Dec. 21, 1954 R. M. BERGSTEIN 2,697,546

CONTAINER INCORPORATING NONFIBROUS FILMS

Filed June 9, 1948 3 Sheets-Sheet 1

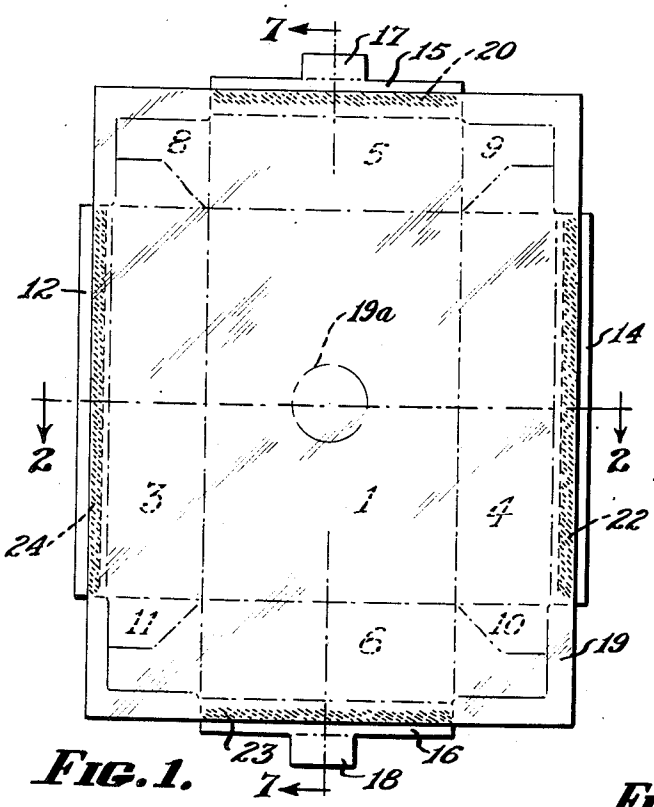


FIG. 1.

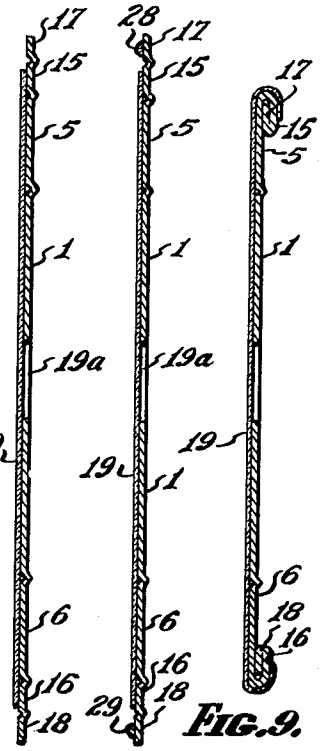


FIG. 9.

FIG. 7. FIG. 8.

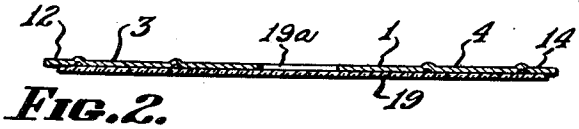


FIG. 2.

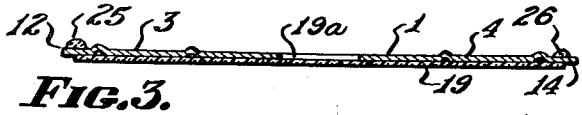


FIG. 3.

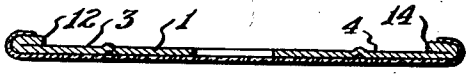


FIG. 4.

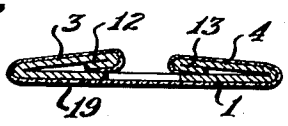


FIG. 5.

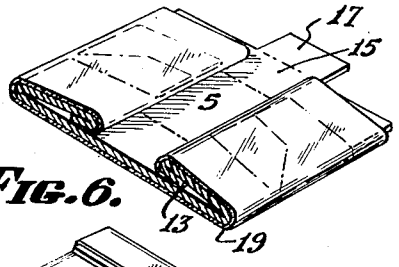


FIG. 6.

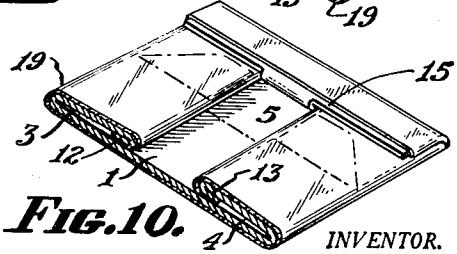


FIG. 10.

