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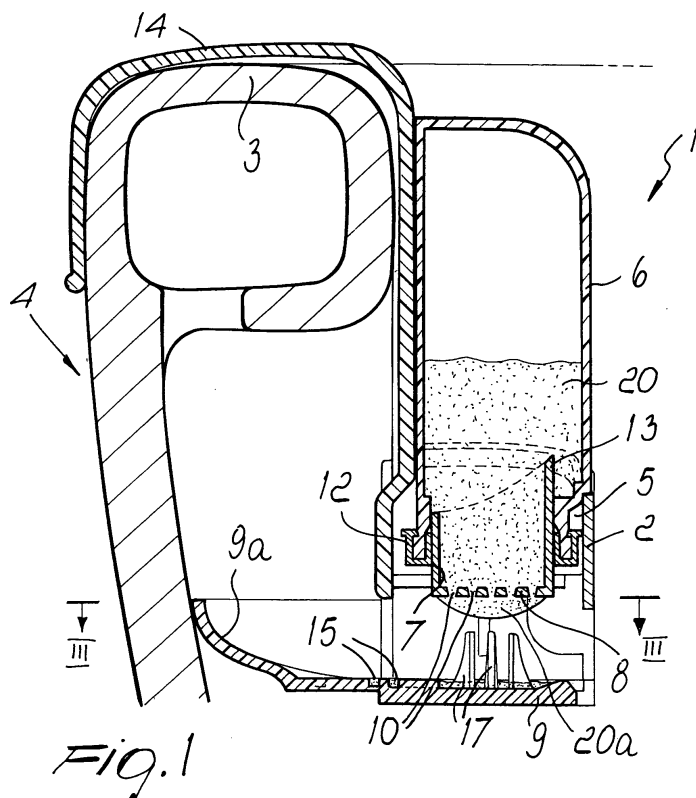
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AL HR LT LV MK(71) Applicant: **Deoflor S.p.A.****27029 Vigevano (Pavia) (IT)**(72) Inventor: **Ruffina, Laura****27036 Mortara (PV) (IT)**(74) Representative: **Modiano, Micaela Nadia et al
Dr. Modiano & Associati S.p.A.****Via Meravigli 16****20123 Milano (IT)****(54) Device for dispensing liquid substances inside toilet bowls**

(57) A device (1) for dispensing liquid substances inside toilet bowls, which comprises a supporting element (2), which is provided with means for engaging the rim (3) of a toilet bowl (4) and forms at least one receptacle (5) for at least one container (6) of the liquid substance (20) to be dispensed, the container being arranged so that its outlet (7) is directed downwardly. Below or at the outlet of the container there is a perforated wall (8), which faces in an upward region an element (9) for collecting

the liquid substance dispensed from the container. The collecting element is affected by the passage of the toilet bowl cleaning water. The perforations (10) of the perforated wall and the viscosity of the liquid substance dispensed from the container are adapted to form, on the lower face of the perforated wall (8), a suspended meniscus (20a) of liquid substance that contrasts the further outflow of liquid substance from the container and is reached and can be removed by the stream of toilet bowl cleaning water that flows over the collecting element.

**Fig. 1****EP 1 632 616 A1**

Description

[0001] The present invention relates to a device for dispensing liquid substances inside toilet bowls.

[0002] Devices for dispensing liquid substances, such as for example detergent and/or sanitizing and/or deodorant substances, inside toilet bowls in order to increase and integrate the cleaning action performed by water when the flushing device of the toilet bowl is operated, are known.

[0003] These devices are offered as a valid alternative to the use of solid substances in the form of bars, contained in cages made of synthetic material, which are hung inside the toilet bowl by fastening them to its rim. These bars, which are gradually dissolved by the flow of cleaning water at each flush, in fact have drawbacks, such as a sometimes uneven consumption and a release of the fragranting or deodorant substances that usually ends before the bar is completely used, and these drawbacks are overcome by devices that use liquid substances.

[0004] Currently commercially available devices for dispensing liquid substances inside toilet bowls are generally constituted by a supporting element, which is provided with means for engaging the toilet bowl rim and supports a container of the liquid substance to be dispensed; by means of appropriately provided passage ducts, said container allows the liquid substance to fall by gravity onto an element that is provided so as to retain a preset amount of the liquid substance and is exposed to the action of the toilet bowl cleaning water.

