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(71) Demandeur/Applicant:
BOEHRINGER INGELHEIM INTERNATIONAL GMBH,
DE
(72) Inventeurs/Inventors:
KUEHN, TORSTEN, DE;
KURTZE, STEPHAN, DE;
LUSTENBERGER, STEFAN, DE
(74) Agent: FETHERSTONHAUGH & CO.

(54) Titre : EMBALLAGE SOUS FORME DE BOUTEILLE AVEC UN MOYEN AMORTISSEUR DISPOSE A L'INTERIEUR
(54) Title: PACKAGE IN THE FORM OF A BOTTLE COMPRISING A CUSHIONING MEANS DISPOSED THEREIN

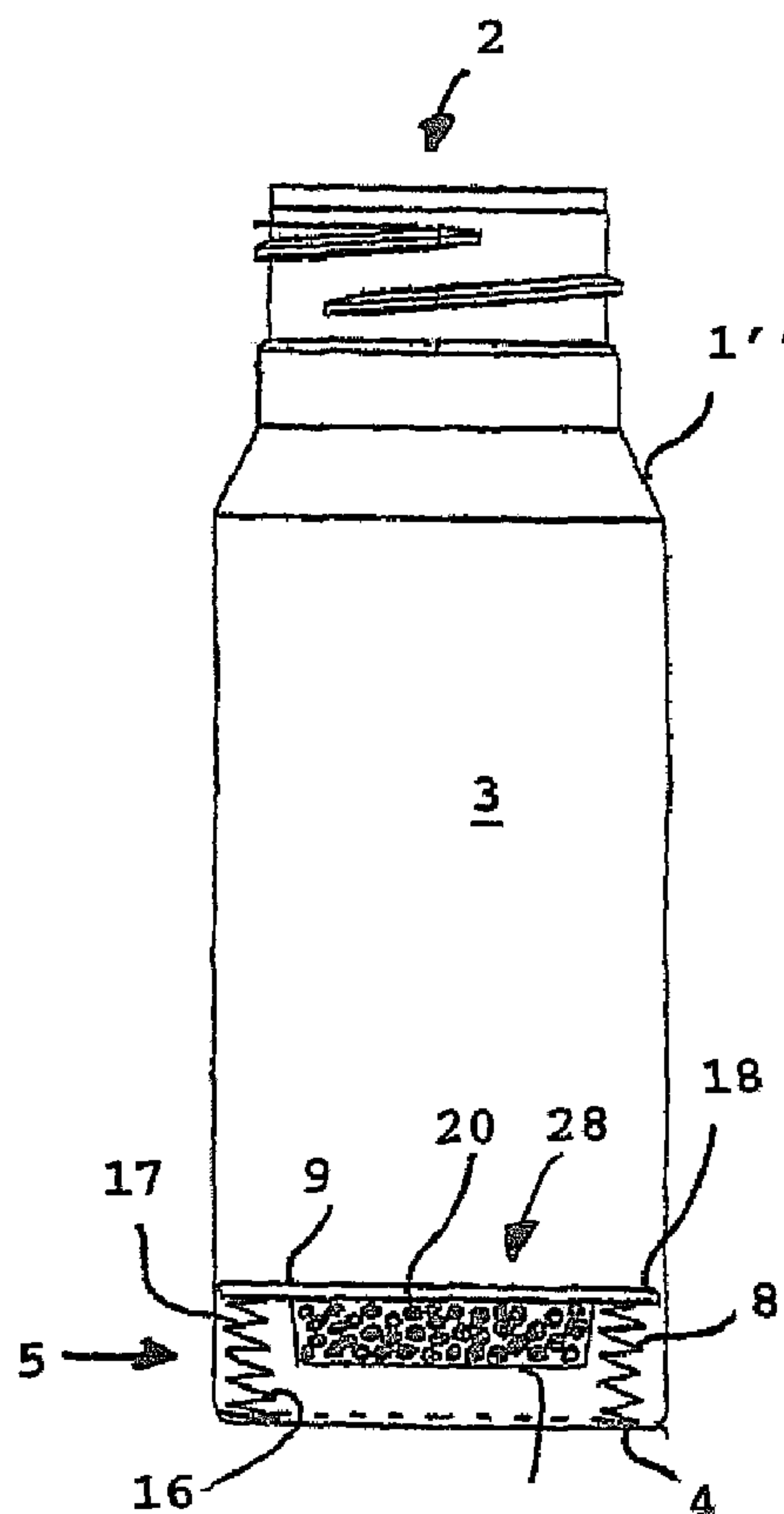


Fig. 3

(57) **Abrégé/Abstract:**

A package in the form of a bottle (1 to 1''') comprises a damping and/or cushioning means (5) that acts on a packaged good placeable inside the volume (3) of the package and that is disposed between the packaged good and the package wall, said

(57) **Abrégé(suite)/Abstract(continued):**

damping and/or cushioning means being adapted to substantially automatically align and/or unfold or compress to a degree of filling of the volume (3) with a packaged good and to shrink or expand and/or unfold to a degree of packaged goods removal at least until a partial removal amount is achieved.

Abstract

A package in the form of a bottle (1 to 1'') comprises damping and/or cushioning means (5) that act on packaged goods placeable in the fill volume (3) thereof and that are disposed between the packaged goods and the wall of the bottle, which are adapted to substantially automatically align and/or unfold or compress in accordance with the degree of filling of the volume (3) with packaged goods and to shrink or expand and/or unfold in accordance with the degree of removal of the packaged goods at least until a certain proportion has been removed.

10

(Fig. 3)

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Boehringer Ingelheim International GmbH

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Package in the form of a bottle comprising a cushioning means disposed therein

Description

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The invention relates to a package in the form of a bottle having a damping and/or cushioning means that acts on packaged goods placeable inside the fill volume of the package and that is disposed between the packaged goods and the package wall.

