March 28, 1939. G. A. MOORE 2,152,323

CONTAINER

Filed March 18, 1937 3 Sheets-Sheet 1

FIG.1.

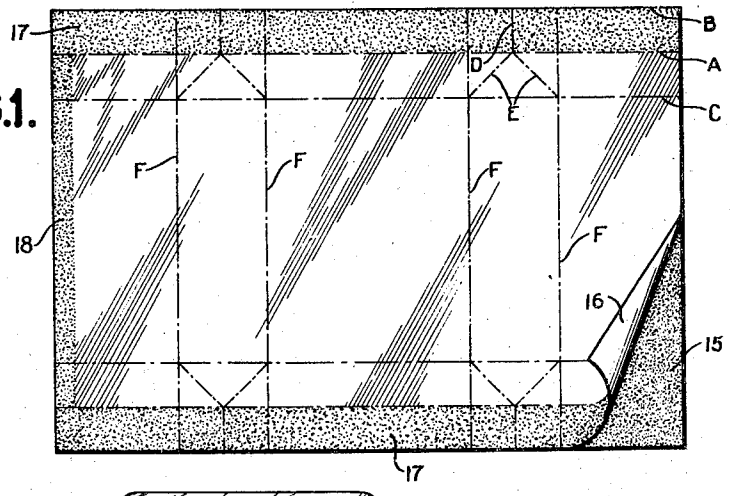
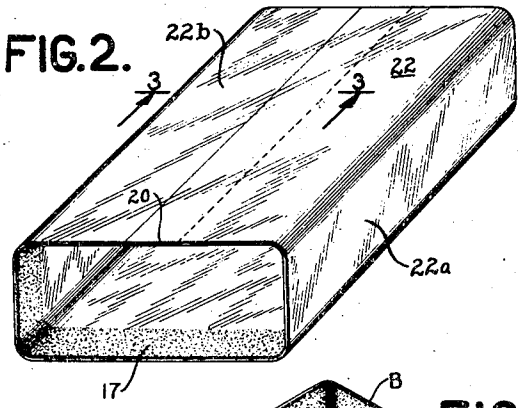


FIG.2.



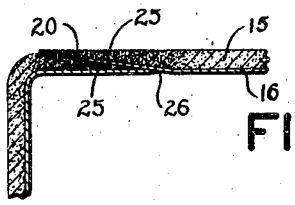


FIG.3.

FIG.4.

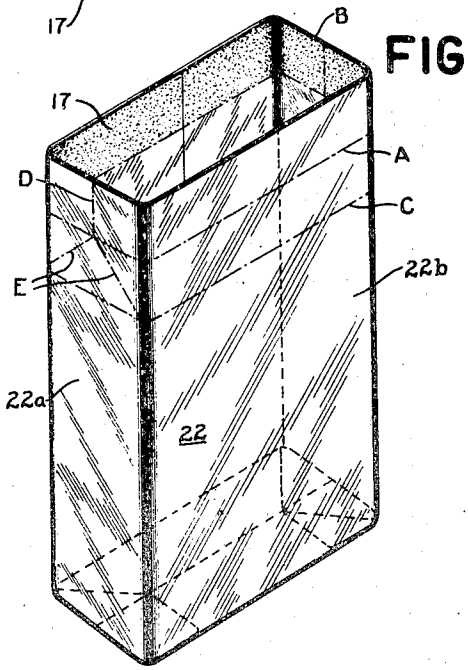
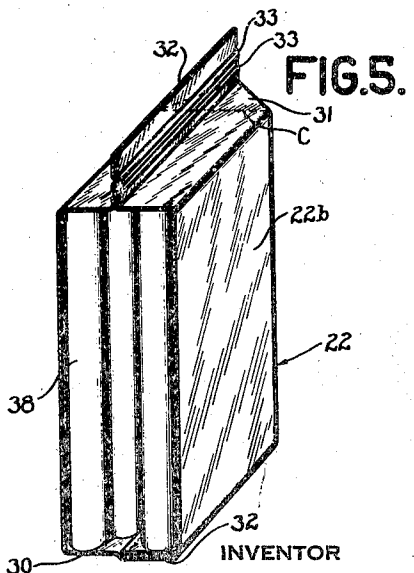


FIG.5.



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FIG.6.

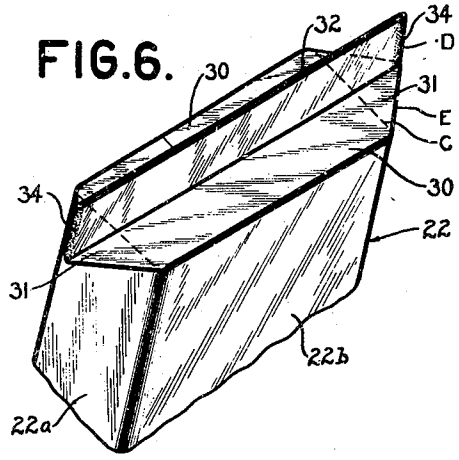


FIG.7.

