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(54) **Dispenser of active substances for WC bowls**

(57) A dispenser of active substances for WC bowls, comprising: suspension means (10) for suspending the dispenser from a rim (51) of the WC bowl; a solid block (30) comprising at least an active substance, in a position which is subject to action of flush water, having an opening (31) which crosses a body of the solid block (30), which opening passes from a surface (33) thereof to another surface (34) thereof; a support element (20), comprising a cross-member (25) passing through the through-opening (31) of the solid block (30), and destined to support the solid block (30). The support element (20) comprises two arms (22, 24) connected to the two ends of the cross-member (25), which two arms (22, 24) exhibit, at the connection with the cross-member (25), respective flat portions (22a, 24a), adjacent to the surfaces (33, 34) of the solid block (30), having such dimensions as to completely cover mouths that the opening (31) forms on the surfaces (33, 34). Though requiring only a very limited amount of plastic, the dispenser enables the solid block to be consumed homogeneously up until a whole body thereof is washed away.

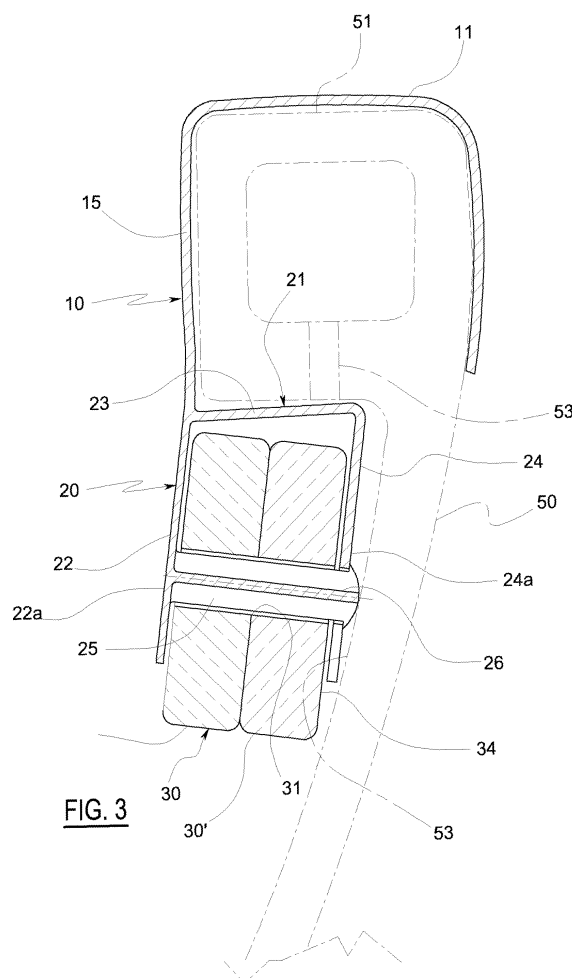


FIG. 3

Description

[0001] The invention concerns a dispenser of active substances for WC bowls, of the type which comprises a container for the active substance and means for hooking the container to the rim of the bowl, in such a way as to maintain the container suspended in a position which is subjected to the action of the flush water.

[0002] As is known, the simplest form of dispensers for WC comprises a rigid cage-like container which contains a solid active substance in the form of a compacted block - usually referred to as a "rim-block".

[0003] The active substance is destined to dissolve on contact with the flush water, thus forming a liquid mixture which crosses the mesh of the cage and spreads over the inside walls of the WC bowl, there performing a perfuming, detergent, disinfectant action, or other types of action, according to the active substance being used.

[0004] The cage of the active substance and the means for fastening it to the WC bowl are typically made of plastic, through an injection moulding process.

[0005] These dispensers are rather expensive to produce, because of the relatively high cost of machines and moulds, the cost of the material, and the high energy consumption.

[0006] Further, owing to the relatively large quantities of plastic used, such dispensers impact very significantly on the environment and consequently give rise to high disposal costs (taxes).

[0007] Documents US 3,675,254 and GB 813,392 describe WC dispensers, in which the quantity of plastic used for manufacturing the dispensers is relatively limited. The dispensers comprise a hooking means for suspending the dispenser from the rim of the bowl and a solid block comprising an active substance, in a position which is subject to the flush water, having a through-opening and a support element which supports the solid block by means of a cross-piece placed through the through-opening of the solid block.

[0008] These types of dispensers, though requiring a very limited quantity of plastic, have however the drawback that the solid block, when subjected to the water, has a working life that is much shorter than it would normally have. After a relatively limited number of flushes, in fact, and a correspondingly limited consumption, it tends to crumble easily and lose pieces up until it is completely washed away by the flush water, and thus becomes ineffective much before than if it were to be dissolved correctly and gradually by the water.

[0009] An aim of the present invention is to realise a dispenser for a WC bowl which though requiring a very limited quantity of plastic obviates the above-mentioned drawback, and the solid block is consumed homogeneously and at a correct rate up until it is completely washed away.

[0010] A further aim of the invention is to achieve the above-mentioned aim within the ambit of a simple, rational and relatively inexpensive solution.

[0011] The aims are achieved by the characteristics of the invention disclosed in independent claim 1.

[0012] The dependent claims delineate preferred and/or particularly advantageous aspects of the invention.

[0013] The invention is described below in detail with the aid of the appended figures of the drawings, which provide a non-limiting example of an embodiment of the invention.

Figures 1 and 2 are perspective views of the dispenser seen from two different points of view.

Figure 3 is a section view of the dispenser applied to the rim of a WC bowl.

Figure 3A is an enlarged detail of Figure 3.

Figure 4 is a perspective view of the suspension means alone.

