior of the internal cylindrical wall 3k and connects there to the channel access 6e of the duct section 6.

[0042] The lever 3c comprises an upper section having two spaced-apart side walls 3g (having a substantially triangular shape, in the example), reaching along the upstanding wall section 3f when the lever is in an operating position. For example, the upstanding wall section 3f can guide the lever between an idle position and valve operating position, for example preventing a certain lateral movement of the lever 3c when respective side walls 3g extend there-along. When the lever is in its idle position, and after assembly of the discharge means 3 to the container 1 (via the coupling member 10), the valve 4 of the container is left in a respective idle, closed, position (thus preventing product discharge).

[0043] A lateral end of the upstanding wall section 3f pivotally holds the lever 3c at an end (via the pivot axis 3d). The top lever part 3g reaches (from the pivot axis 3d) over the mounting member, to an elongated lever leg part 3h. The lever manually operable leg part 3h extends at an angle downwardly from the top lever part 3g, along (and spaced-apart from) a back side of the mounting member 3a, to an area that lies below the lower end 3e of the mounting member. In the example, a longitudinal length of the leg part 3h is significantly larger than (for example at least two times as large as) an axial height of the outer circumferential wall of the mounting member. In a non-limiting example, the length of the leg part 3h is at least 5 cm, or longer, for example about 8 cm.

[0044] Figures 2, 5C shows the lever 3c the first, idle position. From this position, the lever 3c can be pressed towards the mounting member 3a, to a second position (such that the lever 3c pivots with respect to pivot axis 3d), to operate the container valve 4 (i.e., to axially move a valve part 4 from a valve closing position to a valve opening position, allowing product discharge) after mounting.

[0045] The upper section of the lever 3c is provided with a central opening 3i (see Fig. 7), being enclosed between lateral wall sections protruding towards each other from the side walls 3g. Part of the duct section 6 extends through the opening 3i (i.e. therefore being part of a duct channel passage), and cooperates with the upper lever section (having side walls 3g), to hold the dispensing head 5.

[0046] The dispensing head 5 defines a foodproduct receiving space to receive the foodproduct from one or more outflow openings 6f (two lateral outflow openings 6f are shown in Fig. 8B) of the duct section 6. A (downstream) distal part of the food product shaping dispensing head 5 has foodproduct shaping projections 5a.

[0047] In the present example, advantageously, the dispensing head 5 is removable from the other components 3a, 3c, 6 of the discharge means. For example, the present (first) dispensing head 5 can be replaced by a second dispensing head, such as a different type of dispensing head for example having a different shape, different dimensions, and/or different or no food product shaping projections with respect to the first dispensing head 5, to provide a different shaping of the product.

[0048] The present duct section 6 is made of a rigid material, for example a rigid plastic, a metal, an alloy, for example steel. As follows from Figures 8A, 8B, 8C, the duct section has a feeding channel 6d, extending through a straight proximal part 6b and a straight distal part 6a. The proximal part 6b (releasingly) connects to the external valve part (to receive product therefrom) via a channel access 6e after mounting (when the mounting member 3a of the operable discharge means 3 are held by the coupling member 10, with the duct section 6 being appropriately positioned in the mounting member 3a and the lever 3c). The distal part 6a connects to the dispensing head 5 (to feed product to the head), after assembly.

[0049] Particularly, the present dispensing head 5 and duct section 6 are releasingly connected, in this case by a screw thread connection. To this aim, a distal part 6a of the duct section is provided with screw thread 6g, the dispensing head 5 being configured to be screwed on the thread 6g.The present duct section 6 is providing with a blocking part 6i, protruding laterally from the distal part 6a, to define an operating position of the dispensing head 5.

[0050] Alternatively, dispensing head 5 can be releasingly connected to the duct section 6 by a clicking connection, clamping connection, or in a different manner. When assembled, the distal part 6a of the duct section 6 protrudes into the foodproduct receiving space of the

dispensing head 5 to supply the foodproduct thereto.

[0051] In the example, an outer upper surface of the lever 3c has been provided with an optional depression (see fig. 5E) that abuts the central opening 3i of the lever, such, that a bottom part of the dispensing head 5 can protrude (slightly) into the upper lever part -viewed in side view- (see Fig. 5C). Also, the present duct section 6 is arranged to hold the dispensing head spaced-apart from an external surface of the lever 3c, when the lever is in its idle position (see Figure 5E). In this way, the lever can be moved between the idle and operating positions, without the dispensing head 5 counteracting such movement by direct contact with the lever 3c.

[0052] After assembly of discharge means 3, 5, 6, the duct section 6 is supported by the external part 4 of the container's discharge valve (at the channel access 6e of its proximal section 6b). The duct section 6 is provided with lever supporting parts 6c, in the example consisting of two laterally extending, aligned, cam parts 6c located at or near the intersection of the distal and proximal parts 6a, 6b. The cam parts 6c interact with the lever 3c, particularly with the upper lateral wall sections; the lateral wall sections have respective internal concave sections 3m that are supported by the cam parts 6c, thereby positioning the duct section 6 and lever 3c with respect to each other. Thus, a pivoting movement of the lever 3c from its idle to its operating position leads to a respective axial movement of the rigid duct channel 6, leading to axial movement of the valve part 4 in a direction towards the container 1 (and a respective opening the valve). Preferably, movement of the lever 3c in opposite direction (from its operating to its idle position) is achieved by spring means, for example, by a spring force of the valve 4 of the container 1, transferred leading to axial movement of the duct channel 6 away from the container 1.

[0053] As follows from Figures 5A, 5D, 5E, 7, 8A-8C, the lever supporting parts 6c of the duct section 6 preferably have smooth convex, rounded, lever supporting surfaces. During operation, smooth concave sections 3m of the lever 3c can pivot about these external surfaces of the lever supporting parts 6c, with relatively low friction. Also, preferably, centre lines of the (in the example cylinder shaped) lever supporting parts 6c coincide with a longitudinal central plane of the proximal duct section part 6b (see Fig. 8A)

[0054] Besides, in the present example, centre lines of the proximal and distal part of the duct section 6 include an angle smaller than 180° with one another, for example an angle in the range of 90° - 170° (for example a range of 130° - 160°, see Figures 8A, 8C).

[0055] Moreover, as follows from Fig. 5E, the lever 3c and the duct section 6 are configured so that the lever supporting parts 6c of the duct section 6 are spaced-apart from the mounting part 3a of the discharge means. Thus, the lever supporting parts 6c of the duct section 6 can move to and from the mounting part 3a during foodproduct discharging and subsequent releasing operations of the lever 3.

[0056] In the example, the duct section 6 is removable from the mounting member 3a and lever 3c, after the dispensing head has been separated from the duct section 6. Moreover, a locking system is provided, to lock the duct section in a duct channel passage (i.e., to block separation of the duct section 6 from the mounting member 3a and lever 3c), and to lock the lever 3c in place (thereby preventing that the lever swings to an opened position). The locking system holds the lever 3c, duct section 6 and mounting member 3a together, at least in a respective idle position.

[0057] Optionally, as in the example, the dispensing head 5 can be part of such a locking system. In the example, the dispensing head 5 -mounted to the duct section- provides a locking of the lever 3c, particularly, preventing the lever 3c to pivot from its idle position over a large angle (of more than 45^0) to an opened position (away from the mounting member 3a). Due to the separation between the dispensing head 5 and the lever 3c (when the lever is in its idle position), a small amount of swinging freedom of the lever from its depicted idle position away from the mounting part 3a (to a position wherein the lever contacts the dispensing head, and is spaced-apart from the lever supporting parts 6c) may be available.

[0058] As part of the locking system, particularly, the bottom part of the dispensing head 5 (when mounted to the duct section 6) can prevent rotation of the duct section 6 with respect to the mounting member 3a and lever 3c via cooperation with the upper lever section (see Fig. 5C, 5E, 6).

[0059] Also, part of the locking system is achieved by cooperation between the proximal part 6b of the duct section 6 and the mounting member 3a. In the present example, the duct section 6 is provided with a laterally protruding locking cam 6h (at the proximal end 6e) that is positioned below an inwardly protruding locking part 3n (for example a flange) of the mounting member 3a after assembly (see Fig. 5B). The locking part 3n of the mounting member 3a prevents passage of the duct section's locking cam 6h in axial direction upwardly (away from the container 1), in case the duct section 6 is in a rotational operating position, holding the dispensing head 5 (as in Figures 5C and 6). The locking system can also prevent swinging of the lever from the idle position to an opened position (i.e. in a direction away from the mounting member 3a).

[0060] After the dispensing head 5 has been removed from the duct section 6, the lever 3c can be pivoted upwardly (away from the mounting member 3a). Also, in that condition, the duct section 6 can be rotated such that its locking cam 6h is released from the locking part 3n of the mounting member; in the example, this is achieved by rotating the duct section over 90^0 (the rotation being carried out around the centre line of the proximal duct section part 6b). Subsequently, the duct section 6 can be removed from the mounting member 3a and lever 3c. Assembly of duct section 6, lever 3c and dispensing head

5 to the mounting member 3a can be achieved by carrying out the above-described procedure in reverse order.

[0061] Thus, the manually operable discharge means can be disassembled in a relatively straightforward manner, for example to have the different components being cleansed thoroughly (optionally by a dishwashing apparatus).

[0062] Besides, in the present example, the dispensing head 5 can have different orientations with respect to the lever 3c, when the head 5 is mounted for dispensing (and shaping) product. A first head position is shown in Figures 5A-5E, whilst a second head position is shown in Fig. 6. In the example, the first and second head position are mirror symmetrical with respect to one another. Particularly, to this aim, the rotational orientation of the duct section with respect to the duct channel passage (i.e. with respect to the mounting member 3a and lever 3c) is adjustable, over an angle of 180°.

[0063] Figures 5A-5E show a first position of the duct section 6, wherein the distal part 6a reaches forwardly (i.e. towards an area extending in front of the discharge means, at the side of the hinge axis 3d), aiming the discharge head 5 in the same direction.

