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(54) **SELF-VENTILATED BRAKE DISC**

SELBSTBELÜFTETE BREMSSCHEIBE

DISQUE DE FREIN AUTOVENTILÉ

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Description**SUBJECT OF THE INVENTION**

[0001] This invention refers to a brake disk incorporating substantial innovations and advantageous characteristics.

[0002] More specifically the invention refers to a self-ventilated brake disk especially aimed for vehicles, comprising a body with a unique part formed by a frictional circular crown and a hub to transmit the couple to a whole of the disk. The circular crown includes a series of grooves arranged in radial direction in respect to the centre of the disk.

BACKGROUND OF THE INVENTION

[0003] At present, there is a variety of brake disk for vehicles, in particular motorcars. Among them, we may take into account the self-ventilated brake disks, used in most of the present road vehicles, such as motorcars and trucks.

[0004] One of the presently know brake disks, with the aim to reduce the amount of material needed for its manufacture and to have good properties as to the dissipation of heat, has in the circular crown multiple grooves (see figure 1), which substantially follow a zig-zag pattern.

[0005] A kind of the brake disk provided with above mentioned zig-zag pattern is disclosed in US-A-6 536 564 and EP-A-1 180 613 in which their features are defined in the preamble of claim 1.

[0006] Also, it is known from DE 199 43 893 a brake disk provided with a plurality of radially arranged grooves such that do not define a continuous circular path disposed concentrically with respect to the center of said brake disk.

[0007] However, in practice it has been observed that said zig-zag pattern enhances the wear of the brake pads when contacting the friction surface of the disk due to the fact that during the time in which the brake pad establishes contact on the disk, said pad exerts a vertical pressure, so that the grooves act as a shear for the brake pad, given the fact that said pad has a tendency to introduce itself within the grooves.

[0008] The applicant is not aware of any invention showing all the characteristics which are explained in this description.

DESCRIPTION OF THE INVENTION

[0009] The invention has been made with the aim to provide a brake disk to solve all the problems which have been previously mentioned, providing other additional advantages which will be obvious from the reading of the following description.

[0010] Therefore, it is an object of this invention to provide a self-ventilated brake disk, particularly for vehicles, of the type comprising a body with a unique part forming

a frictional circular crown and a hub which transmits the couple to the whole disk, in which the circular crown includes multiple grooves arranged radially in respect of the centre of the disk, which is characterized by the fact that it includes at least a portion arranged between each of the grooves, said portions being in the same plane that the rest of the circular crown.

[0011] Each of the portions arranged between each of the grooves defines at least a continuous circular path.

[0012] Both surfaces of the circular crown are provided with grooves, including each groove at least a portion with a predetermined width arranged between each of the grooves, said portions being on the same plane that the rest of the circular crown, ensuring a low wear of both opposed brake pads, engaging each of them by friction a corresponding surface of the brake disk.

[0013] In one alternative embodiment of the invention, each of the portions arranged between each of the grooves defines two circular paths which are concentric to each other.

[0014] Given these characteristics, an improved brake disk is obtained which permits to reduce the wear of the brake pads, does not require a difficult construction of the mould for its manufacture and therefore permits to obtain a low cost of manufacture. Besides, another not less important aspect consists in the fact that it provides a good heat dissipation during the contact of the brake pad on the friction surface of the disk.

[0015] Other characteristics and advantages of the brake disk which is the subject matter of this invention will be obvious from the description of a preferred embodiment, which is not exclusive, which is shown as a not limitative example in the following drawings in which:

BRIEF DESCRIPTION OF THE DRAWINGS**[0016]**

Figure 1.- Shows a top view of a brake disk according to the state of the art;

Figure 2.- Shows a top view of a brake disk according to the present invention;

Figure 3.- Shows a elevation view of the brake disk of figure 2;

Figure 4.- Shows a perspective view of a detail of a portion of the brake disk according to the invention; and

Figure 5.- Shows a cross section along line A-A.

