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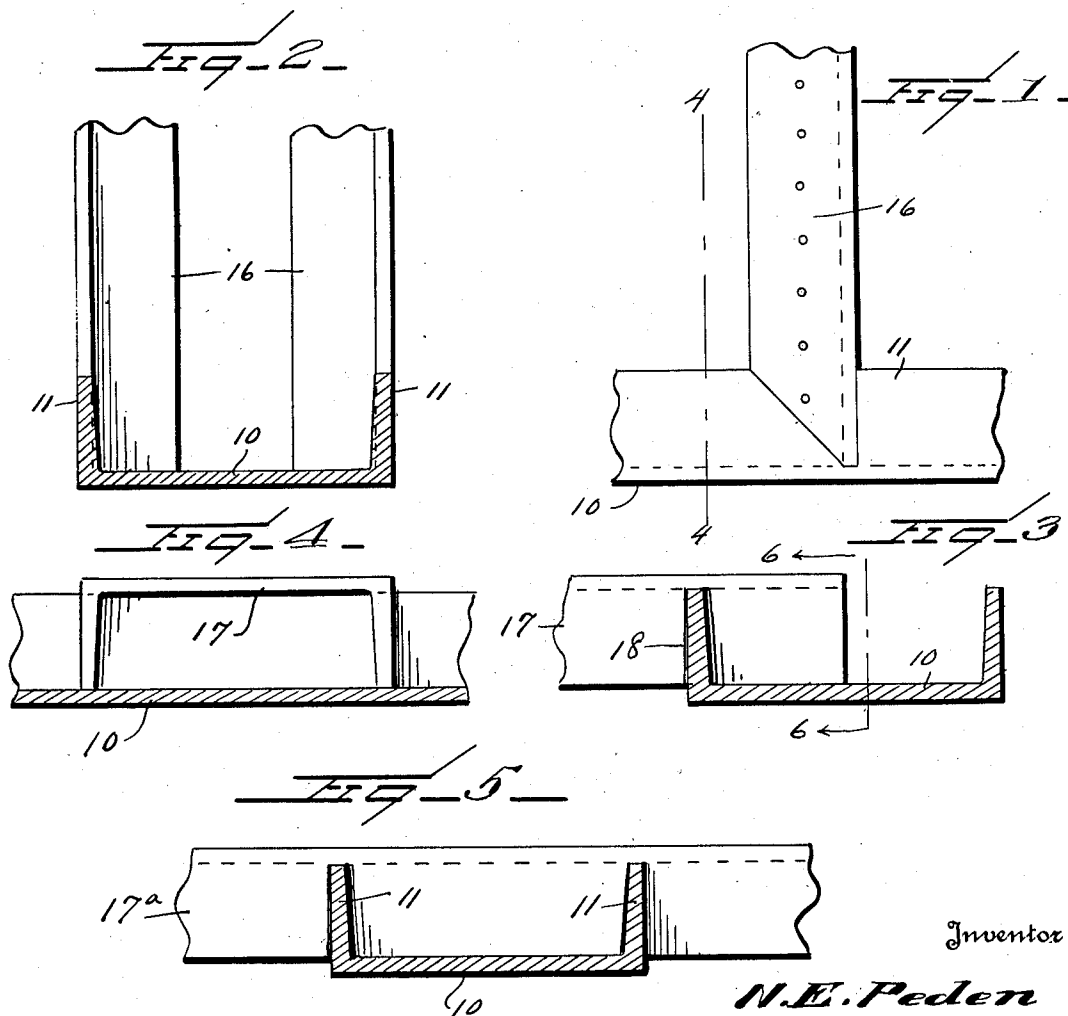
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1,819,970

