(19) Korean Intellectual Property Office (KR)

(12) Registered Patent Publication (B 1)

(45) Publication Date March 18, 2021
(11) Registration Number 10-2229619
(24) Registration Date March 12, 2021

(51) International Patent Classification (Int. Cl.)
A61B 17/50 (JANUARY 2006) ***A61B 17/24*** (JANUARY 2006) ***A61M 1/00*** (JANUARY 2006)

(52) CPC Patent Classification
A61B 17/50 (January 2013)
A61B 17/24 (January 2013)

(21) Application No. **10-2021-0004323**

(22) Application Date **January 13, 2021**
Examination Request Date **January 13, 2021**

(56) Document of prior technology investigation
US4971053 A*
JP2004016460 A*
US04971053 A*
KR1020190088668 A
* Literature cited by the examiner

(73) Patentee
Yuchang Bio Co., Ltd.
28, 506, Hwangsaeul-ro 200beongil, Bundang-gu, Seongnam-si, Gyeonggi-do (Sunaedong, Owner's Tower)

(72) Inventor
Hyun Ho Lee
35, 193beongil, Jukjeon-ro, Suji-gu, Yongin-si, Gyeonggi-do, 101-dong, 1502ho (Jukjeon-dong, Seonghyeon Village Peninsula Yubora)

(74) Representative
Name of patent corporation

Total number of claims: Total of 7 claims

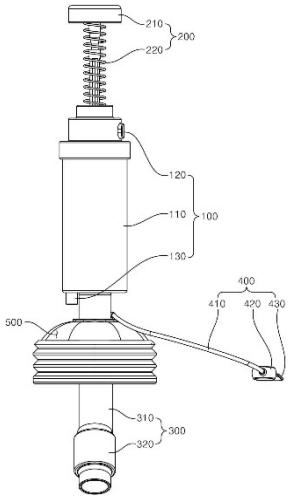
Examiner: Sang Woo Kim

(54) Title of the invention **Device that removes foreign substances from the esophagus**

(57) Summary

The present invention relates to a device for removing foreign substances in the esophagus, and more particularly to a device for removing foreign substances in the esophagus characterized by including a negative pressure generator (100) in which a pneumatic veil is created by the release or introduction of air; a pressurized component (200) connected to one side of the negative pressure generator (100) to exhaust or inflow air within the negative pressure generator (100); an insertion tube (300) connected to the other side of the negative pressure generator (100) and inserted into the mouth cavity of a person with an obstruction of the esophagus; and a close-fitting mask (500) connected to the mouth of a person with an obstruction of the esophagus, wherein the insertion tube (300) is engaged in a structure therethrough.

Representative Drawing - FIG. 1



(52) CPC Patent Classification
A61M 1/0003 (January 2013)
A61B 2217/005 (January 2013)
A61M 2210/105 (January 2013)

Specification

Claims

Claim 1

A device for removing foreign substances from an esophagus, characterized by comprising: a negative pressure generating unit (100) for generating vacuum pressure by discharging or introducing air
a pressurizing unit (200) connected to one side of the negative pressure generating unit (100) for discharging or introducing air inside the negative pressure generating unit (100)

an insertion tube (300) connected to the other side of the negative pressure generating unit (100) for insertion into the oral cavity of a person with an esophageal obstruction;
and a close-fitting mask (500) connected in a structure through which the insertion tube (300) penetrates and is sealed around the oral cavity of a person with an esophageal obstruction,

wherein the insertion tube (300) includes a main tube (310) having a predetermined inner diameter and length, a volumetric deformation part (320), and a check valve (330) located at one side opening of the main tube (310) to block air inside the case (110) from moving to the main tube (310) while allowing air sucked from the esophagus to pass through, and the volumetric deformation part (320) is provided on the outside of the other end of the main tube (310) so that the insertion tube (300) can be in close contact with the esophagus, wherein an air control unit (400) for supplying or discharging air to the volumetric deformation part (320) is included, the air control unit (400) includes an air transport tube (410) having one end connected to the volumetric deformation part (320), an air opening/closing unit (420) connected to the other end of the air transport tube (410) and having a mobile component (424) built in for opening and closing an air movement passage, and a stopper unit (430) for controlling air entry and exit to the air opening/closing unit (420),

wherein the air opening/closing unit (420) includes an opening/closing unit body (421) having a predetermined volume and being capable of volume change, a cylindrical first port (422) provided on one side of the opening/closing unit body (421) and having a first protrusion (422(a)) formed on an outer surface and a second protrusion (422(b)) formed on an inner surface, a second port (423) provided on the other side of the opening/closing unit body (421) and connected to the air transport tube (410), a moving member (424) accommodated inside the first port (422) and opening/closing an air passage inside the first port (422), and a fifth elastomer (425) for inducing linear movement of the mobile component (424),

and wherein the stopper (430) includes a stopper body (431) of a flat structure having an incision (431') cut in a predetermined shape inward from one edge, a catch protrusion (432) provided at a predetermined position of the incision (431') to be connected with the first protrusion (422(a)) of the first port (422),

and an extension protrusion (433) provided at a predetermined position of the cut part (431') to be in close contact with one side of the mobile component (424) of the first port (422).

Claim 2

Deleted

Claim 3

Deleted

Claim 4

Deleted

Claim 5

The device for removing foreign substances from the esophagus of Claim 1,
characterized in that the negative pressure generating unit (100) includes a cylindrical case (110) having an empty interior, a button (120) positioned so as to protrude at a predetermined height on one outer side of the case (110), and an air outlet (130) provided on the other outer side of the case (110).

Claim 6

The device for removing a foreign body from the esophagus of Claim 5,

characterized in that the button (120) includes a button body (121) including a through-hole (121(a)) having a predetermined inner diameter, a first protrusion (121(b)) positioned to protrude a predetermined length from the inner surface of the through-hole (121(a)), and a second protrusion (121(c)) positioned to protrude a predetermined length toward the outside of one side; and a first elastomer (122) positioned in a shape that surrounds the outer surface of the second protrusion (121(c)).

Claim 7

The device for removing foreign substances from the esophagus of Claim 5,

characterized in that an air exhaust element (131) capable of discharging air inside the case (110) and blocking the inflow of external air is accommodated in the air outlet (130).

Claim 8

The device for removing foreign substances from the esophagus, of Claim 6,

characterized in that the pressurized component (200) includes a pressurized section (210) capable of piston movement within the case (110) so as to discharge air within the case (110) to the outside or generate suction force in the insertion tube (300), a second elastomer (220) mounted on one side of the pressurized section (210), and a third elastomer (230) located on the other side of the pressurized section (210).

Claim 9

The device for removing a foreign body from the esophagus of Claim 8,

characterized in that the pressurized component (210) comprises a support axis (211) having a cylindrical shape with a predetermined diameter and a catch (211') provided at a predetermined position on one side, a disc-shaped sealing plate (212) positioned at one end of the support axis (211) and having a diameter relatively larger than the diameter of the support axis (211), and a handle (213) positioned at the other end of the support axis (211) and having a diameter relatively larger than the diameter of the support axis (211),

and the second elastomer (220) is positioned between the sealing plate (212) and the handle (213), and the third elastomer (230) is in close contact with the outer surface of the sealing plate (212).

Claim 10

The device for removing foreign substances from the esophagus of Claim 9,

characterized in that the first protrusion (121(b)) of the button body (121) is settled on or released from the catch (211') of the pressurized component (210), thereby controlling the vertical movement of the pressurized component (210).

