

CLEANING DEVICE FOR MEDICAL INSTRUMENTS OF OTORHINOLARYNGOLOGY HEAD AND NECK SURGERY

Field of the Invention

5 The application relates to the field of auxiliary instrument for medical instruments, and in particular to a cleaning device for medical instruments of otorhinolaryngology head and neck surgery.

Background to the Invention

10 Otorhinolaryngology Head and Neck Surgery, also known as otorhinolaryngology-Head and Neck Surgery, is a medical specialty, which mainly studies the anatomical physiology and disease phenomena related to the ear, nose, pharynx, larynx and their related head and neck areas. Because the instruments of otorhinolaryngology often contact with the open cavity of human body, they are easy to contact with pathogens such as blood and
15 pus. If they are not cleaned in time, these pathogens may spread to the next patient through the instruments, leading to cross-infection. When the medical instruments are used again, they may pass the pathogens of the previous patients to the next patient, increasing the risk of infection and affecting medical safety. Therefore, after each use, the medical instruments of otorhinolaryngology head and neck surgery must go through strict
20 cleaning and disinfection procedures to ensure the safety of patients. At the same time, effective cleaning can not only remove pathogens, but also remove abiotic loads, such as organic and inorganic substances, which is helpful to protect the instruments, prolong their service life and reduce the frequency and cost of maintenance and replacement.

otorhinolaryngology head and neck surgical medical instruments include
25 otorhinolaryngology knives, chisels, otorhinolaryngology scissors, otorhinolaryngology pliers, etc., which are flat and can be placed in a cleaning box for cleaning.

After searching, the China patent with the patent number of CN114904838A discloses a cleaning process for otorhinolaryngology medical instruments, which includes the following

steps: step 1, placing the instruments to be cleaned: fixing the instruments to be cleaned in a fixed seat on the mounting plate of the cleaning device, lifting them into the placing rack in the cleaning cylinder by a handle, and simultaneously embedding the positioning holes of the mounting plate with the positioning columns at the upper part of the placing rack;

5 step 2, cleaning the instrument to be cleaned: starting the motor to drive the driving wheel to rotate, driving the driven wheel to rotate through the driving chain, rotating the rotating disk and the impeller on the driving shaft, adding cleaning liquid into the cleaning cylinder, forming a vortex through rotation of the rotating disk and the impeller, washing and cleaning the instrument fixed on the mounting plate, and enabling the motor to drive the

10 rotating disk to rotate in the forward direction or the reverse direction to ensure the cleaning effect; and step 3: taking out the instruments and drying, and step 4: sterilizing and sterilizing the dried instruments.

The prior art has the following problems: in the prior art, stagnant water is used for washing the instruments, which leads to poor cleaning effect.

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Statement of Invention

In view of the above problems, the present application aims to provide a cleaning device for medical instruments of otorhinolaryngology head and neck surgery, which adopts running water cleaning and self-rotating vibration to improve the cleaning effect.

20 The main idea of the technical solution adopted in the present application is as follows: by means of rotation and self-rotation of two cleaning boxes, the cleaning liquid in the two cleaning boxes is intermittently replaced, while generating vibrations to further improve the cleaning effect.

In order to achieve the above purpose, the technical scheme adopted by the application is

25 as follows:

a cleaning device for medical instruments of otorhinolaryngology head and neck surgery includes a box body and an instrument cleaning box, where the instrument cleaning box is installed on the ceiling in the box body, and the instrument cleaning box is provided with a water injection system and a disinfection system; the middle of the instrument cleaning box

is provided with a cleaning system consisting of a rotatable cleaner capable of circular motion. The system achieves automatic cleaning fluid replacement through the revolution of the cleaner, while the rotation of the cleaner facilitates the pouring out of medical instruments.

5 According to the scheme, further, the cleaner includes a first cleaning box and a second cleaning box, where the first cleaning box and the second cleaning box are connected through a combined revolution-rotation assembly to achieve revolution around the central axis between the first cleaning box and the second cleaning box for cleaning medical instruments, and to perform rotation around the first cleaning box and the second cleaning
10 box for pouring out the medical instruments.

According to the above scheme, further, the combined revolution-rotation assembly includes a first connecting rod, a second motor and a third motor, where the middle of the first connecting rod is connected with the first motor, and both ends of the first connecting rod are respectively connected with the second motor and the third motor.

