F. W. STEFFES.

COLLAPSIBLE CRATE.

APPLICATION FILED AUG. 1, 1919.

1,371,581.

Patented Mar. 15, 1921.

3 SHEETS—SHEET 1.

Fig. 1.

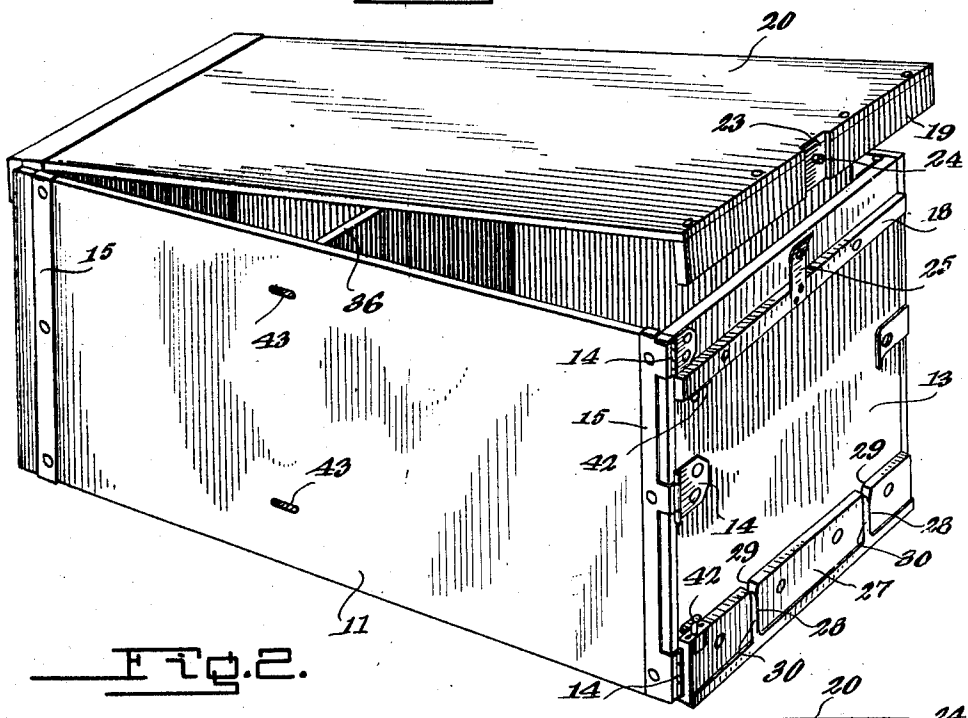
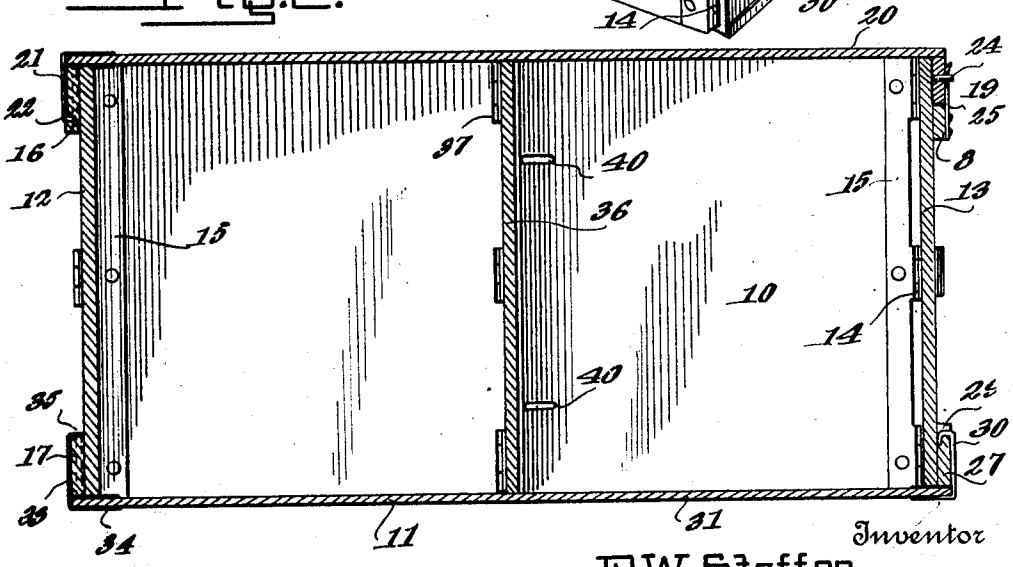


