

Aug. 14, 1945.

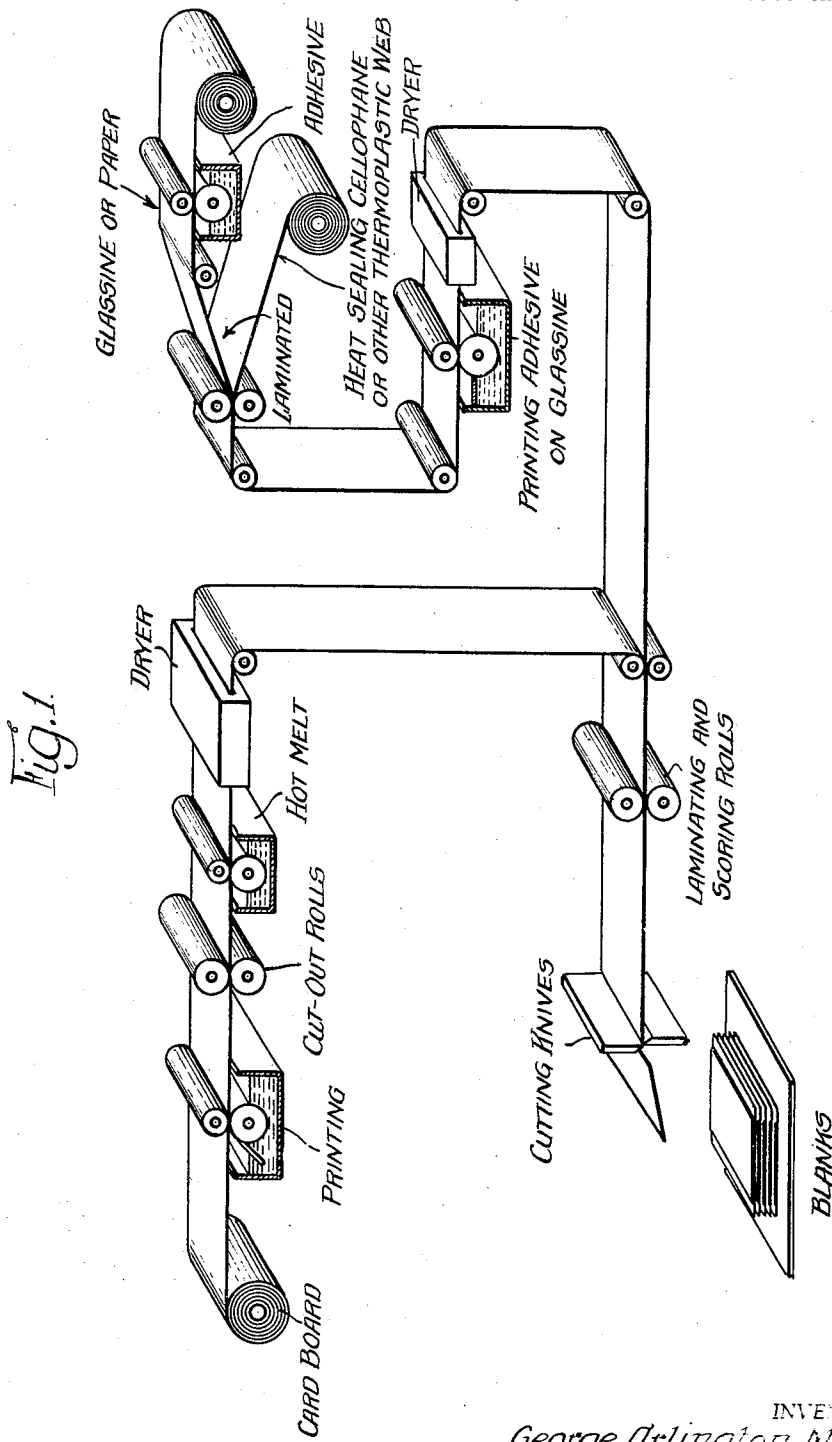
G. A. MOORE

2,382,573

CONTAINER

Filed March 3, 1943

3 Sheets-Sheet 1



INVENTOR

George Arlington Moore,
BY
Llewellyn H. Street, Warden
attys.

