(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 636 356 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
11.09.2013 Bulletin 2013/37

(51) Int Cl.:
A47L 15/44 *(2006.01)* ***D06F 58/20*** *(2006.01)*

(21) Application number: **12158822.2**

(22) Date of filing: **09.03.2012**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(54) A rotary drum laundry treating appliance with a drum provided with an odorizer lifter

(57) There is described a rotary drum laundry treating appliance (10) comprising a casing (11); a drum (19) rotatably enclosed within the casing (11), in which laundry to be treated can be loaded; and at least one lifter (20) comprising a main body (21) projecting from an inner peripheral surface (S) of the drum (19). The at least one lifter (20) further comprises an odorizer portion (22) integral with the main body (21).

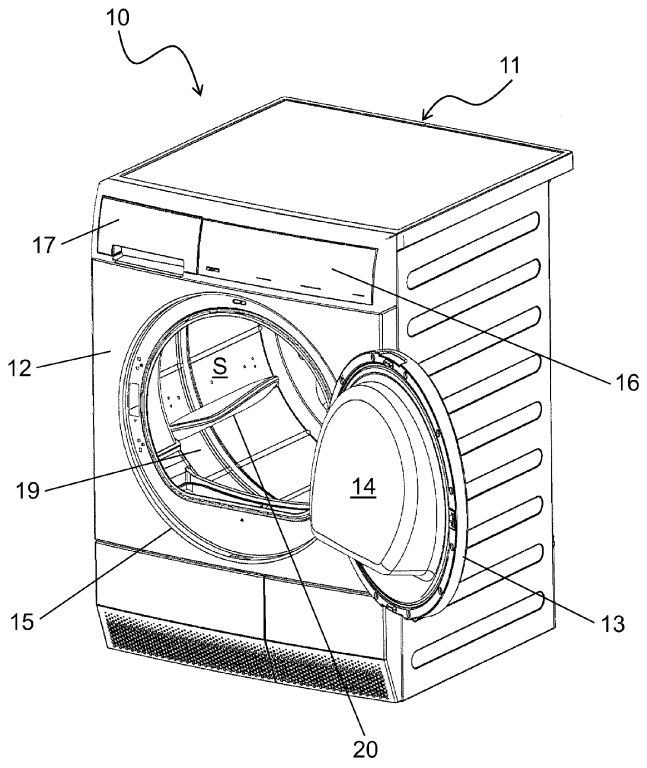

FIG. 1

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Description

[0001] The present invention relates in general to the technical field of the laundry treating appliance. In particular, the invention relates to a rotary drum laundry treating appliance, such as a washing machine, a drying machine or a washing-drying machine provided with at least a lifter placed in the laundry receiving cavity formed by the rotary drum.

[0002] Known rotary drum laundry treating appliances usually comprise an external casing provided with a loading/unloading door that may be sealed by means of a gasket. The loading/unloading door allows the access to a rotary drum that may be mounted within a tub. The rotary drum comprises an inner cavity in which the laundry to be washed and/or dried can be loaded/unloaded through said door. Normally, the drum is provided with one or more lifters adapted to improve the agitation of the laundry during the rotation of the drum. The lifters are substantially prismatic elements fixed to the inner surface of the drum and positioned with their longitudinal axis substantially parallel to the longitudinal axis of the drum or inclined thereto.

[0003] In the case of a new laundry treating appliance, due to the manufacturing processes, some parts of the appliance, such as for example the rotary drum, the gasket sealing the loading/unloading door, plastic components and the like can exhale an unpleasant smell, which can reach the user every time she/he opens the loading/unloading door. In the worse case, the above unpleasant smell can be transferred on the laundry inside the laundry treating appliance, typically during the first washing and/or drying cycles.

[0004] In order to overcome this drawback, on the market are available devices for dispensing perfume, e.g. perfumed napkins, that the user can purchase and put inside the rotary drum of the laundry treating appliance to perfume the laundry.

