

Sept. 10, 1968

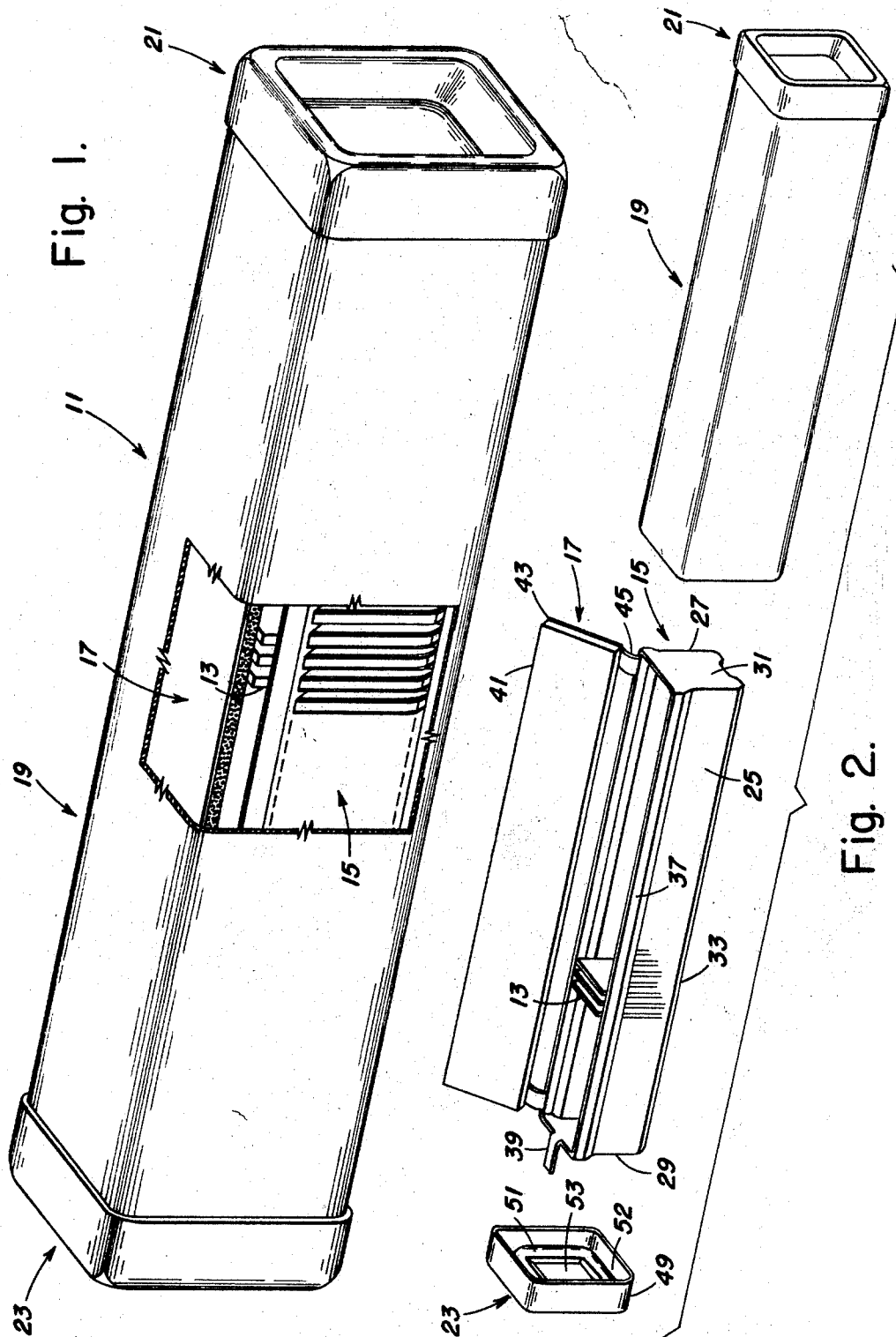
J. R. PUENTE

3,400,809

LIGHT TIGHT PACKAGE

Filed May 22, 1967

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

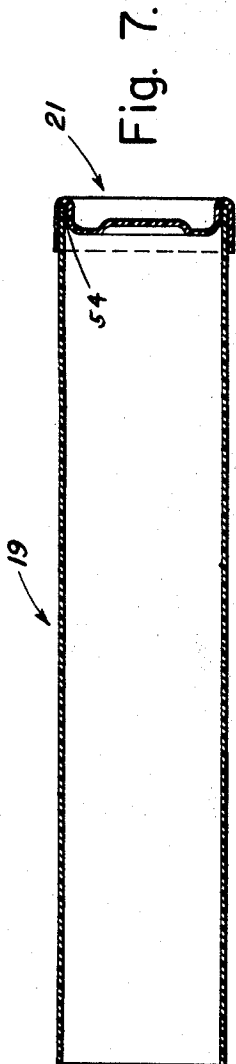


Fig. 7.

