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(54) **FLOOR BRUSH AND VACUUM CLEANER**

(57) Provided are a floor brush and a vacuum cleaner including the floor brush. The floor brush includes an upper housing, a lower housing, a cavity formed by the upper housing and the lower housing, and a roller brush disposed in the cavity. The floor brush further includes: a cleaning assembly, disposed on the upper housing and extending into the cavity. The cleaning assembly includes a driving portion at least partially penetrating the upper housing and a cleaning portion connectable to the driving portion and disposed in the cavity. When subjected to an external force, the driving portion is capable of driving the cleaning portion to move toward the roller brush. The driving portion of the cleaning assembly partially penetrates the upper housing, which simplifies the structure and a manufacturing and mounting process of the cleaning assembly. Therefore, the structure is simple and facilitates operations of a user.

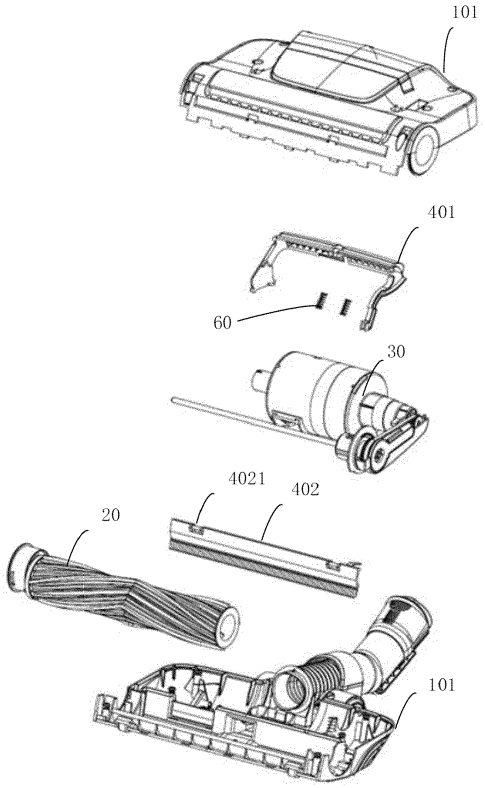

FIG. 4

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Description

BACKGROUND

Technical Field

[0001] The present invention relates to the field of household appliance technologies, and specifically, to a floor brush and a vacuum cleaner.

Related Art

[0002] The vacuum cleaner is a common cleaning apparatus in modern families, and may be configured to clean the floor, surfaces of furniture, and the like. The vacuum cleaner usually includes a floor brush. The floor brush mainly includes a housing and a roller brush disposed in the housing. When the vacuum cleaner works, the roller brush is driven by a power assembly or an external force to rotate.

[0003] However, in daily cleaning, there are a lot of hair twining around the roller brush. On the one hand, it is difficult to clean the roller brush; and on the other hand, the cleaning efficiency of the roller brush is reduced, and it is extremely easy to cause a failure of the vacuum cleaner.

[0004] In the prior art, there have been solutions for preventing hair twining. In a solution, a comb portion directly extends into bristles of the roller brush. The comb portion is fixedly disposed close to the roller brush. The comb portion in the solution is always in contact with the bristles of the roller brush, and consequently component wear is caused after long-time use. In another solution, a power mechanism configured to push the roller brush to approach the comb portion is disposed, thereby cleaning the roller brush. In this solution, the structure of the existing roller brush needs to be improved to add and remove additional parts and components, which is relatively high in costs and relatively complex in process.

SUMMARY

[0005] An objective of the embodiments of the present invention is to provide at least a floor brush and a vacuum cleaner including the floor brush. The floor brush has a cleaning assembly, which can simplify the structure of the cleaning assembly, reduce the process complexity, and facilitate use of a user.

[0006] To resolve the foregoing problem, the present invention provides a floor brush, including an upper housing, a lower housing, a cavity formed by the upper housing and the lower housing, and a roller brush disposed in the cavity. The floor brush further includes: a cleaning assembly, disposed on the upper housing and extending into the cavity, where the cleaning assembly includes a driving portion at least partially penetrating the upper housing and a cleaning portion connectable to the driving portion and disposed in the cavity, where when subjected to an external force, the driving portion is capable of driving the cleaning portion to move toward the roller brush. The driving portion of the cleaning assembly partially penetrates the upper housing, which simplifies the structure and a manufacturing and mounting process of the cleaning assembly. Therefore, the structure is simple and facilitates operations of a user.

[0007] In a possible embodiment, the driving portion includes a button portion and an extension portion extending toward the roller brush, where when subjected to an external force, the button portion drives, by using the extension portion, the cleaning portion to move toward the roller brush. When cleaning the roller brush, the user only needs to continuously apply a force to the button portion, to clean the roller brush.

