A packaging of a bottle (1) is provided by a re-useable thermoformed sheet (S) folded around the bottle (1) to totally enclose and contain the bottle within four mutually-hinged longitudinal wall-sections (11-14). The bottle (1) nests conformably in recesses (21) of each wall-section (11-14) for its shock protection, each recess (21) incorporating cavities (22, 23) of tiered form that decrease in cross-section with depth to establish cushioning buffers (24, 25). The ends of each wall-sections (11-14) are moulded with an upstanding flange (16-19) configured with a pattern of ridges with intervening grooves that nests with the patterns of ridges with intervening grooves of each other flange (18-19) at that end. Ridges (27-29) project transversely upwards within the recesses (21) to provide resilience for cushioning the bottle (1), and the thermoformed sheet (S) when laid flat and open can receive four bottles (41) side-by-side for storage.
PACKAGING FOR A BOTTLE

[0001] This invention relates to packaging and is concerned particularly with packaging for use in protecting bottles against shock during storage and transit.

[0002] Various packaging methods have been used for protecting bottles together with their contents, during storage and transit. These methods, in addition to being generally labour-intensive, commonly involve a substantial outlay in cost and material-resources on packaging items in the form, for example, of cardboard cases and specially-designed items of foam or other forms of plastics, or corrugated cardboard, to fit within them. Much packaging of this nature cannot be re-used or re-cycled and goes to waste.

[0003] It is an object of the present invention to provide a form of packaging for bottles which can be re-used and can be adopted for secondary use when no longer required specifically as a packaging item.

[0004] According to the present invention there is provided packaging for a bottle wherein a thermoformed sheet is foldable circumferentially round the bottle with the bottle nesting conformably within recesses in sections of the sheet spaced from one another circumferentially of the bottle for protecting the bottle against shock, and wherein the sheet is adapted to lay flat with the recesses open upwardly to receive individual bottles conformably side by side.

[0005] The packaging of the invention can be readily re-used for its original purpose, but has a secondary use when laid flat, in storage of bottles. More especially, where wine bottles are involved, the packaging can be readily adopted for use in the provision of a wine rack.

[0006] An example of thermoformed packaging according to the present invention, will now be described with reference to the accompanying drawings, in which:

[0007] FIGS. 1 and 2 are illustrative in side-elevation and plan respectively of three sequential stages in the packaging of a wine bottle within thermoformed packaging according to the present invention, in conjunction with an outer carton;

[0008] FIGS. 3 to 5 are respectively a plan view, a side elevation and a sectional end-view of the thermoformed plastic sheet used in the packaging of the invention;

[0009] FIGS. 6 to 13 are illustrative of four successive stages in the packaging of a wine bottle within the thermoformed packaging of the invention, FIGS. 6 to 9 illustrating the four stages in sectional side-elevation (the section of FIG. 6 being taken on the line V-V of FIG. 3), and FIGS. 10 to 13 illustrating the four stages in side elevation of the case; and

[0010] FIGS. 14 to 16 illustrate successive stages in use of thermoformed packaging of the invention for secondary use in the storage of bottles in a stack.

[0011] Referring to FIGS. 1 and 2, a wine bottle 1 is packaged within a thermoformed packaging case 2 to protect it from shock and damage, and the case 2 with the bottle 1 inside, is then entered into an outer, rectangular cardboard-carton 3. The packaging case 2 is of an elongate rectangular form, being erected from a one-piece thermoformed sheet S (for example of polypropylene) shown in FIGS. 3 to 5, by folding it round the bottle 1 to be protected with the whole of the bottle 1 from its main body 4, shoulders 5 and neck 6 totally enclosed.

[0012] In the latter respect, and referring to FIGS. 3 to 5, the case has four substantially-rectangular moulded sections in the form of a base-wall 11, two opposite side-walls 12 and 13, and a top-wall 14, that are hinged together longitudinally in pairs by three hinges 15 moulded integrally with the paired walls. The walls 11 to 14 are moulded in the sheet S to have respective pairs of flanges 16 to 19 with the two flanges of each pair upstanding from opposite ends of the top or inside surfaces T of the walls 11 to 14. The outer surface 20 of each flange 16 to 19 is configured with a respective pattern of ridges with intervening grooves running side-by-side with one another round it.

