

May 15, 1934.

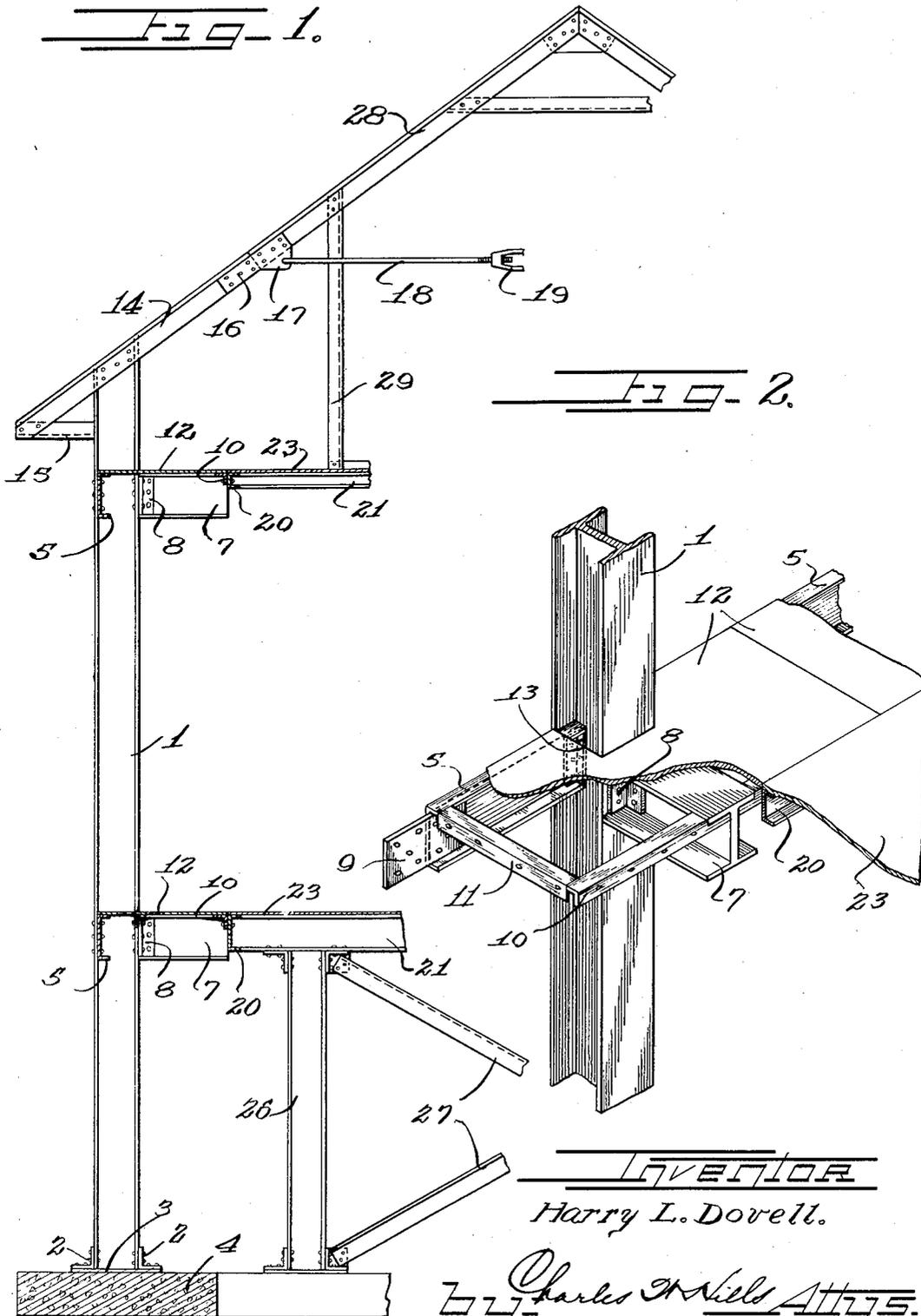
H. L. DOVELL

1,958,473

STRUCTURAL METAL FRAMEWORK

Filed Feb. 27, 1931

3 Sheets-Sheet 1



May 15, 1934.

