Aug. 18, 1942. M. C. SONINO 2,293,569

PORTABLE HOUSE AND SIMILAR STRUCTURE

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FIG.1.

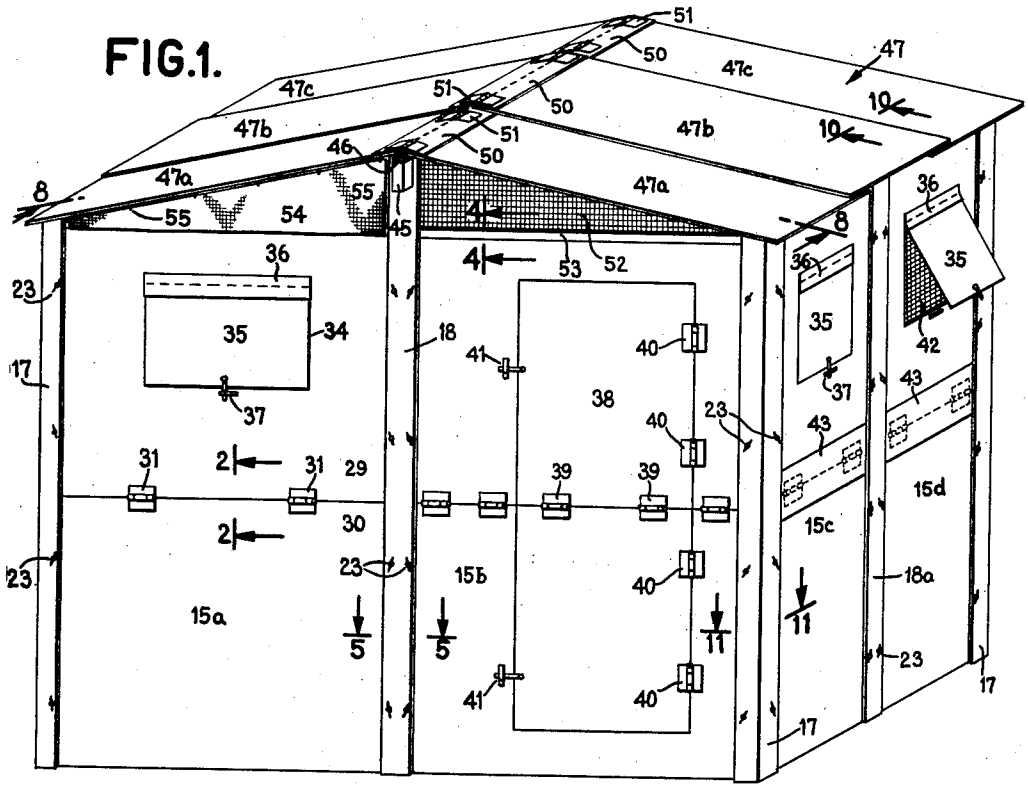


FIG.2.

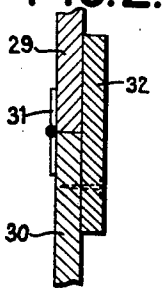


FIG.3.

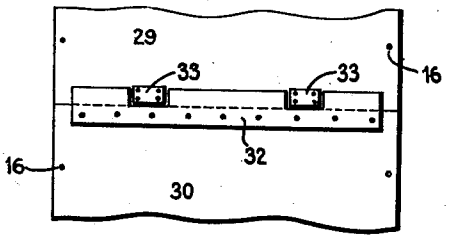


FIG.4.

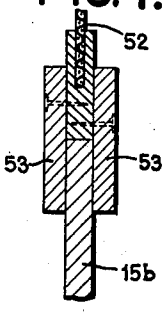


FIG.5.

