W. J. ROUSE.

FOLDING SHEET METAL BOX.

APPLICATION FILED SEPT. 17, 1913.

1,164,755.

Patented Dec. 21, 1915.

3 SHEETS—SHEET 1.

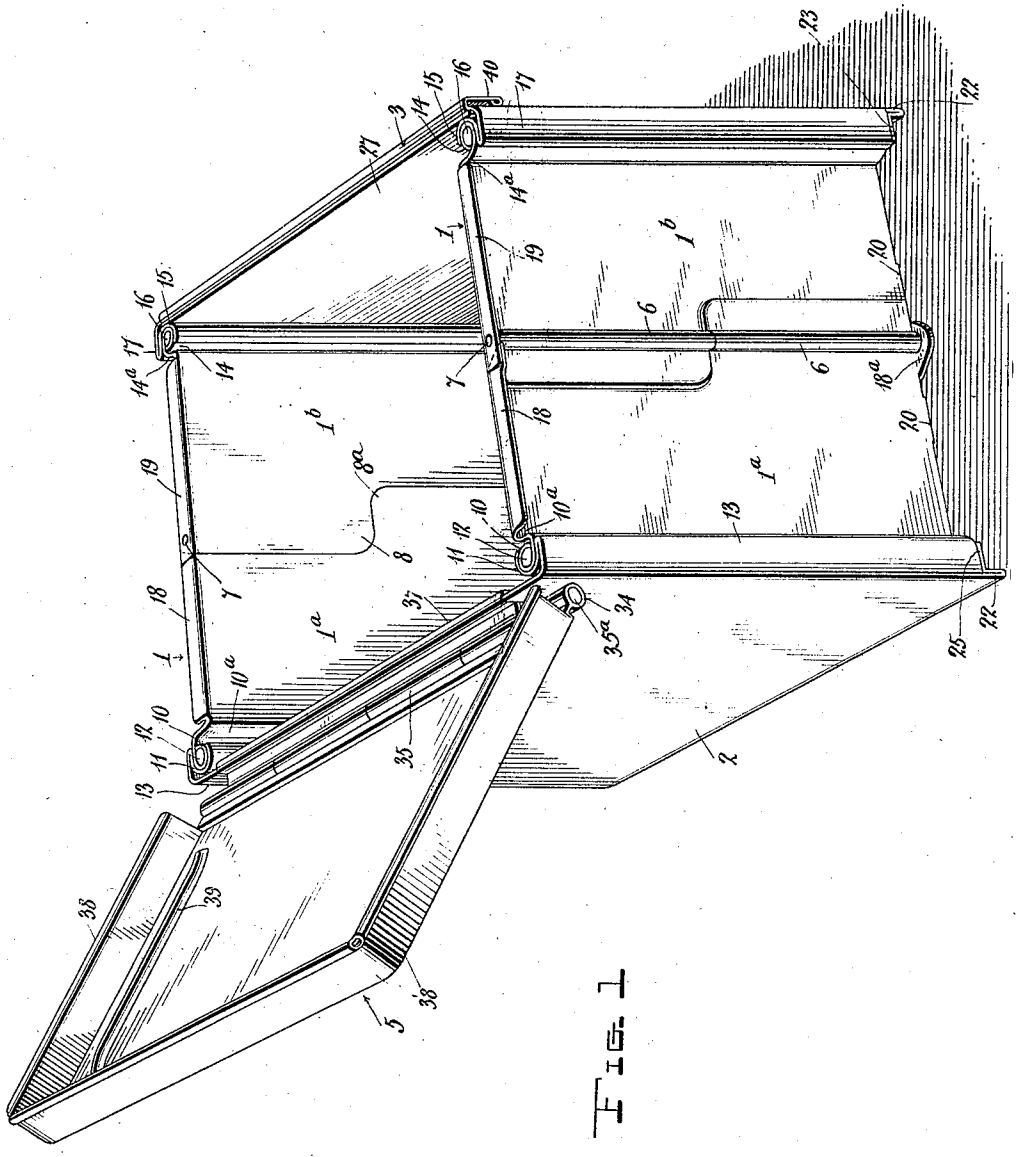


FIG. 1

Witnesses

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3 SHEETS—SHEET 2.

