

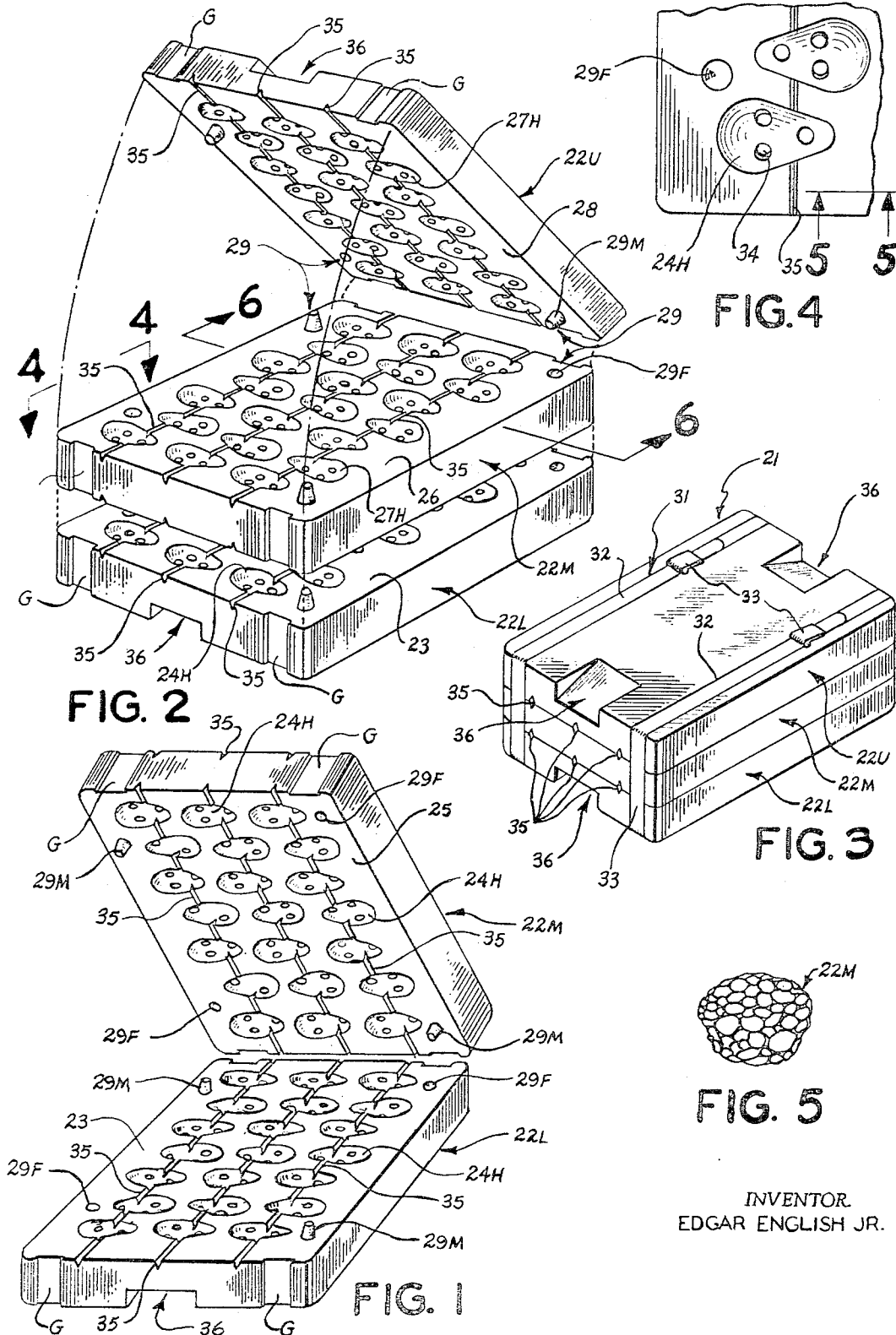
March 28, 1967

E. ENGLISH, JR
PROTECTIVE PACKING APPARATUS, AND FASTENER
MEANS, FOR EASILY DAMAGED OBJECTS

3,311,231

Filed Oct. 18, 1965

4 Sheets-Sheet 1



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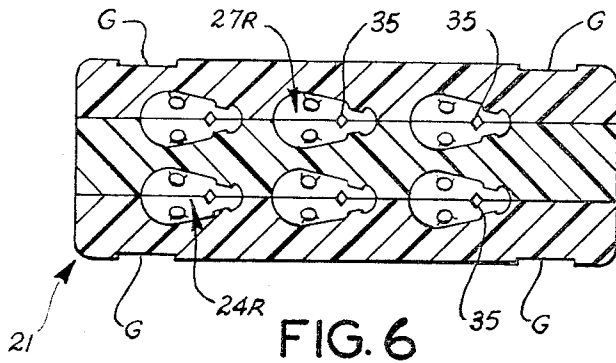


