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- (54) Title: WINDSCREEN WIPER DRIVE

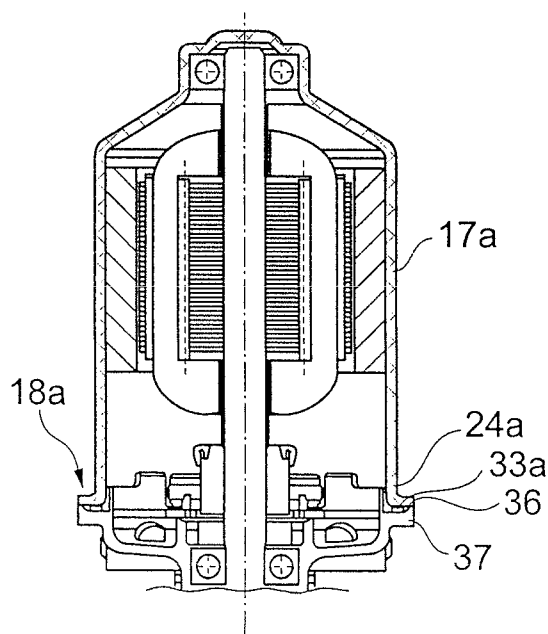


Fig. 6

- (57) Abstract: The invention relates to a windscreen wiper drive (10) with a windscreen wiper motor (11) having a motor housing (17; 17a) and a gear housing (12; 12a), which on a face end of the motor housing (17; 17a) is connected to the gear housing (12; 12a) wherein the preferentially pot-shaped motor housing (17; 17a) and the gear housing (12; 12a) consist in particular of metallically conductive material. According to the invention it is provided that the gear housing (12; 12a) and the motor housing (17; 17a) are interconnected subject to the intermediate positioning of a sealing element (32), and in that electromagnetic screening means (34; 36, 37) are provided, which screen the connecting region between the gear housing (12; 12a) and the motor housing (17; 17a) in the region of the sealing element (32) towards the outside.



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— *of inventorship (Rule 4.17(iv))*

WINDSCREEN WIPER DRIVEPRIOR ART

5 The invention relates to a windscreen wiper drive according to the preamble of Claim 1.

Such a windscreen wiper drive is known from DE 10 2009 014 312 A1 of the applicant. There, the housing of a windscreen
10 wiper motor is connected to a gear housing, in which a gear is arranged that reduces the rotational speed of the windscreen wiper motor, wherein the torque transmitted from the windscreen wiper motor to a wiper linkage for example is increased at the same time. It is known, furthermore, to
15 provide the windscreen wiper motor known from the mentioned publication with a sealing element in the form of a sealing ring in the connecting region between the housing of the windscreen wiper motor and the gear housing in order to avoid that moisture enters the housing interior of the
20 windscreen wiper motor, thus resulting in damages or malfunctioning of the windscreen wiper drive.

Problematic with such windscreen wiper drives is that during the operation of the windscreen wiper motor
25 electromagnetic radiation is generated, which can for example impair the function of wires installed in the vicinity of the windscreen wiper motor through induction of interference voltages.

30 It is therefore known for example from DE 10 2007 058 089 A1 to equip the (open) face end of the housing of a windscreen wiper motor towards the gear housing with a screen consisting of metallically conductive material in order to prevent that electromagnet radiation leaves the
35 windscreen wiper motor or its housing. Disadvantageous in this case is that the screen known from the last mentioned

publication constitutes an additional component and thus increases the manufacturing costs of the windscreen wiper drive. It is problematic, furthermore, that with the first mentioned windscreen wiper drive upon simultaneous use of a sealing ring, the latter in practice is not completely screened metallically on its outer circumference so that a small part of the electromagnetic radiation can still escape from the housing of the windscreen wiper drive.

DISCLOSURE OF THE INVENTION

Starting out from the shown prior art, the invention is based on the object of further developing a windscreen wiper drive according to the preamble of Claim 1 in such a manner that a complete screening in particular of the connecting region between the housing of the windscreen wiper motor and the gear housing when using a sealing element can be achieved with relatively simple effort. With a windscreen wiper drive, this object is solved with the features of Claim 1.

Advantageous further developments of the windscreen wiper drive according to the invention are stated in the subclaims. All combinations of at least two features disclosed in the claims, the description and/or the figures fall within the scope of the invention.