Figure 5 is a section view of a second embodiment of the dispenser, applied to a rim of a WC bowl.

Figure 6 is a perspective view of the suspension means alone of Figure 5.

Figure 7 is a perspective view of a third embodiment. Figure 7A is an enlarged detail of Figure 7.

Figure 8 is a perspective view of a fourth embodiment.

[0014] The dispenser comprises suspension means 10 which at their upper end exhibit a hook means 11 for suspending the dispenser from the rim 51 of the WC bowl 50.

[0015] The hook 11 can exhibit a shape which is traditional for dispensers, for example it can be made of elastically flexible material (typically plastic) which hooks onto the rim 51 of the bowl 50 and at the same time, as a reaction against the original deformation imposed upon it by the act of hooking, grips the rim 51 in such a way as to remain joined to the rim with sufficient force to resist any possible stresses tending to detach it, to which it is subjected during normal use of the bowl 50.

[0016] A support element 20 which is situated at the other (lower) end of the suspension means 10 supports a solid block 30 comprising at least one active substance, in a position which is subjected to the action of the flush water.

[0017] The solid block 30 is formed from a substance which regularly and quite slowly dissolves when in contact with water, thereby forming a liquid mixture which performs an action that depends on the formulation of the active substance it contains.

[0018] For example the action can be detergent, disinfectant, enzymatic, anti-scale, whitening, deodorant, or a synergistic combination of two or more of the foregoing, and it can achieve its effect on the inside walls of the WC, on the water in the siphon, on the walls of the WC below the siphon water level, or in the discharge pipes.

[0019] In particular, in the case of a dispenser suited to being suspended from the rim of a WC bowl 50, the support element 20 and the solid block 30 are arranged

in the WC bowl 50, against the inside surface 52 of the bowl 50, below the upper rim 51 of the bowl 50, and exposed to the action of flush-water flow.

[0020] Usually, flush water exits along the rim 51, flowing from holes 53 which are arranged on the lower part, or exits from a rear central outlet in the bowl 50 and is made to flow in a direction which is tangential to the inside surface 52, below the rim 51.

[0021] In the invention, the solid block 30 exhibits a through-opening 31 afforded through its body, passing from a lateral surface 33 to the opposite surface 34. In detail, the through-opening 31 has the form of a circular channel pass more or less through the centre of the block 30.

[0022] The block 30 can be formed by a single body, or by two or more bodies 30' which are arranged pack-fashion along the direction of the axis of the opening, as shown in figures 3 and 3A, or else are formed by a series of concentric bodies.

[0023] The support element 20 is connected to the suspension means 10, and comprises a cross-member 25, placed through the through-opening 31 of the solid block, and destined to support the solid block 30.

[0024] Further, in the invention, the support element 20 comprises two arms 22, 24, connected to the two ends of the cross-member 25, which exhibit, at the connection thereof with the cross-member 25, respective flat portions 22a, 24a adjacent to the surfaces 33 and respectively 34 of the solid block 30, having an extension which is such as to completely cover the mouths which the opening 31 forms on the surfaces 33, 34.

[0025] In a preferred embodiment illustrated in the figures, the support element 20 defines a closed ring shape able to pass from side to side through the opening 31 of the solid block.

[0026] The support element 20 comprises a shaped portion 21 having a U-shape, in particular downwardly-facing, and a cross-member 25, which is arranged traversing the through-opening 31 of the solid block 30, ends of which cross-member 25 are connected to lower ends of the U-shaped portion 21. The U-shaped portion 21 and the cross-member 25 define the closed ring.

[0027] In particular, in the embodiment shown in figures from 1 to 4, the shaped portion 21 comprises two straight elongate arms 22 and 24, which are substantially parallel and face downwardly, upper ends of which are solidly attached (in a single body) to the ends of the transversal arm 23, and the lower ends of which define the flat portions 22a, 24a adjacent to the surfaces 33 and 34, and the ends of the cross-member 25 are connected thereto.

[0028] The cross-member 25 exhibits at least an end that is removably connected to an end of the U-shaped portion, with a disconnectable connection. In detail, the cross-member 25 exhibits a tapered end 26 shaped like a small spearhead which can be inserted through a hole 27, which is afforded in the lower end of the third arm 24, in such a way as to snap-fit thereto.

[0029] The other end of the cross-member 25 is solidly attached to the lower end of the first arm 22.

[0030] The lower end of the arm 22 defines the flat portion 22a while the lower end of the arm 24 defines the flat portion 24a; these two flat portions adhere to the surfaces 33, 34 of the solid block 30 and are able to effectively cover the two ends of the through-opening 31 from the passage of water.

[0031] Preferably, the cross-member 25 exhibits external longitudinal ribbing 25' which renders the structure rigid.

[0032] In a preferred (though not exclusive) embodiment, the suspension means 10 comprise a stem 15 which extends from the hook 11 and joins, with its lower end, the downwardly-facing U-shaped portion 21.

[0033] In detail, if the upper rim of the bowl forms a recess at an angle with the inner surface 52 of the bowl below the rim, the shaped portion 21 will project laterally relative to the stem 15 in such a way as to fit below the lower wall of the upper rim 51 and against the inside surface 52.

[0034] Thanks to this configuration, the arm 23 and the hook 11 grip the rim 51 of the bowl over a very wide angle (at least 270° in figure 3), thus making the connection of the dispenser to the rim 51 stable.

[0035] In the embodiment shown in the figures, the solid block 30 has the shape of a cylindrical slab, with a through-opening 31 arranged along the longitudinal axis of the cylinder.

