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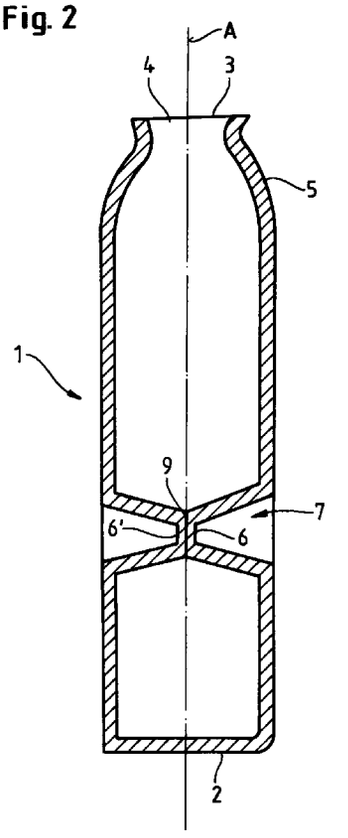
(54) A shipping unit comprising rigidified containers

(57) The present invention relates to a shipping unit (30) comprising a plurality of lightweight plastic containers (1), the containers being held in position relative to each other by an outer supporting layer (31), the outer supporting layer (31) being essentially a film in tension.

Substantially all of the containers (1) comprise a base portion (2), a top portion (3), a side wall (5) and optionally a handle (10), wherein at least two opposing regions (6, 6') of the side wall (5) are joined together to form a rigidifying portion (7) of the container other than the optional handle (10).

Fig. 2



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Description

The present invention relates to the field of packaging, in particular to containers packaged into shipping units for transport.

A great variety of containers have been described in the art and it is also known that packaged articles in general can be shipped in boxes or as bundles wrapped in plastic films. The latter shipping mode has the advantages that it avoids having to use expensive shipping containers, it avoids complicated manipulations to take the articles out of the boxes once they have reached final destination, and it finally avoids the environmentally undesirable use of large quantities of cardboard material, i.e. such shipping mode produces less waste.

However, this stacking and wrapping shipping mode is not applicable to all containers, because it requires that the containers which are being shipped be rigid enough to withstand the absence of an outer box which would normally provide the desired rigidity.

Another problem encountered with certain containers is resistance to bulging. Bulging refers to the deformation of the initial shape of the container, in response to differences of pressures which can be generated between the inside and the outside of the container. This can be the case when the product contained in the container absorbs the air in the headspace during storage or, on the contrary, when it generates gases. Bulging may also occur when there is a significant difference in atmospheric pressure between the place where the container was filled and closed, and the place where the filled and closed container is stored.

Simultaneously, it is a general trend in packaging to diminish the amount of material used for the manufacture of containers. In the case of plastic materials, this leads to the use of so-called lightweight bottles, including the so-called blister bottles, such as those available from Unifill, Italy. Naturally, thermoplastic containers of lighter weight are more prone to the above problems.

Consequently, it is an object of the present invention to provide a shipping unit comprising a plurality of lightweight plastic containers which requires less packaging material to be used than those shipping units known in the prior art.

In particular it is an object of the present invention to provide a shipping unit which does not require an outer cardboard box or case.

Summary of the Invention

The object of the present invention is achieved by using containers substantially all of which comprise a base portion, a top portion, a side wall and optionally a handle, wherein at least two opposing regions of the side wall are joined together to form a rigidifying portion of the container other than the optional handle. The containers being held in position relative to each other by an outer supporting layer, the outer supporting layer being essentially a film in tension.

In a preferred embodiment of the invention the side walls of the lightweight plastic containers are joined together by opposing columns which are substantially in the shape of truncated cones or cylinders. The truncated cones or cylinders may also advantageously comprise a flexible means so that the truncated cones or cylinders can move relative to the side wall. The flexible means may comprises a plurality of steps, or a "zig-zag" profile, along the length of the truncated cone or cylinder.

For good package aesthetics the open end of the truncated cones or cylinders is preferably covered by a label affixed to the outer surface of the side wall.

The shipping unit is maintained in shape during transport and handling by a film in tension. Preferably the film is a plastic material selected from the group consisting of polyethylene, polypropylene, polyester, polystyrene, polyvinyl chloride, acrylic, or combinations or laminates of these.

