

Aug. 13, 1940.

J. V. PATTERSON

2,211,384

STEEL STRUCTURE

Filed June 18, 1936

9 Sheets-Sheet 1

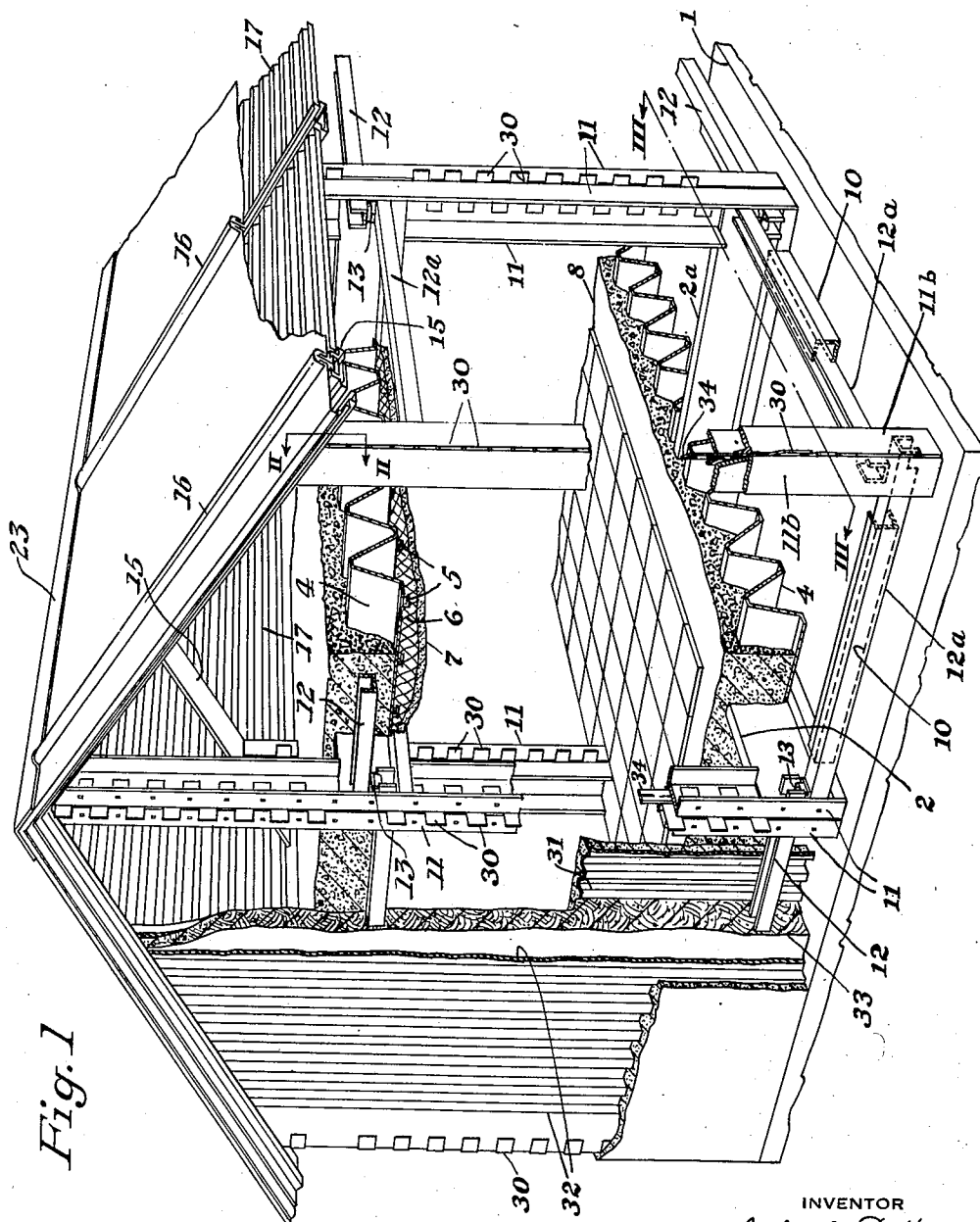


Fig. 1

INVENTOR

John V. Patterson
By his attorney
C. P. Byrnes

Aug. 13, 1940.

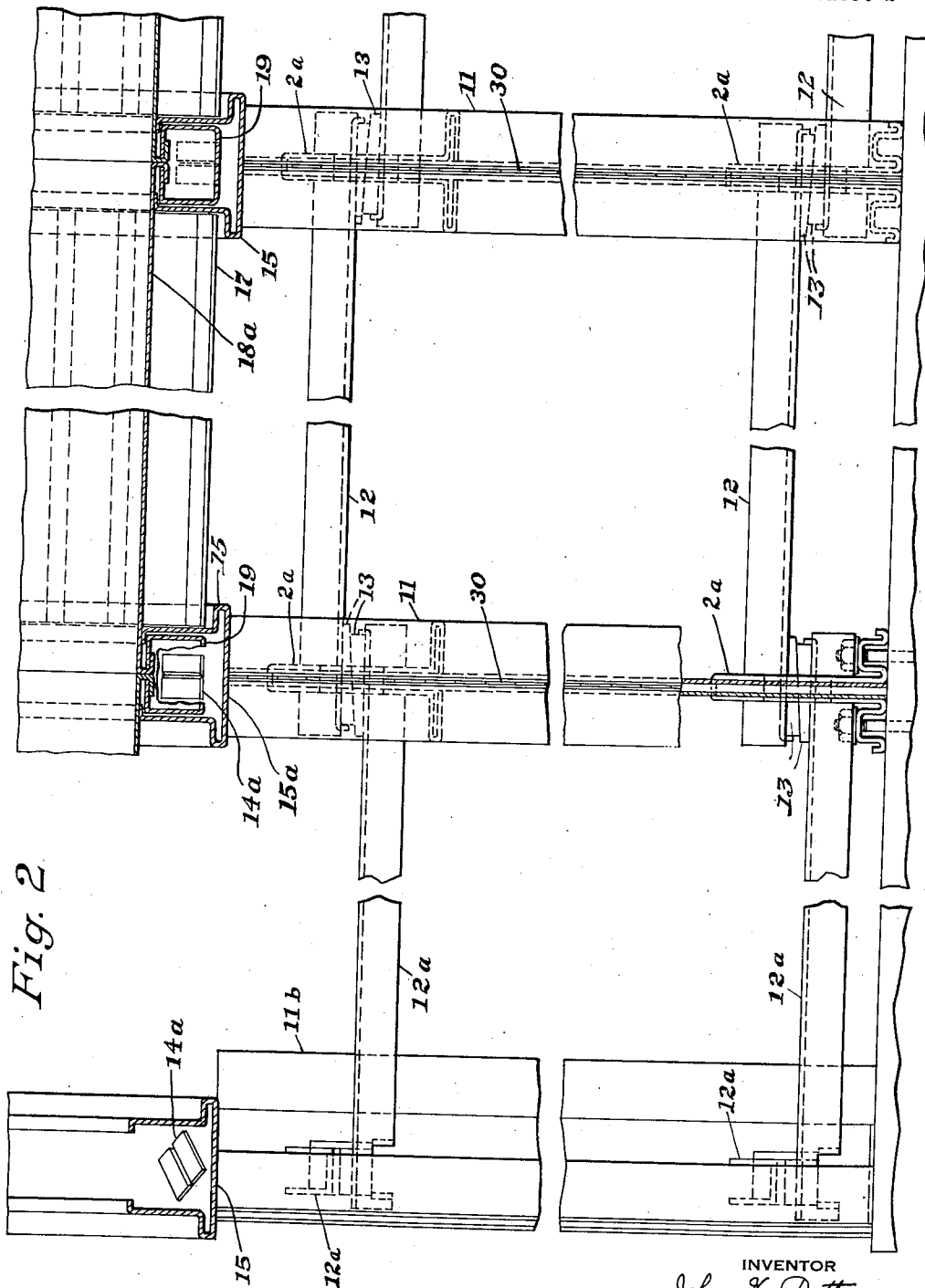
J. V. PATTERSON

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9 Sheets-Sheet 2



INVENTOR

John V. Patterson
By his attorney
C. P. Byrnes

Aug. 13, 1940.

