

Nov. 28, 1944.

A. E. WATERMAN ET AL

2,363,917

SHELTER BUILDING

Filed Nov. 3, 1943

6 Sheets-Sheet 1

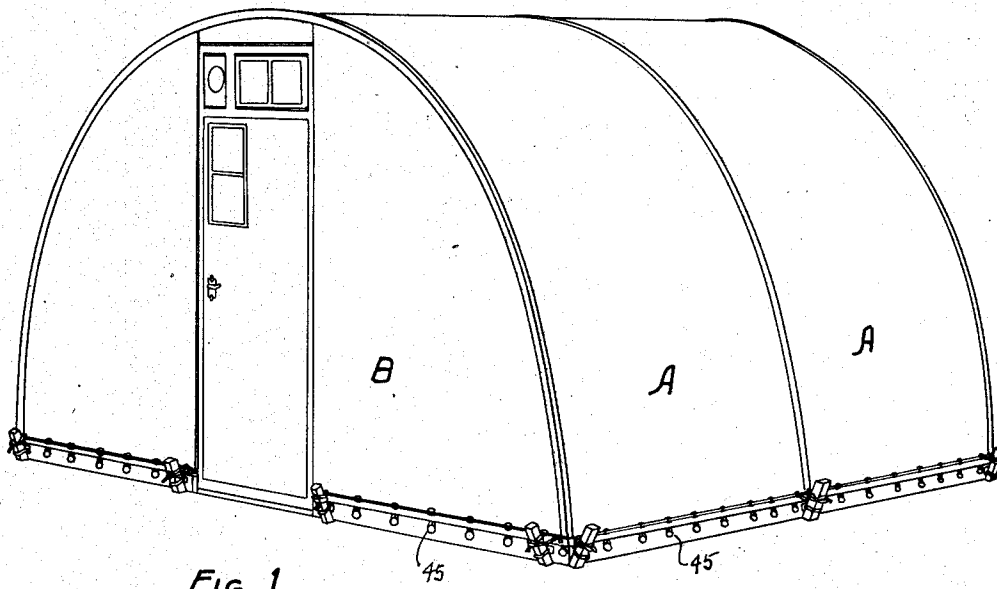


FIG. 1

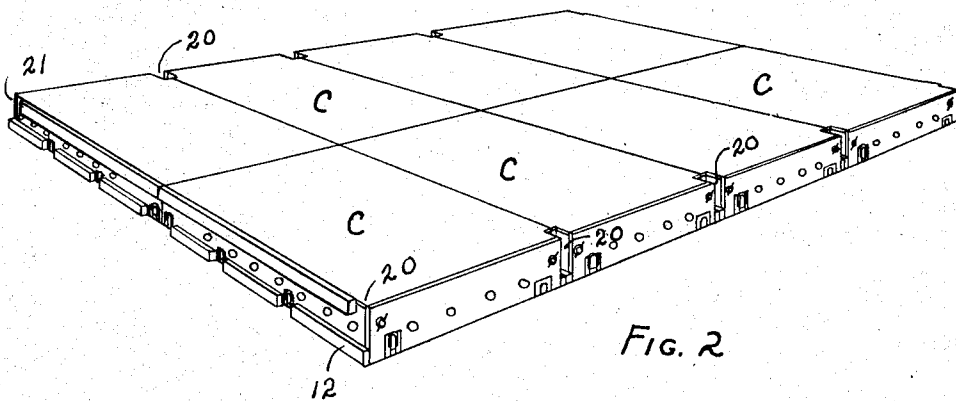


FIG. 2