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CONTAINER INCORPORATING NONFIBROUS FILMS

Filed June 9, 1948 3 Sheets-Sheet 2

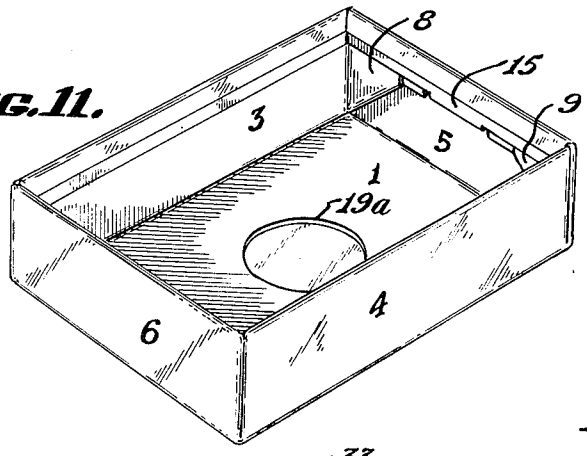


FIG. 11.

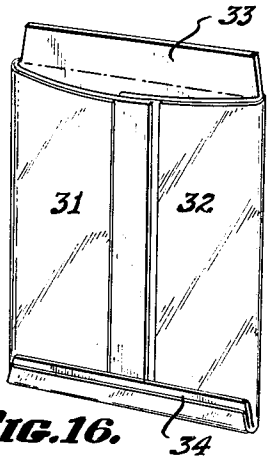


FIG. 16.

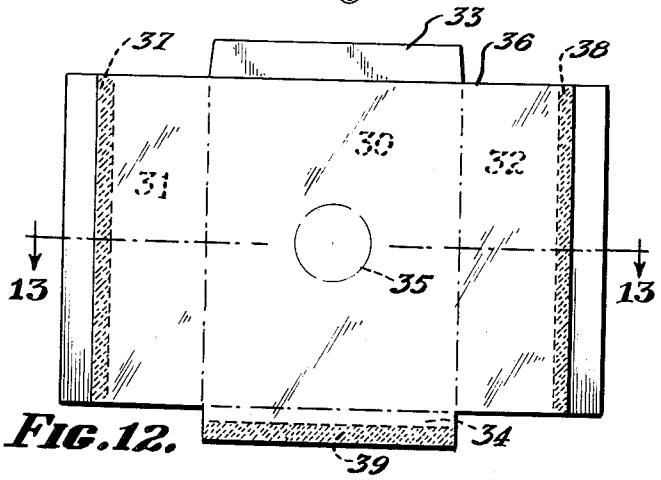


FIG. 12.

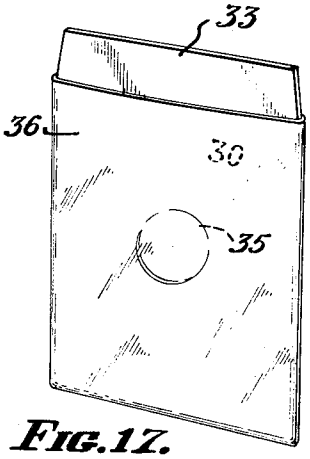


FIG. 17.

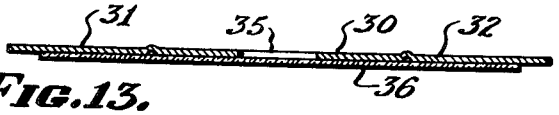


FIG. 13.

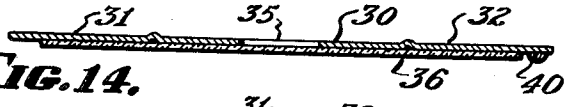


FIG. 14.

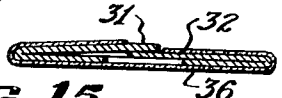


FIG. 15.

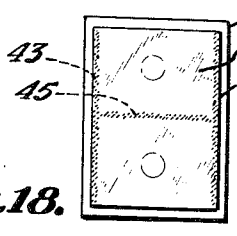


FIG. 18.

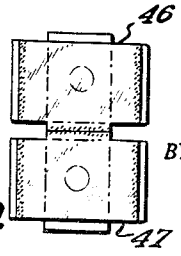


FIG. 19.

