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R. B. MELLER

2,366,419

BOX

Filed April 21, 1942

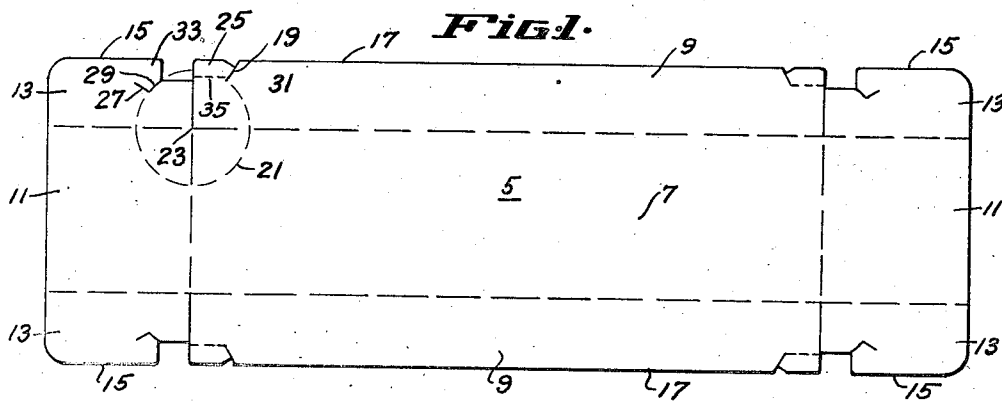


FIG. 2.

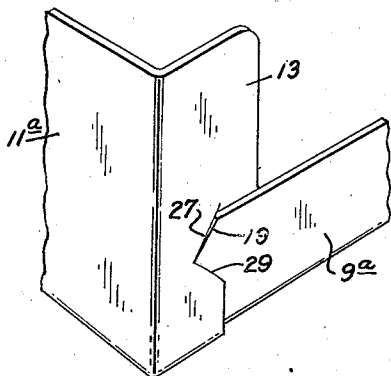


FIG. 3.

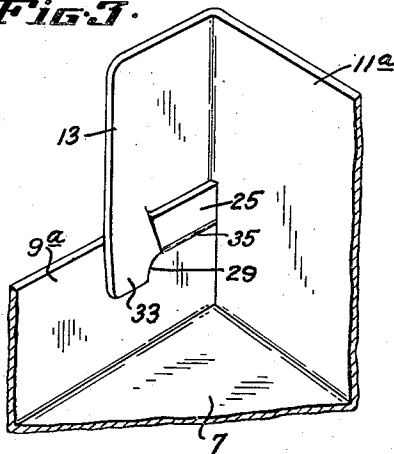
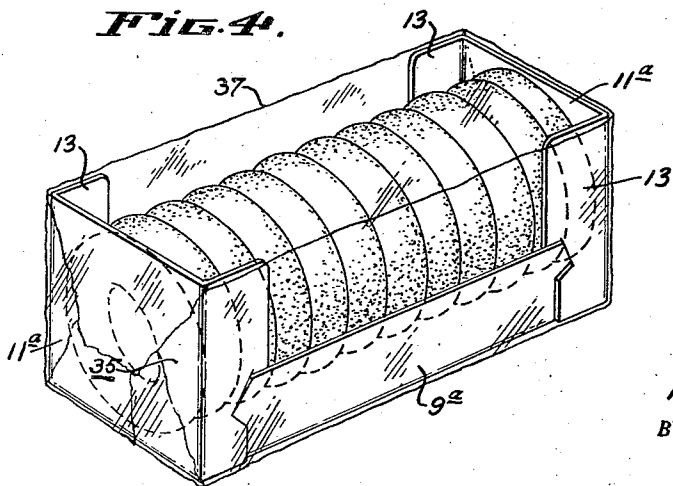


FIG. 4.



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2,366,419

BOX

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Application April 21, 1942, Serial No. 439,895

5 Claims. (Cl. 229—32)

My invention relates to boxes, and more particularly to boxes formed from creasable sheet material having a certain degree of stiffness and resiliency, such as is found in some types of cardboard, thin sheet metal, flexible plastic sheet material, and the like.

