



(11) **EP 4 275 543 A1**

(12) **EUROPEAN PATENT APPLICATION**  
published in accordance with Art. 153(4) EPC

(43) Date of publication:  
**15.11.2023 Bulletin 2023/46**

(21) Application number: **21917178.2**

(22) Date of filing: **17.11.2021**

(51) International Patent Classification (IPC):  
**A46B 13/02** <sup>(2006.01)</sup> **A46B 15/00** <sup>(2006.01)</sup>  
**A46B 17/00** <sup>(2006.01)</sup>

(52) Cooperative Patent Classification (CPC):  
**A46B 13/02; A46B 15/00; A46B 17/00**

(86) International application number:  
**PCT/CN2021/131217**

(87) International publication number:  
**WO 2022/148137 (14.07.2022 Gazette 2022/28)**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB  
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO  
PL PT RO RS SE SI SK SM TR**  
Designated Extension States:  
**BA ME**  
Designated Validation States:  
**KH MA MD TN**

(30) Priority: **05.01.2021 CN 202120019643 U**

(71) Applicant: **Beijing Roborock Technology Co., Ltd.  
Beijing 102206 (CN)**

(72) Inventors:  
• **LEI, Peng  
Beijing 102206 (CN)**  
• **QIAO, Liang  
Beijing 102206 (CN)**  
• **SUN, Qing  
Beijing 102206 (CN)**

(74) Representative: **Studio Torta S.p.A.  
Via Viotti, 9  
10121 Torino (IT)**

(54) **CLEANING DEVICE, STORAGE APPARATUS FOR CLEANING DEVICE, AND CLEANING SYSTEM**

(57) A cleaning device, a storage apparatus for the cleaning device, and a cleaning system. The cleaning device comprises a body (1) and a connecting portion (3); the body (1) or the connecting portion (3) is provided with a suction member (2) for suctioning a surface to be suctioned. After the cleaning device is used, the user can fix the cleaning device on a nearby household appliance or on the storage apparatus by means of suction by the suction member (2) of the cleaning device, so that the user does not need to place the cleaning device against a wall corner or a wall body; thus, the user can conveniently store the cleaning device, and the cleaning device is not prone to falling and has good stability.

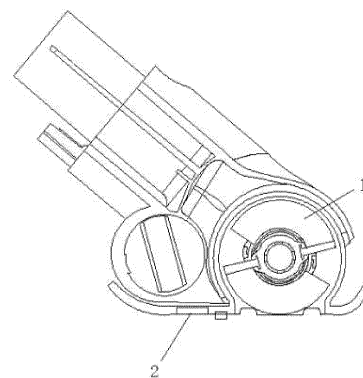


FIG. 1

**EP 4 275 543 A1**

## Description

### CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority of the Chinese Patent Application No. 202120019643.6, filed on January 5, 2021 and entitled "CLEANING DEVICE, STORAGE APPARATUS FOR CLEANING DEVICE, AND CLEANING SYSTEM", which is incorporated herein by reference in its entirety.

### TECHNICAL FIELD

[0002] The present disclosure relates to the field of cleaning devices, and in particular, to a cleaning device, a storage apparatus for a cleaning device, and a cleaning system.

### BACKGROUND

[0003] Cleaning devices are necessities often used in people's home life. Hand-held cleaning devices are used in household cleaning operations due to advantages of small size, light weight, portability and ease of use. However, the existing hand-held cleaning devices are usually placed against a corner or a wall in idle, which is not convenient for the storage.

[0004] It should be noted that the information disclosed in the above Background section is only for enhancement of understanding of the background of the present disclosure, and therefore may contain information that does not form the prior art that is already known to a person of ordinary skill in the art.

### SUMMARY

[0005] A series of concepts in simplified form have been introduced in the Summary section, which are described in further detail in the Detailed Description section. The Summary section of the present disclosure is not intended to attempt to limit the key features and essential technical features of the claimed technical solution, nor is it intended to attempt to determine the scope of protection of the claimed technical solution.

[0006] In a first aspect, according to an embodiment of the present disclosure, a cleaning device is provided, including a body and a connecting portion, wherein the body or the connecting portion is provided with an attraction member configured to attract a surface to be attracted.

[0007] In a second aspect, according to an embodiment of the present disclosure, a storage apparatus for a cleaning device is provided, including a surface to be attracted, wherein the surface to be attracted is capable of being attracted by the attraction member of the cleaning device such that the cleaning device is fixed on the surface to be attracted.

[0008] In a third aspect, according to an embodiment

of the present disclosure, a cleaning system is provided, including the above cleaning device, and the above storage apparatus for the cleaning device.

[0009] It is to be understood that the above general description and the following detailed description are exemplary and explanatory only and are not restrictive of the present disclosure.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The accompanying drawings, which are incorporated in and constitute a part of the description, illustrate embodiments consistent with the present disclosure and together with the description serve to explain the principles of the present disclosure. Obviously, the drawings in the following description are only some embodiments of the present disclosure, and for those of ordinary skill in the art, other drawings can also be obtained from these drawings without creative effort.