[0008] In a possible embodiment, the driving portion further includes a blocking portion, disposed at a joint between the button portion and the extension portion, where when the button portion is subjected to no external force, the blocking portion leans against an inner wall of the upper housing. Therefore, when the user stops applying a force, the driving portion restores to an initial position, and will not detach from the upper housing.

[0009] In a possible embodiment, the button portion and the extension portion are integrally formed. By using the integrally formed driving portion, the action of the driving portion for driving the cleaning portion is more consecutive, and the structure of the cleaning assembly is simpler, which also simplifies the manufacturing and mounting process of the driving portion.

[0010] In a possible embodiment, the extension portion is curved. By using the structure, it is easier for the button portion and the extension portion to apply a pushing force to the cleaning portion, and the service life of the extension portion is prolonged.

[0011] In a possible embodiment, the cleaning assembly further includes a limiting portion, and a fixing portion is further disposed in the cavity, where one end of the limiting portion is fixedly connected to the cleaning portion, and the other end of the limiting portion leans against the fixing portion. The limiting portion is fixedly disposed, so that on the one hand, a distance between the cleaning portion and the roller brush can be limited, preventing the cleaning portion from excessively approaching the roller brush; and on the other hand, the cleaning portion can be pushed to be reset when an external force is removed.

[0012] In a possible embodiment, the limiting portion has an arc shape that is curved upward. By using the structure, the service life of the limiting portion can be prolonged.

[0013] In a possible embodiment, the limiting portion is made of an elastic material.

[0014] In a possible embodiment, the limiting portion and the cleaning portion are integrally formed.

[0015] In a possible embodiment, the cleaning portion is disposed in the cavity by using a first rotation shaft. Therefore, during cleaning, the cleaning portion can ro-

tate about the rotation shaft and approach the roller brush.

[0016] In a possible embodiment, the driving portion is disposed by using a second rotation shaft. Therefore, when subjected to a force, the driving portion can rotate about the shaft to drive the extension portion and the cleaning portion to rotate.

[0017] In a possible embodiment, the second rotation shaft is disposed on the driving portion away from a centre of gravity, so that when an upper end of the driving portion is subjected to an external force, the driving portion rotates about the second rotation shaft along a first direction, and the other lower end of the driving portion pushes the cleaning portion to approach the roller brush to be in contact with the roller brush, where when the external force is removed, the driving portion rotates about the second rotation shaft along a second direction opposite to the first direction, so that the cleaning portion leaves the roller brush.

[0018] In a possible embodiment, the second rotation shaft is disposed on an end of the extension portion away from a centre of the end, so that when an upper end of the driving portion is subjected to an external force, the driving portion rotates about the second rotation shaft along a first direction, and the other lower end of the driving portion pushes the cleaning portion to approach the roller brush to be in contact with the roller brush, where when the external force is removed, the driving portion rotates about the second rotation shaft along a second direction opposite to the first direction, so that the cleaning portion leaves the roller brush.

[0019] In a possible embodiment, a maximum displacement of the driving portion in a rotation direction is 4 to 5 cm. A vacuum cleaner is provided, including the floor brush.

[0020] Compared with the prior art, the technical solutions of the present invention have the following advantages:

By using the foregoing solutions, the structure and a mounting process of a component configured to clean the roller brush can be simplified, and the integrally formed driving portion makes a working process of the cleaning assembly smoother. Moreover, the extension portion has a curved design, so that the service life of the extension portion is prolonged. In addition, the solutions can further make it convenient for a user to clean the roller brush by directly applying a force to the button portion.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021]

FIG. 1 is a schematic diagram of an overall structure of a floor brush according to an embodiment of the present invention;

FIG. 2 is a schematic structural diagram of a cross section cut along a line A-A in FIG. 1 according to an embodiment of the present invention;

FIG. 3 is a schematic structural diagram of a cross section cut along a line B-B in FIG. 1 according to an embodiment of the present invention;

FIG. 4 is a structural exploded view of a floor brush according to an embodiment of the present invention;

FIG. 5 is a left-side cross-sectional view of a floor brush according to an embodiment of the present invention;

FIG. 6 is a side view of a roller brush and a cleaning assembly according to an embodiment of the present invention;

FIG. 7 is a detailed schematic diagram of a driving portion in FIG. 4 according to an embodiment of the present invention; and

FIG. 8 is a right-side cross-sectional view of a floor brush according to an embodiment of the present invention.

DETAILED DESCRIPTION

[0022] The following clearly and completely describes the technical solutions of the present utility model with reference to specific implementations.

[0023] A vacuum cleaner may be an upright vacuum cleaner, a hand-held vacuum cleaner, or the like. The vacuum cleaner usually includes a floor brush 10 configured to clean the floor and the like. In a possible embodiment, the vacuum cleaner further includes a handle assembly connected to the floor brush 10, and cleaning work may be completed through cooperation between the handle assembly and the floor brush.

