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(54) **Closure having means for retention in tubular container.**

(57) This relates to a closure unit (22) which may be inserted into an open end of a tubular container body (21), particularly one formed of paperboard or plastic material, and which will have an automatic interlock with the container body (21) and a seal sufficient to hold the closure unit in sealed relation with respect to the container body (21) under all normal usages without the use of an adhesive. The interlock between the closure unit (22) and the container body (21) is in the form of a plurality of retaining lugs (27, 52) which are resiliently deflected when the closure unit (22) and container body (21) are assembled and which have a pressure engagement with the interior surface of the container body (21) to form an interlock therewith.

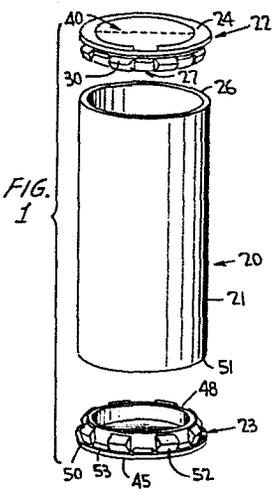

FIG. 1

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This invention relates to end closures for containers having tubular bodies.

Containers for products have in the past been formed of either plastic tubing or a paper tube and the ends of such containers have been closed by end units or end closures which have a projection which telescopes within the respective container and is secured in place by means of a suitable adhesive. The adhesive, in order to make certain that it is supplied in sufficient quantity to effect the bonding of the closure unit to the container body, normally has a portion thereof disposed on the container body beyond the closure unit. Further, the space between the closure unit and the container body containing the adhesive is also open to the product. When the product is a food, the adhesive becomes a possible contaminant.

The object of the present invention is to provide an end closure for a tubular container which overcomes the foregoing problems.

Accordingly, the present invention provides an end closure for tubular container bodies, said end closure comprising an end panel having inner and outer surfaces, said inner surface including a peripheral outer surface area for engaging in abutting relation an extreme end of a container body, and retaining means projecting from said inner surface, said retaining means being in the form of peripherally

spaced lugs, each of said lugs having a resilient connecting portion joined to said end panel within the confines of said peripheral area, each of said lugs including an anchoring head having a cam surface adjacent a free end thereof for engagement with a container extreme end to position said lugs, said cam surface having a radially inner surface thereof lying within an axial projection of said peripheral surface, said anchoring head also including an anchoring surface lying intermediate said cam surface and said connecting portion and generally lying within said axial projection of said peripheral surface.

In accordance with the invention, the lugs sufficiently bear against the inner surface of the container body and form an interlock therewith wherein retention, under test conditions, has been maintained with internal air pressures as high as 60 p.s.i. which is many times the 5-6 p.s.i. normally required.

In a preferred embodiment the lugs may be pressed by the container body against back-up elements so that the anchoring heads of the lugs may be compressibly engaged between the container body and the back-up elements.

The invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is an exploded perspective view showing a tubular container body having associated therewith closure units formed in accordance with this invention.

Figure 2 is an enlarged bottom view of the top closure unit which also is provided with dispensing means.

Figure 3 is an enlarged longitudinal sectional view taken through the closure unit of Figure 2

generally along the line 3-3.

Figure 4 is an enlarged fragmentary sectional view taken generally along the line 4-4 of Figure 2, and shows the specific details of one of the retaining lugs.

Figure 5 is a fragmentary enlarged sectional view taken generally along the line 5-5 of Figure 2, and shows the details of a typical centering lug.

Figure 6 is an enlarged plan view of the bottom closure unit.

Figure 7 is an enlarged fragmentary sectional view taken through a modified form of closure unit.

Figure 8 is a sectional view similar to Figure 7, and shows the closure unit assembled with a tubular container body.

Figure 9 is a fragmentary sectional view similar to Figure 7, showing another form of closure unit.

Figure 10 is a fragmentary sectional view through the closure unit of Figure 9, and inserted within a tubular container body.

Figure 11 is a sectional view taken through the closure unit of Figure 6 when applied to a tubular container body.

