

G. F. BEHRINGER.

STEEL BOX.

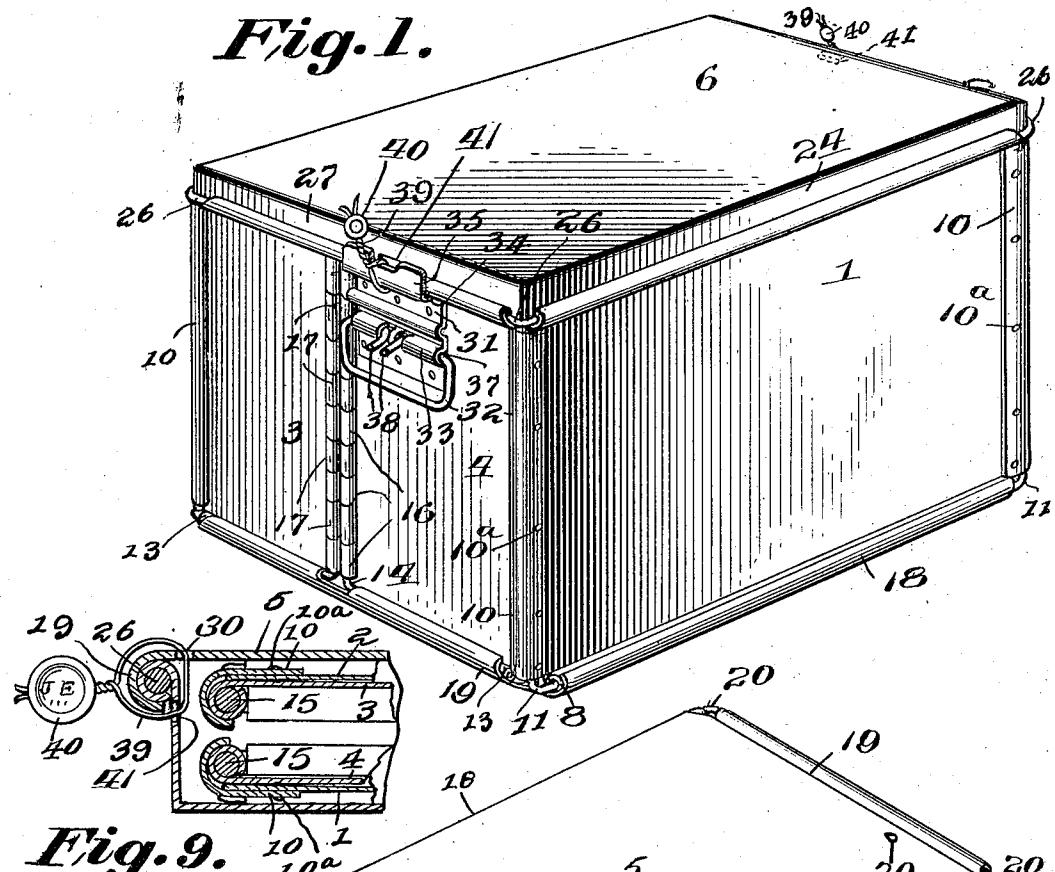
APPLICATION FILED JULY 7, 1915.

1,237,281.

Patented Aug. 21, 1917.

2 SHEETS—SHEET 1.

Fig. 1.