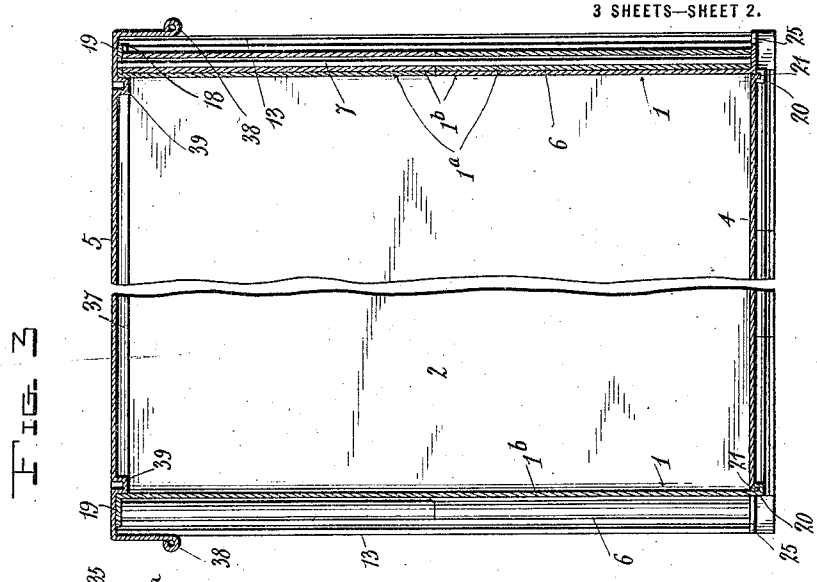


FIG. 3

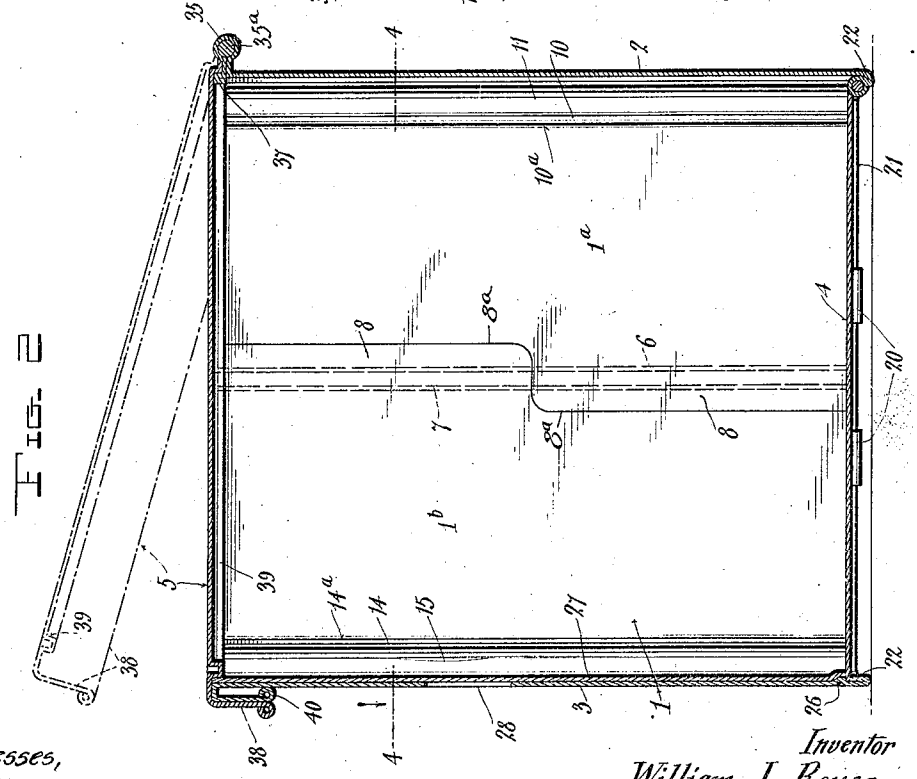


FIG. 2

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3 SHEETS—SHEET 3.

