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SHIPPING CONTAINER FOR GLASS SHEETS

Filed Dec. 7, 1951

2 Sheets-Sheet 1

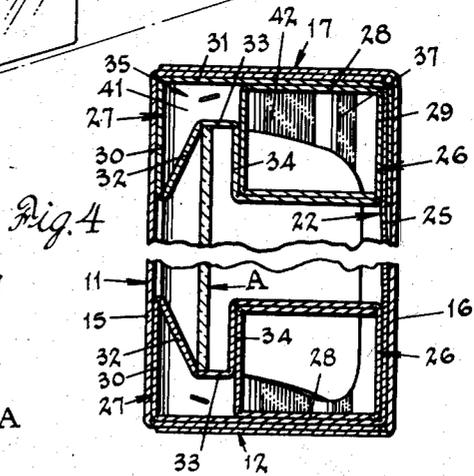
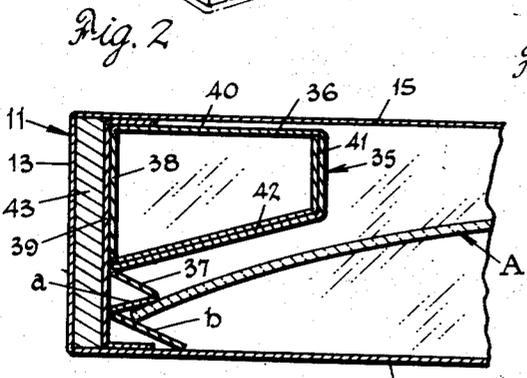
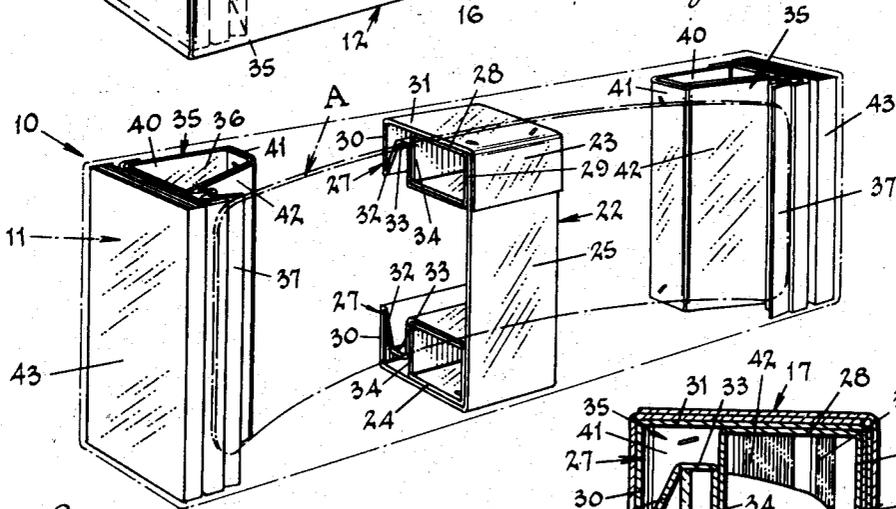
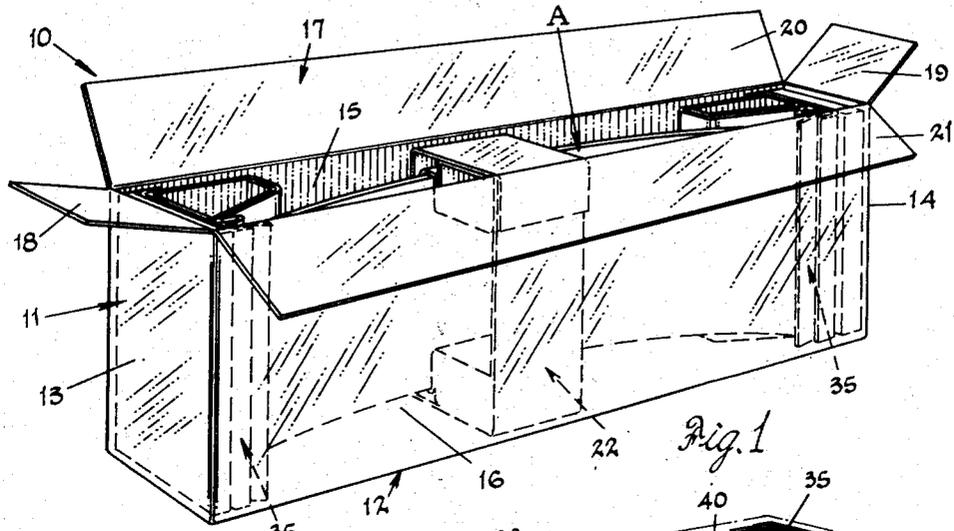