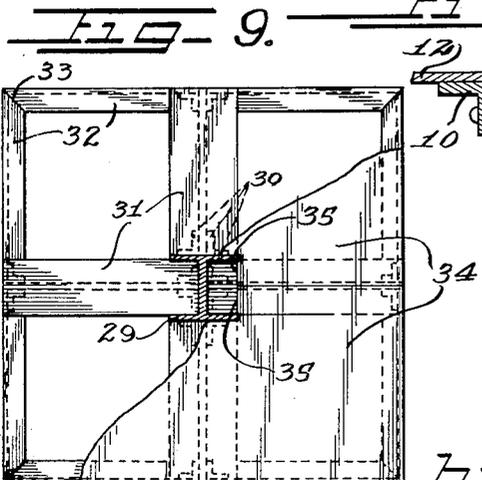
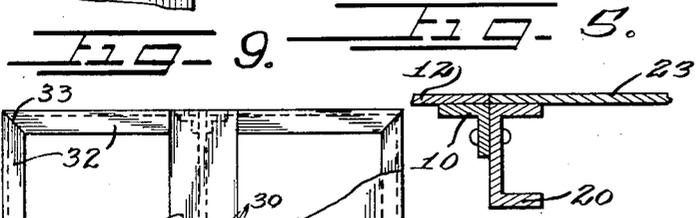
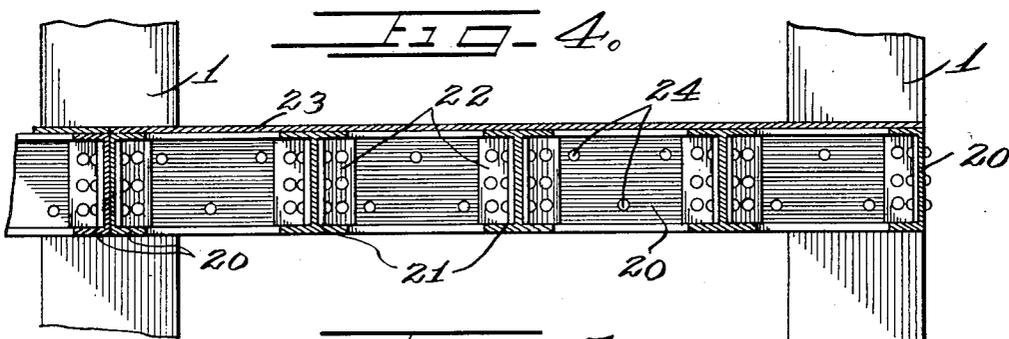
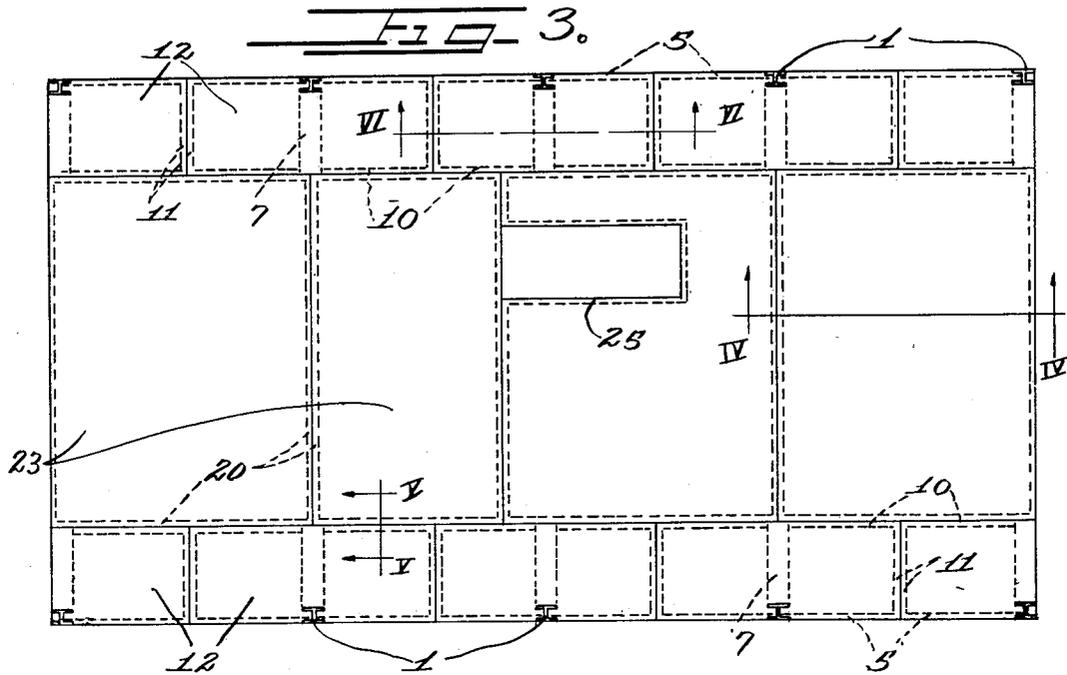
H. L. DOVELL

