Feb. 10, 1959 M. C. KOESTER 2,873,024

SHIPPING CONTAINER FOR GLASS SHEETS

Filed Jan. 2, 1957 3 Sheets-Sheet 1

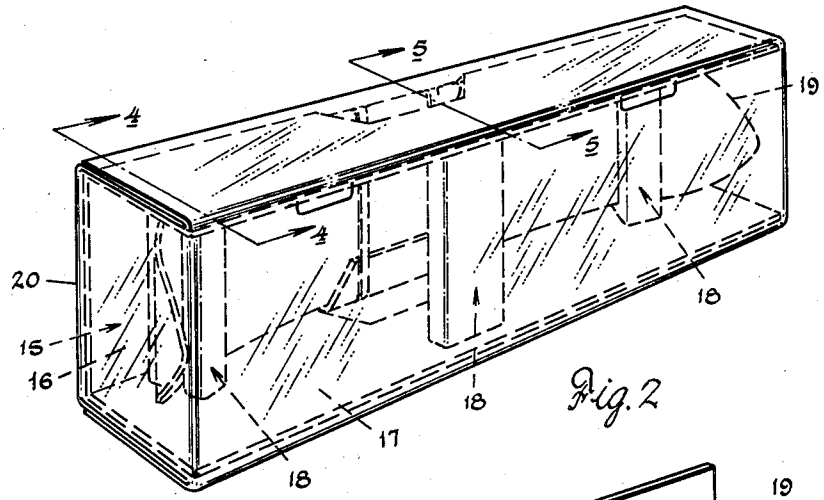


Fig. 2