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

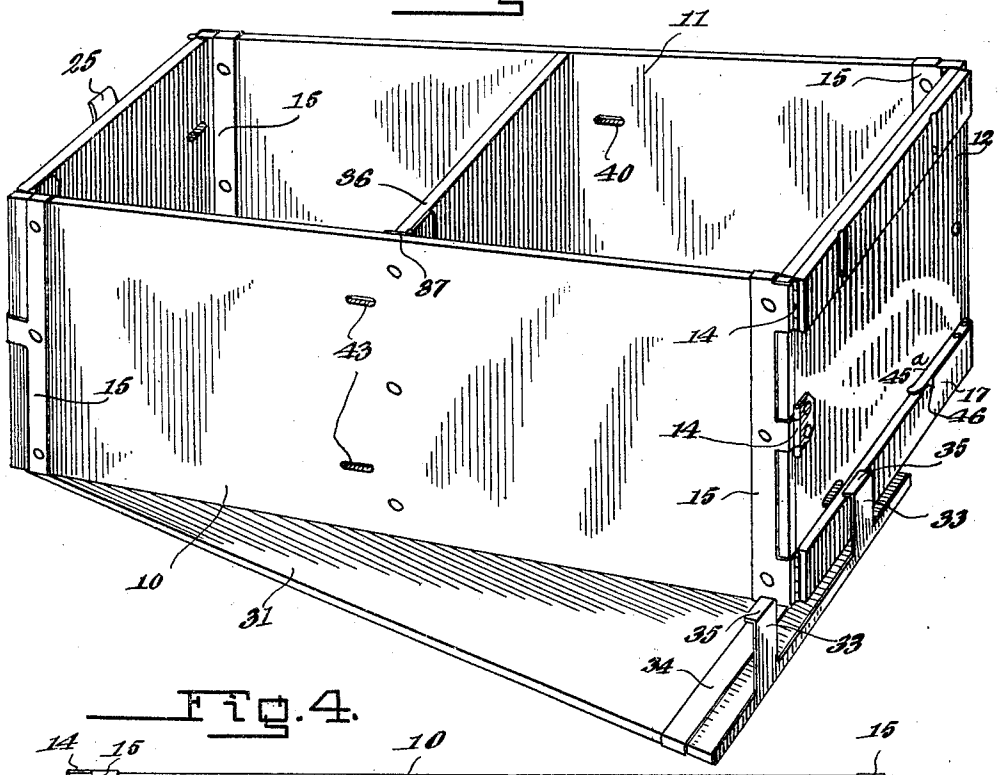
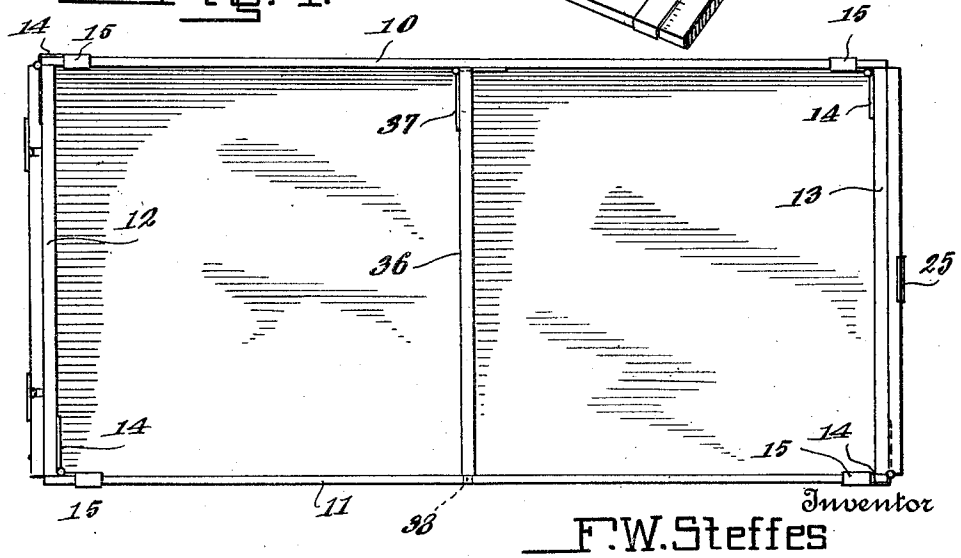


