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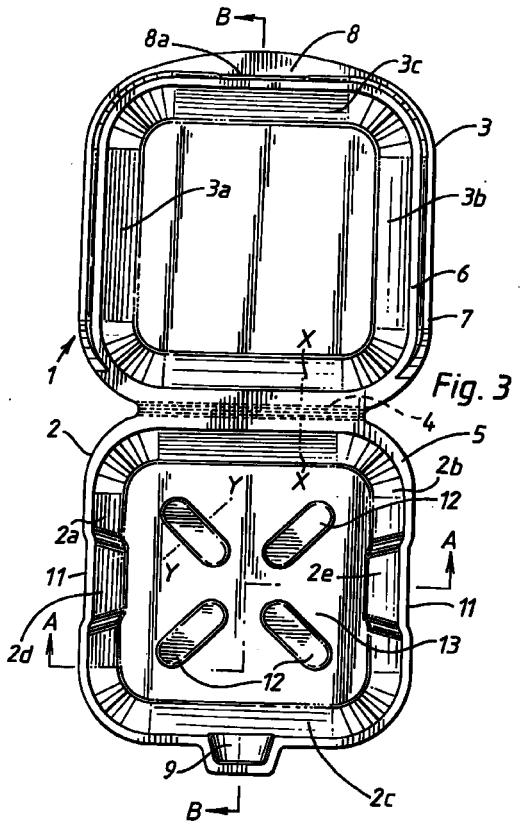
(54) Disposable container with vent

(57) A disposable clam shell container, made from sheet thermoplastics material, has a base and cover, either of which has a side wall or walls, a part of the side wall(s) of the base (cover) being displaced with respect to a corresponding part of the cover (or base) to form a vent (when the container is closed) to enable the escape of moist air from a cooked product. The side wall(s) can be displaced (out of its major plane) either inwardly or outwardly, but is preferably pressed inwardly of the container, both to reinforce the wall and to displace a leading edge of the wall, with respect to a corresponding part of the cover (or base). The size of the vent is determined with regard to the cooked product to be contained. A method of manufacturing the clam shell containers includes the step of pressing the material so as to form depressions which form the base and cover, and to form at least one recess in a side wall of either the base or the cover, the depth to which the recess is pressed and its lateral extent being selected so as to adjust the size of the vent.



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Description

[0001] This invention relates to disposable containers made from sheet thermoplastics material, for example, containers which are mass produced and supplied for use in food packaging.

[0002] Disposable containers for use in the food industry need to be of simple, inexpensive construction, but they also need to be rigid enough to prevent deformation, for example whilst the container is being transported between a point of sale and point of end use. For example, so-called "clam shell" containers, which are made from thin sheets of high density expanded polystyrene, are used by fast food chains in the sale of food products, such as hamburgers. A hamburger is cooked, then placed inside the open container before the cover portion is closed and the product sold to a customer for later consumption. The containers are hot press moulded in an open configuration, so that they can be nested and supplied in bulk for immediate use, i.e. for the holding and transportation of cooked food products (such as hamburgers) at a point of sale. Such containers are cheap to manufacture and are of light but reasonably rigid construction, so as to protect the food product during transportation. The containers have a cover portion which fits closely onto a base portion to strengthen the box construction of the container, when closed, and to prevent the ingress of any foreign matter. However, as the cover fits closely over the base, the container is virtually sealed and this enables moist air to accumulate inside the container, which emanates from the cooked food product, and this can then be absorbed by the product leading to deterioration in its appearance and taste. For example, if a cooked hamburger is left inside the container for even a relatively short period of time, (e.g. 5-10 minutes), the build-up of moist air causes the burger to become soggy.

[0003] The present invention seeks to avoid this problem by providing a venting arrangement which (a) allows the moist air to escape, thereby preserving the quality of the food product for a much longer period of time, (b) does not disadvantageously affect the constructional integrity of the container itself, (c) is easy to incorporate in manufacture (especially where containers are hot press moulded), and enables the size of the vent to be selectively adjusted to suit differences in food products (e.g. such as toasted products and hamburgers).

[0004] According to the invention, a disposable container made from sheet thermoplastics material comprises a base portion and a cover portion which cooperate to form a closed container for a cooked food product, either the base portion or the cover portion having at least one side wall, a part of said side wall of the base (or cover) portion being displaced with respect to a corresponding part of the cover (or base) portion to form a vent (when the container is closed) to enable the escape of moist air from said cooked product.

