March 6, 1928. 1,661,527

J. H. DE BOER

COLLAPSIBLE SHIPPING BOX

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Fig. 1.

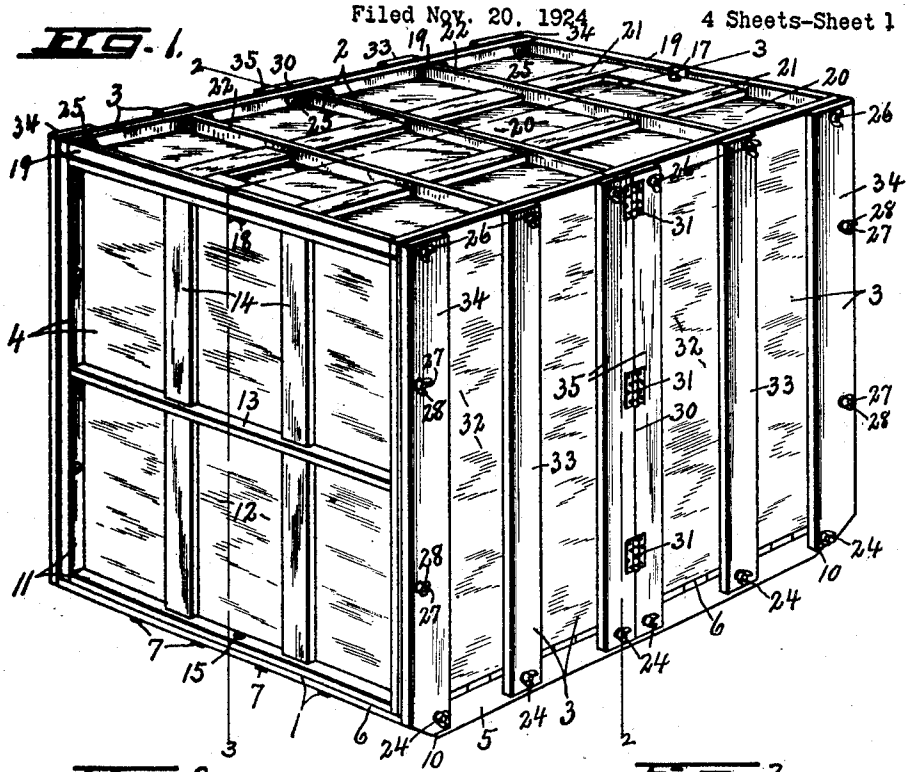


Fig. 2.

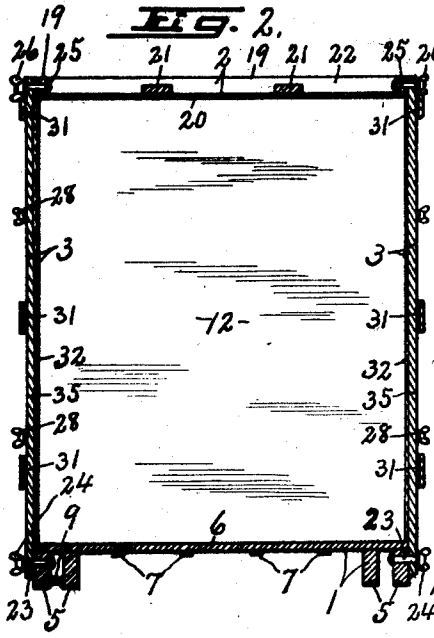
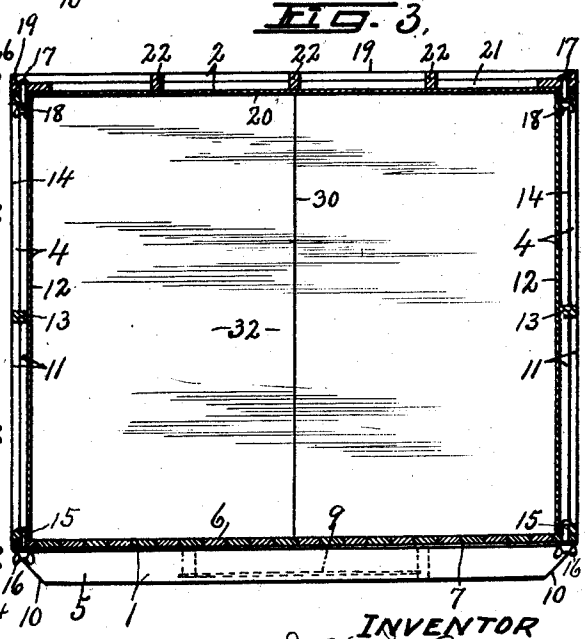


Fig. 3.



