

[54] **STRUCTURAL DEVICE FOR JOINING
SPACED WOODEN MEMBERS**

[75] Inventors: **John Calvin Jureit**, 8901 Arvida Lane, Coral Gables, Fla. 33156;
Andrew G. Seipos, 650 NE. 31st St., Miami, Fla. 33137

[73] Assignee: **American Building Components, Inc.**, Fla.

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[51] Int. Cl.² **E04G 25/06; E04C 3/11**

[58] Field of Search **52/699, 700, 696, 317, 52/715, 644, 632, DIG. 6, 753 L, 758 N; 403/363, 393; 85/13; 297/452; 248/216, 57**

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Primary Examiner—Ernest R. Purser

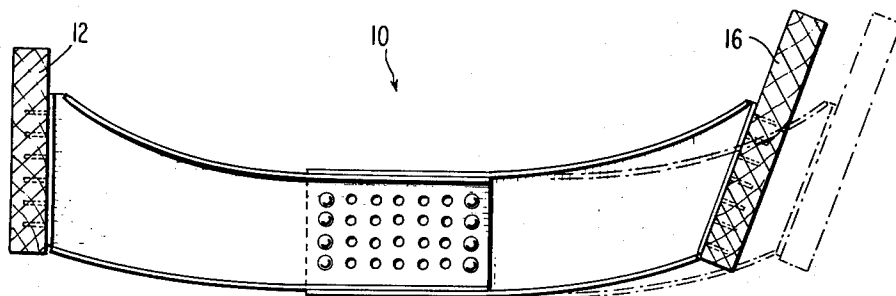
Assistant Examiner—Leslie A. Braun

Attorney, Agent, or Firm—LeBlanc & Shur

[57] **ABSTRACT**

The device includes a pair of plates, each having a generally channel-shaped configuration with a flange at one end. The flanges have a plurality of elongated nail-like teeth struck therefrom for embedment into the respective frame members. The channel-shaped members are telescopically received one within the other at the ends remote from the flanges and secured whereby the frame members are spaced one from the other at selected distances. The upper flanges of the elements are arcuately contoured and provide clearance between the upper flanges and a seat and spring underside to permit deflection of the seat construction toward the flanges when an individual is seated.

