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(71) Applicant Zhongnan Hospital of Wuhan University
Address Zhongnan Hospital of Wuhan University,
No. 169 Donghu Road, Wuchang District,
Wuhan, Hubei Province 430071

(72) Inventor Yu Tian

(74) Patent agency Taiyuan Jiude Patent Agency Office
(General Partner) 14117

Agent Xuan Gao

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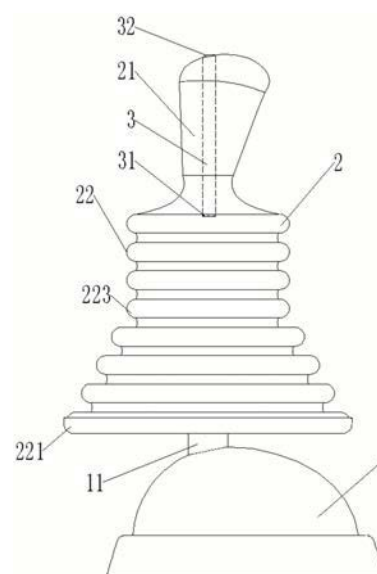
Specification 4 Pages Attached Drawings 2 Pages

(54) Title of Invention

A tracheal foreign body suction device and method

(57) Abstract

The present disclosure provides a tracheal foreign body suction device and method, comprising a breathing mask and a suction device, wherein the breathing mask comprises a ventilation tube, mounted through the breathing mask, with one end of the ventilation tube located outside the breathing mask and connected to the suction device, and the other end located inside the breathing mask; the suction device comprises a handle and a suction cup disposed below the handle, wherein the suction cup is a cylindrical body with an open bottom, a base plate is disposed at the open bottom of the cylindrical body, and the base plate is equipped with an air outlet and a connecting tube, a one-way exhaust valve is disposed on the air outlet, with one end of the connecting tube connected to the base plate, the other end extending inward into the cylindrical body and disposed with a one-way inlet valve; and the dimensions of the connecting tube match those of the ventilation tube. The present disclosure features the advantages of simple operation and the ability to effectively extract foreign bodies from the trachea, and is applicable to the field of medical devices.



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1. A tracheal foreign body suction device, wherein comprises a breathing mask (1) and a suction device (2) that are used in combination;
the breathing mask (1) comprises a ventilation tube (11), mounted through the breathing mask (1), with one end of the ventilation tube (11) located outside the breathing mask (1) and connected to the suction device (2), and the other end located inside the breathing mask (1);
the suction device (2) comprises a handle (21) and a suction cup (22) disposed below the handle (21), wherein the suction cup (22) is a cylindrical body with an open bottom, a base plate (221) is disposed at the open bottom of the cylindrical body, and the base plate (221) is equipped with an air outlet (224) and a connecting tube (222), a one-way exhaust valve (225) is disposed on the air outlet (224), with one end of the connecting tube (222) connected to the base plate (221), the other end extending inward into the cylindrical body and disposed with a one-way inlet valve (226); and the dimensions of the connecting tube (222) match those of the ventilation tube (11).
2. The tracheal foreign body suction device according to Claim 1, wherein a spotlight (3) is provided inside the handle (21), the lamp head (31) of the spotlight (3) is located at the connection between the bottom of the handle (21) and the suction cup (22), and the switch (32) of the spotlight (3) is located on the outer surface of the handle (21).
3. The tracheal foreign body suction device according to Claim 1, wherein the cylindrical body comprises a plurality of grooves (223) arranged sequentially from top to bottom, the groove (223) at the topmost position is connected to the handle (21), and the groove (223) at the bottommost position is connected to the base plate (221).
4. The tracheal foreign body suction device according to Claim 3, wherein the grooves (223) are spaced equidistantly.
5. The tracheal foreign body suction device according to Claim 1, wherein the outer edge of the breathing mask (1) is made of medical-grade silicone and is shaped to fit the face.
6. The tracheal foreign body suction device according to Claim 1, wherein both the breathing mask (1) and the suction device (2) are made of transparent materials.
7. The tracheal foreign body suction device according to Claim 1, wherein the base plate (221) and the connecting tube (222) are an integrally formed structure.
8. The tracheal foreign body suction device according to Claim 1, wherein the cylindrical body is made of a deformable elastic material.
9. A tracheal foreign body suction method, using the tracheal foreign body suction device according to any of Claims 1 to 8 to carry out foreign body suction, wherein the method comprises the following steps:
 - S10. attaching the breathing mask to the human face and inserting the ventilation tube into the connecting tube;
 - S20. pressing down the handle, driving the cylindrical body to press toward the face; the airflow created inside the cylindrical body flows downward, the one-way exhaust valve opens, the one-way inlet valve closes, and the airflow is discharged through the air outlet, creating a negative pressure inside the cylindrical body;
 - S30. pulling up the handle; the one-way exhaust valve closes, and the one-way inlet valve opens; under the effect of the negative pressure, the foreign body in the trachea is suctioned out therefrom.

