Jan. 10, 1933. H. RIDGWAY 1,893,636

METALLIC HOUSE FRAMING

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Fig. 1.

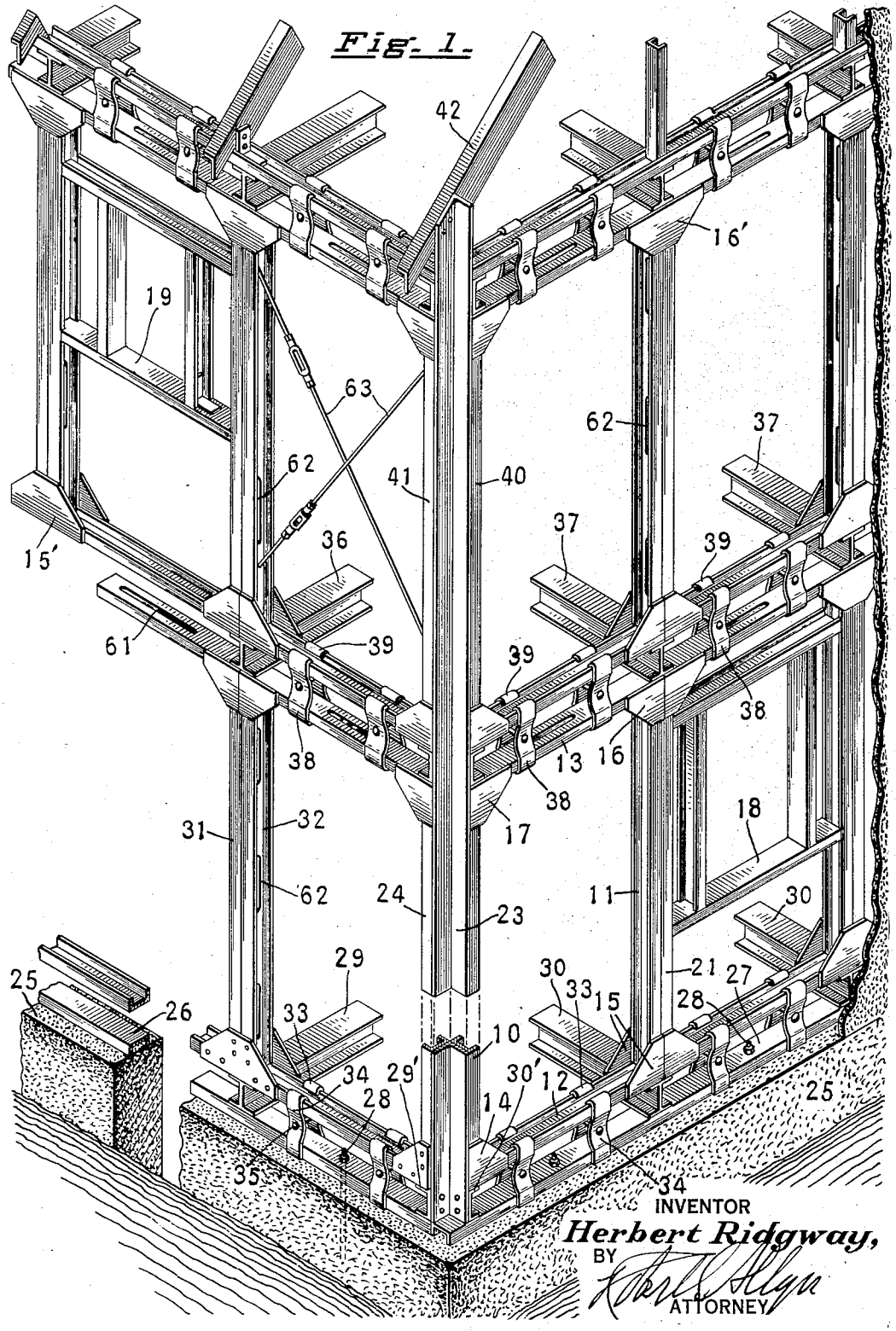

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Fig. 2.

