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DE-A1- 10 013 222
DE-A1-102009 004 060
US-A- 1 394 211
US-A- 4 873 512
US-A- 5 227 950

Discharge device

The invention relates to a discharge device according to claim 1.

Discharge devices of this kind can be used to discharge electrostatic charges due to friction effects or external forces, such as a lightning strike. Moreover, discharge devices of this kind can also be used to discharge electrical charges from motor shafts of electric motors, which can occur in particular in three-phase motors as a result of a shaft-induced electrical current. In the latter case, the "shaft current" is in particular discharged in order to avoid electrolytic corrosion in the bearings of the motors.

In the design of discharge devices, it is known for a brush-shaped arrangement to be provided, in which a grounding brush, which is often produced using thin copper wires, is placed in sliding contact with a contact circumference of the shaft.

However, the known grounding brush having metallic bristles, which is described in DE 100 13 222 A1, for example, often exhibits increased wear in the sliding contact with the contact partner or the shaft from which the charge is to be discharged.

A discharge device whose frame support, which accommodates the contact strand made of the carbon fibers, is installed in a housing surrounding the shaft is known from DE 10 2009 004 060 A1.

Another discharge device is disclosed in US 4 873 512 A.

The object of the present invention is to allow maintenance measures to be shortened or avoided.

This object is attained by a discharge device having the features of claim 1.

For discharging electrostatic charges from a shaft, the discharge device according to the invention has a contact strand which can be disposed in a frame support tangentially to a contact circumference of the shaft in such a manner that a contact surface can be formed between the contact strand and the contact circumference of the shaft when the contact strand is in a contact position, the contact strand having a fiber arrangement composed of a plurality of carbon fibers. In order to shorten or avoid maintenance work, an electric device for function monitoring is provided.

In a particularly reliable configuration, the device for function monitoring is a resistance measuring device.

Advantageously, the resistance measuring device can be disposed in a short-circuit loop formed between ends of the contact strand.

A particularly simple configuration is possible if the fiber arrangement has a plurality of carbon fibers extending in the strand direction.

Particularly preferably, the frame support is provided with a pre-tensioning device for subjecting the contact strand to a defined tension.

A particularly robust configuration is possible if the fiber arrangement of the contact strand is a braid or a cord.

Hereinafter, preferred embodiments of the invention will be explained in more detail with reference to the drawing.

Fig. 1: is an isometric illustration of a discharge device in contact with a shaft;

Fig. 2: is a side view of the discharge device illustrated in **Fig. 1**;

Fig. 3: is a top view of the discharge device illustrated in **Fig. 1**.

Fig. 1 shows a discharge device 10 which comprises a contact strand 12 disposed in a frame support 11 and composed of a plurality of carbon fibers extending in the strand direction.

As shown in **Fig. 2** in particular, contact strand 12 is in essentially tangential contact with a contact circumference 13 of a shaft 14. In the exemplary embodiment illustrated in **Fig. 2**, contact strand 12 consists of a plurality of identically oriented carbon fibers which run parallel to each other, the carbon fibers being jointly provided with force introduction members 15 and 16 at least at their ends. Force introduction members 15 and 16 are connected to terminal ends 18 and 19, respectively, of frame support 11 via a pre-tensioning device 17, which is a coil spring in the case at hand. At a frame side which extends parallel to contact strand 12 and which is a frame base 20, frame support 11 is provided with a bearing mount 21 allowing frame support 11 to be connected to a bearing axis 22 disposed on a support installation, which is not illustrated in detail.

In the exemplary embodiment illustrated in **Fig. 2**, force introduction members 15 and 16 are simultaneously used as terminal contacts for a short-circuit loop 23 provided with an electric resistance measuring device 24.

As shown in **Fig. 2**, an insulation, which is an insulating washer 25, is provided between frame base 20 of frame support 11 and terminal end 18, which is illustrated on the left in **Fig. 2**, the insulation electrically insulating terminal end 18 from frame base 20, with the result that a shaft current discharged from contact circumference 13 of shaft 14 via contact strand 12 and frame base 20 into bearing axis 22 of the support installation because of electrostatic charging of

shaft 14 inevitably runs through resistance measuring device 24. Thus, resistance measuring device 24 allows the electrical resistance formed in contact strand 12 to be measured directly, with the result that wear of the carbon fibers forming contact strand 12 or even fiber breakage of carbon fibers can be detected as a corresponding rise in the electrical resistance by means of resistance measuring device 24.

Notwithstanding contact strand 12 described above as an example, which is composed of a plurality of identically oriented carbon fibers which run parallel to each other, the arrangement composed of frame support 11 and contact strand 12 being approximately comparable to a violin bow, it is also advantageous for the contact strand to be composed of a plurality of carbon fibers which are interwoven in the manner of a braid or formed into a cord, with the result that increased tensile strength of contact strand 12 is possible in cases where a particularly high contact pressure may be required.

