Oct. 23, 1928. 1,688,949

W. WAIT

INTERLOCKING JOINT FOR METALLIC FRAMES

Filed March 31, 1927 2 Sheets-Sheet 1

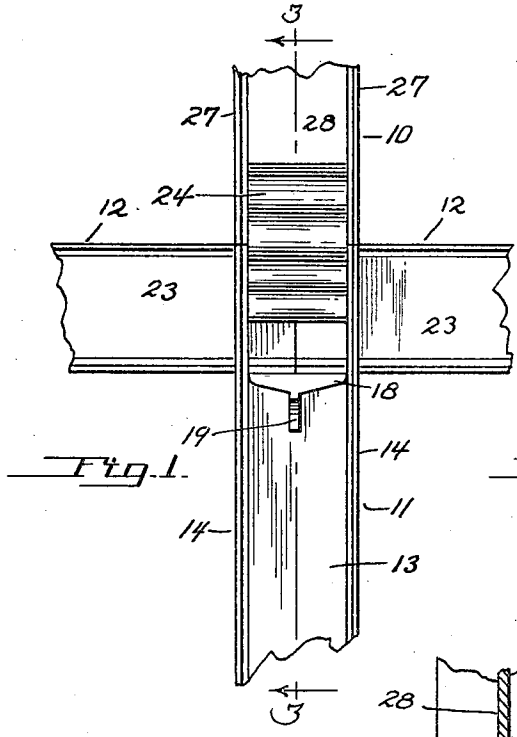


Fig. 1.

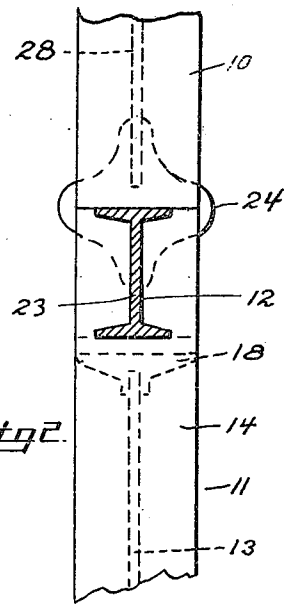


Fig 2.

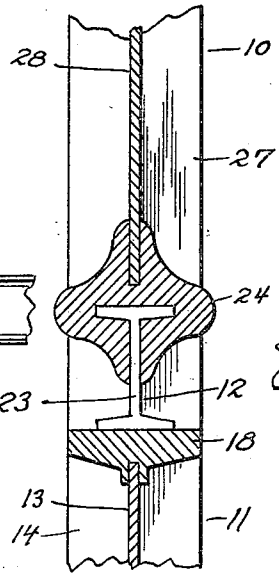


Fig. 3.

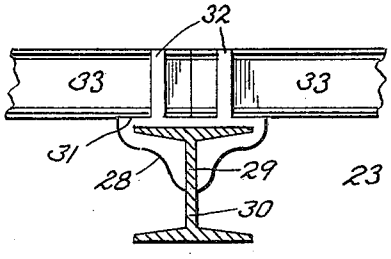


Fig. 4.

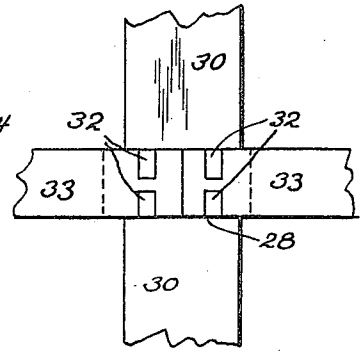


Fig. 5.

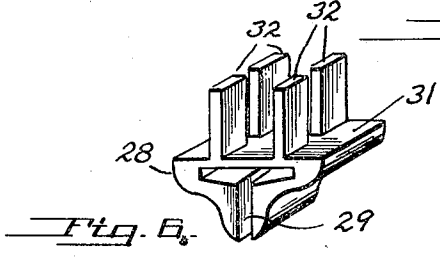


Fig. 6.