Description of Invention

Technical Field

[0001] The present invention relates to a device that removes foreign substances from the esophagus, and more particularly to a device that removes foreign substances from the esophagus that can be removed using suction when food, foreign substances, etc. are trapped in the human esophagus and breathing is difficult.

Prior Art

[0003] Esophageal food impaction is one of the most common and very dangerous emergencies in gastroenterology. Esophageal food impaction sometimes occurs acutely, with patients complaining of chest pain or pressure, inability to swallow, painful swallowing, sensation of choking, and neck pain or throat pain.

[0004] As a prior art for emergency response to food blockage in the esophagus, an esophageal foreign body removal device is disclosed in Korean Patent Publication No. 2020-0102780.

[0005] The esophageal foreign body removal device according to the preceding literature includes a pressurized body configured to form a vacuum pressure through an outlet of air; an air outlet member configured on one side of the pressurized body, which allows the internal air to be exhausted externally according to the operation of the pressurized body, or to block the influx of the external sub-air to form a vacuum pressure; an air outlet member, which is detachably coupled with the air outlet member, and a crimp mask which adheres to the peri-oral area of a person whose esophagus is blocked and removes the foreign material blocked from the esophagus by vacuum pressure.

[0006] However, in the case of the above prior art, vacuum pressure is formed by relying only on the shape restorative power of the pressurized body, and there is also a problem that it is difficult to sufficiently respond depending on the type of foreign material or the degree of blockage because the crimping mask is located only around the mouth.

Prior art literature

Patent literature

[0008] (Patent Document 0001) Korean Publication No. 2020-0102780

Contents of the Invention

Problem to be Solved

[0009] The present invention is intended to solve the above-described problems, and it is intended to provide a device that removes foreign substances in the esophagus that can produce sufficient negative pressure to reliably and quickly release blocked foreign substances in the esophagus.

[0010] The present invention also aims to provide a device that removes foreign objects that is easy to operate and use.

Solution to the Problem

[0012] A device for removing foreign matter from the esophagus of the present invention for solving the above problem is characterized by including a negative pressure generator (100) in which a pneumatic veil is created by the release or introduction of air; a pressurized component (200) connected to one side of the negative pressure generator (100) to exhaust or inflow air within the negative pressure generator (100); an insertion tube (300) connected to the other side of the negative pressure generator (100) and inserted into the mouth cavity of a person with an obstruction of the esophagus; and a close-fitting mask (500) connected to the mouth of a person with an obstruction of the esophagus, wherein the insertion tube (300) is engaged in a structure therethrough.

[0013] It is also characterized that in a device that removes foreign matter from the esophagus of the present invention, the insertion tube (300) includes a main tube (310) having a predetermined inner diameter and length, a volumetric deformation part (320), and a check valve (330) located in one opening of the main tube (310) so that air inhaled from the esophagus can pass while blocking the movement of air inside the case (110) to the main tube (310), the volume modification (320) being provided outside the other end of the main tube (310) so that the insertion tube (300) can adhere to the esophagus.

[0014] In addition, the device for removing foreign substances from the esophagus of the present invention further includes an air control unit (400) for supplying or discharging air to or from the volumetric deformation part (320), wherein the air control unit (400) includes an air transport tube (410) having one end connected to the volume transforming unit (320), an air opening/closing unit (420) connected to the other end of the air transport tube (410) and having a moving member (424) built in for opening and closing an air movement passage therein, and a stopper unit (430) for controlling air entry and exit into the air opening/closing unit (420).

[0015] In addition, the device for removing foreign substances from the esophagus of the present invention is also characterized in that the air opening/closing unit (420) includes an opening/closing unit body (421) having a predetermined size of volume and capable of volume deformation, a cylindrical first port (422) provided on one side of the opening/closing part body (421) and having a first protrusion (422(a)) formed on the outer surface and a second protrusion (422(b)) formed on the inner surface, a second port (423)

provided on the other side of the opening/closing unit body (421) and connected to the air transport tube (410), a moving member (424) accommodated inside the first port (422) and opening/closing the air passage inside the first port (422), and a fifth elastomer (425) for inducing linear movement of the moving member (424), and the stopper (430) includes a stopper body (431) of a flat structure having an incision (431') cut in a predetermined shape in an inward direction from one edge, a catch protrusion (432) provided at a predetermined position of the incision (431') to be connected with the first protrusion (422(a)) of the first port (422), and an extension protrusion (433) provided at a predetermined position of the incision (431') to be in close contact with one side of the mobile component (424) of the first port (422).

[0016] The device for removing foreign substances from the esophagus of the present invention is also characterized in that the negative pressure generating unit (100) includes a cylindrical case (110) having an empty interior, a button (120) positioned so as to protrude at a predetermined height on one outer side of the case (110), and an air outlet (130) provided on the other outer side of the case (110).

[0017] The device for removing a foreign body from the esophagus of the present invention is also characterized in that the button (120) includes a button body (121) including a through-hole (121(a)) having a predetermined inner diameter, a first protrusion (121(b)) positioned to protrude a predetermined length from the inner surface of the through-hole (121(a)), and a second protrusion (121(c)) positioned to protrude a predetermined length toward the outside of one side; and a first elastomer (122) positioned in a shape that surrounds the outer surface of the second protrusion (121(c)).

[0018] The device for removing foreign substances from the esophagus of the present invention is also characterized in that an air exhaust element (131) capable of discharging air inside the case (110) and blocking the inflow of external air is accommodated in the air outlet (130).

[0019] The device for removing foreign substances from the esophagus of the present invention is also characterized in that the pressurized component (200) includes a pressurized section (210) capable of piston movement within the case (110) so as to discharge air within the case (110) to the outside or generate suction force in the insertion tube (300), a second elastomer (220) mounted on one side of the pressurized section (210), and a third elastomer (230) located on the other side of the pressurized section (210).

[0020] The device for removing a foreign body from the esophagus of the present invention is characterized in that the pressurized component (210) comprises a support axis (211) having a cylindrical shape with a predetermined diameter and a catch (211') provided at a predetermined position on one side, a disc-shaped sealing plate (212) positioned at one end of the support axis (211) and having a diameter relatively larger than the diameter of the support axis (211), and a handle (213) positioned at the other end of the support axis (211) and having a diameter relatively larger than the diameter of the support axis (211), and the second elastomer (220) is positioned between the sealing plate (212) and the handle (213), and the third elastomer (230) is in close contact with the outer surface of the sealing plate (212).

[0021] The device for removing foreign substances from the esophagus of the present invention is also characterized in that the first protrusion (121(b)) of the button body (121) is settled on or released from the catch (211') of the pressurized component (210), thereby controlling the vertical movement of the pressurized component (210).

Effects of Invention

[0023] According to a device that removes foreign substances in the esophagus according to the present invention, there is an advantage that the device is easy to operate to remove clogged foreign substances in the esophagus because the button is provided on the outside of the negative pressure generator where negative pressure is generated.

[0024] In addition, according to a device that removes foreign material from the esophagus according to the present invention, there is an advantage that the apical deformity is provided at one end of the insertion tube inserted into the mouth, which can increase the adhesion between the insertion tube and the esophagus, thereby improving the efficiency of removing foreign material.

[0025] In addition, there is an advantage that the device that removes foreign material from the esophagus according to the present invention can increase the reliability of the device because the negative pressure forming structure required for foreign material removal is implemented by the elastic utilizing the spring.

Brief description of the drawing

[0027] FIG. 1 is a perspective view of an esophageal foreign body removal device in accordance with a preferred embodiment of the present invention from one side.

FIG. 2 is a perspective view of an esophageal foreign body removal device in accordance with a preferred embodiment of the present invention from another side.