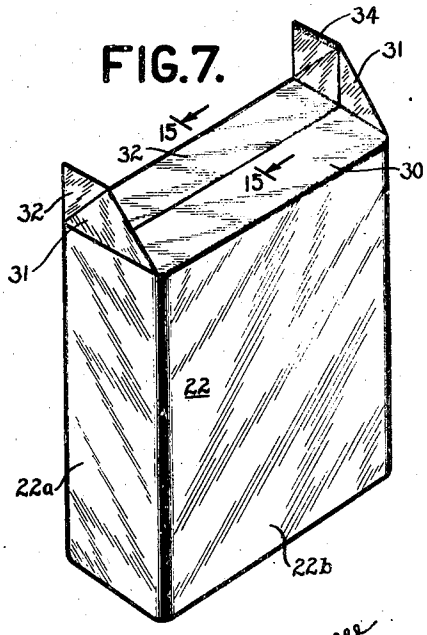
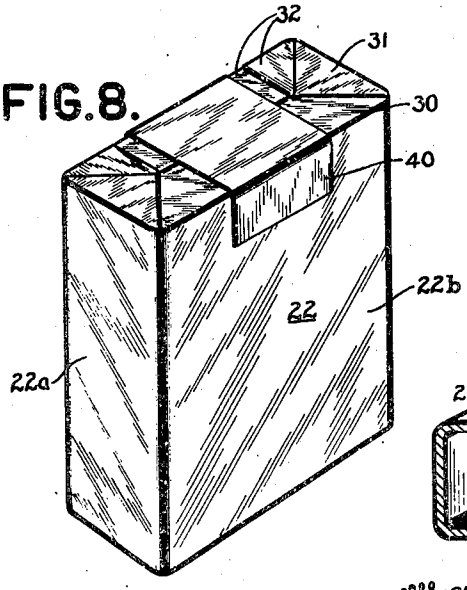


FIG.8.



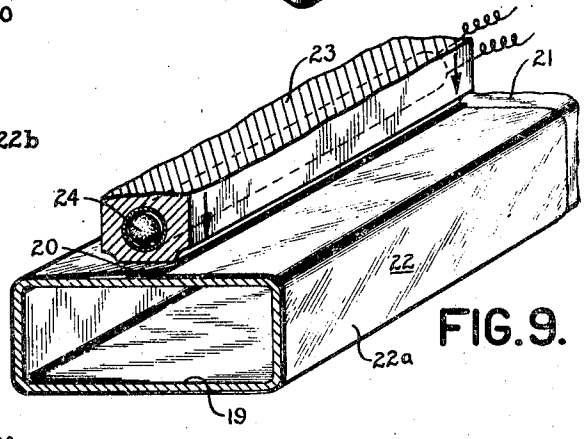


FIG.9.

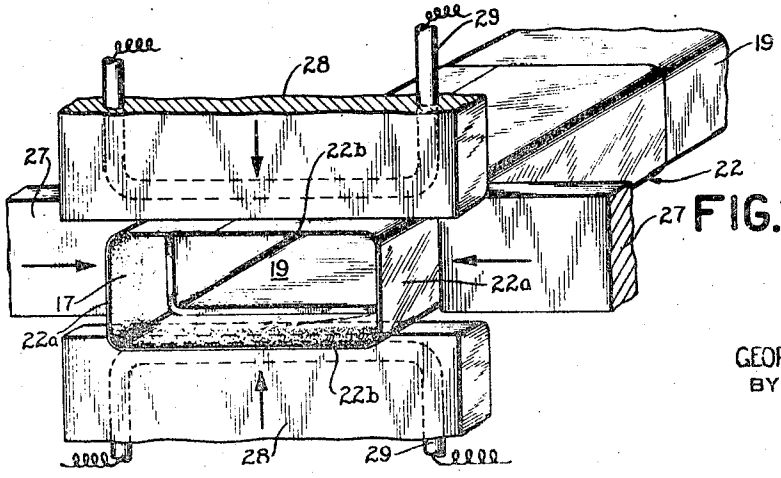


FIG.10.

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FIG.11.

