



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

(43) Date of publication:
04.01.2023 Bulletin 2023/01

(51) International Patent Classification (IPC):
A47L 11/24 ^(2006.01) **A47L 9/00** ^(2006.01)

(21) Application number: **21777611.1**

(52) Cooperative Patent Classification (CPC):
A47L 9/00; A47L 2201/024

(22) Date of filing: **02.06.2021**

(86) International application number:
PCT/CN2021/097957

(87) International publication number:
WO 2022/241850 (24.11.2022 Gazette 2022/47)

(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

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(30) Priority: **21.05.2021 CN 202110559204**

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(54) **GARBAGE COLLECTION SYSTEM OF CLEANING ROBOT**

(57) The present application relates to the field of sweeping robots, and more particularly, to a garbage collection system for a sweeping robot, including a base for placing the sweeping robot and a dust collecting box body connected to the base for collecting garbage in a sweeping robot storage box, an air duct is arranged in the base, and an inlet end of the air duct is aligned with the sweeping robot storage box; an inner chamber of the dust collecting box body comprises a transition chamber, a storage chamber and a power chamber, a blower is arranged in the power chamber, the power chamber communicates with the storage chamber, a dust filter element for filtering garbage is arranged in the storage chamber; a transmission channel is formed in the transition chamber, one end of the transmission channel communicates with an outlet end of the air duct, and other end of the transmission channel penetrates into the storage chamber and communicates with an inlet of the dust filter element; and the transition chamber, the storage chamber and the power chamber are sequentially arranged in a horizontal direction of the dust collecting box body away from the inlet end of the air duct. This application has the advantage of achieving garbage cleaning by using a blower with a lower power when cleaning the garbage of the

sweeping robot.

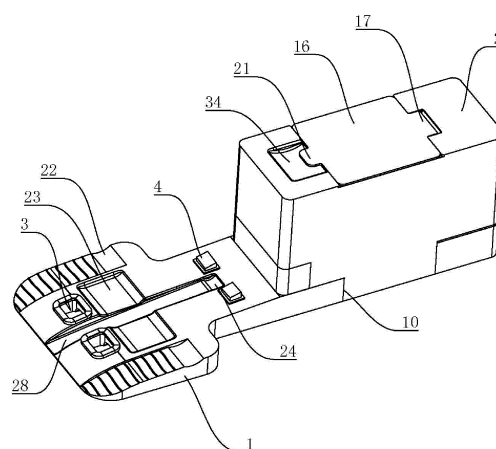


FIG. 1

Description

TECHNICAL FIELD

[0001] The present application relates to the field of a sweeping robot, and more particularly, to a garbage collection system for a sweeping robot.

BACKGROUND

[0002] The sweeping robot is frequently used in our daily life and is mainly used for cleaning floors, and after the sweeping robot is used for a period of time, garbage is stored in the housing of the sweeping robot, so the garbage stored in the sweeping robot needs to be periodically cleaned.

[0003] In the related art, for example, Chinese Utility Patent Application Publication No. CN211408896 U discloses a self-charging dust collecting device for a sweeping robot, which includes a dust collecting box body and a motor base body, the dust collecting box body is arranged on the motor base body, a dust filter bag is arranged in the dust collecting box body, a motor and a centrifugal blower driven by the motor are arranged on the motor base body, an inlet of the centrifugal blower is communicated with the bottom of the dust collecting box body, and an outlet of the centrifugal blower is communicated with the atmosphere; and an inlet of the dust filter bag is communicated with an air duct inlet positioned at the bottom of the motor base body through an air duct.

[0004] In order to facilitate subsequent cleaning of the garbage collected in the dust filter bag, the dust collecting box body is arranged at the top of the device, and during the use of the self-charging dust collecting device, after the centrifugal blower starts to operate, the garbage in the storage box on the sweeping robot enters the dust filter bag via the air duct inlet positioned at the bottom of the motor base body and the air duct. Therefore, the garbage in the sweeping robot storage box is cleaned, and manual operation is omitted.

[0005] With regard to the related art described above, the inventors believe that, in the process of cleaning the garbage in the sweeping robot storage box, the garbage moves from bottom to top in the vertical direction on the path of the air duct of the motor base body, the garbage moves from bottom to top in the vertical direction on the path of the air duct of the motor base body, the garbage can reach the dust filter bag only by moving from the bottom of the device to a position close to the top, and accordingly, the centrifugal blower serving as a power source needs higher power to play a role in cleaning the garbage, and the situation needs to be further improved.

SUMMARY

[0006] The present application provides a garbage collection system for a sweeping robot, and has the advantage of achieving garbage cleaning by using a blower

with a lower power when cleaning the garbage of the sweeping robot.

[0007] The garbage collection system for a sweeping robot according to the present application adopts the following technical solutions.

[0008] A garbage collection system for a sweeping robot includes a base for placing the sweeping robot and a dust collecting box body connected to the base for collecting garbage in a sweeping robot storage box, an air duct is arranged in the base, and an inlet end of the air duct is aligned with the sweeping robot storage box; an inner chamber of the dust collecting box body comprises a transition chamber, a storage chamber and a power chamber, a blower is arranged in the power chamber, the power chamber communicates with the storage chamber, a dust filter element for filtering garbage is arranged in the storage chamber; a transmission channel is formed in the transition chamber, one end of the transmission channel communicates with an outlet end of the air duct, and other end of the transmission channel penetrates into the storage chamber and communicates with an inlet of the dust filter element; and the transition chamber, the storage chamber and the power chamber are sequentially arranged in a horizontal direction of the dust collecting box body away from the inlet end of the air duct.

[0009] By adopting the above technical solutions, when the sweeping robot moves onto the base, in this case, the discharging opening of the sweeping robot storage box is aligned with the inlet end of the air duct of the base. After the sweeping robot is in place, the blower on the dust collecting box body starts to operate. Air flow is formed among the storage chamber, the transmission channel and the air duct. The garbage stored in the sweeping robot storage box sequentially passes through the air duct and the transmission channel, and then enters the storage chamber. Because the dust filter element is arranged in the storage chamber, the garbage entering the storage chamber is collected into the dust filter element, so that the garbage in the sweeping robot is emptied; in the process of emptying the garbage in the sweeping robot, the path of the garbage passing through the air duct in the dust collecting box body can be shortened. In addition, the path of the garbage from bottom to top in the vertical direction is shorter than before. In contrast, the sweeping robot can be emptied through smaller wind power generated by a blower. Therefore, when the blower needs to drive the air flow between the whole dust collecting box body and the air duct, the required working power is small, and power consumption can be reduced.

[0010] In an embodiment, a first yielding groove for embedding of one end of the base is arranged on one side of the dust collecting box body close to the base, the first yielding groove is arranged below the transition chamber, the outlet end of the air duct is arranged on one end of the base that is embedded into the first yielding groove and close to the transition chamber, and an inlet end of the transmission channel is connected to the outlet end of the air duct.

[0011] By adopting the above technical solutions, when the emptying station is assembled, one end of the base is embedded into the first yielding groove of the dust collecting box through the first yielding groove provided, and at the moment, the outlet end of the air duct and the inlet end of the transmission channel are butted in the vertical direction and communicate with each other, and through the above process, the length between the air duct and the inlet end of the transmission channel in the horizontal direction can be shortened.

[0012] In an embodiment, the transmission channel includes a pipe arranged in the storage chamber, an inlet end of the pipe penetrates out a side wall of the storage chamber that is close to the first yielding groove to communicate with the outlet end of the air duct, and an outlet end of the pipe penetrates into the storage chamber and is detachably connected to an inlet of the dust filter element.

[0013] By adopting the above technical solutions, during the emptying process, the garbage is sent from the outlet end of the air duct into the duct, and the transmission path of the garbage in the transition chamber can be determined through the duct provided, and the shortest path between the outlet end of the air duct and the dust filter element can be determined through the duct.

[0014] In an embodiment, a mounting opening is provided in a side wall on top of the storage chamber, and a sealing plate is detachably mounted on the mounting opening so that the storage chamber is in a sealed state.

