Dec. 8, 1964 K. L. SMALLEY 3,160,306

STORAGE AND TRANSPORTATION CASE

Filed March 30, 1962

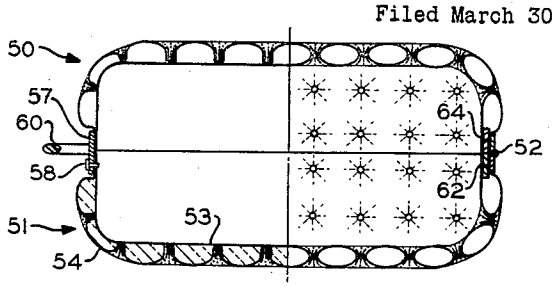


FIG. 5

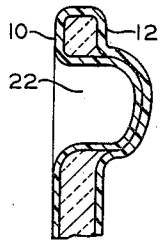


FIG. 4

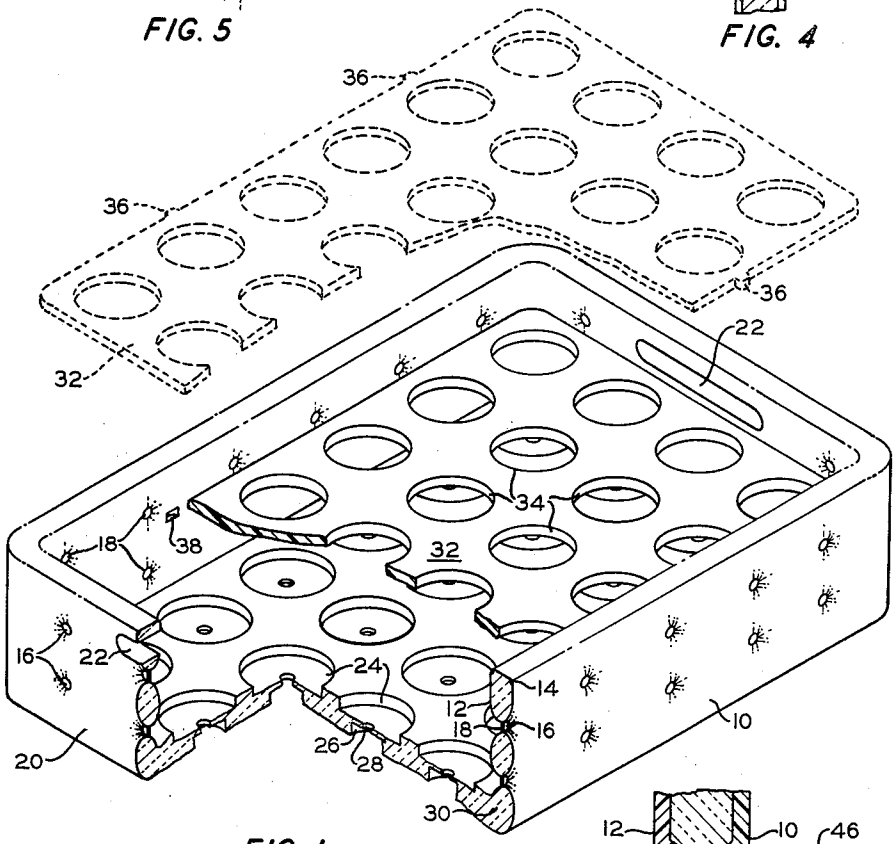


FIG. 1

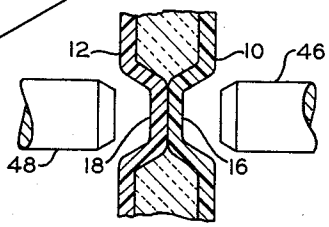


FIG. 3

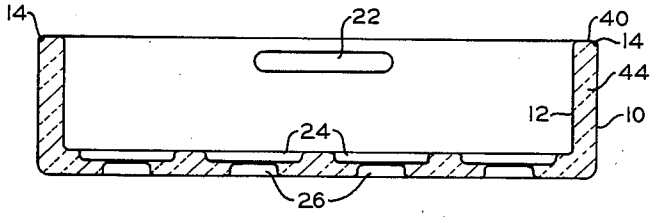


FIG. 2

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STORAGE AND TRANSPORTATION CASE

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This invention relates to a case for storing and transporting packaged items, particularly bottled beverages, including soft drinks, beer, etc., and to a method for making same.

