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(54) **A disc for supporting abrasive material, for electric tools**

Scheibe zum Halten von Schleifmittel für elektrische Werkzeuge

Disque pour supporter un matériau abrasif, pour outils électriques

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(73) Proprietor: **BDL S.r.l.**
42124 Reggio Emilia (IT)

(72) Inventor: **Losi, Matteo**
42122 Reggio Emilia (IT)

(74) Representative: **Colò, Chiara**
BUGNION S.p.A.
Via P. Borsellino, 22
42124 Reggio Emilia (IT)

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Description

[0001] The invention relates to a disc for electric tools, for supporting abrasive material.

[0002] These types of discs are usually employed in industry or in the do-it-yourself field in combination with electric tools such as drills, sanders, millers and the like, to perform abrasive actions on surfaces.

[0003] These abrasive discs for electric tools comprise an annular surface destined to engagedly receive abrasive material, such as for example sandpaper of any grain.

[0004] An example of abrasive material used is given by little blades arranged partially superposed on one another, such that each blade exhibits a free edge which is substantially aligned with an ideal radius developing from the centre of the disc and going up to the edge thereof.

[0005] The blades are stably constrained to the discs by an adhesive material, for example a layer of resin, or are inserted and constrained in channels afforded on the annular portion of the disc.

[0006] A cup-shaped portion develops internally of the annular portion of the disc which is destined to receive the abrasive material, which cup-shaped portion exhibits a hole at a central position of the disc.

[0007] The shaft of the electric tool chuck is inserted in the hole, to constrain the disc to the tool.

[0008] In particular, the chuck shaft is usually conformed such that it exhibits a change in section which defines an abutment having greater dimensions than the hole in the disc.

[0009] The disc is rested on the abutment and the portion of shaft passing through the hole of the disc is engaged by a locknut; thus the disc is coupled to the electric tool.

[0010] The cup-shaped portion of the disc is necessary to ensure that the locknut does not extend (for obvious reasons) beyond the active surface of the disc, i.e. it does not extend beyond the abrasive surface defined by the abrasive material.

[0011] From the above it can be understood that the cup-shaped portion is conformed such as to present the concavity thereof (the inside of the cup) arranged on the same side as the surface of the annular portion destined to engage with the abrasive material.

[0012] An example of prior art disc is disclosed in WO 9853955, wherein a ring-shaped abrasive disc has a series of tabs around the disc which are used to secure it to a backing plate. The disc includes slots arranged around its periphery for receiving the tabs. The backing plate may also include an impeller to blow air over the abrasive disc to provide cooling or remove swarf from the work surface.

[0013] The discs for electric tools for supporting abrasive material in the prior art as briefly described herein above exhibit some drawbacks during use thereof.

[0014] In particular, when the disc having abrasive material is mounted on the electric tool and used, the dust produced following the abrading operations tends to clog the abrasive material, considerably reducing the abrasive capacity thereof.

[0015] During rotation of the disc a part of the dust produced strikes the cup-shaped portion and collects in the concavity thereof.

[0016] By effect of the rotation of the disc, the powder collected in the cup-shaped portion is expelled therefrom in a radial direction towards the external periphery of the disc.

[0017] Thus the dust produced and collected in the cup-shaped portion strikes the abrasive material and deposits thereon, reducing its functionality.

[0018] In this context, the technical aim underpinning the present invention is to provide a disc for electric tools, for the supporting of abrasive material, which obviates the drawbacks in the above-mentioned prior art.

[0019] In particular, an aim of the present invention is to provide a disc for electric tools for supporting abrasive material which is able to guarantee an ideal functioning condition of the abrasive material.

[0020] The set technical aim and the specified objective are substantially attained by a disc for electric tools for supporting abrasive material, comprising technical characteristics as set out in claim 1. Dependent claims 2 to 7 relate to preferred embodiments of the invention.

