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S. H. GROFF

1,735,271

DIATHERMY KNIFE

Filed March 14, 1928

Fig. 1.

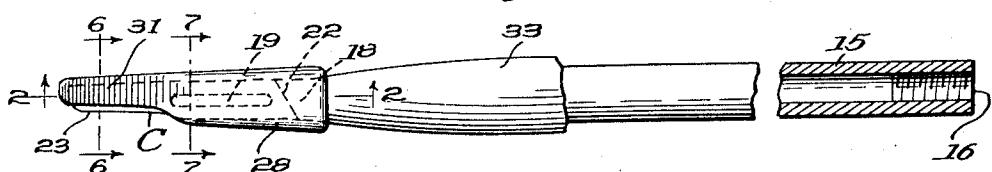


Fig. 2.

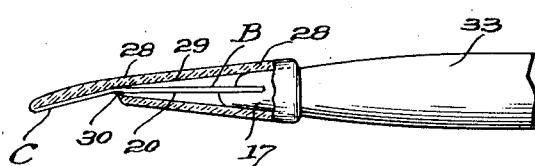


Fig. 3.

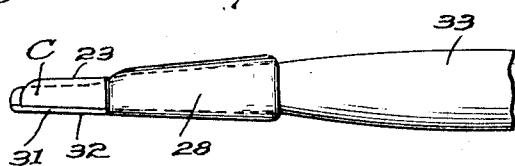


Fig. 4.

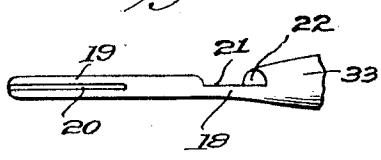


Fig. 5.

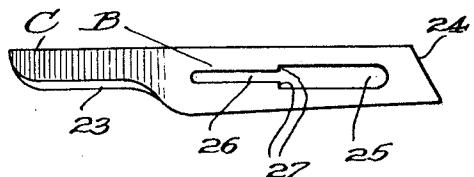


Fig. 6.

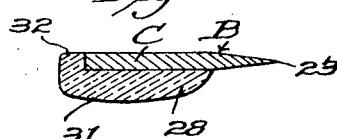


Fig. 7.



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DIATHERMY KNIFE

Application filed March 14, 1928. Serial No. 261,585.

My invention relates to surgical instruments for use in diathermy where electricity is employed to heat and thus destroy the tissue through a process of tissue coagulation and without bleeding, and my invention is more particularly in the nature of an improvement in the form of diathermy knife shown and described in Letters Patent of the United States No. 1,639,996, issued to me on the twenty-third day of August, 1927.

An important object of my invention is to provide a knife wherein is included novel and positively functioning means which, when the invention is used in the practice of tonsillectomy, will serve to protect the pillars from the action of heat and from the action of the cutting blade and which serves to expose the effective cutting edge of the blade and cause the diathermy current to sever the tissues between the pillar and the tonsil, while said means follows the pillar during the incisional and reaming steps.

My invention is so designed that the cutting blade is held with its edge parallel with the pillar so that the latter is not severed when the operation is being performed.

In the accompanying drawings,

Figure 1 is a view in side elevation of the instrument;

Figure 2 is a longitudinal section on line 2—2 of Figure 1, with parts in full lines;

Figure 3 is a view similar to Figure 1, looking toward the opposite side of the instrument;

Figure 4 is a view similar to Figure 3, showing the blade holding means in side elevation;

Figure 5 is a view in perspective of the blade;

Figure 6 is a section on line 6—6 of Figure 1; and

Figure 7 is a section on line 7—7 of Figure 1.

In carrying the invention into practice, use is made of an elongated body 15 of suitable well-known conducting material, preferably in the form of a metal tube, one end of which is open and interiorly threaded, as indicated at 16, to provide a socket in which is adapted to be received the terminal of a

wire (not shown), and constituting a part of the conventional high frequency system for supplying current to the electrode. The opposite end of the body 15 is closed and terminates in a conical portion 17, the latter, in turn, provided with an extension 18 which is constructed to provide means for holding the blade B thereon. This extension 18 is formed of conducting material and comprises an elongated head 19 slotted at 20 and terminating in spaced relation to the tapered portion 17, the intervening portion 18 having a flat side 21 and an inclined shoulder 22. The head 19 is provided with a V-shaped cutting edge 23, a beveled end 24, a slot having a wide portion 25 and a narrow portion 26, with intervening shoulders 27. In the applied position of the blade to the head, the slotted portion of the head 19 engages within the slot 20, the remainder of the head being received in the slot 25. The end 24 of the blade abuts the shoulder 22 and thus the blade is removably secured on the extension. Beyond the outer end of the head 19, the blade B is formed with a reduced angularly disposed extension C, and, as illustrated, said cutting surface 23 extends along one edge of this extension. By arranging the portion C at a suitable angle to the axis of the body 15, the flat back of the blade will lie parallel to the pillar when the tonsil is being operated upon.

