Mar. 13, 1923. 1,448,244

J. E. WILSON

KNOCKDOWN BUILDING

Filed Dec. 10, 1921 5 sheets-sheet 1

Fig. 1.

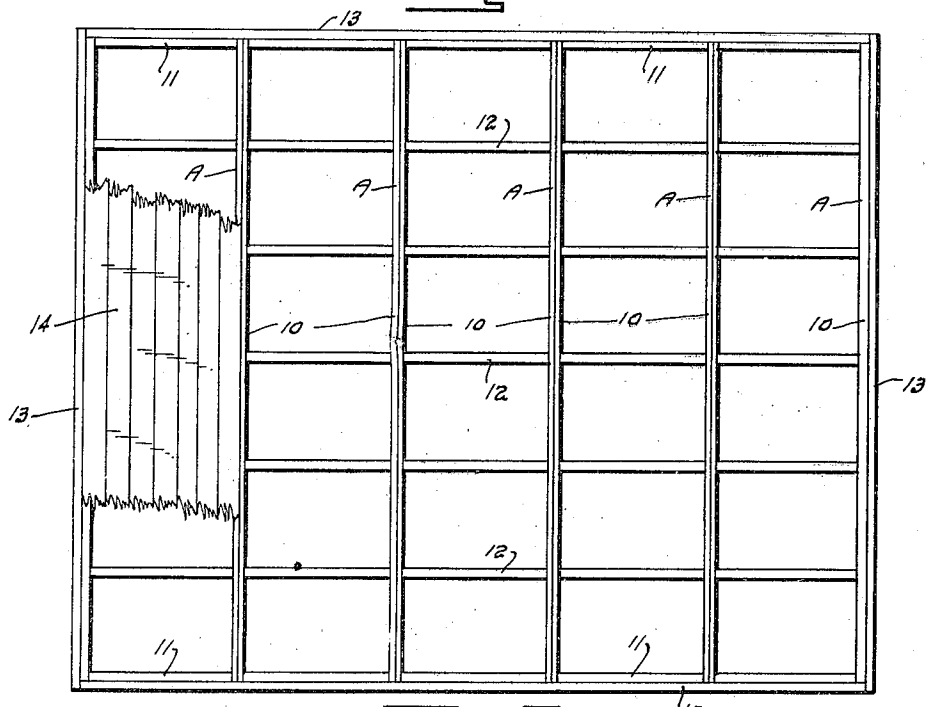
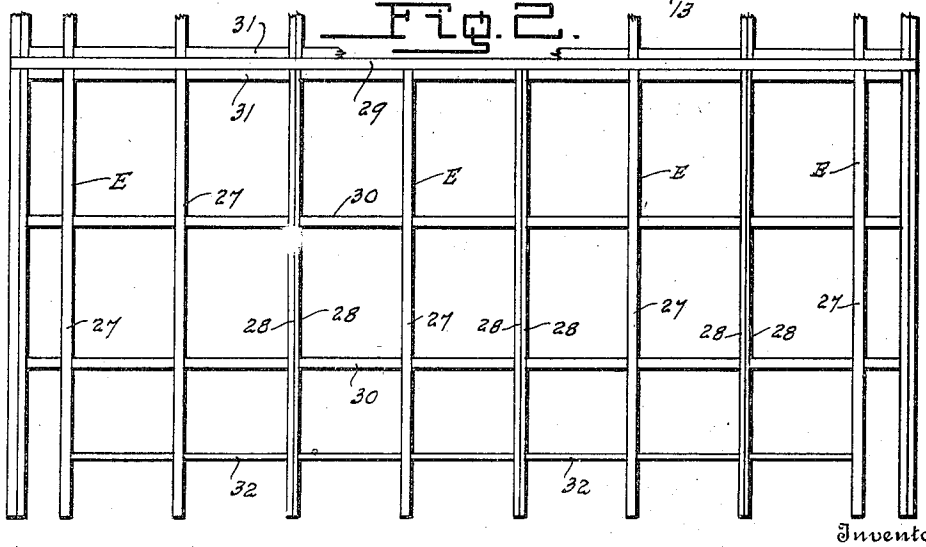


Fig. 2.



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Fig. 3.

