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(12) # EUROPEAN PATENT APPLICATION

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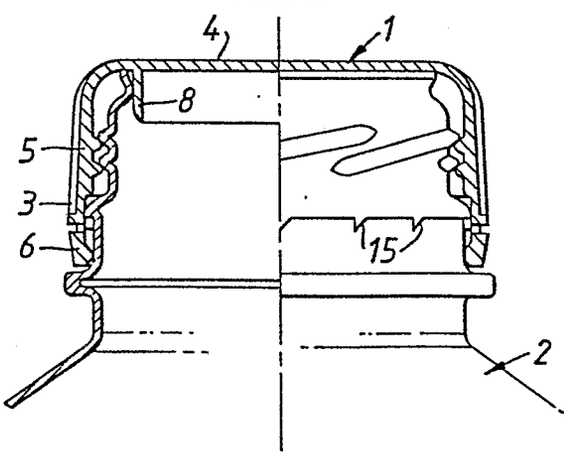
(54) **Container and closure.**

(57) A container and plastics closure therefor having a security band integrally formed with the skirt of the closure, in which a plug on the closure seals inside the month of the container and in which the positioning of the closure on the container is by relative axial movement but removing the closure is by unscrewing to break the attachment of the security band to the skirt of the closure.

FIG. 1.



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TITLE

Container and closure.

INTRODUCTION

This invention relates to a container and plastics closure therefor.

PRIOR ART

The prior art is replete with a multitude of constructions to enable a closure to be effectively secured to a container. Plastics closures and containers are well known and it is also known to provide a security band disposed around the free end of the skirt of the closure. The purpose of this security band is to provide evidence as to whether the closure has been taken off the container or not.

Screw-threaded engagement of the closure and the container is well known and it is also known to provide, on the inside of the closure, a plug which co-operates with the mouth portion of the container to form a seal when the closure is screwed home. A conventional closure positioning machine for fixing a closure with its security band onto a filled container will have a rotating head which screws the closure home in the normal manner. It is, however, possible, dependent upon

the material of which the closure is made and the dimensions and construction of the closure and container, to assemble a closure on a filled container by a simple axial relative motion between the two whereby the screw threads are overridden. The closure positioning machine is thereby of more simple construction without any necessity of having to provide a rotary motion to the closure holding head. Previously, the disadvantage of this has been that the closure cannot be relied upon to exert top pressure on the sealing medium as its final position of thread engagement is random.

OBJECT OF THE INVENTION

It is the main object of this invention to provide a container and closure therefor, at least the latter being of plastics, which enables the closure to be assembled on the container with a simple axial relative motion and in which the closure forms an adequate seal with the container when in position.

STATEMENT OF INVENTION

According to the present invention there is provided a container and closure therefor, at least the latter being of plastics, the neck portion of the container having external screw-threads for engagement with internal screw-threads on the skirt of the closure, in which the closure is capable of being applied to the container by an axial relative movement of the closure and container to override the interference of the threads, wherein the closure is provided with a plug

extending from the inside surface of the base of the closure and capable of entering and forming a seal with the mouth portion of the container over the required range of axial position and wherein the closure is provided with an integral annular security band joined by tearable webs to the free end of the closure skirt, in the assembled condition of the container and closure the band being capable of lying with variable axial clearance from annularly disposed nibs and a security band separating bead on the container.

In a further feature of the invention the plug makes sealing contact with an inwardly porjecting annular shoulder inside the mouth of the container over an adequate axial range. Alternatively, the plug is provided with an external annular bead which makes sealing contact with a straight sided mouth of the container over an adequate axial range.

Conveniently the container and closure both have multistart threads.

Conveniently the nibs on the container engage with castellations on the security band when the closure is unscrewed to tear the webs and release the closure from the security band.

The nibs and/or the castellations may be provided with edges which are presented radially to the co-operating nibs and castellations on unscrewing the closure to assist in engagement.

Also, all the nib engagement surfaces may be disposed

radial to the bottle neck. The nibs may be shaped so as to enable the half-moulds used to form the container to be withdrawn.

