June 4, 1940. J. E. BORAH 2,203,127

SHIPPING BOX

Filed Sept. 12, 1938 3 Sheets-Sheet 1

FIG. 1.

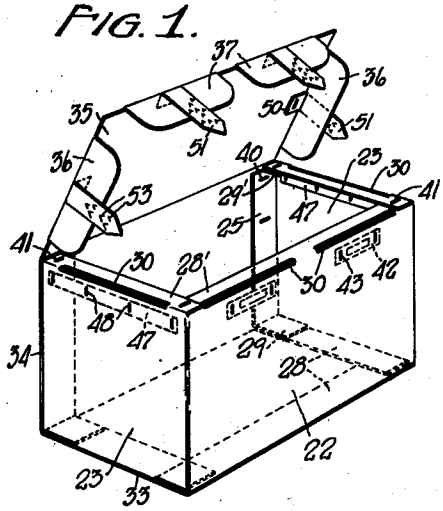


FIG. 2.

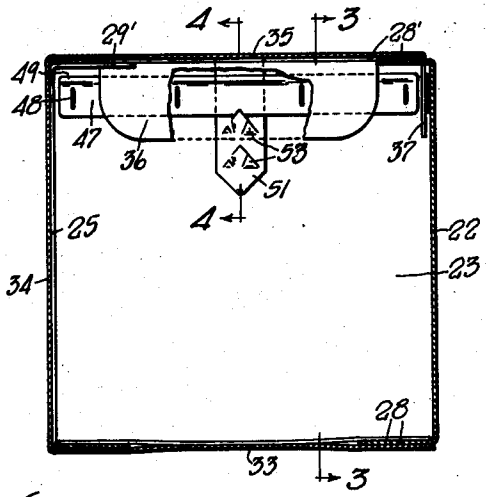


FIG. 3.

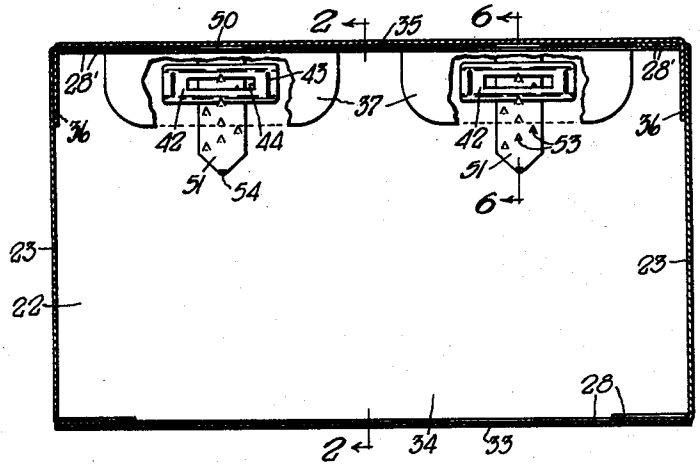


FIG. 4.

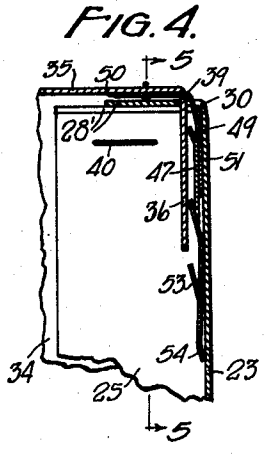


FIG. 5.

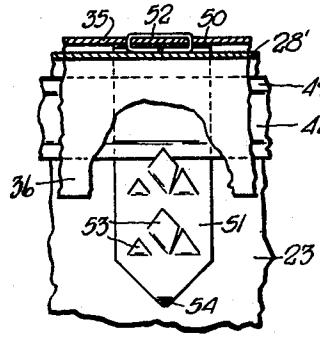
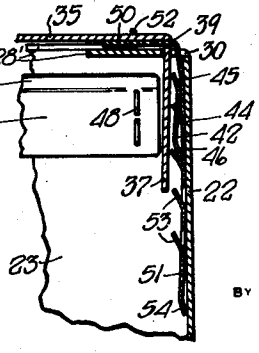


FIG. 6.



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June 4, 1940. J. E. BORAH 2,203,127

SHIPPING BOX

Filed Sept. 12, 1938 3 Sheets-Sheet 2

FIG. 7.

