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(54) **Improvements in closures for containers (cellular seal).**

(57) This invention provides a container and closure assembly in which the closure is made of suitable plastics material shaped to provide a top to cover the mouth of the container and a depending skirt to embrace the neck of the container. The closure is also provided with an internal cellular ceiling area to match the shape of the rim around the mouth of the container so that when the closure is in its operative position on the container the cellular area acts like a sponge and conforms to any irregularities on the rim to provide a more effective seal.

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IMPROVEMENTS IN CLOSURES FOR CONTAINERS.

This invention is concerned with the provision of a container and closure assembly in which the sealing between the closure and the mouth of the container is improved as compared with known products. The invention also provides
5 an improved closure for application to a container. The invention is particularly, though not exclusively, useful in connection with assemblies in which the closure is adapted for screw threaded engagement with the container. The invention is also particularly, though not exclusively, useful in
10 connection with assemblies in which the closure is made of plastics material and the container is made of glass.

Containers normally have a mouth defined by an annular or other shaped rim and sealing between a closure and such a container is often effected by providing the closure with an
15 inserted resilient washer or other liner such as a cork disc. Another method of effecting sealing is to provide what is usually known as a crabs claw sealing member or to provide the closure with a thermo-setting plastics flowed-in seal. Yet another method is to provide the closure with a depending plug
20 adapted to fit within the mouth of the container. All the above methods are usually effective but sometimes do not provide a sufficiently good seal due to irregularities or unevenness in the rim around the mouth. In this connection it should be mentioned that it very often happens that containers are not
25 manufactured to very close tolerances in order to save expense and this fact leads to the inaccuracies mentioned.

It is an object of this invention to improve the sealing capability of closures without resorting to the use of wads or liners or separate seals.

According to one aspect of the present invention there is provided a container and closure assembly in which the closure
5 is made of a suitable plastics material shaped to provide a top to cover the mouth of the container and a depending skirt to embrace the neck of the container characterised in that the closure is provided with an internal cellular area to match the shape of the rim around the mouth of the container so that
10 when the closure is in operative position the cellular area conforms to the uneven shape of the rim to provide an effective seal. According to another aspect of the present invention there is provided a closure for application to a container wherein the closure is provided with an internal cellular area
15 as described above. It will be understood that a normal container will have a mouth which is circular in plan in which case the associated container will have an annular cellular area to match the shape of the rim. The cellular area is preferably a type of honeycomb construction that may conveniently
20 be made of the same plastics material as the main part of the closure.

The present invention may be used with advantage in connection with a container and closure assembly in principle as described in our copending patent application No. 8511257.

25 In order that the invention may be more clearly understood reference is now directed to the accompanying drawings given by way of example in which:-

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Fig.1 is a longitudinal half-sectional view showing a closure embodying the invention in position on a container,

Fig.2 is a cross-section on the line AA of Fig.1,

Fig. 3 is a pictorial sectional view of the closure in an inverted position, and

Fig.4 is a view of proposed assembly in actual size and

Fig.5 is a diagrammatic view.

Referring to the drawings it will be noted that a container 1, in the form of a jar, has a mouth 3 and an external screw

thread 4 below the mouth. At the base of the screw thread 4 the container 1 has cam teeth 5. A closure 8 has a top 9, an internal screw thread 10 and external vertical ribs 11. The closure 8 is provided with a tamper-evident band 12, connected to the skirt of the closure by frangible nibs 13. The band 12

is also provided with ratchet or like teeth 14 formed on the internal surface of the band 12 for cooperation with the cam teeth 5.

The operation of the assembly when screwing the closure 8 on to the container 1 and when screwing the closure 8 off the container 1 is fully described in our patent application No. 8511257 and will not be repeated here. For full understanding of the operation reference is directed to our said application.

As described above a problem with closures generally is to achieve the best possible seal between the closure 8 and the container 1. In accordance with this invention sealing is effected between the inside surface of the top 9 of the closure 8 and the top 20 of the rim around the mouth 3 of the container 1. The problem with achieving a satisfactory seal in this way

is that the top 20, particularly with glass containers 1, may be uneven. To provide the closure 8 with an internal washer, liner, wad or the like goes some way towards solving the problem but does introduce an extra, unwelcome

5 manufacturing and assembly problem. In accordance with this invention we provide the closure with, preferably integrally formed, cellular sealing means 21 extending around the closure and shaped to match the shape of the top 20 of the rim preferably in such a way as to overlap the top 20 on the inside
0 and the outside as shown in Fig. 1. The cellular sealing means 21 may be moulded as an integral part of the closure 8 and when in position will follow or adapt to the contour of the top 20 by entering any small recesses in the top 20 and allowing any part of the top 20 which stands proud to enter into
5 the surface of the sealing means 21. The cells of the cellular sealing means 21 will therefore isolate any small fissures or irregularities in the top 20 and an effective seal will be achieved. In the sealing means 21 each cell is closed or separate from every other cell as shown in Figs. 1 and 3 and
20 this arrangement of providing what may be called an interrupted sealing annulus minimises any risk of leakage into or out of the container 1.

