

Dec. 23, 1969

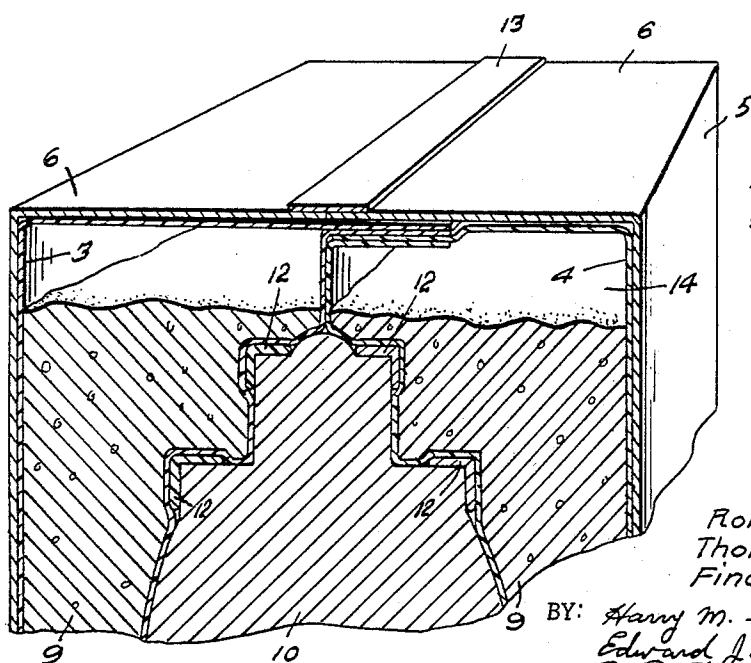
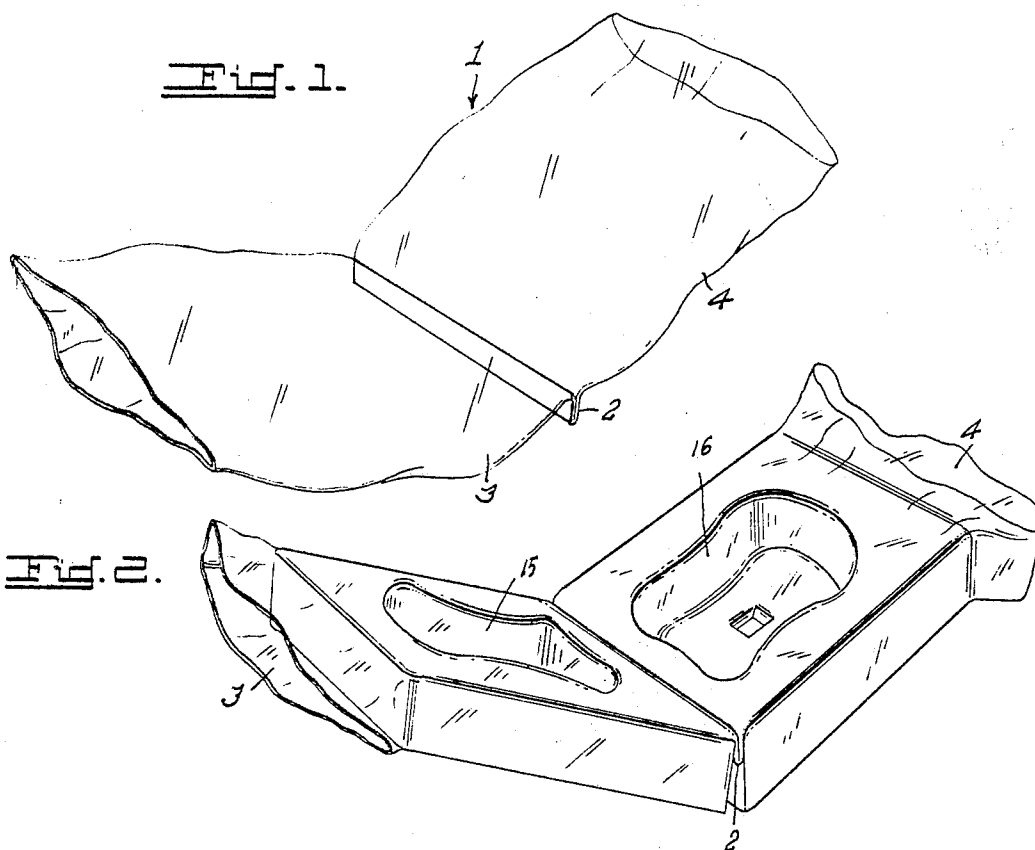
R. MCGILL ET AL

