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(54) **Connector for mixed timber-concrete constructions**

(57) A connector for mixed timber-concrete constructions, of small or large dimensions, comprising a base or peg (11) housed in a cut (20) made in a wooden beam (1), and an elongated body (12) terminating in a widened head (13), that remains embedded in the con-

crete (5), the connector having a central though hole (14) passing through it for the passage of a screw or special nail (15), which can also be made in a single body therewith, able to hold the connector in position.

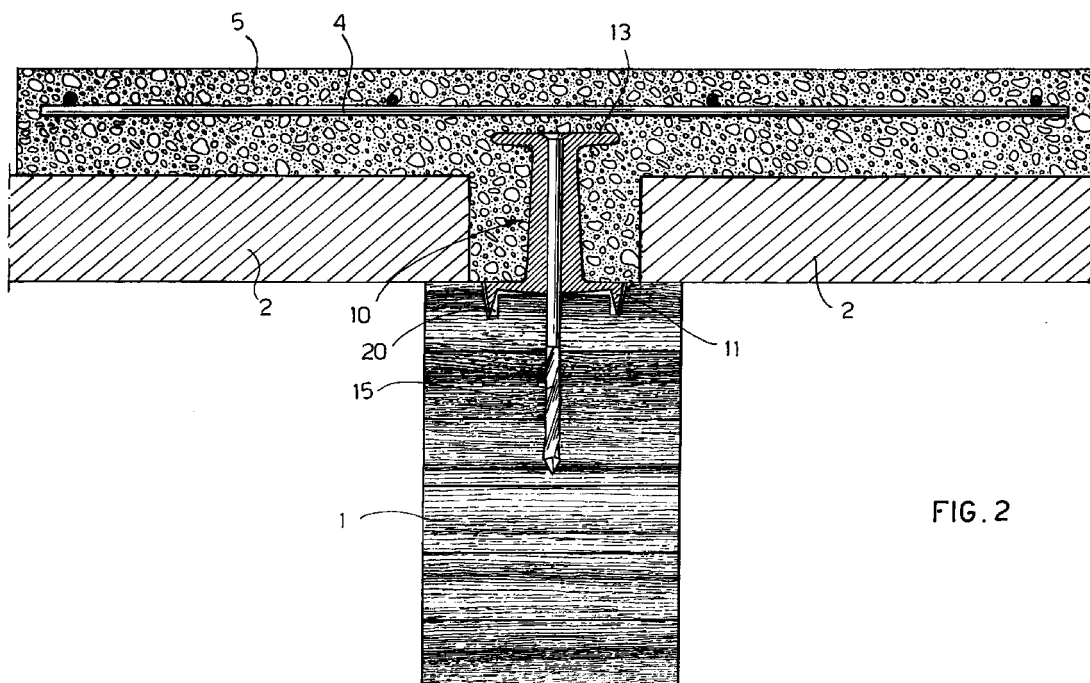


FIG. 2

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Description

[0001] The present invention relates to a connector for mixed constructions in timber and concrete, particularly floor and roof slabs and the like.

[0002] In the building field mixed constructions of small dimensions in timber and concrete are currently widely used.

[0003] In these structures there is the problem of making the timber and concrete cooperate perfectly with each other.

[0004] The object of the invention is to provide a timber-concrete connector that ensures perfect static cooperation between said materials.

[0005] Another object of the invention is that of providing such a connector that is simple in concept and therefore economical, and is easily constrained to a laminate or solid wood beam either in the workshop or on site.

[0006] These objects are achieved by the connector according to the invention which has the characteristics listed in attached independent claim 1.

[0007] Advantageous embodiments of the invention are described in the dependent claims.

[0008] The timber-concrete connector according to the invention is substantially cylindrical in shape and has a base or peg that is housed in a cut made for this purpose in the wood, and a rod-shaped body protruding therefrom and ending at the top in a widened head.

[0009] In one embodiment an axial hole passes through the entire connector for the passage of a screw or special nail able to hold said connector in position in the wood, but without fulfilling an essentially static function. According to a variant embodiment, this nail is made in a single body with the connector.

