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(54) **SUPPORT STRUCTURE AND CLEANING DEVICE**

(57) A support structure and a cleaning device. The support structure is specifically a dust bag support frame, comprising a top structure and a side structure. The top structure is formed to be connected and fixed to the body of a cleaning device. The side structure comprises: a dust bag mounting structure, a dust bag being cooperatively mounted, by means of a mounting component thereon, to the dust bag mounting structure; and a support frame air intake passage (14), which is used to place a dirty air inlet of the cleaning device and an inlet of the dust bag in communication. By means of the support structure, a disposable dust bag can be detachably mounted in a dust collecting device, and when the dust bag is full, the dust bag can be conveniently removed from the support structure.

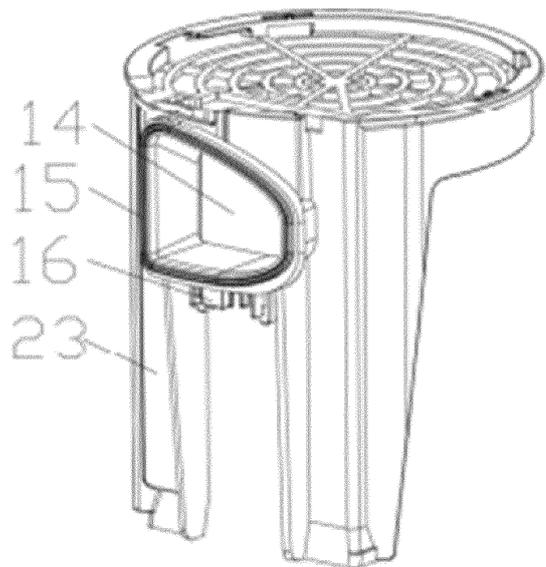


FIG. 2

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present disclosure claims priority to Chinese Patent Application No. 202021858243.6, filed on August 31, 2020 and entitled "CLEANING APPARATUS", and Chinese Patent Application No. 202021858229.6, filed on August 31, 2020 and entitled "SUPPORTING STRUCTURE AND CLEANING DEVICE", which are incorporated herein by reference in their entireties.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of cleaning device technologies, and in particular, to a supporting structure for installing a disposable dust bag in a cleaning apparatus, and a cleaning device.

BACKGROUND

[0003] With the advancement of technologies, cleaning devices including dust collectors and cleaning robots have entered thousands of households, bringing great convenience to people's lives.

[0004] A common handheld cleaning device includes an airflow generation apparatus and a cyclone separation apparatus. Through airflow generated by the airflow generation apparatus, dirty air is guided into the cyclone separation apparatus for garbage separation, and filtered clean air is discharged to the atmosphere. Since dust is separated inside such a cleaning device, fine dust particles are easily stuck in the cyclone separation apparatus, and need to be removed manually by a user.

SUMMARY

[0005] The present disclosure provides a supporting structure and a cleaning device including the same.

[0006] The supporting structure according to embodiments of the present disclosure includes a top structure formed to be connected and fixed to a main body of the cleaning device; and a side structure includes:

a dust bag installation structure, a dust bag being fittingly installed to the dust bag installation structure through an installation assembly on the dust bag; and

a support air inlet channel for communicating a dirty air inlet of the cleaning device and a dust bag inlet.

[0007] Preferably, the top structure includes:

an air-permeable grid in a flat or curved shape; and a clamping groove mating with a corresponding fastener in the main body of the cleaning device for fixing, or a fastener mating with a corresponding clamp-

ing groove in the main body of the cleaning device for fixing.

[0008] Preferably, the dust bag installation structure is a sliding groove disposed in a support leg, two sliding grooves being disposed to accommodate two sides of the installation assembly on the dust bag to be inserted and slide in the two sliding grooves; and when the two sides of the installation assembly move in the two sliding grooves to end points of the sliding grooves, respectively, an inner opening of the support air inlet channel is aligned with an opening of the dust bag to form a through air inlet channel.

[0009] Preferably, a flange surrounding a channel inlet is disposed at a part of the support air inlet channel butted with a tail end of the dirty air inlet of the cleaning device, and the flange is provided with a groove along a channel direction, the groove being provided for disposing a sealing ring.

[0010] Preferably, the side structure further includes: an elastic fastener assembly disposed on a lower side of the support air inlet channel for limiting the dust bag after the dust bag is installed in place.

[0011] Preferably, the elastic fastener assembly includes an elastic component and an elastic fastener;

the elastic fastener includes: a sliding part, an abutting part and a hook part;

the hook part is at one end of the sliding part, and cooperates with an elastic fastener stop bar on the dust bag to limit the dust bag; and the abutting part cooperates with the elastic component to achieve a sliding and reset of the whole elastic fastener.

[0012] Preferably, the elastic component is a spring, where one end of the spring abuts against the supporting structure, and the other end of the spring abuts against the abutting part.

[0013] Preferably, the supporting structure is provided with a groove suitable for accommodating the elastic fastener assembly; and

the elastic component and the abutting part are disposed in the groove, where one side of the abutting part not abutted against the elastic component is in close contact with a side wall of the groove when the elastic component is in a balanced state.

[0014] Preferably, the hook part is formed as a substantially wedge-shaped member, and is formed by a plane substantially parallel to the top structure and an inclined surface intersecting the plane and facing a bottom of a dust bucket.

[0015] The cleaning device according to the embodiments of the present disclosure includes a dust bag, a dust bag supporting structure, a dust collecting bucket provided with a dirty air inlet, and a main body, the dust bag supporting structure being detachably connected to the main body, where

the dust bag includes a bag body made of a flexible air-permeable material, and an installation assembly fixedly connected to the bag body;
 the dust bag is installed to the dust bag supporting structure by the installation assembly; and
 the bag body and the installation assembly are provided with openings of substantially the same size, and the openings abut with the dirty air inlet to allow dirty air to enter the dust bag.

[0016] Preferably, the installation assembly includes an inner clamping plate, an outer clamping plate;

and a drawing plate between the inner clamping plate and the outer clamping plate, where after the inner clamping plate and the outer clamping plate are fixedly bonded, the drawing plate is slideable between the inner clamping plate and the outer clamping plate;
 and the inner clamping plate is bonded and fixed to the bag body.

[0017] Preferably, a soft sealing tape is fixed at one end, close to an opening of the drawing plate, of the drawing plate, and the other end of the soft sealing tape is fixedly connected to one of the inner clamping plate, the outer clamping plate and the dust bag; and
 a drawing part is provided at one end, away from the opening in the drawing plate, of the drawing plate.

[0018] Preferably, the inner clamping plate and the outer clamping plate are provided with a first sealing member and a second sealing member on sides thereof close to the drawing plate, respectively; and/or
 the outer clamping plate is provided with a third sealing member on an outer side of an opening.

