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(12) # EUROPEAN PATENT APPLICATION

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(54) **Contruction for connecting wooden construction parts.**

(57) In a connection arrangement for joining a wooden structural member (1) to another structural element (2) which at the site of the joint partly overlaps the wooden structural member (1) at least one metal tube (6) extends through the wooden structural member (1) and the other structural element (2) in the region where the wooden structural element (1) and the other structural element (2) adjoin and overlap. At least two metal wires (7) extend through each tube (6), each of said wires (7) being tightly stretched around the wooden structural member (1) on each side of the latter and secured against detachment. The other structural element (2) may consist of a metal strip fitting into a slot (3) formed in the wooden structural member (1), or of a second wooden structural member lying partly against the first wooden structural member (1). A connection of this kind can transmit relatively great forces.

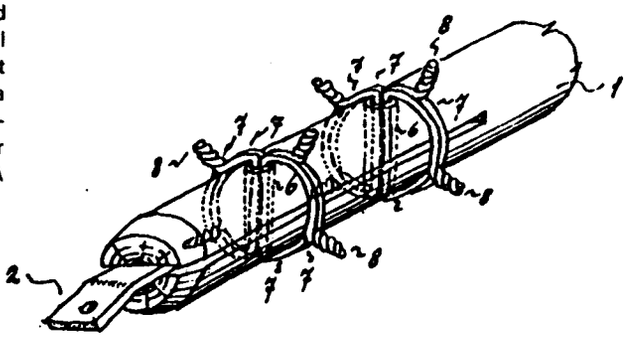

FIG.1

EP 0 216 429 A1

Connection arrangement for wooden structural members.

The invention relates to a connection arrangement for joining a wooden structural member to another structural element which at the site of the joint partly overlaps the wooden structural member.

Round poles of most types of softwood develop in the course of time contraction cracks extending in the longitudinal direction and directed towards the centre. This makes it difficult for structural members to be fastened together with the aid of customary connection means, such as bolts, wire nails and the like, in such a manner as to achieve adequate safety. Up to the present time this fact has prevented high quality and large scale use of round timber for types of construction in which it could otherwise be used to full advantage. In this connection one could think of supporting structures for architectural purposes, particularly so-called spatial structures in which the material is loaded mainly in the direction of the grain, that is to say axially. For applications of this kind round timber is extremely suitable in respect of sectional dimensions and in respect of the material properties of most available types of wood.

The invention now seeks to provide a connection arrangement suitable for joining together wooden structural members, particularly structural members of round timber.

This aim is achieved with a connection arrangement of the abovedescribed type, which is characterized in that in the region where the wooden structural member and the other structural element adjoin and overlap at least one metal

tube extends through the wooden structural member and the other structural element and that at least two metal wires extend through each tube, each of said wires being tightly stretched around the wooden structural member on each side of the latter and secured against detachment. By means of this arrangement a very strong connection can be made between wooden structural members, which connection will be able to transmit relatively large forces.

The other structural element may expediently consist of a metal strip fitting into a slot formed in the wooden structural member while in the region in which the wooden structural member and the metal strip adjoin and overlap at least two metal tubes extend through the wooden structural member and the metal strip.

Wooden structural members can be joined together be means of one or more metal strips. It is however also possible to join wooden structural members together directly by means of the connection arrangement according to the invention. The other structural element then consists of a second wooden structural member lying partly against the first wooden structural member.

The invention will now be explained with the aid of one example of embodiment and with reference to the drawings, in which:

- Figure 1 is a view in perspective of a preferred embodiment of the connection arrangement according to the invention, and
- Figure 2 is an exploded view of the connection arrangement shown in Figure 1.

Figure 1 shows the situation at the end of a wooden pole 1. The strip 2 is here fitted into the slot 3. The thickness of the strip 2 corresponds to the width of the slot 3. At right angles to the width of the strip 2 a hole 4 is drilled through the pole 1 and a hole 5 through the strip 2. A steel tube 6 having a relatively thick wall is passed

through these holes. This tube has a length slightly shorter than the diameter of the pole, and at both ends its interior is rounded-off. The width of the strip 2 must also be smaller than that diameter, because otherwise the desired effect of the connection method would be impaired. Each strip 2 must be fastened by two such tubes 6 at the end of a round wooden pole 1 in order to prevent the introduction of additional pivot points. Particularly when the pole is under compressive stress it would otherwise be possible for additional deformation or buckling to occur.