Aug. 14, 1945.

G. A. MOORE

2,382,573

CONTAINER

Filed March 3, 1943

3 Sheets-Sheet 2

Fig. 2. 20

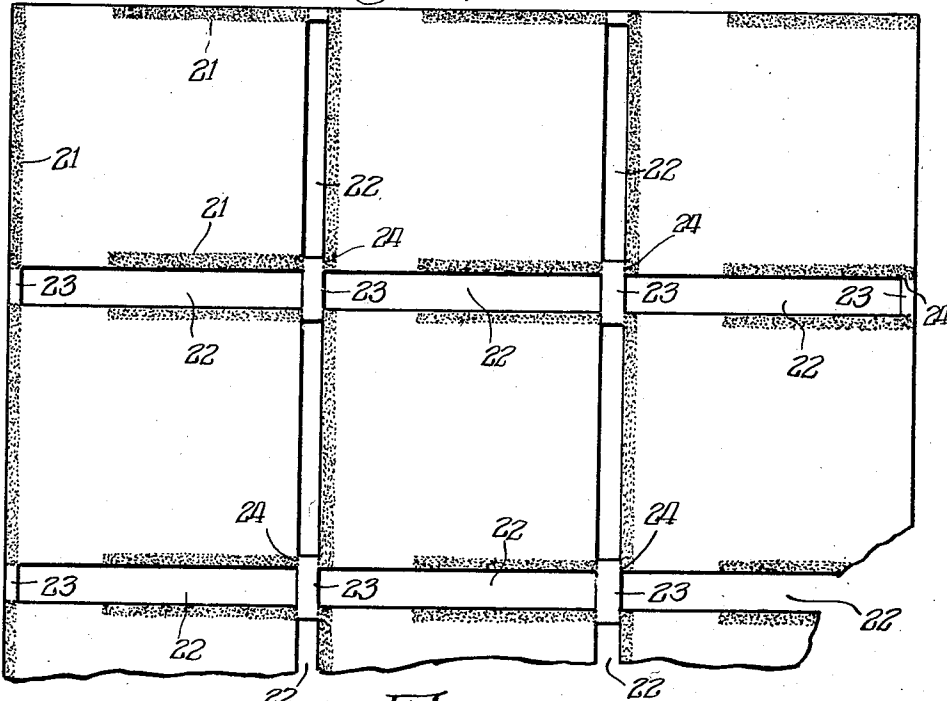


Fig. 3.

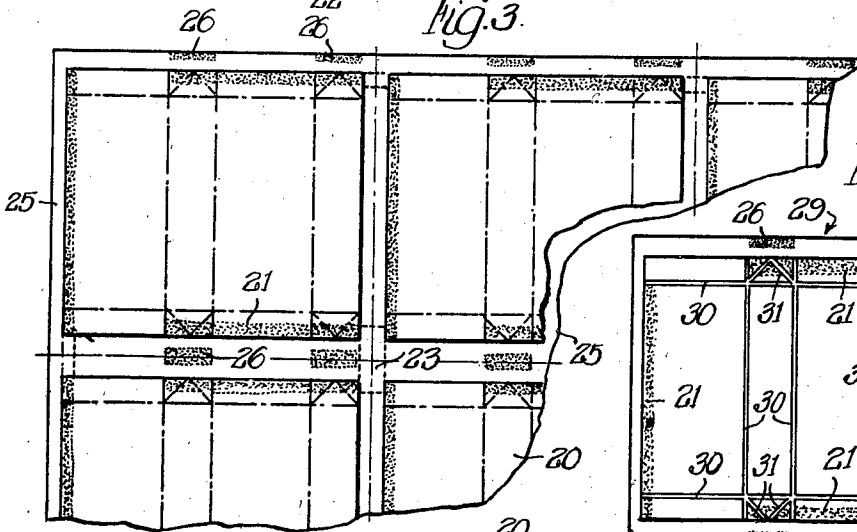


Fig. 4.