For the exact radial positioning of the housing of the windscreen wiper motor and of the gear housing with simultaneously sound electromagnetic screening it is more preferably provided that the housing or the gear housing axially engages over the respective other element with a wall section, that the sealing element is embodied in particular in the form of a ring-shaped seal that is arranged outside the wall section, and that fastening means

are provided radially outside the sealing ring which serve for connecting the housing to the gear housing.

5 In a first design configuration of the electromagnetically active screening means it is proposed that the motor housing and the gear housing comprise a metallically conductive sealing section as electromagnetic screen means, which is arranged radially outside the sealing element and which with installed sealing element is arranged in bearing
10 contact with the gear housing and the motor housing. In particular through the bearing contact of the sealing section, a complete sealing of the housing of the windscreen wiper motor is made possible here, wherein this sealing section can for example be unitarily moulded onto
15 the housing or the gear housing so that relatively low additional costs are incurred through the screening means.

In design configuration of the sealing section it is proposed that the latter is designed in the form of a
20 radially circumferential wall section and that the sealing element is received at least partially in the ring-shaped region between the circumferential wall section and the wall section.

25 In an alternative design configuration of the electromagnetically active screening means it is proposed that the sealing element is axially arranged between a connecting region of the gear housing and a connecting region of the motor housing and that the electromagnetic
30 screening means are formed by the sealing element.

In further development of the last mentioned embodiment, wherein a particularly sound sealing of the housing can be achieved, it is proposed that the sealing element is
35 directly arranged between two end faces of the connecting regions.

Particularly preferred furthermore is a design configuration of the gear housing, wherein the gear housing is designed as metal casting with fastening means arranged radially outside the sealing element, that on the housing a fastening flange is formed and that the gear housing comprises recesses in the region of the wall sections for positioning or receiving components of the windscreen wiper motor.

In a preferred implementation of the electromagnetically active design of the sealing element, the latter can for example consist altogether of metallogically conductive material components or it can comprise a metallic coating. In the case of the last mentioned alternative, each region of the sealing element can be functionally optimised.

Further advantages, features and details of the invention are obtained from the following description of preferred exemplary embodiments and by means of the drawing.

The drawing shows:

Fig. 1 a top view of a windscreen wiper motor to explain the basic construction with the prior art and the invention,

Fig. 2 a perspective view in the connecting region of a motor housing and a gear housing with a windscreen wiper drive according to a first embodiment of the invention,

Fig. 3 a longitudinal section through a windscreen wiper motor mounted to the gear housing with the first embodiment of the invention,

Fig. 4 a perspective view of a motor housing, as it is used with the windscreen wiper motor according to Fig. 3,

5 Fig. 5 a perspective view of the connecting region between a motor housing and a gear housing with an embodiment of the invention that is modified compared with Fig. 2,

10 Fig. 6 a longitudinal section through a windscreen wiper motor in the connecting region with the gear housing according to Fig. 5 and

15 Fig. 7 a perspective view of the motor housing, as it is used with the windscreen wiper motor according to Fig. 6.

Same components or components with the same function are provided with the same reference numbers in the Figures.

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Fig. 1 shows a windscreen wiper drive 10, as it serves for the wiping of a windscreen, which is not shown, in particular of a motor vehicle. To this end, the windscreen wiper drive 10 interacts with a wiper arm 1 shown simplified in Fig. 1, which for example is directly connected or coupled to a windscreen wiper.

The windscreen wiper drive 10 substantially consists of a windscreen wiper motor 11 and a gear housing 12 embodied in particular as metal casting. In the gear housing 12, a reduction gear 13 that is not visible in detail is arranged, with which the rotational speed of the windscreen wiper motor 11 is reduced, wherein at the same time the torque transmittable from the windscreen wiper motor 11 onto the wiper arm 1 is correspondingly increased. The gear housing 12 furthermore comprises two mountings 14, 15 on

35

opposite sides, with which the windscreen wiper drive 10 can be fastened in particular to the body of the motor vehicle that is not shown using screws or similar.

