

Sept. 29, 1931.

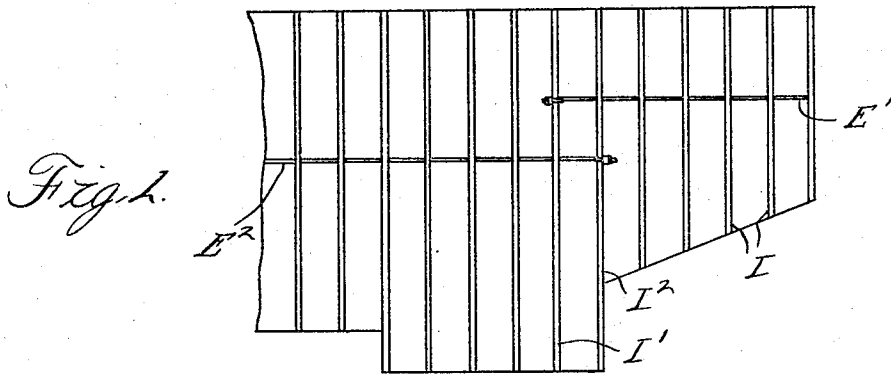
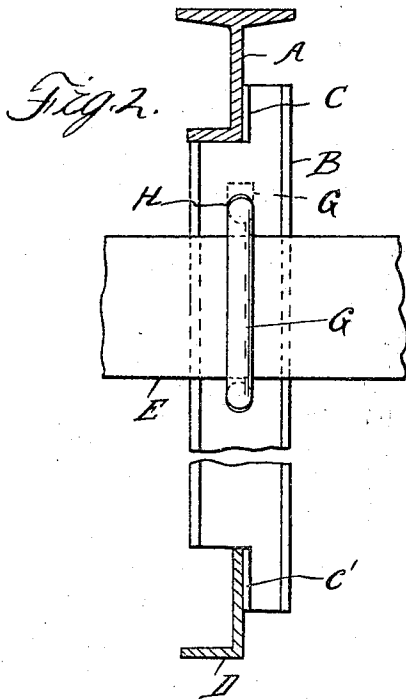
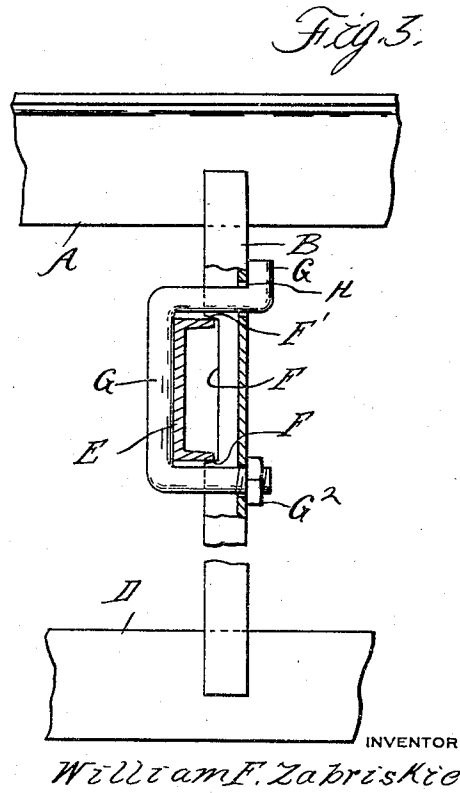
W. F. ZABRISKIE

1,824,797

CROSS BRACING AND BRIDGING FOR METALLIC JOISTS

Filed March 5, 1929

2 Sheets-Sheet 1



BY

Whittemore Halbert
Whittemore & Belknap

ATTORNEYS

Sept. 29, 1931.

W. F. ZABRISKIE

1,824,797

CROSS BRACING AND BRIDGING FOR METALLIC JOISTS

Filed March 5, 1929

2 Sheets-Sheet 2

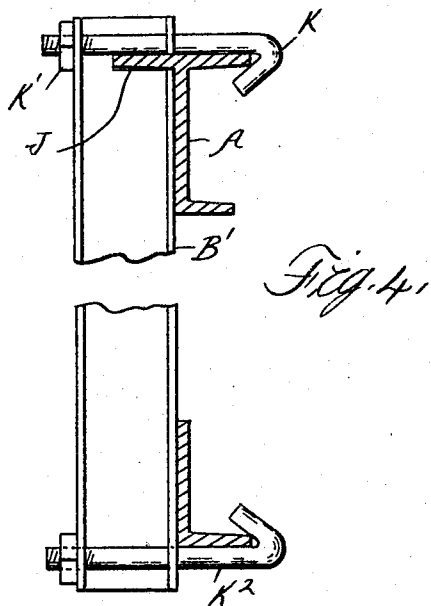


Fig. 4.