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CONTAINER INCORPORATING NONFIBROUS FILMS

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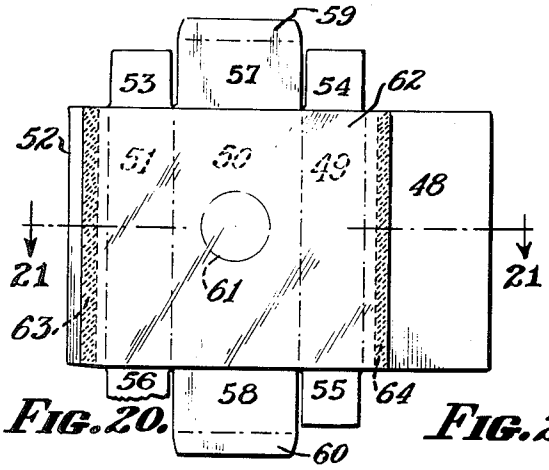


FIG. 20.

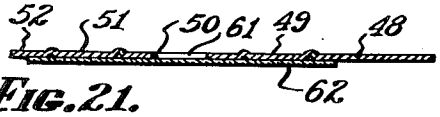


FIG. 21.

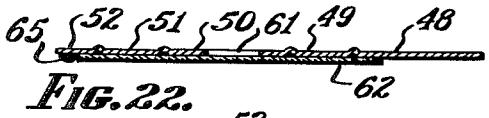


FIG. 22.

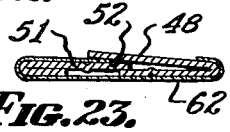


FIG. 23.

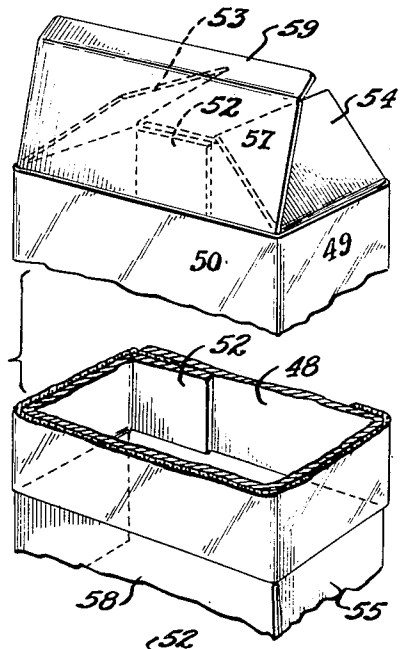


FIG. 24.

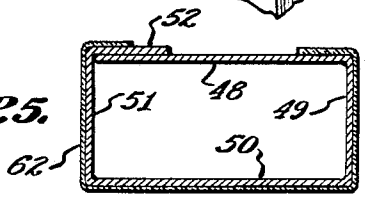


FIG. 25.

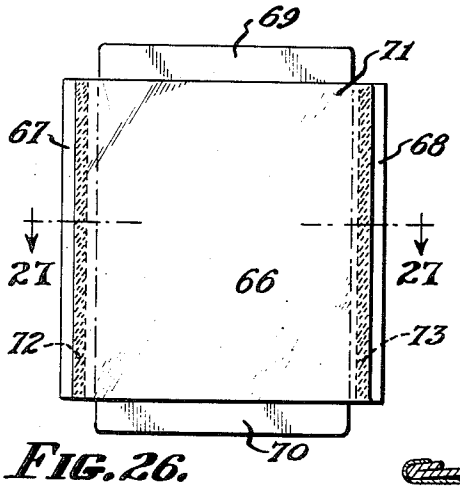


FIG. 26.

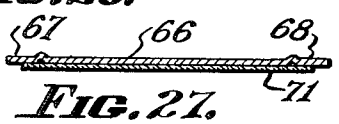


FIG. 27.

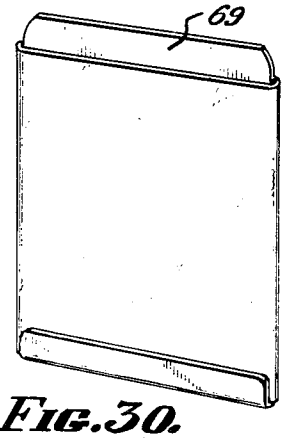


FIG. 30.



FIG. 28.

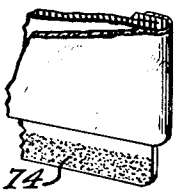


FIG. 29.

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United States Patent Office 2,697,546 Patented Dec. 21, 1954

2,697,546

CONTAINER INCORPORATING NONFIBROUS FILMS

Robert M. Bergstein, Wyoming, Ohio, assignor to The Bergstein Packaging Trust, a trust composed of Robert M. Bergstein and Frank D. Bergstein

Application June 9, 1948, Serial No. 32,009

4 Claims. (Cl. 229—34)

A principal object of my invention is the provision of boxes or other containers made of paper or paperboard and incorporating in their structure non-fibrous films, by simple and inexpensive procedures, and with savings in the cost of the articles produced.

