July 20, 1948. G. D. WIEPERT 2,445,548

METHOD OF MAKING BOX-LIKE CONTAINERS

Filed Jan. 30, 1947 2 Sheets-Sheet 1

Fig. 1.

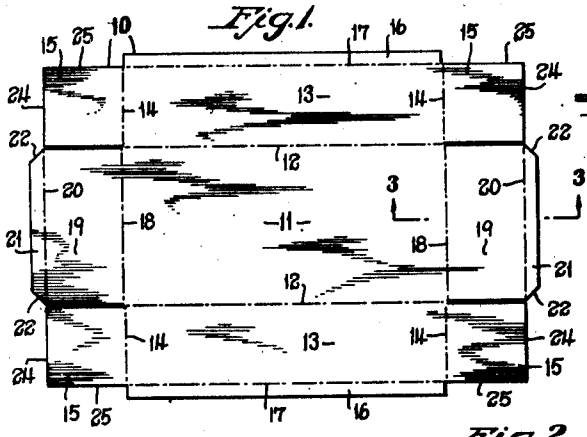


Fig. 3.



Fig. 5.

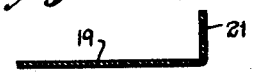


Fig. 2.

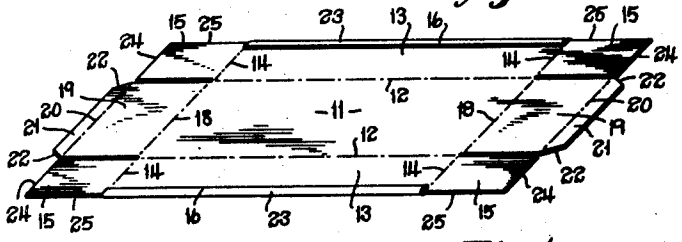


Fig. 7.

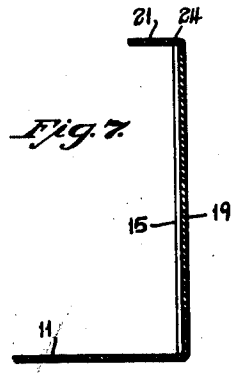


Fig. 4.

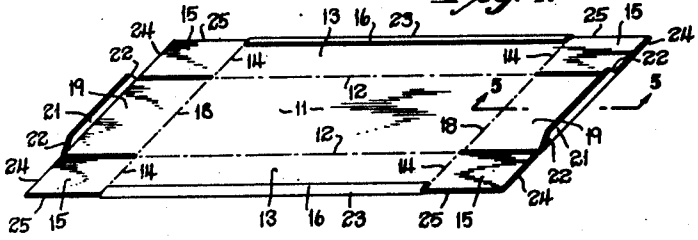


Fig. 6.

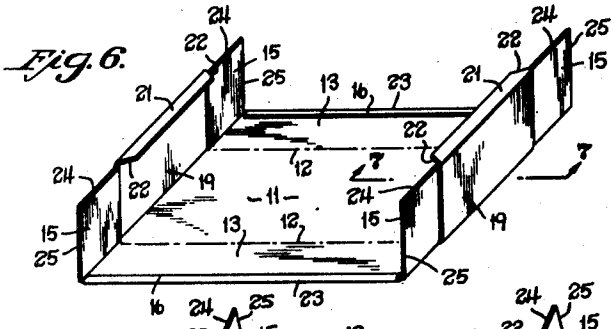


Fig. 9.

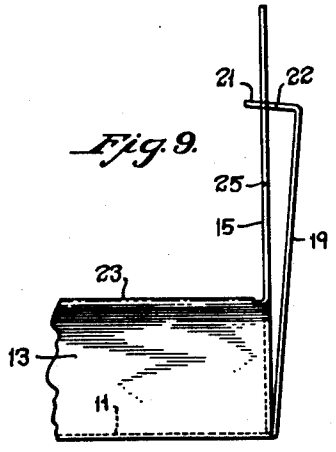
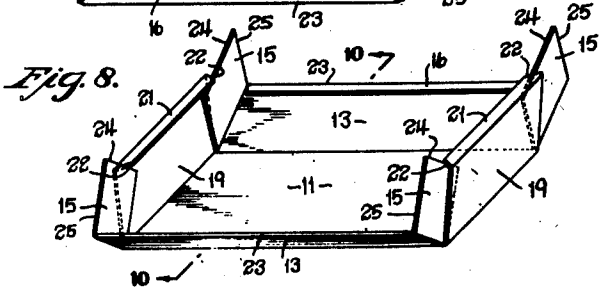


Fig. 8.