A Tracheal Foreign Body Suction Device and Method

Technical Field

[0001] The present disclosure relates to the technical field of medical devices, specifically to a tracheal foreign body suction device and method.

Background Art

[0002] Tracheal foreign bodies are one of the common emergencies in otolaryngology, especially in children. Due to their young age, children are prone to swallowing unchewed candy or hard food or foreign objects during play, leading to tracheal obstruction and affecting breathing.

[0003] If a foreign body enters the airway and no timely measures are taken, it may block the glottis or trachea, causing strong irritation that leads to tracheal spasm or glottic closure, resulting in immediate cyanosis, suffocation, and death due to insufficient gas exchange.

[0004] Currently, in hospitals, the existing method to remove objects stuck in the trachea is to use forceps for extraction. If the foreign body is located deeper, surgery is required to directly open the trachea to locate and remove it. This method requires a large surgical incision, causing significant pain to the patient.

Summary of the Invention

[0005] With regard to the deficiencies in the related art, the technical problem to be solved by the present disclosure is: to provide a tracheal foreign body suction device and method that is simple to operate and can effectively remove foreign bodies from the trachea.

[0006] The technical solution adopted by the present disclosure to solve the above technical problems is:

[0007] A tracheal foreign body suction device, comprising a breathing mask and a suction device that are used in combination, wherein the breathing mask comprises a ventilation tube, mounted through the breathing mask, with one end of the ventilation tube located outside the breathing mask and connected to the suction device, and the other end located inside the breathing mask; the suction device comprises a handle and a suction cup disposed below the handle, wherein the suction cup is a cylindrical body with an open bottom, a base plate is disposed at the open bottom of the cylindrical body, and the base plate is equipped with an air outlet and a connecting tube, a one-way exhaust valve is disposed on the air outlet, with one end of the connecting tube connected to the base plate, the other end extending inward into the cylindrical body and disposed with a one-way inlet valve; and the dimensions of the connecting tube match those of the ventilation tube.

[0008] Preferably, a spotlight is provided inside the handle, the lamp head of the spotlight is located at the connection between the bottom of the handle and the suction cup, and the switch of the spotlight is located on the outer surface of the handle.

[0009] Preferably, the cylindrical body comprises a plurality of grooves arranged sequentially from top to bottom, the groove at the topmost position is connected to the handle, and the groove at the bottommost position is connected to the base plate.

[0010] Preferably, the grooves are spaced equidistantly.

[0011] Preferably, the outer edge of the breathing mask is made of medical-grade silicone and is shaped to fit the face.

[0012] Preferably, both the breathing mask and the suction device are made of transparent materials.

[0013] Preferably, the base plate and the connecting tube are an integrally formed structure.

[0014] Preferably, the cylindrical body is made of a deformable elastic material.