By non-fibrous films I mean any of those relatively thin, flexible, films of plastic materials, usually transparent, of which there are a wide variety. Exemplary films are those made of ethyl cellulose, cellulose acetate, chlorinated rubber and the like. The chemical composition of these films is not a limitation on my invention, and any of them may be employed. I shall hereinafter describe my invention in connection with the employment of ordinary cellophane, it being understood that the teachings hereinafter will apply equally to any available non-fibrous film material.

The association of cellophane with paperboard in the manufacture of cartons is not new. Filled and closed cartons are frequently wrapped in cellophane; but this requires wrapping machinery in the hands of the carton user. In the case of window cartons, i. e. cartons having portions of one or more walls cut away to provide a view of the contents, it has long been the practice to associate a sheet of cellophane with the inside surface of the carton panel containing the window. So-called "window machines" are available on the market for associating sheets of cellophane with the inside surfaces of panels in boxboard blanks, prior to the folding and gluing of the blanks. However, in many instances it is preferable to have the non-fibrous film associated with the outer surface of the boxboard for various reasons. In some instances it is capable of providing better protection in this way. It is also known that an external covering of cellophane or the like adds a sheen to a package, and enhances the appearance of printing on boxboard surfaces seen through the cellophane covering. It has hitherto been suggested that boxes might be made with external coverings of cellophane by printing sheets of boxboard, cutting window holes in appropriate places in such sheets and then laminating to the boxboard sheets layers of cellophane, after which the laminated sheets could be cut and scored for the formation of the desired cartons.

The last mentioned procedure has a number of serious disadvantages. The manufacturing operations are increased in number, and hence the cost of the containers is unduly great. It is difficult to laminate a non-fibrous, transparent film to a piece of boxboard by an adhesive effective all over the surfaces of each without clouding or impairing the transparency of the non-fibrous film, and without the production of visible patches of adhesive lying beneath it. Moreover if the under surface of the non-fibrous film is first coated with adhesive, there is a problem of inactivating this adhesive over windows or cut-outs in the paperboard sheet.

An object of my invention is the provision of containers incorporating non-fibrous films with the elimination of all of the disadvantages set forth above.

It is an object of my invention to provide containers incorporating non-fibrous films which can be made complete in the box factory, and require no equipment on the part of the box user other than that equipment normally required for the closure and sealing of cartons. In the case of cartons which can be set up and closed by hand, of course, no equipment on the part of the user is required.

It is an object of my invention to provide containers incorporating non-fibrous films which can be made and

sold as knocked down or collapsed structures with savings in storage space and the cost of shipment.

It is an object of my invention to provide a mode of manufacturing containers incorporating non-fibrous films requiring no equipment other than the standard equipment of the box factory, including a standard "window machine" as known in that art.

These and other objects of my invention which will be set forth hereinafter or will be apparent to one skilled in the art upon reading these specifications I accomplish by that procedure and in those constructions and arrangements of parts of which I shall now describe certain exemplary embodiments. Reference is made to the accompanying drawings wherein:

Figure 1 is a plan view of the paperboard blank for one element of a two-piece box, with which has been associated a sheet of non-fibrous film such as cellophane.

Figure 2 is a sectional view taken along the line 2—2 of Figure 1.

Figure 3 is a view similar to Figure 2 showing the application of adhesive to marginal portions of the paperboard blank.

Figure 4 is a similar view showing the blank with longitudinal marginal portions infolded.

Figure 5 is a similar view showing the blank with the side walls infolded.

Figure 6 is a partial perspective view of the blank with the side walls infolded.

Figure 7 is a longitudinal section of the blank taken along the lines 7—7 of Figure 1.

Figure 8 is a similar view showing the application of adhesive to end tabs of the blank.

Figure 9 is a similar view showing the blank with the end tabs and marginal extensions of the end walls infolded.

Figure 10 is a partial perspective view showing one end of the completed folded and glued blank.

Figure 11 is a perspective view showing the box element in set up or erected condition.

Figure 12 is a plan view of a blank of paperboard with which has been associated a sheet of non-fibrous film.

Figure 13 is a sectional view taken along the line 13—13 of Figure 12.

Figure 14 is a similar view showing the application of adhesive to a lateral marginal portion of the blank.

Figure 15 is a similar view showing the blank in completely tubed condition.