BUILDING CONSTRUCTION

Filed Jan. 21, 1929

2 Sheets-Sheet 1



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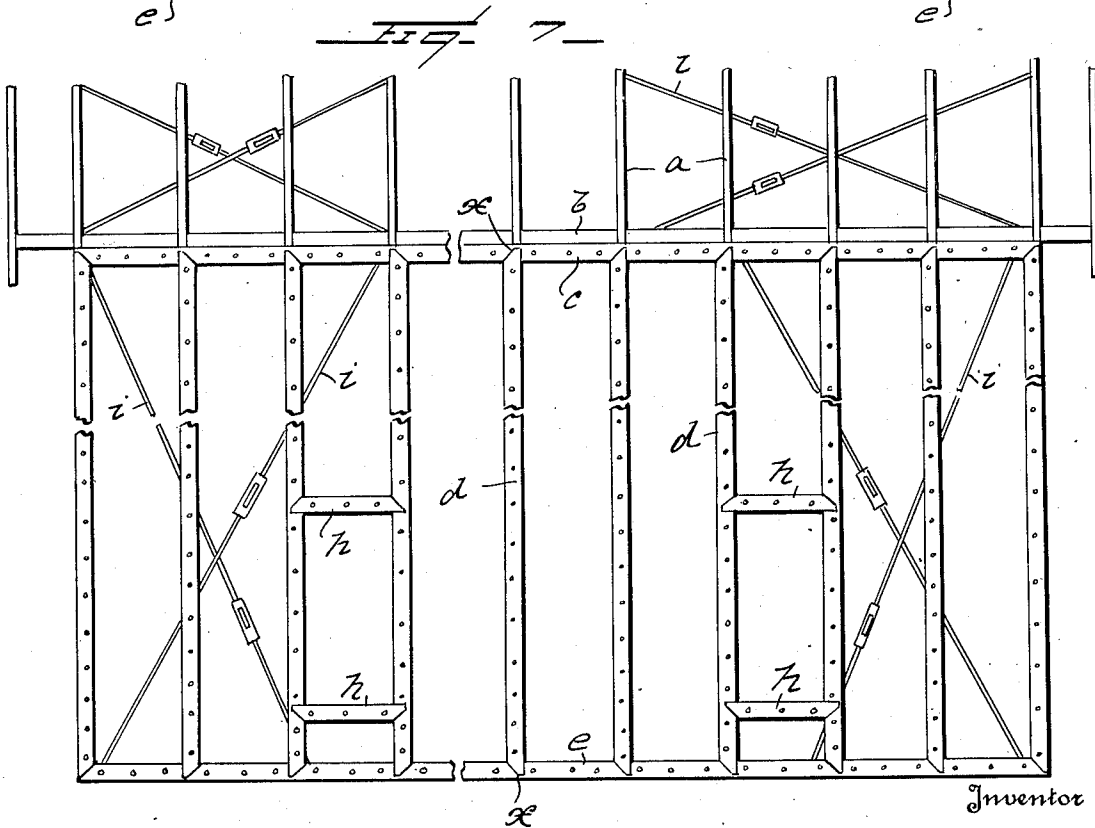
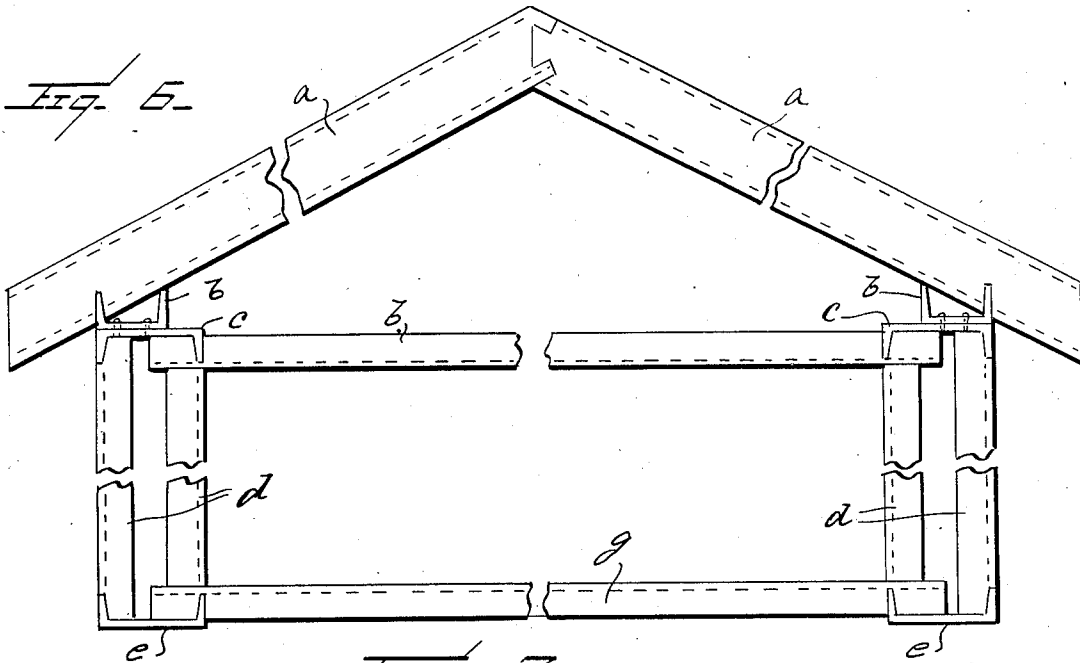
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UNITED STATES PATENT OFFICE

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BUILDING CONSTRUCTION

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Steel as a building material is particularly desirable for use in modern structural work but the expensive methods of fabrication, joining and erecting make steel framing for residences almost prohibitive. Structural steel as at present used must be cut and fitted in the shop and shipped to the place where it is to be used. The structural elements must then be engaged with each other by means of riveted plates, gussets, brackets and the like and the structure when completed is a structure wherein the elements are riveted to each other or engaged with each other through the intermediation of rivets and as a consequence the structure is only as strong as the rivets themselves at many places. These rivets are subjected to a very great shearing stress and unless the rivets are properly placed and properly driven home and overturned and a sufficiency of rivets are employed, the structure will be weak.