10 In the pharmaceutical industry, pharmaceutical active substance formulations are sold in tablet form as coated tablets or as filled capsules that are packaged *inter alia* in glass or plastic bottles. The tablets, coated tablets or filled capsules are packed in the respective bottles in loose form. The disadvantage of this is that vibrations, knocks or impact that may occur while the package is being transported or if it falls and strikes a
15 hard surface, lead to breakage of the tablets or deformation of the capsules. These outcomes may be on the one hand the result of the impact, vibrations or knocks being transmitted directly from the wall of the bottle to the plain or coated tablets or capsules in the bottle, or on the other hand the result of the plain or coated tablets or capsules knocking against one another.

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Therefore, to avoid tablet breakage and capsule deformation, in practice, once the bottle has been filled with the packaged goods, additionally air-filled bags, cushions or cotton wool are placed in the bottle, on top of the packaged goods, in order to attenuate and cushion any external impact and protect the plain or coated tablets or capsules. It
25 is also known to use closures with spring elements disposed thereon, the spring elements pressing on the respective packaged goods in the form of plain or coated tablets or capsules when the closures are closed, thus stabilising their position within the packaging bottle.

30 These provisions are still not entirely satisfactory in terms of stabilising the contents of the package, as it is generally still possible for the individual plain or coated tablets or capsules to move relative to one another. Furthermore, there is room for improvement in the damping or cushioning of impact acting from outside, as damage to the contents

of the package in the form of broken tablets or misshapen capsules can still be found.

The aim of the invention is to provide a package of the type described hereinbefore for pharmaceutical packaged goods in the form of plain or coated tablets or capsules
5 which ensures improved protection for the packaged goods in transit and prevents tablet breakage or capsule deformation from occurring.

This aim is achieved according to the invention by the fact that the damping and/or cushioning means is adapted to at least substantially automatically align and/or unfold
10 or compress in accordance with the degree of filling of the volume with packaged goods and to shrink or expand and/or unfold in accordance with the degree of removal of the packaged goods at least until a certain proportion has been removed.

The damping and/or cushioning means here is advantageously disposed in the volume
15 that holds the packaged goods, particularly on the base of the bottle. Further features and embodiments of the invention will become apparent from the other sub-claims.

The invention provides a package in the form of a bottle, having a soft, flexible damping and/or cushioning means which is disposed in particular on the base of the bottle and
20 is automatically aligned when the inner volume or fill space of the bottle is filled, by the action of the filling material and the resultant application of force, particularly gravity.

Damping and/or cushioning means of this kind may be for example an umbrella-shaped spring element having spring arms that spread out from a central point, which rests with the apex or centre of its convexity on the base of the bottle, or, alternatively,
25 in a position rotated through 180°, rests with its spread-out spring arms on the base of the bottle. When packaged goods in the form of plain or coated tablets or capsules are placed in the container, the goods first of all penetrate into the centre of this spring element, which is presented to the packaged goods in a slightly convex open configuration (or in a closed configuration, in the position rotated through 180°) and then force
30 the spread-open arms apart as the fill volume increases. In this way, the packaged goods impacting on the spring element align the damping and/or cushioning means and cause them to unfold. However, the damping and/or cushioning means may also be a flexible cushion of air or padding which spreads over the cross-sectional filling area of the base of the bottle as the packaged goods make contact, and is thereby

automatically aligned and unfolded. Moreover, the damping and/or cushioning material may be constructed as an insert made of elastically compressible material or in the form of a concertina-like spring element or padded cushion. Furthermore, the damping and/or cushioning means may be a spring-loaded base insert, the spring element re-
5 gion of which is compressed as the bottle is filled and expands again subsequently as the packaged goods are removed.

Besides aligning the damping and/or cushioning means the weight of the packaged goods bearing on them also has the effect of compressing the respective damping
10 and/or cushioning means, compared with their unloaded initial state, or unfolding them, in the case of the spring element with spreadable spring arms. When packaged goods are then removed from the package, the weight acting on the respective damping and/or cushioning means is reduced and the respective damping and/or cushioning means are able to unfold and spread out or expand again, or, in the case of the spring
15 element with the spreadable spring arms, retract again. Thus the damping and/or cushioning means are designed to expand and/or unfold, in accordance with the degree of removal of the packaged goods, at least until a certain proportion has been removed.

20 The respective damping and/or cushioning means ensures that shocks or vibrations acting on the bottle from outside are only transmitted to the packaged goods to a limited extent and are buffered, i.e. cushioned and damped, by the damping and/or cushioning means. This ensures improved protection in transit and reduces the incidence of broken tablets or misshapen capsules.

25 The novel configuration of the package is also of particular advantage in that any desiccant that may be required, for example a silica gel to protect the packaged product from the effects of moisture, can cleverly be introduced into the packaging and stored therein, particularly without making contact with the packaged goods. Preferably, there-
30 fore, the base of the bottle or the damping and/or cushioning means comprises an area filled with a desiccant.

Expediently, the area filled with desiccant is disposed between a surface of the damping and/or cushioning means facing the fill space of the bottle that is to be filled with

packaged goods and the base of the bottle. The desiccant can thus be disposed under a top surface of the respective damping and/or cushioning means that forms a sort of flexible base insert and a fill base surface for the bottle, and the surface of the bottle base on the inside of the bottle. The desiccant then has no direct contact with the packaged goods. This is particularly advantageous for packaging bottles having an induction seal.

In order for the damping and/or cushioning means to perform the function of a base insert with fill a base surface that is variably compressible and re-expandable depending on the weight of the packaged goods acting thereon, according to a further feature the damping and/or cushioning means is constructed as a flexibly compressible or extending insert element that covers the cross-section of filling above the base of the bottle. The insert element may be a spring-loaded base insert. Accordingly, in one embodiment, the damping and/or cushioning means is constructed as a spring-loaded base insert. However, the insert element may also be in the form of an umbrella-shaped spring element. Therefore, the damping and/or cushioning means is alternatively constructed as an umbrella-shaped spring element which bears particularly with the centre of its convexity on the base of the bottle. According to another alternative, the damping and/or cushioning means is in the form of a concertina-like spring element or padded cushion.