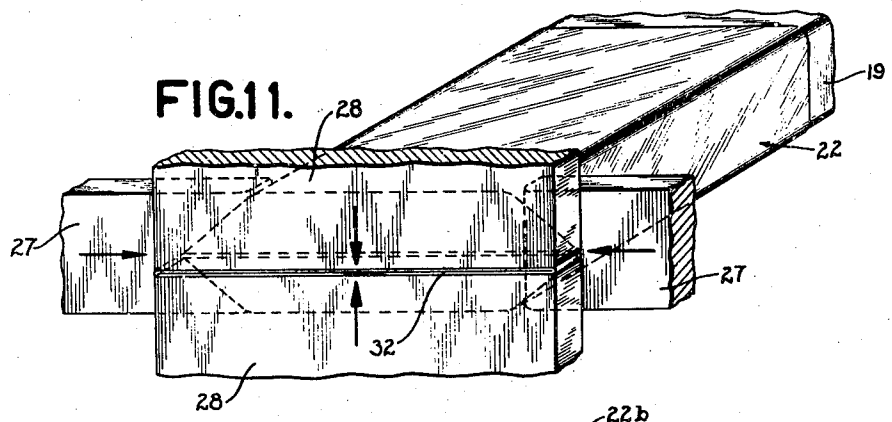
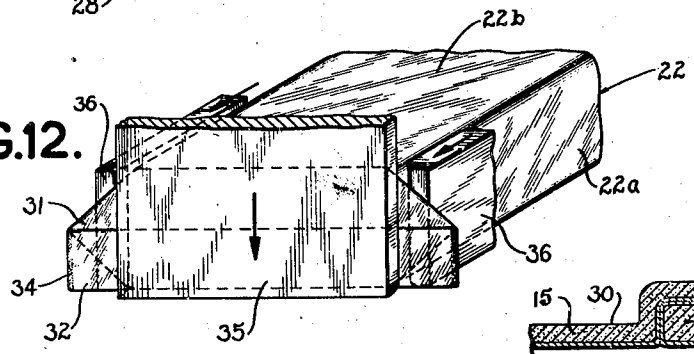


FIG.12.



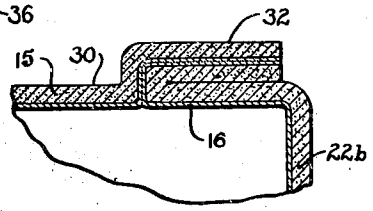


FIG.15.

FIG.13.

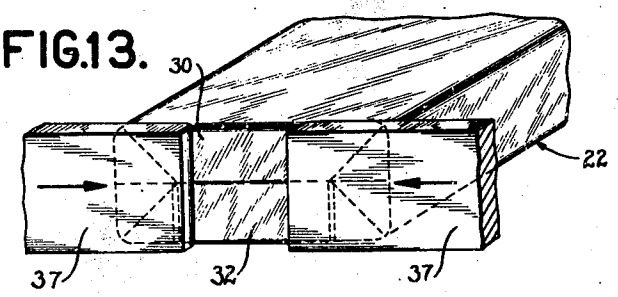
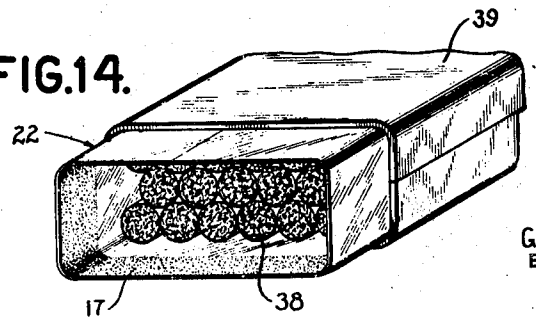


FIG.14.



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UNITED STATES PATENT OFFICE

2,152,323

CONTAINER

George Arlington Moore, Louisville, Ky., assignor to Humoco Corporation, Louisville, Ky., a corporation of Delaware

Application March 18, 1937, Serial No. 131,616

11 Claims. (Cl. 93—35)

This invention relates to containers adapted to be formed from foldable materials such as paper, foil and the like and to methods of making the same.

This application is a continuation-in-part of application Serial Number 91,682 filed July 21, 1936, for containers.

Among the objects of the invention are the provision of (*a*) a novel container or wrapper wherein products and particularly hydroscopic products, such as tobacco, for example, may be sealed and retained for an indefinite period without noticeable change in the condition of the packaged product irrespective of the temperatures, pressures and humidity conditions to which the package is subjected; (*b*) a novel container which may be constructed from a single blank constituted by one or more layers of flexible material, such as paper, foil, or the like; (*c*) a container which may be efficiently and quickly made and sealed in large quantities at low cost by high-speed machinery in such a manner that substantially no air or moisture can either enter the same or escape therefrom; (*d*) a novel container made from an impervious blank comprising paper and foil laminations and having adjacent surfaces of the folded blank secured to one another to form impervious seams or joints; (*e*) a novel method of folding a blank and simultaneously sealing the engaging surfaces thereof by the application of heat and pressure to form a package or wrapper which is substantially impervious to air and moisture; and (*f*) a novel method whereby a non-rigid container may be formed and hermetically sealed without exerting pressures thereon which tend to crush the container and the contents thereof.