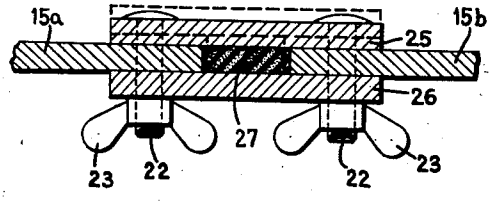
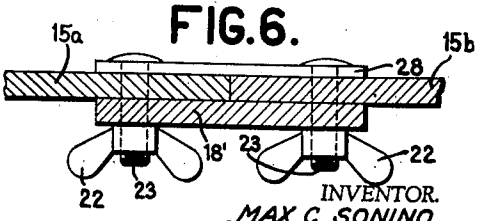


FIG.6.



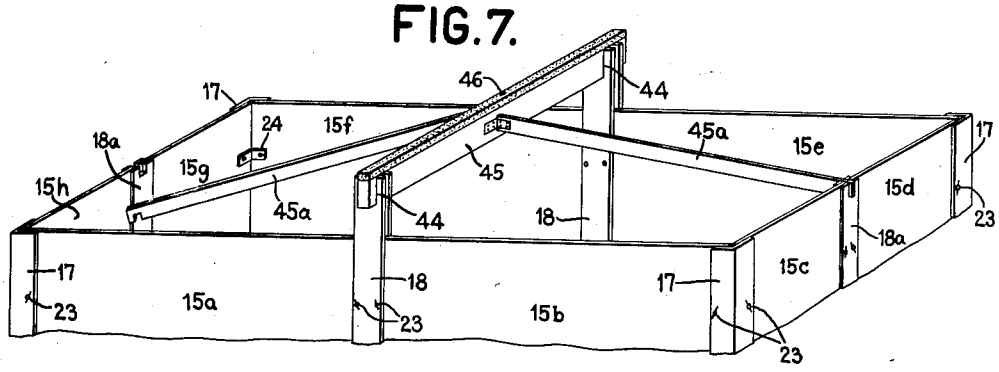
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FIG.7.



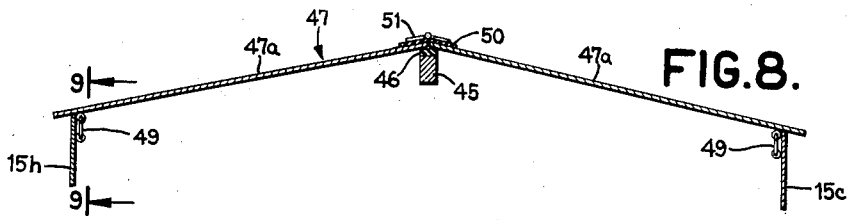


FIG.8.

FIG.9.

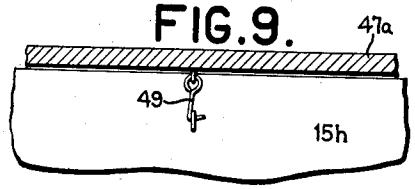
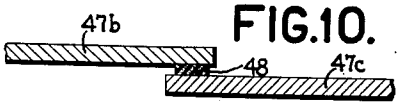


FIG.10.



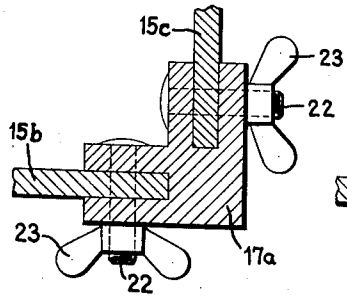


FIG.12.

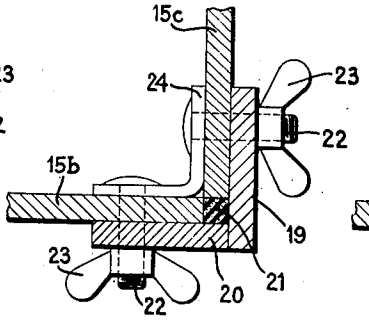


FIG.11.

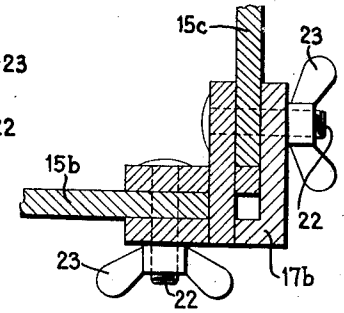


FIG.13.

