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STRUCTURAL ELEMENT

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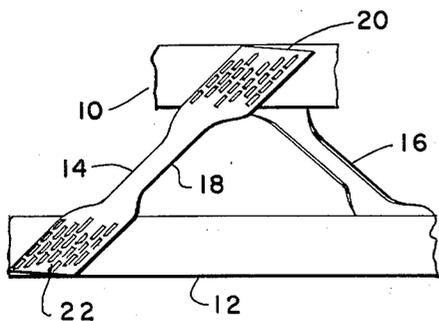


FIG. 1.

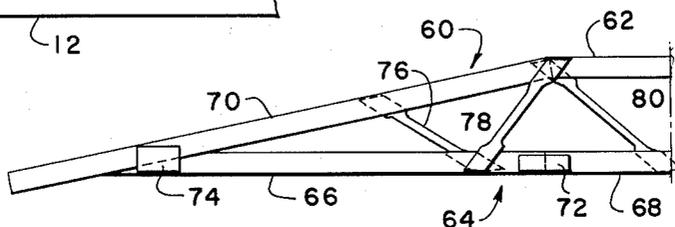


FIG. 2.

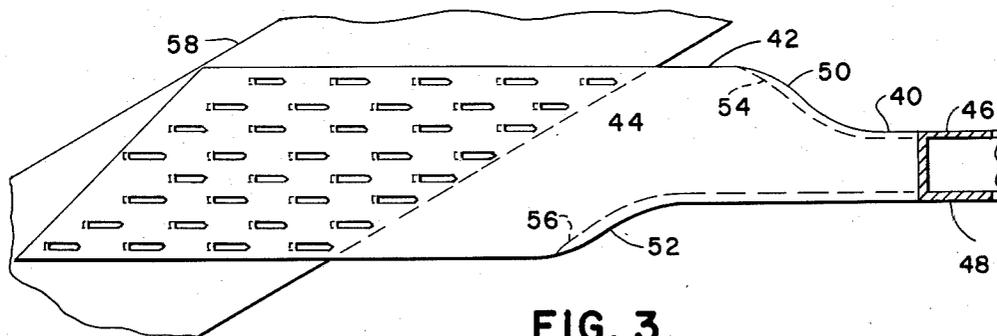


FIG. 3.

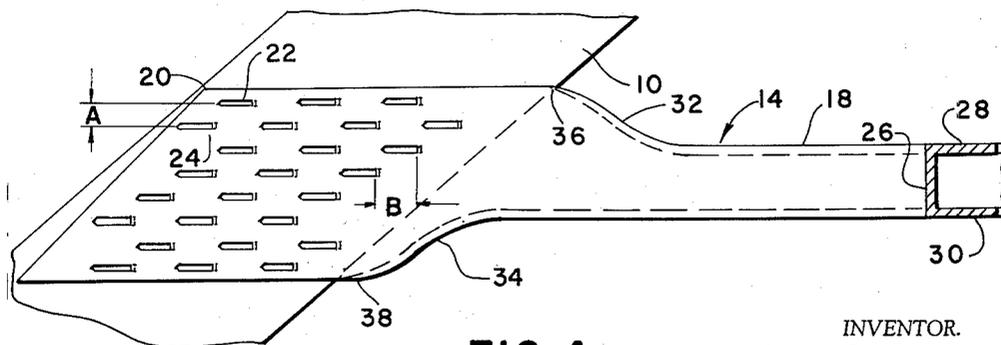


FIG. 4.

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STRUCTURAL ELEMENT

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 4 Claims. (Cl. 20-92)

This invention relates to metal connectors for wooden members and more particularly relates to unitary metal connectors and web members capable of bearing a structural load and joining timbers bearing a structural load.

In the prefabrication of housing and other structures and particularly in the preparation of roof trusses the cost of manufacture has become a critical factor. Because of this, considerable activity has been devoted to truss development and particularly to the development of structural timber connectors capable of replacing the multi-part metal connectors which have been proposed in the past and the older nailed joints which require excessive hand labor. In my copending application Serial No. 609,434, now U.S. Patent No. 2,877,520, I have disclosed a metal connector suitable for this purpose and capable of forming all of the necessary structural joints in truss members.

This application is a continuation in part of my aforementioned copending application and relates to an invention to be used in trusses formed with the connectors of that application. According to the present invention, it has been found that the aforementioned connectors may be combined in a unique manner with a web member so as to form a structural web which may be used to replace wood web members. The use of such metal web members which carry their own integral connecting means results in a decrease in the cost of the manufactured trusses and is adaptable to all types of truss construction. As an example, the metal web members of the present invention may be used in hip trusses in a particular advantageous form, simply being placed across the top and bottom chords at the designed positions and then pressed into the wood. This arrangement precludes the high labor cost of frequently changing saw positions to make seldom used double cuts as well as that of tediously framing the finished member between the two chords to give a tight joint. In addition to this, it is frequently possible to use the web member and its connectors for also serving a splicing function.