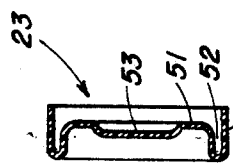


Fig. 8.

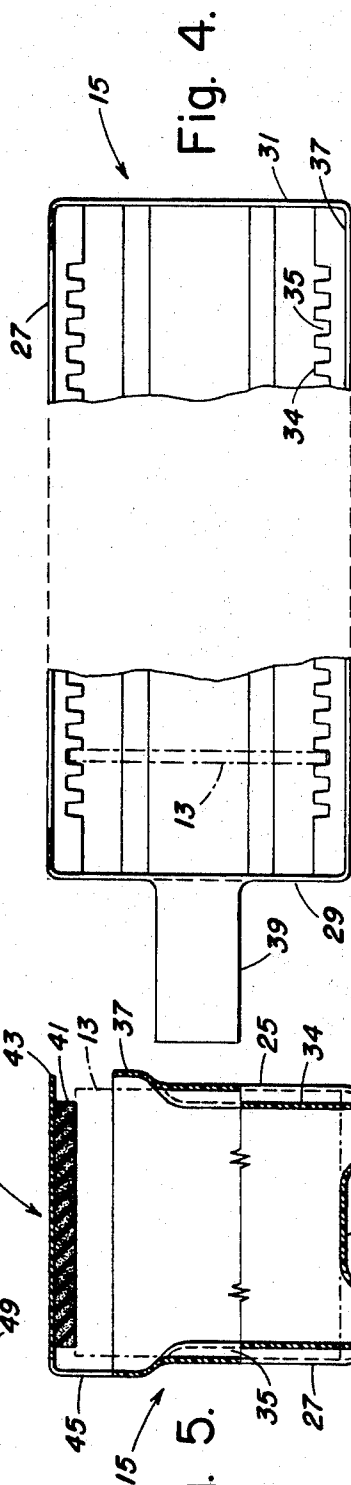


Fig. 4.

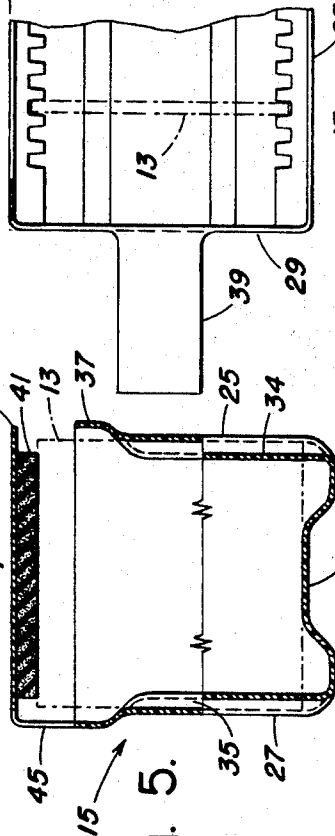


Fig. 5.