[0036] In use, to fit a solid block with active substances 30 to the suspension means 10, the flat portion 24a of the arm 24 is distanced from the end 26 of the cross-member 25, bending the arm 24, which by its own nature is elastically flexible. The cross-member 25 is then inserted through the hole 31 in the block 30, and the flat portion 24a is connected to the free end of the cross-member 25, thus securing the end 26 within the hole 27. In this way the block 30 is suspended from the support element 20 and constrained to it by the closed ring which is formed by the three arms 22, 23, 24 and by the cross-member 25.

[0037] Once applied to the bowl 50 of the WC, the block 30 remains suspended in a position in which it is subjected to the flush water flow and performs its action as if it were inserted within a traditional cage-like dispenser.

[0038] The second embodiment, shown in figures 5 and 6, differs from the previous embodiment solely due to the different shape of the shaped portion 21. In this case, the second arm, which is horizontal and is joined transversely to the stem 15 (indicated by reference numeral 23'), is shorter and is no longer joined to the third arm 24. The arm 24 is defined by the flat portion 24a having a disc shape, placed through the end of the cross-member 25, the external diameter of which is greater than the diameter of the opening 31, with a disconnectable connection.

[0039] The second arm 23' projects laterally with respect to the stem 15 in such a way as to come into contact

with the lower surface of the lower wall of the rim 51 of the bowl, in order to render the connection of the dispenser to the rim 51 more stable.

[0040] Unlike traditional cage dispensers, the dispenser of the invention requires a much smaller quantity of materials, in particular of plastic, for its production, thus causing less environmental impact and costing less for materials, especially since there is no outer cage structure.

[0041] For the same reason, the dispenser of the invention is cheaper to produce, since the process for producing the suspension means 10 is rather simple and economical, enabling the high costs for injection-moulding the plastic to be reduced, and does not require sizeable investments in machines and moulds. Fitting the block 30 to the suspension means 10 is also simple and convenient to perform both manually or using machine assembly.

[0042] It has, further, been experimentally proven that the flat portions 22a, 24a adjacent to the surfaces 33 and 34 of the solid block 30 perform a crucial action in lengthening the working life of the solid block 30 and make it so that the erosion and dissolving thereof caused by the flow of the WC flush water is correct and regular.

[0043] Indeed, without the present of the flat portions, such as for example in the case of the dispensers illustrated in US 3,675,254 and GB 813,392, part of the flow of WC flush water also flows internally of the opening 31, and causes a relatively rapid widening of the opening 31, such that after a relatively low number of flushes the opening 31 reaches the perimeter of the block 30 and the block 30 detaches from the cross-member, or separates into two or more parts and in any case crumbles and is carried away by the flush water. The working life of the block in these cases is very brief and unacceptable.

[0044] On the contrary, with a dispenser of the invention, thanks to the action of the flat portions 22a, 24a, adjacent to the surfaces 33 and 34 of the solid block 30 and having an extension which is such that it completely covers the mouths that the opening 31 forms on the surfaces 33, 34, the flow of the water striking the block 30 does not pass through the opening 31 and thus does not produce the described undesired effects.

[0045] In the embodiments shown in figures 7 and 8, in addition to the solid block 30 comprising at least one active substance in a position which is subjected to the action of the flush water, the dispenser comprises a diffuser element 40 for the airborne diffusion of substances, the diffuser element 40 being fixed to the suspension means 10, and diffusing at least one substance into the air, for example a perfuming or a deodorant substance, independently of the action of the WC flush water, in particular diffusing continuously and extensively over time.

[0046] In detail, the diffuser element 40 comprises a support wall 41 which is provided with at least one through-hole 42. The suspension means 10 comprise at least one projecting body 43 which snap-fits to the support wall 41 via the through-hole 42.

[0047] In the embodiment shown in figures 7 and 7A, the diffuser element 40 is provided with only one hole 42 in a central position and the body 43 is located on the first arm 22. The diffuser element 40 shown here is of the type which comprises a forward shell 44 which is joined to the support wall 41 and contains a plurality of small bodies 46 which are soaked in a volatile substance, or other type of carrier material, such as gel. Through a series of slits 45 afforded in the shell 44, the volatile substance released by the bodies 46 diffuses into the surrounding environment.

[0048] In the embodiment of figure 8, the diffuser element 40 exhibits an elliptically elongate casing, with two holes 42 associated to two projecting bodies 43. The diffuser means are of the type which enclose a (more or less dense) liquid substance contained in a tray formed by the profiled wall 41, allowing the perfuming/deodorant volatile substance given off by the liquid to pass through. Obviously numerous practical and applicational modifications can be introduced to the invention without its forsaking the ambit of the inventive step as claimed herein below.

Claims

1. A dispenser of active substances for WC bowls, comprising:

suspension means (10) for suspending the dispenser from a rim (51) of the WC bowl, a solid block (30) comprising at least an active substance, located in a position which is subjected to action of flush water, having an opening (31) which crosses a body of the solid block (30), which opening passes from a surface (33) thereof to another surface (34) thereof, a support element (20), connected to the suspension means (10), which comprises a cross-member (25) passing through the through-opening (31) of the solid block (30), and destined to support the solid block (30);

characterised in that the support element (20) comprises two arms (22, 24) connected to the two ends of the cross-member (25), which two arms (22,24) exhibit, at the connection with the cross-member (25), respective flat portions (22a, 24a), adjacent to the surfaces (33, 34) of the solid block (30), having such dimensions as to completely cover mouths that the opening (31) forms on the surfaces (33, 34).

