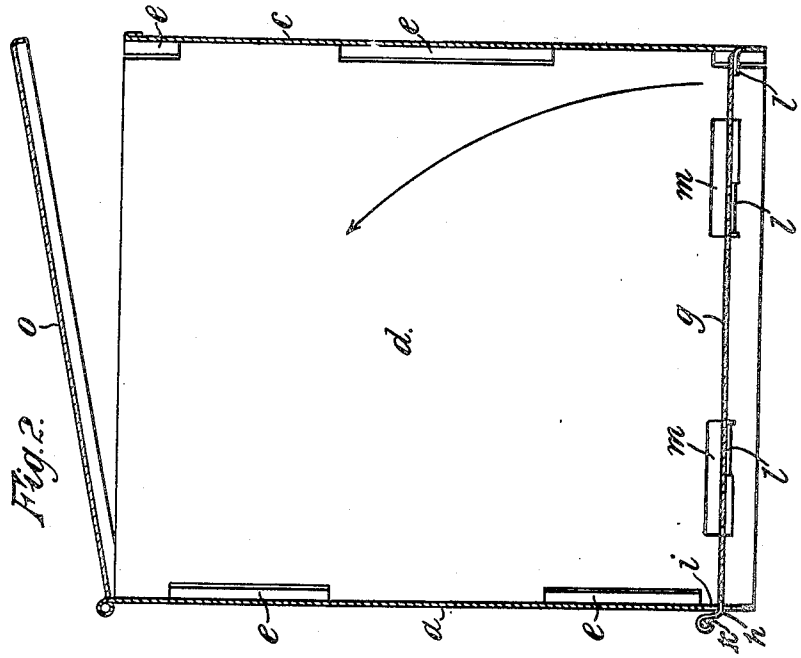
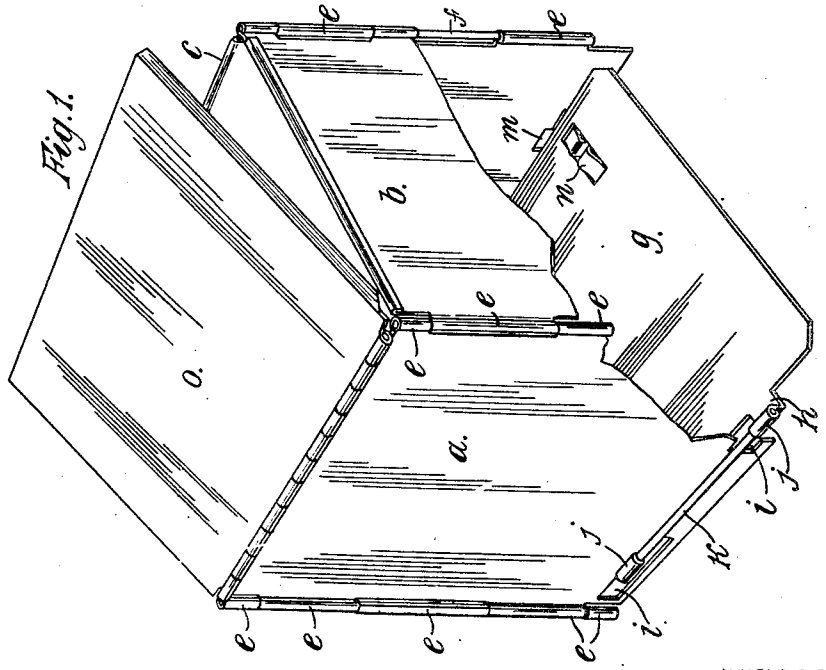
April 24, 1951 J. T. SAYER 2,550,088

