Nov. 26, 1929. W. H. CHAMPLIN 1,737,186

BOX

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Fig. 1.

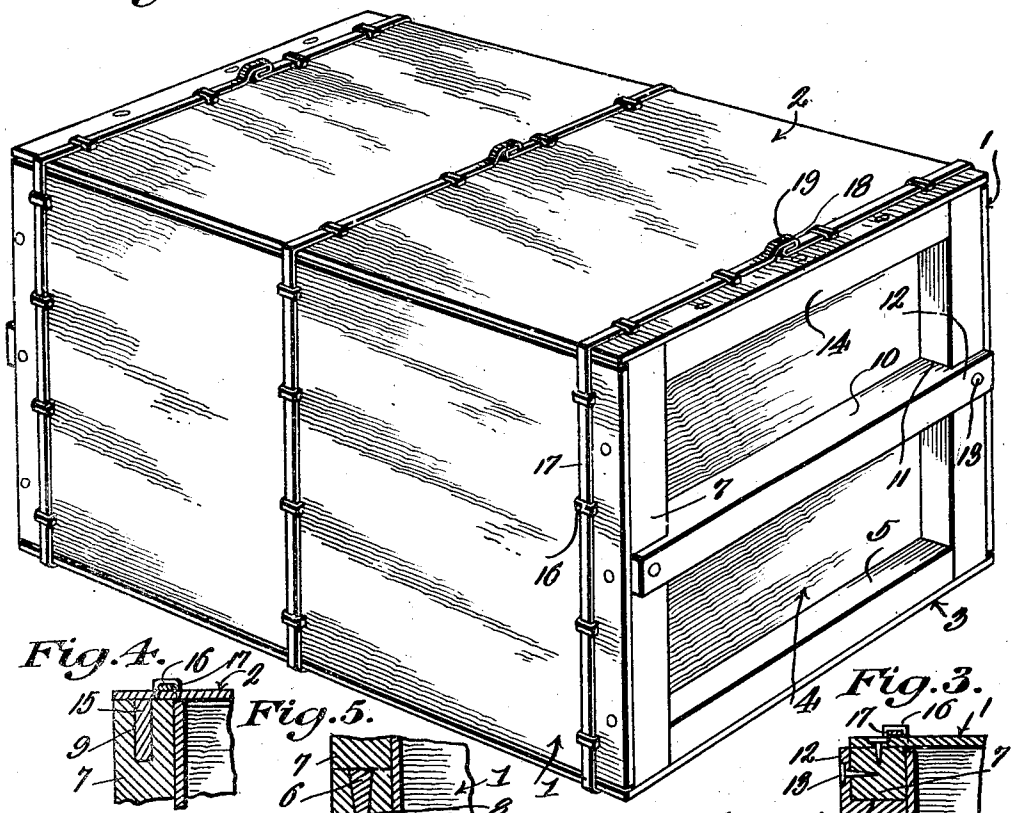


Fig. 4.

Fig. 5.

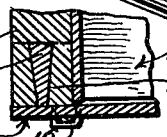


Fig. 3.

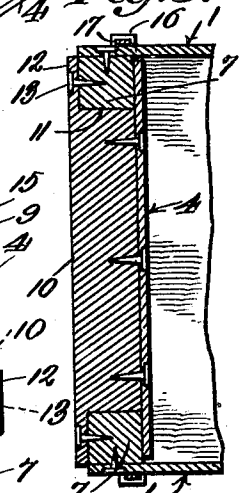


Fig. 2.

