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⑤④ **Plug for containers consisting of two elements fitting into each other and guaranteed against tampering.**

⑤⑦ The plug consists of two elements fitting into each other, the first element being an external annular part (15) and a lid (18), interconnected by narrow radial strips (17), while the second is consisting of an outer body (1) externally shaped to be stably assembled on the hole (6) bored in the container head (5) thus forming an internal U-shaped recess (8), this outer body being a pouring device (10) fitted with a removable seal (12) and connected to the outer body by a thin preferably deformable wall (11). The internal part of the lid (18) and the external part of the pouring device (10) have matching threads (14, 21) which when screwed down allow for assembly of the two elements, which is rendered stable by the presence of perfectly fitting annular swellings (9, 16) on the external surface (15) of the first element and inside the recess (8) of the second element.

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This patent covers a plug for containers, consisting of two elements and providing an excellent guarantee against tampering.

Various types of plugs are already known, mainly consisting of an external body to be peripherally secured to the shaped rim of the opening in the container head and of a pouring device connected to this outer body preferably by a deformable thin wall. Before opening, the plug therefore appears to be flush with the lid, thus facilitating storage, whilst upon pouring, the pouring device can be removed to facilitate pouring.

Container plugs are known to be required to provide the best guarantee against tampering, to safeguard the contents of the vessel.

Since tampering cannot completely be prevented, it is obviously necessary to make tampering more difficult or at least easily detectable.

The plug must therefore be designed with a view to making tampering difficult or at least easily detectable through the presence of damage or permanent deformations.

The plugs at present available are deficient in this respect as this is particularly true for plugs of simple design, whereas plugs consisting of more than one element are more reliable in terms of safety of the contents, though very expensive and of difficult marketability.

This patent therefore aims to illustrate a plug providing the highest guarantee against tampering, at low cost and attractive to container manufacturers.

Furthermore, the potential uses of the plug should extend both to containers filled through the opening in the lid, with subsequent assembly of the plug, and to containers filled through the bottom with the plug already assembled. The plug meets this requirement since it consists simply of two molded elements, the first being an annular element formed by a cylindrical part connected to the closing lid, whilst the second includes the outer body, the pouring device with tear seal and an intermediate connecting part preferably consisting of a thin deformable wall.

The outer body of the second element has an internal U-shaped part turned upward, into which the cylindrical wall of the first element is introduced and blocked thus acting as a firm and unmovable reinforcement inside the body.

The external wall of the pouring device and the inner surface of the lid have matching threads, designed not only to facilitate normal handling of the lid on the opening, but also mutual assembly of the two elements which, as a result of the already described fitting of the outer body of the second element and the cylindrical wall of the first element, will thus be tightly assembled.

The materials constituting the two elements are

of special significance in the invention. The material of the second element is fairly soft and flexible i.e. soft and flexible plastic similar to the material used for conventional plugs, since this element is fitted by plastic deformation into the container opening and is designed to allow the extraction of the delivery device if the model is provided with an extractable pouring device. The first element is manufactured in rather rigid and resisting material, such as hard and rigid plastic, since the cylindrical part is the element which plays the most important role in stiffening the plug and in preventing tampering.

The invention is illustrated in a practical and exemplifying implementation of the plug with extractable pouring device in the enclosed drawings, in which:

Fig. 1 shows a central vertical section of the first element of the plug,

Fig. 2 shows a top view of the first element of Fig.1,

Fig. 3 shows the central vertical section of the second element of the plug,

Fig. 4 shows the central vertical section of the assembled plug complete with external sealing foil, if any,

Fig. 5 shows the central vertical section of the plug illustrated in Fig.4 mounted on the container and extracted for pouring.

With reference to these figures, the second element of the plug as per Fig.3, consists of an annular body 1, which externally presents the well-known profiles 2, 3, 4 useful for the assembly and tightening of the plug in the opening in the head 5 of the container, suitably shaped by normal annular inward-directed bending 6 (See Fig.5).

The external part of body 1 presents in the lower part a U-shaped counterbend 7, forming an upward-turned recess 8 having on its outer surface an annular swelling 9 at some distance from the bottom.

The second element 1 also consists of a cylindrical central part 10 forming the pouring device, connected at its lower end, by an intermediate deformable thin wall 11, to the internal end of counterbend 7.

The pouring device 10 has internally a closing device 12 which can be removed by pulling the raised tongue 13.

