

May 16, 1933.

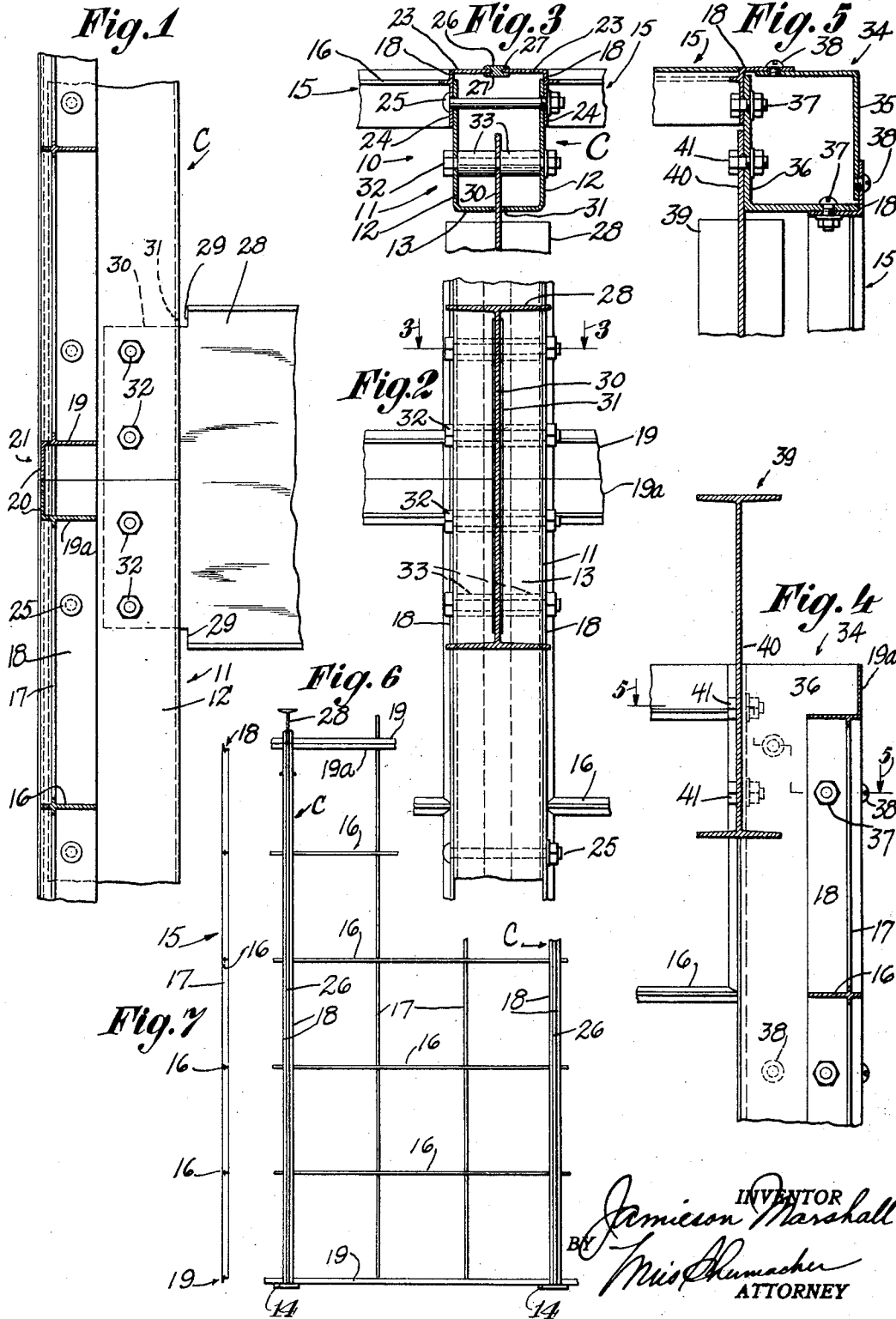
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1,909,877

