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ROBOT SWIMMING POOL CLEANER WITH FILTER SCREEN ANTI-BLOCKING FUNCTION

- (57)

A robot swimming pool cleaner with a filter screen anti-blocking function, including a housing. The interior of the housing is provided with a filtering mechanism (3) and a deposition chamber (105), the housing is provided with a first opening (103) communicated with a water inlet chamber, a second opening (104) communicated with a water pump chamber, and a third opening (106) communicated with the deposition chamber, the
- third opening is provided with a garbage filtering and collecting mechanism (5), the first opening is provided with a first one-way valve and the third opening is provided with a second one-way valve. A water pump may form a reverse water flow, thereby flushing the filtering mechanism, dirt is flushed to the deposition chamber and the garbage filtering and collecting mechanism for temporary storage, avoiding blockage of the filtering mechanism.

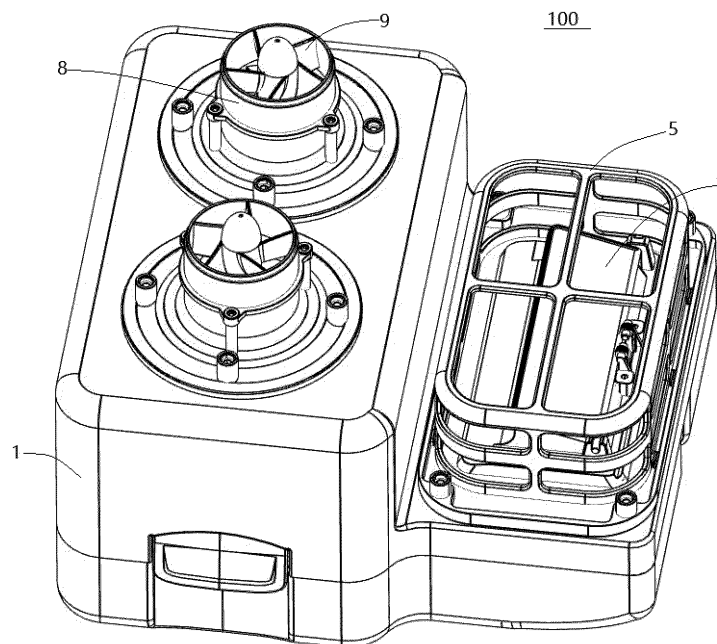


Fig. 1

## Description

### TECHNICAL FIELD

**[0001]** The present application relates to the technical field of swimming pool cleaning devices, in particular to a robot swimming pool cleaner with a filter screen anti-blocking function.

### BACKGROUND

**[0002]** Swimming pools are a place where people engage in swimming activities. During use, some garbage, floating algae, and bacteria and the like may appear in the swimming pool, so it is necessary to regularly clean the swimming pool. A traditional manner of manual cleaning is time-consuming and labor-consuming, but with the advancement of technologies, there is a manner of using robot swimming pool cleaners to clean the swimming pool.

**[0003]** The existing robot swimming pool cleaner includes a housing, the housing is internally provided with a water pump and a filtering mechanism, the water pump sucks water mixed with dirt in the swimming pool into the housing, the filtering mechanism intercepts the dirt and retains it in the housing by a filter screen, and the filtered water is discharged from the housing, thereby the cleaning of the swimming pool is achieved.

**[0004]** However, the robot swimming pool cleaner in existing technologies still has the following shortcomings.

**[0005]** The dirt remaining in the housing may easily block the filter screen, so that suction of the robot swimming pool cleaner is reduced, and the cleaning efficiency is affected. Since the existing robot swimming pool cleaner does not have a self-cleaning function, the filter screen needs to be cleaned and dredged manually and frequently, so it is inconvenient to use.

### SUMMARY

**[0006]** A purpose of the present application is to provide a robot swimming pool cleaner with a filter screen anti-blocking function.

**[0007]** In order to achieve the above purpose of the present application, the present application adopts the following technical schemes.

**[0008]** The robot swimming pool cleaner with the filter screen anti-blocking function includes a housing, the interior of the housing is provided with a filtering mechanism to separate a water inlet chamber and a water pump chamber in the housing, the water inlet chamber and the water pump chamber are located on both sides of the filtering mechanism, the housing is provided with a first opening and a second opening, the first opening is communicated with the water inlet chamber, the second opening is communicated with the water pump chamber, and the housing, located on one side of the water pump chamber, is fixedly provided with a water pump, a dep-

osition chamber is formed inside the housing on one side of the water inlet chamber, the deposition chamber is communicated with the water inlet chamber, the housing is provided with a third opening communicated with the deposition chamber, and the third opening is provided with a garbage filtering and collecting mechanism.

