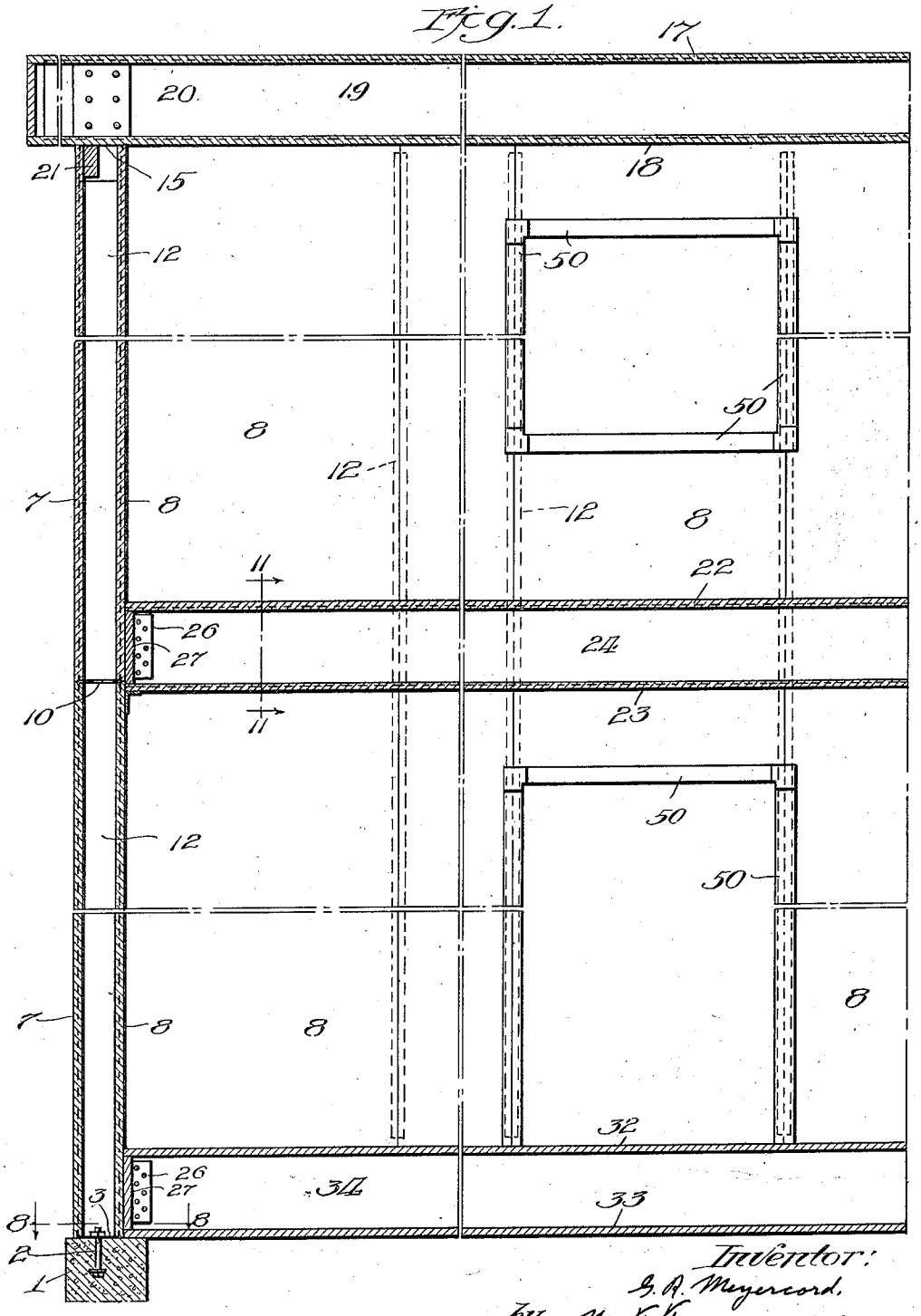
Nov. 24, 1936. G. R. MEYERCORD 2,061,803

BUILDING CONSTRUCTION

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Fig. 1.



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BUILDING CONSTRUCTION

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Fig. 2.

