

March 1, 1949.

W. A. RINGLER
CONTAINER

2,463,313

Filed May 4, 1945

4 Sheets-Sheet 1

FIG. 1

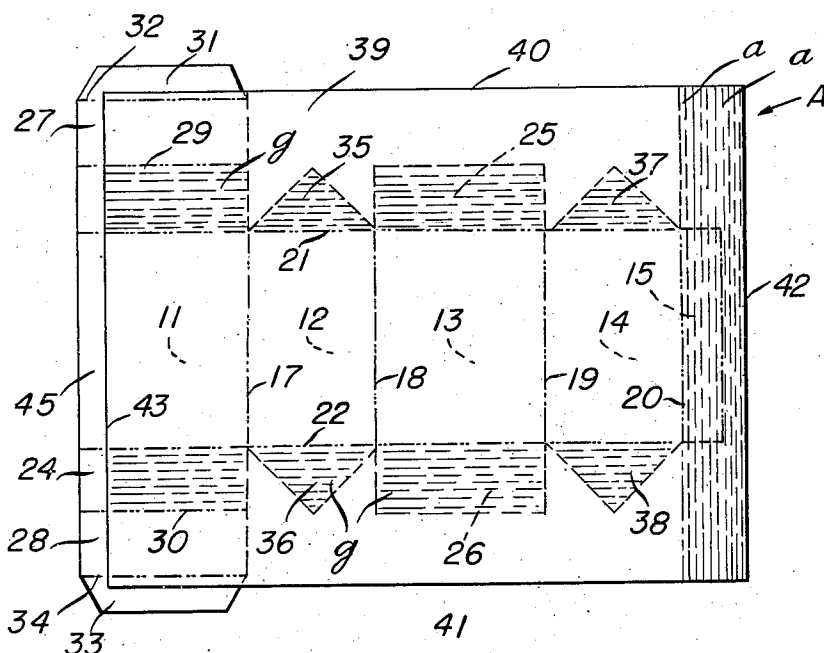


FIG. 2

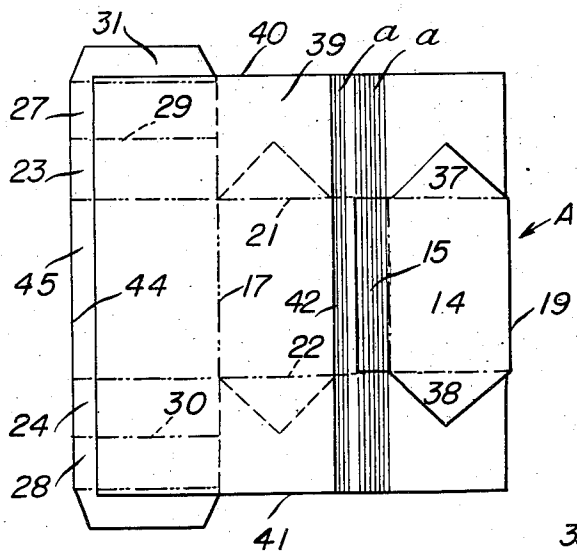
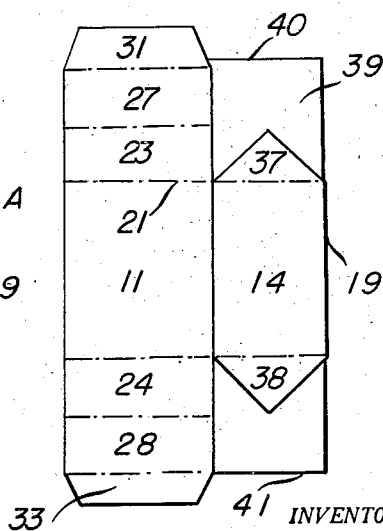