FIG. 1 is a side view of a cleaning device according to an embodiment of the present disclosure;

FIG. 2 is a structure diagram of a body and an attraction member in FIG. 1;

FIG. 3 is a structural diagram of a cleaning device according to another embodiment of the present disclosure;

FIG. 4 is a structural diagram of a cleaning device according to yet another embodiment of the present disclosure;

FIG. 5 is a structural diagram of a cleaning device according to still yet another embodiment of the present disclosure;

FIG. 6 is a partial enlarged view of FIG. 5;

FIG. 7 is a front view of a storage apparatus for a cleaning device according to an embodiment of the present disclosure; and

FIG. 8 is a side view of FIG. 7.

Description of reference numbers:

[0011] 1-Body, 2-Attraction member, 3-Connecting portion, 4-Support portion, and 5-Base.

### DETAILED DESCRIPTION

[0012] In the following description, numerous specific details are set forth in order to provide a more thorough understanding of the present disclosure. It will be apparent, however, to one skilled in the art that the present disclosure may be practiced without one or more of these details. In other instances, some technical features known in the art have not been described in order to avoid obscuring the present disclosure.

[0013] It should be noted that the terminology used herein is for the purpose of describing specific embodiments only, and is not intended to limit the exemplary embodiments in accordance with the present disclosure.

As used herein, the singular forms are also intended to include the plural forms unless the context clearly dictates otherwise. Furthermore, it should also be understood that when the terms "contain" and/or "comprise/include" are used in the description, they indicate the presence of stated features, integers, steps, operations, elements and/or components, but do not exclude the presence or addition of one or more other features, integers, steps, operations, elements, components and/or combinations thereof.

**[0014]** Now, exemplary embodiments according to the present disclosure will be described in more detail with reference to the accompanying drawings. These exemplary embodiments may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. It should be understood that these embodiments are provided such that the present disclosure will be thorough and complete, and will fully convey the concept of these exemplary embodiments to those skilled in the art.

**[0015]** A series of concepts in simplified form have been introduced in the Summary section, which are described in further detail in the Detailed Description section. The Summary section of the present disclosure is not intended to attempt to limit the key features and essential technical features of the claimed technical solution, nor is it intended to attempt to determine the protection scope of the claimed technical solution.

**[0016]** As shown in FIG. 1 to FIG. 4, a cleaning device is provided according to an embodiment of the present disclosure, and includes a body 1 and a connecting portion 3. The body 1 or the connecting portion 3 is provided with an attraction member 2 configured to attract a surface to be attracted.

**[0017]** In this embodiment, the cleaning device may be a hand-held cleaning device, such as a bed brush, a hair brush, or a crevice brush. As shown in FIGS. 1 to 6, the body 1 includes a brush head, or a rod body including a brush head and an extension rod. The brush head may include a brush body or a rolling brush. The brush head including the rolling brush may also include a dust box detachably connected with the rolling brush, and a driving portion electrically connected with the rolling brush. The rolling brush is in contact with a surface to be cleaned, and the driving portion drives the rolling brush to roll, such that objects on the surface to be cleaned may be cleaned to the dust box in order to facilitate the collection and disposal of dirt. In addition, materials of the rolling brush and the brush body may be cotton thread cloth, fiber cloth and the like, which is not limited herein.

**[0018]** Of course, the brush head may also adopt other structures with cleaning functions, which are not strictly limited in the present disclosure. In specific applications, in a case where the surface to be cleaned is relatively low, a user may directly use the body 1, without the rod body, of the cleaning device for cleaning. For example, the user uses the bed brush to clean a bed. In a case where the surface to be cleaned is relatively high, the

user may directly use the body 1, including the rod body, of the cleaning device for cleaning. For example, the user uses a wall brush to clean a roof.

**[0019]** The cleaning device described above may be understood in a broader sense as a cleaning appliance including various types of brush heads. For example, a bed brush is a brush head with a rolling brush and a rolling brush drive motor, which is directly or indirectly connected to a main unit of the cleaning appliance through the connecting portion 3. The main unit of the cleaning appliance includes a dust bucket, a dust bag or a separation device partially or completely disposed inside the dust bucket, a fan, a filter component, a battery component, a control board, and the like. Through the connection between the brush head and the main unit, the battery component on the main unit supplies power to the rolling brush drive motor, and the cleaning of the surface to be cleaned is achieved by an airflow path formed from a dust inlet on the brush head to an air outlet on the body of the cleaning appliance. For the brush head without a rolling brush, such as a hair brush, a crevice brush, and the like, the dust on the surface to be cleaned is sucked and cleaned directly through a similar airflow path.