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UNITED STATES PATENT OFFICE

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PORTABLE HOUSE AND SIMILAR STRUCTURE

Max C. Sonino, Hollis, N. Y.

Application October 9, 1940, Serial No. 360,372

17 Claims. (Cl. 20—2)

This invention relates to a portable house or similar structure that can be readily assembled and disassembled.

The chief objects of the invention are to provide a portable house of sturdy but inexpensive construction which can be put together and taken apart by unskilled labor without tools in a relatively short time; which can be used without a floor or platform if desired, and without any bracing means such as the guy wires that must be used with a tent.

It is also an object of the invention to provide a portable house which when disassembled can be stacked in a small space for ease in transportation, storage, and handling.

It is also an object of the invention to provide a portable house which will withstand adverse wind and rain conditions so that it can be comfortably occupied for long periods of time as a semi-permanent structure.

The portable house of the present invention comprises, basically, corner posts, side posts, and interchangeable side wall panels. The panels may be solid or formed with door and window openings as desired. The panels and posts are interconnected by easily operated fastening means, such as wing nuts and bolts. All the panels are exactly the same size and bolt-receiving apertures are formed in exactly corresponding positions on all the side posts and corner posts and along the sides of all the panels. Consequently the panels are fully interchangeable: each panel can be used in any position desired, i. e., at the front, side, or back of the house, and the panels do not have to be numbered or otherwise marked for identification during assembly.

A roof of any desired construction may be used in connection with the house as long as it is readily detachable from the other parts of the house. It may be a sheet of canvas, or a roof structure of hinged panels may be used as hereinafter described.

The house of the invention may be set up directly on a level piece of ground if desired or it may be mounted on any suitable flooring such as the usual type of wooden tent platform. In the latter case means such as angle irons may be provided for securing the house to the platform. If desired ropes and stakes may be used to secure the house to the ground or platform where it is set up, but in view of the rigidity of the house these ropes can be extended closely along the sides of the house and need not be extended away from the house as in the case of tent guys. This is an important advantage as it conserves space and eliminates the danger of tripping over the ropes and stakes.

To achieve ease in transportation and storage each of the side panels may be hinged at its center. If the panel includes a door extending substantially over the entire height thereof, the door may also be hinged as well as the remaining parts of the panel constituting the door frame. The posts and any elongated roof members such as the ridge-pole may also be hinged if desired but this is not usually necessary as such members are light in weight and consequently are easily carried and handled.

While a feature of the invention is that a post of a very simple nature can be used, special forms of posts as hereinafter described, affording more support to the panels, may be used where a more rigid structure is desired.

Further objects and features of the invention will be apparent from the following description of a preferred embodiment of the invention taken in conjunction with the accompanying drawings in which:

Fig. 1 is a perspective view of a portable house embodying the principles of the invention.

Fig. 2 is a section on the line 2—2 of Fig. 1 showing a detail of a side wall panel.

Fig. 3 is a fragmentary elevation of the portion of a side panel along the hinged joint thereof, looking from the inside.

Fig. 4 is a section on the line 4—4 of Fig. 1 showing a detail of a gable member.

Fig. 5 is a section through a side post along the line 5—5 of Fig. 1.

Fig. 6 is a section similar to Fig. 5 but showing a modified form of side post.

Fig. 7 is a perspective view corresponding to the upper part of Fig. 1 but with the roof removed.

Fig. 8 is a section along the line 8—8 of Fig. 1.

Fig. 9 is a section along the line 9—9 of Fig. 8.

Fig. 10 is a section along the line 10—10 of Fig. 1.

Fig. 11 is a section through a corner post along the line 11—11 of Fig. 1.

Figs. 12 and 13 are sections similar to Fig. 11 but showing modified forms of corner post.