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July 20, 1948. G. D. WIEPERT 2,445,548

METHOD OF MAKING BOX-LIKE CONTAINERS

Filed Jan. 30, 1947 2 Sheets-Sheet 2

Fig. 10.

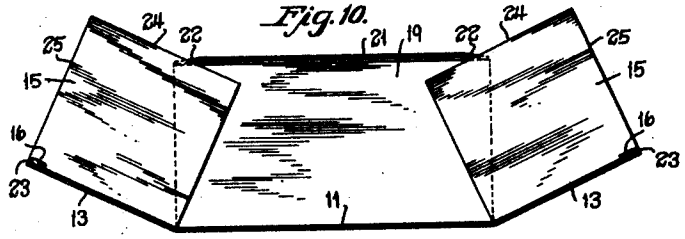


Fig. 12.

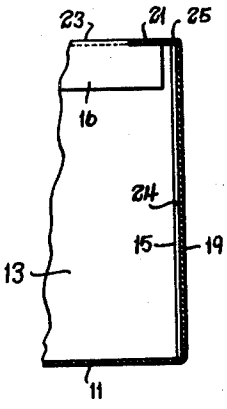


Fig. 11.

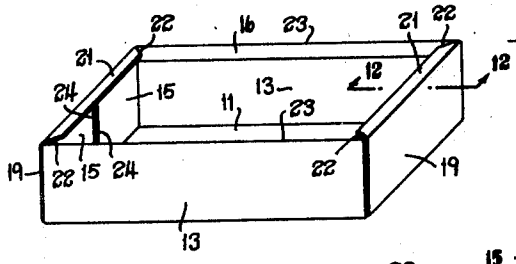


Fig. 13.

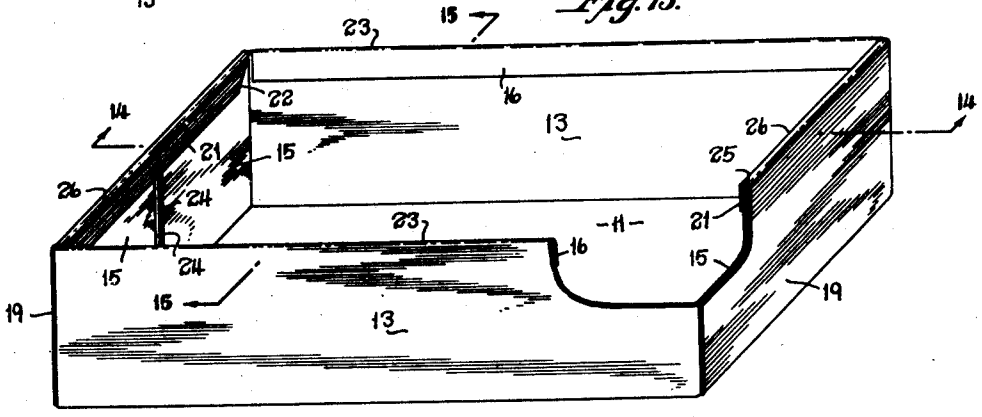


Fig. 14.