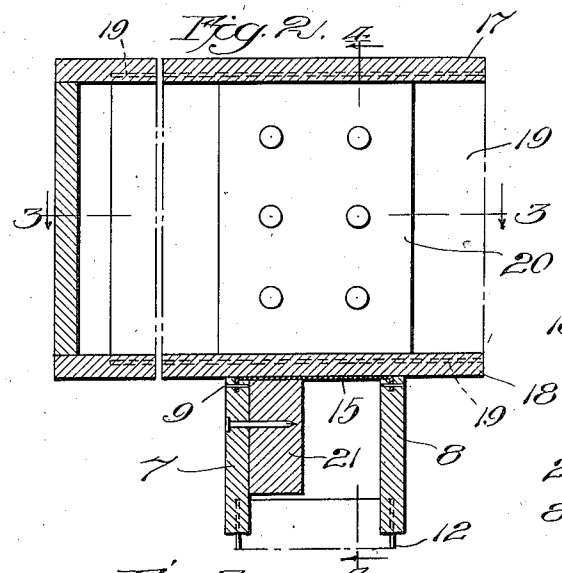


Fig. 4.

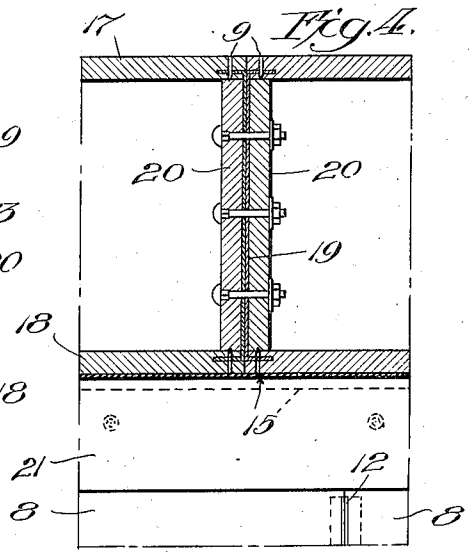


Fig. 3.

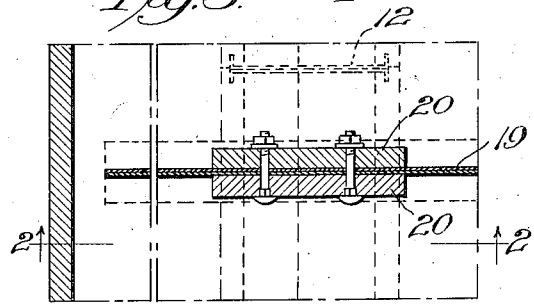


Fig. 7.

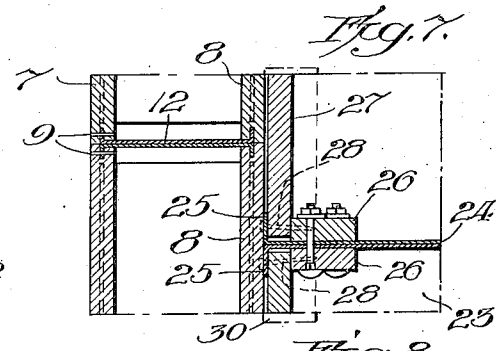


Fig. 5.

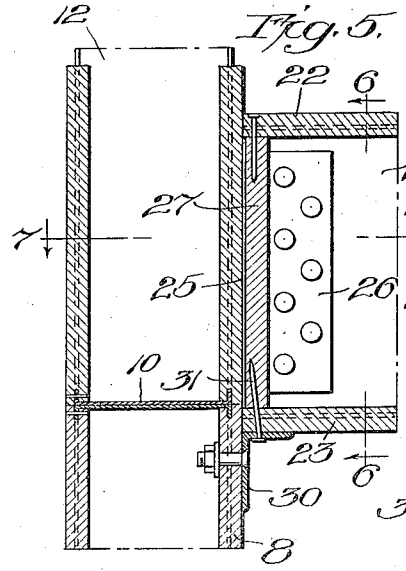


Fig. 6.

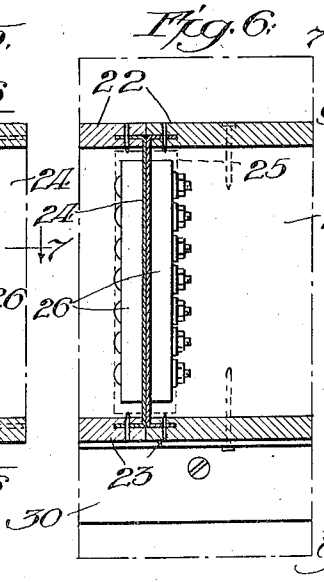


Fig. 8.

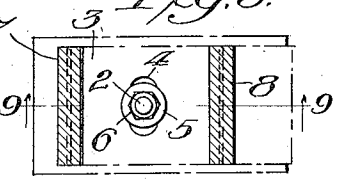
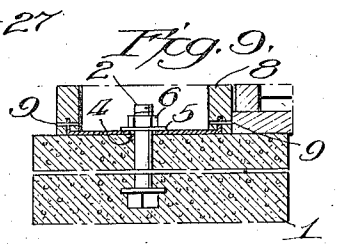


Fig. 9.



