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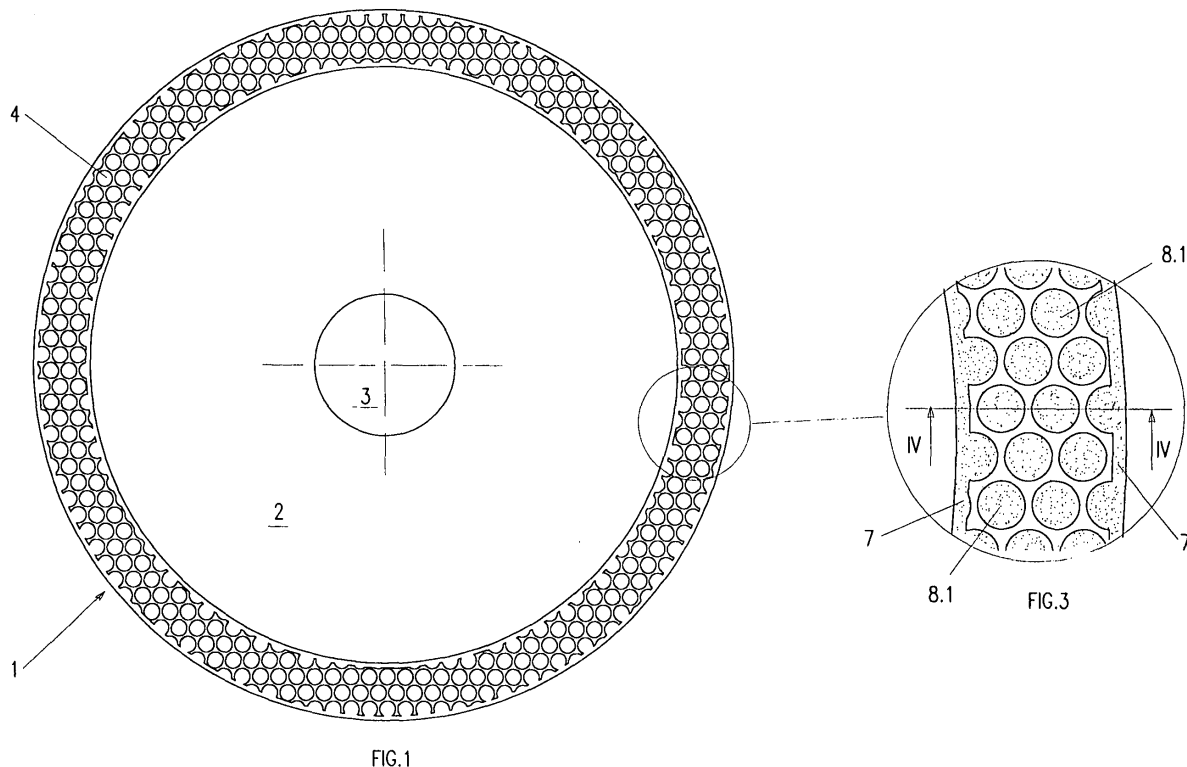
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(54) **Diamond-tipped cutting disc**

(57) The finding concerns a diamond-tipped cutting disc, to be used for cutting or chamfering different products, from natural stones to ceramics, from granite and marble floor tiles to single fired products and from fine compact clinker bricks to hard porcelain stoneware. Such a disc consists of a central disc or core (2) made

from steel, equipped with the hole (3) for the attachment to the machine tool and the diamond band or ring (4), arranged on the outside with respect to the first. Such a disc is characterised in that the diamond band has shaped ridges on a side wall or on both of the side walls, which constitute the abrasive surface of the tool.



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Description

[0001] The present finding concerns a diamond-tipped cutting disc, according to the general part of claim 1.

[0002] In the stone and ceramics industry cutting tools identified with the term "cutting discs" and used for cutting or chamfering different products, from natural stones to ceramics, from granite and marble floor tiles to single fired products and from fine compact clinker bricks to hard porcelain stoneware, are regularly used.

[0003] A cutting disc, for so-called "diamond" cutting, consists of two parts: a disc defined with the term "core", made from steel, equipped with a central hole for adapting to the operating machine and a diamond band, defined with the term "ring", applied onto the outer circumference of the core, which constitutes the cutting member.

[0004] The diamond band is applied onto the steel core to form a single body, through different operations, from braze welding to the use of laser welding.

[0005] Cutting discs are split into two categories: continuous band or crown discs and sector discs, corresponding to the different configuration of the diamond band, respectively consisting of a single ring or of a plurality of radial plates, arranged on the outer circumference of the steel core and arranged more or less close together.