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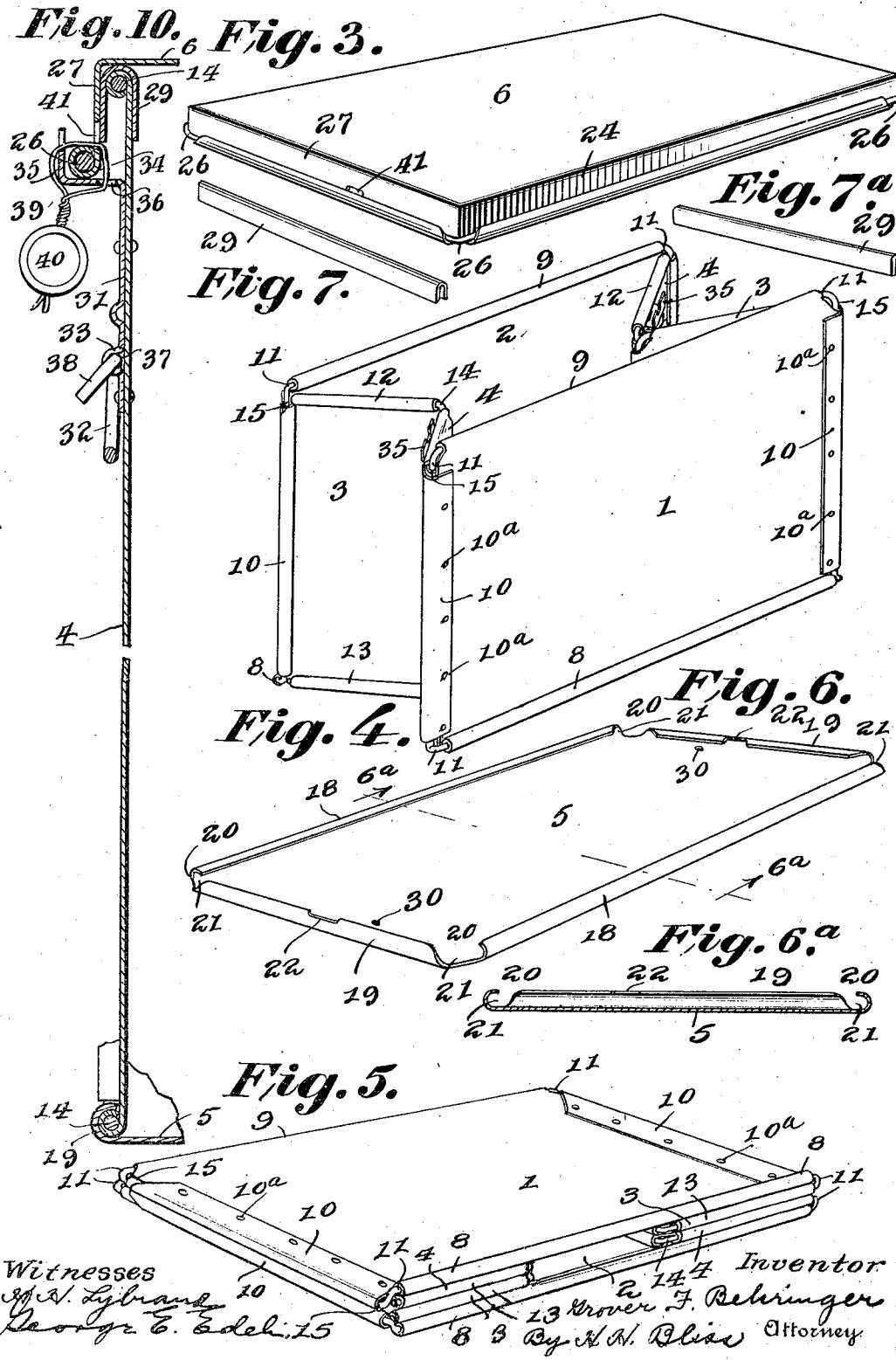
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UNITED STATES PATENT OFFICE.

GROVER F. BEHRINGER, OF DEFIANCE, OHIO, ASSIGNOR TO THE DEFIANCE PRESSED STEEL COMPANY, OF DEFIANCE, OHIO, A CORPORATION OF OHIO.

STEEL BOX.

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Specification of Letters Patent. Patented Aug. 21, 1917.

Application filed July 7, 1915. Serial No. 38,397.

To all whom it may concern:

Be it known that I, GROVER F. BEHRINGER, a citizen of the United States, residing at Defiance, in the county of Defiance and 5 State of Ohio, have invented certain new and useful Improvements in Steel Boxes, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to an improved sheet metal box. The object is to provide a box which will be simple in construction, composed of few parts strongly and firmly connected together and adapted to provide 15 a receptacle which can be used for holding a heavy content in transportation and then have its several parts arranged so compactly that they shall occupy but little space and can be economically sent by return freight 20 for later loads and shipments.

Figure 1 is a perspective view of a sheet metal box embodying my improvements, with the parts opened and secured together in box form;

25 Fig. 2 shows the parts of the box after being separated and then packed together in knock-down form;

Fig. 3 shows the parts in the relationship they are in Fig. 2, but in inverted position;

30 Fig. 4 is a perspective of the side walls and the ends of the box in the positions occupied when partly open;

Fig. 5 is a perspective of these parts when folded together;

35 Fig. 6 is a perspective of the bottom;

Fig. 6^a is a cross section on the line 6^a—6^a of Fig. 6;

40 Figs. 7 and 7^a are perspective views of the lock pieces that hold the end walls rigid when in open position;

Fig. 8 is a cross section on a larger scale, showing the parts in the positions occupied when disposed as in Fig. 2;

Figs. 9 and 10 show details.

45 The box is made with side walls 1 and 2 and with end walls each formed in halves or parts 3 and 4.

50 Each side wall is formed of a sheet of metal with beads 8, at the bottom, and 9 at the top. The beads tightly inclose the top bar and the bottom bar of the rectangular bead wire 11, the vertical legs of this wire not engaging with the sheet metal of the side walls.