1,958,473

STRUCTURAL METAL FRAMEWORK

Filed Feb. 27, 1931

3 Sheets-Sheet 2



INVENTOR  
Harry L. Dovell.

BY Charles K. Wells ATTY.

May 15, 1934.

H. L. DOVELL

1,958,473

STRUCTURAL METAL FRAMEWORK

Filed Feb. 27, 1931

3 Sheets-Sheet 3

FIG. 6.

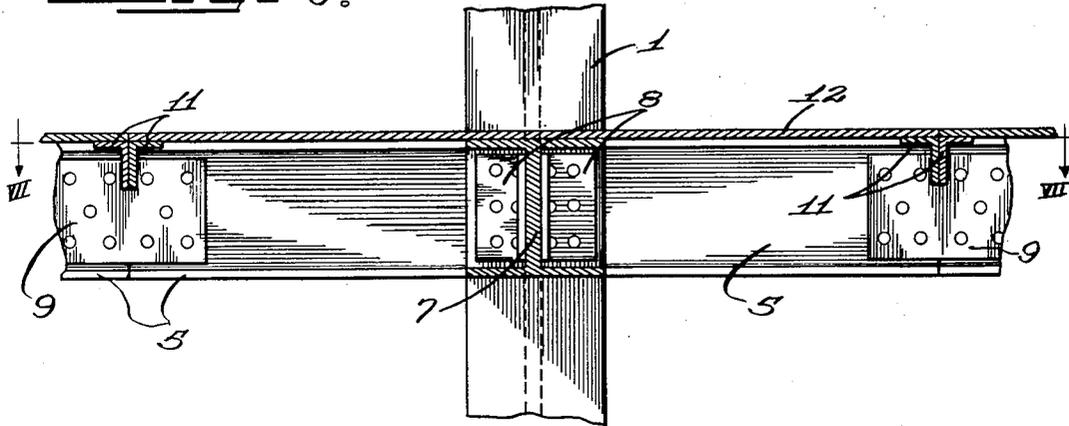


FIG. 7.