FIG. 3



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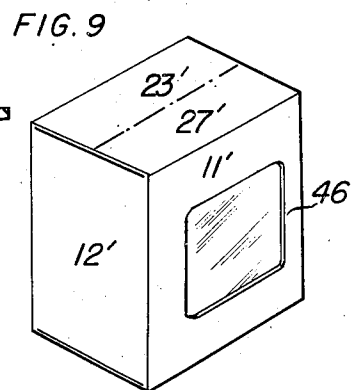
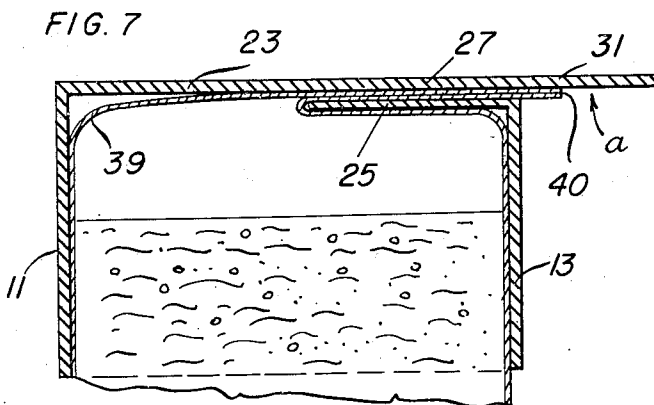
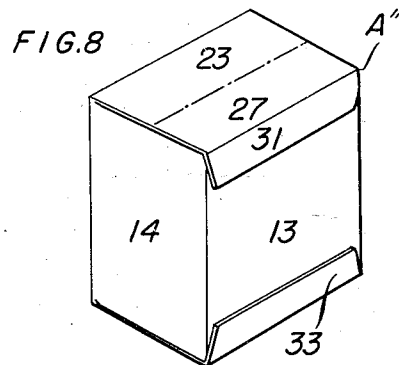
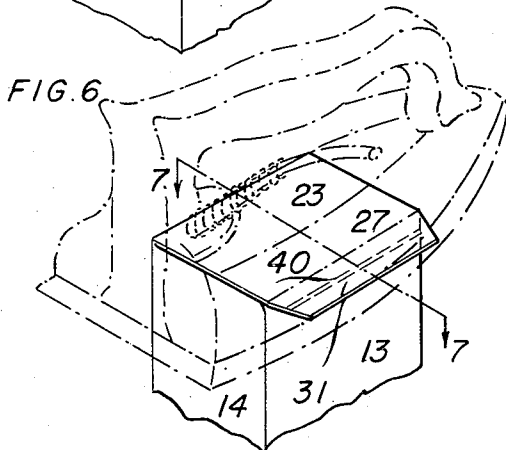
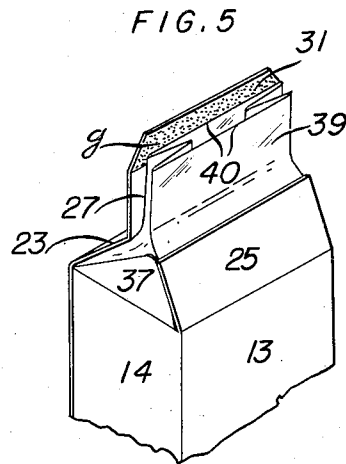
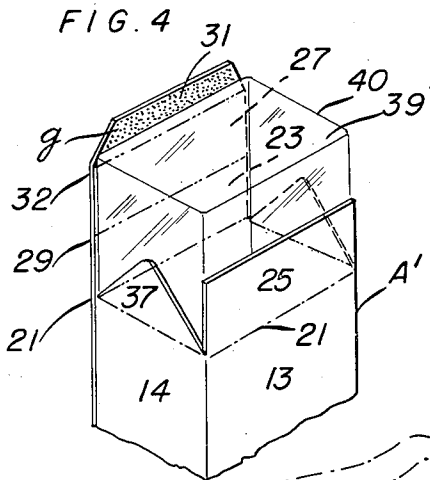
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4 Sheets-Sheet 3