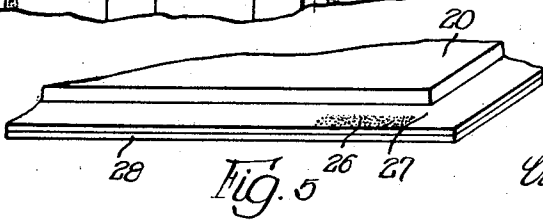
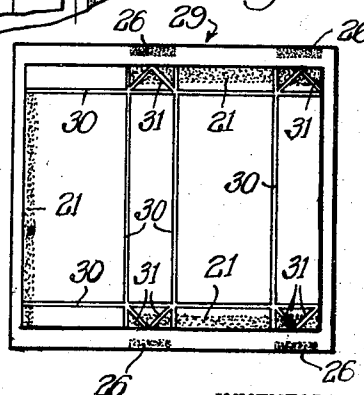


Fig. 5

INVENTOR.
George Arlington Moore,
BY
Cromwell, Bristol-Warden
ATTORNEYS.

Aug. 14, 1945.

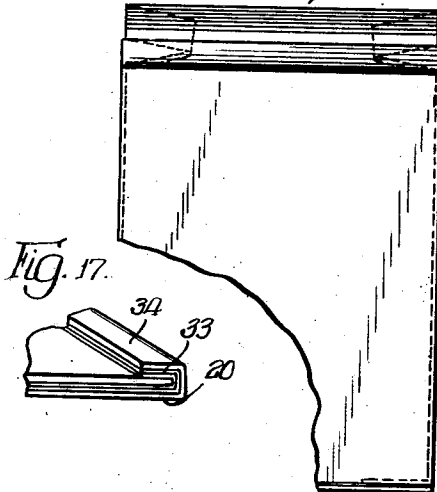
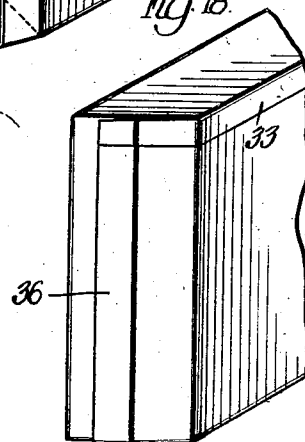
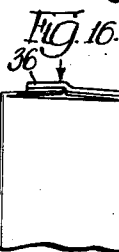
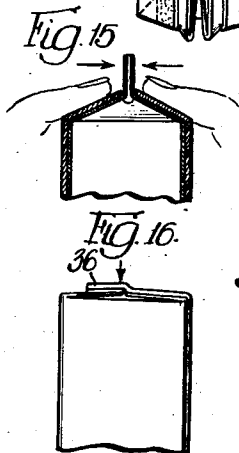
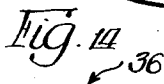
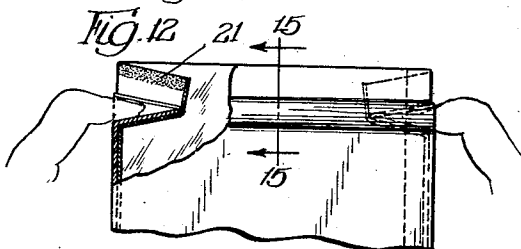
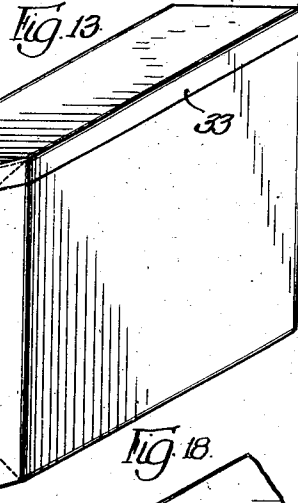
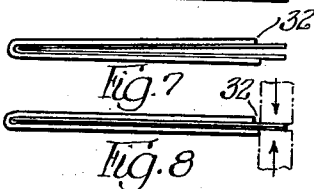
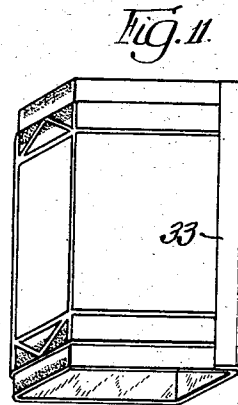
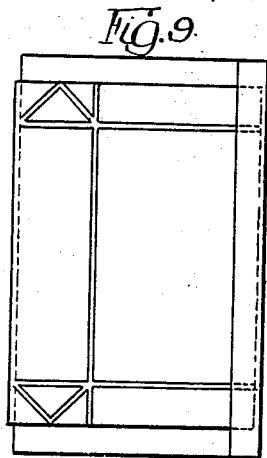
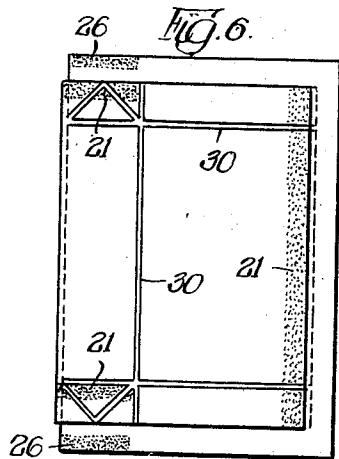
G. A. MOORE