It is accordingly a primary object of the present invention to provide a unitary web member having integral connectors for assembly into wooden structural units in a stress transmitting capacity.

It is another object of the invention to provide an improved metal web member having integral connectors which is usable in wooden structural units in place of wooden webs at a reduction in cost.

It is another object of the present invention to provide a metal web member having integral connectors usable in the construction of trusses to provide a reduction in cost.

It is still a further object of the invention to provide a metal web member capable of serving as a stress bearing web between spaced truss chords and at the same time splicing butted chords.

These and further objects and advantages of the invention will become more apparent upon reference to the following specification and claims and appended drawings wherein:

FIGURE 1 is a vertical elevation showing a portion of a hip truss having a pair of web members connected thereto according to the present invention;

FIGURE 2 is a vertical elevation showing one-half of a hip truss having metal web members connected thereto according to another embodiment of the invention

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wherein the web members also serve a splicing function;

FIGURE 3 is a partial vertical elevation showing details of one end of a tension web member constructed according to the present invention and showing at the right end thereof, a cross section of the web; and

FIGURE 4 is a partial vertical elevation showing the details of one end of a compression web member constructed according to another embodiment of the invention and showing at the right end thereof, a cross section of the web.

Referring to FIGURE 1, there are shown a pair of wooden members 10 and 12 which may constitute the top and bottom chords of a conventional hip truss. These chords are connected together by a pair of web members 14 and 16 which replace not only wooden webs but also the various types of connectors used in connection therewith.

Each web member, such as web member 14, comprises a web 18 having integral connector end plates 20 and 22. The web members 14 and 16 shown in FIGURE 1 are loaded in compression and the end of web member 14 is shown in detail in FIGURE 4.

Referring to FIGURE 4, the connector end plate 20 is provided with a plurality of rows of struck-out teeth or nails 22-24, etc., which are pressed into the chord 10. The teeth in adjacent rows 22 and 24 are staggered and it is essential that a minimum of three and preferably more rows of nails must be used in order to provide the desired structural rigidity. The details of the plates and nails are set out in my aforementioned copending application. Briefly, if the metal plate is too thin, the nails bend when pressed into the wood. If the nails are too short, lateral resistance (shear) and withdrawal resistance (pull out) are inadequate. If the nails are too long, they tend to bend on being pressed into the wood. If the nails are too wide, they tend to chop the grain rather than separate it and substantially reduce the strength of the joint. The nails should be at least six times the thickness of the metal plate and having a width on the order of the thickness of the plate. With regard to other dimensions, according to a specific example, the entire web member, including the ends, is formed from 14 gauge galvanized steel plate. The nails extend  $1\frac{3}{16}$  inch from the under surface of the connector plate, and are  $\frac{1}{8}$  inch in width. The spacing A between rows is  $\frac{3}{8}$  inch and the spacing B between adjacent teeth or nails is  $2\frac{1}{32}$  inch. As pointed out in my copending application, it is desirable to have the slots left by the nails pointing towards the web for best loading characteristics. That is to say, the nails or teeth are pointed and the slots left by the striking of such nails are also pointed. According to the preferred embodiment of my invention these points should extend toward the web.

The web 18 is formed in the shape of a channel having a top 26 and depending side flanges 28 and 30. The flanges 28 and 30 are flared at 32 and 34 as the web joins the connector plate 20 and the end edges of the flanges 36 and 38 preferably abut against the edge of the chord 10 where a compression load is to be carried. In a preferred form, the dimension of the flanges is equal to the dimension of the top. That is to say, in the web member shown in FIGURE 4, the flanges 28 and 30 and the top 26 may all be one inch in width. It will be obvious that the web members may be furnished in various sizes and that the dimensions may be varied to suit the magnitude and nature of the load to be carried.

Referring to FIGURE 3, there is shown another embodiment of a web member which may be used where the web is to be stressed in tension rather than compression. According to this embodiment of the invention, a web 40 is provided with a connector plate 42 having rows of nails 44 struck therefrom as in the embodiment of the

invention illustrated in FIGURE 4. The web is provided with depending flanges 46 and 48 and these are flared at 50 and 52 as in the embodiment of the invention illustrated in FIGURE 4. Where a tension load is to be carried, however, it is not necessarily preferable that the ends 54 and 56 of the depending flanges engage the edge of the chord 58.