The outer surface of the pouring device 10 is threaded 14, to facilitate positioning of the lid and assembly of the two plug elements plug, as hereinafter explained.

The first element of the plug, as shown in Fig. 1 and 2, is formed by an external cylindrical part 15 with an external annular swelling 16 at its lower end.

The closing lid 18 is positioned inside and is linked to the above-mentioned external part 15 by thin radial tearable strips 17; the lid being provided with an external upper flange 19 and an internal annular tightening projection 20 and thread 21 engaging the thread 14 of the pouring device.

One half of the flange 19 approximately is fastened to the lid 18, while the other half 19' can be lifted (see Fig.5) to facilitate the extraction of the pouring device 10 of the plug as well as the screwing and unscrewing of the lid.

The two plug elements are assembled by screwing the thread 21 of the first element onto the thread 14 of the second one. During this operation, the external part 15 of the first element is screwed into the recess 8 of the second fixed element, until the projection 16 has got beyond projection 9 and is steadily positioned beneath the latter (see Fig. 4). The plug thus assembled may be completed by a removable sealing foil 22.

The screwing of the first element onto the second fixed element requires a significant torsional stress due to the friction between the external wall 15 and the related swelling 16 against the walls of recess 8 and its related swelling 9 resulting from the passage of swelling 16 onto swelling 9.

A specific device has therefore been designed to obtain the simultaneous rotation of the lid 18, 19 with the external part 15, so as to prevent tearing of the connecting strips; moreover notches 23 on the lid and holes 24 on the upper rim of the external part 15 are also provided to permit simultaneous screwing of the first element by means of the device.

This solution is just an example since it is possible to replace the notches 23 and the holes 24 by other gripping elements for the device. As an alternative, the notches 23 and the holes 24 may be replaced by radial serrations 25 (hatched in Fig.1 and 2), on the external upper surface of wall 15 and of the lid 18. The serrations permit to screw on the lid, by acting on the vertical surfaces, thus preventing unscrewing due to slipping along the inclined surfaces.

The assembly of the two elements of the plug is extremely steady, since it is practically impossible to extract part 15 from recess 8 by unscrewing it.

According to the invention, the first element is manufactured in rigid and resisting material, whereas the second is in soft and flexible material. The choice of these materials is determined by the fact that the second element has to be deformable so that it can fit in the shape 6 of the hole in the head 5 and to allow for deformation of the thin-walled section 11 for the extraction of the pouring device 10. On the other hand the rigidity and resistance of the first element are useful for the formation of the

reinforcing ring represented by the external part 15.

It should be stressed that the assembly of the plug on the container causes an inward deformation of the external part 2 of body 1 directed toward part 15 (see Fig.5). It follows that, even with various pointed or other tools, it is impossible to deform the body 1 in order to extract the plug by getting beyond the rim 6 of the base 5 without causing failure to the plug.

Fig.5 shows the plug after its removal, ready for pouring, after the lid 18 has been removed.

Instead of the thin deformable walls 11 the plug herein described can also have a non-deformable wall, in which case the plug with the pouring device cannot be extracted. The patent can also be applied to plugs with extractable telescopic pouring devices.

In conclusion the plug consists of only two elements to be screwed into each other, at low production cost and the plug provides the best guarantee against tampering since it can neither be extracted nor removed without causing visible damage to the radial strips 17 or the plug itself, in line with the scope of the invention.

Claims

1) Plug for containers, **characterized** by the fact that it consists of two elements to be assembled by screwing and characterized by the facts that:

- a first element consisting of an external cylindrical part (15), provided externally and at its lower end with an annular swelling (16) and formed by a closing lid (18), an external upper flange (19), an internal sealing projection (20) and thread (21), the outer part (15) and the flange (19) of the lid (18) being interconnected by narrow radial tearable strips (17),

- a second element consisting of an annular body (1), with profiles (2, 3, 4) on its outer surface, devised for a steady installation on the shape (6) of the container head (5) and provided at its lower end with a U-shaped bend (7) forming an annular recess (8) turned upwards, which has on its outer surface an annular swelling (9) at some distance from the bottom, formed by a pouring device (10) having an external thread (14) matching the thread (21) of the lid (18) and a removable seal (12), and consisting of an intermediate, thin-walled section (11) connecting the annular body (1) to the pouring device (10), the wall (11) being generally thin and deformable so as to allow for extraction of the pouring device,

in such a way that the first element is fitted in the second element by mutually screwing of the threads (14, 21) and by steady penetration of the

cylindrical part (15) of the first element into the recess (8) of the second element resulting in the mutual engagement of the swellings (9, 16).

