

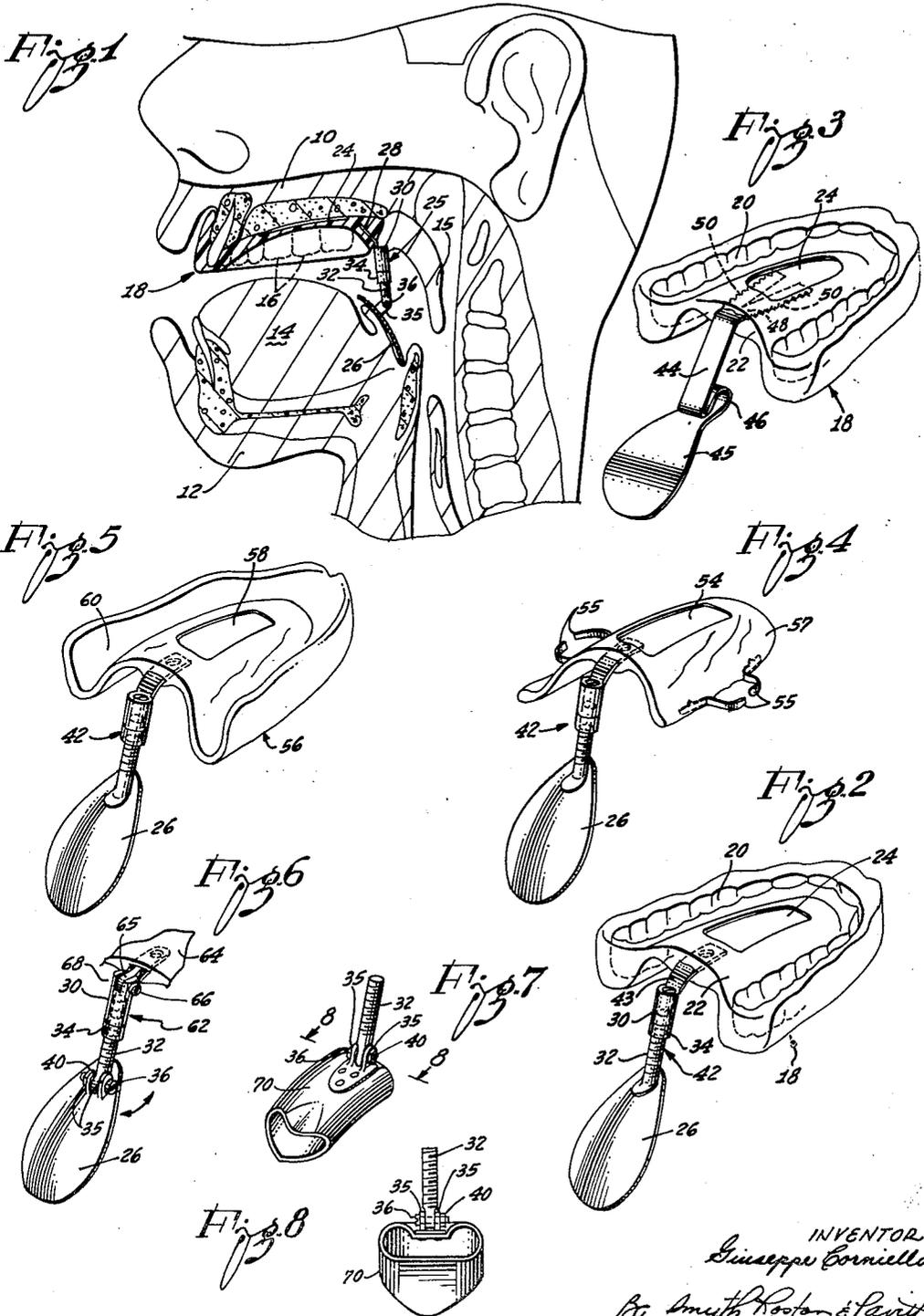
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ANTI-SNORING DEVICE

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ANTI-SNORING DEVICE

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This invention relates to a device adapted for use in a person's mouth for the purpose of preventing snoring.

The invention is based on the discovery that snoring may be prevented by insuring an adequate air passage between the base of the tongue and the soft palate and the further discovery that such a free air passage may be provided in most instances by simply depressing the rear portion of the tongue and in other instances by both depressing the tongue and supporting the tip portion of the soft palate in spaced relation to the tongue.

The invention is further directed to the problem of mounting such a tongue-depressing means in a person's mouth. One requirement, of course, is that the mounting means be comfortable for the user. A second requirement is that the mounting means be freely releasable since it is to be worn only at night. A third requirement is that the mounting means be adapted for reliably holding the tongue-depressing means in an effective position. Another requirement is that the mounting means be correctly shaped and dimensioned to conform with the anatomy of the mouth of the user. A further requirement is that the tongue-depressing means be adjustable to meet the particular requirements of a purchaser.

