June 16, 1964 H. F. SHROYER 3,137,087

PROTECTIVE CORNER

Filed Dec. 22, 1961

FIG. 3

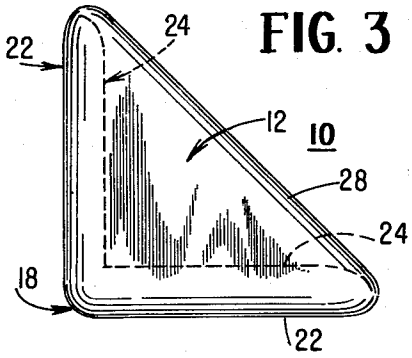


FIG. 2

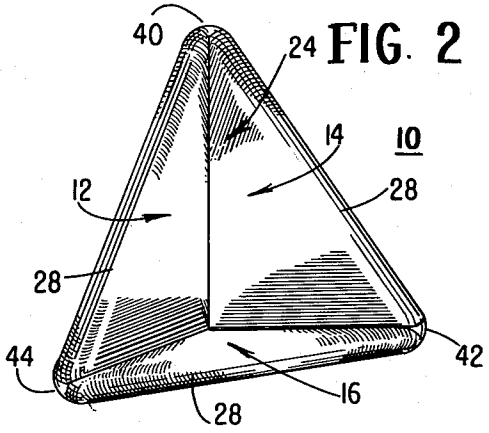


FIG. 4

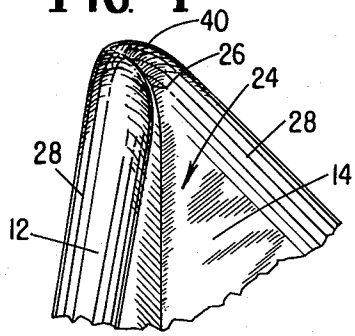


FIG. 5

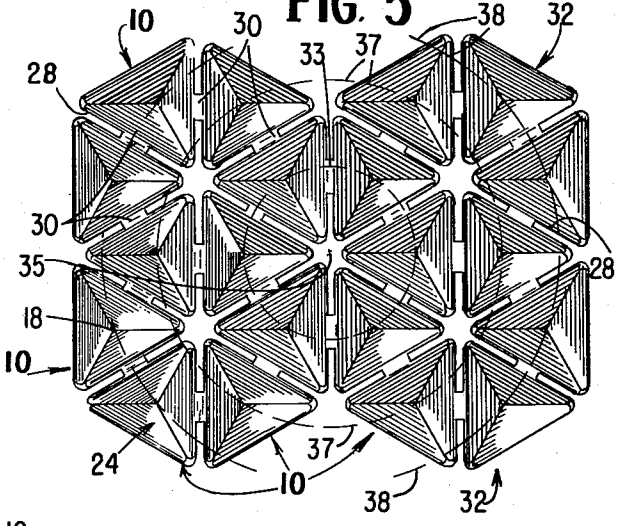


FIG. 1

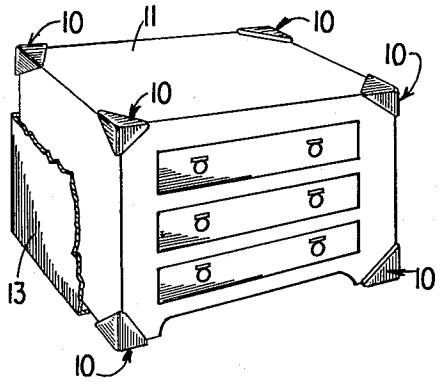
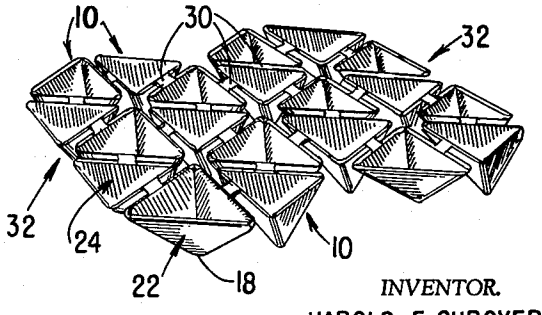


FIG. 6



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PROTECTIVE CORNER

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This invention relates to a packaging protector and, more particularly, to an improved corner protector adapted to be constructed of a plastic, such as foam polystyrene, and manufactured as a sheet comprising a plurality of corner protectors.

