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(54) Plate for the anchorage and tensioning of metal reinforcements in the construction of prestressed reinforced concrete railway sleepers.

(57) Plate for the anchorage and tensioning of metal reinforcements, in the construction of prestressed reinforced concrete railway sleepers, comprising, in a single piece obtained by hot-pressing of standard steel, two pairs of holes and anchorage seats for the harmonic steel bars positioned on one of the two reinforcement planes of the sleepers, and a pair of threaded holes into which screw two tensioning screws for the tensioning of said bars.

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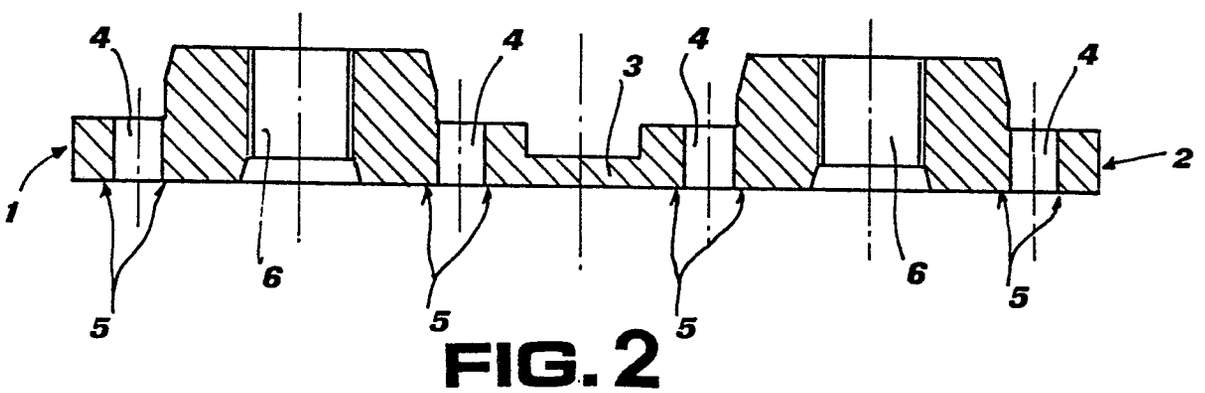

FIG. 2

"PLATE FOR THE ANCHORAGE AND TENSIONING OF METAL REINFORCEMENTS IN THE CONSTRUCTION OF PRESTRESSED REINFORCED CONCRETE RAILWAY SLEEPERS"

As known, in the construction of prestressed reinforced concrete railway sleepers, for the laying of tracks, the harmonic steel bars forming the reinforcement for the sleepers (usually four pairs of bars, positioned by twos, side-by-side and superposed) are anchored by means of plates comprising holes and seats, to which each single pair of bars stays anchored by means of a head formed by cold upsetting at the end of each bar. The bars are then tensioned to the desired extent, before casting is performed, moving the plates by drawing with a bolt comprising a screw external to the plates, which bolt crosses said plates through an appropriate central hole thereof and is screwed to a nut internal to the plates and bearing thereon.

This known arrangement has several drawbacks.

First of all, the nuts of the bolts for drawing the plates and thus the reinforcement bars of the sleeper, remain each time englobed into the casting and thus into the sleepers when the forms are being dismantled, with a waste of material involving a certain expense; furthermore, the anchor plates for the reinforcement bars are likely to undergo, during drawing, even considerable wobbling which causes the bars to leave their ideal position, away from the plane provided therefor, up to taking unacceptable positions: this requires tools and inspections to check said position, involving considerable costs and waste of time.

The present invention concerns a plate for the anchorage and tensioning of the reinforcement bars for prestressed reinforced concrete railway sleepers, which allows to avoid these drawbacks and which provides furthermore important improvements and advantages in respect of known technique.

Said plate is substantially characterized in that it comprises, in a single piece obtained by hot-pressing of standard steel, two pairs of holes and anchorage seats for the harmonic steel bars positioned on one of the two reinforcement planes of the sleepers, and a pair of threaded holes into which screw two tensioning screws for the tensioning of said bars.

Said plate is suitably formed of two thicker elongated lateral portions housing said holes and seats, which are centrally connected by an easily deformable staple of reduced thickness.

The invention is now described in further detail, by mere way of example, with reference to the accompanying drawing, which illustrates a practical embodiment thereof and in which:

Fig. 1 is an external view of the plate according to the invention;

Fig. 2 is a lateral view of the same plate; and

Fig. 3 shows the plate from the inner side, opposite to that of figure 1.

As can be seen from the drawing, the plate according to the invention - obtained in a single piece by pressing of standard steel - comprises two substantially oval elongated lateral portions 1 and 2, centrally connected by a rectangular staple 3.

