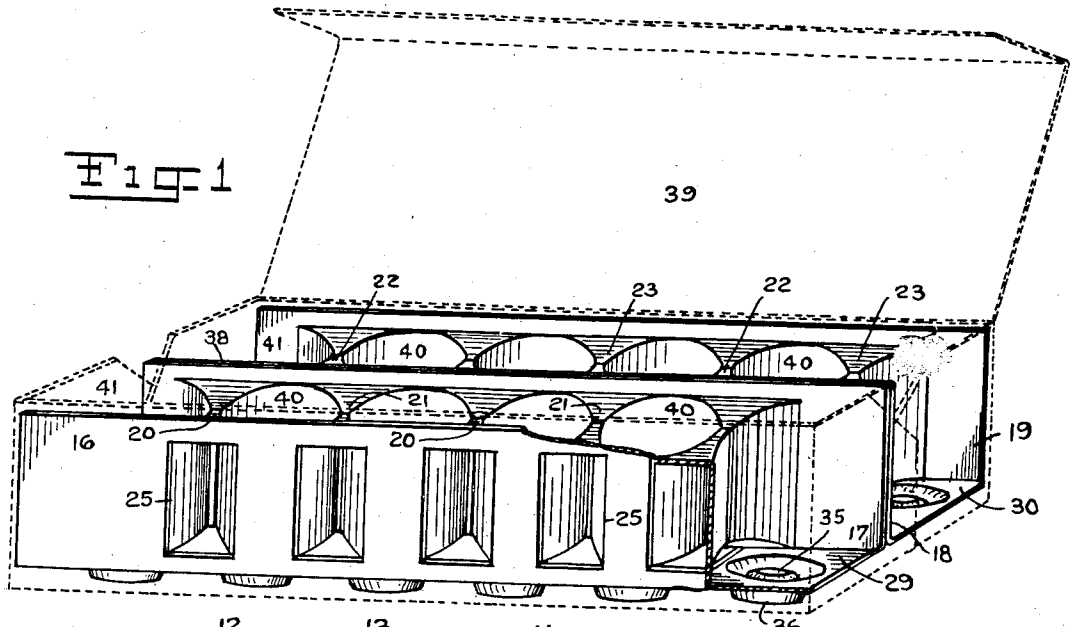
Aug. 14, 1934. M. KOPPELMAN 1,969,802

PACKING HOLDER FOR FRAGILE ARTICLES

Filed Oct. 1, 1928 3 Sheets-Sheet 1

Fig. 1



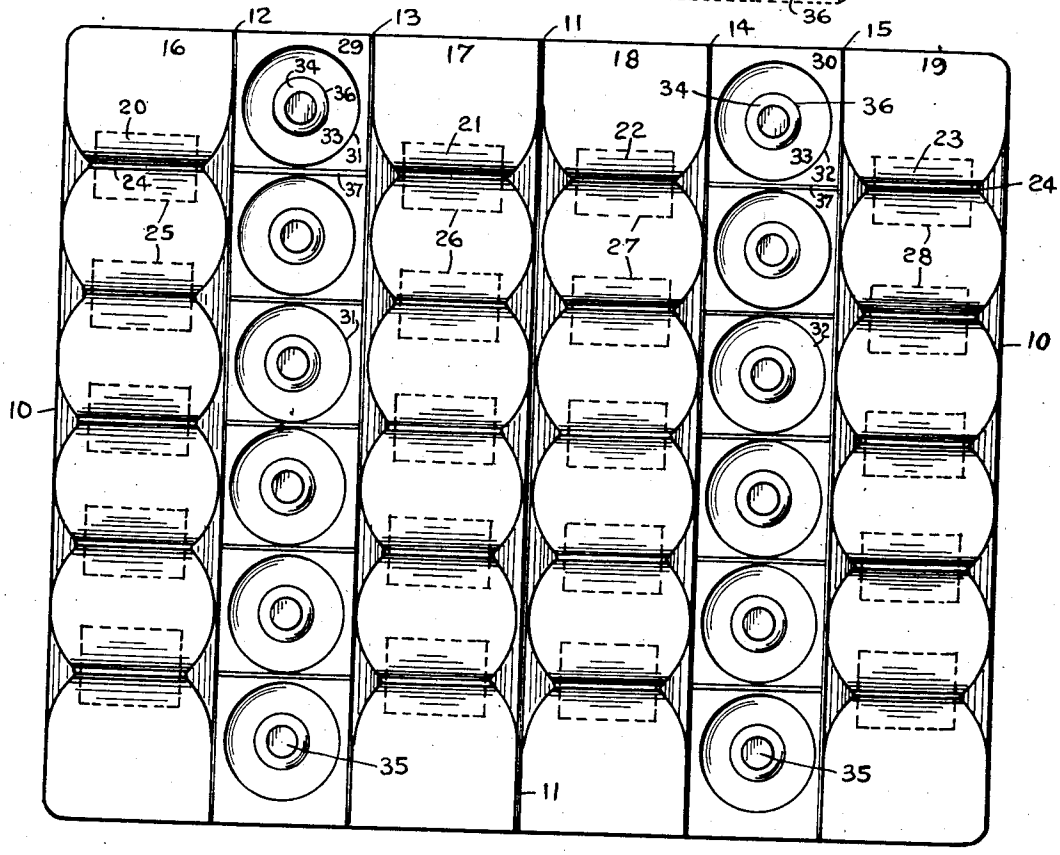


Fig. 2

Inventor
Morris Koppelman
By his Attorney S. J. Cox.

