April 12, 1932. R. W. STAMBAUGH ET AL 1,853,645

JOIST

Filed Jan. 25, 1930 2 Sheets-Sheet 1

Fig. 1.

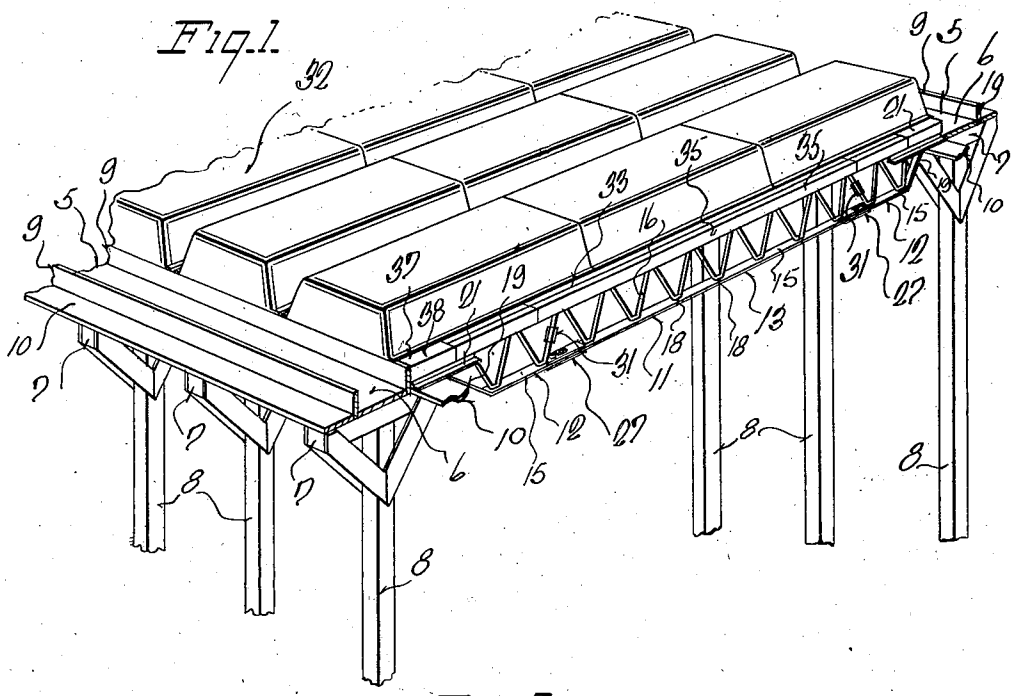
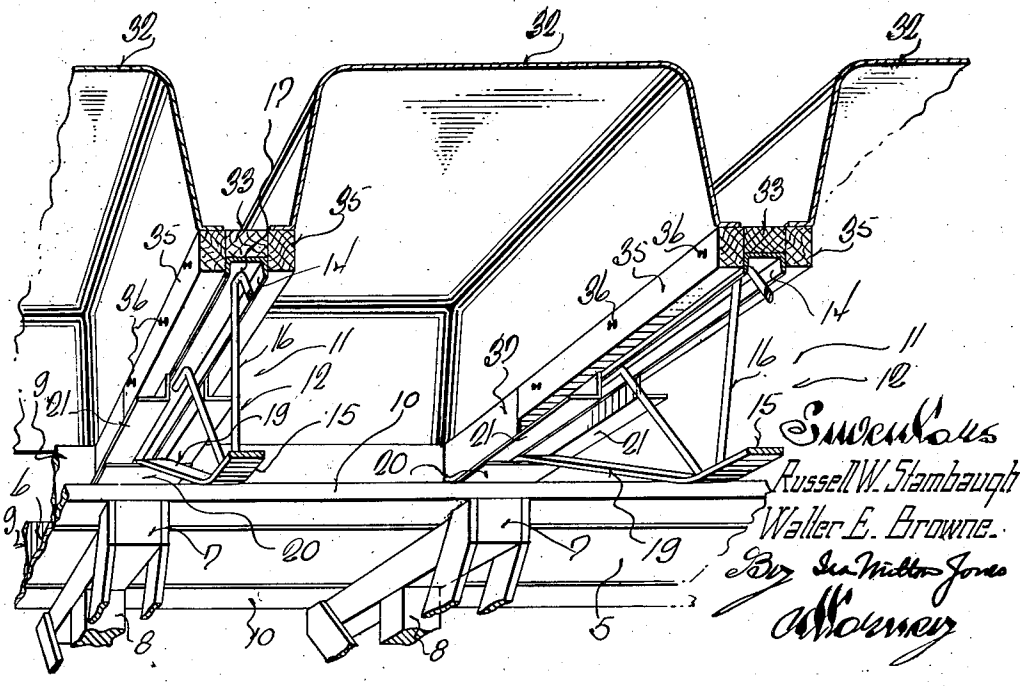


Fig. 2.