COLLAPSIBLE METAL BOX

Filed Oct. 28, 1948 3 Sheets-Sheet 1





INVENTOR:
JOHN T. SAYER
BY: Francis E. Boyer
ATTORNEY

April 24, 1951 J. T. SAYER 2,550,088

COLLAPSIBLE METAL BOX

Filed Oct. 28, 1948 3 Sheets-Sheet 2

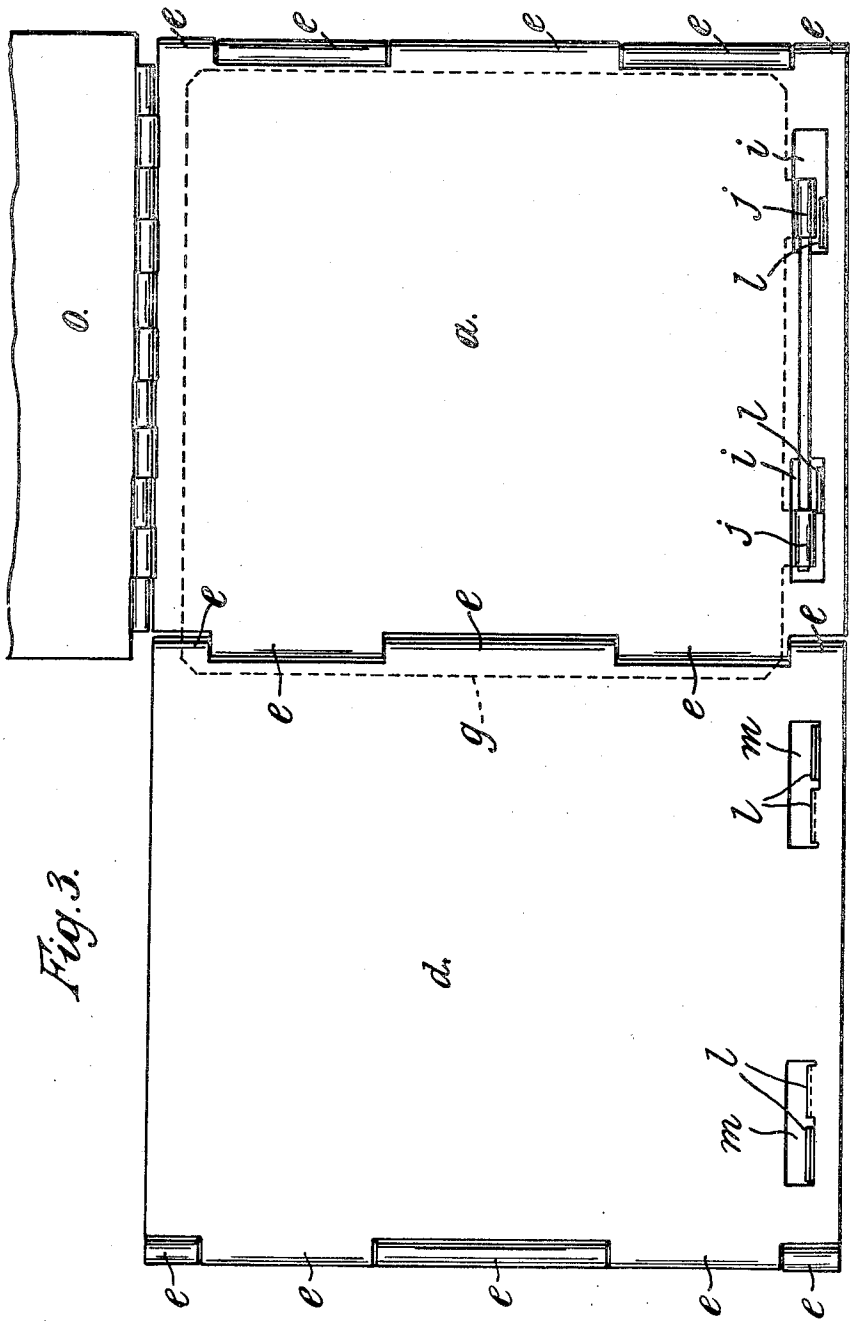


Fig. 3.

