(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 330 519 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **89301906.7**

(22) Date of filing: **27.02.89**

(51) Int. Cl.4: **E 04 C 5/20**

(30) Priority: **25.02.88 GB 8804414**

(43) Date of publication of application:
30.08.89 Bulletin 89/35

(84) Designated Contracting States:
AT BE DE ES FR GB GR IT NL SE

(71) Applicant: **M.C.M. (MACHINE SALES) LTD.**
22 Bancrofts Road Eastern Industrial Estate
South Woodham Ferrars Essex (GB)

(72) Inventor: **Cachia, Michael Carmel**
249 Benfleet Road
Benfleet Essex (GB)

(74) Representative: **Messulam, Alec Moses**
A. Messulam & Co. 24 Broadway
Leigh on Sea Essex SS9 1BN (GB)

(54) Spacer wheel for steel cages.

(57) A spacer wheel is disclosed for mounting on a bar of a concrete reinforcement cage, comprising a main body (30) which defines a rim (20) interrupted by a gap (26) through which, in operation, the cage bar can be passed, an aperture (24) in the main body (30) which communicates with the gap (26) in the rim (20), and bearing means (24b) located within the aperture (24) of the main body (30) for receiving the cage bar.

The main body (30) is an essentially solid, disc-like, member. The bearing means (24b) comprises an interrupted ring having a radially inner surface which, in operation, receives the cage bar and serves as a bearing therefor, and a radially outer surface connected to the wall of the aperture only at points (24d) spaced. from the gap (24c) in the ring (24b), whereby the ring (24b) may be deformed to enlarge the gap (24c) therein without corresponding deformation of the wall (24a) of the aperture (24). Guiding means (27) extend between the gap in the ring (24b) and the wall (24a) of the aperture (24), which guiding means (27) serve during mounting of the spacer wheel on a cage bar to direct the bar towards the gap (24c) in the ring (24b) and to widen the gap (24c) in the ring (24b) to permit the cage bar to be introduced therein.

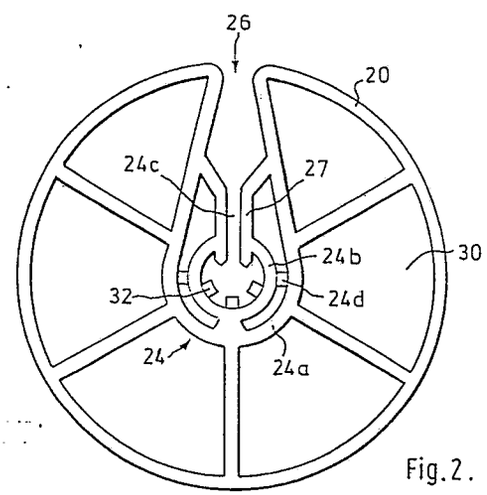

Fig.2.

EP 0 330 519 A1

Description

SPACER WHEEL FOR STEEL CAGES

The present invention relates to a spacer wheel for the steel reinforcement cages of concrete piles.

When making a steel reinforced concrete pile, a bore is excavated and filled with concrete. A steel cage is lowered into the hole, usually after it has been filled with concrete, and it is important for the cage to be spaced from the walls of the bore.

In order to maintain the spacing between the cage and the bore, it is known to use spacer wheels which can be slipped over the horizontal bars of the cage and act not only as spacers but also as guides for the cage as it is lowered into the bore. The spacer wheels must be capable of being fitted to an assembled cage.

It is known for a spacer wheel to comprise a main body which defines a rim interrupted by a gap through which, in operation, the cage bar can be passed, an aperture in the main body which communicates with the gap in the rim, and bearing means located within the aperture of the main body for receiving the cage bar.

One such wheel, shown in Figure 1 of the drawings, is formed as a one piece plastics moulding and has an interrupted rim 10 connected by spokes 12 to a discontinuous hub 14. This construction permits the wheel to be slipped onto a bar by pushing the bar into the gap 16 in the rim, the bar being guided into the hub where it is retained by two generally semi-circular prongs 18, which act as the bearing means.

The disadvantage of this construction is that though the wheel can easily be slipped onto a cage bar, it is also easily dislodged from the bar and on meeting an obstruction can twist and come away from the cage. If this should occur while the cage is being lowered into the wet concrete, then the problem will not be noticed and the cage can be incorrectly located in the pile thereby considerably reducing its strength.

