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(54) **SCREW CAP FOR CONTAINER**

(57) A screw-on cap (31) for a recipient including a retention flap (33) and a locking device comprising a first rib and a second rib (16), such that in the first screwing on of the screw-on closure (31) the retention flap (33) is deviated so as to be able to pass between the first rib and the second rib (16) and in the final position, the retention flap (33) butts against a contact surface of the second rib (16) in a secure and reliable manner.

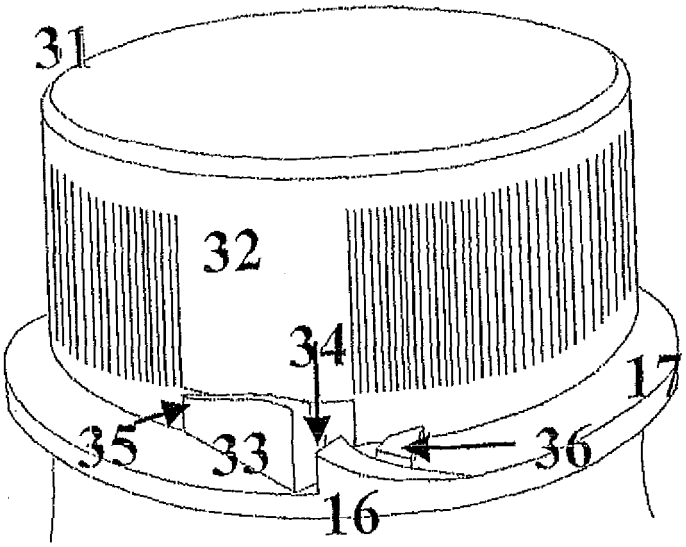

Fig 3

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Description

OBJECT OF THE INVENTION

[0001] The present invention refers to a screw-on closure or cap for closing a recipient.

[0002] More specifically, the present invention refers to a screw-on cap comprising at least one detachable retention flap which can be screwed on or screwed off an outer screw thread belonging to a container for the purpose of preventing undue tampering of the contents stored inside the recipient.

STATE OF THE ART

[0003] Different sealing systems suitable for closing a recipient are currently known. Said sealing systems have the function of assuring the tamper-resistance of the contents stored in the recipient or container.

[0004] A sealing system usually includes a tamper-resistant band joined to a screw-on cap or closure. Said bands, just like the caps to which they are incorporated, are cylindrical and are vertically joined to the also cylindrical body of the cap or closure in the lower portion thereof and are provided with different internal stop profiles assuring, after the initial screwing on of the cap on the threaded neck of the container, the tamper-resistance of the container and its contents by means of the housing of said stop profiles arranged on the tamper-resistant bands, under a circular ring of a diameter exceeding that of the profiles provided on the threaded neck of the container after the screw thread area, which prevents it from being unscrewed without previously breaking the connections arranged for that purpose between said band and the body of the cap.

[0005] The effectiveness of the different existing tamper-resistant bands incorporated to screw-on caps or closures is measured upon or in the moment of the first opening of the container, a moment in which they must have enough resistance so as not to allow unscrewing the cap or closure without previously separating, by breaking, the corresponding connections joining said tamper-resistant bands to the body of the cap or closure, which determines, according to the result, the evaluation of the efficacy it affords to the manufacturer and the end consumer to trust in a given type of cap or closure or not, the tamper-resistance of which must be as evident as possible.

[0006] However, this type of sealing systems has some drawbacks resulting, for example, from the existence of a circular ring under the screw thread/screw threads on the neck of the recipient. Therefore, upon performing the screwing on operation, the stop profiles need to surpass the diameter of the screw threads of the neck of the container, and then that of the circular ring under which it must be located at the end of the run. As a result, to perform said screwing on in the filling line, it is necessary to carry out a high screw torque to assure an effective screwing on, which on many occasions cannot be specified, and on other occasions deforms the outer appearance of the screw-on cap due to an excess.

[0007] Another problem is that the functioning of current tamper-resistant systems is not absolutely reliable either, that is, they do not 100% assure the leak-tightness of the container due to the breaking or detaching of the tamper-resistant band incorporated to the cap, since any partial turn prior to the complete unscrewing of the cap or closure causes a loss of the leak-tightness, and therefore the real possibility of a leak or introduction of liquid into the container without the band having been broken or detached.

