

Jan. 11, 1938.

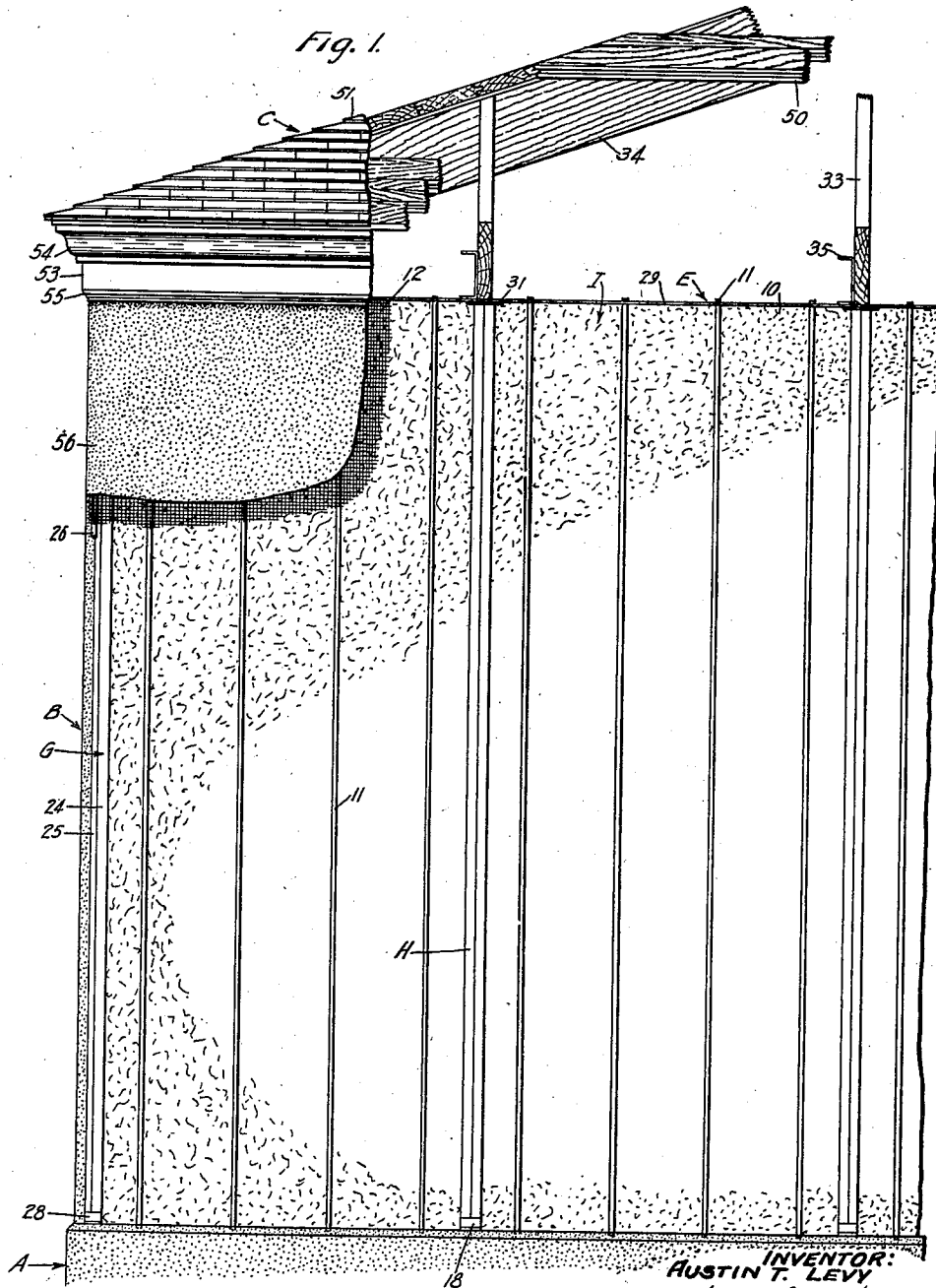
A. T. LEVY

2,104,871

BUILDING

Filed April 29, 1936

3 Sheets-Sheet 1



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Fig. 2.