**[0009]** The robot swimming pool cleaner further includes a control mechanism, the control mechanism is electrically connected with the water pump, the first opening is provided with a first one-way valve that may be opened towards an inner side of the housing, the third opening is provided with a second one-way valve that may be opened towards an outer side of the housing, and the rotation direction of the water pump is controlled by the control mechanism, to form a water flow from the first opening to the second opening inside the housing, or form a water flow from the second opening to the third opening inside the housing.

**[0010]** As a further improved technical scheme of the present application, the third opening is arranged on an upper side of the deposition chamber.

**[0011]** As a further improved technical scheme of the present application, the filtering mechanism includes a first filter screen, the garbage filtering and collecting mechanism includes a second filter screen, and the mesh aperture of the first filter screen is smaller than that of the second filter screen.

**[0012]** As a further improved technical scheme of the present application, the filtering mechanism includes a first filter screen, the garbage filtering and collecting mechanism includes a second filter screen, and the mesh aperture of the first filter screen is larger than that of the second filter screen.

**[0013]** As a further improved technical scheme of the present application, the housing includes an upper housing and a lower housing, and the upper housing and the lower housing are detachably connected by a connecting mechanism.

**[0014]** As a further improved technical scheme of the present application, the garbage filtering and collecting mechanism includes a garbage basket and a first fixed block, the first fixed block is fixedly arranged on the housing, the garbage basket covers the periphery of the third opening and is detachably connected with the first fixed block, and a second filter screen is arranged at a grid gap of the garbage basket.

**[0015]** As a further improved technical scheme of the present application, the second one-way valve includes a movable door, a second fixed block, and a torsion spring, the movable door is connected with the second fixed block by a rotating shaft, so that the movable door may be rotated towards the outer side of the housing, to open the third opening, and the torsion spring is arranged between the movable door and the second fixed block, so that the movable door is rotated towards the inner side of the housing without an external force, to shield the third opening.

**[0016]** As a further improved technical scheme of the

present application, the filtering mechanism includes a filtering basket, the filtering basket is fixedly arranged inside the housing, and a first filter screen is arranged at a grid gap of the filtering basket.

**[0017]** As a further improved technical scheme of the present application, the water pump includes a motor and an impeller, an outer case of the motor is provided with a threading gasket, the outer case and the threading gasket of the motor are provided with a through hole for wiring, and the through hole is internally provided with a waterproof sealing member.

**[0018]** As a further improved technical scheme of the present application, the second opening is provided with a water pump flow channel, the water pump flow channel is fixedly connected with the housing, the impeller of the water pump is arranged in the water pump flow channel, and an outer port of the water pump flow channel is provided with a guide vane.

**[0019]** Compared to existing technologies, the technical effects of the present application are as follows.

**[0020]** The robot swimming pool cleaner has a self-cleaning function and is convenient for use. By arranging the deposition chamber, the garbage filtering and collecting mechanism, the first one-way valve and the second one-way valve, the water pump forms a reverse water flow while being rotated reversely, the filtering mechanism is flushed, dirt is flushed to the deposition chamber and the garbage filtering and collecting mechanism for temporary storage, the filtering mechanism is avoided from being blocked, and it may be guaranteed that the robot swimming pool cleaner has the higher cleaning efficiency for a longer time.

## BRIEF DESCRIPTION OF THE DRAWINGS

### [0021]

Fig. 1 is a stereostructure schematic diagram of a robot swimming pool cleaner with a filter screen anti-blocking function in an implementation mode of the present application;

Fig. 2 is a front-view structure schematic diagram of the robot swimming pool cleaner with the filter screen anti-blocking function in an implementation mode of the present application;

Fig. 3 is a top-view structure schematic diagram of the robot swimming pool cleaner with the filter screen anti-blocking function in an implementation mode of the present application;

Fig. 4 is a section-view structure schematic diagram in an A-A direction in Fig. 3; and

Fig. 5 is a section-view structure schematic diagram in a B-B direction in Fig. 3.

Explanation of drawing reference signs:

**[0022]** Robot swimming pool cleaner 100; Housing 1; Upper housing 11; Lower housing 12; Connecting mech-

anism 2; Filtering mechanism 3; Filtering basket 31; First filter screen 32; Water inlet chamber 101; Water pump chamber 102; First opening 103; Second opening 104; Deposition chamber 105; Third opening 106; Water pump 4; Motor 41; Impeller 42; Threading gasket 43; Through hole 44; Garbage filtering and collecting mechanism 5; Garbage basket 51; First fixed block 52; Second filter screen 53; First one-way valve 6; Second one-way valve 7; Movable door 71; Second fixed block 72; Torsion spring 73; Rotating shaft 74; Water pump flow channel 8; and Guide vane 9.

