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(11) **EP 1 152 097 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.11.2001 Bulletin 2001/45

(51) Int Cl.7: **E04C 5/16**

(21) Application number: **00202992.4**

(22) Date of filing: **28.08.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

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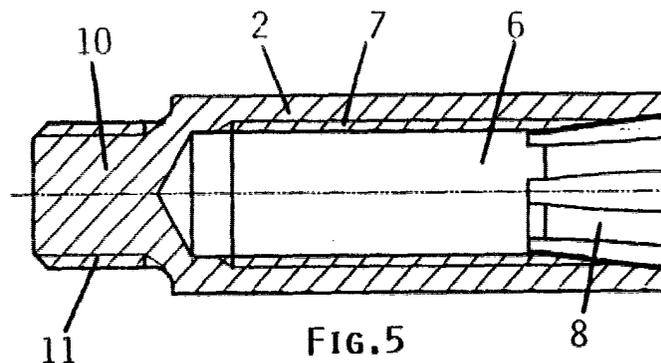
(30) Priority: **04.05.2000 NL 1015118**

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(54) **Coupler for interconnecting two reinforcing bars**

(57) A coupler for interconnecting two ends of reinforcing bars, which coupler (1,2) includes a first hole (3) provided with internal screw thread (4), which can be screwed onto the end of a reinforcing bar, and a second hole (6) provided with internal screw thread (7), which can be screwed onto the end of another reinforcing bar,

wherein a cutting portion (5,8) is present between at least one internal screw thread (4,7) and the entry of the hole (3,6), which cutting portion (5,8) is capable of cutting screw thread into ribs which are present on the surface of the reinforcing bar. The coupler consists of two parts (1,2), which can be screwed together.



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Description

[0001] The invention relates to a coupler for interconnecting two ends of reinforcing bars, which coupler includes a first hole provided with internal screw thread, which can be screwed onto the end of a reinforcing bar, and a second hole provided with internal screw thread, which can be screwed onto the end of another reinforcing bar, wherein a cutting portion is present between at least one internal screw thread and the entry of the hole, which cutting portion is capable of cutting screw thread into ribs which are present on the surface of the reinforcing bar. The two holes are coaxial.

[0002] EP-A-0867578 discloses a coupler of this kind, which coupler is screwed onto the external screw thread which has been formed mainly into the ribs present on the surface of the reinforcing bar by the cutting portion. Said coupler consists of a sleeve having an internally threaded hole at each end. With this coupler it is possible to make a connection between two reinforcing bars on a building site.

[0003] When the screw thread present at the end of the reinforcing bars is formed practically only in the ribs present on the surface of the reinforcing bar, the strength of the reinforcing bar is hardly affected, if at all, whilst it has appeared to be possible yet to make a sufficiently strong connection between the coupler and the reinforcing bar.

[0004] In practice it has become apparent that the cutting of screw thread into the ribs of the reinforcing bar is a difficult job. The cutting portion that cuts the screw thread must be held in precise alignment with the reinforcing bar. This is essential especially at the beginning, when little screw thread has been cut yet, in order to prevent the coupler from making any movements during said thread cutting that might cause damage to the screw thread that has already been cut.

[0005] Damage to the screw thread or screw thread which has not been cut entirely correctly may have a disastrous effect on the intended connection between the two reinforcing bars, especially because the screw thread is formed only on the ribs and provides only limited hold, therefore.

[0006] When the coupler is screwed onto the first reinforcing bar, no major problems present themselves yet, but problems do present themselves when the coupler is screwed onto the end of the second reinforcing bar while being fixed to the first reinforcing bar already. In that case it is not simple to cut screw thread into the end of the second reinforcing bar correctly by means of the coupler, to which the first reinforcing bar is connected. As a result, the connection that is made will be less reliable.

[0007] The object of the invention is to provide an interconnection of two reinforcing bars which can be made without any difficulty and in a reliable manner on a building site.

[0008] In order to accomplish that objective, the cou-

pler consists of two parts, which can be screwed together, wherein each part includes a hole provided with internal screw thread, which can be screwed onto an end of a reinforcing bar. After each part has been separately screwed onto the reinforcing bar, with the cutting portion of at least one part having cut a screw thread into the ribs of the reinforcing bar in question, the two parts are interconnected by means of their screwed connection, which may consist of a threaded rod fixed to one part and an internally threaded hole formed in the other part. The threaded rod and the hole are coaxial with the holes provided with internal screw threads, which can be screwed onto the ends of the reinforcing bars.