[0024] FIG. 1 to FIG. 4 show a floor brush 10 for the vacuum cleaner. FIG. 2 and FIG. 3 are respectively cross-sectional views of the floor brush in FIG. 1 from angles of A-A and B-B. The floor brush 10 includes an upper housing 101, a lower housing 101', a cavity formed by the upper housing and the lower housing, and a roller brush 20 disposed in the cavity. In an embodiment, the floor brush 10 further includes a power mechanism, configured to drive the roller brush to rotate. As shown in FIG. 2, FIG. 3, and FIG. 4, the power mechanism may be a wind wheel assembly 30 disposed in the cavity.

[0025] Further, as shown in FIG. 3, the floor brush 10 may further include a cleaning assembly 40, configured to clean the roller brush 20.

[0026] FIG. 4 shows an exploded view of core components of the floor brush 10, and FIG. 5 shows a schematic diagram of a mounting structure of the cleaning assembly. It may be learned from FIG. 4 and FIG. 5 that the

cleaning assembly 40 may be disposed on the upper housing 101 and extend into the cavity. It may be understood that one part of the cleaning assembly is disposed in the cavity, and the other part of the cleaning assembly is exposed to the outside of the cavity.

[0027] Referring to FIG. 3 to FIG. 6, the cleaning assembly 40 includes a driving portion 401 and a cleaning portion 402. The driving portion 401 may at least partially penetrate the upper housing 101, and the cleaning portion 402 is disposed in the cavity and is connectable to the driving portion 401. That is, the driving portion and the cleaning portion may be fixedly connected, or may be movably connected. When subjected to an external force, the driving portion 401 may drive the cleaning portion 402 to move toward the roller brush 20, to enable the cleaning portion to come into contact with the roller brush, so as to clean up things, such as hair, twining about the roller brush.

[0028] In an embodiment, as shown in FIG. 1, the upper housing 101 may be provided with an opening 1011, one end of the driving portion 401 may penetrate the opening 1011 and extend into the cavity, and the other end of the driving portion 401 may extend out of the opening 1011, so as to be exposed to the outside of the cavity, so that a user may come into contact with the driving portion 401 and apply a force to the driving portion.

[0029] In an embodiment, referring to FIG. 6 and FIG. 7, the driving portion 401 includes a button portion 4011 and an extension portion 4012 extending toward the roller brush. The button portion 4011 is disposed outside the opening 1011, and the extension portion 4012 is in the cavity and extends toward the roller brush 20.

[0030] One end of the extension portion 4012 is connected to the button portion 4011, and the other end of the extension portion 4012 may be connected to the cleaning portion 402. When subjected to an external force F, the button portion 4011 may drive, by using the extension portion 4012, the cleaning portion 402 to move toward the roller brush 20. Specifically, when a user applies an external force to the button portion, the extension portion may be caused to drive the cleaning portion to approach the roller brush to be in contact with the roller brush.

[0031] In an embodiment, the extension portion 4012 may be a curved connecting rod. As shown in FIG. 6 and FIG. 7, the connecting rod may be curved toward the upper housing 101. The connecting rod may be alternatively in another shape.

[0032] In an embodiment, the button portion 4011 and the extension portion 4012 may be integrally formed.

[0033] In an embodiment, as shown in FIG. 7, the driving portion 401 further includes a blocking portion 4013. The blocking portion 4013 is disposed at a joint between the button portion 4011 and the extension portion 4012. When the button portion 4011 is subjected to no external force, the blocking portion 4013 leans against an inner wall of the upper housing 101, so as to prevent the driving portion from detaching from the opening 1011.

[0034] The blocking portion 4013 may be a component independently disposed on the driving portion 401, or may be integrally formed with the driving portion 401.

[0035] In an embodiment, the driving portion 401 may be disposed by using a second rotation shaft 4014.

[0036] Specifically, as shown in FIG. 5 and FIG. 6, the driving portion 401 may be fixed to the upper housing 101 by using the second rotation shaft 4014, the second rotation shaft 4014 may be disposed on the driving portion 401, and a corresponding position on the upper housing 101 may be provided with a shaft hole 4014' fitting the second rotation shaft 4014.

[0037] In an embodiment, the second rotation shaft 4014 may be disposed on the driving portion 401 away from a centre of gravity. When an upper end of the driving portion 401 is subjected to an external force F, the driving portion 401 rotates about the second rotation shaft 4014 along a first direction X, and the other lower end of the driving portion 401 pushes the cleaning portion 402 to approach the roller brush 20 to be in contact with the roller brush.

