

July 28, 1970

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3,521,808

TRAY FOR FRANGIBLE MATERIALS

Filed July 26, 1968

2 Sheets-Sheet 1

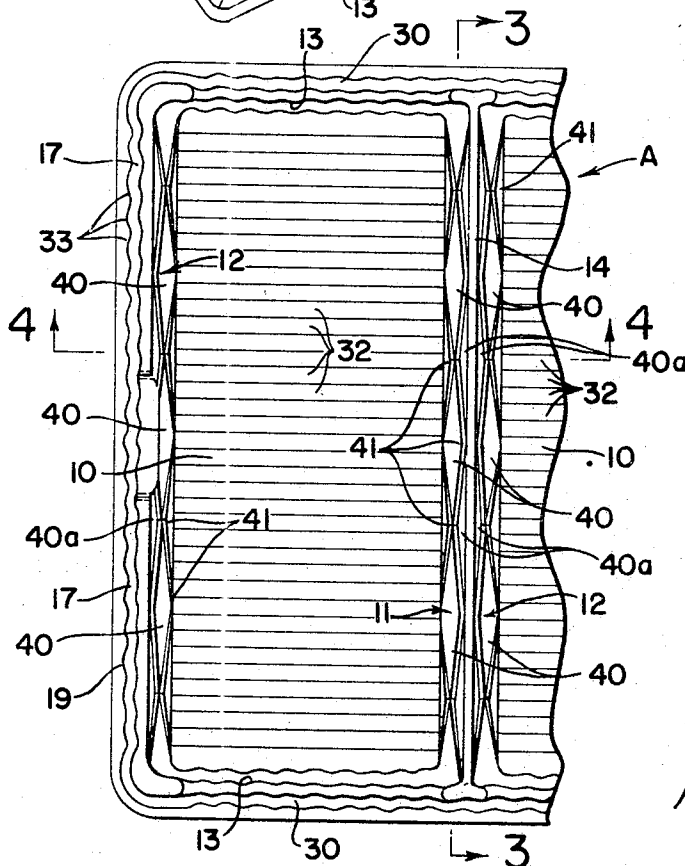
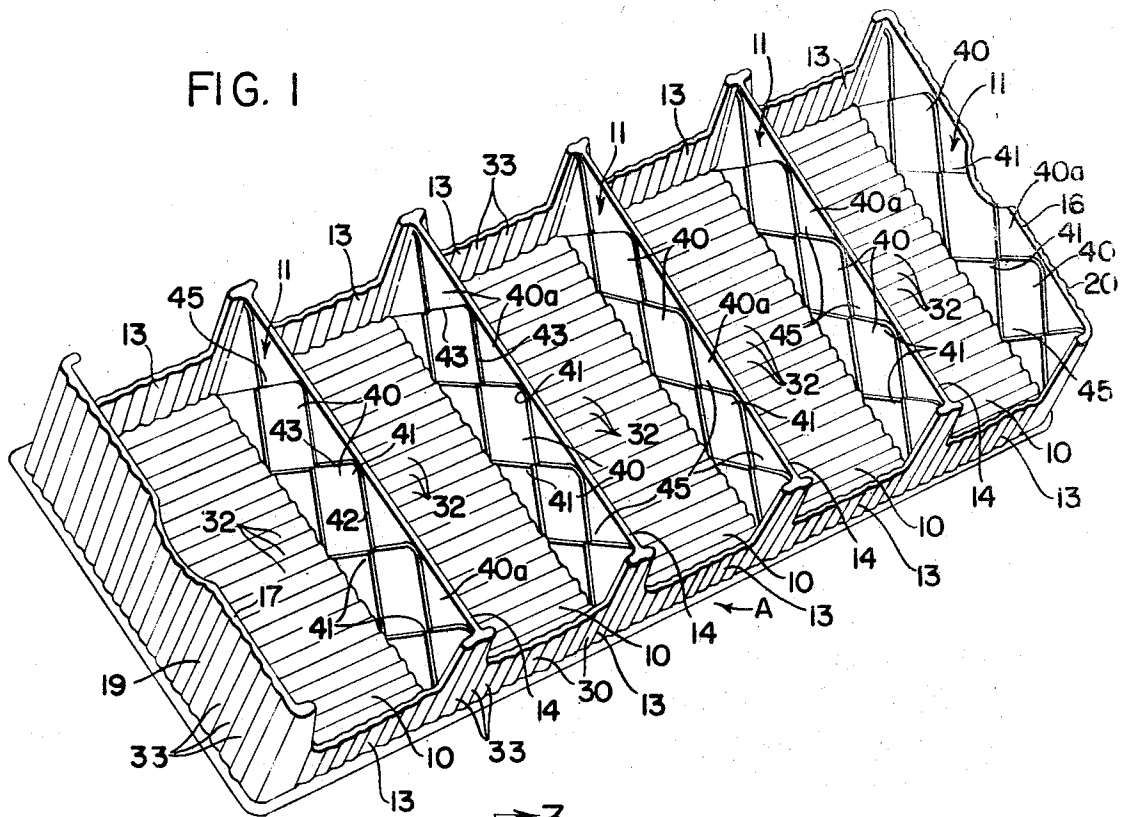