[0021] Further characteristics and advantages of the present invention will more clearly emerge from the following non-limiting description of a preferred but not exclusive embodiment of a disc for electric tools for supporting abrasive material, as illustrated in the accompanying figures of the drawings, in which:

figure 1 is a perspective view of the disc for electric tools for supporting abrasive material of the present invention;
figure 2 is a front view of the disc of figure 1;
figure 3 is a rear view of the disc of figure 1; and
figure 4 is a lateral view of the disc of figure 1.

[0022] With reference to the figures of the drawings, 1 denotes in its entirety a disc for electric tools for supporting abrasive material, according to the present invention.

[0023] The disc 1 comprises an annular portion 2 destined to engagingly receive abrasive material (not illustrated).

[0024] The annular portion 2 comprises a first surface 3 and a second surface 4 opposite the first surface 3.

[0025] Both the surfaces 3, 4 are substantially flat and have an annular development.

[0026] The abrasive material is constrained to the first surface 3, preferably with the aid of an adhesive material, for example a resin.

[0027] As shown in figures 1 and 2, the first surface 3 of the annular portion comprises a plurality of circular recesses 5 which are reciprocally concentric in order to facilitate the constraining of the abrasive material to the disc 1.

[0028] It is stressed that the abrasive material which can be constrained to the annular portion 2 can be of any kind.

[0029] Preferably abrasive material of a sheet-form or flat-form is constrained to the annular portion 2, such that each sheet superposes an adjacent one, creating a crown of abrasive material superposed on the annular portion 2. The disc 1 further comprises a cup-shaped portion 6 (illustrated in figure 1 and also visible in figure 4) which develops internally of the annular portion 2.

[0030] The cup-shaped portion 6 comprises a bottom wall 7 and a lateral wall 8 which connects the bottom wall 7 and the annular portion 2.

[0031] The bottom wall 7 has a substantially flat development and develops substantially parallel to the annular portion 2, as illustrated clearly in figure 4.

[0032] The lateral wall 8 develops between the bottom wall 7 and the annular portion 2 and has a substantially truncoconical development, as illustrated in the figures.

[0033] According to the above description, the cup-shaped portion 6 has the concavity thereof facing towards the annular portion 2.

[0034] The bottom wall 7 of the cup-shaped portion 6 comprises a central hole 9 for passage of a shaft of a chuck of an electric tool, which engages the disc 1 to the electric tool.

[0035] The cup-shaped portion 6 comprises a plurality of openings 10 arranged on the lateral wall 8, as illustrated in the accompanying figures of the drawings.

[0036] In this way, the dust (i.e. the particles of abraded material produced during the use of the disc 1) which collects in the cup-shaped portion 6 during the use of the disc 1 is pushed, by effect of the rotation of the disc 1, towards the periphery of the cup-shaped portion 6 (i.e. towards the lateral wall 8 thereof) and exits from the cup 6 through the openings 10, preventing the dust from striking the abrasive material located on the annular portion 2 and clogging it to reduce its efficiency.

[0037] The openings 10 extend from the bottom wall 7 up to reaching the annular portion 2, in particular the second surface 4 thereof, such that the openings develop over the whole height of the cup-shaped portion 6 and ensure excellent disposal of the dust contained in the cup-shaped portion 6.

[0038] The height of the cup is the distance between the bottom wall 7 and a plane passing through the annular portion 2, in particular the first surface 3 of the annular portion, measured on a straight line which is perpendicular to the bottom wall 7.

[0039] As illustrated in the figures of the drawings, the openings 10 are identical to one another in dimensions and shape and are reciprocally equidistanced. The dust is in this way expelled from the cup-shaped portion 6 uniformly, i.e. not depending on the relative position of the dust inside the cup-shaped portion 6.

[0040] The disc 1 comprises a plurality of walls 11 (see figures 1 and 2) which develop between the hole 9 and the lateral wall 7 of the cup-shaped portion 7.

[0041] Each wall 11 physically separates an opening 10 from an adjacent opening 10.

