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[54] **DISPLAY TRAY**

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[52] **U.S. Cl.** .....**206/65 R,** 229/2.5

[51] **Int. Cl.** **B65d 71/00**

[58] **Field of Search** .....D9/287; 206/65 R, 206/65 S, 72, 45, 46 M; 229/2.5

[56] **References Cited**

UNITED STATES PATENTS

D216,604	2/1970	Brindley	D9/187 X
3,424,306	1/1969	Munck	206/65 S
D213,860	4/1969	Dittman	D9/187
2,428,500	10/1947	Nutt	206/46 M
3,262,786	7/1966	Weiss	206/65 R

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Attorney—John F. Hohmann et al.

[57] **ABSTRACT**

A display tray for a plurality of articles each having a projection extending therefrom, said tray having a boss in at least one of its walls maintaining the articles in arrangement such that no protrusion extends beyond said wall.

4 Claims, 3 Drawing Figures

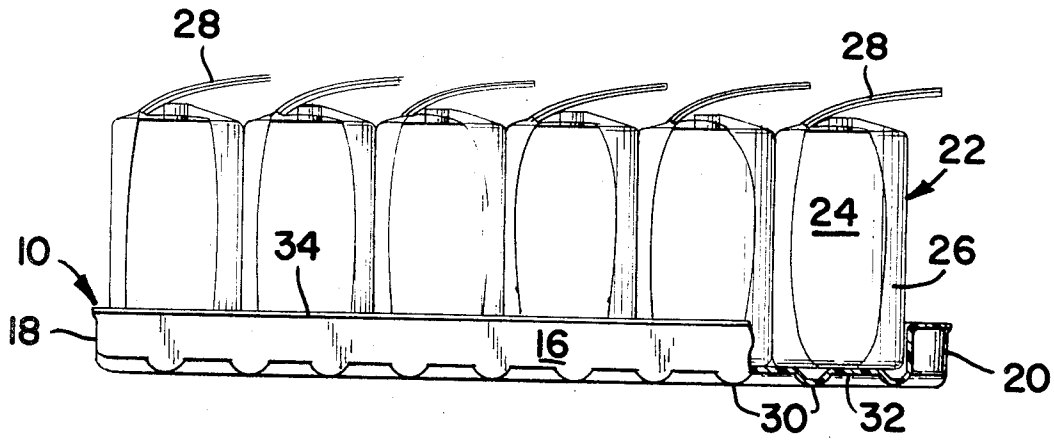


FIG. 1.

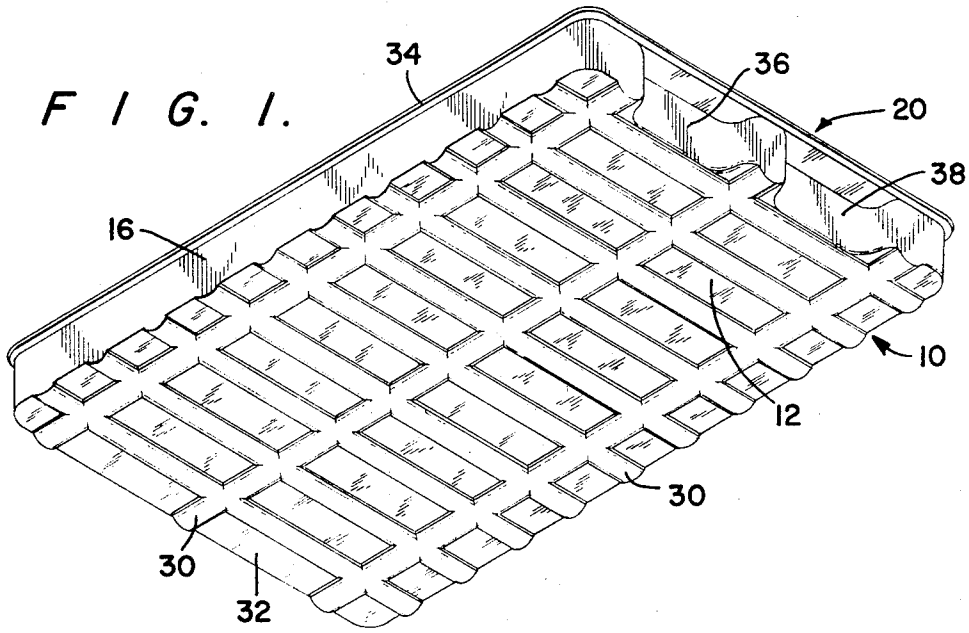


FIG. 2.

