

[54] TRACHEA INSTRUMENT

[76] Inventor: **Vernon E. Hyde**, P.O. Box 285,
Pebble Beach, Calif. 93953

[22] Filed: **Nov. 9, 1973**

[21] Appl. No.: **411,181**

[52] U.S. Cl. **128/305; 128/351**

[51] Int. Cl. **A61b 17/24; A61m 16/00**

[58] Field of Search **128/305; 222/81, 89**

Primary Examiner—Channing L. Pace

[57] **ABSTRACT**

The Trachea Instrument provides a means for reestablishing the supply of oxygen to the lungs below a blockage in the throat or trachea. The instrument consists of a tube of an established length, sharpened at an angle at its exposed end for piercing the front of the throat or neck and the trachea, secured within a handle or grip, for establishing an air vent supplying oxygen below the point of a blockage. The handle is formed so that the penetration is indexed correctly with respect to the angle or position of the cutting edge and precisely restricts the penetration thus precluding any excessive penetration or individual judgement.

[56] **References Cited**

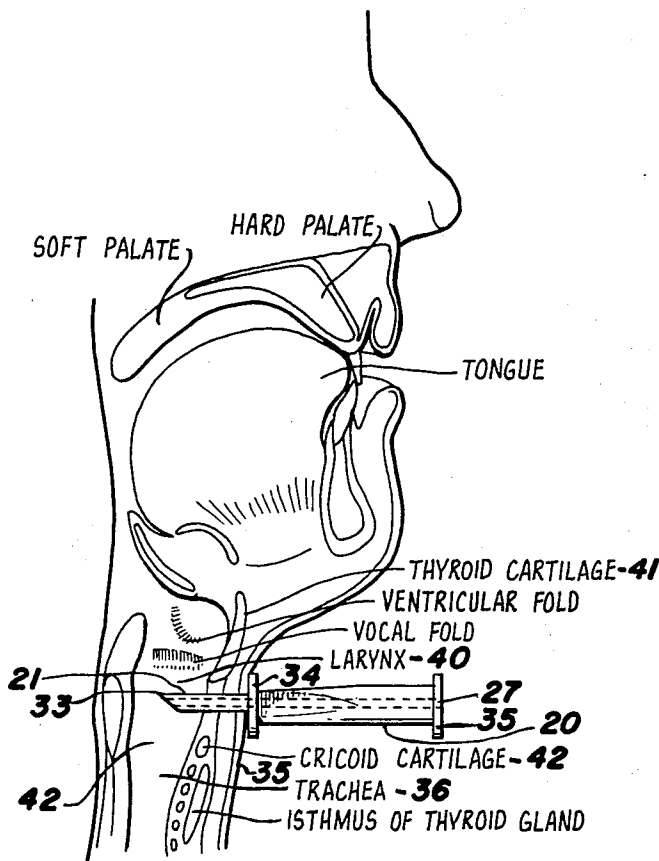
UNITED STATES PATENTS

3,182,663	5/1965	Abelson	128/305
3,330,278	7/1967	Santomieri	128/305 X
3,476,113	11/1969	Tarsitano	128/305
3,704,529	12/1972	Cioppa	128/305 X
3,706,106	12/1972	Leopoldi	128/305 X

FOREIGN PATENTS OR APPLICATIONS

271,797	11/1965	Australia	222/81
---------	---------	-----------------	--------

4 Claims, 4 Drawing Figures



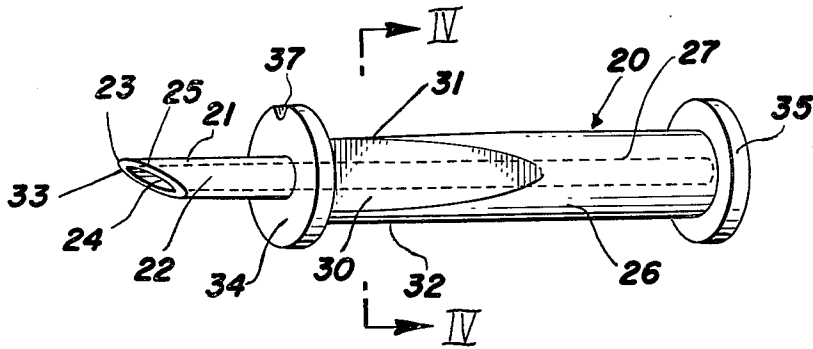


FIG. 1.

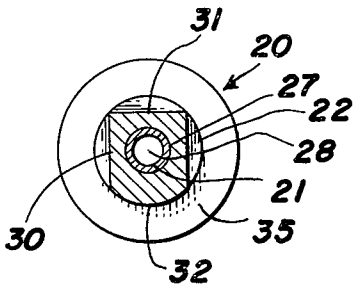


FIG. 4.

