(12) UK Patent Application (19) GB (11) 2 049 857 A

(21) Application No **8005367**
(22) Date of filing **18 Feb 1980**
(30) Priority data
(31) **7912523**
(32) **10 May 1979**
(33) **France (FR)**
(43) Application published
31 Dec 1980
(51) **INT CL³**
F16B 15/00 // E04C 3/18
3/292
(52) Domestic classification
F2H 35
E1W 32 DM
(56) Documents cited
GB 1232592
GB 1113244
GB 1101553
GB 1070079
GB 495606
GB 313962
(58) Field of search
F2H
(71) Applicant
Emile Pierre Di Felice, 51 rue de la Fraternite, Decines, Rhone, France
(72) Inventor
Emile Pierre Di Felice
(74) Agents
Marks & Clerk

(54) Metal connector for wood and method for its use

(57) A metal connector for wood is in the form of a plate having teeth 1 cut and bent out of the plane of the plate at right angles on both sides. The distribution, number and shape of the teeth are substantially the same for both sides. The connector is used by locating it between two pieces of wood and then squeezing such assembly to cause the teeth to penetrate the pieces to secure them together. A strip 10 may be placed under tension by chuck jaws 13 and wooden strips 11 and 12 pressed onto it by roller 14. Release of the strip produces a prestressed beam.