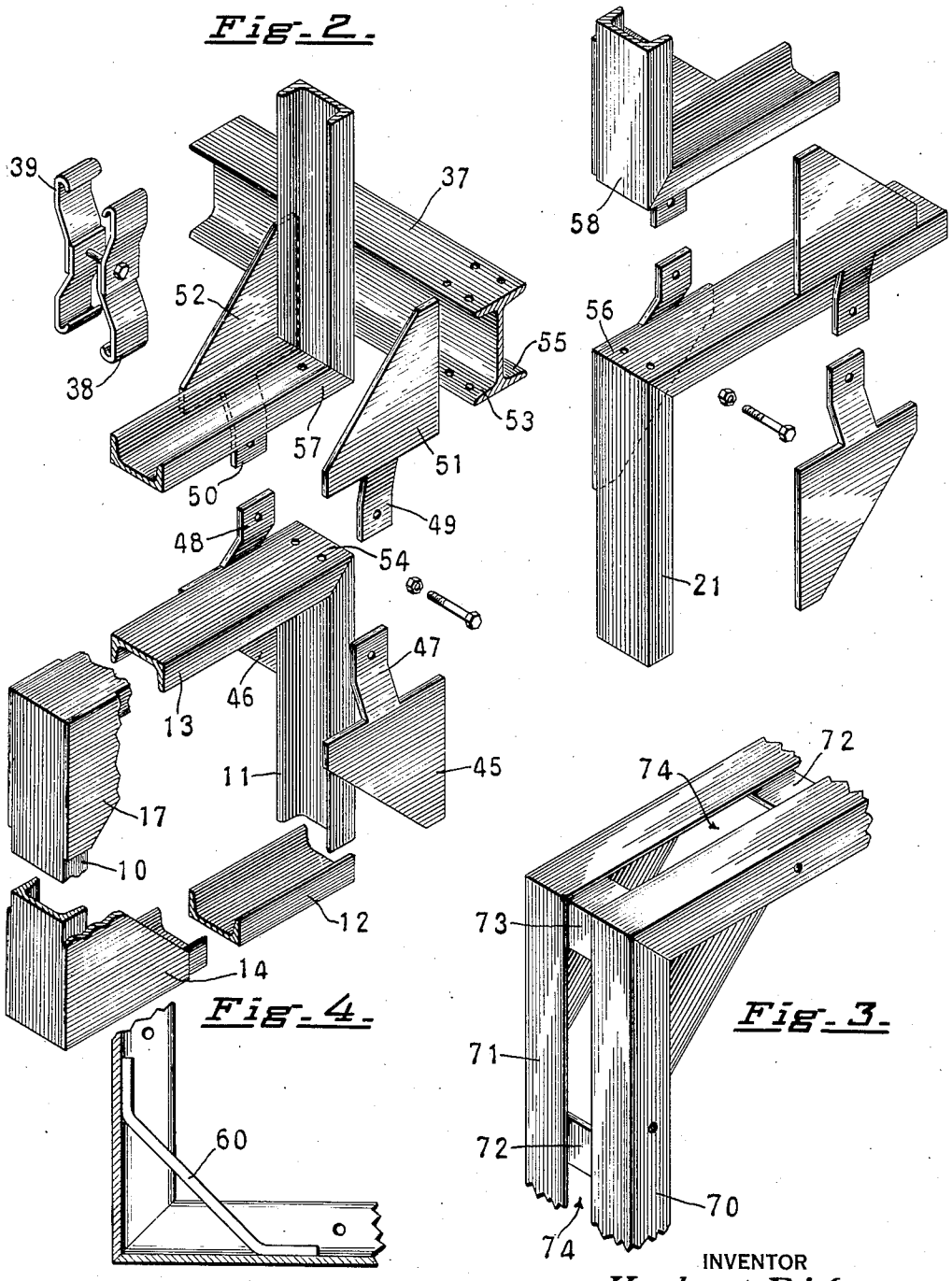

Fig. 4.