FIG. 6

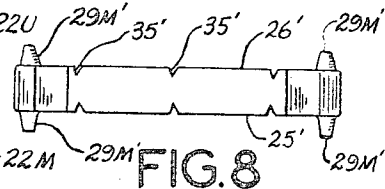


FIG. 8

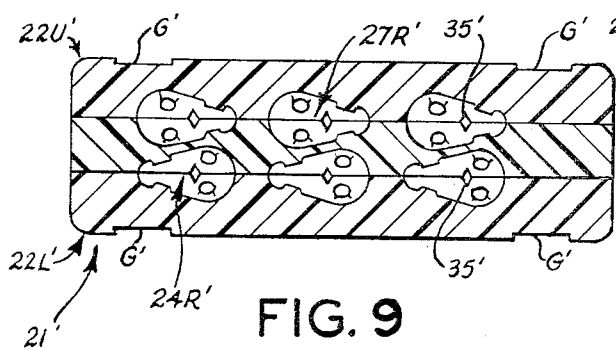


FIG. 9

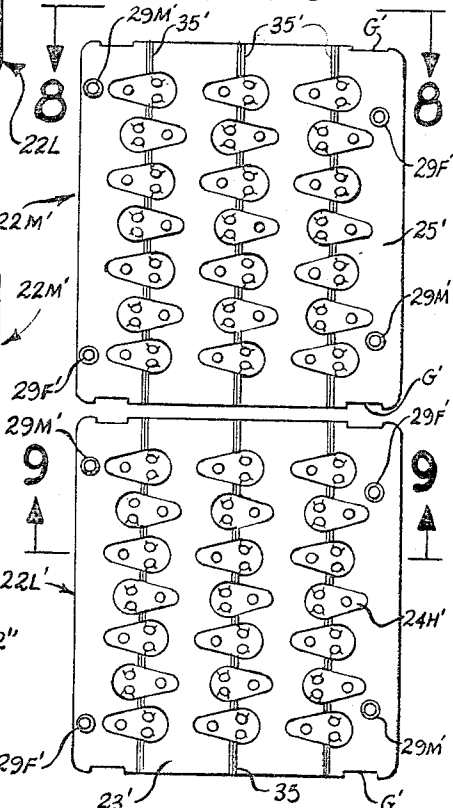


FIG. 7

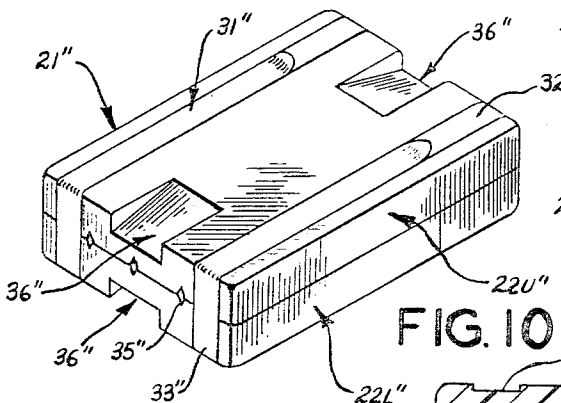


FIG. 10

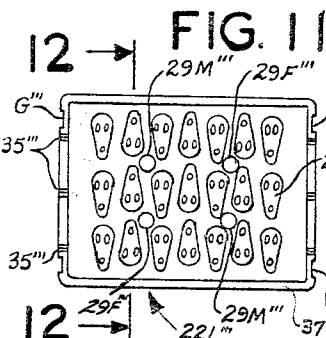


FIG. 11

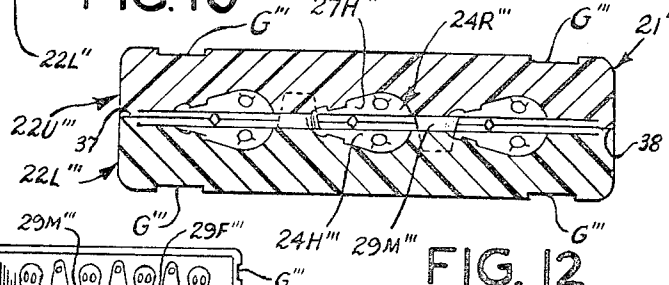


FIG. 12

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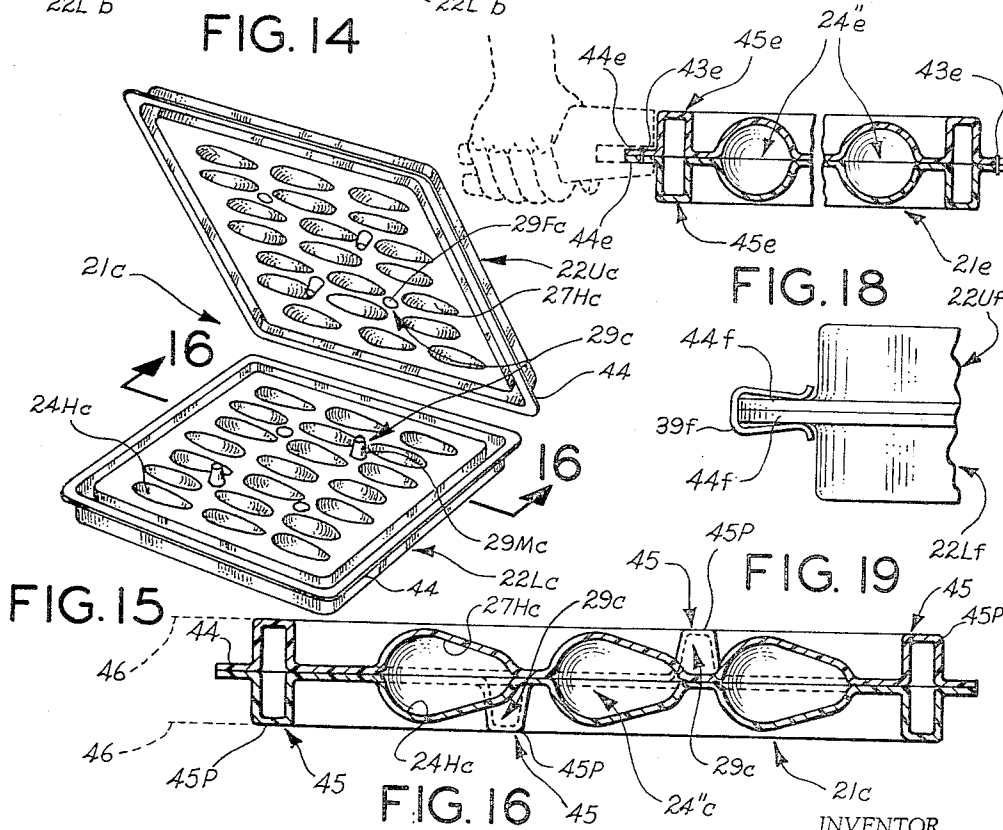
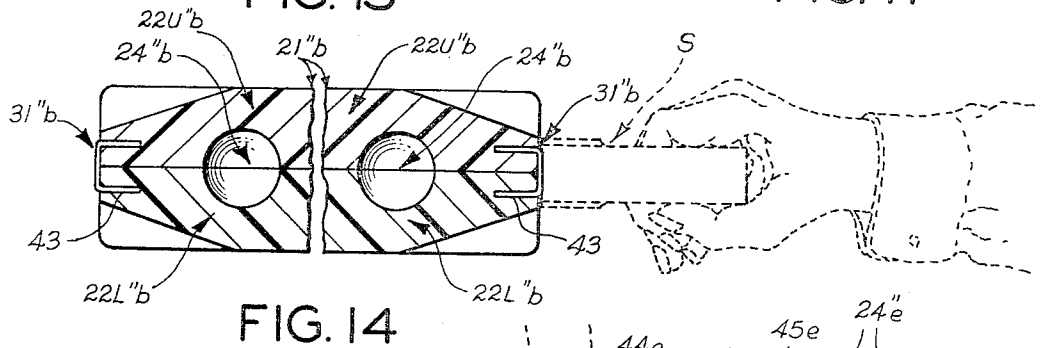
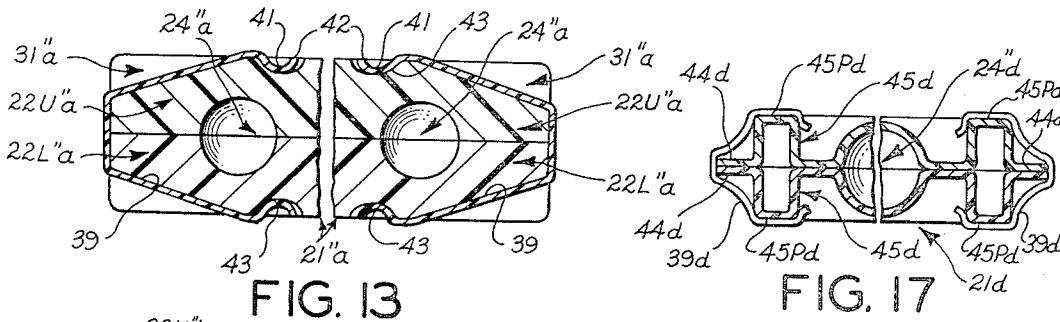
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4 Sheets-Sheet 4

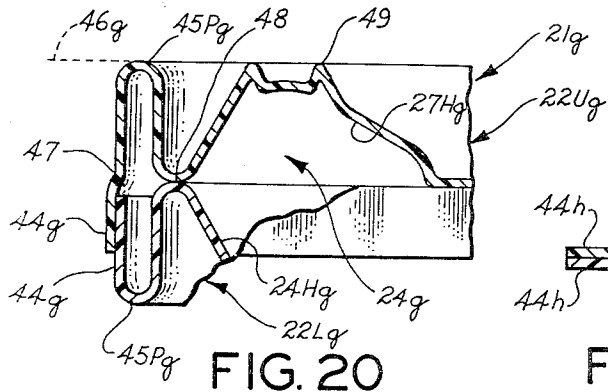


FIG. 20

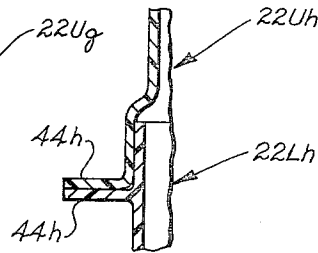


FIG. 21

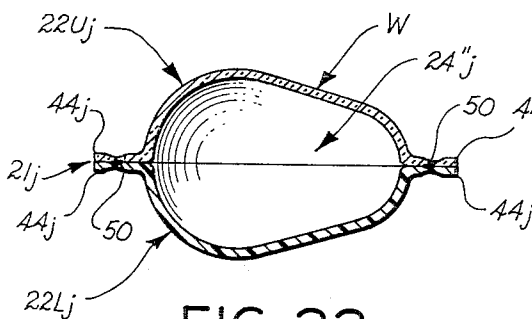


FIG. 22

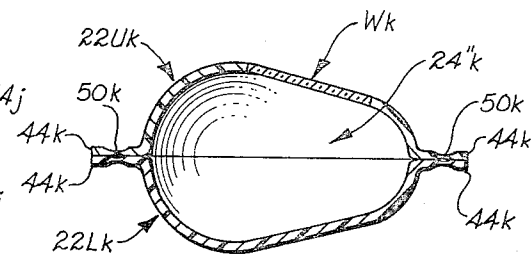


FIG. 23

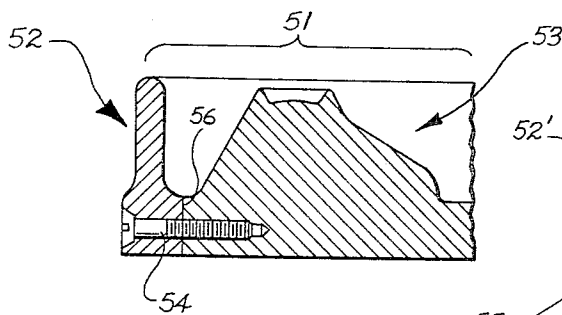


FIG. 24

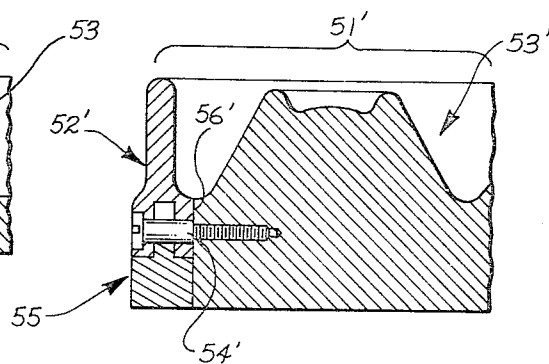


FIG. 25

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PROTECTIVE PACKING APPARATUS, AND FASTENER MEANS, FOR EASILY DAMAGED OBJECTS

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 (% P.O. Box 169, Rosamond, Calif. 93560)
 Filed Oct. 18, 1965, Ser. No. 497,366
 10 Claims. (Cl. 206—65)

This invention comprises a continuation-in-part of my copending patent application Ser. No. 440,846, filed Mar. 18, 1965, and, generally speaking, the present invention relates to the packing and/or packaging art (the two words being used interchangeably herein) and, more particularly, pertains to an improved protective packing and packaging apparatus and means for substantially completely protecting subsequent storage or shipment, and this despite relatively rough handling which may be given to the packaging apparatus or means itself. In other words, the novel apparatus of the present invention acts to very effectively isolate easily damaged objects from undesirable exterior environmental conditions so as to maximize the chances of the objects being in good condition when subsequently removed from the protective packaging apparatus and means of the present invention.

In one application of the present invention, it may be intended for protecting easily damaged objects such as perishable food objects or the like, although the invention is not specifically so limited in all forms thereof. In this particular application of the invention it will be found that the packaging of fruits and vegetables for shipment from a packing house or the like to a point of ultimate sale and utilization thereof normally requires that the food objects travel a very substantial distance, which requires a considerable period of time. It is during this period of time that the food objects may be very easily injured or damaged by bruising, crushing, or the like, during the multiple handling thereof which is required in first loading a truck or railroad car with the food objects (usually in various different types of prior art containers) and then in subsequently removing same from the truck or railroad car when a desired destination is reached. Sometimes this multiple handling occurs several times before a final destination is reached and this greatly increases the chances of the easily bruised or crushed food objects being injured to a degree such that when they are finally ready for display and sale to a retail purchaser, severe bruises or the like, or other visibly observable damage may have occurred to the food objects, which will render them virtually unsalable.

Some degree of deterioration-minimization is now accomplished with respect to such food objects by refrigerating the vehicles transporting same. However, this only slows down rotting, bruising, and crushing damage because of the fact that lowered temperatures slow down the rate of natural decay and decomposition processes.

However, the damage caused by bruising and crushing, which results from lack of physical protection for the easily damaged food objects, can only be provided by the type of packaging employed, and at the present time prior art packaging has serious disadvantages which may be roughly said to fall into two different categories as briefly described hereinbelow.

