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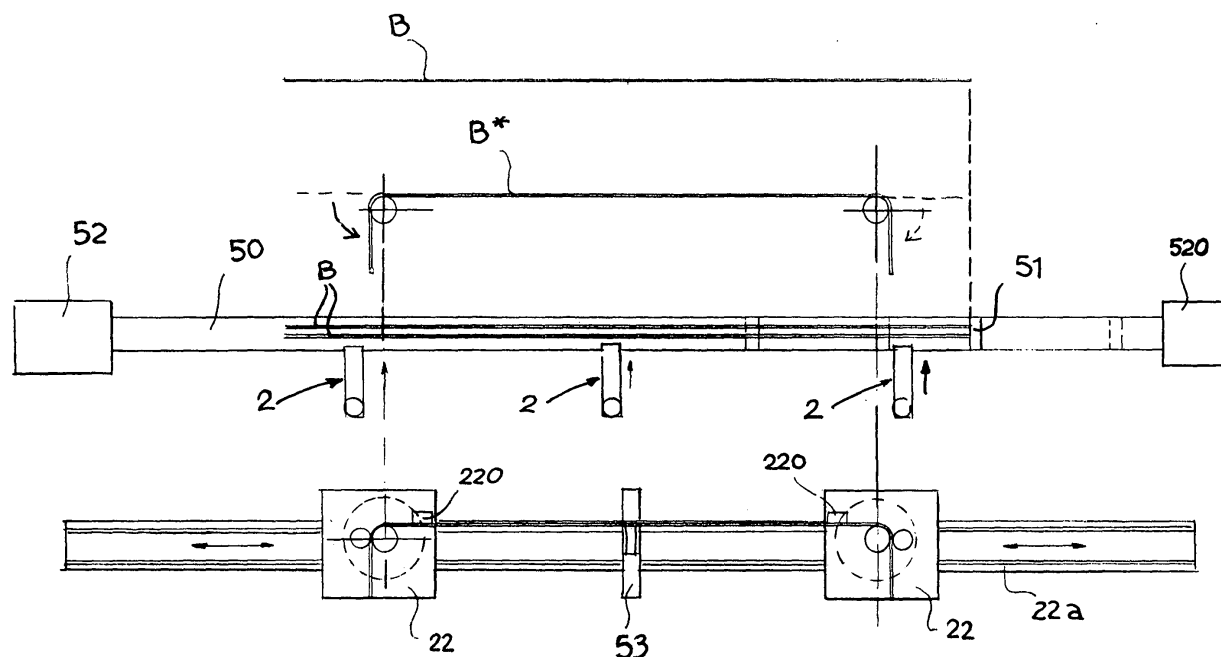
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(54) **Installation for cutting metal bars**

(57) In a plant for cutting metal bars (B), a plane surface for receiving the bars is served by two units

(52,520), which are set at its opposite ends and one of which is designed to operate with straight bars and the other with bars coming off rolls.



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Description

TEXT OF THE DESCRIPTION

[0001] The present invention relates to plants for cutting metal bars, particularly bars that are to be used for reinforcing concrete, of the type comprising at least one plane surface which receives the bars and a feeding and cutting head which feeds, on said plane surface, the bars to be cut to the desired length.

[0002] The invention relates in particular (even though not exclusively), to plants for carrying out both cutting and bending of the bars, of the type further comprising one or more bending units, set adjacent to or in a position corresponding to said at least one plane surface, designed to receive the cut bars to be bent (for example the bending units may be situated at the side of said at least one plane surface or else within it, in line with the direction of advance of the iron bars, which are either straight or are straightened as they come off a roll).

[0003] In the prior art, there are used both plants that operate on rectilinear bars of standard length and on continuous bars wound in rolls. In the former case, the feeding and cutting head receives the leading ends of the rectilinear bars, causes them to advance longitudinally on the aforesaid plane surface (specifically in a channel) and cuts them to the desired length, separating the trailing end of the desired length of bar with respect to the remaining part of the standard bar.

[0004] In the second case, there is provided a feeder-straightener unit, in which there is fed the leading end of the bar that is wound in rolls, and which then renders rectilinear the portion of bar as it comes off the roll and cuts it when a straightened stretch of the desired length has been received.