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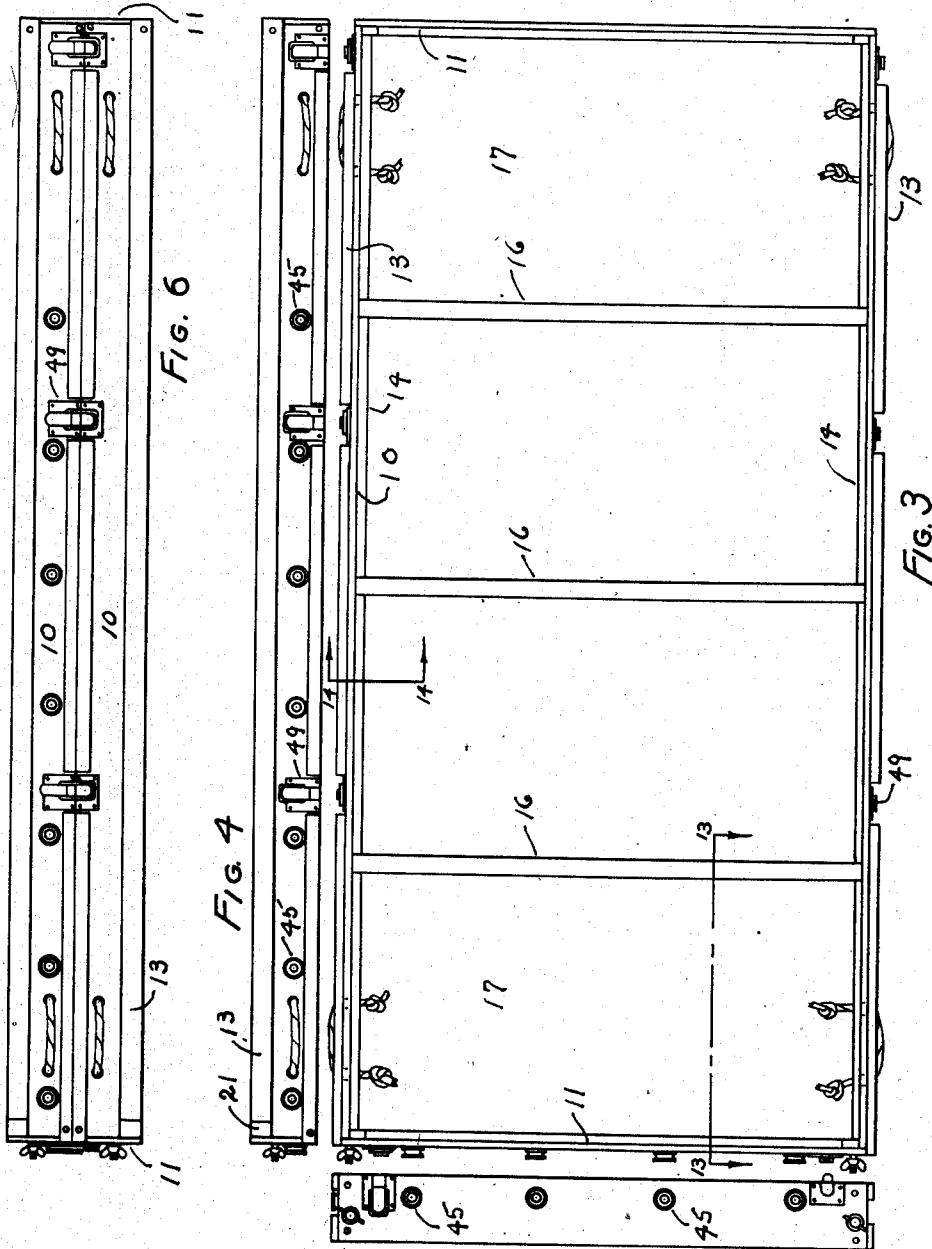
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6 Sheets-Sheet 2



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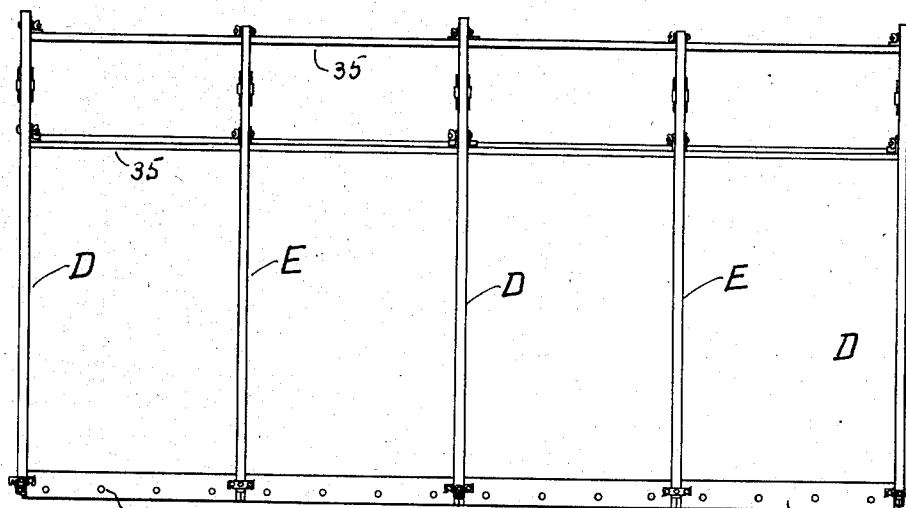