[0005] The side wall can be, for example, one of two side walls of a square or rectangular container. However, as the container could be say, round or oval, there may be only one continuous side wall. The side wall(s) can be displaced (out of its major plane) either inwardly or outwardly, i.e. the recess may be concave or convex with regard to the exterior of the container, but it is preferably formed by pressing a part of at least one side wall of the base portion (or cover portion) so as to direct it inwardly of the container, both to reinforce the wall and to displace a leading edge of the wall, with respect to a corresponding part of the cover portion (or base portion), sufficiently to form a vent of the required size.

[0006] The base and cover portions can be of integral construction and preformed in an open condition from the thermoplastics sheet material, i.e. as with a clam shell container.

[0007] Preferably, the base has an out-turned flange which provides an abutment surface for a corresponding surface on the cover portion, and the recess is located so that it diverts a portion of one of the abutment surfaces with respect to the other, to avoid abutment and to form the vent. The abutment surface on the cover portion is preferably located inwardly of a shoulder portion which overhangs and fits closely against the edge of flange on the base portion when the container is closed.

[0008] When the recess is pressed, it may form a raised portion on the inside of the container to assist in reinforcing the side wall. A preferred container has a base portion with a floor and side walls extending upwardly from the floor, a part of at least one side wall being directed inwardly of the container so that it reinforces the wall and displaces a leading edge of said wall with respect to a corresponding part of the cover portion to form the vent. Preferably, the inwardly directed part of the wall has a rectangular flat region which is inset from the major plane of said wall.

[0009] Preferably, a floor portion of the container has at least one pedestal in order to raise a food product above the floor portion to promote the flow of air around said product. This allows more moist air to escape from all sides of (e.g) a burger. The pedestal can be one of several, e.g. extending radially from the centre of the floor and circumferentially spaced at equal angular intervals.

[0010] The cover portion can have a shoulder which fits closely around the leading edge of the base portion, except for the vent, when the container is closed, an optional fastener being provided to secure the cover portion to the base portion.

[0011] Typically, the container has a base portion and cover portion with generally rectangular cup shapes e.g. suitable for a hamburger, but other shapes, such as circular and oval, are possible.

[0012] The invention also provides a method of manufacturing clam shell disposable containers made from sheet thermoplastics material, each container

comprising a base portion and a cover portion which cooperate to form a closed container for a cooked food product, the method including:

(a) providing a sheet of said thermoplastics material;
(b) pressing said material so as to form depressions which form said base portion and cover portions; and
(c) pressing said material so as to form at least one recess in a side wall of either the base portion or the cover portion, the recess being located so that a vent is defined between the base portion and the cover portion when the container is closed; the depth to which the recess is pressed and its lateral extent being selected so as to adjust the size of the vent.

[0013] In practice, the size of the vent is determined with regard to the cooked product to be contained. For example, more moist air may need to escape from some cooked products than others. The size of the opening which forms the vent (for example, the depth to which the material is pressed), is preferably predetermined or selected before mass production of containers so that each container can be pressed from the blank sheet material in one operation. The vents are preferably slits and the width (which is controlled by the depth to which the recess is pressed), and length of these slits can be designed so as to provide adequate ventilation, whilst maintaining suitable closure and structural rigidity. For example, some cooked foods, such as toasted products need to maintain crispness and may require less ventilation. Other cooked foods, such as hamburgers, may require more ventilation to avoid becoming soggy. The cross-sectional area of slits can easily be adjusted by adjusting the length and width of the slits, i.e. by controlling the length (along the side of the box) as well as the depth of the pressing and the optimum dimensions can be found by trial and error. For example, with a given cooked product such as a burger, similar burgers cooked in the same way, can be placed in sets of closed boxes with differently sized vents and the quality of the burgers in each set can be checked after a timed interval corresponding to a typical period over which the burger remains in the container before consumption. As this period will vary in practice, the quality testing can be extended to cover different periods so as to build up a profile of optimum quality/vent size in order to select the optimum slit width (pressing depth) and slit length. Such quality testing can be repeated with various cooked products so as to build up further profiles of optimum quality/vent size for the respective products. This data can be used to control the operation of the same machinery for mass-producing containers for different customers, or for customers having different product requirements.