First, there is the type of prior art packaging for such easily damaged food objects which consists of very sturdy, structurally strong, outer containers often provided with compressible padding or filler material of one kind or another therein around each of a plurality of easily damaged food objects. In some cases, inner structural reinforcing at various locations and/or levels throughout such a structurally strong outer container of fairly substantial size

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may be provided. Packaging and containers in this category may be said to be reasonably effective for protecting such perishable food objects, or the like, from crushing and bruising but are quite expensive and, additionally, cannot be reused very many times without substantial breakage and, therefore, substantial replacement of major portions thereof, which further adds to the over-all cost of this type package or container.

The second category of the prior art containers and packages for perishable food objects referred to above may be said to be relatively inexpensive but to be also very ineffective from the standpoint of adequately protecting such perishable food objects from bruising and crushing injuries or the like. This category includes containers such as bags, and the like, large volume relatively non-stiff containers of various kinds, bulk shipment, and, in general, arrangements wherein the perishable food objects are not encased in a rigid structurally strong manner by a very highly protective outer container or package which will very substantially isolate the inner perishable food objects from all exterior impact and loading forces which the container may receive.

The novel protective packaging apparatus and means of the present invention substantially completely eliminates and overcomes the disadvantages of both of the above-mentioned prior art types of packaging and container arrangements for such perishable food objects. In other words, the novel packaging apparatus and means of the present invention provides very positive and highly effective protection from crushing, bruising, or the like, for such perishable food objects in a manner even superior to the first above-mentioned prior art type of packages and containers and yet does so in a manner which is extremely inexpensive.

With the above points in mind, it is an object of the present invention to provide novel protective packaging apparatus and/or means for one or more easily damaged objects and adapted to very positively isolate said one or more objects from exterior environmental conditions, with particular reference to exterior impact and loading forces applied to the packaging apparatus and also with respect to vibratory forces applied thereto.

It is a further object of the present invention to provide packing apparatus and means of the character referred to in the preceding object which additionally includes compressible pad means (at least two and, in certain cases, a substantially greater number thereof) which are placed in aligned registration and fastened in said relationship with the easily damaged objects, or perishable food objects, positioned between said compressible pad means in mating half recess portions, thus effectively isolating and separating each easily damaged object of a plurality thereof from each other and, in one preferred exemplary form, being of a nature such as to provide a large amount of hysteretic losses and, therefore, optimum damping for the minimization of any possible vibration-caused damage to said easily damaged objects positioned therein.

It is a further object of the present invention to provide packing apparatus and/or means of the character referred to above, wherein the compressible pad means are formed of expanded-cell foam type material which not only comprises a very effective vibration isolator and shock damage preventer but which may also provide, in those forms of the invention where such is desired, high-efficiency thermal insulating means whereby to provide thermal isolation in addition to mechanical isolation to said easily damaged objects.

It is a further object of the present invention to provide packaging apparatus and means of the character referred to above, intended primarily for packaging and

protecting from deleterious environmental conditions easily damaged objects comprising perishable food objects or the like.

It is a further object of the present invention to provide apparatus of the character referred to in the preceding object, provided with appropriately positioned ventilation aperture means for facilitating heat transfer and/or ventilation for use in packaging those forms of perishable food objects wherein decay will be minimized by an initial quick chilling and/or a measure of ventilation.

It is a further object to provide apparatus of the character referred to hereinabove which is provided with fastening and locking means for effective fastening of the compressible pad means together in aligned registration relationship with respect to each other with the mating recess means portions in aligned opposed recess means-defining relationship.

It is a further object of the present invention to provide apparatus of the character referred to in the preceding object wherein the fastening and locking means comprises tensile member fastening and locking means, such as belt and buckle members, tape members, and various functional equivalents thereof adapted to be placed in surrounding and encompassing relationship with respect to the plurality of compressible pad means comprising the container means.

It is a further object of the present invention to provide apparatus of the character referred to in the preceding object wherein said fastening and locking means comprises resilient clip means adapted to resiliently and controllably removably slip over and engage opposite outside exterior surface portions of the plurality of compressible pad means comprising said container means.

It is a further object of the present invention to provide apparatus of the character referred to in the third preceding object wherein said fastening and locking means comprises a plurality of staple members firmly engaging and effectively interconnecting opposite adjacent edge portions of said plurality of compressible pad means comprising said container means.

It is a further object of the present invention to provide apparatus of the character referred to herein wherein each of the compressible pad means is vacuum formed of compressible expanded-cell type of foam material into a configuration having a surrounding edge flange lying on what may be considered as substantially a medial plane when joined to the surrounding edge flange of an adjacent similar but positionally reversed compressible pad means; said vacuum formed compressible pad means having both exteriorly and interiorly formed portions comprising and defining said plurality of recess means portions and also having exterior contact surface means effectively defining portions of a flat contact surface plane adapted to contact either an auxiliary supporting surface such as an underlying floor or the like or adapted to contact corresponding contact surface means of an adjacent container means either positioned thereunder or thereover.

It is a further object of the present invention to provide apparatus of the character referred to in the preceding object including positioning means normally engaging corresponding portions of the opposite compressible pad means (and, in certain cases, engaging each other) for mounting each of said compressible pad means in properly positioned and, in certain cases, properly supported relationship with respect to each other when in said aligned registration relationship with all of said mating recess means portions in said opposed recess means-defining relationship.

It is a further object of the present invention to provide apparatus of the character referred to in the second preceding object wherein the surrounding edge flange referred to therein may effectively comprise merely an edge which does not extend horizontally in said substantially medial plane to an extent greater than the wall

thickness thereof and, furthermore, in certain forms of the invention the two vertically adjacent compressible pad means may have surrounding edge flange means of an effectively male and female type adapted to mate vertically by having said surrounding edge flange means of one of said compressible pad means portions vertically insert into the closely outwardly adjacent and oppositely vertically directed surrounding edge flange means of the other of said pair of mating compressible pad means to an extent limited by an interior stop, abutment, or shoulder means.

It is a further object of the present invention to provide packaging apparatus of the character referred to herein wherein each pair of vertically adjacent mating compressible pad means may define only one recess means (or a small number of interior recess means) each adapted to carry a perishable food object or other easily damaged object therein and, in certain versions of this form of the invention, one or both of said compressible pad means (or appropriate viewing portions thereof) may be made of a light-transmissive plastic material so that a prospective purchaser or user of the protected perishable food object or other article within the protective packaging apparatus may view same from the exterior of the packaging apparatus prior to opening same, thus making it possible to evaluate the condition of the object and whether or not the prospective purchaser or user finds the condition of the object satisfactory for purchase and/or use. Said light-transmissive upper or lower compressible pad means may still be of foam material, although this tends to interfere with the viewing of the protected food objects and, in some cases, this slight disadvantage may be overcome by having just a portion vertically adjacent to the corresponding interior recess or recess means of the upper or lower compressible pad means provided with a non-foamed portion of transparent material whereby to form what might be termed one or more viewing windows for viewing the protected interiorly contained food object or objects. In other versions of this form of the invention, it may be that the lower compressible pad means may be made of the foamed plastic material while the upper one may be of non-foamed transparent plastic material of sufficient rigidity so as to still provide substantial protection for the interiorly contained food object, or plurality of food objects, while still allowing perfect visibility thereof through the transparent top pad means (which, incidentally, in this form of the invention is not as compressible as the lower pad means). Of course, this form of the invention may also be applied to various different types of easily damaged objects other than perishable food objects but which are of any type requiring such protection prior to sale and/or use thereof.

It is a further object of the present invention to provide apparatus of the character referred to in the preceding object in particular (but the hereinbelow-described feature may also be applied to any of the other forms of the invention) wherein the surrounding edge flange or edge portion of the mating compressible pad means may be effectively hermetically sealed. In the case of easily damaged food objects, this may be for preventing deterioration of same within the packaging means, and this may be further enhanced by sterilization of the food object or objects and the container in any suitable manner so that the food object or objects contained within the hermetically edge-sealed packaging means will remain in perfect condition for long periods of time and will not begin to deteriorate until the packaging means is opened. Since the packaging means is preferably made of an expanded-cell type of foam material, such a hermetically sealed form of the packaging means normally requires that the expanded-cell type of foam material have a sealed surface or "skin" which is impervious to the passage of decay-causing organisms therethrough, and this type of packaging means adapted to be hermetically sealed and sterilized requires that the plastic material either be made of a high-tem-

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perature-resistant plastic material, if the sterilization is to be accomplished by heat, or that it be made of a chemical-resistant plastic material, in case the sterilization is to be accomplished chemically. However, it should be noted that sterilization by subjecting the packaging means and/or the perishable food objects to electrostatic fields and/or to radiation does not affect in an undesirable way most types of foam plastic materials generally available and this is also true of sterilization through the use of antibiotic additive agents, such as various molds and/or mold extracts of the penicillin or the like types; or various other sterilization means may be employed. Incidentally, it should be noted that the edge sealing may be by adhesive means, cohesive means, mechanical fastening means, or the like. However, one effective form of edge sealing of vertically adjacent compressible pad means may be provided by heat sealing the plastic material by conventional heat sealing means. Of course, this version of the invention may protect easily damaged objects other than perishable food objects, such as objects which require protection from moisture, oxygen, or any other contaminants prior to use.

It is a further object to provide means and method for manufacturing packaging apparatus of any of the various types referred to herein and which includes composite molds including an edge mold portion adapted to form and shape the complete surrounding edge portion of the various compressible pad means referred to herein (and which may be of various different lateral, longitudinal, and/or depth dimensions); said composite mold means further including central insert panel mold means adapted to be interchangeably placed within, and in cooperative relationship with respect to, the previously-mentioned edge mold portion for molding a desired central panel portion of the corresponding integral compressible pad means having a desired type, shape, size, and number of recess means half portions formed therein. The edge mold means may be provided with height or depth modifying means for addition thereto for effectively increasing the height of the edge portion of the compressible pad means molded or formed thereby. It will be understood that such a composite mold means makes it possible to produce a great variety of different sizes, shapes, and types of compressible pad means with a minimum mold, die, tooling, and manufacturing cost, insofar as capital investment is concerned and comprises a very flexible manufacturing apparatus and method for producing a great variety of different types, sizes, and versions of the compressible pad means and resulting packaging means of the present invention.