Fig. 4.



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3 SHEETS—SHEET 3.

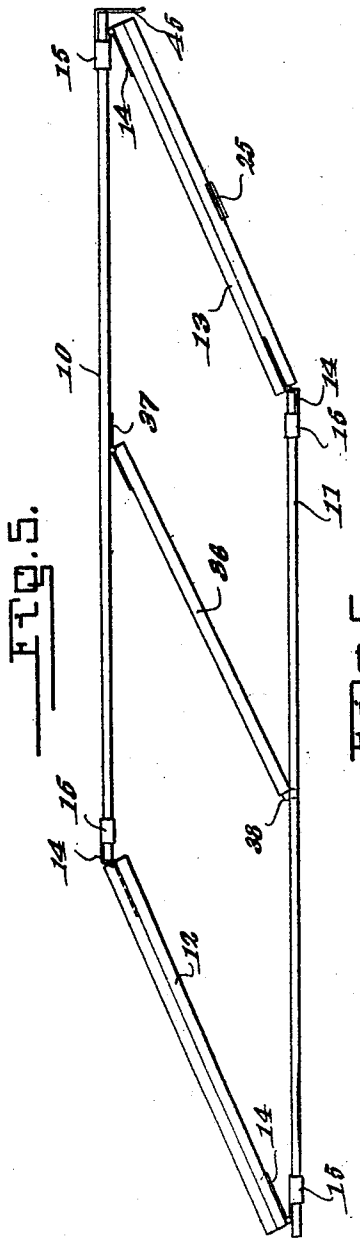


Fig. 5.

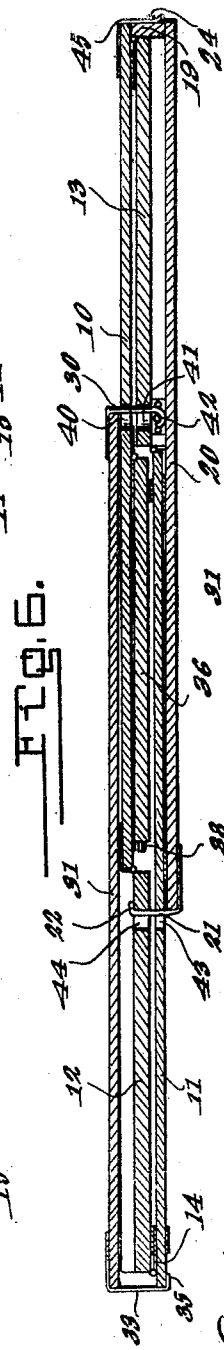


Fig. 6.

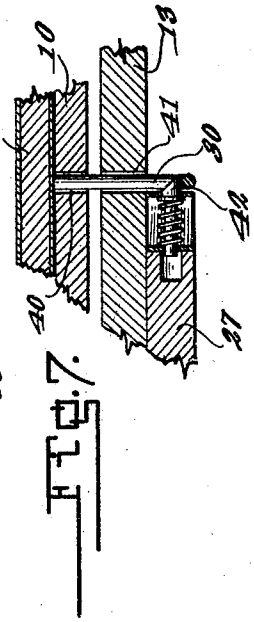


Fig. 7.

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UNITED STATES PATENT OFFICE.