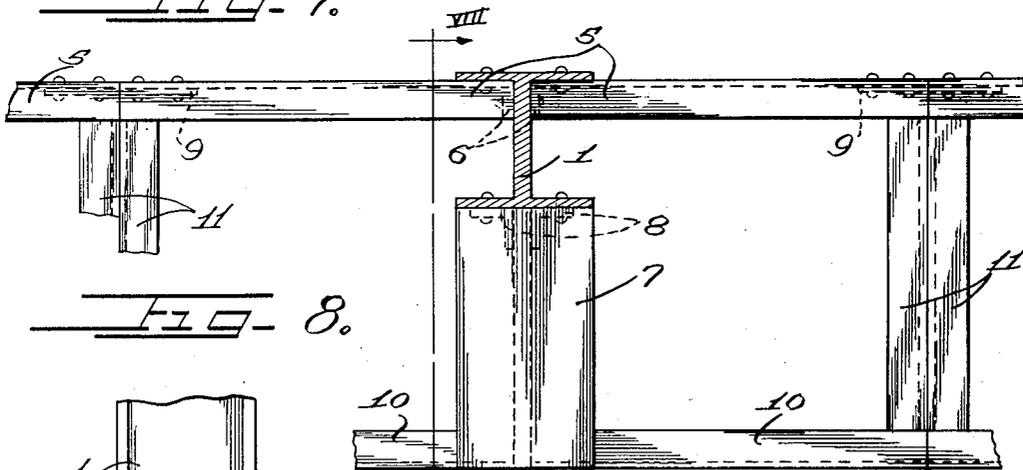
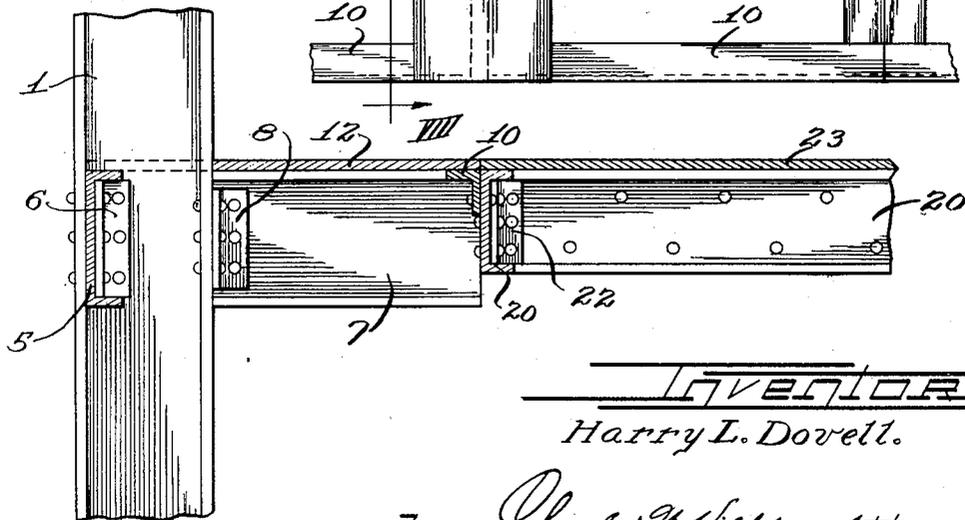


FIG. 8.



INVENTOR  
Harry L. Dovell.

BY Charles Mills ATTY.

# UNITED STATES PATENT OFFICE

1,958,473

## STRUCTURAL METAL FRAMEWORK

Harry L. Devell, Chicago, Ill.

Application February 27, 1931, Serial No. 518,676

13 Claims. (Cl. 189—1)

In the construction and building of small buildings, homes, bungalows, cottages, and the like, the sub-structures or framework have usually been constructed of timber with the exterior walls covered with sidings, stucco, bricks or the like while the inner walls of the structure have been covered with laths and plaster, thereby affording a construction which must be built up on location and one in which the upkeep is considerable. In plaster covered wall structures of the type referred to, a considerable length of time is required for the plaster walls to properly dry out before the structures can be inhabited. The lack of structural steel in the construction of the ordinary small type of buildings and homes has been one of the main reasons for the high cost of upkeep.

The present invention relates to an improved structural metal framework for a small building or home with said framework being constructed of steel members or the like which are grouped and assembled in the factory or mill to form structural steel framework units which are adapted to be shipped on a job and readily assembled to afford an improved structural metal house framework adapted to readily receive outer wall structures consisting of pre-cast concrete slabs adapted to be filled with insulation and having the outer surfaces thereof covered with stucco, brick veneering, shingles or sidings, while the inner sides of the outer walls are adapted to be covered or formed of cast wall-board adapted to be covered with paper or canvas coverings to complete the wall structure, thereby affording wall structures which do not require drying out so that as soon as a building has been completed the same may be put into service.

It is an object of this invention to provide a structure metal framework comprising pre-assembled metal units which are adapted to be shipped on a job and readily connected one to the other to provide a complete metal sub-structure to which outer wall forming elements may be readily applied and in which interior partitions may be conveniently installed to provide the required interior layout.

It is also an object of this invention to provide a structural metal framework comprising vertical and horizontal framework units adapted to be shipped as units and be set up and connected one to the other to form the supporting framework of a small building or house.

It is a further object of this invention to provide an improved type of structural metal framework wherein a plurality of metal column sec-

tions are provided with cantilever platforms or floor sections, with oppositely positioned cantilever floor sections adapted to be rigidly connected together by means of adjacently connected floor sections or units which form a metal floor slab or filler.