[0015] Accordingly, a tracheal foreign body suction method, using the tracheal foreign body suction device described above to carry out foreign body suction, comprises the following steps:

[0016] S10. attaching the breathing mask to the human face and inserting the ventilation tube into the connecting tube;

[0017] S20. pressing down the handle, driving the cylindrical body to press toward the face; the airflow created inside the cylindrical body flows downward, the one-way exhaust valve opens, the one-way inlet valve closes, and the airflow is discharged through the air outlet, creating a negative pressure inside the cylindrical body;

[0018] S30. pulling up the handle; the one-way exhaust valve closes, and the one-way inlet valve opens; under the effect of the negative pressure, the foreign body in the trachea is suctioned out therefrom.

[0019] The beneficial technical effects of the present disclosure are as follows:

[0020] 1. In use, the present disclosure involves attaching the breathing mask to the human face and inserting the ventilation tube into the connecting tube. By pressing down the handle, the cylindrical body is driven to compress toward the face, creating a downward airflow inside the cylindrical body. The one-way exhaust valve opens, the one-way inlet valve closes, and the airflow is discharged through the air outlet, generating negative pressure inside the cylindrical body. After pulling up the handle, the one-way exhaust valve closes and the one-way inlet valve opens. Under the effect of negative pressure, foreign bodies in the human trachea are suctioned out. The present disclosure is simple to operate, effectively removes foreign bodies from the trachea, and is highly practical.

[0021] 2. The cylindrical body in the present disclosure comprises a plurality of grooves arranged sequentially from top to bottom. The arrangement of the grooves increases the elastic stretchability of the cylindrical body and enhances the airflow mobility within the cylindrical body, allowing for the rapid formation of negative pressure inside the suction device.

[0022] 3. The spotlight provided in the present disclosure, when turned on, emits light from the lamp head that passes through the suction cup and illuminates the inside of the mask, allowing the user to conveniently observe the location of foreign bodies in the oral cavity, thereby facilitating the foreign body suction process.

Description of Attached Drawings

[0023] Fig. 1 is a schematic diagram of a tracheal foreign body suction device of the present disclosure;

[0024] Fig. 2 is an exploded schematic diagram of the tracheal foreign body suction device of the present disclosure;

[0025] Fig. 3 is a schematic diagram of the base plate of the present disclosure;

[0026] In the drawings: 1 represents a breathing mask, 2 represents a suction device, and 3 represents a spotlight;

[0027] 11 represents a ventilation tube; 21 represents a handle, 22 represents a suction cup; 31 represents a lamp head, and 32 represents a switch;

[0028] 221 represents a base plate, 222 represents a connecting tube, 223 represents a groove, 224 represents an air outlet, 225 represents a one-way exhaust valve, and 226 represents a one-way inlet valve.

Specific Embodiments

[0029] In order to make the objectives, technical solutions and advantages of the examples of the present disclosure clearer, clear and complete descriptions of the technical solutions in the examples of the present disclosure are provided below in conjunction with the drawings of the examples. It is evident that the examples described below are only some examples of the present disclosure and not all examples. Based on the examples in the present disclosure, all other examples acquired by those of ordinary skill in the art without making inventive efforts shall fall within the scope of protection of the present disclosure.

[0030] Furthermore, the present disclosure is described in detail in conjunction with schematic diagrams. When describing the examples of the present disclosure, sectional views of the device structures are provided for clarity, with certain parts being enlarged for ease of explanation. These schematic diagrams are merely embodiments and should not be construed as limiting the scope of protection of the present disclosure. In addition, in actual production, the three-dimensional spatial dimensions, including length, width, and depth, should be included.

[0031] The following provides a detailed description of an example of the present disclosure in conjunction with the attached drawings.

