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(54) **Plastic bottle particularly for containing beverages**

(57) A plastic bottle, particularly for containing beverages, whose particularity consists of the fact that it

comprises a body (11) with portions (15,17,19) having a circular cross-section which are alternated with portions (16) having a quadrangular cross-section.

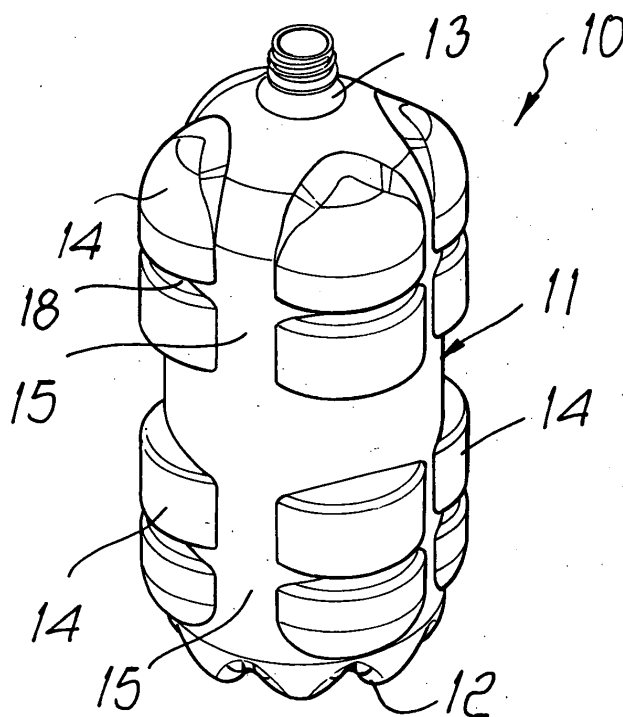


Fig. 1

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Description

[0001] The present invention relates to a plastic bottle particularly for containing beverages.

[0002] It is known that the trend in the beverage market, particularly for non-carbonated beverages, is toward bottle sizes that have increasingly higher capacities and increasingly lower thicknesses.

[0003] A shift has occurred from the conventional bottle with a capacity of 0.75-1 liter to bottles with a capacity of 1.5-2 liters, with a current tendency to produce 5- and 6-liter bottles.

[0004] The conventional bottle shapes currently in use have circular or square cross-sections.

[0005] Bottles having a circular cross-section have excellent resistance to internal pressure without deforming their walls.

[0006] However, such bottles have a limited lateral resting surface, and this makes them less stable during handling and storage.

[0007] Moreover, bottles that have a circular cross-section suffer the drawback that they do not use completely the space, and therefore the capacity, that is available in storage and subsequent palletizing.

[0008] Bottles that have a square cross-section instead fully utilize the space, and therefore the capacity, that is available in storage and palletizing, and can also benefit from a lateral support that is very stable because it is formed by a surface.

[0009] Moreover, such bottles having a square cross-section suffer the drawback of limited resistance to internal pressures and tend to deform, becoming cylindrical.

[0010] The trend in the manufacture of plastic bottles is to increase capacity and at the same time reduce the amount of plastic material used, while maintaining optimum characteristics for storage and palletizing.

[0011] In order to have high storage, bottles full of liquid are usually stacked one on top of the other; to do this, the bottles must be rigid enough to avoid crushing and collapsing of the lower bottles caused by the upper ones.

[0012] In order to stiffen cylindrical bottles, inert gas is added in the internal free space; this produces a higher internal pressure, which tensions the walls of the bottle.

[0013] The aim of the present invention is to provide a plastic bottle, particularly for containing beverages, whose resistance to stresses is comparable to that of bottles having a circular cross-section and whose capacity, palletizing and storage possibilities are comparable with those of bottles having a square cross-section.

[0014] Within this aim, an object of the present invention is to provide a plastic bottle that improves capacity and storage strength.

