May 24, 1955 J. W. LADD 2,709,020

CLEATED PLYWOOD BOX

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Fig. 1.

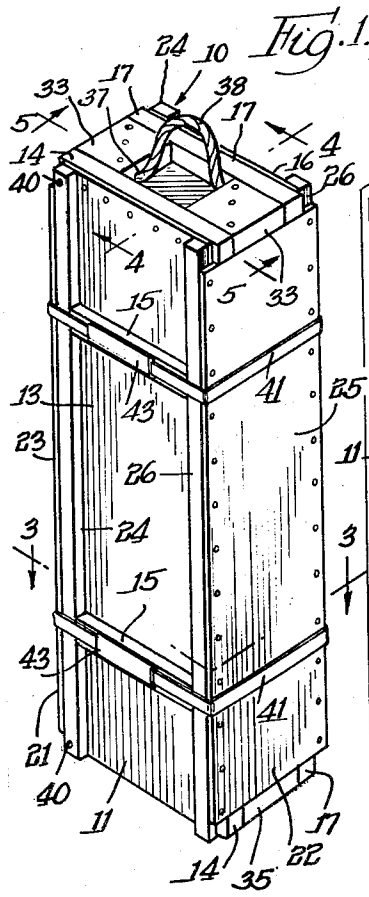


Fig. 2.

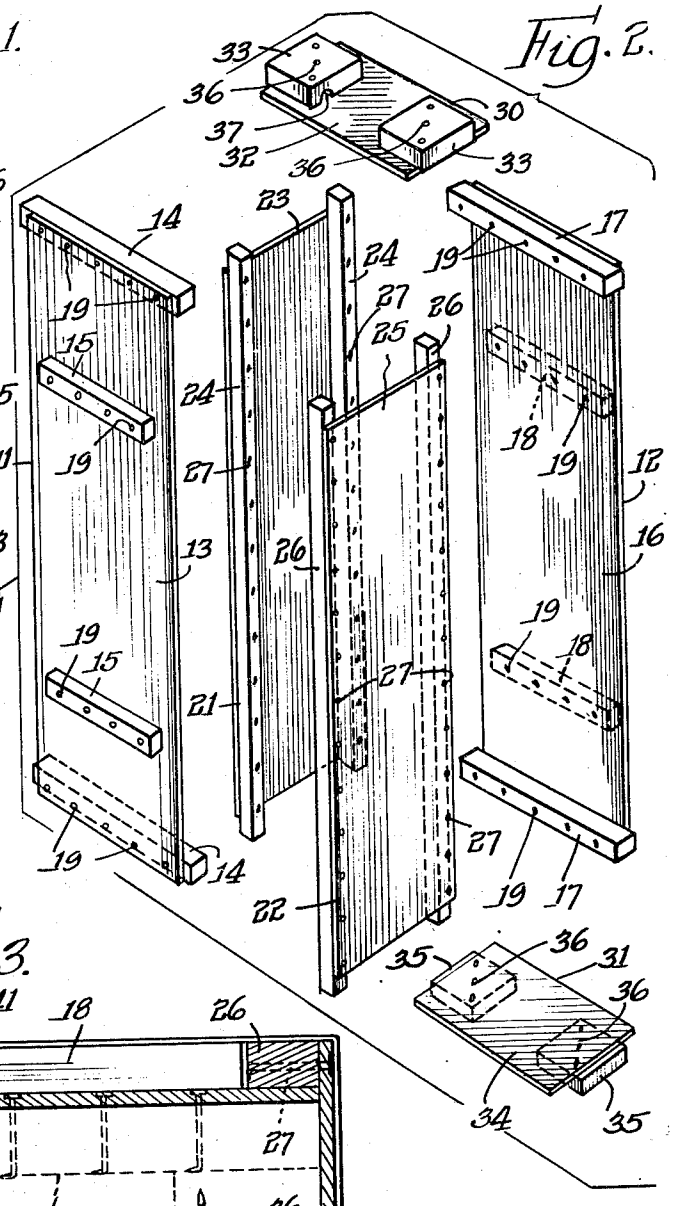
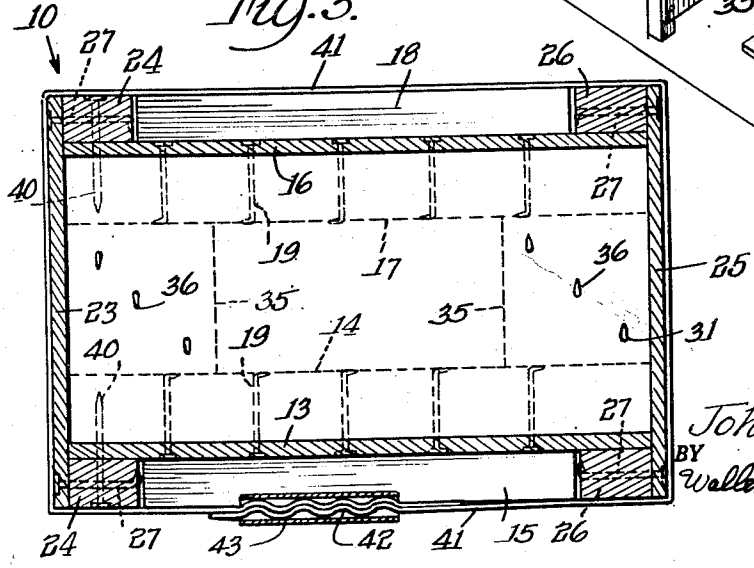