FIG. 5

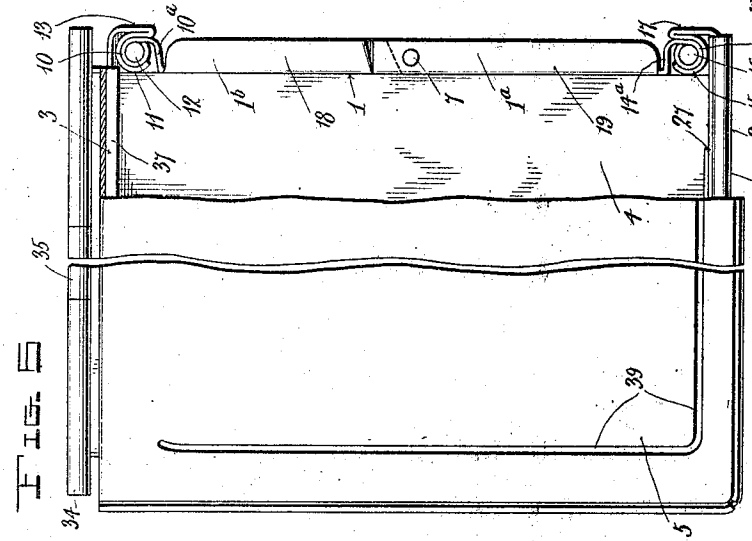


FIG. 6

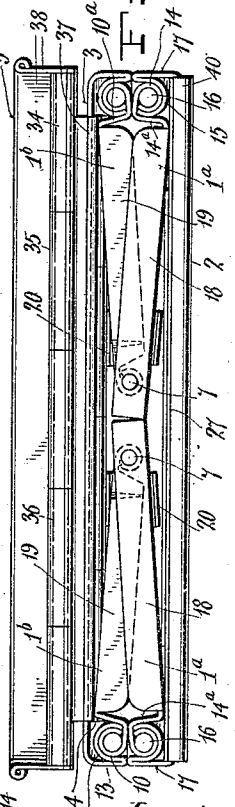
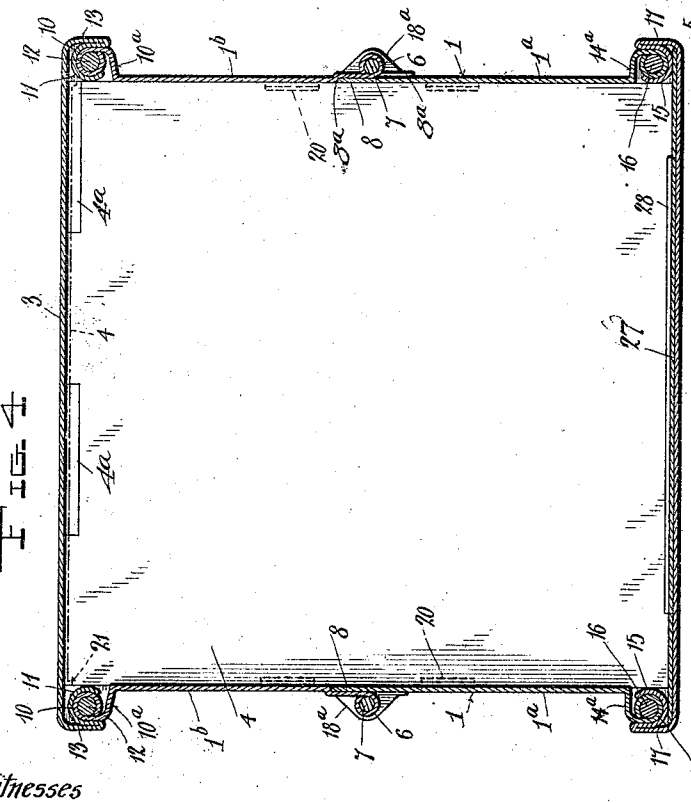


FIG. 4



Witnesses

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UNITED STATES PATENT OFFICE.

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FOLDING SHEET-METAL BOX.

1,164,755. Specification of Letters Patent. Patented Dec. 21, 1915.

Application filed September 17, 1913. Serial No. 790,321.

To all whom it may concern:

Be it known that I, WILLIAM J. ROUSE, a citizen of the United States, residing at Williamsport, in the county of Lycoming and State of Pennsylvania, have invented new and useful Improvements in Folding Sheet-Metal Boxes, of which the following is a specification.

This invention relates to improvements in folding sheet metal boxes and the object of the invention is to provide a box which is especially adapted as a container for perishable goods, in that its contents are well protected against moisture, dust, or vermin; which is strongly constructed in order that it may not be detrimentally affected by rough usage or by packing for transportation; and which is of relatively light character and may be compactly folded, thereby achieving an economy in transportation and storage.

The features of improvement are disclosed in connection with a box which embodies side walls made in sections, hingedly connected to one another on a vertical axis, and respectively hingedly connected to the front and rear walls on vertical axes, a top wall hingedly connected at the upper end of the rear wall, a foldable hingedly connected bottom, and a front wall.

