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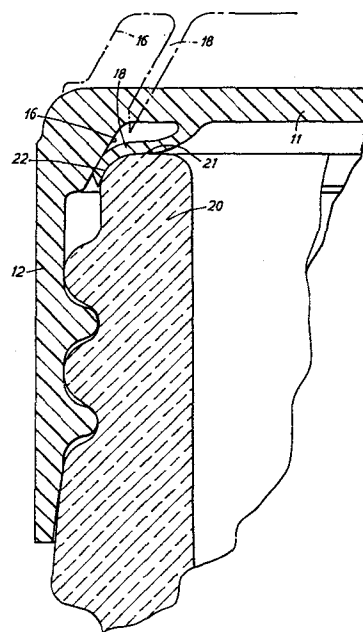
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⑤④ **Improvements relating to container closures.**

⑤⑦ A closure for a container comprises a top 11 with a depending skirt 12 having an internal screw thread. Where the skirt joins the top, the internal surface 15 of the skirt is conically flared in a direction away from the top, and a flexible resilient fin 18 extends from the underside of the top substantially parallel to the flared surface 15. The free end portion of the fin is thickened as by the provision of a broad rib 30 on the radially inner surface of the fin. When the closure is secured on to a container, the fin 18 becomes deformed outward and is sufficiently long to extend round the outer corner portion of the top of the container and is pressed into tight sealing engagement with said outer corner portion by the flared surface. The thickness of the free end portion of the fin causes it to resist expansion and to hug more closely to the corner portion of the top of the container. The radially inner surface of the fin may have annular grooves therein, for example of triangular shape, to provide a ribbed surface to improve the seal.



IMPROVEMENTS RELATING TO CONTAINER CLOSURES

This invention relates to container closures.

According to this invention there is provided a container closure moulded in one piece from a plastics material and comprising a top, a dependent skirt the
5 radially inner surface of which is formed with a screw-thread, a surface which is flared in a direction away from the top being formed on the internal surface of the skirt where it joins the top, and an annular resiliently flexible fin extending from the underside
10 of the top at a position spaced radially inwardly of said flared surface, said fin having an increasing diameter in a direction away from the top and having a length such as to permit at least its portion adjoining its free edge to lie against said flared surface when
15 the fin is deformed outwardly by the top of the neck of a container to which the closure is to be applied and to extend round the outer corner portion of the neck of a co-operating container.

In preferred arrangements said flared surface is
20 conical and is inclined at 45° or less to the central axis of the closure. In one example the angle is 30° . The fin may conveniently also be conical and may extend parallel to said flared surface.

According to a preferred feature of the invention
25 the free end portion of the fin is thicker than the main body of the fin. The free end portion may be thus thickened by reason of the provision of a peripheral rib formed locally on either the radially inner surface or the radially outer surface of said free portion.
30 The thickening of the free end portion serves to reduce the tensile stress in the fin when the closure is applied and in consequence to reduce the degree of extension of the free end portion of the fin so that a

greater part of the length of the fin tends to hug the outer corner portion of the neck more closely and thus improves the seal. Where for this purpose a peripheral rib is formed on the radially inner surface of the fin, 5 the rib may itself form with the neck of the container an additional line seal about the neck. Similarly where the rib is on the radially outer surface of the fin, the flared surface may engage the rib and press the free end portion of the fin towards the neck of the 10 container, preferably at a position slightly below the outer corner portion of the neck.

The radially inner surface of the fin may have a plurality of annular grooves formed therein, each pair of adjacent grooves defining between them an annular 15 rib of triangular cross-section. The grooves may be triangular and of buttress section, and the buttress face of the groove may face towards or away from the top to form a rib or ribs suitable for use with containers for materials under vacuum or under 20 pressure, or may be of other triangular shape such as isosceles or equilateral triangular shape to form a rib or ribs of other required cross-sectional shape.

Some embodiments of the invention will now be described in more detail with reference to the 25 accompanying drawings in which:

Figure 1 shows in axial section a first form of closure according to the invention,

Figures 2 and 3 illustrate how the closure of Figure 1 fits on containers on the upper and lower 30 limits respectively of diametral tolerance,

Figures 4 and 5 respectively illustrate two modifications of the closure of Figure 1,

Figures 6 and 7 are fragmentary sectional elevations illustrating another form of closure 35 according to the invention in place on a container, and

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Figures 8 and 9 are corresponding views of a third form of closure according to the invention.

Referring first to Figure 1, the closure 10 is moulded in one piece from a resilient plastics material and has a top 11 and a dependent skirt 12 formed with an internal screw-thread 13 and external knurling 14. The thickness of the top increases gradually towards the centre. The corner region 15 at the upper end of the skirt is thickened and has a conically flared internal surface 16 extending at an angle of 30° to the central axis 17 of the closure. Spaced radially inwardly of the surface 16 is a flexible resilient annular fin 18 of uniform thickness which extends from the underside of the top and substantially parallel to the surface 16.