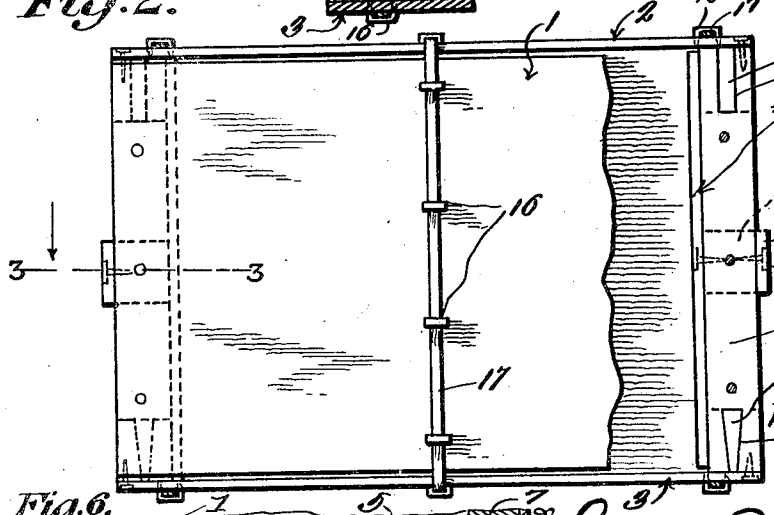
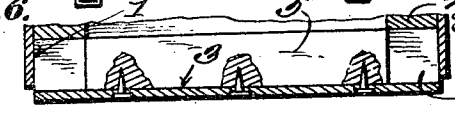


Fig. 6.



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BOX

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Fig. 7.

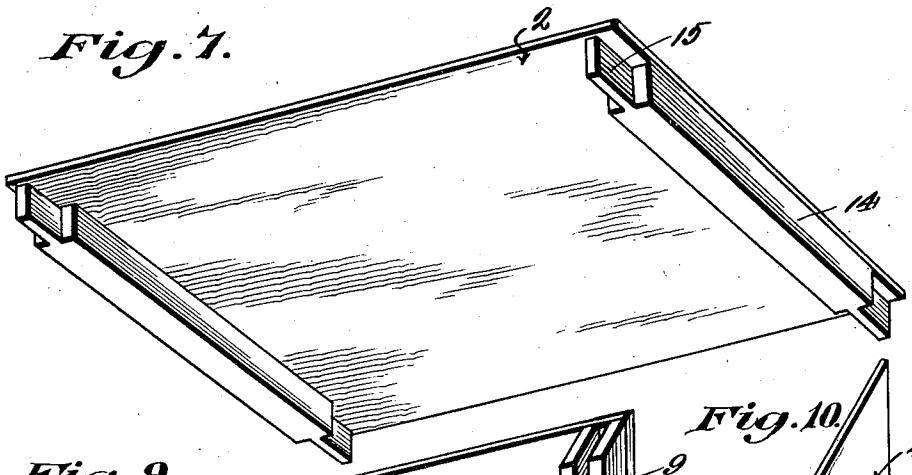


Fig. 9.

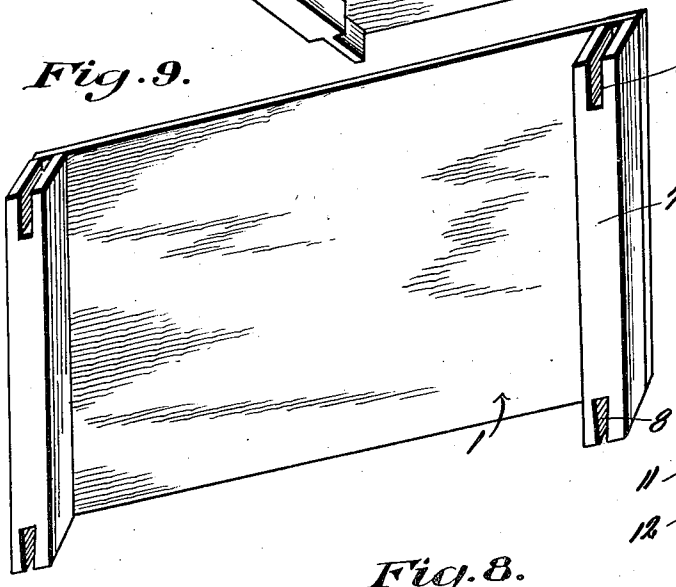


Fig. 10.

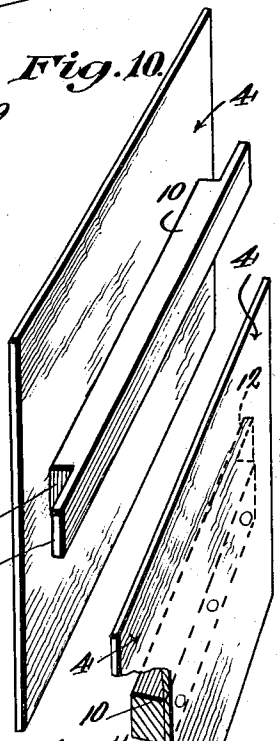


Fig. 8.