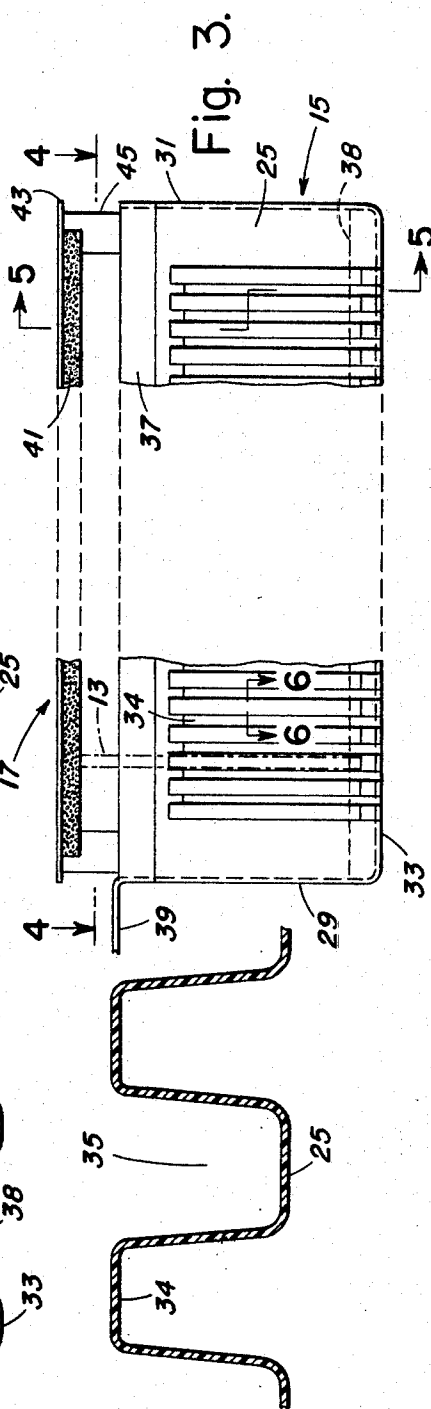


Fig. 3.

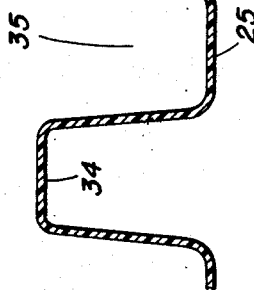


Fig. 6.

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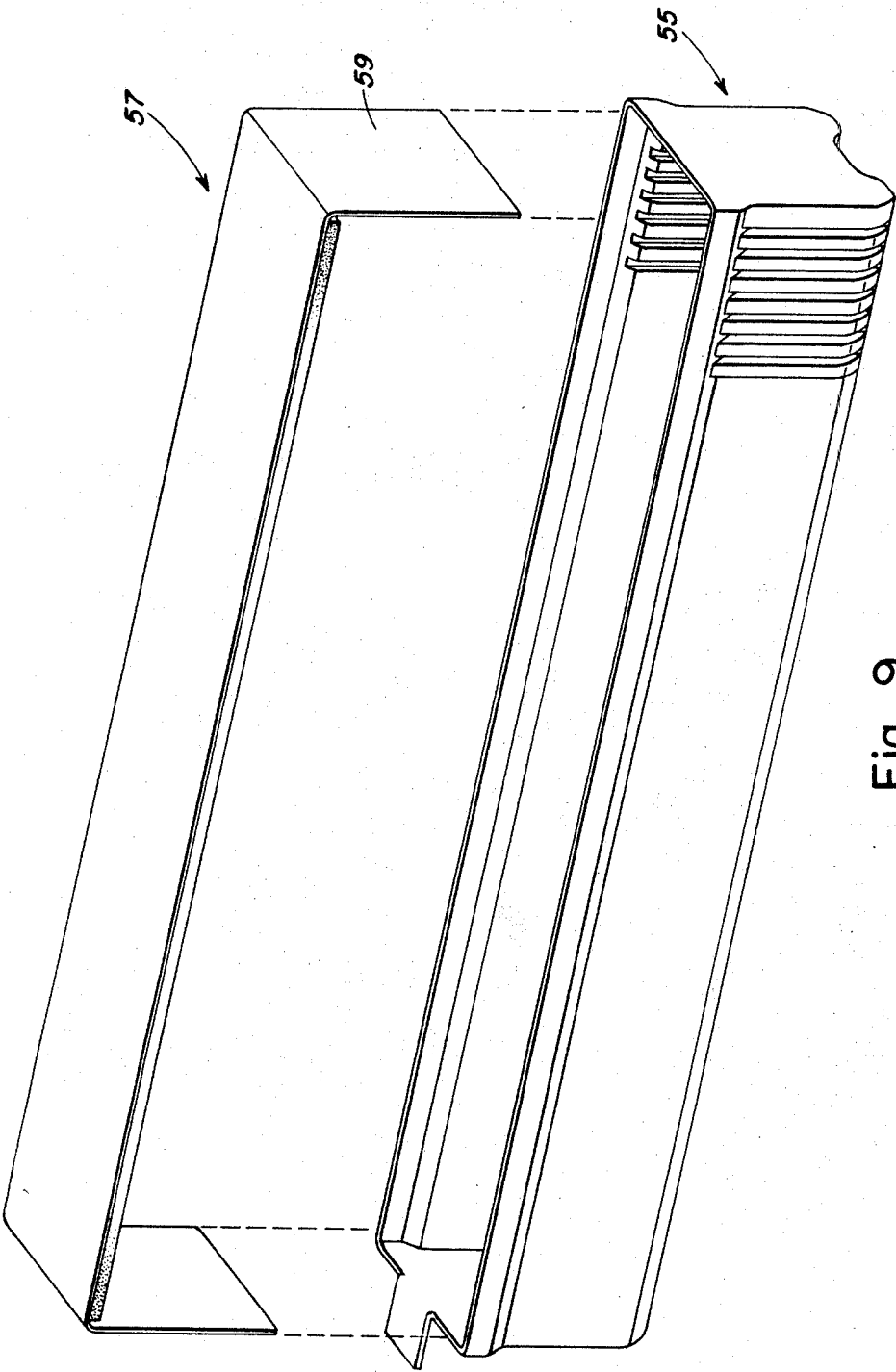


