April 11, 1961 A. S. LIEBESKIND 2,979,246

FOAM PLASTIC COATED CARTON

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FIG. 1

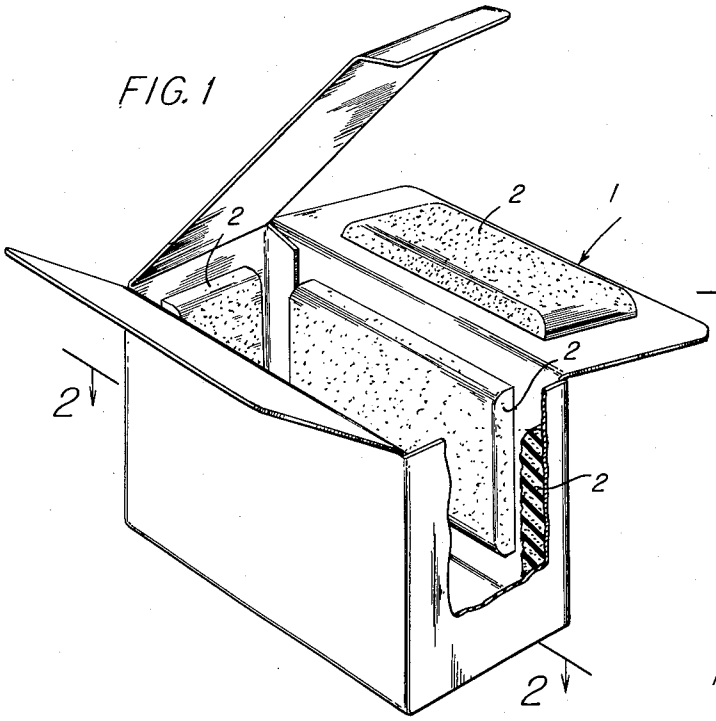


FIG. 2

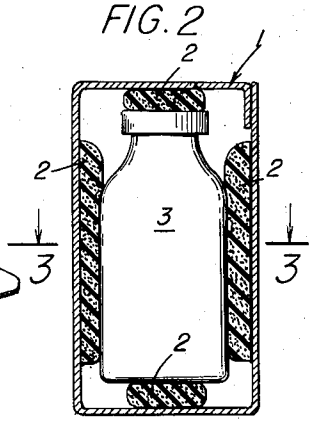


FIG. 3

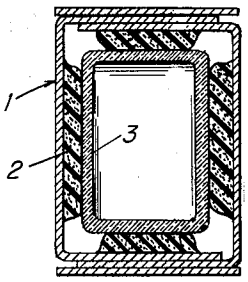


FIG. 4

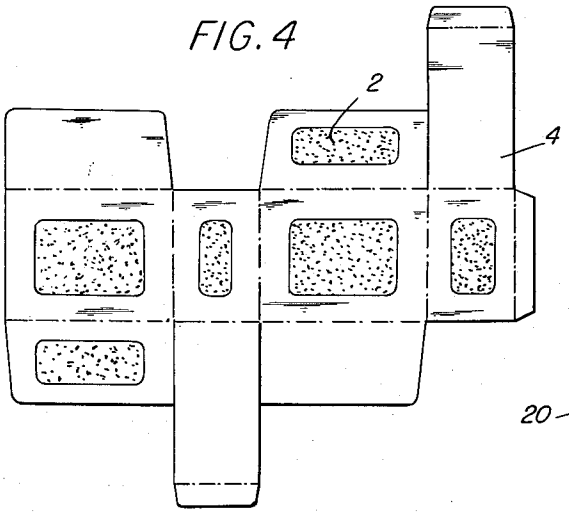


FIG. 5

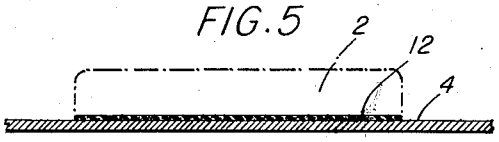
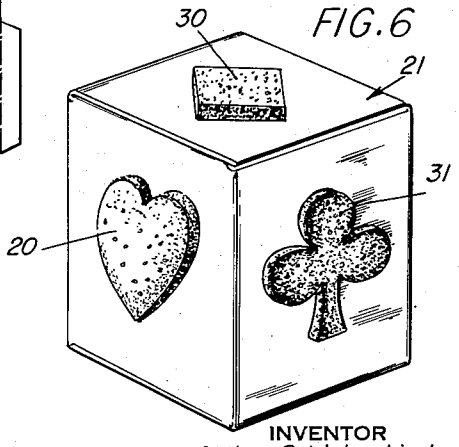