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Fig. 11.

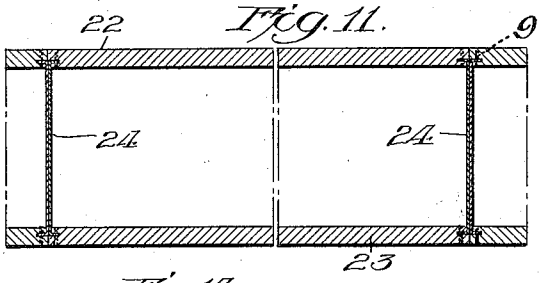


Fig. 10.

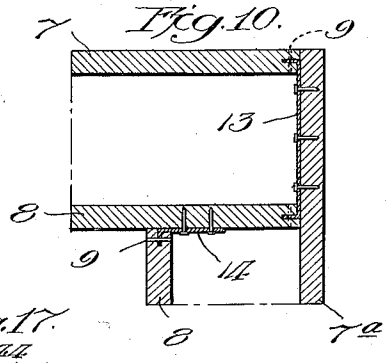


Fig. 14.

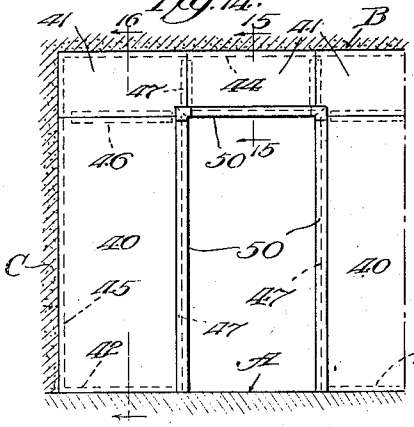


Fig. 17.

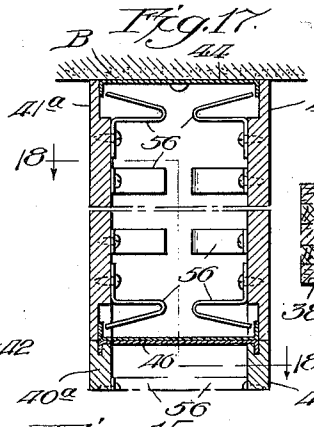


Fig. 12.

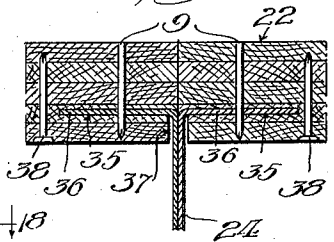


Fig. 16.

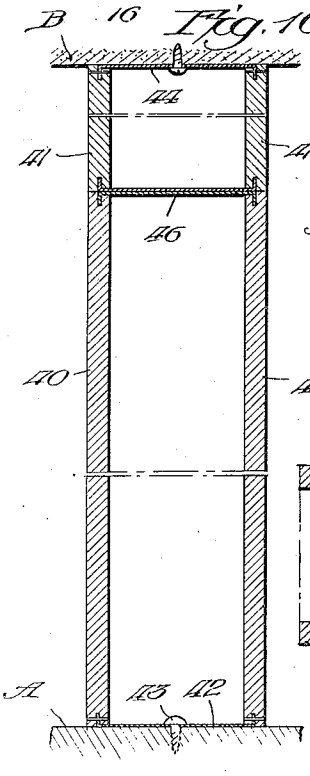


Fig. 15.

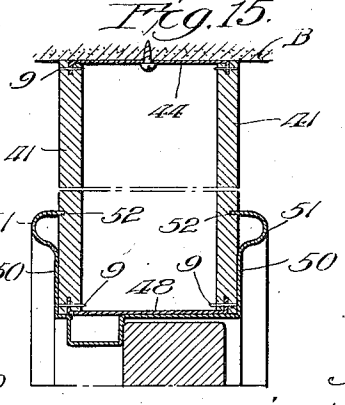


Fig. 13.

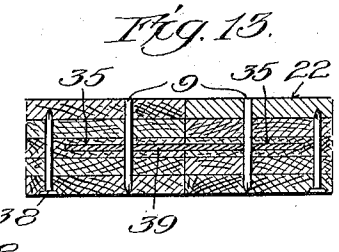
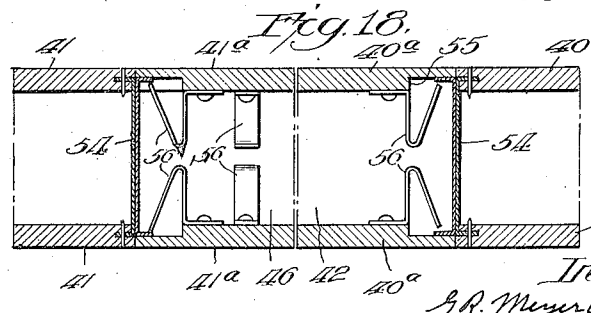


Fig. 18.



