

PATENT SPECIFICATION

(11) 1 443 419

1 443 419

- (21) Application No. 37819/72 (22) Filed 14 Aug. 1972
 (23) Complete Specification filed 9 Aug. 1973
 (44) Complete Specification published 21 July 1976
 (51) INT CL² B65D 25/10
 (52) Index at acceptance B8P 6A 6B4 6E1 6HX 8J
 (72) Inventors PETER LEONARD MEAD and HERBERT JAMES HOLLIDAY



(54) IMPROVEMENTS IN OR RELATING TO CRATES

(71) We, GPG HOLDINGS LIMITED of Cranford, Blackdown, Leamington Spa, Warwickshire, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to plastics moulded crates and is particularly concerned with a plastics moulded bottle crate of the kind (hereinafter referred to as "the kind specified") comprising a laterally extending base, side walls extending upwardly from the base and partitioning means which form an array of compartments within the crate and in each of which compartments a bottle is intended to be located.

Plastics moulded crates of the kind specified are well known in the art as being of generally rectangular parallelepiped shape with the partitioning means forming by themselves, or together with the side walls, compartments which are located in rows extending lengthwise and widthwise of the crate and each of which compartments is substantially square in plan to receive an upstanding, usually cylindrically walled, bottle (such as a conventional beer bottle).

The partitioning means, which may be in the form of crossing partition walls extending parallel to the side walls lengthwise and widthwise of the crate (for example as per the crate shown in British Patent No. 952,979) or may be in the form of pinnacles or columns which extend upwardly from the base of the crate at positions corresponding to the corners of the compartments (for example as per the crate shown in Figure 1 of British Patent No. 943,947), are primarily intended to prevent bottles received in the compartments from knocking against each other during transport and handling. Hitherto the bottles have been closely received within their compartments both to maintain the size of the crate at a minimum and also to prevent undue movement of each bottle within its compartment.

However, it has been found that during handling of loaded crates, particularly when the loaded crates are being transported by lorry, vibration imparted to the crates can cause the bottles to axially rotate in their respective compartments and thereby labels on the bottles to be damaged by scuffing against the partitioning means. It will be appreciated that such damage to the labels is undesirable and it is an object of the present invention to provide a plastic moulded bottle crate of the kind specified and having an improved arrangement for receiving the bottles in their respective compartments by which the aforementioned damage to bottle labels may be alleviated.

According to the present invention there is provided a plastics moulded bottle crate of the kind specified wherein the lower parts of each compartment are provided with bottle centring means, said means comprising at least three discrete ribs each of which is integrally moulded with the base and with the partitioning means, and with an upstanding side wall or walls of the crate in the case of compartments which are partly formed by such side wall or walls, to be circumferentially spaced around a notional area where the bottle base is intended to be centrally located in the compartment, each rib tapering in height towards the centre of the compartment so that the base of the bottle may be substantially centrally located within that compartment with the upstanding side wall of the bottle in laterally spaced relationship from the partitioning means (and from an upstanding side wall or walls of the crate in the case of compartments which are partly formed by such side wall or walls), the arrangement of the ribs being such that lateral displacement from its central position of the bottle base received thereby will cause the bottle to ride up at least one of the ribs and to be tilted until the side wall of the bottle at a position remote from the bottle base abuts the partitioning means and the portion of said bottle side wall below

50

55

60

65

70

75

80

85

90

95

said position of abutment remains clear of said partitioning means.

By the invention each bottle in the crate is normally received with the axis of the bottle extending perpendicularly to the crate base and with the cylindrical side wall of the bottle laterally spaced from the partitioning means so that the label on the bottle is unlikely to be damaged by contact with the partitioning means. Further, the tapering ribs should be arranged so that they will not extend upwardly within their respective compartments to a position above that which conventionally corresponds to the bottom level of a label on a bottle in that compartment, so that even if the bottle axially rotates in its compartment the label should not be damaged by scuffing against the bottle centring means.

