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(71) Applicant: **UNILEVER PLC**
Unilever House Blackfriars P.O. Box 68
London EC4P 4BQ(GB)
(84) **GB**

Applicant: **UNILEVER NV**
Burgemeester s'Jacobplein 1 P.O. Box 760
NL-3000 DK Rotterdam(NL)
(84) **CH DE ES FR IT LI NL SE**

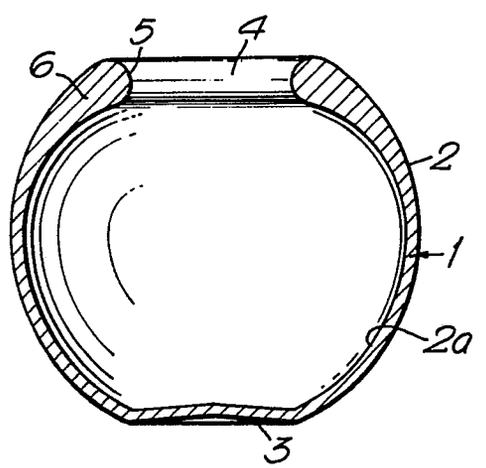
(72) Inventor: **Bozzi, Luigi**
Via Della Molazza 13
20071 Casalpusterlengo Milan(IT)
Inventor: **Raymond, Jean Francois**
18 Church Lane Troston
Bury St Edmunds Suffolk(GB)

(74) Representative: **Rogers, John Edward et al**
UNILEVER PLC Patents Division P.O. Box 68
Unilever House
London EC4P 4BQ(GB)

(54) Method and device for treating textile.

(57) Method and device for treating textile articles in the drum of a washing machine in which the articles are loaded into the drum together with a dispensing device (1) containing detergent or like composition, the device having at least one opening (4) through which it can be filled and the contents dispensed, the device having a smooth resilient wall (2, 32, 33) which is deformed by the wash liquor loaded articles as the drum rotates to pump the composition out of the device into the wash liquor.

Fig.1.



EP 0 368 680 A1

METHOD AND DEVICE FOR TREATING TEXTILE ARTICLES

This invention relates to a dispenser device for dispensing a detergent or like composition and particularly to a reusable device adapted to be placed within the drum of a washing machine to dispense the contents thereof directly into the wash liquor as a result of rotation of the drum, and a method of treating textile articles using such a device.

The use of such a dispensing device is well suited to dispensing compositions in washing machines having no automatic dosing facilities or in machines which have dosing facilities which are not capable of satisfactorily dosing the compositions into the machine. A commonly used dosing facility comprises a drawer or drawers into which the compositions are filled prior to starting the washing cycle and which are flushed by water entering the machine. Where this flushing occurs at the start of a washing cycle or where the drawer design is such that the compositions are not retained in the drawer until the start of the washing cycle, the compositions can flow to dead areas of the machine where they are not fully drawn into the wash liquor in contact with the articles being washed in the drum. Alternatively, the composition can sometimes remain in the drawer and not be fully flushed into the wash liquor.

It has been proposed for instance in GB2157718 to provide a rigid reusable device for a liquid detergent which is placed in the drum of a washing machine to distribute the liquid detergent gradually into the washing liquor when the drum rotates. It has also been proposed to provide such a rigid device with a removable and replaceable lid having a plurality of holes therein which can be filled with a quantity of powdered detergent to be dispensed into the washing liquor.

It has been found that the dispensers as previously proposed may not satisfactorily dispense all liquid and powdered detergent compositions. Where a liquid detergent composition is relatively viscous the previously proposed rigid liquid detergent dispensers can sometimes still contain a quantity of the liquid detergent at the end of the washing cycle. Similarly, when a powdered detergent composition has a tendency to coalesce into lumps in the presence of water the detergent does not dispense satisfactorily through the small holes in the rigid dispenser as previously proposed and can even become adhered to the inside of the dispenser. These problems can arise particularly when the washing cycle is effected at relatively low temperatures. They also arise particularly if the agitation in the drum is low, especially at the beginning of the machine cycle.

The dispensers as previously proposed also suffer from the disadvantage that they create undue noise when they contact the inner surface of the washing machine drum.

According to the present invention there is provided a device for dispensing a detergent or like composition in a washing machine drum comprising a hollow body with at least one opening through which the detergent composition can be filled and dispensed characterised in that the hollow body is provided with smooth resilient walls deformable within the drum of the washing machine by wash liquor loaded textile articles and resilient to return to the original shape when the deforming force is removed. As the drum of the washing machine rotates to tumble the articles being washed in the wash liquor the device is squeezed or compressed from time to time by the weight of articles loaded with wash liquor falling on top of it. This compression reduces the internal volume of the device and serves to pump out some of the contents. As soon as the drum rotates further the weight of articles on the compressed device is released and the resilient walls of the device cause the device to flex back towards the original shape and increase the internal volume back to the original level. This flexing back towards the original internal volume tends to create a partial vacuum in the device and cause wash liquor to be sucked into the hollow device. Wash liquor can also enter the hollow body of the device by simply flowing in through an open filling and dispensing opening or openings. The combination of the pumping effect of the compression and flexing of the resilient walls together with the entry of wash liquor to dilute or dissolve the composition within the device has been found to readily dispense the contents thereof even when the compositions were considered difficult to dispense by virtue of viscosity or tendency to form lumps.