[0008] This is commonly and easily seen in a container containing, for example, a carbonated beverage. Upon beginning to unscrew the cap, there is an audible noise caused by the carbonated gas leaving the inside of the container. It must be noted that in that instant, the cap and tamper-resistant band are still joined.

[0009] If the action of unscrewing the cap is stopped in that instant in which the tamper-resistant band and the cap are joined, just as gas left the container, liquid can also be extracted, and therefore it is possible to introduce liquid into the container. Therefore, the initial contents of the container may be altered, and as a result the end consumer may loose trust in the contents, which would result in a loss of sales for the manufacturer.

[0010] It is therefore necessary to develop a screw-on cap which, in cooperation with a mouth of a recipient, completely prevents the possibility of tampering with the contents stored in the recipient and further enhances the trust of both the manufacturer and the end consumer in the tamper-resistant system installed in the container.

CHARACTERIZATION OF THE INVENTION

[0011] The tamper-resistant system of the present invention comprises a screw-on closure or cap including a retention flap and cooperates with a locking device comprised on the neck of a recipient which in turn includes a first rib and a second rib, such that in the first screwing of the screw-on closure the retention flap deviates towards the axis of the recipient in order to pass between the first rib and second rib, and in the end position of the retention flap butts against the second rib in a secure and reliable manner.

[0012] The tamper-resistant system of the present invention is advantageous because it eliminates the drawbacks previously set forth, those pertaining to the manufacture, those pertaining to its application in filling lines, and especially because it assures the tamper-resistance of the contents of a container before the first use.

[0013] An object of the invention is to develop a simple tamper-resistant system of low manufacturing cost and easy application in a filling line, and which prevents total or partial tampering of the contents stored in a recipient incorporating said tamper-resistant system.

[0014] Another object of the invention is to assure the

existence of evidence in the tamper-resistant system in the event of an attempt to tamper with the contents of the container that is easily identifiable both by the manufacturer and by the end consumer.

[0015] Another object of the invention is to eliminate the tamper-resistant band of other systems so as to simplify the container recovery line in the recycling industry, since if there is no tamper-resistant band on the neck of the container to be recycled, it is possible to eliminate the tool responsible for removing said band from the neck of the recipient. It must be noted that the container and the tamper-resistant band are made of different materials, therefore they must be separated in order to be recovered.

[0016] Yet another object of the invention is to simplify screw-on cap manufacture and filling line application processes.

[0017] It must be noted that merely eliminating the resistance of the stop profiles incorporated on current tamper-resistant bands allows simplifying and economizing the manufacture of the tools or molds on one hand, and improving industrial efficacy on the other. All this is done without jeopardizing the industrial processes and tools for the containers which, if desired, can be lighter in weight without losing strength as a result.

[0018] Upon eliminating the current stop profiles from the neck of the container, the screwing resistance is reduced to a maximum, allowing high accuracy and a low screw torque, which results in the effectiveness of the application or capping machines, increasing their performance and operating life.

[0019] Another objective of the invention is to improve the efficacy, operating life and quality of screw-on cap manufacturing processes. As a result, the manufacturing and filling system is also low-cost.

BRIEF DESCRIPTION OF THE FIGURES

[0020] Devices materializing the invention will now be described, by way of example only, in reference to the attached schematic drawings, wherein:

Figure 1 shows a perspective view of a neck of a recipient according to the invention,

Figure 2 shows a plan view of the neck of the recipient according to the invention,

Figure 3 shows a perspective view of a screw-on closure on the neck of the recipient according to the invention,

Figure 4 shows a plan view of how the screw-on closure remains after the first screwing on according to the invention,

Figure 5 shows a perspective view of another embodiment of the screw-on closure according to the invention, and

Figure 6 shows a plan view of how the screw-on closure of the previous figure remains after the first screwing on according to the invention.

DESCRIPTION OF THE INVENTION

[0021] Figure 1 represents a retention or locking device 15, 16 located under the outer screw thread or threads 13 located on the neck 12 of a container or recipient 11. The recipient 11 is preferably made of a plastic material so that the material can be injected in an injection mold. The recipient 11 is suitable for storing a substance such as a liquid, a carbonated beverage or the like.

