

April 9, 1929.

C. F. SPRAGUE

1,708,596

ART OF BOX MAKING

Filed June 30, 1925

2 Sheets-Sheet 1

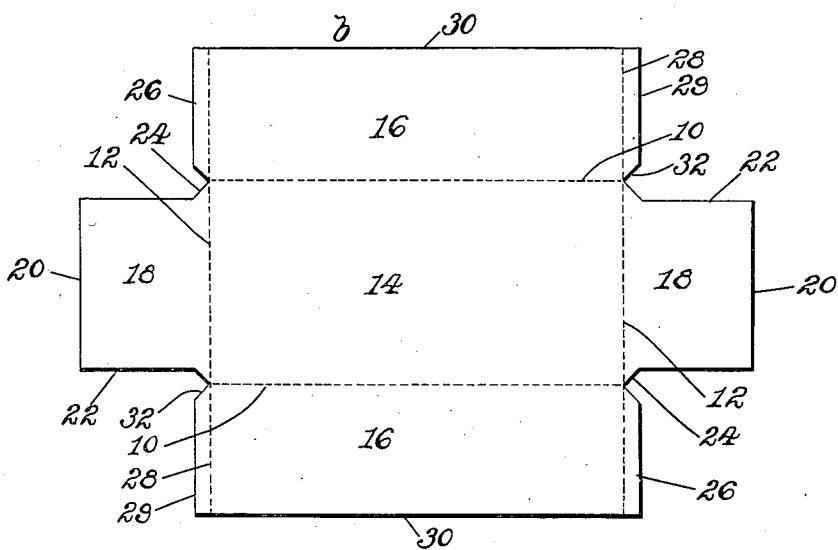


Fig. 1.

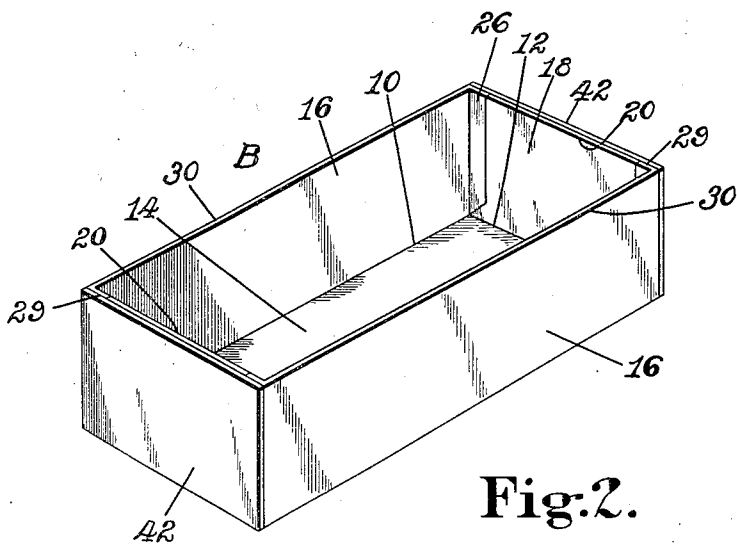


Fig. 2.

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2 Sheets-Sheet 2

Fig. 3.

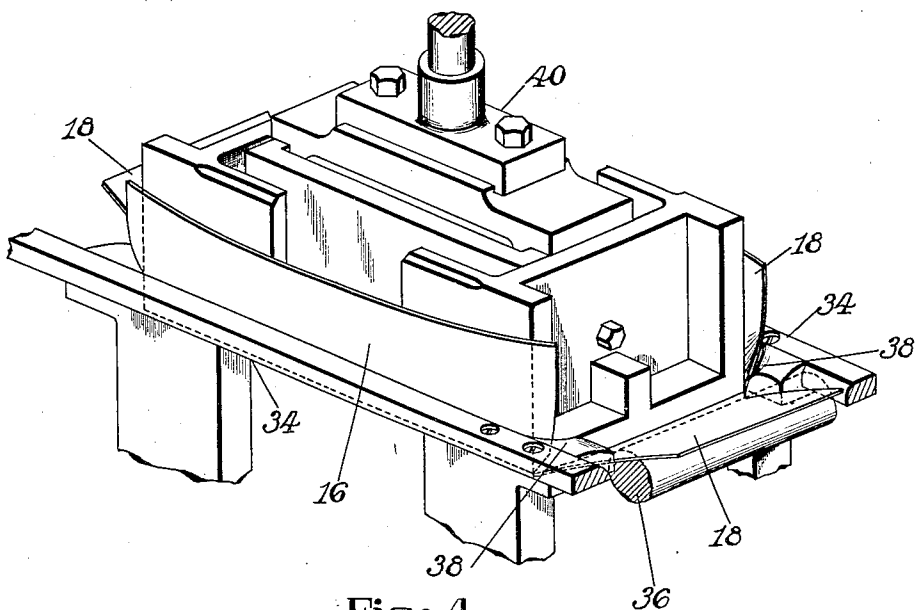
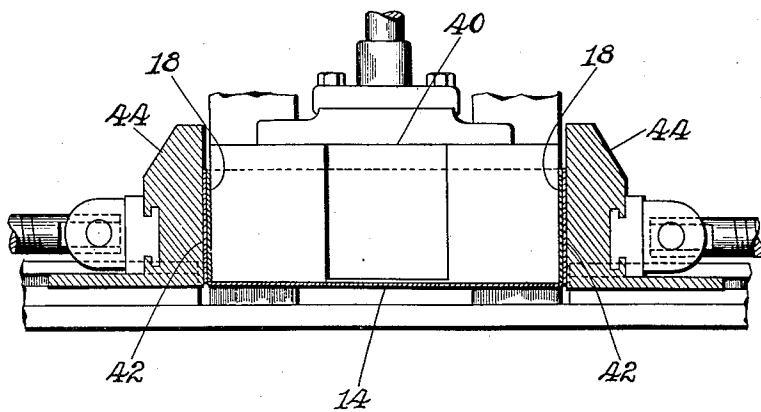


