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(54) **CONTAINER, METHOD AND APPARATUS FOR PACKAGING PRODUCTS**

BEHÄLTER, VERFAHREN UND VORRICHTUNG ZUR VERPACKUNG VON PRODUKTEN

CONTENEUR, PROCÉDÉ ET APPAREIL POUR EMBALLER DES PRODUITS

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Description

[0001] The present invention relates to containers, methods and apparatuses for packaging products, in particular, refers to an apparatus and a method for thermoforming, hot-filling with a product and hermetically closing containers obtained from sheet material by a hot-deformation process.

[0002] Thermoformed containers for products are known, for example for food products, comprising a shell or cavity in which a product is batched and a sheet or film which is coupled along an upper peripheral edge of the shell, by welding, to close the container hermetically.

[0003] In packaging of food products that are not in liquid, fluid or semisolid form, for example drinks, juices and the like, in order to ensure the hygiene and asepticity of the process, it is necessary to proceed, in the case of cold-filling of the containers with the product, to a preventive sterilisation of both the material to be thermoformed and/or of the thermoformed container and of the closing film, before the aforesaid filling. For this purpose, the materials have to be suitable for sterilisation treatment, which is generally performed by using hydrogen peroxide in liquid form as a sterilising agent.

[0004] These sterilising processes are nevertheless complex and costly to achieve and to incorporate in the container production and filling process. Further, remnants of sterilising agent remain on the sterilised materials that may determine variations in the appearance and in the surface finish of the containers.

[0005] Packaging processes are known in which a high degree of hygiene and asepticity is ensured by hot-filling of the containers with the product to be packaged. The product to be packaged is preventively sterilised at a high temperature, typically 70-80°C, and is maintained at this temperature even during filling of the containers, which are subsequently closed hermetically.

[0006] The high temperature of the product in fact enables the container to be purified, air to be extracted from the container (which is in a vacuum when cooling has occurred) and gives stability to the product, inactivating enzymes and microorganisms.

[0007] In order to achieve hot-filling of a food product, it is nevertheless necessary to use suitable stiff containers, that are able to withstand the thermal change and the subsequent mechanical stresses.

[0008] In the case of containers obtained by thermoforming sheet material made of plastics, it is necessary to use a material having appropriate thermal resistance and a sufficiently great thickness to prevent the container, during the cooling step, from becoming deformed or even imploding due to the vacuum that is created in the interior of the container. Such materials are, however, very costly.

[0009] A further drawback of these containers consists of the fact that the thermoforming process for thermoforming these sheet materials is more complex and costly.

[0010] US 2736656 discloses a method for manufac-

turing and filling packages for individual servings of foods. A strip of thermoplastic material is subjected to the action of heat, pressure and suitable forming dies to form a succession of cups having side walls, bottom walls and a border of undeformed strip material. The cups are filled with a product and a cover of elastic plastic material is sealed to the border strip surrounding the individual cups. The cup packages so formed are severed from the strip ready for the use. The cover and the bottom wall of the cup are deformable so as to allow a contraction of the air inside the cup (i.e. when the hot filled product cools) or to allows the expansion of the air inside the cup (i.e. when exterior air pressure decreases).

[0011] WO 93/24391 discloses a container comprising a side wall, a base and means for sealing the container. The base includes a standing ring on which the container is adapted to stand and a diaphragm portion which extends from the inner edge of the standing ring thus forming a central portion of the base of the container. The diaphragm portion is adapted to axially deform by bowing either inwardly or outwardly preferentially to the side wall so to accommodate changes in pressure in the container wherein the portion of the diaphragm adjacent to and extending from the inner edge of the standing ring is substantially continuous.

[0012] An object of the present invention is to improve known apparatuses and methods for making containers by forming sheet material.

[0013] Another object is to provide an apparatus and a method for forming, hot-filling and closing containers obtained from any sheet material for alimentary use and which is suitable for being thermoformed.

[0014] Further object is to improve known containers, in particular increasing the mechanical resistance of the containers and lowering the manufacturing costs of the containers.

[0015] Still another object is to make containers that are suitable for hot-filling and that ensure a high degree of protection to the contained product.

[0016] In a first aspect of the invention there is provided a method according to claim 1.

[0017] In a second aspect of the invention, there is provided an apparatus according to claim 3.

[0018] The invention can be better understood and implemented with reference to the attached drawings, which show some embodiments thereof by way of non-limiting example, in which:

Figure 1A is a schematic front view of an apparatus to make containers according to the invention;

Figure 1B is a schematic perspective view of the apparatus in Figure 1A;

Figure 2 is a schematic perspective view of a thermoformable sheet material subjected to a plurality of operating steps of the method for making containers of the invention;

Figures 3A, 3B are respectively front and perspective views of a container obtained by thermoforming the

sheet material in Figure 2;

Figure 4 is a section according to plane IV-IV in Figure 2A, in which the container is filled with a product; Figures 5A, 5B are sections of the container in Figure 4, closed by further sheet material in a respectively partial and complete manner;

Figure 6 is an enlarged view of a detail of the container in Figure 5 showing wall portions of said container;

Figures 7A, 7B are respectively front and perspective views of the closed container in Figure 6 overturned and having a bottom wall facing upwards, in an initial outward curved configuration;

Figure 8 is a section according to plane VIII-VIII in Figure 7A;

Figure 9 is a section of the container in Figure 7A in which the bottom wall is in a final inward curved configuration;

Figure 10 is an enlarged view of a detail of the container in

Figure 9 showing wall portions of said container;

Figure 11 is a version of the container in Figure 10.

[0019] With reference to Figures 1A and 1B, there is illustrated an apparatus 1 for making and then filling with product 80 containers 50 obtained by thermoforming from sheet material 100, for example material made of plastics.