INVENTOR
JOHN T. SAYER
BY: Francis E. Boyer
ATTORNEY

April 24, 1951 J. T. SAYER 2,550,088

COLLAPSIBLE METAL BOX

Filed Oct. 28, 1948 3 Sheets-Sheet 3

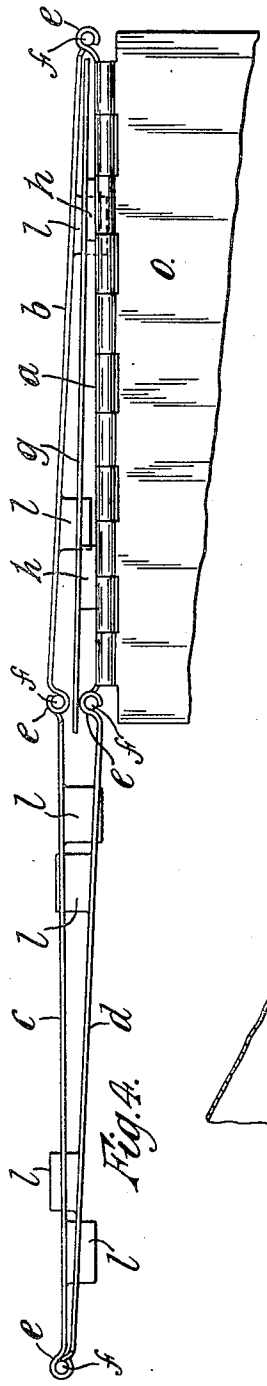


Fig. 4.

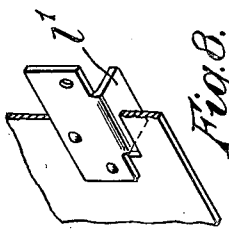


Fig. 8.

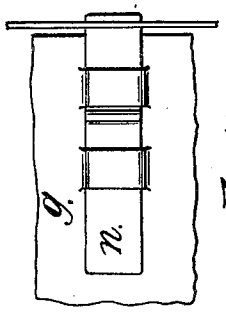


Fig. 7.

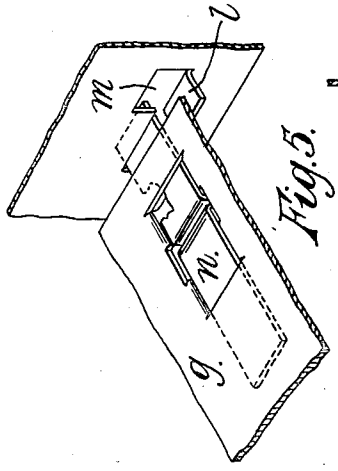


Fig. 5.

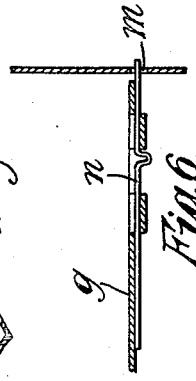


Fig. 6.

INVENTOR
JOHN T. SAYER
BY: Francis C. Boyce
ATTORNEY

Patented Apr. 24, 1951 2,550,088

UNITED STATES PATENT OFFICE

2,550,088

COLLAPSIBLE METAL BOX

John Thomas Sayer, Ifield, England, assignor to Sayer's Metal Products Limited, London, England

Application October 28, 1948, Serial No. 56,950
In Great Britain November 10, 1947

4 Claims. (Cl. 220—6)

1

This invention relates to collapsible metal boxes, usually of sheet metal, of the kind in which the four sides of the box are interhinged and the bottom is pivotally connected to, and can be folded upwards against, one of the sides, and pairs of adjoining sides can be collapsed together, the box passing from a rectangular configuration, through a lozenge configuration, into a flat condition.

The object of the invention is so to connect the bottom of the box pivotally to the respective side of the box, that when the bottom is folded upwards within the box, such folded-up bottom does not obstruct the box collapsing into a flat condition.

