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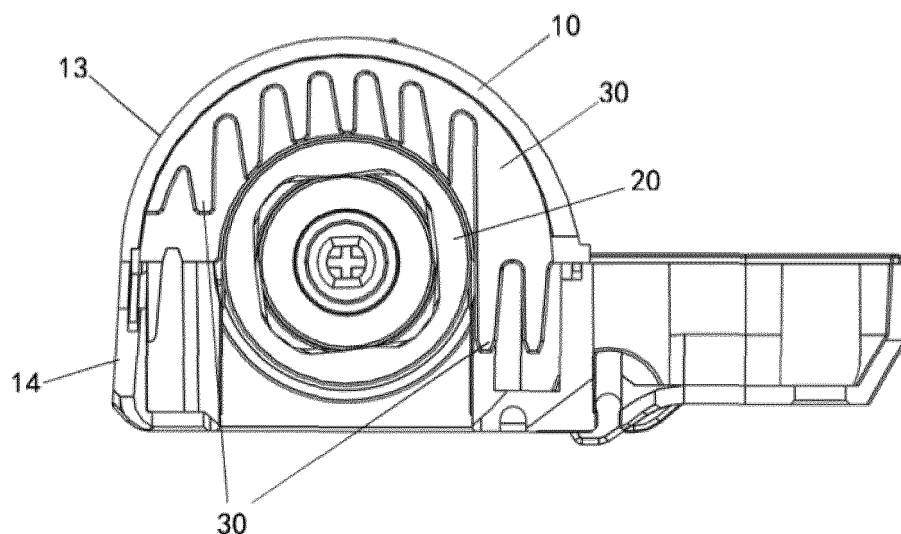
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(54) **SWEEPING ASSEMBLY, CLEANING APPLIANCE, AND METHOD FOR CLEANING APPLIANCE**

(57) The present invention relates to a cleaning appliance and a method for a cleaning appliance. In particular, a cleaning appliance is disclosed, comprising: a housing, comprising an opening facing toward a surface to be swept; a sweeping brush, having a connection part by means of which the sweeping brush is mounted in the housing, and being capable of rotating about a rotation axis by receiving a driving force, so as to perform a sweeping operation; and a toothed structure arranged close to an end of the sweeping brush, the toothed structure being provided between the housing and the sweep-

ing brush and comprising multiple teeth, the multiple teeth extending from one of the housing and the sweeping brush toward the other of the housing and the sweeping brush. The cleaning appliance of the present invention is at least able to prevent or at least reduce the entry of foreign matter into a gap, as well as promptly trigger protection measures when necessary to remind a user to deal with the problem, in order to avoid failure due to melting of the housing and sweeping brush in a connection region.



[Figure no.] Fig. 8

Description

Technical field

[0001] The present invention relates to the technical field of automated cleaning, in particular to a cleaning appliance, a sweeping assembly for a cleaning appliance, and a method for a cleaning appliance.

Background art

[0002] An automatic cleaning appliance is an appliance capable of performing a cleaning operation automatically. Taking a handheld vacuum cleaner as an example, such an appliance comprises a sweeping assembly located at an extremity, the sweeping assembly at least comprising a sweeping brush and a housing for mounting the sweeping brush. The sweeping brush rotates at high speed in the housing and comes into contact with a surface to be swept, thereby separating foreign matter attached to the surface to be swept. The separated foreign matter is picked up by the sweeping brush or sucked into the housing by a suction means, finally being led into a foreign matter collection means.

[0003] Some foreign matter such as hair tends to become wound around the sweeping brush, thereby giving rise to additional friction and hindering the rotation of the sweeping brush. In addition, due to the fact that the sweeping brush is rotatably mounted on the static housing, there is inevitably a gap in a region of connection of the sweeping brush and the housing. Foreign matter such as hair might also be drawn into this gap. If this foreign matter cannot be cleared promptly, it will accumulate in the gap, resulting in increased rotational friction in the region of connection of the sweeping brush and the housing. Under the action of the high-speed rotation of the sweeping brush, this increased friction will continuously generate a large amount of heat and significantly increase the temperature of the housing and sweeping brush in the region of connection, even to the point where the melting point of the materials is exceeded (the sweeping brush and housing generally being made of plastic materials), such that the materials of the housing and sweeping brush melt and deform in the region of connection, thus causing plastics and foreign matter such as hair to fuse together, and thereby causing the cleaning appliance to suffer failure.

[0004] Some measures exist in the prior art for the purpose of preventing foreign matter from entering and accumulating in the gap formed in the region of connection of the sweeping brush and housing. For example, the roller brush unit disclosed in CN 10861495A attempts to prevent the movement of foreign matter toward a rotation shaft side by means of a blocking structure, in order to prevent foreign matter from entering a region between the rotation shaft and a housing connection part. In addition, CN 205903229 U has disclosed the provision of an anti-winding structure, which fills a gap in a connection

region when a sweeping assembly is in an operating state, thereby preventing foreign matter from entering a driving component of a brush body through the gap.

[0005] However, the measures in the prior art still struggle to prevent the entry of foreign matter into the gap very effectively. Furthermore, even if only a small amount of foreign matter is present in the gap, friction can still generate a large amount of heat under the action of continuous rotation. Moreover, it is difficult to detect this small amount of foreign matter by existing techniques and promptly trigger protection measures to remind the user to perform cleaning, and consequently, more and more foreign matter enters the gap. When protection is triggered, it is already too late; the plastic materials in the connection region have often already been melted, and hence failure occurs.

Summary of the invention

[0006] In response to the problem described above, the present invention provides a sweeping assembly for a cleaning appliance, a cleaning appliance, and a method for a cleaning appliance, in order to mitigate the shortcomings of the prior art. In particular, the present invention at least achieves the prevention or at least the reduction of entry of foreign matter into a gap, as well as the prompt triggering of protection measures when necessary to remind the user to deal with the problem, in order to avoid failure due to melting of a housing and a sweeping brush in a connection region.

[0007] According to one aspect of the present invention, a sweeping assembly for a cleaning appliance is provided, comprising:

a housing, comprising an opening facing toward a surface to be swept;
a sweeping brush, having a connection part by means of which the sweeping brush is mounted in the housing, and being capable of rotating about a rotation axis by receiving a driving force, so as to perform a sweeping operation; and
a toothed structure arranged close to an end of the sweeping brush, the toothed structure being provided between the housing and the sweeping brush and comprising multiple teeth, the multiple teeth extending from one of the housing and the sweeping brush toward the other of the housing and the sweeping brush.

[0008] According to another aspect of the present invention, a cleaning appliance comprising the sweeping assembly described above is provided.