[0020] The sheet material 100 unwound from a reel 101 is moved, for example in an indexed manner, by advance means 19 along an advance direction F through a plurality of operating stations indicated below:

- a heating station 7 where heating means 8 heats the sheet material 100 to a temperature near the softening temperature;
- a forming station 2 in which forming means 3 deforms portions of the sheet material 100 that define cavities 51;
- a filling station 4 in which the cavities 51 receive a product 80 to be packaged;
- a closing station 5 in which a further sheet material 200 is superimposed on and fixed to said sheet material 100 to close the cavities 51;
- a blanking station 11 in which cutting means 12 separates from the sheet material 100 formed, filled and closed containers 50; and
- an overturning station 13 in which said containers 50 are rotated by 180° so as to have a respective bottom wall 52 facing upwards.

[0021] The forming means 3 may comprise mechanical forming means, such as drawing tools or punches and/or pneumatic forming means, such as compressed-air dispensing nozzles.

[0022] The forming means 3 makes on the sheet material 100 a plurality of cavities 51 arranged in one or more rows that are substantially orthogonal to the ad-

vance direction F.

[0023] In particular, the forming means 3 is configured so as to make a cavity 51, for example shaped as a glass, provided with wall means comprising a bottom wall 52, a side wall 53 and a connecting wall 54.

[0024] The bottom wall 52 has a shape that is substantially externally convex in a direction opposite to that of the sheet material 100, in an initial outward curved configuration E. The bottom wall 52 forms, for example, a cap surface, with a double curve.

[0025] The bottom wall 52 is connected to the side wall 53 of said cavity 51 by the connecting wall 54 of a substantially annular shape.

[0026] The side wall 53 forms, for example, a cylindrical or conical surface.

[0027] The connecting wall 54 comprises a first portion 54a, connected to the side wall 53 and a second portion 54b that forms a resting surface lying on a plane A that is substantially parallel to the sheet material 100 and is connected to a peripheral portion 52a of the bottom wall 52. The bottom wall 52 is shaped so as to form a deformable portion of said wall means.

[0028] For this purpose, the bottom wall 52 and the connecting wall 54 have lesser thickness than that of the side wall 53 to enable said bottom wall 52 to be elastically deformed and pass from the initial outward curved configuration E to a final inward curved configuration G, as explained in detail below in the description.

[0029] The reduced thickness of the bottom wall 52 and of the connecting wall 54 is obtained by stretching material by punches of the forming means 3.

[0030] In the filling station 4 the cavities 51 are filled with hot-batched product 80 up to a preset level (Figure 4).

[0031] Inserting means 9 is provided in the closing station 5 for spreading said further sheet material 200 and superimposing the further sheet material 200 on the sheet 100, so as to close the aforesaid cavities 51. The further sheet material 200 is, for example, a film of coupled aluminium or plastics unwound from a further reel 201.

[0032] The closing station 5 further comprises welding means 10 that performs a welding, for example a "peelable" welding, between the sheet material 100 and the further sheet material 200. More precisely, the welding means 10 performs welding on an edge portion 55 of each cavity 51, said edge portion 55 having a substantially annular shape and a substantially constant width. welding allows to close hermetically the cavity 51 that in this manner encloses a defined quantity of batched product 80 and an initial volume 81 of air at the same temperature as the product (Figure 5B).

[0033] In the blanking station 11, the cutting means 12 performs a shaped blanking and separates the thermoformed, filled and closed containers 50 from the sheet material 100 and from the further sheet material 200. The blanking scraps 103 are discharged outside the apparatus.

[0034] The cutting means 12 is of known type and is not illustrated in detail, can be of hot-shaped dinking die, punch-die, or longitudinal and transverse blades cutting type.

[0035] The cutting means 12 can be configured so as to obtain from the sheet material 100 a plurality of separate and distinct containers 50. Each container 50 that is thus obtained has an edge portion 55 on which a respective cover 56 is welded that is obtained by blanking from said further sheet material 200. The edge portion 55 forms a protruding annular edge by means of which the container 50 can be grasped and supported during movement.

[0036] In an embodiment that is not illustrated, the cutting means 12 is arranged to separate from the sheet 100 a row of containers 50 that are joined together by connecting strips at the edge portions 55.

[0037] The separated containers 50 that are thus obtained are moved through an overturning station 13 in which they are overturned so as to rest on the respective edge portions 55 and have the bottom walls 52 facing upwards.

[0038] The containers 50 are maintained in this upturned position to enable the product 80 and the air contained in the containers 50 to be cooled. Following this cooling, the air in the cavity 51 reduces in volume causing the container 50 to deform, in the specific case causing the deformation of the bottom wall 52, which folds inwards in a controlled manner, passing from the initial outward curved configuration E to the final inward curved configuration G.

[0039] This localised and partial deformation of the container 50 is made possible both by the cap-shape of the bottom wall 52 and of the suitably shaped connecting wall 54, and by the reduced thickness of the aforesaid walls that have an elasticity and flexibility that are greater than that of the side wall 53. In this manner, it is possible to use, for making the container 50 to be hot-filled with a product 80, any thermoformable sheet material that is suitable for alimentary use and resistant to the temperature of the batched product, nevertheless using thicknesses that would cause the known containers to be deformed or broken.

[0040] In the final configuration G, each container 50 contains, in addition to the defined quantity of batched product 80, a residual volume 81' of air at ambient temperature. In this configuration, the second portion 54b of the connecting wall 54 acts as a stable resting surface for the container 50. With reference to Figure 11, there is illustrated an embodiment of the container 50' that differs from the previously described container through the fact that the bottom wall 52', by excluding the peripheral portion 52a', has a thickness that is substantially the same as that of the side wall 53' and has a substantially cap shape.

[0041] The thickness of the peripheral portion 52a' and of the connecting wall 54' is on the other hand thinner.

[0042] The flexibility of the bottom wall 52' is such as

to ensure the deformation of the bottom wall 52' from the initial configuration E to the final configuration G. The peripheral portion 52a' and the connecting wall 54' with the respective portions 54a' 54b' act as an elastic hinge for facilitating the deformation of the bottom wall 52'.

