

Oct. 8, 1929.

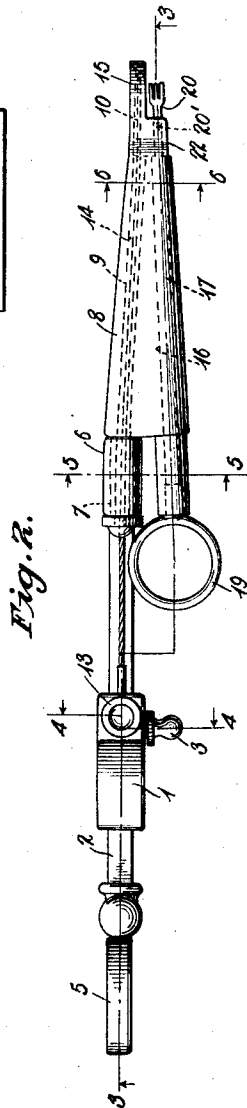
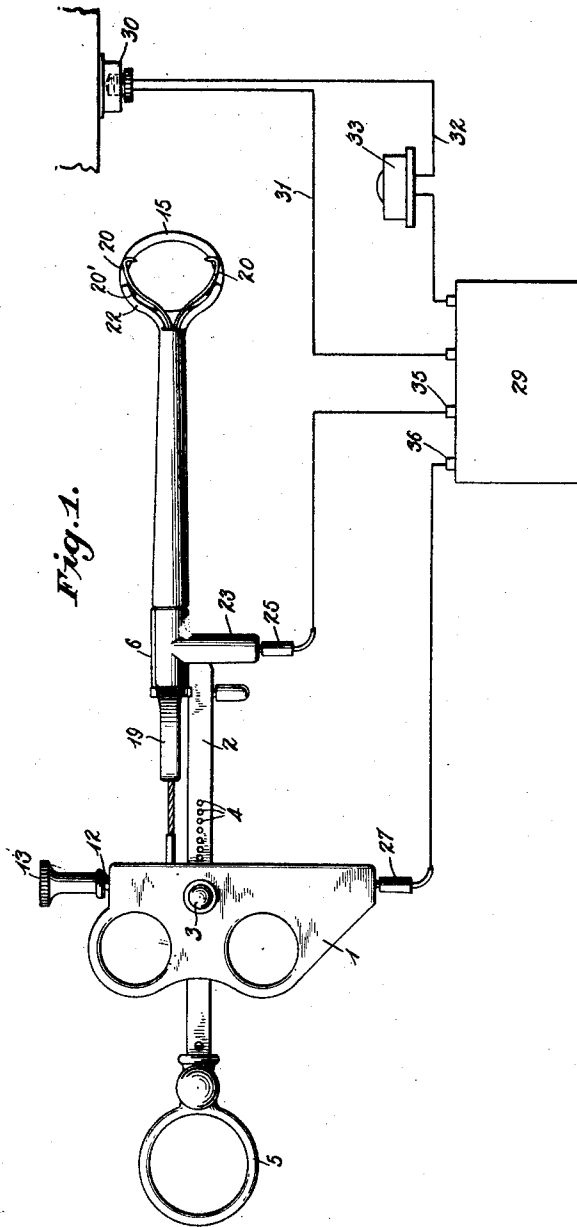
F. P. HERMAN

1,731,069

SURGICAL INSTRUMENT

Filed Jan. 16, 1928

3 Sheets-Sheet 1



INVENTOR.
F.P.Herman
BY *Knights*
ATTORNEYS

Oct. 8, 1929.