[0022] The retention device comprises a first projection 15 and a second projection 16 or ribs close to the contact edge 14 of each one of the two parts or halves constituting the container 11.

[0023] As can be seen in Figure 2, each half of the container includes a first rib 15 and a second rib 16, each one of them located at one of the contact edges corresponding to one half of the container 11. For example the first rib 15 is in contact with the neck 12, that is, in contact with the outer face of the cylinder of the neck of the container 11 and on a horizontal base ring 17 which is located under the screw thread 13.

[0024] On the opposite edge said half of the container includes the second rib 16 arranged on the base ring 17, externally and separately, and not in contact with the cylinder of the neck 12. Therefore, when the contact edges of both halves of the container are joined, two sets of locking devices 15, 16 are formed such that each one of the locking devices comprises a first rib 15 from one half and a second rib 16 from the other half of the container 11.

[0025] Regarding Figures 1 and 3, it must be noted that both ribs 15, 16 are facing at the same height on the base of the neck 12 and on the base ring 17 of the container 11, radially displaced from one another in order to prevent a retention flap 33 belonging to a screw-on cap or closure 31 from being radially displaced towards the axis of the container 11 when said cap 31 is unscrewed for the first time.

[0026] When the cap 31 is screwed on the retention flap is radially pressed towards the axis of the container, inwardly, by the second rib 16 and once said second rib 16 is overcome, the screw-on cap 31 has reached the final closure position for the screw-on cap 31.

[0027] As previously mentioned, in this position the retention flap 33 cannot be radially displaced towards the axis of the container 11, said movement is prevented by the first rib 15 which is in contact with the neck 12 of the container 11.

[0028] Returning to Figure 1, it must be noted that the first rib 15 comprises a deviation bevel on the introduction side, that is, the side closest to the contact edge 17, acting in the screwing on direction such that when the screw-on 31 cap is screwed on, the retention flap 33 is radially deviated outwardly from the axis of the container 11, being able to pass between the outer face of the neck and the concave inner face of the second rib 16 in the first screwing on of the cap 31.

[0029] Again in relation to Figures 1 and 3, the first rib 15 has the purpose of limiting the radial run of the reten-

tion flap 33 towards the axis of the container 11 in the final closure position for the screw-on cap 31 once the latter has been located after the first screwing on, and thus preventing the cap 31 from becoming unscrewed without tampering or previously detaching said flap 33, for example by breaking a breakable bridge or tear strip 34 and/or a film hinge 35 by means of which the retention flap is joined to the skirting or sleeve of the cap 31. It must be noted that the tear strip 34 is located on the side opposite to the hinge 35.

[0030] The first rib 15 extends like a circular arch-shaped curb along one part of the contour of the neck 12 of the container 11, that is, in contact with the outside of the neck of the container, and on the horizontal base ring 17.

[0031] Additionally, the second rib 16 is molded on the base ring 17 in a pyramidal quasi-triangular wedge shape along one part of the contour of the base ring 17 such that its concave inner face is arranged with a predetermined spacing regarding the outer face of the neck 12 of the container 11.

[0032] The inner face of the second rib 16 acts in the screwing on direction such that when the screw-on cap 31 is screwed on, the retention flap 33 is radially deviated towards the axis of the container, being able to pass between the outer face of the neck 12 and the inner face of said second rib 16 in the first screwing on of the cap 31.

[0033] Figure 3 shows the position of the closure 31 after the first screwing on the neck 31. The screw-on cap is molded in a thermoplastic material, in a single piece, suitable for being used in cooperation with the locking device 15, 16 in a tamper-resistant system preventing illicit tampering of the contents stored in the recipient 11.

[0034] The screw-on cap 31 comprises a cap bottom and a cap sleeve or skirt 32 with an internal threading, not shown, so that the cap 31 can be screwed on and off the outer screw thread/threads 13 belonging to the neck 13 of the recipient 11.

[0035] The retention flap 33 is molded in the lower end area of the cap sleeve 32 such that it outwardly projects, being oriented approximately tangentially in the cap sleeve 32, as is seen in Figures 3 to 6. The retention flap 33 projects from the cap sleeve 32 opposite to the screwing on direction.