Each section 3 of the end wall is formed 55 of a sheet of metal beaded at 12 at the top, at 13 at the bottom, and at 15 along the outer vertical side edge. At the inner vertical side edge the sheet is cut away to form a series of tongues which can be bent, as short 60 beads 16, around the vertical leg of the bead wire 14.

The sections or halves 4, 4 of the end walls are constructed to be substantially 65 similar to the sections 3, 3, they having, however, some additional details which will be referred to below.

The bead wires 14 for these end sections 3 and 4 are not complete rectangles, as are the wires 11 for the side walls, but are U-shaped, 70 the top and bottom end parts of each bead wire 14 terminating near the outer edge of the end metal and leaving the outer vertical bead 15 of each end section to serve as a hinge element.

75 The vertical legs of the wires 14 at the inner edges of the end sections 3 and 4 are hinged together by means of clips 17. Each clip is formed of a piece of sheet metal beaded at its edges to form two strong hinge tubes surrounding the adjacent bead wires 14, respectively. These hinge clips are of a length equal to the distance between each short bead section 16 and its neighbor. As many of these hinge clips are provided as 80 possible, four being shown in the construction in the drawings. They provide a strong 85 bracing hinge union which occupies but little space and has its parts so distributed as to resist wear.

90 These end halves or sections 3 and 4 are respectively joined to the side walls by means of the hinge elements 15, which closely encircle the vertical legs of the bead wires 11, but are loose enough to turn 95 around them. The hinging parts are reinforced and held in place, and the joints between the side walls and the end walls, at the corners of the box, are made tight and braced and strengthened by means of a supplemental strip 10. Each of these is riveted 100 to the side walls at 10^a and is beaded around the hinge bead 15 and around the vertical leg of the bead wire 11.

105 The hinging of the end sections 3 and 4 with each other and of each with an adjacent side wall permits movement sufficiently free to allow the end walls to be folded to-

gether and the side walls to be brought closely in parallelism with them, and with each other, as shown in Fig. 5.

The bottom of the box 5 is formed of a sheet of steel which, at its side edges, is curled up to make partially closed beads 18, and at the ends similar beads 19. The edges are not carried around to positions close to the flat parts of the sheet, but are left sufficiently open to provide one element of a sliding joint. The beads 18 and 19 are cut away at 20 so as to leave open spaces at 21. And the central parts of each of the beads 19 are cut away as shown at 22.

The cover of the box is indicated, as an entirety, by 6. It is bent to have vertical flanges 24 at the sides, and end flanges 27. These side and end flanges are tightly beaded around the rectangular wire 26 which encircles the cover. The cover is of such dimension as to fit snugly down, over the top parts of the side walls and end walls of the box.

When the parts of the box are to be opened and secured in their operative position the elements shown in Fig. 5 are placed edgewise on the bottom 5; and then the side walls 1 and 2 are separated, as shown in Fig. 4, the bottom beads 8 sliding outward on the top surface of the bottom and finally moving under the open beads 18, 18. As they get to their outermost position the sections or halves 3 and 4 of the end walls are brought to the same transverse planes and their bottom beads 13 fit under the in-turned parts of the beads 19, 19. The cutaways at 21 permit the outer portions of the end walls to not only swing but slide, slightly, as is necessary when they are coming to their final position.

To lock the end walls in alignment curved sheet lock pieces 29 are used which fit respectively over the beads 12, 12 at each end.

The cover 6 can then be applied by putting it into the position shown in Fig. 1.

Each of the end sections or halves 4, 4 is provided with a handle 32. Each handle is formed of wire bent to provide the hinging arms at 37 and outwardly turned stop lugs 38. The handle is held pivotally in place by means of a bracket 31, which is riveted to the wall section 4, and has hinge sleeves 33. The bracket is formed with a horizontal shoulder and a vertical flange 35. When the cover is in place its end bead fits snugly in the space provided by the shoulder 34 and flange 35, and all of the parts are thereby braced. 36 is an aperture through the metal of the bracket to receive a wire 39 for seal 40, and 41 is a corresponding aperture in the flange of the cover, the wire 39 passing through both the apertures and the seal attached to the wire.

When the package is used for transporting a body of contents from one point to

another, the parts are put and locked in the relative positions shown in Fig. 1 and above described. When it has reached its destination and the contents shipped therein have been removed, and it is to be returned, economy demands that when returned the cubic space occupied by the parts should be much less than that occupied by them when opened out in their operative relative positions.

For placing them compactly in reduced space the steps of the above series are reversed. The cover being removed, the lock bars 29, 29 are lifted from their positions on the beads 12, the end walls are turned inward at their central vertical lines, as shown in Fig. 4, and the side walls and ends are brought together, as in Fig. 5.