The above and further objects and novel features of the invention will more fully appear from the following detailed description when taken in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only and are not designed as a definition of the limits of the invention, reference being had primarily for this latter purpose to the appended claims.

In the drawings, wherein like reference characters refer to like parts throughout the several views,

Fig. 1 shows a laminated blank, a corner of one layer being turned back, which may be employed in constructing one form of container or wrapper comprehended by the present invention;

Fig. 2 is an isometric view showing the body formed from said blank by the first folding and sealing operation;

Fig. 3 is a detail sectional view on an enlarged scale, the section being taken on line 3—3 of Fig. 2, except that the seam is shown adjacent the corner of the body;

Fig. 4 is an isometric view showing the container with the bottom thereof folded and sealed;

Fig. 5 is an isometric view, partly in section, illustrating one type of end seam which may be employed;

Fig. 6 is an isometric view showing a partial container with one end thereof sealed in accordance with the present invention;

Fig. 7 is an isometric view illustrating the method of folding the tabs formed during the end-sealing operation;

Fig. 8 is an isometric view of a completed container;

Fig. 9 is an isometric view, partly in section and with parts broken away, showing one means which may be employed in folding and sealing the blank to form the tubular body of Fig. 2;

Fig. 10 is an isometric view illustrating one means which may be employed for supporting said body and for folding and sealing one end thereof;

Fig. 11 shows the parts of Fig. 10 in sealing position;

Figs. 12 and 13 illustrate means for folding the end portions of the container after the sealing operation;

Fig. 14 is an isometric view illustrating means for supporting the container and the contents thereof during the operations of sealing and folding the other end thereof; and,

Fig. 15 is an enlarged sectional view taken on line 15—15 of Fig. 7.

The present invention is illustrated in the accompanying drawings, by way of example, in the form of a package or container suitable for packaging cigarettes, but it will be understood that the invention is not limited to packages of the size and shape illustrated and that it is not limited in its use to a package for cigarettes or tobacco. A container comprehended by the invention may be used for any of a great variety of commodities and is so constructed as to prevent the products packed therein from absorbing moisture out of the atmosphere and from giving up moisture or other volatiles either to the atmosphere or to the materials constituting the package itself. The package may be made from a single blank comprising one or more layers of material, certain surfaces of which may be treat-

ed, for a purpose to more fully appear hereafter, with adhesives or lacquers, the latter of which may have potential adhesive qualities when activated by a solvent, or heat, or both.

In making one form of container embodying the present invention, a rectangular blank, such as the one shown in Fig. 1, may be employed, said blank, in the form illustrated, comprising one or more layers 15 of fibrous material, such as paper, faced with one or more layers 16 of non-hygroscopic, non-porous material, such as tin or aluminum foil. The paper lamina constitutes a backing or foundation for the foil and, because of its greater tenacity or tensile strength, serves to reinforce and protect the less tenacious foil. The lines along which blank 15, 16 is folded to form a completed container are indicated by broken or construction lines A to F, inclusive. If desired, said blank may be scored or embossed along said lines to facilitate folding.

Laminations 15 and 16 may be secured to each other by any suitable adhesive but preferably by an adhesive having elastic or yielding properties, such as solvent-activated adhesives having a base of gutta-percha, rubber or substances containing latex, or heat activated adhesives containing chlorinated diphenyl resins, for example, as their base, thus insuring that said laminations will be retained in intimate contact when the blank is folded into container form. Said adhesive may be applied to either one or both of the engaging surfaces of layers 15 and 16.

Preferably, foil lamina 16 forms the inner surface of the container, since said foil is impervious and non-hygroscopic and accordingly will not absorb moisture or other volatiles from the contents of the container or serve as a path or a wick at the seams or joints for the passage of air and moisture between said contents and the atmosphere. For joining the overlapping portions of blank 15, 16, when the same is folded into container form, and for sealing the ends thereof in an impervious manner, the outer or exposed surface of foil lamina 16 is preferably pre-coated along the top and bottom edges and along one end thereof with thin dry films 17 and 18, respectively, of thermoplastic cement which is adapted to be activated by a solvent or heat, but by the latter only at temperatures considerably in excess of the temperatures to which the container will ordinarily be subjected. Said cement should be non-hygroscopic and so constituted as to adhere readily to the foil and constitute a good binding medium, either in a foil-to-paper or a foil-to-foil seam or joint. One cement which has been found suitable is Reynolds Metals Company acetate lacquer No. TC-3. This particular lacquer is a clear lacquer which becomes plastic or tacky at about 350° F. or more, is neutral when dry, is soluble in alcohol or acetone, and is adapted to be readily applied to the foil in the form of a thin dry film by a roller coating method.

