July 25, 1933. L. L. DOANE 1,919,543

MEANS FOR EFFECTING THE BLOODLESS REMOVAL OF DISEASED TISSUE

Filed March 29, 1930

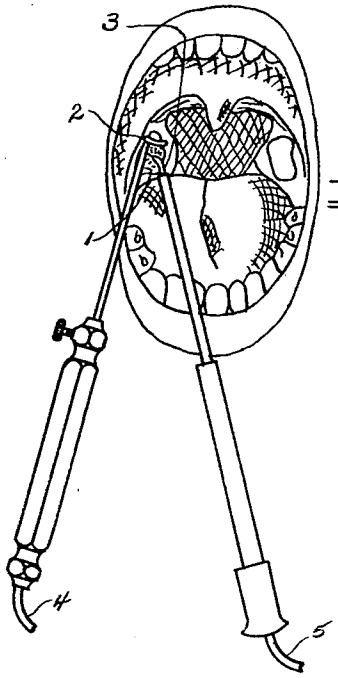


Fig. 1.

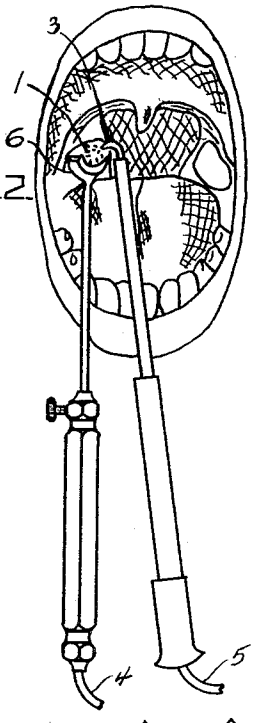


Fig. 2.

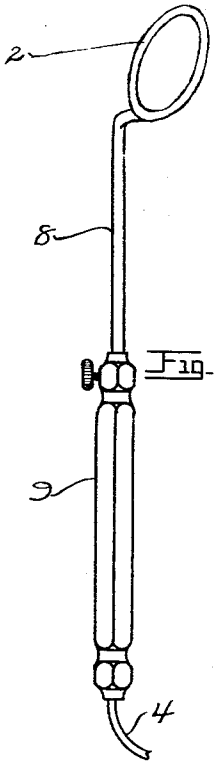


Fig. 3.

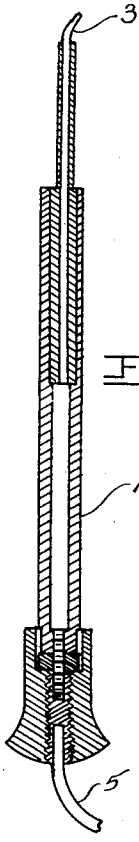


Fig. 5.

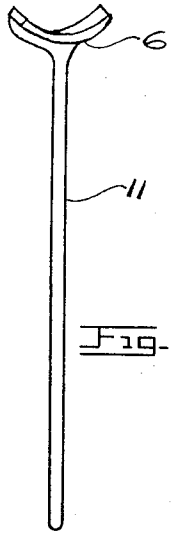


Fig. 4.

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Patented July 25, 1933 1,919,543

UNITED STATES PATENT OFFICE

LEON LEO DOANE, OF BUTLER, PENNSYLVANIA, ASSIGNOR TO McINTOSH ELECTRICAL CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

MEANS FOR EFFECTING THE BLOODLESS REMOVAL OF DISEASED TISSUE

Application filed March 29, 1930. Serial No. 439,880.

My invention consists of an improved method of removal of tonsillar tissue and also of an improved means or instruments for carrying the method into effect.

The prime object of the invention is to remove diseased tonsillar tissue in a bloodless manner by means of an electric current and to restrict the action of the electric current to the diseased area.

A further object of the invention is to provide suitable electrodes to localize the current to the desired tonsil area.

Other objects of the invention will appear from the following description which is directed to the preferred embodiment of the invention as shown in the drawing and hereafter described, the novel features being more particularly set forth in the appended claims.

In the drawing,

Fig. 1 is a view of the open human mouth, illustrating an application of my method by means of a ring electrode,

Fig. 2 is a similar view showing the use of a crutch type of electrode,

Fig. 3 is a perspective view of a ring type electrode mounted in a handle,

Fig. 4 is a perspective view of a crutch type of electrode removed from the handle, and

Fig. 5 is a longitudinal sectional view through the needle point or active electrode mounted in an insulated handle.