Fig. 9.

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LIGHT TIGHT PACKAGE

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ABSTRACT OF THE DISCLOSURE

Disclosed is a package useful for the storage and transportation of fragile plates coated with photosensitive material. The package comprises a carrier member in which the plates are positioned on edge and in parallel longitudinally spaced relationship. A cushion member is on top of the plates. Preferably the cushion member is a laminated pad comprising a plate abutting strip of low density open cell flexible plastic foam and on top of that a protective strip of higher density closed cell flexible plastic foam. The carrier member and cushion member are encased in an opaque tubular case member closed at each end by opaque and closure members that engage the ends of the tubular case member in light tight relationship. The carrier member with its load of plates and the cushion member in place occupy substantially all of the interior space of the tubular member between the end closure members. Preferably the fit is such that the cushion member is compressed slightly against the plates by the corresponding adjacent wall of the case member.

Background of the invention

There is a need for a light tight package for the storage and transportation of a plurality of fragile glass plates coated with photosensitive material. Preferably these plates are handled only edgewise and the coated slides thereof do not come into contact with other surfaces while being handled, stored and transported. It is also desirable that the plates, while being stored and transported in the package, receive substantial protection from glass shattering impacts. In addition, it is desirable that the light tight package be readily made from relatively inexpensive materials of construction, and be capable of manufacture by high speed procedures.

An object of this invention is to provide such a package.

Another object of this invention is to provide a generally improved and more satisfactory light tight package.

Brief description of the drawings

These and other desirable objects are attained by this invention which is described with reference to the drawings which are a material part of this disclosure. In the drawings:

FIG. 1 is a perspective view of a preferred specific embodiment of a light tight package of this invention with a portion of the exterior structure removed to reveal partly diagrammatically illustrated internal structure;

FIG. 2 is an exploded perspective view of the light tight package of FIG. 1 with a portion of the carrier member being diagrammatically illustrated;

FIG. 3 is a side view of the plate carrier and cushion members of the light tight package of FIG. 1;

FIG. 4 is a plan view of the carrier member of the light tight package of FIG. 1, which view has been taken as indicated by the view plane 4—4 in FIG. 3;

FIG. 5 is a cross sectional view of the carrier member of the package of FIG. 1, which view has been taken as indicated by the off-set sectioning plane 5—5 of FIG. 3;

FIG. 6 is a sectional view of one of the side walls of the carrier member, which view has been taken as indicated by the sectioning plane 6—6 in FIG. 3;

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FIG. 7 is a longitudinal sectional view of the tubular case member with one end closure member of the light tight package of FIG. 1;

FIG. 8 is a sectional view of the other end closure member of the light tight package of FIG. 1; and

FIG. 9 is an exploded perspective view of the plate carrier member and cushion member of another preferred, specific embodiment of the light tight package of this invention.

