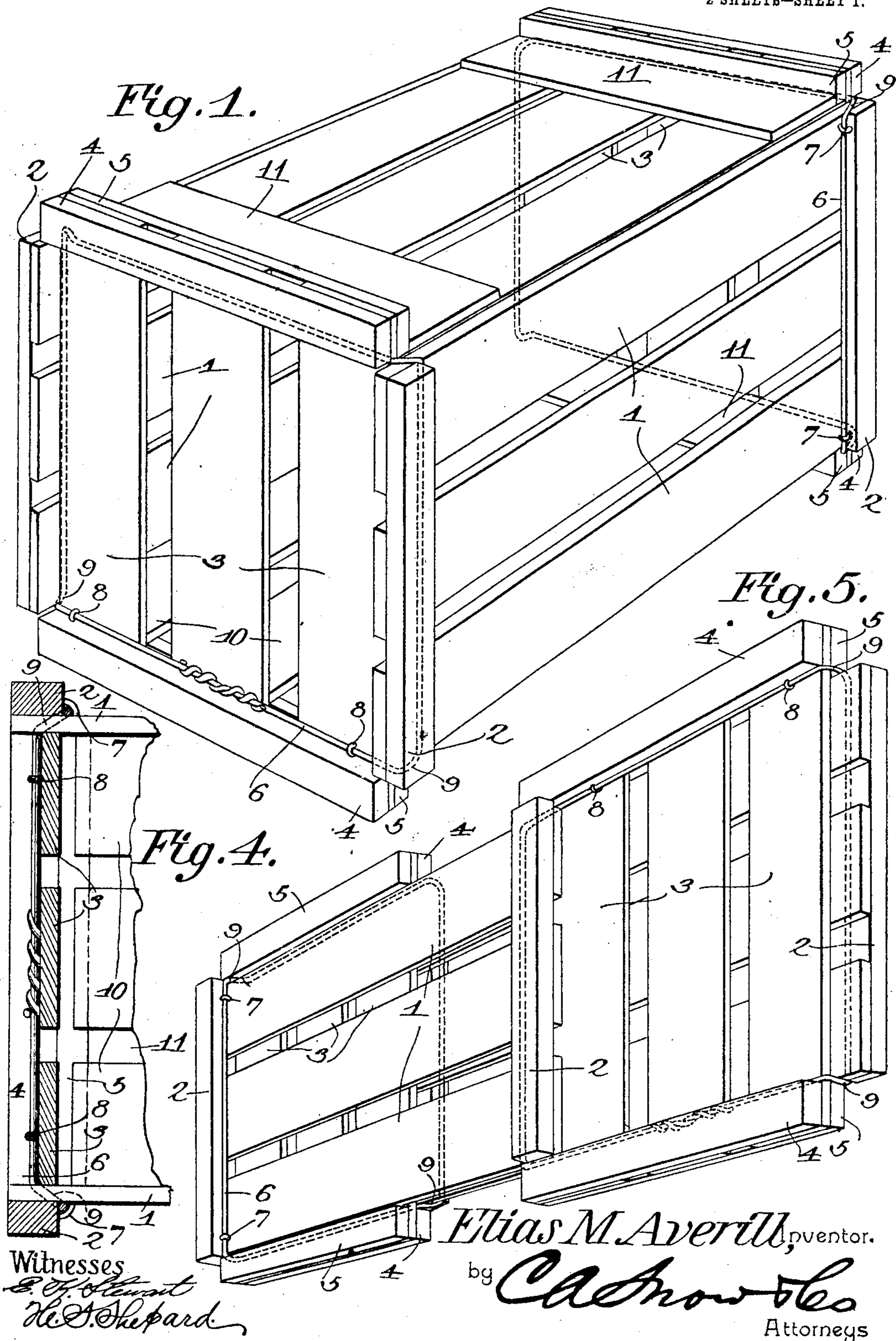


No. 803,537.