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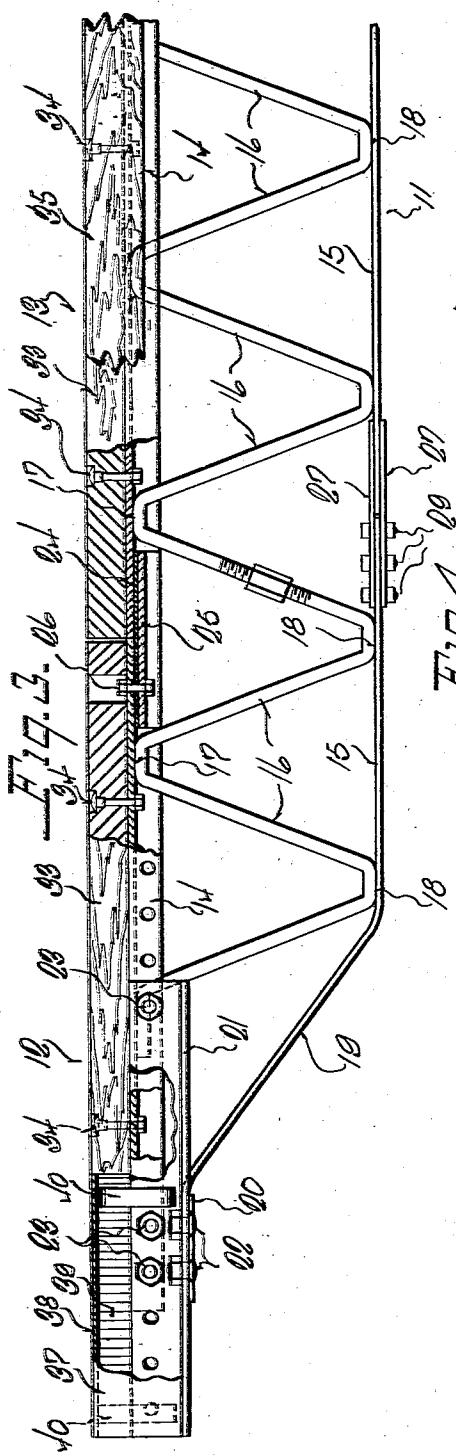

Fig. 3.