[0064] Figure 6 show an opposite second position of the duct section 6, wherein the distal part 6a reaches backwardly (i.e. towards an area extending at the back of the discharge means, at the side of the lever arm 3h), aiming the discharge head 5 in the same direction. Selecting the position of the duct section 6 (and the respective orientation of the dispensing head) can be carried out, in this embodiment, during the mounting of the duct section 6.

[0065] As follows from the drawing, the present lever 3c is dimensioned to allow placing the dispensing head 5 in the respective different orientations. This can be achieved in various ways, as will be appreciated by the skilled person. For example, to this aim, the lever (for example its optional depression, see fig. 5E) can be shaped such, that the bottom part of the dispensing head 5 can protrude (slightly) into the upper lever part (see Figures 5C, 6) -viewed in side view-, in case the head 5 is in each of the (two) respective positions with respect to the lever. Also, the dispensing head can be spaced-apart from the external surface of the lever 3c, in each of the head's orientations, when the lever is in its idle position.

[0066] In an alternative embodiment, not shown, the removable duct section can include one or more curved duct parts. Besides, in an alternative embodiment, the removable duct section can be made partly or totally of an elastic material. Besides, in yet another further embodiment, the removable duct section can be fixed to the discharge head 5, to be jointly coupled (at the same time) to the mounting part 3a and lever 3c of the dispensing means. Moreover, in an alternative embodiment, the proximal part and distal part of the duct section extend in line with one another. For example, according to an embodiment, the discharge head can have only one orientation with respect to the lever (for example a position that is substantially concentric with a centre line of the container 1), when the lever is in its idle position.

Second embodiment

[0067] Figures 9-13 depict a second embodiment according to an aspect of the invention.

[0068] The depicted second embodiment differs from the first embodiment, described above, in that the assembly does not comprise a dedicated coupling member, configured to releasingly hold the manually operable discharge means, the coupling member comprising an integral, removable covering to cover an external part of the discharge valve before the discharge means is coupled to the coupling member. Particularly, in the depicted second embodiment, the manually operable discharge means 103 are directly coupled to the container 1 (particularly to its flange 18).

[0069] However, alternatively, the second embodiment may be provided with such a the coupling member, having said an integral, removable covering (to cover an external part of the discharge valve before the discharge means 4 is coupled to the coupling member).

[0070] Particularly, as follows from Figures 9-10, the present second embodiment is an assembly for dispensing a product, the assembly comprising at least one rigid aerosol container 1, having at least one reservoir 2 containing a propellant and a foodproduct (whether or not together), and an operable discharge valve 4 for discharging the foodproduct.

[0071] The assembly is also provided with a manually operable discharge means 103, configured to cooperate with the discharge valve 4 to discharge the foodproduct. Besides, the assembly includes a removable cap 108 to substantially cover the discharge means 103.

[0072] In the example, the manually operable discharge means 103 integrally comprises a coupling member 103a, which member 103a is integrally, concentrically, connected to an upper end of the container 1. For example, the coupling member 103a and the container flange 18 can firmly hold each other using a clamping force or clicking force.

[0073] The present example also includes a circumferential sleeve 119, enclosing the lower section of the coupling member 103a. The sleeve 119 abuts a lower edge of the cap 108. The sleeve 119 has a substantially truncated conical shape, and has a lower edge abutting the external surface of the container 1. In the present example, the sleeve 119 and the coupling member 103a of the discharge means 103 cooperate (for example via joints, integral blocking members, interlocking cams, notches and the-like) to prevent removal of the sleeve 119 (from the container 1). For example, the coupling member 103a and sleeve 119 can be firmly connected to each other, such as via a plurality of interconnecting sections, for example via ultrasonic welding.

[0074] The cap 108 is detachably coupled to the oper-

able discharge means 103, for example to the sleeve 119. Figures 9, 11 show the cap 108 when it is mounted, and Fig. 10 shows part of the assembly after removal of the cap 108. The detachable coupling of the cap 108 can be achieved, for example to the coupling member 103a thereof, or via the sleeve 119 (that is coupled to the coupling member 103a and container 1). In yet a further embodiment, the coupling member 103a, the sleeve 119, or both, may comprise a breakable or tearable connection, to releasably hold an edge of the cap 108. For example, a connection between the cap 108 and coupling member 103a and/or sleeve 119 can include a breakable member (for example one, or a plurality of breaking members) that breaks when the cap is 108 removed for the first time, for example to provide a tamper evident connection. As is mentioned before, for example, such a breakable of tearable connection can be manufactured by a thermal process, for example by applying heat to locally melt material, by ultrasonic welding, or differently.

[0075] The discharge means 103 of the second embodiment is provided with a dispensing head 105 and a lever 103c.

[0076] The lever 103c is pivotally connected to an upper section of the mounting member 103a, via a hinge 103d that is located at or near a front side of the mounting member 103a. Particularly, the lever 103c comprises an upper part having two spaced-apart side walls 103g. The upper part 103g reaches (from the pivot axis 103d) in a radial direction (with respect to a container's centre line) to an opposite side of the mounting member, to an integral elongated lever leg part 103h. The leg part 103h extends at an angle downwardly from the top lever part 103g, along (and spaced-apart from) a back side of the mounting member 103a, for example to an area that lies below the lower end of the mounting member 103a (see Fig. 11). In the example, a longitudinal length of the leg part 103h is larger than an axial height of the outer circumferential wall of the mounting member 103a. In a non-limiting example, the length of the leg part 103h is at least 2 cm, or longer.

[0077] Advantageously, hinge 103d is an integral component of both the lever 103c and the mounting member 103a. For example, the hinge 103d can be a film hinge 103d, made of plastic. The hinge 103d can be manufactured in one piece with one or both of the lever 103c and the mounting member 103a, for example in an injection moulding process. As follows from Figures 11-12, the hinge may be configured to allow the lever 103c to pivot (after removal of the cap 108) from an idle position to an opened position (away from the mounting member 103a) over a relatively large angle, for example an angle of 90^0 or more, particularly an angle of 180^0 or more.

[0078] When the lever 103c is in said opened position, inner parts of the dispensing means (for example the lever 103c and mounting member 103a) can be exposed, for example to be checked for contamination, and to thoroughly cleansed if required.

[0079] In the present example, the mounting member 103a of the discharge means and the lever 103c are configured to cooperate, to guide the lever 103c along the mounting member 103a during operation. The present mounting member 103a is provided with a top part, having spaced-apart upstanding walls 103f (see Fig. 12), enclosing a central aperture. Particularly, the upper section of the lever 103c comprises the two spaced-apart side walls 103g, which reach along the upstanding wall section 103f when the lever is in an operating position. In this case, the upper section of the lever extends between the two spaced-apart side walls 103g of the mounting member 103a. For example, the upstanding wall section 103f can guide the lever between an idle position and a respective valve operating position, preventing a certain lateral movement of the lever 103c when respective side walls 103g extend there-along.

[0080] Moreover, the lever 103c and mounting member 103a include further positioning parts (in this case located near the hinge 103d), to position the lever in a respective idle position. The present positioning parts are hook members 103x (of the lever) and respective hook receivers 103y (being hook receiving apertures of the mounting member 103a), which cooperate when the lever 103c is in its idle position, for positioning the lever. The hook members 103x extend in parallel, and in parallel with respect to the container's centre line, and protrude into the hook receivers 103y, when the lever is in its idle position. Besides, the positioning parts 103x, 103y cooperate when the lever is pressed from the idle position towards the container 1 (to a product discharge position), to guide the rotation of the lever, and to take away or reduce lateral forces that are applied onto the hinge 103d. Besides, the hook members 103x and respective receivers 103y can cooperate to position the dispensing head 105 onto the container's valve 4, when closing of the lever.

[0081] Also, the lever 103c and mounting member 103a cooperate to counteract pivoting of the lever 103c to an opened position. For example, a blocking system 103q, 103r can be provided, configured to prevent opening of the lever 103c, unless a predetermined opening force is applied thereto. In the example, the blocking system is provided by opposite hook members 103q (of the mounting member), releasingly interlocking with opposite parts 103r (for example suitable blocking members of the lever) when the lever 103c is in its idle position. The skilled person will appreciate that this blocking system can also be configured differently.

[0082] Particularly, Figures 10, 11 shows the lever 103c the first, idle position. From this position, the lever 103c can be pressed towards the mounting member 103a, to a second position, to move the dispensing head downwardly (towards the container) to operate the container valve 4 (i.e., to axially move a valve part 4 from a valve closing position to a valve opening position, allowing product discharge).

[0083] The dispensing head 105 defines a foodproduct receiving space. A (downstream) distal part of the food

product shaping dispensing head 105 has foodproduct shaping projections 105a. After assembly, a distal part of the valve 4, which part protrudes from the container 1, reaches towards the dispensing head 105 and connects to an access 105b thereof (see Fig. 11). In this case, the dispensing head 105 (when in an operational position) extends substantially concentric with respect to a centre line of the container 1 (and valve 4).

[0084] In the present a generally mushroom shaped dispensing head 105 is provided, so that improved foodproduct shaping can be achieved, as is described in applicant's EP1916931A1 incorporated herein by reference in its entirety by reference. The dispensing head can also be shaped and dimensioned differently, see figures 26A and 26B show alternative examples of dispensing heads 105', 105". The first alternative example 105' (of Fig. 26A) has an elongated foodproduct receiving space (that is longer than the foodproduct receiving space of the example shown in Figures 10, 11, 13), having a number of foodproduct shaping projections at a distal part. The alternative head 105" shown in Fig. 26B is not provided with foodproduct receiving space, and includes a cylinder shaped distal part.

[0085] In a further embodiment, the dispensing head 105 and a lever 103c are made of the same material. For example, in this case, one or more of the dispensing head 105, the lever 103c and the respective mounting member 103a, preferably all, can be made of plastic.

[0086] Preferably, the product dispensing head 105 has a proximal sleeve 105c, for example having an outwardly tapered inner wall that defines the product access 105b, to receive a distal part of the discharge valve 4 (see also Figures 14-15, showing similarly tapered inner walls).

