F. W. KEITH.

KNOCKDOWN BOX.

APPLICATION FILED NOV. 18, 1912.

1,159,229.

Patented Nov. 2, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

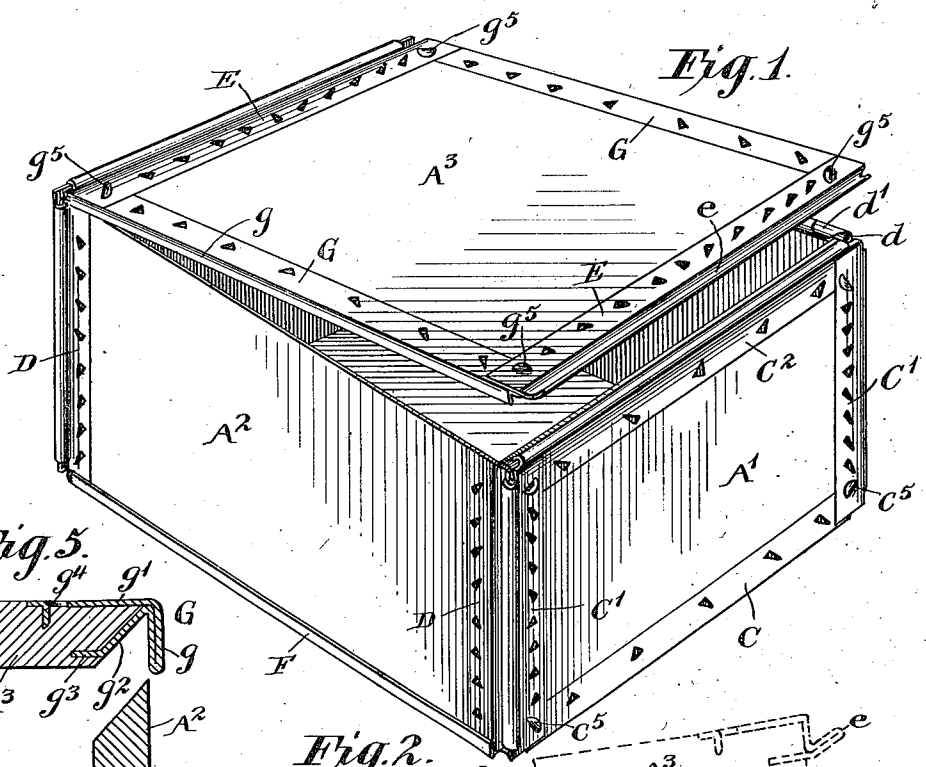


Fig. 5.

Fig. 2.

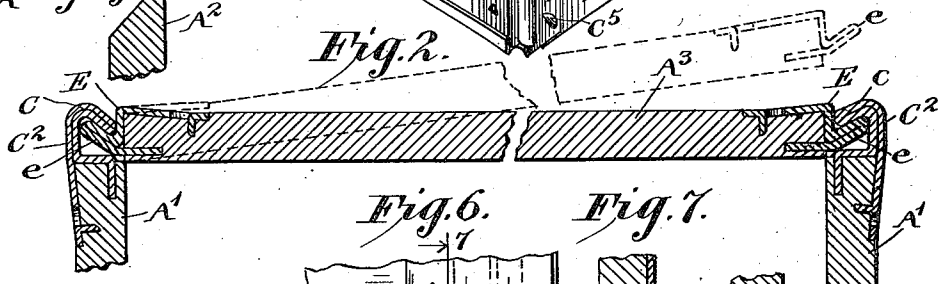


Fig. 6.

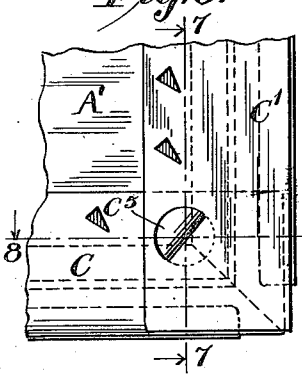


Fig. 7.

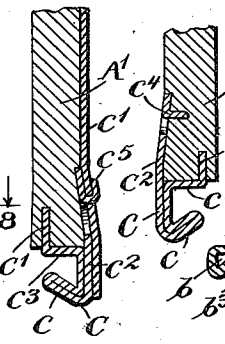


Fig. 4.



Fig. 3.

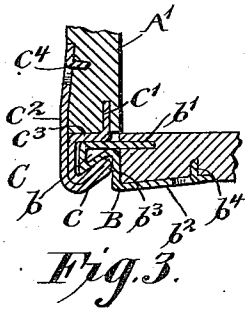
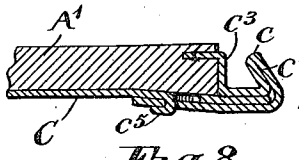


Fig. 8.



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2 SHEETS—SHEET 2.

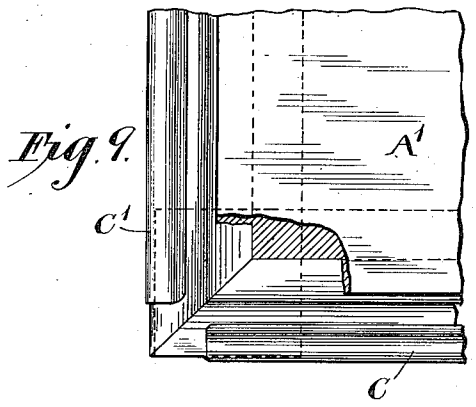


Fig. 9.