DRAWINGS

Two embodiments of container and closure in accordance with the invention will now be described, by way of example only, and with reference to the accompanying drawings in which:-

Figure 1 is a part-sectional view through a closure and container in accordance with the present invention showing the two parts in one assembled condition;

Figure 2 is a view similar to Figure 1 showing the two parts in an alternative assembled condition;

Figure 3 is an outline showing the configuration of the mouth and neck portion of the container of Figures 1 and 2;

Figure 4 is a side elevation of the neck and mouth portions of the container of Figures 1 and 2;

Figure 5 is a plan view of the container in Figure 4;

Figure 6 is a sectional view on the line VI-VI of Figure 4;

Figure 7 is an enlarged sectional view through a portion of the closure of Figures 1 and 2;

Figure 8 is a scrap section on the line VIII-VIII of Figure 7;

Figure 9 is a sectional view through a further

embodiment of closure in accordance with the invention;

Figure 10 is a section on the line X-X of Figure 9; and

Figure 11 is an outline showing the configuration of the mouth and neck portion of a further embodiment of container for use with the closure of Figures 9 and 10.

SPECIFIC DESCRIPTION

Referring first to Figures 1 to 8, a container and closure therefor in accordance with the invention are both made of any suitable plastics, for example low density polythese which is preferred or high density polythene or even polypropylene so long as the material used together with the dimensions of the container and closure particularly in relation to the screw-threads therefor enable axial relative movement between the two to position the closure on the container. Such method of positioning inevitably means that the screw-threads have to override each other but it does mean that simplification in the closure positioning machinery is achieved. Conventional unscrewing of the closure enables the closure to be removed from the container.

As seen in the drawings, there is provided a closure 1 and a container 2. The closure may be knurled or serrated at 3 to enable a good grip to be obtained when unscrewing the closure or repositioning the closure after it has been removed. The closure has a base 4 and

a skirt 5 at the free end of the skirt there being provided an integral security band 6 attached to the skirt 5 by tearable webs 7 (see particularly Figure 7).

Projecting inwardly from the base 4 of the closure is a plug 8 which may have a rounded end at 9. Projecting from the inner wall of skirt 5 are internal screw-threads 10. In this particular embodiment a six start thread has been provided and preferably the thread is multistart.

The security band 6 has inwardly directed radial castellations 11 which can be seen particularly in Figures 7 and 8.

The container which is more particularly illustrated in Figures 3 to 6 has external screw-threads 12 for co-operation with the screw-threads of the closure. The mouth portion of the container is provided with an inwardly projecting annular bead 13 to form a line contact seal with the closure plug 8. The extremity 14 of the mouth of the container may be in the form of a pouring lip or not as desired.

On the outside of the container neck portion are a security band separating bead 24 and a series of outstanding nibs 15 with a radial surface 16. Each nib also has an angled surface 17, either from the lower axial edge or the circumferential edge, in the latter case at an angle to suit half mould opening dependent on the position of the nib. In the illustration the two halves of the mould on forming the container will

be moved away from each other in the directions of arrows 18 as illustrated in Figure 6.

A closure and container constructed in accordance with the present invention enables the closure to be positioned on a filled container by a simple axial movement of the closure towards the container. The closure holding head of the machine may be free to rotate about the axis of the closure dependent upon the interference which is encountered as the two sets of threads override one another. During the axial positioning of the closure on the container the plug 8 makes a good sealing contact with the annular bead 13 of the container and because of the cylindrical nature of the plug 8 the seal will be effective regardless of the final position of the closure on the container. This final position will, of course, be dependent upon the interaction of the screw-threads and the orientation of the closure in relation to the container. Such orientation with automatic closure positioning equipment will be random. Thus the closure may come to rest in a position as illustrated in Figure 1 in which the closure is in the screwed fully home position although this position has been achieved not by screwing but by axial placement. On the other hand the closure may assume a position as illustrated in Figure 2 where the closure is far from being in the screwed fully home position but nevertheless an effective seal is achieved by virtue of the cylindrical

plug 8 contacting the annular bead 13.