[0036] The retention flap can be separated and easily molded on the skirt 32 of the screw-on cap. As a result, the screw-on cap 31 with the retention flap 33 can be easily manufactured unitarily in a single piece from a low-cost material, such as plastic, which has a suitable flexibility allowing the flap 33 to pass between the neck 13 and the second rib 16 after the first screwing on.

[0037] The retention flap ends on its front face in a stop surface which is oriented approximately radially, whereas the end of the second rib 16 located in the unscrewing direction forms a contact surface which is likewise oriented approximately radially, such that after the first screwing on of the cap 31, both surfaces are in contact for the purpose of preventing the unscrewing of the cap 31. When the cap is unscrewed for the first time, the retention flap 33 must be radially displaced outwardly since the second rib 16 prevents it from being radially displaced inwardly, therefore the flap 33 is completely or partially detached and entails that the tear strip 34 and the hinge 35 have been broken. Therefore, the end consumer and/or manufacturer have proof that the container has been opened by them. In another case, the cap shows proof of prior tampering and therefore the end consumer may suspect that the contents of the container 11 have been altered.

[0038] It must be noted that at its stop surface, the retention flap 33 may include a deviation bevel on the inner face acting in the unscrewing direction such that it facilitates the unscrewing action of the screw-on cap 31. In the first unscrewing, the retention flap 33 is radially deviated outwardly of the container 11, breaking the tear strip 34 and furthermore, it will also cause the complete or partial breakage of the film hinge 35 on the retention flap 33, being able to pass over the outer convex face for the second rib 16 after the first unscrewing of the cap 31.

[0039] The retention flap 33 projects from the sleeve 32 of the cap 31 such that in the retained position it partially and reliably covers with its stop surface the contact surface of the second rib 16 so as to maintain a safe retention joining acting only in the direction for the first unscrewing of the screw-on cap 31.

[0040] In reference to Figures 3 and 4, a braking means 36 can be molded such that it projects outwardly from the axis of the cap 31 with a trapezoidal shape on the lower edge of the sleeve 32 of the cap 31, at a predetermined distance from the stop surface of the retention flap 33 in the screw-on direction so that the cap 31 can be stopped appropriately after the first screwing on, that is, contact between the stop surface of the flap 33 and the contact surface of the second rib (16) is assured.

[0041] In reference to Figures 5 and 6, it must be noted that the number of retention flaps 33 can vary according to the number of screw threads of the neck 12 of the container 11, such that a single screw thread will have a single retention flap 33 on the cap 31, a releasable and elastic flap, and one or two for retention flaps 51 fixed on a circular tamper-resistant band 52 like those currently existing. Similarly, a neck with two threads will have two or four fixed retention flaps 51, and a neck with three threads will have two, four or six fixed retention flaps. As is shown in Figure 6, in all cases two retention devices 15, 16 on the base ring 17 separated 180° from on another are enough, as a result, the fixed retention flap act in twos.

[0042] Therefore, for the opening of the container by means of unscrewing the cap, it is necessary to instantly break the connections between the tamper-resistant band 52 and the sleeve 32 of the cap 31 in the case of fixed and rigid retention flaps 51.

[0043] In summary, the cooperation of the retention flap 33 and the locking device 15, 16 acts such that it

necessarily facilitates its passing and coupling of the cap 31 in the screwing on direction and, by means of the controlled run of the threading on the neck 12 of the container 13 and at its end, it is made to necessarily coincide at one previously determined point, facing them at their flat surfaces, which will prevent its unscrewing from the very start of the unscrewing run and as a result will fully assure that the contents of the container have not been unduly tampered with, and it further facilities outer, easily detectable evidence of an illicit tampering of the cap.

Claims

1. A locking device suitable for a recipient (11) comprising a neck (12) with an outer thread (13) which a screw-on cap (31) can be screwed onto, **characterized in that** the locking device includes a first rib (15) and a second rib (16) located at the contact edge (14) of each one of the two halves from which the recipient (11) is formed.

2. A locking device according to claim 1, being configured so as to locate both ribs (15, 16) under the outer thread (13) of the neck (13) of the recipient (11).