3,485,347

FOAMED-IN-BAGS PACKAGING

Filed May 27, 1968

3 Sheets-Sheet 1



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Fig. 4.

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Fig. 3.

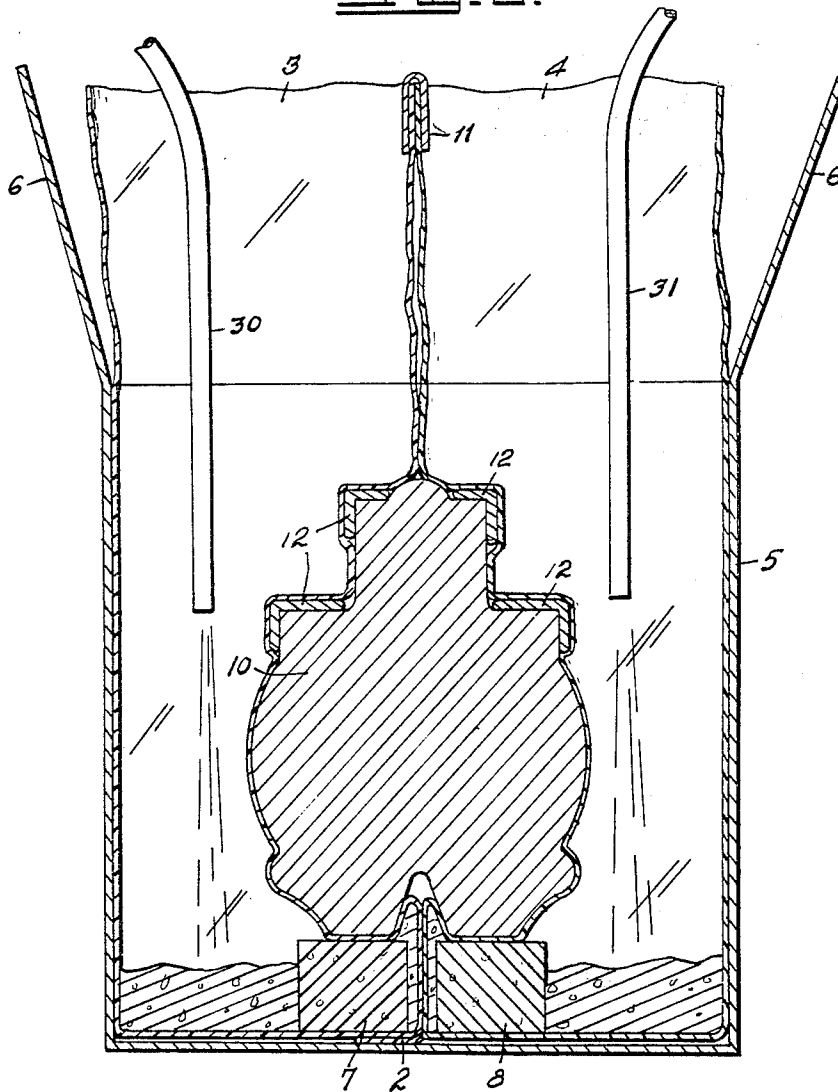
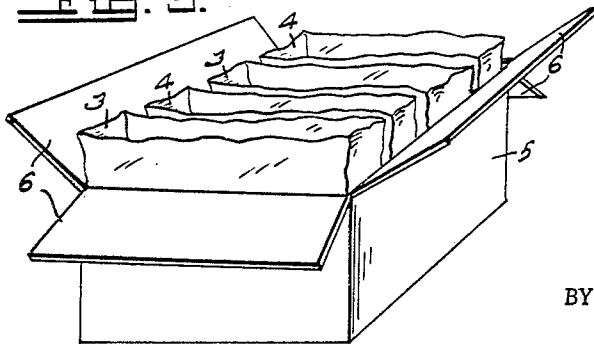