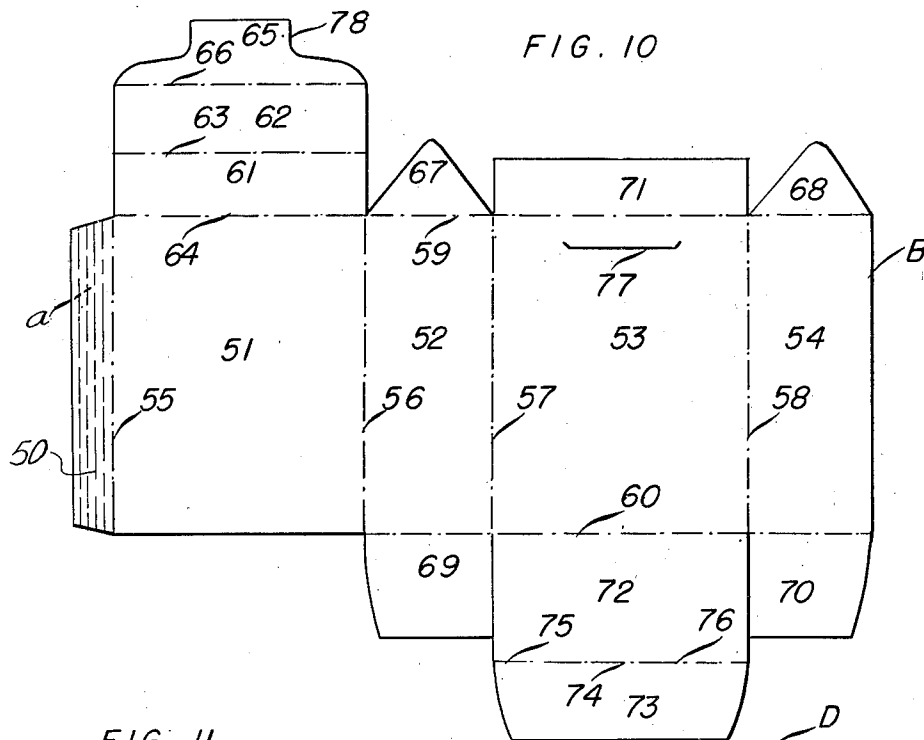


FIG. 11

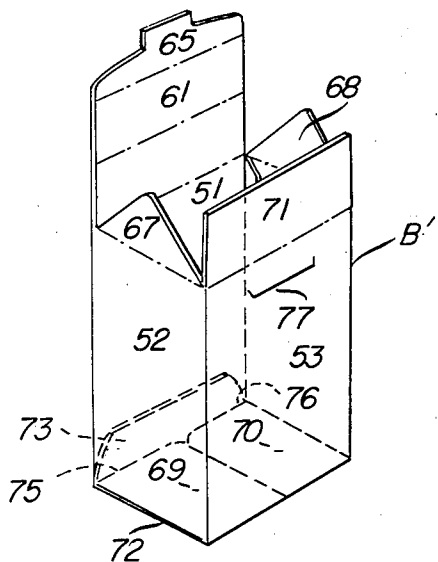
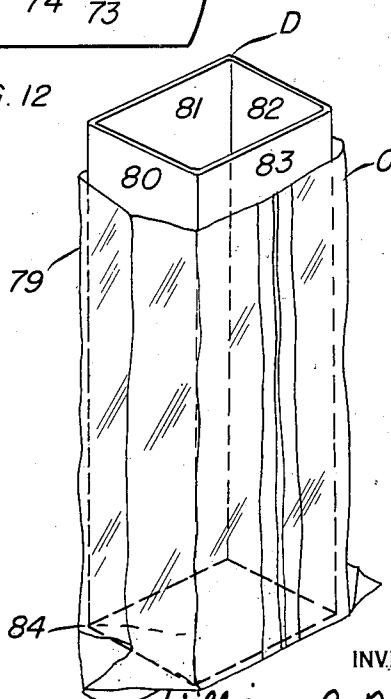