The general object of my invention is to provide a system of building the metallic frames of buildings such that the channel irons, angle irons and T-iron elements necessary to erect an all-steel frame may be delivered to the working point and there the steel elements be fabricated by means of an oxyacetylene cutting flame, welding equipment and the commonest tools, the elements of the frame after being cut by the oxyacetylene flame being welded to each other to form sections, the sections being then erected by means of an ordinary block, tackle and "gin" pole and then the sections welded together, thus forming a complete welded structure without the employment of a single bolt, clip, gusset or rivet.

A further object is to so form the joints between the structural elements that they are of the simplest possible character and to so form the joints that either a full interlocking engagement is secured between the elements or a semi-interlocking engagement is secured so that one member cannot be sheared from another and so that the stability of the structure is not dependent merely upon a welded joint, nor upon the interlocking of the elements, but upon the weld and the interlocking joint of the elements.

A further object is to provide a system for framing and a means of joining the elements of the frame which will secure economy of the amount of steel necessary to erect a frame, economy in the amount of labor necessary to fabricate, join and erect the frame, and economy in the charges for transportation.

A further object in this connection is to provide a method of connecting or joining two or more structural elements which will provide a solid steel structure without collars, elbows, seams or joints, that is, open joints, these being the places that chip and flake and wherein corrosion does it utmost and which is not dependent upon clips, bolts, rivets and gusset plates to join and hold the separate elements and within which the strength of the several members is not impaired, thus adding strength and life to the structure.

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

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

Figure 1 is a side elevation of a sill and studding joined in accordance with my invention;

Figure 2 is a section on the line 4—4 of Figure 1;

Figure 3 is a section through a sill showing the manner in which the floor joists are engaged therewith;

Figure 4 is a section on the line 4—4 of Figure 3;

Figure 5 is a section through a sill showing the transverse joist engaging both flanges of the sill and welded thereto;

Figure 6 is a front elevation of a building frame showing elements connected;

Figure 7 is a side elevation of the frame of the building showing the elements connected.

In the drawings, I have illustrated a building structure of a more or less simple character such as an ordinary dwelling house, garage or the like.

In Figures 1 and 2, I have shown a construction in which a channel iron 10 supports two angle irons 16. One flange of the angle iron 16 is cut away at an angle which extends

to the web of the angle iron and the channel iron 10 is cut away as at 14 so that the flanges of these two angle irons 16 will fit within these cut away portions 14 of the channel iron 10. These elements 10 and 16 are welded at all their points of contact. These elements 16 are also perforated at intervals as previously stated. These angle irons may act as studding and the angle irons 16 are to be placed one on each side of the channel iron, leaving space for wiring, plumbing and bracing.

It is to be understood that while I have illustrated in these figures a construction wherein the member 10 is a sill, yet by inverting the structure shown in these figures, the sill becomes a "plate" supported upon the studding. Therefore, it will be seen that the connection of the sill to the studding is precisely the same as the connection of the plate to the studding.

In Figures 3 and 4, I have illustrated the manner in which a floor joist or ceiling joist may be connected to the sills 10 of channel irons. In this case the floor joist or ceiling joist which is designated 17 is channel-shaped in cross section, one flange and web of the channel iron 17 being cut away as at 18 to fit over one of the flanges 11 of the channel iron sill 10, this cut 18 being of sufficient depth as to permit the face of the flange to rest firmly down upon the web of the channel iron 10 and these two elements are welded to each other along all points of contact. This joint will lock the two sills disposed at opposite ends of the floor joist together, or in inverted position will lock the two plates together. Where the joist 17^a crosses an inside or partition sill, the flanges of the elements 17 would be cut away to engage both flanges of the channel iron 10 and be welded thereto and thus the floor joist being engaged with the interior sill or sills and with the outer sills would lock the entire structure together from spreading. (See Fig. 5.)

In Figure 6, I show an elevation of the frame of a structure which illustrates the application of my invention. The plate is shown as formed of two channel irons *b* and *c* but it is to be understood that an I beam which, of course, has a double channel form may be used in place of the two riveted or otherwise joined channel irons *b* and *c* to constitute the plate. The plate is shown as supported upon the upper ends of the angle iron joists *d* which in turn are supported upon the sills *e*, these sills supporting the floor beams *g*. The ceiling beams *b* might be supported by resting upon the plate, but as shown, these members *b* are connected to the channels *c* in the same manner that the floor beams *g* are connected to the channels *e*. The reflectors *a* of the channel iron are notched through the lower flange and through a portion of the web to receive the upwardly extending out-

side flange of the channel iron *b*. The upper ends of the reflectors are connected to each other by an interlocking joint and weld which forms no part of my present invention.