[0005] For example, European patent EP 1 495 178 discloses a device for dispensing products such as fabric softeners, sanitizers, water repellents, deodorizers, bleaches, anti-wrinkle agents and the like inside a dryer. The product dispenser comprises a plate member and a product carrier, which carries a product. The product carrier is operatively connected to the plate member, which may be attached, typically glued, to the inner surface of the dryer drum, e.g. at the lifter projecting from the drum.

[0006] However, the known product dispensers present some drawbacks.

[0007] First, they are additional elements which have to be separately purchased and subsequently put inside the rotary drum of the laundry treating appliance during each washing and/or drying cycle.

[0008] Second, when the laundry treating appliance is in use, the known product dispensers freely move inside the drum or, in the event they are attached to the drum, they can accidentally detach from the drum and thus again freely move inside it, thus causing noise or even risking to damage the laundry treating appliance.

[0009] Finally, in particular during the drying cycle, the known product dispenser freely moving inside the drum can cause electrostatic charges to be accumulated on the laundry. As a result, when the user opens the door to unload the laundry, she/he can get a light shock, thus being tiresome.

[0010] Thus, the main object of the present invention is to overcome the above mentioned drawbacks with respect to the known deodorizer dispensers by providing a rotary drum laundry treating appliance suitable for eliminating the unpleasant smell investing the user upon opening the loading/unloading door, meanwhile avoiding noise, damage to the appliance and electrostatic charges to be accumulated on the laundry.

[0011] According to the invention, there is provided a rotary drum laundry treating appliance comprising a casinga drum rotatably enclosed within the casing, in which laundry to be treated can be loaded, and at least one lifter comprising a main body projecting from an inner surface of the drum. The rotary drum laundry treating appliance is characterised in that the at least one lifter comprises an odorizer portion integral, i.e. in one piece, with the main body.

[0012] Preferably, the odorizer portion of the at least one lifter is over-injected on the main body of the lifter.

[0013] Preferably, the main body of the at least one lifter has a substantially frusto-conical cross-section and comprises a lower wall, suitable for being fixed to the inner surface of the drum, an upper wall and side walls connecting the lower and upper walls.

[0014] Preferably, in the main body of the at least one lifter a recess is formed extending in the longitudinal direction of the main body and suitable for housing the odorizer portion of the lifter.

[0015] Preferably, the recess is L-shaped and comprises a first section formed on the upper wall of the main body and a second section formed in a side wall of the main body.

[0016] More preferably, the first section is smaller than the second section.

[0017] Preferably, the odorizer portion of the at least one lifter is L-shaped and comprises a first portion, suitable for matching the first section of the recess, and a second portion suitable for matching the second section of the recess.

[0018] Preferably, the odorizer portion of the at least one lifter is made of odorant polyolefin plastics. More preferably, the odorant polyolefin plastics are obtained by mixing an odour imparting material uniformly dispersed in a polyolefin polymeric or co-polymeric material with a filler and a polyolefin material.

[0019] Preferably, the concentration of the odour imparting material in the polyolefin polymeric or co-polymeric material is 10 to 40% by weight.

[0020] Preferably the main body of the lifter to which the odorizer portion is made integral is formed by a polyolefin material and a filler. More preferably, said polyole-

fin material and filler forming the main body are the same of those composing the odorizer portion.

[0021] Preferably, the odorizer portion of the at least one lifter is made in a different colour with respect to the main body of the lifter.

[0022] Further preferably the main body of the lifter has a hollow structure defined by one or more perforated walls.

[0023] Still preferably, the drum is rotatably mounted within a tub.

[0024] Further features and advantages of a rotary drum laundry treating appliance according to the present invention will be clearer from the detailed description of a preferred embodiment thereof, provided by way of non limiting example, with reference to the annexed drawings, in which:

Figure 1 is a perspective view of a rotary drum laundry treating appliance according to the present invention;

Figure 2 is a perspective view of an odorizer lifter of the laundry treating appliance of Figure 1;

Figure 3 is a cross-sectional front view of the odorizer lifter of Figure 2; and

Figure 3A is an enlarged view of the particular circled in Figure 3.

