FOLDING DOUBLE WALL BOX

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FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

FIG. 6

FIG. 7

FIG. 8

FIG. 9

FIG. 10

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This invention relates to improvements in paper boxes and more particularly to a double wall folding box.

One of the important features of the invention resides in a folding box having an air space in the walls thereof for ventilation or freezing purposes, whereby normal or cold air may be circulated therethrough for the preservation of foodstuffs packed in the box.

Another feature of the invention is to provide a folding paper box in which communicating air spaces are provided in the walls thereof, the air spaces being defined by a double wall structure which in addition to imparting a ventilating feature to the box, also provides a cushioning feature to protect fragile articles packed in the box from accidentally breaking during shipment or handling.

Another feature of the invention is the provision of a paper box especially adaptable for the packaging of frozen foods, and by the use of which, such frozen foods may be kept in ordinary refrigeration by subjecting it to a continuous amount of frozen air with a minimum amount of insulation.

A further feature of the invention is to provide a paper box having spaced double side, end and bottom walls, which define air spaces, and which further act to strengthen the box to withstand external forces to which the box may be subjected during ordinary handling and shipment.

Other novel features of the invention will be apparent as the following specification is read in conjunction with the accompanying drawings, in which:

Figure 1 is a perspective view of a folding box constructed in accordance with my invention, the same being illustrated in set up position with the hinged cover open.

Figure 2 is a vertical longitudinal sectional view on the line 2-2 of Figure 1, with the cover in closed position.

Figure 3 is a vertical transverse sectional view on the line 3-3 of Figure 1, with the cover in closed position.

Figure 4 is a horizontal sectional view on the line 4-4 of Figure 1.

Figure 5 is a plan view of the blank from which the box is formed.

Figure 6 is a vertical sectional view of the blank in partially folded position to illustrate the position of the parts when collapsed for storing purposes.

Figure 7 is a perspective view of a modified form of folding box, one end wall being illustrated in unfolded position.

Figure 8 is an enlarged detail view of Figure 1.

Figure 9 is a perspective view of a further modified form of folding box with one end wall in unfolded position.

Figure 10 is an enlarged detail sectional view on the line 10-10 of Figure 9.

Figure 11 is a perspective view of a double wall box provided with a folding stitched end wall.

Figure 12 is a sectional perspective view of a modified form of end wall.

Referring to the drawings by reference characters, and at present to the form of the invention illustrated in Figures 1 to 6 inclusive, the letter A designates a blank of cardboard or other fibre material which is elongated in a vertical direction, and which is scored transversely on the horizontal parallel fold lines 10, 11, 12, 13, 14, 15, 16, 17, 18, and 19. The area from the top of the blank A to the fold line 11 constitutes a cover B, the area of the blank from the fold line 11 to the fold line 14 constituting an outer box body section C, and the area from the fold line 14 to the bottom edge of the blank constitutes an inner box body section D. While I have illustrated the blank A as including a cover section B, it is to be understood that the box body may be constructed of the sections C and D without the cover section B, and the box body may be closed by means of a slip cover rather than by the hinge type cover herein illustrated.

The outer box body section C is scored on the vertical lines 20-20 which extend from the fold line 11 to the fold line 14. The area defined by the lines 20-20 and 12 and 13 constitutes an outer bottom wall 21. The area defined by the fold lines 11 and 12 and 20-20 constitutes an outer side wall 22, and the corresponding area between the fold lines 13 and 14, and the score lines 20-20 constitutes an outer side wall 23. Integral with the side walls 22 and 23, and inwardly foldable on portions of the score lines 20-20, are corner flaps 24.
Integral with the bottom wall 21 and extending from the ends thereof, are outer end walls 25-25 which are separated from top walls 26-26 by the vertical fold lines 27-27. The top walls 26-26 are separated from inwardly folding end flaps 29-29 by the vertical fold lines 25-25. The flaps 28-28 are cut inwardly from their ends to provide flaps of a width approximating the distance between the side walls of the inner box section B for frictional interfitting engagement therewith.