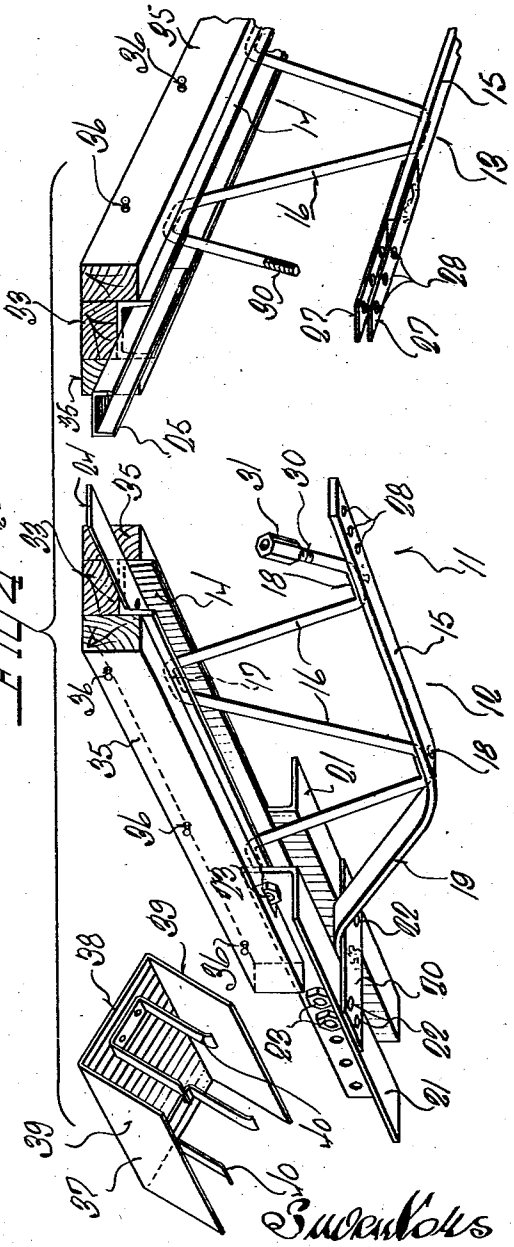

Fig. 4.

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UNITED STATES PATENT OFFICE

RUSSELL W. STAMBAUGH AND WALTER E. BROWNE, OF MILWAUKEE, WISCONSIN, ASSIGNORS TO ADJUSTABLE JOIST COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN

JOIST

Application filed January 25, 1930. Serial No. 423,438.

This invention relates to certain new and useful improvements in joists and refers more particularly to truss joists for supporting concrete forms during the construction of buildings and the like.

Heretofore it has been customary to support the soffit boards upon which the metal pans or forms are placed by vertical shoring spaced approximately two feet apart along the entire length of the boards, and as the distance between adjacent lines of shoring, which is governed by the width of the pans, was also about the same the entire floor space beneath the floor in progress was practically filled with vertical shoring.

This condition is obviously objectionable especially during cold weather and it is, therefore, one of the objects of this invention to provide an efficient joist which will adequately support the concrete forms and the poured floor independent of vertical shoring along its length, thus permitting the space below the floor in progress to be used for the storage of materials or as a working space for the various trades. With the present system of prop supporting the floor forms, it is possible to make up only one floor at a time and to pour that floor and allow the concrete to set before starting work on the next floor.

It is an object of the present invention to provide a method whereby the floor forms are supported from the structural steel and thus enable a plurality of floors to be made up either previous to the pouring of the lower floors, or while the pouring is in progress.

Another object of this invention is to provide novel means for adjusting the length of the joist without detracting from its strength to readily adapt it for universal use.

A more specific object of this invention resides in the provision of intermediate and end sections, the intermediate sections being of different lengths and being readily connected with each other and with the end sections to enable joists to be built up in any desired lengths.

A further object of this invention resides in the provision of means for adjusting the supporting portion of the end sections to provide finer adjustment of the length of the joists.

And a still further object of this invention resides in the provision of means whereby the support for the pans or forms may be quickly removed at any time without disturbing the joists, thus permitting the same to support the floor after it has set.

With the above and other objects in view which will appear as the description proceeds, our invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

In the accompanying drawings, we have illustrated one complete example of the physical embodiment of our invention constructed according to the best mode we have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a perspective view illustrating a typical building construction, and the manner of using the joists of this invention;

Figure 2 is an enlarged, fragmentary perspective view illustrating the manner of supporting the joists from the beam supports and the manner in which the joists support the concrete forms;

Figure 3 is a side elevational view with parts broken away and in section to illustrate structural details, of one end of a joist constructed in accordance with this invention, and

Figure 4 is a perspective view of an end section and the adjacent portion of an intermediate section separated from each other and illustrating the manner of connecting the same, and a guard housing for closing the extreme end of the end section.

Referring now more particularly to the accompanying drawings, in which like numerals designate like parts throughout the several views, the numeral 5 represents built-up troughs or forms for the beams of a conventional concrete floor, which consist of

bottom boards 6 supported on the transverse heads 7 of vertical supports 8, and side pieces 9 secured in any desired manner to the bottom boards. The ends of the transverse heads 7 extend beyond the vertical members 8 to carry boards 10 which provide a support for the joists of this invention, indicated generally by the numeral 11.

The joists comprise end and intermediate sections 12 and 13 respectively, readily detachably connected in a manner to be later described. The intermediate sections 13 are constructed in different lengths and thus permit joists to be built up for all practical spans, by connecting intermediate sections of the desired lengths between pairs of end sections.

