C. W. LEWIS.

BOX STRUCTURE.

APPLICATION FILED MAR. 7, 1906.

951,136.

Patented Mar. 8, 1910.

2 SHEETS—SHEET 1.

Fig: 1.

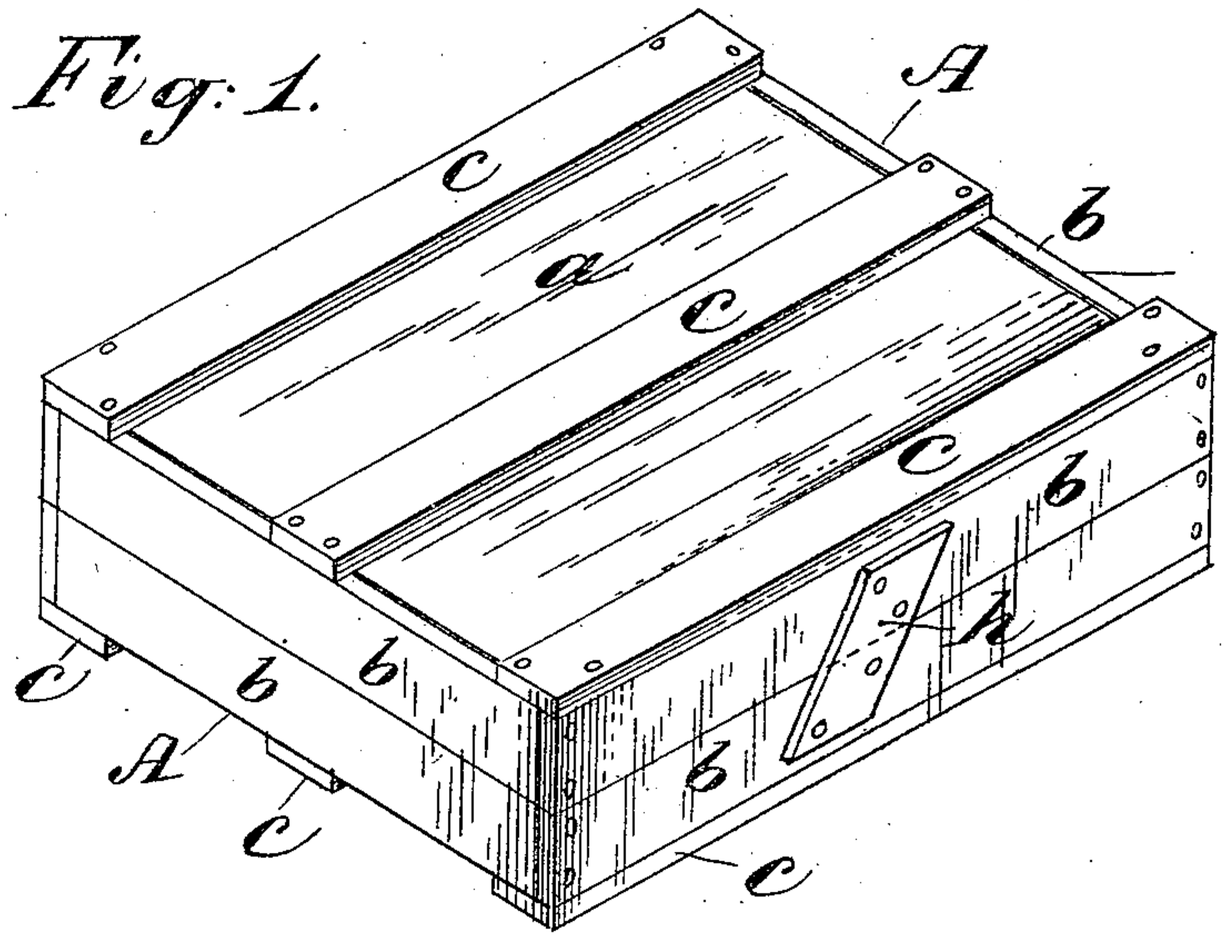
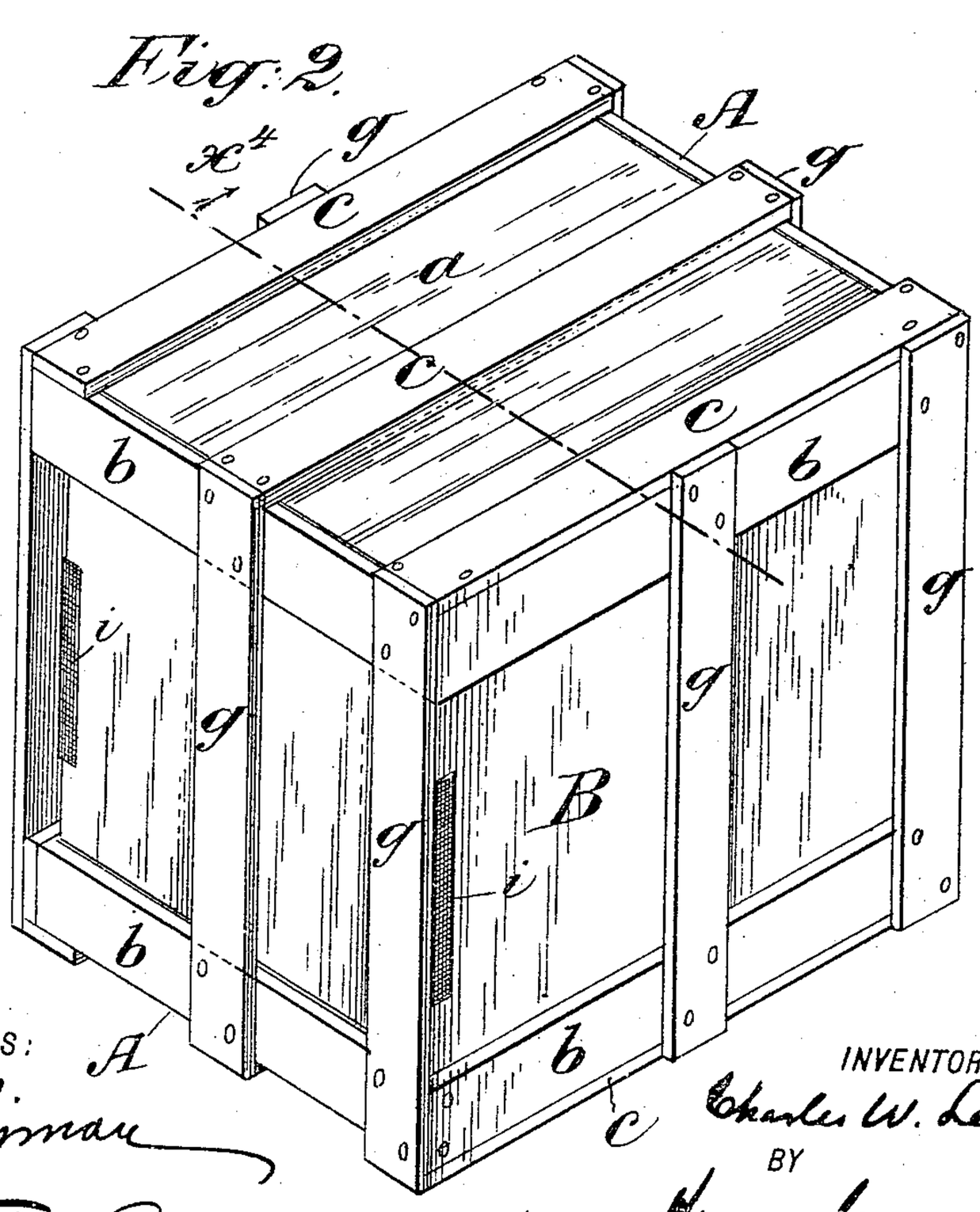


Fig: 2.



