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(54) **DEODORIZING APPARATUS OF SMART COVER PLATE**

(57) A smart deodorization device with a cover plate includes a reaction chamber (20) having a reaction cavity (21); an air extraction unit (30), configured for extracting odor in or near a toilet pool into the reaction cavity (21); and a water supply unit, configured for supplying water to the reaction cavity (21). When working, the air extraction unit (30) extracts the odor into the reaction cavity (21), and the odor is mixed with the water in the reaction cavity (21) to be converted into purified gas and then discharged from the reaction cavity (21). By using the characteristic that ammonia molecules in the odor are easily soluble in water, the odor and water are mixed in the reaction cavity (21) and then discharged to realize the gas purification. Thus, the present invention has obvious effects, simple structures, lower costs, and convenience to use without need of replacing filtering materials.

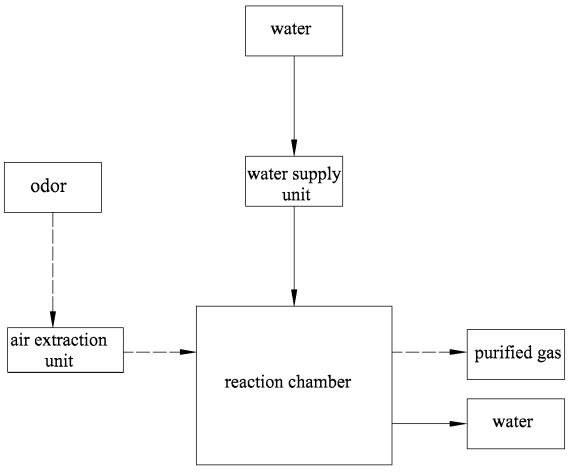

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to a smart deodorization device with a cover plate.

BACKGROUND

[0002] Regarding a main prior method for deodorization of lavatories, deodorization is achieved by using toilet cleaner and incense, which is troublesome for users and does not radically solve the problem of odor. Moreover, in a small number of toilets, activated carbon is used to deodorize. However, since the lavatory is a singularly moist area, the activated carbon has a decreased adsorption effect after being exposed to moisture, resulting in a shortened service life. Thus, the filtering materials need to be replaced frequently to achieve an excellent deodorization effect, which is inconvenient for users to use and has a poor deodorization effect.

SUMMARY

[0003] To solve the above problems, the present invention provides a smart deodorization device with a cover plate.

[0004] For achieving the above objective, the technical solutions adopted by the present invention are as follows.

[0005] A smart deodorization device with a cover plate includes:

a reaction chamber, having a reaction cavity;
an air extraction unit, configured for extracting odor in or near a toilet pool into the reaction cavity;
a water supply unit, configured for supplying water to the reaction cavity.

[0006] When working, the air extraction unit extracts the odor into the reaction cavity, and the odor is mixed with the water in the reaction cavity to be converted into purified gas and then discharged from the reaction cavity.

[0007] Preferably, the water in the reaction cavity is discharged to a sewage pipe of a toilet or a water tank of the toilet.

[0008] Preferably, the reaction chamber is provided with a water inlet channel, the water supply unit has a water supply channel communicating with the water inlet channel, the reaction chamber is further provided with an air intake channel, and the air extraction unit is provided with an air extraction channel communicating with the air intake channel.

[0009] Preferably, the reaction chamber is further provided with a water discharge channel and an air discharge channel, the purified gas in the reaction cavity is discharged from the air discharge channel, and the water in the reaction cavity is discharged from the water discharge channel.

[0010] Preferably, the smart deodorization device with the cover plate further includes a filtering module and/or a scented module arranged corresponding to the air discharge channel.

[0011] Preferably, the reaction chamber is further provided with a discharging channel, and the water and the gas in the reaction cavity are both discharged by the discharging channel.

[0012] Preferably, the reaction cavity is provided with a water storage cavity, water of the water inlet channel flows into the water storage cavity and overflows out of the water storage cavity to be discharged, and an air outlet end of the air intake channel is immersed in the water in the water storage cavity.

[0013] Preferably, a water outlet end of the water inlet channel is provided with a plurality of water outlet holes, thus forming a sprinkling water, which flows into the reaction cavity.

[0014] Preferably, an oblique meshy drip plate is further provided in the reaction cavity, and the meshy drip plate is provided with a plurality of mesh holes.

[0015] Preferably, a water outlet end of the water inlet channel is provided with a vibration generator, thus forming a vaporous water, which flows into the reaction cavity.

[0016] Preferably, a water outlet end of the water inlet channel is fixedly provided with a core, and the core is provided with a plurality of oblique water channels at intervals. When the water enters, a water flow rotates under the action of the oblique water channels to produce a centrifugal force, and the water is dispersed and then sprayed into the reaction cavity.

[0017] Preferably, the smart deodorization device with the cover plate further includes a base fixedly mounted on a toilet seat body. The cover plate is rotatably connected to the base, and the reaction chamber is mounted in the base.

[0018] The advantages of the present invention are as follows.

1. A smart deodorization device with a cover plate of the present invention includes a reaction chamber having a reaction cavity; an air extraction unit, configured for extracting odor in or near a toilet pool into the reaction cavity; a water supply unit, configured for supplying water to the reaction cavity. When working, the air extraction unit extracts the odor into the reaction cavity, and the odor is mixed with the water in the reaction cavity to be converted into purified gas and then discharged from the reaction cavity. In the present technical solutions, by using the characteristic that ammonia molecules in the odor are easily soluble in water, the odor and water are mixed in the reaction cavity, then discharged to realize the gas purification. Thus, the present invention has obvious effects, simple structures, lower costs, and conveniences to use without need of replacing filtering materials.
2. By further including a filtering module and/or a

scented module arranged corresponding to the air discharge channel, the gas is further purified or scented to improve the usage experience of users.