[0005] In some devices, the element that retains the liquid substance is constituted by a porous mass; in other devices, it is constituted by a body with multiple channels or grooves, with a path that may optionally be labyrinth-like, so as to retain a preset amount of liquid substance, preventing it from dripping freely inside the toilet bowl. In practice, with these devices, every time the toilet bowl flushing device is operated, the cleaning water is conveyed onto this element and entrains a preset amount of the liquid substance. By appropriately modulating the ducts for passage from the container to the element that is designed to retain the liquid substance, as well as the viscosity and vapor pressure of said liquid substance, it is possible to achieve, every time the toilet bowl flushing device is operated, the release of substantially constant quantities of the liquid substance into the cleaning water. However, even these devices that use liquid substances are not devoid of drawbacks. When the toilet bowl flushing device is operated too frequently, the liquid substance is in fact unable to saturate the porous mass or fill the grooves or channels of the element that retains the liquid substance, and therefore the amount of liquid substance dispensed into the washing water is lower than intended. If instead the activations of the toilet bowl flushing device are infrequent, the liquid substance retained by the element designed to be struck by the cleaning water may partially dry up, forming a dry residue that can compro-

mise the correct dispensing of the liquid substance in the cleaning water.

[0006] The aim of the present invention is to obviate the drawbacks cited above by providing a device for dispensing liquid substances inside toilet bowls that ensures, every time the flushing device of the toilet bowl is operated, a substantially constant release of the liquid substance into the cleaning water, regardless of the frequency of the activations of the toilet bowl flushing device.

[0007] Within this aim, an object of the invention is to provide a device that ensures a substantially constant release of the liquid substance into the toilet bowl cleaning water throughout its useful life.

[0008] Another object of the invention is to provide a device that can be manufactured at competitive costs.

[0009] This aim and these and other objects that will become better apparent hereinafter are achieved by a device for dispensing liquid substances inside toilet bowls, comprising a supporting element that is provided with means for engaging the rim of a toilet bowl and forms at least one receptacle for at least one container of the liquid substance to be dispensed, said container being arranged so that its outlet is directed downwardly, characterized in that below or at the outlet of the container there is a perforated wall, which faces in an upward region an element for collecting the liquid substance dispensed from said container, said collecting element being affected by the passage of the toilet bowl cleaning water, the perforations of said perforated wall and the viscosity of the liquid substance dispensed from said container being adapted to form, on the lower face of said perforated wall, a suspended meniscus of liquid substance that contrasts the further outflow of liquid substance from said container and can be removed by the stream of toilet bowl cleaning water that flows over said collecting element.

[0010] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of the device according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a sectional side view, taken along a vertical plane, of the device according to the invention, applied to a toilet bowl, when no cleaning water is dispensed;

Figure 2 is a side sectional view, similar to Figure 1, of a portion of the device according to the invention, applied to a toilet bowl, during the dispensing of the cleaning water;

Figure 3 is a sectional view of Figure 1, taken along the line III-III;

Figure 4 is a perspective view of the collecting element.

[0011] With reference to the figures, the device according to the invention, generally designated by the reference numeral 1, comprises a supporting element 2,

which is provided with means for engaging a rim 3 of a toilet bowl 4 and forms at least one receptacle 5 for at least one container 6 for a liquid substance 20 to be dispensed, which is placed in the receptacle 5 so that its outlet 7 is directed downwardly.

[0012] Below or at the outlet 7 of the container 6 there is a perforated wall 8, which faces in an upward region an element 9 for collecting the liquid substance 20 dispensed from the container 6.

[0013] The collecting element 9 is provided and arranged so that when the device is fastened to the rim 3 of the toilet bowl 4 it is struck by the flow of the water for cleaning the toilet bowl 4.

[0014] Perforations 10 of the perforated wall 8 and the viscosity of the liquid substance 20 dispensed from the container 6 are adapted to form, on the lower face of a perforated wall 8, a suspended meniscus of liquid 20a, which contrasts the further outflow of the liquid substance 20 from the container 6 and is reached and removed by the stream of water for cleaning the toilet bowl 4 that flows over the collecting element 9.