The only important factor in this context is that the various embodiments of the damping and/or cushioning means are elastically compressible, or are constructed to extend or stretch, at least in parts, when subjected to the impact of the packaged goods, and as packaged goods are removed, in accordance with the amount removed, at least until a certain proportion has been removed, they either re-expand and unfold or they contract again and moreover when subjected to the impact of packaged goods for the first time within the bottle they are automatically aligned so as in particular to cover the fill cross-section at the base entirely or at least substantially.

However, the damping and/or cushioning means may also be constructed as a flexible and/or elastic inner film bag disposed in the bottle, while in particular a hollow intermediate space is formed at least in parts between the inner wall of the bottle and the outer surface of the inner film bag. The inner film bag may be designed automatically to re-

tract elastically, at least partly, and/or where an intermediate space is present, to be compressed and/or collapsed at least in parts by the action of additional damping and/or cushioning means disposed in the intermediate space. The inner film bag clings to the packaged goods contained therein and presses them against one another. This achieves a particular immobilisation of the packaged goods within the bottle and further protection from tablet breakage and capsule deformation.

One embodiment of the invention might envisage that, when an inner film bag of this kind is used, the hollow intermediate space thus formed is equipped with a soft, flexible damping and/or cushioning means of the kind described hereinbefore. Therefore, additional damping and/or cushioning means is disposed in the intermediate space according to one of claims 1 to 8.

Most advantageously, the package according to the invention is for the packaging and transporting of pharmaceutical active substance formulations in the form of plain or coated tablets or capsules, as these are particularly prone to breakage and pharmaceutical capsules are relatively easily deformed. Thus, the bottle is preferably filled with pharmaceutical active substance formulation in the form of plain or coated tablets or capsules.

Finally, the bottle is expediently made of plastics. Bottles of this kind can be produced cheaply, particularly by blow-moulding, including by coextrusion of a number of layers of material. It is particularly advantageous that the plastics bottle, the inner film bag and/or the damping and/or cushioning means are made from a polyurethane elastomer, a cellular polyurethane elastomer, a thermoplastic material, particularly high density polypropylene or polyethylene, or a film laminate. For the plastic bottle or film bag it is possible to use plastic films made of polyvinylchloride (PVC), cyclo-olefin-copolymer (COC), polychlorotrifluoroethylene (PCTFE), polyethylene (PE), polypropylene (PP), polyethylene terephthalate (PET), polycarbonate (PC), polyester (UP), polyacrylate, polyamide (PA) or another plastic or a multi-layer composite plastic film, consisting for example of a combination of polychlorotrifluoroethylene (PCTFE), which is known particularly by the brand name Aclar® registered as a trade mark by Honeywell International, Inc., with polyvinylchloride (PVC) or polyvinyl chloride (PVC) with polyvinylidene chloride (PVdC), or alternatively laminate films of these materials, or in the

form of aluminium films or composite aluminium films.

It will be understood that the features mentioned above and about to be explained in more detail hereinafter may be used not only in the particular combinations specified
5 but in other combinations as well. The scope of the invention is defined by the claims.

The invention is hereinafter explained more fully by means of embodiments by way of example with reference to the associated drawings. In the drawings:

10 Fig. 1 is a diagrammatic representation of a longitudinal section through a package according to the invention in a first embodiment,

Fig. 2 is a diagrammatic representation of a longitudinal section through a package according to the invention in a second embodiment,

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Fig. 3 is a diagrammatic representation of a longitudinal section through a package according to the invention in a third embodiment,

20 Fig. 4 is a diagrammatic representation of a longitudinal section through a package according to the invention in a fourth embodiment and

Fig. 5 is a diagrammatic representation of a longitudinal section through a package according to the invention in a fifth embodiment.

25 The packages 1, 1', 1'', 1''' and 1'''' shown in Figures 1 to 5 differ only in the construction of a damping or cushioning means. Consequently, identical elements or objects in all the embodiments have been given the same reference numerals.

30 Fig. 1 shows a package in the form of a bottle 1, which is sealed, apart from the mouth opening 2, and has the fill volume 3 or a fill space inside it. The bottles 1' to 1'''' in Figs. 2 to 5 are also constructed in the same way.

Damping and/or cushioning means 5 is arranged on the bottom 4 of the bottles 1 to 1'''' in each case. The respective damping and/or cushioning means 5 is thus provided in

the fill volume 3 and are subjected to the impact of the packaged goods on their upper surface 9 as the bottles 1 to 1''' are filled with the goods on their surface. In the case of the bottles 1''' and 1'''' according to Fig. 4 and Fig. 5, packaged goods 24 act on the inside of the respective film bag 21.

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In the case of a filled bottle 1, 1', 1'' the respective damping and/or cushioning means 5 acts on the packaged goods in the respective bottle 1, 1', 1'' and is located between the wall of the bottle, in this case the base 4 of the bottle, and adjoining wall regions and the packaged goods (not shown). The respective damping and/or cushioning means 5 has flexible, resilient, compressible spring element regions 6, 7, 8, the upper surface 9 of which forms a fill base surface within the respective bottle 1, 1', 1''. Each of the damping and/or cushioning means 5 is constructed as a flexibly compressible insert element covering the fill cross-section of the fill volume 3 above the base 4 of the bottle. By the fill cross-section is meant the cross-sectional area within the respective bottle 1, 1', 1'' which is filled with packaged goods. The respective insert element is inserted diagonally, for example, into the mouth opening 2 and then falls onto the base 4 of the bottle, where it comes to rest. By gently shaking the bottle, the respective base insert 10, 18, 27 or the respective damping and/or cushioning means 5 are roughly aligned. Accurate alignment then takes place later as a result of the packaged goods placed in the respective bottle 1, 1', 1'', which press the base insert into the position of use shown in Figures 1 to 3 and align it accordingly.

In the embodiment according to Fig. 1 the damping and/or cushioning means 5 is constructed as a flexibly compressible insert element in the form of a spring-loaded base insert 10. The base insert 10 comprises on its upper surface 9 a fill base surface 11 which is supported by a compression spring 12 bearing on the base 4 of the bottle.