WITNESSES:

S. H. Hibben

INVENTOR

Charles W. Lewis

BY

Henry Connett

ATTORNEY

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2 SHEETS—SHEET 2.

Fig: 3.

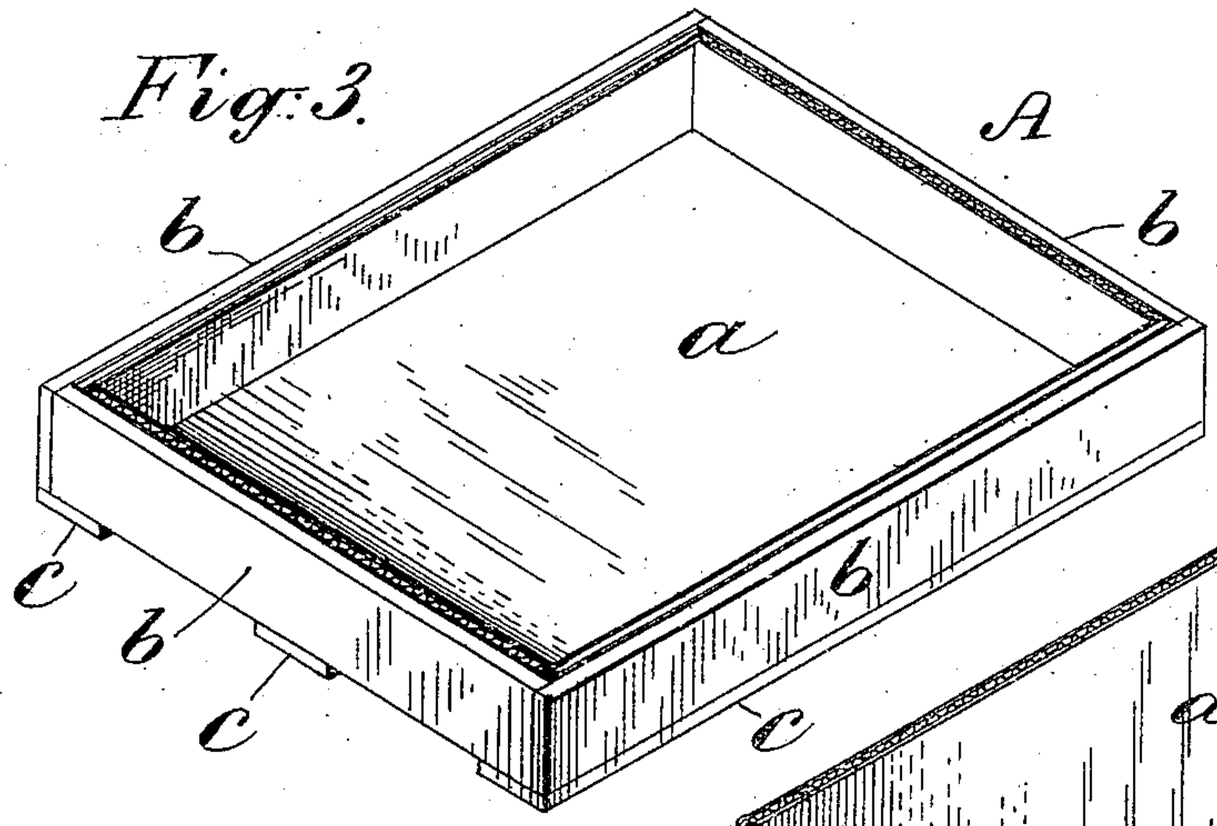


Fig: 5.

