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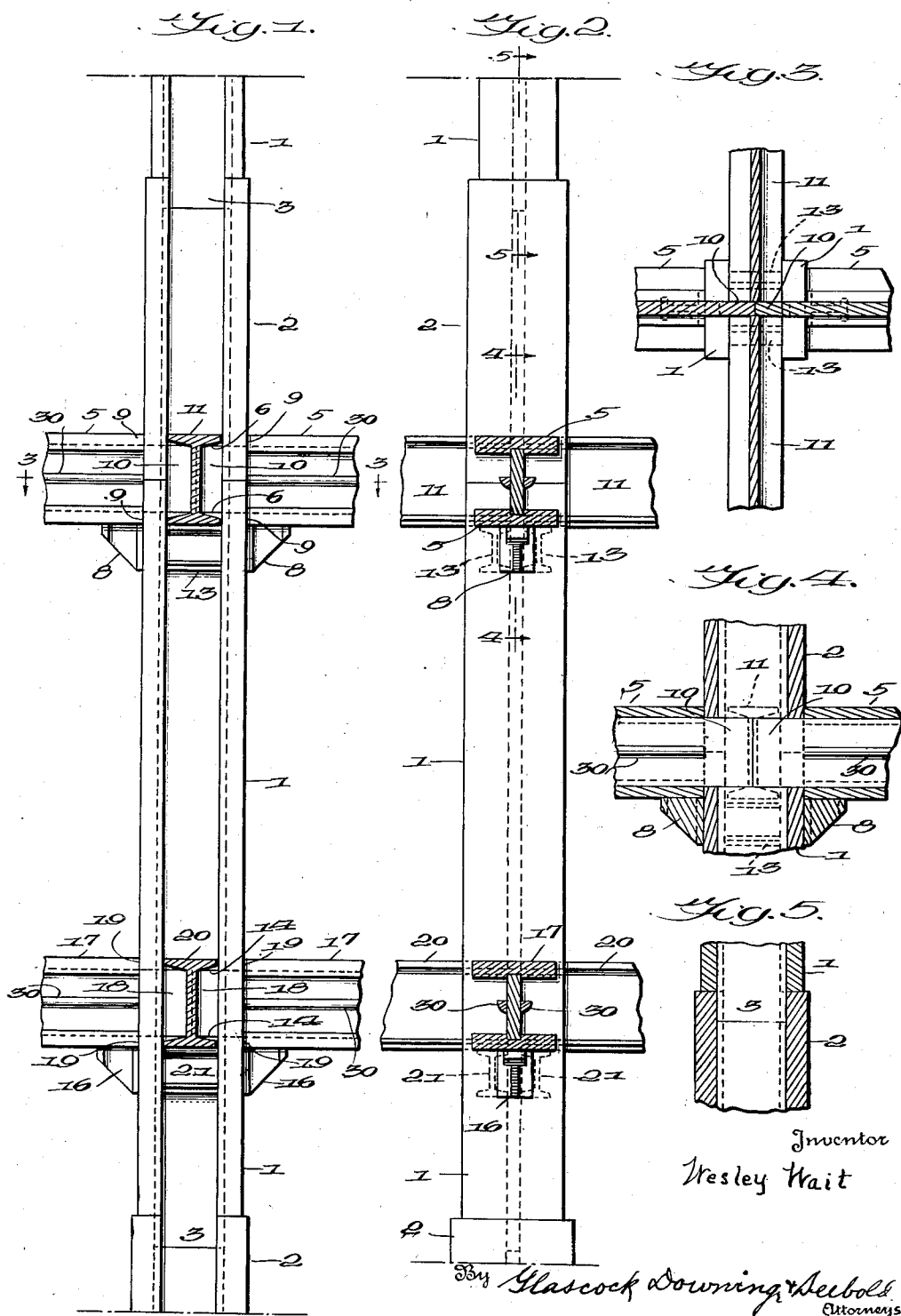
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2,098,734