[0010] The connector thus remains firmly stuck to the wooden beam, and its structure prevents axial sliding of the concrete with respect to the wood, whilst the widened head of the connector prevents any detachment perpendicularly to the surface of the wooden beam, with a stabilizer effect.

[0011] Further characteristics of the invention will be made clearer by the detailed description that follows, referring to a purely exemplary and therefore non-limiting embodiment thereof illustrated in the appended drawings, in which:

Figure 1 is a schematic perspective cutaway view of a timber-concrete structure using connectors according to the invention;

Figure 2 is a section of the structure in Figure 1, taken at a connector, along the line II-II in Figure 1;

Figure 3 is a midline section of the connector alone;

Figure 4 is an axonometric view of the connector.

[0012] Figures 1 and 2 show part of a mixed timber-concrete construction, such as floor or roof slab, for example.

[0013] The structure is made of laminate wood beams 1, only one of which is shown in the figures, on which the so-called intermediate means 2 is laid, that is supporting panels made of tiles, timber or other materials, for subsequent casting of concrete 5. Before carrying out the concrete casting 5, an electric welded wire mesh 4 that serves to reinforce the structure is disposed on the intermediate means 2 to a certain height therefrom.

[0014] To make the timber 1 and the concrete 5 statically cooperating, connectors 10 are disposed therebetween, the number, positioning and size of said connectors 10 being calculated on the basis of the structure to be created.

[0015] Each connector 10 has a base or peg 11 that is disposed in a corresponding cut 20 made in the wooden beam 1, a substantially cylindrical body 12, extending upwards, and a widened head 13. The body 12, which in the embodiment illustrated in the appended drawings has a slightly conical shape toward the top, has a central hole 14 passing through it for insertion of a screw or special nail 15 which screws into the wooden beam 1 beneath, to hold the connector 10 in position, before casting of the concrete 5, but without fulfilling any static function. Alternatively, the nail 15 can be made in a single body with the connector 10, protruding from the base or peg 11 like a plug.

[0016] In the example shown, the base or peg 11 of the connector 10 is shaped like a continuous skirt downwardly tapering to a point, peg known by the name of Appel in other types of connectors. It is obvious, however, that the peg 11 can be of other types, for example with a profile shaped like a T (Christoph & Unmack system), a double cone (Kubler system), in the form of a plate with a plurality of pointed teeth that protrude from the bottom thereof (Geka system), or of other shapes still, the characteristics of the connector according to the invention remaining the same.

[0017] The connectors 10 can be preinstalled on the beams 1 in the workshop or they can also be applied on site, an operation that does not require particular specialized labour.

[0018] Assembly of the connector 10 according to the invention in fact requires a machined part on the beam for housing of the peg 11, after which the screw 15 or special nail is screwed in.