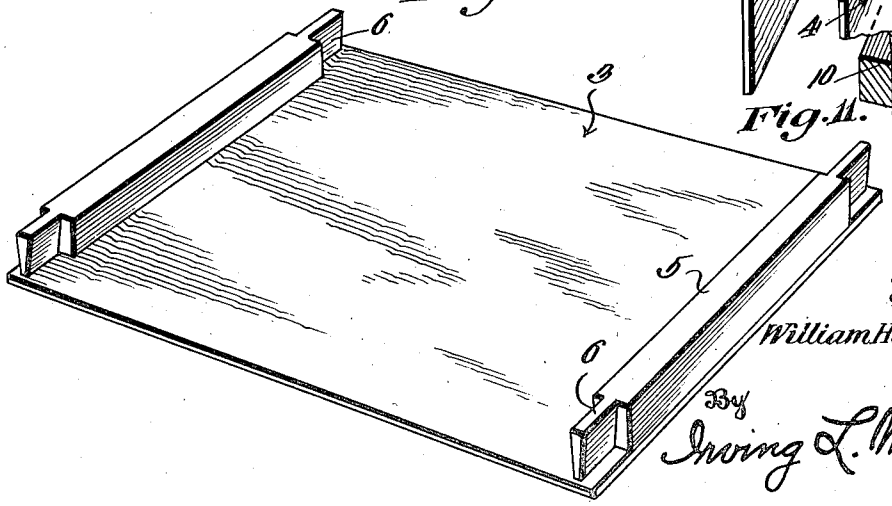
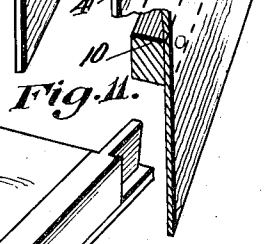


Fig. 11.



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Patented Nov. 26, 1929 1,737,186

UNITED STATES PATENT OFFICE

WILLIAM H. CHAMPLIN, OF ROCHESTER, NEW HAMPSHIRE

BOX

Application filed March 6, 1928. Serial No. 259,574.

This invention relates to improvements in knock-down boxes and more particularly to that type in which the top, bottom, side, and end walls are initially separated and are adapted to be assembled and secured against separation, in the setting up of the box, and one of the objects of the present invention is to provide a novel connection between the side walls and the bottom of the box of such character as to insure against upward displacement as well as longitudinal and inward displacement of the side walls with respect to the bottom, after assemblage of the side walls with the bottom, and both during the operation of setting up of the box and in the use of the box during and after shipment.

Another object of the invention is to provide novel means whereby the end walls of the box may be very readily and quickly assembled with the side walls and bottom of the box, the end walls embodying means coacting with the side walls to prevent inward as well as outward displacement of the end walls after they have been inserted into position between the ends of the side walls, so that there will be no liability of collapse or tilting of these end walls while the box is being set up.

Another object of the invention is to so construct the means which is carried by the end walls of the box for coaction with the side walls to prevent displacement of the end walls, that this means may also serve, by the use, in connection therewith, of simple securing elements, such as nails, as a means for positively preventing any outward displacement of the side walls of the box and, inasmuch as the fastening means serves, as will presently be described, to secure together the end walls and side walls of the box, and the side walls are, as stated, restrained against upward displacement by coacting parts upon the side walls and bottom of the box, the end walls, by reason of their connection with the side walls, will likewise be restrained against upward displacement. Therefore the present invention contemplates the provision of a box which, when set up, will be exceptionally substantial and in which box the side and end walls and the bottom will be so securely connected in assembled relation with respect to one another as to permit of packing of the box with the commodity to be shipped, with expedition and without fear that the box will collapse when the commodity is introduced into the box hurriedly and with the exercise of little care, which is necessary if the packing is to be expeditiously performed.

Another object of the invention is to provide a box of the knock-down type above described of such construction that when set up, packed, and closed, it will be exceptionally durable and substantial and withstand the rough usage to which it will be subjected in shipping, the box being at the same time so constructed that, when it is desired to disassemble the component walls of the box for the purpose of returning it or for storage, this may be readily accomplished without any likelihood of destroying or mutilating any of the component parts of the box and likewise in an expeditious and convenient manner.