[0043] In a further embodiment of the container that is not illustrated in the figures, the bottom wall is substantially flat whilst the side wall has a substantially annular portion that is externally convex, i.e. outwardly curved, having a reduced thickness. This portion is connected to the side wall so as to be able to be deformed in a controlled manner to a concave configuration, during cooling of the hot product batched in the container for compensating the reduction in volume of the air contained in the container.

Claims

1. Method, comprising advancing along an advance direction (F) thermoformable sheet material (100), deforming said sheet material (100) so as to make at least a cavity (51) of a container (50) provided with wall means (52, 53, 54), filling said cavity (51) with a product (80), closing said cavity (51) with a further sheet material (200), after said closing being provided deforming a desired portion (52) of said wall means (52, 53, 54) for varying an internal volume of said cavity (51), wherein said deforming comprises folding said desired portion (52) of said wall means (52, 53, 54) from an initial configuration (E), wherein said portion (52) is curved outwards said cavity (51), to a final configuration (G), wherein said portion (52) is curved inwards said cavity (51), wherein said closing comprises superimposing said further sheet material (200) on said sheet material (100) and joining said sheet materials (100, 200) at an edge portion (55) of said cavity (51), said method comprising, after said joining, blanking said at least a cavity (51) of said container (50) separating the cavity (51) from said sheet material (100) and from said further sheet material (200), wherein said blanking comprises cutting said sheet material (100) and said further sheet material (200) along said edge portion (55) of said at least a container (50), said method being **characterized in that** comprises, after said blanking, rotating said at least a container (50) so as to arrange said desired portion (52) of said wall means (52, 53, 54) to be free to be deformed from said initial configuration (E) to said final configuration (G).
2. Method according to claim 1, wherein said deforming said sheet material (100) comprises forming said desired portion (52) having a lower thickness than the thickness of a remaining portion (53, 54) of said wall means (52, 53, 54), in particular wherein said forming said desired portion (52) comprises forming at least a bottom wall (52) of said wall means (52, 53, 54).

3. Apparatus, comprising means for advancing along an advance direction (F) a thermoformable sheet material (100) through a forming station (2) of said sheet (100), in which there is provided forming means (3) arranged for deforming portions of said sheet material (100) so as to make at least a cavity (51) of a container (50), a filling station (4) in which said at least a cavity (51) is filled with a product (80), a closing station (5) for superimposing and fixing a further sheet material (200) to said sheet material (100) so as to close said at least a cavity (51), said forming means (3) being arranged for making on wall means (52, 53, 54) of said at least a cavity (51) a desired portion (52) that is deformable so as to vary an internal volume of said closed cavity (51), said apparatus comprising a blanking station (11) located downstream of said closing station (5) and in which said containers (50) are separated from said sheet materials (100, 200), said apparatus being **characterized in that** comprises an overturning station (13), located downstream of said blanking station (11), in which each container (50) is rotated so as to arrange said deformable portion (52) of said wall means (52, 53, 54) to be free to become deformed.
4. Apparatus according to claim 3, wherein said forming means (3) is arranged for forming said deformable portion (52) having a lesser thickness than a thickness of a remaining portion (53, 54) of said wall means (52, 53, 54) and/or wherein said forming means (3) is arranged for forming said deformable portion comprising at least a bottom wall (52) of said wall means (52, 53, 54) and/or wherein said forming means (3) is arranged for deforming a plurality of cavities (51) of respective containers (50) and/or wherein said closing station (5) comprises inserting means (9) for spreading said further sheet material (200) and superimposing the further sheet material (200) on said sheet material (100), and joining means (10) located downstream of said inserting means (9) and arranged for joining together said sheet material (100) and said further sheet material (200) along edge portions (55) of said cavities (51).
5. Apparatus according to claim 3, wherein said blanking station (11) comprises cutting means (12) arranged for cutting said sheet material (100) and said further sheet material (200) along edge portions (55) of each container (50).

Patentansprüche

1. Verfahren, aufweisend Vorrücken eines thermoformbaren Plattenmaterials (100) entlang einer Vorschubrichtung (F), Verformen des Plattenmaterials (100), um zumindest eine Kavität (51) eines Behälters (50) zu erzeugen, der mit einem Wandungsmittel-

tel (52, 53, 54) versehen ist, Befüllen der Kavität (51) mit einem Produkt (80), Verschließen der Kavität (51) mit einem weiteren Plattenmaterial (200), Verformen eines gewünschten Teils (52) des Wandungsmittels (52, 53, 54) nach dem Bereitstellen des Verschließens, um ein Innenvolumen der Kavität (51) zu variieren, wobei das Verformen ein Falten des gewünschten Teils (52) des Wandungsmittels (52, 53, 54) aus einer Anfangskonfiguration (E), bei der der Teil (52) von der Kavität (51) nach außen gekrümmt ist, zu einer Schlusskonfiguration (G) umfasst, bei der der Teil (52) zur Kavität (51) nach innen gekrümmt ist, wobei das Verschließen ein Überlagern des Plattenmaterials (100) mit dem weiteren Plattenmaterial (200) und das Verbinden der Plattenmaterialien (100, 200) bei einem Randteil (55) der Kavität (51) umfasst, wobei die Methode nach dem Verbinden ein Stanzen der zumindest einen Kavität (51) des Behälters (50) aufweist, das die Kavität (51) vom Plattenmaterial (100) und vom weiteren Plattenmaterial (200) trennt, wobei das Stanzen ein Schneiden des Plattenmaterials (100) und des weiteren Plattenmaterials (200) entlang des Randteils (55) des zumindest einen Behälters (50) aufweist, wobei das Verfahren **dadurch gekennzeichnet ist, dass** es nach dem Stanzen ein Rotieren des zumindest einen Behälters (50) aufweist, um den gewünschten Teil (52) des Wandungsmittels (52, 53, 54) frei anzuordnen, um von der Anfangskonfiguration (E) zur Schlusskonfiguration (G) verformt zu werden.