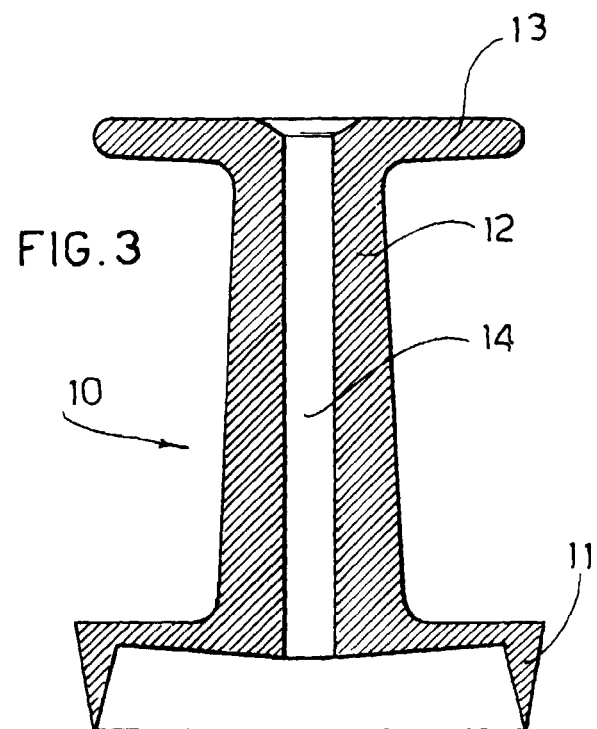
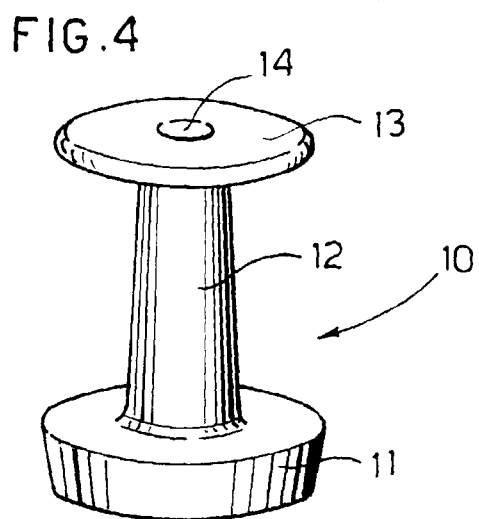
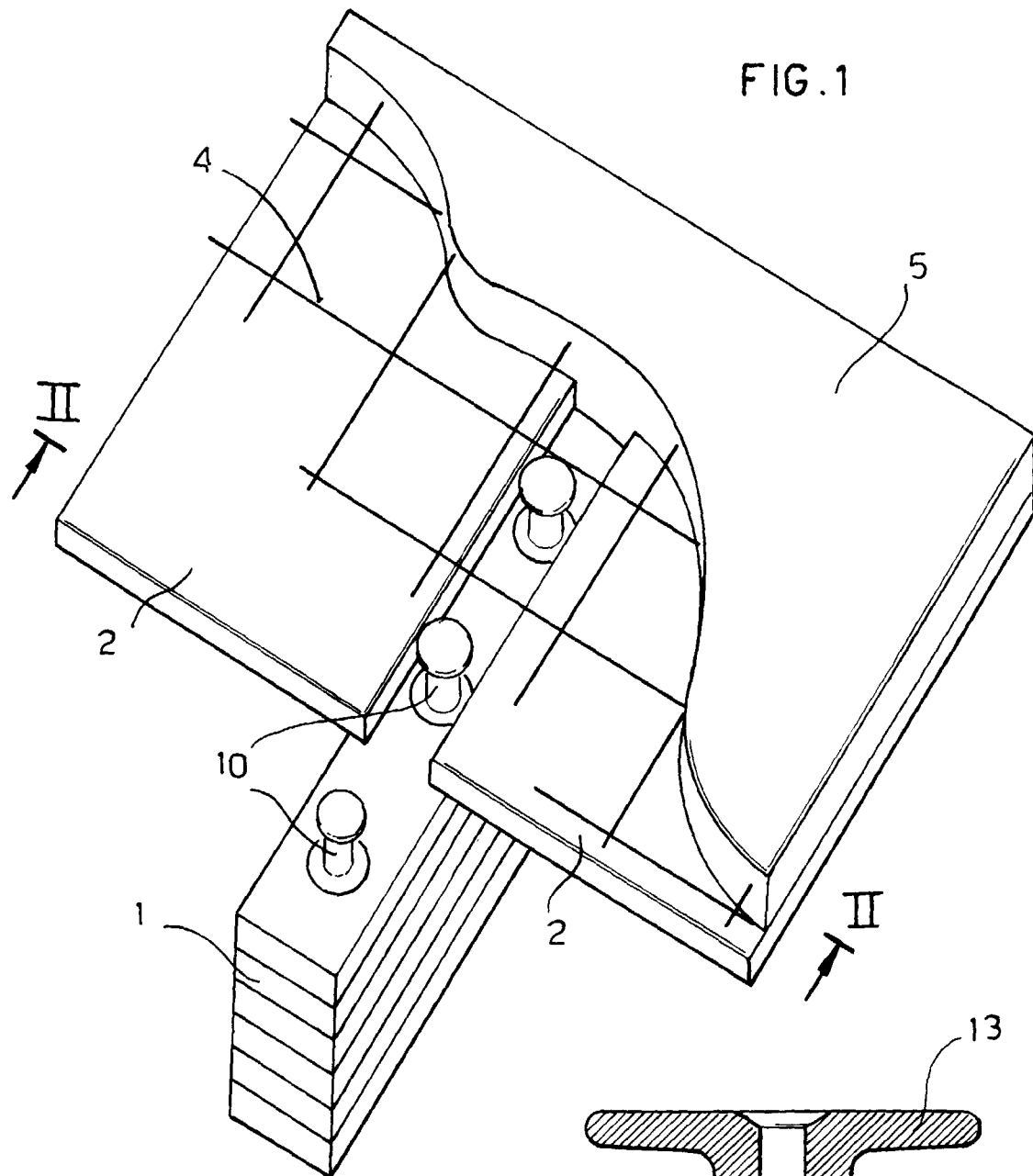
[0019] In the case of the nail being made in a single body with the connector, it is sufficient to apply a suitable pressure thereon.