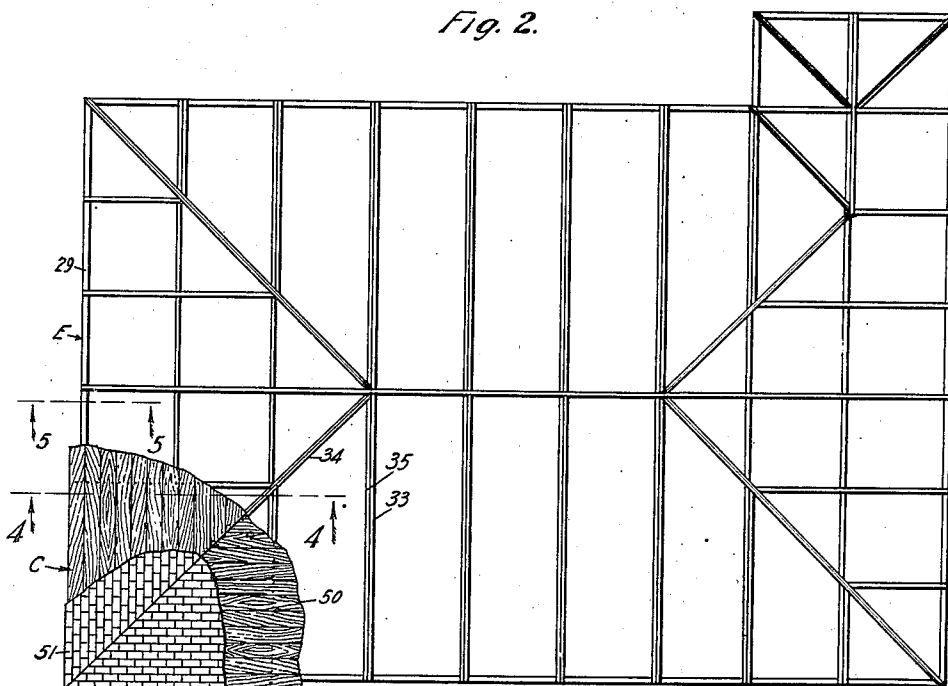


Fig. 4.

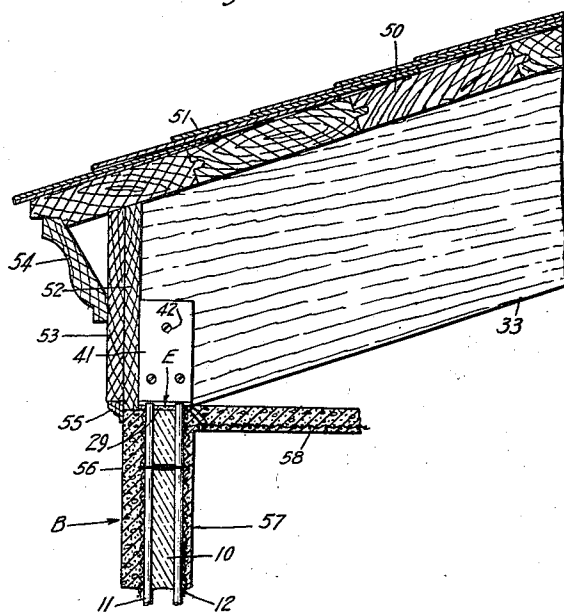
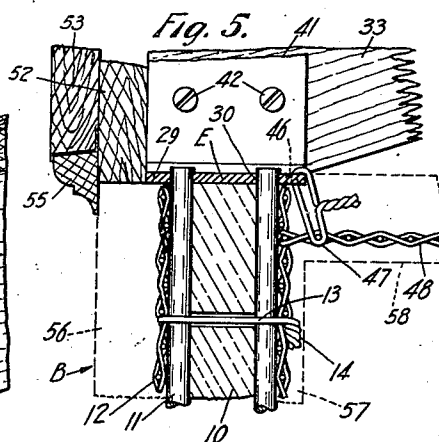


Fig. 5.