Aug. 14, 1934. M. KOPPELMAN 1,969,802

PACKING HOLDER FOR FRAGILE ARTICLES

Filed Oct. 1, 1928 3 Sheets-Sheet 2

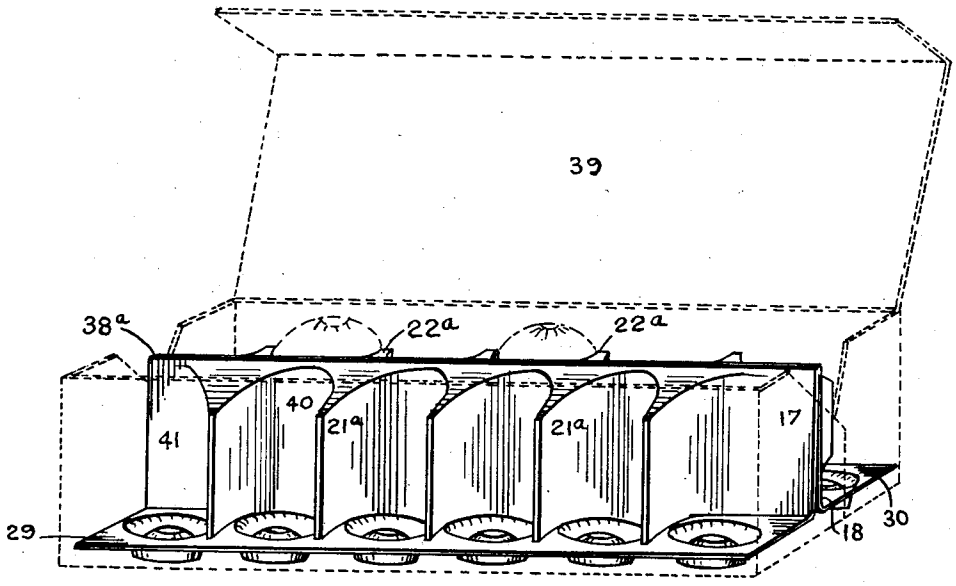


Fig. 3

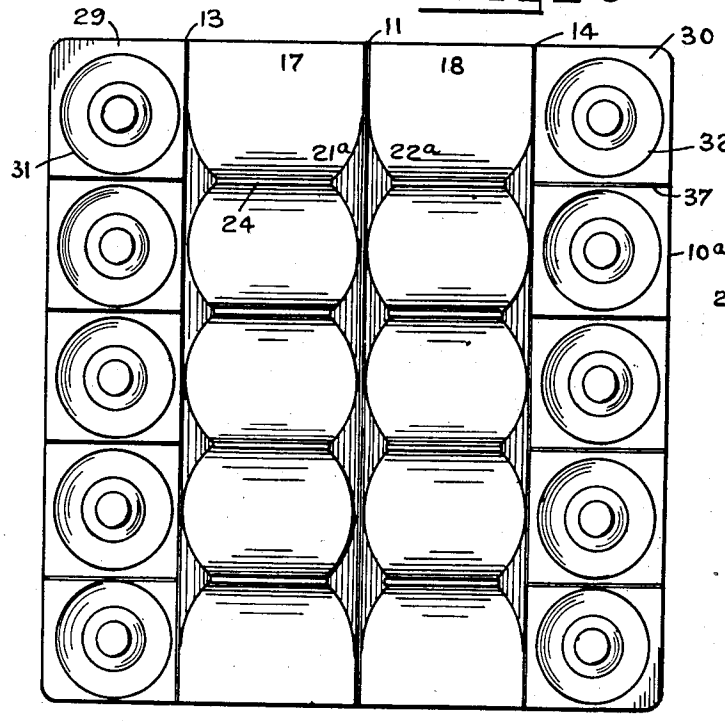


Fig. 4

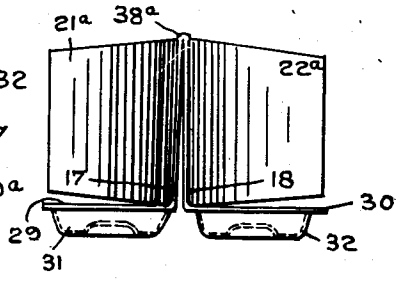


Fig. 5

Inventor
Morris Koppelman
By his Attorney S. J. Cox.