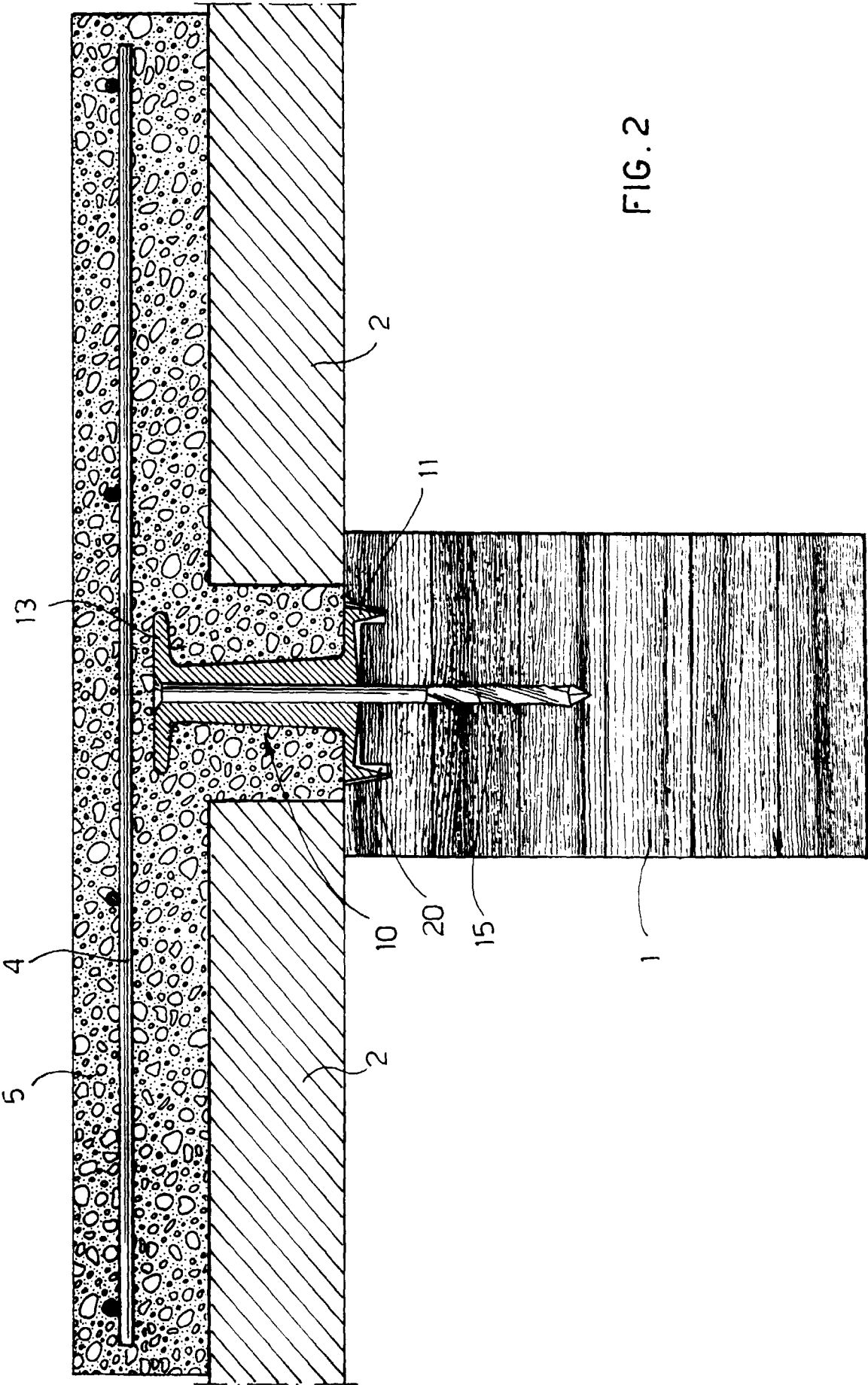
[0020] The connector according to the invention is advantageously made of metal with a special anticorrosive treatment.