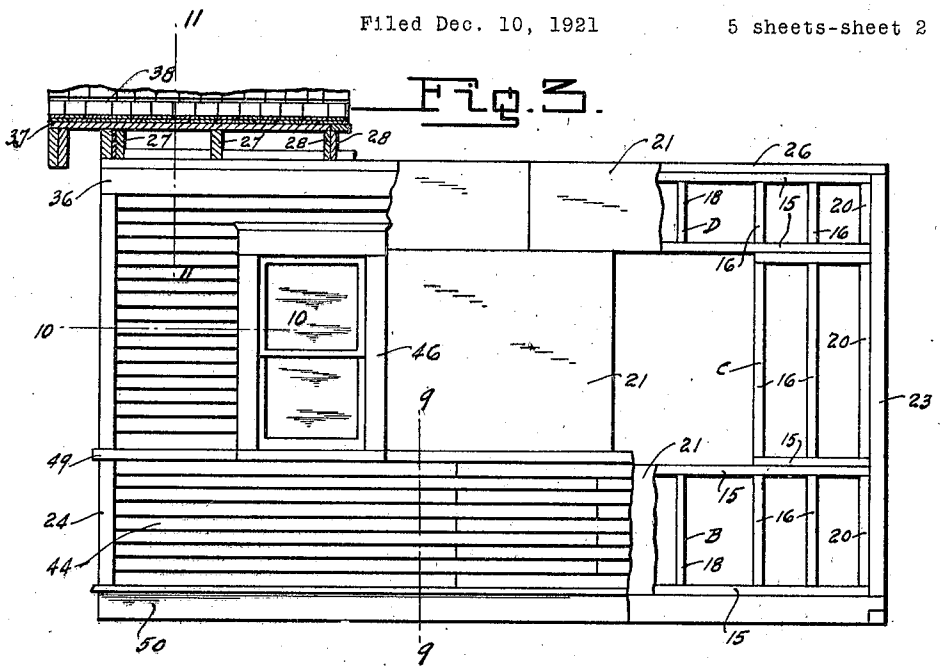
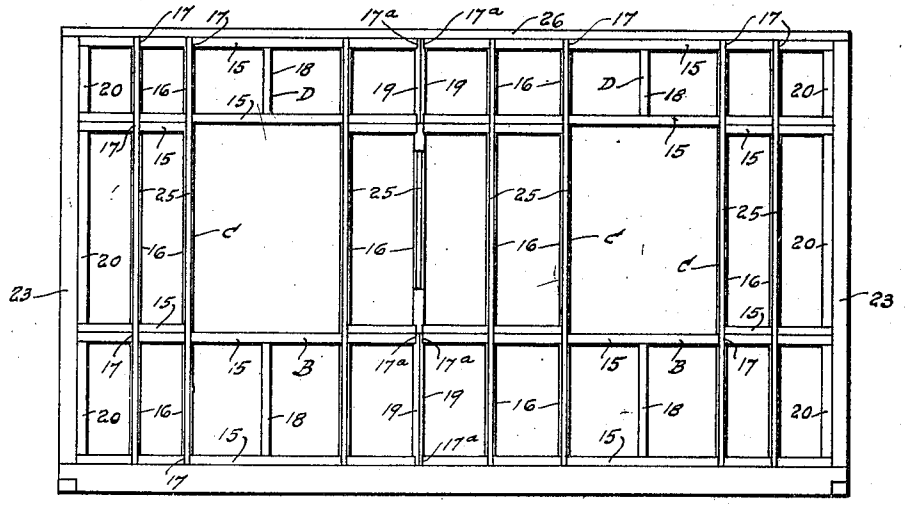


Fig. 4.



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Fig. 5.

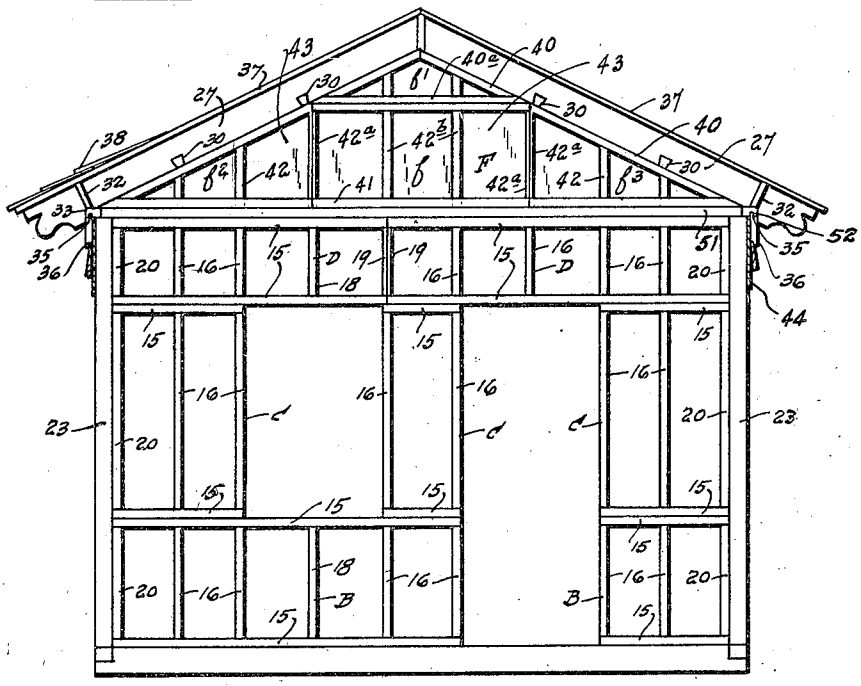
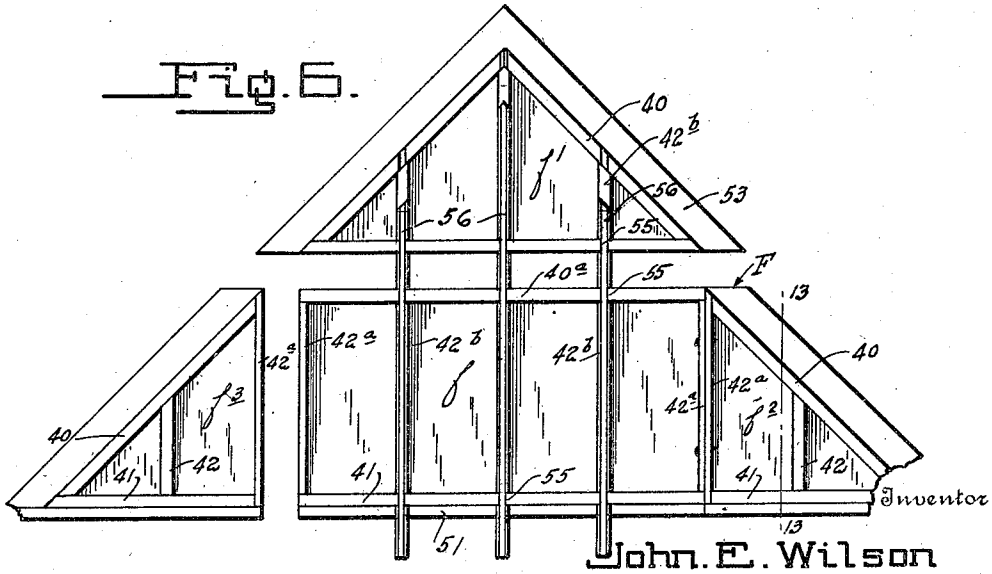