[0009] According to another aspect of the present invention, a method for a cleaning appliance is provided, the cleaning appliance comprising a sweeping assembly, the sweeping assembly comprising a housing and a sweeping brush mounted in the housing, the sweeping brush being capable of rotating in the housing by receiv-

ing a driving force provided by a drive source, so as to perform a sweeping operation, the method comprising:

providing a toothed structure between the housing and the sweeping brush, to capture foreign matter when the sweeping operation is performed, wherein the toothed structure comprises multiple teeth, the multiple teeth extending from one of the housing and the sweeping brush toward the other of the housing and the sweeping brush;
resistance to rotation of the sweeping brush increasing in response to an increase in the amount of foreign matter captured;
triggering overload protection of the drive source providing the driving force to stop the rotation of the sweeping brush when the resistance to rotation has increased to a point where it exceeds a predetermined threshold; and
generating an indication signal in response to the stoppage of rotation of the sweeping brush, to remind a user to clear the captured foreign matter. The indication signal may be communicated to the user by sound, visually and/or haptically, etc.

[0010] Further objects, properties and advantages of the present invention will become clear on the basis of the description below in conjunction with the drawings and particular embodiments. All of the features mentioned can be independent, or combined with each other in any way, and are all advantageous, whether independent or combined.

Brief description of the drawings

[0011] Embodiments of the present invention will now be described as examples with reference to the drawings below, wherein:

Fig. 1 shows schematically a three-dimensional drawing of the sweeping assembly according to the present invention.

Fig. 2 shows schematically a bottom view of the sweeping assembly according to the present invention, showing in particular the opening and the sweeping brush of the sweeping assembly.

Fig. 3 shows schematically a sectional drawing, along the rotation axis of the sweeping brush, of the sweeping assembly according to the present invention, showing in particular the mounting structure by which the sweeping assembly is mounted to the housing.

Fig. 4 shows schematically a partial sectional three-dimensional drawing of the sweeping assembly according to the present invention, showing in particular the toothed structure and blocking rib plate arranged at one end of the sweeping brush.

Fig. 5 is a planar view of Fig. 4, showing in particular

the toothed structure and blocking rib plate arranged at one end of the sweeping brush.

Fig. 6 shows schematically a partial sectional three-dimensional drawing of the sweeping assembly according to the present invention, showing in particular the toothed structure and blocking rib plate arranged at the other end of the sweeping brush.

Fig. 7 is a planar view of Fig. 6, showing in particular the toothed structure and blocking rib plate arranged at the other end of the sweeping brush.

Fig. 8 is a section taken along line I-I in Fig. 5, showing schematically the shape of the toothed structure according to the present invention.

Fig. 9 shows schematically another embodiment of the shape of the toothed structure according to the present invention.

Fig. 10 shows schematically reinforcing ribs on teeth of the toothed structure according to the present invention.

Fig. 11 is a section taken along line II-II in Fig. 5, showing schematically the shape of the blocking rib plate according to the present invention.

Fig. 12 is a section taken along line III-III in Fig. 7, showing schematically the shape of the blocking rib plate according to the present invention.

Fig. 13 shows schematically the upper housing of the housing of the sweeping assembly according to the present invention.

Fig. 14 shows schematically the lower housing of the housing of the sweeping assembly according to the present invention.

Fig. 15 shows schematically a three-dimensional drawing of the sweeping assembly according to the present invention with the upper housing removed, showing in particular the electric machine support.

Detailed description of the invention

[0012] Fig. 1 shows a particular embodiment of the sweeping assembly according to the present invention. Fig. 2 shows a bottom view of the sweeping assembly in Fig. 1. Fig. 3 shows a sectional drawing of the sweeping assembly in Fig. 1.

[0013] Referring to Figs. 1 - 3, the sweeping assembly 1 comprises a housing 10 forming an external appearance and a sweeping brush 20 accommodated in the housing 10. An opening 15 is formed in a bottom face of the housing 10; foreign matter can be swept or sucked into the sweeping assembly 1 through the opening 15. In this embodiment, the sweeping brush is a roller, with bristles provided on a surface thereof. It should be understood that the sweeping brush may also be any form of structure capable of performing a sweeping function. The sweeping brush 20 is rotatably mounted in the housing 10, and exposed to a surface to be cleaned through the opening 15. The sweeping brush 20 can receive a driving force from a drive source and thus rotate about a rotation axis C. The drive source may for example be an

electric machine integrated in the sweeping assembly; the electric machine drives a rotation shaft of the sweeping brush 20 to rotate via a transmission system such as a gearbox. It should be understood that the drive source may also be any form of motive power source capable of driving the sweeping brush to rotate, which may be configured to be integrated in the sweeping assembly or configured to be independent of the sweeping assembly. The drive source is generally provided with overload protection, to prevent damage to the drive source. When the sweeping brush 20 rotates, foreign matter attached to the surface to be cleaned is separated from the surface by the sweeping brush 20 and picked up. Foreign matter that has been separated and picked up can be driven by the sweeping brush or enter the housing 10 through the opening 15 under the action of a suction force.

[0014] As shown in detail in Fig. 3, one end of the sweeping brush 20 has a first connection part 21, the first connection part 21 being rotatably mounted in a corresponding mounting part 11 of the housing 10. Another end of the sweeping brush 20 has a second connection part 22, the second connection part 22 being rotatably mounted in a corresponding mounting part 12 of the housing 10. The sweeping brush 20 receives a driving force from the drive source via a transmission connection head 23 and thus rotates about the rotation axis C.

[0015] Further referring to Figs. 4 - 6, since the sweeping brush 20 is rotatably mounted in the static housing 10, a first gap A is formed between the first connection part 21 of the sweeping brush 20 and the corresponding mounting part 11 of the housing 10. A second gap B is formed between the second connection part 22 of the sweeping brush 20 and the corresponding mounting part 12 of the housing 10. When a sweeping operation is being performed, some foreign matter such as hair will become wound around the sweeping brush 20. This foreign matter might move toward the two ends of the sweeping brush 20 as the sweeping brush 20 rotates, and then enter and accumulate in the gap A and the gap B, or go on to enter a gap D formed by the transmission connection head 23 and the housing 10. When the sweeping brush 20 rotates, the foreign matter that has accumulated in the gap A and the gap B rubs against surfaces at two sides of each gap, thus increasing resistance to the rotation of the sweeping brush 20. In addition, because the rubbing generates heat, a large amount of heat will be continuously generated at the gap A and the gap B under the action of the high-speed rotation of the sweeping brush 20. This heat heats up surfaces of the housing 10 and sweeping brush 20 at two sides of the gap A and of the gap B, or surfaces of the housing 10 and transmission connection head 23 located at two sides of the gap D, such that the surface temperature rises and even exceeds the melting point of the materials, causing melting and deformation of the housing and sweeping brush or transmission connection head in the connection region, and thereby causing the sweeping assembly to suffer failure.