UNIT STEEL FRAMING

Filed March 14, 1932

3 Sheets-Sheet 1



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Fig. 8

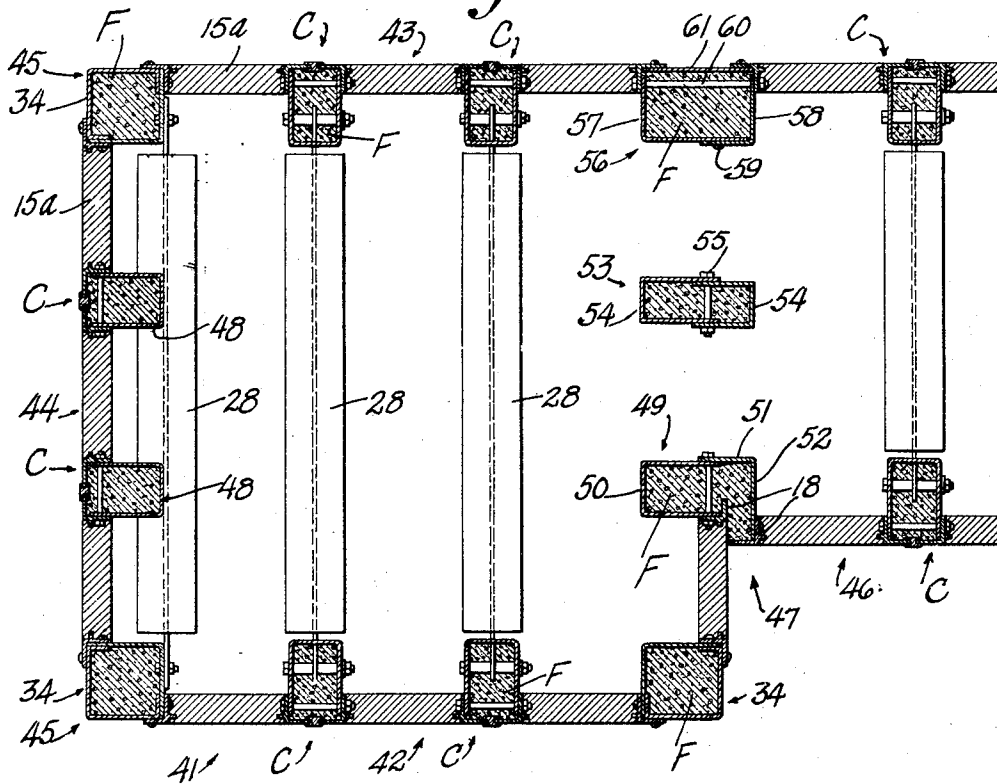


Fig. 9

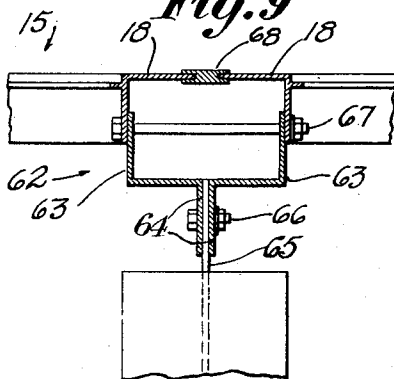
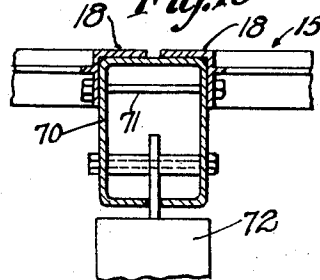


