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2,773,624

PLASTIC CASE FOR TRANSPORTING PACKAGED FRESH MILK

Filed Sept. 20, 1954

3 Sheets-Sheet 1

Fig. 1.

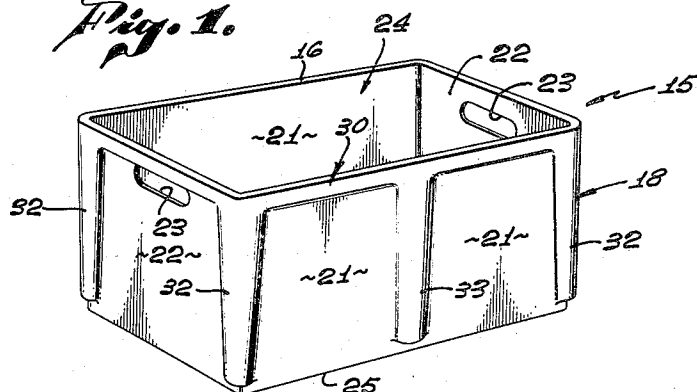


Fig. 2.

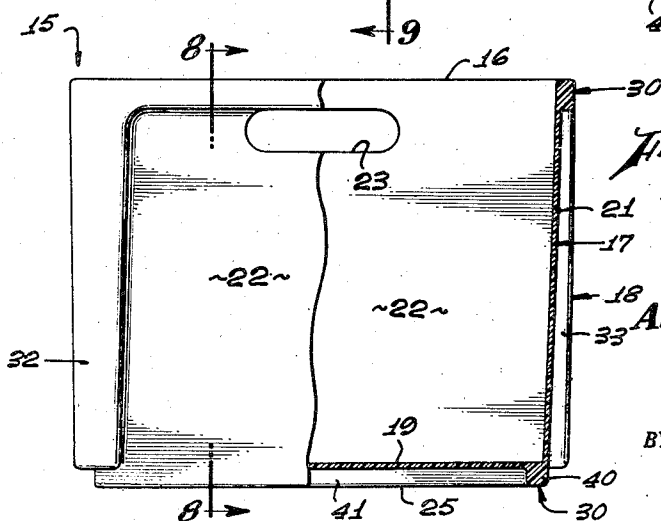
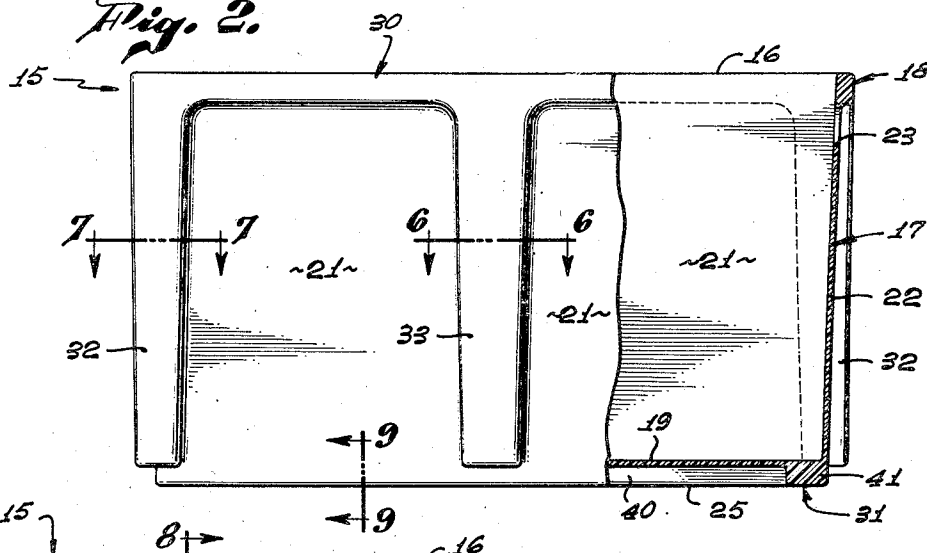


Fig. 3.

