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(54) A squeezable bottle

(57) The proposed invention is intended to the squeezable plastic bottles.

The aim of the invention is to develop such a bottle which is remained squeezed under the effect of impact at the time of throwing into the waste container, in this way simplifying the manufacturing equipment and cutting back the manufacturing costs of the bottle.

The squeezable bottle from plastic, has the bottom (1), the top (2) with the opening (3) for pouring in and out the content, bellow-type side walls with horizontal bellow-type folds (4), with a rounded external ridge (5) of each of them; besides, there are bellow-type measures made in the bottle to retain the bottle in the squeezed position.

The new thing is that wall thickness (d) of each bellows fold (4) at the area of the external ridge (5) is 1.2 - 5 times smaller than the biggest thickness (D) of the walls (7; 8) of the bellows fold.

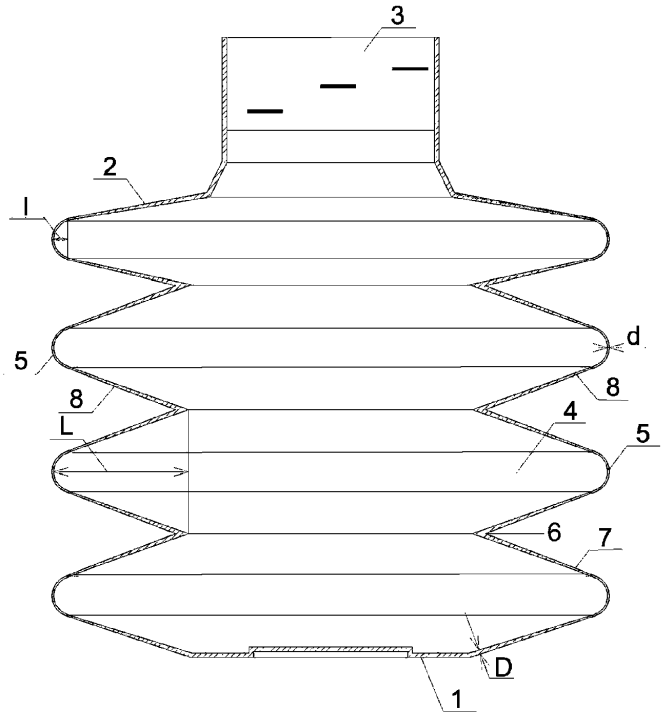

Fig. 1

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Description

Technical Field

[0001] The proposed invention relates to plastic bottles which after their emptying and before their dumping into a waste container may be squeezed to occupy less space, and may be applicable to bottles made from PET plastic.

Background Art

[0002] Since a squeezed bottle may loose up from impact at the time of dumping into the waste container and stretch out again, usually measures are made to retain the bottle in the squeezed position. Such measures have been applied in the European patent EP1706326, international class B65D 1/02, where a bottle made from PET plastic has a bottom, a top with an opening for pouring in and out the content, also bellow-type side walls with bellows folds parallel to the bottom which external ridge has an arched shape. The measures to retain the bottle in the squeezed position consist of embossed thickened elements arranged at intervals in a horizontal line in one wall of each bellows fold. These elements strengthen one wall of the bellows fold of the bottle. Due to difference between the strength of walls of the bellows fold, when the bottle is squeezed, if the stiffening elements are on the lower wall of the folds, the squeezed folds turn up to the top; and if these elements are on the upper wall of the folds - to the bottom, and thus the folds remain squeezed.

Summary of invention

[0003] The shortcoming of this decision to retain the bottle in the squeezed position is a complicated equipment for manufacturing such a bottle, because a number of recesses have to be made in the stamp form for forming the stiffening elements.

[0004] The aim of the present invention is to create such a bottle that remains squeezed under impact at the time of dumping into the waste container, and in this way to simplify the manufacturing equipment and to cut back the manufacturing costs of the bottle.