[0015] Another object of the present invention is to provide a plastic bottle that is more stable during han-

dling.

[0016] Another object of the present invention is to provide a plastic bottle that withstands higher internal pressures than square-section bottles of equal volume.

[0017] Another object of the present invention is to provide a plastic bottle whose production costs are in any case competitive with respect to the costs of bottles of similar capacity.

[0018] Another object of the present invention is to provide a plastic bottle that can be manufactured with known equipment and technologies.

[0019] This aim and these and other objects that will become better apparent hereinafter are achieved by a plastic bottle, particularly for containing beverages, characterized in that it comprises a body in which portions having a circular cross-section are alternated with portions having a quadrangular cross-section.

[0020] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a first perspective view of the bottle according to the invention;

Figure 2 is a second perspective view of the bottle according to the invention;

Figure 3 is a side view thereof;

Figure 4 is a front view thereof;

Figure 5 is a plan view thereof;

Figure 6 is a plan view of four bottles arranged side by side, according to the invention.

[0021] With reference to Figures 1 to 6, a bottle according to the invention is generally designated by the reference numeral 10.

[0022] The bottle 10 comprises a body in which portions that have a circular cross-section are alternated with portions that have a quadrangular cross-section.

[0023] In this embodiment, the body of said bottle is cylindrical and is designated by the reference numeral 11; the bottle 10 further comprises a shaped bottom 12 and a neck 13 with a threaded end for a cap.

[0024] The bottle 10 is made of plastics by means of conventional blow-molding techniques, particularly with the material usually known by the acronym PET.

[0025] According to the invention, the bottle 10 has domed portions 14 that protrude on the upper part and on the lower part of the body 11, separated by a waist portion 19.

[0026] The domed portions 14 respectively form, on the upper part and on the lower part of the body 11, two contoured bands 16 that have a rectangular cross-section.

[0027] Four domed portions 14 are provided on each band 16.

[0028] The domed portions 14 substantially have a semicircular profile that is eccentric with respect to the

axis of the cylindrical body 11.

[0029] The surfaces of the domed portions 14 encounter the surface of the cylindrical body 11 with such an angle as to form discontinuities 17.

[0030] The base portion 15 of the surface of the body 11 that lies between two contiguous domed portions 14 that belong to the longer side of a same band 16 is tangent to a straight line that is tangent to the surfaces of the two contiguous domed portions 14; said bottle can therefore be laid to rest with its longer side against a surface on three contact segments or regions of two adjacent domed portions 14 and of a base portion 15.

[0031] Since the bottle 11 is formed by blow-molding, as mentioned, the amount of material that is deposited in every part of the mold is the same, and therefore, since the diameter of the cylindrical body 11 is smaller than the width of the domed portions 14, said cylindrical body is thicker than the domed portions 14.

[0032] The cylindrical body 11, particularly at the cylindrical narrower portions, is therefore stronger than the domed portions and less subject to stretching.

[0033] The same result can be achieved starting from a predominantly quadrangular body, by providing cylindrical narrower portions along said body.

[0034] In practice it has been found that the invention thus described solves the problems mentioned in known types of bottle; in particular, the present invention provides a plastic bottle whose resistance to stresses is comparable to that of cylindrical bottles, said bottle further having a capacity, and offering palletizing and storage possibilities, comparable to those of bottles having a square cross-section.

[0035] It should be noted that this has been achieved by combining the characteristics of a cylindrical bottle with those of square-section bottles.

[0036] Moreover, the present invention provides a plastic bottle having a predominantly square cross-section that is capable of withstanding internal pressure without undergoing deformation, differently from current square-section bottles, which undergo deformation with a minimal increase of the internal pressure with respect to the atmospheric pressure.

[0037] Furthermore, the present invention provides a plastic bottle that is more stable during handling than cylindrical bottles.

[0038] Finally, the present invention provides a plastic bottle that allows to reduce average wall thickness for an equal volume, reducing the amount of material used and making its production costs in any case competitive with respect to the costs of bottles of similar capacity.

