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(54) **Polishing head for slabs made from stone material**

(57) The invention concerns a honing-polishing machine for products made from stone material, such as marble, granite, agglomerate and the like. Such a machine is characterised in that the honing-polishing oper-

ation of the slab is realised through the use of two or more operating heads (1), of the type with a vertical axis, which are mounted, arranged radially and equally divided circumferentially, on a frame (2) equipped with rotary motion about a fixed vertical axis.

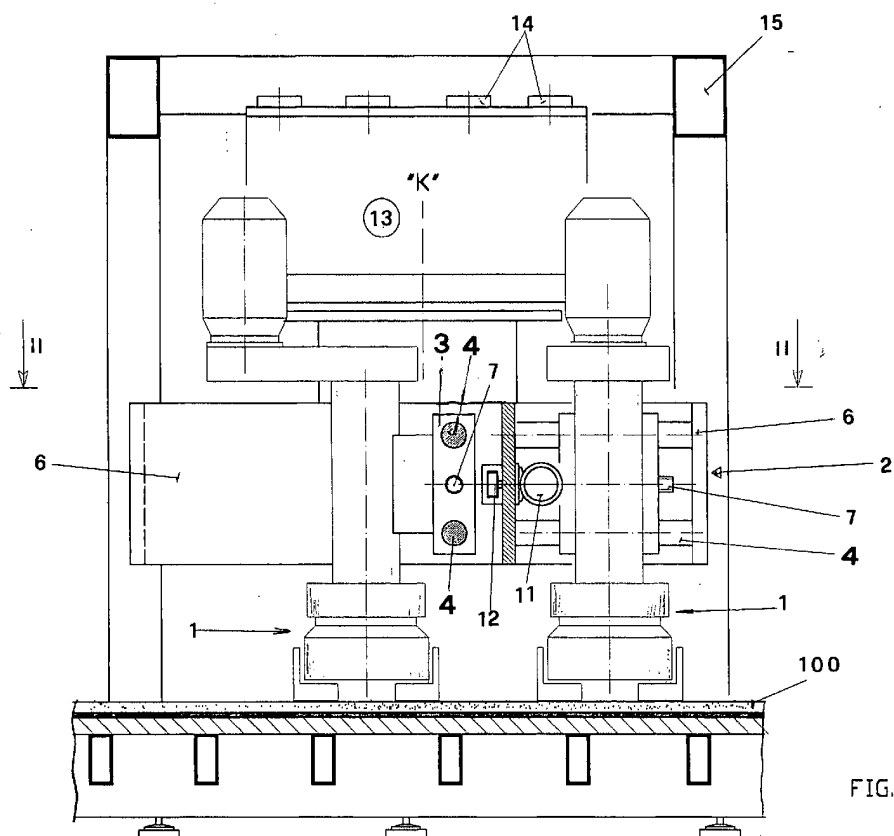


FIG.1

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## Description

**[0001]** The present finding concerns a honing-polishing machine for products made from stone material, such as marble, granite, agglomerate and the like.

**[0002]** The honing-polishing operation of slab-shaped products made from stone material are normally carried out with machine tools equipped with many operating heads, provided with abrasive tools, which perform the working motion, whereas the advancing motion is given to the underlying slab to be worked.

**[0003]** In the current state of the art, the operating heads applied onto common honing-polishing machines comprise many abrasive tools, equipped with balancing motion and arranged radially in a circumferential manner about the rotation axis of the operating head itself.

**[0004]** The operating heads are mounted on a frame that gives them an alternating rectilinear movement (work motion) with perpendicular direction with respect to the advancing direction of the slab.

**[0005]** Such an embodiment has at least two operating drawbacks: the not perfect planarity of the honed surface and a very low work speed, which are a consequence of the alternating rectilinear motion of the operating heads.

**[0006]** The purpose of the present finding is that of realising a honing-polishing machine without the drawbacks that occur in similar known machines.

**[0007]** Such a purpose is obtained with an operating machine where the honing-polishing work of the slab of stone material is realised through the use of two or more operating heads, of the type with a vertical axis and *per se* known, which are mounted arranged radially and equally divided circumferentially, on a frame equipped with rotary motion about a fixed vertical axis.

**[0008]** Therefore, in the operating step each operating head is equipped with sun-and-planet motion resulting from the two movements: that of rotation about its own axis and that of rotation about the central axis of the support structure of all of the operating heads applied to the machine.