FIG. 7

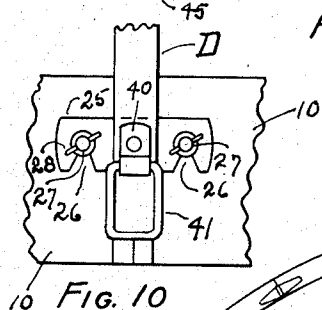


FIG. 10

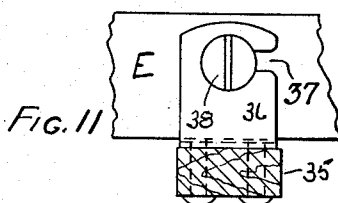


FIG. 11

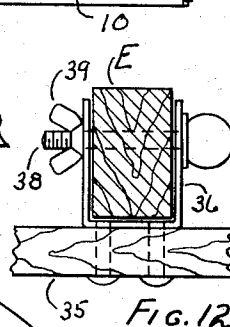


FIG. 12

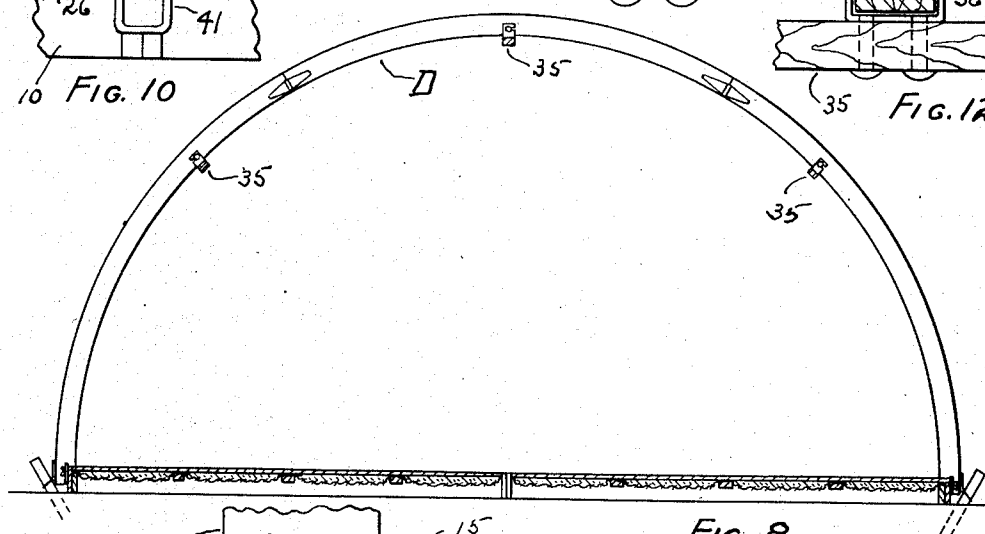


FIG. 8

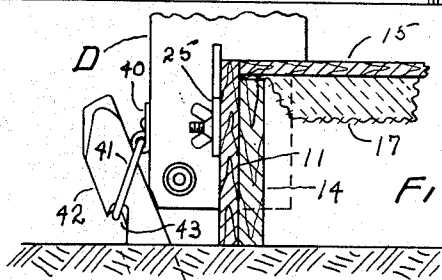


FIG. 9

