Jan. 27, 1959 G. E. STRUBLE 2,870,951

DOUBLE WALLED BOX

Filed Aug. 23, 1955 2 Sheets-Sheet 1

FIG-1

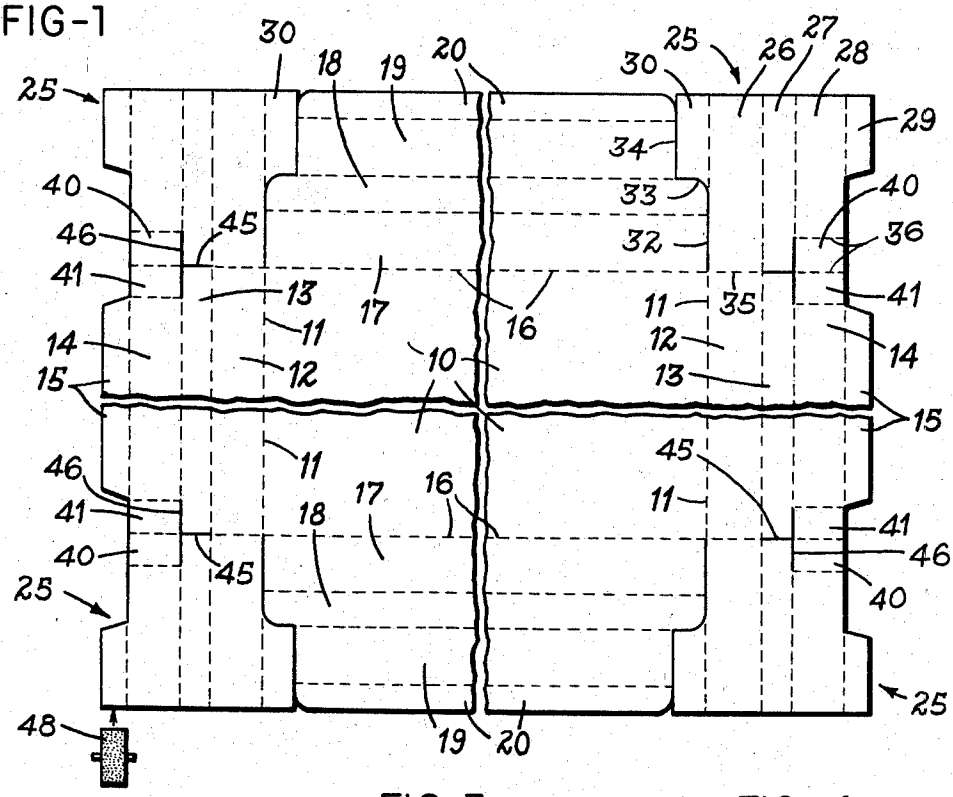


FIG-2

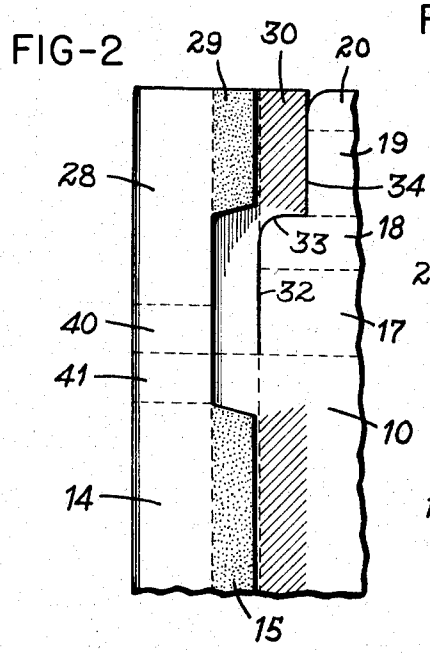


FIG-3

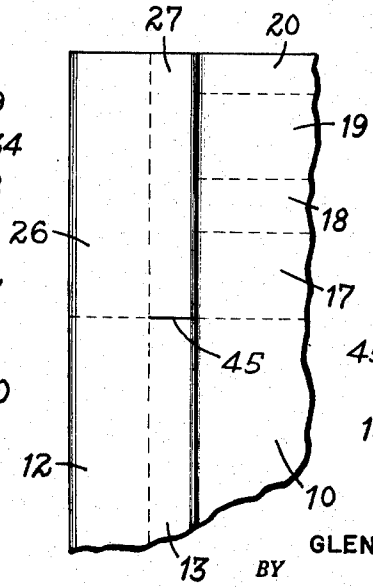
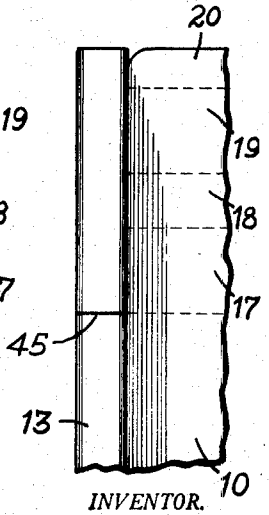