If the bottles exhibit gyrational movement in their respective compartments (that is to say their axes are tilted relative to the base of the crate and they axially rotate) the bottles tend to ride up one or more of the tapering ribs until, at maximum tilt of the bottles, each of their cylindrical side walls abuts the partitioning means (preferably at the upper edge thereof) at a position which is in the region of (and is preferably higher than) the conventionally accepted top level of the bottle label. As a consequence the, or the major part of the label which extends below the aforementioned position of abutment always remains out of contact with the partitioning means and should therefore not be damaged by scuffing either against the side walls of the crate or against the partitioning walls.

In a conventional cylindrical beer or soft drink bottle, the lower part of the bottle has a cylindrical side wall which extends upwardly from the bottle base to a shoulder and thereafter tapers inwardly to a neck. The label which has hitherto proved most susceptible to scuffing on the crate is located on the cylindrical side wall below the shoulder and it is therefore preferred that the partitioning means extends upwardly to a level at or just below the shoulders of bottles which are intended to be received by the crate and the bottle centring means and partitioning means are preferably so arranged that on tilting, each bottle will abut the partitioning means in the region of its shoulder.

The bottle centring means should symmetrically receive the base of a bottle and the tapering ribs are preferably symmetrically disposed in each compartment around the notional area where the bottle base is intended to be centrally located therein. In addition, the

bottle centring means may further comprise an arrangement by which a bottle, when located centrally within a compartment, is seated within engaging means which is formed integrally with the base of the crate, and which is adapted to engage the bottle around the circumference of its base, the tapering ribs providing a substantially continuous surface with the engaging means over which the bottle base will ride as the axis of the bottle is tilted. The engaging means may comprise, at least in part, a substantially annular surface of a seating or recess in the base of the crate, within which the bottle base is received.

Generally a conventional cylindrical beer bottle or soft drink bottle has the circumferential edge formed between its base and cylindrical side wall radiussed to provide a relatively smooth convex profile and if required, guide surfaces of the tapering ribs and/or of the engaging means (where provided), over which the bottle base can ride during axial tilting may be of concave profile to receive the radiussed edge of the bottle base.

The invention further provides a plastics moulded bottle crate constructed in accordance with the present invention in combination with bottles located in the compartments in an upstanding condition, each of said bottles having a cylindrical side wall part which extends upwardly from the bottle base to a shoulder and a neck part which extends upwardly from the shoulder and tapers inwardly thereof, and wherein each bottle is received by the bottle centring means to be substantially centrally located within its compartment and laterally spaced from the partitioning means (and from an upstanding side wall or walls of the crate in the case of compartments which are partly formed by such side wall or walls) and in which, on tilting the axis of the bottle in its compartment, the bottle rides up the bottle centring means until the bottle, in the region of its shoulder, abuts the partitioning means while the cylindrical side wall part of the bottle below said region of abutment is maintained out of contact with the partitioning means.

Several embodiments of the present invention will now be described, by way of example only, with reference to the accompanying illustrative drawings in which:—

Figure 1 is a side elevation, in part section taken on the line I—I of Figure 2, of part of a bottle crate constructed in accordance with the invention and illustrates a compartment of such crate and a bottle received thereby;

Figure 2 is a plan view of part of the crate shown in Figure 1;

Figure 3 is a side elevation, in part section taken on the line III—III, of the crate shown in Figure 2;

Figure 4 is a side elevation, in part section taken on the line IV—IV of Figure 5, of part of a further embodiment of bottle crate constructed in accordance with the invention;

Figure 5 is a plan view of part of the crate shown in Figure 4;

Figure 6 is a side elevation, in part section taken on the line VI—VI of Figure 7 and illustrates part of a still further embodiment of bottle crate in accordance with the invention; and

Figure 7 is a plan view of part of the crate shown in Figure 6.

Where possible throughout the following description the same parts or members in each of the Figures have been accorded the same references.

Each of the crates illustrated is largely of conventional construction and is formed in plastics material by injection moulding to have a substantially flat laterally extending base 1 which is rectangular in plan and has at its periphery four upstanding side walls 2 to form an open topped container of substantially rectangular parallelepiped shape. For convenience, parts only of the crate have been illustrated and the base 1 is shown as substantially closed or solid although it will be realised that the invention is readily applicable to bases formed as an open framework or grid structure as are well known in the art.