[0019] Preferably, the outer side of the outer clamping plate is further provided with an elastic fastener stop bar, where the elastic fastener stop bar mates with an elastic fastener assembly on a support to fix the dust bag.

[0020] Preferably, the bag body is provided with a transparent window along a longitudinal direction, and a garbage storage condition in the dust bag is observable through the transparent window.

[0021] Preferably, a surface of the bag body is sprayed with an anti-allergen agent and/or a broad-spectrum bactericide.

[0022] The above technical solutions of the present disclosure have at least the following beneficial technical effects.

[0023] The detachable support structure is disposed in a handheld dust collecting device for placing the disposable dust bag, and when the dust bag is full, the user can directly remove the dust bag from the support without removing the dust bucket, and can realize the removal of the used dust bag and the installation of a new dust bag only by opening a dust bucket cover, which improves user experience.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024]

- 5 FIG. 1 is an exploded view of a dust bag structure according to embodiments of the present disclosure.
 FIG. 2 is a schematic structural diagram of a support according to embodiments of the present disclosure.
 FIG. 3 is a schematic structural diagram of a cleaning device according to embodiments of the present disclosure.
 FIG. 4 is a schematic diagram of installing a dust bag to a cleaning device according to embodiments of the present disclosure.
 FIG. 5 is a sectional view of the support according to the embodiments of the present disclosure.
 FIG. 6 is a sectional view of the support from another perspective according to the embodiments of the present disclosure.
 FIG. 7 is a schematic diagram of an elastic fastener assembly according to embodiments of the present disclosure.
 FIG. 8 is a sectional view of the elastic fastener assembly according to the embodiments of the present disclosure.

Reference signs in the accompanying drawings:

- [0025]** 1: bag body; 2: inner clamping plate; 3: sealing member; 4: soft sealing tape; 5: sealing member; 6: outer clamping plate; 7: sealing member; 8: elastic fastener stop bar; 9: drawing plate; 10: transparent window; 11: fastener groove; 12: air-permeable grid; 13: fastener protrusion; 14: support air inlet channel; 15: sealing ring; 16: elastic fastener assembly; 17: dirty air inlet; 18: main body; 19: dust bucket cover; 20: elastic component; 21: elastic fastener; 211: sliding part; 212: abutting part; 213: hook part; 22: sliding groove; 23: support leg; 24: elastic fastener fixing wall; 25: elastic fastener limiting member; and 26: elastic component clamping member.

DETAILED DESCRIPTION

[0026] In order to make the objects, technical solutions and advantages of the present disclosure clearer, the present disclosure will be further described in detail below in combination with the specific embodiments and with reference to the accompanying drawings. It should be understood that these descriptions are exemplary only, and are not intended to limit the scope of the present disclosure. Besides, in the following illustrations, the descriptions of well-known structures and technologies are omitted to avoid unnecessarily obscuring concepts of the present disclosure.

[0027] These drawings are not necessarily drawn to scale, and some details may have been omitted for the sake of clarity. The shapes of various regions shown in the figures and the relative sizes and positional relation-

ships therebetween are only exemplary, in practice, there may be deviations due to manufacturing tolerances or technical limitations, and those skilled in the art can additionally design the regions/layers with different shapes, sizes, and relative positions according to actual needs.

[0028] Obviously, the described embodiments are some but not all embodiments of the present disclosure. Based on the embodiments in the present disclosure, all other embodiments obtained by those ordinary skilled in the art without creative efforts shall fall within the protection scope of the present disclosure.

[0029] In addition, the technical features involved in different embodiments of the present disclosure described below may be combined with each other as long as they do not conflict with each other.

[0030] For the problem in the Background, the present disclosure provides a user with another option: a dust bag is added inside a dust bucket to form an integrated replaceable assembly. For a user who does not want to remove the dust in the dust bucket, a disposable dust bag may be used. In this way, after completing the cleaning, the user only needs to close an inlet of the dust bag, take the dust bag out of the machine body and throw it away. In addition, in order to detachably install the above dust bag to a cleaning device, a supporting structure may be disposed that can be separately and detachably connected to the cleaning device.

[0031] In a first embodiment of the present disclosure, as shown in FIG. 1, a dust bag for a cleaning device is provided. The whole dust bag is a separate accessory, and is formed by connecting a bag body 1, an inner clamping plate 2, a drawing plate 9, and an outer clamping plate 6 in sequence. A first sealing member 3, a second sealing member 5, and a third sealing member 7 are disposed between the above components or part of the above components for preventing leakage of the dust and garbage.

[0032] The inner clamping plate 2 provides supporting for fixing the bag body 1 on the inner clamping plate 2. For the bag body 1, the periphery of an opening of the bag body 1 may be bonded to the periphery of an opening in the inner clamping plate 2 corresponding to the opening of the bag body 1 by means of gluing, so that the above openings correspondingly form a unique garbage inlet channel.

[0033] The inner clamping plate 2 and the outer clamping plate 6 may be the same hard plate, and in this case, when the dust bag is taken out, the opening of the dust bag cannot be sealed. In order to prevent the garbage in the dust bag from leaking out of the opening when the dust bag is removed from the cleaning device after a cleaning process is completed, the present disclosure improves the inner and outer clamping plates. The inner clamping plate 2 and the outer clamping plate 6 are two separate identical or different hard plates, rib edges are disposed on the left edges and right edges of opposite surfaces of the inner and outer clamping plates, and the inner and outer clamping plates are respectively bonded

and fixed to the above rib edges, thereby forming a cavity. One drawing plate is disposed in the cavity, and the cavity provides a space for sliding of the drawing plate 9. The purpose of providing the drawing plate 9 is to achieve sealing of the opening of the dust bag by drawing out the drawing plate. The sealing is achieved as follows: when the drawing plate is not pulled down between the inner and outer clamping plates, an opening disposed in the drawing plate corresponding to the openings of the inner and outer clamping plates and the opening of the dust bag is aligned with the above openings to form a garbage channel; and when the drawing plate is pulled down, the above openings are sealed by a sealing tape on the drawing plate.

[0034] Specifically, the soft sealing tape 4 is fixed on an upper part of the drawing plate 9. Preferably, the soft sealing tape 4 may be a paper tape with certain flexibility and toughness. The soft sealing tape 4 may be connected to the upper part of the drawing plate 9 by gluing. The other end of the soft sealing tape 4 is connected to the inner clamping plate 2 or the outer clamping plate 6, preferably the inner clamping plate 2. In this way, when the drawing plate 9 is at the uppermost end, the openings of the inner clamping plate 2, the drawing plate 9 and the outer clamping plate 6 are all aligned with the opening of the bag body 1, and the soft sealing tape 4 is in a folded state and located at the uppermost end of the drawing plate 9. When the dust bag is filled with the dust and garbage, the drawing plate 9 is pulled down, and the drawing plate 9 slides between the inner and outer clamping plates to pull the soft sealing tape 4, of which two ends are fixed on upper parts of the drawing plate 9 and the inner/outer clamping plate respectively, to move downwards, thereby covering the opening in the inner clamping plate 2 and substantially sealing the dust bag.