FIG. 2

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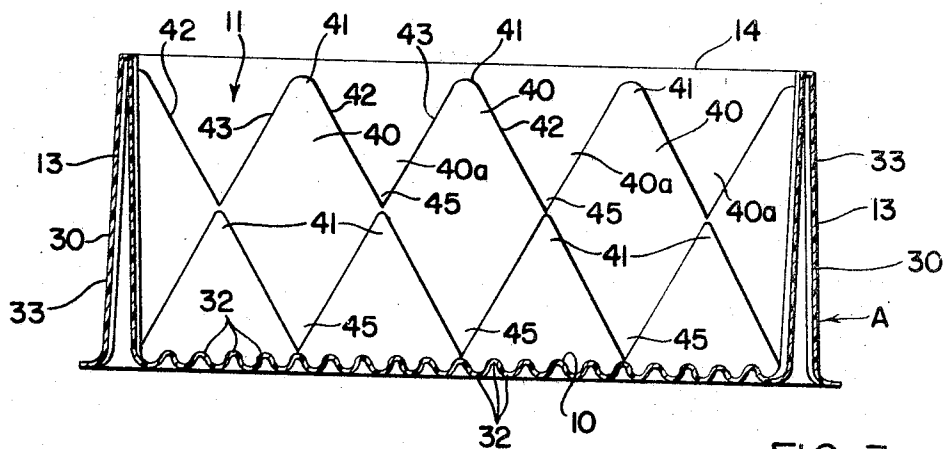


FIG. 3

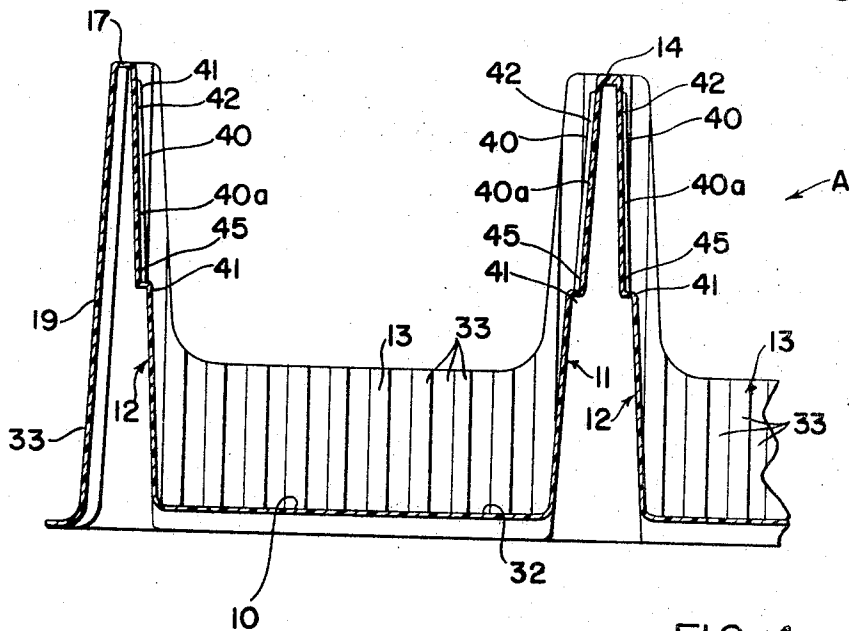


FIG. 4

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TRAY FOR FRANGIBLE MATERIALS