FIG. 12



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FIG. 13

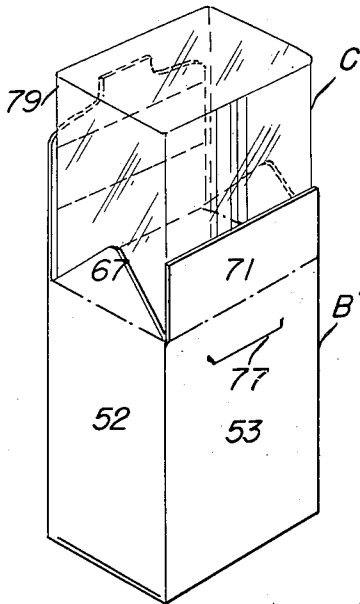


FIG. 14

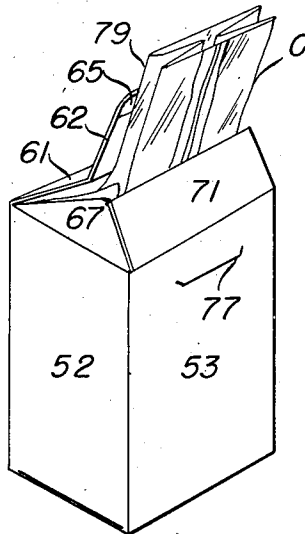


FIG. 15

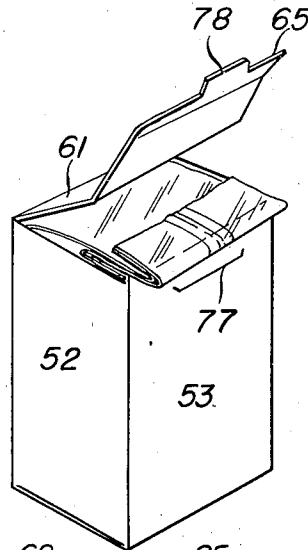


FIG. 17

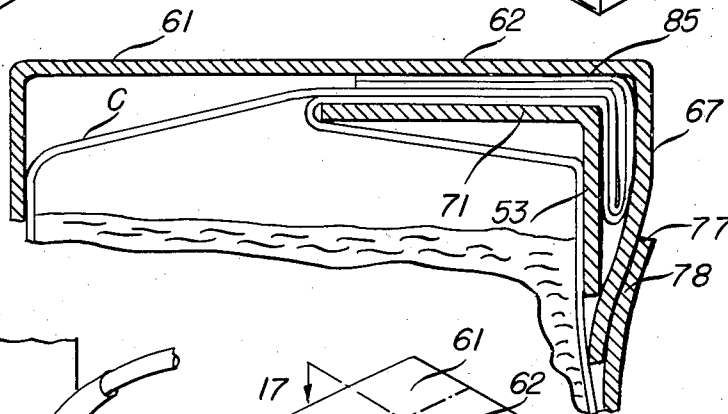
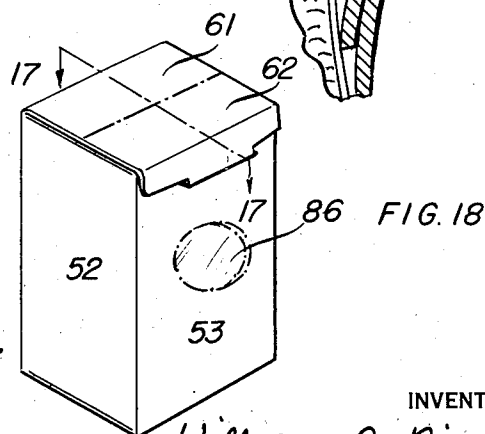
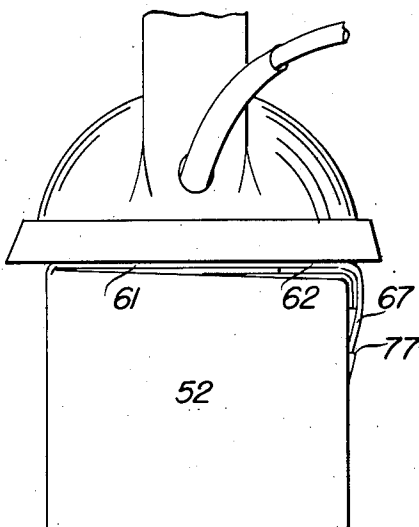


FIG. 16



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UNITED STATES PATENT OFFICE

2,463,313

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Application May 4, 1945, Serial No. 591,881

5 Claims. (Cl. 93—36.01)

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This invention relates to cartons or containers made from cardboard, paperboard or similar material equipped with an inner member such as a liner or an inserted bag, and is especially directed to an improved method for closing and sealing containers of the aforementioned type for the airtight, moistureproof and vaporproof packaging of merchandise.

The invention provides a method of closing the outer carton and sealing the enclosed inner member whereby damage or deterioration of the inner member due to scorching, overheating or drying out, is practically eliminated. The features of my method lead to a reduction of waste in commercial production and brings the practice of heat sealing within the reach of the average untrained person so that it may be successfully practiced by individuals such as housewives in the home packaging and canning of food or other commodities which may be preserved by tight enclosure within packages of the aforementioned type.

Among other objects and features, the invention provides a method of closing and heat sealing the end of the container consisting of an outer carton and an inner heat sealable member whereby the inner member is folded or flattened and sandwiched between end flaps of the outer carton, whereafter heat and pressure is applied to the outside of the folded end flaps for a time sufficient for the heat to penetrate to the inner member causing it to seal tightly while being held between overlying and underlying carton end flaps.

This procedure prevents drying out of the heat sealable inner member consisting, for example, of cellulose material which, as is commonly known, tends to become brittle by loss of its natural moisture. My method also prevents overheating and scorching of the heat sealable inner member by protection of the inner member by an overlying carton flap or panel through which the heat is applied.

These and various other features, objects and advantages of this invention will appear more fully from the detailed description which follows, accompanied by drawings showing for the purpose of illustration, preferred embodiments of the invention. The invention also consists of certain new and original features and combinations of steps hereinafter set forth and claimed.