[0035] Of course, in order to achieve the required effect, the widths of the inner and outer clamping plates are slightly greater than, preferably 2-8 mm greater than the maximum width of a garbage inlet in the bag body 1; and the width of the drawing plate 9 is also greater than, preferably 2-6 mm greater than the maximum width of the garbage inlet in the bag body 1. It is clear that the width of the drawing plate 9 is less than the widths of the inner and outer clamping plates 2 and 6, so that the cavity can be formed between the inner and outer clamping plates for the sliding of the drawing plate 9. The width of the soft sealing tape 4 may be substantially equal to or slightly less than the width of the drawing plate 9 as long as it is ensured that the width of the soft sealing tape 4 with the smallest size is greater than or equal to the maximum width of the opening in the dust bag/inner clamping plate 2. On the basis of the above sizes, the drawing plate 9 slides to drive the soft sealing tape 4 to move downward to cover the inlet of the dust bag, thereby achieving a general sealing effect.

[0036] It may be understood that an installation assembly formed by the inner clamping plate 2, the outer clamping plate 6 and the drawing plate 9 may also be in other

forms. For example, a frame may be formed by an integrally formed plastic member, and the separate drawing plate (which may be made of a hard material) is pulled to slide in the frame. Furthermore, the installation assembly may be formed to be detachably connected to the bag body 1, the user only needs to seal the bag body and throw the bag body away after use, and the frame can be reused again, which reduces the cost of consumables.

[0037] As can be seen from FIG. 1, in addition to forming the dust bag supporting, the installation assembly also needs to ensure the sealing performance during use (including normal dust collection and removal of the dust bag), especially during movement of the drawing plate 9, to avoid leakage. For this purpose, sealing members surrounding the openings may be disposed between the inner clamping plate 2 and the drawing plate 9, and between the drawing plate 9 and the outer clamping plate 6 respectively, and the sealing members can substantially ensure that during pulling of the drawing plate 9, the garbage at the opening of the bag will not leak out. More preferably, the above sealing members are preferably disposed on one side of the inner clamping plate 2 close to the drawing plate 9, and one side of the outer clamping plate 6 close to the drawing plate 9 respectively. Moreover, when the drawing plate 9 is pulled out, the sealing member on the inner clamping plate 2 can also substantially seal the soft sealing tape 4.

[0038] In the above, the inner clamping plate 2 and the outer clamping plate 6 are fixed to form a whole, and two sides of the whole are formed as hard members with certain thickness. From the above descriptions, the widths of the inner and outer clamping plates are greater than the maximum width of a suction port of the dust bag. Therefore, two sides of the hard whole formed by the inner and outer clamping plates provide a supporting part for installation of the whole dust bag.

[0039] As for specific materials of the dust bag, the innermost layer is a spunbonded layer, the middle layer is a melt-blown filter layer, the outermost layer is a spunbonded layer, and the inner spunbonded layer and the outer spunbonded layer are mainly used to protect the middle filter layer. In addition, since some users belong to allergic constitutions, and may have an allergic reaction during operation of the dust bag, an auxiliary agent is added outside the spunbonded layer, and is generally sprayed on the outer layer material by adopting a spraying process generally. Preferably, the auxiliary agent is an anti-allergen agent. After the auxiliary agent is used, the effects of sterilization and removing mites can be achieved, and especially for staphylococcus aureus, aspergillus niger, aspergillus terreus, candida albicans and other molds/fungi, the isolation or elimination of mite allergens, pollen allergens, dog dander allergens, cat dander allergens, live mites, etc., can be realized to achieve the effect of removing mites.

[0040] ZINC OMADINE FPS dispersion is an efficient broad-spectrum bactericide which effectively protects the products from the infection and damage of molds,

yeasts, algae and germs. The ZINC OMADINE FPS should be added early in a production process. The amount of effective preservative of the product depends on several factors, including the susceptibility of a product formulation to microorganisms, an infection extent of the microorganisms, involved species, pH, temperature, and a guarantee period of the product.

[0041] FIG. 2 shows a support apparatus for supporting the dust bag shown in FIG. 1 in a cleaning device. The support apparatus includes a top structure and a side structure. Referring to FIG. 3, an installation part where a cyclone assembly or a supporting member can be installed is formed at a lower part of a main body 18. Alternatively, the user can connect and install the cyclone assembly or the supporting member to the main body 18 in a detachable manner, and then install the dust bucket, and finally, a complete dust collecting airflow channel is formed.

[0042] As shown in FIG. 3, the top structure includes a hollowed-out air-permeable grid 12. The arrangement of the air-permeable grid 12 ensures that the airflow generated by an airflow generation apparatus in the main body of the cleaning device can flow through the dust bucket in a substantially unobstructed manner without larger airflow obstruction. In addition, the air-permeable grid also has the function of a partition plate, and thus the following situation is avoided: a suction force is decreased caused by obstruction to the airflow as the dust bag body is closely attached to the main body of the cleaning device by the airflow generated by the airflow generation apparatus. The top structure is also provided with a fastener groove 11 mating with a fastener protrusion 13 on the main body. When the support is installed, the fastener groove 11 on the support is first aligned with the fastener protrusion 13 on the main body, and then the fastener protrusion 13 is fixed to the fastener groove 11 by rotating.

[0043] The side structure includes a support air inlet channel 14 corresponding to a dirty air inlet 17 and corresponding to the opening in the outer clamping plate 6 of the dust bag, support legs 23, and an elastic fastener assembly 16, etc. The outer side of the support air inlet channel 14 is abutted against a tail end of the dirty air inlet 17. In order to ensure airflow tightness, there is a flange on the outer side of the support air inlet channel 14, and the flange closely surrounds the channel inlet. The flange is provided with a groove for installing a sealing ring 15 therein, and an inner diameter of the sealing ring 15 is equivalent to an outer diameter of the channel inlet, so that the sealing ring 15 can be closely attached to the tail end of the dirty air inlet 17 to form sealing when the support is installed in the cleaning device.

[0044] The inner side of the support air inlet channel 14 corresponds to the opening of the outer clamping plate 6 described in FIG. 1 above, and a sealing member 7 may be disposed in the support air inlet channel 14 or the outer side of the outer clamping plate 6 along the butted inlet or opening, thereby forming a sealed airflow

channel.