[0042] In this way two adjacent walls 11 define, in combination with an opening 10 in the lateral wall 7 of the cup-shaped portion 6, a discharge channel 12, i.e. a space delimited by three walls and open at an end thereof.

[0043] The function of the walls 11 and therefore the discharge channels 12 is to direct the dust which accumulates in the cup-shaped portion 6 towards the openings 10, preventing the dust from freely circulating internally of the cup-shaped portion 6 before being discharged through the openings 10. Thus the walls 11 further increase the ability to discharge dust accumulated internally of the cup-shaped portion 6.

[0044] Each discharge channel 12 preferably exhibits transversal sections which progressively increase in size going from the hole 9 towards the lateral wall 8 of the cup 6.

[0045] By transversal sections of the discharge channels are meant the sections of the discharge channels along a perpendicular plane to the bottom wall 7 of the cup-shaped portion 6.

[0046] It has been noted that this type of development of the discharge channels 12 ensures optimum clearing of the dust through the openings 10 when the disc 1 is set in rotation.

[0047] The walls 11 defining each discharge channel 12 preferably have a spiral-portion development, such that each wall 11 behaves like a blade of an impeller of a centrifugal ventilator.

[0048] This means that the walls 11, in combination with the openings 10 and the bottom wall 7 of the cup-shaped portion 6 are able to deviate a flow of dust striking the disc 1 in perpendicular direction to the bottom wall 7 towards a substantially perpendicular direction to the incident dust flow direction, obviously when the disc is set in rotation.

[0049] The flow of dust, being deviated as described above, therefore strikes the openings 10 in the side wall 8 of the cup-shaped portion 6 and exits from the disc 1 without striking the first surface 3 (the surface which constrainingly receives the abrasive material) of the annular portion 2.

[0050] As illustrated in figure 1, the cup-shaped portion 6 further comprises a cylindrical element 13 emerging from the bottom wall 7.

[0051] The hole 9 is afforded in the cylindrical element 13 and is threaded.

[0052] In this way the hole 9, apart from allowing passage of the chuck shaft of the tool, further enables the shaft to be constrained to the disc 1 with no need for a locknut.

[0053] The chuck shaft screws directly into the threaded hole 9, constraining the disc 1 to the electric tool.

[0054] In particular, the threading of the hole 9 is such that during rotation of the disc 1 the forces acting on the disc 1 tend to rotate the disc 1 with respect to the chuck

shaft in the screwing direction of the disc on the chuck shaft. This characteristic ensures that during use the disc cannot loosen and free itself from the tool.

[0055] Note that the lack of a locknut, or rather the presence of the cylindrical element 13 bearing the threaded hole 9 enables the shape and dimensions of the discharge channels 12 to be optimised.

[0056] In accordance with the invention, the cylindrical element 13 exhibits a height which is substantially identical to the height of the lateral wall 8 of the cup-shaped portion 6, such that the cylindrical element 13 is abreast of the annular portion 2.

[0057] The height of the cylindrical element is measured in the same way as described above, to define the height of the cup-shaped portion 6.

[0058] The walls 11 are connected to an external surface of the cylindrical element, such that each discharge channel 12 is separated from the adjacent one.

[0059] Further, each wall 11 is of a height (measured as above-indicated in relation to the height of the cup-shaped portion 6) which is substantially identical to that of the cylindrical element 13 and the cup-shaped portion 6.

[0060] Note that the fact that the walls 11 are connected to the cylindrical element 13 (and thereefore there is no locknut) guarantees a synergic effect with the presence of the walls 11, enabling optimum discharge of the dust which accumulates in the cup-shaped portion 6.

[0061] As indicated herein above, the hole 9 enables a self-locking coupling between the disc and the tool.

[0062] A plurality of retaining teeth 14 are fashioned from the cylindrical portion 13, which teeth 14 are destined to retain a washer (not illustrated) for demounting the disc from the electric tool.