[0014] A preferred embodiment of the invention will now be described with reference to the accompanying drawings in which:

Fig. 1 is a side elevation of a thermoplastic container in a preformed open condition,

Fig. 2 is a section along a central axis through the open preformed container shown in Fig. 1,

Fig. 3 is a plan view, from above, of the open preformed container,

Fig. 4 is a section on zig-zag line AA (shown in Fig. 3),

Fig. 5 is an enlargement, in section, of a portion of the container showing a venting arrangement,

Fig. 6 is a cross-section through part of the container which forms a hinge between a base portion and a cover portion,

Fig. 7 is a section through a raised portion of the container forming a pedestal,

Fig. 8 is a section of part of the container on line CC, and

Fig. 9 is a section through a fastener portion of the container.

Fig. 10 is a front view, looking in the direction of arrow X of Fig.9.

[0015] Referring to the drawings, a disposable container 1, of integral construction, is preformed in an open condition from thermoplastics sheet material, such as high density polystyrene. For example, a thermomoulding technique can be used where the sheet material is pressed into shape. The container comprises a base portion 2 and a cover portion 3 joined together by hinge portion 4, which is shown in detail in Fig. 6. The hinge is formed by pressing a pair of parallel grooves, 4a,4b, each having a "V" cross-section, in the thermoplastics sheet material. (These grooves are not visible in the plan view of Fig. 3, since they are on the underside of the hinge portion 4.) Mass produced containers, pressed into the shape illustrated in Figs. 1, 2 and 3, can be nested together and supplied "open" to a retailer who requires them for packaging a food product which is cooked prior to sale. For example, the retailer can be a fast food outlet, where a hamburger is first cooked on the premises, then placed in the base portion 2 before closing the cover portion 3 (as shown in Fig. 4), and sold to the customer who takes the food product away for later consumption. The container 1 provides a convenient means of transport, whilst also providing protection and thermal insulation. The container can be

of various shapes; a rectangular box shape being illustrated by way of example. Other shapes include circular and oval.

[0016] As the container 1 is disposable and made from thin thermoplastics material, it is constructed to provide sufficient rigidity in use, i.e. so that the cover portion 3 makes a good fit with the base portion 2 and thereby seals the container whilst helping to prevent distortion or collapse whilst it is being carried. In order to facilitate closure and to provide structural strength when closed, the base 2 has an out-turned flange 5 which provides an abutment surface for a corresponding surface 6 on the cover portion 3. The surface 6 is formed similarly to the surface on flange 5, but it is located inwardly of an overhanging shoulder portion 7 which is designed to provide a fairly close fit, around the edge of flange 6, when the container is closed. The shoulder portion 7 on the cover portion and the flange 5 on the base portion both extend along the edges of respective side walls 2a, 2b and 3a,3b and also along parts of the edges of side walls 2c,3c, as shown in Fig.3. In order to assist in maintaining closure, the container 1 has fastener portions 8,9, which can be secured together when the cover portion 3 is pivoted about the hinge 4 and pressed downwardly on the base portion.

[0017] Referring to Fig. 9, the fastener is formed by a scoop-shaped tab 8a, which fits into a rectangular slot 9a in the base portion 2. The scoop shape helps to reinforce the tab so that it does not deform or snap off when it is pushed into the slot (to secure the cover on the base). Such containers, which may or may not have fasteners, but usually have a pair of cup-shaped hinged parts, are generally known as "clam-shell" containers.

[0018] As clam shell containers have closely fitting cover portions, this can lead to the above-mentioned problem due to entrapment of steam or water vapour in the container after the hot food has been placed in the base and the cover closed. Hot foods, such as a cooked hamburger, generate steam after being placed inside the closed container and if this steam is absorbed by the hamburger, it can make it soggy.

[0019] In order to deal with this problem, whilst preserving structural integrity of the container, the preferred embodiment of the invention includes vents or slits 10 which are formed by side walls of the container and which allow the escape of steam and water vapour after the container has been closed. The vents 10 are formed by making recesses 11 in the side walls 2a, 2b of the base portion 2. These recesses can be formed by pressing the side walls 2a,2b inwardly, during manufacture, so as to provide raised portions 2d,2e on the inside of the container (as shown in Fig. 3). This causes the outer edge of the flange 5 to be relocated a small distance away from the inner corner of the cover portion along most of the width of the recess 11, so that narrow slits or vents 10 are provided therebetween. Thus, a gap is formed between the upper edge of the raised portion (2e) and the side wall (3b) of the cover portion, as shown in Fig. 5. The width and length of these slits or vents 10 can be designed so as to provide adequate ventilation, whilst maintaining suitable closure and structural rigidity. For example, some cooked foods (such as a toasted product) may require less ventilation than others (such as a hamburger). The cross-sectional area of the vents 10 can easily be adjusted by adjusting the length and width of the slits, i.e. by controlling the length (along the side of the box) as well as the depth of the pressing which form recess 11. The optimum dimensions can be found by trial and error, e.g. by placing similar cooked products in boxes with differently sized vents 10 and checking the quality of each product after a timed interval (or intervals). Generally speaking, the vents 10 reduce steam absorption and thereby help to maintain the quality of the food product.