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Fig. 4.

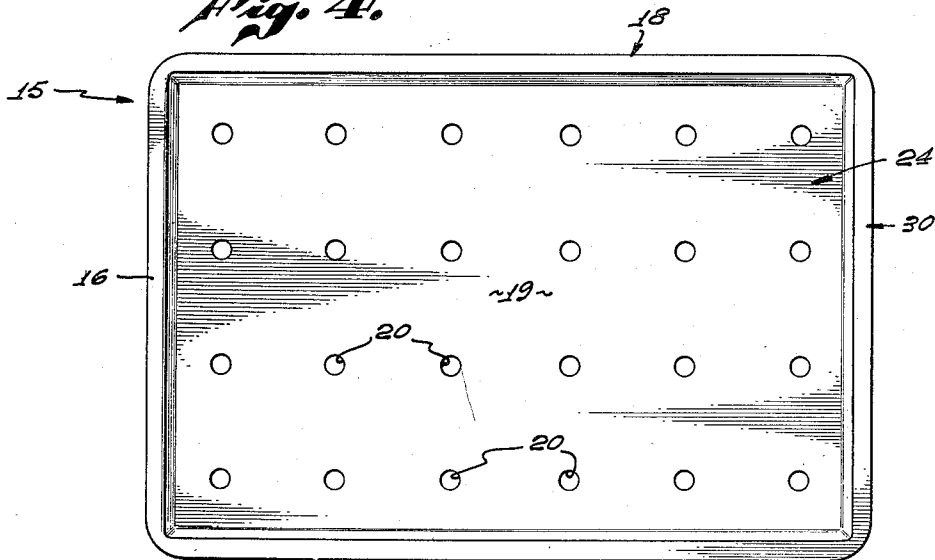


Fig. 5.

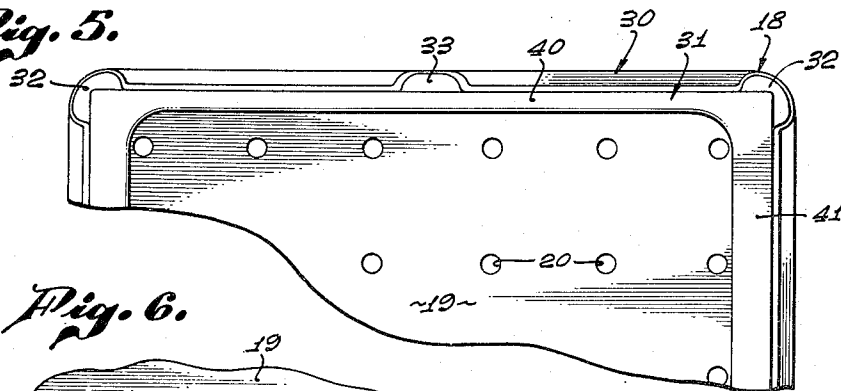


Fig. 6.

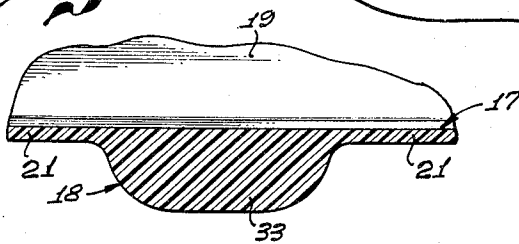
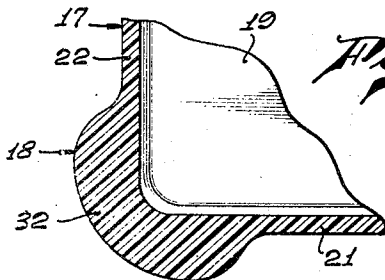


Fig. 7.