It is furthermore an object of this invention to provide an improved type of structural metal framework for houses and other similar constructions, said framework in the main being constructed of column units carrying cantilever sections to which assembled floor units are adapted to be secured to produce the main sub-structure or framework of a house.

Another object of this invention is to provide a structure metal framework for buildings, said framework comprising metal columns having rigidly secured thereto metal cantilever floor sections constructed to permit floor span metal units to be secured thereto to provide a metal framework having a metal floor.

Still another object of the invention is to provide a metal framework adapted to be assembled on location in a comparatively short time and comprising side units and floor units with said side units having cantilever floor sections rigidly forming a part thereof whereby the floor units may be supported in spanned relation between the oppositely positioned side floor sections to produce a main building framework to which brace members and a roof framework are adapted to be secured as required.

It is an important object of this invention to provide a structural metal framework primarily adapted for small houses, buildings and the like with said framework comprising column members, each of which is equipped with one or more cantilever floor sections with the floor sections of oppositely positioned columns adapted to be arranged in parallel rows with the space between said rows of cantilever floor sections adapted to be bridged by means of a plurality of connected adjacently positioned main floor sections to form a filler or arch to complete the framework with the addition of braces at the ends of the framework and with the provision of suitable roof supporting metal frame structures supported on the upper end of the column members.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 illustrates a fragmentary vertical transverse section of a building or house structural metal framework embodying the principles of this invention.

Figure 2 is an enlarged fragmentary isometric view of one of the column members having a cantilever floor section secured thereto and illustrating the positioning of a portion of one of the main floor sections.

Figure 3 illustrates an assembled top plan view of one of the floors of the structural metal framework.

Figure 4 is an enlarged fragmentary vertical detailed section taken on line IV—IV of Figure 3.

Figure 5 is a fragmentary detailed section taken on line V—V of Figure 3, illustrating the method of securing the main floor section with one of the cantilever side floor sections.

Figure 6 is an enlarged vertical detailed section taken on line VI—VI of Figure 3.

Figure 7 is an enlarged fragmentary horizontal sectional view taken on line VII—VII of Figure 6, with the floor plates omitted.

Figure 8 is a fragmentary vertical sectional view taken on line VIII—VIII of Figure 7.

Figure 9 illustrates a horizontal sectional view of a modified four-way cantilever column unit with parts of the floor plates broken away.

As shown on the drawings:

The improved structural metal framework is adapted to be constructed out of steel or other metal members which are adapted to be assembled in a factory or mill to form structural units adapted to be shipped as units and be assembled or connected one to the other on location or on a job to form a main sub-structure of a house or small building.

The structural metal framework is adapted to be constructed of columns or vertical units connected by main floor sections or units in addition to bracing sections and roof framework sections.

Each of the side or column units comprises a metal, preferably steel, I or H cross-sectioned post or column 1 having secured on the lower end thereof by means of angle irons 2 or the like, a base plate 3. The base plate 3 together with the angle-irons 2 forms a foot or base for the column to permit the column to be supported upon a concrete foundation wall or block 4. Each of the posts or columns 1 is provided with one or more cantilever floor platforms positioned at right angles to the column and comprising a pair of channel cross-sectioned cantilever arms or beams 5 which are aligned with one another and positioned on opposite sides of the web of the column 1. The ends of the cantilever beams or arms 5 adjacent the column are rigidly secured against the inner surfaces of the outer flange of the column by means of rivets, bolts or other suitable attaching devices. If preferred, the ends of the cantilever side beams 5 adjacent the column 1 may be secured to the column by means of angle-irons 6 as indicated in Figure 8. Also rigidly secured to the column 1 at right angles to the outer surface of the inner flange of the column and in the plane of the cantilever side beams or arms 5 is an intermediate cantilever arm or beam 7 of I or H cross-section.