When the closure is applied to the neck 20 of a container the top 21 of the neck of the container deforms the fin 18 upward as illustrated in Figures 2 and 3, and the fin lies across and against at least the radially outer portions of the top 21 of the container neck and has a sufficient length in contact with the surface 16 to be pressed thereby against the outer corner portion 22 of the neck to form a top and corner seal. The axial length of the surface 15 and the length of the fin are also such that this sealing engagement takes place when the diameter of the container neck is on the upper limit of its tolerance as shown in Figure 2 or on the lower limit of its tolerance as shown in Figure 3.

Figure 4 shows a modification in which buttress-section triangular grooves 23 (three such grooves in the present instance) are formed on the radially inner surface of the fin to provide improved sealing engagement between the fin and the container. The buttress

faces 24 of the grooves face away from the top and this arrangement is particularly suitable in some cases where the container has a partial vacuum internally thereof.

5 Figure 5 shows an alternative modification for use in some cases where the container holds a carbonated beverage, again to provide improved sealing engagement between the fin and the container, the radially inner surface of the fin having formed
10 therein buttress-section triangular grooves 26 whereof the buttress face 27 is directed towards the top.

 For use with other forms of container, grooves of other sections, e.g. circular or rectangular section, may
15 be formed in the radially inner surface of the fin.

 Referring now to Figures 6 and 7 of the drawings, another embodiment of the invention is shown in which the fin 18 has a main body of uniform thickness but has its free end portion of the fin thickened by
20 reason of the formation of a broad flat-topped rib 30 on the radially inner surface of the end portion.

 Figures 6 and 7 show the closure applied to a screw-threaded container neck 20, the diameters of which are at the lower and upper limits of the
25 tolerance, and Figure 7 also shows the sealing fin in its unstressed condition extending parallel to the flared surface 16. The rib 30 serves to strengthen the free end portion of the fin so that the diametral strain in that portion, due to the outward flexing of
30 the fin by the top and outer corner parts of the neck, is less than if the rib were absent, and in consequence the end-portion of the fin tends to lie closer to the

outer corner portion of the neck even when, as in Figure 6, it is not constrained by the surface 16 to do so.

The construction shown in Figures 8 and 9 is similar to that in Figures 6 and 7, but in Figures 8 and 9 the thickening of the free end portion of the fin is achieved by forming a rib 31 having a curved profile on the radially outer surface of the fin 18. Figures 8 and 9 show the closure applied to container necks on the lower and higher limits respectively of the diametral tolerance. As in the construction of Figures 6 and 7 the thickening of the free end portion of the fin strengthens it locally and causes it to be stretched to a lesser extent, but the surface 16 engages the rib 31 and presses the free end portion of the fin radially inward so as further to improve the seal.

The fin may have a thickness of the order of 0.63mm (.025").

The closures shown in Figures 6 to 9 may additionally have grooves on the radially inner faces of the fins as described in relation to Figures 4 and 5.

The closures may thus be designed for use with either glass or plastic containers which are intended to contain still or carbonated liquids or materials under partial volume.

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CLAIMS

1. A container closure moulded in one piece from a plastics material and comprising a top, a dependent skirt the radially inner surface of which is formed with a screw-thread, a surface which is flared in a direction away from the top being formed on the internal surface of the skirt where it joins the top, and an annular resiliently flexible fin extending from the underside of the top at a position spaced radially inwardly of said flared surface, said fin having an increasing diameter in a direction away from the top and having a length such as to permit at least its portion adjoining its free edge to lie against said flared surface when the fin is deformed outwardly by the top of the neck of a container to which the closure is to be applied and to extend round the outer corner portion of the neck of a co-operating container.
2. A closure as claimed in claim 1, wherein said flared surface is conical.
3. A closure as claimed in claim 2, wherein said flared surface extends at an angle of 30° to the central axis of the closure.
4. A closure as claimed in any one of claims 1 to 3, wherein the fin is of conical form.
5. A closure as claimed in claim 4 in conjunction with claim 2 or claim 3, wherein the fin extends parallel to the flared surface.
6. A closure as claimed in any one of the preceding claims, wherein the free end portion of the fin is thicker than the main body of the fin.
7. A closure as claimed in claim 6, wherein the free end portion is thickened by reason of the provision of a peripheral rib formed locally on the radially outer surface of said free end portion.

8. A closure as claimed in any one of the preceding claims wherein the main body of the fin is of substantially uniform thickness.

9. A closure as claimed in any one of claims 1 to 7 wherein the radially inner surface has a plurality of annular grooves therein, each pair of adjacent grooves defining between them an annular rib of triangular cross-section.

