(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
20 March 2008 (20.03.2008)

PCT

(10) International Publication Number
WO 2008/031463 A1

(51) International Patent Classification:
B24B 41/047 (2006.01)

(21) International Application Number:
PCT/EP2006/070203

(22) International Filing Date:
22 December 2006 (22.12.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
MO2006A000282
14 September 2006 (14.09.2006) IT

(71) Applicant *(for all designated States except US)*: **ANCORA S.P.A.** [IT/IT]; Via Ferrari Moreni 10-18, I-41049 Sassuolo (MO) (IT).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: **CORRADINI, Mario** [IT/IT]; Via Costa 3, I-42014 Castellarano (RE) (IT).

(74) Agents: **LUPPI, Luigi** et al.; Viale Corassori, 54, I-41100 Modena (IT).

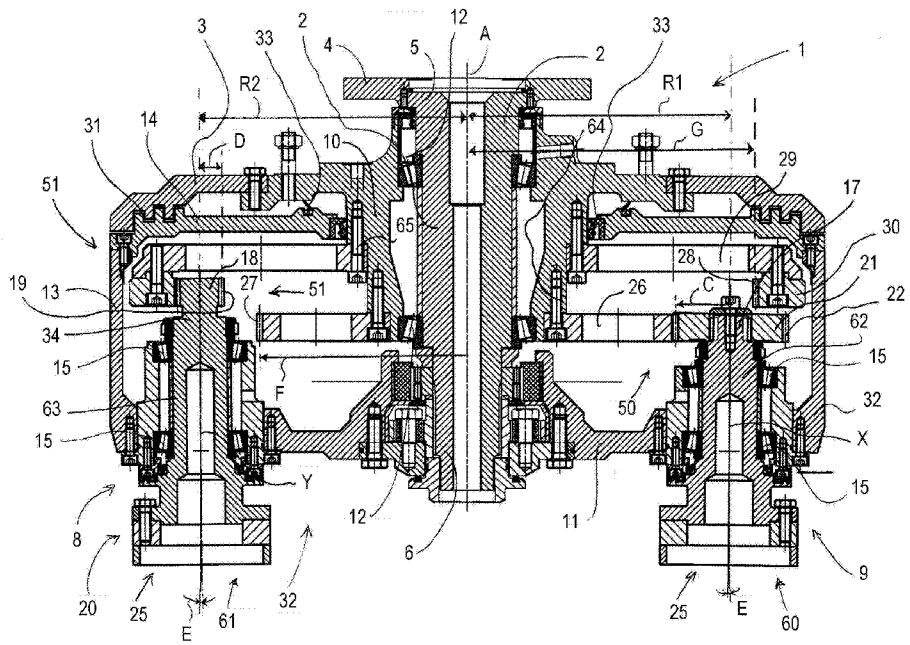
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:
— *with international search report*

(54) **Title:** POLISHING HEAD



(57) **Abstract:** A polishing head comprises first tool-holding shafts (9) rotating in a first rotating direction (L) and associated with first transmission means (21, 26, 50), and second tool-holding shafts (20) rotating in a second rotating direction (M) opposite said first rotating direction (L) and associated with second transmission means (18, 30, 51), said first transmission means (21, 26, 50) and said second transmission means (18, 30, 51) being such that said first tool-holding shafts (9) and said second tool-holding shafts (20) have cutting speeds that are not too different from one another as absolute values.

WO 2008/031463 A1

Polishing head

The invention relates to a polishing head, in particular a polishing head for stone materials.

Polishing heads are known that are used for polishing surfaces of stone material with the assistance of water, in particular slabs or tiles for floors or walls made of ceramics, marble, gres, granite and various forms of stone. The polishing heads are mounted singularly or in groups on an operating machine. Each polishing head comprises a shaft positioned centrally, provided at a first end with a flange, through which a rotational movement is taken from a motor associated with the operating machine. The shaft is rotatably and coaxially connected to a casing element that is fixed to the operating machine and which has a greater diameter than the diameter of the shaft. A cylindrical portion that projects to a second end of the shaft opposite the first end is internally fixed to the casing element. Inside the cylindrical portion the shaft is rotatably supported by means of bearings.