METALLIC FRAME FOR BUILDING CONSTRUCTION

Filed April 28, 1936

2 Sheets-Sheet 1



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METALLIC FRAME FOR BUILDING CONSTRUCTION

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2 Sheets-Sheet 2

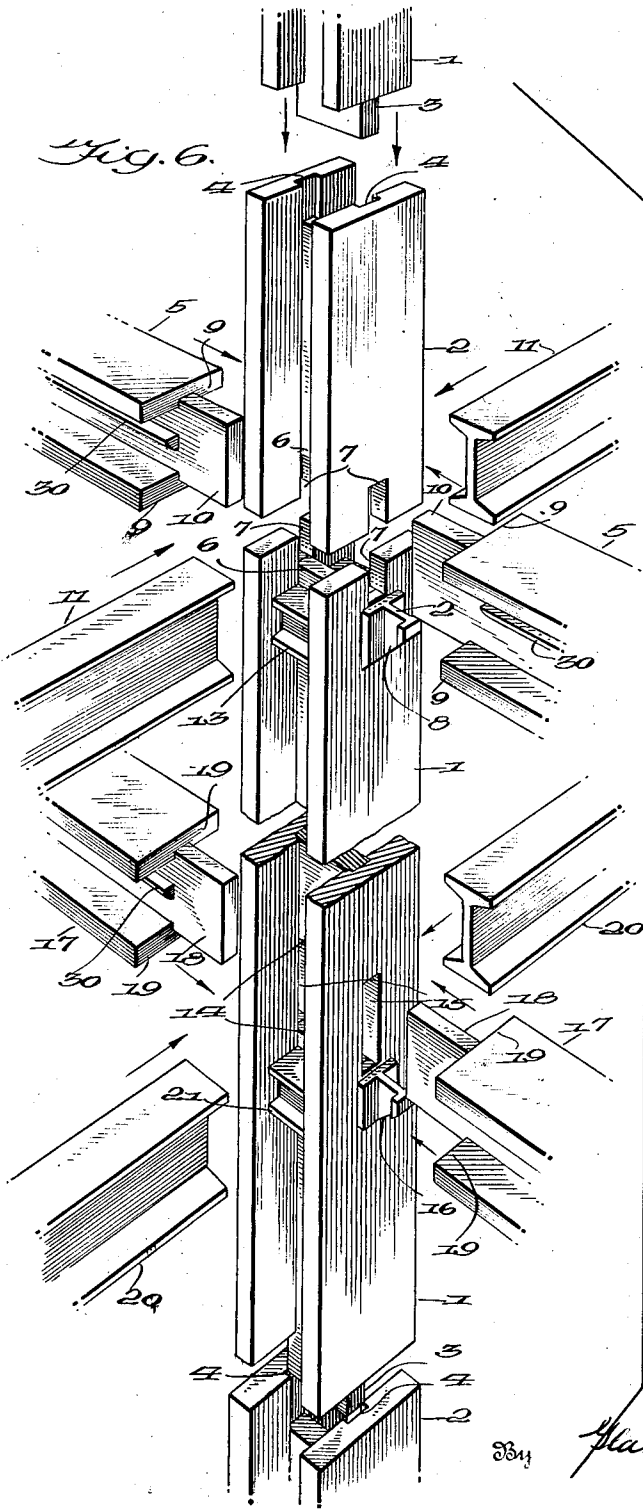


Fig. 7.

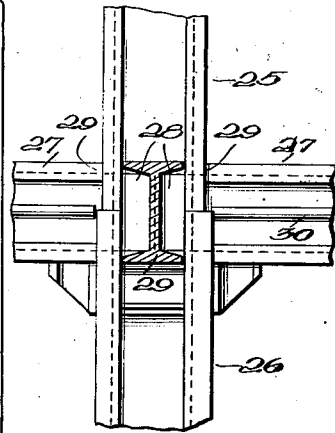


Fig. 8.

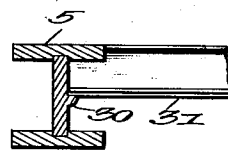
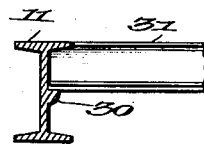


Fig. 9.