[0015] More particularly, the perforated wall 8 is preferably provided as a grille and the perforations 10 are preferably shaped like funnels that taper downwardly.

[0016] The supporting element 2 is preferably made of a molded synthetic material, and the perforated wall 8 may be provided monolithically with the supporting element 2 on the bottom of the receptacle 5 that is designed to receive the container 6.

[0017] The container 6 is preferably made of a transparent or semitransparent molded synthetic material, so as to allow to view the level of the liquid substance 20 contained therein.

[0018] The outlet 7 of the container 6 may be closed until it is used by a cap 12 of the type with a pierceable diaphragm, and on the bottom of the receptacle 5, at the region where the outlet 7 of the container 6 is located, it is possible to provide a beveled element 13, which can be inserted in the outlet 7 in order to retain the container 6 and pierce the closure diaphragm provided on the outlet 7 of the container 6.

[0019] As an alternative, the perforated wall 8 may be provided directly on the outlet 7 of the container 6. In this case, it is possible to provide a closure cap or diaphragm to be removed before arranging the container 6 on the supporting element 2. In this case, the beveled element 13 is obviously unnecessary.

[0020] The means for engaging the supporting element 2 with the rim 3 of the toilet bowl 4 are preferably constituted by a hook-like element 14, which is also preferably made of molded synthetic material and is connected to the supporting element 2 laterally to the receptacle 5 that receives the container 6.

[0021] The collecting element 9 is preferably tray-like, and has a wing 9a that protrudes laterally with respect to the container 6 and can be arranged below the rim 3 of the toilet bowl 4, so as to receive the cleaning water that is dispensed generally between the rim 3 and the

inside walls of the toilet bowl 4.

[0022] Conveniently, the collecting element 9 has, on its upper face, grooves 15, which are designed to retain the liquid substance 20 dispensed from the container 6, as will become better apparent hereinafter.

[0023] The collecting element 9 is open on its opposite side with respect to the wing 9a, in order to allow the cleaning water to flow freely over its upper face.

[0024] The collecting element 9 further has drainage holes 16 to prevent stagnation of the cleaning water of the toilet bowl 4 on its upper face.

[0025] Preferably, the collecting element 9 has, in the region below the outlet 7, i.e., in the region that faces the perforated wall 8, protrusions 17 that protrude toward the perforated wall 8.

[0026] Such protrusions 17 are designed to retain a certain amount of the liquid substance 20 dispensed from the container 6 and to facilitate turbulence of the cleaning water below the perforated wall 8, as will become better apparent hereinafter.

[0027] The collecting element 9 is preferably made of molded synthetic material and is connected to the supporting element 2 below the receptacle 5 that accommodates the container 6.

[0028] Preferably, the diameter of the holes 10 of the perforated wall 8 is substantially comprised between 0.3 and 3 mm, and the liquid substance 20 contained in the container 6 preferably has a viscosity substantially comprised between 100 and 4000 cps.

[0029] Even more preferably, the diameter of the holes 10 of the perforated wall 8 is substantially comprised between 0.5 and 1 mm, and the liquid substance 20 contained in the container 6 preferably has a viscosity substantially comprised between 2000 and 3000 cps.

[0030] Operation of the device according to the invention is as follows.

[0031] The device, with the container 6 arranged upside down, i.e., so that its outlet 7 is directed downwardly inside the receptacle 5 of the supporting element 2, is engaged, by means of the hook-like element 15, on the rim 3 of the toilet bowl 4, so that the wing 9a of the collecting element 9 can receive the cleaning water of the toilet bowl 4 when the flushing device of said toilet bowl 4 is operated.

[0032] Between one operation of the flushing device and the next, the liquid substance 20 flows through the holes 10 of the perforated wall 8.

[0033] Initially, a few drops of the liquid substance 20 fall onto the collecting element 9 and are retained on said collecting element by the presence of the protrusions 17 and of the grooves 15. The drops of liquid substance 20 that remain on the collecting element 9 may perform a fragrancing action if the liquid substance 20 has fragrances added thereto.