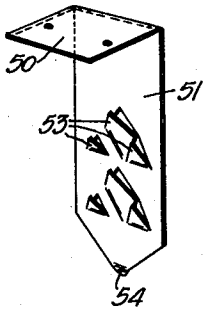


FIG. 8.

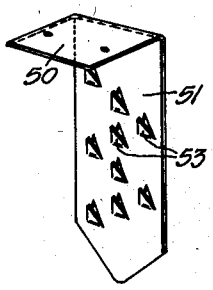


FIG. 9.

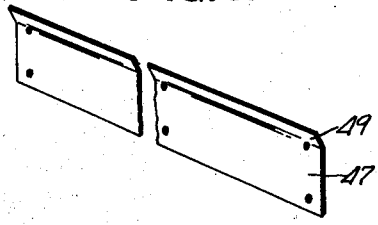


FIG. 10.

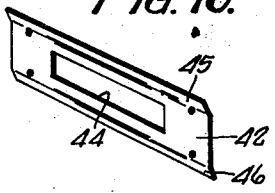


FIG. 11.

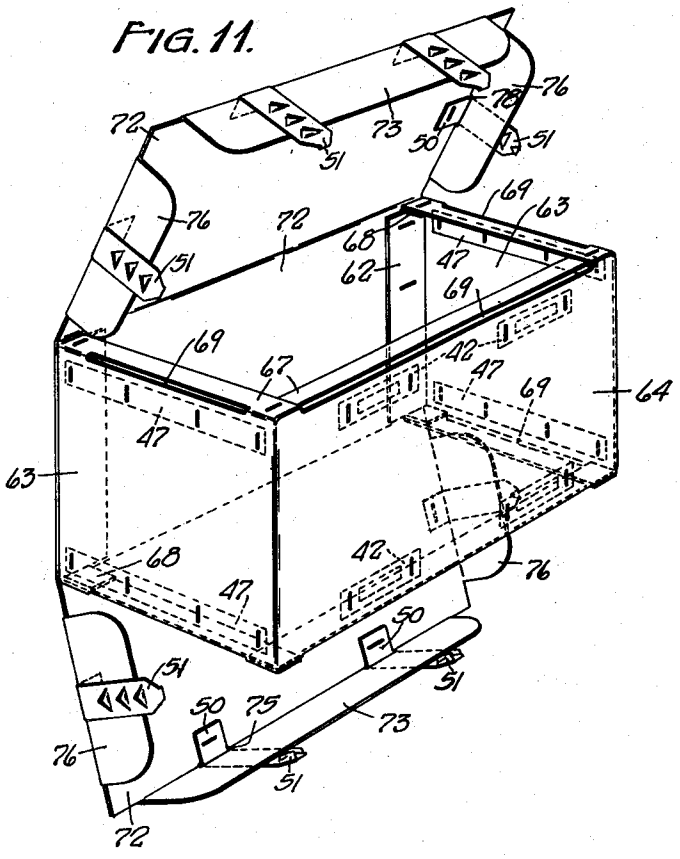
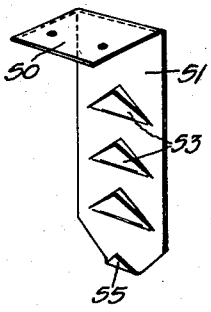


FIG. 12.



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June 4, 1940. J. E. BORAH 2,203,127

SHIPPING BOX

Filed Sept. 12, 1938 3 Sheets-Sheet 3

FIG. 13.

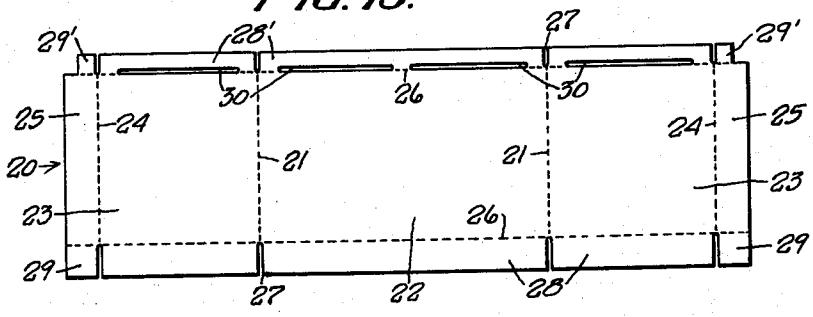


FIG. 14.