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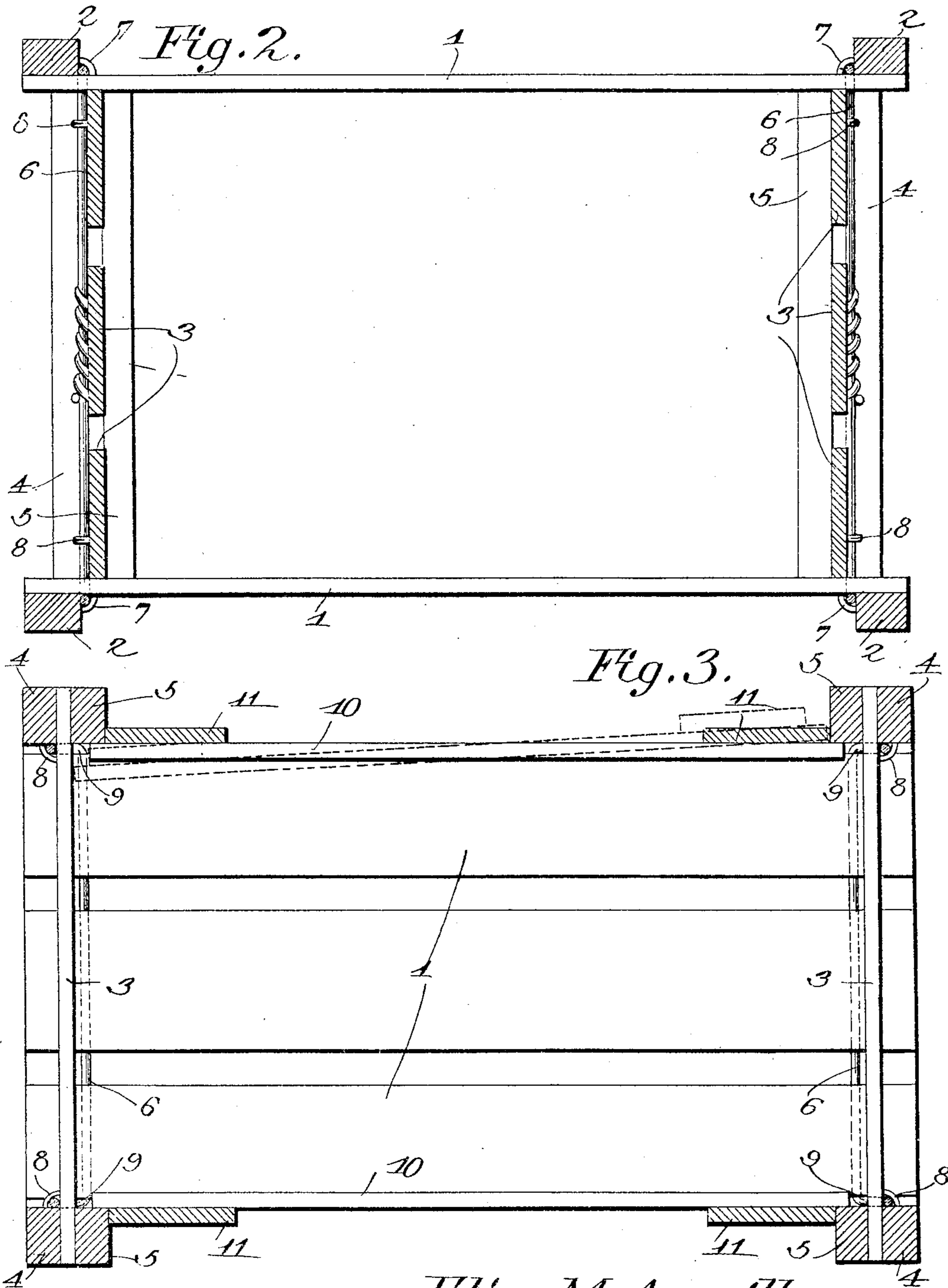
E. M. AVERILL.  
FOLDABLE CRATE.  
APPLICATION FILED JAN. 7, 1906.