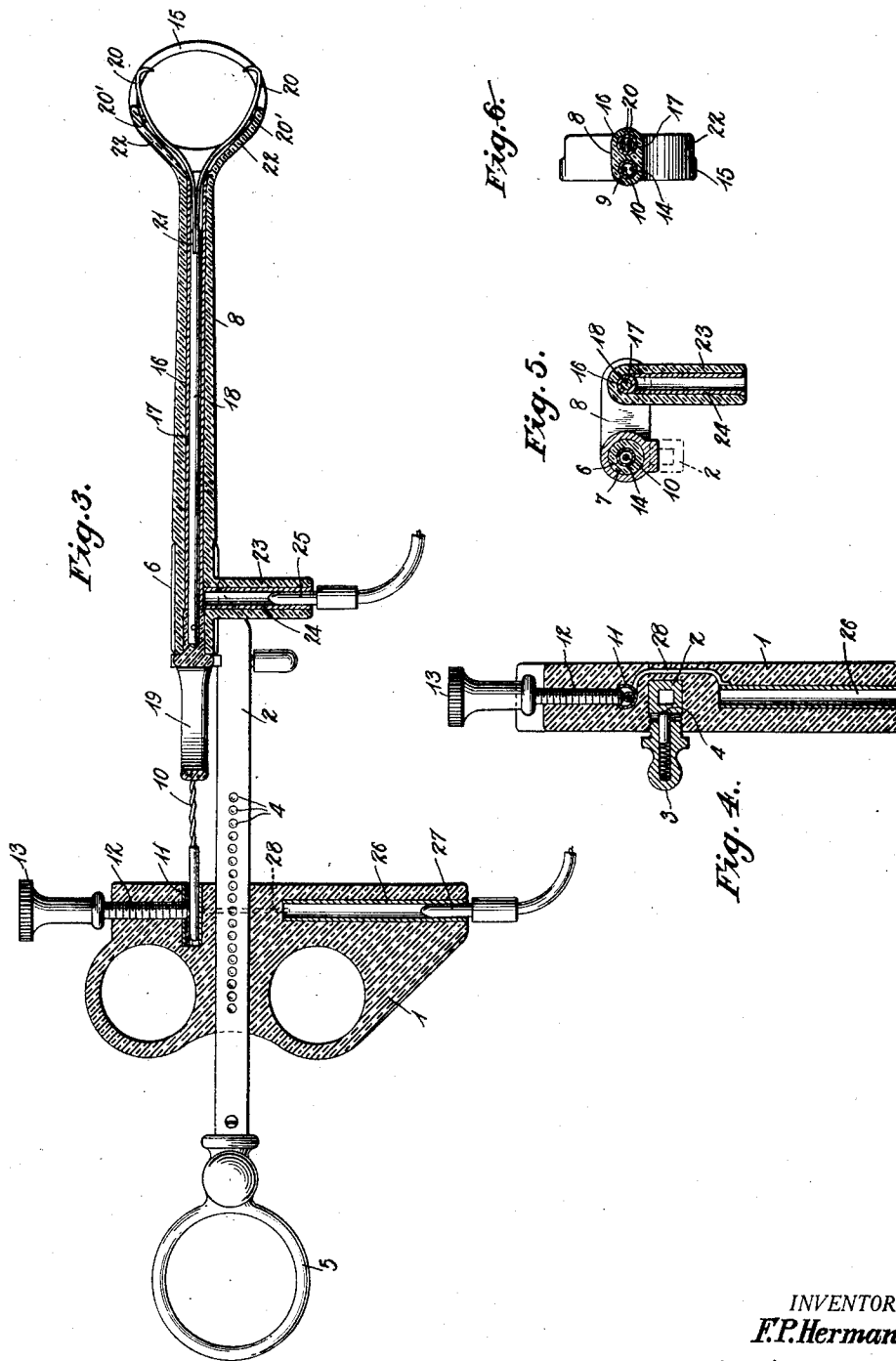
F. P. HERMAN

1,731,069

SURGICAL INSTRUMENT

Filed Jan. 16, 1928

3 Sheets-Sheet 2



INVENTOR.

F.P.Herman

BY

Knight & Co

ATTORNEYS

Oct. 8, 1929.

