Jan. 19, 1943. H. L. MARTINUS 2,308,766

CONVERTIBLE STRUCTURE FOR BUILDINGS OR THE LIKE

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Fig. 1.

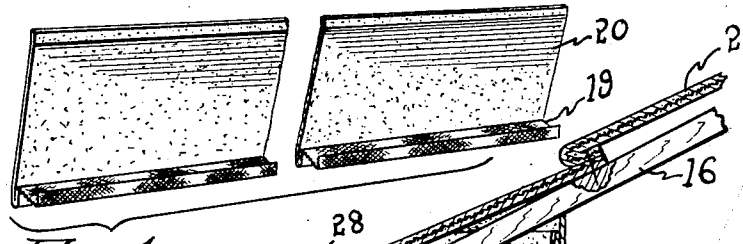


Fig. 2.

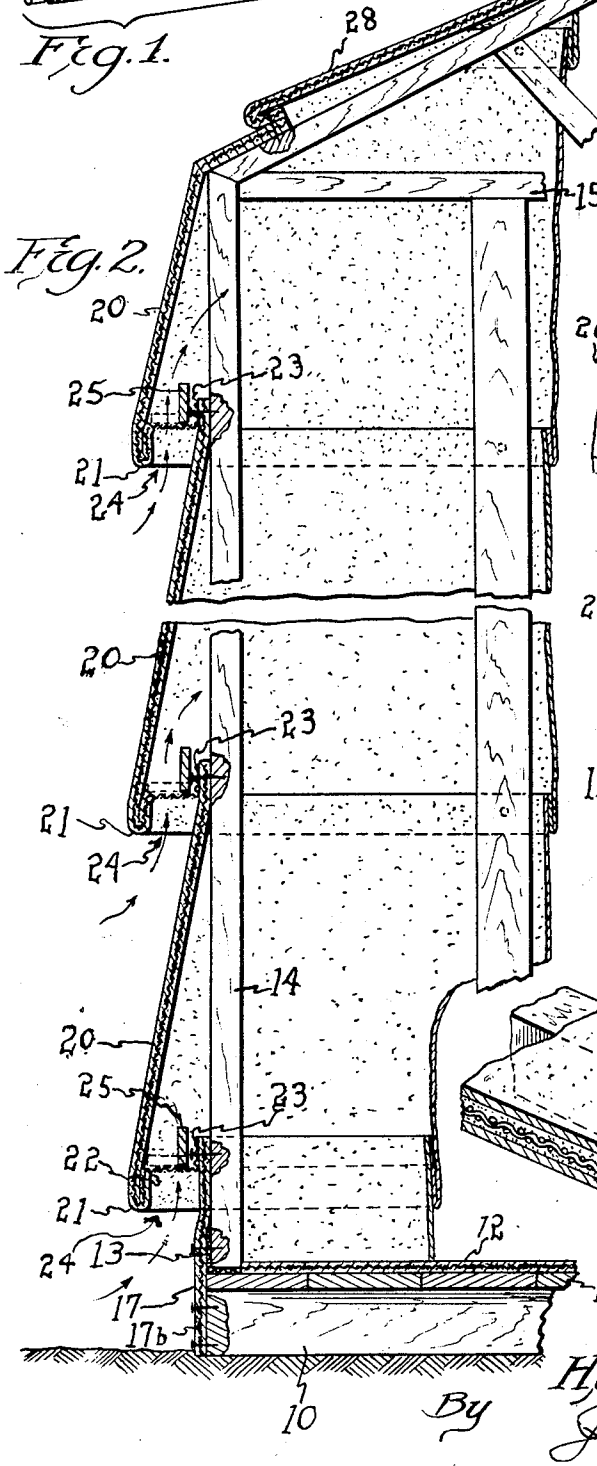


Fig. 3.

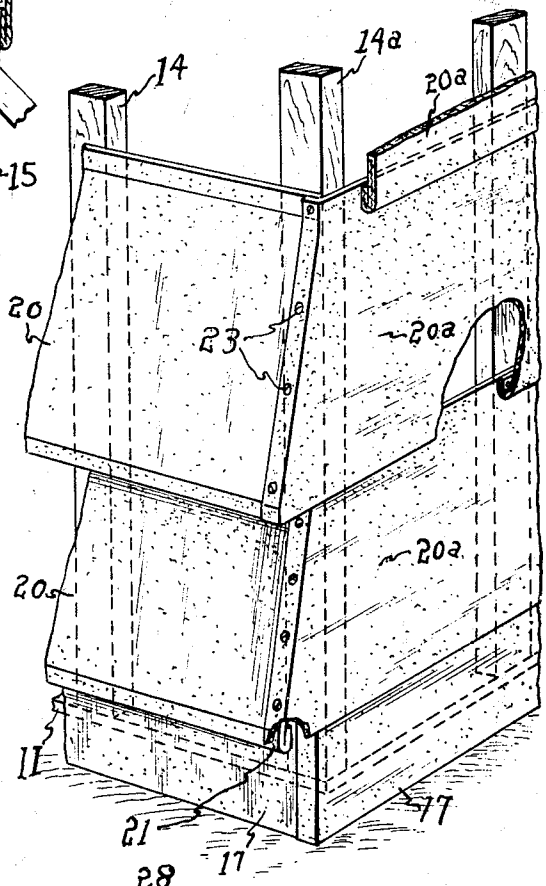
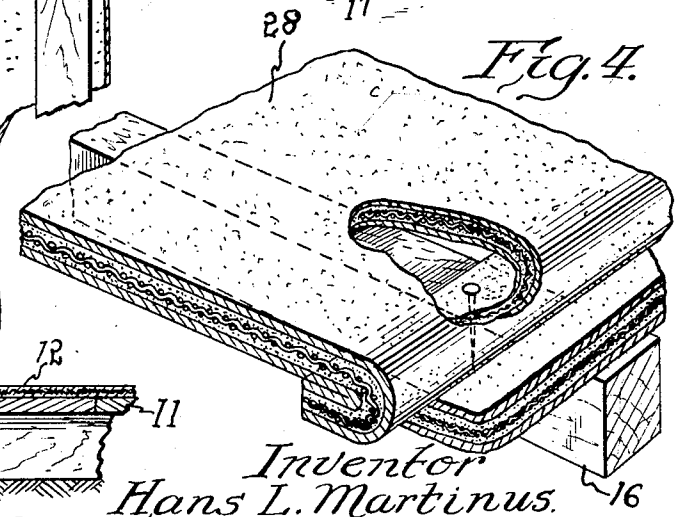


Fig. 4.