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INTERLOCKING JOINT FOR METALLIC FRAMES

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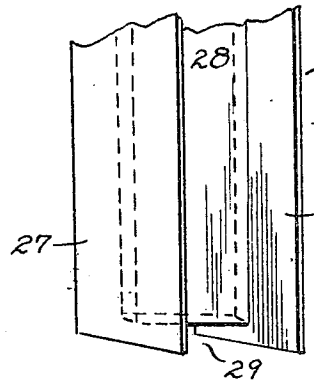


Fig. 8.

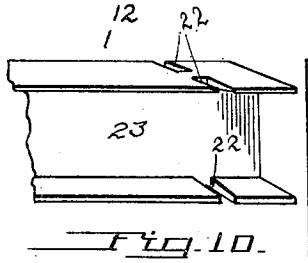


Fig. 10.

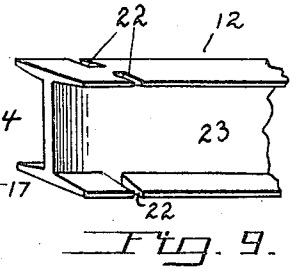


Fig. 9.

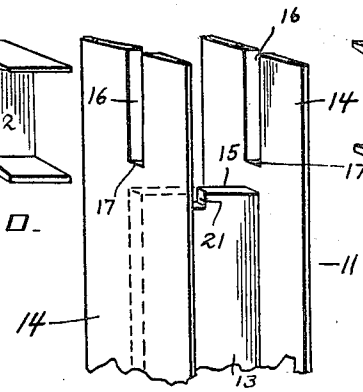


Fig. 7.

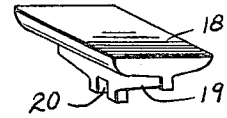


Fig. 12.

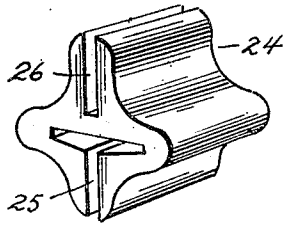


Fig. 11.

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UNITED STATES PATENT OFFICE.

WESLEY WAIT, OF NEWBURGH, NEW YORK.

INTERLOCKING JOINT FOR METALLIC FRAMES.

Application filed March 31, 1927. Serial No. 180,014.

This invention relates to improvements in interlocking joints for metallic frames whereby the use of the rivets or bolts is avoided, the structural units being shaped to uniform stock patterns.

In the formation of a joint of such material the units to be joined can be readily positioned in engaged relation without previous tooling at the place of juncture, where room for tool manipulation may be circumscribed, and the work done by unskilled labor. More particularly, it relates to the formation of an interlocking joint between columns and girders whereby extensions of the metallic frame can be easily accomplished, as when a column is formed of sections and these successively added as the height of the frame progresses. The means whereby the joint is formed are described in detail hereinafter, pointed out in the appended claims, and illustrated by the accompanying drawings.

In the drawings, in which similar reference characters designate corresponding parts,

Figure 1 is a front elevation of a joint embodying the invention, in which abutting column and girder sections are joined together in interlocking relation.

Fig. 2 is a side elevation of the same.

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

Fig. 4 shows a joint between major and minor girder sections, in which a modified form of the saddle is employed.

Fig. 5 is a plan view of the same.

Fig. 6 is a detail perspective view of the modified saddle shown in Figs. 4 and 5.

Figs. 7, 8, 9 and 10 are detail perspective views, respectively showing lower and upper column sections and girder sections.

Fig. 11 is a detail perspective view of the saddle shown in Figs. 1 and 2.

Fig. 12 is a detail perspective view of the chair employed in the joint.