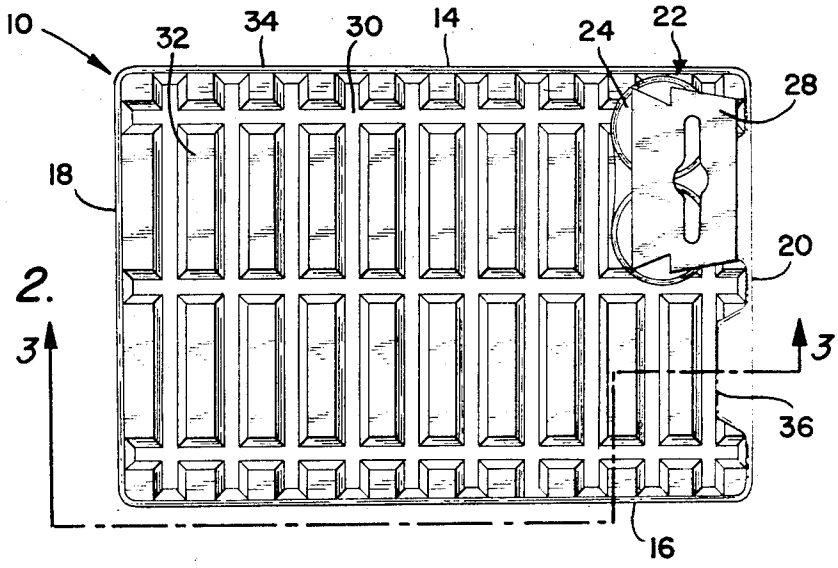
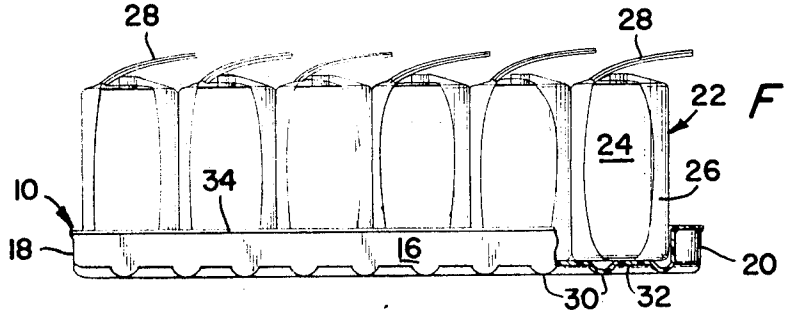


FIG. 3.



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DISPLAY TRAY

This invention relates to display trays and more particularly relates to display trays for free-standing articles having a protrusion extending therefrom.

Display trays for consumer goods have recently become an important merchandising tool. They permit the handling and transfer of a plurality of small articles in a minimum of time and with ease since each article need not be handled individually.

Typical of the type of display tray which is now in general use is that shown in U.S. Design Pat. No. Des. 216,604 which shows a tray having a generally rectangular bottom and four side walls extending upwards from said bottom a short distance. Such a tray is particularly well adapted to display free-standing merchandise contained in a plurality of individual packages and serves to reduce the time necessary for handling the packages at various stages of shipping and merchandising. For example, a display tray full of packaged articles may be conveniently shipped in a carton having end flaps which provide easy insertion and removal of the merchandise-tray combination. Upon arrival at the place of sale, such as a retail store, opposing end flaps of the carton can be opened and the tray with the merchandise thereon can be slid from one end of the carton out the other end directly onto a shelf or counter for display. At the same time, if the articles contained on the tray have flat tops or top portions of uniform height, several loaded trays may be stacked in a single shipping carton and may be displayed stacked on a shelf or counter top to maximize use of available space. When all the merchandise is removed from the top tray it may conveniently be removed to expose another full tray of merchandise.

This manner of display reduces the handling required by the retail seller and is an incentive for him to prominently display articles packaged in this manner rather than those which must be individually handled and are not held in proper alignment for stacking. Moreover, the fact that each article displayed on a tray of this type is readily accessible and is uniformly arranged makes individual price marking, where desired, an easy operation.

In certain instances, however, the articles to be displayed will have protrusions extending therefrom which overhang the sides of a display tray such as that of U.S. Design Pat. No. Des. 216,604. Attempts to package such articles in the usual type of display trays have encountered difficulties in placing a loaded tray into a shipping carton since the overhanging protrusions will contact a side or end of the carton and will be vulnerable to damage during shipping.

