April 7, 1936. J. WILKINS ET AL 2,036,975

BOX AND BOX CONSTRUCTION

Filed Aug. 17, 1934 2 Sheets-Sheet 1

FIG. I.

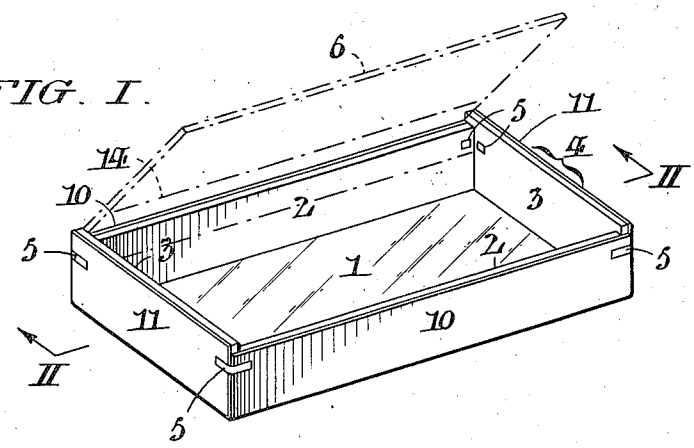


FIG. II.

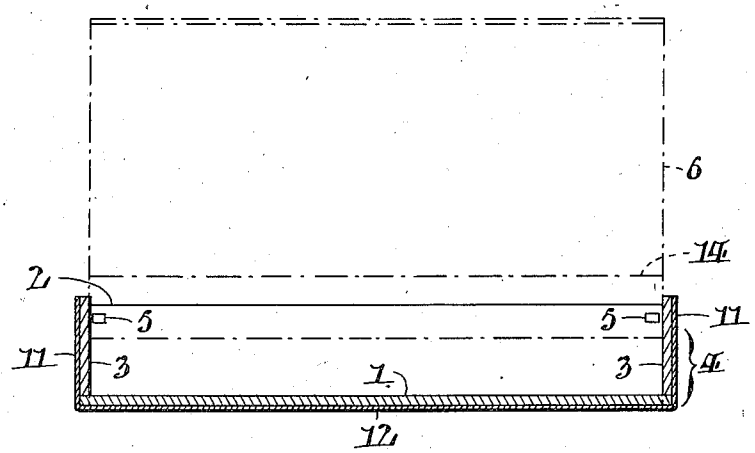
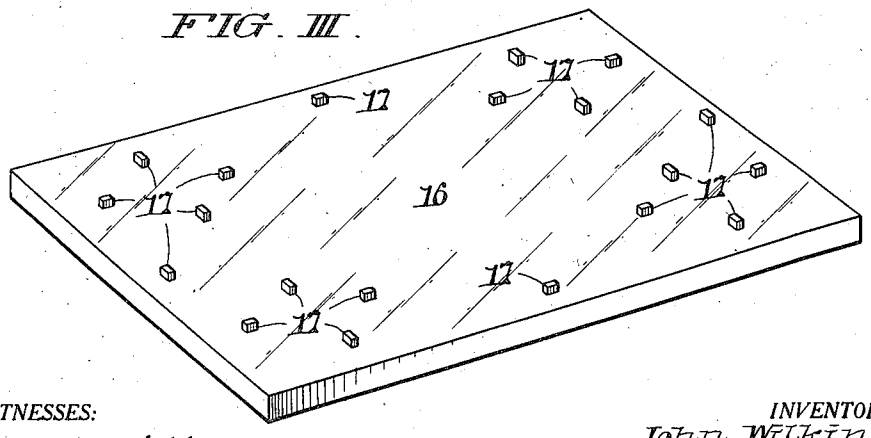


FIG. III.



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Filed Aug. 17, 1934 2 Sheets-Sheet 2

FIG. IV.