Fig. 6.



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Fig. 7.

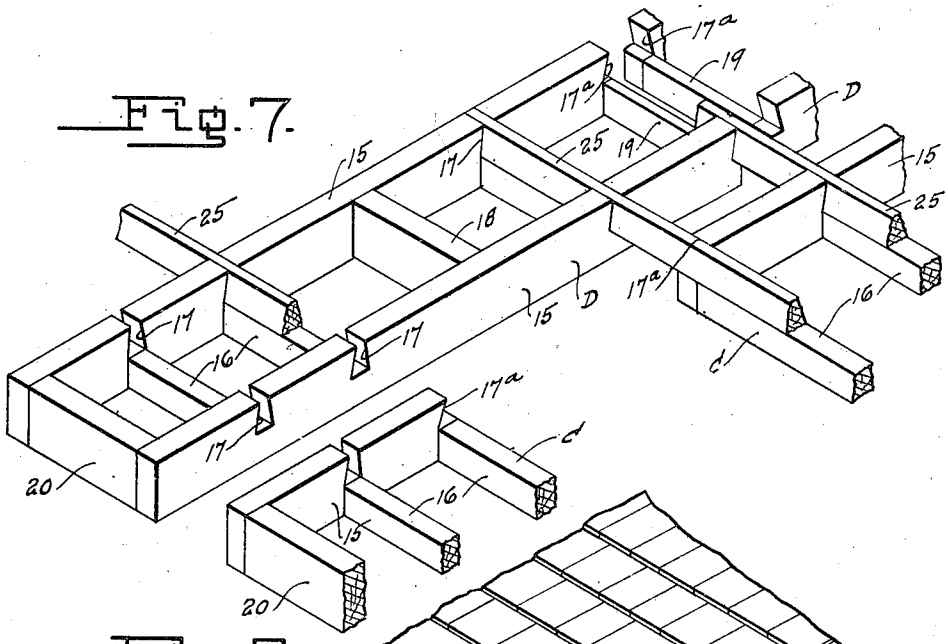
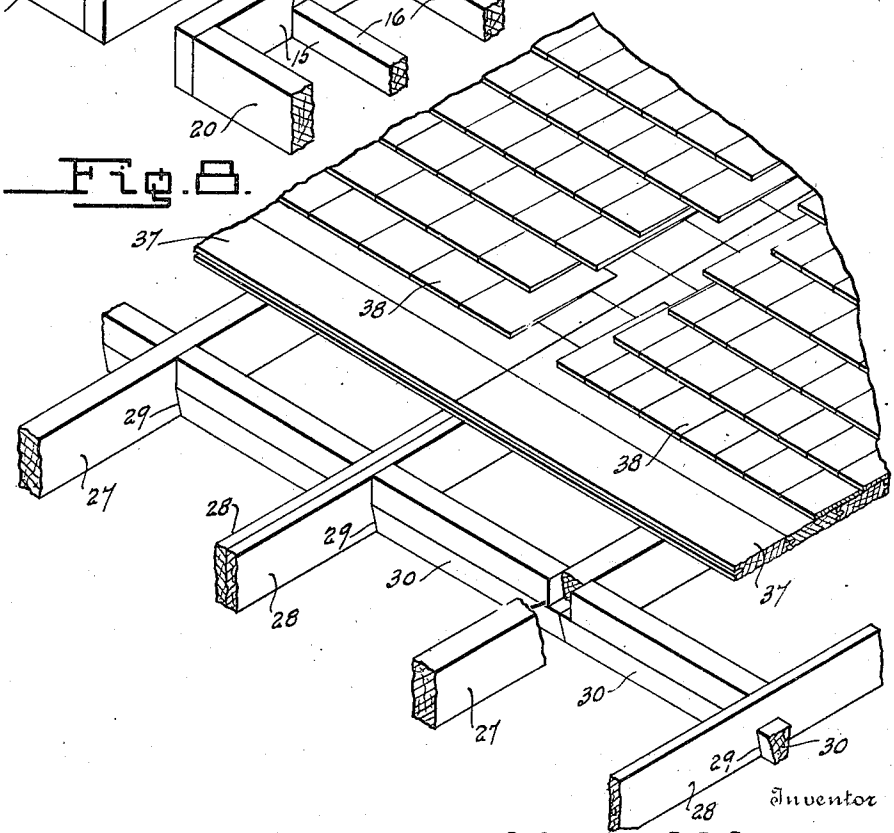


