Jan. 8, 1935. S. BERGSTEIN 1,987,225

LAMINATED PAPER BOARD AND CONTAINER MADE THEREFROM

Filed Dec. 10, 1932

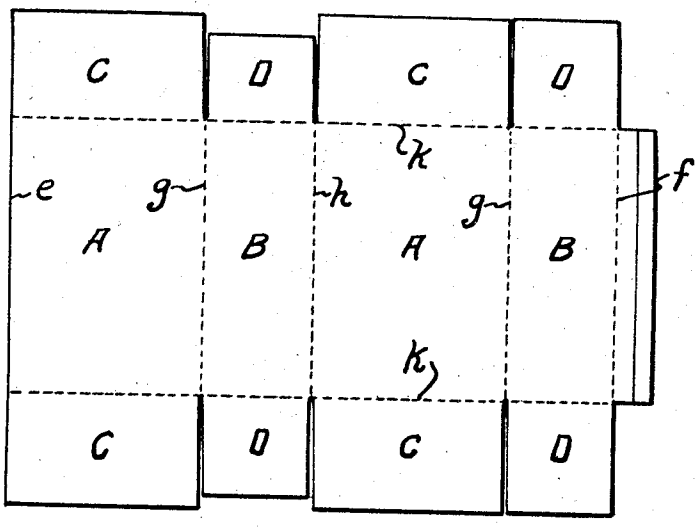


Fig. 1.

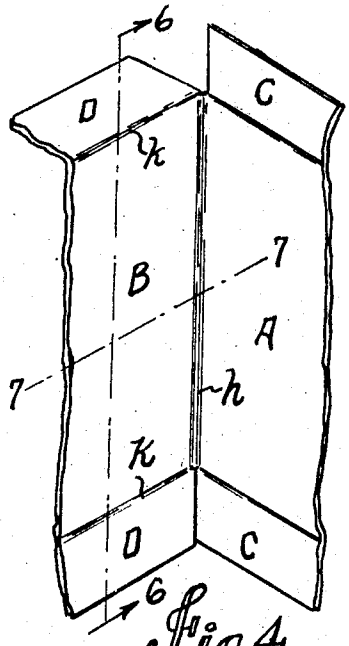


Fig. 4.

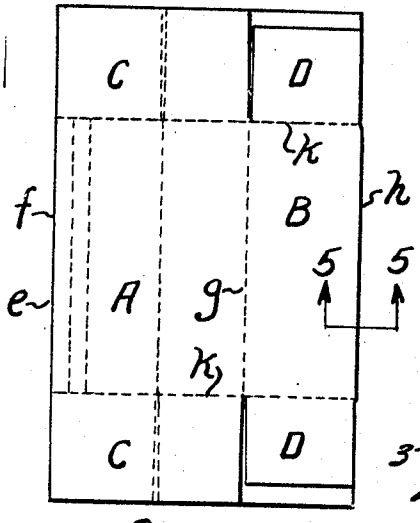


Fig. 2.

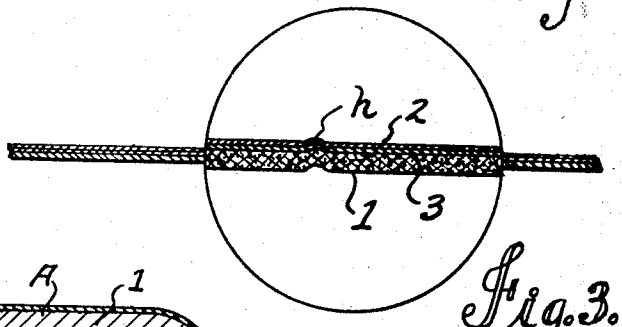


Fig. 3.

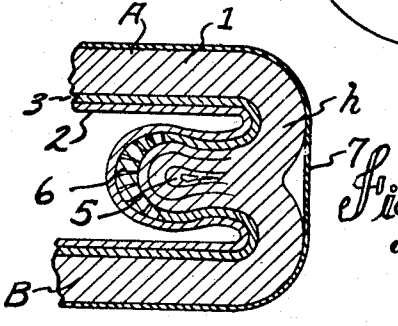


Fig. 5.