At the second end there is fixed a further casing element comprising a circular base, that is rotated by the shaft during operation. The circular base is provided peripherally with a cylindrical wall that projects to the casing element so as to define a closed volume inside the polishing head.

Inside the polishing head there is provided a first gearwheel, provided externally with a first toothing and arranged coaxially to the shaft. The first gearwheel is fixed by means of the cylindrical portion to the casing element.

Within the polishing head there is provided a second gearwheel arranged coaxially to the shaft and having an external diameter that is greater than the first gearwheel. The second gearwheel is fixed to the cylindrical portion in such a way as to be further away from the circular base with respect to the first wheel.

The second gearwheel is provided peripherally with a peripheral annular portion projecting to the circular base. On the annular portion a second toothing facing the shaft is obtained internally.

The polishing head is provided with a plurality of tool-holding shafts for grinding wheels, which shafts are rotatably connected and arranged transversely to the circular base, in such a way as to be able to be rotated by the latter around a central axis of the shaft.

The plurality of tool-holding shafts for grinding wheels is positioned in such a way as to have first ends arranged inside the polishing head and second ends, opposite the first ends, and positioned outside the polishing head for supporting grinding wheels.

The plurality of tool-holding shafts for grinding wheels comprises first tool-holding shafts, for first grinding wheels, and second tool-holding shafts for second grinding wheels. The first tool-holding shafts and the second tool-holding shafts are arranged together in an alternating manner, are uniformly distributed along a peripheral zone of the circular base and have respectively first rotation axes and second rotation axes arranged parallel to the shaft. The first rotation axes and the second rotation axes are arranged at the same distance from the shaft.

The first tool-holding shafts are provided at the first ends with first pinions that engage with the first gearwheel in such a way that during operation, the first tool-holding shafts rotate around the first rotation axes at a preset angular speed and in a first rotating direction that corresponds to a rotating direction of the shaft.

The second tool-holding shafts are provided at the first ends with second pinions that engage with the second gearwheel in such a way that during operation, the second tool-holding shafts rotate at the preset angular speed but in a second rotating direction opposite the first rotating direction.

During operation, the first tool-holding shafts and the second tool-holding shafts rotate respectively around the first axes and the second axes and at the same time rotate around the central axis of the shaft.

The first grinding wheels, as they rotate in a direction that corresponds to the rotating direction of the shaft, have peripheral zones that are further from the central axis that move at a greater cutting speed than further peripheral zones of the second grinding wheels that are further from the central axis, the second grinding wheels rotating in the opposite direction to the shaft.

If on the one hand it has been found to be extremely positive for the purposes of machining to provide first and second grinding wheels rotating in opposite directions to one another, it has nevertheless been found to be complicated to devise operating parameters for the polishing head to make the cutting speeds between the first grinding wheels and the second grinding wheels more homogenous.

An object of the invention is to improve the polishing heads, particularly for stone materials.

In particular, it is desirable to obtain a polishing head for which suitable operating parameters are defined that are such as to make the cutting speeds of the first grinding heads and of the second grinding heads more homogenous. This enables polishing to be improved and a more careful and homogenous surface finish to be obtained.

According to the invention, there is provided a polishing head, comprising first tool-holding shafts rotating in a first rotating direction and associated with first transmission means, and second tool-holding shafts rotating in a second rotating direction opposite said first rotating direction and associated with second transmission means, characterised in that said first transmission means and said second transmission means are such that said first tool-holding shafts and said second tool-holding shafts have

cutting speeds that are not too different from one another as absolute values.

