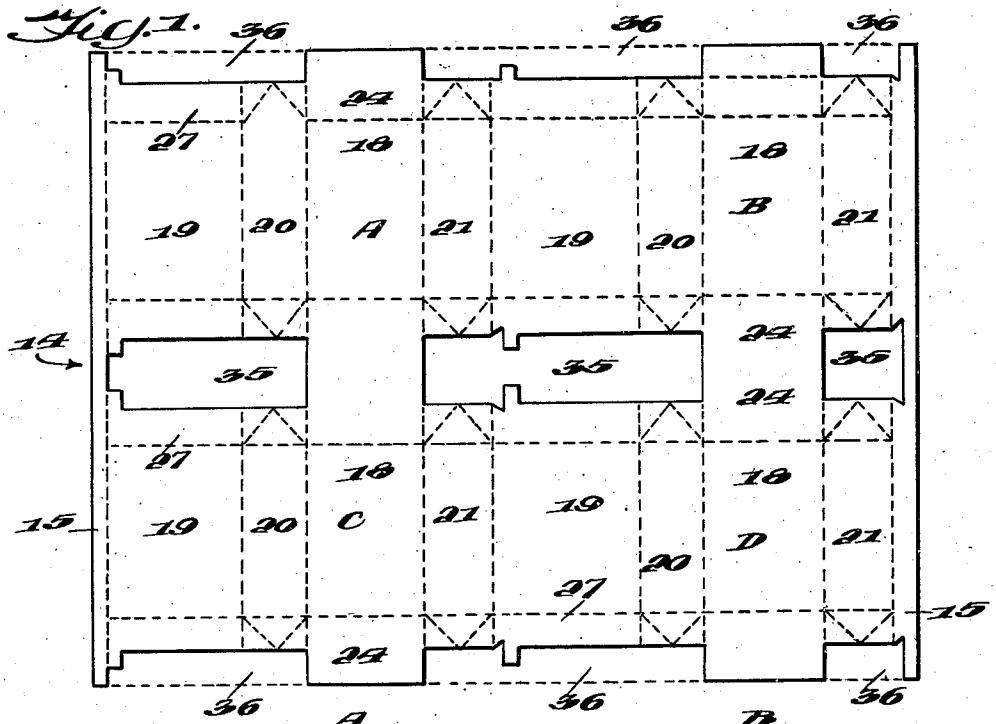
Nov. 21, 1944. C. F. KLEIN 2,363,425

METHOD OF MAKING PAPER BOARD CONTAINERS

Filed Sept. 18, 1943 3 Sheets-Sheet 1

Fig. 1.



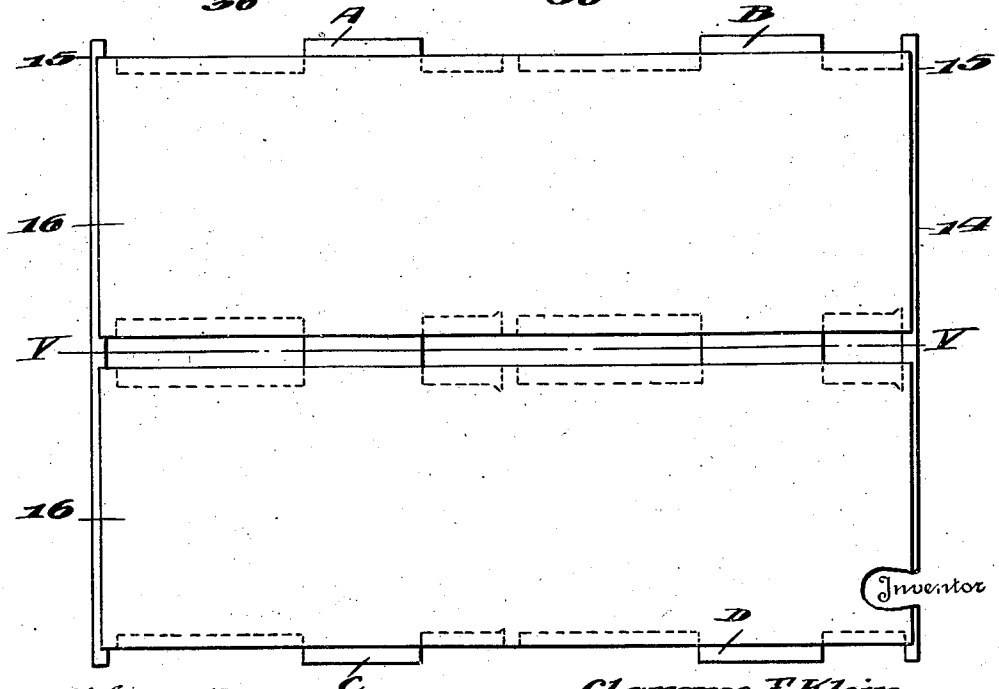


Fig. 2.