Fig. 3

38

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2 Sheets-Sheet 2

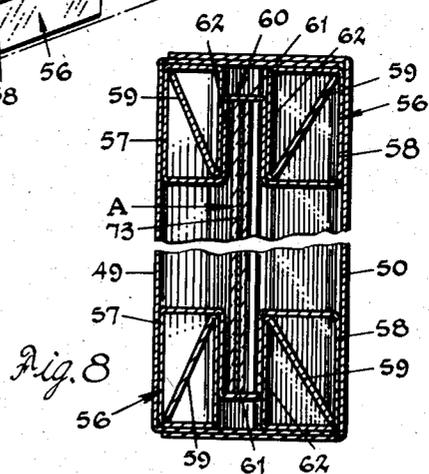
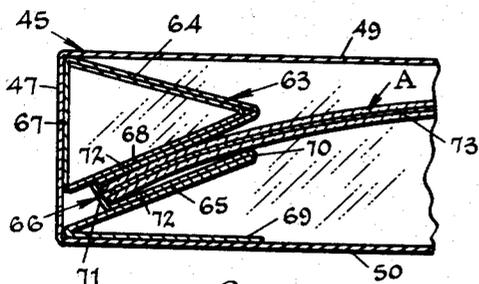
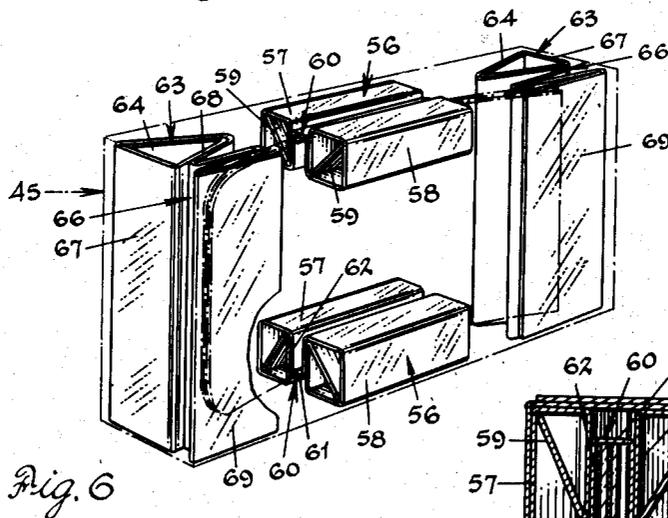
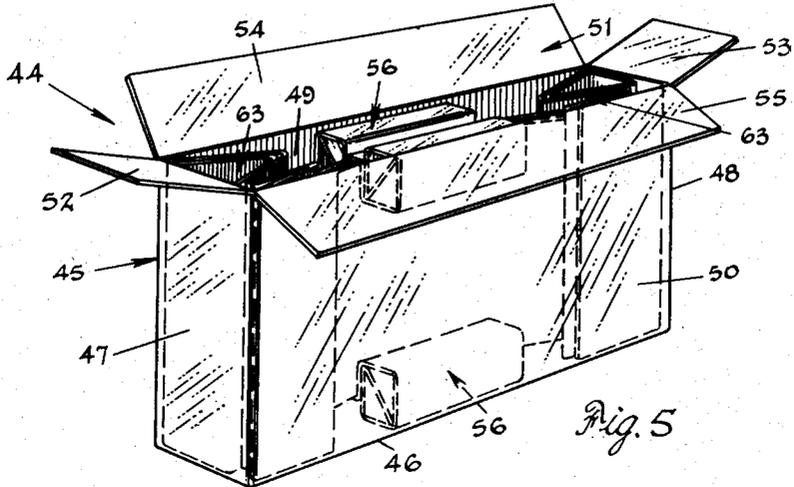


Fig. 6

Fig. 7

Fig. 8

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SHIPPING CONTAINER FOR GLASS SHEETS

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1

The present invention relates broadly to the art of packaging and more particularly to a container, box or carton of novel and improved construction for the handling and shipping of articles, such as for example, bent or curved sheets of glass or other frangible material.