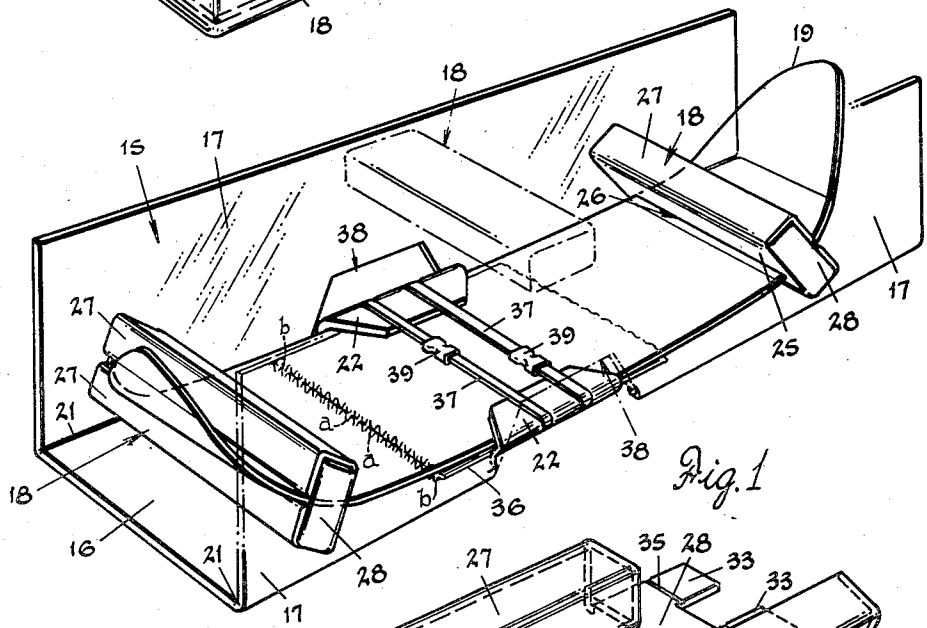


Fig. 1

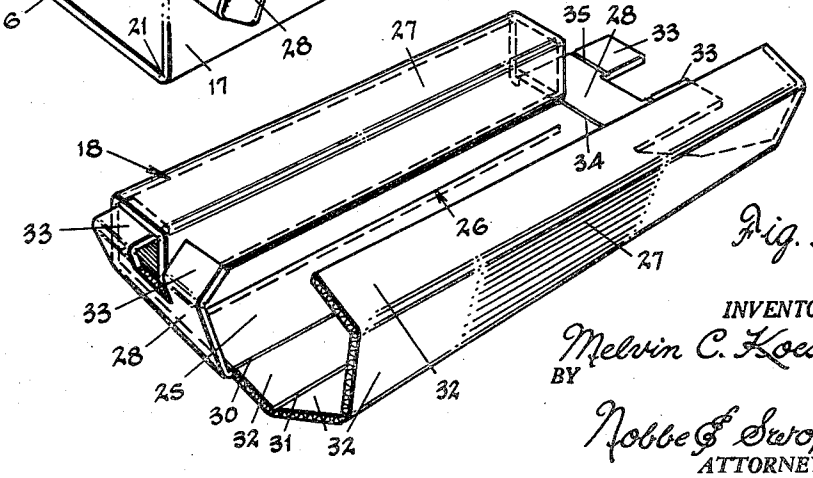


Fig. 3

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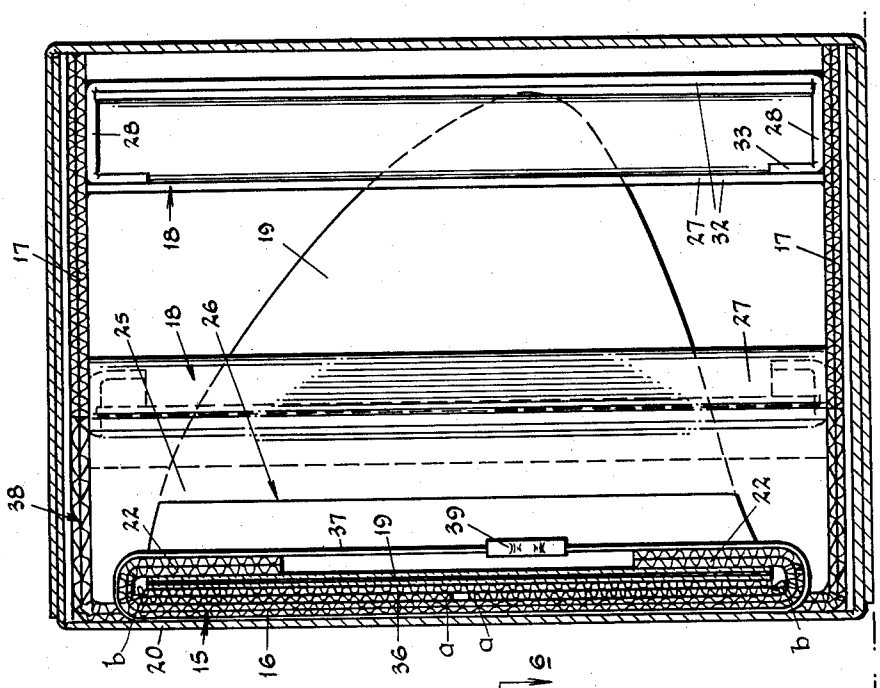