Inventor

Clarence F. Klein,

By W. J. McDowell

Attorney

Nov. 21, 1944. C. F. KLEIN 2,363,425

METHOD OF MAKING PAPER BOARD CONTAINERS

Filed Sept. 18, 1943 3 Sheets-Sheet 2

Fig. 3.

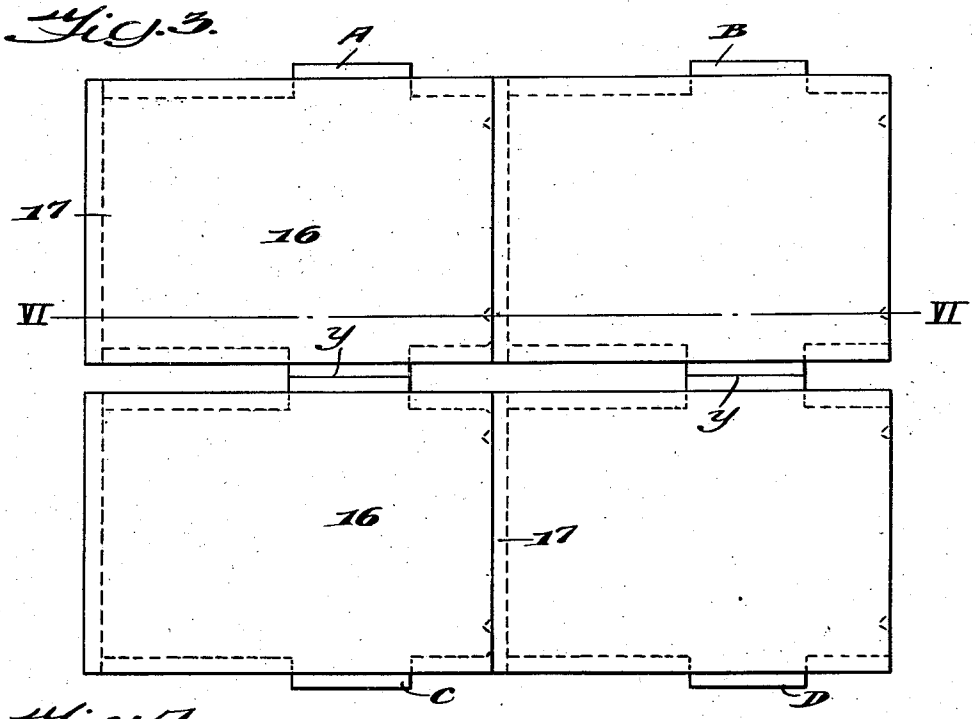
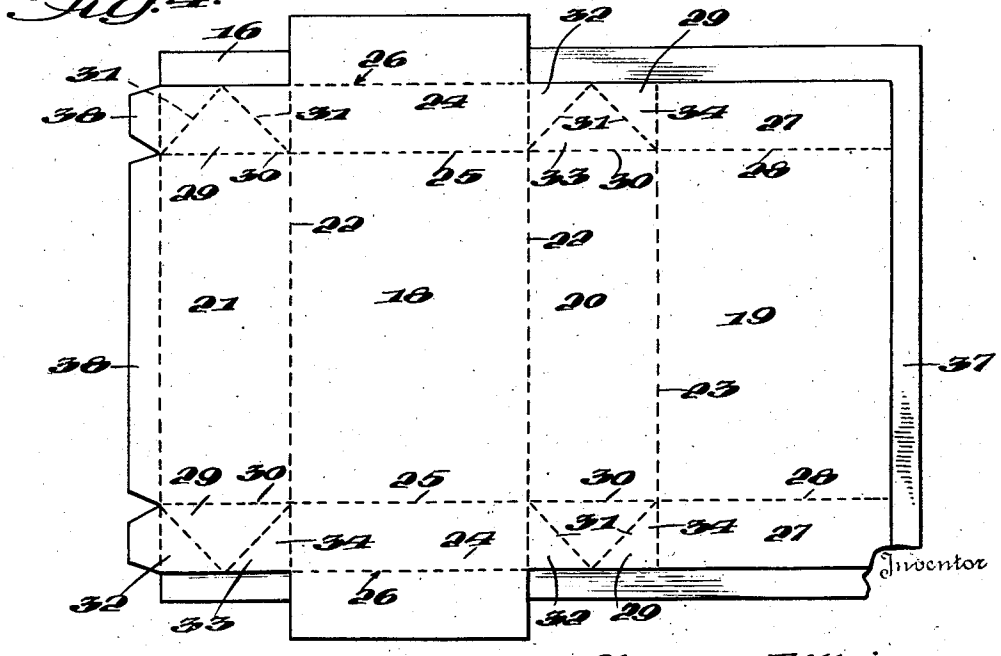