Aug. 14, 1934. M. KOPPELMAN 1,969,802

PACKING HOLDER FOR FRAGILE ARTICLES

Filed Oct. 1, 1928 3 Sheets-Sheet 3

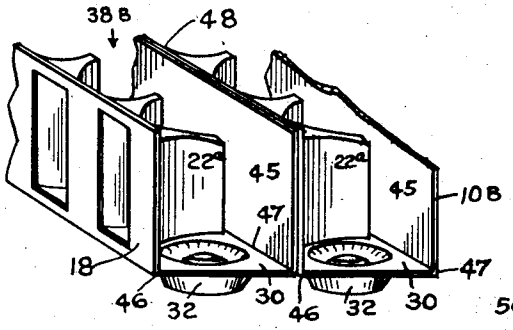


Fig. 6

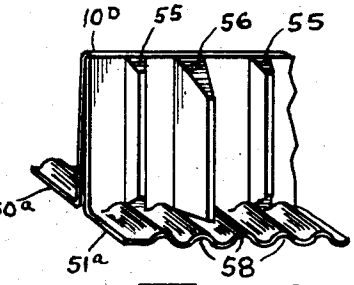


Fig. 9

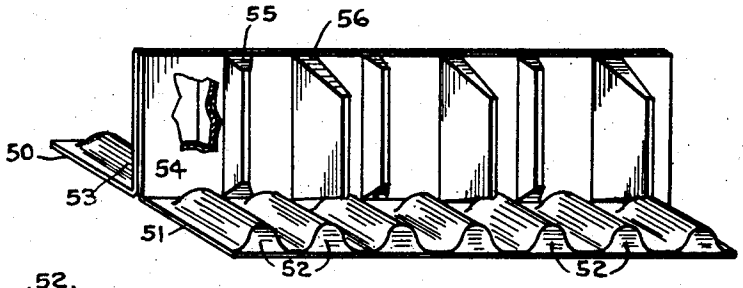


Fig. 7

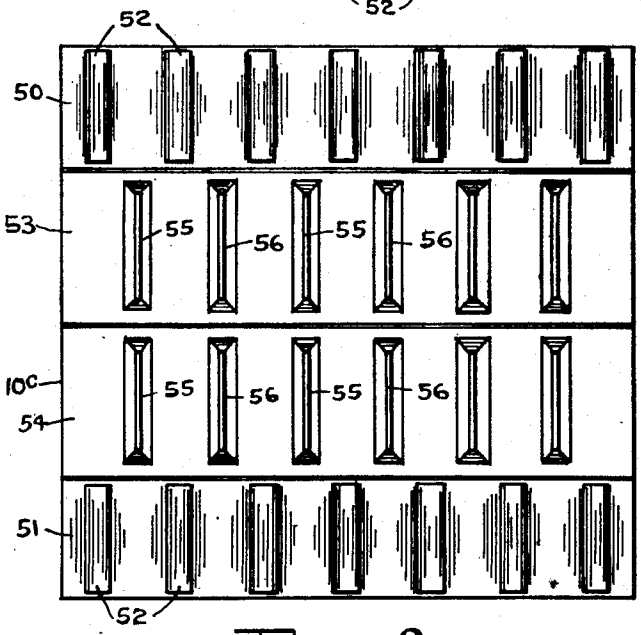


Fig. 8

Inventor
Morris Koppelman
By his Attorney
S. J. Cox.

Patented Aug. 14, 1934 1,969,802

UNITED STATES PATENT OFFICE

1,969,802

PACKING HOLDER FOR FRAGILE ARTICLES

Morris Koppelman, Brooklyn, N. Y., assignor, by mesne assignments, to Packing Products Corporation, a corporation of Delaware

Application October 1, 1928, Serial No. 309,637

4 Claims. (Cl. 217—26.5)

The present improvements relate to packing holders for fragile articles such as fruits, eggs, frail vegetables, incandescent bulbs, radio tubes, bottles and other similar glass or ceramic articles and fragile containers, and their primary objects, among others, are the production of a packing holder adapted to be used in cardboard or other cartons or containers.

A further object is to provide a novel holder for fragile articles embodying features of merit desirable in the trade, not heretofore attained. Another object is to provide a unitary holder adapted for use in cartons or other containers whereby the operations and parts necessary for packing same are reduced to a minimum. Economy of labor is thus attained without sacrificing well recognized requirements of the trade, and at the same time increasing the efficiency of the packing and facilitating the dispensing, carrying and handling of the packed articles.

A still further object is the production of a novel article of manufacture of highly efficient form in such manner and of such material, that the strength, durability, cushioning effect and usefulness of the holder is increased and the cost of production decreased.

