

Aug. 14, 1956

W. O. FARRELL
MOLDED MILK BOTTLE CASE

2,758,742

Filed Aug. 1, 1951

2 Sheets-Sheet 1

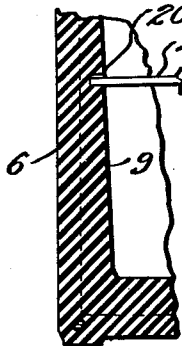
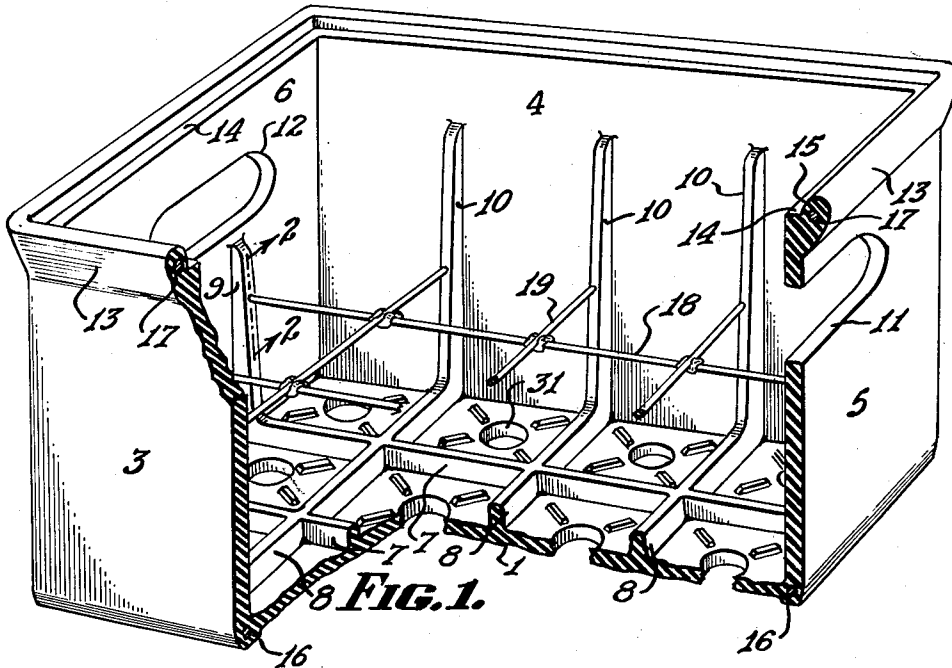


FIG. 2.

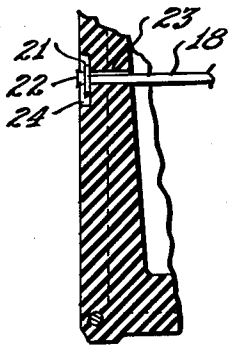


FIG. 3.

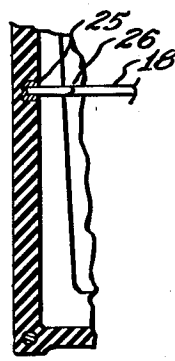


FIG. 4.

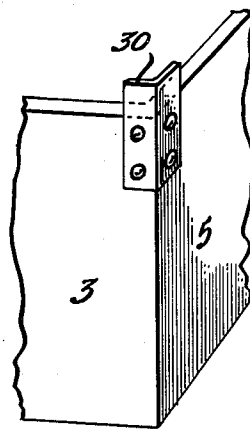


FIG. 6.

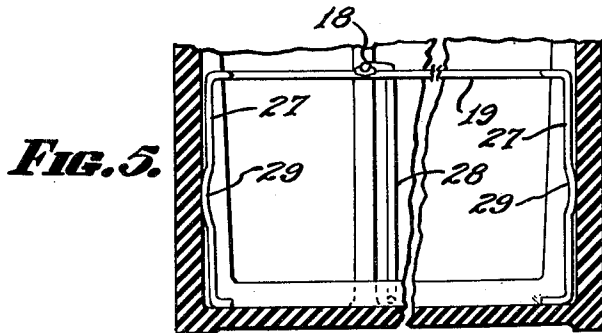


FIG. 5.