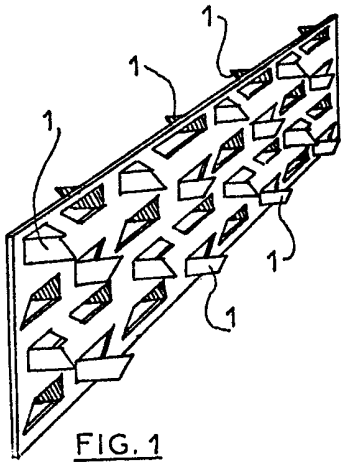


FIG. 1

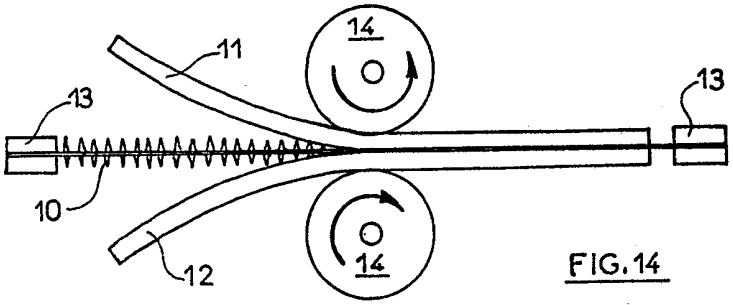


FIG. 14

GB 2 049 857 A

2049857

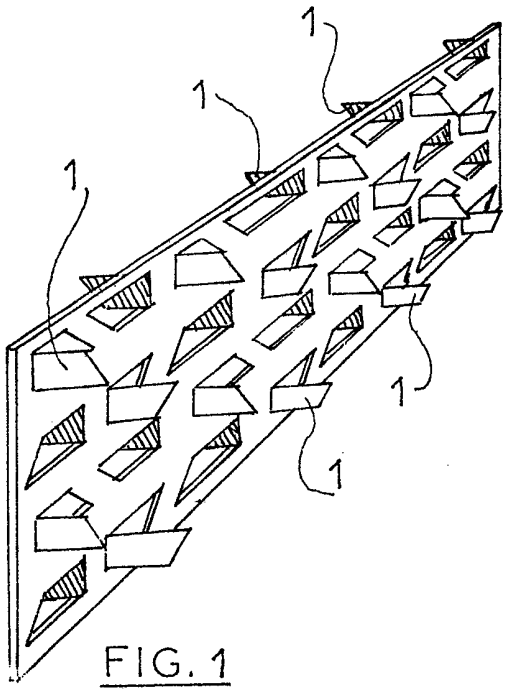