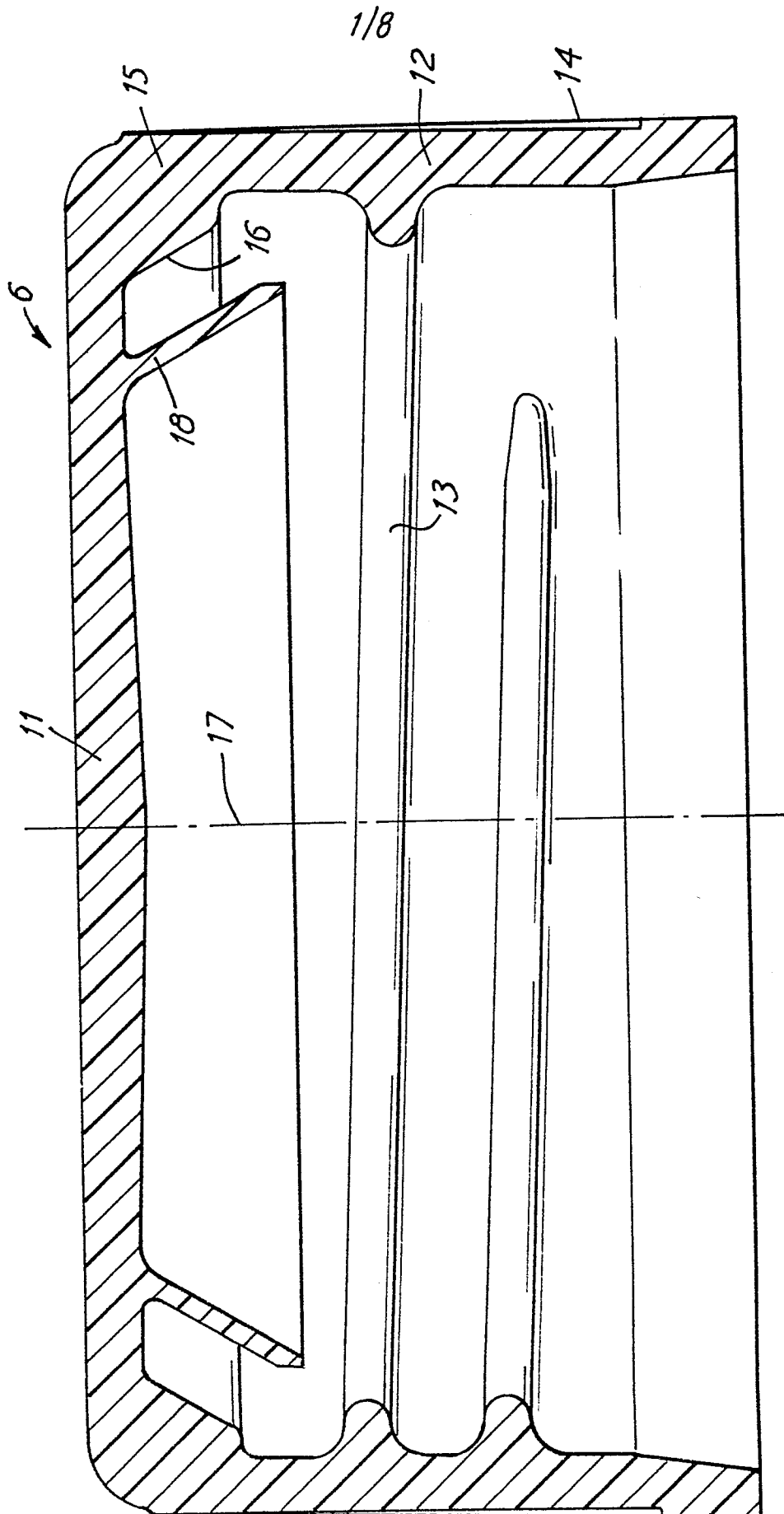