[0015] By adopting the above technical solutions, after the emptying station is used for a long time, a certain amount of garbage is accumulated in the dust filter element, and the garbage inside the dust filter element needs to be periodically cleaned, and the efficiency of the blower to drive the air flow among the storage chamber, the pipe and the air duct is affected. The sealing plate is detached from the dust box body through the mounting opening and the sealing plate provided, so that the dust filter element can be removed from the storage chamber and the garbage stored in the dust filter element is treated, and therefore the garbage in the dust filter element can be cleaned in time.

[0016] In an embodiment, a positioning block is arranged on one side of the dust filter element close to the pipe, and the positioning block extends to a bottom wall of the dust filter element and is flush with the bottom wall of the dust filter element; two parallel elongated strips are arranged on an inner wall of the storage chamber away from the power chamber, and the two parallel elongated strips are positioned on two sides of an outlet end of the pipe; positioning strips are formed on opposite sides of the two elongated strips, and the two positioning strips, the two elongated strips and the inner wall of the storage chamber form a positioning space for embedding of the positioning block.

[0017] By adopting the above technical solutions, when the dust filter element is mounted in the storage chamber, the inlet of the dust filter element is required to

be ensured to be continuously butted and communicated with the outlet end of the pipe, a positioning space for embedding the positioning block on the dust filter element can be provided through the elongated strip and the positioning strip provided, and the position of the positioning block is defined, so that the position of the dust filter element in the storage chamber can be defined. Thus, it is ensured that the inlet of the dust filter element is to be continuously butted and communicated with the outlet end of the pipe, and the emptying effect of the sweeping robot is ensured.

[0018] In an embodiment, a connecting block is arranged on a side wall of the sealing plate facing the power chamber, a fixing block is arranged on a side of the connecting block facing the power chamber, and a fixing groove for embedding of the fixing block is arranged on an outer wall of the power chamber.

[0019] By adopting the above technical solutions, when the sealing plate is fixed on the dust collecting box body, the sealing plate is placed at the mounting opening, the fixing block is aligned with the fixing groove, and the fixing block is fixed in the fixing groove, so that the fixing of the sealing plate can be realized, and if the sealing plate needs to be detached, the fixing block can be directly pulled out of the fixing groove, and the sealing plate can be removed from the dust collecting box body.

[0020] In an embodiment, a groove bottom of the fixing groove is arc-shaped, and a strip-shaped groove is arranged on one side of the fixing block facing the groove bottom of the fixing groove.

[0021] By using the above technical solutions, when the fixing block is embedded into the fixing groove, the groove bottom of the fixing groove is arranged to be an arc-shaped and strip-shaped groove. When the fixing block is close to the fixing groove on the side of the fixing block away from the connecting block, the strip-shaped groove can provide a space in which the fixing block is deformed toward the groove bottom of the fixing groove. Thus, the frictional force between the fixing block and the inner wall of the fixing groove is increased. The firmness of the sealing plate can be ensured while facilitating the mounting and dismounting of the sealing plate.

[0022] In an embodiment, a side wall of the sealing plate away from the power chamber extends to form a power block, a second yielding groove is arranged on an outer wall of the transition chamber close to the power block, and there is a gap between an inner wall of the second yielding groove away from the sealing plate and an outer wall of the power block away from the sealing plate.

[0023] By adopting the above technical solutions, when the sealing plate needs to be removed from the dust collecting box body, an operator can conveniently apply force on the power block through the power block and the second yielding groove provided, thereby facilitating the removal of the sealing plate.

[0024] In an embodiment, the air ducts on the base comprises one or more inlet ends, and the number of

inlet ends of the air ducts corresponds to the number of discharging openings of the sweeping robot storage box.

[0025] By adopting the above technical solutions, due to different styles of the sweeping robot, the number of corresponding discharging openings of the sweeping robot storage box may be one or more, and the number of the inlet ends of the air ducts is one or more. If there is only one discharging opening of the storage box, the inlet end of the air duct can be sealed; if there are a plurality of discharging openings of the storage box, the discharging openings of the storage box are butted and communicated with the discharging opening of the storage box; through the above process, the applicability of the whole system can be improved.

[0026] In an embodiment, a limiting assembly for limiting position of the sweeping robot is arranged on the base so that a discharging opening of the sweeping robot storage box is aligned with the inlet end of the air duct.

[0027] By adopting the above technical solutions, after the sweeping robot moves onto the base, the position of the sweeping robot can be limited through the limiting assembly provided, and it is guaranteed that the discharging opening of the storage box of the sweeping robot is aligned with the inlet end of the air duct, and subsequent emptying operation of the sweeping robot is avoided.

[0028] In summary, the present application includes at least one of the following beneficial technical effects:

1. When the sweeping robot moves onto the base, in this case, the discharging opening of the sweeping robot storage box is aligned with the inlet end of the air duct of the base. After the sweeping robot is in place, the blower on the dust collecting box body starts to work. Air flow is formed among the storage chamber, the transmission channel and the air duct. In this case, the garbage stored in the sweeping robot storage box sequentially passes through the air duct and the transmission channel, and then enters the storage chamber. Because the dust filter element is arranged in the storage chamber, the garbage entering the storage chamber is collected into the dust filter element, so that the garbage in the sweeping robot is emptied; in the process of emptying the garbage in the sweeping robot, the path of the garbage passing through the air duct in the dust collecting box body can be shortened. In addition, the path of the garbage from bottom to top in the vertical direction is shorter than before. In contrast, the sweeping robot can be emptied through smaller wind power generated by a blower. Therefore, when the blower needs to drive the air flow between the whole dust collecting box body and the air duct, the required working power is small, and power consumption can be reduced.

2. One end of the base is embedded into the first yielding groove of the dust collecting box through the first yielding groove provided, and at the moment,

the outlet end of the air duct and the inlet end of the transmission channel are butted in the vertical direction and communicate with each other, and through the above process, the length between the air duct and the inlet end of the transmission channel in the horizontal direction can be shortened.

3. The sealing plate is detached from the dust box body through the mounting opening and the sealing plate provided, so that the dust filter element can be removed from the storage chamber and the garbage stored in the dust filter element is treated, and therefore the garbage in the dust filter element can be cleaned in time.

15 BRIEF DESCRIPTION OF THE DRAWINGS

[0029]

FIG. 1 is a schematic structural diagram of a garbage collection system according to an embodiment of the present application;

FIG. 2 is a partial cross-sectional view of a dust collecting box body according to an embodiment of the present application, which illustrates a dust filter element and a blower;

FIG. 3 is a partial cross-sectional view of a base according to an embodiment of the present application, which illustrates an air duct;

FIG. 4 is a schematic structural diagram of the dust filter element according to an embodiment of the present application;

FIG. 5 is an exploded view of a sealing plate and the dust collecting box body according to an embodiment of the present application;

FIG. 6 is another exploded view of the sealing plate and the dust collecting box body according to an embodiment of the present application;

A of FIG. 7 is a bottom view of a sweeping robot corresponding to a first situation according to an embodiment of the present application;

B of FIG. 7 is a schematic structural diagram of a base corresponding to a first situation according to an embodiment of the present application;

A of FIG. 8 is a bottom view of a sweeping robot corresponding to a second situation according to an embodiment of the present application;

B of FIG. 8 is a schematic structural diagram of a base corresponding to a second situation according to an embodiment of the present application;

A of FIG. 9 is a bottom view of a sweeping robot corresponding to a third situation according to an embodiment of the present application; and

B of FIG. 9 is a schematic structural diagram of a base corresponding to a third situation according to an embodiment of the present application.

[0030] List of References: 1. base; 2. dust collecting box body; 3. air duct; 4. charging terminal; 5. transition

chamber; 6. storage chamber; 7. power chamber; 8. blower; 9. dust filter element; 10. first yielding groove; 11. pipe; 12. positioning block; 13. elongated strip; 14. positioning strip; 15. mounting opening; 16. sealing plate; 17. connecting block; 18. fixing block; 19. fixing groove; 20. strip-shaped groove; 21. power block; 22. first limiting groove; 23. second limiting groove; 24. third limiting groove; 25. driving wheel; 26. universal wheel; 27. cleaning roller; 28. guide elongated groove; 29. directional wheel; 30. fourth limiting groove; 31. mounting hole; 32. connecting shaft; 33. roller; 34. second yielding groove.

