

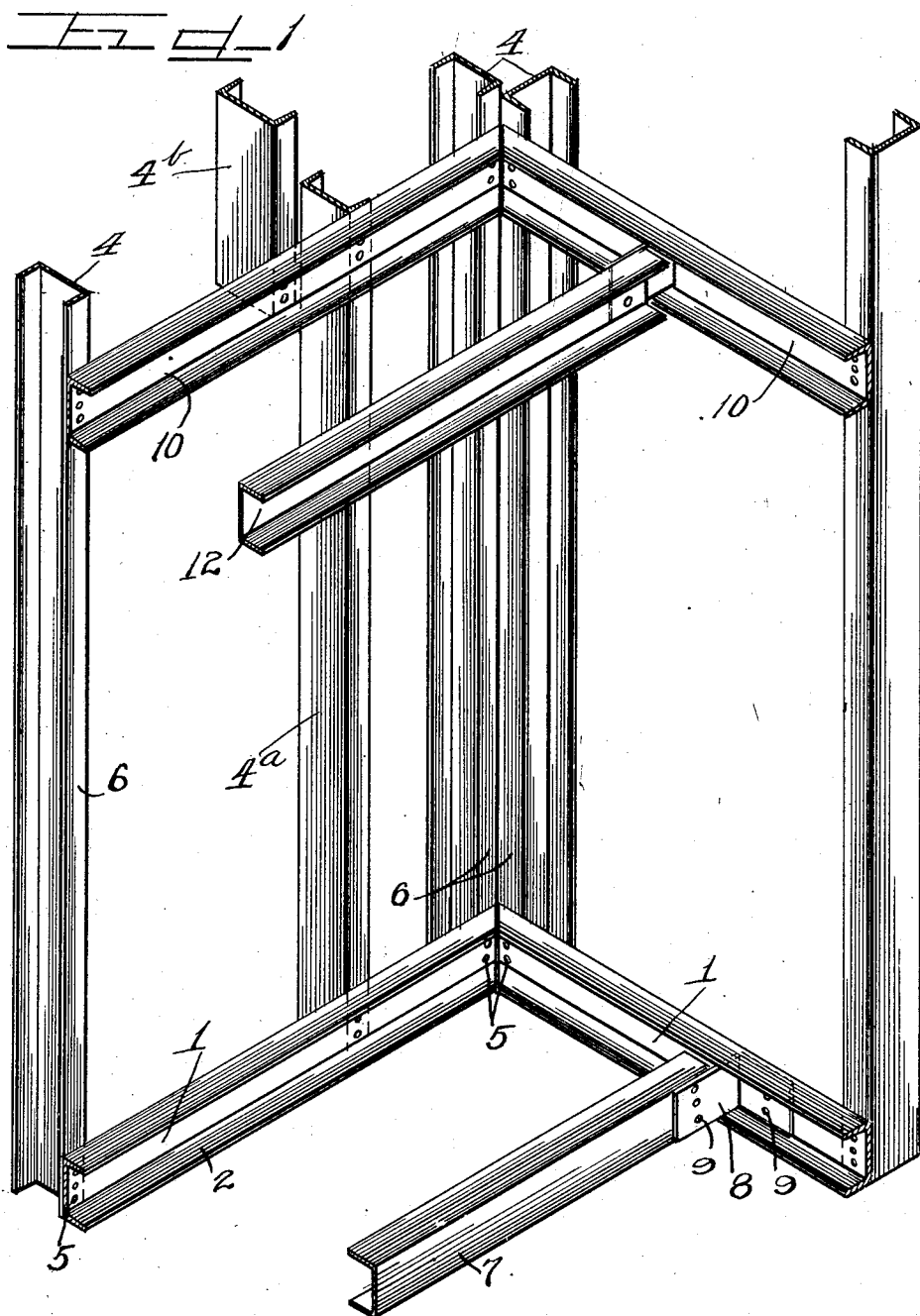
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A. B. PATTERSON
BUILDING CONSTRUCTION

1,857,326

Filed Oct. 18, 1928

3 Sheets-Sheet 1



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May 10, 1932.