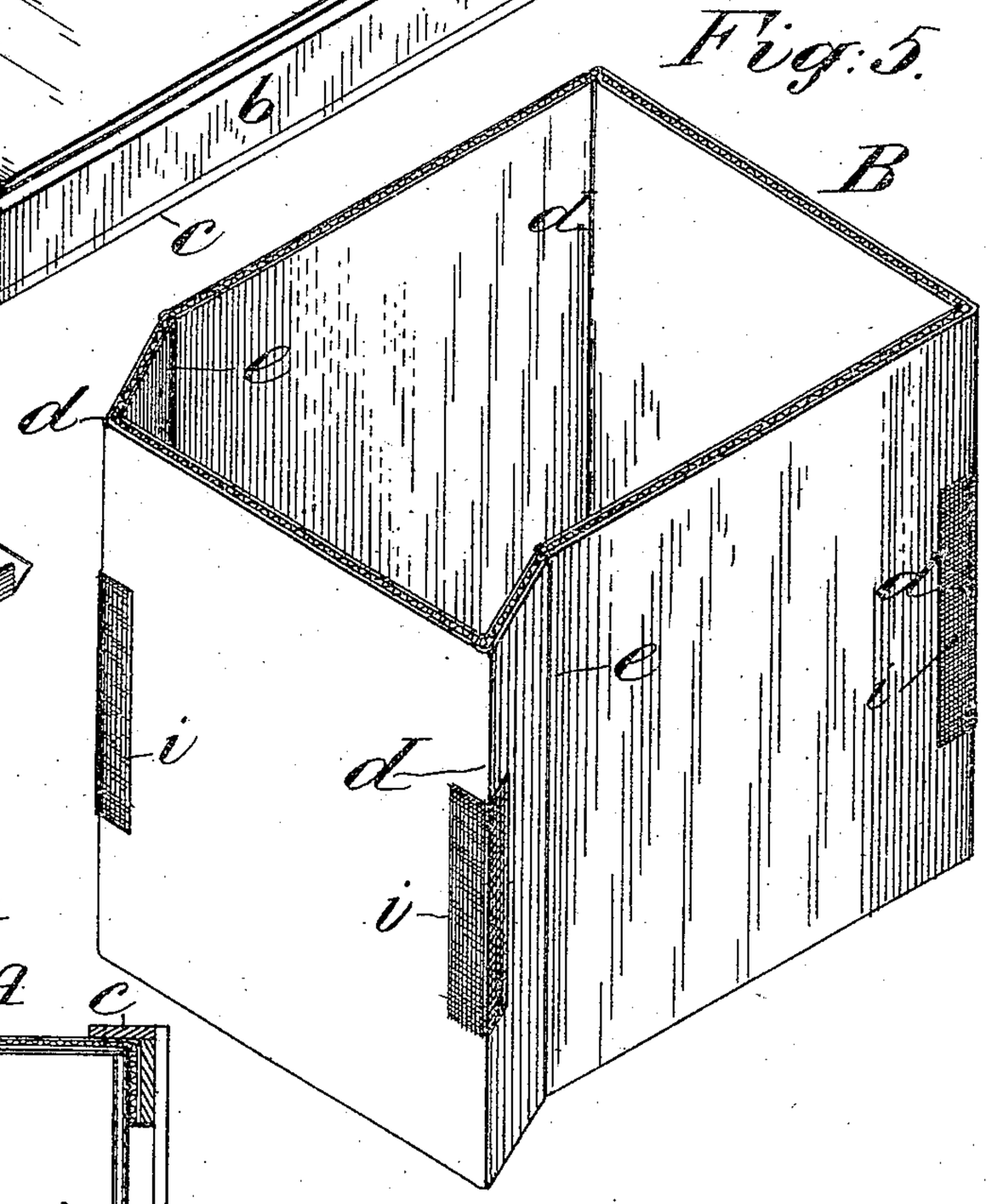


Fig: 7.

