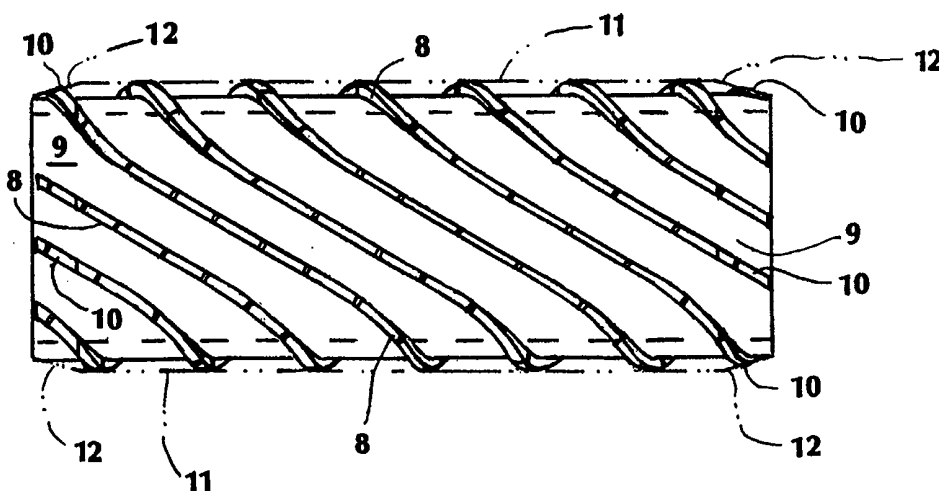




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: DIAMOND ROLLER FOR CERAMICS, HAVING ABRASIVE WITH SLOPED SIDE



## (57) Abstract

The diamond roller for ceramics, having abrasive with sloped side, comprises the abrasive diamond material disposed on the surface of the roller (9), and it is characterised in that it presents for a brief length (10) and on one end, at least, of the envelope surface (11) of the abrasive, with decrease of height (12) from the diameter of cut to the diameter of the roller. Advantageously, said sloped side (12) presents constant inclination and is present on both ends of the roller. Finally, the effect of preventing witness marks of start (6) and stop work (5) of the roller from the surface of the tile (3) is present even when the diamond abrasive is disposed on sectors or teeth (8) on a multi start helix.

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DIAMOND ROLLER FOR CERAMICS, HAVING ABRASIVE WITH SLOPED  
SIDE

The invention concerns: a diamond roller for ceramics,  
5 having abrasive with sloped side, that is an utensil of  
working of ceramic material, typically the hard-fired ce-  
ramic in tiles, for the grinding and/or calibration of the  
surface in sight of the tiles.

10 The state of the art comprises varied types of diamond  
abrasive rollers with most varied conformations of the  
abrasive disposed with sectors or teeth on parallel lines  
to the generating line of the roller, on spiral or helixes  
to varied conformation also multi starts, beyond to the  
15 rollers with abrasive disposed without solution of  
continuity on all surface of the roller.

Machines are present in the state of the art as grinding  
machines and/or calibrating machines, like disclosed in  
the application of European Patent EP 769349 A1, in which  
20 said rollers present the generating line tilted as regards  
the perpendicular direction to the direction of the motion  
of the material in working, to adjust in a rapid way the  
width of the front of cut to the width of the material to  
work.

25 The aforesaid calibrating machines with tilting rollers,  
when used in the working of the ceramic material, present  
drawbacks in the zones of start and stop work of the gene-  
rating line of cut from the surface of the tile: in fact,  
in the begin the working on the tile the roller present  
30 yourself with a vertex of his generating line in such a  
way to insist for a brief time, till that the tile not has  
advanced of a sufficient amount of length, on said zone of  
start work so that remove more than the necessary from the  
surface of it; in a following moment, when a bigger roller  
35 portion is in working on the tile, this abnormal removal

no more happens, because the uniform distribution of the pressure of the roller on a bigger length of the generating line; likewise in the moment of stop work of the roller from the surface of the tile is verified an analogous  
5 bigger removal.