Fig. 4.



Inventor

Clarence F. Klein,

By W. O. McDowell

Attorney

Nov. 21, 1944. C. F. KLEIN 2,363,425

METHOD OF MAKING PAPER BOARD CONTAINERS

Filed Sept. 18, 1943 3 Sheets-Sheet 3

Fig. 5.

Fig. 6.

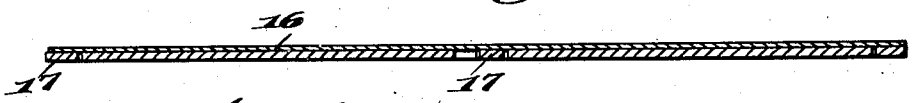


Fig. 7.

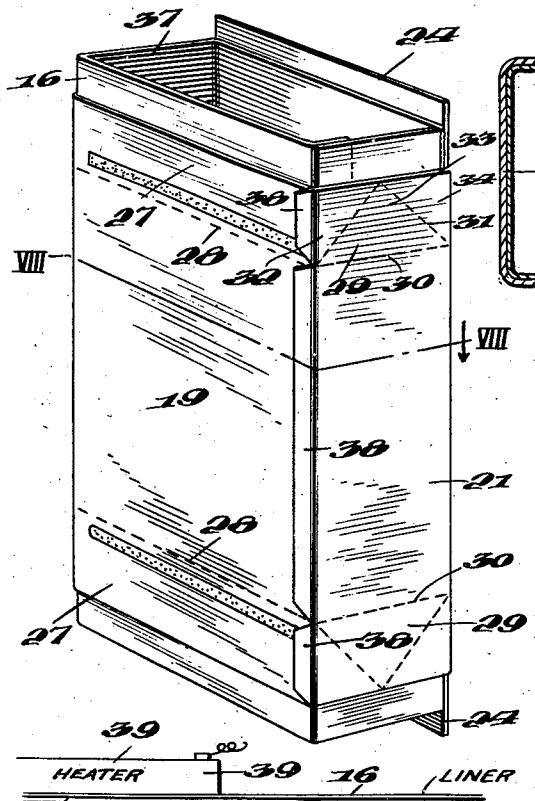


Fig. 8.

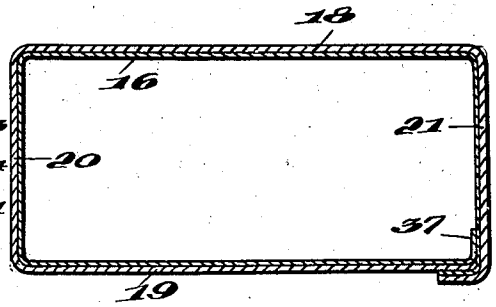


Fig. 9.

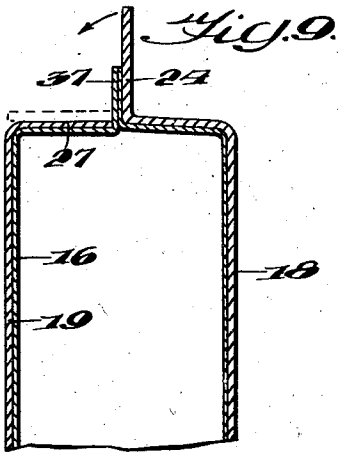


Fig. 10.