3. A locking device according to claim 2, being configured so as to locate both ribs (15, 16) under the outer thread (13) of the neck (13) of the recipient (11) and above a base ring (17) of the recipient (11)

4. A locking device according to any of claims 2 to 3, the first rib (15) being arranged in contact with the neck (12) and the base ring (17) of the recipient (11).

5. A locking device according to claim 4, the first rib (15) being extended like a circular arch-shaped curb along the outside of the neck (12) of the recipient (11).

6. A locking device according to any of claims 2 to 3, the semi-circular arch-shaped second rib (16) being extended along one part of the contour of the base ring (17) such that its inner face is located at a predetermined distance regarding the outer face of the neck (12) of the recipient (11) .

7. A locking device according to claim 6, the second rib (16) having a wedge shape.

8. A locking device according to claim 5, the first rib (15) possibly being provided with a deviation bevel on the introduction side acting in the screwing on direction.

9. A locking device according to claim 2, wherein both ribs (15, 16) are molded on the corresponding half of the recipient (11) such that they project outwardly or in relief.

10. A screw-on closure adequate for being screwed on an outer thread (13) of the neck (12) of a recipient (11),
characterized in that the screw-on closure (31) is configured to comprise a retention flap (33) arranged on the lower part of a sleeve (32) of the screw-on closure (31).

11. A screw-on closure according to claim 10, the retention flap (33) being joined to the sleeve (32) by means of at least one tamper-resistant strip (34).

12. A screw-on closure according to claim 11, the retention flap (33) further being joined to the sleeve (32) by means of a film hinge (35).

13. A screw-on closure according to claim 11, the tamper-resistant strip (34) being located on the lower edge of the sleeve (32) on the side opposite to the film hinge (35).

14. A screw-on closure according to any of claims 10 to 13, the retention flap (33) being molded on the sleeve (32) of the screw-on closure (31) such that it projects outwardly, oriented tangentially, against the screwing on direction.

15. A screw-on closure according to any of claims 10 to 14, the screw-on cap (31) being molded in a single-piece in a plastic material.

16. A screw-on closure according to claim 10, including a circular tamper-resistant band (52) comprising at least one outer fixed retention stop (51), the number of which is according to the screw threads (13) arranged on the neck (12) of the recipient (11).

17. A screw-on cap according to any of claims 10 to 15, including a braking means (36) molded such that it projects outwardly from the axis of said cap (31) at the lower edge of the sleeve (32) of the cap (31) at a predetermined distance from the stop surface of the retention flap (33) in the screwing on direction.

18. A combination of the screw-on closure (31) as is claimed in any of claims 10 to 17 and a locking device (15, 16) as is claimed in any of claims 1 to 9.

19. A combination according to claim 18, such that in the first screwing on of the cap (31), the retention flap (33) is deviated so as to be able to pass between the first rib (15) and second rib (16).

20. A combination according to claims 16 and 19, the fixed retention flaps (51) acting in twos according to the number of screw threads (13).