9 Claims, 9 Drawing Figures



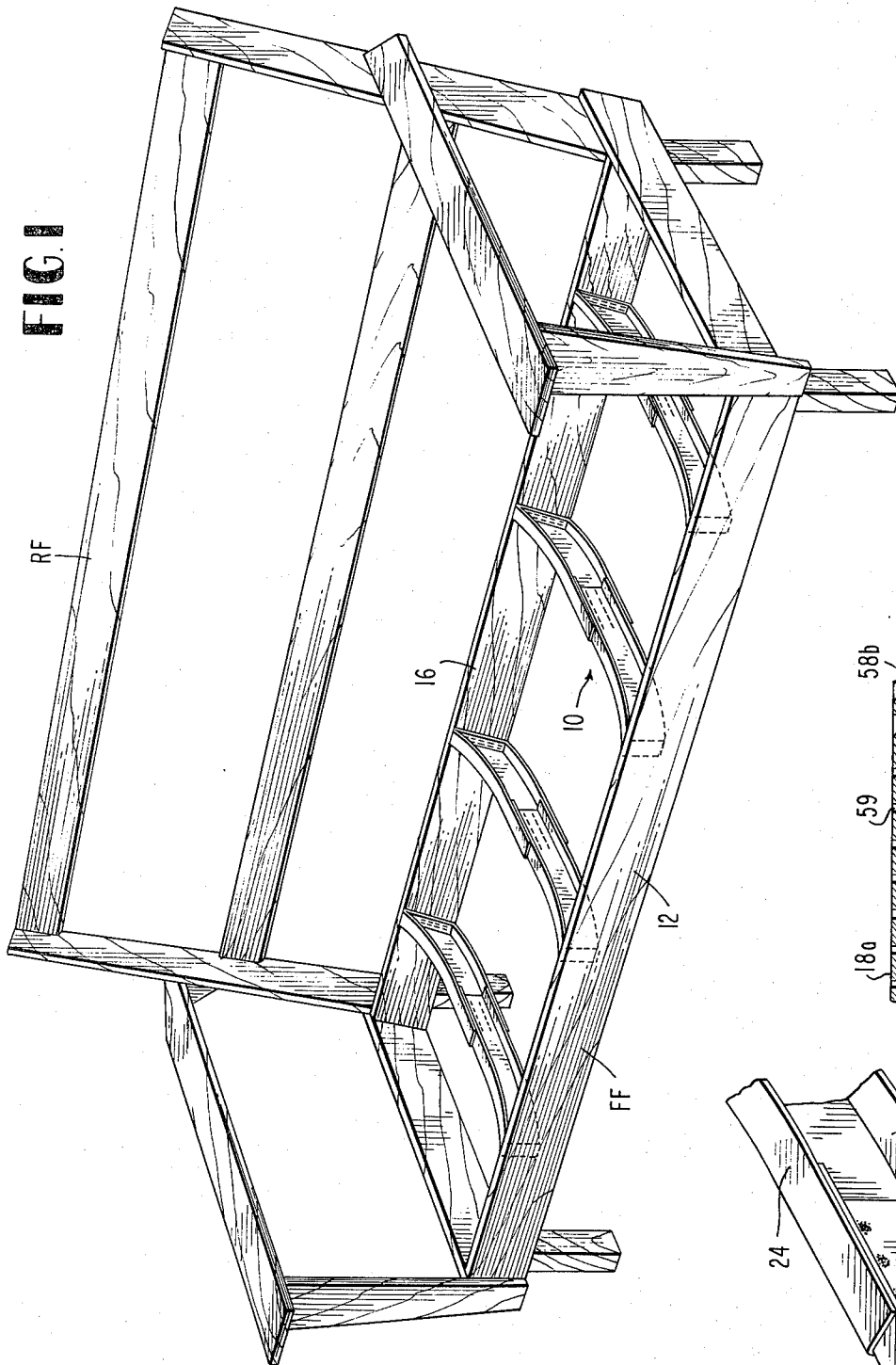


FIG. 1

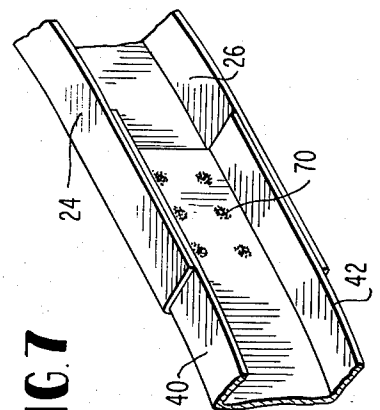


FIG. 7

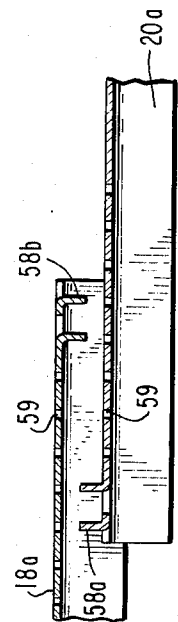


FIG. 8

FIG. 2

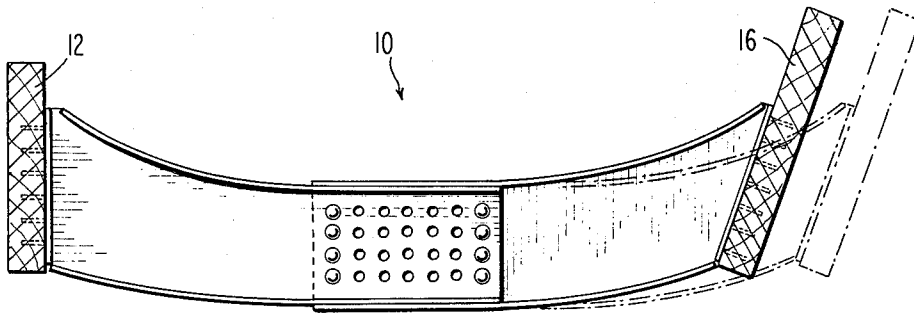


FIG. 3

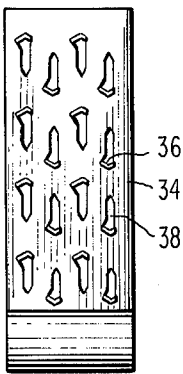


FIG. 4

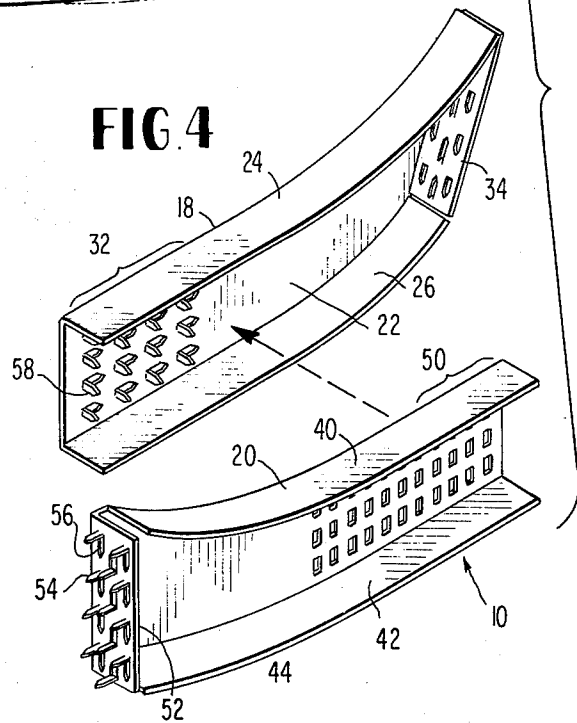


FIG. 4a

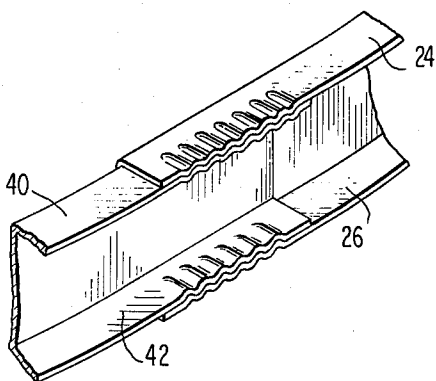
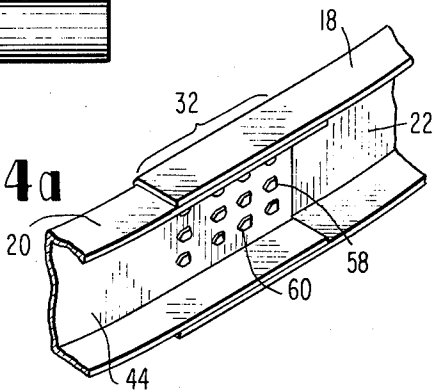


FIG. 5

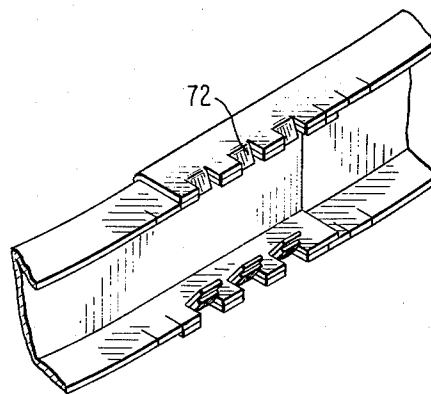


FIG. 6

STRUCTURAL DEVICE FOR JOINING SPACED WOODEN MEMBERS

The present invention relates to a structural device for joining two wooden members spaced one from the other and particularly relates to a novel and improved stretcher for joining the front and back rails of a furniture piece one to the other.

In the furniture construction industry, it is customary to connect the front and back frames of a furniture piece, for example, a sofa, one to the other by a plurality of longitudinally spaced wooden stretchers which extend between and are fastened at opposite ends to the front and back rails of the respective frames. Present practice requires the expenditure of extensive labor to fabricate the stretchers to the required sizes and configurations and to assemble the furniture frame, i.e., connect the stretchers to the front and back frames to form the completed frame. Further, certain current furniture construction requires stretchers having an arcuate upper surface for maximizing clearance between the seat construction and the stretchers. The curved nature of this upper surface greatly increases the costs of forming wooden stretchers. Furthermore, various different furniture pieces require stretchers having different lengths and configurations which not only increase the cost of a particular piece of furniture, but also require, in essence, the custom manufacture of a furniture frame for each piece. Current fabrication and assembly techniques in the furniture industry are therefore not readily adaptable to high production capacity.

