

## VENTILATOR CIRCUIT FIXING DEVICE

### **Field of the Invention**

The present invention relates to the field of medical devices, and specifically to a ventilator  
5 circuit fixing device.

### **Background to the Invention**

In modern clinical medicine, the ventilator, as an effective means of artificially replacing  
autonomous ventilation functions, has been widely used in respiratory failure caused by  
10 various reasons, anesthesia respiratory management during major surgeries, respiratory  
support treatment, and emergency resuscitation. It occupies an extremely important  
position in the field of modern medicine. When using the ventilator, many tubes need to be  
connected, and these tubes require proper fixation.

The existing patent (Publication No.: CN215231257U) discloses a ventilator circuit fixing  
15 device. This ventilator circuit fixing device comprises a placement block and a mounting  
frame. Two accommodating grooves for accommodating the tubes are provided on the top  
of the placement block. Fixing straps are fixed on the placement block on both sides of the  
accommodating grooves. A groove is provided at the bottom of the placement block, and  
the bottom of the groove is arc-shaped. The mounting frame comprises fasteners and two  
20 clamping plates. The two clamping plates are symmetrically fixed on both sides of the  
placement block, forming a mounting space between the two clamping plates and the  
groove. The fastener is arranged between the two clamping plates and is used to adjust  
the spacing between them. The accommodating grooves can be used to place the  
ventilator tubes, which are then fixed in the accommodating grooves by the fixing straps.  
25 The fastener can adjust the spacing between the two clamping plates so that the  
placement block can be stably mounted on bed rails of different sizes. During the  
implementation of the present invention, the inventors found the following problems  
existing in the prior art:

When using a ventilator on a patient, many tubes are inserted into the ventilator. When the

circuit is long, the excess circuit may fall to the ground, and movement by personnel may cause the tubes to shift. Furthermore, two or more tubes may move together, making the tube arrangement chaotic and even causing entanglement between tubes. Therefore, a clamping mechanism is needed to organize and fix the ventilator circuit.

5 Accordingly, a ventilator circuit fixing device is proposed to address the above-mentioned problems.

### **Statement of Invention**

10 To overcome the deficiencies of the prior art and solve the problems raised in the background art, the present invention proposes a ventilator circuit fixing device.

The technical solution adopted by the present invention to solve the technical problem is as follows: the ventilator circuit fixing device of the present invention comprises a support plate and a connecting plate. A clamping mechanism is fixedly connected above the support plate. The clamping mechanism comprises a limiting plate, an anti-slip pad, a fixing frame, a threaded sleeve, a spiral column, a movable shaft, and a fixing plate.

15 One side of the upper portion of the fixing plate is fixedly connected with the limiting plate. The interior of the limiting plate is movably connected with the movable shaft. The outer wall of the movable shaft is fixedly connected with the fixing frame. The anti-slip pad is attached to the upper portion of the fixing frame. A threaded sleeve is fixedly connected  
20 inside one side of the fixing frame. The interior of the threaded sleeve is movably connected with the spiral column. The upper portion of the connecting plate is movably connected with an adjustment mechanism.

25 Preferably, the adjustment mechanism comprises a lifting column, a limiting groove, a slot, an inserting column, and a sleeved column. The lower portion of the lifting column is movably connected with the sleeved column. A limiting groove is provided inside the front end of the lifting column. A slot is provided inside the front end of the sleeved column. The inserting column is movably connected inside the slot.

Preferably, one side of the upper portion of the connecting plate is fixedly connected with

a reinforcing frame. A fixing base is movably connected below the reinforcing frame. A limiting frame is fixedly connected below the support plate.

Preferably, the connecting plate and the reinforcing frame are connected by welding, and the reinforcing frame and the fixing base are connected by snap-fit connection.

5 Preferably, the lifting column and the sleeved column are connected by sleeving. The sleeved column and the slot are of integrated structure. The slot and the inserting column are connected by snap-fit connection.