FIG. 6



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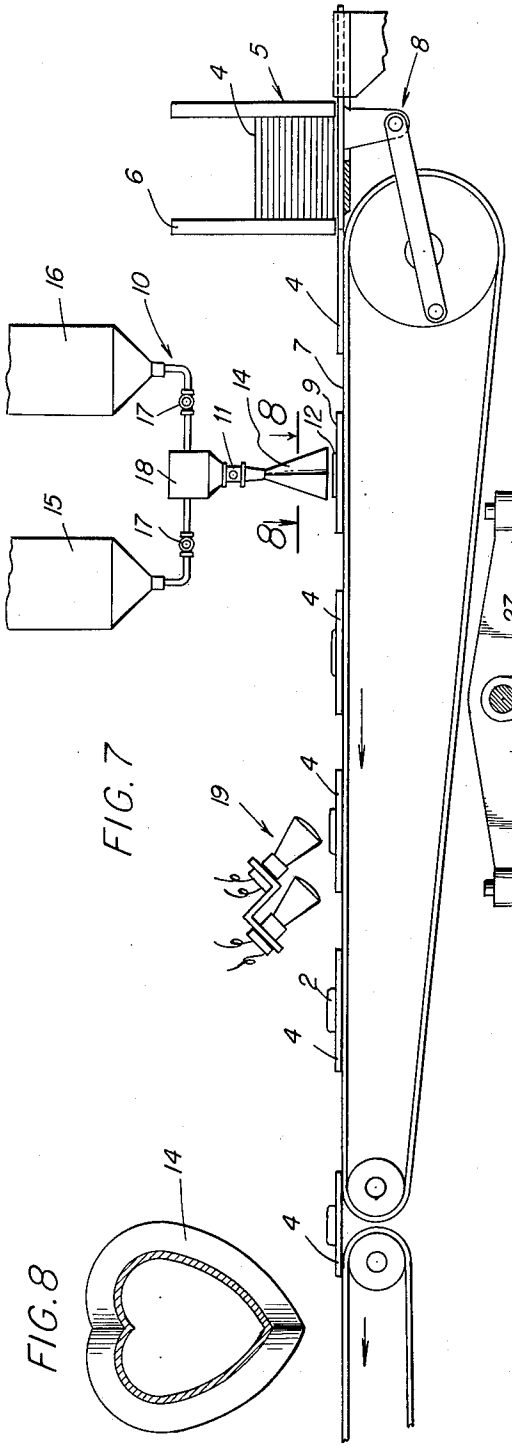

FIG. 7

FIG. 8

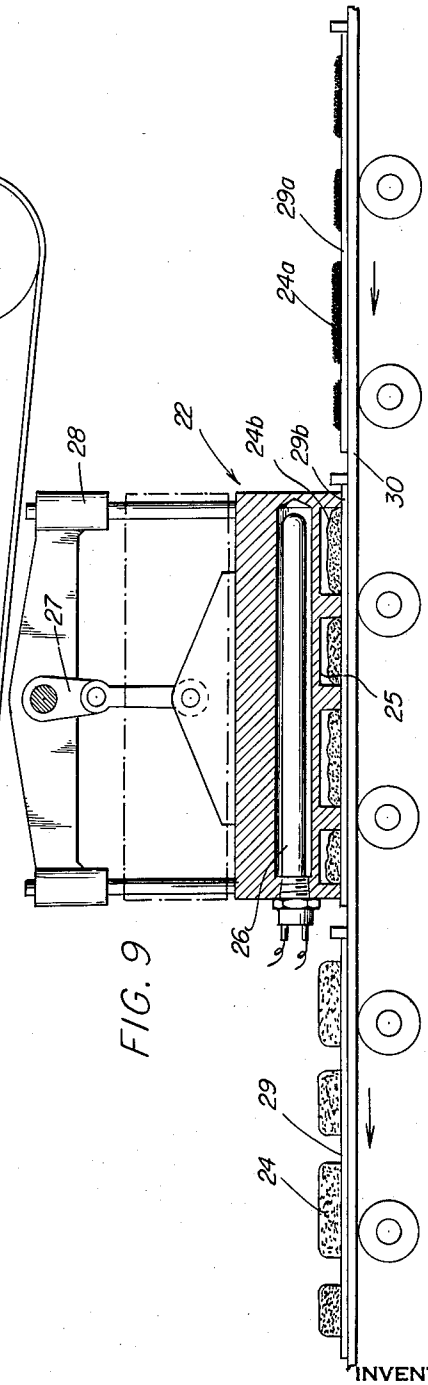

FIG. 9

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FOAM PLASTIC COATED CARTON

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3 Claims. (Cl. 229—14)

The present invention relates to an improved package and more particularly to an improved cushioned container.

