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(54) **Cutting machine**

(57) Cutting machine, comprising a frame (1) on which are mounted piece-holder carriage (2) and a blade-holding arm (3), wherein the latter is hinged on a upright (4) fixed to the frame (1) by means of a pin (5) which is housed in a sleeve (6) supported by the upright (4) and oriented parallel to the top surface of the carriage (2) and

orthogonal to the upright (4), wherein the blade-holding arm (3) is at a side of the upright (4) and is mounted on a portion of the pin (5) which protrudes beyond said sleeve (6) so that it can freely rotate about the axis (x-x) of the same pin (5). The cutting machine is provided with means for adjusting the spatial orientation of the pin (5) with respect to the sleeve (6).

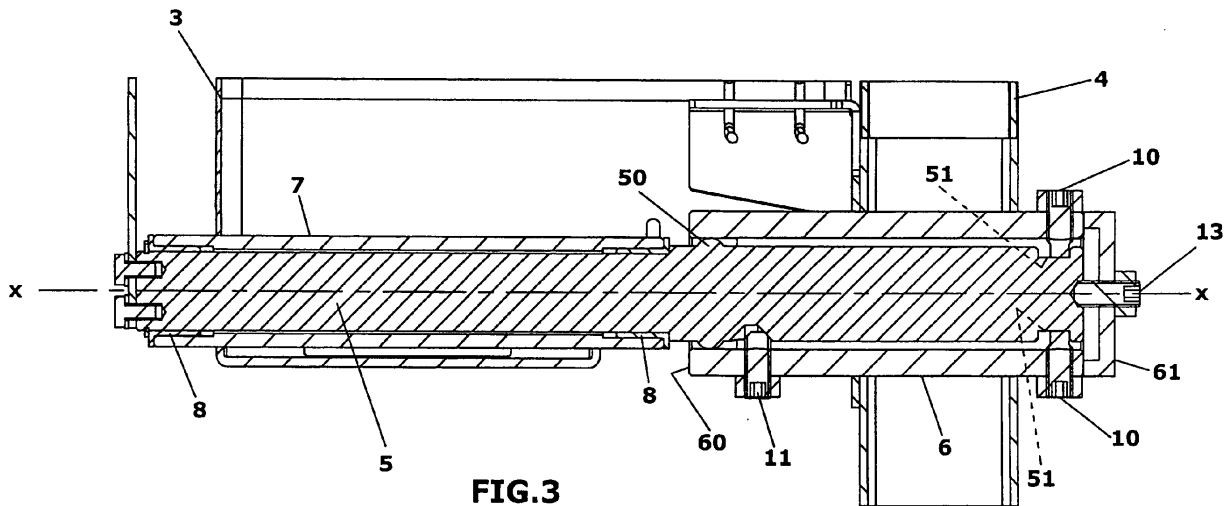


FIG.3

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Description

[0001] The present invention relates to a cutting machine, particularly for cutting stone materials, small concrete blocks, covering slabs and similar materials used in construction sites.

[0002] It is known that a cutting machine of the above mentioned type comprises a frame on which there are mounted a piece-holder carriage and a movable arm which supports a circular blade driven by a driving unit that is associated with the same supporting arm.

[0003] US5265511 discloses a cutting machine of the above-mentioned type.

[0004] The cutting of the material positioned on the piece-holder carriage is obtained by approaching the blade-holding arm to the material and then moving it away, thus bringing it back, at the end of the cutting action, in the raised starting position.

[0005] In such kind of machine, the perpendicularity between the blade and the piece-holder carriage, that is the perpendicularity between the blade and the plane on which the material to be cut is placed, is a particularly important factor for a proper execution of the cutting. Currently, in order to ensure as far as possible the said perpendicularity condition during the assembly of the machine, the positioning of the arm supports is performed by expert operators with considerable physical efforts.

[0006] Therefore, there is still now the need to simplify the positioning of the blade-holding arm during the assembly of the machine in such a manner to permit the execution of the said operation also by not particularly skilled personnel, and to eliminate or at least to reduce the physical efforts made by the operators during such assembly.