[0032] Embodiment 1

[0033] Fig. 1 is a schematic diagram of a tracheal foreign body suction device of the present disclosure; Fig. 2 is an exploded schematic diagram of the tracheal foreign body suction device of the present disclosure; Fig. 3 is a schematic diagram of the base plate in the present disclosure. As shown in Figs. 1 to 3, the tracheal foreign body suction device comprises a breathing mask 1 and a suction device 2 that are used in combination, wherein the breathing mask comprises a ventilation tube 11, mounted through the breathing mask 1, with one end of the ventilation tube 11 located outside the breathing mask 1 and connected to the suction device 2, and the other end located inside the breathing mask 1;

[0034] The suction device 2 comprises a handle 21 and a suction cup 22 disposed below the handle 21, wherein the suction cup 22 is a cylindrical body with an open bottom, a base plate 221 is disposed at the open bottom of the cylindrical body, and the base plate 221 is equipped with an air outlet 224 and a connecting tube 222, a one-way exhaust valve 225 is disposed on the air outlet 224, with one end of the connecting tube 222 connected to the base plate 221, the other end extending inward into the cylindrical body and disposed with a one-way inlet valve 226; the dimensions of the connecting tube 222 match the dimensions of the ventilation tube 11.

[0035] In Fig. 3, the arrows indicate the direction of airflow.

[0036] A tracheal foreign body suction method, using the tracheal foreign body suction device described above to carry out foreign body suction, comprises the following steps:

[0037] S10. attaching the breathing mask to the human face and inserting the ventilation tube into the connecting tube;

[0038] S20. pressing down the handle, driving the cylindrical body to press toward the face; the airflow created inside the cylindrical body flows downward, the one-way exhaust valve opens, the one-way inlet valve closes, and the airflow is discharged through the air outlet, creating a negative pressure inside the cylindrical body;

[0039] S30. pulling up the handle; the one-way exhaust valve closes, and the one-way inlet valve opens; under the effect of the negative pressure, the foreign body in the trachea is suctioned out therefrom.

[0040] In use, the present disclosure involves attaching the breathing mask 1 to the human face and inserting the ventilation tube 11 into the connecting tube 222. By pressing down the handle 21, the cylindrical body is driven to compress toward the face, creating a downward airflow inside the cylindrical body. The one-way exhaust valve 225 opens, the one-way inlet valve 226 closes, and the airflow is discharged through the air outlet 224, generating negative pressure inside the cylindrical body. After pulling up the handle 21, the one-way exhaust valve 225 closes and the one-way inlet valve 226 opens. Under the effect of negative pressure, foreign bodies in the human trachea are suctioned out. The present disclosure is simple to operate, effectively removes foreign bodies from the trachea, and is highly practical.

[0041] Specifically, in this example, the outer edge of the breathing mask 1 is made of medical-grade silicone and is shaped to fit the face. Both the breathing mask 1 and the suction device 2 are made of transparent materials, allowing for easy observation of whether the foreign body has been suctioned out.

[0042] Furthermore, the base plate 221 and the connecting tube 222 are an integrally formed structure.

[0043] Moreover, the cylindrical body is made of a deformable elastic material, such as rubber.

[0044] In this example, the dimensions of the connecting tube 222 match those of the ventilation tube 11, specifically: the diameter of the ventilation tube 11 is slightly larger than that of the connecting tube 222, such that after the connecting tube 222 is inserted into the ventilation tube 11, the outer wall of the connecting tube 222 is in close contact with the inner wall of the ventilation tube 11, thereby improving the airtightness of the suction device.

[0045] In addition, to improve performance, the handle can be repeatedly pressed down and pulled up to generate a higher negative pressure inside the suction device until the foreign body is removed.

[0046] Embodiment 2

[0047] On the basis of Embodiment 1, a spotlight 3 is provided inside the handle 21 of the tracheal foreign body suction device, the lamp head 31 of the spotlight 3 is located at the connection between the bottom of the handle 21 and the suction cup 22, and the switch 32 of the spotlight 3 is located on the outer surface of the handle 21.

[0048] In this example, when the spotlight 3 is turned on, the light emitted from the lamp head 31 passes through the suction cup and illuminates the inside of the mask, allowing the user to conveniently observe the location of foreign bodies in the oral cavity, thereby facilitating the foreign body suction process.