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CONVERTIBLE STRUCTURE FOR BUILDINGS OR THE LIKE

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Fig. 5.

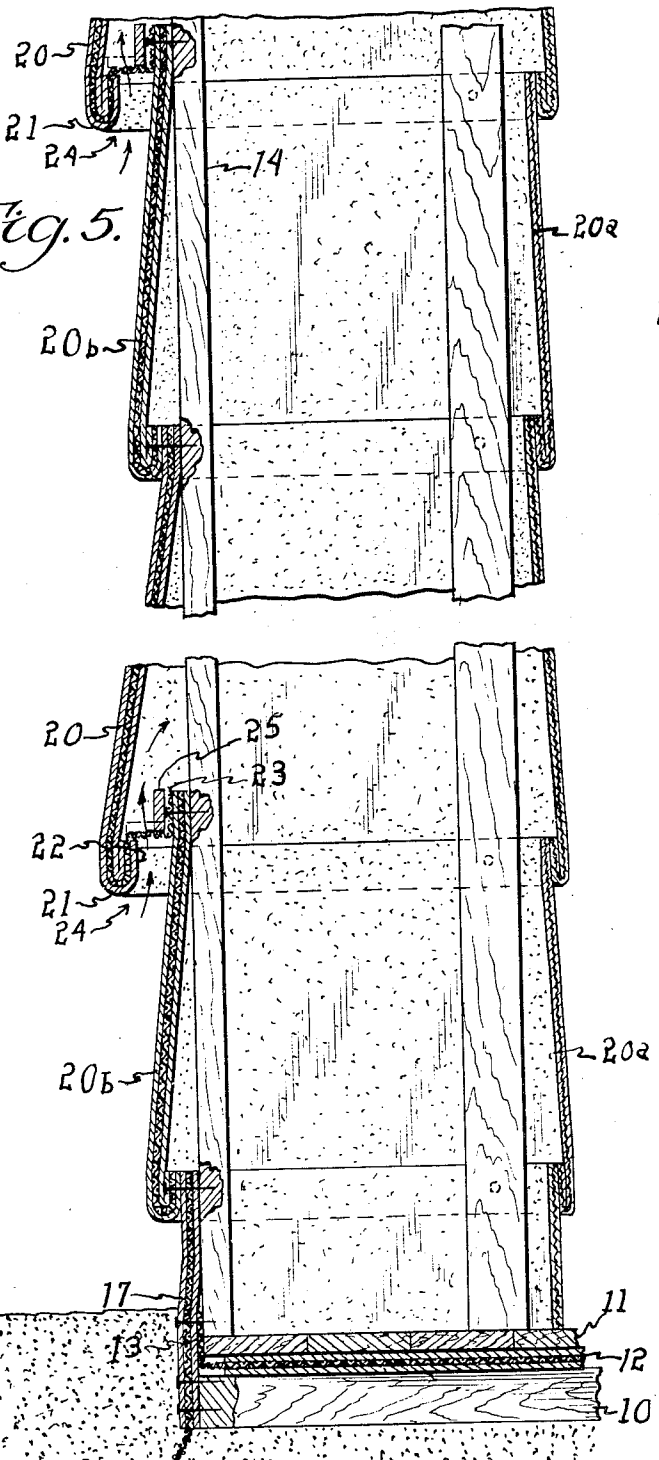
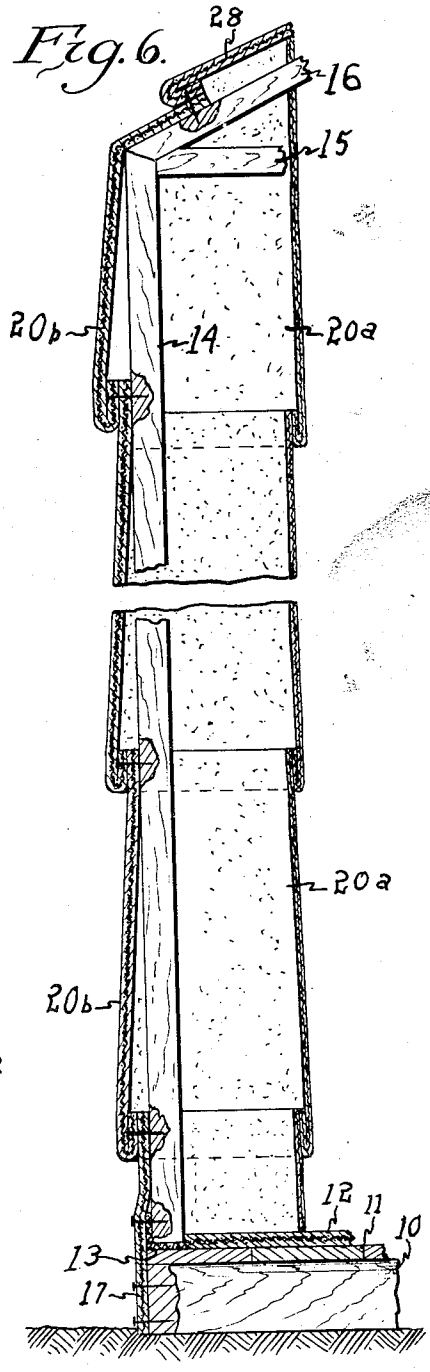


Fig. 6.