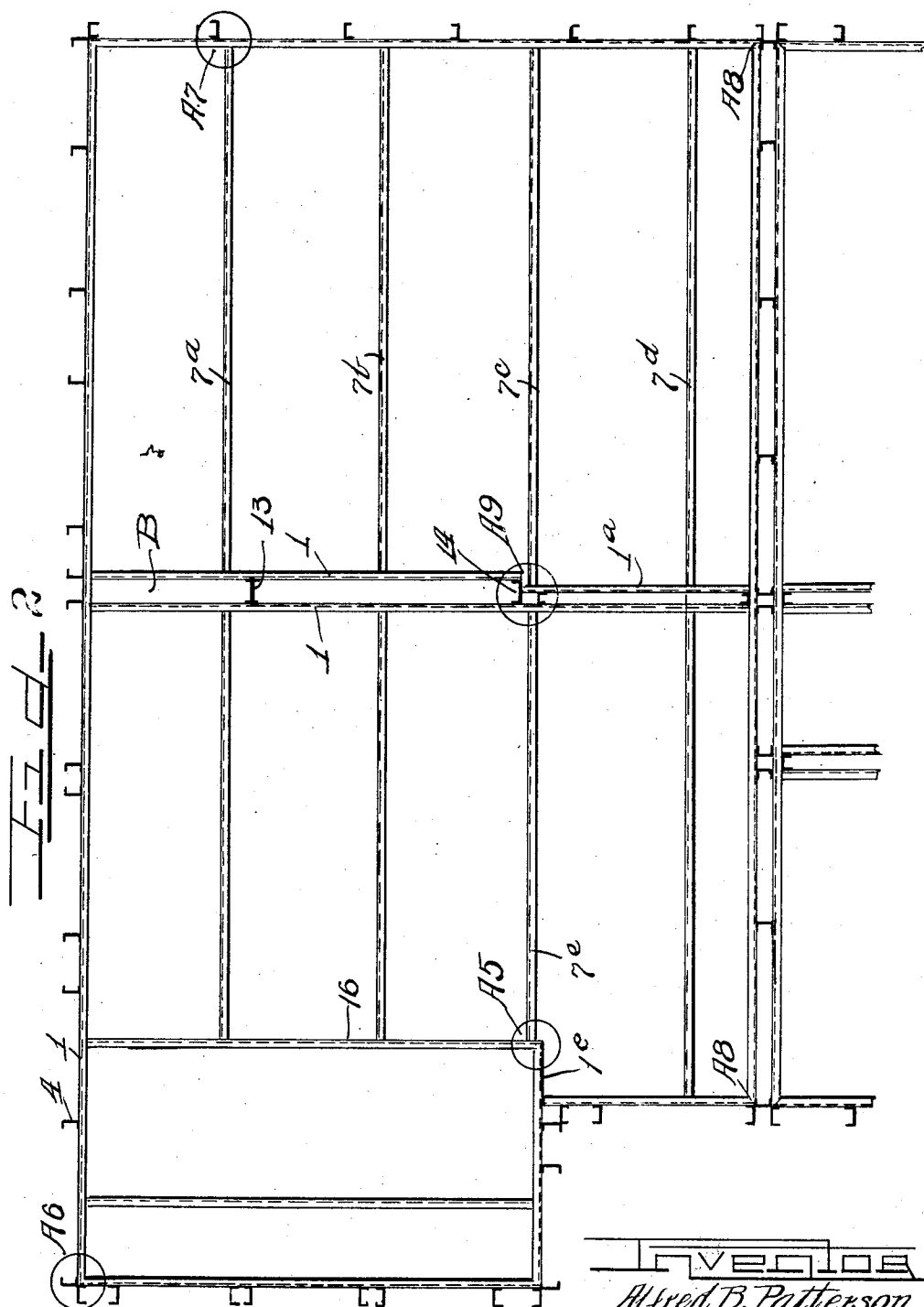
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3 Sheets-Sheet 2