[0020] In order to assist internal air flow within the container, a floor portion 13 of the container has raised portions or pedestals 12. These hold the food product clear of the floor 13 of the base portion 2, thereby allowing the passage of air beneath the product, as well as around the sides and top. These pedestals are in the form of elongated portions which extend radially from the centre of the floor 13 and are circumferentially spaced at equal angular intervals (45°).

[0021] When a hot food product, such as a hamburger, is placed inside the container and the cover portion is closed, moist air can escape from around the whole product and then pass through the vents 10.

[0022] Fig 10 is a front view of the fastener portions 8,9 secured together with the cover portion 3 closed on the base and the tab 9a pushed through the slot 8a. As mentioned above, the tab is scoop-shaped to provide further strength in view of the need to force it through the slot 9a. As the slot 9a is rectangular, this leaves a very small segment shaped vent 8b between the scoop surface of the tab and the lower edge of the cover portion 9. However, this is not large enough to provide adequate ventilation and the size is not adjustable.

Claims

1. A disposable container made from sheet thermoplastics material and comprising a base portion and a cover portion which cooperate to form a closed container for a cooked food product, either the base portion or the cover portion having at least one side wall, a part of said side wall of the base (or cover) portion being displaced with respect to a corresponding part of the cover (or base) portion to form a vent (when the container is closed) to enable the escape of moist air from said cooked product.

2. A disposable container according to claim 1, wherein the base and cover portions are of integral construction and are preformed in an open condition from the thermoplastics sheet material.

3. A disposable container according to claim 1 or 2, wherein the base has an out-turned flange which provides an abutment surface for a corresponding surface on the cover portion, said recess being located so that it diverts a portion of one of said surfaces with respect to the other, thereby avoiding abutment and forming the vent.

4. A disposable container according to claim 3, wherein the abutment surface on the cover portion is located inwardly of a shoulder portion which overhangs and fits closely against the edge of flange on the base portion when the container is closed.

5. A disposable container according to any preceding claim, wherein said vent is formed by pressing a recess into a side wall of the base or cover portion.

6. A disposable container according to claim 5, wherein the vent is a narrow slit whereby the length and width of the slit can be adjusted by the depth of pressing of said recess.

7. A disposable container according to claim 5 or 6, wherein the pressing of said recess forms a raised portion on the inside of the container.

8. A disposable container according to any preceding claim, wherein the base portion has a floor and side walls extending upwardly from the floor, a part of at least one side wall being directed inwardly of the container so that it reinforces the wall and displaces a leading edge of said wall with respect to a corresponding part of the cover portion to form the vent.

9. A disposable container according to claim 8, wherein the inwardly directed part of said wall has a rectangular flat region which is inset from the major plane of said wall.

10. A disposable container according to any preceding claim, wherein a floor portion of the container has at least one pedestal in order to raise a food product above the floor portion to promote the flow of air around said product.

11. A disposable container according to claim 10, wherein said pedestal is one of a plurality disposed on said floor portion.

12. A disposable container according to claim 11, wherein said pedestals extend radially from the centre of the floor and are circumferentially spaced at equal angular intervals.

13. A disposable container according to any preceding claim, wherein the cover portion has a shoulder which fits tightly around the leading edge of the base portion, except for the vent, when the container is closed.

14. A disposable container according to any preceding claim, wherein a fastener is provided to secure the cover portion to the base portion.

15. A disposable container according to any preceding claim, wherein the base portion and cover portion have generally rectangular or circular or oval cup shapes.

16. A method of manufacturing clam shell disposable containers made from sheet thermoplastics material, each container comprising a base portion and a cover portion which cooperate to form a closed container for a cooked food product, the method including:

providing a sheet of said thermoplastics material;
pressing said material so as to form depressions which form said base portion and cover portions; and
pressing said material so as to form at least one recess in a side wall of either the base portion or the cover portion, the recess being located so that a vent is defined between the base portion and the cover portion when the container is closed; the depth to which the recess is pressed and its lateral extent being selected so as to adjust the size of the vent.