**[0020]** As shown in FIGS. 3 and 4, the connecting portion 3 of the cleaning device is a connector connected to the body 1. Specifically, the connecting portion 3 may be a connecting member with a detachable connecting function. Through a combined connection between the connecting portion 3 and the body 1, the cleaning operations on higher surfaces to be cleaned, such as cleaning of roof gaps, may be achieved.

**[0021]** The attraction member 2 is a component with an attraction function, such as a magnet or an electromagnet, etc. The attraction member 2 may be of any shape and is not strictly limited. The surface to be attracted is a surface that may be attracted by the attraction member 2, for example, an outer peripheral wall of a household appliance or an outer surface of a support portion of a storage apparatus.

**[0022]** In practical, after the use of the cleaning device, the cleaning device may be attracted and fixed to a nearby household appliance (such as a refrigerator) or to a storage apparatus through the attraction member 2 of the cleaning device by the user, without being placed against a corner or a wall, which is convenient for the user to store the hand-held cleaning device. In addition, the cleaning device is unlikely to fall over and has good stability.

**[0023]** When the attraction and fixation of the cleaning device is achieved by the attraction member 2, in order to achieve the stability of the attraction and fixation of the cleaning device, the surface of the attraction member 2 is an inclined surface with a protruding upper portion, and correspondingly, the surface to be attracted is an inclined surface with a protruding lower portion. In this way, not only a contact area between the attraction member 2 and the surface to be attracted may be increased, but also a friction force between the attraction member 2 and the

surface to be attracted may be increased, thereby increasing the attraction strength of the attraction member 2 on the surface to be attracted.

**[0024]** Further, the surface of the attraction member 2 has a concave-convex structure, and correspondingly, the surface to be attracted has a concave-convex structure matching the surface of the attraction member 2, which may increase the contact area between the attraction member 2 and the surface to be attracted.

**[0025]** A concave part and a convex part on the surface of the attraction member 2 may be both of strip-shaped structures, and in this case, the concave part and the convex part may be arranged along a horizontal direction or along a vertical direction. Of course, the concave part and the convex part may be both of block-shaped structures, and in this case, the concave part and the convex part are arranged in a grid.

**[0026]** When the convex part has a strip-shaped structure, a cross section of the convex part has a rectangular shape, and the convex part and the concave part are arranged along the vertical direction, or when the convex part has a block-shaped structure and a cross section of the convex part has a rectangular shape, the surface to be attracted may further form a support for the attraction member 2, so as to ensure the stability of the fixation of the cleaning device. When the convex part has the strip-shaped structure and a cross section of the convex part has a semicircular shape, or when the convex part has the block-shaped structure and the convex part has a conical shape, the attraction member 2 may be more easily attracted and fixed onto the surface to be attracted, thereby increasing the fixation efficiency of the cleaning device.

**[0027]** Further, the attraction member 2 is arranged to protrude from the outer surface of a mounting surface, or be lower than the outer surface of the mounting surface, or be flush with the outer surface of the mounting surface.

**[0028]** When the attraction member 2 is mounted on the body, an outer surface of the body 1 is the mounting surface. When the attraction member 2 is mounted on the connecting portion 3, an outer surface of the connecting portion 3 is the mounting surface.

**[0029]** The attraction member 2 may be arranged in various manners. One manner is that the attraction member 2 is arranged to protrude from the outer surface of the mounting surface, such that an attraction surface of the attraction member 2 may be fitted with the surface to be attracted, thereby improving the attraction effect. Another manner is that the attraction member 2 is arranged to be lower than the outer surface of the mounting surface, such that if the mounting surface is a surface to be cleaned of the body 1, when the user uses the cleaning device, the attraction surface of the attraction member 2 may be prevented from hindering and interfering with the cleaning operation. Still another manner is that the attraction member 2 is flush with the outer surface of the mounting surface, such that not only the attraction mem-

ber 2 is fitted with the surface to be attracted, thereby improving the attraction effect, but also the attraction member 2 is prevented from hindering and interfering with the cleaning operation when the user uses the cleaning device. Of course, in some cases, in conditions where manufacturing process are allowed, the attraction member 2 may be embedded at any position inside the cleaning device. That is, the attraction member is invisible from the outer surface, and an entire outer surface of the cleaning device is made of a same material, such that the above function may be achieved without affecting the appearance. That is, the attraction member 2 is disposed inside the body or the connecting portion, or runs through the body or the connecting portion. In an exemplary embodiment, the attraction member 2 is disposed in an inner cavity of the body 1, the attraction member 2 is disposed in an inner cavity of the connecting portion 3, the attraction member 2 runs through a housing wall of the body 1 and extends into an inner cavity of the body 1, and the attraction member 2 runs through a housing wall of the connecting portion 3 and extends into an inner cavity of the connecting portion 3.