The inner box section D is scored on the vertical lines 30-30, the same being disposed inwardly of the plane of the corresponding fold lines 20-20 of the outer box section C for a distance approximating the distance between the spaced end structures of the inner and outer box sections. The score lines 30-30 extend from the horizontal fold line 15 to the horizontal fold line 18, and that portion of the fold lines 30-30 disposed between the fold lines 16 and 17 coat with the latter to define an inner bottom wall 31. The fold lines 15 and 16 and the inner end portions of the fold lines 30-30 define an inner side wall 32. The area between the fold lines 17 and 18 and the lower ends of the fold lines 30-30 define an inner side wall 33. Disposed outwardly from opposite ends of the bottom wall 31 are inner end walls 34-34 which are separated from inwardly and downwardly foldable end flaps 35-35 by the vertical score lines 36-36. Integral with the end walls 34-34 and the side walls 32 and 33 are inwardly foldable corner web flaps 37, the said flaps being foldable on the diagonal lines 38-38 which extend outwardly at a 45° angle from the four corners of the bottom wall 31. The fold lines 16 and 17 are broken, and the broken portions are connected by U-shaped slits 38, whereby upon folding of the inner box section D to a set up position will cause the depending leg portions 39 formed by the slits 38 to extend downwardly and maintain the inner bottom wall 31 in spaced relation to the outer bottom wall 21. The score lines 30-30 are also broken, and the broken portion connected by U-shaped slits 40, which slits form depending feet 41 integral with the end walls 34-34 when the inner box section D is folded, and which feet 41 coact with the feet 38 to maintain the inner and outer bottom walls in spaced relation.

The material of the blank between the fold lines 15 and 16 constitutes a narrow top wall 42 between the outer side wall 23 and the inner side wall 32. The area between the fold lines 18 and 19 constitutes a narrow top wall 43 to close the space between the outer side wall 22 and the inner side wall 33. The material of the blank between the fold lines 19 and the lower edge of the blank constitutes an attaching glue flap 44, which flap is glued as at 45 to the inner side of the side wall 22 adjacent the top edge thereof and which gluing constitutes the initial step toward the complete forming and setting up of the double wall box. Initially, the blank may be folded either on the fold line 15 or 16, and the glue flap 44 folded and adhesively secured at 45 to the inner side of the side wall 22 as clearly illustrated in Figure 6 of the drawings.

The area between the fold lines 10 and 11 and the side edges of the blank A constitutes a cover 46, the sides of which are in alinement with the score lines 20-20. The material between the score line 10 and the top edge of the blank constitutes a cover flap 47, the ends of the flap being cut away to facilitate the infolding of the same within the box when the box is in set up position.