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Filed July 26, 1968, Ser. No. 748,016

Int. Cl. B65d 1/36, 85/36

U.S. Cl. 229—15

6 Claims

ABSTRACT OF THE DISCLOSURE

A one-piece tray vacuum-formed of a very thin thermoplastic material and suitable for packaging, protecting, and displaying frangible foods has a plurality of compartments each having duplex walls terminating in somewhat thicker spines at their upper edges, the adjacent compartments are separated by vertical duplex partitions formed of adjacent wall panels of adjacent compartments and extending transversely of the tray. Increased resistance to deflection by both vertical and transverse loads is obtained by molding into the panels a series of adjacent pyramidal triangular structures having walls extending out of the plane of the panels greatly increasing protection of the packaged foods without decreasing absorption of shocks in directions transverse to the walls of the compartments.

This invention relates to the packaging of commodities, particularly edible commodities like cookies, cakes and candy.

In the merchandising of cookies it is desirable to make a display in a manner so that the cookies are clearly visible and are held in orderly relationship and are protected against breakage by containers which have sufficient flexibility to absorb shock and yet are sufficiently rigid to prevent crushing by either vertical or transverse loads. The cookies are usually arranged in rows with the faces of the cookies in side by side relationship and in a vertical plane. The various rows of cookies are separated from each other by suitable dividers which must have resilience to absorb lateral shocks and protect one row from forces exerted through another. The dividers should have sufficient vertical support to permit many packages to be superimposed without weight being borne by the cookies themselves and should have transverse stiffness to prevent crushing by adjacent packages.

Many trays for display and shipping cookies have been proposed but it has been exceptionally difficult to provide trays of a very thin plastic material which has sufficient shock absorption to prevent damage to the cookies by handling and shipping and yet has sufficient vertical and transverse strength to provide the required degree of load support when packages are superimposed or arranged side by side in shipping containers. It has been proposed to provide trays in which the strength of vertical load supporting surfaces is increased by fluting the vertical disposed surfaces in a vertical direction. It has been found that while the fluting of such surfaces improves their ability to withstand vertical loads that the fluting decreases resistance to transverse loads so that crushing of cookies results during shipment.

It is an object of the present invention to provide a tray suitable for packaging rows of cookies, cakes, candies or other foodstuffs which has good energy absorption and cushioning of the food, and yet has dividers between the rows of cookies or food-containing cavities, which dividers have superior ability to support loads applied from both vertical and transverse directions.

Other objects of the present invention will be apparent from the following description of the invention as illustrated by the appended drawings in which:

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FIG. 1 is a top perspective view showing a typical tray or support member suitable for packaging rows of cookies, cakes, candies or other fragile material.

FIG. 2 is a top plan view of an end portion of the tray of FIG. 1.

FIG. 3 is a sectional view of the line 3—3 of FIG. 2.

FIG. 4 is a sectional view on the line 4—4 of FIG. 2.

Referring more particularly to the drawings in which like parts are designated by like numerals of reference in the several views, the tray A comprises a thin-walled resilient body having a number of compartments each having a floor 10 which is joined to transverse walls 11 and 12 constituting duplex partitions, and to sidewalls 13. The transverse wall or panel 11 of one compartment is integral joined to the transverse panel 12 of an adjacent compartment in a spine 14 which is somewhat thicker than the vertical portions of the panels 11 and 12, as best seen in FIG. 4. The transverse panels 11 and 12 of the end compartments are adjoined in spines 16 and 17 to end walls 19 and 20 respectively of the tray. The tray is provided with a side border member or skirt 30 which is integrally joined to the edges of the transverse panels 11, to the end walls 12 and 19 and 20, and the tops of the sidewalls 13. The transverse panel 11 of the compartments is spaced from the transverse panel 12 of the adjacent compartments except where they are joined at the top. Similarly the side border member is spaced from the sidewalls 13 of the compartments except where joined to the top. Longitudinally extending, substantially washboard fluting 32 preferably covers the floor of the tray. Transversely extending vertical fluting 33 preferably covers the side border member 30 and the sidewalls 13 to provide energy-absorbing surfaces to absorb shocks and cushion the packaged material.