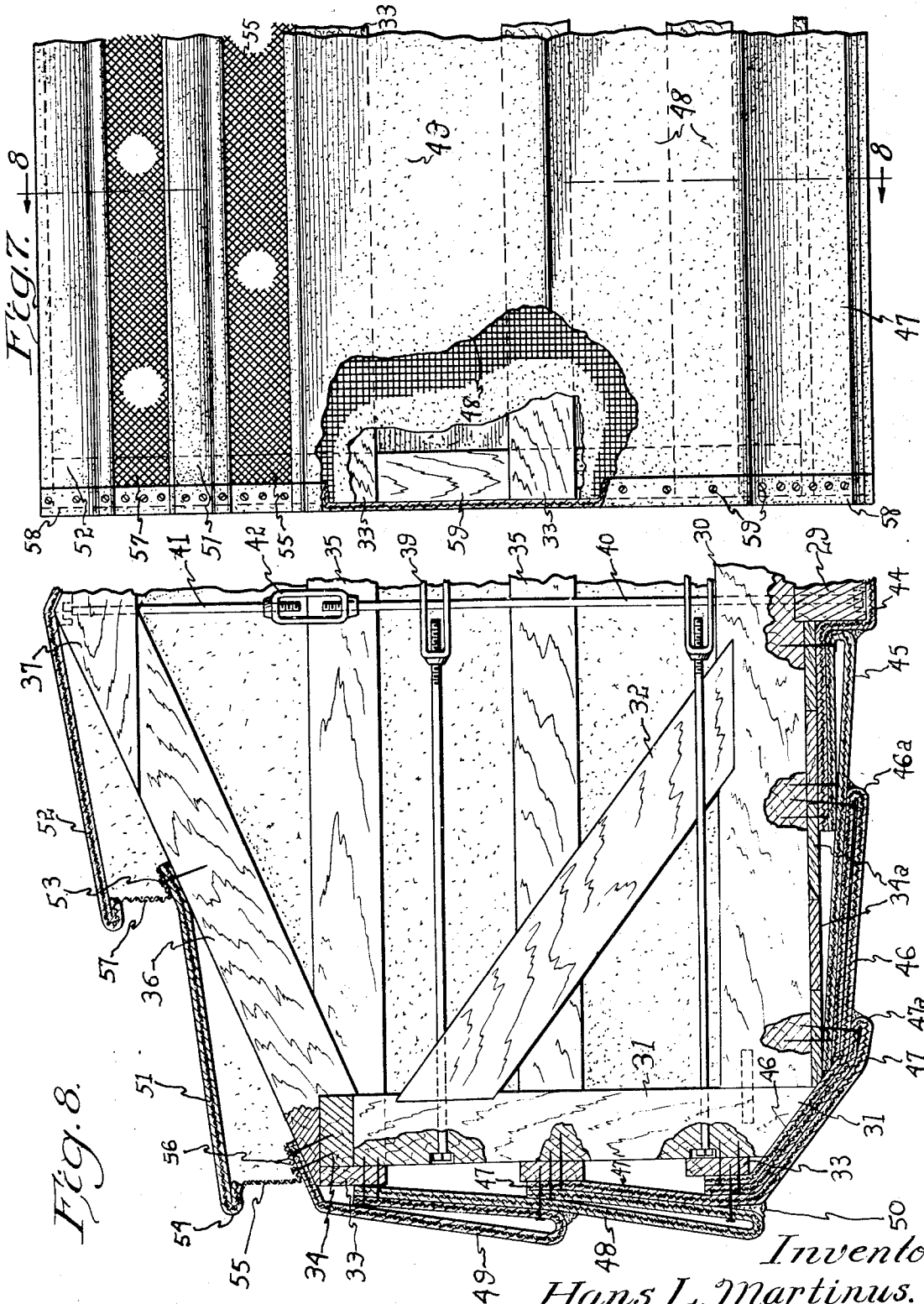


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CONVERTIBLE STRUCTURE FOR BUILDINGS OR THE LIKE

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UNITED STATES PATENT OFFICE

2,308,766

CONVERTIBLE STRUCTURE FOR BUILDINGS OR THE LIKE

Hans L. Martinus, Chicago, Ill., assignor to Gunnar Mortenson, Chicago, Ill.

Application July 16, 1942, Serial No. 451,197

8 Claims. (Cl. 20—2)

This invention is directed to novel constructions and combinations of structural features utilizable in the construction of units such as buildings, barges and other shelter units adapted particularly for relatively quick and inexpensive construction and adaptable for use for storage, shelter and other uses hereinafter recited.

Recent developments, particularly in the field of relatively temporary construction in numerous instances required in connection with various military and civil uses, have presented a definite need for portable units adapted for storage and for relatively easy transport from one location to another, wherein in addition to the requirements of portability and quick and inexpensive construction, there is the definite need for a ventilatable shelter under varying conditions of weather and atmosphere, and which at the same time will require a very minimum amount of material so that the problem of transport of the material is comparatively easy and inexpensive.

For example, in the establishment of military bases, both temporary and permanent, an indispensable requirement is the ability to quickly build portable units for storage of equipment and other uses with the least amount of materials from the standpoints of both volume and weight of the materials.

It is an object of my invention to provide composite and convertible structures for buildings and other material-containing units wherein a skeleton or frame structure, preferably made of wood, may be satisfactorily covered by a plurality of pre-fabricated and pre-formed composite sheets or strips, which themselves may be made up in roll form and relatively easily transported to the situs of the unit to be constructed, and which strips are reinforced by an intermediate metal fabric which imparts strength, stiffness, rigidity and a means for securely nailing such strips into overlapped, overlying and superposed positions upon either side walls, roof or other parts of a building or material-containing unit.

A further object of my invention is the provision of a building unit wherein one or more walls thereof are formed by a series of edge-overlapping longitudinal composite strips which included a bonded-in metal fabric and wherein each portion of the strips are formed solely of continued portions of the said metal fabric so as to provide vents or ports for the buildings in instances where passage of air into and out of the building is a requirement.

A further object of my invention is the provision of composite wall constructions which include truss mounting means and a plurality of weather-proof strips which are bent in a downwardly and outwardly inclined position and wherein the lower edge portions of one or more of the strips forming the weather-proof wall are doubled back inwardly, upwardly and toward the framework of the building to provide both means whereby the strips are secured to the framework as well as providing air vents into which rain or the like cannot normally enter.

A further object of my invention is the provision of the aforesaid metal fabric-contained strips in wall constructions wherein a portion of the bonded-in fabric of the strip is itself extended beyond the moisture-proof parts thereof, and bent angularly into positions to extend toward and adjacent to the building framework so that the strips can be thereby additionally secured by nailing through the metal fabric into the framework to thereby provide optional vents, and of providing closure strips selectively adapted to close the vents thereby formed.

A further object of my invention is the provision of composite constructions of portable units including framework of wood or the like and a plurality of edge-overlapping and secured layers or strips of water-proof material, preferably composed of bonded-together felt and wire fabric layers, and wherein the strips of water-proof material are nailed along their lateral edges as well as intermediate points to the framework and thence doubled back and extended along the framework to cover areas beyond the points of original securance substantially as hereinafter described, said units being capable of use as water vessels, barges or the like.

Other and further important objects of my invention will be apparent from the following specification and claims.

This invention, in a preferred form, is illustrated in the accompanying drawings, reference being made thereto in the following description.

On the drawings:

Fig. 1 is a reduced perspective view, with parts broken away, of one of the wall sections, layers or strips, adapted to form a part of a wall of a building or equivalent unit.