FIG-4



INVENTOR.
GLENN E. STRUBLE
BY
Marshall, Bicbel, French & Bugg
ATTORNEYS

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FIG-5

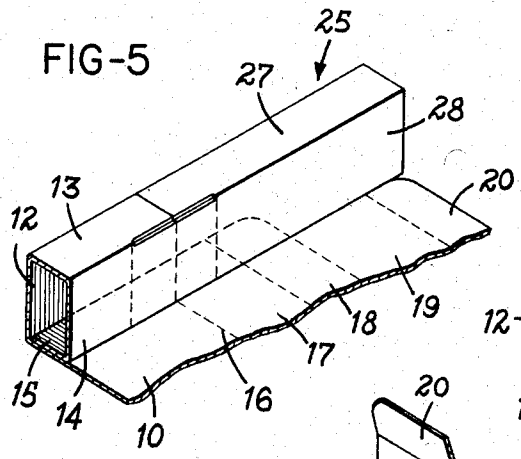


FIG-6

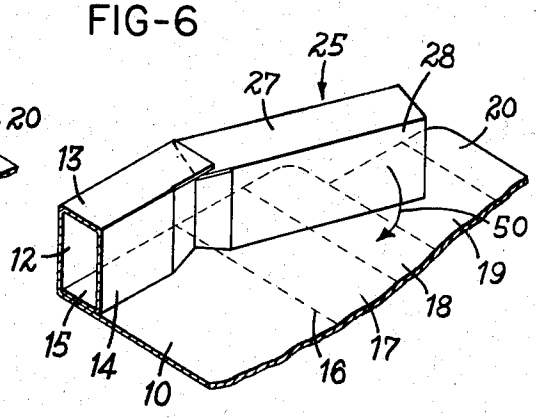


FIG-7

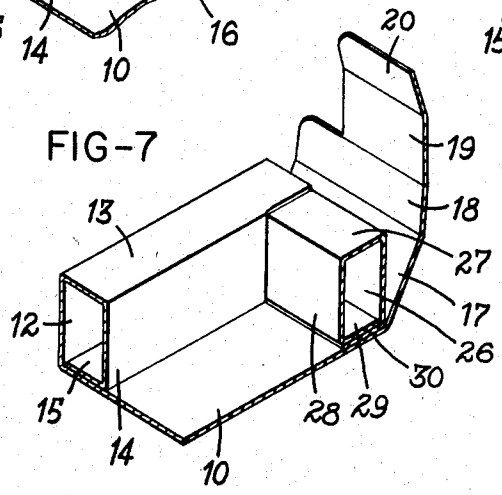


FIG-8

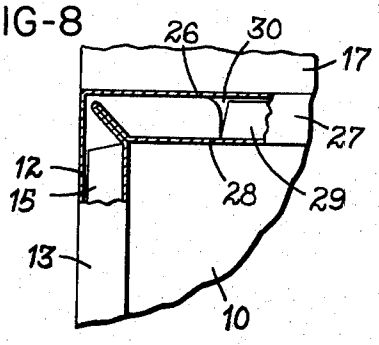


FIG-9

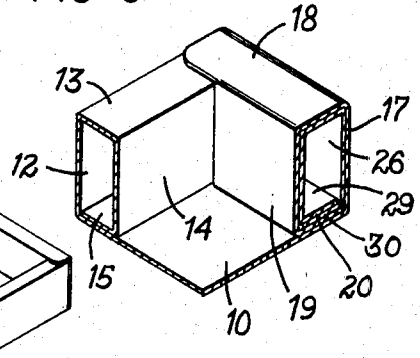
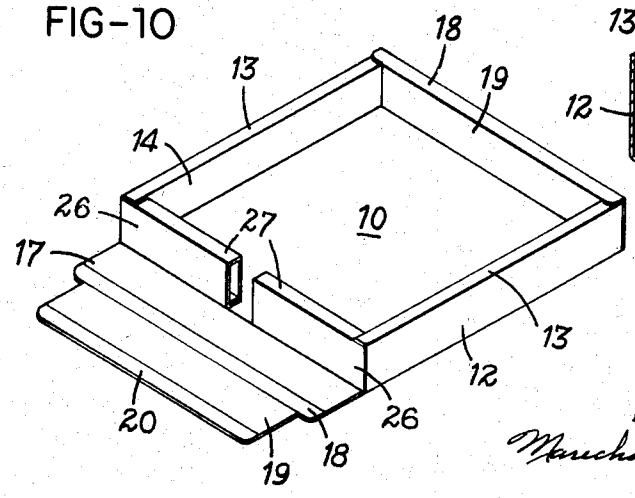