- 5 The windscreen wiper motor 11, the components of which are schematically represented in Fig. 3, comprises a pot-shaped motor housing 17, which in particular consists of sheet metal and is embodied as deep-drawn part. According to Fig. 4, the motor housing 17 furthermore comprises a flange-like
- 10 circumferential connecting region 18, which for example comprises through-bores 19, which, with the help of screws as fastening elements, connect the motor housing 17 and thus the windscreen wiper motor 11 to the gear housing 12 on a face end of the motor housing 17. For this purpose, as
- 15 is evident in particular from Fig. 2, the gear housing 12 comprises further through-bores 21 or similar arranged in congruence with the through-bores 19 of the motor housing 17.
- 20 As becomes clear in particular from a joint view of Fig. 2 and 3, the transmission housing 12 comprises a widened support region 23 in a connecting region 22 for the motor housing 17, from which a radially circumferential wall region 24 originates, which is arranged concentrically to
- 25 the longitudinal axis 25 of the windscreen wiper motor 11, and which radially engages in the circumferential wall 26 of the motor housing 17 in order to position or centre the latter to the gear housing 12.
- 30 Furthermore, recesses 27 to 29 are formed in the support region 23 and in the wall region 24, which serve for the angularly correct positioning of the windscreen wiper motor 11 to the gear housing 12 and in particular also for receiving a brush plate 31, which is arranged on the open
- 35 face end of the windscreen wiper motor 11.

For the sealing connection between the motor housing 17 and the gear housing 12 in the connecting regions 18, 22 a sealing element 32, in particular in the form of an elastic, ring-shaped seal 33 is provided. The seal 33, in the exemplary embodiment shown, radially follows the circumferential wall 26 of the gear housing 12 on the outside according to Fig. 3. Upon axially joining the motor housing 17 with the gear housing 12 by means of the fastening elements embodied in particular as screws, the seal 33 is axially pressed against the end faces or face ends of the connecting regions 18, 22 facing each other and because of this seals the connecting regions 18, 22 against entering moisture or similar.

In order to prevent that because of the recesses 27 to 29 electromagnetic radiation is emitted outside the windscreen wiper drive 10, in particular outside the windscreen wiper motor 11 when operating the windscreen wiper drive 10, it is proposed according to the invention with the first embodiment of the invention that the sealing element 32 or the seal 33 consists of metallically conductive material. This can be effected for example through the addition of metallically conductive particles or grains or similar in the mass of the sealing element 32. Alternatively it can also be provided that the sealing element 32 or the seal 33 is provided with a coating 34 in particular on its radially outer circumference, which consists of electrically conductive material. The coating 34 in this case can be connected to the sealing element 32 in a manner known per se, for example through vulcanising-on or the like.

Fig. 5 to 7 show an alternative exemplary embodiment of the invention. Here it is provided that the connecting region 18a of the motor housing 17a and the connecting region 22a of the gear housing 12a each comprise a radially circumferential wall section 36, 37, which are arranged in

alignment with each other, and which on joining the motor housing 17a to the gear housing 12a come to be in direct (axial) bearing contact. Here, the seal 33a is radially received between the wall section 24a and the wall sections 36, 37.

In modification of the exemplary embodiment shown it is obviously also conceivable to merely provide one of the wall sections 36, 37 on the connecting region 18a of the motor housing 17a or on the connecting region 22a of the gear housing 12a. It is merely substantial that upon axially joining the motor housing 17a and the gear housing 12a a circumferential metallic seal is formed between the two mentioned components, which prevents the emission of electromagnetic radiation from the motor housing 17a.

Because of the wall sections 36, 37, both the connecting region 18 of the motor housing 17a as well as the connecting region 22a of the gear housing 12a are embodied enlarged in diameter or in the radial extension, as is in particular evident by means of a comparison of the two motor housings 17, 17a of Fig. 4 and 7.

The windscreen wiper drive 10 described so far can be changed or modified in various ways without deviating from the inventive idea.

List of reference numbers

	1	Wiper arm
	10	Windscreen wiper drive
5	11	Windscreen wiper motor
	12, 12a	Gear housing
	13	Reduction gear
	14	Mounting
	15	Mounting
10	17	Motor housing
	17a	Motor housing
	18	Connecting region
	18a	Connecting region
	19	Through-bore
15	21	Through-bore
	22	Connecting region
	22a	Connecting region
	23	Support region
	24	Wall region
20	24a	Wall region
	25	Longitudinal axis
	26	Circumferential wall
	27	Recess
	28	Recess
25	29	Recess
	31	Brush plate
	32	Sealing element
	33	Seal
	33a	Seal
30	34	Coating
	36	Wall section
	37	Wall section