Fig. 2 is a vertical cross sectional view, with parts broken away, of one wall or adjacent portion of a typical building utilizing my invention, and including a partial cross section of the floor and foundation thereof.

Fig. 3 is a perspective view of a lower part of a corner of a building made according to my invention, with parts broken away and with parts removed;

Fig. 4 is an enlarged perspective and partially cross sectional view illustrating a fragment of a roof or wall truss and utilizing a part of my invention.

Fig. 5 is a vertical cross section view taken adjacent a corner illustrating two substantially perpendicular wall portions utilizing my invention.

Fig. 6 is a cross sectional view taken on a vertical plane through a side wall, and a part of the roof end and foundation structure illustrating the use of my invention.

Fig. 7 is a side elevational view of the side wall portion adjacent a corner of a so-called portable unit utilizing features of my invention.

Fig. 8 is a cross sectional view taken on line 8—8 of Fig. 7.

Referring to Figs. 2, 5 and 6, reference numeral 10 designates a suitable foundation, which may be of any conventional form, and which may be either partially extending above normal surrounding ground surface or in cases of temporary buildings, may be merely laid upon a level ground surface. In the particular illustration shown, such foundation is formed of suitably connected horizontally extending beams, which may be nailed or otherwise fastened together at their respective junctures. It will be noted at the lower left of Figs. 2, 5 and 6, that the longitudinal foundation beams are shown partially in cross section, into which nails of one of the composite siding strips are driven.

Numeral 11 designates a floor which may be of any conventional construction, and which in the illustration is composed of a plurality of side by side boards which are illustrated in cross section. In Fig. 5, the floor boards of said floor 11 are not nailed directly up on the transverse floor joists, but upon the upper surface of an interposed layer 12 of waterproof material of the type hereinafter described, namely a plurality of bonded-together felt and fibrous layers with an optional intermediated bonded wire fabric as illustrated. In the illustrations of Figs. 2 and 6, said floor layer 12 of waterproof sheeting, (composed of edge-bonded, coated felt or fibrous strips) is laid and secured upon the surface of the floor 11 over its entire area. In the said figures, it will be noted that the edge areas, that is either the longitudinal edges or the end edges of the strips laid upon the floor, are composed solely of wire fabric, this being accomplished by either extending the bonded wire fabric of the composite strips beyond the edges of the felt strips of the said floor composite layer, or by stripping off the felt layers along the edges so as to substantially expose only the wire fabric. Said extended and substantially horizontally exposed edge areas of wire fabric 13 forming a continuation of the metal fabric of the floor layer 12 are preferably laid completely to the edges of the floor before the vertical joists of the building frame-work are mounted, and such extended metal fabric edge areas 13 are preferably, though not necessarily, bent upwardly as indicated in Figs. 2, 5 and 6, where they will be secured by subsequent nailing of the lowermost side wall composite strip hereinafter described.

After said composite floor layer 12 and its integral extended metal fabric edge areas 13 are laid upon the floor as described, the vertical beams or joists 14, which form a part of the skeleton framework, may be mounted and secured in the conventional manner with the ends of the joists optionally, though not necessarily, resting upon the extended metal fabric edge areas 13 as illustrated in Figs. 2 and 6.

I have illustrated only a small part of the structure embodying features of my invention, in which illustrations but a few of the vertical joists or beams 14 are illustrated, it being understood that a suitable number thereof are utilized in suitably spaced apart positions according to the requirements of the particular case. One vertical corner joist 14a is illustrated in Fig. 3 and will be referred to hereinafter.

The vertical beams or joists 14 are secured together at their upper ends in any well known manner, as for example by horizontally extending trusses 15, a fragment of one of which is illustrated in Figs. 2 and 6. The support for the roof may be formed in any conventional manner, one preferred form being illustrated in Figs. 2 and 6, in which a part of an inclined roof truss 16 is illustrated as secured by nailing or the like at its lower end to the upper end of the correspondingly spaced vertically extending side wall-supporting joists 14. As distinguished from a conventional building frame or skeleton, the inclined roof supporting truss 16 terminates flush with the outer side surface of the side wall vertical trusses and do not extend therebeyond, for a purpose which will be hereinafter described.

The framework skeleton may be any one of a number of conventional arrangements and forms which include suitably located braces, etc. to impart desired strength and rigidity to the framework. It will be noted that in a preferred form of my invention, there need be no horizontally extending braces or trusses between the floor and the upper horizontal trusses 15, this being one feature of economy attainable in utilization of my invention.

In the framework shown at the lower left hand portions of Figs. 2, 3, 5 and 6, the lowermost part of the side of the building, (including the side surface of the floor or foundation) has secured thereto a longitudinally extending strip 17 of waterproof material which has bonded thereto or thereinto a reinforcing and strengthening metal fabric 17b which is preferably composed of woven wire having interstices of sufficient size to permit a hot plastic composition to run therethrough.

The term "strip" is used to designate the first and lowermost row of individual pieces of composite waterproof material, which pieces may be secured into end over end overlapping relation at the juncture of one piece with the other so that said strip 17 extends preferably, though not necessarily, completely around the building and a relatively short distance upwardly from the ground surface. This strip 17 keeps the moisture from the ground while, being absorbed by the major part of the floor or foundation and prevents rain or the like from contacting the floor or foundation portions and the lowermost parts of the vertical joists.

As shown in the drawings, the lowermost strips 17 are preferably nailed on at suitable spaced apart points so that the nails pass into either some part of the floor or foundation or into the lower part of the vertical joist. At the same time that nails or the like are driven through the intermediate parts of the surface 17, the same likewise secure in impinged relation the extended and upturned edge portions of the edge areas of the metal fabric 13.

Where it is desirable to securely anchor the building against wind or other elements where these are likely to be encountered in particular localities, it is advisable to utilize a relatively wider strip 17 having a substantial portion of felt layer removed and entirely omitted so as to provide a metal fabric anchor portion 17a shown at the lower left of Fig. 5, and which desirably may be bent outwardly and downwardly and buried in the surrounding earth, so that said metal fabric portion 17a provides an inexpensive and quickly formed anchoring element for the building.