In the simplest embodiment of a dispensing device according to the present invention there is provided a single filling and dispensing opening in the hollow body. The opening can be large enough to provide for easy filling with the desired quantity of composition to be dispensed. Such a device is placed in the drum with the opening uppermost. Whilst a large opening would appear to allow a large proportion of the composition to be dispensed as soon as the device becomes inverted when the drum rotates the washing performance has not been found to be affected thereby. The pumping effect which operates at all orientations of the device in the washing machine drum is found to enhance the cleaning of the inside of the device

of all the composition.

The resilient wall can be at least in part convex, an aperture being disposed in the convex part with a rigid planar insert located in said opening, the insert having at least one aperture therein forming the filling and dispensing opening.

The insert can serve to slightly impede the rate of dispensing of the composition into the wash liquor where there is any risk of damage to the articles being washed by contact with a composition before it has been diluted in the wash liquor. The insert also provides a stiffening of the resilient walls around the opening therein and provides a stiffened zone in which the device can be gripped and held to minimise any risk of the device, after being filled with the composition, being deformed to an extent which would cause the composition to be expelled when being handled by the user placing the device in position in the washing machine drum. Because the insert is disposed in a convex part of the device it can nevertheless be deformed irrespective of the orientation of the device as the textile articles tumble onto it.

The insert can conveniently be provided with a central aperture and a plurality of smaller apertures surrounding the central aperture. The central aperture can be large enough to provide for easy filling with the liquid or powdered composition and the surrounding apertures ensure that at the end of the washing cycle the device is empty of any remaining water.

To facilitate filling of the device the insert can extend into the body to form an annular gap between the insert and the body and have a plurality of apertures at least some of which communicate with said annular gap. There is thus provided a recess above the uppermost surface of the insert and below the upper edge of the resilient body to aid the filling of the device. Because the annular gap formed between the insert and the wall of the body is in communication via at least some of the apertures in the insert with the outside of the device there is little risk of wash liquor or water remaining in the device at the end of the washing cycle.

In an alternative embodiment of the invention the resilient walls are provided with one or more slits through which the composition can be dispensed. The slits form dispensing openings through which the composition can be dispensed by the pumping action derived from the deformation and flexing of the walls of the device by the articles being washed.

The hollow body can have a spherical portion in which slits define a number of panels adapted to adopt a first position extending inwardly into the hollow body to form a filling opening therebetween. Preferably the panels are adapted to adopt a second position in which the panels combine to form at least part of said spherical portion of the hollow body. The user is thus able to move the panels to the second position to substantially close the filling opening after filling. In this condition the device can be readily handled with minimum risk of spillage as the device is placed in the washing machine drum.

Alternatively the filling opening can be disposed in a re-entrant portion of the hollow body to facilitate filling of the device. The re-entrant portion can be defined by a plurality of arcuate slits in a spherical portion of the hollow body, the slits thus being located at the most favourable position to ensure that no wash liquor or water is left in the device at the end of the washing cycle.

A central tubular core member can extend from the filling opening and have at least one opening communicating with the inside of the hollow body. Such a core member can help in minimising spillage of the composition from the device during handling of a filled device.

To assist in providing some rigidity to the device without minimising the pumping action during use the core member can be rigid and also have its second end opposite the filling opening secured to the hollow body. The second end is preferably secured to a second re-entrant portion of the body so that any contact with the drum or the articles being washed with the hollow body at the zones which are reinforced by the core member is cushioned by the surrounding areas of the resilient body.

In yet another embodiment of the invention the hollow body can be formed by upper and lower resilient wall portions connected together by a rigid central tubular core member having an open end communicating with a filling opening in the upper wall portion and at least one opening communicating with the inside of the hollow body, the junction between the upper and lower wall portions forming a single continuous slit in the body. Conveniently, the upper wall portion can be adapted to be flexed to a filling position in which it forms a funnel portion connecting with the open end of the core. The funnel portion thus facilitates filling of the device and is flexed back to the position in which the junction between the upper and lower portions form a slit before being placed in a washing machine drum.

The invention also provides a method of treating textile articles in the drum of a washing machine in which the articles to be treated are loaded in the drum together with a dispensing device having resilient walls and filled with a detergent or like composition, rotating the drum to tumble the articles in the presence of a wash liquor repeatedly onto the device to flex the resilient walls and pump the composition out of the device into the liquor in

the washing machine. The pump action obtained in the process ensures the complete dispensing of the entire contents of the device and can squirt the composition out of the device to provide better dispersion of the composition in the liquor in the machine.

The resilient walls of the device significantly reduce the amount of noise created by the presence of a dispensing device in the rotating drum of a washing machine.

The resilient walls of the device can conveniently be transparent to enable the user to observe the quantity of composition filled into the device. A suitable material capable of imparting the desired degree of resilience and having the necessary heat stability to withstand the operating temperatures normally encountered in a washing machine is plasticised PVC. Such a material can be tinted in various colours without preventing the filling level being observed by the user. Bands of contrasting colour may be incorporated in the body to indicate one or more predetermined fill volumes.