After the blank A has been initially folded to effect gluing of the flap 44 of the inner box section D to the side wall 22 of the outer box body sections C, the partially set up box assumes a substantially flat position as illustrated in Figure 6, thus the collapsed boxes may be compactly stacked or nested one against the other to take up a relatively small amount of space until they are ready for use. When it is desired to use a box, the side walls 22 and 23 of the outer box body sections C are folded upwardly and the scores will be made from opposite sides of the blank so as to effect easy folding. As the side walls 22 and 23 are folded into position, the corresponding side walls 32 and 33 respectively of the inner box section will fold to a corresponding position. The parallel side walls 23 and 32 will be bridged by the top wall 43 whereas the parallel side walls 22 and 33 will be bridged by the top wall 43. As the inner side walls 32 and 33 are moved to their vertical position, the feet 38 engage the outer bottom wall 21 to maintain the inner bottom wall 31 in spaced relation thereto. After the inner and outer box sections have been folded to the position stated, the inner wall structures of the box section D are folded into position. As the end walls 34-34 are swung upwardly, the inwardly foldable corner webs 37 fold inwardly into lapped triangular shaped sections and close the four corners of the inner box section. After the end walls 34-34 are folded to a vertical position, the flaps 35-35 are folded inwardly so as to overlie the inwardly folded corner webs 37 as best illustrated in Figures 2 and 4 of the drawings. As the inner end walls 34 are folded to their vertical position, the feet 41 which are integral therewith depend downwardly and cooperate with the feet 38 to maintain the inner bottom wall 31 in spaced relation to the outer bottom wall 21. The end wall constructions of the inner box section D now being folded, the end wall constructions of the outer box section C may be folded. The corner flaps 24 are swung inwardly and the end walls 26-26 upwardly, so as to overlie the flaps 24, after which the end wall structures are folded on the lines 27 and 29 to enable the top walls 26-26 to bridge the space between the inner and outer end wall structures, whereupon the flaps 28 are folded inwardly and the ends frictionally engage the inner side walls 32 and 33. The box body is now in a set up position as illustrated in Figures 1 to 4 inclusive, whereupon a hollow wall structure is provided. The ends of the hollow side walls are closed by the outer end wall structures, and the space between the hollow end walls and the hollow side walls communicate with the interior of the box body through the slots 47' formed by the cutting out of the legs 39 from the inner bottom wall 31. The placing of the openings 45 in the bottom wall is optional depending upon the purpose for which the box is desired, the air spaces between the inner and outer spaced walls of the box body may communicate with the atmosphere through openings 45 which may be cut in the outer bottom wall 21. The placing of the openings 45 in the bottom wall is optional depending upon the purpose for which the box is desired, the air spaces between the inner and outer spaced walls of the box body may communicate with the atmosphere through openings 45 which may be cut in the outer bottom wall 21. The placing of the openings 45 in the bottom wall is optional depending upon the purpose for which the box is desired, the air spaces between the inner and outer spaced walls of the box body may communicate with the atmosphere through openings 45 which may be cut in the outer bottom wall 21.
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Whereas a box of this construction may have many uses, it will be found exceptionally useful in the packing of frozen foods, for the box permits of quicker refrigeration of the foodstuffs packed therein by means of a continual flow of cold air through the walls of the box body by reason of the communication of the air spaces with the interior of the box body through the communication of the air spaces with the exterior or frigid atmosphere.

Boxes of this construction may be employed for the maintaining of food stuffs in a cold or frozen condition by merely opening one of the ends of the structure and inserting position ice into the open ends of the hollow side walls, and after which, folding the end wall structure to closed position. With the dry ice packed in the hollow side walls, the contents of the box may be kept frozen.

In Figures 7 and 8 of the drawings, I have illustrated a modified construction of my invention wherein the box body includes an inner bottom wall 50, integral inner side walls 51 and 52, outer side walls 53 and 54, the latter being integral with the longitudinal sides of an outer bottom wall 55. The outer top wall 55 terminate short of the ends of the outer bottom wall 55 for a purpose to be presently explained. Connecting the inner and outer side walls 52 and 53 is a top wall 56 and integral with the inner side walls 51 is a top connecting wall 57. The same being integral with a glaze flap 58, the latter being adhesively secured to a hinged cover 59, which is integral with the outer side wall 54. Instead of forming the communicating openings between the interior of the box and the spaces between the hollow side walls by forming the openings 47' in the bottom wall, I provide openings 50 in the side walls and permit the inner wall 50 to lie flat against the outer bottom wall 55. The material from the openings 50 constitutes horizontal outwardly extending tabs 61' which engage and brace the outer side walls 53 and 54.

Each end wall structure in Figures 7 and 8 includes an outer end wall 61 which is integral with an end of the outer bottom wall 55 and which is foldable to a vertical position on the fold line 62. Each outer end wall 61 is connected to the ends of the outer side walls 53 and 54 by inwardly folding corner webs 63, which corner webs overlie the open ends of the hollow side walls as illustrated in Fig. 8 when the box body is in set up position. Integral with the inner end wall 6 is a top wall 64 which is defined by the fold lines 65 and 66. Foldable relative to the top wall 64 on the fold line 66, is an inner end wall 67, the ends of which are provided with locking tongues 68. A bottom flap 69 is connected to the flap 67 along the fold line 70. Each end wall structure is foldable upwardly by first folding the corner webs 63 on the diagonal fold lines 71 and simultaneously folding the outer end wall 61 upwardly, after which the top wall 64 is formed by folding on the lines 65 and 66, whereupon the inner end wall 67 may be folded into a vertical position and the tongue 68 inserted into the slits 72 provided at the ends of the inner side walls 51 and 52. The flap 69 is foldable to a horizontal position into abutting engagement with the ends of the shorter inner bottom wall 58.