15 According to the scheme, further, a weight block is respectively arranged directly below the first cleaning box and the second cleaning box, and a swinging baffle is respectively rotatably arranged behind the first cleaning box and the second cleaning box, and a box cover assembly is rotatably installed above the first cleaning box and the second cleaning box.

20 According to the scheme, further, the box cover assembly includes a telescopic part, a pulling part and a cover body, where the telescopic part is respectively arranged in the first cleaning box and the second cleaning box, and the pulling part is arranged between the telescopic part and the cover body; the movement of the pulling part is controlled through the extension and contraction of the telescopic part, so that the cover body can be opened
25 and closed.

According to the scheme, further, the cleaning system also includes an automatic interceptor, the interceptor is rotatably arranged in the instrument cleaning box to block the cleaner, enabling the water in the cleaner to be poured out.

According to the scheme, further, the cleaning device further includes a splash guard

arranged on the rear wall of the instrument cleaning box, where the splash guard includes a second connecting rod, a louver and a handle; the second connecting rod is rotatably connected to the left outer wall of the instrument cleaning box; one end of the second connecting rod is connected with the louver; and the other end of the second connecting rod penetrates through a left partition and is fixedly connected with the handle.

According to the scheme, further, the cleaning device further includes a drying system arranged behind the splash guard, where the drying system includes a drying box, a heating fan and heat dissipation openings; the drying box is arranged behind the splash guard and penetrates through the rear wall of the box body; the heat dissipation openings are arranged in the rear wall of the drying box, a dustproof net is arranged at the front side of the drying box; the heating fan is arranged in the drying box; and the cleaning system is dried by the heating fan.

According to the scheme, further, the cleaning device further includes a lifting dual-purpose cabinet arranged below the instrument cleaning box, where the dual-purpose cabinet is divided into a drainage groove and a collection box by a second baffle, and the collection box is in front of the drainage groove, where

the drainage groove is arranged below a blocking baffle to collect the waste liquid in the cleaner, and a drainage pipe is communicated below the drainage groove, and

the collection box is used for collecting medical instruments poured out by the cleaner.

Through the scheme, further, two ejector blocks are respectively arranged in the symmetrical two side walls of the collection box, a rotary door is rotatably arranged in the collection box far away from the side wall of the drainage groove, and a second handle is arranged outside the rotary door, and the collection box can be opened by pulling the rotary door.

The application also provides a cleaning method for medical instruments of otorhinolaryngology head and neck surgery using the cleaning device medical instruments of otorhinolaryngology head and neck surgery, and the method includes the following steps:

S1, respectively putting the used otorhinolaryngology head and neck surgical medical instruments into a first cleaning box and a second cleaning box according to the instrument size;

S2, injecting clean water into the first cleaning box and the second cleaning box through a water injection system;

S3, closing the box cover assembly;

S4, activating the first motor, the first motor driving the first connecting rod to rotate around the midpoint, causing both the first cleaning box and the second cleaning box to rotate around the midpoint of the first connecting rod, with the medical instruments in the first cleaning box and the second cleaning box being vibrated and cleaned through the rotating, and colliding with the automatic interceptor during the rotating, resulting in the first cleaning box and the second cleaning box respectively rotating around the two ends of the first connecting rod for a certain angle, the swinging baffle opening to pour out water, and the weight block assisting the first cleaning box and the second cleaning box to return to the right position;

S5, turning off the first motor after cleaning; and

S6, activating the second motor and the third motor respectively, the second motor and the third motor driving the first cleaning box and the second cleaning box to rotate 180 degrees about their respective central points, thereby completely pouring out the clean water from the first cleaning box and the second cleaning box.