[0045] Referring to FIG. 6, opposite sliding grooves 22 are formed in the support legs 23 respectively to accommodate two sides of the whole formed by the inner clamping plate 2 and the outer clamping plate 6 of the dust bag to be inserted therein. When the inner clamping plate 2 and the outer clamping plate 6 slide to the uppermost ends in the sliding grooves 22, the inner opening of the support air inlet channel 14 is just aligned with the opening in the outer clamping plate 6, and at this time, the entire airflow channel is communicated, and the cleaning device can work normally after startup. Lengths of the sliding grooves 22 may be equal to or less than longitudinal lengths of the inner clamping plate 2 and the outer clamping plate 6. The sliding grooves 22 may preferably be in a specific form that the inner clamping plate 2 and the outer clamping plate 6 are inserted upward from the openings in the bottoms of the sliding grooves 22, the sliding grooves 22 are provided with stop bars along the direction parallel to the outer clamping plate 6, and the stop bars restrict the inner clamping plate 2 and the outer clamping plate 6 to move only along the direction of the sliding grooves but not along the direction perpendicular to the sliding grooves 22, thereby ensuring sealed butting between the support air inlet channel 14 and the opening of the outer clamping plate 6.

[0046] From the above, after the inner clamping plate 2 and the outer clamping plate 6 of the dust bag slide in along the sliding grooves 22 in the support, a locking device is also provided to lock the dust bag relative to the support. Referring to FIGS. 2, 5 and 6, the elastic fastener assembly 16 cooperates with an elastic fastener stop bar 8 shown in FIG. 1. The elastic fastener stop bar 8 is a raised folding bar disposed at the lower part of the opening in the outer clamping plate 6. The elastic fastener stop bar 8 has a certain thickness, and preferably may be of a structure with the same material and the same thickness as those of the inner clamping plate 2 and the outer clamping plate 6, which can save materials as the elastic fastener stop bar 8 may be made of a leftover material left after the inner and outer clamping plates are acquired by cutting. The elastic fastener stop bar 8 works along the lower edge of the transverse raised folding bar of the outer clamping plate 6. When the inner clamping plate 2 and the outer clamping plate 6 of the dust bag slide to the end points of the sliding grooves 22, the elastic fastener assembly 16 on the support is held on the above lower edge, thereby restricting the whole dust bag from moving out along the sliding grooves 22.

[0047] The elastic fastener assembly 16 on the support is an elastic structure movable in the transverse direction (along a radial direction of the dust bucket of the cleaning device). When the inner clamping plate 2 and the outer clamping plate 6 slide into the sliding grooves 22, the raised elastic fastener stop bar 8 pushes outward against the elastic fastener assembly 16, so that the inner clamping plate and the outer clamping plate can slide into the sliding grooves smoothly. When the raised elastic fas-

tener stop bar 8 passes over the elastic fastener assembly 16, the elastic fastener assembly 16 resets under the action of a restoring force to be buckled on the lower edge of the raised elastic fastener stop bar 8, and at this time, the inner and outer clamping plates reach the end points of the sliding grooves 22, thereby fixing the dust bag.

[0048] The elastic fastener assembly 16 may be an elastic piece along the direction of the support legs 23, an inward raised fastener is provided at the lowermost end of the elastic piece, a lower part of the raised fastener is an inclined surface, and an upper part of the raised fastener is a small plane perpendicular to an extension direction of the raised fastener. Due to the inclined surface, the elastic fastener stop bar 8 enables the raised fastener to smoothly deform when the inner and outer clamping plates of the dust bag enter the sliding grooves 22. When the inner and outer clamping plates reach the end points of the sliding grooves 22, the elastic fastener stop bar 8 passes over the elastic fastener assembly, the deformed elastic fastener assembly 16 resets under the action of a restoring elastic force, and the small plane on the elastic fastener assembly and the lower edge of the elastic fastener stop bar 8 form limiting.

[0049] However, since the support is a reusable structural member, if the elastic fastener assembly 16 on the support loses the restoring force or is easily broken after a limited number of deformations, the normal use of the integral structure will be affected.

[0050] Based on this, the elastic fastener assembly 16 may be optimized. As shown in FIGS. 5, 7 and 8, the elastic fastener assembly is disposed at a position on the support corresponding to the elastic fastener stop bar 8 of the dust bag. The elastic fastener assembly 16 includes an elastic component 20 and an elastic fastener 21. The elastic fastener 21 is integrally formed and includes a sliding part 211, an abutting part 212 and a hook part 213, and the above whole elastic fastener 21 extends along a radial direction of the top of the support. A corresponding groove for accommodating and fixing the elastic fastener 21 is molded on the support, and the groove includes an elastic fastener fixing wall 24 at one end and an elastic component clamping member 26 at the other end. The elastic component clamping member 26 is used to fix the elastic component 20. It can be understood that when the elastic component 20 is a spring, the spring is inserted into the elastic component clamping member 26 along a longitudinal direction, so that the spring can only be stretched or compressed along a longitudinal axis of the spring in the groove, and other movement modes in which the spring may jump out of the groove are restricted.

[0051] The elastic fastener assembly 16 includes the sliding part 211, the abutting part 212 and the hook part 213. As shown in FIGS. 5 and 6, the whole sliding part 211 is substantially along the radial direction of the top structure of the support; the abutting part 212 is substantially parallel to the sliding part 211 and located at one

end close to the hook part 213 and has a protrusion facing the elastic component clamping member 26 in the groove; the hook part 213 is disposed at one end close to the circle center in the radial direction and formed as a substantially wedge-shaped member, and includes an outer inclined surface and an inner vertical surface (here the inner and outer are relative to the body of the sliding part 211). The above inclined surface, in response to the contact interference with the elastic fastener stop bar 8 on the inner clamping plate 2 and the outer clamping plate 6 of the dust bag, enables the abutting part 212 to compress the elastic component 20 to displace away from the elastic fastener stop bar 8 on the outer clamping plate 6; and after the inner and outer clamping plates slide until release the contact interference of the inclined surface with the elastic fastener stop bar 8 is released, the abutting part 212 moves towards the elastic fastener stop bar 8 under the action of the restoring force of the elastic component 211, and the above vertical surface is buckled with the lower edge of the elastic fastener stop bar 8, thereby realizing the locking of the whole dust bag. The above movement process is: due to the elastic fastener stop bar 8, the hook part 213 is pushed by the elastic fastener stop bar 8 to drive the sliding part 211 to move, and the movement of the sliding part 211 further drives the abutting part 212 to move and compress the elastic component 20; and on the other hand, the restoring force of the elastic component 20 pushes the abutting part 212 to move, which drives the sliding part 211 to move and further drives the hook part 213 to move.

[0052] Further, an elastic fastener limiting member 25 is further provided at the groove in the support, and after the elastic fastener assembly 16 is mounted into the groove, the elastic fastener limiting member 25 restricts the movement direction of the sliding part 211 along the dust bag, that is, the elastic fastener limiting member 25 only allows the sliding part 211 to move along an extending and contracting direction of the elastic component 20.

