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Jansen

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[54] TRAYS FOR PHOTOGRAPHIC SLIDES

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[52] **U.S. Cl.**.....**220/31 S,** 206/62 R, 206/DIG. 32, 229/2.5

[51] **Int. Cl.** **B65d 43/16**

[58] **Field of Search** ....220/31; 206/62 R, 73, 46 FM, 206/DIG. 25, DIG. 32; 229/2.5

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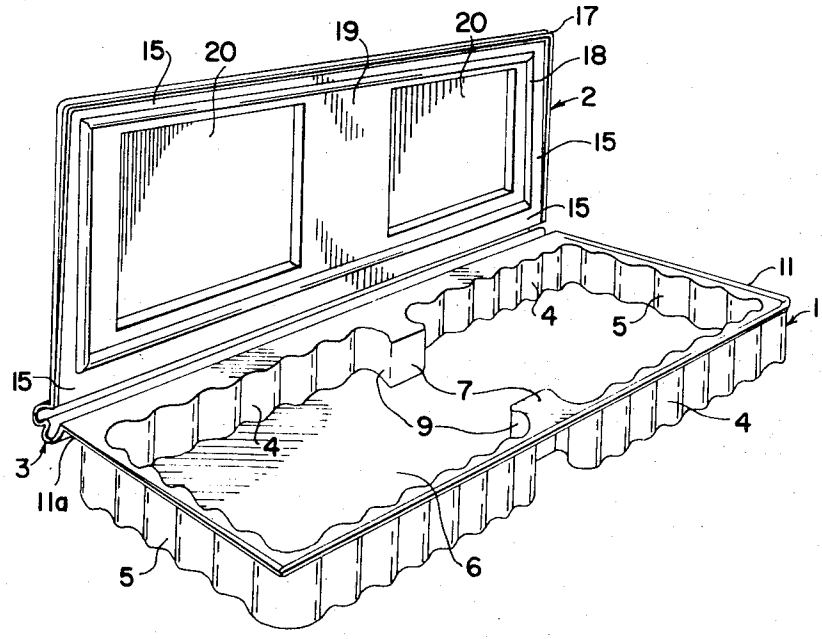
[57] **ABSTRACT**

One-piece trays for shipping, storing, and protecting photographic slides after each use and having an integrally hinged cover contains slide-receiving cavities that are defined by cooperation of side-walls, end walls, a bottom, and side edges of protrusions intermediate the side-walls and extending toward each other only part-way across the tray. The hinges between the cover and the body of the tray are integrally formed with two valleys each of half-circular cross-section separated by a ridge that extends the length of the valleys and of the side edge of said tray. The hinges preferably have the walls of said valleys of graduated thickness being thinnest at the bottom thereof. The cover has upwardly extending bosses over the central portions of the cavities to protect the transparent portions of said slides from damage and the sides are of wave-like configuration with vertical crests.

The present invention relates to trays for shipping and storing photographic slides and the like. It particularly relates to one-piece trays of molded or vacuum-formed thermoplastic material such as polyvinylchloride sheet or film which trays have an integrally formed cover that may be opened and closed repeatedly without cracking and which is suitable for slides for storing, transporting, shipping and even displaying photographic slides and the like such as the usual 35 M.M. slides.