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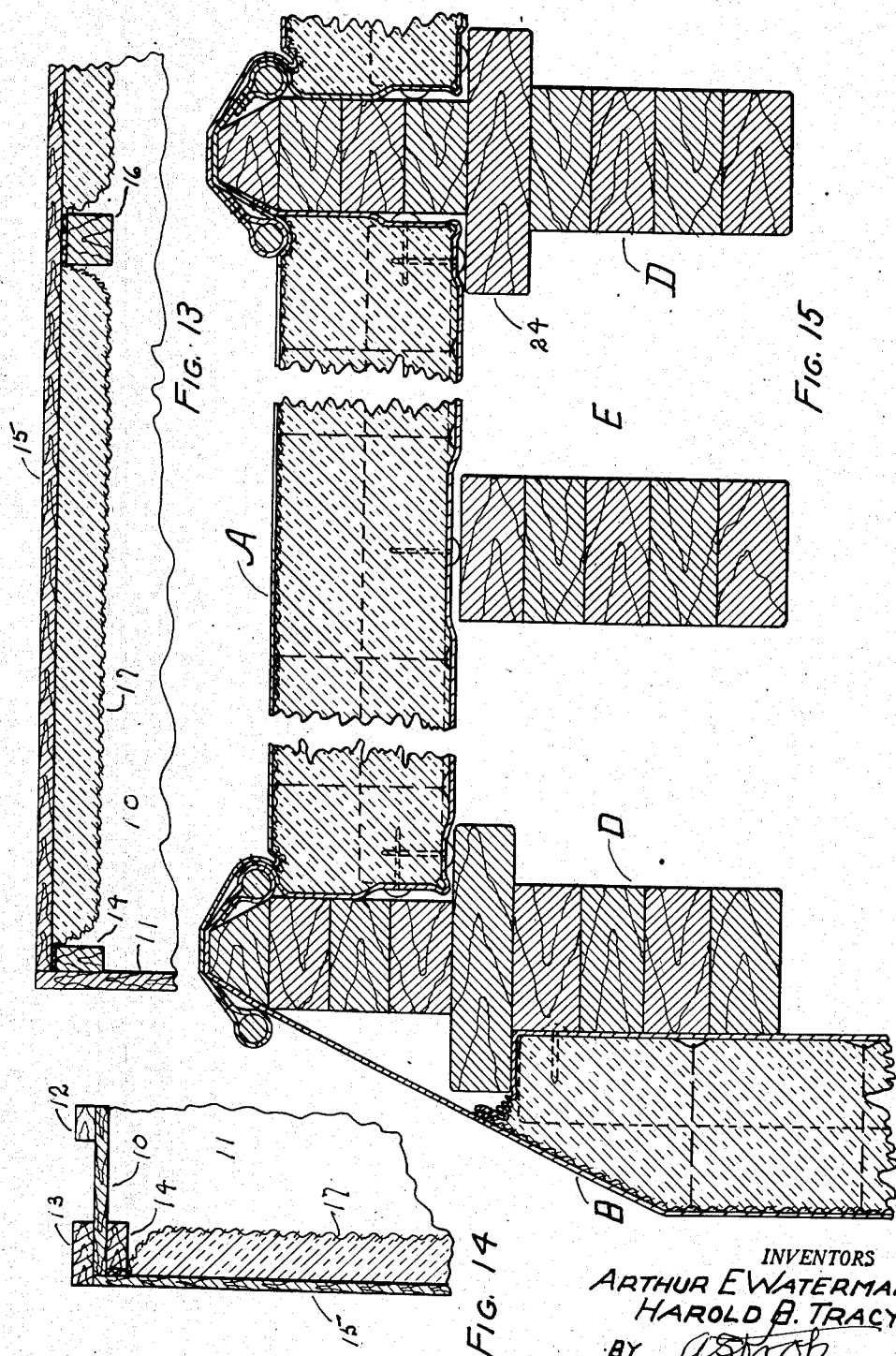
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SHELTER BUILDING

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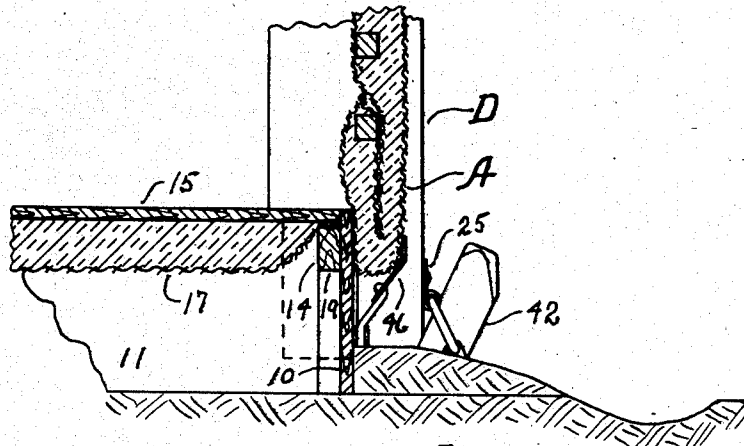