[0013] The inside surface 1 of each wall 11 to 14 between its respective pair of flanges 16 to 19, is contoured in depth and width with a recess 21 that is configured in the moulding of sheet S to conform to the external contour of the bottle 1. Each recess 21 incorporates cavities 22 and 23 of oval and quasi-oval configuration respectively, which are set orthogonally to one another with the cavity 22 smaller in both axes than the cavity 23, and which are both of a tiered or stepped form having cross-sectional dimensions that decrease with depth. The cavities 22 and 23 by virtue of their thermoforming, give rise on the bottom or outside surfaces B of the walls 11 to 14 to respective projections or buffers 24 and 25 that have cylindrically-concave bottom-faces 26 extending lengthwise of the respective walls 11 to 14. The buffers 24 and 25 act principally in the cushioning of the walls 11 to 14 of the case 2 and the bottle 1 contained by it, against external shock imposed on the surfaces B via the outer, secondary packaging carton 3. (The carton 3 may be replaced by a mailing bag or other external packaging, but the buffers 24 and 25, which may be of different heights to one another and of different shapes, serve the same shock-protection purpose.)

[0014] Additional cushioning of the bottle 1 against shock is provided by transverse ridges 27 to 29 moulded to project upwardly from the inside surfaces T into each recess 21 in locations corresponding to those of the neck 6, shoulders 5 and base of the body 4 of the bottle 1. The ridges 27 to 29 give added resilience or springing within the walls 11 to 14 of the case 2.

[0015] A four-stage sequence of packaging the bottle 1 within the case 2 will now be described with reference to FIGS. 6 to 13.

[0016] Referring to FIGS. 6 and 10, the sheet S initially in the packaging sequence is opened out on its hinges 15 with the walls 11 to 14 laid flat on a horizontal support surface with the open cavities 21 uppermost and the bottom faces 26 of the buffers 24 and 25 resting on it. The bottle 1 is oriented horizontally in register with the bottle-contoured cavity 21 of the base-wall 11, and is lowered down between the flanges 16 to nest conformably within the cavity 21. As illustrated in particular by FIG. 7, this seats the neck 6, shoulders 5 and base of the main body of the bottle 1 on the ridges 27 to 29 within the cavity 21 to afford a resilient or spring action in support of the bottle.

[0017] As illustrated in FIG. 11, the walls 12 and 13 are now folded up on either side of the bottle 1, and the wall 14 is brought over the top. As the walls 12 and 13 are closed onto the bottle 1, as illustrated in FIG. 12, the bottle 1 is nested conformably within the cavities 21 of the walls 12 and 13, and the ridges and grooves of the outer surfaces 20 of the flanges 16 of the wall 11 nest in the grooves and ridges respectively, of the outer surfaces 20 of the flanges 18 of the walls 12 and 13. This ridge-within-groove nesting affords cushioned interlocking of the walls 11 to 13 with one another at each end of the bottle 1.

[0018] Folding the wall 14 over the bottle 1 as illustrated in FIGS. 8 and 12, and closing it onto the bottle 1 as illustrated in FIGS. 9 and 13 nests the bottle 1 conformably within the
cavity 21 of the wall 14 and establishes ridge-within-groove nesting to give cushioned interlocking of the wall 14 with the walls 12 and 13. Retention of the case 2 locked closed in this way is provided by projections 30 of the wall 14 that are for engagement within slots 31 of a flap 32 hinged to the wall 13.

[0019] The case 2 containing the bottle 1 when locked closed, is inserted lengthwise into the carton 3 (or other external packaging). The bottle 1 in this is protected against external shock by the cushioning buffers 24 and 25 projecting from the outside surfaces B of all four walls 11 to 14 where they are in contact with the inside of the carton 3. It is also protected by the cushioning of the ridge-within-groove inter-locking of the flanges 16 to 19 of the walls 11 to 14, and by the springing of the ridges 27 to 29 between the case 2 and the bottle 1. The bellows-like resilience of the flanges 16 to 13 at each end of the bottle 1 function to cushion the bottle 1 longitudinally.