Although the characteristic features of this invention which are believed to be novel will be particularly pointed out in the claims appended hereto, the invention itself, its objects and advantages, and the manner in which it may be carried out, may be better understood by referring to the following description, taken in connection with the accompanying drawings forming a part thereof, in which:

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Fig. 1 is a plan view of a flat carton blank having a heat sealable liner attached to its inside surface facing the observer;

Fig. 2 shows the container blank of Fig. 1 after a first folding operation and application of adhesive;

Fig. 3 shows the blank in Fig. 1 after a second folding operation, the blank forming a collapsed tubular structure;

Fig. 4 shows one end of the tubular blank of Fig. 3 in expanded hollow form, ready for the closing and sealing of the carton end;

Fig. 5 is a perspective view of the carton end in the process of folding of the carton end flaps and the inner member;

Fig. 6 is a perspective view illustrating the application of heat and pressure to seal the inner member;

Fig. 7 is a sectional side view of the carton end, a section being taken on line 7—7 in Fig. 6;

Fig. 8 is a perspective view of the back of the sealed and closed container shown in the preceding figures;

Fig. 9 is a perspective view of the front of the closed and sealed container similar to the one shown in Fig. 8 but provided with a window;

Fig. 10 is a plan view of a flat carton blank of modified form suited for use in connection with this invention.

Fig. 11 is a perspective view of a hollow carton formed from the blank of Fig. 10, the bottom of the carton being closed and the top being open, ready for insertion of a bag;

Fig. 12 is a perspective view of a heat sealable bag placed over an auxiliary cardboard mandrel for convenient insertion of the bag into the carton shown in Fig. 11;

Fig. 13 is a perspective view of the carton of Fig. 11 after insertion of the bag of Fig. 12 and removal of the auxiliary mandrel;

Fig. 14 is a perspective view illustrating a phase in the process of folding of the carton end flaps and of the bag;

Fig. 15 is a perspective view illustrating the double folding of the bag to obtain a double seal;

Fig. 16 is a side view illustrating a manner in which heat and pressure may be applied to the container of Fig. 15 to seal the bag;

Fig. 17 is a sectional side view, on an enlarged scale, showing the seal performed on the bag, a section being taken on line 17—17 of Fig. 13; and

Fig. 18 is a perspective view of a closed and sealed container shown in Figs. 10 to 17, an optional window in a side wall being indicated in dash-dot lines.

In the following description and in the claims various details will be identified by specific names for convenience. These names, however, are intended to be as generic in their application as the art will permit. Like reference characters

refer to like parts in the several figures of the drawings.

In the drawings accompanying, and forming part of, the specification, the invention is explained by reference to two specific styles of containers for the purpose of explanation. It is understood, however, that the invention may be applied to other styles of cartons without departure from the broad aspects of the invention.

The carton blank A may be cut and scored in multiple from a large sheet or roll of paperboard or other suitable material on an automatic cutting and scoring machine. Only one side of the carton blank need be decoratively finished or imprinted, since only one surface of the blank is presented as the outside face of the assembled container.

In Fig. 1 the blank is shown in a position in which the inside surface faces the observer. The blank comprises four side wall panels 11, 12, 13 and 14 and a terminal securing flap 15 connected along parallel side score lines 17, 18, 19 and 20. The ends of the side wall panels 11, 12, 13 and 14 are defined by parallel end score lines 21 and 22 which intersect the side score lines 17, 18, 19 and 20 at right angles.

Substantially rectangular end flaps 23 and 24 are connected to the side wall panel 11 along score lines 21 and 22, respectively, and rectangular end flaps 25 and 26 are hingedly connected to the side wall panel 13 along the score lines 21 and 22.

Further end flaps 27 and 28 are hingedly connected to the end flaps 23 and 24 along score lines 29 and 30 respectively. The end flaps 23 and 27 form an end panel for one end of the container and the end flaps 24 and 28 form an end panel for the other end of the container.

A sealing flap 31 is hingedly connected to the end flap 27 along a score line 32 and a similar sealing flap 33 is hingedly connected to the end flap 28 along a score line 34.

Substantially triangular end tabs 35 and 36 are formed as extensions of the side wall panel 12 and are hinged along score lines 21 and 22, and a similar pair of substantially triangular end tabs 37 and 38 are hingedly connected to the side wall panel 14 along the score lines 21 and 22. Each triangular end tab is bounded by a score line at the base and by two cut edges which converge towards the apex of the triangle.