When a tensile or compressive force is now exerted on the strip in the direction of the pole, this force is transmitted to the wooden pole via a bending moment in the tube 6. This has a splitting action on the wood at the point where this tube is located. In most cases the force exerted can be taken at first, but in order to prevent splitting or widening of contraction cracks present in the wood through the action of this force, an iron wire of appropriate quality and thickness can be passed through these tubes and around the wood. For this purpose a piece of iron wire 7 of adequate length is pushed through the tube 6 and laid around the wood on one side. This iron wire is then pulled firmly so that it follows the required path as closely as possible, and finally the ends of the iron wire are twisted together over an appropriate length 8, thus being secured. For each tube at least two such iron wires are used on each side of the wood, depending on the forces occuring, the thickness of the wire, and the dimensions of the strip 2, the tube 6 and the pole 1. Figure 2 shows the different component parts essential for this type of connection.

A suitable tool should be made available for applying this iron wire. A tool of this kind is decribed for example in the publication "Handleiding bij de Delfse Draadspantang" (Manual for the Delft Wire Tensioning Pliers) by P.Huybers,

Technische Hogeschool (Technical University),Delft, June 1984. The effect of this iron wire binding 7 is that when the steel strip is loaded further the formation of cracks in the wood is limited or prevented, and that after the initial yielding of the wood at the location of the tube 6 a strengthening will gradually occur because the iron wire will increasingly bind the wood together. This means not only will a far greater mean strength be achieved than is possible with the customary fastening means, but that in addition there is a far smaller spread of strength data, so that finally a high permissible strength can be maintained.

The ends 8 of the iron wire 7 which have been twisted together can optionally be driven flat against the wood and fastened with a staple in order to improve appearance and prevent injury. The length of the portions 8 twisted together must be sufficient to provide adequate security against pulling apart.

In addition to the embodiment described above, which is mainly intended for connecting round wooden structural members with the aid of a steel strip, it is also possible for a bundle of wooden structural members of circular or rectangular section to be fastened together by drilling a hole through the entire bundle, fitting a tube through the hole in the manner described above, and passing two or more iron wire loops through the tube and around the wood. In this case the tube serves the funtion of the traditional bolt and the iron wire that of the bolt head and nut. This solution can be applied, among other purposes, to the production of trusses.

With the aid of the abovedescribed connection arrangement various types of supporting structures for building purposes can be assembled from wooden structural members, and in particular from round wooden structural members, these supporting structures being particularly strong and in addition having all the advantages of wooden structures.

CLAIMS

1. Connection arrangement for joining a wooden structural member (1) to another structural element (2) which at the site of the joint partly overlaps the wooden structural member (1), characterized in that in the region where the wooden structural member (1) and the other structural element (2) adjoin and overlap at least one metal tube (6) extends through the wooden structural member (1) and the other structural element (2) and that at least two metal wires (7) extend through each tube (6), each of said wires being tightly stretched around the wooden structural member (1) on each side of the latter and secured against detachment.

2. Connection arrangement according to Claim 1, characterized in that the other structural element (2) consists of a metal strip fitting into a slot (3) formed in the wooden structural member (1), and that in the region where the wooden structural member (1) and the metal strip (2) adjoin and overlap at least two metal tubes (6) extend through the wooden structural member (1) and the metal strip (2).

3. Connection arrangement according to Claim 1, characterized in that the other structural element (2) consists of a second wooden structural member lying partly against the first wooden structural member (1).

4. Building structure constructed of wooden structural members joined together by means of connection arrangements according to one or more of Claims 1 to 3.

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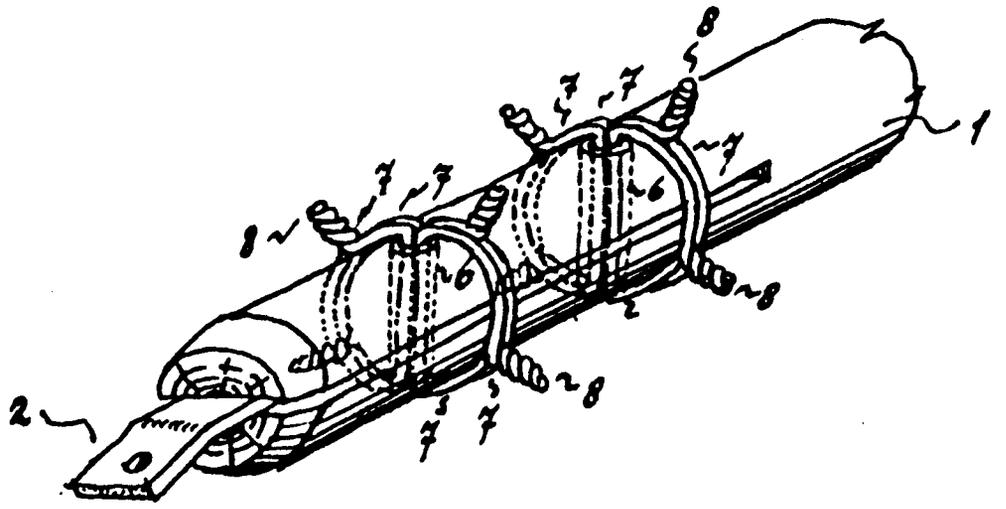