7 Claims, 4 Drawing Figures



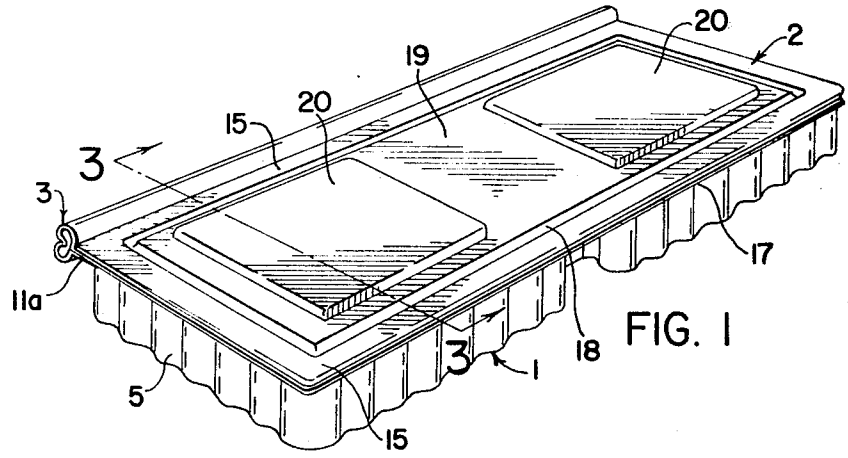


FIG. 1

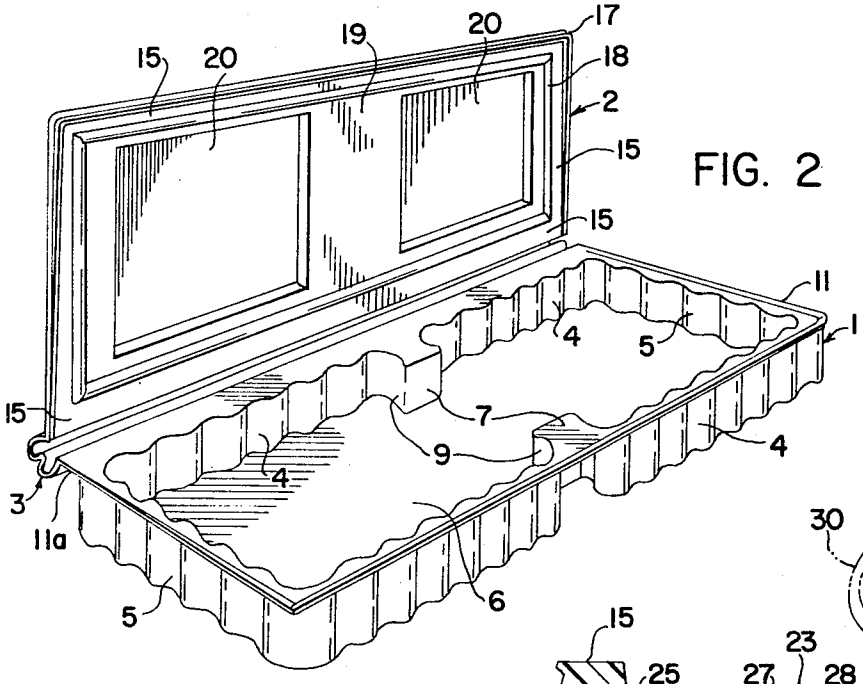


FIG. 2

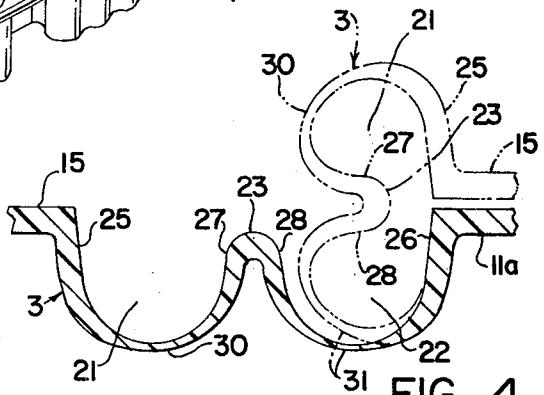


FIG. 4

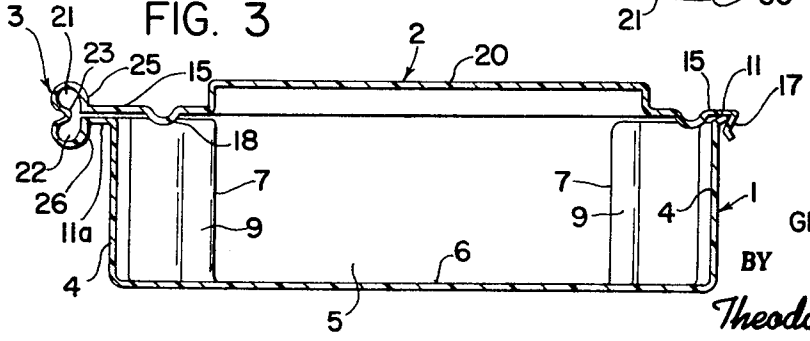


FIG. 3

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TRAYS FOR PHOTOGRAPHIC SLIDES

One-piece molded trays made from unplasticized polyvinylchloride, polystyrene, polyethylene and the like have an integrally formed and integrally attached hinge cover have been heretofore proposed.