Fig. 3.



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Fig. 4.

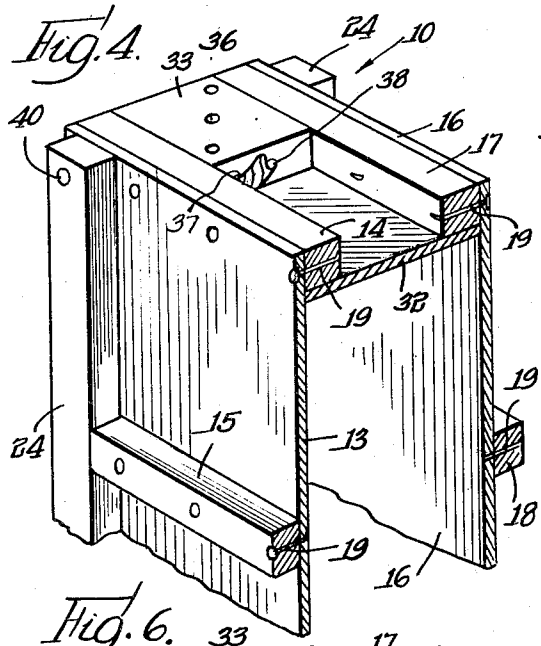


Fig. 5.

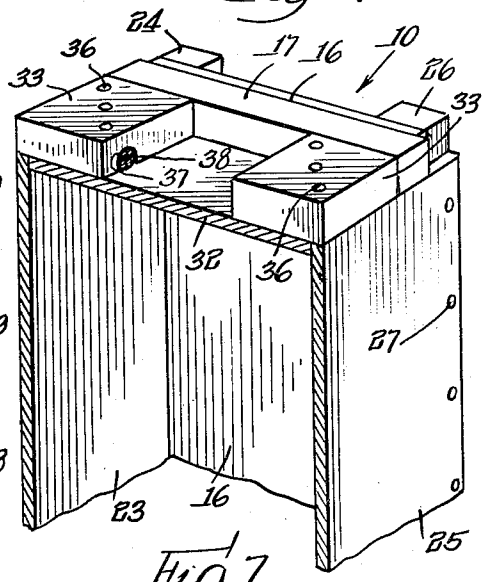


Fig. 6.

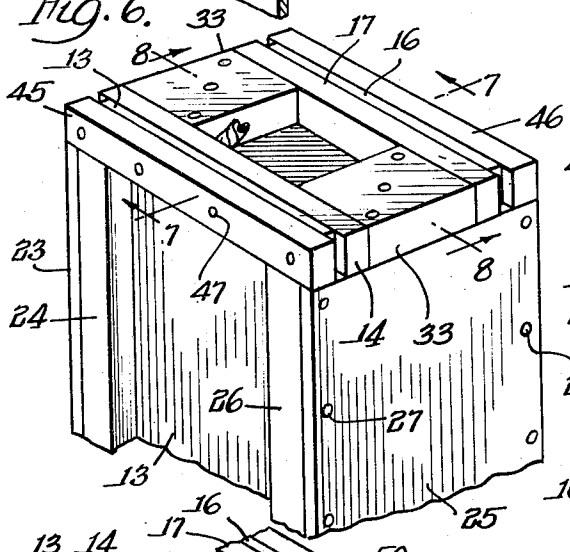


Fig. 7.