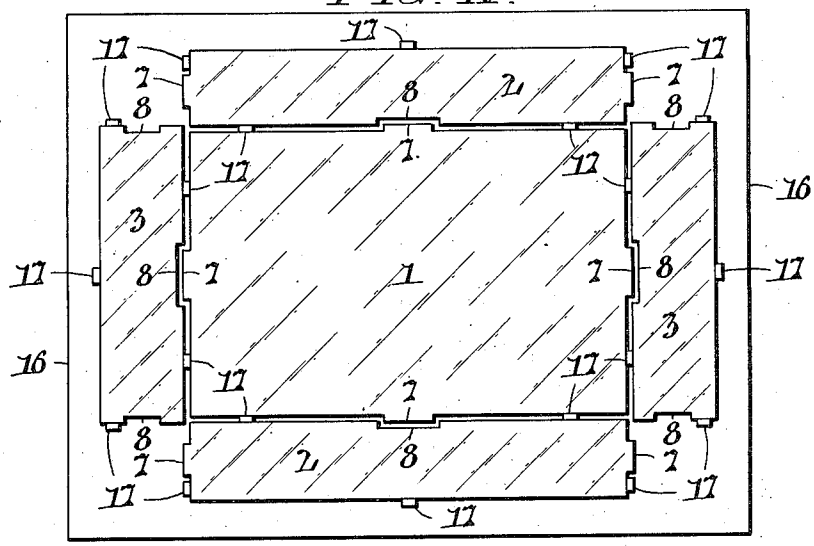


FIG. V.

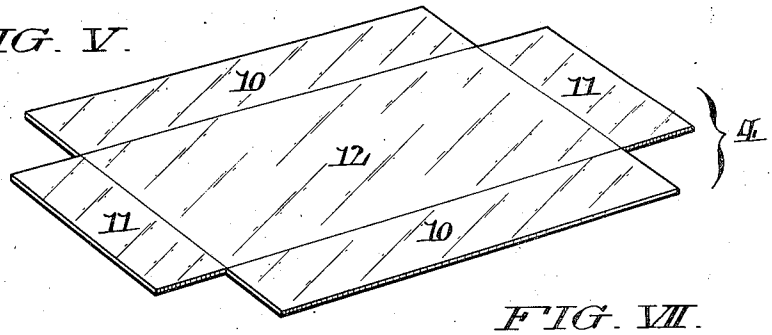


FIG. VII.

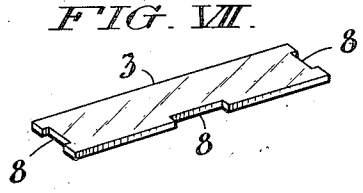


FIG. VI.

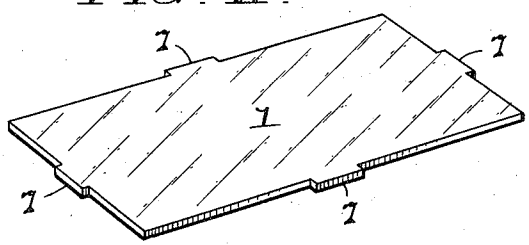


FIG. VIII.

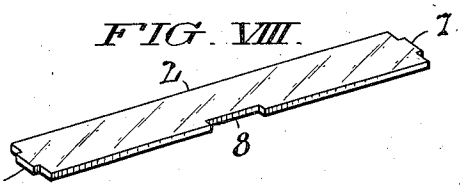
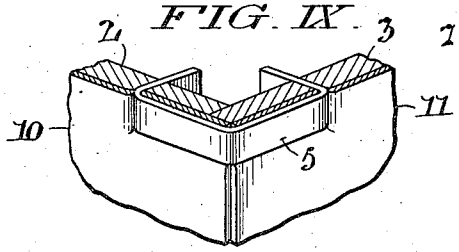


FIG. IX.



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UNITED STATES PATENT OFFICE

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BOX AND BOX CONSTRUCTION

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Application August 17, 1934, Serial No. 740,256

2 Claims. (Cl. 93—55)

This invention relates to improvements in boxes and the art of box making and more particularly to cardboard boxes.

In the making of cardboard boxes there are many factors to consider. Among the most important are strength of the finished box, ease of manufacture, simplicity of structure and cost of construction. The corners and edges of a box require special attention to insure strength and a clean-cut appearance. It is now well-known in the art to form a box from an inner and outer tray, both having side and end flaps which are folded up to form a box. While this provides a box of pleasing appearance and a certain amount of strength, much is left to be desired such as strength at the corners, rigidity of walls, general ruggedness and economy of production.

In the type of box having an inner and outer tray, the inner tray is intended to contribute strength to the completed box, while the outer tray is usually of thinner material and intended to provide a clean-cut corner which is not possible with a heavy, thick material. In the dieing out of these trays there is considerable loss of material from the waste pieces cut out at the corners of the trays in order to provide side and end flaps. The inner tray also loses considerable in strength because of the absence of any bracing joint between the walls and the bottom. Walls formed integrally with the bottom by bending flaps upward do not give as strong cooperative bracing as is desired in boxes of this type. This strength is sacrificed in order to increase the simplicity and ease of construction and assembly of the box by making the inner and outer trays in one piece with integral wall-forming flaps.