[0025] In the following specification and in the drawings reference is made to a front loading laundry treating appliance in the form of a laundry dryer, but it is understood that the same applies not only to front loading washing and washing-drying machines but also to such machines of top-loading type..

[0026] In Figure 1 a rotary drum laundry treating appliance,according to a preferred embodiment of the present invention and exemplarily embodied as a laundry dryer, is schematically shown and generally designated with 10.

[0027] The laundry treating appliance 10 comprises a parallelepiped-shaped external casing 11. At a front wall 12 of the external casing 11 a door 13 is hinged, having a central substantially frusto-conical portion 14 typically made of glass or plastics. The door 13 is suitable for opening and closing a loading/unloading aperture 15 formed in the front wall 12 of the external casing 11.

[0028] The laundry treating appliance 10 further comprises a control panel 16 located on the front wall 12, above the loading/unloading aperture 15 and a drawer unit 17 that comprises a condensate collecting tank. Evidently, in case of a washing and washing-drying machine, said drawer unit 17 may be embodied as a dispenser for detergent products or similar, e.g. softener, freshener, etc. The drawer unit 17 is also located in the front wall 12, alongside the control panel 16.

[0029] The loading/unloading aperture 15 allows access to a rotatable drum 19, in which the laundry to be treated can be loaded. The rotatable drum 19 is enclosed in the casing 11. In case of a washing and washing-drying machine the rotatable drum 19 has a cylindrical perforated wall and it is mounted in a tub provided for collecting washing liquor. The drum 19 comprises one or more lifters 20 mounted on the inner surface S thereof and positioned with their longitudinal axis substantially parallel to the longitudinal axis of the drum 19 or inclined thereto.

[0030] The lifters 20 are rotated together with the drum 19 to lift the laundry to a predetermined height. The lifted laundry then falls from a lifter 20 by gravity to collide with another laundry article, drum 19, another lifter 20, or water in case the laundry treating machine is embodied as a washing or a washing-drying machine.

[0031] With reference to Figures 2, 3 and 3A a lifter 20 is shown comprising a main body 21 and an odorizer portion 30 integral, i.e. in a single unitary piece, with the main body 21.

[0032] The main body 21 is preferably hollow and has a substantially frusto-conical cross-section and comprises a lower wall 23 adapted to be fixed with known means, e.g. screwed to or snap-fitted into the inner surface 21 of the drum 19, an upper wall 24 and side walls 25 connecting the lower and upper walls 23, 24. Preferably the side walls 25 are slightly curved.

[0033] Preferably, the main body 21 further comprises a stiffening rib 26, which longitudinally extends for the whole length of the main body 21.

[0034] Moreover, in the main body 21 a recess 27 is formed, preferably extending in the longitudinal direction of the main body 21 and suitable for housing the odorizer portion 22 of the lifter 20.

[0035] Preferably, the recess 27 is L-shaped and comprises a first portion 27a formed on the upper wall 24 and a second portion 27b formed on a side wall 25 of the main body 21.

[0036] According to another embodiment not shown in the drawings, at least one of the upper and side walls 24, 25 are perforated so as to allow a liquid to access the cavity enclosed by the main body 21. Naturally, if said perforation is made on the recess 27, the odorizer portion is correspondingly perforated such that, holes formed in the recess 27 corresponds, i.e. are axially aligned, to those formed in the odorizer portion.

[0037] The main body is preferably formed of a synthetic resin based material which is resistant against corrosion and abrasion due to laundry contact and, in case the laundry treating machine is embodied as a washing or a washing-drying machine, the synthetic resin based material is also resistant to water as well as fails to chemically react with a detergent or other chemicals normally used in a washing process. In a preferred embodiment, the main body is made of a polyolefin material mixed with a filler.