[0016] To prevent foreign matter from entering the gaps, the present invention provides a toothed structure comprising multiple teeth in a space between the housing and the sweeping brush. The multiple teeth extend from one of the housing and the sweeping brush toward the other of the housing and the sweeping brush. The multiple teeth are adapted to capture foreign matter passing through the multiple teeth or located in the vicinity thereof, and are thereby able to accumulate foreign matter at the toothed structure, thereby preventing foreign matter from entering the gap formed between the sweeping brush and the housing as the sweeping brush rotates. Furthermore, foreign matter captured on the toothed structure hinders the rotation of the sweeping brush, thus increasing resistance to rotation of the sweeping brush. When foreign matter accumulates to a certain amount, the resistance to rotation will increase to a point where it is able to trigger overload protection of the drive source in order to stop the rotation of the sweeping brush, thereby reminding the user to clear the captured foreign matter. In other words, by means of the toothed structure, the present invention actively captures foreign matter between the housing and the sweeping brush that might enter the gap, and utilizes the capturing of this foreign matter to actively increase the resistance to rotation, such that the overload protection of the drive source can be triggered promptly. The present invention converts an amount of foreign matter to a size of resistance to rotation, making it possible to identify, monitor and promptly remind the user to clear foreign matter through the prompt triggering of overload protection of the drive source, thus eliminating and at least reducing the possibility of foreign matter ultimately entering the gap. In addition, since the overload protection of the drive source can be triggered promptly, there will be no generation of a large amount of heat due to friction within the relatively short time before overload protection is triggered, even if a small amount of foreign matter is present in the gap, and this avoids melting of the materials in the region of connection of the housing and the sweeping brush and consequent failure. Thus, the toothed structure comprising multiple teeth provides protection for preventing the entry of foreign matter into the gap and avoiding the melting of materials.

[0017] In the embodiments shown in Figs. 4 - 10, the toothed structure according to the present invention is a plate-like member 30, 32 with teeth. As shown in Figs. 4 - 5, the plate-like member 30 extends from the housing 10 toward the sweeping brush 20 in a direction perpendicular to the rotation axis C of the sweeping brush 20. The plate-like member 30 comprises multiple teeth 300 extending between the housing 10 and the sweeping brush 20. As shown in Figs. 4 and 6, the toothed structure may extend to the connection part close to the sweeping brush. As will be understood, the toothed structure may also be arranged at a position closer to the inside, as long as it does not interfere with the sweeping brush. The multiple teeth 300 extend in the shape of comb teeth. In

other embodiments, the multiple teeth 300 may also have the shape of sawteeth.

[0018] The plate-like member 30 is arranged at a position close to the gap A, and is closer to the inside of the housing than the gap A in the direction of the rotation axis C. Figs. 6 - 7 show the plate-like member 32 arranged close to the gap B. The plate-like member 32 may have a structure similar to that of the plate-like member 30. The plate-like member 32 comprises multiple teeth 310, and is closer to the inside than the gap B in the direction of the rotation axis C. When a sweeping operation is being performed, the multiple teeth 300 of the plate-like member 30 can effectively capture foreign matter moving toward the gap A. The multiple teeth 310 of the plate-like member 32 can effectively capture foreign matter moving toward the gap B.

[0019] The multiple teeth of the plate-like members 30, 32 may extend downward in a vertical direction, substantially in parallel, as shown in Fig. 8. The multiple teeth 300 preferably extend to the connection part close to the sweeping brush. Teeth lying outside the range of the sweeping brush may extend a longer distance. Teeth extending upward from a lower housing may also be provided. It must be pointed out that the teeth in Fig. 8 are substantially tapered teeth, but the teeth may also be configured to have other shapes, as described below.

[0020] As shown in Figs. 13 and 14, the housing 10 may be formed by combining a semicircular upper housing 13 and a rectangular base body 14 comprising the opening 15. The teeth may extend out from the semicircular upper housing 13 and/or rectangular base body 14. Such teeth extending in the vertical direction facilitate mold release when the upper housing is manufactured.

[0021] Fig. 13 clearly shows the structure of the upper housing in an embodiment of the present invention. The upper housing has an inner surface. Toothed members, for example the plate-like members 30, 32, are arranged close to the two ends of the housing and extend inward from the inner surface. Rib plates 40, 42 may be provided outside the plate-like members 30, 32 respectively. The rib plates 40, 42 are spaced apart from the plate-like members 30, 32 respectively by a certain distance. Fig. 14 clearly shows the structure of the lower housing in an embodiment of the present invention. The lower housing has an inner surface. Toothed members are arranged close to the two ends of the housing and extend inward from the inner surface. Rib plates 40, 42 may be provided outside the plate-like members 30, 32 respectively.

[0022] In another embodiment shown in Fig. 9, the multiple teeth 310 each extend at an angle with respect to a radial direction D of the sweeping brush 20, such that tips of the multiple teeth surround the sweeping brush 20 in a ring shape. Such teeth extending at an angle in a ring shape are similar to sawteeth in shape, and can achieve a better foreign matter capturing effect. In one embodiment, the teeth are configured such that the gaps between the teeth can be formed so as to become narrower in the direction toward openings of the gaps. This

helps to retain foreign matter in the gaps.

[0023] The teeth 300 may also comprise reinforcing ribs 305 as shown in Fig. 10; the reinforcing ribs 305 are arranged in a longitudinal direction of the teeth in order to reinforce the teeth, and prevent the teeth from being broken.

[0024] The teeth may have multiple small protrusions projecting transversely (i.e. perpendicular to the longitudinal direction of the teeth) in a circumferential direction of teeth bodies. The transversely projecting small protrusions enable the teeth to be formed in the shape of a rolling comb. This is especially beneficial when the toothed structure is arranged on the sweeping brush, because the transversely projecting small protrusions can capture hair so that it is not thrown off due to centrifugal force.

[0025] The toothed structure according to the present invention may also have other embodiments. The toothed structure may be any structure and shape comprising teeth. For example, as an alternative to the plate-like member with teeth, multiple independent teeth may extend out directly from the housing, to form an array of teeth. The teeth may extend in a direction perpendicular to the rotation axis C as shown in Figs. 4 - 8, or may extend obliquely with respect to the rotation axis C. The angle of obliquity may be 0 - 45 degrees, preferably 5 - 20 degrees, and more specifically may be 15 degrees. Preferably, the teeth extend toward the inside of the sweeping brush obliquely with respect to the rotation axis C, such that the directions of extension of the teeth are opposite to the directions of movement of hair toward the two sides of the sweeping brush, so that hair can be captured more easily. The teeth may be conical teeth, triangular pyramid-shaped teeth or prism-shaped teeth, etc. In addition, any number of toothed structures is possible, and the toothed structure can be arranged at any position between the two gaps. The material of the toothed structure may be plastic or metal, etc.