[0009] Said screwed connection of the two parts of the coupler can be made so that the risk of any damage being caused upon the making of the connection or of an incorrect connection being made in any other manner is practically excluded. Preferably, a conical portion (funnel shape) is thereby used at the entry of the hole. Furthermore the screw connection can have a relative small length, so that the connection can be made by only a limited number of revolutions of the two parts of the coupler with respect to each other.

[0010] The term threaded rod is understood to mean a rod-shaped, externally threaded metal part, also called threaded end.

[0011] A coupler for connecting reinforcing bars which consists of two parts which can be screwed together is known per se. Said parts are not screwed onto the ends of the reinforcing bars, however, but they are fixedly connected to the reinforcing bar by means of a forcing operation under deformation of the material. A coupler of this kind must be made of a special material which allows such a deforming operation, so that it is not possible to select an optimum material to ensure a strong and reliable connection. Moreover, it is difficult to make the connection on the building site, because special machines are required for the operation. Furthermore it is necessary to use a special tool for each different diameter of the reinforcing bar.

[0012] In one embodiment the diameter of the first hole is different from that of the second hole, which makes it possible to interconnect reinforcing bars having different diameters. In that case the two cutting portions will also cut screw threads having different diameters, of course.

[0013] The part provided with the internal screw thread having the smaller diameter preferably comprises an externally threaded rod, which can be screwed into internal screw thread of the other part so as to effect the screwed connection of the two parts of the coupler. The other part may be provided with a through hole in that case, into which hole both the internal screw thread for connection with the reinforcing bar and the internal screw thread for the interconnection of the parts have been formed, which internal screw threads can have substantially the same diameter.

[0014] When the two internal screw threads have dif-

ferent diameters, the diameter of the screw thread of the screwed connection between the two parts is preferably substantially the same or smaller than the diameter of the larger internal screw thread.

[0015] The coupler can have any suitable shape on the outside, for example circular (tubular), but preferably the coupler has an outside circumference of substantially hexagonal cross-section over at least part of its length, preferably over the entire length when the two parts are connected. The parts of the coupler can be screwed onto the ends of the reinforcing bars with a normal wrench in that case and be screwed together by means of the same wrench.

[0016] Preferably, the screwed connection between the two parts is positioned entirely between the screwed connections with the two reinforcing bars, seen in axial direction, so that the coupler can have a cross-sectional dimension which is slightly larger than the diameter of the reinforcing bar.

[0017] The invention furthermore relates to a coupler member which can be used as part of the above-described coupler, which member includes a hole provided with internal screw thread, which can be screwed onto the end of a reinforcing bar, wherein a cutting portion is present between the internal screw thread and the entry of the hole, which cutting portion is capable of cutting screw thread into ribs which are present on the surface of the reinforcing bar, and a threaded rod coaxial with the hole which is provided with external screw thread which is spaced from the internal screw thread by some distance, seen in axial direction. The diameter of the external screw thread is thereby smaller than the cross dimension of the coupler at the location of the internal screw thread, and preferably said diameter is substantially equal to the diameter of the internal screw thread.

[0018] A coupler member of this kind can be used not only as part of the above-described coupler. Two such coupler members can jointly form a coupler for interconnecting two reinforcing bars. They are each screwed onto an end of a reinforcing bar, after which they are fixed together by means of a sleeve provided with internal screw thread, which is screwed onto the external screw thread of the two coupler members.

[0019] The threaded rod of one of the two coupler members can be made longer thereby, so that said sleeve can first be screwed entirely on said threaded rod and then be screwed back onto the other coupler member. An additional nut may be used to lock the sleeve against undesirable rotation.

[0020] The invention furthermore relates to a coupler member which can be used as part of the above-described coupler, which coupler member includes a hole provided with internal screw thread, which can be screwed onto the end of a reinforcing bar, wherein a cutting portion is present between the internal screw thread and the entry of the hole, which cutting portion is capable of cutting screw thread into ribs which are present on the surface of the reinforcing bar, and a hole coaxial with

the aforesaid hole which is provided with internal screw thread of a different type or having a different dimension than the aforesaid internal screw thread.

