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POSITIONING RETAINER FOR ORO-TRACHEAL TUBES

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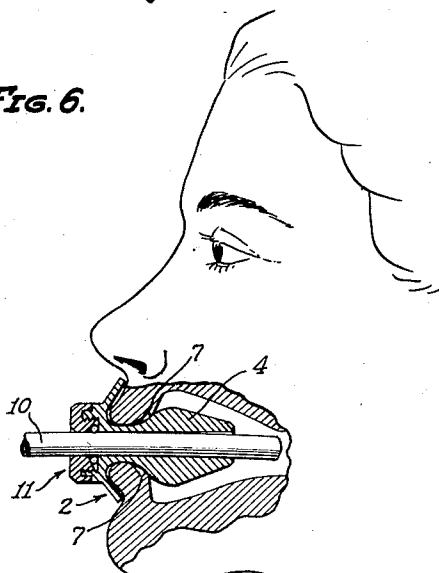
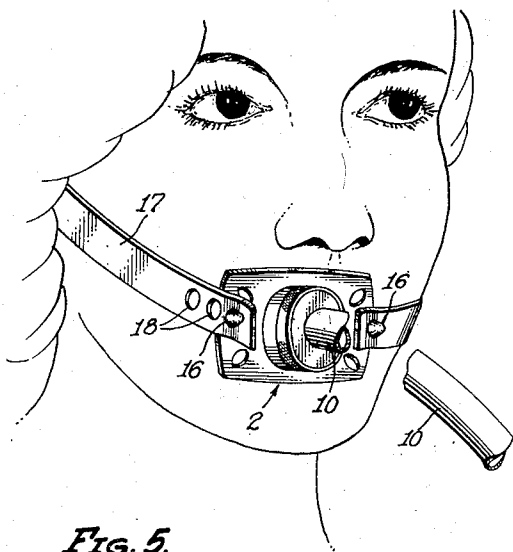
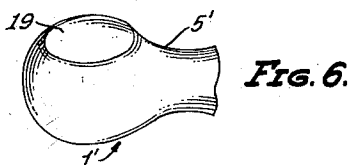
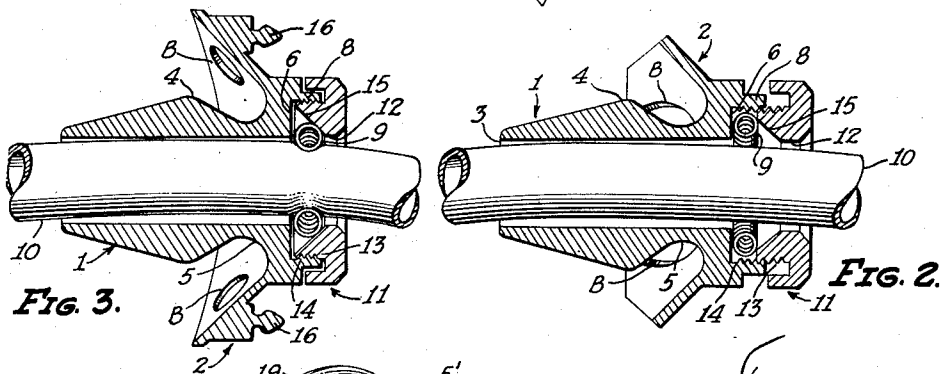
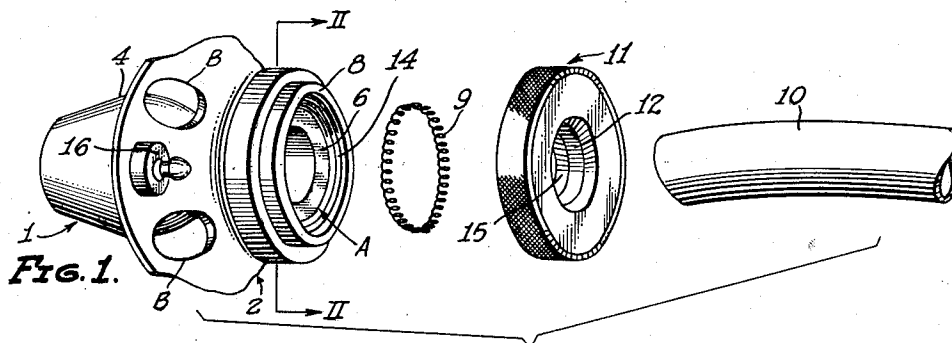


FIG. 4. INVENTOR
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2,820,457

POSITIONING RETAINER FOR ORO-TRACHEAL TUBES

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4 Claims. (Cl. 128—351)

Generally speaking, the present invention relates to anesthesia and similar therapeutic arts having to do with the throat and lungs; more particularly, it pertains to an improved oro-tracheal tube positioning retainer adapted to protect, position, and retain a flexible tube passing through a patient's mouth, such as is used when endotracheal anesthesia is given; further, it pertains to an oral access port member, present as a subcombination in said oro-tracheal tube positioning retainer but capable of functioning independently as a positioner and guard structure serving to protect the mouth and medical (including anesthesia) apparatus introduced therein from mutual damage.