[0034] The descent of the liquid substance 20 by gravity through the holes 10 of the perforated wall 8 is gradually slowed by the partial vacuum that forms inside the container 6, until an equilibrium is reached in which, as

a consequence of the viscosity of the liquid substance 20 and of the diameter of the holes 10, a lenticular mass or meniscus 20a of liquid substance 20 remains suspended on the lower face of the perforated wall 8.

[0035] If the flushing device of the toilet bowl 4 is operated, the cleaning water flows over the collecting element 9, between the upper face thereof and the perforated wall 8, also striking the perforated wall 8 and removing the liquid substance 20 that had deposited on the upper face of the collecting element and the meniscus 20a of liquid substance 20 that had formed on the lower face of the perforated wall 8.

[0036] In this manner, a quantity of liquid substance 20 that is substantially constant regardless of the degree of filling of the container 6 is added to the cleaning water.

[0037] During the flow of the flushing water over the collecting element 9, the protrusions 17 facilitate turbulence of the cleaning water below the perforated wall 8, which ensures removal of the meniscus 20a of the liquid substance 20 that has formed on the lower face of the perforated wall 8.

[0038] Since the container 6 is transparent or semi-transparent, the user can check visually the level of the liquid substance, and when the container is empty he can replace the container 6 with a full one or fill it.

[0039] It should be noted that the device according to the invention, depending on the requirements, may carry, instead of a single container 6, two side-by-side containers of liquid substances, providing a perforated wall 8 as described at or below the outlet of each container. In this manner, it is possible to achieve simultaneous dispensing of two liquid substances in the cleaning water of the toilet bowl.

[0040] In practice it has been found that the device according to the invention fully achieves the intended aim, since it ensures the dispensing, at each actuation of the toilet bowl flushing device, of substantially constant amounts of liquid substance regardless of the degree of filling of the container of the liquid substance and of the frequency with which the flushing device is operated.

[0041] The device thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the same inventive concept; all the details may further be replaced with other technically equivalent elements.

[0042] In practice, the materials used, so long as they are compatible with the specific use, as well as the dimensions, may be any according to requirements and to the state of the art.

[0043] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A device for dispensing liquid substances inside toilet bowls, comprising a supporting element, which is provided with means for engaging the rim of a toilet bowl and forms at least one receptacle for at least one container of the liquid substance to be dispensed, said container being arranged so that its outlet is directed downwardly, **characterized in that** below or at the outlet of the container there is a perforated wall, which faces in an upward region an element for collecting the liquid substance dispensed from said container, said collecting element being affected by the passage of the toilet bowl cleaning water, the perforations of said perforated wall and the viscosity of the liquid substance dispensed from said container being adapted to form, on the lower face of said perforated wall, a suspended meniscus of liquid substance that contrasts the further outflow of liquid substance from said container and can be removed by the stream of toilet bowl cleaning water that flows over said collecting element.
2. The device according to claim 1, **characterized in that** said perforated wall is provided as a grille.
3. The device according to claim 1, **characterized in that** said perforated wall is connected to said supporting element.
4. The device according to one or more of the preceding claims, **characterized in that** said perforated wall is connected to the outlet of the container.
5. The device according to one or more of the preceding claims, **characterized in that** the holes of said perforated wall are shaped like a funnel that tapers downwardly.
6. The device according to one or more of the preceding claims, **characterized in that** said holes of said perforated wall have a diameter that is substantially comprised between 0.3 and 3 mm and said liquid substance has a viscosity substantially comprised between 100 and 4000 cps.
7. The device according to one or more of the preceding claims, **characterized in that** said holes of said perforated wall have a diameter that is substantially comprised between 0.5 and 1 mm and said liquid substance has a viscosity substantially comprised between 2000 and 3000 cps.
8. The device according to one or more of the preceding claims, **characterized in that** said collecting element has, on its upper face, grooves for retaining the liquid substance dispensed from said container.