Fig. 10



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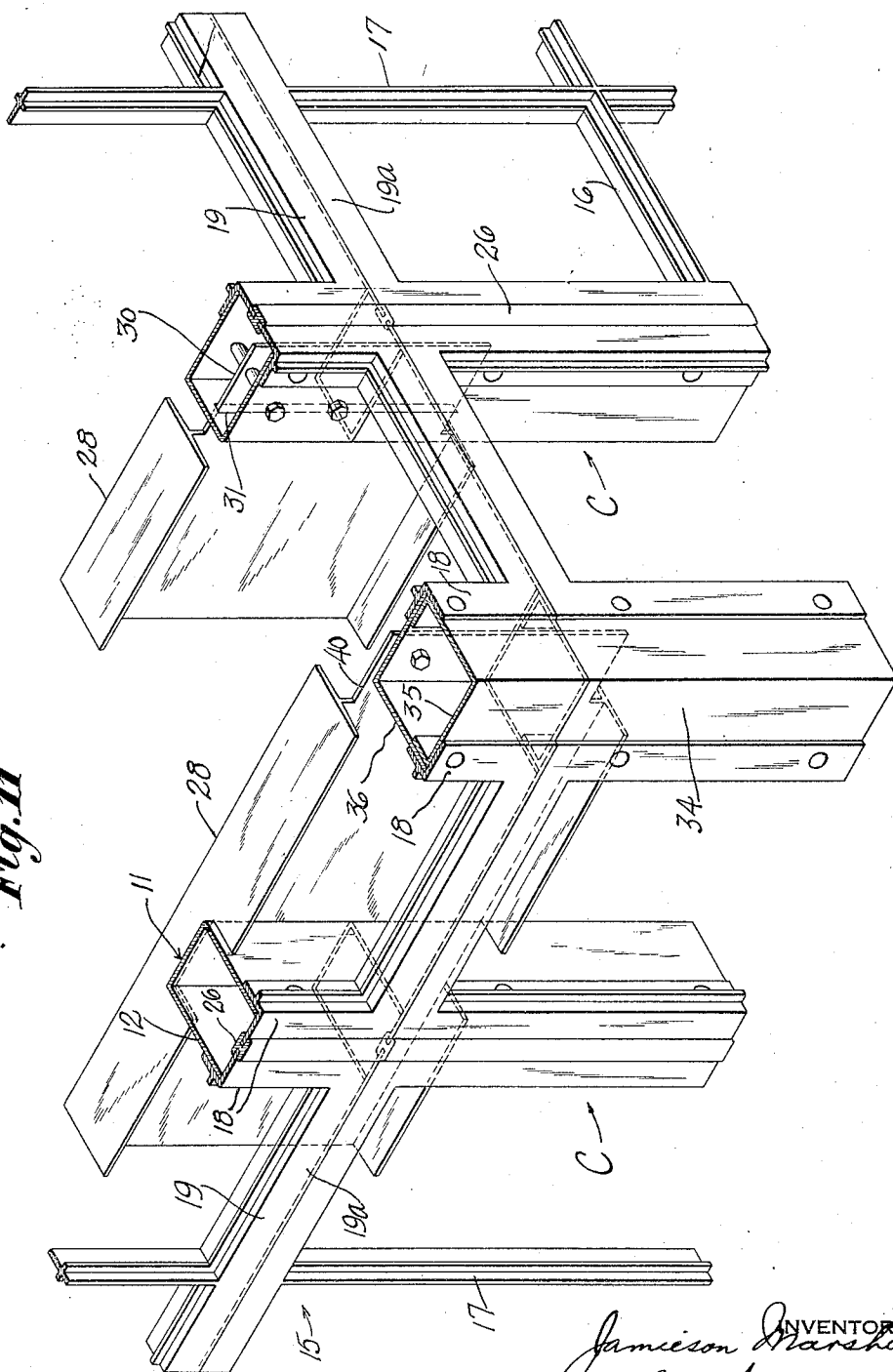
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Fig. 11



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UNIT STEEL FRAMING

Application filed March 14, 1932. Serial No. 598,687.

This invention relates to structural steel devices and frames, and methods of making the same.

