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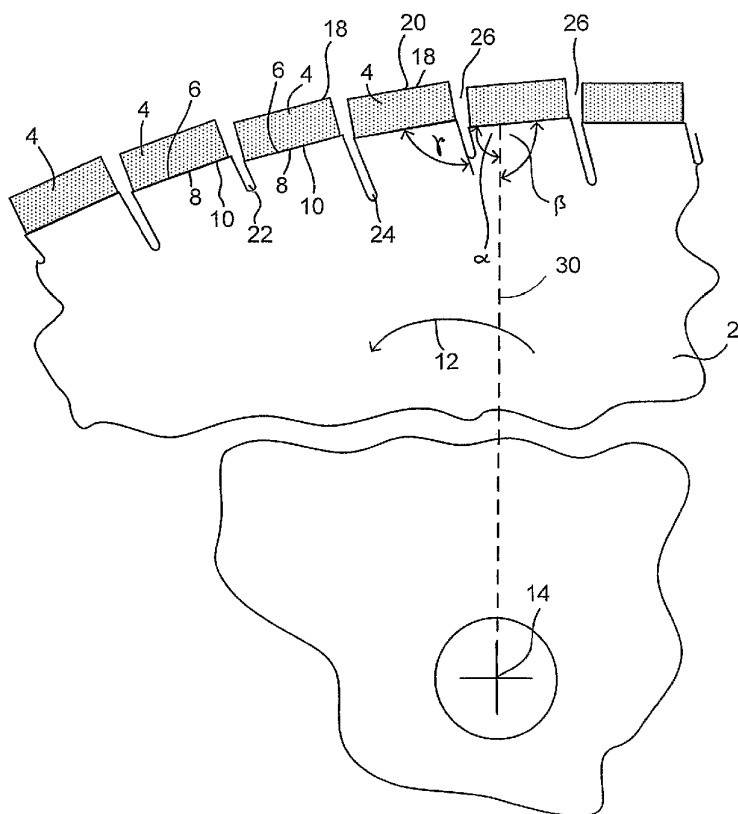
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- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

[Continued on next page]

(54) Title: CUT-OFF WHEEL



(57) Abstract: The invention relates to an abrasive cutoff wheel which comprises a central disk (2) and a plurality of abrasive segments (4) which subtend between themselves a straight bonding line (10) that slants inward along a predetermined disk direction of rotation (12) toward the wheel center of rotation (14), deviating from a tangent line. Seen in wheel sideview, the radially outer surface (18) of each abrasive segment (4) preferably also is straight and slants inward along the wheel direction of rotation (12) toward the wheel center of rotation (14), deviating from a tangent line.



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CUT-OFF WHEEL

The present invention relates to an abrasive cutoff wheel to cut off building materials, in particular concrete, bricks, roof tiles, and to cut apart natural stone.

A reference herein to a patent document or other matter which is given as prior art is not to be taken as an admission that that document or matter was, in Australia, known or that the information it contains was part of the common general knowledge as at the priority date of any of the claims.

An abrasive cutoff wheel of this kind is disclosed in the German patent document DE 44 24 093 C2. It comprises both a central disk and segments. The segments are undetachably affixed by laser welding to the central disk circumference which is continuous or which is sub-divided by circumferential clearances into projecting tabs. The line connecting the segments and the outer contour of the central disk runs tangentially to the central disk origin or is constituted by two corresponding tangential straight lines for each segment, said two lines subtending, in roof-like manner, between them an angle of less than 180°.

The objective of the present invention is abrasive cutoff-wheel improvement.

According to the present invention, there is provided An abrasive cutoff wheel comprising a central disk and a plurality of abrasive segments distributed along a circumference of the central disk on the same number of disk junction faces that are straight as seen in wheel side-view and that comprise each segment junction face which is undetachably affixed to only one of the disk junction faces, wherein the abrasive cutoff wheel is driven into a predetermined direction of rotation, in that each disk junction face and the segment junction face affixed to it when seen in wheel sideview subtend a straight bonding line which, in the predetermined direction of rotation slopes inward toward the wheel center of rotation, deviating from a tangent line, wherein the radially outer surface of each abrasive segment is straight as seen in wheel sideview and defines a straight surface line which slants inward in the direction of the wheel center of rotation, deviating from a tangent line, and

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wherein the surface line and the bonding line of the particular abrasive segment are mutually parallel.

5 The invention can advantageously offer improved distribution of forces at the bonding line between the abrasive segments and the central disk, allowing higher loading on the abrasive cutoff wheel. The present invention can further advantageously convert a substantial portion of the shearing forces

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arising in the dry severing method into compressive forces that are applied in the bonding line between the abrasive segments and the central disk.