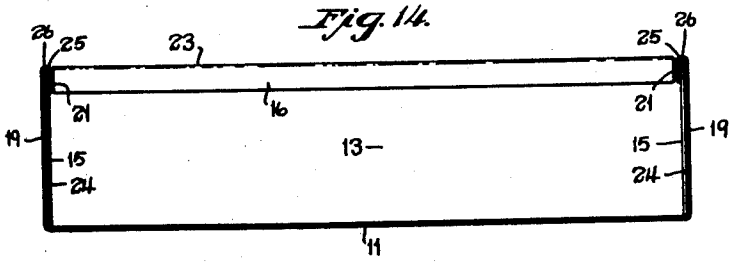
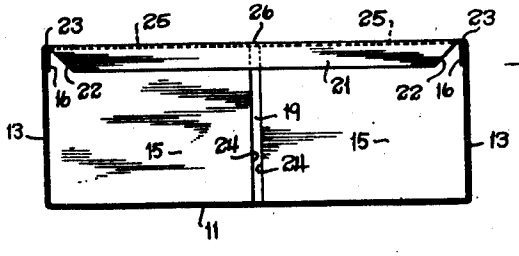


Fig. 15.



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METHOD OF MAKING BOX-LIKE CONTAINERS

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Application January 30, 1947, Serial No. 725,311

2 Claims. (Cl. 113—120)

1

The present invention relates in general to receptacles and more especially to an improved box-like receptacle and method of making the same.

An object of the invention is to provide an improved receptacle which is neat in appearance and relatively inexpensive to manufacture.

A further object of the invention is the provision of an improved method of making a box-like receptacle wherein a minimum number of operations is required for forming a single blank into a finished box.

A still further object of the invention is to provide an improved method of forming a box wherein the end walls of the box are adapted to be bent up substantially simultaneously with the flaps at corresponding ends of the side walls.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features in the said disclosure which are novel over the prior art and which are not claimed in any separate application.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

Fig. 1 is a plan view of a blank from which the improved receptacle of this invention is formed;

Fig. 2 is a perspective view of the blank shown in Fig. 1 with the longitudinal flanges of the side walls of the blank bent over to form smooth beads on the outer edges of the side walls;

Fig. 3 is a fragmentary sectional side elevation of one end of the blank on line 3—3 of Fig. 1 showing a portion of the bottom, the end wall and the flange of the latter all in a common horizontal plane;

Fig. 4 is a perspective view of the blank as shown in Fig. 2, but with the flanges of the end walls turned upwardly at substantially right angles thereto;

Fig. 5 is a fragmentary sectional side elevation of one end of the blank on line 5—5 of Fig. 4;

Fig. 6 is a perspective view of the blank as shown in Fig. 4, but with the end walls and flaps of the side walls bent upwardly at substantially right angles to the bottom of the blank to provide a partially-formed box;

Fig. 7 is a fragmentary sectional side elevation of one end of the partially-formed box on line 7—7 of Fig. 6;

Fig. 8 is a perspective view of the partially-formed box as shown in Fig. 6, but with the side walls partly folded up, the free ends of the flaps

2

of the side walls being in engagement with the beveled ends of the flanges of the end walls;

Fig. 9 is an enlarged fragmentary side elevation of one end of the box as shown in Fig. 8, showing the position of one of the flaps with respect to the bevel-ended flange of the corresponding end wall of the box;

Fig. 10 is an enlarged sectional end elevation of the partially-formed box on section line 10—10 of Fig. 8;

Fig. 11 is a perspective view of the box after the side walls have been folded in and before the flanges of the end walls have been turned down;

Fig. 12 is an enlarged fragmentary sectional side elevation of one end of the box on line 12—12 of Fig. 11;

Fig. 13 is an enlarged perspective view partly in section of the completed box;

Fig. 14 is a side elevation in section of the completed box on line 14—14 of Fig. 13; and

Fig. 15 is an end elevation in section of the completed box on line 15—15 of Fig. 13.