Referring to the drawings in detail, 10 and 11 respectively designate upper and lower sections of a column and 12 designates the girders. The column sections and girders are each formed with a web and flanged on both sides at each edge of the web. The web 13 of the lower column section 11 is cut away between the upper ends of the flanged sides 14, the end of the web forming a transverse abutment 15. The upper end of each flanged side is provided with a median longitudinal slot 16 in the same plane as the web 13, each slot ending a short distance above the transverse abutment 15. In the flanged sides at the inner ends of the slots 16 are the transverse abutments 17 alined in parallel relation to the transverse abutment 15 at the end of the web. Mounted on the transverse abutment 15 is the chair 18 (Fig. 12), fitting between the flanged sides 14. On the under side of the chair is a vertical flange 19 extending across the abutment 15 and notched at 20 to engage the notch 21 in the web 13. The notch engagement between the flange 19 and the web 13 holds the chair against longitudinal movement on the transverse abutment 15. When the chair is in place its top is flush with the transverse abutments 17 in the flanged sides of the column section.

Mounted between the upper ends of the flanged sides 14 of the lower column section are the ends of the girders 12 with their extremities abutting. These ends rest on the chair 18 and their flanges are notched, as at 22, so that the webs 23 can slip into the slots 16 in the flanged sides of the lower column section with the lower edges of the webs seated on the abutments 17. In this way the load of the girders is distributed over the abutments 15 and 17 of the column section. As the webs of the assembled girders and column section are in the same plane, there might be a tendency of the opposing webs to effect a shearing action if they contacted edge to edge. This tendency is obviated by interposing the chair 18 between the edges. While two girders are shown with abutting ends, yet it is obvious a single girder, with a double set of notches, can be substituted for the two abutting girders.

To provide a mounting for the upper column section 10 on the lower section 11 at the interlocking joint the saddle 24 (Fig. 11) is employed. In its lower part this saddle has a T-shaped recess 25 to fit the upper flanged sides and upper part of the webs of the girders 12. The saddle fits between the flanged sides at the upper end of the lower column section 11. In the upper part of the saddle is the vertical recess 26. With the saddle, girders and lower column section in assembled relation, the web 13 of the lower column section and the vertical recess 26 of the saddle are in the same vertical plane. The upper column section 10 is positioned on the lower column section 11 with the lower ends of the flanged sides 27 of the upper section abutting the up-

per ends of the flanged sides 14 of the lower section and with the lower end of the web 28 of the upper column section seated in the vertical recess 26 of the saddle. The lower edge of the web 28 of the upper column section is slightly cut away, as at 29, Fig. 8, between the flanged sides 27. The purpose of this is to provide space for the wall of the saddle between the top of the recess 25 and the bottom of the recess 26. This space to accommodate the wall of the saddle must be provided as the top of the recess 25 is in the same horizontal plane as the abutting ends of the flanged sides of both column sections and as the bottom of the recess 26 is somewhat above such plane.

In assembling the several parts to form the joint between the column sections and the girders, the lower column section 11 having been secured in an upright position, the chair 18 is first seated on the transverse seat 15 at the upper end of the web 13 of the lower column section. Then the girders 12 are positioned with their webs 23 partly inserted in the slots 16 with the ends of the girders abutting. With the girders partly seated, the saddle 24, previously mounted on one of the girders, is slid over the abutting ends of the girders to a position between the sides 14 of the lower column section. Then the girders and saddle are completely seated in the upper end of the lower column section with the ends of the girders resting on the chair 18 and the lower edges of their webs resting on the transverse seats 17 at the lower ends of the slots 16 in the sides of the lower column section. The upper column section 10 is then placed end-to-end on the lower column section with the lower end of its web 28 seated in the vertical recess 26 of the saddle 24 and with the latter extending upwardly between the flanged sides 27 of the upper column section. With the parts so assembled the parts are strongly interlocked to hold them against displacement; particularly, the lower end of the upper column section is firmly held to form a rigid continuation of the lower column section. Also, the saddle is firmly held in its vertical arrangement with respect to the column and the chair mounted in the upper end of the lower column section. This is accomplished by the girders extending through the flanged sides of the lower column section and through the saddle positioned between the sides of said section, thereby providing an interlock between these parts that prevents lateral or transverse movement of the saddle relative to the column section. As the girders are maintained with their webs in the same plane as the web of the lower column section and as the chair is centrally seated on the web and between the flanged sides of the lower column section, the chair is firmly held against lateral or transverse movement with relation to the lower column section. Consequently, the saddle and chair are maintained in perpendicular relation in the column so that the load imposed on the saddle is transmitted in part through the interposed girders to the chair and to the web of the lower column section.