2) Plug as per claim 1, **characterized** by the fact that it can be completed by an external sealing foil (22). 5

3) Plug as per claim 1, **characterized** by the fact that the screwing of the two elements is performed by twisting the first element on the second fixed element, by means of a device acting simultaneously on the external part (15) and on the flange (19) of the first element, to safeguard the integrity of the linking strips (17). 10

4) Plug as per claim 3, **characterized** by the presence of notches (23) and holes (24) or serrations (25) on the outer surface of the external part (15) and of the lid (18) to favour the twisting action on the first element, 15

5) Plug as per claim 1, **characterized** by the fact that the flange (19) is partially secured to the lid (18) and partially detached, so that the detached part (19') may be raised to remove the lid (18) and facilitate extraction of the pouring device (10) through deformation of the thin-walled part (11). 20

6) Plug as per claim 1, **characterized** by the fact that, the first element is produced in rigid and resisting material whilst the second is manufactured in soft and flexible material. 25

7) Plug as per claim 6, **characterized** by the fact that the part (15) of the first element in rigid and resisting material acts as an internal reinforcing support of the annular body (1) of the first element thus preventing any deformation caused by the extraction of the plug from the opening in the container for tampering purposes. 30 35

8) Plug as per claim 6, **characterized** by the fact that by introducing the plug into the shaped body (6) of the head (5), the external body (1) of the second element bends and gets closer to the external rigid annular part (15) of the first element, thus increasing safeguarding against tampering. 40

9) Plug as per claim 1, **characterized** by the fact that the failure of the strips (17) connecting the external body (15) to the flange (19) clearly proves that the contents have been tampered with. 45

10) Plug as per claim 1, **characterized** by the fact that the intermediate section (11) with deformable thin walls may be replaced by telescopic elements facilitating the extraction of the pouring device (10). 50

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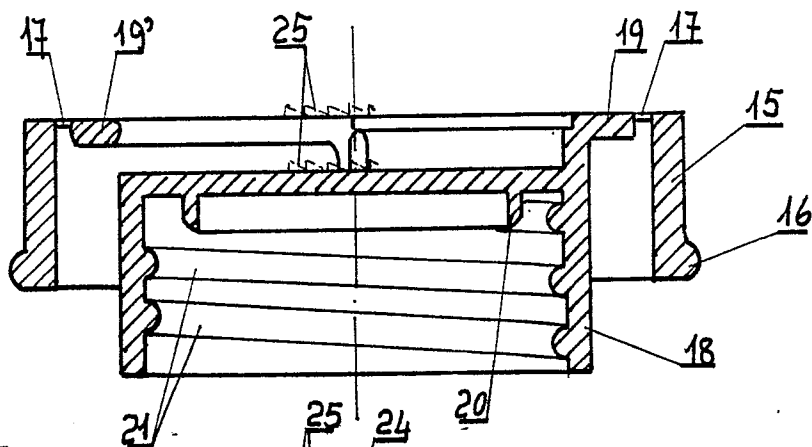