[0005] The aim may be achieved by the solution when in the known squeezable bottle from plastic, having a bottom and a top with an opening for pouring in and out the content, bellow-type side walls from horizontal bellow-type folds, with internal and external ridge, where the external ridge of each fold is rounded, as well as the measures in the bellow-type folds to retain the bottle in the squeezed position, the wall thickness of each bellows fold at the tip of external ridge is 1.2 - 5 times smaller than the biggest wall thickness of the bellows fold. The thickness of fold walls may be constant from the internal ridge of the fold to the rounded external ridge, and pass to the smallest thickness in the rounded external ridge, or, alternatively, the thickness of fold walls may gradually decrease starting from the biggest thickness at the internal ridge of the fold to the smallest thickness at the external ridge.

[0006] The length of central axis of the rounded external ridge of the fold in the horizontal direction makes 0.1 - 0.5 part of the total length of central axis of the fold.

[0007] Besides, the external contour of vertical section of the external ridge of the fold may form less than half of a circle, or half of a circle, or more than half of a circle, or any part of the said circle with continuation made of two walls of the fold, which central planes are parallel, and the length of the said continuation in the horizontal direction does not exceed 3 lengths of central axis of the rounded external ridge.

Brief description of drawings

[0008] The invention is explained by the drawings in which:

[0009] Figure 1 is a vertical section of schematic representation of the bottle according to the invention;

[0010] Figure 2 is a vertical section of schematic representation of the squeezed bottle;

[0011] Figure 3 is a schematic representation of the fold where external contour of vertical section of the rounded external ridge makes less than half of a circle;

[0012] Figure 4 is a schematic representation of the fold where external contour of vertical section of the rounded external ridge makes half of a circle;

[0013] Figure 5 is a schematic representation of the fold where external contour of vertical section of the rounded external ridge makes more than half of a circle;

[0014] Figure 6 is a vertical section of schematic representation of the fold where the rounded external ridge has a continuation;

[0015] Figure 7 is a vertical section of schematic representation of the fold where the thickness of walls gradually reduces from the internal towards the external ridge.

Description of embodiments

[0016] The proposed bottle has the bottom 1, the top 2 with the opening 3 for pouring in and out the content. Side walls of the bottle have a bellow-type shape and are made of the folds 4 with an external 5 and an internal 6 ridge and with the walls 7 and 8.

[0017] The external ridge 5 of each fold is rounded (Fig. Fig. 1;3 - 7). The length l of the axis of the rounded external ridge 5 in the horizontal direction makes 0.1-0.5 part of the total central axis length L of a fold. The thickness d of the wall of the bellows fold 4 at the tip of the external ridge 5 is 1.2 - 5 times smaller than the biggest thickness D of the walls 7 and 8 of the bellows fold 4. The thickness D of the walls 7 and 8 of the bellows fold 4 may be constant from the internal ridge 6 of the fold 4 to the rounded external ridge 5 and pass to the smallest thickness d in the rounded external ridge 5 (see Fig. Fig.

3 - 6). Also, as it is shown in Figures 1 and 7, the thickness D of the fold walls 7 and 8 may gradually reduce from the biggest thickness D at the internal ridge 6 of the fold 4 to the smallest thickness d in the rounded external ridge 5.

[0018] The external contour of vertical section of the rounded external ridge 5 of the fold 4 may make less than half of a circle (Fig. 3), half of a circle (Fig. 4), or more than half of a circle (Fig. 5). Also, the external ridge 5 may be formed of the rounded part having any of the forms shown in Figures 3, 4 and 5 with the continuation 9 formed of two parts of the fold 4 walls which central planes are parallel. The length l1 of the continuation 9 in the horizontal direction does not exceed 3 lengths l of the central axis of the rounded external ridge 5.

[0019] Examples of embodiment

[0020] Example 1.

[0021] The thickness of the walls 7 and 8 of the bellow-type side wall folds 4 of 0.1 litre volume bottle is gradually decreasing from the internal ridge 6 towards the external ridge 5, and the biggest thickness D at the internal ridge 6 is 0.10 mm, while the smallest wall thickness d at the tip of the external ridge 5 is 0.08 mm, i.e. 1.25 times smaller than the biggest thickness D of the walls 7 and 8 at the internal ridge 6. The axis length l of the external ridge 5 in the horizontal direction is 5.00 mm and makes 0.5 part of the axis length L of the fold 4 in the horizontal direction. L is equal to 10 mm.