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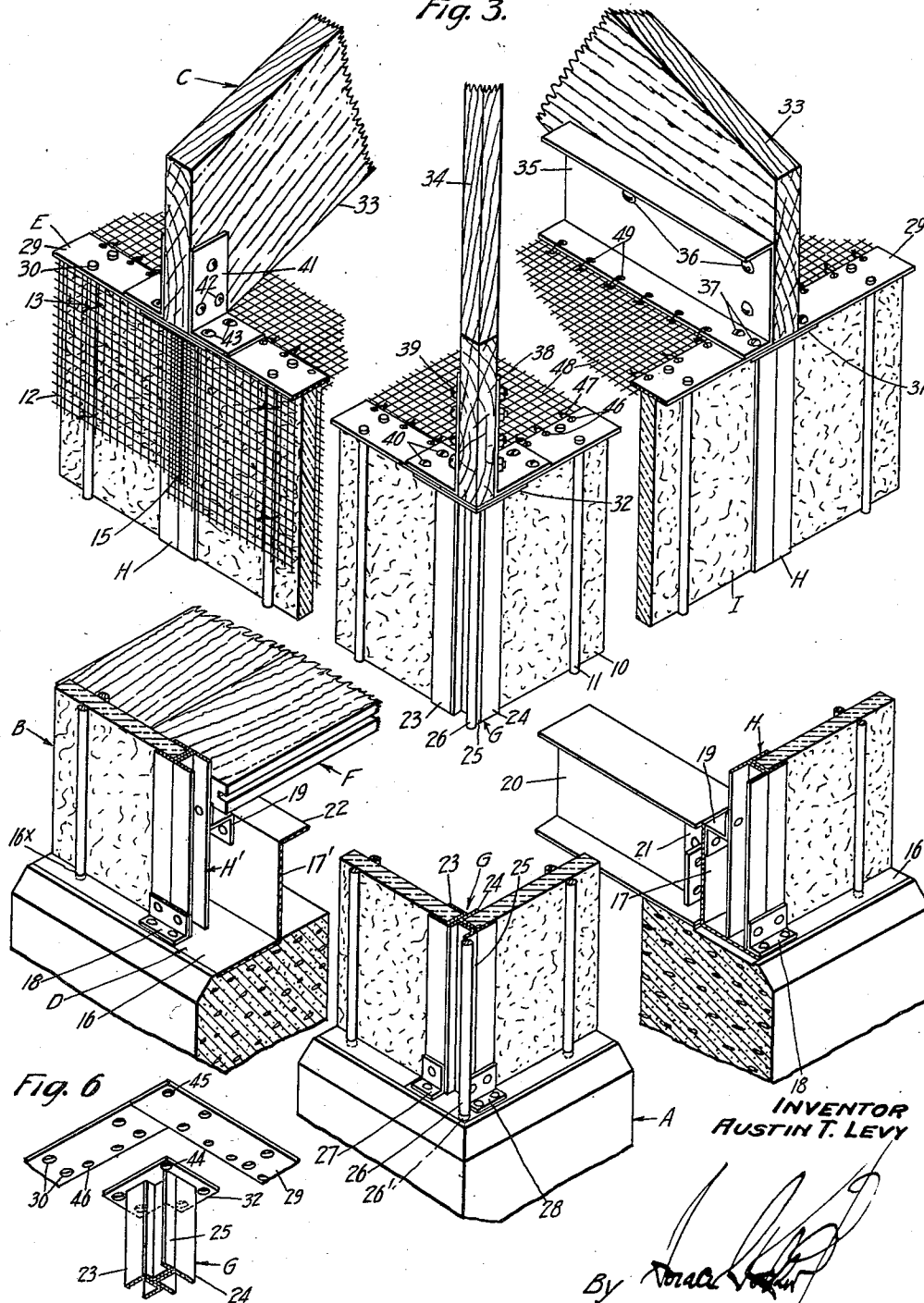
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3 Sheets-Sheet 3

Fig. 3.



UNITED STATES PATENT OFFICE

2,104,871

BUILDING

Austin T. Levy, Harrisville, R. I.

Application April 29, 1936, Serial No. 76,950

26 Claims. (Cl. 72—1)

This invention relates to buildings and more particularly to prefabricated buildings of the general type described in my application, Serial No. 46,156, filed October 22, 1935, and in my application, Serial No. 54,429, filed December 14, 1935.

One of the objects of my invention is to provide a building formed of relatively simple prefabricated parts and combining the advantages of cheapness, ease of erection, strength, durability, and attractive appearance.

Another object which I have in view is to improve the building structure described in my previous applications and to provide a structure in which the total number of parts is considerably reduced and in which certain parts are of simpler form and less expensive and of less weight and more easily assembled than heretofore, so that the cost of the building is reduced while at the same time its erection is facilitated and made more rapid.

Another object is to provide a building of the type in which prefabricated panels are set in and positioned by and between lower and upper plate members, in which the upper plate member can be of simple, inexpensive form by reason of the reduction of the load imposed thereon, and in which the roof rafters and ceiling joists are of a minimum number and so arranged that they are supported in an effective manner directly from the studs without the need of support from the panel positioning portions of the upper plate member.

A further object is to provide an improved upper plate structure and improved roof and ceiling supporting structure associated therewith in an improved manner.