CORONAL SECTION OF THE LARYNX

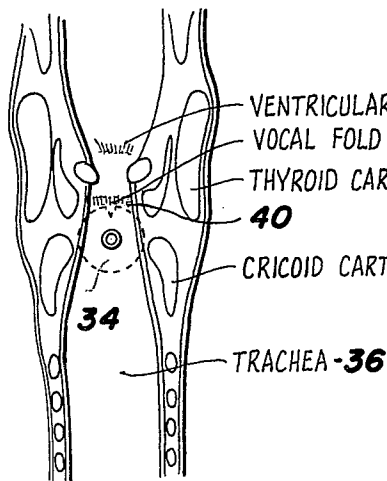


FIG. 3.

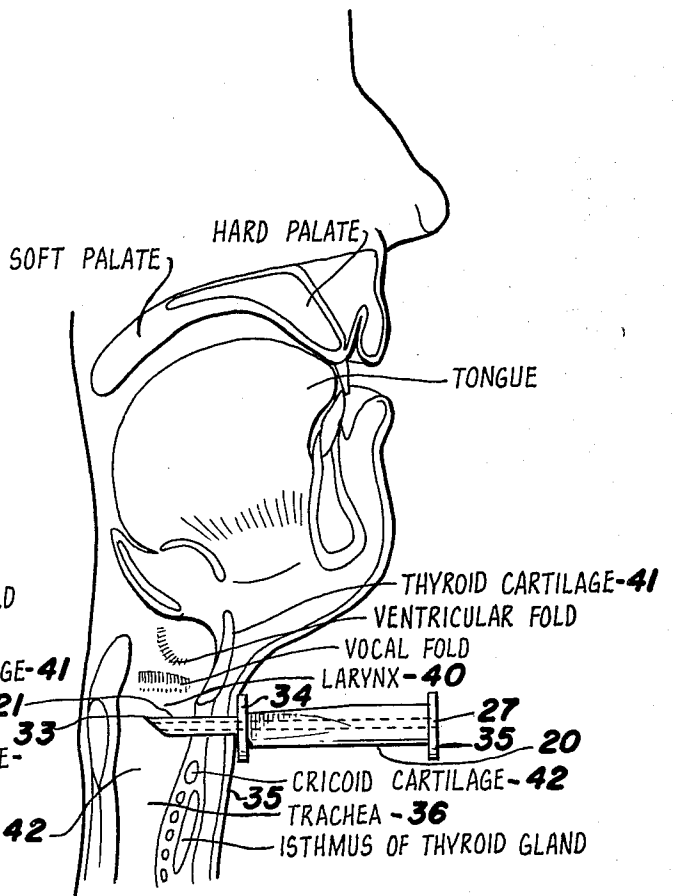


FIG. 2.

TRACHEA INSTRUMENT

BACKGROUND OF THE INVENTION

It is recently being reported that the National Safety Council of America estimates that 25,000 Americans choke to death on food each year. This figure makes food inhalation the sixth leading cause of accidental death in America. It is also indicated that even doctors are unaware that many of the sudden deaths which occur during meals are not caused by heart attacks but rather by choking of the person on food. It has also been reliably reported that the size of pieces of food which people attempt to swallow at mealtime is not only amazing but sometimes unbelievable.

When such a blockage takes place, the time-honored remedy of slapping the victim on the back is more often than not, a waste of time. Likewise, mouth-to-mouth resuscitation before the obstruction is removed is another waste of precious time. A person cannot survive without oxygen more than a very few minutes, on the order of one to four minutes, and so calling and waiting for an ambulance or medical relief is also a waste of time. Accordingly, if a person's life is to be saved when such accident occurs, relief must be administered immediately. Since medical help is not present at this occurrence in almost every instance, the relief provided must be supplied by the lay public with substantially foolproof instruments.

The problem of immediate relief has been formerly supplied by penknife cuts or other such homemade remedies by an unskilled person unable to make the necessary judgments. A tool or instrument is very much needed which can be administered by a lay person with safety and effectiveness.

There have been several attempts in the art to provide this result such as the cricothyrotomy needle of Abelson in U.S. Pat. No. 3,182,663. This instrument is intended for use by a physician and the puncturing of the front of the neck of the victim is accomplished by a cutting stilette which moves within a curved tube and occupies the entire inner diameter of the tube. The cut in the throat is made with the stilette with the degree of penetration largely left to the judgment of the administering physician. The tube is then inserted into the cut and pushed inwardly in a curved path. The downward curve is intended to minimize professional judgment and allow for some error. The place of puncture is restricted to the area between the thyroid cartilage and the cricoid cartilages of the larynx and one must be familiar with the anatomy of the frontal neck position in order to be successful with this instrument. Obviously, it cannot be a successful or useful instrument in the hands of a novice or lay person.