Owing to the invention, there is provided a polishing head that enables surfaces of stone materials to be polished evenly. In particular, the first transmission means and the second transmission means are associated respectively with suitably selected first transmission ratios and second transmission ratios. Further, the first tool-holding shafts and the second tool-holding shafts are distant from a central longitudinal axis of the polishing head respectively by a first amount and by a second amount that are suitably preset. In this way, during operation, abrasive surfaces associated with the first tool-holding shafts, and further abrasive surfaces associated with the second tool-holding shafts act on the surfaces to be machined at substantially the same cutting speeds. In particular, with respect to known polishing heads, the differences in peripheral speed are considerably reduced that are generated between zones of the abrasive surfaces and further zones of the further abrasive surfaces that are further from the longitudinal central axis.

This enables uniform surface finishes to be obtained and the grooves to be homogenised that are generated on the surfaces during machining.

The invention will be better understood and carried out with reference to the attached drawings that illustrate an embodiment thereof by way of non-limiting example, in which:

Figure 1 is a perspective view of a polishing head.

Figure 2 is a schematic view that shows the operation of the polishing head in Figure 1.

Figure 3 is a section view taken along a through plane III-III passing through a longitudinal axis of the polishing head in Figure 1.

Figures 1 to 3 show a polishing head 1 that is suitable for polishing surfaces of stone material, such as slabs or tiles for floors or walls for example, of ceramic, marble, gres,

granite, and various types of stone. The polishing head 1 comprises shaft means 2 that extends along a central longitudinal axis A and is rotatably connected to a casing element 3 that is fixed firmly to an operating machine (not shown). The shaft means 2 is rotatably housed through bearings 12 inside a cylindrical portion 10 that is fixed to the casing element 3. To a first end 5 of the shaft means 2 a flange 4 is fixed by means of which a rotational movement supplied by a motor of the operating machine is transferred to the shaft means 2. To a second end 6 of the shaft means 2, opposite the first end 5, there is fixed a further casing element 32 comprising a base 11 of cylindrical shape. Peripherally to the base 11 there is provided a cylindrical wall 13 that projects towards the casing element 3 in such a way as to define volume that is closed above by an upper circular portion 14 arranged transversely to the shaft means 2 and immediately below the casing element 3. The upper circular portion 14 prevents, by means of sealing elements 31 and gaskets 33, undesired objects from entering inside the polishing head 1. On the base 11 there are obtained housing cavities 8 arranged peripherally at regular intervals in such a way as to house rotatably, through further bearings 15, in an alternating manner, first tool-holding shafts 9 and second tool-holding shafts 20. The polishing head shown in Figures 1 to 3 is provided with five first tool-holding shafts 9 and with five second tool-holding shafts 20, but it is possible to provide another desired number of first tool-holding shafts 9 and of second tool-holding shafts 20.

To the first tool-holding shafts 9 and to the second tool-holding shafts 20 there can be fixed, for example through screws, respectively first grinding wheels 60 and second grinding wheels 61 that are positioned jutting over the base 11.

The first grinding wheels 60 and the second grinding wheels 61 are provided with abrasive surfaces 25 that are able to polish the surfaces to be treated.

The first tool-holding shafts 9 and the second tool-holding shafts 20 comprise respectively stem portions 62, having first rotation axes X, and further stem portions 63, having second rotation axes Y, extending parallel to the central longitudinal axis A. The stem portions 62 are rotatable around first rotation axes X, and the further stem portions 63 are rotatable around the second rotation axes Y.

The first rotation axes X are positioned at a first distance R1 from the central longitudinal axis A, and the second rotation axes Y are positioned at a second distance R2 from the central longitudinal axis A.

The first grinding wheels 60 and the second grinding wheels 61 can be mounted in such a way as to have longitudinal axes slightly tilted by an angle E with respect to the first rotation axes X and to the second rotation axes Y. In this way, when the first tool-holding shafts 9 and the second tool-holding shafts 20 rotate respectively around the first rotation axes X and the second rotation axes Y the planes of the abrasive surfaces 25 are varied continuously in such a way as to adapt better to the surface roughnesses that are treated.

The polishing head 1 comprises first transmission means 50, associated with the first tool-holding shafts 9, and second transmission means 51, associated with the second tool-holding shafts 20.