3. A water outlet end of the water inlet channel is provided with a plurality of water outlet holes, thus forming a sprinkling water which flows into the reaction cavity. Thus, the odor can be more fully mixed with water, and the deodorization effect is optimized.

4. An oblique meshy drip plate is further provided in the reaction cavity, and the meshy drip plate is provided with a plurality of mesh holes. When the water of the water outlet holes flows through the meshy drip plate, a water film can be formed on the mesh holes, and the water film can further increase the contact area with the odor and improve the deodorization effect.

5. A water outlet end of the water inlet channel is provided with a vibration generator, thus forming a vaporous water, which flows into the reaction cavity. Thus, the odor can be more fully mixed with water, and the deodorization effect is optimized.

6. A water outlet end of the water inlet channel is fixedly provided with a core, and the core is provided with a plurality of oblique water channels at intervals. When the water enters, a water flow rotates under the action of the oblique water channels to produce a centrifugal force, and the water is dispersed and then sprayed into the reaction cavity. Thus, the odor can be more fully mixed with water, and the deodorization effect is optimized.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The drawings described here are used to provide further understanding of the present invention and form a part of the present invention, and the schematic embodiments of the present invention and the description thereof are used to explain the present invention and do not constitute an undue limitation to the present invention. In the drawings:

FIG. 1 is a schematic view of a smart deodorization device with a cover plate of the present invention.

FIG. 2 is an assembly view showing a smart deodorization device with a cover plate and a toilet according to Embodiment 1 of the present invention.

FIG. 3 is a cross-sectional view showing a smart deodorization device with a cover plate and a toilet according to Embodiment 1 of the present invention.

FIG. 4 is an exploded view showing a smart deodorization device with a cover plate and a toilet according to Embodiment 1 of the present invention.

FIG. 5 is a working schematic view of a reaction chamber of a smart deodorization device with a cover plate according to Embodiment 1 of the present invention.

FIG. 6 is a perspective view of a core of a smart deodorization device with a cover plate according to Embodiment 1 of the present invention.

FIG. 7 is an exploded view of a smart deodorization device with a cover plate according Embodiment 2 of the present invention.

FIG. 8 is a cross-sectional view of a smart deodorization device with a cover plate according to Embodiment 2 of the present invention.

FIG. 9 is a perspective view of a reaction chamber of a smart deodorization device with a cover plate according to Embodiment 2 of the present invention.

FIG. 10 is a perspective view of a reaction chamber of a smart deodorization device with a cover plate according to Embodiment 3 of the present invention.

FIG. 11 is a working schematic view of a reaction chamber of a smart deodorization device with a cover plate according to Embodiment 3 of the present invention.

FIG. 12 is a working schematic view of a reaction chamber of a smart deodorization device with a cover plate according to Embodiment 4 of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0020] To make the technical problems to be solved by the present invention, technical solutions and advantages clearer and more explicit, the present invention is further described in detail in conjunction with the drawings and embodiments below. It should be understood that the specific embodiments described herein are only used to explain the present invention and are not used to limit the present invention.

Embodiment 1:

[0021] As shown in FIGS. 1 to 6, a smart deodorization device with a cover plate includes:

the base 10, where the base 10 is fixedly mounted on the toilet seat body 1, and the cover plate is rotatably connected to the base 10;

the reaction chamber 20, where the reaction chamber 20 is mounted in the base 10 and is provided with the reaction cavity 21;

the air extraction unit 30, where the air extraction unit 30 is mounted in the base 10 and is used for extracting the odor in or near a toilet pool into the reaction cavity 21; specifically, the air extraction unit 30 is a fan; and

a water supply unit for supplying water to the reaction cavity 21. Specifically, the water supply unit includes a solenoid valve.

[0022] When working, the air extraction unit 30 extracts the odor into the reaction cavity 21, and the odor is mixed with the water in the reaction cavity 21 to be converted into purified gas and then discharged from the reaction cavity 21.

[0023] In this embodiment, the water in the reaction cavity 21 is discharged to the sewage pipe 1a of the toilet. Since the toilet seat body 1 of this embodiment is not provided with a water tank, the water in the reaction cavity 21 is discharged directly to the sewage pipe 1a.

[0024] In other embodiments, the rear of the toilet is provided with a water tank, and the water in the reaction cavity 21 can be optionally discharged into the water tank of the toilet. When the water tank discharges water, the water is discharged with the sewage together to the sewage pipe 1a.

[0025] In this embodiment, the reaction chamber 20 is provided with the water inlet channel 22, the water supply unit has the water supply channel 40 communicating with the water inlet channel 22, and the reaction chamber 20 is further provided with the air intake channel 23. The air extraction unit 30 is provided with the air extraction channel 31 communicating with the air intake channel 23.

[0026] In this embodiment, the reaction chamber 20 is further provided with the discharging channel 24, and the water and gas in the reaction cavity 21 are both discharged by the discharging channel 24.

[0027] In this embodiment, the water outlet end of the water inlet channel 22 is fixedly provided with the core 50, and the core 50 is provided with a plurality of oblique water channels 51 at intervals. When the water enters, a water flow rotates under the action of the oblique water channels 51 to produce a centrifugal force, and the water is dispersed and then sprayed into the reaction cavity 21.

