

July 12, 1960

J. G. VERGOBBI

2,944,715

PACKAGE

Filed Sept. 10, 1957

3 Sheets-Sheet 1

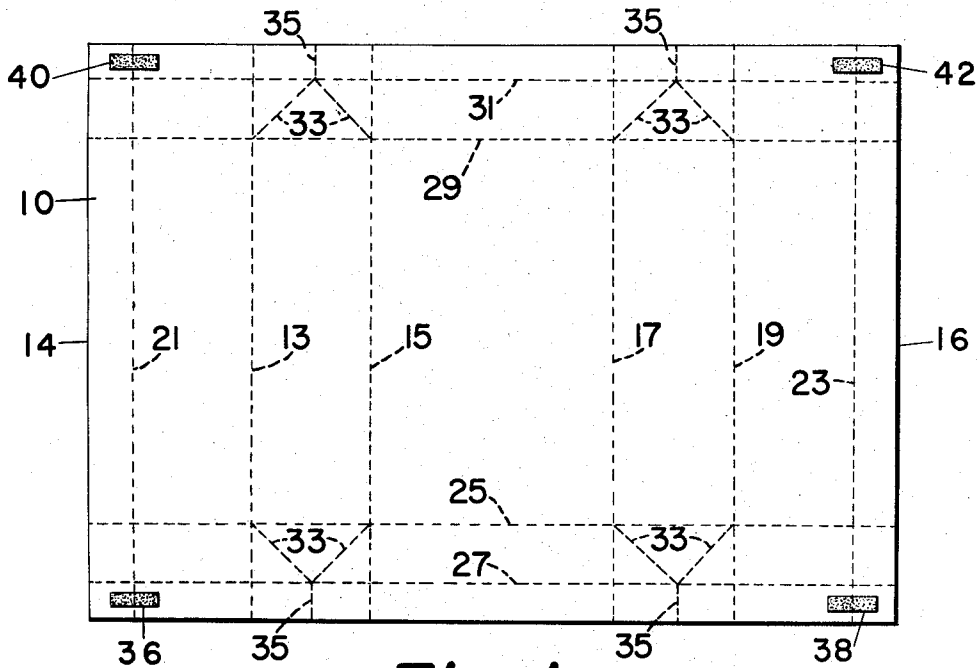


Fig. 1

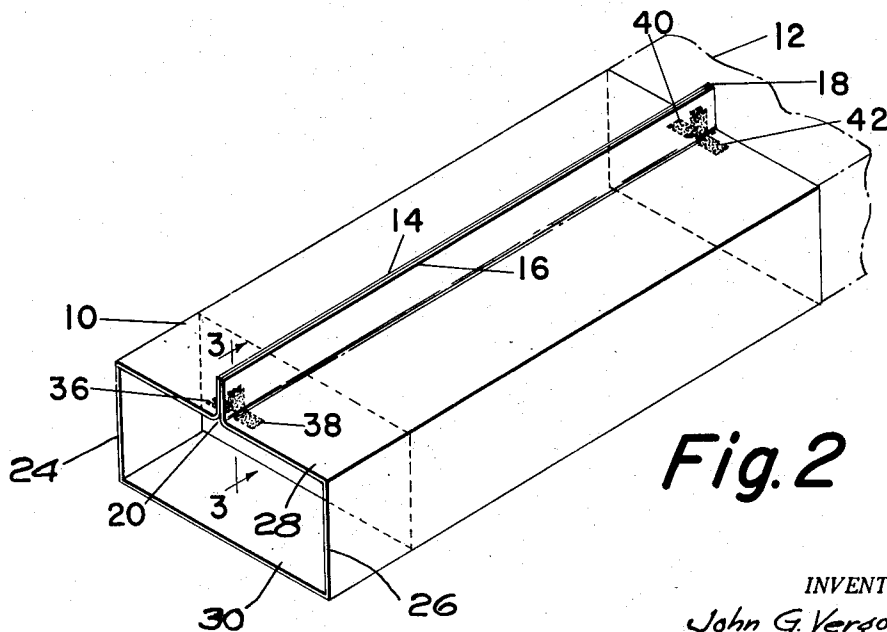


Fig. 2

INVENTOR.