F. P. HERMAN

1,731,069

SURGICAL INSTRUMENT

Filed Jan. 16, 1928

3 Sheets-Sheet 3

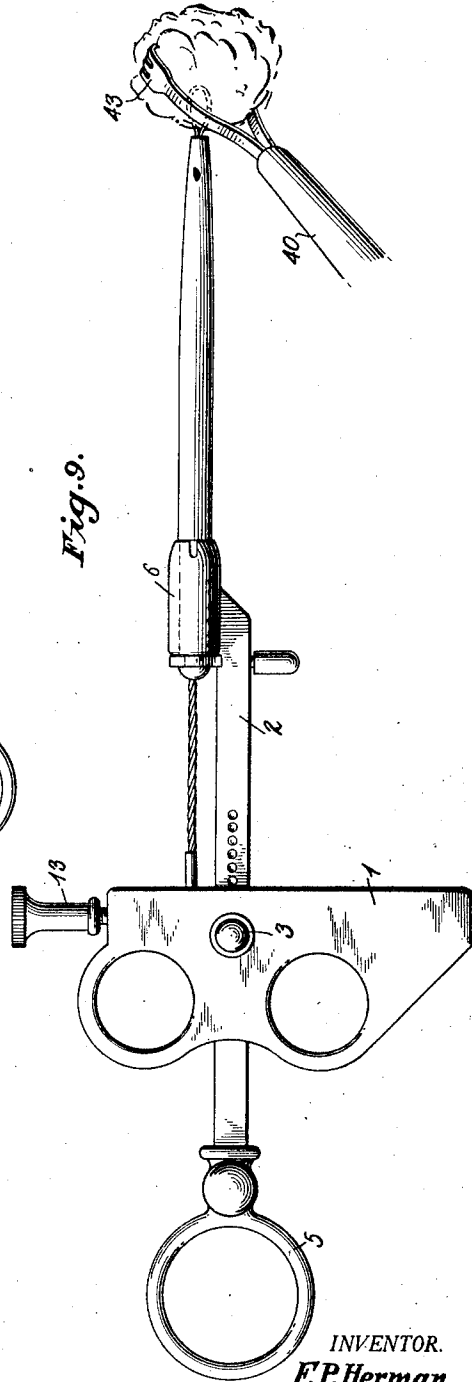
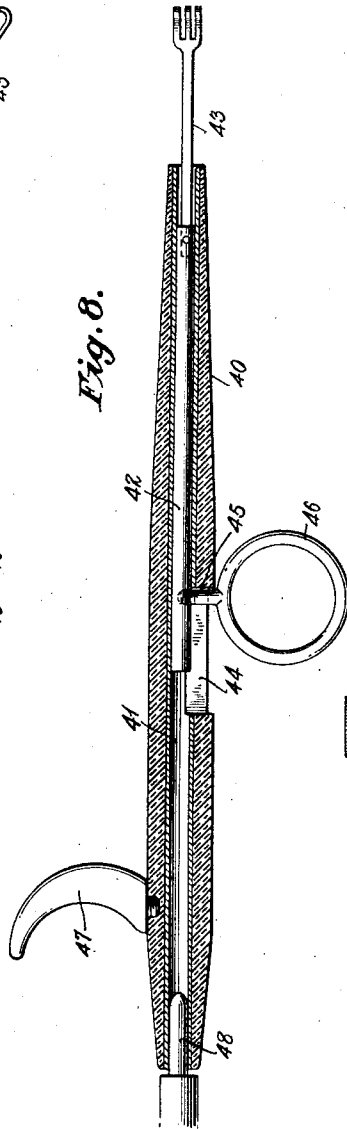
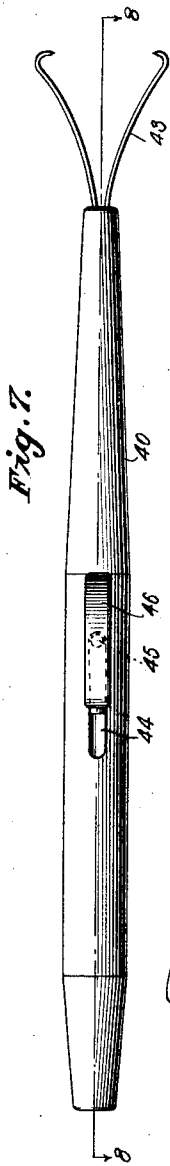


Fig. 9.

INVENTOR.
F.P.Herman

BY *Knight*

ATTORNEYS

UNITED STATES PATENT OFFICE

FLORENTINE PETER HERMAN, OF WEST PALM BEACH, FLORIDA

SURGICAL INSTRUMENT

Application filed January 16, 1928. Serial No. 247,202.

This invention relates to a surgical instrument which is an improvement on the instrument described in my co-pending application Serial No. 202,345, filed June 28th, 1927.

5 Both the older instrument shown in my said co-pending application and the newer one which forms the subject matter of this application utilize an electric current of high frequency which is capable of cutting tissue.

10 The current may be an undamped current of high frequency, for example about 1,000,000 cycles, or a spark gap current of a sufficiently high spark frequency to resemble an undamped current of a sufficiently high frequency to have the property of cutting. In the older instrument the active terminal of the source of current was connected to a metallic snare and inactive terminal thereof to a large sheet such as lead foil to be applied to any part of the body, the snare being so insulated that only the cutting portion thereof was exposed.

15 In the new instrument according to the present application the sheet of lead foil is done away with and the inactive terminal of the generator is connected to a member which is adapted to engage the tissue which is to be removed. This member may be either mounted directly on the snare supporting member or it may be a separate instrument, the latter arrangement being more desirable for certain purposes. The new instrument has a number of advantages over the older one, the principal advantage being that the current passes only through the tissue which is to be removed and not through the body. As a result of this feature the scar tissue is very slight and it is possible to positively cook the tissue which is to be removed without affecting the underlying tissue. During the operation the snare wire remains cold, the cutting action being the result of the electric current itself and not of a heated snare. A further advantage of the instrument in which the member to which the inactive terminal is connected is mounted on the snare support is that only a single application of the instrument to the tissue to be removed is required. The said member is preferably in the form of a forceps which serves not only to form an electric contact therewith, but also to grasp the tissue so that no other forceps are needed. This feature is of particular importance in tonsillotomy because of the limited space within which the surgeon has to operate.

