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3,221,872

PACKAGE ASSEMBLY AND CUSHION

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2 Sheets-Sheet 1

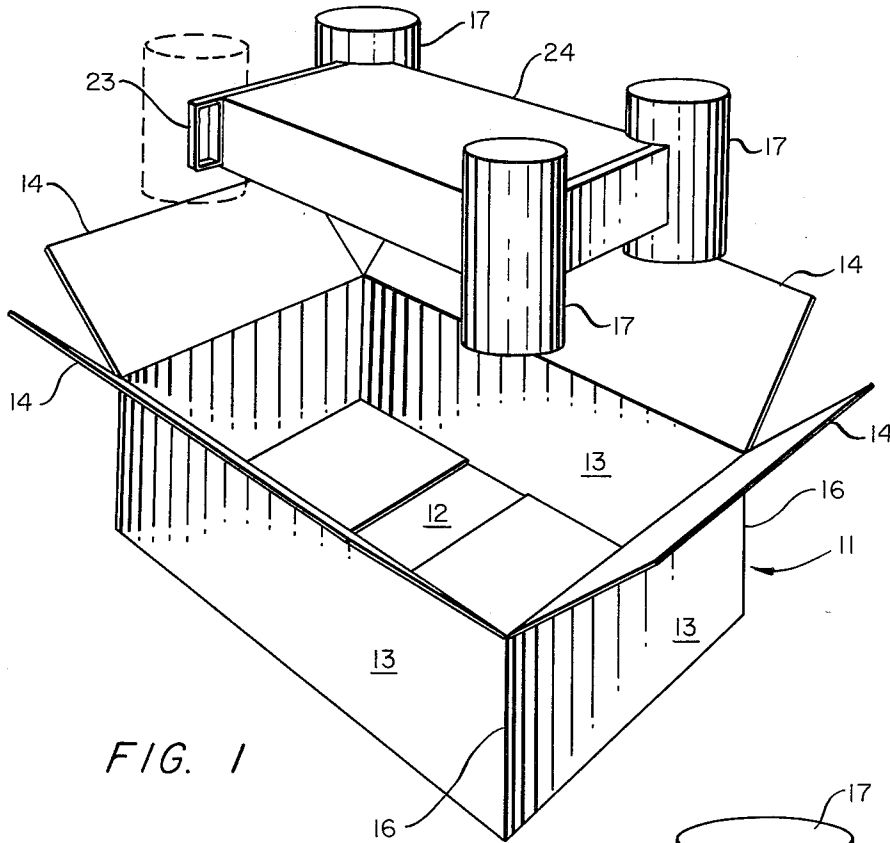


FIG. 1

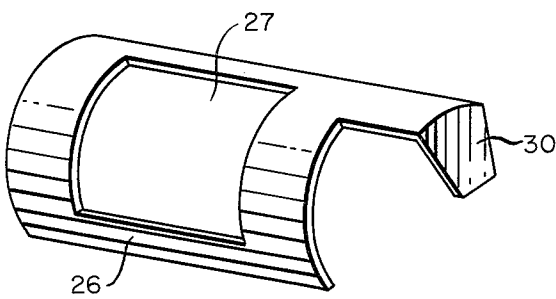


FIG. 6

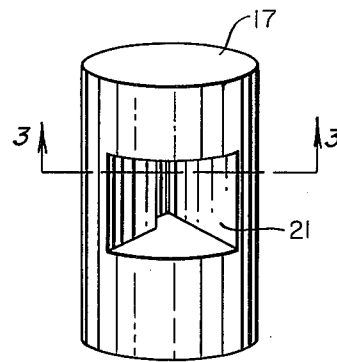


FIG. 2

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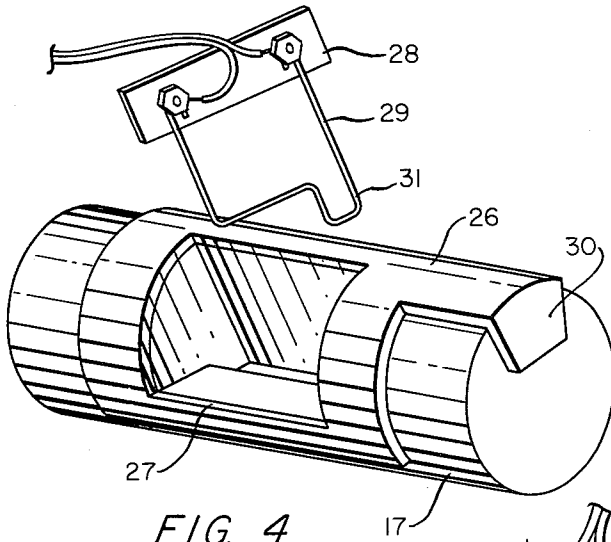


FIG. 4

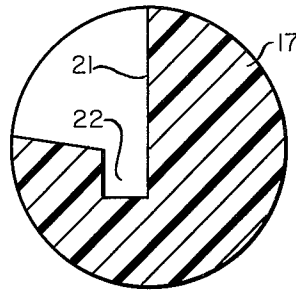


FIG. 3

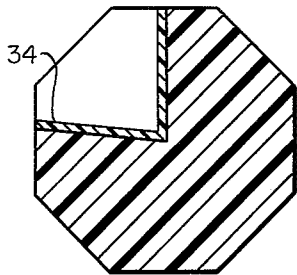


FIG. 8

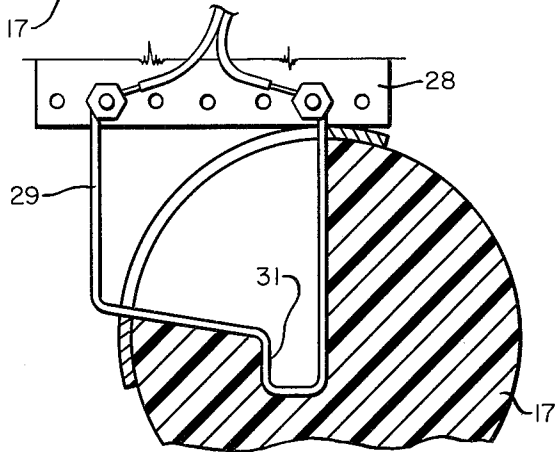