Fig. 3.

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Fig. 5.

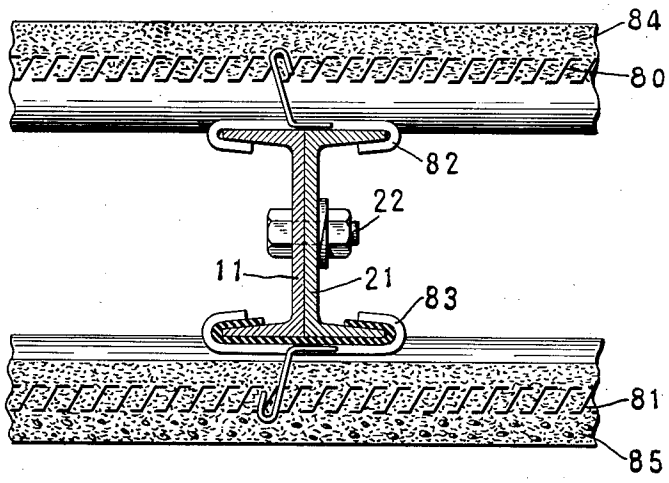


Fig. 6.

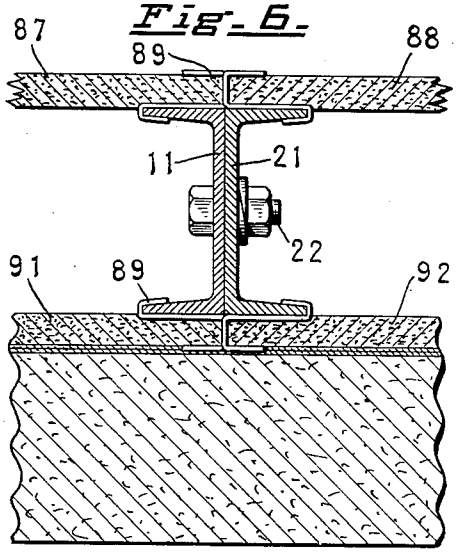
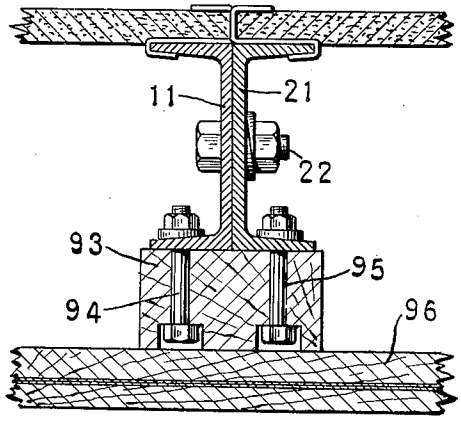


Fig. 7.



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UNITED STATES PATENT OFFICE

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METALLIC HOUSE FRAMING

Application filed April 11, 1931. Serial No. 529,366.

My invention relates particularly to the construction of buildings such as residences from preformed steel frames. The importance of such constructions has been for a long time recognized since a satisfactory solution of the problem would result in economy of construction, freedom from devastating fires, sanitation of a high degree and durability.

I have accordingly sought to produce a construction which can be made up in standard units according to pre-design factory specifications, which units can be easily erected by even moderately skilled labor.

I have also sought to design a construction involving the use of a minimum number of frames and separate pieces.

I have also sought to provide a construction which will afford a maximum strength for a minimum weight of material.

I have also sought to provide a construction which will facilitate the installation of miscellaneous fittings such as wiring, ventilating shafts, heating pipes, etc.

I have also sought to provide a construction which is adapted to readily receive lath, plaster-board and other wall, ceiling and floor members.