It will be understood that it is essential that the interrupted annulus matches the shape in plan of the top 20 of
25 the container and that the annulus extends completely around the top 20 when the closure 8 is in operative position. On the other hand the shape of the individual cells is not critical

and cells that are rectangular in plan and elevation as shown are simply one convenient shape among many. As another example the annulus may have irregular cells like a sponge with closed instead of open cells. Alternatively, the open cells could be
5 circular, honeycombe or any plan form to choice instead of open cells.

In operation the closure 8 is screwed down firmly on to the container 1 until the cellular sealing means 21 is pressed against the top 20 whereupon the sealing means is caused to conform
10 to the shape of the top 20. In some places the top 20 will slightly protrude into the sealing means 21 and in other cases the sealing means will slightly protrude into a small recess in the top 20.

Instead of the cellular sealing means being formed integrally
15 with the rest of the closure the sealing means may be formed as a separate unit or collar which may be inserted into the closure.

Such a requirement might apply if the closure was moulded or formed from a material that is too stiff or rigid to give the
20 required level of resilience to provide a satisfactory seal.

If desired to give additional sealing safety the cellular area may be extended into the inner surface of the skirt of the closure in which case the top of the skirt will be arranged to lie flush against the outer surface of the container. In
25 a similar way the closure may, if desired, be provided with a plug to enter the mouth of the container and the cellular area may be extended into outer surface of the plug, see diagrammatic Fig.5.

1. A container and closure assembly in which the closure is made of a suitable plastics material shaped to provide a top to cover the mouth of the container and a depending skirt to embrace the neck of the container characterised in that the closure is provided with an internal cellular area to match the shape of the rim around the mouth of the container so that when the closure is in operative position the cellular area conforms to the uneven shape of the rim to provide an effective seal.

2. An assembly according to claim 1 wherein the cellular area is formed as a honeycomb construction preferably made of the same plastics material as the main part of the closure.