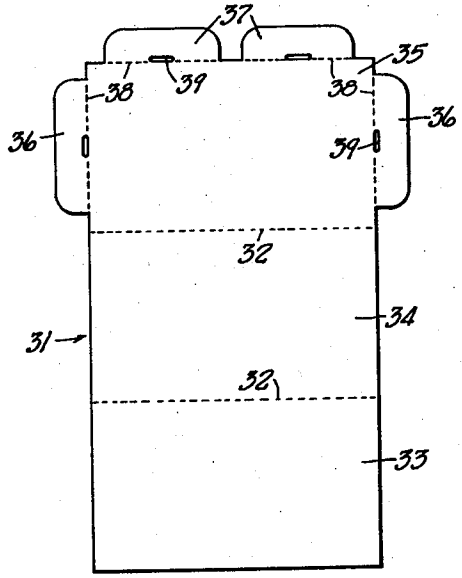


FIG. 15.

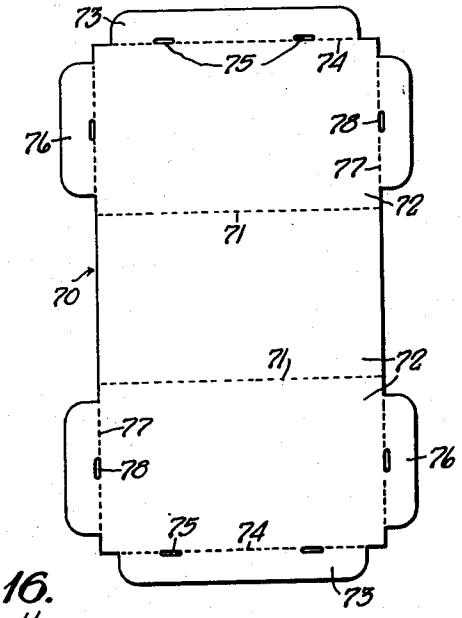
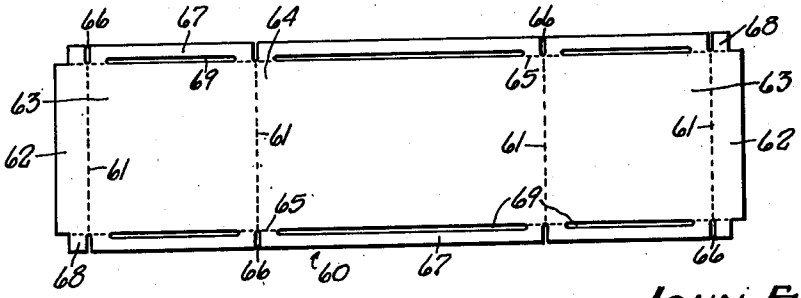


FIG. 16.



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Patented June 4, 1940 2,203,127

UNITED STATES PATENT OFFICE

2,203,127

SHIPPING BOX

John E. Borah, Penn Township, St. Joseph County, Ind.

Application September 12, 1938, Serial No. 229,462

16 Claims. (Cl. 229—47)

This invention relates to improvements in shipping boxes and particularly to such boxes formed of fibre board, cardboard, corrugated paper board, or the like.

The primary object of the invention is to provide a pilfer-proof box.

A further object is to provide a box of this character with novel interiorly positioned self-acting locking means.

A further object is to provide a box of this character which is smooth at all exterior surfaces and has no exposed tabs or flanges.

A further object is to provide a novel two-piece box construction effectively reinforced at its corners.

A further object is to provide a box of this character having square-cut corner flanges overlapping to provide triple-thickness corners.

A further object is to provide a box of this character which may be formed from blanks shaped to minimize waste of material.

A further object is to provide a pre-stitched collapsible self-locking box.

A further object is to provide a box having a self-locking pivoted panel, with flanges to reinforce the box against bulging and to hold said panel against inward thrust.

Other objects will be apparent from the description and appended claims.

In the drawings:

Fig. 1 is a perspective view of the box with its cover panel open.

Fig. 2 is a vertical transverse sectional view of the box taken on line 2—2 of Fig. 3, and with parts broken away.