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Fig. 4.

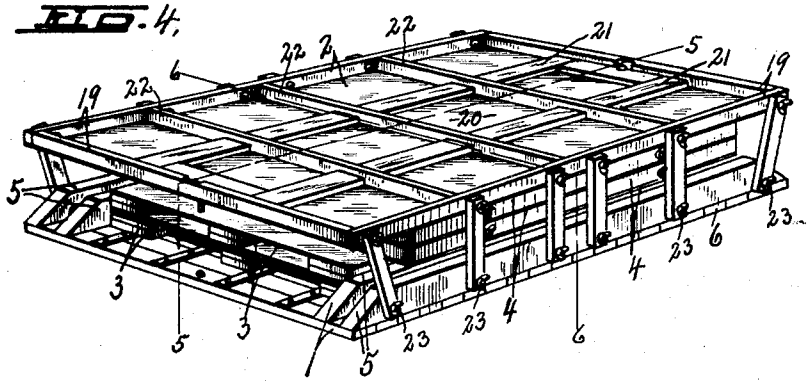


Fig. 5.

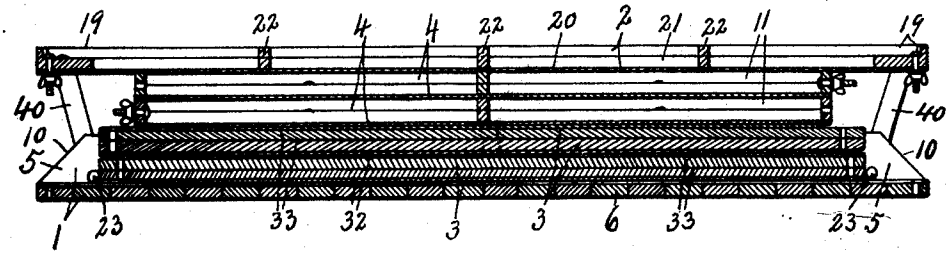
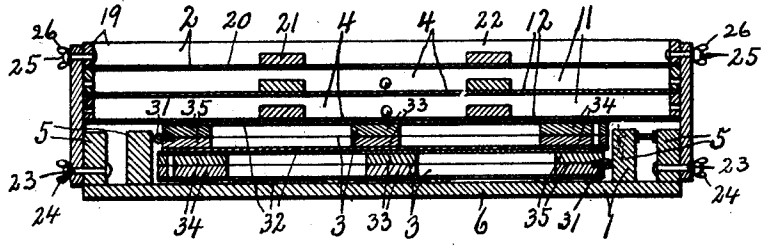


Fig. 6.



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Fig. 7.