An important object of the invention is the provision of an improved shipping container for bent or curved sheets of glass which adequately cushions and supports the glass sheet or sheets and maintains said sheet or sheets in floatable relation with respect to the walls of the container.

Another object of the invention is to provide such a shipping container which is formed largely of cardboard or the like, which may be readily assembled from a minimum number of parts, and which is strong, sturdy and durable in construction.

Another object of the invention is to provide such a shipping container wherein cushioning and supporting means of a novel character are arranged within the container and associated directly with the glass sheet or sheets to brace said sheet or sheets along areas of greatest stress and also to prevent chipping along the edges thereof.

A further object of the invention is to provide, in a shipping container of the character described, novel supporting means in engagement with the edges of the glass sheet or sheets which maintain said sheet or sheets spaced from the walls of the container and yet permit limited movement of the sheet or sheets horizontally and vertically within the shipping container with less likelihood of breakage than was heretofore considered possible to achieve.

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

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

Fig. 1 is a perspective view of the shipping container;

Fig. 2 is a diagrammatic perspective view of the container illustrated in Fig. 1, showing the location of the cushioning and supporting means with respect to the glass sheet;

Fig. 3 is a horizontal detail sectional view of the container shown in Fig. 1;

Fig. 4 is a vertical detail section showing the component parts of the container illustrated in Fig. 1;

Fig. 5 is a perspective view of the shipping con-

2

tainer showing another type of supporting means;

Fig. 6 is a diagrammatic perspective view of the container illustrated in Fig. 5, showing the location of the supporting means in relation to the glass sheet or sheets;

Fig. 7 is a horizontal detail sectional view of the container shown in Fig. 5; and

Fig. 8 is a vertical detail section showing the component parts of the container illustrated in Fig. 5.

While the container of this invention is particularly suited for the packaging and shipment of bent or curved glass sheets, and will be described hereinafter as utilized for that purpose, it will be appreciated that the container herein disclosed may be used for other articles of a similar character, and that the invention is not limited to any specific use.

Referring now to the drawings, and particularly to Figs. 1 to 4, there is provided a shipping container designated in its entirety by the numeral 10 and comprising a substantially rectangular exterior box or carton 11 in which is supported one or more bent or curved sheets of glass, hereinafter referred to by the letter A. The carton 11 is preferably manufactured from relatively heavy double-face cardboard, fiberboard, paperboard or the like and is composed of a suitably sealed bottom 12, end walls 13 and 14, side walls 15 and 16 and a top 17 comprising end flaps 18 and 19 and side flaps 20 and 21.

Disposed within the carton 11 and positioned to engage the upper and lower edges of the glass sheet A substantially intermediate the opposite end edges thereof is a center supporting member 22. This member, which preferably is formed from the same type material as the carton 11, comprises an upper bracing section 23 and a lower bracing section 24, said sections being maintained in spaced parallel relation by a separator 25 which is disposed closely adjacent and parallel to the side wall 16 of the carton 11.

As may be seen in Figs. 2 and 4, each bracing section 23 and 24 is formed of a single length of corrugated material and is shaped to provide a substantially rectangular portion 26 integrally associated with a boot-like portion 27. As thus constructed and located, the portions 26 and 27 have a combined length substantially equal to the distance between the side walls 15 and 16 of the carton 11 and each function to brace and maintain the other in the shape indicated, yet by reason of their particular design and arrangement, allow limited horizontal and vertical move-

ment of the glass sheet A within the carton 11 as it proceeds in transit and receives the shocks which are normally associated with present day shipments. To explain more fully, the substantially rectangular portion 26 has two adjoining surfaces 23 and 29 positioned adjacent the top 17 and side wall 16, respectively, of the carton 11, thereby assuring that said portion 26 will not readily depart from the configuration shown, while the boot-like portion 27 is in direct contact with the side wall 15 and top 17 of the carton by means of the base 30 and horizontal segment 31 respectively of said portion 27.

Each boot-like portion 27 of the bracing sections 23 and 24 further comprises an angularly arranged segment 32 extending diagonally from the base 30 of each portion 27, and a horizontal extension or saddle 33 which proceeds inwardly from the segment 32 and receives the upper or lower edge of the glass sheet A.