This variation in the ultimate positioning of the closure on the container is also permitted by the security band 6 being capable of lying with variable clearance from the security band separating bead 24 and the annularly disposed nibs 15 on the container. This clearance will be seen quite clearly in Figure 1. When the closure is positioned on the container it may well be possible slightly to move the closure in an axial direction without any loss of seal.

In order to remove the closure from the container and break the security band, a normal unscrewing movement of the closure is carried out. Eventually, on unscrewing the closure, the nibs 15 will engage the castellations 11 and by virtue of either the nibs 15 or the castellations 11 or both of them having a leading edge which is presented to the other member, the two co-operate to prevent further rotation of the security band. On further rotation of the closure and the restraint imposed on the security band by the nibs and at the same time bead 24, the webs 7 are ruptured and the security band 6 becomes detached from the closure 1. The closure 1 may then be completely unscrewed and removed from the container leaving the security band remaining in the container.

Although above it has been stated that the plug is cylindrical the outer surface of the plug 8 may have

a draft in the order of $\frac{1}{2}^{o}$.

Referring now to the further embodiment illustrated in Figures 9 to 11, like parts to the previously described embodiment have been given like reference numerals.

A closure 19 made of plastics (Figures 9 and 10) is for sealing a container 20 (Figure 11) of glass although even in this embodiment the container 20 may be of plastics.

The closure 19 has a plug 21 with an external annular bead 22 which makes sealing contact with the straight sided mouth portion 23 of the container 20 over the desired axial range of positions.

The method of positioning and removing the closure on and from the container is as described in connection with the previous embodiment.

An added advantage of the construction of the present invention is that because only relative axial movement between the closure and container takes place on positioning of the closure, the tearable webs 7 are subjected only to compression and no circumferential shear so that there is no likelihood of them becoming broken at this stage. They can thus be made dimensionally smaller so as readily to rupture when subject to circumferential shear and tension on removal of the closure from the container.

CLAIMS

1. A container and closure therefor, at least the latter being of plastics, the neck portion of the container having external screw-threads for engagement with internal screw-threads on the skirt of the closure, in which the closure is capable of being applied to the container by an axial relative movement of the closure and container to override the interference of the threads, wherein the closure is provided with a plug extending from the inside surface of the base of the closure and capable of entering and forming a seal with the mouth portion of the container over the required range of axial position and wherein the closure is provided with an integral annular security band joined by tearable webs to the free end of the closure skirt, in the assembled condition of the container and closure the band being capable of lying with variable axial clearance from annularly disposed nibs and a security band separating bead on the container.

2. A container and closure therefor as claimed in Claim 1, in which the plug makes sealing contact with an inwardly projecting annular bead inside with mouth of the container over an adequate axial range.

3. A container and closure therefor as claimed in Claim 1, in which the plug is provided with an external annular bead which makes sealing contact with a straight sided mouth of the container over an adequate axial range.

4. A container and closure therefor as claimed in any one of the preceding claims, in which the container and closure both have multi-start threads.

5. A container and closure therefor as claimed in any one of the preceding claims, in which the nibs on the container engage with castellations on the security band when the closure is unscrewed to tear the webs and release the closure from the security band.

6. A container and closure therefor as claimed in Claim 5, in which the nibs and/or castellations are provided with edges which are presented to the co-operating nibs or castellations on unscrewing the closure to assist in engagement.

7. A container and closure therefor as claimed in any one of the preceding claims, in which all the nib engagement surfaces are disposed radial to the bottle neck.

8. A container and closure therefor as claimed in Claim 7, in which the nibs are shaped so as to enable the half-moulds used to form the container to be withdrawn.

9. A container and closure therefor substantially as herein describe with reference to Figures 1 to 8 or Figures 9 to 11 of the accompanying drawings.

FIG. 1.