[0020] The sheet S when folded round the bottle 1 in the form of the case 2 serves to afford protection to the bottle 1 during transportation and storage, and can be readily re-used for such a service. However, when its service in this respect is no longer required, or re-use is not a practical possibility, it can be usefully and economically used to afford an efficient and continued degree of shock protection in the provision of a form of wine rack for laying up the bottle 1 together with other, corresponding bottles of wine. In this regard, the sheet S when opened out on its hinges 15 with the walls 11 to 14 laid flat on a horizontal surface, can be used to support four bottles laid horizontally side by side for storage. FIG. 14 shows four bottles 41 (each corresponding to bottle 1 described above) being laid down in this way, for nested support horizontally and side by side on the four wall-sections 42 of a thermoformed sheet-moulding 43 identical to the sheet S described above. A second, identical packaging-case moulding 44 is shown in FIG. 15 in the process of being placed on the four bottles 41 for support on the bottles 41 by the buffers 45 of the moulding 44. The cylindrically-concave bottoms 46 of the buffers 45 (corresponding to the bottoms 26 of the buffers 24 and 25 of the sheet S) provide good conformal surface-con-tact with the bottles 41 to enhance the location and alignment of the moulding 44 with moulding 43.

[0021] A further four bottles 47 may now be stored on the moulding 44 in a similar way to the bottles 41 on the moulding 43, and indeed as illustrated in FIG. 16, a further moulding 48 identical to each of the mouldings 43 and 44 may be used, to add a further layer of bottles 49 to the stack. Still further layers of bottles may be added in the same way for as long as the stack remains stable.

1. (canceled)
2. The package for the bottle according to claim 1 wherein the thermoformed sheet in the folded condition is folded into four mutually-hinged sections of a four-sided rectangular case for enclosing the bottle wrapped round circumferentially by the thermoformed sheet, and the four mutually-hinged sections being individual sections of the thermoformed sheet spaced from one another that form walls of the case comprising, respectively, a base-wall, first and second side-walls opposite one another, and a top-wall of the case when erected.
3. The package for the bottle according to claim 2 wherein folding of the thermoformed sheet to form the case is about three hinges that are molded integrally with the walls of the case to enable folding on the hinges of the first and second side-walls from the base-wall and the top-wall from the first of the side-walls to close on the second side-wall in erection of the case.
4. The package for the bottle according to claim 2 wherein the walls are molded in the thermoformed sheet to have respective pairs of flanges with the two flanges of each pair upstanding at opposite ends of the respective wall.
5. The package for the bottle according to claim 4 wherein the flanges are each configured with a pattern of ridges with intervening grooves, and the pattern of ridges with intervening grooves of each flange nests ridge-within-groove with the pattern of ridges with intervening grooves of each other flange when the case is erected.
6. The package for the bottle according to claim 11 wherein ridges are molded to project upwardly within the recesses to provide resilience for cushioning the bottle.
7. The package for the bottle according to claim 11 wherein each of the recesses incorporates a cavity of tiered form that decreases in cross-sectional dimensions with depth to form a buffer on the outer surface of the thermoformed sheet.
8. The package for the bottle according to claim 7 wherein the buffer has a cylindrically-concave bottom-face extending lengthwise of the respective wall.
9. The package for the bottle according to claim 11 when laid flat in the unfolded condition with the recesses open upwardly, and including a multiplicity of bottles loaded on the inner surface of the thermoformed sheet with individual bottles located conformably side by side, and wherein an additional thermoformed sheet lies on top of the loaded bottles with the buffers supporting the additional thermoformed sheet on the loaded bottles.
10. The package for the bottle according to claim 9 wherein the buffers of the additional thermoformed sheet engage the loaded bottle conformably.
11. A packaging for a bottle wherein the packaging comprises a bottle and a thermoformed sheet, and the thermoformed sheet having an inner surface and an outer surface, the thermoformed sheet has selectively a folded condition in which it is wrapped circumferentially round the bottle with the inner surface of the thermoformed sheet in abutment with the bottle, and an unfolded condition in which the thermoformed sheet is adapted to be laid-out flat with the inner surface uppermost, the thermoformed sheet is configured with a series of recesses of its inner surface which in the folded condition of the thermoformed sheet are spaced from one another circumferentially round the bottle, in the folded condition of the thermoformed sheet the bottle is wrapped round by the thermoformed sheet with parts of the bottle that are spaced from one another circumferentially round the bottle nestling conformably in respective ones of the recesses of the thermoformed sheet, and in the unfolded condition of the thermoformed sheet the bottle lies supported on the thermoformed sheet with one of the parts of the bottle nestling conformably in one of the series of recesses.