Inventor

Clarence F. Klein,

By W. D. McDowell

Attorney

Patented Nov. 21, 1944 2,363,425

UNITED STATES PATENT OFFICE

2,363,425

METHOD OF MAKING PAPERBOARD CONTAINERS

Clarence F. Klein, Columbus, Ohio, assignor to Frankenberg Bros., Inc., Columbus, Ohio, a corporation of Ohio

Application September 18, 1943, Serial No. 502,939

6 Claims. (Cl. 93—36)

The present invention relates to the manufacture of paperboard cartons or containers and is especially directed to the manufacture of collapsible or knockdown cartons or containers in which an inner lining is used to enable the package to be employed for sealing the contents to preserve the latter against deterioration or loss.

It is an object of the present invention to provide an improved method for facilitating the manufacture of lined paperboard containers of the character set forth, whereby to reduce manufacturing costs and utilize, with but slight modification, existing machinery now in general use.

Another object of the invention is to provide an improved method of producing lined paperboard boxes in which the lining material projects beyond certain of the marginal edges of the box body, so that when the box is completely folded to enclose the contents thereof, such projecting portions of the lining may be brought into sealing engagement with each other to provide for improved protection of the contents of the box and, when pulverulent materials are positioned in the box, to prevent sifting of such materials exteriorly of the box.

A further object of the invention rests in the provision of an improved method for manufacturing the blanks from which said lined paperboard boxes are formed in which strip-like areas are removed from the blanks in order to provide for the projection of the lining material beyond the edges of the blank.

For a further understanding of the invention, reference is to be had to the following description and the accompanying drawings, wherein:

Fig. 1 is a flat layout of one form of blank used in forming cartons in accordance with the present invention;

Fig. 2 is a similar view disclosing lining sheets applied adhesively to one face of the blank shown in Fig. 1;

Fig. 3 is a view of the blank following its cutting to separate the individual box-forming regions thereof;

Fig. 4 is a flat layout of one of the individual box-forming blanks, looking toward its unlined face and showing by broken lines the folding creases of the blank;

Fig. 5 is a vertical transverse sectional view taken through the multiple blank on the plane indicated by the line V—V of Fig. 2;

Fig. 6 is a similar view taken on the plane VI—VI of Fig. 3;

Fig. 7 is a perspective view showing an individual blank and the initial folding thereof to rectangular shape and prior to the closure of its end flaps;

Fig. 8 is a horizontal sectional view taken on the plane indicated by the line VIII—VIII of Fig. 7;

Fig. 9 is a vertical transverse sectional view taken through the box or container and showing in full lines the position of the end flaps prior to final sealing, and in broken lines the positions of the end flaps after final sealing;

Fig. 10 is a diagrammatic view illustrating apparatus employed in separating a removable strip of the box-forming blank from the adjoining liner.

In forming a box or carton in accordance with the present invention, paperboard stock of suitable weight is utilized. While various types of containers may be made in which the features of the present invention may be used to advantage, there has been illustrated in the accompanying drawings one form of a container in which the features of the present invention are particularly applicable.

As shown in Fig. 1, a multiple, substantially rectangular, paperboard blank 14 is initially die cut so that it will possess a plurality of box-forming regions, indicated by the reference characters A, B, C and D. At the time of such initial cutting, the blank may be scored or creased, as indicated by dotted lines in Figs. 1 and 4 which, as usual, define the panels and flaps and facilitate the folding of the blank in the formation of boxes therefrom. The blank is of sufficient width so that at each side thereof there is provided an elongated and narrow strip-like region 15 which permits the blank to be engaged by the feeding and guiding instrumentalities employed in automatic box-making machinery. These strip regions are later removed from the blank at the time of severance of the box forming regions, as indicated in Fig. 3.