Among the objects of my invention are:

1. To provide a novel and improved box blank capable of being readily assembled into a box without the use of adhesive to hold the corner components together;

2. To provide a novel and improved box blank capable of being readily assembled at point of use, into a non-collapsible box without use of adhesive;

3. To provide a novel and improved box of substantial rigidity throughout and devoid of looseness or play at the corners thereof;

4. To provide a novel and improved box which is readily assembled by hand or machine, from a flat blank;

5. To provide a novel and improved box of thin sheet material, capable of standing considerable stress against the end walls; and

6. To provide a novel and improved box having its end walls of substantially greater height than the side walls.

Additional objects of my invention will be brought out in the following description of the same taken in conjunction with the accompanying drawing wherein—

Figure 1 is a view of a blank from which my improved box is formed;

Figure 2 is an outside view in perspective, of a corner of my improved box;

Figure 3 is an inside view in perspective, of the same corner; and

Figure 4 is a view in perspective, of the assembled box in use.

In its preferred form, my invention provides for a box blank 5 of substantially rectangular form and scored as at 10, 20 and 30 to define a bottom section 7 and side and end wall sections 9 and 11, respectively. Extending from each end of an end wall section 11, and preferably integral therewith, is a wing 13 separated from the adjacent side wall section 9 by a cut 40, the free edge 15 of which terminates preferably in alignment with the free longitudinal edge 17 of the adjacent side wall section 9. This provides for the most economical type of blank, as it eliminates the necessity of trimmings and waste.

Each side wall section 9, in proximity to each end thereof, is provided with a cut 19 into its free longitudinal edge. This cut is in a direc-

tion transverse to a circle 21, having its center at the nearest corner 23 of the bottom section 7, and in its preferred embodiment, the cut 19 will be normal to such circle. Such cut creates a tab 25 at each corner of a side wall section 9.

Each end wall wing 13 is provided with a cut 27 transverse to the circle 21, its direction being preferably normal to the cut 19 in the adjacent side wall section 9; that is, if both cuts were extended, they would intersect at right angles to one another.

Each end wall wing 13 has that corner adjacent the side wall section removed, and is further provided with an additional cut 29, preferably arcuate in shape, starting at an extremity of the first cut 27 and following along the arc of circle 21 through the inner extremity of the side wall cut 19, until such arcuate cut intersects an edge of the end wall wing. The two cuts 27 and 29 thus made in each end wall wing, define a locking tab 33 on such wing.

The blank is now in condition to be assembled into a box. In forming the box, the side wall and end wall sections 9 and 11 of the blank are creased along the score lines of the blank to form the side and end walls 9a and 11a, respectively, of the box; and either simultaneously with or following such creasing, the end wall wings 13 are folded inwardly toward the side walls. As the final step in the assembling of the box, the locking tab 33 of each wing is guided through a side wall cut 19 and forced forward until the edge of the side wall tab 25 formed by such cut, snaps in behind the corresponding edge of the locking tab 33 in a self-locking action, thereby effectively holding the end wall 11a in proper position with respect to the side walls 9a of the box. Such self-locking action is attributable to the fact that the locking tab 25 of the side wall, during such assembling of the box, is stressed out of the plane of the side wall, and likewise the locking tab of the wing is stressed out of the plane of said wing, thereby establishing an existing tendency for these tabs to return to their original planes.

The 90° relationship between the cuts 19 and 27 associated at each corner forming section of the blank, brings the engaging edges of the locking tabs 25 and 33 into line contact along the edges for practically the entire length of these edges, as distinguished from a point contact existing in the prior art type of hook lock where there exists a definite crossing or intersection of engaging edges.

By spacing the side wall cut 19 the same dis-

tance from the end of the side wall section 9, as the wing cut 29 is spaced from the edge of the end wall section 11, interlocking of the tabs 25 and 33 will occur when an end wall section reaches its final position in abutment against the end of the side wall section to form a box corner, thereby preventing slack or looseness between the box components and creating a box corner of substantial rigidity, with the end wall locked against movement either forward or rearward of its final position. In other words, the end walls and wings are swung only to their final position to obtain locking, and it is not necessary to swing them beyond such position as in the hook type lock of the prior art.

A score line 35 across the tab 25 will provide a definite hinge line for the tab and thereby facilitate the operation of assembling the box from the blank, particularly for machine assembly, by providing a groove at the junction with the wall cut 19 for the tab 33 to slide in, instead of the sharp narrow end of the cut. The score line further enhances the locking action in presenting an offset or ridge which effectively increases the abutting surface to the engaging tip of the tab.

Proper and effective functioning of the corner lock of my invention is, in large measure, based upon the use of sheet material which has the characteristics of stiffness and resiliency, for an efficient locking will not be realized when employing sheet material, such as heavy paper or cardboard formed of soft pulp as is customarily employed in suit or hat boxes.

