

Aug. 27, 1968

V. H. RAIMO

3,398,747

AIRWAY

Filed Jan. 6, 1966

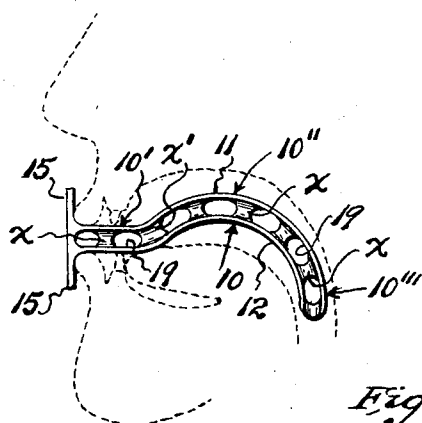


Fig. 1

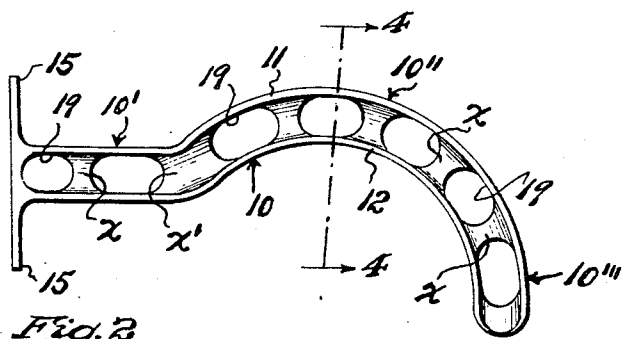


Fig. 2

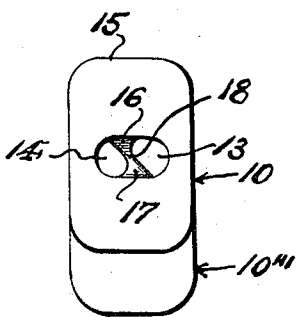


Fig. 3

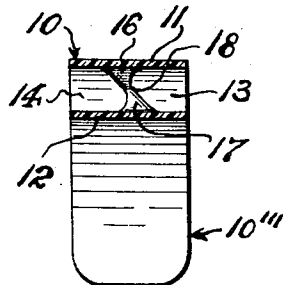


Fig. 4

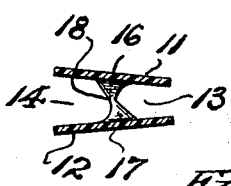


Fig. 5

INVENTOR.
Victor H. Raimo,
BY *Richards and Bifelli,*
Attorneys—

1

3,398,747
AIRWAY

Victor H. Raimo, 214 Ballentine Parkway,
Newark, N.J. 07104
Filed Jan. 6, 1966, Ser. No. 519,126
5 Claims. (Cl. 128—351)

ABSTRACT OF THE DISCLOSURE

Airway devices for introduction through a patient's mouth to the trachea area of the throat have an elongated body having a straight portion adjacent the mouth and a curved pharyngeal portion. The body of the airway is made up of flat top and bottom walls spaced apart, but connected by an intervening strut formation extending along the medial line of the body and having periodic open lateral passages therethrough. The cross section of the strut is similar to two pyramids having their bases in contact with the top and bottom walls and their apices joined in a relatively flexible juncture permitting pivoted movement of the top and bottom walls together on one side and apart on the other side, thus preventing complete occlusion of the air passage by biting pressure on the top and bottom walls.

This invention relates to an improved airway device for introduction into the mouth of surgical or other patients, to prevent suffocation of the patient.

It has long been the practice to employ a device to assure passage of air through to the trachea of anesthetized patients in order to prevent suffocation during and subsequent to surgery. In previous devices for this purpose, faults have been noted with respect thereto. One such fault is due to the fact that said previous devices are not efficient in the provision of air passage means that are adapted to avoid clogging by accumulation of fluids therein and in the patient's trachea, which clogging may cause suffocation. Furthermore, said previous devices were not well adapted to resist collapse and closing of their air passages, when subject to pressure of biting teeth of a patient served thereby.

It is an object of the present invention, to provide an airway device which is well adapted, under conditions of use, to assure unobstructed passage of air through the mouth to the patient's trachea, while at the same time avoiding risk of collapse and closing of the air passage path therethrough under biting pressure of the patient's teeth.

It is a further object of this invention to provide, at all times in use, an open passage through the airway device, for introduction therethrough into the trachea, of a suction tube for removal of any accumulation of air passage obstructing fluids.