Figure 16 is a perspective view showing the tubed blank with a bottom flange folded over and adhesively secured.

Figure 17 is a perspective view of the same structure taken from the other side or face side.

Figures 18 and 19 are respectively plan views of pieces of boxboard with which sheets of non-fibrous film have been associated, the first of these figures showing the structure immediately after such association, and the second of these figures showing the structure after it has been subjected to the action of cutting and scoring dies.

Figure 20 is a plan view of another form of carton blank with which a sheet of non-fibrous film has been associated.

Figure 21 is a transverse sectional view of the same structure taken along the line 21—21 of Figure 20.

Figure 22 is a similar view showing the application of adhesive to the glue flap.

Figure 23 is a similar view showing the structure in completely tubed condition.

Figure 24 is a partial perspective view of the erected tubed structure of Figure 23 with parts broken away to show their relationship.

Figure 25 is a sectional view of an erected tubular carton showing an alternative mode of adhering the glue flap.

Figure 26 is a plan view of a paper or paperboard blank having a sheet of non-fibrous film adhered thereto.

Figure 27 is a sectional view thereof taken along the line 27—27 of Figure 26.

Figure 28 is a similar view showing marginal portions of the blank infolded and adhesively secured.

Figure 29 is a partial perspective view of the structure of Figure 28 showing a bottom flap with an application of adhesive.

Figure 30 is a perspective of a completed envelope structure formed from the elements indicated in Figures 26 to 29 inclusive.

Briefly in the practice of my invention I associate a sheet of non-fibrous film with the face side of a paperboard or other sheet or blank. This association may be readily accomplished by passing the blank through any of the standard "window" machines of commerce, applying to face portions of the blank desired areas of adhesive, and then positioning on the blank a sheet of non-fibrous film to cover the desired area of the blank, which in normal practice will comprise a plurality of panels or walls thereof.

In ordinary practice the blank will be completely formed prior to this association. By this I mean that the blank will previously have been cut, scored, printed as desired, and provided with any desired window openings. All of these operations may be performed in the usual way and by the use of the usual printing presses, and the usual cutting and scoring presses. The cartons or banks will normally be formed in multiples on large sheets, which are then separated, and the scrap removed, in the ordinary way. The blanks will then be sent individually through the window machine, which is a machine equipped with means to deposit sheets of non-fibrous film upon the carton blanks, usually as they pass beneath a depositing wheel. For the adhesive union of the non-fibrous film to the paperboard blank a glue printing apparatus will be located ahead of the depositing roll. Then the assembly will be sent through a carton folding and gluing machine wherein other gluing means are employed to deposit adhesive upon parts of the blank which are subsequently to be folded and secured together, all as is well known in the art.

The blanks may be of boxboard or paperboard of suitable weights and qualities, or in the case of particular articles such as envelopes, they may be of paper.

In my practice. the blanks are run through the window machine in a different fashion, however, i. e. with their outer surfaces uppermost; the adhesive is deposited upon these outer surfaces, and the sheet of non-fibrous film is also so deposited as to overlie the outer surfaces of the blanks.

It is within the scope of my invention to pass through the window machine sheets of paper or boxboard intended for the formation of a plurality of aligned cartons or envelopes. These sheets will have previously been printed as desired, and if they are to contain windows, appropriate cut outs will be provided. After a sheet of non-fibrous film has been deposited upon such sheets of paperboard or paper they may subsequently be treated in a cutting and scoring press for the formation of a plurality of blanks. This expedient is one which I employ, however. only in instances where a non-fibrous film associated with a particular blank is to be itself of irregular or non-rectangular shape, or where it is necessary for some other reason to form cuts in the non-fibrous film. In all other instances I prefer to handle the blanks individually in the window machine after they have been completely formed by printing, cutting and scoring operations.

In practicing my invention, the sheets of non-fibrous film are not laminated to the blanks by an all over coating of adhesive. Instead I prefer to adhere the sheets to the blanks only at marginal portions. This does not preclude. in instances where it may be desired, the deposition of adhesive substance about the margin of a window opening so as to secure the non-fibrous film to this margin. Unless the carton or other structure is to contain granular or powdered materials, however, this expedient is not required.

In the usual practice of my invention the size of the sheet of non-fibrous film deposited upon the blank is very nearly as large as the blank itself. The sheet of non-fibrous film will in any event cover major portions of a plurality of panels of the blank, which panels are articulated together. In some instances the sheet of non-fibrous film deposited upon a blank will be greater in area than the blank itself.

