CLOSURE COLLAR FOR RESPIRATORS

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This invention relates to apparatus for effecting artificial respiration and more particularly to a device for use with respirators commonly known as iron lungs, the iron lung being a chamber which encloses at least the chest portion of the patient, and which in many cases encloses the patient entirely from the neck down.

It is an object of the invention to provide a respirator collar unit which will effectively seal the respirator at the point where the neck of the patient protrudes through it so that there is little or no loss of pressure about the neck of the patient, and wherein the sealing collar unit is relatively comfortable to the patient and permits him a certain degree of movement.

Another object of the invention is to provide a respirator collar which is so constructed that it can be readily manipulated to engage the neck of the patient with a sealing action and can be readily released to free the patient.

Still a further object of the invention is to provide a respirator collar which can be used conveniently in conjunction when the patient has undergone a trachectomy, means being provided for holding portions of the collar in a forwardly spaced relation to the patient's throat so that proper functioning of the tube to the trachectomy is not disturbed.

The above and other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawings, wherein like reference characters refer to the same parts throughout the views, and, in which:

Figure 1 is a side elevational view of the neck receiving end of an iron lung respirator with the collar unit in one position thereof;

Figure 2 is a view similar to Figure 1 with the collar in an alternate position;

Figure 3 is a perspective view of the collar unit;

Figure 4 is a top plan view of the collar unit;

Figure 5 is a perspective view showing the interior of the device; and

Figure 6 is an enlarged transverse sectional view there through.

In Figures 1 and 2 there is shown one end of an iron lung casing 7 which has an end plate 8 secured to the main casing by any suitable means. The end plate 8 is provided with a central opening 9 through which the neck of the patient is adapted to extend with the head lying outside of the casing.

The collar unit includes a rigid ring 10 which may be of metal and which has a downwardly turned flange 11 thereon, the bottom edge of the flange being turned outwardly slightly as at 12. The upper and lower side surfaces of the ring 10 having a yieldable gasket element 13 secured thereto by any suitable means such as an adhesive. The ring 10 is adapted to be clamped about the opening 9 in the respirator or iron lung plate 8 by means of clamps 14 shown in Figures 1 and 2, said clamps preferably being removably secured as by studs 15.

The collar unit includes a frusto-conical flexible and air resistant element 16 whose large end fits over the bottom of the downwardly extending flange 11 on the ring 10 and is secured thereto by means of a fastening band 17 which may be releasably secured by means of a suitable readily releasable catch 18 such as disclosed in my co-pending application, Serial Number 493,318, filed May 1, 1943, now Patent No. 2,421,533, entitled "Clamp-Sealed Joint Construction (Belt, Neck and Wrist) for Pressure-Applying Aviator's Suit," although any suitable securing means for the bands 17 may be used. The smaller end of the frusto-conical flexible element 16 defines a neck opening 19 which is adapted to snugly fit the neck of the patient. It should be noted, particularly in Figures 1 and 3, that the neck opening 19 is disposed more toward the rear portion 16a of the element 16 than toward the front portion 16b of said element.

Means is provided for admission of the head of the patient through the opening in the flexible element 16 in the form of a separation 20 which extends from the rearward point about the neck opening 19 outwardly toward the ring 10 and also forwardly in said flexible element. The separation 20 preferably is closed by a slide fastener unit generally indicated at 21. Underlying the separation 20 is a flap 22 which preferably is made of the same material as the flexible element 16, the latter conveniently being of relatively thin flexible rubber. Consequently, when pressure is applied inside of the frusto-conical element 16 and said element is tight around the neck of the patient to provide a seal, said pressure will force the flap 22 tightly against said element and seal the separation 20.

In Figure 1 the collar unit is shown applied to a patient under normal circumstances with the frusto-conical flexible element 16 extending outwardly from the ring member 20 and up firmly close beneath the chin of the patient. In Figure 2 the collar unit is shown applied to the patient with the flexible element 16 extending into the
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iron lung or respirator casing 7 so that a substantial portion of the neck of the patient is exposed. The position of the device in Figure 2 is useful when the patient has undergone a tracheotomy and unrestricted exposure of a tracheotomy tube 23 is desired. A tracheotomy is performed in certain cases of paralysis where the throat muscles are paralyzed and breathing is otherwise difficult or impossible. In order to have the flexible sealing element 16 away from the area of the tracheotomy tube 1 I provide a wire positioning device 24 which may be in the form of a member having three arms 25 which are bowed in shape and branch in three directions with their spaced ends 26 bent over and inserted in suitable openings 27 in the downwardly extending collar 11 which extends from the flattening ring 10. The device 24, as shown in Figure 2, holds the forward portion of the flexible element 16 down adjacent the base of the neck and also holds it out in front of the neck so that there is none of the structure which closely confines the tracheotomy tube 23.

Location of the neck receiving opening 19 toward the rear portion of the unit rather than in the center thereof provides a greater amount of material of the flexible element 16 toward the front of the device so that the forward portion of the neck can be freely exposed, and the arrangement of the separation 20 in the element 16 is such that the closure or slide fastener 21 can be freely operated without interfering with the patient in the event he has undergone a tracheotomy.

From the foregoing description it will be seen that I have provided an extremely effective yet relatively simply constructed closure collar for respirators of the iron lung type which effectively seals the respirator at the point where the neck of the patient extends through it and which is considerably more comfortable than a thick bulky sponge rubber collar or the like, and further wherein the neck can be considerably exposed so that a tube can be inserted into the trachea of the patient. It should also be noted that the flexible element 16 is secured adjacent one edge of the collar portion or flange 11 on the ring 10 and at one side of said ring. By reason of this structure the collar unit can be revised to more conveniently fit persons having longer or shorter necks. Furthermore, normally the device is applied as viewed in Figure 1 with the flexible element 16 extended outwardly from the end of the respirator casing 7 to its full extent. However, when used as viewed in Figure 2, the collar unit is reversed in position so that the flexible element 16 will extend into the respirator a substantial distance, thereby exposing a considerable portion of the throat or neck.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of my invention.

What I claim is:

1. A closure collar for the opening of an iron lung respirator including a rim, a flexible element secured to said rim and of such size that it will cover said respirator opening, said flexible element having a neck receiving opening therein, and a positioning device for said flexible element secured to said rim and extending laterally of the plane of said rim to hold portions of said flexible element in spaced relation to said neck receiving opening.

2. A closure collar for the opening of an iron lung respirator including a rim, a flexible element secured to said rim and of such size that it will cover said respirator opening, said flexible element having a neck-receiving opening therein, and a positioning device for said flexible element secured to said rim independently of said flexible element and extending laterally of the plane of said rim adjacent the interior of said rim to hold other portions of said flexible element away from that portion of said element which defines said neck-receiving opening.

JOHN D. AKERMAN.

REFERENCES CITED

The following references are of record in the file of this patent:

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