At first thought it would seem that a suitable support or mounting means for the tongue-depressing means of the invention could consist simply of means to clamp onto the lower teeth in the user's mouth. It has been found, however, that such a mounting means on the lower jaw prevents the user from swallowing and therefore, soon becomes intolerable. A mounting means on the upper jaw, however, does not interfere with swallowing. The problem, then, is to provide a support means capable of anchoring engagement with the user's upper jaw. The solution to this problem must take into consideration the fact that many people have few, if any, natural upper teeth and therefore wear removable upper dentures.

The invention meets this problem by providing different forms of mounting means, some for people with natural upper teeth and some for people who wear removable upper dentures. One form of mounting means for people with natural teeth has metal fingers to grip the upper teeth. Another form of mounting means for the same purpose comprises a body of plastic or other suitable material with a U-shaped groove dimensioned and shaped to receive and engage the whole set of upper teeth of the user. Another form of mounting means specialized for people who wear removable upper dentures is a plastic body which replaces the upper denture at night and is adapted to fit the upper gums of the user in the same manner as the replaced upper dentures.

In most instances, the tip of the soft palate which hangs downward near the rear portion of the tongue is relatively short so that merely depressing the rear portion of the tongue provides sufficient clearance for free breathing between the soft palate and the tongue to eliminate snoring. For such users, the tongue-depressing means may comprise a simple thin pad of metal or other suitable material on the end of a downwardly extending support arm.

In other instances, the downwardly hanging soft palate is so long and hangs so low that merely depressing the rear portion of the tongue fails to provide adequate breathing space between the soft palate and the tongue. In these latter instances, the invention both depresses the rear portion of the tongue and supports the soft palate

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upward away from the tongue to provide the degree of breathing clearance that eliminates snoring. For this purpose the tongue-depressing means may comprise a short tubular member, the lower side of which depresses the rear portion of the user's tongue and the upper side of which supports the low hanging soft palate away from the tongue.

Adjustability of the downwardly extending arm in length and angle for adjustment in the position of the tongue-depressing means to meet the particular need of a user may be provided in various ways. In one form of the invention the arm is in the form of a strip of metal of sufficient stiffness to serve its primary purpose, but nevertheless of sufficient pliability to be readily bent to different configurations. Forming such a pliable strip with a loop portion not only facilitates bending the arm to different angles, but also facilitates changing the effective length of the arm.

In another form of the invention, the arm is extensible and contractible in length by screw-thread action. The invention teaches that such an arm may be pliable for changes in angle or the arm may be provided with adjustable hinge means on at least one end of the arm.

The various features and advantages of the invention may be understood from the following detailed description and the accompanying drawing:

In the drawing, which is to be regarded as merely illustrative:

FIG. 1 is a fragmentary view of a user's head, partly in section, showing a selected embodiment of the invention mounted on the user's upper set of natural teeth;

FIG. 2 is a perspective view of a second embodiment of the invention that is also adapted to be mounted on the user's upper set of natural teeth;

FIG. 3 is a third embodiment of the invention which is also adapted to be mounted on the user's upper set of natural teeth;

FIG. 4 is a fourth embodiment of the invention which has pairs of curved fingers to engage selected teeth of the user's upper set of natural teeth;

FIG. 5 is a perspective view of an embodiment of the invention that temporarily replaces the user's removable upper denture and engages the upper gums of the user in the same manner as the upper denture;

FIG. 6 is a fragmentary perspective view showing the construction of an arm that may be substituted for any of the arms in the above-mentioned embodiments of the invention;

FIG. 7 is a perspective view of a tongue-depressing means in the form of a tubular member which is adapted not only to depress the user's tongue but also to support the soft palate in an upper position away from the tongue; and

FIG. 8 is an end view of the tubular member as seen along the line 8—8 of FIG. 7.

FIG. 1 shows the typical anatomical structure of the mouth of a user of the invention, including the upper jaw 10, the lower jaw 12, the tongue 14 and the soft palate or musculus uvulae 15 which hangs downward near the rear portion or base of the tongue. In the anatomical structure shown in FIG. 1 the user has an upper set of natural teeth 16.

The same mounting means, generally designated by numeral 18, is employed in each of the first three embodiments of the invention shown in FIGS. 1, 2 and 3. This mounting means 18 is in the form of a plastic body having a U-shaped groove or cavity 20 molded to conform closely to the configuration of the upper set of natural teeth 16. The plastic body has a central web 22 which is molded to a configuration to lie snug against the roof of the user's mouth, the central web having a shallow central recess 24

which is typical of a well-known type of upper denture. Such a plastic body may be accurately molded by well-known dental techniques.