**[0030]** Different fixing manner may be adopted for attraction members 2 with different thicknesses. In a case of the attraction member 2 with a relatively thin thickness, the attraction member 2 is disposed inside the body 1 or the connecting portion 3. In a case of the attraction member 2 with a relatively thick thickness, the attraction member 2 may run through the body 1 or the connecting portion 3, so as to improve the adaptability between the body 1 or the connecting portion 3 and the attraction member 2.

**[0031]** In a specific implementation, the attraction member 2 is a magnetic member mounted on the body 1 or the connecting portion 3 by inlaying or injection molding. The attraction member 2 may be a magnetic member with a different heat resistance degree, and the magnetic member may be made of a material with magnetic property, such as ferrite, NdFeB, and the like. Now, the magnetic member with the different heat resistance degree is described in detail.

**[0032]** In one manner, the attraction member 2 is a magnetic member with a maximum heat resistance temperature of 80°C-120°C, and the attraction member 2 is mounted on the body 1 by inlaying.

**[0033]** The magnetic member with the maximum heat resistance temperature of 80°C-120°C may be a magnetic member made of ferrite. Specifically, the method of inlaying is to define a slot matching the magnetic member in the body 1, and then fix the magnetic member in the slot. The magnetic member is mounted by inlaying, which is simple in process and easy to operate.

**[0034]** In another manner, the attraction member 2 is a magnetic member with a maximum heat resistance temperature above 250°C, and the attraction member 2 is mounted on the body 1 by injection molding.

**[0035]** The magnetic member with the maximum heat resistance temperature above 250°C may be a magnetic member made of a samarium cobalt material. Specifical-

ly, the method of injection molding is to completely melt a plastic material by stirring with a screw rod at a certain temperature, and inject the same into a mold cavity where the magnetic member is placed with high pressure. After cooling and solidification, the magnetic member may be fixed on the body 1. The magnetic member is mounted by injection molding, which may increase the stability of the mounting of the magnetic member.

**[0036]** Further, for different cleaning devices, the structures of the bodies 1 of the cleaning devices are different, such that the attraction members 2 may be fixed at different positions.

**[0037]** Specifically, the attraction member 2 may be mounted at different positions. A first mounting position is a position where the attraction member 2 is disposed and where a center of mass of the cleaning device is mapped to the outer surface of the body 1 or the outer surface of the connecting portion 3.

**[0038]** In some embodiments, a mapping direction for the position where the attraction member 2 is mounted may be determined according to a surface on which a side of the cleaning device facing towards the surface to be attracted is located when the cleaning device is fixed.

**[0039]** The center of mass refers to a point where an entire mass of the cleaning device is concentrated. By arranging the attraction member 2 at the position where the center of mass of the cleaning device is mapped to the outer surface of the body 1 or the connecting portion 3, when attracted and fixed by the attraction member 2, the cleaning device may be prevented from falling over, such that the stability of the attraction and fixation of the cleaning device may be ensured.

**[0040]** In an exemplary embodiment, as shown in FIGS. 1 and 2, the bed brush includes a brush head (body 1) and a holding portion connected with the brush head. The holding portion is inclined relative to the brush head, such that the position where the center of mass of the cleaning device is mapped to the outer surface of the body 1 is determined at a bottom surface of the brush head, and the attraction member 2 is mounted on the bottom surface of the brush head. That is, for the bed brush as shown in FIGS. 1 and 2, the bottom surface of the body 1 faces the surface to be attracted. In this case, the mapping direction is determined as a direction that passes through the center of mass of the bed brush and is perpendicular to the bottom surface of the body 1, and thus the position where the attraction member is mounted may be determined on the bottom surface of the body 1.

**[0041]** The second mounting position is that each of the body 1 and the connecting portion 3 has a symmetrical plane passing through the attraction member 2. That is, both the body 1 and the connecting portion 3 have the symmetrical planes, and a projection of the attraction member 2 partially overlaps with the two symmetrical planes, respectively.

**[0042]** The attraction member 2 may be mounted on the body 1, and the symmetrical plane of the body 1 passes through the attraction member 2. Alternatively, the

attraction member 2 may be mounted on the connecting portion 3, and the symmetrical plane of the connecting portion 3 passes through the attraction member 2.

**[0043]** In an implementation, as shown in FIGS. 5 and 6, taking the body 1 as a rod body of an extension rod as an example, the attraction member 2 is mounted on the rod body of the extension rod, and a symmetrical plane of the extension rod passes through the attraction member 2. When the cleaning device is attracted and fixed by the attraction member 2, the attraction member 2 is uniformly stressed, which may prevent the cleaning device from falling over and ensure the stability of the attraction and fixation of the cleaning device. In addition, after use, the user may directly use the attraction member 2 on the extension rod for attraction and fixation without disassembling the extension rod for storing, which further facilitates the storing of the cleaning device for the user. Optionally, the attraction member 2 is disposed at a top end of the rod body of the extension rod, such that the top end of the rod body of the extension rod is used as a connection for attraction and fixation, thereby improving the stability of the attraction and fixation of the extension rod.