According to this invention the above object is achieved, in a collapsible metal box having interhinged sides and a bottom which is foldable upwardly within the box, by the hinge structure between the bottom and a side wall of the container. This hinge structure comprises tongues extending from a border of the bottom through elongated horizontally disposed slots adjacent the bottom edge of such side wall, which tongues are secured to an external horizontal rod, each horizontal slot extending, in at least one direction, sufficiently beyond the width of the tongue extending therethrough, as to permit lateral displacement of the bottom clear of the hinge of such side to the side of the box folding thereagainst when the box is collapsed. Such side, in folding, pushes the bottom to slide sideways to be clear of the hinge, whereas the opposite side, on unfolding, pushes the bottom back into a central position in the box.

In order that the box can be collapsed in either direction to bring alternative sides against the folded-up bottom, the transverse slots through which the tongues of the bottom extend, preferably extend in both directions beyond the widths of the tongues.

The bottom of the box when turned down, is supported on lugs protruding inwardly from the other three sides of the box to which the bottom is not pivotally connected. Transverse slots are provided in the sides into which these lugs enter when the box is collapsed into the flat condition.

The box is usually composed of sheet metal, but the components thereof may be metal castings.

The lugs may be formed by bending inwards a portion of the sheet metal cut to form each slot, the remainder of the sheet metal cut to form the slot being removed to provide clearance

2

for the entry of a lug of an opposite side when the box is collapsed flat.

A collapsible metal box, constructed in accordance with the invention, is shown, by way of example, in the accompanying drawings, in which:

Fig. 1 is a perspective view showing the box uncollapsed and with two sides partly broken away to expose the bottom to view.

Fig. 2 is a vertical section of the box in the uncollapsed condition.

Fig. 3 is a side elevation of the box collapsed with the lid partly broken away, and

Fig. 4 is a corresponding plan.

Fig. 5 is a fragmentary sectional perspective view,

Fig. 6 is a corresponding vertical section and

Fig. 7 is a corresponding inverted plan, showing a latch bolt holding down the bottom.

Fig. 8 is a perspective view of an alternative detail.

The box is composed of sheet metal.

The four sides *a, b, c, d*, Fig. 4, of the box are interhinged so that pairs of sides can be collapsed together, the box passing from the rectangular configuration shown in Fig. 1, through a lozenge configuration (not shown), into the flat condition shown in Figs. 3 and 4.

The hinges are formed by notching and bending the adjoining borders of the sides to form hinge sleeves *e* embracing hinge pins *f*, Fig. 4.

g is the bottom of the box. The bottom *g* is pivotally connected to the side *a*, so as to be capable of being alternatively folded up within the box against the side *a*, as shown in Figs. 3 and 4, or folded down so as to hold the sides *a, b, c, d* apart when unfolded to impart a rectangular configuration to the box, as shown in Figs. 1 and 2.

The bottom *g* is pivotally connected to the side *a* by tongues *h* on the bottom *g*, which extend through transverse slots *i* in the side *a*, and which, outside the box, are bent to form sleeves *j* which embrace and are clinched around the ends of an external transverse rod *k*, Figs. 1 and 3.

The external transverse rod *k* preferably, as shown, does not extend beyond the tongues *h*. Instead of a single rod *k*, each tongue *h* may embrace a separate short rod or pin to constitute a T head on the end thereof.

The sides of the box can be folded flat either as shown in Figs. 3 and 4, or in the reverse direction.

The slots *i* in the side *a* through which the

tongues *h* of the bottom *g* extend, extend on both sides of the tongues *h* sufficiently beyond the width of the tongues *h* to permit the bottom *g* of the box to be displaced sideways by the side *b* or the side *d* folding against the upturned bottom *g*, and so to be clear of the hinge of such side to the side *a*. When the sides are unfolded to impart the rectangular configuration to the box, the opposite side *d* or *b* in unfolding thrusts the bottom *g* back into its central position.

When down, the bottom *g* rests on lugs *l* protruding inwardly from the sides *b*, *c*, *d*.