Such defect comes mostly underlined from the presence of the abrasive disposed in a discrete way, with sectors or teeth on the cylindrical surface of the roller.

It result from a defective working that forces to prolong  
10 the time of the following polishing, effected like known with abrasive oscillating or rotating grindstones on a vertical axle: the timing of working of the production line results enormously reduced in such a way to make unprofitable the use of said calibration machine with  
15 inclinable rollers in the field of the ceramic materials.

Such state of the art may be subject to remarkable improvements regarding the possibility of eliminate the aforesaid drawback.

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From what has been said so far, the necessity arises of solving the technical problem of setting up a conformation of the abrasive roller that allows to avoid the aforesaid bigger removal in the zones of start and stop work of the  
25 generating line of cut from the surface of the tile in ceramic material.

The present invention solves the above-mentioned technical problem by adopting: a diamond roller for ceramics,  
30 having abrasive with sloped side, comprising the abrasive diamond material disposed on the surface of the roller, characterized from that, it presents for a brief length and on one end, at least, of the envelope surface of the abrasive, with decrease of height from the diameter of cut  
35 to the diameter of the roller.

Adopting, moreover: said decrease of height of the abrasive with constant inclination.

Adopting, moreover: said decrease of the height of the abrasive present on both ends of the roller.

5 Adopting, moreover: the diamond abrasive disposed in a discrete way, that is with sectors or teeth, on the surface of the roller.

Adopting, finally: said sectors or teeth disposed according to a multi starts helix.

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The advantages accomplished by the present invention are: the begin start work of the roller happens in a gradual way and the bigger removal, located in the zones of start and stop work of the generating line from the  
15 surface of the tile, not happens, not even with the rollers with diamond sectors or teeth arranged to helix, also if the sector or tooth of cut presents the axle parallel to the direction of advance motion of the tiles.

20 An embodiment of the invention is shown, by way of example only, in the drawing table attached, in which: Figure 1 is the perspective schematic view of the tiles in working with an abrasive roller to tilted axle, with the sloped sides according to the invention; Figure 2 is the  
25 side view of a roller with abrasive disposed on multi starts helix; Figure 3 is the transversal view of the roller of Figure 2.

The indications are as follows: with 1, Figure 1, the  
30 line of tiles 2 in ceramic material, having advance motion in the direction A; with 3 the tiles in working; with 4 the tiles worked and 5 the stop work zone of the abrasive roller and 6 the start work zone of the working; with 7  
the zones of stop work of the working in the tiles in wor-  
35 king; with N the perpendicular direction to the direction

of the motion A; with C the direction of the generating line envelope of the sectors or abrasive teeth 8 of the abrasive roller 9, in contact with the surface of the tile; with B the angle formed between the generating line C and the perpendicular direction N; with 10 the sloped sides of the abrasive on the roller 9.

Finally, indications are as follows: with 11, Figure 2, the line of the generating line envelope of the sectors or abrasive teeth of the roller 9; with 12 the conical sloped sides of said generating line envelope in the end zones the roller, to which the sectors or abrasive teeth are conformed; with 13, Figure 3, the inside diameter of the roller for the joining to the relative shaft; with 14 the axial holes of fixing said roller on said shaft.

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The operation of the diamond roller with sloped sides of the abrasive happens like as follows: the roller 9, is positioned with the correct angle B for the working of the width of the tiles 2, as known with dimension slightly lower of the same width; the tiles are made advancing with the roller in rotating motion on the own axle to the recommended cut speed; in the above mentioned zones of start work 6 of the cut of the diamond abrasive roller on the surface of the tile 3, the presence of the sloped side 10, 12 allows a gradual beginning so that don't remove the material in concentrated way; likewise in the zones of stop work 5 of the cut of the sectors or teeth 8 of the roller, it happens in a gradual way so that doesn't let witness marks.