[0049] Embodiment 3

[0050] On the basis of Embodiment 1, a cylindrical body of the tracheal foreign body suction device comprises: a plurality of grooves 223 arranged sequentially from top to bottom, the groove 223 at the topmost position is connected to the handle 21, and the groove 223 at the bottommost position is connected to the base plate 221.

[0051] Specifically, the grooves 223 are spaced equidistantly.

[0052] In Embodiment 3, the cylindrical body comprises a plurality of grooves 223 arranged sequentially from top to bottom. The arrangement of the grooves 223 increases the elastic stretchability of the cylindrical body and enhances the airflow mobility within the cylindrical body, allowing for the rapid formation of negative pressure inside the suction device.

[0053] In summary, the tracheal foreign body suction device and method provided by the present disclosure enable easy suction of foreign bodies, are user-friendly, easy to promote, and highly practical.

[0054] In the description of the present disclosure, it should be understood that the terms “center,” “longitudinal,” “transverse,” “length,” “width,” “thickness,” “upper,” “lower,” “front,” “back,” “left,” “right,” “vertical,” “horizontal,” “top,” “bottom,” “inside,” “outside,” “clockwise,” “counterclockwise,” “axial,” “radial,” “circumferential,” and the like are based on the orientational or positional relationships indicated by the attached drawings. They are only for the convenience of describing the present disclosure and simplifying the description, and are not for indicating or implying that the device or element referred to must have a specific orientation or be constructed and operated in a specific orientation. Therefore, they shall not be construed as limitations of the present disclosure.

[0055] Furthermore, the terms “first” and “second” are for descriptive purposes only and should not be understood as indicating or implying relative importance or implicitly indicating the number of technical features indicated. Thus, features defined as “first” and “second” may explicitly or implicitly include at least one of such features. In the description of the present disclosure, “plurality” means at least two, such as two, three, and so on, unless specifically defined otherwise.

[0056] In the present disclosure, unless otherwise explicitly specified and defined, the terms “install,” “connected,” “connecting,” “fixed,” and the like shall be broadly interpreted. For example, they may refer to fixed connections or detachable connections, or integration into a single unit; refer to mechanical connections or electrical connections; refer to direct connections or indirect connections through an intermediate medium; or refer to connections involving internal elements between two components or the interaction between two components, unless otherwise explicitly specified. The specific meaning of the above terms in the present disclosure may be understood by those skilled in the art based on the specific situation.

[0057] Throughout the description of the present Specification, reference to the terms “one example,” “some examples,” “embodiments,” “specific examples,” “some examples,” and the like, means that specific features, structures, materials, or characteristics described in connection with the example or embodiment are included in at least one example or example of the present disclosure. In the present Specification, schematic representations of the above terms are not necessarily meant to refer to the same example or embodiment. Moreover, the specific features, structures, materials, or characteristics described may be combined in a suitable manner in any one or a plurality of examples or embodiments. Furthermore, those skilled in the art may combine and integrate different examples or embodiments described in the present Specification, as well as the features of various examples or embodiments under non-contradictory circumstances.

[0058] In the above examples, each example is described with its own focus. Any parts that are not detailed in one example can be found in the relevant descriptions of other examples.

[0059] Finally, it should be noted that the above examples are provided to illustrate the technical solutions of the present disclosure and are not intended to limit them. Although the present disclosure has been described in detail with reference to the aforementioned examples, those of ordinary skill in the art should understand that they can still make modifications to the technical solutions described in the various aforementioned examples or make equivalent substitutions for some or all of the technical features. Such modifications or substitutions do not cause the essence of the corresponding technical solutions to depart from the scope of the technical solutions of the examples of the present disclosure.