The application has the following beneficial effects:

1. the first motor drives the first connecting rod to rotate about its midpoint, wherein the rotation of the first connecting rod drives the first cleaning box and the second cleaning box to rotate synchronously, generating vibrational forces that enhance surface cleaning of the medical instruments;

2. the first cleaning box and the second cleaning box rotate and collide with the blocking baffle, causing the first cleaning box and the second cleaning box to rotate by a certain angle about the endpoints of the first connecting rod, wherein the swinging baffle

immediately and automatically opens due to its own gravity, allowing the cleaning liquid to flow between the swinging baffle and the cleaning boxes into the drainage groove, and subsequently automatically returns to the correct position under the action of the weight block, where the first cleaning box and the second cleaning box perform cross-rotation for water pouring, thereby improving water pouring efficiency, ensuring the cleaning liquid remains clean, and significantly enhancing the cleaning effect;

3. in the process of pouring water, the cleaning liquid is always injected from a water injection nozzle, and the cleaning liquid is replenished into the first cleaning box and the second cleaning box to realize the purpose of changing water, and the cleaning effect is obviously improved through running water and vibration cleaning;

4. after changing the water, a disinfectant is injected through the disinfectant injection pipe, filling the first cleaning box and the second cleaning box for immersion, thereby sterilizing and disinfecting the medical instruments;

5. the cleaning liquid is injected through the water injection nozzle, the operations of water injection, water replacement, and water pouring collectively enable a more thorough cleaning process;

6. by controlling the opening and closing of the splash guard, damage to the drying system caused by cleaning liquid and disinfectant is prevented, thereby extending the service life of the drying system;

7. the ejector blocks resist a retaining door to prevent the retaining door from opening automatically; in the process of cleaning and disinfection, the rotary door is always closed to prevent the cleaning liquid and disinfectant from entering the dual-purpose cabinet; and

8. the dual-purpose cabinet is driven by a lifting controller to slide downwards, the retaining door is automatically opened due to its own gravity, and the ejector blocks are always attached to the retaining door; the opening degree of the retaining door is determined by the downward sliding distance of the dual-purpose cabinet, when the retaining door is opened to a certain extent, medical instruments are poured into the collection box from the first cleaning box and the second cleaning box.

Brief Description of the Drawings

In order to explain the technical scheme of the embodiment of the present application more clearly, the drawings needed in the embodiment will be briefly introduced below.

5 FIG. 1 is a structural schematic diagram of a cleaning device for medical instruments of otorhinolaryngology head and neck surgery according to the present application.

FIG. 2 is a structural schematic diagram of the box body, water injection system and disinfection system according to the present application.

FIG. 3 is a schematic diagram of the instrument cleaning box and its internal installation structure according to the present application.

10 FIG. 4 is a structural schematic diagram of the instrument cleaning box and disinfection system according to the present application.

FIG. 5 is a structural schematic diagram of the instrument cleaning box according to the present application.

15 FIG. 6 is a structural schematic diagram of the cleaning system according to the present application.

FIG. 7 is a schematic diagram of the cleaning system during water replacement according to the present application.

FIG. 8 is a structural schematic diagram of the cleaning system during medical instrument pouring according to the present application.

20 FIG. 9 is a structural schematic diagram of the first cleaning box according to the present application.

FIG. 10 is a structural schematic diagram of the splash guard according to the present application.

25 FIG. 11 is a structural schematic diagram of the drying system according to the present application.

FIG. 12 is a schematic diagram of the dual-purpose cabinet controlling the opening and closing of the retaining door according to the present application.

FIG. 13 is an enlarged view of the circled portion in FIG. 12 according to the present application.

FIG. 14 is a structural schematic diagram of the dual-purpose cabinet according to the present application.

5 FIG. 15 is a structural schematic diagram of a storage cabinet according to the present application.

FIG. 16 is a structural schematic diagram of the lifting controller according to the present application.

In the figures:

10 1. box body; 101. instrument cleaning box; 102. left partition; 103. right partition; 104. lower partition; 105. first installation hole; 106. first baffle; 107. through hole; 108. second installation hole; 109. retaining door; 110. sliding door; 111. first handle;

2. water injection system; 201. water injection nozzle; 202. water diversion plate; 203. water diversion hole;

15 3. disinfection system; 301. disinfectant injection pipe; 302. first outlet liquid pipe; 303. second outlet liquid pipe;

4. cleaning system; 401. blocking baffle; 402. first cleaning box; 403. second cleaning box; 404. weight block; 405. first connecting rod; 406. first motor; 407. second motor; 408. third motor; 409. electric telescopic rod; 410. pull ring; 411. pull rope; 412. first net cover; 413. 20 second net cover; 414. swinging baffle;

5. splash guard; 501. second connecting rod; 502. louver; 503. handle;

6. drying system; 601. drying box; 602. heating fan; 603. heat dissipation opening;

7. dual-purpose cabinet; 701. second baffle; 702. drainage groove; 703. collection box; 704. drainage pipe; 705. ejector block; 706. rotary door; 707. second handle;

25 8. lifting controller; 801. control cabinet; 802. fourth motor; 803. rotating rod; 804. turntable; 805. first connector; 806. second connector; 807. lifting rod;

9. storage cabinet; 901. wall hanging box; 902. horizontal box; 903. hook; and 904. placing plate.