Fig. 3 is a longitudinal vertical sectional view taken on line 3—3 of Fig. 2 and with parts broken away.

Fig. 4 is an enlarged fragmentary vertical sectional view taken on line 4—4 of Fig 2.

Fig. 5 is a fragmentary elevation of the end locking means viewed from the interior of the box, with parts broken away.

Fig. 6 is an enlarged fragmentary vertical sectional view taken on line 6—6 of Fig. 3.

Fig. 7 is a perspective view of one type of locking element.

Fig. 8 is a perspective view of another type of locking element.

Fig. 9 is a fragmentary perspective view of one type of locking bar.

Fig. 10 is a fragmentary perspective view of another type of locking bar.

Fig. 11 is a perspective view of an embodiment of the box having opposed locking panels.

Fig. 12 is a perspective view of another type of locking element.

Fig. 13 is a plan view of one of the blanks utilized in forming the box shown in Fig. 1.

Fig. 14 is a plan view of the other blank utilized in forming the box shown in Fig. 1.

Fig. 15 is a plan view of one of the blanks utilized in forming the box shown in Fig. 11.

Fig. 16 is a plan view of the other blank utilized in forming the box shown in Fig. 11.

Referring to the drawings, and particularly to Figs. 1 to 10, inclusive, 13 and 14, which illustrate one embodiment of my invention, the numeral 20 (Fig. 13) designates a substantially rectangular blank of fibre board or other suitable box material. Blank 20 is provided with a pair of spaced transverse fold lines 21 defining a central portion 22 adapted to form the front panel of the box, and end portions 23 adapted to form the end panels of the box. Adjacent each end of the blank and parallel thereto is provided a transverse fold line 24 defining a flange portion 25. Adjacent each longitudinal edge of the blank and parallel thereto is provided a longitudinal fold line 26. Narrow notches 27, aligned with transverse fold lines 21 and 24, extend inwardly from the longitudinal edges of the blank to the longitudinal fold lines 26 to define a plurality of flange portions 28 and 28' and square-cut corner tabs 29 and 29' at opposite sides of the blank. A plurality of slots 30 are aligned and substantially coincide with one of the longitudinal fold lines 26 of the blank in the flanges 28'.

A second blank 31 (Fig. 14) is of substantially rectangular form and is provided with a pair of spaced transverse fold lines 32 to define a bottom panel 33, back panel 34 and cover panel 35. Adjacent the cover panel 35, the blank 31 is provided with a pair of opposed side tongue projections 36, and with end projecting tongues 37. Fold lines 38, forming continuations of the edges of the blank from which tongues 36, 37 project, outline the inner portions of said tongues; and short slots 39 parallel to and substantially coinciding with fold lines 38 are formed at the center of each tongue 36, 37.

In assembling the blanks to form the box, each blank is first folded along all fold lines thereof to condition the parts. The adjacent square-cut ends of flange portions 28 at the longitudinal side of blank 20 opposite slots 30 are arranged in overlapping relation, and the corner tabs 29 at the same side of the box are likewise arranged in overlapping relation to the adjacent ends of

said flange portions. Bottom panel 33 of blank 31 is arranged to underlie said flange portions 28 and tabs 29 at its margins, and is stitched or stapled thereto. The back panel 34 of blank 31 is then stitched or stapled along its side edges, as by staples 40, to the flange portions 25 of blank 20. The ends of flange portions 28' are arranged in overlapping relation to each other and to corner tabs 29' at their ends, and are secured together, as by staples 41. The box is then assembled as illustrated in Fig. 1.

At the inner face of front panel 22 below and vertically centered with slots 30, a pair of locking bars 42 are rigidly secured at their ends as by staples 43. The construction of the locking bar 42 is best illustrated in Fig. 10, and comprises a metal plate having a large central opening 44 therein. The upper and lower edge portions 45 and 46 of the plate are bent at a slight angle to the plate, preferably at a point spaced from opening 44, the upper edge 45 being inwardly bent, and the lower edge 46 being outwardly bent. At the inner face of each end panel 23 adjacent the top thereof, a locking bar 47 is secured adjacent its ends by staples 48. Locking bar 47 is best illustrated in Fig. 9, and comprises an elongated metal plate having a flange portion 49 bent inwardly therefrom at a slight angle at its upper edge.