It may thus be seen that by means of the novel center supporting member 22 herein disclosed the central area of the curved glass sheet A, which area is subjected to considerable stress and strain in shipment, is not only maintained spaced from the bottom 12 and top 17 of the carton 11 but is held in a substantially rigid cushioned position within said carton. Yet, at the same time, the sheet A is permitted freedom of movement to a limited degree such as may be necessary should the carton be accidentally dropped from the normal position shown in Figs. 1 and 2, to a position in which the carton 11 rests on either of the side walls 15 and 16 thereof. In other words, as the glass sheet A carried within the carton 11 proceeds during shipment the upper and lower edges of said sheet will be held substantially rigid within the boot-like portions 27 of the bracing sections 23 and 24 by their cushioned contact with the angularly arranged segment 32 and saddle 33 of each portion 27. However, should the carton 11 receive lateral jarring as it is handled during shipment, that portion of the lateral force which is not absorbed by the carton itself will be transferred to the center supporting member 22, and the other supporting and cushioning means associated therewith to be hereinafter described. As such a force is received by the member 22 the sheet A will move to a limited extent in a transverse direction, depending upon the direction from which the force originates. Should the force be directed at the convex surface of the sheet A, the upper and lower edges of said sheet will move slightly inwardly from their position in contact with the angularly arranged segment 32 and saddle 33, and should the force be of substantial magnitude, said edges will traverse the length of the saddle 33 and engage the vertical extension 34 of corrugated material which overlaps the substantially rectangular portion 26 of each bracing section 23 and 24. By virtue of the shape of said portion 26, the sheet A will be stopped in its movement and cushioned thereagainst. Similarly, should the carton 11 receive a lateral force directed against the concave surface of the sheet A, the upper and lower edges of said sheet will press against the angularly arranged segment 32 in the manner shown in Fig. 4 and said segment will move outwardly toward the base 30 of the boot-like portion 27, thereby permitting limited movement of the sheet A and cushioning said sheet during such movement.

The present invention further contemplates, in novel association with the center bracing mem-

ber 22 herein disclosed and above described, the provision of additional supporting and cushioning means. Such supporting means comprise, as best shown in Figs. 2 and 3, end filler members 35, one of which is positioned in engagement with each end edge of the glass sheet A.

Each end filler member 35 is preferably constructed of a single sheet of double-face corrugated cardboard, fiberboard, paperboard or the like and is suitably folded to provide a trapezium 36 having an accordion or Z-shaped extension 37 projecting outwardly therefrom and contacting the side wall 16 of the carton 11. The trapezium is positioned whereby one of the parallel sides 38 has a portion thereof in parallel abutting relation with an end channel member 39 and one of the non-parallel sides 40 closely parallel the side 15 of the carton 11. As may be further observed, the remaining sides 41 and 42 of the trapezium present a double layer of corrugated material to provide greater cushioning and bracing should the glass sheet A come in contact therewith, and that the non-parallel side 42 of the trapezium 36 lies generally parallel to the glass sheet A.

The accordion or Z-shaped extension 37 of the filler member 35 functions to receive an end edge of the sheet A therein, to space that portion of the sheet from the side wall 16 of the carton 11, and to maintain the end portion of said sheet in substantially rigid yet floatable relation with respect to the container. Due to the particular shape of the extension 37 and the compressibility imparted thereto by virtue of its composition and configuration, the glass sheet A is held relatively rigid by the location of one of the edges thereof in a fold formed by the V-shaped portions a and b of the accordion-like extension. By so maintaining the sheet, in combination with the cushioning support granted by the center member 22, the end filler members 35 effectively preclude undesirable shifting of the sheet A during handling.

However, should the shipping container 10 receive rough handling en route to its destination, the filler members 35 will coact with the center supporting member 22 to allow a limited freedom of movement of the glass sheet and thereby eliminate or minimize the liability of breakage. To illustrate, a force directed at the convex surface of the sheet A will have, in addition to the effect noted above with respect to the center member 22, the effect of directing the trapezium 36 inwardly toward the sheet until it contacts said sheet. Any further force will tend to compress the Z-shaped extension 37 and will be absorbed by said extension or the trapezium prior to being transferred to the sheet. A force approaching from the opposite direction and received by the carton 11 will result in compression of the Z-shaped extension, slight movement of the sheet toward the trapezium, and stoppage of the sheet by the corrugations of said trapezium.