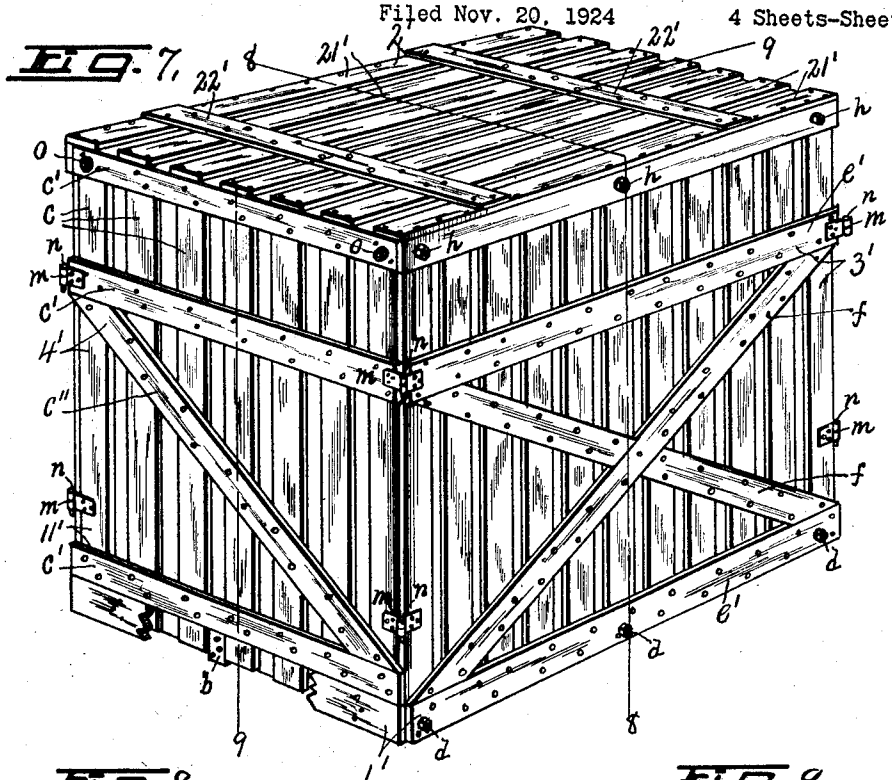


Fig. 8.

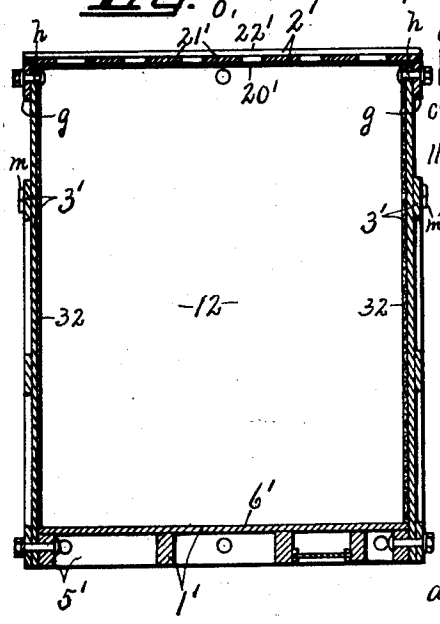
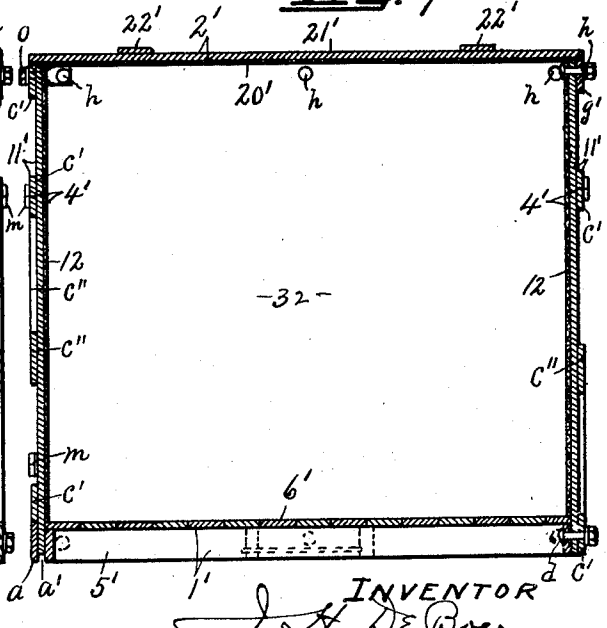


Fig. 9



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FIG. 10.

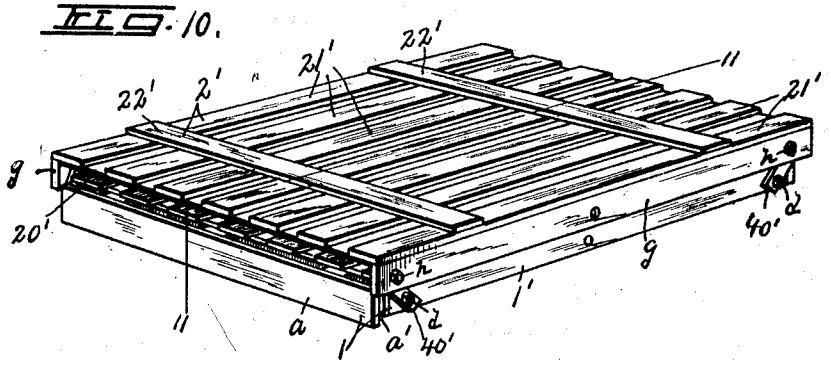


FIG. 11.