These and other objects of the invention will, however, appear more clearly hereinafter, or will be obvious to those skilled in the art.

In the accompanying drawings, in which I have shown an illustrative embodiment of my invention,—

Figure 1 is an elevation partly in section, and in part broken away, of the corner portion of a building, such as a small dwelling, embodying my improvements;

Fig. 2 is a top plan view of the building shown in Fig. 1, broken away in order to illustrate the arrangement of the roof rafters and ceiling joists;

Fig. 3 is a perspective view with some parts broken away and with some parts omitted, illustrating the structure of the building at a corner thereof at an intermediate stage of its erection;

Fig. 4 is an enlarged section on line 4—4 of Fig. 2;

Fig. 5 shows on a larger scale certain parts shown in Fig. 4, some of the parts being indicated in dotted lines, and

Fig. 6 is a detail perspective view of the upper end portion of a corner stud and the portion of the upper plate member supported thereby, illustrating the manner in which the parts are assembled.

In the drawings I have shown my improvements applied to a building such as a small dwelling of the bungalow type having a hip roof and in which wall panels of the type disclosed in my previously mentioned applications are set in apertures formed by the lower and upper plate members and by the stud members. In the drawings, the foundation is shown at A, the outer wall at B, the roof at C, the lower plate at D and the upper plate at E. As described in my previous applications, the wall panels and the studs are covered on the outside by a layer of cementitious material such as stucco, and on the inside by a layer of cementitious material such as plaster. The structure of the foundation A, the lower plate D and the support for the floor F is essentially the same as described in my application, Serial No. 54,429, and the structure of the corner stud G, the ordinary wall studs H and the panels I are also as described in said application.

Each of the panels I preferably comprises as heretofore a board 10 of compressed wood fiber or like thermal insulating material having applied to each face thereof a series of longitudinal reinforcing and locking rods 11 in contact with the board face. These rods serve to space from the board, sheets 12 of coating anchoring material or metal lath which may, as herein shown, be formed of woven wire. If desired, expanded metal may be used or some other form of reticulated material. The sheets 12 and the rods 11 are fastened to the board 10 by appropriate means such as wire loops 13 arranged at suitable intervals in the length of the rods and passing through suitable perforations in the board. The arrangement is such that the rods 11, lying against opposite faces of the board and firmly secured thereto, considerably increase the resistance of the panel to buckling strains and also space the anchoring sheets from the board faces. After the fastening wires have been placed in position, the ends of the wires are twisted together as shown at 14, so as to tightly clamp the rods against the board and the anchoring sheets against the rods. The ends of the rods, located

adjacent the upper and lower edges of the panel, project slightly beyond the edges of the board so as to act as locking means as hereinafter described. The sheets 12 are preferably substantially coextensive in length with the board but are of greater width than the board so as to project beyond the same at the lateral edges thereof. The lateral edge portions of adjacent sheets are adapted to overlap the stud members positioned adjacent the lateral edges of the board and to overlap each other, as shown in Fig. 3, where the overlapping portions of the sheets of adjacent panels are shown at 15. This structure is employed at the inner face of the wall as well as at the outer face.

The foundation A, as heretofore, is preferably made of concrete, and to the upper face of the foundation wall the metallic lower plate member D is applied. At a side of the building this lower plate member comprises a relatively wide plate portion or flange 16 suitably secured to the foundation as by bolting it thereto, and it also comprises an upstanding portion 17 projecting upwardly from the foundation at the inner part of the plate 16. The plate 16 is provided at intervals with suitable perforations 16x to receive the lower extended ends of the inner and outer rods of the panels. The rods 11 may also extend into shallow sockets formed in the concrete in alignment with the perforations 16x, as indicated by dotted lines in Fig. 3. The studs H preferably comprise channel members placed back to back and suitably interconnected as by welding. The studs have their lower ends in engagement with the upper face of the member 16 and are secured to said member by suitable means such as angle plates 18. The channels of the studs H receive and position the side edges of the panel boards and extend within the projecting lateral edges of the coating anchoring sheets. The inner flange portions of the stud members are in outwardly spaced relation to the upstanding flange 17 of the lower plate member and are secured to said flange by double angle members 19. In the case illustrated, the floor beams 20 extend from one side of the building to the other and each end of a floor beam is positioned adjacent the upstanding portion 17 of the lower plate member and is fastened thereto by suitable means such as angle plates 21.