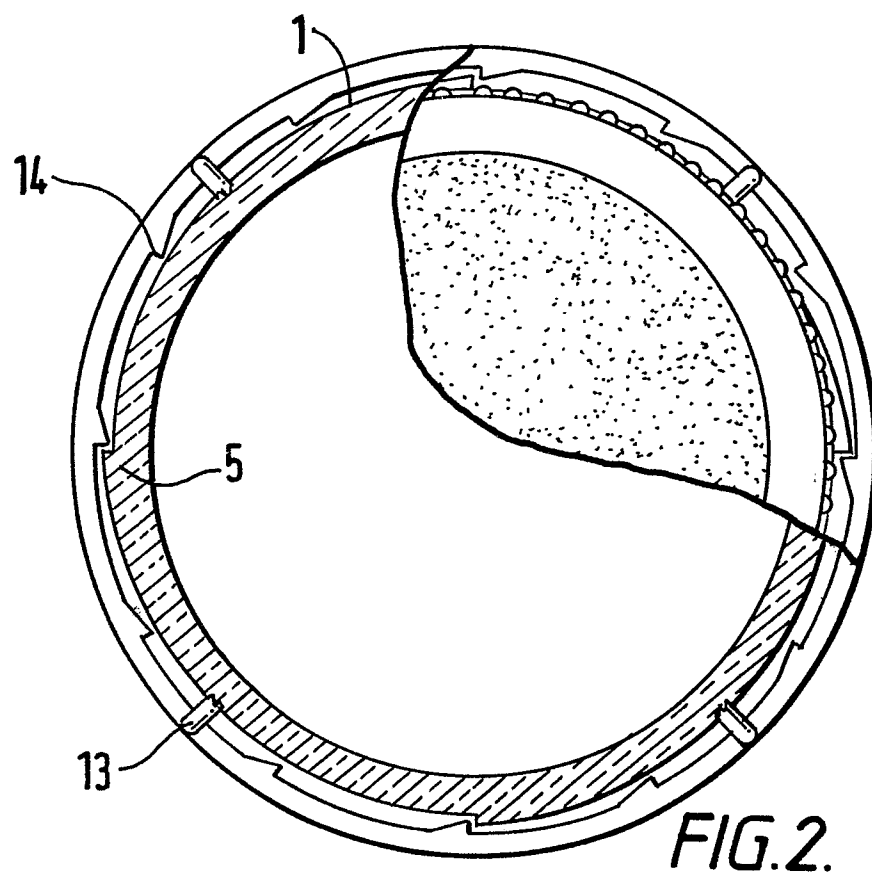
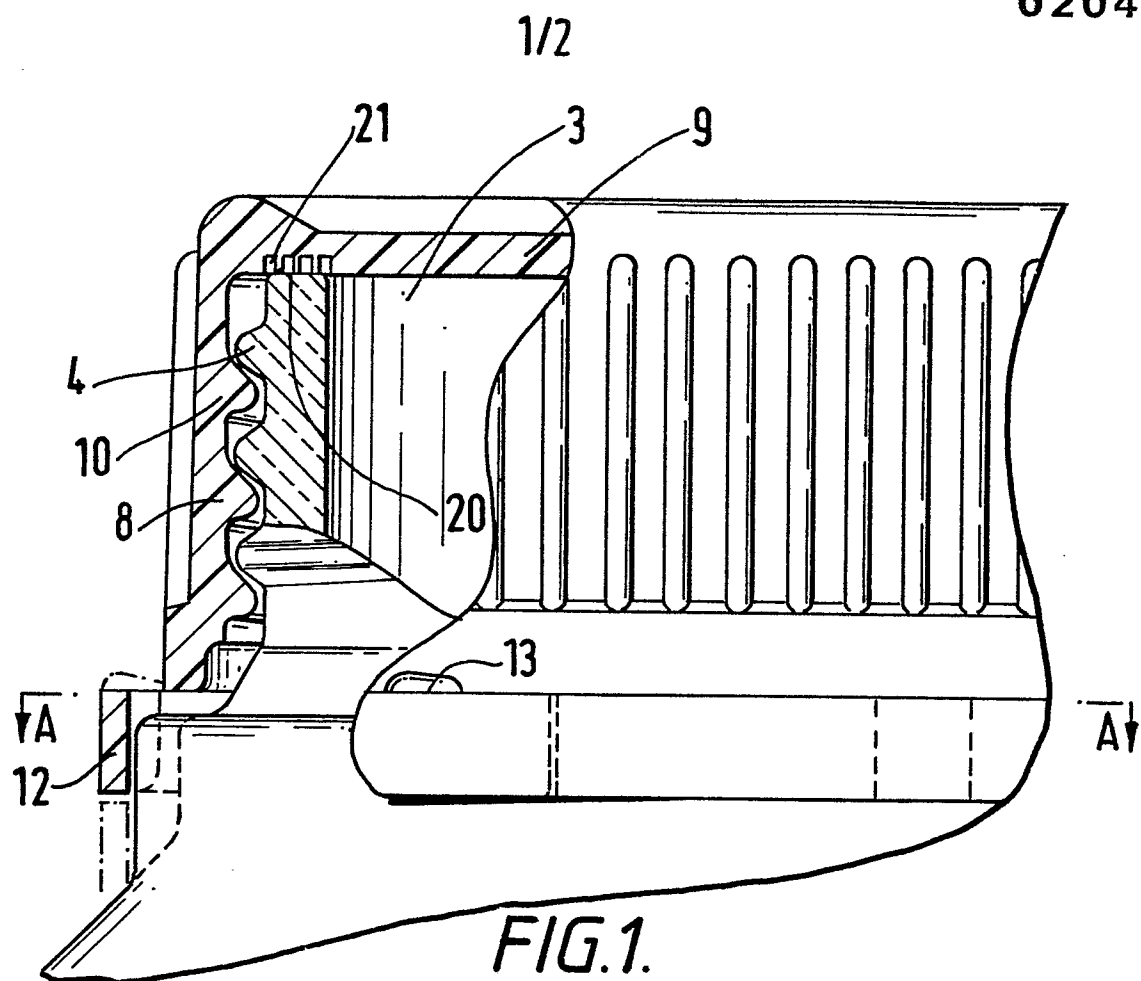
3. An assembly according to claim 1 wherein sealing is effected between the inside surface of the top of the closure and the top of the rim around the mouth of the container and wherein the cellular area is in the form of a cellular sealing means extending around the closure and shaped to match the shape of the top of the rim around the mouth of the container.