In one preferred embodiment of the present invention, the radially outer surface of each abrasive segment is straight when seen in wheel side view and this outer surface of each segment defines a surface line sloping inward in the direction of disk rotation toward the center of the wheel, deviating from a tangent line. As a result, when the abrasive cutoff wheel is used for the first time, only a minute part of each abrasive cutoff segment makes contact with the work piece to be cut, and thereby allows automatically honing the abrasive segments during first time use.

The abrasive segments can be composed of, at least in their top zones, an imbedding material containing imbedded diamond elements illustratively sintered into said imbedding material. Before an abrasive cutoff wheel is used for the first time, the diamond elements do not protrude from the imbedding material, so that the abrasive cutoff wheel must be honed before or by means of first use to assure the diamond elements shall project above the imbedding material.

In another preferred embodiment of the present invention, the surface line and the bonding line of the particular abrasive segment are always mutually parallel.

In a further preferred embodiment of the present invention, the central disk is fitted with one circumferential notch between all adjoining disk junction faces. In this manner material abraded from a workpiece more easily escapes from the notch formed in the workpiece.

The present invention is elucidated below by means of a preferred embodiment and in relation to the appended drawing.

Fig. 1 is a sector-like cutaway of a sideview of an abrasive cutoff wheel of the invention.

The abrasive cutoff wheel of the invention shown in Fig. 1 substantially includes a circular central disk 2 and a plurality of abrasive segments 4. The abrasive segments 4 are distributed preferably symmetrically along the full outer circumference of the central disk 2 on the same plurality of straight (as seen in wheel side-view) disk junction faces 6 and each segment is fitted with its own segment junction face 8 that is undetachably joined, for instance by

brazing, welding or laser processing, to one of the disk junction faces 6. The central disk 2 preferably is made of steel.

The abrasive cutoff wheel of the invention does its cutoff work in a predetermined direction of rotation 12.

5 Each disk junction face 6 and the segment junction face 8 joined to it determine between them a straight bonding line 10 (as seen in wheel sideview), this bonding line sloping inward along the predetermined direction of wheel rotation 12, relative to wheel center of rotation 14, that is, deviating from a line tangent to the wheel center of rotation. A conceptual radial line from the
10 wheel center of rotation 14 to the center (in sideview) of a disk junction face 6 subtends an angle with said surface 6 that deviates from 90° .

The radially outer surface 18 of each abrasive segment 4 is straight when seen in wheel sideview and defines a straight surface line 20 which as seen in wheel sideview slants in the direction of rotation of the wheel toward
15 the wheel center of rotation 14, deviating from a tangent line. The surface line 20 and the bonding line 10 of the particular abrasive segment 4 preferably are mutually parallel.

Between every two mutually adjacent disk junction faces 6, the central disk 2 is fitted with a circumferential notch 22 respectively 24.

20 In the preferred embodiment shown in Fig. 1, the circumferential notches 22 and 24 differ in depth, a deeper circumferential notch 24 and a shallower circumferential notch 22 alternating along the circumference. The configuration of circumferential notches of different depths lowers the danger of cracks in the central disk.

25 A spacer gap 26 is subtended in all embodiment modes of the invention between the circumferentially sequential abrasive segments 4 to facilitate eliminating ground material when grinding the workpiece.

The bonding line 10 and a radial line 30 subtend an angle deviating from 90° at least at the longitudinal center point of the disk junction face 6,
30 preferably however also at any other point along the length of the segment junction face 8. As a result the angle α situated in the predetermined wheel direction of rotation 12 in front of the radial line 30 is less than 90° and the angle β situated behind is larger than 90° .

The circumferential notches 22 and 24 preferably are slots open at the outer central disk circumference. Said notches subtend a defined angle γ preferably larger than 90° with the connecting line 10, respectively the disk junction surface 6, preceding them in the wheel's direction of rotation 12.

- 5 The invention described herein is susceptible to variations, modifications and/or additions other than those specifically described and it is to be understood that the invention includes all such variations, modifications and/or additions which fall within the spirit and scope of the above description.

THE CLAIMS DEFINING THE PRESENT INVENTION ARE AS FOLLOWS:

1. An abrasive cutoff wheel comprising a central disk and a plurality of abrasive segments distributed along a circumference of the central disk on the same number of disk junction faces that are straight as seen in wheel side-view and that comprise each segment junction face which is undetachably affixed to only one of the disk junction faces,

wherein the abrasive cutoff wheel is driven into a predetermined direction of rotation, in that each disk junction face and the segment junction face affixed to it when seen in wheel sideview subtend a straight bonding line which, in the predetermined direction of rotation slopes inward toward the wheel center of rotation, deviating from a tangent line,

wherein the radially outer surface of each abrasive segment is straight as seen in wheel sideview and defines a straight surface line which slants inward in the direction of the wheel center of rotation, deviating from a tangent line, and

wherein the surface line and the bonding line of the particular abrasive segment are mutually parallel.