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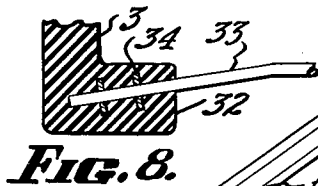


FIG. 8.

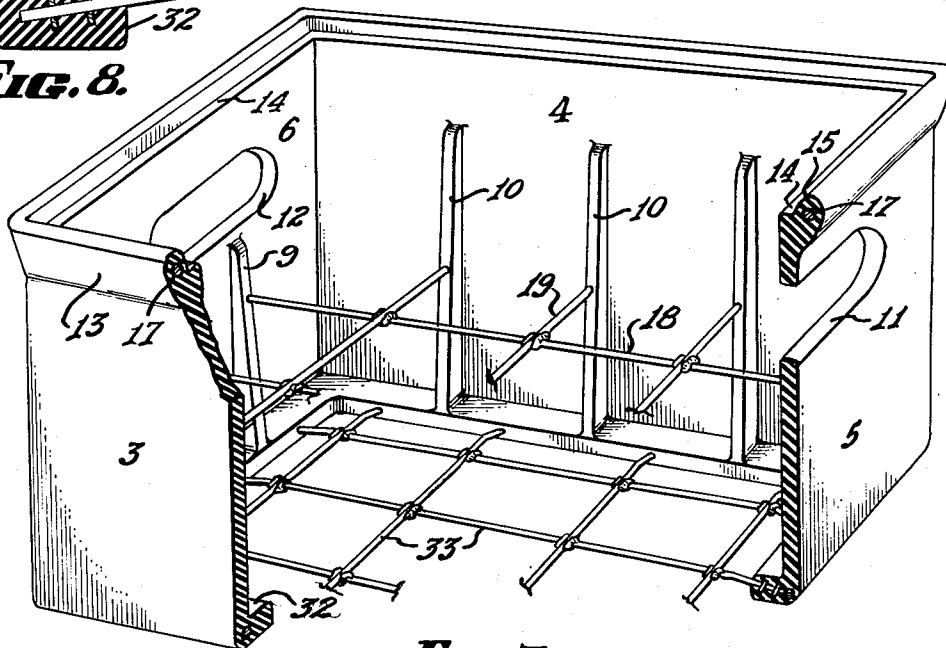


FIG. 7.

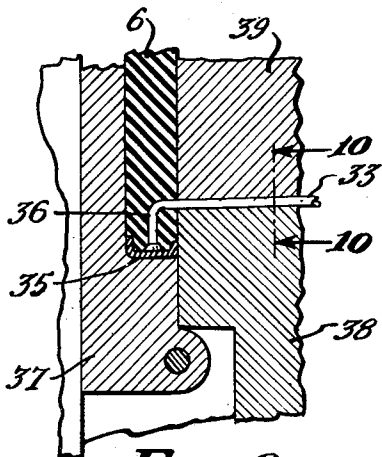


FIG. 9.



FIG. 10.

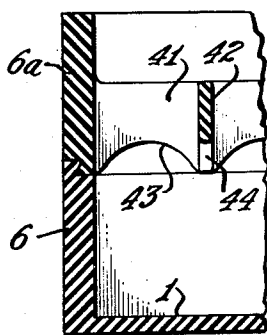


FIG. 11.

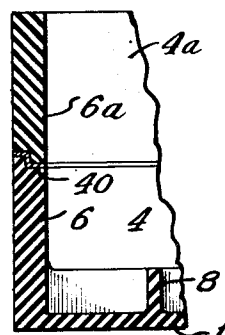


FIG. 12.

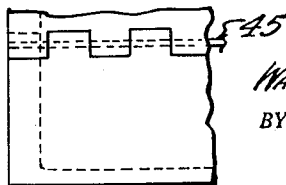


FIG. 13.