[0087] In the present example, the dispensing head 105 is removable from the other components of the discharge means, for example to be cleansed, and/or to be replaced with a different type of dispensing head, for example with one of the examples 105', 105" shown in Figures 26A, 26B. In the present example, the upper section of the lever 103c is provided with a central opening 103i (see Fig. 10-11) to receive the dispensing head. After assembly, a proximal part 105c of the dispensing head 105 extends through the opening 103i and cooperates with the lever, to releasingly hold one another. The proximal parts 105c', 105c" of the alternative dispensing heads 105', 105" are also configured to extend through the opening 103i and to cooperate with the lever, to releasingly hold one another.

[0088] In the example, the operating member includes a cylindrical or tapered inner wall 103k, the interior thereof being accessible via said opening 103i. The product dispensing head has a proximal sleeve 105c that can be inserted via the opening 103i, to be coupled to said inner wall 103k.

[0089] In the embodiment, the head 105 can be twisted (from an operating position, depicted in Fig. 10) over an angle of 90^0 with respect to the lever 103c to allow removal of the head. In the present example, the coupling between the dispensing head 105 and lever 103c is provided by a bayonet connection. In this case, the sleeve part 105c of the dispensing head 105 is provided with axially protruding bayonet cams 105d (two, at opposite sides of the head, in this example). The opening 103i and inner wall 103k are configured to allow axial passage of the dispensing head's sleeve 105c and bayonet cams 105d, when they have a certain rotational mounting orientation with respect to the lever 103c. The opening 103i and inner wall 103k of this embodiment define (two opposite, axial) guiding grooves which guide the bayonet cams 105d in a direction towards the container 1. After insertion, the bayonet cams 105d have passed the inner wall 103k. Also, in that case, preferably, the head's sleeve 105c abuts a rim that encloses the insertion opening 103i of the lever 103c.

[0090] Then, the dispensing head 105 can be rotated from a respective intermediate head position to a locked position (over an angle of 90^0 in the example), such, that the respective bayonet cams 105d are moved away from the guiding grooves, towards locking positions defined by respective inner edge parts of the inner wall 103k. When the dispensing head 105 is in its locked position, the inner edge of the inner wall 103k and the bayonet cams 105d face each other, and hold each other, thereby axial removal of the head 105 from the lever 103c. Preferably, a holding mechanism is provided to counteract rotation of the dispensing head 105 when it is in its locked position. In this example, the head 105 can be held in its locked position by clicking means 103z, for example small protrusions 103z located on the inner edge of the inner wall 103k to counteract rotational displacement of the bayonet cams 105d using a small friction force. In a further embodiment, after assembly, the head 105 may be clamped to the lever 103c via an axial clamping force, for example by an optional clamping force achieved by lever parts on the head's sleeve 105c and the bayonet cams 105d.

[0091] Disassembly of the head 105 from the lever 103c is achieved by carrying out these steps in reverse order (that is, rotating the head from the locking position back to the intermediate position, thereby overcoming the holding mechanism 103z -if any- and subsequently sliding the head's sleeve part 105c out of and away from the lever's 103c inner wall 103k).

[0092] The sleeve part 105c', 105c" of each alternative dispensing head 105', 105" (see Fig. 26A, 26B) is configured the same as the sleeve part of the first head example 105, in this case having axially protruding bayonet cams. Assembly and disassembly of one of the alternative dispensing heads 105', 105" (see Fig. 26A, 26B) to and from the lever can be carried out in the same manner as described above, including sliding the head's sleeve part 105c', 105c" in and out of the lever's 103c inner wall 103k, and rotating the head 105', 105" between the the intermediate position and locking position.

[0093] As follows from Figures 13, 26A, 26B in a further

embodiment, the external surface of the proximal part 105c, 105c', 105c" of the dispensing head can include a relief, for example one or more protrusions, for example ring shaped structures. This relief can reduce chances that the head's external surface sticks to an opposite inner surface of the lever 103a, for example during operation and/or mounting/dismounting.

[0094] Now referring to Figures 11, 12, according to a preferred embodiment, the cap 108 has an opening 108a.The lever 103 reaches through the opening 108a, such that the cap 108 blocks movement of the operating member in at least one direction. Particularly, the lever 103a is pivotally movable over an angle of at least 90°, in a direction away from the container 1, when the cap 108 has been removed. In this example, the cap 108 as such is configured to block said pivotal movement when the cap 108 is in a position to cover the discharge means 103 (as in Figures 9, 11). As a result, a reliable, compact assembly can be provided. Since the lever 103a protrudes out of the cap 108, via the respective aperture 108a, the lever is visible from surroundings in case the cap 108 is mounted to the container 1 (via a respective part of the discharge means 103, in this example). Moreover, the cap 108 provides different functions at the same time, that is: covering the discharge means 103, as well as preventing a certain displacement of the lever 103a.

[0095] According to a further embodiment, the discharge means 103 is provided with a blocking member 103p, having an initial blocking state to block a pivotal movement of the lever towards the container 1, when the cap 108 is in a position to cover the discharge means 103. The blocking member 103p, which can also serve as a temper evident member, is adjustable from the blocking state (shown in Fig. 9) to a releasing state, to allow pivotal movement of the lever towards the container 1. Preferably, one or more breakable connecting members hold the blocking member 103p in its initial blocking position, thereby providing a further temper evidence.

[0096] In this example, the blocking member 103p is a wall part, integrally connected to the mounting member 103a. As follows from Figures 9, 11, 12, the blocking member 103p extends below the lever 103c when the blocking member is in its initial blocking state. Preferably, before use, the blocking member 103p is attached to a lower side of the lever 103c and/or another nearby part of the discharge means 103, for example via one or more breakable connecting members. The present blocking member 103p is pivotally connected to a side wall of the mounting member 103a. The blocking member 103p can be pressed inwardly towards the container valve 4, thereby breaking said breakable connecting members -if any-, such, that the blocking member 103p pivots to the respective releasing state (shown in Fig. 11). The skilled person will appreciate that the blocking member can also have a different configuration. Preferably, the lever 103c and blocking member 103p are configured to interact when they are in abutting relationship, for example via interlocking and/or snapping profiles, to counteract movement of the lever 103c in different directions, for example both horizontal and vertical directions (with respect to the container 1).

[0097] Preferably, the blocking member 103p is adjustable between the blocking state (shown in Fig. 9) and the releasing state. For example, after use, the blocking member 103p can be returned to its ignition blocking state, to prevent the movement of the lever towards the container 1, such as during logistics and handling.

Third embodiment

[0098] The third embodiment, part of which is depicted in Figures 14-15, is substantially the same as the embodiment shown in Figures 9-13, the only significant difference being that the dispensing head 205 of the third embodiment has been made in one piece with the lever 203c. Thus, in the present third embodiment, the dispensing head 205 and lever 103c are not detachable connected. Moreover, the embodiment comprises discharge means, having the mounting member 203a, hook members 203x, blocking member 203p, cap 208, circumferential sleeve 219 and dispensing head 205 with an access 205b and distal head parts 205a. The third embodiment can be assembled using relatively little assembly steps, providing a relatively cheap, durable, hygienic solution.

Fourth embodiment

[0099] The fourth embodiment, part of which is depicted in Figures 16-17, is substantially the same as the embodiments shown in Figures 9-15, a first significant difference being that the discharge means of the fourth embodiment are removable from the container 1. The fourth embodiment comprises discharge means, having a mounting member 303a, hook members 303x, blocking member 303p and dispensing head 305 with an access 305b and distal head parts 305a. In a preferred example, the fourth embodiment is provided with a cap configured to block an opening movement of the lever 303c of the discharge means (such as in Figures 9, 11 and 14), however, that is not essential. Also, in the present example, a blocking system 303q, 303r is be provided, configured to prevent opening of the lever 303c, unless a predetermined opening force is applied thereto.

[0100] Particularly, the fourth embodiment includes a coupling member 310, having a lower section 311 which connects to the container flange 18 (and encloses that flange) after assembly. The present coupling member 310 also includes an (in the example substantially ring-shaped) upper section 312. A circumferential, cylindrical, surface (of the present upper section 312) of the coupling member 310 is provided with an outer screw thread 312a. Advantageously, a diameter of the upper section 312 is smaller than a diameter of the lower section 311.

[0101] The coupling member 310 can be the same as, or similar to, the coupling member 10 of the first embod-

iment. For example, optionally, as in the first embodiment (see Figures 3-4), the coupling member 310 may comprise an integral, removable covering (not shown in Fig. 17), for example a flat, disc shaped part, and an optional a breakable or tearable connection, to releasably hold the covering. Also, such a covering can be provided with an optional operating member, for example an upstanding, preferably ring-shaped, operating member (see Fig. 4).

[0102] As follows from Figures 16-17, the discharge means include a mounting member 303a defining an (interior) space for receiving the coupling member 310, the space being accessible at a lower end of the mounting member 303a, and having internal screw thread 303b to detachably connect to the external thread 312a of the coupling member 310. In this example, preferably, the mounting member 303a of the operable discharge means 303 is preferably made of a plastic, for example polypropylene or a different plastic material. In the present example, the mounting member 303a of the discharge means only covers the upper part 312 of the coupling member 310 when the mounting member 303a has been mounted thereon.

[0103] The present fourth example combines several advantages of the above-described embodiments. For example, the dispensing head 305 can be removed from the container 1, for cleansing purposes, and/or for replacement if desired. According to a further embodiment, an assembly can include one or more second manually operable discharge means, configured be held by the coupling member 310 of the container instead of a first manually operable discharge means 303, wherein the first and second manually operable discharge means are configured differently. The second manually operable discharge means may be the same as, or similar to, the discharge means 3 shown in Figures 1-8. For example, the second discharge means can comprises a metal or alloy part to connect to the coupling member 310.

[0104] For example, containers 1 having first manually operable discharge means 303 can be distributed and sold, the first manually operable discharge means 303 providing end users direct capability to discharge food product, in an efficient manner. The end users have the option to replace the first manually operable discharge means 303 (which may have a relatively cheap configuration) with an improved, for example more durable, multi-purpose (for example providing different reorientation of the head 5), and more professionally looking, second operable discharge means (for example the above-described discharge means 3).

[0105] Besides, in an environmental friendly and even more economical solution, containers 1 can be distributed and sold without yet being provided with any operable discharge means 303, such as the container depicted in Figure 1. In that case, end users can select an operable discharge means 3 and/or 303 (provided separately) to be mounted to the container (via the mounting member 10; 310) before use.