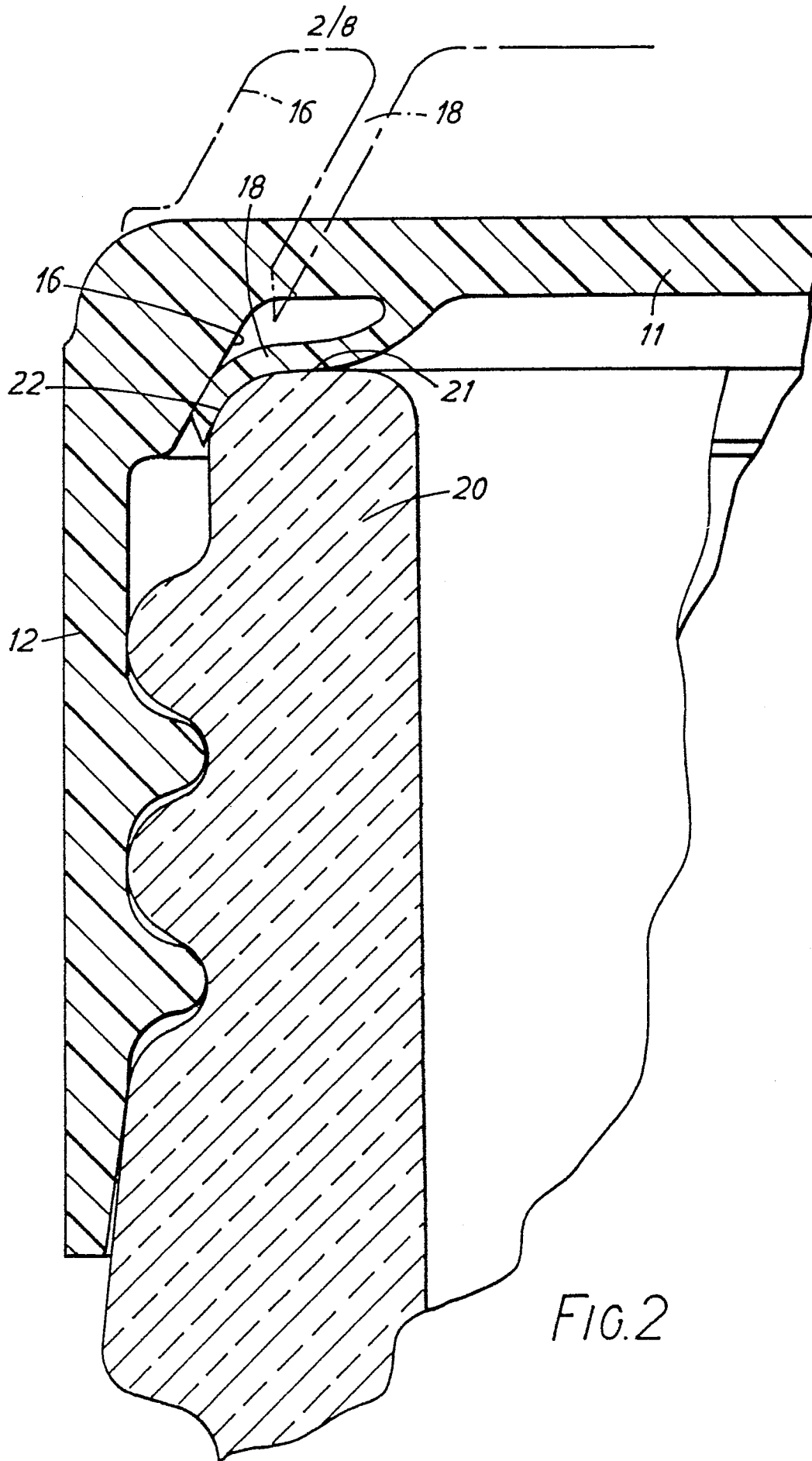