[0028] The specific working process of this embodiment is as follows:

When working, the air extraction unit 30 extracts the odor from the air extraction channel 31 to the reaction cavity 21, and the water supply channel 40 of the water supply unit simultaneously supplies water to the water inlet channel 22, and the water flow of the water inlet channel 22 rotates to produce the centrifugal force under the action of the oblique water channels 51 of the core 50, thus forming vaporous water, which is sprayed to the reaction cavity 21, and the odor is mixed with the water in the reaction cavity 21 to be converted into purified gas by deamination. Meanwhile, the water in the reaction cavity 21 is mixed with the odor to form ammonia water, and the purified gas and the ammonia water are discharged via the discharging channel 24 together.

Embodiment 2:

[0029] As shown in FIGS. 7 to 9, this embodiment mainly differs from the Embodiment 1 in that the reaction chamber 20 is further provided with the water discharge channel 25 and the air discharge channel 26, the purified gas in the reaction cavity 21 is discharged from the air discharge channel 26, and the water in the reaction cavity 21 is discharged from the water discharge channel 25.

[0030] This embodiment also includes the filtering module 60 and/or the scented module 60 arranged corresponding to the air discharge channel 26.

[0031] Preferably, the reaction cavity 21 is provided with the water storage cavity 27, the water of the water inlet channel 22 flows into the water storage cavity 27 and overflows out of the water storage cavity 27 to be discharged, and the air outlet end 231 of the air intake channel 23 is immersed in the water in the water storage cavity 27.

[0032] The other undescribed parts are identical to that of Embodiment 1 and will not be repeated.

Embodiment 3:

[0033] As shown in FIGS. 10 and 11, this embodiment mainly differs from Embodiment 2 in that the water outlet end of the water inlet channel 22 is provided with a plurality of water outlet holes 221, thus forming water droplets, which flow into the reaction cavity 21. The oblique meshy drip plate 28 is further provided in the reaction cavity 21, and the meshy drip plate 28 is provided with a plurality of mesh holes 281. The water droplets of the water outlet holes slip under the action of their own gravity, and a water film is formed on the mesh holes 281 through which the water droplets slip to further increases the contact surface with the odor.

[0034] The other undescribed parts are identical to that of Embodiment 2 and will not be repeated.

Embodiment 4:

[0035] As shown in FIG. 12, this embodiment mainly differs from Embodiment 3 in that the water outlet end of the water inlet channel 22 is provided with the vibration generator 70, thus forming vaporous water which flows into the reaction cavity 21.

[0036] The other undescribed parts are identical to that of Embodiment 3 and will not be repeated.

[0037] The above descriptions shows and describes the preferred embodiments of the present invention, and as mentioned, it should be understood that the present invention is not limited to the form disclosed herein and should not be regarded as the exclusion of other embodiments, but can be used in a variety of other combinations, modifications and circumstances, and can be modified through the above teaching, or technology or knowledge in related fields within the scope of the present invention concept described herein. The modifications and changes made by the skilled in the art without deviating from the spirit and scope of the present invention shall fall within the scope of protection of the claims appended to the present invention.

Claims

1. A smart deodorization device with a cover plate, comprising:

   a reaction chamber, having a reaction cavity;

an air extraction unit, configured for extracting odor in or near a toilet pool into the reaction cavity;

a water supply unit, configured for supplying water to the reaction cavity;

when working, the air extraction unit extracts the odor into the reaction cavity, and the odor is mixed with the water in the reaction cavity to be converted into purified gas and then discharged from the reaction cavity.

2. The smart deodorization device with the cover plate according to claim 1, wherein the water in the reaction cavity is discharged to a sewage pipe of a toilet or a water tank of the toilet.

3. The smart deodorization device with the cover plate according to claim 1, wherein the reaction chamber is provided with a water inlet channel, the water supply unit has a water supply channel communicating with the water inlet channel, the reaction chamber is further provided with an air intake channel, and the air extraction unit is provided with an air extraction channel communicating with the air intake channel.

4. The smart deodorization device with the cover plate according to claim 3, wherein the reaction chamber is further provided with a water discharge channel and an air discharge channel, the purified gas in the reaction cavity is discharged from the air discharge channel, and the water in the reaction cavity is discharged from the water discharge channel.

5. The smart deodorization device with the cover plate according to claim 4, further comprising a filtering module and/or a scented module arranged corresponding to the air discharge channel.

6. The smart deodorization device with the cover plate according to claim 3, wherein the reaction chamber is further provided with a discharging channel, and the water and the gas in the reaction cavity are both discharged by the discharging channel.

7. The smart deodorization device with the cover plate according to claim 3, wherein the reaction cavity is provided with a water storage cavity, water of the water inlet channel flows into the water storage cavity and overflows out of the water storage cavity to be discharged, and an air outlet end of the air intake channel is immersed in the water in the water storage cavity.

8. The smart deodorization device with the cover plate according to claim 3, wherein a water outlet end of the water inlet channel is provided with a plurality of water outlet holes, thus forming a sprinkling water which flows into the reaction cavity.

9. The smart deodorization device with the cover plate according to claim 8, wherein an oblique meshy drip plate is further provided in the reaction cavity, and the meshy drip plate is provided with a plurality of mesh holes.