FIG. 3 is a cross-sectional view cut along line A-A′ of FIG. 2.

FIG. 4 is a perspective view of an air evacuation element in an esophageal foreign body removal device in accordance with a preferred embodiment of the present invention.

FIG. 5 is a perspective view showing the compressed pressurization member in an esophageal foreign body removal device according to a preferred embodiment of the present invention.

FIG. 6 is an enlarged perspective view of a pressurized part in an esophageal foreign body removal device according to a preferred embodiment of the present invention.

FIG. 7 is a cross-sectional view to describe the bonding structure of the pressurizing member with the button in an esophageal foreign body removal device according to a preferred embodiment of the present invention.

FIG. 8 is a perspective view of a bottom portion of an esophageal foreign body removal device in accordance with a preferred embodiment of the present invention, showing the appearance of the volume modification before expansion.

FIG. 9 is a perspective view of a bottom portion of an esophageal foreign body removal device in accordance with a preferred embodiment of the present invention, showing the appearance of the volume modification after expansion.

FIG. 10 is a perspective view for describing the operating state of a check valve in an esophageal foreign body removal device according to a preferred embodiment of the present invention.

FIG. 11 is a perspective view for describing a removable structure of an air opening and a stopper in an esophageal debris device in accordance with a preferred embodiment of the present invention.

FIG. 12 is a cross-sectional view to describe the air flow in the air opening according to the removal of the stopper in an esophageal foreign body removal device according to a preferred embodiment of the present invention.

Specific details for implementing the invention

[0028] It should be understood that the terms “include,” “have,” or “equip” in this application are intended to specify the presence of a feature, number, step, component, part, or combination thereof described in the specification, and do not exclude in advance the possibility of the presence or addition of one or more other features, numbers, steps, operations, components, parts, or combinations thereof.

[0029] When it is said that a component is “connected” or “coupled” to another component, it should be understood that it may be directly connected or connected to that other component, but that there may be other components in the middle. On the other hand, when it is mentioned that a component is “directly connected” or “directly connected” to another component, it will be understood that no other component exists in the middle. Other expressions that describe the relationship between components, such as “between” and “directly between” or “adjacent to” and “directly adjacent to”, should be interpreted similarly.

[0031] Hereinafter, a device for removing foreign substances from the esophagus according to the present invention will be described with reference to the attached drawings.

[0032] FIG. 1 is a perspective view of an esophageal foreign body removal device according to a preferred embodiment of the present invention on one side, FIG. 2 is a perspective view of an esophageal foreign body removal device according to a preferred embodiment of the present invention on the other side, FIG. 3 is a cross-sectional view cut along line A-A′ of FIG. 2 and FIG. 4 is an attempt to buy an air exhaust element in an esophageal foreign body removal device according to a preferred embodiment of the present invention.

[0033] As shown in FIGS. 1-3, esophageal debridement devices according to the present invention are constructed including a negative pressure generating portion (100) in which vacuum pressure is generated by the evacuation or evacuation of air, a pressurized section (200) for evacuation or evacuation of air within the negative pressure generating portion (100), an insertion tube (300) inserted into the mouth of a person with a blocked formula, an air control unit (400) and a close mask (500) that is close to the mouth periphery.

[0034] To describe the above configurations in detail, first the negative pressure generator (100) is configured including a keeper (110) having an empty circular shape inside, a button (120) positioned protruding at a height to one outward side of the case (110), and an air outlet (130) provided on the other side of the case (110).

[0035] Here, the button (120) is configured to hold the press (200) compressed or return the pressurized section (200) to its original position, wherein when the pressurized section (200) is compressed and released, a negative pressure is formed momentarily inside the case (110) and the foreign material is suctioned out with the insertion tube (300) inserted into the vicinity of the airways of the mouth by such negative pressure, and the detailed configuration related to the button (120) for performing the above functions will be described below.

[0036] And the air outlet (130) corresponding to the passage through which air is exhausted inside the case (110) is housed with the air

exhaust element (131) as shown in FIG. 4. When the pressurized section (200) is compressed, the air inside the case (110) must be rapidly discharged to the outside with limited movement to the insertion tube (300), for which the air exhaust element (131) is a cylindrical shape on the top part through, and the bottom part is a nip shape with a lower cross-sectional area and an ejection section (131') which is cut straight through and close to each other.

[0037] Here, it is preferred that the air exhaust element (131) consists of an elastic material, such as silicon or rubber, because the ejection section (131′) is easily opened when the air of the case (110) is vented, and it is advantageous to prevent the outside air from entering the ejection section (131′) when the inside of the case (110) is under negative pressure.

[0038] On the other hand, when the pressurized section (200) is compressed, it will be described below in relation to a configuration that restricts the movement of air inside the case (110) to the insertion tube (300).

[0039] FIG. 5 is a perspective view showing the compressed state of the pressurized component in an esophageal foreign body removal device according to a preferred embodiment of the present invention, and FIG. 6 is an enlarged perspective view of the pressurized component in an esophageal foreign body removal device according to a preferred embodiment of the present invention.

[0040] The pressurized section (200) for evacuating or entering air inside the negative pressure generation part (100) is exposed to outside the negative pressure generation part (100) on one side and, more particularly, outside of the negative pressure generation part (100), except for the lower part, but when compressed, the remaining parts are connected in a form that is received inside the negative pressure generation part (100).

[0041] Such a pressurized section (200) is configured by including a pressurized component (210) capable of piston movement inside the case (110), a second elastomer (220) such as a coil spring mounted on one side of the pressurized component (210), and a third elastomer (230) such as a coil spring located on the other side of the pressurized component (210) so as to allow air inside the case (110) to escape out or generate suction power on the insertion tube (300).

[0042] To describe the pressurized component (210) in more detail, include a support axis (211) with a cylindrical shape having a diameter and length, one side with a slightly depressed catch (211′) at a predetermined position, a sealing plate (212) on a disc having a diameter that is relatively larger than the diameter of the support axis (211) at one end of the support axis (211), and a handle (213) having a diameter that is relatively larger than the diameter of the support axis (211) at the other end of the support axis (211) (see Figure 6).

[0043] Also, the second elastomer (220) described above is positioned between the sealing plate (212) and the handle (213), and the third elastomer (230) is positioned in a form that fits one side with the outer surface of the sealing plate (212) while the other side is positioned in a form that fits the lower inner surface of the case (110).

[0044] On the other hand, it is desirable to have additional packings (212′) around the sealing plate (212) on the disc to ensure that the airtightness between the inside of the case (110) and the sealing plate (212) is maintained.

[0045] FIG. 7 is a cross-sectional view to describe the bonding structure of the pressurizing member with the button in an esophageal foreign body removal device according to a preferred embodiment of the present invention.

[0046] A button (120) positioned slightly protruding on the case (110) upper outer surface is configured including a button body (121) and a first elastomer (122), such as a coil spring. Specifically, the button body (121) is constructed including a through-hole (121(a)) having a predetermined inner diameter, a first protrusion (121(b)) positioned to protrude a predetermined length from the inner surface (121(a)), and a second protrusion (121(c)) positioned to protrude a predetermined length from the outer surface of one side, wherein the first elastomer (122) is positioned in a shape circumscribing the outer surface of the second protrusion (121(c)).

[0047] Briefly describing the principle of controlling movement of the pressurized component (210) by a button (120) having the above configuration, where the press member (210) is not compressed, the first protrusion (121(b)) of the button body (121) is located below the support axis (211) (Figure 7(a)), and when the support axis (211) is moved and compressed into the case (110), the first protrusion (121(b)) of the button body (121) rests on the catch (211′) of the additive (210) to prevent the press member (210) from returning to its original position (FIG. 7(b)).