The present invention minimizes and/or eliminates the above noted and other problems associated with prior structural devices for joining wooden members, particularly stretchers for use in furniture construction, and provides a novel and improved structural device, particularly useful as a stretcher in furniture construction, having various advantages in construction and assembly in comparison with such prior devices and stretchers. Particularly, the present invention provides a stretcher comprised of a pair of sheet metal plates, each bent to form a generally channel-shaped element having an intumed flange at one end. A plurality of elongated nail-like teeth are struck from the end flange and project in a direction away from the plate for embedment into the front or back rail of a furniture frame. The channel-shaped elements are telescopically received one within the other whereby the furniture frames can be selectively spaced in accordance with the particular furniture design. The channel-shaped elements are preferably joined one to the other, with the frames at the required spacing, by a plurality of teeth struck from one element and engaging through the other element. The tips of the teeth are then deformed to, in effect, rivet the members one to the other. Other types of securement can be provided as desired. For example, the elements can be riveted or spot welded one to the other. Another feature of the present invention is the provision of an arcuate upper surface for each of the members. The upper flange of each element inclines arcuately and upwardly in a direction toward the end flange. When the plates are joined one to the other, the arcuate flanges cooperate each with the other to form a continuous upper arcuate surface or recess bounded by the frames and in which springs, webbing, cushions and the like can be received. It will be appreciated that the frames are thus readily secured one to the other at predetermined distances one from the

other. Moreover, the arcuate flange is readily formed in the plate steel construction hereof by a simple bending operation and the high cost attributed to the formation of such arcuate surface in a wood stretcher is entirely eliminated.

Accordingly, it is a primary object of the present invention to provide a novel and improved structural device for joining two spaced wooden members one to the other.

It is another object of the present invention to provide a novel and improved stretcher for use in a furniture construction.

It is still another object of the present invention to provide a novel and improved stretcher for joining spaced furniture frames one to the other at selected distances.

It is a further object of the present invention to provide a novel and improved steel stretcher for furniture construction and wherein the steel stretcher is readily and easily applied to the frames.

It is a still further object of the present invention to provide a novel and improved furniture frame construction which is readily and inexpensively fabricated.

It is a related object of the present invention to provide a novel and improved furniture construction including a plurality of steel stretchers having arcuate upper surfaces forming a support and a recess for receiving springs, webbing, cushions and the like.

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

FIG. 1 is a perspective view of a frame for a furniture piece and employing a plurality of structural devices constructed in accordance with the present invention;

FIG. 2 is a transverse cross-sectional view illustrating a pair of wooden members, such as the front and back rails of the furniture frame of FIG. 1, joined one to the other by a structural device constructed in accordance with the present invention;

FIG. 3 is an enlarged end view of the device illustrated in FIG. 2;

FIG. 4 is an exploded perspective view of a pair of structural elements comprising the device hereof;

FIG. 4a is a fragmentary perspective view illustrating the elements of the device in FIG. 3 in assembled relation one to the other;

FIGS. 5-7 are fragmentary perspective views of the elements joined one to the other and illustrating several forms of joint therefor; and

FIG. 8 is a fragmentary cross-sectional view of another form of juncture between the elements.

Referring now to the drawings, particularly to FIG. 2, there is disclosed a structural device, generally indicated 10, for joining two spaced wooden members one to the other. While the device is useful for joining any two wooden members one to the other, it has particular utilization in the furniture construction industry for joining the front and back rails of furniture pieces one to the other. For example, there is illustrated in FIG. 1, a front furniture frame FF comprised of a front rail 12 which spans the entire width of the furniture piece and a rear furniture frame RF including a back rail 16 which likewise spans the entire width of the furniture piece. In most furniture pieces, the rear frame RF is inclined to the vertical and is conventionally joined to the front rail 12 by a plurality of longitudinally spaced

wooden stretchers each having the general outline of the structural device 10. It will be appreciated, however, that these stretchers, when formed of wood, are expensive to fabricate and assemble in the furniture piece.

Referring to FIG. 4, the structural device 10 is comprised of a pair of elements 18 and 20. Element 18 comprises a flat elongated sheet metal plate 22 bent to form a pair of flanges 24 and 26 along its upper and lower edges respectively, whereby the element 18 is substantially channel-shaped. The flanges 24 and 26 diverge and incline upwardly and arcuately away from one another in a direction toward the end of the element which is secured to the rear frame. The flanges 24 and 26 at the opposite end of element 18 extend parallel one to the other for the portion of its length indicated at 32 for reasons as will become clear from the ensuing description.