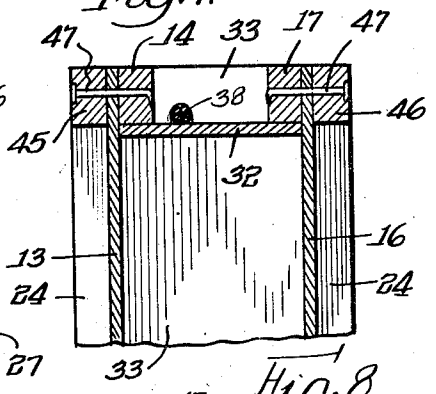


Fig. 8.

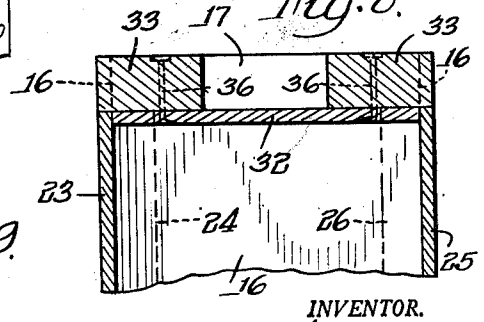
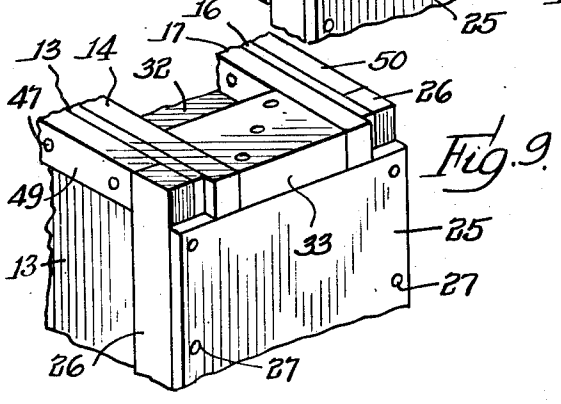


Fig. 9.



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2,709,020

CLEATED PLYWOOD BOX

John W. Ladd, Oak Park, Ill.

Application May 4, 1951, Serial No. 224,471

4 Claims. (Cl. 217—12)

This invention relates to cleated plywood boxes for packaging and shipment purposes.

The principal object of this invention is to provide an improved cleated plywood box which will take prolonged rough handling and keep major shock away from its contents, which is strong but yet light in weight, which presents a smooth interior, which has minimum overall dimensions with maximum internal dimensions, which may be shipped and stored in knockdown condition or partially assembled nested condition thereby saving storage and shipping space, which is simple to assemble without the use of nails or the like, which may be readily filled and packed in partially assembled condition, which may be quickly opened, which may be readily opened for inspection purposes and the like and readily reclosed without impairment of box strength, which utilizes a minimum of lumber footage, which eliminates the necessity for metal hardware such as hinges or hasps, and which is inexpensive to manufacture and assemble.

Briefly, the cleated plywood box of this invention includes a first pair of opposed side members each including a plywood panel and a cleat secured at each end edge of the panel on the inside thereof and extending beyond the side edges. It also includes a second pair of opposed side members each including a plywood panel and a cleat secured at each side edge of the panel on the inside thereof. It further includes a pair of opposed end members each including a plywood panel and a block at each of two opposed edges of the panel on the outside thereof which extend over said edges and terminate short of the exposed edges. These members are preferably all prefabricated and the various cleats and blocks may be permanently secured to the plywood panels as by clinch nailing. This assures strong box members capable of rough handling which may be readily and inexpensively manufactured on a production basis. These prefabricated members may be stored and shipped in knockdown condition which affords considerable saving in handling cost.

In assembling the cleated plywood box of this invention the cleats of one of the second pair of opposed side members are located outside of the first pair of opposed side members and overlie the side edges of the panels thereof. If desired, at this stage, the first pair of opposed side members may be nailed by four unclinched nails to the other side member to lend stability to this subassembly for stability in filling and packing. In fact, this sub-assembly may be preformed and stored and shipped in nested condition. The pair of opposed end members are then located in place with the cleats of the first pair of opposed side members located on the outside of the end members and overlying the exposed side edges of the panels thereof. These same cleats also extend over the end edges of the panel of the side member of the second pair of side members. The blocks of the pair of opposed end members extend between the cleats of the first pair of opposed side members and also extend over the end edges of the panel of the side member of the second pair of side members. The box thus

far assembled includes three side members and two end members arranged together by the cleats so that it may be readily filled and packed, even by production packing methods if so desired. The box may also be filled and packed before the end members are set in place.