[0026] Optionally, in another embodiment, besides the toothed structure comprising multiple teeth, a blocking rib plate may also be provided. The blocking rib plate is closer to the gap than the toothed structure, thereby further blocking the entry of foreign matter, especially foreign matter captured by the toothed structure, into the gap. Thus, the blocking rib plate provides further protection for preventing the entry of foreign matter into the gap and avoiding the melting of materials. In one embodiment, the blocking rib plate is a rib plate 40, 42 extending from the housing 10 toward the sweeping brush 20. As shown in Figs. 4 - 5, the rib plate 40 extends from the housing 10 toward the sweeping brush 20 in a direction perpendicular to the rotation axis C of the sweeping brush 20. It should be understood that in other embodiments, the rib plate according to the present invention may also extend at an angle with respect to the rotation axis C. The angle may be 0 - 45 degrees, preferably 5 - 20 degrees, and more specifically may be 15 degrees. The rib plate 40 extends substantially to a circumferential surface

of the sweeping brush 20, with as small a gap as possible being left between an end of the rib plate 40 and the circumferential surface of the sweeping brush 20. The rib plate 40 is arranged close to the gap A and located outside the plate-like member 30. A space for holding foreign matter is formed between the rib plate 40 and the plate-like member 30. As shown in Fig. 11 and referring to Figs. 13 and 14, the rib plate 40 may be formed of a semicircular ring-shaped plate extending toward the inside from the upper housing 13 and a rectangular plate extending toward the inside from the rectangular base body 14.

[0027] Figs. 6 - 7 show the rib plate 42 arranged close to the gap B and located outside the plate-like member 32. The rib plate 42 may have a structure similar to that of the rib plate 40. As shown in Fig. 12 and referring to Figs. 13 and 14, the rib plate 42 may be formed of a semicircular ring-shaped plate extending toward the inside from the upper housing 13 and a semicircular ring-shaped plate extending inward from the rectangular base body 14, the two semicircular ring-shaped plates forming a circular plate that completely surrounds the sweeping brush 20. Ends of the rib plates 40, 42 substantially lie against the circumferential surface of the sweeping brush 20.

[0028] Optionally, in order to further prevent overheating and melting of the housing, the sweeping brush mounting part of the housing is integrally formed with an electric machine support, and uses a high-performance material such as PA6-GF30, to improve the material performance of the sweeping brush mounting part. This provides further protection for avoiding the melting of materials.

[0029] In one embodiment, the sweeping assembly 1 has an electric machine arranged in the sweeping assembly, the electric machine being mounted in the sweeping assembly 1 in a fixed manner by means of an electric machine support 50. As shown in Fig. 15, the sweeping brush mounting part 11 of the housing 10 is integrally formed with the electric machine support 50, thus simplifying the steps of installation. At the same time, the sweeping brush mounting part 11 of the housing 10 may be made from the high-performance material PA6-GF30 (nylon 6 reinforced with 30% glass fiber) instead of a low-performance material. The high-performance material has a higher melting point, thus further reducing the risk of the housing material melting.

[0030] The sweeping assembly of the present invention is adapted to be mounted on a sweeping appliance. Examples of sweeping appliances include various types of vacuum cleaners, including handheld vacuum cleaners, horizontal vacuum cleaners and upright vacuum cleaners.

[0031] The cleaning appliance of the present invention can promptly trigger protection measures when necessary through the following process, to remind the user to deal with the foreign matter, in order to avoid failure due to melting of the housing and sweeping brush in the con-

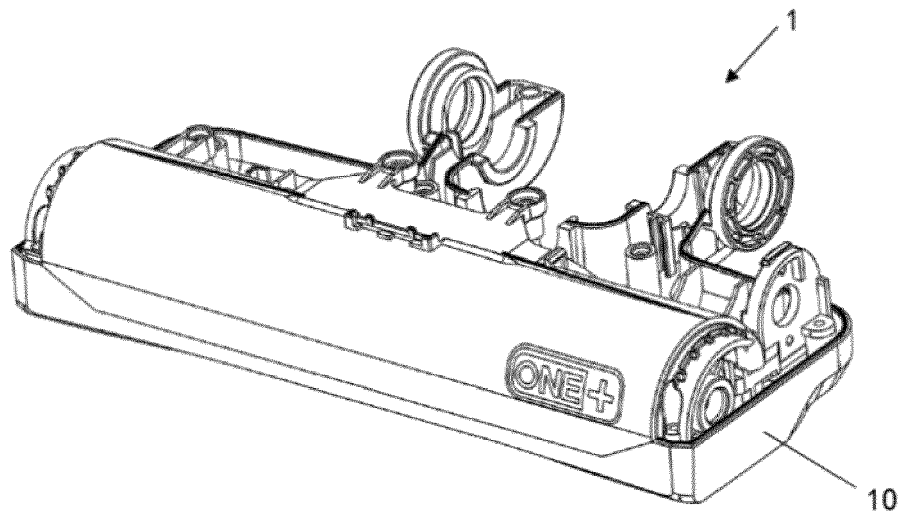
nection region. The process comprises: the toothed structure capturing foreign matter passing through the teeth or located in the vicinity thereof; in response to an increase in the amount of foreign matter captured, the resistance to rotation of the sweeping brush increasing; when the resistance to rotation has increased to a point where it exceeds a predetermined threshold, triggering overload protection of the drive source providing the driving force in order to stop rotation of the sweeping brush; and in response to the stoppage of rotation of the sweeping brush, generating an indication signal to remind the user to clear the captured foreign matter.

[0032] The present invention has already described some preferred embodiments and variants thereof. Those skilled in the art will be able to think of other variants and changes after reading and understanding the description. Thus, the present invention is not limited to the particular embodiments disclosed as preferred modes for implementing the present invention, and shall include all embodiments falling within the scope of the claims.