Similar numerals refer to similar parts throughout the several views.

The reference character 1, in Fig. 1, indicates a tonsil, the electrodes 2 and 3 being adjusted to the tonsil, to conduct to it an electric current of high voltage and high frequency, preferably of the d'Arsonval type, by means of the conductors 4 and 5 connected with the electrodes. In the practice of the improved method, the electrode 2 in Fig. 1 and the electrode 6 in Fig. 2 are known as the indifferent electrodes and are utilized to restrict the electric current to a desired area. The electrode 3 shown in Fig. 1 and in Fig. 2, is known as the active electrode. Due to the smallness of the point of the active electrode relatively to the surface of the indifferent electrode applied to the tonsil, and the fact that the same amount of current flows through the active electrode as flows through the indifferent electrode, the density of the current flow concentrated at the point of the active electrode causes the tonsillar tissue to coagulate at the point of application of the active electrode, the electric current flow is limited to the area between the active and the indifferent electrode, and the density of the current flow at the indifferent electrode is so small that undesirable effects at the indifferent electrode may readily be avoided.

After the coagulation or destruction of the tonsillar tissue is complete, the coagulated tissue may be left in situ or removed by any suitable instrument.

According to the method heretofore employed for the coagulation of tissue of the tonsils, it has been customary to use a large indifferent electrode, consisting either of a handle held in the hand of the patient, or a large sheet metal plate placed upon the abdomen or back of the patient, connected with a source of electric current of high voltage and high frequency, and an active electrode, consisting of a needle attached to an insulated handle and connected with the source of current, the needle being inserted in that portion of the tonsil where it is desired to produce coagulation of the tissue. The employment of this method causes the current to flow through the tonsillar tissue and through the bases of the pillars and deeper structures of the throat, causing an engorgement of the blood vessels of this region, which may result in edema of the pillars and adjacent tissues with much discomfort to the patient and the possibility of a secondary hemorrhage later.

By the improved method of my invention, instead of applying an indifferent electrode to the hands, the back or abdomen of the patient, necessitating a strong current to overcome the resistance of the body, the two electrodes are placed near each other, with little intervening tissue; hence, a minimum resistance exists, and a mild current suffices. Selection is made from various

forms of indifferent electrodes of the one best adapted to the structure of the tonsils to be treated. This electrode is attached to the metal handle 9 in Fig. 3 and connected to a source of electric current of high voltage and high frequency, and the active electrode 3 in Fig. 1 is connected to a second terminal of the same source of electric current.

By means of the indifferent electrode, the tonsil is engaged at its base and the pillars are retracted from the tonsil; then the active electrode is inserted into the portion desired to be treated and by means of a suitable switch connected in the electric circuit, the current is turned on for a period sufficient to produce coagulation, after which the current is turned off.

Employment either of the ring or crutch type of electrode as the indifferent electrode in close proximity to the active electrode, causes a rapid coagulation of the diseased tissue.

Figs. 3, 4 and 5 show different forms of metal electrodes which may be used to carry out my improved method of removing tonsillar tissue. In Fig. 3, one form of the ring type of indifferent electrode is shown at 2, having a shank 8, mounted in a metal handle 9, connected with a current carrying cord 4. In Fig. 4 one form of the crutch type of indifferent electrode is shown at 6, having a shank 11. In Fig. 5 a needle type or active electrode 3 is shown provided with an insulated handle 13, and connected with a current carrying cord 5.

It will be understood that the electrodes shown and described in connection with Figs. 3, 4 and 5 are illustrative of particular forms of the several types shown, and that many other forms may be employed without departing from my invention. For example, with the ring type of electrode illustrated in Fig. 3, any desired size and shape of ring may be employed, having any desired inclination and relation to the shank of the electrode. Similarly, with the crutch type of electrode illustrated in Fig. 4, any desired shape and proportions may be employed, having any desired relation to the shank of the electrode. For convenience, the shanks of the indifferent electrodes are of a size to be held by the same handle 9, although each may be provided with its own handle if preferred.

Referring particularly to Figs. 3 and 4, the contact area of electrode 2 in Fig. 3 and of electrode 6 in Fig. 4, is extremely large in comparison with the contact area of the needle point 3 of the active electrode in Fig. 5. The ring 2 shown in Fig. 3 and its shank 8 are of metal, the ring being of proper size to closely fit the tonsil being treated. The crutch type of indifferent electrode 6, shown in Fig. 4, is curved to fit the curvature of the tonsil and is used when it is difficult to place the ring type electrode over the tonsil, the electrode 6 and shank 11 being of metal. All of the shanks of the indifferent electrodes are preferably made to interchangeably fit the metal handle 9, which may have the electric cord 4 permanently connected with it.