**[0044]** In another implementation, as shown in FIGS. 3 and 4, the connecting portion 3 is used as a connecting structure of a hairbrush or a crevice brush, the attraction member 2 is mounted on the connecting structure, and a symmetrical plane of the connecting structure passes through the attraction member 2. When the cleaning device is attracted and fixed by the attraction member 2, the attraction member 2 is uniformly stressed, which may prevent the cleaning device from falling over and ensure the stability of the attraction and fixation of the cleaning device.

**[0045]** The above battery component of the cleaning appliance includes a rechargeable battery, a first charging circuit connected to the rechargeable battery, and a first charging electrode arranged on the appliance. In some possible implementations, the first charging circuit includes a charging control circuit, a charging temperature detection circuit, and a charging voltage detection circuit. In some possible implementations, the first charging electrode is strip-shaped, and has two charging electrodes.

**[0046]** It should be noted that the cleaning device may also include other modules or components not shown in FIGS. 1 to 4, or may only include some of the above modules or components, which are not limited in the embodiments of the present disclosure.

**[0047]** As shown in FIGS. 7 and 8, a storage apparatus for a cleaning device is further provided according to an embodiment of the present disclosure. The storage apparatus includes a surface to be attracted, and the surface to be attracted is capable of being attracted by the above attraction member of the cleaning device, such that the cleaning device is fixed on the surface to be attracted.

**[0048]** The storage apparatus may include a base 5

and a support portion 4 connected to the base 5. The surface to be attracted is disposed on an outer surface of the support portion 4 to be attracted by the attraction member 2 of the above cleaning device, such that the cleaning device may be fixed on the support portion 4. In addition, the surface to be attracted may cover an entire outer surface of the support portion 4, or a part thereof, which is not strictly limited in the present disclosure.

**[0049]** The surface to be attracted may be made of a material that may be attracted by the attraction member 2. For example, if the attraction member 2 is an N-pole magnet, the surface to be attracted may be made of an S-pole magnet, or a metal that may be attracted by the magnet such as iron, such that the attraction member 2 may be attracted onto the surface to be attracted, and then the storage apparatus may store the cleaning device of any structure mentioned above.

**[0050]** In the storage apparatus for the cleaning device provided in the present embodiment, after the use of the cleaning device, the cleaning device is attracted and fixed onto the support portion 3 by an attraction force generated between the surface to be attracted and the attraction member 2 of the cleaning device, without being placed against the corner or wall, which is convenient for the user to store the hand-held cleaning device. In addition, the cleaning device is unlikely to fall over and has good stability.

**[0051]** Further, the storage apparatus is also provided with a charging component.

**[0052]** The charging component includes a second charging electrode and a second charging circuit connected with the second charging electrode. The second charging electrode is adapted to the first charging electrode of the cleaning appliance. When the first charging electrode is electrically connected to the second charging electrode, the battery of the cleaning device is charged through the first charging circuit and the second charging circuit. The second charging circuit also includes a charging control circuit, a charging temperature detection circuit, and a charging voltage detection circuit.

**[0053]** With the charging component of the storage apparatus, the cleaning device may be charged during storage, thereby saving charging time of the cleaning device and increasing an usage rate of the cleaning device.

**[0054]** In some applications, the storage apparatus may also be equipped with a dust collection device for cleaning garbage stored in the dust bucket of the cleaning appliance. For example, after the cleaning appliance is stored in the storage apparatus, the user manually or automatically triggers the dust collection device to work. Exemplarily, the trigger operation causes a dust bucket cover to be opened, and the existing garbage in the dust bucket is dumped into the dust collection device under the action of gravity or other driving force. Moreover, the dust collection device may also be equipped with a garbage collection bag and a compression and packaging device of the collection bag, so as to achieve the full automation of the dust collection process.

**[0055]** A cleaning system is also provided according to an embodiment of the present disclosure, and includes the above cleaning device and the above storage apparatus for the cleaning device.

**[0056]** It should be noted that the cleaning device and the storage apparatus involved in the embodiments may be the cleaning device and the storage apparatus in the above embodiments. For the specific implementation and working principle, reference may be made to the corresponding content in the above embodiment, which is not repeated herein.

**[0057]** This embodiment provides a cleaning system. After the use of the cleaning device, the cleaning device may be attracted and fixed onto the storage apparatus through the attraction force between the attraction member 2 of the cleaning device and the support rod of the storage apparatus, without being placed against a corner or wall, which is convenient for a user to store the hand-held cleaning device. When the user needs to use the cleaning device, he/she only needs to manually pull the cleaning device stored on the storage apparatus away from the storage apparatus, and the pulling process may be achieved when the force is greater than the attraction force.