2. The dispenser of claim 1, **characterised in that** at least one of the arms (22) is directly fixed to the suspension means (10).
3. The dispenser of claim 2, **characterised in that** the support element (20) exhibits a shape which defines

a closed ring, of which the cross-member (25) is a part and is destined to cross the through-opening (31) of the solid block from one side thereof to another side thereof.

4. The dispenser of claim 3, **characterised in that** the support element (20) comprises a U-shaped portion (21) which the two arms (22, 24) are part of, lower ends of which U-shaped portion (21) define the flat portions (22a, 24a) adjacent to the surfaces (33, 34), ends of the cross-member (25) being connected thereto.

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5. The dispenser of claim 4, **characterised in that** the cross-member (25) exhibits at least an end which is connected to an arm of the two arms (22, 24) by means of a disconnectable connection.

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6. The dispenser of claim 4, **characterised in that** the cross-member (25) projects laterally with respect to the stem (15) in such a way as to be housable, together with the solid block (30), below the upper rim (51) of the WC bowl, in a case in which the WC bowl exhibits an upper rim (51) which forms an angled undercut recess with a surface (52) of the bowl (50) located below the rim.

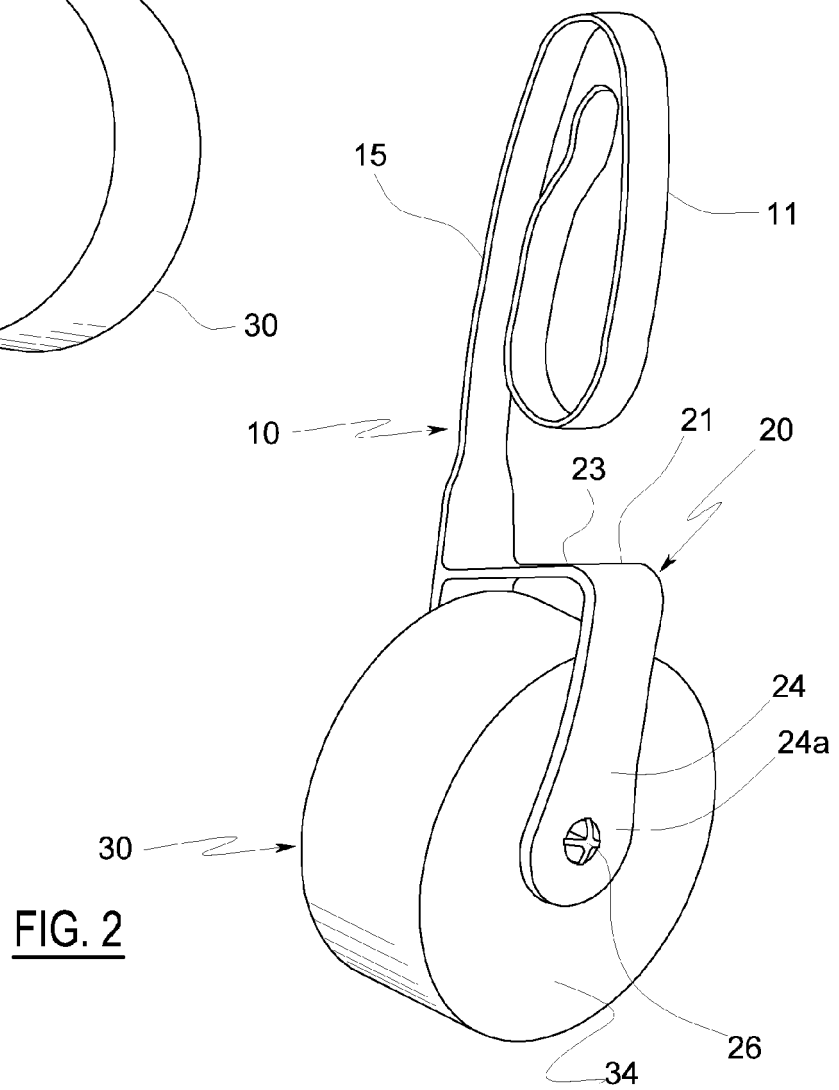
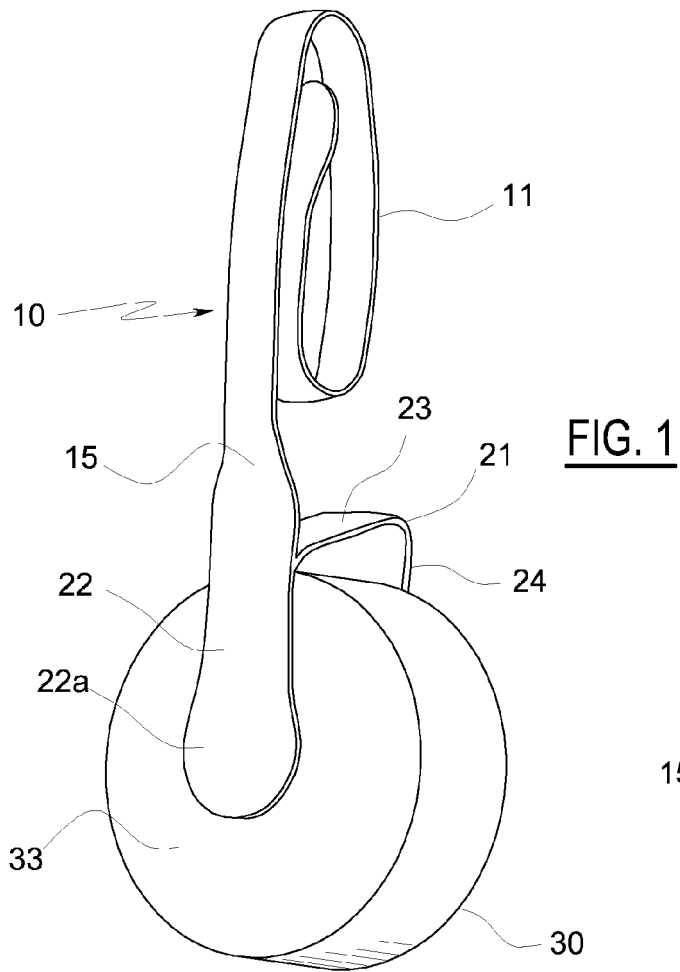
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7. The dispenser of claim 2, **characterised in that** the cross-member (25) is supported projectingly by the first arm (22), which is directly fixed to the suspension means (10), while the other arm (24) is defined by the flat portion (24a) having a disc shape, located through the end of the cross-member (25), an external diameter of which is greater than a diameter of the opening (31), with a disconnectable connection.