Detailed description of a preferred embodiment

In greater detail, FIGS. 1—8 illustrate a specific light tight package 11 of this invention, useful for the storage and transportation of a plurality of fragile glass plates 13 coated with photosensitive material. These plates are substantially rectangular, usually square, and have substantially the same dimensions. The specific light tight package 11 (see FIG. 1) comprises a plate carrier member 15, a cushion member 17, a tubular case member 19 and a pair of end closure members 21 and 23.

The plate carrier member 15 (see FIG. 2) is a box-like container structure having in general a pair of side walls 25 and 27, a front end wall 29, a back end wall 31 and a bottom wall 33. The side walls 25 and 27 (see FIGS. 3 and 6) have at longitudinally, preferably regularly, spaced intervals inwardly extending recesses 34. These recesses provide between themselves and the end walls substantially transversely aligned, normally vertically oriented, linear grooves 35 for receiving preferably in sliding fit corresponding edge portions of the glass plates 13 when placed on end into the carrier member 15 in substantially parallel, longitudinally spaced relationship. Preferably the plate carrier member 15 is vacuum formed from a sheet of thermoplastic resin material. A preferred material is polypropylene. Other thermoplastic resins including other polyolefin resins can also be employed. To achieve the desired structural strength and rigidity, it is preferred that the sheet of thermoplastic resin material have sufficient thickness to be substantially stiff or rigid, and that the plate carrier member 15 be shaped so as to be interior load supporting as well as to afford to fragile plates disposed in the grooves 35 side and bottom protection from impact forces. Each side wall 25 and 27 from the front end wall 29 to the back end wall 31 has an outwardly offset rim portion 37 (see FIGS. 2 and 5). This plus the rib-like alternate recesses 34 and grooves 35 give a structure that resists inward buckling of each side wall when appropriately directed forces are applied thereto. In addition, it is preferred that the bottom wall 33 have a central recess 39 that extends from the front end wall to the back end wall. This not only helps strengthen the structure, but provides a support surface for the bottom edges of the fragile plates disposed in the grooves 35.

Preferably the front end wall 29 of the plate carrier member 15 comprises a pull or tab 39 to assist removal of the plate carrier member 15 through one end of the tubular case member. In the embodiment shown the pull is integral with the front end wall 29 and preferably normally extends longitudinally outwardly from the front end wall, while being bendable so as to lie flat against the front end wall when the plate carrier member 15 is within the tubular case member 19 with the end closure members 21 and 23 thereon, and having memory so as to spring back into its normally outwardly extending position when the corresponding front end closure member 23 is removed from the tubular case member 19.

The cushion member 17 (see FIG. 5) is a two layer pad comprising an inner layer 41 and an outer layer 43. The inner layer 41 is an elongated, rectangular strip of low density (for example, two pounds per cubic foot), open cell, flexible, foamed resin material. A preferred material

is polyurethane which can be of the polyester, polyether or other type. The inner layer 41 preferably has sufficient length to extend substantially from one end to the other of the carrier member 15, and sufficient width to extend substantially from one side to the other of the carrier member. Normally the inner strip 41 is the part of the cushion member 17 that rests on the top ends of the plates 13 in the plate carrier member 15. The outer layer 43 is another elongated, rectangular, flexible strip of foamed resin material. A preferred material is foamed polypropylene resin material. However, it has relatively substantially higher density (for example, four pounds per cubic foot), and is a closed cell material. In the embodiment shown it has sufficient length to extend substantially from one end to the other of the carrier member and sufficient width to extend substantially from one side to the other of the carrier member. It normally is on the upper or outer side of the inner layer 41 and forms a protective "skin" for the inner layer 41, particularly when the plate carrier member 15 with a load of plates 13 and the cushion member 17 in position thereon are being inserted into the tubular case member 19. In this connection, it is preferred that the cushion member 17 be partially compressed by the corresponding wall of the case member 19. This compression takes place as the cushion member passes the front end of the case member 19. Preferably the inner and outer layers of the cushion member 17 are secured to one another as by a suitable adhesive, heat sealing or the like. In the embodiment shown the cushion member 17 is joined to the plate carrier member 15 by at least one strap-like hinge portion 45 (see FIGS. 3 and 5) of a side wall 27. In the embodiment shown there are two hinge portions 45. In other embodiments, however, only one hinge portion 45 is involved and in at least one of these embodiments the hinge portion extends substantially from one end to substantially the other end of the plate carrier member 15. The hinge portion 45 in the embodiment shown is joined as by heat sealing to the denser outer layer 43 of the cushion member 17.