The specific construction of the joists is the same throughout their entire length and includes top and bottom chords 14 and 15, respectively, maintained in parallel spaced relation by a plurality of diagonal braces or struts 16 which absorbs shearing stretches and are preferably formed by bending a single length of round bar stock and welding the same to the top and bottom chords, as at 17, and 18, respectively. Since the top chord 14 is a compressible member in each instance it is preferably channel shaped in cross section to provide the necessary rigidity and the bottom chord, which is subjected only to tension stresses, may be of flat bar stock or any other desired cross sectional shape.

The end sections differ from the intermediate sections in that their outer ends are adapted to engage suitable supports at their upper portions, and to this effect the bottom chord 15 has its outer end directed diagonally upwardly toward the top chord, as at 19, to be welded or otherwise secured to a transverse plate 20.The plate 20 extends across and is adjustably connected with the horizontal flanges of a pair of angle iron members 21 by bolts 22, and the vertical flanges of the angle iron members are adjustably connected with the flanges of the adjacent end portion of the top chord 14 by bolts 23, so that the angle iron members 21 are adjustable toward and away from the end section proper and thus providing an additional means of adjusting the overall length of the joists.

The spacing of the holes in the flanges of the angle iron members through which the bolts 22 and 23 pass and of the holes in the flanges of the top chord are such that the angle iron members may be moved toward and from the end sections in steps of approximately two inches, and for a total distance of approximately six inches. The two end sections of a joist thus provide about a twelve inch range of adjustment which supplement the adjustment afforded by the different lengths of the intermediate sections and readily permits the overall span of the joists to be adjusted in units of lengths less than the length of the shortest section to accommodate the distance between the supports.

The connection between the end sections and the intermediate sections includes, at the top, gusset plates 24 welded or otherwise secured to the inner surface of the end section top chord channel web, and which is receivable between the inner surface of the web of the adjacent end of the intermediate section top chord and a channel iron member 25 welded or otherwise secured to the adjacent end portion of the intermediate section top chord. When so engaged the adjacent ends of the top chords of the end and intermediate sections abut to impart stresses directly to each other. A bolt 26 passed through aligned apertures in the end section top chord, the gusset plate 24, and the channel 25 prevents accidental disengagement, but is not essential.

At the bottom, the sections are connected by pairs of spaced gusset plates 27 welded or otherwise secured to the end of the intermediate section bottom chord and between which the adjacent end of the end section bottom chord is receivable. Aligned apertures 28 in the gusset plates 27 and the adjacent end portion of the end section bottom chord are adapted to receive bolts 29 which securely connect the bottom chords of the two sections against tension stresses.

The diagonal braces or struts 16 of the sections have their adjacent ends threaded, as at 30, and are connected by an elongated nut 31 which, when the sections are separated may be carried by either section.

This manner of connecting the sections obtains throughout the entire structure so that the parts are readily interchangeable and permit quick addition or removal of sections to adapt the joists to any desired particular span.

With the joists built up to the desired length, they are placed in position with their ends supported upon the boards 10, as illustrated in Figures 1 and 2 and spaced according to the width of the pans 32 which are supported by the joists in the following manner:

Wooden nailing strips 33 are bolted, as at 34, to the upper surface of the top chords of the end and intermediate sections and are of a width substantially equal to the width of the channel member forming the top chords, to provide nailing strips for solid decking. However, in the construction illustrated in Figures 1 and 2, solid decking is not employed and the joists are therefore also equipped with side nailing strips 35 which, as best illustrated in Figures 2 and 4, are secured to the sides of the top strips 33 by double headed nails 36. The strips 35 extend beyond the normal width of the joist and provide means for supporting the pans 32, as clearly illustrated in Figure 2.

With the pans supported in this manner

the forms may be removed at any time without disturbing the joists, which remain to support the concrete until it has thoroughly dried, by merely removing the side strips 35 by drawing out the double headed nails 36.

In view of the adjustable feature of the end sections, the strips 33 and 35 are not extended to the very ends of the angle iron members 21 and the space thereabove is adapted to be closed by a hood 37 which, as best illustrated in Figure 4, has a top 38 and sides 39, to respectively form continuations of the top of the strip 33 and the outer sides of the strips 35 when in position. U shaped clips 40 riveted or otherwise secured to the top portion 38 are snugly engageable over the outer faces of the vertical flanges of the angle iron members to secure the hood in position.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art to which an invention of the character described appertains, that we provide a novel construction for joists which lends itself particularly well to use as a support for concrete forms without the use of vertical shoring to thus provide a useable space below the floor in progress, and whereby in steel skeleton construction any floor may be poured without waiting for the ordinary progress of the work. It is also apparent that the joists of this invention can be shipped and stored in lengths convenient for handling and that they may also be used as a permanent support for floors and when so used, permits their manufacture in regular commercial mill lengths which may be cut at any point and attached to the adjustable end sections to provide any desired length.

