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(54) Title: CLOSURE FOR CONTAINERS, WITH TAGGANT ELEMENTS

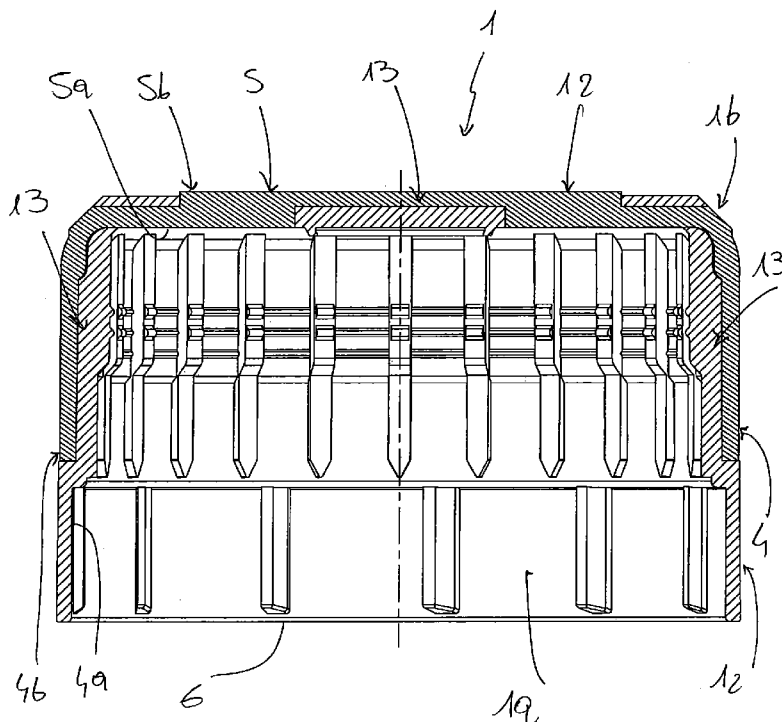


Fig. 5

(57) Abstract: A container closure (1) comprising a first part (2) and a second part (3) overmolded on the first part (2). The closure has a tubular band (4) open at one end (20) and closed at the opposite end by a flat wall (5), transverse to the longitudinal axis of the tubular band. The second part (3) is formed with a volume of plastic material that is smaller than the volume of plastic material that is used to form the first part (2) and comprises taggant elements embedded in its material.



Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

Published:

— *with international search report (Art. 21(3))*

Closure for containers, with taggant elements

DESCRIPTION

The present invention relates to a closure for containers, such as bottles or jars, which is made of plastic and incorporates taggant elements in its structure, for designating its origin. As the
5 taggant elements are detected by a special device, e.g. a handheld device, they allow identification of the closure and its origin, and further afford assessment of whether the product in the bottle is authentic or should be deemed as counterfeit.

Closures, particularly capsule-type closures made of plastic and having taggant elements, known in this particular field with the name of taggants, are disclosed, for example, in WO
10 2005/085087 and WO 2005/040001.

According to the prior art, the taggant elements include materials that are embedded in the plastic material designed to form the closure, i.e. by injection or casting into special molds. When such taggant materials are hit by an electromagnetic ray emitted by a detection and control device, they are excited and emit a light signal or, more generally, an electromagnetic
15 signal whose intensity is proportional to the amount of taggant that is embedded in the plastic material that forms the closure.

Examples of materials adapted for use as taggants in plastic closures are mentioned and disclosed in WO 2007/035565.

If the intensity of the signal as detected by the device matches or falls within a predetermined
20 range of values designed for that type of closure, and is particularly higher than a predetermined threshold, the closure being examined may be deemed or assessed to be authentic and the content of the bottle having that closure may be deemed to actually be the original content.

Conversely, if the detected signal is not included in the predetermined range of values, and is
25 particularly lower than the predetermined threshold value, then the closure is deemed to be

patently counterfeit or not matching the original.

In spite of its apparent effectiveness, the control system that uses taggants to discover non-authentic closures is still affected by certain practical drawbacks that may lead to false authentic results even when the closure is totally counterfeit.

5 This is because authentic closures may be collected by organizations of counterfeiters after use, and broken into granules for recovering the plastic material. The recovered plastic material is used to form closures that are exactly identical to or confusable with the original closures, and used on containers that are also identical to the original, but containing a counterfeit product.