2,382,573

CONTAINER

Filed March 3, 1943

3 Sheets-Sheet 3



INVENTOR
George Arlington Moore,
BY
Cromwell, Street & Warden
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,382,573

CONTAINER

George Arlington Moore, New York, N. Y.

Application March 3, 1943, Serial No. 477,821

5 Claims. (Cl. 93—36)

The present invention relates to improvements in the packaging industry. More particularly it pertains to conversion of packaging materials into laminated and scored tubular formations to be erected into cartons, filled with a food commodity, or the like, and made into hermetically sealed packages readily usable by the ultimate consumer, and this is a principal object of the invention.

A carton which has recently met with considerable favor in the industry is the folding box type in which various non-fibrous kinds of inner folded envelopes are either loosely deposited or otherwise suitably affixed therein. Such inner envelopes or containers may also be formed from a blank of material attached to an outer carton blank and formed when the latter is set up for use. However, many of these folding box types have certain undesirable features and disadvantages which develop largely as the result of their fabrication and this is particularly true with respect to the seam formation. Such cartons depend to a great extent on tongue and cover flaps and other multiple thicknesses and overlapping formations in reinforcing the outer carton sections. In the inner non-fibrous container multiple folds, as in the bellows or gusset type as well as the satchel type, are used, and these various essential folds produce multiple thicknesses of material in the seam structures that are conducive to the development of tiny apertures in the seams resulting in leaks with consequent impairment to hermetic sealing properties which is sought to be obtained.

A general object of the present invention is the conversion of packaging materials into a suitable tube formation which readily can be erected into container form and filled to provide an hermetically sealed package, such article being economic of manufacture, simple yet sturdy and durable of construction and which is well suited to the purposes for which it is intended.

More specifically, the present invention has for an object the conversion of suitable packaging materials into a tubular formation which is adapted to be erected into a carton wherein an outer web of cardboard reinforcing material is lined with a laminated structure consisting essentially of a suitable heat-sealing web and a layer of fibrous protective material with the heat-sealable material exposed to the inner surface, and the fibrous protective layer being laminated to the cardboard reinforcing material, the resulting construction having suitable score lines defining various panels with the inner laminated structure extending beyond spaced apart edges of the cardboard reinforcement and being bonded together into a longitudinal seam affixed to one wall of the resulting tubular structure.

A further object of the present invention is the

provision of a container which can readily be formed from such a tube having a similarly constructed bottom seam with respect to the longitudinal seam and wherein such a container after being filled with a suitable commodity, can be made into a package by effecting a closure at the top thereof by means of a seam construction identical with that of the bottom seam construction.

Another object of the invention is the provision of a container in which a cardboard reinforcing member is utilized to control the formation of the folds of an inner laminated reinforced liner to form the closures of such a container in the development of a package.