The object of the present invention is to provide a spacer wheel which can be mounted on a cage bar and which is not easily dislodged during handling of the cage.

According to the present invention, there is provided a spacer wheel for mounting on a bar of a concrete reinforcement cage, comprising a main body which defines a rim interrupted by a gap through which, in operation, the cage bar can be passed, an aperture in the main body which communicates with the gap in the rim, and bearing means located within the aperture of the main body for receiving the cage bar, characterised in that the main body is an essentially solid, disc-like, member, the bearing means comprises an interrupted ring having a radially inner surface which, in operation, receives the cage bar and serves as a bearing therefor, and a radially outer surface connected to the wall of the aperture only at points spaced from the gap in the ring, whereby the ring may be deformed to enlarge the gap therein without corresponding deformation of the walls of the aperture, and guiding means extend between the gap in the ring and the walls of the aperture, which guiding means serve during mounting of the spacer wheel on a cage bar to direct the bar towards the gap in the ring and to widen the gap in the ring to permit the cage bar to be introduced therein.

The spacer wheel of the invention differs from that shown in Figure 1, in the first instance, in that the disc of the wheel is solid and concrete cannot pass from one side of the disc to the other as it can be tween the spokes 12. As a result, the wheel can roll more freely while being lowered into concrete as it does not need displace concrete during its rotation. The solid disc is also less easily distorted on meeting an obstruction and more force is required to push the cage bar through the gap in the rim of the wheel both top fit the wheel to a cage bar and to dislodge it from a cage bar.

A second difference is that the cage bar received in the aperture in the body of the wheel does not rest on the wall of this aperture directly. Instead, the bar is received within a separate ring disposed within the aperture. The effect of this construction is that if the body of the wheel should be twisted for any reason during the handling of the cage, it does not result in the bearing being twisted off the cage bar.

Lastly, the bearing ring requires significant force to deform it to permit the bar to be inserted into it and this is achieved with the help of the guiding means which act as levers to prise the bearing ring apart at the gap. Once the bar is received within the ring, much more force is required to act between the bar and the bearing ring before the bar can be extracted.

In a preferred embodiment of the invention, the gap in the rim of the wheel is narrower than the inner diameter of the bearing ring, that is to say narrower than the diameter of the cage bar. This construction enable the wheel to roll more easily during positioning of the cage.

Conveniently, the bearing ring is connected to the wall of the aperture only at three points, disposed at 90°, 180° and 270° from the gap.

Advantageously, the inner surface of the bearing ring is provided with radial teeth to contact the surface of the cage bar. By moulding wheels with different sizes of teeth inside the bearing ring, it is possible to accommodate bars of different diameter without major modification to the mould.

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

Figure 1 shows the construction of a known wheel as has been described previously, and

Figure 2 is a similar view of a wheel of the invention.

The wheel shown in Figure 2 is a solid disc 30 having a hub-receiving aperture 24 which is wide at the centre and communicates with a gap 26 in the rim 20 of the disc. The gap 26 is narrower than the diameter of a cage bar on which the wheel is to be mounted.

The rim 20, which is of greater thickness than the disc, is connected by spoke-like reinforcement ribs 22 to the wall 24a of the aperture 24, the wall 24a being of the same width as the rim 20 and as a bearing ring 24b connected to the wall 24a at three support points 24d.

The bearing ring 24 is interrupted at 24c by a gap of narrower width than the cage bar on which the wheel is to be mounted. The gap 24c forms part of an insertion passage defined between two guide members 27 extending from the gap 24c to the wall 24a of the aperture 24.

To mount the wheel on a cage bar, the wheel is position with the gap 26 in line with the bar and it is hammered so that the bar first passes through the gap 26, then through the passage 24c into the centre of the bearing ring 24b, which acts as a hub for the wheel. The inner ring 24b has inwardly extending teeth 32 which grip the cage bar and form a bearing surface allowing the wheel to rotate about the cage bar.

When inserted into the inner ring 24 of the hub 24 the bar is firmly captured and the construction of the wheel ensure that it cannot be dislodged with ease. The inner ring 24b and outer ring 24a are connected only at points 24d spaced from the gap 24c so that twisting of the disc 30 does not tend to twist the bearing ring 24b off the cage bar. Also, the disc is itself rigid because it is solid and because of the depth of the rim 20, the wall 24a and the reinforcement ribs 22.