Fig. 5

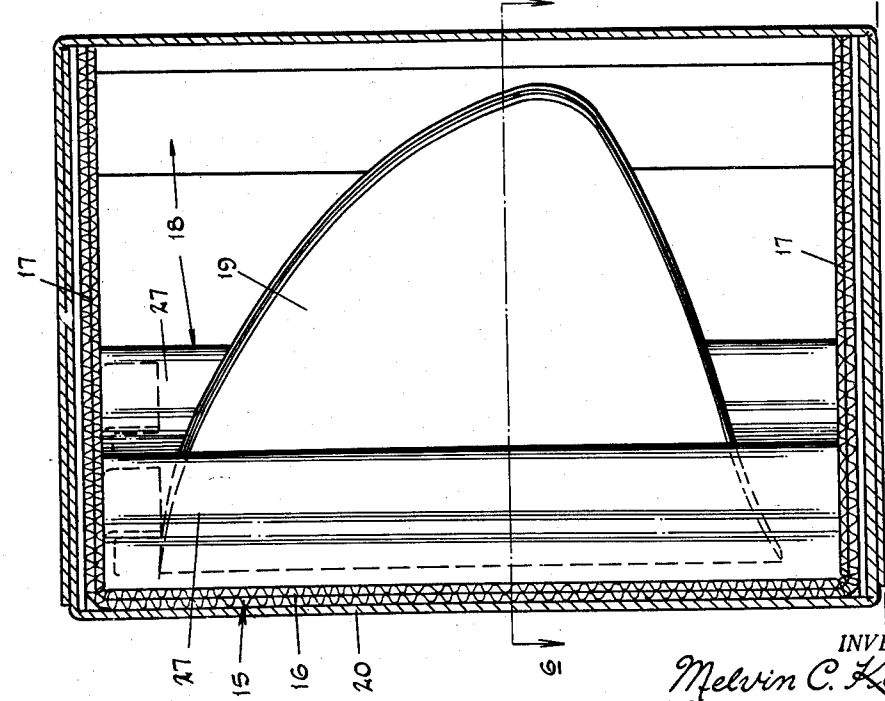


Fig. 4

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SHIPPING CONTAINER FOR GLASS SHEETS

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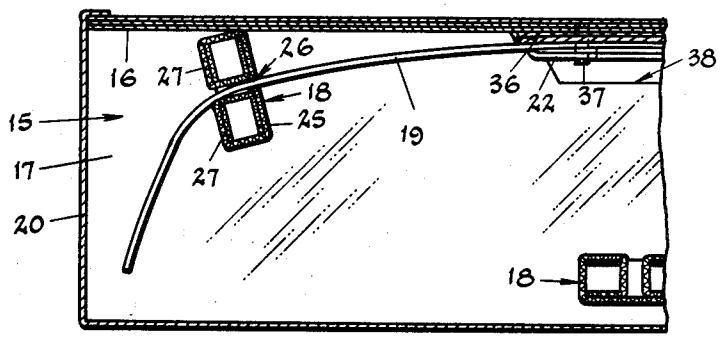


Fig. 6

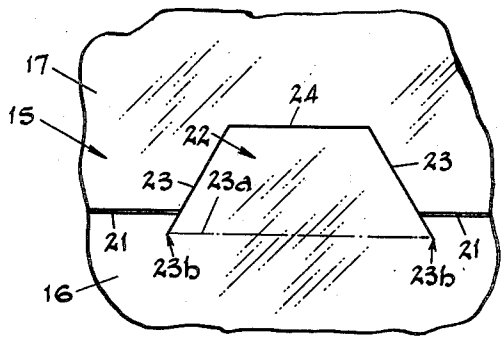


Fig. 7

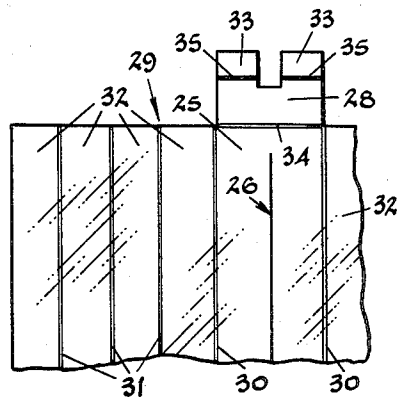


Fig. 8

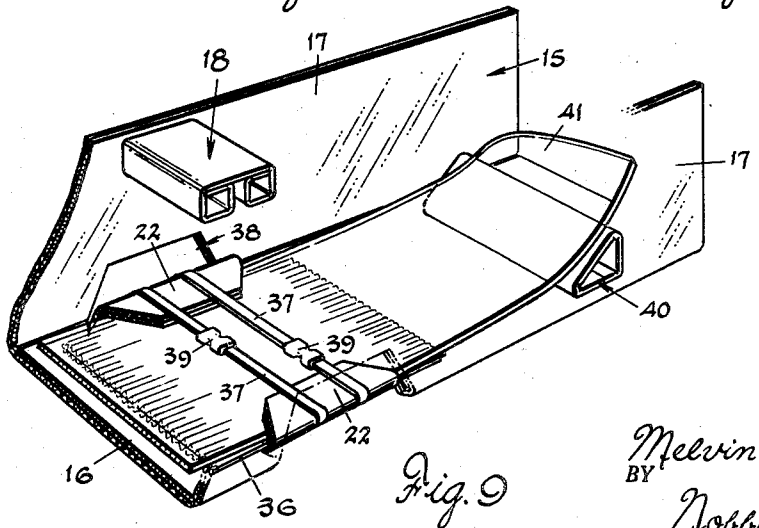


Fig. 9

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2,873,024

SHIPPING CONTAINER FOR GLASS SHEETS

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Application January 2, 1957, Serial No. 632,187