10. The smart deodorization device with the cover plate according to claim 3, wherein a water outlet end of the water inlet channel is provided with a vibration generator, thus forming a vaporous water, which flows into the reaction cavity.

11. The smart deodorization device with the cover plate according to claim 3, wherein a water outlet end of the water inlet channel is fixedly provided with a core, and the core is provided with a plurality of oblique water channels at intervals; when the water enters, a water flow rotates under an action of the oblique water channels to produce a centrifugal force, and the water is dispersed and then sprayed into the reaction cavity.

12. The smart deodorization device with the cover plate according to claim 1, further comprising a base fixedly mounted on a toilet seat body, wherein the cover plate is rotatably connected to the base, and the reaction chamber is mounted in the base.

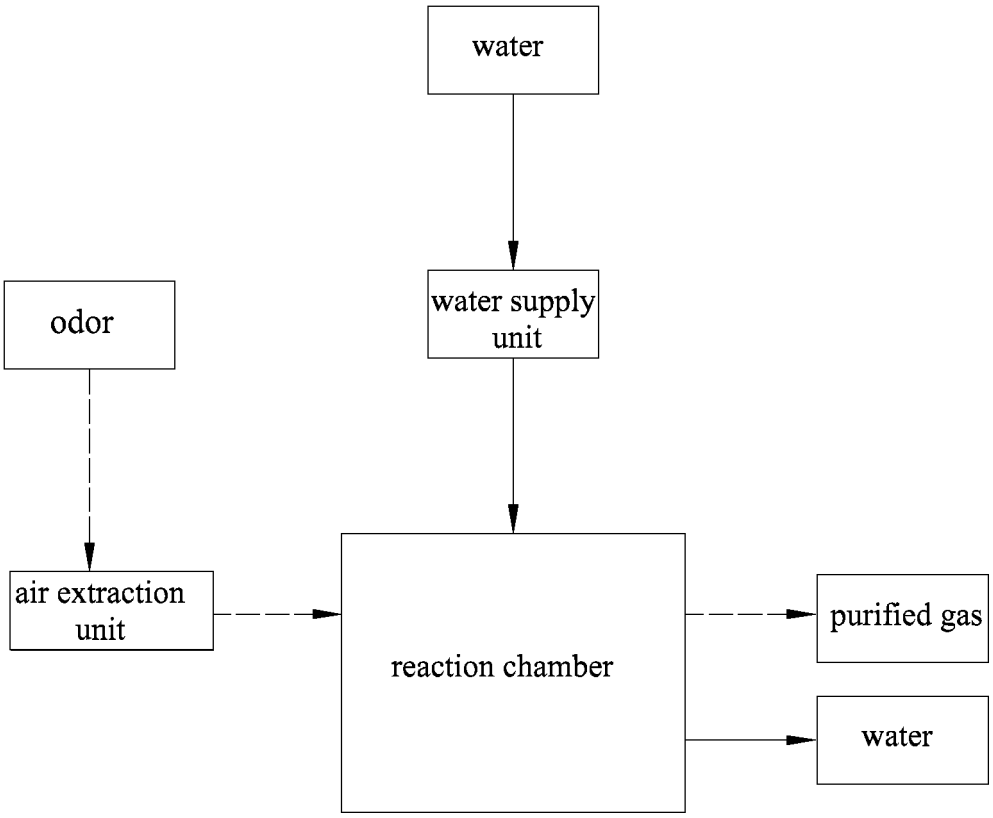
water
water supply unit
odor
air extraction unit
reaction chamber
purified gas
water