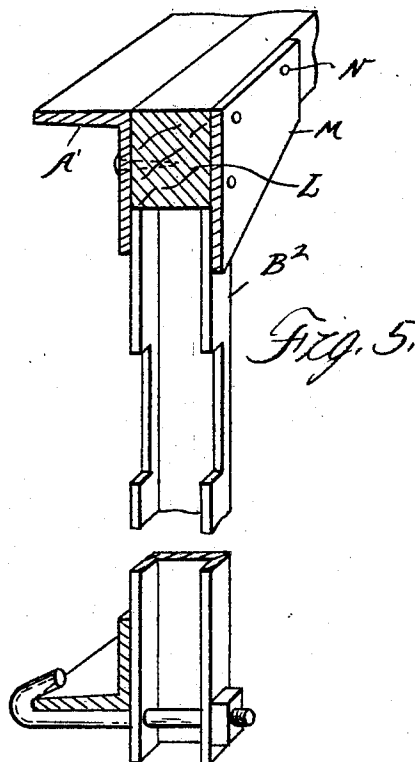


Fig. 5.

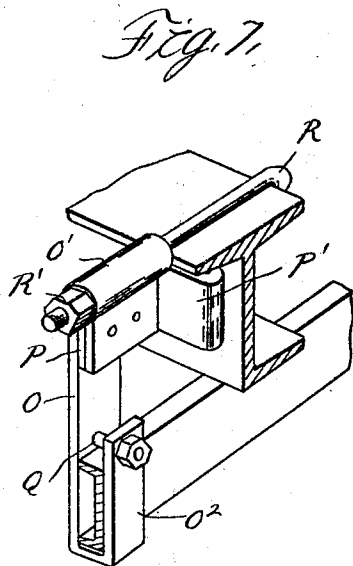


Fig. 7.

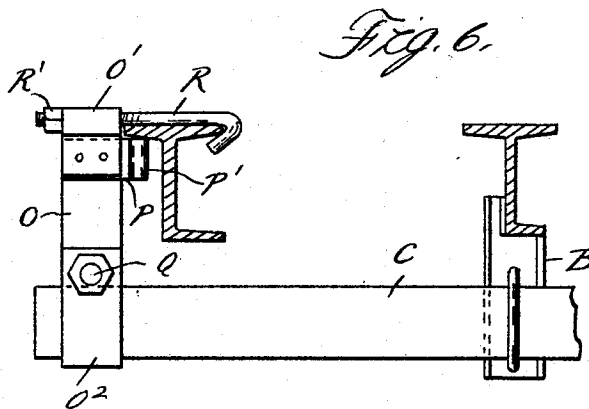


Fig. 6.

INVENTOR
William F. Zabriskie
BY Whittemore Hulbert
Whittemore & Belknap

ATTORNEYS

UNITED STATES PATENT OFFICE

WILLIAM F. ZABRISKIE, OF DETROIT, MICHIGAN, ASSIGNOR TO GABRIEL STEEL COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN

CROSS BRACING AND BRIDGING FOR METALLIC JOISTS

Application filed March 5, 1929. Serial No. 344,480.

It is the object of the invention to provide a construction of cross bracing and bridging which may be easily applied to various constructions of metallic floor joists and to various arrangements of said joists in the floor construction. To this end the invention consists in the construction as hereinafter set forth.

In the drawings:

Figure 1 is a diagrammatic plan view showing a portion of a floor construction having joists of varying lengths arranged adjacent to each other and showing the means of applying the cross bracing thereto;

Figure 2 is a cross section and Figure 3 a side elevation showing a construction of a permanently attached strut and the bracing bar in engagement therewith;

Figure 4 is a cross section illustrating one form of adjustable strut;

Figure 5 is a sectional perspective view illustrating another form of adjustable strut;

Figure 6 is a cross section showing the manner of bridging between adjacent series of joists having separate cross bracing members, and

Figure 7 is a perspective view of the bracket member shown in Figure 6.