30 The aforesaid operation have been verified with the rollers having diamond abrasive with most varied dispositions of above mentioned sectors or teeth, also if, with the add between the angles of helix construction and setting B of the roller, said sectors or teeth begin to cut the surface of the tile 3 with the axle in parallel direction to the

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direction of the motion A: the working has not presented defects in the zones of start work 6 and stop work 5 of the cut.

5 If in practice the materials, dimensions and operative details should be different from those indicated, but technically equivalent, the patent will still apply. As, even if less suitably, the roller could present the degrading sloped sides 10, 12 of the abrasive from one end  
10 only, being known that the rollers could be composed in an axial way, and in the case they could be composed specularly in the middle on the same head of calibration, reaching the combined effect of graduate as the start work as the stop work of the cut of the roller on the tile 3,  
15 as the roller 9 with the sloped sides 10, 12 from both ends.

Further, the diamond abrasive, even if less suitably, could be disposed in uniform and continuous way on the surface of the roller, also presenting a sloped side of  
20 the thickness of it, at least.

Finally, the decrease of the height 12 of the abrasive, by making the sloped side, could not be at constant inclination that is to conical conformation 10, like represented in the Figure 2, but made with rounding it at  
25 constant radius or varying radius.

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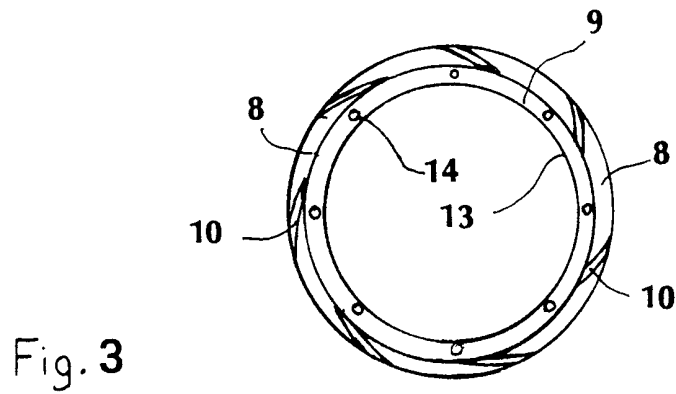
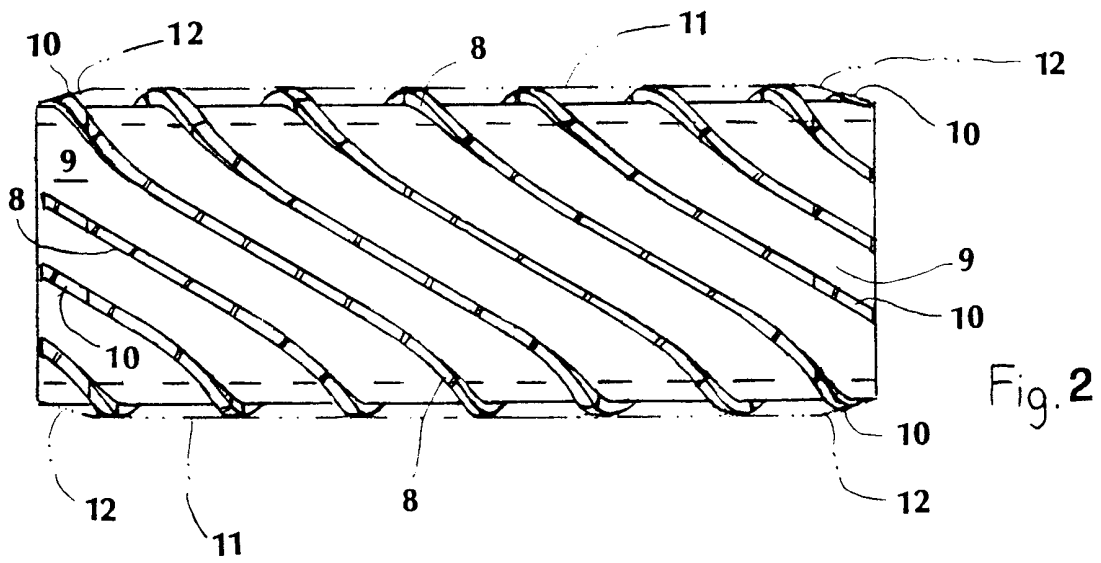
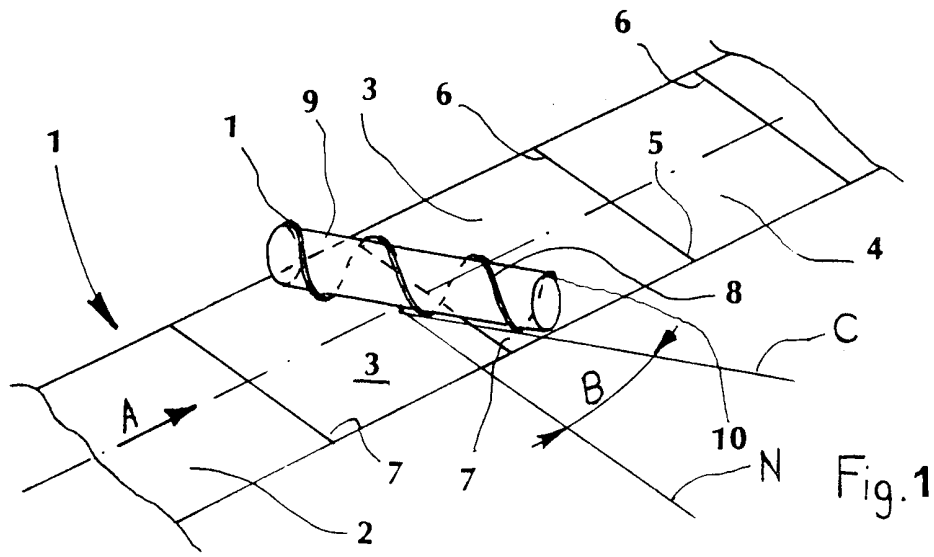
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## CLAIMS

