

Dec. 18, 1956

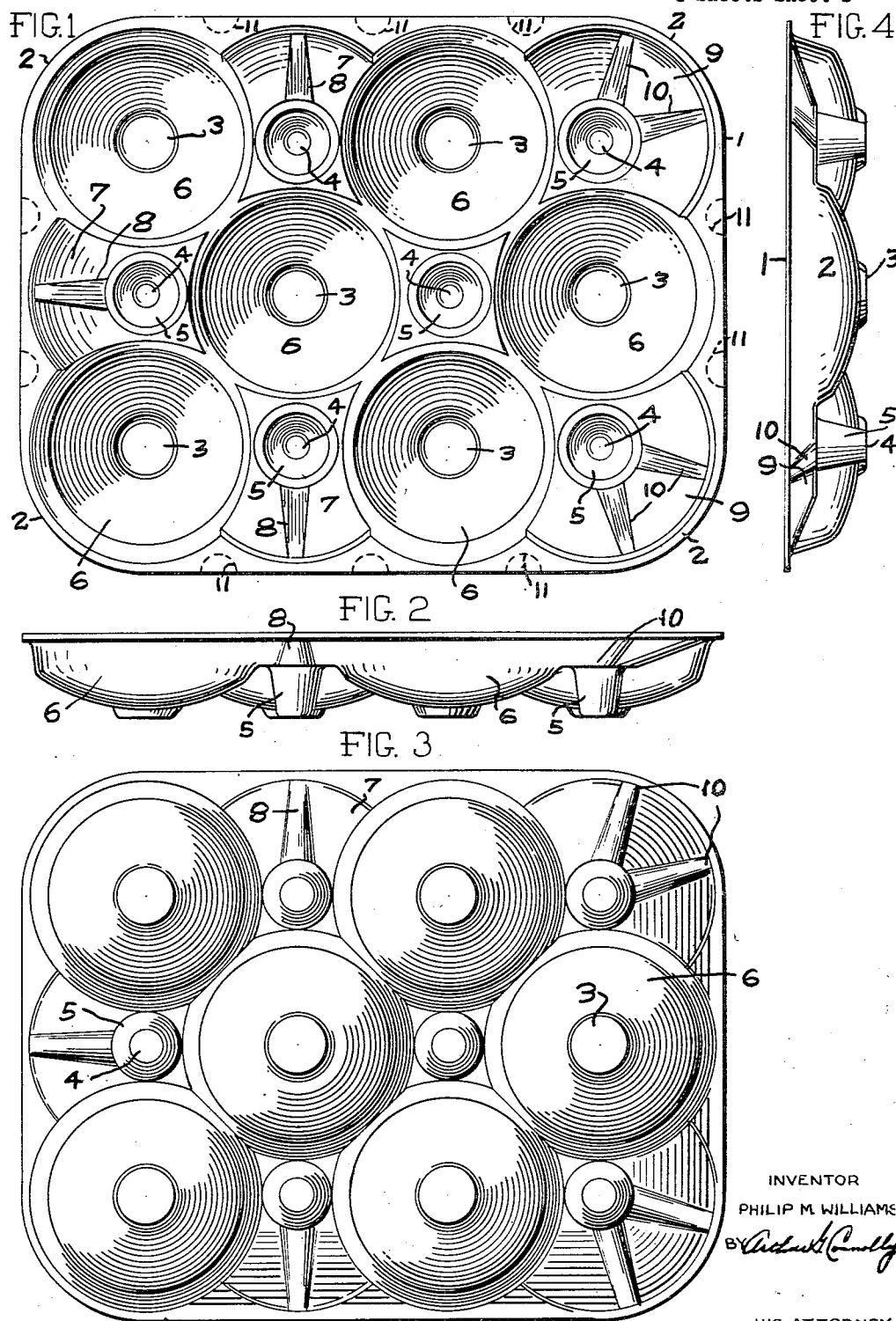
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SUPPORT-PROTECTOR FOR FRAGILE ARTICLES