Beverage bottle cases have been molded from plastic materials to provide single-walled cases. In this type of case it has heretofore been impossible to provide means for holding the bottom of the bottles in place in the case and also provide recesses in the underside of the case bottom for receiving the bottle tops of the bottles in another case when stacking is practiced without utilizing partitions such as are disclosed in U.S. Patent 2,535,493, or without fabricating the bottom of the case of extra thick material. The use of such extensive partitions adds greatly to the weight of the case which requires a substantially thick wall in order to carry the weight of the filled bottles without damage to the case. This invention is concerned with a beverage bottle case which is light, strong, rigid, and insulated both to heat and to shock.

Accordingly, the principal object of the invention is to provide a light weight, strong, rigid, durable, readily washable, storage and carrying case. Another object is to provide a method of making an improved carrying case. A further object is to provide a case for beverage bottles which holds the bottles in erect position in the case without the use of a system of upright partitions or dividers, thereby reducing the weight of the case. It is also an object of the invention to provide a case which is well insulated against heat transfer and mechanical shock. Other objects of the invention will become apparent to one skilled in the art upon consideration of the accompanying disclosure.

A broad aspect of the invention comprises a double-walled molded unitary plastic case formed of spaced-apart inner and outer shells bonded together along their upper edges to provide a sealed insulated space between the shells. In order to add strength to the double walled case, opposed thermoformed indentures bonded to each other intermediate the shells at frequently spaced intervals are provided in the walls of the case. Also recesses for the bottoms of the bottles are molded into the bottom of the inside shell and opposed recesses are molded into the bottom of the outside shell to form opposed recesses which are bonded together intermediate the two shells. These recesses are concentric and add rigidity and strength to the case while holding the bottoms of the bottles in position in the case and providing receptacles for the tops or caps in a subjacent case for nesting.

A more complete understanding of the invention may be had by reference to the accompanying schematic drawing of which FIGURE 1 is a diametric view of a case with a cut-away section; FIGURE 2 is a vertical cross section of a pair of nested shells ready for heat bonding or welding together; FIGURE 3 is a fragmentary view of a section in the vertical wall of a case; FIGURE 4 is a partial vertical section thru the handhold in the end of the case, and FIGURE 5 is a transverse cross sectional view of a luggage case utilizing two of the cases of the invention.

Referring to FIGURE 1 the case comprises an outer shell 10 and an inner shell 12 bonded and sealed along the line 14. Indentures 16 in the outer shell spaced vertically and longitudinally around the upright walls of

the case and opposed indentures 18 in the inner shell are welded or otherwise bonded thereto. End sections 20 are provided with hand holes or indentures 22.

Recesses 24 are formed in the bottom of the inside shell for holding the bottles in spaced relation during storing or transportation and opposed recesses 26 formed in the bottom of the outer shell receive the tops or upper ends of the bottles in a subjacent case during nesting. These recesses 24 and 26 are concentric and engage each other intermediate the two shells. They are preferably bonded together by fusing or other means to provide additional rigidity to the case. Holes 28 at the center of the recesses may be provided for drainage of the case, but they may be omitted when it is desired to utilize the case for a cooler by placing ice among the bottles in the case.

In order to increase the strength and add to the thermal insulation and resistance to thermal shock of the case, insulating material 30, either in particulate form or in the form of a continuous sheet, is positioned in the space intermediate the shells.

A spacer or separator 32 perforated with regularly spaced bottle holes 34 is positioned in the case intermediate the bottom and the top edge thereof to hold the bottles in upright position during movement of the case so as to avoid breakage of the bottles. This separator is made out of a relatively light sheet of plastic but it may be made out of two sheets molded together in spaced-apart relation with reinforcing indentures similar to the walls of the case in order to provide strength and lightness in this member. Separator 32 is supported in the case by means of lugs 36 which fit into recesses 38 molded in the walls of the inner shell. The preferred arrangement comprises two lugs on each longitudinal edge of the separator spaced substantially from the ends thereof. The separator is fabricated in a size substantially that of the inside of the case so that lugs 36 can be snapped into position in recesses 38 by slightly springing the case walls outwardly. This structure facilitates removal of the separator for cleaning the interior of the case.