The damping and/or cushioning means 5 according to Figure 2 is constructed as a flexibly compressible insert element with a base insert 27 in the form of an umbrella-shaped spring element 13 which bears on the base 4 of the bottle with the spread side of its spring arms 14 that spread out from a central point 15. However, it is also possible to arrange the umbrella-shaped spring element 13 on the bottle base 4 so that it rests with its central point 15 on the bottle base 4. The upper surface 9 that is thus as-

sociated with the fill volume 3 then forms a fill base surface 26 of the base insert 27 of the bottle 1'.

5 In the embodiment according to Fig. 3 the damping and/or cushioning means 5 therein are constructed as a flexible, compressible insert element in the form of a concertina-like spring element 16 or cushioned pad. The concertina-like spring element 16 consists of compressible side wall regions 17 and a base insert 18 disposed thereon, which constitutes a fill base surface 28 on its upper surface 9. In addition, inside the concertina-like spring element 16 there is also a region 19 that is filled with a desiccant
10 20. The region 19 filled with the desiccant 20 is disposed between the upper surface 9 of the base insert 19, which forms the fill base surface 28 of the damping and/or cushioning means 5 facing the fill volume 3 of the bottle 1" that is to be filled with packaged goods, and the base 4 of the bottle.

15 Each of the damping and/or cushioning means 5 shown in Fig. 1 to 3 is constructed by virtue of its springy, flexible and compressible design with spring element regions 6, 7, 8, so that, on the one hand, when the fill volume 3 is filled with packaged goods, the presence of the packaged goods impacting on its upper surface 9 causes it to be automatically aligned on the base 4 of the bottle so that its region forming a base insert
20 10, 18, 27 or a fill base surface 11, 26, 28 above the base 4 of the bottle covers the cross-section of filling of the fill volume 3. Moreover, the respective damping and/or cushioning means 5 is constructed, by virtue of their flexible, compressible and springy design, so that they are compressed under the weight of the load of packaged goods, but then re-expand and unfold or open out again as packaged goods are removed from
25 the fill volume 3. The damping and/or cushioning means 5 retains this property and function at least until a certain proportion of packaged goods has been removed.

The packaged goods envisaged for the bottles 1 to 1'" shown in Figures 1 to 5 consist of a pharmaceutical active substance formulation in the form of plain or coated tablets
30 or capsules which are better protected in transit thanks to this packaging.

The bottles 1 to 1'" and the damping and/or cushioning means 5 may be made from any common conventional plastics that are suitable and permitted for the packaging of pharmaceutical active substance formulations. The respective bottles 1 to 1'" are

preferably produced by a plastic blow-moulding process, particularly an extrusion process, while the damping and/or cushioning means 5 may be produced by injection moulding.

5 Figs. 4 and 5 show packages in the form of bottles 1'', 1''', which have an inner film bag 21 on the inside forming the damping and/or cushioning means 5. The inner film bag 21 is designed to be automatically at least partly elastically retractable and/or at least partly compressible and/or collapsible by the effect of the force of additional damping and/or cushioning means 23 disposed in a hollow intermediate space 22. The
10 inner film bag 21 clingingly envelops the packaged goods 24 contained therein, pressing them against one another. On the inside of the mouth opening 2 of the bottle 1'', 1''' in question, the inner film bag 21 is secured by welding or gluing or sealing. For filling, reduced pressure is applied to the inside of the respective bottle 1'', 1''' through an opening 25 formed in the wall of the bottle, thereby applying the inner film bag 21 to
15 the interior wall of the bottle. Then the inside of the inner film bag 21 is filled with the packaged goods 24 and the reduced pressure is removed. The inner film bag 21 then automatically contracts, as it is made to be elastically expandable. In addition, it subsequently contracts further as the packaged goods are removed, at least until a certain proportion has been removed. Thus, the inner film bag 21 is also to be understood as
20 being damping and/or cushioning means designed to align itself automatically as the fill volume 3 is filled with packaged goods 24 and/or to expand and/or unfold to a degree corresponding to the removal of the packaged goods, at least until a certain proportion has been removed. The walls of the film bag 21 and the intermediate space 22, particularly if it is provided with the additional damping and/or cushioning means 23, cause
25 buffering and damping of shocks or vibrations acting on the respective bottles 1'', 1''' from outside. The additional damping and/or cushioning means 23 may be one of the insert elements 10, 13, 16, or alternatively may be an insert of flexibly compressible material, such as foam, for example.

Patent Claims

1. Package in the form of a bottle (1 to 1'") having damping and/or cushioning means (5) which acts on goods for packaging that may be placed in its fill volume (3) and which are disposed between the goods and the wall of the bottle, **characterised in that** the damping and/or cushioning means (5) is constructed to be substantially automatically aligned and/or unfolded or compressed as the fill volume (3) is filled with goods, and to contract or expand and/or unfold as goods are removed, at least until a certain proportion has been removed.
2. Package according to claim 1, **characterised in that** the damping and/or cushioning means (5) is disposed in the fill volume (3) that holds the goods, particularly on the base (4) of the bottle.
3. Package according to claim 1 or 2, **characterised in that** the bottle base (4) or the damping and/or cushioning means (5) comprises a region (19) filled with a desiccant (20).
4. Package according to claim 3, **characterised in that** the region (19) filled with the desiccant (20) is disposed between a surface (9) of the damping and/or cushioning means (5) facing the fill volume (3) of the bottle (1, 1', 1'') that is to be filled with the goods and the base (4) of the bottle.
5. Package according to one of claims 1 to 4, **characterised in that** the damping and/or cushioning means (5) is constructed as a flexibly compressible or extending insert element that covers the cross-section of filling above the base (4) of the bottle.
6. Package according to one of claims 1 to 5, **characterised in that** the damping and/or cushioning means (5) is constructed as a spring-loaded base insert (10).
7. Package according to one of claims 1 to 5, **characterised in that** the damping and/or cushioning means (5) is constructed as an umbrella-shaped spring ele-

ment (13) that rests in particular with the centre (15) of its convexity on the base (4) of the bottle.