Figure 12 is a sectional view similar to Figure 7, and shows yet another form of closure unit.

Figure 13 is a sectional view through the closure unit of Figure 12, applied to a tubular container body.

Figure 14 is a fragmentary sectional view similar to Figure 7, and shows still another form of closure unit.

Figure 15 is a sectional view similar to Figure 7, and shows yet another form of closure unit.

Referring now to the drawings in detail, reference is made to Figure 1 wherein there are illustrated components of a container formed in accordance with this invention, the container being generally identified by the numeral 20, and including a container body 21 which is provided with an upper end closure, generally identified by the numeral 22, and a lower end closure generally identified by the numeral 23.

It is to be understood that the container body 21 is in the form of a length of tubing. Normally the tube from which the container body 21 is formed will be a conventional spirally wound tube. Accordingly, the constructional details of the container body 21 will not be set forth in more detail here.

With respect to the foregoing, it is also pointed out that the container body 21 could feasibly be formed of a length of plastic tubing.

Referring now to Figures 2 and 3 it will be seen that there is illustrated the closure unit 22 in detail. The closure unit 22 is of a molded plastics material construction and includes an end panel 24 having formed on its underside a peripheral surface area 25 for engaging an extreme end 26 of the container body and generally forming a seal therewith. The external diameter of the end panel 24 will correspond to the external diameter of the container body 21.

The end panel 24 has depending therefrom a plurality of circumferentially spaced retaining lugs, each identified by the numeral 27. The retaining lugs 27 are separated by separately formed aligning lugs 28 which lie on a common circle and which have radially outer surfaces 30 adapted to be snugly received in an open end of the container body 21.

The closure unit 22 is a dispensing unit,

and the end panel 24 has one half thereof axially inwardly offset with the offset end panel portion being identified by the numeral 31 and being in part surrounded by an axial circumferentail wall 32 which depends from the end panel 24 and is annular in outline. The wall 32 has an outer corner 33 which is disposed adjacent the retaining lugs 27 as is best shown in Figure 4 and will be described in detail hereinafter.

The end panel 24 has extending upwardly therefrom an annular projection 34 so as to define a closure element retaining seat arrangement to be described in detail hereinafter.

With particular reference to Figure 3, it will be seen that the end panel 24 includes a generally half-circular panel portion 35 which lies in the plane of the end panel 24 and which is axially offset from the panel portion 31. A generally diametrical wall 36 joins diametrically adjacent inner portions of the panel portions 31 and 35.

The panel portion 35 has formed therein suitable dispensing openings 37. The size and shape of these openings, as well as the number, will be varied depending upon the product to be dispensed. The illustrated openings 37 are intended for the dispensing of a powder or fine granular material.

The annular projection 34, remote from the panel portion 35, has hingedly connected thereto as at 38 a closure disk generally identified by the numeral 40. The closure disk is circular in outline and is divided by a hinge line 41 into two generally semicircular portions 42 and 43.

The semicircular portion 43 has projecting therefrom pins 44 which are receivable in the openings 37 to effect the sealing thereof. The portion 42 is intended to overlie the recessed panel portion 31 and the relationship of the closure element 40

to the remainder of the closure unit 22 is one whereing, when the closure unit is sealed closed and one presses down on the panel portion 42, the panel portion 43 will lift upwardly and become disengaged from the panel portion 35. This specific closure action is in no way a part of this invention and is clearly disclosed in U.S. Patent No. 3,850,350. Accordingly, no further details of this feature of the closure unit 22 will be set forth here.

Reference is now made to Figure 6 wherein it will be seen that the closure unit 23 is of a construction very similar to the closure unit 22, but without the dispensing feature. The closure unit 23 is also preferably molded of a resilient plastics material and includes an end panel 45 having a projecting central portion defined by an annular wall 48.