Referring to FIGURE 2, there is shown an illustration of the versatility of the web member of this invention. In that figure, there is shown one-half of a hip truss 60 having a top chord 62 and a bottom chord 64 formed of spliced members 66 and 68. The top chord 62 and bottom chord 66 are butted by a further top chord 70. Bottom chords 66 and 68 are spliced by means of connector plates 72 which are of the type described in my aforementioned copending application and which may be formed according to the dimensions set forth hereinabove relative to the connectors at the end of the web members here described. The left end of bottom chord 66 may be joined to top chord 70 by a similar connector 74.

Bracing between the chords is provided by a series of metal web members constructed according to this invention and indicated at 76, 78 and 80. It will be noted that the top connector plates of web members 78 and 80 are utilized not only to attach the web members to the top chords 70 and 62 but also to splice the ends of chords 70 and 62 together, thereby eliminating not only the wooden webs and conventional connectors which would be used therewith, but also the connectors which would be used to join top chords 70 and 62. It is believed that it will be apparent from this illustration that an infinite variety of uses may be made of the web members of this invention to reduce the cost of trusses and other prefabricated structural units.

From the foregoing, it will be seen that there is presented according to this invention a unique structural element which may be utilized to replace wooden webs in roof trusses and other prefabricated structural elements at a material reduction in cost. The units are versatile in character and may be used in certain environments to perform other connector functions while at the same time serving such a structural purpose. Where the words channel shaped are used herein it is to be understood that shapes other than that illustrated may be used, such as V-shaped or other equivalent sections.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A unitary metal connector comprising a pair of metal plates each having substantially parallel faces, at least three spaced substantially parallel rows of elongated teeth struck from each plate to leave three spaced rows of slots, said teeth having a width on the order of the thickness of said plates so as to be slender and nail-like in appearance in all directions and having a length equal to at least six times the thickness of said plate, a first pair of substantially parallel sides of each said tooth being formed by said faces of each said plate, a second pair of

substantially parallel sides of each said tooth joining said first pair of sides, said teeth terminating in pointed ends and extending away from said plates substantially normal thereto for embedment in wooden members, said plates being connected by a channel shaped metal web integral with said plates.

2. A connector as set out in claim 1 wherein the teeth to one side of a transverse center line through said web perpendicular to the rows of teeth are struck in a direction so that the slots left by the striking extend from the teeth toward the center line, and the teeth on the opposite side of said center line are struck in an opposite direction so that the slots left by the striking extend from the teeth towards the center line.

3. A unitary metal connector comprising a pair of rigid metal plates each having substantially parallel faces, said plates being connected by a longitudinally folded rigid metal web integral with said plates, said parallel plate faces lying in planes substantially parallel with the longitudinal axis of said web, at least three spaced substantially parallel rows of elongated teeth struck from each plate to leave three spaced rows of slots, said teeth having a width on the order of the thickness of said plates so as to be slender on all sides to give a nail-like appearance and having a length equal to at least six times the thickness of said plate, a first pair of sides of each tooth being formed by said faces of each plate, a second pair of substantially parallel sides of each tooth joining said first pair of sides, said teeth terminating in pointed ends and extending away from said plates substantially normal thereto for embedment in wooden members.

4. A structural unit comprising a pair of butting wooden members and a spaced third wooden member, a connector joining said butted wooden members and said spaced wooden member, said connector comprising a pair of rigid metal plates having substantially parallel faces, said plates being connected by a longitudinally folded rigid metal web integral with said plates, said parallel plate faces lying in planes substantially parallel with the longitudinal axis of said web, at least three spaced substantially parallel rows of elongated teeth struck from each plate to leave three spaced rows of slots, said teeth having a width on the order of the thickness of said plates so as to be slender on all sides to give a nail-like appearance and having a length equal to at least six times the thickness of said plate, said teeth terminating in pointed ends and extending away from said plates substantially perpendicular thereto, a first perpendicular pair of sides of each tooth being formed by said faces of each plate, a second pair of perpendicular sides of each tooth joining said first pair of sides, the teeth of one of said plates entering both said butted wooden members to join said butted wooden members together and the teeth of the other of said plates entering said third wooden member to join said third wooden member to said pair of butted wooden members.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

60	705,626	Vogel	July 29, 1902
	1,649,226	Gstalter	Nov. 15, 1927
	2,056,289	Marks	Oct. 6, 1936
	2,369,525	Blaski	Feb. 13, 1945
	2,827,676	Sanford	Mar. 25, 1958
65	2,844,852	West	July 29, 1958
	2,868,146	Mackintosh	June 13, 1959
	2,870,917	Johnson	Jan. 27, 1959