

Nov. 28, 1967

D. W. DONOVAN

3,355,084

CONTAINERS

Filed Oct. 22, 1965

3 Sheets-Sheet 1

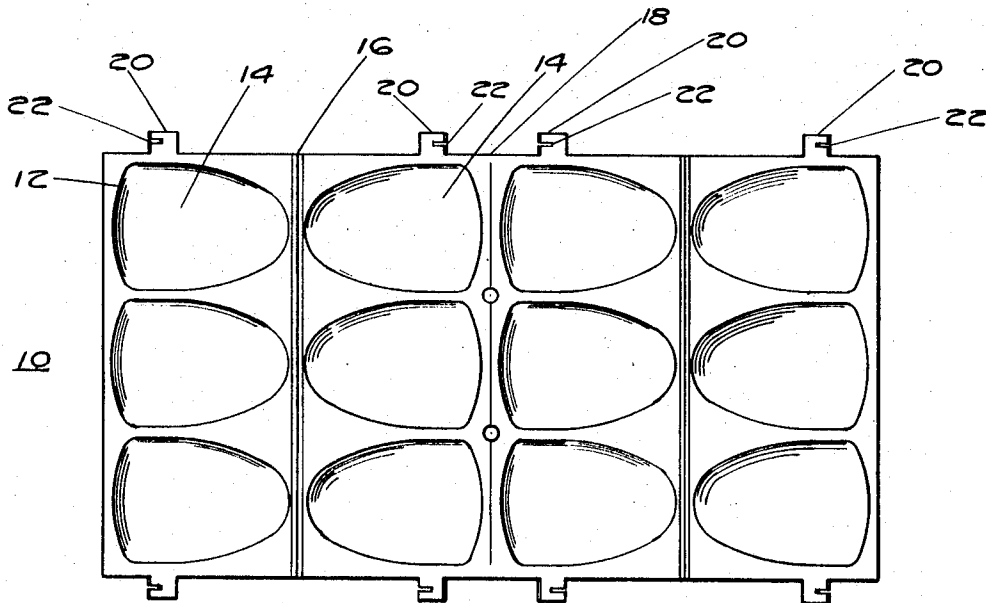


FIG. I

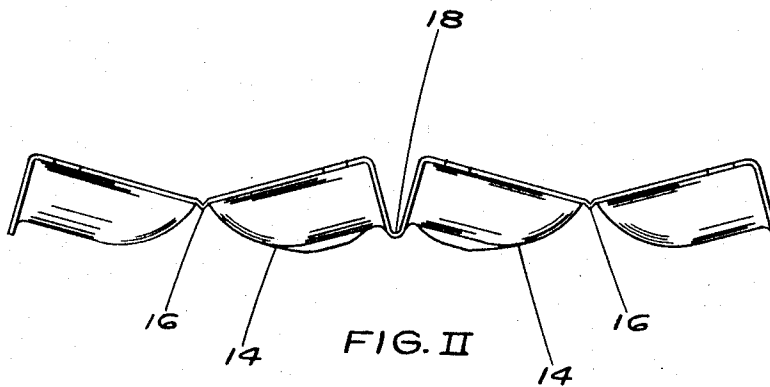


FIG. II

DONALD W. DONOVAN
INVENTOR

BY *James C. Logomasini*