- 5 8. Package according to one of claims 1 to 5, **characterised in that** the damping and/or cushioning means (5) is constructed as a concertina-like spring element (16) or padded cushion.
- 10 9. Package according to one of claims 1 to 5, **characterised in that** the damping and/or cushioning means (5) is a flexible and/or elastic inner film bag (21) disposed in the bottle (1'', 1'''), while at least in parts a hollow intermediate space (22) is formed between the inner wall surface of the bottle (1'', 1''') and the outer surface of the inner film bag (21).
- 15 10. Package according to claim 9, **characterised in that** additional damping and/or cushioning means (5, 23), particularly damping and/or cushioning means according to one of claims 1 to 8, is arranged in the intermediate space (22).
- 20 11. Package according to one of claims 1 to 10, **characterised in that** the bottle (1 to 1''') is filled with a pharmaceutical active substance formulation in the form of plain or coated tablets or filled capsules.
12. Package according to one of claims 1 to 11, **characterised in that** the bottle (1 to 1''') is a plastic bottle.

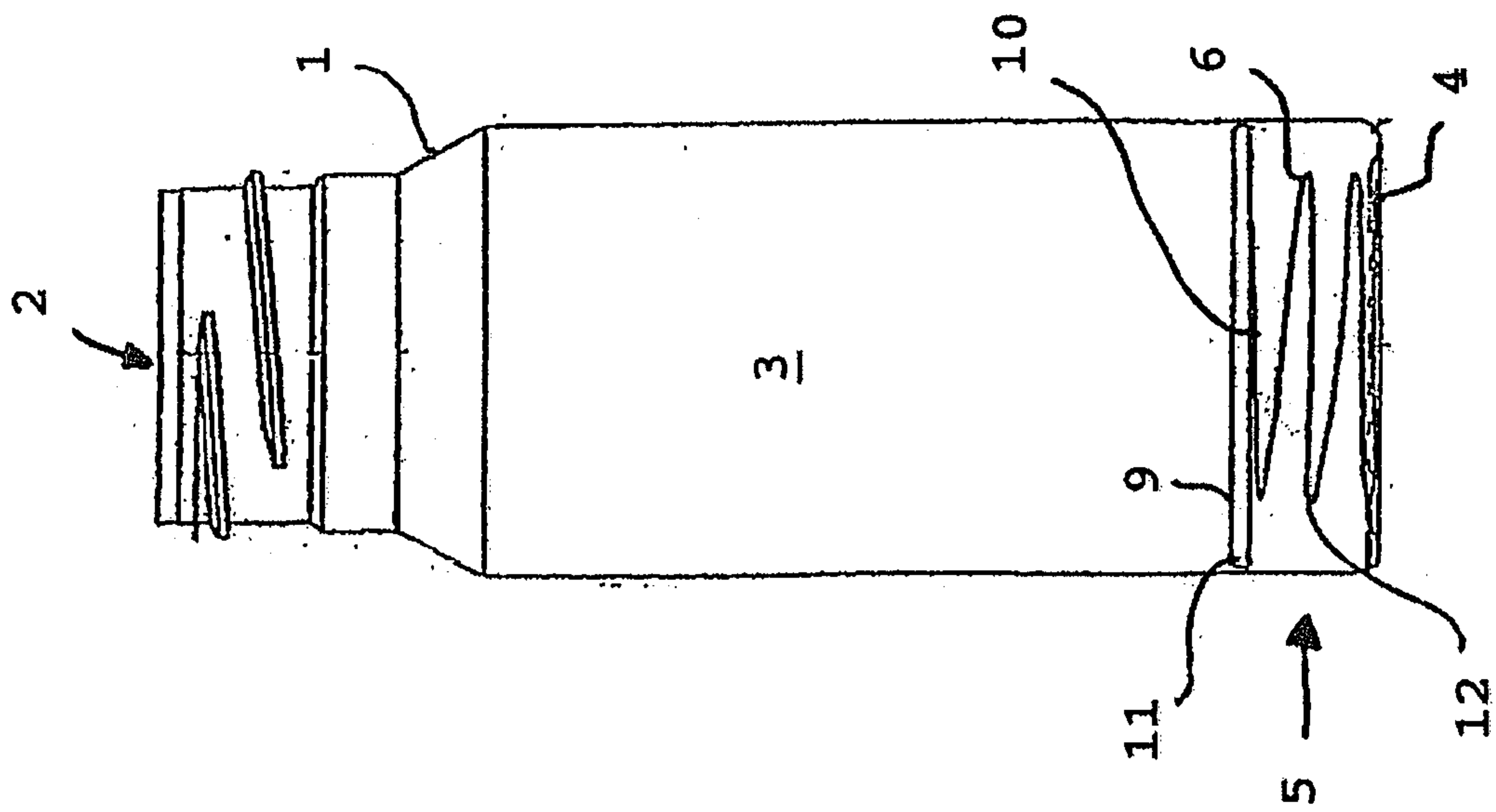


Fig. 1

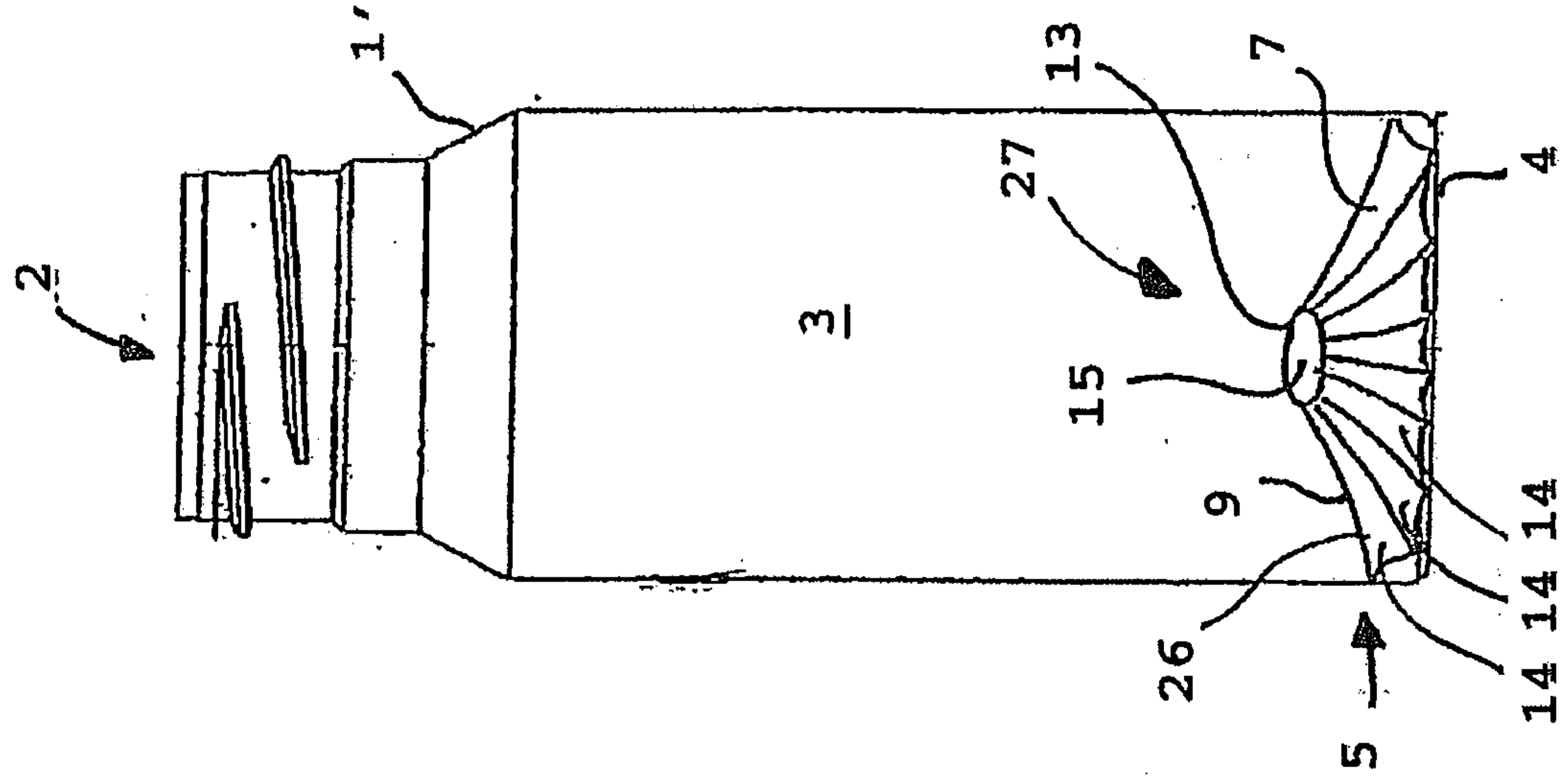


Fig. 2

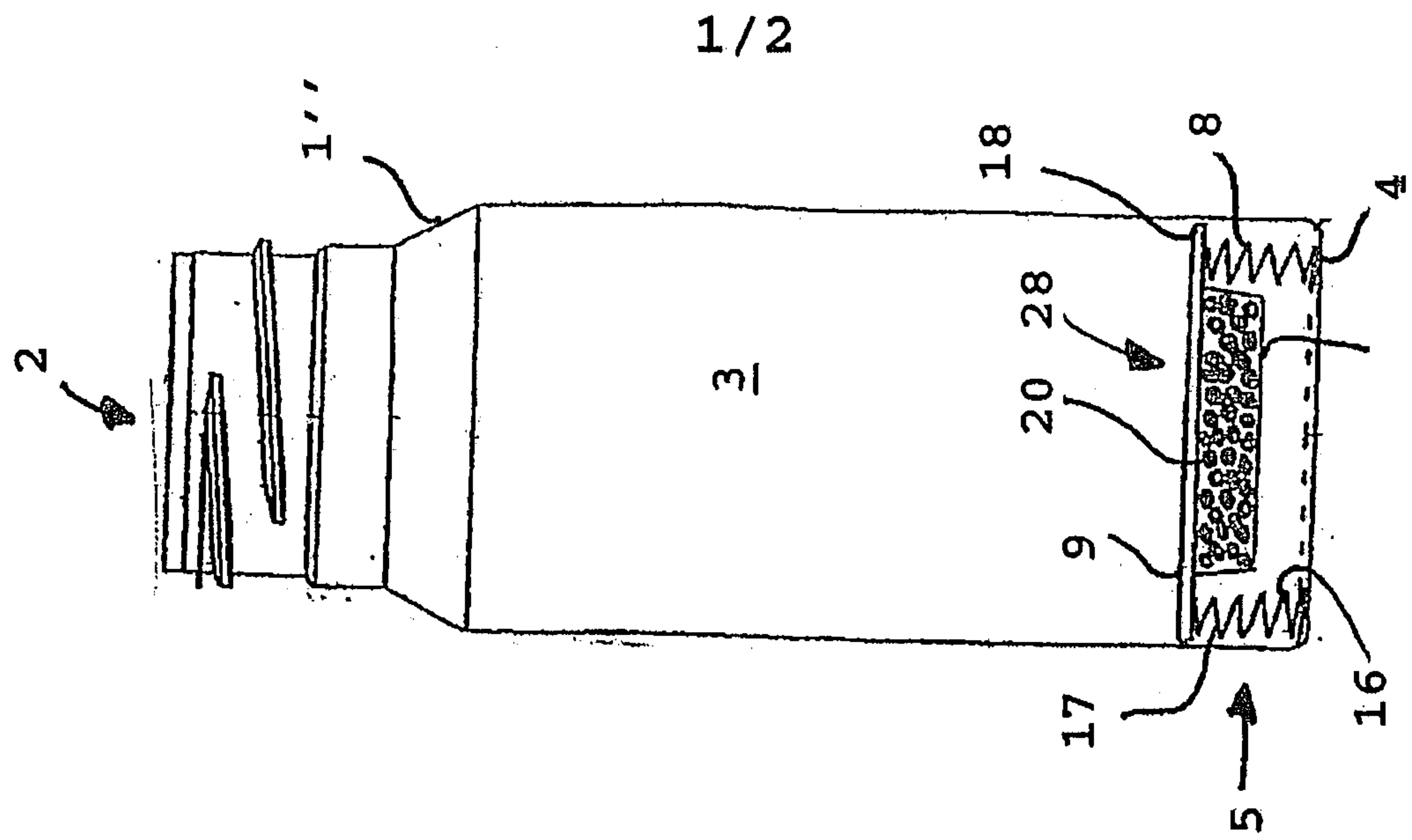
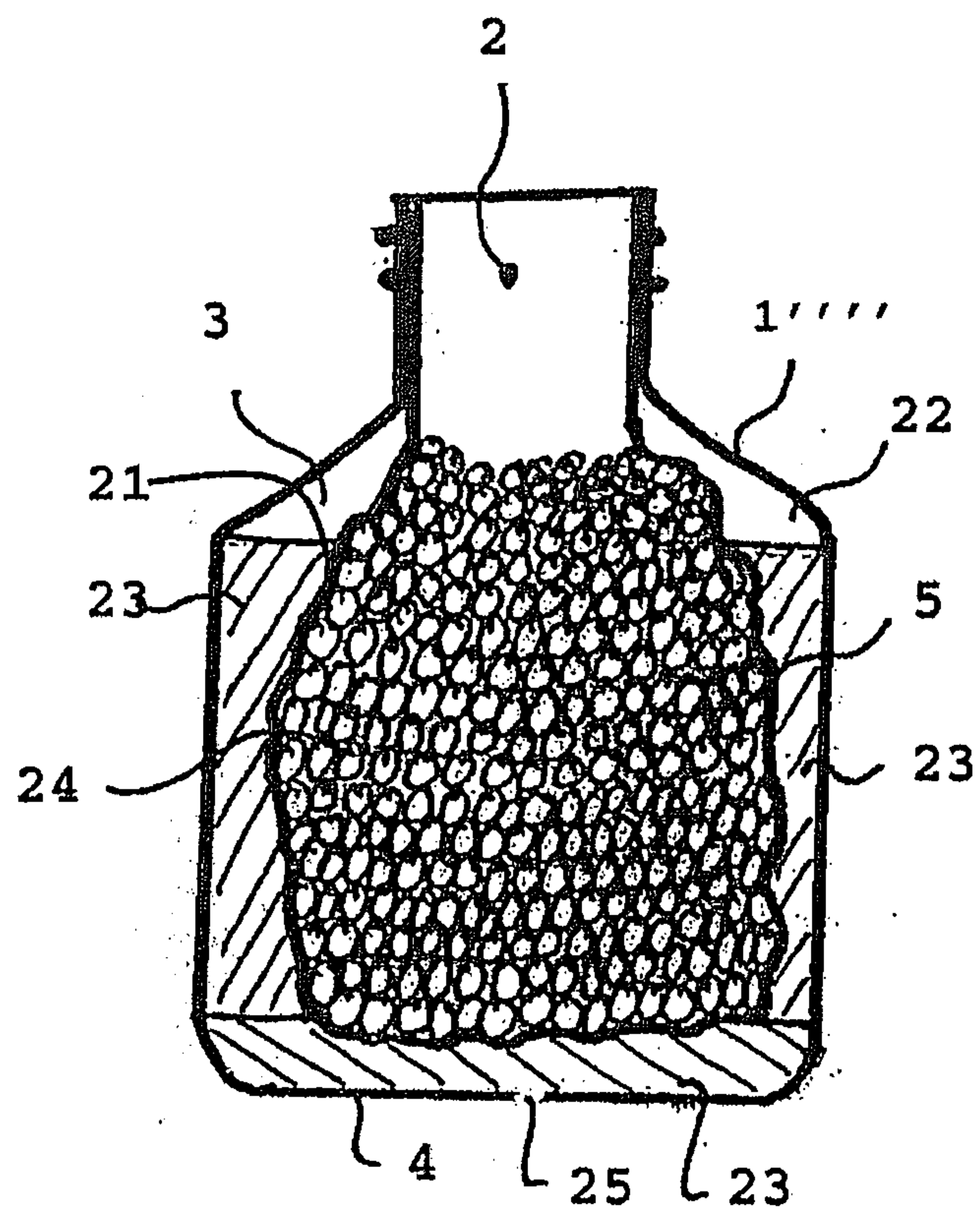
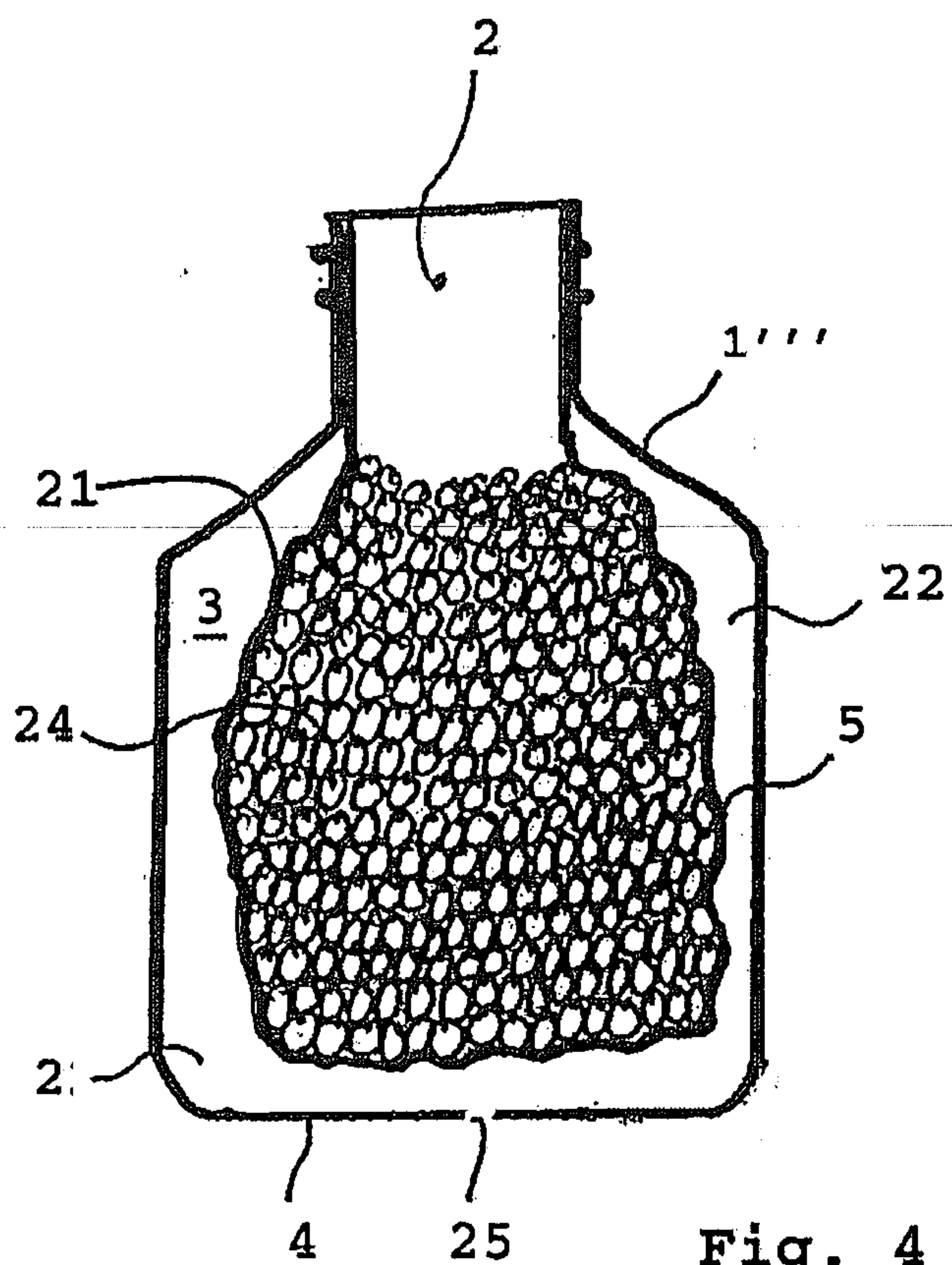