Fig. 8.



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Fig. 9.

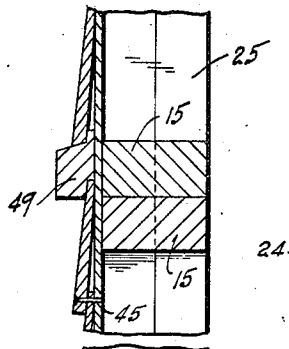
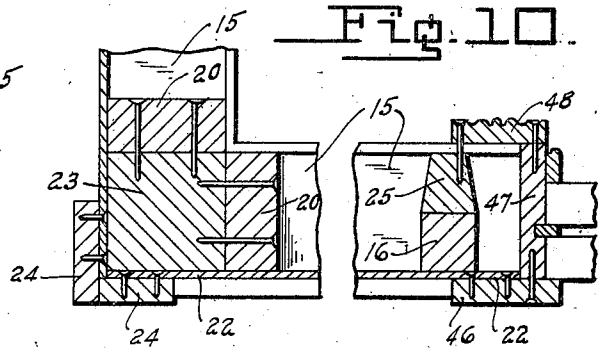


Fig. 10.



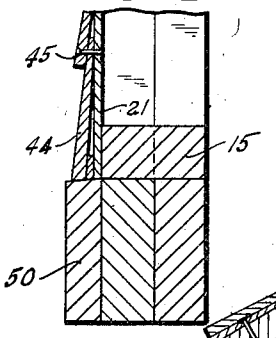


Fig. 11.

Fig. 12.

Fig. 13.

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Patented Mar. 13, 1923. 1,448,244

UNITED STATES PATENT OFFICE.

JOHN E. WILSON, OF NORTHUMBERLAND, PENNSYLVANIA.

KNOCKDOWN BUILDING.

Application filed December 10, 1921. Serial No. 521,384.

To all whom it may concern:

Be it known that I, JOHN E. WILSON, a citizen of the United States, residing at Northumberland, in the county of Northumberland and State of Pennsylvania, have invented certain new and useful Improvements in Knockdown Buildings, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to buildings, and particularly to sectional buildings which are made in sections so that the units may be formed complete at the factory, shipped to the point where the buildings are to be set up, and then the units assembled to form a complete building, such buildings being known as portable houses or knock-down houses.

The general object of my invention is to provide a building of this character formed of sections or units, which sections may be readily engaged with each other to form the complete building, the units or sections being interlocked with each other and so constructed that the building is as strong and firm in every respect as if it had been entirely built upon the site on which the building is erected in the usual manner.

A further object is to provide a building of this character wherein the sections are locked together so that the interlocked sections are particularly strong, and in this connection to form a building of horizontally extending sections as distinguished from vertically extending sections and interlock these sections by means of vertical interlocking bars which add their strength to that of the studding for the purpose of supporting the roof.

A still further object is to provide a construction of this character wherein the clapboards on the exterior of the building are applied to the several sections and the clapboards interlocked with each other when the sections are placed in proper position.

Another object is to provide a roof likewise formed in sections to have proper interlocking engagement with the side units of the building and to provide a floor structure formed in sections.

Still another object is to provide means whereby the jambs, sill and lintel of the window opening or door opening may be formed with the proper sections so that a door frame or a window frame may be simply set in place and the sections closed upon said frame.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a top plan view of the floor supporting frame of the portable house;

Figure 2 is a fragmentary top plan view of the roof with the sheathing and shingles removed, showing the sections of which the roof is composed;

Figure 3 is a side elevation of the house, the roof being shown in section at the eaves;

Figure 4 is an inside elevation of the several sections showing the arrangement of the studding and beams;

Figure 5 is an end elevation of the house;

Figure 6 is an end elevation of one form of gable therefor;

Figure 7 is a fragmentary perspective view of the framework for the side of the house;

Figure 8 is a fragmentary perspective view of the roof sections;

Figure 9 is a vertical sectional view on the line 9—9 of Figure 3;

Figure 10 is a fragmentary horizontal section on the line 10—10 of Figure 3;

Figure 11 is a fragmentary vertical section on the line 11—11 of Figure 3;

Figure 12 is a fragmentary perspective view of one of the gable end sections, as for instance the section f^2;

Figure 13 is a fragmentary vertical section through the gable end of the house.