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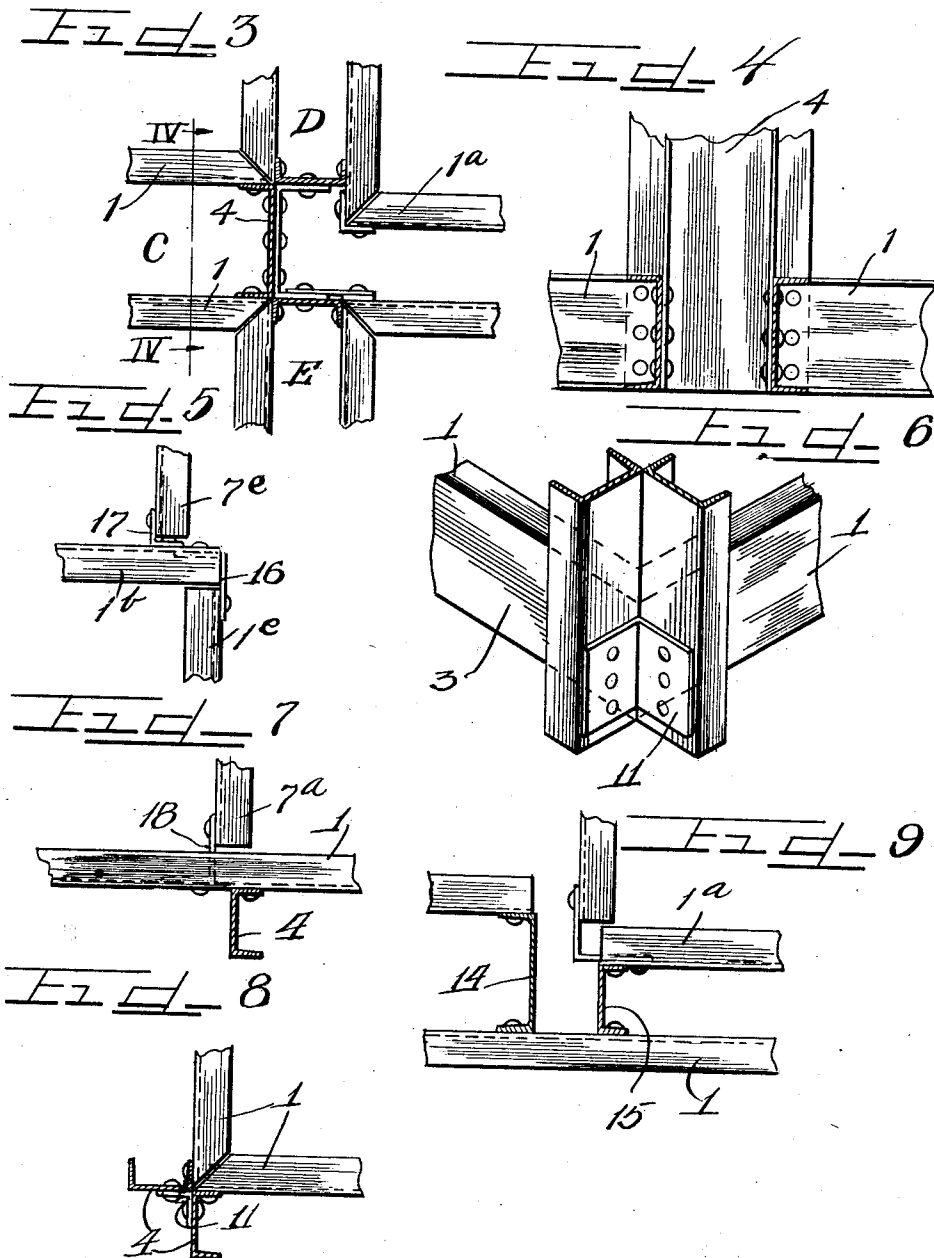
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UNITED STATES PATENT OFFICE

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BUILDING CONSTRUCTION

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This invention relates to building construction, and has particular reference to standardized steel frame construction for residences, farm buildings, small buildings and the like wherein light commercial structural shapes are employed.

This invention has to do with the application and erection of light commercial shapes with a minimum number of fastening elements which shapes are bolted together whereby erection of a steel frame of standard parts may be quickly accomplished and but a few number of different connections are required.

The invention further contemplates a frame structure of light steel commercial shapes including sills, studs and joist arranged so that the load is carried by the sills, studs and joist and not by the joist and studs or columns only. The studs are connected to the sills so that all of the load is transmitted directly to the sills.