Another object of the invention is to provide a knock-down box of the class referred to above so constructed that, while simple fastening elements such as nails, are employed in securing together the component parts of the box, these nails or other securing elements will be few in number and may be removed with great ease when it is desired to disassemble the component walls of the box.

While the accompanying drawings and the description which is to follow, constitute a disclosure of the preferred embodiment of the invention, it will be understood that various changes may be made within the scope of what is claimed.

In the accompanying drawings:

Figure 1 is a perspective view of the box, embodying the invention, set up and closed for shipment;

Figure 2 is a side elevation of the box in set up condition, a portion of the adjacent side wall being cut away to illustrate more clearly the connection provided between the side walls and the bottom of the box;

Figure 3 is a horizontal sectional view

through one end of the box taken substantially on the line 3—3 of Figure 2 looking in the direction indicated by the arrow;

Figure 4 is a detail horizontal sectional view through one upper corner of the box;

Figure 5 is a similar view through one lower corner of the box;

Figure 6 is a view partly in vertical section and partly in elevation illustrating the construction of the lower portion of the box at one end;

Figure 7 is a perspective view of the top of the box;

Figure 8 is a similar view of the bottom of the box;

Figure 9 is a perspective view of one of the side walls of the box;

Figure 10 is a perspective view of one of the end walls of the box, looking at the outer side thereof;

Figure 11 is a fragmentary perspective view of one of the end walls of the box looking at the inner side thereof.

As is usual, the box embodying the invention comprises side walls 1, a top 2, a bottom 3, and end walls 4. All of these walls may consist of a single rectangular piece of wood, or any one or more of the walls may be constructed of a plurality of assembled pieces of wood, this depending entirely upon the size of the box and the judgment of the manufacturer. By reference to Figures 1, 2, 5, 6 and 8 of the drawings, it will be observed that a cleat 5 is secured to the upper side of the bottom 3 at each end thereof and that these cleats have their outwardly presented faces substantially in registration with the end margins of the said bottom, each cleat being provided at each end with a dovetail tenon 6 and these tenons terminating, at their outer ends, nearly flush with the longitudinal margins of said bottom. As will be observed by reference to Figures 2, 3, and 9 of the drawings, cleats 7 are secured to the inner face of each side wall 1 of the box and extend vertically with their outer faces substantially in registration with the vertical end edges of the side wall, and each of these cleats is formed in its lower end with a dovetail mortise indicated by the numeral 8 and in its upper end with a plain mortise 9, the cleats terminating at their upper and lower ends substantially flush with the upper and lower edges of the respective side wall. From the foregoing and by reference to Figure 2, 5 and 6 of the drawings, it will be evident that the side walls 1 are assembled with the bottom 3 by the interfitting of the lower ends of the cleats 7 of the side walls, in which the mortises 8 are formed, with the tenoned ends 6 of the cleats 5 upon the bottom 3, this assemblage of the side walls with the bottom being effected by disposing the side walls in upright position with the mortises 8 opposing the outer ends of the tenons 6 of the cleats 5 at the respective side of the bottom 3, and shifting the side wall 1 in an inward direction to effect interfitting of the tenons and mortises. It will also be evident at this point that when the lower ends of the cleats 7 upon the side wall 1 are in this manner connected with the ends of the cleats 5 upon the bottom 3, the lower ends of the said cleats 7 will rest squarely in engagement with the upper surface of the bottom 3 and the said cleats 7 will be securely held assembled with the cleats 5 so that there can be no upward displacement of the side walls 1 with respect to the bottom 3 and likewise so that the side walls will be held, in the assembling or setting up of the box, in a true upright position. It will also be evident that the inwardly presented sides of the cleats 7 abut, at their lower ends, against the shoulders which are formed at the ends of the cleats 5, in the formation of the tenons 6 and that those faces of the cleats 7 which are presented toward the respective ends of the box structure as a whole will be flush with or occupy a common plane with the corresponding faces of the cleats 5 and the advantage of this construction will presently be set forth.