A locking element comprising an elongated sheet metal plate bent transversely intermediate its ends to provide a mounting flange 50 and a locking tongue 51, is secured to the inner face of cover panel 35 adjacent each of tongues 36, 37 at the mounting flange 50 thereof by means of staple 52. Locking tongue 51 is provided with a plurality of anchor tabs 53 struck out therefrom in spaced relation along the length thereof, said anchor tabs 53 extending at a slight angle to tongue 51 to project from the inner face thereof, with their free ends disposed in the direction of mounting flange 50. Three different constructions of locking element are illustrated in Figs. 7, 8 and 12. In Fig. 7, the anchor tabs 53 are arranged in vertically spaced groups or clusters of three, each of different size with its free end spaced from mounting flange 50 a different dimension than the others of the same group, to provide a graduated longitudinal spacing of all tabs of all groups along said tongue. The free end of tongue 51 in this construction is preferably bent outwardly at a slight angle to provide a guide element 54, for purposes to be hereinafter set forth. In Fig. 8, the anchor tabs 53 are arranged in diagonal rows to provide longitudinal spacing of the tabs. In Fig. 12, the tabs 53 are arranged in a longitudinal row, and the free end 55 of the locking tongue 51 is inwardly return bent to provide another anchor tab.

The locking elements are arranged to project outwardly through the slots 39 between cover panel 35 and the respective tongues 36, 37; whereby the locking tongues 51 thereof are positioned outwardly of cover tongues 36, 37, and are preferably slightly spaced forwardly therefrom.

When the box has been filled and is ready to be closed and sealed, cover 35 is lowered to permit cover tongues 36, 37 at the ends and free side or front of the box, together with the locking tongues 51 of the locking elements associated therewith, to be passed through the slots 30 therefor. The cover tongues 37, 36 are positioned to pass freely inwardly of the upper inwardly directed guide flanges 45, 49 of the locking bars 42, 47, respectively at the front and ends of the box. The locking tongues 51, being outwardly spaced from cover tongues 36, 37, and especially when provided with guides 54, engage the upper guide flanges 45, 49 of locking bars 42, 47, respectively, and are deflected outwardly to pass between said locking bars and the box panels 22, 23 mounting the bars. The cover is closed to the maximum extent permitted by its contents, and preferably sufficiently to rest upon the box flanges 28' to be positioned and reinforced thereby. Locking tongues 51 are of sufficient length to extend substantially below locking bars 42, 47 in normal closed position, so that a plurality of the anchor tabs 53 of said tongues will be positioned below said locking bars. The longitudinally graduated spacing of the anchor tabs 53 on locking tongue insures positioning of one tab adjacent the lower edge of the locking bar to effect a self-locking interengagement with said locking bar. In reference to locking bar 42, having opening 44 therein, a double interlock at the bottom thereof and at the top of opening 44 is permitted as illustrated in Fig. 6.

It will thus be seen that the box is self-locking, by virtue of the engagement of tabs 53 with the locking bars, and that this interlock is facilitated by the arrangement locking tongue 51 between the locking bar and adjacent box panel to restrain said locking tongue against movement in a direction to disengage the locking bar. The lock is positive, and the container cannot be opened without breakage and destruction thereof, so that it is proof against pilfering. In this connection, note that the flanges 28' underlying the margins of cover panel 35 prevent insertion of tools within the container, and that the retention of the locking tongues 51 between the vertical box panels and the locking bars, prevents lock release by manipulation of tools inserted through slots 30. Another important advantage of this locking arrangement is that the box need not be stitched, taped, cemented or otherwise processed by the user incident to filling and sealing thereof.

The interlocks at front and end panels of the box, together with the reinforcement effected by interconnected flanges 28' and corner tabs 29', serves effectively to prevent bulging of the box adjacent the cover 35. Likewise, the square-cut corners of the said flanges and corner tabs provide a three layer reinforced construction at each of the eight corners of the box. In case of contents of heavy weight, and of stacking thereof, the boxes may be positioned to rest upon one of the panels 22 or 34 to position flanges 28, 28' vertically to obtain full advantage of said reinforced construction. Also, the above mentioned three-layer corner construction prevents the corners of the box from being bent or pushed in while being handled or while being moved or jostled about incident to transportation. The box possesses the further advantage of use of minimum amount of material, formed from blanks having minimum departure from rectangular shape, and thereby reduces waste of material, while being of adequate strength, with all vulnerable portions, i. e. corners and edges, adequately reinforced. The arrangement of the parts of the box permits all flanges, tabs, etc. employed therein to be interiorly positioned, whereby the outer side is smooth and free from protuberances, and still affords maximum cubical capacity. The over-all smoothness of the box facilitates stacking of the boxes, and is of particular advantage where the boxes are placed on conveyors or on

gravity chutes or slides, since danger of striking projections and being caught and jammed, with resultant breakage, service interruption, and the like is avoided.