The lateral plate portions 1 and 2 house pairs of holes 4, meant to be crossed by the ends of the reinforcement bars for the sleepers being constructed, said holes 4 forming seats 5 onto which bear the heads - formed by cold upsetting - of said bars. Between the holes 4, said portions 1 and 2 comprise larger threaded holes 6 for the tensioning screws.

The lateral portions 1 and 2 are thicker than the connecting staple 3 and their central part surrounding the holes 6 is even thicker.

In use, a plate as that illustrated allows to anchor and tension all four bars of one of the two reinforcement planes of the sleeper to be cast, using a pair of tensioning screws screwed into the threaded holes 6 and tensioned by means of two identical coupled jacks.

It is evident that the remarkable width of said plate prevents any undesired wobbling thereof (even when the form is being dismantled) and maintains a perfect lie (or anyhow within very strict tolerance limits) of the reinforcement bars on their planes. The plate according to the invention thus eliminates all the most serious drawbacks of previous technique. It also guarantees an improved prestress diffusion in the concrete at the heads of the sleeper. Furthermore, the absence of sharp edges in the geometrical configuration of the sleeper prevents any undesired notching effects in the concrete.

Moreover the presence, in the structure of the plates, of the staple 3 of reduced thickness - far more deformable than the rest of the structures - allows the permanent absorption of any elongation differences in the reinforcement bars, which may always arise during the tensioning operations (even if these are carried out with a strictly uniform law, under an even pull of identical jacks). In practice, the plate takes up a Z-configuration which helps to absorb the differences in behaviour of the bars, allowing the two tensioning screws to obtain the same tensions in the four bars, independently of any errors in the mounting, or differences in length,

of the bars employed.

The construction of sleepers is thereby improved with obvious advantages.

The increased thickness of the plate in correspondence of the holes 6 finally allows to dispose of quite a long threading, so as to guarantee the positive holding of the screwing engagement between the tensioning screws and said plate even under highest stress, though using for the plate low cost materials, as standard steel, and without having to provide for any special treatments in correspondence of the actual threading.

Also from the economical point of view, the advantages which the use of the plates according to the invention allows to obtain are thus quite evident.

Claims

1) Plate for the anchorage and tensioning of metal reinforcements in the construction of prestressed reinforced concrete railway sleepers, characterized in that it comprises, in a single piece obtained by hot-pressing of standard steel, two pairs of holes and anchorage seats for the harmonic steel bars positioned on one of the two reinforcement planes of the sleepers, and a pair of threaded holes into which screw two tensioning screws for the tensioning of said bars.

2) Plate as in claim 1), formed of two thicker elongated lateral portions housing said holes and seats, which are centrally connected by an easily deformable staple of reduced thickness.

3) Plate as in claim 1) or 2), wherein the central part of said lateral portions, housing the threaded hole for the tensioning screw, is of further increased thickness.

4) Plate as in claims 1) to 3), wherein said lateral portions have an oval shape.