It is a further object to provide packaging apparatus and/or means having the advantages referred to herein and including the features referred to herein, generically and/or specifically, and individually or in combination, and which is of extremely simple inexpensive construction adapted for large scale mass manufacture at very low cost whereby to be conducive to widespread use thereof.

Further objects are implicit in the detailed description which follows hereinafter (which is to be considered as exemplary of, but not specifically limiting, the present invention), and said objects will be apparent to persons skilled in the art after a careful study of the detailed description which follows hereinafter.

For the purpose of clarifying the nature of the present invention, several exemplary embodiments of the invention are illustrated in the hereinbelow-described figures of the accompanying three sheets of drawings and are described in detail hereinafter.

FIG. 1 is a reduced-size, three-dimensional view illustrating the lower compressible pad means and the intervening or middle compressible pad means of one exemplary three-pad form of the invention. The purpose of the open relationship of the bottom and intervening or middle compressible pad means in this view is to clearly show the details of the upper surface of the lower

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compressible pad means and the lower surface of the intervening or middle compressible pad means, and the alignment and registration means, prior to the positioning of perishable food objects, such as avocados, in the mating half recess portions and prior to vertical superimposition of the intervening or middle compressible pad means on the bottom compressible pad means. In other words, this view is a pre-assembly fragmentary view of the complete three-pad form of the invention.

FIG. 2 is a three-dimensional view very similar to FIG. 1, although viewed from a very slightly different vantage point than FIG. 1 and also drawn to a very slightly larger scale than FIG. 1. Additionally, it should be noted that the opened-up intervening or middle compressible pad means of FIG. 1 has now been swung downwardly into a substantially superimposed but very slightly vertically upwardly spaced immediately pre-assembly relationship with respect to the lower compressible pad means and, additionally, the third or upper compressible pad means (not shown in FIG. 1) is shown in FIG. 2 in an opened-up pre-assembly relationship with respect to the top surface of the intervening or middle compressible pad means. This arrangement is for the purpose of clearly disclosing all details of the top surface of the intervening or middle compressible pad means and bottom surface of the upper compressible pad means and the corresponding alignment and registration means prior to being placed in vertically assembled relationship with perishable food objects, such as avocados or the like, in the recess means defined by the mating half recess portions, and in a closed, fastened, and locked relationship such as is shown in FIG. 3.

FIG. 3 is a three-dimensional view, generally similar to FIGS. 1 and 2, but shows the three compressible pad means in fully vertically assembled, fastened, and locked relationship suitable for shipment or storage, usually with the recess means therein carrying corresponding avocados or other perishable food objects, although it is possible that the containers might be shipped or stored empty in the assembled closed relationship shown in FIG. 3.

FIG. 4 is an enlarged, fragmentary top plan view taken generally in the direction of the arrows 4—4 of FIG. 2, and illustrates the interior detail of a representative pair of the mating recess means half portions and of the projecting fingers carried therein which mount the corresponding avocados, or other perishable food objects, in slightly spaced relationship with respect to the walls of the recess means so as to provide an effective air space therearound.

FIG. 5 is a greatly enlarged, fragmentary, cross-sectional view, taken substantially on a representative plane such as is indicated by the arrows 5—5 of FIG. 4, and is merely for the purpose of illustrating the fact that the material of the plurality of compressible pad means preferably comprises a compressible expanded-cell type of foam material, such as polystyrene foam, polyurethane foam, or the like, although not specifically so limited, which is sufficiently rigid to provide positive protection for the interiorly contained easily damaged food objects, such as avocados or the like, and, therefore, may be said to provide effective vibration and shock isolation means and which, in certain forms of the invention (where such is desired), may also effectively comprise high-efficiency thermal insulating means, although not specifically so limited in all forms of the invention.

FIG. 6 is a cross-sectional view of the three vertically assembled compressible pad means of FIG. 2 after vertical superimposition and assembly thereof, but prior to the locking and fastening thereof with tensile member belt means, tape means, or the like, as shown in FIG. 3, and is taken substantially on a plane such as that indicated by the arrows 6—6 of FIG. 2. However, it should be clearly noted that, for purposes of drawing simplification and clarity, no perishable food objects, such

as avocados or the like, are shown in the recess means illustrated in FIG. 6.

FIG. 7 is an opened-up view showing, in plan view, the top surface of a bottom compressible pad means of a modification of the invention and showing a plan view of the opened-up bottom surface of a modified intervening or middle compressible pad means of this modified form of the invention. In other words, this view shows essentially the same portions of a bottom compressible pad means and intervening or middle compressible pad means as shown in FIG. 1, although it will be noticed that in the showing of FIG. 7 all of the recess means half portions are oppositely directed from those of FIG. 1, which will have the effect of causing all of the lower recess means defined thereby to be oppositely directed from the upper recess means of this form of the invention, which are identical to those clearly illustrated in FIG. 2 of the first form of the invention, thus producing a modified arrangement of the type best exemplified by comparing FIG. 9 of this modified form of the invention with the corresponding view comprising FIG. 6 of the first form of the invention.

FIG. 8 is an end elevational view, taken substantially in the direction of the arrows 8—8 of FIG. 7.

FIG. 9 is a cross-sectional view of the fully assembled modified form of the invention of FIGS. 7 and 8 but prior to fastening and locking same together, and with no perishable food objects, such as avocados, being positioned in the recess means for reasons of drawing clarity and simplification. This view of the assembled three compressible pad layers of the modified form of the invention is taken substantially on a plane such as that indicated by the arrows 9—9 of FIG. 7 and substantially corresponds to the plane of the sectional view comprising FIG. 6 of the first form of the invention and clearly shows the positionally reversed relationship of upper and lower rows of recess means and the reduction in the vertical thickness of the intervening or middle compressible pad means made possible thereby.

FIG. 10 is a reduced-size, three-dimensional view, generally similar to FIG. 3, but illustrates a two-layer arrangement of the first form of the invention illustrated in FIGS. 1-6, which merely has had the middle or intervening compressible pad means removed so that the upper and lower compressible pad means are placed in direct vertical superimposition and contact for similarly defining half as many recess means as previously illustrated in the first form of the invention shown in FIGS. 1-6. Also for purposes of broadening the scope of the invention, this modified arrangement is shown with a slightly modified form of fastening and locking means.

FIG. 11 is a view very similar to FIG. 6, but illustrates a further modification of the invention, which is shown in a 90 degree rotated position from the showing of FIG. 7 for drawing space-saving reasons.

FIG. 12 is a transverse sectional view of the vertically assembled pad means of FIG. 11 on a plane such as 12—12 of FIG. 11 and is a view generally similar to the lower portion of FIG. 6, with recesses reversed.

FIG. 13 is a fragmentary, longitudinal, central plane, sectional view of a very slight modification of the form of the invention illustrated in FIG. 10 wherein a different type of fastening and locking means is employed. It will be noted that central portions of the container means between the opposite end portions thereof are broken away for drawing space saving reasons.

FIG. 14 is a view very similar to FIG. 13 and again illustrates a very slight modification of the form of the invention illustrated in FIG. 10 wherein a different type of fastening and locking means from that shown in FIG. 10 or that shown in FIG. 13, is shown.

FIG. 15 is a view of a modified form of the invention which may have compressible pad means of any desired number of layers, but which, for purposes of simplicity, is shown as comprising a two-layer form generally similar

to that shown in FIG. 10, for example, although of a modified form, and shows the two modified type compressible pad means in pictorial, three-dimensional open relationship in a manner generally similar to the showing of FIG. 1.

FIG. 16 is a cross-sectional view of the modified form of the invention shown in FIG. 15, with the two compressible pad means moved into superimposed vertically aligned relationship and with the plane of the view being that indicated by the arrows 16—16 of FIG. 15.

FIG. 17 is a view very similar to FIG. 13, but comprises a fragmentary, longitudinal, central plane, sectional view of the modified form of the invention shown in FIGS. 15 and 16 and clearly illustrates a modified type of fastening and locking means therefor which may be mounted at the ends or at the sides, or both, of this modified form of the invention.

FIG. 18 is a fragmentary view similar to a portion of FIG. 17 but illustrates a further modification of the type of fastening and locking means which also may be carried by any of the opposed surrounding edge flange portions as desired and needed.

FIG. 19 is a fragmentary view generally similar to the left portion of FIG. 17 but shows a further slight modification of the type of fastening means employed.

FIG. 20 is a fragmentary view generally similar to a portion of FIG. 16 and fragmentarily illustrates a further modification of the invention.

FIG. 21 is a fragmentary view similar to FIG. 20 but illustrates a slight variation thereof.

FIG. 22 is a fragmentary view illustrating a further modification of the invention wherein the upper mating portion of the packaging means is made of a transparent plastic material so that the perishable food object, or other easily damaged object, adapted to be stored in the recess means, can be viewed through the top portion of the container means. The edges of the container means are shown as being hermetically sealed in this modification of the invention.

FIG. 23 is a view similar to FIG. 22 but illustrating a variation of the top mating portion of the container means wherein it is adapted to be formed of the compressible plastic foam means but wherein a portion thereof at the top of the interior recess means is effectively made of non-foamed and transparent plastic material whereby to effectively comprise viewing window means to facilitate viewing the perishable food object contained within the recess means.

FIG. 24 is a fragmentary, sectional view, of a somewhat diagrammatic and schematic nature and with many associated portions of the cooperating apparatus removed for reasons of drawing simplicity and clarity, showing a typical composite lower mold means having interchangeable (and, in some forms, controllably elevatable) outer edge mold portions and a controllably interchangeable central panel mold portion which is adapted for producing an integral compressible pad means having a desired type, number, and size of recess means formed therein and also having the edge portion of said formed compressible pad means of desired length, width, and height.