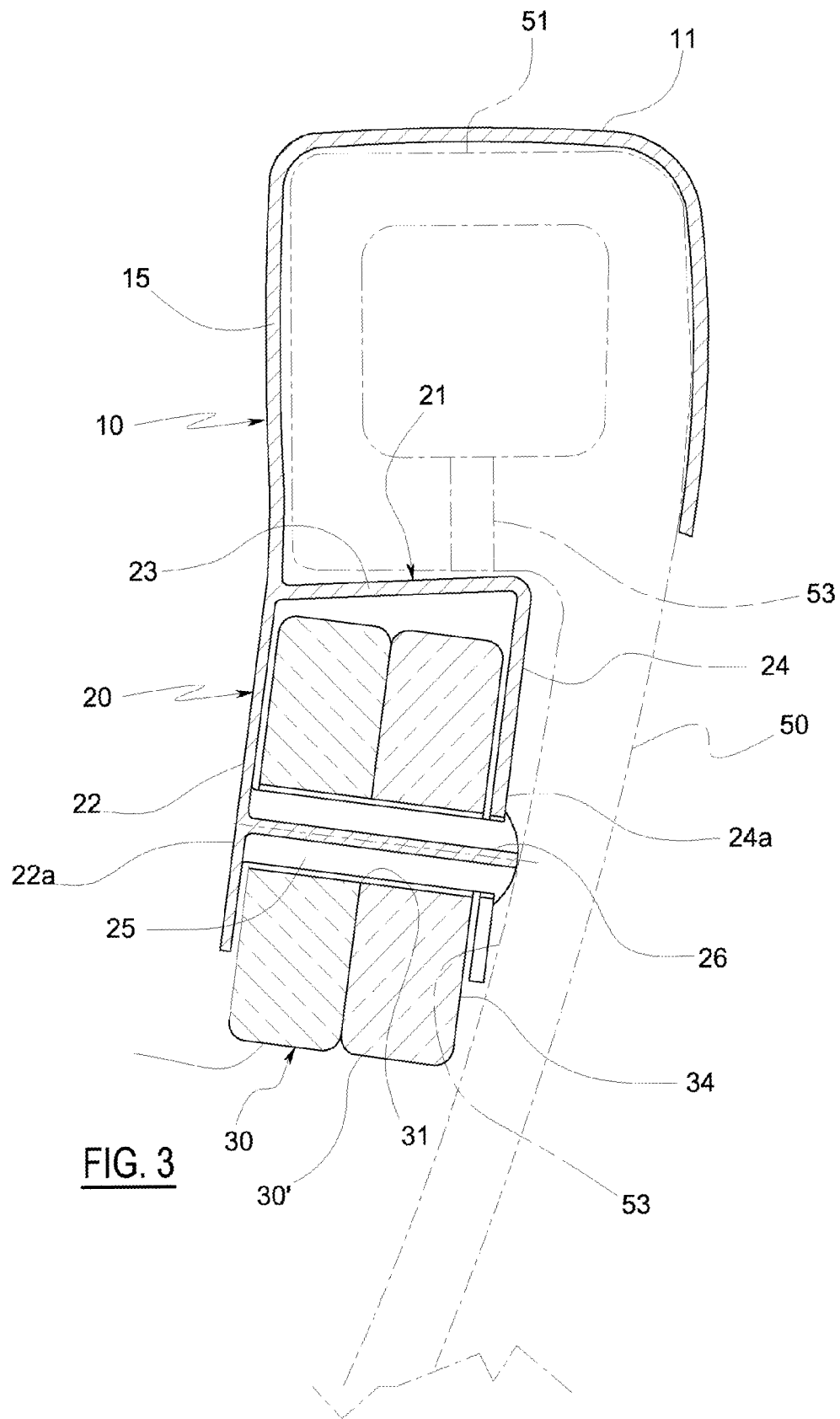
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8. The dispenser of claim 7, **characterised in that** it comprises a second arm (23') which projects laterally with respect to the stem (15) such as to come into contact with a lower surface of a lower wall of the rim (51) of the bowl.