The invention consists of certain details of construction, the nature and purpose of which will appear as the description proceeds, and which will be succinctly pointed out in the appended claims.

A box in which the features of invention are incorporated is illustrated in the accompanying drawings, wherein:—

Figure 1 is a perspective view of the improved box set up for use; Fig. 2 is a vertical sectional view in a plane parallel to the plane of the side walls: Fig. 3 is a vertical sectional view in a transverse plane; Fig. 4 is a horizontal sectional view on the line 4—4 of Fig. 2: Fig. 5 is a top plan view, the lid or cover being partly broken away to more clearly expose the construction of the hinge joints at one side of the box; Fig. 6 is a plan view showing the box collapsed as for transportation or storage.

Similar characters of reference designate corresponding parts throughout the several views.

The box comprises side walls 1, a rear wall 2, a front wall 3, a bottom 4, and a top 5. The side walls 1 are each made in sections, the section 1^a being located adjacent the rear wall 2 and the section 1^b being located adjacent the front wall 3. The sections 1^a and 1^b are hingedly connected to one another and are respectively hingedly connected to the rear wall 2 and the front wall 3. The bottom 4 is hinged at its rear edge as at 4^a to the lower extremity of the rear wall, and the top 5 is hinged at its rear edge to the upper extremity of the rear wall. When the box is set up for use, the sections 1^a and 1^b of each side wall occupy a common plane. When the box is collapsed, the sections 1^a and 1^b of each side wall lie in substantially parallel relation, being folded inwardly against one another. The bottom is folded between the sections 1^a and the rear wall, and the top is folded against the rear wall.

The hinge connection between the sections 1^a and 1^b includes beads 6 provided at relatively opposite ends of said respective sections and of substantially half their depth, and a hinge pin 7 engaged through said beads. Each section 1^a and 1^b, beyond its bead 6, is provided with a substantially co-planar extension 8. These extensions engage the inner faces of the adjoining sections when the box is set up, thereby limiting the outward movement of said sections and insuring their co-planar relation. The extensions 8 are substantially half of the depth of the sections of which they form parts and immediately adjoin the beads 6 of said sections. By virtue of these relations each bead 6 immediately adjoins the other bead and each extension 8 immediately adjoins the other extension. Each of the sections 1^a and 1^b is provided with a shallow recess 8^a which conforms to the shape of the extension 8 of the adjoining section and in which said extension is received when the sections are in co-planar relation, the recesses 8^a thus permitting the extensions to come flush with the inner faces of the sections and avoiding any interruption of the regularity of the inner face of the side walls. The hinge joint described is of advantage in that it has great strength and furnishes a dust and vermin proof connection between the sections 1^a and 1^b in any position thereof, and thereby not only protects the contents of the box when the box is in use, but when the box is collapsed for shipment or storage, prevents dust from passing between

the sections 1^a and 1^b, and thereby insures that the box will remain clean and in sanitary condition.

The hinge connection between the sections 1^a and the rear wall 2 includes intermatching beads 10 and 11 on said sections and rear wall respectively, and a reinforcing pin 12 engaged through the bead 10, which latter fits within the bead 11. The proper relation of the sections 1^a and the rear wall, when the box is set up, is insured by the use of flanges 13, provided upon one of the companion hinged parts and overlying the other. In the embodiment shown, the flanges 13 are provided at the side edges of the rear wall 2 and are inturned at right angles to said rear wall. The flanges 13 are of multi-ply construction and are formed by doubling over inturned side edge portions of the rear wall. The beads 11 are formed as marginal projections on the under-turned or underlying portions of the flanges 13, and the hinge joints proper are located adjacent the angles formed by the flanges 13 and the rear walls. The beads 10 are formed on laterally and outwardly directed flanges 10^a which have the same width as a diameter of the adjacent hinge joint, and, together with the adjoining parallel portion of the rear wall, form an offset pocket in which the hinge joint is located. The advantages of the hinge connection described between the sections 1^a and the rear wall, aside from its positively insuring the proper relation of said sections and wall when the box is set up, are that it has great strength, substantially reinforcing the box at the places where it is applied, and, except as to the hinge pin, being integral with the walls of the box; is inclosed and yet does not project into the storage space of the box; and is of dust and vermin proof character, in the folded as well as in the extended relation of the box.

