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(54) **Membrane for closing containers and product preservation device comprising said membrane**

(57) The membrane (1) for closing containers in general, comprising a body (2) of elastic material defining a portion (3) for its retention on said container (4) and a portion (5) for closing this latter. The membrane comprises a valve (6) associable with a vacuum pump

or aspirator (25) for discharging the air contained in the container (4) to the outside. The food product preservation device comprises a container (4) to receive the food products (26) and a lid (27) for their protection. The device also comprises the membrane (1) interposable between the container (4) and the lid (27).

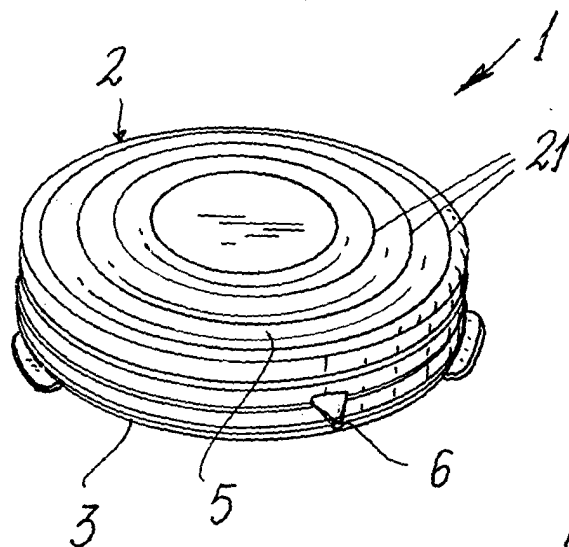


FIG. 1

Description

[0001] The present invention relates to a membrane for closing containers in general, and a product preservation device comprising said membrane.

Foods are known to be often preserved in containers provided with a protection lid.

[0002] However the air present under the lid causes rapid deterioration of the food product, even if stored in a refrigerator.

[0003] To obviate this drawback, membranes have been developed to seal the container and isolate it completely from the outside.

[0004] However even in this case the air (and hence the oxygen) present in the container and causing deterioration of the food product cannot be eliminated.

[0005] Hence in practice, traditional membranes do not ensure food product preservation for a sufficiently long period.

[0006] Moreover although traditional membranes present elastic properties, it is extremely difficult to stretch them to enable them to be applied to the container.

[0007] The technical aim of the present invention is therefore to provide a membrane for closing containers in general and a product preservation device comprising said membrane which enable the stated drawbacks of the known art to be eliminated.

[0008] Within the scope of this technical aim, an object of the invention is to provide a membrane and device which enable foods to be preserved for even very lengthy time periods without undergoing degradation.

[0009] Another object of the invention is to provide a membrane which can be easily applied to the container without having to exert too high a force; in this manner, a housewife can also easily and quickly apply the membrane, without risk of suffering pain.

[0010] The technical aim, together with these and further objects, are attained according to the present invention by a membrane for closing containers in general and a product preservation device comprising said membrane, in accordance with the accompanying claims.

[0011] Further characteristics and advantages of the invention will be more apparent from the ensuing description of a preferred but non-exclusive embodiment of the membrane and of the preservation device comprising said membrane according to the invention, illustrated by way of non-limiting example in the accompanying drawings, in which:

Figure 1 is a perspective view of a silicone membrane according to the present invention;

Figure 2 is a cross-section through a membrane of the present invention;

Figure 3 is an enlarged section through a valve of the membrane of Figure 2;

Figure 4 is a view from the interior of the membrane

of Figure 2;

Figure 5 shows a membrane and a container being connected together;

Figure 6 shows a membrane partly connected to the container;

Figure 7 shows a membrane connected to the container before air is drawn from its interior;

Figure 8 shows a membrane connected to the container while air is being drawn from its interior;

Figure 9 is a section through the container with the membrane applied, after the air has been completely removed from its interior;

Figure 10 is a section through a different container with the membrane applied, after the air has been completely removed from its interior;

Figure 11 is a cross-section through a different embodiment of the membrane according to the invention;

Figure 12 is a perspective view of a grid to be positioned on the container when vacuum has been created; and

Figure 13 shows a container in which vacuum has been created, provided with the grid shown in Figure 12.

