

IMPROVED CONTAINER BASE.

This invention relates to a container such as, for example, plastic containers, and in particular to a base of such containers.

Plastic containers are well known and accepted as being convenient for the sale and storage of matter such as, for example, liquids, and are in day to day use in Australia and throughout the world. In many cases such containers are in the form of bottles, which are filled with liquids for storage, sale and use. Such containers have varying forms of bases, which are intended to provide stability to the bottles once filled and especially for the purposes of packaging, delivery and use.

It has however, become a problem that in the filling of some containers, apparatus and machinery is used which pressurises the containers.

The containers that are generally used are usually of a substantially cylindrical shape having a substantially circular cross section, the bases often including a substantially recessed or concave base formation, there often being provided a substantially circumferential curved turned over, or rib portion extending about the base, upon which the container rests. It has however, been found that in these forms of containers, and in other forms of containers, (as at present available), serious problems arise when the containers are pressurised during filling. It should be appreciated that when containers are filled, it is often necessary to use filling apparatus and machinery which pressurises the containers. The result of this pressurisation during filling, is often that the base of the container (as described hereinbefore), is deformed (for example, outwardly), so that the base is of an irregular formation. On pressure being released such container bases do not return to their original shape or 'mode', and thus will not stand upright, and will often fall over. Clearly, this is a serious problem from the point of view of marketing products in such containers, and in particular, from the point of view of using containers, wherein it is desired to package and store the containers both during marketing and use.

It is therefore an object of this invention to go some way towards overcoming or at least minimising these problems.

Other objects of this invention will become apparent from the following description.

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According to one aspect of this invention there is provided a plastic container having a base of a substantially circular cross section; an underside of said base in a normal mode, being of a generally inverted or concave configuration; a plurality of spaced apart ribs extending circumferentially about and inwardly of said substantially concave base so as to form a plurality of circumferentially spaced apart inwardly extending feet therebetween; said ribs and feet extending inwardly from the circumference of said base but so as to be spaced apart from a central portion thereof; the arrangement being such that the provision of said ribs and feet in said concave base, causes said base to spring back into said normal mode after having being pressurised during filling.

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This invention will now be described by way of example only and with reference to the accompanying drawings, which are included by way of example only and wherein:

Figure 1: Is a side view of a base of a container according to one form of the present invention.

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Figure 2: Is a bottom view of a container according to one form of the present invention.

Figure 3: Is a side sectional view of a base of a container according to a further form of the present invention.

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Figure 4: Is a further side sectional view of a base of a container, according to a further aspect of the present invention.

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The present invention would be described by way of example only, with reference to these drawings and it should be appreciated that modifications and improvements may be made to the invention without departing from the scope or spirit thereof.

- 5 As discussed hereinbefore, real problems have arisen previously with plastic containers having a substantially recessed and substantially concave base, with a circumferential rib extending thereabout, to act as a supporting base. As discussed, when such containers are pressurised, the base becomes deformed so that real difficulties arise when pressure is released, and the container bases retain their deformed shape, such that such containers
10 do not stand properly, and often fall over, this bringing about real problems and disadvantages insofar as the packaging, marketing, display and use thereof are concerned.

- The present invention provides a container with a base which is formed so that if the
15 container is pressurised during filling, the formation of the base will cause the plastic base to spring back into its normal mode or position, so that it is able to stand upright for the purposes of packaging, marketing, display and use, and so as to overcome the disadvantages apparent in known containers (as discussed hereinbefore).

- 20 It should be appreciated that if a heavy enough plastic material (ie: a thick enough plastic material) is used, this will overcome the above problems, because container bases formed of such a heavy material, will not be subject to such disadvantageous deforming on pressure fully. It is however, desired to keep the plastic material as light (ie: thin) as possible, from a commercial and in particular cost point of view. Thus the containers and
25 bases used up until this time, and in respect of which problems have arisen (as discussed hereinbefore) have been of a generally lightweight plastic material. The container bases of the present invention are also of a lightweight plastic material, and are generally formed so that the outer rim of the base has a thickness less than 0.7mm. Preferably, the outer rim thickness can be less than 0.4 - 0.5mm. These are however, by way of example
30 only.

The present invention involves the use of a known container, of a generally cylindrical formation having a substantially circular cross section. As will be appreciated, the invention has application to containers and bottles of varying sizes and dimensions. Such sizes and dimensions will depend greatly upon the desires of a manufacturer and user, and the use to which the container is to be put. By way of example only, and for the purpose of packaging and using the container to hold liquids, containers can vary from 500ml to 1.5 litres or 2.0 litres. These are however by way of example only.