The hinge joints between the sections 1^b and the front wall 3 may be, and preferably are, similar to the hinge joints described between the sections 1^a and the rear wall 2, and include intermatching hinge beads 14 and 15 provided on said sections 1^b and front wall 3 respectively, reinforcing pins 16 engaged through said beads 14, the latter fitting within the beads 15, flanges 14^a similar to the flanges 10^a and provided with the hinge beads 14, and flanges 17 similar to the flanges 13 and provided with the hinge beads 15.

The sections 1^a and 1^b are preferably provided at their upper edges with out-turned flanges 18 and 19 respectively, the flanges 19 forming bearings for the upper ends of the hinge pins 7 and being extended beyond said hinge pins so as to overlie the adjacent end portions of the flanges 18. In this way, when the sections 1^a and 1^b are extended, the flanges 18 and 19 are substantially flush and present the appearance of a continuous uninterrupted flange. The sections 1^a are provided at their lower edges with out-turned flanges or lugs 18^a which form bearings for the lower ends of the hinge pins 7, in this function complementing the flanges 19, as is obvious. The sections 1^a and 1^b are preferably provided at their lower edges with inturned vertical flanges 20 which define alining channels. The bottom 4 is hingedly connected at its rear edge to the lower edge of the rear wall 2 and is provided at its sides with depending flanges 21 for engagement in the flanges 20 when the box is set up, the flanges 21, by virtue of such engagement, positively locking the lower portions of the side walls against inward displacement.

The rear and front walls 2 and 3 are provided at their lower ends with shelf engaging flanges 22. The flange 22 of the front wall is formed to support the front edge portion of the bottom 4 and is provided at its ends with inwardly projecting horizontal extensions 23 which form bearings for the pins 16 of the adjacent hinge connections between the front wall and the side wall sections 1^b and which also close the lower ends of said hinge connections, thus preventing dust or vermin from penetrating the same. The flange 22 of the rear wall is utilized as a part of the hinge joint between the rear wall and the bottom and is formed at its ends with inwardly projecting horizontal extensions 25 which provide bearings for the pins 12 of the adjacent hinge connections between the rear wall and the side wall sections 1^a and which also close the lower ends of said hinge connections.

The front wall 3 is provided near its lower edge with an internal bead 26 to engage over the front edge of the bottom 4 and thereby prevent any upward displacement of said bottom. The bead 26 is of relatively slight depth and when the bottom is moved to its lowermost position, its front edge springs or snaps over said bead, as is obvious. If desired, in addition to the bead 26, a plate 27 may be used to positively hold the bottom against upward displacement. The plate 27 fits against the inner face of the front wall, its side edge portions engaging frictionally between the front wall and the hinge beads 15 and its lower edge engaging over the bottom 4. The plate 27 may also be utilized as a name plate, having provided or otherwise formed thereon a designation of the trade name of the contents of the box, which is visible through an opening 28 in the front wall.

The hinge joint between the top 5 and the rear wall 2 includes intermatching hinge beads 34 and 35 provided on said top and rear wall respectively, and a hinge pin 35^a engaging through said beads. The beads 35 are formed to stand out beyond the rear wall

2, the latter for this purpose having a rearwardly directed crimped projection 36 of which the beads 35 form a part. The projection 36 is preferably located slightly below the upper edge of the wall 3 and at said upper edge an inwardly directed angular flange 37 is provided. The flange 37 serves a number of purposes, strengthening the hinge joint between the top and the front wall; forming a rest for the rear portion of the top when the latter is closed; and coacting with the top to prevent dust and vermin from entering the box between said top and the upper edge of the rear wall.

The top 5 is formed at its side and front edges with depending flanges 38 and inwardly of said side and front edges with stamped projections 39 arranged parallel to the flanges 38 and forming therewith channels adjacent the inner face of the top. The front wall is provided with an out-turned flange 40. The upper flanges 18 and 19 of the side walls and the flange 40 of the front wall engage in the channels defined by the flanges 38 and projections 39 and in this way dust and vermin proof joints are formed between the top of the box and the upper edges of the front and side walls. The engagement of the flanges 18 and 19 in the channels aforesaid is effective to lock the side walls against inward displacement at their upper ends in the same way that the engagement of the bottom flanges 21 in the channels 20 is effective to lock the side walls against inward displacement at their upper ends.