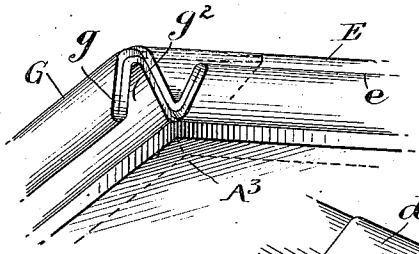


Fig. 10.

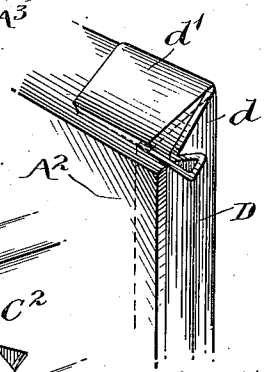


Fig. 11.

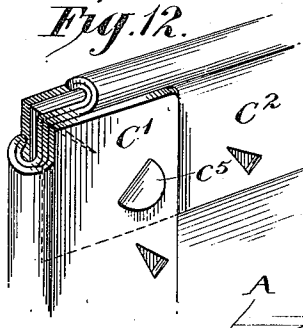


Fig. 12.

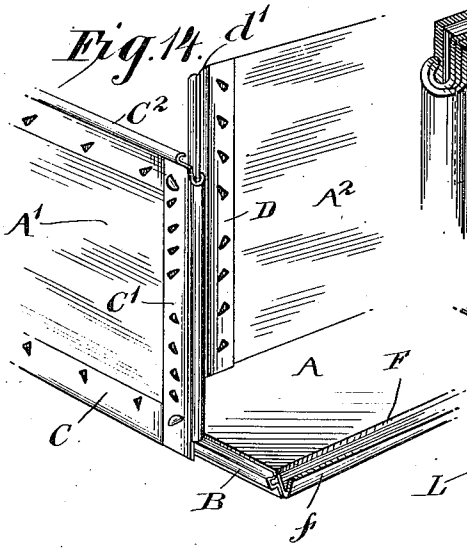


Fig. 14.

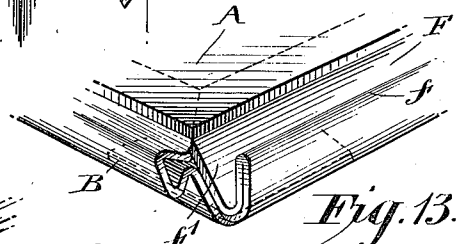


Fig. 13.

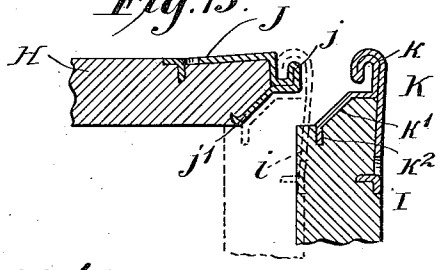


Fig. 15.

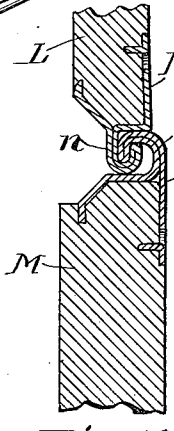


Fig. 16.

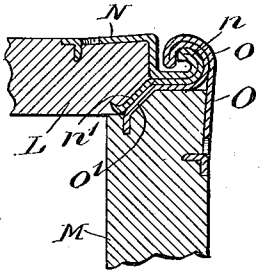


Fig. 17.

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FRED WILDER KEITH, OF CHICAGO, ILLINOIS.

KNOCKDOWN BOX.

1,159,229. Specification of Letters Patent. Patented Nov. 2, 1915.

Application filed November 18, 1912. Serial No. 731,983.

To all whom it may concern:

Be it known that I, FRED WILDER KEITH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Knockdown Boxes, of which the following is a specification.

This invention relates to improvements in separable or knock-down wooden boxes and more particularly to means for providing separable metallic joints for the meeting edges of the walls of such boxes.

The invention consists in the matters hereinafter described and pointed out in the appended claims.

In the drawings illustrating my invention:—Figure 1 is a perspective view of a box embodying my invention. Fig. 2 is a vertical section on an enlarged scale of the box shown in Fig. 1, showing the two joints between the upper margins of the end walls and the top wall of the box. Fig. 3 is a like enlarged sectional view of the joint between one of the end walls and the bottom wall of the box. Fig. 4 is a view of the meeting margins of the end and bottom walls as illustrated in Fig. 3, separated from each other. Fig. 5 is a sectional view of the meeting edges of one of the side walls and the top wall of the box, separated from each other. Fig. 6 is a detail side elevation of one corner of the end wall of the box. Fig. 7 is a sectional view of the same, taken upon line 7—7 of Fig. 6. Fig. 8 is a section of the same, taken upon line 8—8 of Fig. 6. Fig. 9 is a view showing the inner face of one corner of the end wall of the box. Fig. 10 is a perspective view of one corner of the top wall of the box. Fig. 11 is a perspective view of one of the upper corners of the side wall of the box. Fig. 12 is a perspective view, as seen from the outside of one of the upper corners of the end wall of the box. Fig. 13 is a perspective view of one corner of the bottom wall of the box. Fig. 14 is a perspective view of one corner of the box shown in Fig. 1, illustrating the method of assembling the bottom, end and side walls. Fig. 15 is a sectional view of the meeting edges of two of the two box walls showing a modified construction in the joint strips. Figs. 16 and 17 are like sectional views illustrating still another modification of the joint strips.