The present invention provides a base formation 1 of a substantially concave section, as shown in the accompanying drawings. As discussed previously, the use of such concave sections is normally associated with an outer rib or raised portion which attempts to add stability to the container. That is for the purpose of standing. As discussed, one of the problems has been that in pressurising containers during filling, the concave base tends to be pressured outwardly, this affecting the base as a whole and causing substantial instability.

In the base of the present invention, the concave base 2 is provided with a plurality of inwardly extending and circumferentially spaced apart inwardly extending ribs 3, which extend from the periphery of the base 4 inwardly towards the central portion 5 of the concave base 2, but which are stopped short of the central portion 5 of the concave base 2, such as shown in the accompanying drawings. These circumferentially spaced apart ribs 3 defined between them a plurality of feet 6 having foot pads 8, having substantially flat or planar undersides. The circumferentially spaced apart ribs 3 and feet 6 therebetween extend radially in towards the centre 5 of the concave base 2, but are spaced apart from the centre 5 of that base 2. As will be appreciated from the above, the number of circumferentially spaced apart ribs 3 and feet 6 can vary depending upon the sizes of the container. In this 'first mode' the container base has qualities of stability. It has however been found that when such containers are pressurised, during filling, the concave base 3 and feet 6 will be deformed outwardly, except that the combination of the concave base 3 and circumferentially spaced apart ribs 3 separating the feet 6, imparts an essentially "spring" effect to the base, so that when the pressure is released, following filling, the base will return to its first mode which will impart stability to the

container. This compares greatly with existing containers, wherein following the application of pressure during filling, the base is deformed and remains in that deformed condition, so as to impart instability to the base.

5 It should be appreciated that the invention has particular application to relatively lightweight materials, and therefore enables containers to be constructed of a relatively lightweight plastic material, as compared with a heavier material. It should of course be appreciated that the problems outlined above will be overcome or minimised substantially, by merely moulding a container with a known base (such as referred to
10 hereinbefore), of sufficient plastic so that the base is of a thickness and strength such as to resist deforming which might result from the application of pressure. The object of the invention however, is to allow a container of a relatively lightweight plastic material to be manufactured and used to advantage, this being a substantial advantage from a cost point of view. Such advantages have not however, been able to be achieved previously.

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We will now refer by way of example only, to examples of containers in the form of bottles formed utilising the base of the present invention.

EXAMPLE NO. 1 - 500ML BOTTLE

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A 500ml bottle was moulded having a bottle diameter of 71mm. This bottle also had a bearing surface diameter of 54mm. The bottle was provided with twelve (12) feet, each having a foot pad width of 6.6mm. The angular spacing between each foot was 30°, the ribs having a depth of 3mm. The ribs are of a length extending in from the circumference,
25 of 17.8mm.

EXAMPLE NO. 2 - 500ML BOTTLE

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This bottle had a diameter of 70.5mm with a bearing surface diameter of 55.6mm. The bottle has twelve (12) feet with foot pad width being 6.6mm. The angular spacing between said feet was 30° and the rib depth was 3mm. The length of the ribs extending inwardly from the circumference of said base is 17.8mm.

EXAMPLE NO. 3 - 500ML BOTTLE

5 This bottle has a diameter of 71.5mm and a bearing surface of 54mm. The container also has twelve (12) feet with the angular spacing between said feet being 30°. The foot pad width of each foot was 6.6mm. The rib depth is 3mm and the length, extending inwardly from the circumference of the base, is 17.8mm.

EXAMPLE NO. 4 - 1.5 LITRE BOTTLE

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This bottle has a diameter of 92mm with a bearing surface of 70mm. The bottle is provided with fourteen (14) feet, there being an angular spacing between each foot of 26°. The width of each foot pad is 6.6mm. The rib depth is 4.5mm, and the length of each rib extending inwardly from the circumference of the base is 29mm.

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EXAMPLE NO. 5 - 2.0 LITRE BOTTLE

20 This bottle has a diameter of 105mm, with a bearing surface diameter of 83.4mm with a foot pad width of 6.6mm with a angular space between said feet of 24°. The rib depth of each rib between the feet, is 6mm and the length of each rib extending inwardly from the circumference of the base is 33.0mm.

25 The above are by way of example only, but are examples of containers manufactured and used, incorporating the present invention and which have exhibited the substantial advantages of the present invention over known arrangements.

30 It has however, been found to be substantially advantageous of the present invention, to maintain the foot pad of each foot, as shown in the accompanying drawings, the width of 6.6mm. This has been found to be particularly advantageous in maintaining the containers in a desired upright or standing position, with the container ~~is~~ in its first mode, that is before and after pressurisation during filling.

