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(54) **A sealed plastic vessel.**

(57) A sealed vessel formed by a cover (2), a bottom (8) and a lateral surface.

The cover (2) and the bottom (8) are obtained by thermoforming of a solid sheet of plastic material identical to that from which the lateral surface is formed. The lateral surface is obtained by means of dinking, starting from a sheet of plastic material having an alveolar structure, or from a solid sheet.

The cover (2) is engaged at the upper end of the vessel, and the bottom (8) is welded or glued to its lower end. Furthermore, the lateral surface is obtained by welding (melting) or by fixing in a known manner (for example by an adhesive) the two opposite ends of the planar development of the lateral surface.

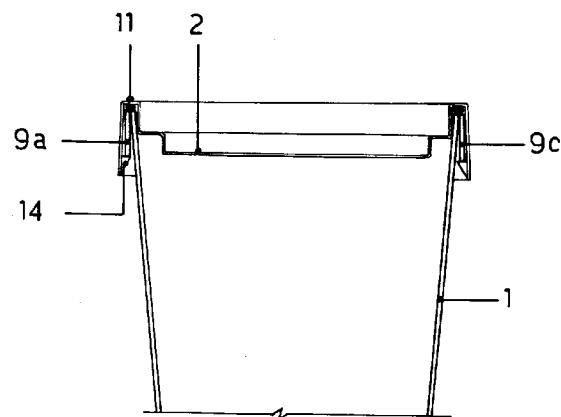


FIG. 1

The present invention relates to a sealed plastic vessel for collecting materials to be isolated from the external environment, as for example hospital waste.

Vessels having this function are already known.

A first type of vessel is made of cardboard.

Even if it is light, since the required sealing conditions are not provided, it is often advised against its use.

Other vessels, on the other hand, are made of plastics, but even if they are adequate to ensure the required seal, they employ a noticeable amount of materials which makes them heavy to transport, and when they are to be incinerated, they excessively increase during combustion the temperature of the furnace, thus causing problems as regards the operation of the plant.

The present invention provides a vessel or container which is sealed, which may be recycled due to the fact that all its parts are made of the same material, and for whose production the use of raw material is reduced, without lowering the required resistance of the vessel.

The present invention will now be described according to a particular embodiment thereof, which is given only for illustrative but non-limitative purposes.

In the drawings:

Fig. 1 schematically shows a longitudinal section of the upper part of the vessel and its associated cover before the latter is fixed at the upper end of the lateral walls;

Fig. 2, is a perspective view of the cover of the vessel, with one of its four U-shaped edges cut away;

Fig. 3, shows a small lace or string made of nylon or a similar material, used to close a bag to be enclosed in the vessel, the bag containing the material to be isolated;

Fig. 4a shows the longitudinal section of the lower part of the vessel, the bottom thereof being welded to the lateral walls;

Fig. 4b, is a perspective view of the lower part of the vessel, the bottom thereof being welded to the lateral walls;

Fig. 5, shows the development of the lateral wall of the container, shaped like a frustum of pyramid;

Fig. 6, is a plan view of the bottom of the vessel.

It follows from Fig. 1, that the vessel has slanting lateral walls 1, which form a lateral surface shaped like a frustum of pyramid with upper and lower (open) ends having a rectangular or square cross sectional area.

On the upper end of the lateral surface shaped like a frustum of pyramid (having a larger cross sectional area than the lower end), there is assembled a cover 2, in a manner described later. The lateral surface, shaped like a frustum of pyramid, is obtained by dinking or shearing a sheet of plastic material having

an alveolar structure, along the contour of the development shown in Fig. 5, and by thermoforming the sheet by folding it along the four lines 3, 4, 5, 6 which will form the edges of the lateral surface shaped like a frustum of pyramid.

The tongue 7, shown in Fig. 5 is welded by melting the material, or it is glued by an appropriate adhesive providing a seal, to the area 18. The alveolar structure saves raw material, and it lightens the product without decreasing its resistance. The cover 2 of the vessel like the bottom 8 are obtained by thermoforming a solid sheet of material (i.e. with no inner cavities).

The lateral surface shaped like a frustum of pyramid also comprises four tongues 9a, 9b, 9c, 9d which are obtained by thermo-folding the sheet along the lines 10a, 10b, 10c, 10d (fig. 5), said tongues being folded outwardly with respect to the vessel (Fig. 1).