Attached to the rear end of the mounting means 18 is a downwardly extending support arm 25 and on the lower end of the arm is mounted a suitable means to depress the rear portion of the user's tongue in the manner shown in FIG. 1. The tongue-depressing means may be a thin metal plate or pad 26 which is slightly curved to conform to the general curvature of the rear portion of the user's tongue. Preferably the thin metal pad 26 is somewhat pear-shaped as may be seen in the perspective views of the metal pad in FIGS. 2, 3 and 4. The upper end 28 of the support arm 25 is embedded in the molded plastic body of the mounting means 18.

The support arm 25 may be of any suitable construction, but in this instance is extensible and contractible in length and for that purpose comprises an upper internally threaded sleeve 30 and a lower screw 32 that adjustably screws into the sleeve. A lock nut 34 of the configuration of a smooth round collar is threaded onto the lower screw 32 and is tightened against the end of the upper sleeve 30 to immobilize the lower screw at any selected adjustment.

It is desirable that the tongue-depressing pad 26 be adjustable in angle or inclination to conform to the configuration of the user's tongue 14 and to suit the comfort of the user. In this first embodiment of the invention adjustable inclination of the pad 26 is provided primarily by a hinge at the lower end of the support arm 25, the hinge comprising a pair of spaced ears 35 on the pad 26 and a suitable pivot member 36 that extends through the two ears as well as through the lower end of the support arm.

If desired, the described hinge means may be sufficiently stiff in its pivotal action to maintain any angular position of the pad 26 to which the pad may be adjusted. Preferably, however, the hinge means at the lower end of the support arm 25 is of the general character shown in FIGS. 6, 7 and 8 in which the pivot member 36 is in the form of a headed screw carrying a nut 40. The headed screw 36 may be loosened in the nut 40 to permit freedom of angular adjustment of the metal pad 26 and then the headed screw may be tightened in the nut to clamp the two spaced ears 35 tightly against the lower end of the support arm to make the metal pad rigid relative to the support arm.

The construction of the embodiment shown in FIG. 2 is largely similar to the construction of the first embodiment of the invention as indicated by the use of corresponding numerals to indicate corresponding parts, the only difference being in the provision for angular adjustment of the pad 26. The screw 32 that forms the lower end portion of a support arm 42 is rigidly welded to the metal pad 26, as indicated, but the internally threaded sleeve 30 is connected to the mounting means 18 by a metal ribbon 43 that has sufficient rigidity to hold different angles of adjustment but is sufficiently pliable to permit changes in the angle.

In FIG. 3 the support arm 44 that extends downward from the mounting means 18 and a metal tongue-depressing pad 45 mounted on the lower end of the support arm are both integral portions of a single strip of suitable material such as stainless steel. The metal strip is sufficiently rigid to serve the primary purpose of the support arm 44 and the metal pad 45 but nevertheless is sufficiently pliable for adjustment by bending. A feature of this embodiment of the invention is that the metal strip is formed with two bends or rounded folds which provide a loop 46 in the strip at the lower end of the arm 44. This loop configuration facilitates bending the strip to adjust the angle of the metal pad 45 relative to the support arm 44 and also makes it possible to vary the effective length of the support arm 44 by increasing and decreasing the amount of the metal strip in the loop 46.

The upper end of the metal strip may be attached to the mounting means 18 in any suitable manner. In the construction shown, the upper end 48 of the metal strip is cut and spread to a forked configuration and, in addition, the opposite side edges of the embedded portion of the metal strip are formed with serrations or teeth 50 for positive engagement with the material of the mounting means 18.

The embodiment of the invention shown in FIG. 4 has a curved web 52 of metal or suitable plastic to fit the roof of the mouth, the web having the usual shallow central recess 54. This mounting means is provided with pairs of curved fingers of suitable metal to clasp selected upper teeth 16 of the wearer. In this instance there are two pairs of curved fingers 55 as shown. The metal pad 26 is mounted on the web 52 by means of the same support arm 42 that is shown in FIG. 2.

The embodiment of the invention shown in FIG. 5 includes a mounting means, generally designated 56, which is constructed to replace during sleeping hours a wearer's removable upper denture. For this purpose the mounting means 56 is a web of suitable material molded to conform to the gums and roof of the user's mouth, the web having the usual shallow central recess 58 and the usual U-shaped groove 60 to conform to the configuration of the upper gums. The pad 26 is connected to the mounting means 56 by a previously described support arm 42.