In Figs. 4, 5 and 6 is shown a modified form of the saddle, which is adapted to the support of minor girders on a major girder. In the modified form the saddle 28 has in its lower part a T-shaped recess 29 to fit the flanged upper side of a major girder 30. The upper part of the saddle has a flat face 31 from which project the four lugs 32 spaced apart, both longitudinally and transversely of the saddle. Mounted on the saddle are the abutting ends of the minor girders 33. The flanges of these ends are notched so that the girders can be seated on the face 31 of the saddle interlocking with the lugs 32. Thereby, a strong interlock is provided for the major and minor girders.

What I claim is:

1. In an interlocking joint for metallic frames, the combination of a column formed with a web and flanged sides and comprising upper and lower sections, the lower section having in its web a recess between the upper ends of the flanged sides, with a chair positioned in the recess between the flanged sides of the lower column section and seated upon the web of said section, a girder seated transversely in the upper end of the lower column section on the chair having a flanged side between the ends of the flanged sides of said lower column section, and a saddle positioned on the girder between the flanged sides of the lower column section, the upper column section being seated in the saddle, the web of the upper column section being recessed between the lower ends of the flanged sides of said upper section to admit the intermediate part of the saddle between the web of said upper section and the top of the girder.

2. In an interlocking joint for metallic frames, the combination of a column comprising upper and lower sections formed with a web and opposite flanged sides with the flanged sides of the sections in abutting relation, the lower column section having a recess in its web between the upper ends of the flanged sides thereof, with a chair positioned in the recess between the flanged sides of the lower column section and seated upon the web of said section, a girder transversely mounted in the upper end of the lower column section on said chair and having a web and an upper flanged side within the recess at the upper end of the lower column section, and a saddle positioned between the abutting flanged sides of the two column sections and having seats in its top and under sides respectively engaged by the web of the upper column section and by the upper flanged side and web of the girder, the web of the upper column section being recessed between the lower ends of the flanged sides of said upper section to admit

the intermediate part of the saddle between the web of said upper section and the top of the girder.

3. In an interlocking joint for metallic frames, the combination of a column comprising upper and lower sections formed with a web and opposite flanged sides with the flanged sides of the sections in abutting relation, the lower column section having a recess in its web between the upper ends of the flanged sides thereof, with a chair positioned in said recess upon the upper edge of the web of the lower column section, and girders transversely mounted in the upper end of the lower column section and having their ends in abutting relation in said recess and seated on said chair, said girders each having a web and a flanged side within the recess, and a saddle positioned between the abutting flanged sides of the two column sections and having seats in its top and under sides respectively engaged by the web of the upper column section and by the flanged sides and webs of the abutting girders, the web of the upper column section being recessed between the lower ends of the flanged sides of said upper section to admit the intermediate part of the saddle between the web of said upper section and the tops of the girders.

4. In an interlocking joint for metallic frames, the combination of a column comprising upper and lower sections formed with a web and flanged sides, the lower section having a recess in its web between the upper ends of the flanged sides and said sides having longitudinal slots coincident with the recess; with a chair positioned in said recess upon the upper edge of the web of the lower column section, flanged girders seated transversely in the upper end of the lower column section with their ends abutting in the recess and seated on the chair, said girders having their flanges notched to receive the flanged sides of the lower column section and having their webs extending through the longitudinal slots; and a saddle positioned between the flanged sides of the lower column section, provided on its lower side with an extension having a recess engaged by the abutting ends of the girders, said saddle also provided on its upper side with an extension having a seat therein, said upper column section having its web engaged in the seat in the upper extension of the saddle and said saddle fitting between the flanged sides of the upper column section, the web of the upper column section being recessed between the lower ends of the flanged sides of said upper section to admit the intermediate part of the saddle between the web of said upper section and the tops of the girders.