9. The device according to one or more of the preceding claims, **characterized in that** said collecting element has drainage holes for the flushing water of the toilet bowl. 5
10. The device according to one or more of the preceding claims, **characterized in that** said collecting element has, in the region below the outlet of said container, protrusions that protrude toward said perforated wall. 10
11. The device according to one or more of the preceding claims, **characterized in that** said collecting element is shaped like a tray and has a wing that protrudes laterally with respect to said container and can be arranged below the rim of the toilet bowl in order to receive the toilet bowl cleaning water. 15
12. The device according to one or more of the preceding claims, **characterized in that** said collecting element is open on its opposite side with respect to said wing. 20
13. The device according to one or more of the preceding claims, **characterized in that** said means for engaging the rim of a toilet bowl comprise a hook-like element, which is connected to said supporting element laterally to said container. 25
14. The device according to one or more of the preceding claims, **characterized in that** said supporting element, said collecting element and said perforated wall are made of molded synthetic material. 30
15. The device according to one or more of the preceding claims, **characterized in that** said container is made of transparent or semitransparent synthetic material. 35
16. The device according to one or more of the preceding claims, **characterized in that** said receptacle has, at the region where the outlet of said container is located, a beveled element that can be inserted in said outlet in order to retain said container and pierce a closure diaphragm that is arranged on the outlet of said container. 40 45
17. The device according to one or more of the preceding claims, **characterized in that** said supporting element forms two receptacles, each of which is adapted to accommodate a container of a liquid substance to be dispensed, a perforated wall being provided below or at the outlet of each container and facing said collecting element in an upward region. 50

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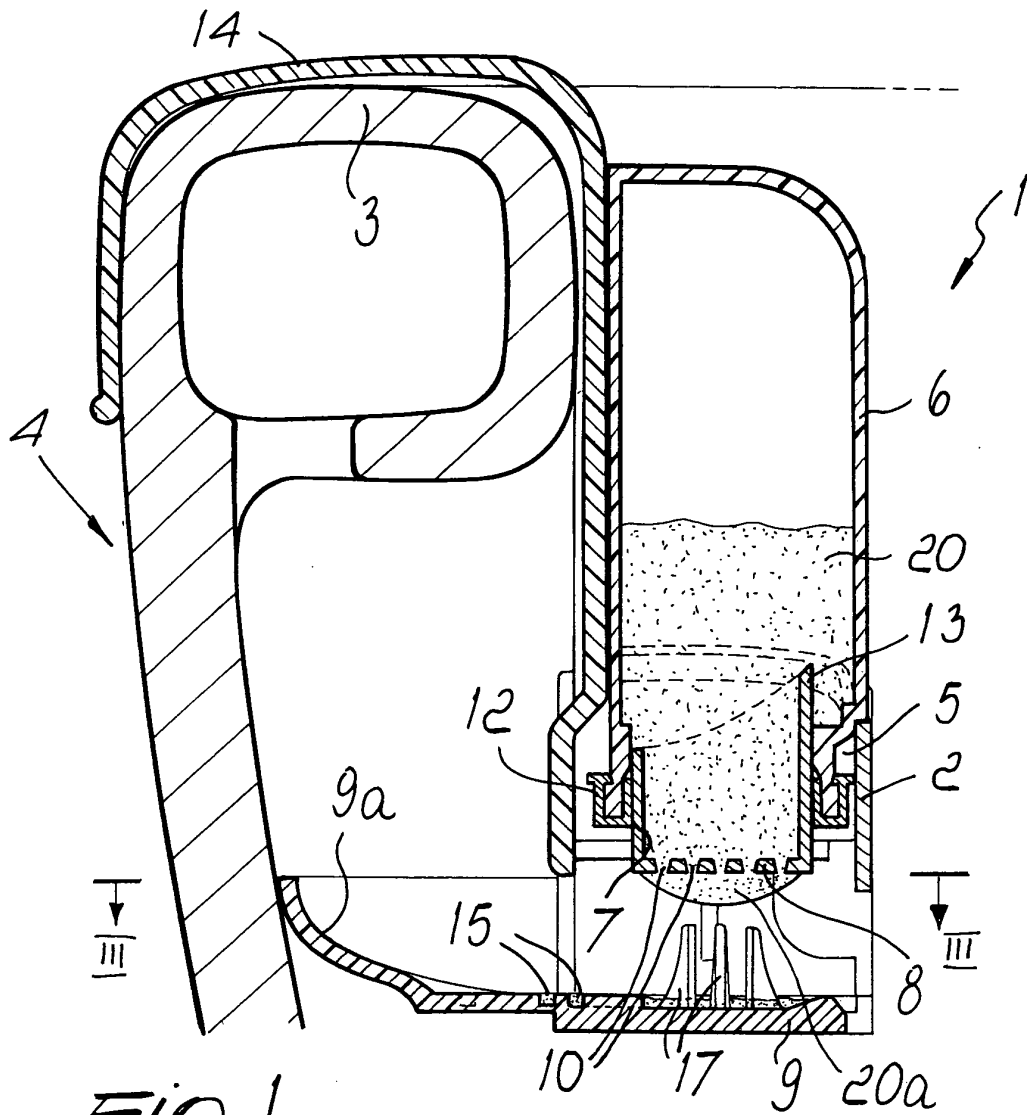