DESCRIPTION OF THE EMBODIMENTS

[0031] The present application will be further described in detail below.

[0032] Referring to FIGS. 1 and 2, a garbage collection system for a sweeping robot according to an embodiment of the present application includes a base 1 for placing the sweeping robot and a dust collecting box body 2 connecting to the base 1 for collecting garbage in a sweeping robot storage box. An air duct 3 is integrally formed in the base 1 (as shown in FIG. 3). After the sweeping robot moves onto a specified position of the base 1 with its own driving wheel 25, the charging terminal 4 disposed on the base 1 is connected to a charging socket at the bottom of the sweeping robot, such that the base 1 can charge the sweeping robot. In order to ensure stability of the sweeping robot on the base 1, a limiting assembly is provided on the base 1. The limiting assembly can limit the position of the sweeping robot on the base 1, and ensure that a discharging opening of the sweeping robot storage box is communicated with an inlet end of the air duct 3 for emptying garbage in the storage box.

[0033] Referring to FIG. 2, an inner chamber of the dust collecting box body 2 includes a transition chamber 5, a storage chamber 6 and a power chamber 7. A blower 8 is mounted in the power chamber 7. The power chamber 7 communicates with the storage chamber 6. A dust filter element 9 for filtering garbage is mounted in the storage chamber 6. In this embodiment, the dust filter element 9 is a square dust filter bag with a shape similar to an inner chamber of the storage chamber 6. A transmission channel is formed in the transition chamber 5, one end of the transmission channel communicates with an outlet end of the air duct 3, and the other end of the transmission channel extends into the storage chamber 6 and communicates with an inlet of the dust filter element 9. The transition chamber 5, the storage chamber 6 and the power chamber 7 are sequentially arranged on the dust collecting box body 2 in a direction horizontal to the dust collecting box body 2 away from the inlet end of the air duct 3.

[0034] After the blower 8 starts to operate, the garbage enters the dust filter element 9 from the storage box through the air duct 3 and the pipe 11, so as to achieve an emptying operation of the sweeping robot. The emptying operation refers to cleaning the garbage

collected in the storage box of the sweeping robot. In this process, a path for the garbage entering into the dust filter element 9 can be shortened. In addition, a path of the garbage from bottom to top in a vertical direction is shorter. In contrast, the sweeping robot can be emptied with a smaller wind generated by a blower 8. Therefore, the operating power of the blower 8 that is required to drive the air flow in the whole dust collecting box body 2 and the air duct 3 is small, and thus power consumption can be reduced.

[0035] Referring to FIGS. 1 and 2, in order to further shorten the path of garbage in the emptying process, a first yielding groove 10 for embedding of one end of the base 1 is arranged on one side of the dust collecting box body 2 close to the base 1. The first yielding groove 10 is arranged below the transition chamber 5. Meanwhile, the outlet end of the air duct 3 is arranged on one end of the base 1 that is embedded into the first yielding groove 10 and one side close of the base 1 to the transition chamber 5. After one end of the base 1 is embedded into the dust filter element 10, the inlet end of the transmission channel is connected in the vertical direction and communicates with the outlet end of the air duct 3. Thus, the path of the garbage to the dust filters 9 in the horizontal direction can be shortened.

[0036] Referring to FIG. 2, in this embodiment, the transmission channel includes a pipe 11 mounted in the storage chamber 6. An inlet end of the pipe 11 penetrates through a side wall of the storage chamber 6 which is close to the first yielding groove 10 to communicate with the outlet end of the air duct 3, and an outlet end of the pipe 11 penetrates into the storage chamber 6 and communicates with the inlet of the dust filter element 9.

[0037] Referring to FIGS. 4 and 5, after the dust filter element 9 is mounted in the storage chamber 6, it is required to limit the position of the dust filter element 9 to ensure the continuous communication of the inlet end of the dust filter element 9 with the outlet end of the pipe 11. For this purpose, a positioning block 12 is integrally formed on one side of the dust filter element 9 close to the pipe 11. The positioning block 12 extends to and is flush with a bottom wall of the dust filter element 9. Two parallel elongated strips 13 are integrally formed on an inner wall of the storage chamber 6 away from the power chamber 7 and positioned on two sides of the outlet end of the pipe 11. Positioning strips 14 are formed on the opposite sides of the two elongated strips 13. The two positioning strips 14, two elongated strips 13 and the inner wall of the storage chamber 6 form a positioning space for embedding of the positioning block 12. When the dust filter element 9 is assembled, the positioning block 12 on the dust filter element 9 is embedded into the positioning space, such that an end face of the positioning block 12 close to the bottom of the storage chamber 6 abuts against the inner bottom wall of the storage chamber 6. In this way, the inlet end of the dust filter element 9 communicates with the outlet end of the pipe 11, which can also ensure stable communication of the

inlet end of the dust filter element 9 with the outlet end of the pipe 11.

[0038] Referring to FIGS. 5 and 6, during use of the emptying station, the dust filter element 9 stores a certain amount of garbage, and if the garbage in the dust filter element 9 is accumulated excessively, the driving efficiency of the blower 8 for air flow among the storage chamber 6, the pipe 11 and the air duct 3, as well as the emptying operation of the sweeping robot, will be affected. Thus, it is necessary to periodically clean the garbage in the dust filter element 9. For this purpose, a mounting opening 15 is provided in a side wall on the top of the storage chamber 6. A sealing plate 16 is detachably attached on the mounting opening 15. After the sealing plate 16 is mounted, the storage chamber 6 is in a sealed state.

[0039] In order to achieve the detachability of the sealing plate 16 on the dust collecting box body 2, a connecting block 17 is formed by extending on a side wall of the sealing plate 16 facing the power chamber 7, and a fixing block 18 is integrally formed on one side of the connecting block 17 facing the power chamber 7. Further, a fixing groove 19 for embedding of the fixing block 18 is formed in an outer wall of the power chamber 7. In order to enhance the firmness of the fixing block 18 in the fixing groove 19, the groove bottom of the fixing groove 19 is arranged to be arc-shaped, and the fixing block 18 is provided with a strip-shaped groove 20 toward the groove bottom of the fixing groove 19. The strip-shaped groove 20 may provide a space for deforming of the fixing block 18 toward the groove bottom of the fixing groove 19. When the fixing block 18 is embedded into the fixing groove 19, the fixing block 18 is deformed. The fixing block 18 applies a force to the inner wall of the fixing groove 19. The frictional force between the fixing block 18 and the inner wall of the fixing groove 19 may be increased, such that the firmness of the fixing block 18 in the fixing groove 19 can be enhanced.

[0040] Referring to FIGS. 5 and 6, with enhancing of the firmness of the fixing block 18 in the fixing groove 19, the detaching of sealing plate 16 will become difficult. In order to facilitate detaching the sealing plate 16, a side wall of the sealing plate 16 away from the power chamber 7 extends to form a power block 21, and a second yielding groove 34 is provided on an outer wall of the transition chamber 5 close to the power block 21. After the sealing plate 16 is mounted, there is a gap between an inner wall of the second yielding groove 34 away from the sealing plate 16 and an outer wall of the power block 21 away from the sealing plate 16. When the sealing plate 16 needs to be removed from the dust collecting box body 2, the second yielding groove 34 can facilitate the operator to apply force on the power block 21 by means of the power block 21 and the second yielding groove 34, thereby facilitating the detaching of the sealing plate 16.

[0041] Due to different styles of the sweeping robot, the number of corresponding discharging openings of the sweeping robot storage box may be one or more, and

the number of the inlet ends of the air ducts 3 on the base 1 is set to one or more, and the number of the inlet ends of the air ducts 3 corresponds to the number of discharging openings of the sweeping robot storage box. If the storage box includes one discharging opening, the inlet end of the air duct 3 can be sealed; if the storage box includes a plurality of discharging openings, the discharging openings of the storage box communicate with the discharging opening of the storage box. With the above process, the applicability of the whole system can be improved.

[0042] In the whole processes of emptying and charging, the sweeping robot can be positioned on the base 1 with the limiting assembly. When limiting the sweeping robot with the limiting assembly, a driving wheel 25, a universal wheel 26 and a cleaning roller 27 on the sweeping robot are limited at corresponding positions of on the base 1, such that the whole sweeping robot is limited on the base 1. Since styles of the sweeping robots are different, and the positions of the universal wheels 26 on some of the sweeping robots are different, the corresponding limiting assemblies are also different on the base 1, and the positions of the inlet end of the air duct 3 and the positions of the charging terminals 4 on the base 1 are also correspondingly different, and the specific situations are described as follows.