A heat sealable liner 39 overlies the carton blank A. The liner may consist of heat fusible material such as cellophane or may consist of non-fusible material such as paper metal foil or other suitable material to which a heat fusible coating has been applied at appropriate areas. The side edges 40 and 41 of the liner overlap and extend beyond the side edges of the carton blank. One terminal edge 42 of the liner extends beyond the corresponding terminal edge of the securing flap 15 and the opposite edge 43 of the liner ends short of the terminal edge 44 of the carton blank so as to leave a sealing margin 45 to which the securing flap 15 may be glued.

The liner 39 is adhesively secured to the carton blank A preferably along limited areas or glue strips *g* which may extend across the inside surface of the rectangular end flaps and of the triangular end tabs of the carton blank.

The carton blank A together with the attached liner 39 constitutes the container blank and may be formed into a collapsed tubular container as follows:

Adhesive is first applied, preferably in two nar-

row strips *a*, to the outside surface of the liner 39 and of the carton blank A along the terminal edge 42 of the liner and the terminal edge of the securing flap 15. The container blank is then folded along the score line 19 so that the inside surface of the liner overlying the side wall panel 14 comes to rest on the inside surface of the liner overlying the side wall 13. The folded container blank is shown in Fig. 2.

Substantially simultaneously with this folding operation, or immediately thereafter, the container blank is folded along the score line 17 so as to bring the margin 45 into adhesive engagement with the terminal securing flap 15 and to bring the marginal area of the liner along the terminal edge 43 into adhesive engagement with the glue strip *a* applied along the terminal edge 42. Thus two substantially parallel seams are provided uniting the ends of the carton blank and of the liner. It is understood, however, that the two glue strips *a* may be merged into a single strip of greater width.

The folded and glued container blank forms a tubular collapsed flat structure as shown in Fig. 3. The collapsed blank requires a minimum of space for storage and shipment and may be shipped in collapsed condition to the ultimate user who expands the blanks as needed and completes them into final container form ready for filling and sealing.

The folding, closing and sealing of the container ends forming the bottom of an empty container and the top of the filled container may be carried out in substantially the same manner, as follows:

The triangular end tabs 35 and 37 are first folded inwardly, causing the liner 39 to crease and fold substantially as indicated in Fig. 5 so that opposite walls of the liner are brought together in flattened relationship. The folding of the triangular end tabs 35 and 37 causes a simultaneous folding of the end flaps 23 and 25 inwardly since both the triangular tabs 35 and 37 and the rectangular flaps 23 and 25 are interconnected by the liner 39.

The folding may be performed by hand by a user of small quantities of containers or may be performed by automatic box machinery where large numbers of containers are involved.

The folding operation is continued by folding the end flap 27 down onto, and over, the end flap 25 with the folded flattened end of the liner 39 lying therebetween, the edge 40 of the liner preferably extending slightly beyond the top edge of the wall panel 13 to which the end flap 25 is hinged.

The container is now ready for sealing of the liner which may be done on automatic heat sealing machinery where great numbers of containers are to be handled, or may be done with the aid of an ordinary electric iron, as will now be described.

In order to seal the liner 39, it is only necessary to place a hot electric iron on the container end for a period of approximately 3 to 6 seconds. The heat penetrates the end panel 23, 27 and reaches the heat sealable liner, causing the end of the liner to adhere together. The weight of the electric iron or the force exerted by some other heating appliance in automatic machines compresses the end portion of the liner, particularly the portion immediately above the upper edge of the side wall panel 13. The side wall panel 13 offers considerable resistance to the sealing force applied

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in the plane in which the wall panel 13 extends.

Loss of heat from the sealing area to the inside of the container is effectively prevented by the end flap 25 lying directly underneath. The flap 25 due to the inherent resiliency of the stock urges the liner against the overlying end flap 27 and prevents yielding or deflection of the liner towards the inside of the container.

An accidental overheating of the heat seam because of excessive heat of the iron or application of heat for too long is prevented by the overlying carton end flap 27 which protects the seam. Scorching of the heat seam is thus effectively prevented.

The position of the liner which is sandwiched between the end flaps 25 and 27 prevents the escape of moisture from the liner at the seam and safeguards against brittleness of the seam which is often caused by drying out of liner materials, particularly cellulose sheeting.

After the sealing of the liner, the sealing flap 31 may be adhesively secured to the top portion of the wall panel 13. This may either be done by application of adhesive *a* to the underside of the sealing flap 31 or by moistening glue *g* previously applied to the inner surface of the sealing flap by the blank manufacturer, as indicated in Figs. 4 and 5.