2 SHEETS--SHEET 1.



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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

ELIAS M. AVERILL, OF NEWAYGO, MICHIGAN.

## FOLDABLE CRATE.

No. 803,537.

Specification of Letters Patent.

Patented Nov. 7, 1905

Application filed January 7, 1905. Serial No. 240,071.

*To all whom it may concern:*

Be it known that I, ELIAS M. AVERILL, a citizen of the United States, residing at Newaygo, in the county of Newaygo and State of Michigan, have invented a new and useful Foldable Crate, of which the following is a specification.

This invention relates to packing and storing vessels, and has for its object to provide an improved device of this character in the nature of a shipping-crate which is capable of being collapsed or folded when not in use, so as to facilitate the storage of a plurality of crates and the return of said crates when empty.

Another object of the invention is to enable the completion of the crate at the factory and to provide for storing and shipping the same in a collapsed and folded condition and capable of being readily set up when required for use.

It is furthermore designed to provide an improved connection between the sides and ends of the crate to enable the initial collapsing or folding thereof and the subsequent unfolding and setting up of the crate without disconnecting the permanent sides and ends and at the same time to effectually bind the ends of the crate and render the same strong and durable.

Another object of the invention is to facilitate the application and removal of the two removable sides of the crate and to retain the removable sides in place without the aid of additional fastenings.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a perspective view of a crate embodying the features of the present invention. Fig. 2 is a horizontal longitudinal sectional view of the crate prior to the application of the removable sides. Fig. 3 is a vertical longitudinal sectional view with the removable sides in place. Fig. 4 is a detail plan view of one end of the crate, showing the end member forced out flush with the ends of the perma-

nent sides by the application of the removable sides. Fig. 5 is a perspective view illustrating the crate in its folded or collapsed condition.

Like characters of reference designate corresponding parts in each and every figure of the drawings.

While the present invention may be embodied in the nature of a closed box and also as a ventilated box or crate, it has been shown as a slatted ventilated crate particularly adapted for the packing of vegetables, fruit, and other perishable articles.

In the present construction of crate there are what will be termed two "opposite permanent sides," each of which consists of a series of spaced slats 1, connected at their corresponding ends by means of cleats or cross-bars 2, secured to the outer sides of the slats flush with the ends of the latter, the slats of course running longitudinally of the crate. Between the corresponding ends of these side members are end members, each of which consists of a series of upright spaced slats 3, the ends of which are received between and connected to the pairs of cleats or cross-bars designated 4 and 5, which are located, respectively, upon the outer and inner sides of the end member, said pairs of cleats being respectively disposed above and below the top and bottom edges of the permanent sides of the crate.

As best shown in Fig. 2 of the drawings, it will be noted that the ends of the crate are disposed between and inwardly from the corresponding ends of the permanent sides of the crate in the original manufacture of the device, and each end is connected to the side members by means of a continuous band 6, preferably of pliable wire, which embraces the exteriors of the sides 1 at what will be termed the "inner" edges of the cleats 2 and extends across the outer side of the end of the crate across what will be termed the "inner" edges of the external cleats 4, suitable staples 7 being driven into the side slats 1 and cleats 2 and other staples 8 driven into the end slats 3 and outer end cleats 4 to rigidly connect the pliable band to the permanent sides and ends of the crate.

It will here be explained that the crate as originally manufactured is in the condition indicated in Fig. 2 of the drawings, and therefore includes two sides and two ends which are permanently connected by means of pliable bands embracing and connected to the

sides and also connected to the ends upon the exteriors thereof. After being thus constructed the crate may be collapsed or folded to bring the opposite permanent sides 1 along-side of one another, as indicated in Fig. 5, this collapsing or folding being possible in view of the pliability of the bands 6. When the crate is thus folded, bends 9 are produced at the upper and lower corners of each band at one side only of the crate, the bends of the two bands being at opposite sides of the crate. Upon unfolding the crate the bends will partially but not entirely disappear. It will of course be understood that the crate may be folded in either direction, and therefore it is not necessary to exercise care as to the direction in which the crate should be folded.