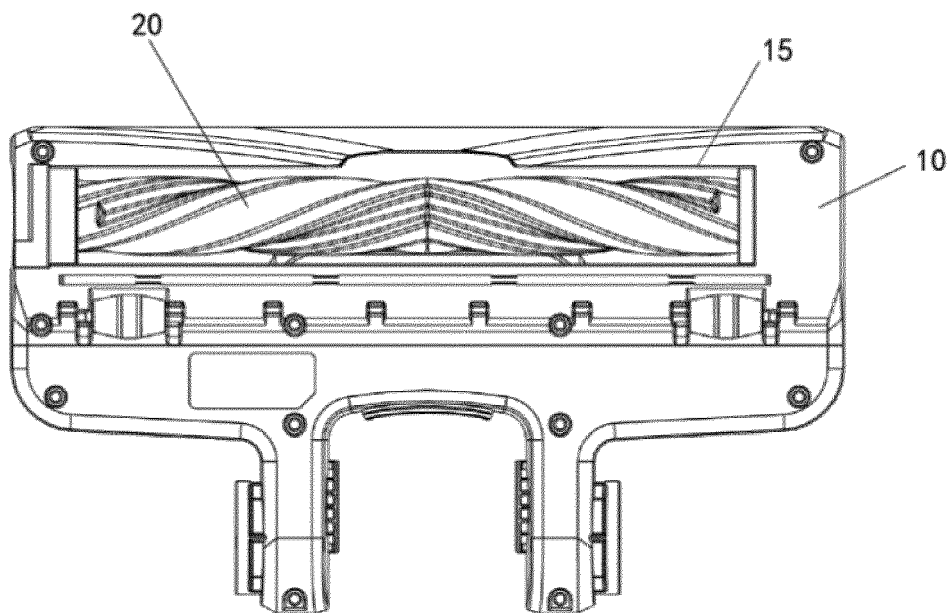
Claims

1. A sweeping assembly for a cleaning appliance, comprising:
 - a housing, comprising an opening facing toward a surface to be swept;
 - a sweeping brush, having a connection part by means of which the sweeping brush is mounted in the housing, and being capable of rotating about a rotation axis by receiving a driving force, so as to perform a sweeping operation; and
 - a toothed structure arranged close to an end of the sweeping brush, the toothed structure being provided between the housing and the sweeping brush and comprising multiple teeth, the multiple teeth extending from one of the housing and the sweeping brush toward the other of the housing and the sweeping brush.
2. The sweeping assembly as claimed in claim 1, wherein the multiple teeth extend from at least one of the housing and the sweeping brush in a direction perpendicular to the rotation axis or in a direction forming an angle with respect to the rotation axis.
3. The sweeping assembly as claimed in claim 2, wherein the multiple teeth extend parallel to each other in a vertical direction.
4. The sweeping assembly as claimed in claim 2, wherein the multiple teeth each extend at an angle with respect to a radial direction of the sweeping brush.

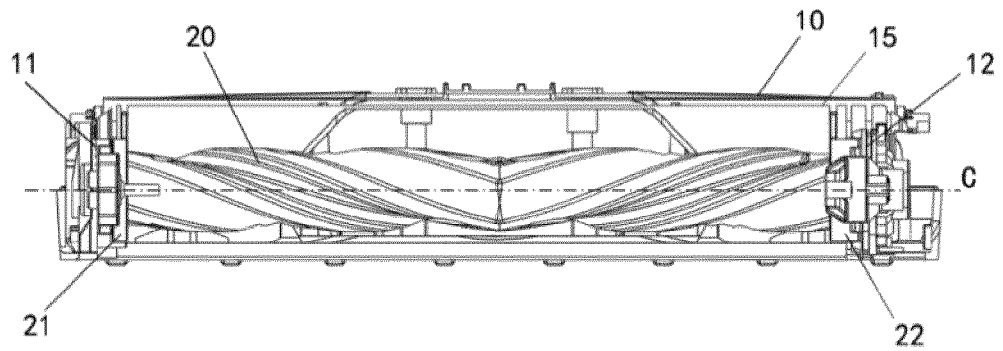
5. The sweeping assembly as claimed in claim 2, wherein one or more of the multiple teeth is provided with multiple protrusions extending transversely to a longitudinal axis thereof, and/or one or more of the multiple teeth may further comprise a reinforcing rib arranged in a longitudinal direction of the tooth in order to reinforce the tooth.
6. The sweeping assembly as claimed in any one of claims 1 - 5, wherein the toothed structure is mounted on the housing or is formed integrally with the housing.
7. The sweeping assembly as claimed in any one of claims 1 - 6, further comprising a blocking rib plate arranged around the sweeping brush substantially in a ring shape, a gap being formed between the housing and the connection part of the sweeping brush, and the blocking rib plate being located between the gap and the toothed structure, in order to block the entry of foreign matter into the gap.
8. The sweeping assembly as claimed in claim 7, wherein the housing comprises a semicircular upper housing and a rectangular base body comprising an opening, the sweeping brush picking up foreign matter through the opening; the semicircular upper housing and the rectangular base body are each provided with an inward-extending semicircular ring-shaped plate, and the blocking rib plate is a circular plate formed by the semicircular ring-shaped plate of the semicircular upper housing and the semicircular ring-shaped plate of the rectangular base body.
9. The sweeping assembly as claimed in claim 1, wherein the sweeping brush is connected to a drive source, the drive source providing a driving force to make the sweeping brush rotate against resistance to rotation, the toothed structure being able to cause the resistance to rotation of the sweeping brush to increase by means of captured foreign matter, and the drive source having overload protection, which is triggered to stop the rotation of the sweeping brush when the resistance to rotation has increased to a point where it exceeds a predetermined threshold, thereby reminding a user to clear the captured foreign matter.
10. The sweeping assembly as claimed in claim 9, wherein the drive source is an electric machine, and a sweeping brush mounting part cooperating with the connection part of the sweeping brush is integrally formed with an electric machine support, the material of the sweeping brush mounting part preferably being PA6-GF30.
11. The sweeping assembly as claimed in claim 1, wherein the housing comprises an upper housing and a lower housing, the upper housing and/or the lower housing comprising the toothed structure.
12. The sweeping assembly as claimed in claim 2, wherein the multiple teeth form an angle of 0 - 45 degrees with respect to the rotation axis.
13. A cleaning appliance, comprising the sweeping assembly as claimed in any one of claims 1 - 12.
14. The cleaning appliance as claimed in claim 13, being a handheld vacuum cleaner, a horizontal vacuum cleaner or an upright vacuum cleaner.
15. A method for a cleaning appliance, the cleaning appliance comprising a sweeping assembly, the sweeping assembly comprising a housing and a sweeping brush mounted in the housing, the sweeping brush being capable of rotating in the housing by receiving a driving force provided by a drive source, so as to perform a sweeping operation, the method comprising:
 - providing a toothed structure between the housing and the sweeping brush, to capture foreign matter when the sweeping operation is performed, wherein the toothed structure comprises multiple teeth, the multiple teeth extending from one of the housing and the sweeping brush toward the other of the housing and the sweeping brush;
 - resistance to rotation of the sweeping brush increasing in response to an increase in the amount of foreign matter captured;
 - triggering overload protection of the drive source providing the driving force to stop the rotation of the sweeping brush when the resistance to rotation has increased to a point where it exceeds a predetermined threshold; and
 - generating an indication signal in response to the stoppage of rotation of the sweeping brush, to remind a user to clear the captured foreign matter.