[0005] With a view to enabling the use of a plant capable of operating both with straight bars and with bars in rolls, the subject of the present invention is a plant for cutting (and preferably also bending) metal bars, comprising a unit for receiving and cutting the bars, with at least one plane surface for receiving the bars that are to undergo the cutting operation and possibly also a bending operation, and feeding and cutting means which supply, on said at least one plane surface, the bars to be bent, and which cut them to the desired length, said plant being characterized in that said means comprise a first feeding and cutting unit designed to operate with straight bars and a second unit for straightening, feeding and cutting, which is designed to operate with bars wound in rolls, said first and second units being set at the opposite ends of the aforesaid at least one plane surface for receiving the bars.

[0006] Thanks to the above characteristics, the plant according to the invention can be exploited for operating both with straight bars and with bars coming from rolls, simply using each time and without any dead time the appropriate unit whenever it is necessary to change the

type of material entering the plant. Obviously, in the two cases, feeding will be performed from one end or from the other of the bench that defines the at least one plane surface for receiving the bars.

[0007] It should be considered that already starting from the early nineties the present applicant, in order to market a machine that could work rods for reinforced-concrete both from straight (rectilinear) bars and from bars coming from rolls, had developed an apparatus for straightening bars to be set in front of the normal head for cutting and measuring rectilinear bars of the equipment referred to as "cutting benches" and "Combi System". This system, however, presented two disadvantages: when the roll that had already been straightened passed through the rollers of the cutting head for cutting the straight bars, the straightening process was found to be degraded; furthermore, the straightening apparatus was set in front of the cutting head for straight bars. Consequently, in order to pass from the processing of iron in rolls to the processing of straight bars and vice versa, it was necessary to move the stocking structure containing the iron bars and replace it with the reels that carried the rolls and vice versa. By setting the pay-off reels angled alongside the bars so as not to have to displace them, there was a degradation in quality. Furthermore, given that the straightening process is always applied to iron bars with small diameter and with only a few wires providing an additional dedicated shear only for bars straightened from rolls, in order not to use the one for straight bars represents a relatively modest percentage increase in the cost of the machine. Another possible approach already known in the art for several years now consists in producing a mixed apparatus equipped both with rollers for straightening bars from rolls and with rollers for drawing and measuring. In the case of iron bars coming from rolls all the rollers are used; in the case of straight bars, the rollers for straightening are moved away or in any case their pressure is decreased and they are positioned differently from material since in this case they are not necessary. In this way, however, the apparatus proves more complex, and the wear of the components is asymmetrical. In addition, the problem referred to in the second point of the previous case remains, and likewise the long time involved in resetting the machine for operating on bars coming from rolls and vice versa displacing the material. On the other hand, this mode of operation is theoretically possible on all bar-cutting machines that cut from rolls, but is very rarely used.

[0008] Similar disadvantages would result from setting the two heads for straight iron and iron in rolls alongside one another, each time translating the entire unit in order to align the head selected with respect to the rest of the machine.

[0009] In the practical case in which the bars are received in a channel on the aforesaid bench, it is possible to envisage a single channel that can be fed from the two opposite ends by means of the first unit or the sec-

ond unit, or else even two or more parallel channels set alongside one another, at the same level or at different levels, each supplied by one of the two corresponding feed units set at their ends.

[0010] Further characteristics and advantages of the invention will emerge from the ensuing description with reference to the annexed drawing, which illustrates in plan view and schematically an example of embodiment of a plant according to the invention.

[0011] The figure shows a plant with two bending machines 22 of a type in itself known. The two bending machines 22, in the case of the embodiment illustrated, can be displaced on rails 22a parallel to the direction A according to the length of the bars to be bent, and each has a fixed central mandrel 23 and an eccentric pin for bending the bars B. The bars to be bent are inserted aligned with respect to one another in a vertical plane, being rested on the plane surfaces 21 of the two bending machines 22 in the space existing between each mandrel 23 and a corresponding fixed reaction square, by any handling means (for example by means of the clamping device forming the subject of the co-pending European patent application No. 03014748.2 in the name of the present applicant) or in theory even manually, after being picked up from a cutting bench 50 onto which they are fed.

[0012] The bars B are received on the cutting bench 50, where they are cut to the desired length by means of a cutting head 52, which includes feeding means designed to operate on straight bars and which is situated at one end of the bench 50, or by means of a straightening, feeding and cutting unit 520 set at the opposite end of the bench 50. In the example illustrated (but any other technique is possible) the cut bars B fed by the head 50 are longitudinally referenced by activating a contrast element 51 that can be lifted (or any other equivalent element, such as a stopper or movable element or even using completely different systems, such as for example using an encoder for stopping advancement of the bar once the desired point is reached), the said contrast element being selected from a set of similar contrast elements, distributed along the bench 50, according to the desired length of bar that is to be cut. Once the bars B have thus been longitudinally referenced, they can be picked up and transported onto the bending machines 22, which in the mean time have been longitudinally set in the positions suitable for carrying out shaping of the two ends of the bars in order to cause each bar B (see top part of the Figure) to assume the shape designated by B*. For executing in sequence the various bends corresponding to the various sides of the shape to be obtained, it will be necessary to use means for imparting a relative motion between the iron and the bending units, so that it will be the bending units that can move in the longitudinal direction A of the iron bars, or else the iron bars B that can move, or else both.