2. Verfahren nach Anspruch 1, wobei das Verformen des Plattenmaterials (100) ein Bilden des gewünschten Teils (52) umfasst, der eine geringere Dicke als die Dicke eines verbleibenden Teils (53, 54) des Wandungsmittels (52, 53, 54) aufweist, wobei das Bilden des gewünschten Teils (52) insbesondere ein Bilden zumindest einer unteren Wandung (52) des Wandungsmittels (52, 53, 54) umfasst.
3. Vorrichtung, aufweisend ein Mittel zum Vorrücken eines thermoformbaren Plattenmaterials (100) entlang einer Vorschubrichtung (F) durch eine Formstation (2) für die Platte (100), bei der ein Formmittel (3) vorgesehen ist, das dazu ausgestaltet ist, Teile des Plattenmaterials (100) zu verformen, um zumindest eine Kavität (51) eines Behälters (50) zu erzeugen, eine Befüllstation (4), bei der die zumindest eine Kavität (51) mit einem Produkt (80) befüllt wird, eine Verschlussstation (5), um dem Plattenmaterial (100) ein weiteres Plattenmaterial (200) zu überlagern und an diesem festzulegen, um den zumindest einen Hohlraum (51) zu verschließen, wobei das Formmittel (3) dazu ausgestaltet ist, an einem Wandungsmittel (52, 53, 54) der zumindest einen Kavität (51) einen gewünschten Teil (52) zu erzeugen, der verformbar ist, um ein Innenvolumen der verschlosse-

nen Kavität (51) zu variieren, wobei die Vorrichtung eine Stanzstation (11) aufweist, die stromabwärts der Verschlussstation (5) angeordnet ist, und bei der die Behälter (50) von den Plattenmaterialien (100, 200) getrennt werden, wobei die Vorrichtung **dadurch gekennzeichnet ist, dass** eine Kippstation (13) vorgesehen ist, die stromabwärts der Stanzstation (11) angeordnet ist, bei der jeder Behälter (50) rotiert wird, um den verformbaren Teil (52) des Wandungsmittels (52, 53, 54) frei anzuordnen, um verformt zu werden.

4. Vorrichtung nach Anspruch 3, wobei das Formmittel (3) dazu ausgestaltet ist, den verformbaren Teil (52) zu bilden, der eine geringere Dicke als eine Dicke eines verbleibenden Teils (53, 54) des Wandungsmittels (52, 53, 54) aufweist, und/oder wobei das Formmittel (3) dazu ausgestaltet ist, den verformbaren Teil zu bilden, der zumindest eine untere Wandung (52) des Wandungsmittels (52, 53, 54) aufweist, und/oder wobei das Formmittel (3) dazu ausgestaltet ist, eine Mehrzahl von Kavitäten (51) entsprechender Behälter (50) zu verformen, und/oder wobei die Verschlussstation (5) ein Einfügemittel (9) zur Verteilung des weiteren Plattenmaterials (200) und zur Überlagerung des Plattenmaterials (100) mit dem weiteren Plattenmaterial (200), und ein Verbindungsmittel (10) aufweist, das stromabwärts des Einfügemittels (9) angeordnet ist und dazu ausgestaltet ist, das Plattenmaterial (100) und das weitere Plattenmaterial (200) entlang von Randteilen (55) der Kavitäten (51) miteinander zu verbinden.
5. Vorrichtung nach Anspruch 3, wobei die Stanzstation (11) ein Schneidmittel (12) aufweist, das dazu ausgestaltet ist, das Plattenmaterial (100) und das weitere Plattenmaterial (200) entlang von Randteilen (55) jedes Behälters (50) zu trennen.

Revendications

1. Procédé comprenant l'avancée dans une direction de progression (F) d'un matériau thermoformable en feuille (100), la déformation dudit matériau en feuille (100) afin de réaliser au moins une cavité (51) d'un contenant (50) pourvu de moyens de parois (52, 53, 54), le remplissage de ladite cavité (51) avec un produit (80), la fermeture de ladite cavité (51) avec un autre matériau en feuille (200), après ladite fermeture étant réalisée la déformation d'une portion désirée (52) desdits moyens de parois (52, 53, 54) pour modifier un volume interne de ladite cavité (51), dans lequel ladite déformation comprend le pliage de ladite portion désirée (52) desdits moyens de parois (52, 53, 54) d'une configuration initiale (E), dans laquelle ladite portion (52) est incurvée vers l'extérieur de ladite cavité (51), jusqu'à une configuration finale

(G), dans laquelle ladite portion (52) est incurvée vers l'intérieur de ladite cavité (51), dans lequel ladite fermeture comprend la superposition dudit autre matériau en feuille (200) sur ledit matériau en feuille (100) et la réunion desdits matériaux en feuille (100, 200) sur une portion de bord (55) de ladite cavité (51), ledit procédé comprenant, après ladite réunion, le détachement de ladite au moins une cavité (51) dudit contenant (50) séparant la cavité (51) dudit matériau en feuille (100) et dudit autre matériau en feuille (200), dans lequel ledit détachement comprend le découpage dudit matériau en feuille (100) et dudit autre matériau en feuille (200) le long de ladite portion de bord (55) dudit au moins un contenant (50), ledit procédé étant **caractérisé en ce qu'il** comprend, après ledit détachement, la rotation dudit au moins un contenant (50) afin d'obtenir que ladite portion désirée (52) desdits moyens de parois (52, 53, 54) soit libre d'être déformée de ladite configuration initiale (E) à ladite configuration finale (G).