In practicing the present improvements, the holder is preferably made of light weight material such as heavy paper, cardboard, rubber or other yieldable non-metallic material. Projections or bulged areas are preferably formed in a sheet of such material simultaneously with the formation of the sheet. The formation of the sheets and the projecting portions, although preferably accomplished by one and the same process, may be practiced by first forming a flat sheet and subsequently forming the projections therein. Any other suitable method may be employed for producing a sheet of this character.

In forming the sheet and projecting portions thereof, wood pulp, cellulose or other fibrous material is employed, the fibres being first placed in a liquid bath. Macerated paper, thoroughly disintegrated and mixed with water until it has the consistency of thick soup may be employed, as may other similar materials. The formation of the sheets may then be accomplished by molding or felting by means of suitable dies or molds, whereby a sheet of relatively yieldable material results, with the aforementioned projections therein, all consisting of intimately matted fibres. If desired, and particularly where the nature of the fibre employed renders it advisable, a hardening substance such as Portland cement may be added to the bath in quantity sufficient to secure the desired result, but this is not necessary or essential.

The advantages of the present improvements will be further set forth in connection with the accompanying description of the invention and drawings in which—

Fig. 1 is a perspective view of an open carton in outline, illustrating a holder embodying one form of the present improvements disposed therein, parts being broken away for convenience in illustration;

Fig. 2 is a plan view of the holder of Fig. 1, showing same in sheet form and unfolded;

Fig. 3 is a view similar to that of Fig. 1, showing a modified form of holder;

Fig. 4 is a plan view of the holder of Fig. 3 showing same in sheet form and unfolded;

Fig. 5 is an end elevation of the form of holder illustrated in Fig. 3, showing the upstanding portions slightly separated;

Fig. 6 is a perspective of part of a modified form of holder, parts being broken off;

Fig. 7 is a perspective of a modified form;

Fig. 8 is a plan view of the holder of Fig. 7, showing same in sheet form and unfolded;

Fig. 9 is a fragmentary view of still another modified form of holder.