The first transmission means 50 comprises a first gearwheel 26, having a first external radius F, arranged coaxially to the shaft means 2 and fixed to the cylindrical portion 10 by means of screws 64. The first gearwheel 26 is provided peripherally and externally with a first toothing 27.

The first transmission means 50 comprises first pinions 21, having a second external radius C, that are fixed to upper connecting ends 17 of the first tool-holding shafts 9. The

first pinions 21 are externally and circumferally provided with further first toothings 22 that engage with the first toothing 26. Between the first gearwheel 26 and the first pinions 21 there is defined a first transmission ratio Z1, i.e. a first ratio between a first number of teeth N1 provided on the first gearwheel 26 and a second number of teeth N2 provided on each first pinion 21.

The second transmission means 51 comprises a support ring 29 of a second gearwheel 30, arranged coaxially with respect to the shaft means 2 and fixed to the cylindrical portion 10 by further screws 65. The second gearwheel 30 is provided in the interior thereof with a second internal toothing 28 arranged along a circumference coaxial to the central longitudinal axis A. The second toothing 28 has an internal radius G that is greater than the second distance R2.

The second transmission means 51 comprises second pinions 18, having a third external radius D, that are fixed to further upper connecting ends 34 of the second tool-holding shafts 20, in such a way as to be further from the base 11 than are the first pinions 21. The second pinions 18 are provided externally and circumferally with further second toothings 19 that engage with the second toothing 28. Between the second gearwheel 30 and the second pinions 18 there is defined a second transmission ratio Z2, i.e. a second ratio between a third number of teeth N3 provided on the second gearwheel 30 and a fourth number of teeth N4 provided on each second pinion 18.

During operation, the base 11, which is rotated in a first direction L by the shaft means 2, drags with it the first tool-holding shafts 9 and the second tool-holding shafts 20 that travel along a revolution trajectory around the central longitudinal axis A. Simultaneously, the first toothing 27, which is fixed, interacts with the further first toothings 22 in such a way that the first pinions 21 rotate in a direction corresponding to the first direction L around the first rotation axes X. In this way the first grinding wheels

60 rotate around the first rotation axes X and at a first angular speed W1.

The second toothing 28, which is fixed, interacts with the further second toothings 19 in such a way that the second pinions 18 rotate in a second direction M opposite the first direction L around the second rotation axes Y. In this way, the second grinding wheels 61 rotate around the second rotation axes Y at a second angular speed W2.

By selecting suitable values of the first distance R1, of the second distance R2 and/or of the first transmission ratio Z1 and of the second transmission ratio Z2 it is possible to reduce significantly the differences in cutting speed between the first grinding wheels 60 and the second grinding wheels 61, due to rotations in opposite directions, in particular between zones of the first grinding wheels 60 and further zones of the second grinding wheels 61 that are further from the central longitudinal axis A. This enables the first grinding wheels 60 and the second grinding wheels 61 to move on the surfaces to be machined at cutting speeds that are not very different from one another as an absolute value.

In a first example, the polishing head 1 has a first transmission ratio Z1=3.78, (with N1=151, N2=40) at a first distance R1=191 mm (distance between diametrically opposite first tool-holding shafts 9 equal to 382 mm), a second distance R2=194 mm (distance between second diametrically opposite tool-holding shafts 20 equal to 388 mm), a second transmission ratio Z2=13.12 (with N3=210, N4=16) and a first angular input speed n1 of the shaft means 2 equal to 200 rpm.

With such design parameters, peripheral zones of the first grinding wheels 60 move, in regions that are further from the shaft means 2, at a first cutting speed Vt1=9.01m/s. The first cutting speed Vt1 is generated by the algebraic sum of a first speed contribution equal to 3.96m/s provided by the rotation of the first grinding wheels 60 around the first

rotation axes X and a second speed contribution equal to 5.05m/s, provided by the rotation of the first grinding wheels 60 around the central longitudinal axis A.