2. Procédé selon la revendication 1, dans lequel ladite déformation dudit matériau en feuille (100) comprend le formage de ladite portion désirée (52) avec une épaisseur inférieure à l'épaisseur d'une portion restante (53, 54) desdits moyens de parois (52, 53, 54), et en particulier dans lequel ledit formage de ladite portion désirée (52) comprend le formage d'au moins une paroi de fond (52) desdits moyens de parois (52, 53, 54).
3. Dispositif comprenant des moyens pour faire avancer, dans une direction de progression (F), un matériau thermoformable en feuille (100) à travers un poste de formage (2) de ladite feuille (100), dans lequel sont prévus des moyens de formage (3) agencés pour déformer des portions dudit matériau en feuille (100) afin de réaliser au moins une cavité (51) d'un contenant (50), un poste de remplissage (4) dans lequel ladite au moins une cavité (51) est remplie d'un produit (80), un poste de fermeture (5) pour superposer et fixer un autre matériau en feuille (200) audit matériau en feuille (100) afin de fermer ladite au moins une cavité (51), lesdits moyens de formage (3) étant agencés pour réaliser, sur des moyens de parois (52, 53, 54) de ladite au moins une cavité (51), une portion désirée (52) qui est déformable afin de modifier un volume interne de ladite cavité fermée (51), ledit dispositif comprenant un poste de détachement (11) situé en aval dudit poste de fermeture (5) et dans lequel lesdits contenants (50) sont séparés desdits matériaux en feuille (100, 200), ledit dispositif étant **caractérisé en ce qu'il** comprend un poste de retournement (13), situé en aval dudit poste de détachement (11), dans lequel chaque contenant (50) est tourné pour obtenir que ladite portion déformable (52) desdits moyens de parois (52, 53, 54) soit libre d'être déformée.

4. Dispositif selon la revendication 3, dans lequel lesdits moyens de formage (3) sont agencés pour le formage de ladite portion déformable (52) avec une épaisseur inférieure à l'épaisseur d'une portion restante (53, 54) desdits moyens de parois (52, 53, 54), et/ou dans lequel lesdits moyens de formage (3) sont agencés pour le formage de ladite portion déformable comprenant au moins une paroi de fond (52) desdits moyens de parois (52, 53, 54), et/ou dans lequel lesdits moyens de formage (3) sont agencés pour déformer une pluralité de cavités (51) de contenants respectifs (50) et/ou dans lequel ledit poste de fermeture (5) comprend des moyens d'insertion (9) pour étendre ledit autre matériau en feuille (200) et superposer ledit autre matériau en feuille (200) sur ledit matériau en feuille (100), et des moyens d'union (10) situés en aval desdits moyens d'insertion (9) et agencés pour réunir ledit matériau en feuille (100) et ledit autre matériau en feuille (200) le long de portions de bord (55) desdites cavités (51).
5. Dispositif selon la revendication 3, dans lequel ledit poste de détachement (11) comprend des moyens de coupe (12) agencés pour découper ledit matériau en feuille (100) et ledit autre matériau en feuille (200) le long de portions de bord (55) de chaque contenant (50).

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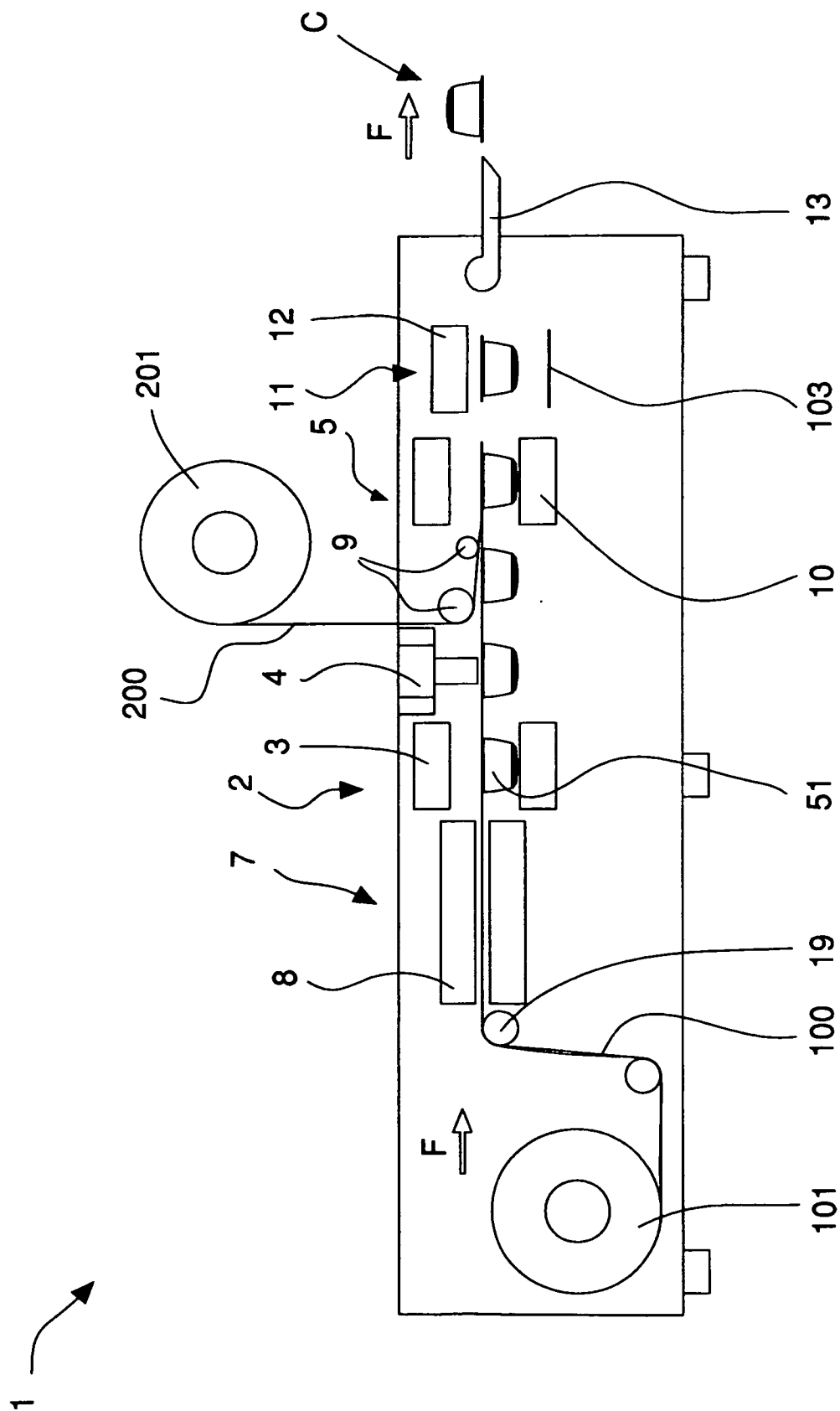