[0053] The groove also includes the elastic fastener fixing wall 24, which is used to limit a movement of the elastic fastener assembly 16. When the abutting part 212 is in contact with the elastic fastener fixing wall 24, the hook part 213 cooperates with a fastener of the elastic fastener stop bar 8 on the outer clamping plate 6 without affecting the normal work.

[0054] In an actual use process, as shown in FIG. 4, the user first fixes the support to the main body by rotating, then installs the dust bag from the sliding grooves 22 of the support, and finally installs the dust bucket to the main body. After completing the cleaning, a dust bucket cover at the bottom of the dust bucket is firstly opened, the lower part of the drawing plate 9 is pulled from bottom, the drawing plate 9 first moves relative to the dust bag to drive the third sealing member 7, preferably the soft sealing tape seals the opening of the dust bag, and the drawing plate 9 or the inner and outer clamping plates 2 and 6 is/are continued to be pulled down, so that the dust bag is released from the restraint of the

elastic fastener assembly 16, and then the sealed dust bag is removed.

[0055] Of course, a manual button may also be disposed on the elastic fastener assembly 20 to release a locking state of the elastic fastener stop bar 8 by the elastic fastener assembly 20.

[0056] Of course, the cleaning device according to the present disclosure is not limited to the handheld dust collector above, but may also include various devices with a dust collecting function, such as a cleaning robot, a dust collecting support of the cleaning device, and a dust collecting base station of the cleaning device.

[0057] The present disclosure has been described above with reference to the embodiments of the present disclosure. However, these embodiments are for illustrative purposes only, and are not intended to limit the scope of the present disclosure. The scope of the present disclosure is defined by the appended claims and their equivalents. Those skilled in the art can make various substitutions and modifications without departing from the scope of the present disclosure, and these substitutions and modifications should all fall within the scope of the present disclosure.

Claims

1. A supporting structure, comprising:
 - a top structure formed to be connected to and fixed to a main body of a cleaning device; and
 - a side structure comprising:
 - a dust bag installation structure, a dust bag being fittingly installed to the dust bag installation structure through an installation assembly on the dust bag; and
 - a support air inlet channel for communicating a dirty air inlet of the cleaning device and a dust bag inlet.
2. The supporting structure according to claim 1, wherein the top structure comprises:
 - an air-permeable grid in a flat or curved shape; and
 - a clamping groove mating with a corresponding fastener in the main body of the cleaning device for fixing, or a fastener mating with a corresponding clamping groove in the main body of the cleaning device for fixing.
3. The supporting structure according to claim 1, wherein
 - the dust bag installation structure is a sliding groove disposed on a support leg, two sliding

- grooves being disposed to accommodate two sides of the installation assembly of the dust bag to be inserted and slide in the two sliding grooves; and
 when the two sides of the installation assembly move in the two sliding grooves to end points of the two sliding grooves, respectively, an inner opening of the support air inlet channel is aligned with an opening of the dust bag to form a through air inlet channel.
4. The supporting structure according to claim 1 or 3, wherein
- a flange surrounding a channel inlet is disposed at a part of the support air inlet channel butted with a tail end of the dirty air inlet of the cleaning device, and
 the flange is provided with a groove along a channel direction, the groove being provided for disposing a sealing ring.
5. The supporting structure according to claim 1, wherein
 the side structure further comprises:
 an elastic fastener assembly disposed on a lower side of the support air inlet channel for limiting the dust bag after the dust bag is installed in place.
6. The supporting structure according to claim 5, wherein
 the elastic fastener assembly comprises:
- an elastic component, and
 an elastic fastener comprising:
- a sliding part;
 a hook part at one end of the sliding part, cooperating with an elastic fastener stop bar on the dust bag to limit the dust bag; and
 an abutting part cooperating with the elastic component to achieve a sliding and reset of the whole elastic fastener.
7. The supporting structure according to claim 6, wherein:
 the elastic component is a spring, one end of the spring abuts against the supporting structure, and the other end of the spring abuts against the abutting part.
8. The supporting structure according to claim 7, wherein:
 the supporting structure is provided with a groove suitable for accommodating the elastic fastener assembly; and
 the elastic component and the abutting part are
- disposed in the groove, one side of the abutting part not abutted against the elastic component is in close contact with a side wall of the groove when the elastic component is in a balanced state.
9. The supporting structure according to claim 6, wherein
 the hook part is formed as a substantially wedge-shaped member, and is formed by a plane substantially parallel to the top structure and an inclined surface intersecting the plane and facing a bottom of a dust bucket.
10. A cleaning device, comprising a dust bag, a dust bag supporting structure, a dust collecting bucket provided with a dirty air inlet, and a main body, the dust bag supporting structure being detachably connected to the main body, wherein
 the dust bag comprises a bag body made of a flexible air-permeable material, and an installation assembly fixedly connected to the bag body; the dust bag is installed to the dust bag supporting structure by the installation assembly; and the bag body and the installation assembly are provided with openings of substantially the same size, and the openings abut with the dirty air inlet to allow dirty air to enter the dust bag.
11. The cleaning device according to claim 10, wherein the installation assembly comprises:
 an inner clamping plate bonded and fixed to the bag body,
 an outer clamping plate, and
 a drawing plate between the inner clamping plate and the outer clamping plate, wherein after the inner clamping plate and the outer clamping plate are fixedly bonded, the drawing plate is slideable between the inner clamping plate and the outer clamping plate.
12. The cleaning device according to claim 11, wherein
 a soft sealing tape is fixed at one end, close to an opening of the drawing plate, of the drawing plate, and the other end of the soft sealing tape is fixedly connected to one of the inner clamping plate, the outer clamping plate and the dust bag; and
 a drawing part is provided at one end, away from the opening in the drawing plate, of the drawing plate.
13. The cleaning device according to claim 12, wherein
 the inner clamping plate and the outer clamping

plate are provided with a first sealing member and a second sealing member on sides thereof close to the drawing plate, respectively; and/or the outer clamping plate is provided with a third sealing member on an outer side of an opening. 5

14. The cleaning device according to claim 11, wherein the outer side of the outer clamping plate is further provided with an elastic fastener stop bar, the elastic fastener stop bar mates with an elastic fastener assembly on a support to fix the dust bag. 10

15. The cleaning device according to claim 10, wherein the bag body is provided with a transparent window along a longitudinal direction, and a garbage storage condition in the dust bag is observable through the transparent window. 15

16. The cleaning device according to claim 10, wherein a surface of the bag body is sprayed with an anti-allergen agent and/or a broad-spectrum bactericide. 20