FIG. 1

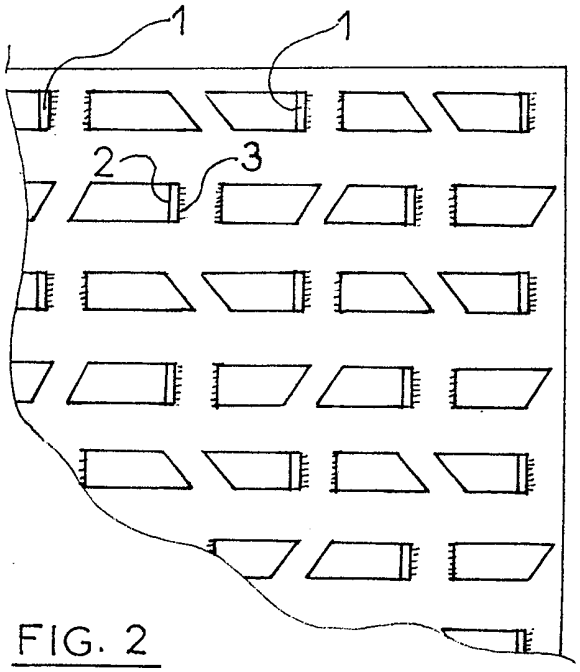


FIG. 2

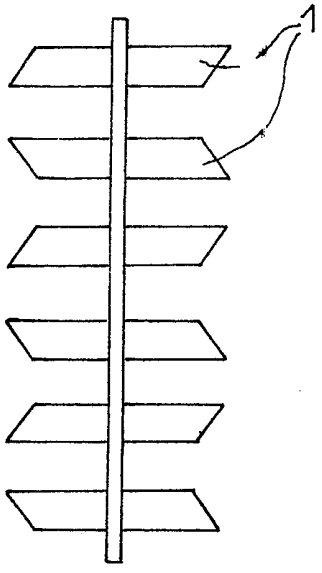


FIG. 3

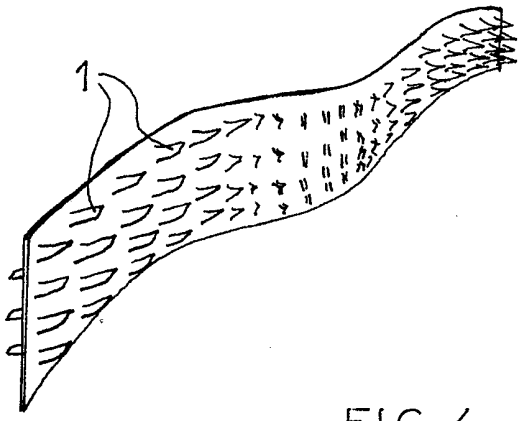