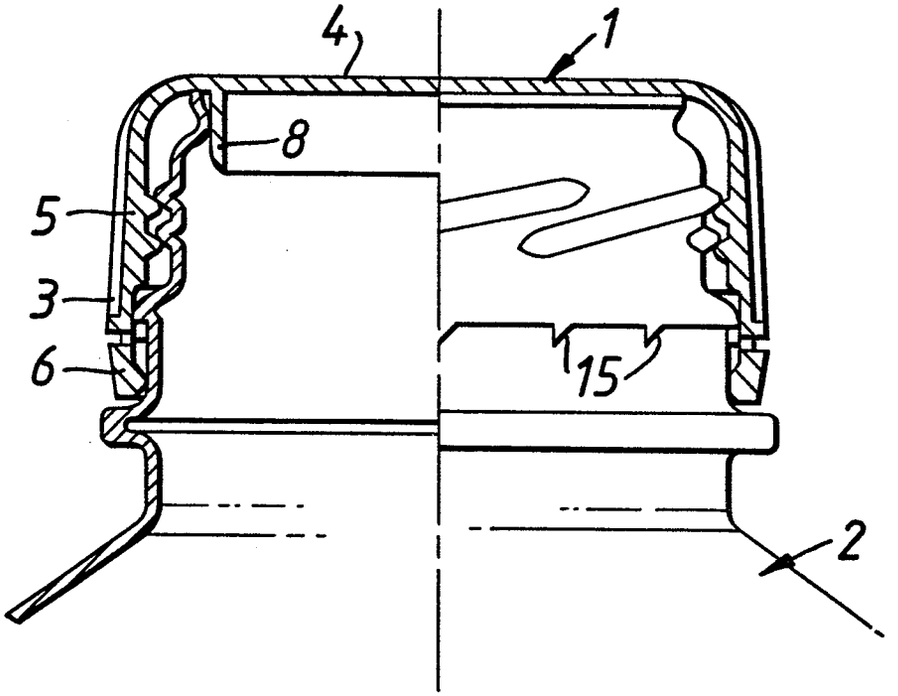

FIG. 2.

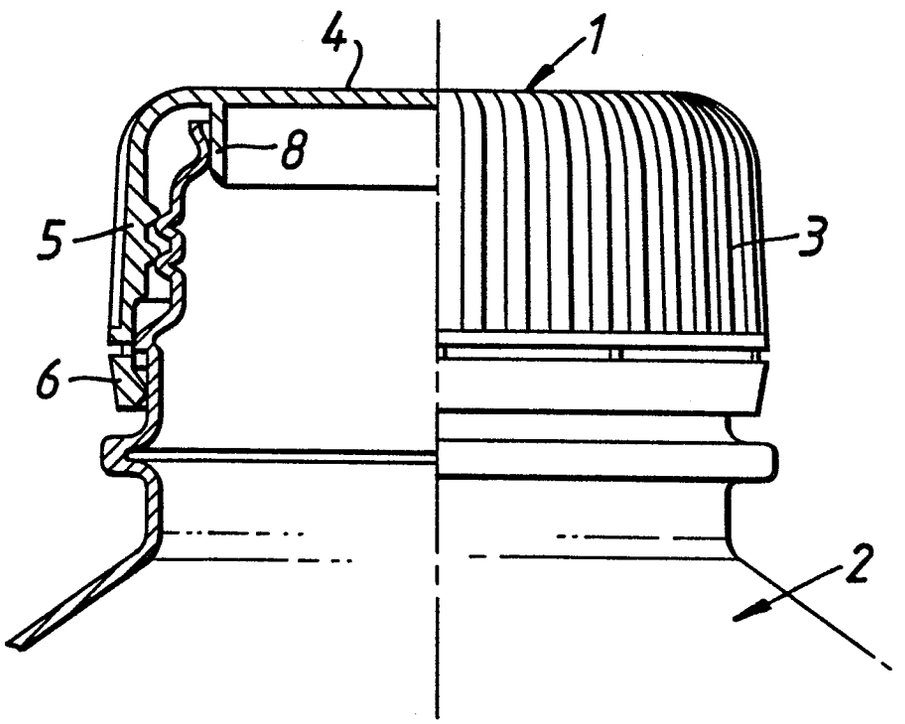

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FIG. 3.