4. An assembly according to the claims 1 or 3 wherein the cellular area is integrally formed with the main part of the closure.

5. An assembly according to claim 1 or 3 wherein the cellular area of the closure overlaps the rim on the inside and/or on the outside.

6. An assembly according to claim 3 wherein the sealing means forms an interrupted sealing annulus extending completely around the top of the rim of the container when the closure is in operative position.

7. An assembly according to claim 1 wherein the cells of the cellular area are rectangular in plan and elevation or of other regular formation.
8. An assembly according to claim 1 wherein the cells of the cellular area are of irregular size and shape like a sponge.
9. An assembly according to claim 1 wherein the cellular area is formed as a separate collar or unit which is inserted into the closure.
10. A closure for use in an assembly according to claim 1 wherein the closure has an internal cellular area to match the shape of the rim around the mouth of the container.
11. A closure according to claim 10 wherein the cellular area is in the form of a cellular sealing means extending around the closure and shaped to match the shape of the top of the rim around the mouth.
12. A closure according to claim 10 wherein the cellular area is extended into the inner surface of the skirt of the closure and/or into the outer surface of a plug provided to enter the mouth of the container.



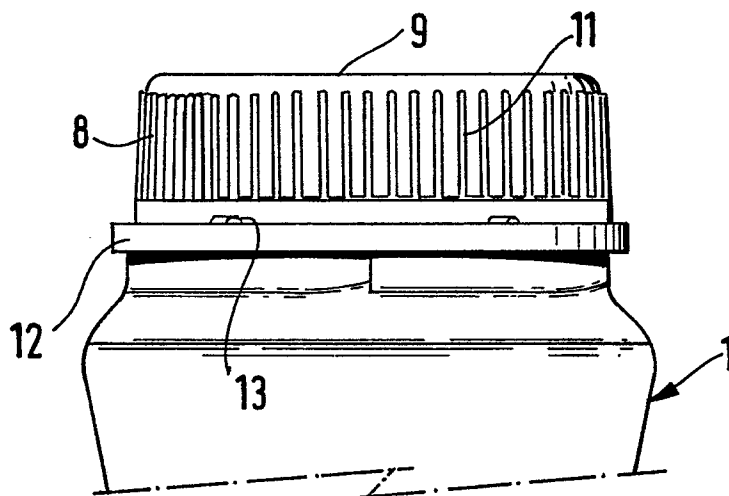
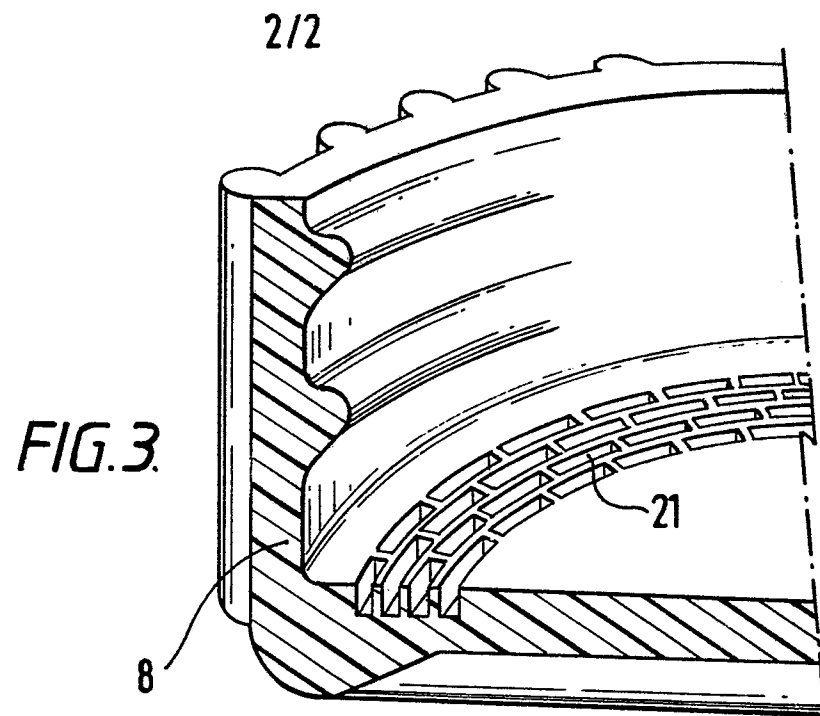


FIG. 4.