As shown in said drawings, A indicates the bottom, A^1 A^1 the end walls, A^2 A^2 the side walls, and A^3 the top wall of a wooden knock-down box. The bottom A is provided at its ends with sheet metal joint strips B B. The ends A^1 A^1 are provided with bottom joint strips C C adapted to interlock with the strips B B and have lateral joint strips C^1 C^1, and a top joint strip C^2. The sides A^2 A^2 have end joint strips D D adapted to interlock with the joint strips C^1 C^1. The top A^3 is provided at its ends with joint strips E E adapted to interlock with the joint strips C^2 C^2. The bottom A is provided at its side margins with joint strips F F forming grooves to receive the lower margins of the side walls, and the top A^3 has like joint strips G G forming grooves to receive the upper margins of the said side walls. Said joint strips are made of folded strips of sheet metal, the marginal parts of which embrace the margins of the wooden parts or walls to which they are attached and have clamping engagement with the same, while their central parts are folded upon each other and shaped to form flanges which project from the edges of the walls and are adapted for interfitting or interlocking engagement with each other, except at the side edges of the bottom and top walls where the flanges on said joint strips form grooves to receive the said upper and lower margins of the side walls.

The construction of the joint strips by which the bottom, side and end walls are united with each other is shown in section in Figs. 3 and 4, in connection with the joint strips B and C, by which the lower edge of the end wall is joined to the adjacent end margin of the bottom wall. The said strips B and C are folded along their central parts to form double-thick flanges *b c* that project from the edges of the wall to which the strips are attached, while the marginal parts of the strips are arranged to embrace the marginal parts of the wall and have clamping engagement therewith. In the case of the strip B, the folded flange *b* is hollow and of dove-tail shape and its marginal part b^1 adjacent to the inner face of the wall A is inserted in a slit or groove extending inwardly from the edge of the wall parallel with its inner face, while the exterior marginal part b^2 of the strip extends over the outer face of the wall A, and its free edge is depressed or indented into the wood so as to

bring said marginal part b^2 into convergent relation with the part b^1 thereby affording a firm clamping engagement of the parts b^1 b^2 with the part of the wall between them. The hollow flange b is located adjacent to the inner face of the wall A, and the inner fold of the metal forming it is parallel with the inner face of the wall and preferably in line with the marginal part b^1 of the strip B. The outer fold of said flange b is obliquely arranged, so as to give dove-tail shape to the flange. The outer marginal part b^2 of the strip B is united with the exterior folded part of the flange b at the base of the latter by means of a transversely extending part b^3 which overlies the end surface of the wall A and merges into the said outer marginal part b^2 by a right angled bend. As a further means of securely fastening the joint strip to the wall, the strip is shown as provided in its outer marginal part b^2 with the inwardly bent prongs, cut from the sheet metal, as shown at b^4 in Figs. 3 and 4. In the case of the joint strip C, its folded part constituting the flange c is bent into hook-form to constitute an inwardly facing dove-tail groove adapted to receive the dove-tail flange b of the joint strip B. Said strip C has its inner and outer marginal parts c^1 c^2 arranged in the same manner as the corresponding parts b^1 b^2 of the joint strip B. The flange c of the strip C is formed by the central part of the strip, which is folded together to give a double thickness of metal in the flange. Said flange is arranged adjacent to the outer face of the end wall A^1 and its inner fold is connected with the marginal part c^1 by a transversely bent or extending part c^3 which rests against the edge of the end wall. The outer edge of the flange c is bent inwardly into oblique relation to the plane of the wall, and forms with the transversely extending part c^3 of the strip, a groove of dove-tailed form adapted to receive the correspondingly shaped flange b. The outer marginal part c^2 of said joint strip C is, moreover, provided with holding prongs c^4 cut from the said part and extending into the wall in the same manner as in the case of the joint strip B.

When the parts are interlocked by the engagement of the flange b with the groove formed by the flange c, said flange b overlaps the margin of the end wall and bears at its inner face against the part c^3 of the strip C, while the hooked marginal part of the flange c extends into bearing contact with the transverse part b^3 of the strip B. The interlocking parts of joint strips are thus brought substantially within the planes of the outer faces of the box walls, and the joints are made without any parts which project outside of the outer surfaces of the box.

The folded parts of the joint strips which constitute the interlocking flanges, are made with a minimum number of bends in their folded parts, while said folded parts are relatively narrow, so that the marginal parts of the strips are held from spreading apart and will firmly hold or clamp the margins of the wooden walls, while the flanges themselves are made stiff or rigid and are, therefore, adapted to retain the form originally given them by the machine used in their manufacture and will always accurately fit each other in assembling the box. The strips will, therefore, be strongly and firmly secured to the box walls while at the same time very strong joints are formed between said walls.