Most articles sold today must be shipped to the buyer by truck, rail or air freight. Many of these articles are readily susceptible to damage in transit. For example, furniture is particularly vulnerable, as scratches, nicks, dents and the like destroy its appearance and render it unacceptable to the buyer. Manufacturers long ago recognized the need for protective means in which the articles could be shipped to the buyer to prevent damage to the article in transit. In particular, furniture manufacturers began wrapping the furniture with a paper covering or the like and placing it into crates before shipping it to the customer. However, this proved to be inadequate for during transit, or during the course of loading or unloading, the crate often was bumped, knocked, or otherwise struck with resulting damage to the furniture inside. Most often the corners of the crate received the abuse, thereby damaging the corners of the furniture inside.

In an effort to remedy this situation it has been the practice to place paper, cardboard, straw and the like between the corners of the furniture and the shipping crate. This practice, however, has not been completely satisfactory for although these materials offer adequate cushioning and resistance to light bumps, knocks, or impact, they do not offer protection against rougher handling of the crate, especially when such materials become damp or wet. In addition, such materials must often be packed around the furniture after it has been placed in the crate. Furthermore, such loose materials often become dislodged from the area to be protected so that their effectiveness is lost.

The corners of the furniture, however, are not the only areas susceptible to damage. The furniture may move within the crate and its sides come into contact with the walls of the crate thereby scratching, nicking, denting, and the like the exterior surfaces of the furniture. For this reason, the furniture is generally wrapped in a protective covering or padding before it is placed in the shipping crate. Though this has proved to be a reasonably effective method for protecting the sides of the furniture, the wrapping procedure is time consuming and the wrapping material is relatively expensive, both of which add to the cost of the furniture.

It is apparent that the considerations addressed to furniture are equally applicable to other goods, particularly scientific and electrical instruments and appliances. Such instruments and appliances many times include delicate components and elements which must be protected against shock and impact.

It is therefore an object of the present invention to provide an improved corner protector for articles placed in a crate for shipment, such as furniture, scientific instruments, appliances and the like.

It is a further object of the present invention to provide a corner protector for articles placed in a crate for shipment which has sufficient resiliency to cushion the article from the most severe bumps, knocks and other impacts upon the crate.

It is a further object of the present invention to provide a corner protector for articles placed in a crate for shipment which suspends the article within the crate to prevent blows or impacts upon the sides or corners of the crate from damaging the sides or corners of the article.

It is a further object of the present invention to provide a corner protector for articles placed in a crate for shipment which supports the article in spaced relation from the walls of the crate thereby eliminating the necessity of a protective cover or wrapping for the article.

It is a further object of the present invention to provide an improved corner protector for articles placed in a crate for shipment which is adapted to guide the article into proper position on the corner protector within the crate.

It is a further object of the present invention to provide a corner protector for articles placed in a crate for shipment which is sufficiently resilient to absorb impact upon the crate.

It is a further object of the present invention to provide a corner protector for articles placed in a crate for shipment which may be constructed in sheets readily adapted to be nested one upon the other for convenient storage.

These objects are accomplished by the corner protector of the present invention which comprises a hollow, pyramidal configuration made of plastic, such as foam polystyrene or the like. The corner protectors are positioned in the corners of a crate and each support a corner of the article to be shipped in the crate. In this manner the article is in spaced relationship from the walls of the crate. The configuration of the corner protector is such that it guides the article into proper position on the corner protectors within the crate. The corner protector is resilient and absorbs blows upon the crate. A plurality of the corner protectors may be made in the form of a sheet with a plurality of sheets being adapted to be stacked in nesting relationship for convenient storage.

The invention, both as to its organization and method of operation, taken with further objects and advantages thereof, will best be understood by reference to the following description taken in connection with the accompanying drawings, in which:

FIGURE 1 is a partially cut-away perspective view of a shipping crate in which the corner protectors of the present invention are employed to protect an article being shipped in the crate;

FIGURE 2 is a perspective view of the corner protector illustrated in FIGURE 1;

FIGURE 3 is a side view of the corner protector illustrated in FIGURE 1;

FIGURE 4 is an enlarged fragmentary view of the corner protector illustrated in FIGURE 1;

FIGURE 5 is a plan view of a molded sheet comprising a plurality of the corner protectors illustrated in FIGURE 1; and

FIGURE 6 is a perspective view of the sheet of corner protectors illustrated in FIGURE 5.