Referring to the drawings, the sheets illustrated therein are preferably formed of relatively yieldable unfinished fibrous material and may be formed in the following manner. Forms for shaping the sheets are made of fine wire mesh or foraminous sheet metal, said forms being provided with bulged areas or protruding portions where desired for producing the sheets illustrated in Figs. 1 to 6, or with suitable corrugations for producing sheets as illustrated in Figs. 7 to 9. The forms are mounted for immersion in a tank or tub containing a liquid composed of water and loose fibres, preferably cellulose or other suitable vegetable fibre suspended therein so as to give the bath the consistency of a thick soup. The forms may be mounted on a drum or other means for dipping same in the bath and are provided with suitably positioned suction pipes so that as the forms pass through the bath, the water will be drawn through the foraminous forms, and said forms will receive, on the side thereof opposite the pipes, a coating of fibres or "pulp", depending for its thickness on the thickness of the bath or "soup", the length of time the form is in the bath and the degree of suction. Other suction pipes may be located above the bath and particularly opposite the compression dies, to draw air through the layer of fibrous material on the forms and remove excess

water and also to hold the same tightly against the forms. Assuming that the form used in the process so far described, has projections representing suitable bulged areas, it is apparent that the form will have deposited on the exterior thereof the loose floating fibrous material so that a sheet or coating conforming to the said form, and as illustrated in Figs. 1 to 6, is applied thereto. The form with the sheet thereon is then withdrawn from the bath, subjected to the pressure of a former so that the sheet will have a comparatively smooth surface and be fairly compact, whence the sheet is removed from the form by suitable means, such as compressed air, projected against the underside of the form and through it against the underside of the formed sheet. As the sheet is still in a wet condition it is passed through any suitable type of drier. Obviously a sheet of the character illustrated in Figs. 7 to 9 may be formed in a similar manner by employing appropriate foraminous forms.

If desired, the sheets may be formed flat in the bath, that is, a plane foraminous form without protruding portions may be employed, whereby a substantially even sheet is produced on the form. The bulged areas, may then be pressed into the sheet while wet, by means of suitable dies and then permitted to dry in that state. Either of the processes so far described may be practiced in producing the non-planiform sheet illustrated in the drawings.

The above described method of preparing sheets is of vital importance in some forms of the present improvements. The loose fibres floating in the bath through which the forms are passed are relatively short and obviously infinite in number. Upon being sucked against the form, these short fibres become felted or matted together in over-lapping, inter-engaging and superposed relation with slight regard for organized arrangement. If an enlarged cross section of such a sheet could be viewed, an infinite number of these short fibres would be seen felted together with an infinite number of minute spaces between the fibres. Where the bulged areas or projections are produced initially in the sheet by the configuration of the form itself, the sheet is caused to be dried with the fibres in the aforementioned matted relation with the minute spaces therebetween. However, where the sheet is initially made flat, the bulged areas or projections are afterward formed in the sheet while wet and then permitted to dry in that form with the fibres similarly matted and with minute spaces therebetween, as is apparent.

By reason of the above described texture of the sheet, the dried fibres will form a relatively rigid sheet but at the same time will give to the sheet an inherent elasticity. Therefore this method of making the sheet insures proper and accurate form when dry and the preservation of that form in use since any pressure on the sheet or any part thereof will tend to move its fibres from their normal position and will be constantly resisted thereby, to the end that all the parts of the sheet will always have a tendency to return to their original position, which causes them to exert a counter pressure when slightly pressed or drawn therefrom.

Accordingly the entire sheet and the elements thus formed therein, have great strength and will preserve their shapes under ordinary conditions of use and when unfolded or folded, as hereinafter described, to form the holder, a great amount of inherent elasticity is found to be present therein.

Referring more particularly to Figs. 1 and 2, a sheet 10 is illustrated in plan in Fig. 2, said sheet being formed as above described. Substantially centrally of the sheet is provided a scored or fold line 11, and similar fold lines 12, 13, 14 and 15 are provided in the sheet spaced from line 11 and substantially parallel thereto, whereby the sheet is divided into a plurality of portions. As illustrated the portions 16, 17, 18 and 19 are provided with a plurality of spaced laterally projecting members 20, 21, 22 and 23 respectively, which members constitute spacing means or partitions as well as cushion members as hereinafter noted. These members 20 to 23 are formed in the sheet and integral therewith, during the manufacturing process and therefore are of the same texture as the sheet itself, namely an intimately matted mass of short pulp fibres.