Referring to Figure 1, which illustrates the floor plan of a building constructed in accordance with my invention, it will be seen that this floor supporting frame consists of a number of panels or sections, designated A. These sections each consist of parallel beams 10, end beams 11, and cross beams 12. These several beams are connected to each other by nails, screws or any other suitable means so as to form a relatively long and narrow rectangular frame. The beams 10 are preferably, though not necessarily, 1x4 or 1x6, or any other suitable dimensions so that when the frames are disposed against each other the two adjoining longitudinal beams 10 of the two sections will together form a floor beam having the usual width and the usual depth, as for instance 2x6, or whatever dimensions may be desired. These

several sections are placed together in parallel relation, as illustrated in Figure 1, and then held in place by an outer rim or band formed by relatively long timbers 13 extending across the ends of all of the sections and extending longitudinally of the end sections. The beams 13 forming this band are nailed, spiked, screwed or otherwise engaged with the beams 10, as illustrated most clearly in Figure 1, and this floor frame is, of course, supported upon any suitable foundation. Floor boards 14 are disposed upon this floor supporting frame.

The building, as illustrated, is a one-story building, though it is to be understood that it may be made of any number of stories. This one-story building is formed in what may be termed three courses, the first course being composed of sections extending from the base or plate to a height equal to the window sill, the second course extending to a height equal to the lintel of the window, and the third course extending to the roof. Each section of each course is rectangular in form and composed of longitudinal beams and vertical studding. The first course is formed of the sections B. Each of these sections B comprises longitudinally extending beams, designated 15, and a series of vertical studs 16 disposed equi-distantly from each other intermediate the ends of the beams 15, each of these studs having half the depth of the beams 15. Opposite the ends of each of these studs the beams 15 are formed with dove-tailed shape recesses 17. Intermediate between two of the studs 16 and coming beneath the window sill, as will be later described, is a studding 18 which has a depth equal to the depth of the beams 15.

One end of the section B has a vertical stud 19 which has the same depth as the studs 16 but only half the width of these studs so that when these studs 19 are placed together, as illustrated in Figure 4, the two studs will be equal in thickness to the thickness of one of the studs 16. This end of the beams 15 is formed with a half dove-tailed notch 17a. The opposite end of the frame or section is formed with a stud 20 which is the same size as the stud 18. The exterior face of each section B is covered with sheathing 21 of thin veneer or wallboard of any suitable character. This is nailed upon the frame for the section or otherwise attached thereto and at one end projects beyond the frame, as at 22. This lower course composed of the sections B extends entirely around the building on all four sides and, as before stated, has a height equal to the height between the sill of the house and the sill of the window. The manner in which the clapboards 44 are applied to these sections will be later stated.

The next course, which is the course in which the windows are formed, is composed of sections C. These sections have a height equal to the height of the window and the upper edge of the sections are level with the top of the window and the top of the door, as illustrated in Figures 4 and 5. At the corners the sections B, the sections C and the sections D to be hereafter described, are joined to the vertical corner timbers 23. In other words, these vertical timbers 23 are erected upon the floor supporting frame at the corners thereof and nailed, bolted or otherwise attached thereto and extend upward the full height of the house or the full height of a story, and the end sections 20 are nailed, screwed, bolted or otherwise attached to this corner post, as illustrated in Figure 9. The sheathing, as before remarked, extends beyond the beam 20, as at 22, so as to overlap the beam 23 and at the ends of the sheathing corner boards 24 are permanently attached. The clapboards or siding 44 is attached to the exterior of the sheathing by nails driven from inside the sheathing, these clapboards or siding boards being applied to each section before it leaves the factory.

The sections C which form the second course of the building are each composed of frames including longitudinally extending beams 15 and vertically extending studs 16, as before described. All of these studs, however, are one-half the thickness or depth of the beams 15 and the beams 15 are formed with dove-tailed recesses or locking notches 17 opposite the ends of each of the studs 16. In other words, the sections C for the second course are constructed in exactly the same manner as the sections B for the first course, but in placing these sections C in place upon the sections B they are, as illustrated, disposed so as to break joints with the sections B but are disposed so that the notches 17 of a section B will be beneath and in alignment with the notches 17 of the section C. These sections C are designed to be disposed a sufficient distance from each other to leave space for a window opening or for the upper portion of the door opening. These sections C at their ends are designed to be engaged with the corner posts 23 in the same manner as are the sections B.

The third course for each floor of the house is composed of the sections D. These sections each consist of the longitudinally extending beams 15, the vertical studs 16, which have half the depth of the beams 15, the vertical stud 18, which has the full thickness of the beams 15, the stud 20 which is at the end of the section and has the full depth of the beams 15, and the half stud 19 which has a depth equal to the depth of the stud 16 but is only half the thickness thereof. The beams 15 are, as previously described, notched to form the dove-tailed

notches or recesses 17 immediately opposite the studs 16 and the half dove-tailed recesses or notches immediately opposite the ends of the half stud 19. These sections D are intended to rest upon the sections C but to break joints therewith.