Still another object of the invention is the provision of such an article comprising materials so produced and formed that the resulting panels serve the function of folding tools manually operated to form the container closures thereby providing a carton reinforced on six sides, without the use of folding machinery such as tubular arbors and the like.

Yet another object of the invention is the provision of such an article wherein a longitudinal seam is provided which consists of sealing marginal portions of heat-sealable surfaces of a laminated structure to itself in face-to-face relationship and subsequently sealing the resulting seam to its reinforcement member.

It is also an object of the invention to produce a carton closure which comprises a varying multiplicity of layers of material whereby novel closure means and seals are employed to compensate for the varying thicknesses of folds constituting the closure and to insure an hermetic seal throughout the resulting package.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the several steps and the relation of one or more of such steps with respect to each of the others, and the article possessing the features, properties and the relation of elements, which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a diagrammatic representation of a preferred method of continuously converting suitable packaging materials into blanks to be made into tubular formation for subsequent erection into containers and packages;

Fig. 2 is a plan view illustrating a fragmentary portion of one suitable type of cardboard carton web formation with pre-spotted designs

of a suitable adhesive and having cutout portions, the blank being held sectionally together by perforated segments;

Fig. 3 is a plan view similar to Fig. 2 illustrating a cut-out web formation having been adhesively affixed to another web consisting of a laminated sheet of liner material;

Fig. 4 is a finally completed single blank adapted to be formed into a tube;

Fig. 5 is a fragmentary portion of a corner of a blank such as that shown in Fig. 4 enlarged to show the relative lamina constituting the same;

Fig. 6 is a plan view of a blank such as that shown in Fig. 4 folded over upon itself along a median line;

Fig. 7 is an end view of the folded blank shown in Fig. 6;

Fig. 8 is a view similar to Fig. 7 with marginal portions of the blank shown being thermally sealed together;

Fig. 9 is a plan view of the completed blank showing the sealed marginal portion folded over upon the reinforcement structure;

Fig. 10 is a further step illustrating the sealing of the marginal portion to the reinforcement structure;

Fig. 11 is an isometric view showing the tube in squared position;

Fig. 12 is a plan view of a fragment of the upper half of a container partly in section and illustrating the manual closure of an end thereof;

Fig. 13 is an isometric view illustrating a further development in the closing of a container to provide a completed package;

Fig. 14 is a side elevation of a package completely closed at the bottom with a portion thereof broken away and sealed but unfolded at the top;

Fig. 15 is a sectional end elevational view of a fragment of the upper half of the container shown in Fig. 12 taken along line line 15-15 and further illustrating the manual closure of an end;

Fig. 16 is an end elevational view of a fragment of the upper half of a container showing the relative position of the end fold and seam closure;

Fig. 17 is a perspective view of a fragmentary portion of the end of a completed closure of a container illustrating the relative positions of the seam structures; and

Fig. 18 is a perspective view of a portion broken from the end of a completed container.

Referring more particularly to Fig. 1 of the drawings, there has been diagrammatically set forth for purposes of clarity in illustration a continuous and progressive scheme for converting packaging material used in conjunction with the principles of the present invention. Briefly, it will be noted that to the left there is depicted a stock roll of suitable cardboard reinforcing material which is preferably first run over an applicator roll, such as an etched gravure cylinder revolving in a bath of suitable printing ink whereby the bottom portions, where desired, of such a cardboard web can suitably be printed. One or more applicator rolls can, of course, be provided depending on the number of colors desired in the printing operation. As the web progresses it runs between suitable cut-out rollers which cut such a web into a plurality of blank sections held together in adjacent relationship by small uncut but perforated segments,

all as will more fully be described hereinafter. It will be understood that, depending on the results desired, these cut-out rollers become optional as to their size and the nature of the cut-out configuration. As the web proceeds it passes over a similar applicator roll as that utilized in the printing and there is then applied a predetermined pattern or design of a hot melt adhesive to the under surface of the web. Any suitable means of applying the design may be utilized. For convenience of illustration, an etched gravure cylinder is indicated herein having the usual doctor blade governing the application of the hot melt, but it will be understood that other means of application, such as by passing the web around a drum immersed in the adhesive so as to secure the desired application may be utilized if desired. Preferably, the web is next passed through a drier, if necessary, to dry the adhesive application.