Accordingly one object of this invention is the provision of a box of increased ruggedness with a greater simplicity and ease of construction and assembly with the further advantage of greater economy of production. Another object of this invention is the provision in a box of this nature of a separate bottom and walls of strong material assembled within an outer shell having side and end flaps which are bent up in the formation of the box. Another object of this invention is the provision of a box of this type in which the joints between the separate bottom and walls cooperatively brace themselves into an integral structure in which stresses and strains are easily absorbed and dissipated throughout the entire structure. Another object of this invention is the provision of a method by means of which a box having separate bottom and walls around which an outer shell is formed may be efficiently and economically constructed and assembled. Other objects and advantages of the invention will be apparent from the detailed description of the preferred embodiment thereof which follows and which has reference to the accompanying drawings, of which:

Fig. I shows a perspective view of the finished box without the wrap.

Fig. II shows a transverse section about the lines II—II of Fig. I.

Fig. III shows a perspective view of a conventional form of gage frame used in the assembly of the box.

Fig. IV shows a plan view of the gage frame with separate bottom and wall pieces positioned thereon.

Fig. V shows a perspective view of the outer shell as died out to form integral side and end flaps, showing the scoring out.

Fig. VI shows a perspective of a separate bottom with joint tabs formed thereon.

Fig. VII shows a perspective view of the end wall with recesses formed therein to receive cooperating tabs.

Fig. VIII shows a perspective view of a side wall with joint tabs and a recess formed therein.

Fig. IX is a perspective view of the corner-securing means.

The preferred embodiment of our invention comprises generally a separate bottom 1, side walls 2, end walls 3, an outer shell 4 formed around the bottom 1 and walls 2, 3, corner securing means 5, and a lid 6. The bottom 1 is made of strong chip board or any strong cardboard with dimensions corresponding to the inside dimensions of the finished box, and on each edge is formed a tab 7 which fits into a corresponding recess 8 in the bottom edge of each wall piece 2, 3. The side walls 2 and the end walls 3 are also died out of strong chip board of the same thickness as the bottom 1 with tabs 7 formed on each side wall 2 to fit into corresponding recesses 8 in each of the ends of each end wall 3. These tabs 7 and recesses 8 are designed to cooperate in forming a joint in which the end of the tab 7 is flush with the outer face of the adjacent piece having the cooperating recess 8 receiving the tab 7. This forms a very strong joint in which the ends of the side walls abut the inner faces of the end walls 3, and the edges of the bottom 1 abut the inner faces of the walls 2, 3. By the tab 7 and the recess 8, this abutting relationship is affirmatively assured. Of course the tab 7 and recess 8 could be reversed, making the tabbed piece in each case the recessed

piece, and the recessed piece the tabbed piece, without departing from the spirit of the invention. The side walls 2 are lower than the end walls 3 by a distance equal to the thickness of the lid 6, thus seating the lid 6 on the upper edges of the side walls 2 and between the inner faces of the end walls 3, with the upper edges of the end walls 3 flush with the top surface of the lid 6.

The outer shell 4 is formed from kraft board or other strong flexible cardboard and is thinner than the material used for the bottom 1 and side and end walls 2 and 3. Side flaps 10 and end flaps 11 are designed to have heights when folded upward which correspond with the heights of the side walls 2 and end walls 3, respectively. A bottom 12 is designed with dimensions according to the extreme length and width of the bottom 1, measuring from the ends of opposite tabs 7. The side flaps 10 and end flaps 11 are scored to give a sharp bend when the side and end flaps 10 and 11 are bent up from the bottom 12 in order to provide well-defined sharp outer corners for the box. Because of the thinness of this outer shell 4 there will not be large and objectionable grooves at the corners because of this scoring out.

The bottom 1 and wall pieces 2 and 3 are all adhesively secured to the inner face of this outer shell 4 so that the bottom 1 and walls 2 and 3 all fit into their designed relationship when the flaps 10 and 11 are bent upward to form the box. The corners of the box are secured by any of the usual corner-securing means, in this case by strong metal clips 5 which pierce both the outer shell 4 and the walls 2 and 3 as they are clinched into place. This specific type of corner-securing means has been found to be very satisfactory in providing the strong, rugged fastening necessary in this type of box.