Trays having formed from films of sufficient thickness to provide both the necessary rigidity in the tray to withstand crushing that may be encountered in repeated use and having an integrally attached and integrally formed cover form one-piece of unplasticized film, however, have been found to crack and separate at the integral formed plastic hinge when the tray is opened and closed only a comparatively few times. It has been proposed to construct the integral hinges between the cover and the side-wall of the tray by forming a hinge with two valleys separated by a ridge which runs parallel to the valleys. The valleys were formed so that when the cover was laid open 180° from the closed position, the valleys had a quarter round cross-sectional configuration. While such configuration extended the life of the hinge to some extent, flexing was still concentrated in a relatively small area with a result that separation of the cover from the body of the tray still occurred when the tray was opened and closed but a comparatively few times.

It is an object of the present invention to provide one-piece stiff relatively gauge trays for storing, shipping and packing a substantial number of photographic slides and the like, which permits easy and convenient removal of slides in seriatim from the package, which has an integrally formed cover and which may be opened and closed a large number of times without separation of the cover from the main body of the integrally formed tray.

It is a further object of the present invention to provide trays for storing, packing and handling groups of photographic slides and the like, which trays are vacuum-formed of relatively rigid or unplasticized thermoplastic material such as polyvinylchloride and the like, and which have cover, body and hinges integrally formed from a single sheet or film, which has means for fastening the cover in a closed position and which permits opening and closing of the container repeatedly without separation of the cover from the body of the tray.

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

FIG. 1 - Is a perspective view of a tray embodying the present invention, showing the integrally formed cover in a closed position.

FIG. 2 - Is a perspective view of a tray embodying the present invention, showing the cover in a opened position and in a plane 90° from the plane of the top edge of the body of the tray.

FIG. 3 - Is a cross-sectional view, on the line 3—3 of FIG. 1.

FIG. 4 - Is an enlarged cross-sectional view, through the hinge portion of the tray when the tray is opened to a position so that the plane of the cover is parallel with the top of the body of the tray, and also showing in dotted lines, the hinge portion of the tray when the cover is in the closed position.

Referring more particularly to the drawings wherein, like-parts are designated by like-numerals in reference throughout the several views. The trays of the present invention comprise a body portion 1, a cover portion 2 and a integrally formed hinge portion 3.

The body portion, has side-walls 4, end walls 5 and bottom 6.

Intermediate, the internal length of each of the two side-walls 4, a protrusions 7 extends inwardly part-way toward the central portion of the tray and toward the opposite side. The protrusions 7 are sufficiently short so that there is a space between the most inwardly portions of the two protrusions for insertion of a portion of one's finger so that he can grasp a side-edge of a photographic slide lying within one of the two cavities formed in the body of the tray. Each of the slide-receiving cavities are formed by the cooperation of the side-walls 4 with an end wall 5, the bottom 6 and a side 9 of each of the protrusions 7. The bottom 6 is preferably flat but the side-walls 4, the end walls 5 and the sides 9 of the protrusions 7 are preferably fluted or wave-like in transverse cross-section to provide greatly increased vertical stiffness and strength in the side-walls so that a number of the loaded trays may be stacked together without deforming the walls.

The upper edges of the side-walls and end walls preferably terminate in a generally laterally or outwardly extending flange portion 11. The flange portion 11 extends around the entire periphery of the body portion of the tray.

Along one side of the tray, the flange portion 11a is of greater lateral extent and is preferably flatter or more horizontal than the remainder of the flange 11 to facilitate formation of the hinge 3 by the vacuum-forming process preferably used.

The cover 2 is provided with a generally flat frame portion 15 which is adapted to bare against the upper surface of the flange portion 11 of the body portion when the cover is in the closed position as shown in FIG. 1.

The free (un-attached and unhinged) edge portions of the frame 15 terminate in a generally downwardly extending portion 17, which extends downwardly and inwardly from the side-edges of the frame 15 so as to overlie the outer edge of the flange 11 and inter-lock therewith to hold the cover in a closed position when the filled tray has the cover in a closed position.

The portion 17 preferably has a vertical cross-section which has the general shape of an inverted "S" as shown in FIG. 3.

The frame portion 15 may have a stiffening groove 18 which extends around intermediate portions of the cover 2. The central portion 19 of the frame 15 of the cover 2 is preferably coplanar with the outer peripheral frame portion 15 and preferably carries upwardly extending bosses 20 which are disposed in the cover 2 so as to overlie the central portions of each of the cavities in the body of the tray when the cover is in the closed position as shown by FIG. 1. These bosses 20 are of a size at least as great as the area of the transparent portion of the slides and prevents damaging contact of the picture by the tray.