12 Claims. (Cl. 206—62)

The present invention relates broadly to the art of packaging, and more particularly to a novel and improved packaging interliner or mounting member for use with shipping cartons or boxes for bent or curved sheets of glass or other frangible material.

The primary object of this invention is to provide an interliner element for more or less conventional shipping containers by means of which bent or curved sheets of glass or like materials are suitably cushioned and supported in so-called floating relation to the walls of the container.

Another object is to provide an interliner element of the above character which is formed largely of cardboard or similar material and by means of which a bent or curved glass sheet will be both resiliently supported, and braced in the areas of greatest stress, within a suitable container.

Another object of the invention is to provide, in an interliner of this character special supporting means for engaging the central area of a bent glass sheet to maintain the same spaced from the walls of the carton, and special bracing means that also act to limit movement of the sheets and thus reduce likelihood of breakage.

A further object of the invention is to provide a packaging element in shipping cartons for curved glass sheets which is readily assembled from a minimum number of parts, which is strong and sturdy in construction and very durable under expected handling and shipping conditions.

Other objects and advantages of the invention will become apparent during the course of the following description, when taken in connection with the acompanying drawings.

In the drawings, wherein like numerals are employed to designate like parts throughout the same:

Fig. 1 is a perspective view of an interliner or mounting element constructed in accordance with this invention and shows a bent glass sheet supported thereon;

Fig. 2 is a perspective view of a conventional shipping carton showing the interliner element and glass sheet in dotted lines therein;

Fig. 3 is a perspective view of one of the bracing members of the interliner in partially folded condition;

Fig. 4 is a vertical transverse section taken substantially along the line 4—4 of Fig. 2;

Fig. 5 is a similar vertical transverse section, but taken on line 5—5 of Fig. 2;

Fig. 6 is a horizontal section taken on line 6—6 of Fig. 4;

Fig. 7 is a fragmentary plan view of a part of the interliner element;

Fig. 8 is a fragmentary plan view of one of the bracing members; and

Fig. 9 is a perspective view showing a modified use of the interliner element and employing a modified form of bracing member.

Briefly stated, the preferred form of interliner element, embodying the features of the invention, which is illustrated in Figs. 1 to 8 of the drawings, comprises a substantially U-shaped member designated in its entirety by the numeral 15 and made up of a sheet of corrugated board or the like, folded to provide a web wall 16 and wing walls 17. Brace members 18 are arranged in spaced triangular relationship between the walls 17 to reinforce the same, and cooperate with mounting and retaining members associated with the web wall 16 to resiliently support a bent glass windshield 19, when the interliner 15 is inserted into a conventional carton or box 20, in a manner to be more clearly hereinafter described.

The inventive concept of the interliner element of this invention is not restricted to the packaging of windshields, or even to bent or curved glass sheets. However, because it has been found to be especially well adapted to the successful packaging for shipment of the so-called "panoramic" or "wrap-around" windshields for automobiles that have recently come into such wide usage, and which have presented an unusually difficult packaging problem because of their large size, unusual outline and complicated bends or curvatures and the invention will be described in that connection here.

Referring now more particularly to the drawings, in Fig. 1 the interliner 15 is shown in packing position, or as resting on the web wall 16, in which position the wing walls 17 are substantially vertically disposed and the windshield 19 being packed, lies on its side or in a horizontal position. However, as shown in Fig. 2 when the windhield has been secured within the interliner it is preferable to turn the interliner up onto one of its wing walls 17 to bring the windshield into a vertical position before inserting the interliner into the carton 20. That is to say, when a glass sheet is being packaged, it has been found more convenient to lay the interliner down on the wall 16, but during shipping or storage, greater strength and stability is afforded when the interliner is turned up so that the glass is in a vertical position in the carton.