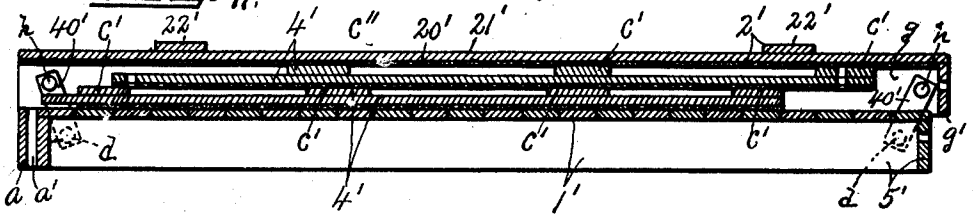
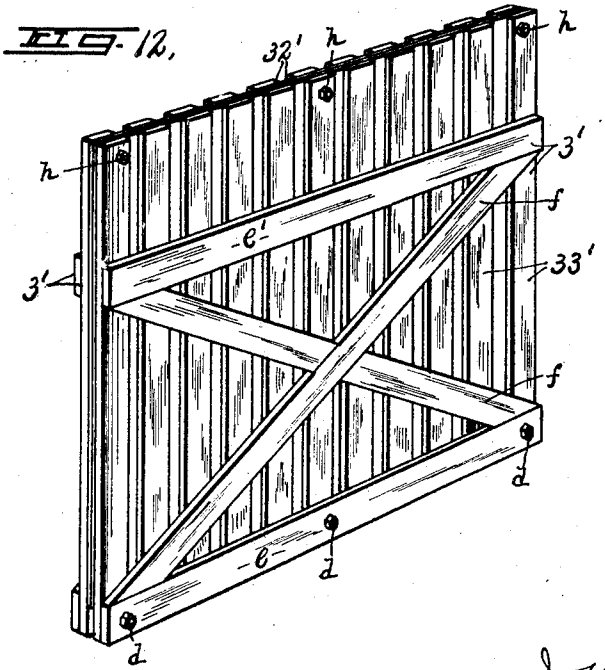


FIG. 12.



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Patented Mar. 6, 1928. 1,661,527

UNITED STATES PATENT OFFICE.

JOHN HENRY DE BOER, OF SYRACUSE, NEW YORK.

COLLAPSIBLE SHIPPING BOX.

Application filed November 20, 1924. Serial No. 751,074.

This invention relates to a collapsible shipping case adapted to be made in relatively large sizes for the transportation of furniture and analogous objects requiring careful packing for safe transportation by any of the usual carriers without marring.

These cases when properly constructed, are necessarily too expensive for destruction at the end of their destination of the contents and unless collapsible into compact space, would also involve considerable expense in return transportation when empty, and the main object of my present invention is to provide a collapsible transportation case composed of six sections or units, one each for the bottom and top, a pair of similar sections for the sides and a pair of similar end sections, all of which may be easily and quickly united at the corners by suitable clamping means to form a strong and durable structure or may be as easily detached, placed one upon the other in compact relation for return transportation when emptied, thereby permitting the indefinite re-use of the same case for the transportation of furniture and other goods and also permitting the return transportation of the empty cases at a comparatively low transportation rate such as would justify the re-use of the case.

Another object is to provide a collapsible case in which the several sections may be reversed end for end and clamped together at the corners by the same clamping means.

A further object is to arrange the holes for the clamping bolts in such manner that at least some or all of the bolts may be used for clamping the sections in knocked-down stacked positions.

Other objects and uses relating to specific parts of the different case structures will be brought out in the following description.

In the drawings:—

Figure 1 is a perspective view of a collapsible shipping case in which the several sections are assembled for use as a container for furniture or other objects.

Figures 2 and 3 are respectively, a transverse vertical sectional view and a longitudinal vertical sectional view of the same case taken respectively on lines 2—2, and 3—3, Figure 1.