[0063] Once the disc 1 has been installed on the electric tool, the washer is screwed on the shaft of the chuck and is lodged in the retaining teeth 14, thus being solidly constrained to the disc 1.

[0064] To demount the disc it is necessary to unscrew the washer, thus also unscrewing the disc from the chuck shaft.

[0065] In the preferred embodiment the retaining teeth 14 are four in number and are equidistanced.

[0066] Further, the lower part of the cup-shaped portion 6, i.e. the part facing the opposite direction with respect to the concavity which houses the walls 11, comprises an annular undercut 15 which develops about the hole 9.

[0067] This undercut 15 has the function of self-centring the disc 1 on the chuck shaft.

[0068] The invention as described achieves the set aims.

[0069] The openings 10 enable the dust collected in the cup-shaped portion 6 to be discharged without striking the surface of the annular portion 2 destined to receive the abrasive material.

[0070] This ensures excellent efficiency of the abrasive material during the use of the disc.

[0071] Further, the walls 11 increase the efficiency of the dust discharge.

[0072] The collaboration between the openings 10 and the walls 11, apart from increasing the expulsion efficiency of the dust, advantageously generates a flow of air which aids cooling of the portion of material subjected to surface abrasion.

[0073] The conformation of the walls 11 and the absence of the locknut optimise efficiency of the walls 11.

[0074] The presence of the walls 11 increases the mechanical properties of the abrasive tool 1, giving it greater rigidity with respect to traditional tools in the prior art.

Claims

1. A disc for electric tools for supporting abrasive material, comprising:

   an annular portion (2) destined to retainingly receive abrasive material;
   a cup-shaped portion (6) which develops internally of the annular portion (2) and comprises a bottom wall (7) affording a central hole (9) for passage of a shaft of an electric tool chuck and a lateral wall (8) connecting the bottom wall (7) and the annular portion (2);
   the cup-shaped portion (6) comprising a plurality of openings (10) arranged on the lateral wall (8);
   characterised in that:
   a cylindrical element (13) emerges from the bottom wall (7); the hole (9) being afforded in the cylindrical element (13) and being threaded;
   said openings (10) extend from the bottom wall (7) to the annular portion (2);
   it comprises a plurality of walls (11) which develop between an external wall of the cylindrical element (13) and the lateral wall (8) of the cup-shaped portion (6), each wall (11) of the plurality of walls (11) separating an opening (10) from an adjacent opening (10), each wall (11) having a height substantially equal to that of the cylindrical element (13); and that
   two adjacent walls (11) define a discharge channel (12), in combination with the opening (10) of the lateral wall (8) of the cup-shaped portion (6).

2. The disc of claim 1, wherein each discharge channel (12) exhibits transversal sections having dimensions which increase in a direction going from the hole towards the lateral wall (8) of the cup-shaped portion (6).

3. The disc of claim 1 or 2 wherein the walls (11) defining each discharge channel (12) have a spiral portion development such as to realise a plurality of flow deviators.

4. The disc of claim 1, wherein the openings (10) are identical and equidistanced.

5. The disc of claim 1, wherein the cylindrical element (13) exhibits a height which is substantially equal to a height of the lateral wall (8) of the cup-shaped portion (6), such that the cylindrical element (13) is abreast of the annular portion (6).

6. The disc of claim 1, comprising a plurality of retaining teeth (14) emerging from the cylindrical element (13) destined to retain a washer for demounting the disc from the electric tool.

7. An abrasive tool, comprising a disc according to one of claims from 1 to 6, and an abrasive material applied on an annular portion of the disc.