FIG. 4

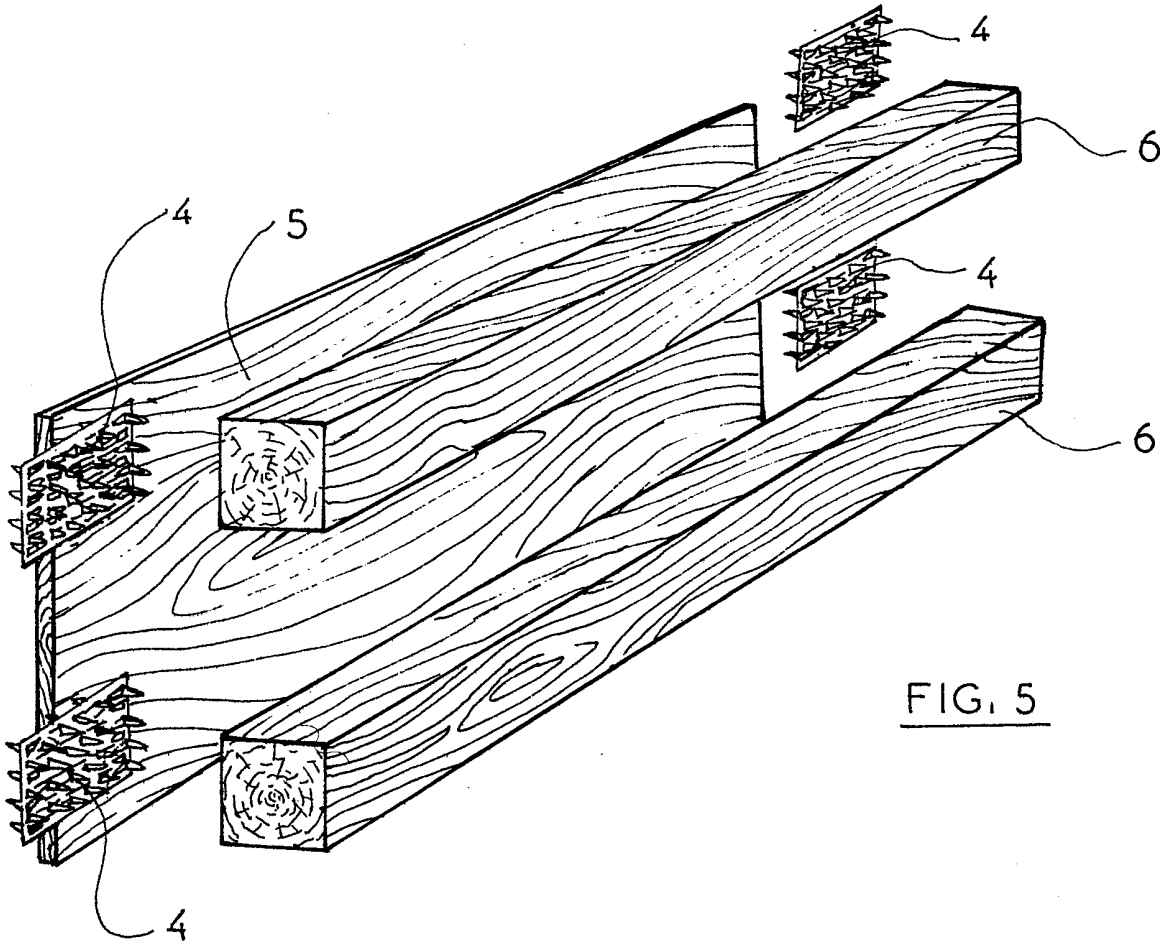


FIG. 5

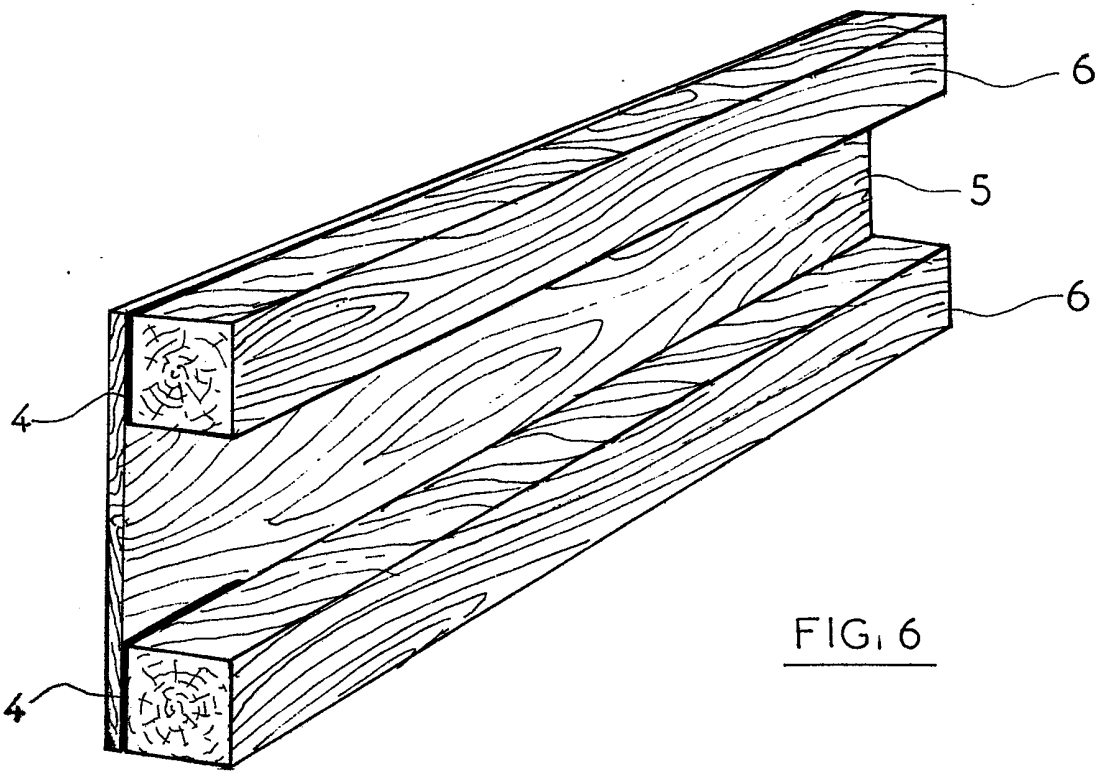


FIG. 6

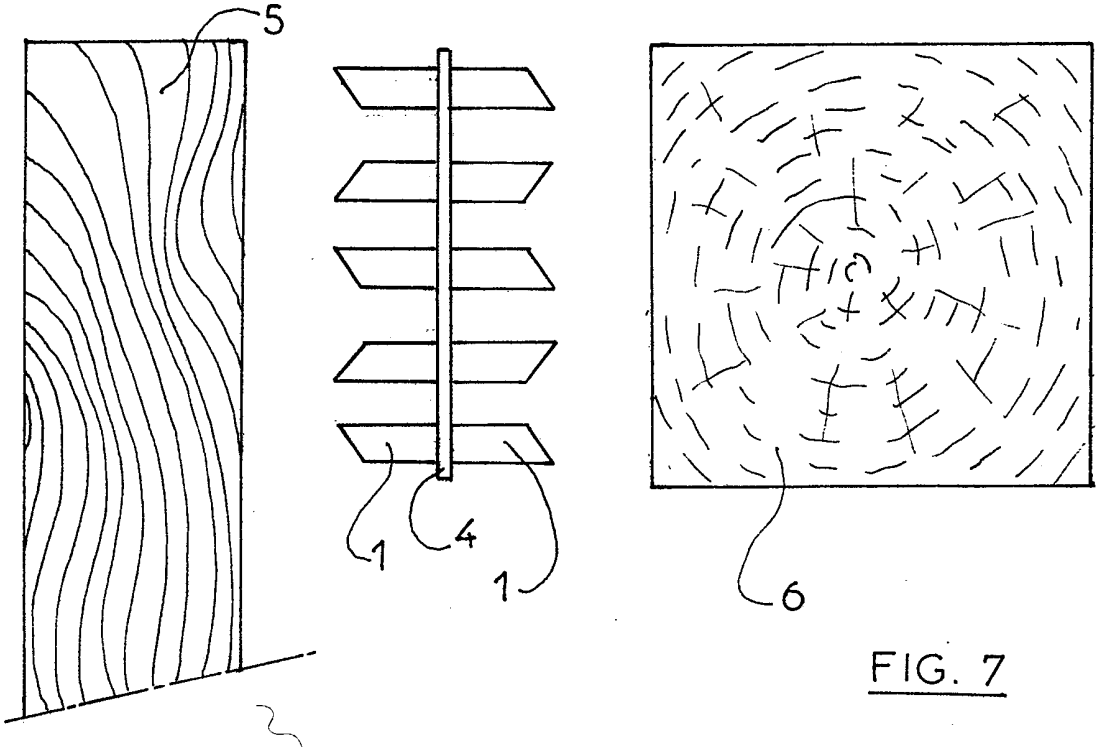