[0048] When the button (120) is pressed while the pressurized component (210) is compressed, the first protrusion (121(b)) moves left in the figure so that the pressurized component (210) is restored to its original position by the third elastomer (230), where a temporary negative pressure occurs inside the case (110).

[0049] FIG. 8 is a perspective view of a bottom portion of an esophageal foreign body removal device in accordance with a preferred embodiment of the present invention, showing a view before the volumetric deformation part is expanded, FIG. 9 is a perspective view of a bottom portion of an esophageal foreign body removal device in accordance with a preferred embodiment of the present invention showing a view after the volumetric deformation part is expanded, and FIG. 10 is a perspective view for describing the operating state of the check valve in the esophageal foreign body removal device in accordance with a preferred embodiment of the

present invention.

[0050] Referring together to FIGS. 3, 8-10, it is to be described with respect to the insertion tube (300), the air control unit (400), and the close-fitting mask (500) that conforms around the mouth .

[0051] The insertion tube (300) is configured to include a main tube (310) having a predetermined inner diameter and length, a volumetric deformation part (320), and a check valve (330) that blocks air inside the case (110) from moving to the main tube (310) while allowing air sucked from the esophagus to pass through.

[0052] The length and outer diameter of the main tube (310) are not particularly limited if it can be inserted into parts of the mouth and esophagus of a person, and the morphological deformation (contraction by negative pressure) does not occur when the inside of the case (110) is under negative pressure, and the quality of the resuscitation is somewhat flexible.

[0053] The volumetric deformation part (320) is provided outside the other end of the main tube (310) to induce confidentiality with the esophagus and insertion tube (300).

[0054] Also, unlike the main tube (310), it is desirable to consist of an elastic material so that the volume can be deformed by the outlet of air, and it is more desirable to be able to restore the original volume (appearance) when exposed to atmospheric pressure in a constricted state.

[0055] In other words, as in FIG. 8, the volume modification part (320) was constricted before inserting the main tube (310) into the mouth, but the outer side of the volumetric deformation part (320) and the esophagus remained tight by supplying and expanding air to the volumetric deformation part (320) with the end of the main tube (310) positioned in the esophagus.

[0056] On the other hand, a check valve (330) for controlling air movement in only one direction is located in the main tube (310) one-sided opening, in particular in the case (110) opposite the volumetric deformation part (320), while blocking air movement to the main tube (310) when the air in the case (110) is vented, and opening the main tube (310) is actuated when the case (110) is under negative pressure.

[0057] As illustrated in FIG. 10, the check valve (330) comprises a cylindrical valve body (331) having an outer diameter or inner diameter similar to that of the main tube (310), a pair of semicircular valves (332) positioned facing each other on the inside of the valve body (331) so as to open or close the flow of air, a pair of first support rods (333) for limiting the radius of movement of the semicircular valves (332), a second support rod (334) for connecting a predetermined portion of the pair of semicircular valves (332) to the valve body (331) in a hinge structure, and a fourth elastomer (335) for controlling the valve (332) to be in an open state only when a negative pressure is formed inside the case (110).

[0058] Here, a part of the center of the fourth elastomer (335) is a coil shape that wraps around the second support rod (334), and both ends are in close contact with a pair of semicircular valves (332), respectively. FIG. 10(a) shows a state in which air flow is blocked by a pair of semicircular valves (332), and FIG. 10(b) shows an open state in which air flow is permitted.

[0059] The close-fitting mask (500) is designed to adhere to the peri-oral area of the mouth of a person with a blocked esophagus and maintain maximum confidentiality. In the middle, it is fastened with a structure through which the insertion tube (300) penetrates. Here, although the material of the close-fitting mask (500) is not particularly limited, it is desirable to be a silicone or rubber material having a certain elastic force such that it has excellent adhesion with the peri-oral cavity.

[0060] Meanwhile, reference numeral 311 is formed as a seat groove in a form that is recessed in a certain depth on the outside of the main tube (310), which is a configuration to allow the air transport tube (410) to be seated along the longitudinal direction of the main tube (310) to be described below.

[0061] The following is described with respect to an air control unit (400) for supplying or evacuating air to the volumetric deformation part (320).

[0062] FIG. 11 is a perspective view for explaining the detachable structure of the air opening/closing unit and the stopper in an esophageal foreign body removal device according to a preferred embodiment of the present invention, and FIG. 12 is a cross-sectional view for explaining the air flow within the air opening/closing unit according to the detachable structure of the stopper in an esophageal foreign body removal device according to a preferred embodiment of the present invention.

[0063] Referring together to FIGS. 9, 10, 11, and 12, the air control unit (400) is configured including an air transport tube (410), an air opening/closing unit (420), and a stopper (430).

[0064] First, when we first describe the air transport tube (410), one side acts as a moving passageway of air by connecting to the air opening/closing unit (420) and the other side to the volumetric deformation part (320).

[0065] An air opening/closing unit (420) connected to one side of an air movement pipe (410) is configured to block or allow the flow of

air, and includes an opening/closing unit body (421) made of a material having a predetermined volume and a deformable volume, a cylindrical first port (422) provided on one side of the opening/closing unit body (421) and having a first protrusion (422(a)) formed on the outer surface and a second protrusion (422(b)) formed on the inner surface, a second port (423) provided on the other side of the opening/closing unit body (421) and connected to the air transport tube (410), a moving member (424) accommodated inside the first port (422) and opening/closing an air passage inside the first port (422), and a fifth elastomer (425) such as a coil spring for inducing a linear movement of the mobile component (424).

[0066] Here, the moving member (424) may comprise a center pin (424(a)) having a predetermined inner diameter and a pair of block pins (424(b)) provided at both ends of the center pin (424(a)).

[0067] A stopper (430) for controlling air inflow and outflow into an air opening/closing unit (420) is configured to include a stopper body (431) having a flat structure in which an incision (431′) is formed in a predetermined shape from one edge toward the inside, a catch protrusion (432) provided at a predetermined position in the incision (431′) to be connected with a first protrusion (422(a)) of a first port (422), and an extension protrusion (433) provided at a predetermined position in the cut portion (431′) to be in close contact with one side of a mobile component (424) of the first port (422).

[0068] To briefly explain the operating principle of the air control unit (400) having the structure as described above, the main tube (310) is inserted into the oral cavity while the volumetric deformation part (320) is in a contracted state, that is, the stopper (430) is coupled to the air opening/closing unit (420) as shown in FIG. 12(a), and then the plug unit (430) is separated from the air opening/closing unit (420) (FIG. 12(b)).

[0069] The mobile component (424) is then moved by the fifth elastomer (425), and thus the block pin (424(b)) which was blocking the air passage of the opening/closing unit body (421) is also moved together, thereby freeing the outlet of air through the opening of the first port (422) (FIG. 12(b)).

[0071] The following is a brief description of how to use a device that removes foreign matter from the esophagus of the present invention having the above configuration.

[0072] First, the pressurized component is pressed to operate so that the first protrusion of the button body catches on the catch of the pressurized component, and the volumetric deformation part is contracted to attach the stopper to the air opening/closing unit.

[0073] The insertion tube is pushed into the mouth of an emergency patient with a foreign body stuck in the esophagus, and when the volumetric deformation part of the insertion tube is located near the esophagus, the stopper connected to the air opening/closing unit is separated to expand the volume deformation part.

[0074] Next, when the button body is pressed, the first protrusion is released from the catch of the pressurized component, and the pressurized component returns to its original position. At this time, the foreign substance blocking the esophagus is discharged through the insertion tube by the negative pressure generated momentarily.