Inventor
Wesley Wait

334

Glascok & Downing & Sebold
Attorneys

UNITED STATES PATENT OFFICE

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METALLIC FRAME FOR BUILDING CONSTRUCTION

Wesley Wait, Newburgh, N. Y.

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5 Claims. (Cl. 189—36)

This invention relates to improvements in interlocking joints for metallic frames employed in building construction; more particularly, it relates to an interlocking joint for connecting column sections with each other and with the girders and floor beams at the different floors of the building. One of the objects of the invention is to provide an interlocking joint that will permit preforming of the structural units so that they can be readily assembled and joined together without further shaping of the engaging parts, which are welded together to complete the joint.

Another object of the invention is to provide a structural column including a unitary section that extends through two floors of the building structure, with interlocking joints connecting the girders and beams of the respective floors to the unitary section.

The invention will be described in detail hereinafter, pointed out in the appended claims, and illustrated in the accompanying drawings.

In the accompanying drawings in which similar reference characters designate corresponding parts:

Figure 1 is an elevation of a column and girder structure embodying the invention.

Figure 2 is a similar view, at right angles to that shown in Fig. 1.

Figure 3 is a horizontal sectional view on the line 3—3 of Fig. 1.

Figure 4 is a vertical sectional view on the line 4—4 of Fig. 2.

Figure 5 is a vertical sectional view on the line 5—5 of Fig. 2.

Figure 6 is an exploded perspective view of the column and girders.

Figure 7 is a detail view showing in elevation a modification of the interlock connecting two column sections, with the upper section of less cross-sectional area than the lower section.

Figures 8 and 9 are detail sectional views, showing respectively a girder and a beam structure, in both of which the reinforcing rib is utilized to support a minor floor beam.

Referring to the drawings in detail, the column is formed of the main sections 1 and the auxiliary sections 2, assembled in vertical alignment with their ends abutting, and with the main sections alternating with the auxiliary sections. The main and auxiliary sections are of H-shape in cross-area, each comprising a web member and opposite flange members secured together as disclosed in my previous patent, No. 1,911,413, dated May 30, 1933. Each main section 1 is of such a length as to extend through a lower flooring and

into an upper flooring. In the assembled relation of the column sections, the flange members at the lower end of each main section 1 are cut away to provide a tongue 3 at the lower end of the web member. At the upper end of the auxiliary section 2, immediately below, the web member is cut away to provide a socket to register with the tongue 3. The tongue enters the opposite grooves 4 of the auxiliary section and is seated on the recessed end of the web of the latter. The contacting parts of the two sections are welded together.

On the upper end of the main section 1 is seated the auxiliary section 2 immediately above, with the flange members of the two sections in abutting relation. At this juncture of the two column sections an interlock is provided by the girders 5 to hold the column sections against relative lateral displacement. At this juncture of the two column sections the contiguous webs are cut away at 6 to form a recess between the abutting end parts of the opposite flange members of the two sections. Extending through the abutting end parts of the flange members are the complementary slots 7 registering with the recess between the web edges 6. The slots 7 are in the same plane as the webs of the two sections. Secured to the outer face of each flange section 1 is the chair 8, slightly below the lower end of the slot 7.

The end parts of the flange members of each of the girders 5 is cut away to form the shoulders 9 at the end of each girder, and also to provide the tongue 10 at the end of the web member. In the assembled arrangement of the girders and the column sections, as shown in Fig. 1, the shoulders 9 at the end of each girder respectively abut the outer faces of the flange members of the two column sections, above and below the complementary slots 7, with the lower shoulder 9 seated on the adjacent chair 8. The tongue 10 of each girder projects through the complementary slots 7 into the recess 6. The extremities of the tongues 10 abut each other in a plane coinciding with the vertical axis of the column.