Relatively thick or multiple layer package walls are presently used in several important packaging methods. Thus, some packages are provided with a resilient padding, such as a sponge rubber padding, to provide for a shock-resistant package and others are provided with relatively thick cellular-type wall coatings to form an insulated package. These resilient pads or coatings are now formed separately and are thereafter applied in their final form to the carton walls.

Other presently known types of cartons use multi-layer walls to obtain a relatively shock-proof package. In these presently known multi-layer wall packages, a single complex carton blank is cut for a subsequent involved folding operation to provide the multi-walled container or two separate blanks are used and they are separately folded and are then fitted together.

The present invention discloses the use of a relatively simple and effective foam-type resilient pad or cellular coating on a carton blank.

In the typical carton manufacturing process, sheets of suitable paperboard are first decorated by a suitable printing or other means. Thereafter the sheets are cut and scored according to the carton design to form flat blanks. The flat blanks are next partially folded and glued so that they are ready for filling with the packaged product. The filling step may be done by machine or hand. Where cushioning or insulation is required, separate steps are at present required to attach the padding or insulation to the cartons or to fold and insert a liner means. The present invention provides the cushioning or insulating layer as a related step in the initial carton blank formation.

An object of the present invention is to provide an improved cushioned or insulated package.

Another object of the present invention is to provide a speedily and simply formed resilient coating for folded cartons.

Another object of the present invention is to provide an efficient and easily formed insulated folding carton.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

Fig. 1 is a perspective view partially cut away of a folded carton having resilient cushions formed in accordance with the present invention;

Fig. 2 is a top plan view in section of a carton similar to that of Fig. 1 having a container fitted therein;

Fig. 3 is a sectional view taken along line 3—3 of Fig. 2;

Fig. 4 is a top plan view of a carton blank having resilient cushions thereon formed according to the present invention;

Fig. 5 is an enlarged fragmentary elevational view showing the original and final shapes of a typical foaming plastic applied to a carton blank in accordance with the present invention;

Fig. 6 is a perspective view of a folded carton having resilient cushions formed on its outer surface in accordance with the present invention;

Fig. 7 is a diagrammatic view illustrating means for performing the method of the present invention;

Fig. 8 is a cross sectional view of the plastic application nozzle taken along the line 8—8 of Fig. 7; and

Fig. 9 is a diagrammatic view of another embodiment of a means for performing the method of the present invention.

Fig. 1 shows a folded carton 1 having resilient foam plastic cushions 2 formed in place on the carton walls by means of the method of the present invention. The cushions 2 have a cellular or sponge-like characteristic, as will be more fully explained below, which results in a resilient cushion capable of providing a shock-proof mounting for a glass container 3 as shown in Figs. 2 and 3 or any other fragile article. The cushions 2 also provide an effective insulating medium due to the large number of air pockets therein which are characteristic of the foam plastic cushions.

The method of forming the foam plastic cushions 2 will now be described with particular reference to Figs. 4, 5, and 7.

At the right end of Fig. 7 a stack of carton blanks 4 is indicated at 5 in a suitable support 6. These carton blanks 4 are ready for their initial folding and gluing steps and the carton blanks 4 thus have been suitably decorated, cut, and scored. Before the blanks 4 are folded and glued, they are fed onto the conveyor 7 by an intermittent feed 8 for the application of the resilient foam plastic cushions 2 in accordance with the method of the present invention.

The conveyor 7 has a suitable intermittent drive which advances a carton blank 4 to a position indicated at 9 beneath the foam plastic applicator 10 each time that it operates. As a carton 4 is moved to point 9, the control valve 11 of applicator 10 is opened to apply a spot 12 of foaming plastic to the carton 4 in a shape controlled by the pattern 14 and at a depth determined by the "on" period for the control valve 11.

A known method of producing the unexpanded foam from commercially available components for its initial application to the blank 4 is indicated generally at 10.

A suitable polyester is placed under pressure in a first tank 15 and a catalyst such as a liquid diisocyanate is placed in a second tank 16 under pressure. The outputs of the tanks 15 and 16 are metered by suitable adjustable valves 17 and are mixed in a mixing chamber 18 which directs the mixture through pattern 14 onto the carton blanks 4 on the conveyor 7. A suitable polyester is marketed as Multron by the Mobay Chemical Company of New Martinsville, West Virginia. The same company markets a suitable isocyanate, Mondur. Other well-known mixes for foaming plastics may be used. The mixed polyester and diisocyanate form an adhesive liquid deposit on the blank 4 in a suitably shaped spot 12 which is relatively thin when first deposited. Almost at once a spontaneous foaming action occurs which causes the applied mixture to expand upwardly from a relatively thin layer 12 (Fig. 5) to form the relatively thick sponge-like plastic cushion 2. The foaming action of the polyurethane type of foam is speeded by heat

which is applied by a suitable source such as heat lamps 19. After cushions 2 of a suitable shape and arrangement have been formed on the blanks 4, the carton is fed continuously into regular folding and gluing machinery for the regular package forming steps.