The vertical hinge joints between the sections of the side walls and between the side walls and front and rear walls, aside from their intrinsic advantages previously referred to, enable the box to be very compactly folded, as shown in Fig. 6. The flanges 13 and 17 are preferably provided on the rear and front walls respectively, since by this arrangement said flanges abut when the box is collapsed and prevent any inward movement beyond a certain point, in this way protecting the joints against stresses and insuring that the boxes having the same dimensions shall be folded to the same extent. Consequently, the boxes may be evenly nested for shipping or storing, and when nested, each individual box is strongly braced against the weight superimposed thereon by the flanges 17 and 13 having the abutting co-planar relation shown in Fig. 6. The provision of the flanges 18 and 19 at the upper edges of the side walls in no way interferes with the compactness of the box when it is in folded relation, since at such time, as clearly shown in Fig. 6, the flanges 18 engage or nest under the flanges 19, the resiliency of the metal being sufficient to provide for this relation.

To promote clearness of illustration, the dimensions of the hinge beads 10 and 11 and 14 and 15 relative to the walls of the box have been somewhat exaggerated in the drawings. In practice these beads will be of substantially shorter relative diameter and the side wall sections will have a more nearly parallel relation than is shown in Fig. 6.

While the features of improvement have been described in connection with a folding box, it will be understood that such description imports no limitation as to their practical application, since they may be applied to structures, which while having the general characteristics of a box, are not strictly designated by such term, *e. g.* structures which have no lids, such as folding sheet metal crates or baskets.

Having fully described my invention, I claim:

1. In a folding box, side walls composed of sections, each having a single hinge bead adjacent its outer face and extending along one half of its inner edge and having a single co-planar marginal extension extending along the other half of its inner edge, the hinge bead of one section immediately adjoining and alining with the hinge bead of the other section and the extension of one section immediately adjoining the extension of the other section, and a hinge pin engaged through said beads, the marginal extension of each section engaging against the inner face of the other section in the extended relation of said section.

2. In a folding box, companion hingedly connected angularly disposed walls, one of which is provided with an inturned flange doubled upon itself and having a hinge bead projecting beyond the edge of its under-turned portion and the other of which is provided with a marginal hinge bead to conformably fit within said first named hinge bead, one of said walls having an outwardly directed flange carrying the hinge bead thereof and parallel to the other wall, said flange providing a pocket internal to the box in which the hinge joint is disposed.

3. In a folding box, side walls formed in hingedly connected inwardly folding sections, a front wall and a rear wall, the front and rear walls being provided at each of their side edges with an inturned flange doubled upon itself and having a hinge bead projecting from its under-turned portion, said side walls having their end edges each bent outwardly at an angle and provided with a marginal hinge bead to conformably fit within one of said first named hinge beads.

4. In a folding box, side walls formed in hingedly connected inwardly folding sections, a front wall and a rear wall, the front and rear walls being provided at each of their side edges with an inturned flange doubled upon itself and having a hinge bead

projecting from its under-turned portion, and the side walls being provided at each of their front and rear edges with out-turned vertical flanges lying, when the box is set up, substantially parallel to the front and rear walls and formed with hinge beads to conformably fit within said first named hinge beads.

5. In a folding box, a rear wall having a crimped outstanding horizontal projection substantially adjacent its upper edge and formed by bending the upper edge portion of said wall angularly and doubling the bent portion upon itself, a top, and a hinge connection between the marginal portion of the projection and said top, the portion of the top adjacent said hinge connection engaging upon said projection when the top is in its closed position.

6. In a folding box, a rear wall having a crimped outstanding horizontal projection substantially adjacent its upper edge and formed by bending the upper edge portion of said wall angularly and doubling the bent portion upon itself, a top, and a hinge connection between the marginal portion of the projection and said top, the said projection being formed with an upwardly extending flange in the plane of the rear wall and the portion of the top adjacent said hinge connection resting upon said flange and said projection when the top is in its closed position.

7. In a folding box, side walls made in hingedly connected sections, a front wall, a rear wall, the front and rear walls having inturned flanges at their side edges, and the flanges being doubled upon themselves, and hinge connections between the sections of the side walls and the under-turned portions of said flanges, said flanges being externally adjacent the side walls.

8. In a folding box, side walls made in hingedly connected sections, a front wall, a rear wall, the front and rear walls having inturned flanges at their side edges, and the flanges being doubled upon themselves, and hinge connections between the sections of the side walls and the under-turned portions of said flanges, said connections including interengaging hinge beads formed on said sections and flanges respectively, said flanges being externally adjacent the side walls.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM J. ROUSE.

Witnesses:
LULU W. CLARK,
WM. H. SCOTT.