The invention will now be more particularly described with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a sectional side elevation of one embodiment of a device according to the invention,

Figure 2 is a plan view of the device of Figure 1,

Figure 3 is a sectional side elevation of a modified version of the device of Figure 1,

Figure 4 is a plan view of the device of Figure 3,

Figure 5 is a perspective view of a third embodiment of a device according to the invention,

Figure 6 is a perspective view of the device of Figure 5 in the condition in which it can be filled before use,

Figure 7 is a perspective view of a fourth embodiment of the invention,

Figure 8 is a sectional side elevation of the device of Figure 7,

Figure 9 is a perspective view of a fifth embodiment of the invention,

Figure 10 is a sectional side elevation of the device of Figure 9,

Figure 11 is a perspective view of a sixth embodiment of the invention, and

Figure 12 is a perspective view of the embodiment of Figure 11 in the condition in which it is filled before use.

Referring to Figures 1 and 2 there is shown a dispenser device comprising a substantially spherical hollow body 1 made of resilient plastics material having a smooth outer surface 2 and inner surface 2a. A flattened portion 3 is provided to form a base on which the device can be stood on a flat horizontal surface without any tendency to roll. Diametrically opposite the base 3 is an opening 4 having smoothly rounded annular edge 5 through which the device can be filled and the contents dispensed during use. The edges 5 of the opening are thickened at 6 to increase the stiffness of the upper region of the hollow body with respect to the remainder of the body so that in spite of the presence of the opening 4 a filled dispenser can be readily picked up by hand and placed in the drum of a washing machine without the device being squashed to expel or spill some of the contents.

The device can be made of any suitably resilient plastics material such as plasticised PVC which will withstand the necessary operating temperatures in the washing machine. The body is conveniently transparent or translucent so that the user can see the level to which it has been filled and markings can be provided on the body to indicate to the user the fill level for particular volumes. The opening 4 can be closed with a removable closure allowing the device to be distributed and sold containing a predetermined quantity of composition.

In use the user fills the hollow body with the desired quantity of composition with which textile articles are to be treated in the drum of a washing machine. The composition can be in liquid or powdered form. The composition will typically be a detergent composition but other compositions such as bleach can be filled into the hollow body. This, and other compositions, can be dispensed from the device into the drum alone or in combination with other compositions, the other combinations either being dispensed in a similar way or from the automatic dispensing facilities incorporated in the machine itself.

Where two compositions are required to be dispensed into the washing machine at the same time, and provided they are compatible, they can of course each be filled into the hollow body. Where they are insufficiently compatible to be filled into a single hollow body as shown in Figure 1 the hollow body can be sub-divided into two, or even more, compartments each having a filling and dispensing opening.

Having filled the device it is placed in the drum of the washing machine together with the textile articles to be treated. The device is placed in an upright position so that the contents do not dispense until the drum begins to rotate. When the drum rotates the dispensing device is upset and the composition contained therein is dispensed through the opening 4. Depending upon the nature of the composition it is unlikely that the entire contents are dispensed as soon as the drum rotates. The rate at which the dispensing occurs depends on the nature of the product, the angle to which the dispenser is tipped and the time for

which the dispenser is tipped. As the drum rotates and the dispenser is tumbled together with the textile articles some wash liquor enters the hollow body. Most importantly, as the textile articles which have absorbed and are thus loaded with wash liquor tumble onto the device the weight of the articles squeezes or compresses the device irrespective of its orientation to reduce its internal volume. This compression thus pumps out some of the contents of the hollow body. As the weight of the articles is removed from the device the resilient walls cause the hollow body to flex back to its original shape. This flexing generally occurs when the device is below the level of the wash liquor in the machine so that some wash liquor is sucked into the device. The entry of wash liquor into the device and the pump effect of the compression and flexing of the resilient walls ensures that even the most difficult to dispense compositions are properly dispensed into the drum. At the end of the machine cycle there is no trace of the composition in the device. When the machine cycle ends with a high speed spinning of the drum the dispenser can thereafter be retrieved from inside the drum empty of any water or wash liquor ready for re-use.

Referring now to Figures 3 and 4 there is shown a modified version of the dispenser of Figures 1 and 2 in which a rigid insert 7 is located within an annular groove 8 in the region 6 surrounding the opening 4 of the hollow body. The insert is dish shaped with an external annular flange 9 which locates in the annular groove 8 and a plane portion 10 spaced inwardly in the hollow body from the flange 9. The plane portion 10 is provided with a central aperture 11 surrounded by a plurality of smaller apertures 12 and 13. The apertures 13 extend to the underside of the annular flange 9 to communicate with an annular gap 14 created by the dish shape of the insert exteriorly thereof between the insert and the inside surface 2a of the hollow body 1.

The dish shape of the insert together with the thickness of the thickened region 6 of the hollow body combine to form a recess 15 above the insert and below the upper edge of the filling device.

The dispenser is filled through the apertures 11, 12 and 13 in the insert, the majority of the filling conveniently being effected through the central aperture 11. Where the rate of passage of the composition through the apertures is less than the rate at which the composition is being poured or fed to the device the recess 15 above the insert minimises any spillage.