In the embodiment of Figures 1 to 3 the crate has an array of internal partition walls 3 which project upwardly from the base 1 and extend in the lengthwise and widthwise directions of the crate parallel to the side walls to form rows of compartments 4 each of which is square in plan and is intended to receive a bottle 5.

The bottle 5 is of conventional shape and has a flat base 6, a cylindrical side wall 7 which extends upwardly from the bottle base 6 to a shoulder 8 and a neck part 9 which extends upwardly from the shoulder and tapers inwardly thereof. In accordance with conventional practice for beer and soft drink bottles, a label 10 is carried on the cylindrical wall part 7 of the bottle at a position spaced from the bottle base 6 and below the shoulder 8. The circumferential edge of the bottle base 6 is radiussed as at 11 to provide a relatively smooth convex transition surface with the cylindrical side wall 7.

Located in each compartment 4 adjacent to the base 1 of the crate are four substantially triangularly shaped ribs 12 having substantially upwardly and outwardly directed guide surfaces 12a. The ribs 12 provide centring means for the

bottle 5 and when the bottle is located centrally in its compartment 4 the ribs 12 are symmetrically disposed around the periphery of the bottle base 6. As shown in Figure 2 the ribs 12 are integrally moulded with the base 1 of the crate and extend upwardly therefrom and are also integrally moulded with a partition wall to project therefrom, such partition wall partly forming the compartment (or, in the case of the compartment which is located adjacent to a side wall, with that side wall — as in Figure 3). The configuration of each rib is therefore such that it tapers in height towards the centre of the respective compartment.

One or more of the ribs 12 can receive the bottle 5 as it is lowered into a compartment 4 and the guide surface 12a cause the bottle base 6 of the descending bottle to be displaced until it is located centrally in that compartment where the cylindrical side wall 7 of the bottle is laterally spaced from the partition walls 3 (and from the side wall 2). In such disposition it will be apparent that the bottle 5 can exhibit axial rotation within the bottle compartment 4 without the label 10 scuffing against the partition walls 3 (or side wall 2). With the bottle 5 standing upright on the base 1 the shoulder 8 thereof should be at substantially the same height as the upper edges of the partition walls 3.

If the bottle base 6 should be displaced from its central position in the compartment 4 laterally over the base 1, it will ride up the guide surface 12a of at least one of the ribs 12 and thereby cause the axis of the bottle to tilt as indicated by the broken lines in Figures 1 and 3. The dimensions of a compartment 4 and of the ribs 12 are so arranged with respect to a bottle 5 which is intended to be located in that compartment, that axial tilting of the bottle will continue until the bottle, in the region of its shoulder 8, abuts the upper edge of a partition wall 3. In this condition of maximum tilt, the whole or part length of the cylindrical side wall 7 which is beneath the aforementioned position of abutment is clearly out of contact with the partition walls 3. Consequently since the label 10 is located on the cylindrical side wall 7 below the shoulder 8, such label should remain undamaged as a result of the bottle 5 tilting in its compartment and even if the bottle undergoes axial rotation.

Conveniently, but not essentially, the guide surfaces 12a of the ribs 12 over which the bottle base rides are of concave profile to provide a smooth seating for the radiussed edge part 11.

In the section shown in Figure 1 it will be apparent that the bottle, in the region of its shoulder 8, abuts at least one partition wall

70

75

80

85

90

95

100

105

110

115

120

125

130

3 for tilting movement in any direction. However in the case of the section shown in Figure 3 in which the compartment 4 is partly formed by the side wall 2 of the crate, the bottle 5 when tilted may abut the side wall 2 and, as shown in Figure 3, the side wall 2 is conveniently provided with an internal shoulder 13 against which the bottle in the region of its shoulder 8 is intended to abut.