ATTORNEY

Nov. 28, 1967

D. W. DONOVAN
CONTAINERS

3,355,084

Filed Oct. 22, 1965

3 Sheets-Sheet 2

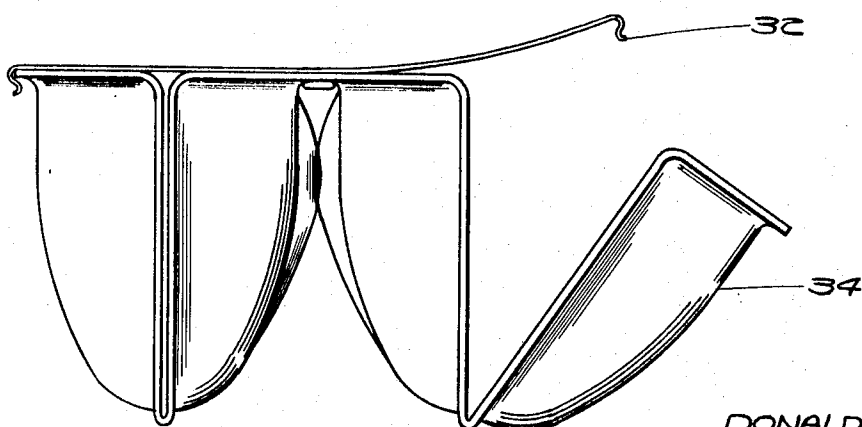
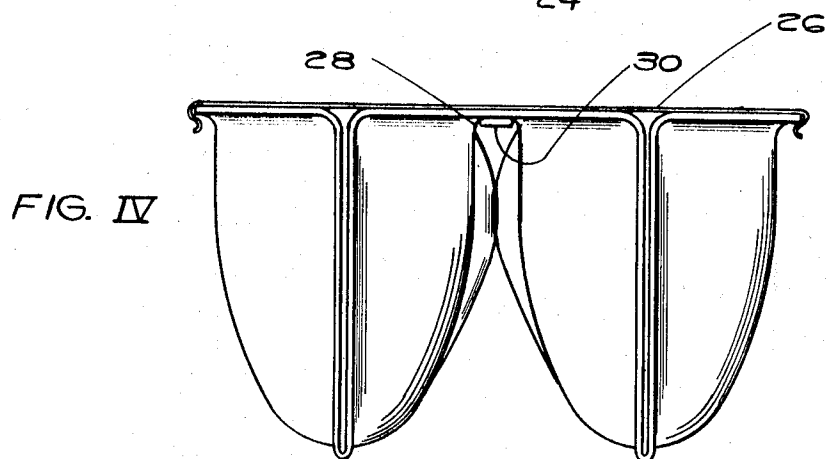
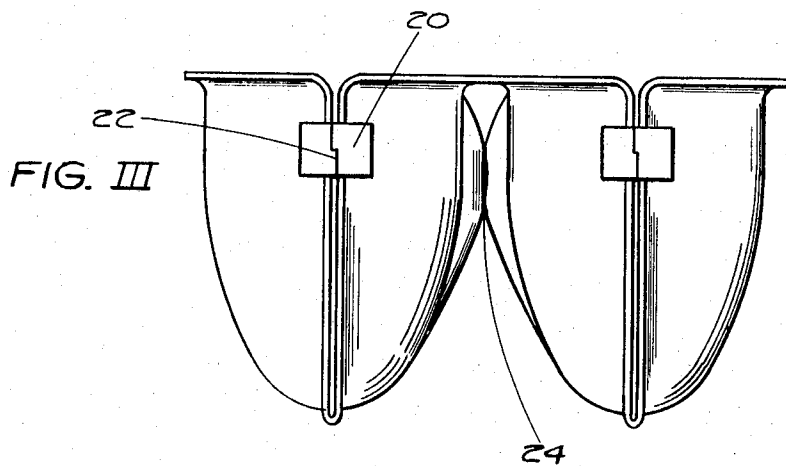