It should be appreciated therefore that the present invention provides a container base with substantial advantages over containers known up until this time, and in particular a container base which is able to be pressurised during filling, but which will, due to the "spring" nature of the base, given the particular formation of the base described
5 hereinbefore, returns to its original mode or formation, such as to retain the container or bottle in its desired upright position. This compares substantially with the known containers, wherein substantial problems arise with lightweight materials, because the bases do not return sufficiently to their original position, and therefore remain deformed so as to be unstable.

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It should be appreciated that modifications and improvements may be made to this invention without departing from the scope thereof as defined by the appended claims.



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REPLACED

THE CLAIMS DEFINING THIS INVENTION ARE AS FOLLOWS:

1. A plastic container having a base of a substantially circular cross section; an underside of said base in a normal mode, being of a generally inverted or concave configuration; a plurality of spaced apart ribs extending circumferentially about and inwardly of said substantially concave base so as to form a plurality of circumferentially spaced apart and inwardly extending feet therebetween; said ribs and feet extending inwardly from the circumference of said base but so as to be spaced apart from a central portion thereof, the arrangement being such that the provision of said ribs and feet in said concave base, causes said base to spring back to said normal mode after having been pressurised during filling.
2. A plastic container as claimed in claim 1, wherein said inwardly extending feet are provided with foot pads having a foot pad width of 6.6mm.
3. A plastic container as claimed in claim 1 or claim 2, wherein said base is formed of a lightweight plastics material.

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ABSTRACT

IMPROVED CONTAINER BASE

A base for plastic container is of a substantially circular cross section and of a generally inverted or concave configuration; a plurality of spaced apart ribs extend circumferentially about and inwardly of the concave base so as to form a plurality of circumferentially spaced apart inwardly extending feet therebetween; said ribs and feet extend inwardly from the circumference of the base but are spaced apart from a central portion thereof, the arrangement between such that the provision of said ribs and feet in said concave base, causes said base to spring back to its normal mode after having been pressurised during filling.

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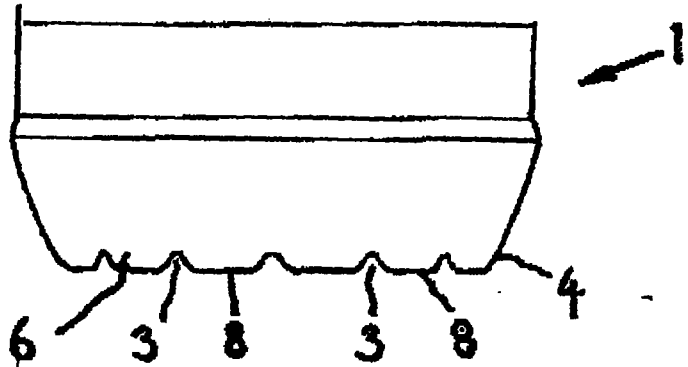