At the ends of the building, the arrangement of the lower plate member and studs is generally similar to that previously described, but in this case, the lower plate member is provided with an upstanding portion 17' having an inwardly directed flange 22 at the upper part thereof, adapted to support the end portions of boards of a wooden floor F, which extend across and is supported by the floor beams 20. In Fig. 3, I have shown only one of the floor beams, but, it will be understood that at what is, in this particular instance, the side of the building, the floor beams will be spaced so as to be in alignment with the studs and will be suitably fastened to the upstanding member or flange 17 in the manner previously described. At what is, in this instance, the side wall at the end of the building, the studs are secured to the upstanding member or flange 17' by means of double angle members 19.

The corner stud G is preferably composed as heretofore of three interconnected channel members 23, 24 and 25, the members 23 and 24 being adapted to receive the edges of panel boards arranged at right angles to each other, and the member 25 being a relatively shallow channel

member set in at the corner and arranged back to back with the member 24. At the corner of the building, in proximity to but spaced outwardly from member 25, is a corner rod 26 positioned at its lower end in a perforation 26' in the lower plate member and positioned at its upper end in the upper plate member in a manner to be hereinafter described. This corner rod serves as a coating anchoring means and is adapted to support the extended side portions of the reticulated outer sheets 12 at the corner of the building in the manner described in my application, Serial No. 54,429. The lower end of channel member 23 is secured to the lower plate member by an angle plate 27 and the lower end of member 24 is secured to the lower plate member by an angle plate 28.

Referring more particularly to my improved construction, the upper plate member is preferably constituted by a flat web or plate lying in a horizontal plane and adapted to receive and hold the upper protruding ends of the locking members 11 of the panels. According to my invention, the upper plate member should be and is of such nature and form as to provide ample resistance to lateral stress in order that the panels may be firmly supported against lateral dislocation at their upper ends, but as hereinafter explained, it is not necessary for the plate member to sustain any considerable downward stress and, therefore, a thin member of the nature above indicated may be successfully used. In the form shown in the drawings, the upper plate member E consists of sections of thin plate 29 supported on the studs of the building and having inner and outer series of perforations 30 which receive the upper protruding ends of the locking rods 11 in order to interlock the panels with the upper plate member. Intermediate of its ends, each section or plate rests at intervals on the tops of the studs. At the upper ends of the studs H, rectangular plates or pads 31 are welded to the channels of the studs, and on these plates or pads the ribbonlike plate member rests so as to be supported thereby. At the corner of the building, an angular plate or pad 32 is welded to the upper end of the corner stud as shown in Figure 6, and upon this plate 32 the contiguous ends of adjacent plate sections are supported. As shown in Figure 6, one end of one plate section is abutted against the end of another plate section at the side of the latter, and these plate sections are supported on the angle plate 32 in that relation.

In the structure shown herein, which has a hip roof, the sloping roof rafters 33 at the sides and ends of the building are in alignment with and supported by the studs at the sides and ends of the building, said rafters resting on the shallow plate member at points where the latter is supported from beneath by the studs. At the corners of the building the hip rafters 34 rest on the plate member in locations where the latter is supported from beneath by the corner studs G. The ceiling joists 35, which in this instance extend to the sides of the building, are supported by the studs H, resting on the plate member in locations where the latter is supported from beneath by the studs H. As shown in Fig. 3, the ceiling joists 35 and the rafters 33 are arranged in abutting relation to each other so that the web of each U-shaped ceiling joist lies against one side of a rafter at the end of the rafter, and both the rafter and the ceiling joist are located over a stud plate or pad 31, with a portion of the plate member intervening. The ceiling joists

and rafters are interconnected by suitable means such as bolts 36, and each joist 35, plate member 29 and pad 30 are interconnected by suitable means such as bolts 37. Each hip rafter is secured in place above and in line with the corner stud by suitable means such as angle plates 38 having bolts 39 passing through the rafter. The lower legs of angle plates 38 are secured to the plate member by bolts 40, certain of which pass downward through perforations in the pad 32 of the corner stud. The rafters 33 at the end of the building rest at their ends on the plate member at portions thereof directly above and in line with the upper ends of the studs and are secured in position by angle plates 41. Each of these angle plates 41 has a leg positioned against the plate member and a leg positioned against the side face of the rafter, and the angle plates are fastened to the rafters by means such as bolts 42 and to the plate member by means such as bolt 42, certain of the latter bolts passing downwardly through the plate or pad 31 on the upper end of the stud. Various changes may be made in the provisions for securing the rafters and ceiling joists in position, those described being merely by way of example. It is preferable, however, to utilize a structure such as herein described in which the ends of the studs are provided with pads on which sections of the plate rest and to which they are secured, the roof rafters and ceiling joists resting on the plate member only in locations where the latter is supported from beneath by the studs.