10 Since the recovered material actually retains the entire amount of taggant material that was added and embedded in the original plastic material, in case of an authenticity examination, the signal emitted by the taggants of the closures formed with such recovered material might still fall within the range of values designating a authentic state, even with counterfeit closures.

15 Closures with taggants as described in WO 2005/085087 were also found to be susceptible to counterfeiting due to the possibility of separating the taggant-containing material from the taggant-free material.

Namely, the closure as disclosed in WO 2005/p85087 comprises a base wall from which a tubular skirt. The base wall may be a multilayered wall and include the taggants in an
20 intermediate layer. Furthermore, a seal may be disposed on the inner surface of the base wall, and attached thereto by an adhesive layer or overmolded on the base wall. Here, the taggant particles may be embedded in the seal and/or in the adhesive layer, in addition to or instead of the taggant embedded in the base wall. If the taggant particles are only embedded in the seal, then the closure is exposed to tamper by a counterfeiter, who may remove the seal and isolate
25 the taggant-containing element from the remaining taggant-free material. Thus, the

counterfeiter may form a new closure with the recovered seal and apply it to a container which will be found totally authentic by an authenticity examination.

The present invention has the purpose of solving the problem of false authentic signals resulting from closures formed with plastic material recovered by authentic taggant-containing
5 closures.

This problem is addressed by a plastic closure formed as defined in claim 1.

The invention will be now described in greater detail with reference to an embodiment of the closure, which is given by way of illustration and without limitation, and shown in the annexed drawings, in which:

- 10 Figure 1 is a perspective view of the inventive closure as viewed from the outside;
Figure 2 is a perspective view of the first component part of the inventive closure;
Figure 3 is a perspective view of the second component part of the inventive closure;
Figure 4 is a perspective view of the inventive closure as viewed from the open end;
Figure 5 is a sectional view of the closure, as taken along the line V-V of Figure 1.
- 15 Referring to the above figures, numeral 1 generally designates a container closure, particularly a capsule closure.

The closure 1 has an inner surface 1a and an outer surface 1b.

The closure 1 is formed by a plastic molding process and comprises a first part, generally referenced 2 in Figure 2, and a second part, generally referenced 3 in Figure 3, which is
20 overmolded on the first part 2, with which it forms a single body.

Therefore, the first part 2 and the second part 3 form a single one-piece body.

Referring to the closure 1 as a whole, as shown in Figures 1, 4 and 5, it comprises a tubular band 4 having a longitudinal axis X-X. The tubular band 4 is closed at one end 20 by a flat wall 5, transverse to the longitudinal axis X-X, and has an aperture 21 at the opposite end,
25 defined by the circular edge 6.

The tubular band 4 has an inner surface 4a and an outer surface 4b, and the flat wall 5 has an inner surface 5a and an outer surface 5b.

The inner surface 4a of the tubular band 4 and the inner surface 5a of the flat wall 5 define the inner surface 1a of the closure 1.

5 Likewise, the outer surface 4b of the tubular band 4 and the outer surface 5b of the flat wall 5 define the outer surface 1a of the closure 1.

The closure of the above mentioned figures has a plurality of axial ribs, referenced 8 and 9, in the inner surface 4a of the tubular band 4, said ribs being evenly arranged around the periphery and being designed to ensure coupling with other elements of the closure, such as
10 valves, not shown as being unnecessary for the understanding of the invention, which are in turn mounted to the neck of a bottle, not shown, the latter being designed to contain, for instance, valuable spirits.

Alternatively, the inner surface 4a of the tubular band 4 may have single or double threads, for possible direct coupling of the closure 1 with the neck of a bottle, should the latter be also
15 threaded.

The first part 2 and the second part 3 are overmolded together such that each of the inner and outer surfaces 1a, 1b of the closure 1 has a portion of the first part 2 and a portion of the second part 3. This will hinder or even substantially prevent separation of the first part 2 from the second part 3, when not using instruments or requiring times that are not compatible with
20 counterfeiting activities.

According to a preferred embodiment, the first part 2 and the second part 3 are overmolded together at least along a part of the tubular band 4 and the flat wall 5 such that each of the inner and outer surfaces 4a, 4b of the tubular band 4 and the inner and outer surfaces 5a and 5b of the flat wall 5 has a portion of the first part 2 and a portion of the second part 3.

25 Particularly, the tubular band 4 and the flat wall 5 have portions that are internally and

externally defined by both first and second parts 2, 3 and portions that are internally and externally defined by one of the first and second parts 2, 3.