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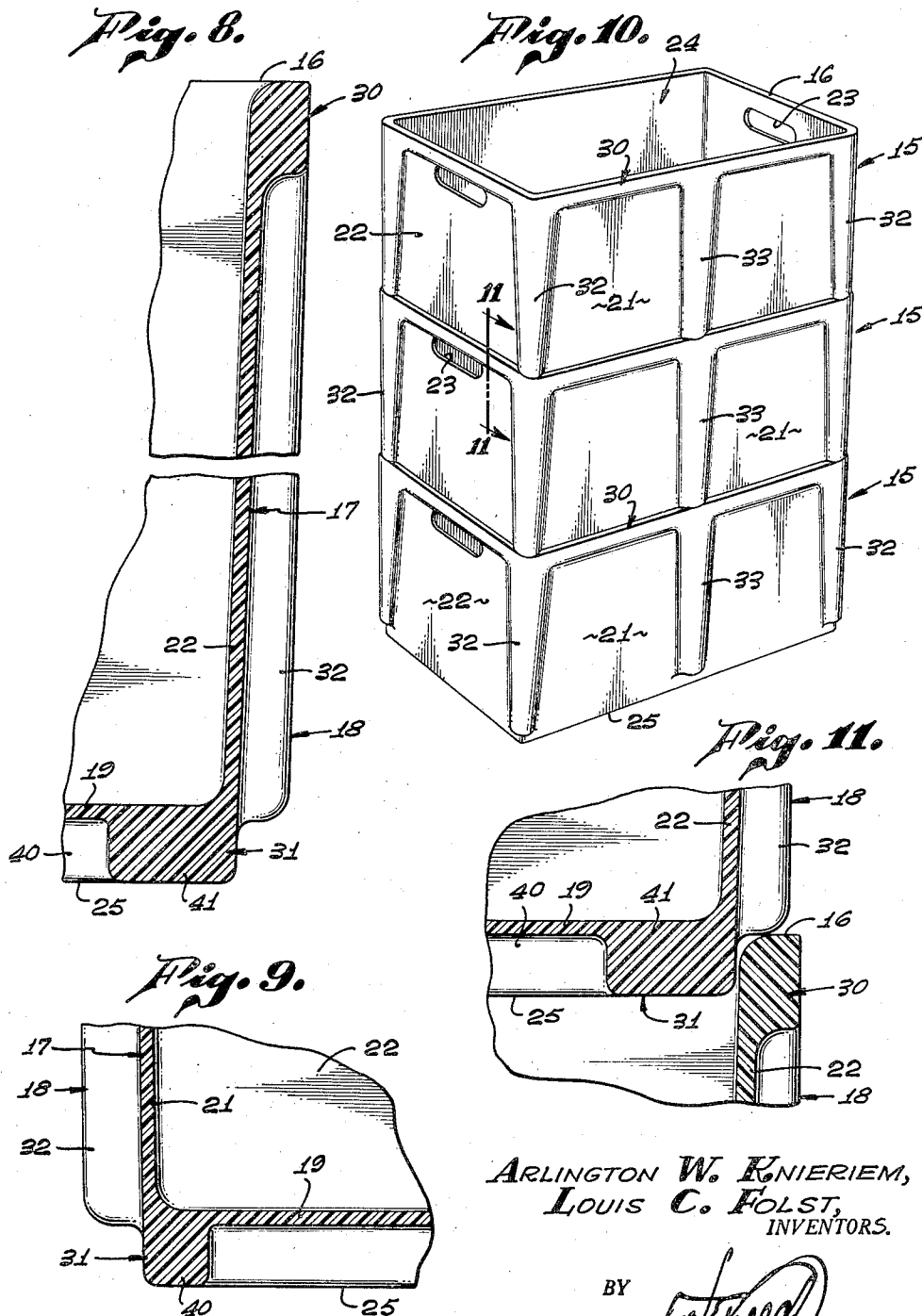
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PLASTIC CASE FOR TRANSPORTING PACKAGED FRESH MILK

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3 Claims. (Cl. 220—97)

This invention relates to the transporting of fresh milk packed in rectangular waxed paper cartons and particularly to a novel case for carrying a multiplicity of said cartons.