In carrying out the invention in its preferred form the invention contemplates the use of a plurality of pre-formed frame units, such units being made up of rolled or formed channel irons. The use and assembly of such units will be found to involve a number of details of construction and attachments for facilitating erection and installation of equipment, the details of which are more fully described hereinafter.

Fig. 1 is a perspective view of one corner of a building showing various features of my invention.

Fig. 2 is an exploded perspective view showing parts for connecting corners of four adjacent frames.

Fig. 3 is a detailed perspective view of a fragment of a corner of a modified construction.

Fig. 4 is a fragmentary detail showing one method of connecting two sides of a frame.

Figs. 5, 6 and 7 are sectional views showing details of construction.

Each framing unit consists of four members, 10, 11, 12 and 13, of channel-like cross section, the ends of the respective sections being connected together to form a rigid rectangle. These corners may be secured together in various ways, as for instance by the gusset plates such as 14, 15, 16 and 17 which may be welded, riveted or bolted to the sides of the channel irons. Adjacent frames may be connected together by means of the gusset plates such as 15′ and 16′ as shown in Fig. 1. It should be understood that these various frames may themselves carry various window and door openings, such for instance as the window frames 18 and 19.

The channels of adjacent frames may be secured together back to back as shown in Fig. 5 where the webs of the channels 11 and 21 are connected by a bolt 22.

The corner frames may be conveniently secured together by an angle iron such as 23, as shown in Fig. 1, having its flanges secured to the channel 10 on the one side and the channel 24 on the other side.

I have shown the construction set up on a foundation wall 25 with sills 26 and 27 which may be secured to the foundation, for instance, by bolts such as 28. Floor joists such as 29 and 30 may be suitably secured to and supported on the sills and in turn these floor joists support the columns made up, for instance, of the channels 11 and 21 and of the channels 31 and 32.

Similar support at the corner column formed by the channels 10 and 24 and the angle iron 23 is afforded by the short channel shaped block 29′ on the sill 26 supporting the load under the channel 24 and the similar block 30′ on the sill 27 supporting the channel 10. Both of these blocks are suitably fastened to the angle iron 23 as well as to the other members with which they are in contact.

The lower edges of the frame units may be tied to the sills by clamps such as 33 and 34, such clips being arranged in pairs and drawn together by bolts such as 35.

An upper story can be superposed on the

lower story as shown in Fig. 1 with floor beams such as 36 and 37 interposed. In this case clips 38 and 39 connect the adjacent channels of the upper and lower frames. This figure also shows how the upper and lower stories may be tied together by the corner iron 23 which is secured not only to the two lower corner frames but to the channels 40 and 41 of the upper frames. In fact, the angle 23 may be extended above the upper frames and directly secured to a rafter 42. It will be understood, of course, that the floor joists 36 and 37 will be bolted, welded or otherwise suitably secured to the lower frames and that the upper frames will be also suitably secured to the flanges of the joists 36 and 37.

In place of the gusset plates such as 16 I might employ connecting gussets such as shown in Fig. 2. In this case gusset plates 45 and 46 are secured to the channels 11 and 13 and provided with extensions 47 and 48 to be secured to similar extensions 49 and 50 depending from the corner plates 51 and 52 of the upper frame.

These extensions space the upper and lower frames sufficiently to receive the end of the floor joist 37 which has one flange 53 adapted to be bolted or otherwise secured to the end 54 of the channel 13. The other flange 55 is similarly adapted to be bolted or otherwise secured to the end 56 of the adjacent frame. The upper flange of the rafter 37 is similarly adapted to be secured to the corners 57 and 58 of the adjoining upper frames.

The adjacent members of a frame may be reinforced by interior tie members such as 60, as shown in Fig. 4, arranged between the flanges of the channels.