Patentansprüche

1. Scheibe für elektrische Werkzeuge zum Halten von Schleifmittel, umfassend:

einen ringförmigen Abschnitt (2), der dazu bestimmt ist, Schleifmittel haltend aufzunehmen;
einen tassenförmigen Abschnitt (6), der sich im ringförmigen Abschnitt (2) entwickelt und eine Bodenwand (7), die ein zentrales Loch (9) für den Durchgang eines Schafts eines Spannfutters eines elektrischen Werkzeugs aufweist, und eine Seitenwand (8) umfasst, die die Bodenwand (7) und den ringförmigen Abschnitt (2) verbindet;
wobei der tassenförmige Abschnitt (6) eine Vielzahl von Öffnungen (10) umfasst, die an der Seitenwand (8) angeordnet sind;
dadurch gekennzeichnet, dass ein zylindrisches Element (13) aus der Bodenwand (7) heraustritt; das Loch (9) im zylindrischen Element (13) ausgebildet und mit einem Gewinde versehen ist; **dadurch gekennzeichnet, dass**:

sich die genannten Öffnungen (10) von der Bodenwand (7) zum ringförmigen Abschnitt (2) erstrecken;
sie eine Vielzahl von Wänden (11) umfasst, die sich zwischen einer Außenwand des zylindrischen Elements (13) und der Seitenwand (8) des tassenförmigen Abschnitts (6) entwickeln, wobei jede Wand (11) der Vielzahl von Wänden (11) eine Öffnung (10) von einer angrenzenden Öffnung (10) trennt, jede Wand (11) eine Höhe besitzt, die im Wesentlichen der des zylindrischen Elements (13) entspricht; und dadurch, dass zwei angrenzende Wände (11) einen Ablaufkanal (12) in Kombination mit der Öffnung (10) der Seitenwand (8) des tassenförmigen Abschnitts (6) definieren.

2. Scheibe nach Anspruch 1, wobei jeder Ablaufkanal (12) Querprofile aufweist, deren Abmessungen in eine Richtung vom Loch zur Seitenwand (8) des tassenförmigen Abschnitts (6) zunehmen.

3. Scheibe nach Anspruch 1 oder 2, wobei die Wände (11), die jeden Ablaufkanal (12) definieren, eine Entwicklung in Form eines Spiralabschnitts besitzen, sodass eine Vielzahl von Durchflussabweisern entsteht.

4. Scheibe nach Anspruch 1, wobei die Öffnungen (10) identisch sind und jeweils den gleichen Abstand zueinander aufweisen.

5. Scheibe nach Anspruch 7, wobei das zylindrische Element (13) eine Höhe aufweist, die im Wesentlichen einer Höhe der Seitenwand (8) des tassenförmigen Abschnitts (6) entspricht, sodass das zylindrische Element (13) neben dem ringförmigen Abschnitt (6) angeordnet ist.

6. Scheibe nach Anspruch 1, umfassend eine Vielzahl von Haltezähnen (14), die aus dem zylindrischen Element (13) hervortreten und dazu bestimmt sind, eine Unterlegscheibe zu halten, um die Scheibe vom elektrischen Werkzeug abzumontieren.

7. Schleifwerkzeug, umfassend eine Scheibe nach einem der Ansprüche von 1 bis 6 und ein Schleifmaterial, das auf einem ringförmigen Abschnitt der Scheibe aufgebracht ist.

Revendications

1. Disque pour supporter un matériau abrasif, pour outils électriques comprenant:

une section annulaire (2) destinée à recevoir et à contenir un matériau abrasif;
une section en forme de tasse (6) qui se développe à l'intérieur de la section annulaire (2) et comprend une paroi de fond (7) avec un orifice central (9) pour faire passer un axe d'un mandrin d'un outil électrique, et une paroi latérale (8) raccordant la paroi de fond (7) et la section annulaire (2) ;
la section en forme de tasse (6) comprenant une pluralité d'ouvertures (10) situées sur la paroi latérale (8) ;
caractérisé en ce qu'un élément cylindrique (13) dépasse de la paroi de fond (7) ; l'orifice (9) étant réalisé dans l'élément cylindrique (13) et étant fileté ; **caractérisé en ce que**:

lesdites ouvertures (10) vont de la paroi de fond (7) à la section annulaire (2) ;
il comprend une pluralité de parois (11) qui se développent entre une paroi extérieure de l'élément cylindrique (13) et la paroi latérale (8) de la section en forme de tasse (6), chaque paroi (11) de la pluralité des parois (11) séparant une ouverture (10) d'une ouverture adjacente (10), chaque paroi (11) présentant une hauteur pratiquement égale à celle de l'élément cylindrique (13) ; et **en ce que** deux parois adjacentes (11) déterminent un canal d'évacuation (12), conjointement avec l'ouverture (10) de la paroi latérale (8) de la section en forme de tasse (6).

