June 24, 1930. S. MACOMBER 1,766,181

STRUCTURAL UNIT

Filed Feb. 3, 1927

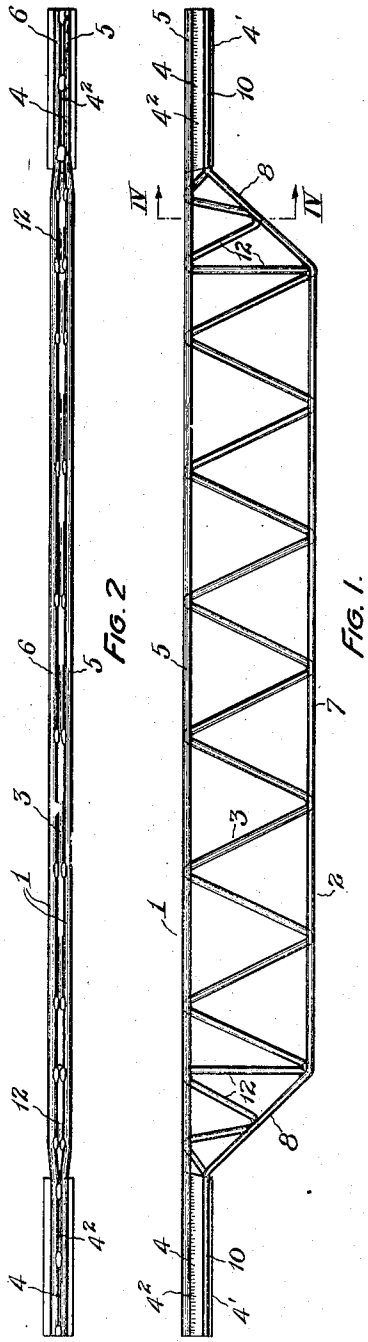


FIG. 2

FIG. 1.

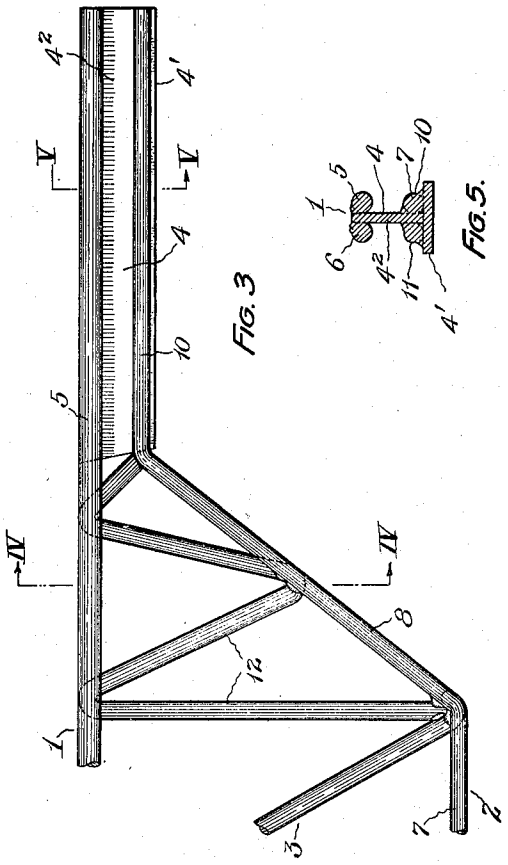


FIG. 3

FIG. 5.

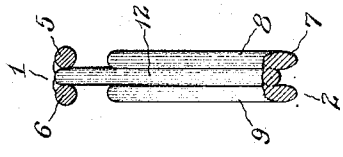


FIG. 4.

INVENTOR:
STANLEY MACOMBER
BY George W. Saywell
ATTORNEY.

Patented June 24, 1930 1,766,181

UNITED STATES PATENT OFFICE

STANLEY MACOMBER, OF EDGEFIELD DISTRICT, STARK COUNTY, OHIO, ASSIGNOR TO THE MACOMBER STEEL COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO

STRUCTURAL UNIT

Application filed February 3, 1927. Serial No. 165,578.