FIG. 1

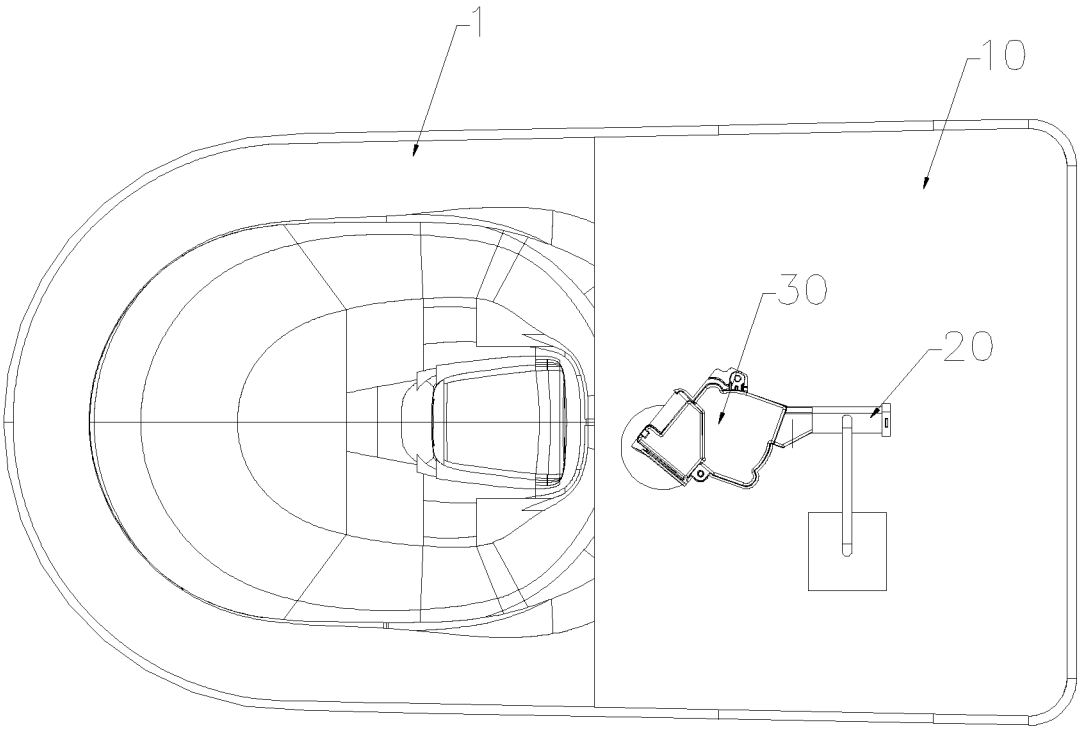

FIG. 2

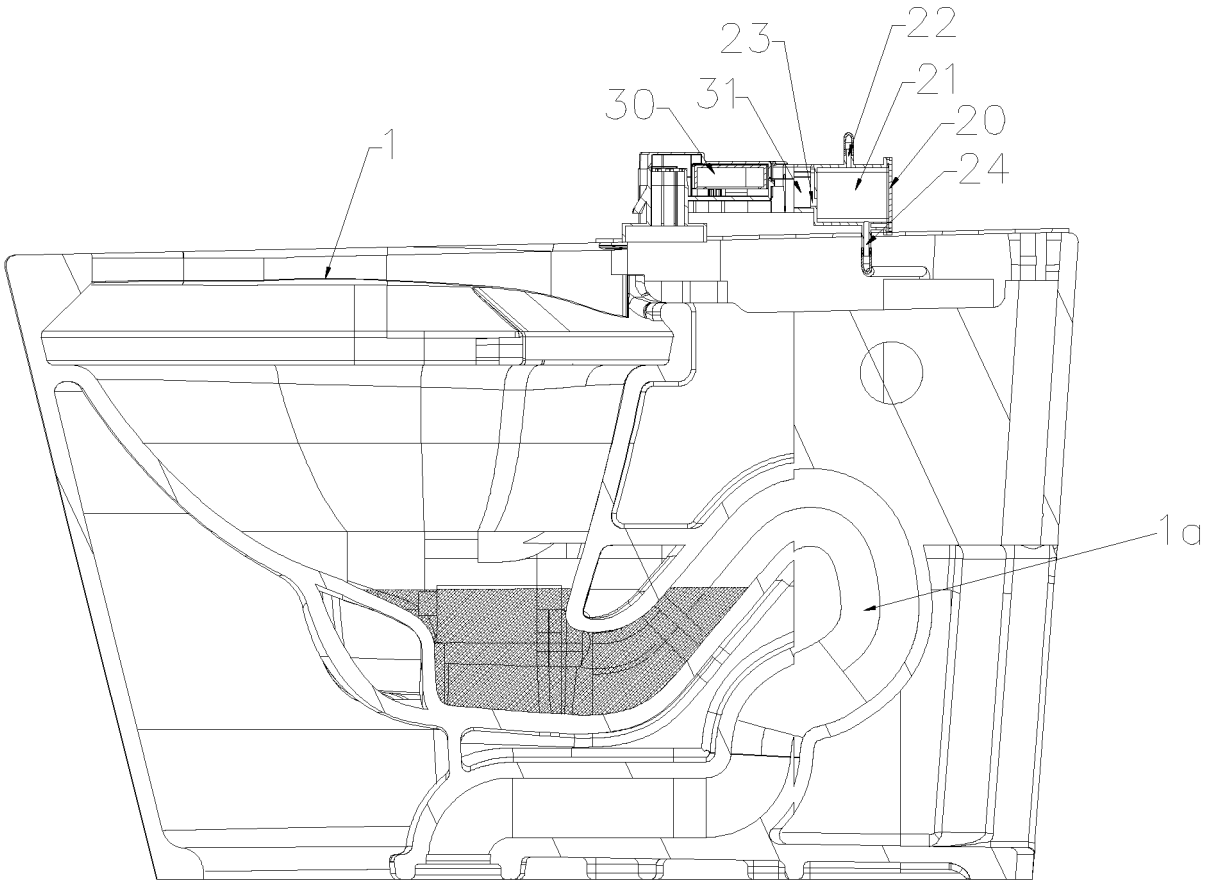

FIG. 3

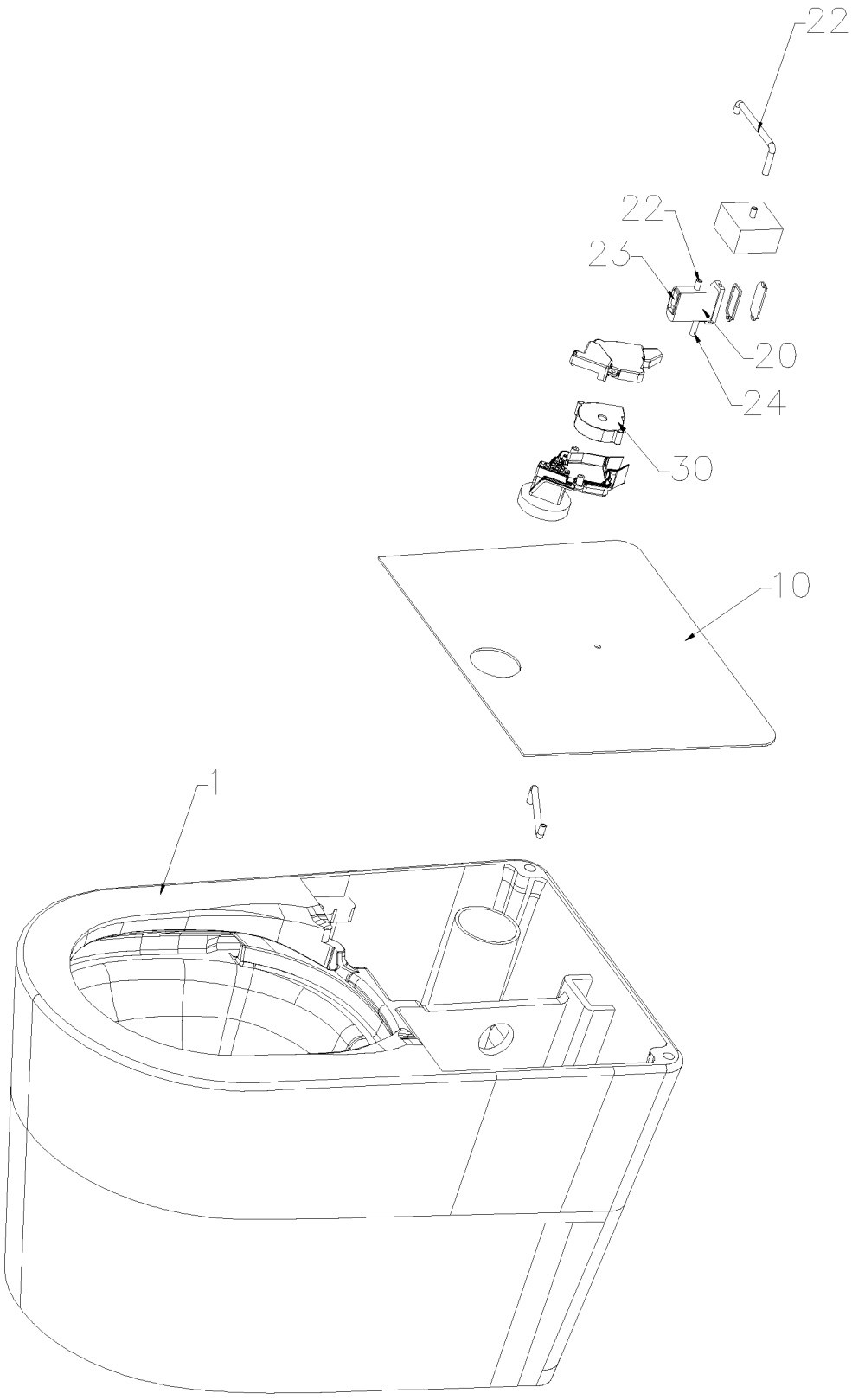

FIG. 4

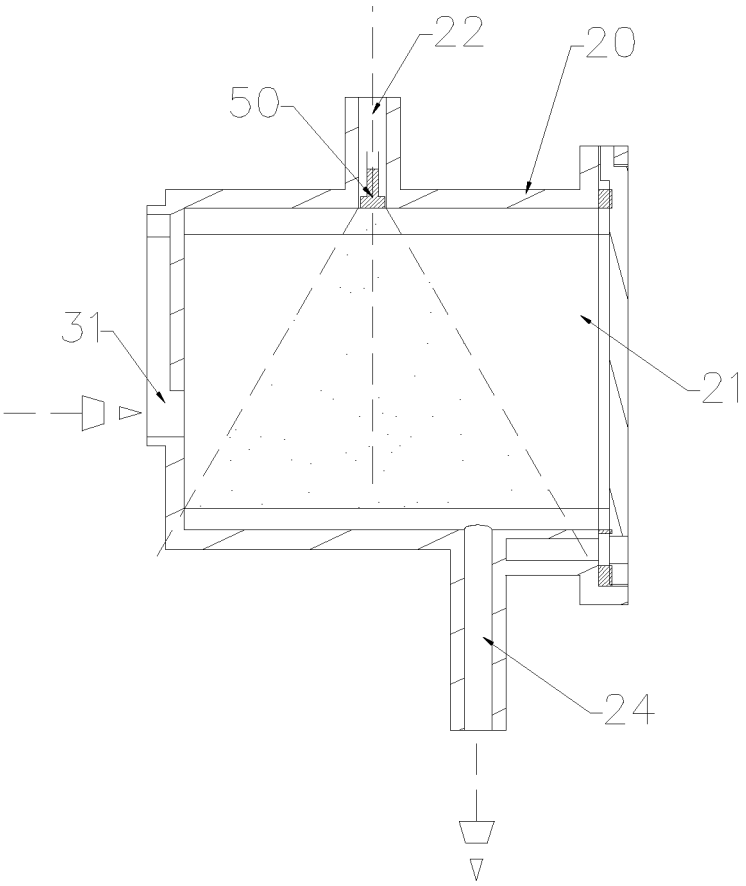

FIG. 5

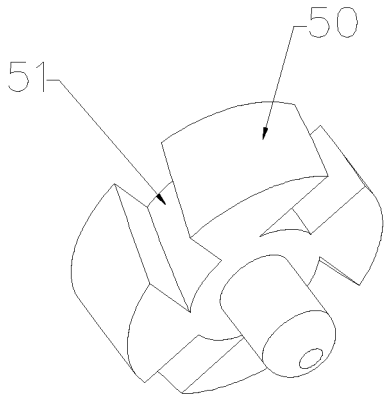

FIG. 6

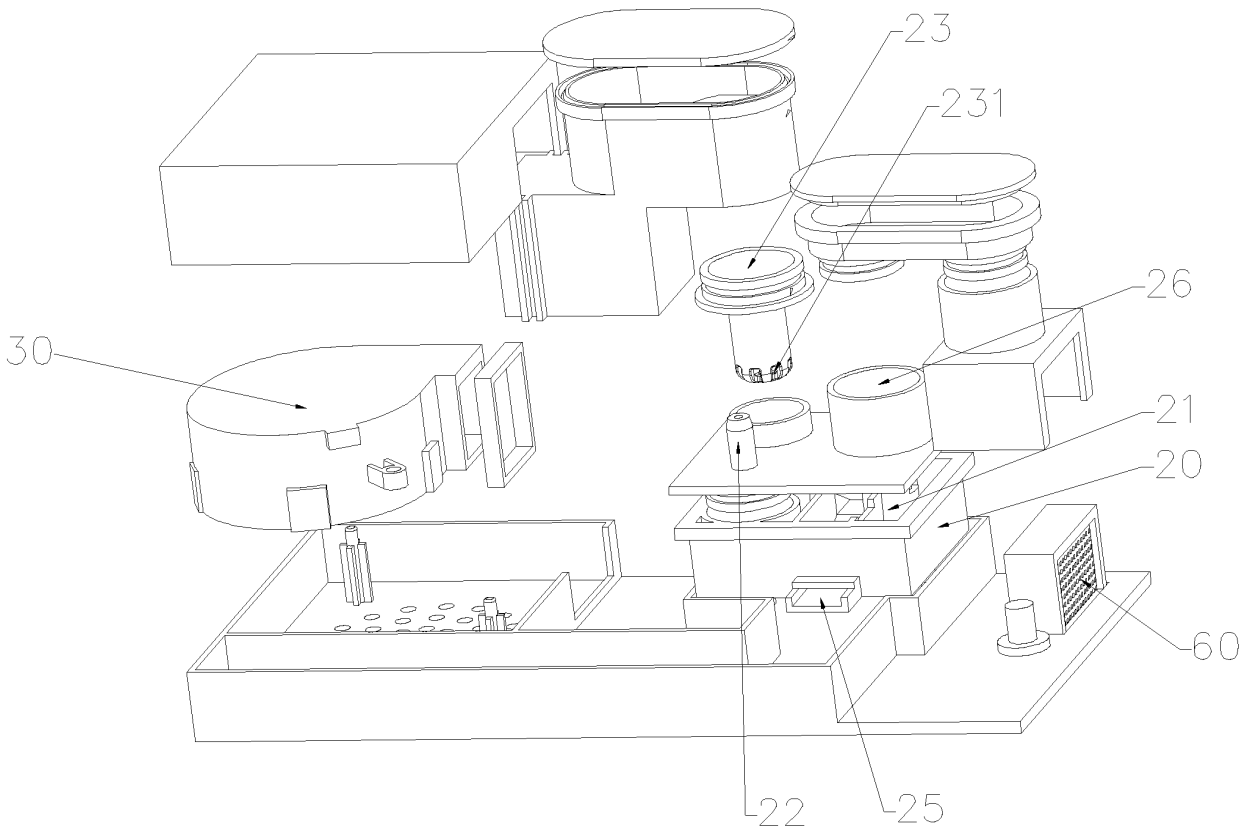

FIG. 7

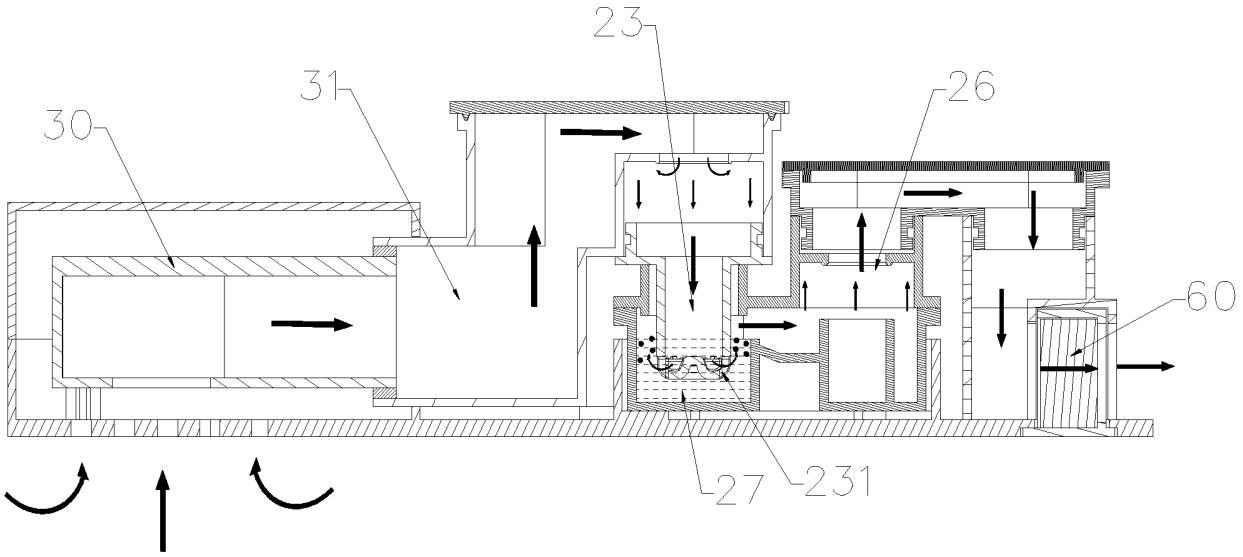

FIG. 8

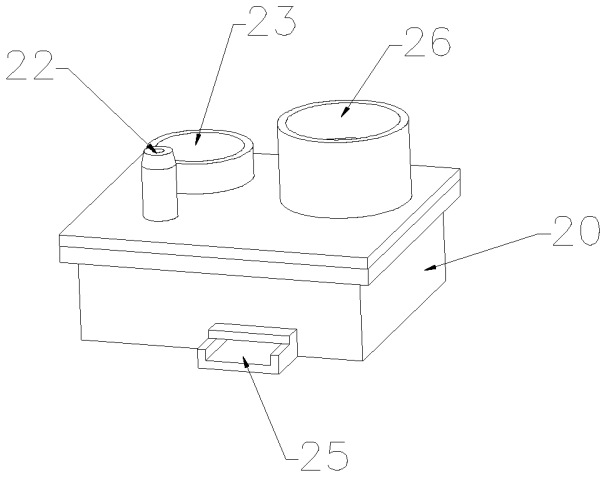

FIG. 9