In carrying out the present invention it is proposed to provide the blanks for the box-like receptacle of this invention by stamping or otherwise forming the blanks from a continuous length of material in any well known manner, the preferred material being a suitable metal of relatively-thin gauge. It will be understood, however, that any other material having good mechanical strength and capable of being bent in the manner shown and hereinafter described, may be used. One of these blanks is indicated generally at 10 in Fig. 1 of the drawings and comprises a bottom portion 11 which is substantially rectangular in shape, its opposite longitudinal edges, indicated by the broken lines 12 in Fig. 1 and corresponding to fold-lines, having integrally-joined substantially-rectangular side-wall portions 13. Each of the side-wall portions 13 is, in turn, provided at its opposite ends, indicated by the broken lines 14 in Fig. 1 and corresponding to fold-lines, with integrally-joined substantially-rectangular flaps 15, the width of each flap corresponding substantially to the width of the respective side-wall portion 13 and the length of each flap corresponding substantially to one-half the width of the bottom portion 11 of the blank. Each side-wall portion 13 is provided also with a longitudinal flange 16 integrally joined to the outer edge of each side-wall portion, as indicated by the broken line 17, the over-all length of each flange being substantially equal to the over-all length of its respective side-wall portion 13. The bottom portion 11 of the

blank is provided at its opposite ends, which are indicated by the broken lines 18 in Fig. 1, with end-wall portions 19 which are joined integrally thereto and which are substantially rectangular in shape, the width of each end-wall portion 19 being substantially equal to the width of each side-wall portion 13 and its respective flap 15; and the length of each end-wall portion 19 being substantially equal to the width of the bottom portion 11. Each end-wall portion 19 is provided at its outer edge 20 with an integrally-joined flange or fastening-means 21, the opposite ends of which are beveled, as indicated at 22, for the purpose hereinafter described.

In forming a box-like receptacle from the blank shown in Fig. 1 in accordance with the improved method of this invention, the longitudinal flanges 16 of the side-wall portions 13 are first bent over on the fold-lines 17 and pressed down tightly onto the adjacent upper surfaces of their respective side-wall portions 13 to form smooth rounded edges or beads 23 along the outer edge of each side-wall portion 13, as indicated in Fig. 2. Following the formation of the longitudinally-beaded edges 23, each bevel-ended flange 21 of its respective end wall 19 is bent up on its fold-line 20 at substantially right angles thereto, as shown in Figs. 4 and 5. The next operations which are performed on the blank are adapted to convert the blank from the blank form shown in Fig. 4 to a partially-formed box-like receptacle. Heretofore, it has been customary in folding up the side-wall portions and end-wall portions of a blank to first bend up the portions corresponding to the flaps 15 at substantially right angles to their respective side-wall portions and then to fold up the side-wall portions at substantially right angles to the bottom of the box. Thereafter, the end-wall portions have been folded up into cooperative relationship with the flaps of the side walls and finally the flange or fastening-means of each end wall has been turned down over the upper edges of its respective flaps to secure the flaps, side walls and end walls together. Thus, a minimum of four separate steps have been required to form a box from a blank. The present invention features the discovery that by providing beveled ends on the flanges or fastening-means of the end walls, the latter and the side walls of the box may be assembled in a minimum of three operations. Thus, in accordance with the present invention, the end-wall portions 19 and the flaps 15 of the side-wall portions are adapted to be bent up at substantially right angles to the bottom portion 11 and side-wall portions 13 respectively of the blank before the side-wall portions are folded up. The bending up of each end-wall portion and the corresponding flaps of the side walls may be done simultaneously or the end-wall portions may be bent up first, after which the flaps may be bent up, the flaps and end-wall portions assuming the relationship shown in Figs. 6 and 7. In this connection, it should be noted that the fold-line 18 of each end-wall portion 19 is not coextensive with the fold-lines 14 of the flaps 15 at corresponding ends of the blank, but is displaced outwardly slightly so that when the end-wall portions 19 are bent up, the vertical plane of the inner face of each end-wall portion is coincident with the vertical plane of the outer faces of the flaps 15, as shown in Figs. 6 and 7, as a consequence of which the latter are adapted to swing inwardly in front of the inner faces of the end walls 19, as hereinafter described and as shown in Figs. 8 and 9.