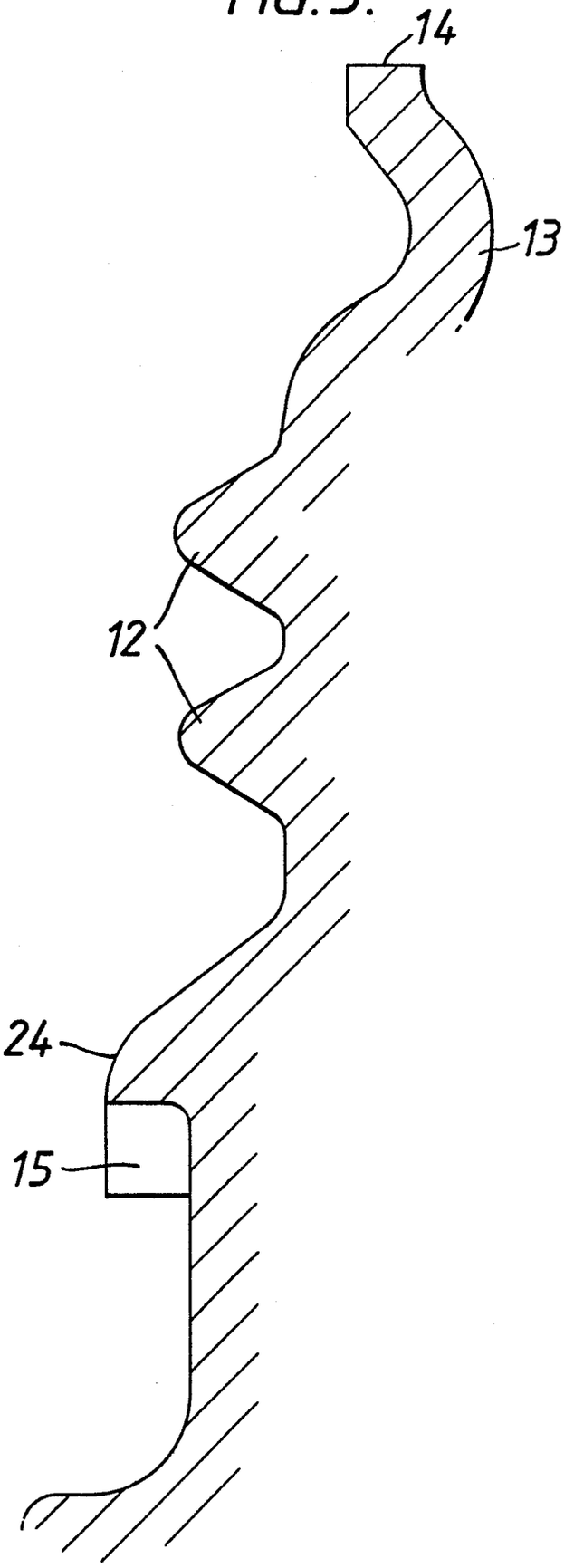


FIG.4.

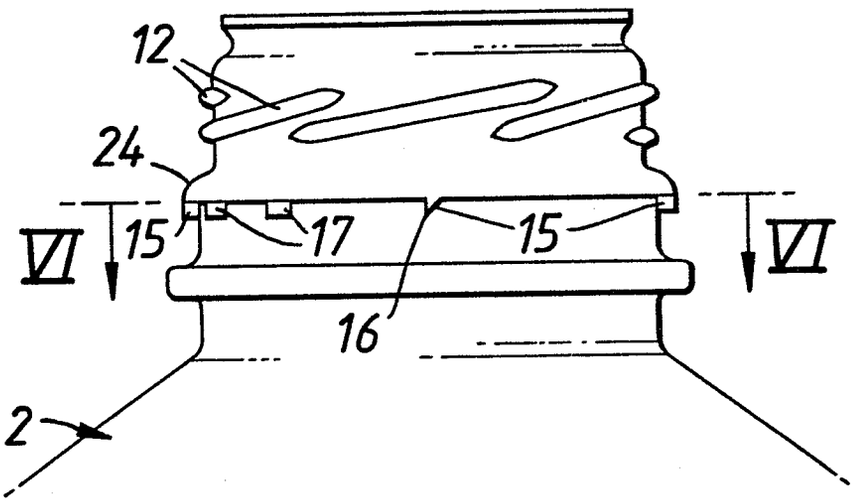


FIG.5.