The upper side of the end panel 45 around the periphery of the end panel is in the form of a surface area 50 for engaging in abutting relation the extreme lower end 51 of the container body 21 generally in sealed relation. The end panel 45 has projecting therefrom in circumferentially spaced relation retaining lugs, generally identified by the numeral 52, and aligning lugs 53 which respectively correspond substantially to the lugs 27 and 28.

Rather than to describe the manner in which the closure units 22, 23 are interlocked with the container body 21, reference is now made to Figures 7 and 8 wherein there is schematically illustrated the details of the simplest form of closure unit formed in accordance with this invention, the closure unit being generally identified by the numeral 54. The closure unit 54 includes a circular outline end panel 55 which has depending therefrom at circumferentially spaced intervals retaining lugs 56 which

are similar to the lugs 27 but may have a configuration different therefrom. An annular portion of the end panel 55, radially outwardly of the connections of the lugs 56 to the end panel 55, defines a surface area 57 by abutting an extreme end of a tubular container body.

It is to be noted that the retaining lug 56 has a thin strap-like portion 58 which is directly integral with the end panel 55, and an anchoring head, generally identified by the numeral 60. The anchoring head 60 has a cam surface 61 facing away from the end panel 55 and sloping generally toward the plane of the end panel 55 and radially outwardly with respect thereto. The head 60 also has an anchoring surface 62 which is disposed generally radially outermost and slopes toward the plane of the end panel 55 and radially inwardly. The other surfaces of the anchoring head 60 have no function in this embodiment of closure unit.

With reference to Figures 7 and 8, it will be seen that the relative diameters of the surface 61 and the intended container body 21 is such that the extreme end of the container body, for example the end 51, will engage the cam surface and as the closure unit 54 is pressed into the container body 21, the lugs 56 will be radially inwardly deflected until they reach a position where they will pass through the container body 21, after which the closure unit 54 and the container body 21 are telescoped sufficiently to have the extreme end 51 abut the surface 57, as is clearly shown in Figure 8.

Due to the resiliency of the lugs 56, the lugs will tightly press the anchoring surface 62 of each lug against the inner surface of the container body. Further, when the container body 21 is formed

of a relatively soft and deformable material such as paperboard or plastic, the lugs 56 will have a tendency to impress the material of the container body and form anchoring interlocks therewith.

The anchoring surface 62 may either be relatively smooth, as shown in Figure 7, or may be generally serrated, as is shown with respect to the lugs 27 which are to be described in more detail hereinafter.

Although the closure unit 54 has been illustrated and described hereinabove with only projecting retaining lugs 56, it is to be understood that if desired between adjacent retaining lugs there may be guide lugs such as the lugs 28.

Referring now to Figure 9, it will be seen that there is illustrated still another form of closure generally identified by the numeral 63. The closure 63 is identical with the closure unit 54 with the addition of a pressure ring 64 disposed radially inwardly of the lugs 56. The closure unit 63 is assembled with a container body 21 in the same manner as described with respect to the closure unit 54. However, as is clearly shown in Figure 10, when the lugs 56 are deflected radially inwardly sufficiently to be received within the container body 21, radially inner surraces 65 of the lugs 56 will have engaged the pressure ring 64 which functions as a back-up for the lugs 56. Thus, the pressure exerted radially outwardly by each of the retaining lugs 56 on the inner surface of the container body is not restricted to the resiliency of the strap portion 58, and thus the closure unit 63 may be more firmly anchored within the container body.

Reference is now made to Figure 11 which could be a cross section of the closure unit 23 although it

does not necessarily have the guide lugs 53. The closure unit in Figure 11 is generally identified by the numeral 66 and includes an annular end panel 67 having projecting from the radially inner portion thereof an annular wall 68 which, in turn, carries an axially offset inner end panel portion 70. The end panel 67 also has projecting therefrom in the same axial direction as the wall 68 and in surrounding relation to the wall 68 a plurality of circumferentailly spaced anchoring lugs 56. The connections between the strap 58 of the lugs 56 and the end panel are surrounded by a radially outer peripheral surface 71 which, like the surface 57, is intended to abut the extreme end of the container body 21.