The tubular case member 19 is a hollow section of tubing, the interior of which has a cross sectional shape that can accommodate the plate carrier member 15 when loaded with plates 13 and with the cushion member 17 in position on top of the plates 13. Preferably the interior cross sectional shape of the tubular case member 19 is such that the rim portions 37 of the side walls are adjacent, desirably in sliding fit, the corresponding walls of the case member and, in order to fit in, the cushion member 11 is partially compressed. The tubular case member 19 is made from an opaque material of construction and preferably has a high degree of rigidity and impact resistance. A preferred material of construction is high impact polystyrene resin material.

The end closure members 21 and 23 in the embodiment shown (see FIGS. 7 and 8) are cap-like members that fit over the ends of the tubular case member 19 in a cap-like and light sealing manner. Each end closure member has a skirt portion 49 intended to bear substantially all the way around against the exterior surface of the corresponding end portion of the tubular case member 19. In addition, each end closure member has an inwardly recessed end wall 51, the interior sides of which are intended to bear substantially all the way around against the interior surface of the corresponding end portion of the tubular case member 19. Each end closure member 21 and 23 is made from opaque material, preferably opaque thermoplastic resin material. Indeed, it is preferred to vacuum form the end closure members 21 and 23 from thin sheets of thermoplastic resin materials. To obtain the desired structural strength and degree of rigidity, it is preferred that the end wall 51 of each end closure member have a central, rectangular, outwardly projecting portion 53. Also, it is preferred that the end closure member 21 at normally the back end of the tubular case member 19 be secured to the case member as by heat sealing or, as in the embodiment shown, by

a suitable bonding agent or adhesive 54 (see FIG. 7). A preferred material of construction for the back end closure member 21 is high impact polystyrene material. On the other hand, it is preferred that the other or front end closure member 23 be separable from the case member 19. A preferred material of construction for the front end closure member or for both end closure members when both are separable, is one which gives to the end closure member a form fitting or pliable property while having memory so that it retains its general structural shape. This aids in establishing and maintaining a light seal between the tubular case member 19 and the end closure member. An example of such a material of construction is low density polyethylene resin material.

To use the light tight package 11, the photosensitive glass plates 13 are placed in the plate carrier member 15, the cushion member 17 is swung into position on top of the plates 13, and the plate carrier member with its load of plates 13 and the cushion member 17 thereon is inserted into the open front end of the tubular case member 19. When the loaded plate carrier member 15 has been inserted to the extent that the back end wall 31 thereof abuts the back end closure member 21, the pull 39 is bent downwardly and the separable end closure member 23 is placed into position over the front end of the case member 19, thereby closing off the open front end of the case member to the extent that no exterior light can enter the interior thereof.

The light tight package 11 is opened by pulling the separable end closure member 23 away from the front end of the tubular case member 19, whereupon the pull 39 pivots upwardly. The pull 39 is grasped and pulled to remove the plate carrier member 15 from the case member 19. The cushion member 17 is then tilted or swung backwardly to thereby provide access to the plates 13.

Detailed description of another preferred embodiment

The specific light tight package involved in FIG. 9 is alike in all respects to the specific light tight package 11 of FIGS. 1-8, except for the structure of the plate carrier member and of the cushion member.

The embodiment of FIG. 9 comprises a plate carrier member 55 having substantially the same structure as the plate carrier member 15 in the embodiment of FIGS. 1-8, except that it has no hinge portion or portions 45.

The embodiment of FIG. 9 comprises a cushion member 57 that is substantially the same as the cushion member 17 of the light tight package 11 of FIGS. 1-8, except that the denser outer layer has at least at one end and preferably at both ends a longitudinally outwardly extending tab portion 59 that normally is bent downwardly to fit between the corresponding end wall of the plate carrier member 55 and the last opposed pair of ribs, or into the last groove at the corresponding end of the plate carrier member. In one embodiment, between the tab portion 59 at the inner end thereof and the main portion of the outer layer there is a transverse fold line or indentation or crease formed by pressing heated dull knife-like means adjacent the outer layer on one or both sides thereof. When the fold line is formed and while the indented portion is still plastic or moldable and before it has set or hardened into the non-moldable condition, the tab portion 59 is bent downwardly. This gives a permanent normally downwardly bend to the tab portion 59.