My invention relates to structural units and particularly to truss devices of this character utilized for fireproof floor construction, roof girders, etc. The particular improvement herein presented relates to a new construction for providing the necessary end rigidity in truss structures of this character which have a bar forming a top chord and a bar forming a bottom chord united and connected by an intermediate web bar comprised of a series of alternate oppositely-directed angle portions, and end reinforcing members secured to the respective ends of these top and bottom chords and web bar, or other means in lieu of such members for rigidly securing together and strengthening the end portions of the top and bottom chords. Truss structures of this character provide a standardization as to length, enabling a single truss to serve for a plurality of spans, as also providing various other advantages all of which are shown, described and claimed in other patent applications previously filed by me. This particular improvement consists in shortening the said end members and providing in lieu of the inner ends thereof additional end web-members as hereinafter fully described. Although this improvement is shown in the accompanying drawing in connection with a preferred form of truss structure which has two spaced bars forming the top chord and two other spaced bars forming the bottom chord, it is not limited to such particular chord constructions, but the latter may be single bars either round or square, or angles or channels or other suitable shapes.

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

In said annexed drawing:

Figure 1 represents a side elevation of my improvement as embodied in a twin-bar-chord unit of preferred construction;

Figure 2 is a plan view;

Figure 3 is an enlarged view of one end portion of the unit;

Figure 4 is a transverse vertical section upon an enlarged scale, taken in the plane indicated by the line IV—IV, Figure 1; and

Figure 5 is a transverse vertical section, taken in the plane indicated by the line V—V, Figure 3.

Referring to the annexed drawing in which the same parts are indicated by the same respective ordinals in the several views, I indicate an upper truss chord by the ordinal 1, a lower truss chord by the ordinal 2, a web-member connecting said chords 1 and 2 by the ordinal 3, and end reinforcing members by the ordinals 4, all as generally shown in Figure 1. The upper chord 1, in the form of unit illustrated, is comprised of two spaced bars 5 and 6 and the lower chord 2 is comprised of two spaced bars of which the main portion of only one appears in the accompanying drawing, viz., bar 7. The lower chord bars are extended upwardly near their ends, as indicated by bar sections 8 and 9, and their extreme ends 10 and 11 are extended in parallel relation to the ends of the upper chord bars 5 and 6 and closely adjacent the latter, as plainly shown in Figures 1 and 3. Secured to the ends of the chord bars 5 and 6 and the end extensions 10 and 11 of the lower chord 2 are the reinforcement members 4 which are comprised of two plates 4^1 and 4^2 forming an inverted T-construction, the bars 10 and 11 lying upon the flanges of the T-member 4^1 and being rigidly secured thereto, preferably by welding, the upper chord bars 5 and 6 being secured to the sides of the web 4^2 of the T-member 4 and adjacent the top edge of the latter. The web 3 runs continuously between the upper and lower chords 1 and 2 for a distance approximately equal to the widely spaced parallel portions of these chords, and consists of a series of reversed angle portions alternately connected to the chords 1 and 2 between the respective pairs of parallel bars composing these chords, as plainly shown in Figure 1.

In constructions of this character heretofore, the web portions 4^2 of these end members 4 have extended inwardly to a point adjacent the connection of the end angles of

the web 3 to the top chord 1 and have been secured to the top chord 1 or web 3 at about this point. In the improvement herein shown, I have shortened the end reinforcement plates 4^2 so that they extend inwardly only a distance approximately equal to the closely spaced parallel relation of the top and bottom chord member, i. e., to the inner end of the chord sections 10 and 11 or to the top and bottom inclined chord sections 8 and 9. I provide substitute reinforcements for the end plate portions thus omitted, and this substitute reinforcement consists of additional web members 12 comprised of a plurality of reversed angle portions alternately secured top and bottom to the other members of the unit, the particular construction shown in the accompanying drawing having the inner end of the additional reinforcement bar 12 secured to the bottom chord 2 and the end of the central web member 3 at the point of connection of this web and the bottom chord portion 7, the first upper angle of the additional reinforcement 12 being secured to the upper chord 1 and between the bars 5 and 6 thereof at a point substantially vertically aligned with the bottom connection just mentioned, a central angle of the reinforcement 12 being secured between the inclined portions 8 and 9 of the bottom chord and about centrally of these inclined portions, a second upper angle of the reinforcement 12 being secured between the upper chord bars 5 and 6 at a point somewhat interiorly of the inner end of the reinforcement member 4, and the extreme outer end of the reinforcement 12 being secured to the bottom chord at about the inner end of the upper portions 10 and 11 thereof, and also being secured to the inner edge of the reinforcement member 4.

