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PACKAGING METHOD AND APPARATUS

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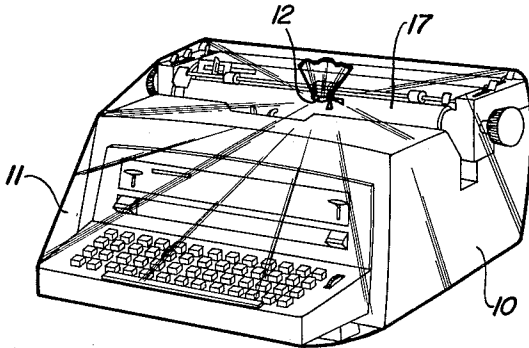


Fig-1

Fig-2

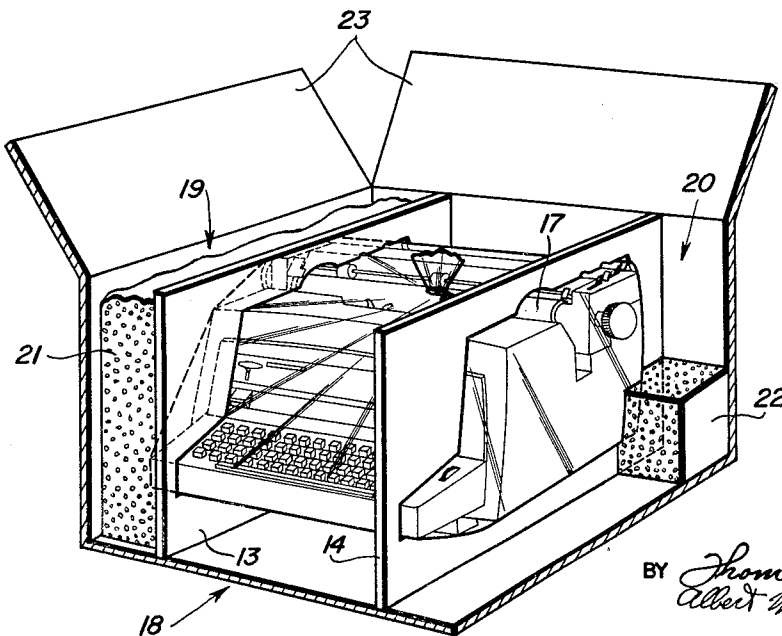
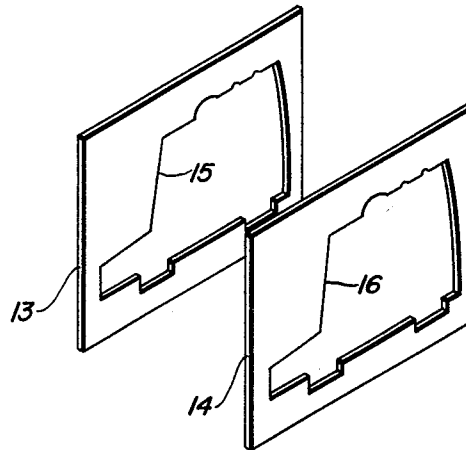


Fig-3

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PACKAGING METHOD AND APPARATUS

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This invention relates to a more efficient method and apparatus for inexpensively packaging delicate or precision equipment that is to be protected from the impacts, vibrations and other jarring forces normally incident to commercial handling, shipping and/or storage.

The many presently available types of packaging arrangements are relatively expensive in that either the container unit itself is relatively complex in construction or the inventory storage for the container units requires too much warehouse space. The recent improvements in foam-in-place techniques for packaging have not been entirely satisfactory in some cases such as where the article to be packaged has many projecting elements. Here when such articles are completely embedded in a foam sheath the unpacking operations may become tedious and time consuming in that, among other things, the foam sheath must be broken into many pieces in order to allow the complete withdrawal of the packaged article.

The primary object of the instant invention is to provide a more efficient low cost packaging arrangement.

Another object of the invention is to provide an improved method and apparatus for packaging products whereby the inventory space requirements for the container unit is greatly reduced.

Another object of the invention is to provide a novel method and apparatus for packaging products whereby a single type of container unit is capable of properly packaging any one of many different shaped products.

Another object of the invention is to provide a novel foam-in-place technique of packaging a product whereby only a relatively small predetermined part of said product is ultimately surrounded by foam material.

Another object of the invention is to utilize a plastic foam in the packaging of a product in an outer container whereby said outer container and said product effectively define only a predetermined portion of the walls of the mold cavity in which the said foam is allowed to set.