Milk must be kept constantly refrigerated while being stored and transported incidental to its distribution to the retailer. Wooden crates, in which the milk cartons are temporarily packed, have heretofore been commonly used in this refrigerated handling and storage of packaged milk. Due to the high humidity prevalent in refrigerated trucks and storage rooms, these wooden crates, called "milk cases" absorb large quantities of moisture. This causes the wood to swell and makes it necessary for the crate to be metal bound which makes the crates relatively heavy. The moisture so absorbed also adds to the crate's weight to an extent which substantially increases the cost of handling and transportation of these wooden crates.

It is an object of the present invention to provide a novel case for use in handling fresh milk packaged in cartons which case will be substantially lighter than a metal bound wooden crate and substantially impervious to moisture.

Another object is to provide a novel case of molded plastic construction having thin walls with spaced integral reinforcing elements which are so related to each other as to comprise a rigid skeletal structure, yet which fit into a mold pattern allowing the case to be produced in and withdrawn from a two part mold, and provide nesting formations at the upper and lower peripheral surfaces of said case which do not extend respectively above or below said surfaces.

The manner of accomplishing the foregoing objects as well as further objects and advantages will be made manifest in the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a perspective view of a preferred embodiment of the invention.

Fig. 2 is a side elevational view of the invention partially broken away to disclose the sectional construction of an end and adjacent bottom portion of the case.

Fig. 3 is an end elevational view of the invention partially broken away to show in section a side and adjacent bottom portion of the case.

Fig. 4 is a plan view of the invention.

Fig. 5 is a partial bottom plan view of the invention.

Fig. 6 is an enlarged fragmentary horizontal sectional view taken on the line 6—6 of Fig. 2, and showing a mid-side pilaster like integral reinforcing element.

Fig. 7 is a similar sectional view taken on the line 7—7 of Fig. 2 and shows a corner reinforcing element.

Fig. 8 is an enlarged fragmentary sectional view of an end wall of the case taken on the line 8—8 of Fig. 3.

Fig. 9 is an enlarged fragmentary sectional view of a bottom portion of a side wall of the invention taken on the line 9—9 of Fig. 2.

Fig. 10 is a perspective view showing three cases, embodying the invention, stacked in nesting relation.

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Fig. 11 is an enlarged detail sectional view taken on line 11—11 of Fig. 10 and illustrating the manner in which upper and lower end portions of adjacent cases in a stack nest together.

Referring specifically to the drawings, the invention is therein illustrated as embodied in a plastic case 15 which, because of its unique design, is adapted to be made in a two part mold and also have the other characteristics heretofore mentioned.

The male and female halves of the mold (not shown) form the inner and outer surfaces respectively of the case 15, and the parting line between said mold halves is the outer boundary line of the top horizontal surface 16 of the case 15. All exterior surfaces of the case 15 are tapered downwardly from surface 16 so that case 15 will draw upwardly from the female half of the mold. Likewise, all internal surfaces of the case 15 are tapered downwardly to permit the case 15 to draw from the male half of the mold.

These limiting requirements had to be met in the development of the present invention. Thus, before the other objects of the invention could be realized and an internal carton carrying cavity provided meeting the existing space requirements, which of course could not be altered, the taper angles on some surfaces of the case 15 were reduced to the limit of what is generally considered good practice in plastic moulding.

The case 15 comprises a thin shell 17 having a reinforcing skeleton 18 formed integral therewith.

The shell 17 includes a bottom 19, having drainage perforations 20 formed therein, side walls 21, and end walls 22, the latter preferably having hand-holes 23 provided near their upper edge.

The shell 17 has a uniform thickness of .09" where not integrally united with the skeleton 18. The shell provides a clean surfaced approximately rectangular cavity 24 for accommodating either 24 quart milk cartons or 12 half gallon milk cartons. Each case, when loaded, thus carries forty eight pounds of milk.

The downward taper between the side walls 21, and between the end walls 22, is approximately forty-five minutes.