The inner end of the intermediate cantilever beam 7 is secured to the inner flange of the column 1 by means of angle-irons 8 which are riveted or bolted in position to the web of the cantilever intermediate beam 7 and to the inner flange of the column 1. Riveted or bolted on the inner

side of the outer end of each of the side cantilever beams or arms 5 is an apertured tie plate 9 one end of which projects beyond the end of the cantilever beam as clearly illustrated in Figure 2 to permit the plate to be secured to the outer end of an abutting side cantilever beam of an adjacent unit. Rigidly secured to the cantilever side beams 5 and the cantilever intermediate beam 7 is a cantilever frame comprising angle-irons 10 and 11. The angle-iron frame members 10 are secured at right angles to the outer end of the upper flange portion of the cantilever intermediate beam 7 while the end angle-iron frame members 11 connect the outer end of the angle-iron frame members 10 to the upper flanges of the side cantilever beams or arms 5. The ends of the frame angle-irons 10 and 11 may be secured to the cantilever beams by welding or by any other suitable means. The intersecting ends of the angle-irons 10 and 11 are adapted to be rigidly secured together by means of welding or other suitable fastening means. It will thus be noted that the cantilever beams 5 and 7 together with the cantilever frame members 10 and 11 form a cantilever frame or platform which is rigidly secured at right angles to the column or post 1. Rigidly secured to the top of cantilever frame and resting upon the top flanges of the cantilever side beams 5 and the intermediate beam 7 and upon the upper flanges of the angle frame members 10 and 11 is a sheet metal side floor section or plate 12 which is provided with a cut-out portion at 13 to permit the side floor plate to fit around the column 1, as clearly illustrated in Figure 2. Each of the columns or posts 1 is adapted to be equipped with one or more cantilever side floor platforms with the platforms spaced from one another a distance depending upon the height of the rooms to be provided in the building.

In addition to having a column or post 1 equipped with one or more cantilever side platform floor sections and with a base to permit the column to be secured to a foundation or wall, the upper end of the column or post under certain conditions may be equipped with a roof section comprising an angle iron rafter member 14 which may be secured to the column by rivets, bolts or other suitable means with the rafter member positioned at an angle depending upon the shape of the roof to be built. The lower projecting end of the roof member or rafter 14 may be braced in position by means of a braced arm 15 similar to the arrangement illustrated in Figure 1. Rigidly secured to the upper end of the roof member or rafter 14 is a tie plate 16 having an apertured wing member 17 integrally formed thereon in which one end of a connecting or tie rod 18 is adapted to be engaged. The tie rod 18 is provided with the ordinary type of turnbuckle 19 to permit tensioning or adjustment of the tie rod. The opposite end of the tie rod 18 is connected to the opposite side of the roof.

The main section or floor portion of the improved structural metal framework is adapted to be formed out of a plurality of connected floor sections or units each of which comprises an outer frame preferably constructed out of a plurality of channel beams 20 positioned with the backs or outer surfaces of the web portions of the channel beams directed outwardly. The intersecting ends of the channel frame beams 20 are mitered and may be secured to one another by welding or other suitable means. To reinforce the floor section frame, a plurality of reinforcing

I-beams 21 are connected in parallel relation longitudinally of the floor section to the end members 20 of the floor frame. The ends of the reinforcing I-beams 21 are adapted to be secured to the end members 20 by angle brackets 22 which may be riveted or bolted in position as clearly illustrated in Figures 4 and 8. Welded or otherwise rigidly secured to the top flanges of the floor section channel frame members 20 and the reinforcing I-beams 21 is a sheet metal floor plate 23. The outer channel frame members 20 of the floor section are provided with apertures 24 as illustrated in Figure 4 to permit the floor sections to be riveted or bolted one to another and to the apertured flanges of the cantilever frame members 10. The main floor units may be constructed of different widths and lengths depending upon the size of the building in which they are to be used and, if preferred, certain of the floor section plates 23 may be provided with stair or elevator shaft openings 25 as required.