Further peripheral zones of the second grinding wheels 61 move in regions that are more distant from the shaft means 2, at a second cutting speed Vt2=8.63m/s. The second cutting speed Vt2 is generated by the algebraic sum of a further first speed contribution equal to 13.74m/s provided by the rotation of the second grinding wheels 61 around the second rotation axes Y, and a further second speed contribution equal to 5.11m/s, provided by the rotation of the second grinding wheels 61 around the central longitudinal axis A.

In a second example, the polishing head 1, differs from the first example only by having a second angular input speed n2 of the shaft means 2 equal to 265 rpm. In this case, there is a first cutting speed Vt1=11.93m/s. The first cutting speed Vt1 is generated by the algebraic sum of a further first speed contribution equal to 5.24m/s provided by the rotation of the first grinding wheels 60 around the first rotation axes X, and a further second speed contribution equal to 6.687m/s, provided by the rotation of the first grinding wheels 60 around the central longitudinal axis A.

In this example, there is a second cutting speed Vt2=11.43m/s. The second cutting speed Vt2 is generated by the algebraic sum of a still further first speed contribution equal to 18.20m/s provided by the rotation of the second grinding wheels 61 around the second rotation axes Y, and a still further second speed contribution equal to 6.77m/s, provided by the rotation of the second grinding wheels 61 around the central longitudinal axis A.

It is possible to note how the values of Vt1 and Vt2, in the first example and in the second example disclosed above, differ from one another by less than 5%.

CLAIMS

1. Polishing head, comprising first tool-holding shafts (9) rotating in a first rotating direction (L) and associated with first transmission means (21, 26, 50), and second tool-holding shafts (20) rotating in a second rotating direction (M) opposite said first rotating direction (L) and associated with second transmission means (18, 30, 51), characterised in that said first transmission means (21, 26, 50) and said second transmission means (18, 30, 51) are such that said first tool-holding shafts (9) and said second tool-holding shafts (20) have cutting speeds that are not too different from one another as absolute values.
2. Polishing head according to claim 1, wherein said first transmission means (50) comprises first pinion means (21), fixed to said first tool-holding shafts (9), and first gearwheel means (26) interacting together, and said second transmission means (51) comprises second pinion means (18), fixed to said second tool-holding shafts (20), and second gearwheel means (30) interacting together.
3. Polishing head according to claim 2, wherein between said first gearwheel means (26) and said first pinion means (21) there is defined a first transmission ratio Z1, having a value selected from an interval comprised between 2 and 5.
4. Polishing head according to claim 3, wherein said first transmission ratio Z1, has a value selected from an interval comprised between 3 and 4.
5. Polishing head according to claim 3 or 4, wherein said transmission ratio (Z1) has a value equal to 3.5.
6. Polishing head according to claim 3, or 4, wherein said transmission ratio (Z1) has a value equal to 3.78.
7. Polishing head according to claim 6, wherein said first gearwheel means (26) has a first number of teeth (N1)

equal to 151, and said first pinion means (21) has a second number of teeth (N2) equal to 40.

8. Polishing head according to any one of claims 2 to 7, wherein between said second gearwheel means (30) and said second pinion means (18) is defined a second transmission ratio (Z2) having a value selected from an interval comprised between 10 e 15.

9. Polishing head according to claim 8, or 9, wherein said second transmission ratio has a value selected from an interval comprised between 12 and 14.

10. Polishing head according to claim 8, or 9, wherein said second transmission ratio (Z2) has a value equal to 13.

11. Polishing head according to claim 8 or 9, wherein said second transmission ratio (Z2) has a value that is about 13,12.

12. Polishing head according to claim 11, wherein said second gearwheel means (30) has a third number of teeth (N3) equal to 210 and said second pinion means (18) have a fourth number of teeth (N4) equal to 16.

13. Polishing head according to any one of claims 2 a 12, wherein said first pinion means (21) and said second pinion means (18) are positioned respectively at a first distance (R1) and at a second distance (R2) from a central longitudinal axis (A) of said polishing head (1).