[0038] The odorizer portion 22 of the lifter 20 is preferably plate shaped and is over-molded on the main body 21 of the lifter 20 at the recess 27 formed in the main body 21.

[0039] Preferably, the odorizer portion 22 is also L-shaped and comprises a first portion 22a suitable for matching the first section 27a of the recess 27, and a second portion 22b, suitable for matching the second section 27b of the recess 27.

[0040] Preferably, the odorizer portion 22 is made of odorant polyolefin plastics. In a preferred embodiment, the odorant polyolefin plastics are obtained by mixing an odour imparting material uniformly dispersed in a polyolefin polymeric or co-polymeric material, commonly known as "masterbatch", with a filler material and a polyolefin material.

[0041] Preferably, the concentration of the odorant polyolefin imparting material in the masterbatch is 10 to 40% by weight. This advantageously allows to produce odorant polyolefin plastics in which the odour is released for a relatively long time.

[0042] The filler material is preferably selected from calcium carbonate compounds, like dolomite (MgCa $(CO_3)_2$) or calcium carbonate itself, silicate compounds, like mica ($K2Al_6Si_6O_{20}(OH)_4$), talc ($Mg_3Si_4O_{10}(OH)_2$) or silica itself. The filler material has been found to trap on its surface the odour molecules contained in the masterbatch and therefore to greatly slow odour release from the plastics obtained.

[0043] A preferred amount of filler material to be added to the mixture of polyolefin material and masterbatch is comprised between 0.5 and 60% by weight. In the mixture, the masterbatch represents up to 10% by weight and the polyolefin material 30 to 99% by weight.

[0044] It has been found that 40% by weight of micron-sized calcium carbonate in polypropylene allows odorant plastics to retaining odour for at least three month at 40 deg. C.

[0045] Preferably, the polyolefin and the filler materials of the odorizer portion 22 are the same in nature and composition of those composing the main body 21.

[0046] Preferably, the main body 21 and the odorizer portion 22 of the lifter 20 are differently coloured, this increasing the aesthetic appearance of the lifter 20. For example, the odorizer portion has a colour corresponding to the perfume it exhales.

[0047] Conclusively, it can be stated that the present invention allows to provide a rotary drum laundry treating appliance suitable for eliminating unpleasant smell due to manufacturing processes without noise and damages to be caused to the laundry treating appliance itself and to the user. In fact, owing to the fact that the odorizer portion is integral with the main body of the lifter, no additional device has to be put inside the drum of the laundry treating appliance. As a result, possible damages of the machine due to, for example, a perfumed napkin which is free to move inside the drum can be avoided. Moreover, it is possible to take advantage of the drum rotation to better spread the perfume.

[0048] Although a preferred embodiment has been shown and described, it would be appreciated by those skilled in the art that changes can be made in this embodiment without departing from the principles of the invention, the scope of which is defined in the claims.

Claims

1. A rotary drum laundry treating appliance (10) comprising:

   - a casing (11);
   - a drum (19) rotatably enclosed within the casing (11), in which laundry to be treated can be loaded; and
   - at least one lifter (20) comprising a main body (21) projecting from an inner peripheral surface (S) of the drum (19);

   characterised in that said at least one lifter (20) comprises an odorizer portion (22) integral with the main body (21) of said at least one lifter (20).

2. A rotary drum laundry treating appliance (10) according to claim 1, **characterized in that** said odorizer portion (22) is over-injected on said main body (21) of the lifter (20).

3. A rotary drum laundry treating appliance (10) according to claim 1 or 2, **characterized in that** said main body (21) of said at least one lifter (20) has a substantially frusto-conical cross-section and comprises a lower wall (23) suitable for being fixed to the inner surface (S) of the drum (19), an upper wall (24) and side walls (25) connecting said lower (23) and upper (24) walls.