For example, Figure 5 shows portions that are internally and externally defined by one of the first and second parts 2, 3 and portions 13 that are internally and externally defined by both
5 first and second parts 2, 3.

The second part 3 overmolded on the first part 2 may be used to define areas on at least part of the visible surface of the tubular band 4 and the flat wall 5, such as the areas referenced 10 and 11, whose color is different from that of the part 2 and said areas possibly having different surface areas. Furthermore, the second part 3 may be also used for the visible surfaces to
10 display text, graphics or various indications among which the logo of the manufacturer or user on the visible surfaces of the closure.

The second part 3 is formed with a volume V_2 of the plastic material that is smaller than the volume V_1 of plastic material that is used to form the first part 2.

For example, the volume of plastic material that is used to form the second part 3 ranges from
15 $1/3$ to $1/6$ of the volume of material that is used for the first part 2.

The second part 3 comprises a given amount Q of taggant elements or taggants, embedded in its mass.

The amount Q of taggant elements embedded in the second part 3 is selected to output a response signal higher than a preset authenticity threshold, when the closure 1 is subjected to
20 an electromagnetic exploration ray emitted by a checking device, and to output a response signal lower than such preset authenticity threshold, when the amount Q of taggant elements is embedded in a volume of plastic material which is equal to at least the sum of the volumes V_1 and V_2 that are used to obtain the first part 2 and the second part 3. In a non-limiting example, a capsule closure having an outside diameter of about 32 mm and a total axial
25 dimension equal to about 20 mm is formed using a volume of plastic material equal to about

2665 cubic mm for molding the first part 2 and a volume of about 657 cubic mm for molding the second part 3, and a taggant or a taggant is introduced into the material of the latter in such an amount Q that, upon reading by a checking device, i.e. an infrared ray device, a response signal is generated which is higher than a predetermined authenticity threshold, such that the
5 closure 1 is deemed to be authentic.

If the closure 1 is ground to recover the plastic material of the first part 2 and the second part 3, whose volume is equal to the sum of the volumes V1 and V2, and the recovered material is used to mold another closure having the same dimensional characteristics as the original, with the addition of dyes to reproduce the same color as the two layers that compose the original
10 closure, when an authenticity check is made, the detected signal will be found to be well below the preset authenticity threshold assigned to the original closure, thereby generating a false signal.

This is because the amount Q of taggant elements that was originally found in the second part 3 only, would be embedded, during grinding of the closure 1 for recovering the material, at
15 least in an amount of plastic material that is equal to the sum of the volumes V1 and V2 that form the closure 1, thereby causing, in a new closure formed with such recovered plastic material, a dispersion of the amount Q of taggant elements in a volume of plastic material that is equal to at least the sum of the volumes V1 and V2 and hence a concentration of taggant elements that is much lower than that it originally had in the closure 1. When this new closure
20 obtained from the ground closure 1 is exposed to an electromagnetic exploration ray emitted by a checking device, it will output a response signal that is lower than the preset authenticity threshold, whereby the closure will be deemed as false.