Detailed Description

5 In order to make the purpose, technical scheme and advantages of the embodiment of the application more clear, the technical scheme in the embodiment of the application will be described clearly and completely with the attached drawings. Obviously, the described embodiment is a part of the embodiment of the application, but not the whole embodiment. The components of the embodiments of the present application, which are generally
10 described and illustrated in the drawings herein, can be arranged and designed in various different configurations.

Therefore, the following detailed description of the embodiments of the application provided in the accompanying drawings is not intended to limit the scope of the claimed application, but merely represents selected embodiments of the application. Based on the
15 embodiments in this application, all other embodiments obtained by ordinary technicians in this field without creative work belong to the protection scope of this application.

In practice, the inventor found that the existing technology used stagnant water to wash, which resulted in poor cleaning effect, possibly leading to cross infection and affecting medical safety.

20 Based on the above findings, this application puts forward a cleaning device for medical instruments of otorhinolaryngology head and neck surgery, which adopts running water cleaning and self-rotating vibration to improve the cleaning effect.

Embodiment 1

Referring to FIGs. 1 - 9, the application discloses a cleaning device for medical instruments
25 of otorhinolaryngology head and neck surgery, which includes a box body 1, a water injection system 2, a disinfection system 3 and a cleaning system 4, where an instrument cleaning box 101 is installed on the ceiling of the box body 1, the water injection system 2 and the disinfection system 3 are arranged on the instrument cleaning box 101, and the

cleaning system 4 is rotatably arranged in the middle of the instrument cleaning box 101.

An instrument cleaning box 101 is installed on the ceiling of the box body 1, a sliding door 110 is rotatably arranged in front of the box body 1, and a first handle 111 is arranged on one side of the sliding door 110. When in use, the sliding door 110 can be opened by
5 pulling the first handle 111.

Further, a first installation hole 105 is opened at the upper rear of the instrument cleaning box 101 for installing the splash guard 6, and a first baffle 106 is arranged at the lower near the bottom of the box 1, the first baffle 106 divides the bottom of the instrument cleaning box 101 into two parts. A through hole 107 is opened at the first part of the bottom of the
10 instrument cleaning box 101 near the rear wall of the instrument cleaning box 101, and the through hole 107 communicates with the instrument cleaning box 101 and the drainage groove 702. A second installation hole 108 is opened in the second part of the bottom of the instrument cleaning box 101 near the front of the instrument cleaning box 101, and a retaining door 109 is rotatably arranged in the second installation hole 108, the retaining
15 door 109 cooperates with the ejector blocks 705. After the ejector blocks 705 descends, the retaining door 109 opens due to its own gravity, that is, the opening and closing of the retaining door 109 is controlled by the lifting of the dual-purpose cabinet 7. A left partition 102, a right partition 103 and a lower partition 104 are respectively arranged at the left and right lower parts of the instrument cleaning box 101, and the instrument cleaning box 101 is
20 connected with the box body 1 through the left partition 102 and the right partition 103.

where the water injection system 2 includes a water injection nozzle 201 and a water diversion plate 202, where the water injection nozzle 201 is arranged on the box body 1, the water diversion plate 202 is arranged on the instrument cleaning box 101, the water injection nozzle 201 is communicated with the water diversion plate 202, and water
25 diversion holes 203 are formed on the water diversion plate 202, and the cleaning liquid uniformly enters the cleaning system 4 through the water diversion holes 203.