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Patented Nov. 24, 1936 2,061,803

UNITED STATES PATENT OFFICE

2,061,803

BUILDING CONSTRUCTION

George R. Meyercord, Chicago, Ill.

Application October 7, 1933, Serial No. 692,571

10 Claims. (Cl. 20—4)

The primary object of the present invention is to make it possible to construct a strong, substantial and attractive house or other building from pre-formed elements that may be shipped in a flat condition and be quickly and easily assembled at the location which the building is to occupy.

The principal structural features embodied in my invention reside in the wall, ceiling and floor constructions which, it is evident, may be employed in remodeling or rebuilding an old house or building, or in partitioning a space in a building into rooms, chambers or compartments. Therefore, viewed in one of its aspects, the present invention may be said to have for its object to produce a simple and novel wall, floor, roof, or ceiling, or a partition for use in buildings or for other purposes.

In carrying out my invention, I construct each wall or the like of two layers of wood spaced apart from each other but connected together by light flanged metal beams whose flanges interlock with the wood so as to form a hollow body which possesses great strength as a beam and which may be quickly and easily assembled or taken apart. The interlocking between the wood elements and the beams is effected by providing the wood elements with edge grooves into which the flanges of the beams fit, so that the wood reinforces the flanges and prevents them from buckling when the beams are subjected to bending stresses. Each layer of wood is composed of rectangular panels, preferably of plywood. Furthermore, the parts of each hollow body may be effectively secured together by nails or the like driven into the panels and through the flanges of the beams. If headless nails be used, it becomes a simple matter to separate the hollow body into its constituent pieces by driving the nails clear through the panels at the time of taking the structure apart.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 is a more or less diagrammatic view in the nature of a vertical section through a conventional building constructed in accordance with the present invention; Fig. 2 is an enlarged view corresponding to the upper left-hand corner of Fig. 1, showing the construction in greater detail, or it may be said to be a section on line 2—2 of Fig. 3; Fig. 3 is a section on line 3—3 of Fig. 2; Fig. 4 is a section on line 4—4 of Fig. 2; Fig. 5 is a view similar to Fig. 1 showing, on a larger scale, a fragment of the left-hand wall in Fig. 1 and an adjacent fragment of the floor and ceiling structure about midway between the top and bottom of Fig. 1; Fig. 6 is a section on line 6—6 of Fig. 5; Fig. 7 is a section on line 7—7 of Fig. 5; Fig. 8 is a section, on the same scale as Figs. 2–7, on line 8—8 of Fig. 1, showing only a small fragment; Fig. 9 is a section on line 9—9 of Fig. 8; Fig. 10 is a horizontal section through a corner of the building; Fig. 11 is a section on line 11—11 of Fig. 1, but on a somewhat larger scale, and only a small fragment being shown; Fig. 12 is a section through one of the joints appearing in Fig. 11, on a greatly enlarged scale; Fig. 13 is a section taken on a plane at right angles to the plane of Fig. 12, showing a possible form of joint between the sections of what may be termed a single panel; Fig. 14 is an elevation of a fragment of a partition in an office building or the like, provided with a door; Fig. 15 is a section, on a much larger scale, on line 15—15 of Fig. 14; Fig. 16 is a section on line 16—16 of Fig. 14, the scale being the same as that of Fig. 15; Fig. 17 is a view similar to Fig. 15, showing a modification for a partition having no door opening; and Fig. 18 is a section on line 18—18 of Fig. 17.

I shall describe first the construction shown in Figs. 1–12, inclusive. Referring to these figures of the drawings, 1 represents a foundation which is illustrated as being of concrete. Held in this foundation and projecting upwardly therefrom are bolts 2. Resting on and extending along the top of the foundation is a light channel iron 3 of a width somewhat less than the thickness of the outer wall of the building that rests on the foundation. As best shown in Fig. 8, the web portion of the channel iron has therein holes 4 that are considerably larger than necessary to receive the bolts rising from the foundation, so as to compensate for inaccuracies in setting the bolts. Since the holes through which the bolts pass are large, I provide washers 5 of large diameter under the nuts 6 on the upper ends of the bolts. The outer wall of the building consists of two layers of wood each provided with a groove in its under edge to receive one of the flanges of the channel iron. Each layer of wood is composed of sections arranged edge to edge. Furthermore, corresponding sections are made of the same width; each section being in the form of a wood