Filed Jan. 31, 1952

3 Sheets-Sheet 1



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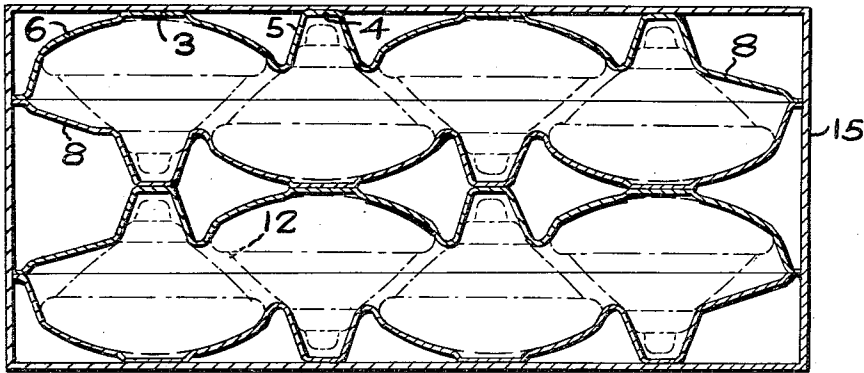
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3 Sheets-Sheet 2

FIG. 5



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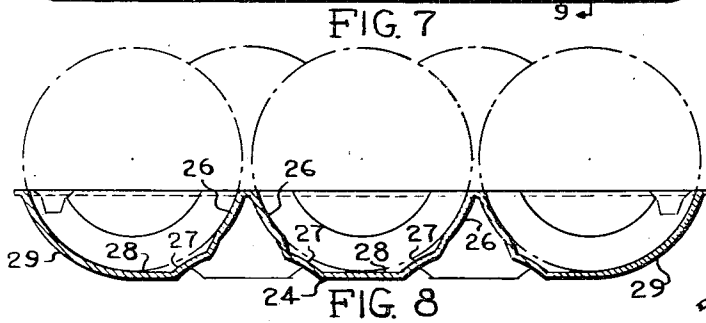
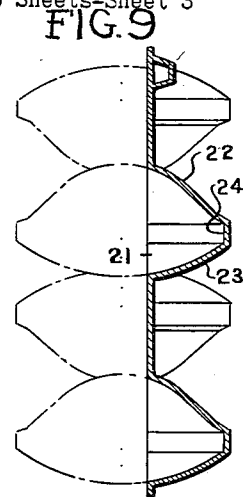
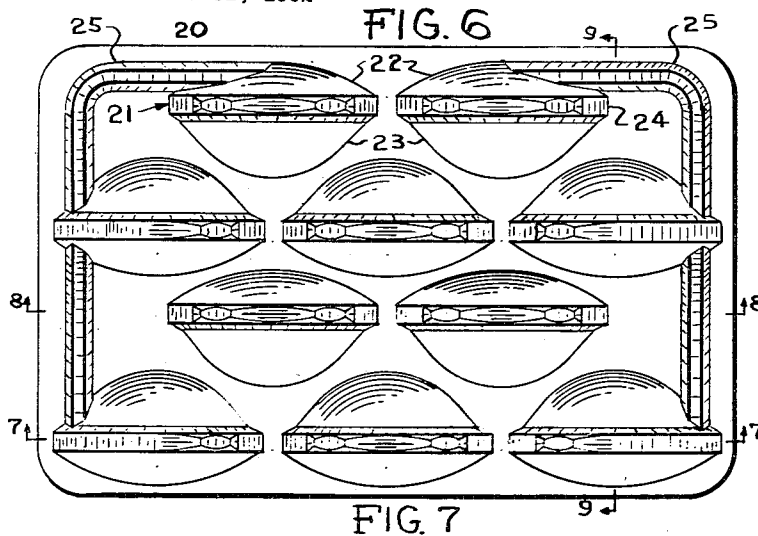
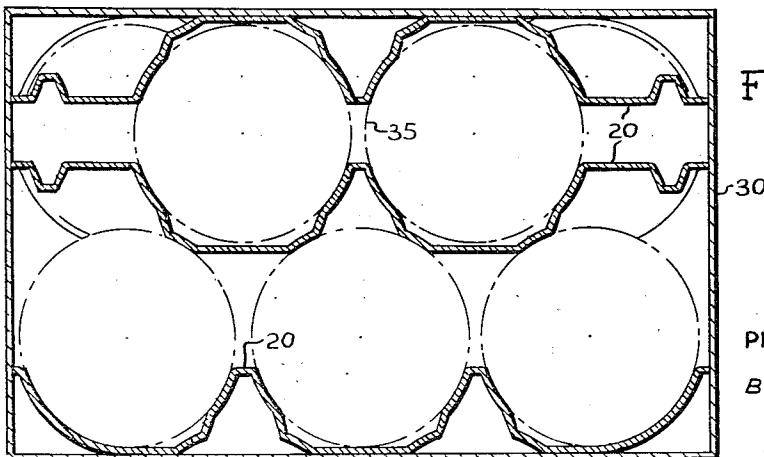
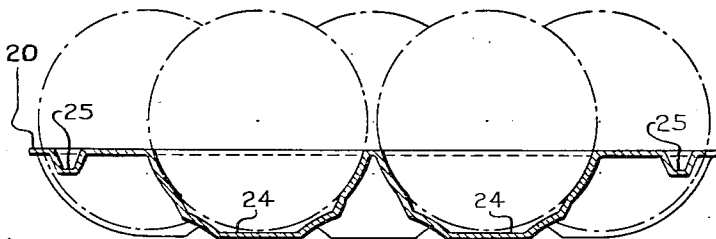
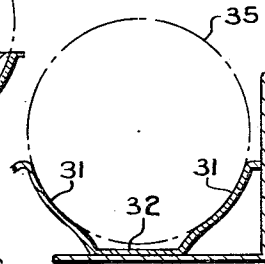


