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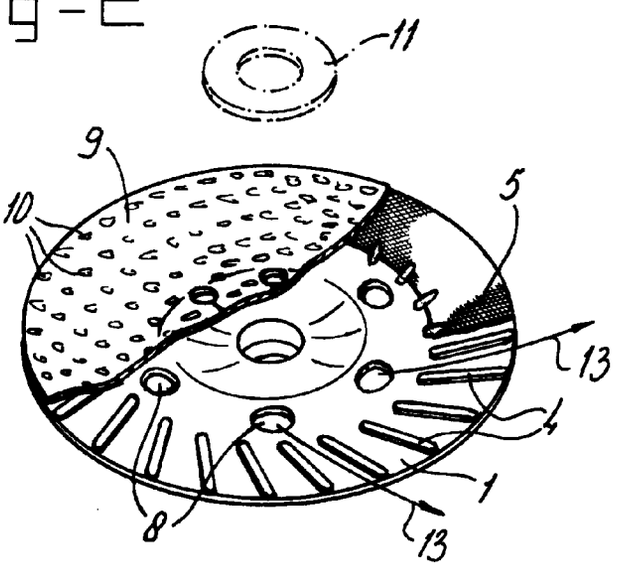
(54) Backup pad for a flexible grinding disc

(57) A backup pad for supporting a flexible grinding disc, comprises a hub which is to be connected to a rotary spindle, as well as a concentric support disc having a support face onto which the grinding disc is to be supported. The support disc is provided with ventilating holes which open out on the supporting face, for providing an air flow between the facing surfaces of support disc and grinding disc. Also, the support face of the support disc is provided with support protrusions for supporting the grinding disc, between which protrusions (4) an air gap (12) is available.

Fig-2



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Description

The invention is related to a backup pad for supporting a flexible grinding disc, which pad comprises a hub which is to be connected to a rotary spindle, as well as a concentric support disc having a support face onto which the grinding disc is to be supported.

The purpose of such backup pad is to support the grinding disc. It should have a desired stiffness, so as to be able to press the grinding disc with the sufficient force against the object to be ground. Nevertheless, the backup pad should also be able to flex somewhat under the service loads excited thereon.

In the case of conventional grinding discs based on silicon carbide or aluminium oxide, the state of the art backup pads behave satisfactorily. Problems arise however when superabrasive grinding discs are applied. The grinding surface thereof comprises diamond particles. Their cutting action is a few times higher than the cutting action of the traditional grinding discs.

As a result, these superabrasive grinding discs generate a much higher temperature (e.g 200-250 degrees C). The known backup pads are not resistant to such temperatures, and will melt and deform readily under such conditions. Subsequently, the superabrasive grinding disc will be damaged due to lack of support by the backup pad, entailing explosions or parts breaking away.

Even in cases where the traditional backup pads are not destroyed, they nevertheless become to soft due to the fact that they are made of plastics, rubber, polyurethan etc.

The object of the invention is to provide a backup pad which lacks these disadvantages. This object is achieved in that the support disc is provided with ventilating holes which open out on the support face, for providing an air flow between the facing surfaces of support disc and grinding disc.

The backup pad according to the invention has in general the same strength and stiffness properties as the traditional backup pads. Because of the fact however that the backup-pad according to the invention is actively cooled by the air flow which is generated in service, the temperature thereof may be kept within acceptable limits, even under extreme loading conditions such a sustained grinding action under high pressure forces.

The supporting face of the support disc may be carried out with support protrusions for supporting the grinding disc, between which protrusions an airgap is available. The support protrusions delimit channels through which the air flow may escape towards the outer edge of the discs.

An excellent cooling effect is also obtained in case the protrusions are are burl-shaped, nodular shaped, or cylindrically shaped.

Furthermore, the support protrusions may be covered with a layer of metal mesh material, which layer supports the grinding disc. In this embodiment, sagging of the flexible disc between the protrusions, which sagging would render the grinding surface partly inoperative, can be avoided.

According to the invention, propelling means may be provided for inducing an air flow through the ventilating holes. These propelling means may simply take the form of obliquely shaped holes, which "scoop" the air and propel it through the openings and further through the above channels.

In a preferred embodiment, the propelling means comprise a fan with fan blades which are tangentially oriented with respect to the hub, and which rest against the support disc. The ventilating holes may be situated between the fan blades.