FIG. 25 is another fragmentary, sectional view illustrating the provision of a height or depth modifying additional element to the outer or edge mold portion of the composite mold means shown in FIG. 24.

Generally speaking, the exemplary first form of the invention illustrated in FIGS. 1-6 may be said to comprise container means, such as is generally designated at 21, which is shown as being substantially rectangular as seen in plan view, although the invention is not specifically so limited.

The container means 21 effectively comprises at least two area-coextensive compressible pad means having at least two (and usually a similar plurality of) opposed mating aligned recess means half portions formed therein for aligned juxtaposition whereby to effectively define

therebetween full recess means (usually a plurality thereof) adapted to receive, support, and protect therein one or more corresponding easily damaged objects, such as perishable food objects or the like, although not specifically so limited in all forms of the invention.

In the exemplary first form of the invention illustrated in FIGS. 1-6, the container means 21 effectively comprises three such area-coextensive insulating pad means which are adapted to be placed in vertically adjacent superimposed juxtaposition with respect to each other whereby to align the corresponding plurality of recess means half portions in a manner such as to define two vertically spaced horizontal layers, each comprising a plurality (twenty-one in the example illustrated) full recess means adapted to receive perishable food objects, such as avocados, pears, or the like, therein in a highly protective manner when the three compressible pad means are assembled therearound in a fully assembled, fastened, and locked relationship effectively comprising the complete container means 21, as best shown in FIG. 3.

In the exemplary first form of the invention illustrated, the three area-coextensive compressible pad means are designated by the reference characters 22L, 22M, and 22U, and comprise, respectively, a lower or lowermost compressible pad, a middle or intervening compressible pad, and an upper or top compressible pad.

It will be noted that the upper surface 23 of the lower pad 22L is provided with a plurality of lower recess means half portions 24H formed therein, while the corresponding bottom or lower surface 25 of the middle or intervening compressible pad means 22M is provided with a correspondingly positioned plurality of downwardly facing recess means half portions 24H identical to the upwardly facing recess means half portions 24H carried by the lower compressible pad means 22L and adapted to be placed in aligned registration or opposition thereto when assembled, in the manner best shown in FIGS. 3 and 6, whereby to define the lower layer plurality (twenty-one in the example illustrated) of full or complete recess means, each of which is generally designated by the reference character 24R in FIG. 6.

Similarly, it should be noted that the upper surface 26 of the middle or intervening compressible pad means 22M is provided with a plurality (twenty-one in the example illustrated) of upwardly facing recess means half portions 27H substantially completely identical to the corresponding plurality of upwardly facing recess means half portions 24H carried by the upper surface 23 of the lower compressible pad means 22L and similarly positioned. Also, it should be noted that the bottom or lowermost surface 28 of the upper or top compressible pad means 22U is provided with a similar plurality (twenty-one in the example illustrated) of downwardly facing recess means half portions 27H identical to (but positioned in opposition to) the previously mentioned plurality of upwardly facing recess means half portions 27H carried by the upper surface 26 of the middle or intervening compressible pad means 22M and adapted to be placed in aligned registration and superimposed thereover, as is best shown in FIG. 6, whereby to define a corresponding upper layer plurality (twenty-one in the example illustrated) of whole or full recess means, as generally designated by the reference character 27R in FIG. 6.

All three of the compressible pad means 22L, 22M, and 22U are adapted to be properly vertically aligned in effective vertical registration relative to each other, such as is perhaps best shown in FIGS. 3 and 6, by controllably disengageable alignment and registration means adapted to normally matingly engage each other for maintaining said three compressible pad means in the proper vertical aligned superimposed relationship such as to properly align all of the opposed recess means half portions defining both the upper layer of the full recess means 27R and the lower layer of full recess means 24R, best shown in FIG. 6.

In the exemplary first form of the invention illustrated, said alignment and registration means are generally desig-

nated at 29 and may be said to comprise male projection elements, such as shown at 29M, and corresponding co-operable female reception elements, such as designated at 29F, carried by opposed adjacent parts of the adjacent surfaces of the compressible pad portions 22L, 22M, and 22U when in aligned vertical registration with respect to each other, such as is clearly shown in FIGS. 3 and 5. In other words, each interface junction plane, such as the lower interface junction plane defined by the surfaces 23 and 25 and the upper interface junction plane defined by the surfaces 26 and 28, is provided at a plurality of locations with corresponding mating vertically aligned ones of said male projection elements and female reception elements 29M and 29F for engagement when all three of said compressible pad means 22L, 22M, and 22U are vertically superimposed in vertical alignment and registration with each other, such as is clearly shown in FIGS. 3 and 6, and will prevent said compressible pad means from inadvertently getting out of such alignment.

After perishable food objects such as avocados, pears, or the like, although not specifically so limited, are packed in the opposite recess means half portions 24H and 27H, and the three compressible pad means 22L, 22M, and 22U are placed in vertical superimposition with the alignment and registration means 29 engaged, suitable fastening and locking means may be employed for firmly fastening and locking the vertically stacked assembly of said three compressible pad means 22L, 22M, and 22U together into an effectively unitary structure, comprising the container means generally designated at 21, which is then suitable for shipment or storage and which will provide very effective protection for such perishable food objects or the like until they are later removed from within the container means 21.

While various types of fastening and locking means may be employed within the broad scope of the present invention, the exemplary first form of the invention illustrates one typical type of such fastening and locking means as generally comprising tensile member means, such as indicated at 31, adapted to be controllably removably placed in tight encompassing relationship around the container means 21 and then adapted to be retained in said tight encompassing relationship during storage and/or shipment thereof until such time as it is later removed for disassembly of the container means 21 and removal of the perishable food objects packed therein.

In the exemplary first form of the invention illustrated, said tensile member type fastening and locking means 31 takes the form of a pair of strap or webbing type belt members 32 adapted to be placed around the assembled container means 21 in two corresponding fastening groove means G and then to be drawn into very tight encompassing relationship and locked and fastened in such relationship by the buckle type fastener means 33, although not specifically so limited. However, it should be clearly noted that tape means or various other fastening means, either in the form of two fastening strips as shown in FIG. 3, or in other arrangements ranging from one such strip up to any desired number thereof and which may be directed similarly to the showing of FIG. 3 or in any other manner with respect to the container means 21, may be employed in lieu of the specific exemplary showing of FIG. 3, and also various other types of fastening means may be employed in lieu thereof.

It should be noted that, in the exemplary first form of the invention illustrated, each of the recess means half portions 24H and 27H is provided with a plurality of inwardly projecting compressible mounting and spacing finger means 34, such as are best shown in FIGS. 4 and 6, which are adapted to contact and support corresponding portions of an easily damaged object, or perishable food object such as an avocado or the like, out of contact with the remaining walls of the corresponding recess means whereby to provide a very substantial effective air space

therearound for ventilation purposes. Such ventilation is further enhanced by the provision of ventilation aperture means interconnecting the recess means 24H and 27H with the exterior of the complete container means 21, thus providing a complete system of ventilation around the perishable food objects stored within the recess means 24R and 27R, where this is desirable. In the exemplary first form of the invention illustrated, said ventilation aperture means is designated at 35 and comprises a plurality (twelve in the exemplary first form illustrated) of longitudinal grooves in each of the mating or junction surfaces of the three compressible pad means, such as the surfaces 23, 25, 26 and 28, and which together define the complete plurality (six in the exemplary form illustrated) of ventilation apertures communicating with ambient atmosphere at opposite ends of the assembled container means 21, as is perhaps best shown with respect to one representative end thereof in FIG. 3.

It should be noted that where easily damaged objects are to be packed and protected by the apparatus of the present invention and are of a type other than perishable food objects (which, obviously, therefore, require no ventilation) or of a type of perishable food object which is better preserved and protected by not having ventilation, either the plurality of mounting and spacing finger means 34 or the plurality of ventilation aperture means 35, or both, may be eliminated.

FIG. 5 illustrates the fact that, in the preferred exemplary first form of the invention illustrated, the three compressible pad means 22L, 22M, and 22U are preferably made of an expanded-cell foam-type material, such as polystyrene foam, polyurethane foam, or the like, although not specifically so limited, which has sufficient rigidity to provide proper exterior protection for easily damaged objects placed within the recess means 24R and 27R and which may be said to comprise a very effective shock and vibration isolator and, in certain cases, may also effectively comprise an effective thermal insulator and isolator also, where such is desirable for the purpose of the present invention. However, it should be clearly noted that the invention is not specifically limited to employing material comprising a thermal insulator or isolator since this is not necessary in all forms of the invention—particularly where the easily damaged objects to be protected by the invention are not of a type which is damaged or injured in any manner by temperature changes.

Preferably, the cellular type material shown in representative cross-sectional form in FIG. 5 may be of a non-connected cell type which has certain decided advantages from the standpoint of rigidity, shock and vibration isolation and even thermal insulation and isolation. However, it should be noted that, in some forms of the invention, communicating cell type of materials may be employed. In any case, it should be noted that, if desired, the material may be of a type having very pronounced hysteretic loss characteristics which, thus, provide very effective damping of vibration and enhances the degree of protection provided to easily damaged objects carried within the recess means 24R and 27R. This type of hysteretic loss characteristics may be provided by reason of the nature of the material itself, by reason of the physical structure which allows interior physical frictional losses to occur as a result of compression and expansion, and/or may further be enhanced by the use of additives having such hysteretic loss characteristics, to the foam-like cellular material such as is shown in one representative exemplary form in FIG. 5.

It should be noted that the exemplary first form of the invention illustrated in FIGS. 1-6 is also effectively provided with recessed engagement means (usually hand engagement means) such as generally designated at 36. It will be noted that, in the exemplary first form of the invention illustrated, said hand engagement means 36

comprises four inclined recess means at opposite top and bottom ends of the complete assembled container means 21 so arranged as to effectively provide an end access opening for a person's hand, or for any other appropriate lifting tool, even when the bottom of the complete container means 21 is resting upon a flat horizontal underlying supporting surface. This facilitates lifting one or more such stacked containers 21 from a horizontal underlying surface, or lifting one or more upper container means 21 from underlying container means 21 when they are initially in the form of a vertical stack of a plurality of such container means 21.