Introduction of the bar into the central bearing is facilitated by the long guide members 27 which act as levers tending to prise apart the passage 24c. Removal of the wheel through the same passage, on the other hand requires much greater force as there is no lever action assisting in spreading of the passage 24c and on the contrary any force tending to move the cage bar towards the passage 24c is opposed by the two teeth which are formed as extensions of the lips 27.

The wheel can be formed by injection moulding of a tough plastics material such as high density polythene. The shape of the teeth 32 can be varied by the use of different inserts in the mould and as a result it is possible to use the same injection mould in the manufacture of wheels suitable for cage bars of different diameters.

Claims

1. A spacer wheel for mounting on a bar of a concrete reinforcement cage, comprising

(i) a main body (30) which defines a rim (20) interrupted by a gap (26) through which, in operation, the cage bar can be passed,

(ii) an aperture (24) in the main body (30) which communicates with the gap (26) in the rim (20), and

(iii) bearing means (24b) located within the aperture (24) of the main body (30) for receiving the cage bar,

characterised in that

(iv) the main body (30) is an essentially solid, disc-like, member,

(v) the bearing means (24b) comprises an interrupted ring having a radially inner surface which, in operation, receives the cage bar and serves as a bearing therefor, and a radially outer surface connected to the wall of the aperture only at points (24d) spaced from the gap (24c) in the ring (24b), whereby the ring (24b) may be deformed to enlarge the gap (24c) therein without corresponding deformation of the wall (24a) of the aperture (24), and

(vi) guiding means (27) extend between the gap in the ring (24b) and the wall (24a) of the aperture (24), which guiding means (27) serve during mounting of the spacer wheel on a cage bar to direct the bar towards the gap (24c) in the ring (24b) and to widen the gap (24c) in the ring (24b) to permit the cage bar to be introduced therein.

2. A wheel as claimed in claim 1, wherein the gap (26) in the rim (20) of the wheel is narrower than the inner diameter of the bearing ring (24b).

3. A wheel as claimed in claim 1 or 2, wherein the bearing ring (24b) is connected to the wall of the aperture only at three points, disposed at 90°, 180° and 270° from the gap (24c).

4. A wheel as claimed in any preceding claim, wherein the inner surface of the bearing ring (24b) is provided with radial teeth (32) to contact the surface of the cage bar.

