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(54) **SPRAY ROD**

(57) Disclosed is a spray rod provided in an intelligent closetool, comprising a first spray rod component (11), a second spray component (12), at least one water inlet (21, 31) and at least one water outlet (22, 32), wherein the first spray rod component is provided with a first surface and an opposite second surface, the second surface being defined to be provided with at least one groove (2, 3) for water to flow; the second spray component is provided with a first surface and an opposite second surface; when the first spray rod component (11) and the second spray component (12) are assembled together, the second surface of the first spray rod component (11) is coupled to the first surface of the second spray component (12) so that the at least one groove (2, 3) of the second surface of the first spray rod component (11) and the first surface of the second spray rod component (12) respectively form at least one flowing channel; and the at least one water inlet and the at least one water outlet are respectively coupled to at least one flowing channel such that the water can flow in from the at least one water inlet (21, 31) and flow out from the at least one water outlet (22, 32). Such a spray rod has a simple structure and is convenient to be processed and mounted.

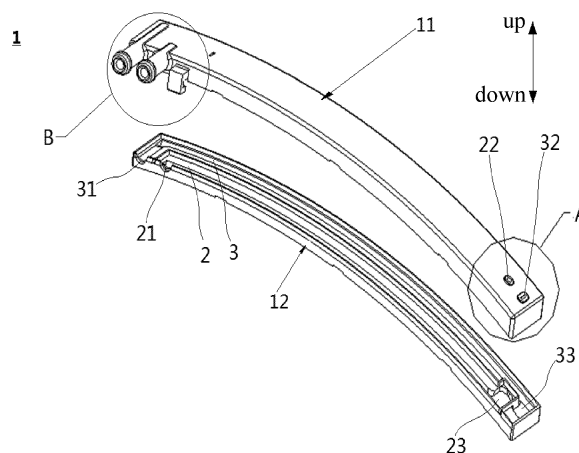


Figure 2

Description

FIELD

[0001] This application relates to the field of intelligent sanitary wares, and in particular to a spray rod and a flushing device for an intelligent toilet.

BACKGROUND

[0002] With technological development, intelligentization of sanitary wares has become a trend, and toilets (closetools) also follow the trend and are becoming intelligentized. Intelligent toilets provide unprecedented comfortable experiences for users, and have gradually become the first choices of people who pursue high quality of life.

TECHNICAL ISSUE

[0003] At present, for most intelligent toilets in the market, a spray rod of its flushing device is generally formed by arranging a hose in a hollow rod, and since a connector is required to connect the hose to a water outlet and the cross-section of the spray rod (or spray tube) is generally circular or elliptical, a large number of components has to be installed in the spray rod, the installment steps are complicated, and the spray rod has a great overall thickness. Accordingly a toilet cover has a large volume after the spray rod is installed into the toilet cover, which adversely affects the thickness and appearance of the toilet cover, and causes the whole device to be bulky.

SOLUTION TO THE TECHNICAL ISSUE

TECHNICAL SOLUTION

[0004] In view of the deficiencies in the conventional technology, an object of the present application is to provide a spray rod and a flushing device, which reduce a volume of the flushing device to reduce a height of a toilet, thereby improving the overall appearance of the product and facilitating manufacture and installment of the product.

[0005] In order to achieve the above object, a spray rod is provided according to the present application, and the spray rod includes a first spray rod component having a first surface and a second surface opposite to the first surface, the second surface having at least one groove configured to allow water to flow; a second spray rod component having a first surface and a second surface opposite to the first surface, wherein in a case that the first spray rod component and the second spray rod component are assembled together, the second surface of the first spray rod component is coupled to the first surface of the second spray rod component, to allow the at least one groove of the second surface of the first spray rod component and the first surface of the second spray

rod component to form at least one flow channel; and at least one water inlet and at least one water outlet both in communication with the at least one flow channel, to introduce water via the at least one water inlet and spray water out via the at least one water outlet.

[0006] According to an embodiment of the present application, the first surface of the second spray rod component has at least one groove configured to allow water to flow; and the at least one groove of the first surface of the second spray rod component matches the at least one groove of the second surface of the first spray rod component; and in a case that the first spray rod component and the second spray rod component are assembled together, the second surface of the first spray rod component is coupled to the first surface of the second spray rod component, to allow the at least one groove of the second surface of the first spray rod component and the at least one groove of the first surface of the second spray rod component to form the at least one flow channel.

[0007] According to an embodiment of the present application, the first surface of the second spray rod component is a flat surface.

[0008] According to an embodiment of the present application, the second surface of the first spray rod component has a plurality of grooves, and in a case that the first spray rod component and the second spray rod component are assembled together, the second surface of the first spray rod component is coupled to the first surface of the second spray rod component, to allow the plurality of grooves of the second surface of the first spray rod component and the first surface of the second spray rod component to form a plurality of flow channels; a width of a cross-section of the spray rod is greater than a height of a cross-section of the spray rod, and the plurality of grooves are arranged side by side in a width direction of the cross-section of the spray rod.

[0009] According to an embodiment of the present application, the cross-section of the spray rod is rectangular.

[0010] According to an embodiment of the present application, the spray rod has a preset curvature.