The anchoring lugs 56 function in the same manner as that described with respect to the closure units 54 and 63 except that the annular wall 68 has the further function of being a back-up for the lugs 56 and may extend axially beyond the radially inner surface 65 of the lugs 56 so that the lugs 56 engage an intermediate portion of the wall 68 for its back-up support.

Reference is now made to Figures 12 and 13, wherein it will be seen that there is illustrated another closure unit generally identified by the numeral 72. The closure unit 72 may be identical with the closure unit 54 and will differ therefrom only in that there is projecting from the end panel 55 in the same axial direction as the retaining lugs 56 a plurality of back-up lugs 73, therebeing one back-up lug 73 for each of the lugs 56, and, if desired, the back-up lugs 73 may be of a lesser circumferential extent than the retaining lugs 56.

Referring now to Figure 13, it will be seen that when the closure unit 72 is positioned within an end of the container body 21, the radially inner

surface 65 of each lug 56 will engage its respective back-up lug 73 substantially in the same manner as does the lug 56 of the closure unit 63 with respect to the annular wall 64. The individual back-up lugs 73 have the added advantage of providing for controlled resiliency, and thus controlled back-up support pressure on the retaining lugs 56.

Referring now to Figure 14, it will be seen that the illustrated closure unit, generally identified by the numeral 74, is identical with the closure unit 63 except that the annular wall 64 is provided with individual back-up lugs 75 adjacent the connection of the wall 64 to the end panel 55. The axial extent of the lugs 75 will control the point at which they engage the surface 65 of the lugs 56 and this, in combination with the resiliency of the lugs 56, will control the pressure engagement of the anchoring heads 60 with the inner surface of the container body. It is also feasible that the lugs 56 be so proportioned that the surfaces 65 thereof will engage both the lugs 75 and the ring or wall 64.

A further closure unit, generally identified by the numeral 76, is illustrated in Figure 15. This closure unit corresponds to the closure unit 66 and differs therefrom only in that the wall 68 has formed integrally therewith backpup lugs 77 which correspond to the back-up lugs 75 of Figure 14. The back-up lugs 77 function in the same manner as the back-up lugs 75 and no further description of the operation thereof is believed to be necessary.

Reference is now specifically made to Figures 4 and 5.

First, with respect to Figure 5, it will be seen that the guide or aligning lugs 28 are relatively short as compared to the lugs 27 and serve

to position and center the extreme end of the container body 21 relative to the end panel 24.

Referring now to Figure 4, it will be seen that the lugs 27 are of a construction similar to that of the lugs 56 and in fact, the lugs 56 could be of an identical configuration to that of the lugs 27. It is, of course, pointed out here that the lug 27 illustrated in Figure 4 is the preferred lug embodiment, and therefore will be described most specifically here. The lug 27 includes a strap potion 78 which is integrally connected to the end panel 24 immediately adjacent the area 25 and generally along the same circle as the lugs 28. The strap 78 extends axially from the end panel 24 and radially outwardly so as partially to intersect with an axial projection of the surface 25.

Each lug 27 also includes an anchoring head, generally identified by the numeral 80. The anchoring head 80 is generally triangular in cross section and has a radially inner rear surface 81 which is part of a cylinder. It also has a cam surface 82 which is part of a cone and which slopes axially toward the plane of the end panel 24 and radially outwardly. The surface 82 is at least in part aligned with an axial projection of the surface 25 so that it will engage in camming relation the extreme end 26 of the container body 21 and thus will effect the camming of the lug 27 radially inwardly so that it will enter the container body.

The anchoring head 80 also has a radially outer part 83 disposed adjacent the strap 78 and forming an anchoring surface for engaging the internal surface of the container body 21. The part 83 is of a serrated construction so that it will dig into the container body and form a strong mechanical interlock therewith and thus further resist displacement of the closure unit 22 relative to the container body 21.