[0007] This result has been achieved, according to the present invention, by providing a machine having the features indicated in claim 1. Further features of the present invention are the subject of the dependent claims.

[0008] Thanks to the present invention, it is possible to simplify the positioning of the blade-holding arm when the cutting machine is assembled and it is possible to entrust this operation also to not particularly skilled personnel. In addition, a mechanism to adjust the position of the blade-holding arm according to the present invention is relatively easy to build, economical and reliable. These and further advantages and characteristics of the present invention will be best understood by anyone skilled in the art from a reading of the following description in conjunction with the attached drawings, given as a practical exemplification of the invention, but not to be considered in a limitative sense, wherein:

- Figs. 1 and 2 respectively show a side view and a front view of a machine according to the present invention;
- Fig.3 shows a section view along the line A-A of Fig.1;
- Fig.4 schematically shows some possible positions

of the axis (x-x) of the pin (5) with respect to the axis (b-b) of the sleeve (6).

[0009] Reduced to its essential structure and with reference to the figures of the attached drawings, a machine in accordance with the present invention is of the type comprising a frame (1) on which there are mounted a piece-holder carriage (2) and a blade-holding arm (3). The latter is hinged on an upright (4) of the frame (1) by means of a pin (5) which is housed in a sleeve (6). Said sleeve is supported by the upright (4) and is oriented parallel to the upper face of the carriage (2) and orthogonal to the upright (4). The blade-holding arm (3) is positioned laterally to the upright (4) and is fitted on a portion of the pin (5) that protrudes beyond the above mentioned sleeve (6), in such a manner to be freely rotating about the axis (x-x) of the same pin (5). Therefore, the arm (3) is supported by the upright (4) and is free to rotate to and from the carriage (2) as schematically indicated by the double arrow "R". For this purpose, the blade-holding arm (3) is fitted on the said portion of the pin (5) by means of a further sleeve (7) that is mounted on the pin with the interposition of two bearing bushes (8) that are placed at the two ends of the further sleeve (7). The arm (3) supports, in addition to the blade (9), its driving unit too. The connection between the blade (9) and its driving unit is per se known and can be realized in any manner known to those skilled in the art.

[0010] Advantageously, in accordance with the present invention and with reference to the example shown in the drawings, the outer diameter of the pin (5) is smaller than the inner diameter of the first sleeve (6) except near the end of the latter from where the same pin (5) protrudes. In other words, the pin (5) exhibits a convex ring-shaped projection (50) that is near the end (60) of the sleeve (6) from which the pin (5) protrudes. In Fig.3 the said end (60) of the sleeve (6) is the left end. On the opposite side, that is, at the rear end (61) of the sleeve (6), there are four screws (10) inserted in the latter. Said screws have a radial orientation with respect to the sleeve (6) in which they are screwed and are angularly equally spaced from each other. The free ends of the screws (10) act on an annular throat (51) of the pin (5). As shown in Fig.3, said annular throat is provided at the end of the pin (5) resulting in correspondence of the side (61) of the sleeve (6) (right end in Fig.3) where the screws (10) are screwed. The length of the screws (10) is such that the free ends of the same screws (10) are in the annular throat (51) of the pin (5).

[0011] As further described below, as a result of the contact between the ring-shaped projection (50) and the inner surface of the sleeve (6), the pin (5) can be rotated with respect to the sleeve (6) by acting on one or more of the said screws (10). In practice, by screwing any of the screws (10), a corresponding force is exerted on the pin (5) - since the free ends of the screws (10) are in the throat (51) of the pin (5) - thus forcing the latter to rotate around the fulcrum that is formed by the convex surface

of the projection (50). Therefore, during the assembly and the final adjustment of the machine, the operator, placing the orthogonal sides of a metal square in contact respectively with the a flank of the blade (9) and with the upper face of the carriage (2), by acting on the screws (10) can easily adjust the spatial orientation of the pin (5) and consequently of the arm (3) and of the blade (9) too, in such a manner to have the latter oriented orthogonally to the upper face of the carriage (2).