In addition to the permanent sides 1 there are two duplicate removable sides, each side consisting of spaced slats 10 and end cleats 11, located upon the outer sides of the slats and spaced a suitable distance inwardly from the ends thereof. In practice each cleat 11 should be placed inwardly from the adjacent end of the removable side a distance equal to substantially one-half of the thickness of the adjacent end cleat 5, and the length of said removable side should exceed the initial distance between the slats of the opposite ends of the crate by the thickness of one of the inner end cleats 5. One of the removable sides is introduced into the crate and forced downwardly until the projected ends of the slats rest upon the lower inner cleats 5 with the cleats 11 bearing against the inner faces of said cleats 5, wherefore the lower portions of the ends will be forced outwardly flush with the extremities of the permanent sides 1 and bends 9 will appear in all of the lower corners of the two bands 6. The fruit, vegetables, or other material is then packed into the crate and one end of the removable top is then introduced beneath one of the upper inner-end cleats 5, as indicated by dotted lines in Fig. 3, with the cleat 11 beneath the cleat 5, which brings the opposite end of the removable top against the inner face of the other upper cleat 5, and then the upwardly-inclined end of the removable top is forced down until its end underlies the adjacent cleat 5, whereupon the removable top may be shifted slightly in an endwise direction to snap both cleats 11 into engagement with the inner faces of the inner cleats 5, which operation produces bends in all of the upper corners of the bands and forces the upper portions of the ends of the crate outwardly flush with the extremities of the permanent sides 1 and the removable top will be held in place by the pressure of the fruit, vegetables, or the like without the employment of extraneous fastenings. When the removable sides have thus been fitted in place, they operate as braces to rigidly support the crate in its set-up condition, and when said sides are removed the crate may be again

folded in either direction, as indicated in Fig. 5 of the drawings, for convenience in storage or for shipment as an empty.

From the foregoing description it will be understood that the ends and two sides of the present crate are permanently connected, and therefore it is not necessary to disconnect any of these parts when it is desired to fold or collapse the crate, and the removable sides are held in place without the employment of extraneous fastening means, which materially facilitates the setting up and collapsing of the crate, and there are no fastening devices to be lost and broken. Moreover, the bands at each end of the crate embrace the same in a manner to effectually take the outward strains of the weight of the contents of the crate, thereby adding materially to the strength and durability of the latter, while at the same time imparting practically no additional weight thereto.

In the folding and unfolding of the crate, while the bands 6 constitute flexible connections between the permanent sides and the ends to permit of such folding, the folding operation is not due to any pivotal or turning movements of the bands within the staples 7, but to a flexibility or bending of the corners of the bands between the adjacent fastenings 7 and 8, carried by the permanent sides and the ends. The objection to hinged or pivotal connections between the permanent sides and the ends of the crate resides in the fact that such connections are loose and practically preclude the production of a rigid crate, while in the present construction the forcing of the ends of the crate outwardly by the introduction of the removable sides produces a flexing or bending of the pliable bands, which in turn results in the binding of the removable sides between the ends of the crate, while at the same time the connection between the permanent sides and the ends is comparatively stiff, and thus all looseness is effectually obviated.

A very important advantage of the present form of crate resides in the fact that the continuous bands form the sole connections between the permanent sides and the ends of the crate, and as these bands embrace the sides of the crate a very strong and durable structure is provided. Moreover, these fastening-bands are bendable to permit folding of the crate and in a sense constitute hinged connections between the permanent sides and the ends.

Having fully described the invention, what is claimed is—

1. A crate having opposite ends and two opposite sides permanently connected and capable of being folded at the joints between the sides and ends, cleats upon the inner faces of the ends of the crate, and removable sides having their ends externally lapped by the respective end cleats and provided with external

cleats gripped between the end cleats of the crate.