One object of this invention is to provide a device of the nature set forth having preformed sections such as sashes and co-operating upright elements to which the sashes are connected in improved relation to form complete columns therewith supporting the sashes and other members or bodies that may be associated with the columns thus produced; and another object of the invention is the provision of a device of the character described wherein simple structural forms may be used, or standard structural elements, so combined in an improved manner as to produce a strong framework having efficient columns that are inexpensive to obtain.

Another object of the invention is to furnish a framework for houses and the like, having preformed sashes completing a columnar structure that may include improved corner shapes and/or beams coordinated therewith in any improved manner.

Another object of the invention is to provide an improved method of constructing a metal frame for houses and the like, whereby certain completed sections are utilized for completing other frame parts to which they are connected, so that a light, strong frame is produced in a quick, simplified and inexpensive manner.

Another object of the invention is to provide a structural frame for a house having sashes associated with columns in an improved manner so as to cross brace the columns.

A further object of the invention is the provision of a device of the type mentioned having relatively few and simple parts, and which is inexpensive to manufacture and assemble, and durable, reliable, and efficient in use.

Other objects of the invention and advantages thereof will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention consists in the novel combinations and arrangements of parts hereinafter described in their preferred embodiments,

pointed out in the subjoined claims, and illustrated on the annexed drawings, wherein like parts are designated by the same reference characters throughout the several views.

In the drawings:

Figure 1 is a fragmentary view in side elevation with parts in section showing a device embodying the invention.

Fig. 2 is a similar view taken at right angles to Fig. 1.

Fig. 3 is a horizontal sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is a fragmentary view in elevation with parts in section showing a corner column and connections therewith.

Fig. 5 is a horizontal sectional view taken on the broken line 5—5 of Fig. 4.

Fig. 6 is a fragmentary diagrammatic front view in elevation showing a frame including sash, beam, and columns.

Fig. 7 is a diagrammatic view in vertical cross section of a sash corresponding to that of Fig. 6.

Fig. 8 is a fragmentary horizontal sectional view of a house embodying the invention.

Fig. 9 is a fragmentary cross sectional view of a structure including a modified column.

Fig. 10 is a horizontal cross sectional view of a modified form of the invention showing a different column.

Fig. 11 is an isometric view of the invention.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined in one and the same structure, but, useful devices may be produced embodying less than the whole.

It will be obvious to those skilled in the art to which this invention appertains, that the same may be incorporated in several different constructions. The accompanying drawings, therefore, are submitted merely as showing the preferred exemplification of the invention.

Generally described, this invention provides an improved structural frame including vertical elements to which sashes having angles are connected to form complete

columns with the frame elements. These columns are efficient and reliable and adapted to carry the desired loads. The vertical elements may be standard or may be formed of bent plates, while the sashes may be standard, and, at any rate, are preformed and shipped complete where they are directly connected in place for rapidly completing the frame. By forming columns of substantially closed cross section, ample strength in every direction is afforded, and in this invention, the several parts so co-operate as to produce such columns. Through bolts may be employed for joining the column parts, and spacers may be used for the flanges of bent plate channels, or between the flanges of sash angles, or for cooperation with the webs of beams that may extend into the columns through suitable slots or openings. The sash angles may be joined as by a strip member or a soft metal came to permit the column to be poured full of concrete or the like. Other details in the construction and method of the invention will be particularly referred to hereinafter, including the re-enforcing bracing interaction between columns and sashes.

Referring in detail to the drawings, 10 denotes a device embodying the invention. The same may include a channel 11 which may be bent out of a suitable plate, this channel preferably having flanges 12 of greater depth than the web 13 thereof. These channels may be of suitable length and extend, for instance, in sections of the height of one story each for the building. The lowermost section may be sunk into a foundation so as to rest on a plate 14 therein. The channels are spaced apart as may be feasible along the lines intended for the walls of the building.