Fig. 4.



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ART OF BOX MAKING.

Application filed June 30, 1925. Serial No. 40,655.

This invention relates to boxes and to the making of boxes of such material as pasteboard, and particularly those of the "wall" type, which are set up in their permanent form during manufacture. Heretofore, as far as I am aware, these boxes, when provided with double end-walls, have been made only by rather complicated automatic machinery. Such apparatus operates efficiently only upon large runs of a single size, since the changes involved in passing from one size to another are time-consuming and relatively expensive. The simpler box-machines, while capable of being adapted readily for the production of different sizes, are so arranged that they are not applicable to the manufacture of any double-end boxes of which I have knowledge, and are utilized only for making the single-end form of box, which is not so strong, and which is less attractive in appearance.

My invention has as an object the provision of an improved wall-box adapted for production by relatively simple means, and accordingly it provides a novel box so organized that extensions from the bottom and opposite walls lie in a common plane to furnish another substantially complete wall. The thus-formed wall may further carry a reinforcement to furnish a double wall.

A further object of the invention is to arrange for the proper production of a box of the character just indicated, and to this end I furnish a novel blank, the bottom and side-portions of which have flaps, shown as extended bottom-wings and relatively narrow side-flanges, which are adapted to be so arranged as to give, in combination, complete end-walls of a single thickness.

In the accompanying drawings,

Fig. 1 shows, in top plan, a particular form of the blank of my invention;

Fig. 2 is a perspective view of a box made from such blank; while

Figs. 3 and 4 illustrate, respectively, in perspective and vertical longitudinal section, steps taken in producing the box.

Referring particularly to Fig. 1, a blank *b* may be cut from sheet material, as pasteboard of the desired thickness. Bounded by scored or indented side-lines 10, 10 and end-

lines 12, 12 is a rectangular portion 14 corresponding to the bottom of the box which is to be made from the blank. Outside the scored lines 10, 10 are rectangular side-portions 16, 16, these each being equal in size to a side of the box. From both extremities of the bottom and side-portions are integral extensions to furnish end-walls and being in the form of flaps. Each bottom-extension is bounded at its inner side by one of the scored lines 12, and consists of an elongated wing 18, the major portion of which is rectangular. The outer edge 20 of each wing is parallel to the lines 12, and the side-edges 22 are parallel to each other and to the lines 10, 10. The length of the wing is substantially equal to the height of the box to be formed, while the width is somewhat less than that of the bottom-portion 14, each of the edges 22 being spaced equally from the boundary line 10 of the bottom-portion at each side of the wing. Joining each corner of the bottom-portion to the edge 22 of each wing 18 is an inclined edge 24, preferably making, with the lines 12, an angle of about 45 degrees. The area of each wing 18 is thus less, by the portion omitted at each side, than the area of the end of the box of which it is to furnish a part. The extensions from the side-portions consist of flanges 26, narrow as compared with the length of the wings, and lying outside scored lines 28, which are continuations of the end-lines 12. The area of each of the flanges 26 is approximately equal to that which one of the wings 18 requires at each side to bring it to the area of the end of the box. The greater portion of one edge 29 of the flange is parallel to the wing-edges 20 and to the scored lines 28. The outer end of the flange lies in an edge 30 common to it and to the outer edge of the side-portion 16 of which it is an extension. The inner end is inclined at 32 equally and oppositely to the edge 24, so these two inclined edges form with each other an angle of about 90 degrees. Thus the projection of the flanges beyond the side-walls corresponds to the altitude of the inclines 24.