[0038] In an embodiment, a spring 60 may be disposed at a side of the button portion. As shown in FIG. 4, one end of the spring is connected to an inner side of the button, and the other end of the spring is connected to a housing of the wind wheel. When rotating along the first direction X, the driving portion 401 presses the spring. When the external force is removed, the driving portion 401 may rotate about the second rotation shaft 4014 along a second direction Y opposite to the first direction, when subjected to a restoring force of the spring, so that the cleaning portion 402 leaves the roller brush 20.

[0039] In an embodiment, the second rotation shaft 4014 may be disposed on an end of the extension portion 4012 close to the button portion 4011. Preferably, referring to FIG. 6, the second rotation shaft 4014 may be disposed on an end of the extension portion 4012 away from a centre of the end, which may be a side of the end.

[0040] In an embodiment, a maximum displacement of the driving portion 401 in a rotation direction is 4 to 5 cm. It may be understood that a maximum displacement of the button portion 4011 of the driving portion 401 is 4 to 5 cm. Alternatively, a maximum displacement of the button portion 4011 rotating about the rotation shaft is 4 to 5 cm.

[0041] In an embodiment, the cleaning portion 402 is disposed in the cavity by using a first rotation shaft 4021.

[0042] When the driving portion 401 drives the cleaning portion 402 to move, the cleaning portion 402 may rotate about the first rotation shaft 4021.

[0043] In an embodiment, referring to FIG. 6 and FIG. 8, the cleaning assembly 40 may further include a limiting portion 403, and a fixing portion 50 may be disposed in the cavity. One end of the limiting portion 403 may be fixedly connected to the cleaning portion 402, and the other end of the limiting portion 403 leans against the fixing portion 50.

[0044] When the cleaning portion 402 rotates about

the first rotation shaft 4021 along the first direction X, because the limiting portion 403 is fixed between the cleaning portion 402 and the fixing portion 50, the cleaning portion 402 presses the limiting portion 403.

[0045] When an external force applied to the driving portion 401 is removed, due to a restoring force of the limiting portion, the cleaning portion 402 rotates about the first rotation shaft 4021 along the second direction Y, thereby restoring to an original position. On the one hand, the limiting portion 403 may limit a displacement of the cleaning portion, and on the other hand, the cleaning portion and the driving portion may restore to initial positions after the external force is removed.

[0046] As shown in FIG. 5 and FIG. 6, the fixing portion 50 may be disposed in the cavity, or may be fixed on an inner wall of the upper housing 101, or may be a groove formed by the upper housing by being recessed toward the cavity.

[0047] In an embodiment, the limiting portion 403 may have an arc shape that is curved upward. In this way, during rotation, the cleaning portion 402 may apply a force to the limiting portion 403 more easily, and the service life of the limiting portion 403 may be prolonged. Certainly, the limiting portion 403 may be alternatively set in another shape.

[0048] In an embodiment, the limiting portion 403 is made of an elastic material, and may restore to an initial status when an external force is removed.

[0049] In an embodiment, the limiting portion 403 and the cleaning portion 402 may be integrally formed.

[0050] By using the foregoing structure design, a user may clean the floor brush as required. In addition, the structure and a mounting process of a component configured to clean the roller brush can be simplified, and the integrally formed driving portion makes a working process of the cleaning assembly smoother. Moreover, the extension portion has a curved design, so that the service life of the extension portion is prolonged. In addition, the solutions can further make it convenient for a user to clean the roller brush by directly applying a force to the button portion.

[0051] A working manner of the floor brush is as follows:

When the roller brush needs to be cleaned, the user may step on the button portion, to enable the button portion and the extension portion to rotate about the second rotation shaft along the first direction X. In this case, the extension portion drives a comb portion to move toward the roller brush. The comb portion is driven by the extension portion, and rotates about the first rotation shaft along the first direction X, so that a tooth portion of the comb portion approaches the roller brush to be in contact with the roller brush.

[0052] During rotation, the comb portion presses the limiting portion. When the force applied by the user is removed, a restoring force of the limiting portion causes the comb portion to rotate in the second direction Y, to restore to the initial position. Similarly, the extension portion and the button portion also restore to the initial positions.

[0053] Although the present invention is disclosed above, the present invention is not limited thereto. A person skilled in the art can make various changes and modifications without departing from the spirit and the scope of the present invention. Therefore, the protection scope of the present invention should be subject to the scope defined by the claims.