After the box is filled or packed then the other side member of the second pair of opposed side members is put in place completely to enclose the contents of the box. Here the cleats of that side member overlie the side edges of the panels of the first pair of opposed side members and the cleats of the first pair of opposed side members and the blocks of the pair of opposed end members extend over the end edge of that side member. The box is secured in assembled relation by securing together the two pairs of side members and this may be readily accomplished by encircling the side members with straps or the like.

The necessity for nailing in assembly is eliminated and the resulting box is considerably stronger and will take more prolonged rough handling than a conventional nailed box. The various cleats, blocks and plywood panels all functionally cooperate with each other toward this end. The box has stability of internal and external shape and distortional stresses are shared by adjacent panel members and supporting cleats. There is balanced resistance to diagonal distortion and to edge compression and also great resistance to splitting. There are no open cracks at any of the joints between the various members.

Further objects of this invention reside in the details of construction of the cleated plywood box of this invention and in the cooperative relationships between the component parts thereof.

Other objects and advantages of this invention will become apparent to those skilled in the art upon reference to the accompanying specification, claims and drawings, in which:

Fig. 1 is a perspective view of one form of the cleated plywood box of this invention;

Fig. 2 is an exploded perspective view illustrating the side and end members utilized in forming the box of Fig. 1;

Fig. 3 is a horizontal sectional view taken substantially along the line 3—3 of Fig. 1;

Fig. 4 is a vertical sectional view taken substantially along the line 4—4 of Fig. 1;

Fig. 5 is a vertical sectional view taken substantially along the line 5—5 of Fig. 1;

Fig. 6 is a perspective view illustrating another form of the cleated plywood box of this invention;

Fig. 7 is a vertical sectional view taken substantially along the line 7—7 of Fig. 6;

Fig. 8 is a vertical sectional view taken substantially along the line 8—8 of Fig. 6; and

Fig. 9 is a partial perspective view illustrating still another form of the cleated plywood box of this invention.

Referring first to Figs. 1 to 5 of the drawings, there is illustrated one form of the cleated plywood box of this invention, this box being generally designated at **10**. It includes a first pair of opposed side members **11** and **12**, a second pair of opposed side members **21** and **22** and a pair of opposed end members **30** and **31**. These members are all prefabricated and then are later assembled together for packaging and shipping purposes.

The side member **11** of the first pair of opposed side members includes a plywood panel **13** and a cleat **14** secured at each end edge of the panel **13** on the inside thereof. The cleats **14** extend beyond the side edges of the panel **13**. A plurality of cleats **15** are also secured on the outside of the panel **13** and these cleats terminate short of the side edges of the panel **13**. In a like manner the other opposed side members **12** includes a plywood panel **16** and a cleat **17** secured at each end edge of the panel **16**

on the inside thereof. Here also the cleats 17 extend beyond the side edges of the panel 16. A plurality of cleats 18 are also secured to the outside of the panel 16 and these cleats terminate short of the side edges of the panel 16. The various cleats are permanently secured to the panels as by clinch nailing, designated at 19. In this way the cleats are permanently and secured fastened to the panels.

The side member 21 of the second pair of opposed side members includes a plywood panel 23 having a cleat 24 secured at each side edge of the panel 23 on the inside thereof. The cleats 24 extend beyond the end edges of the panel 23. In a like manner the other side member 22 includes a plywood panel 25 having a cleat 26 secured to each side edge thereof on the inside thereof. The cleats of these side members are permanently secured to the panels, as by means of clinch nailing 27.

The end member 30 of the pair of opposed end members includes a plywood panel 32 and a block 33 secured at each of two opposed edges of the panel on the outside thereof. These blocks 33 extend over those two opposed edges and also terminate short of the exposed edges. In a like manner the other end member 31 includes a plywood panel 34 and a block 35 secured at each of two opposed edges thereon on the outside thereof. The blocks 35 extend over those opposed edges and also terminate short of the other exposed edges. The blocks are permanently secured to the panels, as by means of clinch nailing 36. The blocks 33 may be provided with suitable holes 37 for carrying a rope handle 38, the handle, when not in use, resting on the panel 32 between the blocks 33. A similar rope handle may be provided on the other end member 31.