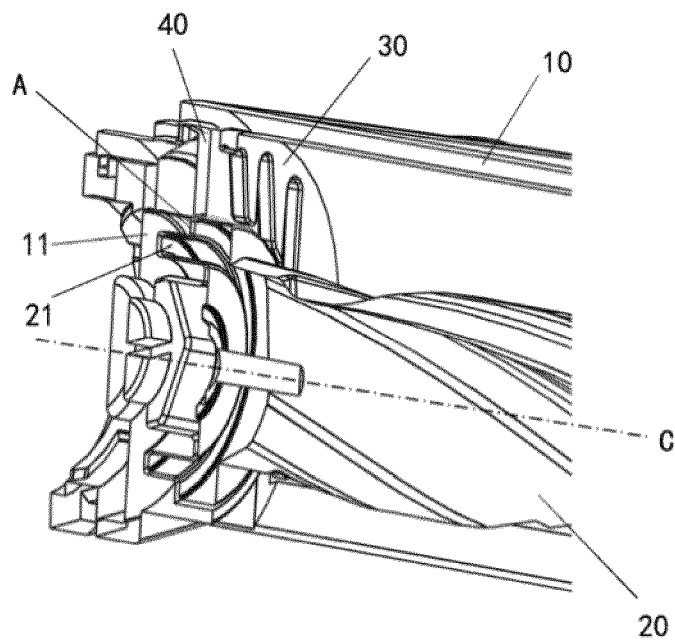
[Figure no.] Fig. 1



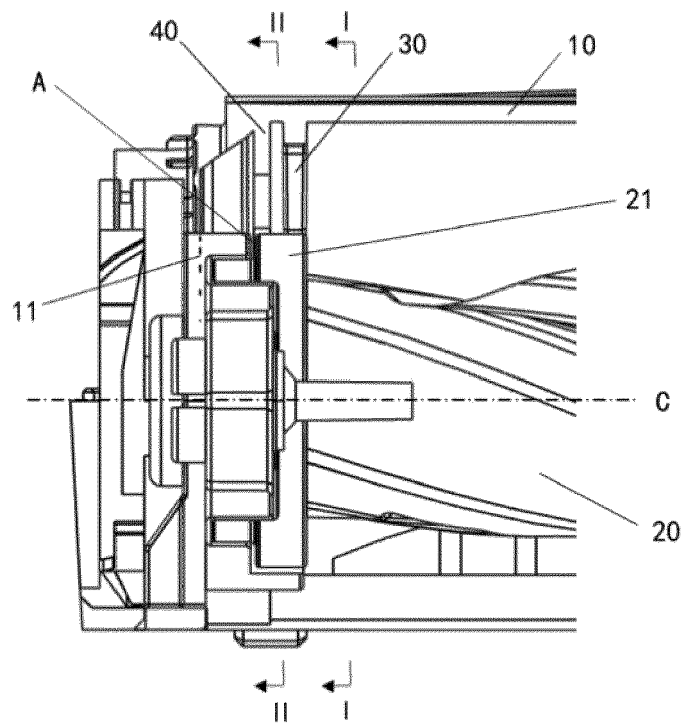
[Figure no.] Fig. 2



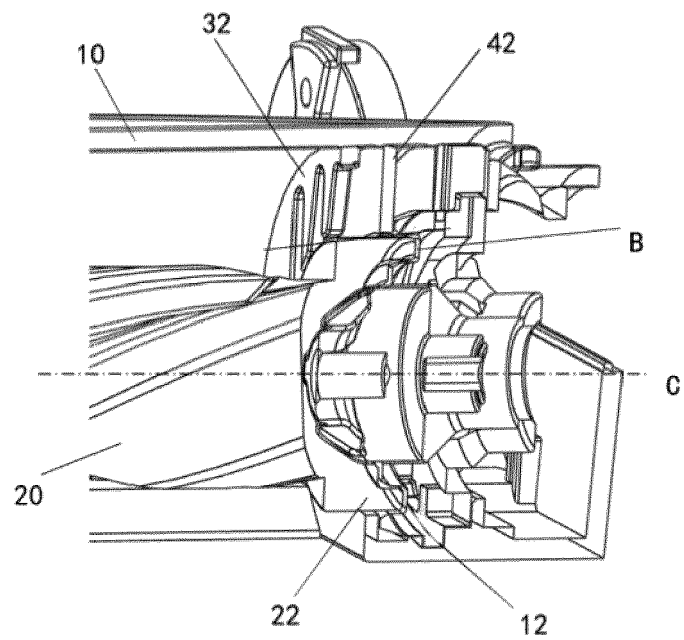
[Figure no.] Fig. 3



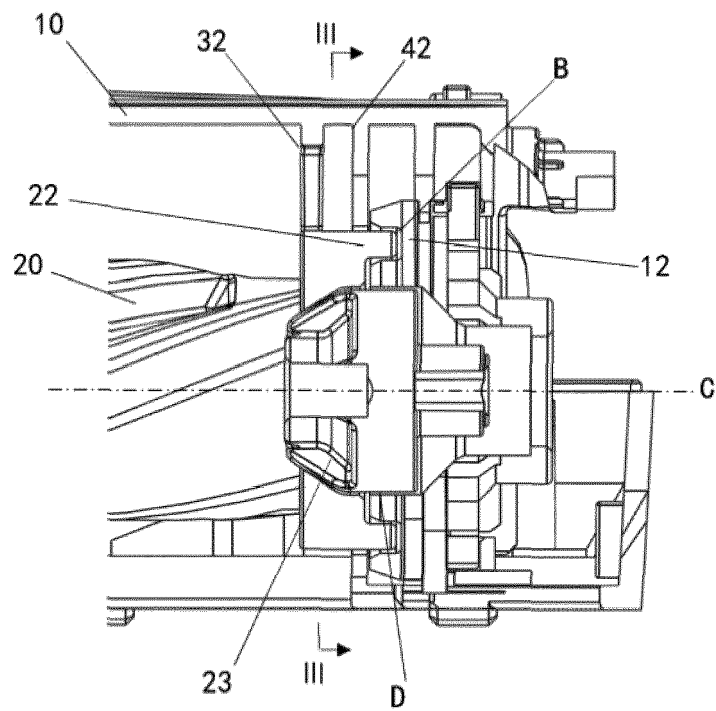
[Figure no.] Fig. 4



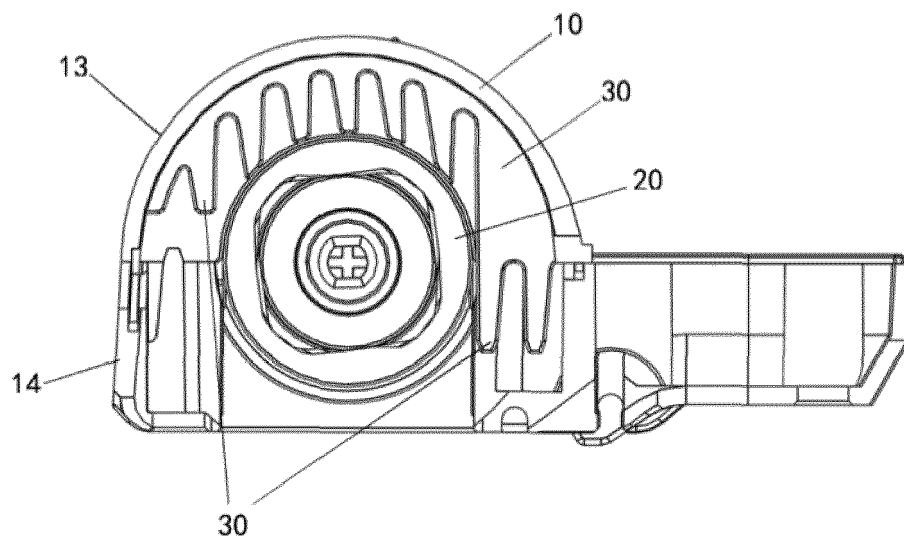
[Figure no.] Fig. 5



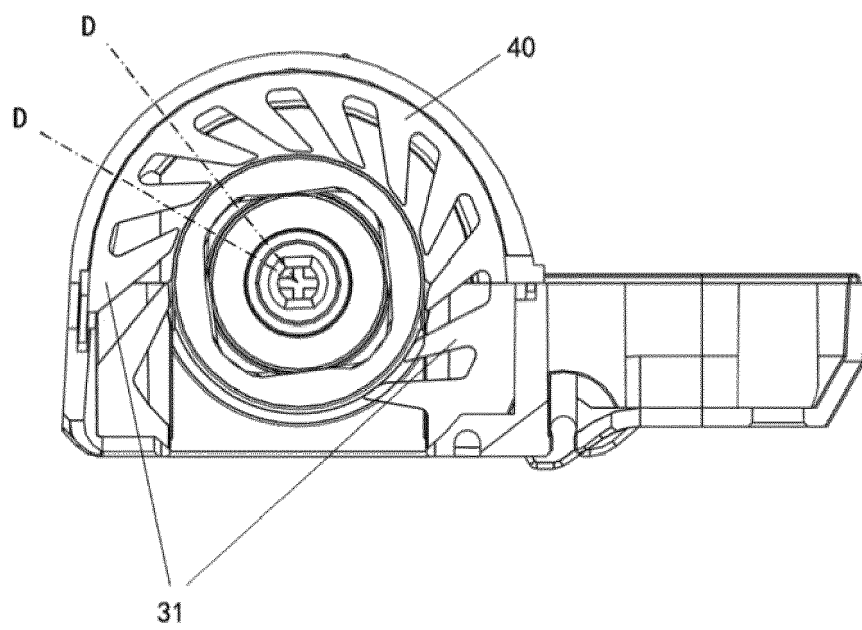