Still another object of the invention is to provide an improved method and apparatus for packaging a product in an outer container whereby a liquid plastic foam is permitted to be molded about only predetermined end portions of said product after the latter has been positioned in a predetermined location in said outer container.

A further object of the invention is to provide a novel method and apparatus for packaging a wrapped product in an outer container whereby a pair of apertured product supporting partitions are placed over the sides of the wrapped product and, in combination with the sides of said wrapped product and the respectively adjacent container end walls, effectively define two isolated mold cavities or chambers in which foam producing materials may be deposited so that the latter may expand and set to the shape of the respective chambers.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same

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becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

FIGURE 1 is a perspective view of the wrapped product to be packaged.

FIGURE 2 is a perspective view of the product supporting partitions for the instant packaging arrangement.

FIGURE 3 is a cut away perspective view of the packaged product.

The instant disclosure will be made with reference to the packaging of a business machine, such as a typewriter, however it will be understood that this is for illustrative purposes and that various other similar types of products may be correspondingly packaged in the manner to be described. Referring to FIGURE 1 there is shown a typewriter 10 that is to be packaged for shipment. This typewriter is initially inserted in a lightweight bag made of any suitable material, such as polyethylene plastic, and the top of the bag is gathered and sealed by any suitable clamping means, such as illustrated at 12, in order to keep dust, moisture and other foreign matter away from the typewriter parts. A set of rectangular product supporting partitions 13 and 14 are prepared from any suitable material such as cardboard or the like, the length and height of each of these partitions respectively corresponding to the dimensions of the inner cross sectional profile of the container to be used. In said partitions apertures 15 and 16 are respectively formed and shaped so as to respectively closely correspond to the left and right side profiles of the typewriter 10. These partitions are positioned in mutual parallel relation over each side of the typewriter so as to extend in a direction which is substantially normal to the axis of the typewriter platen 17, and this assembly is then lowered into an outer container 18 as illustrated in FIGURE 3; container 18 being constructed of any suitable material such as corrugated cardboard or the like. When so lowered the peripheral edges of each of said product supporting partitions 13 and 14 will respectively engage the forward rear and bottom walls of the container 18. Under these conditions said partitions initially locate and retain the typewriter in the container in a predetermined central elevated position.

As may be readily seen the support partitions 13 and 14 in cooperation with the left and right side portions of the typewriter and the respectively adjacent end walls of the container establish two isolated foam molding cavities or chambers 19 and 20 at the left and right end portions of the container 18. Each of these chambers extends around at least a portion of each of the bottom, top, forward and rearward side edges of the typewriter; or stated otherwise the sides of said typewriter respectively project a short distance into the respective mold chambers 19 and 20. Into each of these chambers there is introduced a mixture of foam producing materials in proportions to give the desired strength, density and resiliency to the foam produced. The foam producing materials used here may be any one of the many well known mixtures of this type. For example, any one of the several well known polyurethane foam materials may be used, or a foam producing material such as described

in U.S. Patent 2,842,506 may be employed. When small predetermined amounts of such foam producing materials are deposited in each of the chambers 19 and 20 the plastic foam which is produced will expand and fill each of these cavities to a nearly full condition as illustrated by FIGURE 3. When the foam hardens or sets molded end caps 21 and 22 of resilient plastic material will have been formed which snugly surround just the left and right side portions of the typewriter. For purposes of clarity in illustration the greater part of the end cap 22 has been cut away in the perspective view of FIGURE 3. The foam material faithfully extends into the various corners, crevices, etc., of the mold chambers 19 and 20 thus insuring that the packaged product 10 is subsequently yieldably held in a substantially fixed central position relative to the outer container. In this type arrangement the support partitions 13 and 14 together with the adjacent flexible membrane defined by the walls of the plastic bag 11 act as dams or barriers to prevent the flow of foam material over more than just the predetermined side portions of the typewriter, the major central part of the machine remaining exposed. Here no difficulty is experienced in subsequently unpacking the typewriter in that no foam material will have set or hardened in a locking relation with respect to one or more of the projecting parts of the wrapped typewriter 10. If any air is initially trapped in the plastic bag 11 it can cause a slight bulging of said bag in the open or exposed region between said partitions 13 and 14 and yet not interfere with or distort the proper shape of the respective foam molding chambers 19 and 20.