For completing the channels into column form, sashes 15 of any conventional form may be used, the columns being so spaced that the sashes may be connected thereto. Each sash may consist of a rectangular frame having transverse horizontal and vertical muntins 16, 17 respectively. At the opposite side edges of the sill, jamb angles 18 are provided, while at the top and bottom of the sash are provided sill and head angles 19, 19a respectively. These different angles may be interconnected with each other and with the muntins in any suitable manner. In every case, it will be noted that the head and sill angles have flanges such as 20 that extend outward of the sash so that a head angle of one sash may cooperate with a sill angle of the next upper sash to form a horizontal channel 21. Also the jamb angles of the sashes have flanges 22 extending outwardly, so that these flanges of adjacent sashes extend toward each other.

The jamb angles of the sashes cooperate with the vertical channels 11 in a novel manner to form the latter into columns of sub-

stantially closed cross section. For example, the other flanges 24 of the jamb angles lie snug against the edge portions of the channel flanges 12, and are secured thereto in different ways, as by bolts 25 that are passed through registering holes in the channel and jamb angles flanges. This mode of connection is rapid, and avoids connections at inaccessible points. The flanges 23 are hence disposed in substantially the same plane and parallelly to the web 13 of the channel. The flanges 23 may extend into suitable proximity or abutment with each other, but preferably a space is provided for receiving a filler strip 26. The latter may be in the nature of a came, and may be made of soft metal such as lead. It can have opposed grooved longitudinal portions 27 for receiving adjacent edge portions 27 of the flange 23 so as to seal the column closed, for a purpose hereinafter described.

Mounted on the built up columns C consisting of the channel and sash jamb angles, are beams 28 which may be disposed at the junctions of the column sections. A preferred forms of connection may include the removal of flange portions at the ends of the beams as at 29 to provide a projecting web portion 30. For receiving the latter, the channels 11 may have their webs 13 centrally slotted at 31 at the end portions of the channels, these slots being alined and in communication for the different sections of a column. The web portions 30 extend through slots 31 into the columns, and through bolts 32 may be passed through registering holes in the channel flanges 12 and the web portion 30. In this manner the successive column sections are strongly united into a unitary column. To facilitate the provision of a rigid connection, spacers 33 may be associated with or passed over the bolts so as to lie between the web portion 30 and the channel flanges 12. The web portions 30 may rest at the lower ends of the slots. A wall frame of any desired length or height may be constructed in this manner.

Any suitable corner columns may be provided, preferably of built up structural elements as shown at 34. Each of these may include a pair of diagonally opposite angles 35, 36. These angles may be interconnected by sash jamb angles 18 in any suitable manner to form a column of closed cross section. For example, through bolts may be used at 37 and tap bolts at 38. A beam 39 may be externally secured to column 34 at the web 40 by means of bolts 41.

In Fig. 8 is shown an application of the invention to the construction of a building. The same may include side walls 42, 43, an end wall 44, united by corners 45. The side wall 42 may have an offset portion 46 connected by a reentrant angle or corner 47. Each of the walls includes a plurality of

spaced columns C, and at the corners of the building columns 34 are provided, all as hereinbefore described. Suitable beams 28 may be mounted on the columns, one of these

5 beams having its flange recessed at 48 to accommodate adjacent columns C.

At the corner 47 a column such as 49 may be provided which may include a bent plate channel 50, to one flange of which is connected a large angle 51 whose flange 52 is spaced from the channel flanges. The sash jamb angles 18 are suitably connected to the other channel flange and to the angle flange 52 so that the jamb angles are offset to provide a

10 suitable corner. As shown in the drawings, there may be a vertical space between the angles, which space may be temporarily closed by a strip of wood or the like, in course of construction.

20 Alined with the column 49 is a spaced column 53 which may consist of a plurality of bent plate channels 54, or the like, that may be interconnected by through bolts 55 extending through registering holes in the

25 flanges. Alined with columns 49 and 53, a comparatively wide or spacer column 56 may be provided which may include large angles 57, 58 interconnected at 59, and individually with sash jamb angles 18 by a bolt 60 extending through registering holes. The column is completed by an elongated plate 61 spanning and interconnecting the jamb sash angles. In this manner passages may be obtained between columns 49, 53 and 56, and

30 any suitable beam may be hung on these columns.