FREDERICK W. STEFFES, OF WIEN, MISSOURI.

COLLAPSIBLE CRATE.

1,371,581. Specification of Letters Patent. Patented Mar. 15, 1921.

Application filed August 1, 1919. Serial No. 314,733.

To all whom it may concern:

Be it known that I, FREDERICK W. STEFFES, a citizen of the United States, residing at Wien, in the county of Chariton and State of Missouri, have invented certain new and useful Improvements in Collapsible Crates, of which the following is a specification.

This invention relates to crates or cases of the type employed for shipping eggs, or analogous articles, and an object of the invention is to provide a crate structure which may be easily collapsed into a compact form for reshipment to the original shipper to permit of reuse.

In the present cases or crates employed in the shipment of eggs or analogous fragible articles, the crates are relatively large and bulky and take up so much space that it is impractical to return them to the shipper for reuse, and they are consequently destroyed, resulting in the loss of the labor and time necessary for making them, as well as the loss of material of which they are made, and it is an object of the invention to provide a case or crate structure which may be easily collapsed for return to overcome the undesirable features of the egg crates usually employed.

Another object of this invention is to provide, a collapsible case or crate structure wherein the sides and ends are hingedly connected, to permit them to be collapsed to lie in substantially parallel abutting engagement when the crate is not in use, and also to provide a removable bottom and cover for the crate structure which may be readily attached to and detached from the sides and ends of the crate when the latter are in an open or extended position and which permits the top or cover and bottom to lie against the surfaces of the sides, when the latter are collapsed, and also to provide means for connecting the cover and bottom to the sides and end of the body when in an open position, which means also co-act with companion means for securely connecting the bottom and cover to the sides and ends when collapsed, and serve to lock the crate or case in a collapsed position.

Other objects of the invention will appear in the following detailed description taken in connection with the accompanying drawings, forming a part of this specification, and in which drawings:

Figure 1 is a perspective view of the improved crate or case showing the cover partly open.

Fig. 2 is a vertical section through the crate or case in an upright position.

Fig. 3 is a detail perspective view of the crate or case having the cover removed and showing the bottom partly disconnected from the sides and ends, of the crate.

Fig. 4 is a top plan of the crate with the cover removed.

Fig. 5 is a top plan of the sides and ends of the crate showing them partly collapsed.

Fig. 6 is a horizontal section through the crate in a collapsed position, and

Fig. 7 is a detail sectional view of a part of the locking mechanism for locking the crate in a collapsed position.

Referring more particularly to the drawings, wherein like characters indicate like and corresponding parts throughout the several views, the improved collapsible case or crate includes sides 10 and 11 which are hingedly connected to the ends 12 and 13 by hinges 14, to permit the collapsing of these ends and sides into a comparatively flat position. The hinges which are carried by the sides 10 and 11 are formed upon suitable metal strips 15 which are attached to the outer surfaces of the sides, near their ends and form bracing means therefor, while the end 12 is made by transversely extending bracing strips 16 and 17 along its upper and lower edges. The end 13 is braced by an upper transversely extending bracing strip 18 which is positioned a short distance below the upper edge of the end 13 to permit the engagement with the outer surface of the end 13 at its upper edge, with a depending binding strip 19 which is carried by one end of the cover 20. The cover 20 has substantially right angled hook members 21 attached to its end opposite the end which carries the binding strip 19, and the free ends of these hook members are bent inwardly as shown at 22 for seating in recesses formed in the supporting strip 16 to securely connect the top or cover 20 to the ends 12 of the casing. The binding strip 19 is provided with a cut out portion 23 formed in its outer sur-

face intermediate its ends in which a pin 24 is mounted. The pin 24 is adapted to engage through an opening formed in the free end of a spring clip 25 for locking the cover 20 in a closed position upon the casing or crate, when the latter is open or in an operative condition.