Fig. 1

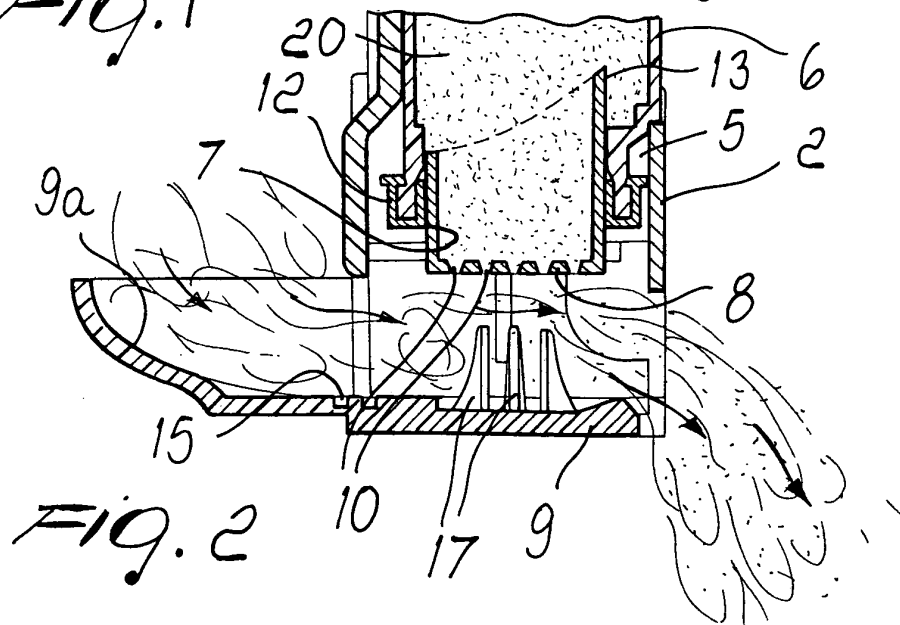


Fig. 2

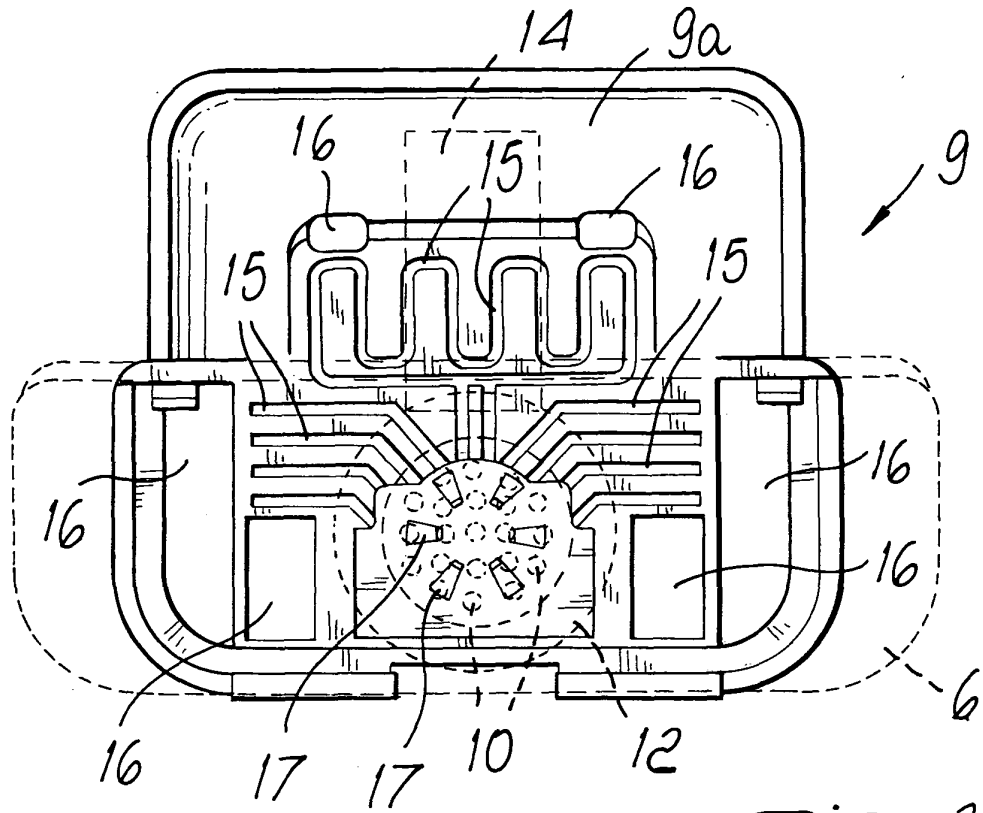


Fig. 3

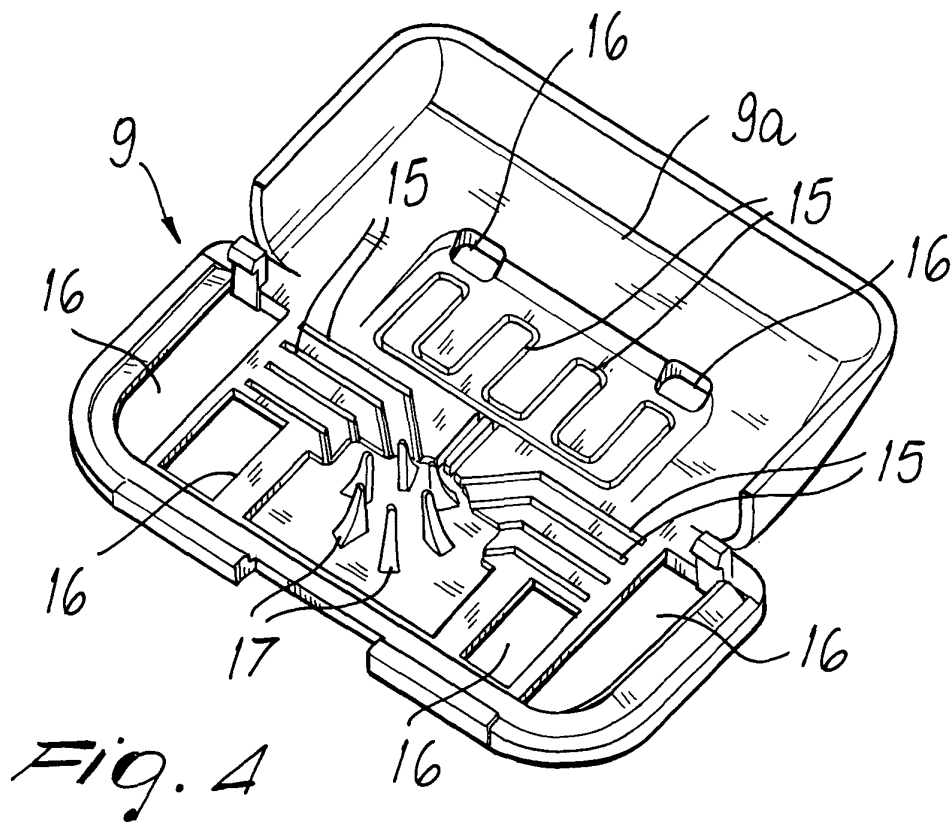


Fig. 4



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Application Number
EP 04 42 5662

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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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 10 February 2005	Examiner Van Bost, S
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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