Referring now to the drawings, and more particularly to FIGURE 1, the corner protector of the present invention is indicated generally by reference numeral **10**. The corner protector **10** protects the corners and sides of an article shipped in a crate from being damaged by bumping or knocking of the shipping crate, particularly blows on the corners of the shipping crate. The corner protector **10** is made of a plastic material, such as foam polystyrene, which is sufficiently resilient to absorb impacts upon the crate and, on the other hand, possesses sufficient strength to support the article in spaced relationship with the walls, floor and top of the crate. These characteristics are not materially altered by the protector **10** coming in contact with water. In this manner the

article will not be damaged by blows on the side or corners of the crate in which the article is shipped. Likewise, the need for a protective covering or padding on the article is obviated.

More specifically the corner protectors 10 are illustrated in FIGURE 1 employed in a crate 13 to support a chest of drawers 11 being shipped therein. The chest of drawers 11 was prepared for shipment by placing a corner protector 10 in each corner of the bottom of the crate 13. The chest of drawers 11 was then lowered into the crate 13 and onto the corner protectors 10, the corner protectors 10 guiding and properly positioning the chest of drawers 11 within the crate 13 in a manner described in more detail hereinafter. Additional corner protectors 10 were then placed on the top corners of the chest of drawers 11 as shown in FIGURE 1 and the top of the crate secured by suitable means.

In this manner the chest of drawers 11 is resiliently supported within the crate 13 and is in spaced relationship with the walls, top and floor of the crate 13. The chest of drawers 11 is ready to be shipped.

Referring now to FIGURES 2–4 the corner protector 10 of the present invention is illustrated in more detail. The corner protector 10 is made of plastic, such as foam polystyrene, by compression molding, injection molding, air injection molding or the like. It is composed of three isoceles, right-triangular sections 12, 14 and 16 of the same size. The isosceles edges of each right-triangular section are molded together with an isosceles edge of the other two right-triangular sections to form a hollow, pyramidal configuration having an interior surface 24 and an exterior surface 22 formed by the sides of these sections and an apex 18, the point where the three right-triangular sections 12, 14 and 16 meet. Each right-triangular section lies in a plane perpendicular to the planes of the other right-triangular sections. Therefore, the exterior surface 22 of the protector 10 will fit into and conform with the corner of any rectangular shipping crate and, likewise, the interior surface 24 of the protector 10 may receive rectangular corners or the like of the article to be shipped in the crate 13, such as the furniture chest 11 illustrated in FIGURE 1.

The thickness of the right-triangular sections 12, 14 and 16 determine how far the chest 11 in the crate 13 is spaced from the walls, floor and top of the crate 13. In this manner, the protection afforded by the corner protectors 10 may be enhanced by simply increasing the thickness of the triangular sections 12, 14 and 16 so as to increase the space between the article and the walls, floor and top of the crate 13.

Each right-triangular section 12, 14 and 16 has a rounded free edge 28 having a width corresponding approximately to the thickness of the triangular section which terminates at a juncture with the free edge 28 of another triangular section at corners 40, 42 and 44 of the protector 10. In each corner 40, 42 and 44 there is formed at the line of intersection between the adjacent triangular sections a guiding groove 26 which flares outwardly from the interior of the protector 10 as best seen in FIGURE 4.

The guiding groove 26 performs the important function of guiding the article as it is lowered into the crate 13 onto the interior surface 24 of the corner protectors 10 which have been placed in the corner of the crate 13. As it is important that the corner portectors 10 fit snugly between the corner of the crate 13 and the corner of the article which is to be shipped in the crate, such as the chest of drawers 11, there is a tendency for the corners of the article to become stuck on the uppermost corner of one or more of the protectors 10 as the article is lowered into the shipping crate 13. The guiding groove 26, however, minimizes this problem by receiving the corner of the article and directing it into the interior surface 24 of the corner protector 10. In this manner, the article does not become stuck on the top of the corner protector 10 and, likewise, does not have a tendency to dislodge the corner protector 10 from its position in the corner of the crate 13.

It will be understood that the corner protector 10 is symmetrical in that it may be laid on the exterior side of any triangular section 12, 14 or 16 and is thereby in proper position to receive the article to be shipped. Thus, any guiding groove 26 may be called upon to perform its intended function, depending solely upon which triangular section happens to be placed on the floor of the crate 13.