Figure 4 is a perspective view of the same case collapsed with the sections stacked one upon the other and clamped together for reshipment.

Figures 5 and 6 are respectively a longitudinal vertical sectional view and a transverse vertical sectional view taken on lines 5—5 and 6—6, Figure 4.

Figure 7 is a perspective view of a slightly modified form of case having its sections assembled for use as a container for articles to be shipped.

Figures 8 and 9 are respectively, a transverse vertical sectional view and a longitudinal vertical sectional view taken on lines 8—8, and 9—9, Figure 7.

Figure 10 is a perspective view of the several sections of the case shown in Figure 7, collapsed and secured together in stacked relation.

Figure 11 is a longitudinal sectional view taken on line 11—11, Figure 10.

Figure 12 is a perspective view of two of the upright side walls of the case shown in Figure 7, clamped together.

These cases are preferably made rectangular in form and of any suitable dimensions or materials capable of being manufactured at a minimum cost and of retaining their shape and integrity under varying shipping and storage conditions and also of protecting the contents from injury.

Each case preferably comprises six units or sections, viz, a bottom section as —1—, a top section as —2—, a pair of side sections —3— and a pair of end sections —4—, as shown in Figures 1 to 4 inclusive in which the lining of each section forms the main body thereof, reinforced by suitable externals bars, or the case may be made of the same number of sections, namely, a bottom section —1′—, a top section —2′—, opposite side sections —3′— and opposite end sections —4′— in which the top, sides and end sections are composed mainly of slats in spaced relation and covered by an inner lining to form a smooth and continuous interior surface in which the articles to be shipped are placed as shown in Figures 7 to 12 inclusive.

The bottom section —1— shown in Figures 1 to 6 inclusive, consists of a rectangular frame composed of opposite pairs of similar supporting bars —5— and a floor —6—, the bars of each pair being extended along and in close proximity to the opposite lengthwise edges of the bottom section in transversely spaced relation for receiving and supporting the floor —6— which is nailed or otherwise secured to the upper

faces of the bars —5—, and preferably consists of a series of boards or planks arranged edge to edge in close juxaposition throughout the length of the bottom section, so that the outer faces of the outermost bars —5— and corresponding edges of the floor boards will lie in substantially the same vertical planes and determine the interior width of the box and also form abutments for the lower edges of the side sections.

The ends of the bottom section extend longitudinally under the lower edges of the end sections to form supports therefor.

The several boards or planks forming the floor of the bottom section —1— may be tied together by the binding strips —7— of sheet metal or equivalent material, said bars —5— and floor boards —6— being preferably made of wood or other light, strong and economical material.

If desired, the intermediate portions of the bars —5— of each pair may be used to receive interposed labels —9— of metal or other suitable material, both ends of each bar being similarly beveled at —10—, Figure 3, to permit said bars to be used as skids whereby the loaded case may be more readily moved along a floor or other support.

The end sections —4— determine the interior width and height of the case and preferably consists of rectangular frames —11— and inner linings —12— nailed or otherwise secured thereto to form a unitary part thereof, the linings —12— being braced by a central horizontal rail —13— and a pair of vertical rails —14— which also form unitary parts of their respective end sections, the upright bars —14— being arranged in spaced relation and suitably secured to the central bar —13— and lower and upper rails of the frame —11— to cooperate with the central bar —13— in bracing the frame and maintaining its rectangular form.

The lower edges of the end sections rest upon the upper faces of the adjacent portions of the floor —9— of the section —1— and are detachably secured thereto by clamping devices consisting in this instance, of bolts —15— and thumb nuts —16—, the bolts passing through registering apertures in the lower rails of the frame —11— and adjacent portions of the floor —9— of the bottom section —1— with the thumb nuts on the underside where they are accessible for tightening and loosening and thereby attaching and detaching the end sections to the bottom sections.

The top section —2— is also rectangular and co-extensive with the area of the bottom section —1— so that its opposite end edges may rest upon the upper edges of the end sections —4— where it is secured to end sections by clamping means consisting of bolts —17— and nuts —18—, the bolts —17— being passed through registering apertures in the top rail of the end frame —11— and overlying portions of the top section with the nuts on the under-side of the top rail of the frames of the end sections where they are accessible for tightening and loosening and permitting the top sections to be removed and replaced at will.