The end of element 18 remote from end portion 32 is provided with a flange 34 bent from base 22 to lie on the same side thereof as flanges 24 and 26. Flange 34 extends between the ends of flanges 24 and 26 and at an angle upwardly and rearwardly corresponding to the angle of inclination of the rear frame from the vertical. To secure element 18 to the rail 16 of the back frame, a plurality of elongated nail-like teeth 36 are struck from flange 34. Particularly, the teeth 36 are struck from flange 34 to project in a direction away from end 32 and leave a plurality of slots 38 in flange 34. The teeth are preferably arranged in a plurality of vertically extending transversely spaced rows as best illustrated in FIG. 3. The teeth 36 may be configured and arranged similarly as in my U.S. Pat. No. 2,877,520 or U.S. patent application Ser. No. 153,169 filed June 15, 1971.

Referring again to FIG. 4, the second element 20 of the device 10 is formed similarly as element 18. Particularly, element 20 comprises an elongated flat sheet metal plate bent to form upper flanges 40 and 42 along its upper and lower edges respectively, whereby element 20 is substantially channel-shaped. Flanges 40 and 42 diverge and incline upwardly and arcuately away from one another in a direction toward the end of the element secured to the front frame. The flanges 40 and 42 at the opposite end of element 20 extend parallel one to the other for the portion of its length indicated at 50. In comparing elements 18 and 20, end portion 50 of element 20 is sized as to be receivable within the end portion 32 of element 18.

Element 20 is also provided with a flange 52 on the end thereof remote from end portion 50. Flange 52 is bent from base 44 on the same side thereof as flanges 40 and 42 and extends the full vertical distance between the ends of flanges 40 and 42 at an angle corresponding to the inclination of the front frame from the vertical. In the particular construction illustrated, the front frame extends substantially vertically. Flange 52, similarly as flange 34, is provided with a plurality of elongated nail-like teeth 54 struck to project therefrom in a direction away from end portion 50 for embedment in rail 12. Particularly, teeth 54 are configured and arranged similarly as teeth 36.

It will be appreciated that the teeth 36 of flange 34 and teeth 54 of flange 52 may be embedded into the respective rear and front rails 16 and 12 by any suitable type press, for example a C-clamp as disclosed in my U.S. Pat. No. 3,402,869. Further, it will be appreciated that a plurality of such elements are spotted along rails

12 and 16 at longitudinally spaced positions one from the other with the frames being assembled one to the other by telescoping the end portion 50 of element 20 within the end portion 32 of element 18. The frames can be adjustably spaced one from the other selected distances as desired with end portions 32 and 50 telescoping to a greater or lesser extent.

To secure the element 18 and 20 one to the other with the frames in the selected spaced positions, several types of securement may be employed. In FIG. 4, the base 22 of overlapping element 18 in the region of end portion 32 is provided with a plurality of teeth 58 struck to project therefrom on the same side as flanges 24 and 26. After the elements are applied to the rails and the frames are properly spaced, a suitable press is applied to elements 18 and 20 to drive the teeth 58 through base portion 44 of element 20. Alternately, slots corresponding in spacing as the teeth 58 may be provided in the base 44 of element 20 for receiving teeth 58. As illustrated in FIG. 4a, the tips 60 of the teeth 58 are then deformed to secure the elements in assembled relation one to the other. This deformation may take the form of an enlargement of the metal tip to form, in effect, a rivet head. Alternatively, the tips of the teeth can be peened over to effect the securement.

Alternately, teeth and slots may be provided in the base of each element 18 and 20. As illustrated in FIG. 8, teeth 58a and 58b project from the bases of elements 18a and 20a. Also each base carries spaced slots 59 preferably sized to match the cross section of the teeth. Providing one or both bases of elements 18a and 20a with more slots than teeth permits telescoping adjustment of elements 18a and 20a to space the front and rear frames one from the other as desired. Fewer teeth are required in this assembly and, by matching slot size to tooth cross section, it will be appreciated that a simple twist with or without bending of the teeth in a press will effectively lock elements 18a and 20a one to the other.

Referring to FIG. 5, the overlapping flanges 24, 40 and 26, 42 can be crimped one to the other after the frames are properly spaced. In FIG. 6, the flanges may be provided with a plurality of precut tabs 72. When the elements are telescopically received with the rails spaced as desired, the tabs of the overlapping flanges can be bent or peened over to secure the elements one to the other. Alternatively, and referring to FIG. 7, elements 18 and 20 can be secured one to the other by a series of spot welds indicated 70.