The insert serves to stiffen the upper region of the hollow body to facilitate handling of the filled dispenser without spillage but because it is disposed in a convex part of the hollow body the device can neverthless be compressed by the loaded articles irrespective of its orientation within the drum. The filled device is placed in the washing machine drum as before and the machine cycle commenced. The insert then serves to partly restrict the dispensing of the composition and minimise any risk that might arise from the concentrated composition contained within the device coming into direct contact with the textile articles particularly before the articles are wetted. As soon as the device is tumbled together with the articles in the presence of a liquor the pumping action will suck a quantity of liquor into the device to dilute the composition before it is dispensed. Furthermore, the liquid composition, either diluted liquid composition or disolved powder composition, is pumped out of the smaller apertures 12 and 13, particularly the smallest apertures 12 as jets of liquid giving improved dispersion of the composition in the liquor in the drum.

During a final spinning cycle the device is emptied of water or liquor. The apertures 13 which communicate with the annular gap 14 ensure that no water or liquor remains trapped in the annular gap.

Referring now to Figure 5 there is shown a device which comprises a substantially spherical hollow body 1 of resilient material. The upper spherical portion of the body is provided with three arcuate slits 16 together forming a circle having interruptions 17. Extending from the centre point 18 of the spherical portion above the slits 16 are three further slits 19 which extend towards the mid-point of the interruption 17 and terminate above the circle of the slits 16. The slits 16 and 19 together define three petal-like panels 20 which can be pushed inwardly from the spherical condition as shown in Figure 5 to a first filling position as shown in Figure 6. In the first position as shown in Figure 6 the panels 20 are spaced from one another and provide therebetween a filling opening 21 through which a composition can be filled into the hollow body. The device can be placed in this condition into the drum of a washing machine but to minimise spillage and any inadvertent release of composition in the drum before the machine cycle commences the panels 20 are preferably caused to revert to the second position shown in Figure 5. This can be effected by squeezing the hollow body around approximately the horizontal diameter thereof. In this condition the device is placed in a washing machine drum together with the articles to be treated and there is little risk of the composition escaping from the device through the slits 16 and 19 before the drum rotates even if the device becomes upset from an upright position with the centre point 18 uppermost.

When the drum begins to rotate the device is squashed and deformed by articles in the drum as

in the previous embodiments. This deformation causes one or more of the slits to open and a proportion of the contents of the device are pumped out as before. When the device returns to its original shape liquor is drawn into the device through the slits. During a spinning sequence in the machine cycle any remaining liquor or water in the device escapes through the slits.

In the embodiment of Figures 7 and 8 a generally spherical hollow body of resilient material is provided with three arcuate slits 16 interrupted at 17 as in Figure 5. Within the circle defined by the slits 16 is a re-entrant body portion 22 having at its centre an opening 4. Extending inwardly into the hollow body from the filling opening 4 is a hollow tubular central core member 23 which is open at its lower end 24 to communicate with the inside of the hollow body.

In use the device is filled through the filling opening 4 which is facilitated by the re-entrant portion 22. The central core member inhibits spillage during handling. When the device is deformed by articles in the drum of the machine the contents of the drum are pumped out of the slits 16 and through the opening 4. When the deforming force is removed to allow the device to return to the original condition liquor is sucked in through the slits and may also enter through the opening 4. The slits 16 ensure that the device is empty of liquid at the end of a spinning sequence of the machine.

Referring now to the embodiment shown in Figures 9 and 10 a substantially spherical resilient hollow body 1 has the filling opening 4 uppermost. The filling opening 4 is disposed in a re-entrant portion 25 and communicates with a hollow tubular central core member 26 which extends through the hollow body and is secured to the hollow body at the end 27 opposite the opening 4. The end 27 of the core member is closed, one or more longitudinal openings 28 providing communication between the inside of the hollow body 1 and the inside of the core member 26. The end 27 of the core member is secured to a lower re-entrant portion 29 of the hollow body similar to the re-entrant portion 25 at the upper end of the core member. The lower re-entrant portion 29 provides a circular edge 30 on which the device can stand. Slits 31 are provided in the hollow body above the filling level of the composition to be dispensed from the device.

The device is filled as before through the opening 4. In use the composition contained in the device is pumped out through the slits 31 and through the core member and out of opening 4. The slits 31 ensure that the device is empty at the end of the spinning sequence of the machine. Although the hollow body 1 is made somewhat more rigid by the core member the device is deformed by articles tumbling onto it irrespective of the orientation of the device. Since the rigid core member is secured to re-entrant portions 25 and 29 of the hollow body the core member cannot contact the drum of the washing machine to create noise.

In the embodiment of Figure 11 and 12 the hollow body is formed from an upper wall portion 32 and a lower wall portion 33 both of resilient material. The upper portion 32 has a filling opening 4 which communicates with the upper end of a tubular hollow central core member 26. The lower end of the core number is closed and is secured to the lower wall portion 33. Longitudinal openings 28 are formed in the core member adjacent the lower end of the core.

The upper and lower wall portions are both saucer shaped and held together by the core member so that the junction of the outer rims of the wall portions forms a continuous circular slit 34 in the hollow body.

The device can be filled through the opening 4 and in use the contents are dispensed by being pumped out of the slit 34 and the opening 4 as before. The slit 34 ensures that the device is empty after a spinning sequence.