[0022] Example 2.

[0023] The thickness D of the walls 7 and 8 of the bellow-type side wall folds 4 of 0.4 litre volume bottle is gradually decreasing from the internal ridge 6 towards the external ridge 5, and the biggest thickness D at the internal ridge 6 is 0.23 mm, while wall thickness d at the tip of the external ridge 5 is 0.07 mm, i.e. 3.28 times smaller than the biggest thickness D of the walls 7 and 8. The axis length l of the external ridge 5 in the horizontal direction is 3.5 mm and makes 0.26 part of the axis length L of fold 4 in the horizontal direction. L is equal to 13.3 mm.

[0024] Example 3.

[0025] The thickness D of the walls 7 and 8 of the bellow-type side wall folds 4 of 10 litres volume bottle from the internal ridge 6 to the external ridge 5 is the same and is 4.6 mm, while the thickness d of the rounded ridge 5 is 0.92 mm, i.e. 5 times smaller than the thickness D of the walls 7 and 8. The axis length l of the external ridge 5 in the horizontal direction is 8 mm and makes 0.1 part of the axis length L of the fold 4 in the horizontal direction. L is equal to 80 mm.

[0026] When the bottle is squeezed (Fig. 2), the walls 7 and 8 of the bellows fold 4 close up, whereas one side of the external ridges 5 of the bellows folds 4 is bent into the other side of the ridge 5 due to its thinned wall d and its rounded shape, and in this way remains squeezed and reliably maintains the bottle squeezed when it is dumped into the container.

[0027] The equipment for forming the proposed bottle from PET plastic by blowing is cheaper compared to the background art, since there is no need to make a number recesses in stamp form for forming the stiffening elements of the fold walls.

Claims

1. A squeezable bottle, having the bottom (1), the top (2) with the opening (3) for pouring in and out the content, the bellow-type side walls with the horizontal bellow-type folds (4), with the internal (6) and external (5) ridge, where the external ridge (5) of each fold is rounded, and the means in the bellow-type folds to retain the bottle in the squeezed position, **characterised in that** the wall thickness (d) of the bellows fold (4) at the tip of external ridge (5) of the fold (4) is 1.2 - 5 times smaller than the biggest thickness (D) of the walls (7; 8) of the bellows fold (4); or the thickness (D) of the walls (7; 8) of the bellows fold (4) may be constant from the internal ridge (6) of the fold (4) to the rounded external ridge (5) and pass to the smallest thickness (d) in the rounded external ridge (5); or the thickness of the fold walls (7; 8) may gradually decrease, starting with the biggest thickness (D) at the internal ridge (6) of the fold to the smallest thickness (d) in the external ridge (5); besides, the central axis length (l) of the rounded external ridge of the fold in the horizontal direction makes 0.1 - 0.5 part of the total central axis length (L) of the fold.

2. A squeezable bottle according to the claim 1, **characterised in that** the external contour of vertical section of the external ridge (5) of the fold may form less than half of a circle, or half of a circle, or more than half of a circle, or any said part of the circle with continuation (9) comprised of the two parts of the fold walls which central planes are parallel.

3. A squeezable bottle according to the claim 2, **characterised in that** the length (l 1) of the said continuation (9) in the horizontal direction does not exceed 3 lengths (l) of central axis of the rounded external ridge.

