(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 225 155**
A2

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **86309187.2**

(22) Date of filing: **25.11.86**

(51) Int. Cl.[4]: **B 65 D 1/02**

(30) Priority: **27.11.85 GB 8529234**

(43) Date of publication of application:
10.06.87 Bulletin 87/24

(84) Designated Contracting States: **DE FR GB**

(71) Applicant: **MENDLE BROTHERS LIMITED**
Wattstown Porth Rhondda
Mid Glamorgan CF39 OPB Wales (GB)

(72) Inventor: **Riemer, Horst Hermann**
24 Pandy Close Merthyr Tydfil
Mid Glamorgan CF47 8PB Wales (GB)

(74) Representative: **Jennings, Guy Kenneth**
GILL JENNINGS & EVERY 53-64 Chancery Lane
London WC2A 1HN (GB)

(54) **Bottle.**

(57) In order to withstand internal pressure a plastics bottle (1) has a base formed with a number (such as seven) of identical, equi-angularly spaced foot portions (3) separated by relatively narrow, effectively parallel-sided grooves (4). The feet project below the central portion (6) which is thickened at (13) and together with the lower surfaces of the feet forms a smooth re-entrant shape braced by the portions of the wall defining the bottoms of the grooves (14), each in the form of a smooth curve. The bottle is stable and satisfactory for use on a chain conveyor.

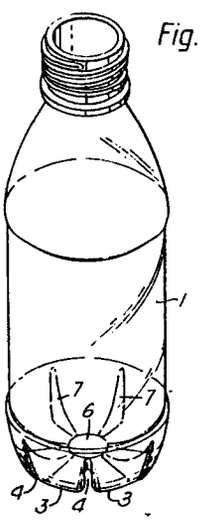

Fig. 1.

EP 0 225 155 A2

Description

BOTTLE

This invention relates to bottles of the type used for sparkling wines and other carbonated beverages, that is to say bottles designed to withstand the internal pressure of the dissolved gas. It is the bottom of the bottle which represents the area of weakness in resisting the internal pressure, and bottles for champagne and other sparkling wines have traditionally had re-entrant-shaped bottoms, usually conical. This leaves a flat area around the re-entrant portion and does not affect the stability of the bottle. There has been a recent trend towards plastics bottles, for carbonated beverages rather than for wines, and here the traditional solution cannot be exactly replicated since the moulding of the re-entrant portion in the bottom leads to an area of weakness in the plastics material between the edge of the re-entrant portion and the side of the bottle.

An alternative solution, therefore, is to dome the bottom of the bottle outwardly to form an arch-shaped configuration when seen in cross section. This creates no moulding problems and is ideally suited to resist the internal pressure. However, it does, of course, mean that the bottle is incapable of standing upright without support and it is therefore necessary to provide a base cup which may be added as an extra to the bottle and in which the bottom of the bottle sits. This is quite satisfactory, but adds appreciably to the overall cost of the bottle.

With this in view, various attempts have been made to modify the shape of the domed bottom so as to form foot portions and thus to render the bottle self-supporting without the need for an additional cup. It is possible to do this without sacrificing the pressure-resisting properties of the domed bottom, but this in its turn leads to further problems, which are primarily concerned with the filling of the bottles on automatic bottling machines. On these machines, the bottles have to be transported to the filling heads at high speed on chain conveyors. The stability of each bottle is obviously very much less when it is empty and there is the risk that any projecting feet will get caught in the chain mechanism. Particular disadvantages arise from the fact that the diameter of the circle through the outer extremities of the foot portions is appreciably less than the diameter of the bottle itself so that the bottle is effectively standing on a base of reduced diameter and also from the fact that the spaces between the foot portions can be entered by parts of the chain mechanism and thus cause a jam. Attempts to overcome these disadvantages have detracted from the effectiveness of the pressure-resisting properties of the bottom of the bottle.