In order to facilitate filling the upper wall portion can be flexed to adopt the funnel shaped position as shown Figure 12. After being filled the upper wall portion is flexed back to the position shown in Figure 11 before the device is placed in the washing machine drum.

Dispensing devices as described above and the method of washing textile articles provide a significant improvement in the dispensing of detergent and like compositions and moreover avoid creating noise since contact of rigid elements of the dispensing device with the washing machine drum is minimised.

Claims

1) A device for dispensing a detergent or like composition in a washing machine drum comprising a hollow body with at least one opening through which the detergent composition can be filled and dispensed characterised in that the hollow body (1, 32, 33) is provided with a smooth resilient wall (2, 32, 33) deformable within the drum of the washing machine by wash liquor loaded textile articles and resilient to return to the original shape when the deforming force is removed.

2) A device according to claim 1 characterised in that there is provided a single filling and dispensing opening (4, 21) in the hollow body.

3) A device according to Claim 1 or Claim 2 characterised in that the resilient wall (2) is at least

in part convex, an aperture (4) being disposed in the convex part with a rigid planer insert (7) located in said opening, the insert having at least one aperture (11, 12, 13) therein forming the filling and dispensing opening.

4) A device according to Claim 3 characterised in that the insert (7) is provided with a central aperture (11) and a plurality of smaller apertures (12, 13) surrounding the central aperture.

5) A device according to Claim 3 or Claim 4 characterised in that the insert (7) extends into the body (1) to form an annular gap (14) between the insert and the body and has a plurality of apertures (11, 12, 13) at least some of which (13) communicate with said annular gap (14).

6) A device according to Claim 1 characterised in that the resilient walls (2, 32, 33) are provided with one or more slits (16, 19, 31, 34) through which the composition can be dispensed.

7) A device according to Claim 6 characterised in that the hollow body (1) has a spherical portion in which slits (16, 19) define a number of panels (20, 22) adapted to adopt a first position extending inwardly into the hollow body (1) to form a filling opening (21, 4) therebetween.

8) A device according to Claim 7 characterised in that the panels (20) are adapted to adopt a second position in which the panels combine to form at least part of said spherical portion of the hollow body (1).

9) A device according to Claim 6 characterised in that the filling opening (21, 4) is disposed in a re-entrant portion of the hollow body.

10) A device according to Claim 9 characterised in that the re-entrant portion (22) is defined by a plurality of arcuate slits (16) in a spherical portion of the hollow body.

11) A device according to Claim 9 or Claim 10 characterised in that there is provided a central tubular core member (23, 26) communicating at one end with the filling opening (4) and having at least one opening (24, 28) communicating with the inside of the hollow body (1).

12) A device according to Claim 11 characterised in that the core member (26) is rigid, one end of the core member being at the filling opening (4) and the opposite end (27) being secured on a second re-entrant portion (29) of the hollow body (1).

13) A device according to Claim 6 characterised in that the hollow body (1) is formed by upper and lower resilient wall portions (32, 33) connected together by a rigid central tubular core member (26) having an open end communicating with a filling opening (4) in the upper wall portion (32) and at least one opening (28) communicating with the inside of the hollow body, the junction (34) between the upper and lower wall portions forming a single continuous slit in the body.

14) A device according to Claim 13 characterised in that the upper wall portion (32) is adapted to be flexed to a filling position in which it forms a funnel portion connecting with the open end (4) of the core (26).

15) A method of treating textiles articles in the drum of a washing machine comprising loading the drum with articles to be treated, together with a dispensing device containing the desired quantity of detergent or like composition before commencing the machine cycle, tumbling the dispensing device together with the articles in the presence of a wash liquor, characterised in that the device has resilient walls which are repeatedly flexed by the articles tumbling onto the device as the drum rotates, the flexing of the walls pumping the composition out of the device into the liquor.

16) A dispensing device according to any one of Claims 1 to 14 containing a quantity of a detergent composition.

Fig.1.

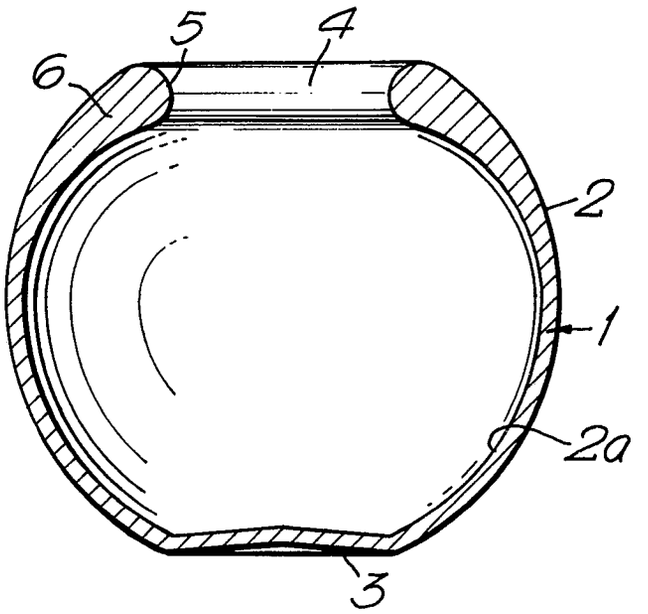


Fig.2.