The end 13 also has a transversely extending bracing strip 27 at its lower end, which bracing strip is provided with a pair of vertically extending cut out portions 28 terminating in companion cut out portions 29 extending inwardly from the upper edge of the bracing strip. These cut out portions 28 and 29 receive therein the hook members 30 which are carried at one end of the bottom 31 of the crate or case. The inner ends of the recesses 29 are rounded so as to permit a certain amount of pivotal movement of the bottom 31 to facilitate its proper attachment with the sides and ends of the casing. The end of the bottom 31 opposite to that which carries the hook member 30 has a pair of spring members 33 attached thereto. These springs 33 are formed upon and extend laterally from a strip 34 of sheet metal which is bent to extend about the bottom 31 near the free end, as clearly shown in Figs. 2 and 3 of the drawing. The free ends of the tongues 33 are angled as shown at 35 for engagement over the upper edge of the strip 17 to connect the bottom to the end 12 of the crate structure.

A bracing partition 36 is hingedly connected, by means of hinges 37 to the side 10 of the crate. Dowels 38 are preferably formed upon the normally free edge of the bracing partition 36 and they are adapted to seat in suitable receiving recesses formed in the side 11, for preventing accidental hinged or pivotal movement of the partition when the crate is assembled.

When desired to collapse the crate structure for reshipment, the cover 20 is first removed by springing the spring latch 25 out of engagement with the pin 24 and the cover is then moved upwardly and rearwardly to disengage the hook member 21 from the bracing strip 16 which permits the disconnection of the cover with the sides and ends of the crate. The spring tongues 33 upon the bottom 31 are then sprung outwardly, to disengage their angled ends 35 with the bracing strip 17, and the bottom is rocked upon the hooked ends of the hook member 30, which engages with the arcuate walls of the recesses 29, after which the hook ends are moved out of these recesses, thereby disconnecting the bottoms from the sides and ends of the crate, after which the sides and ends are collapsed as shown in Figs. 5 and 6 of the drawings to position them substantially parallel and in close proximity to each other. After the sides and ends of the crate have been collapsed, the bottom 31 is connected to the collapsed members, being positioned against a portion of the outer surface of the side 10 and having the angled ends 35 of the spring tongues 33 engaging over one end of the side 11, while the hook 30 extends through openings 40 and 41, in the side 10 and the end 13 and are engaged by spring controlled latches 42, which are carried by the bracing strips 18 and 27, of the end 13, which spring controlled latches engaging in the crooked end of the hook 30 securely connect the bottom 31 to the sides and ends when in collapsed position and prevent the uncollapsing movement of these sections. The hook members 21 on the top 20, are inserted through openings 43 and 44 in the side 11 and end 12, and their angled end 22 is engaged over a portion of the end 12 adjacent the openings 44 for connecting one end of the top 20 to the side 11 and end 12. The opposite end of the top 20, namely the end which carries the binding strip 19 engages against the outer edge of the end 13 and is held securely connected to the collapsed sides and ends of the casing by a spring tongue 45, which engages over the pin 24.

In assembling the crate structure, the sides and ends are opened so as to be at substantially right angles to each other, after which the hooks 30 upon the bottom 31 are properly positioned in the recesses or cut out portions 28 and 29 upon the member 27 of the end 13. The bottom is then positioned in such relation to the end 12 and strip 17 that the angled ends 35 of hooks 33 are free to slide upon the upper surface of strip 17, as shown in Fig. 3 of the drawings. When the sides are clipped over the bottom they will assume their proper positions and the angled ends of the tongues 33 will engage over the upper edge of the reinforcing strip 17. A spring catch structure 45^a is carried by the upper edge of the bracing strip 14 and it has a depending tongue 46 thereon, which, when the end 12 is being moved over the bottom 31, will ride over the rearmost tongue 33, and spring downwardly for seating the tongue 35 into a recess formed in the upper edge of the brace 17 for receiving it, thereby locking the bottom 31 connected to the end 12 to prevent accidental lateral swinging movement of the bottom relative to the sides and ends of the crate.