FIG-10



INVENTOR.
GLENN E. STRUBLE

BY
Marshall, Bibel, Brush & Bugg
ATTORNEYS

United States Patent Office 2,870,951
Patented Jan. 27, 1959

2,870,951

DOUBLE WALLED BOX

Glenn E. Struble, Hamilton, Ohio, assignor, by mesne assignments, to Diamond Gardner Corporation, a corporation of Delaware

Application August 23, 1955, Serial No. 530,011

5 Claims. (Cl. 229—34)

This invention relates to a double walled box, particularly to a construction for forming corners on such a box and for locking the box in erected position.

One of the principal objects of this invention is to provide a double walled box of improved design having corner constructions which securely lock the side walls and end walls of the box into erected position.

Another object of the invention is to provide such a box wherein double walled locking sections extend as integral portions of the box side walls and are foldable at right angles to the side walls for extension across the ends of the box to be enfolded within the end walls, and wherein the integral connection between the locking sections and the side walls includes folding panels which move into face to face relation within the corner of the erected box.

A further object of this invention is to provide such a double walled box from a unitary blank of sheet material which is appropriately scored and slit with a minimum of waste material, and which is foldable along the score lines into a box having improved and substantially strengthened construction particularly at its corners.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

In the drawings—

Fig. 1 is a plan view of the unitary blank of sheet material from which the box of this invention is formed;

Figs. 2, 3, 4, 5, 6 and 7 illustrate sequential steps in the assembly and erection of one corner of the box from the blank of Fig. 1;

Fig. 8 is a top view, partly in section and partly in elevation, of one corner of the erected box;

Fig. 9 is a perspective view of one corner of the erected box; and

Fig. 10 is a perspective view of the completed box with one end wall fully completed, and the other end wall readied for folding into erected condition.

Referring to the drawing, which illustrates a preferred embodiment of the invention, and particularly to Fig. 1, the unitary blank of sheet material from which the box of this invention is formed is illustrated with dotted lines indicating score lines in the blank separating it into a main or bottom panel **10** having integral extensions from its opposite sides foldable along score lines **11** into an upright position with respect to bottom **10**. Each of these extensions is also provided with longitudinal score lines extending parallel to the main fold line **11** and dividing the extensions into side walls including outer panels **12**, top panels **13**, inner panels **14** and bottom panels **15**. These side wall panels are foldable over and over to provide a hollow side wall of substantially rectangular cross section, as seen in Fig. 5.

The bottom side wall panels **15** are secured (preferably by adhesive) to bottom **10** to maintain the proper spacing of the inner and outer side wall panels **12** and **14**, but when the blank is made up into flattened form for shipping or storage (as in Fig. 3) this connection does

not interfere with the flattening of the side walls to provide a flat knocked down box. From the other edges of bottom **10** extend integral members hinged thereto along score lines **16**, and each of these extensions is divided by score lines parallel to lines **16** to provide end walls including outer panels **17**, top panels **18**, inner panels **19** and bottom or tuck panels **20**. When the box is erected these end wall panels are folded over and over inwardly toward the bottom **10** to provide end walls which are also of substantially rectangular cross-section.

To lock the hollow side and end walls in the erected condition, each corner of the box is provided with a locking section indicated generally at **25** and including outer panel **26**, top panel **27**, an inner panel **28**, a short bottom panel **29** and a glue flap **30** integral with outer locking section panel **26**. At the same time the side walls are formed by attachment of their bottom panel **15** to the bottom **10**, the short locking section bottom panels **29** are attached to glue flaps **30** to provide, in knocked down form, the hollow locking sections which are erectable along with the hollow side walls into members of substantially rectangular cross-section. The locking sections are separated from the end wall panels by a slit **32** separating outer end wall panel **17** from panel **26**, and by a curved extension **33** of slit **32** separating the top end wall panels **18** from glue flaps **30**. A continuation of the slit at **34** separates inner end wall panels **19** from glue flaps **30**, and the rounded cut at the corner of tucking panels **20** separates them from glue flaps **30**. Thus, each locking section **25** is entirely separate from the end walls of the box.