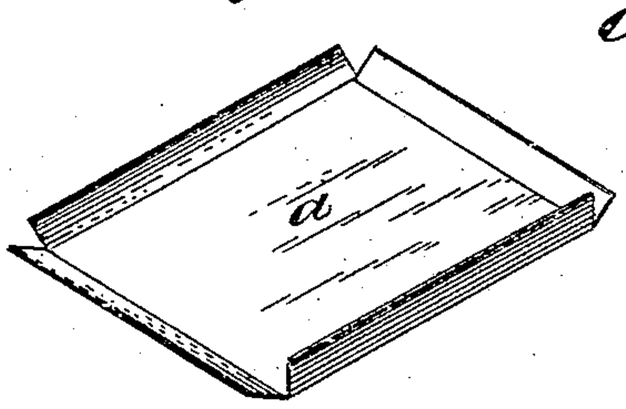


Fig: 4.

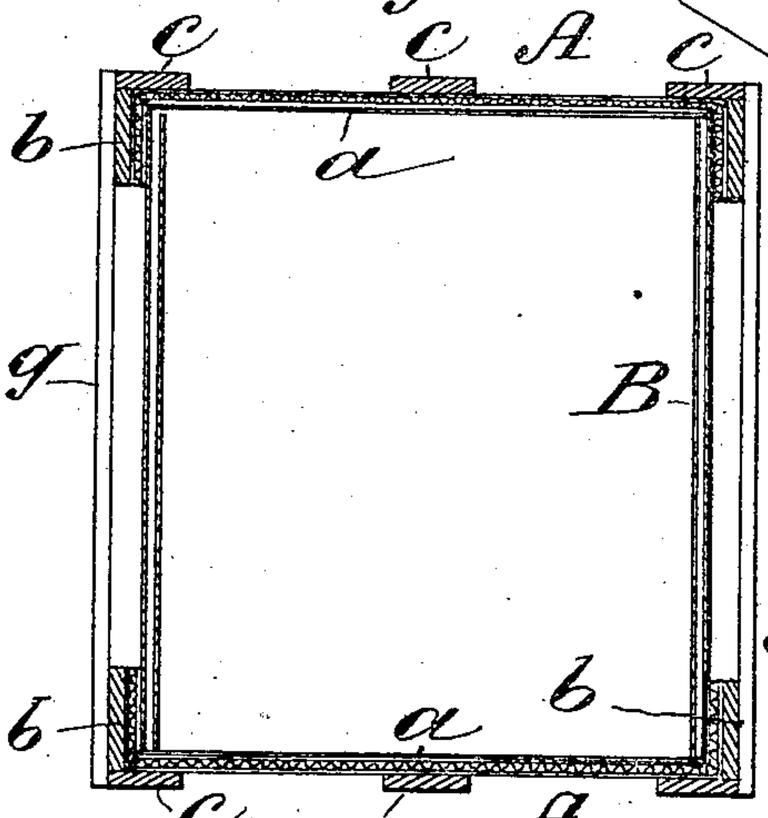
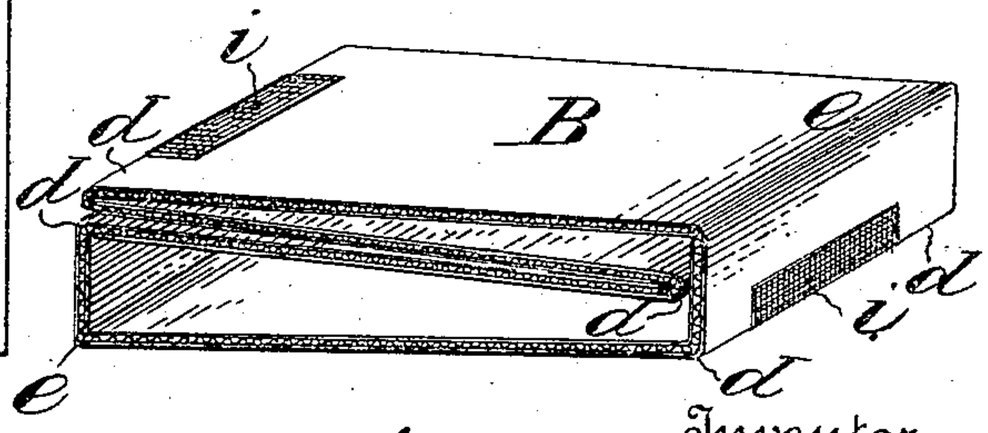


Fig: 6.



