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CONNECTOR PLATE FOR WOOD JOINTS

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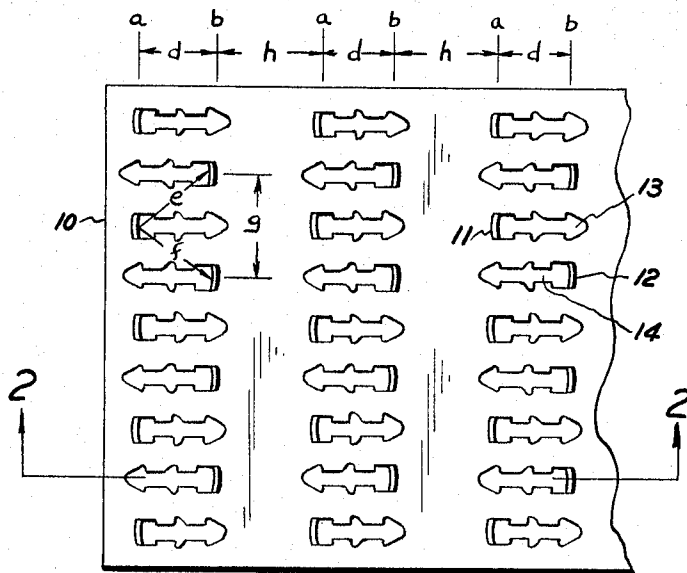


FIG. 1

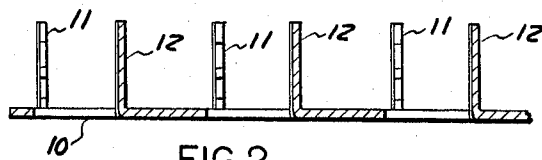


FIG. 2

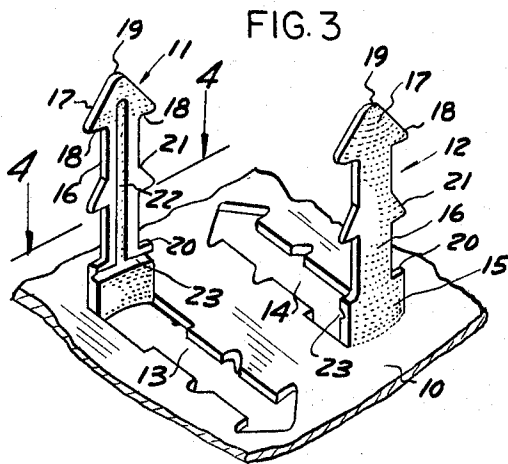


FIG. 3

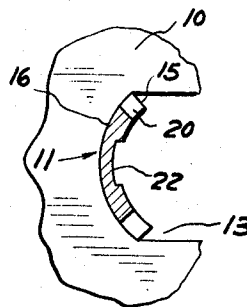


FIG. 4

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CONNECTOR PLATE FOR WOOD JOINTS

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This invention relates to a connector plate and more particularly, to a metal plate useful in forming joints between wood members.

In forming joints between wood members, such as joints between the abutting ends of wood strips which form a truss or other structural device, it is common to use various types of metal plates to overlap the abutment between the wood members, with means to secure the plate to the wood members for forming a tight joint therebetween. Conventional plates normally are somewhat fragile and tend to bend or become distorted when applied to the wood and frequently require the manual application of nails for positioning the plate upon the wood and, in addition, are so formed that they frequently crack the wood.

Thus, it is an object of this invention to form a metal plate having spikes struck out from the plate and so formed as to easily engage and bite in and hold wood structural members to form a solid, rigid joint therebetween with the spikes being so formed as to reduce the tendency of the wood to crack or split and to substantially eliminate the tendency of the spikes to bend or distort out of shape when forced into the wood.

These and other objects and advantages of this invention will become apparent upon reading the following description, of which the attached drawings form a part.

In these drawings:

FIG. 1 is a plan view of a fragment of a connector plate herein.

FIG. 2 is a cross-sectional elevational view taken in the direction of arrows 2-2 of FIG. 1.

FIG. 3 is a fragmentary, perspective view showing two opposed spikes, and

FIG. 4 is an enlarged cross-sectional view taken in the direction of arrows 4-4 of FIG. 3.

The connector plate herein is formed of a flat, rigid, metal plate 10 out of which pairs of parallel rows of spikes 11 and 12 are struck-out. The spikes 11 form a row *a* and the spikes 12 form a row *b* in a single pair of rows. Spikes 11 are identical to, but mirror images of spikes 12. Openings 13 and 14 are left in the plate where the spikes 11 and 12, respectively, are struck-out.

As shown in FIG. 3, each spike is in the form of a wide arrow having a widened base 15 integral with a narrower shank 16 which terminates in a head 17 which forms barbs 18 at its juncture with the shank. The end 19, of the head 17, is slightly rounded to form a blunt point.

The blunt point is advantageous in that it permits accurate vertical piercing of the wood without causing the wood to crack or split.

At the juncture between the shank 16 and the base 15, relatively sharp shoulders 20 are formed. The relatively sharp shoulders 20 serve in conjunction with the abrupt edge surfaces of barbs 18 or their counterparts on intermediate ears 21 to form a locking or packing surface against which intermediate wood fibers are wedged in the event the connector plate is attempted to be removed or experiences stress during use. In addition, transversely outwardly extending ears 21 are formed approximately midway between the junctures between the shank and the head and the shank and the base, respectively.