Changes in details may be made without departing from the spirit of this invention, but

I claim:

1. In a collapsible crate, the combination of hingedly connected side and end members, bracing strips extending transversely across said end members at their lower ends, a detachable bottom, hooks carried by said bottom for engagement with one of said

bracing strips, and upstanding tongues carried by said bottom and having their upper ends angled for engagement over the upper edge of the bracing strips at the end which is opposite said end engaged by said hooks.

2. In a collapsible crate, the combination of hingedly connected side and end members, bracing strips extending transversely across said end members at their lower ends, a bottom, hooks carried by said bottom for engagement with one of said bracing strips, and upstanding tongues carried by said bottom and having their upper ends angled for engagement over the upper edge of the bracing strips at the end which is opposite that engaged by said hook, said side and end members adapted to swing laterally over the bottom in assembling the crate structure to permit engagement of the angled ends of said tongues with the adjacent bracing strips.

3. In a collapsible crate, the combination of hingedly connected side and end members, bracing strips extending transversely across said end members at their lower edges, a bottom, hooks carried by said bottom for engagement with one of said bracing strips, upstanding tongues carried by said bottom and having their upper ends angled for engagement over the upper edge of the bracing strips at the end which is opposite that engaged by the hook, said side and end members adapted to swing laterally over the bottom in assembling the crate to permit engagement of the angled ends of said tongues with the adjacent strip, and a spring cap carried by said bracing strip adapted to engage one of the tongues to prevent accidental disconnection of the bottom, side and end members.

4. In a collapsible crate, the combination of hingedly connected side and end members, bracing strips extending transversely across said end members at their lower edges, a bottom, hooks carried by said bottom for engagement with one of said bracing strips, upstanding tongues carried by said bottom and having their upper ends angled for engagement over the upper edge of the bracing strips at the end which is opposite that engaged by the hook, said side and end members adapted to swing laterally over the bottom in assembling the crate to permit engagement of the angled ends of said tongues with the adjacent strip, a spring cap carried by said bracing strip adapted to engage one of the tongues to prevent accidental disconnection of the bottom, side and end members, certain of said side and end members provided with openings to receive said hooks therethrough when the crate is collapsed, and spring actuated catches for engaging said hooks when the crate is collapsed to lock it against accidental assembling movement.

5. In a collapsible crate, the combination of hingedly connected side and end members, bracing strips extending across said end members adjacent their lower edges, a bottom, hooks carried by said bottom for engagement with one of said bracing strips, upstanding tongues carried by said bottom and having their lower ends angled for engagement over the upper edge of bracing strips at the end of the crate opposite said end engaged by said hook, certain of said side and end members provided with openings to receive said hooks therethrough when the crate is collapsed, and spring actuated catches for engagement with said hooks when the crate is collapsed to lock it against accidental assembling movement.

6. In a collapsible crate, the combination of hingedly connected side and end members, bracing strips extending transversely across said end members adjacent their upper edges, a detachable cover, a downturned binding strip at one edge of said cover and adapted to engage over the upper edge of one of said end members, a pin carried by said binding strip, and a spring tongue carried by said last named end member and adapted to engage said pin to hold the cover and end and side members connected.

7. In a collapsible crate, the combination of hingedly connected side and end members, bracing strips extending transversely across said end members adjacent their upper edges, a cover, a downturned binding strip at one edge of said cover and adapted to engage over the upper edge of one of said end members, a pin carried by said binding strip, a spring tongue carried by said last named end member and adapted to engage said pin to hold the cover and end and side members connected, and hooks carried by the ends of said cover opposite the end which carries said binding strip, the end of the bracing strip at the end of the crate adjacent the hook being provided with recesses adapted to receive portions of said hook therein.

8. In a collapsible crate, the combination of hingedly connected side and end members, bracing strips extending transversely across said end members at their lower ends, a bottom, hooks carried by said bottom for engagement with one of said bracing strips, upstanding tongues carried by said bottom and having their upper ends angled for engagement over the upper edge of the bracing strip at the end of the crate opposite said end engaged by said hooks, bracing strips extending across said end members engaging their upper edges, a cover, a downturned binding strip on one edge of said cover and adapted to engage over the upper edge of one of the end members, a pin carried by said binding strip, and a spring tongue carried by said last named end member and

adapted to engage said pin to hold the cover and end and side members connected.