In Figures 9 and 10, a further modified construction is shown, and wherein the bottom and side walls are substantially the same as that illustrated in Figures 1 to 6 inclusive, but the end wall construction is slightly different and eliminates the use of hinged outwardly folded corner flaps. In view of the similarity of the form of the invention illustrated in Figures 9 and 10 with that of Figures 1 to 6 inclusive, it is believed that a description of the end wall construction alone will suffice. Formed integral with each end of the outer bottom wall 21' is an outer end wall 25' of a width equal to the width of the box body, and which is foldable against an open end of the hollow side walls. Formed integral with the outer end wall 25' is a top wall 26' defined by the fold line 26 which is an inner end wall 28', the ends of which are provided with hook tongues 73 which when the end wall structure is in folded position, are received in vertical slots 74 provided adjacent the ends of the inner side walls 32' and 33'. The bottom edge of the inner end wall 28' is provided with a tongue extension 75 which is received in a transversely disposed slot 76 in the inner bottom wall 31'. By this end wall construction, it will be seen that the outer end wall 25' will close the open ends of the hollow side walls in a manner as the inner end walls 28' are held in spaced relation to the outer end walls 25' by means of the interlocking tongues 73 with the slots 74 and the tongues 75 with the slots 76. This interlocking of the inner end wall with the inner walls of the box body prevents any accidental unfolding of the end walls and accidental collapsing of the box body.

In Figure 11 of the drawings, a still further modified form of the invention is illustrated wherein the box body is provided with abutting outer and inner bottom walls in the same manner as that shown in Figures 7 and 8, and with hollow side walls 80—89, the inner walls of the hollow side walls being provided with opposed openings 81 which may act as seats for fragile articles supported by the walls of the opposed openings. Integral with one end of the outer walls of the hollow side walls are inwardly foldable end flaps 82, the same having interlocking notches 83 whereby the flaps may be held in closed position against one end of the hollow side walls. The interlocking flaps 82—83 constitute an inner end wall whereas the outer end wall 84 integral with the outer bottom wall is foldable against the flaps and has a swinging cover 85 integral therewith. The free end of the cover 85 is provided with a folding flap 86 adapted to fit into the opposite end of the box body when in closed position. This opposite end of the box body comprises a folding end wall structure 87, the parts being secured together by a metal stitch 88, and which construction of end wall is similar to that shown in my pending application, Serial No. 221,285, filed August 16, 1940.

When the end wall 87 is folded to upright position, it closes the front end of the box body whereas the interlocking flaps 82—83, outer end wall 84, close the rear end of the body and the cover 85 when swung to closed position closes the open top of the body with the flap 86 fitting against the end wall structure 87.

In Figure 12 of the drawings, there is illustrated a still further modified form which includes an inner bottom wall 100, and an outer bottom wall 101, and formed integral with each end of the inner bottom wall are outer spined end walls 102 and an outer spaced end wall 103 connected by a top wall 104. The outer bottom wall...
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101 is of a length slightly greater than the inner bottom wall panel 100 and foldable into a position between these bottom walls is a locking flap 103. The ends of the inner end wall panel 102 are provided with locking tongues 106, each of which is received in a slot 107 formed in the inner side wall 108, the outer side wall 109 extending to and being engageable with the outer end wall 101. This modification distinguishes from the end wall construction shown in the preceding forms, in that it is folded outwardly from the bottom wall structure rather than inwardly.