As mentioned above, the interlock between the various closure units and a tubular container body, preferably one formed of paperboard, is such that an effective seal can be obtained between the container body and the closure unit which will withstand an internal air pressure as high as 60 p.s.i. which greatly exceeds the required 5-6 p.s.i. Accordingly, the closure units of this invention have a holding power which greatly exceeds that required, and therefore no adhesive is required to hold the closure unit in place, thereby eliminating the possible contamination of a food product by the adhesive.

Although a number of forms of closure units in accordance with this invention have been specifically illustrated and described, it is to be understood that minor variations may be further made in the closure units without departing from the spirit and scope of the invention.

CLAIMS

1. An end closure for tubular container bodies, said end closure comprising an end panel having inner and outer surfaces, characterized by said inner surface including a peripheral outer surface area (25, 57, 58, 71) for engaging in abutting relation an extreme end (26, 51) of a container body, and retaining means projecting from said inner surface, said retaining means being in the form of peripherally spaced lugs, (27, 56) each of said lugs having a resilient connecting portion (78, 58) joined to said end panel within the confines of said peripheral area, each of said lugs including an anchoring head (80, 60) having a cam surface (82, 61) adjacent a free end thereof for engagement with a container extreme end to position said lugs, said cam surface (82, 61) having a radially inner surface thereof lying within an axial projection of said peripheral surface, said anchoring head also including an anchoring surface (83, 62) lying intermediate said cam surface (82, 61) and said connecting portion (78, 58) and generally lying within said axial projection of said peripheral surface.

2. An end closure according to claim 1, characterized in that there are back-up means (32, 34, 68, 73) for said lugs to limit radial inward movement thereof.

3. An end closure according to claim 2, characterized in that at least one of said back-up means and said anchoring head are resiliently compressible.

4. An end closure according to claim 2 or 3, characterized in that said back-up means are in the form of a continuous ring (32, 64, 68).

5. An end closure according to claim 4, characterized in that said continuous ring (32, 68) defines a recessed cavity in said end panel including a recessed end panel portion (31, 35, 70).

6. An end closure according to claim 5, characterized by said recessed end panel portion (35) having at least one dispensing opening (37) therein.

7. An end closure according to claim 2 or 3, characterized in that said back-up means includes a separate back-up member (73) for each lug.

8. An end closure according to any of claims 1 to 7, characterized in that there is disposed between each pair of said lugs (27) a depending centering lug (28).

9. An end closure according to claim 8, characterized in that said centering lugs (28) lie along a common circle.

10. An end closure according to any of claims 2 to 7, characterized by said anchoring head (80, 60) also having a radially inner back surface (81, 65) for engaging said back-up means.

11. An end closure according to any of claims 1 to 10, characterized in that said anchoring surface (83) is of a serrated arrangement.

12. An end closure according to any of claims 1 to 11, characterized in that said connecting portion (78, 58) is in the form of a strap sloping axially and radially outwardly from said end panel.

13. An end closure according to any of claims 1 to 12, characterized in that said end closure is formed in one piece of a resiliently deformable plastic.