FIG. 5

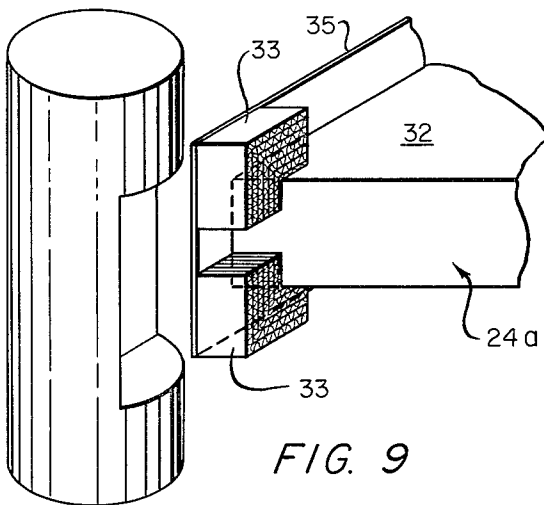


FIG. 9

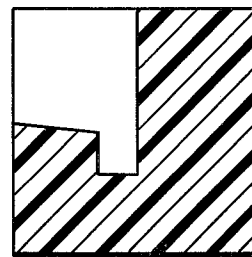


FIG. 7

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PACKAGE ASSEMBLY AND CUSHION

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7 Claims. (Cl. 206-46)

This invention relates generally to a package assembly and to a corner cushion for use therein, and more particularly to a package assembly suitable for packaging scientific equipment of a delicate or fragile nature such as electronic instruments, electrical devices, meters and the like.