**[0058]** The present disclosure has been described by the above embodiments, but it should be understood that the above embodiments are only for the purpose of illustration and description, and are not intended to limit the present disclosure to the scope of the described embodiments. In addition, those skilled in the art can understand that the present disclosure is not limited to the above embodiments, and more variations and modifications can also be made according to the teachings of the present disclosure, which all fall within the scope of protection of the present disclosure. The protection scope of the present disclosure is defined by the appended claims and their equivalents.

#### 40 Claims

1. A cleaning device, comprising a body and a connecting portion, wherein the body or the connecting portion is provided with an attraction member, and the attraction member is configured to attract a surface to be attracted.
2. The cleaning device according to claim 1, wherein the attraction member is arranged to protrude from an outer surface of a mounting surface, or the attraction member is arranged to be lower than the outer surface of the mounting surface, or the attraction member is arranged to be flush with the outer surface of the mounting surface.
3. The cleaning device according to claim 1, wherein the attraction member is disposed inside the body or the attraction member is disposed inside the con-

necting portion, or the attraction member runs through the body or the attraction member runs through the connecting portion.

4. The cleaning device according to claim 1, wherein the attraction member is a magnetic member, and the magnetic member is mounted on the body or the connecting portion by inlaying or injection molding. 5
  
5. The cleaning device according to claim 4, wherein the attraction member is disposed at a position where a center of mass of the cleaning device is mapped to an outer surface of the body or an outer surface of the connecting portion. 10
  
6. The cleaning device according to claim 4, wherein each of the body and the connecting portion has a symmetrical plane passing through the attraction member. 15
  
7. A storage apparatus for a cleaning device, comprising a surface to be attracted, wherein the surface to be attracted is capable of being attracted by the attraction member of the cleaning device according to any one of claims 1 to 6, such that the cleaning device is fixed on the surface to be attracted. 20
  
8. The storage apparatus for a cleaning device according to claim 7, further comprising a charging component. 25
  
9. The storage apparatus for a cleaning device according to claim 8, wherein the charging component comprises a first charging electrode and a charging circuit connected with the first charging electrode, the first charging electrode being adapted with a second charging electrode disposed on the body of the cleaning device. 30
  
10. A cleaning system, comprising the cleaning device as claimed in any one of claims 1 to 6, and the storage apparatus for a cleaning device as claimed in any one of claims 7 to 9. 35