FIG. 16

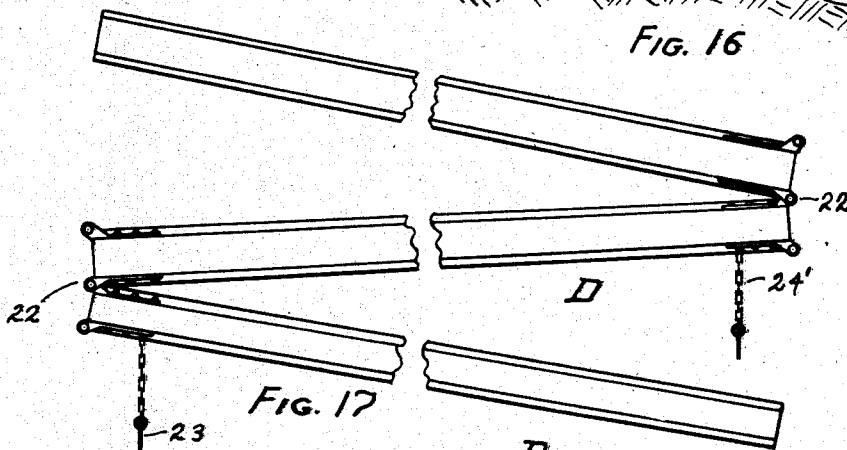


FIG. 17

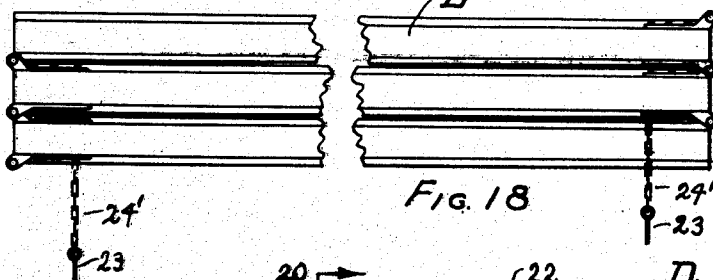


Fig. 18

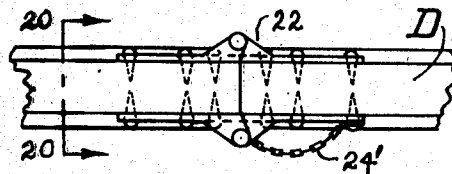


FIG. 19

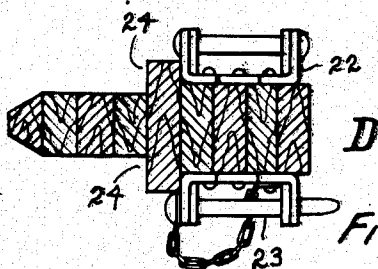


Fig. 20

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6 Sheets-Sheet 6

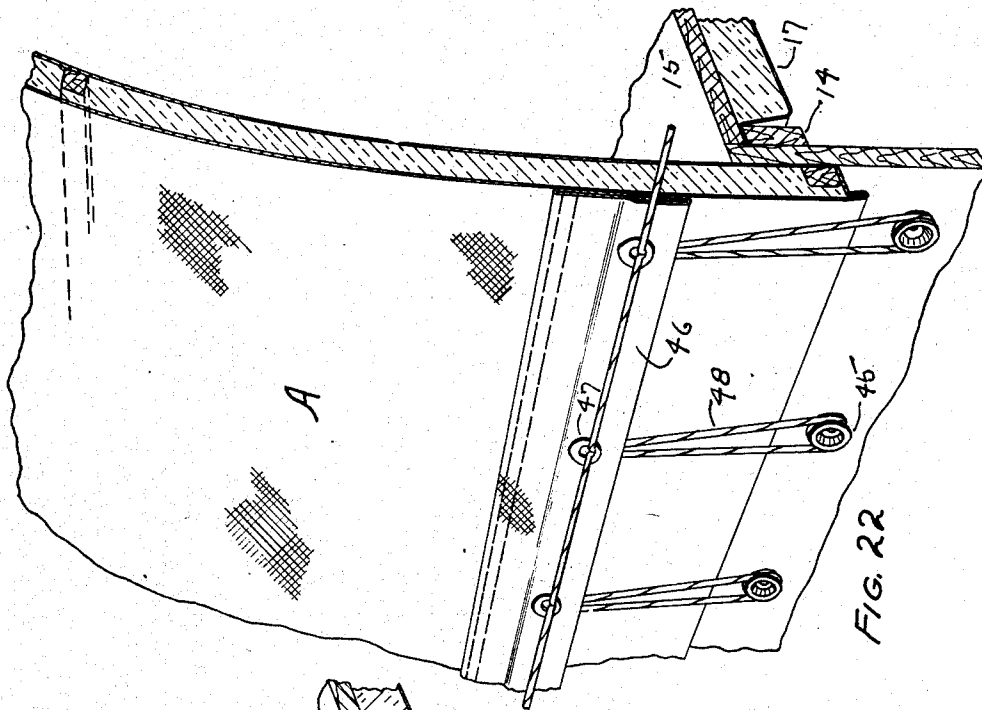


FIG. 22

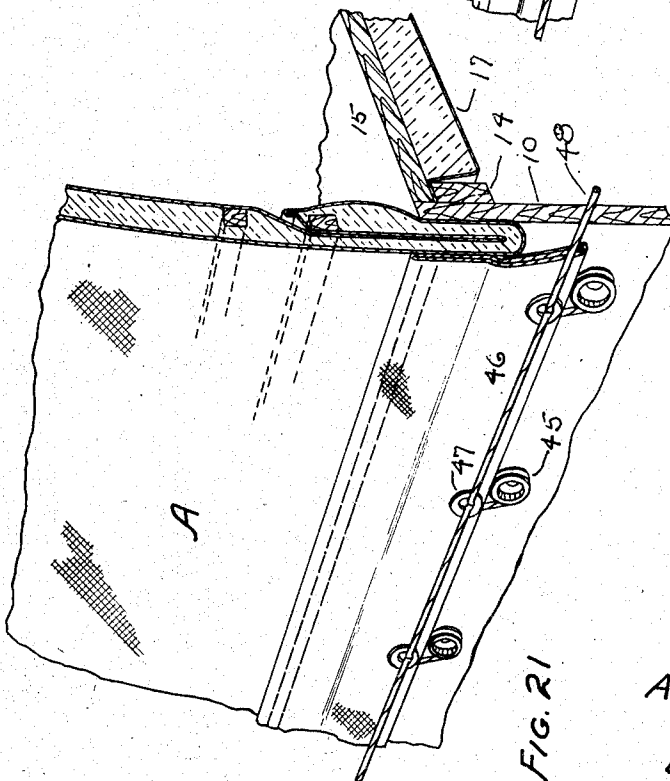


FIG. 21

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2,363,917

SHELTER BUILDING

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Application November 3, 1943, Serial No. 509,008

7 Claims. (Cl. 135—1)

The present invention relates to buildings which can be knocked down for convenient transportation and which are adapted for sheltering human beings and particularly for army use, and for sheltering delicate instruments.

The present invention relates to improvements on the design shown in our copending application Serial #464,314, filed November 2, 1942.

Important objects of the present invention are to simplify the floor structure which includes a number of units and to improve the method of fastening the ribs of the building to the floor assembly.

Another object of the present invention is to provide a number of box-like floor units which may be assembled together in pairs, forming containers into which various parts of the building may be packed and the container parts secured together, preferably by means of trunk like fastenings; thus, if a building consists of 8 floor units these units may be used to provide four containers which are suitable for convenient handling and into which all or part of the building parts may be packed.

An object of the present invention is to provide containers from the floor units which may be easily handled and stacked, easily loaded and unloaded and being particularly suited for truck, vessel or airplane transportation.

To these and other useful ends our invention consists of parts, combination of parts or their equivalents as hereinafter set forth and claimed and shown in the accompanying drawings in which:

Fig. 1 is a perspective view of our improved shelter building.

Fig. 2 is a perspective assembled view of our floor assembly.

Fig. 3 is a bottom view of one of the floor sections.

Fig. 4 is a side view of the section shown in Fig. 3.

Fig. 5 is an end view of the floor section shown in Fig. 3.

Fig. 6 is a side view of two of the floor sections fastened together to form a packing container.

Fig. 7 is a side view of the floor assembly with the covering blanket supporting arches attached thereto.