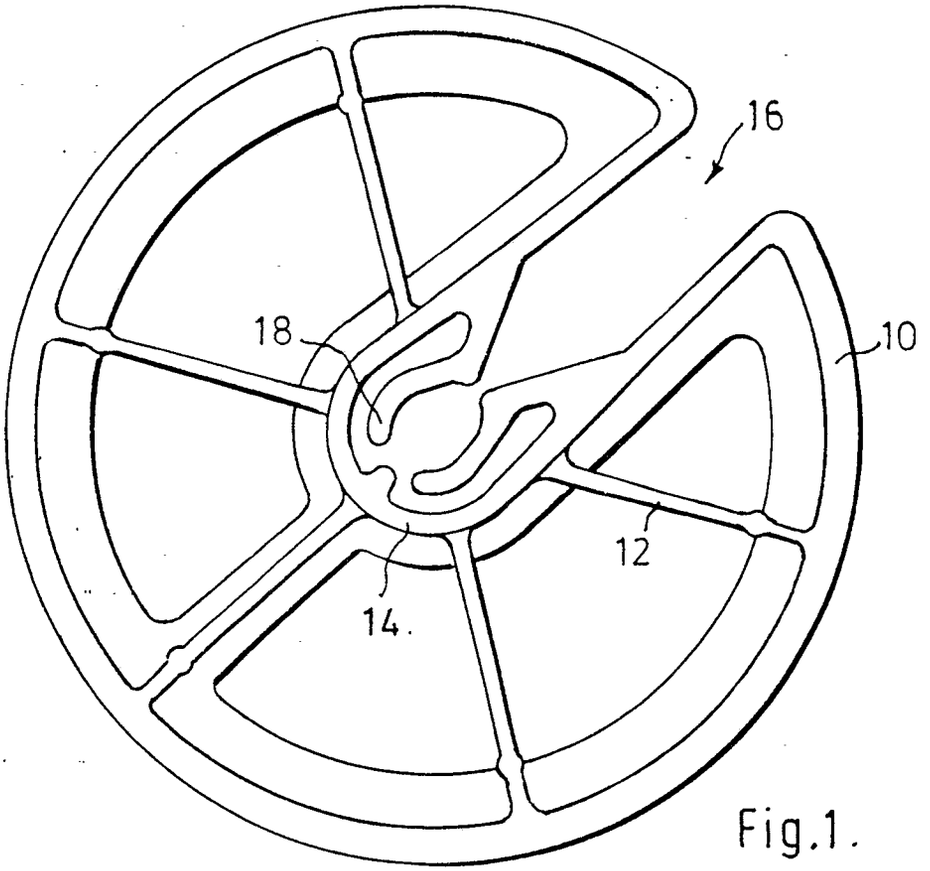

Fig.1.

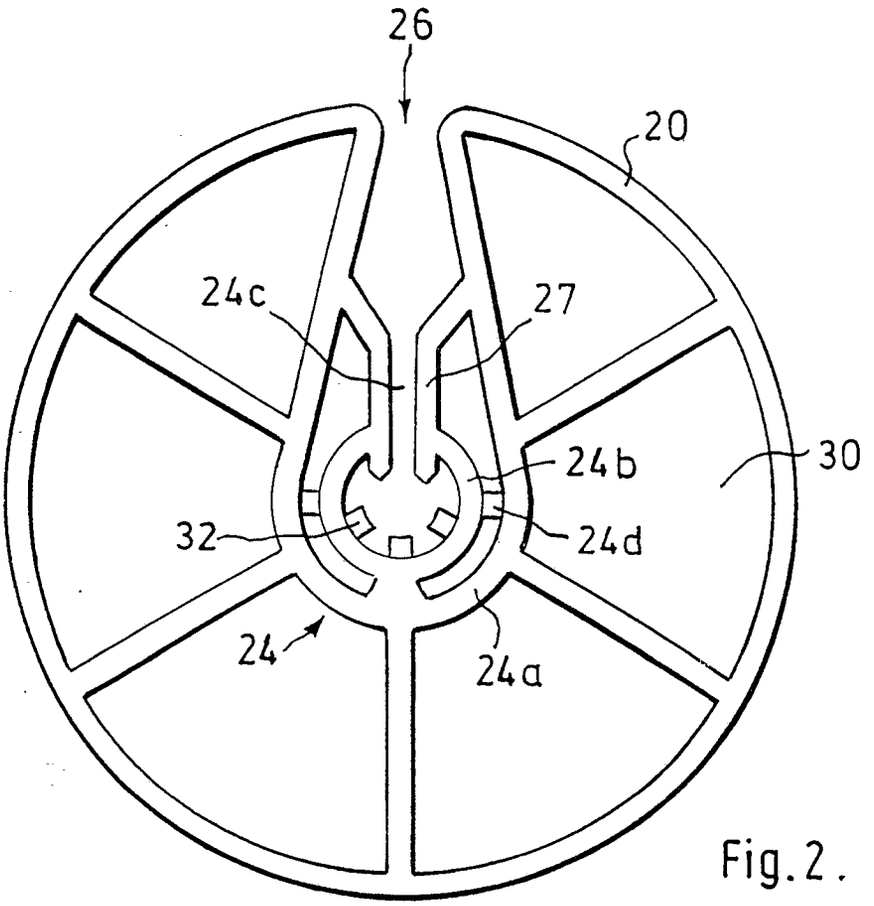

Fig.2.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 30 1906

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)
Y	DE-U-8 535 866 (H.W. DAUSEND) * Page 4, lines 1-10; page 5, lines 1-5; figures 1,2 *	1,3,4	E 04 C 5/20
Y	DE-A-3 126 271 (GEBR. SEIFERT GmbH) * Page 9, lines 15-26; figure 1 *	1,4	
Y	US-A-3 280 529 (K. REUSS) * Page 1, lines 61-72; page 2, lines 1-5,42-56; figure 1 *	1,3	
A	DE-A-1 609 713 (M. LEIBUNDGUT) * Claim 4; figure 3 *	2	
A	GB-A-1 042 727 (F.W. BERRY) * Figures 7,8 *	3	
A	CH-A- 521 493 (NOVOPLAST GmbH) * Figure 1; claim 3 *	4	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

E 04 C
E 02 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	23-05-1989	KRIEKOUKIS S.

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

EPO FORM 1503 03.82 (P0401)