By arranging the interlocking flanges in the manner above described, and by inserting the inner margins of the joint strips in slits or grooves in the walls, so that the inner margins are covered by the parts of the walls which extend over the inserted margins of the strips, a construction is provided by which the inner marginal parts of the wooden walls meet each other, this construction having the advantage that the box has a continuous interior surface of wood for contact with the contents of the box, so that, if the box be used for fruit or other commodity liable to corrode the metal strips, the contents of the box will be prevented from coming in contact with any part of said strips.

The lateral joint strips C^1 C^1 and the top joint strips C^2 on the end walls A^1 A^1 are made like the joint strips C, while the end joint strips D D on the side walls A^2 are like the joint strips B B on the ends of the bottom wall. The bottom and side walls of the box thus constructed will be joined to the end wall by slipping the locking flanges on the ends of the bottom wall into engagement with the corresponding flanges of the bottom strips C C of the end wall, and by likewise inserting the locking flanges on the ends of the side walls into engagement with the corresponding flanges on the lateral margins of the end walls.

The meeting margins of the side walls, bottom wall and top wall are mitered or beveled at their meeting edges, as clearly seen in Fig. 5. By this construction, said bottom, side and top walls are held by their engagement with each other in proper relative position or from sliding on the end wall. That is to say, assuming the bottom wall to be first connected with the end walls, and the side walls then inserted into place, the engagement of the mitered meeting edges of the bottom and side walls will result in holding said bottom wall from sidewise movement and in holding the side walls from slipping downwardly past the edges of the bottom wall. The method of assembling the parts is clearly illustrated in Fig.

14 wherein the bottom wall A is shown as extending from the end wall, and the side wall A^2 is partially elevated above its normal position.

The lateral joint strips F and G on the bottom and top walls are alike, and the construction thereof will be understood from a description of one of the top-wall joint strips G which is illustrated in Fig. 5. Said joint strip G extends along and is secured to the side margin of the top wall and shaped to form a vertical flat flange *g* which projects downwardly and is adapted to form with the beveled or mitered edge of the top wall, a groove to receive the mitered upper margin of the side wall A^2. Said joint strip G is shown as connected with the top wall in the same manner as hereinbefore described. That is to say, the central part of said strip is folded together along its central part to form the flange *g*, its marginal part g^1 overlaps the outer face of the top wall, and its marginal part g^2 extends along the inner face of the beveled edge of said top wall and has its edge g^3 inserted in a slit or groove formed in said top wall between its inner and outer faces. The said joint strip G, arranged as described, forms, with the beveled edge of the top wall, a V-shaped groove to receive the beveled top margin of the side wall and serves, by the arrangement of its flange *g* with the outer face of said side wall to hold said side wall from springing outwardly away from the top wall, while the stiffness imparted to the edge of the top wall by said strip G, which extends from end to end of the same, serves to prevent the margin of the top wall from springing or bending outwardly away from the side wall.

The strips G G on the lateral edges of the top wall and the like strips F F on the bottom wall are, moreover, shown as additionally secured to the said walls by means of holding prongs as indicated by g^4 in Fig. 5, cut from the outer marginal parts of the strips and entering the surface of the wooden wall.

The top wall A^3, when arranged to engage at its side edges with the side walls A^2 A^2 in the manner described, will have its end joint strips E E so constructed that they may be placed in locking engagement with the joint strips C^2 C^2 on the end walls, without endwise sliding movement of said joint strips. As shown in the drawings, said joint strips E E are connected with the ends of the top wall in the same manner as before described in connection with the other joint strips illustrated, and they have flanges *e* formed by folding together the parts of the joint strips which extend outwardly from the ends of the top wall, as hereinbefore described, but said flanges *e* instead of being of dove-tailed form are flat and inclined upwardly and outwardly so that they will be adapted for interlocking engagement with the flanges *c c* on the said strips C^2 in the manner clearly shown in Fig. 2. This construction of the said flanges *e e* permits the engagement of the ends of the top wall with the end wall, by first inserting the flange *e* beneath the flange *c* at one end of the box, this being done by placing the top wall in an inclined position, as shown in dotted lines in Fig. 2, and then lowering the elevated end of the top wall until the flange *e* thereon is carried beneath and interlocked with the flange *c* at the same end of the box as shown in full lines in said Fig. 2. In this operation, downward pressure is brought upon the strip E on the downwardly moving edge of the top wall sufficient to force said flange *e* past the flange *c* when the lower inclined surface of the flange *e* is in contact with the upper inclined surface of the flange *c;* the top edge of the end wall being sprung outwardly far enough to permit the said flange *e* to slip past the edge of the flange *c* and enter beneath the same.

The top and bottom joint strips C C^2, and the end joint strips C^1 C^1 on the end wall of the box are rigidly joined or connected with each other at their ends, so that the four joint strips will constitute in effect a rigid metal frame surrounding the end wall and giving great strength or rigidity thereto. Likewise, the two end joint strips B B on the bottom wall are rigidly joined at their ends to the lateral joint strips F F on said bottom wall, and the end joint strips E E of the top wall are rigidly joined at their ends to the lateral joint strips G G on the lateral margins of the top wall.