FIG. 7

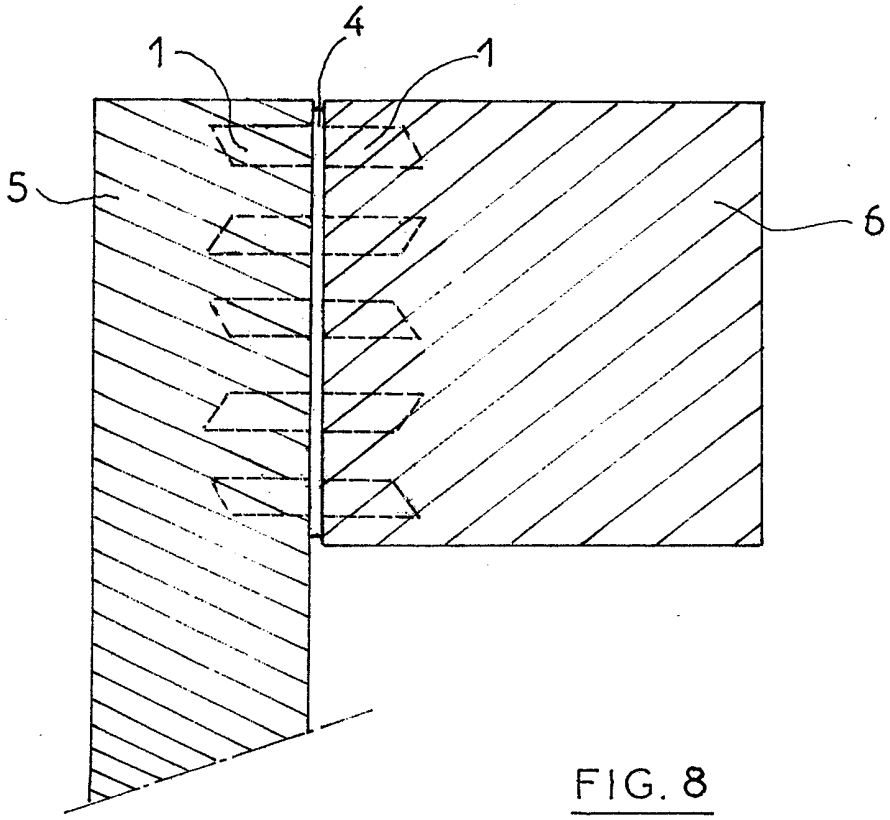


FIG. 8

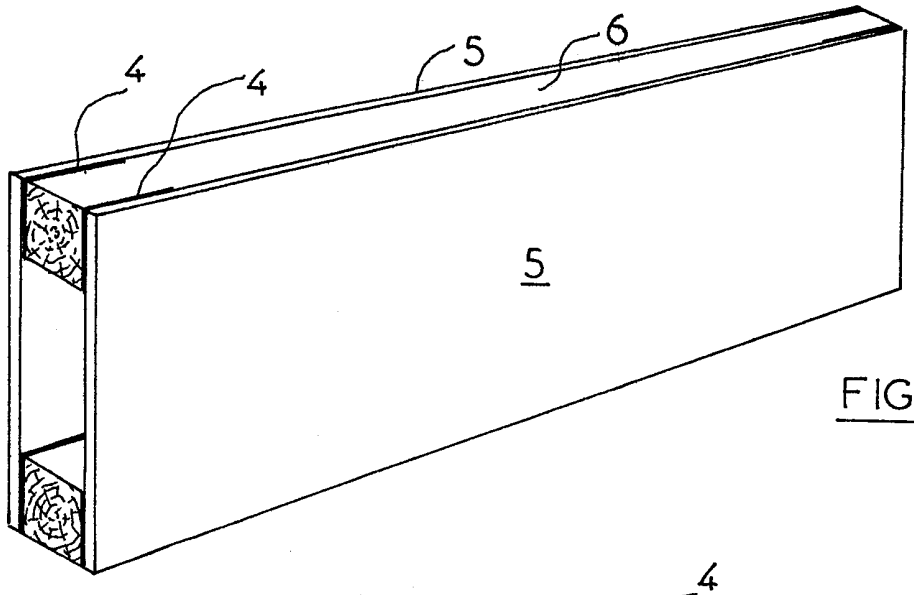


FIG. 9

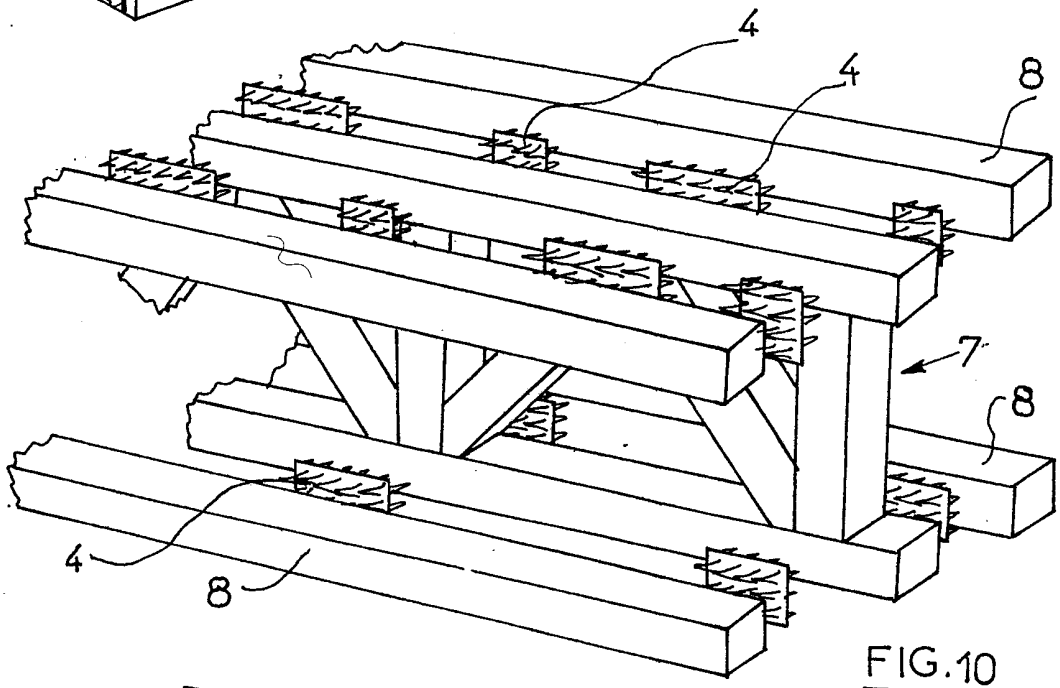