[0012] With reference to said figures, these show a membrane, indicated overall by the reference numeral 1, for closing containers in general.

[0013] The membrane 1 comprises a body 2 of elastic material, such as silicone.

[0014] The body 2 defines a portion 3 for its retention on a container 4 and a portion 5 for closing said container 4.

[0015] The membrane 1 comprises valving means consisting of a valve 6 associable with suction means for discharging to the outside the air contained in the container 4.

[0016] For example the suction means can consist of a small vacuum pump or an aspirator.

[0017] Advantageously, the valve is unidirectional and is at least partly connected to the retention portion 3 of the body.

[0018] This enables the aspirator or pump to be securely supported and retained during air extraction from the interior of the container 4.

[0019] In another example (not shown) the unidirectional valve is connected to the closure portion 5.

[0020] As shown in Figures 3 and 4, the body 2 presents a connection channel 7 between the valve 6 and the interior 8 of the container 4.

[0021] The channel 7 is defined by two parallel ribs 9 which extend to the side of an inner port 11 of the valve 6 along an inner surface 12 of the retention portion 3; the ribs 9 also suitably extend onto the closure portion 5.

[0022] Advantageously, the valve 6 is co-moulded with the body 2 and presents at least one thickened portion 13 presenting a conduit 14 which defines the inner port 11.

[0023] In addition, an end portion 15 of the valve 6 presents a slit 16 extending between an end 17 of the conduit 14 and the outside 18.

[0024] Under normal conditions the slit 16 is closed (maintained in the closed configuration by the internal stresses generated by its structure) and can be opened, to enable air to pass, by the effect of mechanical stresses caused by the pump or aspirator or by manual action (by laterally squeezing the valve).

[0025] Advantageously, the closure portion 5 presents a substantially convex profile, as indicated by the axis 19, and is provided with a plurality of undulations 21 substantially parallel to the perimeter of the closure portion 5 to provide the membrane with greater extensibility.

[0026] In particular, as shown in the accompanying figures, the closure portion 5 is substantially circular, the undulations 21 also being circular and concentric.

[0027] In addition, the retention portion 3 presents perimetral ribs 22 which extend along its outer surface.

[0028] The operation of the membrane according to the invention is apparent from that described and illustrated, and is substantially as follows.

[0029] The membrane 1 is applied to a container 4 as indicated in Figures 5-7.

[0030] Specifically, the membrane 1 is stretched in opposite directions, indicated by the arrows F1 in Figure 5.

[0031] The membrane 1 is then partly mounted on the container 4 and finally completely drawn over the container 4 as indicated by the arrow F2.

[0032] At this point a vacuum pump or aspirator (of which only a tube 25 for connection to the membrane is shown) is connected to the valve 6, as shown in Figure 7.

[0033] As the air contained in the interior of the container 4 (in particular the air contained between the container 4 and the membrane 1) is drawn off, the membrane 1 deforms until it adheres to the walls of the container 4 and to the food products contained therein.

[0034] For example, Figure 9 shows this situation; in this figure the food products are indicated by the reference numeral 26.

Advantageously, the membrane 1 allows the use of containers having a structure not reinforced to withstand the high vacuums and stresses generated within the container when the air is drawn out (to create the vacuum); in this respect, it is the membrane 1 itself which deforms, so preventing the container being subjected to high stresses.

[0035] Moreover the food products can be solid or liquid of any type.

[0036] The present invention also relates to a device for preserving food products.

[0037] This device (shown for example in Figure 10) comprises the container 4 for receiving the food product 26 and a lid 27 for protecting the membrane 1.

[0038] The device comprises the membrane 1, inter-

posed between the container 4 and the lid 27.

[0039] Advantageously, the lid 27 presents a first seat 28 for passage of the valve 6 (in the example this seat is lateral) and a second seat 29 enabling the containers 4 to be stacked safely one on another.

[0040] Two utilization examples of the membrane according to the present invention are described hereinafter.

[0041] In a first example the membrane is used in a domestic environment.

[0042] For example the membrane is used to close containers such as saucepans, bowls or jars containing food products (for example the left-overs from a lunch or dinner).

[0043] These food products can be either liquid or solid, in both cases the membrane adhering to them to ensure their preservation under vacuum and their retention without the risk of accidental leakage.