As illustrated, the top section preferably consists of a rectangular frame —19— and an inner lining —20— together with lengthwise bars —21— and cross bars —22—, the bars of each set being arranged in parallel spaced relation and secured to each other at their intersections and to the side and end rails of the frame —19— of which they form a unitary part, the inner lining —20— being also nailed or otherwise secured to the inner faces of the frame —19— and bars —21— and —22— to form a smooth inner surface for the top section.

The side sections —3— are also rectangular in cross section and of somewhat greater area than the interior longitudinal vertical area of the case so that their marginal edges may overlap upon the opposite lengthwise edges of the bottom section —1— and top section —2— and also upon the opposite upright edges of the end sections —4—.

The overlapping portions of the side sections and adjacent portions of the outer bars —5— of the bottom section —1— are provided with registering bolt openings for receiving clamping bolts —23— having external nuts —24— by which the bolts may be tightened and loosened for permitting the side sections to be attached to and detached from the bottom section.

The upper edges of the side sections and adjacent side rails of the top frame —19— are also provided with registering bolt holes for receiving bolts —25— having external nuts —26— by which the bolts may be tightened and loosened to permit the top sections to be removed and replaced from and upon the side sections.

The end edges of the side sections —3— and adjacent upright rails of the frames —11— of the end sections —4— are also provided with registering bolt openings for receiving clamping bolts —27— having external nuts —28— which may be tightened and loosened to permit the side sections —3— to be removed or replaced from and upon the end sections.

Each side section is similar and is preferably divided vertically at —30— midway between its ends for convenience of handling and stacking in collapsed position, the opposite halves being flexibly connected at the joint by external hinges —31— which permits them to be folded flatwise one upon the other.

As illustrated, each side section is composed of an inner lining —32 —and upright brace bars —33—, —34— and —35— ar-

ranged in parallel spaced relation so that portions of the end bars —34— and the adjacent portions of the lining —32— may overlap upon the opposite upright edges of the end sections —4—, the central bars —35— being arranged in close relation at opposite sides of a division line —30— to afford suitable attaching means for the hinges —31—.

It will now be seen that when the parts are assembled, the floor panels —6—, side panels —32—, top panel —20—, and end panels —12— constitute a practically continuous smooth and unbroken interior lining for the case against which the articles to be shipped may be packed with a minimum liability of becoming marred or broken and while the floor panel —6— is preferably made of wood or plank for strength and wear, it together with the remaining panels may be made of any other light, strong and durable material such for example, as sheet metal, heavy cardboard or the like, all of said panels being reinforced by the external brace bars of their respective sections previously described.

It will be seen from the foregoing description that either end section may be removed without displacing any of the other sections which permits the articles to be closely and compactly packed within the case in a manner similar to the process of filling a furniture van and when the case is filled the previously removed end head or section may be restored and clamped in place by the bolts —17— and —27— with the assurance that every article within the case will be protected from injury from contact with external objects and if properly packed, against friction one with the other.

In a similar manner, either of the side sections may be removed without disturbing any of the other sections in case it should be desired to pack the case from the side instead of from the end.

The bolt holes which receive the clamping bolts for clamping the various sections together are arranged in such manner that either section may be reversed end for end and placed in operative position with the assurance that its bolt openings for receiving the clamping bolts will be registered with other bolt openings in the adjacent portions of the other sections.

In assembling the various sections of the case, the bottom section is first laid flatwise upon the floor or other support, the end sections are then placed in operative position and clamped in place with their lower ends resting upon the end edges of the floor of the bottom section after which the top section may be placed in operative position and clamped in place upon the upper edges of the end sections following which, the side sections are placed in operative position and clamped in place in the manner described to the adjacent sides of the frames of the bottom and top sections and also to the adjacent edges of the frames of the end sections thereby producing a rigid case which with the load therein may be handled with safety in shipping or in storage with a minimum liability of injury to the contents or to the case.