[0106] Thus, as follows from the above, the present invention also provides a modular system including one or more assemblies of the invention, wherein several types of manually operable discharge means are interchangeable.

Fifth embodiment

[0107] The fifth embodiment, part of which is depicted in Figures 18-25, is substantially the same as the embodiment described with respect to Figures 16-17, the most significant difference being that the coupling member 410 comprises a first connector section 412a to releasingly hold one component (for example a cap 408, or a suitable manually operable discharge means 3, 303), and a second connector section 412b to releasingly hold another component (for example a manually operable discharge means 403).

[0108] The present coupling member 410 connects to the flange 18 of the aerosol container 1 (and encloses that flange) after assembly. Also, the coupling member 410 has a central aperture 410i; as follows from Fig. 18, as an example, the external part of the container valve 4 protrudes through this aperture 410i, to be operated by -and feed product to- downstream discharge means 403.

[0109] The present coupling member 410 includes an (in the example substantially ring-shaped) section 412. A circumferential, cylindrical, surface (of the present ring shaped section 412) of the coupling member 410 is provided with an outer screw thread 412a, thereby providing the first connector section.

[0110] As follows from Figures 19A, 19B, the coupling member 410 has an upper ring shaped flange 412b, surrounding the aperture 410i, and extending radially inwardly with respect to the first connector section 412a. The upper flange 412b provides said second connector section of the coupling member 410. In the present example, the second connector section 412b is provided with a number of connector apertures 412c, usable as part of a releasable connection with another component (being the manually operable discharge 403 in this example). In this example, the second connector section of the coupling member 410 is arranged to provide a bayonet coupling with the other component 403.

[0111] In the present example (see Figures 18-20), the assembly includes a removable cap 408, having internal screw thread 408x, to removably mount the cap onto the external thread 412a of the coupling member 410. Preferably, as in above-described embodiments, the coupling member 410, a sleeve 419, or both, may comprise a breakable or tearable (tamper evidence) connection (for example one or more breaking members), to releasably hold an edge of the cap 408.

[0112] A manually operable discharge means 403 is provided, being detachably connected to the second connector section of the coupling member 410 (see Fig. 18), simultaneously with the cap 408, such that the cap 408 covers the discharge means 403 (for example prior to

use, or after use). Figures 21-23 show details of the discharge means 403 when connected to the coupling member 410. Figures 24-25 shown the discharge means 403 separately.

[0113] The removable discharge means 403 as such can be configured in various ways. The present example is provided with a dispensing head 405 that is tiltably held by an integral mounting member 403a. In the present fifth embodiment, again, a generally mushroom shaped dispensing head 405 is provided, so that improved foodproduct shaping can be achieved, as is described in applicant's EP1916931A1 incorporated herein by reference in its entirety by reference. The head 405 can also be configured in a different manner. As in the embodiments of Figures 15-17, the head 405 has a proximal access 405b that receives the distal part of the container valve 4, to cooperate with the valve 4

[0114] For example, the head 405 integrally comprises an operating member, i.e., a knob part 422 for manual activation of dispensing of the foodproduct. In the present example, activation of the discharge means 403 can be achieved by manually operating (i.e. depressing, tilting) of the dispensing head 405, via the knob 422. The operating member 422 of the present example is fully enclosed by the cap 408, when dispensing means and cap are joined with the mounting member (see Fig. 18).

[0115] More particularly, the mounting member 403a of the dispensing head 405 includes a plurality of bayonet cams 405d (four substantially L-shaped cams 405d in this example, evenly distributed along an inner surface of the mounting member). In case of assembling the head 405 to the coupling member 410, the connector apertures 412c of the flange 412b of the coupling member 410 allow axial passage of the L-shaped bayonet cams 405d first, after which the mounting member 403a can be turned to move the bayonet cams 405d to respective blocking positions (see Fig. 23). Disassembly of the head 405 can be achieved by carrying out these steps in reverse order.

[0116] Preferably, one or more other types of removable dispensing means are provided, for example the dispensing means 3 of the first embodiment shown in Figures 1-8, and/or the dispensing means of the embodiment of Figures 16-17. In that case, following a further advantageous elaboration of the invention, the one or more other types of removable dispensing means can be coupled to the coupling member 410 of the present fifth embodiment (particularly after the respective dispensing means 403 shown in Fig. 18-25 have been removed there-from). In yet a further embodiment, the one or more other types of removable dispensing means can be provided with internal screw thread parts 3a, 3b, 303a, 303b, such, that they can be screwed onto the first connector section 412a of the present coupling member 410.

[0117] Thus, the present fifth example combines several advantages of the above-described embodiments. For example, containers 1 having the respective manually operable discharge means 403 -connected to the second connector sections 412b- can be distributed and sold, the manually operable discharge means 403 being protected well, within the protective cap 408. Again, end users have the option to replace the manually operable discharge means 403. Besides, the cap 408 can provide very hygienic storage of the aerosol container 1, when mounted, for example during an idle storage period and/or in case the discharge means 403 have been removed (such as for cleansing purposes).

[0118] Although the illustrative embodiments of the present invention have been described in greater detail with reference to the accompanying drawings, it will be understood that the invention is not limited to those embodiments. Various changes or modifications may be effected by one skilled in the art without departing from the scope or the spirit of the invention as defined in the claims.

[0119] It is to be understood that in the present application, the term "comprising" does not exclude other elements or steps.

[0120] Also, each of the terms "a" and "an" does not exclude a plurality. For example, the rigid aerosol container can be provided with a single reservoir, containing propellant and product together.

[0121] Also, for example, the rigid aerosol container can be provided with a plurality of reservoirs. In that case, propellant and product can be contained separate from each other, in different reservoirs of the rigid container.

[0122] Any reference sign(s) in the claims shall not be construed as limiting the scope of the claims.

[0123] For example, in another embodiment (not shown in the drawing), there can be provided a single-use dispensing means. For example, an embodiment can include a connection means having a breaking member, such that a dispensing means 3 can be mounted to a coupling member 10 once, and only once. In an embodiment, a dismounting of the dispensing means 3 can lead to breaking (for example rupture) of the breaking member, such, that the broken breaking member prevent any second mounting of the dispensing means 3.

Claims

1. An assembly for dispensing a product, comprising:

- at least one rigid aerosol container (1), having at least one reservoir (2) containing a propellant and a foodproduct, and an operable discharge valve (4) for discharging the foodproduct;
- a first manually operable discharge means (103), configured to cooperate with the discharge valve (4) to discharge the foodproduct;

wherein the aerosol container (1) is provided with a coupling member (103a; 203a), configured to hold the manually operable discharge means (3), wherein the discharge means (103) include a dispensing head (105; 205) and a lever (103c; 203c), the lever (103c; 203c) being pivotally connected to an upper section of the

mounting member (103a; 203a), via a hinge (103d) that is located at or near a front side of the mounting member (103a; 203a), wherein the hinge (103d) is an integral component of both the lever (103c; 203c) and the mounting member (103a; 203a), wherein the hinge is configured to allow the lever (103c; 203c) to pivot from an idle position to an opened position over an angle of 90^0 or more, particularly an angle of 180^0 or more.

2. The assembly according to claim 1, wherein the mounting member (103a; 203a) of the discharge means and the lever (103c; 203c) are configured to cooperate, to guide the lever (103c; 203c) along the mounting member (103a; 203a) during operation, the mounting member (103a; 203a) having a top part, having spaced-apart upstanding walls (103f), enclosing a central aperture, wherein an upper section of the lever (103c; 203c) comprises two spaced-apart side walls (103g), which reach along the upstanding wall section (103f) of the mounting member (103a; 203a) when the lever is in an operating position.

3. The assembly according to claim 1 or 2, wherein the lever (103c; 203c) comprises an upper part (103g), wherein the upper part (103g) reaches from the hinge (103d) in a radial direction with respect to a container's centre line to an opposite side of the mounting member, to an integral elongated lever leg part (103h), the leg part (103h) extending at an angle downwardly from the upper part lever part (103g).

4. The assembly according to any of claims 1-3, wherein the dispensing head (105) is removable from the other components of the discharge means (103).

5. An assembly according to claim 4, wherein the coupling between the dispensing head (105) and lever (103c) is provided by a bayonet connection.

6. An assembly according to any of claims 1-3, wherein the dispensing head (205) has been made in one piece with the lever (203c).

7. An assembly according to any of the preceding claims, wherein the lever (103c) and mounting member (103a) cooperate to counteract pivoting of the lever (103c) to an opened position, wherein the assembly includes a blocking system (103q, 103r) configured to prevent opening of the lever (103c) unless a predetermined opening force is applied thereto.

8. An assembly according to any of the preceding claims, wherein the discharge means (103) is provided with a blocking member (103p; 203p), having an initial blocking state to block a pivotal movement of the lever towards the container (1), wherein the blocking member (103p; 203p) is adjustable from the blocking state to a releasing state, to allow pivotal movement of the lever towards the container (1).

9. An assembly according to claim 8, wherein the blocking member (103p; 203p) is a wall part, integrally connected to the mounting member (103a; 203a), wherein the blocking member (103p; 203p) extends below the lever (103c; 203c) when the blocking member is in its initial blocking state, wherein the blocking member (103p; 203p) is pivotally connected to a side wall of the mounting member (103a; 203a), wherein the blocking member (103p; 203p) can be pressed inwardly towards a container valve (4), such, that the blocking member (103p; 203p) pivots to the respective releasing state.

10. An assembly according to any of the preceding claims, wherein the assembly includes a circumferential sleeve (119; 219), enclosing a lower section of the coupling member (103a; 203a), wherein the sleeve (119; 219) abuts a lower edge of a removable cap (108; 208), the sleeve (119; 219) having a substantially truncated conical shape, and having a lower edge abutting the external surface of the container (1).

11. An assembly according to any of the preceding claims, wherein the container is made of plastic.

12. The assembly according to any of the preceding claims, comprising manually operable discharge means that are at least partly made of a plastic.