An integral hinge connection is provided between each of the locking sections **25** and the side walls. This connection includes a score line **35** separating panels **12** and **26**, and score lines **36** separating the connection between panels **14** and **28** into two gusset panels **40** and **41** hinged to each other and to the inner side wall and locking section panels **14** and **28**, respectively. That portion of the blank extending between bottom side wall panels **15** and bottom locking section panels **29** along the gusset panels **40—41** is removed to provide clearance for the corner folding operations to be described presently.

The top side wall panels **13** and the top locking section panels **27** are separated from each other by the vertical leg **45** of a T-shaped slit, and the horizontal leg **46** of this slit separates the panels **40** and **41** from the top panels **13** and **27** respectively. This slit provides for sliding movement of top panels **13** and **27**, one upon the other, during folding of the erected locking sections **25** across the ends of the box at right angles to the side walls. During this folding action the panels **40** and **41** bow inwardly into the hollow side walls at the corners of the box, into face to face relation with each other, and the end wall panels **17—20** are then folded about the locking sections **25**. When the bottom end wall or tucking panel is pushed between the bottoms of the locking sections and the bottom **10**, the end walls are locked in place, and consequently the entire box is locked into its erected position.

Referring to Fig. 2, one corner of the blank is shown in an intermediate step of assembly into flat-folded form. The bottom side wall and locking section panels **15** and **29**, respectively, have a suitable adhesive applied to them, as by the glue wheel shown at **48** in Fig. 1. These portions of the panels are to be folded into abutting relation with the shaded portions on bottom **10** and glue flap **30**.

After application of the adhesive, the side and end wall panels are folded over along the score line separating panels **13**, **14** and **27**, **28** as in Fig. 2, and the side and end wall panels are then folded over along line **11**, as in Fig. 3. In this form the blank is in a "knocked-down" condition wherein it is flattened for shipping or storage.

Fig. 4 illustrates the erection of the side walls and locking sections, wherein the inner and outer side wall and locking section panels are folded upwardly at right angles with respect to the bottom **10**. Fig. 5 illustrates in perspective the corner of the box in the same condition as shown in plan in Fig. 4.

The locking section **25** is then folded inwardly, as indicated by arrow **50** in Fig. 6, until the locking section extends at right angles with respect to the side wall, and the entire locking section overlies bottom **10** within the score lines **16**. During this folding operation the gusset panels **40** and **41** bow inwardly into the corner of the box, as shown in Fig. 6, and at the same time the inner corners of top side wall panel **13** and top locking section panel **27**, being freed from each other by the T-shaped slit **45—46**, slide one under the other, preferably with the corner of panel **27** passing underneath the corner of panel **13**. When the locking section has completely folded across the end of the box the panels **40** and **41** are face to face within the corner of the box, as seen in Fig. 8.

The end wall panels are then folded upwardly about score lines **16**, and about the score lines separating them into individual panels, and the bottom or tucking end wall panel **30** is slipped beneath the bottom of the locking section **25** to hold the box in erected condition. The final relation of the end wall panels is shown in Fig. 9, with the rounded corner of the top panel **18** as provided by slit **33**, resting in superposed position upon the other panels at the corner of the box.

It will thus be seen that the present invention provides a double walled box construction wherein the corners of the box, in addition to providing a sealed double walled box construction, also lock the box into its erected position and provide a corner of substantial strength which is highly resistant to crushing and the like. This is emphasized by noting that at the top of each corner there are three thicknesses of sheet material provided by the overlapped corner of panels **13**, **27** and **18**, and that these overlapped portions are vertically supported by a double thickness of sheet material in the form of the vertically extending gusset panels **40** and **41** within the corners of the box.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention as defined in the appended claims.

What is claimed is:

1. A blank for forming a double walled box of the character described, comprising a unitary sheet of material scored to provide a bottom, side walls each including outer, top, inner and bottom panels extending in that order from one edge of said bottom and foldable into tubular form with said bottom side wall panel adapted for securing to said bottom, end walls, each including outer, top, inner and bottom panels connected in that order and foldable into tubular form with said bottom panel overlying said bottom, corner locking sections at opposite ends of said side walls and each including inner, outer, top and bottom panels foldable into tubular configuration, a glue flap on each said outer locking section panel for attachment to said bottom locking section panel, said locking sections being free of direct connection with said end walls and having integral hinged connections with said side wall through said inner side wall panel and said inner locking section panel and through said outer side wall and said outer locking section panel, the connection between said inner side wall panel and said inner locking section panel including a pair of gusset panels adapted for folding into abutting relation within said hollow side wall at the corner of the erected box, and said top side wall and top locking section panels being separated from each other and from the adjacent edge of said gusset panels by a T-shaped slit through said blank providing for overlapping of said top side wall and top locking section panels and for inward folding of said gusset flaps after said locking section is folded into position extending across the end of the box.