**[0009]** Moreover, the finding also foresees the possibility of adjusting the radial opening of the operating heads to adapt the work area to the width of the underlying slab to be honed.

**[0010]** With such a constructive solution a honing-polishing unit has thus been realised which, due to the radial arrangement of the operating heads, is perfectly balanced, for which reason there are no vibrations that can damage the mobile parts and therefore the working motion is perfectly regular on the entire surface of the slab being processed.

**[0011]** The finding shall be better understood through the description of a possible embodiment thereof, given only as a non-limiting example, with the help of the attached tables of drawings, where:

- fig. 1 (Table I) represents a front elevated view, sec-

tioned according to the line I-I of fig. 2, of the machine according to the finding;

- fig. 2 (Table II) represents a plan view, sectioned according to the line II-II of fig. 1, of the machine according to the finding;

- fig. 3 (Table III) represents a side elevated view, sectioned according to the line III-III of fig. 2, of the machine according to the finding.

**[0012]** As can be seen from the figures, the operating heads 1, arranged radially with respect to the vertical axis "K", are applied on a frame, wholly indicated with reference numeral 2, rotating about the aforementioned axis.

**[0013]** In detail, each operating head 1 is supported and able to slide, through the support 3, on the guides 4, integral between the central body 5 and each of the projecting tabs 6, which make up the frame 2.

**[0014]** As can be seen, in particular in fig. 1, the radial adjustment of the operating heads 1 is realised through threaded pins 7, on which the respective supports 3 engage, placed in simultaneous rotation through the transmission group 8, contained inside the central body 5, consisting of the two conical pairs 9 and two return pinions 10 and made to rotate through the action of the motor 11 and of the transmission 12, which moves one of the aforementioned pins.

**[0015]** As can be seen, in particular in fig. 3, the entire support frame for the operating heads 1 is applied on the lower wall of a cylindrical body 13, which anchors, with the points 14, onto the bearer structure 15 of the machine.

**[0016]** The rotation of the frame 2 and therefore of the single operating heads 1 about the vertical axis "K" is realised through the use of a thrust block 16 placed between the central body 5 of the frame in movement and the fixed cylindrical body 13, where the ring 17 is integral with the aforementioned cylindrical body, whereas the inner toothed ring 18, integral with the aforementioned central body 5, is made to rotate through the motor 19, equipped with the pinion 20, fixed to the base of said cylindrical body.

**[0017]** From that which has been outlined above, both the constructive and operative advantages of the honing-polishing machine according to the finding are clear, thanks to the radial and symmetrical arrangement of the rotating bodies about a single axis and due to the possibility of continuously adjusting the width "D" of the operating heads to adapt them to the width "L" of the slab 100 to be worked.

**[0018]** The constructive solution described above also lends itself to being used with the use of just one operating head, obviously associated with the necessary dynamic equalizers.