[0044] In a second example, the membrane of the present invention can also be used at the industrial or semi-industrial and professional level.

[0045] For example the described membrane and device of the invention can be used in catering to facilitate food product distribution and the preservation of left-over food products after said distribution within a restaurant or canteen.

[0046] In this example the food products are prepared in a central facility and sent from there to various restaurants, canteens or other distribution points, contained in containers of predetermined dimensioned.

[0047] The lid 27 and membrane 1 are removed in the restaurant or canteen, after which the containers 4 are inserted into tanks (not shown) containing hot water for their heating.

[0048] In this manner the food products can be distributed hot.

[0049] After their distribution the food products can be preserved by repositioning the membrane 1 and lid 27 and replacing the container 4 in a suitable place.

[0050] Advantageously, they can be preserved in the actual containers used for their transportation, as preservation (achieved by the absence of air) is ensured by the membrane.

[0051] Existing containers can also be used or adapted, as they do not have to withstand high stresses when their interior is put under vacuum (it being the membrane which deforms).

[0052] Catering containers are known to possess a horizontal perimetral free edge 30 on which the membrane can grip. Consequently, the retention portion 3 of the membrane 1 presents a horizontal part 31 which rests against the horizontal edge 30 and a U-bent part 32 which locks the membrane onto the container 4. Advantageously, the valve 6 is positioned on the horizontal part 31 of the retention portions 3; ribs 9 are also provided in this case, to enable the valve 6 to communicate with the interior of the container.

[0053] It is also known that contact of the membrane

1 with certain food products 26 can alter the taste of such food products; this is evidently unpleasant for the consumer.

[0054] In other cases, sharp-pointed food products (such as chicken or other meat with projecting bones) can damage the membrane 1 or tear it.

[0055] For these reasons, in such cases it is advisable to hinder direct contact of the food products 26 with the membrane 1.

[0056] This is achieved by positioning within the container grids 40 for example of metal; the grid 40 presents, for separating the food product 26 from the membrane 1, a surface 41 from which legs 42 extend; in the example of Figures 12 and 13 only three legs are shown, however in other examples they can be of a different number.

[0057] As shown in Figure 13, the grid is housed within the container 4; the free edge 43 of the grid 40 is inserted as an exact fit into the container 4 so as to completely separate the food product 26 from the membrane and prevent the existence of regions where direct contact can occur.

[0058] The illustrated grid 40 presents wide apertures but in other examples the grid apertures 45 can be very small.

[0059] It has been found in practice that the membrane for closing containers in general and the product preservation device comprising said membrane of the invention are particularly advantageous because they enable solid or liquid food products of any type to be preserved for long periods with limited risk of deterioration because of the lack of air (and hence of oxygen) in the container.

[0060] The membrane for closing containers in general and the product preservation device comprising said membrane conceived in this manner are susceptible to numerous modifications and variants, all falling within the scope of the inventive concept; moreover all details can be replaced by technically equivalent elements.

[0061] In practice the materials used and the dimensions can be chosen at will, according to requirements and to the state of the art.

Claims

1. A membrane (1) for closing containers in general, comprising a body (2) of elastic material defining a portion (3) for its retention on said container (4) and a portion (5) for closing this latter, **characterised by** comprising valving means (6) associable with suction means (25) for discharging the air contained in said container (4) to the outside.
2. A membrane (1) as claimed in claim 1, **characterised in that** said valving means (6) comprise a unidirectional valve.

3. A membrane (1) as claimed in one or more of the preceding claims, **characterised in that** said valve (6) is at least partly connected to said retention portion (3) of said body (2).

4. A membrane (1) as claimed in one or more of the preceding claims, **characterised in that** said body (2) presents a connection channel (7) between said valve (6) and the interior (8) of said container (4).

5. A membrane (1) as claimed in one or more of the preceding claims, **characterised in that** said channel (7) is defined by ribs (9) which extend to the side of an inner port (11) of said valve (6) along an inner surface (12) of said retention portion (3).

6. A membrane (1) as claimed in one or more of the preceding claims, **characterised in that** said valve (6) is co-moulded with said body (2).