Referring to the drawings, the portable house of the invention, in the embodiment shown, comprises eight sidewall panels 15*a*—15*h* (see Figs. 1 and 7) hereinafter referred to collectively as the panels 15. Each of these panels is of the same size, for example 6′ high by 4′ wide by ¼″ thick, so that a panel can be used at any desired position in the house.

At the sides of each panel are bolt-receiving apertures **16** (Fig. 3), one series of apertures along each side of the panel and spaced from the edge thereof, say by 1 inch. These apertures are formed in the same relative positions on all the panels, for the purpose of making the panels interchangeable.

The panels **15** are mounted between corner posts **17** and side posts **18**, **18***a* each of said posts having portions overlapping the sides of two adjacent panels and provided with corresponding bolt-receiving apertures.

Referring particularly to Fig. 11 which shows a preferred form of corner post, it will be seen that the post consists of two sheets of material **19**, **20** arranged at right angles and nailed or cemented together. Although a simple lap joint is shown, a mitre or other special form of joint may also be used. A strip of material **21** is arranged at the inside meeting corner of sheets **19**, **20** to act as an abutment for the panels **15**. Preferably this strip is made of resilient material such as sponge rubber so as to provide a tight seal between the panels and post.

An important reason for using the abutment strip **21** is in connection with the interchangeability of the panels. If the panels were allowed to lap one another in the manner of sheets **19**, **20**, the apertures **16** of one panel would have to be a different distance from the panel edge than the apertures of the other panel. By providing the abutment strip **21**, the apertures of all the panels, and the apertures on both sides of the same panel, can be arranged at the same distance from the panel edge.

It will be seen from Fig. 11 that bolts **22** are passed through the registering apertures of the panels and corner post and cooperating wing nuts **23** are screwed up on the bolts to hold the parts firmly together. At the inside the bolts also extend through individual angle pieces **24** preferably of metal (see also Fig. 7). The wing nuts are arranged on the outside of the structure so as to be quickly and easily operable.

Some of the many possible modifications of the corner post are shown in Figs. 12 and 13. Fig. 12 shows a unitary corner post **17***a* which may be a molded plastic or extruded metal element. Fig. 13 shows a corner post **17***b* with a jointed tongue and groove construction. In the case of both Figs. 12 and 13, the post itself comprises a double wall structure extending the entire height of the panel so that the individual angle pieces **24** of Fig. 11 are not used. The continuous double wall structure of course adds greater rigidity to the post and to the house as a whole.

Referring now to Fig. 5 which shows a preferred form of side post, it will be seen that the post consists of two parallel sheets of material **25**, **26** secured together in spaced relationship by an intermediate abutment strip **27**. The sheets **25**, **26** and the strip **27** may be cemented or nailed together.

The abutment strip **27** is preferably made of resilient material such as sponge rubber, the thickness of the abutment strip is such that the sheets **25**, **26** will be spaced apart a distance slightly greater than the thickness of the panels **15**—for example a distance of $\frac{5}{16}$'' where the panels are ¼'' thick. In assembly, bolts **22** having associated wing nuts **23** are passed through the registering apertures of the sheets **25**, **26**, and intermediate panel **15**. Upon tightening the wing nuts **23** the rubber abutment strip is flattened from the dotted line position to the full line position shown in Fig. 5, thereby forming a tight seal between the post and panels.

Fig. 6 shows a modified form of side post consisting of only a single sheet **18'**. With this post individual backing elements **28**, preferably of metal, are used corresponding to the angle pieces **24** of Fig. 11.

It will be understood that either form of side post is provided along its edges with a series of bolt-receiving apertures corresponding in location to the apertures of the panels. The distance from the apertures of the side post to the edge of the abutment strip **27** (Fig. 5) or to the center line of the post **18'** (Fig. 6) is the same as the distance from the apertures of corner post **17** to the portions of the corner post acting as abutments for the panels. As a result of this, interchangeability of the panels is assured.