The backup pad according to the invention will be described further with reference to the following figures.

Figure 1 shows a view in perspective, on one side of the backup pad.

Figure 2 shows a view in perspective, partly taken away, of the backup pad with grinding pad, from the other side.

The backup pad as shown in figure 1 comprises a disc 1 of plastic, which has an integrated hub 2 which can be connected to the shaft 3 (shown in dotted lines) of a grinding machine.

As shown in figure, the other side of the backup pad is provided with a number of radially/tangentially oriented support ridges 4, on top of which a layer of mesh material 5 has been connected. For instance, the plastic material 4 of the ridges may have been molten a little bit, such that it protrudes into the meshes of the mesh material 5.

On the side shown in figure 1, the backup pad carries propelling means 6 carried out as a fan with six fan blades 7.

Moreover, the backup pad has ventilating holes 8, which each on the one hand open out between a pair of fan blades 7, and which on the other side (see figure 2) open out within the circle described by the support ridges 4.

On top of the side shown in figure 2, in particular on top of the supporting mesh material 5, a grinding disc 9 is supported, carrying deposits 10 with highly abrasive material.

By means of connecting nut 11 (shown in dotted lines), the grinding disc 9 is connected to the drive shaft 3 shown in figure 1.

Due to the fact that the grinding disc 9 lies on top of the mesh material 5 and the support ridges 4, an air gap 12 is maintained between the backup pad 1 and the grinding disc 9.

In service, the fan blades 7 of the propelling means 6 are brought in rotation, whereby they propel the environmental air through the ventilating holes 8, in between the backup pad 1 and the grinding disc 9: see the arrows 13. Thereby, an increased cooling effect for the grinding disc 9 is obtained. Moreover, the grinding disc

9 is supported firmly but also between the support ridges 4, by the mesh material 5 covering these ridges 4. Thus, the grinding action of the grinding disc is not impaired by the air gap 12.

Claims

1. Backup pad for supporting a flexible grinding disc (9), which pad comprises a hub (2) which is to be connected to a rotary spindle (3), as well as a concentric support disc (1) having a support face onto which the grinding disc (9) is to be supported, characterised in that the support disc (1) is provided with ventilating holes (8) which open out on the supporting face, for providing an air flow between the facing surfaces of support disc (1) and grinding disc (9).

2. Backup pad according to claim 1, wherein the support face of the support disc (1) is provided with support protrusions (4) for supporting the grinding disc (9), between which protrusions (4) an air gap (12) is available.

3. Backup pad according to claim 2, wherein the support protrusions (4) are covered by a layer of metal mesh material (5), which layer (5) supports the grinding disc (9).

4. Backup pad according to claim 2 or 3, wherein the protrusions (4) are generally radially oriented.

5. Backup pad according to claim 2 or 3, wherein the protrusions are burl-shaped, nodular shaped, or cylindrically shaped.

6. Claim according to claim 5, wherein the protrusions have a diameter of 1 to 4 mm.

7. Backup pad according to any of the preceding claims, wherein propelling means (6, 7) are provided for inducing an air flow through the ventilating holes (8).

8. Backup pad according to claim 7, wherein the propelling means (6) comprise a fan with fan blades (7) which are tangentially oriented with respect to the hub (2), and which rest against or are connected to the support disc (1).

9. Backup pad according to claim 8, wherein the ventilating holes (8) are situated between the fan blades (7).

10. Backup pad according to claim 8 or 9, wherein the fan blades (7) are covered by a cover disc at their side facing away from the support disc (1).