Fig. 8 is a cross section of the assembly as shown in Fig. 7.

Fig. 9 is an enlarged fractional view illustrating how the arches are held to the floor section and staked to the ground.

Fig. 10 is an enlarged fractional view of two

floor sections illustrating how the arches are detachably fastened to the floor sections.

Figs. 11 and 12 are enlarged detailed views illustrating how the spacer bars are fastened to the arches.

Fig. 13 is a fractional longitudinal section through one of the floor members.

Fig. 14 is a fractional transverse section through one of the floor members.

Fig. 15 is an enlarged section through three of the ribs, a covering and an end blanket.

Fig. 16 is a fractional view through a floor unit illustrating how the end of the blanket is fastened to the floor unit when folded.

Fig. 17 illustrates one of the ribs as shown in Fig. 8 but partially folded.

Fig. 18 illustrates a rib folded and ready to be packed in a container or tied together for transportation.

Fig. 19 is a side fractional view of one of the ribs illustrating how the ends are secured together by means of hinges.

Fig. 20 is a sectional view taken on line 20—20 of Fig. 19.

Fig. 21 is an enlarged perspective fractional view showing a fraction of one of the floor units in section and illustrating the manner of fastening an end of the blanket when folded to the floor unit.

Fig. 22 is a view similar to Fig. 21 showing the blanket fastening to the floor unit when the blanket is not folded.

As thus illustrated, the covering blankets are designated in their entirety by reference character A. The end covering including the door is illustrated in its entirety by reference character B. The floor units are designated in their entirety by reference character C. In Fig. 2 eight floor units C are shown fitted together ready to receive the ends of the arches, which in their entireties are designated by reference characters D and E.

By scrutinizing Figs. 1, 2 and 7 it will be seen that the complete floor assembly as illustrated consists of eight members D, so that the building is the width of the lengths of two members C and the length of four widths of these members; that there are three members D and two members E used in this assembly and as illustrated in Fig. 15, there will be two cover blankets A and of course two members B to make a complete building of a popular size. In some assemblies the rear end member may be somewhat different from member B as shown in Fig. 1. This rear member may be similar to that illustrated in Fig.

2 of our copending application #464,314 filed November 2, 1942.