As shown in Fig. 2, the cover 2 has U-shaped edges or sides 11 (one of the two edges 11 has been omitted in Fig. 2 in order to show the whole upper part of cover 2), and on the upper part the cover 2 is provided with reinforcement lines 12a, 12b which form diagonal grooves 12a, 12b. These grooves 12a, 12b form however corresponding projections on the other side of cover 2, that is the thickness of the cover remains constant.

With reference to Fig. 1, the cover 2 is engaged at the upper end of the lateral surface having slanting walls 1 and a shape like a frustum of pyramid, and the upper edges of the walls 1 together with the tongues 9a, 9b, 9c, 9d, are introduced inside the cavities defined by the U-shaped edges 11.

On the cover 2 and on every lateral wall 13 which forms the longer side of every U-shaped edge 11, there are provided two swallow-tailed impressions 14 which hook from below the lower ends of the tongues 9a, 9b, 9c, 9d.

Inside the groove formed by the U-shaped edges 11, there is introduced along the whole periphery of said groove, a soft sealing substance (for example a butyl-based substance), in which there is "plunged" the upper edge of the lateral surface shaped like a frustum of pyramid, avoiding in this way the propagation of the smell.

The aforesaid impressions 14 close the vessel in an irreversible way.

The bottom 8 of the vessel also comprised U-shaped edges 15, which are engaged at the lower ends of the lateral walls 1.

The bottom 8 made of the same plastic material which forms the cover 2 and the lateral surface shaped like a frustum of pyramid, is obtained by thermoforming of a solid sheet (with no inner cavities), and has, as shown in Fig. 6, longitudinal and transversal reinforcement ribs 16, which form grooves on one side and projections on the other side, and which are obtained by thermoforming the bottom 8, in such a

way that the thickness of the bottom 8 remains constant. The final assembling of the bottom 8 and the lateral surface shaped like a frustum of pyramid, is performed by melting together the plastic material, or with ultrasound techniques, or by means of adhesives, along the strip-like region 17 shown in Fig. 4b, and along the three corresponding strip-like regions, located along the longer sides of the four U-shaped edges 15. The welding operation is performed preferably by means of a hot rod applied from the outside, from the inside, or on both sides, with a machinery which determines the values of the temperature, the pressure exerted by the rods, and the welding time.

As in the case of the welding of the lateral surface shaped like a frustum of pyramid, the adjacent surfaces of the bottom 8 and of the lateral walls 1 will melt, and one thereby obtains a perfect seal on the lower part of the vessel.

On two opposite lateral walls 1 of the vessel, there are welded two handles obtained from a solid sheet (not shown), the welding being performed once again by melting the plastics, or by means of adhesives or ultrasound, the handles being previously obtained by dinking and being produced with the same plastic material which forms the other components of the vessel.

Instead of welding the bottom 8 and the lateral surface shaped like a frustum of pyramid, a suitable adhesive may be used which realizes a seal between said two parts. On the cover 2 there is also provided a groove 19 which is schematically shown by means of a straight line segment, in Fig. 2. On the other side of the vessel there is a corresponding projection, as already described for the reinforcements 12a, 12b.

The groove 19 is used as a seat for a string or lace 20 (Fig 3) made of nylon or any other suitable material, employed for closing a bag (for example a PVC bag) which is introduced inside the vessel and which is previously filled with the material to be isolated from the external environment.

The width of the grooves of the U-shaped edges of the cover 2 is about 6 mm, twice the width of the grooves of the U-shaped edges of the bottom 8, which is about 3 mm.

The reinforcements 12a, 12b, 16 may have any configuration whatever. For example, in Fig. 4, the bottom 8 of the vessel is shown as having a different configuration with respect to that of the reinforcements 16 in Fig. 6.

The vessel of the present invention has the following advantages: a perfect impermeableness with regard to liquids, lightness, a regular shape and the possibility of being piled up on other identical vessels, uniformity of the material used (since the bottom, the cover, the lateral surface and the handles for transporting the vessel, are all made of the same plastic material).

The vessel may be used for example in order to

collect powders or ice creams.

The vessel combines the positive features of cardboard, i.e. the lightness, with those of plastic vessels obtained by thermoforming or injection moulding (having solid walls), that is the resistance and the impermeableness.

According to an obvious modification of the object of the present invention, the lateral surface shaped like a frustum of pyramid, is obtained from a solid sheet instead of a sheet having an alveolar structure, by means of shearing, dinking, folding, and welding the two ends of its planar development.