FIG.10

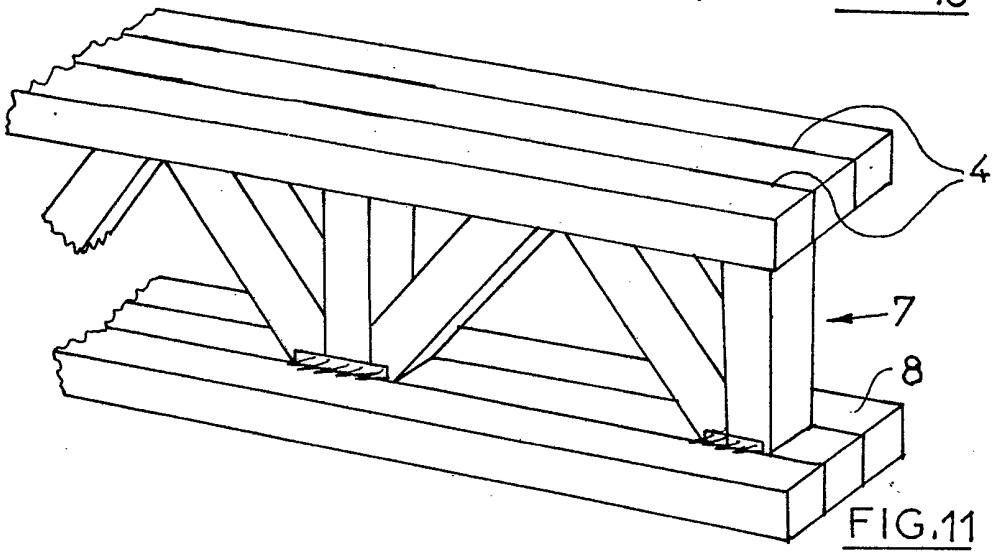


FIG.11

FIG. 12

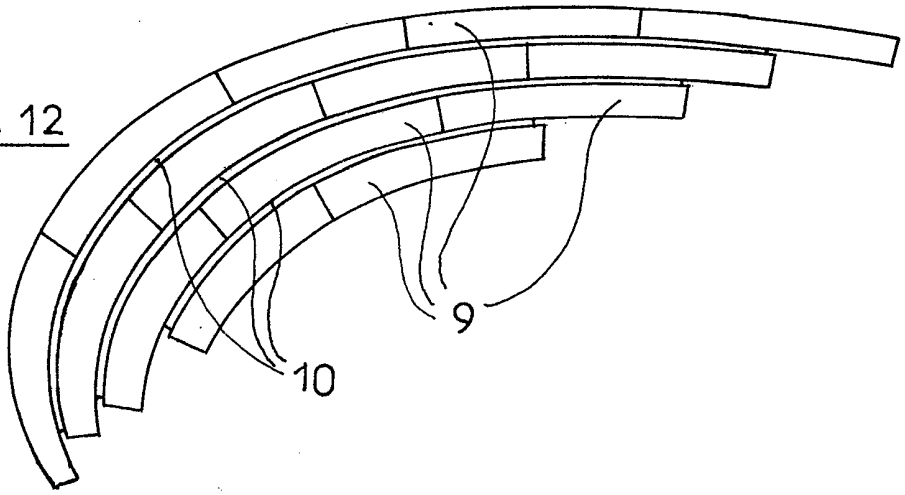
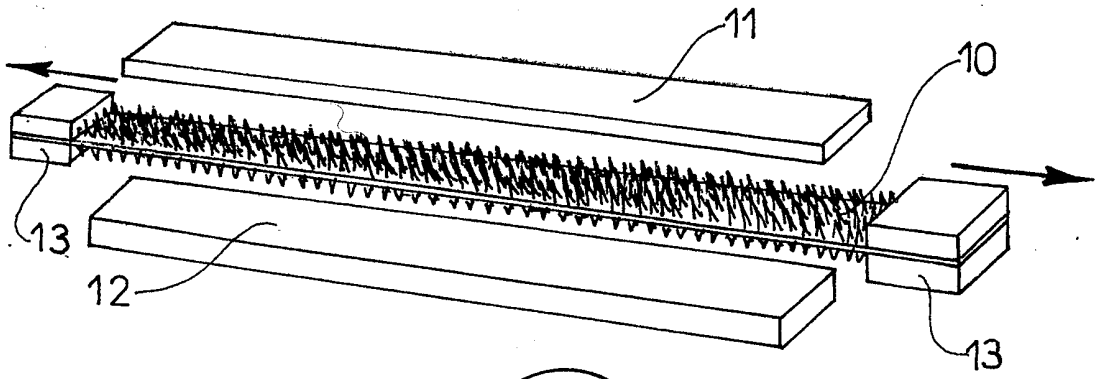