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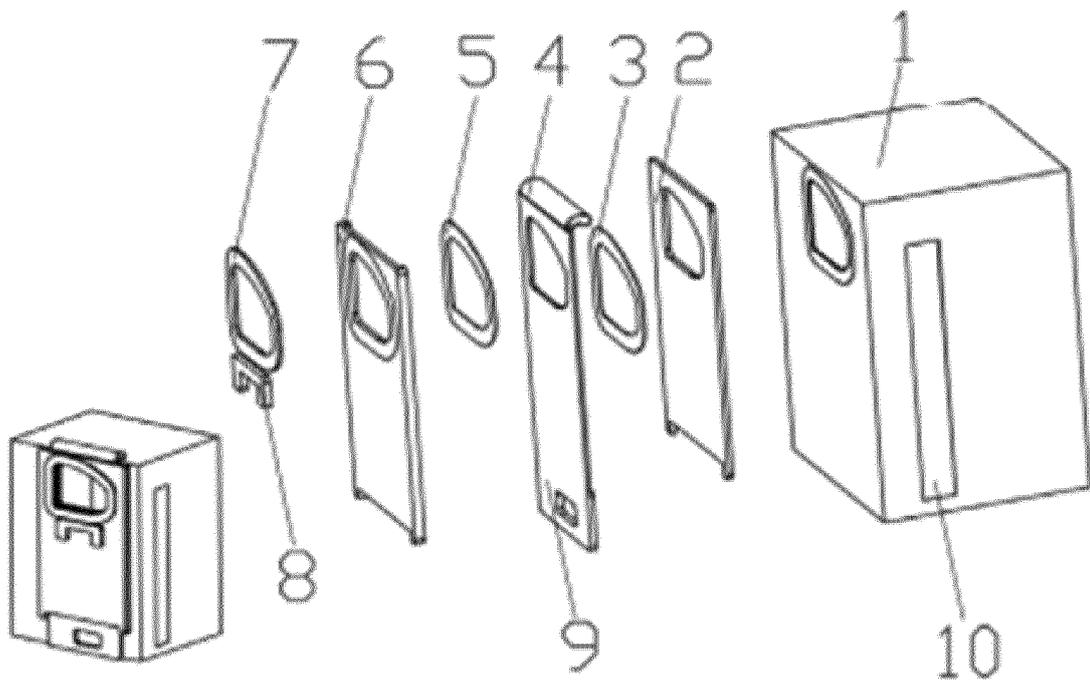