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2,758,742

MOLDED MILK BOTTLE CASE

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Application August 1, 1951, Serial No. 239,650

9 Claims. (Cl. 220—21)

My invention relates to carriers for milks bottles, frequently termed "milk crates" in the art. Ordinarily these structures are made of wood heavily reinforced with metal. They are usually designed to hold twelve milk bottles and may be made of different dimensions to hold milk bottles of various sizes. They must be exceedingly rugged in construction due to the manner in which they are handled and the weights they must contain; they must be capable of being stacked one upon the other stably; and they must be capable of being washed or treated, usually by machine, with detergent and/or sterilizing solutions. They must be deeper in internal dimension than the bottles which they are to contain so that the bottles will be adequately protected during stacking. Moreover, they must be suitably partitioned in some manner to separate the bottles.

Although efforts have been made in the past to provide molded milk bottle cases or crates, due to the stringent requirements, some of which are set forth above, these efforts have not met with success.

It is a primary object of my invention to provide a molded milk bottle case which will meet the requirements of use and at the same time will be economical both from the standpoint of initial cost and from the standpoint of useful life.

It is a specific object of my invention to provide a molded milk bottle case which will be more durable and give longer service than the wooden cases hitherto employed.

It is a further object of my invention to provide a mechanical design and structure for a molded milk bottle case which will permit economical and successful molding from satisfactory compositions and with relatively simple equipment adaptable to large-scale production.

These general objects and more specific ones, which will be set forth hereinafter or will be apparent to one skilled in the art upon reading these specifications, I accomplish in that structure and by those procedures of which I shall now describe exemplary embodiments. Reference is made to the accompanying drawings wherein:

Figure 1 is a perspective view with parts broken away of a preferred form of my molded milk bottle case.

Figures 2, 3, 4 and 5 are partial sectional views, the first being taken along the section line 2—2 of Figure 1, showing various modifications of internal cage or partition elements which may be employed in cases of my invention.

Figure 6 is a partial perspective view of a corner of a molded case showing another means for providing alignment upon stacking.

Figure 7 is a perspective view with parts broken away of another form of my molded milk bottle case.

Figure 8 is an enlarged fragmentary sectional view showing one way of engaging a wire bottom with the walls of my molded milk bottle case.

Figure 9 is a fragmentary sectional view illustrating a manner of molding the case of Figure 8.

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Figure 10 is a sectional view taken on the line 10—10 of Figure 9.

Figure 11 is a fragmentary sectional view of a modification wherein the case is made in two pieces.

Figure 12 is a fragmentary sectional view of still another modification wherein the case is made in two pieces.

Figure 13 is a side view of yet another modification wherein the case is made in two pieces.

Excepting as set forth in the appended claims, the particular molding composition from which my structures are formed does not constitute a limitation upon the invention. Depending upon the particular service requirements, various compositions may be employed, ranging from thermoplastic to thermosetting types. For example, I may form my cases from thermoplastic compositions comprising bituminous binders, fibers, preferably organic, to contribute toughness, and non-fibrous, finely divided fillers, usually but not necessarily mineral in nature, to contribute hardness. Such thermoplastic compositions may be delivered hot to the press and molded in cold molds, as is customary in the storage battery case industry. Again, depending upon service requirements, synthetic resinous compositions may be employed, inclusive of phenol-aldehyde resins and the various other molding resins both of the thermoplastic and of the thermosetting kinds. In particular, my structures may be molded from a resinous molding material consisting of or comprising comminuted textile material, such as cotton duck, saturated with an incompletely polymerized phenol-formaldehyde resin. Ordinary hard rubber molding compositions may likewise be employed.