SUMMARY OF THE INVENTION

The invention of the trachea instrument presented here has for an object the provision of a means which can be effective and give immediate relief in the event of the blockage of air to the lungs in the throat. Since most blockages occur above the trachea, the relief to be effective must be below the blockage so that a direct passage of air and oxygen to the lungs is established.

The instrument described herein can be administered by a lay person with only the bare minimum degree of skill required, and with a high degree of certainty of success by proper utilization. Since the cutting portion is a tubular straight section, and the thrust is straight in-

wardly through the neck into the trachea, there is no danger of judgment involved. It has been medically reported that there is a great uniformity in the distance from the outer surface of the neck to the trachea so that the length of the straight section can be made standard and practically universal. The length of the cutting tube is such that it will penetrate into the trachea and the stop provided by the handle, will prevent passing through it.

Another very distinctive advantage is that the oval portion easily makes the incision just below the Adams Apple so-called, which is the projection in the front of the neck formed by the largest cartilage of the larynx. The distance at this point from the neck surface to the trachea is for all practical purposes remarkably uniform, and the handle of the instrument provides a stop for the thrust of the hollow-tube at precisely the exact depth. There is no need for professional judgment or allowance for error.

Since the cutting tube is cut on the bias or at an angle to expose an oval opening, the area so exposed provides the maximum available areas for the admission of air or oxygen to the trachea and lungs. This oval opening should be in the downward position to provide the greatest ingress and egress of oxygen and carbon dioxide to reestablish proper breathing.

The handle portion of the instrument provides a positive tactile indexing of the instrument in the proper position to eliminate any visual determination prior to making the puncture. The indexing means is provided without any weakening of the structure of the instrument or providing a source of contamination.

Likewise the handle is provided with an outer stop which can be used for mouth to instrument aid in the breathing, accompanied by appropriate pressure massage of the lungs. Or, it may be used for the temporary and prompt use of oxygen if it is available.

Further objects are to provide a construction of maximum simplicity, economy and ease of assembly and disassembly, also such further objects, advantages and capabilities as will fully appear and as are inherently possessed by the device and invention described herein.

The invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawing, and while there is shown therein a preferred embodiment thereof, it is to be understood that the same is illustrative of the invention and that the invention is capable of modification and change and comprehends other details of construction without departing from the spirit thereof or the scope of the appended claims.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an enlarged perspective view of the instrument forming the subject matter hereof;

FIG. 2 is a diagrammatic view of the Trachea instrument in its operative position showing the anatomy of the pertinent area in vertical section;

FIG. 3 is a coronal section of the larynx; and

FIG. 4 is an end view of the instrument shown in FIG. 1, taken on the line IV — IV thereof.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to the drawing and particularly to FIG. 1 thereof, in which like parts are identified by the same numerals throughout the several views, the emergency

traceotomy instrument 20 is shown in its entirety. This instrument includes a tubular knife-like member 21, with an axial passage 22 completely therethrough. It is formed with a biased cut 23 at its outer end which cut is preferably at a 9 to 10 mm. bevel leaving an oval shaped opening 24 for optimum results. The edge 25 of the bevel cut 23 is sharpened to the extent that usual surgical instruments require, providing an elliptical sharpened edge 25.

The tubular member 21 is held in a fixed position in a generally cylindrical handle 26. The handle 26 has an axial bore 27 therethrough in which a portion of the tubular member 21, is received either for the remainder of its entire length, or for such portion of the remainder thereof as will hold the tubular member 21 in fixed immovable position therein. This then provides an axial passage from the oval opening 24 completely through the instrument 20. The knife-like portion of the tubular member 21 projects from the handle 26 and the stop 34 a distance of 20 mm., as will be explained later herein. In consideration of the fact that only a few moments are available if a person's life is to be saved, the outer surface of the cylindrical handle 26 has a portion thereof shaved down to form parallel flat sides 28 and 30 and a flattened top portion 31. This leaves the lower quadrant 32 with the original cylindrical shape so that the precise orientation of the instrument can be identified in advance by a single touch. The tubular portion 21 with its outer portion and cutting edge 25, is securely held within the handle portion 26 so that the point 33 thereof is at the top and in a plane parallel to the plane of the flattened top portion 31 of the handle.

The handle portion 26 is provided with a front disc 34 and a rearward disc 35. The forward disc 34 acts as a stop for the penetration of the tubular portion 21 at 20 mm. It has been unexpectedly determined that the distance from the outer surface of disc 34 to the point 33 can be made uniform in view of the discovery in this research that the distance from the outer surface of the throat of an individual into the trachea 36 is substantially uniform and constant in all adults. There are, of course, exceptions but the exceptions constitute such a minimal percentage that the distance from the outer face of disc 34 to the point 33 can be made constant at 20 mm. This constant length amply penetrates the anterior wall of the trachea 36 with safety and without penetrating the mucosa of the posterior wall or possible damage to the mucosa of the posterior wall. The disc 34 may also be provided with a notch 37 or any other indexing means which will also establish the vertical and proper position of the instrument 20.