The corner rod 26, previously mentioned, is held in position at its upper end by suitable means which, in the case illustrated, comprises a perforation 44 in the plate or pad 32 and a registering perforation 45 in the plate member 29.

In forming the ceilings of the building, the wall plate member is utilized to support suitable metal lath which may comprise woven wire that receives and holds the plaster. This reticulated material is also supported by the ceiling joists 35. In the example shown, the plate member 29 is provided adjacent its inner edge with a longitudinally disposed series of small perforations 46 adapted to be engaged by suitable fasteners 47 such as wire loops which support sheets 48 of woven wire or other suitable anchoring material to which the plaster of the ceiling is applied. As shown more particularly in Fig. 5, the wire of which the fastener 47 is formed may be passed through a perforation 46 and through openings of the reticulated sheet and the ends of the wire twisted together to form a supporting loop for the sheet, which attaches it to the plate member, but other types of fastening means may be used if desired. The ceiling joists 35 are also provided in their lower flanges with longitudinally spaced perforations 49, which may be engaged by fasteners 47, such as above described, or other suitable fasteners which engage the reticulated material in order to support it from the ceiling joists.

It will be noted that the wall studs are rather widely spaced from each other and that there are no rafters set in between those having their lower ends situated directly over the stud H. For this reason, there are applied to the rafters, wooden roofers 50 which are somewhat heavier and stronger than those ordinarily used in a building of this type, in order that the roof structure may be very strong and rigid notwithstanding the small number of rafters employed. To the roofers 50 a suitable outer covering is applied,

for example, shingles 51. A suitable ground board 52 is applied to the rafters at their outer ends in the space between the panel-formed outer wall and the roofers, the lower edge of this board being extended downward so as to lie in front of the plate member 29, as shown more particularly in Fig. 5. The lower edge of this board is preferably flush with the lower face of the plate member 29. Applied to this board 52 is an outer board 53, and a molding 54 is extended from the outermost roofer to the front face of board 53. A small molding 55 at the lower edge of board 53 covers the joint between the stucco or other cementitious material applied to the outer face of the wall, and the ground board 52.

The outer coating of cementitious material, such as stucco, is shown at 56, and it will be understood that this is applied to the outer anchoring sheets 12 carried by the panels and extending over the studs. The inner coating of cementitious material, such as plaster, applied to the inner sheets 12 of the building walls, is shown at 57. The body of cementitious material, such as plaster, used in forming the ceilings, is shown at 58, and, as usual, this is integrally joined with the inner coating of the side walls.

A portion of the ceiling lath is shown in Fig. 3, and it will be noted that sheets of this material are employed which are usually substantially co-extensive in width with the spaces between the ceiling joists. As shown in Fig. 3, a sheet 48 of metal lath is secured to angularly related plate member sections of the outer wall while said sheet is also attached to one of the ceiling joists 35 by means of the perforations 49 in said joist in the manner described.

It will be noted that as in my prior applications, the building is formed of parts of simple character which may be easily and inexpensively manufactured and easily transported to the building site. The wall panels are also of relatively light weight, and while they are of such length that they extend substantially from the foundation to the roof line, they can be readily handled and assembled. They provide thermal insulation and are equipped with means whereby they can be readily interlocked with the plate members, and they are also provided with effective means for anchoring the coatings of plastic material which are to be applied to the outer and inner surfaces of the walls. It will be observed in particular that the plate members are of very simple and improved flat form and are of light weight and can be readily handled and assembled. It will also be noted that by my improvements the number of parts employed in the building is considerably reduced. The stud members are reduced to a minimum number, and the roof rafters and ceiling joists are reduced to a minimum number, being used only in those locations where wall studs are located. Preferably the distance between adjacent studs is of the order of four feet, and from this it will be seen that the total number of parts for a given building is quite small in comparison to ordinary buildings. Among other things, a considerable number of roof rafters and joists are eliminated, it being unnecessary to use plate supported rafters and joists between the studs such as are employed in usual structures, and yet the structure is very strong and rigid. It will also be noted that not only the upper plate member but the panels themselves are relieved of load imposed by the weight of the roof and the ceiling joists, and this aids in providing a simple, inexpensive

and readily assembled structure. It is also noted that by my invention, the ceilings can be provided in a very simple and expeditious manner. These and other advantages of my improved structure will be manifest to those skilled in the art.