In making a box B from the blank *b*, such blank may be advanced over a form fur-

nished by opposite side-walls 34 and end-walls each conveniently consisting of a roll 36, which roll may not only have a forming action but may also apply an adhesive to the exteriors of the corresponding wing and flanges of the blank during the formation. At the corners of the form are curved deflecting walls 38, which, at their extremities, merge into the side-walls and the inner peripheries of the rolls. Into the form may be forced a plunger 40 closely fitting between its walls, the area of the bottom of the plunger corresponding to that of the bottom of the box. This presses the blank into the form, bending up the sides 16 and the wings 18 at the scored lines 10 and 12, respectively. Simultaneously, the deflecting walls 38 turn in the flanges about the scored lines 28, so that, at the completion of the downward travel of the plunger, the flanges and wing have been brought at each end of the form approximately into a common plane across the body of the box, with the longitudinal edges 22 and 29 and the inclined edges 24 and 32, respectively, in substantial contact. Thus there is formed at each end a practically continuous single wall of the box B. The top of this wall is furnished almost entirely by the edge 20 of the wing 18, the edges 30 of the flanges 28 giving a limited portion at each side.

To retain the elements of each end-wall in the proper relation to each other and to strengthen the structure, reinforcements 42 are secured to the outside of these walls. These reinforcements preferably consist of rectangles of pasteboard similar to that from which the blank is made and corresponding in form to the end of the finished box. The reinforcements may be delivered when the box is in the lower portion of the form 34, 36 between the ends of the vertical plunger 40 and opposite horizontally movable plungers 44, 44. After the reinforcements have been placed over the bent-in flaps and against the ends of the plungers 44, the latter are caused to travel toward each other to press the reinforcements against the surfaces coated by the rolls 36. The double end-walls are thus completed, save for such finish-covering as it may be desired to apply.

The resulting box, though produced by simple, readily changed bending and pressure elements, or by manipulation, is as strong as those manufactured by more intricate and less easily modified machines. It is especially adapted, because of its complete double end-walls, for the rough usage which is received by cartons shipped according to the common practice in corrugated pasteboard cases, rather than in wooden boxes. The exterior reinforcement presents an unbroken finished surface, while the inner flaps, with their butted edges, fur-

nish an almost continuous wall, of great strength at the center where most deforming strain is received, pleasing in appearance, and which will not catch or interfere with articles in their introduction or removal. The flanges 26 extend for so slight a distance beyond the sides 16 that there is no danger of interference in their bending in simultaneously with the wings 18, and no strains tending to rupture the blank are thrown upon the junctures of the edges 24 and 32. In supplying the blank to the form, particularly by a mechanically actuated device, the edges 20 provide effective rectilinear contact-surfaces for engagement by a feeding member. As the pieces removed from a complete sheet at the corners of the blank between the edges 22 and 29 are substantially rectangular and but slightly smaller than the reinforcing walls of the box made from the blank, they may be utilized for the reinforcements of a somewhat smaller size of box. The waste of stock is thus minimized.

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

1. A box having a bottom and opposite side-walls each provided with an extension, these extensions lying across the body of the box and substantially meeting in a common plane to provide an end-wall, the end of the bottom-extension furnishing the greater portion of the top of the end-wall produced by the extensions and the bottom-extension and end-extensions meeting along lines parallel to the box-corners throughout the greater portion of their height.

2. A box having a bottom and opposite side-walls each provided with an extension, these extensions lying across the body of the box and substantially meeting in a common plane to provide an end-wall, the bottom-extension being slightly less in area than the end of the box and the side-extensions occupying the spaces left by the bottom-extension, the bottom-extension and end-extensions meeting along lines parallel to the box-corners throughout the greater portion of their height.

3. A box-blank comprising a bottom-portion and opposite side-portions, the bottom-portion having at each extremity an elongated wing of generally rectangular form and the side-portions being provided with flanges narrow as compared with the elongated wing.

4. A box-blank comprising a bottom-portion and opposite side-portions, the bottom-portion having at each extremity a flap in the form of a rectangle with inclined edges joining said rectangle to the bottom-portion, and flaps projecting from the side-portions to an extent corresponding to the inclined edges of the bottom-flaps.

5. A box-blank comprising a bottom-portion and opposite side-portions, the bottom-portion having at each extremity a flap in the form of a rectangle with inclined edges joining said rectangle to the bottom-portion, and flaps projecting from the side-portions to an extent corresponding to the inclined edges of the bottom-flaps and having their edges adjacent to said edges inclined oppositely thereto.

In testimony whereof I have signed my name to this specification.

CHARLES F. SPRAGUE.