The steel frame construction as contemplated by this invention comprises sills arranged on a foundation with studs secured to the sills, plates fastened to the studs for the floors above the first floor, and joists connected to the sills and plates for carrying the intervening load. All of the load therefore is transmitted through the joists to the plates and sills, and eventually to the sills making a very rigid, firm and readily adaptable frame construction for residences and small buildings.

An object of the invention is to provide a steel frame construction for residences and the like comprising sills, studs and joists in which the various members are bolted together.

Another object of the invention is to provide a building construction for residences and the like wherein the frame is constructed of light commercial steel shapes of standardized lengths and punchings.

A further object of the invention is to provide a steel frame construction for residences and the like of light commercial steel shapes wherein sills are employed for carrying the load transmitted to the sills by the joist and studs.

A still further object of the invention is to provide a steel frame construction for residences and the like wherein partition walls are framed in the frame structure thereby relieving the floor and ceiling from all loads.

A still further object of the invention is to provide a steel frame construction for residences and the like wherein partition walls are framed in the frame structure thereby providing a bracing to the side walls of the frame.

A still further object of the invention is to provide a standardized unit steel frame construction for small buildings wherein the sills go all around the room or frame.

A still further object of the invention is to provide unit steel frame construction for residences and the like made of light commercial shapes bolted together.

Another and further object of the invention is to provide a standardized unit steel frame construction for small buildings wherein the whole frame structure is carried by sills.

A yet further object of the invention is to provide a standardized unit steel frame construction for small buildings of light commercial shapes bolted together and with hollow partitions for heating and plumbing pipes, conduits and the like.

Another and yet further object of the invention is to provide a standardized or unit steel frame construction for buildings which is economical to manufacture and erect and whereby a strong and rigid frame structure may be erected in comparatively short time.

The above, other and further objects of the invention will be apparent from the following description, accompanying drawings and appended claims.

One form of the invention is illustrated in the accompanying drawings and the views thereof are as follows:

Figure 1 is a perspective view of a corner of a steel frame constructed in accordance with this invention.

Figure 2 is a partial floor plan for a small house constructed in accordance with this invention.

Figure 3 is a fragmental plan view of cer-

tain details of construction employed where a hollow partition of one width is connected to a hollow partition of a different width.

Figure 4 is a section on line IV—IV of Figure 3.

Figure 5 is a fragmental plan view of the construction of connection at A5 of Figure 2.

Figure 6 is a fragmental perspective view of an outside corner construction as at A6 of Figure 2.

Figure 7 is a fragmental plan view of connection at A7 of Figure 2.

Figure 8 is a fragmental sectional view of the corner construction of A6 of Figure 2.

Figure 9 is a plan view of details of connection at A9 of Figure 2.

The various structural parts are in the accompanying drawings shown as fastened together by rivets. The use of rivets in the drawings is merely for the purpose of convenience in making the drawings as the invention contemplates the use of bolts for fastening together the structural shapes as being quicker and more efficient for the purpose, although rivets may if desired be used.

The characteristic feature of this invention resides in the use of sills 1 which are placed on the foundation with one of the flanges 2 resting on the foundation and the web 3 on the outside and the flanges directed inwardly. Stud 4 of light channel shape are bolted to the webs 3 of the sills 1 by bolts 5 passing through properly punched holes in the webs 3 of the sills and correspondingly punched holes in one of the flanges 6 of the studs. The studs are arranged on the outside of the sills, that is with the flanges 6 of the studs bolted to the webs 3 of the sills.

Punchings in the flanges 6 of the studs 4 are all gauged from the lower ends of the studs so that the second and third floors of the building will be level and even. All of the various commercial shapes employed in the frame construction of this invention are all gauged from the same ends of the shapes so as to provide a standardized unitary construction whereby frame erection may be expedited.

The sills 1 make a frame having an outline which is that of the foundation. The studs 4 are placed at regular intervals about the sills 1 or arranged to permit openings at desired intervals in the sides of building.