[0021] A coupler member of this kind can be used not only as part of the above-described coupler. Two such coupler members can also jointly form a coupler for connecting to reinforcing bars. They are each screwed onto an end of a reinforcing bar, with the cutting portion cutting screw thread into the ribs which are present on the surface of the reinforcing bar, after which said coupler members are fixed together by means of a threaded rod which is screwed into the latter internally threaded hole of the coupling members. This makes it possible to interconnect two ends of reinforcing bars which are positioned further apart.

[0022] The invention furthermore relates to a method for interconnecting two ends of reinforcing bars, wherein a coupler including a first hole and a second hole, both provided with internal screw thread, and a cutting portion present between at least one internal screw thread and the entry of the hole, is screwed onto the end of a reinforcing bar, whereby a screw thread is cut during said screwing in the ribs which are present on the surface of the reinforcing bar, whereby the coupler consists of two parts which each include an internally threaded hole, whereby each part is screwed separately onto the end of a reinforcing bar, thereby cutting a screw thread, after which the two parts are fixed together by means of a screwed connection.

[0023] In order to explain the invention more fully, two embodiments of a coupler will be described hereafter with reference to the drawing.

Figures 1, 2 and 3 are views of two parts which jointly form a coupler;

Figures 4 and 5 are sectional views of said coupler; and

Figures 6 and 7 show a second embodiment of a coupler.

[0024] Figure 4 is a sectional view of the part 1 of coupler 1, 2 which is shown in elevation in Figure 1. The illustrated part 1 includes a through hole 3, which is provided with internal screw thread 4 on the left-hand side, which is adjacent to a cutting portion 5 which is capable of cutting screw thread into ribs which are present on the end of a reinforcing bar. Thus it is possible to fix part 1 to the end of the reinforcing bar by rotation, with cutting portion 5 cutting a screw thread, which screw thread is subsequently screwed into the internal screw thread 4.

[0025] Figure 5 is a sectional view of the part 2 of coupler 1, 2 which is shown in elevation in Figure 1. The illustrated part 1 includes a blind hole 6 provided with internal screw thread 7. Screw thread 7 is positioned adjacent to a cutting portion 8 which is capable of cutting screw thread into ribs which are present on the end of a reinforcing bar. Thus it is possible to screw down part 2 on the end of the reinforcing bar, with cutting portion

8 cutting a screw thread, which screw thread is subsequently screwed into the internal screw thread 7.

[0026] After the parts 1 and 2 have been fixed to the two ends of the reinforcing bars, the two reinforcing bars are connected by screwing threaded rod 10, which is provided with internal screw thread 11, into the internal screw thread 12 of hole 3 until the two parts 1, 2 are firmly connected.

[0027] Part 1 includes a funnel-shaped portion 13, which makes it easier to screw the two parts 1, 2 together.

[0028] Figure 3 is a view of the cutting portion 8 of part 2 of the coupler, wherein the hexagonal outer circumference is clearly shown.

[0029] Each part 1, 2 can be fixed separately to the end of a reinforcing bar, which must be done with due care so as to have the cutting portion perform its function correctly. Following that, the two reinforcing bars can be connected together.

[0030] Figures 6 and 7 show a second embodiment, with Figure 6 showing a part 15 which is similar to the part 2 which is shown in Figures 2 and 5. Part 15 includes an internally threaded hole (not shown) and a cutting portion. Part 15 furthermore includes an externally threaded rod 18. The other part 17 of the coupler is different from the part 15 which is shown in Figure 6 in that its threaded rod 19 is longer. An internally threaded sleeve 20 is present on threaded rod 19. After the parts 15 and 17 have each been fixed to an end of a reinforcing bar, sleeve 20 is turned in the direction of part 15 until sleeve 20 surrounds threaded rod 18 as well as threaded rod 19, thus interconnecting the two parts 15 and 17. A locknut may be used to fix sleeve 20.

[0031] In this second embodiment parts 15 and 17 and sleeve 20 have a hexagonal outer circumference.