In a further embodiment of the invention the shipping unit comprises a plurality of lightweight plastic containers wherein the lightweight plastic containers are packaged into sub-units, and wherein at least the lightweight containers at the corners of the packaged sub-units comprise handles which are located asymmetrically on the lightweight container, the lightweight containers being oriented so that the handles lie closest to the corners of the packaged sub-units. It is preferred that the lightweight plastic containers are packaged into sub-units, each sub-unit being substantially enclosed by a paper or plastic film or tape. Furthermore the lightweight containers preferably have a bottom wall which comprises anti-bulging ridges and depressions, optionally the anti-bulging ridges and depressions extend into the side wall.

Detailed Description of the Invention

- Fig. 1 is a side view of a container according to the present invention.
- Fig. 2 is a cross sectional view of a container according to the invention
- Fig. 3 is a cross sectional view of another container according to the invention.
- Figs. 4a to 4d illustrate schematically a method of making a container of the invention, in a cross sectional view.
- Fig 5a is a perspective view of a sub-unit comprising four bottles in a 2 x 2 arrangement. Part of the wrapping is shown cut-away for clarity. Fig 5b is a perspective view of a completed shipping unit comprising four layers of eight of the sub-units of fig. 5a. The outer wrapping layer is not shown for clarity.
- Figs 6a to 6d are cross sectional views of the rigid-

ifying portion of alternative embodiments of the container of the invention.

By "shipping unit" 30 it is meant herein a stack of bottles which can be readily transported from the point of filling to a warehouse or a wholesale or retail outlet. A typical shipping unit is based upon a standard sized wooden pallet, although other suitable bases are also used. For example, 4 litre bottles having approximate dimensions of 184 x 90 mm, and 357 mm tall are conveniently arranged as a shipping unit which comprises a standard Euro-pallet supporting 12 by 4 bottles, stacked 4 bottles high. Each layer may optionally be separated by a paper anti-slip tie-sheet.

A "sub-unit" 20 is defined herein as any packaged unit comprising at least two lightweight containers. Normally at least two sub-units will be assembled in order to make a shipping unit. Preferably a shipping unit consists of from 10 to 100, preferably from 30 to 80 sub-units. Taking the example of the 4 litre bottles, these may be conveniently arranged in sub-units of 4, to give 12 sub-units per layer, and 48 sub-units per shipping unit.

The lightweight container 1 herein can be made of a variety of materials, but preferred containers herein are made of a thermoplastic material or blends thereof, including blends of recycled and virgin plastic.

Referring to Figure 1, the lightweight container 1 of the invention first comprises a base portion 2. The base portion 2 is the portion on which the container stands in its normal upright position.

The container further comprises a top portion 3 which will generally comprise an opening 4 which will allow filling and/or emptying of the container. Accordingly, preferred containers herein are bottles, however the present invention is also applicable to containers which do not have an opening, i.e. which need to be torn or otherwise ruptured to be emptied.

The container further comprises at least one side wall 5 which joins the top portion 3 and the base portion 2. The present invention is not limited to containers of a particular cross section. When the container is of a generally cylindrical cross section, in a plane perpendicular to the containers vertical axis A (i.e. an axis which is perpendicular to the base), there is only one, continuous side wall. Containers herein can alternatively have an ellipsoid cross section in which case they are considered to have two side walls. It is preferred that containers herein have four side walls and a square or rectangular cross section. In particular for the purpose of providing containers which are suitable to be assembled in sub-units 20 which are wrapped in films, it is preferred to have containers which have substantially flat side walls, i.e. containers of square or rectangular cross section. Indeed, such containers allow best use of space, and provide shipping units and sub-units of good rigidity. However, lightweight containers having this square or rectangular cross section are vulnerable to bulging when filled. Bulging is detrimental to tight, stable sub-units, hence the use in the present invention of containers comprising a rigidifying portion.