Extending from opposite sides of the column and normal to the girders 5 are the supplementary beams 11 of I-shape in cross-section. Each one of these beams 11 fits at its inner end between the flanges of the flange members of both the main section 1 and the auxiliary section 2 of the column. The inner end of each beam 11 abuts the edge part 6 of the web of both the main and auxiliary sections of the column, and also abuts the meeting ends of both of the tongues 10. All of

the contacting parts are welded together to form a solid juncture of the assembled parts. This juncture or mounting is located at one of the floors of the building.

5 In assembling the parts to form the mounting at the upper end of the main section 1 of the column, the girders are positioned to seat the tongue 10 in the slots 7 in the upper end of the main section, with the tongues abutting each
10 other and the shoulder 9 of the girders abutting the flange members of the section, and with the girders resting on the chair 8. The auxiliary section 2 of the column is then seated at its lower end on the upper end of the main section, with
15 the tongues 10 engaging the slots 7 in the lower end of the auxiliary section. The beams 11 are then positioned with their ends seated on the chairs 13 between the flanged sides of the main section. The ends of the beams fit closely be-
20 tween the flanged sides and are prevented from upsetting thereby. The extremities of the beams abut the tongues 10, breaking joint with the same. The extremities of the beams also overlap the web sections at 6, 6 of the two sections. With the
25 parts so arranged and welded together, a firm interlock is secured.

In the lower part of the main section 1 a mounting is provided for the girders and beams of a lower floor of the building structure. The
30 web member of the main section is cut away to provide a recess in the web between the edges 14, 14 of the web. The flange members of the main section are each slotted at 15 to coincide with the recess in the web member between the edges 14,
35 14 of the web. To the outer face of each flange member is secured a chair 16 immediately below the slot 15. The girders 17 of the lower mounting, like the girders 5 of the upper mounting, have at the ends of their web members the
40 tongues 18 and at the ends of their flange members are the shoulders 19.

In assembling the parts of the lower mounting, the tongues 18 are thrust through the slots 15 into the recess between the edges 14, 14 of the
45 web member, with the tongues abutting each other and coinciding with the plane of the web member. With the tongues so positioned, the girders are seated on the chairs 16 and their shoulders 19 abut the flange members of the
50 column section.

Associated with the girders 17 in the lower mounting are the I-shaped beams 20 extending from the column at right angles to the girders 17. The end of each beam is fitted between the flange
55 members of the column section and is seated on the chair 21 secured to the web of the section below the lower edge 14 of the web. The inner ends of the two beams 20 abut the meeting ends of the tongues 18 and also abut the web of the column
60 section adjacent to the edges 14 of the web. The several parts of this lower mounting are also welded together to form a unitary structure.

By providing at the upper end of the main section 1 a mounting for the girders and beams of
65 an upper floor, and by providing in an intermediate part of the section a mounting for the girders and beams of a lower floor, a column section can be employed that extends through two
70 floors of the building under construction. In positioning such a column section, but little more effort is required than would be expended in the erection of a separate column section for each story. In the construction of a large building,
75 not only would there be an appreciable saving

in labor, but there would also be a considerable saving of time in the completion of the structure.

The mountings for the girders and beams of the present invention permit a gradual reduction in the cross-area of the column toward the top of the structure. This is an advantage, for the load of the building structure lessens toward the top and lighter column sections may be used to carry the girders and beams of the upper floors. As shown in Figs. 1, 2 and 6, each
10 upper main section 1 is of less cross-area than the auxiliary section 2 immediately below. To accommodate the uniform shape of the girders and beams, the width of the web preferably remains the same throughout the several sections
15 to maintain a uniform space between the flange sections. However, if lighter girders and beams are used in the upper floors, then the width of the web may be reduced in the upper column sections to accommodate the narrower girders and
20 beams.

In massive construction, the comparatively short auxiliary column section 2 facilitates the handling of the same and also in mounting thereon the next main section 1 above. In lighter
25 construction, the auxiliary section 2 may be omitted and the higher main section mounted directly on the lower main section. When the auxiliary section is omitted, the length of the main section is increased to include an additional length equal
30 to that of the auxiliary section. When column sections of the same length are employed, that is, each having a length to extend through two stories of the building, the mounting connecting the two sections is practically the same as the
35 upper mounting shown in Figs. 1 and 2. Such a mounting is shown in Fig. 7.