J. V. PATTERSON

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STEEL STRUCTURE

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Fig. 22

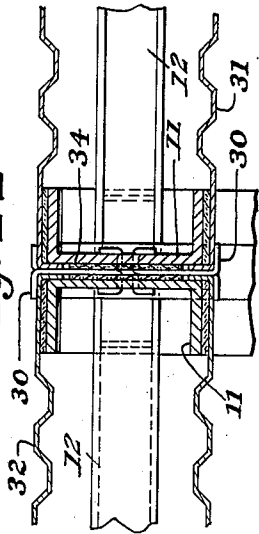


Fig. 21

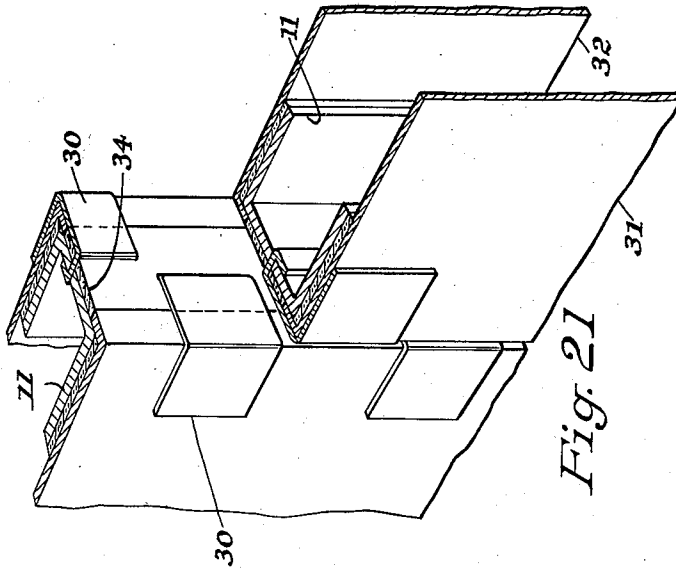


Fig. 4

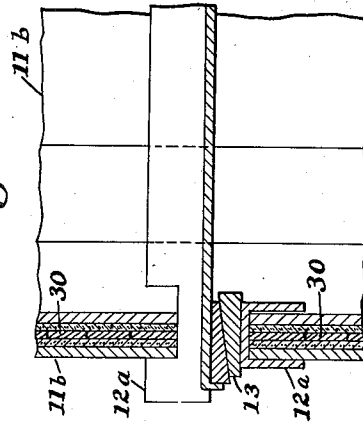
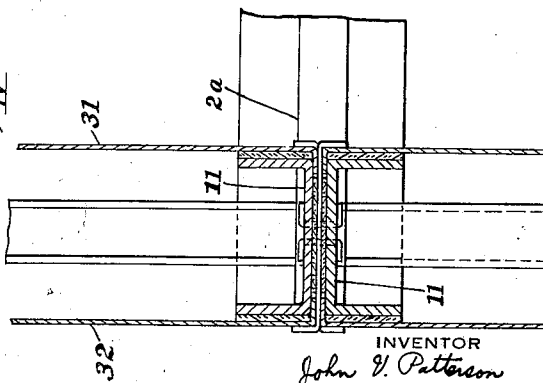
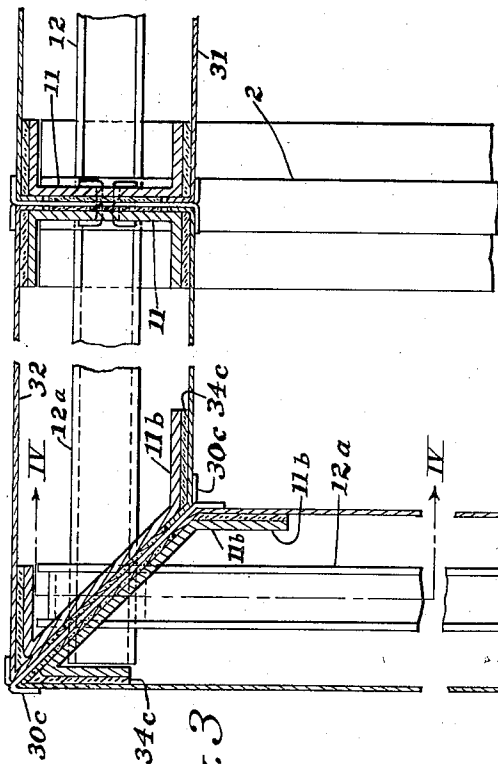


Fig. 3



INVENTOR
John V. Patterson
By his attorney,
C. P. Byrnes

Aug. 13, 1940.

J. V. PATTERSON

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Fig. 5

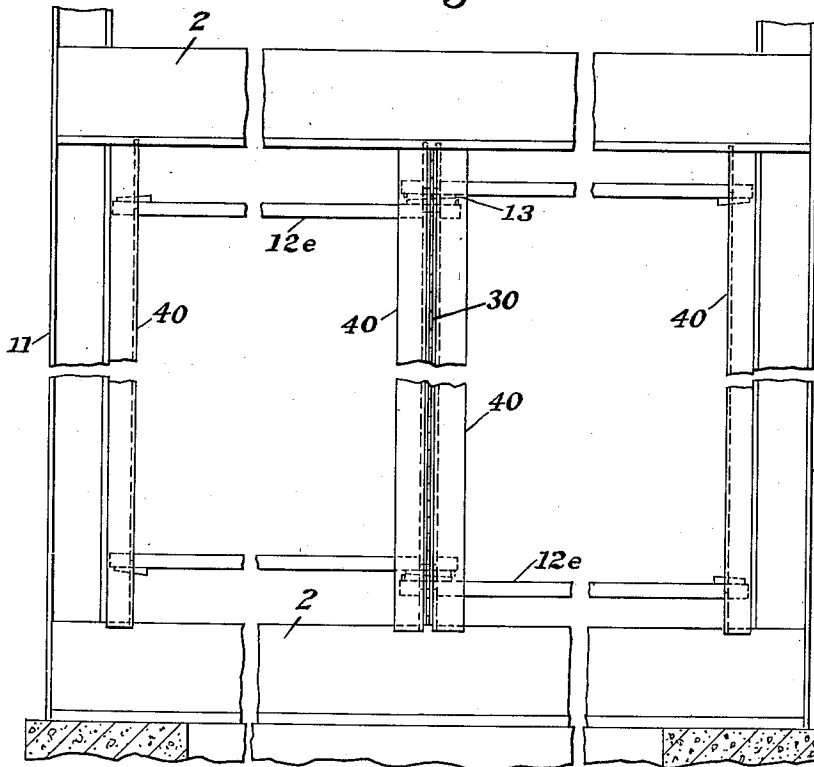


Fig. 6

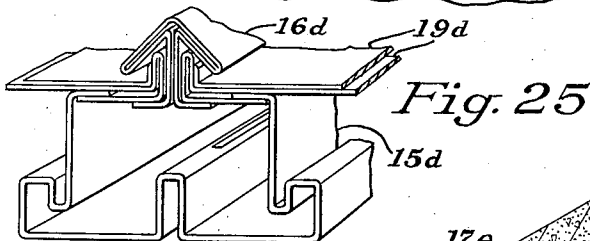
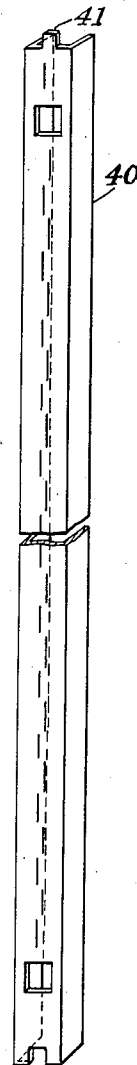