The construction of the box illustrated in Fig. 11, from the blanks shown in Figs. 15 and 16, is as follows: Rectangular blank 60 is provided with transverse fold lines 61 to provide end flanges 62, end panels 63, and front panel 64. Longitudinal fold lines 65 adjacent the opposite sides of the blank cooperating with narrow notches 66 aligned with fold lines 61 and extending from lines 65 to the adjacent sides of the blank provide longitudinal flanges 67 and corner tabs 68 each with square-cut corners. Slots 69 are formed in each longitudinal flange 67 with their inner edges substantially coinciding with fold lines 65, said slots terminating short of the ends of their respective flanges 67 a distance substantially equal to the width of said flanges.

Blank 70 is provided with transverse fold lines 71 defining three body panels 72. At each end of blank 70 is provided a projecting tab 73 whose major dimension is substantially equal to the slots 69 in the central flanges 67 of blank 60. Tabs 73 are defined by fold lines 74 and have one or more short slots 75 formed therein with their inner edges substantially aligned with the lines 74. Tabs 76 project at both sides of the blank at each of the two end panels 72. Tabs 76 have a major dimension substantially equal to the length of slots 69 in the end flanges 67 of blank 60. Tabs 76 are defined by fold lines 77 extending longitudinally of the blank, and have short slots 78 formed therein adjacent said fold lines 77.

In the assembly of the box, the margins of intermediate panel 72 of blank 70 are stapled or otherwise secured to the end flanges 62 of blank 60. Locking bars 47 are stapled to the end panels 63 in inwardly spaced parallel relation to flanges 67 thereof, and locking bars 42 are stapled to panel 64 in inwardly spaced parallel relation to flanges 67. Locking elements 50 are stapled to the inner faces of end panels 72 of blank 70 to project through slots 75, 78 with their locking tongues 51 positioned outwardly of tongues 73, 76 of blank 70. If desired, the box may be shipped in this condition, in flat form. It is then necessary for the user to staple the flanges 67 and corner tabs 68 at 79 preparatory to use. Insertion of tabs 73, 76 in their respective receiving slots 69 to effect interlocks between locking tongues 51 and the respective locking bars 42, 47, as previously described, completes the assembly and sealing of the box.

This embodiment of box has the same advantages previously mentioned. In addition the flat-folding for shipment with minimum processing required of the user; together with the increased accessibility for filling the box with certain types of merchandise afforded by opposed open ends, constitute important advantages for some applications and uses.

One of the advantages of both embodiments illustrated, is the strengthening or reinforcing effect of the locking bars, especially where the same extend substantially the full width of the panel by which they are mounted, as bar 47 in Figs. 1 and 11. This construction resists bulging and depression of the box panel, and strengthens the box panel against impact, and crushing stresses, as when the boxes are dropped or are stacked.

I claim:

1. A box comprising a rectangular section having longitudinal and transverse fold lines defining three body panels spaced inwardly from the edges of said sections, said section having notches therein outwardly of said panels and aligned with said transverse fold lines to define marginal flanges and corners outwardly of said panels, the longitudinal flanges on one side of said section having elongated slots adjacent the longitudinal fold line, a second section having transverse fold lines defining three body panels and end and side tongues projecting from at least one end panel, said tongues being defined by fold lines and having short slots adjacent said fold lines, the central panel of said second section being secured to the end flanges of said first section and the corner tabs and adjacent ends of the longitudinal flanges of the first section being interconnected, locking elements secured to the inner face of the tongued panel of the second section to project through said slots and terminate in a locking portion outwardly of said tongues and having longitudinally spaced projections, and locking bars carried by the banner faces of the panels of said first section adjacent the slots thereof, the tongues and locking elements of the second section being insertible through the slots in said first section.