Packaging of equipment to afford protection against impact, vibration, pressure and displacement, abrasion, corrosion and temperature extremes during shipment has been an ever present problem. Many types of package assemblies have been developed to solve the problem. Packages have included boxes or containers of various shapes and sizes provided with cushioning material disposed between the commodity and the container to protect the commodity against shocks and vibration encountered during shipping, storing and the like. Although satisfactory packages do exist, they are relatively expensive because of the labor involved in fabricating the package and also because of the labor involved in packaging the commodity.

Prior art packages are generally heavy and bulky thereby increasing shipping and storage costs. Furthermore, a relatively large quantity of cushioning material is required for each package. The weight of the cushioning material is generally a large proportion of the entire weight of the package. This, not only increases the total weight as described, but also leads to waste of material since, in general, the package is destroyed when the commodity is delivered.

In many instances, the cushioning material does not afford the resiliency and shock absorption which is necessary to adequately protect the commodity. In other instances, for example, in packages which employ corner cushions and the like, the corner cushions may slip off and be displaced from the corners when the package is subjected to shock whereby the commodity is then unprotected. Where corrugated fibreboard, the most commonly used material, is employed for cushioning, it has a tendency to permanently set and be easily damaged. The damage due to inadequate packaging of products, commodities and instruments has reached major proportions. This is causing concern in the shipping and packaging industry and in industry in general.

It is an object of the present invention to provide an improved package assembly.

It is another object of the present invention to provide a novel cushion for packaging.

It is a further object of the present invention to provide a novel corner cushion for packaging commodities in containers.

It is a further object of the present invention to provide a package assembly which is relatively inexpensive and simple in construction.

It is a further object of the present invention to provide a package assembly which offers improved protection to packaged commodities.

It is still another object of the present invention to provide a package assembly in which a product is easily and rapidly packaged.

It is a further object of the present invention to provide a reusable cushion for a package assembly.

It is still another object of the present invention to provide a package assembly in which the cushioning material is a small proportion of the total weight and in which

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the overall volume of the package is minimum, thus resulting in a package which can be economically shipped and stored.

It is still another object of the present invention to provide a package assembly in which the commodity is suspended in spaced relationship with respect to an outer box by resilient corner posts which engage the package to resiliently suspend the commodity and absorb impact and vibrational energy.

The foregoing and other objects of the invention will become more clearly apparent from the following description when taken in conjunction with the accompanying drawing.

Referring to the drawing:

FIGURE 1 is an exploded view of a package assembly in accordance with the invention;

FIGURE 2 is a view of a corner post in accordance with the present invention;

FIGURE 3 is a sectional view taken along the line 3—3 of the corner post of FIGURE 2;

FIGURE 4 shows a template and cutter which may be employed to form the corner posts of the present invention;

FIGURE 5 is a sectional view showing the position of the cutter during a typical cutting operation;

FIGURE 6 is a perspective view of a template suitable for guiding the cutter during a cutting operation;

FIGURE 7 shows a corner post in accordance with the invention which is square in section;

FIGURE 8 shows a corner post in accordance with the invention which is hexagonal in section; and

FIGURE 9 shows a corner post associated with another instrument configuration including pads for distributing the forces.

Generally, the present invention employs four spaced corner posts which have cut-out sectors forming recesses or pockets which receive and snugly fit over the corners of a commodity to support the same in spaced relationship with respect to the bottom, top and side walls of an outer box or container in which the posts are placed.

Referring to FIGURE 1, there is shown a box or container 11 which may be corrugated fibreboard which includes a folded bottom 12, sides 13 and folding top flaps 14. Other types of materials may be used for the container. The box is adapted to envelope a commodity which is disposed therein. The box 11 includes corners 16 which receive posts 17. The posts 17 may be in the form of short columns which can be circular, square, triangular or other configuration in section. It has been found that cylindrical posts or columns 17 are satisfactory and such will be described herein. The sides of the cylinders tangentially engage the cooperating sides 13 forming the corners 16. This leaves a space between the edge of the corner and the associated cylindrical post 17.