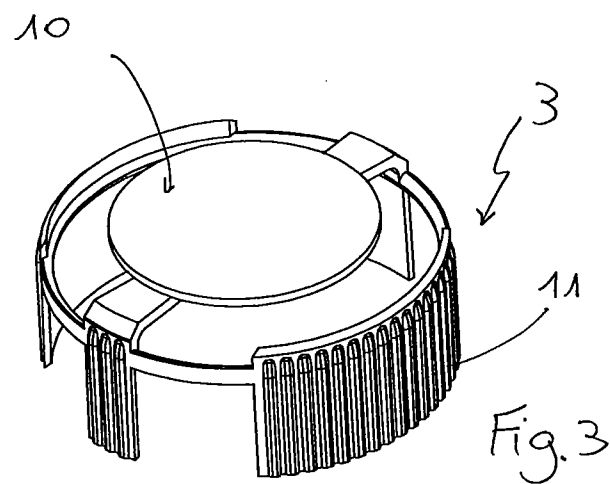
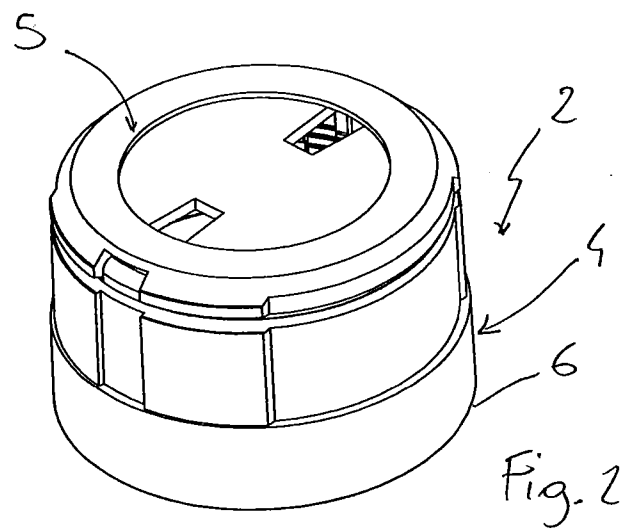
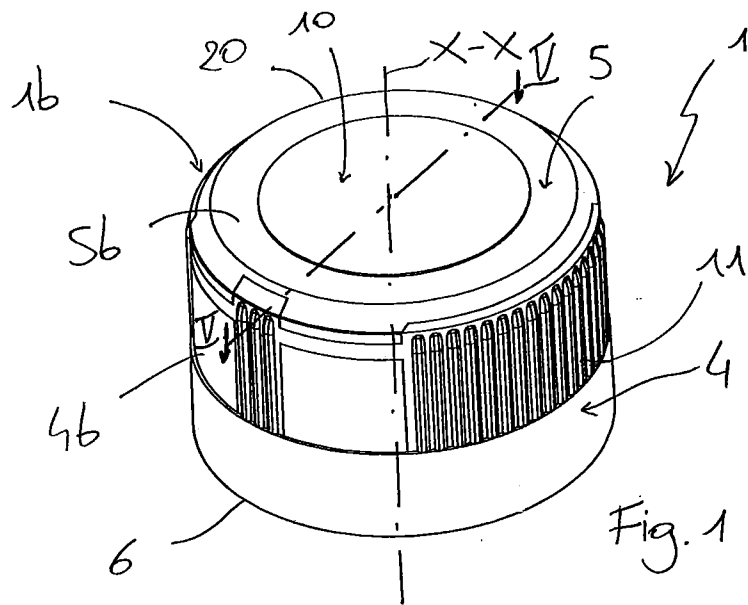
Therefore, the invention fulfills the purpose of avoiding false positive signals emitted by closures that are seemingly identical to the original closures, but obtained by the ground
25 plastic material of the original closures and later molding of the recovered plastic material.

CLAIMS

1. A closure (1) for containers, comprising a first part (2) and a second part (3) made of plastic material, said closure (1) having an inner surface (1a) and an outer surface (1b), said second part (3) being overmolded on the first part (2), said closure (1) having a tubular band
5 (3) with a longitudinal axis (X-X), said tubular band (4) being open at one end (6) and closed at the opposite end by a flat wall (5) transverse to the longitudinal axis of the tubular band (4), wherein said second part (3) is formed with a volume V2 of plastic material that is smaller than the volume V1 of plastic material of said first part (2), and said closure (1) comprising an amount Q of taggant elements embedded in the second part (3),
10 **characterized in that:**
- said first part (2) and said second part (3) are overmolded together such that each of the inner and outer surfaces (1a), (1b) of the closure (1) has a portion of the first part (2) and a portion of the second part (3),
 - said amount Q of taggant elements embedded in the second part (3) is selected to:
15 - output a response signal higher than a preset authenticity threshold, when the closure (1) is subjected to an electromagnetic exploration ray emitted by a checking device,
- output a response signal lower than said preset authenticity threshold, when said amount Q of taggant elements is embedded in a volume of plastic material which is equal to at least the sum of said volumes V1 and V2 of the first part (2) and the second part (3).
20
2. A closure (1) as claimed in claim 1, wherein the tubular band (4) and the flat wall (5) have respective inner (4a, 5a) and outer (4b, 5b) surfaces, the first part (2) and the second part (3) being overmolded together at least over a part of the tubular band (4) and the flat wall (5) such that each of the inner (4a, 5a) and outer (4b, 5b) surfaces of the tubular band (4) and of
25 the flat wall (5) has a portion of the first part (2) and a portion of the second part (3).