[0043] First situation: positions of the driving wheels 25, the universal wheel 26 and the cleaning roller 27 on the sweeping robot are shown in A of FIG. 7. Referring to B of FIG. 7, the corresponding limiting assembly includes first limiting grooves 22, a second limiting groove 23 and a third limiting groove 24. The first limiting grooves 22 are arranged on both sides of the base 1 for embedding of the driving wheels 25 of the sweeping robot. Since the cleaning roller 27 is disposed between the two driving wheels 25 and the second limiting groove 23 is configured for embedding of the cleaning roller 27, the second limiting groove 23 is disposed between the two first limiting grooves 22. The third limiting groove 24 is configured for embedding of the universal wheel 26, and is disposed between two charging terminals 4.

[0044] Furthermore, in order to ensure that the universal wheel 26 can guide the sweeping robot to accurately move to a designated position, the base 1 is provided with a guide elongated groove 28 that communicates with the third limiting groove 24. The universal wheel 26 can accurately move to the third limiting groove 24 by moving in the guide elongated groove 28. After the universal wheel 26 of the sweeping robot moves into the third limiting groove 24, the two driving wheels 25 are correspondingly embedded into the corresponding first limiting groove 22, the cleaning roller 27 moves to the second limiting groove 23, and the outlet end of the sweeping robot storage box communicates with the inlet end of the air duct 3.

[0045] Second situation: positions of the driving wheels 25, the universal wheel 26 and the cleaning roller 27 on the sweeping robot are shown in A of FIG. 8, the

main difference from the first situation is in the position of the universal wheel 26. Referring to B of FIG. 8, the corresponding limiting assembly includes first limiting grooves 22, a second limiting groove 23 and a third limiting groove 24. The position of the first limiting groove 22 on the base 1 is consistent with that in the first situation, the position of the second limiting groove 23, and the position of the third limiting groove 24 needs to be adjusted on the base 1. The position of the third limiting groove 24 is formed between the two charging terminals 4 of the base 1 and corresponds to the position of the universal wheel 26 in A of FIG. 8.

[0046] Third situation: positions of the driving wheels 25, the universal wheel 26 and the cleaning roller 27 on the sweeping robot are shown in A of FIG. 9, the main difference from the second situation is that a directional wheel 29 is additionally mounted on the sweeping robot. A roller 33 is provided to guide and assist the sweeping robot to move to a position corresponding to the base 1 when the sweeping robot moves toward the base 1, referring to B of FIG. 9. Hence, the corresponding limiting assembly further comprises a fourth limiting groove 30 concavely formed on the base 1. The fourth limiting groove 30 is provided for embedding of the directional wheel 29. In addition, mounting holes 31 are provided on the base 1. The mounting holes 31 are positioned on both sides of the two charging terminals 4 along the length direction of the base 1. A connecting shaft 32 is rotatably connected to the inner walls of the two opposite sides in the mounting hole 31. A roller 33 is rotatably connected to the connecting shaft 32. When the sweeping robot moves on the base 1 through the roller 33 provided, the frictional force between the bottom of the sweeping robot and the base 1 can be reduced, and movement of the sweeping robot on the base 1 is facilitated.

[0047] The implementation principle of a garbage collection system for a sweeping robot according to an embodiment of the present application is described below. When the sweeping robot moves onto the base 1, the discharging opening of the sweeping robot storage box is aligned with the inlet end of the air duct 3 of the base 1. After the sweeping robot is in place, the sweeping robot can be limited on the base 1 by means of a limiting assembly. The blower 8 on the dust collecting box body 2 starts to operate such that an air flow is formed among the storage chamber 6, the transmission channel 11 and the air duct 3. The garbage stored in the sweeping robot storage box sequentially passes through the air duct 3 and the transmission channel 11, and then enters the dust filter element 9, so that the garbage in the sweeping robot is emptied. In the process of emptying the garbage in the sweeping robot, the garbage is collected into the dust filter element 9 only by the air duct 3 and the pipe 11, and the path of the garbage in the process is short. In addition, the path of the garbage from bottom to top in the vertical direction is shorter than before. In contrast, the sweeping robot can be emptied with smaller wind

generated by a blower 8. Therefore, when the blower drives the air flow between the whole dust collecting box body and the air duct, the required power is small, and power consumption can be reduced.

[0048] The above description is only preferred embodiments of the present application and is not intended to limit the protection scope of the present application. Therefore, all equivalent changes of the structure, shape or principle according to the spirit of the present application should be all included in the protection scope of the present application.

Claims

1. A garbage collection system for a sweeping robot, comprising: a base (1) for placing the sweeping robot and a dust collecting box body (2) connected to the base (1) for collecting garbage in a sweeping robot storage box, an air duct (3) is arranged in the base (1), and an inlet end of the air duct (3) is aligned with the sweeping robot storage box; **characterized in that**, an inner chamber of the dust collecting box body (2) comprises a transition chamber (5), a storage chamber (6) and a power chamber (7), a blower (8) is arranged in the power chamber (7), the power chamber (7) communicates with the storage chamber (6), a dust filter element (9) for filtering garbage is arranged in the storage chamber (6); a transmission channel is formed in the transition chamber (5), one end of the transmission channel communicates with an outlet end of the air duct (3), and other end of the transmission channel penetrates into the storage chamber (6) and communicates with an inlet of the dust filter element (9); and the transition chamber (5), the storage chamber (6) and the power chamber (7) are sequentially arranged in a horizontal direction of the dust collecting box body (2) away from the inlet end of the air duct (3).
2. The garbage collection system for a sweeping robot according to claim 1, **characterized in that** a first yielding groove (10) for embedding of one end of the base (1) is arranged on one side of the dust collecting box body (2) close to the base (1), the first yielding groove (10) is arranged below the transition chamber (5), the outlet end of the air duct (3) is arranged on one end of the base (1) that is embedded into the first yielding groove (10) and close to the transition chamber (5), and an inlet end of the transmission channel is connected to the outlet end of the air duct (3).
3. The garbage collection system for a sweeping robot according to claim 2, **characterized in that** the transmission channel comprises a pipe (11) arranged in the storage chamber (6), an inlet end of the pipe (11) penetrates out a side wall of the storage

chamber (6) that is close to the first yielding groove (10) to communicate with the outlet end of the air duct (3), and an outlet end of the pipe (11) penetrates into the storage chamber (6) and is detachably connected to an inlet of the dust filter element (9).

4. The garbage collection system for a sweeping robot according to claim 3, **characterized in that** a mounting opening (15) is provided in a side wall on top of the storage chamber (6), and a sealing plate (16) is detachably mounted on the mounting opening (15) so that the storage chamber (6) is in a sealed state. 10
5. The garbage collection system for a sweeping robot according to claim 4, **characterized in that** a positioning block (12) is arranged on one side of the dust filter element (9) close to the pipe (11), and the positioning block (12) extends to a bottom wall of the dust filter element (9) and is flush with the bottom wall of the dust filter element (9); two parallel elongated strips (13) are arranged on an inner wall of the storage chamber (6) away from the power chamber (7), and the two parallel elongated strips (13) are positioned on two sides of an outlet end of the pipe (11); positioning strips (14) are formed on opposite sides of the two elongated strips (13), and the two positioning strips (14), the two elongated strips (13) and the inner wall of the storage chamber (6) form a positioning space for embedding of the positioning block (12). 15
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6. The garbage collection system for a sweeping robot according to claim 5, **characterized in that** a connecting block (17) is arranged on a side wall of the sealing plate (16) facing the power chamber (7), a fixing block (18) is arranged on a side of the connecting block (17) facing the power chamber (7), and a fixing groove (19) for embedding of the fixing block (18) is arranged on an outer wall of the power chamber (7). 35
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7. The garbage collection system for a sweeping robot according to claim 6, **characterized in that** a groove bottom of the fixing groove (19) is arc-shaped, and a strip-shaped groove (20) is arranged on one side of the fixing block (18) facing the groove bottom of the fixing groove (19). 45
8. The garbage collection system for a sweeping robot according to claim 7, **characterized in that** a side wall of the sealing plate (16) away from the power chamber (7) extends to form a power block (21), a second yielding groove (34) is arranged on an outer wall of the transition chamber (5) close to the power block (21), and there is a gap between an inner wall of the second yielding groove (34) away from the sealing plate (16) and an outer wall of the power block (21) away from the sealing plate (16). 50
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9. The garbage collection system for a sweeping robot according to the claim 1, **characterized in that** the air ducts (3) on the base (1) comprises one or more inlet ends, and the number of inlet ends of the air ducts (3) corresponds to the number of discharging openings of the sweeping robot storage box.