While the hand engagement means 36 provides a convenient and effective form of hand engagement means, it should be noted that the present invention also contemplates various modifications thereof and various other forms thereof and, in certain forms of the invention, they may be dispensed with entirely.

Incidentally, it should be noted that the foam material of the compressible pad means 22L, 22M, and 22U may effectively have any one or all of the surfaces thereof sealed, if desired, in any of a number of different ways. For example, such a sealed surface may be provided by effective heat sealing and/or compressing the exterior of such foam material, by applying and sealingly joining thereto a thin sheet panel of sealing material, or otherwise.

FIGS. 7-9 illustrate an arrangement very similar to the first form of the invention, with the exception of the fact that the lower layer of recess means 24R' are positionally reversed from those designated at 24R of the first form of the invention. Because of the similarities, similar parts are designated by similar reference characters, singly primed, however. In this modification, the upper compressible pad means 22U' and the upper surface 26' of the intervening or middle compressible pad means 22M' are identical to those of the first form of the invention designated at 22U, 26, and 22M, respectively, and all similar portions of this modified form of the invention are exactly the same and, of course, identical to the corresponding parts of the first form of the invention and, therefore, will not again be described at this point.

The change or modification of this form of the invention begins to occur at the lower surface 25' of the middle or intervening compressible pad means 22M' and all portions therebelow when the apparatus is in fully vertically assembled relationship such as is shown in FIG. 9. It will be noted that said bottom surface 25' of the intervening or middle compressible pad means 22M' is positionally reversed 180 degrees around its center point from the corresponding bottom surface 25 of the middle pad 22M of the first form of the invention illustrated in FIGS. 1-6 and described in great detail hereinbefore. This, of course, positionally reverses the direction of each recess means half portion 24H' and also of each of the registration means portions 29' from the arrangement of the first form of the invention.

The lower compressible pad means 22L of this modification of the invention is precisely the same as the lower compressible pad means 22L of the previously described first form of the invention, but it is also positionally reversed around its center 180 degrees so as to be suitable for mating engagement of each of the lower recess means half portions 24H' thereof with respect to the corresponding recess means half portions 24H' of the positionally reversed bottom surface 25' of the modified middle or intervening compressible pad means 22M'. This is also true with respect to the registration means portions 29'.

Thus, it will readily be understood that the three compressible pad means in this modification of the invention are assembled in vertically superimposed relationship substantially the same as that described hereinbefore in detail in connection with the first form of the invention

illustrated in FIGS. 1-6, and the only difference is the fact that the lower layer of full or complete recess means 24R' (best illustrated in FIG. 9) are positionally reversed from the corresponding lower layer of full or complete recess means 24R of the first form of the invention, as is perhaps best shown in FIG. 6. This provides an optimum utilization of vertical space and allows the modified middle or intervening compressible pad means 22M' to be somewhat thinner in this modification of the invention (as shown in FIG. 9) than the pad 22M of the first form of the invention (as shown in FIG. 6). Otherwise, this modification is similar to the first form, and no further description is thought necessary.

FIG. 10 is a reduced-size, three-dimensional view quite similar to FIG. 3 of the first form of the invention and, in fact, merely comprises the upper and lower compressible pad means 22U and 22L of FIG. 3 directly joined together in face-to-face opposition without having the intermediate or middle compressible pad means 22M of the first form of the invention therebetween, as is clearly shown in FIG. 3. In other words, FIG. 10 illustrates a modified container means generally designated by the reference numeral 21'' which has only an upper compressible pad means 22'' and a lower compressible pad means 22L'' and, thus, effectively defines only a single layer of recess means corresponding to either the upper layer of such recess means 27R or the lower layer of recess means 24R of the first form of the invention, as is perhaps best shown in FIG. 6.

Despite the fact that the upper compressible pad means 22U'' and the lower compressible pad means 22L'' of FIG. 10 are exactly the same as the corresponding upper and lower compressible pad means 22U and 22L of the first form of the invention, nevertheless, they are designated by the same reference numerals, doubly primed, however, in the case of FIG. 10, since together they comprise the slightly modified two-pad container means 21'' of this modified form of the invention shown in FIG. 10. Also, for purposes of variety, the tensile member fastening means 31'' of this form of the invention is slightly modified from the first form of the invention (although, if desired, it may employ the same type of tensile member fastening and locking means as that shown at 31 in the first form of the invention) and comprises wraparound tape type fastening strip means 32'' which does not have fastening buckles or the like, such as shown at 33 in the first form of the invention. Otherwise, this modified form of the invention is similar to the first form of the invention illustrated in FIGS. 1-6 and described in detail hereinbefore.

FIGS. 11 and 12 are views generally similar in appearance to FIG. 7 and the bottom half of FIG. 6, respectively, but illustrate a two-pad version of the invention similar in many ways to the form shown in FIG. 10, but which is interiorly provided with a further modification with respect to the opposed surfaces 23''' and 28''' which are effectively slightly recessed inside of corresponding surrounding upwardly directed and downwardly directed abutable edge portions 37 and 38 which will, of course, provide a much larger area interior ventilation means coextensive with substantial areas of the opposed surfaces 23''' and 28''' and comprising inner enlargements of the opposite end ventilation apertures 35''' adapted to enhance and facilitate the circulation of air around perishable fruit or the like, within the recess means 24R''' defined by the mating lower and upper recess means half portions 24R''' and 27H''' when the upper and lower compressible pad means 22U''' and 22L''' are placed in vertically superimposed aligned registration and are fastened in such relationship in a manner similar to the showing of FIG. 10.

Another difference of the modified form of the invention illustrated in FIGS. 11 and 12 is the fact that the alignment and registration means generally designated at 29''' is slightly different from that shown at 29 of the

first form of the invention and is so arranged as to not only act for the alignment and registration purposes previously described in connection with the structure shown at 21 in the first form of the invention, but also effectively comprises vertical contact and support means for maintaining the proper vertical spacing of the upper and lower compressible pad means 22U''' and 22L''' across the central area parts thereof positioned inwardly of the two abutting edge flanges 37 and 38. The remainder of this modified form of the invention is similar to the first form of the invention previously described and illustrated except that it is of the two-pad type exteriorly illustrated in FIG. 10 and previously described. However, it should be noted that it may also be of the three (or more) pad type similar to the showing of the first form of the invention illustrated in FIGS. 1-6 or the slight modification thereof illustrated in FIGS. 7-9.

Incidentally, it should be noted that, while the recess means, such as the exemplary ones of the first form of the invention shown at 24R and 27R, are illustrated as being shaped in a manner suitable for the reception of avocados, pears, or the like, the shapes thereof may be modified for appropriate reception of various other kinds of fruits or perishable food objects or various other kinds of easily damaged non-food objects, and this may be readily accomplished by changing the appropriate mold portion.

Incidentally, it should be noted that in the preferred arrangements illustrated, the top and bottom compressible pad means are adapted to be made by the same mold means and that all of the intermediate or intervening pad means, such as the exemplary one shown at 22M in the first form of the invention, are identical, with the exception of the slight modification thereof shown at 22M' in FIGS. 7 and 9, and, thus, container means comprising any desired number of such compressible pad means may be formed from similar compressible pad means made from the few mold means just referred to, which has the effect of greatly reducing the cost of such composite container means.

The various forms of the invention described in detail hereinbefore may, in certain instances, rely upon the fastening and locking means for providing for proper alignment and registration of the plurality of compressible pad means rather than upon the specific male and female elements, such as shown at 29M and 29F in the first form of the invention, for example, of said alignment and registration means, such as shown at 29 in the first form of the invention, for example. Under such circumstances, the fastening and locking means, such as generally designated at 31 in the first form of the invention, for example, may, in effect, comprise the functional equivalent of such alignment and registration means.

It should be noted that FIG. 13 illustrates a form of the invention very similar to that illustrated in FIG. 10, which comprises a double layer version of the three-layer first form of the invention illustrated in FIGS. 1-6 inclusive, and, in fact, the only difference of the FIG. 13 form therefrom is the different type of fastening and locking means. Therefore, reference characters similar to those employed in FIG. 10 are employed in FIG. 13, but are followed by the letter "a," however. In this modification, it will be noted that there are no tensile member fastening means, such as that shown at 32' in the FIG. 10 form of the invention, nor any grooves adapted to carry same as in the FIG. 10 form of the invention. Instead, the modified version of FIG. 13 has a different type of fastening and locking means, generally designated at 31''a, comprising a plurality of resilient clip means, such as indicated at 39, adapted to be resiliently and controllably removably snapped over opposite end portions of the container means, generally designated at 21''a, whereby to resiliently engage opposite outside exterior surface portions of the upper and lower compressible pad means 22U''a and 22L''a comprising said container means 21''a.

It will be noted that each of the resilient clip means 39 may be made of resilient plastic such as molded "nylon," molded "polypropylene," or various other suitable materials or, in certain cases, may be made of metal and may have forward end portions 41 which curve inwardly toward each other to a very slight degree and have slightly reversed tip ends 42 whereby to be positioned in the slightly recessed exterior surface portions 43 of the exterior or outside surfaces of the compressible pad means 22U''a and 22L''a whereby to provide a very positive engagement between the resilient clips 39 and the opposite surfaces of the container means 21''a and yet to do so in a manner which will allow the ready removal of each of the resilient clip means 39 when desired.

Incidentally, it should be noted that any desired number of resilient clip means 39 may be employed and they may be positioned along side edges of the container means 21'' or along the ends thereof, or both if desired.