When the different columns are completed, they may be filled with a hardening material such as a filler of concrete F which

40 can be readily poured thereinto. Thereafter, the sashes may be filled at 15a and treated to complete the walls in any well known manner.

Thus it is seen that by my invention, column elements for a first story of a building are erected, then the sashes are connected in place completing the columns and the framing. Then the beams are mounted and the framing for the second story constructed in

50 a similar manner. Finally, the columns are filled with concrete and the walls completed. However, the columns may also be left empty.

In Fig. 9 is a modification of a column 62 including a plurality of Z bars 63 with flanges 64 in coincidence with each other and preferably receiving a beam web 65 which is secured therebetween at 66. The column may be completed by sash jamb angles 18 connected to the bars 63 by bolts 67 passing through registering holes. A cap 68 may be provided. It will be noted that the Z bars provide a channel structure completed as a substantially closed column by the jamb angles, and that

65 the column has substantial depth in a direc-

tion at right angles to the wall or plane of the sashes 15.

In Fig. 10 is shown a modification of the invention wherein any suitable originally complete columns have the sashes connected therebetween to form a cross bracing for the columns. Heretofore the sashes have been connected merely to mullions which had no function as columns, and separate columns were provided independent of the sashes. The latter and the mullions were carried mainly by the concrete or other wall portions of the building. By my invention the construction of the house framework is simplified, expedited, reinforced and less expensive columns may be employed.

Specifically I may use columns 70 formed of round welded or seamless pipe rolled into rectangular form. The jamb angles 18 of sashes 15 are readily connected to the columns as by means of through bolts 71, the connection being facilitated by the shape of the column. Thus the sashes form re-enforcements and cross bracing between the columns. Hence the columns may be lighter in weight, or they may be less in width, in other words, a square form of column is unnecessary. This again facilitates the concreting, plastering and other operations in building up the wall around the sashes and columns. The beam 72 may be connected to the column as above described and the column may be filled with concrete if desired.

It will be appreciated that various changes and modifications may be made in the device as shown in the drawings, and that the same is submitted in an illustrative and not in a limiting sense, the scope of the invention being defined in the following claims.

I claim:

1. A structural steel frame for a house, including spaced column members of channel form, and preformed sashes each having angles extending along the edges thereof, said angles having flanges projecting in opposite directions along a plane parallel to the plane of the sash, said sashes being disposed between successive adjacent channel column members with the angles connected to the flanges thereof and with the oppositely projecting angle flanges being so related that a pair of these flanges of adjacent sashes extend toward each other parallelly to the web of the channel members to form columns therewith of substantially closed form in cross section.

2. A device including a plurality of spaced channel means, sashes therebetween having edge angles connected to each of said channel means on opposite sides thereof, said angles having flanges extending toward each other to provide a wall for the channel means opposite to the web thereof, said channel means having a slot in said web, a beam having a

web projecting into said slot, and means for securing said web to the channel means.

3. A device including a plurality of spaced channel means, sashes therebetween having edge angles connected to each of said channel means on opposite sides thereof, said angles having flanges extending toward each other to provide a wall for the channel means opposite to the web thereof, said channel means having a slot in said web, a beam having a web projecting into said slot, and means for securing said web to the channel means, said means for securing the web to the channel means including a bolt extending through the web and the flanges of the channel means, and spacers between the web and the flanges of the channel means.

4. A house frame including vertical spaced channel means having flanges projecting toward the outside of the house, performed frame sashes between the channel means, said sashes having marginal jamb angles extending outward of the respective sashes, said jamb angles being arranged and connected to the channel means so that the jamb angles overlie the flanges of the channel means and certain flanges of the jamb angles form a substantially complete longitudinal closure for the channel means.