Fig. 25

Fig. 26

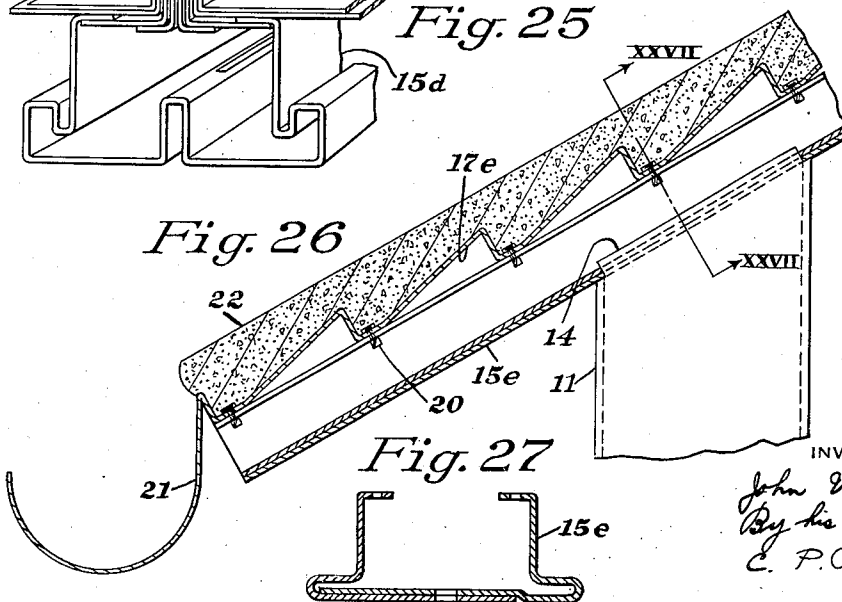
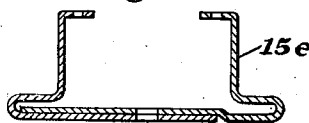


Fig. 27



INVENTOR

John V. Patterson
By his attorney,
E. P. Byrnes

Aug. 13, 1940.

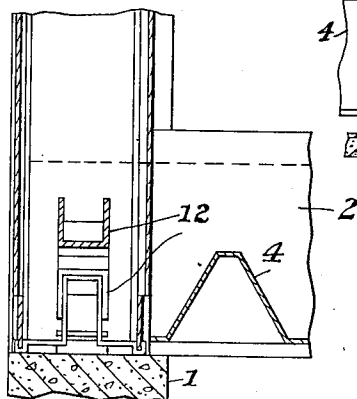
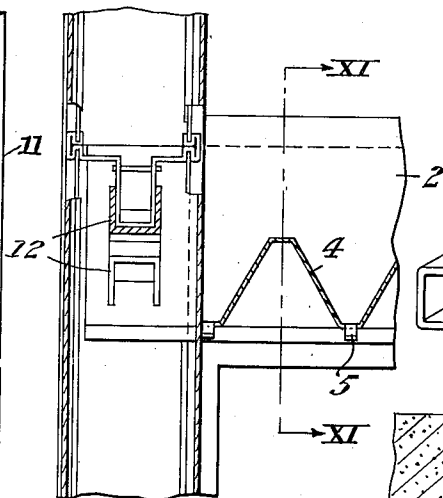
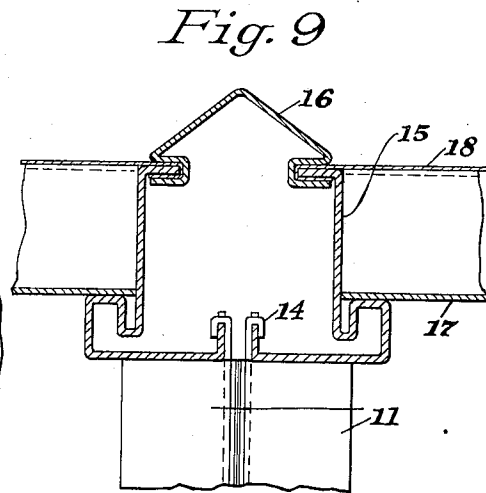
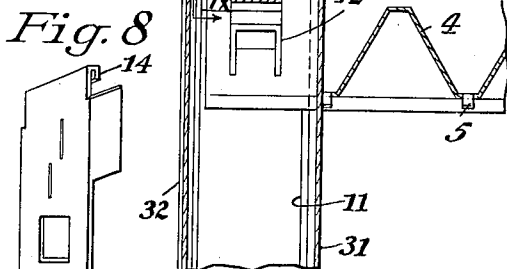
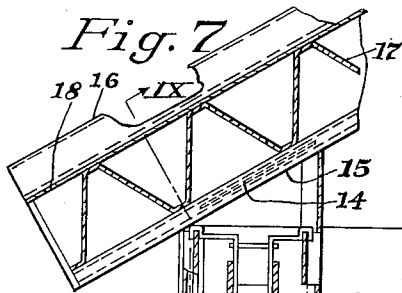
J. V. PATTERSON

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STEEL STRUCTURE

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INVENTOR
John V. Patterson
By his attorney,
C. P. Byrnes

Aug. 13, 1940.

J. V. PATTERSON

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Fig. 12

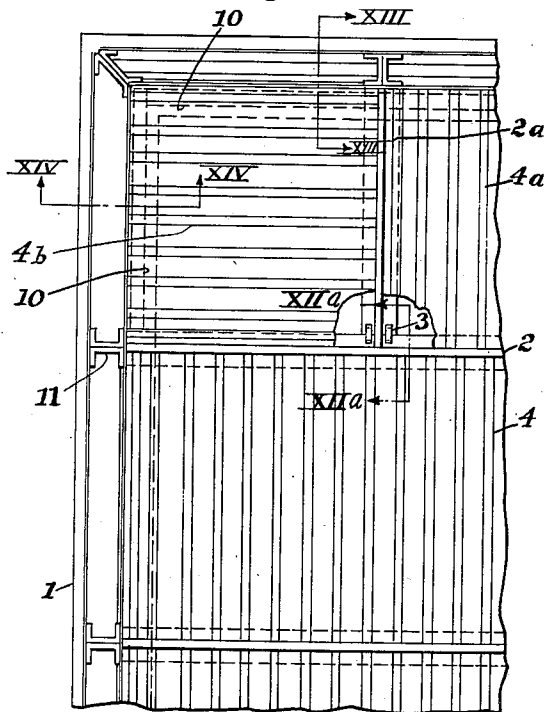


Fig. 13

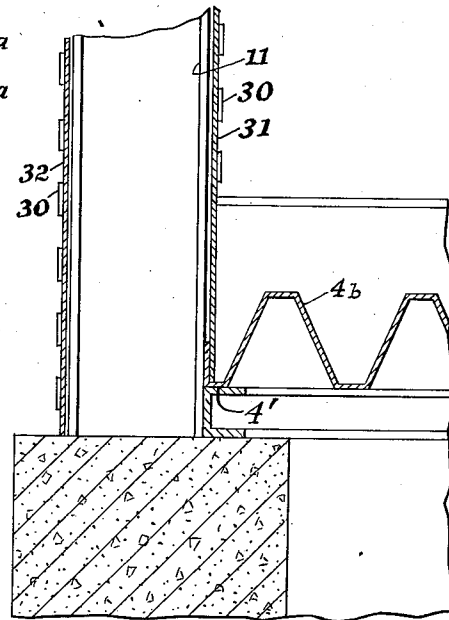


Fig. 14

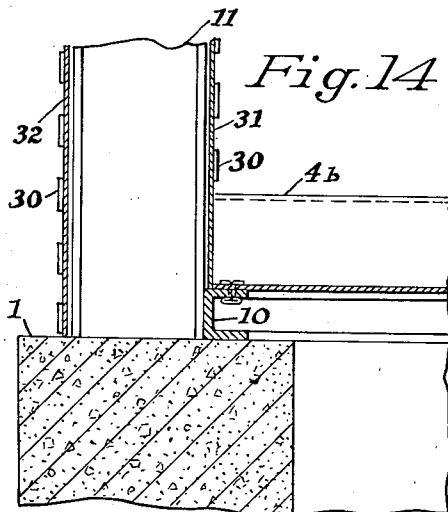
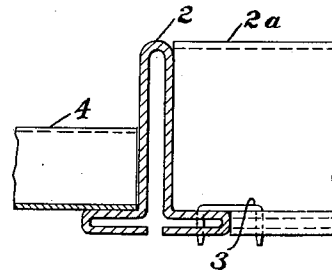


Fig. 12a



INVENTOR

John V. Patterson
By his attorney
C. P. Byrnes

Aug. 13, 1940.