2. Disque selon la revendication 1, dans lequel chaque canal d'évacuation (12) présente des parties transversales ayant des dimensions croissantes dans une direction allant de l'orifice à la paroi latérale (8) de la section en forme de tasse (6).

3. Disque selon les revendications 1 ou 2, dans lequel les parois (11) déterminant chaque canal d'évacuation (12), ont un développement en section de spirale de sorte à réaliser une pluralité de déviateurs de flux.

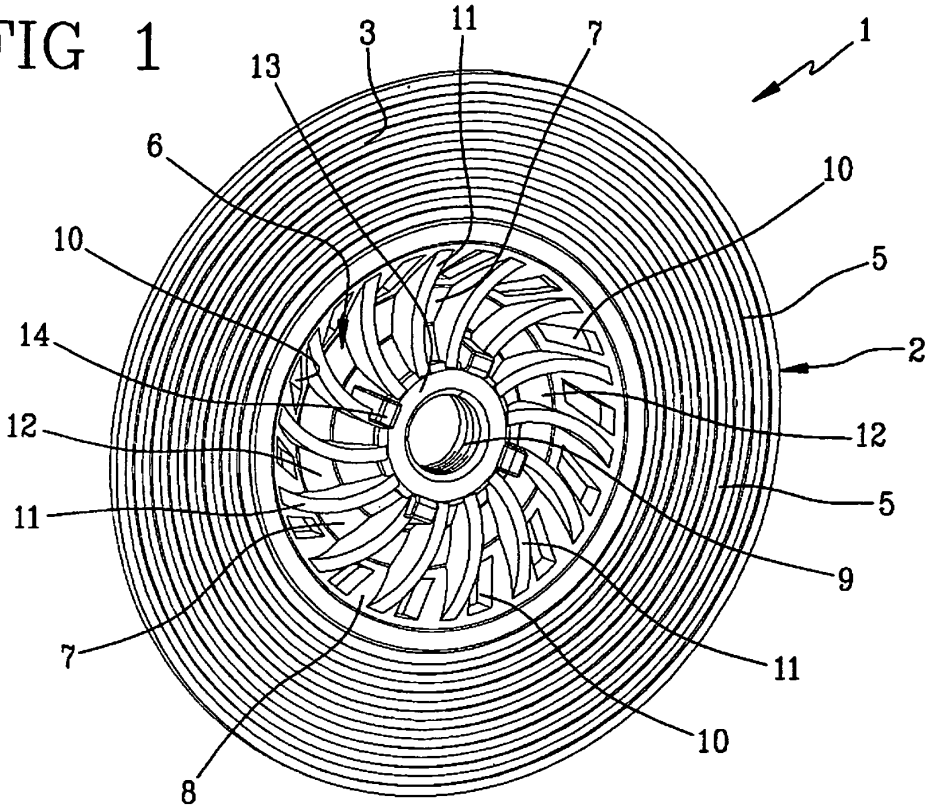
4. Disque selon la revendication 1, dans lequel les ouvertures (10) sont identiques et équidistantes.

5. Disque selon la revendication 1, dans lequel l'élément cylindrique (13) présente une hauteur qui est pratiquement égale à la hauteur de la paroi latérale (8) de la section en forme de tasse (6), de sorte que l'élément cylindrique (13) est de niveau avec la section annulaire (6).

6. Disque selon la revendication 1, comprenant une pluralité de dents de retenue (14) dépassant de l'élément cylindrique (13) destinées à retenir une rondelle pour démonter le disque de l'outil électrique.