FIG. V

DONALD W. DONOVAN
INVENTOR

BY *James C. Logomasi*
ATTORNEY

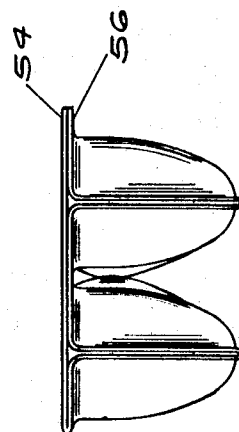
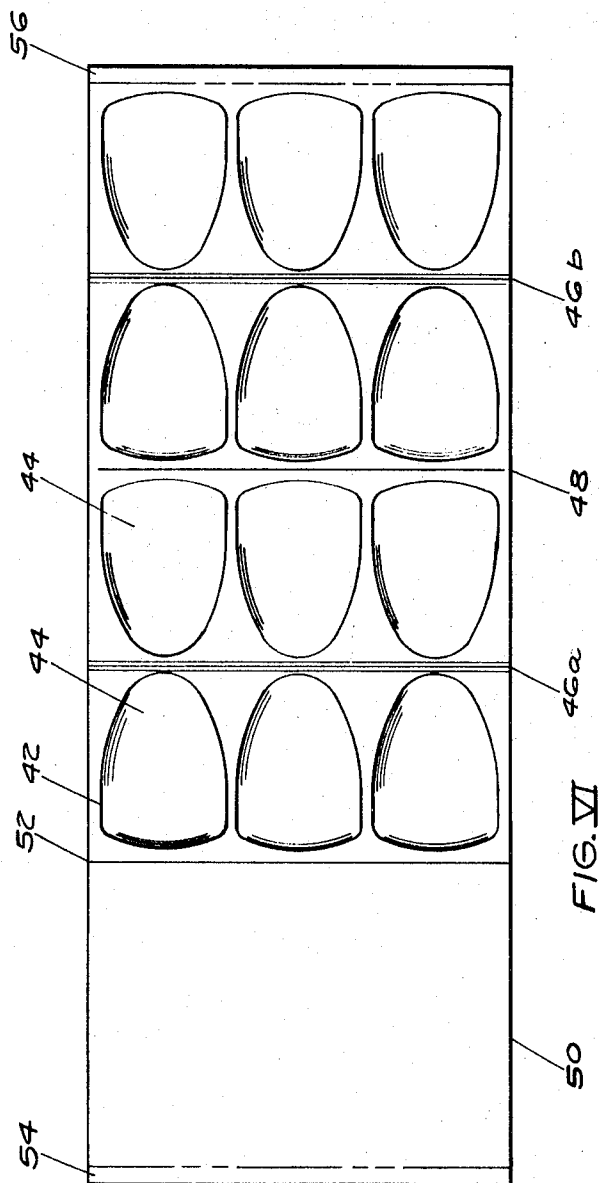
Nov. 28, 1967

D. W. DONOVAN
CONTAINERS

3,355,084

Filed Oct. 22, 1965

3 Sheets-Sheet 3



40

DONALD W. DONOVAN
INVENTOR
BY *James C. Logomasini*
ATTORNEY

1

2

3,355,084
CONTAINERS

Donald W. Donovan, Glastonbury, Conn., assignor to
Monsanto Company, St. Louis, Mo., a corporation of
Delaware

Filed Oct. 22, 1965, Ser. No. 590,796
3 Claims. (Cl. 229—28)

ABSTRACT OF THE DISCLOSURE

A multi-compartmented, self-supporting container formed by molding a plurality of depression pairs in a substantially planar plastic sheet, each pair forming the sides of a compartment when the sheet is folded between the individual depression pairs. The container may be of a one-piece transparent construction with a snap-on cover, may have fastening tabs to hold the depression pairs together when the container is assembled, and may include sealing provisions for joining outer surfaces of adjacent compartments, to provide stability to the container.

The present invention relates to containers and more specifically to containers having a plurality of compartments or sections for items such as eggs, vegetables, fruit and the like and to a method for making same.

It is an object of the present invention to provide a novel and relatively high strength compartmentalized container for small items such as eggs, vegetables, fruit and the like.

Another object is to provide a multi-compartment package which is simply and easily fabricated.

A further object of this invention is to provide method and means by which to attain the preceding objects.

Other objects of this invention will in part be obvious and will in part appear herein.

These and other objects are attained by molding a plurality of depression pairs in a substantially planar plastic material, each depression pair being designed to form opposing sides of a compartment and then folding the substantially planar plastic material between the individual depressions making up each pair to produce a container having a plurality of compartments.

The following drawings are provided for the purpose of illustrating various embodiments of the present invention.

FIG. I is a plan view of a molded sheet having a plurality of depression pairs prior to being folded.

FIG. II is a side view of the molded sheet of FIG. I.

FIG. III is a side view of the molded sheet of FIG. I after it is folded to form compartments.

FIG. IV is a side view of one embodiment of the present invention wherein a special plastic top is attached to the middle fold.

