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S. MACOMBER

1,737,601

COMPOSITE WOOD METAL STRUCTURAL UNIT

Filed Dec. 24, 1927

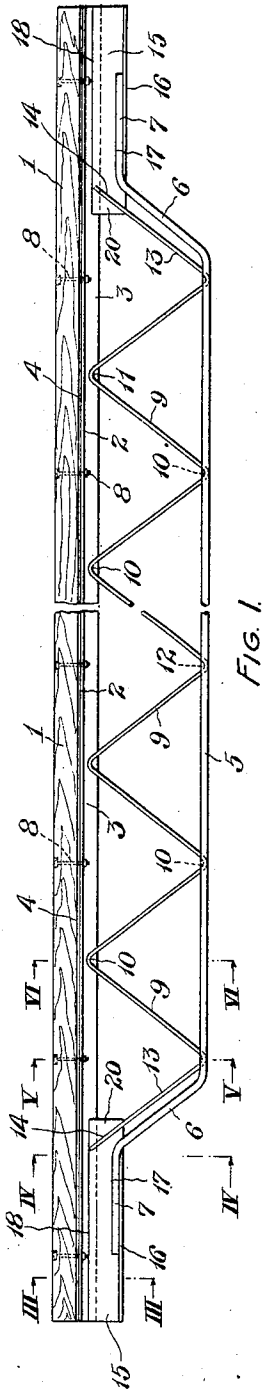


FIG. 1.

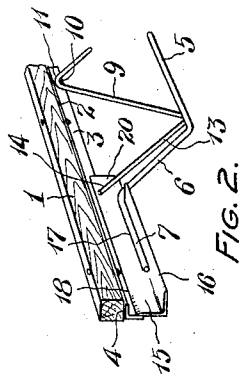


FIG. 2.

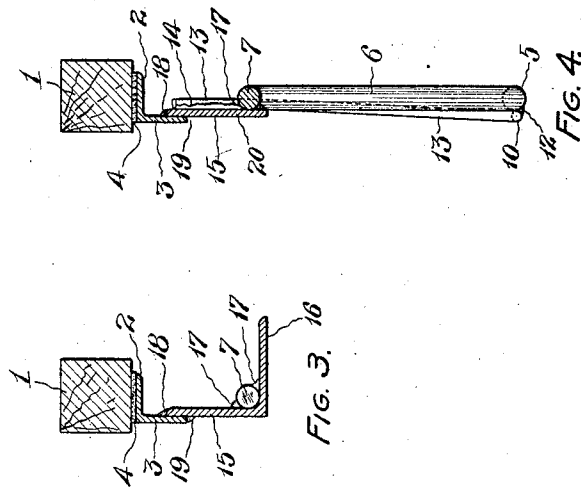


FIG. 3.

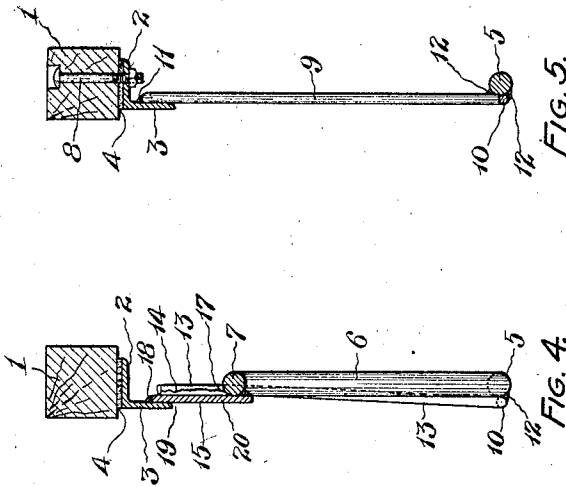


FIG. 4.