The side and end wall may be considered as extending downwardly about one-half inch below the bottom 19 to make it about 10 3/4" from the top surface 16 of case 15 to bottom surface 25 of the case.

The exterior surfaces of side walls 21 and end walls 22 are clean of encumbrance below the level of the bottom 19 and because of the downward taper of said walls, the lower half inch of each case 15 fits loosely within the upper half inch of the cavity 24 of another case 15 disposed in vertical alignment therebeneath.

The skeleton 18 includes a rectangular perimetric top reinforcing frame 30 which is formed by the outward thickening of the upper edge portions of side walls 21 and end walls 22.

The skeleton 18 also includes a rectangular perimetric bottom reinforcing frame 31 which is formed by extending lower edge portions of side walls 21 and end walls 22 below the bottom 19 by an amount equal to several times the thickness of said bottom, and by the inward thickening of the lower edge portions of the side walls 21 and end walls 22 by an amount equal to several times the thickness of said side walls. Frame 31 is integral with the bottom 19 and thus has the additional aspect of constituting a downward thickening of perimetric portions of the bottom 19 several times the thickness of said bottom.

To reinforce the thin side and end walls of shell 17 and provide rests for limiting the distance the bottom portion of each case may be inserted downwardly into the cavity 24 of a case therebelow, the skeleton 18 also

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includes upright pilaster-like, downwardly tapering, corner reinforcing elements 32 and intermediate side wall reinforcing elements 33.

Corner reinforcing elements 32 are formed by downwardly thickening top frame 30 and outwardly thickening adjacent edges of side walls 21 and end walls 22, and extend downward to terminate one half inch above bottom surface 25 of the case 15.

The lower extremities of upright reinforcing elements 32 and 33 at least partially overlap and are integral with rectangular perimetric bottom reinforcing frame 31. The skeleton 18 is thus seen to be formed by the integral union of the perimetric top and bottom reinforcing frames 30 and 31 with opposite ends of the upright reinforcing elements 32 and 33, as well as all of these skeleton elements being integral with the adjacent walls of the shell 17. Skeleton 18 comprises six rectangular perimetric reinforcing frames including two rectangular end frames, two rectangular side frames and rectangular top and bottom frames 30 and 31. The skeleton side frames are reinforced and divided into equal rectangles by the intermediate reinforcing elements 33.

As shown by the bottom plan view of Fig. 5, the upright reinforcing elements 32 and 33 are tapered, downwardly so as to readily draw from the female half of the mold. This taper is accomplished, while leaving substantial abutting faces on the lower extremities of elements 32 and 33 which faces lie in the same horizontal plane and simultaneously engage the top surface 16 of a case 15 disposed in nesting relation therebeneath as shown in Figs. 10 and 11.

Furthermore, the upright elements 32 and 33 of successive cases 15 thus stacked are thereby placed in vertical end-to-end abutment causing these to form upright compression members extending from the bottom to the top of the stack. This concentrates the stresses of supporting the upper cases in a stack in these vertical compression members which are heavily constructed with special reference to making them able to sustain these loads with an ample margin of strength. The lighter structure of cases 15 at the lower end of stack are thus freed from undue stresses which might otherwise be imposed by the weight of loaded cases resting thereon.

The hand holes 23 are located in the end walls 22 just beneath the rectangular perimetric top reinforcing frame 30 so that end portions of this frame may be gripped in the hands, when the fingers are extended inward through said holes.

The rectangular perimetric bottom reinforcing frame 31 of the skeleton 18 includes side members 40 and end members 41, the latter being of substantially wider and heavier construction than the members 40 to withstand strains imposed by conveyor lugs engaging members 41 in propelling the cases 15 along a conveyor.

Power conveyors for handling milk cases generally include a pair of tracks or chains so closely spaced as to support cases 15 entirely by contact of the cross members 41 with the conveyor. The substantial longitudinal breadth of members 41 fits these for withstanding the friction thus set up between the conveyor and said members.