The sections B, C, and D are connected to each other by vertically extending locking rods or studs 25 which are dove-tailed in cross section so as to fit the dove-tailed notches 17. After the sections have been arranged in superposed relation, these vertical rods are inserted and extend the whole height of the building, if the building is a one-story building, or extend the whole height of the building if the building is a two-story building, or in the latter case may extend for the height of one story. When these dove-tailed studs are put in place they lock the sections to each other against longitudinal movement or against relative lateral movement.

After the three sections have been superimposed upon each other and the locking rods or studs 25 have been inserted, a plate 26 is spiked, screwed, bolted or otherwise attached to the uppermost beam 15 of the uppermost course of sections D, which plate extends, of course, across the openings 17 of this timber 15 and over the upper ends of the locking rods 25. This plate has a length equal to the length of the wall of the house or the plate may be made in sections, each section projecting at one end beyond the section D to which it is attached so as to overlap an adjacent section D.

The roof is likewise made in sections, designated E, each of these sections being long enough to extend from the ridge of the roof over and beyond the vertical wall of the house. Each section is composed of a longitudinally extending rafter 27 which is 2x6, for instance, or any other desired width, and the two longitudinally extending parallel half rafters 28, which have the same length as the rafter 27 but are only half as thick, in other words are 1x6, for instance. When two sections are disposed against each other with the rafters 28 contacting, it follows that the two half rafters will form a single rafter 2x6 or whatever other dimension may be desired. These rafters are notched at intervals, as at 29, and disposed transversely through these notches are dove-tailed locking rods 30. These locking rods may be relatively short to simply lock two sections to each other, or they may be the whole length of the roof. The upper ends of the roof sections E are all connected by a ridgeboard 31 and the spaces between the rafters at the lower ends thereof are closed by plank sections 32. The rafters are cut out to fit upon and be nailed to relatively short beam sections 33 adapted to be disposed in front of the plate 26, and when the house is completed to be held to this plate by horizontally extending spikes, screws or bolts 34. The under face of the beam sections 33 are grooved for the reception of a tongue 35 on the upper end of a frieze board 36 which is attached to and forms part of the front of the sections D.

Attached to the rafters of each section E are the roofing boards or shingle laths 37 which are tongued and grooved, as illustrated, and attached to the shingle laths and on each section are the shingles 38. It will be understood that each section E is complete in itself with the shingle lath and shingles. The shingles 38, however, are initially left off at the edges of the sections, as illustrated in Figure 7, so that the sections may be adjusted against each other and then after the roof sections are put in place then the shingles are put in place to cover the joint between the two sections. The shingle lath 37 projects above the beam sections 31 and these beam sections, when the roof sections are disposed upon the house, are attached to a ridge pole 39 which extends along the whole length of the house in the usual manner and rests at its ends upon the upwardly and centrally extending frame members 40 of a gable F. This gable is preferably formed in sections and is composed of exterior frame members 40 and 41 and vertical studs 42, these studs supporting the sheathing 43 to which the siding is attached, as heretofore stated, by nails from inside the sheathing. It will be understood that the gable section F may be constructed precisely the same as the sections B, C and D, that is the frame members 40 may be formed with notches and the locking rods 25^a may extend through these notches of the gable section so as to lock the sections composing the gable section F together.

As before remarked, the clapboards are attached to each section B, C, D and E. These clapboards, which are designated 44, are of any suitable character and are attached by nails, screws, bolts or other suitable means 45 extending from the inner face of the wall into the clapboards through the sheathing. I have illustrated clapboards, but it will be understood that any other exterior finish may be given to the house. If the clapboards are used, however, then each section B or each section C or each section D has its clapboards so disposed that alternate clapboards project beyond the section and the intermediate clapboards are less than the length of the section so that when two sections are placed together the clapboards will interlock and break joints, as illustrated in Figure 3. Obviously shingles may be used in place of clapboards or the

sections may have lathing attached to the outer faces of the sections to which plaster, cement or other material may be applied.

The window and door frames of the house, that is the jambs, sill and lintel of the window frames or the jambs and lintel of the door frames, are attached to the sections B, C and D. Thus, for instance, in the window frame the jambs 46 on the outside of the window will be attached to one of the sections C, while the opposite jamb will be attached to the other section C, these sections being brought together to form the window opening, as previously stated, the sill will be attached to the member 15 of the section B, the lintel will be attached to the superposed section D, and all that will be necessary to do will be to set the window frame 47 in place against one section C above the section B which carries the sill and below the section D which carries the lintel, then shift the other section C into place against the wind frame and nail through the jambs 46 into the window frame 47. Afterwards the inner or finishing jamb 48 may be put in place to complete the frame of the window. A like operation is practiced with relation to the door, only in this case the sill of the door is attached to the sills forming the floor section of the house.