Preferably, the threaded sleeve and the spiral column are connected by threaded connection, and the threaded sleeve and the fixing frame are of integrated structure.

10 Preferably, the fixing frame and the limiting plate form a movable structure via the movable shaft, and the limiting plate and the fixing plate are connected by welding.

Advantages of the Invention:

1. In the present invention, through the interaction between the limiting plate, anti-slip pad, fixing frame, threaded sleeve, spiral column, movable shaft, and fixing plate, the ventilator circuit fixing device is placed inside a hospital. When the doctor applies the ventilator to a patient, the doctor places the ventilator circuit above the fixing plate, then pulls the fixing frame to rotate it, thereby driving the anti-slip pad to rotate. The anti-slip pad rotates clockwise until it adheres to the ventilator circuit located on the fixing plate. Then the doctor rotates the spiral column, which rotates and descends within the threaded sleeve, and continues to rotate downward until it reaches the fixing groove inside one side of the fixing plate for limiting and fixing. As a result, the ventilator circuit can be better organized and fixed.

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2. In the present invention, through the interaction between the lifting column, limiting groove, slot, inserting column, and sleeved column, the ventilator circuit fixing device is placed inside a hospital. According to the height of the ventilator, the doctor presses the lifting column, which descends within the sleeved column and simultaneously drives the limiting groove to descend. When it descends to the required height, the corresponding limiting groove aligns with the slot. The doctor then takes the inserting column and inserts

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it into the slot, pushing the inserting column so that it penetrates the limiting groove. In this way, height adjustment can be better achieved.

### **Brief Description of the Drawings**

5 To more clearly illustrate the technical solutions in the embodiments of the present invention or the prior art, the following is a brief introduction to the accompanying drawings required for describing the embodiments or the prior art. It is evident that the drawings described below only represent some embodiments of the present invention. For those skilled in the art, other drawings may also be obtained based on these drawings  
10 without requiring creative efforts.

FIG. 1 is a schematic view of the overall structure of the present invention.

FIG. 2 is a schematic view of the structure of the clamping mechanism of the present invention.

FIG. 3 is an enlarged schematic view of portion A in FIG. 1 of the present invention.

15 FIG. 4 is a schematic view of the structure of the adjustment mechanism of the present invention.

In the figures: 1. Clamping mechanism; 101. Limiting plate; 102. Anti-slip pad; 103. Fixing frame; 104. Threaded sleeve; 105. Spiral column; 106. Movable shaft; 107. Fixing plate; 2. Limiting frame; 3. Adjustment mechanism; 301. Slot; 302. Inserting column; 303. Sleeved  
20 column; 304. Limiting groove; 305. Lifting column; 4. Connecting plate; 5. Fixing base; 6. Reinforcing frame; 7. Support plate.

### **Detailed Description**

25 The following will describe the technical solutions in the embodiments of the present invention clearly and completely in conjunction with the accompanying drawings in the embodiments of the present invention. It is evident that the described embodiments are only part of the embodiments of the present invention and not all embodiments. Based on the embodiments of the present invention, all other embodiments obtained by those of

ordinary skill in the art without creative efforts shall fall within the protection scope of the present invention.

Please refer to FIGs. 1 to 4. A ventilator circuit fixing device comprises a support plate 7 and a connecting plate 4. A clamping mechanism 1 is fixedly connected above the support plate 7. The clamping mechanism 1 comprises a limiting plate 101, an anti-slip pad 102, a fixing frame 103, a threaded sleeve 104, a spiral column 105, a movable shaft 106, and a fixing plate 107.

One side of the upper portion of the fixing plate 107 is fixedly connected with the limiting plate 101. The interior of the limiting plate 101 is movably connected with the movable shaft 106. The outer wall of the movable shaft 106 is fixedly connected with the fixing frame 103. The anti-slip pad 102 is attached to the upper portion of the fixing frame 103. A threaded sleeve 104 is fixedly connected inside one side of the fixing frame 103. The interior of the threaded sleeve 104 is movably connected with the spiral column 105. An adjustment mechanism 3 is movably connected above the connecting plate 4. The material of the anti-slip pad 102 is rubber.