## DETAILED DESCRIPTION OF THE EMBODIMENTS

**[0023]** The present application is described in detail below in combination with the specific implementation modes shown in the drawings. However, these implementation modes do not limit the present application, and any changes in structures, methods or functions made by those of ordinary skill in the art according to these implementation modes are all contained in the scope of protection of the present application.

**[0024]** Please refer to Figs. 1 to 5, a robot swimming pool cleaner 100 with a filter screen anti-blocking function includes a housing 1, the housing 1 includes an upper housing 11 and a lower housing 12, the upper housing 11 and the lower housing 12 are detachably connected by a connecting mechanism 2, and a closed space is formed while the upper housing 11 and the lower housing 12 are connected together.

**[0025]** In this implementation mode, the connecting mechanism 2 is a lock catch structure, and after the lock catch structure is opened, the upper housing 11 and the lower housing 12 may be separated, as to remove dirt stored in the housing 1.

**[0026]** The interior of the housing 1 is provided with a filtering mechanism 3, the filtering mechanism 3 includes a filtering basket 31, the filtering basket 31 is a grid structure and serves as a mounting framework of a first filter screen 32, and the first filter screen 32 is filled and arranged at a grid gap of the filtering basket 31, and used to intercept the dirt in a water inlet chamber 101.

**[0027]** The filtering mechanism 3 is fixedly arranged inside the housing 1 to separate the water inlet chamber 101 and a water pump chamber 102 in the housing 1, the water inlet chamber 101 is located on an outer side of the filtering mechanism 3, the water pump chamber 102 is located on an inner side of the filtering mechanism 3, the housing 1 is provided with a first opening 103 and a second opening 104, the first opening 103 is communicated with the water inlet chamber 101, the second opening 104 is communicated with the water pump chamber 102, and the housing 1 located on one side of the water pump chamber 102 is fixedly provided with a water pump 4.

**[0028]** A deposition chamber 105 is further formed in the housing 1 on one side of the water inlet chamber 101, the deposition chamber 105 is communicated with the

water inlet chamber 101, the housing 1 is provided with a third opening 106 communicated with the deposition chamber 105, and the third opening 106 is provided with a garbage filtering and collecting mechanism 5.

**[0029]** It should be noted that the description manner of the water inlet chamber 101 and the deposition chamber 105 is only for the convenience of distinguishing functions of each area in the closed space formed by enclosing the upper housing 11 and the lower housing 12. In fact, in some implementation modes of the present application, the water inlet chamber 101 and the deposition chamber 105 are completely an integrated structure, namely the water inlet chamber 101 and the deposition chamber 105 are a same overall interconnected space.

**[0030]** The garbage filtering and collecting mechanism 5 includes a garbage basket 51 and a first fixed block 52, the first fixed block 52 is fixedly arranged on the housing 1, the garbage basket 51 covers the periphery of the third opening 106 and is detachably connected with the first fixed block 52, and a second filter screen 53 is arranged at a grid gap of the garbage basket 51.

**[0031]** The garbage basket 51 is a grid structure and serves as a mounting framework of the second filter screen 53, and the second filter screen 53 is filled and arranged at the grid gap of the garbage basket 51, and used to intercept the dirt in the garbage basket 51.

**[0032]** In this implementation mode, the garbage basket 51 is detachably connected with the first fixed block 52 by using a buckle structure, so that the garbage basket 51 may be conveniently cleaned and replaced.

**[0033]** The robot swimming pool cleaner 100 further includes a control mechanism (unshown), the control mechanism is electrically connected with the water pump 4, the first opening 103 is provided with a first one-way valve 6 that may be opened towards an inner side of the housing 1, the third opening 106 is provided with a second one-way valve 7 that may be opened towards an outer side of the housing 1, and the rotation direction of the water pump 4 is controlled by the control mechanism, to form a water flow from the first opening 103 to the second opening 104 inside the housing 1, or form a water flow from the second opening 104 to the third opening 106 inside the housing 1.

**[0034]** The second one-way valve 7 includes a movable door 71, a second fixed block 72, and a torsion spring 73, the movable door 71 is connected with the second fixed block 72 by a rotating shaft 74, so that the movable door 71 may be rotated towards the outer side of the housing 1, to open the third opening 106, and the torsion spring 73 is arranged between the movable door 71 and the second fixed block 72, so that the movable door 71 is rotated towards the inner side of the housing 1 without an external force, to shield the third opening 106.