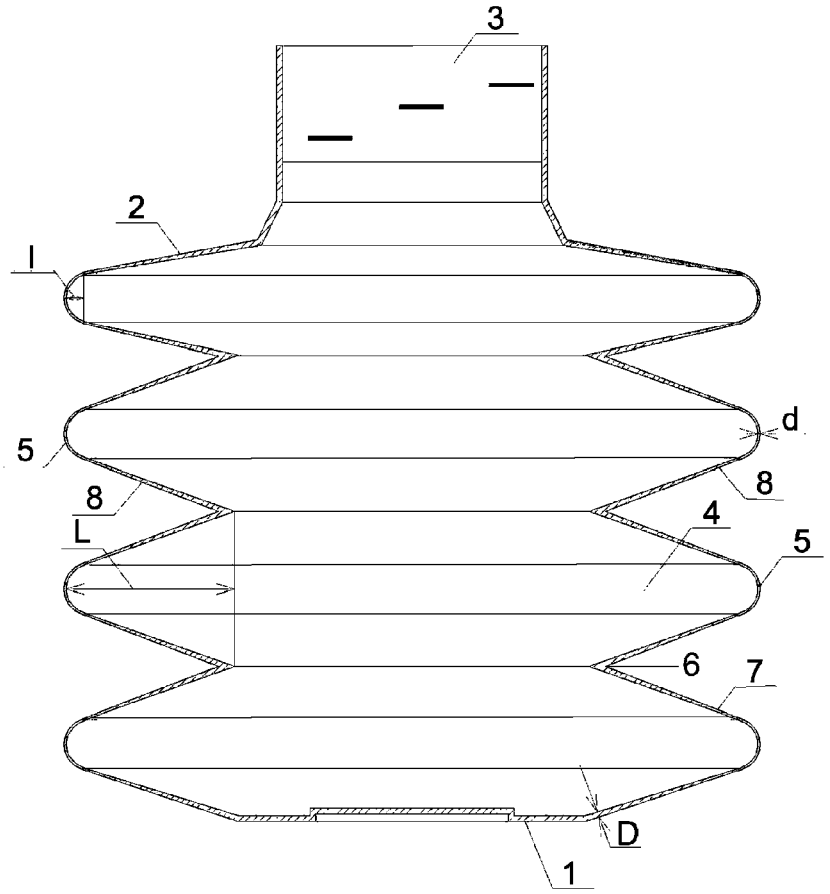

Fig. 1

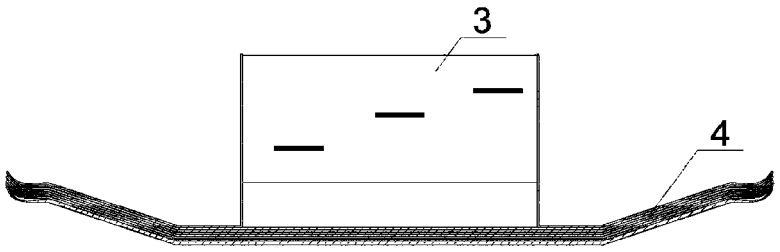

Fig. 2

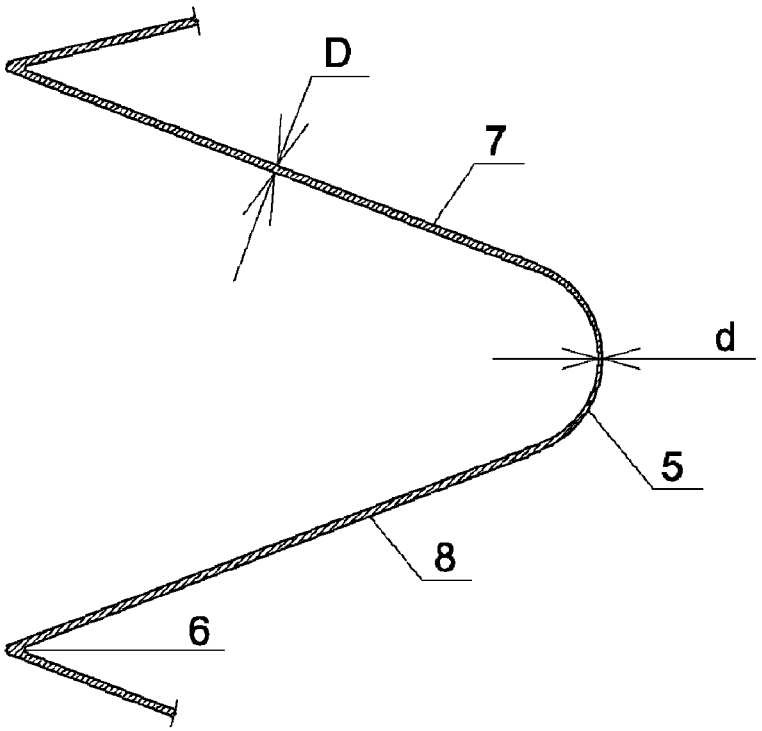

Fig. 3

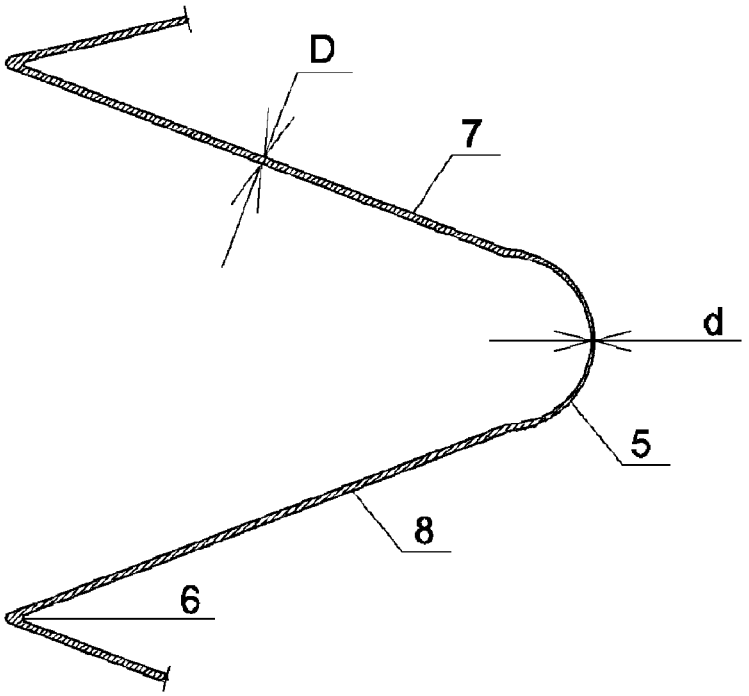

Fig. 4

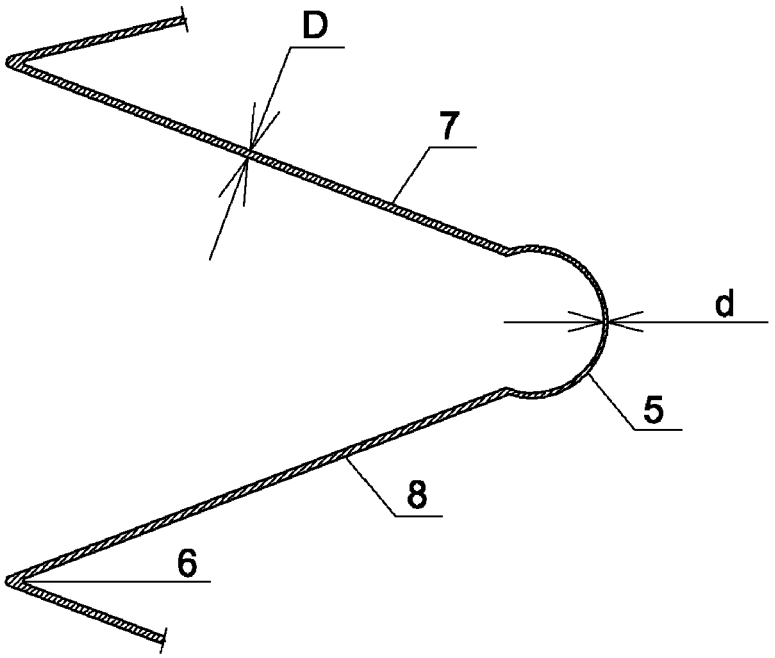

Fig. 5

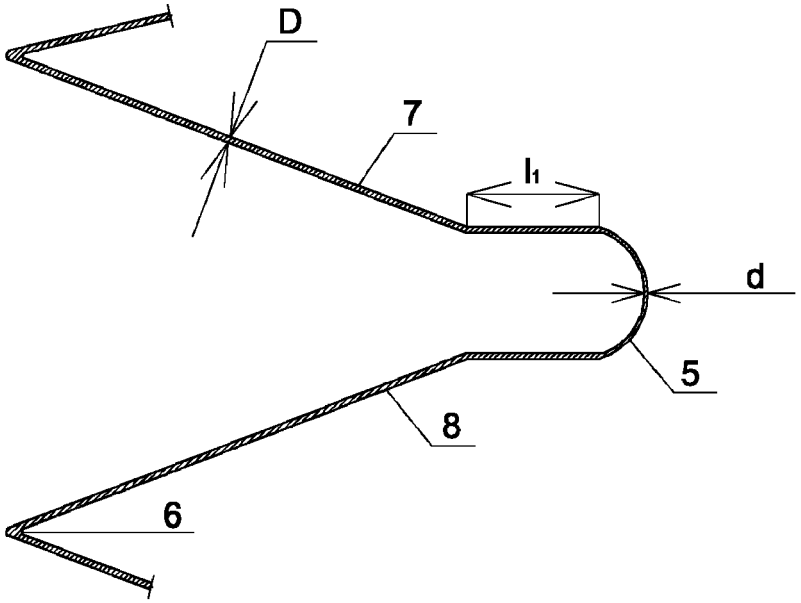

Fig. 6

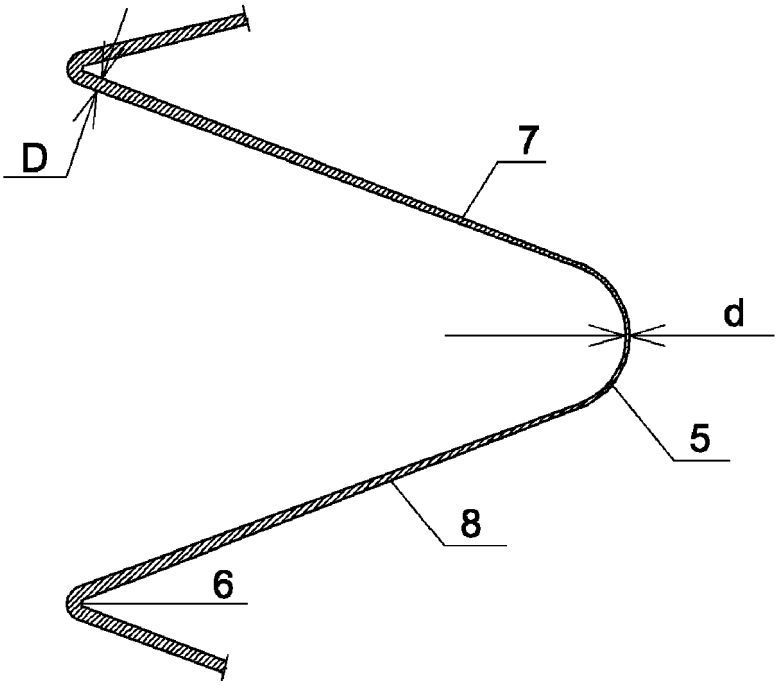

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 10 18 8830

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2004/040972 A1 (HAJ KALIL [US]) 4 March 2004 (2004-03-04) * paragraph [0025]; figure 3 *	1-3	INV. B65D1/02
X	US 6 105 815 A (MAZDA MASAYOSI [JP]) 22 August 2000 (2000-08-22) * figures *	1-3	
A	DE 195 10 846 A1 (GEBELEIN DIETER [DE]; ROEHRNBACHER EMMERICH [DE]) 26 September 1996 (1996-09-26) * the whole document *	1-3	
A	WO 03/035485 A1 (ALPLA WERKE [AT]; PALM DIETER [DE]) 1 May 2003 (2003-05-01) * figures *	1-3	
A	DE 20 42 593 A1 (HEFENDEHL HANSFRIEDRICH) 16 March 1972 (1972-03-16) * figures *	1-3	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	14 January 2011	Vigilante, Marco

CATEGORY OF CITED DOCUMENTS

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14-01-2011

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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- EP 1706326 A **[0002]**