The members 20 to 23 may be prismatic in form, and are preferably of that general shape except that their six surfaces (omitting reference to the base) curve away gradually from the ridge 24 of the prism to the base and merge either with the contiguous sheet portion or the contiguous quasi-prismatic member. Obviously, the formation of the sheet 10 with the portions 16 to 19 therein, the latter having the above described members 20 to 23, causes the under or opposite side of the sheet to have apertures 25, 26, 27 and 28 therein, whereby the laterally projecting members 20 to 23 are hollow and define air pockets or buffers as later described.

The portions 29, 30 of the sheet 10, interposing the portions 16 to 19, as illustrated, constitute bases or supporting means. Said portions 29 and 30 are provided with spaced cushion means 31 and 32. Each such cushion member comprises a truncated bowl shaped portion 33 and an inverted truncated bowl shaped portion 34, the latter having a flat top 35. The ring 36 formed at the juncture of the portions 33 and 34 affords a supporting surface for the sheet. The cushion means 31 and 32 are also formed in the sheet 10 and integral therewith during the manufacturing process and therefore are of the same texture as the sheet, namely an intimately matted mass of short pulp fibres. Intermediate the cushion means 31 and 32 are transverse grooves 37 formed in the sheet.

It is apparent from the foregoing description that the sheets 10 may be stacked one upon another in nested relation, when in the unfolded form illustrated in Fig. 2. Obviously the protruding portions of the superposed sheet will nest in the complementary portions of the adjacent sheets, and ad infinitum, thereby facilitating shipment and storage of the sheets in unfolded position.

In use, the sheet 10 is folded along its fold lines thereby disposing portions 17 and 18, back to back, portions 29 and 30 being disposed horizontally and portions 16 and 19 being upstanding all as illustrated in Fig. 1. The holder 38 thus resulting, may be placed in a carton 39. It is notable that the laterally projecting member 20 to 23 are so positioned on the sheet and of such extent as to substantially meet or contact each other at their ridges 24. This result is seen in Fig. 1, wherein compartments 40 are formed between such members, and compartments 41 are formed between such members and the end walls of the carton.

Each of these compartments or cells has a cushioned base provided by the members 31 and 32. It is notable also that the curvature of the members 20 to 23, in the folded position, conforms

generally to that of the cushion members as well as to the surface of the base portions wherein grooves 37 are disposed. It is thus seen that upon folding the sheet 10, as illustrated a plurality of compartments for fragile articles are formed each having a cushion support at the base and surrounding walls of relatively yieldable material. Each article is thus separated from its neighbor and well cushioned by the surrounding portions. Several peaches are shown in outline in Fig. 3 to illustrate the relation.

The entire holder 38 due to its texture and configuration tends to resist pressure and shocks from all directions but will yieldingly give under strains, returning to its original shape after release thereof. The spacing members 20 to 23 and the cushion members 31 and 32, function to cushion the articles and yieldingly protect same, due not only to the texture of the walls thereof, but also to their shape and the air pockets formed thereby. The articles seat on the flat top 35 of the bowls 34 of each cushion member and depending upon the shape of the article, may be further cushioned by the peripheral base of bowl 33. Regardless of the shape of the article packed, however, the parts 33, 34 and 35 cooperate and contribute to cushion such article. The efficacy of the air cushions present in the hollow separating members 20 to 23 cannot be overemphasized, and it is notable that when portions 17 and 18 are back to back, juxtaposed members 21 and 22 provide larger air chambers along the center of the holder 38. Furthermore the entire sheet 10, due to its texture, serves in a cushioning relation, because when in the folded position (Fig. 1) the intimately matted fibres are distorted at the fold lines 11 to 15, and constantly tend to return the sheet to its flat form, resisting the folding operations. This spring or inherent elasticity is shown in Fig. 5 in connection with a modified form.