The construction of the parts at the meeting ends of said joint strips on the end wall is illustrated in Figs. 6 to 9, in connection with the joint strips C C^1 at the bottom and one end margin of the end wall, and in Fig. 12, in connection with the joint strips C^1 C^2 at the end and top of said end wall. As clearly seen in Figs. 6, 7 and 8, the meeting ends of the outer marginal parts of the said strips C and C^1, which extend over the outer faces of the end wall, are arranged in overlapping relation to each other; said marginal part of the strip C extending at its end under that of the strip C^1. The ends of said strips C C^1 are joined by means of tongues c^5 cut from the strip C and extending through slots in the strip C^1 and bent over on the outer face of said strip C^1, as clearly seen in Figs. 7 and 8 and also illustrated in connection with the upper joint strip C^2 and end joint strip C^1 in Fig. 12. By means of the tongue c^5, the meeting ends of the joint strips are rigidly secured together. To further strengthen the connection between the meeting ends of the joint

strips, the end of the outer marginal part of the joint strip C, which extends beneath the corresponding outer part of the joint strip C^1, is, as clearly shown in Figs. 6 and 8, extended into the folds of the flange c, and reaches to the base of the hooked end of said flange. Said end of the joint strip C, being confined in the fold of the strip C^1, a firm and rigid joint is afforded between the ends of said strips C C^1.

The end margin of the inner fold of the flange c, including the transverse part c^3, and the inner marginal part c^1 which extends into the edge of the box wall, is made oblique or mitered, and the end margin of the corresponding parts of the strips C is correspondingly mitered; the mitered end margins meeting each other at the corner of the wall, as clearly seen in Fig. 9. The inner parts or folds of the folded joint strips are thus mitered at their ends, while the outer parts or folds overlap each other and are rigidly joined together. At all of the corners of the end wall, moreover, the inturned or hooked edges of the locking flanges on the joint strips C C^1 and C^2 are cut away at their ends, so as to leave openings, in line with the grooves formed by said joint strips, for the lateral insertion of the flanges on the side and bottom walls, as clearly seen in Figs. 9 and 12.

At the corners of the bottom wall, the ends of the joint strips B where they join the oblique or mitered side edges of said bottom wall are beveled, as shown in Fig. 13, so as to substantially coincide with the beveled marginal surface of the said bottom wall, and the oblique part f^1 of the strip F which fits against said beveled surface. Likewise in the case of the corners of the top wall, the ends of the flanges g on the joint strips G are beveled or inclined to correspond with the inclination of the beveled side edges of said top wall and to coincide with the inclined parts g^2 on the joint strip G, as clearly seen in Fig. 10. In the case of said bottom and top walls, the meeting ends of the joint strips B and F in one case and E and G in the other case are overlapped, and joined by tongues cut from the ends of one of the strips and passing through slots in the other strip. This construction is shown in Fig. 1, wherein the ends of the lateral joint strips G G enter beneath the ends of the joint strips E E, and said joint strips G are provided with tongues g^5 which pass through slots in the ends of the strips E, and are bent downwardly over the same, so as to afford a strong interlocking connection between said joint strips E and G.

The inner folds or marginal parts of the joint strips B and F which are inserted edgewise into the bottom wall are mitered at their meeting ends, as shown in dotted lines in Fig. 13. The corresponding parts of the joint strips E and G of the top wall are similarly mitered, as shown in dotted lines in Fig. 10.

At the corners of the side walls the ends of the joint strips D of said side walls are beveled to correspond with the beveled upper and lower margins of said side walls, as clearly seen in Fig. 11. The outer marginal part d of said joint strips are, moreover, provided at their ends with endwise projecting tongues d^1 which are folded inwardly over the beveled surfaces at the top and bottom edges of said side wall, and are pressed firmly against or embedded in said beveled surfaces so as to be substantially flush therewith. The tongues d^1 thus constitute hooked ends on the strips which serve to bind or confine the tapered or beveled margins of the side walls to the joint strips, and to afford a strong and firm connection between the ends of said joint strips, and the said side wall. By the employment of said hooked shaped tongues d^1 on the ends of the end joint strips D, therefore, not only are the side margins of the side wall firmly connected to the joint strips outwardly to the extreme margins of the beveled edges of said side walls, but the ends of the joint strips D D are brought into solid bearing contact with the flanged joint strips F and G on the bottom or top walls, with the result that strains tending to disrupt the box will be resisted mainly by the metal joint strips, which are thus directly engaged with each other.

The folded sheet metal joint strips for connecting the walls of boxes, embodying the general features of construction hereinbefore set forth, may be variously modified in form without departure from my invention, and several forms in which said joint strips may be constructed, are shown in Figs. 15, 16 and 17.

As illustrated in Fig. 15 the meeting edges of two box walls H and I are shown, the same being provided with sheet metal joint strips J and K. In this instance the meeting edges of the box walls H and I are beveled at their inner parts and meet each other in the manner of a mitered joint, and the joint strips J and K are folded along their central parts to form locking flanges j and k. In this instance, the flange j is made of L-shape, while the outer edge of the flange k is made of hook-shape, so as to embrace the transversely extending marginal part of the L-shaped flange j. The inner marginal parts j^1 k^1 of the joint strips in this instance extend inwardly along the beveled surfaces of the walls H and I. The edge of the marginal part j^1 is bent inwardly against the inner surface of the wall H and the inner marginal part of the part k^1 is extended into the wood of the wall I at a distance from the inner surface of said wall.