Referring again to the sidewall panels **15**, it will be seen that the same are hinged along a central horizontal line so as to be foldable outwardly of the house. Thus, panel **15***a* consists of the two halves **29**, **30** connected by hinges **31**. As shown in Figs. 2 and 3, a strip of material **32** is secured along the upper edge of the lower half **30** of the panel with part of the strip projecting above said edge to form a stop for the hinging movement of the upper half **29** of the panel. This relieves strain on the hinges **31**. The strip **32** also reinforces the panel half **30** where the hinges **31** are connected thereto. Referring to Fig. 3 it will be seen that, at the positions of the hinges, rectangles **33** cut out from the strip **32** are secured to the panel half **29** as reinforcement for the hinges.

The upper panel half **29** (see Fig. 1) is shown as having a window opening **34** formed by cutting out a rectangular portion **35** of the panel. The portion **35** is replaced in the opening to serve as a shutter, being hinged at its upper edge to the panel by any suitable hinges or, as shown, by a continuous flexible strip **36** which may be of rubberized fabric so as to be waterproof. A suitable latch **37** may be provided at the lower edge of the shutter and the shutter may be retained open when desired by a stick or prop.

The next sidewall panel **15***b* is shown as including a door **38** which is hinged at **39** so as to be foldable with the remainder of the panel and also hinged at **40** so as to be capable of opening and closing movement after the house has been set up. Suitable latches **41** are provided to lock the door in closed position.

It will be understood that, once the panel **15***b* is assembled with the corner post and side post at its margins, there will be no tendency for the door to collapse or fold at its hinges **39**.

The panels **15***c* and **15***d* shown at the side of the house are substantially the same as the panel **15***a* described above. The shutter **35** of panel **15***d* is shown as partially opened to reveal a screen **42** extending over the window opening. The panels **15***e*—**15***h* may also be the same as panel **15***a* or may be solid panels without windows or doors.

Attention is directed to the modified hinging shown in connection with panels **15***c* and **15***d* and involving the use of a continuous strip of flexible material similar to the strips **36** used for hinging the shutters **35**. The hinges **31** are shown below strip **43** and are preferably mounted in the panel so that they do not project substantially beyond the surface thereof. Also the flexible strip may be cut out where it overlies the hinges to reduce the bulk thereof. The strip **43** could

also be used without any hinges 31 or a continuous piano hinge could be used with or without strip 43. The joint between the two panel halves need not be a simple joint as shown in Fig. 2 but could be a rabbet joint. By the use of a rabbet joint and a continuous flexible waterproof strip, an extremely water-tight arrangement can be provided.

Referring now to Figs. 1 and 7, the corner posts 17 and two of the side posts 18a are the same height as the sidewall panels. However, the other two side posts 18 extend upwardly beyond the panels, for example these posts can be 6' 9" high when the other posts are 6' high. At their upper ends the side posts 18 are formed with slots 44 to receive a ridge-pole 45 which may be, for example, 8' 6" x 2½" x ¾". This ridge-pole is provided with an upper surface 46 of resilient material such as sponge rubber.

Hinged to the ridge pole 45 are rafters 45a shown in Fig. 7. The outer ends of these rafters are slotted and are received in complemental slots in the side posts 18a. The left-hand side of Fig. 7 shows the rafter and side post before engagement while the right-hand side of Fig. 7 shows these parts engaged. Due to the hinged connection of the rafters to the ridge-pole, the rafters can be folded up against the ridge-pole when the house is disassembled.

The roof 47 of the house is shown as formed of three pairs of hinged panels 47a, 47b, 47c. Each individual panel (6 in all) may be 3' x 4' 4" x ⅛". The hinged ends of the roof panels rest on the rubber surface of the ridge-pole 45 while their free ends are supported on and extend beyond the sidewall panels 15c, 15d and 15g, 15h. The front and rear roof panels 47a, 47c rest on the sidewall panels, and the center roof panel 47b overlaps and rests on the front and rear roof panels as shown in Figs. 1, 8, 9 and 10. A resilient rubber strip 48 may be used between the roof panels. By the use of these separate, overlapping roof panels, good protection can be obtained even if some warping occurs.