The wing walls 17 and the base or web wall 16 of the U-shaped portion of the interliner are formed by creasing along fold lines 21 suitably indented into a flat blank from which this part of the interliner is produced. Medially in their length, each of the crease lines 21 is interrupted to provide a folding flap 22 that is defined by convergently angled die-cut lines 23. The ends of each flap in the respective wall 17 is defined by a cut line 24 while the ends of lines or slits 23, as can be seen in Fig. 7, are located in the base wall 16. The purpose of so arranging these cut lines is to enable the flaps 22 to be folded upwardly and within the width or span of the wall 16 along a fold area 23*a* created between the ends 23*b* of the slit lines 23. The U-shaped portion of the interliner may be made of a suitable paperboard, fibre board or corrugated board which for adequate reinforcing qualities, and more especially, is of a double wall construction having a test factor of from 275 to 350 pounds.

The brace members 18 are preferably formed of similar material suitably folded and, as will be seen in Figs. 3 and 8, have a centrally disposed wall portion 25 in which there is provided a slit line 26. Interfolded against this central wall 25, there are two integrally associated column-like structure 27 which are positioned by means of end wall portions 28. More particularly, as shown in Fig. 8, the blank 29, from which each brace member is formed, is provided with parallel crease lines 30 that define the width of central wall 25 and with parallel crease lines 31, suitably spaced outwardly from lines 30, to define the several walls 32 of each structure 27. Each end wall 28 is provided with spaced tabs 33 and has a width, as defined by crease lines 34 and 35, which is substantially equal to the structures 27. As illustrated diagrammati-

cally in Fig. 3, the several walls 32 are folded progressively along crease lines **31** into a rectangular formation. The end walls **28** are then folded on crease line **34**, upwardly and inwardly with each tab **33** being folded along lines **35** and directively urged into the open area formed within the walls **32** of structure **27**.

As contemplated by my invention in employing the herein disclosed interliner **15**, a glass sheet, such as the laminated safety glass windshield **19**, is mounted in such a manner that it is substantially fixed in rigid relation in its central area to the interliner. One brace member is then forced over each end of the windshield and is adhered to the walls **17**.

This is carried out by utilizing a suitable cement to form an adhesive layer in the medial area of the web wall **16** and between the flaps **22**. The layer should have some thickness in order to operate as a cushioning support for the windshield. For this purpose, foam-forming plastics may be used to advantage. However, to reduce packaging time and a similarly inconvenient spraying or other applying of an adhesive, I have found that an adhesively coated, or pressure sensitive, single wall corrugated paper fulfills the requirement of mounting a sheet of glass. In fact, such a strip **36** of corrugated material can be rapidly and easily looped at its ends so that the adhesive characteristics in these end areas between *a* and *b* (Fig. 1) will engage and hold the strip to the surface of the interliner while the upwardly exposed intermediate portion between *b* and *b* will engage and likewise operate to hold the windshield in its central area. The strap **36** thus affords a readily positioned support for the windshield **19**, with respect to the interliner base **16**, and likewise fixedly positions and retains said windshield by reason of its adhesively coated surface between the portions *b*—*b* thereof.

The flaps **22** are then bent downwardly and folded inwardly over the proximate edges of the windshield. When so positioned, the flaps operate to locate the same substantially midway between the walls **17** and simultaneously may be employed to absorb any pressure exerted by retaining elements. Now, to retain these flaps in their relative positions, bands of suitable stripping may be employed to effect a rigid mounting. And while some adhesively coated materials have been experimented with, it has been found that under certain tested conditions, such as for inherent self-relaxation and susceptibility to humidity, certain of these types have been found unsuitable. That is to say, some adhesively coated materials when placed under linear tension will gradually relax or stretch to reduce their efficiency for use as a permanently rigid banding material. This condition may also be occasioned by absorption of moisture. Accordingly, the retaining elements **37** are preferably of a commercially-known metal strap or banding material which is equipped with securing clips. These bands are wrapped about the opposite side of the web wall **16** and the ends are brought in through the openings **38** created as the flaps **22** are folded from the parent wall surface. The ends are then drawn tightly together and secured by clips **39**.