FIG. 1

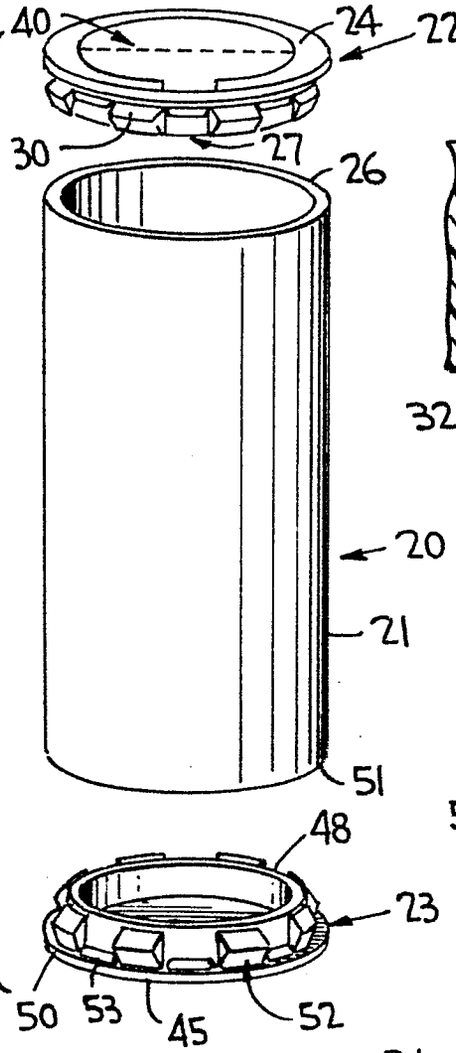


FIG. 4

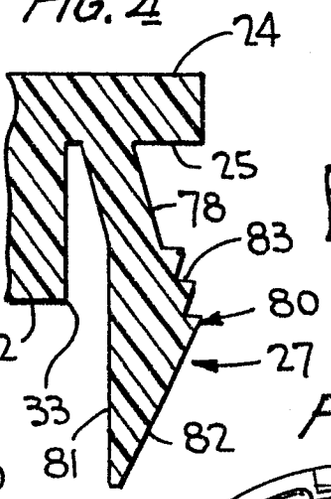


FIG. 5

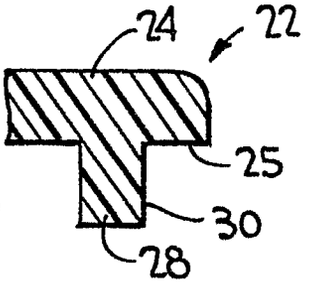


FIG. 6

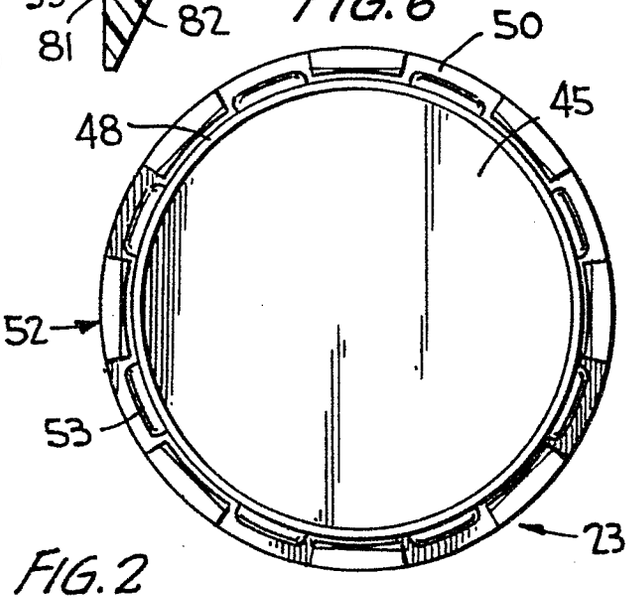


FIG. 2

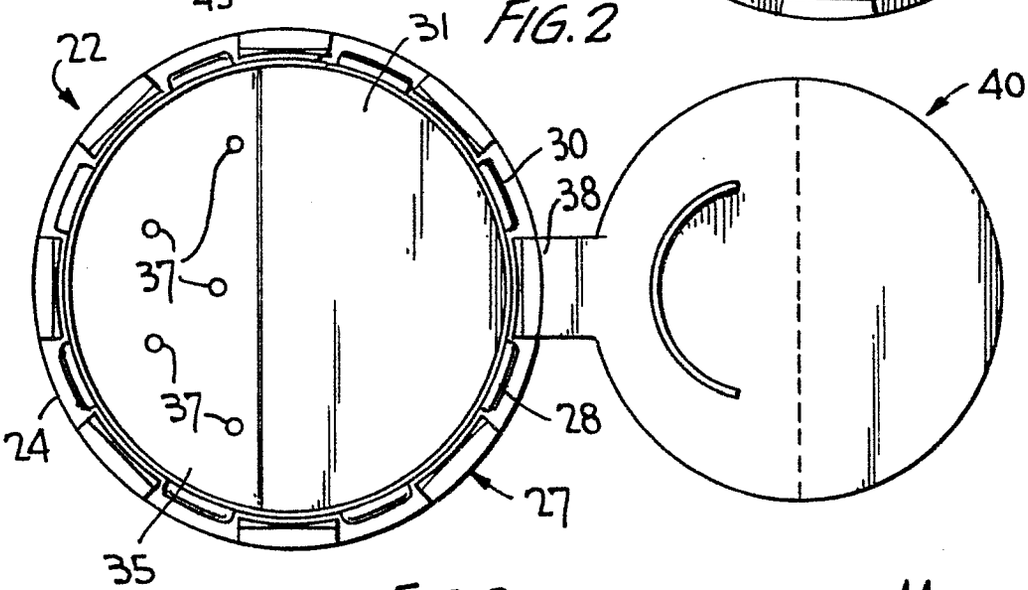


FIG. 3

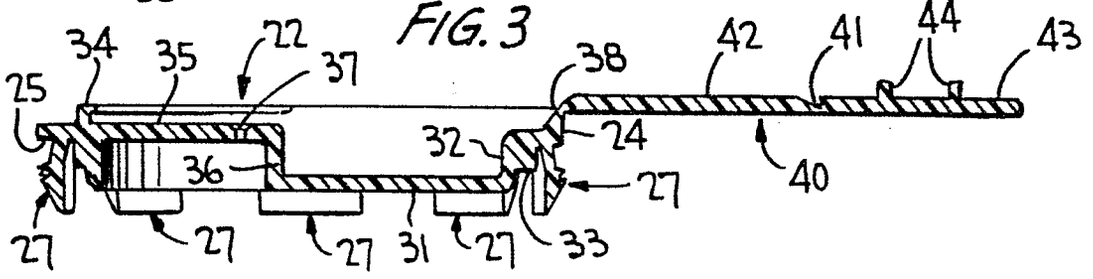


FIG. 7

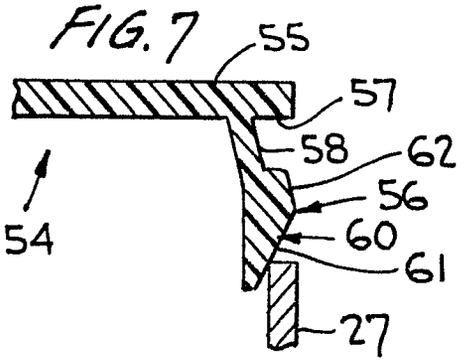


FIG. 8

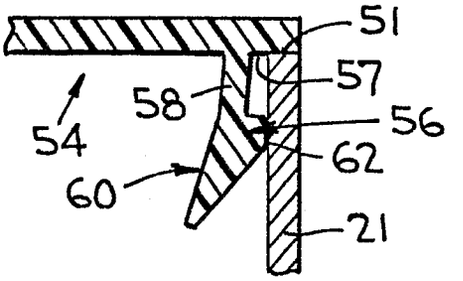


FIG. 9

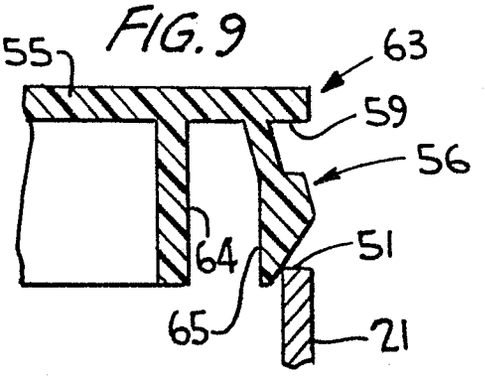


FIG. 10

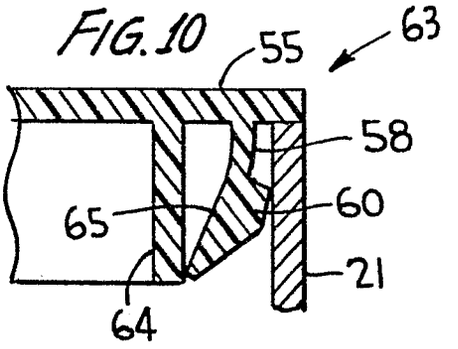