Fig. 1

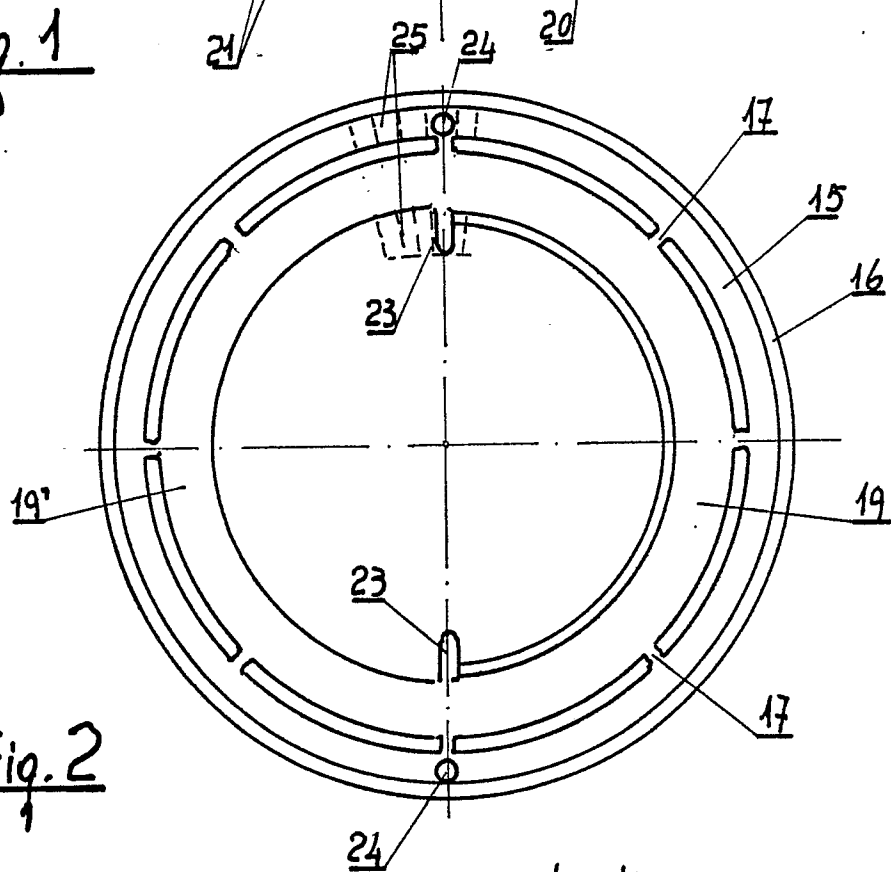


Fig. 2

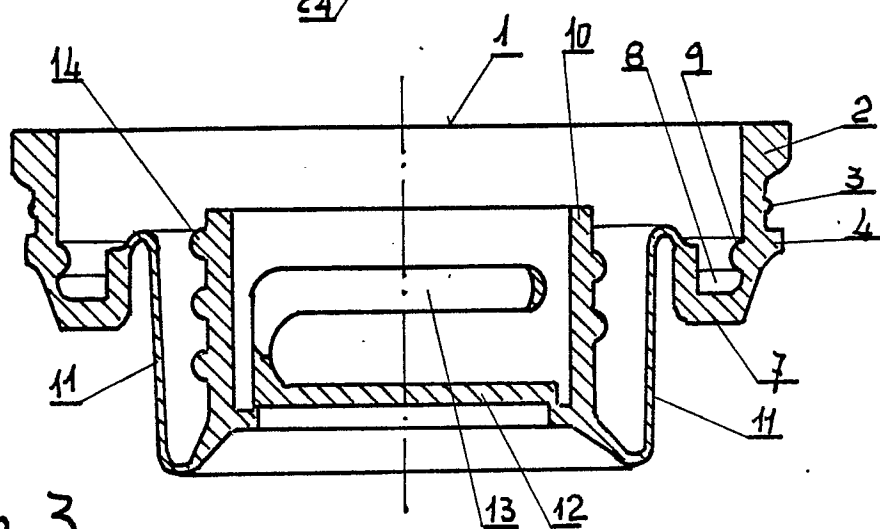


Fig. 3

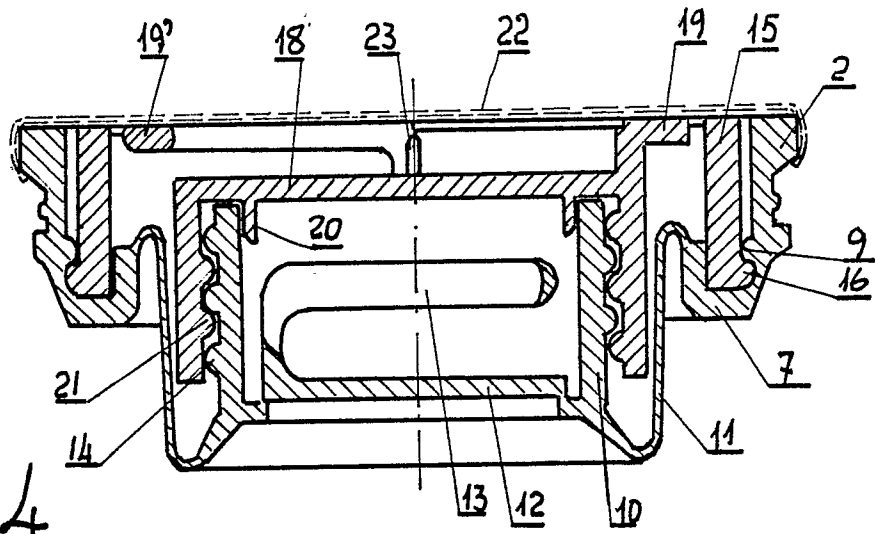


Fig. 4

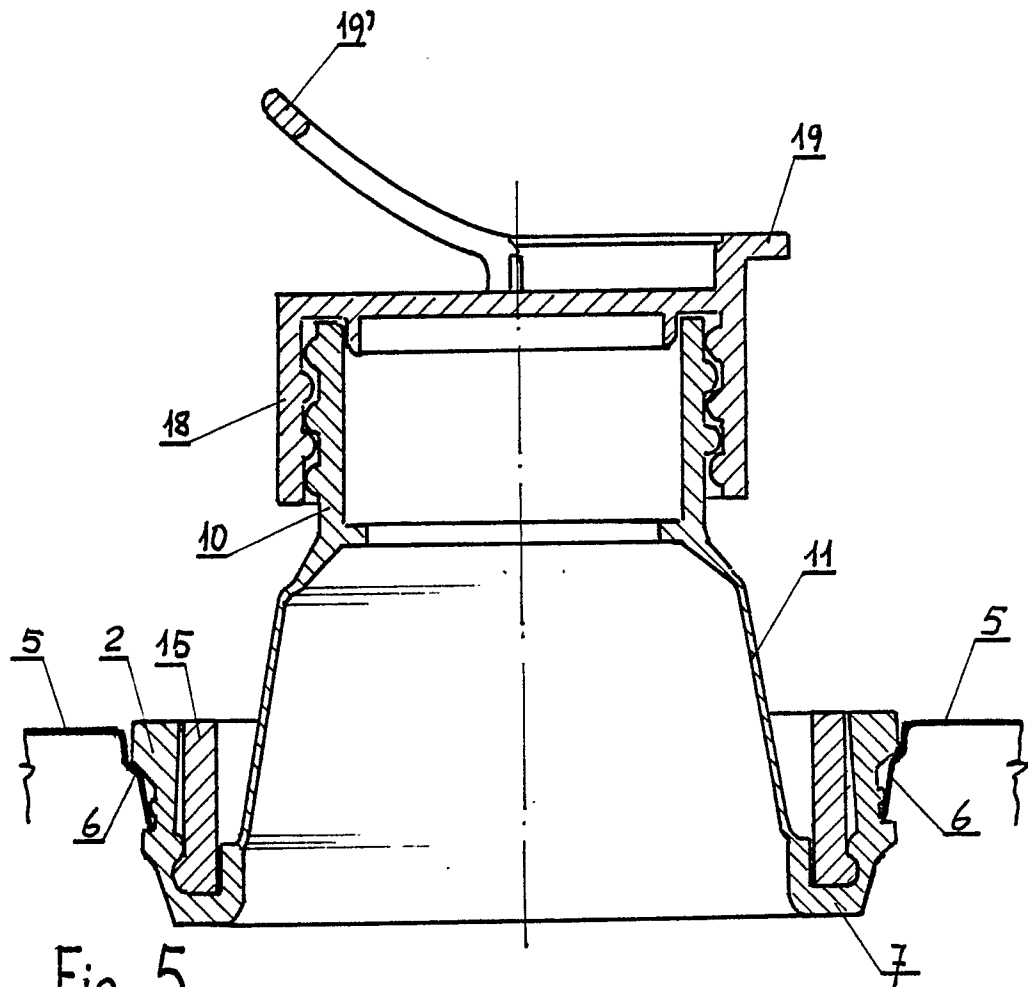


Fig. 5



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.4)
X	EP-A-0 269 499 (P. REMY) * Column 3, line 57 - column 5, line 8; column 6, lines 28-61; figures 1-4,14,15 *	1,5-9	B 65 D 47/06
Y	---	2,10	
Y	EP-A-0 221 419 (BERG) * Page 9, lines 5-17; figure 1 *	2	
A	---	1	
Y	LU-A- 56 406 (BERTOLLI) * Page 2, line 18 - page 3, line 15; figures *	10	
A	EP-A-0 224 863 (BERG) * Column 8, lines 8-20; figures 1,2 *	1,9	
A	EP-A-0 127 943 (JOHNSEN & JORGENSEN) * Page 6, line 17 - page 7, line 15; figures 1,2 *	3,4	
A	US-A-3 604 740 (SUMMERS) -----		TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 65 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24-08-1989	Examiner MARTENS L.G.R.
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			