FIG. 11



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SUPPORT-PROTECTOR FOR FRAGILE ARTICLES

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2 Claims. (Cl. 206—65)

This invention relates to a packing material for fragile objects of generally oblate spheroidal shape and has for its principal object the provision of a new and improved support and protector for such objects.

More particularly in the disclosed embodiments the invention relates to a packaging support and protector for fragile objects such as sealed beam automobile headlights and the like.

One specific embodiment of the invention relates to a support and protector for headlights having a generally tapered end section, a second end section in the shape of a dome, and an intermediate portion interconnecting said end sections.

The prior art is full of many and varied forms of packing material for packing various type fragile objects for shipment in wooden or corrugated paper cases. Some of the prior art packing structures employ specifically shaped bottom-supporting structures made of molded pulp material with intermediate filler sheets of a different configuration, and sometimes even a top cover section of a still further different configuration. Other prior art type packing structures employ plural unitary molded pulp fragile article support structures of a single configuration which are adapted to provide support for a group of such articles in a packing case, but are so designed that the fragile articles are in substantially direct contact with each other throughout a portion of their boundary surfaces and with only a thin separator wall intervening.

It is a primary object of the instant invention to provide a unitary support and protector sheet for fragile articles which will permit the packing of such articles in a relatively small space and yet provide highly adequate protection against breakage due to shocks and jars without requiring the use of separate differently shaped auxiliary supports.

Another object of this invention is to provide a single type support sheet which is readily adapted to various methods of packing.

As illustrative of the principles involved, there are shown two separate types of support-containers for such fragile articles, but it will be understood that the generic disclosure as used in the invention is not limited to the specific structure of the two illustrated embodiments.

In the accompanying drawings in which are indicated the specific embodiments of the fragile article supports:

Fig. 1 is a top plan view of an automobile headlight support and protector made from a unitary rectangular sheet of molded pulp;

Fig. 2 is an end edge view of the support member of Fig. 1;

Fig. 3 is a bottom plan view of the unitary support of Fig. 1;

Fig. 4 is a side edge view thereof;

Fig. 5 is a vertical longitudinal sectional view of a plurality of the supports of Fig. 1 illustrating the use thereof in packing a case of twenty-four automobile headlights;

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Fig. 6 is a top plan view of a modified fragile article support;

Fig. 7 is a section taken along the lines 7—7 of Fig. 6;

Fig. 8 is a section of such modified article support taken along the line 8—8 of Fig. 6;

Fig. 9 is a sectional view taken along the line 9—9 of Fig. 6;

Fig. 10 is a sectional view taken along the line 8—8 of Fig. 6 and indicating the use of the modified article support in packing a crate of twenty automobile headlights; and

Fig. 11 is a sectional detail view of a modification of the support sheet of Fig. 6.

In packing fragile objects such as automobile headlights for shipment from the manufacturer to the distributor or user, it is the usual practice to pack such articles in units of twenty or thereabouts, depending upon the type of bulb, arranged in a plurality of rows in vertically spaced layers within a rectangular box or crate. Intermediate the separate rows of headlights are normally interposed support-protectors formed of a cushioning material. The instant invention is devoted to providing a single protector which may be used to pack any number of rows of such fragile objects in the supporting crate or box.