Claims

1. A sealed plastic vessel for collecting material to be isolated from the external environment, characterized in that it comprises a lateral surface, a cover (2) and a bottom (8), all made of the same plastic material, the lateral surface being obtained by dinking, from a sheet having an alveolar structure or from a solid sheet, said cover (2) and said bottom (8) being obtained by thermoforming of a solid sheet, the bottom (8) being welded by melting the plastics or being fixed in any known manner so as to realize a seal, to the lower end of the lateral surface, the lateral surface being welded or fixed in any known manner, at the two ends of its planar development, said cover (2) being engaged at the upper end of the vessel, providing a seal.
2. A vessel according to claim 1, characterized in that said cover (2) has U-shaped edges with projections or impressions (14), so as to ensure an irreversible closing.
3. A vessel according to claim 2, characterized in that the lateral walls (1) of the vessel, which form its lateral surface, have tongues (9a, 9b, 9c, 9d) which are folded towards the outside of the vessel, said tongues being engaged together with the upper edges of said lateral walls inside the grooves defined by said U-shaped edges (11), in which a sealing substance is introduced, so that said projections or impressions (14) will hook from below said tongues (9a, 9b, 9c, 9d).
4. A vessel according to claim 1, characterized in that said cover (2) has reinforcements or ribs (12a, 12b) which form grooves on one side of the cover (2), and projections on the other side, the thickness of the cover remaining constant.
5. A vessel according to claim 1, characterized in that the bottom (8) of the vessel has U-shaped edges (15) in whose grooves there are inserted

the lower edges of the lateral walls (1) of the vessel, said lower edges being welded or fixed in a known manner, to said U-shaped edges (15) of the bottom (8).

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6. A vessel according to claim 1, characterized in that said bottom (8) has reinforcements (16) which form grooves on one side of the bottom (8), and projections on the other side.

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7. A vessel according to any of the preceding claims, characterized in that all its components are made of polypropylene.

8. A vessel according to any of the claims 1 to 4, or claim 6 or 7, characterized in that said bottom (8) forms a base and four lateral surfaces which are welded or glued externally or internally to the lower edges of the lateral surfaces (1).

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9. A vessel according to any of the preceding claims, characterized in that on two opposite lateral walls (1), there are glued or welded by melting or ultrasound, two handles previously sheared from a solid sheet of the same material as all the other components of the vessel.

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10. A vessel according to any of the preceding claims, characterized in that on the cover (2) there is provided a seat (19) for a small lace or string (20) preferably made of nylon.

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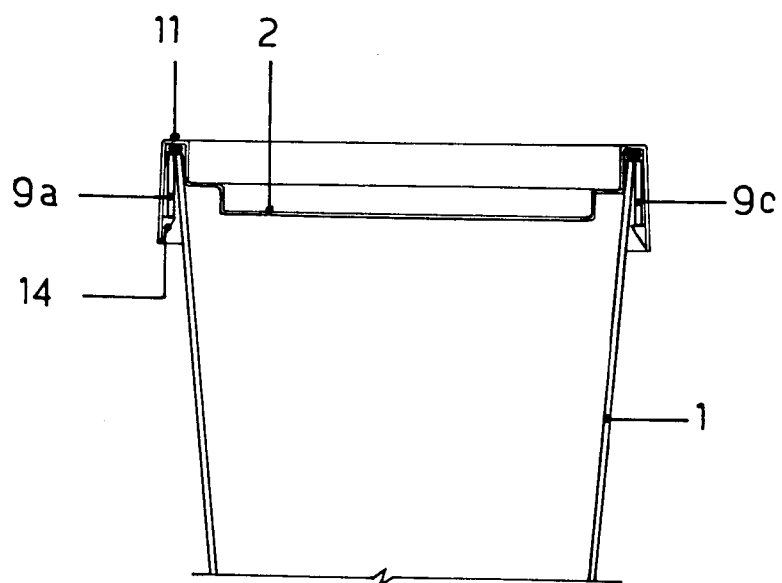