panel, preferably of plywood, or a plurality of panels arranged one above the other. In the drawings I have shown only the simplest forms which, however, illustrate the principle of my invention. In the construction thus illustrated, starting from the channel iron on the foundation, say at one corner of the building, two panels 7 and 8 are interlocked with the channel iron and are held spaced apart at their lower ends by the latter. Nails 9, preferably of the headless type, as illustrated in Fig. 9, may be driven into the panels 7 and 8 and through the corresponding flanges of the channel iron. The panels 7 and 8 are shown as being long enough to extend through the entire height of the first floor or story of the building. Both panels are grooved in their upper edges, as in their lower edges and, laid on its side on the upper edges of these panels, is a light I-beam 10, the under flanges of which enter the grooves in the panels and hold the panels in spaced relation to each other. Either or both panels may be nailed to the under flanges of the I-beam.

The vertical edges of the panels 7 and 8 are also grooved. When the first wall section has been set up, a light I-beam 12, as best shown in Fig. 7, is set against the inner edges of the panels 7 and 8, with two of the flanges on the beam entered in the grooves of the panels. A second pair of panels 7 and 8 is then engaged with the channel iron on the foundation and interlocked with the remaining flanges of the vertical I-beam. The panels 7, 7 and/or the panels 8, 8 may be nailed to the flanges of the vertical I-beam. In this same way the entire width of the first outer wall may be set up.

The corner of the building may be fashioned in various ways, a simple arrangement being illustrated in Fig. 10. Referring to Fig. 10, it will be seen that the hollow wall composed of the members 7 and 8 that are horizontal, as viewed in this figure, does not extend to the plane of the outer face of the meeting wall but terminates short of such plane a distance equal to the thickness of one of the wood panels. The vertical edges of these panels 7 and 8 are, of course, grooved and into these grooves are inserted the flanges of a vertical channel iron 13. This vertical channel iron is preferably nailed or otherwise fastened to a panel 7*a* which is to form the corner outermost panel of the meeting wall. consequently, when the panels 7 and 8 are nailed to the flanges of the vertical channel iron, they become securely fastened to the panel 7*a*. The panel 8, corresponding to the panel 7*a*, is made only wide enough so that it will abut against the panel 8 of the meeting wall which has attached thereto a flanged plate 14, the flange on this plate entering the edge groove in and being nailed to the panel 8 that meets the panel on which the plate 14 is carried.

A wall that is to be carried above the height of the panels 7 and 8 may be built up on top of the completed lower part of the wall; the upwardly-projecting flanges on the I-beams 10 serving the same purpose as do the flanges on the channel irons 3 on the foundation. In any event, another piece of wall may be built on top of the first piece out of panels 7 and 8, as shown in Fig. 1, in the manner heretofore explained. When the wall has reached its full height, a channel iron 15, similar to the channel iron 3, may be set on top of the wall with the flanges directed downwardly and entered in the grooves in the upper edges of the uppermost sections.

It will be seen that either the vertical metal beams or the horizontal metal beams, but not both, may be continuous throughout the corresponding dimension of the wall in which they are located. If the building be not too high, it may be advisable that the vertical I-beams and channel irons be made continuous, in which case the channel irons in the top and bottom may also be continuous throughout the entire width of each wall, while the I-beams 10 must be in short sections no longer than the width of one of the panels.

The details of the roof, which is shown as being flat, are illustrated in Figs. 2, 3 and 4. The roof is shown as being made of two layers of wood composed of panels 17 and 18, respectively; these two layers being held in spaced relation to each other and tied together by I-beams 19 whose flanges fit into edge grooves in the meeting edges of the panels in each layer. Bolted to the webs of the I-beams 19 are thick plates 20, 20 that may conveniently be pieces of wood; these plates lying directly over the outer walls of the building so that the load is transmitted through the same to the panels 18 and from the latter to the vertical walls of the building. It may be advisable to secure a horizontal load-distributing member to the inner side of the outermost panels of the outer wall at the very top of the wall, so that the load delivered over comparatively small areas by the I-beams 19 and the plates 20 will be distributed across the width of the supporting wall. In the arrangement shown, there is an ordinary wooden two by four 21 nailed to the uppermost panels 7 for this purpose.