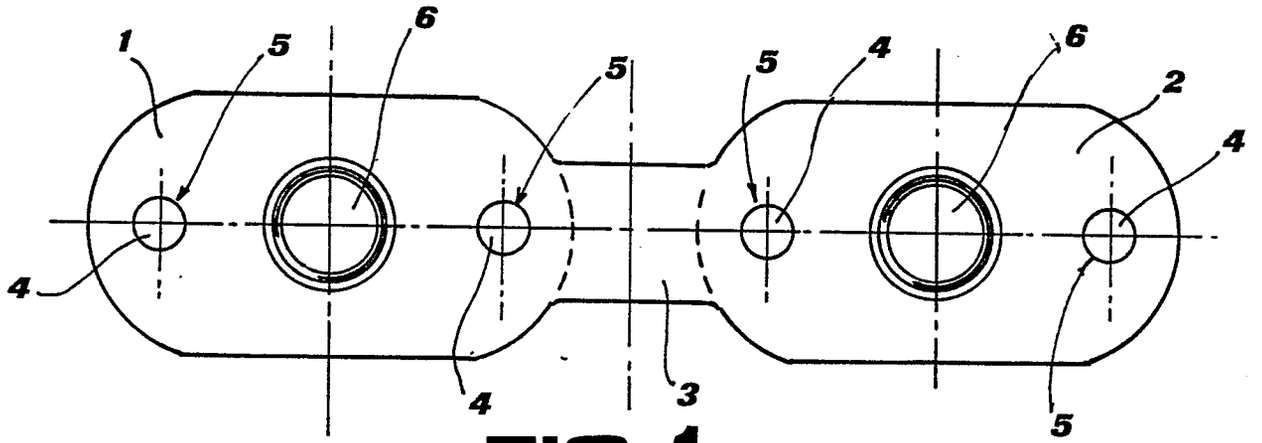

FIG. 1

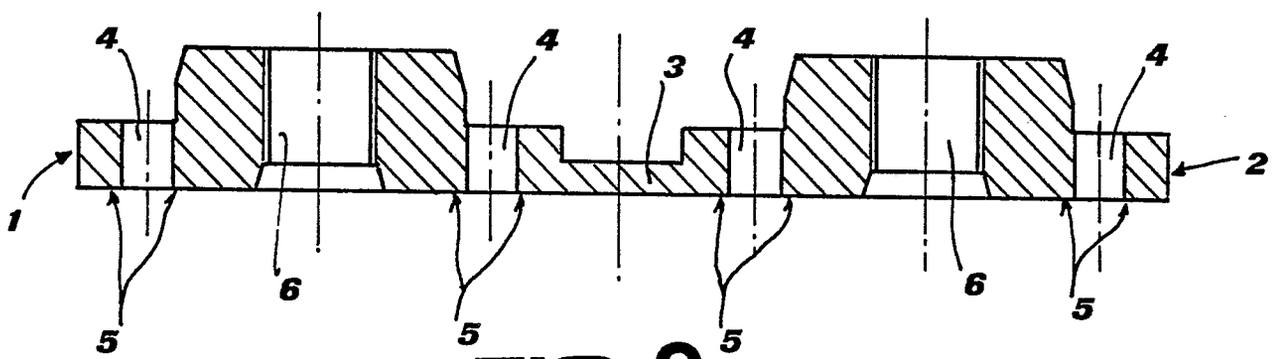

FIG. 2

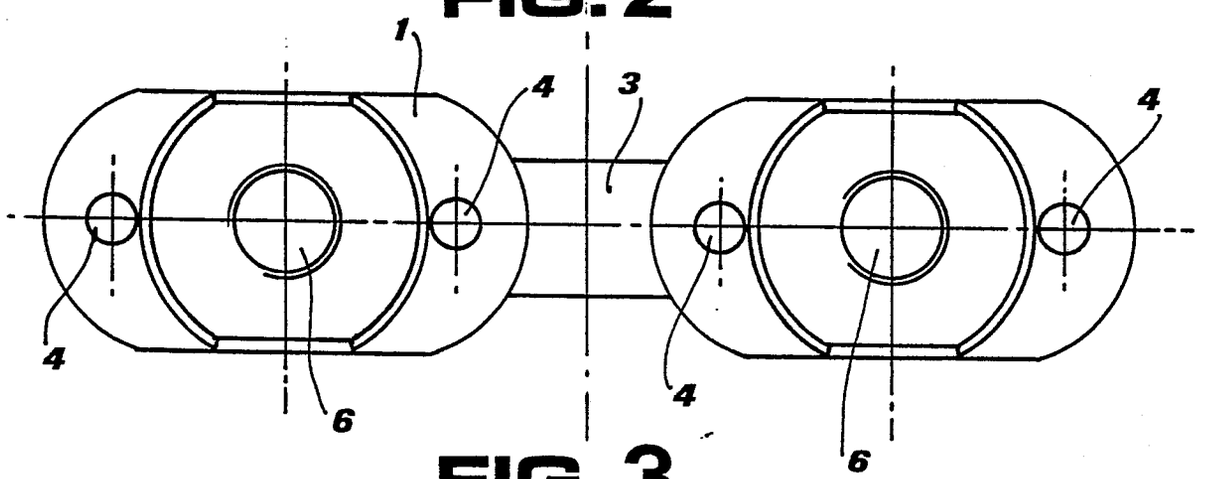

FIG. 3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 10 8507

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)
A	US-A-2 689 999 (CONCRETE PRODUCTS CO.) * Whole document *	1	B 28 B 23/00 E 01 B 3/34 E 04 C 5/12
A	US-A-3 568 274 (A.D. LITTLR INC.) * Whole document *	1	
A	GB-A- 657 794 (MINISTER OF WORKS) * Whole document *	1	
A	BE-A- 450 406 (O. FRIEDRICHS) * Whole document *	1	
A	US-A-3 985 482 (NIHON KOGEN CONCRETE K.K.) * Whole document *	1-3	
A	DE-B-1 047 695 (F. BOCK) * Whole document *	1-3	
A	CH-A- 376 634 (HUNZIKER & CIE AG) * Whole document *	1	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	GB-A- 633 245 (D.H. STENT) * Whole document *	1	B 28 B E 01 B E 04 C E 04 G
A	US-A-3 577 613 (A.D. LITTLE INC.) * Whole document *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	31-08-1988	GOURIER P.A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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