A copending application in the name of Gordon A. Ruschman, Serial No. 130,436, filed December 1, 1949, and entitled Shatter-Resistant Hard Rubber Compositions and Method of Making Them, teaches the provision of an extremely tough and resistant rubber composition hitherto found especially useful in the manufacture of molded cases or crates of the low-wall type for soft drink bottles. In Ruschman's compositions great strength and toughness are attained through the use of substantial quantities of textile fibers existing partly at least in the form of bundles or cords and most conveniently provided through the use of friction scrap as one of the constituents of the composition; while fiber length and toughness are preserved by modes of compounding and modes of cure set forth in the said application. A typical formula for the Ruschman compound is:

	Parts
Friction scrap-----	232
Sulphur -----	31
MgO -----	9
Petrolatum -----	10
808 accelerator-----	1

The parts in the above formula are by weight. The MgO may be high calcined magnesium oxide acting as a secondary accelerator. The 808 accelerator is a butyraldehyde aniline accelerator, but other rubber accelerators may be employed. Such compositions mold easily and give a very durable structure devoid of brittleness, and are excellent for use in the structures of my invention.

Referring to Figure 1, I have shown a molded crate structure having a bottom 1, side walls 3 and 4 and end walls 5 and 6. An important feature of this embodiment of my invention involves the provision across the bottom wall 1 of a series of internal upstanding ribs 7, 8 which are integral with the bottom and with each other. These ribs serve the combined function of reinforcing the bottom wall and of providing low or partial partition elements between the bottoms of bottles, as will be evident from Figure 1. The several ribs 7 and 8 terminate at

their ends in upstanding rib elements 9 and 10 integral with the bottom ribs and with the side and end walls respectively of the crate. The ribs 7 and 8 are tapered slightly away from the bottom wall 1 to give a proper draft to the mold, while the upstanding ribs 9 and 10 are tapered upwardly along the side and end walls for a similar reason. The ribs 9 and 10 serve to reinforce the side and end walls and, where desired, to provide mounting or locating means for an internal cage or grid to keep the partition structure.

The case of Figure 1 may be molded in a conventional hydraulic molding press, such as those which are used for the formation of storage battery cases. Such a press will usually have a lower platen upon which a mold block is mounted. The block may be provided with a recess or cavity conforming to the outer surfaces of the bottom, side and end walls of the case, or where external decoration is desired, the mold may be of the so-called "basket" type in which a series of elements for molding the outer surfaces of the side and end walls are arranged slidably along ways at a slant to the vertical so that as the case is stripped from the mold, these elements will separate laterally from it. In either event, however, it is usual to provide an upwardly movable bottom molding plate in the mold cavity. This plate is actuated by the plunger of a kick-out cylinder located beneath the platen of the press.

The interior surfaces of the case are molded by means of a plunger attached to the ram of the main overhead hydraulic cylinder of the press. The plunger will be provided with a means for molding the upper edges of the side and end walls of the case, and these means may be either a fixed and integral part of the plunger itself or a movable element with kick-off pins which will serve to strip the molded case from the plunger. The plunger will be provided with suitable air relief valves, as is well known in the art.

For handles by which the case may be carried, I preferably provide hand hole perforations 11 and 12 in the end walls of the structure. These may be formed by plungers operable through the end walls of the mold block and through the movable end wall molding elements within the mold block if these are employed. Prior to the shaping of the article, the plungers may be driven inwardly to a position against the main plunger which molds the interior surfaces of the case, and during the molding operation the plastic material will flow around them. Particularly, however, in the molding of hard rubber structures it is within the scope of my invention to locate within the mold and above the hand hole forming plungers, strips of rubber composition so as to avoid any knit lines which might otherwise be produced by the flow of the plastic around these plungers. The inserts or bars may also be of a stronger composition if desired. Procedures such as those just referred to are described in the copending Ruschman application.

In the exemplary embodiment of Figure 1, the cavity of the mold block or movable molding elements is recessed to permit the formation of an outstanding peripheral ridge 13 about the upper edges of the side walls and end walls of the case. In this structure the ridge 13 serves the dual purpose of reinforcing the upper edges of my structure and of providing for stacking, to which end it is provided with an interior groove presenting an upwardly facing horizontal shoulder 14 and an upwardly slanting shoulder 15, the dimensions being such that the bottom edge portions of another similar case will fit within the groove 14, 15, as will be readily understood.