[0006] In the current state of the art cutting discs are designed and made that, suitably combining the constructive parameters of the tool such as the type of grain of the abrasive part, the diameter, the thickness and the height of the diamond band, aim to obtain the best possible yield in terms of material worked.

[0007] The purpose of the present finding is that of making a diamond-tipped cutting disc that, during use, displays properties, such as greater resilience, elevated hardness, substantial abrasiveness and low wear, such as to make it, during use, highly innovative with respect to similar known products and very economically advantageous.

[0008] Such a purpose is obtained by making a diamond band that has the two side walls that, instead of being flat, as it is in current product, are equipped with shaped ridges that constitute the abrasive surface of the tool.

[0009] Specifically, such ridges consist of surface portions that are arranged, with modular progression, circumferentially and that extend on an entire or both side walls of the diamond band.

[0010] Such ridges are obtained through recesses that, substantially, can be grouped into two types of configurations: circumferential rings, arranged concentrically on the side wall of the diamond band and a plurality of plates, arranged substantially transversally with respect to the circumference of the aforementioned rings.

[0011] In detail, the plates are arranged rectilinear to each other, with directions that are preferably radial or

lying on lines tangent to a concentric and inner circumference with respect to the circumference that constitutes the outer perimeter of the aforementioned band, i. e. with the outer perimeter of the cutting disc.

[0012] The ridges can have the sides straight or, preferably, inclined, so as to make sections diverging towards the outside and the plates, moreover, can be shaped with a circular and/or in any case polyhedral outer profile.

[0013] Thanks to the presence of such ridges the "polishing" and "greasing" effects of the abrasive ring are substantially delayed and, in wet cutting, they advantageously cause the cooling water cushion that forms on the work surface to be broken.

[0014] Laboratory tests and experiments have highlighted the fact that, with the use of the discs equipped with the shaped ridges according to the finding, a better cutting ability and lower consumption (up to 50%) is achieved, with respect to similar tools that use the same type of abrasion to make the diamond band with flat side surfaces.

[0015] The finding shall be illustrated better through the description of some possible embodiments thereof, given as a non-limiting example, with the help of the attached tables of drawings, where:

- figs. 1 to 4 (table I) respectively represent overall and detailed views of a cutting disc according to the finding, in a first possible configuration thereof;
- figs. 5 to 8 (table II) respectively represent overall and detailed views of a cutting disc according to the finding, in a second possible configuration thereof;
- figs. 9 to 12 (table III) respectively represent overall and detailed views of a cutting disc according to the finding, in a third possible configuration thereof.

[0016] As can be seen in the figures, a so-called diamond-tipped cutting disc, wholly indicated with reference numeral 1, consists of a central disc or core 2 made from steel, equipped with the hole 3 for the attachment to the machine tool and the diamond band or ring 4, welded on the outside.

[0017] The ring 4, made from a known abrasive material, is characterised in that its side surface 5 is equipped with shaped ridges 6 that, when in work, help the cutting operation, constituting in themselves the abrasive surface of the disc.

[0018] As can be seen in figs. 1 to 4 in a first possible embodiment the shaped ridges, wholly indicated with reference numeral 6 and projecting from the wall 5, comprise plates 8.1, with circular profile, contained inside the border rings 7.

[0019] Alternatively, as can be seen in figures 5 to 8, in a second possible embodiment the shaped ridges, wholly indicated with reference numeral 6 and projecting from the wall 5, comprise rings 7, arranged circumfer-

entially and concentrically on the wall 5, which intersect the plates 8.2, with a substantially quadrilateral profile.

[0020] Substantially, as can be seen in figs. 9 to 12, with the superposition of the two possible embodiments, a third embodiment is obtained in which, thanks to the mutual interference between the rings 7 and the plates 8.1 and 8.2, an abrasive surface 5 is obtained equipped with shaped ridges 6, which allow a substantially advantageous cutting action such as to completely satisfy all of the processing requirements required for cutting and chamfering all types of stone and ceramic materials.