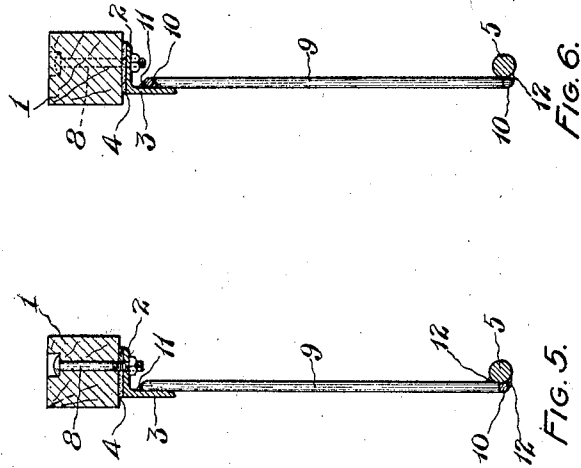


FIG. 5.

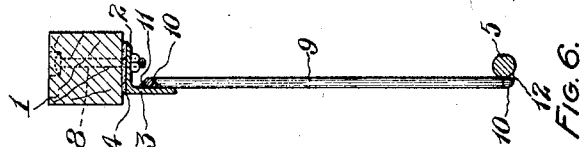


FIG. 6.

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UNITED STATES PATENT OFFICE

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COMPOSITE WOOD-METAL STRUCTURAL UNIT

Application filed December 24, 1927. Serial No. 242,354.

This invention relates to improvements in structural units of the general type shown in my United States Patent No. 1,651,032. In said patent there is disclosed a metal unit of a light truss-like structure adapted for use instead of beams in carrying light loads, as in the case of floor joists, columns, roof purlins, and reinforcement for concrete floors, etc. The invention comprises, as illustrated in that patent, a truss center and extension beam ends whereby with a minimum amount of material the unit is designed to carry a predetermined load and at the same time provide, together with other described advantages, a flexibility as to the span which the unit can cover. The present invention relates to improvements in a joist of this general character for use in competition with or as a substitute for wood supports in wood floor construction.

The particular improvements of the present invention consist in replacing the upper metal chord of the joist of said Patent No. 1,651,032 with a wood nailing strip, in combination with a small connecting angle running lengthwise of the wood strip and serving to attach the web bar securely and carry the stresses to the nailing strip. This connecting angle also directly carries a minor portion of the stresses. Such an improved construction greatly cheapens and lightens the joist, while at the same time adequately caring for the stresses which the several parts of the joist should withstand and the stress load which the unit as a whole should carry. Also, economy in installation is effected in thus being enabled to provide the necessary nailing strip which, otherwise, would require extra operations and additional members.

The annexed drawing and the following description set forth in detail certain means embodying my invention, such disclosed means showing, however, but one of the various forms in which the principle of the invention may be exemplified.

In said annexed drawing:

Figure 1 is a broken side elevation of the complete joist;

Figure 2 is a perspective view of one end of the joist; and

Figures 3, 4, 5, and 6 are transverse vertical sections, upon an enlarged scale, taken, respectively, in the planes denoted by the lines III—III, IV—IV, V—V, and VI—VI, Figure 1.

Referring to the annexed drawing in which the same parts are indicated by the same respective ordinals in the several views, I show a wood strip 1 which is a wood joist or timber of substantial cross-section and which will serve both for the usual nailing strip of wood floor construction, and, in connection with a metal angle hereinafter fully described, carry the compression loads for which the joist is designed, in lieu of the usual metal upper chord. To this nailing strip 1 and below the same I secure by bolts 8 an angle member running lengthwise of the joist and having the horizontal leg 2 and the vertical leg 3. Between the nailing strip 1 and the horizontal leg 2 of the connecting angle may be placed cushioning material such as the felt strip 4. The lower chord of my improved joist is comprised of a metal member 5 spaced from the upper wood-metal top chord and running substantially parallel with the latter throughout the major portion of its length, the ends of the member 5 being extended upwardly into the inclined portions 6 and thence horizontally into the end members 7 disposed closely adjacent the ends of the nailing strip 1 and running parallel therewith. For purposes of illustration I have shown the bottom chord 5 as a round bar. Serving to connect the top and bottom chords is a continuous, reversely bent web member 9 whose angles 10 are connected in alternate relation to the vertical leg 3 of the upper-chord connecting angle, and to the bottom chord 5, the connections preferably being made by means of welded joints 11 and 12, respectively. The ends 7 of the bottom chord 5 are welded to, and preferably in the angles of, a pair of joist-end angle members having horizontal legs 16 and vertical legs 15, the latter being secured along their upper edges to the vertical legs 3 of the top-chord connecting angle, the respective connections prefer-