The cylindrical posts 17 have a length which is substantially equal to the depth of the package whereby when they are placed within the package and the top flaps 14 folded over and sealed, the top and bottom ends of the cylindrical posts snugly fit within the box whereby to prevent any relative movement between the box and the corner posts.

Referring to FIGURE 2, the front posts 17 have sector-shaped cut-outs 21 which have an included angle slightly less than 90°. The bottom of the cut-out 21 is provided with an elongated groove or slot 22 which accommodates the handle 23 (FIGURE 1) of the instrument, commodity or product associated therewith. With the included angle being less than 90°, the cut-out snugly fits the front and side faces of the commodity 24 which is accommodated therein to provide a snug glove-like fit. The rear posts 17 are likewise formed with a sector-

shaped cut-out. However, they need not include a groove 22, since the rear of the instrument does not include a handle. It is, of course, apparent that many commodities do not have front handles and in such event, the slots 22 are not required. In all instances, the cut-out is of such size and configuration as to snugly fit against the instrument when the instrument is placed therein. The height of the cut-out is selected such that it is slightly less than the height of the instrument associated therewith whereby there is a snug glove-like fit between the top and bottom of the instrument and the associated post.

The four posts are placed on the corners of the instrument and then the complete assembly lowered into the box whereby the posts snugly fit against adjacent faces forming the four corners. The top of the box is then closed and sealed whereby to provide a package assembly with the instrument 24 suspended in the package with top, bottom and sides spaced from the respective top, bottom and sides of the associated box. The space between the corners and the posts provides means whereby there can be some damage of the corners of the box without providing any impact to the corner posts.

The corner posts are made of a resilient material having a high damping coefficient with omnidirectional energy absorption properties. The resilient cushion preferably has a high degree of recovery after compression. Thus, any forces, due to dropping of the box, other external impact or the like, which provide shock, compress the corner posts which then absorb the shock energy. The resilient posts then revert to their original configuration to again support the commodity in spaced relationship with the sides of the box. The material of the corner posts should limit resonance and reduce high frequency motion. The drift loss under compression should be relatively small. Preferably, the material is lightweight, chemically inert, immune to water, non-abrasive, non-toxic, clean and resistant to fungus, etc. Furthermore, it is preferable that the material of the corner posts be a material which can be easily molded or fabricated.

A suitable material is expanded polyethylene known by the trade name "Ethafoam." "Ethafoam" is polyethylene expanded thirty times or more from the solid state into a cellular, extremely light-weight material in which each of the cells is closed off from its neighbor. The material further has good work energy retention whereby to absorb a large amount of any deflection forces to which it is exposed. It can be cut with power tools, saws, knives or the like, or can be cut by a hot wire cutter such as the cutter shown in FIGURES 4-7.

Referring to FIGURES 4 through 6, there is shown one way of forming corner posts. Referring particularly to FIGURE 4, there is shown a cylindrical portion 17 which has a template 26 applied thereto. Referring to FIGURE 6, the template 26 comprises a flat sheet of material which is bent to correspond to the surface of the cylindrical post. It includes an opening 27 which is of a length desired for the height of the product or commodity which is to be supported and a width corresponding thereto. The template also includes a shoe 30 for locating the template along the post. A hot wire cutter including a support plate 28 and hot wire 29 having a configuration corresponding to the desired configuration for the cut-out is employed in conjunction with the template. The hot wire 29 is disposed within the opening 27 with the extending portion 31 extending downwardly and one of the vertical portions of the cutter extending substantially radially. The wire is inserted at one end of the opening and removed. It is then inserted at the other end and moved across the opening. The hot wire serves to cut the material whereby the sector can be removed and provide the desired sector-shaped cut-out in the corner post.

In one particular example, corner posts were formed which were 4 inches in diameter and 16¼ inches long with a cut-out 10½ inches extending inwardly to the axis of the post. These posts were placed within an outer box

which was 22¼ inches x 23¼ inches x 16 inches. An instrument was placed in an inner box which was 18¾ x 19½ x 9¾ inches. The corners of the inner box were accommodated in the cut-out portions of the posts and the complete assembly placed in the outer box. The packaged assembly was then dropped on each of the corners from a height of 3 ft., dropped flat on the top from a height of 3 ft., on the bottom from a height of 3 ft., and on the front and side from a height of 3 ft. No damage to the inner box or instrument contained within the carton was apparent. The carton bounced very well and apparently gave good cushioning.