[0076] As described in detail above, for those of ordinary skill in the art, such sphere volumetric technology is only a preferred embodiment, and is not thereby limited to the scope of the invention, and it is apparent to those skilled in the art that various changes and modifications are possible within the scope and spirit of the invention, and it is also natural that such modifications and modifications fall within the appended claims.

Description of references

[0078] 100: Negative pressure generation unit

110: Case

120: Button

121: Button body

121(a) : Through-hole
121(b): First protrusion
121(c) : Second protrusion

122: First elastomer

130 : Air outlet

131: Air exhaust element
131': Ejection section

200 : Pressurized section

210: Pressurized component

211: Support axis
211': Catch

212: Sealing plate
212': Packing

213: Handle

220: Second elastomer

230: Third elastomer

300 : Insertion tube

310: Main tube

311: Seat groove

320 : Volumetric deformation part

330: Check valve

331: Valve body

332: Valve

333: First support rod

334: Second support rod

335: Fourth elastomer

400 : Air control unit

410: Air transport tube

420: Air opening unit

421: Opening unit body

422: First port

422(a) : First protuberance

422(b): Second protuberance

423: Second port

424: Mobile component

424(a) : Center pin

424(b): Block pin

425: Fifth elastomer

430: Stopper

431: Stopper body

431': Incision

432: Catch protrusion

433: Extended swivel

500 : Close-fitting mask

Drawings

FIG. 1

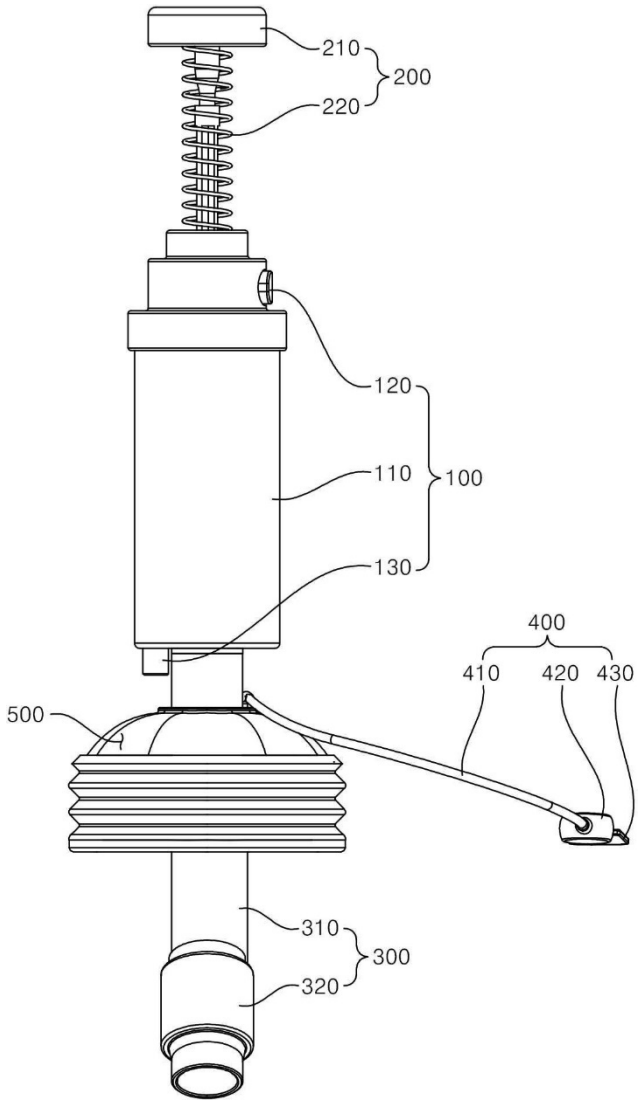


FIG. 2

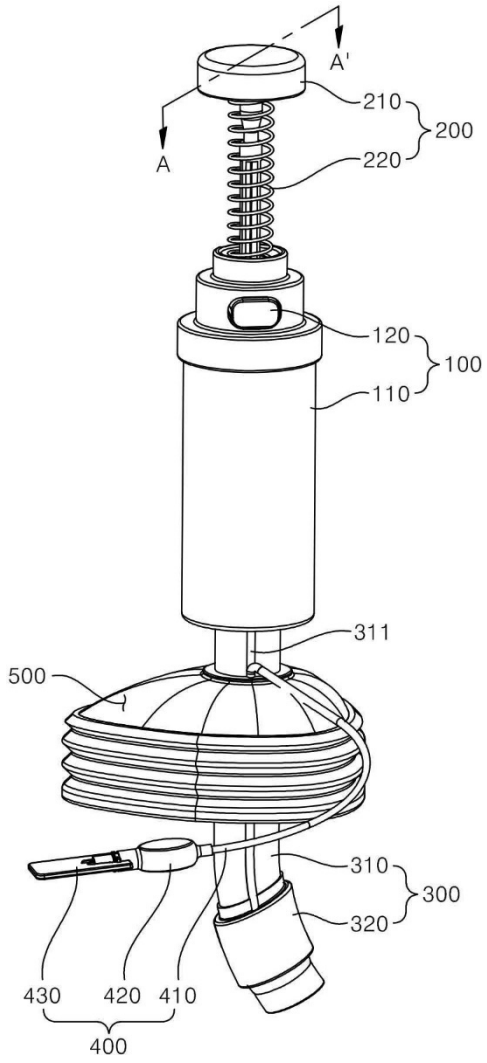


FIG. 3

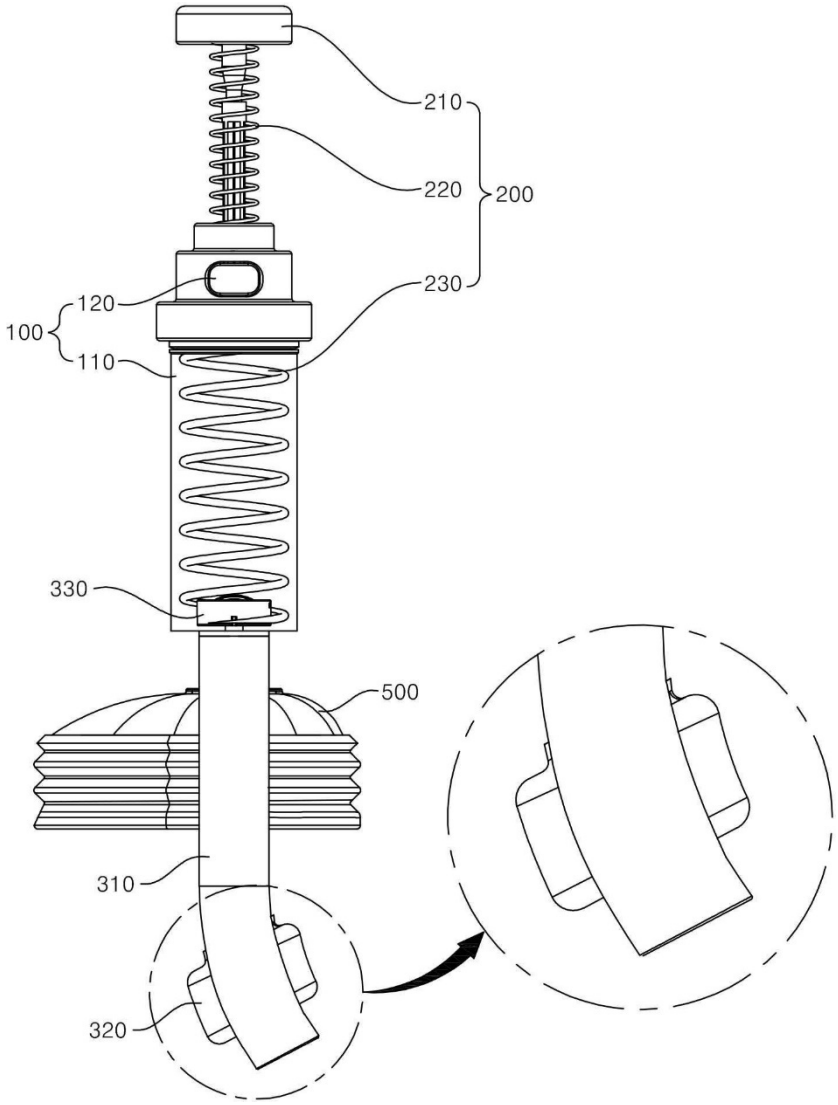


FIG. 4

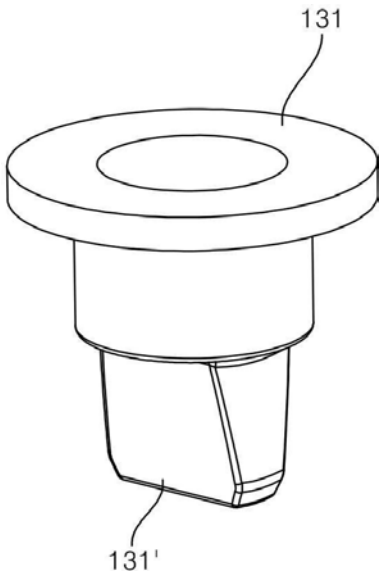


FIG. 5

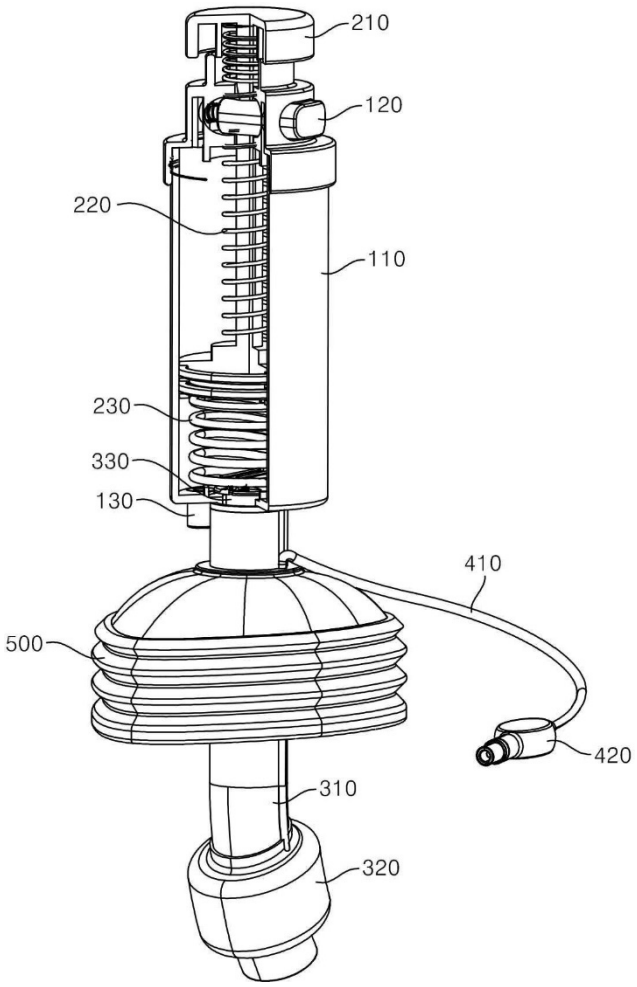


FIG. 6

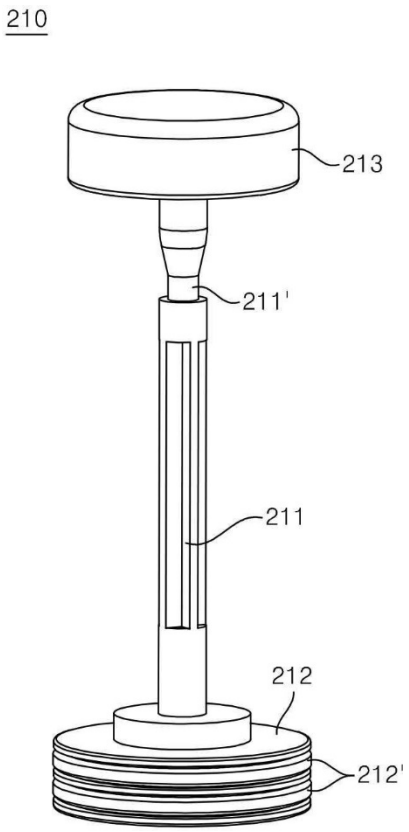


FIG. 7

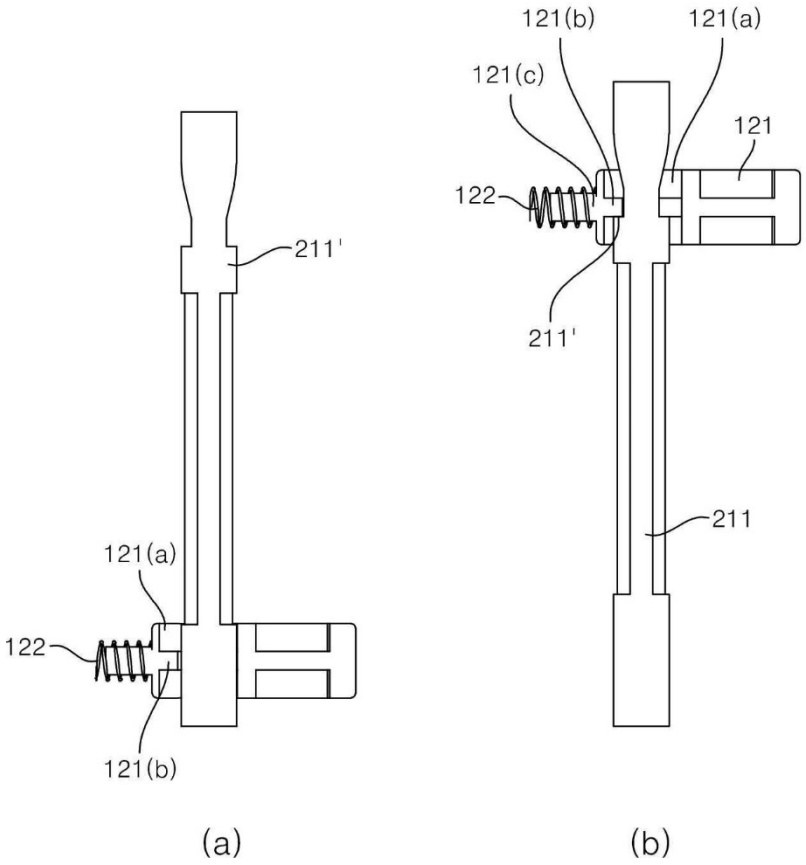


FIG. 8

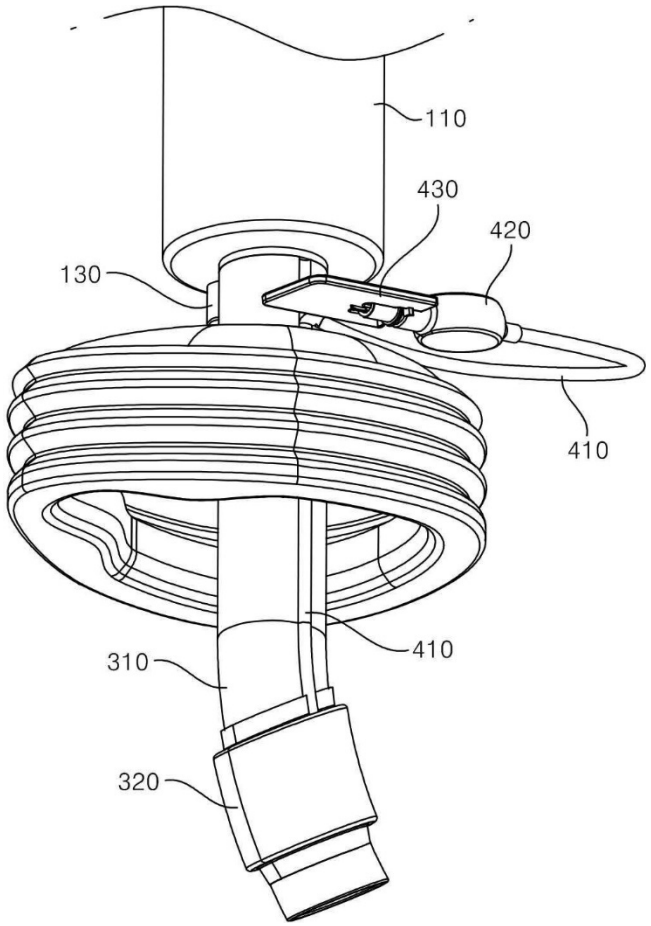


FIG. 9

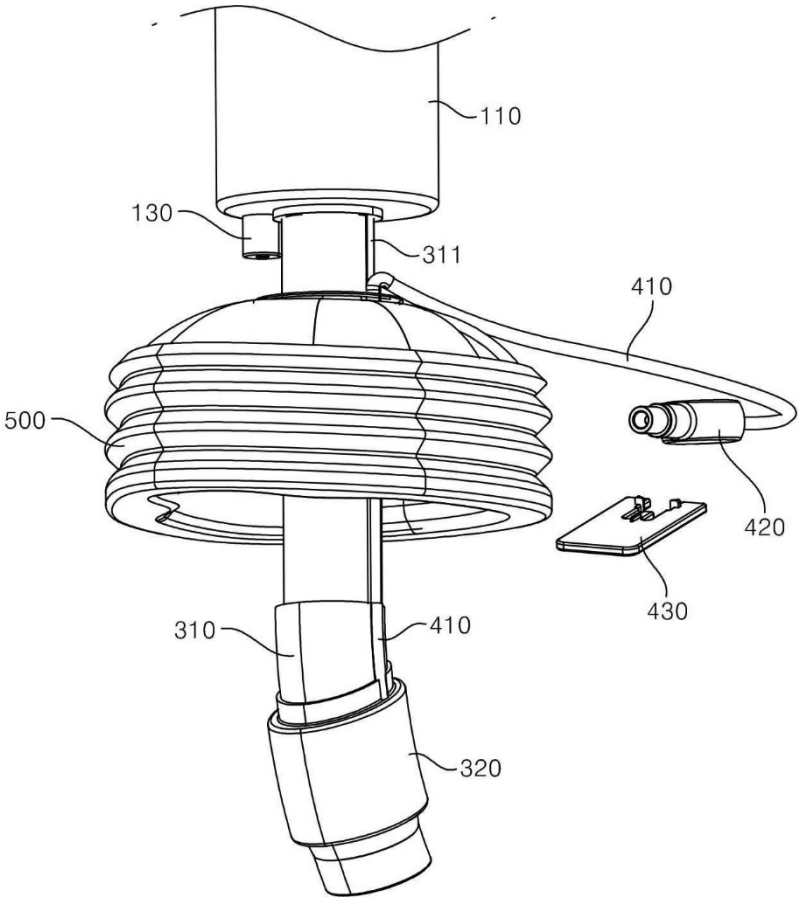

110
130
311
410
500
420
430
310
410
320

FIG. 10

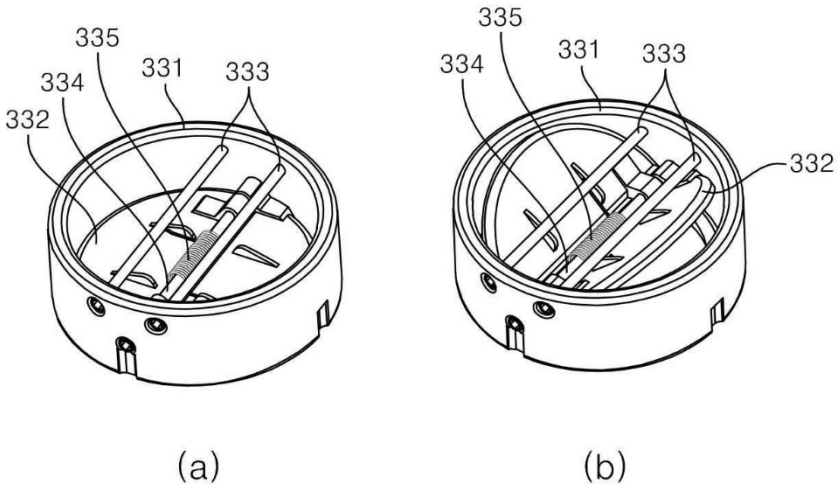

335
331
333
334
332
335
331
333
334
332
(a)
(b)