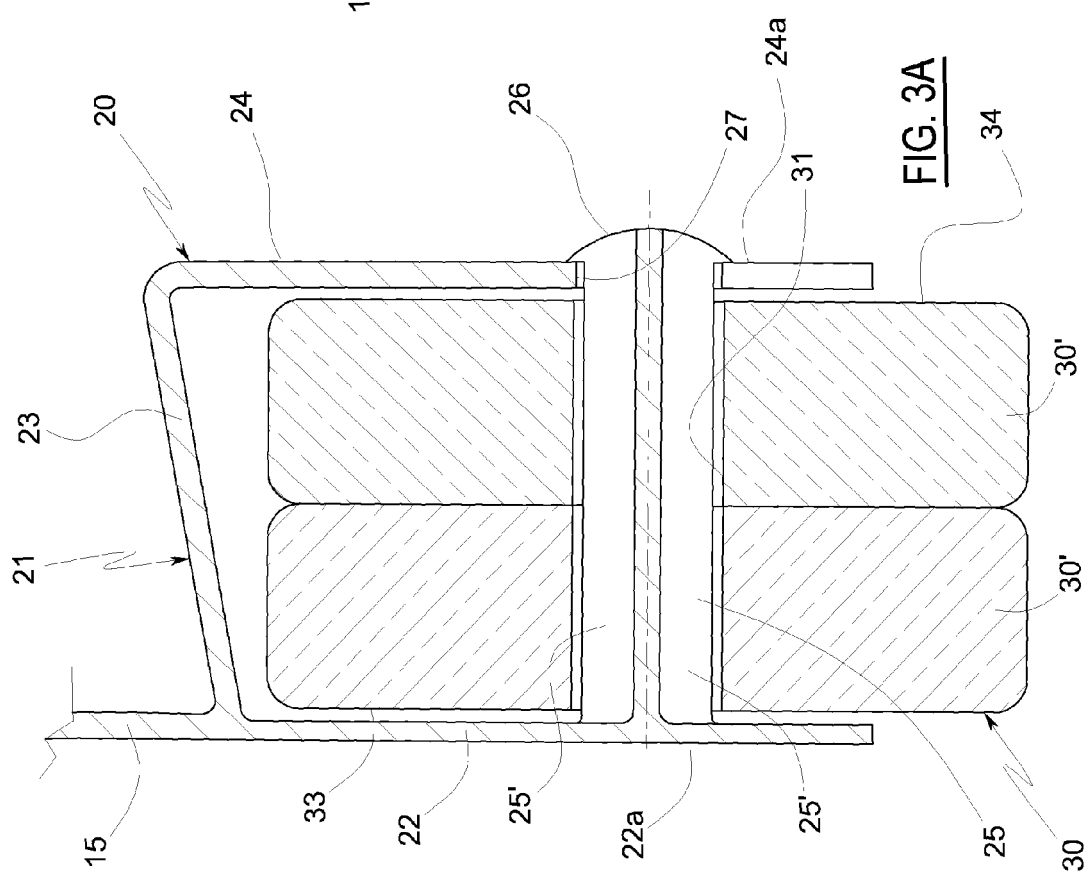
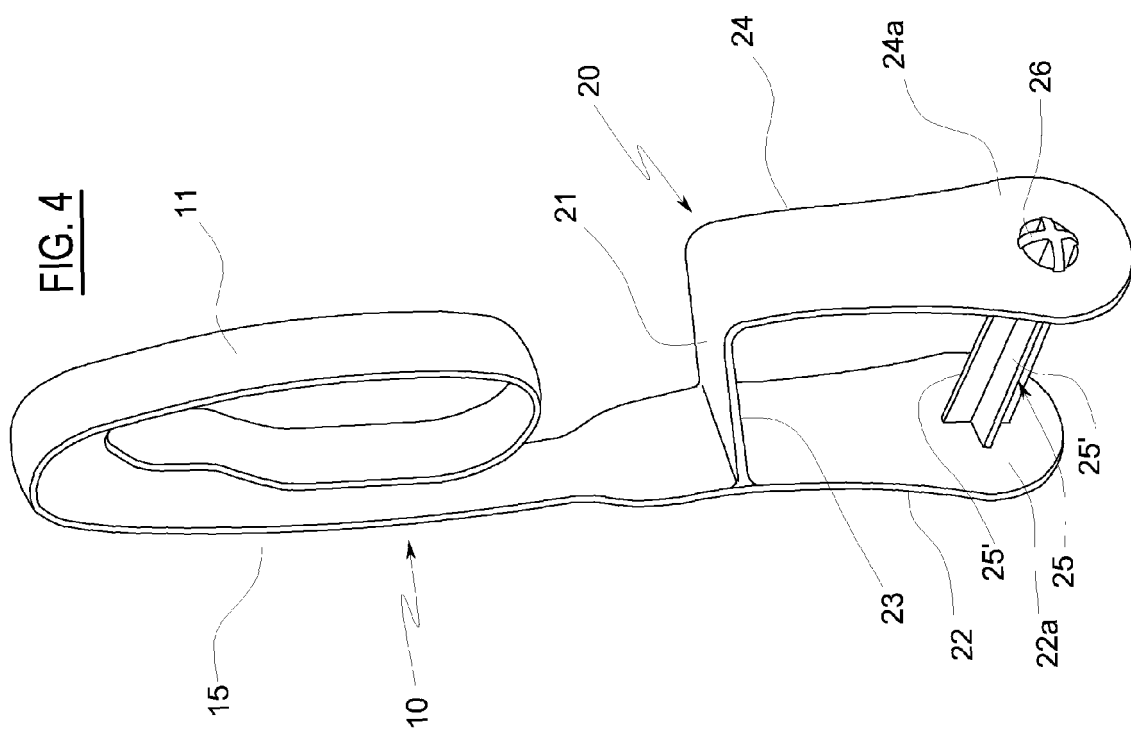
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9. The dispenser of any of the preceding claims, **characterised in that** it comprises a diffuser element (40) for airborne diffusion of substances, which diffuser element (40) is attached to the support means (20).