3. A closure (1) as claimed in claim 1 or 2, wherein the tubular band (4) and the flat wall (5) have portions (13) that are internally and externally defined by both first and second parts (2, 3) and portions (12) that are internally and externally defined by one of the first and second parts (2, 3).
4. A closure (1) as claimed in any of claims from 1 to 3, wherein said taggant elements include elements selected among phosphorus-containing materials.
5. A closure (1) as claimed in any of claims from 1 to 4, wherein the volume V2 of plastic material of the second part (3) ranges from $\frac{1}{3}$ to $\frac{1}{6}$ of the volume V1 of plastic material of the first part (2).
6. A closure (1) as claimed in any of claims from 1 to 5, wherein the inner surface (4a) of the tubular band (4) comprises ribs (8, 9) for coupling with other closure elements mounted to the neck of a bottle designed to contain valuable spirits.
7. A closure (1) as claimed in any of claims from 1 to 6, wherein the inner surface (4a) of said tubular band (4) has single or double threads, for coupling the closure with the neck of a bottle, when the latter is also threaded.

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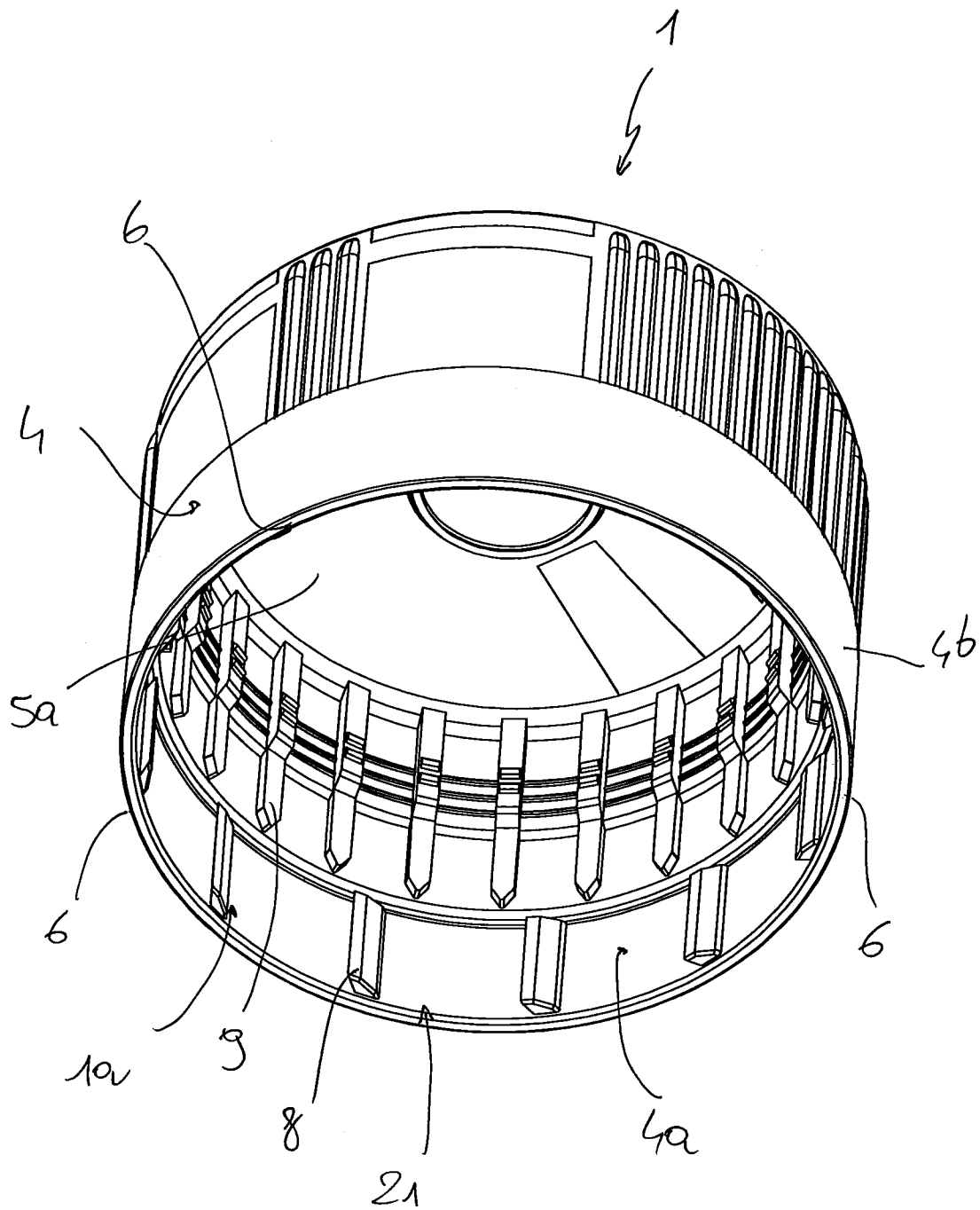