Referring to the form of the construction illustrated in Figs. 1 and 2, a plurality of strips of composite waterproof and weatherproof material 20 are formed, preferably in roll form for convenient transport, and which strips of material 20 are preferably composed of two or more layers of felt or other equivalent fibrous material similar to that commonly referred to as roofing paper, and which is preferably impregnated and suitably coated with a bituminous material such as tar or other composite mixtures containing the same. The strips or covering material 20, which are preferably made at the factory in large quantities and placed into roll form for convenient handling and transport, are each made with a metal fabric, which may be composed of interwoven wires or punched sheets forming interstices or apertures of suitable size, and wherein such metal fabric is bonded between two or more layers of felt or other fibrous material or bonded or pressed into one flat surface thereof. In the particular illustration of the drawings, the woven wire fabric designated by numeral 18, Fig. 2, is shown as bonded between the felt layers, the same including suitable bonding composition applied as a plastic to bond the respective layers of fabric into one composite substantially flexible unit. In the manufacture of these composite sheets at the time of production, such parts thereof which are to be utilized for temporary ventilated buildings, have the woven metal fabric of greater area so that one longitudinal edge of said metal fabric extends several inches beyond the main weatherproof portion of the composite strips, this providing an integral longitudinal edge formed solely of metal fabric and designated by reference numeral 19.

As this composite covering material is preferably brought to the location of actual use in flat sheets or in rolls capable of being rolled out flat, those strips in connection with which air vents of the lengths desired are cut off, and each strip of composite material 20 is bent along a longitudinal line preferably a short distance inwardly of the edges of the felt material adjacent to the metal fabric edge portions 19 to form a doubled back part or flange 21 composed principally of apertured metal. The exposed metal fabric edge portion 19 is then bent angularly and preferably, though not necessarily, in a substantially vertical direction to the plane of the main body of the composite covering strips 20, and the outer edge of the flange 21 is preferably again bent upwardly or downwardly to present a flange-like portion for convenient nailing to the vertical joists of the framework. Said first mentioned bend of said vent-forming flange is designated for convenient reference as numeral 22, and the longitudinal bend which forms a convenient nailing flange or innermost edge portion is designated by reference numeral 23. The doubled back end portion formed by the longitudinal fold or bend made inwardly of the exposed metal fabric portion 19 thereby forms a depending flange which acts as a guard against rain or other elements as substantially shown in cross section in Figs. 2, 5 and 6.

The said bent metal fabric edge portion 19 is secured to the framework by nailing or equivalent means, the nails being driven through the integral longitudinally extending nailing flange 23 of said metal fabric, before the bend forming the depending flange 21 is fully formed so that the builders may swing their hammers without interference and while the main body of the covering strips are extended in a direction away from the building framework itself. After said nails are driven through said metal fabric flange, the main body of each strip is lifted upwardly to complete the bend forming the depending flange 21 of each row of strips, and thereupon the uppermost longitudinal edge of each covering strip 20 is secured to the vertical joists of the building framework either by separate nailing or by the nails which are driven either through the bent back lower edge nailing flange 23 of the next adjacent covering strip 20, or through the lower substantially flat edge portion of the adjacent strip.

As illustrated at the left hand portion of Fig. 2, when the upper longitudinal edges of one row of covering strips 20 are placed against the side wall joists, the upwardly bent nailing flanges 23 of the metal fabric exposed area 19 is placed thereagainst and the same nails driven through both said metal fabric flanges and through the upper edges of the covering strip below it to thereby secure both thereof with the same nails and with resulting economy in time and material.

As to the metal fabric edge areas 19 composed solely of interwoven wire or the like with suitably sized interstices, it will be apparent that the above described formation and mounting of said angularly bent metal fabric edge areas 19 holds the lower doubled back flanges 21 of each strip a short distance away from the building framework and holds the main body of the weatherproof covering strips 20 in a slightly inclined position, and thereby forms downwardly opening air vents which extend to the length that said aforedescribed construction is adhered to. Such longitudinally extending air vents, designated generally as 24, may be formed either entirely around a building at spaced apart intervals, or at either the juncture of two adjacent strips or at the spaced apart junctures of two or more of the covering strips, all according to the desired ventilation of the particular building. It will be apparent that the lengths, sizes and number of such longitudinally extending downwardly opening vent openings, which are obstructed solely by the interwoven wire which readily admits air, can be regulated according to the desires of the particular case to meet the particular requirements of the intended uses of the building, and it will be further apparent that such longitudinally extending vents will be guarded against normal weather conditions by the downwardly extended overhanging flanges formed by the said doubled back edge portions of the covering strips.

As indicated in Figs. 5 and 6, the composite sheets which include a reinforced metal fabric as a part thereof which are secured to the side walls and which strips are merely nailed along their longitudinal edges, (the lower edge being doubled back as illustrated) and which strips are so secured that no vents are provided thereby, are designated by the reference numeral 20b. These strips 20b are similar in construction and

in mounting to the end strips 20a which are illustrated in part in the right hand parts of Figs. 5 and 6.

As illustrated in Figs. 2 and 5, the longitudinal air vents 24 formed as hereinbefore described, may be substantially closed against any material passage of air therethrough by means of longitudinally extending boards, strips or baffles 25, which are illustrated in upstanding position upon their respective edges, and when it is desired to substantially close said vents to restrict the amount of ventilation, wind, etc., these baffles 25 may be laid flat in a horizontal plane resting upon the horizontally extending portions of the metal fabric. In this manner, the horizontally extending portions of the metal fabric not only serve to provide ventilated openings, but actually support the main body of edge covered strip 20 in extended position away from the framework of the building, and additionally prevent any unauthorized entry of insects through such vent openings. In instances where the wire fabric is of sufficiently fine mesh, these horizontally extending metal fabric portions also guard against the entry of insects.

I desire it to be understood that the number of air vents formed substantially in the manner hereinbefore described may be varied according to desire and any one or more thereof may be positioned at the desired height from the ground at the points of juncture of any two rows of adjacent wall covering strips. It will be apparent that side wall covering strips having vents formed like those hereindescribed, may vary in direction in different buildings, as for example all of the side wall covering strips could be secured as above stated in edge-overlapped inclined or vertical directions and at the same time being provided with portions of one or more of the wall covering strips bent inwardly and apertured and secured to the side wall frame supports to provide the desired number of air vents opening in directions other than downwardly

In Fig. 3 I have illustrated a lower portion of a typical corner of a building utilizing my hereindescribed constructions wherein the end wall covering of the building shown at the right of Fig. 3 is composed of edge-overlapped composite strips 20 which are preferably secured by nails to the vertical wall supports of the frame substantially as illustrated. It will be seen that these end wall strips 20 extend a short distance beyond the corner joists 14a and have the extreme edge portion designated as 26 bent angularly upon and over the end edge portion of the side wall strips 20 shown at the left of Fig. 3. In this view, both the two side wall strips 20 at the left of Fig. 3 are illustrated as being in slightly downwardly inclined position in the same manner as shown in cross section in Fig. 2. The end edge portion 26 of the two end wall strips 20 which form sealing flanges and a weatherproof joint with the ends respectively of the side wall strips 20, may be secured to said side wall strips in any suitable manner, as for example by suitable cement, plastic composition, sheet metal screws or the like. In Fig. 3 the particular optional form of said securing means is represented by sheet metal screws 27.