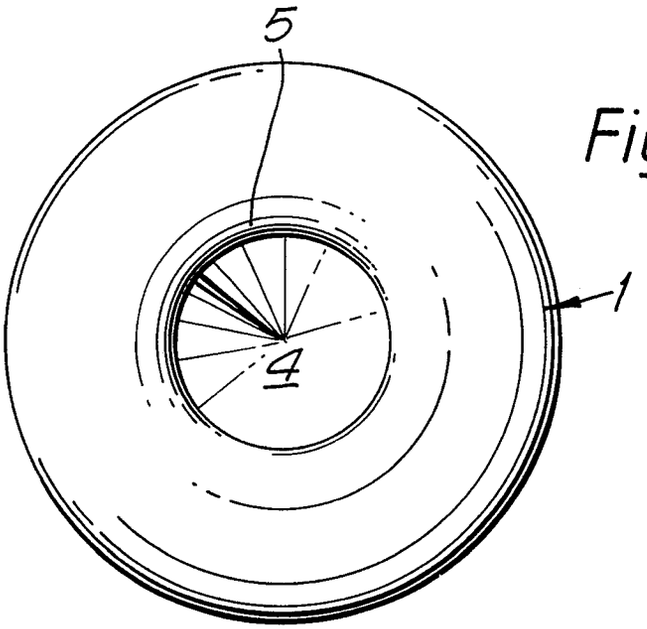


Fig.3.

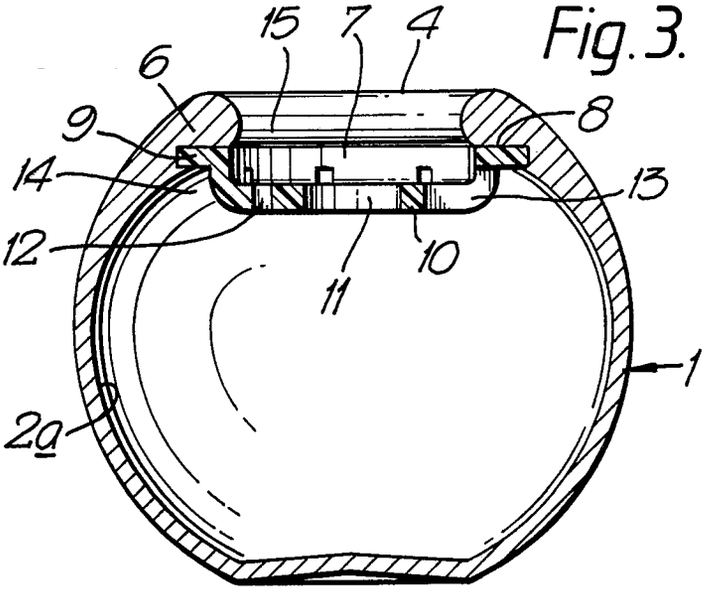
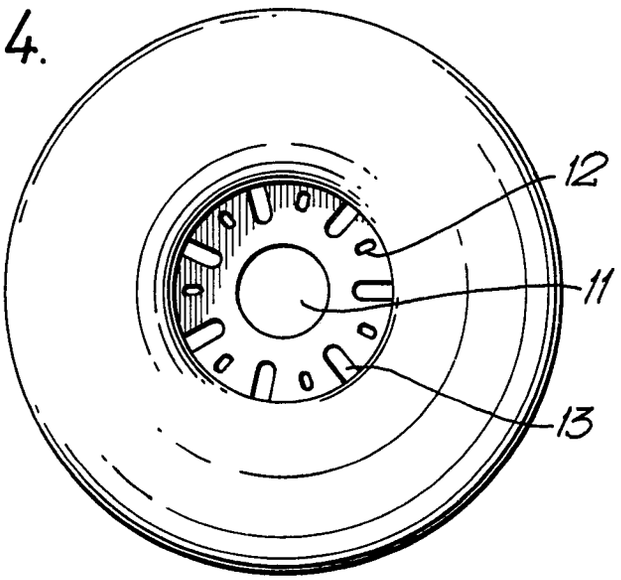


Fig. 4.