**[0035]** In this implementation mode, the second fixed block 72 is fixed on the first fixed block 52, namely the second one-way valve 7 is arranged on the garbage filtering and collecting mechanism 5.

**[0036]** In other implementation modes, the second

fixed block 72 may also be set to be fixed on the upper housing 11, namely the second one-way valve 7 is arranged on the housing 1.

**[0037]** In this implementation mode, the first one-way valve 6 also adopts a structure similar to the second one-way valve 7, and the difference is that the first one-way valve 6 may be rotated towards the inner side of the housing 1, to open the first opening 103.

**[0038]** While the robot swimming pool cleaner 100 performs the cleaning work of the swimming pool, the control mechanism controls the forward rotation of the water pump 4, and the water flow from the first opening 103 to the second opening 104 is formed in the housing 1. Specifically, the first one-way valve 6 is opened under the thrust of the water flow, water with the dirt enters the housing 1 from the first opening 103, and after being filtered by the first filter screen 32 on the filtering basket 31, the dirt is intercepted in the water inlet chamber 101, and the filtered water is discharged from the housing 1 by a water pump flow channel 8 at the second opening 104. In this process, the second one-way valve 7 keeps the third opening 106 to be in a closed state.

**[0039]** After the robot swimming pool cleaner 100 is operated for a period of time, the dirt may block the first filter screen 32. At this time, the control mechanism controls the water pump 4 to be reversely rotated for self-cleaning, and the water flow from the second opening 104 to the third opening 106 is formed in the housing 1. Specifically, the water flow enters the housing 1 from the water pump flow channel 8 at the second opening 104, the first filter screen 32 on the filtering basket 31 is reversely flushed, the second one-way valve 7 is opened under the thrust of the water flow, and the water flow pushes the dirt towards the deposition chamber 105 and the garbage basket 51, so that the smoothness of the first filter screen 32 is recovered. In this process, the first one-way valve 6 keeps the first opening 103 to be in the closed state.

**[0040]** By regularly performing the self-cleaning, the robot swimming pool cleaner 100 may maintain the higher cleaning efficiency for a longer time.

**[0041]** In this implementation mode, the third opening 106 is preferably arranged on an upper side of the deposition chamber 105. During the self-cleaning, under the action of gravity, the larger dirt (it is not easy to cause blockage of the first filter screen 32) may remain in the deposition chamber 105, while the smaller dirt (it is easy to cause the blockage of the first filter screen 32) may be washed into the garbage basket 51 with the water flow. By setting a relative position between the third opening 106 and the deposition chamber 105, the classification and storage of the dirt in the self-cleaning process are achieved, and the blockage process of the second filter screen 53 on the garbage basket 51 may be delayed, thereby the service time of the robot swimming pool cleaner 100 is prolonged.

**[0042]** In this implementation mode, the filtering mechanism 3 includes a first filter screen 32, the garbage fil-

tering and collecting mechanism 5 includes a second filter screen 53, and the mesh aperture of the first filter screen 32 is smaller than that of the second filter screen 53. Some small dirt that may block the first filter screen 32 may pass through meshes of the second filter screen 53, thereby the blockage process of the second filter screen 53 is delayed. The robot swimming pool cleaner 100 adopting this implementation mode focuses on prolonging the service life.

**[0043]** In other implementation modes, the filtering mechanism 3 includes a first filter screen 32, the garbage filtering and collecting mechanism 5 includes a second filter screen 53, and the mesh aperture of the first filter screen 32 is larger than that of the second filter screen 53. The second filter screen 53 may intercept the small dirt in the garbage basket 51, and the robot swimming pool cleaner 100 adopting this implementation mode focuses on enhancing the water quality cleaning effect.

**[0044]** In this implementation mode, the water pump 4 includes a motor 41 and an impeller 42, an outer case of the motor 41 is provided with a threading gasket 43, the outer case and the threading gasket 43 of the motor 41 are provided with a through hole 44 for wiring, and the through hole 44 is internally provided with a waterproof sealing member. An electric connection cable of the motor 41 penetrates the through hole 44 and is sealed by the waterproof sealing member, to prevent the water from entering the interior of the motor 41.

**[0045]** Furthermore, the second opening 104 is provided with the water pump flow channel 8, the water pump flow channel 8 is fixedly connected with the housing 1, the impeller 42 of the water pump 4 is arranged in the water pump flow channel 8, and an outer port of the water pump flow channel 8 is provided with a guide vane 9. The water pump flow channel 8 is arranged in order to improve the working efficiency of the water pump 4.