The improved column units and the main floor section units are adapted to be assembled in the factory or mill and are formed in suitable sizes to permit handling and shipment thereof. The column units are adapted to be supported on concrete base blocks or foundation walls 4 similar to the arrangement illustrated in Figure 1, with the base plates 3 secured to the concrete foundation by means of retaining bolts or the like. After the column units have been mounted in position to form the opposite wall frame structures of the building, the adjacently positioned cantilever floor sections are adapted to be rigidly riveted or bolted together after which the main floor units are secured in position to form a distributing girder along the length of the room or building to distribute the loads to the braced end sections of the framework. The distributing girder or filler section spans or bridges the space between the opposite cantilever side floor sections, with the apertured end frame members 20 of the main floor sections riveted or bolted to the apertured flanges of the cantilever frame members 10. As clearly illustrated in Figures 2 and 3, the main floor sections are staggered with respect to the cantilever side floor sections to provide a rigid framework construction. The main floor sections or units, when connected together, form a floor filler which bridges or spans the space between the cantilever side floor sections of the framework.

At the ends of the framework or building sub-structure upright fillers or posts 26 are secured to the outermost longitudinal frame member 20 of the end floor units, and said uprights or posts 26 are adapted to be connected by means of crossed braces 27 as illustrated in Figure 1. The posts 26 and the brace members 27 are only provided at the ends of the building structure in the basement and in the various floors as required.

The roof portion of the metal framework is constructed of a plurality of roof truss units 28, the ends of which are adapted to be positioned in abutting engagement with the upper ends of oppositely positioned roof rafter members 14 forming a part of a pair of oppositely positioned column units. The lower ends of the roof trusses 28 are adapted to be secured to the tie plate 16 by means of rivets or bolts or any other suitable means. When required, the upper roof trusses 28 are provided with vertical brace posts 29 provided for the end truss sections of the roof only.

It will of course be understood that while a gabled or pointed roof framework is illustrated and

described in connection with the improved structural metal framework, that any other desired type of roof supporting truss structure or roof framework may be used in supported engagement on the upper ends of the column units.

Figure 9 illustrates a modified form of column unit in which an I or H-cross sectioned column 29 has rigidly secured to four sides thereof by means of angle brackets 30 or the like, the inner ends of four cantilever I-beams or arms 31 which are positioned at substantially right angles with respect to one another to form a cross or four-way floor support. The outer ends of the four cantilever beams or arms 31 are connected by means of angle frame members 32 which are mitered or joined at 33 to form corners for the frame. Rigidly secured upon the top of the four cantilever beams 31 and the frame formed by the angle members 32 are two plate sections 34 which are constructed of sheet metal and are cut out at 35 to permit the two floor plates to fit around the column 29. In this form of a four-way cantilever column floor section, the main floor units constructed similar to those illustrated and described in Figures 3 and 4 of the drawings may be rigidly secured to the four sides of the column floor section or platform.

An improved structural metal framework has been described adaptable for use in buildings, homes, cottages, bungalows and the like, with the framework adapted to be formed out of a plurality of column floor and roof framework units which are adapted to be assembled in the shop or mill and which may be shipped as units ready to be connected together to produce the required structural framework in a comparatively short time. After a framework has been set up similar to the arrangement illustrated in Figure 1, the outer walls of the building may be readily formed by means of pre-cast slabs covered on the outside with stucco, brick veneer, shingles or sidings, while the inner sides of the wall may be provided with insulation and with plaster boards or panels adapted to be covered with paper or canvas coverings or the like. The interior layout of the structure may be planned as desired and may be formed by portable partitions or inner walls adapted to be secured to the metal framework. The outer wall fillings and the partitions, whereby the interior of the structure is divided into rooms to provide the required layout are not provided with the idea of affording supports for the various floors of the building, but are merely provided for the purpose of protection against the weather and for the separation of the required room spaces of the structure. The required strength is all provided in the improved structural metal framework which is of a type adapted to be constructed out of assembled structural units so that a building may be conveniently and readily assembled or constructed in a comparatively short length of time. By assembling the various structural metal units in the shop or mill, the cost of construction is materially reduced and metal sub-structures or frameworks may thus be used in the construction of homes, small buildings, and the like without being beyond the builder's means. The improved structural metal framework construction permits a small building or home to be formed or built, which will not require the continual upkeep repairs that the ordinary type of home or small building requires.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles

of this invention, and it is therefore not the purpose to limit the patent granted hereon otherwise than is necessitated by the scope of the appended claims.