7. A membrane (1) as claimed in one or more of the preceding claims, **characterised in that** said valve (6) presents at least one thickened portion (13) presenting a conduit (14) which defines said inner port (11), and an end portion (15) presenting a slit (16) extending between an end (17) of said conduit (14) and the outside (18), said slit (16) being openable by the effect of mechanical stresses, to enable air to pass.

8. A membrane (1) as claimed in one or more of the preceding claims, **characterised in that** said closure portion (5) presents a substantially convex profile.

9. A membrane (1) as claimed in one or more of the preceding claims, **characterised in that** said closure portion (5) presents a plurality of undulations (21) substantially parallel to the perimeter of said closure portion (5).

10. A membrane (1) as claimed in one or more of the preceding claims, **characterised in that** said closure portion (5) is substantially circular, said undulations (21) also being circular and concentric.

11. A membrane (1) as claimed in one or more of the preceding claims, **characterised in that** said retention portion (3) presents at least one perimetral rib (22) which extends along its outer surface.

12. A food product preservation device comprising a container (4) to receive said food products (26) and a lid (27) for their protection, **characterised by** comprising, interposable between said container (4) and said lid (27), a membrane (1) comprising a body (2) of elastic material defining a portion (3) for its retention on said container (4) and a portion (5)

for closing this latter, said membrane (1) comprising at least one valve (6) associable with suction means (25) for discharging the air contained in said container (4) to the outside.

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13. A device as claimed in the preceding claim, **characterised in that** said lid (27) presents a first seat (28) for the passage of said valve (6).
14. A device as claimed in claim 12 or 13, **characterised in that** said lid (27) presents a second seat (29) enabling said containers (4) to be stacked one on another.
15. A device as claimed in one or more of claims 12 and onwards, **characterised in that** said container (4) presents a substantially horizontal perimetral free edge (30) on which said membrane can grip, said retention portion (3) of said membrane (1) presenting at least one horizontal part (31) which rests against said horizontal edge (30) and a substantially U-bent part (32) which locks said membrane (1) onto said container (4).
16. A device as claimed in one or more of claims 12 and onwards, **characterised by** comprising a separation grid (40) interposable between said food products (26) and said membrane (1).
17. A device as claimed in one or more of claims 12 and onwards, **characterised in that** said grid (40) presents, for separating said food product (26) from said membrane (1), a surface (41) from which legs (42) extend.
18. A device as claimed in one or more of claims 12 and onwards, **characterised in that** said surface (41) presents a free edge (43) which is inserted as an exact fit into the container (4) so as to completely separate the food product (26) from the membrane and prevent the existence of regions where direct contact can occur.

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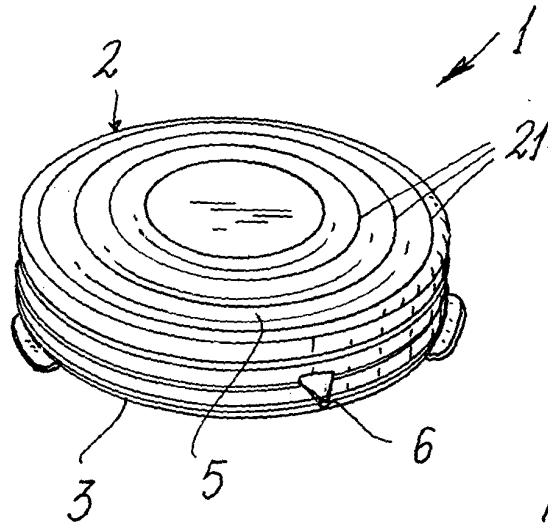