CLAIMS

1. A windscreen wiper drive (10) with a windscreen wiper motor (11) comprising a motor housing (17; 17a) and a gear housing (12; 12a), which on a face end of the motor housing (17; 17a) is connected to the gear housing (12; 12a), wherein the preferentially pot-shaped motor housing (17; 17a) and the gear housing (12; 12a) in particular consist of metallic conductive material, characterized in that the gear housing (12; 12a) and the motor housing (17; 17a) are connected to each other subject to the intermediate positioning of a sealing element (32), and in that electromagnetic screening means (34; 36, 37) are provided which screen the connecting region between the gear housing (12; 12a) and the motor housing (17; 17a) towards the outside in the region of the sealing element (32).
2. The windscreen wiper drive according to Claim 1, characterized in that the motor housing (17; 17a) or the gear housing (12; 12a) axially engages over the respective other housing with a wall section (24; 24a), in that the sealing element (32) is embodied in particular in the form of a ring-shaped seal (33; 33a), which is arranged radially outside the wall section (24; 24a), and in that fastening means (19, 21) are provided radially outside the seal (33; 33a), which serve for connecting the motor housing (17; 17a) to the gear housing (12; 12a).
3. The windscreen wiper drive according to Claim 2, characterized

in that the motor housing (17a) and the gear housing (12a) comprise a metallogically conductive sealing section (36, 37) as electromagnetic screening means, which is arranged radially outside the sealing element (32), and which with assembled sealing element (32) is arranged in bearing contact with the gear housing (12a) and the motor housing (17a).

4. The windscreen wiper drive according to Claim 3, characterized

in that the sealing section is embodied in the form of a radially circumferential wall section (36, 37), and in that the sealing element (32) is at least partially received in the ring-shaped region between the circumferential wall section (36, 37) and the wall section (24).

5. The windscreen wiper drive according to Claim 1 or 2, characterized

in that the sealing element (32) is axially arranged between a connecting region (22) of the gear housing (12) and a connecting region (18) of the motor housing (17), and in that the electromagnetic screening means (34) are formed by the sealing element (32).

6. The windscreen wiper drive according to Claim 5, characterized

in that the sealing element (32) is directly arranged between two end faces of the connecting regions (18, 22).

7. The windscreen wiper drive according to Claim 5 or 6, characterized

in that the sealing element (33) is embodied in an electromagnetically screening manner through a metallic embodiment of the sealing element (32).

8. The windscreen wiper drive according to Claim 5 or 6,
characterized
in that the sealing element (32) is embodied in an
electromagnetically screening manner through a
metallic coating (34) of the sealing element (32).
9. The windscreen wiper drive according to Claim 2 to 8,
characterize
in that the gear housing (12; 12a) is embodied as
metal casting with fastening means (21) arranged
radially outside the sealing element (32), and in that
the gear housing (12; 12a) in the region of the wall
section (24; 24a) comprises recesses (27 to 29) for
positioning or receiving components of the windscreen
wiper motor (11).
10. The windscreen wiper drive according to any one of the
Claims 1 to 9, characterized in that the motor housing
(17; 17a) is embodied as deep-drawn part of sheet
metal.