Fig. 1A

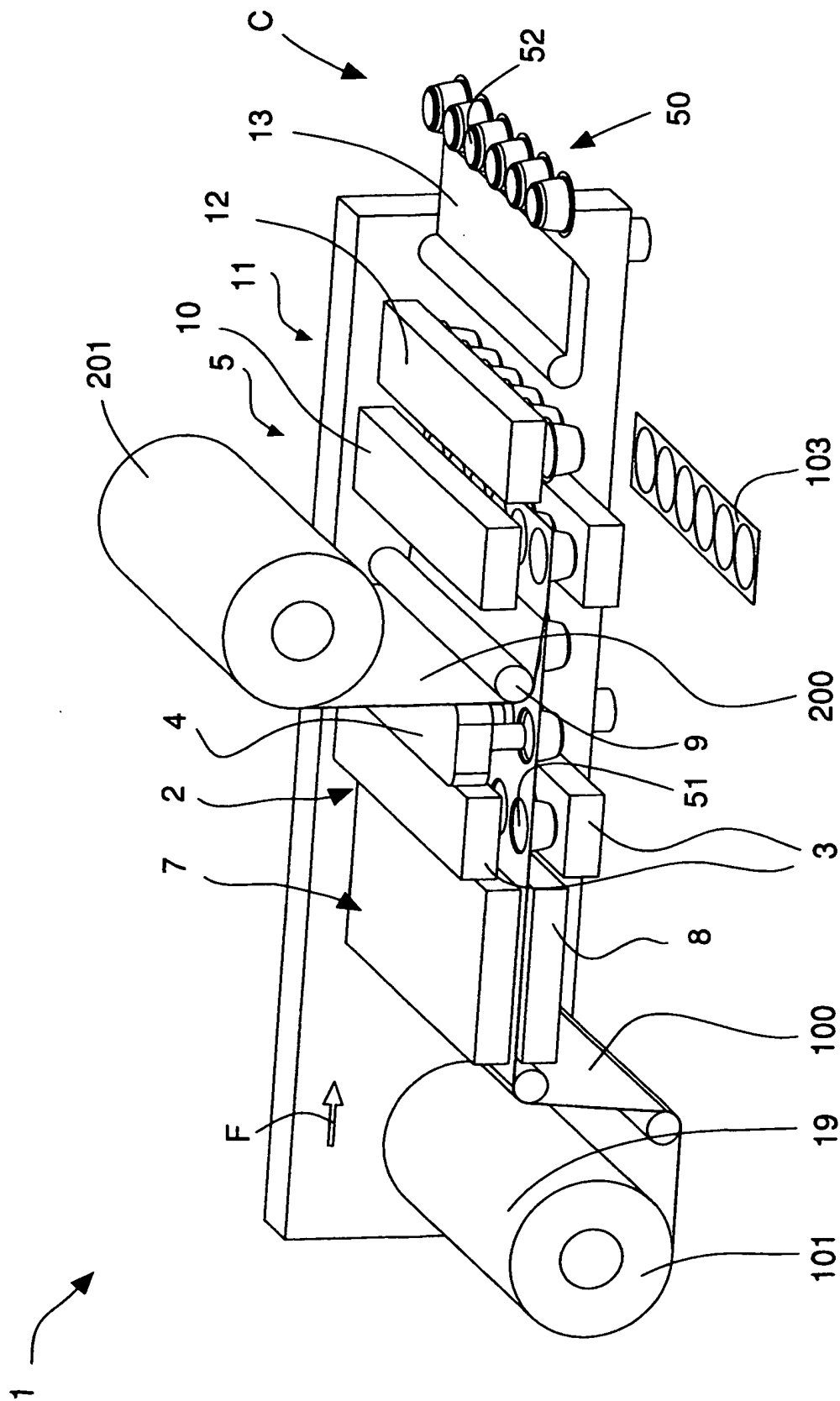


Fig. 1B

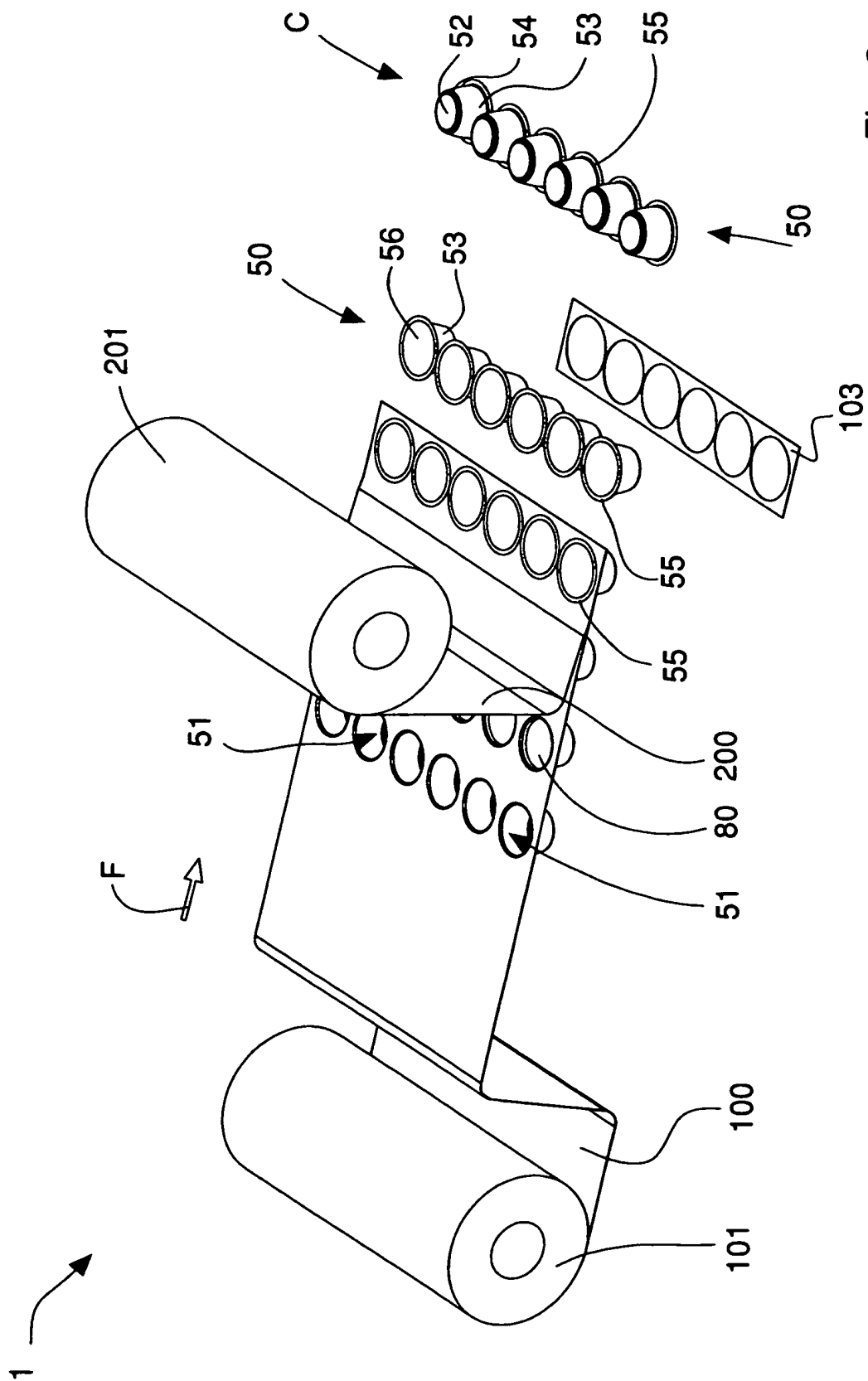


Fig. 2

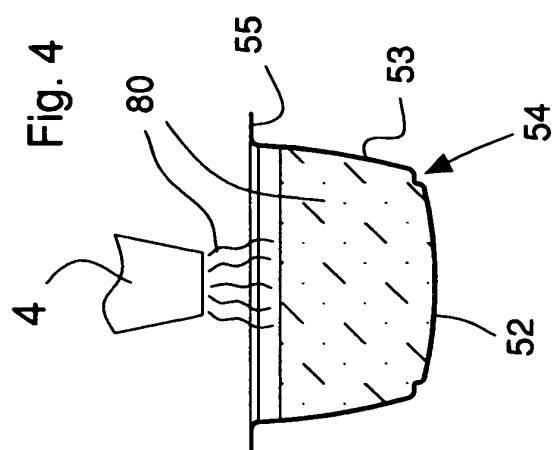


Fig. 4

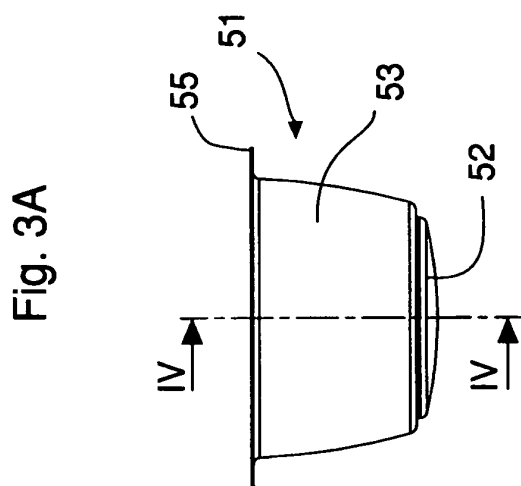


Fig. 3A

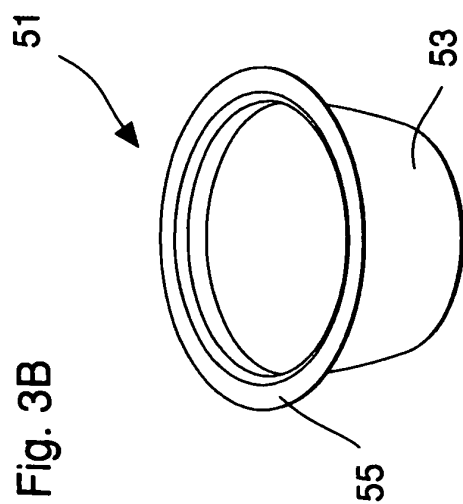


Fig. 3B