This channel-like frame construction lends itself most conveniently to the installation of wiring, piping, etc. since the webs of the channels can be readily perforated as at 61 and 62 in Fig. 1 to provide passageways without seriously weakening the channels. The webs may also be perforated to receive tie rods such as 63. In Fig. 3 I have shown a modified form of framing in which the channels are formed of spaced apart angle irons such as 70 and 71 connected together by ties such as 72 and 73 so that openings 74 between the adjacent flanges are provided.

The channel-like constructions also particularly lend themselves to the support of lath and plaster-board as shown in Figs. 5, 6 and 7 and for the attachment of stucco, brick, tiling, etc. For instance, in Fig. 5, two rib lath sections 80 and 81 are secured on opposite sides of the frames by means of clips 82 and 83 and layers of plaster or cement 84 and 85 are applied.

In Fig. 6 plaster board sections 87 and 88 are united by clips 89 to the channel frame members 11 and 21 and plaster-board of similar facings 91 and 92 are secured on the opposite side. In both these constructions it will be seen that an air space is provided between the opposite walls. The channel-like formation affords a maximum degree of rigidity for a minimum weight of metal.

In Fig. 7 a beam 93 is secured to the adjacent channels by bolts 94 and 95 and wooden paneling 96 may be secured to the beam 93.

In all of these cases it will be seen that the oppositely extending flanges of adjacent channels afford broad bearing and supporting surfaces which readily adapt themselves to the attachment of clips, bolts and other fastening devices so necessary in miscellaneous house construction.

From the foregoing it will be seen that the construction is such that the parts can be predesigned and formed according to factory specifications and readily erected on the job. The spaces between the flanges constitute excellent air insulators and also provide passages for various plumbing, lighting and heating fixtures and attachments. Such constructions when properly erected are extremely durable and proof against hurricanes, earthquakes and vermin. Fire hazards are greatly reduced or eliminated so as to afford lower insurance rates. Since there is very little depreciation in a structure of this character the cost of upkeep is a minimum and the material has a substantial salvage value.

I claim:

1. A steel frame building construction composed of a plurality of frame units, each unit being made up of channel irons with the flanges substantially parallel with the surfaces of the walls and gusset plates having connected extension arms securing the corners of adjacent units together.

2. A steel frame building construction comprising walls disposed at right angles to each other and each made up of a plurality of frame units, each frame unit being formed of channel irons with the channels facing inwardly and the flanges parallel to the planes of the walls, and an upright tie member secured between the webs of the angularly disposed frames and securing them together.

3. A steel frame construction comprising walls arranged at angles to each other and each made up of a plurality of frame units, each frame unit being formed of channel irons with the channels facing inwardly and the flanges parallel to the planes of the walls, and an upright angle iron tie member secured between the webs of the angularly disposed frames.

4. A steel frame building construction comprising walls arranged at right angles to each other and each made up of a plurality of upper and lower frame units, each frame unit being formed of channel irons with the channels facing inwardly and the flanges parallel to the planes of the walls, and an upright tie member secured between the webs

of the angularly disposed frames and also connecting upper and lower units.

5. A steel framing construction for buildings comprising a wall built up of a plurality of frame units, each unit being formed of channel irons with the flanges extending inwardly and the webs facing outwardly, means for spacing the webs of adjacent frames from each other and clips embracing the edges of adjacent channels to tie them together.

6. A steel framing construction comprising a wall built up of a plurality of frame units, each unit being formed of channel irons with the flanges extending inwardly and the webs facing outwardly, pairs of clips embracing the edges of adjacent channels to tie them together, and means for drawing the clips of each pair together.

7. A skeleton steel wall made up of a plurality of rows of frame units with a number of frame units in each row, each frame unit being formed of channel irons with the webs at the outside and perpendicular to the plane of the unit and with the flanges parallel to the plane of the unit, the vertical sides of the frame units constituting studs, each stud comprising the adjacent channel irons of adjacent frame units and the studs of the upper row of units being in alinement with the respective studs of the lower row of units and floor beams having their ends secured to and between the respective lower and upper studs.

HERBERT RIDGWAY.