July 6, 1965 S. MANTELL ETAL 3,192,680

PACKAGING METHOD

Original Filed Nov. 25, 1960

Fig_1

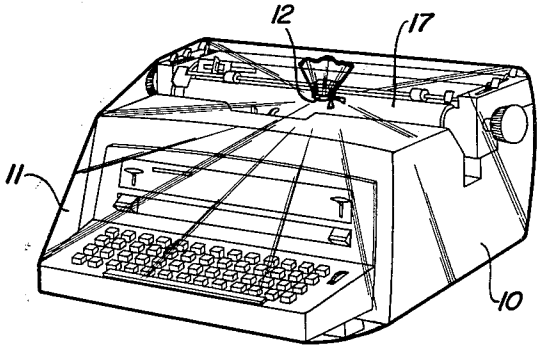


Fig_2

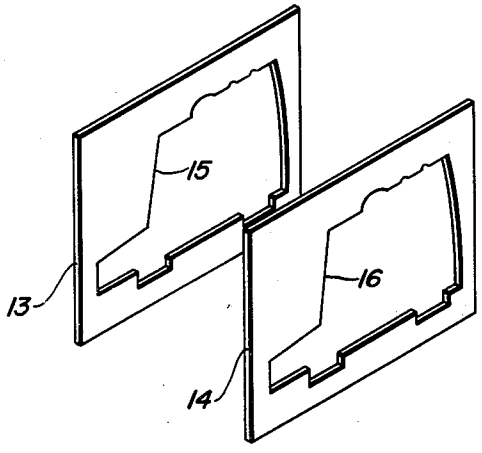
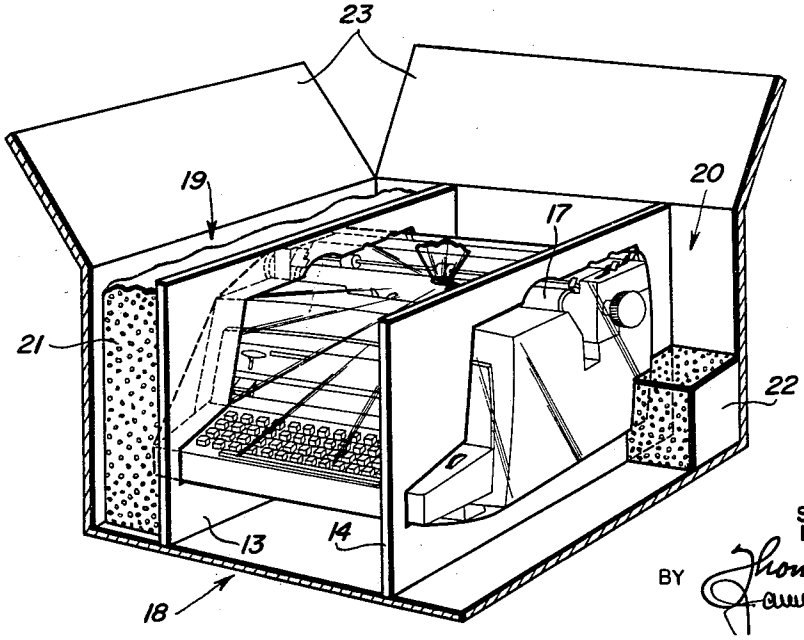


Fig_3



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PACKAGING METHOD

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Original application Nov. 25, 1960, Ser. No. 71,530, now Patent No. 3,033,358, dated May 8, 1962. Divided and this application Feb. 28, 1962, Ser. No. 176,303

2 Claims. (Cl. 53—27)

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.

This application is a division of the copending application of Stanley Mantell et al., Serial No. 71,530, filed November 25, 1960 for Packaging Method and Apparatus, now Patent No. 3,033,358.

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 unpackaging 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 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 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 light-weight 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, thus 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 beeen 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** comforming to side or end contours of the particular product involved.

While there is in this application specifically described one form which the invention any 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. In a method of packaging in a container a product having opposite sides of irregular contour, the steps of

imperviously sealing the product in wrapping material,

forming holes in a pair of substantially rigid bulkheads contoured to snugly receive the said sides of the product,

inserting said product sides through said holes whereby the product is supported against movement in two directions,

disposing said bulkheads and supported product in said container with said bulkheads spaced inwardly of their respective adjacent container sides thereby forming a pair of spaced chambers,

introducing a foam producing material into said chambers only whereby when said material sets said product will be resiliently supported in a direction normal to the planes of said bulkheads,

and closing said container.

2. A method of packaging a product in an outer container normally open at one side, comprising the steps of

wrapping the product in an impervious sheath,

interiorly contouring a pair of substantially rigid bulkheads to the profiles of inner portions of opposite sides of said product whereby portions of the product project through said bulkheads when installed therein,

placing said bulkheads in parallel relation about inner portions of the opposite sides of said wrapped product whereby to substantially rigidly support said product against movement in the direction of the planes of said bulkheads,

placing said product loaded bulkheads in said container to form spaced and unconnected chambers with respective opposed sides of said container and with opposed edges of said bulkheads resting against opposed sides of said container when the container is closed whereby to preclude any substantial movement of said bulkheads and accordingly said product in directions normal to said opposed container sides,

placing in said chambers foam producing material expandible to at least partially fill said chambers and set to the contours of the projecting exposed wrapped portions of said product to resiliently support said product transversely of said bulkheads,

and closing the said open side of said container to prevent movement of said bulkheads relative thereto.

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