Fig. 5.



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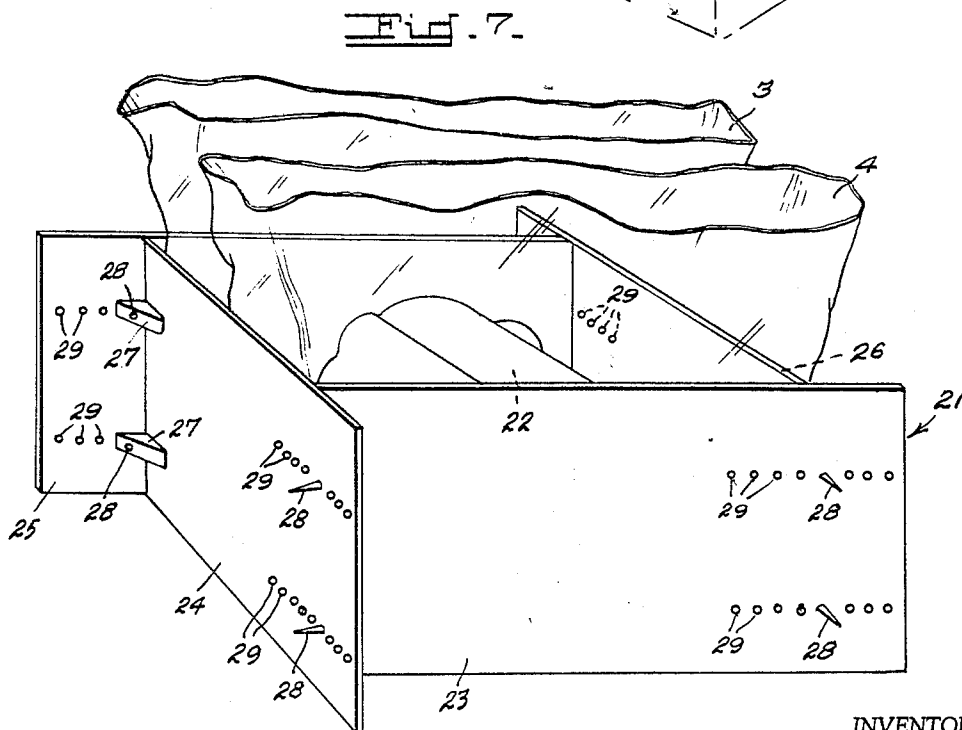
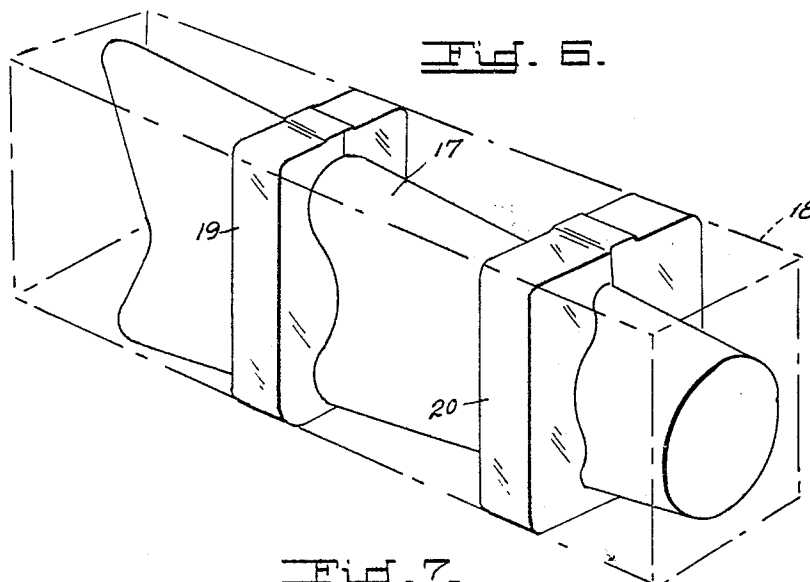
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FOAMED-IN-BAGS PACKAGING