7. Outil abrasif, comprenant un disque selon l'une des revendications 1 à 6, et un matériau abrasif appliqué sur une section annulaire du disque.

FIG 1


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11
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13
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10
10
5
14
2
12
12
11
5
9
7
11
10
8

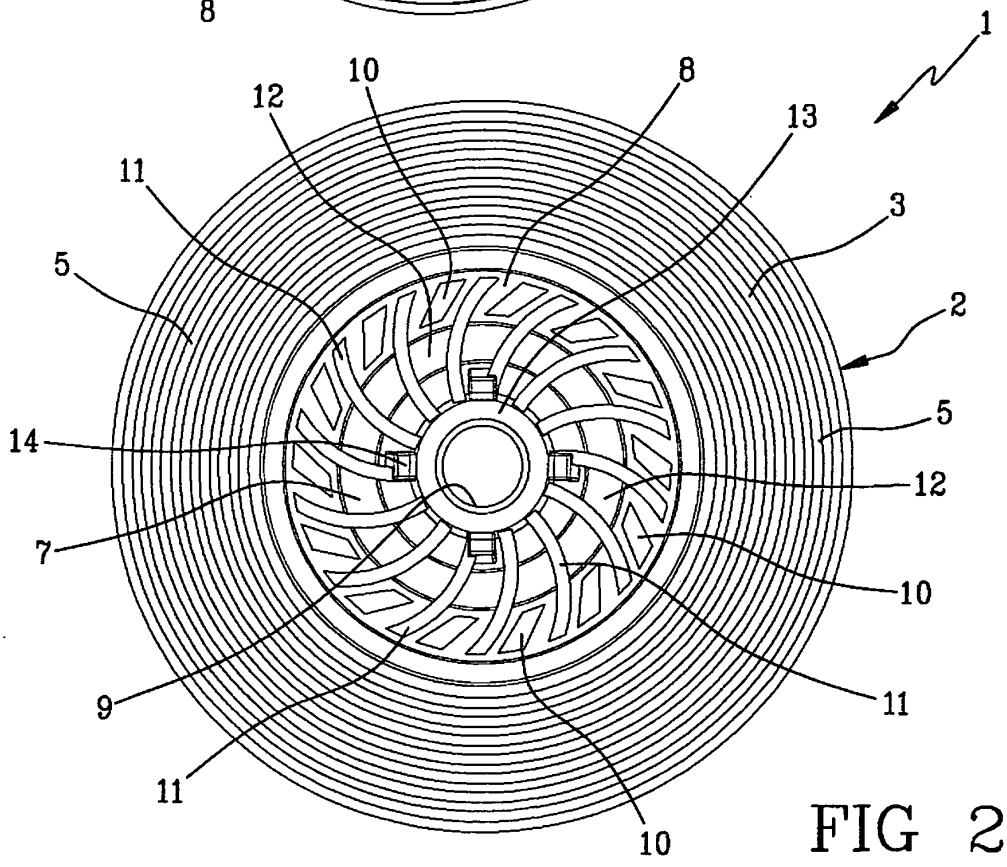
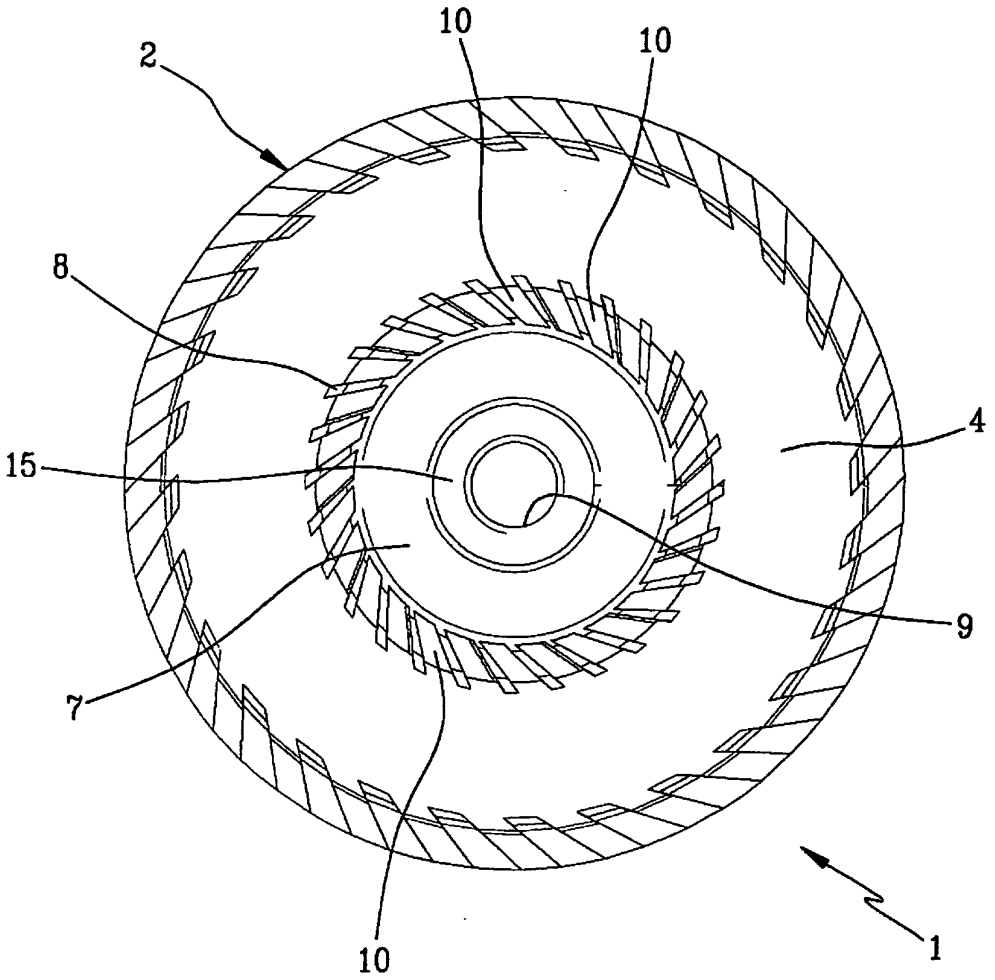