J. V. PATTERSON

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Filed June 18, 1936

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Fig. 15

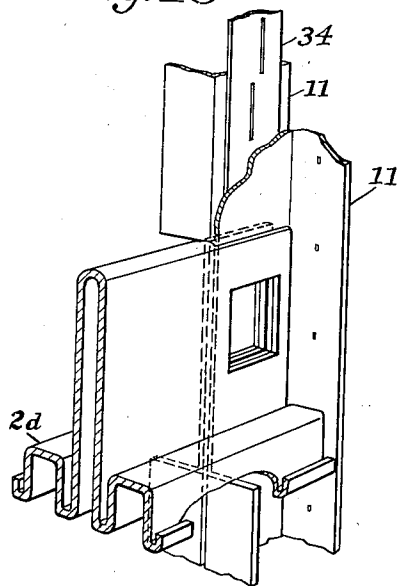


Fig. 16

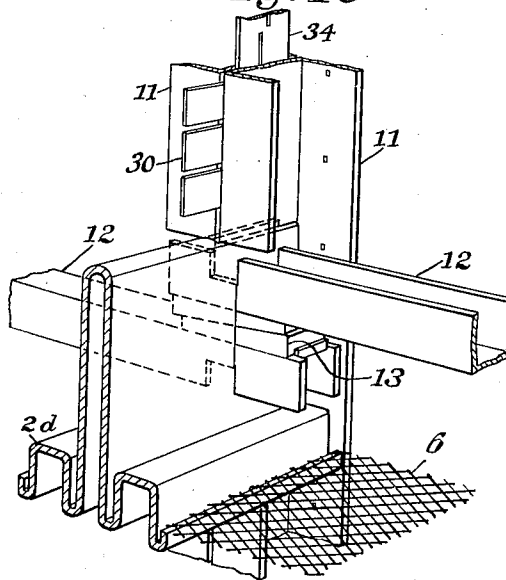


Fig. 17

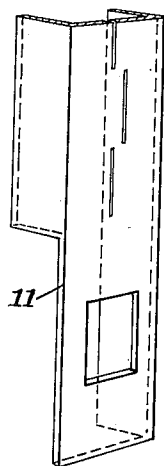


Fig. 18

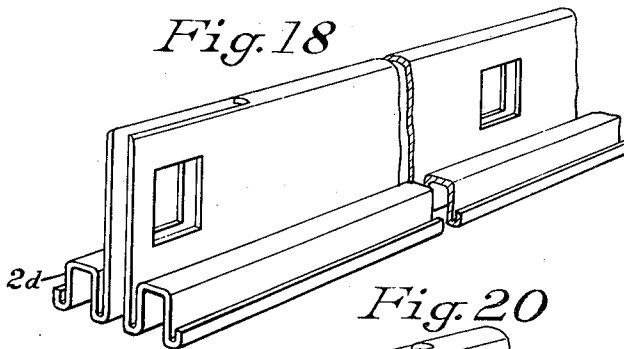
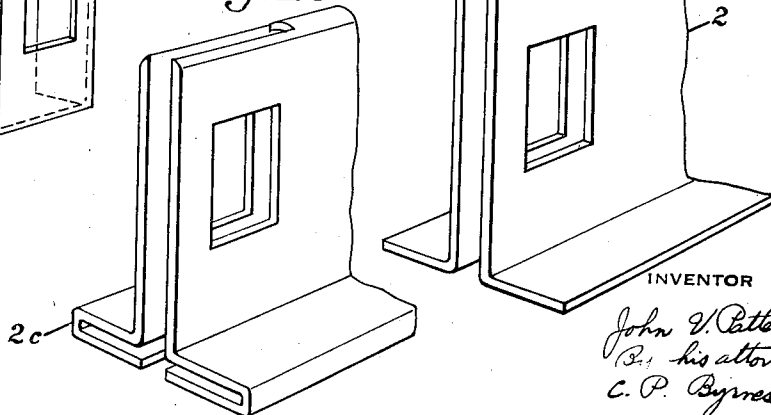


Fig. 20

Fig. 19



INVENTOR

John V. Patterson
By his attorney,
C. P. Byrnes

Aug. 13, 1940.

J. V. PATTERSON

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Filed June 18, 1936

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Fig. 23

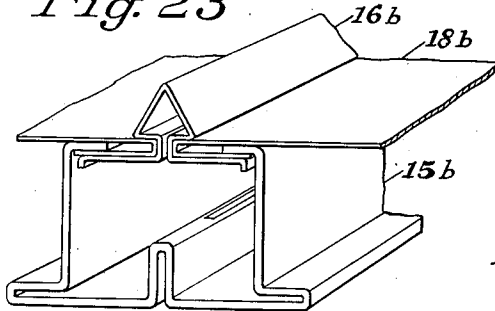


Fig. 24

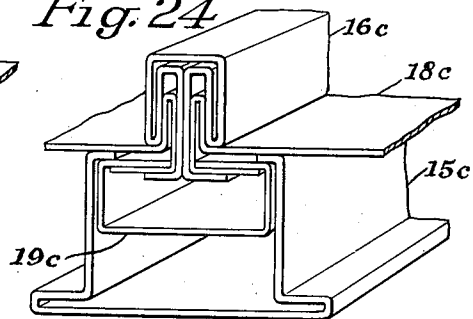


Fig. 28

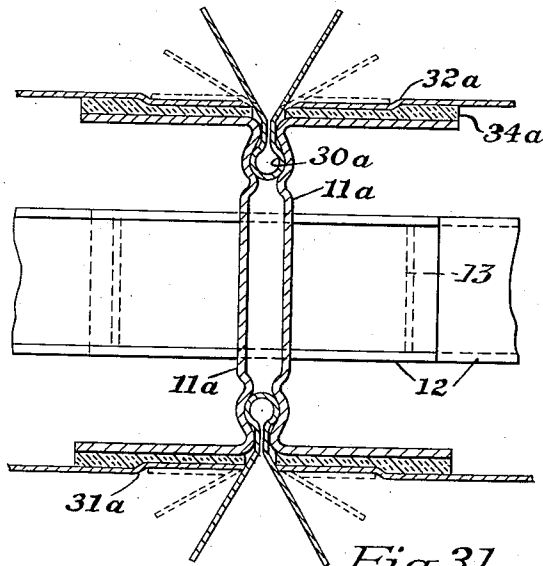


Fig. 29

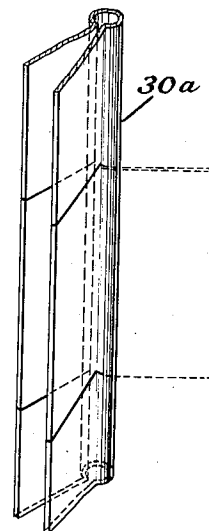
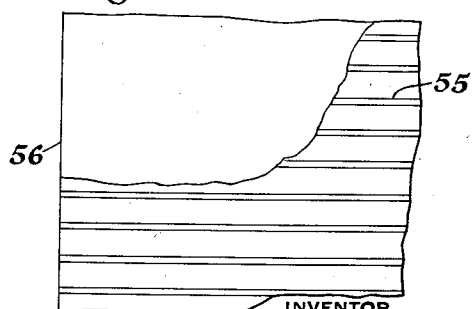
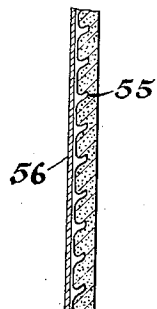
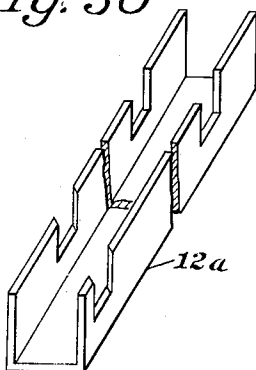


Fig. 31 Fig. 32

Fig. 30



INVENTOR

John V. Patterson
By his attorney,
C. P. Byrnes

UNITED STATES PATENT OFFICE

2,211,384

STEEL STRUCTURE

John V. Patterson, Pittsburgh, Pa.