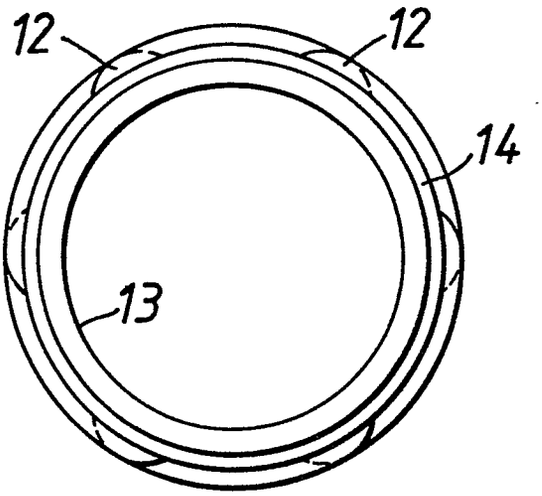


FIG.6.

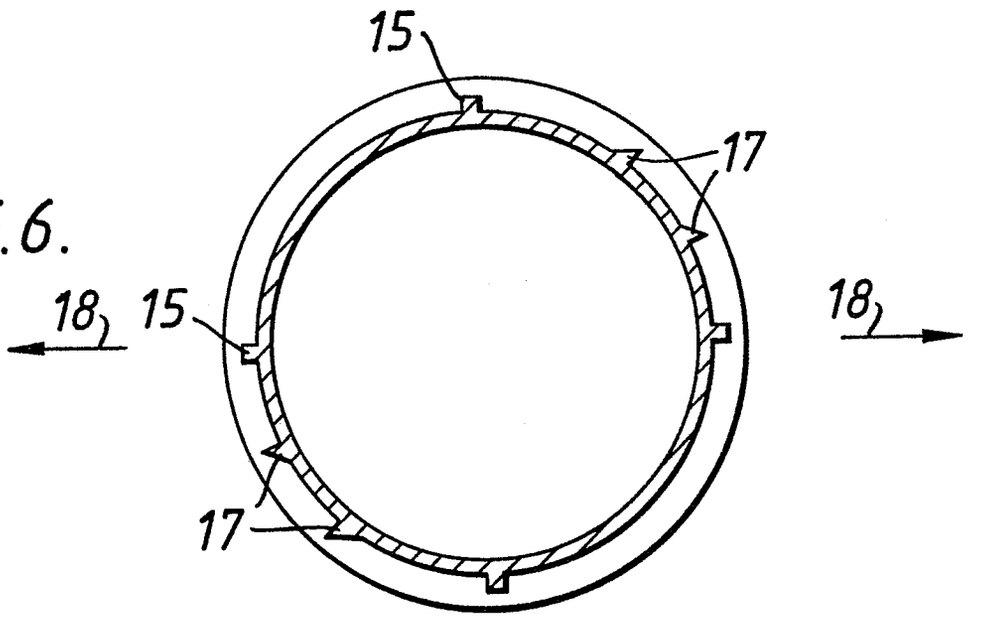