In view of the thickness of the materials employed in relation to the over-all dimensions of the container, the laminated structure of the container walls, in the illustrated embodiment, is shown only in Figs. 1, 3 and 15. A single wall thickness is shown in all other figures in the interest of clarity.

In forming blank 15, 16 into an impervious container or package while simultaneously enclosing a quantity of cigarettes or other product therein in accordance with the novel method of the invention, said blank is first wrapped around a hollow form tube 19 (Fig. 9) having a desired size and shape, the non-hygroscopic lamina 16 being adjacent said tube. The latter is preferably formed of sheet metal, the thickness of which is exaggerated in the drawings in the interest of clarity, and is mounted on or secured to a suitable arbor 21 which may, in turn, be supported on a rotatable turret (not shown) whereby said form tube may be moved by rotation of the turret from one station to another.

In the illustrated embodiment, blank 15, 16 extends around tube 19 only once with the ends thereof overlapped at 20 so that thermoplastic strip 18 will engage the exposed surface of paper lamina 15 at the opposite end of the blank. It will be understood, however, that more than one blank similar to blank 15, 16 may be employed to form body 22 (Fig. 2) or that a single but longer blank may be wrapped around the form tube a plurality of times, if a heavier laminated body is desired. Blank 15, 16 is preferably folded along lines F so that the corners of body 22 occur along said lines and the overlap 20 occurs at approximately the center of one side of the body. Said overlap, however, may be at any desired point in the periphery of the body, such as near the corner thereof as shown in Fig. 3. An elongated sealing iron 23, which may be heated and maintained at a desired temperature by any suitable means, such as an electric heating element or cal-rod 24 coupled with a thermostat, is then brought into contact with and pressed against joint 20. The heat from iron 23 and the pressure exerted on said joint thereby are effective to activate lacquer film 18 between the overlapped ends of blank 15, 16 and to press the same into the interstices of the engaging surfaces and thereby substantially weld said surfaces together. The pressure applied by means of iron 23 is preferably sufficient to compress the paper component of the blank, as indicated by heavy hatching at 25, thereby forming a tapered joint and causing the end of foil lamina 16 within body 22 to engage an intermediate portion thereof as at 26 and thus provide said body with a continuous inner surface of impervious, non-hygroscopic foil. The compression of paper lamination 15 at points 25 also materially reduces the wicking effect thereof and accordingly prevents the passage of moisture into and out of the container through this portion of the joint.

Body 22 is next moved to another station and advanced on tube 19 so that a marginal portion constituting the area between line A and edge B (Fig. 4) and a peripheral band portion defined by lines A and C and having a width equal to one-half the width of body walls 22*a* will overhang the outer end of said tube. With body 22 in this position, a pair of supporting tools 27, 27 (Fig. 10) are moved into engagement with sides 22*a* of said body, the plane of the outer surfaces of said tools coinciding with bending line C and the outer edge of tube 19. A pair of heating and pressing anvils 28, 28, which are provided with electric heating elements or cal-rods 29, converge at right-angles to the direction of movement of tools 27, as indicated by the arrows (Fig. 10), and engage the overhanging portion C—B of sides 22*b* of body 22.

Upon continued movement of anvils 28 from the positions shown in Fig. 10, the same become effective to fold the band portions A—C of side walls 22*b* inwardly and across the mouth of tube 19 to thereby form a two-part end wall 30, 30

(Fig. 6). During this folding operation, walls 22a bend outwardly along fold lines C and the marginal portions A—B of said walls bend along lines D while band portions A—C of walls 20a fold along lines E. Thus, when anvils 28 reach the positions shown in Fig. 11, the band portions A—C of walls 22a will be folded into laminated triangular tabs 31, 31 (Fig. 6) projecting outwardly at right-angles from said sides and the entire marginal portion A—B of the body will have the opposed halves of the inner peripheral surface thereof, which is coated with thermoplastic lacquer 17, pressed into engagement to form a flat laminated tab 32 which extends across the center of the end of body 22 from the extreme vertices of the outwardly projecting triangular ears or tabs 31.

The pressure exerted on, and the heat conducted to, tab 32 by anvils 28 are effective to activate the thermoplastic cement coatings 17 interposed between the engaging foil surfaces of said tab and thereby weld said surfaces together for a substantial distance longitudinally of body 22 and, hence, imperviously seal one end of the latter. Since no pressure is exerted by anvils 28 on the central side walls or contents of the body tending to crush or compact the same during the formation of the seal between the foil surfaces of tab 32, a substantial pressure may be applied in order to insure the formation of an impervious seam or joint without, in any way, affecting or injuring said body or contents. Furthermore, when high pressures are employed, less heat is required to form a satisfactory seam of the above character and the speed with which the container may be formed is correspondingly enhanced. The foil-to-foil seam thus formed and which includes the non-hygroscopic thermoplastic coating 17 provides an end closure seam which serves to prevent the escape or entrance of moisture or air from or into the container. It has been found that the same result cannot be obtained with an ordinary untreated paper-to-paper seam, since paper is hygroscopic and porous and forms a path for the passage of moisture and air between the contents of the container and atmosphere, the may be formed is correspondingly enhanced. The moisture.