Application June 18, 1936, Serial No. 85,897

17 Claims. (Cl. 189—1)

This invention pertains to building constructions, and more particularly to prefabricated metal constructions and to improvements therein.

There is a need for an inexpensive but practical type of metal building construction that is prefabricated at the mill, and/or shop and that may be quickly erected at the job by one or two laborers having a small amount of mechanical ability.

It is apparent that the expense is prohibitive when it is necessary to obtain and employ skilled metal workers at the job, and this is especially true where a small building such as a home is to be erected. I believe that if metal dwellings are to become popular that they should be capable of being erected by ordinary labor under proper supervision, or given simple training.

It is well known at the present time that there is a need for an inexpensive and practical form of dwelling house for persons of ordinary income. There is a tremendous potential market for dwellings of this type, and it is my belief that a metal construction can be provided that will conform to all requirements and that can eventually be sold at a popular price that will open up markets in a manner similar to the automobile.

A substantially all-metal construction is vermin-proof, and has characteristics of strength, rigidity, and long life. But, previous to the present invention, the material and the labor costs of metal building constructions have been high. I believe that these costs are, to a great extent at least, due to the problems that arise in connection with the securing of the various parts and members in position. Whereas nails are required in fastening timber constructions, bolts, rivets and/or welds are required in metal constructions. However, I have developed a metal construction such that bolt, rivet or weld fastenings are not required to be made at the job; any necessary amount of this work is done at the fabricating shop. Only very simple operations are required to fasten the members and parts rigidly in place at the job.

My invention also eliminates the problems that arise in connection with constructions that employ heavy sections assembled at the shop; because of their bulkiness and weight they are difficult and costly to handle and to erect.

It has been an object of my invention to provide an improved metal building construction.

Another object of my invention has been to devise new and improved procedure for erecting metal buildings.

Another object has been to provide an improved metal building construction that will meet the requirements of persons of ordinary income or of modest means.

A further object has been to provide a prac-

tical form of metal building construction that may be inexpensively fabricated and/or erected.

A still further object has been to provide a metal building construction that is effectively and simply fastened together at the job.

These and many other objects of my invention will appear to those skilled in the art from the following description taken in view of the claims and the drawings, in which:

Figure 1 is a vertical view in sectional perspective of a building constructed in accordance with my invention;

Figure 2 is an elevational view partly in section, the section being taken along the line II—II of Figure 1 and showing vertical columns, horizontal tie channels, and a portion of the roof construction;

Figure 3 is a horizontal section showing the wall construction and taken along the line III—III of Figure 1;

Figure 4 is a vertical section taken along the line IV—IV of Figure 3 and showing a detail of a corner construction;

Figure 5 is an elevational detail of the framing and showing a portion of a partition wall, vertical plate support channels and tie rods or channels;

Figure 6 is a vertical perspective of a vertical plate support channel;

Figure 7 is an enlarged vertical section of a corner of a three-story building constructed in accordance with my invention;

Figure 8 is a vertical perspective of a channel employed in the corner construction of Figure 7;

Figure 9 is a vertical sectional detail taken along the line IX—IX of Figure 7, and showing a method of attaching an upright member to a roof beam;

Figure 10 is a detail perspective showing one portion of the roof beam of Figure 9;

Figure 11 is a vertical section taken along the line XI—XI of Figure 7, and showing floor and ceiling details;

Figure 12 is a sectional plan view of a portion of the flooring of Figure 1;

Figure 12a is a section on line XIIa—XIIa of Figure 12;

Figure 13 is a vertical sectional detail taken along the line XIII—XIII of Figure 12, and showing how the inner wall plates rest upon floor sheet members;

Figure 14 is a vertical section taken along the line XIV—XIV of Figure 12, and showing a support channel for outer ends of a corner floor sheet member;

Figure 15 is a vertical sectional perspective detail of a portion of upright or stud channels and a floor beam in an associated relationship;

Figure 16 is a view similar to Figure 15 showing tie channel members in place;

Figure 17 is a vertical perspective showing how the stud channels are cut out for assembly;

Figure 18 is a vertical perspective showing how the floor beams are cut out for assembly;

5 Figures 19 and 20 are vertical perspectives showing modified forms of floor beams;

Figure 21 is a sectional detail in perspective showing how inner and outer wall plate members are secured in place against a pair of stud channels;

10 Figure 22 is a horizontal section of the structure of Figure 21, but showing the corrugated type of wall plate construction of Figure 1;

15 Figures 23, 24 and 25 are vertical sectional perspectives showing modified forms of roof channel beam and roof plate cap constructions;

Figure 26 is a vertical section through the roof of Figure 1, and showing a modified form of construction;

20 Figure 27 is a section taken along the line XXVII—XXVII of Figure 26, and showing a detail of the channel construction employed;

Figure 28 is a horizontal section taken through a pair of adjacent stud channels and showing a modified method of mounting inner and outer wall plates;

Figure 29 is a fragmental vertical perspective showing a plate clip element of Figure 28;

25 Figure 30 is a perspective view of a horizontal channel tie member cut out adjacent one end for corner mounting, see Figure 3;

Figure 31 is a vertical end sectional view, and Figure 32 is a vertical side sectional view of a modified form of wall construction;

30 Figure 33 is a vertical section of a corner of a building employing a sheeting or metal clapboard constructed in accordance with my invention;

Figure 34 is a view similar to Figure 33, but showing the corner construction in full;

40 Figure 35 is a horizontal section taken along the line XXXV—XXXV of Figure 33; and

Figure 36 is a vertical section taken along the line XXXVI—XXXVI of Figure 1, and showing the roof gable construction in detail.

45 In the building construction shown, I have provided suitable foundation portions, floor beam members, and floor sheet members extending between the beams. A plurality of spaced studs or stanchions extend upwardly from the beams and support a roof at the eave and gable portions thereof. The stud uprights and the floor beams are interlocked by means of tie members extending horizontally therebetween; wall plates are mounted on the inner and outer faces of these stud uprights by means of suitable tongues or flaps extending therefrom.

50 The inner and outer plate members may have any suitable form and are preferably of smooth outline if the surfaces are to be directly coated with paint or with wall paper, and are preferably corrugated if the surfaces are to be covered with plaster on the inside and with a stucco brick or stone veneer or cement finish on the outside. I have also contemplated employing a metal sheeting structure in place of the outer plate structure that has the appearance of clapboard of a timber construction, see Figures 33 and 34.

55 The roof portions proper are mounted to extend between roof beams or channels and may comprise corrugated portions similar to the corrugated portions of the floors, or may comprise smooth plate portions such as indicated in connection with the walls, or may comprise clapboard-like plate portions secured directly to the channels and having a cement, or bituminous, or

some other suitable substance mounted on the outer surface thereof, see Figure 26.