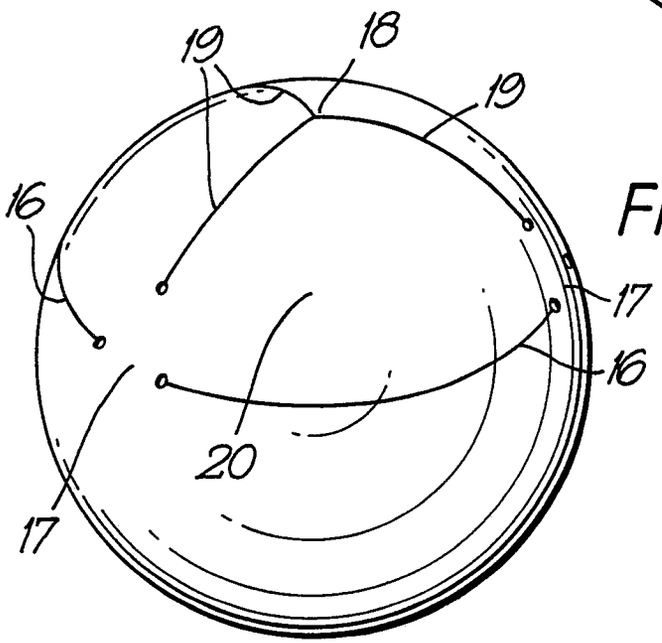
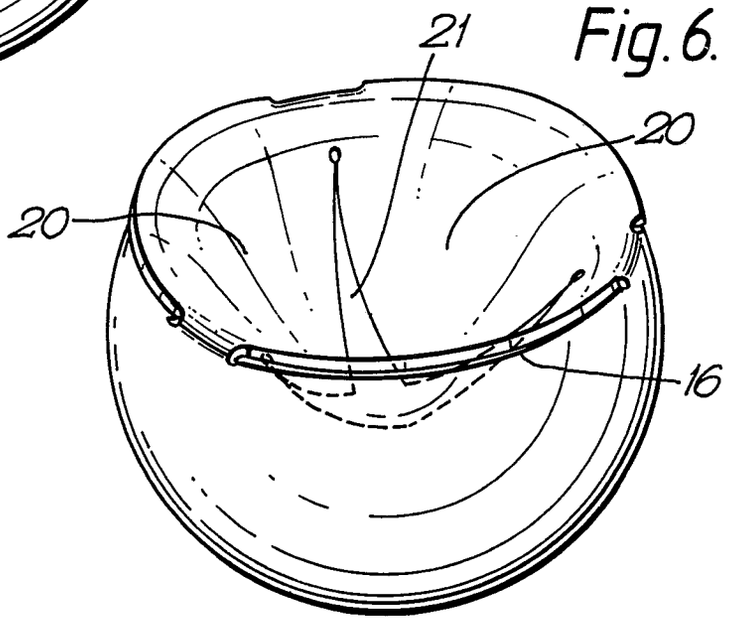


Fig. 5.

Fig. 6.



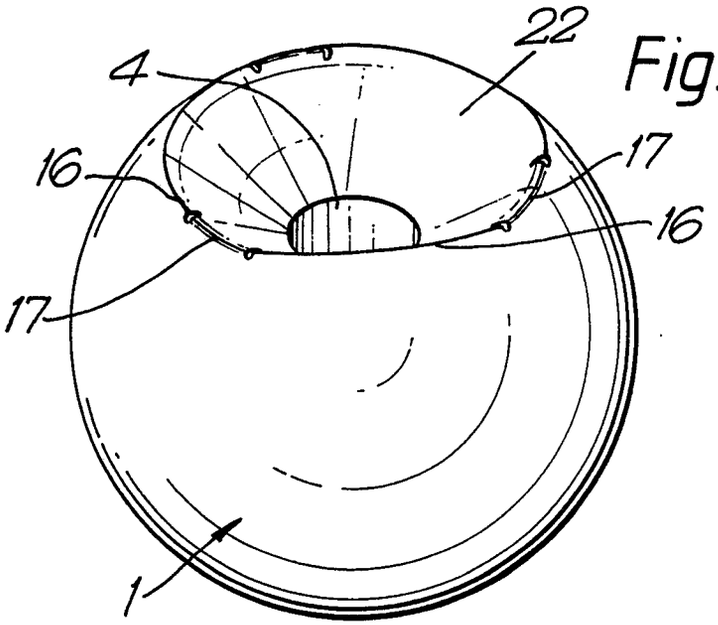


Fig. 7.

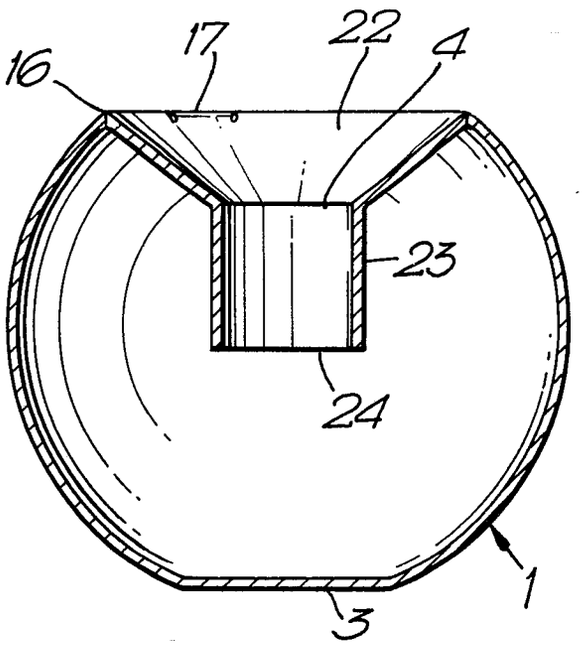


Fig.8.