The light tight package involved in FIG. 9 is used in much the same way as the light tight package 11 in FIGS. 1-8, except that after loading the plate carrier member 55 with glass plates, the cushion member 57 is placed into position with each end tab 59 bent downwardly and inserted into the end groove at each end of the plate carrier member 55. To obtain access to the plates 13 and the plate carrier member 55 after it has been removed from the tubular case member, the cushion member 57 is merely lifted away from the plate carrier member 55

until the tabs 59 are pulled out of the end grooves, and then moved off to one side.

Thus there is provided a light tight package of simple, but yet rugged construction. It can be made inexpensively from readily available inexpensive materials. At the same time, it provides a high degree of protection to fragile glass plates stored and transported therein.

Other features, advantages and specific embodiments of this invention will be readily apparent to those in the exercise of ordinary skill in the pertinent art after reading the foregoing disclosure. The specific embodiments herein described are presented for purposes of illustration and not of limitation, and variations and modifications of them can be effected without departing from the spirit and scope of the claimed subject matter.

What is claimed is:

1. A light tight package useful for storing and transporting a plurality of fragile plates coated with photosensitive material, said plates being substantially rectangular and having substantially the same dimensions, which comprises:

a carrier member having a front end wall, a back end wall, two side walls and a bottom wall, at least one of said side walls and at least one of said bottom wall and the other of said side walls providing at longitudinally spaced intervals, equal in number to said plurality, normally vertically oriented, substantially transversely aligned grooves that receive in at least sliding fit corresponding edge portions of said plates when placed normally vertically into said carrier in substantially parallel, longitudinally spaced relationship;

a cushion member for placement on the top edges of said plates when in position in said carrier member, said cushion member comprising a first elongated rectangular strip of low density open cell flexible foamed resin material, said strip being normally positioned on said top edges, having sufficient length to extend substantially from one end of said carrier member to the other, and having sufficient width to extend substantially from one side of said carrier member to the other, and a second elongated rectangular strip of relatively higher density closed cell flexible foamed resin material normally positioned on top of said first strip, having sufficient length to extend substantially from one end of said carrier member to the other, and sufficient width to extend substantially from one side of said carrier member to the other, said first strip being secured to said second strip;

a substantially rigid opaque tubular case member, rectangular in cross section and dimensioned to receive said carrier member loaded with said plates with said cushion member in normal position thereon and partially compressed; and

opaque, light tight, substantially rigid, end closure members for closing each end of said tubular case member and establishing and maintaining the interior of said case member free of exterior light with

the end closure member at least at one end of said case member being removable from said tubing section.

2. A light tight package according to claim 1, wherein said carrier member comprises at least at one end a pull for pulling said carrier member out of said tubing section when one end thereof is open, said pull being movable from a longitudinally outwardly extending position to a transversely oriented position adjacent the exterior of the corresponding end wall.

3. A light tight package according to claim 2, wherein said container member and said pull are vacuum formed from a substantially stiff sheet of thermoplastic resin material.

4. A light tight package according to claim 3, wherein said second strip of said cushion member is joined on one side to said carrier member.

5. A light tight package according to claim 4, wherein said carrier member has a strap-like hinge portion extending upwardly from one of said side walls and secured to said second strip.

6. A light tight package according to claim 4, wherein said second elongated strip extends longitudinally beyond at least one end of said first strip by a distance sufficient to enable the corresponding end portion of said second strip to be bent downwardly and positioned adjacent the interior of the corresponding end wall when said cushion member is in position.

7. A light tight package according to claim 6, wherein adjacent said end of said first strip said second strip is transversely creased with the longitudinally outer portion of said second strip having a normally downwardly permanent bend at said crease.

8. A light tight package according to claim 1, wherein one of said end closure means is secured to said tubing section.

9. A light tight package according to claim 1, wherein at least one of said end closure members is removable and has a skirt portion that, when in position, normally bears against the exterior surface substantially all around said tubular case member adjacent said end, and has an inwardly recessed portion that normally bears against the interior surface substantially all around said tubular case member adjacent said end.

10. A light tight package according to claim 1, wherein said carrier member has outwardly projecting side wall rim portions that normally are adjacent in at least sliding fit corresponding walls of said case member.

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