Following the formation of the blank shown in Fig. 1, there is applied to one face thereof one or more sheets, indicated at 16, of lining material. Usually this material comprises a thin moisture-resisting and fat-repelling substance, such as parchment, various synthetic films, Cellophane, waxed paper or their equivalents. The union of the lining with the paperboard stock is preferably effected by applying to the stock, the lining, or both, a heat-softening adhesive, such as wax, paraffin or an adhesive composed principally of the latter materials. I have used advantageously an adhesive which has a melting point of the order of 160° to 165° Fahr. The ad-

hesive, preferably, is uniformly and thinly distributed over the meeting surfaces of the paperboard stock and the lining and, with the application of heat and pressure, the lining adheres firmly to the paperboard stock and becomes, in effect, a component part thereof.

In Fig. 2, I have shown the paperboard blank 14 as having applied thereto a pair of spaced lining sheets. This is done in order to save the lining material, but it will be understood that, if desired, a single sheet of lining material may be applied to each of the multiple blanks. This will depend upon the construction of the containers formed from the blanks.

Following the application of the lining sheets, the laminated blank is then fed back through an automatic press and the cutting of the blank to sever the individual box-forming sections is accomplished, such severing taking place along the lines indicated at X and Y in Fig. 3. At the same time, the strip-forming regions 15 are removed, the severed blank possessing the configuration illustrated in Fig. 3.

After the strip regions 15 have been removed, there is provided at the sides of the blank, shown in Fig. 3, additional severed strips indicated by the numeral 17, to one face of which the lining sheets are united adhesively, and in a subsequent operation, performed on the individual blanks, the strips 17 are removed from the blank body but without removing the area of the lining sheets immediately adjoining such strips. That is, as shown in Fig. 6, at the time of severing the multiple blank to produce separate box-forming blanks, the multiple blank body is cut to form the strips 17. This cutting extends through the paperboard body of the blank but not into the lining sheets. When the individual blanks are fed through a folding machine, the strips 17 are heated to soften the adhesive uniting the same with the lining sheets, and, preferably by suction forces and following such heating, the strips 17 are removed from engagement with the lining sheets and the blank body as illustrated in Fig. 10.

In order to form the particular box illustrated, each of the blanks A, B, C and D, which are duplicates, is creased or scored (see Fig. 4) to provide a front panel 18, and a rear panel 19, and side panels 20 and 21. The front panel 18 is joined with the side panels 20 and 21 along the scored or creased lines 22, and the rear panel 19 is joined with the side panel 20 along the scored or creased line 23. The front panel is provided with end flaps 24, the flaps being foldable along the scored lines indicated at 25. Also, each of the end flaps 24 is longitudinally scored as at 26 intermediately of its width. The rear panel 19 is also provided with end flaps 27 which possess approximately one-half the width of the flaps 24, the flaps 27 being united with the panel 19 along the scored fold lines 28.

The side panels 20 and 21 are each provided with end flaps 29 which are foldable about the scored lines 30. Also, each of the flaps 29 is triangularly scored as at 31 to produce the regions indicated at 32, 33 and 34 which, when the container is folded and sealed, are adapted to overlap each other, that is the regions 32 and 34 overlap the region 33. By virtue of the openings shown at 35 in the multiple blank of Fig. 1, the complemental marginal recesses 36 and the removal of the strips 15 and 17, it will be noted, by reference to Fig. 4, that the lining sheet of each blank projects beyond the margins of the end flaps 27 and 29 and the rear panel 19, forming at the side of each blank a border 37 which, as shown in Fig. 8, seals the interior of the container by overlapping adjacent portions of the lining and which are adhesively united.

The side panel 21 and the adjoining end flaps 29 are provided with glue laps 38 which, as shown in Figs. 7 and 8, are glued to the rear panel 19 and its adjoining end flaps 27. This operation is carried out by passing the blanks shown in Fig. 4 through a standard straight line folding and gluing machine which causes the blank to assume the partially folded form illustrated in Fig. 7, the end flaps at the bottom of the box being folded prior to the insertion of materials into the box and the top flaps folded after the materials have been placed in the box. The extended portions of the lining sheet which project beyond the end flaps, as illustrated in Fig. 7, are adapted to be brought into abutting engagement, as shown in Fig. 9. These abutting portions of the lining sheet may be united by a heating operation in which the wax or resin adhesive is softened to enable the contacting surfaces of the lining to adhere to each other and thereby seal the contents of the box.