Secondly, the disinfection system 3 includes a disinfectant injection pipe 301, a first outlet liquid pipe 302 and a second outlet liquid pipe 303. The disinfectant injection pipe 301 passes through the top of the right side of the box body 1 and is arranged between the

instrument cleaning box 101 and the box body 1. The disinfectant injection pipe 301 is respectively communicated with the first outlet liquid pipe 302 and the second outlet liquid pipe 303, and the first outlet liquid pipe 302 and the second outlet liquid pipe 303 respectively pass through the right side wall of the instrument cleaning box 101.

5 In particular, the cleaning system 4 includes an automatic interceptor and a cleaner, where the blocking baffle 401 can be selected as the automatic interceptor,, and the blocking baffle 401 is rotatably arranged in the instrument cleaning box 101 to block the cleaner so that the cleaner can pour water.

10 Further, the cleaner includes a first cleaning box 402 and a second cleaning box 403. the first cleaning box 402 and the second cleaning box 403 are connected through a combined revolution-rotation assembly to achieve revolution around the central axis between the first cleaning box 402 and the second cleaning box 403 for cleaning medical instruments, and to perform rotation around the first cleaning box 402 and the second cleaning box 403 for pouring out the medical instruments.

15 Further, for the combined revolution-rotation assembly, the combined revolution-rotation assembly includes a first connecting rod 405, a second motor 407 and a third motor 408. The middle of the first connecting rod 405 is connected with the first motor 406, and both ends of the first connecting rod 405 are respectively connected with the second motor 407 and the third motor 408.

20 That is, the middle parts of both sides of the first cleaning box 402 and the second cleaning box 403 are respectively connected with the two ends of the first connecting rod 405, and the middle of the first connecting rod 405 is connected with a first motor 406, the first motor 406 drives the first connecting rod 405 to rotate around the midpoint, and the two ends of the first connecting rod 405 are respectively connected with a second motor 407 and a
25 third motor 408, and the second motor 407 drives the first cleaning box 402 to rotate around the midpoint of the first cleaning box 402, and the third motor 408 drives the second cleaning box 403 to rotate around the midpoint of the second cleaning box 403.

Further, a weight block 404 is respectively arranged directly below the first cleaning box 402 and the second cleaning box 403, and a swinging baffle 414 is respectively rotatably

arranged behind the first cleaning box 402 and the second cleaning box 403. The swinging baffle 414 cooperates with the blocking baffle 401 to pour water when the first cleaning box 402 and the second cleaning box 403 rotate, and a box cover assembly is rotatably installed above the first cleaning box 402 and the second cleaning box 403.

5 In the above scheme, the first motor 406 drives the first connecting rod 405 to rotate around the midpoint, so that both the first cleaning box 402 and the second cleaning box 403 rotate around the midpoint around the first connecting rod 405, and the rotation makes the medical instruments in the first cleaning box 402 and the second cleaning box 403 vibrate, which is beneficial to the surface cleaning of the medical instruments. During the
10 rotation, the first cleaning box 402 and the second cleaning box 403 will encounter the blocking baffle 401. The first cleaning box 402 and the second cleaning box 403 are rotated around the two ends of the first connecting rod 405 by a certain angle respectively. At this time, the swinging baffle 414 is in an open state due to its own gravity, and the cleaning liquid flows into the drainage groove 702 from between the swinging baffle 414
15 and the cleaning box, and the first cleaning box 402 and the second cleaning box 403 continue to rotate. Due to the action of the weight block 404, the first cleaning box 402 and the second cleaning box 403 are aligned. After cleaning, the first motor 406 is turned off, and the second motor 407 is started. The second motor 407 drives the first cleaning box 402 to rotate 180° around the midpoint of the first cleaning box 402, and the box cover
20 assembly is opened, thus the medical instruments in the first cleaning box 402 are poured out. The third motor 408 is started, and the third motor 408 drives the second cleaning box 403 to rotate 180° around the midpoint of the second cleaning box 403, so that the box cover assembly is opened and the medical instruments in the second cleaning box 403 are also poured out.

25 Further, the box cover assembly includes a telescopic part, a pulling part and a cover body, where the telescopic part is respectively arranged in the first cleaning box 402 and the second cleaning box 403, and the pulling part is arranged between the telescopic part and the cover, and the movement of the pulling part is controlled through the extension and contraction of the telescopic part, so that the cover can be opened and closed.