The next operation on the partially-formed box is that of folding in the side-wall portions 13. As each side wall 13 is folded up on its fold-line 12, its respective flaps 15 are swung inwardly inside of the inner face of its respective end wall 19, the outer free ends 24 of each flap being brought into engagement with the corresponding beveled ends 22 of its respective flange 21, as a consequence of which the flaps and end walls are displaced relative to each other by the camming action of the free ends 24 of the flaps against the beveled ends 22 of the flanges, as indicated in Fig. 9. The relative displacement of the flaps 15 and end walls 19 may consist primarily of the inward deflection of each flap with little or no outward deflection of the respective end walls 19, or the end walls may be cammed outwardly to a considerable extent, as indicated in Fig. 9. In either event, however, the relative positions of the flaps and end walls are temporary and as soon as each side wall 13 has been folded up into a substantially-vertical position, that is to say, at substantially right angles to the bottom 11 of the box, the upper edge 25 of each flap 15 will have assumed a position beneath the substantially-horizontal overhanging-flange 21 of its respective end wall, as indicated clearly in Fig. 12, the inherent resiliency of the flaps and end walls bringing these elements into cooperative relationship, as indicated in Figs. 11, 12 and 15. Thereafter, the bevel-ended flanges 21 of the respective end walls 19 are bent down on the fold-lines 20 over the upper edges 25 of the inturned flaps 15, the flanges being flattened tightly against the inner faces of the flaps 15, as shown in Figs. 13 and 14, to clamp the latter securely to their respective end walls and simultaneously to form smooth rounded beads 26 on the upper edges of the end walls. In accordance with the foregoing construction, the end walls comprise double-walled end-closures for the box, the side walls and end walls of which are securely held in cooperative relationship by the bevel-ended flanges 21 which constitute the only fastening-means for holding the elements of the box together.

Although the drawings and description relate to a substantially-rectangular box having relatively-long side walls and relatively-short end walls, it will be understood that the invention is applicable to rectangular boxes, the sides and ends of which may be substantially equal in length.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

I claim:

1. The method of forming a receptacle having a bottom, a pair of side walls and a pair of double-walled end-closures comprising the steps of forming a blank from sheet metal, the said blank having a bottom-portion and side-wall and end-wall portions: beveling the opposite corners respectively of each end-wall portion to form mitered edges; bending-up opposite end-portions of each side wall at substantially right angles thereto to form rectangular flaps; bending-up a relatively-narrow longitudinal strip along the

outer edge of each respective end-wall portion at substantially right angles thereto to form a fastening-flange embodying said mitered edges, folding-up said end-wall portions and said side-wall portions at substantially right angles to said bottom so as to simultaneously engage the straight edges of said rectangular flaps with the respective mitered edges of said fastening-flanges initially to flex the said flaps inwardly from beneath said fastening-flanges and subsequently to release said flaps to permit the latter to spring back beneath said fastening-flanges against the inner faces of said end walls; and then bending said fastening-flanges down over the upper edges of the respective pairs of flaps at corresponding ends of said receptacle to secure each end wall and its corresponding pair of flaps in assembled relationship .

2. The method of forming a receptacle having a bottom, a pair of side walls and a pair of double-walled end-closures comprising the steps of forming a blank from sheet metal, the said blank having a bottom-portion and side-wall and end-wall portions; beveling the opposite corners respectively of each end-wall portion to form mitered edges; bending-over the longitudinal edge of each respective side wall to form a bead thereon; bending-up opposite end-portions of each side wall at substantially right angles thereto to form rectangular flaps; bending-up a relatively-narrow longitudinal strip along the outer edge of each respective end-wall portion at substantially right angles thereto to form a fastening-flange embodying said mitered edges,

folding-up said end-wall portions and said side-wall portions at substantially right angles to said bottom so as to simultaneously engage the straight edges of said rectangular flaps with the respective mitered edges of said fastening-flanges initially to flex the said flaps inwardly from beneath said fastening-flanges and subsequently to release said flaps to permit the latter to spring back beneath said fastening-flanges against the inner faces of said end walls; and then bending said fastening-flanges down over the upper edges of the respective pairs of flaps at corresponding ends of said receptacle to secure each end wall and its corresponding pair of flaps in assembled relationship.

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