Fastening means such as hooks and eyes 49 are arranged between the free edges of the roof panels and the side panels so that the roof panels can be pulled down onto the top of the side panels. This action also results in a tight joint between the hinged ends of the roof panels and the rubber surface 46 of the ridge-pole 45.

As shown in Figs. 1 and 8 a flexible strip 50 may be arranged across the joint at the hinged edges of the roof panels and between said panels and the hinges 51. The strip 50 may be of rubberized fabric or a tough flexible building paper such as sold under the name Sisalkraft, and which can be repeatedly bent without breaking, can be used.

In the triangular spaces between the tops of panels 15a, 15b and the roof, gable members 52 are provided. These are shown as screened but solid gables could be used if desired. As shown in Fig. 4, downwardly projecting strips 53 are secured to the bottom of the gable member so that said member can be slid over the top of the repective panel. For additional protection a cover 54 of canvas or other impervious material may be secured over the gable member by hooks 55. It is preferable to use a cover of transparent material such as "Pliofilm" so that light is not shut off. Transparent material such as a transparent plastic could also be used for the gable member itself in the case of a solid gable. It will be understood that gable members are also mounted on the rear sidewall panels 15e and 15f not shown in Fig. 1.

From the foregoing description the manner of assembling the portable house of the invention should be apparent. Preferably two of the sidewall panels are assembled with an intermediate corner post while flat on the ground. Then the subassembly so formed can be stood up and the other sidewall panels and posts added thereto. When all the parts of the side walls are in position except the last panel, the parts have sufficient flexibility so that they can be spread apart to permit insertion of the last panel between the respective corner and side posts, even if double-wall posts are used.

It will be understood that, as all the sidewall panels are identical in their size and shape and in the position of the bolt-receiving apertures therein, and as all the posts have bolt-receiving apertures in the same positions, any sidewall panel may be placed at any part of the house desired. The panels do not have to be numbered or otherwise identified for guidance in assembly. The position of the various side panels may be changed upon successive uses of the house.

After assembly of the sidewall panels and posts, the ridgepole 45 is next placed in position in the slots of the side posts 18 and the rafters are moved on their hinges to a position above the slots of the side posts 18a and pushed down into said slots.

The front and rear roof panels 47a, 47c are next placed over one side of the roof in folded position, extending from the ridgepole to one side wall. By pushing up with a stick on the free edge of the upper roof panel of each pair where it overhangs the side wall, the folded panel can then be opened like a book, said upper roof panel being allowed to swing over and fall upon the sidewall panel at the other side of the roof. If two people are erecting the house, while one stays outside the house and pushes the roof panel over as indicated above, the other can station himself inside the house to check the fall of said panel with a stick and lower same into position on the sidewall panel. The center roof panel is then applied in a similar manner.

The gable members 52 are slid into position, lifting the respective roof panels for this purpose as may be necessary. Finally the hooks and eyes 49 are connected to secure the roof panels, and consequently also the gable members, in position.

In the drawings, no flooring has been shown in connection with the house, as it has been found that the house may be erected on the ground without any flooring and is entirely self-supporting and extremely resistant to adverse wind and weather conditions. A canvas sheet may be used as a floor if desired to keep moisture out. Also, if desired, the house may be mounted on a floor such as a wooden tent floor or platform and, in such a case, the side-wall panels or posts may be connected to the floor by angle brackets, guy wires or other means.

If guy wires are used either for fixing the house to a platform or to the ground, these wires may extend from an upper corner of the house at one side to a stake adjacent the diagonally opposite lower corner of the house at the same side. In other words, the guys do not have to extend outwardly from the house as in the case of tent guys. This means that more houses may be accommo-

dated in a given space and there is no danger of tripping over the guy wires.

Although a roof structure consisting of panels has been shown a sheet of canvas supported by the ridge-pole rafters, and sidewall panels could be used instead.