The active or needle point electrode 3 shown in Fig. 5, is completely insulated by the insulation of the handle 13, nearly to the point of the needle, leaving, for example, about one-quarter of an inch of the point of the needle exposed, and the current conducting cord 5 may be permanently connected with the shank of the needle in the handle 13.

In the use of these electrodes and employing the method described, the removal of tonsillar tissue is accomplished as follows:

The electrodes are connected by means of the current carrying conducting cords to a suitable supply of high frequency current; the indifferent electrode is then applied to the base of the tonsil, retracting intervening membranes; the active electrode is then inserted into the diseased tissue of the tonsil in proximity to the indifferent electrode, the metal and insulated handles being held by the operator; the electric current is then turned on by a suitable switch, causing the current to flow through the electrodes and intervening tissue; the concentration of current on the needle or active electrode, limits the destruction of tissue to this area and thereby prevents the current from affecting the healthy tissue. Coagulation of tonsillar tissue by this method successfully sears the area at the point where the active electrode is applied, with no effect at any point other than the area between the electrodes. This searing and coagulating effect prevents both superficial and deep bleeding and thereby prevents painful and distressing reactions in healthy tissue.

While I have shown my invention in the particular embodiment above described, it will be understood that I do not limit myself specifically to the steps of treatment described, in carrying out my improved method, and that I do not limit myself specifically to the particular constructions above described, as I may employ equivalents known to the art at the time of the filing of the present application without departing from the scope of the appended claims.

What I claim is:

1. Means for retracting pillars from tonsillar tissue and coagulating the tonsillar tissue, consisting of the combination of an inactive metal electrode having a rigid pillar retracting portion of metal for connection with a first electrical conductor con-

nected with one terminal of a source of high frequency current of the d'Arsonval type, and an active electrode comprising an insulated metal rod exposed at its end for application to tissue to be coagulated and for connection with a second electrical conductor connected with the other terminal of said source of current, said electrodes being independent of each other mechanically and cooperating in the hands of an operator to effect tissue retraction and coagulation of limited tissue areas adjacent the active electrode, whereby separation and retraction of the tissues may be effected by the inactive electrode independently of the active electrode and for any tissue retracting and separating position of said inactive electrode, cooperation of said electrodes may be had to coagulate desired tissue.

2. Means for retracting and coagulating tonsillar tissue, consisting of the combination of an inactive metal electrode having a rigid ring portion of metal for retracting tonsillar tissue and for connection with a first electrical conductor connected with one terminal of a source of high frequency current of the d'Arsonval type, and an active electrode comprising an insulated metal rod exposed at its end for application to tissue to be coagulated and for connection with a second electrical conductor connected with the other terminal of said source of current, said electrodes being independent of each other mechanically and cooperating in the hands of an operator to effect tissue retraction and coagulation of limited tissue areas adjacent the active electrode, whereby separation and retraction of the tissues may be effected by the inactive electrode independently of the active electrode and for any tissue retracting and separating position of said inactive electrode, cooperation of said electrodes may be had to coagulate desired tissue.

3. Means for retracting and coagulating human tissue, consisting of the combination of an inactive metal electrode having a rigid tissue retracting portion of metal for connection with a first electrical conductor connected with one terminal of a source of high frequency current of the d'Arsonval type, and an active electrode comprising an insulated metal rod exposed at its end for application to tissue to be coagulated and for connection with a second electrical conductor connected with the other terminal of said source of current, said electrodes being independent of each other mechanically and cooperating in the hands of an operator to effect tissue retraction and coagulation of limited tissue areas adjacent the active electrode, whereby separation and retraction of the tissues may be effected by the inactive electrode independently of the active electrode and for any tissue retracting and separating position of said inactive electrode, cooperation of said electrode may be had to coagulate desired tissue.

LEON LEO DOANE.

CERTIFICATE OF CORRECTION.

Patent No. 1,919,543. July 25, 1933.

LEON LEO DOANE.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 97, claim 3, for "electrode" read "electrodes"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of September, A. D. 1933.

F. M. Hopkins

(Seal) Acting Commissioner of Patents.