John G. Vergobbi

BY

Robert R. Churchill

ATTORNEY

July 12, 1960

J. G. VERGOBBI

2,944,715

PACKAGE

Filed Sept. 10, 1957

3 Sheets-Sheet 2

Fig. 3

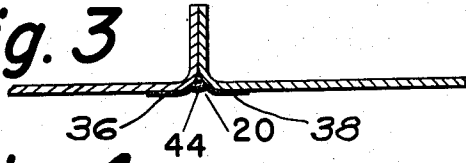


Fig. 4

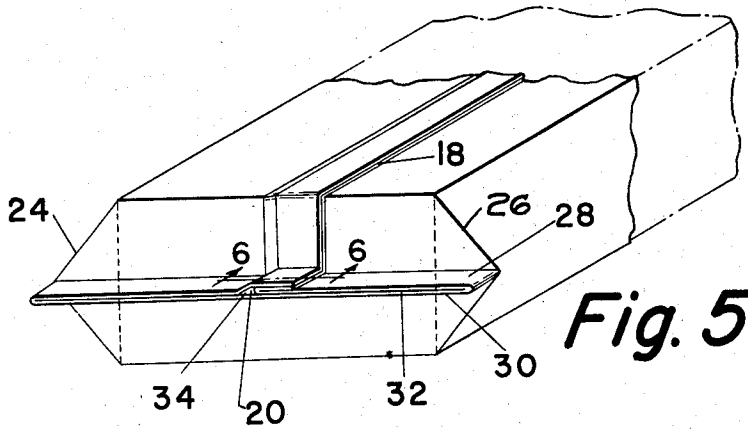
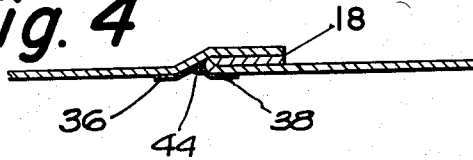