Witnesses

Inventor

Charles W. Lewis

By his Attorney

Henry Connett

UNITED STATES PATENT OFFICE.

CHARLES W. LEWIS, OF NEW YORK, N. Y., ASSIGNOR TO THE THOMPSON AND NORRIS COMPANY.

BOX STRUCTURE.

951,136. Specification of Letters Patent. Patented Mar. 8, 1910.

Application filed March 7, 1906. Serial No. 304,686.

To all whom it may concern:

Be it known that I, CHARLES W. LEWIS, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Box Structures, of which the following is a specification.

This invention relates to certain improvements in that class of box structures which are provided with removable flanged covers, and the object of the invention is, in part, to provide, for use in such structures, a box cover of novel and improved construction, reinforced in such a manner as to afford increased strength and rigidity and, in part, to provide a novel and improved construction of collapsible or foldable body portion, whereby it is rendered possible to compactly arrange the body portion of the structure when the same is collapsed or folded for storage or shipment.

The invention consists in certain novel features of the construction, and combinations and arrangements of the several parts of the improved box structure, whereby certain important advantages are attained, and the device is rendered simpler, less expensive, and otherwise better adapted and more convenient for use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In the accompanying drawings which serve to illustrate my invention, and wherein I have illustrated one embodiment thereof—Figure 1 is a perspective view showing the improved box structure in collapsed or knock-down arrangement; Fig. 2 is a view similar to Fig. 1, but showing the improved box structure assembled or set up in condition for use; Fig. 3 is a perspective view showing one of the end or cover sections of the improved structure, detached; Fig. 4 is a vertical section, drawn to a reduced scale, and taken through the improved box structure in the plane indicated by the line x^4 in Fig. 2; Fig. 5 is a perspective view showing the body portion of the improved structure in expanded or opened condition; Fig. 6 is a perspective view showing said body portion in collapsed or folded condition, and—Fig. 7 is a perspective view, drawn to a reduced scale, and showing the formation of the lining for the end or cover section of the structure.

In these drawings I have shown my improvements embodied in a box or crate, the walls of which are made from that variety of corrugated compressible material, commonly termed "cellular board", which is formed from two spaced plies of smooth paper, between which is arranged a crimped or corrugated paper sheet, my present improvements being particularly well adapted for use in connection with such material, although I do not desire to be understood as limiting myself in this respect.

As shown in these views, the improved box structure comprises two similar end or cover sections A, A, each of which has an inner compressible lining *a* formed of a rectangular piece of cellular or corrugated board having projecting wings or flaps a^1, a^1, extended along its several edge portions and separated from its main central portion by means of scores or creases, which permit said flaps or wings a^1, a^1 to be bent over at angles from said main central portion so as to form integral pendent flanges extended at angles from the edges of the lining, as clearly shown in Figs. 3, 4 and 7. The flanged lining *a* thus formed, is provided with a rectangular frame *b* produced from connected wooden strips, said frame being extended around the pendent flanges a^1, a^1 of the lining *a* in such a manner as to hold the same securely in position at right angles to the main central portion of the lining, as clearly shown in Fig. 3, and overlapping the corrugations of the material from which said flanges are formed in such a manner as to effectively reinforce the edge portions of such material and prevent splitting thereof, and upon the outer surface of the lining are extended spaced wooden strips *c*, *c* the opposite ends of which are nailed or otherwise secured to opposite ends of the rectangular wooden frame or reinforce *b*, in such a manner as to securely hold the lining *a* against displacement from said frame or reinforce. As herein shown, two of said wooden strips *c*, *c* are extended along opposite sides

of the rectangular frame b, so as to overlie and protect the corresponding joints between the main central portion and flanges a^1, a^1 of the lining a, while a third strip c is extended across the central part of the rectangular frame or reinforce b, parallel with but spaced apart from the first-named oppositely arranged strips, in such a manner as to effectively stiffen said frame or reinforce and protect the central part of the lining a.