Referring now to the drawings in more detail, particularly Fig. 1, the support-protector of the invention is illustrated as a unitary rectangular sheet 1 formed of a molded pulp material. The corners 2 of said rectangular sheet are rounded to save material and to increase the rigidity of such sheet. Formed in lengthwise and transverse rows at equi-distant points on said sheet are a plurality of circular hub-shaped bosses 3 and 4, respectively. As shown in Fig. 1, there are six bosses indicated as 3 and six bosses indicated as 4, two of each of the differently numbered bosses being aligned in horizontal longitudinal rows on said sheet in alternate relationship. The arrangement is such that the separate bosses are also alternately aligned transversely of the sheet in four parallel rows of three bosses each.

The six bosses indicated as 3 are integrally formed as the bottom central portions of a plurality of deep dome-shaped cavities 6. The other six bosses are formed as integral hollow truncated cone sections 5. Each of the twelve bosses are arranged to terminate in a single horizontal plane vertically displaced below the edge surface of said sheet. Three of the truncated cone sections, at the open ends thereof, merge with shallow arcuate segmental dish-shaped cavities 7. Each of these generally arcuate dish-shaped cavities is disposed adjacent a respective edge of the sheet intermediate two adjacent dome-shaped cavities and merge therewith. Formed in the central portion of the arcuate dish-shaped cavities are depending internal rib portions 8. These rib portions merge with the external surface of the arcuate dish-shaped cavities.

A further two of said truncated cone portions are located adjacent two of the corners of said sheet and merge with semi-circular sections of shallow dish-shaped cavities 9. These cavities are formed identical with the aforesaid shallow cavities with the exception of the arcuate extent thereof. Two strengthening ribs 10 identical in construction with the ribs of the aforementioned arcuate cavities are placed in each semi-circular cavity 9 and are disposed to radiate to the circumferential edge section of said semi-circular cavities adjacent the respective end segments of the arcs forming the rounded corners of the sheet.

The sixth and last truncated cone portion is positioned intermediate four of the deep dome-shaped cavities and merges with a four-sided star-shaped support section hav-

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ing boundary sides contiguous with respective ones of the surrounding dome-shaped cavities.

The deep dome-shaped cavities, the arcuate and semi-circular dish-shaped cavities and the star-shaped section are all interconnected by a network of arcuate rib-like sections. This network of support ribs assures that the article support adequately resists excessive bending. By use of such a network about staggered pockets it has been possible to eliminate the need for conventional extended support ribs except in the fringe areas of the shallow dish-shaped cavities. This network of interrelated arcuate support ribs also provides an anchor section for the dome-shaped cavities 6 and permits such dome-shaped cavities to provide a suspended resilient cushioning support for the articles within the network of the supporting arcuate lengths while such arcuate lengths hold the protector sheet well supported in a single plane. With such construction the dome-shaped cavities 6 function as resiliently supported article-retaining members having a vertical flexibility which is desirable to prevent injury to the fragile articles due to shocks and jars.

Reference will now be made to Fig. 5 in describing the function and operation of this novel support in packing a case of automobile headlights for shipment. In positioning the headlights, indicated by broken lines 12, in the support sheet 1, six are placed with their frontal dome-shaped portions in the dome-shaped cavities 6 of the sheet 1. Six more are placed in an inverted relationship with their tapered rear portions inserted into frictional engagement with the internal sides of the truncated cone portions 5 of sheet 1. It will be noted that this method of packing permits a staggered grouping of 12 headlights in a layer which occupies considerably less space than that of the total of the cross-sectional surface areas of the individual headlights.

After the twelve headlights are inserted in the bottom support sheet, a second identical support sheet, inverted with respect to the first by rotating it 180° around its short axis, is placed over the top of the headlights. This second sheet, as is clear from an inspection of Fig. 5, engages the previously extended ends of the twelve headlights and provides with the lower support sheet 1 a completely closed support and protector for such headlights. It will be noted, as is indicated in the figure, that the boss portions 3 and 4 of the bottom support sheet all bear upon the bottom of the crate 15 and provide a solid foundation for the packed assembly. As previously described, the headlights contained in the cavities 6 of the bottom support sheet frictionally bear upon the depending surface of said dome-shaped cavity and due to the boss sections 3 are vertically supported above the bottom surface of the crate. This insures that the headlights will be adequately cushioned against any shocks resulting from a handling of the case during shipment. The cone-shaped cavities have an inherent resiliency due to the construction of the intermediate hump-shaped arcuate rib structures which, together with the tapered character of the engagement between the end of the headlights and the boss causes them to deflect in a lateral direction when forces from any source press the headlights against the support sheets. It will further be noted that the tapered end sections of the headlights, which are mounted in the lower support, are vertically suspended above the surface of the shipping crate in substantially the same manner as are the dome-shaped portions of the headlight. The upper portion of these tapered ends is wedged into engagement with the side walls of the upper part of the truncated cone portions 5, thereby providing a relatively self-supporting base for such bulbs during packing, and yet retaining sufficient flexibility due to the arcuate rib structures intermediate the headlights to protect such articles against breakage due to shocks or jars. The hump-shaped arcuate lengths provide a positive separating or isolating boundary between adjacent headlights and obviate any possibility of their coming into direct contact with each other.