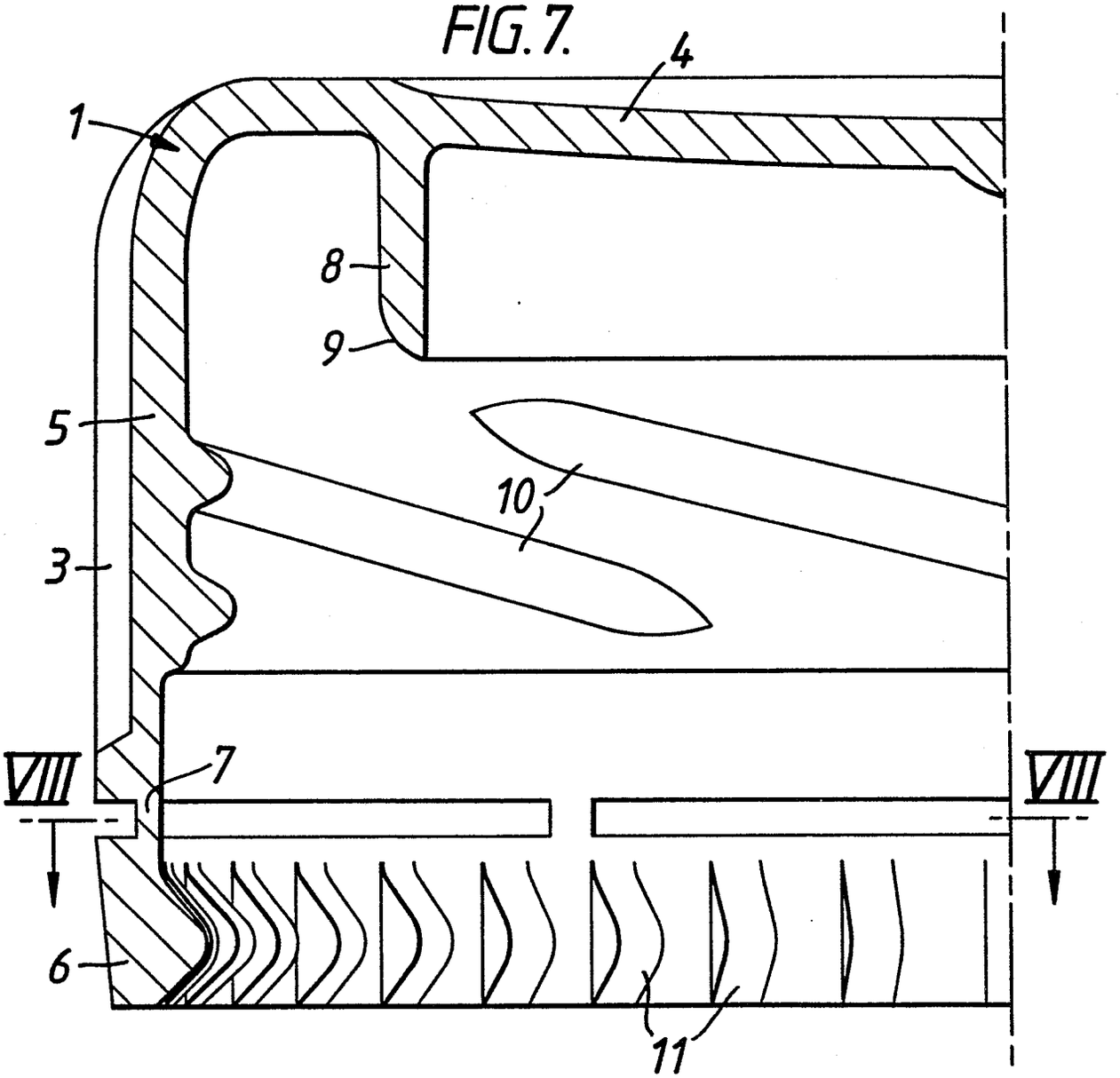


FIG.7.



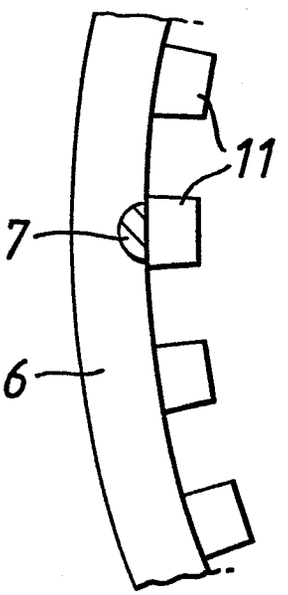


FIG.8.

FIG. 9.