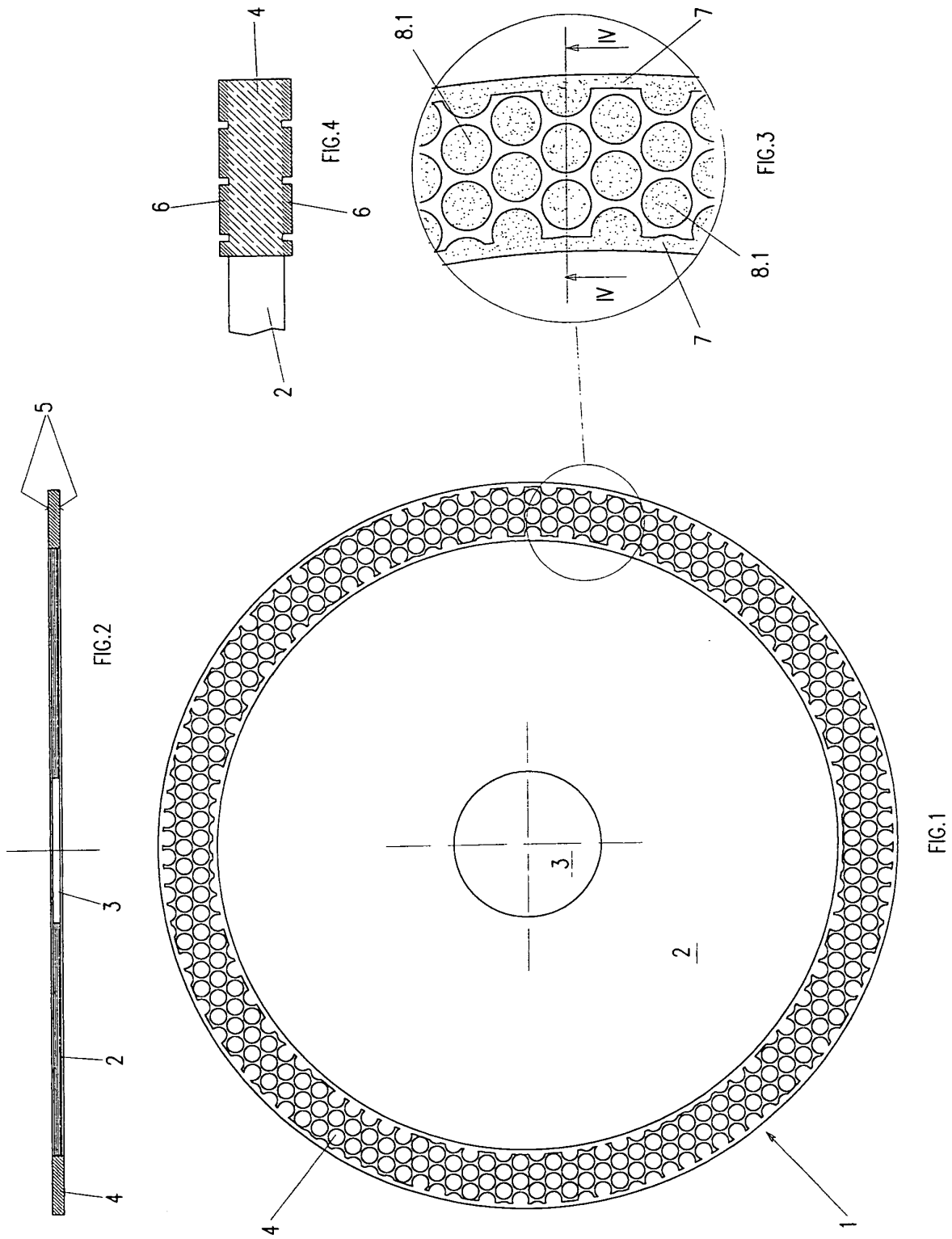
[0021] Of course, further embodiments of the diamond ring are possible, in which the side walls 5 have projections configured even in a substantially different way to those illustrated and described, without for this reason departing from the scope of the claims, defined hereafter.