FIG. 11

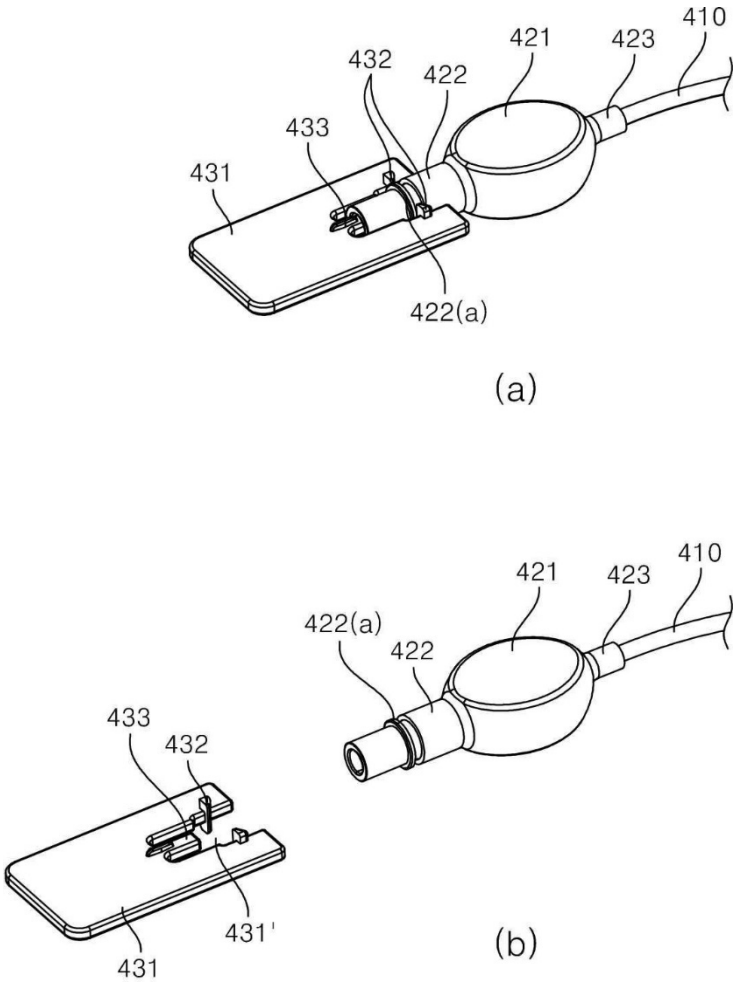
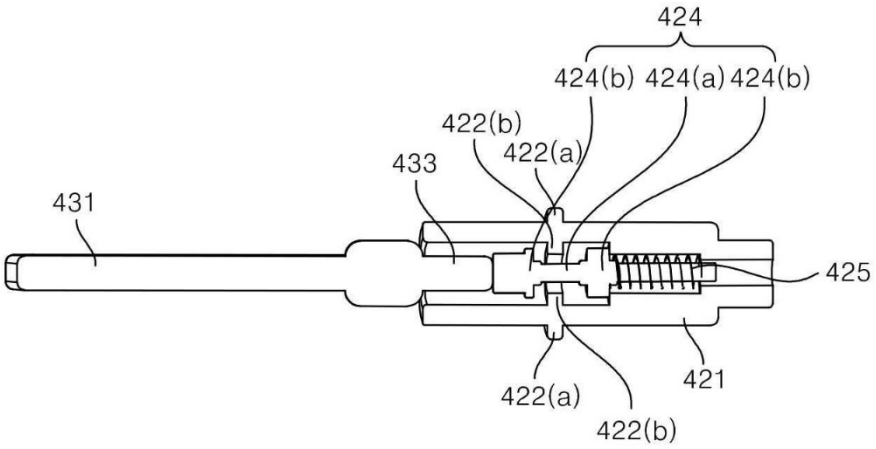
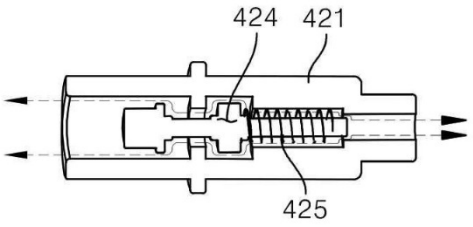

410
421
423
432
422
433
431
422(a)
(a)
421
423
410
422(a)
422
433
432
431'
431
(b)

FIG. 12



(a)



(b)

[Examiner's Ex Officio Correction]

[Correction Item 1]

[Correction Item] Scope of claims

[Correction details] Claim 1

[Before change]

A device for removing foreign substances from an esophagus, characterized by comprising: a negative pressure generating unit (100) for generating vacuum pressure by discharging or introducing air;

a pressurizing unit (200) connected to one side of the negative pressure generating unit (100) for discharging or introducing air inside the negative pressure generating unit (100);

an insertion tube (300) connected to the other side of the negative pressure generating unit (100) for insertion into the oral cavity of a person with an esophageal obstruction;

and a close-fitting mask (500)

connected in a structure through which the insertion tube (300) penetrates and is sealed around the oral cavity of a person with an esophageal obstruction,

wherein the insertion tube (300) a main tube (310) having a predetermined inner diameter and length, a volumetric deformation part (320), and a check valve (330) located at one side opening of the main tube (310) to block air inside the case (110) from moving to

the main tube (310) while allowing air sucked from the esophagus to pass through, and the volumetric deformation part (320) is provided on the outside of the other end of the main tube (310) so that the insertion tube (300) can be in close contact with the esophagus,

wherein an air control unit (400) for supplying or discharging air to the volumetric deformation part (320) is included, the air control unit (400) includes an air transport tube (410) having one end connected to the volumetric deformation part (320), an air opening/closing unit (420) connected to the other end of the air transport tube (410) and having a mobile component (424) built in for opening and closing an air movement passage, and a stopper unit (430) for controlling air entry and exit to the air opening/closing unit (420), wherein the air opening/closing unit (420) includes an opening/closing unit body (421) having a predetermined volume and being capable of volume change, a cylindrical first port (422) provided on one side of the opening/closing unit body (421) and having a first protrusion (422(a)) formed on an outer surface and a second protrusion (422(b)) formed on an inner surface, a second port (423) provided on the other side of the opening/closing unit body (421) and connected to the air transport tube (410), a moving member (424) accommodated inside the first port (422) and opening/closing an air passage inside the first port (422), and a fifth elastomer (425) for inducing linear movement of the mobile component (424),

and wherein the stopper (430) includes a stopper body (431) of a flat structure having an incision (431') cut in a predetermined shape inward from one edge, a catch protrusion (432) provided at a predetermined position of the incision (431') to be connected with the first protrusion (422(a)) of the first port (422), and an extension protrusion (433) provided at a predetermined position of the cut part (431') to be in close contact with one side of the mobile component (424) of the first port (422).

[After change]

A device for removing foreign substances from an esophagus, characterized by comprising: a negative pressure generating unit (100) for generating vacuum pressure by discharging or introducing air

; a pressurizing unit (200) connected to one side of the negative pressure generating unit (100) for discharging or introducing air inside the negative pressure generating unit (100)

; an insertion tube (300) connected to the other side of the negative pressure generating unit (100) for insertion into the oral cavity of a person with an esophageal obstruction;

and a close-fitting mask (500) connected in a structure through which the insertion tube (300) penetrates and is sealed around the oral cavity of a person with an esophageal obstruction,

wherein the insertion tube (300) includes a main tube (310) having a predetermined inner diameter and length, a volumetric deformation part (320), and a check valve (330) located at one side opening of the main tube (310) to block air inside the case (110) from moving to the main tube (310) while allowing air sucked from the esophagus to pass through, and the volumetric deformation part (320) is provided on the outside of the other end of the main tube (310) so that the insertion tube (300) can be in close contact with the esophagus, wherein an air control unit (400) for supplying or discharging air to the volumetric deformation part (320) is included, the air control unit (400) includes an air transport tube (410) having one end connected to the volumetric deformation part (320), an air opening/closing unit (420) connected to the other end of the air transport tube (410) and having a mobile component (424) built in for opening and closing an air movement passage, and a stopper unit (430) for controlling air entry and exit to the air opening/closing unit (420),

wherein the air opening/closing unit (420) includes an opening/closing unit body (421) having a predetermined volume and being capable of volume change, a cylindrical first port (422) provided on one side of the opening/closing unit body (421) and having a first protrusion (422(a)) formed on an outer surface and a second protrusion (422(b)) formed on an inner surface, a second port (423) provided on the other side of the opening/closing unit body (421) and connected to the air transport tube (410), a moving member (424) accommodated inside the first port (422) and opening/closing an air passage inside the first port (422), and a fifth elastomer (425) for inducing linear movement of the mobile component (424),

and wherein the stopper (430) includes a stopper body (431) of a flat structure having an incision (431') cut in a predetermined shape inward from one edge, a catch protrusion (432) provided at a predetermined position of the incision (431') to be connected with the first protrusion (422(a)) of the first port (422),

and an extension protrusion (433) provided at a predetermined position of the cut part (431') to be in close contact with one side of the mobile component (424) of the first port (422).

Declaration of Translation

I, Gwen Snorteland hereby declare:

I am qualified to translate documents from Korean to English;

My qualifications are as follows: BA in East Asian Studies from Princeton University, JD from University of Pennsylvania;

I have over 15 years of work experience in the Field of Translations;

I translated the "KR102229619B1" from Korean into English and to the best of my knowledge and belief, the attached Document KR102229619B1 is a true and accurate translation from Korean 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 7, 2025