50 DESCRIPTION OF A PREFERRED EMBODIMENT

[0017] As shown in the enclosed set of drawings, a self-ventilated brake disk, according to the present invention, which bears the general numeral 1, comprises a unique body obtained by means of casting, which essentially has a frictional circular crown 2 as well as a hub 3 transmitting the couple to the whole disk 1 which is aimed at being secured on the shaft of the wheel of the

vehicle, wherein the circular crown 2 includes multiple grooves 4 arranged radially in respect to the centre of said disk.

[0018] As will be more clearly appreciated in figure 2, each of the grooves 4 has two portions 5, 6 having a predetermined width by way of a "bridge" (see figure 4), which are separated by a predetermined distance defining two circular paths, so that the wear of the brake pads (not shown) is reduced. Said portions 5, 6 are arranged at both opposite faces of the brake disk 1.

[0019] To carry out the manufacture of the brake disk according to the invention, only one mould is needed, made out of two halves which may be engaged one onto the other, obtaining in this way the internal voids which define the "bridges".

[0020] It is obvious that the grooves 4 may be linear or substantially curved, as disclosed for example in the patent of invention ES 2 260 979 of the present applicant.

[0021] The details, forms, dimensions and other accessory elements, as well as the materials used in the manufacture of a brake disk according to the invention may be conveniently substituted by other technically equivalent which do not depart from the essential features of the invention or from the scope of the same as defined in the following claims.

Claims

1. Self-ventilated brake disk (1), particularly for vehicles, comprising a unique body formed by a frictional circular crown (2) and a hub (3) transmitting the couple to the whole of the disk, wherein the circular crown (2) includes multiple grooves (4) arranged radially in respect to the centre of the disk, including at least a portion with a predetermined width arranged between each of the grooves (4), said portions being arranged on the same plane that the rest of the circular crown (2), so that, between portions (5) located between the two opposed faces of the circular crown internal channels are defined arranged radially in respect to the centre of the circular crown (2), creating a path from the edge of the external diameter to the edge of the internal diameter, **characterized in that** each portion (5) is defined by a bridge, defining each of the portions arranged between each of the grooves (4) at least one continuous circular path.
2. Self-ventilated brake disk (1), according to claim 1, **characterized in that** each of the portions arranged between each of the grooves define two circular paths arranged concentrically to each other.

Patentansprüche

1. Selbstventilierte Bremsscheibe (1), insbesondere

für Fahrzeuge, umfassend einen einzigen Körper, bestehend aus einer nichtbindigen Rundkrone (2) und einem Zentrum (3), das das Kräftepaar auf die gesamte Scheibe überträgt, wobei die Rundkrone (2) mehrere radial zum Zentrum der Scheibe angeordnete Rillen (4) umfasst, einschliesslich wenigstens eines zwischen jeder Rille (4) angeordneten Abschnitts mit einer vordefinierten Breite, wobei diese Abschnitte auf derselben Ebene wie die restliche Rundkrone (2) angeordnet sind, so dass zwischen den zwischen den gegenüberliegenden Seiten der Rundkrone gelegenen Abschnitten (5) innere Kanäle definiert sind, die radial zum Zentrum der Rundkrone (2) ausgerichtet sind und eine vom Rand des Aussendurchmessers zum Rand des Innendurchmessers reichende Bahn bilden, **dadurch gekennzeichnet, dass** jeder Abschnitt (5) durch eine Brücke definiert wird und jeder der zwischen jeder Rille (4) angeordneten Abschnitte wenigstens eine kontinuierliche kreisförmige Bahn definiert.

2. Selbstventilierte Bremsscheibe (1) gemäss Anspruch 1, **dadurch gekennzeichnet, dass** jeder der zwischen den Rillen angeordneten Abschnitte zwei kreisförmige Bahnen definiert, die konzentrisch zueinander angeordnet sind.