It is another object of this invention to provide an airway device having outwardly open and oppositely directed side air passage channels, extending throughout the length thereof, together with intercommunicating openings therebetween, whereby discharge therefrom of any fluids tending to accumulate therein and obstruct the same is greatly enhanced.

A further object of this invention is to provide an airway device which can be produced in one-piece as an integral structure from a suitable plastic, such e.g. as polyethylene, and which is so shaped and constructed that, when in place under use conditions, it is adapted to lift the epiglottis and straighten the tracheal curve, whereby to avoid reduction and partial obstruction of the tracheal passage.

Still another object of this invention is to provide an airway device the air passages of which are defined by

2

separated top and bottom walls, having intermediate, longitudinally spaced apart, interconnecting struts of novel formation and disposition, which struts are adapted to yield to biting pressure of a patient, served by the device, so that the top and bottom walls will move in relation one to the other, whereby tendency to close together and constrict one side air passage will automatically open and expand the other or opposite side air passage, thus assuring at least one freely open air passage through the device at all times.

The above and other objects of this invention will be apparent from a reading of the following description of an illustrative embodiment thereof as shown in the accompanying drawings, in which:

FIG. 1 is a schematic view showing the airway device of this invention in place for use within a patient's mouth and throat;

FIG. 2 is a side elevation of the airway device drawn on an enlarged scale;

FIG. 3 is an outer end elevation of the airway device;

FIG. 4 is a cross-sectional view, taken on line 4—4 in FIG. 2; and

FIG. 5 is a cross-sectional view showing effect of biting pressure exerted on the airway device which tends to close one air passage side thereof, but, due to yielding and fulcrum action of the novel strut structure, is effective to open and expand the opposite air passage side thereof.

Like characters of reference are applied in the several figures of the above described views, to indicate corresponding parts.

Referring now to the drawings, the airway device of this invention comprises an integral structure shaped to be received within the mouth and pharyngeal cavities of the patient to be served thereby; and to this end, consists in a body 10 having an outer straight portion 10' to be located within the patient's mouth, and an upwardly bowed portion 10'' terminating in a downwardly directed curved inner end portion 10''', that is adapted to extend therefrom into the trachea area of the patient's throat.

Said airway body includes a top wall 11 and a bottom wall 12 of suitable widths. These top and bottom walls are spaced apart by intervening strut elements X of novel formation, and are disposed to extend, in longitudinally spaced apart relation, along the length of the body and centrally intermediate the side margins of the top and bottom walls 11 and 12.

The airway body thus formed provides end to end open air passage channels 13 and 14, respectively opening laterally outward along opposite sides of the body.

At its outer end, the body 10 is provided with one or more stop flanges 15, which project angularly therefrom, and which, when the airway device is in use, are adapted to externally abut the lips of the patient, thus holding the device against inward displacement from its applied operative relation to the patient's mouth and throat.

The strut elements X each comprise an upper portion 16 of substantially triangular cross-sectional shape, the base of which is adjoined to the inner surface of the body top wall 11, and a lower portion 17, also of substantially triangular cross-sectional shape, the base of which is adjoined to the inner surface of the body bottom wall 12. Said triangular strut portions 16 and 17 have their apices opposed one to the other and joined to form a weakened connection or neck 18 of substantially reduced cross-sectional area. This connection or neck 18 is yieldable to leverage applied to the strut element by relative movements of the walls 11 and 12 of the airway device, when the latter are forced by biting pressure exerted by the patient; thus the weakened connection or neck 18 serves as a fulcrum about which the relatively moved walls 11 and 12 may turn under such circumstances.

The base portions 16 and 17 may be disposed and opposed in a vertical medial plane between the body walls 11 and 12, but it is preferable however that said base portions 16 and 17 be disposed and opposed in a plane oblique or diagonal to a vertical medial plane between the body walls 11 and 12, with the apical connection or neck nevertheless lying in the aforesaid vertical medial plane (see FIGS. 3 and 4). The latter preferred disposition of the strut elements X enables the top and bottom walls 11 and 12, when relatively moved under biting pressure exerted by a patient, to more easily effect their leverage upon said strut element X, whereby to cause the apical connection or neck 18 to yield to such movements, while nevertheless serving as a fulcrum about which said walls 11 and 12 can turn (see FIG. 5).