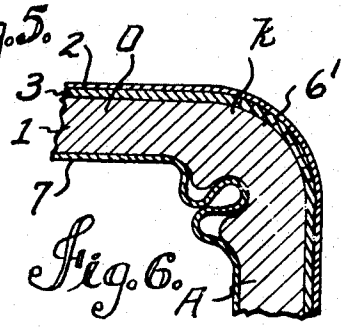


Fig. 6.

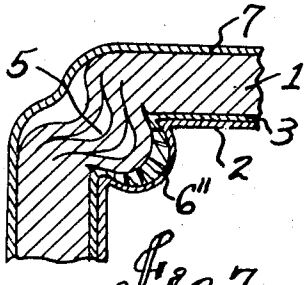


Fig. 7.

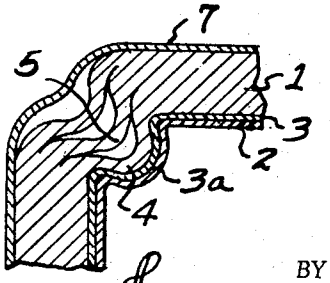


Fig. 8.

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LAMINATED PAPER BOARD AND CONTAINER MADE THEREFROM

Samuel Bergstein, Cincinnati, Ohio

Application December 10, 1932, Serial No. 646,665

11 Claims. (Cl. 154—46)

My invention relates to sheet stock for making boxes, cartons or like containers, and to containers made from such stock, in which it is desirable to have the stock, and the container made therefrom, resistant as possible to passage of air, moisture or grease. It especially relates to containers, and stock therefor, in which folding of the stock is required.

An example of sheet stock known in the art for such purposes is a paper board base ply, a glassine lining or surfacing ply, and an adhesive uniting the plies, having dextrin as its basis. The paper board is a relatively thick, brittle and absorbent material. Glassine is a thin, semi-transparent sheet material well known in the art, well adapted to resist passage of air, moisture or grease; but dextrin adhesive does not have these properties.

Also, glassine is very flexible, has considerable toughness, and would be well adapted to remain intact and conform closely to the base ply under all usual stresses, including those involved in folding the stock if its connection with the base ply were maintained. Dextrin adhesive, however, is not tough or flexible in its dried condition between the plies. Consequently it is not well adapted to preserve the union of the plies under stresses, and when the brittle laminated stock is scored and folded the adhesive breaks and cracks in the fold. This allows the plies to separate at the fold due to the unequal bending of the thick and thin plies, reducing the effectiveness of the glassine ply as an air, moisture and grease proofing lining or surfacing for the paper base supply. These same defects are present in any sheet stock with other equivalent plies united by any equivalent adhesive; and so far as I am aware there has hitherto been no laminated stock for such purposes in which such defects are avoided. Cartons or similar containers made from such stocks are required to contain materials from which it is desired to prevent escape of moisture, or from which it is desired to exclude moisture; also materials having a grease content which it is desired shall be prevented from being absorbed by and passing through the walls, corners and joints of the container. The thinner surfacing ply usually is inside the container as a lining, but of course may be on the outside as a covering.

It is an object of my invention to add to, rather than reduce the proofing properties of the lining or surfacing ply by the adhesive used in uniting the plies. A further object is to avoid breaking or cracking of the adhesive, and to preserve the union of the base ply and surfacing ply, when the stock is subjected to folding. In the manufacture and supply of scored and folded paper board cartons, the stock is subjected to a 180 degree fold as the carton is produced in collapsed, flat condition for storage and shipping. In packaging the goods in such cartons, certain flaps are subjected to a 90 degree fold in one direction for opening and filling the carton and for applying adhesive to the flaps; and to a 180 degree fold in the opposite direction, for closure of the carton. In setting up the carton, its walls unfold 90 degrees from the collapsed positions, at two diagonally opposite corners, and fold 90 degrees at the other two corners. The materials at all corners therefore are subjected to severe stresses of compression or distension. The base ply usually is separated at the corners into fractional plies of various degrees of curvature. The thinner surfacing ply, if of glassine or equivalent stock, remains substantially intact; and it is my object to insure substantially intact junction of this ply with the adjacent surface of the folded base ply under all of these conditions of folding, so that the properties of the surfacing ply are realized throughout the container structure, including its folded corners.