However, it is not necessary that the liner be heat sealed before the sealing flap 31 is secured to the wall panel 13. The sealing flap may be attached immediately after folding down of the end flaps 23, 27 over the end flap 25 and the liner 39 and the heat sealing proper may then be performed on the glued carton. This is entirely optional.

The complete sealed container A' is shown in Fig. 8, the sealing operations of the top and bottom having been performed in the manner hereinbefore described.

Fig. 9 shows a container made from a similar form of blank differing from the previously described blank only by the presence of a window 46 cut into the wall panel 11'. Elements of the container of Fig. 9 corresponding to the elements of the container hereinbefore described are identified by primed reference numerals. The window 46 exposes a portion of the liner through which the contents of the container are visible, obviating the necessity of labeling cartons used for the home packaging of food stuffs and adding to the attractiveness of the container in general.

It is of course not necessary that the inner member enclosed in the outer carton have the form of a liner connected to the blank of the carton. The inner member may equally well assume other forms, for example, the form of a bag. The assembly of a container consisting of a carton and a heat sealable bag is illustrated in Figs. 10 to 18 and will now be described.

The blank B comprises four side wall panels 51, 52, 53, 54, and a securing flap 50 connected along parallel side score lines 55, 56, 57 and 58. The ends of the side wall panels 51, 52, 53 and 54 are defined by parallel end score lines 59 and 60 running at right angles with respect to the side score lines 55, 56, 57 and 58.

An end panel consisting of rectangular end flaps 61 and 62 divided by a score line 63 is hingedly connected to the side wall panel 51 along a score line 64. A tuck flap 65 is hingedly connected to the end panel along a score line 66.

Substantially triangular end tabs 67 and 68

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are hingedly connected to the side wall panels 52 and 54 along the score line 59 and substantially rectangular end tabs 69 and 70 are hingedly connected to the other side of the same side wall panels along the score line 60.

A rectangular end flap 71 and an end panel 72 are connected to opposite ends of the side wall panel 53 along the end score lines 59 and 60 and a tuck flap 73 is hingedly connected to the end panel 72 along the score line 74. The ends of the score line 74 may be cut at 75 and 76 to lock the end panel 72 in carton closed position in a manner generally known in the art. A slit 77 is provided in the wall panel 53 to accommodate a tongue shaped extension 78 of the top flap 65.

In the assembly of the container blank B adhesive is first applied to the terminal securing flap 50 as shown at *a* and the blank is then folded about the side score lines 56 and 58 resulting in a flat tubular structure similar to the one shown in Fig. 3.

The blank B may be expanded into hollow tubular form, as needed, and the one end, or bottom, of the resulting carton may be closed by infolding of the rectangular bottom and tabs 69 and 70 and folding of the end panel 72 thereover. The end panel 72 is locked in position by the tuck flap 73 whose cut edges 75 and 76 interlock with the edges of the end tabs 69 and 70. The carton is now ready to receive a bag.

The bag C is shown in Fig. 12 and may be made from a sheet 79 of heat fusible material or may be made from paper having a heat fusible coating thereon. The bags C are preferably preformed and are supplied to the user in flat collapsed form ready for use.

The bag C is inserted into the hollow carton B in any convenient manner. Its insertion is facilitated by use of a mandrel D which may be made from paperboard, cardboard or the like and comprises side walls 80, 81, 82 and 83 and a bottom wall 84.

The mandrel is first inserted into the empty bag C and the bag, reinforced by the mandrel, is inserted into the hollow carton 11, whereafter the mandrel is withdrawn.

The resulting container comprising an outer carton B' and an inner bag C is shown in Fig. 13 and is ready for filling.

The filled container is closed by infolding of the triangular end tabs 67 and 68 which aid in the proper creasing and folding of the bag C as is illustrated in Fig. 14. The end flap 71 is then infolded and the folded open end of the bag C is placed thereover.

In the illustrated embodiment, the bag C is long enough to permit folding of the open end of the bag back upon itself as is indicated in Fig. 15. The folding back of the bag causes a double thickness of the bag to overlie the end flap 71, whereby a double seam is formed during the subsequent heat sealing operation. It is preferable to fold the end of the bag so that it overlies the top edge of the wall panel 53 of the carton so that the wall panel 53 will resist the sealing pressure causing the bag to be firmly compressed and a tight seam to be formed immediately above the wall panel 53.

After the bag has been folded, the end panel 61, 62 of the carton may be secured in carton closed position by insertion of the tongue 78 through the slit 77 in the wall panel 53.