It will thus be appreciated that the device hereof forms an effective structural joint between a pair of spaced wooden members and is particularly useful for joining the front and back frames of furniture pieces one to the other. For example, as in FIG. 1, a plurality of such devices are longitudinally spaced one from the other along a furniture frame and secure the front and back frames one to the other. Moreover, the continuous upper flange formed by the flanges 24 and 40 of elements 18 and 20 respectively form a spring deflection clearance and in some cases may be used for support of webbing and cushions and the like. Further, such metal devices, as utilized in a furniture construction, replace the more expensively formed wooden pieces.

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 frame comprising a pair of elongated spaced wooden members extending generally parallel one to the other, plural means at longitudinally spaced positions along said members connecting said members one to the other with each connecting means including first and second sheet metal plates each having a base and a flange bent out of the plane containing said base, each said flange extending substantially the entire length of the associated base in reinforcing relation thereto, each said plate including a second flange bent out of the plane containing the associated base and projecting from an end thereof, each said second flange having a plurality of elongated nail-like teeth struck to project in a direction away from the associated base and embedded into one of said members and leaving a plurality of slots in said second flange, and means joining said first and second plates one to the other at the ends thereof remote from their respective second flanges to prevent endwise movement of said plates relative to one another and movement of said wooden members toward or away from one another, the second flanges lying in non-parallel planes generally normal to parallel planes containing the bases of said plates when the plates are joined one to the other, the base of each said plate being substantially planar and having an arcuate edge, the first flange of each plate projecting from said arcuate edge and having a face of like arcuate contour, said arcuately contoured flanges overlapping one another when said plates are joined to provide a substantially smooth continuous arcuate surface.

2. A frame according to claim 1 wherein said plural connecting means constitute teeth struck from said plates and said frame constitutes a furniture frame, said arcuately contoured flanges lying along the upper side of said plates in said furniture frame.

3. A device for joining a pair of spaced wooden members one to the other, said device comprising a sheet metal plate adapted for disposition between the members, said plate including a base and a flange bent out of the plane containing said base and extending generally perpendicular to said base along one edge thereof, said flange extending substantially the entire length of said base in reinforcing relation thereto, said plate having a second flange bent out of the plane containing said base and projecting generally perpendicular to said base from an end thereof, said second flange having a plurality of elongated nail-like teeth struck to project therefrom in a direction away from said base for embedment into the one member and leaving a plurality of slots in said flange, a second sheet metal plate including a base and a flange bent out of the plane con-

taining said base and extending generally perpendicular to said base along one edge thereof, said flange extending substantially the entire length of said base in reinforcing relation thereto, said second plate having a second flange bent out of the plane containing said base and projecting from an end thereof, said second flange having a plurality of elongated nail-like teeth struck therefrom to project in a direction away from the base of said second plate for embedment into the other member and leaving a plurality of slots in said second flange, the base of each plate being substantially planar and having an arcuate edge, the first flange of each plate projecting from said arcuate edge and having a face of like arcuate contour, said arcuately contoured flanges overlapping one another when said plates are joined to provide a substantially smooth continuous upper surface, and means for joining the ends of said plates remote from their respective second flanges thereof one to the other to prevent endwise movement of said plates relative to one another, the second flanges lying in non-parallel planes generally normal to parallel planes containing the bases of said plates when the plates are joined one to the other.

4. A device according to claim 3 wherein each of said plates has a third flange bent out of the plane containing the associated base, the first and third flanges of each plate projecting from said base on a like side thereof to define a generally channel-shaped plate, the end of one of said channel-shaped plates remote from its second flange being receivable within the end of the other of said channel-shaped plates remote from its second flange.

5. A device according to claim 3 wherein each of said plates includes a third flange bent out of the plane containing said base and extending substantially the entire length of said base in reinforcing relation thereto, the first and second flanges of each said plate projecting from the associated base on a like side thereof to define generally channel shaped plates.

6. A device according to claim 3 wherein the ends of said plates remote from the second flanges thereof overlap one another, and means engaging through the overlapping ends of said plates for securing one plate to the other.

7. A device according to claim 6 wherein said securing means includes means for securing the members one to the other at selected locations therealong whereby the respective second flanges are spaced selected distances one from the other.

8. A device according to claim 6 wherein said securing means includes a plurality of teeth struck from an end of one plate and engaging through the end of the other plate, the tips of said latter teeth on the side of the other plate remote from the one plate being deformed to retain the plates secured one to the other.

9. A device according to claim 8 wherein said latter teeth are struck from the base of one of the plates and engage through the base of the other of the plates.

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