In the meantime, another laminated structure is being developed. Either such a structure can be made independently or simultaneously run to produce a laminated sheet. The laminated sheet consists preferably of a fibrous material, such as paper or glassine run off a stock roll, to which there is applied a surface coating of a suitable laminating adhesive. This coating may also be applied by the utilization of an etched gravure cylinder wiper with a doctor blade, the cylinder revolving in the bath of laminating adhesive. Here again there has been shown the same type of applicator as indicated above. As this web progresses it joins another web running off a stock roll and this web preferably is of a non-fibrous nature, preferably a thermoplastic material or any suitable material which has been treated to provide heat-sealing characteristics. While such material as Pliofilm and Koroseal are desirable, it will be understood that in the event such materials are not readily available, a heat-sealing Cellophane, for example, may be used. These two webs are joined together in the bite of two laminating pressure rollers and the suitable laminated sheet is obtained. The laminated sheet passes around idler rollers and again is similarly given a coating on its fibrous surface, partially in a spot-printed design, and dried, all as more fully explained hereinafter. This web or laminated sheet then meets the untreated surface of the cardboard web and these two are likewise laminated together as they pass between laminating and scoring rollers respectively to effect a score line through the various laminae. It will be understood that the scoring operation can be produced at an earlier point in the cardboard web if desired, although for certain purposes and for certain containers it is desirable to effect the score throughout all the laminae at predetermined areas. The combined structure then passes between suitable cutting or shearing knives where the web is cut into suitable blanks and thereafter folded and sealed into desired tubular formations.

Referring now more particularly to Fig. 2 of the drawings for a more detailed description, there is indicated generally at 20 a web of reinforcing cardboard material suitable for the formation of outer walls of cartons. The particular web here indicated is free of any indication of display printing but there has been indicated a spot-printed design of a suitable adhesive indicated generally at 21. As heretofore described, the web passes through suitable rollers having knives, for example, which remove portions of the web as at 22 but leave small segments 23 holding the web

together in a series of adjacently spaced apart identical blanks. These segments, where they join each of these blanks, are preferably perforated as at 24.

As seen in Fig. 3 and as heretofore explained, the web of reinforcing material is next laminated to an already laminated sheet 25 and it will be observed that this sheet 25 is of a greater overall width than the web 20 so that each separated blank comprising the web is surrounded by a marginal portion of the laminated sheet exposing the fibrous portion thereof and this marginal portion extends completely around the entire web, including the cut-out portions. It is, of course, necessary to keep the laminated sheet 25 as well as the cardboard web 20 in registration. As before indicated, printing of adhesive on the fibrous sheet of the laminated structure is also by means of an etched cylinder carrying a suitable design necessary to give the proper application of adhesive to this web. Furthermore, the etched cylinder not only is equipped to apply a spot-printed design which is commensurate in area with each individual blank of cardboard material to which it is laminated but, in addition, prints suitable spots of adhesive 26 in those areas appearing as marginal portions between the blanks as they register in the cut-out portions 22. The particular nature of the combined laminae may more readily be observed by reference to Fig. 5 wherein there is shown laminated to the cardboard material 20 a fibrous layer 27, such as paper or glassine, and a thermoplastic material 28, or a material treated to provide such characteristics, such as those heretofore mentioned.

After completing this final laminating operation the entire combined structure is preferably, at this point, subjected to the pressure of a pair of suitably scored rollers which provide score lines generally as indicated in the drawings and thereafter each combined structure is separated into blanks indicated generally at 29 (see Fig. 4).