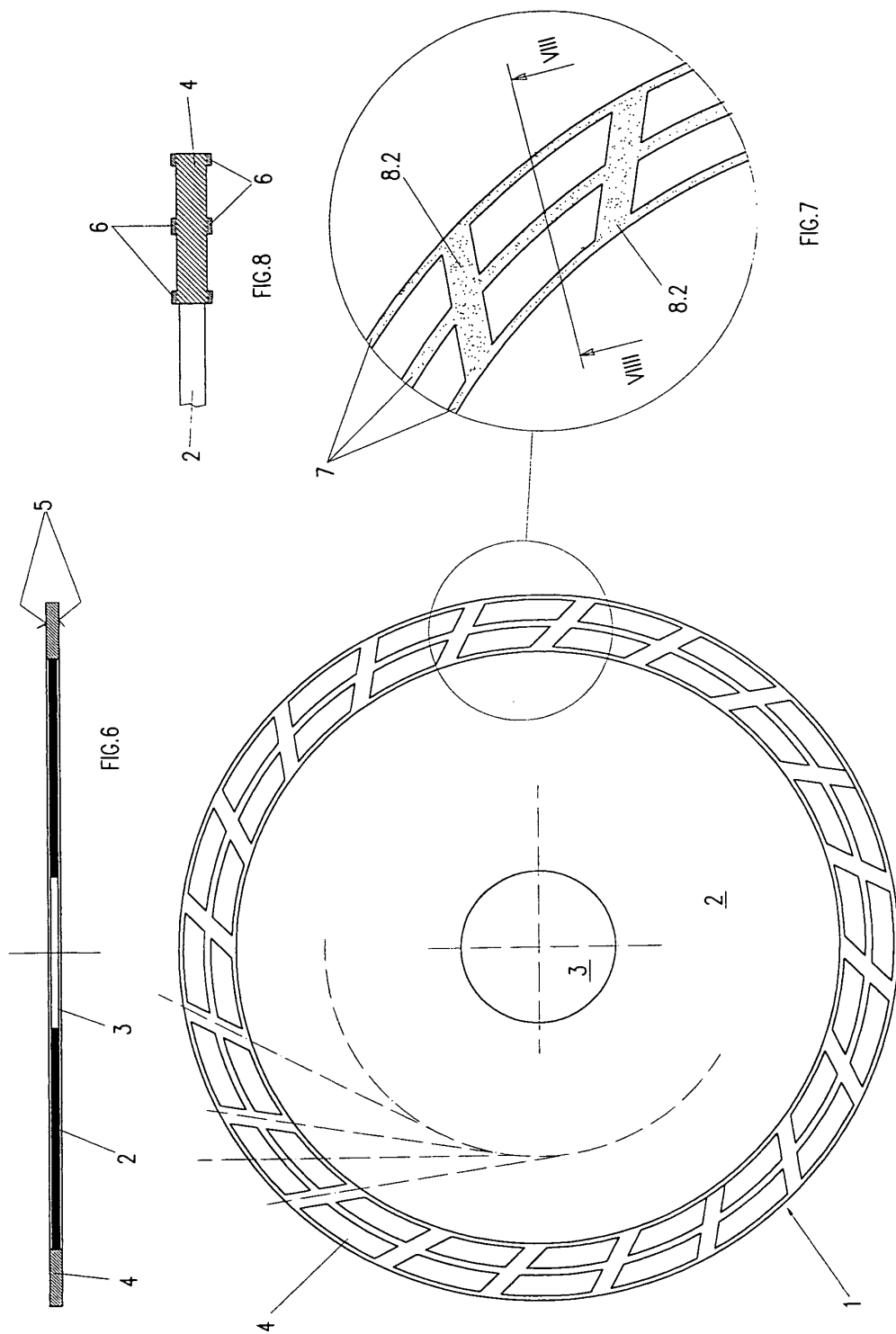
Claims

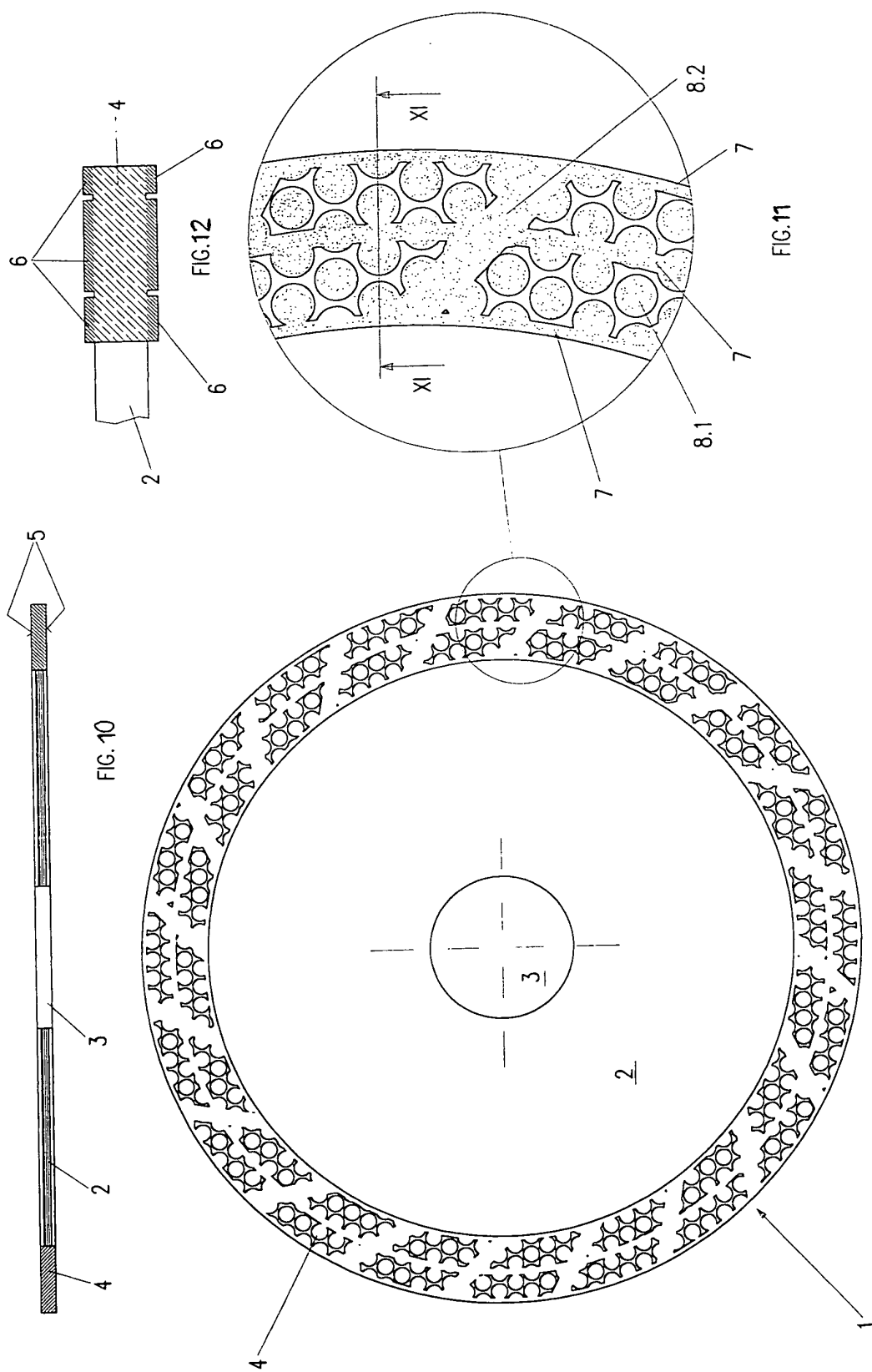
1. DIAMOND-TIPPED CUTTING DISC, to be used for cutting or chamfering different products, from natural stones to ceramics, from granite and marble floor tiles to single fired products and from fine compact clinker bricks to hard porcelain stoneware, said disc consisting of a central disc or core (2) made from steel, equipped with the hole (3) for the attachment to the machine tool and a diamond band or ring (4), arranged on the outside with respect to the first, **characterised in that** the diamond band (4) has shaped ridges (6) on a side wall (5) or on both of the side walls, said ridges constituting the abrasive surface of the tool.
2. DIAMOND-TIPPED CUTTING DISC, according to claim 1, **characterised in that** the ridges consist of surface portions that are arranged, with modular progression, circumferentially.
3. DIAMOND-TIPPED CUTTING DISC, according to claim 2, **characterised in that** the ridges occupy the entire wall of the diamond band.
4. DIAMOND-TIPPED CUTTING DISC, according to claim 3, **characterised in that** the ridges (6) are obtained through recesses that define two types of configurations: circumferential rings (7), arranged concentrically on the side wall of the diamond band and a plurality of plates (8), arranged substantially transversally with respect to the circumference of the aforementioned rings.
5. DIAMOND-TIPPED CUTTING DISC, according to claim 4, **characterised in that** the ridges (6) have straight sides.
6. DIAMOND-TIPPED CUTTING DISC, according to

claim 4, **characterised in that** the ridges (6) have inclined sides, so as to make sections diverging towards the outside.

7. DIAMOND-TIPPED CUTTING DISC, according to claim 4, **characterised in that** the plates (8) have a circular profile (8.1).
8. DIAMOND-TIPPED CUTTING DISC, according to claim 4, **characterised in that** the plates (8) have a polyhedral profile, preferably quadrilateral (8.2).
9. DIAMOND-TIPPED CUTTING DISC, according to one or more of the previous claims, **characterised in that** the diamond band (4) has the surface (5) equipped with ridges (6) resulting from the mutual intersection between the circumferential rings (7) and of the radial plates (8.1, 8.2).









European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 05 00 2335

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 April 2005	Examiner Eder, R
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 05 00 2335

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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