The lining a being formed from compressible material is adapted to be readily pressed within the rectangular frame or reinforce b, and the latter being made to fit with sufficient tightness upon said lining, will thereafter be securely held in place thereupon, so that accidental separation of the reinforce from the lining is prevented without the employment of extraneous fastening means.

B represents the body section or portion of the improved box structure which, as herein shown, is also made from cellular board in rectangular form with its opposite ends open to receive the end or cover sections A, A and provided, at its several corners with flexible joints d, d, affording connection between its sides, which joints may be conveniently made in the nature of scores or creases, and which permit the body section or portion to be flattened down in a well known way when in collapsed or compacted condition.

As herein shown, the improved box structure has an elongated rectangular form in cross section, and the body section or portion B is provided at corresponding oppositely arranged points in its opposite longer sides B^1, B^1 with vertically directed flexible joints e, e, parallel with its corner joints d, d and which may also be conveniently made in the form of scores or creases similarly to said corner joints d, d, and which serve to divide each of the opposite longer sides B^1, B^1 of said body section or portion B into two parts or members which are capable of being folded relatively to each other so that, when the body section or portion B is to be collapsed, as shown in Fig. 6, its said longer sides B^1, B^1 are caused to occupy a space substantially equal to its shorter sides, and are prevented from projecting beyond the edges of said shorter sides,

By this construction, the body section or portion B may be given a depth or height greater than its shorter transverse measurement, and may yet be so compactly folded together when collapsed as shown in Fig. 6 as to permit it to be entirely housed and inclosed within the flanges of the end sections A, A which may thus be fitted together as shown in Fig. 1, and secured in relation by means of strips h, so as to afford a simple and practical closure or container for housing and protecting the collapsed body section or portion B during storage or shipment, the said strips or cleats h being capable of ready removal so as to permit convenient separation of the end or cover sections for the removal of said body section B therefrom when it is desired to set up the structure for use.

In setting up the improved box structure for use, the body section or portion B is expanded or opened up as shown in Fig. 5, so that its walls stand substantially at right angles to each other, after which one of the end or cover sections A is fitted upon the lower open end of the said body section, so as to afford a bottom for the box or crate, the compressible material from which the lining a of said end or cover section is produced permitting of fitting said end or cover section A upon the open lower end of the body section B with sufficient tightness and security to prevent accidental displacement of the parts. After the box or crate has been set up in this manner and filled with the goods to be contained therein, the other end or cover section A is fitted tightly over the open top end of the body section or portion B, and forms an effective cover therefor, its compressible lining a permitting it to be fitted tightly and securely around the top of the body section in such a manner as to afford a close joint between the parts.

In order to permit of securing the end or cover sections against displacement from the body section or portion B, I provide a plurality of cleats or strips g, g which are vertically extended along the corners and at the central portions of the side walls of the structure as herein shown, their upper and lower ends being removably secured by means of tacks or nails to the sides of the rectangular frames or reinforces b, b of the respective upper and lower end or cover sections A, A, in such a manner as to hold the parts securely in relation during shipment, and also to brace and stiffen the structure against crushing strains. I do not desire to be understood, however, as limiting myself to the employment of the arrangement of these strips or cleats g, g, herein shown, although such strips or cleats add greatly to the strength and rigidity of the structure and, being capable of ready removal, do not materially interfere with the opening of the improved box or crate. Where such strips or cleats are desirable, the rectangular frames or reinforces b, b of the end or cover sections A, A afford a convenient means of attachment therefor, so that the liability of damage to the contents of the box or crate is avoided.