[0011] According to an embodiment of the present application, at least one water storage tank is further provided between the at least one flow channel and the corresponding at least one water outlet, and the at least one water storage tank has a cross-sectional area greater than a cross-sectional area of the at least one flow channel.

[0012] According to an embodiment of the present application, a flow path from the at least one flow channel to the corresponding at least one water outlet is L-shaped.

[0013] According to an embodiment of the present application, the spray rod is further provided with at least one water inlet conduit which is in communication with the at least one water inlet and is configured to guide an external water source to the at least one water inlet.

BENEFICIAL EFFECTS OF THE PRESENT APPLICATION

BENEFICIAL EFFECTS

[0014] The spray rod according to the present application has a simple structure and is convenient to manufacture and install. With the spray rod, the thickness of the flushing device is reduced, the height of the intelligent toilet cover is reduced significantly, and the overall appearance of the product is improved.

BRIEF DESCRIPTION OF THE DRAWINGS

DESCRIPTION OF THE DRAWINGS

[0015] Other features, objects, and advantages of the present application will become apparent with reference to the detailed description of non-limitative embodiments made in conjunction with the drawings.

Figure 1 is a partial perspective view of a spray rod according to a preferred embodiment of the present application;

Figure 2 is a schematic perspective view of a spray rod according to a preferred embodiment of the present application, in which a first spray rod component and a second spray rod component of the spray rod are separated from each other;

Figure 3 is a partially enlarged schematic view of a water outlet of the spray rod according to a preferred embodiment of the present application;

Figure 4 is a schematic bottom view of a first spray rod component of the spray rod according to a preferred embodiment of the present application;

Figure 5 is a schematic top view of a second spray rod component of the spray rod according to a preferred embodiment of the present application;

Figure 6 is a schematic bottom view of a spray rod according to a preferred embodiment of the present application;

Figure 7 is a schematic perspective view of a spray rod in an extended state according to a preferred embodiment of the present application;

Figure 8 is a schematic perspective view of the spray rod in a retracted state according to a preferred embodiment of the present application; and

Figure 9 is a sectional view of a flushing device according to a preferred embodiment of the present application.

DETAILED DESCRIPTION OF EMBODIMENTS

EMBODIMENTS OF THE PRESENT APPLICATION

- [0016]** In order to make technical contents disclosed in the present application more detailed and complete, reference may be made to the following embodiments of the present application in conjunction with the drawings, in which same reference numerals refer to same or similar components. However, it should be understood by the person skilled in the art that the embodiments given hereinafter are not intended to limit the scope of the present application. In addition, the drawings are only for illustrative purposes and are not drawn in the actual sizes.
- The technical contents of the present application are further explained hereinafter in conjunction with the drawings and embodiments.
- [0017]** The present application is described in conjunction with the drawings. As shown in Figure 1 and Figure 2, a spray rod 1 is provided according to the present application, and is arranged in an intelligent toilet. The spray rod includes a first spray rod component 11. The first spray rod component 11 has a first surface and a second surface opposite to the first surface. The first surface is an upper surface of the first spray rod component 11 and the second surface is a lower surface of the first spray rod component 11. A first groove 2 and a second groove 3 are arranged side by side in the lower surface and are configured to allow water to flow, and the number of these grooves may be set according to the actual requirement of the practical use in design. The side-by-side arrangement refers to that the grooves are arranged in parallel with each other. Depths of the grooves may be the same or different.
- [0018]** As shown in Figure 1 and Figure 2, a rib is provided between the first groove 2 and the second groove 3 to separate the first groove 2 from the second groove 3. The shape of the rib is formed by flow paths of the first groove 2 and the second groove 3. The spray rod includes a second spray rod component 12, and the second spray rod component 12 has a first surface and a second surface opposite to the first surface. The first surface is an upper surface of the second spray rod component and the second surface is a lower surface of the second spray rod component. The upper surface of the second spray rod component is provided with grooves, and the number of the grooves of the upper surface of the second spray rod component is the same as the number of the grooves of the lower surface of the first spray rod component. The lower surface of the first spray rod component 11 and the upper surface of the second spray rod component 12 may be provided with side walls respectively, and when the first spray rod component and the second spray rod component are assembled together, the lower surface of the first spray rod component and the upper surface of the second spray rod component may be engaged to each other under the action of their respective side walls, and in this case, the first groove and the second groove

of the lower surface of the first spray rod component cooperate with corresponding grooves of the upper surface of the second spray rod component to form a first flow channel and a second flow channel respectively.

[0019] According to an embodiment of the present application, the spray rod may further has a first water inlet 21, a second water inlet 31, a first water outlet 22 and a second water outlet 32 or more water inlets and water outlets. The water inlets and the water outlets are in communication with the first flow channel and the second flow channel respectively, to introduce water via the first water inlet 21 or the second water inlet 31 and to spray water via the first water outlet 22 or the second water outlet 32.

[0020] The water inlets and the water outlets are spaced apart at a certain distance since the water inlets and the water outlets are respectively in communication with each other through the respective flow channels. The water inlets may be arranged in the first spray rod component 11 or the second spray rod component 12, and the water outlets may be arranged in the first surface of the first spray rod component or the second surface of the second spray rod component, which are not limited to this. In addition, the first flow channel and the second flow channel are not in communication with each other, and the first flow channel and the second flow channel respectively cooperate with the respective water inlets and the respective water outlets to form individual water passages.