30 In this application, in order to reduce the influence of human factors and realize the

automatic opening of the lid, the telescopic part adopts a structure that can realize the telescopic starting purpose, such as an electric telescopic rod and a cylinder. Specifically, if an electric telescopic rod 409 is adopted, the electric telescopic rod 409 is arranged at the four corners of the first cleaning box 402 and the second cleaning box 403.

5 In addition, in this application, the pulling part is optionally a combination of a pull ring 410 and a pull rope 411. The pull ring 410 is arranged at two corners of a first net cover 412 and a second net cover 413, the two corners are close to the first cleaning box 402 and the second cleaning box 403. The electric telescopic rod 409 is connected with the pull ring 410 through the pull rope 411 to control the opening and closing of the first net cover 412
10 and the second net cover 413.

In addition, as for the cover body, the first cleaning box 402 and the second cleaning box 403 are respectively provided with the first net cover 412 and the second net cover 413. In order to realize the above-mentioned automatic opening and closing purpose, the first net cover 412 and the second net cover 413 are divided into two parts and arranged into two
15 halves. At the same time, the first net cover 412 and the second net cover 413 are both provided with meshes that can prevent the instruments from falling out and allow the water to enter from the outside to the inside unimpeded, and the mesh number is 30-60.

When the above scheme is used, the electric telescopic rod 409 contracts, pulling the pull rope 411 to move into the cleaning box, and the pull rope 411 pulls the pull ring 410 to
20 drive the first net cover 412 or the second net cover 413 to rotate, so that the first net cover 412 and the second net cover 413 are covered on the first cleaning box 402 and the second cleaning box 403 respectively. When pouring out medical instruments, the first cleaning box 402 and the second cleaning box 403 rotate by 180° respectively, and the electric telescopic rod 409 is extended. Due to their own gravity, the first net cover 412 and
25 the second net cover 413 are opened in turn, so that the medical instruments in the first cleaning box 402 and the second cleaning box 403 are poured out.

One use process of this embodiment is as follows:

respectively putting the used otorhinolaryngology head and neck surgical medical instruments into the first cleaning box 402 and the second cleaning box 403 respectively

according to the instrument size;

injecting the cleaning liquid from the water injection nozzle 201, the cleaning liquid flowing from the water injection nozzle 201 to the water distribution plate 202 and into the first cleaning box 402 and the second cleaning box 403 through the water distribution holes
5 203;

after filling the first cleaning box 402 and the second cleaning box 403 with cleaning liquid, the electric telescopic rod 409 contracting to pull the pull rope 411 for moving into the cleaning box, the pull rope 411 pulling the pull ring 410 to drive the first net cover 412 or the second net cover 413 to rotate, thereby covering the first net cover 412 and the second
10 net cover 413 on the first cleaning box 402 and the second cleaning box 403 respectively;

activating the first motor 406, the first motor 406 driving the first connecting rod 405 to rotate about its central point, the first connecting rod 405 in turn driving the first cleaning box 402 and the second cleaning box 403 to rotate respectively, the rotation of the first cleaning box 402 and the second cleaning box 403 generating vibrational forces, thereby
15 enhancing surface cleaning of the medical instruments, the first cleaning box 402 rotating and colliding with the blocking baffle 401, causing the first cleaning box 402 to rotate by a certain angle about the endpoint of the first connecting rod 405, the swinging baffle 414 immediately and automatically opening due to its own gravity, allowing the cleaning liquid to flow between the swinging baffle 414 and the cleaning box into the drainage groove 702,

thereby discharging the used cleaning liquid from the first cleaning box 402, and the first cleaning box 402 automatically returning to its original position under the action of the weight block 404, performing rotational cleaning during the water pouring process of the first cleaning box 402, and after completing water pouring from the first cleaning box 402, the second cleaning box 403 then executing water replacement through the same
20 operation as the first cleaning box 402, with the first cleaning box 402 and the second cleaning box 403 alternately performing water pouring, thereby improving water pouring efficiency; continuously injecting cleaning liquid through the water injection nozzle 201 during the water pouring process, the cleaning liquid entering the first cleaning box 402 and the second cleaning box 403 through different through-holes arranged on the first net
25 cover 412 and the second net cover 413 respectively, thereby replenishing cleaning liquid
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to achieve water replacement, with the combined action of flowing water and vibrational cleaning significantly improving the cleaning effectiveness;