**[0046]** The robot swimming pool cleaner 100 has a self-cleaning function and is convenient for use. By arranging the deposition chamber 105, the garbage filtering and collecting mechanism 5, the first one-way valve 6 and the second one-way valve 7, the water pump 4 forms a reverse water flow while being rotated reversely, the filtering mechanism 3 is flushed, dirt is flushed to the deposition chamber 105 and the garbage filtering and collecting mechanism 5 for temporary storage, the filtering mechanism 3 is avoided from being blocked, and it may be guaranteed that the robot swimming pool cleaner 100 has the higher cleaning efficiency for a longer time.

**[0047]** Finally, it should be noted that the above implementation modes are only used to describe the technical schemes of the present application, rather than limiting it; although the present application is described in detail with reference to the aforementioned implementation modes, it should be understood by those of ordinary skill in the art that: it may still modify the technical schemes recited in the aforementioned implementation modes or equivalently replace some of technical features in which; and these modifications or replacements do not separate

the essence of the corresponding technical schemes from the spirit and scope of the technical schemes of the various implementation modes of the present application.

## Claims

1. A robot swimming pool cleaner with a filter screen anti-blocking function, comprising a housing, wherein the interior of the housing being provided with a filtering mechanism to separate a water inlet chamber and a water pump chamber in the housing, the water inlet chamber and the water pump chamber being located on both sides of the filtering mechanism, the housing being provided with a first opening and a second opening, the first opening being communicated with the water inlet chamber, the second opening being communicated with the water pump chamber, and the housing, located on one side of the water pump chamber, being fixedly provided with a water pump, it is **characterized in that** a deposition chamber is formed inside the housing on one side of the water inlet chamber, the deposition chamber is communicated with the water inlet chamber, the housing is provided with a third opening communicated with the deposition chamber, and the third opening is provided with a garbage filtering and collecting mechanism; and the robot swimming pool cleaner further comprises a control mechanism, the control mechanism is electrically connected with the water pump, the first opening is provided with a first one-way valve that can be opened towards an inner side of the housing, the third opening is provided with a second one-way valve that can be opened towards an outer side of the housing, and the rotation direction of the water pump is controlled by the control mechanism, to form a water flow from the first opening to the second opening inside the housing, or form a water flow from the second opening to the third opening inside the housing.
2. The robot swimming pool cleaner with the filter screen anti-blocking function as claimed in claim 1, wherein the third opening is arranged on an upper side of the deposition chamber.
3. The robot swimming pool cleaner with the filter screen anti-blocking function as claimed in claim 1, wherein the filtering mechanism comprises a first filter screen, the garbage filtering and collecting mechanism comprises a second filter screen, and the mesh aperture of the first filter screen is smaller than that of the second filter screen.
4. The robot swimming pool cleaner with the filter screen anti-blocking function as claimed in claim 1,

wherein the filtering mechanism comprises a first filter screen, the garbage filtering and collecting mechanism comprises a second filter screen, and the mesh aperture of the first filter screen is larger than that of the second filter screen.

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channel, and an outer port of the water pump flow channel is provided with a guide vane.

5. The robot swimming pool cleaner with the filter screen anti-blocking function as claimed in claim 1, wherein the housing comprises an upper housing and a lower housing, and the upper housing and the lower housing are detachably connected by a connecting mechanism. 10
6. The robot swimming pool cleaner with the filter screen anti-blocking function as claimed in claim 1, wherein the garbage filtering and collecting mechanism comprises a garbage basket and a first fixed block, the first fixed block is fixedly arranged on the housing, the garbage basket covers the periphery of the third opening, and is detachably connected with the first fixed block, and a second filter screen is arranged at a grid gap of the garbage basket. 15 20
7. The robot swimming pool cleaner with the filter screen anti-blocking function as claimed in claim 1, wherein the second one-way valve comprises a movable door, a second fixed block, and a torsion spring, the movable door is connected with the second fixed block by a rotating shaft, so that the movable door can be rotated towards the outer side of the housing, to open the third opening, and the torsion spring is arranged between the movable door and the second fixed block, so that the movable door is rotated towards the inner side of the housing without an external force, to shield the third opening. 25 30 35
8. The robot swimming pool cleaner with the filter screen anti-blocking function as claimed in claim 1, wherein the filtering mechanism comprises a filtering basket, the filtering basket is fixedly arranged inside the housing, and a first filter screen is arranged at a grid gap of the filtering basket. 40
9. The robot swimming pool cleaner with the filter screen anti-blocking function as claimed in claim 1, wherein the water pump comprises a motor and an impeller, an outer case of the motor is provided with a threading gasket, the outer case and the threading gasket of the motor are provided with a through hole for wiring, and the through hole is internally provided with a waterproof sealing member. 45 50
10. The robot swimming pool cleaner with the filter screen anti-blocking function as claimed in claim 9, wherein the second opening is provided with a water pump flow channel, the water pump flow channel is fixedly connected with the housing, the impeller of the water pump is arranged in the water pump flow 55