As above noted, there is positioned in overlapping relation with respect to the end filler members 35 an end channel member 39. This latter member serves to provide a firm level surface against which the points of the accordion or Z-shaped extension 37 may press upon compression thereof, to protect the resilient cushioning member 43 against piercing by said points of the extension 37, and to provide additional cushioning for the opposite ends of the glass sheet A and thereby avoiding chipping or movement thereof through the end walls 13 and 14 of the carton 11.

5

The resilient cushioning member 43, which is positioned between the end channel member 39 and end walls 13 and 14 of the carton 11 in parallel abutting relation therewith, has the principal functions of effectively preventing movement of the end edges of the sheet A through the end walls of the box, this function being performed in combination with the Z-shaped extension 37, and further to cushion and protect the glass sheet in the event of endwise movement within the carton 11. This resilient cushioning member 43, which conforms in size and shape to the end walls 13 and 14 of the carton, is occasionally known to the trade as 8 ply-plypack and is formed from a plurality of parallel sheets of kraft paper between which are adhesively secured additional sheets of corrugated kraft paper.

The shipping container 10 above disclosed when assembled with the cushioning and supporting means described positioned with respect to a curved or bent glass sheet will accord to the sheet adequate protection and substantial freedom from breakage heretofore considered unavoidable in the art. It is to be noted in particular that the central area of the glass sheet, which area by virtue of the curvature of the glass is subjected to considerable stress during movement, is adequately braced and cushioned throughout a substantial portion of its length, and further that the edges of the sheet, which previously were frequently chipped or otherwise damaged as by breaking through the end walls of the carton, are also properly cushioned and supported. Notwithstanding this substantially rigid manner in which the sheet is maintained, a floatable relation between said sheet and carton is provided by reason of the limited freedom of movement allowed.

The above disclosed shipping container is of particular application to the packaging and shipment of one piece curved glass sheets, such as for example, windshields and rear windows for automobiles and the like. An additional container, which has been found successful for the safe and expeditious packing and shipment of two-piece windshields, which glass sheets are conventionally shipped in matched pairs, is illustrated in Figs. 5 to 8 and will be hereinafter described.

This modified form of shipping container, which is hereinafter designated in its entirety by the numeral 44, comprises a substantially rectangular exterior box or carton 45 of the same general character previously described in connection with the other shipping container 10. That is, the box or carton supports therein one or more pairs of curved glass sheets A and is composed of a suitably sealed bottom 46, end walls 47 and 48, side walls 49 and 50, and a top 51 comprising end flaps 52 and 53 and side flaps 54 and 55, said flaps of course being secured together during shipment of the container.

Disposed substantially centrally of the length of the carton 45 and intermediate opposite ends of the glass sheets A is a pair of center supporting members 56, which perform substantially the same functions as the center bracing member 22 above described. These members 56, which are in general vertical alignment with one another and are identical in construction, serve to maintain the part of matched glass sheets A spaced from the top 51 and bottom 46 of the carton 45, hold the sheets A in substantially rigid cushioned relation, and yet permit a limited amount of movement of the sheets both horizontally and vertically within the carton.

In order to accomplish the above purposes, each

6

center member 56 is formed of a single sheet of corrugated material of any one of the types above suggested, said sheet being folded to provide a pair of substantially rectangular portions 57 and 58 having a diagonal 59 extending between opposite corners and a saddle-type portion 60 having a horizontal seat 61 and vertical sides 62. As may be seen in Fig. 8, each of the substantially rectangular portions 57 and 58 has two surfaces thereof in parallel contact with the top and side walls or bottom and side walls of the box or carton 45. It is to be further observed that said portions 57 and 58 include between opposite corners thereof the diagonal 59 which is formed as a part of these portions and functions to maintain said portions substantially rigid and in the shape indicated when the sheets A are positioned therebetween.

The upper and lower edges of the glass sheets A are received within the saddle-type portions 60, and when located as shown in Fig. 8, abut against the horizontal seat 61 and are spaced between the vertical sides 62 of said saddle-type portions. It is thus evident that the glass sheets are restrained against vertical movement and cushioned by said seat 61 and that the close engagement provided between the seats and edges of the sheets A introduces friction and thereby diminishes movement of the sheets inwardly or outwardly of the carton 45. However, should accidental jarring be received by the shipping container, the glass sheets will be stopped and cushioned by the vertical sides 62 of the saddle-type portions 60 if the force proceeds in a transverse direction, and will float upwardly and downwardly against the cushioned horizontal seats 61 if the force is directed in a vertical manner.