Also, it should be noted that the shape and configuration of the resilient clip means 39 may be modified within the broad scope of the present invention, and they may be provided with engageable means such as apertures or the like, adapted to cooperate with some sort of a spreader type applicatory and/or removing tool so that said tool may be employed for initially spreading the resilient clip means 39 into a greater than normal open relationship for snapping same over the edge portions of the container means 21''a after which they will be released, and also adapted for later use in quickly engaging the resilient clip means 39 for removing same when desired. However, this is merely an optional feature of said resilient clip means 39, which may readily be manually engaged and disengaged if desired, and which may assume any suitable configurations for facilitating such quick engagement and disengagement when desired.

FIG. 14 illustrates a form of the invention very similar to that illustrated in FIG. 13 except for the fact that the fastening and locking means is of a different type from that illustrated in FIG. 13. Therefore, because of the similarities, corresponding parts of the invention as illustrated in FIG. 14 are designated by reference characters similar to those of FIG. 13 but with "b's" appended thereto in lieu of the "a's" appended to the reference characters in FIG. 13. In this modification, the fastening and locking means designated generally at 31''b comprises a plurality of staple members 43 adapted to be firmly driven into adjacent opposed edge portions of the plurality of compressible pad means, 22U''b and 22L''b comprising the container means 21''b as is clearly shown in FIG. 14, which will effectively and firmly fasten and lock the complete container means 21''b in closed relationship. Of course, it will be understood that the plurality of staple members 43 may be driven into the opposed adjacent edge portions of the compressible pad means 22U''b and 22L''b by a conventional type stapling gun, such as is generally designated at S in phantom in FIG. 14. The staples may be of the conventional metallic type or, in certain forms thereof, might be made of various other suitable materials.

FIGS. 15 and 16 illustrate a further modification of the invention generally similar to the first form of the invention shown in FIGS. 1-6 with the exception of the fact that it is a two-layer type rather than a three-layer type, and has no middle compressible pad means in the exemplary arrangement illustrated in FIGS. 15 and 16. In other words, it is of a two-layer type somewhat similar to the showing of FIG. 10. Therefore, similar reference characters designate corresponding parts, but are followed by the letter "c," however, to distinguish them from the earlier forms of the invention. In this modification, it will be noted that each of the compressible pad means 22Uc and 22Lc is formed by a different process than the corresponding upper and lower pad means of the earlier form of the invention; said modified upper and lower compressible pad means of FIGS. 15 and 16 being of a vacuum formed type with each being formed into a configuration

such as is illustrated wherein each has a surrounding edge flange such as is illustrated at 44 which lies in what might be considered a medial plane when the upper and lower compressible pad means are in superimposed aligned relationship as is clearly shown in FIG. 16.

Also, each of the vacuum formed compressible pad means has both exteriorly and interiorly formed portions comprising and defining said plurality of recess means portions 24Hc and 27Hc. This is because of the nature of the vacuum forming process and of the type of articles produced by such a vacuum forming process.

Therefore, in order to provide a proper exterior contact surface defining at least portions of a flat contact surface plane so that one or more of such container means 21c can be vertically stacked, one upon the other, and the bottom one upon an underlying floor surface, this modification of the invention also includes exterior contact surface means, such as generally designated at 45, effectively defining portions of such a flat contact surface plane, two of which are indicated somewhat diagrammatically in broken lines at 46 in FIG. 16.

The above-mentioned exterior contact surface means 45 actually comprise vacuum formed portions of the upper and lower compressible pad means 22Uc and 22Lc having completely flat outer surface parts 45P, all of which lie in a common, flat, exterior, contact surface plane such as either one of the two shown at 46 in FIG. 16. This clearly provides sufficient flat contact surface means at the bottom of the container means 21c to allow it to rest upon an underlying horizontal surface, such as a floor or the like, and also provides sufficient flat contact surface means at the top of the container means 21c to allow one or more additional similar container means to rest thereupon.

It should also be noted that each of the compressible pad means is provided with what might be considered to be the equivalent of the alignment and registration means 29 of the first form of the invention and which is generally designated by the reference character 29c in this modification and which includes male and female portions 29Mc and 29Fc which are adapted to engage one another whereby to provide not only proper registration and alignment of the upper and lower compressible pad means but also to provide vertical support thereto so that there will not be any inadvertent collapsing of central portions of the container means 21c between the outer edges thereof if a number of additional container means rest thereupon so that a very substantial loading of the lower container means occurs. In other words, in this case, the alignment and registration means 29c may also be said to effectively comprise controllably disengageable positioning and support means, and it should be clearly noted that said means may be modified substantially as to number, as to position, and as to type, and that this is also true with respect to the previously mentioned exterior contact surface means 45.

The modified form of the invention shown in FIGS. 15 and 16 may comprise two or more compressible pad means, although it is shown in the two-layer form for purposes of drawing simplicity and clarity, and it should be understood that it may employ any of the various types of fastening means referred to hereinbefore, including the belt and buckle form of the first form of the invention as perhaps best shown in FIG. 3, the modified tape type thereof as perhaps best shown in FIG. 10, or various equivalents thereof. However, in FIG. 17, a modified vacuum formed version of the invention similar to that illustrated in FIGS. 15 and 16 is shown with a modified type of resilient clip fastener arrangement 39d generally similar in nearly all respects to the corresponding resilient clip fastener means 39 illustrated in FIG. 13. Therefore, since it is so similar to the showing of FIG. 13 with respect thereto, with the compressible pad means, of course, being of the type shown in FIGS. 15 and 16, correspond-

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ing parts are designated by similar reference numerals, with the letter "d" appended thereto, however.

FIG. 18 is a view similar to FIG. 17, but shows the staple type fastener means of FIG. 14 which, however, in this modification are designated by the reference numeral 43e and which are no longer driven inwardly into the opposed adjacent edge portions of the compressible pad means in the manner of FIG. 14, but which are driven vertically therethrough whereby to effectively join same together as is clearly illustrated in FIG. 18. This may be done at end edges, side edges, or both, as desired or needed. Parts of this modification of the invention corresponding to those previously described are designated by corresponding reference numerals, followed by the letter "e," however.

FIG. 19 is a fragmentary view similar to the left portion of FIG. 17 and merely illustrates a slightly different type of resilient clip fastener means 39f which is resiliently slipped over and engaged with respect to the opposed edge flange portions 44f rather than extending inwardly to the extent of the resilient clip fastener means 39d shown in FIG. 17. Other parts corresponding to those of the earlier forms of the invention are designated by similar reference numerals and/or upper case letters, followed by the letter "f," however.

FIG. 20 fragmentarily illustrates a slightly modified form of the invention and is a view of the portion of said modified form similar in location to the left side of FIG. 16. Parts of this modification which correspond to those of FIG. 16 are designated by similar reference numerals and/or upper case letters, followed by the letter "g," however. In this modification of the invention, each of the two upper and lower pad means 22Ug and 22Lg have surrounding edge flange means portions 44g, which are what might be called a mating type, and which do not extend horizontally to a substantial extent in the manner of the edge flange means 44 of the earlier form of the invention illustrated in FIG. 16, but extend in said horizontal direction only the width of the material or the wall thickness of each of said flanges 44g. This is so because said flanges 44g are of an effectively male and female type adapted to mate vertically, as is clearly shown at the left side of FIG. 20, by having the surrounding edge flange means 44g of the lower pad means 22Lg insert upwardly into the closely outwardly adjacent and oppositely and vertically downwardly directed surrounding edge flange means 44g of the upper pad means 22Ug to an extent limited by an interior stop, abutment or shoulder means which may comprise either the shoulder 47 or the pair of opposed shoulders indicated at 48, which actually comprise abutment or contact means extending completely around the central portion of each of the upper and lower pad means 22Ug and 22Lg and effectively provides a structurally strong supporting means for the entire container means 21g.

Also in this modification, the outer surface parts 45Pg are shaped slightly differently from those illustrated in FIG. 16, although it should be clearly understood that actually the surface parts 45P of FIG. 16 would probably be slightly curved and have a radius at the outer edges thereof in a manner similar to the corresponding parts 45Pg of FIG. 20.

The major difference with respect to said outer contact surface means defined by said surface parts 45Pg is the fact that the outer portion of each of the recess-defining walls 27Hg and 24Hg is adapted to be provided with supplementary outer surface parts 49 which are also adapted to lie in the common contact plane 46g whereby to provide spaced outer surface contact portions across the complete upper and lower surface of the container means 21g. The edge flanges 44g may be stapled, adhesively or cohesively joined, clipped together with resilient clip means, or otherwise suitably joined together.

Of course, it should be understood that the modified form of the invention illustrated fragmentarily in FIG. 75,

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20 may be of a multiple-layer type rather than single-layer type, as illustrated in FIG. 20, and appropriate modifications of the structure for the inclusion of multiple layers, and equivalent in many respects to the provision of multiple layers as shown in FIG. 2 of the first form of the invention, may be incorporated in this modification.

FIG. 21 is a fragmentary view similar to the left portion of FIG. 20 and merely illustrates a very slight variation thereof, and similar parts are designated by similar reference numerals and/or upper case letters, followed by the letter "h," however. In this modification it will be noted that the two edge flange means 44h differ from the corresponding two edge flange means 44g of FIG. 20 by being substantially horizontally directed and in horizontal abutment with each other in a manner very similar to the edge flange means 44 of the form of the invention illustrated in FIG. 16. Otherwise this modification is similar to the form of the invention illustrated in FIG. 20. The edge flanges 44h may be stapled, adhesively or cohesively joined, clipped together with resilient clip means, or otherwise suitably joined together.

FIG. 22 illustrates a further modification of the invention, and portions similar to the earlier forms of the invention are designated by similar reference numerals and/or upper case letters, followed by the letter "j," however. In this modification, only a single recess means 24''j is illustrated, and the complete container means 21j is illustrated as comprising only said single recess means 24''j.

While this form of the invention is well adapted for use in the single-recess version illustrated, it should be clearly understood that it is also applicable to a multiple-recess form of the invention in the general manner of the earlier forms of the invention illustrated in the earlier figures and described in detail hereinbefore.