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10. The dispenser of claim 9, **characterised in that** the diffuser element (40) for airborne diffusion of substances comprises a support wall (41) provided with at least a through-hole, and the support wall (20) comprises at least a projecting body (43) which snaps to the support wall through the through-hole.

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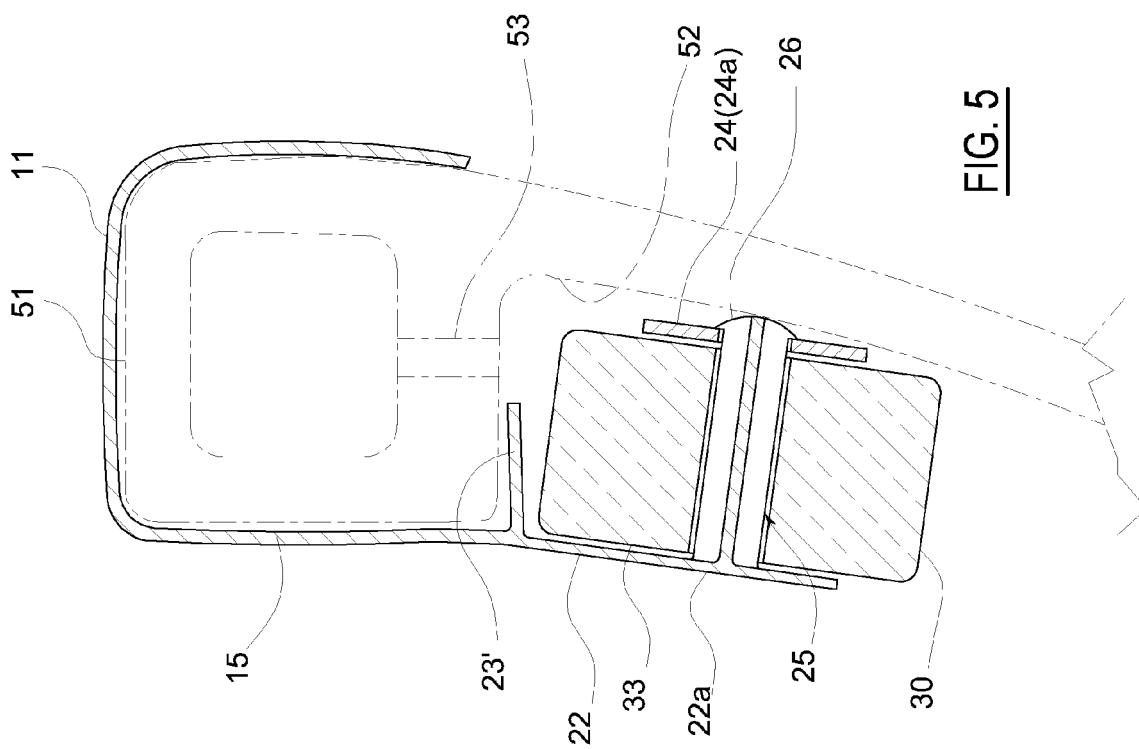
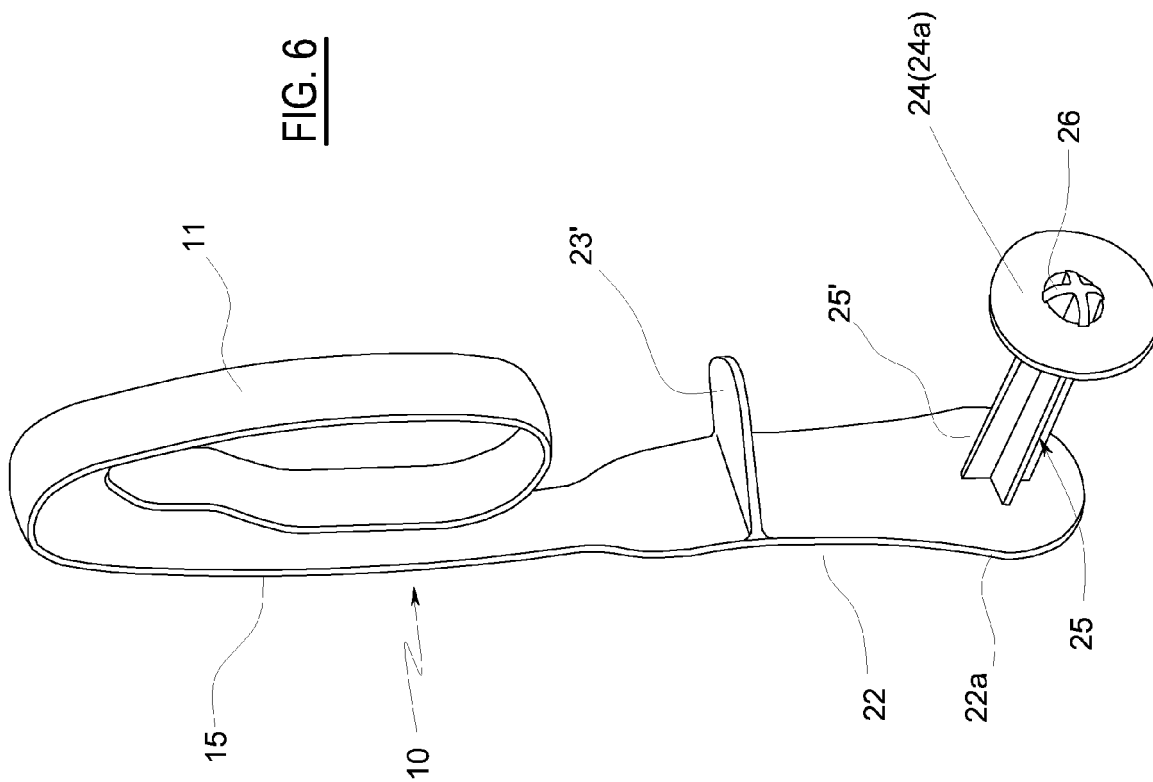