Said wall I is thicker than the wall H and the edge of its tongue *i*, formed by the wood which projects past the margin of the part k^2 of the joint strip K is at right angles to the inner face of the wall, and adapted to meet or abut against the inner face of the wall H, so as to cover the edge of the part j^1 and prevent the contents of the box from coming in contact with the inner marginal parts of either of the joint strips, as indicated in dotted lines in Fig. 15.

In Figs. 16 and 17 I have shown joint strips generally like those illustrated in Fig. 15. In this case, the two walls L, M are provided with joint strips N, O, having flanges *n o*. The flange *n* is bent into hook-form in cross-section, and the flange *o* is likewise bent into hook-form, and has the edge of its inturned marginal part located at such distance from its base, as to give room for insertion of the hooked end of the flange *n* while the parts n^1 o^1 extend inwardly over the beveled meeting edges of the walls L and M. In this case, the interlocking flanges *n o* may be engaged with each other either by slipping the flange *n* endwise into the flange *o* or by bringing the hooked flange *n* into engagement with the flange *o* when the walls L, M are in line with each other as shown in Fig. 16 and then swinging the two walls into position at right angles to each other, as shown in Fig. 17.

The walls may be connected in the manner last described in joining the bottom with the end walls of the box but in connecting the side walls with said end wall it is necessary that the side walls be slipped into place after the bottom and end walls have been joined.

An important advantage is gained by the employment of the joint strips which embrace or are clamped upon the marginal parts of wooden box walls and are provided with interlocking flanges for the reason that by this construction, a very strong and rigid box may be made by the use of thin wood or veneer. Such box, therefore, may be light in weight, and made by the use of a small quantity of wood, with consequent saving in cost of material. The joint strips having clamping engagement with the edges of the thin pieces of wood forming the box walls serve to stiffen and strengthen the same and prevent the splitting of the wood. It will, of course, be understood that in the case of the side walls of the box, the grain of the wood will run endwise, and the end joint strips will extend transversely of the grain of the wood.

An important advantage is gained in the case of a box wall having four joint strips by rigidly connecting the joint strips with each other at the corners of said wall, for the reason that by this construction any splitting or breaking of the wall cannot take place without breaking or rupturing the metal joint strips. Said joint strips, being of sheet metal and bent into a shape which gives them great strength and rigidity, form with the wooden walls to which they are secured, a box having great strength and capacity for withstanding rough handling or usage.

It will be especially noted that the joint strips made as described have great strength to resist bending under a lateral strain thereon because of the portions of said joint strips, which extend transversely over the side edges of the walls to which they are attached. Said joint strips are, moreover, given stiffness to withstand bending stresses acting obliquely on the strips, because of the inclined parts of the joint strips, such as are formed by the inwardly bent outer margin of the flange *c* in Figs. 3 and 4, by the oblique part of the dove-tailed portion of the flange *b* in said Figs. 3 and 4, by the oblique parts f^1 g^1 of the strips F and G, (Figs. 10 and 13) by the oblique parts j^1 k^1 of the joint strips J and K, shown in Fig. 15, and by the similar oblique parts n^1 o^1 of the joint strips N and O shown in Figs. 16 and 17. Said oblique parts form in effect obliquely disposed stiffening members adapted to resist bending stresses or strains acting obliquely on the corners of the box.

It will be noted that in the case of each form of joint shown in which two joint strips unite the meeting edges of the box walls by interlocked engagement, the interlock is so formed as to effectually stiffen the box and prevent it from permanent distortion by racking movement. That is to say, in the case of each pair of coöperating joint strips, they are so constructed that they have rigid abutting shoulder portions which engage each other at or near the interior angle formed by the meeting inner surfaces of the box walls and also have other abutting and interlocked parts which are outwardly remote from the first mentioned shoulders so that change of angular relation of the box walls in a direction toward each other, or in such manner as to reduce the angle between their inner surfaces to less than a right angle, is prevented. Obviously, if this condition be secured in all of the four parallel corners or angles of the box, considered either transversely around the box or lengthwise around the box, then the box cannot be distorted or racked in that particular direction, and, if the joints be thus rigid both ways around the box, rigidity against racking or distortion, in any possible direction, within the limits of stiffness of said flanges, is insured.

While I have throughout this specification used the term "rigidly" as describing the character of union formed by the joint strips

described, yet I do not wish this term to be understood in its literal or absolute sense, inasmuch as it is obvious that these joint strips, formed of resilient sheet metal shaped to form flanges of double thickness, as described, afford a certain amount of resilience and have some capacity for movement relatively to each other without permanently distorting the box or the joint strips, and without in any sense weakening the union. This capacity to yield under abnormal stresses, so far from being a disadvantage, constitutes a distinct and important feature of advantage of the invention. That is to say, in the case of a box heavily loaded being dropped, or otherwise being brought into violent contact with a practically unyielding object, such for example, as a pavement, it will be obvious that a certain amount of elasticity or capacity for yielding must be provided for, or the box will be broken or the joints ruptured; an inelastic or rigid body being more easily broken by impact than an elastic one. I have found by practical demonstration that heavily loaded boxes constructed in accordance with the present invention may be subjected to extraordinary concussion both upon the corners and flatwise upon the ends or sides and yet withstand such concussion without injury or permanent distortion. This result is clearly due to the limited, but sufficient, degree of resiliency inherent to the double-thick interlocked flanges of the joint strips having the characteristics set forth.