13. An assembly for dispensing a product, for example an assembly according to any of the preceding claims, comprising:

- at least one rigid aerosol container (1), having at least one reservoir (2) containing a propellant and a foodproduct, and an operable discharge valve (4) for discharging the foodproduct;
- a first manually operable discharge means (103), configured to cooperate with the discharge valve (4) to discharge the foodproduct;

wherein the aerosol container (1) is provided with a coupling member (103a), configured to hold the manually operable discharge means (3), wherein the discharge means (103) include a dispensing head (105) and a lever (103c), the lever (103c) being pivotally connected to an upper section of the mounting member (103a), via a hinge (103d) that is located at or near a front side of the mounting member (103a), wherein the dispensing head (105) is removable.

14. An assembly according to claim 13, wherein the

head (105) can be twisted from an operating position over an angle of 90^0 with respect to the lever (103c) to allow removal of the head.

15. An assembly according to claim 13 or 14, wherein the coupling between the dispensing head (105) and lever (103c) is provided by a bayonet connection.

16. An assembly for dispensing a product, for example an assembly according to any of the preceding claims, comprising:

- at least one rigid aerosol container (1), having at least one reservoir (2) containing a propellant and a foodproduct, and an operable discharge valve (4) for discharging the foodproduct;
- a first manually operable discharge means (3), configured to cooperate with the discharge valve (4) to discharge the foodproduct;

wherein the aerosol container (1) is provided with a coupling member (10), configured to releasingly hold the manually operable discharge means (3), wherein the coupling member (10) comprises an integral, removable covering (10a) to cover an external part of the discharge valve (4) before the discharge means (3) is coupled to the coupling member (10).

17. The assembly according claim 16, wherein the coupling member (10) comprises a breakable or tearable connection, to releasably hold its covering (10a).

18. The assembly according to claim 17, wherein the covering is integrally provided with an upstanding operating member, preferably a ring-shaped operating member.

19. Assembly according to any of the preceding claims, comprising a cap (8) configured to be removably held by the coupling member (10), to cover the coupling member.

20. The assembly according claim 19, wherein the coupling member (10) comprises a breakable or tearable connection, to releasably hold the cap.

21. The assembly according to any of the preceding claims, wherein the coupling member is made of plastic.

22. The assembly according to any of the preceding claims, wherein the manually operable discharge means (3) are at least partly made of a metal or an alloy.

23. Assembly according to any of the preceding claims, wherein the coupling member (10) is provided with external screw tread, and the manually operable discharge means (3) is provided with internal screw thread, to detachably connect to each other.

24. Assembly according to any of the preceding claims, wherein the manually operable discharge means (3) covers the coupling member (10) when operable discharge means (3) are in a position to cooperate with the discharge valve (4).

25. Assembly according to any of the preceding claims, wherein the manually operable discharge means (3) has a rigid main part (3a), configured to be held by the coupling member.

26. Assembly according to any of the preceding claims, wherein the manually operable discharge means (3) comprises a distal product dispensing head, and a duct section to connect the dispensing head to a distal part of the container valve (4).

27. Assembly according to claim 26, wherein the dispensing head and duct section are releasingly connected, preferably by a screw thread connection.

28. Assembly according to claim 26 or 27, wherein the duct section has a proximal part that connects to the external valve part when the manually operable discharge means (3) are held by the coupling member (10), wherein the duct section has a distal part that connects to the dispensing head.

29. Assembly according to claim 28, wherein the proximal part and distal part of the duct section extend in line with one another.

30. Assembly according to claim 29, wherein centre lines of the proximal and distal part of the duct section include an angle smaller than 180° with one another, for example an angle in the range of 90° - 170°.

31. Assembly according to any of claims 26-30, wherein the duct section extends through a duct channel passage that is defined by the first manually operable discharge means (3)

32. Assembly according to claims 30 and 31, wherein a rotational orientation of the duct section with respect to the duct channel passage is adjustable.

33. Assembly according to any of claims 31 and 32, wherein the duct section is removable from the duct channel passage.

34. Assembly according to claim 33, wherein the dispensing head is part of a locking system to hold several parts (3a, 3c, 6) of the discharge means together.

35. Assembly according to any of the preceding claims, wherein the manually operable discharge means (3) has a rigid actuating member, for example a lever, configured to be manually moved for operating the discharge valve (4) when the discharge means (3) is held by the coupling member.

36. Assembly according to any of the preceding claims, comprising a second manually operable discharge means, configured be held by the coupling member (10) of the container instead of the first manually operable discharge means (3), wherein the first and second manually operable discharge means are configured differently.

37. Assembly according to claim 36, wherein the first manually operable discharge means (3) comprises a metal or alloy part to connect to the coupling member (10), wherein the second manually operable discharge means (3) comprises a plastic part to connect to the coupling member (10).

38. Assembly according to claim 36 or 37, wherein the coupling member (10) comprises a first connector section to hold the first manually operable discharge means (3), and a second connector section to hold the second manually operable discharge means.

39. Assembly according to claim 38, wherein the second connector section of the coupling member is configured to be part of a bayonet coupling.

40. An assembly for dispensing a product, for example an assembly according to any of the preceding claims,
comprising:

- at least one rigid aerosol container (1), having at least one reservoir (2) containing a propellant and a foodproduct, and an operable discharge valve (4) for discharging the foodproduct;
- a manually operable discharge means (103), configured to cooperate with the discharge valve (4) to discharge the foodproduct;
- a removable cap to substantially cover the discharge means (103);.

wherein the cap has an opening, and a manually operating member of the discharge means reaches through the opening, preferably such that the cap blocks movement of the operating member in at least one direction.

41. Assembly according to claim 40, wherein the operating member is pivotally movable over an angle of at least 90^0, in a direction away from the container, when the cap has been removed, wherein the cap is configured to block said pivotal movement when the cap is in a position to cover the discharge means (103).

42. Assembly according to any of the claims 40-41, wherein the discharge means (103) is provided with a blocking member, having an initial blocking state to block a pivotal movement of the operating member towards the container, when the cap is in a position to cover the discharge means (103), wherein the blocking member is adjustable from the blocking state to a releasing state, to allow pivotal movement of the operating member towards the container.

43. Assembly according to any of the claims 40-42, wherein the manually operable discharge means (103) comprises a distal product dispensing head that is removably connected to the operating member, preferably using a bayonet connection.

44. Assembly according to claim 43, wherein the operating member includes a cylindrical or tapered inner wall, the distal product dispensing head having a proximal sleeve that cooperates with said inner wall to removably connect the head to the operating member.

45. Assembly according to claim 43 or 44, wherein the product dispensing head has a proximal sleeve, having an outwardly tapered inner wall to receive a distal part of the discharge valve (4).

46. Assembly according to any of claims 40-45, wherein the manually operable discharge means (103) are integrally attached to the container.

47. Assembly according to any of claims 40-45, wherein the manually operable discharge means (103) are removably connected to a coupling member of the container.

48. An assembly for dispensing a product, for example an assembly according to any of the preceding claims, comprising:

- at least one rigid aerosol container (1), having at least one reservoir (2) containing a propellant and a foodproduct, and an operable discharge valve (4) for discharging the foodproduct;
wherein the aerosol container (1) is provided with a coupling member (410), having a first connector section configured to releasingly connect to a first component (408; 3), and a second connector section configured to releasingly connect to a second component (405).

49. Assembly according to claim 48, wherein the first connector section comprises screw thread, wherein the second connector section is configured to be part

of a bayonet coupling.

50. An assembly for dispensing a product, for example an assembly according to any of the preceding claims, comprising:

- at least one rigid aerosol container (1), having at least one reservoir (2) containing a propellant and a foodproduct, and an operable discharge valve (4) for discharging the foodproduct;
- a first manually operable discharge means (103), configured to cooperate with the discharge valve (4) to discharge the foodproduct;

wherein the aerosol container (1) is provided with a coupling member (103a; 203a), configured to hold the manually operable discharge means (3), wherein the discharge means (103) include a dispensing head (105; 205) and a lever (103c; 203c), the lever (103c; 203c) being pivotally connected to an upper section of the mounting member (103a; 203a), via a hinge (103d) that is located at or near a front side of the mounting member (103a; 203a), wherein the discharge means (103) is provided with a blocking member (103p; 203p), having an initial blocking state to block a pivotal movement of the lever towards the container (1), wherein the blocking member (103p; 203p) is adjustable from the blocking state to a releasing state, to allow pivotal movement of the lever towards the container (1).

51. An assembly according to claim 50, wherein the blocking member (103p; 203p) is a wall part, integrally connected to the mounting member (103a; 203a), wherein the blocking member (103p; 203p) extends below the lever (103c; 203c) when the blocking member is in its initial blocking state, wherein the blocking member (103p; 203p) is pivotally connected to a side wall of the mounting member (103a; 203a), wherein the blocking member (103p; 203p) can be pressed inwardly towards a container valve (4), such, that the blocking member (103p; 203p) pivots to the respective releasing state.