As illustrated in Fig. 7, the column sections are intended to be of equal length, but the upper one having less cross-area. As indicated, the
40 two sections 25 and 26 are connected by an interlock provided by the girders 27 having tongues 28 projecting through slots in the contacting ends of the sections, and with the ends of the beams
45 29 (only one is shown) abutting and breaking joint with the abutting ends of the tongues. This structure is practically the same as the previously described interlock, shown in the upper mounting of Fig. 1; the only difference is in the
50 less cross-area of the upper section 25. To accommodate this difference in cross-area, the upper flange member of the two girders 27 and 28 is cut away less than the lower flange member to provide the further projecting shoulder 29 to
55 abut the upper section 25.

The several girders illustrated have a strengthening rib 30 extending longitudinally of the web member on both sides of the latter. The ribs 30 are formed when the web members are rolled. A rib 30 on a girder may also be utilized to support a minor floor beam 31, as shown by Figs. 8 and 9.

What I claim is:

1. In a metallic frame for buildings, the combination of a column including upper and lower
65 sections of the H-shape type with the flanged sides of the two sections in abutting relation, each of said sections having the end part of its web cut away to form a recess between the end parts of the flanged sides, said flanged sides having
70 ing slots in their end parts coinciding with said recess, the abutting relation of the two column sections being such that their recesses register to provide a common recess and so that the slots on each side register to provide a common slot
75

in the respective sides, opposite girders having tongues at their ends respectively seated in the opposite slots and abutting at their ends in the common recess, and beams normal to the girders fitting at their end parts between the flanged sides of the abutting sections and having their extremities abutting the opposite sides of the tongues.

2. In a metallic frame for buildings, the combination of a column including a section of the H-shape type having at an intermediate part a vertically slotted opening extending through the flanged sides and the intermediate web of the section, opposite girders having tongues at their ends respectively seated in the slotted opening and meeting at their inner ends, and beams normal to the girders fitting at their end parts between the flanged sides of the column section and having their extremities abutting the opposite sides of the meeting tongues.

3. In a metallic frame for buildings, the combination of a column including upper and lower sections of the H-shape type with the flanged sides of the two sections in abutting relation, each of said sections having the end part of its web cut away to form a recess between the end parts of the flanged sides, said flanged sides having slots in their end parts coinciding with said recess, the abutting relation of the two column sections being such that their respective recesses register with each other to provide a common recess in the web of the column and so that their respective slots register with each other to provide a common slot in the respective sides of the column, opposite girders having at their inner ends tongues respectively seated in the opposite common slots and abutting at their ends in the common recess in the web of the column, said tongues being shaped to pass through the respective common slots in the flanged sides

of the column to seat within the common recess in the web of the column, and means for securing the tongues in the common recess in their abutting relation.

4. In a metallic frame for buildings, the combination of a column including upper and lower sections of the H-shape type with the flanged sides of the two sections in abutting relation, each of said sections having the end part of its web cut away to form a recess between the end parts of the flanged sides, at least one of the flanged sides of each column section having in its end part a slot coinciding with the recess in said end part, the abutting relation of the two column sections being such that their respective web recesses register with each other to provide a common recess in the web of the column and so that their respective slots register with each other to provide a common slot in one of the flanged sides of the column coinciding with the common recess in the web of the column, a girder having at one end a tongue seated in the common slot and in the common recess of the column, said tongue being shaped to pass through the common slot in the flanged side of the column to seat in the common recess in the web of the column, and means for securing the tongue in the common recess.

5. In a metallic frame for buildings, the combination of a column including a section of the H-shape type having at an intermediate part a recess extending vertically through the web of the section between the flanged sides of the section, at least one of the flanged sides of the section having a vertical slot therein coincident with the vertical recess in the web, and a girder normal to the column and having at an end a tongue seated in the vertical slot and in the vertical recess.

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