**[0019]** Embodiments different to the one described are also possible, such as the use of two or more oper-

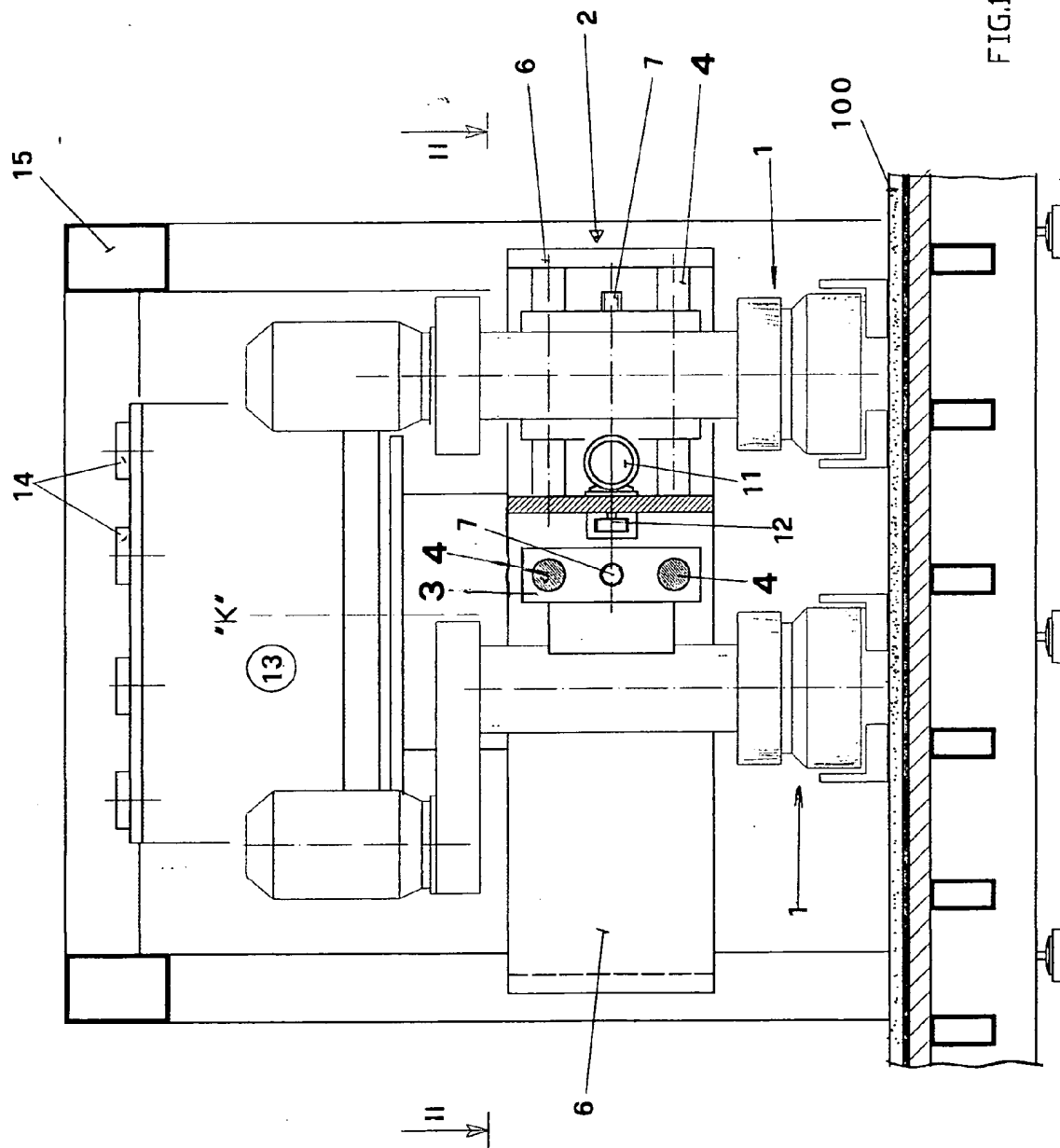
ating heads, still arranged radially, just as different mechanisms for adjusting the position of the heads themselves are possible, without, for this reason, departing from the scope of the claims, defined hereafter.