10. The garbage collection system for a sweeping robot according to the claim 1, **characterized in that** a limiting assembly for limiting position of the sweeping robot is arranged on the base (1), so that a discharging opening of the sweeping robot storage box is aligned with the inlet end of the air duct (3).

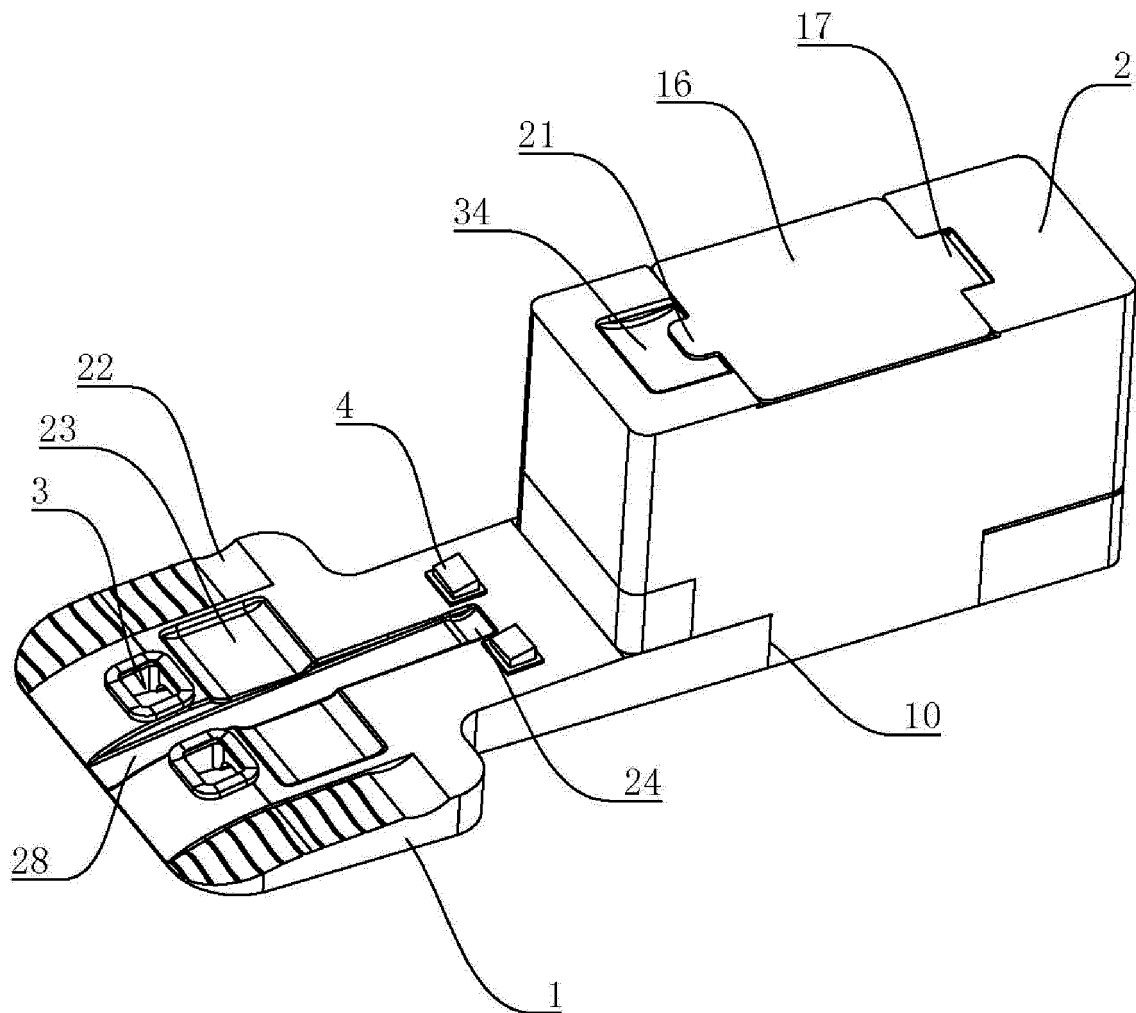


FIG. 1

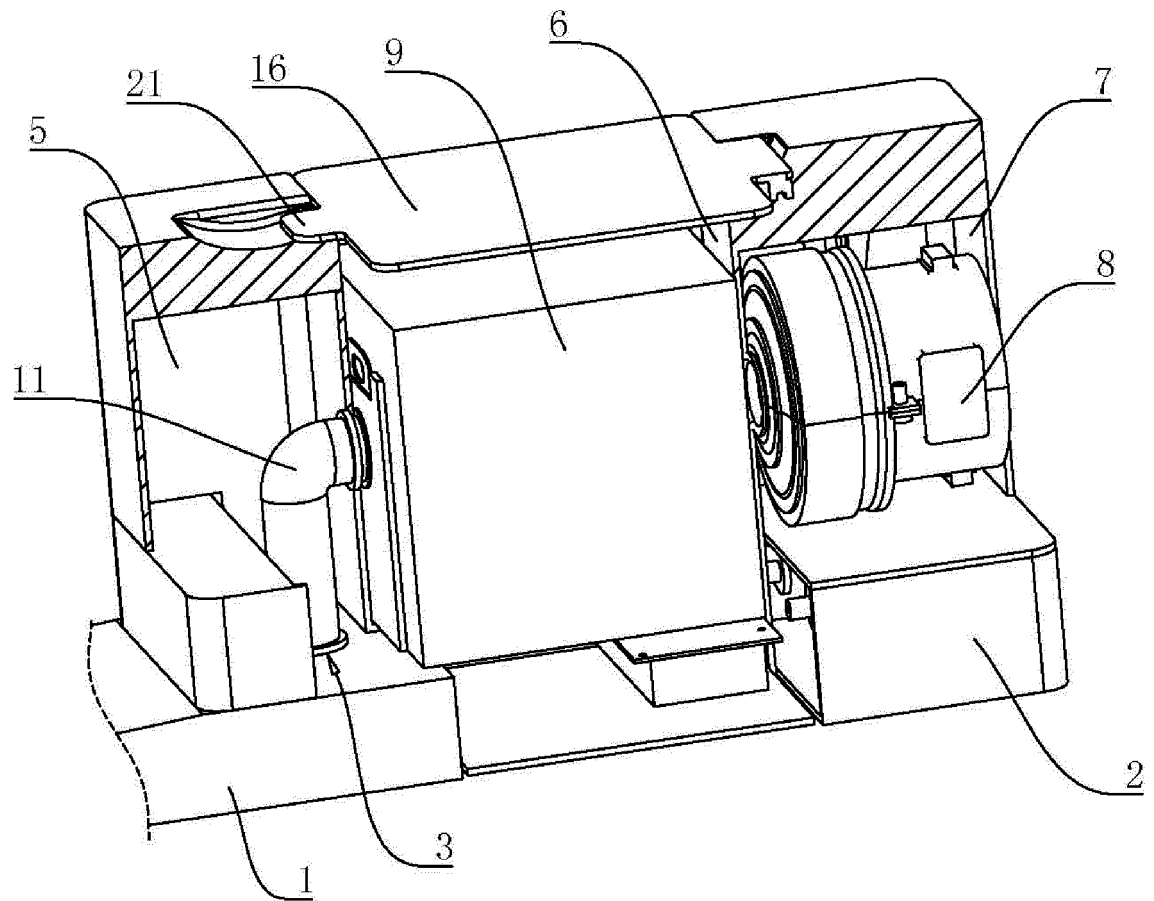


FIG. 2

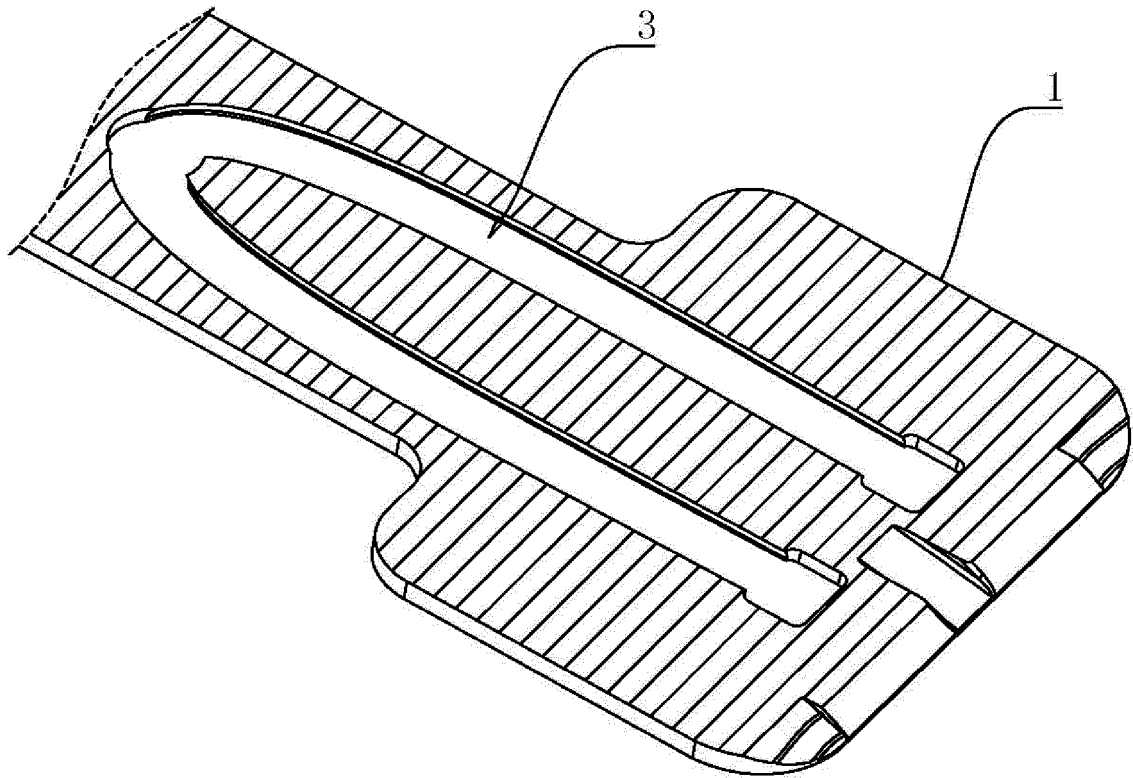


FIG. 3