Referring to Figure 2, the containers herein further comprise a rigidifying portion 7 which is formed by two opposing regions 6, 6' of the side wall which are joined together 9. By "joined together", it is meant herein that the opposing regions are joined other than by the top portion 3, the base portion 2, or remaining portions of the side wall 5. By "opposing", it is meant herein that the regions 6, 6' are located on opposing sides of a vertical plane of symmetry of the container (i.e. a plane of symmetry passing by the container's vertical axis A). Preferably, both regions are located symmetrically about the plane of symmetry. More preferably, each of the regions 6, 6' is preferably located at about mid height (from highest point of the top portion 3 to lowest point of the base portion 2) and/or width (between the two extreme points of the container in a side view, at the height of the region) of the container. The drawings in the present application show that the two regions 6, 6' join in approximately the vertical plane of symmetry A of the container, but that is not intended to be a limitation of the present invention. The shape of the regions 6, 6' of the side wall 5 is not critical for the purpose of the present invention, but the bigger the regions are, the bigger the rigidifying portion 7 can be, which provides more rigidity. Of course, containers herein can comprise one or several rigidifying portions.

In a preferred embodiment of the invention, a means is provided to allow some movement of the rigidifying portion 7 relative to the side wall 5. This improves the resistance of the container to breakage when it is dropped from a height. A flexible means allows some deformation to take place which absorbs some of the impact energy if the bottle is dropped thereby making it less likely to rupture. Preferred flexible means are a step or zig-zag profile as shown in figures 6a to 6d. In this embodiment of the invention the flexible means is distributed along the length of the rigidifying portion. In another embodiment of the invention the flexible means is located close to the centre line A of the bottle, where the opposing regions are joined. In another embodiment of the invention the area 9 where the opposing regions 6, 6' are joined may be deliberately designed to break in case of a shock load or impact. This point of weakness ensures that the integrity of the container itself is maintained and no leakage occurs.

As illustrated in Fig. 4, the rigidifying portion 7 can be formed on a container not having such a portion by applying to heated mould inserts 8, 8' onto two opposing regions of the side wall and forcing the inserts 8, 8' towards each other until the rigidifying portion 7 is formed. In the rigidifying portion, the two initial regions 6, 6' may be joined in 9 in a juxtaposed manner, as in Fig. 2 or, e.g. by forcing the two heated indents further, a hollow communication can be formed through the container, as in Fig. 3. In that case, the joining of the two regions can be considered to form the wall of the hollow communication.

As an alternative, the formation of the rigidifying

portion can be included in an otherwise conventional blow moulding operation. Indeed, the mould which would otherwise be used to form the container can be provided with two opposing indents in opposite regions of the mould corresponding to the side wall of the container and which cooperate when the mould is closed. As a further alternative, only one indent can be provided which extends from a region of the mould corresponding to a region of the side wall to the opposing region of the mould, when the mould is closed.

As an optional but preferred feature, the container herein can further comprise a handle 10. The handle can be provided by recesses in opposite regions of the side wall, or even by a hollow communication through the container. It is intended that the handle 10 which the container herein may have does not substitute itself to the rigidifying portion 7 described hereinbefore. In other words, containers herein which have a handle 10 which is provided by two opposing regions of the side wall being joined together must further comprise a rigidifying portion 7 as hereinbefore described.

In most bottles above about 1 litre in size any handle 10 must be located asymmetrically with respect to the main bottle axis A for ergonometric reasons. The effect of this is that one side of the bottle, the side where the handle is located is inherently more rigid than the opposing side. If two containers are bundled together in a sub-unit, it is advantageous to orient the containers so that the handles are located nearest to the opposing ends of the sub-unit. If three containers are bundled together, it is advantageous to orient the end containers so that the handles are located nearest to the opposing ends of the sub-unit, the middle container may be oriented in either direction. If four containers are bundled together one possible arrangement is 2 x 2. In this case it is advantageous to orient the end containers so that the handles are located nearest to the four corners of the sub-unit 20. For sub-units comprising more than four containers similar advantageous arrangements can be constructed following the same principle.

In a preferred embodiment of the invention the base portion is also provided with means for increasing rigidity, such as ridges and depressions which may, for example, be arranged in parallel, or radially. Increased rigidity of the base portion serves both to minimise or avoid bulging, and also minimises or avoids the risk of the base portion collapsing inwards when two or more layers of containers are stacked on top of each other in a shipping unit.

As an optional but preferred feature, at least one of the two regions 6, 6' may be fitted with an external device, e.g. a dosing and/or dispensing device for the product contained in the container, or promotion gifts which can be desirable when dealing with consumer goods.