Referring more particularly to the blanks shown in this figure these score lines are of two kinds. Parallel score lines 30 define the walls of the container as well as the end closure flaps together with triangular or diagonally directed groups of score lines 31. Preferably the score lines of the triangular formations should be embossed into the board oppositely to that of the straight or parallel score lines. In other words, taking Fig. 4 for example as the top face of the board, the parallel score lines are male on the top surface and female on the bottom surface, whereas the diagonal score lines are female on the top and male on the bottom. The lines when so scored facilitate the ready formation of the desired folds and insures the board surfaces making quick and ready contact in the completion of the end closures.

Referring now to Figs. 6 to 11, it will be seen that a blank, such as that illustrated in Fig. 4, has been folded along a median line represented by one of the centrally disposed longitudinal parallel score lines so that the cardboard web is on the outside and the laminated sheet is on the inside with the heat-sealable surface in face-to-face relationship.

As indicated by Fig. 8, where the marginal portions come together they are subjected to the action of suitable sealing irons which may be of either the pressure or the roller type and in this manner these marginal portions are thermally welded or sealed together. It should be noted that the operation of folding and sealing as here-

tofore indicated may be practiced immediately and as a part of the laminating process or may be performed subsequently and independently, depending on whichever method is most convenient.

It should also be observed that one of the outer cardboard panels is somewhat foreshortened to an extent which is equal to the combined thicknesses of the laminated inner sheet, as indicated at 32. This permits ready folding of the marginally sealed portion to the adjacent marginal surface on the cardboard reinforcing structure 20 and along the marginal application of the hot melt adhesive 21. The seam is then heat-sealed to the cardboard surface 21 as indicated in Fig. 9 and there is thus provided a longitudinal seam secured to the carton body where it extends beyond adjacent edges thereof.

In a flattened or knocked down condition, however, the unopened tube is ideally suited for shipment in large quantities from the factory of the converter to the user, suitable for erecting the same into container formation. From Fig. 11 it will be observed that the tube has now been squared in condition to infold, for example, one end to form a container bottom. After filling with a commodity, for example, food, the mouth of the container is similarly closed and an hermetically sealed package is provided.

By referring to the remaining figures of the drawings, it will be observed that this infolding operation can readily be performed manually. Briefly, the manual closure of such containers can rapidly be effected and the construction is particularly designed for such operation. The index fingers of both hands, for example, inwardly press the triangularly scored panels which collapse downwardly. This action of the fingers draws downwardly the multiple thicknesses of the fold, pulling the top edges below the parallel top margins of the extension of the marginal lip of the container, thus facilitating a two-ply joint over substantially the entire length of the seam.

Thereafter the extension panels of the side walls are pressed down together and it will be seen that they do not overlap. The extending marginal portions, however, emerge from adjacent edges of the panels and after the panels are brought down into squared position, suitable sealing irons are brought to bear thereagainst and another hermetic seal is effected. This type of seam is illustrated in Fig. 14, shown completed as indicated at 36, the parallel lines drawn across the extended margin representing depressions or flutes resulting from the use, for example, of a crimp sealing iron.

It will be observed that the hot melt adhesive 21 has been activated simultaneously with the pellicle of lining material and merged into the primary longitudinal seam. When using heat-sealing Cellophane for example, as the interior lining face, heat pressure activates the thermoplastic coating to cement the same together and the hot melt pattern that is on the exterior margins of the tuck-in fold is activated at the same time and flows over the top edges of the inward fold plugging what otherwise would be tiny apertures of the junction formed by four layers running into two layers of material thickness.

The completed seams 33 and 36 are shown in Figs. 16 and 17. When each seam has been pressed flat after being contacted by a hot plate which has activated the hot melt patterns of adhesive on the board material, and the margins

and the tuck-in folds of the board material have been brought into folded relationship, the desired type of hermetically sealed container is produced.