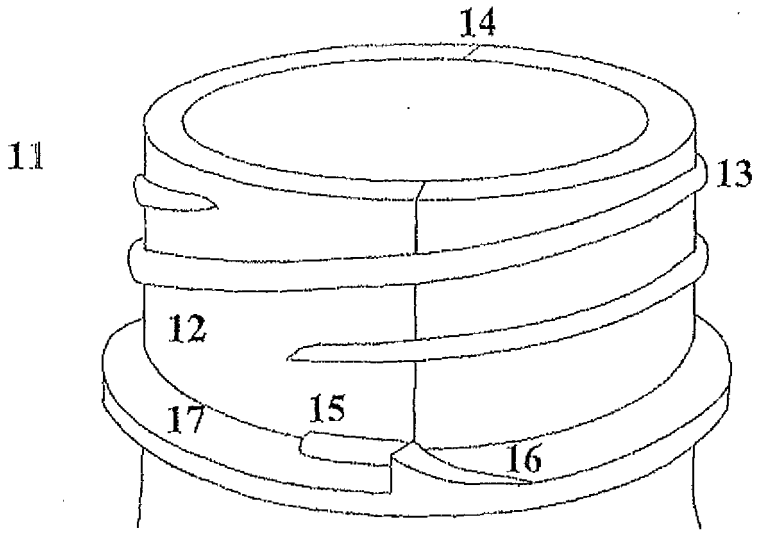

Fig. 1

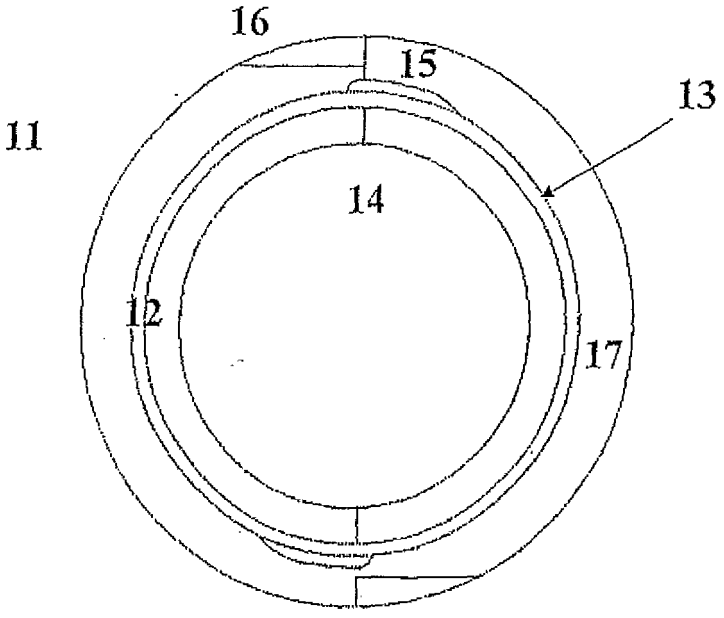

Fig. 2

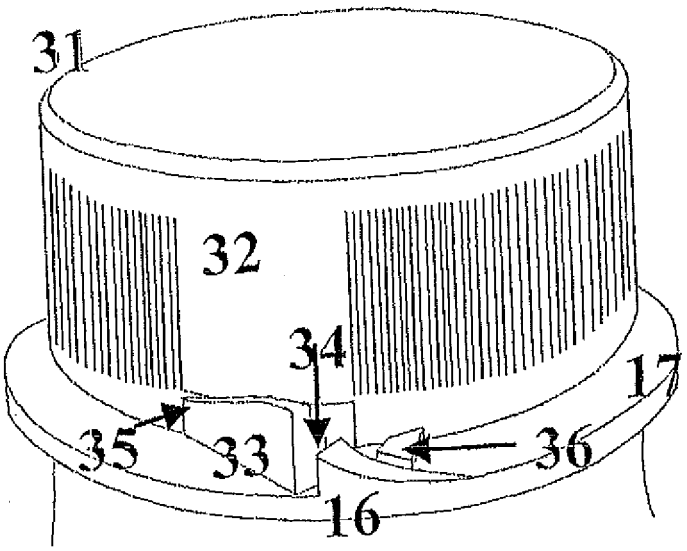

Fig 3

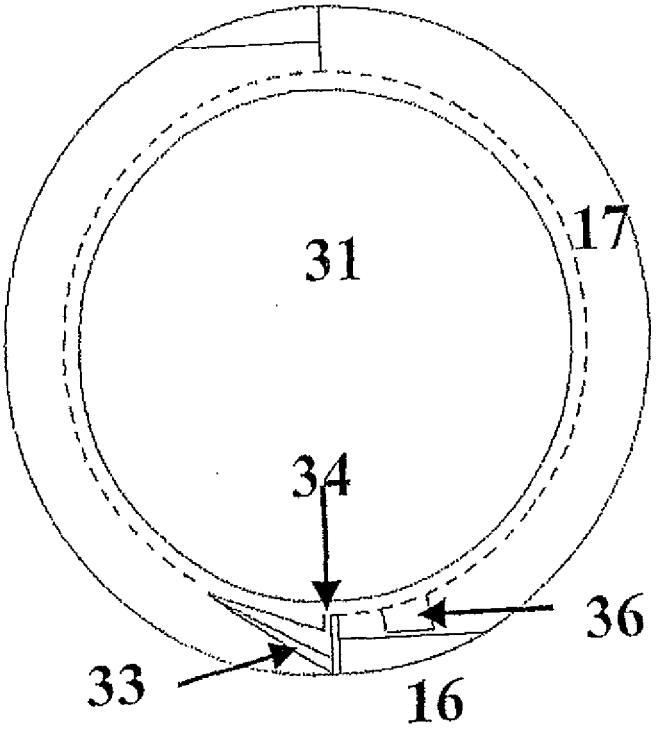

Fig. 4

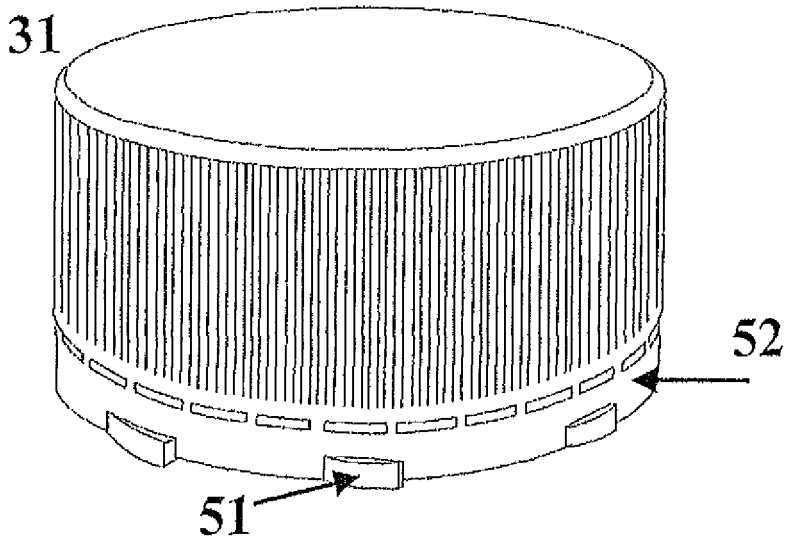

Fig. 5

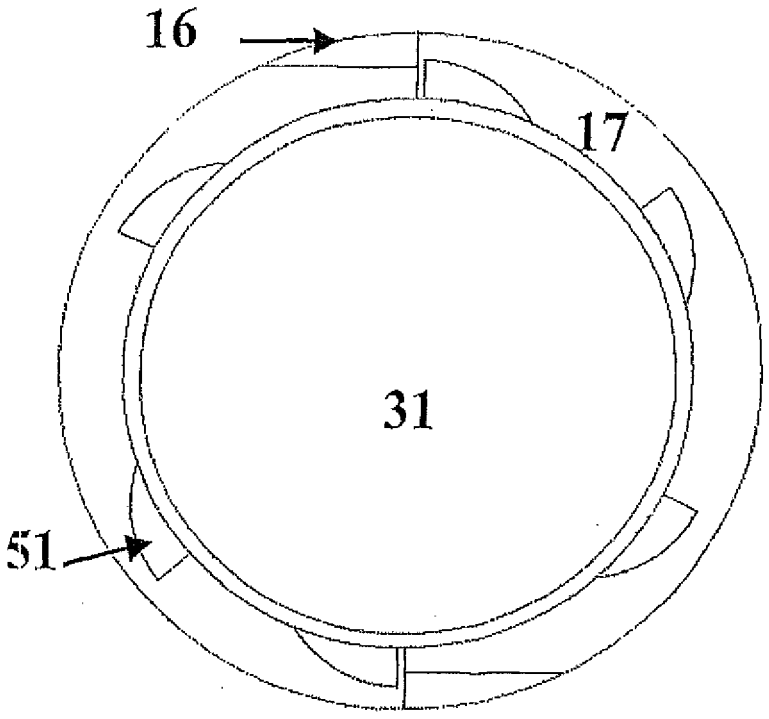

Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES 03/00378

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 B65D 50/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 B65D50/06

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CIBEPAT, EPODOC, WPI, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 4512485 A (Agbay et al.) 23.04.1985, whole document.	1-5
A	US 4279355 A (Schwartz et al.) 21.07.1981, whole document.	1-5

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
17 October 2003 (17.10.03)	23 October 2003 (23.10.03)
Name and mailing address of the ISA/ S.P.T.O. Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No
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