FIG. 6 shows a support arm, generally designated 62 that may be substituted for any of the previously described support arms. The support arm 62 is adjustable in length and therefore comprises the usual upper internally threaded sleeve 30 in combination with the usual lower screw 32 and a cooperating lock nut 34. The support arm 62 differs from the previously described support arms in being hingedly connected both to the metal pad 26 and the mounting means, which mounting means is designated 64.

The support arm is connected to the metal pad 26 by the previously described lower hinge means comprising a pair of ears 35 and a screw 36 threading into a nut 40. To provide the upper hinge, the upper end of the internally threaded sleeve 30 forms a clevis to receive an apertured tongue 65 that is rigidly fixed to the mounting means 64. A pivot means in the form of a screw 66 extends through the clevis and the apertured tongue, the screw threading into a nut 68. It is apparent that the lower hinge screw 36 may be temporarily loosened to permit angular adjustment of the metal pad 26 relative to the support arm 62 and the upper hinge screw 66 may be temporarily loosened to permit angular adjustment of the support arm relative to the mounting means 64.

FIGS. 7 and 8 show how a tubular passage member 70 made of plastic or other suitable material may be substituted for a metal pad in any of the previously described embodiments of the invention, the purpose of the tubular member being not only to depress the user's tongue, but also to elevate and support the downwardly hanging soft palate. Preferably the tubular passage member 70 has a shallow recess or groove 72 on its upper side at its rearward end to cradle the tip of the soft palate. The tubular passage member 70 may be mounted on any of the previously described support arms in any suitable manner. In FIGS. 6 and 7 the passage member 70 is illustrated as mounted by a previously described lower hinge on the lower end of a screw 32 which constitutes the lower portion of a previously described extensible support arm.

My description in specific detail of the selected embodiments of the invention will suggest various changes, substitutions and other departures from my disclosure within the spirit and scope of the appended claims.

I claim:

1. A device to prevent snoring comprising:
a mounting means adapted to fit into a user's mouth in fixed engagement with the user's upper jaw; and
means extending downwardly from said mounting

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means to contact the user's tongue in the region of the soft palate to provide an unobstructed air passage between the tongue and the soft palate, said means to contact the user's tongue, including a tubular member to support the soft palate in spaced relation to the tongue.

2. A device as set forth in claim 1 in which said downwardly extending means is made in multiple adjustably interconnected sections for adjustment in length.

3. A device as set forth in claim 1 in which said mounting means comprises a body with an arcuate groove to receive and engage the upper teeth of the user.

4. A device as set forth in claim 1 in which said mounting means comprises a body having fingers to releasably grip the upper teeth of the user.

5. A device to prevent snoring comprising:
a mounting means to fit into a user's mouth in fixed engagement with the user's upper jaw;

means for contact with the user's tongue in the region of the soft palate to provide an unobstructed air passage between the tongue and the soft palate; and an arm extending downward from said mounting means and connecting said contact means to the mounting means, said arm maintaining said contact means in position to contact and depress the tongue in the region of the soft palate to provide an unobstructed air passage between the tongue and the soft palate, said means to contact the user's tongue, including a tubular member to support the soft palate in spaced relation to the tongue.

6. A device as set forth in claim 5 in which said arm is made in multiple adjustably interconnected sections for adjustment in length.

7. A device as set forth in claim 5 in which said arm is adjustable in angle relative to at least one of said mounting means and contact means.

8. A device to prevent snoring, comprising:
a mounting means adapted to fit into a user's mouth in fixed engagement with the user's upper jaw; means for contact with the user's tongue in the region of the soft palate to provide an unobstructed air passage between the tongue and the soft palate; a support arm for said contact means extending down-

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ward from said mounting means to the contact means; and

hinge means at at least one end of said arm, said hinge means including a pivot member in the form of a screw adapted to be loosened to permit adjustment and tightened to maintain the adjustment.

9. A device as set forth in claim 8 which includes hinge means at both ends of the arm.

10. A combination as set forth in claim 8 in which said arm is made in two parts for adjustment in length.

11. A device to prevent snoring comprising:
a mounting means adapted to fit into a user's mouth in fixed engagement with the user's upper jaw; and means extending downward from said mounting means, said downwardly extending means including a lower wall to contact the user's tongue in the region of the soft palate and an upper wall to support the soft palate in spaced relation to the tongue, said two walls being spaced apart to form an air passage therebetween.

12. A device to prevent snoring comprising:
a mounting means adapted to fit into a user's mouth in fixed engagement with the user's upper jaw; a metal strip curving rearward and downward from said mounting means, said strip being pliable for angular adjustment.
an internally threaded downwardly extending sleeve carried by said strip;

means to contact the user's tongue in the region of the soft palate to provide an unobstructed air passage between the tongue and the soft palate; and means to support said contact means, said support means having a portion threaded into said sleeve for longitudinal adjustment thereon.

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