FIG. V is another side view of the embodiment shown in FIG. IV illustrating its novel utility.

FIG. VI is a plan view of a molded sheet material wherein about one-half of the sheet has been molded to produce a plurality of depression pairs and the other half is substantially planar throughout.

FIG. VII is a side view of the molded sheet of FIG. VI after it is folded to form a complete carton having compartments.

Referring to the drawings and more specifically to FIG. I, there is schematically shown a sheet 10 molded to produce a plurality of depression pairs 12, each depression 14 is designed to be one side or half of a compartment when the sheet is folded along fold line 16 in the direction such that the concave sides of the depressions face each other. When the sheet is folded in the opposite

direction along the central fold line 18, the configuration shown in FIG. III is attained. To maintain the fold of FIG. III, tabs 20 situated along the edges of the molded sheet are hooked together as shown by engagement of slits 22 cut into the side of each tab 20. In addition the two adjacent compartments that are formed are sealed together by an adhesive or by fusion at their area of contact 24. This latter seal is extremely important for without it, the entire package will be unstable and not suitable for containing fragile and other items. In summary, a sheet can be formed or molded to form plurality of shallow depression pairs which can be subsequently folded to produce a container having plurality of relatively deeply recessed compartments.

FIGS. IV and V illustrate a rather unique embodiment of the present invention wherein a plastic cover 26 is affixed to the middle fold 28 by buttons 30, molded into the plastic cover, being forced through holes in the middle fold 28. Although this is considered to be a rather unique way of affixing the cover to the folded portion, it is obvious that other methods of attachment may be relied on. FIG. V illustrates the manner in which the featured package is utilized. More specifically cover 26 has overlapping edges 32 which maintain the side 34 in place. When the cover is lifted on one side the contained articles are released such as shown in FIG. V. In fact, when the package is resting on a level surface and the cover has been open on one side, the items are exposed for easy withdraw from the package.

An alternate embodiment is disclosed in FIGS. VI and VII wherein a sheet or blank 40 is molded to produce a plurality of depression pairs 42 having individual depressions 44 which can be folded along fold lines 46a and 46b, such that the concave sides of the depressions are folded towards each other, to produce deeply recessed compartments. The sheet is then folded the opposite way along fold line 48 to present two rows of deeply recessed compartments after which the unmolded side or cover portion 50 is folded over the double row of compartments at fold lines 52 to produce the container shown in FIG. VII. The opposing lip portions 54 and 56 on opposite sides of sheet 40 are in contact in FIG. VII and if desired may be sealed by heat, adhesive, stapled, etc. to produce a complete package having relatively deeply recessed compartments formed by molding relatively shallow depressions in a substantially planar plastic material.

The above description and particularly the drawings are set forth for the purpose of illustration only and not for the purpose of limitation. Although the illustrated embodiment is one having a particular utility for eggs, the container of the present invention may be shaped to store and display fruits, vegetables, confections, baked goods, toys and ornamental articles such as tree ornaments and the like.

The plastic material from which the container is formed may be any plastic which can be manufactured in substantially planar form and which can be folded without causing rupture along the line of fold. Structurally, the plastic material may be cellular or non-cellular as long as the material is sufficiently self-supporting to hold the items it is designed to contain. Generally, the thickness of non-foamed plastic material will range between about 5 to 50 mils while the thickness of foamed plastic material will range between about 15 to 250 mils. Preferred materials are those polymer plastics based on styrene. A particularly useful material is biaxially-oriented polystyrene, a rigid transparent plastic. Other suitable resins (foamed or non-foamed) which may be used are isotactic polyethylene or polypropylene; styrene, copolymers, for instance styrene-acrylonitrile copolymers; polyacrylates, polymethacrylates, polycarbonates;

polyvinyl chloride; polyethylene terephthalates and the like.