In the drawings I have illustrated an optional form of roof covering, though I desire it to be understood that any satisfactory form of a construction of roof may be utilized in connection with my invention, my invention being in no way limited to any particular type or construction of weatherproof roof covering.

In Figs. 1 and 6, I have illustrated in cross section fragments of an optional form of roof in which the longitudinally extending strips are formed of a fibrous or other suitable material having bonded thereinto a reinforcing metal fabric of the type hereinbefore described, and wherein the roof strips, designated as 28, are nailed along the one lower edge by being first placed downside up, the nails driven through the overlapping lower edge of said inverted strip through the upper edge of the next adjacent strip therebelow and into the roof supporting members of the building frame. Thereupon the inverted strips or sheets of said material are bent completely over to double the edge portions adjacent to the nailed parts and then the same cycle of overlapping and doubled back securance may be repeated with respect to the next and upper strip 28 of the roof covering. An enlarged fragmentary view of the manner in which the roof covering strips 28 are secured upon the roof trusses 16 and doubled back to lay upon the roof supports of the frame is illustrated in the enlarged fragment of Fig. 4.

In Fig. 6 I have illustrated in vertical cross section a side wall embodying one of the features of my invention, and wherein each of the respective longitudinally extending covering strips of the side wall are secured so that the lower longitudinal edge is doubled back upon itself and securing nails passed through the edge flange and through the underlying upper edge of the next adjacent covering strip and into the side wall supports of the building frame. This is most economically accomplished in the building operation by laying the strip inside out with the upper edge thereof flush with the upper edge of the already secured strip, driving the nails at spaced apart intervals through both the said overlying edges and into the side wall members of the frame, and thereafter taking each strip or row of strips and folding it outwardly and upwardly letting its upper edge portions lie against the side wall supporting members, whereupon the operation is again repeated with respect to the next adjacent covering strip.

A portable unit made according to the hereindescribed invention provides not only a weatherproof and substantially durable shelter, which optionally includes the air vents as hereindescribed, but also provides a structure and a roof and wall covering having a high degree of resistance to fire, and being to a substantial degree shatter proof so that fragments of bombs, shells and other explosives which might explode in close proximity will not penetrate the side wall and roof structure due to its resiliency or flexibility nor result in any substantial breaking away or flying of splinters such as encountered in ordinary wood walls and coverings.

In Figs. 7 and 8, I have illustrated the portable unit capable of use either as a building or shelter or as a barge or boat which embodies features of construction which have been heretofore described.

In this illustration, a different style or form of frame structure is illustrated, and such frame may be varied according to the particular desire and requirements of the job. In the particular illustration, reference numeral 29 designates a base beam which extends longitudinally from end to end of the structure, and numerals 30 designate typical transversely extending joists

or beams, one of which is illustrated, and which preferably rest upon and are secured to the central longitudinal beam 29. These joists or trusses 30 extend in both directions from their intermediate position overlying the beam 29 to points a short distance inwardly of the side walls as indicated. The side wall trusses 31, which are of a desired number and spaced apart at suitable intervals, extend upwardly and downwardly and are secured by suitable means, as for example by fitting pegs, nails, etc., to the opposite ends respectively of the transversely extending joists 30. Suitable diagonally extending braces 32, preferably formed of wood, extend from the upper end portions of the side wall supporting trusses 31 to the horizontally extending lower beams 30 and are secured by nails or other equivalent fastening elements.

A plurality of longitudinally and substantially horizontally extending side wall supporting members 33, preferably made of wood, extend from along each side and ends of the frame and are preferably in spaced apart relation, being illustrated as three in number in Fig. 8. These are secured by nails or the like to the upwardly and downwardly extending side wall trusses 31. A pair of top rail members or beams 34 extend from end to end of the structure and are secured to the upper ends of the side wall trusses 31 by nails or equivalent fastening means, the upper edge portions of the uppermost side wall member also secured thereto by nails or the like.

The floor or bottom of this unit may be composed of a number of side by side secured members of any suitable material, those of the illustration being wood boards 34a laid in side by side relation and secured by nailing or the like in a substantially common plane to the lower edge surface of the transverse joists or beams 30. The area of these boards 34 extends from the longitudinal beam 29 to a point adjacent the upwardly and downwardly extending side wall supporting trusses 31.

Numerals 35 designate two spaced apart connecting bars or trusses, two or more of which may be secured across opposite ends of the structure by nailing the opposite ends of each thereof to the upwardly and downwardly extending side wall trusses 31, and optionally also to the respective adjacent ends of the upper side wall members 33. These bars or trusses 35 aid in rigidly bracing the two side walls with respect to each other and they also form a foundation upon which to secure the waterproof and weatherproof covering of the ends of the structure.

Reference numeral 36 designates one of a plurality of spaced apart preferably inclined roof trusses which have their lower ends suitably recessed to fit about the upper and inside surfaces of each of the two longitudinal rails 34, and said lower ends of said roof trusses 36 are secured by nails or equivalent means to the longitudinal rails 34 substantially as illustrated. The two upper adjacent ends of each opposed pair of roof trusses 36 are cut in conventional manner so that they engage each other to form cooperating brace members and supports for the roof structure, and such upper ends of such roof trusses 36 are optionally additionally connected by connecting links 37, preferably made of wood, which are nailed across the joint of each pair of roof trusses 36.

The structure may optionally be additionally braced by one or more pairs of metal tie rods or connecting rods 38, the outer ends of each of which are anchored in suitable apertures formed in one or more of the side wall trusses substantially as illustrated in Fig. 8. The inner ends of these tie or connecting rods 38 are provided with oppositely directed threads upon which a suitable turnbuckle 39 is threaded and whereby said rods may be securely tightened to fulfill their securing and bracing functions.