4. A rotary drum laundry treating appliance (10) according to any of claims 1 to 3, **characterized in that** a recess (27) is formed in the main body (21) of said at least one lifter (20) extending in the longitudinal direction of the main body (21) and suitable for housing said odorizer portion (22) of the lifter (20).

5. A rotary drum laundry treating appliance (10) according to claim 4 when depending on claim 3, **characterized in that** said recess (27) is L-shaped and comprises a first section (27a) formed on the upper wall (24) of said main body (21) and a second section (27b) formed on a side wall (25) of said main body (21).

6. A rotary drum laundry treating appliance (10) according to claim 5, **characterized in that** said odorizer portion (21) of said at least one lifter (20) is L-shaped and comprises a first portion (22a) suitable for matching the first section (27a) of the recess (27), and a second portion (22b), suitable for matching the second section (27b) of the recess (26).

7. A rotary drum laundry treating appliance (10) accord-

ing to any of the preceding claims, **characterized in that** said odorizer portion (22) of said at least one lifter (20) is made of odorant polyolefin plastics.

8. A rotary drum laundry treating appliance (10) according to claim 7, **characterized in that** said odorant polyolefin plastics are obtained by mixing an odour imparting material uniformly dispersed in a polyolefin polymeric or co-polymeric material with a filler material and a polyolefin material.

9. A rotary drum laundry treating appliance (10) according to claim 8, **characterized in that** the concentration of said odour imparting material in said polyolefin polymeric or co-polymeric material is 10 to 40% by weight.

10. A rotary drum laundry treating appliance (10) according to any of the preceding claims, **characterized in that** the odorizer portion (22) has a different colour with respect to the main body (21) of the at least one lifter (20).

11. A rotary drum laundry treating appliance (10) according to any of the preceding claims, **characterized in that** both the odorizer portion (22) both the main body (21) comprise the same polyolefin and filler material.

12. A rotary drum laundry treating appliance (10) according to any of the preceding claims, **characterized in that** the main body (21) has a hollow structure defined by one or more perforated walls (24, 25, 22).

13. A rotary drum laundry treating appliance (10) according to any of the preceding claims, **characterized in that** the drum (19) is rotatably mounted within a tub.