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7 Claims

ABSTRACT OF THE DISCLOSURE

A means of packaging an item consisting of placing the item between halves of a folded plastic bag which is placed in a container such as a fiberboard carton, then filling the bag halves with a liquid foaming material which forms a cellular solid, such as rigid polyurethane foam to provide protective molds about the item. When unpacking the item, it is only necessary to pull the bag halves out of the carton and separate them to completely free the item, the molds being reusable if needed.

The invention described herein may be manufactured, used, and licensed by or for the Government for governmental purposes without the payment to us of any royalty thereon.

It has become common practice to package items for shipment by a method that is known as "foamed-in-place." This method consists of placing the item to be packed in a carton, the item being supported in the carton so that there will be a space surrounding it. Then a mixture of chemical ingredients (usually in part, a polymeric-isocyanate) is poured into the carton in liquid form. The resultant chemical reaction produces heat and gas evolution causing an expansion of the mass. This foaming mass surrounds the item and molds itself to the item contour, thereby providing excellent support and/or cushioning when the mold hardens or cures.

However, the aforesaid method presented further problems. To remove the item it was necessary to break away the mold. The mold was then destroyed and hence not usable again.

Also, the mold did not break away clean from the item and the item had to be cleaned to remove particles therefrom, a laborious task if the item was of complicated structure, such as machinery parts or mechanisms. Moreover such removal often resulted in the damage to delicate parts.

To permit clean removal of the item, it was wrapped in a plastic bag before molded, such as a polyethylene bag, the polyethylene being impervious to a polymeric-isocyanate mix.

While the above procedure eliminated the problem of adherence of the foam to the item, the problem of reuse of the mold remained, as well as the time consumed to break away the mold from the item.

Finally the problem of adherence of the mold to the carton itself still remained.

Many ways were devised to remove the mold from the item and/or the carton. One method being the use of tear wires, perforated strips along the carton, etc., which of course destroyed either or both the carton and the mold and rendered them unfit for further use.

Since the mold material was opaque, no visual inspection of the item was feasible unless the item was removed by destroying the mold.

The present invention is designed to overcome the aforesaid problems by placing the item to be packed between

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halves or folds of a flexible tube which has been infolded at its center and if desired heat sealed along the medium portion of the fold thereby forming two bags joined together. The connected bags or compartments are placed in a carton and the item is supported between each of the tube halves or bags. Each of the bags are then filled with the foaming mixture.

As the mass expands, the bags fill and flex, allowing the foam to fit both the surface contours of the item and the cavity around the item in the carton.

The molds may be easily removed from both the carton and the item since they are provided with a confining skin which cannot adhere to either the item or the walls of the carton. The item may be inspected freely without damage to the carton, item or the molds. The molds will of course be reusable if desired.

It is therefore a principal object of this invention to provide a divided packaging mold for protecting an item for shipment whereby the item may be removed easily and quickly and without damaging the mold or the container.

Another object is to prevent adherence of the mold to either the item or a shipping carton.

A further object is to provide a divided packaging mold for an item that is reusable.