5. A house frame including vertical spaced channel means having flanges projecting toward the outside of the house, preformed frame sashes between the channel means, said sashes having marginal jamb angles extending outward of the respective sashes, said jamb angles being arranged and connected to the channel means so that the jamb angles overlie the flanges of the channel means and certain flanges of the jamb angles form a substantially complete longitudinal closure for the channel means, the frame including sashes disposed above one another between the columns, and the sashes having head and sill angles cooperating with each other to form horizontal channels.

6. A house frame including spaced columns constructed in sections superimposed upon each other, beams each connected to sections of the columns so as to unite the sections of a column together, each of the column sections including a channel means, and preformed sashes between the channel means and having jamb angles, said jamb angles cooperating with the channel means to form said columns as columns of substantially closed form in cross section.

7. A device including a plurality of spaced columns, said columns being hollow and having narrow vertical slots, beams having webs extended through the slots into the columns, means for securing said webs in the columns, and sashes between the columns, said sashes having angles connected to the columns and reinforcing the latter at the region of said slots.

8. A house frame including spaced columns constructed in sections superimposed upon each other, beams each connected to sections of the columns so as to unite the sections of a column together, each of the column sections including a channel means, and preformed sashes between the channel means and having jamb angles, said jamb angles cooperating with the channel means to form said columns as columns of substantially closed form in cross section, certain of said sashes being disposed above one another and having head and sill angles cooperating with each other to form horizontal channels.

9. A structural steel frame for a house, including spaced column members of channel form, and preformed sashes each having angles extending along the edges thereof, said angles having flanges projecting in opposite directions along a plane parallel to the plane of the sash; said sashes being disposed between successive adjacent channel column members with the angles connected to the flanges thereof and with the oppositely projecting angle flanges being so related that a pair of these flanges of adjacent sashes extend toward each other parallel to the web of the channel members to form columns therewith of substantially closed form in cross section, and grooved soft metal strip means between said oppositely projecting angle flanges receiving the edges of said flanges in said grooves.

10. A device including a plurality of spaced columns, preformed frame sashes therebetween and connected to the columns, said frame sashes having head and sill angles cooperating with each other to form horizontal channels extending between the columns.

11. A device including a plurality of spaced columns, a plurality of preformed frame sashes disposed above one another, said frame sashes having vertical jamb angles along their side edges, said jamb angles extending along the columns, and being connected thereto, and said frame sashes having head and sill angles cooperating with each other to form channels extending between the columns.

12. A device including a plurality of spaced columns, a plurality of preformed frame sashes disposed above one another, said frame sashes having vertical jamb angles along their side edges, said jamb angles extending along the columns and being connected thereto, and said frame sashes having head and sill angles cooperating with each other to form channels extending between the columns, each frame sash being of one piece construction, and said jamb, head and sill angles being continuous with each other and having certain flanges thereof lying in a common vertical plane.

13. A frame sash for connection between

columns of structural building frames, including vertical jamb angles and horizontal head and sill angles, forming the top, bottom and sides of the frame sash, said angles having certain flanges extending outward of the frame sash at the top, bottom and sides thereof, said outward extending flanges lying substantially in a common plane, and the other flanges lying in planes substantially at right angles to the said common plane, and reinforcing cross members interconnecting said angles, said jamb angles being adapted to be fitted between the columns and to be connected thereto, and said head and sill angles being adapted to form with each other a common horizontal channel between said columns for superimposed frame sashes.

14. A one piece frame sash for connection between columns of structural building frames, including vertical jamb angles, and horizontal head and sill angles connected with the jamb angles, and reenforcing cross members extending continuously between the angles and connected therewith, the jamb angles being adapted to extend along columns and to be connected thereto, the head and sill angles of superimposed sashes being adapted to form channels with each other.

In testimony whereof I affix my signature.
JAMIESON MARSHALL.

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