This is precisely the same construction as regards the engagement by the studding with the sills as is shown in Figures 1 and 2 and as regards the connection of the floor and the ceiling joists with the sills and plate as is shown in Figure 4.

In Figure 7 I illustrate the side elevation of a structure showing the manner in which my invention may be used in the construction of a simple house frame. In this case *e* designates the sill, *c* the plate, *b* the auxiliary plate, *a* the rafters, *d* the angle irons or channel irons forming the studding and *h* transverse members forming the sills of the windows and doors and engaged in or welded to the flanges of the studding by means shown in Figure 3 and heretofore described. Preferably the structure will be held against strains by tie-rods or wind braces *i* which may be disposed in any suitable relation to the building. Where the structure is to be made up of sections, the elements of which are joined to each other and then a section erected and joined to the next adjacent section, the adjacent ends of the two sections will be disposed as at *x* in Figure 7 and the member *d* will be inserted after the two sections have been brought together and welded at the joint *x* between the two sections.

It will be understood that in Figures 3 and 4, and Figure 6, that the members 10 and 17 and the beams *b* and *c* in Figure 6 might be either standard channel iron or standard I-beams. It is also to be understood that the plate which in Figure 4 is formed of the two members *b* and *c* might be formed of an I-beam or double channel. It will be seen that the joints which I have illustrated are applicable to any of the standard forms of sill, can be employed at any angle, that they are simply and easily cut and by welding need not be accurately fitted and in fact inasmuch as they are to be welded, they should not be close fitting. The cuts may be readily made by means of an oxyacetylene burner and the welding may be easily accomplished at the place where the building is to be erected. None of the joints described depend upon the weld alone for their holding strength, the welds being employed to add strength and hold the sections in place.

I claim:—

1. A metallic building structure including a structural element having lateral flanges, spaced angle irons, each having one flange abutting against the web of said element and the other flange abutting against a flange of said element, one of the abutting flanges being cut away to receive the flange of the other element, the abutting ends and flanges of the angle irons being welded to said ele-

ment and a third building element extending in a plane parallel to the plane of the first named element but at right angles to the first named element and comprising a channel iron having one of its flanges and a portion of the web cut away to receive the marginal flange of the first named element, said channel iron extending across between the flanges of the first named element and resting against the web thereof abutting against the opposite flange and being welded thereto throughout its entire extent of contact.

2. A metallic building structure including a sill formed of a channel iron having upwardly extending flanges, a plate parallel to the sill and having downwardly extending flanges and studs of angle iron, each having one of its flanges extending parallel to and intersecting a flange of the plate and sill, the flanges of the plate and sill and the parallel flanges of the angle irons being one cut away to receive the other, the plate and sill being welded to the angle iron studs through their entire area of contact.

3. In a metallic building structure, a channel-shaped sill having upwardly extending flanges, studding of angle iron having their lower ends abutted against the web of the sill, the outer flanges of the studding being abutted against the flanges of the sill, the angle irons and the sill being welded to each other along their entire area of contact, a plate having upwardly and downwardly extending flanges, the angle iron studding abutting at their upper ends against the web of the plate, the outer flanges of the studding being in alinement with the depending marginal flanges of the plate and the studding being welded to the plate throughout its entire area of contact, a ceiling joist of channel iron having one flange and a web notched to receive one of the flanges of the channel iron plate, the edge face of the ceiling joist resting against the web of the plate, the ceiling joist being welded to the plate throughout its entire area of contact, and a rafter of channel iron extending upward through the plate at an angle thereto, the rafter being notched through its lower flange and a portion of the web to receive the upwardly extending outer flange of the plate, the rafter and plate being welded to each other throughout their entire extent of contact.

4. In a metallic building structure of the character described, a building element extending horizontally and having vertically disposed flanges, and a horizontally disposed joist extending at right angles to the first named element, notched to receive one of the flanges of the first named element and to bear against the web of the first named element, the contacting portions of the joist and element being welded to each other throughout their entire extent.

5. In a metallic building structure, a structural element having lateral flanges, spaced angle irons each having one flange abutting against the web of the element and the other flange abutting against a flange of said element, one of the abutting flanges being cut away to receive the flange of the other element whereby the angle iron is supported upon said cut away flange and upon the web of the first named element, the abutting ends and flanges of the building element being welded to said element.

In testimony whereof I hereunto affix my signature.

NORMAN E. PEDEN.