In the practice of my invention I apply a sheet of cellophane or the like to a blank so as to span at least one panel thereof, securing margins of the sheet to other parallel articulated panels, and then by folding the outlying panels with respect to the intermediate panel or panels I tighten or draw the cellophane sheet around the intermediate panel or panels. This action is possible because the sheet of non-fibrous film is adhered to the blank at its margins, and is free or substantially free of

the blank elsewhere. The tightening action which I have just described is an important feature of my invention and results in a final structure smoothly covered with the non-fibrous film although the major portion of the area of that film is not in adhesive union with or laminated to the blank itself.

The folding which accomplishes this tightening is a folding inwardly of an articulated panel on both sides of the intervening panel or panels over which the film lies so that a double tensioning or tightening action is obtained. The folding may take different forms for different blanks as will now be understood by the skilled worker in the art. In some instances the sheet of non-fibrous film will be doubly tightened in but one direction across the blank; in other instances as where the blank is subjected to two directional folding, the sheet of non-fibrous film will be doubly tightened in both directions, as will be made clear hereinafter.

Referring now to Figure 1, I have there shown a boxboard blank for one element of a two-piece construction. Dot-dash lines indicate lines of score and solid lines indicate lines of cut. The blank comprises a main panel **1**, side walls **3** and **4**, and end walls **5** and **6**. The ends of the side and end walls are connected by corner webs **8**, **9**, **10** and **11**, which are diagonally scored and cut as shown. The side walls have extensions **12** and **14**, and the end walls have extensions **15** and **16**, provided centrally with articulated tabs **17** and **18**. The main panel **1** may be provided if desired with a cut out or window opening **19***a*. The paperboard blank itself is a known form of blank for a two-piece box.

The blank is next sent through a window machine with its outer printed surface-uppermost, and a sheet **19** of cellophane or other non-fibrous film is associated with it. I have indicated this sheet as extending into the areas of the side and end wall extension elements **12**, **14**, **15** and **16** and adhered to these elements by means of stripes of adhesive indicated at **20**, **22**, **23** and **24**. The sheet is also shown as extending somewhat beyond the edges of the corner connecting webs **8**, **9**, **10** and **11**. The blank and associated non-fibrous film is shown in section in Figure 2.

The combined blank and sheet of non-fibrous film may then be sent through an ordinary carton folding and gluing machine in the opposite position, i. e. with the reverse side of the boxboard up. In Figure 3 I have shown stripes of adhesive applied to the side wall extensions **12** and **14** as at **25** and **26**. The next operation will be the infolding of the side wall extensions as shown in Figures 4 and the adhesive attachment of these extensions to the side walls themselves, thus providing double thickness upper edges for the side walls, and tightening the cellophane as explained above. Next the side walls themselves are folded inwardly as shown in Figures 5 and 6. The result of these folding operations is to tension the sheet **19** of non-fibrous film across the main panel **1** and side walls **3** and **4** of the blank.

If the folding and gluing machine being employed is a straight line machine, the blanks folded as in Figures 5 and 6 will next be sent through the machine in the transverse direction, or if the machine being employed is a right angle machine the folded blanks will pass to its second section, there to be folded transversely. As shown in Figure 8 the first step will be the application of areas of adhesive **28** and **29** to the tabs **17** and **18** on the end wall extensions, which tabs are then folded inwardly, again tightening the cellophane in a direction transverse the first direction. The end wall extensions **15** and **16** are next folded inwardly as shown in Figure 9, the result being the adhesive attachment of the folded tabs **17** and **18** to the end walls **5** and **6** as will be clear from the drawing.

An end of the completely folded and glued, knocked-down box is shown in Figure 10. All outer surfaces of the box are covered with the tightened non-fibrous film **19**. This film also covers the corner connecting webs **8**, **9**, **10** and **11** but does not interfere with the erection of the box. This is accomplished as is usual with such structures, the result being the box illustrated in Figure 11 in erected form. All outer surfaces of this box are covered with the non-fibrous film in tensioned condition. The box is exceptionally neat and attractive in appearance. It will be evident that the teachings of this invention are applicable to a wide variety of one-piece and

two-piece boxes, as will now be apparent to the skilled worker in the art.

In Figure 12 I have illustrated an envelope structure comprising a blank cut and scored to present a main panel **30**, side-wise articulated panels **31** and **32** and end panels or tabs **33** and **34**. This blank may be made of paperboard or, since the ultimate structure will be in the form of an envelope, it may be made of paper. The main panel **30** may be provided, as desired, with a window opening **35**.