[0012] Since the operator can adjust the spatial orientation of the pin (5) simply acting on the screws (10) and visually checking the said condition of perpendicularity by means of the metal square, such operation may be also performed by non-expert personnel. At the end of said operation, the operator will lock the adjusted spatial position of the pin (5) by means of a screw (11), that is oriented radially with respect to the sleeve (6) and to the pin (5) and acts on in blind hole (52) of the latter.

[0013] Practically, the orientation of the axis (x-x) of the pin (5) with respect to the axis of the sleeve (6) can be easily adjusted up to determine the aforementioned requirement of perpendicularity between the blade (9) and the upper face of the carriage (2). Fig.4 shows, by way of example, two possible positions (β , λ) of the axis (x-x) of the pin (5) with respect to axis (b-b) of the sleeve (6).

[0014] The position of the pin (5) can be also adjusted along its axial direction. For this purpose, the rear part of the pin (5), i.e. the side of the latter on which the screws (10) act, is subjected to the action of an axial screw (13) which determines the translation of the pin (5) along its own axis (x-x). As shown in Fig.3, the said axial screw (13) is centrally screwed in the rear end (61) of the sleeve (6) and is oriented parallel to the axis (b-b) of the latter.

[0015] The mechanism for adjusting the spatial orientation of the pin (5) described above allows to simplify the assembly and the final adjustment of the cutting machine, thus reducing the manufacturing time and cost.

[0016] In practice, a cutting machine in accordance with the present invention comprises a frame (1) on which are mounted piece-holder carriage (2) and a blade-holding arm (3), wherein the latter is hinged on a upright (4) fixed to the frame (1) by means of a pin (5) which is housed in a sleeve (6) supported by the upright (4) and oriented parallel to the top surface of the carriage (2) and orthogonal to the upright (4), wherein the blade-holding arm (3) is at a side of the upright (4) and is mounted on a portion of the pin (5) which protrudes beyond said sleeve (6) so that it can freely rotate around the axis (x-x) of the same pin (5); the cutting machine is provided with adjusting means to adjust the spatial orientation of said pin (5) with respect to said sleeve (6); said adjusting means comprise screw means (10) for exerting a radial force on the pin (5), the pin (5) having a fulcrum (50) inside the sleeve (6) provided at a preset distance from the screw means (50) and the radial force provoking a rotation of the pin (5) about the fulcrum (50) such that the spatial orientation of the pin (5) with respect to the

sleeve (6) can be adjusted by means of the radial force exerted by the screw means (10). According to the example disclosed above, the said fulcrum is constituted by the convex ring-shaped projection (50) of the pin (5) in contact with the inner surface of the sleeve (6) and provided at a predetermined distance from the throat (51). Furthermore, according to the example disclosed above, the said radial force can be exerted by any of the screws (10) screwed in the sleeve (6) and the radial force is transmitted to the pin (5) through the throat (51). In this example, the throat (51) of the pin (5) is a portion of the latter destined to receive a radial force that changes its orientation with respect to the sleeve (6) when desired.

[0017] Practically, all the construction details may vary in any equivalent way as far as the shape, dimensions, elements disposition, nature of the used materials are concerned, without nevertheless departing from the scope of the adopted solution idea and, thereby, remaining within the limits of the protection granted by the present patent.

Claims

1. Cutting machine, comprising a frame (1) on which are mounted piece-holder carriage (2) and a blade-holder arm (3), wherein the latter is hinged on a upright (4) fixed to the frame (1) by means of a pin (5) which is housed in a sleeve (6) supported by the upright (4) and oriented parallel to the top surface of the carriage (2) and orthogonal to the upright (4), wherein the blade-holding arm (3) is at a side of the upright (4) and is mounted on a portion of the pin (5) which protrudes beyond said sleeve (6) so that it can freely rotate about the axis (x-x) of the same pin (5), **characterized by** the fact that it is provided with adjusting means to adjust the spatial orientation of said pin (5) with respect to said sleeve (6) and in that said adjusting means comprise screw means (10) for exerting a radial force on the pin (5), the pin (5) having a fulcrum (50) inside the sleeve (6) provided at a preset distance from the screw means (10) and the radial force provoking a rotation of the pin (5) about the fulcrum (50) such that the spatial orientation of the pin (5) with respect to the sleeve (6) can be adjusted by means of the radial force exerted by the screw means (10).
2. Cutting machine according to claim 1 **characterized in that** the said adjusting means comprise a plurality of screws (10) screwed into said sleeve (6) and oriented radially with respect to the same, the free ends of said screws (10) acting on a throat (51) provided by the pin (5), the latter being provided, at a predetermined distance from said throat (51), with a convex ring-shaped projection (50) in contact with the inner surface of the sleeve (6).