FIG. 1

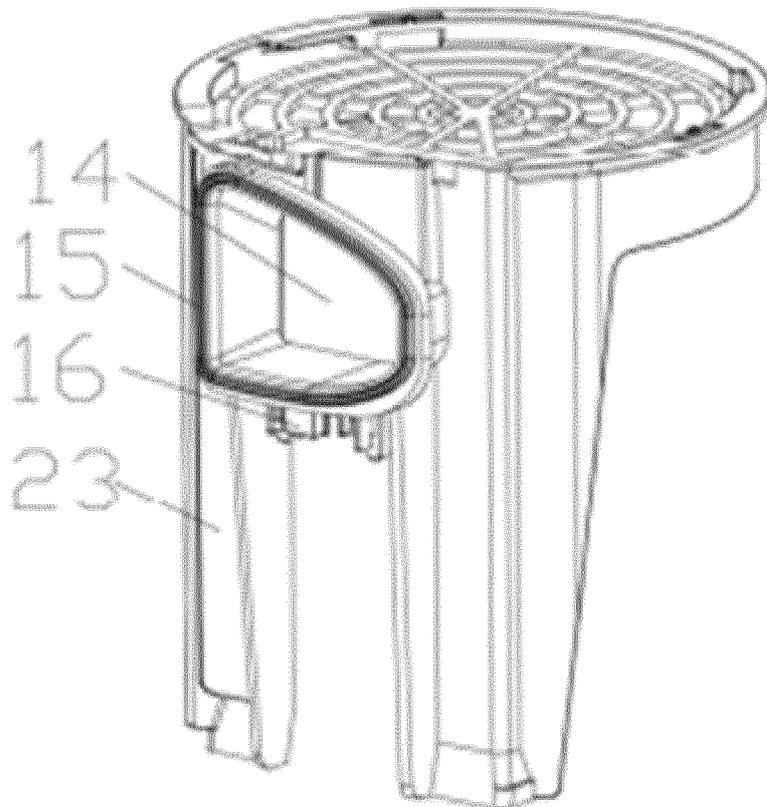


FIG. 2

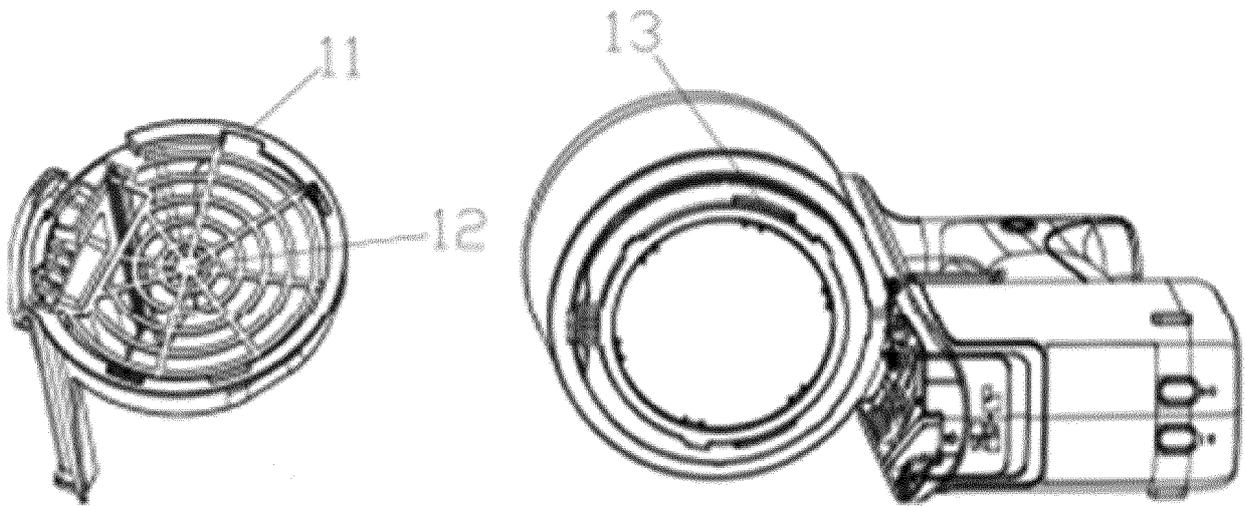


FIG. 3

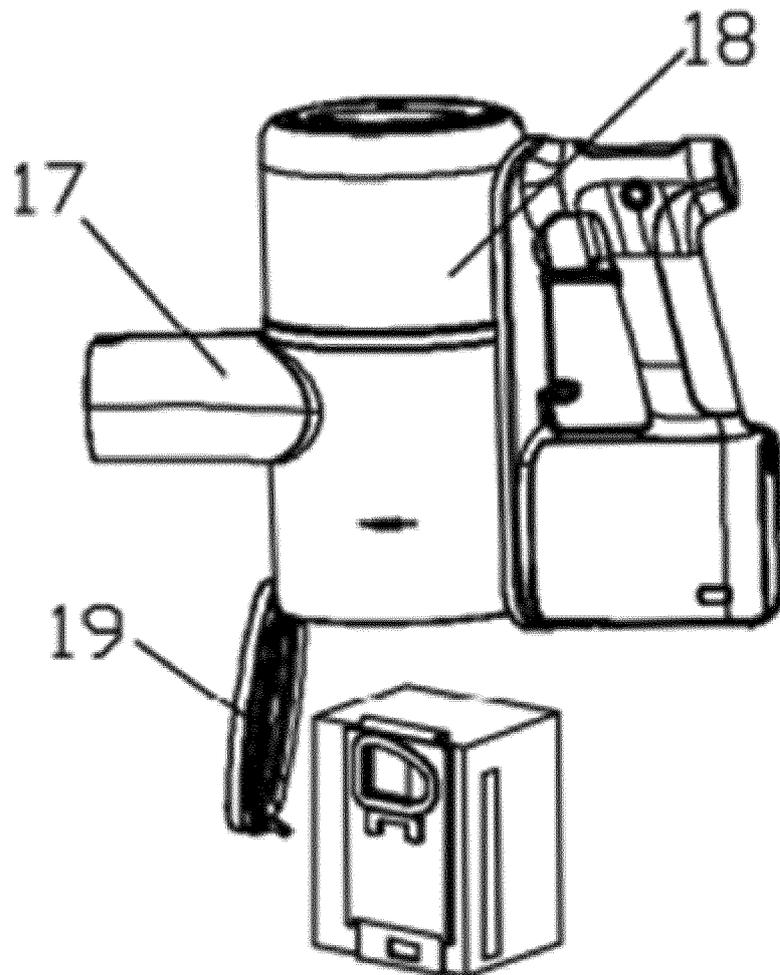


FIG. 4

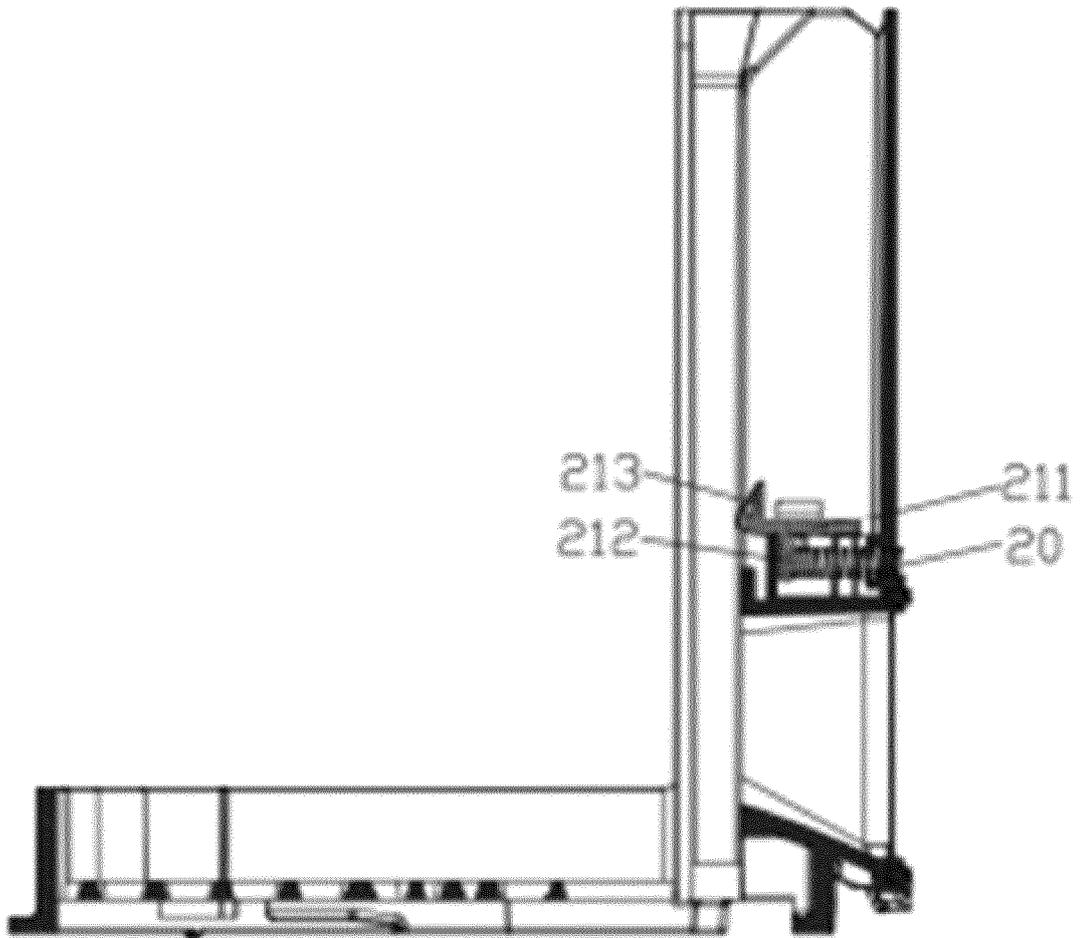


FIG. 5

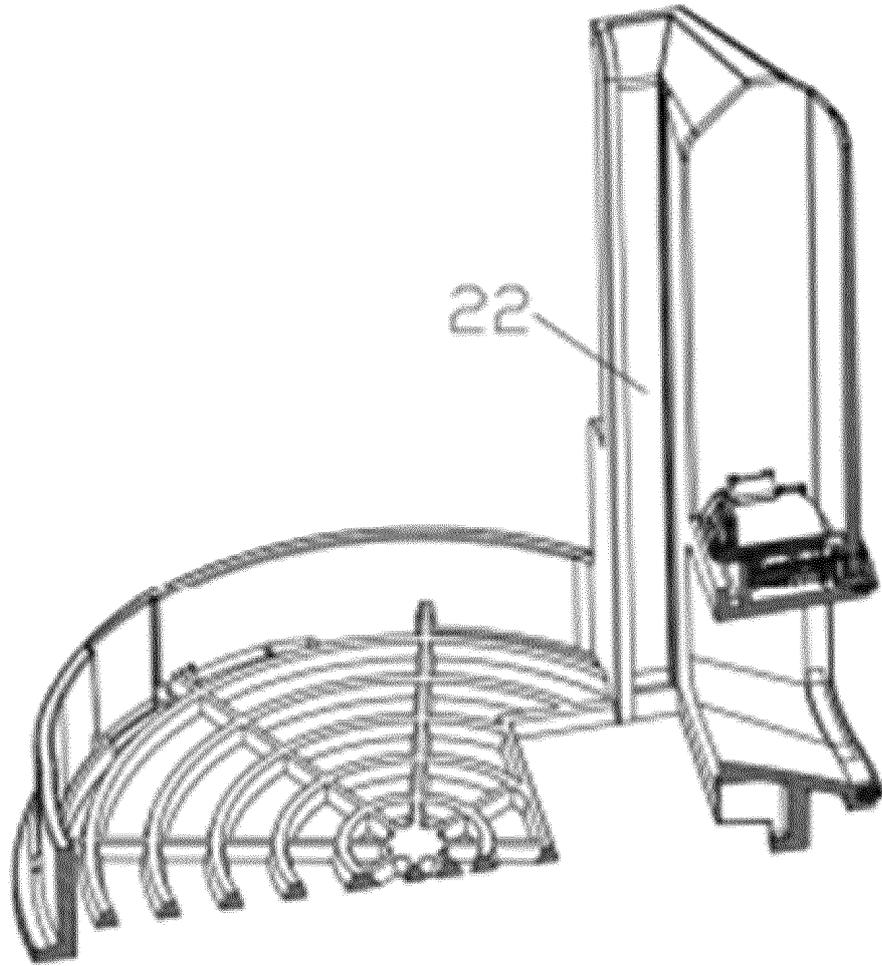


FIG. 6

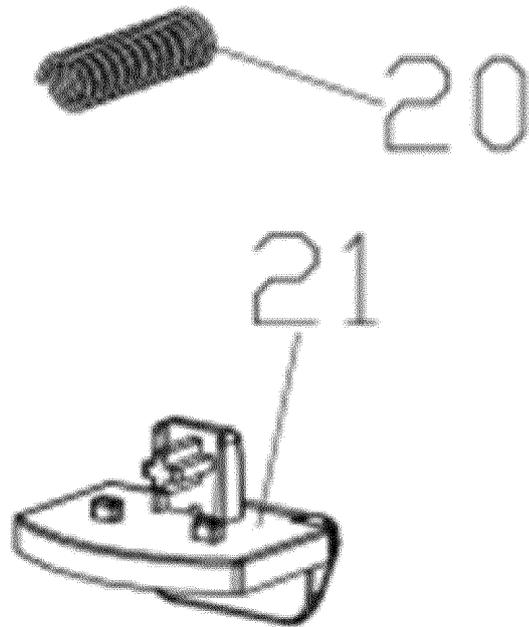


FIG. 7

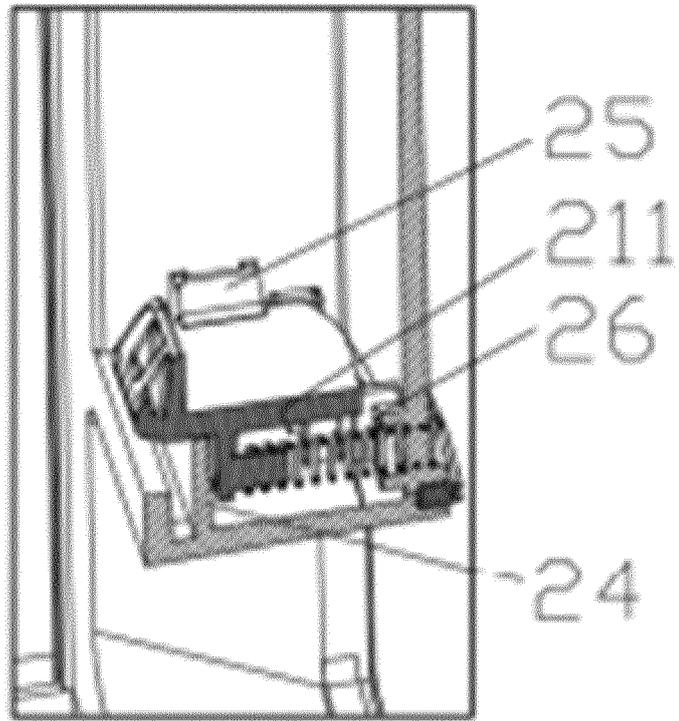


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/114529

A. CLASSIFICATION OF SUBJECT MATTER		
A47L 9/14(2006.01)i		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
A47L9; A47L11; F23J1		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
CNABS; CNTXT; CNKI: 清洁, 吸尘, 除尘, 尘袋, 支撑, 安装, 卡扣, 卡槽, 滑槽, 限位, 弹扣, 弹性, 弹簧, 抽板, 抽拉, 密封 VEN: clean+, dust, collector, bag, support+, buckle, slot, chute, groove, clasp, spring, fastening, slid+, plate, seal, cover		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 213910029 U (BEIJING STONE CENTURY TECHNOLOGY CO., LTD.) 10 August 2021 (2021-08-10) entire description	1-16
X	CN 210383760 U (STATE GRID CORPORATION OF CHINA et al.) 24 April 2020 (2020-04-24) description, paragraphs [0018]-[0021], and figures 1-3	1-2
Y	CN 210383760 U (STATE GRID CORPORATION OF CHINA et al.) 24 April 2020 (2020-04-24) description, paragraphs [0018]-[0021], and figures 1-3	3-9
Y	CN 109549564 A (JIANGSU MIDEA CLEANING APPLIANCES CO., LTD. et al.) 02 April 2019 (2019-04-02) description paragraphs 0055-0102, figures 1-10	3-9
Y	CN 211355187 U (SKYBEST ELECTRIC APPLIANCE (SUZHOU) CO., LTD.) 28 August 2020 (2020-08-28) description paragraphs 0035-0043, figures 3-11	3-9
X	CN 201267442 Y (SHI, Zhengbing) 08 July 2009 (2009-07-08) description, pages 3-4, and figures 1-3	10-16
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.		<input checked="" type="checkbox"/> See patent family annex.
* Special categories of cited documents:	"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	
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"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		
Date of the actual completion of the international search	Date of mailing of the international search report	
18 November 2021	30 November 2021	
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		
Facsimile No. (86-10)62019451	Telephone No.	

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INTERNATIONAL SEARCH REPORT

International application No. PCT/CN2021/114529

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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	EP 0627189 A1 (AICHNER FILTER GMBH) 07 December 1994 (1994-12-07) entire document	1-16
A	CN 107028555 A (TONGXIANG FUHONG PLASTIC PRODUCTS CO., LTD.) 11 August 2017 (2017-08-11) entire document	1-16
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Information on patent family members

International application No. PCT/CN2021/114529

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CN	109549564	A	02 April 2019	CN	109549564	B	29 January 2021
CN	211355187	U	28 August 2020	US	2021121030	A1	29 April 2021
CN	201267442	Y	08 July 2009	None			
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				DE	59403929	D1	09 October 1997
				DE	9308159	U1	05 August 1993
CN	107028555	A	11 August 2017	None			
CN	207679385	U	03 August 2018	None			

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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- CN 202021858229 [0001]