It is preferable that a strut element X' which is located at the juncture of the straight portion 10' and the bowed portion 10'' of the airway device be of greater length than that of the other outlying strut elements (see FIG. 2), whereby to reinforce and strengthen the connection between the body walls 11 and 12 at such point.

From the above, it will now be obvious that in event of uneven biting pressure, applied to the airway device in use, tending to close together its top and bottom walls 11 and 12 at one side thereof, and thus to close or constrict the air passage, e.g. 13, at such side, said walls will turn about the fulcrum provided by strut elements, so that said walls will be spaced apart at the opposite side of the device, whereby to hold open the opposite air passage channel, e.g. 14 (see FIG. 5), or vice versa. It will therefore be apparent that at least one open air passage channel through the device is maintained at all times, and that an open passage for insertion of a suction tube there-through is likewise assured when required. It may be further pointed out that should one or more connections or necks 18 be broken through or breached under stress of biting pressure, the opposed base portions 16 and 17 will still tend to abut, and thus prevent total closing of air passage channels.

Owing to the longitudinally spaced apart relation of the novel strut elements X, it will be noted that openings or ports 19 are provided which afford communication between the side air passage channels 13 and 14. This is of marked advantage since it more easily permits flow of fluids through the airway device, with less tendency of clogging the air passage channels thereof.

The described conformation of the airway device, is, when the device is in use, well adapted by its straight portion 10' to hold down the patient's tongue against obstructing of air flow to the trachea area while the upwardly bowed portion 10'' and its downwardly curved end portion 10''' is adapted to lift the epiglottis and straighten the tracheal curve so as to keep open the tracheal passages.

What is claimed is:

1. An airway device for introduction through a patient's mouth to the trachea area of the patient's throat comprising, a body of suitable longitudinal shape formed by spaced apart top and bottom walls of suitable width, said walls being connected by an intervening strut formation extending along a medial line from end to end of the body, whereby to provide respective air passage channels extending from end to end of the body, and wherein the strut formation comprises a series of longitudinally spaced apart strut elements, the spacing of which provides inter-

communicating openings between the air passage channels, each strut element comprising an upper base portion of triangular cross-sectional shape having its base adjoined to the inner surface of the body top wall and a lower base portion also of triangular cross-sectional shape having its base adjoined to the inner surface of the body bottom wall, said base portions being opposed one to the other with their apices joined together, thereby forming an intermediate yieldable neck providing a fulcrum about which the body top and bottom walls can turn under biting pressure of the patient's teeth.

2. An airway device according to claim 1, wherein the strut elements are diagonally positioned across a vertical medial plane intermediate the sides of the top and bottom walls.

3. An airway device for introduction through a patient's mouth to the trachea area of the patient's throat comprising, a body of suitable longitudinal shape formed by spaced apart top and bottom walls of suitable width, said walls being connected to a series of longitudinally spaced apart strut elements extending along a medial line from end to end of the body, whereby to provide respective air passage channels extending from end to end of the body and opening laterally outward therefrom at respective sides thereof, the spacing of said strut elements providing intercommunicating openings between said passage channels, each strut element comprising an upper base portion of triangular cross-sectional shape having its base adjoined to the inner surface of the body top wall and a lower base portion also of triangular cross-sectional shape having its base adjoined to the inner surface of the body bottom wall, said base portions being opposed one to the other with their apices joined together, thereby forming an intermediate neck portion to provide a fulcrum about which the top and bottom walls can turn under biting pressure of the patient's teeth, and said body having at least one angularly projecting stop flange at its outer end to externally abut the patient's lips, whereby to hold the body against inward displacement through the patient's mouth.

4. An airway device according to claim 3, wherein the strut elements are diagonally positioned across a vertical medial plane intermediate the sides of the body top and bottom walls.

5. An airway device according to claim 3, wherein the body formation comprises a straight outer end portion leading to an upwardly bowed mid portion which terminates in a downwardly curved inner end portion, and wherein a strut element at the juncture of said outer straight end portion and said upwardly bowed midportion is of greater length than outlying strut elements, whereby to reinforce the body at such juncture.

References Cited

UNITED STATES PATENTS

1,696,018	12/1928	Schellberg	128—240
2,599,521	6/1952	Berman	128—208
3,306,298	2/1967	Raimo	128—351

FOREIGN PATENTS

1,348,518	12/1963	France.
88,138	8/1896	Germany.

DALTON L. TRULUCK, *Primary Examiner*.