In manufacturing these corners protectors 10 an important consideration is that they be rapidly made in large quantities. Furthermore, it is desirable that they be shipped to the consumer in a form that may easily be stored prior to use and, on the other hand, in a form wherein they are readily available for use. To these ends, as illustrated in FIGURES 5 and 6, a plurality of corner protectors 10 are molded into a sheet indicated generally by reference numeral 32, by conventional compression molding, injection molding or air injection molding. The interior surface 24 of the corner protectors 10 in the sheet 32 open to one side of the sheet 32 while the apexes 18 of these protectors 10 lie in a plane on the other side of the sheet 32. The free edge 28 of each corner protector 10 is connected substantially at its midpoint to the midpoint of the free edge 28 of the adjacent corner protector 10 by a sprue 30.

The corner protectors 10 are symmetrically arranged in the sheet 32 to get the most number of protectors 10 in the sheet 32 in the least amount of space. This is accomplished as shown in FIGURES 5 and 6 by placing the apexes 18 of the adjacent corner protectors 10 equidistant from one another, the free edge 28 of the corner protector 10 being substantially parallel to the free edge 28 of the adjacent corner protector 10. In addition, if more than six protectors comprise the sheet 32, as illustrated in FIGURES 5 and 6, they are arranged such that the apexes 18 of at least six of them will lie on the circumference of a circle which lies in the plane of these apexes 18. Thus, as shown in FIGURE 5, six of the corner protectors 10 have their apexes 18 on the circumference of a circle 33, indicated in dotted lines, having a center 35. As more protectors are placed in the sheet 32, they likewise have apexes 18 which will lie on the circumference of various circles having the same center 35, such as circle 37 and circle 38 indicated in dotted lines in FIGURE 5.

It will be readily understood that the sheet 32 illustrated in FIGURES 5 and 6 is adapted to be made with plastic, whether it be a foam or non-foam plastic, by compression or injection molding, both techniques being well known in the art.

It will be understood from FIGURES 5 and 6 that the arrangement of the corner protectors 10 in the sheet 32 renders them readily adapted to be stacked one upon the other for storage. Thus the apexes 18 of the corner protectors 10 of one sheet will slide into the open hollow portions of another sheet 32 and nest therein, allowing the sheets 32 to be stacked one upon the other without taking up excessive space. It will be further understood that storing the corner protectors 10 in the form of a sheet 32 is more convenient than trying to store a plurality of individual corner protectors 10.

Furthermore, it will be understood that the corner protectors 10, when desired for use, may be broken off of the sheet 32 by merely gripping the corner protector 10 and tearing it to free it by a shearing action on the sprues 30. Likewise, the corner protectors 10 may be severed from the sheet 32 by cutting the sprues 30.

While the embodiment described herein is at present considered to be preferred, it is understood that various modifications and improvements may be made therein, and it is intended to cover in the appended claims all such modification and improvements as fall within the true spirit and scope of the invention.

What is desired to be claimed and secured by Letters Patent of the United States is:

1. A corner protector integrally molded with plastic which comprises three isosceles right-triangular sections, the isosceles sides of each of said triangular sections being connected with an isosceles side of one of the other triangular sections to form a hollow pyramidal configuration, the non-isosceles sides of each of said triangular sections forming corners on said pyramidal configuration, at least one of said corners having a guiding groove therein flaring outwardly from the interior of said hollow, pyramidal configuration.

2. A corner protector integrally mounted with foam polystyrene which comprises three isosceles right-triangular sections, the isosceles sides of each of said triangular sections being connected with an isosceles side of one of the other triangular sections to form a hollow, pyramidal configuration, the non-isosceles sides of each of said triangular sections forming corners on said pyramidal configuration, each of said corners having a guiding groove in alignment with a line of intersection between adjacent triangular sections in the interior of said hollow, pyramidal configuration, said guiding grooves flaring outwardly from the interior of said hollow, pyramidal configuration.

3. A corner protector comprising three plastic, isosceles triangular sections, the sides of each of said triangular sections being connected with a side of one of the other triangular sections to form a hollow, pyramidal configuration having corners, at least one of said corners having a guiding groove therein flaring outwardly from the interior of said hollow, pyramidal configuration.

4. The corner protector of claim 3 wherein two of said triangular sections are isosceles right-triangular sections, the non-isosceles sides of each of said right-triangular sections forming one of said corners on said pyramidal configuration, said one corner having said guiding groove therein.

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