[0013] The plant illustrated is thus able to operate both with straight bars, which are fed in from the left (with

reference to the figure), and with straightened bars wound off rolls, which are fed in from the right. As already referred to above, it is possible to envisage a common longitudinal channel on the bench, which receives the bars from both of the feed units located at the two ends of the bench, or else two or more distinct parallel channels set alongside one another, at the same level or at different levels, each supplied respectively by one of the two corresponding units.

[0014] It is clear, for example, that the cutting plant according to the invention could serve bending units however arranged, or even, as an alternative to the bending units, racks, carriages or any other stocking structures. For example, at the two sides of the aforesaid at least one plane surface there could be two bending units, or else on one side a bending unit and on the other a stocking structure, or else only stocking structures. Furthermore, in the case of two or more separate plane surfaces, for example channels on a bench, straight bars and straightened bars coming from rolls may be fed not only alternately in sequence, but also simultaneously.

[0015] Of course, without prejudice to the principle of the invention, the details of construction and the embodiments may vary widely with respect to what is described and illustrated herein purely by way of example, without thereby departing from the scope of the present invention.

[0016] It is clear for example that the cutting plant according to the invention could serve bending units however provided or even, as an alternative to the bending units, racks, carriages or any other stocking structure.

Claims

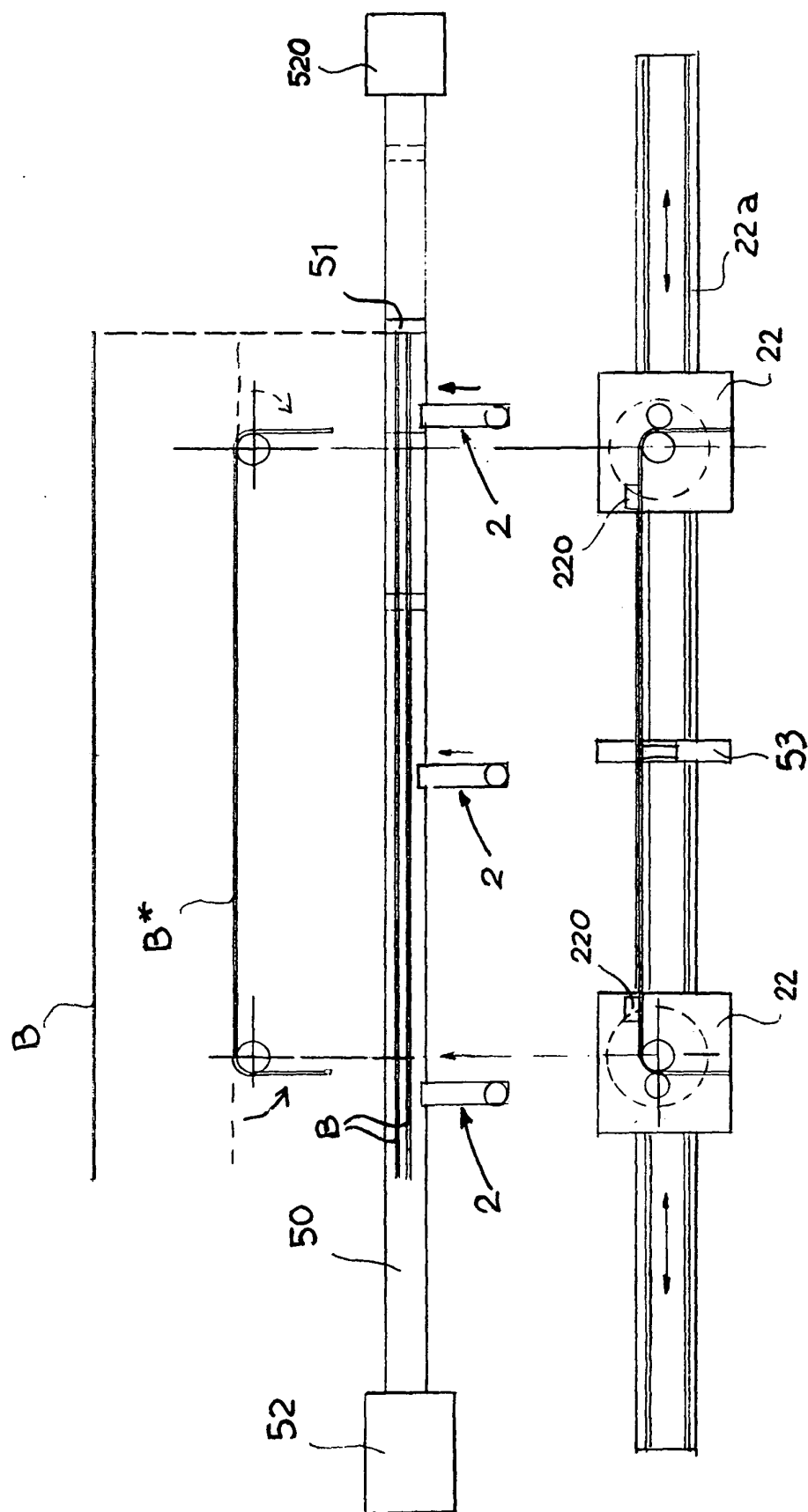
1. A plant for cutting metal bars, particularly bars designed for reinforcing concrete, of the type comprising at least one plane surface that receives the bars, and feeding and cutting means, which feed onto said at least one plane surface the bars that are to be cut to the desired length, said plant being **characterized in that** said means comprise a first feeding and cutting unit designed to operate with straight bars, and a second unit for straightening, feeding and cutting, designed to operate with bars wound in rolls, said first and second units being located at the opposite ends of the aforesaid at least one plane surface that receives the bars.
2. The plant according to Claim 1, **characterized in that** it is a plant for cutting and bending, comprising also one or more bending units adjacent to or in a position corresponding to said at least one plane surface, said bending units being designed to receive the cut bars to be bent.
3. The plant according to Claim 2, **characterized in**