While my improved cross bracing is applicable to various constructions of metallic joists, I have illustrated specifically that type such as shown in my prior Patents No. 1,622,559 of March 29, 1927, and No. 1,704,235 of March 5, 1929, in which the upper and lower cord members are formed of bars of structural shape. With such a construction it is possible to insert a strut member at a convenient point in the length of the joist and to provide this strut member with means for longitudinally attaching thereto a transversely extending bracing and bridging bar. Thus where the lengths of the joists in a portion of the floor construction are substantially the same, these struts in the successive joists will be in substantial alignment with each other so that a single brace bar may be extended to engage with each of the struts of the series. There are, however, floor constructions where such an arrangement is not possible, for the

reason that the joists are of various lengths and therefore the struts cannot be placed to line up with each other without interference with other portions of the joists. For such a condition I have provided means of attaching struts to the joists after the laying of the same, thus permitting of aligning said struts to receive the cross bracing.

With the construction illustrated in Figures 2 and 3 the joist is provided with a permanently attached strut and in which A represents a bar of structural shape which forms the upper cord member of the joist and B is the strut bar. This strut is preferably formed of a channel bar having its upper end transversely slitted a part way through and bent to form an attachment flange C which is welded to the web of the member A. In a similar manner the lower end of the strut B is slitted and bent to form an attachment flange C' which is welded to the lower cord member D of the joist. The portions of the bar adjacent to the flanges C and C' abut against the cord members A and D and thus the strut in addition to its function of a bracing connection constitutes a structural element of the joist.

E is a bracing bar adapted to extend transversely of a series of joists and to be rigidly attached to each of the struts thereof. The attachment between the struts and the bracing bar is preferably formed by notching or cutting away a portion of the flanges of the channel bar B as indicated at F so as to receive the bar E, which latter is also preferably formed of channel cross section. The opposite ends F' F² of the notch F are slightly tapered or beveled so that the bar E will have a wedge engagement therewith. The two members are then clamped to each other preferably by a U-bolt G which has its legs inserted through apertures H in the web of the bar B, one end of said bolt terminating in a hook G' while the opposite end is threaded for engagement with a nut G². Thus when the parts are assembled and the nut G² is tightened the flanges of the bar E will be forced into wedging engagement with the ends F' F² of the notch F so as to form a

rigid connection between the strut and the bracing bar.

The construction just described is applicable where the joists of a series are all substantially the same in length so that the struts thereof will be in substantial alignment. However, it frequently happens that the series of joists will be of varying lengths which would render it difficult or impossible to locate permanently attached struts that would line up with each other. In Figure 1 I have illustrated diagrammatically such a condition in which a series of joists I are of progressively increasing length. It is therefore necessary to arrange the struts in relatively different positions in order that they may line up with others in the series and furthermore it may be impossible to arrange the struts in all of the joists in the same line. Thus as shown the struts for a portion of the series are aligned to engage a brace bar E' and the struts for another portion of the series are differently aligned for engagement with a brace bar E². To permit of so attaching the struts I have devised constructions as shown in Figures 4 and 5 provided with means means for adjustably clamping or attaching the ends of the struts to the upper and lower cord members of the joist. In Figure 4 the strut bar B' which is of channel cross section, is notched at J to fit over the lateral flange of the upper cord member A. The bar B' also extends above the cord member A and is provided with a hooked bolt K passing through apertures in the flanges thereof and having a clamping nut K'. The lower end of the bar B' is provided with a similar hook bolt K², but as the lower cord member is merely an angle bar having its lateral flange extending away from the strut, it is unnecessary to notch each strut. With such a construction the struts for a series of joists may be so placed in relation to each joist as to line up with each other and wherever it is impossible to extend the alignment through the entire series a portion of the joists may have their struts differently aligned.

The construction shown in Figure 5 is particularly designed for use where a wooden floor is laid upon upper cord members of the joist. It is necessary to provide means for nailing the floor to the joist and therefore each of the upper cord members A' which as shown are formed of angle bars, has attached thereto a wooden nailing strip L. With this construction the strut B² may be clamped to the lower cord member in the same manner as illustrated in Figure 4, but to attach the upper end of the strut to the upper cord member I preferably provide a gusset plate M. This plate is welded to the upper portion of the bar B² and is arranged to overlap the side of the nailing strip

L to which it may be attached by nails as indicated at N.