after completing the cleaning process, stopping the injection of cleaning liquid and deactivating the first motor 406, with the first cleaning box 402 being positioned above the drainage groove 702 at this moment, activating the second motor 407, the second motor 407 driving the first cleaning box 402 to rotate 180 degrees about its central point, thereby completely pouring out the cleaning liquid from the first cleaning box 402 into the drainage groove 702, then reversing the second motor 407 to rotate the first cleaning box 402 back by 180 degrees to its original position, restarting the first motor 406 to rotate the second cleaning box 403 above the drainage groove 702, deactivating the first motor 406 and activating the third motor 408, the third motor 408 driving the second cleaning box 403 to rotate 180 degrees about its central point, thus fully discharging the cleaning liquid from the second cleaning box 403 into the drainage groove 702, and finally reversing the third motor 408 to return the second cleaning box 403 to its initial position by 180-degree rotation.

After completing the water drainage, injecting the disinfectant through the disinfectant injection pipe 301, the disinfectant being diverted from the disinfectant injection pipe 301 into the first outlet liquid pipe 302 and the second outlet liquid pipe 303, then flowing out through the first outlet liquid pipe 302 and the second outlet liquid pipe 303 into the first cleaning box 402 and the second cleaning box 403, until the first cleaning box 402 and the second cleaning box 403 being filled with the disinfectant, then stopping the injection of disinfectant and soaking for a period of time to sterilize and disinfect the medical instruments;

after completing the immersion process, activating the first motor 406, the second motor 407, and the third motor 408 respectively, and according to the above water pouring operation, completely pouring out the disinfectant from the first cleaning box 402 and the second cleaning box 403 into the drainage groove 702; and

after pouring out the disinfectant, injecting cleaning liquid through the water injection nozzle 201 again, and following the aforementioned water injection, water replacement, and water pouring operations, thereby achieving more thorough cleaning.

Embodiment 2

As shown in FIG. 10, a splash guard 5 is arranged on the rear wall of the instrument cleaning box 101, and the splash guard 5 includes a second connecting rod 501, a louver 502 and a handle 503, where the second connecting rod 501 is rotatably connected to the left outer wall of the instrument cleaning box 101, one end of the second connecting rod 501 is connected with the louver 502, and the other end of the second connecting rod 501 is fixedly connected with the handle 503 through the left partition 102.

As shown in FIG. 11, a drying system 6 is arranged behind the splash guard 5, and the drying system 6 includes a drying box 601, a heating fan 602 and heat dissipation openings 603, where the drying box 601 is arranged behind the splash guard 5 and penetrates through the rear wall of the box body 1; the rear wall of the drying box 601 is provided with the heat dissipation openings 603, and a dustproof net is arranged in the front; and the heating fan 602 is arranged in the drying box 601, so that the cleaning system is cleaned by the heating fan 602.

One use process of this embodiment is as follows:

before injecting water for disinfection, pulling the handle 503 downward, the handle 503 driving the second connecting rod 501 to rotate, causing the opposite end of the second connecting rod 501 to move upward, thereby closing the louver 502, the louver 502 blocking the cleaning liquid and disinfectant within the instrument cleaning box 101, preventing damage to the drying system 6 behind the splash guard 5 by the cleaning liquid and disinfectant, and extending the service life of the drying system 6. After completing cleaning and disinfection, pulling the handle 503 upward, the handle 503 driving the second connecting rod 501 to rotate, causing the opposite end of the second connecting rod 501 to move downward, thereby opening the louver 502, with the drying system 6 now communicating with all equipment inside the instrument cleaning box 101. Then activating the heating fan 602, the heating element of the heating fan 602 increasing in temperature, the surrounding air being heated through contact with the heating element, the fan rotating to blow the heated air through the splash guard 5 toward the cleaning system 4, thereby drying the fabric inside the cleaning system 4. After completing drying, deactivating the

heating fan 602.

Embodiment 3

As shown in FIGs. 12 - 16, a lifting dual-purpose cabinet 7 is arranged below the instrument cleaning box 101. A lifting controller 8 and a storage cabinet 9 are respectively
5 arranged below the dual-purpose cabinet 7, and the lifting controller 8 is behind the storage cabinet 9 for controlling the lifting of the dual-purpose cabinet 7.