To further insure the impervious character of the seal between the engaging surfaces of tab 32 and to obviate any possibility of the same being destroyed by relative slippage or movement of said surfaces, when the tab is folded in the manner to be hereinafter described, said tab may be embossed along one or more laterally extending lines 33, 33 as shown in Fig. 5. Said embossing may be accomplished simultaneously with the formation of tab 32 by providing the operating face of one of the anvils 28 with suitable ribs and the face of the other of said anvils with grooves positioned to cooperate with said ribs.

To complete the formation of the end of the package or container, tabs 31 and 32 are folded in a novel manner to strengthen the end of the container and give it a neat and pleasing appearance. For this purpose, body 22 is moved to another station while supported on tube 19, and strips 34, 34 adjacent the ends of tab 32 are coated with an adhesive which is adapted to be activated either by heat, a solvent, or both. Strips 34 may be printed on the blank during the process of printing the label designs, or, if desired, the same may be applied during the processing of the blank to package form. A folding iron 35 (Fig. 12) having a width substantially equal to the width of walls 22b is moved across the end of the container in a plane parallel to end wall 30 to thereby fold tab 32 along bending line A so that the central portion thereof engages said end wall (Fig. 15). Thereafter, tabs 31 and the overhanging ends of tab 32 are folded through a ninety-degree angle (Fig. 7) into the plane of sides 22b by a pair of folding irons 36, 36 (Fig. 12) moving in a plane parallel to said sides. After withdrawal of folders 35 and 36, tabs 31 are folded inwardly through an additional ninety-degree angle (Fig. 8) by a pair of folding plates 37 (Fig. 13) which converge with one surface thereof paralleling the plane of end wall 30. The adhesively coated strips 34 are thus caused to engage and adhere to the central portion of tab 32 to thereby hold the tabs 31 and 32 in folded position. The central portion of tab 32 may also be adhesively secured to end wall 30, if desired, but this is not essential.

One end of the package being thus formed and sealed, the same is filled with cigarettes 38, or any one of various other types of products, through the other or open end thereof. Preferably, the cigarettes or other goods are packed into tube 19, which is rigid, and the partially closed container is thereafter moved off said tube by pressure exerted through the goods against the closed end of the package in a manner well understood in the art. The filled package is transferred to an outside supporting chuck 39 (Fig. 14) which may be formed in two parts for firmly clamping the package with the marginal portion A—B and band portion A—C of the open end of the body projecting beyond the outer edge of the chuck. Said marginal and band portions are then folded and sealed in the same manner and by the same means above described in connection with the sealing of the opposite end of the package. It will, of course, be understood that the package may be filled after the removal of the same from tube 19 and either before or after the same is clamped between the jaws of chuck 39. If desired, an adhesively coated strip or stamp 40 (Fig. 8) may be attached across the end of the completed package.

The outer surface of the above-described package may have any desired printed matter impressed thereon and may be coated with a thin, dry film of high-gloss lacquer to improve the appearance thereof and to render the outer surface moisture-repellent. The printed matter and gloss lacquer coating, if used, are preferably applied to the exposed surface of lamina 15 of blank 15, 16 prior to the formation of the container.

It will be understood that the foil lamina may be replaced by other impervious coatings. For example, the inner or nonhygroscopic lamina of the above-described container may be constituted by a thin sheet of vinylite material or by a thin, dry film of a suitable lacquer. In the present state of the art, the lacquers are not commercially satisfactory, however, and, hence, cannot be considered the full equivalent of the foil.

There is thus provided a novel container and novel method of constructing the same from one or more blanks having one or more layers of fibrous material faced with one or more impervious layers, such as foil, lacquer, or the like, the walls and seams of said container being adapted to prevent the passage of air or moisture therethrough, whereby the contents of the package are maintained in factory-fresh condition for an extended period of time irrespective of climatic conditions. The novel method provided for fold-

ing the blank into container form and sealing the same permits the use of high pressures to assure hermetic sealing without exerting any crushing or destructive forces on the container or the contents thereof. The container provided may be readily and rapidly manufactured at low cost by high speed machinery and the joints thereof are strong and durable so that the impervious character of the container will not be destroyed by handling during distribution.