U.S. Pat. No. 3,424,306 discloses a package comprising a loop of thermoplastic material heat shrunk around package contents and a header board of relatively stiff material extending from said loop forming an appendage useful for hanging the package, printing advertising, and providing a gripping tab for easy opening of the package. When packages of this type are shipped, it is preferable to fold the header board flat against the top of the package to conserve space in the outer carton and to allow formation of a tight, well-packed carton. Likewise, the header board must be folded flat to allow loaded display trays to be stacked. When this is done in the preferred package size for flashlight batteries, for example, it is found that the

header board protrudes past the front edge of the package. When these packages are aligned on a display tray such as that of U.S. Design Pat. No. Des. 216,604, the header board extends a short distance over the front edge of the display tray and is vulnerable to damage by the shipping carton during transportation and handling.

It is therefore an object of the present invention to provide a display tray particularly suited for articles having a protrusion extending thereform.

It it a further object of the invention to provide such a display tray which will protect the protrusions of said articles from damage when packaged in a shipping carton.

It is a further object of the invention to provide such a tray which accomplishes its purpose without detracting from the utility and appearance of the displayed articles.

These and other objects will become apparent to those skilled in the art from the following description of the invention.

In accordance with the present invention there is provided, in combination, a plurality of articles and a support for said articles, each of said articles comprising a body portion and a protrusion extending from said body portion in a plane generally parallel to the plane of said support, at least one wall of said support being provided with an integral boss maintaining said articles in arrangement so that no protrusion extends beyond said wall.

The present invention will be more readily understood by reference to the accompanying drawings wherein:

FIG. **1** is an elevated isometric view from the bottom of a display tray in accordance with the present invention;

FIG. **2** is a top plan view of the display tray of FIG. **1** having an article positioned thereon; and

FIG. **3** is a side view taken along lines **3—3** of FIG. **2** showing a fully loaded display tray in accordance with the present invention.

Referring in detail to the drawings there is shown a display tray, generally designated **10,** comprising a substantially rectangular bottom **12,** two side walls **14, 16,** a rear wall **18** and a front wall **20** which embodies the novelty of the present invention.

The packages, generally designated **22,** on the trays of FIGS. **2** and **3** are packages of a pair of flashlight batteries **24** and comprise a loop of heat shrinkable thermoplastic film **26** heat shrunk around the batteries **24** and a header board **28** extending from the top of said package. These packages are substantially those shown in one embodiment of U.S. Pat. No. 3,424,306 except that header board **28** is here depicted folded down against the top of package **22** in the manner it would be folded for stacking several layers of packages such as for shipping.

The bottom **12** of the display tray is provided with a grid of ribs **30** which define a plurality of raised bosses **32.** This combination of ribs and bosses adds strength to the resulting tray and is particularly desirable when relatively heavy articles such as flashlight batteries are packaged thereon. Walls **14, 16, 18,** and **20** are each provided at their upper end with a lip **34** extending around the entire periphery of the tray. This lip adds further strength to the tray and provides a somewhat resilient cushion against the side walls of an outer carton in which the tray may be finally packaged.

Front wall **20** of tray **10** is provided with two bosses **36, 38** which reduce the surface area of tray bottom **12** without reducing the overall outside dimensions of the tray.

In use it can be seen that header board **28** of package **22,** when folded flat against the top of the package, protrudes a short distance beyond the body of the package. If a plurality of packages, such as the grouping shown in FIG. **3,** where positioned on a rectangular tray of dimensions corresponding substantially to the dimensions of the body portions of packages **22,** the header boards **28** of the front pair of packages would extend for a distance beyond the front wall of the display tray and would be subject to damage during shipping. From FIG. **3** it can be seen that the display tray of the present invention substantially reduces the possibility of damage to this header board by providing bosses **36** and **38** which extend beyond the front of the body of the first package in each row of packages and additionally extend beyond the furthest extent of header board **28.** In this way, when a loaded tray is positioned in an outer shipping carton, the tray extends beyond the packages contained thereon in every direction and acts as a cushion for the packages during shipping.

It will be obvious to those skilled in the art that the materials from which useful trays in accordance with the present invention may be fabricated are not limited to any particular classes of materials nor is the method of fabrication critical to obtaining the improved display trays.