5 I claim as my invention:

1. A structural metal framework comprising a plurality of columns, cantilever floor sections formed thereon including cantilever supports, and main floor units secured to the cantilever floor sections.

2. A structural framework comprising a plurality of rows of columns, cantilever floor sections rigidly secured to said columns with the cantilever floor sections of each row of columns connected one to the other, a plurality of main floor sections rigidly connected adjacent one another and spanning the space between the opposite rows of cantilever floor sections with the ends of the main floor sections rigidly secured to the cantilever floor sections.

3. A structural framework comprising a plurality of column units, including cantilever floor sections and cantilever supports therefor, said column units positioned adjacent one another and connected together in rows, and a floor filler bridging the space between the rows of connected column units and rigidly secured to the cantilever supports of said column units.

4. A structural framework comprising a pair of oppositely positioned columns, cantilever side floor sections rigidly secured to said columns and projecting toward one another, and an intermediate floor unit rigidly connecting said opposite cantilever side floor units.

5. A structural framework comprising a pair of oppositely positioned columns, cantilever members rigidly secured thereto, side floor plates secured on said cantilever members to form side floor sections, and an intermediate floor unit secured between the side floor sections.

6. A structural framework comprising a plurality of oppositely positioned columns, side floor units rigidly secured to said columns with each of said units comprising a plurality of cantilever members secured to the columns, frame members rigidly supported on said cantilever members, side floor plates secured to the cantilever members and the frame members, and intermediate floor units rigidly connected to the oppositely positioned side floor units to bridge the space therebetween.

7. A structural metal framework comprising oppositely positioned columns, a plurality of cantilever members rigidly secured to each of said columns, frame members rigidly connecting the cantilever members of each of said columns, a side floor plate rigidly secured on the cantilever members and the side frame members of each column to form a side cantilever floor unit, an intermediate floor frame rigidly connected to the oppositely positioned cantilever floor units and bridging the space therebetween, reinforcing members provided in said intermediate floor frame, and an intermediate floor plate rigidly

secured on said intermediate floor frame and on said reinforcing members.

8. A structural metal framework comprising a pair of oppositely positioned columns, cantilever side floor units rigidly secured on said columns, and an intermediate main floor unit rigidly connected to the side floor units and spanning the space therebetween, said main floor unit comprising a frame, reinforcing members therein, and a main floor plate rigidly secured to said frame and said reinforcing members.

9. A structural metal framework comprising a pair of oppositely positioned columns, cantilever side floor units rigidly secured to said columns, each of said side floor units comprising a plurality of cantilever beams, frame members rigidly connected together and to said cantilever beams, and a floor plate secured on said cantilever beams and on said frame members.

10. A structural metal framework comprising oppositely positioned rows of columns, cantilever side floor units rigidly secured to said columns with the cantilever side floor units of each row rigidly connected one to another to form a side floor section, and an intermediate floor filler rigidly connecting the oppositely positioned side floor sections to span the space therebetween, said intermediate floor filler comprising a plurality of adjacently positioned rigidly connected floor units staggered with respect to the cantilever side floor units.

11. The combination with a structural metal framework, of a column unit forming a part thereof, and comprising a column member, a plurality of cantilever beams rigidly secured thereto, a plurality of frame members intersecting one another and connected to said cantilever beams, and a floor plate rigidly secured upon said cantilever beams and said frame members.

12. The combination with a structural metal framework, of a column unit forming a part thereof comprising a column member, a plurality of cantilever beams rigidly secured to said column member with the top surfaces of said beams positioned in substantially the same plane, a plurality of frame members rigidly connecting said cantilever beams, and a plate rigidly secured on said cantilever beams and on said frame members to form therewith a cantilever platform.

13. A structural metal framework comprising rows of columns, cantilever side floor units rigidly secured to said columns with the cantilever side floor units of each row of columns abutting one another and rigidly secured together to form a side floor cantilever section, an intermediate floor filler section bridging the space between the side floor cantilever sections and rigidly secured thereto, said intermediate floor filler section comprising a plurality of floor units rigidly connected one to the other with said floor units staggered with respect to the cantilever side floor units on said columns.

HARRY L. DOVELL.

35

70

75

80

85

90

95

100

105

110

115

120

125

130

135

140

145

150