Joists 7 of light channel or beam section are fastened to the sills 1 by angle plates 8 and bolts 9. The bolt holes in the angle plates 8 are all gauged properly as are the bolt holes in the joists 7 and the webs 3 of the sills 1. This construction enables erectors to very quickly assemble the frame structure in the proper manner.

The sills which are employed are seven inch channels while the studs 4 are four inch channels. The joists 7 are for the most part seven inch channels or beams although where-

ever occasions demand other size joists may be used.

The sills 1 having been fastened together are then leveled so that the sill structure is perfectly even and level. Consequently the studs 4 attached to the sills will have the punchings in the flanges of said studs in such position that the plates 10 when bolted to the studs 4 for the second floor of the building will be even and level. The plates 10 are bolted to the studs 4 by bolts passing through the webs of the plates and the flanges 6 of the studs in the same manner as the sills are attached. The plates are for the most part of seven inch channel section.

The corner construction of the invention is shown in Figures 1, 6 and 8 and is as follows: The webs 3 of the sills 1 are punched as are the flanges 6 of the corner studs and the bolts 5 fasten the studs to the sills at the corner as shown in Figures 1, 6, and 8. An angle plate 11 is bolted to the outsides of the webs of the corner studs 4 thus making a rigid construction at the corners of the building.

Figure 1 shows a first floor joist 7 and a second floor joist 12 which are out of vertical alignment. Wherever the partitions for the second and subsequent floors are out of alignment with the partitions for the first floor then suitable joists are inserted for directly supporting the partition walls of the several floors. The studs 4 extend from the sills 1 up to the upper plates of the building to which upper plates the roof structure is fastened. It may so happen that in the second or third story of a building different sized openings are desired than in the first floor in which event certain of the studs say 4a in the Figure 1 have the upper ends cut off flush with the upper flange of the plate 10 and a second floor stud 4b is attached to the plate 10 and rises to the plate or plates of subsequent floors.

Figure 2 is a partial floor plan of the first floor steel construction of a frame constructed in accordance with this invention. The plan is somewhat schematic in form but nevertheless illustrates several features of the invention. It will be observed that all of the studs 4 as before stated are attached to the outsides of the sills 1 so that when the outer finishing material such as wood, metal, laths, wall-board or the like is attached air spaces will be formed between the outer finish and the inner finish which is secured inwardly of the walls formed by the studs 4. These air spaces serve a double purpose in that the same aid in protecting the interior of the house from climatic changes and also as means for receiving the conduits for the electric wires and perhaps heating and/or plumbing pipes.

It has been found that in erecting buildings embodying the construction of this invention where plumbing is used or hot air flues are employed a hollow partition of seven-

inches is required for the cast iron soil pipes. Figure 2 shows a hollow partition B which extends from the first floor of the frame structure up as high as the soil pipes or heating flues are carried. The partition B in Figure 2 is formed by sills 1 extending transversely of the building and spaced by vertically disposed channels of seven inches in width as shown at 13 and 14.

Figure 9 shows the connection of the various structural elements to form the connection designated A9 in Figure 2. It will be observed that one of the sills 1 extends from side to side of the frame structure whereas the other one terminates at the stud 14. The stud 14 being a seven inch stud naturally spaces the two sills seven inches apart thus forming a hollow partition or wall of seven inches in width. A four inch stud 15 is bolted to the transversely extending sill 1 and also to the sill 1a completing the transverse sill construction at this part of the building.

Joists in Figure 2 are designated at 7a, 7b, 7c and 7d. The several joists are connected to the sills in the manner heretofore described that is by use of angle plates 8 bolted by bolts 9 to the joists 7 and the sills 1.

Figure 5 is a fragmental plan view of the joint made at A5 in Figure 2 where a sill 1e extends inwardly to meet a headed joist 1b which headed joist and sills are connected by an angle plate 16 shown in Figure 5. A joist 7e is attached to headed joist 1b by an angle plate 17 bolted to the sill and to the joist.

Figure 7 shows the construction at point A7 of Figure 2 wherein the joist 7a is fastened to an end sill 1. Here an angle plate 18 is employed which plate is reversed as to position from that shown in Figure 5 and is bolted to the joist and to the sill.