In the embodiment illustrated in Figures 4 and 5 a circular aperture 1a is located in the base 1 of the crate at the centre of each compartment 4 and the edge surface of the base defining such aperture 1a is formed as an annular seating surface 14 of generally frusto conical form tapering upwardly and outwardly through the base 1. The seating surface 14 forms part of the bottle centring means and the guide surfaces 12a of the ribs 12 are arranged to be continuous with the surface 14. As shown in Figure 4 the bottle 5 is normally seated with its base 6 supported circumferentially on the seating surface 14 and if required the surface 14 can be of concave profile to receive the radiused edge part 11 of the bottle base. If the axis of bottle 5 in Figure 4 is tilted it will be apparent that the bottle base 6 will ride up the seating surface 14 on to one or more of the guide surfaces 12a (as illustrated by the broken line 5 in Figure 4) until the bottle, in the region of its shoulder 8, abuts the upper edge of the partition wall 3 in a similar manner to the embodiment of Figures 1 to 3.

If convenient, the aperture 1a can be omitted and the annular seating surface 14 formed by a peripheral surface which partly defines a generally circular recess in the upper surface of the base 1.

In Figure 4 the crate is shown with downwardly extending projections 15 which form a spaced array of pads or islands on the underside of the base 1. Such pads or islands are well known in the art of crate design for providing interbonding when brick stacking several of the crates.

The embodiment of crate partly illustrated in Figures 6 and 7 is of the "pinnacle" type whereby the compartments 4 are formed by an array of laterally spaced pinnacles 16 extending upwardly from the base 1 at positions which may be considered as corresponding to the cross-over points of the partition walls 3 in the embodiment shown in Figure 2. Each pinnacle 16 has a cylindrical lower part 17a and a fluted upper part 17. The upper part 17 of each pinnacle 16 is fluted to be of cross-shape in section taken in a plane parallel to the base 1 and the flanges of this part 17 substantially lie on the notional diagonal lines (in plan) of the adjacent compartments 4 (as is best seen in Figure 7). The pinnacles 16 which

together form a compartment 4 are joined together at their lower parts 17a by an array of webs 18 which extend parallel to the side walls 2 of the crate in the lengthwise and widthwise directions and project upwardly from the base 1. The ribs 12 are located in the compartments 4 in a similar array to that shown in Figure 2 and are integrally formed with the base 1 and webs 18.

In use of the crate shown in Figures 6 and 7 the bottle 5 is received and located in a compartment 4 in a similar manner to that above described with reference to Figures 1 to 3. However if the axis of the bottle is tilted, its base 6 will ride over the guide surface 12a of one or more of the ribs 12 until the bottle, in the region of its shoulder 8, abuts the edge of a flange on the upper part 17 of one or more of the pinnacles 16.

Where a compartment 4 is partly formed by a side wall 2 of the crate it is preferred that a rib-like projection 16a having a profile which is similar, in part, to a pinnacle 16 extends upwardly from the base 1 and is integrally formed with that side wall 2. If a bottle 5 in such a compartment is tilted towards the side wall 2 it can abut, in the region of its shoulder 8, either the shoulder 13 on the side wall 2 or a flange on the upper part of a rib-like projection 16a (see Figure 7).

If required the bottle centring means in the embodiment of the pinnacle crate shown in Figures 6 and 7 can be modified to include an annular seating surface similar to that shown at 14 in Figure 4.

WHAT WE CLAIM IS:—

1. A plastics moulded bottle crate of the kind specified wherein the lower parts of each compartment are provided with bottle centring means, said means comprising at least three discrete ribs each of which is integrally moulded with the base and with the partitioning means, and with an upstanding side wall or walls of the crate in the case of compartments which are partly formed by such side wall or walls, to be circumferentially spaced around a notional area where the bottle base is intended to be centrally located in the compartment, each rib tapering in height towards the centre of the compartment so that the base of the bottle may be subsequently centrally located within that compartment with the upstanding side wall of the bottle in laterally spaced relationship from the partitioning means (and from an upstanding side wall or walls of the crate in the case of compartments which are partly formed by such side wall or walls), the arrangement of the ribs being such that lateral displacement from its central position of the bottle base received thereby will cause the bottle to ride up at least one of the ribs and to be



3 for tilting movement in any direction. However in the case of the section shown in Figure 3 in which the compartment 4 is partly formed by the side wall 2 of the crate, the bottle 5 when tilted may abut the side wall 2 and, as shown in Figure 3, the side wall 2 is conveniently provided with an internal shoulder 13 against which the bottle in the region of its shoulder 8 is intended to abut.