The side wall panels of the house of the invention may be made of wood or composition board such as "Masonite," "Cellotex," or "Weatherwood." It has been found that good results can be obtained by using the products sold under the names of "Weatherwood Denseboard" and "Weatherwood Structoboard," the latter grade being stronger and more weather-resistant. The posts and roof panels may be made of the product sold under the name of "Weatherwood Hardboard" which is a still harder composition material, or metal or plastics could be used. Another form of sidewall panel that could be used comprises a frame of wood or metal with canvas or screening stretched thereover.

The house of the present invention has a large field of use, both indoors and outdoors. Indoors it can be used as a playhuse, darkroom for photographic purposes, for subdividing a large room into individual cubicles or dressing rooms, or for other sub-division purposes. In the latter case, no roof may be required or desired. Outdoors, the house of the invention may be used as a temporary or semi-permanent cabin, for housing troops, for housing refugees and for isolation cabins in emergencies, for camping trips, as a guest house or beach cabana.

The house may be made of any size desired by adding side posts and sidewall panels. The house shown, when disassembled and the sidewall panels and roof panels folded over as permitted by the hinging thereof will occupy a space of only about 4′ x 3′ x 6″ except for the posts, ridge-pole, and rafters. If desired the latter could also be hinged but this is generally unnecessary as they are light in weight. The house of the invention may therefore be transported readily by automobile for camping or week-end trips and can be set up by one man without tools in a short time—considerably less than one hour. With two experienced persons it is possible to assemble or disassemble the house in about 15 minutes.

While specific dimensions are referred to in the above description it will be understood that these have been given by way of example only as the individual parts of the house and the house as a whole may be made of any size desired. Also the sidewall panels need not be hinged or may be hinged along a different line from that shown, depending on the size of the panels and the requirements as to transportation and storage. The invention is susceptible of numerous changes and modifications in addition to those suggested above and it is intended for the appended claims to cover all such changes and modifications that fall within the spirit of the invention.

I claim:

1. A portable house comprising a plurality of posts each having a central longitudinally extending abutment and a longitudinal row of spaced apertures at each side of said abutment, a plurality of interchangeable side wall panels each having rows of similarly spaced apertures parallel to and spaced from the side edges of the panel, the apertures at one side of a panel, when said panel is arranged in overlapping relation with a post and with the edge of the panel in contact with the abutment of the post, registering with the apertures at the respective side of the post, quick detachable means extending through said apertures for interconnecting said posts and panels, and a roof detachably supported on the side walls of the structure, the posts being interconnected solely by the panels and roof structure.

2. A portable house comprising a plurality of posts each having a central longitudinally extending abutment and a longitudinal row of spaced apertures at each side of said abutment, a plurality of interchangeable side wall panels each having rows of similarly spaced apertures parallel to and spaced from the side edges of the panel, the apertures at one side of a panel, when said panel is arranged in overlapping relation with a post and with the edge of the panel in contact with the abutment of the post, registering with the apertures at the respective side of the post, quick detachable means extending through said apertures for interconnecting said posts and panels, a ridge-pole detachably supported directly by certain of the posts, rafters extending between said ridge-pole and the side walls of the structure and detachably connected to said side walls, and a roof detachably supported on said ridge-pole and rafters, and on the side walls of the structure, the posts being interconnected solely by the panels and roof structure.

3. A portable house comprising four identical corner posts having longitudinal side portions arranged at right angles to one another and a longitudinal abutment at the inside meeting angle of said side portions, two pairs of side posts, the members of each pair being identical and the members of one pair being longer than the members of the other pair, eight interchangeable side wall panels any one of which may be secured between any corner post and any side post, each panel having a longitudinal row of spaced apertures parallel to and spaced from each side edge of the panel, and each post having two longitudinal rows of similarly spaced apertures, the distance of any row of post apertures from the nearest edge of the abutment of the respective post being the same as the distance of any row of panel apertures from the nearest side edge of the respective panel whereby, when a panel is arranged in overlapping relation with a post and with the edge of the panel in contact with the abutment of the post, the panel apertures will register with the post apertures, quick detachable means extending through the apertures for interconnecting the posts and panels, a ridge-pole detachably supported directly by the longer pair of side posts, rafters extending from said ridge-pole to and detachably supported by the shorter pair of side posts, and a roof comprising a plurality of interchangeable hinged sections detachably supported on said ridge-pole and rafters, and on the side walls of the structure.