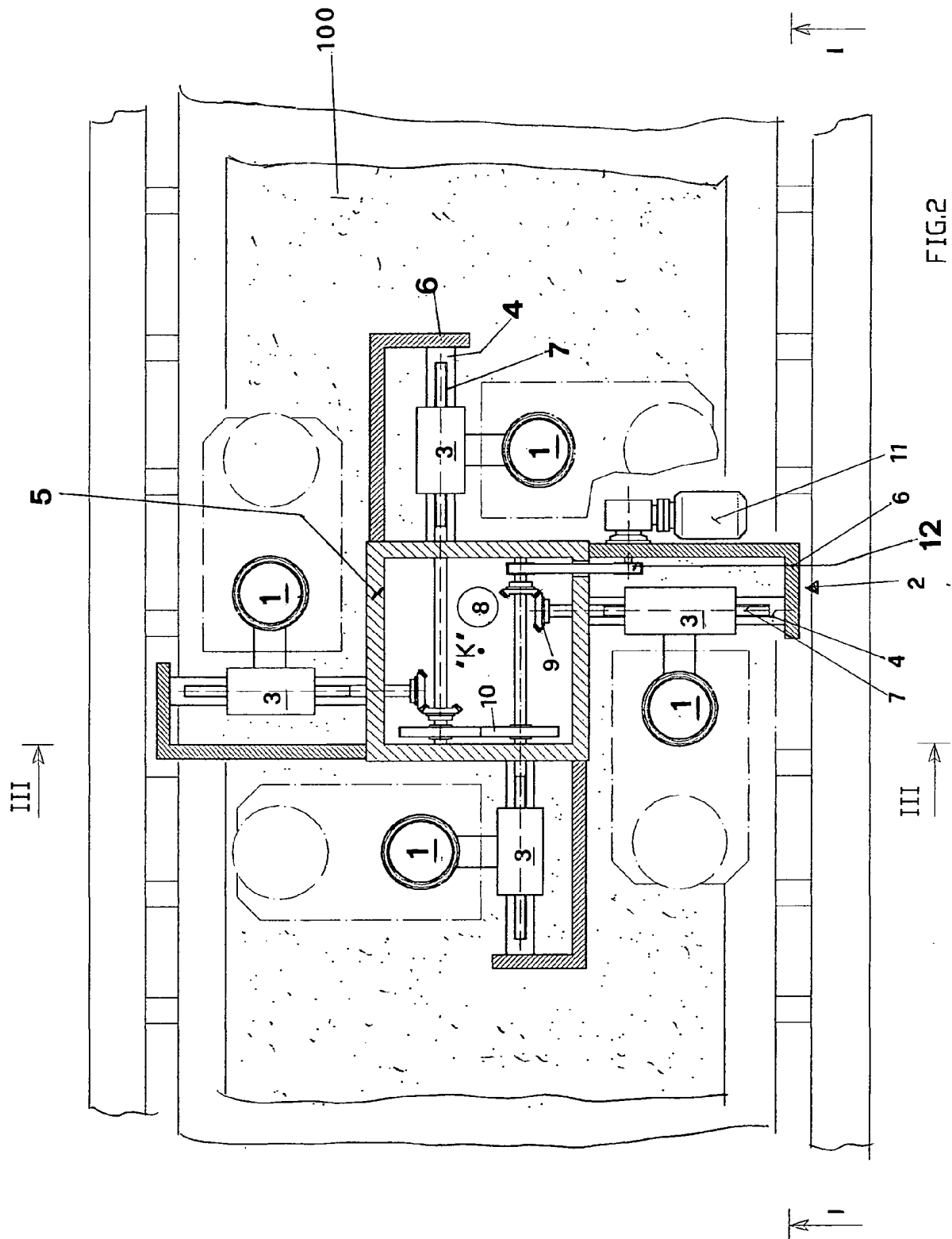
## Claims

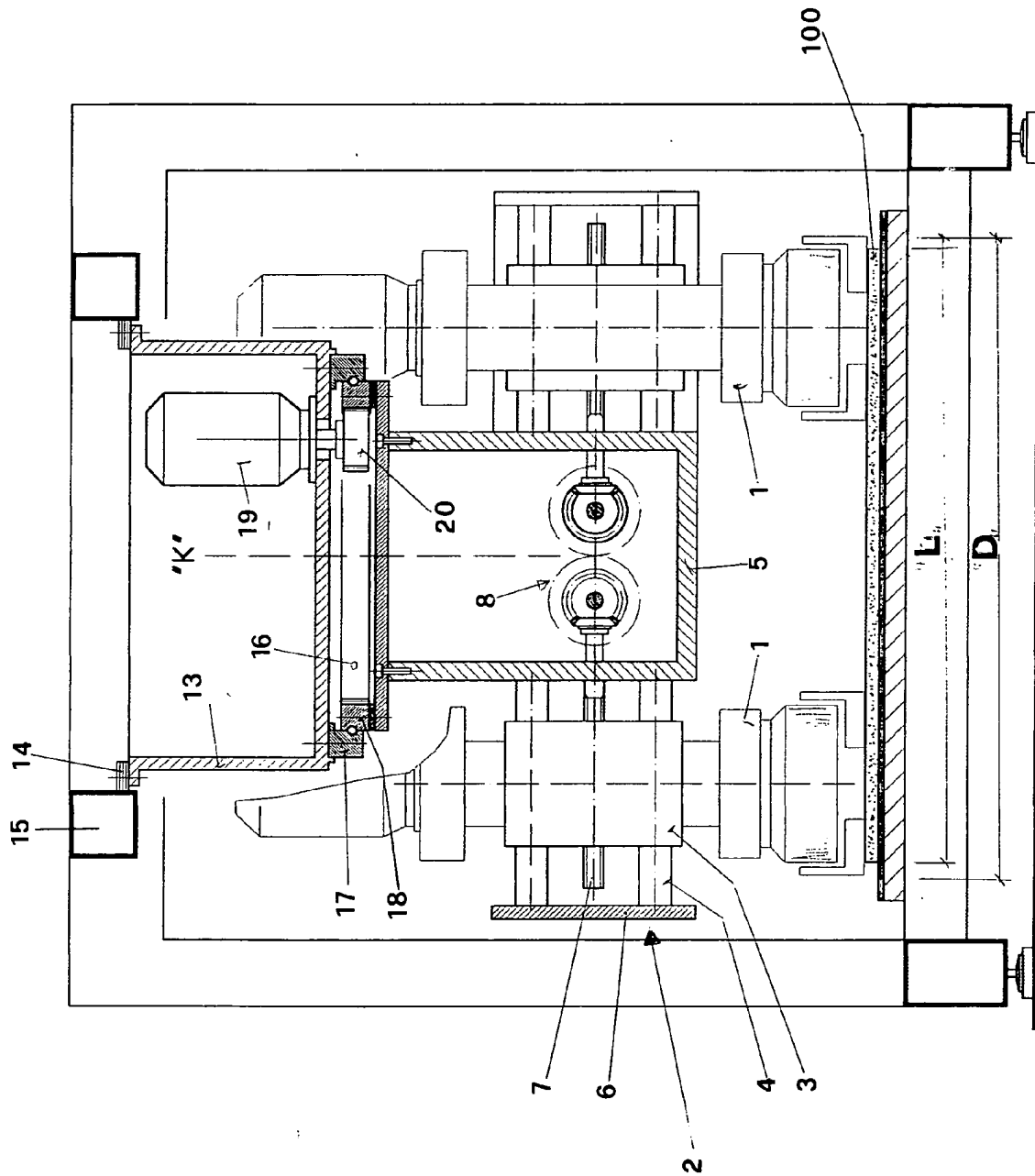
1. HONING-POLISHING MACHINE FOR SLAB-SHAPED PRODUCTS MADE FROM STONE MATERIAL, such as marble, granite, agglomerate and the like, said machine being **characterised in that** the honing-polishing operation of the slab is realised through the use of two or more operating heads, of the type with a vertical axis, which are mounted, arranged radially and equally divided circumferentially, on a frame equipped with rotary motion about a fixed vertical axis. 10
2. HONING-POLISHING MACHINE according to claim 1, **characterised in that** each operating head is equipped with a sun-and-planet motion resulting from the two movements: that of rotation about its own axis and that of rotation about the central axis of the support structure of all of the operating heads applied to the machine. 25
3. HONING-POLISHING MACHINE according to claim 2, **characterised in that** it foresees the possibility of adjusting the radial opening of the operating heads to adapt the work area (D) to the width (L) of the underlying slab (100) to be honed-polished. 30
4. HONING-POLISHING MACHINE according to one or more of the previous claims, **characterised in that** the operating heads (1) are arranged radially with respect to the vertical axis (K) and are applied on a frame (2) rotating about the aforementioned axis. 40
5. HONING-POLISHING MACHINE according to claim 4, **characterised in that** each operating head (1) is supported and is able to slide, through the support (3), on the guides (4), integral between the central body (5) and each of the projecting tabs (6), which make up the frame (2). 45
6. HONING-POLISHING MACHINE according to claim 5, **characterised in that** the radial adjustment of the operating heads (1) is realised through threaded pins (7) on which the respective supports (3) engage, said pins being placed in simultaneous rotation through the transmission group (8), contained inside the central body (5) and consisting of the two conical pairs (9) and of the two return pinions (10). 55

7. HONING-POLISHING MACHINE according to claim 6, **characterised in that** the transmission group (8) is made to rotate through the action of the motor (11) and of the transmission (12), which move one of the threaded pins (7).

8. HONING-POLISHING MACHINE FOR SLAB-SHAPED PRODUCTS MADE FROM STONE MATERIAL, such as marble, granite, agglomerate and the like, **characterised in that** the honing-polishing operation of the slab is realised through the use of just one operating head, of the type with a vertical axis, which is mounted on a frame equipped with rotary motion about a fixed vertical axis.









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# EUROPEAN SEARCH REPORT

Application Number  
EP 04 01 1610

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                               |                                  |                                              |
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| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                               |                                  |                                              |
| Place of search                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                               | Date of completion of the search | Examiner                                     |
| The Hague                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                               | 9 August 2004                    | Garella, M                                   |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                                               |                                  |                                              |

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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09-08-2004

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