In Fig. 8 I have illustrated a vertically extending pair of tie rods 40 and 41, the lower tie rod having its headed end anchored and a suitable aperture formed in the central longitudinal beam 29, and the upper tie rod 41 being anchored by means of a suitable aperture formed in the adjoining engaged upper ends of the roof trusses 36. A suitable turnbuckle 42 is threaded upon the oppositely threaded substantially adjacent ends of the vertically extending rods 40 and 41 as indicated.

The bottom and side wall covering for the portable unit such as illustrated in Figs. 7 and 8 is composed of a plurality of suitably secured, bent and overlapped sheets of waterproof material, preferably of a construction such as hereinbefore described, and preferably including fibrous or equivalent material with a sheet of fabric bonded either into an intermediate part thereof or upon one surface thereof. In the illustration of Fig. 8, this waterproof covering material shows the metal fabric bonded thereinto as an intermediate layer. A central bottom strip 43 of said waterproof material is secured in any suitable manner upon and about the central longitudinal beam 44 and bent angularly to substantially fit into the corners formed by said beam 44 and the bottom 34, the opposite side section (only one of which is shown), of said central bottom strip being nailed or equivalently secured directly to the bottom boards 34. Thereupon a sheet or strip of said waterproof material designated as 45 is laid with one edge lying in registry with each lateral edge of the central bottom strip 44, and secured thereon and to said bottom by a plurality of spaced apart nails, and said strip 45 is bent and doubled back upon itself so that the roof will lie in secured position in each respective corner adjacent the central bottom beam 29. The extending edge portion of the part of the strip 45 which has been brought up against the bottom of the structure is secured by nails or the like to the floor 44, as illustrated. Thereupon a second strip designated as 46 is laid with its outer lateral edge substantially adjacent and parallel to the outermost lateral edge of the strip 45, and nails driven therethrough to secure the portion thereof to said floor, both along its lateral edge and along a substantial line below the lateral edge of the central covering strip 44. Thereupon the said second bottom strip 46 is formed and doubled back upon the fold designated as 46a and the free lateral edge is positioned against the corner of the structure and bent to conform with whatever shape said corner structure defines. Said bent outermost edge of said second bottom covering strip 46 is secured by nails or the like to the lowermost of the horizontally extending side wall members 33.

Thereupon the third longitudinally extending waterproof composite strip 47 is secured in a manner similar to strip 46, namely by first securing one lateral edge to the already nailed outer edge of strip 46 and to the lower side wall mem-

ber 33, by nailing the same along a longitudinally extending path over the secured outer edge portion of the strip 45 and over the secured intermediate portion of the second bottom strip 46, thence folded as at 47a and positioning the initially free portion thereof over the corner part of the portable structure and securing it to one of the horizontally side wall members 33, in Fig. 8 being illustrated as the intermediate one. Thereupon a longitudinally extending side wall covering strip 48 is securely mounted in the manner as strips 45, 46 and 47 and the same doubled back and extended upwardly to a point near the upper part of the side wall structure. Thereafter the side wall covering strip 49 is similarly secured and doubled back and the uppermost edge being preferably bent to lap over and be secured to the inclined roof trusses 36. At points where the next sealing covering strip is overlapped upon a portion of the previously secured covering strip, suitable waterproof plastic composition often termed "mopping" or "coating" may be interposed between the adjacent overlying surfaces of said covering strips, a portion of the sealing or waterproofing composition being designated by reference numeral 50 at the lower left of Fig. 8.

In the immediately preceding paragraph I have described only the covering of the one-half portion of the portable unit, and it is to be understood that the correspondingly built other half portion and the covering roof is similarly constructed and sealed.

In the upper part of Fig. 8 I have illustrated the roof portion as composed of two strips, 51 and 52, of waterproof material, which strips are like those hereinbefore described and which have a reinforcing rigidifying layer of metal fabric bonded therein. The strip 51, which may be composed of a plurality of individual sheets joined at their adjacent ends, has its upper longitudinal edge secured to the roof trusses 36 by nails or equivalent fastening elements designated as 53, and has its lower edge doubled back and folded upon itself as at 54, and has the woven metal fabric thereof itself extended and bent in a substantially downward direction and designated by numeral 55, and again bent angularly and inwardly to form a convenient nailing flange 56. Suitable nails are driven through nailing flange 56 at the inner side edge to secure the "vent" portion of the roof strip 51 before the upper longitudinal edge is secured by nails 53.

Thereafter one or more longitudinally extending roof covering strips 52 (according to the size of the roof to be covered and the size of the preformed sheets) are secured in the same manner as described with reference to the first roof covering strip 51, and in the same manner provides another side opening longitudinally extending air vent 57 composed solely of woven fabric through which air may readily enter or pass for suitable ventilation of the unit. In certain instances, where such portable unit might be desired to be used by the armed forces of which shooting would be desirable, a plurality of amply large spaced apart passages may be formed in the vent portions 57 substantially as illustrated in the fragment of Fig. 7.

As illustrated in the left of Fig. 7, which is a side elevation of an end portion of the side of said portable unit, the ends of the respective bottom and side wall covering units formed of combined composite material and metal fabric may be satisfactorily secured to the end portions of the frame of the structure by a plurality of spaced apart screws 59 passing through spaced apertures in a reinforcing and securing metal strip 58, said screws threading into the end parts of the respective frame members hereinbefore described.

A further important accomplishment of my said described manner of securing the bottom and side covering strips and in folding and doubling the same back with parts of one of the next adjacent as described, is that the heads of one of the nails (or screws or equivalent fastening elements) which are driven thereinto in the described manner are exposed to the outer surface of the covering strips, and therefore no water will be permitted to enter through the holes caused by driving the respective nails through said covering strips when secured in the before described manner.

I am aware that various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages of the invention or any features thereof, and nothing herein shall be construed as limitations upon the invention, its concept or structural embodiment as to the whole or any part thereof.

I claim as my invention:

1. In a portable building having a substantially rigid supporting framework, said framework having part thereof adapted to have side wall and roof covering units mounted thereon; a plurality of composite strips formed of flexible, waterproof material and metal fabric secured in over-lapping relation on said framework to form a weatherproof covering thereon; certain of said strips on the side wall portions of said framework being secured to said framework along the upper longitudinal edges respectively, and extending in a downwardly and outwardly inclined direction and having their respective longitudinal lower edge portions doubled back and upwardly and thence horizontally, said horizontally extending edge portions of said covering strips being secured to said framework and being provided with a plurality of apertures therethrough to form ventilating ports; and closure strips removably mounted on said horizontally extending edge portions of said strips and adapted, when lowered, to substantially obstruct said ventilating ports.