Figure 3 is a fragmental plan view of a connection where a seven inch hollow wall C is connected to hollow walls D and E of four inches in width. It is believed that the construction of the parts is obvious having in mind the description heretofore made of some of the other connections employed in the steel construction of this invention.

The partitions formed by the arrangement of the studs as hereindescribed serve as braces for the side walls of the structure thereby adding to the rigidity of the same.

The interior finish which may be readily applied to the studs of a frame construction in accordance with this invention may be of any sort such as lath, metal lath, wallboard, or the like.

All of the structural parts entering into a frame construction for a building are as before stated cut to proper lengths and the bolt holes are punched in accordance with gauges measured from the same ends of the several parts. This assures proper fit of all of the parts and also a level construction of the second and subsequent floors of the building.

It will be observed that by the construction of this invention everything is anchored to the sills so that when the sills are leveled the whole structure is level and even. The studs being fastened to the sills makes a rigid structure preventing movement of the building in the wind and prevents uneven settling. It will be observed that the studs are bolted to the webs of the sills and plates by bolts passing through the flanges of the studs. It is believed that this manner of fastening the studs to the sills and plates has never heretofore been applied. It has been found that such structure provides a very rigid, secure and strong frame. The construction of this invention also very readily lends itself to arrangement of rooms, halls, partitions and the like as the parts used are of standard commercial shapes, light in weight and very readily laid out to accommodate the several parts to any type, kind and arrangement of building as desired. It will further be observed that employing sills the whole structure is carried on the foundation without the use of supporting posts in the basement. This feature is an added advantage in that it leaves the basement free of all posts thus enabling the arrangement of the basement as desired.

As before stated Figure 1 is somewhat schematic in form. Should it so happen that the partitions in the second floor were not in alignment with the partitions in the first floor plan such as that shown in Figure 2 then intermediate studs and sills would be employed to carry the partitions for the second floor. It is believed that such arrangement is obvious from the description and accompanying drawings and will be readily apparent to one skilled in the art.

The load is carried on the frame structure of this invention in the same manner as it is carried in wood frame structures that is the studs are attached to the sills and plates and the joists are fastened to the plates and sills.

It is believed that fastening the studs to the webs of the sills makes a stronger construction than if the studs were placed endwise on the upper flanges of the sills and bolted thereto by angle plates.

The gist of the invention resides in the use of sills and plates fastening the studs to the webs of the sills and plates and fastening the joists to the sills and plates. This construction ties together all of the structural parts providing a rigid and secure frame construction.

It is noted that all of the structural parts employed in this frame construction comprise channel members of four and seven inches in width so that a fabricator need carry in stock channels of only the two widths together with the necessary angle plates whereby the same may be readily and quickly fabricated after receiving the plans of a building.

The fastening of the flanges of the studs against webs of the sills and plates provides greater surface contact between these members than if fastened by flange to flange, resulting in a more rigid construction of frame.

While details of the invention have been described more or less precisely, it is to be understood that changes may be made in the arrangement and proportion of parts and that equivalents and materials of other sizes may be substituted, all without departing from the spirit and scope of this invention.

I claim as my invention:

1. A steel frame corner construction for a frame of the character herein described including channel sill members arranged edge-wise and with the webs of the sill members outermost, the meeting edges of the flanges of said sills being mitered, a stud arranged with one of its flanges in contact with the web of one of said sills at the end thereof and bolted to the web of said sill by bolts passing through said web and the contacting flange of said stud, a second stud arranged with one of its flanges in contact with the web of the other sill at said corner and bolted to the web of said sill by bolts passing through the contacting flange of said second stud and the web of said second sill, the studs being arranged with the flanges thereof directed away from the angle formed by the webs of said studs, and an angle plate bolted to the webs of said studs in the angle opposite to the angle formed by the meeting ends of the sills.

2. A steel frame corner construction including channel sill members arranged edge-wise with the flanges thereof mitered—a stud bolted to the web of one sill member and a stud bolted to the web of the other sill with the flanges of said studs directed away from the corner, and angle plates bolted to said studs to hold same together.

In testimony whereof I have hereunto subscribed my name at Tulsa, Tulsa County, Oklahoma.

ALFRED B. PATTERSON.