45

50

55

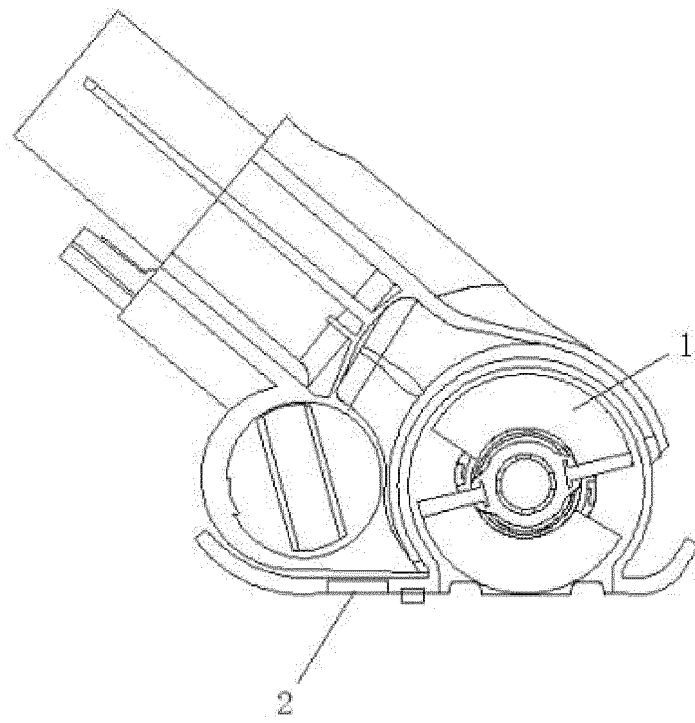


FIG. 1

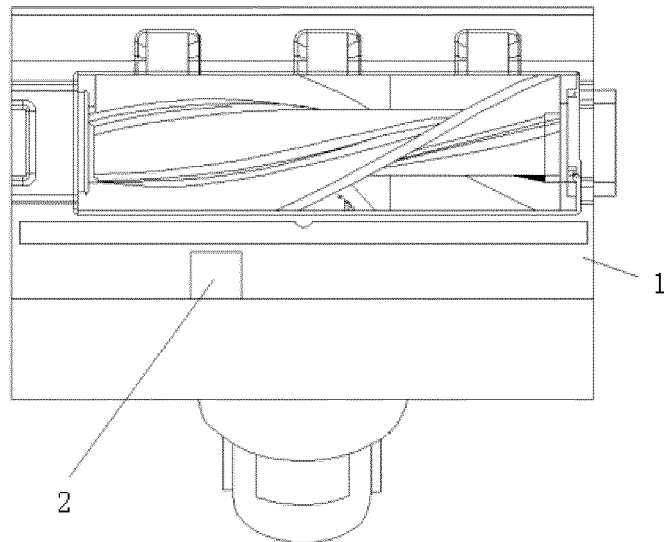


FIG. 2

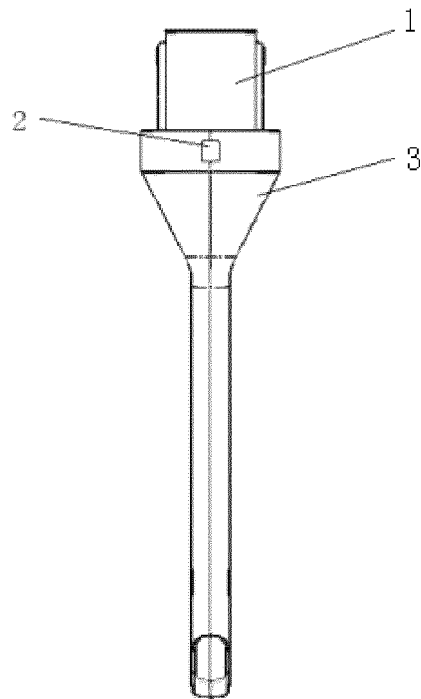


FIG. 3

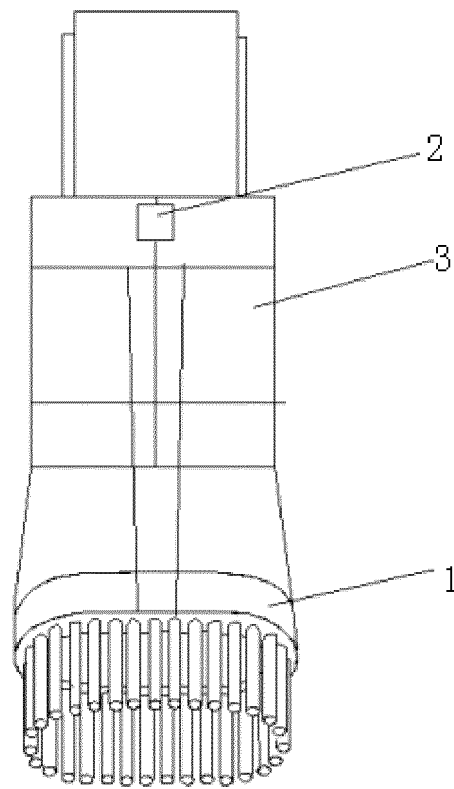


FIG. 4

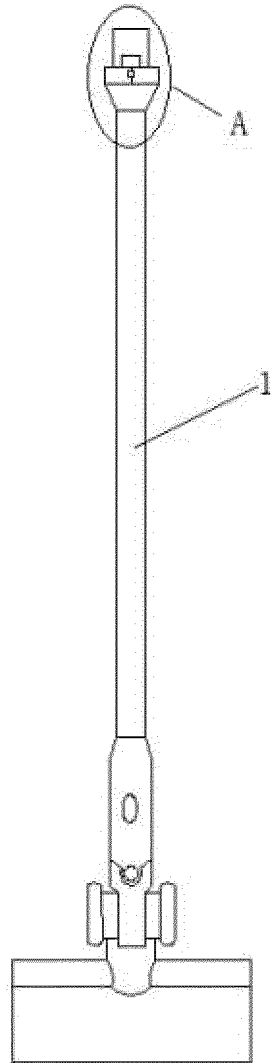
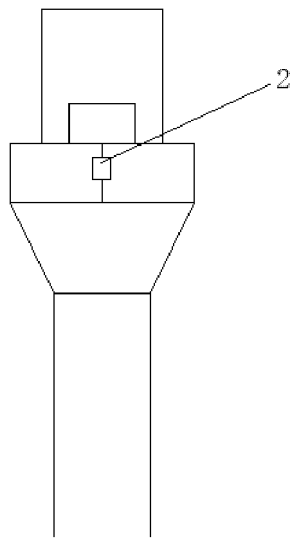