The packaging operation is completed by closing the container 18; the container lids 23 being folded over the top edges of partitions 13 and 14 and sealed in any conventional manner. The typewriter 10 will then be yieldably supported at predetermined points against the many multidirectional forces which will be experienced in the subsequent handling and shipping operations. When the typewriter is to be unpacked the container is opened, as by a suitable tear strip or the like, and the lids 23 folded back. After the container walls have been loosened from contact with the hardened foam the entire container contents may be removed as by grasping the gathered end of the plastic bag 11 and lifting the typewriter together with the support partitions and molded foam end caps clear of the container 18. Outward end pressure applied to the respective support partitions 13 and 14 will readily remove the same together with the molded foam end caps 21, 22 from the respective sides of the typewriter. The plastic bag 11 may then be opened and the typewriter 10, being fresh and clean, may be made available for immediate use.

The instant packaging arrangement has been found to have many significant advantages. The first is that the per unit cost of packaging typewriters is greatly reduced. Further, the inventory storage space required for the flat partitions, such as 13 and 14, and the collapsible cardboard containers, such as 18, is relatively small. Also the space required for storage of the drums holding the said foam producing materials is relatively very slight in that the foam to liquid volume ratio is here in the order of 30 or 40 to 1. Another advantageous feature here is that only a portion of the total volume of the container 18 is filled with foam, this requiring less of the foam material and further lightening the package. In addition the foam may lightly adhere to the walls of the container during and after hardening thus increasing the structural rigidity of the container as a whole and at the same time preventing movement of the packaged product 10 towards the top of the container as seen in FIGURE 3. A packaged unit such as illustrated here has been tested under the most severe conditions and has been found to keep all foreign matter away from the machine and to be capable of effectively insulating the packaged typewriter from the

random impact forces which are normally expected to be experienced by the package unit.

The instant arrangement lends itself nicely to the use of high speed automatic processing equipment which requires little, if any, costly labor time. As will be apparent products having various shapes and sizes may be packaged using the instant method and arrangement, the molded end caps formed by the mutually isolated mold cavities corresponding to chambers 19 and 20 conforming to side or end contours of the particular product involved.

While there is in this application specifically described one form which the invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration only and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

The invention claimed is:

1. A package arrangement; comprising a product to be packaged, wrapping means surrounding said product, a set of foam damming partitions, an outer container, said partitions each being formed with an aperture which corresponds to the profile of one part of said product, the outer edges of said partitions being adapted to engage the inner walls of said container when said partitions are placed over the related parts of said product and together with the product are placed in said container, and plastic foam end caps molded by and in the respective spaces between said partitions and the respective adjacent walls of said container.

2. A package arrangement; comprising a product to be packaged, wrapping means effectively sealing said product, an outer container, a set of foam damming partitions each formed with an aperture having a shape which corresponds to the profile contours of a predetermined related portion of said product, said partitions being respectively placed over the related product portions and at least some of the peripheral edges of each of said partitions engaging the inner walls of said container, said partitions serving to initially orient and support said product in said container in a desired position and in combination with said product and the respectively adjacent container walls to define a set of mutually isolated foam receiving chambers, and plastic foam end caps formed by and in said chambers and respectively surrounding just those side portions of said product that respectively project into said foam receiving chambers.

3. A package arrangement, comprising a business machine, wrapping means for surrounding and effectively sealing said business machine, an outer container, a set of foam damming partitions, each of said partitions having an aperture formed therein which corresponds to the profile of a related side of said business machine, said partitions being disposed over the respective related sides of said machine and having peripheral edges which engage the respective adjacent inner walls of said container in a predetermined manner, and plastic foam end caps molded around just said side portions of said products, the outer surface portions of said end caps being in contact with the inner walls of said container and the inner surface portions of said end caps respectively being in contact with said foam damming partitions and the respective related wrapped sides of said business machine.

4. A package arrangement; comprising a typewriter to be packaged, a plastic bag covering and effectively sealing said typewriter, an outer container, a pair of foam damming partitions each having an aperture formed therein which has a shape that corresponds to the profile of a related side of said typewriter, said partitions being disposed over the related sides of the typewriter and having peripheral edges which respectively engage the walls of said container so as to initially orient and support said typewriter in predetermined desired position in said container, said partitions and the wrapped sides of said typewriter together with the respectively adjacent ends of said

container respectively defining two isolated foam receiving chambers each of which surrounds just a predetermined part of the related side of said typewriter, and plastic foam end caps respectively molded to shape by and in said chambers so that said typewriter is yieldably supported and retained in a predetermined position in said container.

5. Apparatus as defined by claim 3 wherein said partitions and outer container are made of cardboard, and wherein said partitions are substantially rectangularly shaped and are disposed in substantially parallel planes

that are substantially normal to the axis of the platen of said typewriter.

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