FIG. 1

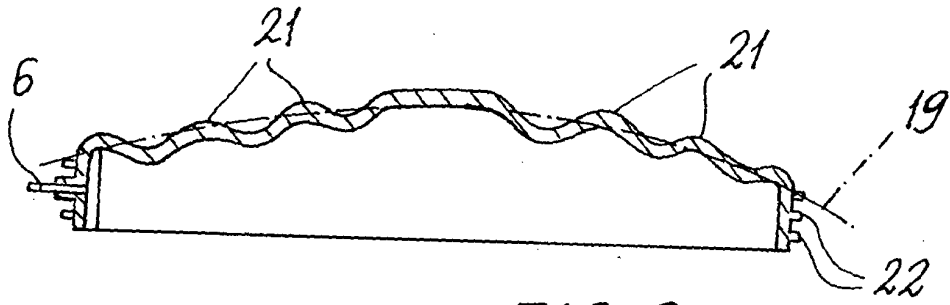


FIG. 2

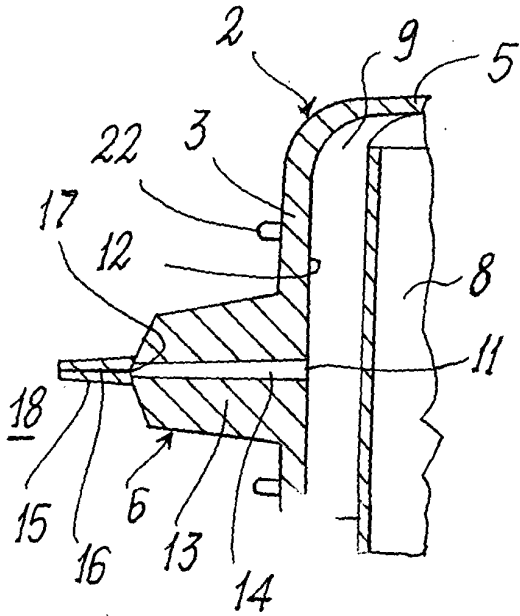


FIG. 3

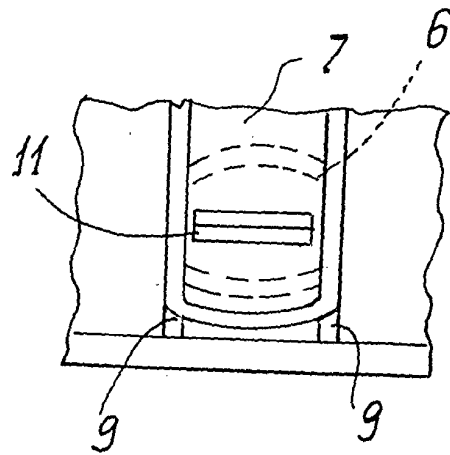