The present invention is based on the general concept of foot portions which are so shaped as to provide an effective base of diameter only slightly less than that of the bottle itself, with gaps between them too small for the entry of parts of the chain mechanism and providing pressure resistance by giving the central region within the foot portions a re-entrant shape, that is to say departing from any attempt to maintain an effectively outwardly domed configuration.

Thus, according to the present invention, the peripheral portion of the base of a bottle of this kind is formed as a number of identical equi-angularly spaced foot portions separated by relatively narrow, effectively parallel-sided grooves and projecting below the central portion which, together with the lower surfaces of the foot portions forms a smooth re-entrant shape.

Preferably the portions of the wall of the bottle defining the bottoms of the grooves are each in the form of a smooth curve bracing the central re-entrant portion. It is found that a minimum of four such foot portions is essential, although as many as twelve are possible, and that the preferred number is odd, seven feet giving best results. The advantage of an odd number such as seven is that a groove on one side of the base is opposite a foot portion on the other side so that no groove forms a continuation of any other groove which might possibly lead to slight risks of engagement with the conveyor mechanism.

As just stated, the central, re-entrant portion is braced by the portions of the wall defining the bottoms of the grooves and its stability is preferably further increased by localised thickening of the material of the wall in this region. This result can be achieved without difficulty by the well-known process of injection-blow-stretch moulding and best results are found to be obtained by the use of PVC which is automatically orientated by the final stretching step of the moulding process. It is well known that orientated PVC leads to enhanced strength, but similar results can be obtained by the use of various other plastics materials which can be moulded by this same process.

An example of bottle in accordance with the invention will now be described in more detail with reference to the accompanying drawings, in which:-

Figure I is a perspective view;

Figure 2 is an underneath plan view; and

Figure 3 is a cross-sectional view to an enlarged scale of one half of the base of the bottle shown in Figure I.

Apart from the shape of its base, the bottle I shown in Figure I is of a standard type and size for the reception of carbonated soft drinks. If the base were merely flat, the internal gas pressure would cause it to bulge outwardly and the bottle would not be able to stand upright. It is the shaping of the base shown in the various Figures of the drawings which gives the bottle enhanced stability, enabling it to stand upright, whether full or empty,both on a normal flat surface and also when travelling at high speed on the chain conveyor of an automatic bottling machine. The configuration of base which makes this possible will now be described in more detail.

Referring first to the underneath plan view of

Figure 2, it will be seen that the base comprises seven lobe-like foot portions 3 which are separated from one another by relatively narrow grooves 4 which, as seen in this view, are substantially parallel-sided and are sufficiently narrow to prevent the entrance of parts of the chain conveyor mechanism. In a particular example, these grooves may be approximately 2 mm wide, but in more general terms, they may range in width between I mm and 4 mm. The fact that there are seven foot portions as illustrated in Figure 2 means that no groove 4 is directly opposite any other groove which might otherwise increase the risk of interference with the chain mechanism owing to the presence of an effectively continuous groove across the full width of the base. However, this is not an essential requirement and, as mentioned above, a minimum number of four foot portions is possible which does, of course, have pairs of grooves opposite one another.

Figure I shows the shape of each foot portion 3 and the intervening grooves 4 when seen in elevation. As can be seen, the width across the outside edges of the foot portions is only slightly less than the full diameter of the bottle and thus inherently leads to enhanced stability. The central portions of the grooves 4 are substantially parallel-sided, but their upper ends taper slightly and end in a rounded top when seen in this direction.

The bottle seen in Figure I is transparent, so that the shape of a central, re-entrant portion 6 can clearly be seen, as can the shape of the portions of the wall defining the bottoms of the grooves which are shown as 7. This shaping is shown in more detail in the enlarged sectional view of Figure 3.

