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(54) **DIAMOND ROLLER FOR CERAMICS, HAVING ABRASIVE WITH SLOPED SIDE**  
DIAMANTUMFANGFRÄSER MIT ABGESCHRÄGTEN SCHLEIFENDEN  
ROULEAU DIAMANT POUR CERAMIQUES, DONT L'ABRASIF PRESENTE UN COTE OBLIQUE

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• **PATENT ABSTRACTS OF JAPAN vol. 009, no.  
235 (M-415), 21 September 1985 & JP 60 090623  
A (SUMITOMO DENKI KOGYO KK), 21 May 1985**

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## Description

**[0001]** The invention concerns: a diamond roller for ceramics, with an abrasive sloped side, that is a tool for working ceramics, in particular the hard-fired ceramic tiles, to grind and/or calibrate the upper side surface of the tiles.

**[0002]** The state of the art comprises different types of diamond abrasive rollers with various conformations of the abrasive disposed with sectors or teeth on lines parallel to the generating line of the roller, on spirals or helixes of different conformation with multi starts too, besides the rollers with abrasive material disposed without solution of continuity on all the surface of the roller. Grinding machines and/or calibrating machines are present in the state of the art, as described in the application for European Patent EP 769349 A1, in which the above mentioned rollers have the generating line inclined to the perpendicular direction to the movement of the processing material, to adjust quickly the width of the cutting front to the width of the material to be worked. The aforesaid calibrating machines with inclined rollers, when used in the processing of ceramic material, present drawbacks in the starting and stopping zones of the generating cutting line from the surface of the tile: in fact, when the working on the tile starts the roller has a vertex of his generating line in a position to insist for a short time, till the tile moves forward sufficiently so that it removes more material than necessary from the tile surface in that position; afterwards, when a bigger portion of the roller is working on the tile, there is not this abnormal removal anymore, because of the uniform distribution of the pressure of the roller on a longer length of the generating line; likewise when the roller stops working there is a bigger removal again.

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

The result is a defective working that forces to protract the following polishing time, made known by abrasive oscillating or rotating grindstones on a vertical axle: the timing of the working production line is enormously lessened in such a way to make unprofitable the use of the above mentioned calibration machine with inclinable rollers in the ceramic tiles industry.

**[0003]** This state of the art may be subjected to remarkable improvements regarding the possibility to eliminate the aforesaid drawback.

**[0004]** From what has been said so far, the necessity arises to solve the technical problem of setting up a conformation of the abrasive roller that avoids the aforesaid bigger removal when the generating cutting line starts and stops working on the surface of the tile.

**[0005]** The present invention solves the above-mentioned technical problem by adopting: a diamond roller for grinding and/or calibrating ceramics, comprising an abrasive diamond layer disposed on the cylindrical surface of the roller body, characterised in that, at least at

one end of the diamond roller the thickness of the abrasive diamond layer is decreased for a brief length, in direction to the roll end from the outer diameter of said abrasive diamond layer to the cylindrical surface of said roller body. Adopting, moreover: said thickness decrease of the abrasive layer have constant inclination.

Adopting, moreover: said thickness decrease of the abrasive layer is on both ends of the roller.

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

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

**[0006]** The advantages accomplished by the present invention are: the roller starts working in a gradual way and there is not a bigger removal, located in the starting and stopping zones of the generating line from the surface of the tile, not even with the rollers with diamond sectors or teeth arranged to helix, even if the sector or cutting tooth presents the axle parallel to the direction of advancing motion of the tiles.

**[0007]** An embodiment of the invention is shown, by way of example only, in the drawing table herewith attached, in which: Figure 1 is the perspective schematic view of the tiles in working process with an abrasive roller with tilted axle, with the sloped sides according to the invention; Figure 2 is the side view of a roller with abrasive material disposed on multi start helix; Figure 3 is the transversal view of the roller of Figure 2.

**[0008]** The indications are as follows: 1, Figure 1, is the line of tiles 2 made of ceramic material, moving forwards to the direction A; 3 is the tiles in the working process; 4 are the worked tiles and 5 the stopping work zone of the abrasive roller and 6 the starting work zone of the manufacturing process; 7 is the zones of stopping phase of the process while the tile are being worked; N is the direction perpendicular to the direction of the A motion; C is the direction of the generating line envelope of the sectors or abrasive teeth 8 of the abrasive roller 9, in contact with the tile surface; B is the angle formed by the generating line C and the perpendicular direction N; 10 is the sloped sides of the abrasive material on the roller 9.

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

**[0009]** The diamond roller with sloped sides of the abrasive operates as follows: the roller 9, is positioned with the correct angle B to work on the width of the tiles 2, as known with a slightly lower width; the tiles advance on the roller in a rotating motion on its own axle to the recommended cut speed; in the above mentioned starting zones 6 of cutting 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 it does not remove the material in a concentrated way; likewise in the stop cutting work zones 5 of the sectors or teeth 8 of the roller, the stop cutting happens in a gradual way so that they do not let witness marks.