As an optional but preferred feature, at least one of the two regions 6, 6' of the side wall is covered by a label. In the case where none of the regions is fitted with an external device as hereinbefore described, it is preferred that both, or all of the regions be covered by one or several labels, so as to avoid the possibly unpleasant appearance of the regions.

Plastic films useful herein typically have a thickness of less than 250 micrometers, preferably less than 150 micrometers, and more preferably less than 50 micrometers. In one embodiment of the invention the outer supporting layer of the shipping unit is applied by shrink-wrapping, the plastic film being sealed around the bottles and shrunk in a heat tunnel. Most preferably the plastic film thickness for shrink-wrapping is 35 to 50 micrometers. In an alternative embodiment of the invention the outer supporting layer of the shipping unit is applied by stretch-wrapping, the plastic film most preferably having a thickness of 10 to 30 micrometers. The plastic film may also be applied in the form of strips, for example, adhesive strips which may be wrapped around the shipping unit.

The containers herein are suitable to be shipped in bundles as "sub-units" 20. Indeed a wrapped bundle of containers according to the present invention is much more rigid than a wrapped bundle of similar containers without rigidifying portions. Accordingly, containers according to the present invention can be assembled in sub-units, then wrapped in either pre-stretched plastic films (stretch-wrapping) or in heat-shrinkable films (shrink-wrapping). In the latter case, the sub-units wrapped in the film must be processed though a heating means for the film to shrink. Preferred films in both cases are polyethylene wrapping films available for instance from Mobil. Wrapped sub-units according to the present invention preferably consist of a single height of containers, but the wrapped sub-units can in turn be stacked.

In an alternative embodiment of the invention the sub-units may also be contained by paper wrapping. A material which is formed as a cellulosic web, and which fulfils these requirements is suitable for use as the wrapping in the present invention. For example the cellulosic web may be a laminate, a bonded compressed air laid web, or a wet laid web, although wet laid paper wrapping is preferred due to its tensile properties. Paper having a basis weight of at least 40 grams per square metre, and preferably about 70 grams per square metre is preferred. In order to achieve the benefits of the lightweight package of the invention, the paper should most preferably have a basis weight of less than 125 grams per square metre. The most preferred material of construction of the wrapping is a wet-laid paper made from wood- or manila fibres, or a mixture of these. Both virgin and recycled paper may be used.

Claims

1. A shipping unit (30) comprising a plurality of lightweight plastic containers (1), the containers being held in position relative to each other by an outer supporting layer (31), the outer supporting layer being essentially a film in tension,

wherein substantially all of the containers (1) comprise a base portion (2), a top portion (3), a side wall (5) and optionally a handle (10),
characterised in that at least two opposing regions (6, 6') of the side wall (5) are joined together to form a rigidifying portion (7) of the container other than the optional handle (10).

2. A shipping unit (30) comprising a plurality of lightweight plastic containers (1) according to claim 1 wherein the opposing regions (6, 6') of the side wall (5) of the lightweight plastic containers are joined together by opposing columns which are substantially in the shape of truncated cones or cylinders.

3. A shipping unit (30) comprising a plurality of lightweight plastic containers (1) according to claim 2, wherein the truncated cones or cylinders comprise a flexible means so that the truncated cones or cylinders can move relative to the side wall (5).

4. A shipping unit (30) comprising a plurality of lightweight plastic containers (1) according to claim 3, wherein the flexible means comprises a plurality of steps (40) along the length of the truncated cone or cylinder.

5. A shipping unit (30) comprising a plurality of lightweight plastic containers (1) according to any of claims 2 to 4, wherein the open end of the truncated cones or cylinders is covered by a label affixed to the outer surface of the side wall (5).

6. A shipping unit (30) comprising a plurality of lightweight plastic containers (1) according to claim 1 wherein the film in tension is a plastic material selected from the group consisting of polyethylene, polypropylene, polyester, polystyrene, polyvinyl chloride, acrylic, or combinations or laminates of these.

7. A shipping unit (30) comprising a plurality of lightweight plastic containers (1) according to any of claims 1 to 6 wherein the lightweight plastic containers are packaged into sub-units (20), and wherein at least the lightweight containers at the corners of the packaged sub-units (20) comprise handles (10) which are located asymmetrically on the lightweight container (1), the lightweight containers being oriented so that the handles (10) lie closest to the corners of the packaged sub-units (20).