For the purpose of further holding the glass sheets A relatively rigid with respect to the carton 45, and additionally to cushion opposite ends of the sheets and prevent their passage through the end walls 47 and 48 of said carton in the event of jarring, there is also provided end filter members 63 in contact with said end walls and in overlapping relation to the ends of the matched pair of glass sheets. In order that the filler members 63 may successfully accomplish these objectives, each comprises a triangular or pyramidal portion 64 positioned on the convex surface of the pair of sheets and interconnected to an angular portion 65 disposed on the concave surface by a web 66 which engages the edges of the sheets.

As is best shown in Fig. 7, the base 67 of the pyramidal portion 64 is in firm parallel engagement with the end wall 47 of the carton 45 and one side 68 of said portion has a part thereof lying generally parallel to the convex surface of the pair of sheets A. On the opposite surface of the glass sheets, one leg 69 of the angular portion 65 presses against the side wall 50 of the carton 45, while the opposite leg 70 of said portion 65 runs parallel to the side 68 of the pyramidal portion 64. Interconnecting these two portions 64 and 65 and making actual contact with the edges of the glass sheets is the web 66, said web defining a pocket which cushions and protects the end edges of the sheets with a bottom section 71 and side sections 72.

By the novel arrangement of cushioning and supporting means herein disclosed, all areas of the sheets A normally subject to chipping or stress and strain are adequately protected. Should a force be directed transversely of the container, the center supporting members 56 will function in the manner previously described,

while the end filler members 63 will grant the desired cushioning support by compression of the angular portion 65 if the force is against the side wall 50, and twisting of the pyramidal portion 64 if the force is against the opposite side wall 49. A horizontal or longitudinal force against either end wall 47 or 48 of the carton 45 will be dissipated without damage to the sheets A by the cushioned float provided by the web 66. Thus, although the pair of glass sheets A are carried and supported within the carton 45 in a relatively rigid cushioned condition, there is adequate provision for limited movement of the sheets in two directions, thereby effectively avoiding breakage of said sheets should the carton be handled in a rough manner.

To prevent scratching of the inner surfaces of the sheets A as they are maintained in a vertical position parallel to one another, one or more sheets 73 of kraft paper or the like may be inserted therebetween. Also, if desired, resilient cushioning members similar to the members 43 above described may be placed between the end walls 47 and 48 and the end filler members 63 to add cushioning protection to the opposite ends of the pair of glass sheets A.

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. In a container for shipping curved sheets of glass or other frangible material, a substantially rectangular carton having top and bottom and side and end walls, a curved glass sheet arranged within said carton, resilient filler members having springable portions engaging opposite ends of the sheet throughout substantially the entire length thereof and maintaining said ends in spaced floatable relation with respect to the side and end walls of said carton, and resilient spacer members arranged between the top, bottom and side walls of the carton in engagement with the side edges of the glass sheet, each of said members contacting both of the side walls of the carton and spacing said sheet edges from said side walls in floatable relation therewith.

2. In a container for shipping curved sheets of glass or other frangible material, a substantially rectangular carton having top and bottom and side and end walls, a curved glass sheet arranged within said carton, resilient filler members having springable portions positioned at opposite ends of the sheet and overlapping said ends throughout substantially the entire length thereof, said members extending between the side walls of the carton and maintaining the ends of the glass sheet in spaced floatable relation with respect to the side and end walls of said carton, and resilient spacer members arranged between the top, bottom and side walls of the carton in contact therewith and in engagement with the side edges of the glass sheet substantially intermediate the opposite ends thereof and spacing the sheet from the top, bottom and side walls of the carton in floatable relation therewith.

3. In a container for shipping curved sheets of glass or other frangible material, a substantially rectangular carton having top and bottom and side and end walls, a curved glass sheet arranged within said carton, resilient filler members having closed portions thereof disposed ad-

jacent one surface of the glass sheet and other portions providing folds within which the opposite ends of the sheet are yieldably and substantially entirely received and maintained spaced from the end and side walls of the carton, and resilient spacer members arranged between the top, bottom and side walls of the carton in contact therewith, said members providing a saddle-type portion within which the side edges of the glass sheet are received and maintained in floatable relation spaced from said top, bottom and side walls of the carton.