It is an object of the present invention to provide a novel oral (and/or oro-tracheal) tube positioner and retainer adapted to prevent compression and obstruction of the tube by a patient's teeth or jaws; adapted to anchor the tube in a patient's mouth; adapted to provide for quick and easy adjustment and maintenance of depth of the tube with respect to a patient's trachea; and adapted to allow auxiliary access into a patient's mouth.

It is a further object of the present invention to provide a novel oral access port adapted to prevent compression and obstruction of a tube by a patient's teeth or jaws; adapted to prevent damage to said teeth or jaws by said tube or other medical instrument (or equipment); and adapted to allow auxiliary access to the mouth of the patient.

Other and allied objects will be apparent to those skilled in the art after a careful perusal, examination and study of the accompanying illustrations, the present specification, and the appended claims.

To facilitate understanding, reference will be made to the herein below described drawings, in which:

Fig. 1 is an exploded perspective view of one illustrative form of the present invention;

Fig. 2 is a longitudinal sectional view of the device shown in Fig. 1 in fully assembled relationship as it would appear if viewed in the direction of the arrows II—II in Fig. 1, the constricting ring being shown in non-engaged position with respect to the tube and the tube being shown in elevation;

Fig. 3 is a longitudinal sectional view similar to Fig. 2 but in a plane 90 degrees displaced from Fig. 2, the constricting ring being shown in engaged relationship with respect to the tube and the tube being shown in elevation;

Fig. 4 is a reduced-size view, partly in section, showing the tube retainer of the present invention in retained relationship with respect to a patient's mouth, the constricting ring being in engaged relationship with respect to the tube;

Fig. 5 is a reduced-size perspective view showing the tube retainer of the present invention in retained relationship with respect to a patient's mouth and showing the cooperative relationship of the strap means with respect to the patient's head and with respect to the strap-holding

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means as the strap holds the tube retainer firmly in position; and

Fig. 6 is a fragmentary view of a modified form of the mouth-insertion member of the mouth-engaging means (or oral access port) in which the diameter of the enlarged portion is enlarged in certain directions and is reduced in certain other directions.

It should be noted that all of the above described figures appear in upright position in the sheet of drawings. This is merely for reasons of convenience and does not necessarily mean that anesthesia would be administered to a patient oriented as shown in the figures. In fact, usually anesthesia would be administered to a reclining patient—and under such circumstances all of the above figures would be rotated counter-clockwise approximately 90 degrees.

Generally speaking, the tube positioner and retainer of the present invention includes a mouth-engaging member (or oral access port) having a projecting mouth-insertion member and a centrally apertured mouth-abutting flange member positioned effectively across one end of said insertion member. Bore means extends through said mouth-insertion member to the co-axial, larger diametered central aperture of said flange member and is adapted to receive therethrough a hollow tube (usually a hollow flexible oro-tracheal tube), or other medical instruments (such as a bronchoscope, for example).

In the specific example illustrated, the mouth-insertion member is indicated generally at 1, the mouth-abutting flange member is indicated generally at 2, and the bore means is indicated generally at 3.

In the specific example illustrated, the projecting mouth-insertion member 1 comprises an enlarged portion 4 connected by a reduced-sized neck 5 to the flange member 2. This arrangement effectively provides mouth-retaining means on the mouth-insertion member, insertable between and retainable behind the upper and lower teeth 7 of the patient.

Also generally speaking, the tube retainer of the present invention includes an adjustable chuck in cooperable relationship with respect to the bore means and having annular flat surface means adjacent said bore means, bushing means, constrictible engaging ring means, and selectively manually advanceable ring-compressing means.

In the specific example illustrated, the annular flat surface means 6 surrounds the terminus of the bore means 3 and is positioned in the central aperture (indicated generally at A) of the flange means 2, serving with the cylindrical bushing 8 to contain the constrictible ring means 9 when in non-engaged position with respect to a tube, such as the tube 10 (as best shown in Fig. 2), and to hold the ring in position as it is constrictibly engaged with said tube (as best shown in Fig. 3).

In the specific example illustrated, the selectively manually advanceable ring-compressing means comprises a rotatable body member, indicated generally at 11, centrally apertured at 12 and provided with an exteriorly threaded cylindrical surface 13, engageable with a threaded portion 14 of the bushing. Lying about the central tube receiving aperture 12 is inclined annular inner surface means 15, which, with exterior surface 13, thus forms a tapered ring-compressing rim. Said rim is adapted to be inserted between said ring 9 and said bushing 8, being selectively positionable in any desired location between complete removal and full ring-compressing insertion, by means of said threaded engagement of surface 13 with threaded surface 14 of the bushing. In this form of the invention, the constrictible ring means 9 comprises a toroidal spring.