Although only a limited number of embodiments of the invention have been illustrated and described, it is to be expressly understood that the same is not limited thereto. For example, a layer of foil or other impervious material may be mounted on both sides of fiber lamina 15 to thereby provide a foil-to-foil seam at 20 or the same result may be attained by making seam 20 similar to seam 32 (Fig. 15) and folding the same against wall 22*b*, thereby avoiding the presence of a raw edge of the paper lamina inside of body 22. If desired, the entire inner surface of foil lamina 16 may be coated with lacquer. The method of folding the blank may also be practiced in forming a container which is not impervious or the blank may be folded in accordance with said method to form a wrapper for other packages. The terms "container" and "package", wherever used in the foregoing description or in the claims, are accordingly intended to be sufficiently broad to include a wrapper for containing goods which are enclosed by means other than said wrapper.

The anvils employed in the folding operations should be so constructed as to avoid sharp edges contacting the material, as shown in the drawings.

The pressure and heat employed in forming the seams are applied at right-angles to the body of the container and without deleterious effects on the contents of the package. It will be noted that the process of forming the package is carried out in such a manner as to avoid a multiplicity of thicknesses in the seams, thereby insuring imperviousness. Particular attention is called to the fact that the foil, at the corners of the body proper of the package, is placed under compression rather than tension, thus avoiding disruption of the foil during the steps of fabrication with a consequent loss in imperviousness.

The cigarette-making industry has invested many millions of dollars in packaging machinery. When the container or package of the present invention is used for cigarettes, this machinery may be altered at relatively small expense without curtailing the capacity thereof, for producing the package. Moreover, the present package avoids the necessity for a plurality of sheets of material such as are now commonly employed in the making of packages of the character employed for cigarettes, thus reducing the expense and greatly facilitating the opening of the package. For example, one brand of cigarettes in use today employs first a paper blank which is surrounded by a heavy foil blank. A paper label completely surrounds the foil, and then a layer of "Cellophane" is placed around the paper label. Each of the wrappers must be torn before the cigarettes can be removed from the package, and the four separate sheets do not constitute an impervious closure. In the present invention, a single laminated blank which can be readily opened maintains the contents of the package in factory fresh condition, thereby avoiding the necessity for a wax-paper wrapping around the carton, which is now so extensively used in an effort to prevent the loss of volatiles.

Various other changes, such as in the size and shape of the container and in the materials employed, may be made without departing from the spirit and scope of the invention, as will now be apparent to those skilled in the art. For a definition of the limits of the invention, reference will be had primarily to the appended claims.

What is claimed is:

1. The method of forming a container which comprises adhesively joining layers of fibrous and foil sheet material together to form a laminated blank, folding said blank with a foil layer innermost to form a rectangular-like body, applying heat and pressure to the overlapping ends of the blank to activate a thermoplastic adhesive interposed between said overlapped ends, folding portions of two opposed side walls of the body inwardly to form an end wall, pressing opposed halves of the inner peripheral metallic surface of a marginal portion at an end of said body into engagement, and applying heat and pressure to said margin to activate a thermoplastic adhesive on said marginal portion to imperviously seal the engaged metallic surfaces thereof together.

2. A substantially rectangular container formed from a substantially rectangular blank comprising fibrous and metallic sheet material adhesively joined together throughout the entire area thereof, said metallic material having applied thereto a thin, dry film of thermoplastic lacquer having potential adhesive qualities, said blank having opposed ends thereof overlapped and joined together by said thermoplastic lacquer, the metallic lamina at one end of the blank being joined to the metallic lamina adjacent the other end of the blank to thereby form a metal-lined tubular body of substantially rectangular cross section, said body having portions of two opposed side walls adjacent an end thereof folded inwardly to form a two-part end wall substantially perpendicular to said side walls and a metal-to-metal end closure seam formed by joining to each other by means of said thermoplastic lacquer opposed halves of the inner peripheral surface of a marginal portion of said body adjacent said end wall.

3. A container formed from a substantially rectangular blank comprising fibrous and metallic sheet material, said blank having opposed ends thereof overlapped and joined together by a thermoplastic adhesive, thereby forming a tubular body of substantially rectangular cross section, said body having portions of two opposed side walls adjacent both ends thereof folded inwardly to form two-part end walls substantially perpendicular to said side walls, a tab at each end of said body formed by a peripheral marginal portion of the body adjacent an end wall and having opposed halves of the inner peripheral surface of said marginal portion in engagement, and a thermoplastic adhesive joining the engaged surfaces of said tabs throughout the entire lengths of the latter to form end closure seams.

4. A substantially rectangular container formed from a laminated blank comprising fibrous and non-hygroscopic material, said blank having opposed ends thereof overlapped and joined together by a thermoplastic adhesive to form a tubular body of substantially rectangular cross section, said body having portions of two

opposed side walls adjacent the end thereof folded inwardly to form a two-part end wall substantially perpendicular to said side walls, a tab formed by a peripheral marginal portion of said body adjacent said end wall and having opposed halves of the inner peripheral surface of said marginal portion in engagement, and a thermoplastic adhesive joining engaged surfaces of said tab throughout the entire length of the latter to form an impervious end closure seam.