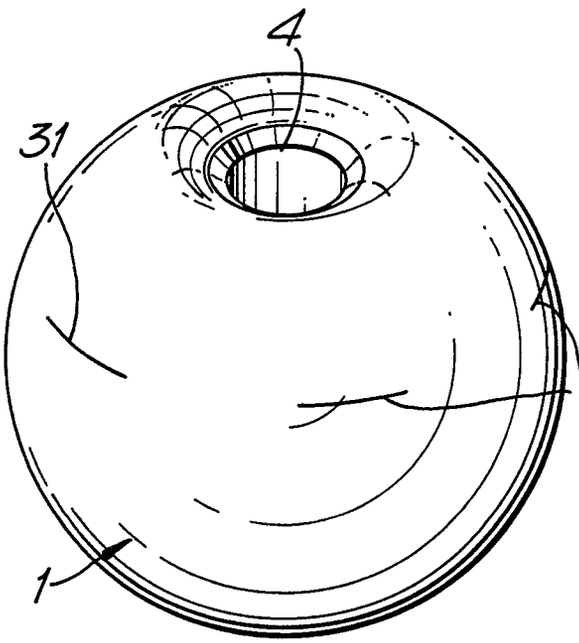
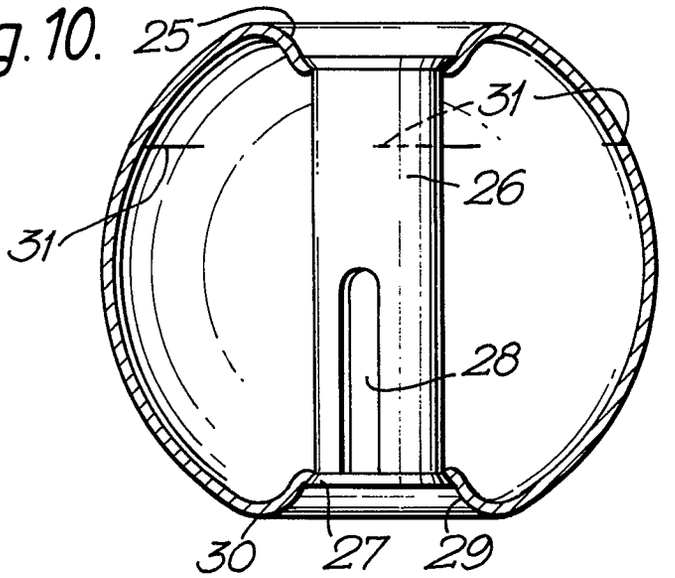


Fig.9.

Fig.10.



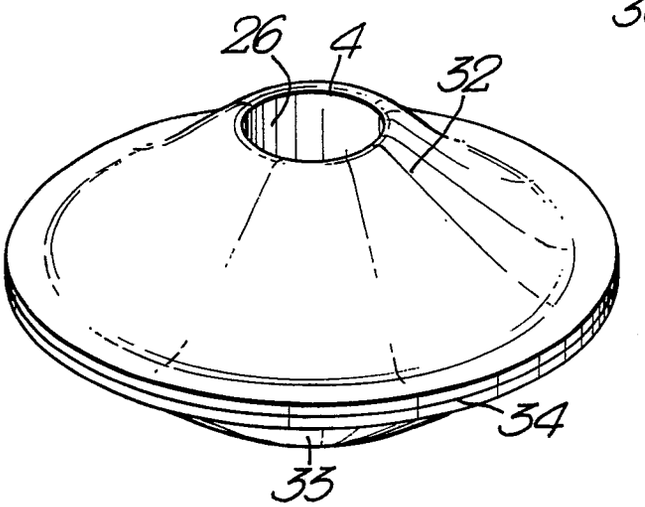
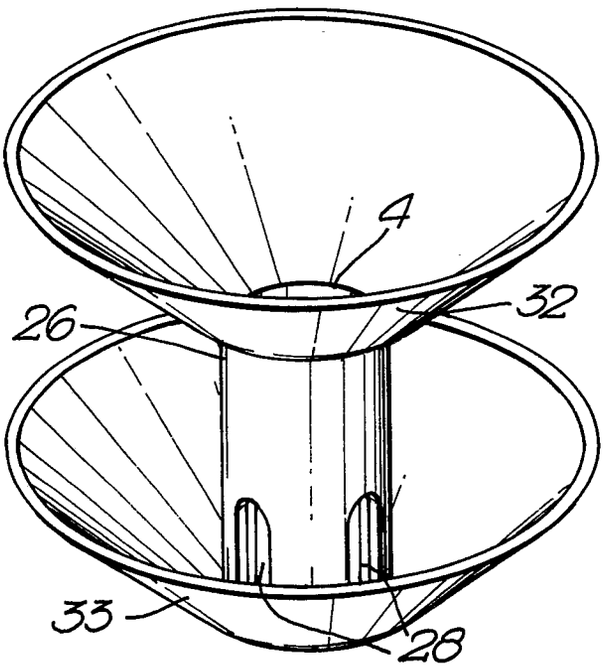


Fig.11.

Fig.12.



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EUROPEAN SEARCH REPORT

Application Number

EP 89 31 1690

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X,P	DE-C-3803645 (HENKEL K.G.) * claims 1-5; figures *	1, 2, 6-10, 15, 16	D06F39/02
X	US-A-2941309 (WHIRLPOOL CORPORATION) * column 3, line 69 - column 4, line 7; figure 4 *	15	
A		1, 6, 16	
A	EP-A-288347 (THE PROCTER & GAMBLE COMPANY) * column 5, lines 22 - 45; figure 2 *	1-5, 11, 15, 16	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10 JANUARY 1990	COURRIER G.L.A.

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1