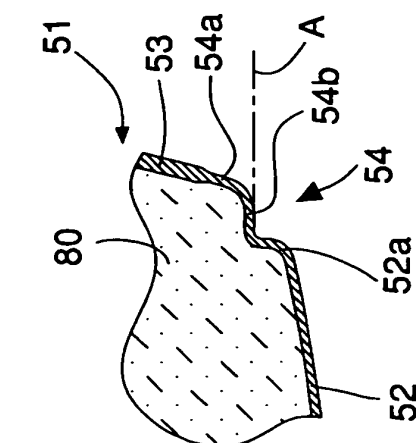


Fig. 6

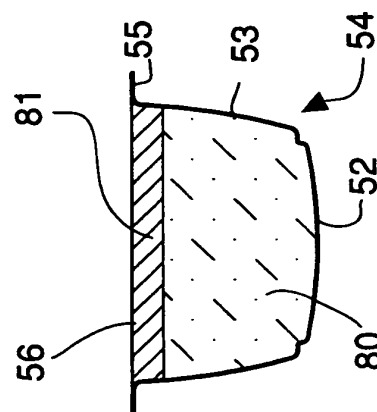


Fig. 5B

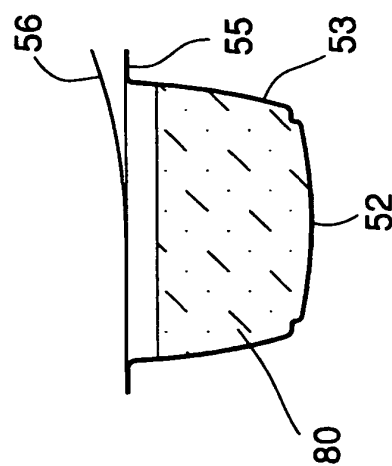


Fig. 5A

Fig. 7A

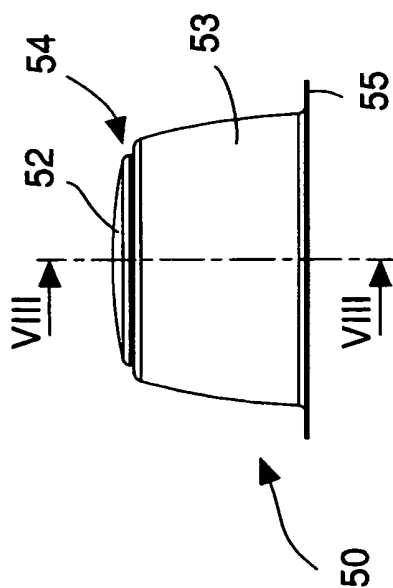


Fig. 8

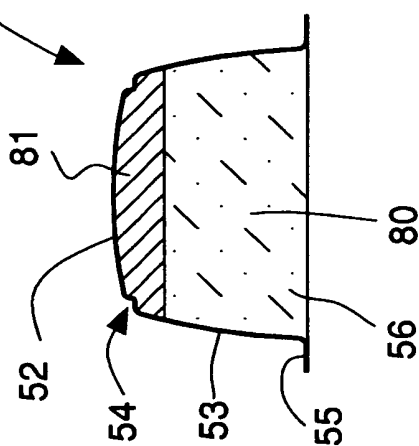


Fig. 7B

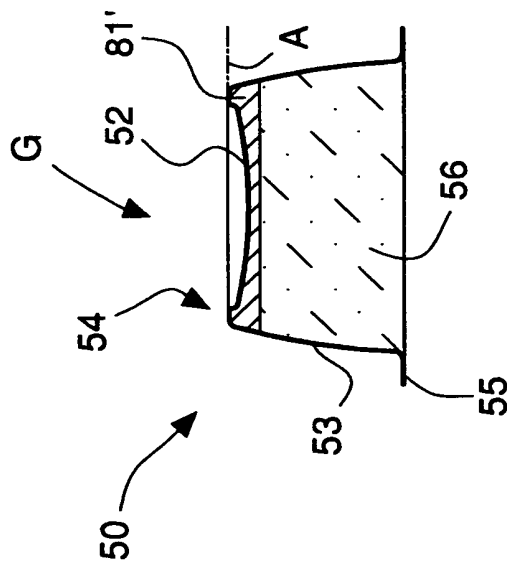