[0021] According to the embodiment of the present application, a water guiding passage is directly formed inside the spray rod, thus, it is not required to install a rubber hose or the like in the hollow rod to guide water, and only two installation components are required, therefore the assembling is convenient. In another aspect, referring to Figure 5, the cross-section of the spray rod is actually rectangular, and the spray rod 1 has a width W greater than its height H. Since the two flow channels are arranged side by side in the spray rod 1 in a direction of the width W of the spray rod 1, the cross-section of the spray rod in the present application is flatter than that in the conventional technology, and thus an overall thickness of the spray rod can be significantly reduced and can be reduced from about 1 cm in the conventional technology to a value ranging from 0.5 cm to 0.6 cm.

[0022] In another embodiment, the first surface of the second spray rod component may also be embodied as a flat surface to further reduce the thickness of the spray rod.

[0023] According to an embodiment of the present application, the water outlets of the spray rod 1 are arranged in the upper surface of the spray rod 1. As shown in Figure 3, the first water outlet 22 is an elliptical nozzle, and the second water outlet 32 is a circular nozzle. The shape of the nozzle may be arbitrarily selected as required.

[0024] In an embodiment, the spray rod is set to have a certain curvature, and the set curvature specifically ranges from 200 rad to 500 rad. An intelligent toilet is normally composed of a ceramic bowl and a seat, and

with the spray rod having this curvature range according to the present application, a distance from a highest point of the seat to a highest point of the ceramic bowl of the intelligent toilet may be reduced from 10 cm or more in the conventional technology to a value ranging from 3 cm to 3.5 cm.

[0025] According to an embodiment of the present application, referring to Figure 3 and Figure 5, a first water storage tank 23 is provided between the first flow channel and the first water outlet 22, and a second water storage tank 33 is provided between the second flow channel and the second water outlet 32. A cross-sectional area of the first water storage tank 23 is greater than a cross-sectional area of the first flow channel, and a cross-sectional area of the second water storage tank 33 is greater than a cross-sectional area of the second flow channel, that is, the first water storage tank 23 and the second water storage tank 33 are recessed deeper than the first groove and the second groove of the respective surfaces of the first spray rod component and the second spray rod component respectively.

[0026] In addition, the rib partitioning the first groove and the second groove extends between the first water storage tank 23 and the second water storage tank 33, and separates the first water outlet 22 from the second water outlet 32.

[0027] This avoids a situation that it is difficult to spray a water jet having sufficient intensity due to an insufficient water pressure caused by the presence of air in the fluid passage, and allows the water jet to be sprayed smoothly. According to the conventional technology, a connection device is generally required to be additionally provided between a hose and a water outlet in the spray rod to control the water jet, however, the water storage tank provided in the present application may achieve the same effect.

[0028] In an embodiment, referring to Figures 2, 3 and 4, a flow path from the first flow channel to the first water outlet 22 and a flow path from the second flow channel to the second water outlet 32 are each L-shaped, and the two L-shaped flow paths are arranged to be staggered, to allow the water outlets to be neatly arranged in the spray rod.

[0029] As shown by a marked portion B in Figure 2, the spray rod is further provided with a first water inlet conduit 24 and a second water inlet conduit 34 which are respectively in communication with the first water inlet 21 and the second water inlet 31, to guide an external water source to the first water inlet 21 and the second water inlet 31.

[0030] Reference is made to Figure 7, which shows a flushing device arranged in an intelligent toilet according to the present application. The flushing device includes a spray rod 1 according to any one of the above embodiments and a base 6. The base 6 has a guide rail 62 for accommodating and driving the spray rod 1, and a sliding groove 621. A width, a length and a curvature of the guide rail 62 match with those of the spray rod 1. The sliding

groove 621 includes a first sliding groove and a second sliding groove opposite to the first sliding groove, and curvatures of the first sliding groove and the second sliding groove match with the curvature of the spray rod 1. The spray rod 1 is further provided with a slider 4 matching with the first sliding groove and the second sliding groove, and the slider 4 includes a first slider and a second slider opposite to the first slider. In retracting the spray rod 1 into the base 6, the first slider and the second slider cooperate with the first sliding groove and the second sliding groove respectively, to prevent the spray rod 1 from deviating from the guide rail in the sliding process.

[0031] In an embodiment, as shown in Figure 6, the spray rod 1 is further provided with a rack 5 configured to be driven by a gear, and the rack 5 is arranged on the lower surface of the second spray rod component 12.

[0032] As shown in Figure 7 and Figure 9, the base is further provided with a drive assembly, and the drive assembly includes a motor and at least one gear. The guide rail is provided with an opening 63, part of gear teeth of the at least one gear extend out of the opening to engage with the rack, thereby driving the spray rod to extend and retract. In an embodiment of the present application, as shown in Figure 9, the at least one gear includes a gear 7, a gear 8, a gear 9 and a gear 10 which are engaged to operate, and part of gear teeth of the gear 10 are exposed at the opening 63.

[0033] According to an embodiment of the present application, as shown in Figure 8, the base is further provided with a guide portion, and the guide portion has a thickness matching with the thickness of the spray rod. The guide portion is further provided with a water spraying means configured to clean the first water outlet 22 and the second water outlet 23 of the spray rod. When the spray rod is fully retracted into the base, the guide portion covers the first water outlet 22 and the second water outlet 23.