2. In a building structure having a skeleton framework including a side wall, roof beams and trusses; a side wall covering composed of a plurality of edge-overlapped and partially superposed strips of composite weatherproof material, said weatherproof material including a bonded-in woven wire fabric; said strips being secured to said framework along their upper longitudinal edges, the opposite and lower longitudinal edge portions of said covering strips being composed solely of extended portions of said wire fabric; said lower wire fabric edge portions of said strips being bent angularly and substantially horizontally and the extreme edges of said extending inwardly bent wire fabrics being secured to said framework to thereby provide longitudinally extending downwardly opening vents; and a plurality of edge-overlapped composite waterproof, flexible strips secured on the roof portion of said skeleton framework.

3. In combination with a building shelter unit having a skeleton framework including a plurality of connected together joists, trusses and beams, certain of said beams providing means for mounting a side wall covering and roof there-

on, the side wall beams being disposed in substantially vertically extending directions; a side wall covering on said side walled beams composed of a plurality of superposed rows of composite weatherproof composition and partially of a bonded woven wire fabric; the wire fabric unit of each of said strips itself extending beyond one lateral edge of each of said strips; the lower portions of certain said strips being bent inwardly and the extending metal fabric portions along said bent in edge being bent horizontally and extending to positions adjacent the side wall beams of said framework; fastening elements securing the lateral edge portions of said wire fabric extending portions to said side walled beams; said inwardly extending metal fabric portions providing downwardly opening air vents for said building; and a plurality of edge-overlapped strips of waterproof material forming the roof portion of said unit.

4. In a portable building unit; a supporting framework including side wall and roof supporting members; and substantially shatter-proof walls secured on the side wall members of the said supporting frame, said side walls being composed of a plurality of edge-overlapped slightly yieldable strips formed of sheets of fibrous material and metal reinforcing fabric edge bonded together as integral units, certain of said composite strips having their longitudinal edges doubled back upon the main portions thereof and said doubled back portions secured in overlapping relation with respect to the longitudinal edge portion of the adjacent composite strip, one or more of said side walls having air vents therethrough provided by angularly bent aperture-bearing portions of one or more of said strips of material covering said side wall.

5. In a quickly assemblable and portable building; a supporting framework including vertically extending side wall members and roof supporting members; a weather-proof covering secured on said roof composed of a plurality of edge-overlapped strips of waterproof material sealed at the respective joints of said strips, said strips of waterproof material being composed of a fibrous flexible material and a reinforcing metal fabric bonded thereto; and a plurality of longitudinally extending flexible strips composed of fibrous material and reinforced metal fabric bonded thereto secured on said side walls in substantially edge-overlapped relation and forming weatherproof side walls for said building, one or more of said longitudinally extending strips having the metal fabric thereof extended and exposed along the longitudinal edge of such covering strip, and said exposed metal fabric strip edge portion being bent angularly and inwardly and secured to the side wall members of said frame so as to normally hold such strip in slightly inclined position and to thereby form longitudinally extending air vents for said building.

6. In a quickly assemblable and portable building; a supporting framework including extending side wall members and a plurality of spaced apart inclined roof supporting members; a weatherproof covering secured on said roof composed of a plurality of edge-overlapped strips of waterproof material sealed at the respective joints of said strips, said strips of waterproof material being composed of a fibrous flexible material and a reinforcing metal fabric bonded thereon; a plurality of longitudinally extending flexible strips composed of fibrous material and reinforced metal fabric bonded thereto secured on said side walls in substantially edge-overlapped relation and forming weatherproof side walls for said building, one or more of said longitudinally extending strips having the metal fabric thereof extended and exposed along the longitudinal edge of such covering strip, and said exposed metal fabric strip edge portion being bent angularly and inwardly and secured to the side wall members of said frame so as to normally hold such strip in slightly inclined position and to thereby form longitudinally extending air vents for said building; and a longitudinal strip extending about the lowermost part of said frame and composed of strips of material with end edges overlapped and which strips are composed of woven metal fabric partially covered by weatherproof material so that the lower part of said strips are composed solely of said woven metal fabric and are adapted to be bent angularly and buried in the surrounding earth to provide anchoring means for said building.

7. In a portable structure having a framework including inclined roof trusses; side wall supporting joists, bottom beams and braces, all said framework members being connected together to define a pliable space; a bottom composed of a plurality of side by side wood boards secured to the bottom members of said framework; longitudinally extending side wall members connecting the vertically extending side wall members of said frame; a waterproof covering secured upon the bottom on the side wall and end wall portions of said structure comprising a plurality of longitudinally extending strips of composite waterproof material including a metal fabric bonded therein; one lateral edge of each of said strips being secured by nailing or the like to said bottom boards and the remainder of each strips being doubled back and folded adjacent to and secured to said bottom boards; each next succeeding strip having one longitudinal edge portion secured by nailing or the like to the doubled back portion of the preceding strip, the main portion of such strip being doubled back against said framework and secured thereto, and each succeeding strip being similarly secured and doubled back; the longitudinally extending overlapping edges of said strips being sealed to form a continuous composite waterproof bottom end wall.

8. In combination with a portable, habitable enclosed structure of the type described, said structure having a rigid framework defining an interior space and including a plurality of supported longitudinally extending wood side strips and a braced floor including a plurality of secured side by side boards; said structure having waterproof end walls at the opposite end walls thereof; a waterproof composite wall covering the undersurface of said floor and covering the sides of said structure composed of a plurality of metal-reinforced waterproof flexible strips of composite material, the central bottom strip extending longitudinally and continuous from one end to the other of said structure; each of the two strips adjacent said central strip forming a portion of the covering of said bottom and said side walls being folded and doubled back along a longitudinal line so that one edge area is positioned and secured by nails or the like to one lateral edge portion of said central bottom strip and so that a larger doubled back portion of each of said two strips adjacent said central strip extends substantially beyond the lateral edges respectively of said central strip; each of

the succeeding longitudinally extending waterproof composite strips having one longitudinally extending edge portion secured by nails or the like to the extended portion of the adjacent preceding strip and being doubled back along a longitudinal line and the larger doubled back portion positioned and secured against the bottom and side wall of said structure respectively so as to form triple layers of said strip material over on portions thereof between the points of securance and between the respective longitudinally extending folds of said respective strips, said triple layer wall thereby formed forming a waterproof substantially rigid covering for the bottom of the side walls of said structure.

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