Where in the claims, I refer to "side" of the building, it will be understood that unless otherwise indicated by the context the term is used in a broad sense so as to include what is in a strict sense an end of the structure.

While I have shown and described herein one embodiment which my invention may assume in practice, it will be understood that many changes may be made in the details of the structure herein described and many modifications thereof adopted without departing from the principles of my invention or the scope thereof as defined in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. A building comprising a foundation, an outer wall, and a roof having intermediate the ends thereof a plurality of rafters extending to a side of the building and widely spaced from each other, said outer wall including a plurality of stud members correspondingly located and spaced from each other by the distance between said rafters and located beneath and in alignment with said rafters to support all of the same directly.

2. A building comprising a foundation, an outer wall, a roof having rafters extending to a side of the building and widely spaced from each other and heavy roofers interconnecting said rafters, said outer wall including stud members in alignment with and directly supporting consecutive rafters and wall panels of story height in the intervals between said stud members, and means free from roof load for positioning the upper ends of said panels.

3. A building comprising a roof having widely spaced rafters and heavy roofers applied to and interconnecting said rafters, a series of studs at a side of the building directly supporting consecutive rafters, wall panels between said studs, and means extending between the upper ends of adjacent studs and spacing said studs from each other and positioning said panels.

4. A building comprising a sloping roof having at a side thereof and intermediate its ends a plurality of widely spaced rafters, correspondingly located studs supporting consecutive rafters directly from beneath, wall panels between said studs, and an upper plate member having portions free from roof load against which said panels are positioned.

5. In a building, a foundation wall at a side of the building, a roof having rafters whose ends are located over said wall, ceiling joists having ends located over said wall, studs supported by said wall and directly supporting said rafters and ceiling joists, a light upper plate member having portions in the intervals between said studs free from roof and ceiling joist load, and wall panels between said studs positioned against inward and outward displacement by said portions of said plate member.

6. A building comprising a foundation wall, widely spaced stud members extending upwardly therefrom and having channels to receive the side edges of adjacent panels, a roof having widely spaced sloping rafters extending to a side of the building and all of which have their weight carried directly by stud members, a plate mem-

ber extending across the upper ends of said stud members and free from roof load in the intervals between said members, wall panels of story height between the stud members in engagement with the channels thereof, and means carried by said panels and forming parts thereof whereby said panels are positioned relatively to said plate member.

7. A building comprising a foundation wall, widely spaced stud members extending upwardly therefrom, a roof having widely spaced rafters at one side all of which have their weight carried directly by stud members, a ceiling having widely spaced joists all of which have their weight carried directly by stud members, a member spacing apart the upper ends of said stud members, and wall panels of story height between the stud members having their upper ends beneath and positioned by said spacing member.

8. A building comprising a foundation, a wall supported thereon including a plurality of stud members intermediate the ends thereof and panel members between said studs, a roof whose load is imposed directly on said stud members, and means substantially free from roof load interconnecting said stud members at the upper ends thereof and positioning said panels.

9. A building comprising a foundation, a wall supported thereon including stud members and panel members, a roof whose load is imposed directly on said stud members, and a lightweight metal upper plate member free from roof load interconnecting said stud members and positioning said panels in the intervals between said stud members.

10. In a building, the combination of a foundation, a side wall supported on the foundation, a roof having intermediate the ends thereof a plurality of widely spaced rafters, said wall including a plate and cooperating stud members corresponding in number to the rafters at that side of the building and respectively supporting said rafters directly, and wall panels set in the spaces between said stud members.

11. In a building, a foundation, a wall supported thereon including stud members and panel members, a roof whose load is imposed directly on said stud members, a ceiling whose load is imposed directly on said stud members, and a light upper plate member having portions in the intervals between said studs which position said panel members.

12. In a building, a foundation, a side wall supported on the foundation and including studs and panels of story height set in the spaces between said studs, a roof having rafters extending to said wall with consecutive rafters supported directly by said studs, and a plate member of relatively thin metal which overlies the upper edges of said panels and positions the same against inward and outward displacement.

13. In a building, a foundation wall, a roof having rafters, studs upstanding from said foundation wall and located directly beneath and in alignment with said roof rafters in position to carry substantially the entire roof load, an upper plate member positioning said studs at their upper ends having portions between said studs free from roof load and with said studs and foundation wall forming a plurality of panel openings, and non-load-sustaining wall panels forming closures for said openings.