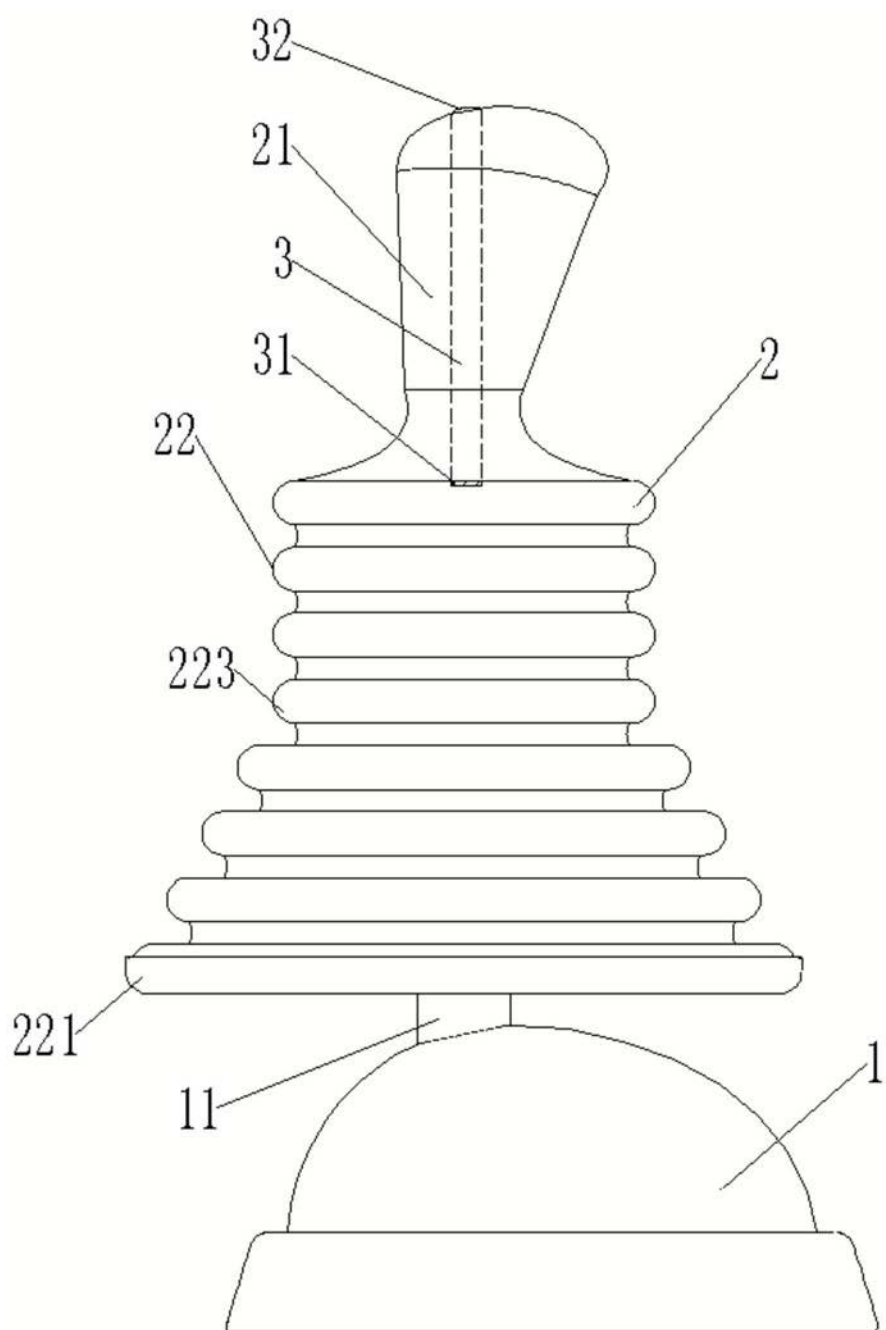


Fig. 1

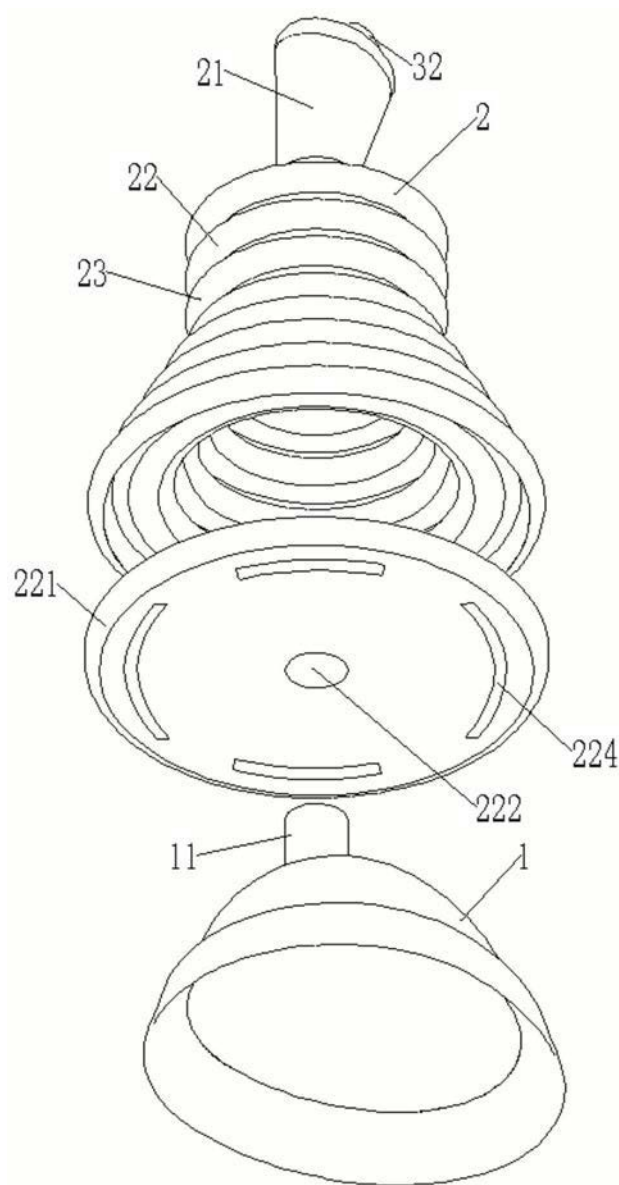


Fig. 2

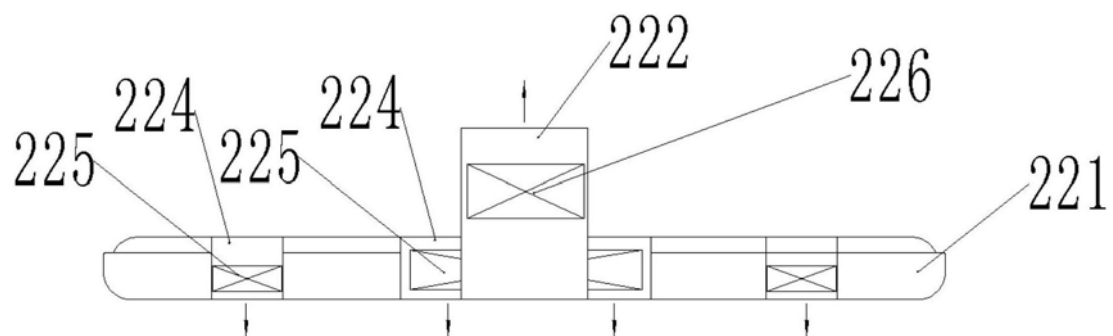


Fig. 3

Declaration of Translation

I, Vivian Khaw hereby declare:

I am qualified to translate documents from Chinese to English;

Master of Arts in Translation and Interpretation;

I have over 6 years of work experience in the Field of Translations;

I translated the “CN112932633A” from Chinese into English and to the best of my knowledge and belief, the attached Document CN112932633A is a true and accurate translation from Chinese into English;

I also declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001, and may jeopardize the validity of the application or any patent issuing thereon.

Dated: [January 8, 2025]