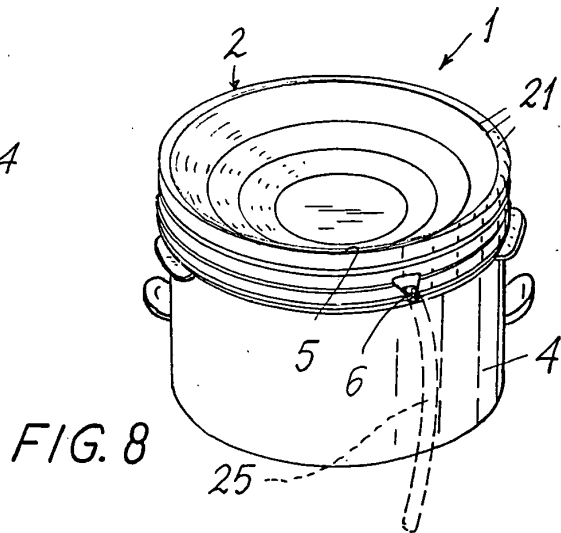
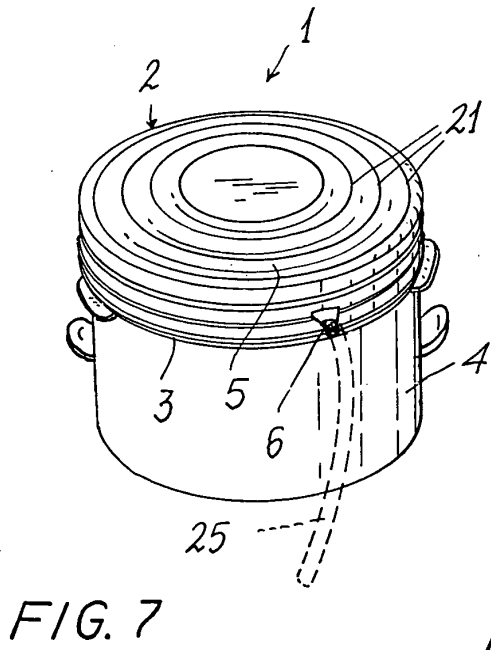
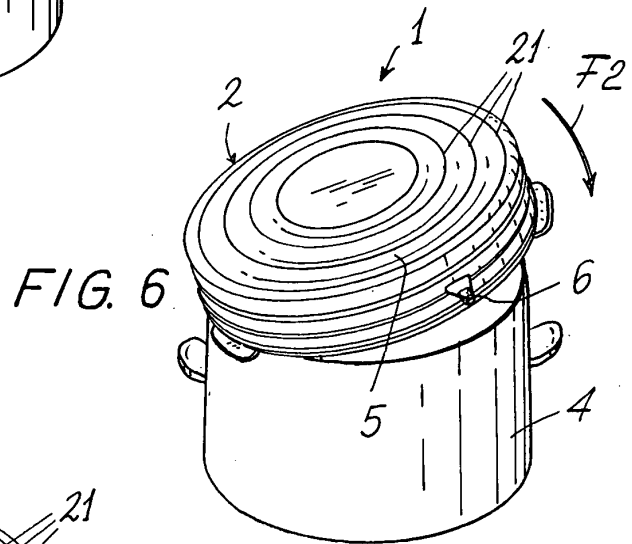
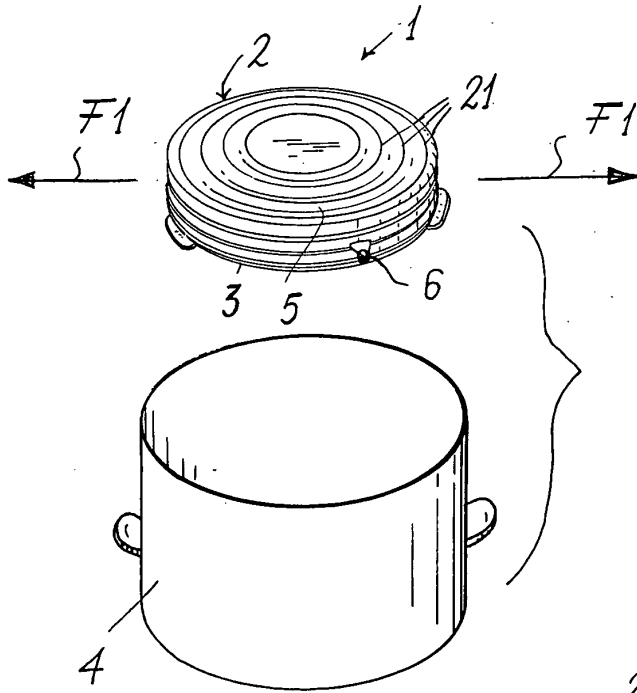