1. Diamond roller for ceramics, having abrasive with sloped side, comprising the abrasive diamond material disposed on the surface of the roller (9), characterised from that, it presents for a brief length (10) and on one end, at least, of the envelope surface (11) of the abrasive, with decrease of height (12) from the diameter of cut to the diameter of the roller.
- 10 2. Diamond roller, according the previous claim, characterised from that, it presents said decrease of height (12) of the abrasive with constant inclination.
- 15 3. Diamond roller, according to one of the previous claims, characterised from that, it presents said decrease of the height (12) of the abrasive on both ends of the roller (9).
- 20 4. Diamond roller, according to one of the previous claims, characterised from that, it presents the diamond abrasive disposed in a discrete way, that is with sectors or teeth (8), on the surface of the roller (9).
- 25 5. Diamond roller, according to the previous claim, characterised from that, it presents sectors or teeth (8) disposed according to a multi starts helix.

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/IT 98/00219

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 6 B24D5/06 B24B7/22 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)  
 IPC 6 B24D 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)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	FR 1 592 177 A (ROBERT ARISTIDE) 11 May 1970	1
A	see page 2	4,5
Y	US 2 563 907 A (DONALD D. AUSTIN) 14 August 1951	1
A	see column 3, line 28 - line 55; figures	2,3
A	EP 0 769 349 A (PEDRINI LUIGI) 23 April 1997 cited in the application see page 3, column 4, line 7 - line 29; figure 1	1
A	US 4 635 407 A (PACINI ERMANNO) 13 January 1987 see column 3, line 22 - line 42	1
	-/--	

Further documents are listed in the continuation of box C.  Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
10 December 1998	17/12/1998

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DD 285 568 A (ZUSCHLAGSTOFFE UND NATURSTEINE) 19 December 1990 see page 2, paragraph 4 -----	1
A	PATENT ABSTRACTS OF JAPAN vol. 009, no. 235 (M-415), 21 September 1985 & JP 60 090623 A (SUMITOMO DENKI KOGYO KK), 21 May 1985 see abstract -----	1

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information on patent family members

International Application No

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