[Figure no.] Fig. 6



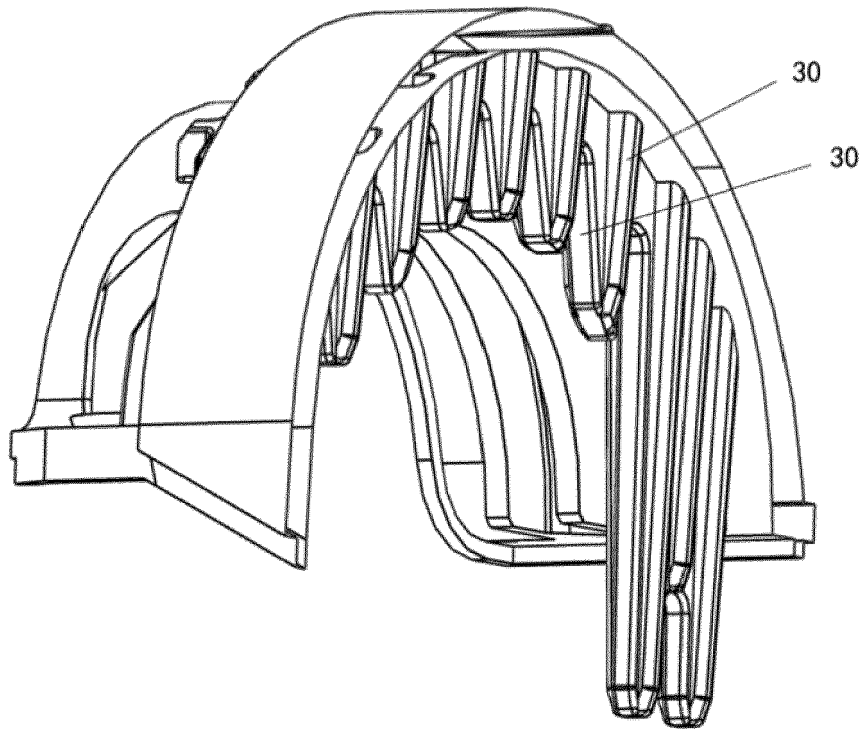
[Figure no.] Fig. 7



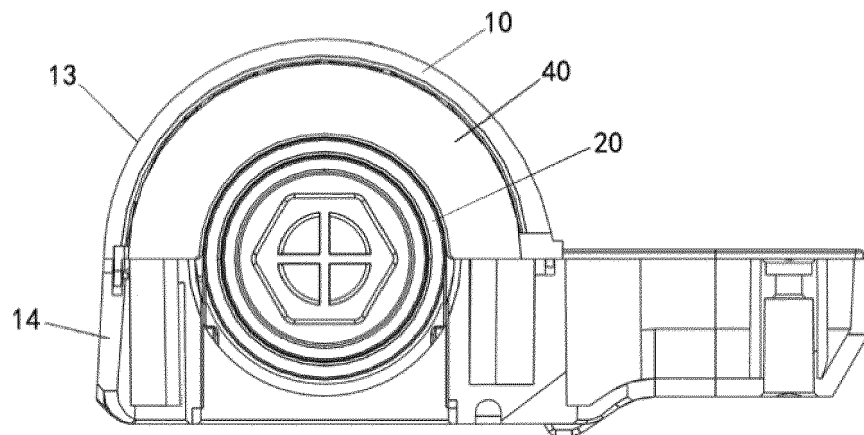
[Figure no.] Fig. 8



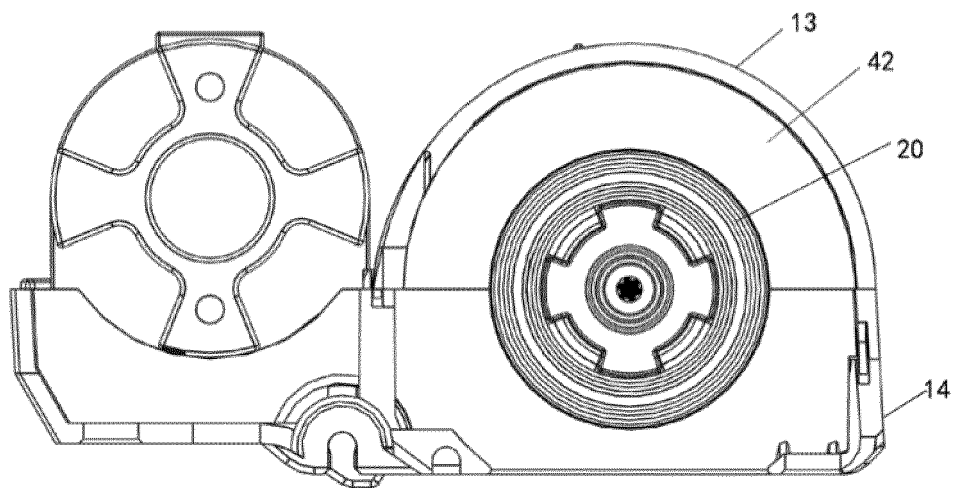
[Figure no.] Fig. 9



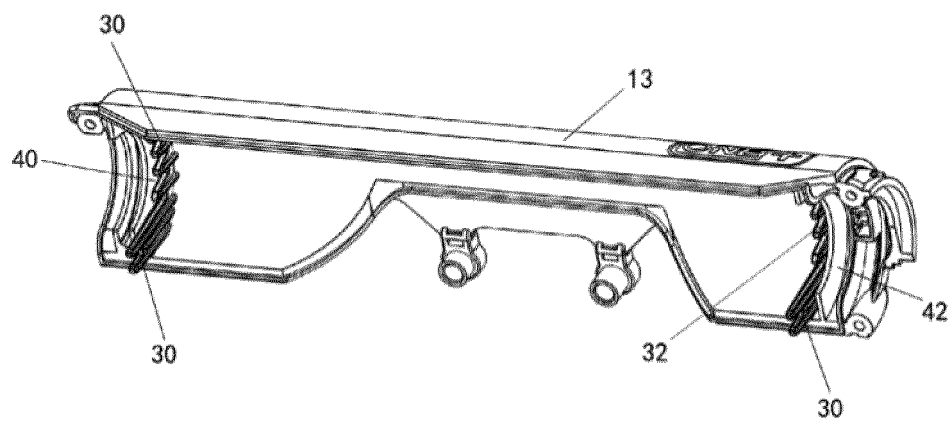
[Figure no.] Fig. 10



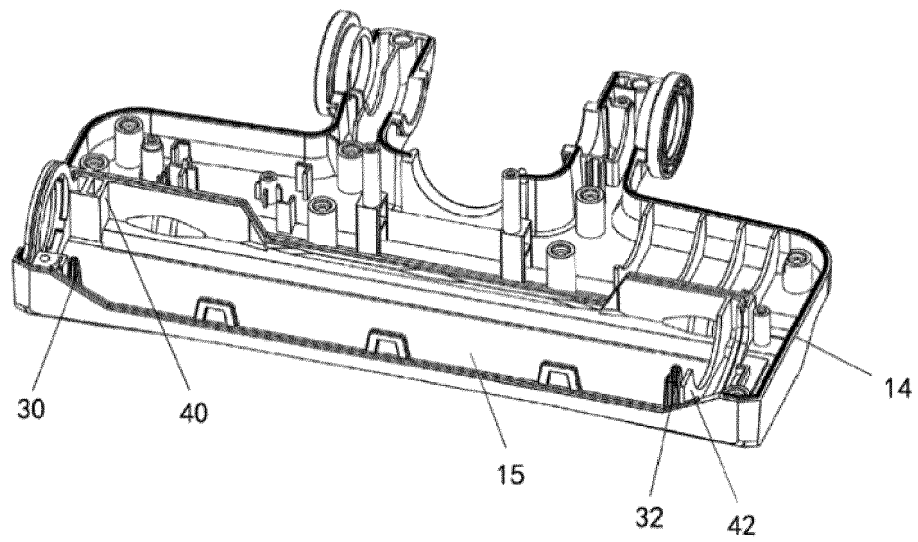
[Figure no.] Fig. 11