It will be seen that the panels 18 form the ceiling for the room or rooms of the second story of the building. The floor for the second story and the ceiling for the first story are provided by a second hollow structure similar to that for the roof and upper ceiling. This combined floor and ceiling structure comprises spaced horizontal upper and lower wood layers made up of panels 22 and 23, respectively, associated with horizontal I-beams 24 in the manner that the panels 17 and 18 and the beams 19 are interrelated.

As best shown in Figs. 5 and 7, there are at the ends of the webs of the beams 24 vertical flanges 25, 25 extending laterally in opposite directions from the webs. Wooden blocks or plates 26, 26 are placed on opposite sides of the web of each of the I-beams, a short distance inwardly from the flanges 25 and are bolted to the beams. Boards 27 are set on edge between the upper panels 22 and the lower panels 23 the ends of the boards fitting between the corresponding flanges 25 and blocks 26. Nails 28 are driven through the flanges 25 and the boards 27 into the blocks 26. The hollow box-like structure thus formed is conveniently supported on a suitable shelf extending around the interior of the building along the wall thereof at the proper height. In the arrangement shown, the shelf is the horizontal flange of an angle iron 30 bolted to the lower panels 8 just below the plane of the horizontal beams 10. Nails 31, driven up through the horizontal flanges of the angle irons and into the boards 27, serve to tie the vertical walls and the composite floor and ceiling structure together.

The floor for the first story and the ceiling for the basement may be constructed in exactly the same way as the composite floor and ceiling just described; resting directly on the foundation 1, if desired, however, instead of on special supports. Since it may be desired to use different

woods for the lowermost floor and ceiling, I have numbered the panels therefor **32** and **33** instead of **22** and **23**, and the main I-beams are numbered **34**.

The main I-beams of each combined floor and ceiling unit or each ceiling and roof unit preferably extend across the entire width of the building so that each hollow floor or roof structure, comprising I-beams spaced apart by wood panels interlocked with and nailed to their flanges, possess great strength, regarding them as beams. Usually none of the horizontal panels will be long enough to extend across the entire width of the building and each section must therefore be made up of a plurality of panels arranged end to end. Where each upper panel is of the same length as the corresponding lower panel in the same floor and ceiling unit, connections may be made just as between the lower and upper halves of the vertical walls, short I-beams corresponding to the I-beams **10** and extending transversely to the main I-beams being employed. What I believe to be a better construction, however, is one in which no transverse I-beams are employed but meeting panel members are formed by flat metal strips or plates fitted into the registering grooves in the meeting edges of the panel members.

In Fig. 12 there are illustrated, on a larger scale than Figs. 1–11, fragments of two of the panels **22** and of the main I-beam that connects them together. The two panels may, however, be any of the other panels that are arranged either vertically or horizontally, and the beam may be the beam in the joint between such other panels. It will be seen that the panels, as shown, consist of plywood that provides strength, rigidity, durability, and the capacity to remain flat. The meeting edges of the panels abut outwardly from the grooves **35** in which lie the flanges **36** of the beam; but, inwardly from such grooves, the edges of the panels are cut back to provide a slot **37** for the reception of the web of the I-beam. Since it is that portion of each panel lying above the flanges that must carry the load between the supporting beams therefor, the grooves **35** are preferably placed below the middle of the floor or ceiling panels, so that there will be more plies above than underneath the supporting flanges. Furthermore, headed, cement-coated nails are preferably driven into the panels near the grooves **35** to prevent the panels from splitting.

In Fig. 13 there is illustrated the preferred construction of a transverse joint in the plywood; a metal plate **39** being fitted into the registering grooves **35** and being nailed to the wood by headless nails **9** as are the flanges **36** in Fig. 12; and there being cement-coated nails **38** driven into the wood near the grooves.

It will thus be seen that, having the required preformed wood panels and beams, a wall or building may be quickly erected; and that, after being erected, the structure will be rugged and durable. It will further be seen that the panels may all be given the desired surface finishes in the factory so that the erection of the structure will complete the job and make it unnecessary subsequently to paint or otherwise decorate it. If it be desired later to take the structure apart, this involves simply the taking out of some bolts and the removal of headless nails by driving the latter through the panels in which they are found. It will also be seen that, as has heretofore been pointed out, the parts for an entire building may be shipped in a compact form because the panels may lie flat one upon the other and the beams take up only such space as is needed for any structural beam of the same kinds.