5. In an interlocking joint for metallic frames, the combination of a column comprising upper and lower sections formed with a web and flanged sides, the lower section having its web cut away between the upper ends of its flanged sides to provide a transverse seat at the upper end of the web, said lower section also having longitudinal slots in the upper ends of its flanged sides forming transverse seats therein above the transverse seat at the upper end of the web; with a chair positioned on the transverse seat at the upper end of the web with its top flush with the transverse seats in the flanged sides of the lower column section; flanged girders having abutting ends seated on the chair with the webs of the girders extending through the longitudinal slots in the upper ends of the flanged sides of the lower column section, said webs being seated on the transverse seats at the lower ends of said slots and the flanged sides of the girders being notched to admit the flanged sides of the lower column section; and a saddle positioned between the flanged sides of the lower column section, provided on its lower side with an extension having a recess engaged by the abutting ends of the girders, said saddle also provided on its upper side with an extension having a seat therein, said upper column having its web engaged in the upper seat of the saddle and said saddle fitting between the flanged sides of the upper column section.

6. In an interlocking joint for metallic frames, the combination of a column section having a web and opposite flanged sides with the web recessed between the upper ends of the flanged sides and said sides having longitudinal slots coincident with the recess; with a chair longitudinally positioned in the recess in the column section and seated on the web between the flanged sides of the section, the chair and web having mutually engaged notched parts to prevent longitudinal displacement of the chair, a girder having a web and flanged sides transversely mounted in the recess of the column section with a flanged side seated on the chair, the web of said girder extending through the longitudinal slots of the column section and the flanged sides of the girder being notched to admit the flanged sides of the column section; a saddle positioned in the recess of the column section between the flanged sides of said section and seated on the upper flanged side of the girder; and a structural member seated on the saddle.

7. In an interlocking joint for metallic frames, the combination with a column section having a web and opposite flanged sides with a recess formed in the web between the upper ends of the flanged sides to provide a transverse abutment at the upper edge of the web, said flanged sides having longitudinal slots in the plane of the web coincident with the recess to provide transverse seats at the inner ends of the slots spaced above the abutment at the upper edge of the web; of a

chair positioned in the recess upon the transverse abutment, the top of the chair being flush with the transverse seats in the flanged sides at the inner ends of the slots; and a girder having a web and flanged sides transversely mounted in the recess of the column section with a flanged side seated on the chair, the web of the girder extending through the longitudinal slots of the column section and the flanged sides of the girder being notched to admit the flanged sides of the column section.

8. In an interlocking joint for metallic frames, the combination of a column comprising upper and lower sections formed with a web and flanged sides and with the flanged sides of the two sections in abutting relation, the webs at the abutting ends of the sections being cut away to form a recess common to both sections, and the flanged sides of the lower section having slots in the plane of the web coincident with the recess to provide transverse seats at the lower ends of the slots spaced above the upper edge of the web of the lower section; of a chair positioned in the recess upon the edge of the web of the lower section with its top flush with the seats at the lower ends of the slots; girders formed with a web and flanged sides and having abutting ends positioned transversely in the recess and seated on the chair, the webs of the girders extending through the slots in the flanged sides of the lower section and the flanged sides of the girders being notched to admit the flanged sides of the lower section; and a saddle seated in the recess in engagement with the abutting ends of the girders and extending between the flanged sides of both sections and engaging the lower end of the web of the upper section.

In testimony whereof I affix my signature.

WESLEY WAIT.