In a window machine a sheet of cellophane or other non-fibrous film **36** will be deposited upon the blank. It will be of a size to cover the main panel **30** and major portions of the side panels **31** and **32**. Preferably also it will cover a portion at least of the bottom flap **34**, and it will be adhered marginally to these several elements as by areas of adhesive **37**, **38** and **39**.

The blank treated in this fashion will next be sent through a carton folding and gluing machine. As shown in Figure 14 adhesive will be applied to a margin of one of the side panels as at **40**, and the side panels will next be folded over and adhesively secured at their interlap as shown in Figure 15. This forms a flat tubular structure and tensions the cellophane or other non-fibrous film about the panel **30** and portions of the side panels which in their joined condition form the back of the envelope. In a right angled operation the bottom flap **34** will be folded over and adhesively secured to the back of the structure as illustrated in Figure 16.

An envelope-like container is formed in this fashion with its entire front surface and portions of its rear surface covered with tensioned film. In use, articles of merchandise will be inserted in the envelope through its open end as will be apparent in Figure 16, whereupon the top flap **33** may be folded over rearwardly and adhesively secured to the rear of the structure. While I have shown the flap **33** free of the non-fibrous film, it is within the scope of my invention to treat this flap as flap **34** was treated.

It will be noted that it is undesirable to have the sheet of non-fibrous film extend beyond the ends of the side and top and bottom flaps of the main blank. In instances where the window machine is unable to form or handle sheets of cellophane of non-rectangular shape, it is within the scope of my invention, as illustrated in Figures 18 and 19 to associate a sheet **41** of non-fibrous film with a sheet **42** of suitable material for the blank, adhering the non-fibrous film at its edges to the sheet **42** as indicated at **43** and **44** and elsewhere where it is desired that the non-fibrous film be attached to flap members, as at **45**. Then the composite sheet illustrated in Figure 18 can be sent through a cutting and scoring press to form two or more envelope structures as illustrated at **46** and **47** in Figure 19. These structures upon being cut apart, can be sent through carton folding and gluing equipment and treated as hereinabove described.

In Figure 20 I have illustrated a paperboard blank for a folding tubular carton having a series of body walls **48**, **49**, **50** and **51** and a glue flap **52** in articulation. Short flaps **53**, **54**, **55** and **56** are shown articulated to the ends respectively of body wall panels **49** and **51**, while the body wall panel **50** is provided with closure flaps **57** and **58** having tuck elements **59** and **60**. The carton is thus in the form of the well known tuck-end tubular carton. The principles of this invention are applicable to other knock-down tubular cartons having other forms of end closure as will be evident. The panel **50** may be provided with a window **61** if desired.

To the face side of the blank of Figure 20, in a window machine, I apply a sheet **62** of cellophane or other non-fibrous film adhering it at its edges to the glue flap **52** and the body wall **48** by areas of adhesive indicated at **63** and **64**. The combined blank is thereupon sent through a carton folding and gluing machine, and with the application of adhesive as at **65** to the glue flap **52**, it may be tubed in the ordinary way as shown in cross section in Figure 23. The result of this tubing operation will be to tension the cellophane or other non-fibrous film across the body wall panels **49**, **50** and **51**.

The glue flap **52** may be adhered to the inside marginal portion of the body wall **48** as shown in Figures 23 and 24 or to the outside marginal portion of the body wall **48** as shown in Figure 25. In either instance a knock-down tubular carton is produced the outer surfaces of the body walls of which are covered with tensioned non-fibrous film at least as to the panels which are desired to be so covered. It will be obvious in Figure 20 that the widthwise dimension of the sheet of cellophane or the like may be increased until it covers the body panel **48**, if this be desired.

In Figure 26 I have shown a blank of paper or paperboard comprising a main panel **66**, articulated side panels **67** and **68** and articulated end panels **69** and **70**. A sheet **71** of cellophane or other non-fibrous film is deposited upon this blank so as to cover the main panel **66** and extend at least partially across the side panels **67** and **68** to which it is marginally adhered by areas of adhesive **72** and **73**. This structure is shown in cross section in Figure **27**. The side panels **67** and **68** are narrow; and in the folding and gluing of this structure they are simply folded back and adhesively secured to the rear surface of the main panel **66**, as shown in Figure 28. This folding tensions the sheet of non-fibrous film as hereinabove explained. As a next operation, the lower end flap **70** is folded forwardly and adhesively secured to the lower edge of the sheet of non-fibrous film as will be evident from Figures 29 and 30, the application of adhesive to the lower or bottom flap being indicated at **74** in Figure 29. The resultant structure is an envelope adapted for the display of merchandise. The panel **66**, reinforced at its edges by the side flaps **67** and **68** forms the back of the envelope, while the main portion of the non-fibrous film **71** forms the front portion. The merchandise is inserted between the front and rear portions of the envelope, after which the top flap **69** may be folded over forwardly and adhesively secured to the top marginal portion of the non-fibrous film. In this way there is formed a display envelope in which the entire front element or panel is formed of the non-fibrous film and is transparent for display purposes, excepting for the relatively narrow top and bottom marginal portions lapped by the flaps **69** and **70**.