A sheet material which has proven very efficient as well as economical, is one developed particularly for this purpose, and comprises an intermediate layer of pulp, an outer layer on one side, of material known to the trade as glassine, and an outer layer on the other side, of thin bond paper, both outer layers being adhesively secured to the intermediate layer by a suitable binder. The important feature in connection with this paper is the fact that a normal amount only of binder is preferably employed in adhesively securing the outer layer of bond paper to the intermediate layer, whereas the inner layer of glassine paper is adhesively secured by an amount of adhesive material sufficient to impregnate the intermediate layer for a substantial portion of its thickness. This adhesive, which may be that generally used in paper manufacture, has the property, upon drying, of rigidifying the impregnated portion of the intermediate layer, thereby increasing the stiffness and resiliency thereof on one side. These characteristics imparted to the material by the deep impregnation of one surface of the intermediate layer, further enable the formation of rather sharp corners between the components of the box when the blank is folded with the impregnated side of the intermediate layer facing inwardly.

My improved locking means permits of the design and construction of boxes of the "boat" type 35 wherein the end walls 11a are of substantially greater height than the side walls 9a. Boxes of this type lend themselves very nicely to the packaging and merchandising of commodities such as pastry, doughnuts and the like. When so employed, the box and its contents may conveniently be wrapped with transparent material 37 such as Cellophane, as the upper edges of the end wall wings 13 offer adequate support for the wrapping, without necessarily per-

mitting the wrapping to snugly engage the contents of the box. Waxed wrapping paper may also be used.

By reason of the rigid support offered to the end walls by my lock construction, the box, when wrapped with Cellophane or waxed paper, lends itself to heat sealing by machine or hand, for the end walls and bottom can stand the sealing pressure without such flexing as would tend to weaken or break the seal upon the removal of such pressure. This characteristic obtains, notwithstanding inward pressure distortion of the side walls due to any clamping means for holding the box during the sealing process.

While I have disclosed the preferred embodiment of my invention in detail, I do not wish to be limited in my protection to such details, as the embodiment disclosed by me is susceptible to change and modification, without departing from the principles and spirit of my invention. For example, the box may be constructed with end walls of the same or lesser height than the side walls by removing the corners of the side walls and placing the side wall cut in the horizontal edge thus formed. Another change contemplated, is to form the side wall cut 19 by providing a narrow notch in the edge of the wall. This would preferably be the practice, where the box is to be formed of extra heavy material. Other changes will, no doubt, suggest themselves to those skilled in the art.

I claim:

1. A corner section of a blank, adapted to be folded into a self-locking box corner, comprising a bottom section, a side wall section and an end wall section, a wing extending from said end wall section adjacent said side wall section, said side wall section having a cut in the longitudinal edge thereof in a direction transverse to a circle having its center at the corner of said bottom section to form a locking tab in the plane of said side wall section, and said wing having a cut transverse to said circle and substantially normal to said side wall section cut, and another cut extending from an extremity of said wing cut to an edge of said wing substantially along an arc through approximately the inner extremity of said side wall cut, to define with said wing cut, a locking tab in the plane of said wing adapted to be wedged through said side wall section cut during folding of said blank into box formation to automatically interlock with said side wall section tab in edge to edge engagement therewith.

2. A corner section of a blank, adapted to be folded into a self-locking box corner, comprising a bottom section, a side wall section and an end wall section, a wing extending from said end wall section adjacent said side wall section, said side wall section having a cut in the longitudinal edge thereof in a direction transverse to a circle having its center at the corner of said bottom section to form a locking tab in the plane of said side wall section, and said wing having a cut transverse to said circle and substantially normal to said side wall section cut, and another cut extending from an extremity of said wing cut to an edge of said wing substantially along an arc of said circle to that edge of said wing which is adjacent to said side wall section to define with said wing cut a locking tab in the plane of said wing adapted to be wedged through said side wall section cut during folding of said blank into box formation to automatically interlock with said side wall section tab in edge to edge engagement therewith.

3. A corner section of a blank, adapted to be folded into a self-locking box corner, comprising a bottom section, a side wall section and an end wall section, a wing extending from said end wall section adjacent said side wall section, said side wall section having a cut in the longitudinal edge thereof in a direction transverse to a circle having its center at the corner of said bottom section to form a locking tab in the plane of said side wall section, and said wing having a cut transverse to said circle and substantially normal to said side wall section cut, said side wall cut being spaced from the end of said side wall a distance substantially equal to the spacing of said wing cut from the end wall section, and another cut extending from an extremity of said wing cut to an edge of said wing substantially along an arc through approximately the inner extremity of said side wall cut to define with said wing cut, a locking tab in the plane of said wing adapted to be wedge through said side wall section cut during folding of said blank into box formation to automatically interlock with said side wall section tab in edge to edge engagement therewith.