14. In a building, a foundation wall, a side wall erected on said foundation wall comprising a load sustaining frame defining panel openings

and non-load bearing panels forming closures for said openings, said frame including load bearing studs upstanding from said foundation wall at each side of said panel openings and connected to said side wall at their upper ends against lateral displacement, and a roof having rafters extending to said side wall and widely spaced from each other having connections to said side wall overlying said studs and spaced by the distance between said studs.

15. In a building, a foundation wall, a side wall erected on said foundation wall comprising a load sustaining frame defining panel openings and non-load bearing panels forming closures for said openings, said frame including load bearing studs upstanding from said foundation wall at each side of said panel openings and connected to said side wall at their upper ends against lateral displacement, and a roof having rafters extending to said side wall and widely spaced from each other having connections to said side wall overlying said studs and spaced by the distance between said studs, one of said studs being a corner stud and having adjacent side wall studs on opposite sides thereof, and certain of said rafters adjacent said corner being angularly related.

16. In a building, a foundation wall, angularly related side and end walls erected on said foundation wall, each having a load sustaining frame including studs defining panel openings and non-load bearing panels forming closures for said openings, rafters supported on said frame directly over said studs, and means connecting said side and end walls at the junction of said walls and of said rafters.

17. In a building, a foundation wall, parallel side and angularly related end walls erected on said foundation wall, each having a load sustaining frame including studs defining panel openings and non-load bearing panels forming closures for said openings, and a roof structure having rafters supported on said frame directly over said studs and means connecting said side and end walls including angularly related rafters supported on studs at the junctions of said side and end walls and connected to the other rafters.

18. In a building, a stud having oppositely disposed channels, panels having their edges received in said channels, anchoring sheets applied to the faces of said panels, a ribbon-like plate member extending across the top of said stud, and means for fastening said panels to said plate member.

19. A building having a roof, studs located beneath the roof rafters and carrying directly substantially the entire roof load, a ribbonlike upper plate member having means for preventing lateral displacement of wall panel members, and wall panel members positioned by said plate member.

20. A building comprising a foundation, a roof having sloping rafters, studs located beneath the ends of the rafters, ceiling joists alongside the ends of the rafters above the studs, a ribbonlike plate member extending across the tops of

the studs and having portions in line with the studs on which the rafters and ceiling joists rest, and wall panels between said studs positioned by said plate members.

21. A building having a foundation wall, studs extending upwardly therefrom, a roof having rafters supported directly over said studs, a plate member presenting a thin web having portions resting on the upper ends of the studs and disposed between said upper ends and the rafters, said web being provided in the intervals between the studs with longitudinally spaced sockets, and wall panels set in between said studs and carrying locking projections engaging said sockets.

22. In a building, a frame having studs and an upper plate member defining a wall panel receiving space, and a panel in said space having locking rods applied to a face thereof and projecting beyond the upper edge of the panel body, said upper plate member being in the form of a ribbon and having perforations engaged by said rods for locking the panel to said member.

23. In a building, a frame having an upper plate member, and a plurality of panels in said frame, said plate member having a longitudinal series of perforations for engaging panel locking members and also having means at one side of said series of perforations for the attachment of metallic ceiling lath.

24. In a building, a frame having studs and an upper plate member, ceiling joists supported by said studs, panels between said studs carrying coating anchoring sheets, means for attaching said panels to said plate member, a coating applied to said sheets, said plate member and said ceiling joists being provided with marginal perforations, anchoring material for a ceiling, means engaging said perforations for supporting said material from said plate member and said ceiling joists, and a ceiling coating applied to said material.

25. In a building, an outer wall frame having studs and an upper plate member, a cooperating frame having studs and an upper plate member, ceiling joists supported by certain of said studs, panels between said studs, and anchoring material for a ceiling coating attached to and supported by both said plate members and said ceiling joists.

26. In a building, a wall frame comprising studs and a ribbonlike upper plate member extending across said studs and resting at intervals on the tops thereof, panels between said studs positioned by said plate member against inward and outward displacement, a roof having sloping rafters resting at their ends on said plate member at points directly above studs, ceiling joists resting at their ends on said plate member at points directly above studs, said plate member in the intervals between said studs being free from roof and ceiling joist load, and ceiling coating anchoring material attached to said plate member and to said joists, said material being attached to said plate member adjacent the inner margin of the latter.

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