The above construction affords means for obtaining the necessary end rigidity without the necessity of extending the end members 4 inwardly to the main web member 3, the result being effected by the use of properly designed end web bar portions 12 of substantially the gauge and character of the bar of which the main web 3 is comprised.

What I claim is:

1. In a truss-like structural unit, the combination of a top chord-member; a bottom chord-member lying parallel with said top chord-member throughout the major portion of its length and having its ends bent upwardly and then into parallel closely proximate relation to the corresponding ends of said top chord-member; a member bent to form a series of alternate oppositely directed angles, said angles being secured to the top and bottom chord-members, respectively, said last-named member forming a central web-member; stiffening plates secured to said ends of said top and bottom chord-members; and additional end web-members rigidly secured to the upwardly bent ends of said bottom chord-member and also rigidly secured to the top chord-member and to the connected ends of said top and bottom chord-members, and serving to tie such connected ends into the central truss portion so as to adapt the unit as a whole to sustain a predetermined load irrespective of its points of support upon said connected ends and stiffening plates.

2. In a truss-like structural unit, the combination of two parallel rods forming a top chord-member; two other rods spaced from but lying parallel with said first-named rods throughout the major portion of their length, said last-named rods forming a bottom chord-member and having their ends bent upwardly and then into closely proximate relation to the corresponding ends of said top chord-member; still another rod bent to form a series of alternate oppositely directed angles, said angles being secured to the top and bottom chord-members, respectively, in the spaces between the respective pairs of rods, said last-mentioned rod constituting a central web-member; vertical stiffening plates secured to said ends of said top and bottom chord-members; and additional end rod web-members rigidly secured to the upwardly bent ends of said bottom chord-member, and also rigidly secured to the top chord-member and to the connected ends of said top and bottom chord-members and serving to tie such connected ends into the central truss portion so as to adapt the unit as a whole to sustain a predetermined load irrespective of its points of support upon said connected ends and said stiffening plates.

3. In a truss-like structural unit, the combination of a top chord-member; a bottom chord-member lying parallel with said top chord-member throughout the major portion of its length and having its ends bent upwardly; a central web-member bent to form a series of alternate oppositely directed angles, said angles being secured to said top and bottom chord-members respectively, the extreme ends of said bottom chord-member lying parallel with the corresponding ends of said top chord-member and closely adjacent thereto; vertical stiffening plates secured to said ends of said top and bottom chord-members and extending inwardly to a distance approximately equal to the closely adjacent parallel portions of said top and bottom chord-members; and additional end web-members bent to form alternate oppositely directed angles, said angles being secured to said top and bottom chord-members intermediate said central web-member and said stiffening plates, the extreme ends of said end web-members being secured, respectively, to the inner ends of said stiffening plates and to said bottom

chord-member at the junction thereof with the ends of said central web-member, whereby said additional end web-members serve to tie the connected ends of the top and bottom chord-members into the central truss portion so as to adapt the unit as a whole to sustain a predetermined load irrespective of its points of support upon said chord-member ends and said stiffening plates.

4. In a truss-like structural unit, the combination of two parallel rods forming a top chord-member; two other rods spaced from but lying parallel with said first-named rods throughout the major portion of their length, said last-named rods forming a bottom chord-member and having their ends bent upwardly; still another rod forming a central web-member and bent to form a series of alternate oppositely directed angles, said angles being secured to said top and bottom chord-members in the spaces between the respective pairs of rods, the extreme ends of said bottom chord-member lying parallel with the corresponding ends of said top chord-member and closely adjacent thereto; vertical stiffening plates secured to said ends of said top and bottom chord-members and extending inwardly for a distance approximately equal to the closely adjacent parallel portions of said top and bottom chord-members; and additional end rod web-members bent to form alternate oppositely directed angles, said angles being secured to said top and bottom chord-members intermediate said central web-member and said stiffening plates, the extreme ends of said web-members being secured, respectively, to the inner ends of said stiffening plates and to said bottom chord-member at the junction point of the latter with the ends of said central web-member, whereby said end web-members serve to tie the connected ends of said top and bottom chord-members into the central truss portion so as to adapt the unit as a whole to sustain a predetermined load irrespective of its points of support upon said connected ends and said stiffening plates.

Signed by me this 28 day of January, 1927.

STANLEY MACOMBER.