Each of the spikes is transversely bent so that the spikes 11 are all concave towards the spikes 12 and vice versa

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(see FIG. 4). In addition, a groove-like flute 22 is formed on each spike and extends partially into the head 17 and base 15 where it meets a cross-like or groove 23. The concavity of spikes 11 facing the concavity of spikes 12 in rows *a* and *b* has a tendency to compress the intervening wood between the pairs of spikes and thus enhances the interlocking strength between the connector plate and the wood in which it is imbedded. The groove-like flute 22 adds substantially to the vertical rigidity and resistance to bending of each spike and functions with the concave cross-section of the spike to effectively retain the vertical relationship between the spikes 11, 12 and plate 10 as the connector plate is forced into the wood members being joined. Flute 22, which extends from the lower portion of head 17 into the upper portion of base 15, serves to unify the head 17 and base 15 into a stiff, integral unit. In a similar way, cross-flute 23 serves to rigidify and maintain the concave cross-section of the base portion 15 of the spikes 11 and 12.

The rows *a* and *b* of each pair of rows are spaced apart a distance *d* which is approximately $\frac{2}{3}$ of the height of the spikes and the distance *h* between the adjacent rows of adjacent pairs of rows is approximately equal to the height of the spikes. Also, the distance *e* and *f* between each spike and the adjacent spikes on the other row of its pair are equal to each other and approximately equal to the height of the spikes, that is, approximately equal to the distance *h*. Likewise, the distance *g* is preferably equal to distances *e*, *f* and *h*, although *g* may be slightly greater for certain specific applications.

In operation, the ends of the wood members to be joined, are abutted and the plate is laid upon the wood members, overlapping the joint, with the spikes rested upon the wood. Then, pressure is applied, such as by a heavy roller or by manual hammering to force the spikes into the wood, until the plate surface is in face to face contact with the wood. Because of the shape of the spike, they are unusually rigid and tend to remain perpendicular to the plate, without bending or distorting, and will pierce the wood without cracking or splitting the wood. Due to the transverse curvature and shape of each spike, each spike is adapted to sustain a maximum shear load. In actual tests, it has been found that the wood members will break sooner than will the joint formed by the plate with the wood.

This invention may be further developed within the scope of the following claims. Accordingly, it is desired that the foregoing description be read as being merely illustrative of an operative embodiment of this invention and not in a strictly limited sense.

I now claim:

1. A connector plate comprising a rigid, flat metal plate having identical pairs of parallel rows of spaced apart spikes, each of which is struck out of the plate and bent perpendicular thereto, with the spikes in each row being identical to one another and being identical to but oppositely formed relatively to the spikes in the other row of its pair; each spike being in the form of an arrow-like shape having a widened base with one end integral with that plate and a narrowed shank integral with and centrally extending from the opposite end of the base to form a relatively sharp pair of substantially right angle shoulders on said opposite end of the base, and the shank terminating in a barbed head having a rounded blunt penetrating tip at the free end thereof, and having thereon a pair of oppositely disposed outwardly extending ears forming abrupt shoulders facing said base and spaced therefrom, each said spike being transversely curved to define a substantially smooth arc in cross-section and including in the concave face thereof a longitudinal groove-like flute extending from a point on said head intermediate the tip

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thereof and said abrupt shoulders to said widened base, and a transverse groove-like flute extending completely across the width of said base to intersect said longitudinal flute at a substantially right angle, with said flutes in the spikes in one row opening toward the flutes in the spikes in the other row of its pair; the spikes in one row being staggered relative to the spikes in the other row of its pair so that each of the spikes is approximately equally spaced from the next adjacent spikes in its own row and in the other row of its pair.

2. A connector plate comprising a rigid, flat metal plate having identical pairs of parallel rows of spaced apart spikes, each of which is struck out of the plate and bent perpendicular thereto, with the spikes in each row being identical to one another and being identical to but oppositely formed relatively to the spikes in the other row of its pair; each spike being in the form of an arrow-like shape having a widened base with one end integral with that plate and a narrowed shank integral with and centrally extending from the opposite end of the base to form a relatively sharp pair of shoulders on said opposite end of the base, and the shank terminating in a blunt pointed, barbed head, having thereon outwardly extending ears forming an abrupt shoulder facing said base and spaced therefrom, each said spike being transversely curved in cross-section and including in the concave face thereof a groove-like flute extending from said head to said widened base, with said flutes in the spikes in one row opening toward the flutes in the spikes in the other row of its pair; a second pair of transversely, outwardly extending ears formed on each of said spike shanks and located approxi-

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mately mid-way between the junctions of the shank of the spike with its base and head respectively, said ears forming an abrupt shoulder facing said base and said groove-like flute terminating in said base in a groove-like flute extending across said base at a location spaced above the plane of said plate; the spikes in one row being staggered relative to the spikes in the other row of its pair so that each of the spikes is approximately equally spaced from the next adjacent spikes in its own row and in the other row of its pair.

3. A construction as defined in claim 2 and wherein the spacing between the adjacent rows of two adjacent pairs of rows and also the distance between each of the spikes and its adjacent spikes in its own row and in the other row of its pair are all approximately equal to the height of the spikes.

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