Referring to the modified form illustrated in Figs. 3 to 5 the sheet 10^a is formed similarly to that just described except that the portions 16 and 19 are omitted. The central fold line 11 is flanked by portions 17 and 18 and the latter have contiguous portions 29 and 30. While portions 29 and 30 have cushion means 31 and 32 similar in form to those previously described, the portions 17 and 18 are provided with laterally projecting spacing members 21^a and 22^a which extend outwardly from the sheet a greater distance than members 21 and 22. While members 21^a and 22^a are of the same general shape as their complements in Fig. 1, it will be seen upon inspection of Figs. 3 and 5 that said members, when sheet 10^a is folded, project between the cushion means to points substantially in the vertical planes passing through the edges of portions 29 and 30.

In use, the sheet 10^a is folded along line 11, causing portions 17 and 18 to be back to back, whereupon portions 29 and 30 are folded along lines 13 and 14 respectively, to assume the horizontal positions shown in Figs. 3 and 5. The holder 38^a is then inserted in the carton 39. The functions, texture, shape, etc. of holder 38^a are the same as that set forth in detail with respect to the form first described, the only exception being, of course, that each laterally projecting member 21^a and 22^a, of itself, serves as a separating and cushioning member for the packed articles, by reason of the fact that they extend from the upstanding central walls 17 and 18, over to approximately the edges of the horizontally disposed portions 29 and 30. In this form also the air cushions formed by the juxtaposed hollow members 21^a and 22^a are provided between each article as well as along the center of the holder 38^a.

The yieldable and resilient characteristics of the holder as a whole is partially illustrated in Fig. 5 where portions 17 and 18 are shown as slightly diverging, due to the resistance of the sheet to the folding operation. This feature provides a yieldable or elastic effect transversely of the holder, and is present and may be taken advantage of in all embodiments of the invention, although where the encasing carton or other receptable does not admit of such spreading of the parts, they may be placed together as in Fig. 3.

In the form illustrated in Fig. 6, the sheet 10^B is formed and adapted for use in cartons or other packing boxes or containers of greater capacity and are preferably employed for use in the latter due to the adaptability of their manufacture in a continuous sheet of any size. Only a fragment of such sheet is illustrated but it is understood that same may be made up with an infinite number of portions, which latter may extend to provide an infinite number of article compartments, thereby providing a continuous holder limited only by the dimensions of the packing container in which it is planned to be employed.

The sheet 10^B is formed with a sequence of portions, viz., 18, 30 and 45, which sequence may be repeated ad infinitum in the sheet. The portions 18 and 30 are similar to their complements in Figs. 3 to 5, having the members 22^a projecting to the edge of portion 30, which latter portion is provided with the cushion means 32. Portion 45 has a relatively smooth surface, as illustrated.

In use, the sheet 10^B is folded along lines 46, 47 and 48 to the form illustrated, whereby each sequence of portions (18, 30 and 45) provides a holder 38^B. The functions, shape and efficiency of this form are similar to those ascribed to previously described forms. Obviously the air cushions, separating means and cushion means are all present in this form and it is apparent that the arrangement of the portions in repeated sequence indefinitely throughout the sheet provides a series of compartments for fragile articles which may be quickly folded and applied for use.

It is notable with respect to the form in Fig. 6, that layers of articles may be packed in cartons or other boxes, without any other separate elements common in the trade. This is obvious, when it is realized that the upstanding walls 18, and 45 of one tier are supported by complementary portions of the tier thereunder, and this is true whether the contiguous tiers are built up with the walls of the superposed tiers vertically aligned or alternately criss-crossed. With either arrangement, the under surfaces of the bottom portions 30, with their bowl shaped cushions fit over and cushion the articles of the subposed tier.

The general form of the sheet 10^C, illustrated in Figs. 7 and 8 is similar to that of Figs. 3 to 5. However, in this form the cushion members are provided by forming portions 50 and 51 with corrugations 52 of substantially equal height, while portions 53 and 54 are provided with corrugations 55 and 56, alternately short and long as illustrated. Every two corrugations 52 serve as a cushion support for an article, while the longer corrugations 56, when the sheet is folded, interpose such pairs of corrugations 52 and serve as laterally extending members, functioning in the same manner, as members 21, 22, 21^a and 22^a

previously described. The shorter corrugations 55 serve to brace, cushion and maintain the articles erect. The folding, use and functions of this form are apparent in view of the detailed explanation with respect to other forms.