LIST OF REFERENCE SINGS

[0054]

10	floor brush
20	roller brush
30	wind wheel assembly
40	cleaning assembly
50	fixing portion
60	spring
101	upper housing
101'	lower housing
401	driving portion
402	cleaning portion
403	limiting portion
1011	opening
4011	button portion
4012	extension portion
4013	blocking portion
4014	second rotation shaft
4014'	shaft hole
4021	first rotation shaft

Claims

1. A floor brush (10), **characterized by** comprising an upper housing (101), a lower housing (101'), a cavity formed by the upper housing (101) and the lower housing (101'), and a roller brush (20) disposed in the cavity, wherein the floor brush (10) further comprises:

   a cleaning assembly (40), disposed on the upper housing (101) and extending into the cavity, wherein

   the cleaning assembly (40) comprises a driving portion (401) at least partially penetrating the upper housing (101) and a cleaning portion (402) connectable to the driving portion (401) and disposed in the cavity, wherein when subjected to an external force, the driving portion (401) is capable of driving the cleaning portion (402) to move toward the roller brush (20).

2. The floor brush according to claim 1, **characterized in that** the driving portion (401) comprises a button portion (4011) and an extension portion (4012) ex-

tending toward the roller brush (20), wherein when subjected to an external force, the button portion (4011) drives, by using the extension portion (4012), the cleaning portion (402) to move toward the roller brush (20).

3. The floor brush according to claim 2, **characterized in that** the driving portion (401) further comprises a blocking portion (4013), disposed at a joint between the button portion (4011) and the extension portion (4012), wherein when the button portion (4011) is subjected to no external force, the blocking portion (4013) leans against an inner wall of the upper housing (101) .

4. The floor brush according to claim 2, **characterized in that** the button portion (4011) and the extension portion (4012) are integrally formed.

5. The floor brush according to claim 2, **characterized in that** the extension portion (4012) is curved.

6. The floor brush according to claim 1, **characterized in that** the cleaning assembly (40) further comprises a limiting portion (403), and a fixing portion (50) is further disposed in the cavity, wherein one end of the limiting portion (403) is fixedly connected to the cleaning portion (402), and the other end of the limiting portion (403) leans against the fixing portion (50).

7. The floor brush according to claim 6, **characterized in that** the limiting portion (403) has an arc shape that is curved upward.

8. The floor brush according to claim 6, **characterized in that** the limiting portion (403) is made of an elastic material.

9. The floor brush according to claim 6, **characterized in that** the limiting portion (403) and the cleaning portion (402) are integrally formed.

10. The floor brush according to claim 1, **characterized in that** the cleaning portion (402) is disposed in the cavity by using a first rotation shaft (4021).

11. The floor brush according to claim 2, **characterized in that** the driving portion (401) is disposed by using a second rotation shaft (4014).

12. The floor brush according to claim 11, **characterized in that** the second rotation shaft (4014) is disposed on the driving portion (401) away from a centre of gravity, so that when an upper end of the driving portion (401) is subjected to an external force, the driving portion (401) rotates about the second rotation shaft (4014) along a first direction, and the other lower end of the driving portion (401) pushes the cleaning portion (402) to approach the roller brush (20) to be in contact with the roller brush (20), wherein when the external force is removed, the driving portion (401) rotates about the second rotation shaft (4014) along a second direction opposite to the first direction, so that the cleaning portion (402) leaves the roller brush (20).

13. The floor brush according to claim 11, **characterized in that** the second rotation shaft (4014) is disposed on an end of the extension portion (4012) away from a centre of the end, so that when an upper end of the driving portion (401) is subjected to an external force, the driving portion (401) rotates about the second rotation shaft (4014) along a first direction, and the other lower end of the driving portion (401) pushes the cleaning portion (402) to approach the roller brush (20) to be in contact with the roller brush (20), wherein when the external force is removed, the driving portion (401) rotates about the second rotation shaft (4014) along a second direction opposite to the first direction, so that the cleaning portion (402) leaves the roller brush (20).

14. The floor brush according to claim 11, **characterized in that** a maximum displacement of the driving portion (401) in a rotation direction is 4 to 5 cm.