The lid 6 is a cardboard blank died out to fit into the seat provided by the raised edges of the walls 3 with the side edges of the lid 6 flush with the outer faces of the corresponding side walls 2 of the box. The lid 6 is attached along the edge of one of the side walls 2 of the box by a muslin strip 14 adhesively secured to the inner face of the lid 6 and the corresponding side wall 2 of the box thereby providing a hinge. Any wrap may be applied to the box according to the purposes for which the box is made, but as it is not directly related to this invention it is not shown.

A convenient method of assembly giving excellent results has been found in the following described order of operations. In the assembly, the bottom 1, side and end walls 2, 3 are positioned in the same plane with the bottom edges of the walls 2, 3 lying parallel to the corresponding edges of the bottom 1, and separated therefrom by a distance equal to the thickness of the material of the side walls 2, 3. This layout is shown in Fig. IV and in order to facilitate the layout, a gage frame or plate 16 is used which holds the pieces accurately in place by abutments or pins 17 while the outer shell 4 is applied and adhesively secured. The abutments or pins 17 when in place in the gage frame 16 are lower than the thickness of the bottom 1 and wall pieces 2, 3 and therefore do not interfere with the shell 4 when it is applied. These pins 17 are simple pegs which seat in holes provided in the frame 16 through a more complicated abutment having capacity for sliding movement for adjustment may also be used.

After the bottom 1, side and end walls 2, 3 are positioned as explained above, a coat of strong glue is applied to the inner face of shell 4 and this face is then pressed onto the positioned pieces, care being taken that the outside edges of the shell 4 fit evenly with the corresponding outer edges of the side and end walls 2, 3. Pressure is applied until the glue has set and then the box is removed from the gage frame 16. Next, the side and end flaps 10, 11 are bent upward along the scoring, thus seating all the tabs 7 in the corresponding recesses 8. The metal corner securing means 5 are now applied to the vertical corners of the box and the main part of the box is complete. The corner-securing means 5 are of the metal clip type which pierce the sides forming the corners but any other strong corner-securing means could be used equally well without departing from the spirit of the invention.

The lid 6 and a tasteful wrap is finally applied in the usual manner well understood in this art. The muslin hinge 14 is adhesively secured to the inner face of the lid 6 and to the inner face of the corresponding side wall 2.

It has been found that a box constructed as explained above possesses greater strength and is simpler of construction than anything now offered by the box art. The benefit from the elimination of waste is obvious from the above description and this advantage is alone a contribution to the art. This new box has been found to have the advantages of the integral outer tray construction combined with the advantages in strength and ruggedness from the separate bottom 1 and walls 2, 3 which brace each other into an integral structure of great strength. By this scientific system of arrangement of the bottom 1 and the walls 2, 3, a structure is created which easily absorbs stresses and strains at one point by dissemination throughout the entire stucture. This integrality has been found to give added strength with the same size of materials used before and without any attendant disadvantages. Size and simple strength of materials are thus reduced to a minimum by utilizing strength of design in a scientific manner.

While our invention has been described in some detail with reference to a specific embodiment, various changes in the form and kinds of the material used and obvious modifications in the steps comprising the method are within the contemplation of the invention and such changes should not be deemed to constitute a departure from the spirit of the invention as hereinafter claimed.

Having thus described our invention, we claim:

1. A method of constructing a box which comprises positioning on a plane a separate bottom and wall pieces with the edges of the wall pieces parallel to corresponding edges of the bottom and separated therefrom by a distance equal to the material thickness of these parts, adhesively securing an outer shell to said parts with the outer edges of the shell flush with the outer edges of the wall pieces, bending upward the flaps of the outer shell to form the box, and applying corner securing means to the vertical corners.

2. A method of constructing a box which comprises positioning on a gage frame a separate bottom and wall pieces with the edges of the wall pieces parallel to corresponding edges of the bottom and separated therefrom by a distance

equal to the material thickness of these parts, adhesively securing a shell to the faces of said parts with the outer edges of the shell even with those of said parts, said shell having been scored to bend where the walls and bottom join with the bottom inset, bending upward the flaps of the outer shell to form the box with inset bottom mutually braced with the walls, and applying corner securing means to the vertical corners.

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