8. A shipping unit (30) comprising a plurality of lightweight plastic containers (1) according to claim 7 wherein the lightweight plastic containers are packaged into sub-units (20), each sub-unit (20) being substantially enclosed by film or tape, the film or tape being paper or plastic.

9. A shipping unit (30) comprising a plurality of lightweight plastic containers (1) according to any of claims 1 to 8, wherein the bottom wall (2) of the lightweight container comprises anti-bulging ridges and depressions.

10. A shipping unit (30) comprising a plurality of lightweight plastic containers (1) according to claim 9, wherein the anti-bulging ridges and depressions extend into the side wall (5).

Fig. 1

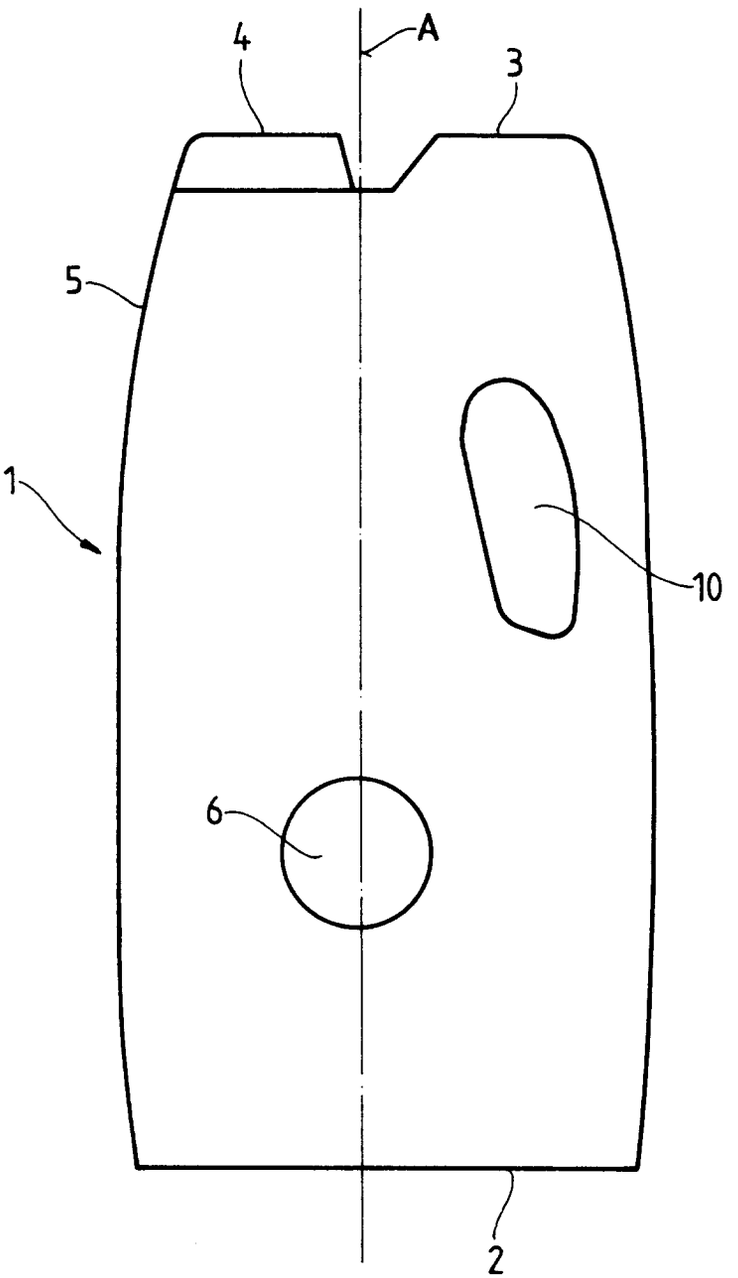


Fig. 2

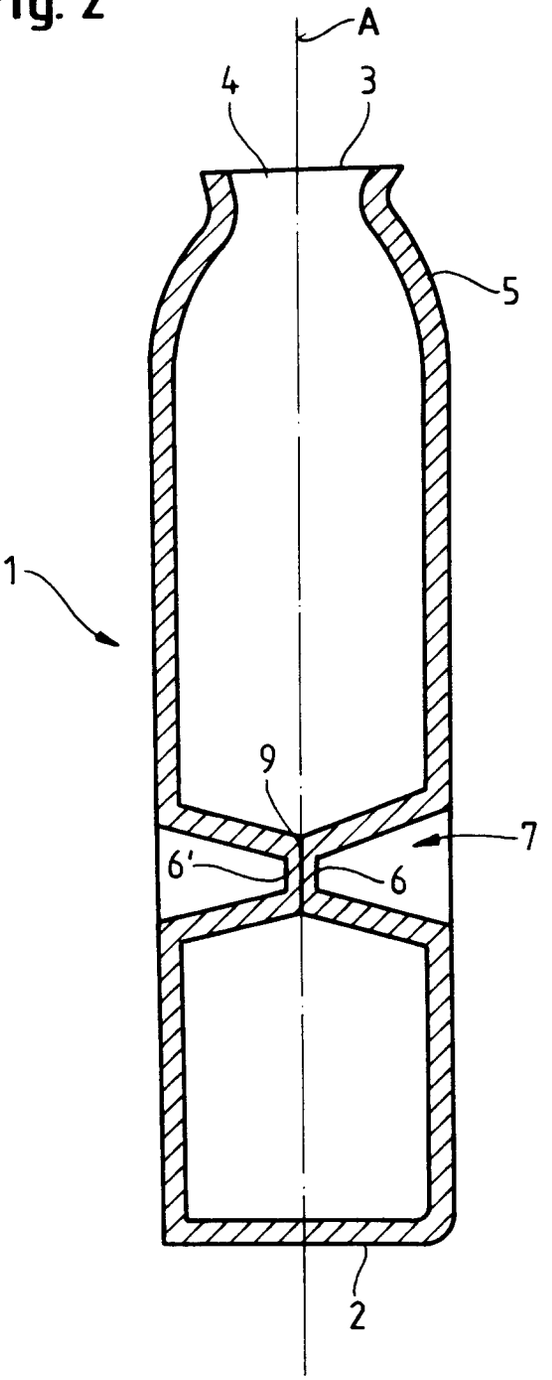
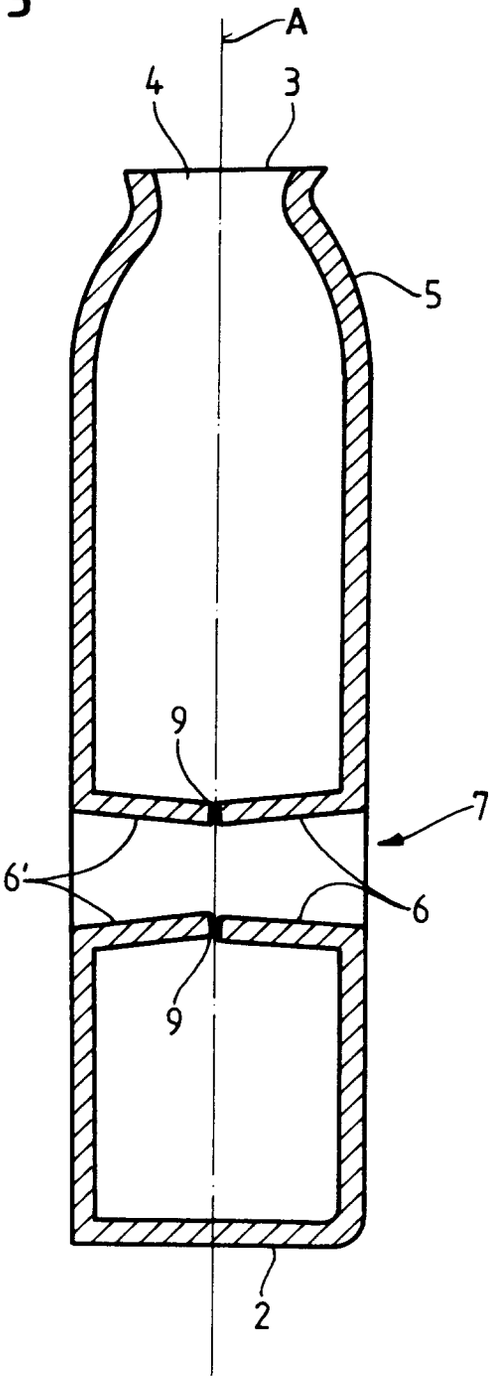