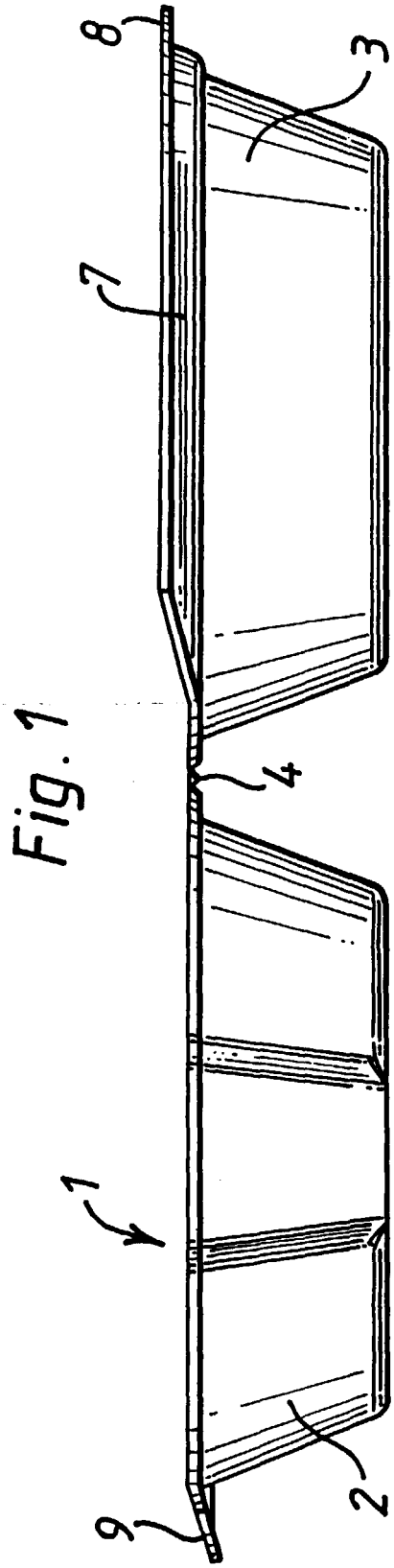

Fig. 1

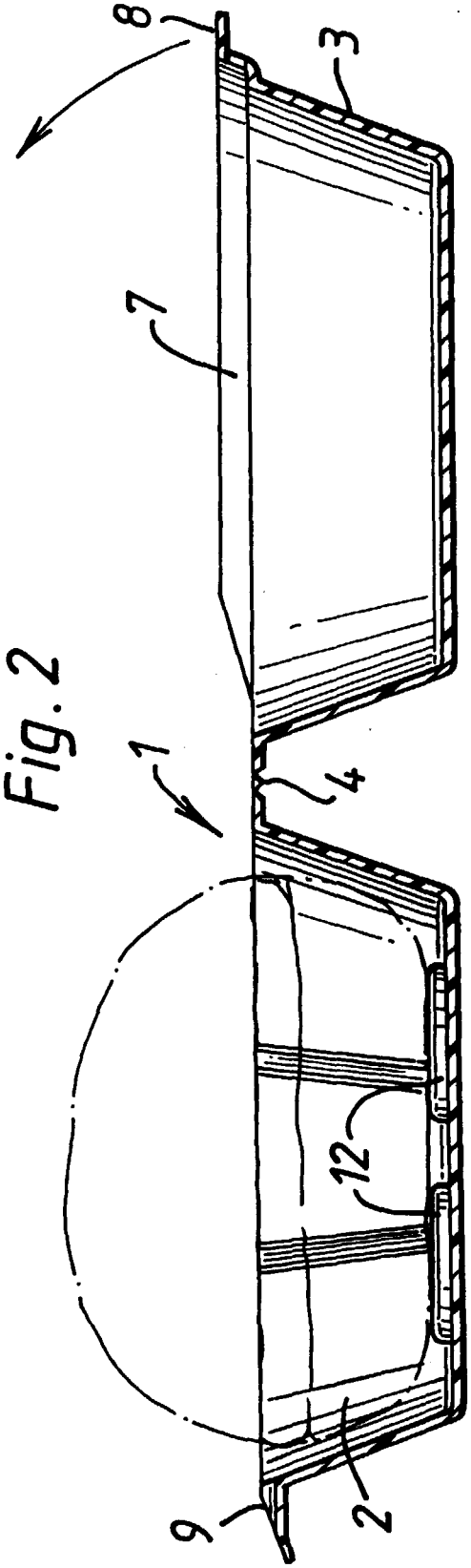

Fig. 2