The aforesaid operation has been verified with the rollers having diamond abrasive with various dispositions of above mentioned sectors or teeth, even if, by adding the angles of helix construction and setting B of the roller, these sectors or teeth begin to cut the surface of the tile 3 with the axle in parallel direction to the direction of the A motion: the working process has not shown defects in the zones where the cutting operations start 6 and stop 5.

As, even if less suitably, the roller could present the degrading sloped sides 10, 12 of the abrasive in one end 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, setting the combined effect of graduating both the starting point and the stopping point of the cutting of the roller on the tile 3, as the roller 9 with the sloped sides 10, 12 from both ends does.

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, at least the same thickness.

Finally, the thickness decrease 12 of the abrasive, caused by operating to get the sloped side, need not be of constant inclination, that is a conical conformation 10, as shown in the Figure 2, but may be obtained by rounding it at a constant or variable radius.

### Claims

1. A diamond roller for grinding and/or calibrating ceramics, comprising an abrasive diamond layer (8) disposed on the cylindrical surface of the roller body (9), **characterised in that**, at least at one end of the diamond roller, the thickness (12) of the abrasive diamond layer is decreased for a brief length (10), in direction to the roll end from the outer diameter of said abrasive diamond layer to the cylindrical surface of said roller body (9).
2. A diamond roller, according the previous claim, **characterised in that**, said thickness decrease (12) of the abrasive layer has constant inclination.
3. A diamond roller, according to one of the previous claims, **characterised in that**, said thickness decrease (12) of the abrasive layer is on both ends of the roller (9).
4. A diamond roller, according to one of the previous claims, **characterised in that**, the diamond abra-

sive layer is disposed in a discrete way, that is with sectors or teeth (8), on the cylindrical surface of the roller body (9).

5. A diamond roller, according to the previous claim, **characterised in that** it has sectors or teeth (8) disposed according to a multi start helix.

### 10 Patentansprüche

1. Eine Diamantrolle zum Schleifen und/oder Kalibrieren von Keramiken, eine abschleifende Diamantschicht (8) enthaltend, die auf der zylinderförmigen Oberfläche des Rollenkörpers steht, **gekennzeichnet dadurch, dass** mindestens an einem Ende der Diamantrolle, die Stärke (12) der abschleifenden Diamantschicht für eine kurze Länge (10) verringert wird, in der Richtung auf das Rollenende vom äußeren Durchmesser der besagten abschleifenden Diamantschicht auf die zylinderförmige Oberfläche des besagten Rollenkörpers (9).
2. Eine Diamantrolle, entsprechend dem vorhergehenden Anspruch, **gekennzeichnet dadurch, dass** die besagte Stärkenabnahme (12) der abschleifenden Schicht konstante Neigung hat.
3. Eine Diamantrolle, entsprechend einem der vorhergehenden Ansprüche, **gekennzeichnet dadurch, dass** die besagte Stärkenabnahme (12) der abschleifenden Schicht an beiden Enden der Rolle (9) ist.
4. Eine Diamantrolle, entsprechend einem der vorhergehenden Ansprüche, **gekennzeichnet dadurch, dass** die abschleifende Schicht des Diamanten wird in einer getrennten Weise, d.h. mit Sektoren oder Zähnen (8), auf der zylinderförmigen Oberfläche des Rollenkörpers (9) angebracht.
5. Eine Diamantrolle, entsprechend dem vorhergehenden Anspruch, **gekennzeichnet dadurch, dass** sie Sektoren oder Zähne (8) hat, die einer Helix mit mehreren Anfängen entsprechend angebracht werden.

### Revendications

1. Un rouleau de diamant pour rectifier et/ou calibrer la céramique, comportant une couche abrasive diamantée (8), disposée sur la surface cylindrique du corps de rouleau (9), **caractérisée en ce que**, au moins à une extrémité du rouleau de diamant, l'épaisseur (12) de la couche abrasive de diamant est diminué pour une brève longueur (10), dans la direction à l'extrémité du rouleau, du diamètre ex-

térieur de ladite couche abrasive de diamant à la surface cylindrique de ledit corps de rouleau (9).

2. Un rouleau de diamant, selon la revendication précédente, **caractérisée en ce que** ladite diminution d'épaisseur (12) de la couche abrasive a une inclination constante. 5
3. Un rouleau de diamant, selon une des revendications précédentes, **caractérisée en ce que** ladite diminution d'épaisseur (12) de la couche abrasive est sur les deux extrémités du rouleau (9). 10
4. Un rouleau de diamant, selon une des revendications précédentes, **caractérisée en ce que** la couche abrasive de diamant est disposé d'une manière discrète, c'est à dire avec des secteurs ou des dents (8), sur la surface cylindrique du corps de rouleau (9). 15  
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5. Un rouleau de diamant, selon la revendication précédente, **caractérisée en ce que** il présente des secteurs ou des dents (8) disposées selon une spirale multi-démarrant. 25

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