The flange means 2 of the oral access port (or mouth-engaging means) is, in the specific form illustrated, provided with lateral apertures B and with strap holding

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means consisting of a pair of projecting studs 16. The access port is held firmly in position on the patient's head by a rubber strap 17 which is apertured in a plurality of locations 18 so as to be adjustably attachable to the strap holding studs 16.

In the modified form of the tube retainer illustrated in Fig. 6, the diameter of the mouth insertion member is reduced in certain directions, by a flat 19 (or diametrically opposed pair of flats), and the mouth-engaging means is, for insertion purposes, placed so that said flat is toward the teeth—thus insertion is facilitated; after insertion, the device is rotated until the normal-diameter portions of the mouth-insertion member are engaged by the interior of the mouth, and the face conforming flange engages the exterior of the mouth. In this form of the invention the normal (non-flatted) diameter of the enlarged portion of the mouth-insertion member may be larger than in the form of Figs. 1 through 5.

With reference to the flange means of Figs. 1 through 5, it should be noted that the height, with reference to the face, is considerably less than the width. It should also be noted that the radius of curvature of the flange in a vertical plane may be made greater than that in the horizontal plane, if desired. In other words, the flange is so constructed that it simulates the mouth portion of a face and may be placed comfortably against virtually any normal face.

The operation of the device may be briefly described as follows: The exploded components shown in Fig. 1 are assembled together in the position shown in Fig. 2. Then the mouth-insertion member 1 is inserted through the upper and lower teeth 7, as shown in Fig. 4, and the flange 2 is bound against the head by strap 17 as shown in Fig. 5. The tube 10 is inserted to a desired depth and the ring-compressing member 11 is threadedly advanced within the bushing 8 toward the annular flat surface 6 so as to cause the inclined surface 15 of the tapered rim to enter between the constricting ring 9 and the bushing 8, thus compressing the ring 9 into fastening engagement with respect to the tube 10 (as best shown in Fig. 3). The entire device will then be in operative relationship with respect to the patient's mouth and will maintain the tube 10 in a desired inserted relationship with respect to the patient's trachea and will allow the introduction of auxiliary apparatus into the mouth through apertures B, if desired, and will further provide adequate protection against occlusion of the tube 10 by the patient's teeth 7 or injury to the teeth or jaws by the tube.

Whenever it is desired to readjust the insertion depth of the tube 10, this can be done easily by merely threadedly retracting the ring-compressing means 11 from the position shown in Fig. 3 into the position shown in Fig. 2, then longitudinally readjusting tube 10, and then threadedly advancing the ring-compressing means 11 into the position shown in Fig. 3.

One specific form of the subcombination of the present invention can be considered to be adequately illustrated (in one specific embodiment) by the left member of the plurality of exploded members shown in Fig. 1, and comprises the mouth-insertion member 1, the mouth abutting flange member 2, and the bore means 3—also, this subcombination form of the invention may include the strap 17, such as is shown in Fig. 6. This subcombination form of the invention, considered broadly, may be employed with a variety of different types of tube chucks, etc., other than the specific one described and illustrated herein.

Numerous modifications and variations of the present invention will occur to those skilled in the art after careful study hereof. All such properly within the basic spirit and scope of the present invention are intended to be included and comprehended herein as fully as if specifically described, illustrated and claimed herein.

For example, the exact configurations of the mouth-insertion member, the mouth-abutting flange member, the annular flat surface means, the constrictible ring means,

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the bushing means, the tapered rim and other portions of the manually advanceable ring-compressing means are not critical and can be modified somewhat from the specific forms disclosed herein without departing from the spirit of the present invention.

Furthermore, while the strap holding means has been described as a pair of projecting studs engageable with apertures in a strap, the strap holding means may well consist of a pair of apertures engageable by studs held on the strap. Also, the apertures B may be replaced with scallops or convolutions at the edges of the flange means to permit the introduction of auxiliary apparatus into the mouth or for other ingress or egress purposes.

Furthermore, while the portions of the present invention, exclusive of the constrictible ring means, may preferably be made of a material such as "Lucite" (acrylic resin), or other suitable material sufficiently strong to support screw threads, and sufficiently resilient to preclude damage to a patient's teeth (polyethylene plastic might be used, especially for the oral access port as a separate entity), various other materials or combinations of materials may be employed.

It should also be noted that the constrictible ring means does not necessarily take the form of a toroidal spring but may comprise any suitable type of constrictible member capable of constrictible cooperation with an annular inclined surface, or the equivalent.

The exact compositions, configurations, constructions, relative positionings, and cooperative relationships of the various component parts of the present invention are not critical, and can be modified substantially within the spirit of the present invention.