ably being made by welding, as illustrated by the respective ordinals 17 and 18, 19. The ends of the web-member 9 are turned upwardly into the inclined portions 13 and are secured by welded joints 14 to the inner portions 20 of the vertical legs 15 of the respective end angles, as plainly shown in Figures 2 and 4.

This improved joist can be supported to cover the given span at any desired point along the horizontal legs 16 of the extended integrated end portions. These horizontal legs 16 of the end angles serve as continuous joist-end supporting members. The top-chord connecting angle 2—3 serves as efficient means for attaching the intermediate web 9 and conveying the stresses to the nailing-strip 1. This connecting angle 2—3 also directly carries a certain part of the upper chord stresses, but the major portion of these stresses is cared for by the wood joist 1.

By the construction described, and plainly shown in the accompanying drawing, I preserve the general advantages of the structural unit described in said Patent No. 1,651,032, and at the same time greatly decrease the weight of the unit for use in wood floor construction and the cost of construction and installation of the unit.

What I claim is:

1. A composite wood-metal structural unit for use in wood floor constructions, comprising a top chord consisting of a wood joist and a metal web-securing member running longitudinally of and adjacently beneath said wood joist and secured thereto, a metal bottom chord, a metal web-member connecting said top and bottom chords, and metal unit-end reinforcing means respectively connected to and integrating the ends of said chords and said web-member.

2. A composite wood-metal structural unit for use in wood floor constructions, comprising a top chord consisting of a wood joist and a metal web-securing member running longitudinally of and adjacently beneath said wood joist and secured thereto, in combination with cushioning material disposed between said wood joist and said metal web-securing member, a metal bottom chord, a metal web-member connecting said top and bottom chords, and metal unit-end reinforcing means respectively connected to and integrating the ends of said chords and said web-member.

3. A composite wood-metal structural unit for use in wood floor constructions, comprising a top chord consisting of a wood joist and a metal web-securing member running longitudinally of and adjacently beneath said wood joist and secured thereto, a metal bottom chord spaced from said top chord and having its ends bent upwardly into closely proximate relation to the corresponding ends of said top chord, supporting unit-end metal

angles respectively secured below and to the ends of said metal web-securing member and also secured to the ends of said bottom chord, and a metal web-member connecting said top and bottom chords, the extreme end portions of said web-member being secured to said supporting unit-end angles.

4. A composite wood-metal structural unit for use in wood floor constructions comprising a top chord consisting of a wood joist and a metal angle secured by one leg to the bottom face of said wood joist and having its other leg extended downwardly, a metal bottom chord spaced from said top chord and running parallel therewith for the major portion of its length, the ends of said bottom chord being extended upwardly and then horizontally in parallel closely proximate relation to the corresponding ends of said top chord, supporting unit-end metal angles respectively secured by a vertically-extended leg to the downwardly-extending leg of said top-chord angle and having their other respective legs extended laterally, the horizontal end extensions of the bottom chord being secured respectively to the top faces of the laterally-extended legs of the end angles, and a continuous reversely bent metal web-member connected at its angles in alternate relation to the widely spaced parallel portions of said top and bottom chords, the extreme end portions of said web-member being secured respectively to the vertical legs of said supporting unit-end angles.

Signed by me this 14th day of December, 1927.

STANLEY MACOMBER.