Fig. 5

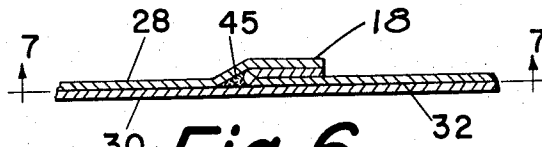


Fig. 6

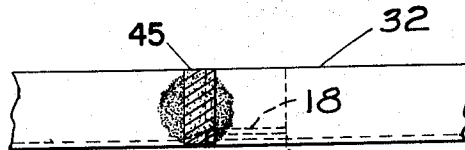


Fig. 7

INVENTOR.
John G. Vergobbi
BY Robert R. Churchill

ATTORNEY

July 12, 1960

J. G. VERGOBBI

2,944,715

PACKAGE

Filed Sept. 10, 1957

3 Sheets-Sheet 3

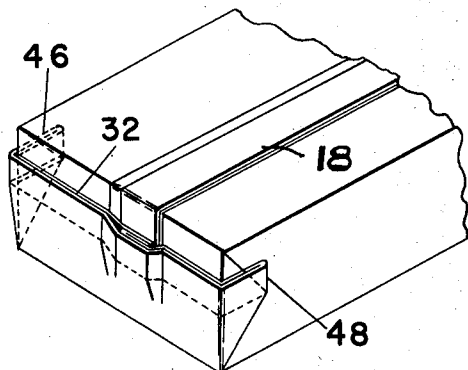


Fig. 8

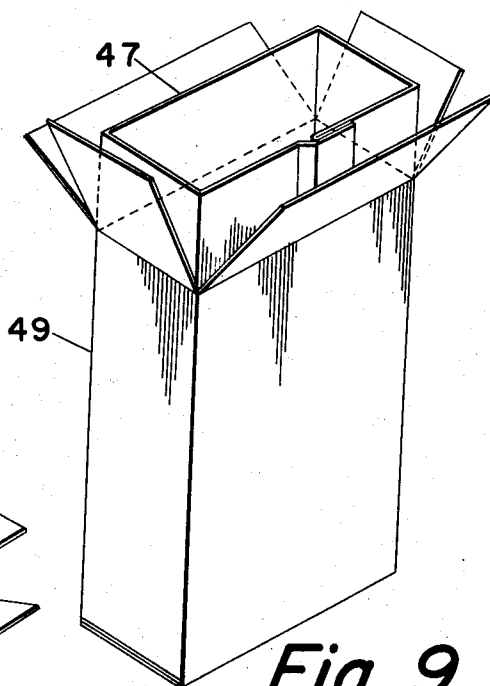


Fig. 9

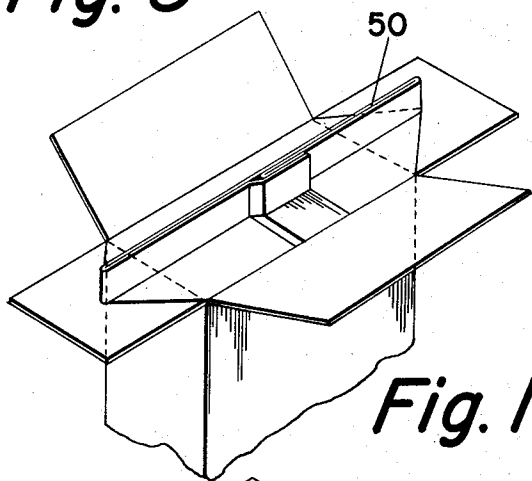


Fig. 10

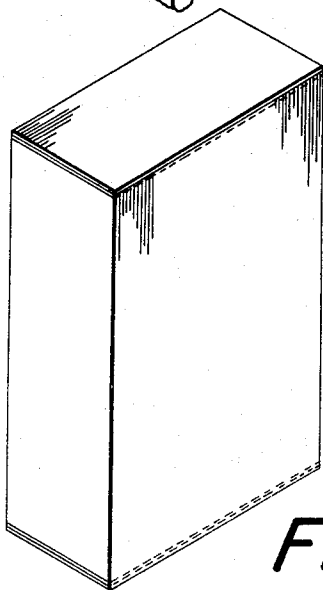


Fig. 12

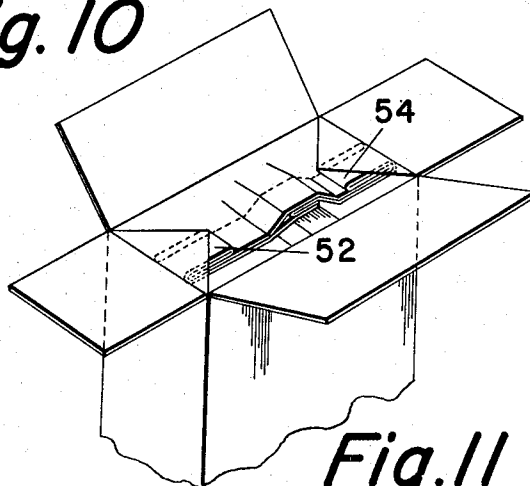


Fig. 11

INVENTOR.
John G. Vergobbi
BY Robert A. Churchill
ATTORNEY

1

2,944,715

PACKAGE

John G. Vergobbi, Quincy, Mass., assignor to Pneumatic Scale Corporation, Limited, Quincy, Mass., a corporation of Massachusetts

Filed Sept. 10, 1957, Ser. No. 683,184

1 Claim. (Cl. 229—14)

This invention relates to a package and more particularly to a liner bag for a package.

The invention has for an object to provide a novel and improved lined package in which provision is made for closing and sealing the end closures of the liner in a novel and improved manner whereby to produce a package having a leakproof liner bag.

Another object of the invention is to provide a novel and improved liner bag having a face-to-face longitudinal side seam and provided with face-to-face end closure seams wherein provision is made for preventing leakage through the side seam portions occurring at the end closure seams in a manner such as to produce impervious end closures.

A further object of the invention is to provide a novel and improved method of forming a liner bag of the character specified in a novel manner such as to provide an impervious end closure.