For the purpose of illustrating a preferred form of my invention, I have shown in Figure 1 a perspective of a two story building having a 5 gabled roof. A suitable foundation 1 is provided and a plurality of transversely spaced longitudinally extending floor beams 2 are mounted upon the foundation walls 1 and extend thereacross. On two opposite sides of the building, I have 10 provided transversely-extending, spaced floor beams 2a which at one end rest upon the foundation walls 1a and at the other end rest upon a flange of an adjacent longitudinal floor beam 2. The form of connection between the trans- 15 verse floor beams 2a and the longitudinal floor beams 2 is shown particularly in Figures 12 and 12a. The transverse beam 2a has its flange portions cut away at one end, in order that its web portion may rest upon the adjacent side flange 20 of a longitudinal beam 2. Each of the opposite flanges of the transverse beam 2a is connected to the adjacent flange of the longitudinal beam 2 by U-shaped keys or connecting elements 3. The 25 keys 3 are removably positioned in slots in the flanges mentioned. In the embodiment of my invention shown particularly in Figures 15, 16, 17, and 18, the floor beams 2 have U-shaped flange portions which terminate on opposite sides thereof in at least a pair of U-shaped flange portions 30 which thus have an arch-like appearance and are double load supporting.

By employing the construction shown, I have been able to eliminate sills, sleepers and joists. In place of joists, I have provided floor plates or 35 members 4, that comprise a series of connected U's having a zig-zag or offset outline. Each main floor plate 4 is adapted to rest upon opposite flanges of the longitudinal floor beams, and each side floor plate 4a, upon the transverse 40 beams 2a. It will appear that the ribs, corrugations, or zig-zag portions of the floor plate members 4 extend transversely of the longitudinal floor beams 2 in the same manner as joists normally would do. The same type of construction is suitable for the ceiling, roof, and/or 45 second floor story of a building.

It is advantageous to provide the connecting portions of the V's of the floor members 4 with 50 pressed-out lugs 5 upon which metal lath 6 may be secured. Plaster 7 may be mounted upon the metal lath 6 in the usual manner. The plaster or other form of wall material may be mounted directly upon the bottom portion of the floor members 4 by reason of the corrugated 55 or V-shaped form, but this is somewhat wasteful of material. The upper surfaces of the floor members 4 are preferably covered with concrete 8 and suitable rubber, glass, ceramic, wood, or metal tile may be mounted upon the cement sur- 60 face.

In Figure 11, I have shown a modified structure for supporting a ceiling. Ceiling plates 21 are supported adjacent each floor beam 2a or 2 by means of U-shaped clips 22 that abut con- 65 tiguous edges of the plates and extend from an outer surface of each plate inwardly of the joint therebetween into slots or openings formed by the pair of double flanges of the floor beam. Plaster or plaster-board 7 may be mounted upon 70 the plate structure or the plate structure may, itself, be painted or papered to form the interior finish of a room.

When, as shown in Figures 1, 12 and 14, floor beams 2 or 2a are not employed at corner por- 75

tions of the building, I provide auxiliary support members such as a channel 10 anchored to the foundation 1. The channel 10 supports an outer longitudinal edge of a corner floor member 4b, while the flange of a transverse floor beam 2a supports the inner longitudinal edge of this floor member.

I have provided stud uprights or stanchion members 11 that are cooperatively associated at their ends with the floor, ceiling, and/or roof beam members 2 and 2a. The stud or stanchion members include a pair of similar channels placed back to back in a spaced relationship with respect to each other. In order that the channels 11 and the beams 2 and 2a may be connected together, as shown particularly in Figures 1, 15, 16, 17 and 18, a side flange of each channel 11 terminates short of the end of the channel and the beam members 2 and 2a have slotted out portions connecting their spaced double webs. The channel 11 as well as the beam members 2 and 2a are provided with rectangular shaped and horizontally extending cutout portions for receiving a pair of notched tie members 12. As seen, the tie members 12 are placed back to back and are inserted in the rectangular cut-out portions by a lever-like movement and are located in place by one or more complementary wedge members 13. In this manner, the stud channels 11, the beams 2 or 2a, and the tie members 12 are simultaneously locked together without the employment of nails, bolts, rivets or a welding operation. At the corners of the construction of Figure 1, the tie members 12 extend through the stud uprights 11 and lock them in place with respect to each other.

As above intimated, the stud uprights 11 are placed with their web portions in a back-to-back relationship and each stud upright has a pair of outwardly-extending and oppositely-positioned flange portions. Along sides of the stud upright combination, the flange portions thereof are interrupted or cut out to permit the slotted beam members to fit over the back-to-back web portions and against the opposite flange portions of the stud upright pair. In this manner, the beam and stud upright members can be very securely locked in position without employing permanent means such as a weld or rivets, etc.

The construction is the same for one or more stories and repetition is unnecessary. The stud uprights 11 are, as shown particularly in Figures 2, 7, 8 and 9, provided with inwardly bent web portions 14 that are preformed at the shop and are angularly inserted in slots cut in suitable roof channel beam members 15. However, as shown in Figure 2, flange portions 14a may be hammered over inside the beams 15 after they have been inserted in the slots. For rigid beam members, the latter method is not as advantageous as the previously enumerated method. The roof channel members 15 may be of any suitable construction, and I have shown a number of constructions in Figures 2, 9, 10, 23, 24, 25, 26 and 27.

In the construction of Figures 9 and 10, the roof channel or beam 15 is of a two-part construction comprising a pair of suitably shaped channels that are held in position by a roof joint cap 16 and by the inwardly turned flanges 14 of the stud members 11. The roof, itself, may comprise inner and outer plate members 17 and 18, respectively; the inner plate members 17 rest upon lower or opposite side flanges of the beam members 15 and the outer plate members 18 rest upon upper side flanges of the same beams

and are closed off or sealed at their contiguous portions or joints by the cap members 16.

The inner roof plate members 17 are preferably of the corrugated or V-shaped or zig-zag outline of the floor plate members 4. In other words, the inner roof plate members, see Figures 1 and 2, may be replicas in miniature of the floor members 4. The outer roof plates 18 are preferably laid in place and locked in position by the cap members 16 and the ridge caps hereinafter described, but if desired, they may be spot welded to the ribs or transverse portions of the inner plates 17.

In the construction of Figure 2, the channel members 15a are of one-piece construction suitably slotted to receive the locking flanges 14a. They are also adapted to receive longitudinally extending pan members 19 that are positioned longitudinally-centrally thereof and that cooperate with a pair of flanges or feet that extend from the roof plates 18a and that lock them in position adjacent their joints to the channel 15a; this plain type of joint requires no cap member.

In the embodiment of Figure 23, the channel member 15b is provided with double flanges and a central, upwardly extending flange of double form, in order to provide additional strength for the construction. The roof cap member 16b is of hollow V-shape, and extends downwardly between the contiguous edges of the plate members 17b and abuts against opposite, lapped-under, contiguous edges of the roof plates 17b, pressing the latter against or in abutment with upper flanges of the beam member 15b to lock the plates 17b to the beam.

In the embodiment of Figure 24, the beam member 15c is provided with double side flanges, with no central flange, and with suitable top and inwardly projecting side flanges. A pan 19c extends longitudinally of the member and receives a double U-shaped form of cap member 16c, as well as the flanges of the contiguous plate members 19c. As shown, the edges of the plates 18c are of a double L-shape, in that they first lap upwardly, then extend downwardly, and finally extend outwardly to abut the upper side flanges of channel 15c. Outwardly, the cap 16c has a rectangular appearance.

In the embodiment of Figure 25, the beam member 15d is provided with especially constructed side flanges of U-shaped outline, as well as a center flange of U-shaped outline. This construction is similar to that of Figure 24 with the exception that the pan 19c has been eliminated and the cap member 16d has a substantially double V-shaped form. The edges of the roof plates 19d are of double L-shape and the inner flanges of cap 16d hold the roof plates in position.