10 In the embodiment illustrated in Figures 4 and 5 a circular aperture 1a is located in the base 1 of the crate at the centre of each compartment 4 and the edge surface of the base defining such aperture 1a is formed as an annular seating surface 14 of generally frusto conical form tapering upwardly and outwardly through the base 1. The seating surface 14 forms part of the bottle centring means and the guide surfaces 12a of the ribs 12 are arranged to be continuous with the surface 14. As shown in Figure 4 the bottle 5 is normally seated with its base 6 supported circumferentially on the seating surface 14 and if required the surface 14 can be of concave profile to receive the radiused edge part 11 of the bottle base. If the axis of bottle 5 in Figure 4 is tilted it will be apparent that the bottle base 6 will ride up the seating surface 14 on to one or more of the guide surfaces 12a (as illustrated by the broken line 5 in Figure 4) until the bottle, in the region of its shoulder 8, abuts the upper edge of the partition wall 3 in a similar manner to the embodiment of Figures 1 to 3.

35 If convenient, the aperture 1a can be omitted and the annular seating surface 14 formed by a peripheral surface which partly defines a generally circular recess in the upper surface of the base 1.

40 In Figure 4 the crate is shown with downwardly extending projections 15 which form a spaced array of pads or islands on the underside of the base 1. Such pads or islands are well known in the art of crate design for providing interbonding when brick stacking several of the crates.

45 The embodiment of crate partly illustrated in Figures 6 and 7 is of the "pinnacle" type whereby the compartments 4 are formed by an array of laterally spaced pinnacles 16 extending upwardly from the base 1 at positions which may be considered as corresponding to the cross-over points of the partition walls 3 in the embodiment shown in Figure 2. Each pinnacle 16 has a cylindrical lower part 17a and a fluted upper part 17. The upper part 17 of each pinnacle 16 is fluted to be of cross-shape in section taken in a plane parallel to the base 1 and the flanges of this part 17 substantially lie on the notional diagonal lines (in plan) of the adjacent compartments 4 (as is best seen in Figure 7). The pinnacles 16 which

together form a compartment 4 are joined together at their lower parts 17a by an array of webs 18 which extend parallel to the side walls 2 of the crate in the lengthwise and widthwise directions and project upwardly from the base 1. The ribs 12 are located in the compartments 4 in a similar array to that shown in Figure 2 and are integrally formed with the base 1 and webs 18.

70 In use of the crate shown in Figures 6 and 7 the bottle 5 is received and located in a compartment 4 in a similar manner to that above described with reference to Figures 1 to 3. However if the axis of the bottle is tilted, its base 6 will ride over the guide surface 12a of one or more of the ribs 12 until the bottle, in the region of its shoulder 8, abuts the edge of a flange on the upper part 17 of one or more of the pinnacles 16.

80 Where a compartment 4 is partly formed by a side wall 2 of the crate it is preferred that a rib-like projection 16a having a profile which is similar, in part, to a pinnacle 16 extends upwardly from the base 1 and is integrally formed with that side wall 2. If a bottle 5 in such a compartment is tilted towards the side wall 2 it can abut, in the region of its shoulder 8, either the shoulder 13 on the side wall 2 or a flange on the upper part of a rib-like projection 16a (see Figure 7).

85 If required the bottle centring means in the embodiment of the pinnacle crate shown in Figures 6 and 7 can be modified to include an annular seating surface similar to that shown at 14 in Figure 4.