2. An abrasive cutoff wheel as claimed in claim 1, wherein the central disk comprises a circumferential notch at every two adjacent disk junction faces.

3. Abrasive cutoff wheel as claimed in claim 2, wherein the depths of the circumferential notches are different, a deeper circumferential notch and a shallower circumferential notch alternating in the wheel circumferential direction.

4. An abrasive cutoff wheel according to the embodiment substantially as herein described and illustrated.

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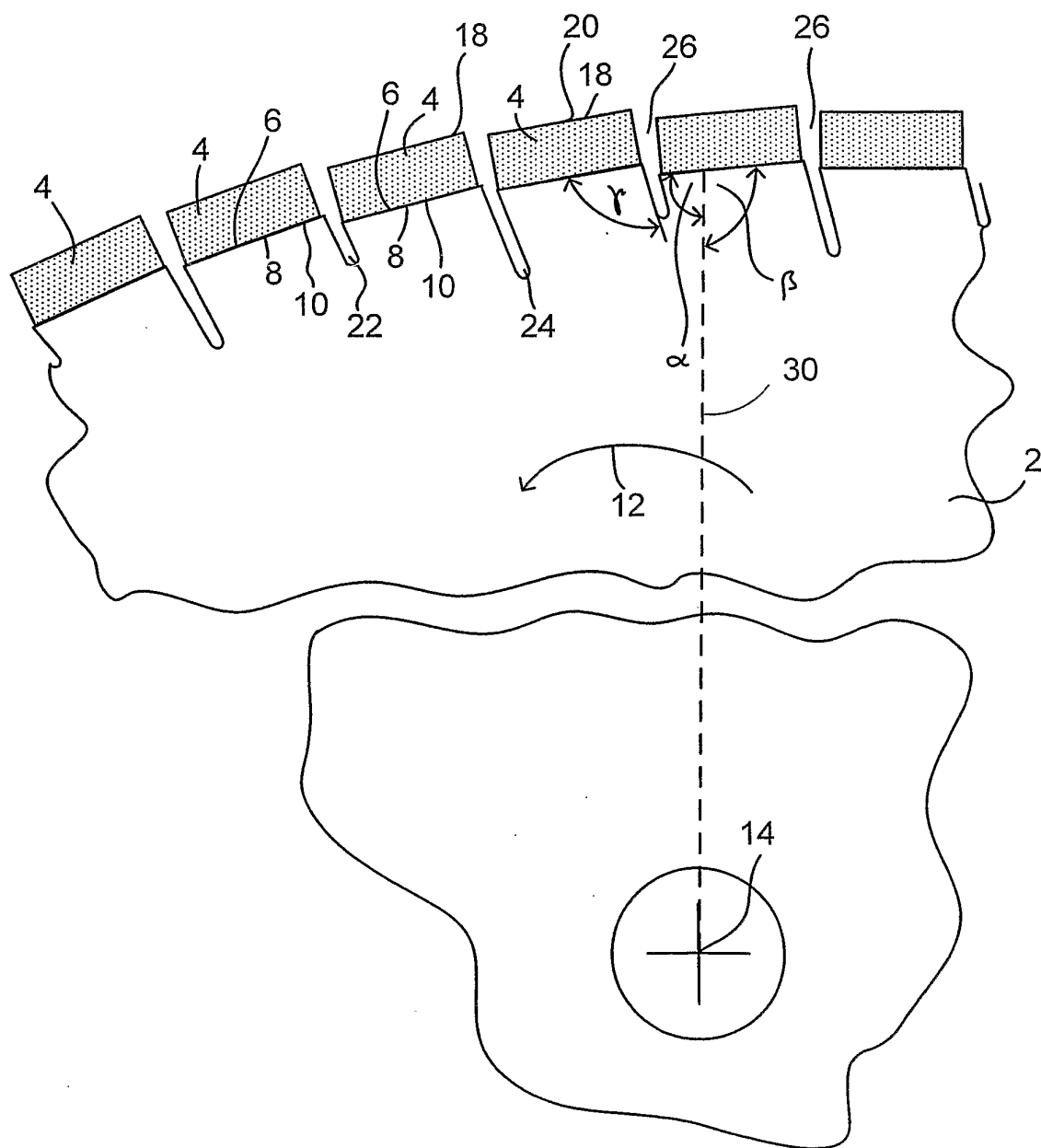


Fig. 1