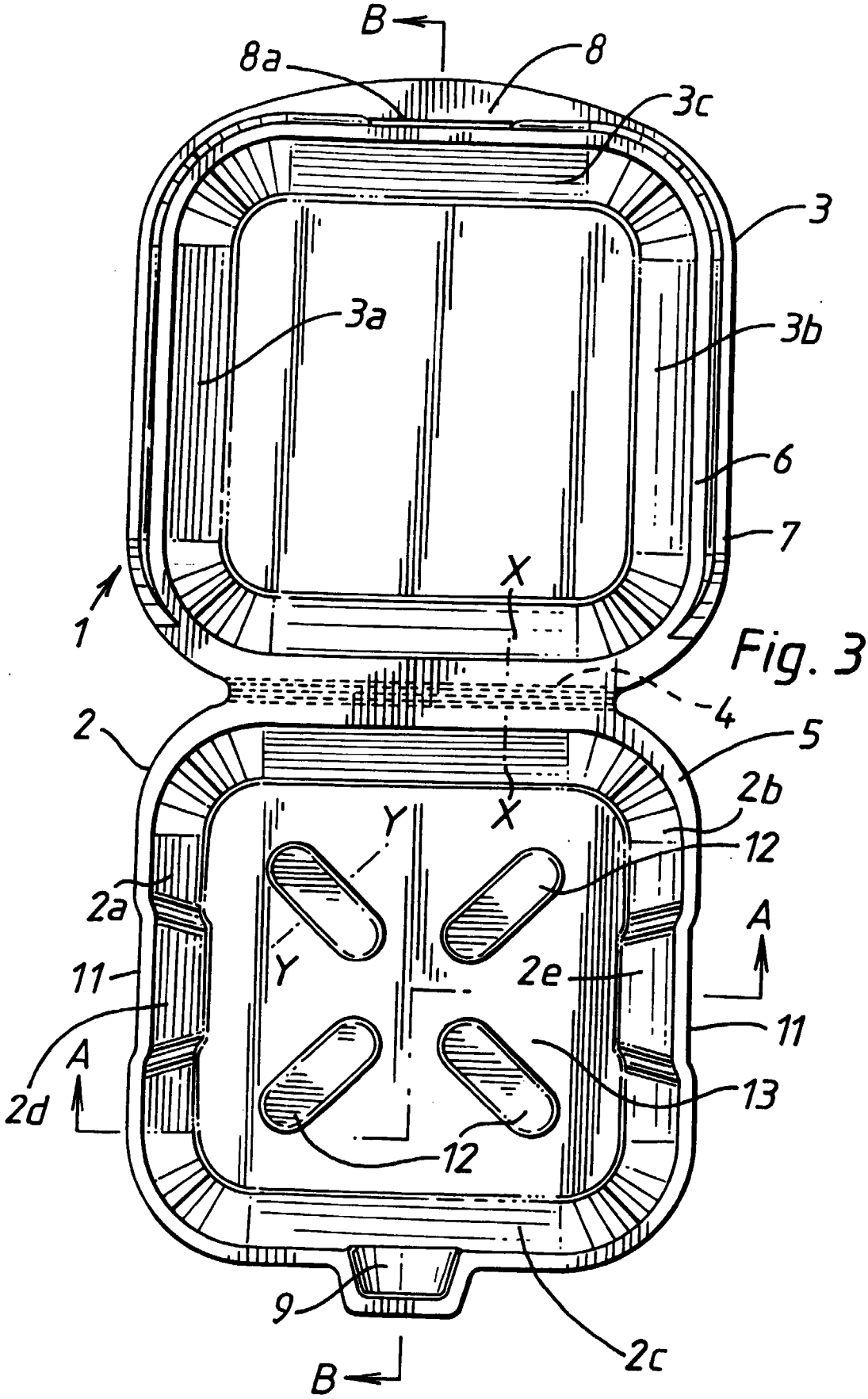

Fig. 3

Fig. 4

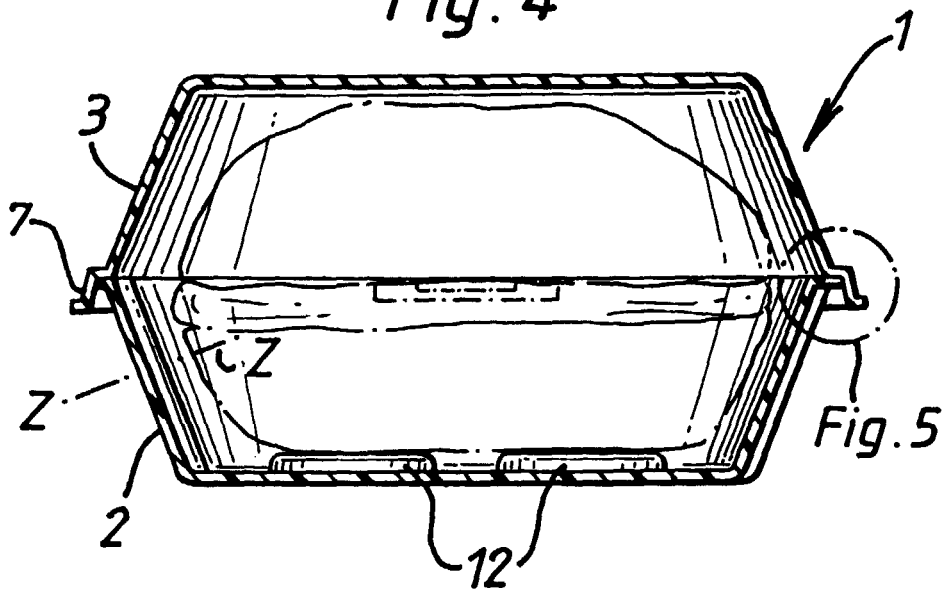

Fig. 5