The container is now ready for heat sealing of the bag which may be done by placing a hot electric iron on the end panel 61, 62 for a time

sufficient to permit the heat to penetrate the panel and seal the underlying bag.

After removal of the electric iron the container may be turned upside down on a cool surface, for example a table top to accelerate the rate of cooling of the sealed bag.

A cross sectional view of the sealed and closed container is shown in Fig. 17 illustrating the compression of the bag at double seam 85 overlying the top edge of the wall 53. The finished container is shown in Fig. 18. It may be provided with a window 86 where inspection of the contents without opening of the carton is desired. It is understood that such apertures or windows 86 are cut in the blank B during the original cutting and creasing operation of the blank.

It is obviously not necessary that a bag C be used which is so tall as to permit folding of the end of the bag back upon itself to form a double seam. In many instances it is sufficient to make the bag long enough to form a single seam similar to the seam of the liner of the container first described and illustrated in Fig. 7.

It is also evident that the application of heat and pressure may be done by suitable attachments of an automatic carton closing sealing machine. I have illustrated the use of an electric iron to show the adaptability of my method to home packaging of food by persons unskilled in the heat sealing of containers. My method may be safely and successfully practiced by unskilled persons because of the various safety features which the method provides, particularly the protection of the heat sealable inner member against scorching by the overlying end panel, the protection against drying out by the arrangement of the heat sealable inner member between two flaps or panels, the certainty of a tight and positive seal along a well defined seam immediately above the top edge of a side wall of the carton over which the inner member is folded.

Obviously the present invention is not restricted to the specific forms of containers or to the specific steps herein shown and described. Various changes, modifications, additions, omissions and substitutions may be made without departure from the spirit and teaching of the invention.

What is claimed is:

1. The method of sealing a container consisting of an outer carton having enclosing walls and end closure flaps, and an inner heat sealable member, the method comprising, bringing together in flattened relationship two opposite walls of said inner member and folding them over an end closure flap; folding another end closure flap over said folded inner member; and applying heat and pressure to said folded inner member through said other end closure flap to seal said walls of said inner member together, said end flaps underlying and overlying said inner member at the sealing portion preventing drying out of said inner member, said underlying flap further urging said sealing portion against said overlying flap to increase the effective sealing pressure.

2. The method of sealing a container consisting of an outer carton having enclosing walls and end closure flaps, and an inner heat sealable member, the method comprising, bringing together in flattened relationship two opposite walls of said inner member and folding them to

overlie the edge of one of said enclosing walls; folding an end closure flap over said folded inner member; and applying heat and pressure to said folded inner member through said other end closure flap against said edge to seal said walls of said inner member together in line with said edge resisting the outward sealing pressure and ensuring a positive tight seal of the walls of the inner member.

3. The method of closing and sealing the open end of a container which consists of enclosing carton side walls, a carton end panel, and an inner heat sealable member protruding from the open carton end, the method comprising, bringing together in flattened relationship two opposite walls of the inner member; folding said flattened walls of said inner member back upon themselves and over the edge of an enclosing side wall; folding said carton end panel over said folded flattened walls of said inner member; and applying heat and pressure to said inner member through said carton end panel against said edge, whereby a tight double seam is formed on said inner member in line with said edge.

4. The method of closing and sealing the open end of a container which comprises a carton having enclosing carton side walls, a carton end panel hingedly connected to one carton side wall, an end flap hingedly connected to another carton side wall; and an inner heat sealable member protruding from the open carton end, the method comprising, bringing together in flattened relationship two opposite side walls of the inner member; folding said flattened walls of said inner member over the infolded carton end flap; folding said carton end panel over said flattened folded walls of said inner member whereby a portion of said inner member is sandwiched between said end flap and said end panel; and applying heat and pressure to said inner member through said carton end panel, whereby the sandwiched portion of said inner member is fused, drying out of the fused portion being prevented by said flap and panel retarding an escape of moisture from the fusing inner member.

5. The method of closing and sealing the open end of a container which comprises a carton having enclosing carton side walls and carton end flaps connected to said carton side walls; and an inner heat sealable member in the nature of a bag or liner protruding from the open carton end, the method comprising, flattening the protruding portion of said inner member, folding the carton end flaps into carton closing position together with the flattened portion of the inner member in such manner that the flattened portion of said inner member is sandwiched between carton end flaps; and then applying heat and pressure to the closed carton end for a time sufficient for the heat to penetrate to, and fuse together, said flattened portion of the inner member.

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