In Figs. 14–16 I have shown a partition adapted to be set up and reach from floor to ceiling in a building that is already standing. When the partition contains a door opening the erection thereof is comparatively simple because grooved panel members, I-beams and channel irons are all that are then required. Each of the double walls of the partition is shown as being composed of lower panel members **40** and upper panel members **41**; the height of the panels **40** being that of the door opening. These panel members are all grooved in all four of their edges, as in the constructions heretofore described. Suitable channel irons **42** are secured to the floor A by screws **43** or by other suitable means. Against the ceiling B, directly above the channel irons **42**, are secured a channel iron or channel iron sections **44**. Similar channel irons extend vertically along the side walls of the room or structure in the plane of the channel irons **42** and **44**. In Fig. 14 there is shown one of these vertical channel irons **45**, secured to the wall C. It will be seen that the left-hand panel members **40** on each side of the partition may be set upon the flanges of the lower channel iron and be engaged with the flanges of the adjacent vertical channel iron. A short transverse I-beam **46** may then be laid on top of the first two panel members **40**, as illustrated in Fig. 16. The corresponding panel members **41** may then be engaged with the flanges on the upper channel iron **44**, to the right of the panels **40** that have been set up, and then be slid toward the left, as viewed in Fig. 14, until engaged with the flanges of the I-beam **46** and with the flanges of the vertical channel iron **45**. In the arrangement shown, the door opening is placed a distance equal to the width of one panel from the wall C. Therefore, after the erection of one pair of panel members **40** and one pair of panel members **41**, the erection of the panel members is resumed from the opposite side of the room; a set of panel members **40** and the corresponding panel members **41** being placed against the opposite wall, a vertical I-beam being then engaged with the exposed edges of the four panel members, with two of the flanges entered in the edge grooves in those members. Four more panel members are then erected in interlocked engagement with the vertical I-beam. This process is continued until the door opening is reached. The vertical beams **47** at the sides of the door opening are in the form of channel irons throughout the height of the door opening and in the form of I-beams from the door opening to the ceiling. This permits the last of the panel members **41**, which lie directly above the door opening, to be slipped up from below. A short channel iron **48** is then interlocked with the lower edges of these last two short panels and bounds the door opening at the top. After these last two panel members **41** are nailed to the flanges of the upper channel iron, they will have sufficient support to hold them in place until a door frame has been fitted into the door opening.

While the door frame may take any usual or preferred form, I have in Figs. 14 and 15 illustrated a door frame which is suitable, not only for partitions of the type under description, but also for use in any wall of a building. The door frame illustrated is composed of two upright members and an upper cross member each made

from sheet metal bent or formed into the shape of a trough whose width equals the thickness of the partition or wall as a whole. The marginal portions of the side wall **50** of each trough-like frame element are bent outwardly and then inwardly, as indicated at **51**, the free edges of the side walls being carried a short distance inwardly past the planes of the main portions of the side walls. The panels **41** and **40** above and at the sides of the door opening have in the outer faces thereof grooves **52** to receive the free edges of the side walls of the troughs. These frame members are composed of spring metal or, at least, metal that can be sprung without stressing it beyond its elastic limit, whereby the mouths of the troughs may be expanded to slip the trough-shaped pieces in place; the sides of the troughs then springing together and causing the portions adjacent to the free edges to enter the grooves **52**.

When there is no door opening in a partition such as I have just described, which is to be placed in position in a room in a completed building and extend entirely across and throughout the entire height of the room, four special panel members are required. The erection may proceed as heretofore explained up to the point where an opening the width of one panel remains. It may be assumed that this opening corresponds to the door opening in Fig. 14. Then, instead of employing the special vertical beams **47**, I-beams **54** are placed at the sides of the opening; these beams being just like the rest of the vertical I-beams in the partition. Panels **40***a* are then set in place, these panels being grooved at the top and bottom, as are the panels **40**, but being cut away on their inner sides along their vertical edges, as indicated at **55** in Fig. 18, so that they may simply rest against the vertical I-beams and not be interlocked therewith; the lower ends of the panels being interlocked with the flanges of the floor channel irons. One of the I-beams **46** is laid on its side on the top edges of the panels **40***a*, as shown in Fig. 17. Each of the panels **40***a* has on the inner side spring catches **56** adapted to snap behind the projecting flanges of the adjacent vertical I-beams and thus lock the panels in place. The panels **41***a*, on the other hand, have no edge grooves but all the material thereof along the margins behind the plane containing the grooves in the top and bottom of the corresponding panel members **40***a* is cut away. Therefore the panels **41***a* are simply carried in directions at right angles to the planes thereof into the spaces above the members **40***a* until the thin marginal portions strike against the exposed flanges of the ceiling channel iron, the underlying horizontal I-beam and the two adjacent vertical I-beams. Each of the members **41***a* has spring catches **56** to snap behind the flanges on the adjacent beams and secure said members in place.