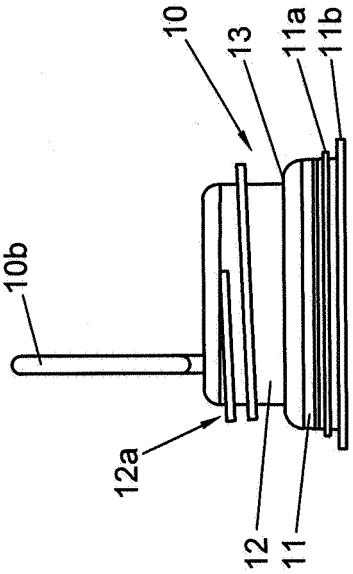

FIG. 3

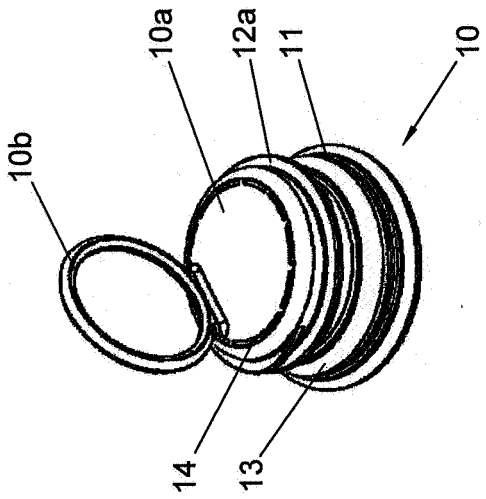

FIG. 4A

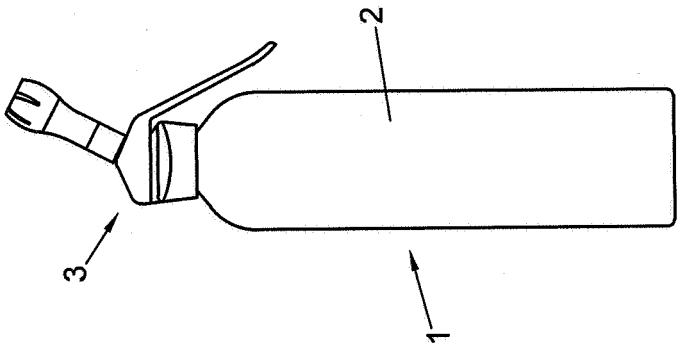

FIG. 2

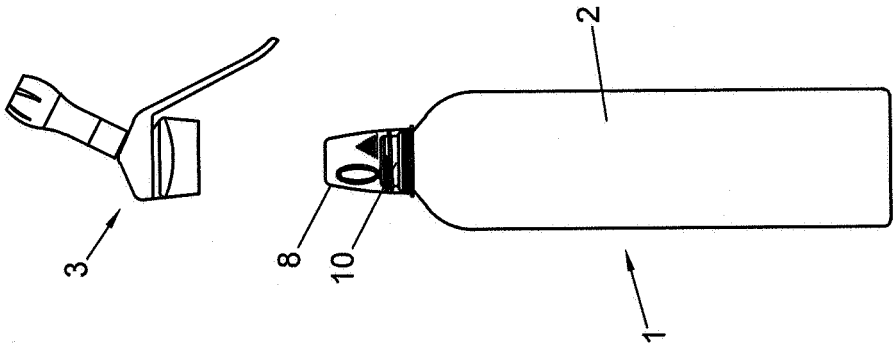

FIG. 1

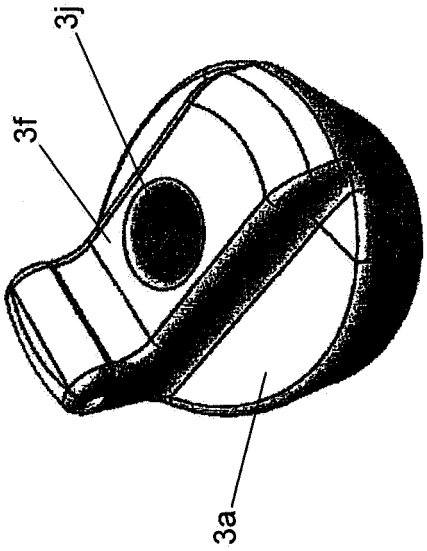

FIG. 4C

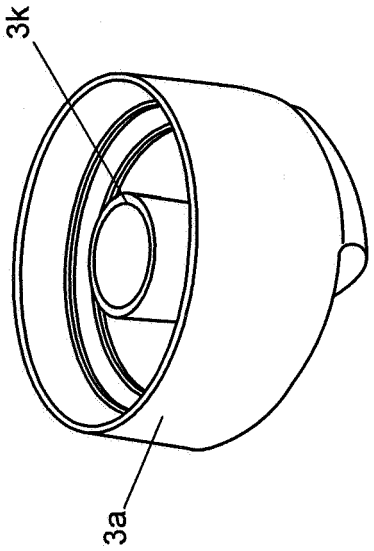

FIG. 4D

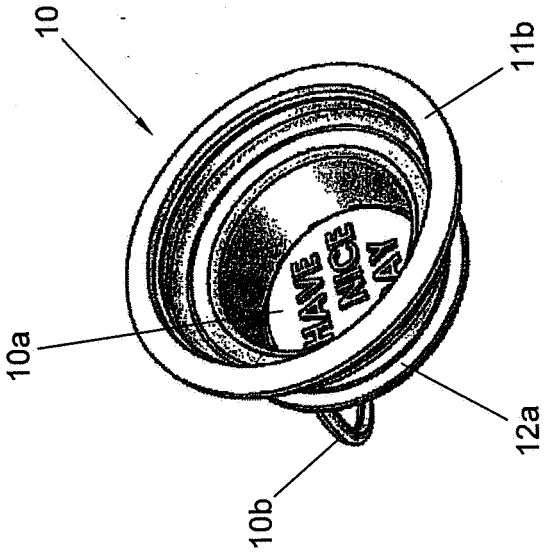

FIG. 4B

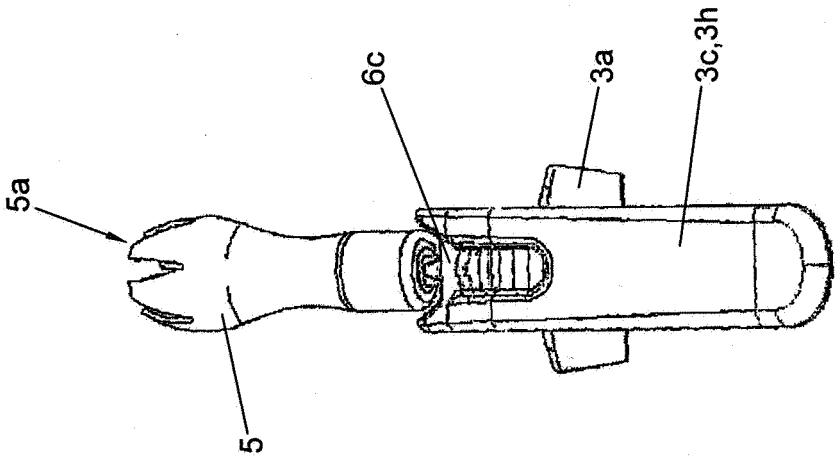

FIG. 5D

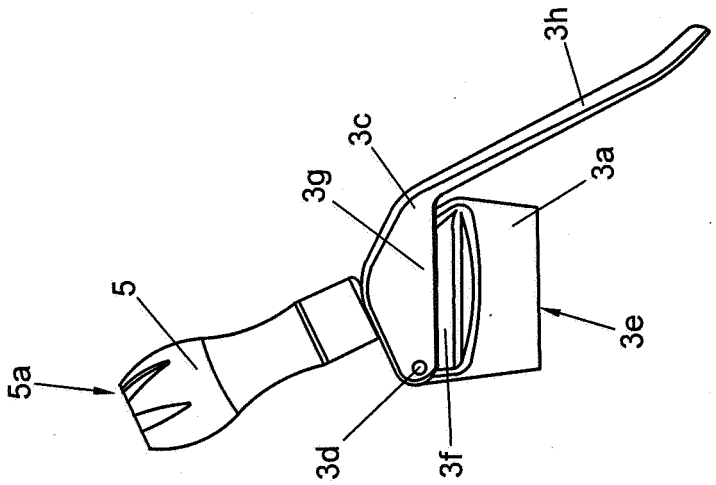

FIG. 5C

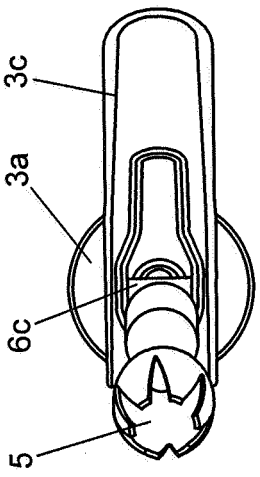

FIG. 5A

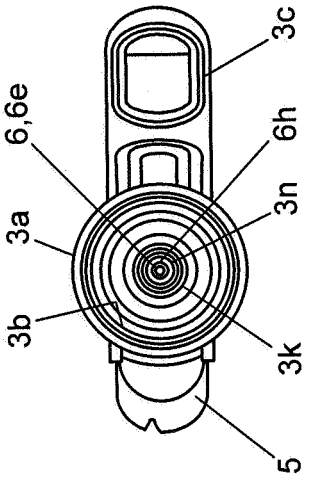

FIG. 5B

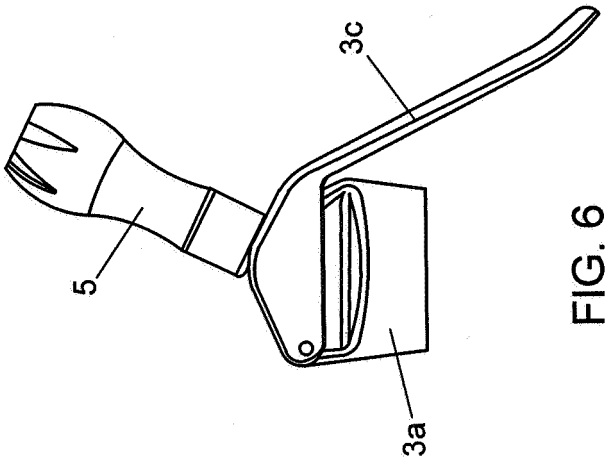

FIG. 6

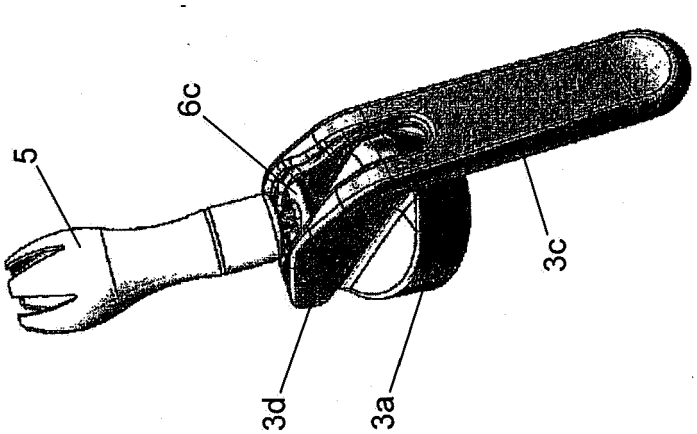

FIG. 5E