In the roof construction shown in Figures 26 and 27, the roof beams or channels 15e are of a two-part construction and overlap at their bottom flanges. A slot is cut therein in the usual manner for receiving the bent-over or lock portion 14 of a stud upright member 11, see particularly Figure 26. In this construction, the upper portions of the channel are flattened to provide supporting surfaces for a clapboard-like roof surface 17e. This structure is secured to the upper flange of the channels by means of small clip pins or elements 20 that extend through holes in the plate structure and in the upper side flanges of the channel. This structure also includes a roof rain-spout portion 21 extending therefrom. It is preferably coated with a suitable roofing material 22 such as a bituminous mixture, cement, etc.

The center or gable stud uprights 11, see Figures 1 and 36, are provided with web portions that extend beyond their side flanges and enter the roof channel members 15. A gable cap member 23 is lapped over the face of the outer roof plates 17 and extends inwardly and downwardly between the stud uprights 11 and the roof channel members 15, and is pressed into position against the lower surface of these channel members. A suitable U-shaped key is mounted to extend through slots in legs of the cap member 23 and in the web portions of the stud uprights 11.

As previously pointed out, any suitable form of wall plate structure may be provided, depending upon the type of surface desired. I secure the wall plates in position by means of tabs or tongues 30, which, as shown particularly in Figures 1, 21 and 22 extend inwardly from the web portions of each stud upright 11, are bent over inside of each stud upright, and extend outwardly along the spacing between the opposite stud uprights of a pair.

After the inner and outer wall plate members 31 and 32 are placed flat against the inner and outer side flanges of the U-channels 11, the tabs 30 are hammered or pressed into abutment with the plate surfaces to hold them rigidly in position. Rockwood or other suitable insulation 33 may be inserted between the plates 31 and 32. Suitable insulation 34 is also preferably provided between the intumed contiguous edges of the plates 31 and 32; it extends longitudinally of the stud members 11. As seen, each contiguous or inner edge of the plate members is bent inwardly to lap over a portion of the web of an adjacent channel member 11 for better securing the wall plates in position. The tabs 30 are preferably staggered on each stud upright, and are also staggered with reference to the tabs of the other stud upright of a given pair, see the slots of Figure 8 and the tabs of Figure 21; on each side of the walls the tabs 30 alternately extend in opposite directions from the joints.

In Figures 28 and 29, I have shown a modified form of tab structure. Here the channel members 11a have their webs bent slightly inwardly adjacent their flange portions to form sockets and to hold a longitudinally extending duo or looped form of clip member 30a in position therebetween. The tabs of the clip member 30a extend longitudinally along each side thereof and one group is bent over the wall plates on one side and the other group is bent over the wall plates on the other side. The tabs 30a are transversely separated at intervals along each longitudinal length, in order that they may be more easily bent over. It may be preferable in this structure, as well as in the structure of Figure 21, to slightly depress the inner portions of the wall plates 31a and 32a, in order that the clip portions may be positioned therein and thus lie within the plane of the major portion of the outer surface of the plates. This is particularly advantageous if the plate structure is to be painted or papered. Insulation 34a is mounted on the flange portions of the channel members 11a and abuts the wall plates 31a.

In Figures 18, 19 and 20, I have shown a number of types of floor beams which have somewhat of an I-beam shape, but are fabricated from plate, sheet or strip material, and in reality vary from a single U form to a triple U form. The form shown in Figure 18, namely, 2d, is a simple type and may be suitable for ordinary installations. The form 2c shown in Figure 19 has lapping or

inwardly-turned flange portions and is preferable for some installations, for example, when the ceiling structure is to be mounted in a manner illustrated in Figure 11. This construction gives additional strength and holding capacity to the flange portions.

As shown in Figure 16, the beam 2d is preferably provided with upwardly turned and extending side edge flange portions for supporting metal lath 6 thereon. However, these additional support flanges need not be provided if some other ceiling construction is desired.

The structure 2d shown in Figure 18, is in general, however, the preferable structure, in that I have found that its weight supporting capacity is such that a relatively smaller beam may be provided for the same load. The weight carrying capacity of this type of beam is substantially two to three times that of an ordinary I beam; the cost of material is less and the cost of fabricating it is the same. The triple U-shape, and particularly the downwardly open U shape of the flange portions of this member 2 greatly increases the load carrying capacity of the side flanges.

As shown particularly in Figures 15, 16, 18, 19, 20, and 12a, the floor beam members 2 or 2a are substantially half an I-beam in shape and have at least two and preferably three pairs of doubled or spaced-apart portions. That is, for example, as shown in Figure 18, the web comprises a pair of spaced-apart portions which are connected adjacent their longitudinal top edges and which extend outwardly adjacent their longitudinal bottom edges to connect to flange members. In the embodiment shown in Figures 18, 19, and 12a, the flange members are also provided with longitudinally extending spaced-apart portions whose side edges are connected together as shown.

As seen particularly from Figures 1, 3, 4 and 30, the fastening of the corner stud upright members 11b is practically the same as the fastening of the intermediate stud members. However, the tie channels 12a are provided at one end with staggered locking slots, as shown in Figure 30, and the side flanges of the stud channels 11b are bent to present parallel surfaces to the wall plates 31 and 32. The tab members 30c, unlike the tab members previously described, extend the full length of the transverse width of the web portions of the channel members 11a, and lap over both the inner and outer wall plates. However, the tab structure of Figure 21 may be employed in place of the tab structure of Figure 3, and vice versa. Suitable insulation 34c may be mounted upon the outer faces of the side flanges of the channel members 11b.

In Figures 33, 34 and 35, I have illustrated a clapboard construction that is mounted in such a manner as to provide an outer weatherproof surface or sheathing for a building. This structure is made up of a plate or sheet member 45 bent to provide a plurality of inclined portions 46, a plurality of step portions 47, and a plurality of inner-lapping portions 48, see particularly Figure 33. In this case, the side flanges of the stud uprights 11 and the corner stud uprights 11b are provided with a plurality of spaced holes, and clip members 49 are mounted to extend through the lapped-over portions 48 into the holes of the channel members 11 or 11b; they are then twisted until the sheathing 45 is locked in position. The corner structure is very similar with the exception that a longitudinally

extending mullion or box member 51 is placed between contiguous corner edges of the wall sheets 45, and is provided with a pair of flanges 50 which extend between the webs of the channel members 11b and are lapped over in the usual manner.

In Figures 31 and 32, I have shown a modified form of wall structure. I have provided an inner plate portion 55 having a plurality of inwardly projecting teeth portions. An outer plate portion 56, preferably of thin sheet material, is spot-welded to the corrugated structure 55. Plaster, cement, or some other suitable material may be mounted in the usual manner upon the rib-like outer side of the plate 55 and the outer side of the plate 56 may be painted or coated as desired. This is a relatively simple surface structure and may be substituted in place of the inner and outer wall structures 31 and 32 of the embodiment of Figure 1.

The section of Figure 12 shows how the transverse ribs of the floor plates 4 extend cross-wise to the longitudinally extending floor beams 2. At the corners, however, the ribs of the members 4 extend at right angles to the ribs of adjacent floor members. To support the outer edges of a corner plate 4b, I have provided a channel length 10, see particularly Figures 12 and 14, that may be suitably anchored to the foundation 1. The inner wall plate members 31, as shown in Figure 13, rest upon an end bracket portion 4' of each floor member and are thus interconnected in this manner.

For providing wall partitions within a given portion of the building, I employ vertically extending battens or partition studs 40 which at one end, as shown in Figure 6 are slotted out in their web portions to fit over the web portion of a floor beam and at the other end are provided with a tab or tongue 41 that extends upwardly between double walls of the web portion of a floor beam, such as shown in Figures 18, 19 and 20. When the battens 40 are mounted adjacent a stud member 11, they are positioned back to back with the stud member, and when mounted centrally of a partition wall structure, they are placed back to back with respect to each other to form a pair in a manner similar to that disclosed in connection with the stud uprights 11, see Figure 5. The battens 40 are slotted out and provided with tabs 30 similar to those described in connection with the stud uprights 11 and 16. Connection is also made between these batten members 40 by small tie channels 12c in the same manner that connection is made between the stud uprights by the larger channels 12 and 12a, see Figure 1. The tab, stud and/or plate modified construction of Figures 28 and 29 is also applicable to the partition walls as well as the outer walls.