3. Cutting machine according to claim 2 **characterized by** the fact that said screws (10) are four in number and are angularly equidistant.

4. Cutting machine according to claim 1 **characterized in that** comprises means for adjusting the axial position of said pin (5).

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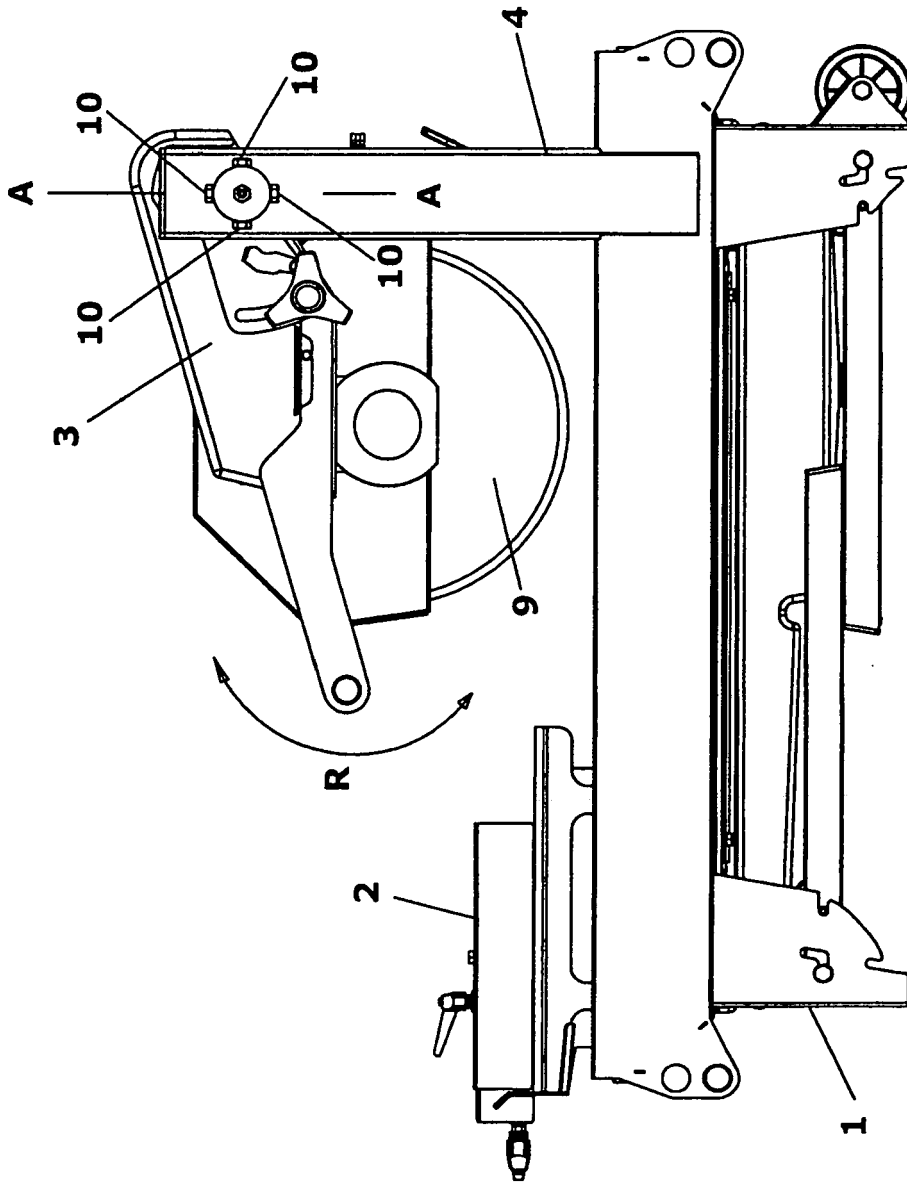