From this it can be seen that the wall of a foot portion 3 extends upwardly in a smooth curve to merge with the side of the bottle at II and that the diameter of the effective base provided by the foot portions 3 is only slightly less than the full diameter of the bottle by a dimension which is indicated in Figure 3 as A. At its other end at I2, the wall of the foot portion 3 merges smoothly into the central re-entrant portion 6. As seen in both Figures I and 3, this shaping is such as to resist the internal pressure and is further strengthened by increased wall thickness as indicated at I3. The wall of the groove 4 which separates the foot portion 3 from the next portion, is shown as I4 and extends smoothly from the wall of the bottle at II to the edge of the portion 6 at I5. These wall portions I4 form a system of rigid ties which brace the central portion 6 at intervals around its circumference and thus provide a rigid, pressure resistant structure.

Claims

I. A plastics bottle designed to withstand internal pressure and having a base of which the peripheral portion is formed as a number of identical, equi-angularly spaced foot portions separated by relatively narrow, effectively parallel-sided grooves and projecting below the central portion which, together with the lower surfaces of the foot portions forms a smooth re-entrant shape.

2. A bottle according to claim I, in which the portions of the wall of the bottle defining the bottoms of the grooves are each in the form of a smooth curve bracing the central re-entrant portion.

3. A bottle according to claim I or claim 2 in which the wall of the bottle is locally thickened in the region of the central re-entrant portion.

4. A bottle according to any one of the preceding claims in which the number of feet is odd.

5. A bottle according to claim 4 in which there are seven feet.

6. A bottle according to any one of the preceding claims in which the width of each groove is between I and 4 millimetres.

Fig. 1.

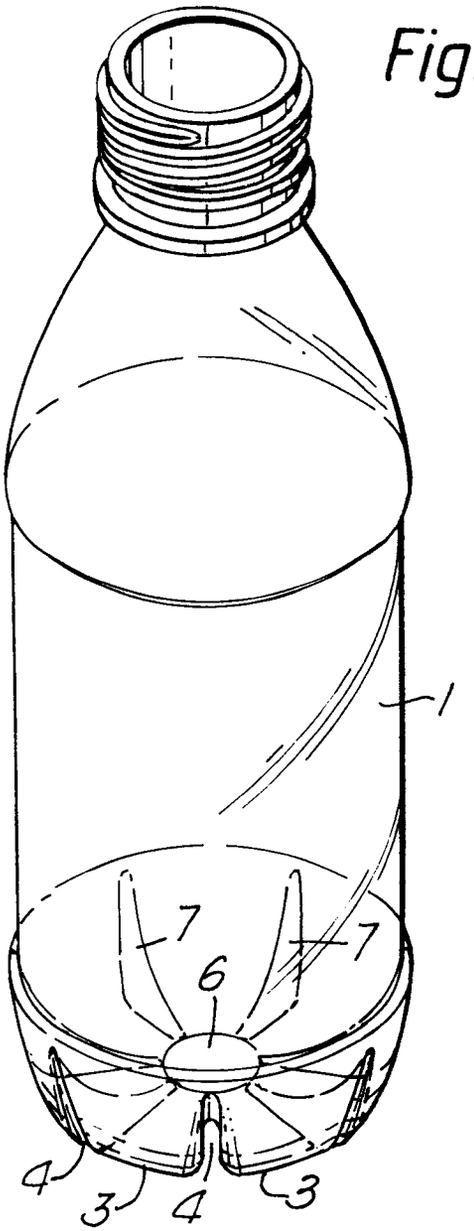

Fig. 2.

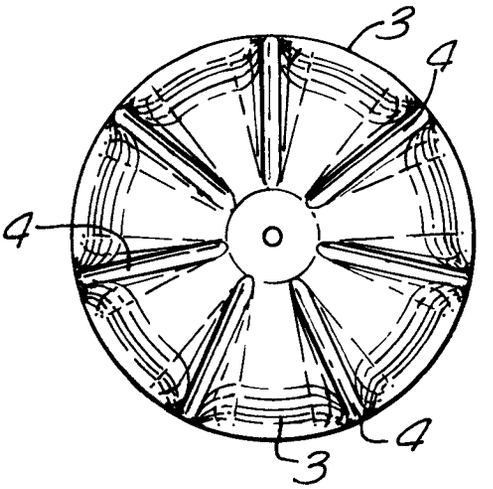

Fig. 3.