It is also within the scope of my invention to provide other types of reinforcement where desired. For example, a closed rectangular loop of metal 16, preferably though not necessarily of wire, may be placed within the mold cavity so as to become embedded in or at least secured to the lower edge portions of my molded case. In a similar manner another and somewhat larger closed

loop of wire or the like 17 may be located in the upper portion of the mold so as to become embedded in the molded outstanding ridge 13. Variant procedures are possible here such as the use of reinforcing elements of sheet metal accurately fitting the mold parts and so positioned that the plastic molding substance will be molded against them, while they remain exposed at outer surfaces of the structure. Since, however, this calls for reinforcing elements quite accurately made to fit the mold parts, I generally prefer, where reinforcement is desired, to use wire or other metallic closed loops as described, the dimensions of the loops being such that they will become embedded in the plastic composition during molding.

Excepting where resinous or other thermoplastic compositions may be employed in a comminuted or powdered state and liquefied by heat initially applied to the mold, I prefer to introduce the molding compositions into the mold in the form of weighed charges of warmed and continuously plastic material. Both the mold block and the main plunger are provided, as is usual in the molding industry, with passageways for heating or cooling fluid, which passageways are connected with suitable sources of fluid by flexible tubing. If the thermoplastic composition is introduced into the mold in a continuously plastic state, the mold parts may be continuously cooled to harden the composition after it is shaped by the mold parts. When using compositions of the thermosetting variety including thermosetting resins and rubber compositions requiring polymerization or vulcanization, the mold parts will normally be heated to initiate or produce the polymerization or vulcanization reactions so as to set the composition after shaping. Thereupon, the mold parts may be cooled if desired to stiffen the article to some extent prior to its removal from the mold.

In the formation of my articles, they are molded as has been described and removed from the mold in the usual fashion. Hard rubber articles may require to be placed upon an external shrink fixture for cooling substantially to room temperature. Other types of articles will, in general, have reached a sufficient stability of ultimate shape and size upon removal from the mold.

If drainage holes 31 are desired in the bottom wall 1 of the case, these may be formed during molding, but I prefer to form them by means of gang drills upon the completed molded article when it has been removed from the mold. Similarly, any perforations required for the interior cage next to be described are most conveniently formed by drilling after molding.

The partitions in my structure, partially provided by the relatively low ribs 7 and 8, are completed by an interior cage or grid. This may, if desired, be an integral sheet metal stamping; but it is most conveniently formed as a wire grid indicated at 18 and 19 in Figure 1, the wires where they cross being welded or otherwise fastened together. A very simple form of grid may be employed as in Figure 1 and 2, the ends of the wire elements 18 and 19 merely lying in some perforations 20 formed by drilling in the upstanding rib elements 9 and 10. The grid will be maintained above the bottom of the box a suitable distance to prevent the upper portions of the bottles from knocking together, the lower portions of the bottles being maintained in separated condition by the low molded ribs 7 and 8. The exact height of the grid may be determined by the shape of the bottles; but where the bottles are substantially cylindrical in shape (or rectangular), throughout the greater part of their length, I prefer to position the grid somewhat above the center of gravity of the filled bottles.

It is also within the scope of my invention to carry the ends of the wire elements 18 and 19 of my grid through the side and end walls of my case and rivet them in place over a washer 21, as at 22 in Figure 3. In this event suitable holes 23 may be drilled through the walls and the ribs 9 and 10, if desired, from the outside

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by means of gang drills so shaped as to provide an outer recess 24 to contain the washer and the riveted head of the wire.

Yet again, where the ends of the wire elements merely enter holes in my molded structure, it is competent to bush with soft rubber inserts 25, as illustrated in Figure 4.

Where the ends of the grid elements are engaged in perforations, bushed or not, in the ribs or walls of the molded case, the resilience of the wires forming the grid enables me to spring the ends into place.