A still further object is to provide a divided mold for protecting an item in shipment by placing the item between the inner sides of two joined plastic bags and filling the bags with a liquid foamable plastic such as a polyurethane reaction mixture which forms a solid cellular mass. Other well known plastic foams may be also utilized.

These and other objects and advantages of the present invention will be fully apparent from the following description when taken in connection with the annexed drawing, in which:

FIG. 1 is a perspective view of a length of tubular plastic material, sealed at its middle to form two compartments or bags for forming the divided mold of this invention;

FIG. 2 is a perspective view of the completed mold with a hinge and being opened;

FIG. 3 is a cross sectional view of a carton and the joined bags positioned therein with an item to be protected by the mold in position therebetween;

FIG. 4 is a partial view, in perspective, showing the bags folded together at their tops and the carton sealed, and ready for shipment;

FIG. 5 is a perspective view showing an arrangement of bags for packing two items;

FIG. 6 is a perspective view showing two molds as supporting an elongated item, and,

FIG. 7 is a perspective view of an adjustable frame for forming a mold when the item requires no carton for protection.

Referring in detail to the drawings in which like reference numerals designate like parts throughout the several views, 1 indicates generally a tubular, plastic material such as is commonly known on the market as polyethylene. This material is folded as at 2, and preferably heat sealed along the median portion of the fold whereby two separate compartments or bags 3 and 4 are formed, as seen in FIG. 1.

The tubular material 1 is now ready for preparation of the mold and its use is best seen in FIG. 3. A container of fiberboard or the like which will be used for shipment is indicated by 5 and has closing flaps 6.

The tubular material 1 is placed in container 5 in the folded position with the compartments or bags 3 and 4 upright and with their ends protruding from the container

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and with the heat seal fold 2 lying along the container length as shown.

Now a support is placed, one support 7 in one bag half 3 and another support 8 in bag half 4, as shown. As many supports may be used as required and they may be of polyurethane foam which is left over as scrap from other molds.

Then an item 10 is placed between the inner sides of the bags 3 and 4 to rest upon supports 7 and 8.

Finally, the inner sides of bags 3 and 4 are secured together by a length of tape 11 temporarily.

If the item 10 is of a contour that contains sharp edges, etc., cushion pads of protective material 12 may be placed about them, as shown, for protection of the bag halves 3 and 4.

The assembly is now ready for pouring of the liquid foam producing mix. This mix can be accomplished by hand, using stirring rods or paddles; motor driven blades, aerosol cans; or dispensing machinery. Pouring is done from a source such as one of the existing dispensing systems, not shown, now in use and fed into the bags 3 and 4 by conduits 30 and 31 respectively.

The proper quantity of foam to fill bags 3 and 4 is determined from the volume of the container 5, item 10, total volume of supports 7 and 8, and the density of the foam used.

If the item 10 is of symmetrical form, and the supports 7 and 8 are substantially of equal size and number, then half of the liquid mix will be fed into each bag.

If the contour of item 10 is not symmetrical it will be necessary to proportion the mixture accordingly to insure filling the cavities properly.

After the pouring is finished, the foam 9 will rise in bags 3 and 4 to fill out all the cavities.

The tape or fastening device 11 may now be removed and the ends of bags 3 and 4 are overlapped. The flaps 6 of container 5 are then closed as seen in FIG. 4 and sealed longitudinally by a tape 13.

It may be necessary to place a weight, not shown on the top of container 5 until the foaming ceases.

Once the foam 9 has set and cured the item 10 is considered ready for shipment.

If the foam 9 is allowed to extend beyond the closed height of container 5, the foam 9 can be cut off following curing, at the closed height of the container 5 allowing the flaps 6 to be folded.

Should foam 9 not completely fill the container and leaves a space 14, additional material may be added to fill the void.

Any number of items may be packed in a single container and a carton for two items is shown in FIG. 5 wherein four bag halves are shown.

In FIG. 2 there is shown the mold as opened to free item 10 therefrom. A heat sealed fold 2 acts as a hinge and after the bags are lifted from carton 5 all that is necessary is to open the mold book fashion.