1
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2
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14
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11
11
10

FIG 2

FIG 3



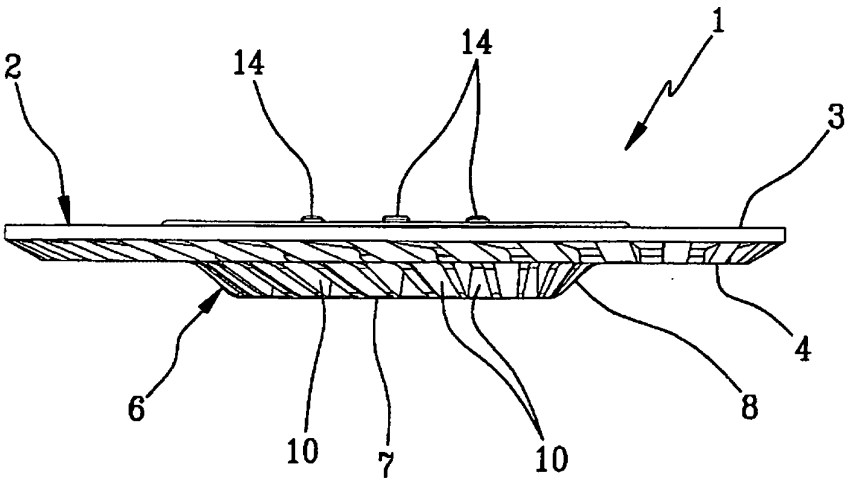


FIG 4

REFERENCES CITED IN THE DESCRIPTION

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