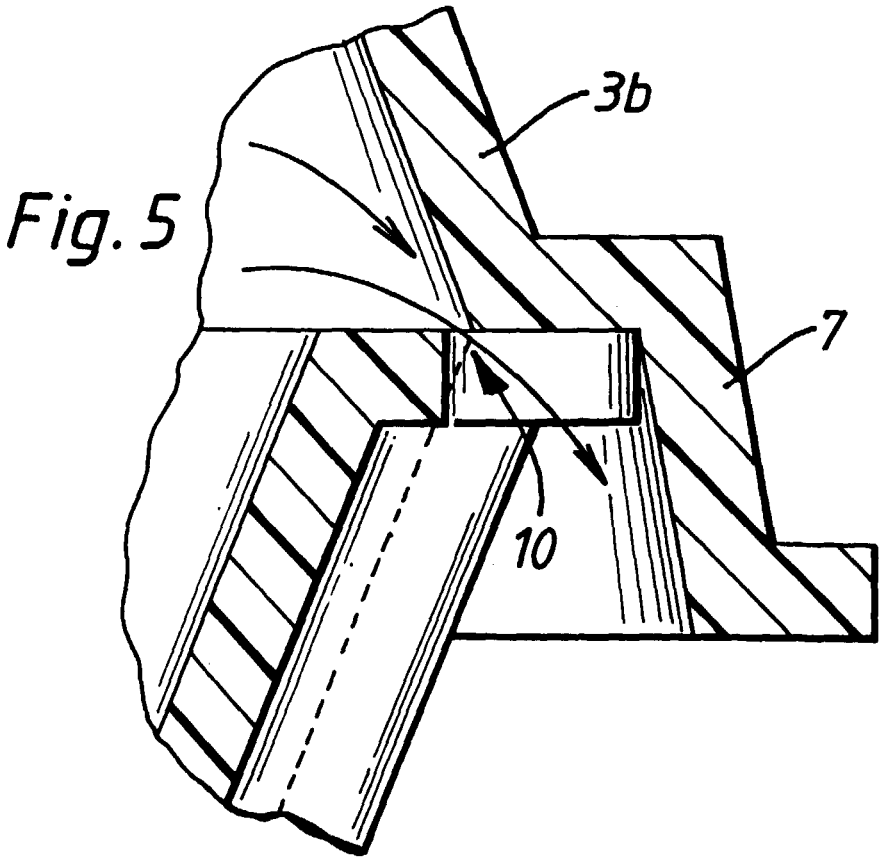

Fig. 6

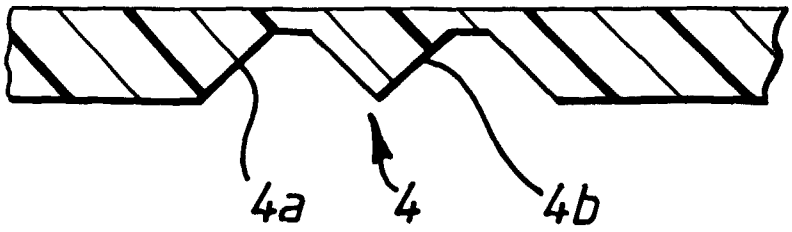

Fig. 7

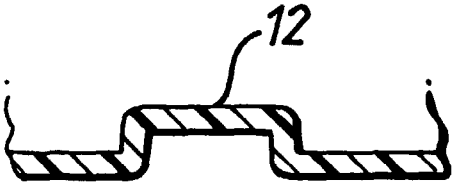