The outer end panels 19 and 20 and the side border member 30 also preferably have vertical fluting to provide for shock absorption in directions transverse to the fluted surfaces while vertical support is improved. When vertical fluting is provided in the panels 11 and 12 the resistance to transverse or sidewise crushing by forces in the plane of panels 11 and 12 and perpendicular to the flutes is greatly impaired.

I have found in accordance with the present invention that the transverse as well as vertical support provided by the duplex partitions formed by the transverse panels 11 and 12 is greatly enhanced by molding suitable archlike pyramidal structures or reinforcements in the side panels instead of using vertical fluting as was previously proposed. This is accomplished without impairing the ability of the duplex partitions to absorb shocks normal to the panels 11 and 12.

These structures strengthen the panels 11 and 12 to improve resistance to all forces in the plane of the panels. Sidewise crushing of packaged material is reduced and enhanced vertical support is also provided. The archlike reinforcements are preferably made by vacuum forming a series of alternate shallow triangular shaped protrusions and indentations in the face of the transverse panels 11 and 12. The triangular protrusions 40, having upwardly pointing vertices 41 formed by the sides 42 and 43, are in a slightly different plane from that of adjacent triangular indentations having downwardly pointed vertices 45. The result is a sort of pyramidal or rooflike support which provides increased strength against both lateral (sidewise) forces and vertical forces. This permits the use of extremely thin thermoplastic material such as polyvinyl chloride, polypropylene, polyethylene or polystyrene sheets for vacuum forming the trays.

The outer bottom periphery of the tray formed by the lower edges of the side border members and end walls

is preferably somewhat lower than the floor of the compartments to further cushion against vertical shock.

It will be understood that modification of the exact preferred structure shown and described is contemplated within the scope of the invention. For example, the transverse partitions can be irregular spaces and can be of varying heights, either all the same, or different. Where there are sides to the compartments, these can be of varying heights, equal or unequal from compartment to compartment. Where desired, the spines can be wider to provide greater division between the respective compartments.

I claim:

1. In a tray suitable for display and packaging of fragile materials such as cookies and the like, which tray is of one piece molded thermoplastic material and comprises a lower substantially planar floor portion and vertically extending duplex partitions at the outer edges of said floor portion and at intermediate portions of said floor portion transversely of said tray and defining upwardly opening commodity-receiving compartments, said duplex partitions comprising relatively thin spaced resilient walls integrally connected at upper edges and bordered at upper edges by a continuous relatively stiff spine somewhat thicker than said duplex partition walls depending therefrom and comprising a shaped retaining frame at the upper edges of said tray, said duplex partitions defining an outer continuous skirt surrounding and spaced from said floor portion, said floor portion being substantially thinner than said spine, the improvement which comprises forming in the walls of duplex partitions which are intermediate portions of said floor portions, a series of pyramidal structures having walls extending out of the plane of the panels forming said duplex partitions whereby said partitions are strengthened in all directions in the planes of the walls of said partitions.

2. The structure of claim 1 wherein said pyramidal structures are a series of adjacent alternate triangular shaped protrusions and indentations.

3. The structure of claim 1 wherein the inner panels of the duplex end walls of said tray also have said pyramidal structures formed therein.

4. The structure of claim 1 wherein the floor of the compartments is fluted to provide a washboard type surface.

5. The structure of claim 1 wherein the said outer continuous skirt is vertically fluted to provide a washboard-like surface.

6. The structure of claim 2 wherein the sidewalls of said compartments, the floors thereof and the said outer continuous skirt are fluted.

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U.S. Cl. X.R.

206—46, 72; 220—22, 72; 229—2.5