Fig. 3

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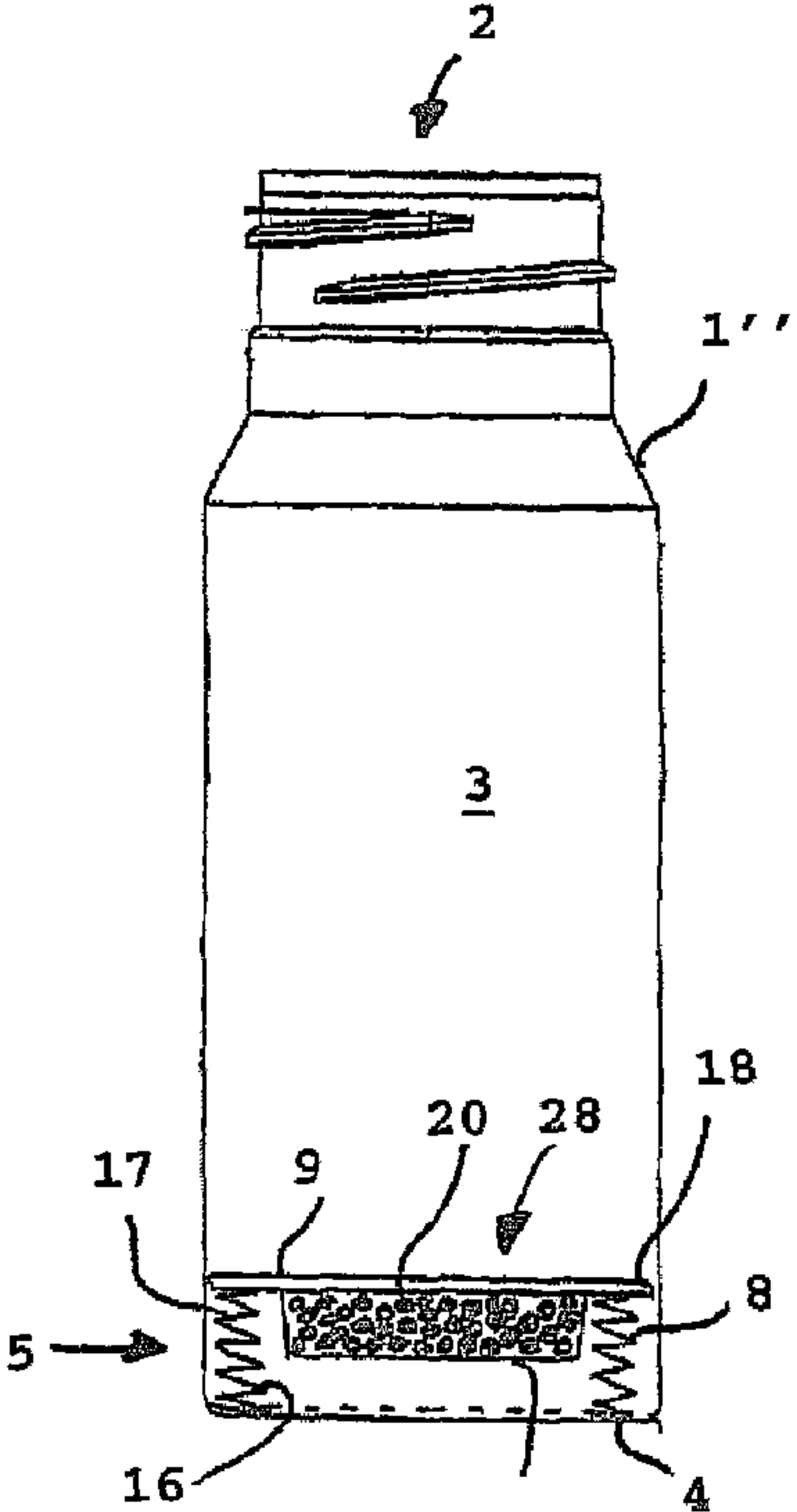


Fig. 3