4. In a container for shipping curved sheets of glass or other frangible material, a substantially rectangular carton having top and bottom and side and end walls, a curved glass sheet arranged within said carton, resilient filler members positioned at opposite ends of the carton, each of said members having a portion disposed adjacent one of the side walls of said carton and spaced from one surface of the glass sheet and another portion extending from said first mentioned portion and engaging the opposite side wall of said carton, said extended portion providing a fold within which the opposite ends of the sheet are yieldably received and maintained spaced from the end and side walls of the carton, and resilient spacer members arranged between the top, bottom and side walls of the carton, said members providing a saddle-type portion within which the side edges of the glass sheet are received and supported in floatable relation spaced from said top, bottom and side walls of the carton.

5. In a container for shipping curved sheets of glass or other frangible material, a substantially rectangular carton having top and bottom and side and end walls, a curved glass sheet arranged within said carton, resilient filler members positioned at opposite ends of the carton, each of said members having a portion disposed adjacent one of the side walls of said carton and spaced from one surface of the glass sheet and another portion extending from said first mentioned portion and engaging the opposite side wall of said carton, said extended portion providing a fold within which the opposite ends of the glass sheet are yieldably received and maintained spaced from the end and side walls of the carton, and resilient spacer members disposed substantially centrally of the carton, each of said members having a substantially rectangular portion located adjacent the top, bottom and one side wall of the carton and another portion in engagement with the top, bottom and opposite side wall of said carton, said portions being connected by a saddle-type section within which the side edges of the glass sheet are received and supported in floatable relation spaced from the top, bottom and side walls of the carton.

6. In a container for shipping curved sheets of glass or other frangible material, a substantially rectangular carton having top and bottom and side and end walls, a curved glass sheet arranged within said carton, resilient filler members positioned at opposite ends of the carton, each of said members having a portion disposed adjacent one of the side walls of said carton and spaced from one surface of the sheet and another portion extending from said first mentioned portion and engaging the opposite side wall of said carton, said extended portion providing a fold within which the opposite ends of the glass sheet are yieldably received and maintained spaced from the end and side walls of the

9

10

carton, resilient spacer members disposed substantially centrally of the carton, each of said members having a substantially rectangular portion located adjacent the top, bottom and one side wall of the carton and another portion in engagement with the top, bottom and opposite side wall of said carton, said portions being connected by a saddle-type section within which the side edges of the glass sheet are received and supported in floatable relation spaced from the top, bottom and side walls of the carton, a cushioning member positioned against each end wall of the carton and parallel to the resilient filler member, and a resilient channel member located between said cushioning member and said filler member.

7. In a container for shipping curved sheets of glass or other frangible material, a substantially rectangular carton having top and bottom and side and end walls, a curved glass sheet arranged within said carton, resilient filler members positioned at opposite ends of the carton, each of said members having a triangularly shaped portion disposed adjacent one surface of the sheet and against one end wall of the carton and an angularly shaped portion located on the opposite surface of the sheet, said portions being connected by a web defining a pocket within which opposite ends of the glass sheet are yieldably received and maintained spaced from the end and side walls of the carton, and resilient spacer members arranged between the top, bottom and side walls of the carton, said members providing a saddle-type portion within which the side edges of the glass sheet are received and supported in floatable relation spaced from said top, bottom and side walls of the carton.

8. In a container for shipping curved sheets of glass or other frangible material, a substantially rectangular carton having top and bottom and side and end walls, a curved glass sheet arranged within said carton, resilient filler members positioned at opposite ends of the carton, each of said members having a triangularly shaped portion disposed adjacent one surface of the sheet and against one end wall of the carton and an angularly shaped portion located on the opposite surface of the sheet, said portions being connected by a web defining a pocket within which opposite ends of the glass sheet are yieldably received and maintained spaced from the end and side walls of the carton, and resilient members disposed substantially intermediate the opposite ends of the carton, each of said members comprising a pair of substantially rectangular portions abutting the side walls of said carton and a saddle-type portion extending between and connecting said rectangular portions, said saddle-type portion receiving and supporting the side edges of the glass sheet in floatable relation spaced from the top, bottom and side walls of the carton.

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