In assembling the cleated plywood box of this invention the first pair of opposed side members 11 and 12 are placed in position on the side member 21 of the second pair of opposed side members. The cleats 24 are located on the outside of the first pair of opposed side members 11 and 12 and overlie the side edges of the panels 13 and 16 thereof. The cleats 14 and 17 extend over the end edges of the panel 23 and the ends of the outside cleats 15 may abut against the cleats 24. If desired, at this stage, the first pair of opposed side members 11 and 12 may be nailed to the other side member 21 and this may be accomplished by driving four nails 40 through the extending ends of the cleats 24 and through the panels 13 and 16 into the cleats 14 and 17. This lends stability to this sub-assembly for the purposes of filling and packing the same. In fact, this sub-assembly may be preformed and stored and shipped in nested condition, thereby saving considerable space in so doing.

The pair of opposed end members 30 and 31 are then set in place. Here the cleats 14 and 17 of the first pair of opposed side members are located on the outside of the end members 30 and 31 and overlie the exposed side edges of the panels 32 and 34 thereof. The blocks 33 and 35 extend over the end edges of the panel 23 and also extend between the cleats 14 and 17. Thus, the blocks 33 and 35 and the cleats 14 and 17 securely locate the end members 30 and 31. The blocks thus far assembled include three side members and two end members arranged together by the cleats and blocks so that it may be readily filled and packed, even by production packing methods if so desired.

After the box is filled or packed then the other side member 22 of the second pair of opposed side members is put in place completely to enclose the contents of the box. Here the cleats 26 of the side member 22 overlie the side edges of the panels 13 and 16 of the first pair of opposed side members and the blocks 33 and 35 of the pair of opposed end members extend over the end edges of the panel 25. The box is secured in assembled relation by securing together the two pairs of side members 11, 12, 21 and 22 in any suitable manner. For example, this may be readily accomplished by encircling the side members with conventional straps 41 or the like. To secure the straps 41 tightly in place the overlapping ends of the straps may be crimped, as, for example, at 42, and encased in a sleeve 43. Preferably, the straps overlie the outside cleats 15 and 18 secured on the first pair of opposed end members 11 and 12. The assembled and strapped box is extremely strong and will take prolonged rough handling and keep major shock away from its contents.

By reason of the construction of the cleated plywood box of this invention there is no necessity for nailing during assembly and the resulting box is considerably stronger than a conventional nailed box. The various cleats, blocks and plywood panels all functionally cooperate with each other toward this end. The box is extremely stable and maintains its internal and external shape. Distortional stresses are sharped by the adjacent panel members and the supporting cleats. There is balanced resistance to diagonal distortion and to edge compression and also great resistance to splitting. There are no open cracks at any of the joints between the various members.

The form of the invention illustrated in Figs. 6 to 8 is essentially the same as that of Figs. 1 to 5 and like reference characters have been utilized for like parts. In the cleated plywood box of Figs. 6 to 8 the cleats 24 and 26 of the second pair of opposed side members terminate short at the end of the panels 23 and 25. Here also outside cleats 45 and 46 are clinch nailed, as at 47, to the ends of the panels 13 and 16 and to the inside cleats 14 and 17. The outside cleats 45 and 46 extend beyond the side edges of the panels 13 and 16 and extend over the panels 23 and 25 of the second pair of opposed side members. The ends of the cleats 24 and 26 of the second pair of opposed side members abut against these outside cleats 45 and 46. The box of Figs. 6 to 8 is assembled, filled, and packed in the same manner as the box of Figs. 1 to 5.

The form of the box of Fig. 9 is very much like the form of the box of Figs. 1 to 5 and like reference characters have been utilized for like parts. Here the cleats 24 and 26 of the second pair of opposed end members also extend beyond the end edges of the panels 23 and 25. Outside cleats 49 and 50 are secured to the panels 13 and 16 of the first pair of opposed side members, these outside cleats 49 and 50 terminating short of the side edges of those panels. The outside cleats 49 and 50 may be permanently secured in place, as by clinch nailing 47. When the box is assembled the ends of the outside cleats 49 and 50 abut against the extended cleats 24 and 26 of the second pair of opposed side members. The box of Fig. 9 is assembled, filled, and packed in the same manner as the box of Figs. 1 to 5.

While for purposes of illustration several forms of this invention have been disclosed, other forms thereof may become apparent to those skilled in the art upon reference to this disclosure and, therefore, this invention is to be limited only by the scope of the appended claims.