In this embodiment, the adjustment mechanism 3 comprises a lifting column 305, a limiting groove 304, a slot 301, an inserting column 302, and a sleeved column 303. The lower portion of the lifting column 305 is movably connected with the sleeved column 303. A limiting groove 304 is provided inside the front end of the lifting column 305. A slot 301 is provided inside the front end of the sleeved column 303. The inserting column 302 is movably connected inside the slot 301. The number of limiting grooves 304 is four groups.

In this embodiment, one side of the upper portion of the connecting plate 4 is fixedly connected with a reinforcing frame 6. A fixing base 5 is movably connected below the reinforcing frame 6. A limiting frame 2 is fixedly connected below the support plate 7. Through the relationship between the support plate 7 and the limiting frame 2, stability can be better improved during later use.

In this embodiment, the connecting plate 4 and the reinforcing frame 6 are connected by welding, and the reinforcing frame 6 and the fixing base 5 are connected by snap-fit connection. Through the relationship between the reinforcing frame 6 and the fixing base

5, better support can be achieved during later use.

In this embodiment, the lifting column 305 and the sleeved column 303 are connected by sleeving. The sleeved column 303 and the slot 301 are of integrated structure. The slot 301 and the inserting column 302 are connected by snap-fit connection. Through the relationship between the lifting column 305 and the sleeved column 303, height adjustment of the lifting column 305 can be better achieved during later use.

In this embodiment, the threaded sleeve 104 and the spiral column 105 are connected by threaded connection, and the threaded sleeve 104 and the fixing frame 103 are of integrated structure. Through the relationship between the threaded sleeve 104 and the spiral column 105, better limiting and fixing can be achieved during later use.

In this embodiment, the fixing frame 103 and the limiting plate 101 form a movable structure via the movable shaft 106, and the limiting plate 101 and the fixing plate 107 are connected by welding. Through the relationship between the fixing frame 103, the movable shaft 106, and the limiting plate 101, angle adjustment of the fixing frame 103 can be better achieved during later use.

Working Principle, the ventilator circuit fixing device is placed inside a hospital. Then the fixing base 5 is placed against the floor. The doctor adjusts according to the height of the ventilator and presses the lifting column 305, which descends within the sleeved column 303, simultaneously driving the limiting groove 304 to descend. When it descends to the required height and the corresponding limiting groove 304 aligns with the slot 301, the doctor picks up the inserting column 302 and inserts it into the slot 301. The doctor then pushes the inserting column 302 so that it penetrates the limiting groove 304. Next, when the doctor applies the ventilator to a patient, the doctor places the ventilator circuit above the fixing plate 107, then pulls the fixing frame 103 to rotate it, thereby driving the anti-slip pad 102 to rotate. The anti-slip pad 102 is rotated clockwise until it adheres to the ventilator circuit located on the fixing plate 107. The doctor then rotates the spiral column 105, which rotates and descends within the threaded sleeve 104, and continues to rotate downward until it reaches the fixing groove inside one side of the fixing plate 107 for limiting and fixing. This describes the working principle of the ventilator circuit fixing

device.

In the description of this specification, the reference to terms such as “one embodiment,” “example,” or “specific example,” means that the specific features, structures, materials, or characteristics described in connection with that embodiment or example are included in at least one embodiment or example of the present invention. The illustrative description of the above terms in this specification does not necessarily refer to the same embodiment or example. Moreover, the specific features, structures, materials, or characteristics described may be combined in a suitable manner in any one or more embodiments or examples.

The basic principles, main features, and advantages of the present invention have been shown and described above. Those skilled in the art should understand that the present invention is not limited to the above-mentioned embodiments. The above-mentioned embodiments and the description in the specification are only used to explain the principles of the present invention. Without departing from the spirit and scope of the present invention, various changes and improvements may be made to the present invention. These changes and improvements shall fall within the scope of protection claimed for the present invention.