I claim as my invention:

1. In a box, two walls and means uniting said walls in right angled relation, comprising joint strips applied to the meeting edges of the respective walls, each strip being formed of resilient sheet metal and folded upon itself longitudinally and having its lateral marginal portions separated and embracing and clamping a substantial portion of the margin of the box wall to which it is applied, and also having its central folded portion formed into a double-thick locking flange, said flanges being shaped to interlock with each other, and said joint strips having substantially non-yielding abutting portions which engage each other at or near the interior angle of intersection of the inner surface of the box walls, and the flanges having interfitting engaging portions outwardly distant from said abutting parts, whereby the box walls are united and locked against change of angular relation in a direction toward each other, rigidly within the limit of stiffness of said flanges.

2. In a box, a wall provided with a sheet metal joint strip applied to the edge of said wall, said strip being folded upon itself longitudinally and having its lateral marginal portions separated and arranged to embrace and clamp a substantial portion of the margin of the wall to which it is applied, said separated lateral marginal portions converging toward each other in a direction from the edge of the wall inwardly and the intermediate folded portion of said strip being formed into a double-thick locking flange.

3. The combination with two box-walls of wood or the like, or folded joint strips, the marginal parts of which embrace and are clamped upon the margins of the walls, and the central parts of which are folded together and shaped to form interlocking flanges, the flange of one case extending in the plane of the wall to which it is attached substantially in line with the outer face of the wall and being bent inwardly at its margin to form, with the part of the strip that extends over the edge of the wall, a flange receiving groove, and the flange in the other case extending in the plane of the wall to which it is attached at a distance inwardly from the outer face of the wall and being bent at its margin toward the outer face of the wall to engage the inwardly bent marginal part of the flange on the other wall; the flanges when interlocked occupying the space exterior to the meeting edges of the walls and substantially within the planes of the outer faces of the walls.

4. The combination with two box walls of wood or the like, of metal joint strips, the marginal parts of which embrace and are clamped upon the margins of said walls, one of said joint strips being folded upon itself to form a flange which projects from the edge of the wall to which it is attached, the base of which is located adjacent to the outer face of the said wall, and the margin of which extends obliquely inward to form, with the transverse part of the strip which extends inwardly from the base of the flange over the marginal surface of the wall, a dove-tailed groove, and the other strip being folded upon itself to form a hollow dove-tailed flange adapted to engage said groove, said dove-tailed flange projecting from the margin of the other wall and having its inner face parallel with the inner face of the wall, its base at a distance inwardly from the outer surface of the wall, and its outer face obliquely disposed.

5. The combination with two box-walls of wood or the like, of folded joint strips, the marginal parts of which embrace the marginal parts of the walls and the central parts of which are folded together and shaped to form interlocking flanges, the inner marginal part of each strip being extended into the wall to which it is attached between the side faces thereof and the marginal parts of the walls inside of said inner marginal parts of the strips meeting each other to cover the joint strips.

6. The combination with two-box walls of

wood or the like, of folded joint strips, the marginal parts of which embrace the marginal parts of the walls and the central parts of which are folded together and shaped to form interlocking flanges, the flange in one case extending from the edge of the wall adjacent to the outer face thereof and being bent inwardly at its margin to form, with the part of the strip that extends over the edge of the wall, a flange receiving groove, and the flange in the other case extending from the edge of the wall to which it is attached at a distance from the outer face thereof and being bent at its margin toward the said outer face of the wall; the inner marginal part of each strip being extended into the wall to which it is attached between the side faces thereof and the marginal parts of the walls inside of said inner marginal parts of the strips meeting each other to cover the joint strips.

7. The combination of end walls provided on similar edges with joint strips and two other walls which meet each other at their side edges and are provided at their ends with joint strips which interlock with those on the end walls; each pair of interlocking joint strips being shaped to form, in one instance, a flange receiving groove and, in the other instance, a flange adapted to be slid endwise into said groove; the meeting side edges of said walls being mitered, and one of them being provided with a joint strip having a flange adapted to form, with the mitered face of the wall to which it is attached, a groove to receive the mitered side edge of the other wall.

8. The combination with two box-walls of wood or the like, of folded joint strips, the marginal parts of which embrace the marginal parts of the walls and the central parts of which are folded together and shaped to form interlocking flanges, both of said joint strips embracing obliquely extending parts adapted to stiffen the joint in a manner to withstand oblique strains.

9. A box wall of wood or the like, provided with four sheet metal joint strips folded at their central parts to form flanges which project from the edges of the wall and the marginal parts of which embrace the marginal parts of the wall, the ends of said joint strips being overlapped and rigidly secured to each other at the corners of the wall.

10. A box wall of wood or the like, provided with four sheet metal joint strips folded at their central parts to form flanges which project from the edges of the wall and the marginal parts of which embrace the marginal parts of the wall, the marginal parts of the ends of said strips, at one side of the wall, being overlapped and rigidly secured together at the corners of the wall.

11. A box wall of wood or the like, provided with four sheet metal joint strips folded at their central parts to form flanges which project from the edges of the wall and the marginal parts of which embrace the marginal parts of the wall, the marginal parts of the ends of said strips at one side of the wall meeting each other at the corners of the box in overlapped relation, and the overlapping parts at each corner being provided one with a locking tongue and the other with a slot to receive said tongue.