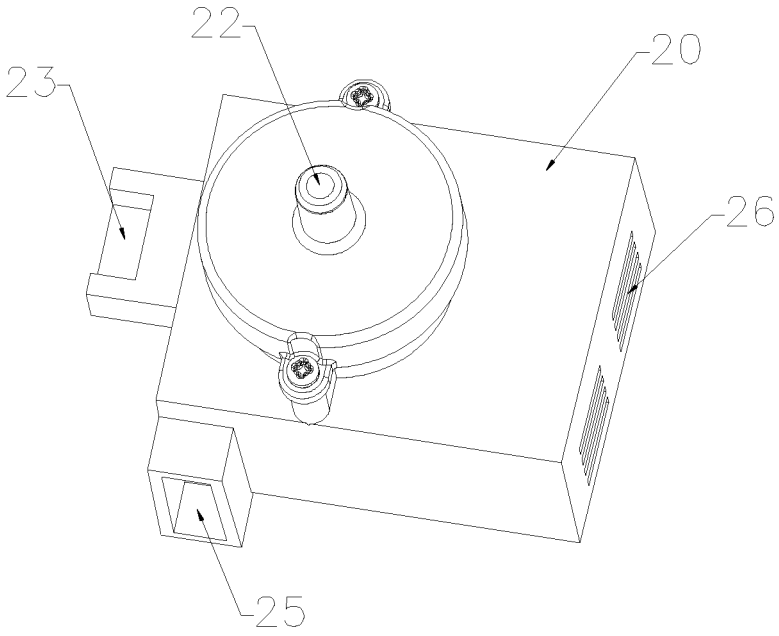

FIG. 10

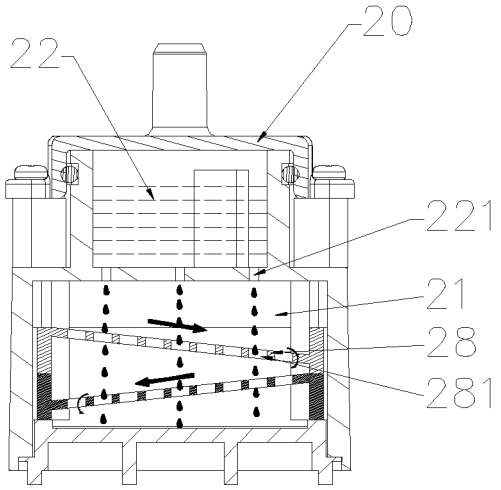

FIG. 11

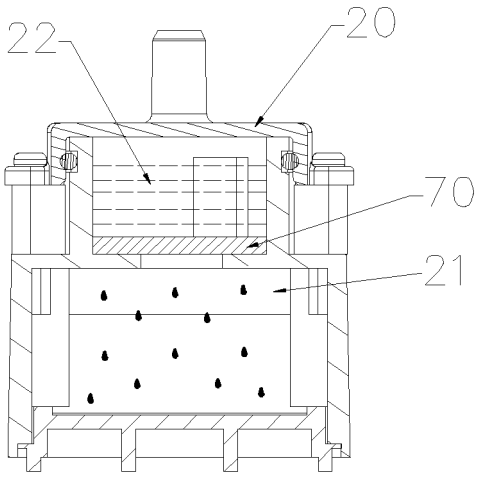

FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/107290

A. CLASSIFICATION OF SUBJECT MATTER

E03D 9/00(2006.01)i; E03D 9/05(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)

E03D

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, DWPI, SIPOABS, ISI Web of Knowledge, 读秀, 超星科技数字图书馆; 马桶, 座便, 盖板, 气, 水, 混合, 净化, 喷, 除臭, 臭气, 雾, 抽, 吸, 反应, 过滤; toilet, cover, seat+, air, water, deodor+, clean+, suck+, filt+, spray+

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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X	CN 107653951 A (HUNAN KUANGWEI TECHNOLOGY CO., LTD.) 02 February 2018 (2018-02-02) description, paragraphs 0029-0039, figures 1-4	1-12
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A	CN 207244758 U (FOSHAN FAENZA SANITARY WARE CO., LTD.) 17 April 2018 (2018-04-17) entire document	1-12

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 October 2020	**13 November 2020**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/107290

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2020/107290

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