14. Polishing head according to claim 13, wherein said first distance (R1) has a value selected from an interval comprised between 150mm and 230mm.

15. Polishing head according to claim 13 or 14, wherein said first distance (R1) has a value selected from an interval comprised between 180mm and 200mm.

16. Polishing head according to any one of claims 13 to 15, wherein said first distance (R1) has a value equal to about 190mm.

17. Polishing head according to any one of claims 13 to 15, wherein said first distance (R1) has a value equal to 191mm.
18. Polishing head according to any one of claims 13 to 17, wherein said second distance (R2) has a value selected from an interval comprised between 150mm and 230mm.
19. Polishing head according to any one of claims 13 to 18, wherein said second distance (R2) has a value selected from an interval comprised between 180mm and 200mm.
20. Polishing head according to any one of claims 13 to 19, wherein said second distance (R2) has a value equal to about 195mm.
21. Polishing head according to any one of claims 13 to 19, wherein said second distance (R2) has a value equal to 194mm.
22. Polishing head according to any one of claims 13 to 21, and further comprising shaft means (2), extending along said central longitudinal axis (A) and arranged for driving said first tool-holding shafts (9) and said second tool-holding shafts (20).
23. Polishing head according to claim 22, and further comprising a base element (11) fixed transversely to an end (6) of said shaft means (2) and arranged for supporting said first tool-holding shafts (9) and said second tool-holding shafts (20).
24. Polishing head according to claim 23, wherein said first tool-holding shafts (9) and said second tool-holding shafts (20) are arranged peripherally and rotatably on said base element (11) in an alternating manner to one another.
25. Polishing head according to any one of claims 22 to 24, wherein said shaft means (2) is rotatably connected, through bearing means (12), to a casing element (3).
26. Polishing head according to claim 25, wherein said first gearwheel means (26) and said second gearwheel means (30) are fixed to said casing element (3).

27. Polishing head according to claim 23 or 24, or according to claim 25 or 26, as claim 25 is appended to claim 23, wherein said second gearwheel means (30) is arranged at a distance from said base element (11) that is greater than a further distance of said first gearwheel means (26) from said base element (11).
28. Polishing head according to claim 23 or 24, or according to claim 25 or 26, as claim 25 is appended to claim 23, or according to claim 27, wherein said second gearwheel means (30) is provided with a peripheral annular portion that projects to said base element (11).
29. Polishing head according to any one of claims 22 to 28, wherein said shaft means (2) is rotated at a first angular input speed n1 equal to 200rpm.
30. Polishing head according to any one of claims 22 to 28, wherein said shaft means (2) is rotated at a second angular input speed n2 equal to 265rpm.