FIG. 1

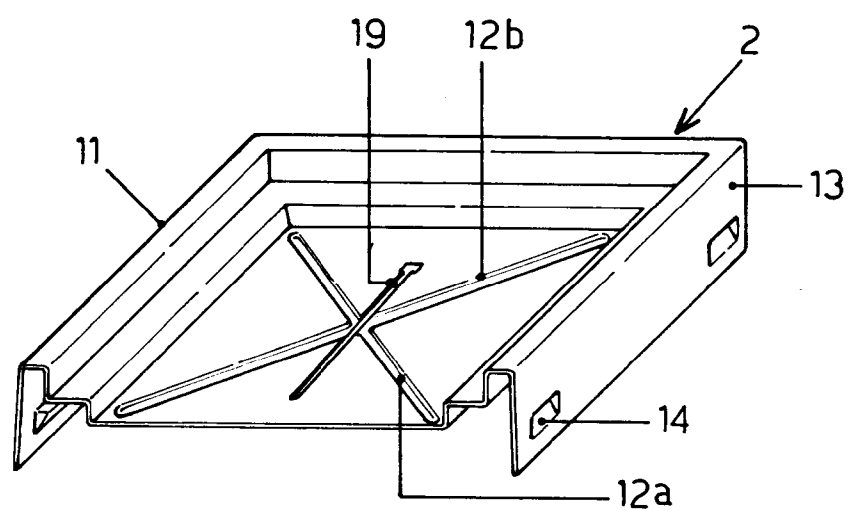


FIG. 2



FIG. 3

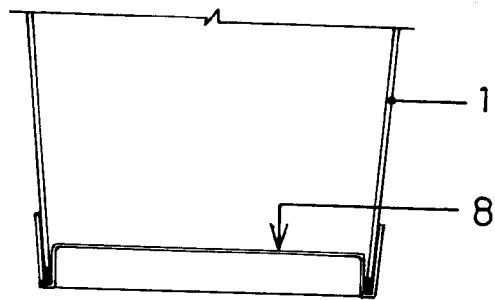


FIG. 4a