FIG. 11

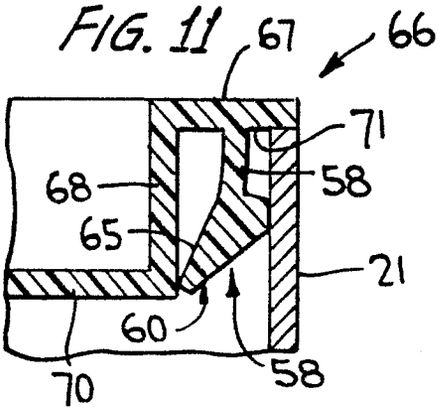


FIG. 12

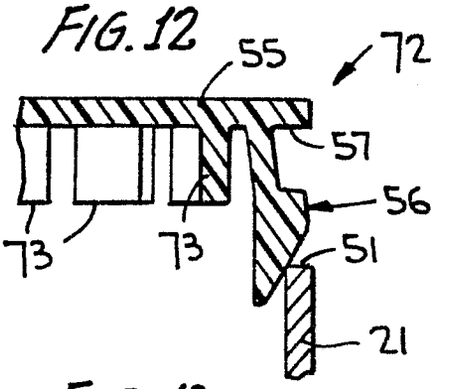


FIG. 14

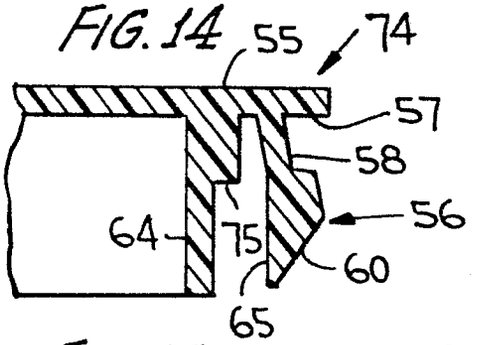


FIG. 13

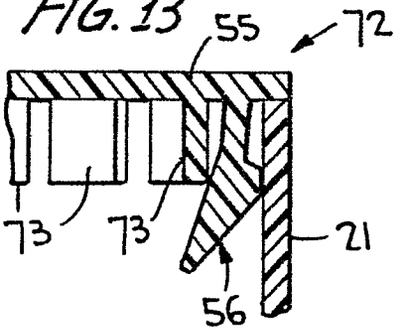
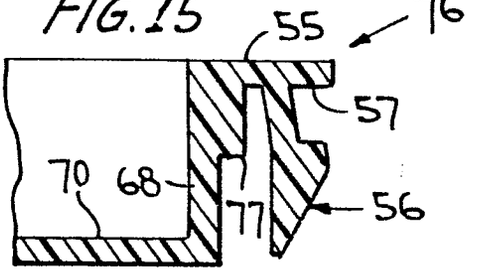


FIG. 15



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EUROPEAN SEARCH REPORT

0089395
Application number

EP 82102417.1

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl ³)
A	GB - A - 725 112 (WIECKMANN) * Fig. 1,3 * --	1,2,4, 10,13	B 65 D 39/04
A	DE - A1 - 2 845 196 (ALCA S.A.) * Fig. 1,2 * & GB-A-2 006 726 --	1,2,4, 10,13	
D,A	US - A - 3 850 350 (TOWNS et al.) * Fig. 1,2 * --	1,5,6	
A	US - A - 3 851 812 (BITTEL) * Fig. 1,2,3,4,5 * ----	1,5,6	

TECHNICAL FIELDS SEARCHED (Int Cl ³)

B 65 D 1/00
B 65 D 3/00
B 65 D 39/00
B 65 D 41/00
B 65 D 43/00
B 65 D 47/00

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	17-11-1982	CZUBA

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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