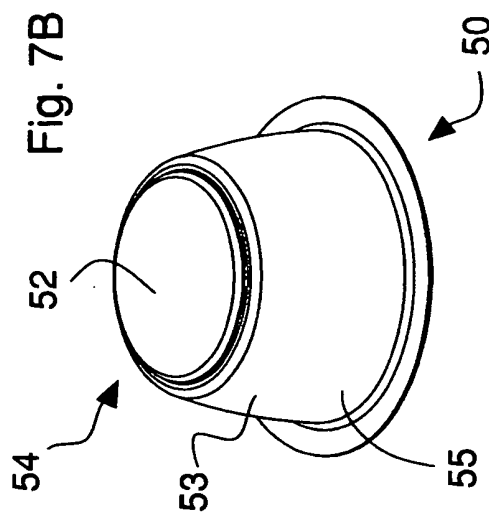


Fig. 9

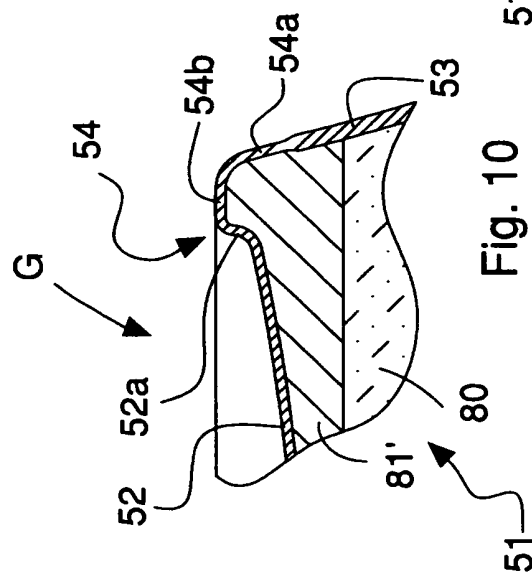


Fig. 10

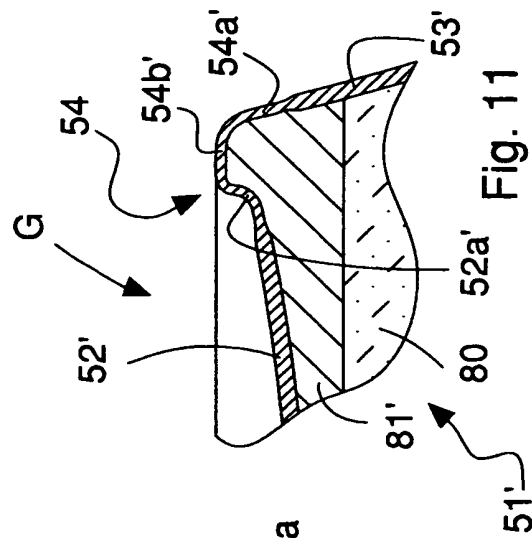


Fig. 11

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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