Designed as it is for being produced in a two part mold, the plastic case 15 of the invention is adapted for manufacture by any plastic molding process and from any of the various plastic materials available.

For superior characteristics of strength and lightness and impermeability to moisture, case 15 is preferably molded of a polyester resin under high pressure with fiber glass reinforcing material packed in the mold and thus embedded in the plastic forming the various elements of the case, when the latter is taken from the mold.

It is believed manifest from the foregoing description and the accompanying drawings that the present invention provides a plastic case of great strength for its weight, which has relatively low tooling and production costs; and

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which provides a novel and highly effective means for nesting the cases when stacked without requiring any lugs projecting above or below the body of the case.

The claims are:

1. In an integrally molded plastic case, the combination of: a thin shell comprising a bottom, side walls and end walls, said side and end walls converging slightly from top to bottom to permit withdrawal of said case upwardly from the mold in which it is formed and to permit a lower end portion of said shell of one of said cases to fit within an upper end portion of the shell of another of said cases therebelow; a perimetric top reinforcing frame formed by outwardly thickening upper edge portions of said side and end walls; a perimetric bottom reinforcing frame formed by extending lower edge portions of said side and end walls several times the thickness of said bottom below said bottom and inwardly thickening said lower edge portions of said side and end walls several times the thickness of said side and end walls; said bottom reinforcing frame constituting a downward thickening of perimetric portions of said shell bottom several times the thickness of said bottom; and a series of downwardly tapering upright wall reinforcing elements formed by outwardly thickening said shell walls, said upright elements also constituting the downwardly tapering, downward thickening of said top reinforcing frame at spaced points about said case with the lower ends of said upright elements terminating short distances above the lower edges of said shell walls by at least partially overlapping with said perimetric bottom reinforcing frame, whereby said upright elements of one case rest on the top perimetric reinforcing frame of a case disposed therebelow in nesting relation therewith, said tapering upright reinforcing elements being located at the vertical corner edges of said shell whereby said elements reinforce said side and end walls at their lines of juncture and unite with said top and bottom perimetric reinforcing frames to form an integral skeleton of six rectangular frames, five of which are reinforced in the planes of said rectangular frames by said ends, sides and bottom of said shell.

2. A combination as in claim 1 in which tapering upright reinforcing elements are also provided at mid points in said shell side walls, said middle side reinforcing elements dividing each of the side rectangular frames into two rectangular frame sections integrally united within said skeleton.

3. In an integrally molded plastic case, the combination of: a thin shell comprising a bottom, side walls and end walls, said side and end walls converging slightly from top to bottom to permit withdrawal of said case upwardly from the mold in which it is formed and to permit a lower end portion of said shell of one of said cases to fit within an upper end portion of the shell of another of said cases disposed therebelow; a rectangular perimetric top reinforcing frame formed by outwardly thickening upper edge portions of said side and end walls; a rectangular perimetric bottom reinforcing frame formed by extending lower edge portions of said side and end walls below said bottom several times the thickness of said bottom, and inwardly thickening said lower edge portions of said side and end walls several times the thickness of said walls, said bottom reinforcing frame constituting a downward thickening of perimetric portions of said shell bottom, several times the thickness of said bottom; and a series of downwardly tapering upright wall reinforcing elements formed by outwardly thickening said shell side and end walls, said upright elements also constituting a downward thickening of said top reinforcing frame at the corners of said shell, said upright elements thereby reinforcing said side and end walls at their lines of juncture and extending downwardly in overlapping relation with at least a portion of said perimetric bottom reinforcing frame and being integrally united at their opposite ends with said top and bottom reinforcing

ing frames to form an integral skeleton of six rectangular frames, five of which are reinforced in the planes of said rectangular frames by said ends, sides and bottom of said shell, the lower ends of said upright elements of one case being adapted to be vertically aligned with the top perimetric reinforcing frame of a case disposed therebelow in nesting relation therewith whereby the weight of said upper case is transferred through said upright elements thereof to the top perimetric reinforcing frame of the lower case.

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