With these general objects in view and such others as may hereinafter appear, the invention consists in the package embodying a leakproof liner bag and in the method of making the same as hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention:

Fig. 1 is a plan view of a sheet of liner bag material from which the present liner bag is produced;

Fig. 2 is a perspective view illustrating the sheet of bag forming material wrapped about a mandrel and provided with a longitudinal face-to-face side seam to form a rectangular tube;

Fig. 3 is a cross sectional view taken through the side seam on the line 3—3 of Fig. 2 and illustrating a feature of the present invention;

Fig. 4 is a view similar to Fig. 3 showing the face-to-face side seam folded flat against the wall of the liner bag;

Fig. 5 is a perspective view of the bottom end closure of the liner bag;

Fig. 6 is a cross sectional view through a portion of the bottom end closure as taken on the line 6—6 of Fig. 5;

Fig. 7 is a front elevation of the portion of the end closure as seen from the line 7—7 of Fig. 6;

Fig. 8 is a perspective view of the completed bottom end closure;

Fig. 9 is a perspective view of the liner bag placed in a carton;

Fig. 10 is a perspective view of the upper portion of the lined carton showing the top end closure partially formed;

Fig. 11 is a similar view showing the completely formed top end closure; and

Fig. 12 is a perspective view of the completely sealed package.

In general the present invention contemplates a novel and improved leakproof package and a method of mak-

2

ing the same comprising a liner bag and a carton wherein the liner bag may comprise a fibrous moistureproof sheet material, such for example as a moistureproof paper or a composite sheet comprising a sheet of paper and a foil sheet laminated thereto and provided with a relatively thin coating of thermoplastic adhesive on its inner surface to render the material capable of being heat sealed face to face by the application of heat and pressure. In the illustrated embodiment of the invention the sheet material provided with the thermoplastic coating is folded to form a rectangular tube having a longitudinally extended face-to-face side seam sealed by the application of heat and pressure. The top and bottom end closures of the liner bag are also formed by elongated face-to-face heat sealed seams to produce a completely sealed liner bag.

In practice it has been found that in the formation of the longitudinally extended face-to-face side seam a relatively small longitudinal groove or gap is formed on the inner surface of the liner bag defined by a slight separation or break in continuity of opposed portions of the bag forming material at the bottom or inner end of the side seam, and when the end portions of the bag are subsequently folded and heat sealed in face-to-face relation with extended portions of the side seam it was found that a relatively small and substantially triangular channel was formed in each end closure defined by the side seam groove in one wall of the end closure and the adjacent inner face of the opposing wall of the heat sealed end closure through which finely divided or liquid and semiliquid material may leak. In accordance with the present invention provision is made for closing such relatively small channels in the end closures in a novel manner whereby to render the package leakproof and capable of being used for packaging finely divided and liquid or semiliquid products.

An example of the products which may be contained in the present package includes a dehydrated food product, such as a soup mix containing dry, fatty particles which when packaged and subsequently subjected to climatic conditions of excessive heat is liquefied, the fatty liquid tending to penetrate through any relatively small openings in the lining bag seams and rendering the package unsalable. The present invention includes the provision of relatively thick auxiliary strips of thermoplastic adhesive applied to the liner sheet at the end closure portions of the subsequently formed heat sealed side seam and end closures which serve to close the relatively small openings during the formation of the liner bag.

The present package is capable of being produced in a high speed packaging machine wherein the liner bag is formed by wrapping the liner sheet about a mandrel and forming the face-to-face heat sealed side seam and a bottom closure whereupon a prescored carton blank is folded about the mandrel and the liner bag and sealed along a side seam. The bottom flaps of the carton are then folded and sealed while supported on the mandrel. The lined carton is then removed from the mandrel and filled with the product being packaged whereupon the lining bag top closure is formed and the top closure flaps of the carton are folded and sealed to complete the package.

Referring now to the drawings, 10 represents a sheet of flexible fibrous lining bag material which may and preferably will comprise a moistureproof material provided with a relatively thin coating of thermoplastic adhesive on one face thereof comprising the inner face of the sheet in the subsequently formed lining bag, the thermoplastic coating being activated to effect adherence of face-to-face inner portions of the bag material upon the application of heat and pressure. As shown in Fig. 2, the liner sheet 10 may be wrapped about a mandrel 12

3

to form an elongated tubular structure rectangular in cross section, the marginal side edges 14, 16 of the sheet being brought together in face-to-face relation and sealed by the application of heat and pressure to provide a longitudinally extended "fin" type sealed side seam 18. In the production of the bag the fin type seal is formed by a pair of cooperating pressure bars, at least one of which is heated, and which are clamped against opposed sides of the seam to effect the heat seal. In practice the inner or bottom portion of the seam, where the flexible bag forming material is bent upwardly at right angles to the block, defines a relatively small groove or gap indicated at 20 in Figs. 2 and 3.