FIG. 7

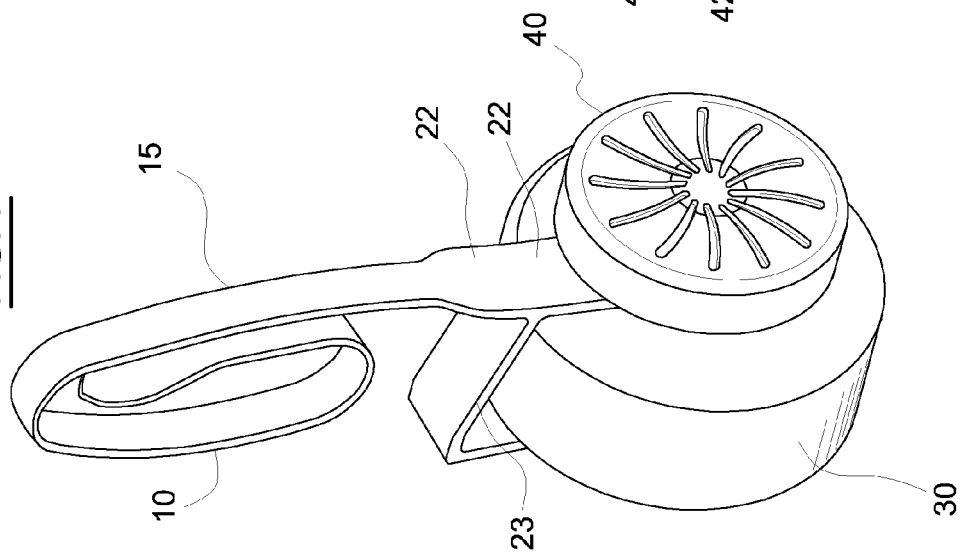


FIG. 7A

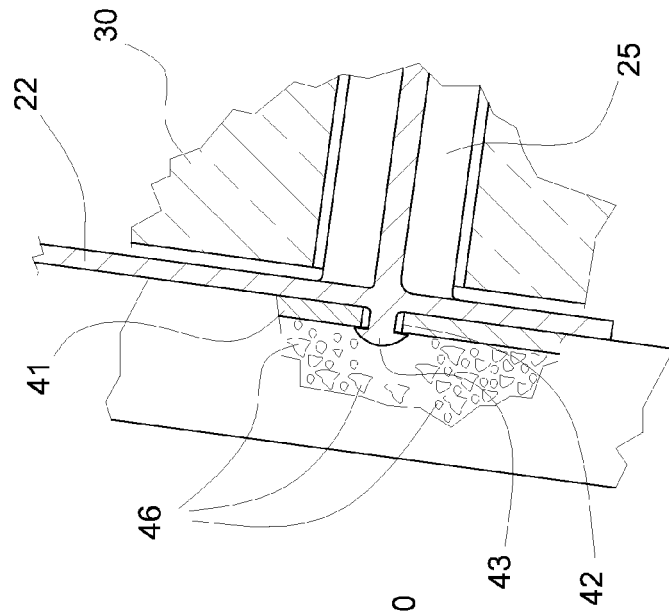
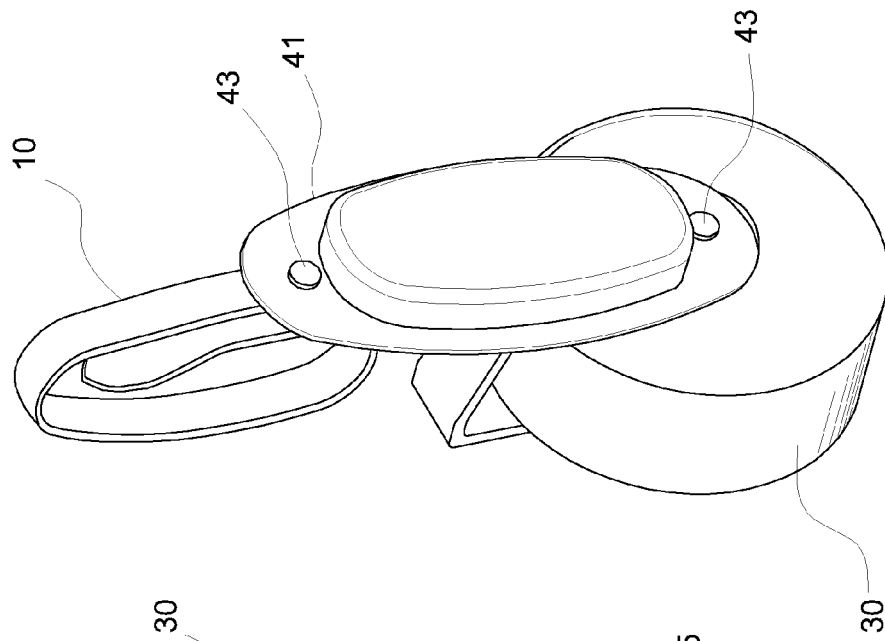


FIG. 8





EUROPEAN SEARCH REPORT

Application Number
EP 10 16 7413

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 8 October 2010	Examiner Urbahn, Stephanie
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 10 16 7413

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The members are as contained in the European Patent Office EDP file on
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08-10-2010

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