Irrespective of the configuration of contact strand 12, it is easily possible for the contact pressure exerted radially on contact circumference 13 of shaft 14 by contact strand 12 to be changed or adjusted by changing the radial distance between bearing axis 22, on which frame support 11 is disposed by means of bearing mount 21, and contact circumference 13 of shaft 14.

PATENTKRAV

1. Afledningsindretning (10) til afledning af elektrostatisk ladning fra en aksel (14), hvorved afladningsindretningen omfatter en kontaktstreng (12), som kan arrangeres i en rammeholder (11), tangentielt i forhold til en kontaktperiferi (13) for akslen, på en sådan måde, at der kan dannes en kontaktflade mellem kontaktstrengen og akslens kontaktperiferi, når kontaktstrengen er i en kontaktposition, hvorved kontaktstrengen omfatter et fiberarrangement, der er sammensat af en flerhed af kulfibre,
kendetegnet ved en elektrisk indretning til funktionsovervågning af afledningsindretningen.

2. Afledningsindretning ifølge krav 1,
kendetegnet ved, at indretningen til funktionsovervågning er udformet som resistansmåleindretning (24).

3. Afledningsindretning ifølge krav 2,
kendetegnet ved, at
resistansmåleindretningen (24) er arrangeret i en kortslutningssløjfe (23), der er dannet mellem kontaktstrengens ender.

4. Afledningsindretning ifølge et hvilket som helst af de foregående krav,
kendetegnet ved, at
fiberarrangementet omfatter en flerhed af kulfibre, som strækker sig i strengens retning.

5. Afledningsindretning ifølge et hvilket som helst af de foregående krav,
kendetegnet ved, at
rammeholderen (11) er udstyret med en forspændingsindretning (17) med henblik på påvirkning af kontaktstrengen (12) med en defineret trækspænding.

6. Afledningsindretning ifølge et hvilket som helst af de foregående krav,
kendetegnet ved, at
fiberarrangementet for kontaktstrengen er udformet som litze eller snor.

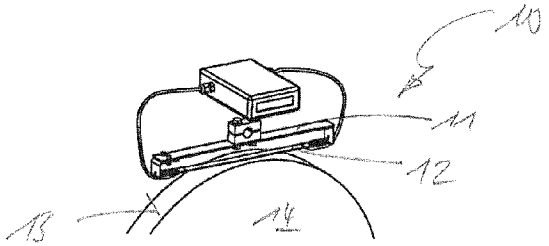

FIG.1

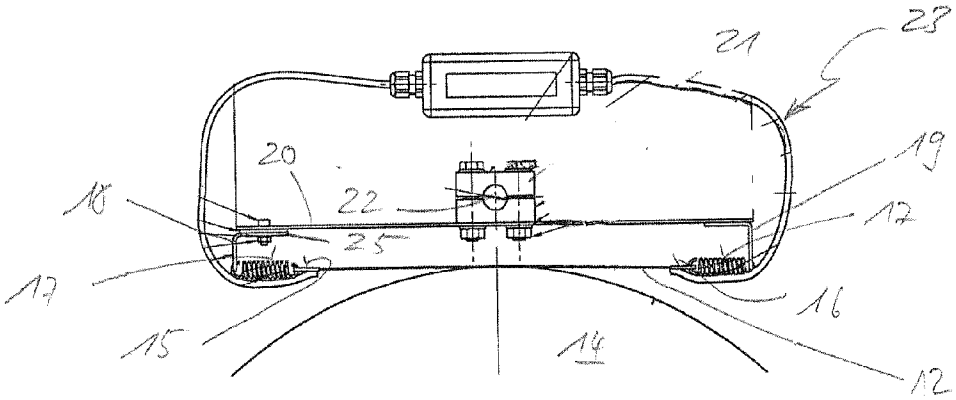

FIG.2

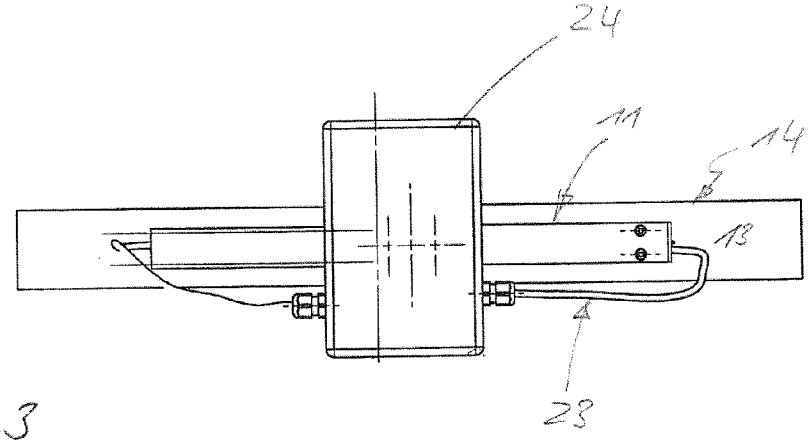

FIG.3