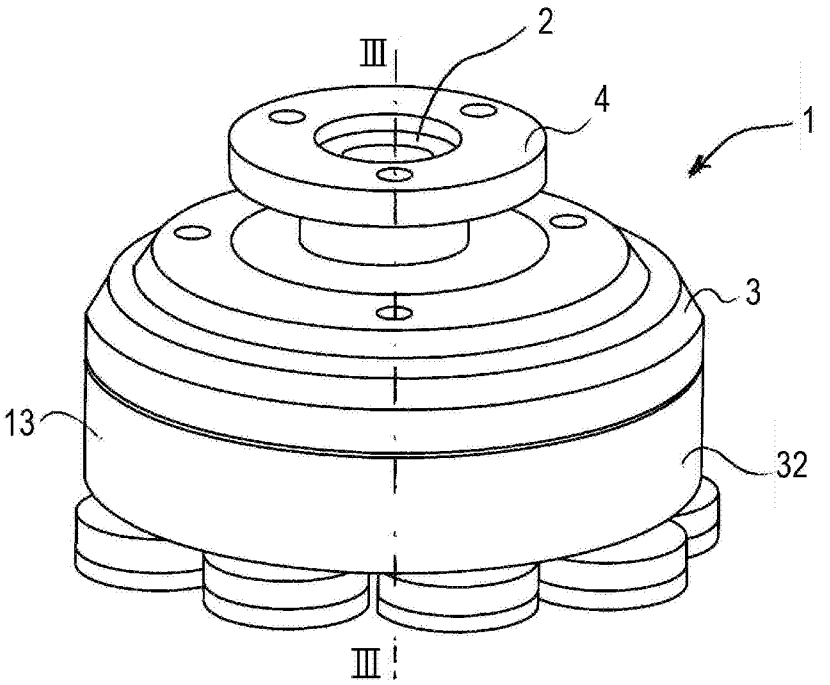


Fig. 1

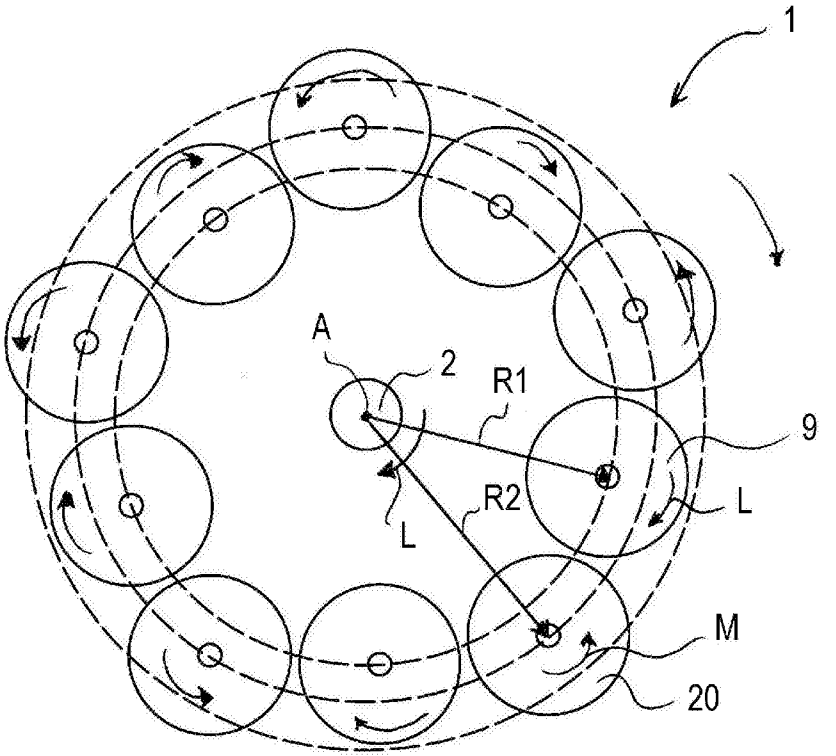


Fig. 2

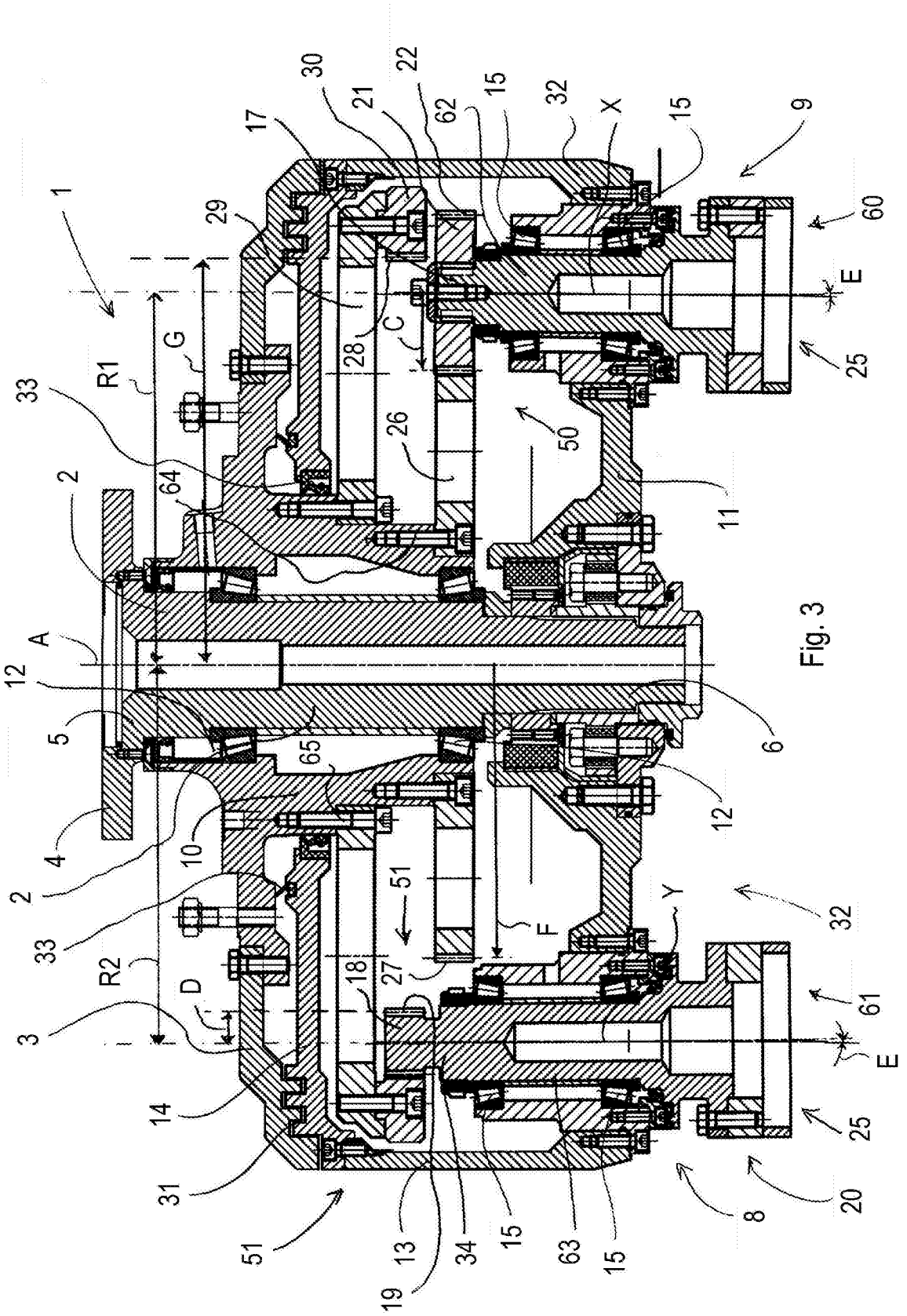

1
I
I
G
R1
R2
A
D
C
F
X
Y
E
E
2
3
4
5
6
8
9
10
11
12
13
14
15
17
18
19
20
21
22
25
26
27
28
29
30
31
32
33
34
50
51
60
61
62
63
64
65

Fig. 3

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2006/070203

A. CLASSIFICATION OF SUBJECT MATTER
INV. B24B41/047

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B24B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 073 627 A (LAZZARI GIOSUE; BONVINO MICHELE) 1 October 1971 (1971-10-01) page 6, line 21 - page 7, line 9; figures 4,5	1,2,13, 22-28
X	FR 1 108 781 A (BRENDEL) 17 January 1956 (1956-01-17) page 3, left-hand column, lines 3-45; figures 7-9	1
A	RU 2 220 039 C2 (SVITKOVSIJ ET AL.) 27 December 2003 (2003-12-27) abstract; figure	1
A	WO 01/70458 A (NUOVE OFFICINE ANCORA S P A [IT]; CORRADINI MARIO [IT]) 27 September 2001 (2001-09-27) abstract; figures	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 May 2007	22/05/2007

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Garella, Mario

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2006/070203

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2073627 A	01-10-1971	BE 760052 A1	17-05-1971
FR 1108781 A	17-01-1956	NONE	
RU 2220039 C2	27-12-2003	NONE	
WO 0170458 A	27-09-2001	AU 4098001 A IT MO20000054 A1	03-10-2001 21-09-2001