FIG. 4



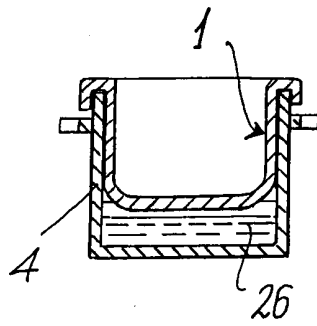


FIG. 9

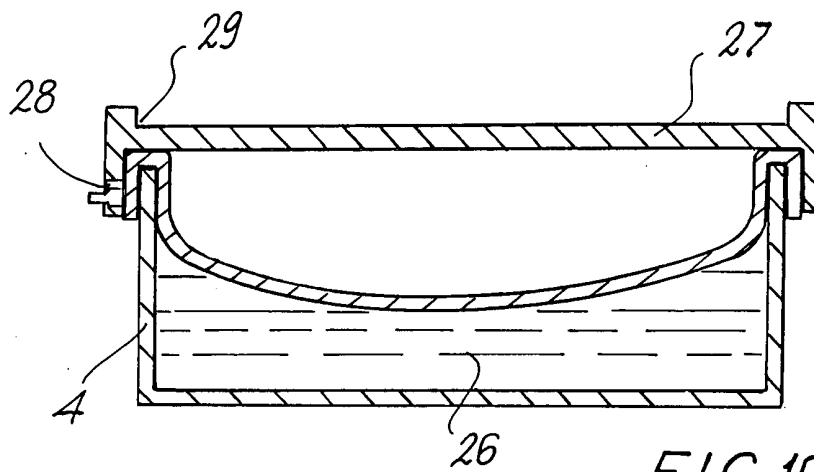


FIG. 10

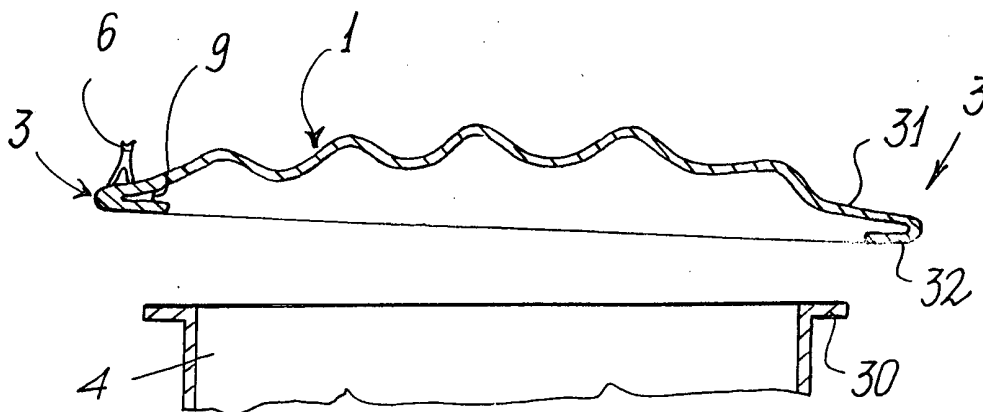


FIG. 11

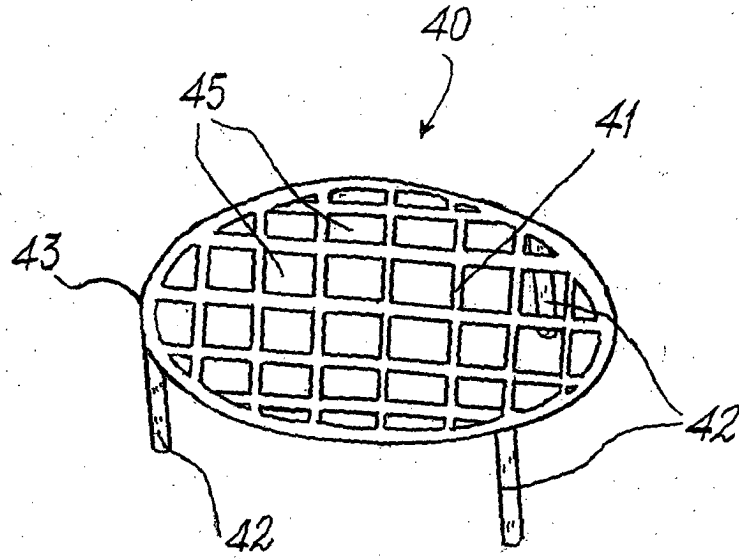


FIG. 12

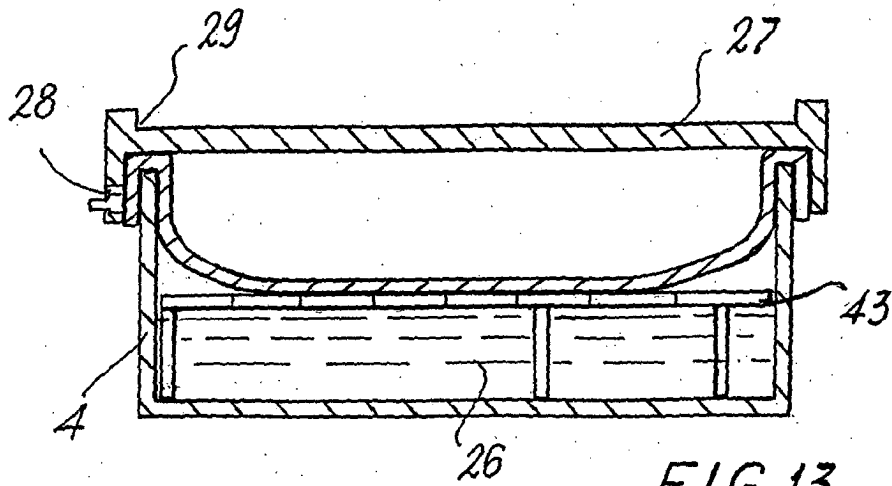


FIG. 13

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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