As previously indicated, the sheet material from which the container is formed may be of any type which can be molded to produce a container of the type described. The most advantageous aspect of the present invention is that the entire container if desired can be molded from a single sheet of plastic material. In other words, the sheet material can be molded and subsequently folded and sealed together at the outer contacting areas of adjacently folded compartments to produce a self-sustaining container having a plurality of compartments. If desired the container may be locked together by tabs located along the sides of the sheet or sealed by adhesive heat and the like. The important aspect is that a complete container can be manufactured having a plurality of relatively deeply recessed compartments by simply molding a series of relatively shallow depressions in a plastic sheet material and subsequently folding. Furthermore, the sheet can be molded in such a way that when the molded sheet is subsequently folded not only is a multi-compartmented receptacle created but also a cover portion which folds over the top and completely encloses the compartments.

The shallow depressions which are formed in the plastic material may be of various shapes to accommodate a wide variety of irregularly shaped articles. The shape of the depression should closely approximate at least one side of the outside contour of the article to be contained. In this manner, a snug fit will be obtained which will serve to greatly cushion the article against damage from shock caused by impact. If desired, the depressions may be formed such that after folding, each compartment has a restricted neck portion in proximity to its open end. In other words, the sheet is molded to produce compartments which substantially surround the contained articles. In this instance, the articles would obviously be removed by opening the fold between the opposing depressions making up the compartments. In line with the above, the depressions may be formed to substantially surround articles of any shape such as square, oval, round, cylindrical and the like. Furthermore, although the illustrated embodiment is folded to produce a double row of compartments, it is obvious that the sheet could be molded and folded to produce several rows of compartments if desired.

The container of the present invention can be readily manufactured because only shallow depressions need be formed in the plastic sheet. Consequently, any suitable method for molding may be relied upon. For example, vacuum, positive pressure or plug assist type of molding operations may be utilized to produce the container of the present invention. The shallow depth forming is particularly advantageous in that the container walls are maintained rather uniform throughout as opposed to the difficulty of maintaining uniform thicknesses on containers which must be deeply drawn.

As can be readily appreciated, the present invention provides a container for holding a plurality of items and which is extremely simple to fabricate. In other words, a

single sheet may be converted by a relatively simple molding operation into a completely self-sustaining package having a plurality of compartments shaped to accommodate a wide variety of irregularly shaped items. In addition, its adaptability to high speed production operations is particularly unique.

The above description and particularly the drawings are set forth for purposes of illustration only. Many variations and modifications thereof will be obvious to those skilled in the art and can be made without departing from the spirit and scope of the invention herein described.

What is claimed is:

1. A one-piece, self-supporting, multi-compartmented container of rigid polystyrene, which comprises a substantially planar plastic sheet which has been molded to form a plurality of depression pairs, each depression pair being designed to form opposing sides of a compartment when the sheet is folded between the individual depressions making up the pair with portions of the outer surfaces of adjacent compartments being fused together, said container having at least one cover flap located at the edge of the sheet which is designed for snap attachment with another portion of the sheet and at least two pairs of fastening tabs on its edges for engagement when the sheet is folded between the individual depression pairs.

2. The container according to claim 1 wherein the polystyrene is biaxially oriented and substantially transparent.

3. A self-supporting package comprising a multi-compartmented container of rigid, oriented polystyrene, which comprises a substantially planar plastic sheet which has been molded to form a plurality of depression pairs, each depression pair having a major axis and a minor axis, and being designed to form opposing sides of a compartment when the sheet is folded between the individual depressions making up the pair, fastening means for joining portions of the outer surfaces of adjacent compartments which are formed when the sheet is folded between the individual depression pairs, latching means projecting outwardly of the edges of said sheet which are parallel to the major axes of the depressions, to keep the depressions together when the container is assembled, a cover designed for snap-on engagement with an edge portion of the container, and affixing means associated with a surface of the cover and a surface of the container comprising a projection on one of said surfaces which fits within a cooperating opening in the other of said surfaces.

References Cited

UNITED STATES PATENTS

2,154,194	4/1939	Benoit	229—29
2,474,391	6/1949	Bergstein.	
2,961,123	11/1960	Boydak et al.	229—29
3,043,354	7/1962	Fitzgerald.	
3,131,846	5/1964	Whiteford	229—29 X

JOSEPH R. LECLAIR, *Primary Examiner.*

DAVIS T. MOORHEAD, *Examiner.*