Fig. 3



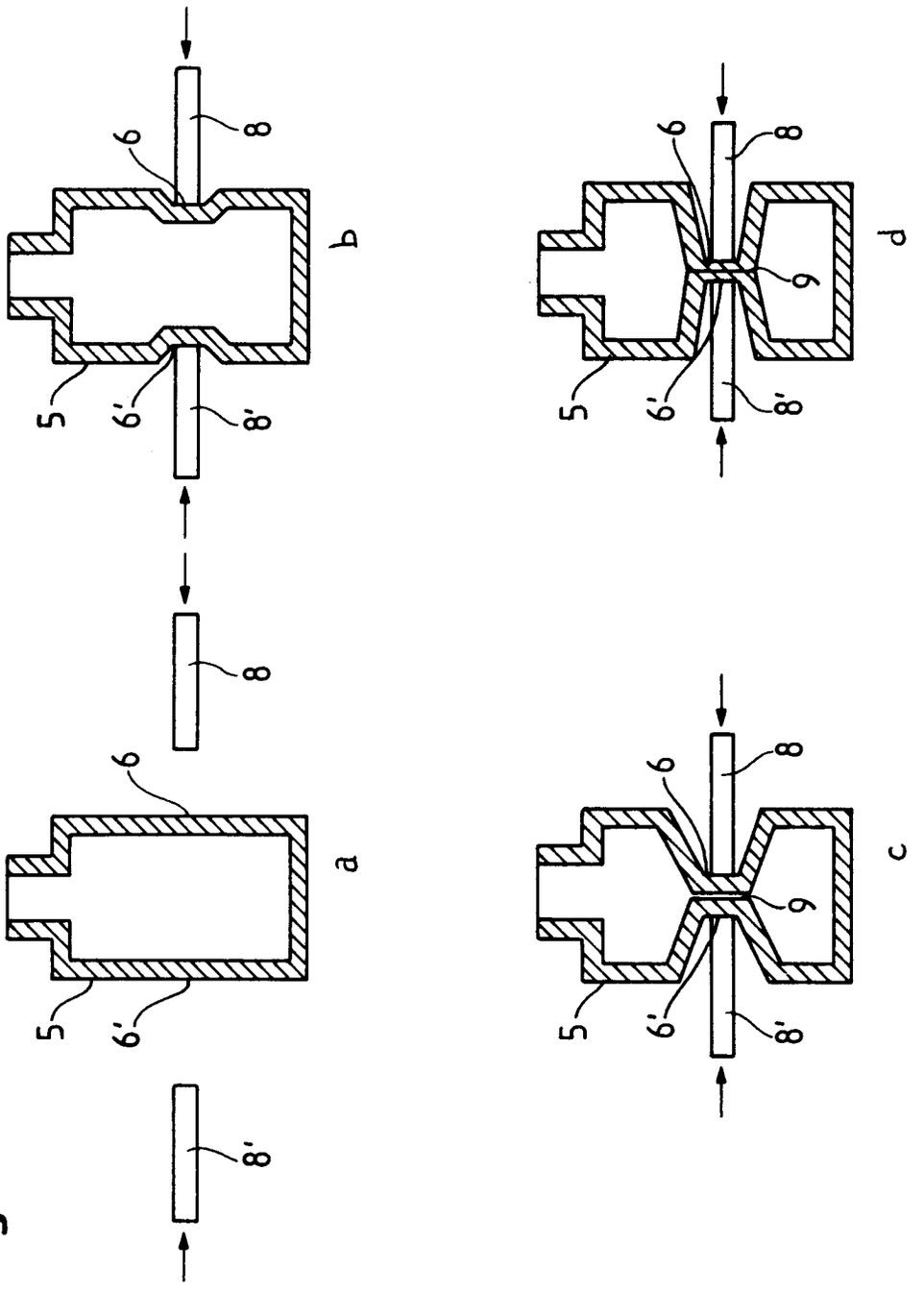


Fig. 4

Fig. 5a

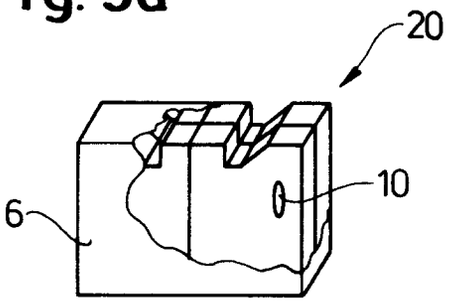
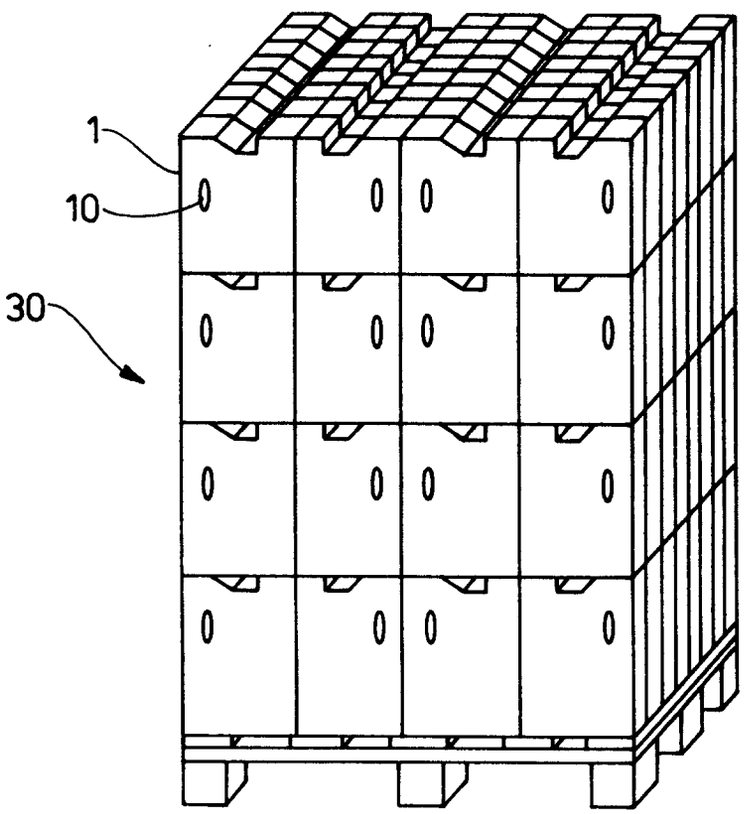


Fig. 5b