2. A box as defined in claim 1 wherein the outer end portions of said locking elements are spaced from their complementary tongues and the upper edges of said locking bars have inturned guide flanges to direct said locking elements to the outer side thereof.

3. A box having sides, bottom and a top integral with one side, inturned apertured flanges integral with said sides and interconnected at their ends to reinforce said box at the open end thereof, said top having apertured tongues at its free edges, locking elements secured to the inner face of said top and each extending through a tongue aperture to terminate outwardly of said tongue, and locking bars secured to the inner faces of said sides, said tongues and locking elements projecting through said flange apertures with said locking elements passing between said locking bars and sides to interlock with said locking bars.

4. A box having a restricted opening defined by marginal flanges and an integral cover foldable over said opening, an apertured tongue projecting from said cover, said box having a slot receiving said tongue, a locking bar secured within said box beneath said slot, and a locking element secured to the inner face of said cover and passing through said tongue to terminate outwardly thereof, said locking element extending through said slot to interlock with said locking bar.

5. A box as defined in claim 4 wherein said locking bar has an upper guide edge to direct said locking element outwardly of said locking bar.

6. A box as defined in claim 4 wherein said locking element bears on the outer surface of said locking bar and has a plurality of longitudinally spaced locking projections at its inner face.

7. A box having sides, bottom and cover, said sides having inturned flanges secured together at the box corners, the cover and bottom overlying said flanges to provide smooth exterior box surfaces, and cooperating members secured to the interior faces of said cover and at least one side for locking said box.

8. A box as defined in claim 7, and means for guiding the locking member carried by said cover

to interlocking relation with the other member while said cover is being closed.

9. A box having sides, bottom and cover, said sides having slotted inturned reinforcing flanges secured together at all box corners, the cover and bottom overlying said flanges to provide smooth exterior box surfaces, tongues projecting from the free edges of said cover and insertible in said slots, a locking element secured to the inner face of said cover, and a latch member at the inner face of one side receiving said locking element.

10. A box as defined in claim 9, wherein said locking element passes through one of said slots for guided movement relative to said latch member.

11. A box as defined in claim 9, wherein a portion of said locking element passes through one of said tongues to engage said latch adjacent said cover.

12. A box as defined in claim 9, wherein a portion of said locking element passes through and terminates outwardly of one of said tongues for insertion between said latch member and the adjacent box side.

13. A box comprising a section having longitudinal and transverse fold lines defining three body panels and a marginal portion, said marginal portion having notches therein aligned with said transverse fold lines to provide a plurality of aligned flanges and corner tabs at each longitudinal margin of said section, said section being folded with said longitudinal flanges and corner tabs secured together in overlapping relation at each corner, and a second section having transverse fold lines defining three body panels, the intermediate body panel of the second section being secured to the end flanges of the first section in overlapping relation, and the end panels of said second section overlying the interconnected longitudinal flanges and corner tabs of the first section to provide a triple-thickness portion at each box corner and smooth exterior box surfaces.

14. A box comprising sides, a bottom and a top, each integral with and folded from one side, inturned flanges and corner tabs integral with three sides and secured together in overlapping relation and corner tabs folded parallel and adjacent to said first folds for face engagement with portions of said flanges, the bottom and top bearing on the outer faces of said flanges to provide triple-thickness reinforced corners and smooth exterior box surfaces.

15. A box having sides, bottom and a cover integral with one side, said sides having inturned flanges secured together at the box corners, the cover and bottom overlying said flanges to provide smooth exterior box surfaces, at least one of said flanges having a slot therein, and a tongue projecting from a free edge of said cover and insertible in said slot to position said cover relative to said sides and prevent distortion of said box.

16. A box having sides, bottom and a cover integral with one side, said sides having inturned flanges secured together at the box corners, the cover and bottom overlying said flanges, and tongues projecting from the free edges of said cover, said flanges having slots therein adjacent said sides for snugly receiving said tongues to position said cover and cooperate with the corner securing of said flanges to prevent distortion of the box.

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CERTIFICATE OF CORRECTION.

Patent No. 2,203,127. June 4, 1940.

JOHN E. BORAH.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 24, claim 1, for the word "banner" read --inner--; 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 2nd day of July, A. D. 1940.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)