12. A box wall of wood or the like, provided with four sheet metal joint strips folded at their central parts to form flanges which project from the edges of the wall, and the marginal parts of which embrace the marginal parts of the wall, the marginal parts of the ends of said strips at one side of the wall meeting each other at the corners of the wall in overlapping relation, and the end portion of one of the marginal parts at each corner extending beneath the end portion of the marginal part of the other strip and between the folded parts constituting the flange on such other strip.

13. A box wall of wood or the like, provided with four sheet metal joint strips folded at their central parts to form flanges which project from the edges of the wall, and the marginal parts of which embrace the marginal parts of the wall, the marginal parts of the ends of said joint strips at the outer face of the wall being overlapped and rigidly joined to each other at their meeting ends, and the marginal parts of the joint strips at the inner face of the wall being mitered at their meeting ends.

14. The combination with a box-wall of wood or the like, which is beveled or mitered at its side edges, of joint strips on the ends of said wall, the central parts of which form locking flanges which project from the end margins of the wall and the marginal parts of which embrace the marginal parts of the wall, and joint strips on the beveled side margins of said wall, the central parts of which are folded together to form flanges at right angles to the outer face of the wall, which form, with the beveled edges of the walls, V-shaped grooves, and the marginal parts of which embrace the said beveled edges of the wall.

15. The combination with a box wall of wood or the like, which is beveled or mitered at its side edges, of joint strips on the said side edges, the central parts of which are folded together to form flanges which project at right angles to the outer face of the wall and form, with its beveled edges, V-shaped grooves, and the outer marginal parts of which extend over the outer face of the wall and the inner marginal parts of which extend over the beveled edges of the wall.

16. The combination of end walls provided with joint strips, and bottom, top and side

walls provided at their ends with joint strips which interlock with those on the end walls, the top, bottom and side walls being mitered at their meeting edges, and the bottom and top walls being provided at their side edges with joint strips having flanges adapted to form, with their mitered edges, grooves to receive the bottom and top margins of the side walls, and which consists of folded strips of metal, the central parts of which are folded to form said flanges, the marginal parts of which embrace the marginal parts of the said bottom and top walls, and the inner marginal parts of which fit against the mitered edges of said bottom and top walls, and have their edges inserted into the beveled edges of said bottom and top walls between the inner and outer faces thereof.

17. A box-wall of wood or the like, which is beveled or mitered at its side edges, and provided at its end margins with folded metal joint strips, said metal joint strips being folded at their central parts to form locking flanges which project from the end margins of the wall, and the lateral parts of which embrace the marginal parts of the wall, the said joint strips being provided at the ends of their outer marginal parts with tongues which are bent inwardly over the beveled or mitered marginal side edges of the said wall.

18. A box wall of wood or the like, which is beveled or mitered at its side edges, and provided at its end margins with metal joint strips, said metal joint strips being folded at their central parts to form locking flanges which project from the end margins of the wall, and the lateral parts of which embrace the marginal parts of the wall, the said joint strips being provided at the ends of their outer marginal parts with tongues which are bent inwardly over the beveled or mitered marginal side edges of the said wall, and the inner marginal parts of said joint strips being inserted edgewise into said wall between the inner and outer faces thereof.

19. The combination of end walls provided each with four joint strips, the central parts of which are folded to form locking flanges, the marginal parts of which embrace the marginal parts of the said end walls, and the ends of which are rigidly connected with each other at the corners of said end walls, bottom, top and side walls, which are mitered at their meeting side edges, said bottom and top walls being provided each at its end and side margins with joint strips the central parts of which are folded to form flanges, and the marginal parts of which embrace the marginal parts of the wall and the ends of which are rigidly connected with each other at the corners of said wall, the flanges on the end joint strips of said bottom and top walls being adapted to interlock with the flanges of the joint strips on the end walls, and the flanges on the side margins of said bottom and top walls being adapted to form grooves to receive the margins of the side walls, and said side walls being provided at their ends with joint strips folded to form locking flanges adapted to engage the flanges of the joint strips on the end walls, and the marginal parts of which embrace the marginal parts of the said side walls.

20. The combination of end walls provided each with four joint strips, and bottom, top and side walls which are mitered at their meeting edges and provided at their ends with joint strips which interlock with those on the end walls, the bottom wall being provided at its ends with joint strips having flanges adapted to interlock with the joint strips on the end walls, and at its side margins with joint strips having flanges adapted to form, with the mitered side edges, grooves to receive the bottom edges of the adjacent side walls, and the top wall being provided at its side margins with joint strips, having flanges adapted to form, with its mitered side edges, grooves to receive the top margins of the adjacent side walls, and having on its ends joint-strips folded to form flanges adapted to engage the flanges of the joint-strips on the upper margins of the end walls, said flanges on the ends of the top wall being upwardly and outwardly inclined to permit their lateral entrance beneath the flanges on the said upper margins of the end walls by downward or inward pressure on the said top wall.

21. The combination with a pair of meeting board members, of a metal joint strip on each of said meeting edges for locking the boards together, each strip being folded upon itself longitudinally to form a double-thick interlocking flange and having its lateral marginal edges separated and formed to clasp the edge of its board, and a portion of one of said marginal parts bent to enter such board and interlock the strip to the latter.

FRED WILDER KEITH.

Witnesses:
EMILIE ROSE,
SAMUEL N. POND.