The cover 6 is then inverted, and the parts shown in Fig. 5 are laid down therein, flat-wise.

Then the bottom 5 is also inverted and slipped longitudinally over the cover 6 and its contents. The beads 18, 18 engage with the beaded edges of the cover in the way shown in Fig. 5, the bottom and the cover being shown in Fig. 8 as inverted.

The cover being necessarily somewhat longer than the bottom, the latter does not entirely register with it throughout. But it covers enough of the area to firmly lock the contents from escape. 30 indicates an aperture in the bottom for the sealing wire. When the cover and the wire are brought together in the way shown in Figs. 2, 3, and 9 the apertures 30 and 41 register in such way that the latter can be used as well for sealing the parts when in the "knock-down" position as it can when they are extended or opened out to form the box.

A seal can be used at each end of the box when its parts are extended, there being an aperture 41 in each of the end flanges 27 of the cover and there being a handle bracket 31 on each of the end sections 4, and each bracket having an aperture 36 for the seal wire. When the box is being returned in "knock-down" condition it is not necessary to have more than a single seal.

What I claim is:

1. A collapsible box having three unitary separable elements, namely a bottom, a cover and an intermediate structure with two integral side walls and two end walls, each end wall being formed in two sections hinged together, said intermediate structure adapted to be folded into the space inclosed by the cover, and the bottom being adapted to move longitudinally across the bottom edge of the cover and having sliding engagement therewith.

2. A collapsible box comprising three unitary elements, a bottom; a cover, and an intermediate structure having two integral side walls, and two end walls each formed

in two sections hinged together at their central vertical lines, and grooved lock bars for engaging with the top edges of the end sections and holding them rigidly in alinement, 5 the intermediate structure having all of its parts foldable to lie within the cover, and the bottom being adapted to detachably engage with the cover to retain the folding intermediate structure therein.

10 3. A collapsible box formed of sheet metal having the three unitary elements, to wit, the bottom, a cover and an intermediate structure formed with two integral side walls, and the two end walls each formed in 15 two sections hinged together at a midway vertical line, the parts of said intermediate structure being adapted to be folded together as described and fitted into the cover, the said bottom detachably engaging with 20 the cover, and the cover and bottom being provided with seal wire retaining devices, substantially as set forth.

4. A sheet steel collapsible box comprising the three unitary elements, to wit, the bottom, the cover and the intermediate structure having the two continuous side walls, and the two end walls each formed in two sections hinged together on a vertical line intermediate of their outermost edges, said 30 bottom having at its edges beads or up-curved parts adapted to permit bottom beads on the sides and ends of the intermediate structure to be bodily moved outward into engagement with the bottom beads, and means for locking the walls of 35 the intermediate structure in engagement with the beads on the bottom.

5. A collapsible sheet steel box having the three elements, to wit, the bottom, the 40 cover and the intermediate structure formed with continuous side walls and with end walls each formed in two sections hinged together on a vertical axis, said bottom having at its side edges and end edges upward 45 and inward curved open beads and the intermediate structure having around the bottom edges of its sides and ends beads or projections adapted to be bodily moved out-

ward into engagement with the beads on the bottom. 50

6. A collapsible sheet steel box having the three unitary elements, to wit, the bottom, the cover and the intermediate structure formed with the side walls extending continuously from end to end and the end 55 walls each formed in two sections hinged together on a vertical axis, said side walls and end walls having outwardly extending bead-like projections, and said bottom having inwardly turned beads or projections at the side edges and end edges which are shaped as described to provide clearance spaces at the corners of the bottom to permit the outward and inward movements of the corner parts of the intermediate structure as the 60 side walls and end walls are moved horizontally relatively to the edge projections on the bottom.

7. A collapsible sheet steel box having the three main elements described, to wit, the bottom, the cover and the intermediate structure formed with the side walls each having a rectangular bead wire and a sheet of metal beaded at its upper and lower edges around the horizontal parts of said 70 wire, and the end walls each formed in two parts hinged together at a vertical axis and each end section having a U-shaped bead wire and a sheet of metal beaded at its top and bottom to the end arms of the bead 75 wire and its inner edge beaded to the intermediate part of the bead wire, the outer vertical edge of the sheet metal being beaded to the vertical part of one of the side walls, and the closing and bracing strips 80 one at each corner of the box rigidly secured to the side walls and beaded around the bead of the end wall and around the bead wire of the side wall. 85

In testimony whereof, I affix my signature, in presence of two witnesses. 90

GROVER F. BEHRINGER.

Witnesses:

DEY AYERS,
ELMER SPAHR.