In setting up a wall or other structure embodying the present invention, adjacent panels or sections of panels may be pressed tightly together in edge contact with each other, before nailing, and thus produce closed joints. If it be desired to seal such joints more effectively, thin strips or tapes coated on their rear faces with asphalt or other fusible, waterproof adhesive material may be laid over the joints and be caused to adhere to the wood by applying heat and pressure. The strips or tapes are preferably composed of metal as, for example, very thin sheet copper cut into strips.

While I have illustrated and described with particularity only a single preferred form of my invention, I do not desire to be limited to the exact structural details thus illustrated and described; but intend to cover all forms and arrangements which come within the definitions of my invention constituting the appended claims.

I claim:

1. A structure which has great strength as a hollow box-like beam comprising parallel wood panels having grooves in and extending lengthwise of opposite edges thereof, metal beams each having spaced parallel flanges extending lengthwise thereof and fitted into and filling corresponding grooves in the panels, and fastenings extending through at least some of the flanges and adjacent portions of the panels engaged by such flanges.

2. A structure which has great strength as a hollow box-like beam comprising parallel wood panels having grooves in and extending lengthwise of opposite edges thereof, metal beams each having spaced parallel flanges extending lengthwise thereof and fitted into and filling corresponding grooves in the panels, and nails extending into each panel and through at least some of the flanges entered in the grooves therein.

3. A structure which has great strength as a hollow box-like beam comprising parallel wood panels having narrow grooves in and extending lengthwise of opposite edges thereof, metal beams each having spaced parallel flanges extending lengthwise thereof and fitted into and filling corresponding grooves in the panels, and nails extending into each panel and both of the metal flanges engaged therewith.

4. A wall comprising a support, a channel iron resting and secured on said support with its flanges on the upper side, a plurality of panels of wood arranged edge to edge above and in the plane of each flange of the channel iron, said panels having in their lower edges grooves in which said flanges are engaged, said panels having narrow longitudinal grooves in their meeting edges, vertical metal beams each having flanges entered in and filling the longitudinal grooves in the meeting edges of two panels, and means securing each such beam to the opposite panels.

5. In a wall, a horizontal channel iron beam having its flanges on the upper side, a plurality of vertical I-beams of about the same depth as the width of the channel iron arranged above with their flanges in about the planes of the flanges of the channel iron, transverse I-beams parallel with the channel iron lying on their sides with their flanges in about the planes of the corresponding flanges of the vertical beams, and a series of rectangular wood panels lying in each of said planes, each panel being surrounded by a frame composed of four of said beams or parts thereof and each having edge grooves into which the adjacent flanges on the beams are fitted.

6. A floor structure or the like comprising parallel horizontal I-beams whose corresponding flanges lie in the same upper and lower planes, wood panels arranged in said planes and spanning the spaces between the beams, each panel having in the edges longitudinal grooves into which the adjacent flanges on the I-beams fit, the flanges of said beams being thin enough and of such material that nails may be readily driven through the same, nails securing the panels to said flanges, and cement-coated headed nails

driven through the panels inwardly from and near the grooves.

7. A structure comprising parallel wood panels having deep narrow grooves in and extending lengthwise of opposite edges thereof, light metal beams each having thin spaced parallel flanges extending lengthwise thereof and fitted tightly into corresponding grooves in the panels so as to be reinforced by the panels, and fastenings extending through at least some of the flanges and adjacent portions of the panels engaged by such flanges.

8. A structure comprising parallel wood panels having narrow grooves in and extending lengthwise of opposite edges thereof, the panels being spaced apart at right angles to the planes thereof, light metal beams each having spaced parallel flanges extending lengthwise thereof and entered edgewise into and filling corresponding grooves in the panels, the flanges being of such a character as to permit nails to be readily driven therethrough and nails extending into each panel and through at least some of the flanges entered in the grooves therein.

9. A structure comprising parallel wood panels having narrow grooves in and extending lengthwise of opposite edges thereof, the panels being spaced apart at right angles to the planes thereof, metal beams each having spaced parallel flanges extending lengthwise thereof and fitted edgewise into and filling corresponding grooves in the panels, the flanges being of such a character as to permit nails to be readily driven therethrough and headless nails extending into each panel and both of the metal flanges engaged therewith.

10. A wall comprising a support, a channel iron resting and secured on said support with its flanges on the upper side, a plurality of panels of wood arranged edge to edge above and in the plane of each flange of the channel iron, said panels having in their lower edges grooves in which said flanges are entered edgewise, said panels having longitudinal grooves in their meeting edges, vertical metal beams each having flanges entered edgewise in the longitudinal grooves in the meeting edges of two panels, and means securing each such beam to the opposite panels.

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