2. A double walled box of the character described, comprising a bottom, four panel hollow side walls provided with outer, inner, top and bottom panels joined into tubular configuration, locking sections at opposite ends of said side walls and each including outer, inner, top and bottom panels and a glue flap joining said locking section panels into tubular configuration, said outer locking section panels and said outer side wall panels being hingedly connected along a common fold line for folding of said locking sections across the ends of said box, said top locking section panels and said top side wall panels being separated by a slit providing for overlapping thereof during folding of said locking sections across the ends of the box, and end walls including inner, outer, top and bottom panels foldable independently of said locking sections to enclose said locking sections with said bottom end wall panels locking beneath said locking sections.

3. A double walled box of the character described, comprising a unitary sheet of material providing a bottom, a hollow side wall having an integral connection with said bottom and including outer and inner panels separated by a top panel, a bottom panel on said side wall secured to said bottom retaining said side wall panels in open tubular configuration, a corner locking section including an outer panel having an integral hinged connection with said outer side wall panel and an inner panel having a folding hinged connection with said inner side wall panel, a top locking section panel joining said inner and outer locking section panels and separated from said top side wall panel by a first slit through said sheet material, said folding hinged connection including a pair of gusset panels separated from said top side wall and locking section panels by another slit extending across the end of said first slit bordering on said inner panels, said locking section being foldable substantially at right angles with respect to said side wall about said hinge connection between said outer side wall and locking section panels, said gusset panels being arranged for movement into face to face relation within the corner of the erected box, the slitted ends of said top side wall and locking section panels being slidable one upon the other at the corner of the erected box, and an end wall including inner, outer, top and bottom panels for enfolding said locking section with said bottom end wall panel tucked beneath said locking section to lock the box in erected condition.

4. A double walled box of the character described comprising a bottom, integral extensions from two opposite sides of said bottom providing hollow side walls each including outer, top, and inner panels, bottom flaps on said side walls secured to said bottom, integral extensions from the other sides of said bottom providing end walls including outer, top, inner and bottom panels, said inner and bottom end wall panels having cut away portions at their opposite ends, said cutaway portions being equivalent in width to the thickness of said side walls, integral extensions from said outer and inner side wall panels providing corner locking sections including inner, outer, and top locking section panels, said top locking section panels being separated from said top side wall panels by the vertical leg of a T-shaped slit, and the horizontal leg of said slit separating adjoining portions of said inner side wall and inner locking section panels from their respective adjoining top panels to define an integral hinged connection between said inner side walls and said inner locking section panels said hinged connection including a pair of gusset panels foldable inwardly within said side walls in face to face relation with each other as said locking sections are folded across the ends of said box into position to be enfolded by said panels of said end walls.

5. A blank for forming a double walled box of the character described, comprising a unitary sheet of ma-

terial scored to provide fold lines defining a rectangular bottom, four panel side walls extending from opposite sides of said bottom and each including outer, top, inner and bottom panels extending in that order from the side edges of said bottom and foldable into tubular form, said bottom side wall panels being securable to said bottom for retaining said side walls in tubular form, end walls extending from the other edges of said bottom, each end wall including outer, top, inner and bottom panels connected in that order and foldable into tubular form with said bottom panel overlying said bottom, said end wall inner and bottom panels being of a length less than said end wall outer and top panels by a distance at each end substantially equal to the width of said side wall top panels, corner locking sections at opposite ends of said side walls and each including inner, outer, top and bottom panels foldable into tubular configuration, said outer locking section panel being separated from said end wall outer and top panels by a slit, glue flaps extending from each of said outer locking section panels to adjacent said end wall inner and bottom panels and being separated from the latter by a slit in said blank providing for folding of said corner locking sections independently of said end walls, said bottom panels of said locking sections being

adapted for securing said glue flaps to retain said locking sections in tubular configuration, a folding connection between each said inner side wall panel and its adjacent said inner locking section panel including gusset panels providing for relative folding movement of said locking sections about an axis coincident with the fold line separating said outer side wall panels and said outer locking section panels, and said top side wall and top locking section panels being separated from each other and from adjacent edges of said gusset panels by a slit providing for overlapping of said top side wall and top locking section panels during folding of said locking sections across the ends of said box.

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