Further, the dual-purpose cabinet 7 includes a drainage groove 702 and a collection box 703, and the collection box 703 is separated in front of the drainage groove 702 by a
10 second baffle 701. The drainage groove 702 is arranged below the blocking baffle 401 to collect the waste liquid in the cleaner, and a drainage pipe 704 is communicated below the drainage groove 702. The collection box 703 is used for collecting medical instruments poured out by the cleaner. Two ejector blocks 705 are respectively arranged in the symmetrical two side walls of the collection box 703, and the ejector blocks 705 are
15 matched with the retaining door 109. After the ejector blocks 705 descend, the retaining door 109 is opened due to its own gravity, that is, the opening and closing of the retaining door 109 is controlled by the lifting of the dual-purpose cabinet 7. The collection box 703 is rotatably provided with a rotary door 706 far away from the side wall of the drainage groove 702, and a second handle 707 is arranged outside the rotary door 706. The collection box 703 can be opened by pulling the rotary door 706.

Specifically, the lifting controller 8 includes a control cabinet 801, a fourth motor 802, a
20 rotating rod 803, a turntable 804, a first connector 805, a second connector 806 and a lifting rod 807. The control cabinet 801 is below the dual-purpose cabinet 7, and the rear wall of the control cabinet 801 is provided with the fourth motor 802, the fourth motor 802 is connected with one end of the rotating rod 803, and the rotating rod 803 is fixedly
25 connected with the turntable 804. The other end of the rotating rod 803 is sleeved on the first connector 805, one end of the first connector 805 is fixedly connected with the turntable 804, and the other end is arranged in the middle of the second connector 806; one end of the lifting rod 807 penetrates through and is fixedly connected with the first connector 805 and the second connector 806, and the other end is fixedly connected with

the bottom of the dual-purpose cabinet 7.

In addition, the storage cabinet 9 includes a wall hanging box 901 and a horizontal box 902, the wall hanging box 901 and the horizontal box 902 are connected with the lower part of the instrument cleaning box 101 through the lower partition 104. The wall hanging box 901 and the horizontal box 902 are arranged in the box body 1 left and right, and a plurality of hooks 903 are arranged in the wall hanging box 901, and a plurality of placing plates 904 are uniformly arranged in the horizontal box 902 up and down.

One application process of the application is as follows:

the dual-purpose cabinet 7 initially fitting flush beneath the instrument cleaning box 101, the ejector blocks 705 pressing against the retaining door 109 to prevent automatic opening thereof, and during the cleaning and disinfecting processes, the rotary door 706 remaining closed to block entry of cleaning liquid and disinfectant into the dual-purpose cabinet 7;

after completing the drying process, activating the fourth motor 802, the fourth motor 802 driving the rotating rod 803 to turn, the rotating rod 803 causing the turntable 804 to rotate, the turntable 804 driving the first connecting member 805 to revolve, the first connecting member 805 actuating the second connector 806 to move, thereby making the lifting rod 807 perform vertical motion;

the lifting rod 807 moving downward to drive the dual-purpose cabinet 7 to slide downward, the ejector blocks 705 moving downward synchronously, the retaining door 109 automatically opening due to its own gravity while maintaining contact with the ejector blocks 705, the opening degree of the retaining door 109 being determined by the sliding distance of the dual-purpose cabinet 7, and when the retaining door 109 opening to a certain extent, the medical instruments pouring from the first cleaning box 402 and the second cleaning box 403 into the collection box 703; and

then pulling the second handle 707 to rotate the rotary door 706, thereby opening the collection box 703, and respectively storing the medical instruments within the collection box 703 in the wall-mounted box 901 and the horizontal box 902 via the hooks 903 and the storage plate 904.

The basic principle, main features and advantages of the present application have been shown and described above. It should be understood by those skilled in the art that the present application is not limited by the above-mentioned embodiments, and what is described in the above-mentioned embodiments and descriptions only illustrates the principles of the present application. Without departing from the spirit and scope of the present application, there will be various changes and improvements in the present application, which fall within the scope of the claimed application. The scope of that present application is define by the appended claim and their equivalentents.