It will thus be seen that the objects hereinbefore set forth may readily and efficiently be attained and since certain changes in carrying out the above method and certain modifications in the article which embodies the invention may be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A method of making tubular formations to be converted into hermetically sealed packages after filling with a food commodity or the like, which comprises the steps of applying a spot-printed design of adhesive to one surface of a fibrous web of carton board material, providing a laminated sheet of a heat-sealable material and a fibrous reinforcing material, said laminated sheet being of a width greater than said fibrous board web, applying a laminating adhesive to the fibrous surface of said laminated sheet along an intermediate portion and marginally along predetermined portions thereof and laminating said web and sheet together leaving exposed the marginal applications of said adhesive on said laminated sheet, providing said resulting combined layers with a series of spaced apart score lines, cutting portions of said combined layers at predetermined points into blanks, folding each blank along a median line with the heat-sealable surface in face-to-face relationship, and heat-sealing together overlying marginal extensions of said laminated sheet to provide said tubular formation.

2. A method of making tubular formations to be converted into hermetically sealed packages after filling with a food commodity or the like, which comprises the steps of applying a spot-printed design of a suitable adhesive to one surface of a fibrous web of carton board material, cutting out portions of said web to provide a plurality of spaced apart connected sections, providing a laminated sheet of a thermoplastic material and a fibrous reinforcing material, said laminated sheet being of a width greater than said fibrous board web, applying a laminating adhesive to the fibrous surface of said laminated sheet and laminating the web and sheet together leaving exposed marginal applications of said adhesive, providing said resulting lamina with suitable score lines, cutting portions of said laminated sheet at predetermined points between said connected sections into blanks, folding said blanks along a median line with the thermoplastic surface on the inside facing itself, and heat-sealing together overlying marginal extensions of said laminated sheet to provide said tubular formation.

3. A method of making tubular formations adapted to be converted into hermetically sealed packages after filling with a suitable commodity,

which comprises continuously applying a printed design of a suitable adhesive to one surface of a cardboard material, providing a laminated sheet of heat-sealing Cellophane and a fibrous reinforcing material, said laminated sheet being of a width greater than said fibrous board web, applying a laminating adhesive to the fibrous surface of said laminated sheet and laminating the web and sheet together leaving exposed marginal applications of said adhesive at predetermined points, scoring said resulting lamina with spaced apart male and female diagonal and parallel score lines, cutting portions of said laminated sheet at predetermined points into blanks, folding said blanks along a median line with the heat-sealing Cellophane surface in face-to-face relationship, and heat-sealing together overlying marginal extensions of said laminated sheet to provide said tubular formation.

4. A method of making a tube to be erected into a container and thereafter filled and sealed to provide an hermetically sealed package, which comprises the steps of applying a spot-printed design of a hot melt adhesive to one surface of a cardboard reinforcing web, providing a laminated sheet of thermoplastic material and a fibrous reinforcing material, said laminated sheet being of a width greater than said cardboard web, applying a laminating adhesive to the fibrous surface of said laminated sheet and laminating the web and sheet together leaving exposed marginal applications of said adhesive, providing the resulting lamina with a series of spaced apart score lines, cutting portions of said laminated sheet at predetermined points into blanks, folding said blanks along a median line with the thermoplastic material in face-to-face relationship, heat-sealing overlying marginal extensions of said laminated sheet together to provide said tubular formation, and sealing said sealed marginal extension along one edge of the cardboard web to provide a longitudinal seam.

5. A method of forming a tube to be erected into a carton, which comprises the steps of applying a spot-printed design of adhesive to one surface of a fibrous web of spaced apart sections of carton board material, providing a laminated sheet of a thermoplastic material and a fibrous reinforcing material, said laminated sheet being of a width greater than said web of carton board material, applying a laminating adhesive to the fibrous surface of said laminated sheet along an intermediate portion and marginally along predetermined portions thereof and laminating said web and sheet together leaving exposed marginal applications of said adhesive, providing said resulting lamina with a series of score lines, cutting portions of said laminated sheet at predetermined points between said spaced apart sections of the web of carton board material to provide blanks, folding said blanks along a median line with the heat-sealable surface in face-to-face relationship so that all but one side edge of each resulting blank when folded has a marginal extension of said laminated sheet along the remaining edge, heat-sealing marginal extensions to provide said tubular formation, sealing said resulting marginal sealed extension against the fibrous web of carton board material where it overlies a portion of said spot-printed design to provide a longitudinal seam.

GEORGE ARLINGTON MOORE.