Thermoplastics are the preferred material of construction, however, since they lend themselves to ease of fabrication and the resulting trays possess desirable strength and are lightweight. The resin material can, for example, be a homopolymer or copolymer of an olefin such as ethylene or propylene and may contain any of the usual additives such as plasticizers, stabilizers, pigments, etc. However, resins such as styrene polymers and polycarbonates are preferred for use due to their high impact strength. One material particularly preferred for use due to its high strength is an extrusion grade high impact polystyrene material, such as described in The Encyclopedia of Chemical Technology, Kirk-Othmer, Volume 13, page 159, for example, and having the physical properties shown in Table I:

TABLE I

Physical Properties of High Impact Polystyrene

	ASTM Test No.	Units	Range
Izod Impact		foot pounds	
at 73°F.	D 256–56	per inch	0.80–2.00
at 0°F.	D 256–56	of notch	0.60–1.80
Tensile Stress			
at yeild	D 638–61T	p.s.i.	3000–50–00
at rupture	D 638–61T	p.s.i.	2800–40–00
Tensile Elongation			
at yield	D 638–61T	%	1.2–2.0
at rupture	D 638–61T	&	15–65
Tensile Modulus	D 638–61T	p.s.i.	250,000–400,0–00
Heat Deflection Temperature	D 648–56	°F.	170–200
Vicat Softening Point	D1525–58T	°F.	180–220
Rockwell Hardness	D 785–62	L scale	65–85

Injection molding or any of the conventional thermoforming methods such as vacuum forming, mated mold forming, and the like may be used to fabricate the trays of the present invention.

Likewise, the thickness of the tray is not narrowly critical and will depend upon several factors including the weight of the packages to be contained thereon, the method of fabrication, and the strength of the particular resin employed. Using a high impact polystyrene butadiene resin, for example, a thickness before forming of from **30** mils to **60** mils is preferred for a display tray which will hold **24** flashlight batteries.

An embodiment of the display tray of the present invention will be described in the following Example which is illustrative of the invention and is not intended in any manner to be limitative thereof:

EXAMPLE

A tray as shown in FIG. **1** was made by vacuum forming an extruded sheet of high impact polystyrene having a thickness of 40 mils. The polystyrene contained about **8** per cent by weight of butadiene and had the mechanical properties recited in Table II:

TABLE II

Physical Properties of Polystyrene Butadiene Resin

Izod Impact ¼'' injection mold)	1.2–1.9
Falling Dart Ft. lbs.,.100'' diameter support)	24–42
Tensile Stress	3000–4000
Elongation (minimum per cent)	25
Rossi Peaks Flow (seconds to flow 1½'')	120–160
Extrusion Plastometer (milligrams per minute)	250–350

The display tray was vacuum formed by the drape forming technique whereby the thermoplastic sheet is held in a double frame above an inverted male mold and heated under radiant heaters. When forming temperature has been reached, usually about 20 seconds, the clamped sheet is held stationary and the mold is moved upward until the heated sheet is sealed around the mold base. Vacuum is then applied and the prestretched sheet picks up the detailed contours of the mold.

The completed display tray measured about 6½ inches × 4 inches × ½ inch and contained the raised and depressed areas shown in the drawings. It supported **12** packages of two No. 935 batteries each, in the manner shown in FIG. **3** of the drawings.

The packages of batteries contained on the display tray were shipped and handled without damage to the header boards or any other portion of the packages.

While the present invention has been described with particularity, it will be obvious to those skilled in the art that the tray is susceptible to change without departing from the scope of the invention as defined in the appended claims. Likewise, while the tray of the invention has been described with packages of batteries displayed thereon, it should be understood that any kind of package or merchandise having a protrusion extending therefrom may advantageously be displayed on the tray of the invention.

What is claimed is:

1. In combination a plurality of articles and a support for said articles, each of said articles comprising a body portion and a protrusion extending from said body portion in a plane generally parallel to the plane of said support, at least one end wall of said support having a boss maintaining said articles in arrangement so that no protrusion extends beyond said end wall.

2. The combination according to claim 1 wherein said articles are packaged products each comprising a foldable tab adapted to be folded from a plane generally perpendicular to the general plane of said support to a plane generally parallel to the general plane of said support.

3. The combination according to claim 1 wherein said support is a flat rectangular thermoplastic tray having walls generally perpendicular to and extending a short distance above the plane of said tray, at least one of said walls having a boss therein.

4. In combination a plurality of packaged products and a support for said products, each of said packaged products comprising a foldable tab adapted to be folded into a plane generally parallel to the plane of said support, an end wall of said support having a boss maintaining said packaged products in arrangement so that no tab extends beyond said end wall.

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