While I have shown and described several forms of my invention, I wish it to be understood that other modifications may be resorted to as come within the scope of the appended claims.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. A folding double wall box blank comprising a cardboard blank of cardboard cut and scored to provide a foldable outer box section including a rectangular outer bottom wall, two opposed outer side walls connected to the bottom wall along hinge scores, two opposed outer end walls connected to the bottom wall along hinge scores; an inner box section including an inner bottom wall, two opposed inner side walls connected to the inner bottom wall along hinge scores, hinge score connections between one of the inner side walls and an adjacent outer side wall, two opposed inner end walls connected to the inner bottom wall along hinge scores, said inner box section being foldable within the outer box section along the hinge score connecting the adjacent inner and outer side walls, a glue flap connected to the other of the inner side walls along a hinge score and adapted to be secured to the inner side of the other outer side wall, and releasable interlocking means for securing the side and end walls of the inner and outer box sections in erected position when the blank is folded thereeto.

2. A folding double wall box blank as set forth in claim 1, including a cover connected to the other outer side wall along a hinge score.

3. A folding double wall box blank as set forth in claim 1, including means foldable from the inner and outer box sections of the blank for spacing the walls of the inner box section from the respective corresponding walls of the outer box section.

4. A folding double-wall rectangular box blank including an outer box section having a rectangular outer bottom wall panel, rectangular outer side wall panels connected to opposite sides of the outer bottom wall panel along hinge scores, outer rectangular end wall panels connected to the respective ends of the outer bottom wall panel along hinge scores, end top spacer wall panels respectively connected to outer end wall panels along hinge scores and being of a length equal to the length of the outer end wall panels, inwardly foldable flaps respectively connected to the top spacer wall panels along hinge scores, said flaps being of a length shorter than the top spacer wall panels and terminating short of the ends thereof; an inner box section having a rectangular inner bottom wall panel of a length and width slightly less than the outer bottom wall panel and equal to the space to be provided between the corresponding side and end walls of the outer and inner box sections when the blank is folded, rectangular inner side wall panels respectively connected to the opposed sides of the bottom wall panel along hinge scores, inner rectangular end wall panels respectively connected to the opposed ends of the inner bottom wall panel along hinge scores, spacer feet cut from the inner bottom wall panel and integral with the inner side wall panels against vertical folding with the inner side wall panels, side top spacer wall panels connected to the respective inner side wall panels along hinge scores, said side top spacer wall panels being of a width substantially equal to that of the end top wall spacer panels, one of the side top spacer wall panels being integrally connected to one of the outer side wall panels along a hinge score, and a glue flap connected to the other side top wall panel along a hinge score for attachment to one of the outer side wall panels when the blank is folded to set up position with the side side wall panels of the inner box section folded within and disposed in spaced relation to corresponding walls of the outer box section.

5. A folding double-wall rectangular box blank as set forth in claim 4, including corner boxes connected to the respective ends of the outer side wall panels for infolding against the inner side of the outer end wall panels, foldable corner webs integral with the adjacent inner side and end wall panels and connected thereto along hinge scores for folding to a position against the respective adjacent inner end wall panels, and intermediate panel flaps connected to the respective inner end wall panels for folding against the folded corner webs when the blank is folded to box set up position.

6. In a folding double-wall box, a single substantially rectangular blank of cardboard scored transversely on a hinge score and folded thereon to provide an outer box forming section and an inner box forming section, said outer box forming section having a rectangular outer bottom wall, opposed rectangular side wall panels connected to the sides of the bottom wall along hinge scores, inwardly foldable outer end wall panels connected to the opposed ends of the outer bottom wall along hinge scores; said inner box forming section having an inner rectangular bottom wall of a length and width slightly less than that of the outer bottom wall, inner side walls of a height slightly less than the height of the outer side walls, one of the inner side walls being integrally connected to an adjacent outer side wall along that hinge score connecting the inner and outer box forming sections, inner foldable end wall panels connected to the respective ends of the inner bottom wall along hinge scores, a glue flap integral with the other inner side wall and adhesively secured to the inner side of the other or free outer side wall, whereby said inner and outer box forming sections may be flatly folded against each other when the box is collapsed and unfolded to a set up position with the inner box forming section disposed within the outer box forming section.

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