By reference to Figures 1, 2, 3, 10 and 11 of the drawings, it will be observed that there is secured, to the outer face of each end wall 4, a cleat 10 which is of substantially the same cross sectional dimensions as the cleats 5 and 7 except as regards its thickness dimension which is slightly greater than that of the cleats 7. The cleat 10 extends transversely horizontally of the end wall 4 midway between the upper and lower edges thereof and is formed in each end with a recess 11 proviring a tongue 12 at each end of the cleat. The recesses 11 are formed in the inner sides of the cleats 10 and therefore the tongues 12 are in spaced relation to the outer faces of the respective end walls 4 and parallel thereto, and in practice the recesses 11 will be formed of such width that the inner sides of the tongues 12 will be spaced from the outer face of the respective end wall 4 a distance equal to the thickness of the cleats 7 upon the side walls 1. It will now be evident, and particularly by reference to Figures 1 and 3 of the drawings, that the end walls 4 of the box are assembled with the side walls and bottom 3 by sliding the end walls downwardly into place with the vertical marginal portions of their outer faces riding against the inner faces of the cleats 7 and with the tongues 12 riding against the outer faces of said cleats. In the final position of each end wall, it will rest at its lower longitudinal edge upon the upper side of the bottom 3 of the box and at its outer face and vertical margins, against the inner faces of the cleats 7, the end walls being retained in upright position and against any inward tilting or collapse, through the engagement of the tongues 12

with the cleats 7. With the bottom, side walls, and end walls, assembled as above described and as illustrated in the several figures of the drawings, the box may be completed for the purpose of packing, by driving nails or other fastening elements 13 through each of the tongues 12 and into the respective cleat 7 and at this point it will be evident that in this simple manner and by the use of a single one of the fastening elements 13 in connection with each of the tongues of the cleats 10, the side walls 1 are securely connected with the end walls 4 so that there can be no outward displacement of either side wall and, inasmuch as each side wall is restrained against upward displacement with respect to the bottom 3 of the box, through the engagement of the tenons 6 in the mortises 8, and the end walls 4 are secured to the side walls 1 through the medium of the fastening elements 13, the said end walls 4 are restrained from any upward displacement and likewise, the side walls 1 are restrained from outward displacement such as would cause disengagement of the lower ends of the cleats 7 from the respective ends of the cleats 5. In this manner the entire assemblage of walls is rendered exceptionally firm and rigid and at the same time this result is accomplished without resort to any complicated fastening elements or the necessity of positively securing any of the component parts together except by the use of the fastening elements 13 which, as stated above, are driven through the tongues 12 and into the cleats 7. The body of the box, as thus set up, is in every respect, sufficiently substantial to permit of its being packed without the exercise of any special care at the time of introducing the commodity to be shipped, into the box, although other extraneous means are employed, as will presently be explained, for the purpose of binding the structure and protecting it from damage during shipment.

As illustrated in Figures 1, 2, 4 and 7 of the drawings, cleats 14 are secured to the under side of the top 2 of the box at each end thereof and the outer faces of these cleats are in registration with the end margins of said top. Each of these cleats is formed at its ends with tenons 15 which terminate approximately at the longitudinal margins of the top 2 and which seat snugly in the mortises 9 in the upper ends of the cleats 7 upon the side walls 1, when the top 2 is disposed in place upon the open top of the body structure above described.

By reference to Figures 1, 2, 3, 4, and 5 of the drawings, it will be observed that rows of staples 16 are driven into the side walls and top and bottom of the box near the ends of the structure and at the middle thereof, and in preparing the box for shipment, metal straps 17 are threaded through these staples and are drawn tightly into binding engagement about the box structure and the ends of each strap are brought together and preferably interlocked and overlapped as indicated by the numeral 18 and secured by a suitable fastener 19. At this point it will be evident that the straps 17 serve to securely bind the box and retain the top 2 in place as well as relieving the fastening elements 13 and the interfitting mortises and tenons, from a considerable part of the strain. It will also be evident from the foregoing that when it is desired to disassemble the component parts of the box, this may be readily accomplished by removing the fastening elements 19, separating the ends of the straps and withdrawing the straps, and then withdrawing the fastening elements 13, after which the component parts of the structure may be separated in a manner which will be obvious from the foregoing description of the manner of their assemblage.

It will be understood of course that, in general practice, the box will be placed upon the market in shook form.