It will appear to those skilled in the art that I have provided a structure which may be mounted in place without the employment of any special tools and without the need of mechanics of particular skill. That is, the main frame members are rigidly and securely fastened together and interlocked by a simple wedge and lock mechanism and the various parts are subject to alteration in accordance with the desires of the owner. That is, one or more rooms, porches, additional floors, etc. may be added without difficulty. The frame structure is one of the most important features of the present invention and any type of wall, ceiling, and roof structures may be employed in connection therewith, but, of course, the structure illustrated is preferable.

The roof structure is believed to be an important advance in the particular art in question, since previous to the present invention, there has been a tendency for sheet or metal roofing structures to leak adjacent their contiguous edges. My type of cap and roof channel structure is such that moisture cannot possibly enter and leak into the inner portions of the house, or seep in and rust the metal parts. Further, this structure is such that it may be securely mounted in position without the employment of bolts, nails, welds, etc.

While I have herein illustrated and described preferred embodiments of my invention, it will be understood that various changes may be made therein and that various parts may be interchanged without departing from the spirit of the invention or the scope of my broader claims.

I claim:

1. In a fabricated building construction, a plurality of stud uprights, floor and ceiling members slotted to receive said stud uprights, interlocking tie members, said tie members locking said stud uprights to said floor and ceiling members and locking adjacent stud uprights together.

2. In a fabricated building construction, a floor beam of inverted U shape, a channel-shaped stud upright, said beam having a pair of spaced web portions and a portion connecting said web portions adjacent the top of the beam, rectangular openings in the web portions alined with respect to each other, a slot in the connecting portion at right angles to the rectangular openings and adjacent thereto, said stud upright having web and flange portions, a rectangular opening in the web of said stud upright at one portion thereof, one of the flange portions of said stud upright terminating short of said portion, so that said portion of said stud upright will enter the slot in the connecting portion of said beam and that its rectangular opening will aline with the openings in the web portions of said beam, and notched tie channel members adapted to enter the alined rectangular openings in said beam and stud upright for locking them in position with respect to each other.

3. In a fabricated building construction, a beam having at least three U-shaped portions and up-turned side edge portions, floor plates resting upon at least two of the U-shaped portions, and ceiling members resting on said side edge portions.

4. In a fabricated building construction, a beam having a plurality of doubled portions, a stud upright cooperatively associated with one of the doubled portions, sheet members cooperatively associated with other doubled portions, and ceiling members cooperatively associated with still other doubled portions.

5. In a fabricated building construction, a plurality of stud uprights, floor and ceiling members slotted to receive said stud uprights, interlocking tie members, said tie members locking said stud uprights to said floor and ceiling members, said floor and ceiling members having at least two pairs of connected spaced-apart offset portions, floor plates resting upon one pair of offset portions and ceiling members resting on another pair of said offset portions.

6. In a fabricated beam of substantially inverted T-shape, a web having a pair of longitudinally extending spaced-apart portions connected together adjacent their side edges, and a longitudinally extending flange extending from said web and having a pair of spaced-apart por-

tions in a parallel relationship with respect thereto.

7. In a fabricated beam of substantially inverted T-shape, a web member, at least one flange connected to a side edge of said web member and extending therefrom in a substantially parallel relationship with respect thereto, said flange having a pair of spaced-apart portions connected together adjacent longitudinal edges thereof, said spaced-apart portions being substantially parallel with respect to each other and with respect to said web member.

8. In a fabricated beam of substantially inverted T-shape, a web member, and a pair of flange members connected to and extending from said web member, each of said flanges having a pair of spaced-apart portions connected in a continuous and parallel relationship with respect to each other and with respect to said web member.

9. In a fabricated beam of substantially inverted T-shape, a longitudinally extending web member, longitudinally extending flange members connected adjacent longitudinal edges to said web member and extending therefrom, said web member having a double load-supporting portion, each of said flanges having a pair of arch-like load-supporting portions extending in substantially parallel planes with respect to said web member.

10. In a fabricated building construction, a stud upright, a floor beam, said beam being slotted out to receive said stud upright, said beam and said stud upright having slotted portions that align when said beam is received by said stud upright, and a member having a notch therein of a length substantially equal to the distance between side walls of said beam and said stud through said aligned slotted portions and being constructed and arranged to latch over said aligned slotted portions and to lock said stud upright in position with respect to said beam.

11. In a fabricated building construction, spaced pairs of structural frame members adapted to be locked in position with respect to each other, a pair of tie elements interlocking with one of said spaced pairs of structural frame members and extending across to and interlocking with adjacent pairs of structural frame members, and means engaging said tie elements and holding them in a locked position with respect to each other.

12. In a fabricated building construction, spaced pairs of stud uprights and beams, said stud uprights and said beams having portions interfitting with each other, a pair of tie members interlocking with one of said pairs and extending across and interlocking with adjacent pairs, and means interlocking with said pair of tie members and holding them in a locked position with respect to said stud and beam pairs.

13. A fabricated beam having a continuous web portion, a continuous flange portion connected to and extending from said web portion, said web portion having a pair of substantially oppositely-positioned wall portions and a connecting portion therefor, wall portions of said flange extending along and in substantially the same direction as the wall portions of said web, the connecting portion of said flange being on a plane substantially parallel to a plane along the connecting portion of said web.

14. A fabricated beam having a substantially continuous web portion, continuous flange por-

tions connected to and extending from opposite sides of said web portion, said web portion having a pair of substantially oppositely-positioned wall portions and a connecting portion therefor, each of said flange portions having a pair of substantially oppositely-positioned wall portions and a connecting portion therefor, the wall and connecting portions of said flanges extending along and in substantially the same direction as the wall and connecting portions of said web in such a manner as to, in effect, provide three adjacently-positioned and connected web portions.

15. In a fabricated building construction, stud uprights, floor and ceiling members having spaced-apart portions to receive said stud uprights, tie members locking said stud uprights to said floor and ceiling members, said floor and ceiling members having a web portion and a pair of connected portions offset with respect to said web portion and with respect to each other, floor parts resting on one of said connected portions, and ceiling parts resting on the other connected portion of the pair.

16. In a fabricated building construction, spaced pairs of structural frame members adapted to be secured in position with respect to each other, one of said structural frame members of each pair having spaced-apart web portions, the other of said structural frame members of each pair being of angular shape and having a portion adapted to fit between and interengage with the spaced-apart portions of said first-mentioned member, an opening extending through interengaged portions of said pair of structural members, a pair of tie elements extending into the opening and locking a pair of said structural members in position with respect to each other and extending across to and interlocking with adjacent pairs, and means confined by a portion of one of said structural frame members and interlocking with said tie elements for holding said tie elements in an interlocking position with respect to said structural frame members.

17. In a fabricated building construction, spaced pairs of structural frame members adapted to be locked in position with respect to each other; each pair comprising a pair of channel-like stud uprights placed with their web portions in a back-to-back relationship, each of said stud uprights having a pair of oppositely-positioned and outwardly-extending flange portions, a flange portion of each of said stud uprights being interrupted along a portion of a side of the back-to-back combination, a beam member having a slotted end portion adapted to fit over back-to-back web portions of said pair of stud uprights adjacent the above-mentioned interrupted flange portions of said pair of stud uprights, said beam member being constructed and arranged to abut against inside portions of the other flanges of the spaced-apart pair of stud uprights, an opening extending through said beam member and web portions of said stud upright upon which said beam member is adapted to be positioned; and, a tie element extending through said opening and interlocking said pair of stud uprights with respect to said beam member of one of said spaced pairs of structural frame members and extending across to and interlocking in the same manner with the other pair of said structural frame members.