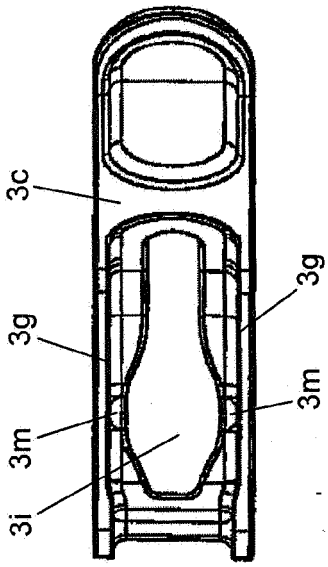

FIG. 7

FIG. 8A

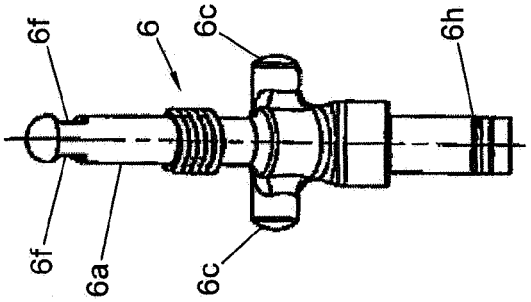

FIG. 8B

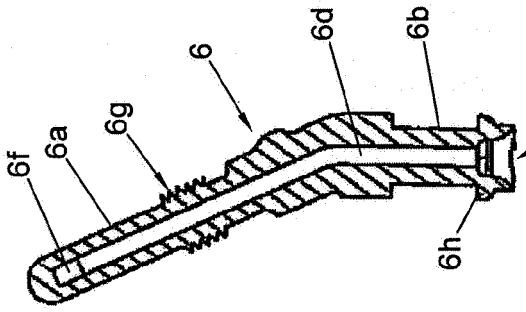

FIG. 8C

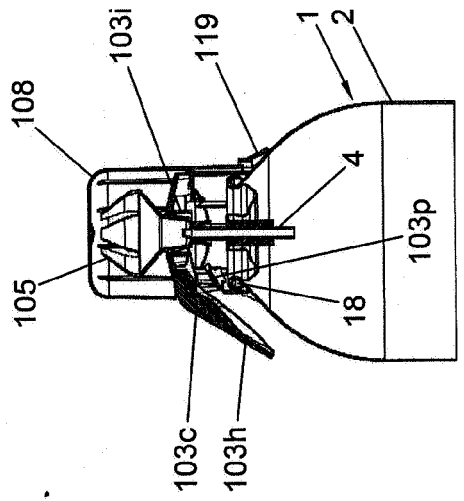

FIG. 11

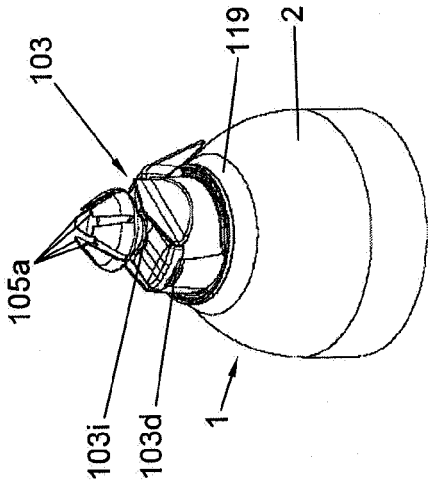

FIG. 10

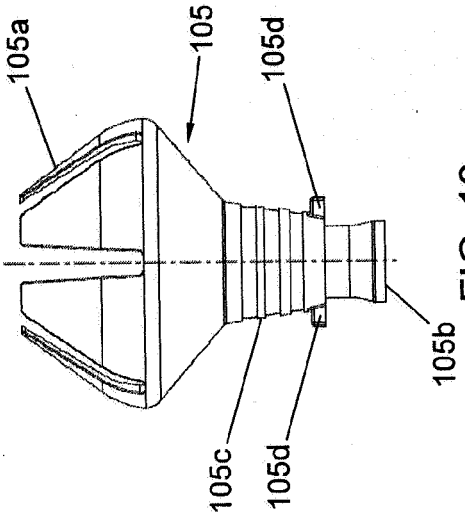

FIG. 13

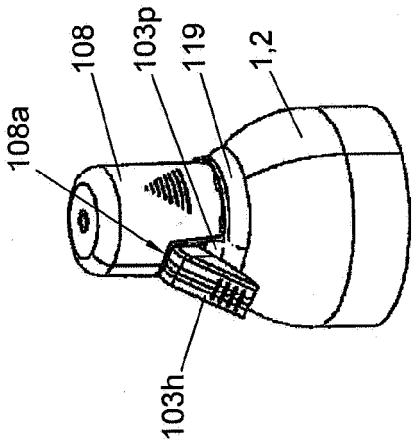

FIG. 9

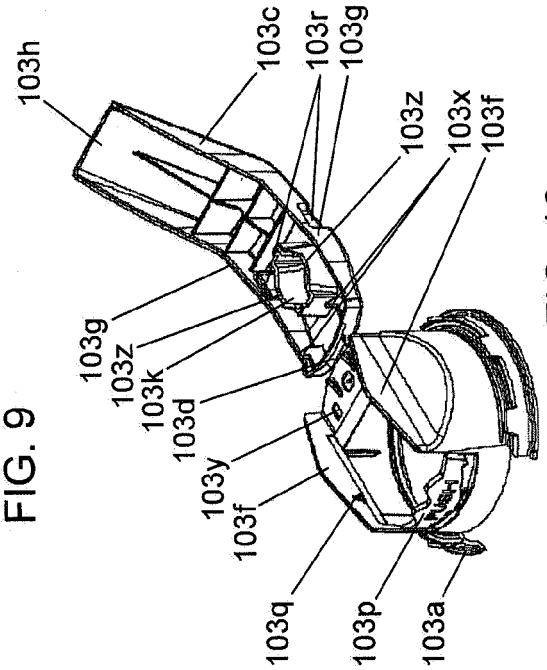

FIG. 12

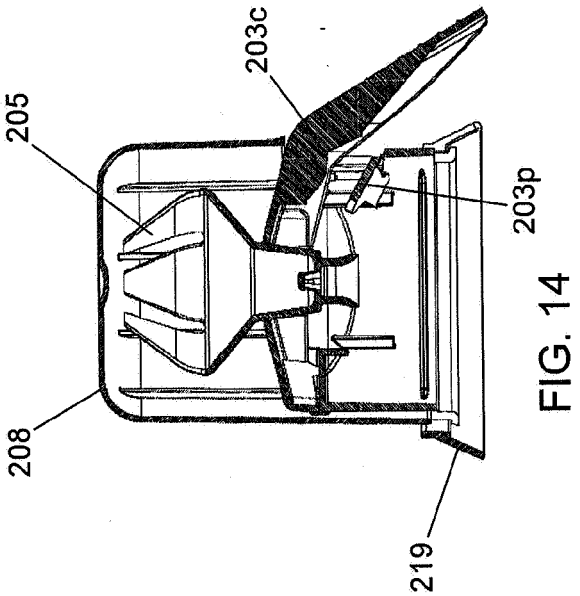

FIG. 14

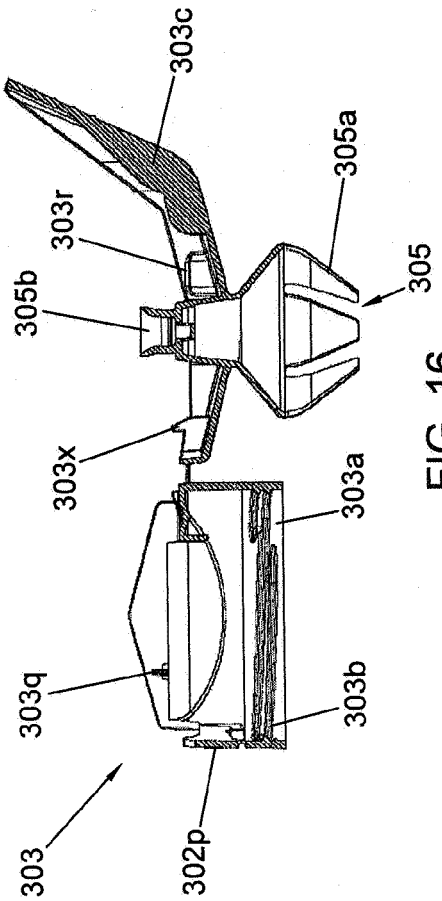

FIG. 16

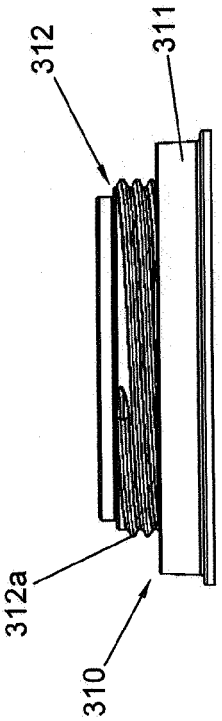

FIG. 17

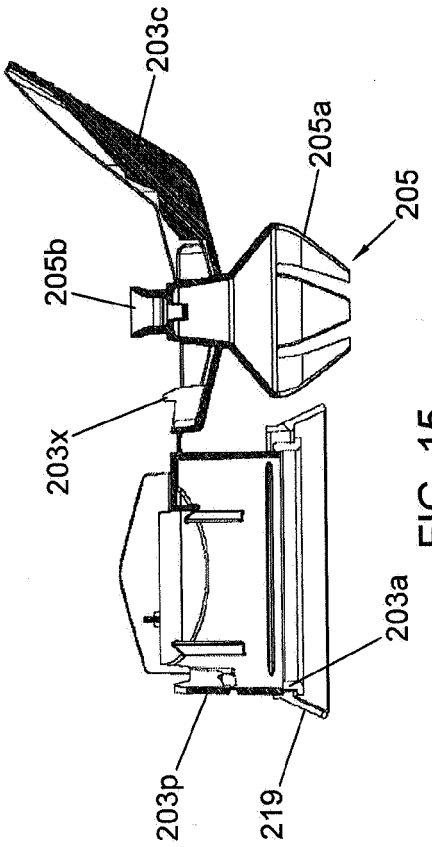

FIG. 15

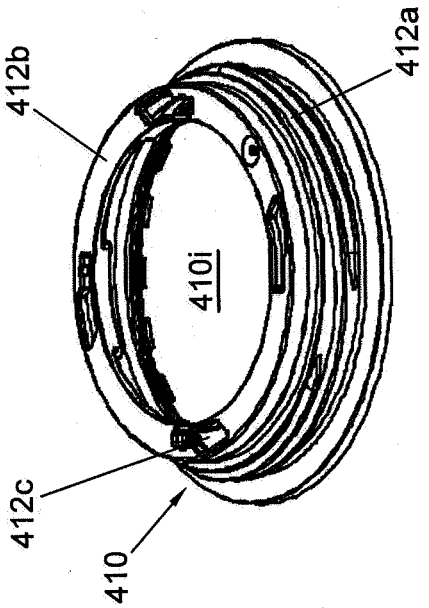