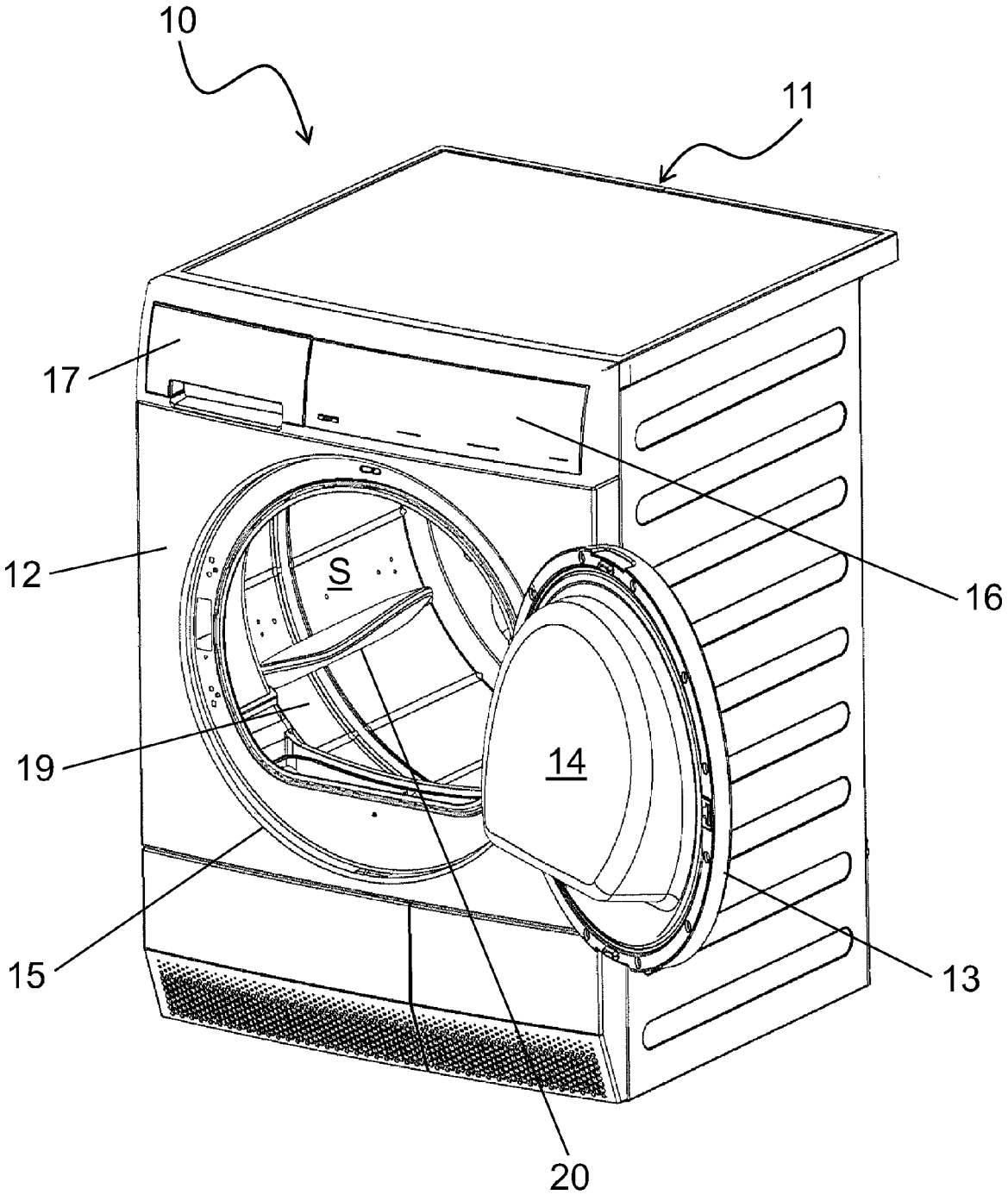

FIG. 1

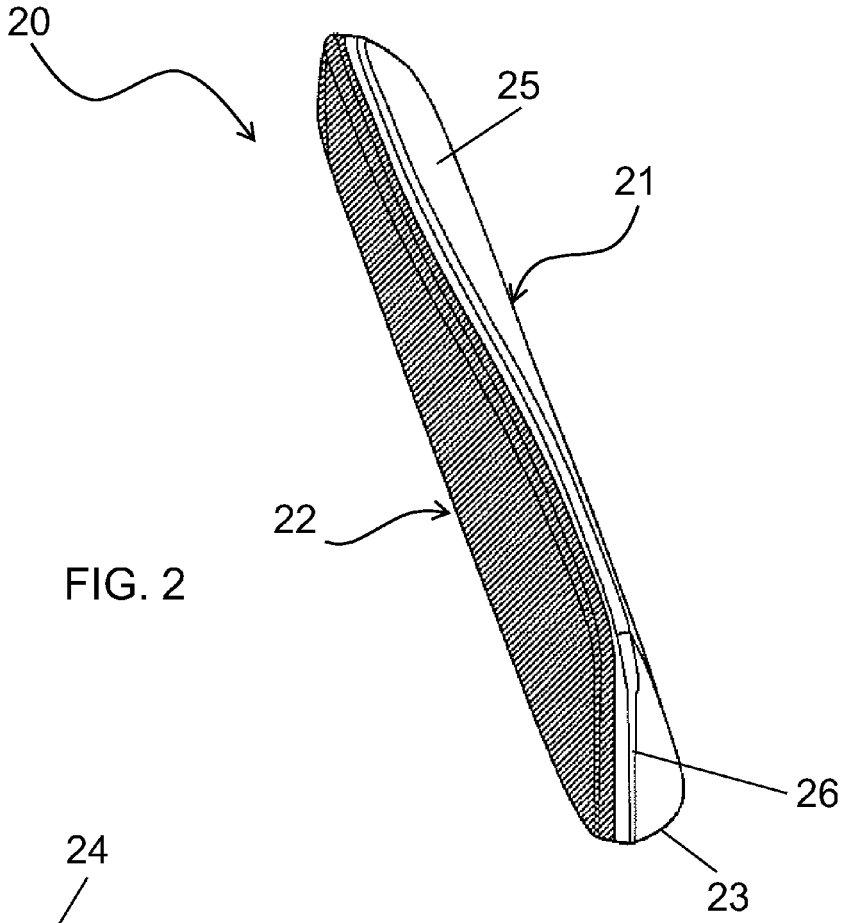

FIG. 2

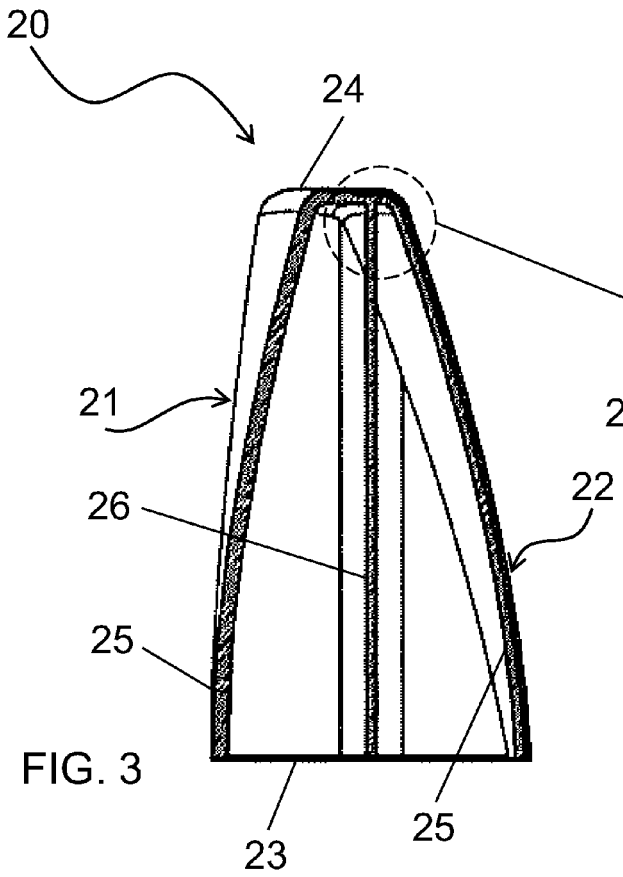

FIG. 3

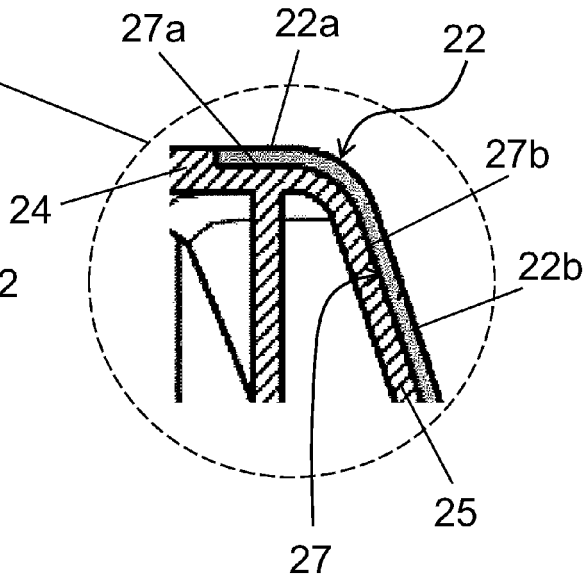

FIG. 3A

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Application Number
EP 12 15 8822

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A47L
D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 September 2012	Kising, Axel

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