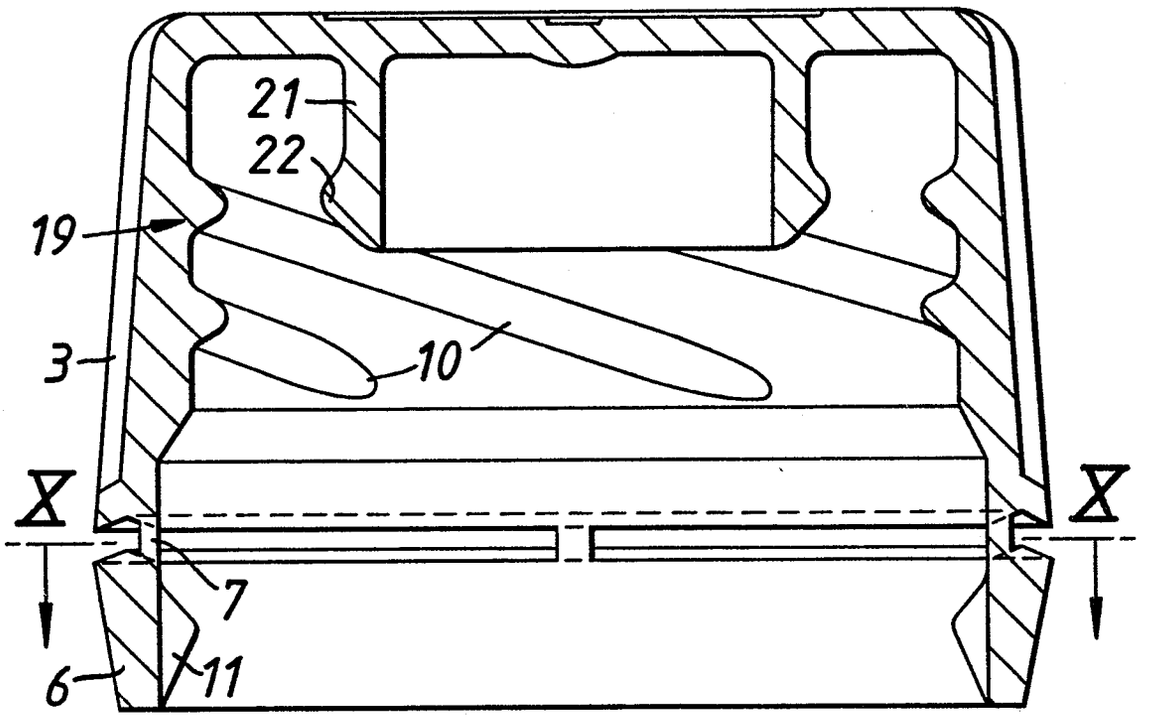


FIG. 10.

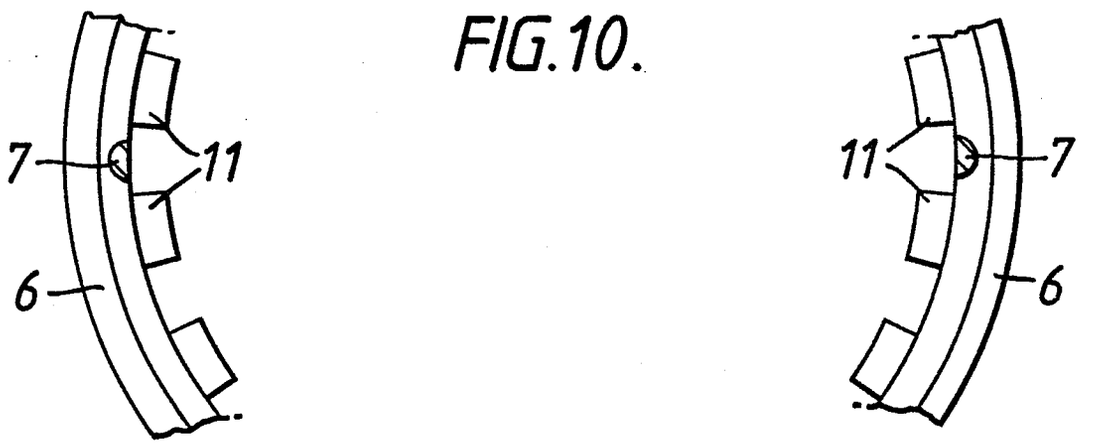


FIG.11.