15. A vacuum cleaner, **characterized by** comprising the floor brush (10) according to any one of claims 1 to 14.

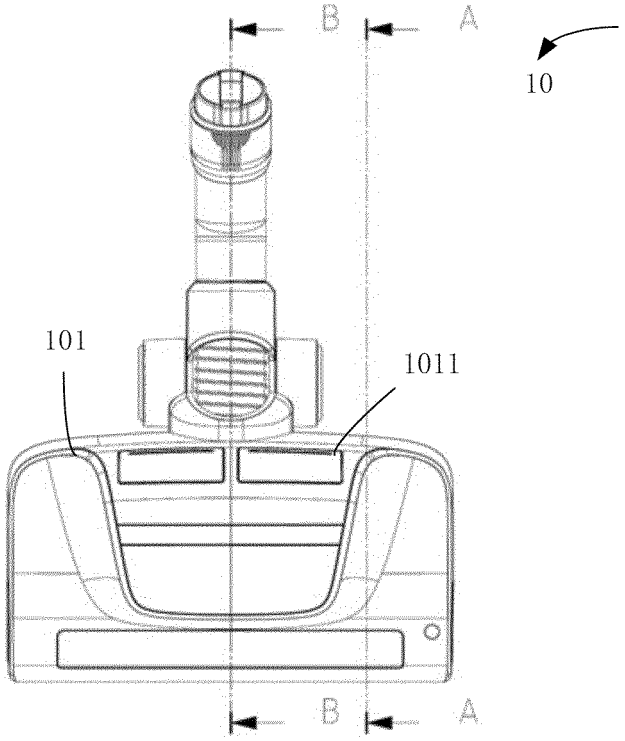

FIG. 1

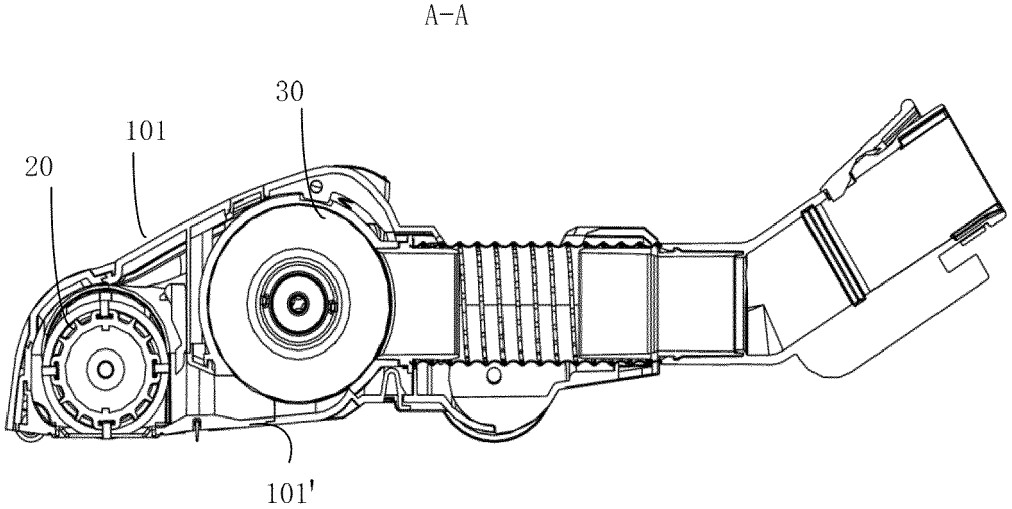

FIG. 2

B–B

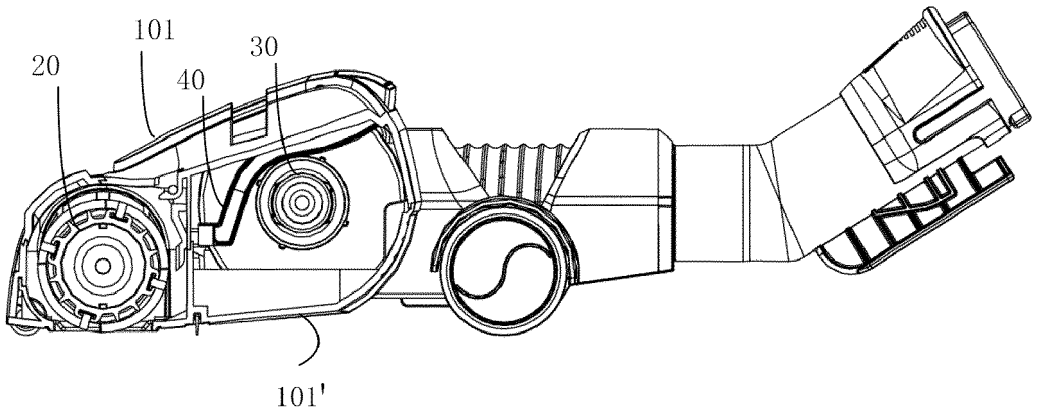