Preferably a water table 49 will be disposed around the exterior of the house at the junction of the sections B and C, this water table being in sections and carried upon the sections C and nailed thereto. The lowermost course of clapboards preferably rests upon a board 50 attached to the sills by bolts, spikes or screws. Of course, the interior of the house may be finished in plaster, wainscoting, or covered with wallboard. Obviously the interior finish and trim forms no part of my present invention.

Referring again to the gable end F of the house, as shown in Figure 5, this gable end is shown as formed in a plurality of sections f, f' f^2 and f^3, which sections are nailed or spiked together either before or after elevating into place, the sections then being spiked to the member 33 in the same manner as illustrated in Figure 11.

In Figure 6, a slightly different arrangement of sections is illustrated, there being, however, four sections, as in Figure 5, the studs being differently placed, however, but otherwise than this the construction shown in Figure 6 is the same as that shown in Figure 5, and inasmuch as Figure 6 shows the details of construction better than Figure 5, reference is to be had to Figure 6 as to these details. Each of the three lower sections f, f^2 and f^3 is formed of a base plate or bottom 41 (see Figure 13), the upwardly inclined beam or beams 40 (or the longitudinal beam 40^a of section f), and the vertical studs 42, or 42^a or 42^b. Beneath the beams 41 extend strips 51 (see Figures 12 and 13) which are longitudinally grooved, as at 52, to fit the tongues 35 on the member 36. Attached to the exterior face of each section f, f', f^2 and f^3 is sheathing 53, and exterior to this sheathing are the clapboards 44 and the exterior finishing strip or mold 54. The studs 42^a are half studs and analogous to the half studs 19 in the side wall frames. The studs 42^b are one-half the depth of studs 40 or 42^a and the beams 40, 41^a and 41 are formed with dove-tailed notches for the reception of the locking strips 56, which strips are the equivalent of the locking strips 25 in Figure 7. After the roof sections are in place, the several rafters 27 and 28 are joined by transversely extending studs 57 (see Figure 11) which are nailed, bolted or otherwise attached to the rafters 27 and 28 so as to counteract the under thrust of these rafters. It will be seen that the gable ends illustrated in Figures 5 and 6 nearly constitute an additional course supported upon the end walls of the house so as to give a proper pitch to the roof and close in the gable.

While I have illustrated a house of one story, it is to be understood that the same construction may be used for houses of two stories, the second story of the house duplicating the first story of the house. Preferably the locking rods 25 will only extend up through one story and will be duplicated in the second story, the sill beams of the second story being nailed or bolted to the plate forming the top of the sections D. I have found by actual tests that a house constructed in accordance with my invention is as strong and sturdy as frame houses of ordinary construction and that these houses are in every respect satisfactory, while at the same time they may be erected for considerably less cost than ordinary frame houses. The houses are made in standard sizes with the various sections cut and put together in the factory, with the siding or exterior finish applied thereto and with the shingles applied to the roof sections. The sections are readily put together by relatively unskilled labor, as no fitting has to be done and it is only necessary to lock the sections by means of the locking beams 25. Of course, it will be understood that these beams are made of material having sufficient strength to bear the strains and stresses to which the house will be subjected. Buildings of this character may be quickly erected, it being possible to put up a single story building constructed in accordance with this invention within a day.

While I have illustrated many details of

construction which have been found particularly effective, I do not wish to be limited thereto, as it is obvious that many changes might be made in these details without departing from the general spirit of the invention.

I claim:—

1. A frame structure of the character described including a plurality of units, each having upper and lower longitudinally extending beams and vertical studs, the inner edges of all of said beams being formed at intervals with dove-tailed-shaped apertures opening upon the inner faces of the beams, and locking members dove-tailed in cross section and disposed through the apertures in the beams of a plurality of units and extending across the plurality of units and locking said sections together.

2. A frame structure of the character described including a wall formed of superposed wall sections, each section including a frame having horizontally extending members and a facing upon the exterior of the frame, all of the horizontal members being formed with vertical dove-tailed apertures opening upon the face of the member remote from the facing, the apertures of said sections being in alignment with each other, and locking members dove-tailed in cross section extending the full height of the wall and extending through the locking apertures of the several sections.

3. A frame structure of the character described including a sill, superposed wall sections, the wall sections being arranged in horizontal courses, the wall sections of one course being disposed to break joints with the wall sections of a next adjacent course, each of said sections including a frame having a plurality of horizontal members, said members being formed with vertical apertures opening upon the inner faces of the members, the apertures of the members of one course being in alignment with the apertures of the like members of all the other courses, vertically disposed locking members extending downward the full height of the wall and disposed in said apertures and locking the sections to each other, the lower ends of said locking members resting upon the sill, and a plate attached to the horizontal members of the top course and extending over the joints between the sections of this course and over the upper ends of the locking members and holding the locking members in place.