FIG.1

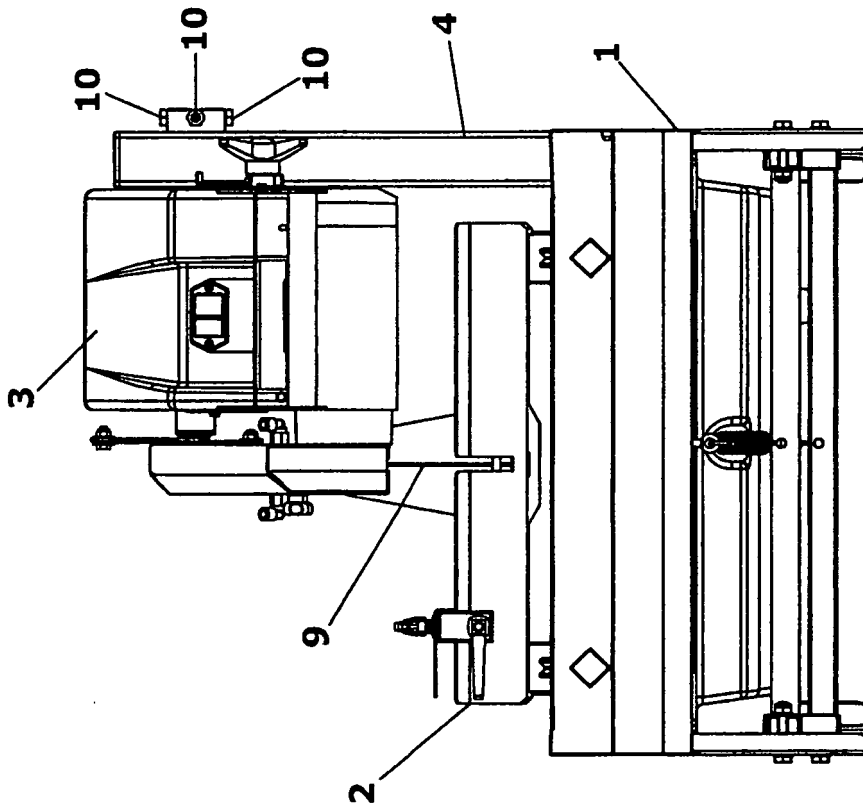


FIG. 2

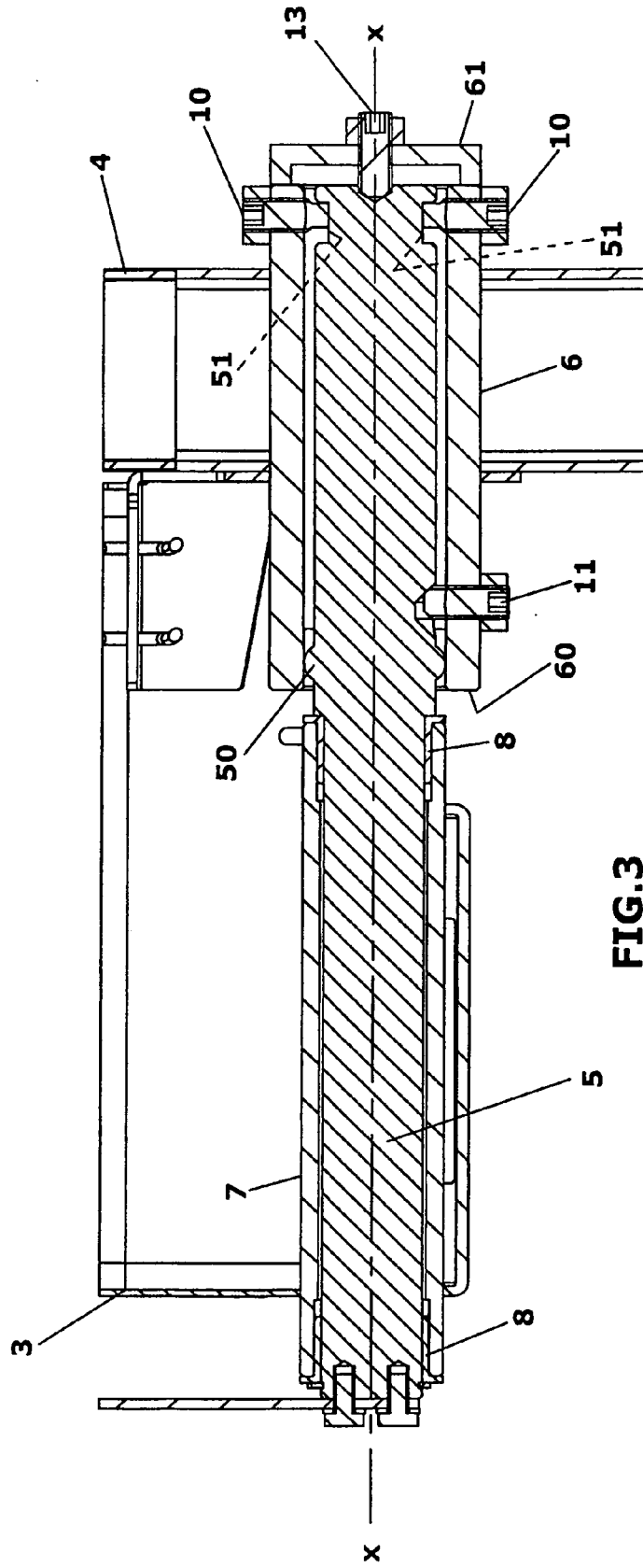


FIG. 3

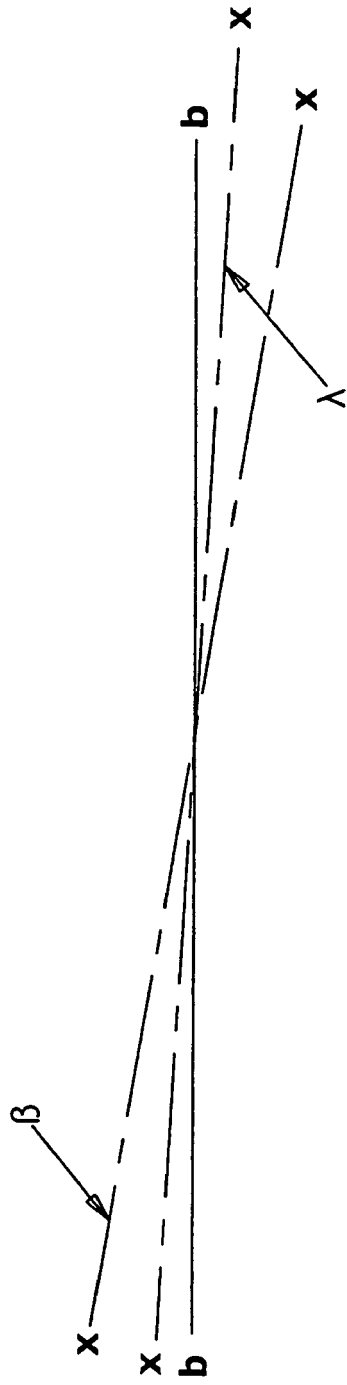


FIG. 4



EUROPEAN SEARCH REPORT

Application Number
EP 12 00 5587

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 5 265 511 A (ITZOV ANDREW L [US]) 30 November 1993 (1993-11-30) * column 5, lines 19-48; figures 4-8 * -----	1	INV. B23D47/02 B28D1/04
A	US 6 752 140 B1 (FUHRMAN MICHAEL D [US] ET AL) 22 June 2004 (2004-06-22) * column 9, line 13 - column 10, line 55; figures 13-14 * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B23D B28D
Place of search		Date of completion of the search	Examiner
The Hague		2 January 2013	Garella, Mario
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 12 00 5587

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02-01-2013

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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