The axial passage 27 through the handle also penetrates and the disc 35 at the rear end of the handle 26 so that there is a continuously open passage therethrough. The opening in disc 35 is available for mouth application of breathing, or the attachment of an oxygen supply, if the same is available.

APPLICATION AND OPERATION

In the event of an emergency where a person is in danger of asphyxiating due to obstruction of the larynx 40, the life saving application of the trachea instrument is readily understood and observable. Its application need not be by a doctor but may be made by a layman following a few simple and easily determinable steps, all of which can be done without delay. Time is a factor because a victim will suffer asphyxiation in a matter of

one to four minutes, and unless help is received within this time it becomes impossible to save this victim's life.

All that is necessary is to determine the position of the thyroid cartilage 41 at the front of the front of the throat. This is easily located because this is one's Adam's Apple, a portion of the anatomy which is familiar to almost everyone. There is a space between the lower end of the thyroid cartilage 41 and the next solid landmark of anatomy in the front of the throat which is the cricoid cartilage 42. There is an available distance between these two cartilages 41 and 42 so that precise positioning of the instrument in this area is not critical for making the incision or cut. It has been further determined that the fleshy area between the two cartilages may easily be penetrated by a sharp instrument which practically no bleeding and no danger because there are very few blood vessels in this particular area and no blood vessels in the trachea 36. Such a circumstance makes the use of the trachea instrument very much more acceptable in the hands of a layman, than if there was substantial bleeding in this area.

The instrument 20 is held by the handle 26 in the position so that the groove 37 and the sides 28 and 30 are in vertical planes corresponding with the vertical plane of victim's neck. Having located the tissue area between the thyroid cartilage 41 and the cricoid cartilage 42, the point 33 of the tubular portion 21 is moved sharply at right angles to the throat to penetrate this area and then quickly moved further into position so that the front of the neck of the victim engages the stop 34 of the handle. It will be observed from FIG. 2 that when the instrument is in this position the tubular portion 21 penetrates the trachea at substantially its deepest portion, with the oval opening 24 downward and thus air supply is established from the outside to the trachea 36 and to the lungs (not shown) so that free breathing is again restored below the point of blockage. If breathing has stopped, the person administering the relief may reestablish breathing by placing his mouth against the disc 35 and breathing into the lungs of the victim through the air supply passage 27. When outside help arrives, or if there is a small oxygen cylinder available, oxygen may be administered by attaching the connection to the opening 27.

It will thus be observed that the trachea instrument 20 disclosed herein, can be administered quickly by a layman without the assistance of a physician or surgeon and with safety and effectiveness. In this manner the instrument may be kept in a suitable container at any restaurant or other place where such emergencies or situations usually arise. Thus many lives may be saved by having the appropriate instrument available. The instrument may also be carried in a first aid kit, and by lay persons, or even general practitioners. A further and distinct advantage is that the instrument is a simple straight forward inexpensive piece of equipment that may be operated simply and expeditiously by an intelligent person.

I claim:

1. A tracheotomy instrument for non-professional emergency use providing air passage to the lungs of a victim to avoid asphyxiation comprising a straight tubular knife in the form of a right circular cylinder having an outer end and a cutting end, said cutting end being slanted to provide an oval opening sharpened into a continuous cutting edge with a rounded point and a handle of greater diameter than said tubular knife im-

5

movably secured to the outer end of said tubular knife with a uniform axial passage continuously through said knife and said handle, said handle having a radially outwardly extending stop limiting penetration of said cutting end to entry of the oval opening into the trachea without scraping or penetration of the posterior wall of the trachea upon insertion at right angles to the vertical axis of the trachea.

2. The instrument of claim 1 having indexing means on the stop and on the handle adjacent the stop in axial alignment with said rounded point for both visual and tactile determination of the position of the rounded point of the tubular knife providing quick and effective means for correctly placing the instrument at the victim's throat for penetration into the trachea to provide an unobstructed air passage through the tubular knife

6

from the exterior to the trachea.

3. The instrument of claim 1, wherein the slant at the cutting end of the tubular knife is at a bias of 9 to 10 mm. to provide a maximum oval opening for the passage of air into the trachea and a slicing effect when thrust into the victim's throat in the cricothyroid notch substantially at right angles to the vertical axis of the trachea.

4. The instrument of claim 1, wherein the length of the tubular knife from the said stop to the tip of the round point is set at 20 mm. to insure the arrival of the entire area of the oval knife opening within the trachea for maximum air supply without scraping or penetration of the posterior wall of the trachea.

* * * * *

20

25

30

35

40

45

50

55

60

65