From the above teachings in which I have set forth certain exemplary embodiments of my invention, it will be evident how the principles of it can be applied by the skilled worker in the art to envelope, container and carton structures of a wide variety of forms. Advantages of the method herein set forth are cheapness and simplicity, arising from the use of known and available apparatus as well as from the specific construction of the articles themselves. The articles are knock-down or collapsed structures of completely fabricated form, requiring no manipulations on the part of the user other than those inherent in the erection, closing and filling of ordinary cartons, containers and envelopes and the like, and requiring no apparatus in the plant of the user beyond apparatus normally present for these functions. Yet the cartons or containers are ones in which the advantages of an external surfacing of non-fibrous film over desired panels is fully attained with all of the advantages inherent in such external surfacings.

Modifications may be made in my invention without departing from the spirit of it. Having thus described my invention in certain exemplary embodiments, what I claim as new and desire to secure by Letters Patent is:

1. A collapsible box structure formed from a paperboard blank having a rectangular main panel, side wall panels articulated to opposite side edges of said main panel and hinged extensions on the outer side edges of said side wall panels, a substantially rectangular sheet of non-fibrous film overlying and covering the upper surfaces of said main panel and said side wall panels and adhesively secured along opposite marginal edges to the upper surfaces of said hinged extensions but free of attachment to said main panel and said side wall panels, said extensions and the portions of said sheet of non-fibrous film adhesively secured thereto lying in rearwardly infolded condition with said extensions adhesively secured to the under surface of said box blank, with said sheet of film thereby permanently pretensioned across the upper surface of said main panel and said side wall panels.

2. A process of making a collapsible paperboard box structure surfaced with non-fibrous film, which comprises providing a paperboard blank having a rectangular main panel, side wall panels articulated to opposite side edges of said main panel, and extensions articulated to the outer edges of said side wall panels, depositing a rectangular sheet of non-fibrous film on the upper surface of said blank, said sheet covering the said bottom panel and said side wall panels and overlying said extensions, and ad-

hering said sheet marginally to the upper surfaces of said extensions, said sheet being free of attachment to said blank in the areas of said main panel and said side wall panels, and thereafter folding said extensions rearwardly through substantially 180° and adhesively securing them in the folded condition to the under surfaces of said side wall panels, whereby to apply pulling forces to said sheet of non-fibrous film acting to permanently pretension it across the upper surface of said main panel and said side wall panels.

3. A process of making collapsible box structures surfaced with non-fibrous film, which comprises providing a paperboard blank having a rectangular main panel, side and end wall panels articulated to the edges of said main panel, and extensions articulated to the outermost side edges of said side and end wall panels, depositing a rectangular sheet of non-fibrous film on the upper surface of said blank, said sheet covering said bottom panel, said side and end wall panels, and overlying said extensions, adhering said sheet marginally to the upper surfaces of said side and end wall extensions only, said sheet being free of attachment to said main panel and said side and end wall panels, and thereafter folding said side wall extensions rearwardly through substantially 180° and adhesively securing them in the folded condition to the under surfaces of said side wall panels, whereby to apply pulling forces to said sheet of non-fibrous film acting to permanently tension it across the upper surfaces of said main panel and said side wall panels, and during the erection of said box structure, infolding said end wall extensions through at least substantially 180° and securing them in the infolded condition to further tension said sheet of non-fibrous film.

4. A carton construction formed from a paperboard blank having a main panel, side and end wall panels articulated to said main panel, and hinged extensions on the outer edges of said side and end wall panels, a rectangular sheet of non-fibrous film overlying and covering the outer surface of said blank, said sheet being adhesively secured along marginal edges to said hinged extensions only but free of attachment to said main panel and said side and end wall panels, said side wall extensions and the portions of said sheet adhesively secured thereto lying in rearwardly infolded condition with said last named extensions adhesively secured to the inner surfaces of said side wall panels, said carton structure being in the erected condition with said side and end walls extending perpendicular to said main panel, and with said end wall extensions folded through substantially 180° and lying in face-to-face contact with the inner surfaces of said end walls.

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