When the case with the contents therein reaches its destination and the contents are removed by detaching one of the side sections or end sections or all of the sections in the manner previously explained, said detached sections may be stacked flatwise one upon the other in the manner shown in Figures 4 to 6 inclusive by simply laying the bottom section in an inverted position flatwise upon a floor or other support, then folding the two halves of each side section, one upon the other and laying them in a folded portion flatwise upon the inner face of the floor between the innermost bars —5— after which, the end sections are laid flatwise one upon the other and upon the uppermost folded side section ready to receive the top section which is then placed flatwise upon the uppermost end section following which, the several sections in their collapsed relation are secured together by tie bars —40— arranged in spaced relation along the longitudinal edges of the bottom and top sections and bolted thereto by some of the previously described clamping bolts using such bolt holes in the bottom and top sections as may be most convenient for the proper disposition of the tie bars —40—, thus permitting the collapsed sections to be handled as a unit in return transportation.

The construction set forth in Figures 7 to 12 inclusive is somewhat similar to that previously described except that a greater number of brace bars or slats for supporting the inner linings of the top, sides and end sections are used and the side sections are made as rigid units instead of being divided midway between their ends, and the opposite halves are not foldable one upon the other as in the construction shown in Figures 1 to 6 inclusive.

The bottom section —1′— consists of a rectangular frame —5′— and a floor —6′— preferably of boards, plank or equivalent strips secured edge to edge to the upper face of the frame which latter is provided at one end with a supplemental end bar —*a*— held in spaced relation to the adjacent portions of the frame —5′— by spacing blocks —*b*— preferably at the center and ends of the adjacent portions of the frame to permit the lower ends of the slats of the adjacent end section to be inserted in the intervening spaces as a part of the means for retaining the said end section in operative position when the several sections are assembled for

use and also to permit said end section to be removed and replaced without disturbing any of the other sections as for example, when furniture or other articles are being packed within or removed from the case.

This removable end section —4'— consists of a rectangular frame —11'— of upright slats —*c*—, lower, intermediate and upper cross bars —*c'*— and a diagonal brace bar —*c''*— between the lower and intermediate bars —*c'*— together with an inner lining —12— which is secured by any suitable fastening means to the inner faces of the upright slats —*c*— and is substantially co-extensive with the interior cross sectional area of the case, the cross bars —*c'*— and brace bar —*c''*— being mailed or otherwise secured to the outer faces of the upright slats —*c*— to hold the latter in parallel spaced relation.

The upper edge of the upper cross bars —*c'*— is disposed in substantially the same horizontal plane as the upper edges of the side sections and the opposite end section, while the lower cross bar —*c'*— is disposed in a horizontal plane some distance above the lower edges of the upright slats —*c*— which therefore, project below the lower cross bar for insertion into the spaces —*a'*—, see Figure 11, between the end bar —*a*— and adjacent portion of the bottom frame —5'—.

The other end section —4' —is similar to that previously described in that it consists of a series of upright slats held in spaced relation by lower, intermediate and upper cross bars —*c'*— and a brace bar —*c''*— by the lower cross bar —*c'*—, and is arranged in the plane of the bottom section opposite the bar —*a*—.

The lower edge of this end section overlaps upon the corresponding edge of the bottom section and is secured thereto by bolts —*d*—.

The side sections —3'— are similar and each comprises a series of upright slats —33'— held in parallel spaced relation by lower and upper cross bars —*e*— and —*d'*— and diagonal brace bars —*f*— as shown in Figures 7 and 12, the inner faces of the slats of each section being covered, with a lining —32'— of relatively thin wood, metal or heavy cardboard substantially co-extensive with the longitudinal vertical sectional area of the interior of the case.

As shown more clearly in Figures 7 and 11, the top section —2'— comprises a series of longitudinally extending slats —21'— held in parallel spaced relation by cross bars —22'— and provided with an inner lining —20'— of relatively thin wood, sheet metal or heavy cardboard, all of said parts being nailed or otherwise secured to each other.

The top section is also provided with opposite lengthwise side flanges as —*g*— and an end flange as —*g'*— adapted to overlap upon the outer faces of the upper ends of the slats of the side sections and one of the end sections, when the parts are assembled, said flanges forming a unitary part of the top section.

These flanges are provided with bolt openings for receiving bolts —*h*— by which the top section may be detachably clamped to the adjacent portions of the side and end sections.