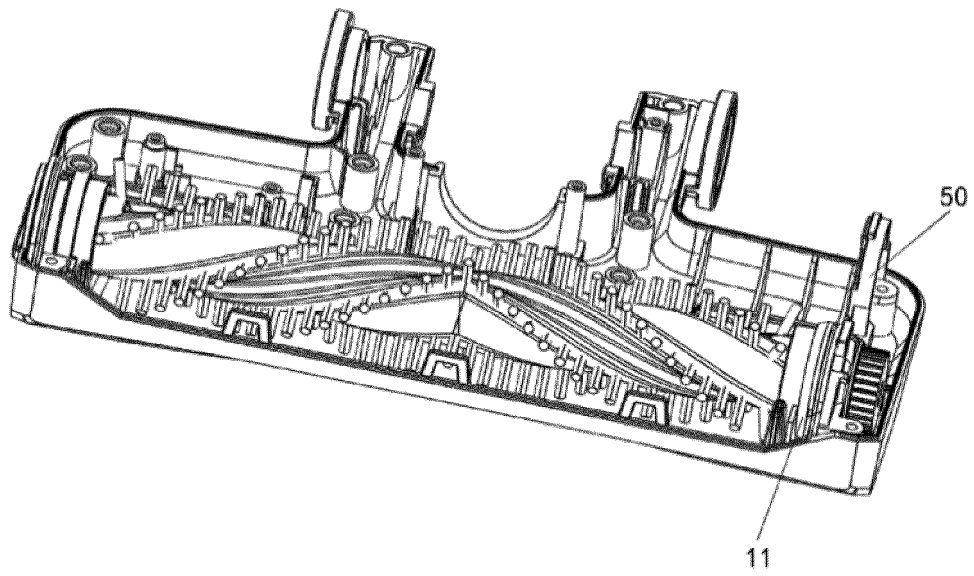
[Figure no.] Fig. 12



[Figure no.] Fig. 13



[Figure no.] Fig. 14



[Figure no.] Fig. 15



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Place of search Munich		Date of completion of the search 29 March 2022	Examiner Eckenschwiller, A
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