[0034] In the preferred embodiments described above, the first spray rod component 11 and the second spray rod component 12 are formed by injection molding with a mould, however, the present application is not limited to this, and the person skilled in the art may employ other machining methods, such as stamping with a mould, to form the components according to a practical design.

[0035] Furthermore, in each of the preferred embodiments described above, the cross-section of the spray rod is in the shape of a rectangle, however, the present application is not limited to this, and the person skilled in the art may also choose other shapes according to practical designs and usage requirements, such as a trapezoidal shape, a semicircular shape or a semi-elliptical shape or the like.

[0036] As shown in Figure 9, when the flushing device according to the present application is installed on a toilet, altitudes of two ends of the arc-shaped sliding groove are set to be higher than the highest point of the ceramic bowl of the toilet by 4 mm or more, to prevent the water from flowing backward in the spray rod.

[0037] The embodiments of the present application have been described hereinbefore with reference to the drawings. The person skilled in the art may understand that various modifications and substitutions may be made to the embodiments of the present application without departing from the spirit and scope of the present application. These modifications and substitutions fall within the scope of the present application as defined by the claims.

INDUSTRIAL APPLICABILITY

[0038] The spray rod according to the present application has a simple structure and is convenient to manufacture and install. With the spray rod, the thickness of the flushing device is reduced, the height of the intelligent toilet cover is reduced significantly, and the overall appearance of the product is improved.

Claims

1. A spray rod, configured to be arranged in an intelligent toilet, comprising:
 - a) a first spray rod component having a first surface and a second surface opposite to the first surface, the second surface having at least one groove configured to allow water to flow;
 - b) a second spray rod component having a first surface and a second surface opposite to the first surface, wherein in a case that the first spray rod component and the second spray rod component are assembled together, the second surface of the first spray rod component is coupled to the first surface of the second spray rod component, to allow the at least one groove of the second surface of the first spray rod component and the first surface of the second spray rod component to form at least one flow channel; and
 - c) at least one water inlet and at least one water outlet both in communication with the at least one flow channel, to introduce water via the at least one water inlet and spray water out via the at least one water outlet.
2. The spray rod according to claim 1, wherein the first surface of the second spray rod component has at least one groove configured to allow water to flow; and the at least one groove of the first surface of the second spray rod component matches the at least one groove of the second surface of the first spray rod component; and
 - in a case that the first spray rod component and the second spray rod component are assembled together, the second surface of the first spray rod component is coupled to the first surface of the second

spray rod component, to allow the at least one groove of the second surface of the first spray rod component and the at least one groove of the first surface of the second spray rod component to form the at least one flow channel.

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preset curvature of the spray rod ranges from 200 rad to 500 rad.

3. The spray rod according to claim 1, wherein the first surface of the second spray rod component is a flat surface.

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4. The spray rod according to claim 1, wherein the spray rod is flat and a width of the spray rod is greater than a height of the spray rod.

5. The spray rod according to claim 4, wherein a cross-section of the spray rod is rectangular, trapezoidal, semicircular or semi-elliptical.

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6. The spray rod according to claim 1, wherein the second surface of the first spray rod component has a plurality of grooves, and in a case that the first spray rod component and the second spray rod component are assembled together, the second surface of the first spray rod component is coupled to the first surface of the second spray rod component, to allow the plurality of grooves of the second surface of the first spray rod component and the first surface of the second spray rod component to form a plurality of flow channels; and the plurality of grooves are arranged side by side in a width direction of a cross-section of the spray rod.

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7. The spray rod according to claim 6, wherein a flow path from the at least one flow channel to the corresponding at least one water outlet is L-shaped.

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8. The spray rod according to claim 1, wherein at least one water storage tank is further provided between the at least one flow channel and the corresponding at least one water outlet, and the at least one water storage tank has a cross-sectional area greater than a cross-sectional area of the at least one flow channel.

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9. The spray rod according to claim 8, wherein the at least one water storage tank is recessed deeper than the respective groove.

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10. The spray rod according to claim 1, wherein the spray rod is further provided with at least one water inlet conduit which is in communication with the at least one water inlet and is configured to guide an external water source to the at least one water inlet.

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11. The spray rod according to any one of claims 1 to 10, wherein the spray rod has a preset curvature.

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12. The spray rod according to claim 11, wherein the