FIG. 3

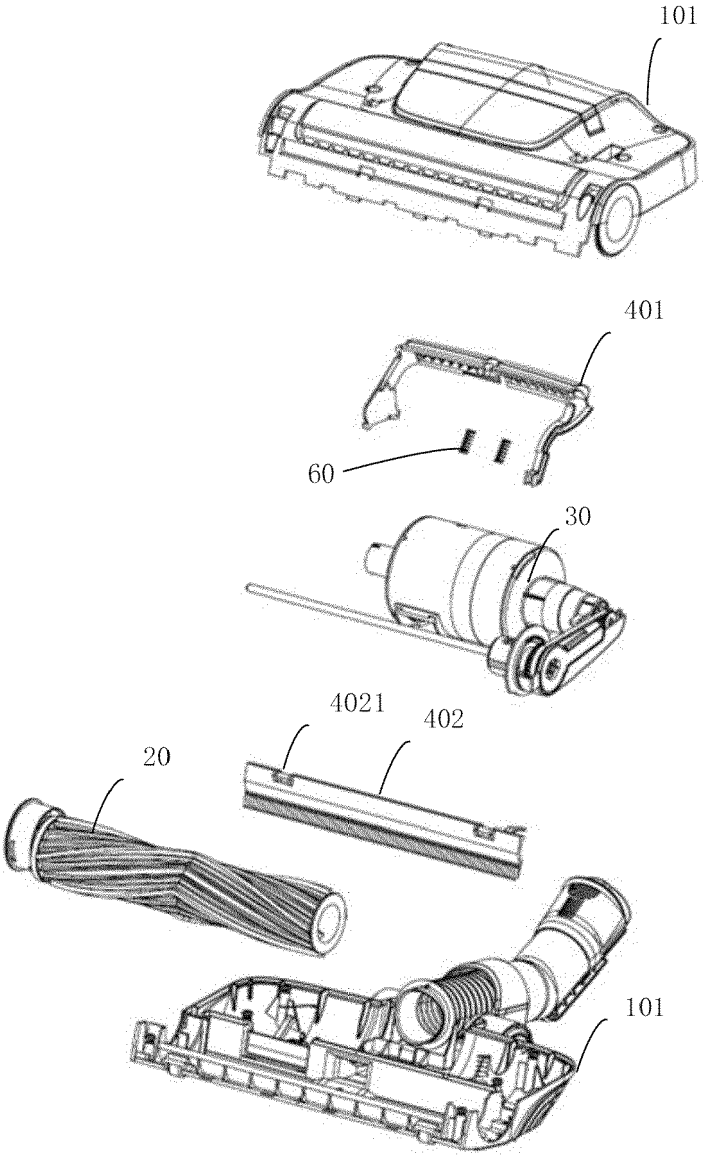

FIG. 4

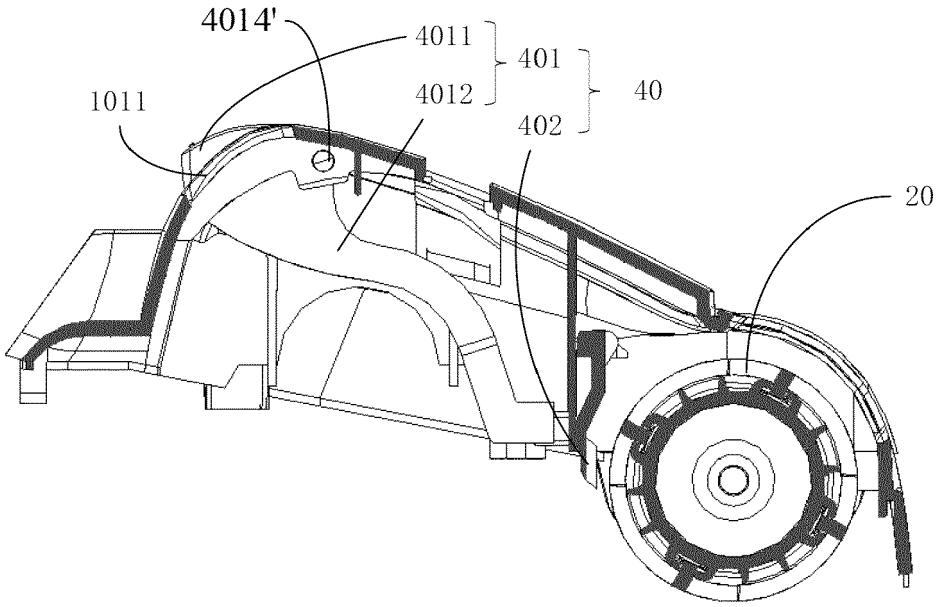
4014'
4011
401
40
4012
1011
402
20

FIG. 5

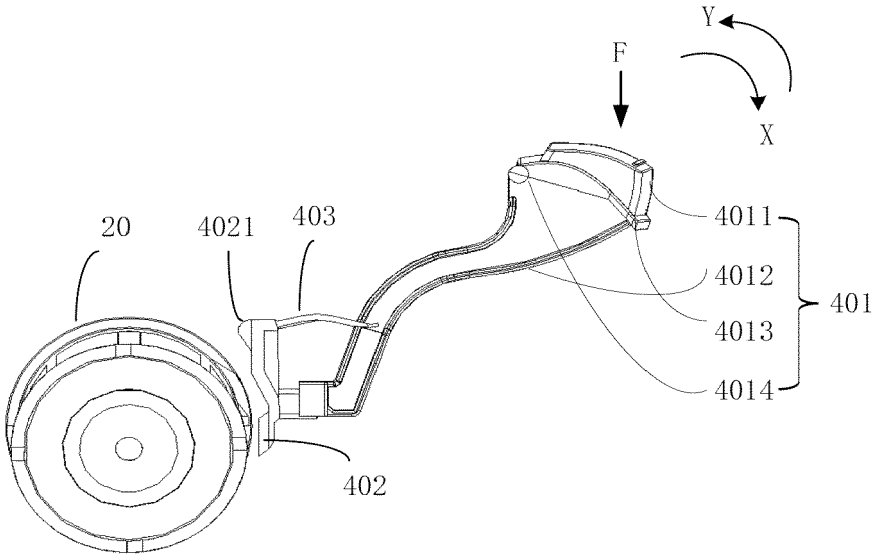
Y
F
X
20
4021
403
4011
4012
401
4013
4014
402