FIG. 1



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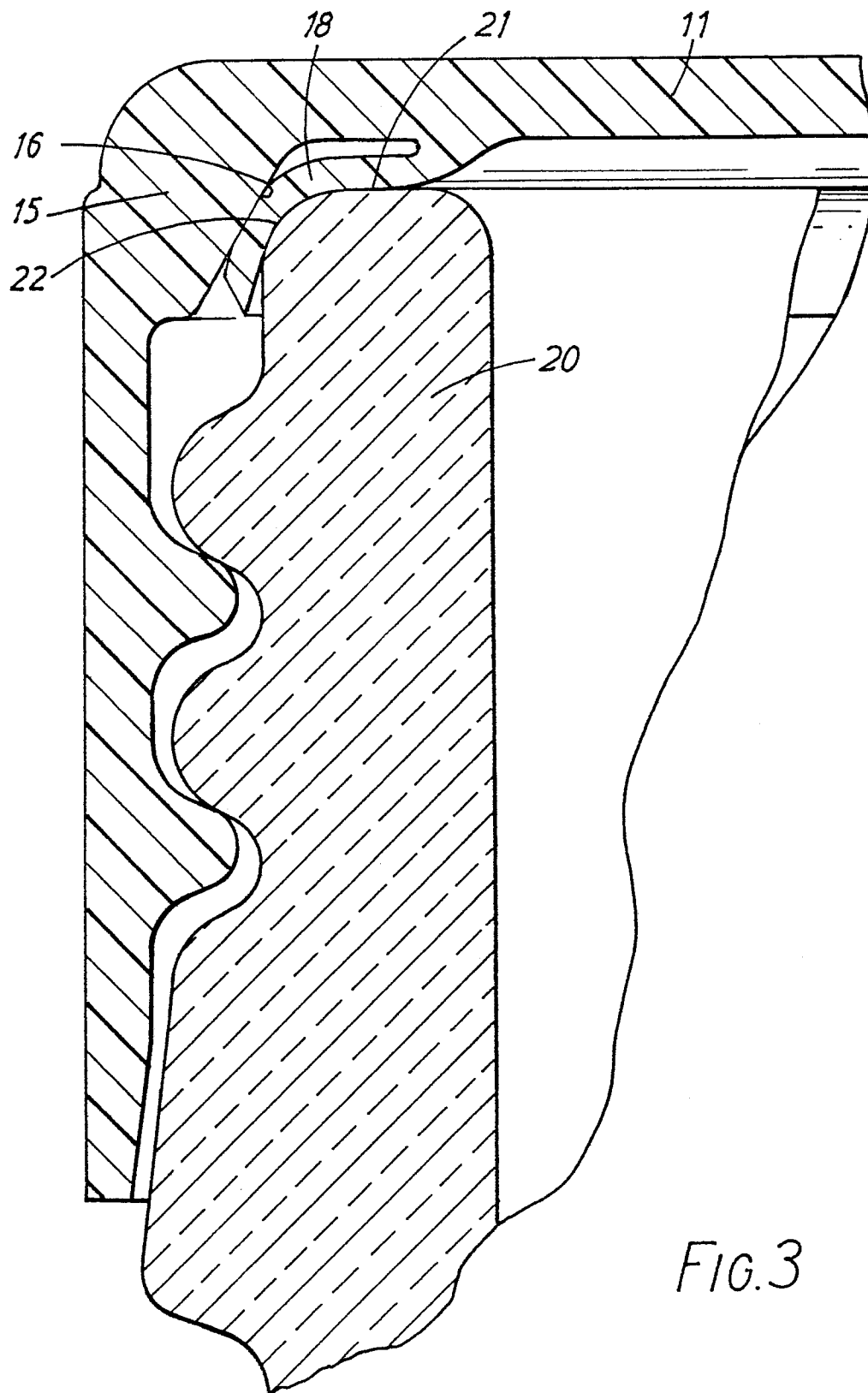


FIG. 3

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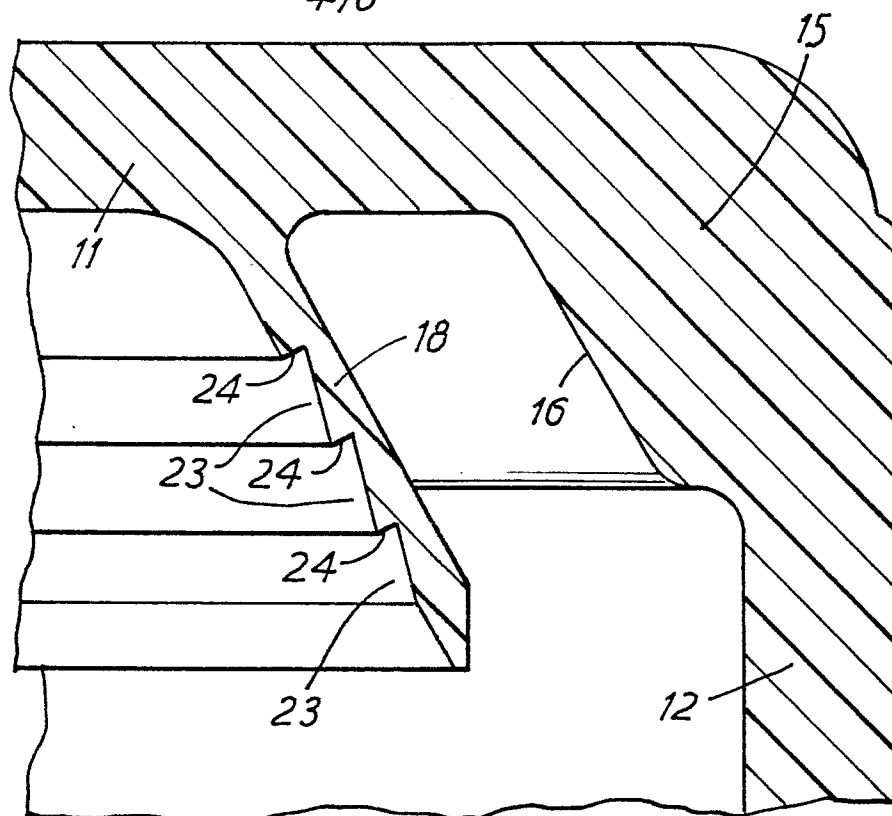