WHAT WE CLAIM IS:—

1. A plastics moulded bottle crate of the kind specified wherein the lower parts of each compartment are provided with bottle centring means, said means comprising at least three discrete ribs each of which is integrally moulded with the base and with the partitioning means, and with an upstanding side wall or walls of the crate in the case of compartments which are partly formed by such side wall or walls, to be circumferentially spaced around a notional area where the bottle base is intended to be centrally located in the compartment, each rib tapering in height towards the centre of the compartment so that the base of the bottle may be subsequently centrally located within that compartment with the upstanding side wall of the bottle in laterally spaced relationship from the partitioning means (and from an upstanding side wall or walls of the crate in the case of compartments which are partly formed by such side wall or walls), the arrangement of the ribs being such that lateral displacement from its central position of the bottle base received thereby will cause the bottle to ride up at least one of the ribs and to be



tilted until the side wall of the bottle at a position remote from the bottle base abuts the partitioning means and the portion of said bottle side wall below said position of abutment remains clear of said partitioning means.

2. A plastics moulded bottle crate as claimed in Claim 1 in which the tapering ribs are symmetrically disposed around said notional area of each compartment.

3. A plastics moulded bottle crate as claimed in either Claim 1 or Claim 2 in which the tapering ribs are of substantially triangular shape in side elevation and present substantially upwardly directed guide surfaces with which a bottle base may engage during its location in a compartment to be slidably guided to its central position within the compartment.

4. A plastics moulded crate as claimed in Claim 3 wherein said guide surfaces have a concave profile in the form of a smooth curve.

5. A plastics moulded bottle crate as claimed in any one of the preceding claims in which the bottle centring means further comprises an arrangement by which a bottle, when located centrally within a compartment, is seated within engaging means which is formed integrally with the base of the crate, and which is adapted to engage the bottle around the circumference of its base, the tapering ribs providing a substantially continuous surface with the engaging means over which the bottle base will ride as the axis of the bottle is tilted.

6. A plastics moulded bottle crate as claimed in Claim 5 wherein the engaging means comprises a substantially annular surface of a seating or recess in the base of the crate within which the bottle base is to be received.

7. A plastics moulded bottle crate as claimed in Claim 6 wherein the substantially annular surface is of concave profile and presents a smooth curve in radial section.

8. A plastics moulded bottle crate as claimed in any one of the preceding claims wherein the partitioning means comprise an array of internal partition walls extending lengthwise and widthwise of the crate parallel to the side walls to form rows of compartments each of which is substantially square in plan.

9. A plastics moulded bottle crate as claimed in any one of the preceding claims wherein the partitioning means comprise an array of laterally spaced pinnacles extending upwardly from the base of the

crate, said pinnacles being located, in plan, at the corners of notional squares corresponding to the compartments.

10. A plastics moulded bottle crate as claimed in Claim 9 wherein at least the upper part lengths of said pinnacles are fluted and flanges of the pinnacles defining said flutes extend along notional diagonal lines of the square compartments.

11. A plastics moulded bottle crate as claimed in Claim 1 and substantially as herein described with reference to Figures 1 to 3 of the accompanying illustrative drawings.

12. A plastic moulded bottle crate as claimed in claim 1 and substantially as herein described with reference to Figures 4 and 5 of the accompanying illustrative drawings.

13. A plastics moulded bottle crate as claimed in claim 1 and substantially as herein described with reference to Figures 6 and 7 of the accompanying illustrative drawings.

14. A plastics moulded bottle crate as claimed in any one of the preceding claims in combination with bottles located in the compartments in an upstanding condition, each of said bottles having a cylindrical side wall part which extends upwardly from the bottle base to a shoulder and a neck part which extends upwardly from the shoulder and tapers inwardly thereof, and wherein each bottle is received by the bottle centring means to be substantially centrally located within its compartment and laterally spaced from the partition walls (and from an upstanding side wall or walls of the crate in the case of compartments which are partly formed by such side wall or walls) and in which, on tilting the axis of the bottle in its compartment, the bottle rides up the bottle centring means until the bottle, in the region of its shoulder, abuts the partitioning means while a cylindrical side wall part of the bottle below said region of abutment is maintained out of contact with the partitioning means.

URQUHART-DYKES & LORD

11th Floor,
St. Martin's House,
140, Tottenham Court Road,
London, W1P 9LN.

— and —
11th Floor Tower House,
Merrion Way,
Leeds LS2 8PB.
Chartered Patent Agents.