In Fig. 9, the sheet 10^D is formed similarly to that of Figs. 7 and 8 except that the horizontally disposed cushioning portions 50^a and 51^a are provided with a plurality of small corrugations 58 whereby to afford cushion means upon which the packed articles may rest. The folding, use and functions of this form are apparent in view of the detailed explanation with respect to other forms.

The advantages and efficiency of the present improvements are apparent. Primarily the sheets and resulting holders may be manufactured in any size depending upon the contemplated use which of course is governed by the size of the articles to be packed. Furthermore, the sheets in all the forms illustrated, need not be limited in the number of rows of cushion means and partitions shown, but the rows may be continued and multiplied as desired.

A further feature of marked importance resides in the facility of manufacture, since a single sheet may be made, which provides in one operation, integral cushion rows and rows with separating partitions, thereby eliminating the several manufacturing operations necessary in forming the separate packing elements common in the trade. Furthermore, the packing operation is facilitated, with the attendant economy of labor, due to the fact that but one sheet need be handled in fabricating the compartments or cells, thereby eliminating the trouble, time and movements the packer exercises in setting up the separate elements of all known types.

A further advantage is apparent in the facility and speed with which the sheets herein described may be folded to form a complete holder. This ease of assembly cannot be over-estimated and permits speedy insertion in the enclosing carton or box. If desired the holders themselves may be utilized without the surrounding carton or box, for purposes of displaying the articles on sale, or for carriage thereof by the ultimate consumer.

It is notable that the present improvements may be embodied in sheets for forming holders, wherein the material of which the sheets are made is other than that specifically described, for example cardboard, or other similar material may be employed, and the fold lines, cushion means and spacing elements etc., may be provided therein in any desired form or manner.

Various other advantages as well as modifications within the scope of the present improvements, will occur to those skilled in the art. Such modifications as come within the purview of the invention are covered by the appended claims. For example, any desired form of cushion and separating means may be substituted for those illustrated, and other sequences of rows may be designed without departing from the scope and spirit of the invention.

I claim.

1. A foldable holder for fragile articles comprising a sheet of material divided by transverse fold lines, said lines dividing the sheet into sections adapted upon folding to provide upstanding wall sections and horizontal base sections, said wall sections having laterally extending spaced partition means projecting, when folded, over the horizontal base sections, said base sections having a flat upper surface thereby presenting an uninterrupted plane surface for accommodating said partition means, said partition means extending the full height of the walls and substantially contacting the horizontal base sections.

2. A foldable holder for fragile articles comprising a sheet of material divided by transverse fold lines, said lines dividing the sheet into sections adapted upon folding to provide upstanding wall sections and horizontal base sections, said wall sections having laterally extending spaced partition means projecting, when folded, over the horizontal base sections, said base sections having a flat upper surface thereby presenting an uninterrupted plane surface for accommodating said partition means said partition means extending the full height of the walls and substantially contacting the horizontal base sections, said base sections having portions depressed beneath the plane thereof for supporting individual fragile articles.

3. A foldable holder for fragile articles for use in cartons comprising a sheet of material having at least three fold lines dividing the sheet into sections adapted for folding to provide walls at least equal in extent to the greatest dimension of the article to be packed, means defining a base along the bottom of each wall for accommodating fragile articles in rows, there being not more than two full-height walls, one disposed along each row, whereby access from one side of the row is afforded, and partition means on said walls extending substantially the width of the row for maintaining the articles of a row from contact.

4. A foldable holder for fragile articles comprising a sheet of material having at least three fold lines dividing the sheet into sections adapted for folding to provide two upstanding walls disposed back to back, means defining a base along the bottom of each wall for supporting fragile articles on either side thereof, said walls having spaced partitions extending laterally substantially the width of the row and cooperating with said base means for defining article cells.

MORRIS KOPPELMAN.