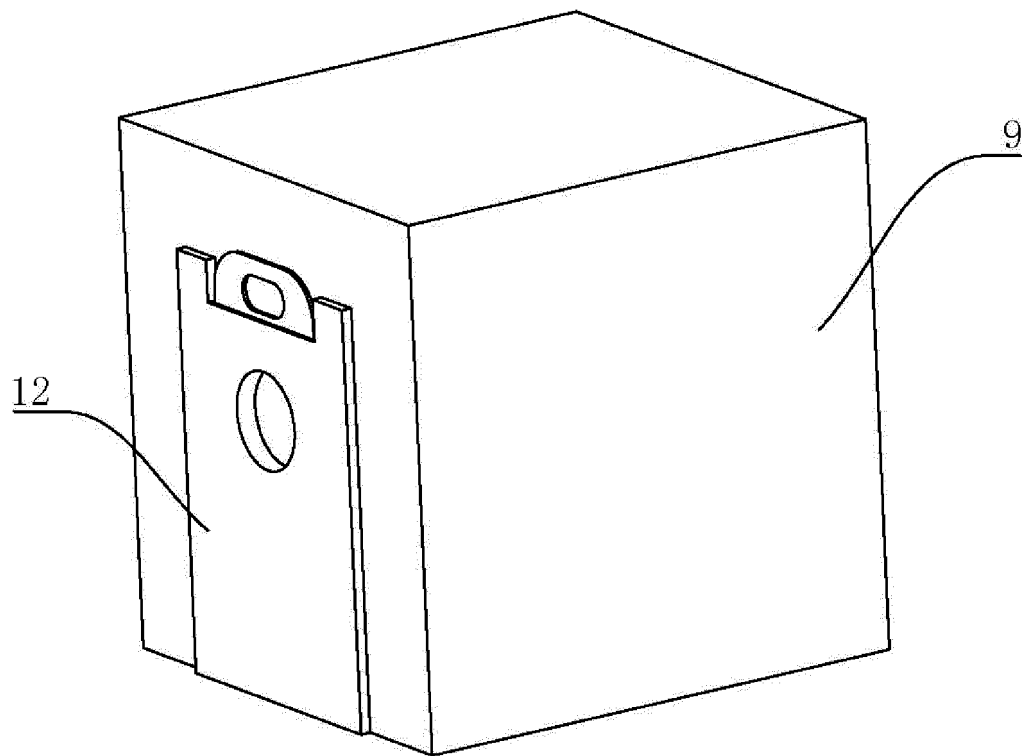


FIG. 4

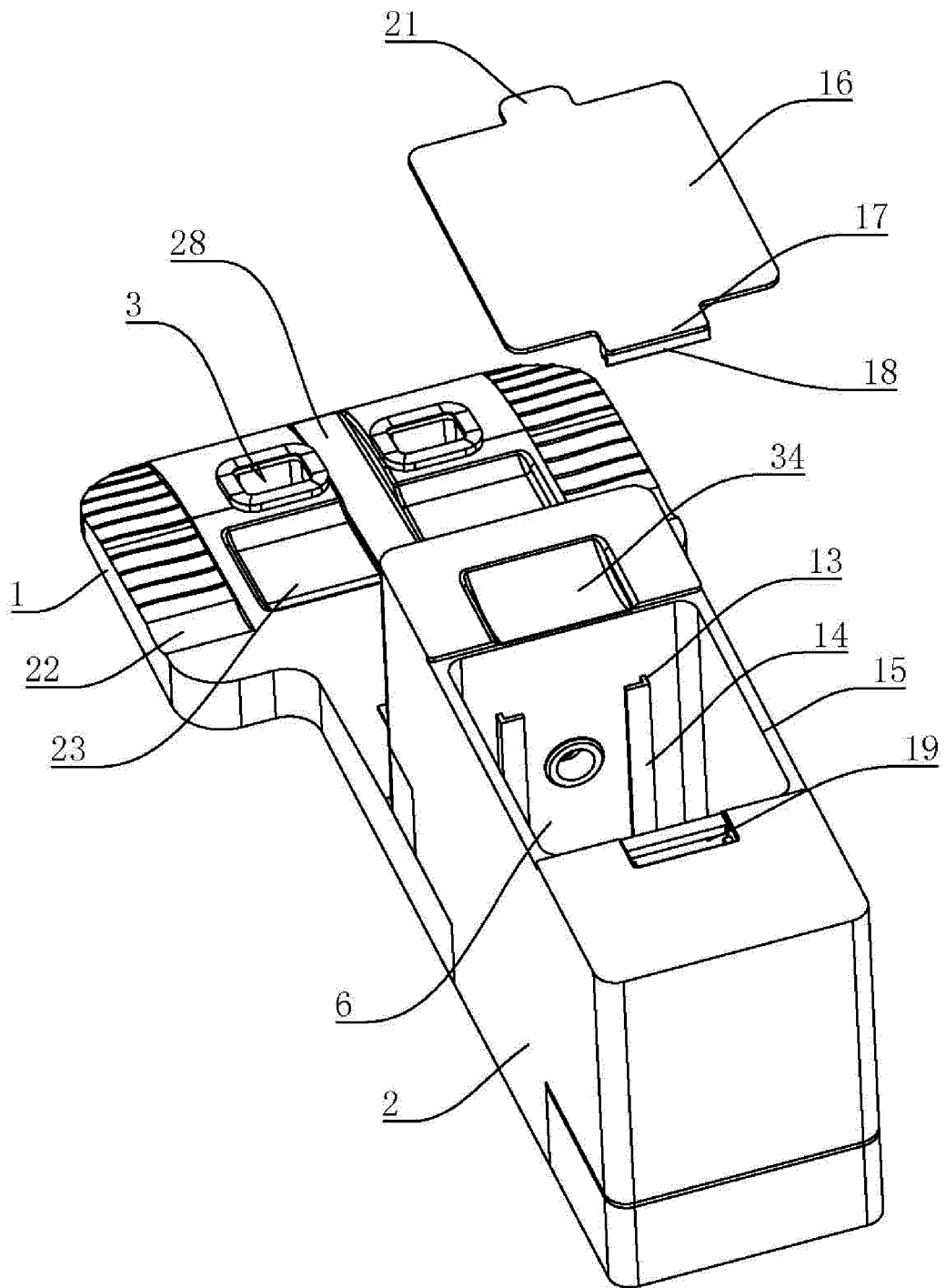


FIG. 5

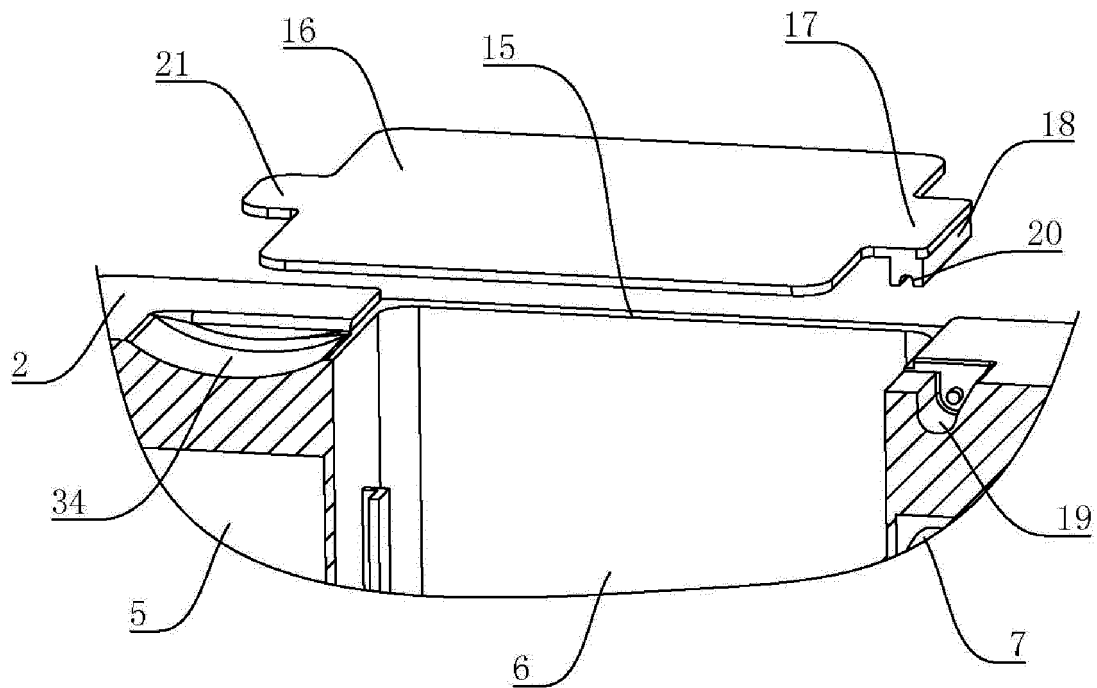


FIG. 6

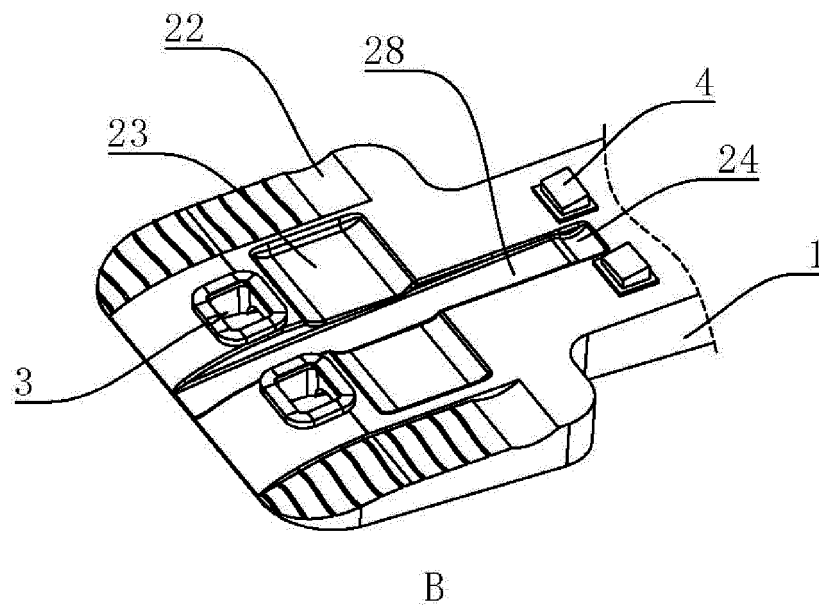
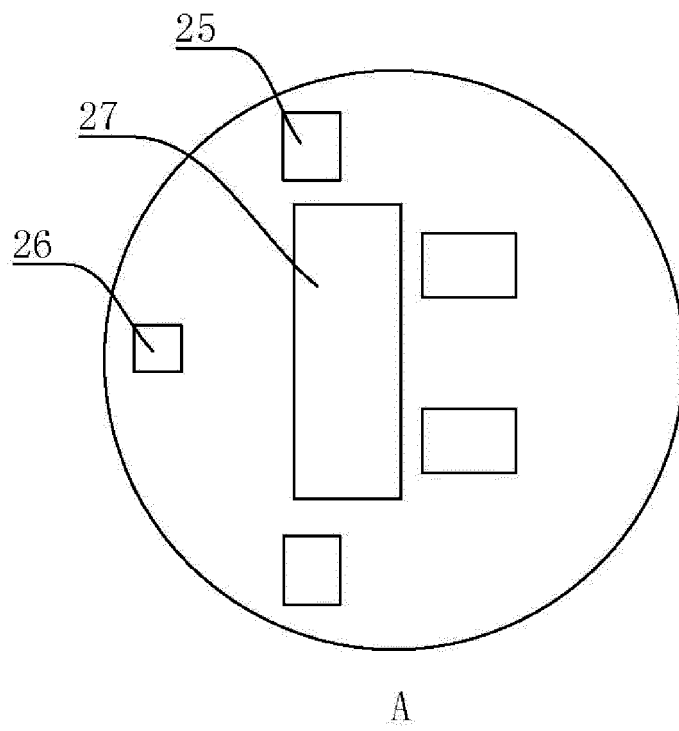