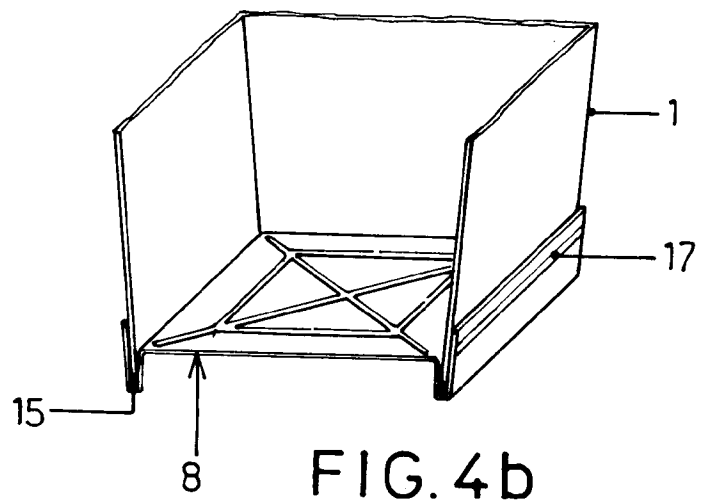


FIG. 4b

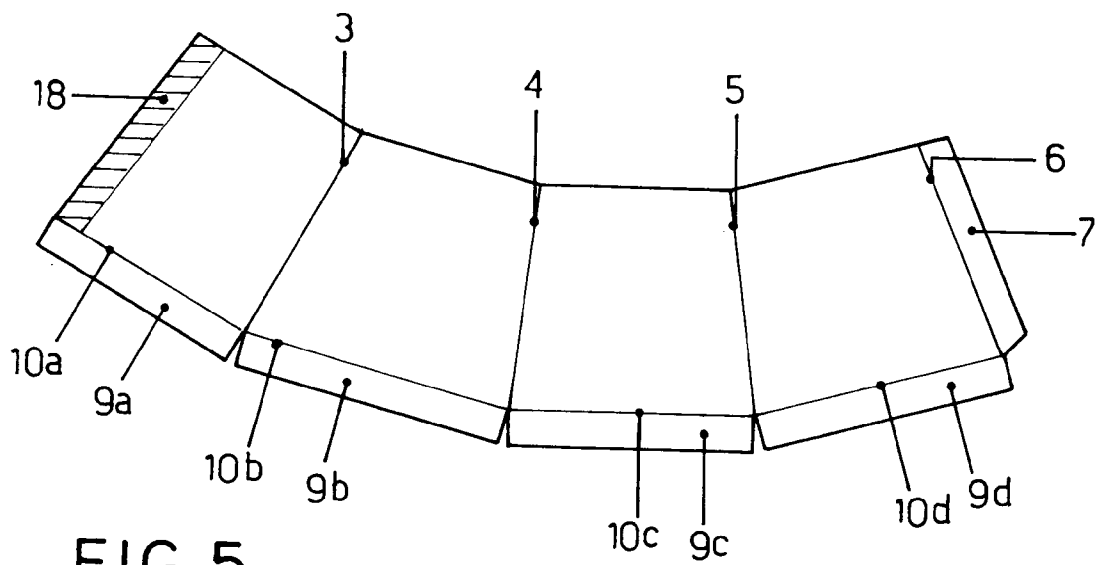


FIG. 5

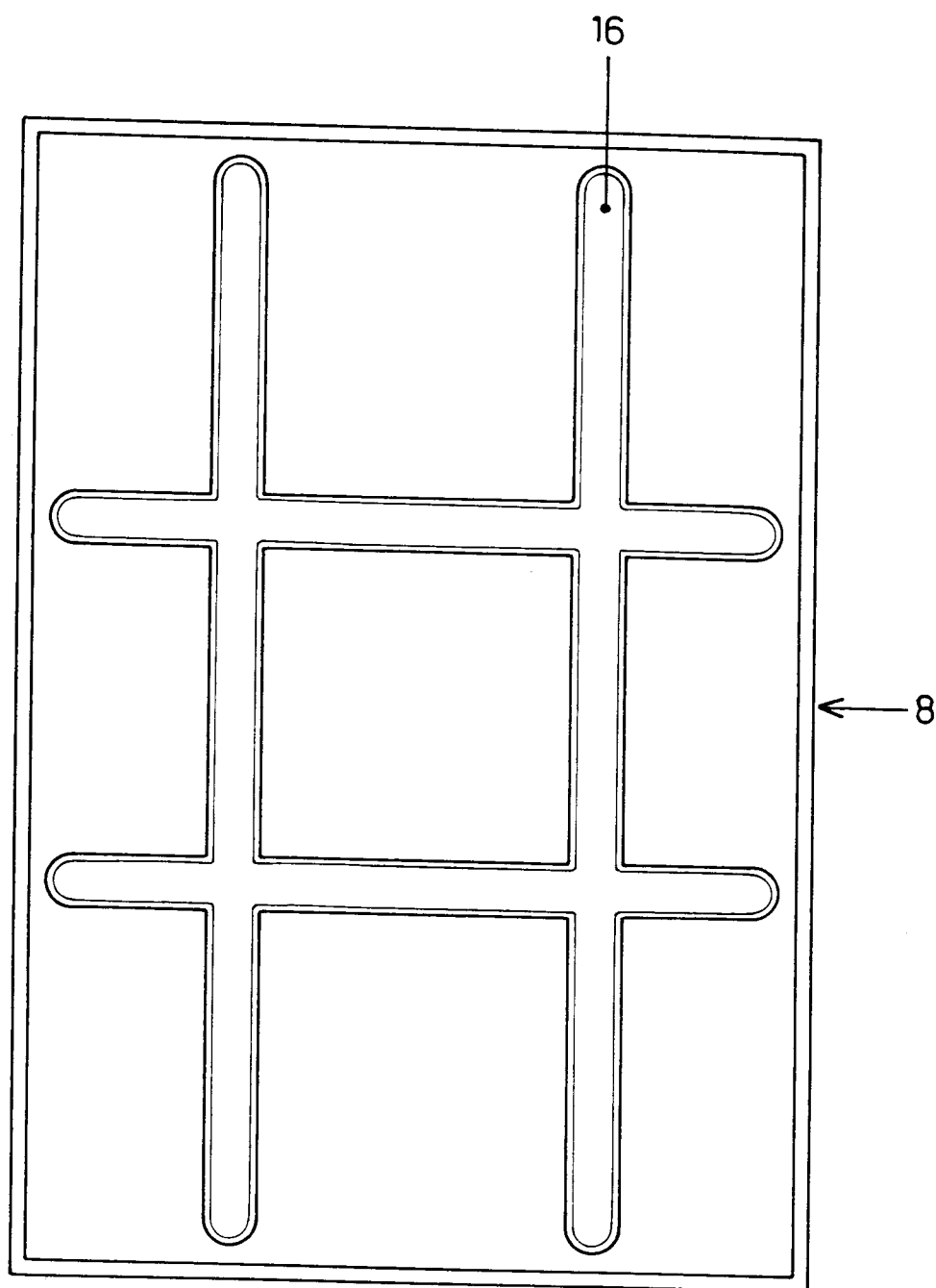


FIG. 6