The case and partition may be fabricated of any suitable plastic or resin which is readily moldable or amenable to thermoforming. A preferred material comprises the polymers of 1-olefins including polyethylene, polypropylene, polybutene and mixtures or copolymers thereof. High density polyethylene formed at low temperatures and pressures is a preferred material. This material is sold under the trade name of Marlex (a trademark of Phillips Petroleum Company) and has a high melting point, above 250° F., which permits steam cleaning of the case without warpage thereof. It is also readily amenable to thermoforming and welding to facilitate easy manufacture of the case.

FIGURE 2 illustrates a method of forming a double wall case by separately thermoforming outer shell 10 and inner shell 12, the latter being formed with a flange 40 which spaces the inner shell properly from the outer shell and is welded at 14 to the upper edge of the outer shell to seal the two shells into a unitary case and provide an insulating space 44. A preferred method of forming the case comprises molding recesses 24 in the inner shell during the thermoforming of the inner shell and molding recesses 26 in the bottom of the outer shell during the thermoforming thereof. After welding the two shells together, the indentures in the upright walls of the case may be made as illustrated in FIGURE 3 by means of opposed punches 46 and 48 which are forced together while the shells are in heated condition suitable for forming indentures 16 and 18. While the indentures 16 and 18 may be made successively, they may be made by means of a jig containing groups of pairs of opposed

punches regularly spaced in a generally U-shaped holder adapted to encompass a sizeable section of the wall of the case with opposed punches on each side thereof and provided with clamping means for applying and withdrawing the punches. It is also feasible to mold recesses **24** and **26** in the bottoms of the shells after nesting and welding the shells together, by a technique similar to that applied in the forming of the indentures. Indentures **16** and **18** may also be in the form of seams, extending vertically substantially the height or length of the side wall of the case, or in a quilted or tufted pattern, such as illustrated in U.S. Patent 2,633,442.

Hand holes **22** may be formed in the end walls of the case at the center line thereof by pressing in on the walls while they are hot so as to weld a substantial section thereof in the desired shape. The major portion of the weld is then cut out to form a hand hole. The hand hole may also be made by utilizing a ring or annular female punch on one side of the wall and a solid male punch on the other side so as to simultaneously weld and punch out the surplus plastic.

When the case is to be utilized as a cooler with holes **28** omitted from the bottom of the case, it is desirable to form recesses **22** in the end walls of the case by thermoforming (as shown in FIGURE 4) so as to provide a hand hold which does not allow leakage of liquid from the case.

Insulation **30** may be inserted by flowing particle form insulation in thru drill holes after joining of the two shells and thereafter sealing the holes with plastic by welding. The insulation material is preferably in the form of plastic foam which does not interfere with the bonding of engaging indentures **16** and **18** or recesses **24** and **26**. Sheet plastic foam of the proper thickness to occupy the space between the shells may be positioned within the outer shell prior to nesting of the inner shell therein, after which the inner shell is inserted and welded to the outer shell.

The processes and methods for thermoforming shells of the character described are well known in the art. Common among these methods are draping over a male mold or into a female mold. Thermoforming with a plug and female mold is also conventional. It is also possible to blow mold the shells. Both the recesses in the bottoms of the shells and the indentures in the side walls may be formed at the time of thermoforming the shells. The inner shell may be thermoformed within a split female mold having recesses therein to form recesses **24** and **18** as well as recesses **38** for lugs **36**. After thermoforming the split mold is removed to free the shell. The outer shell may also be formed within a similar split mold provided with projections for forming indentures **16** and recesses **26**. When the shells are thermoformed with the indentures and recesses in them, prior to nesting and bonding the shells, the bonding of the opposed indentures and recesses may be effected simply by applying heat and pressure to the areas to be bonded. Also, pressure may be applied to effect the bonding while the entire shells are at the proper temperature.

The unitary case of the invention is also applicable to luggage construction. Two such cases may be formed to abut and/or overlap at their edges for hinging and latching and/or locking. Either one or both of the inner and outer shells of the case may be tufted and welded together at the tufts or indentations. In this manner, light strong luggage may be fabricated of tough and strong plastic, fiber glass, or similar material amenable to thermoforming.