The brace members **18** that are adapted to support the ends of the sheet of glass may be varied in structure according to their intended use and without departing from the spirit of the invention. According to one function, they are positioned so as to merely space the ends of the sheet equally above and from the web wall **16**; thereby substantially, balancing or equalizing the mounted position of the sheet. However, in packaging certain types of glass it has been found that the end areas of a centrally secured sheet will flex upwardly and downwardly in rapid movement following some circumstances of bumping or inadvertent dropping. One typical example is annealed glass from which the majority of automobile windshields are produced as laminated or so-called "safety" glass structures. Because of the tendency of such safety glass to withstand total fracture or destruction and to retain its unitary structure, the bent windshield units will, when suddenly jarred and if not properly restrained, move in their end areas and produce a so-called "whipping" action capable of breaking one or both of the end areas.

To obviate this danger in a simple and efficient manner, the brace members **18** are adapted to be located at the area of greatest change in curvature i. e., at the extremities of the glass sheet. In being so positioned, the end of a glass sheet or windshield is thrust through a slit **26** in the central wall **25** of said member. Preferably the slit is made in the form of a simple cut which is forced open upon insertion of the glass and so that the outwardly disposed edges of the slit will operate to actively grip the opposed surfaces of the sheet. The column-like structures **27** are thus disposed rearwardly of the central wall **25** and the curvature of the sheet may cause the same to engage one of the inwardly opposed corners thereof. An adhesive applied to the outer surface of each end wall **28** acts to secure the brace bodily to the walls **17** of the interliner.

When the brace members **18** are arranged as shown in Fig. 1 and at each end of sheet **19**, a third brace is adhered to the walls **17** in triangular relation to the two braces engaging said sheet. Upon completion of the sheet's securement, the interliner **15** is turned substantially ninety degrees from the position shown in Fig. 1 and is lowered into a carton **20** (Fig. 2). It will thus be seen in Figs. 2, 4 and 5, that the packaged sheet or windshield substantially floats between the upper and lower walls of the carton and that by reason of its mounted position is incapable of endwise movement sufficient to strike either of the carton end walls (Fig. 6). Also when the interliner is positioned within a carton, the triangular relation of the bracing members enables their further utility as pillars to withstand vertical pressure.

In stacking, as would be particularly experienced during shipping or storage, cartons containing interliners embodying the features of this invention have been found to satisfactorily support five and six times their own weight. As well, and under laboratory tests of extremely severe handling, such as by bumping and dropping which might be occasioned by inexperienced or careless labor, the carton has withstood breakage and the contained windshields suffered no damage. It will thus be seen that this novel interliner is well adapted, while flat, for convenient pre-storage, for easy and rapid accessibility during the packaging and lastly provides a strong support for glass sheets despite the simplicity of its assembly.

As shown in Fig. 9, a modification is illustrated to include use of the interliner for types of glass not subject to fracture from end vibration or whipping. Such types of glass may be those known as "tempered" glass which has proved to withstand flexure between its ends or excessive vibration and jarring. For this purpose, a modified hollow triangular shaped brace member as indicated at **40** may be employed. As herein disclosed such a brace need only balance a glass sheet **41** at its opposite ends while the central area, on the adhesive layer, is engaged by flaps **22** and rigidly secured by straps **37**. These may be suitably folded paperboard structures that are held by cementitious material to both the walls **17** and the web wall **16**. These more simplified means of bracing may even be dispensed with when a sheet of very shallow curvature is packaged.

It is believed that, by the novel features embodied in the interliner of my invention, packaging of curved sheets of glass is materially improved since labor and time is greatly reduced without sacrificing the necessary safety required in shipping. Also with a fewer number of parts, such an interliner maintains a curved glass sheet against movement incurred during normal handling while afford-

ing considerable reinforcement for a carton when so contained.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred embodiment of the same, but that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. A package unit containing a frangible member having one or more areas of curvature change which unit includes a container, a substantially U-shaped interliner unit inserted into said container and a frangible member contained within the hollow interior defined by said U-shaped interliner, said interliner unit including a base wall, at least two wing walls integrally joined to said base wall, means securing the intermediate portion of said frangible member to the intermediate portion of said base wall, first bracing means extending between said wing walls adapted to positively retain the interliner in its U-shape and second bracing means extending between said wing walls to fixedly support the extremities of said frangible member out of contact from said base wall whereby movement of the extremities of said frangible member is prevented.