2. A crate comprising opposite ends and two opposite permanent sides, bands embracing 5 and rigidly connected to the sides in planes substantially parallel with the ends and rigidly connected thereto, the bands being pliable to permit folding of the sides and ends, and removable sides to brace the crate in its set-up 10 condition.

3. A crate comprising opposite permanent sides, ends interposed between the sides and disposed inwardly from the extremities thereof, bands embracing the end portions of the 15 sides in substantial parallelism with the sides and rigidly connected thereto and to the ends, the bands being bendable at points between the sides and the ends to permit of the latter being forced outwardly, and removable sides 20 exceeding in length the initial space between the ends of the crate and capable of being inserted between said ends to force the latter outwardly.

4. A crate comprising two permanent sides, 25 ends interposed between the sides and spaced inwardly from the extremities thereof, bands embracing and rigidly connected to the end portions of the sides in substantial parallelism with the ends with portions lying across the 30 outer faces of the ends and rigidly connected thereto, portions of the bands between the sides and the ends being bendable to permit of the ends being forced outwardly, and removable sides exceeding in length the initial 35 space between the ends of the crate and capable of being inserted between said ends to force the same outwardly.

5. A crate comprising two permanent sides, ends interposed between the sides and disposed 40 inwardly of the extremities thereof, bands embracing the end portions of the sides and rigidly connected thereto and to the ends, portions of the bands between the sides and the ends being bendable to permit of the ends 45 being forced outwardly, opposite cleats upon the inner face of each end, and a pair of removable sides exceeding in length the initial space between the ends of the crate and capable of being inserted between the ends to 50 force the same outwardly, each removable side having opposite cleats disposed inwardly from the respective ends to bear against the inner faces of corresponding cleats of the ends of the crate.

55 6. A crate comprising a pair of permanent sides, ends interposed between the sides inwardly from the extremities thereof and projected beyond the opposite edges of the sides, bands embracing the end portions of the sides 60 and lying across the projected portions of the

ends and also rigidly connected to the sides and the ends, the portions of the bands between the sides and the ends being bendable to permit of the ends being forced outwardly, and a pair of removable sides exceeding in length 65 the initial space between the ends of the crate and capable of being inserted therebetween to force the same outwardly.

7. A crate comprising a pair of permanent sides having external terminal cleats, ends 70 interposed between the sides and located inwardly from the extremities thereof, each end being projected beyond the opposite edges of the sides and provided upon its projected portions with inner and outer cleats, bands 75 embracing the sides and located in the angle between said sides and the inner faces of the cleats thereof, portions of the band lying across the outer face of the end in the angles between said end and the outer cleats thereof, 80 the bands being rigidly connected to the sides and the ends, and removable sides exceeding in length the initial space between the ends and capable of being introduced between the ends to force the same outwardly, each re- 85 movable side having external transverse cleats spaced inwardly from the ends thereof for engagement with the inner faces of corresponding end cleats.

8. A crate comprising ends, two opposite 90 permanent sides, bands embracing the end portions of the sides in planes substantially parallel with those of the ends and connected to the sides and the ends, said bands forming hinges to foldably connect the sides and ends, 95 and removable sides exceeding the initial distance between the ends and capable of being inserted between the same to force them outwardly, the bands capable of bending during the insertion of the removable sides to permit 100 yielding of the ends and to frictionally bind the removable sides between the ends of the crate.

9. A crate comprising opposite ends, two opposite permanent sides, bendable connections 105 between the sides and the ends, and two opposite removable sides exceeding in length the initial distance between the ends and capable of being forced in between the latter, the bendable connections between the ends 110 and the sides permitting of the ends being forced outwardly by the insertion of the removable sides.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in 115 the presence of two witnesses.

ELIAS M. AVERILL.

Witnesses:

E. O. SHANER,

J. M. MEENNENBERG.