The impression formed by item 10 is seen as at 15 and 16 in bag halves 3 and 4 respectively.

In case an elongated item is to be shipped, it may be impractical to completely fill the carton with the foam mix.

Item 17 is placed in an elongated carton 18, indicated in broken lines in FIG. 6. Here is shown two molds 19 and 20 acting as cradles. These molds are formed as the molds of FIG. 3 by using dividers, not shown, having a central cut out of the items contoured, or by any other expedient means.

Sometimes the nature of the item to be shipped may permit packaging without a carton. The mold in this case could be held together by tape, not shown.

Such a mold could also be formed by an adjustable frame as shown in FIG. 7. The bag halves 3 and 4 would be placed in the frame, indicated generally by 21 with an item 22 placed between the halves. The frame 21 consists of four sides 23, 24, 25 and 26. Each side has a pair of braces 27 having studs 28 fixed therein, only two braces

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being shown. Each side is identical. Studs 28 will be passed through a hole in a horizontally arranged line of holes 29 in each side. By adjusting the sides of the frame 21 the proper size of frame will be made to accommodate a correspondingly sized item. The frame 21 would of course rest on a flat surface, not shown.

In cases where it is necessary to eliminate any possibility of moisture damage to the item, then the item may be first wrapped in a polyethylene bag, not shown, before placement between the bag halves 3 and 4.

Two or more individual bags made by taping the medial fold 2, in lieu of heat sealing the fold 2, also may be used. The joining of the bags insures that the foam under the item forms a good cradle.

Flexible tubing, not forming two bags, could be used where the foam is of a low density to break away easily instead of hinging and where the reusability of the molds is of secondary importance.

While a preferred form of the invention is shown and described, other forms of the invention are contemplated and numerous changes and modifications may be made therein without departing from the spirit of the invention as set forth in the appended claims.

What is claimed is:

1. A packaging means including a carton and an item for shipment therein, said means comprising a length of flexible tubing open at each outer end positioned in said carton, said tubing being infolded in a transverse manner along a portion medially thereof and adapted to receive said item between the folds thereof, protecting members within said folded tubing for supporting said item in spaced relation from the floor of said carton and for protecting sharp edges on said item, and a foaming, resettable plastic material in each compartment formed by said folded tubing whereby a two part, hinged mold is formed encasing said item and filling said carton.

2. A packaging means as set forth in claim 1 wherein said flexible tubing is fabricated from a length of polyethylene material, said medial infold being heat sealed to effect a permanent hinge between said compartments formed by said infold.

3. A packaging means as set forth in claim 1 wherein said tubing is of a predetermined volume whereby when it is filled with said plastic foam it will completely encase said item and fill the void around said item in said carton.

4. A packaging means as set forth in claim 1 wherein said tubing is placed in said carton whereby the open ends of said compartments extend upward and above the top of said carton for folding and joining together.

5. A packaging means, including a carton, and an item to be protected for shipment therein, comprising two bags joined together at their bottoms, said bags being positioned in said carton, support means within each bag at the bottom thereof, a hinge formed by sealing each end joined together at the bottom portion of each bag with a tape, said item being positioned on said support means and between said bags and a foaming, resettable plastic material within said bags forming a mold around said item, said bags being joined together for shipment.

6. The packaging means of claim 5 wherein said hinge is formed by heat sealing together the bottom portion of said bags.

7. A packaging means as claimed in claim 1 wherein said carton comprises four identical, rectangular sides, each side having at least two vertically spaced rows of longitudinally aligned holes at their outer end portions, at least two vertically spaced brackets fixed on the inner ends of said sides, each bracket being in longitudinal alignment with a corresponding row of holes, and a stud carried by each said bracket whereby said sides may be arranged as a rectangular frame with said studs entering corresponding holes for adjusting said frame to accommodate mold and item assemblies of varying size.

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