that for the purpose of executing a number of bends in different points of the bars, there are provided means for imparting a relative movement between bars and bending units in the longitudinal direction (A) of the bars.

4. The plant according to Claim 3, **characterized in that** said means for imparting a relative movement control a movement of the bending units in the longitudinal direction (A). 10
5. The plant according to Claim 3, **characterized in that** said means for imparting a relative movement control a movement of the bars in the longitudinal direction (A) . 15
6. The plant according to Claim 1, **characterized in that** said plane surface is defined by a channel on a bench that that can be fed from the two opposite ends by means of the first unit or the second unit. 20
7. The plant according to Claim 1, **characterized in that** said plane surface is defined by two or more parallel channels set on a bench and supplied, respectively, by the two feeding units located at the ends of the bench. 25
8. The plant according to Claim 4, **characterized in that** the two channels are to the same level. 30
9. The plant according to Claim 4, **characterized in that** the two channels are at different levels.
10. A method for cutting metal bars, particularly bars designed for reinforcing concrete, in which there is provided at least one plane surface that receives the bars, and there are fed, on said at least one plane surface, the bars to be cut to a desired length, said method being **characterized in that** there is provided a first feeding and cutting unit designed to operate with straight bars, and a second unit for straightening, feeding and cutting, designed to operate with bars wound in rolls, and **in that** said first and second units are set at the opposite ends of the aforesaid at least one plane surface for receiving the bars, for making it possible to feed onto said at least one plane surface the straight bars or the bars in rolls, respectively, from opposite ends of said at least one plane surface. 35 40 45 50
11. The method according to Claim 10, **characterized in that** the straight bars and the bars from rolls are fed in sequence onto said at least one plane surface from one or from the other end thereof. 55
12. The method according to Claim 10, **characterized in that** the straight bars and the bars coming off rolls are fed simultaneously onto parallel receiving plane

surfaces from the opposite ends thereof.

13. The plant according to Claim 1, **characterized in that** said at least one plane surface is defined by a channel.
14. The plant according to Claim 1, **characterized in that** said at least one plane surface is defined by a space between rollers.





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 03 02 2451

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)
X	US 4 339 861 A (SHIRAISHI HIROSHI ET AL) 20 July 1982 (1982-07-20) * column 2, line 39 - column 3, line 52 *	1-3, 5, 10-14	B21D43/28 B21D11/12
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			TECHNICAL FIELDS SEARCHED (Int.CI.7)
			B21D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 4 February 2004	Examiner Gerard, O
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			

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

EP 03 02 2451

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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