These lugs *l* are formed by bending part of the metal cut to form transverse slots *m* in the sides *b*, *c*, *d*. These slots *m* are so mutually positioned and are of a length extending beyond the width of the lugs bent therefrom, as to receive the lugs *l* of opposed sides when folded thereagainst.

The lugs *l* of a side *b* or *d* folded against the side *a* enter the slots *i* thereof.

The lugs may alternatively be formed by pieces of sheet metal l^1 bent to L cross section and riveted on the respective sides as shown in Fig. 8.

Flat sliding latch bolts *n* entering the slots *m* in the sides *b*, *c*, *d*, and operated from the underside of the bottom *g*, are provided on the underside of the bottom *g*, to hold the bottom down.

o is a lid hinged to the top of the side *a*, the hinge being formed in the same manner as the hinges of the sides.

In the case of a shallow box of which the width of the bottom and lid is greater than the depth of the box, and which therefore if in one piece would project beyond the sides of the box when the box is collapsed, the bottom and lid may each be formed by two flaps, respectively pivotally connected and hinged to opposite sides of the box.

I claim:

1. In a collapsible box, vertical side walls of said box formed with elongated horizontally disposed slots adjacent their bottom edges and hinged together at their vertical edges, a bottom of said box foldable upwardly within said box about hinge elements disposed between one edge of said bottom and a bottom edge of one of the said side walls, said bottom hinge elements comprising tongues on one edge of said bottom and extending through said slots in said side wall, each said slot in said side wall extending in at least one direction beyond the width of the tongue extending therethrough, and a transverse rod external to said box and secured to each said tongue, and lugs protruding inwardly from the three other side walls adjacent their bottom edges at the level of said slots.

2. In a collapsible box, vertical side walls of said box formed with elongated horizontally disposed slots adjacent their bottom edges and hinged together at their vertical edges, a bottom of said box foldable upwardly within said box about hinge elements disposed between one edge of said bottom and a bottom edge of one of the said side walls, said bottom hinge elements comprising tongues on one edge of said bottom and extending through said slots in said side wall, each said slot in said side wall extending in both directions beyond the width of the tongue extending therethrough, and a transverse rod external to said box and secured to each said tongue, and lugs protruding inwardly from the three other side walls adjacent their bottom edges at the level of said slots.

3. In a collapsible metal box, vertical side walls of said box formed with horizontally disposed slots adjacent their bottom edges and hinged together at their vertical edges, a bottom of said box foldable upwardly within said box about hinge elements disposed between one edge of said bottom and a bottom edge of one of said side walls, said said bottom hinge elements comprising tongues on one edge of said bottom and extending through said elongated horizontally disposed slots in said side wall, each said slot in said side wall extending in at least one direction beyond the width of the tongue extending therethrough, and a transverse rod external to said box and secured to each said tongue, and lugs protruding inwardly from the three other side walls adjacent their bottom edges and consisting of inwardly bent portions of the metal cut to form said slots therein of less width than offset relatively to said slots.

4. In a collapsible metal box, vertical side walls of said box formed with horizontally disposed slots adjacent their bottom edges and hinged together at their vertical edges, a bottom of said box foldable upwardly within said box about hinge elements disposed between one edge of said bottom and a bottom edge of one of said side walls, said bottom hinge elements comprising tongues on one edge of said bottom and extending through said elongated horizontally disposed slots in said side wall, each said slot in said side wall extending in both directions beyond the width of the tongue extending therethrough, and a transverse rod external to said box and secured to each said tongue, and lugs protruding inwardly from the three other side walls adjacent their bottom edges and consisting of inwardly bent portions of the metal cut to form said slots therein of less width than and offset relatively to said slots.

JOHN THOMAS SAYER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,038,816	Arnold	Sept. 17, 1912
1,374,602	Panek	Apr. 12, 1921
1,620,585	Walther	Mar. 8, 1927
2,367,205	Cowen	Jan. 16, 1945

FOREIGN PATENTS

Number	Country	Date
177,430	Canada	June 5, 1917