FIGURE 5 illustrates such a piece of luggage which is formed of a cover case **50** and a bottom case **51** attached by hinges **52** which can be mounted between the edges of the cover and bottom to be concealed. Bottom **51** comprises inner shell **53** and outer shell **54**, while cover **50** comprises inner shell **55** and outer shell **56**. A band **57**, attached by welding (or by screws or rivets) to the

cover, overlaps the bottom case so as to conceal the joint between the cases and to provide a means for attaching a latch (or lock) **58**. A handle **60** is provided for carrying the luggage. Both the cover and bottom members are thermoformed of separate inner and outer shells welded together at their edges, both of which shells may be "tufted" or "dimpled" as described previously and as shown in the right half of the luggage case. Or, either the inner or the outer shell may be molded smooth, in which case the tufts or dimples (indentures) are molded into only one of the shells as illustrated in the left half of the luggage case. The dead air space between the shells may be left void or filled with insulation such as plastic foam. The reinforcing members **62** and **64** extend along the back edge of the two cases or they may extend completely around cases **50** and **52**.

Certain modifications of the invention will become apparent to those skilled in the art and the illustrative details disclosed are not to be construed as imposing unnecessary limitations on the invention.

I claim:

1. A double-walled molded unitary plastic case comprising spaced-apart inner and outer shells having upright walls and a bottom, the upper edge of said inner shell forming an outwardly extending flange, the outer edge of which is fused to the upper edge of said outer shell to form a seal therewith; thermoformed opposed indentures in the upright walls of said shells bonded to each other at spaced intervals to impart strength and rigidity to said case; rows of thermoformed recesses in the bottom of said inner shell for receiving the bottoms of bottles or the like standing in said case.

2. The case of claim 1 wherein said space between said shells is filled with plastic foam.

3. The case of claim 1 including molded recesses in the bottom of said outer shell opposed to and concentric with the molded recesses in said inner shell to receive the tops of bottles or the like packed in a similar case to aid in stacking filled cases.

4. The case of claim 1 including drain holes in said recesses.

5. The case of claim 3 including a plastic separator in sheet form having holes therein correspondingly spaced to said recesses to accommodate said bottles and maintain same in upright position said sheet being supported in said case parallel to and spaced from said bottom.

6. A water-tight case in accordance with claim 1 including inwardly thermoformed recesses in a pair of opposite sides of said case to provide hand holds.

7. The case of claim 5 including molded recesses in opposite upright walls of solely the inner shell of said case and lugs protruding from the corresponding edges of said separator to enter said recesses when said separator is positioned in said case, said separator being sized to snap into position with said lugs in said recesses to hold said separator at a fixed level intermediate the bottom and upper edges of said case.

8. The method of making a double-walled plastic case for storing bottles or the like, comprising separately thermoforming from plastic sheet an outer shell of generally rectangular cross section and a smaller inner shell of corresponding cross section, each shell having generally upright sides and a bottom, said inner shell being thermoformed with an outwardly extending flange around its upper edge to engage the upper edge of the outer shell when said inner shell is nested in said outer shell in spaced relation thereto; thermoforming opposed rows of recesses in the bottom of said inner shell to receive the bottoms of bottles and in the bottom of said outer shell to receive tops of bottles; thereafter, placing said shells in nesting relationship; heat welding said flange to the upper edge of said outer shell; and simultaneously outwardly thermoforming indentures in the upright walls of said inner shell and inwardly thermoforming corresponding opposed engaging indentures in said outer shell so as to weld said

shells together at the indentures to impart strength to said case.

9. The method of claim 8 including the step of inwardly thermoforming recesses in opposite ends of said case for hand holds, after said shells are nested and welded together.

10. The method of claim 8 including the step of placing plastic foam between said shells before welding same to each other.

11. A closed container comprising a pair of cases each formed of spaced-apart inner and outer shells, the upper edge of said inner shell forming an outwardly extending flange, the outer edge of which is fused to the upper edge of said outer shell to form a seal therewith; there being thermoformed opposed indentures in said shells bonded to each other at spaced intervals in the sides and bottom thereof to impart strength and rigidity to said case, said cases being juxtaposed at matching edges to provide a

unitary storage space and hinged along one pair of adjacent edges for holding said cases in pivotal relationship along said pair of edges, and having latching means along the edges of said cases opposite the hinged edges.

12. The container of claim 11 including a carrying handle attached to the latching edge of said container.

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