Claims

1. A coupler for interconnecting two ends of reinforcing bars, which coupler includes a first hole (3) provided with internal screw thread (4), which can be screwed onto the end of a reinforcing bar, and a second hole (6) provided with internal screw thread (7), which can be screwed onto the end of another reinforcing bar, wherein a cutting portion (5,8) is present between at least one internal screw thread (4,7) and the entry of the hole, which cutting portion (5,8) is capable of cutting screw thread into ribs which are present on the surface of the reinforcing bar, **characterized in that** the coupler consists of two parts (1,2), which can be screwed together, wherein each part (1,2) includes a hole (3,6) provided with internal screw thread (4,7), which can be screwed onto an end of a reinforcing bar.
2. A coupler according to claim 1, **characterized in that** said first hole (3) and said second hole (6) have different diameters.
3. A coupler according to claim 2, **characterized in that** the part (2) provided with the internal screw thread (7) having the smaller diameter includes an externally threaded rod (10), which can be screwed into internal screw thread (12) of the other part so as to effect the screwed connection of the two parts (1,2) of the coupler.
4. A coupler according to claim 3, **characterized in that** the other part (1) is provided with a through hole (3), into which hole both the internal screw thread (4) for connection with the reinforcing bar and the internal screw thread (12) for the interconnection of the parts (1,2) have been formed, which internal screw threads (4,12) can have substantially the same diameter.
5. A coupler according to any one of the preceding claims, **characterized in that** the diameter of the screw thread (11,12) of the screwed connection between the two parts (1,2) is substantially the same or smaller than the diameter of the larger internal screw thread (4,7).
6. A coupler according to any one of the preceding claims, **characterized in that** at least part of the length of the coupler (1,2) has an outside circumference of hexagonal cross-section.
7. A coupler according to any one of the preceding claims, **characterized in that** the screwed connection (11,12) between the two parts (1,2) is positioned entirely between the screwed connections (4,7) with the two reinforcing bars, seen in axial direction.
8. A coupler member to be used as part (2) of a coupler according to any one of the claims 1-7, which coupler member includes a hole (6) provided with internal screw thread (7), which can be screwed onto the end of a reinforcing bar, wherein a cutting portion (8) is present between the internal screw thread (7) and the entry of the hole, which cutting portion (8) is capable of cutting screw thread into ribs which are present on the surface of the reinforcing bar, **characterized by** a threaded rod (10) coaxial with the hole (6), which rod (10) is provided with external screw thread (11) which is spaced from the internal screw thread (7) by some distance, seen in axial direction.
9. A coupler member to be used as part (1) of a coupler according to any one of the claims 1-7, which coupler member includes a hole (3) provided with internal screw thread (4), which can be screwed onto the end of a reinforcing bar, wherein a cutting por-

tion (5) is present between the internal screw thread (4) and the entry of the hole (3), which cutting portion (5) is capable of cutting screw thread into ribs which are present on the surface of the reinforcing bar, **characterized by** a hole (3) coaxial with the aforesaid hole (3), which hole is provided with internal screw thread (12) of a different type or having a different dimension than the aforesaid internal screw thread (4).

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10. A method for interconnecting two ends of reinforcing bars, wherein a coupler (1,2) including a first hole (3) and a second hole (6), both provided with internal screw thread (4,7), and a cutting portion (5,8) present between at least one internal screw thread (4,7) and the entry of the hole (3,6), is screwed onto the end of a reinforcing bar, whereby a screw thread is cut during said screwing in the ribs which are present on the surface of the reinforcing bar, **characterized in that** the coupler consists of two parts (1,2) which each include an internally threaded hole (3,6), whereby each part (1,2) is screwed separately onto the end of a reinforcing bar, thereby cutting a screw thread, after which the two parts (1,2) are fixed together by means of a screwed connection (11,12).