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As shown in Fig. 5, a second layer of headlights may be supported above the first in an identical support sheet 1. This grouping of layers may be increased to any desired number, but under the usual commercial conditions two rows are all that are necessary. The bottom-supporting sheet of the upper row is shown to have continuous and positive bearing support through its boss members 3 and 4 upon the like boss members 3 and 4 of the upper cover sheet of the bottom row. This reduces the possibility of the upper headlights sagging into contact with the lower headlights.

Many variations in using the support protector sheet of this invention in packing fragile objects such as headlight bulbs are possible; for example, the bottom protector sheet may be inserted in the crate first and then have the headlights placed thereon, thereafter providing a cover for the first row, then inserting a support for the second row on top of said cover, inserting the second row of headlights in the second support, and thereafter providing the upper cover for said second row. Alternatively, the headlights may be assembled in the protector sheets in separate subassembled groups by inserting twelve of the headlights in a bottom protector and thereafter covering each with the upper inverted cover support, thereby providing a completely protected subassembly of twelve headlights which can be easily and safely handled in any manner desired.

Another form of the invention is illustrated in Figs. 6 through 10 inclusive. In Fig. 6, 20 indicates a modified form of protector sheet having a substantially flat horizontal surface configuration. Formed in this sheet are ten generally oblate cavities 21, each having arcuate, convex-depending surfaces 22 and opposed convex-depending surfaces 23 of a different radius of curvature interconnected by a central strip 24, partly of curved and partly of angularly related flat sections, 26 through 27 inclusive. The cavities are formed in staggered longitudinal rows of 3 and 2, respectively, two rows of each being illustrated, but such arrangement of rows may be extended as desired. Adjacent the longitudinal ends of the rectangular sheet 20 are formed depending stiffening ribs 25, each of which merges with some or all of the cavities at the ends of the sheet to stiffen it, particularly near corner portions that are far from pockets. As shown in Figures 7 and 8, the centrally located cavities which are spaced from the longitudinal ends of the sheet 20 have their central strips formed of a depending cross-sectional surface configuration of opposed convex surfaces 26 interconnected by an integral angular related plurality of concave and flat sections 27 and 28 respectively. The oblate cavities adjacent the longitudinal ends of the rectangular sheet 20 have their central connecting strip formed with a cross-sectional surface configuration of arcuate curvatures, 26 and 29, of differing lengths connected by two short sections 27 and 28. The portions of the central strips 26, 27 and 28 adjacent the center section of the sheet 20 in these end cavities are formed identically with the adjacent portions of the strips of the intermediate cavities in the center section of the sheet 20.

The purpose of the angularly related flat sections interconnecting the arcuate curved sections of the central strips of the cavities is to provide a resilient support surface for the edges of the headlights when disposed in the cavities. As indicated by the dot-dash circles in Figs. 7 and 8, the headlights, when disposed in the cavities, are frictionally gripped by the upper arcuate sections of the central strips and supported above the angularly related short flat sections. This provides a space in which the headlights may be moved vertically as by reason of shocks and jars encountered under shipping conditions without engaging any hard objects or adjacent articles.

An example of the use of this modified headlight support and protector is illustrated in Fig. 10. In this figure the packing crate 30 contains 20 such headlights, indi-

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cated by broken lines 35, arranged in two vertically spaced groups of ten each. In packing the headlights for shipment, the first group is placed in one layer on a bottom-support sheet 20 previously positioned in the crate, a second support sheet is then placed over the upper surfaces of this lower layer of headlights with the second sheet turned end for end. As is indicated in the figure, the concave sections 27 of the intermediate strips of the depending cavities in the second sheet have reverse curvatures which conform to and frictionally bear upon the exposed surfaces of the lowermost row of headlights and are supported thereby. A second series of headlights is then placed in this second support sheet, and as will be noted from an inspection of the figure, they are supported in spaced relation with respect to the lowermost layer of headlights. To insure complete protection, a third identical protector sheet 20 is inserted over this upper layer in an inverted relationship with respect to the second support sheet and provides extra top protection for this upper layer of headlights.