FIG. 4

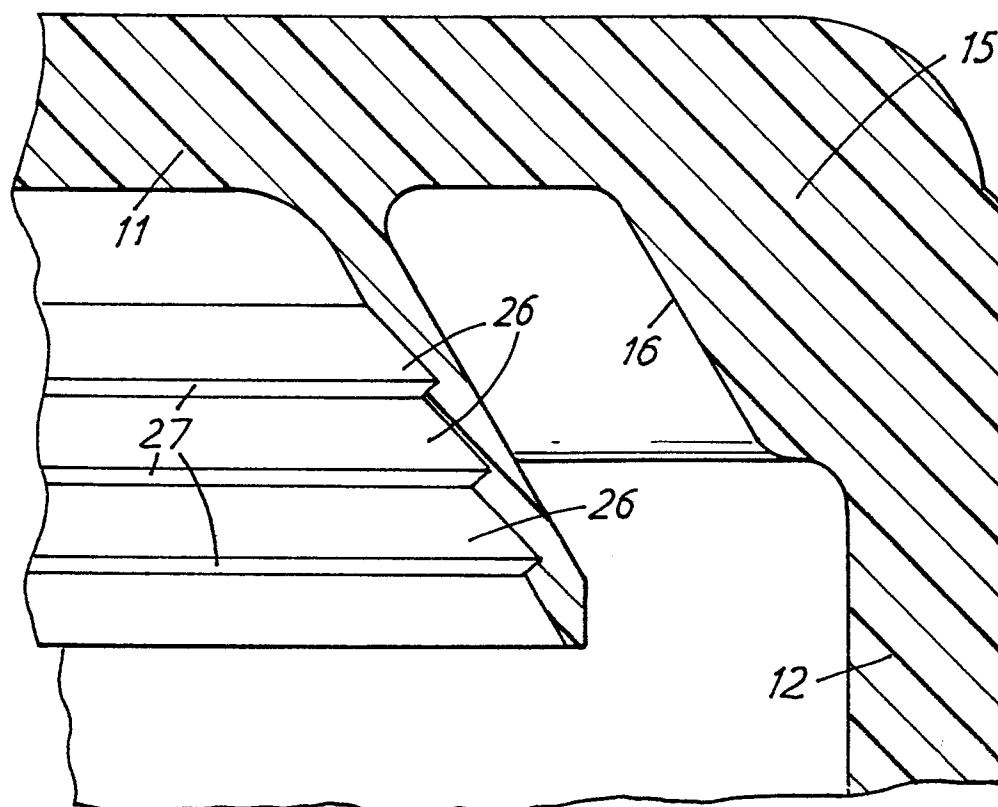


FIG. 5

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