2. A package unit as claimed in claim 1, wherein said first bracing means includes a first bracing member extending between the wing wall of the interliner, said member positioned intermediate the extremities of said frangible member and over said frangible member contained in the interliner.

3. A package unit as claimed in claim 1, wherein said second bracing means includes at least two hollow elongated bracing members wedged between a surface of said frangible member and the interior surface of said base wall.

4. A package unit as claimed in claim 1, wherein said securing means includes a sheet of folded adhesive material, one surface of said adhesive sheet engaging a surface of said base wall and the other surface of said adhesive sheet engaging a surface of said frangible member.

5. A package unit as claimed in claim 1, wherein said securing means includes at least two flap elements, each of said flap elements extending inwardly from one of said wing walls and adapted to fold over opposite edges of and against the exposed surface of said frangible member to centralize the same with respect to said base wall, and mechanical securing means for retaining said flap elements in engagement with said frangible member.

6. A package unit as claimed in claim 5, wherein said mechanical securing means includes a strap member extending around said flaps and frangible member.

7. A package unit including a container and an interliner, said interliner inserted into said container and adapted to support a glass sheet, said interliner including a base wall, at least two wing walls integrally joined to said base wall, means for securing the intermediate portion of a glass sheet when a glass sheet is positioned within the hollow interior defined by the U-shaped interliner to the intermediate portion of said base wall, first bracing means extending between said wing walls adapted to positively retain the interliner in its U-shape when a glass sheet is positioned therein and second bracing means extending between said wing walls, for fixedly supporting the extremities of a glass sheet, when so positioned in said interliner, out of contact with said base wall whereby movement of the extremities of a glass sheet, so positioned, is prevented, said second bracing means including at least two elongated bracing members of folded sheet material supported by said wing walls, each of said members having two end walls interconnected by a central wall and a plurality of side walls, said end walls mounted to said wing walls by means of adhesive.

8. A substantially U-shaped interliner unit as claimed in claim 7, where said central wall of each elongated bracing member of said second bracing means has a longitudinal slit therethrough through which the extremity of a glass sheet extends when a glass sheet is positioned within the hollow interior of said interliner whereby a glass sheet so positioned is supported.

9. A substantially U-shaped interliner unit capable of being inserted into a container and adapted to support a glass sheet which interliner unit includes a base wall, at least two wing walls integrally joined to said base wall, means for securing the intermediate portion of a glass sheet when a glass sheet is positioned within the hollow interior defined by the U-shaped interliner to the intermediate portion of said base wall, first bracing means extending between said wing walls adapted to positively retain the interliner in its U-shape when a glass sheet is positioned therein and second bracing means extending between said wing walls for fixedly supporting the extremities of a glass sheet, when so positioned in the interliner out of contact with said base wall whereby movement of the extremities of a glass sheet so positioned is prevented.

10. A substantially U-shaped interliner unit as claimed in claim 9, wherein said securing means includes at least two flap elements, each of said flap elements extending inwardly from one of said wing walls and adapted to fold over opposite edges of and against the exposed surface of a glass sheet when a glass sheet is positioned within the hollow interior of said interliner to centralize the same with respect to said base wall and mechanical securing means for retaining said flap elements in engagement with a glass sheet so positioned.

11. A substantially U-shaped interliner unit as claimed in claim 9, wherein said first bracing means includes a first bracing member extending between the wing wall of the interliner, said member positioned substantially centrally of the interliner and over a glass sheet when a glass sheet is positioned in the interliner.

12. A substantially U-shaped interliner unit as claimed in claim 11, wherein said first bracing member is formed of a folded sheet material and is mounted to said wing walls, said member having two end walls interconnected by a central wall and a plurality of side walls, said side walls being mounted to said wing walls by adhesive.

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