Having thus described the invention, what I claim is:

1. In a box structure of the class described, a bottom, side walls, and end walls, cleats upon said bottom and side walls having mutually interlocking portions restraining the side walls from upward, inward, and endwise displacement with respect to the bottom, and coacting means upon the side walls and end walls restraining the side walls against outward displacement and the end walls against outward, inward, and upward displacement with respect to the side walls.

2. In a box structure of the class described, a bottom, side walls, and end walls, coacting mortise and tenon members upon said bottom and side walls restraining the side walls from upward, inward, and endwise displacement with respect to the bottom, and coacting means upon the side walls and end walls restraining the side walls against outward displacement and the end walls against outward, inward, and upward displacement with respect to the side walls.

3. In a box structure of the class described, a bottom, side walls, and end walls, cleats upon the bottom having dovetail tenons, cleats upon the side walls having dovetail mortises fitting the tenons, the interfitting of the tenons and mortises constituting means for restraining the side walls from upward displacement and from endwise diplacement, and the engagement of the cleats serving to prevent inward displacement of said side walls, and coacting means upon the side walls and end walls restraining the side walls against outward displacement and the end walls against outward, inward, and upward displacement with respect to the side walls.

4. In a box structure of the class described,

a bottom, side walls, and end walls, cleats upon the upper side of the bottom at the ends thereof and each provided at each of its ends with a dovetail tenon, cleats upon the inner side of each side wall at the ends thereof and each provided at its lower end with a dovetail mortise to accommodate a respective one of the tenons, the ends of the cleats upon the bottom at the opposite sides of the tenons constituting shoulders against which the cleats upon the side walls abut to prevent inward displacement of the side walls, the inter-engagement of the mortises and tenons constituting means for preventing endwise and upward displacement of the side walls, and coacting means upon the side walls and end walls restraining the side walls against outward displacement and the end walls against outward, inward, and upward displacement with respect to the side walls.

5. In a box structure of the class described, a bottom, side walls, and end walls, cleats upon said bottom and side walls having mutually interlocking portions restraining the side walls from upward, inward, and endwise displacement with respect to the bottom, and means carried by the end walls and coacting with portions of the side walls to provide for sliding insertion of the end walls into position and constituting likewise means for restraining the end walls against inward and outward displacement, the said means upon the end walls comprising a cleat upon each wall, and a tongue at each end of each cleat for engagement with end portions of the side walls and for the passage therethrough of a securing element whereby to prevent outward displacement of the side walls with respect to the end walls.

6. In a box structure of the class described, a bottom, cleats upon the upper side of the bottom at the ends thereof, side walls, cleats upon the inner faces of the side walls at the ends thereof, the outer ends of the first mentioned cleats and the lower ends of the second mentioned cleats having interfitting dovetail mortise and tenon connection to provide against upward displacement of the side walls with respect to the bottom, end walls disposed against the inner sides of the cleats upon the side walls at each end of the structure, a transverse cleat upon the outer face of each end wall recessed at its ends to accommodate the cleats upon the side walls at the respective end of the structure and to provide tongues engaging over the outer sides of the cleats upon the side walls, and securing elements driven through the tongues and into the cleats upon the side walls.

7. In a box structure of the class described, a bottom, side walls, end walls, and a top, cleats upon said bottom and side walls having mutually interlocking portions restraining the side walls from upward, inward, and endwise displacement with respect to the bottom, cleats upon the end walls having tongues overlapping and secured to the ends of the side walls and restraining the side walls against outward displacement and the end walls against outward, inward, and upward displacement with respect to the side walls, coacting means upon the top and the side walls for restraining the top against longitudinal and transverse displacement, and means circumscribing the said bottom, top, and side walls and binding the same in their assembled relation.

8. In a box structure of the class described, a bottom, side walls, end walls, and a top, cleats having coacting mortise and tenon members and mounted upon the said bottom and side walls and restraining the side walls from upward, inward, and endwise displacement with respect to the bottom, coacting means upon the side walls and end walls restraining the side walls against outward displacement and the end walls against outward, inward, and upward displacement with respect to the side walls, cleats upon the under side of the top and the said side walls having mutually interfitting portions for preventing longitudinal and transverse displacement of the said top, guiding and retaining means upon the outer sides of the side walls, the bottom, and the top, and binding straps removably assembled with said means and surrounding the wall assemblage including the side walls, top and bottom.

In testimony whereof I affix my signature.

WILLIAM H. CHAMPLIN.