Fig. 8

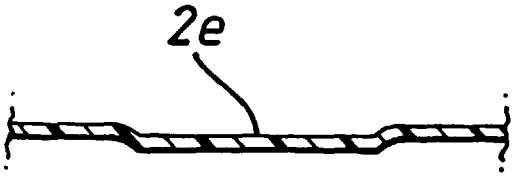

Fig. 9

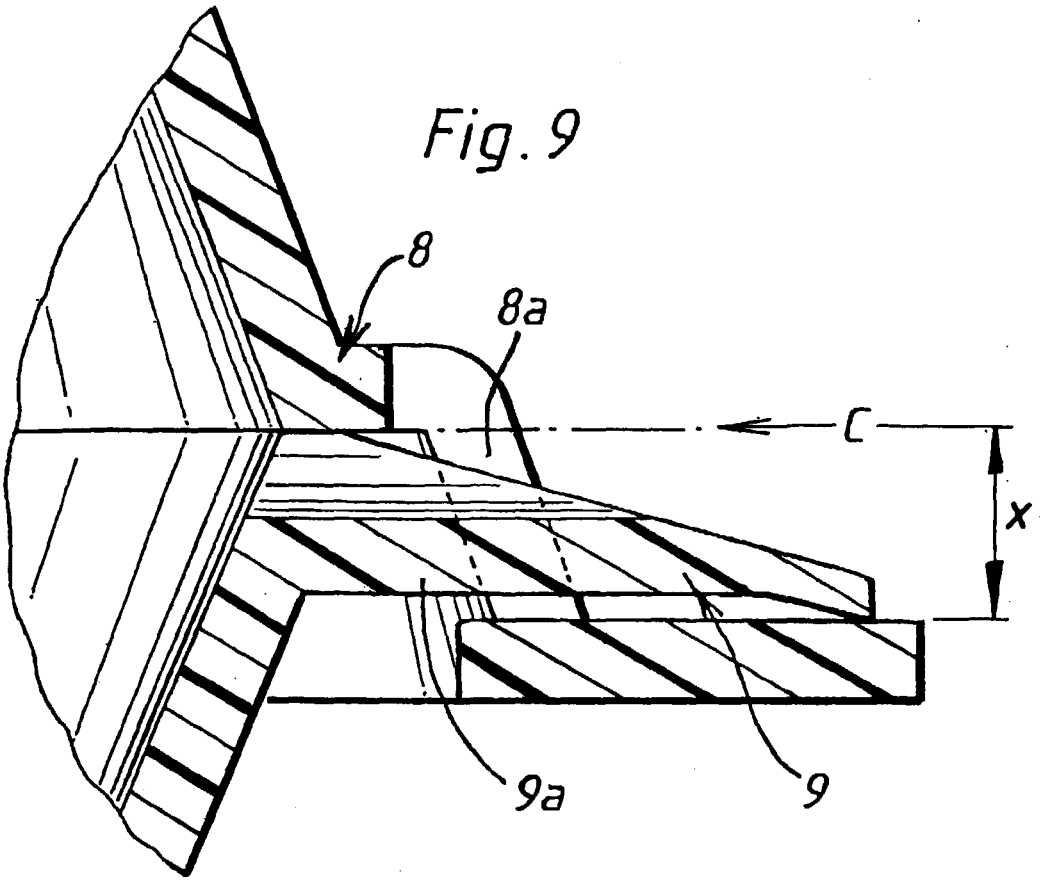

Fig. 10