In accomplishing this object I have successfully used, specifically, a laminated chip board paper stock, usual in making cartons, as the base ply which is a relatively thick, brittle, absorbent stock, glassine as the surfacing ply, and adhesive containing latex, uniting the plies throughout their adjacent surfaces. I have found that laminated board of this construction avoids all of the above mentioned defects. Cartons made from it are effective in excluding air from the contents, and do not absorb or allow outward penetration of grease from the contents, as for instance food products containing grease as shortening.

The latex adhesive increases considerably the grease-resisting properties of the glassine lining; it increases materially the air-resistance of the glassine, imparting to the carton these properties which the paper stock base ply lacks. Due to the use of the latex adhesive, when the water or moisture is absorbed in the board or otherwise evaporates or dries up, the film of latex adhesive between the plies does not become brittle and permeable, but remains impermeable and very flexible and stretches like rubber.

I have illustrated an example of a carton, and magnified views of folds thereof in different stages of folding as before mentioned, in the accompanying drawing, in which—

Figure 1 shows a scored carton blank of well known design, in flattened condition, ready for folding into a collapsed tubular condition for storage and shipping.

Fig. 2 shows the blank thus folded.

Fig. 3 is a slightly magnified view of a cross section of the stock, showing the plies and the adhesive between them, and one of the scores used in folding.

Fig. 4 is a view of part of the carton with walls folded to position for use of the carton, and showing a flap thereof folded out for filling and application of sealing adhesive to the flap.

Fig. 5 is a much magnified view of a cross section at 5—5 in Fig. 2, to illustrate the nature of the stresses on the adhesive and the separation of the lining from the base ply if the adhesive breaks under the stresses.

Fig. 6 is a similarly magnified cross section at 6—6 in Fig. 4, for the same purpose.

Fig. 7 is a similarly magnified cross section at 7—7 in Fig. 4, for the same purpose.

Fig. 8 is a view similar to Fig. 7, illustrating the unbroken adhesive and the intact union of the base and lining plies in any final 90 degree fold of the carton in completed condition, as the result of using latex as the adhesive according to my invention.

The magnified views of Figs. 5, 6, 7 and 8 are substantial representations of the various portions of the structure as seen in actual examples by use of magnification to about the degree represented in these views. Those of Figs. 5, 6 and 7 were seen in this manner in cross section of stock now in extensive use, comprising paper board base, glassine lining and a dextrin adhesive. Fig. 8 substantially indicates the structure as seen in the same manner, in my improved board using paper board base of chip stock, glassine lining and latex as the adhesive. The scoring of both samples was the same, as illustrated in Fig. 3.

The carton is of a usual formation, with wide sides A, narrower ends B, with corner folds *g*, *g*, *h* and *f*; the last fold for a flap joining at end *e* to form walls A and ends B to tubular shape. Walls A have flaps C at top and bottom, and ends B have flaps D at top and bottom, with corner folds *k*, which in final disposition are folded inward in lapping relation. The bottom flaps are sealed together, but the top flaps C and D are folded outward, as the flap D in Fig. 4, in filling, and to apply adhesive to seal the flaps. For the latter purpose, the bottom flaps are subject to outward bending in the adhesive applying operation. The adhesive used in the flap sealing, as at C and D as well as at the connection at *e*, *f* (Fig. 2) is to be distinguished from the adhesive herein essentially involved as uniting the board plies. However, my invention does not exclude the use of latex or equivalent adhesive for the carton sealing at such flaps.

As seen in Fig. 3, the board is scored inwardly on its outer surface, at the base ply 1. The glassine or equivalent lining is indicated at 2, and the adhesive, exaggerated in thickness, is indicated at 3. These parts are correspondingly indicated in the magnifications of Figs. 5, 6, 7 and 8, except that my improved board in Fig. 8 has the adhesive indicated by 3*a*. In all of these much magnified views, the thickness of the adhesive is exaggerated; and in Figs. 5, 6 and 7 the cross lines in the region of strained adhesive are merely conventional as indicating a not clearly perceived (at this degree of magnification) disruption of adhesive, in the prior art sample. In the examined sample of my improved board, no separation of lining was perceptible, and this is indicated at 4 in Fig. 8.