The embodiments of the present invention specifically described and illustrated herein are exemplary only, and are not intended to limit the scope of the present invention, which is to be interpreted in the light of the prior art and the appended claims only, with due consideration for the doctrine of equivalents.

I claim:

1. An oral tube positioning retainer comprising: mouth-engaging means including external mouth-abutting flange means in which a central aperture is defined, a projecting mouth-insertion member mounted on said flange means and retainably engageable by the interior of the mouth, and bore means defined by said mouth-insertion member and connected to said central aperture, through which a hollow tube may pass from the oral cavity to said central aperture of said flange means; said mouth-abutting flange means being of a shape virtually complementary to the facial structures adjacent to the lips, said flange means being provided with strap-holding means; a tube-chuck mounted in said central aperture and including annular flat surface means and bushing means cooperable with said flange means, constrictible ring means, and manually advanceable ring-compressing means having a tube-receiving aperture and inclined annular inner surface means by which said ring may be selectively gradually constricted as said inclined surface is forcibly inserted between said ring and said bushing means toward said flat surface means, and by which said ring may be selectively gradually released as said surface is moved away from said flat surface means; said manually advanceable ring-compressing means being an annular cylindrical member screw-threadedly engageable with said bushing, said flat annular surface means being positioned within said central aperture around the connecting end of said bore means, and said constrictible ring means being a toroidal spring in slidable constrictible relationship with respect to said inclined surface means and in abuttingly retained relationship with respect to said flat surface means whereby said hollow tube, when introduced through said central aperture, may be positioned and protected from the jaws and be selectively retained in fixed position or released as it is respectively engaged or disengaged by said ring of said tube-chuck;

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strap means attachable to said strap-holding means, by which the head may be encompassed to hold said flange means firmly in position against the mouth.

2. An oral tube positioning retainer comprising: mouth-engaging means including external mouth-abutting flange means in which a central aperture is defined, a projecting mouth-insertion member mounted on said flange means and retainably engageable by the interior of the mouth, and bore means defined by said mouth-insertion member and connected to said central aperture, through which a hollow tube may pass from the oral cavity to said central aperture of said flange means; said mouth-abutting flange means being doubly curved and of shape virtually complementary to the facial structures adjacent to the lips, said flange means being comfortably placeable against the facial structures exterior to and nearby the mouth, said flange means including a plurality of lateral aperture means to communicate with the mouth, and strap-holding means; a tube-chuck mounted in said central aperture and including annular flat surface means and bushing means cooperable with said flange means, constrictible ring means, and manually advanceable ring-compressing means having a tube-receiving aperture and inclined annular surface means by which said ring may be selectively gradually constricted as said inclined surface is forcibly inserted between said ring and said bushing means toward said flat surface means, and by which said ring may be selectively gradually released as said surface is moved away from said flat surface means; said manually advanceable ring-compressing means being an annular cylindrical member screw-threadedly engageable with said bushing, said flat annular surface means being positioned within said central aperture around the connecting end of said bore means, and said constrictible ring means being a toroidal spring in slidable constrictible relationship with respect to said inclined surface means and in abuttingly retained relationship with respect to said flat surface means whereby said hollow tube, when introduced through said central aperture, may be positioned and protected from the jaws and be selectively retained in fixed position or released as it is respectively engaged or disengaged by said ring of said tube-chuck; strap means attachable to said

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strap-holding means, by which the head may be encompassed to hold said flange means firmly in position against the mouth.

3. An oral access port member serving to protect the front of the oral cavity and medical apparatus introduced therein from mutual damage, comprising: mouth-abutting flange means of shape virtually complementary to the facial structures adjacent to the lips, said flange means being provided with a central aperture and with strap-holding means; an internal mouth-insertion member mounted on said flange means and shaped so as to be firmly retained by the relaxed jaws; and bore means defined by said mouth-insertion member to permit free communication between the oral cavity and said central aperture of said flange means, through a constant-size opening; strap means attachable to said strap-holding means, by which the head may be encompassed to hold said flange means firmly in position against the mouth.

4. An oral access port member serving to protect the front of the oral cavity and medical apparatus introduced therein from mutual damage, comprising: mouth-abutting doubly curved flange means of shape virtually complementary to the facial structures adjacent to the lips, said flange means being comfortably placeable against the facial structures exterior to and nearby the mouth, said flange means defining a central aperture, a plurality of lateral aperture means to communicate with the mouth, and strap-holding means; an internal mouth-insertion member mounted on said flange means and shaped so as to be firmly retained by the relaxed jaws; and bore means defined by said mouth-insertion member to permit free communication between the oral cavity and said central aperture of said flange means, through a constant-size opening; strap means attachable to said strap-holding means, by which the head may be encompassed to hold said flange means firmly in position against the mouth.

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