4. A portable house comprising four identical corner posts having longitudinal side portions arranged at right angles to one another and a longitudinal abutment at the inside meeting angle of said side portions, two pairs of side posts having slots at one end thereof, the members of each pair being identical and the members of one pair being longer than the members of the other pair, eight interchangeable side wall panels any one of which may be secured between any corner post and any side post, each panel having a longitudinal row of spaced apertures

parallel to and spaced from each side edge of the panel, and each post having two longitudinal rows of similarly spaced apertures, the distance of any row of post apertures from the nearest edge of the abutment of the respective post being the same as the distance of any row of panel apertures from the nearest side edge of the respective panel whereby, when a panel is arranged in overlapping relation with a post and with the edge of the panel in contact with the abutment of the post, the panel apertures will register with the post apertures, quick detachable means extending through the apertures for interconnecting the posts and panels, a ridge-pole detachably supported directly by the longer pair of side posts and fitting into the slots thereof, rafters extending from said ridge-pole to and detachably supported by the shorter pair of side posts and fitting into the slots thereof, and a roof comprising a plurality of interchangeable hinged sections detachably supported on said ridgepole and rafters, and on the side walls of the structure.

5. A portable house according to claim 4, in which each side post comprises two parallel flanges spaced apart by the abutment of the post a distance slightly greater than the thickness of the side wall panels, the apertures of the post being formed in said flanges.

6. A portable house according to claim 4, in which the abutments of the posts are at least as thick as the side wall panels.

7. A portable house according to claim 4, in which at least some of the abutments of the posts are made of resilient material.

8. A portable house according to claim 4, comprising resilient material at the top of the ridgepole to receive the hinge portions of the roof sections.

9. A portable house acording to claim 4, in which the free ends of the roof sections have fastening means cooperating with complemental fastening means on the side walls of the house.

10. A portable house according to claim 4, in which a strip of foldable waterproof material extends across and covers the hinged joint of each roof section.

11. A portable house according to claim 4, comprising gable members of generally triangular shape detachably secured between the upper portions of the longer side posts and the tops of the adjacent side wall panels.

12. A portable house according to claim 4, comprising gable members of generally triangular shape detachably secured between the upper portions of the longer side posts and the tops of the adjacent side wall panels, each gable member having elements extending downwardly therefrom for detachably engaging the top of the panel on which said member is mounted.

13. A portable house according to claim 4, comprising gable members of generally triangular shape detachably secured between the upper portions of the longer side posts and the tops of the adjacent side wall panels, at least some of said gable members having openings therein, and protecting members adapted to be hooked over the gable members to close said openings.

14. A portable house according to claim 4, in which at least some of the side wall panels are hinged along a horizontal line to reduce overall size for transportation and storage, the panel apertures for receiving the quick detachable interconnecting means extending longitudinally on both sides of said hinging line whereby, after the interconnecting means are secured in said apertures and in the corresponding apertures of the posts, said panels will be held firm in open position notwithstanding the hinged nature thereof.

15. A portable house according to claim 4, in which at least one of the side wall panels comprises a door frame and hinged door, and is hinged along a horizontal line passing through said door frame and door to reduce overall size for transportation and storage, said door having hinges disposed on both sides of the line of hinging of the panel, and the apertures of the panel for receiving the quick detachable interconnecting means extending longitudinally on both sides of said hinging line whereby, after said interconnecting means are secured in said apertures and in the corresponding apertures of the posts, the panel will be held firm in open position notwithstanding the hinged nature thereof, and the hinged door will be able to swing on its hinges.

16. A portable house according to claim 4, in which at least some of the side wall panels are hinged along a horizontal line by a strip of foldable waterproof material.

17. A portable house according to claim 4, in which the quick detachable interconnecting means comprise bolts and wing nuts.

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