4. A frame structure of the character described including superposed wall sections, the wall sections being arranged to break joints with the wall sections of the next adjacent course, each of said sections including a frame having horizontal members and vertical members, said horizontal members being formed with vertical apertures, the apertures of the members of one course being in alignment with the apertures of all the other courses, vertically disposed locking members extending downward the full height of the wall and disposed in said apertures and locking the sections to each other, corner posts with which the vertical members of the end sections of each course are engaged, a sill extending beneath the lower horizontal course of sections and beneath the corner posts, and a plate extending over the upper horizontal members of the topmost course and resting upon said corner posts and extending over the joints between the sections of the top course and over the upper ends of the locking members.

5. A frame structure of the character described including sections disposed in the same plane, each section having a frame composed of longitudinal elements and vertical elements, certain of the vertical elements having a depth equal to the depth of the horizontal elements and certain other vertical elements having a less depth than the depth of the longitudinal elements, the horizontal elements being formed behind the intersection of said second named vertical elements with dove-tailed recesses, and locking members having a depth equal to one-half the depth of the longitudinal members and extending across a plurality of sections and being disposed in said notches.

6. A frame structure of the character described including superposed wall sections arranged in a plurality of horizontal courses, the sections of one course breaking joints with the sections of a next adjacent course, each section having a frame composed of longitudinal elements and vertical elements, certain of the vertical elements having a depth equal to the depth of the horizontal elements and certain other of the vertical elements having a depth less than that of the longitudinal elements, the horizontal elements being formed behind the intersection of said second named vertical elements with dove-tailed recesses, and locking members having a depth equal to one-half the depth of the longitudinal members extending across a plurality of sections and being disposed in said notches, the locking members being dove-tailed in cross section.

7. A structure of the character described including superposed wall sections arranged in courses, each section having a frame composed of longitudinal elements and vertical studs, certain of the vertical studs having a depth equal to the depth of the horizontal elements and certain of the studs being one-half the depth of the longitudinal elements, the horizontal elements being formed behind the intersection of said second named studs with dove-tailed notches, and locking members in the form of studs extending the full height of the wall having a depth

equal to one-half the depth of the longitudinal members and dove-tailed in cross section and being disposed in said dove-tailed notches.

8. A frame structure of the character described including wall sections disposed in horizontal courses, each wall section comprising a supporting frame, and an exterior sheathing attached thereto, the wall sections being arranged to define an opening and each wall section carrying an element of the frame defining said opening.

9. In a frame structure of the character described, wall sections and roof sections, the roof sections including longitudinally extending rafters and transverse members, the lower edges of the rafters being formed with dove-tailed recesses extending transversely to the length of the rafters, and transversely extending locking rods inserted in said recesses and locking the roof sections to each other.

10. A frame structure of the character described including a plurality of horizontally arranged sections having a height equal to the distance from the floor of the building to the window sill, a plurality of superposed horizontal sections resting upon the first named sections and having a height equal to the height of the windows in said building, and a plurality of horizontal sections having a height equal to the distance between the lintel of the window and the eaves line of the building, and means for detachably interlocking the sections with each other.

11. A frame structure of the character described including a plurality of horizontally arranged sections having a height equal to the distance from the floor of the building to the window sill, a plurality of superposed horizontal sections resting upon the first named sections and having a height equal to the height of the windows in said building, a plurality of horizontal sections having a height equal to the distance between the lintel of the window and the eaves line of the building, the sections forming one course breaking joints with the sections of an adjacent course, and locking members extending vertically downward through all of said sections and detachably engaged therewith.

12. A frame structure of the character described including a plurality of horizontally arranged sections having a height equal to the distance from the floor of the building to the window sill, a plurality of superposed horizontal sections resting upon the first named sections and having a height equal to the height of the windows in said building, a plurality of horizontal sections having a height equal to the distance between the lintel of the window and the eaves line of the building, the sections forming one course breaking joints with the sections of an adjacent course, locking members extending vertically downward through all of said sections and detachably engaged therewith, and window and door frames disposed between adjacent sections of the first named course and the second named course.

13. As a structural unit, a roof section comprising lateral rafters half the thickness of an ordinary rafter and an intermediate rafter of full thickness, transverse elements connecting said rafters and including a vertically disposed member extending across the lower ends of the rafters and closing the space between them, the frame thus formed having an exterior sheathing attached thereto, and shingles attached to the sheathing, the lateral margins of said sheathing being bare of shingles whereby shingles may be applied over the joint between two roof sections after the roof sections are put in position to form a roof.

14. A frame structure of the character described made up of a plurality of units, the units being arranged in courses, the units of one course breaking joints with the units of a next adjacent course, and locking rods extending the full height of all of the superposed courses and interlocking with each of said units and locking the units to each other, the units of one course breaking joints with the units of the other course whereby to interlock adjacent units of the same course to each other.

15. A frame structure of the character described made up of a plurality of units, the units being arranged in horizontal courses, corner posts extending the full height of all of the courses and against which the adjacent units of all of the courses are abutted and engaged, and members extending the full height of all of the courses and engaging the units of the several courses and locking the several courses together.

In testimony whereof I hereunto affix my signature.

JOHN E. WILSON.