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(54) Cage for reinforcing a concrete pile.

(57) A support structure 10 is described for use in the production of a cage for reinforcing a concrete pile. The support structure 10 comprises at least two transverse frames 12, 14 and a plurality of metal rods 16 secured to and extending between the transverse frames 12, 14. At least three of the rods 16 extending between the frames 12, 14 have radially outwardly offset guide portions 18 that lie outside the volume bounded by the frames 12, 14 and are coated with a plastics material to act as spacers for centring the cage in a bore.

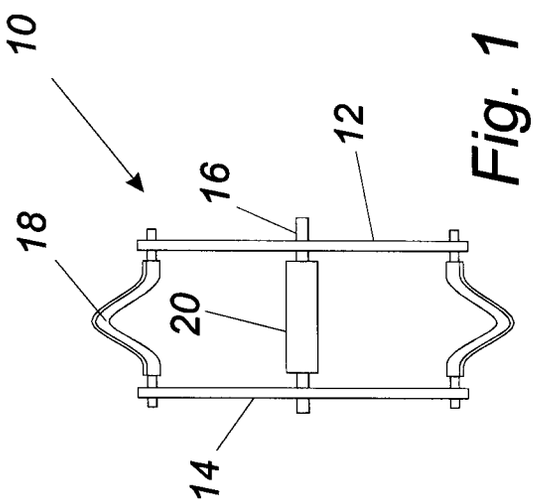

Fig. 1

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Field of the invention

The present invention relates to a cage for reinforcing a concrete pile.

Background of the invention

It is known to use, for the purpose of reinforcing a concrete pile, a cage having longitudinally extending bars arranged at the corners of a polygon and secured to transverse rods. These transverse rods act to keep the longitudinal bars apart and to add structural strength to the cage.

It is important that the cage should be correctly located within the concrete so that an adequate thickness of concrete should surround all parts of the cage. In order to achieve this aim, it is usual to place plastics spacer wheels on the transverse rods of the cage. These spacers are split wheels that can be pushed onto the transverse rods and they are intended to roll on the walls of the bore into which the cage is lowered to centre the cage within the bore.

It is also known to form a cage by first producing support structures which comprise transverse frames, that may be formed by a rod bent into a circle or a polygon, and longitudinal rods that are secured to the frames to keep the frames at the correct distance apart and in planes that are correctly inclined relative to the longitudinal axis of the cage. To form a cage, two or more such support structures are placed in line with one another and the longitudinal cage bars are positioned on the frames and secured to the support structures.

The use of spacer wheels has certain associated disadvantages. In particular, because of the cost of the spacer wheels and the labour involved in mounting them on the cage, they add considerably to the expense. Furthermore, they can be dislodged while the cage is being lowered into the bore, for example if they meet an obstruction or if they received a knock during rough handling of the cage. If this should occur, there is no way of knowing that they have come away and this may lead to cage misalignment. A still further problem is that they can interfere with the flow of concrete in the bore.

Object of the invention

The invention therefore seeks to provide a support structure that can enables a cage to be constructed in such a manner that its correct alignment in a concrete pile can be ensured without the need for plastics spacer wheels.

Summary of the invention

According to the present invention, there is provided a support structure for use in the production of a cage for reinforcing a concrete pile, the support structure comprising at least two transverse frames and a plurality of metal rods secured to and extending between the transverse frames, wherein at least three of the rods extending between the frames have radially outwardly offset guide portions that lie outside the volume bounded by the frames and that are rendered corrosion resistant.

The guide portions may be made corrosion resistant by being covered with a suitable coating, such as a plastics material, or by being treated against corrosion, such as by galvanisation.

The metal rods are preferably evenly distributed about the circumference of the transverse frames, the optimum number of rods being dependent upon the size of the frames.

Brief description of the drawings

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

Figure 1 is a side view of a support structure for use in producing a cage,

Figure 2 is a side view of a cage produced using two support structures as shown in Figure 1,

Figure 3 is an end view of the cage shown in Figure 2, and

Figure 4 is a section through an alternative form of plastics sleeve fitted over the guide portions of the metal rods in a further embodiment of the invention.

Detailed description of the drawings

Figure 1 shows a support structure 10 formed of two circular frames or rings 12, 14 connected to one another by four longitudinal metal rods 16. The frames 12, 14 need not be circular and the number of metal rods may be three or more.