fig-1

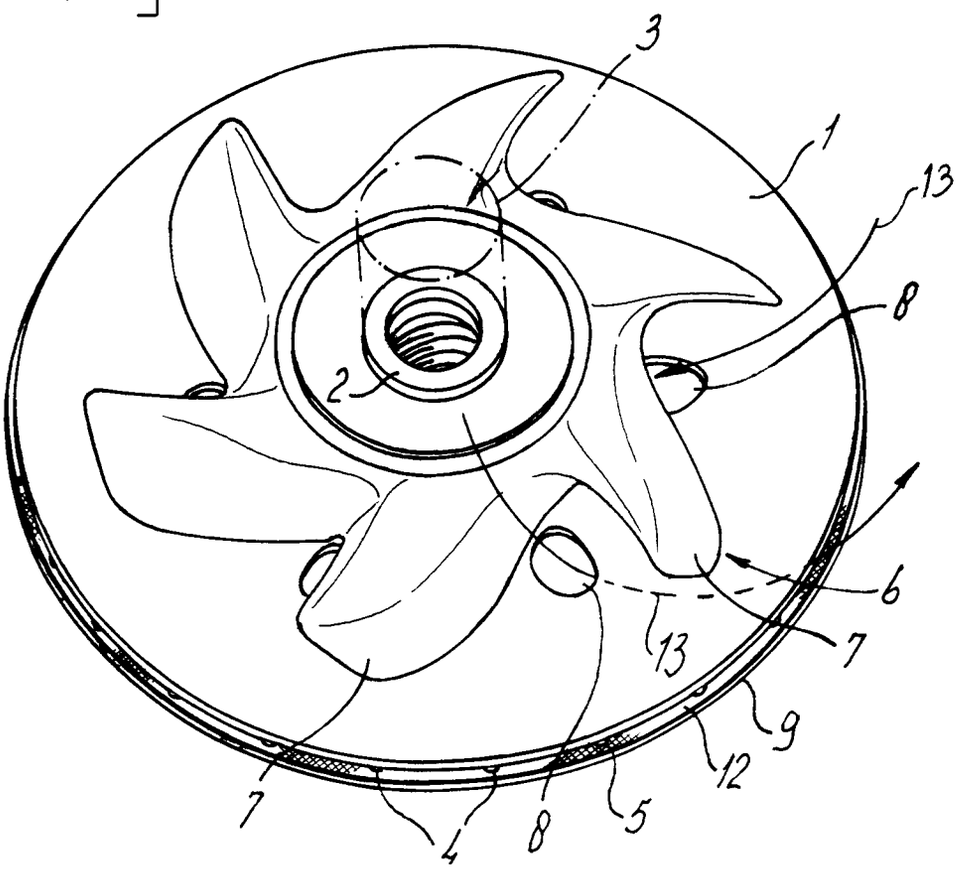
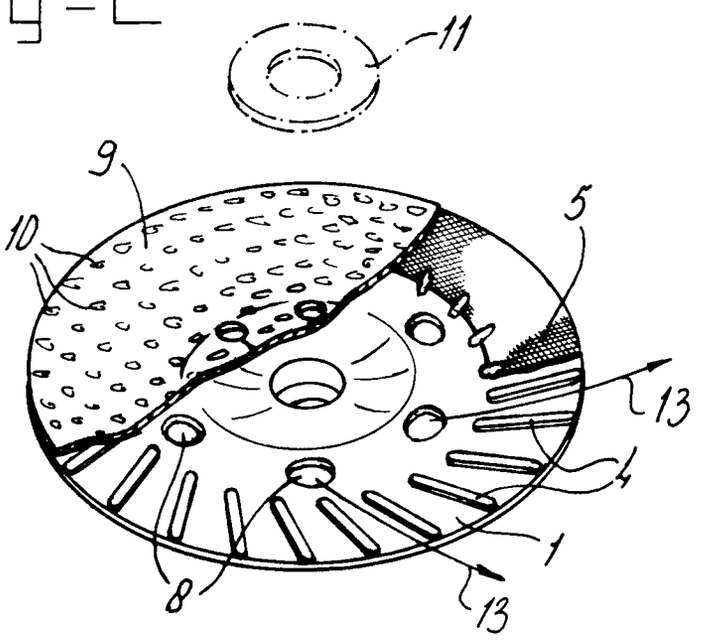


fig-2



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EUROPEAN SEARCH REPORT

Application Number
EP 96 20 2844

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 3 754 359 A (SCANDALETOS L) 28 August 1973 * the whole document *	1,2,4,5, 7-10	B24D9/08
X	WO 93 08955 A (FABRITIUS HANS JOSEF) 13 May 1993 * abstract; figures *	1,2,4,5, 7	
X	FR 2 701 417 A (CIFAP SA) 19 August 1994 * abstract; figures *	1	
A	US 2 599 952 A (WILFRED STRAYER) 10 June 1952 * claim; figures *	7,8,10	
A	US 3 187 475 A (E.J. SOPCAK & AL.) 8 June 1965		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)
B24D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12 March 1997	Eschbach, D

CATEGORY OF CITED DOCUMENTS

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