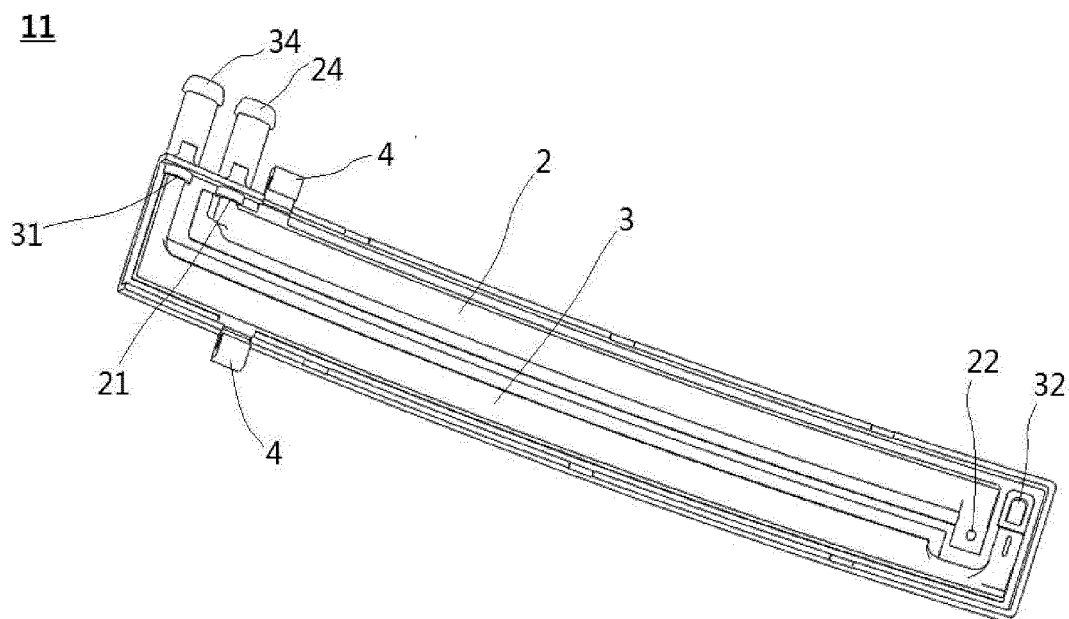


Figure 1

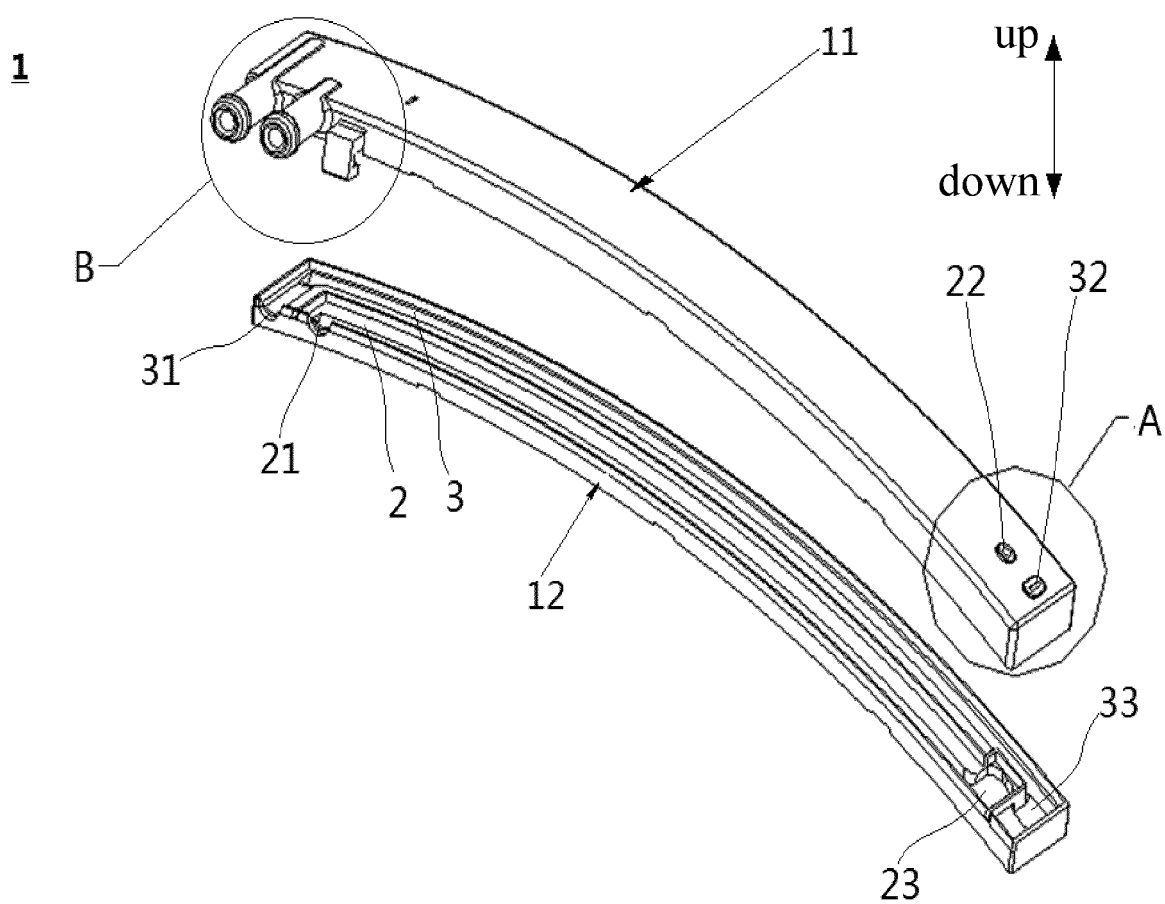


Figure 2

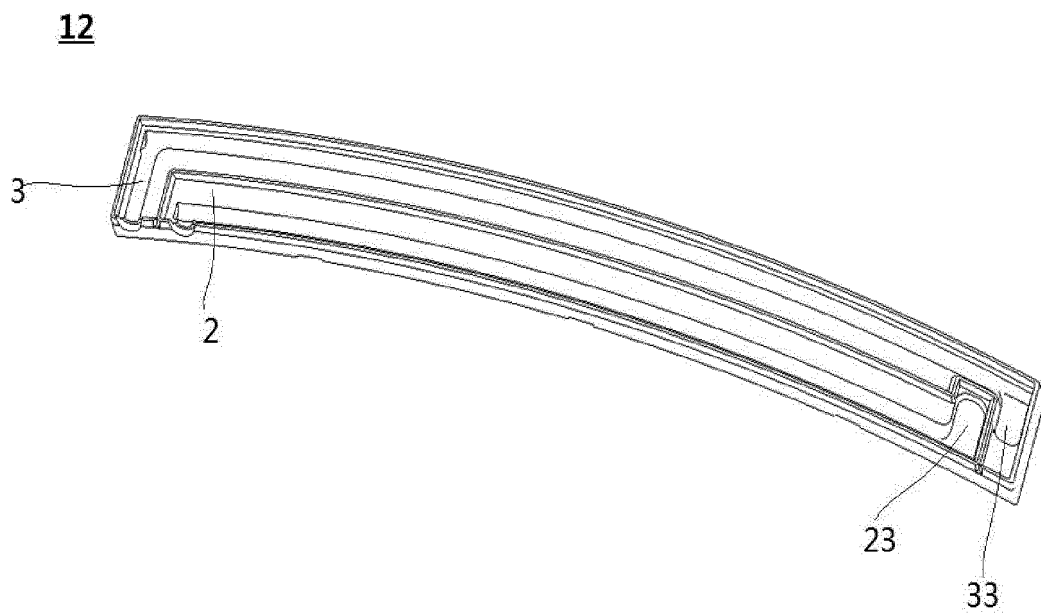


Figure 3

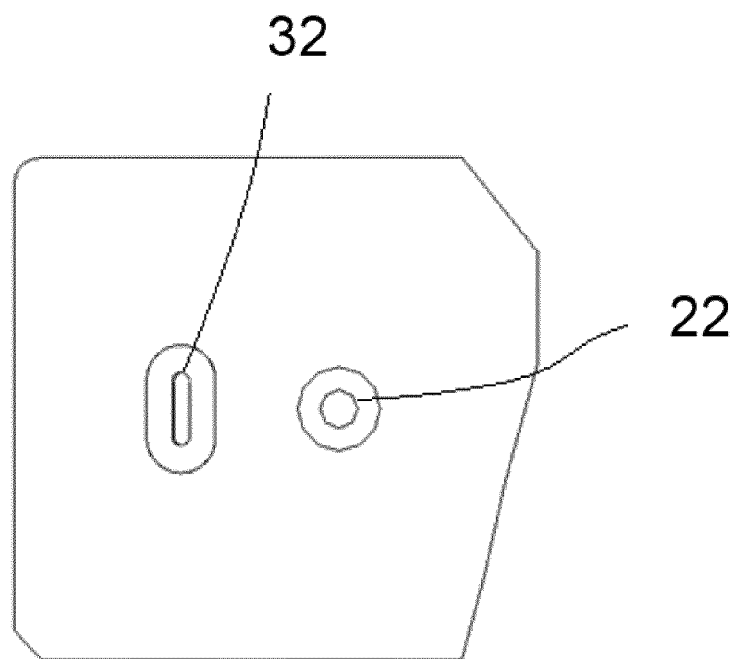


Figure 4

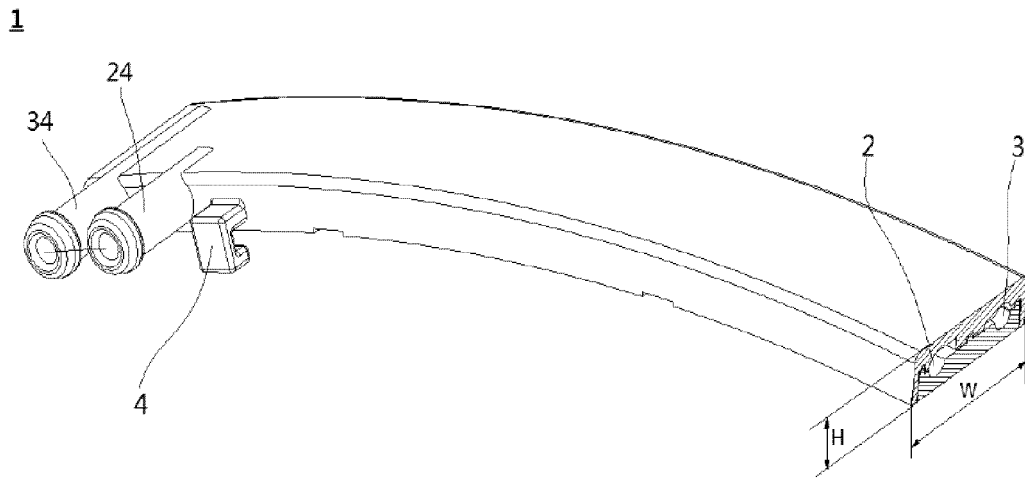


Figure 5

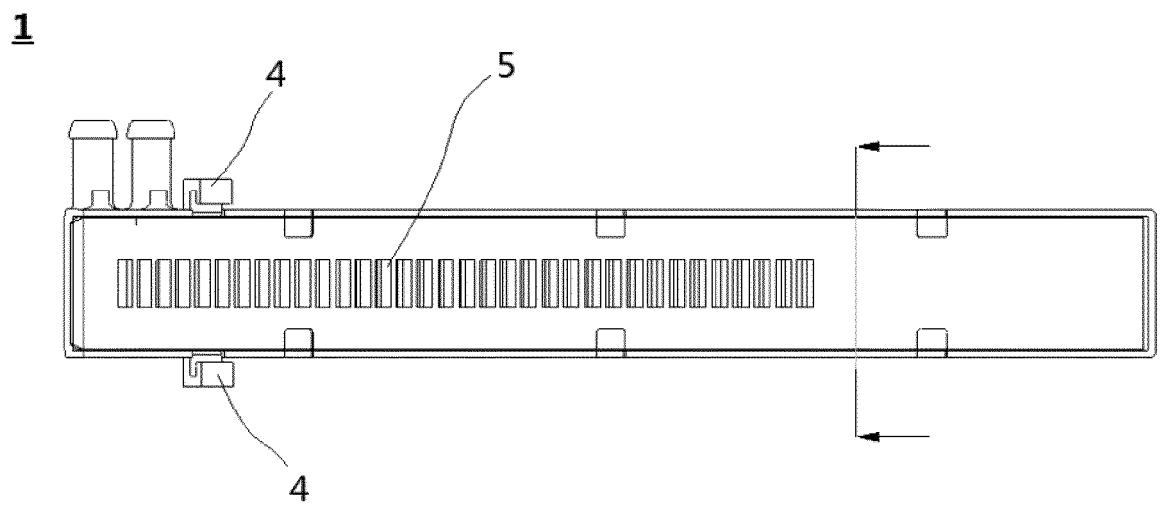


Figure 6

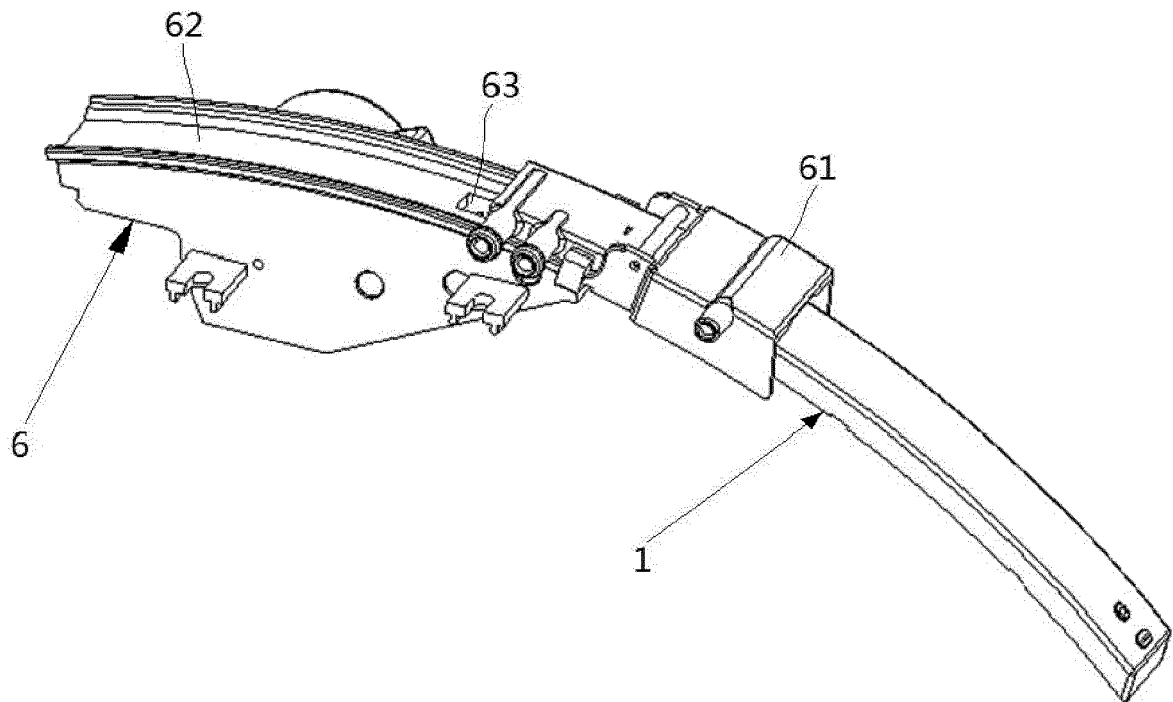


Figure 7

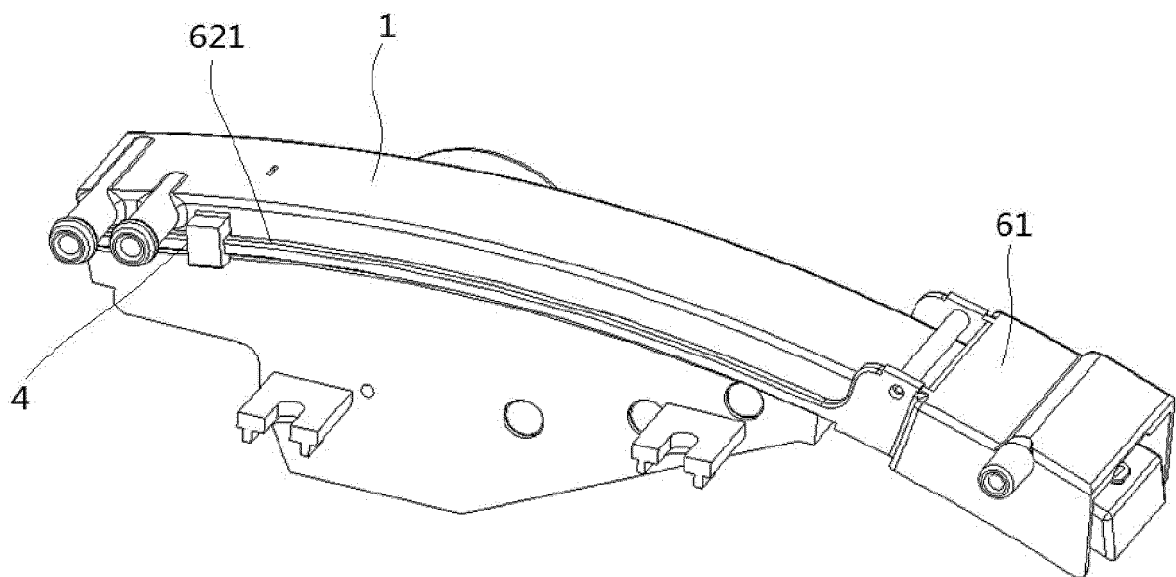


Figure 8

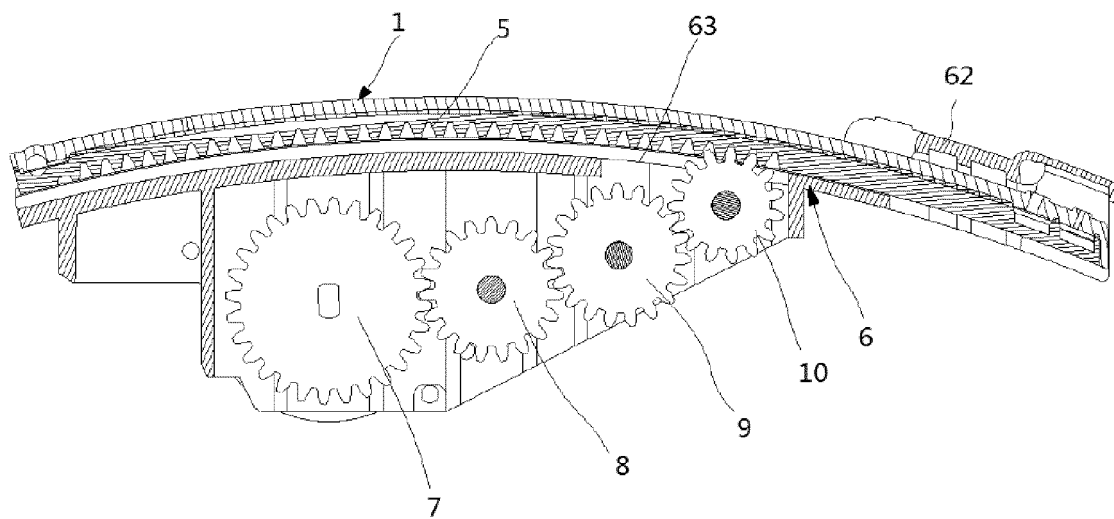


Figure 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2016/076323

A. CLASSIFICATION OF SUBJECT MATTER

E03D 9/08 (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; A61H 35