FIG. 5



**FIG. 6**

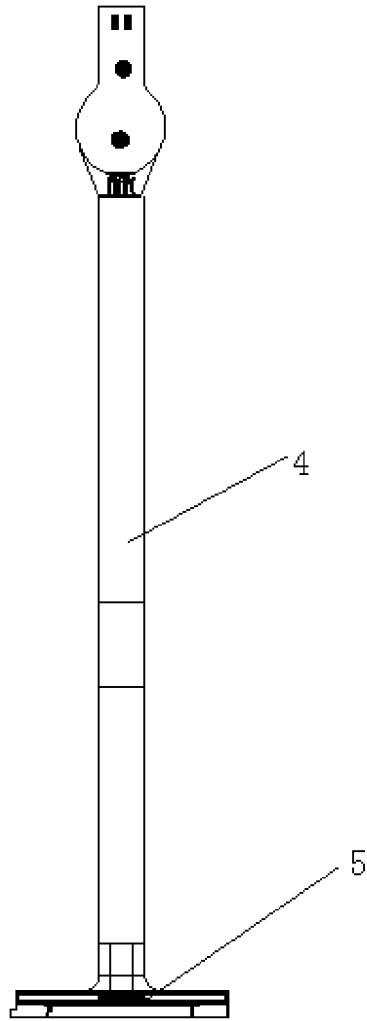


FIG. 7

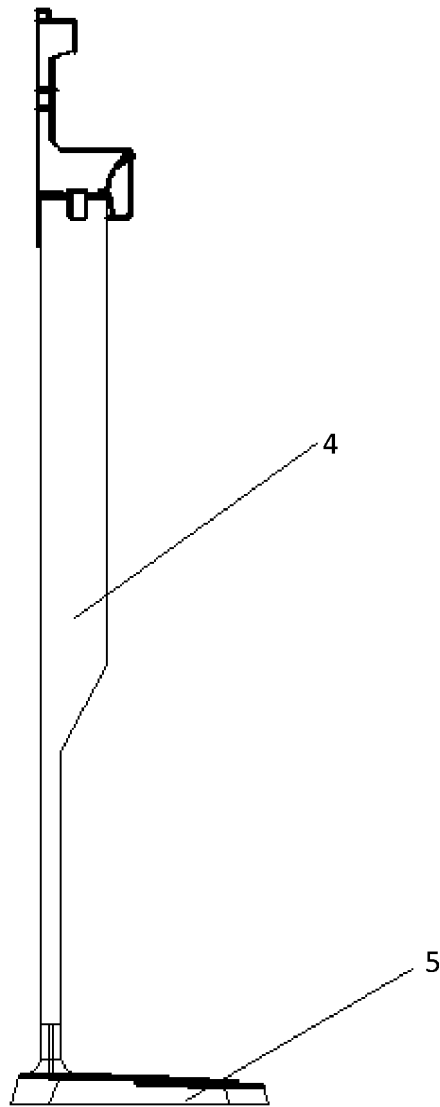


FIG. 8

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/131217

5	<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
	A46B 13/02(2006.01)i; A46B 15/00(2006.01)i; A46B 17/00(2006.01)i		
	According to International Patent Classification (IPC) or to both national classification and IPC		
10	<b>B. FIELDS SEARCHED</b>		
	Minimum documentation searched (classification system followed by classification symbols)		
	A46B		
	Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
15	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
	CNKI, CNPAT, WPI, EPODOC: 北京石头世纪科技股份有限公司, 雷鹏, 乔亮, 孙庆, 清洁, 刷, 吸尘, 吸附, 磁铁, 磁体, 磁性, 墙, 倒, 充电; dust, clean+, brush, magnet, magnetic, attract+, charg+		
20	<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
	Category*	Citation of document, with indication, where appropriate, of the relevant passages	
		Relevant to claim No.	
	X	CN 209252675 U (SUZHOU CLEANPLUS ELECTRIC APPLIANCE CO., LTD.) 16 August 2019 (2019-08-16) description, paragraphs [0018]-[0023], and figures 1-5	1-10
25	X	CN 210898610 U (SU, Zehui) 30 June 2020 (2020-06-30) description, paragraphs [0019]-[0027], and figures 1-5	1-10
	X	CN 209252676 U (SUZHOU CLEANPLUS ELECTRIC APPLIANCE CO., LTD.) 16 August 2019 (2019-08-16) description, paragraphs [0016]-[0020], and figures 1-4	1-10
30	A	CN 209437169 U (JIANGSU MIDEA CLEAN ELECTRIC APPLIANCE CO., LTD. et al.) 27 September 2019 (2019-09-27) entire document	1-10
	A	DE 102007036228 A1 (BSH BOSCH UND SIEMENS HAUSGERAETE GMBH) 05 February 2009 (2009-02-05) entire document	1-10
35	<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
40	* 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		
45	"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	
	04 January 2022	26 January 2022	
50	Name and mailing address of the ISA/CN	Authorized officer	
	China National Intellectual Property Administration (ISA/CN) No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China		
55	Facsimile No. (86-10)62019451	Telephone No.	

Form PCT/ISA/210 (second sheet) (January 2015)

**INTERNATIONAL SEARCH REPORT**  
**Information on patent family members**

International application No.  
**PCT/CN2021/131217**

5

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN	209252675	U	16 August 2019	None	
CN	210898610	U	30 June 2020	None	
CN	209252676	U	16 August 2019	None	
CN	209437169	U	27 September 2019	None	
DE	102007036228	A1	05 February 2009	DE 102007036228 B4	10 October 2013

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- CN 202120019643 [0001]