FIG. 6

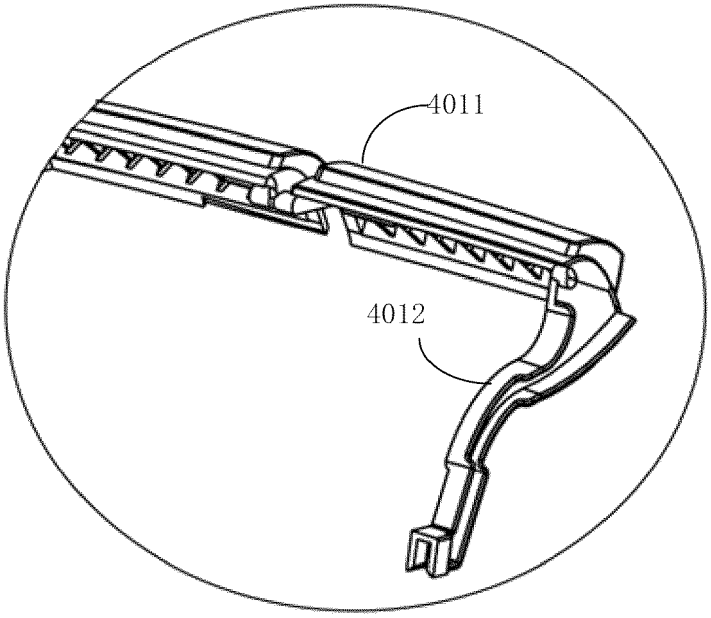

FIG. 7

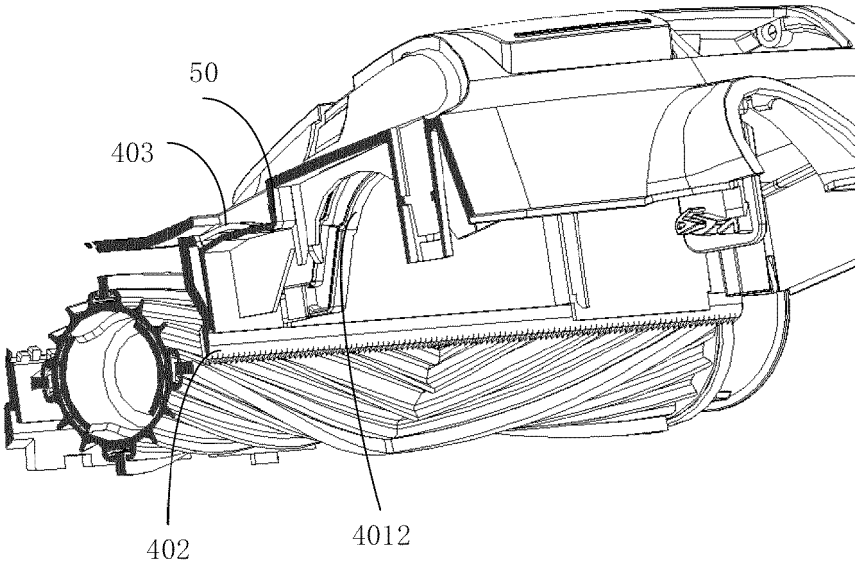

FIG. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 21 17 4821

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 543 301 A1 (SAMSUNG ELECTRONICS CO LTD [KR]) 9 January 2013 (2013-01-09) * paragraph [0055] - paragraph [0056]; figures 1,3,5a,5b *	1-15	INV. A47L9/04 A47L9/28 A47L11/24 A47L9/06
X	US 2015/230676 A1 (ERIKSSON HENRIK [SE]) 20 August 2015 (2015-08-20) * figures 5a,5bdd *	1-15	A47L11/40
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X	WO 2014/177216 A1 (ELECTROLUX AB [SE]) 6 November 2014 (2014-11-06) * figures 5a,5b *	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	24 November 2021	Trimarchi, Roberto

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 21 17 4821

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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24-11-2021

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