In the 180 degree inward fold of Fig. 5, the base stock fractional plies separated in the folding are seen at 5, and the adhesive disruption at 6. The paper cover on the outside of the board is shown at 7. In Fig. 6, the opposite folding compresses the adhesive, with crushing action as at 6′. In Fig. 7 the disruption of adhesive at 6″ may be the result of a mere 90 degree fold at *g*, alternate foldings as at *h*, or alternate foldings as at *k*. I find that my adhesive remains intact at all foldings, and corresponding representation of my board in Figs. 5, 6 and 7 would show the adhesive as at 4 in Fig. 8, instead of as 6, 6′, and 6″. My adhesive stretches at 6 or 6″ and compresses at 6′, without disruption or separation from either ply 1 or 2; with the result that the carton is as continuous at the corners against passage of air or moisture, or grease penetration, as it is throughout the areas of the unfolded portions.

I have specifically illustrated and described actual examples of use of my invention, and of prior examples for comparison. Also, I have mentioned certain preferred materials in the make up of my improved board. However, it will be understood that I am not limited to any such specific illustration, description or mention of materials, but what I claim as new and desire to secure by Letters Patent is:

1. A laminated board comprising a relatively thick brittle paper stock base ply, a relatively thin weak surfacing ply of grease resisting material, and a flexible elastic adhesive uniting said plies, adapted to remain intact under folding stresses tending to separate the plies and adding to the grease-resisting properties of the surfacing ply.

2. A laminated board comprising a relatively thick brittle paper stock base ply, a relatively thin air, moisture or grease resisting surfacing ply, and a latex adhesive uniting said plies, adapted to remain intact under folding stresses tending to separate the plies.

3. A laminated board comprising a relatively thick brittle paper stock base ply, a glassine surfacing ply, and a latex adhesive uniting said plies, adapted to remain intact under folding stresses tending to separate the plies.

4. A paper container composed of a plurality of plies, the outer ply being a relatively thick, brittle and absorbent laminated paper board, the inner ply being a thin glassine sheet, and said plies being united by a layer of latex adhesive, adapted to remain intact under folding stresses tending to separate the plies.

5. A paper container composed of a plurality of plies, the outer ply being a relatively thick, brittle and absorbent laminated paper board, the inner ply being a thin glassine sheet, and said inner and outer plies being united by an adhesive having elastic properties when dried, adapted to remain intact under folding stresses tending to separate the plies.

6. A paper container composed of a ply of relatively thick, brittle absorbent paper board and a ply of glassine united by an adhesive having elastic properties when dried, adapted to remain intact under folding stresses tending to separate the plies.

7. A paper container blank having scored fold lines, a cross section of said lines composed of a sheet of a relatively thick, brittle and absorbent laminated paper board with an inner surfacing

of glassine united to said laminated board with adhesive having elastic properties when dried, adapted to remain intact under folding stresses tending to separate the plies.

8. A paper container blank having scored fold lines, a cross section of said lines composed of a sheet of a relatively thick, brittle and absorbent laminated paper board with an inner surfacing of glassine united to said laminated board with adhesive having elastic properties when dried, adapted to remain intact under folding stresses tending to separate the plies, said adhesive having a substantial quantity of latex in its composition.

9. A laminated board for use as carton stock, comprising a relatively brittle paper stock base ply of relatively great thickness to afford the requisite strength for the carton walls, a relatively thin and air, moisture or grease resisting surfacing ply, and an adhesive that is flexible and elastic independent of water content, uniting said plies, having a function of increasing the impermeability of the plies and characterized by ability to be compressed or stretched under stresses imposed by the relative movements of the united plies upon deformation of the board, whereby it also performs a function of preserving the union of the plies and their impermeability at the places of deformation.

10. A laminated board for use as carton stock, comprising a relatively brittle laminated paper stock base ply of relatively great thickness to afford the requisite strength for the carton walls, a relatively thin air, moisture or grease resisting surfacing ply, and an adhesive that is flexible and elastic independent of water content, uniting said plies, having a function of increasing the impermeability of the plies and characterized by ability to be compressed or stretched under stresses imposed by the relative movements of the laminations of the relatively thick base ply and movement of said laminations relatively to the surfacing ply upon deformation of the board, whereby it performs a function also of preserving the union of the plies and their impermeability at the places of deformation.

11. A laminated board for use as carton stock, comprising a relatively brittle laminated paper stock base ply of relatively great thickness to afford the requisite strength for the carton walls, a relatively thin air, moisture or grease resisting surfacing ply of substantially greater impermeability than the base ply, and latex adhesive uniting the plies, increasing their collective impermeability and preserving their union and impermeability upon deformation of the board.

SAMUEL BERGSTEIN.