The hinge 3 is integrally formed with the cover 2 and the body of the tray and is carried and attached to both, one-side of the cover 2 at an edge of the frame 15 and to one-side of the generally laterally extending flange 11a of the body portion.

The hinge 3 is shaped and formed by vacuum molding when the cover 2 is formed in the opened position so that the plane of the frame portion 15 is about identical with the plane of the flange portion 11a.

The hinge as thus formed, has two channels or valleys 21 separated by a ridge 22. The walls of the valleys 21 are of varying cross-sectional thickness being relatively thick at their upper edge portions 25 and 26 where they respectfully join the frame 15 and the flange 11*a*, and also being relatively thick at the portions 27 and 28 where they respectfully join the crest portion of the ridge 22 and gradually tapering in thickness to a general minimum thickness at the bottom portions 30 and 31 respectfully. Both the tapered construction and the semi-circular transverse cross-sectional shape of the valleys, prevents a concentration of flexure when the cover is opened and closed and permits a relatively long life for the tray. The relatively thicker portions of the hinge prevent the cover from sliding laterally on the upper surface of the flange 11, when the cover is in the closed position over the slide-filled tray.

The trays are preferably formed from sheet stock of unplasticized or substantially unplasticized polyvinylchloride or a copolymer of vinylchloride and vinylacetate, having at least 70 percent, preferably more than 80 percent, of combined vinylchloride therein. Other thermo-plastic rigid polymers may however, also be used in place of P.V.C. including polystyrenes, high impact polystyrenes, polyvinyltoluene and the like, polyethylene (preferably high density), A.B.S., etc.

The trays are preferably of comparatively heavy gauge material. A thickness in excess of 0.015 percent are usually used, and a thickness of 0.020 percent to 0.030 percent is frequently preferred.

It will be understood that the above description is by way of illustration rather than limitation, and that in accordance with the provisions of the Patent Laws variations and modifications of the invention may be made without changing the spirit thereof.

Having described my invention, I claim:

1. A one-piece tray suitable for storing and protecting photographic slides and the like, said tray comprising a body portion, a cover and a hinge portion all integrally formed of one piece of thermoplastic sheet material, said body portion having a bottom, side-walls, and end walls, each of the two side-walls having a protrusion intermediate thereof which extends toward the protrusion in the opposite side-wall and toward the central portion of the said body, the ends of said protrusions being spaced from each other, the said side-walls, end walls, sides of said protrusions cooperating with said bottom to form two generally rectangular cavities to receive slides, and bear against the sides thereof, the upper edge positions of said side-walls and end walls terminating in an outwardly extending annular flange, said cover having a shape to overlie said annular flange of said body when closed, one side edge of said cover and one side edge of said flange of said body portion terminating in said integrally formed hinge, said hinge having two valleys separated by a ridge extending about the length of said flange, the said valleys having, when said cover is opened 180° from its closed position, a substantially semi-circular cross-sectional shape, one side edge of each of said valley portions of said hinge being attached to the crest portion of said ridge, the other side edge of one valley portion being attached to the said flange of said body and the other side edge portion of the other valley portion being attached to a side of said cover.

2. The tray of claim 1 wherein, a free unhinged side edge of said cover terminates in a downwardly extending portion which in the closed position, overlies and contacts said outwardly extending annular flange of said body at an unhinged portion thereof.

3. The tray of claim 2 wherein, said downwardly extending portion is of generally inverted "S" shaped cross-section and overlies and contacts the unhinged side edge of the flange of said body portion when said cover is in the closed position.

4. The tray of claim 1 wherein, the sides of said valleys in said hinge are of graduated thickness being thinner at the bottom portions thereof, than at the top portions thereof.

5. The tray according to claim 1 wherein, the side-walls are of wave-like form and crests of the waves therein are vertical.

6. The tray of claim 1 wherein, at the hinged side of said body portion, said flange is of greater lateral extent than at other sides and wherein, said cover comprises a relatively flat frame portion which when said cover is opened 180° from the closed portion is about coplanar with the hinged portion of said flange.

7. The tray according to claim 6 wherein, said cover is provided with bosses each of which when cover is in the closed position, extends upwardly and overlies the central portion of one of said cavities, whereby transparent portions of photographic slides in said cavity are prevented from contact with said cover.

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