The adapter 28 is in the form of a sleeve having an internal flared wall 29 which fits over the conical portion 17 and frictionally engages therewith. It extends in a forward direction and is open at 30 for the passage therethrough of the reduced blade extension C. Under the back of the reduced extension C and formed as an integral part of the sleeve 28 is a guard 31. This guard comes flatwise against the back of the said blade extension C, and, at 32, same is formed with a longitudinal rib which comes flush with the front face of the said extension. The free end of the guard follows the end curvature of the blade and the guard then proceeds to follow the cutting edge of the blade, being related thereto so that only the effective cutting surface of the blade is exposed therefrom. This

guard extends angularly with respect to the longitudinal axis of the instrument and conforms with the angle of the said blade extension so that it may follow the pillar and effectively adapt itself thereto when the operation of removing the tonsil is being performed, and being formed of heat-insulating material protects the pillar from the heat induced by the electric current passing into the knife.

The electrode 15 is enclosed within a jacket 33 of hard rubber or other well-known heating and electrical insulating material, and the sleeve 28 is correspondingly formed.

In this manner, and when current is supplied to the electrode 15, the cutting edge of the blade becomes charged, and in manipulating the knife, the cutting edge of the blade is made to penetrate the tissue to be removed, and immediately upon contact of the blade with the tissue, current is conducted thereto to effect sufficient heating to destroy the tissue. Consequently, as the blade penetrates, it functions to sever the tissue and follow the tonsil so that the latter can be removed without bleeding. As in the case of my invention set forth in the aforementioned U. S. Letters Patent, the cutting edge of the blade being in contact with the tissue effects a concentration of the current along such cutting edge, to thereby effect a rapid destruction of the tissue and with a minimum consumption of current.

It is to be understood that the instrument is to be made with blades and co-acting adapters that will permit operations to be performed upon the right and left tonsils, respectively.

I claim as my invention:

1. A diathermy knife comprising a tissue protecting member of insulating material, a cutting blade associated with the adapter and provided with a sharp edge exposed from a portion thereof, and means to cause an electric current to be conducted to the blade, the said member covering at least one side and the back of the blade.

2. A diathermy knife comprising an electrode, a blade detachably secured on the electrode and having a relatively sharp cutting edge, and a member of insulating material arranged flatwise against one face of the blade and related to the aforesaid cutting edge thereof so that same is exposed from said member.

3. A diathermy knife for use in the practice of tonsillectomy comprising an electrode provided with a blade having a cutting edge, and a member of insulating material associated with the electrode and the blade so that the said cutting edge is exposed therefrom, thereby permitting the member to bear against and follow over the pillar while the knife, when charged with a diathermy current, is permitted to sever the tissues between

the pillar and the tonsil when the knife is manipulated.

4. A diathermy knife for use in the practice of tonsillectomy comprising an electrode provided with a blade having a cutting edge, and a member of insulating material associated with the electrode and the blade so that the said cutting edge is exposed therefrom, thereby permitting the member to bear against and follow over the pillar while the knife, when charged with a diathermy current, is permitted to sever the tissues between the pillar and the tonsil when the knife is manipulated, the blade disposed at an angle to the electrode so that the cutting edge of the blade may be disposed parallel with the pillar.

5. A diathermy knife comprising an electrode, a blade thereon having a sharp cutting edge, whereby current from the electrode will be concentrated along the cutting edge and a burning of the tissue effected as the blade penetrates to permit the removal of the tissue without bleeding, and means of insulating material arranged flatwise against one side of the blade for protecting the tissue during manipulation of the knife.

6. A diathermy instrument including an elongated electrode having a blade at one end, the blade having an angular extension provided with a continuous cutting edge, and a backing of insulating material extending along one face of the blade but with respect thereto so that the cutting edge of the blade is freely exposed therefrom along one edge thereof.

7. A tissue protecting device for use in connection with diathermy knives comprising a member of insulating material having a portion to receive and cover a knife blade and from which said portion the cutting edge of the blade will be effectively exposed for use, while protecting other parts of the blade against contact with the tissue.

8. A tissue protector for diathermy knives comprising a body of insulating material having a hollow portion into which a cutting blade is insertable to partially project therefrom with its cutting edge exposed, and another portion of such shape as to cover at least one side and the back of the projecting part of the cutting blade when the blade is inserted into the first mentioned portion.

9. A tissue protector for diathermy knives comprising a body of insulating material having an internally flared hollow portion adapted to fit over a cutting blade holder and to receive a cutting blade carried by the holder with the blade partially projecting to expose its cutting edge, and another portion of such shape as to cover at least one side and the back of the projecting part of the blade when the protector is in applied position.

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