The employment of the end or cover sections having the rigid external reinforces or frames b as above described, affords such a degree of stiffness and rigidity in the struc-

ture as is desirable for the effective protection of the contents, and the employment of the soft compressible linings *a*, *a*, within such rigid frames or reinforces *b*, *b* insures against damage to the contents from contact with the walls of the crate and permits the members or sections to be fitted together more accurately than would otherwise be possible.

The employment of the intermediate or auxiliary creases or joints *e*, *e* in the opposite longer walls of the body section or portion B also affords a material advantage, since where these joints or creases are employed in a structure of elongated rectangular cross sectional form, the said body portion may be given a height or depth equal to its greatest transverse measurement, and may still be housed and inclosed within the end or cover sections A, A, when folded or compacted as shown in Fig. 6.

The thickness of the frames or reinforces *b*, *b* of the end or cover sections is also such as to protect the lateral surfaces of the body section B against damage from contact with a supporting surface when the improved box structure is rested upon its sides, and said reinforces or frames also prevent injury to the linings *a* or their flanges and serve to support the cellular walls out of contact with the surface whereon the improved structure is rested in such a manner as to prevent access of water thereto when the structure is exposed to the weather.

From the above description of my improvements it will be seen that the box structure made according to my invention is of an extremely simple and comparatively inexpensive nature and is particularly well adapted for use by reason of its lightness and strength, and it will also be obvious that the structure is capable of some modification without material departure from the principles and spirit of the invention, and for this reason I do not desire to be understood as limiting myself to the precise form and arrangement of the parts herein set forth in carrying out my invention in practice.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. A box structure having an open-ended body section, and end sections removably held upon the opposite open ends of said body section being capable of independent removal from the body section and each such removable end section having an external reinforcing frame formed from connected strips of stiff material, and a lining formed from corrugated paper board held within the reinforcing frame and extended across the same in position to cover the open end of the body section, the reinforcing frames of the respective end sections having portions projecting at angles around the sides of the linings and arranged to take outside the walls of the body section around the opposite open ends thereof and overlapping the corrugations of the linings to prevent splitting thereof.

2. A box structure having an open-ended body section, and end sections removably held upon the opposite open ends of the body section being capable of independent removal from the body section and each such removable end section having an external reinforcing frame formed from connected strips of thick and stiff material, and a lining formed from corrugated paper board held within the reinforcing frame and extended across the same in position to cover the open end of the body section and provided with integral angular flanges extended around its edges and arranged in contact with the outer surfaces of the walls of the body section around the open end thereof, the reinforcing frames of the respective end sections having thickened portions projecting around the outer surfaces of the edge flanges of the lining and adapted to support the body section out of contact with a supporting surface when the structure is rested upon its side and overlapping the corrugations of said edge flanges of the linings to prevent splitting thereof.

3. A box structure having a collapsible body section elongated in cross section and open at its ends and having its longer sides provided with flexible joints at points intermediate between its corners, and end sections removably held upon the opposite open ends of the body section and capable of independent removal therefrom and provided with flanges extended around their edges fitted upon the outer surfaces of the body section around the opposite open ends thereof, and adapted to be fitted together to form a closure to receive and house said body section when the same is collapsed.

4. A box structure having an open-ended body section, and end sections removably held upon the opposite open ends of the body section, each such removable end section being capable of independent removal and having an external reinforcing frame formed from connected strips of stiff material, and a lining formed from corrugated paper board connected with and held within the reinforcing frame and extended across the same in position to cover the open end of the body section, the reinforcing frames of the respective end sections projecting around the sides of the linings and overlapping the corrugations thereof to prevent splitting of said linings, and being arranged to take outside the walls of the body section around the opposite open ends thereof, and strips extended across the outer sides of the body

section between the reinforcing frames of the respective end sections and having their end portions lapped upon and secured to the outer surfaces of the said reinforcing frames to hold said end sections removably in position upon the open ends of the body section.

In witness whereof I have hereunto signed my name this 6th day of March 1906, in the presence of two subscribing witnesses.

CHARLES W. LEWIS.

Witnesses:
HENRY CONNETT,
H. G. HOSE.