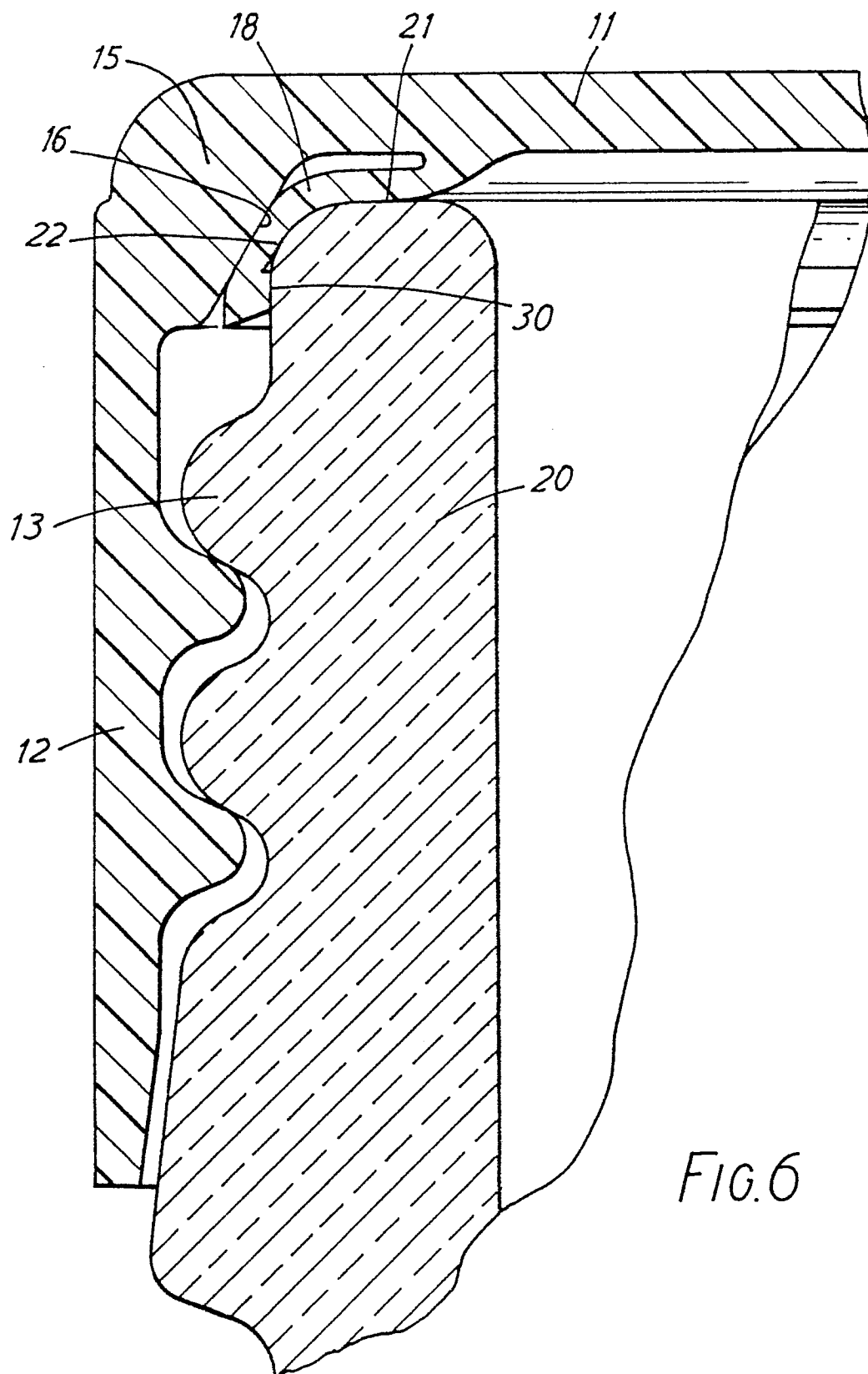
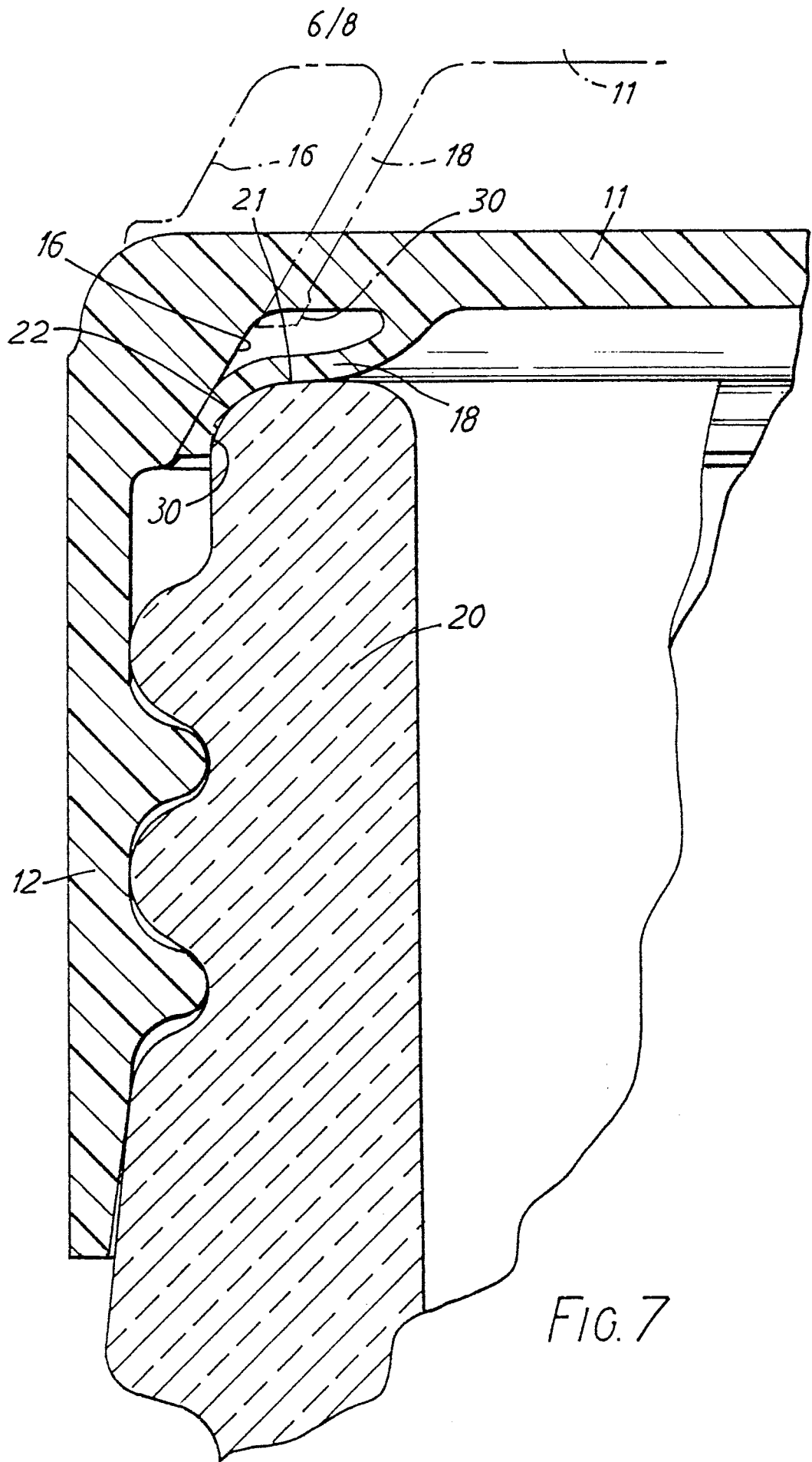