Referring now specifically to Figs. 2, 3, 4, 5, 6, 13 and 14: Member C comprises a frame having side frame boards 10—10 and end frame boards 11—11. Members 10 are preferably provided with reinforcing strips 12, 13 and 14. Members 13 extend slightly above the edges of the top of members 10. Members 10 and 11 are preferably provided with strips 14 so as to form ledges on which floor boards 15 rest.

We provide transverse sills 16. These sills are at their ends, secured to the side frame members and are flush with the tops of member 14; thus, in the design shown each floor section is preferably provided with three members 16 (see Fig. 3), leaving four spaces under the floor boards for insulation pads 17. These pads consist of a sheet of fabric material and a filler of insulating material. The edges of the fabric sheets extend over the tops of members 14 and 16; thus when the floor boards and the insulating pads 17 are assembled and the box shaped frame placed on the ground, there will be considerable space between members 17 and the ground forming a dead air space between the pads and the ground and add to the insulation characteristics of the building.

At two adjacent corners in members C, members 13 terminate a short distance from these ends; thus when members C are assembled together as shown in Fig. 2 there are left openings 20 which are suitable for the reception of the ends of ribs D and E.

Members D and E are preferably made in three pieces, see Figs. 17, 18, 19 and 20 and these pieces are secured together by means of suitable hinges 22, one on each side at the joints. When it is necessary to fold the ribs for packing a detachable bolt 23 is removed from one of each of the hinges. These bolts are secured to the hinges by means of chains 24, to prevent losing them. Members D are shaped as shown in Fig. 20 having preferably ledges 24—24 on which the ends of blankets A rest as clearly illustrated in Fig. 15.

Members E in cross section are shaped as shown in Fig. 15 forming a rest for blanket A midway between members D.

Member D near their bottoms are provided with brackets 25 (see Figs. 9 and 10), which are slotted on their undersides as at 26. Members 10 are provided with bolts 27 in the proper position so when member D is pressed down into space 20 formed by the floor assembly, thumb nuts 28 may be tightened so as to form a very rigid fastening between the floor units C and between the arches and floor units. Members D at the end of the floor assembly may be provided with an L shaped member (not shown) as a substitute for member 25, or one end of this member may project past the floor assembly as shown in Fig. 7. Members D are provided with brackets 40 having rings 41 hinged thereto, as illustrated. After the arches are secured to the floor assembly stakes 42 having notches 43 are placed in the rings and driven into the ground until the notch engages the outer edge of the ring so the entire assembly is firmly held to the ground by the stakes.

In order to form a rigid structure, we provide spaced strips 35 (see Figs. 7, 8, 11 and 12) having U-shaped brackets 36 with grooves 37 adapted to receive bolts 38. When the strips are placed into position, thumb nuts 39 may be tightened to form a rigid connection between the

strips and arches; thus it will be seen by scrutinizing Figs. 7 and 8, that the floor assembly and the arches with their fastenings and strips form a very substantial frame. A frame which has adequate strength for supporting the blankets and withstanding the worst storms and weather.

After the frame-work is assembled as illustrated in Figs. 7 and 8, blankets A are placed into position (see Figs. 1, 15, 21, and 22).

It has been found in practice that while the frame work of the device changes very little in the course of months or years, the blankets do change because of weather conditions. Blankets A are therefore made so that they may be used conveniently at all times in the following manner: spaced anchors 45 are secured to the baseboards as illustrated in the various figures. Flaps 46 are secured to the blankets a short distance from the ends as illustrated in Figs. 21 and 22. These flaps are provided with grommets 47 which are preferably positioned about in line with members 45 and a rope 48 is laced over members 45 and made taut as illustrated, the ends being secured to stakes 42. When the blanket is shrunk, one or both of the blanket ends are laced to anchors 45 as illustrated in Fig. 22 and when the blankets are abnormally long, they are folded as illustrated in Fig. 21; in either event the lacings will act to hold the blankets snugly against the baseboard.

It will be seen by scrutinizing Figs. 21 and 22, that we have provided means for taking care of the shrinking and stretching of the blankets, which at all times will snugly hug the floor units to form an air tight enclosure; and in view of the fact that the blankets consist of two fabric sheets having an insulating filling and that there is an insulated pad under the floor and a dead air space under the pad, it is obvious our shelter building is easily heated during cold weather and is cool during hot weather, equalling in efficiency a modern insulated conventional residence.

Clearly our shelter building is light, can be manufactured at low cost and can be knocked down and packed in the containers formed from a pair of members C; and when so packed the containers can be easily handled and transported.

The separate units with which to erect our shelter building being detachably secured together provides a building which can be easily and quickly erected or disassembled and packed for shipment. Or the building may be mounted on skids and moved about for short distances without danger to the structure.