9. In a collapsible crate, the combination, of hingedly connected side and end members, bracing strips extending transversely across said end members at their lower ends, a bottom, hooks carried by said bottom for engagement with one of said bracing strips, upstanding tongues carried by said bottom and having their upper ends angled for engagement over the upper edge of the bracing strip at the end of the crate opposite said end engaged by said hooks, bracing strips extending across said end members engaging their upper edges, a cover, a downturned binding strip on one edge of said cover and adapted to engage over the upper edge of one of the end members, a pin carried by said binding strip, a spring tongue carried by said last named end member and adapted to engage said pin to hold the cover and end and side members connected, and a hook carried by said cover opposite to the end which carries said binding strip, the bracing strip at the upper edge of the end of the crate, adjacent said hook being provided with recesses adapted to receive portions of the hook to connect the cover to said end member.

10. In a collapsible crate, the combination of hingedly connected side and end members, bracing strips extending across said end members and adjacent their lower edges, a bottom, hooks carried by said bottom for engagement with one of said bracing strips, upstanding tongues carried by said bottom and having their upper edges angled for engagement over the upper edge of the bracing strip at the end of the crate opposite said end engaged by said hook, said side and end members adapted to swing laterally over the bottom in assembling the crate structure, to permit engagement of the angled ends of said tongues with said bracing strips, a spring catch carried by the bracing strip and adapted to engage one of the tongues to prevent accidental disconnection of the bottom and sides and end members, bracing strips extending across said end members engaging their upper edges, a cover, a downturned binding strip on one edge of said cover, and adapted to engage over the upper edge of said last named end member, a pin carried by said binding strip, a spring tongue carried by said last mentioned end member and adapted to engage said pin to hold the cover and end and side members connected.

11. In a collapsible crate, the combination of hingedly connected side and end members, bracing strips extending transversely across said end members at their lower ends, a bottom, hooks carried by said bottom for engagement with one of said bracing strips, upstanding tongues carried by said bottom and having their upper ends angled for engagement over the upper edge of the bracing strip at the end of the crate opposite the end engaged by said hook, said sides and ends adapted to swing laterally over the bottom in assembling the crate structure to permit engagement of the angled ends of said tongue with said bracing strip, certain of said side and end members provided with openings to receive hooks therethrough when the crate is collapsed, spring actuated catches for engaging said hooks when the crate is collapsed to lock it against accidental assembling movement, bracing strips extending across said end members adjacent their upper edges, a cover, a downturned binding strip on one edge of said cover adapted to engage over the upper edge of one of said end members, a pin carried by said binding strip, a spring tongue carried by said last named end member and adapted to engage said pin to hold the cover and end and side members connected, and means for connecting the end of said cover opposite said binding strip to its adjacent end member.

12. In a collapsible crate, the combination of hingedly connected side and end members, bracing strips extending transversely across said end members at their lower edges, a bottom, hooks carried by said bottom for engagement with one of said bracing strips, upstanding tongues carried by said bottom and having their upper ends angled for engagement over the upper edge of the bracing strip at the end of the crate opposite the end engaged by said hooks, certain of said side and end members provided with openings to receive said hooks therethrough when the crate is collapsed, spring actuated catches for engaging said hooks when the crate is collapsed to lock it against accidental opening movement, bracing strips extending across said ends adjacent their upper edges, a downturned binding strip on one edge of said cover and adapted to engage over the upper edge of one of the end members, a pin carried by said binding strip, a spring tongue carried by said last named member and adapted to engage said pin to hold the cover and end member connected, hooks upon the end of said cover opposite said binding strip, the bracing strip adjacent said hook being provided with recesses to receive the hooks, certain of said side and end members provided with openings adapted to receive said last named hooks therethrough when the case is assembled, and a second spring tongue carried by one of said side members and adapted to engage said pin when the crate is collapsed.

FREDERICK W. STEFFES.