Where as illustrated in Figure 1 one brace bar E' is clamped to a portion of a series of joists and another brace bar E² differently aligned is clamped to another portion of a series, it is necessary to provide a bracing and bridging connection between the adjacent joists attached to the respective bars. Thus as shown the bar E' overlaps the bar E² between the adjacent joists I' and I². The construction may be such that it would be impossible to place strut bars in the same joist for attachment to each of the brace bars E' E² and I have therefore devised a construction of bracket attachable to the upper cord member of the joist and depending therefrom into position for clamping engagement with a brace bar. Such a construction is illustrated in Figures 6 and 7 in which O is a bar having a return bend at its upper end forming the eye member O' and also clamping a bar P which extends transversely therefrom, terminating in the S-shaped bend P'. These parts are preferably rigidly attached to each other by welding. At the lower end of the bar O is a return bend O² which is proportioned to embrace the brace bar E and is also provided with a clamping bolt Q for rigid attachment to said bar. A hook bolt R is inserted through the eye O' and is provided with a clamping nut R'. In the construction as described the bracket is attached to a joist such as I' which is next adjacent to a joist I² having the last strut for engaging the brace bar E'. It will be noted, however, that the brace bar E' extends beyond the joist I² overlapping the joist I' so that it can be clamped in the return bend O² and thus rigidly attached. It will also be obvious that when the bolt R is clamped by the nut R' it will wedge the S-shaped end P' of the bar P beneath the tapering flange of the upper cord member A of the joist which makes a rigid connection between the bracket and this member.

What I claim as my invention is:

1. In a floor construction, the combination with a series of metallic joists, of a bracing and bridging connection therebetween comprising a strut rigidly attached to each joist and formed of a bar of channel cross section, the flanges of said bar being notched or cut away at one point, a transversely extending bracing bar engaging the notches in said flanges to interlock therewith and means for clamping said bracing bar to said strut.

2. In a floor construction, the combination with a series of metallic joists, of a bracing and bridging connection therefor including struts attachable to the successive joists to be in transverse alignment with each other, a bracing bar extending along the series of struts and means for rigidly clamping said bracing bar to each strut of the series.

3. In a floor construction, the combination with a series of metallic joists of varying lengths, each joist comprising upper and lower cord members, of a transverse bracing for said joist, comprising struts adjustably attachable to the upper and lower cord members of each joist so as to be in transverse alignment with each other in the successive joists, and a bracing bar rigidly clamped to each of said struts.

In testimony whereof I affix my signature.

WILLIAM F. ZABRISKIE. 70

10 each of said struts. 75

4. In a floor construction, the combination with a metallic joist having upper and lower cord members, of a strut for attachment to a brace and bridging bar, said strut being formed of a bar of channel cross section, the flanges of said channel being notched or cut away at one point for the reception of a brace bar and tapered to form a wedging engagement therewith, and means for clamping the bracing bar to said strut to form a rigid lock therewith. 80

5. In a floor construction, the combination with a metallic joist having upper and lower cord members, of a strut extending between said upper and lower cord members and attached thereto, said strut being formed of a bar of channel cross section having the flanges thereof cut away at one point to form a notch for receiving the bracing bar, and a U-bolt for embracing the bracing bar engaging apertures in the web portion of said strut and provided with a clamping nut. 85

6. In a floor construction, the combination with a series of metallic joists having upper and lower cord members, said joists being of varying lengths, of a transverse bracing therefor comprising a plurality of bracing bars for the joists of different portions of the series, said bracing bars being out of alignment with each other, a strut for each joist arranged to align with the respective bracing bars and rigidly clamped thereto, and a bracing and bridging connection between the two end joists of adjacent series comprising an extension to one of said bars to overlap the other of said bars, and a bracket attachable to the upper cord member of the joist and depending therefrom, being provided with clamping means for engaging the end of said overlapping bracing bar. 100

7. In a floor construction, the combination with a metallic joist having upper and lower cord members, the upper cord member being of structural shape and having oppositely extending flanges, of a bracket attachable to said upper cord member comprising a bar having an eye at its upper end and a laterally extending member attached thereto terminating in a transversely bent flange for engaging the under side of a flange of said structural shape, a hook bolt engaging said eye and hooking over the oppositely extending flange of said structural shape, a clamping nut for said bolt adapted to wedge said laterally projecting member against the flange of said 105

130