Foaming types of plastic are well known, and any of the known types may be utilized in place of the above described chemically foamed types. It is characteristic of nearly all of these foamed plastics, including the polyurethanes, that they have adhesive qualities with respect to typical paperboard materials so that they adhere tightly to the carton blank after the termination of the foaming action.

The shape of the cushion 2 formed on the carton blanks 4 may be controlled by a suitably shaped nozzle or pattern 14. Thus round, square, or generally rectangular cushions may be directly applied by suitably shaped nozzles. Where an irregular or more complicated shape is desired, a hollow cone-type pattern may be used to direct the spray or flow of the plastic foam. The pattern shown in Figs. 7 and 8 has a heart-shaped cross section to form a finished cushion having a heart shape as shown at 20 in Fig. 6. The carton 21 shown in Fig. 6 has the foam plastic cushions formed on the outside where they may provide the dual function of decorating the carton in an unusual and attractive manner and at the same time provide a protective cushioning effect.

In Fig. 9 a heated mold 22 is shown being used to control and shape the expansion of foamed plastic cushions 24. The mold 22 has suitable cutouts 25 to control the cushion shapes and has a heater 26 in the vicinity of the cutouts to warm them to assist in the expansion of the foam plastic. A suitable drive 27 on the frame 28 raises and lowers the mold 22 to allow for the positioning and removal of the blanks 29 by the conveyor 30. In Fig. 9 the blank 29*a* has unexpanded foam plastic coatings 24*a* thereon before it is admitted to the mold. The blank 29*b* is in position beneath the mold 22 and the cushions 24*b* are shown in their partially expanded position before they completely fill the mold cutouts 25. The blank 29 to the left of the mold 22 has the completely expanded cushions 24. Any of the commonly known heat expanded plastics are suitable for use with the method using the mold 22. One such foaming plastic is expandable polystyrene, which is polystyrene beads with a heat-activated foaming agent added. These are available commercially and one suitable polystyrene bead is Dylite of the Koppers Company, Inc., of Pittsburgh, Pennsylvania. An adhesive coating is first applied to the carton blank 29 and the beads are then dusted onto the adhesive in the amount and pattern desired.

Fig. 4 shows a plan view of a carton blank 4 such as is formed by either of the above-described methods having resilient cushions 2 on its various flaps and panels. The cushions 2 are positioned on the blank 4 so that they take the desired positions in the subsequent gluing and folding operations to support or insulate the carton contents such as the bottle 3 shown in Figs. 2 and 3.

The properties of the cushions formed may be readily varied by changing the proportions of the plastics and the foaming agents. Thus, by increasing the proportion of the diisocyanates in the urethanes or the foaming agent in the polystyrene beads a lighter, more porous and more flexible cushion is obtained.

The position of the steps may be varied as desired and as convenient. Thus, the cushions may be formed at any point in the manufacture of the carton blanks and they may even be formed after the package is completed. The carton 21 shown in Fig. 6, for example, may have one or all of the cushions 20, 30, or 31 formed after the carton is set up and closed as shown.

It will be seen that the present invention provides an improved cushioned or insulated carton. The formation of the cellular cushions is relatively simple and is rapidly accomplished by the addition of a few simple steps as a part of the carton manufacturing process. The cushions may be formed in a variety of shapes and thicknesses by simple changes in the mixtures of the foam plastic ingredients or the thickness of their application to the carton blank. Cushioned or insulated cartons are provided at a relatively small cost as conventional single-wall folded containers are used and they are handled on regular carton blank automatic machinery with slight changes to provide for the application of the foam plastic.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. A flat unfolded carton blank of fibrous sheet material cut and scored to provide a plurality of panels adapted for erection as an article carton comprising the combination of a plurality of at least unfoamed cushions on the inner face of a plurality of its panels, each unfoamed cushioned panel being only partially covered by its unfoamed cushion and said unfoamed cushions being adapted to cooperate to provide article holding foamed cushions in the erected carton, said unfoamed cushions each comprising a body of foam-type plastic in an at least partially unfoamed condition whereby said unfoamed cushions may be expanded by causing the plastic to foam at any time subsequent to the application of the plastic to the carton blank panels.

2. The blank as claimed in claim 1 in which the foam-type plastic comprises a heat foamed plastic and the foam-type plastic is applied at a temperature below the foaming temperature.

3. The blank as claimed in claim 1 in which said foam-type plastic comprises polystyrene beads incorporating a compressed gas blowing agent.

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