Self-supporting grids may also be employed, obviating the formation of recesses or holes in the walls or ribs. In Figure 5 I have shown a structure in which the ends of the wire elements 18 and 19 are bent downwardly to form supporting legs 27 and 28, the lower ends of which, preferably bent over as indicated, will rest upon the bottom wall 1 of the case. In such a structure, it will be usual to offset the end portions of the horizontal parts of the wire elements 18 and 19 to avoid the ribs, as indicated. The leg portions of the grid may be caused to have a resilient outward inclusion so that the grid may be held within the case during such operations as washing and sterilizing; and slight outward deflections, as at 29, may be employed to fix the bearing of the legs against the side and end walls.

As indicated, a provision for stacking is normally required; but I am not limited to the provision of the outstanding ridge 13. The ridge may be omitted entirely, as in Figure 6, and corner stacking elements 30 may be riveted or otherwise fastened in place at the corners of the case, as illustrated in Figure 6.

In Figure 7 I have shown another embodiment of my invention. In considering Figure 7 it should be noted that I have designated those parts of this structure which are similar to corresponding parts of the structure of Figure 1 with reference numerals corresponding to those used for such parts in Figure 1. The major point of distinction between the embodiments of Figures 1 and 7 lies in the use of a wire mesh to constitute the major portion of the bottom wall of the milk crate instead of the molded, ribbed bottom wall shown in Figure 1.

The side and end walls of the milk bottle case of Figure 7 may be molded by apparatus, materials and processes similar to those described in connection with the embodiment of Figure 1. It should be noted, however, that I prefer to form these walls with an integral bottom member or lower lip 32. This member serves not only to strengthen the bottle carrier but also to furnish a suitable base for properly securing the wire mesh 33.

The wire mesh 33 may be secured to the bottom member 32 of the milk bottle case of Figure 7 by ways and means similar to those described in connection with the wire grid 18, 19. Thus I sometimes find it desirable to secure the wire mesh in place after the side and end walls and lip have been molded. In Figure 8, however, I have illustrated yet another way of fastening the wire mesh 33 (or the wire grid 18, 19 if desired) to the body of the bottle case. In this figure I have illustrated a strand of the mesh 33 as provided with a pair of discs or projections 34 fixed thereto. This strand, plus the discs, is molded in the lip 32. The discs serve as anchoring means to insure that the weight of the milk bottles will not cause the wire strands to pull out of this lip.

In Figures 9 and 10 I have illustrated not only an embodiment of my invention wherein a metal rim is provided for the bottom of the molded milk bottle case but I have also illustrated the manner in which the wire mesh, such as 33 in Figure 7, may be molded directly in the milk bottle case. In the particular embodiment of Figure 9 I have illustrated the use of a metal rim 35 and have shown the individual strands of the mesh 33 as having extensions 36 which are welded to the rim 35. The rim 35 and the wire mesh which is fixed thereto is placed in a conventional basket-type mold one plate of which is

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indicated at 37. The bottom plate of this mold is designated at 38 and the punch at 39.

The molded milk bottle case of Figure 9, one wall 6 of which is shown, is indicated as being formed of a rubber composition. In molding a case of this type, it is to be understood that the punch 39 will come down and contact the wire, or formed metal bottom if desired, to prevent the formation of a solid rubber sheet. A thin rubber flash might be present over parts of the bottom, but this can very easily be removed.

In Figures 11, 12 and 13 I have illustrated certain embodiments of my invention wherein the molded milk bottle case is made in two pieces. The embodiment of Figure 12 is similar to that of Figure 1 except for the fact that it is made in two sections. A lower section will be formed with the molded bottom 1 and the ribs 7 and 8. An important advantage of a two-piece case of this type is that it enables the case to be molded on a standard battery box press. I have indicated that the walls of the upper section are but continuations of those of the lower section; in Figure 12 therefore, the upper portion of the wall 6 is shown at 6a and the upper portion of the wall 4 at 4a. The two sections of the case of Figure 12 are shown as having mating flanges which are cemented together as at 40.