Fig. 4

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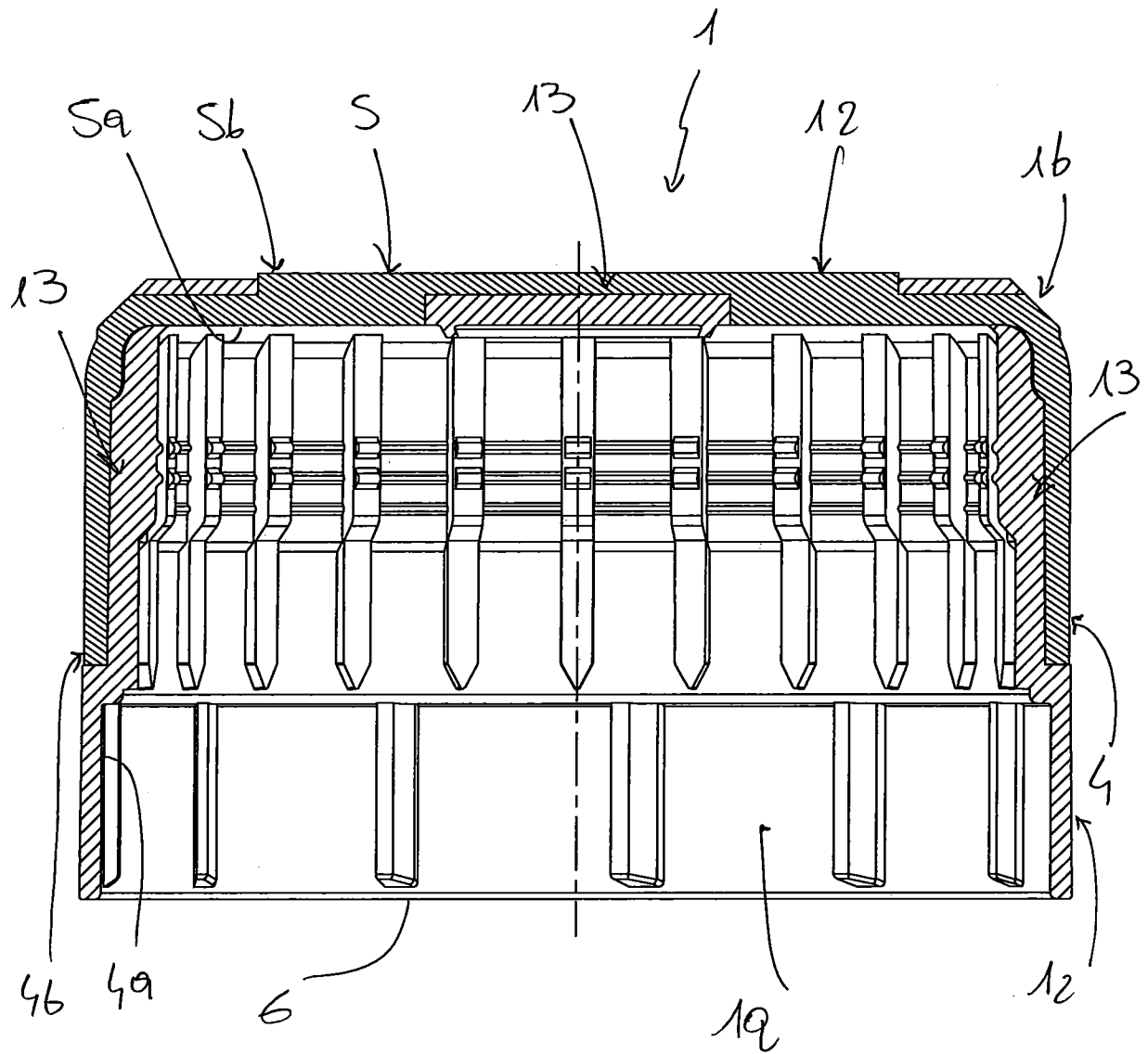


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2013/052840

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D41/00
ADD.

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)
B65D

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)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2005/189255 A1 (SAFIAN JOHN W [US]) 1 September 2005 (2005-09-01) paragraph [0019]; figure 3 -----	1-7



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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27/06/2013

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2013/052840

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