In this exemplary form of the invention, the upper pad means 22Uj is made of a light-transmissive plastic material so that a prospective purchaser or user of the protected perishable food object, or other object adapted to be contained within the recess means 24''j, may view same from the exterior of the complete container means 21j prior to opening same, thus making it possible to evaluate the condition of said perishable food object, or other easily damaged object, and also to determine whether or not said prospective purchaser or user finds the condition of the object satisfactory for purchase and/or use. The lower pad 22Lj may still be made of foam plastic material for maximizing the protection provided by the container 21j and the upper transparent pad 22Uj may be made of a transparent or semi-transparent foam plastic material so as to maximize the protection provided thereby, but since such foam material tends to interfere with the viewing of the protected food object adapted to be carried within the recess means 24''j, said upper pad 22Uj will most usually be made of a non-foamed plastic material which is substantially transparent, thus effectively forming what might be called a viewing window means which, in the case of the FIG. 22 form of the invention, comprises the complete wall forming the upper half of the recess means 24''j and which is generally designated by the reference character W. In such a form of the invention, the upper pad means 22Uj is usually substantially less compressible than when it is made of foam plastic material and thus is more properly designated as a protective cover means, which is also designated by said reference numeral 22Uj, and it will normally be of sufficient rigidity to provide a substantial degree of protection to the object adapted to be carried within the recess means 24''j.

In the event that the object to be carried within the recess means 24''j is a perishable food object, or the like, the edge flange means 44j may be joined in a hermetically sealed manner, as indicated at 50. This may comprise a complete encircling heat-sealed junction provided by conventional heat-sealing means for plastic

materials, or may comprise adhesive, cohesive, or mechanical joining means capable of providing a complete hermetic seal. Also it should be noted that the perishable food object, and the complete container means 22Uj, may be suitably sterilized so that the hermetic seal 50 will be effective for maintaining the perishable food object in perfect condition for a long period of time. Such sterilization may be accomplished by heat, by chemicals, by antibiotics, by radiation, by high-potential electrostatic fields, and by various other sterilization means and/or techniques.

FIG. 23 illustrates a very slight modification of the form of the invention illustrated in FIG. 22, and similar parts are designated by similar reference numerals and/or upper case letters, followed by the letter "k," however. It will be noted that the major modification of this form of the invention from the showing of FIG. 22 is the fact that the viewing window means Wk merely comprises a small portion of the wall defining the upper half of the recess means 24''k, with the remainder of the upper protective pad or cover means 22Uk being preferably made of foam plastic material in the manner of the complete lower pad means 22Lk. In certain forms of the invention, the upper protective pad or cover means 22Uk may be made of one integral type and sheet of plastic material including both the foamed portions and the non-foamed window portions Wk. This is possible by forming the foamed sheet from clear polystyrene, or the like, in selected areas other than the areas which are intended to become the viewing window means Wk, which, therefore, will retain their non-foamed and transparent character even when the rest of the sheet of polystyrene has expanded into a foamed form.

FIG. 24 is a fragmentary sectional view which is somewhat diagrammatic in nature and which has other portions of the associated and cooperating apparatus removed for reasons of drawing simplicity and clarity. This view shows a typical composite lower mold means intended primarily for use in producing, by vacuum molding, the type of upper and lower compressible pad means illustrated in the FIG. 20 form of the invention, although it will be understood that the lower compressible pad means 22Lg of FIG. 20 has had the outer offset flange portion, similar to that shown at 44g of the upper compressible pad means 22Ug illustrated in FIG. 20, cut off. This is a very simple operation which can be performed subsequent to the molding operation. It will be understood that the composite lower mold means illustrated in FIG. 24 is primarily intended for use in vacuum molding, and the complete mold means is generally designated by the reference numeral 51 and includes an outer edge mold portion generally designated at 52 (which is of rectangular configuration as seen in top plan view) and also includes a controllably interchangeable central panel mold portion, such as is generally designated at 53, which is adapted for use in producing the central panel portion of the upper and lower formed compressible pad means of the type shown at 22Ug and 22Lg in FIG. 20 and each having a desired type, number, and size of recess means formed therein. It will be noted that fastening or attachment means 54 is provided for effectively connecting the outer edge mold portion 52 to the central panel insert mold portion 53 so as to effectively comprise a composite functional unitary mold means for the purposes referred to above. Said fastener means 54 is illustrated as comprising threaded screw means but may comprise various kinds of dowel means, locating pin means, and the like, if desired. It will be understood that since the central insert mold panel portion 53 can be interchanged at will, it may be modified to provide any type of recess means which is desired. Such modification may pertain to shape, size, and/or number, which makes it possible to produce a pad adapted to receive and carry virtually any desired easily damaged object.

FIG. 25 illustrates a slight modification of FIG. 24 and similar parts are designated by similar reference numerals, primed, however. In this modification, it will be noted that the outer edge mold means portion 52' is provided with a height or depth modifying additional element 55 which can be fastened by the fastening means 54' thereto and to the central panel mold portion 53' so as to provide any desired effective overall height in said edge panel outer mold portion 52' corresponding to the increased height or depth of said central panel mold portion 53'.

It should be understood that the separation plane between the outer edge mold portion 52 and the central panel mold portion 53 of FIG. 24, as indicated at 56, may be repositioned from the bottom of the curved portion as shown in FIG. 24 either toward the right or left as desired, and this is also true of the corresponding separation plane 56' of FIG. 25.

It should be noted that certain of the various different modification and variations of the invention illustrated in different figures of the drawing and described in detail hereinbefore are shown without any ventilation aperture means, such as the type designated at 35 in the first form of the invention, for example. This is done for purposes of drawing simplicity, and it should be clearly understood that, in certain instances, said modifications and variations not now shown as having such ventilation aperture means, may be provided with appropriate ventilation aperture means, if desired. This is also true with respect to the inwardly projecting compressible mounting and spacing finger means 34 of the first form of the invention, which, for purposes of variety, are not shown in certain of the other modifications and variations of the invention illustrated in other figures of the drawings and described in detail hereinbefore. In other words, it should be clearly understood that said modifications and variations may be provided with such mounting and spacing finger means, or functionally equivalent structures, if desired.

It should be understood that the figures and the specific description thereof set forth in this application are for the purpose of illustrating the present invention and are not to be construed as limiting the present invention to the precise and detailed specific structure shown in the figures and specifically described hereinbefore. Rather, the real invention is intended to include substantially equivalent constructions embodying the basic teachings and inventive concept of the present invention.

I claim:

1. Protective packing apparatus, and fastener means, for easily damaged objects, comprising: container means taking the form of at least two closely adjacent area-co-extensive protective pad and cover means having at least one pair of opposed mating aligned recess means portions formed therein, said opposed mating recess means portions cooperating with each other to define at least one complete recess means, with said recess means being adapted to receive and physically protectively support therein a substantially similarly shaped and sized, easily damaged object, with said mating recess means portions being in surface contact with at least parts of the surface area of said easily damaged object in a manner such as to firmly and protectively support same within said recess means in nested relationship with respect to the exterior of said container means, a first one of said protective pad and cover means comprising a corresponding wall portion of said container means, a second one of said protective pad and cover means comprising a corresponding oppositely positioned wall portion of said container means, said protective pad and cover means being provided with controllably disengageable positioning and effective support means normally engaging corresponding portions of the opposite protective pad and cover means and effectively maintaining said protective pad and cover means in properly positioned, and supported, aligned registration relationship with respect to each other, with said mating recess means portions in said opposed re-

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cess means-defining relationship; and fastening and locking means cooperable with said protective pad and cover means for firmly locking them together in said aligned registration relationship; each of said protective pad and cover means comprising a blank of plastic material formed from an initial sheet thereof into a configuration having a medial-plane, surrounding edge flange and having both exteriorly and interiorly formed portions comprising and defining said recess means portions and having exterior contact surface means effectively defining portions of a flat contact surface plane, each of said protective pad and cover means being formed of a compressible expanded-cell type of foam plastic material comprising a high-efficiency combination thermal insulation means and vibration and shock isolation means.

2. A device as defined in claim 1, wherein said fastening and locking means comprises a plurality of resilient clip means resiliently and controllably removably positioned over and engaging opposite outside exterior surface portions of said container means.

3. A device as defined in claim 1, wherein said fastening and locking means comprises a plurality of staple members firmly driven into, engaging, and effectively interconnecting opposed adjacent edge portions of said plurality of protective pad and cover means comprising said container means.

4. A device as defined in claim 1, wherein at least one of said protective pad and cover means has a substantially transparent viewing window portion in area-coextensive relationship with respect to said recess means portion.

5. A device as defined in claim 1, wherein at least one of said protective pad and cover means has a substantially transparent viewing window portion in area-coextensive relationship with respect to said recess means portion, the other one of said protective pad and cover means and the nonviewing window portion of said first-mentioned upper one of said protective pad and cover means effectively comprising protective compressible pad means.

6. A device as defined in claim 1, wherein said fasten-

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ing and locking means comprises hermetic seal and junction means sealingly connecting adjacent surfaces of corresponding opposed edge portions of said vertically adjacent protective pad and cover means.

7. A device as defined in claim 4, wherein said fastening and locking means comprises a plurality of resilient clip means resiliently and controllably removably positioned over and engaging opposite outside exterior surface portions of said container means.

8. A device as defined in claim 4, wherein said fastening and locking means comprises a plurality of staple members firmly driven into, engaging, and effectively interconnecting opposed adjacent edge portions of said plurality of protective pad and cover means comprising said container means.

9. A device as defined in claim 4, wherein the other one of said protective pad and cover means from the one having said transparent viewing window portion, and the nonviewing window portion of said first-mentioned one of said protective pad and cover means effectively comprise said protective compressible pad means.

10. A device as defined in claim 1, wherein said fastening and locking means comprises hermetic seal and junction means sealingly connecting adjacent surfaces of corresponding opposed edge portions of said vertically adjacent protective pad and cover means.

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