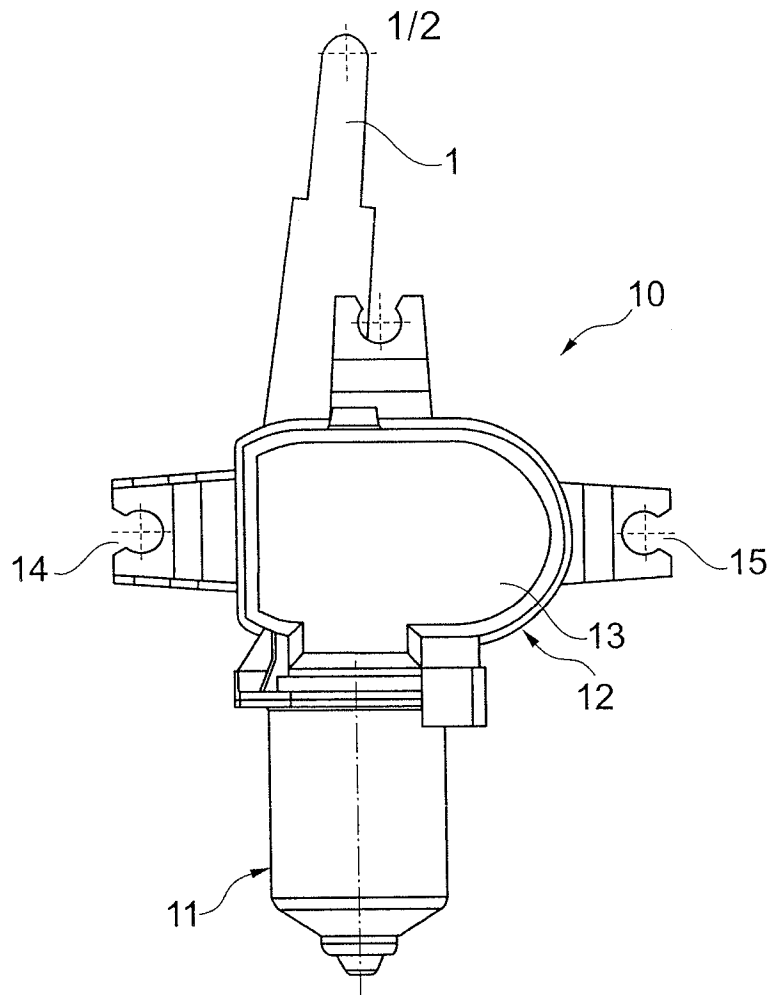


Fig. 1

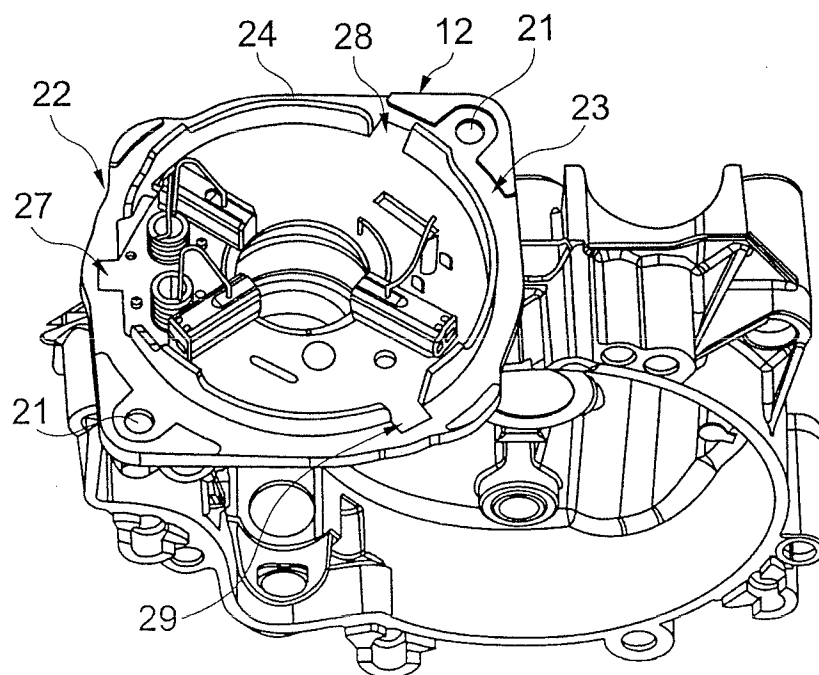


Fig. 2

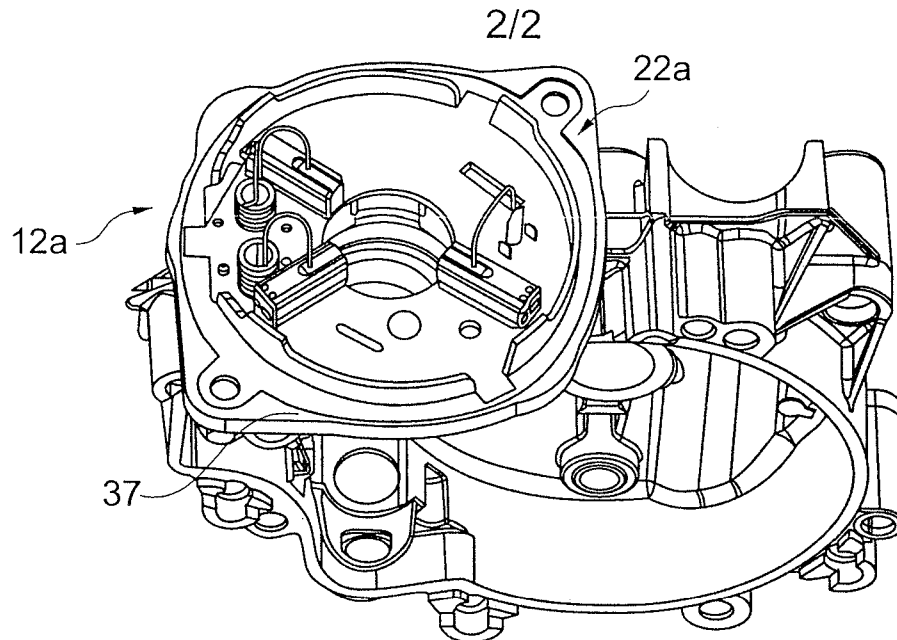


Fig. 5

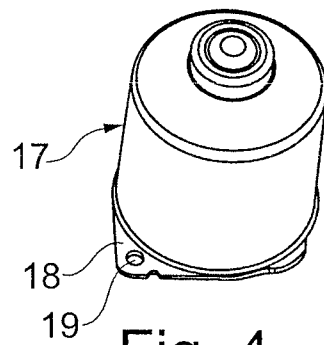


Fig. 4

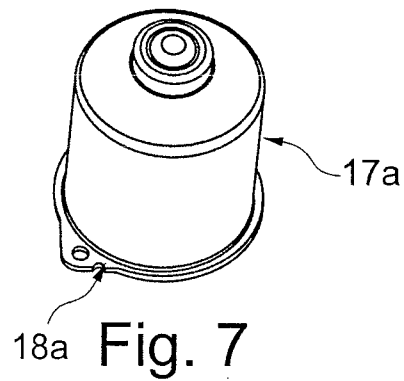


Fig. 7

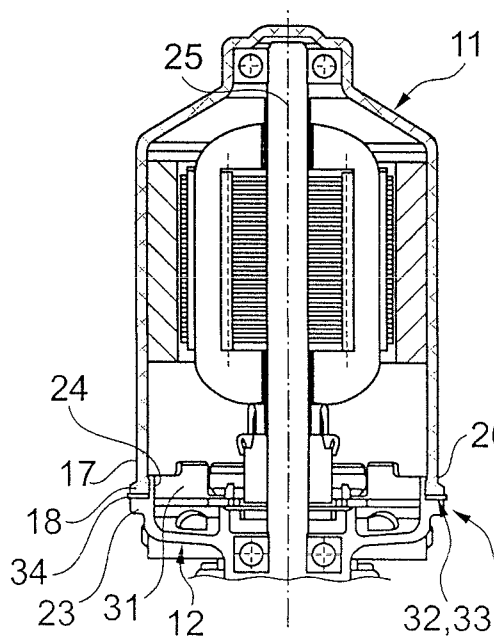


Fig. 3

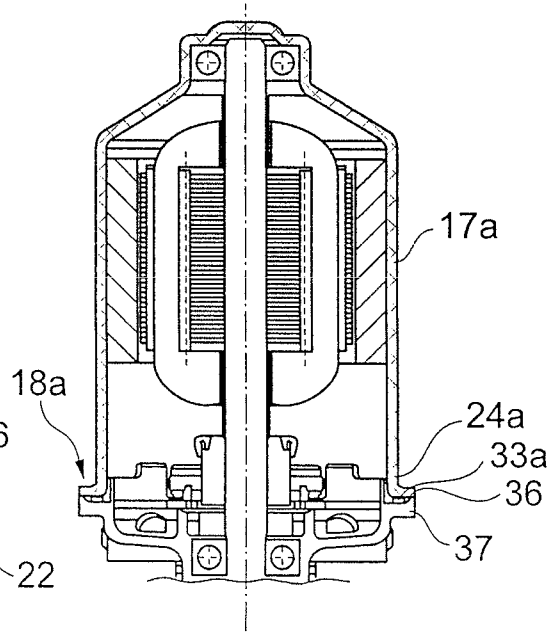


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/053956

A. CLASSIFICATION OF SUBJECT MATTER INV. B60S1/16 H02K7/116 H02K11/00 H05K9/00 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) B60S H02K H05K		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	DE 20 2008 001317 U1 (MTC MICRO TECH COMPONENTS GMBH [DE]) 27 November 2008 (2008-11-27) paragraph [0033] - paragraph [0038]; figures	1-10
A	US 6 810 769 B1 (GERRAND DOMINIQUE [FR] ET AL) 2 November 2004 (2004-11-02) column 2, line 24 - column 3, line 67; figures -/-	1-10
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search	Date of mailing of the international search report	
24 May 2012	05/06/2012	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Sangiorgi, Massimo	

INTERNATIONAL SEARCH REPORT

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Information on patent family members

International application No

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