4. A box comprising a sheet of material having a first fold line and a first cut in alignment with said first fold line; said first fold line and said first cut separating a first box element from a second box element; a second fold line, substantially normal to said first fold line and extending along said first box element and said second box element substantially at the point of abutment of said first fold line and said first cut, defining with said first cut a wing on said second element and a side on said first element; said elements, wing and side being movable with respect to one another into a position in which they provide a box corner with said first and said second elements at substantially 90° to each other and wherein said side is at substantially 90° to the first element and said wing and side are movable into a face-to-face abutment; a second cut in said side, said second cut starting substantially at and extending outwardly from the periphery of a circle which has its center substantially at the point of intersection of the second fold line, the first fold line and the first cut, substantially along an extended radius of said circle for a substantial distance to the edge of said side; a third cut in said wing of substantially the same length as said second cut, said third cut starting substantially at and extending outwardly from the periphery of said circle and

substantially at 90° to said second cut; and a fourth cut extending outwardly from that end of said third cut which is substantially at said circle to that edge of said wing which is adjacent said first cut to define with said third cut a wing tab exteriorly of said circle and adapted to be inserted into said second cut and moved there-through until said second cut and said third cut are in an edge-to-edge engagement and said corner is locked with said first and second elements at substantially 90° to one another.

5. A box comprising a sheet of material having a first fold line therein; a first cut in alignment with and continuing said first fold line; said first fold line and said first cut separating a first box element from a second box element; a second fold line substantially normal to said first fold line and extending along said first box element and said second box element substantially at the point of abutment of said first fold line and said first cut, and defining, with said first cut, a wing on said second element and a side on said first element; said first and said second elements, said wing and said side being movable with respect to one another into a position in which they provide a box corner with said first and said second elements at substantially 90° to each other and wherein said side is at substantially 90° to the first element and the said wing and side are movable into a face-to-face abutment; a second cut in said side, said second cut extending inwardly from the edge of said side to and terminating substantially at a circle having its center substantially at the point of intersection of the second fold line, the first fold line and the first cut and in a direction which is at an acute angle to the line of the first fold and the first cut and transverse to said circle; a third cut in said wing, said third cut starting substantially at and extending outwardly from the periphery of said circle and substantially at 90° to said second cut; and a fourth cut extending outwardly from that end of said third cut which is substantially at said circle to that edge of said wing which is adjacent said first cut to define with said third cut a wing tab exteriorly of said circle and adapted to be inserted into said second cut and moved there-through until said second cut and said third cut are in an edge-to-edge engagement and said corner is locked with said first and second elements at substantially 90° to one another.

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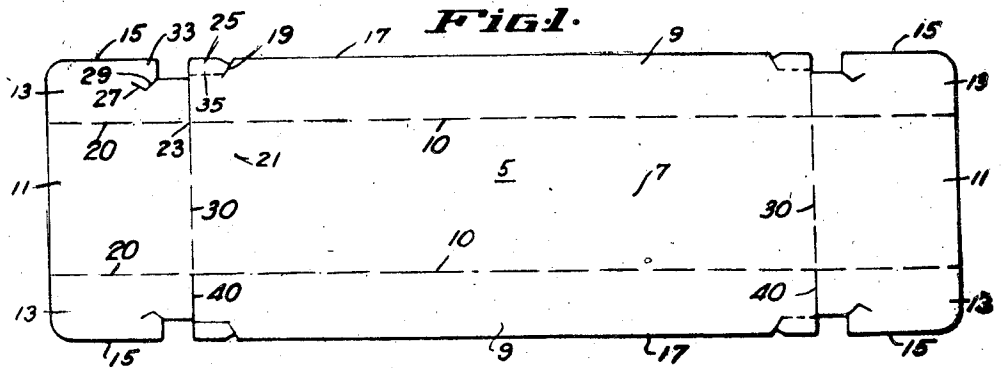
CERTIFICATE OF CORRECTION.

Patent No. 2,366,419.

January 2, 1945.

REGINALD B. MELLER.

It is hereby certified that error appears in the above numbered patent requiring correction as follows: In the drawing, Figure 1 should appear as shown below instead of as in the patent -



and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office. Signed and sealed this 22nd day of May, A. D. 1945.

(Seal)

Leslie Frazer
Acting Commissioner of Patents.