In another embodiment of my invention I contemplate incorporating molded partitions in the case rather than utilizing the wire mesh such as shown at 18 and 19 in Figures 1 and 7. By making such a case in two pieces, however, I am able to provide large holes or gaps in the partitions at the parting line of the two sections of the case. This saves weight, material and increases air circulation. Thus, in Figure 11 I have indicated one of the end walls as being formed of the sections 6 and 6a and the bottom wall as being a molded bottom 1. The bottom section of a case of this type may simply be an open topped box such as shown in Figure 11 or it may be provided with the integral upstanding ribs 7 and 8 such as is shown in Figures 1 and 12. The top section of the case of Figure 11 is provided with a plurality of molded partitions 41 and 42 having openings 43 and 44 therein respectively.

The molded milk bottle case of Figure 11 may be fastened together in the following manner. A molded undercut flange in one of the sections is joined to a mating half while one of the halves is still hot from the mold. The .150 inch or so shrinkage that such a container would go through in cooling plus the hot elasticity of the material is thus utilized to seal the two halves together. Such undercut flanges may be formed by mold inserts or may be machined later.

In Figure 13 I have illustrated yet another way in which the two sections of a two-piece molded milk bottle case may be fastened together. In this figure the sections of the case are shown as formed with mating notches through which a metal pin 45 is placed. This construction prevents the panels from separating because of warpage or distortion.

The metal rim 35 of the embodiment of Figure 9 serves not only to protect the heavily loaded milk bottle case from wear as it is dragged about rough concrete floors and the like but it also serves as a very suitable means for anchoring and positioning the wire mesh bottom. In addition it serves as a reenforcement especially in the corners.

Modifications may be made in my invention without departing from the spirit of it. Having thus described my invention in an exemplary embodiment, what I claim as new and desire to secure by Letters Patent is:

1. A molded monolithic milk bottle case comprising a bottom wall, side and end walls integral therewith and with each other and relatively short, upstanding integral ribs crossing the bottom wall and each other to provide low partition elements within the case, said ribs extending upwardly along the side and end walls of the case to a

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relatively great height, the extensions of the ribs being integral with the ribs themselves and with the side or end walls of the case and extending only a relatively short amount from the respective side and end walls, and including a grid for providing additional partitioning between bottles, said grid being supported above said bottom wall and said ribs and having separating elements substantially aligned with the several rib extensions.

2. The structure claimed in claim 1 including stacking means affixed to the upper edges of said side and end walls.

3. The structure claimed in claim 1 including stacking means affixed to the upper edges of said side and end walls, said end walls having hand hole perforations therein below the top edges thereof.

4. A molded monolithic milk bottle case comprising a bottom wall, side and end walls integral therewith and with each other and relatively short, upstanding integral ribs crossing the bottom wall and each other to provide low partition elements within the case, said ribs extending upwardly along the side and end walls of the case to a relatively great height, the extensions of the ribs being integral with the ribs themselves and with the side or end walls of the case and extending only a relatively short amount from the respective side and end walls, and including a grid for providing additional partitioning between bottles, said grid being supported above said bottom wall and said ribs and having separating elements substantially aligned with the several rib extensions, said grid being formed of wire, end portions of the wire elements formed at and extending into recesses in the said case.

5. The structure claimed in claim 4 wherein said recesses are formed in said rib extensions.

6. The structure claimed in claim 4 wherein said recesses are formed in the side and end walls of said case, end portions of said wire elements being offset to avoid said rib extensions.

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7. The structure claimed in claim 4 wherein said recesses are bushed with soft rubber.

8. The structure claimed in claim 4 wherein the ends of said wire elements extend through the said walls and are riveted.

9. The structure claimed in claim 8 including an integral outstanding rib at the upper edges of said side and end walls, said rib having an interior groove presenting an upwardly facing shoulder of a dimension substantially equivalent to the dimensions of the lower edges of said case, to provide for stacking, said case having hand hole perforations in the end walls thereof beneath said outstanding rib.

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