The adjacent edges of the side and end sections are connected by hinge clips —*m*— having removable connecting pins —*n*— which when inserted in the eyes of the hinge sections, firmly hold the side and end sections together at the corners but may be withdrawn when desired to permit the side and end sections to be detached one from the other as for example, when collapsing the case and stacking the several sections as shown in Figures 10 and 11, or the side sections may be clamped together as shown in Figure 12, by portions of the same bolts —*d*— and —*h*— preparatory to stacking the sections one upon the other for re-shipment in close compact space.

It will be observed that the bottom section —1'— has a marginal flange extending around all four sides thereof in addition to the extra cross bar —*a*— forming recesses —*a'*—, Figure 11, so that if it should be desired to remove the adjacent end section —4'— to permit the goods to be packed within or removed from the case, it is simply necessary to remove the corresponding locking pins —*n*— and the nuts —*o*— of the corresponding bolts whereupon the upper portion of said end section may be drawn outwardly and then lifted to remove the lower ends of its slats from the recesses —*a'*— leaving the remaining sections of the case rigidly connected to each other.

In order to collapse the crate for re-shipment, the bolts —*h*— for fastening the top section to the side sections and one of the end sections may be removed to permit the top section to be displaced and laid aside after which the locking pins —*h*—, nuts —*o*— and nuts —*d*— of the corresponding bolts are removed thus permitting the side and end sections to be removed.

The bottom section is then laid flatwise upon the floor and the end sections placed flatwise one upon the other and upon the floor of the bottom section following which the top section may be placed flatwise upon the uppermost end section and clamped thereto by tie pieces —40'— using some of the bolts —*d*— and —*h*— in the previously formed openings in the bottom and top sections to clamp the tie pieces in place.

The side sections which have been previously clamped together as shown in Figure 12, may be laid flatwise upon the top sec-

tion or if desired may be placed between the bottom and top sections with the end sections by simply using longer tie pieces —40′—.

The bolts for receiving the nuts —*o*— may be fastened to the inner faces of the adjacent portions of the side pieces and extended through openings in the adjacent end section for receiving said nuts.

In both modifications of the case, it will be observed that at least one of the end sections may be removed without displacing any of the other end sections to permit the packing and removal of the goods within and from the case and that the bottom, top, side and end sections are made as separate units detachably connected to each other so that they may be stacked flatwise one upon the other for re-shipment in relatively small compact space thus permitting an indefinite re-use of the parts of the same case.

It will also be observed that when the several sections are assembled in a manner described, the linings on the inner faces thereof enjoin each other at the corners and form a smooth inner surface for protecting the contents from injury by abrasion or by external elements.

The binding strips —7— between the corners —5— serve not only to bind the floor boards together but also to reinforce the same against inward compression or breaking particularly when the shipping case is transported by means of a hand truck in which case the portion of the bottom between the corners —5— would in all probability rest upon the upstanding rail on the rear of the truck and in that case might break the bottom boards unless some such reinforcement was provided.

In Figures 7 to 12 inclusive, the recesses —*a*′— between the outer rails —*a*— and inner rails —5′— form upright sockets in which the lower ends of the slats of the side and end sections are slidable so that when inserted in the sockets they are locked in place against lateral movement between the inner and outer rails —*a*— and —5′— without interfering with the free upward displacement of the side and end sections from the bottom section when it is desired to remove the sections for stacking one upon the other.

I claim:

In a collapsible shipping box composed of separably connected sections, a bottom section having a floor and underlying shipping bars therefor, opposite upright side sections each comprising two substantially equal parts hingedly connected together and having their lower edges overlying upon the outer faces of the bottom section, opposite upright end sections rising from corresponding ends of the bottom section, a top section mounted upon the upper edges of the end sections and having opposed outer faces overlaid by the upper edges of the side sections, said side sections, end sections and the top section being provided with inner linings coextensive with the areas thereof, clamping devices for connecting and disconnecting the side and end sections to the bottom section and additional clamping devices for connecting and disconnecting the top section to the side and end sections.

In witness whereof I have hereunto set my hand this 5th day of November 1924.

JOHN HENRY DE BOER.