FIG.1

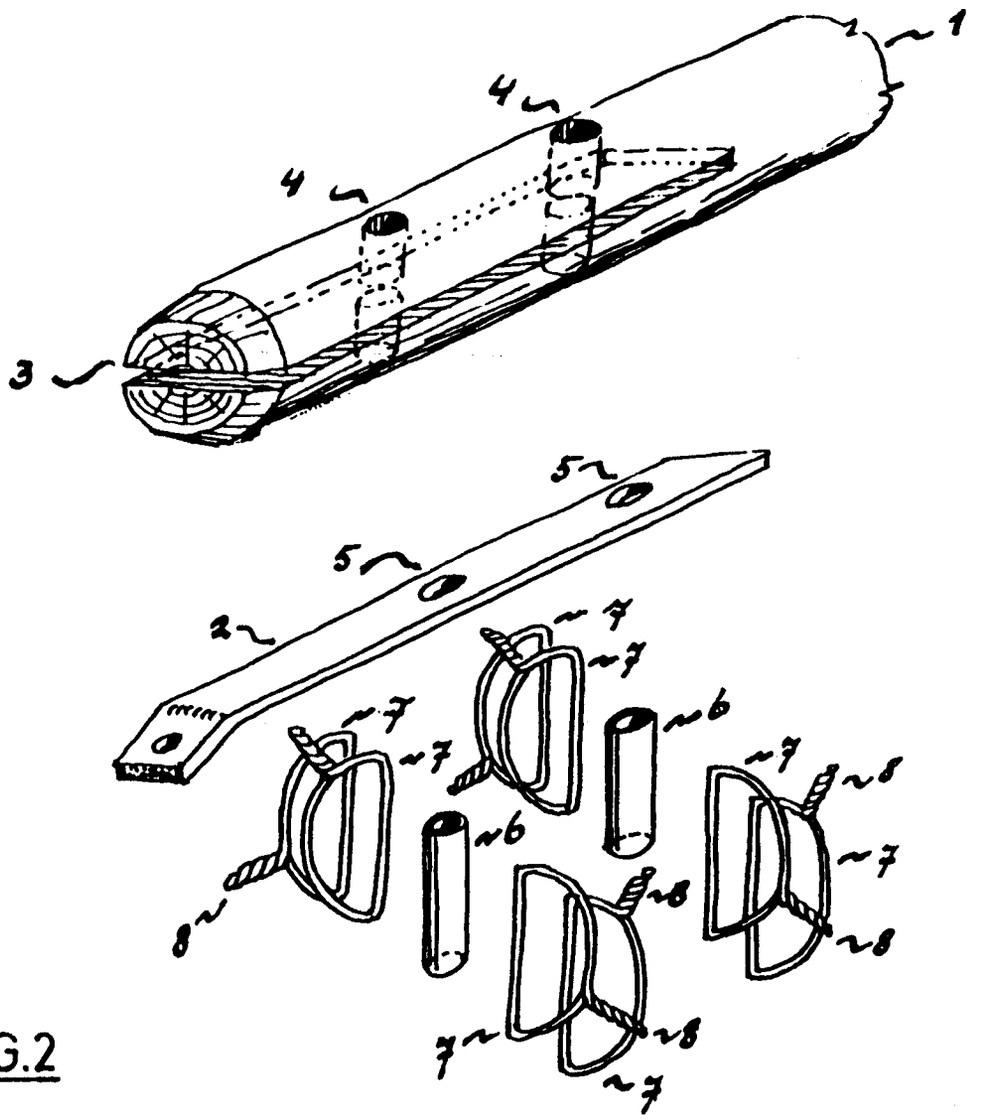

FIG.2

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EUROPEAN SEARCH REPORT

0216429
Application number

EP 86 20 1623

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl 4)
X	ARCHITECTUUR/BOUWEN, vol. 1, no. 2, February 1985, pages 34-35, Rijswijk, NL; P.HUYBERS: "Ontwikkelingen in de marge" * Page 34 - page 35, paragraph 1 *	1-4	E 04 B 1/19 E 04 B 1/26
A	DE-A-1 933 089 (SPEIDEL) * Page 4, paragraph 3; figures IIIa,IIIb *	1	
A	BE-A- 554 302 (NEMAHO) * Page 4, line 3 - last line; figures 3,4 *	1	

TECHNICAL FIELDS SEARCHED (Int Cl 4)

E 04 B
E 04 H
E 04 C
B 27 M

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	05-06-1986	CLASING M.F.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
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