Each of the metal rods 16 has a radially outwardly offset guide portion 18 that lies outside the volume bounded by the frames 12, 14. The guide portions 18 are covered with a plastics material 20 which may be preformed plastics sleeves fitted over the metal rods prior to their being bent to form the cranked guide portions. Instead of a coating, these guide portions 18 may be galvanised to withstand corrosion.

Figure 4 shows an alternative form of sleeve 20' having a flat outer surface, defined by flanges 20a and 20b that extend laterally from both sides of the sleeve.

Figure 2 shows a complete cage formed of two support structures 10 arranged at opposite ends of the cage. Four bars 24 are secured to the support structures 10 and pass inside the frames 12 and 14.

In the finished cage, the plastics covered guide portions 18 lie outside the volume bounded by the

cage bars 24 and act to guide the cage as it is being lowered into a bore and to centre the cage within the bore. These guide portions therefore act in place of spacer wheels but offer the considerable advantage of being integral with the cage so that they cannot be dislodged while the cage is being lowered into a bore. Furthermore, the cost of a cage incorporating such guide portions is less than a cage fitted with spacer wheels, there being both material and labour savings to be achieved by the construction of the invention. A cage constructed using the support structures of the invention is also found to meet less resistance and to require less effort when it is driven into wet concrete.

The above description of a preferred embodiment is given only by way of non-limiting example and various modifications may be made without departing from the scope of the invention as set out in the appended claims.

For example, as the guide portions are used for centring the cage, there need only be three. In larger cages, on the other hand, it may be desirable to use more than four. In practice, as the rods are also used to locate the cage bars, it is advantageous, though not essential to provide as many rods as there are main bars in the cage. The number of offset guide portions is determined in part by the size of the cage and in part by the hardness of the soil. Larger cages require more guiding and the same applies to soft soil.

It is also not essential for all the rods of the support structure to include offset guide portions. Thus a large cage may require several rods for strength but only require a lesser number of guide portions in view of the soil.

Furthermore, when some of the rods are left straight, the strength of the support structure is improved in that it can better withstand axial forces, without the bent rods being deformed from their desired shape.

It will also be clear that when making longer cages, more than two support structures may be needed along the length of the cage.

Claims

1. A support structure for use in the production of a cage for reinforcing a concrete pile, the support structure comprising at least two transverse frames (12,14) and a plurality of metal rods (16) secured to and extending between the transverse frames (12,14), characterised in that at least three of the rods (16) extending between the frames (12,14) have radially outwardly offset guide portions (18) that lie outside the volume bounded by the frames and that are rendered corrosion resistant.

2. A support structure as claimed in claim 1, wherein the guide portions are rendered corrosion resistant by being covered with a suitable coating.

3. A support structure as claimed in claim 2, wherein the coating on the guide portions is of a plastics material, being formed as plastics sleeves fitted over the rods.

4. A support structure as claimed in claim 3, wherein the plastics sleeves have flat outer surfaces defined by flanges (20a, 20b) extending laterally from both sides of a cylindrical tube (20').

5. A support structure as claimed in claim 1, wherein the guide portions are galvanised or otherwise treated against corrosion.

6. A support structure as claimed in any preceding claim, wherein the metal rods (16) are evenly distributed about the circumference of the transverse frames (12,14).

7. A cage comprising a plurality of longitudinal bars secured to two or more support structures as claimed in any preceding claim.