Claims

mesh (4) is disposed on said beams (1) before casting of the concrete (5).

1. A connector for mixed timber-concrete constructions, such as floor or roofing slabs and the like, comprising a base or peg (11) housed in a seat (20) made in the wooden beam (1), and an elongated body (10) terminating in a widened head (13), embedded in concrete (5). 5
2. A connector according to claim 1, characterized in that it has an axial through hole (14) for insertion of a screw (15) or special nail for fixing the connector (10) to the wooden beam (1). 10
3. A connector according to claim 1, characterized in that, protruding from said base or peg (11), it has a screw or nail (15) made in a single body therewith. 15
4. A connector according to any one of the preceding claims, characterized in that said elongated body (10) is substantially cylindrical. 20
5. A connector according to claim 4, characterized in that said elongated body (12) is tapered at the opposite end to said base or peg (11). 25
6. A connector according to any one of the preceding claims, characterized in that said base or peg (11) consists of a continuous skin tapered downwardly, of the Appel type (type "A" DIN 1052), or has a T-shaped profile, of the Christoph and Unmack type, or has a double-cone profile, of the Kubler type, or has a plurality of sharp teeth that stick into the wooden beam (1), of the Geka type. 30
7. A method of connecting a mixed timber-concrete structure in a statically cooperating manner, using a plurality of connectors (10) according to any one of the preceding claims, consisting in making cuts (20) in the wooden beam (1), disposing the bases or pegs (11) of the connectors (10) in said cuts (20), fixing the connectors (10) to the beam (1) by means of screws or special nails (15) passing through a corresponding central hole (14) in the connectors (10) or made in a single body therewith, and casting the concrete (5) on the beam (1) prepared with the connectors (10). 35
8. A method according to claim 7, wherein said connectors (10) are applied to the beams (1) in the workshop. 40
9. A method according to claim 7, in which said connectors (10) are applied to the beams (1) on site. 45
10. A method according to any one of claims 7 to 9, in which intermediate means (2) of tiles, wood or the like and possibly a reinforcing electric welded wire 50







European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 98 12 4601

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.6)
X Y A	EP 0 742 323 A (TECNARIA) 13 November 1996 * the whole document *	1,4 2 7-10	E04B5/23
Y	FR 2 751 355 A (HILTI FRANCE SOCIETE ANONYME) 23 January 1998 * figures 9-11 *	2	
A	DE 297 06 301 U (KNEIDL) 5 June 1997 * the whole document *	1,3,6-10	
A	EP 0 280 228 A (ENTREPRISE PARIS OUEST) 31 August 1988 * the whole document *	1,4,6-10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E04B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 21 May 1999	Examiner Mysliwetz, W
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 12 4601

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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21-05-1999

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 742323	A	13-11-1996	IT	VI950041 U	12-11-1996
FR 2751355	A	23-01-1998	NONE		
DE 29706301	U	05-06-1997	NONE		
EP 280228	A	31-08-1988	FR	2611778 A	09-09-1988
			AT	65100 T	15-07-1991
			CA	1322668 A	05-10-1993
			US	4841703 A	27-06-1989