FIG. 7

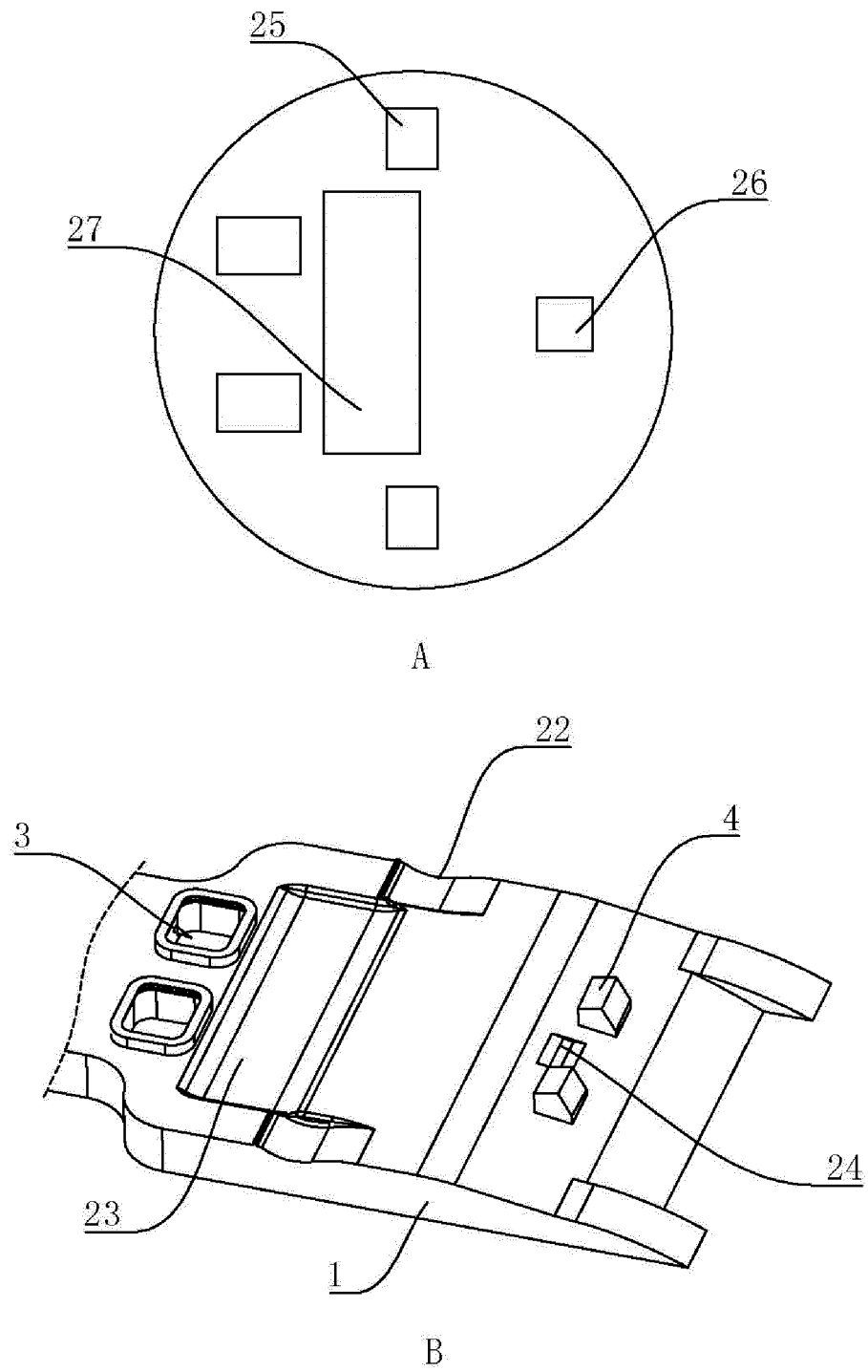


FIG. 8

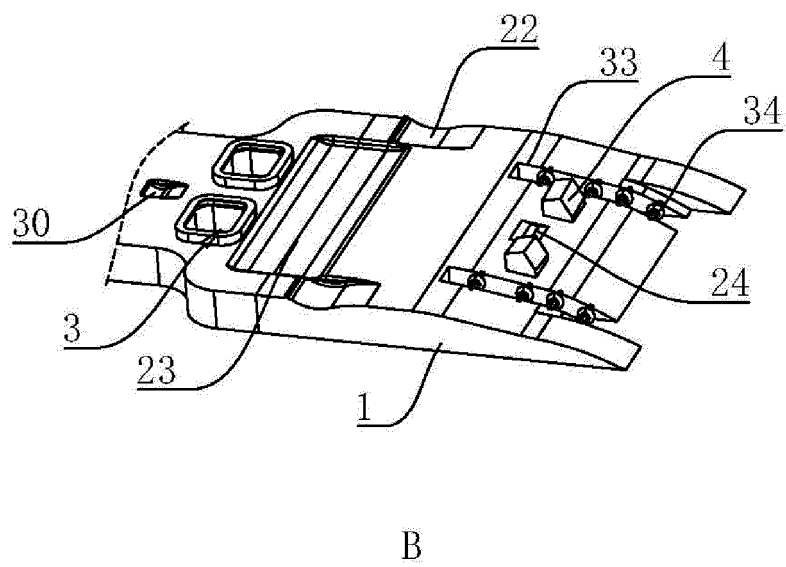
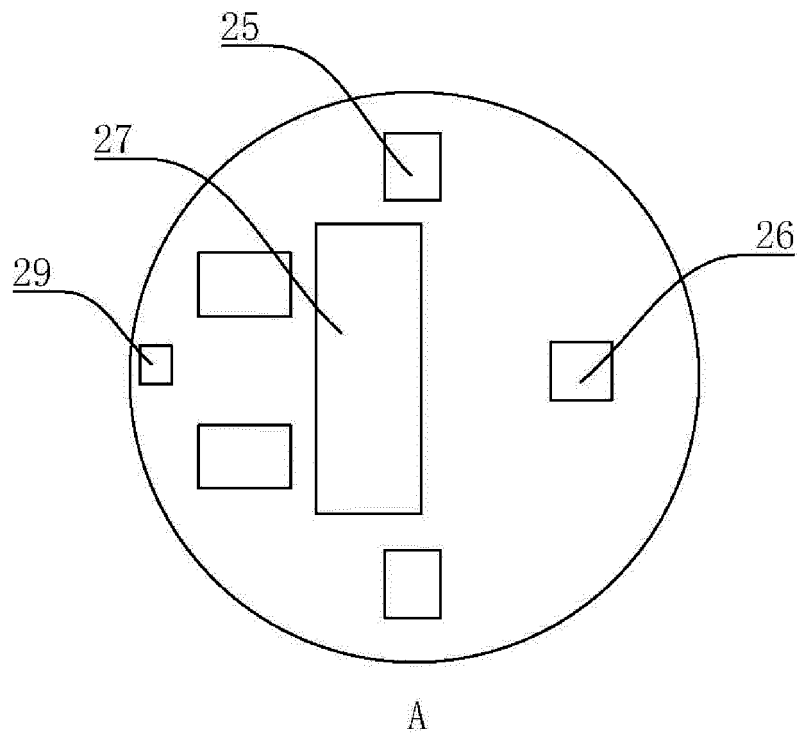


FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/097957

A. CLASSIFICATION OF SUBJECT MATTER

A47L 11/24(2006.01)i; A47L 11/40(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)

A47L

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; VEN; WOTXT; EPTXT; USTXT: 集尘, 抽尘, 垃圾, 灰尘, 回收, 收集, 排空, 清理, 动力, 风机, 电机, 水平, 前后, 设置, 布置, 排列, 分布, 滤, 机器人, 清洁剂, 充电座, 维护站, 充电站, 集成站, 停靠站, maintenance, maintain +, charg+, recharg+, integrat+, station, base, dust, waste, recycl+, collect+, clean+, clear+, robot

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 101352326 A (TAIYIKAI ELECTRICAL APPLIANCES (SUZHOU) CO., LTD.) 28 January 2009 (2009-01-28) description page 1 line 26 - page 6 line 15, figures 1-6	1-10
X	CN 111557614 A (SHENZHEN SILVER STAR INTELLIGENT TECHNOLOGY CO., LTD.) 21 August 2020 (2020-08-21) description, paragraphs [0005]-[0084], and figures 1-16	1-10
X	CN 209564069 U (BEIJING XIANGJIE TECHNOLOGY CO., LTD.) 01 November 2019 (2019-11-01) description, paragraphs [0005]-[0078], and figures 1-22	1-10
X	CN 1994212 A (SAMSUNG ELECTRONICS CO., LTD.) 11 July 2007 (2007-07-11) description page 2 line 13 - page 9 line 27, figures 1-7	1-10
X	CN 112386181 A (HANGZHOU CRAFTSMAN DRAGON ROBOT TECHNOLOGY CO., LTD.) 23 February 2021 (2021-02-23) description, paragraphs [0006]-[0083], and figures 1-4	1-10

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

16 November 2021

Date of mailing of the international search report

13 January 2022

Name and mailing address of the ISA/CN

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Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No. PCT/CN2021/097957

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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	DE 102010061327 A1 (VORWERK AND CO. INTERHOLDING GMBH) 21 June 2012 (2012-06-21) entire document	1-10

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2021/097957

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		EP 1806086 B1	23 December 2009
		CN 1994212 B	12 January 2011
CN 112386181 A	23 February 2021	None	
CN 110051283 A	26 July 2019	None	
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Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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