FIG. 13



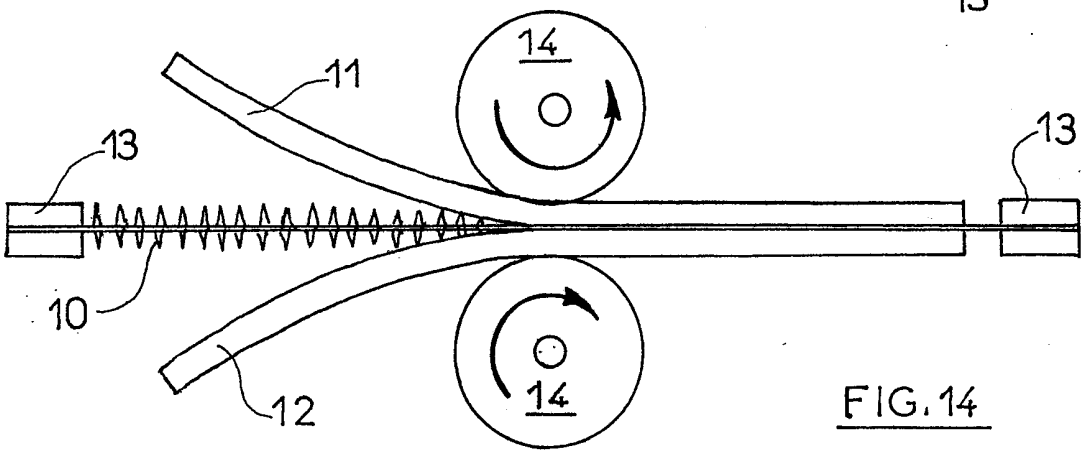


FIG. 14

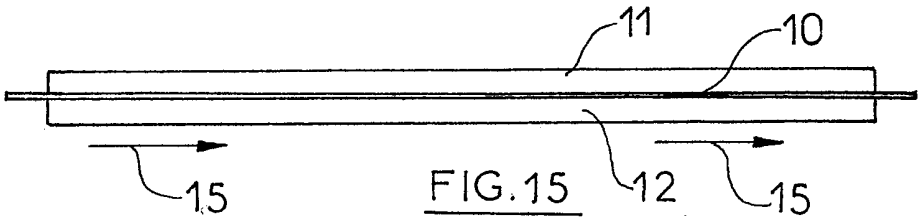


FIG. 15

SPECIFICATION

Metal connector for joining wood and method for its use

The present invention relates to a connector for joining wood, and to a method of using the connector.

Various types of connectors are known, which are used for example in the manufacture of industrialised wooden frame-works, for fixing together several adjacent frame members. A connector is generally in the form of a metal plate of, for example, rectangular shape provided on one of its sides with a plurality of teeth, each tooth being constituted by being partially cut out in the plate before being bent at right angles with respect to the plate. When the plate is fitted to a plurality of adjacent members of a wooden frame-work, several teeth are driven into each member, which ensures a particularly robust connection.

The object of the invention is to provide a connector which can be used to produce wooden arrangements which, hitherto, could not be produced with known connectors, in particular:

— beams, the web of which is constituted by a lattice.

— frame-work trusses, the length of which is greater than the standard length of timber available.

— lamellated structures which are not stuck with adhesive.

— pre-fabricated building panels.

— gantries for industrial buildings.

A connector, according to the invention, comprises a metal plate having a plurality of teeth cut out from the plate and bent outwardly of the plane of the plate on both sides of the plate with substantially equal distribution, number and shape of teeth on both sides of the plate.

The connector is preferably constituted by a plate of substantially rectangular, or more generally polygonal shape.

The connector may be constituted by a very long metal strip.

Preferably the two major sides of all the teeth are arranged transversely with respect to the major axis of the plate.

A method of using such a connector according to the invention comprises the steps of placing the connector between two respective flat faces of two wooden elements to be connected, and then squeezing such assembly between the jaws of a press or between pressing rollers in order to cause the teeth to penetrate the two wooden elements to connect the latter together.

Several strips of wood may be fixed one against the other by inserting a connector strip in the gap between two adjacent wooden strips to produce nailed lamellated structures.

A pre-stressed composite member of great length may be produced in the following manner:

— a connector strip is stretched lengthwise to obtain elastic deformation thereof;

— while the strip remains stretched, two pieces of wood of substantially the same length as the strip are placed on either side of the latter, these two pieces of wood being pressed against the strip;

— the strip is then released.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

Figure 1 is a perspective view of a connector according to the invention.

Figure 2 is a partial front view of the connector of Figure 1.

Figure 3 is a side view of the connector of Figure 1.

Figure 4 is a perspective view of an alternative connector according to the invention.

Figure 5 is a perspective exploded view of parts of a wooden arrangement employing connectors according to the invention.

Figure 6 is a perspective view of the wooden arrangement of Figure 5 assembled.

Figure 7 is a side view of the wooden arrangement, before assembly.

Figure 8 is a cross-sectional view of the assembled wooden arrangement.

Figure 9 is a perspective view of another wooden arrangement which can be produced by means of connectors according to the invention.

Figure 10 is an exploded perspective view of another wooden arrangement which can be produced by means of connectors according to the invention.

Figure 11 is a perspective view of this assembled arrangement.

Figure 12 is a side view of a lamellated beam produced by means of strip connectors according to the invention.

Figures 13 to 15 are views illustrating the method of the invention, for producing a wooden beam which is pre-stressed by means of a strip connector.

Figures 1 to 3 illustrate a connector according to the invention, in the form of a rectangular plate. This connector is constituted by a plate of sheet metal provided with a plurality of teeth 1. Each tooth is cut out in the plate before being bent outwardly of the plane of the plate at right angles with respect to the plate. Both major sides 2 and 3 of all the teeth are arranged transversely with respect to the major axis of the plate. The connector is provided with teeth 1 on both faces, the distribution, numbers and shapes of the teeth being substantially the same for both sides.