The fin type side seam 18 is subsequently folded flat against the side wall of the tube, as shown in Fig. 4, and thereafter the extended portions of the tubular structure are folded, as shown in Fig. 5 by spreading the extended end walls 24, 26 outwardly and folding the opposed extended side walls 28, 30 inwardly in face-to-face relation providing an elongated end closure which is also subjected to heat and pressure to form an adhesive seam 32. It will be observed that one of the extended side walls 28 includes a portion of the side seam 18, and when the side walls 28, 30 are brought face to face the side wall 30 extends across the small groove or gap 20 forming with the groove a substantially triangular channel indicated at 34 in the sealed closure seam 32, resulting in a small opening from the interior of the bag to the atmosphere.

The vertical dotted lines shown in Fig. 1 represent the lines upon which the unscored lining sheet is folded to produce a tubular container having a fin type side seam, and the horizontal dotted lines shown in Fig. 1 represent the fold lines produced when the top and bottom end closures are formed to provide the fin type end closures. Thus, the vertical dotted lines 13, 15, 17, 19 represent the fold lines produced when the lining sheet is wrapped about longitudinal edges of the forming block, as shown in Fig. 2, and the vertical dotted lines 21, 23 represent the fold lines produced when the marginal edges 14, 16 are folded into face-to-face relation to provide the longitudinally extended side seam 18. The horizontal dotted line 25 shown at the lower end of the lining sheet disclosed in Fig. 1 represents the fold lines produced when the extended portion of the tubular container is folded to produce the lining bottom closure while supported upon the forming block, and the horizontal line 27 represents the folds produced when the fin type seam 32 is formed. Similarly, the corresponding lines 29, 31 at the upper end of the lining sheet are produced when the top closure is formed. The angular fold lines 33 and the relatively short vertical fold lines 35 represent the lines produced when the triangular end tabs are formed in the top and bottom end closures as illustrated in Figs. 5 and 10 respectively.

The above description of the formation of the liner bag conforms substantially to the manner of producing the fin type sealed liner bags of the prior art, and in accordance with the present invention in order to effectively seal such end closure opening 34 during the formation of the liner bag, the liner sheet 10 is provided with relatively small and thick auxiliary strips 36, 38 and 40, 42 of a thermoplastic adhesive, preferably a so-called "hot melt" adhesive applied on top of the thermoplastic coating. The auxiliary strips of hot melt adhesive are applied adjacent the corners of the sheet in a selected location such that when the longitudinal side seam 18 is formed a portion of opposed hot melt adhesive strips 36, 38 at the outer or bottom closure end of the tube will be in confronting relation between the folds of the side seam 18, and likewise a portion of opposed strips 40, 42 at the top closure end of the tube will also be in confronting relation between the folds of the side seam 18. As shown in Fig. 1, the auxiliary strips 36, 40 are placed at right angles to the subsequently formed

4

fold line 21, and extend equidistantly on both sides of said fold line. Likewise, the auxiliary strips 38, 42 are similarly disposed relative to the subsequently formed fold line 23. Thus, when heat and pressure is applied to seal the side seam 18 by virtue of the thermoplastic coating on the inner face of the sheet, the confronting portions of the hot melt adhesive will be melted to flow into and partially close the groove 20 at each end of the seam as indicated at 44 in Fig. 3. The remaining portions of the hot melt adhesive strips which are in contact with the unheated mandrel will remain in their hardened and unmelted condition, as indicated in Fig. 3, and the melted portions 44 partially filling the groove will set up into its solid form substantially immediately upon removal of the heat sealing apparatus.

Thereafter, when the elongated end closure seam 32 comprising the bottom closure is formed by the application of heat and pressure, the remaining hot melt adhesive portions extended between the folds of the seam 32 will be activated to flow into the groove 20 and merge with the previously activated portion 44 and completely fill the channel 34 to provide in effect a plug of adhesive 45 to form an impervious end closure as indicated in Figs. 6 and 7. The bottom closure seam 32 is then folded flat against the bottom wall of the liner bag and the laterally extended tabs 46, 48 formed by the end closure operation are preferably folded against the end walls of the bag as shown in Fig. 8.