FIG. 19A

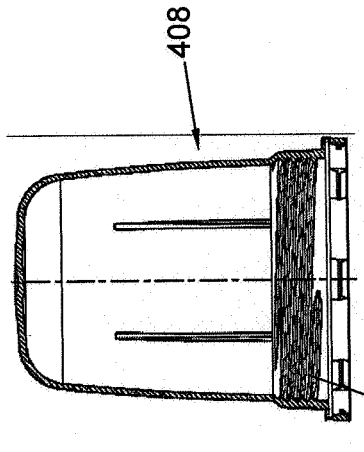

FIG. 20

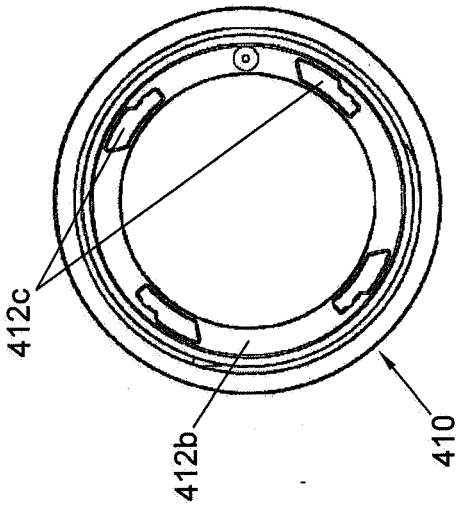

FIG. 19B

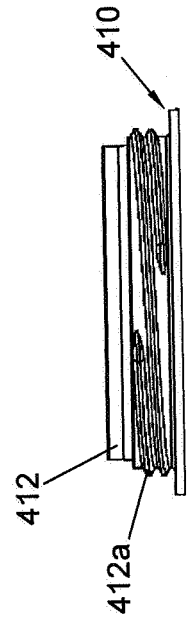

FIG. 19C

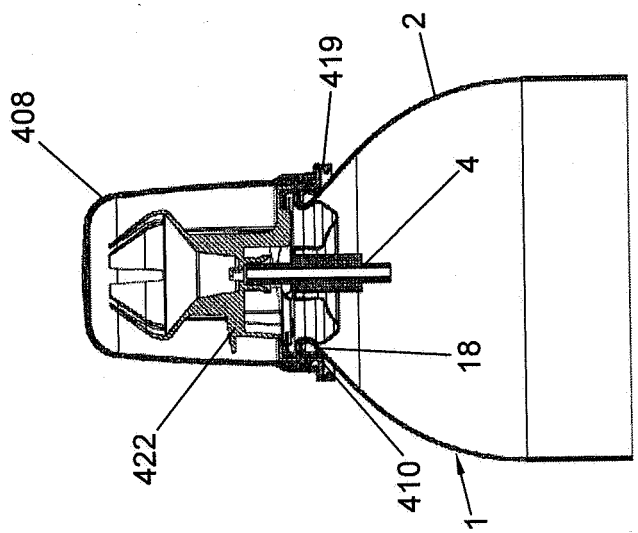

FIG. 18

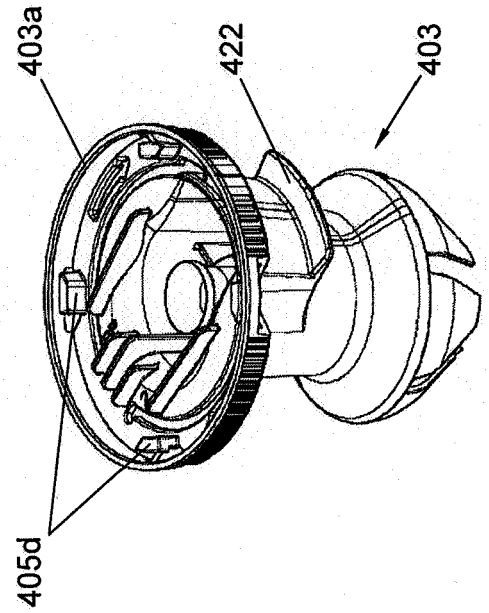

FIG. 24

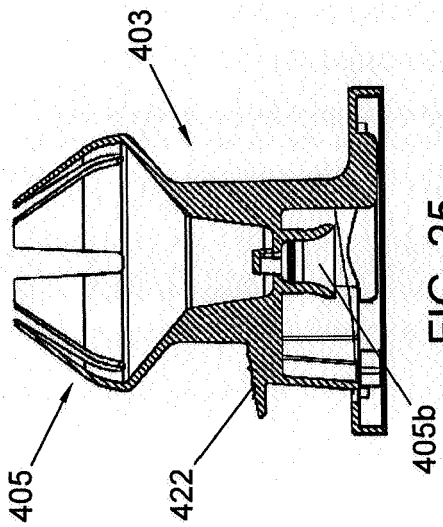

FIG. 25

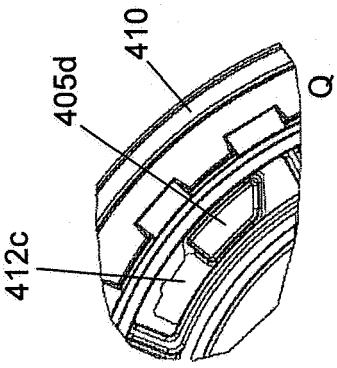

FIG. 23

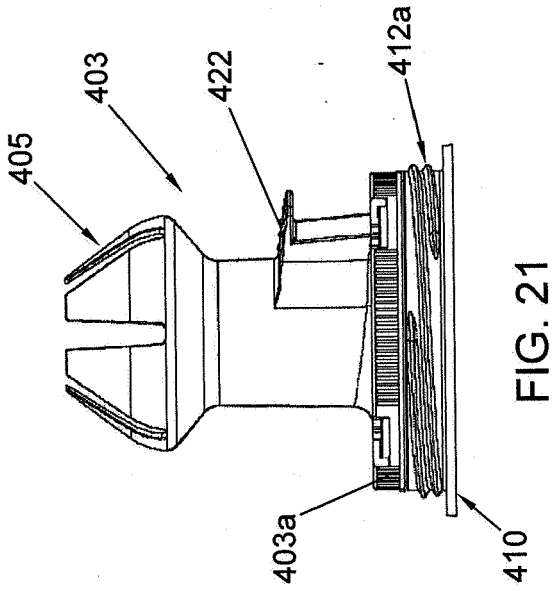

FIG. 21

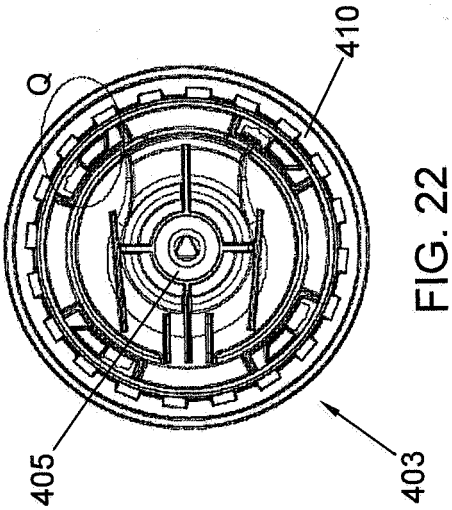

FIG. 22

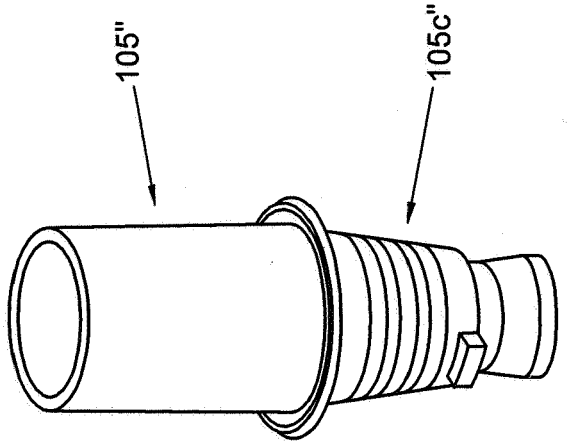

FIG. 26B

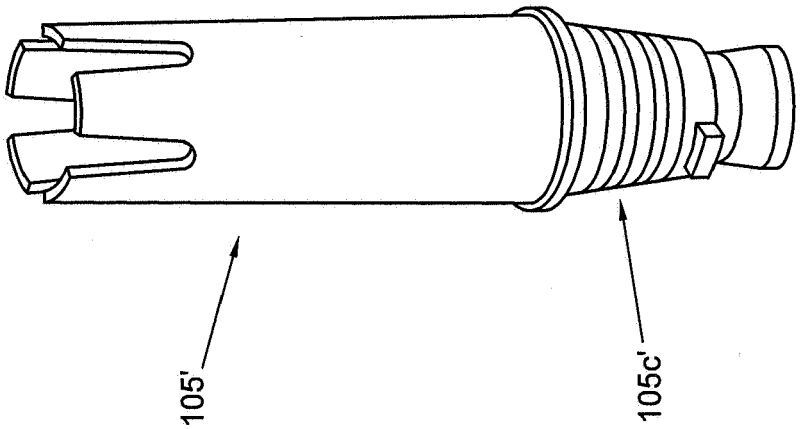

FIG. 26A

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- EP 1061006 A1 **[0020] [0022]**