I claim as my invention:

1. A cleated plywood box comprising, a first pair of opposed side members each including a plywood panel and a cleat secured at each end edge of the panel on the inside thereof and extending beyond the side edges, a second pair of opposed side members each including a plywood panel and a cleat secured at each side edge of the panel on the inside thereof, and a pair of opposed end members each including a plywood panel and a block secured at each of two opposed edges of the panel on the outside thereof and extending over said opposed edges and terminating short of the remaining exposed edges, the cleats of the second pair of opposed side members being located outside of the first pair of opposed side members and overlying the side edges of the panels thereof, the cleats of the first pair of opposed side members being located on the outside of and over the exposed edges of the pair of opposed end members and overlying the exposed side edges of the panels of the second pair of side members, the blocks of the pair of opposed end members

extending between and contacting the cleats of the first pair of opposed side members and extending over the end edges of the second pair of opposed side members, and means for securing the second pair of opposed side members to the first pair of opposed side members.

2. A cleated plywood box comprising, a first pair of opposed side members each including a plywood panel and a cleat secured at each end edge of the panel on the inside thereof and extending beyond the side edges, a second pair of opposed side members each including a plywood panel and cleat secured at each side edge of the panel on the inside thereof and extending beyond the end edges, and a pair of opposed end members each including a plywood panel and a block secured at each of two opposed edges of the panel on the outside thereof and extending over said opposed edges and terminating short of the remaining exposed edges, the cleats of the second pair of opposed side members being located outside of the first pair of opposed side members and overlying the side edges of the panels thereof and extending throughout the lengths of the first pair of opposed side members, the cleats of the first pair of opposed side members being located on the outside of the pair of opposed end members and overlying the exposed side edges of the panels thereof and also extending over the end edges of the panels of the second pair of side members, the blocks of the pair of opposed end members extending between and contacting the cleats of the first pair of opposed side members and extending over the end edges of the second pair of opposed side members, and means for securing the second pair of opposed side members to the first pair of opposed side members.

3. A cleated plywood box comprising, a first pair of opposed side members each including a plywood panel, a cleat secured at each end edge of the panel on the inside thereof and extending beyond the side edges and a cleat secured at each end edge of the panel on the outside thereof and extending beyond the side edges, a second pair of opposed side members each including a plywood panel and a cleat secured at each side edge of the panel on the inside thereof and terminating at the end edges, and a pair of opposed end members each including a plywood panel and a block secured at each of two opposed edges of the panel on the outside thereof and extending over said opposed edges and terminating short of the remaining exposed edges, the cleats of the second pair of opposed side members being located outside of the first pair of opposed side members and overlying the side edges of the panels thereof and extending between and contacting the outside cleats of the first pair of opposed side members, the inside cleats of the first pair of side members being located on the outside

of the pair of opposed end members and overlying the exposed side edges of the panels thereof, the inside and outside cleats of the first pair of opposed side members extending over the edges of the panels of the second pair of side members, the blocks of the pair of opposed end members extending between and contacting the inside cleats of the first pair of side members and extending over the end edges of the second pair of opposed side members, and means for securing the second pair of opposed side members to the first pair of opposed side members.

4. A cleated plywood box comprising, a first pair of opposed side members each including a plywood panel, a cleat secured at each end edge of the panel on the inside thereof and extending beyond the side edges and a cleat secured at each end edge of the panel on the outside thereof and terminating short of the side edges, a second pair of opposed side members each including a plywood panel and a cleat secured at each side edge of the panel on the inside thereof and extending beyond the end edges, and a pair of opposed end members each including a plywood panel and a block secured at each of two opposed edges of the panel on the outside thereof and extending over said opposed edges and terminating short of the remaining exposed edges, the cleats of the second pair of opposed side members being located outside of the first pair of opposed side members and overlying the side edges of the panels thereof and extending throughout the length of the first pair of opposed side members, the inside cleats of the first pair of opposed side members being located on the outside of the pair of opposed end members and overlying the exposed side edges of the panels thereof and also extending over the end edges of the panels of the second pair of side members, the outside cleats of the first pair of opposed side members extending between and contacting the cleats of the second pair of opposed side members, the blocks of the pair of opposed end members extending between and contacting the inside cleats of the first pair of side members and extending over the end edges of the second pair of opposed side members, and means for securing the second pair of opposed side members to the first pair of opposed side members.

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