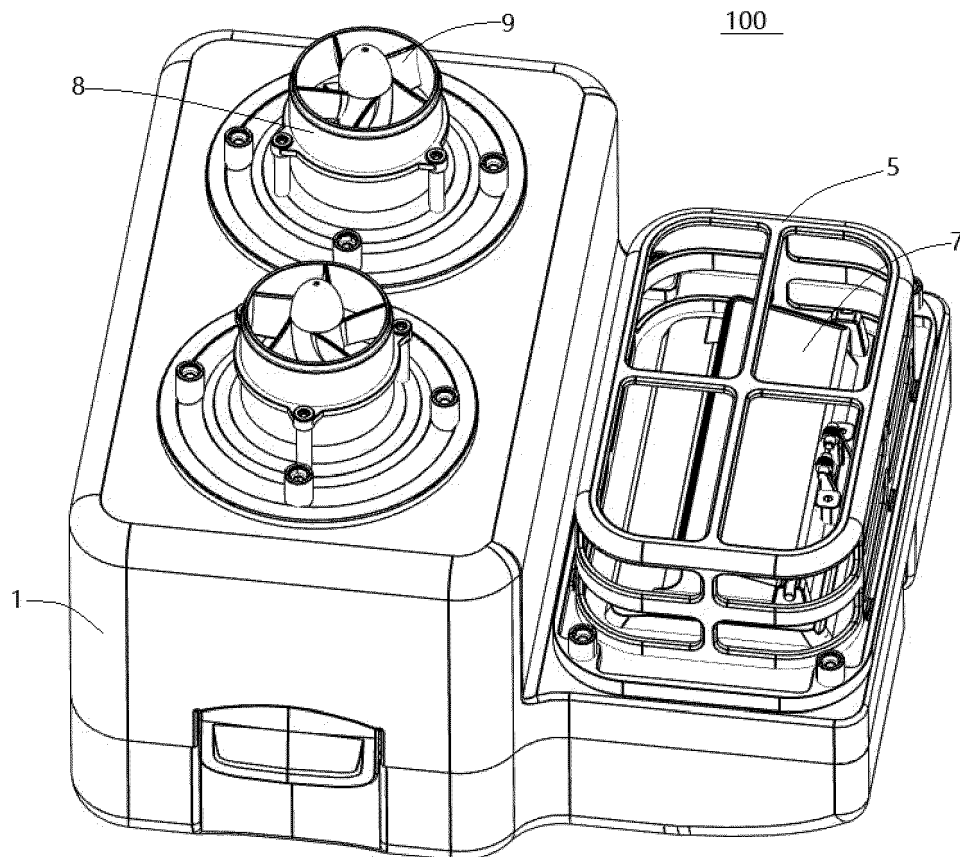


Fig. 1

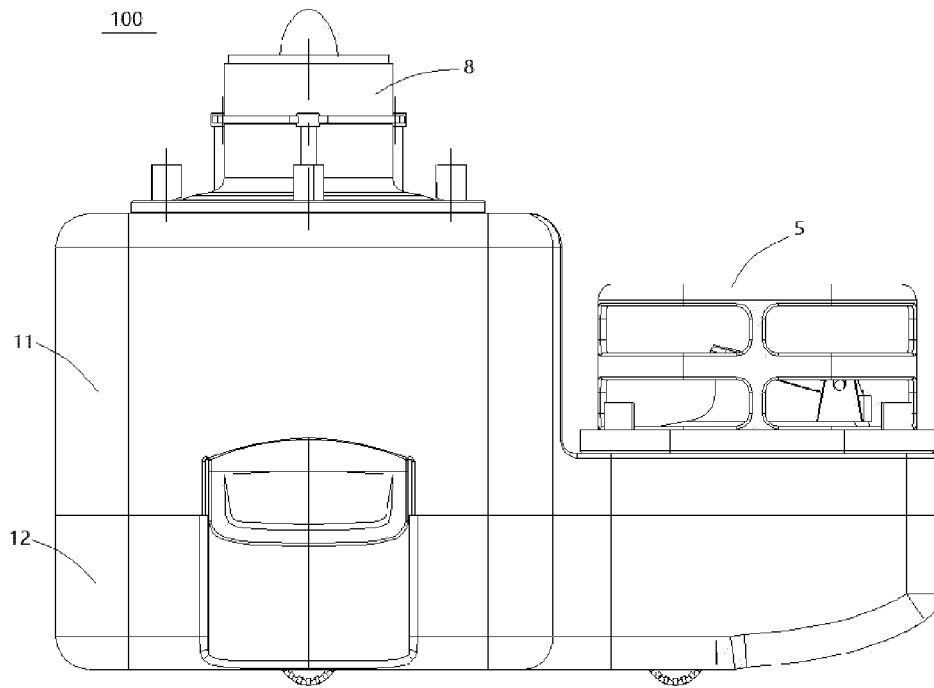


Fig. 2

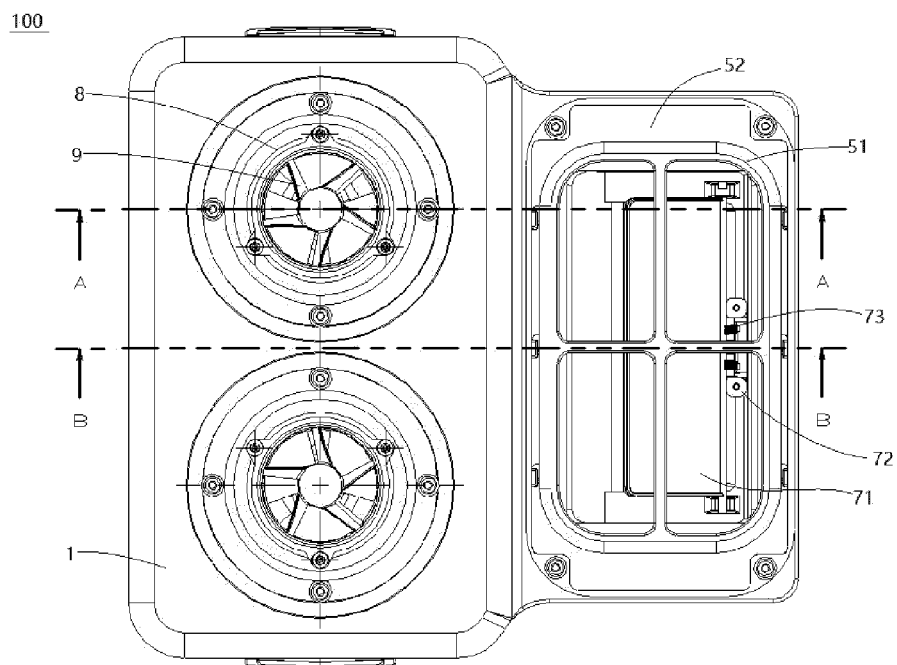


Fig. 3

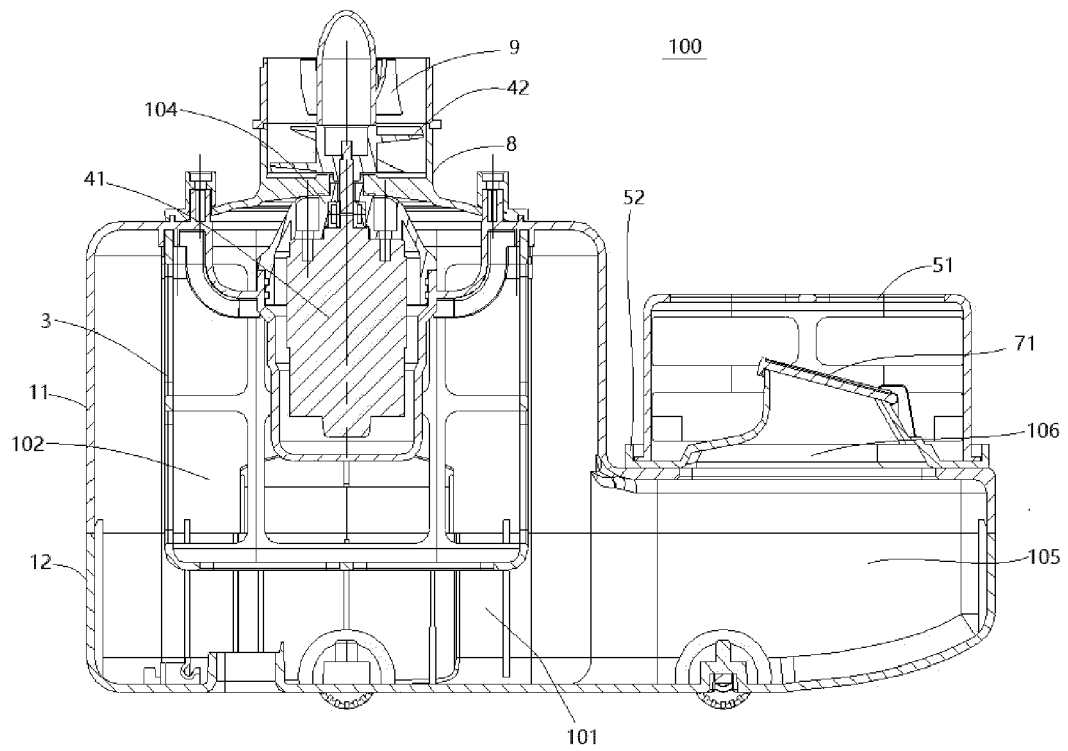


Fig. 4

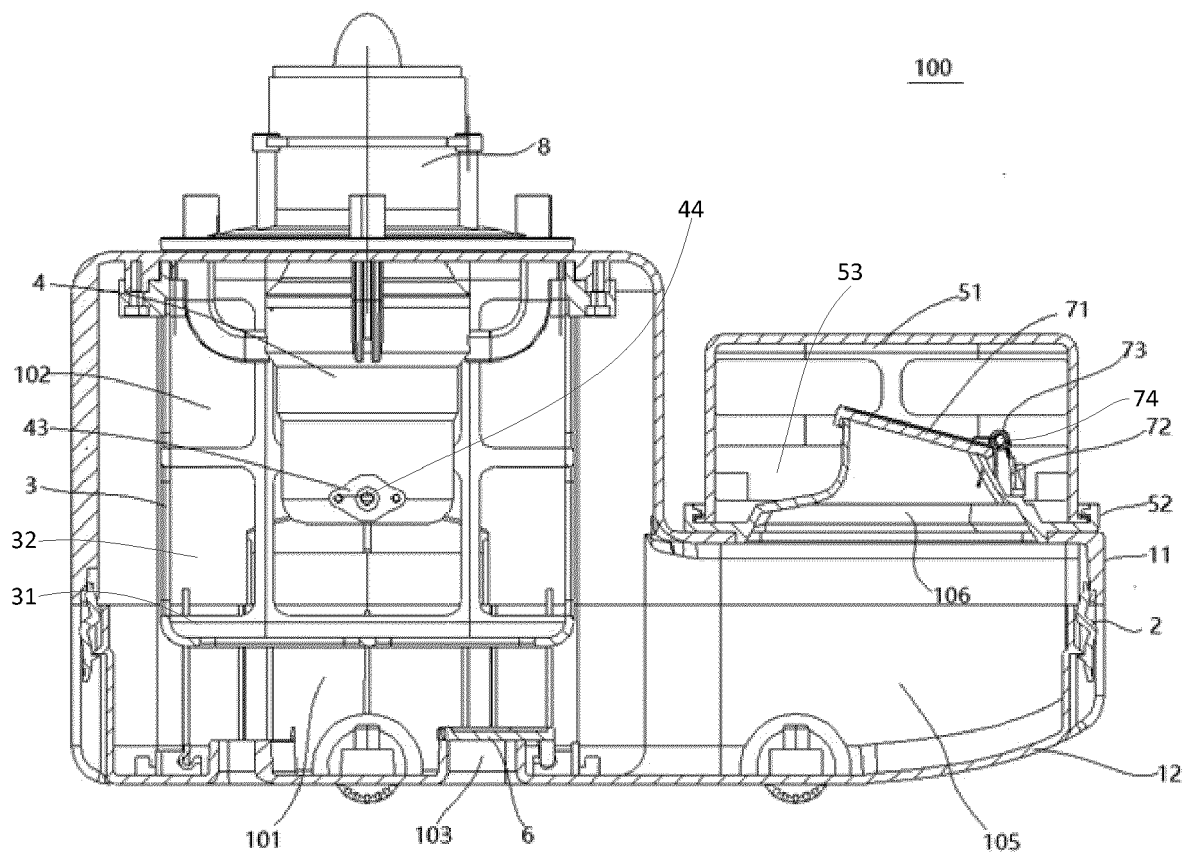


Fig. 5



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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                    |                                                                                                                                       |                                                                                                                                                                                                                                                                                       |                                         |
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