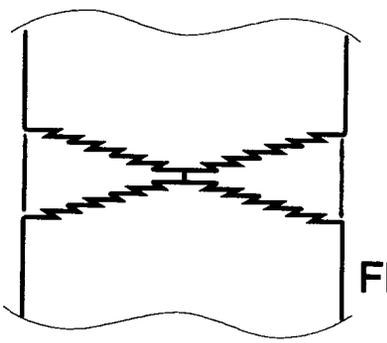


FIG. 6a

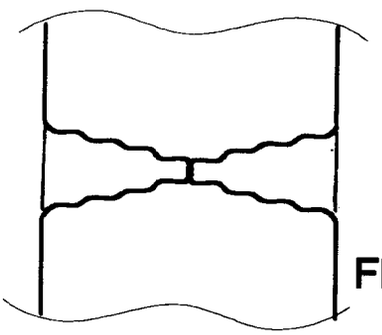


FIG. 6b

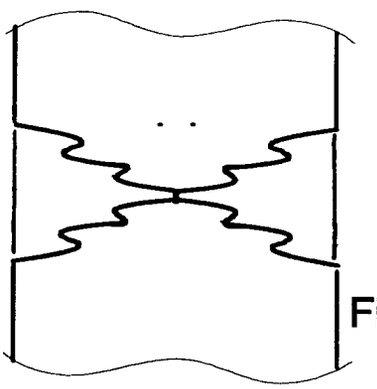


FIG. 6c

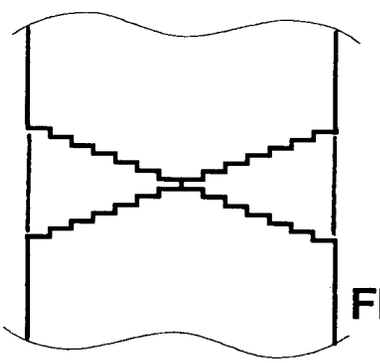


FIG. 6d