In Fig. 16 we illustrate how, after the building has been erected, a trench may be made around the four sides of the building and dirt or snow piled against the floor units as illustrated, thus to doubly insulate the floor and at the same time provide suitable drainage.

We have, as a matter of convenience shown a standard sized building. An advantage of the applicants' design is that our shelter building may be erected in various lengths; for example, four, eight or twelve members C may be used for three different length buildings, without a single change in the parts or units from which the building is assembled. In any event the characteristics of the building will not be changed, and the entire building in any size may be packed in containers formed from members C and these members may be secured together by means of trunk clasps 49 or by means of bolts.

Our improved building can be easily assembled from the ground and when assembled, its yield-

ing characteristics, make it safe and particularly adapted for housing and repairing delicate instruments, and for radio sending and receiving sets, because the building insulates against outside noises, whereas metal covered buildings are very noisy during windstorms and transmit outside sounds to the interior. Furthermore because of the flexible nature of the building a perfectly flat surface on which to erect the building is not necessary as in metal buildings particularly those having a sheet metal covering.

Clearly many minor detailed changes may be made without departing from the spirit and scope of our invention as recited in the appended claims.

Having thus shown and described our invention we claim:

1. A floor assembly for a building of the character described, comprising a number of inverted box shaped elements adapted to be placed end to end in pairs and side by side, the upper closed sides being adapted to act as a floor for the building, spaced means on certain outer surfaces of said elements adapted to register when the open sides of the elements are laid together to form an enclosure, the spaced members adapted to act as detachable means for holding the elements together.

2. A device as recited in claim 1 including: insulating pads positioned adjacent and under said closed sides and having a thickness considerably less than the thickness of the elements.

3. A device as recited in claim 1 including: transverse sills secured at their ends to the sides of said elements and adapted to assist in supporting the upper closed sides of the elements, insulating pads positioned adjacent and under said closed sides and having a thickness considerably less than the thickness of the elements.

4. A floor assembly for a building of the character described, comprising a number of inverted box shaped elements adapted to be placed end to end in pairs and side by side, the upper closed sides being adapted to act as a floor for the building, spaced means on certain outer surfaces of said elements adapted to register when the open sides of the elements are laid together to form an enclosure, the spaced members adapted to act as a detachable means for holding the elements together, a number of curved roof supporting arches, notches in adjacent corners on one end of the floor units adapted to provide recesses on the opposite sides of the floor assembly, said recesses adapted for the reception of the ends of said arches, detachable means adapted to bind said floor units together and bind the ends of the arches to the floor units.

5. A floor assembly for a building of the character described, comprising a number of inverted box-shaped elements adapted to be placed end to end in pairs and side by side, the upper closed

sides being adapted to act as a floor for the building, spaced means on certain outer surfaces of said elements adapted to register when the open sides of the elements are laid together to form an enclosure, the spaced members adapted to act as detachable means for holding the elements together, transverse sills secured at their ends to the sides of said elements and adapted to assist in supporting the upper closed sides of the elements, insulating pads positioned adjacent and under said closed sides and having a thickness considerably less than the thickness of the elements, said insulating pads comprising a fabric sheet with its edges lying between said frame and closed side and having a filling of insulating material between the fabric sheets and closed sides.

6. A floor assembly for a building of the character described, comprising a number of inverted box shaped elements adapted to be placed end to end in pairs and side by side, the upper closed sides being adapted to act as a floor for the building, spaced means on certain outer surfaces of said elements adapted to register when the open sides of the elements are laid together to form an enclosure, the spaced members adapted to act as detachable means for holding the elements together, a number of curved roof supporting arches, notches in adjacent corners on one end of the floor units adapted to provide recesses on the opposite sides of the floor assembly, said recesses adapted for the reception of the ends of said arches, detachable means adapted to bind said floor units together and bind the ends of the arches to the floor units, said arches adapted to support cover blankets, said cover blankets having flaps secured at one side to the blankets a short distance from the ends thereof, the free edges of the flaps having a number of spaced grommets, spaced anchors secured to said floor units and ropes adapted to be laced through said grommets and over the anchors whereby the blankets may be stretched tightly over the arches.

7. A building of the character described, comprising a floor assembly, a number of spaced arches having their ends detachably secured to the sides of said floor assembly, spaced rope anchors on the sides of said floor assembly, roof blankets adapted to be supported by said arches, their ends contacting the floor unit, said blankets having flaps secured on their upper sides thereto and a short distance from the ends of the blankets, the free edges of the flaps having spaced grommets, ropes slidably laced through said grommets and around said anchors, whereby the ropes may be used to pull the blankets tightly over the arches and hold their ends snugly against said floor assembly, and whereby one or both ends of the blankets may be folded as required to accommodate the varying lengths of the blankets.

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