FIGURE 1

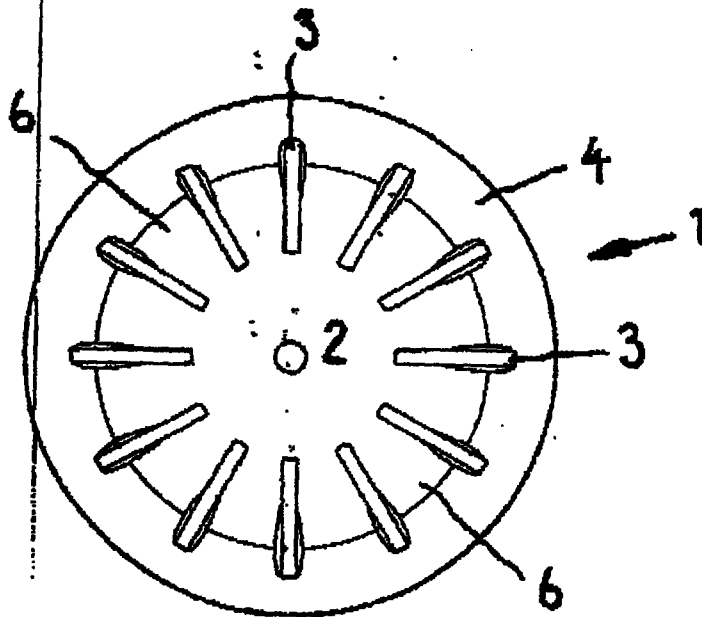


FIGURE 2

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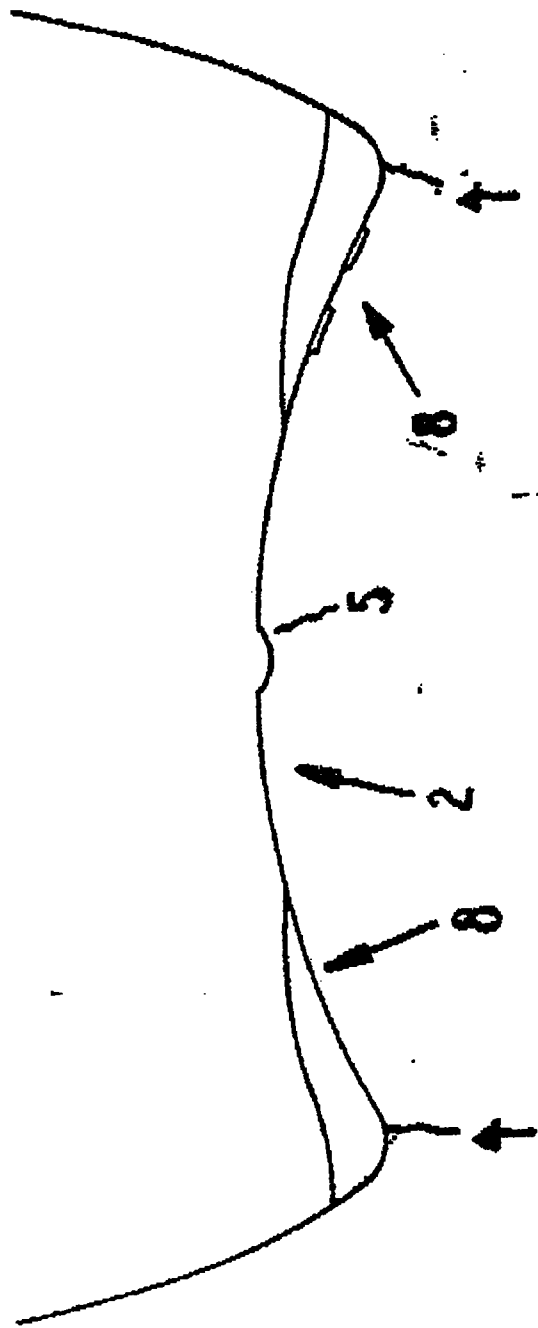


FIGURE 3



FIGURE 4

REPLACEMENT SHEET

Date **26 MAR 1996**

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ABSTRACT

IMPROVED CONTAINER BASE

A base for plastic container is of a substantially circular cross section and of a generally inverted or concave configuration; a plurality of spaced apart ribs extend circumferentially about and inwardly of the concave base so as to form a plurality of circumferentially spaced apart inwardly extending feet therebetween; said ribs and feet extend inwardly from the circumference of the base but are spaced apart from a central portion thereof, the arrangement between such that the provision of said ribs and feet in said concave base, causes said base to spring back to its normal mode after having been pressurised during filling.

(Figure 1)

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TEXT OF THE ABSTRACT

A plastic container has a base (1) of substantially circular cross section, the underside of the base having a generally concave shape (2) and comprising a plurality of grooves (3) with foot portions (6) formed between the grooves and pads (8) being provided for the foot portions, the grooves and the foot portions extending towards the centre (5) from the periphery (4) but stopping short of the central portion; the provision of the grooves and foot portions causing the base to spring back to the concave position after having been pressurised during filling. Preferably the foot pads have a width of 6.6mm and have substantially planar undersides. Preferably the container is formed of lightweight plastic material.

Fig. 1, 2.

REPLACEMENT SHEET

Date .. 24 OCT 1996 ..

Date 19 AUG 1997

**THE CLAIMS DEFINING THIS INVENTION ARE AS FOLLOWS:**

1. A thin walled plastic container for non or very low carbonated beverages having a base of a substantially circular cross section; an underside of said base in a normal mode, being of a generally inverted or concave configuration; a plurality of spaced apart ribs extending circumferentially about and inwardly of said substantially concave base so as to form a plurality of circumferentially spaced apart and inwardly extending feet therebetween; said ribs and feet extending inwardly from the circumference of said base but so as to be spaced apart from a central portion thereof; wherein, the wall of the base is of sufficient thinness such that when counter pressure is applied to the base during filling of the container, the base is able to flex outward and when said counter pressure is at least partially released the base returns to its original configuration; wherein the degree of flexing is commensurate with the reduction in the counter pressure.
2. A plastic container as claimed in claim 1, wherein said inwardly extending feet are provided with foot pads having a foot pad width of 6.6mm.
3. A plastic container as claimed in claim 1 or claim 2, wherein said base is formed of a lightweight plastics material.

AMENDED SHEET