Revendications

1. Disque de frein autoventilé (1), particulièrement pour des véhicules, comprenant un corps unique formé par une couronne circulaire de frottement (2) et un centre (3) que transmet le couple au disque entier, de manière que la couronne circulaire (2) comprend plusieurs rainures (4) agencées radialement quant au centre du disque, incluant au moins une portion avec une largeur prédéterminée, agencée entre chacune des rainures (4), ces portions étant disposées dans le même plan comme le reste de la couronne circulaire (2), de manière que, entre les portions (5) situées entre les deux faces opposées de la couronne circulaire sont définis des canaux intérieurs, agencés radialement quant au centre de la couronne circulaire (2), formant un trajet depuis le bord du diamètre extérieur jusqu'au bord du diamètre intérieur, **caractérisé en ce que** chacune portion (5) est définie par un pont, et chacune des portions agencées entre chacune des rainures (4) définit au moins un trajet circulaire continu.
2. Disque de frein autoventilé (1) suivant la revendication 1, **caractérisé en ce que** chacune des portions agencées entre chacune des rainures définit deux trajets circulaires arrangés de manière concentrique l'une vers l'autre.

FIG. 1

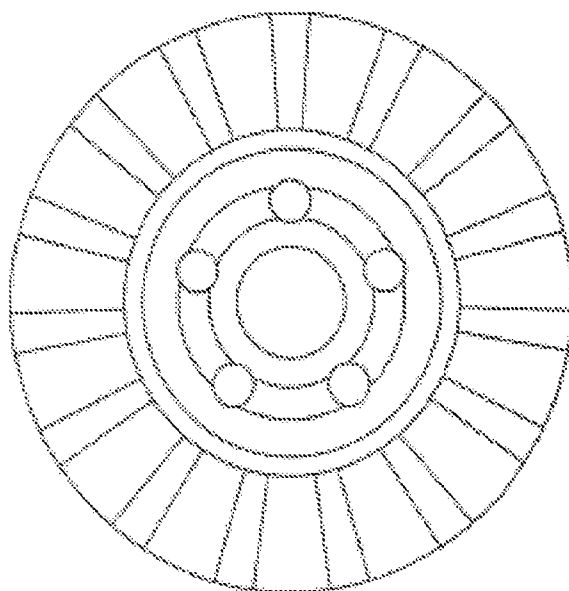


FIG.2

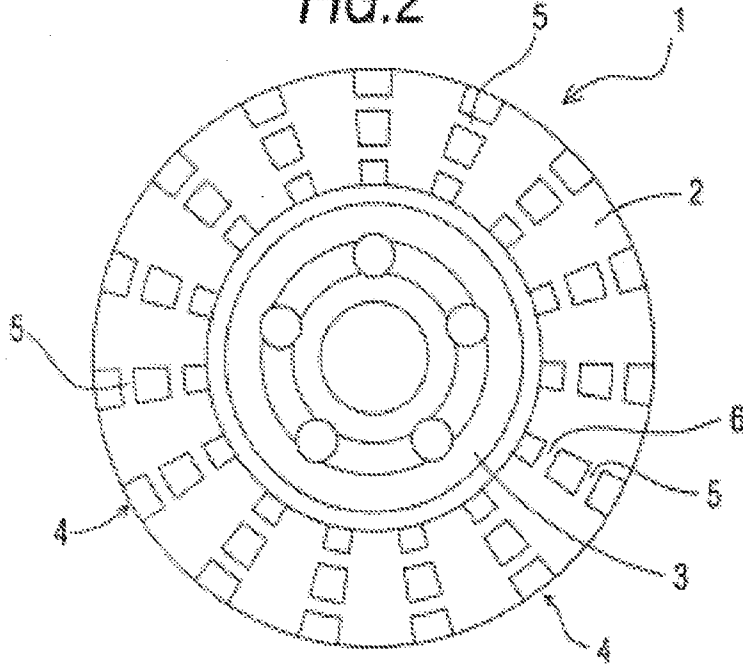


FIG.3

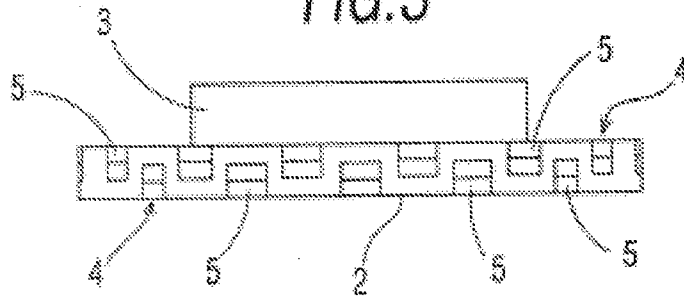


FIG. 4

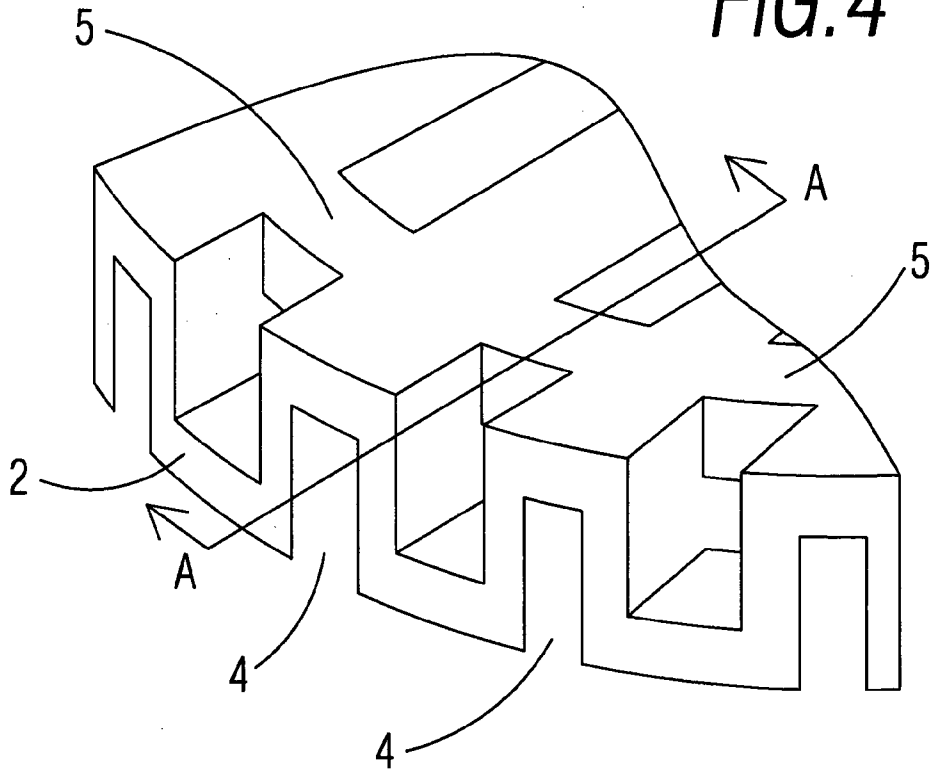
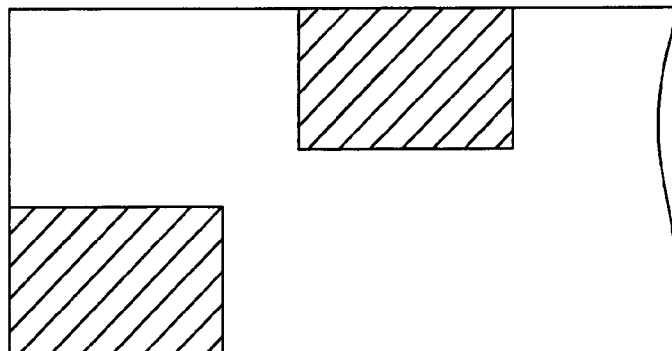


FIG. 5



REFERENCES CITED IN THE DESCRIPTION

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