By the instant invention there is provided a relatively simple and easily and cheaply manufactured support protector for fragile articles which may be easily and readily adapted to various types of packing and shipping methods without the use of any other support or protecting structure. A group of support sheets 20 of identical configuration is all that is needed to pack any desired numerical assembly of bulbs in a shipping crate. It will further be noted that in the embodiment of Fig. 10 no protective covering is needed for the bottom layer of headlights since sections of the cavities of an upper sheet provide the required spacing between the vertically displaced rows. It is thus seen that by simply using three such protector and support sheets, a case of twenty fragile headlights may be safely and easily packed for shipment.

Fig. 11 illustrates an alternative construction for the end cavities of the longitudinal sheet 20. In lieu of utilizing a central strip having arcuate sections in different lengths and an intermediate angularly related flat strip, the central section may be devised as having opposed arcuate sections 31 which merge into an offset horizontally flat strip 32 similar to the support provided for the dome-shaped portions of the headlights in the example of Fig. 1. In this form the oblate spheroidal headlights are frictionally gripped by the opposed arcuate surfaces 31 on a relatively large circumferential area of their central periphery and are positively supported above the surface of the shipping crate. The flat intermediate connecting section provides a cushion support which permits the arcuate sections to deflect under shocks and jars even more than in the sheet construction of Fig. 10.

A feature of the present invention is that the packed articles themselves provide a link in the resilient spacing between adjacent layers of the articles. Thus it will be noted that in the construction of Fig. 5, the central portions of the protective sheets 1 need not be supported against each other between the individual articles about which they are sandwiched. These central portions being remote from the abutting flange-like margins of these sheets are normally weak enough to permit considerable sagging in the absence of some effective support. However, by providing suitable strengthening bends of rib-like character, as indicated in the above-described examples, the sheets can be made to very effectively support themselves against the articles they cushion, cushion the articles from each other, and also cushion the articles in one row from those in an adjacent row.

To assist in inserting and removing the above packing sheets from the bosses or crates with which they are to be used, the sheets can be provided with marginal finger holds or weakened portions 11 through which a person's

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fingers can be slipped so as to secure an adequate finger hold on the edges of the sheet where there would otherwise be insufficient marginal clearance.

Although the sheet of Fig. 1 is shown as having its margin in the form of a flange extending in a plane displaced on one side of the remainder of the sheet, this marginal flange can be lowered part or all of the way to the level of other portions of the sheet, as shown for example in the construction of Fig. 6. On the other hand the construction of Fig. 6 can, if desired, have its margins displaced into an offset plane as in the construction of Fig. 1.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope hereof, it is to be understood that the invention is not limited to the specific embodiments hereof except as defined in the appended claims.

What is claimed is:

1. An article support for fragile articles consisting of a generally rectangular sheet of molded pulp material having a set of deep tangential dome-shaped cavities and a set of arcuate segments of shallow dish-shaped cavities formed therein between adjacent dome-shaped cavities, each of said sets of cavities depending in the same direction, a plurality of truncated cone portions formed integral with each of said dish-shaped shallow cavities, further depending therefrom and projecting beyond the lower portions of the domes a plurality of circular bosses formed integral with the central bottom portions of said dome-shaped cavities and projecting down to the level of the lower ends of said cone portions.

2. A package comprising a rectangular box-like crate, a first rectangular support sheet within said crate, said sheet being constructed of molded-pulp material and having a set of deep, tangential, dome-shaped cavities and a set of arcuate segments of shallow dish-shaped cavities formed therein between adjacent dome-shaped cavities, each of said sets of cavities depending in the same direction, a plurality of truncated cone portions formed integral with each of said shallow, dish-shaped cavities, there being a plurality of circular bosses formed integral with the central bottom portions of said dome-shaped cavities, said circular bosses depending from and projecting beyond the lower portions of said dome-shaped cavities down to the level of the lower ends of said cone portions, the lower ends of said circular bosses and of said cone portions resting on the bottom of said crate, a plurality of fragile objects supported within the cavities and segments of cavities in spaced relation to the bottom of said crate, a second support sheet identical with said first support sheet and turned end-for-end with respect thereto, said second support sheet overlying said fragile articles supported by said first support sheet to form an enclosed bottom layer and adapted to support a similar enclosed layer thereupon within said crate.

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