[0039] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0040] In practice, the materials employed, so long as they are compatible with the specific use, as well as the dimensions, may be any according to requirements and

to the state of the art.

[0041] The disclosures in Italian Patent Application No. PD2002A000075 from which this application claims priority are incorporated herein by reference.

[0042] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. A plastic bottle, particularly for containing beverages, **characterized in that** it comprises a body (11) with portions (15,17,19) having a circular cross-section alternated with portions (16) having a quadrangular cross-section.
2. The plastic bottle according to claim 1, **characterized in that** said body (11) is cylindrical and comprises circumferentially, respectively at least on the upper part and on the lower part of said body (11), domed portions (14) that form, as a whole, for each part, at least one quadrangular contoured band (16).
3. The plastic bottle according to claim 1, **characterized in that** it comprises a body (11) that has a substantially quadrangular cross-section and, along said body, cylindrical narrower portions (18) that increase resistance to internal pressure without deformations.
4. The bottle according to claim 2, **characterized in that** there are four of said domed portions (14) for said at least one band (16).
5. The bottle according to claim 2, **characterized in that** each one of said domed portions (14) substantially has a semicircular profile.
6. The bottle according to claim 2, **characterized in that** said body (11) comprises four contoured quadrangular bands (16).
7. The bottle according to claim 6, **characterized in that** said cross-section of said bands (16) is substantially rectangular.
8. The bottle according to claim 2, **characterized in that** the thickness of the cylindrical body (11) of said bottle is greater than the thicknesses of said domed portions (14).
9. The bottle according to claim 2, **characterized in**

that the surfaces of said domed portions (14) meet the surface of the cylindrical part of said bottle at an angle which forms discontinuities (17).

10. The bottle according to claim 5, **characterized in that** said semicircular profile of each one of said domed portions (14) is eccentric with respect to the axis of said cylindrical body (11). 5

11. The bottle according to claim 7, **characterized in that** a line tangent to two of said domed portions (14) that are contiguous and belong to the longer side of a same said band (16) is also tangent to said cylindrical body (11). 10

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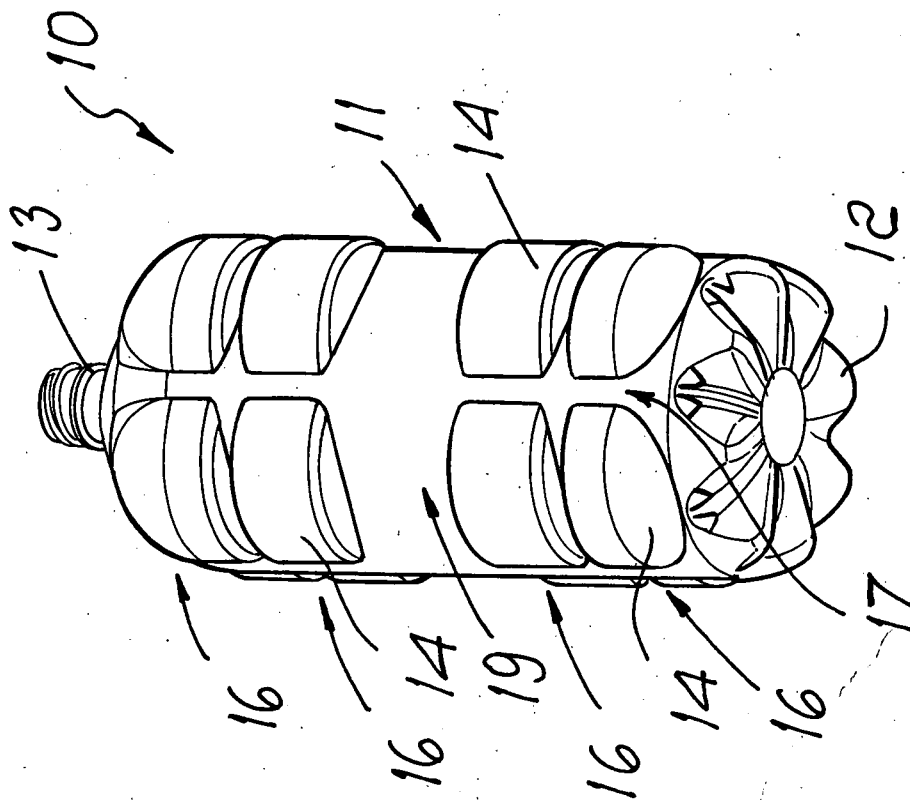