What we claim as our invention is:

1. A joist structure of the character described comprising, a plurality of sections, each section having a top and a bottom chord, diagonal braces connecting said top and bottom chords, means for readily detachably connecting adjacent end portions of the top and bottom chords and means for readily detachably connecting adjacent end portions of the diagonal braces of adjacent sections at points intermediate said top and bottom chords.

2. In a joist structure adapted to span the distance between two supports comprising, a rigid intermediate section having an upper and lower chord, diagonal braces connecting said upper and lower chord to hold the chords in spaced parallel relationship, a pair of end sections attached to the opposite ends respectively of said intermediate section, said end sections each having an upper and a lower chord detachably connected to the upper and lower chords of said intermediate section, diagonal braces between the upper and lower chords of said end sections and means connecting said diagonal braces and said end sections with the diagonal braces of said intermediate section intermediate said chords.

3. In a joist structure of the character described, an intermediate section having spaced top and bottom chords, diagonal braces connecting the top and bottom chords, a pair of end sections having top and bottom chords forming a continuance of the top and bottom chords respectively of said intermediate section, diagonal braces between the top and bottom chord of said end sections, means joining the ends of the top and bottom chords of said end sections to said intermediate section and means connecting the diagonal braces of the intermediate section with the ends of the braces of the end sections.

4. A joist structure of the character described, comprising separable sections each having top and bottom chords and diagonal braces connecting said chords, means readily detachably connecting the sections and including means readily detachably connecting the adjacent portions of the diagonal braces of the sections intermediate said chords.

5. A joist structure of the character described, comprising separable sections each having top and bottom chords diagonal braces maintaining said chords in spaced relation, means for readily detachably connecting the adjacent ends of the sections, said means including a member carried by one of the diagonal braces of one section readily engageable with an adjacent portion of one of the diagonal braces of the other section intermediate said chords.

6. A joist structure of the character described, comprising separable sections including top and bottom chords diagonal braces maintaining said top and bottom chords in spaced relation the outermost braces terminating intermediate said chords, means for readily detachably connecting the sections and including a nut member threadedly engageable with the adjacent ends of the diagonal braces.

7. A joist structure adapted to span a distance between two supports for supporting concrete forms or the like comprising, a plurality of sections detachably connected end to end, each section having an upper and lower chord and means connected to both upper and lower chords of one of said sections for readily adjusting the length of the joist structure in units of length less than the length of the shortest section to accommodate the distance between the supports.

8. A joist comprising a plurality of sections, means for varying the overall length of the joist, each section including spaced top and bottom chords, and a plurality of diagonal braces extending therebetween, the end braces of each section being free with respect to one of the chords, and means for connecting the ends of said sections with the free ends

of said braces brought into continuous bridging relation with respect to the chords.

9. A joist structure adapted to span a distance between two supports for supporting concrete forms or the like comprising, a plurality of sections each formed of a compression chord and a tension chord connected by a separate diagonal brace forming a zig-zag support throughout the length of the section, each brace having free end terminals, means for detachably connecting the adjacent ends of the compression and tension chords of each section, and means for associating the adjacent free end terminals of the diagonal braces to continue the zig-zag support throughout the length of the assembly.

10. A joist structure adapted to span a distance between two supports for supporting concrete forms or the like comprising, a plurality of sections each formed of a compression chord and a tension chord connected by a separate diagonal brace forming a zig-zag support throughout the length of the section, each brace having free end terminals, means for detachably connecting the adjacent ends of the compression and tension chords of each section, means for associatinig the adjacent free end terminals of the diagonal braces to continue the zig-zag support throughout the length of the assembly, and means to adjust the overall length of the joist assembly in units of length less than the length of any one section.

In testimony whereof, we have hereunto affixed our signatures.

RUSSELL W. STAMBAUGH.
WALTER E. BROWNE.