FIG. 6



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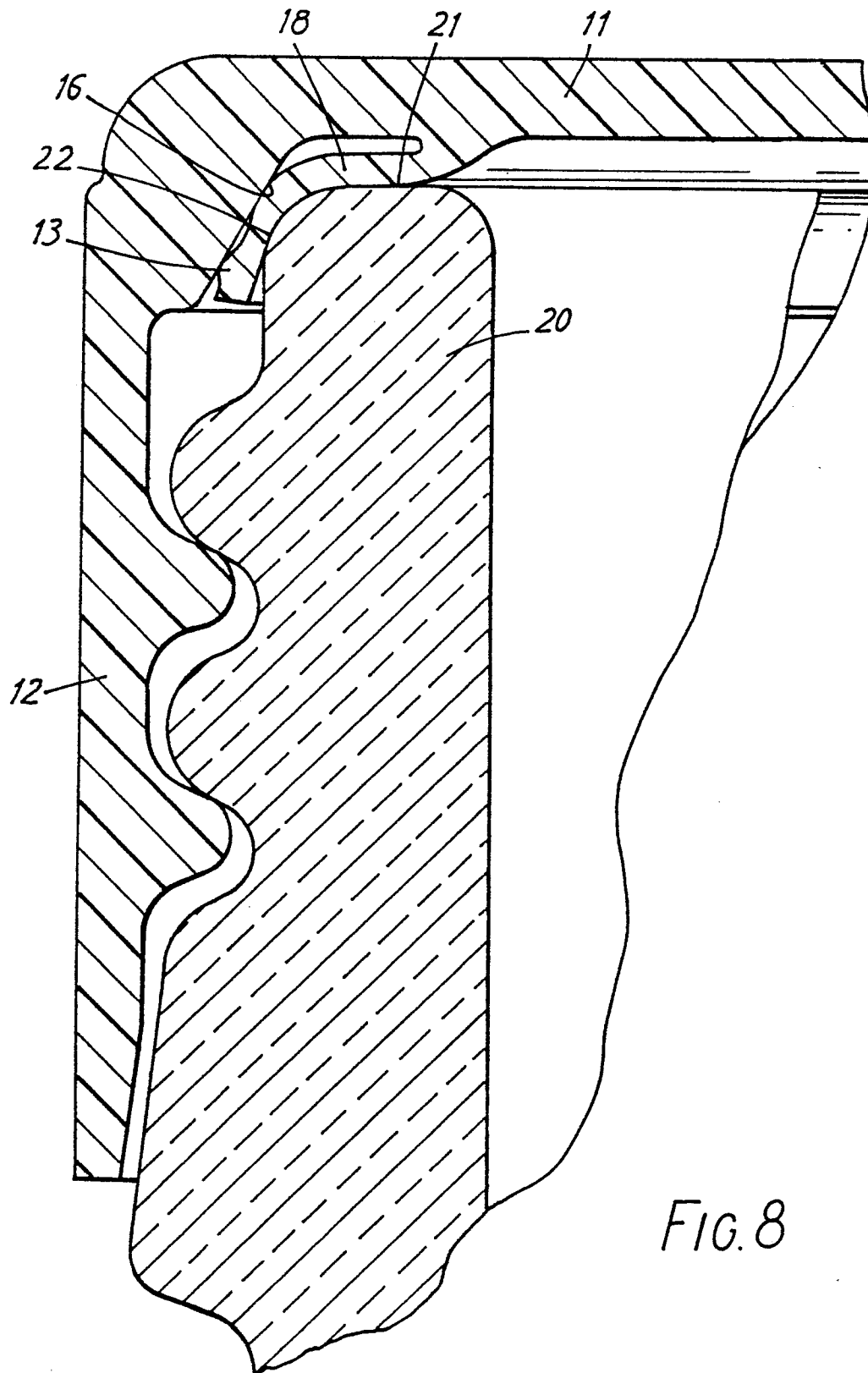


FIG. 8

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