The folding or gluing machine is provided with a longitudinally extending guideway, not shown, through which the blanks are advanced longitudinally by any suitable means. Along the guideway, there is arranged a stationary electrical heater 39 and a suction roll 40, which roll is of a width corresponding to that of the strip region 17 of the blank. As the blank passes through the guideway of the machine, the strip 17 thereof passes over the roll 40. As the blank passes through the guideway of the machine, the strip 17 of the blank moves beneath the elongated heater 39 and, by the operation of the latter, the adhesive between the strip 17 and the lining is softened. Therefore, when the strip 17 passes into engagement with the suction roll 40, suction forces are exercised on said strip to remove the same from the associated areas of the liner, thus leaving the liner attached to the body of the blank so that it may form the inner lap or border shown at 37.

In view of the foregoing, it will be seen that I have provided an improved method for producing an inner lined paperboard box in which the operations of forming the box may be carried out with existing machines and with a rapidity and economy favorably comparable with that of standard unlined boxes. The construction of the top and bottom flaps, after the carton is heat sealed, is such that nothing but the liner contacts the enclosed contents, the liner being moisture and grease resisting, seals the contents against deterioration by such forces. The carton offers the same protection to the contents as if the latter were placed in separate heat sealed bags with the latter positioned inside of standard folding boxes.

I claim:

1. In the manufacture of inner lined paperboard boxes, the steps which comprise applying to one side of a box-forming blank through use of a heat-softening adhesive a lining sheet, locally cutting through the body of the blank but not the lining sheet to provide a strip adapted for removal from the blank but temporarily held in connection with the latter by said sheet, passing the blank longitudinally through a guide-

way, during the passage of the blank through said guideway and without interrupting the movement thereof subjecting the blank in the region of said strip to the action of heat of sufficient temperature and duration to soften the adhesive uniting the strip with said sheet, and thereafter and during continued travel of the blank along the guideway applying pneumatically induced suction forces to the strip to effect its complete separation from said blank and sheet.

2. In the manufacture of inner lined paperboard boxes, the method steps which comprise die cutting a substantially rectangular paper board blank to provide a plurality of box-forming regions having slotted margins, flatly securing to one side of the blank by use of a heat softening adhesive a lining sheet, thereafter cutting the blank to separate individually the box-forming regions, and removing a marginal strip from each of said blanks to cause the lining sheet to project beyond the margins of said blank.

3. In the manufacture of folding inner lined paperboard boxes, the method steps which comprise cutting paperboard to produce a box-forming blank, applying to one face of said blank through the use of a heat-softening adhesive a lining sheet, again cutting the paperboard but not the lining sheet to produce a body adapted for removal from the blank but temporarily held in connection with the latter by said sheet, heating the blank in the region of said body to soften the adhesive uniting the body with said sheet, and thereafter removing the body from said sheet.

4. In the manufacture of inner lined paperboard boxes, the method which comprises die cutting paperboard to provide a blank containing a plurality of box-forming regions, flatly securing to one side of the blank by use of a heat-softening adhesive an inner lining sheet, again cutting the blank and lining sheet to separate individually the box-forming regions, simultaneously with said second cutting operation cutting each of said regions of said blank but not the lining sheet to provide a removable body, thereafter heating said body to soften the adhesive uniting the same with said sheet, and following the softening of the adhesive removing the body from association with said blank and sheet.

5. In the production of folding carton blanks from a sheet of paperboard having a sheet of a lining material secured thereto by means of a heat-softening adhesive, the improvement which comprises cutting through said paperboard sheet along selected lines within the confines of each of said blanks without cutting the lining material thereon, whereby to produce a body adapted for removal from the blank but temporarily held in connection with the latter by said sheet, locally heating the blank in the region of said body to soften the adhesive uniting the body with said sheet, and with the adhesive in a softened state removing the body from said sheet.

6. In the production of folding carton blanks from a sheet of paperboard having a sheet of a lining material secured thereto by means of a heat-soften adhesive, the improvement which comprises cutting through said paperboard sheet along a line parallel and adjacent to its marginal edges but without cutting the lining material thereon, whereby to form a strip adapted for removal from the blank but temporarily held in connection with the latter by said sheet, softening the adhesive uniting said strip with said lining sheet, and while the adhesive is in a softened state, removing the strip from the lining sheet.

CLARENCE F. KLEIN.