Although corner posts which are circular in section have been described, it is contemplated that corner posts of other configurations can also be employed. For example, the corner post 17 can be square or rectangular in section as shown in FIGURE 7, or it can be hexagonal in section as shown in FIGURE 8.

Certain types of instruments, for example, rack-mounted electronic instruments, have a front panel 35 which extends beyond the instrument body 32. In order to distribute the impact forces, back-up members or pads 33, such as of corrugated fibre-board material, may be introduced between the instrument body and the post to fill the space between the edge of the face and body. The pad then serves to distribute the load over the surface of the cut-out.

In conventional instruments with sharp corners, it may be desirable to provide a load distributing skin or liner. Such a skin or liner is illustrated at 34 in FIGURE 8.

The arrangement of the post and instrument described has assumed that the assembled package includes the posts disposed at the four side corners of a box. It is apparent that the same cushioning would be obtained if the corner posts were located at the top and bottom, side or edge corners. In essence then, the posts should be disposed at opposed or spaced corners whereby to support the commodity. If the container has only three corners for a three-cornered commodity, only three posts are required to stably suspend the commodity in spaced relationship with respect to the walls of the box. This might result in an economy of cushioning material in boxes of certain configuration. It is apparent that the corner posts described, which receive and suspend the goods, may be used with many other configurations of containers. It is, therefore, to be understood that the invention is not intended to be limited in this respect.

I claim:

1. A package assembly for commodities comprising a container and a plurality of spaced posts, each post comprising a solid unitary column of resilient energy-absorbing material, said posts each including a cut-out intermediate the ends to provide upper and lower surfaces for engaging the associated portions of the top and bottom of the commodity supported therein to provide a contact area substantially equal to the area of said surfaces, and side surfaces for engaging the associated portions of the sides of a commodity being supported to provide a contact area substantially equal to the area of said side surfaces, the dimensions of said cut-out being less than the corresponding dimensions of the commodity, said posts engaging/adjacent portions of said container to support the commodity in the container in spaced relationship therewith.

2. A package assembly for commodities comprising a container having top, bottom and side walls, and a corner post made of solid resilient energy-absorbing material, such as expanded polyethylene foam, disposed in each spaced opposed corner of said container, each of said corner posts having a length normally greater than the length of said corner whereby the posts are compressed by engagement with the top and bottom walls of said container and the sides of the posts engage the side walls of the container, said posts including a cut-out intermediate the ends to provide upper and lower surfaces for engaging the associated portions of the top and bottom

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of the commodity supported therein to provide a contact area substantially equal to the area of said surfaces, and side surfaces for engaging the associated portions of the sides of a commodity being supported to provide a contact area substantially equal to the area of said side surfaces, the dimensions of said cut-out being less than the corresponding dimensions of the commodity, said spaced posts serving to support the commodity within the container in spaced relationship with the top, bottom and side walls and providing restraining force against vertical and lateral movement of the commodity.

3. A package assembly as in claim 2 wherein the commodity is of the type having lateral surfaces intersecting to form corners and wherein said cut-out has two intersecting lateral surfaces having an angle of intersection less than the angle of intersection of the lateral surfaces of the commodity whereby to firmly frictionally grip said lateral surfaces of the commodity.

4. A package assembly as in claim 3 wherein the height of said cut-out is less than the height of the commodity to thereby grip the commodity between the upper and lower surfaces.

5. A package assembly as in claim 4 wherein said post is circular in section.

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6. A package assembly as in claim 1 wherein said post is made of expanded polyethylene.

7. A package assembly as in claim 1 wherein said container is of rectangular shape, said posts engaging the walls of said container only in regions spaced from but adjacent the corners of said container.

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