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)

CNKI; CPRSABS; CNABS; VEN: toilet bowl, sanitary device, toilet seat, bidet, cover, Lavatory, nozzle, shower, mouth , eject, spout,
pipe, hose, conduit, wash, spray, flush, clean

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2010269247 A1 (CHEN DAVID) 28 October 2010 (28.10.2010) description, specific mode and figure 10, refer to paragraph 【0033】 in details	1-12
A	DE 202011051361 U1 (MICRO SUTURES & GOLDEN TECH CO.) 22 February 2012 (22.02.2012) the whole document	1-12
A	CN 202212291 U (SHANGHAI KOHLER ELECTRONICS TECHNOLOGY CO., LTD.) 09 May 2012 (09.05.2012) the whole document	1-12
A	CN 202466761 U (SHANGHAI FLORY SANITARYWARE CO., LTD. et al.) 03 October 2012 (03.10.2012) the whole document	1-12

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

* Special categories of cited documents:	“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
“A” document defining the general state of the art which is not considered to be of particular relevance	
“E” earlier application or patent but published on or after the international filing date	“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	“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
“O” document referring to an oral disclosure, use, exhibition or other means	
“P” document published prior to the international filing date but later than the priority date claimed	“&”document member of the same patent family

Date of the actual completion of the international search 27 May 2016	Date of mailing of the international search report 07 June 2016
Name and mailing address of the ISA State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	Authorized officer HAN, Bingbing Telephone No. (86-10) 62085356

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2016/076323

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
US 2010269247 A1	28 October 2010	US 8065755 B2	29 November 2011
DE 202011051361 U1	22 February 2012	None	
CN 202212291 U	09 May 2012	None	
CN 202466761 U	03 October 2012	None	