Fig. 2

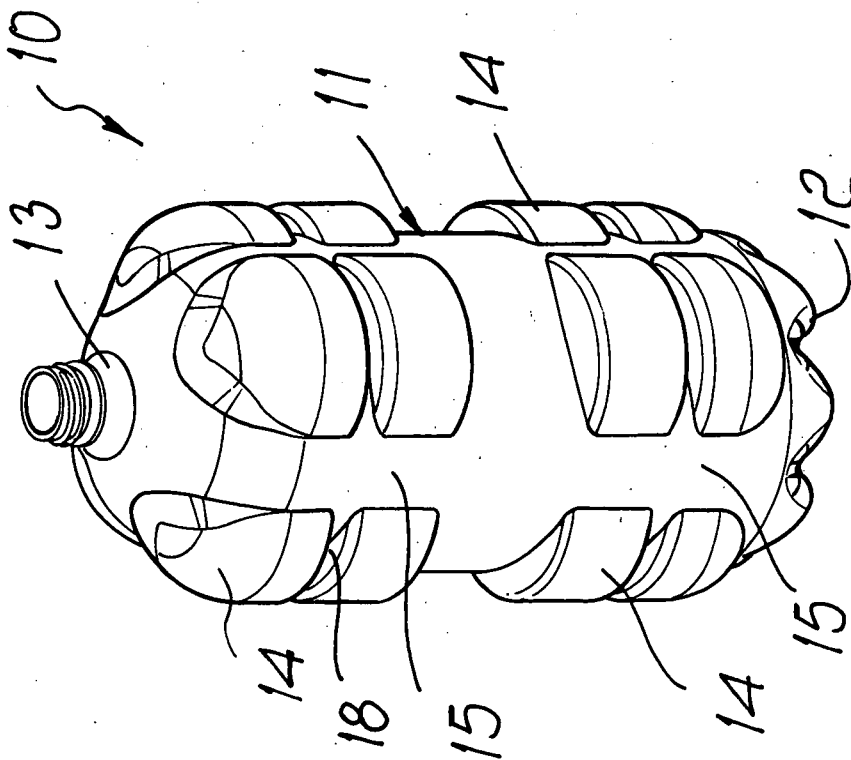


Fig. 1

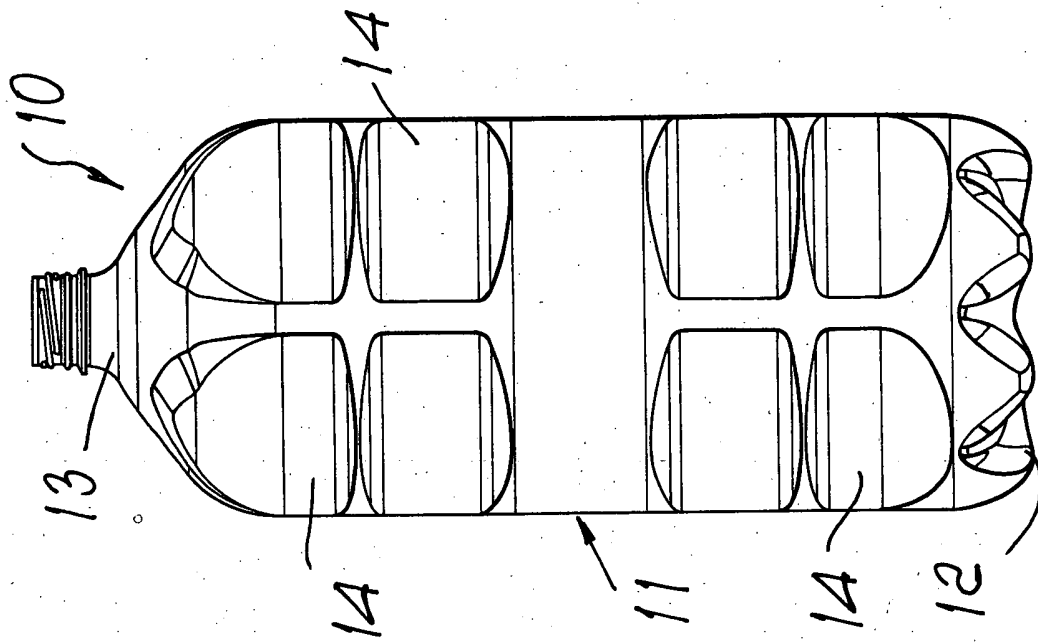


Fig. 4

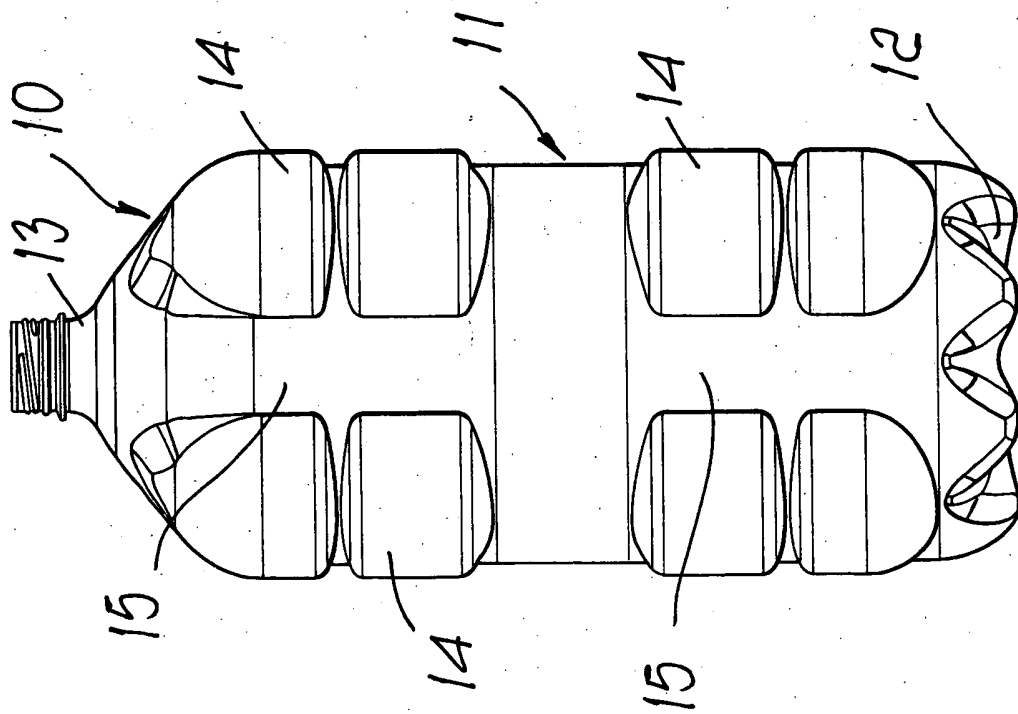


Fig. 3

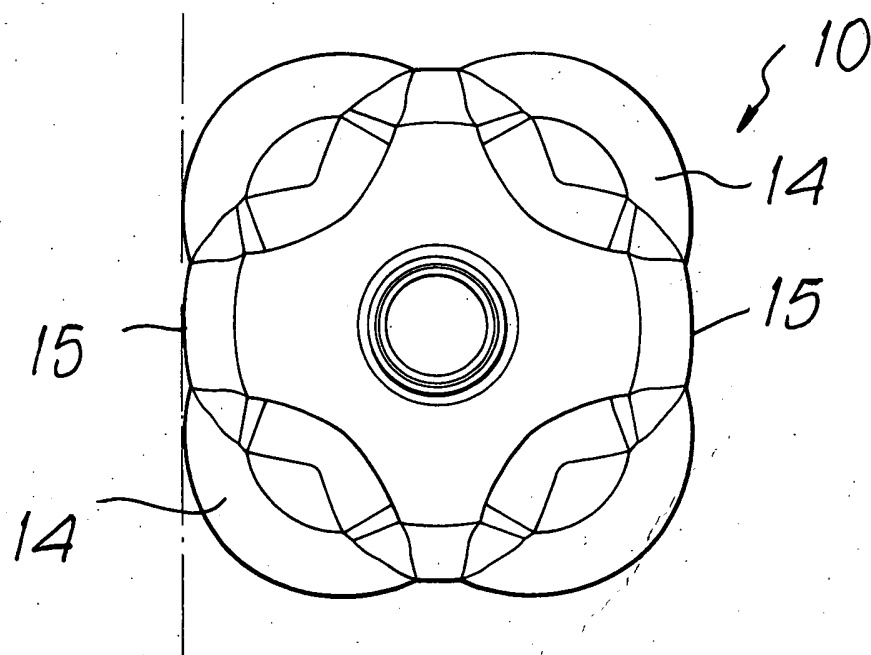


Fig. 5

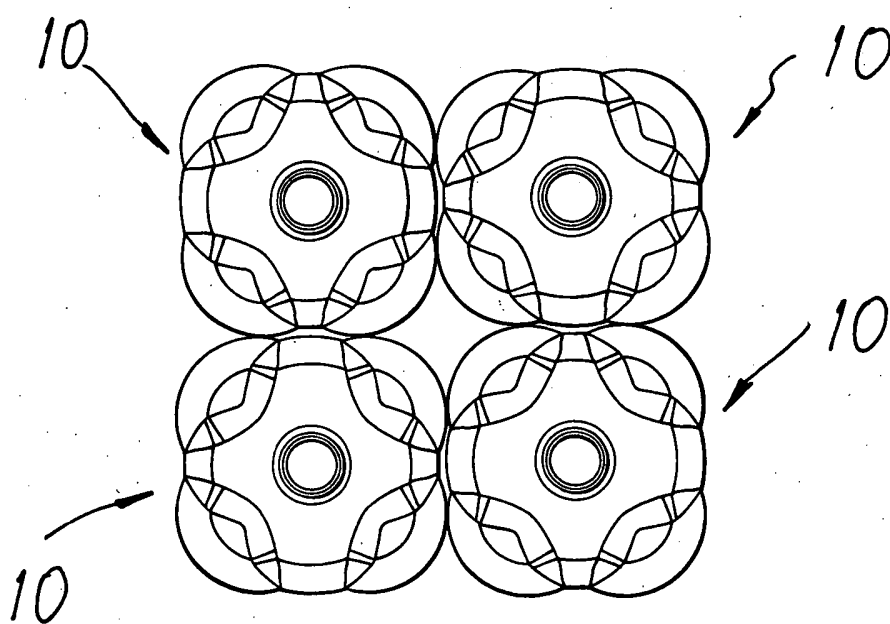


Fig. 6



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EUROPEAN SEARCH REPORT

Application Number
EP 03 00 3258

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A	EP 0 409 388 A (GRAHAM ENG CORP) 23 January 1991 (1991-01-23) * figures *	1	
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 June 2003	Examiner Fournier, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03 B2 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 03 00 3258

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