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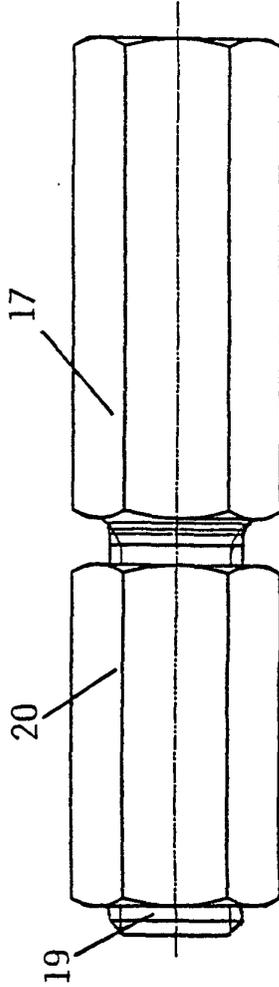
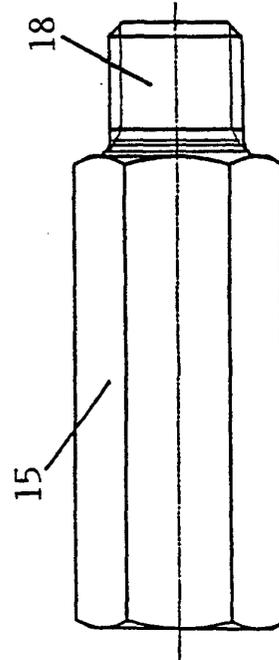
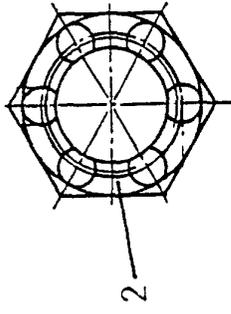
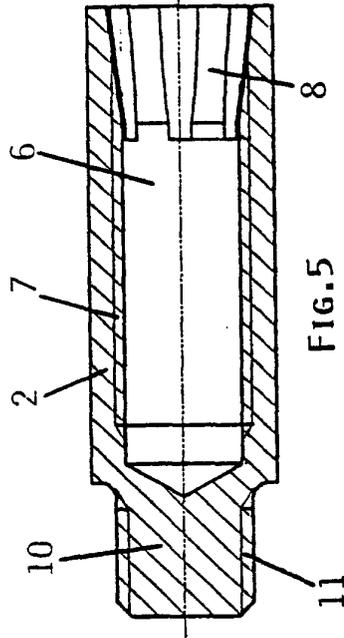
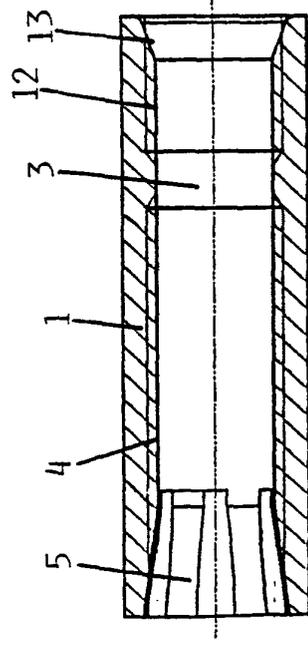
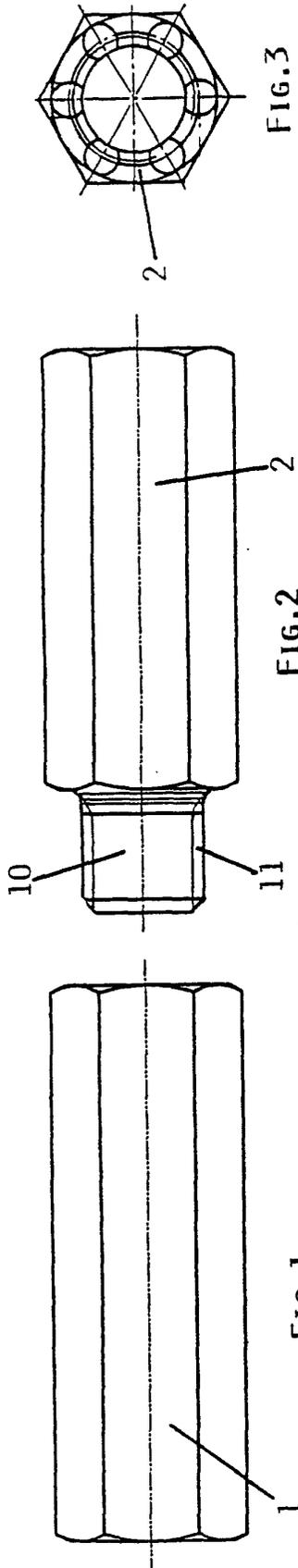
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EUROPEAN SEARCH REPORT

Application Number
EP 00 20 2992

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.CI.7)
Y	US 3 369 334 A (R.R.BERG) 20 February 1968 (1968-02-20)	1,5-10	E04C5/16
A	* column 7, paragraph 2; figure 11 *	2-4	
D,Y	EP 0 867 578 A (BARFIX) 30 September 1998 (1998-09-30) * abstract; figures *	1,5-10	
A	US 5 308 184 A (BERNARD) 3 May 1994 (1994-05-03) * figures 3,4 *	2	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.CI.7)
			E04C
Place of search	Date of completion of the search	Examiner	
THE HAGUE	15 December 2000	Righetti, R	
CATEGORY OF CITED DOCUMENTS		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	
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			

EPO FORM 1503 03 82 (P/4C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 00 20 2992

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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