5. A substantially rectangular container formed from a laminated blank comprising fibrous and non-hygroscopic material, said blank having opposed ends thereof overlapped and joined together by a thermoplastic adhesive to form a tubular body of substantially rectangular cross section, said body having portions of two opposed side walls adjacent the end thereof folded inwardly to form a two-part end wall substantially perpendicular to said side walls, a tab formed by a peripheral marginal portion of said body adjacent said end wall and having opposed halves of the inner peripheral surface of said marginal portion in engagement, and a thermoplastic adhesive joining engaged surfaces of said tab throughout the entire length of the latter to form an impervious end closure seam, said tab being embossed to form one or more ribs and complementary grooves entirely across said seam.

6. A container formed from a laminated blank comprising fibrous and foil sheet materials adhesively joined together, said blank having opposed ends thereof joined together by a thermoplastic adhesive, the foil lamina at one end of the blank being joined to the foil lamina adjacent the other end of the blank to form a metal-lined body having a substantially rectangular cross-section, said body having a marginal portion at an end thereof folded to form an end wall perpendicular to the side walls of the body and a tab comprising the outermost part of said marginal portion and having opposed halves of the inner-peripheral surface of said outermost part in engagement, and a thermoplastic adhesive joining said engaged surfaces of the tab to form a metal-to-metal closure seam.

7. The method of forming a container which comprises adhesively joining layers of fibrous and foil sheet material together to form a laminated blank, wrapping said blank around a rectangular-like form with a foil layer innermost, heat sealing the overlapping ends of the blank together, the foil lamina at one end of the blank being joined to the foil lamina adjacent the other end of the blank to form a metal-lined body, supporting said body on said form while folding portions of two opposed side walls thereof inwardly through an angle of ninety degrees to form an end wall, pressing opposed halves of the inner-peripheral surface of the margin of said body adjacent said end wall into engagement, and applying heat to said margin to activate a thermoplastic adhesive therebetween and form a metal-to-metal closure seam.

8. A substantially rectangular container formed from a blank comprising fibrous material, said blank having opposed ends thereof overlapped and joined together by a thermoplastic adhesive to form a tubular body of substantially rectangular cross-section, said body having portions of two opposed side walls adjacent the end thereof folded inwardly to form a two-part end wall substantially perpendicular to said side walls, a tab formed by a peripheral marginal portion of said body adjacent said end wall and having opposed halves of the inner peripheral surface of said marginal portion in engagement, and a thermoplastic adhesive joining engaged surfaces of said tab throughout the entire length of the latter to form an impervious end closure seam.

9. The method of forming a container which comprises applying a thin film of thermoplastic adhesive in liquid form to parts of the surface of a blank comprising fibrous material, drying said thermoplastic adhesive, folding said blank around a rectangular-like form, applying heat and pressure to the overlapping ends of the blank to activate said thermoplastic adhesive interposed between said overlapped ends and form a tubular body, folding portions of two opposed side walls of the body inwardly to form an end wall, pressing opposed halves of the inner peripheral surface of a marginal portion at an end of said body into engagement to form a tab, and applying heat and pressure to said tab to activate said thermoplastic adhesive upon the engaging surfaces of the tab to imperviously seal said surfaces together and form an end closure seam.

10. A container formed from a blank of foldable material, said blank having opposed ends thereof overlapped and joined together by a thermoplastic adhesive to form a tubular body of substantially rectangular cross-section, said body having portions of two opposed side walls adjacent the end thereof folded inwardly to form a two-part end wall substantially perpendicular to said side walls, a tab formed by a peripheral marginal portion of said body adjacent said end wall and having opposed halves of the inner-peripheral surface of said marginal portion in engagement, and a thermoplastic adhesive joining engaged surfaces of said tab throughout the entire length of the latter to form an end closure seam.

11. A container formed from a laminated blank comprising fibrous and foil sheet material, said blank having opposed ends thereof overlapped and joined together by a thermoplastic adhesive to form a tubular body of substantially rectangular cross-section, the foil lamina at one end of the blank being joined to the foil lamina adjacent the other end of the blank to form a metal-to-metal body seam, said body having portions of two opposed side walls adjacent the end thereof folded inwardly to form a two-part end wall substantially perpendicular to said side walls, a tab formed by a peripheral marginal portion of said body adjacent said end wall and having opposed halves of the inner-peripheral surface of said marginal portion in engagement, and a thermoplastic adhesive joining engaged surfaces of said tab throughout the entire length of the latter to form an end closure seam.

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