A prescored carton blank 49 provided with the usual end closure flaps is then wrapped about the mandrel and the liner bag carried thereby and sealed along overlapping marginal portions to provide a side seam in the usual manner whereupon the bottom flaps of the carton are folded and sealed to complete the bottom closure. The lined carton is then removed from the mandrel in the condition shown in Fig. 9 and delivered to a filling machine where the product being packaged is deposited into the lined carton. The extended mouth portions 47 of the liner bag are then folded and sealed in the same manner as the lining bottom closure to provide a top closure having an elongated face-to-face heat sealed seam 50 wherein the remaining portions of the second pair of cooperating hot melt adhesive strips 40, 42 extended between the folds of the seam 50 are melted and caused to flow into the channel opening to provide a hermetic seal for the mouth of the bag as illustrated in Fig. 10. The seam 50 is then folded flat, and the laterally extended tabs 52, 54 are folded inwardly on top of the bag, as shown in Fig. 11, whereupon the top closing flaps of the carton are folded and sealed to produce the completely sealed package shown in Fig. 12.

In practice the moistureproof liner bag material may be provided with a relatively thin thermoplastic coating such as a vinyl plastic coating which serves to produce leakproof heat sealed seams at all sealing points where the material is brought together in face-to-face relation without any intervening break in continuity of the seam, such as occurs when the ends of the side seam 18 are included in the end closure seams. In other words, there is no leakage laterally through the seams thus produced, and the channel formed by the side seam portion occurring in the end closure portion is effectively sealed by the provision of the relatively thick auxiliary strips of hot melt adhesive as described. In practice the melting point of the vinyl plastic coating and the melting point of the hot melt adhesive is preferably about the same, although some variation in the melting point of the different adhesives may occur within a limited range. For example, it was found in practice that a selected vinyl thermoplastic coating having a melting point between 300° and 325° F. used with a selected hot melt adhesive having a melting point between 275° and 300° F. served to produce hermetically sealed liner bag seams, the relatively lower melting point of the hot melt ad-

5

hesive serving to assure free flowing of the same into the channel opening during the heat sealing operation.

From the above description it will be seen that the present package embodying a hermetically sealed liner bag provides a novel structure preventing leakage through the channels formed by the side seam portions included in the end closure seams. While specific examples of moistureproof lining material and thermoplastic adhesives have been herein described it will be apparent that the invention may be embodied in liner bags composed of other materials and having other types of adhesive where- in the fin type side seam portions occurring in the fin type end closure seams form channels which may be effectively sealed by the provision of auxiliary strips of adhesive in the manner described. It will also be apparent that the present liner bag may be used alone as a container if desired. The invention also contemplates the use of a paraffin coated bag forming material having fin type seams formed by fusing of the paraffin coating and provided with auxiliary strips of hot melt adhesive for sealing the channels in the end closure seams as described.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

6

A package comprising a liner bag formed from a sheet having a relatively thin coating of thermoplastic material on the inner face thereof and having a heat sealed face-to-face longitudinal side seam and a heat sealed face-to-face transverse end closure seam in which a portion of the side seam occurring in the end closure seam forms a channel opening defined by the inner ends of the side seam fold in one wall of the end closure and the inner face of the opposing wall of the end closure, said sheet being provided with opposing relatively thick strips of thermoplastic adhesive applied to the inner face thereof adjacent the side seam portions occurring in said end closure seam, the completed end closure seam having a plug of thermoplastic material closing said channel opening formed by melting and flowing of said auxiliary strips of adhesive during the heat sealing operations.

References Cited in the file of this patent

UNITED STATES PATENTS

2,095,910	Bergstein	Oct. 12, 1937
2,228,647	Waters	Jan. 14, 1941
2,357,842	Moore	Sept. 12, 1944
2,370,680	Moore	Mar. 6, 1945
2,372,735	Palmer	Apr. 3, 1945
2,493,337	Buttery	Jan. 3, 1950
2,549,970	Howard	Apr. 24, 1951
2,658,662	Paulsen	Nov. 10, 1953