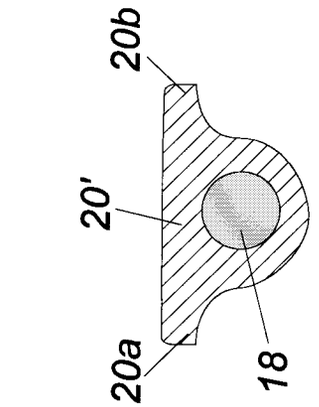

Fig. 4

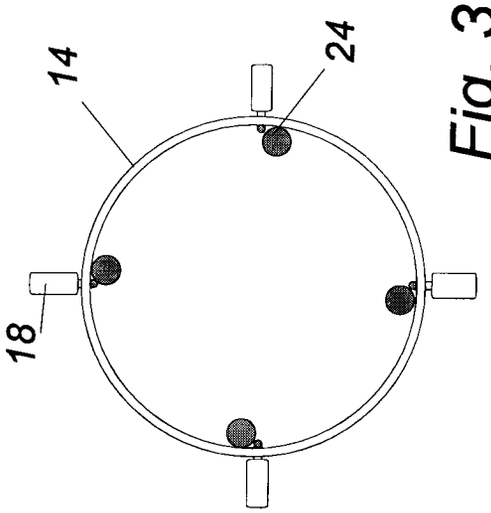

Fig. 3

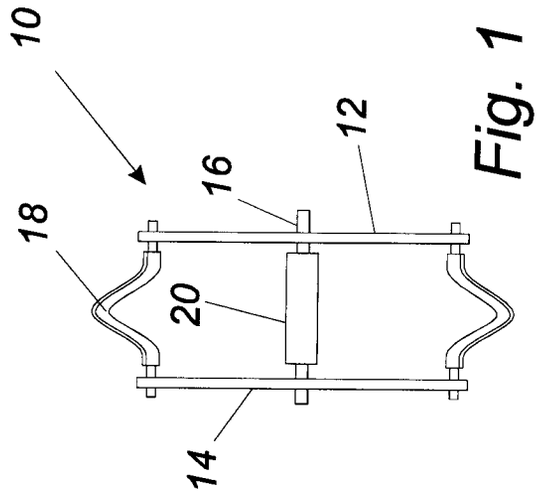

Fig. 1

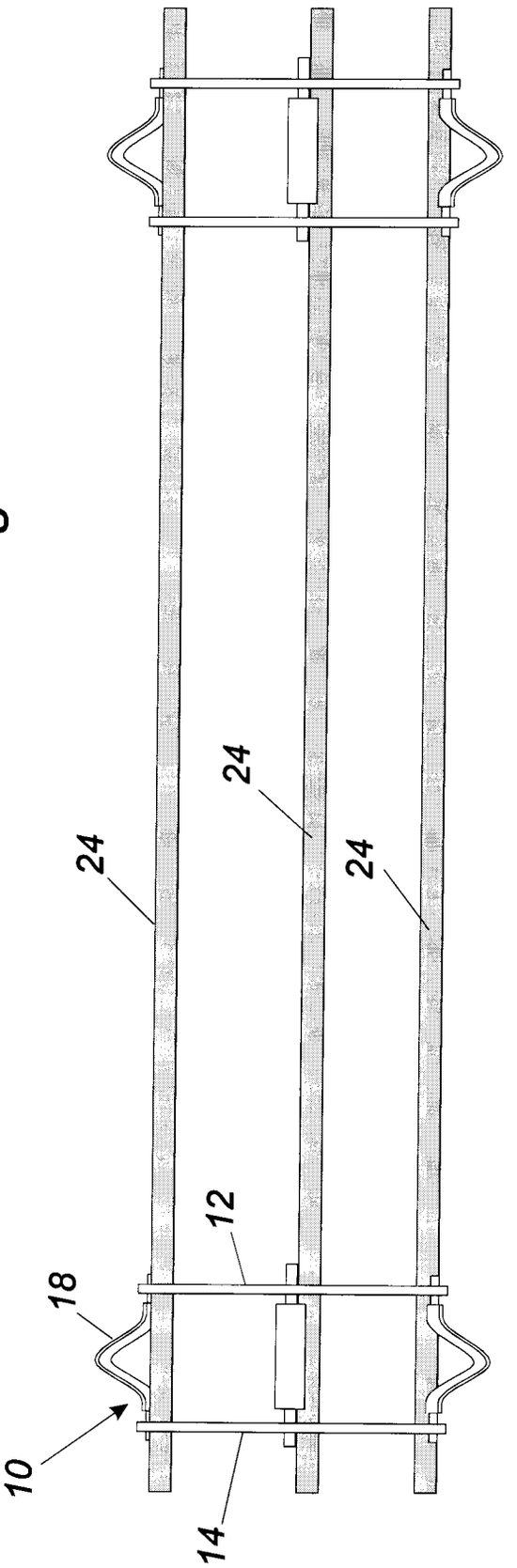

Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 94 30 0209

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.5)
A	GB-A-2 235 223 (BACHY) * page 4, line 17 - page 7, line 25; figures 1,2 *	1,6,7	E04C5/06 E02D5/38
A	FR-A-1 583 735 (HALMSTADS JÄRNVERK AB) * page 3, line 16 - line 24; figures 1,2 *	2-4	
A	FR-A-2 526 465 (STANDARM) * page 7, line 11 - line 13; figures 1,8 *	2,4	
A	DATABASE WPI Week 8350, Derwent Publications Ltd., London, GB; AN 83-841033 & JP-A-58 188 614 (NISSO MASTER BUILDERS) 4 November 1983 * abstract *	2,5	

TECHNICAL FIELDS SEARCHED (Int.Cl.5)
E04C B21F E02D B28B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29 April 1994	Tellefsen, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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