In Figure 4, the connector is produced in the form of a continuous strip of great length. As previously, this strip is provided with teeth 1 on both its sides and the two major sides of these teeth are arranged transversely with respect to the major axis of the strip.

Connectors according to the invention are used by inserting them between two pieces of wood, in contact with the two major faces of these two pieces, then by squeezing the arrangement for example between the jaws of a press or between pressing rollers in order to cause the teeth 1 of the connectors to penetrate simultaneously in the two wooden pieces and thus to fix same together by

means of the connector (Figures 5 to 8).

In this way and with connectors in the form of plates 4, it is possible to produce beams composed of two plywood panels 5 fixed on either side of two pieces of timber 6. It will be noted that the plane of the teeth 1 is arranged transversely with respect to the fibres of the two pieces of timber 6 (Figure 9), which is advantageous as regards the rigidity of the connection.

In the same way, it is possible to produce composite beams comprising, on the one hand, a central lattice 7 and, on the other hand, at the top and bottom, pieces of timber connected laterally on either side, these pieces 8 of timber thus giving the arrangement a cross-section in the form of an H laid on its side (Figures 10 and 11).

By using connectors in the form of strips, it is possible to produce beams composed of a series of superimposed strips 9 of wood (Figure 12), a continuous strip 10 being inserted in each gap between two strips. This method of use has a triple advantage:

— in view of the fact that it is possible to superimpose as many strips as desired, it is possible to produce composite beams of considerable cross-section, which are capable of withstanding high loads, the cross-section also being able to be varied without difficulty from one end of the beam to the other.

— since the strips are very flexible, taken individually, it is possible to produce beams which are curved according to any design, without difficulty.

— it is possible to juxtapose the strips end to end, provided that the junction point of the strips of one layer is staggered with respect to that of the other layer, so as not to compromise the rigidity of the arrangement.

Composite beams are thus obtained whereof the length is much greater than the standard length of timber available.

Frame-work members produced by means of this method could be referred to by the imaginative name "BOIS LAME" (lamellated timber).

These members can be produced more easily than glued lamellated members which have to be left in a press until the glue sets and which thus require a very bulky installation, whereas in order to assemble a lamellated wooden member according to the invention, it is sufficient to pass its components between two pressing rollers.

According to a modification illustrated in Figures 13 to 15, a pre-stressed wooden beam is produced by means of two pieces of wood 11 and 12 and a continuous strip 10, by proceeding in the following manner:

— the strip 10 is stretched lengthwise, each end of this strip being held in a chuck 13, in order to obtain an elastic deformation of the strip, by elongation of the latter (Figure 13).

— when the strip has been stretched, the pieces 11 and 12 of wood are secured on either side, by squeezing the arrangement between two rollers 14 (Figure 14).

— the strip 10 is released from chucks 13 (Figure 15).

In the composite beam obtained, the pieces 11 and 12 of wood are constantly subject to an axial compressive force (arrows 15) owing to the fact that the strip 10 tends to resume its initial length by contracting elastically.

The principle of pre-stressing, which is well-known for producing structures from reinforced concrete, is in this case applied to a wooden beam, an application which is completely new. Thus, the beam is initially subjected to permanent compressive stress which is superimposed on all other stresses and which is thus able to suppress extension stresses.

CLAIMS

1. A connector comprising a metal plate having a plurality of teeth cut out from the plate and bent outwardly of the plane of the plate on both sides of the plate.

2. A connector according to claim 1, in which the distribution, number and shape of teeth are substantially the same for both sides of the plate.

3. A connector according to claim 1 or 2, in which two major sides of each tooth are arranged transversely to the major axis of said connector.

4. A connector according to any one of the preceding claims, in which the plate is of substantially rectangular shape.

5. A connector according to any one of claims 1 to 3, in which the plate is in the form of a continuous strip of great length.

6. A method of using the connector according to any one of claims 1 to 5, comprising the steps of placing the connector between two respective flat sides of two wooden parts to be connected, and then squeezing such assembly between the jaws of a press or between pressing rollers in order to cause the teeth to penetrate the two wooden parts and thus to connect the two parts together.

7. A method of using the connector according to claim 5, comprising the step of connecting a plurality of strips of wood together by inserting a connector in strip form between adjacent strips of wood in order to produce nailed lamellated structures.

8. A method of using the connector according to claim 5 to produce a composite pre-stressed member of great length comprising the steps of stretching the connector lengthwise in order to obtain an elastic deformation due to elongation of the strip, while the strip remains stretched, fixing two pieces of wood of substantially the same length as the connector strip on either side of the latter, by pressing these two pieces of wood against the connector strip, and releasing the strip.

9. A connector substantially as hereinbefore

described with reference to the accompanying drawings.

10. A method of using a connector according to any one of claims 1 to 5 and 9, substantially as hereinbefore described with reference to the accompanying drawings.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1980. Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.