55 The separate tissue engaging member which is preferably in a form of a forceps may also be connected to the active electrode of the generator and used to grasp a gauze sponge which is dipped into a saline solution and applied to bleeding parts after the operation. In this case the inactive electrode is applied to a portion of the body adjacent the wound, for example on the neck directly opposite the tonsil externally and the current passes through the dampened sponge and seeks the avenue of least resistance which is naturally that point from which the blood is flowing, namely, the artery or vein which is bleeding or oozing. This brings about a direct application of coagulating current down the terminus of the artery or vein needing the same. The invention is applicable to instruments for many different kinds of operations, but the nature of the invention will be sufficiently understood from the accompanying drawing and specification in which I have shown and described two embodiments of the invention suitable for tonsillotomy.

70 Fig. 1 shows in side elevation an instrument of the type having a forceps mounted on the snare support itself. A wiring diagram is also shown in this figure.

75 Fig. 2 is a plan view of the instrument shown in Fig. 1.

80 Fig. 3 is a longitudinal section on the line 3—3 of Fig. 2.

85 Fig. 4 is a section on the line 4—4 of Fig. 2.

90 Fig. 5 is a section on the line 5—5 of Fig. 2.

95 Fig. 6 is a section on the line 6—6 of Fig. 2.

Fig. 7 is an elevation of a separate forceps.

Fig. 8 is a longitudinal section thereof on the line 8—8 of Fig. 7, and

Fig. 9 shows the manner in which the separate forceps is used in combination with an open snare.

Referring first to Figs. 1 to 6 a finger grip 1 is slidably mounted upon a bar 2 and is

provided with a lock and drag member 3 which cooperates with depressions 4 in the bar 2 to control the motion of the finger grip or to lock the same. One end of the bar 2 is provided with a thumb grip 5 and the other end with a sleeve 6 adapted to receive the shank 7 of a supporting member 8 having a bore 9 in which is slidably received the stem of a metallic snare 10. The rear end of the snare is secured in a metallic tube 11 in an aperture in the finger grip 1 by means of a set screw 12 having a knurled head 13 of insulating material. The member 8 is made of insulating material and the bore 9 is preferably lined with a metallic tube 14 for reinforcement. At its outer end the member 8 has a loop 15 of insulating material the inner circumference of which is grooved to receive the loop of the snare 9 when in its expanded position.

The member 8 is provided with a second longitudinal bore 16 which is likewise lined with a metallic tube 17 within which is slidably mounted a metallic forceps composed of a bar 18, a finger grip 19 at one end thereof, and a pair of jaws 20 at the other end thereof. The jaws 20 are preferably two curved spring steel members secured at one end in a slot 21 in the rod 18. The jaws 20 are curved so as to normally spread apart and lie in substantial alinement with the sides of the loop 15. The sides of the loop 15 are provided with guards 22 which extend over the jaws 20 and cover all but the ends thereof. The jaws 20 have stops 20' which abut against the end of tube 17 and limit the motion of the jaws into the tube. When the jaws are drawn into the bore 16 by pulling on finger grip 19 they are closed together in an obvious manner.

An electric contact 23 is mounted on the member 18 at the rear end of bore 16. This contact consists of an insulated metallic tube 24 adapted to receive a contact point 25 and connected at its inner end to the metallic lining 17 of bore 16. An electric contact is also provided on the finger grip 1 consisting of a metallic tube 26 adapted to receive a contact point 27 and connected at its upper end by a wire 28 to the metallic tube 11 in which the end of the snare is secured. A high frequency generator 29 capable of producing a cutting current is supplied with current from a light socket 20 by wires 31 and 32 in one of which is inserted a foot switch 33. The inactive terminal 34 of the generator is connected to the contact point 25 inserted in contact 23. The active terminal 36 is connected to contact point 27 inserted in contact 26.

The operation of the instrument is as follows:

The foot switch 33 being off and the snare and forceps being in expanded position the tonsil is worked through the loop 15 and the

jaws of the forceps are then drawn in by pulling on finger grip 19 which causes them to grasp the tonsil and form a good electric connection therewith. Simultaneously the snare is drawn up taut and the foot switch is then turned on sending an electric current from the snare through the tonsil to the forceps. This current is of a cutting nature as set forth above and the snare is easily drawn through the base of the tonsil. There is practically no penetration of the underlying tonsil fossa by the current and the resulting scar tissue is therefore very slight.

In Figs. 7 to 9 I have shown a separate forceps adapted to be used in connection with an open snare for cases in which all of the tonsil cannot be removed by the first operation with the covered snare. This forceps consists of a tubular body 40 of insulating material lined with a metallic forceps consisting of a rod 42 having secured to one end a pair of resilient jaws 43 as in the instrument previously described. The tubes 40 and 41 are provided with a slot 44 through which extends the stem 45 of a finger grip 46, which stem is screwed into a threaded hole near the end of the rod 42. A thumb grip 47 is mounted on the tube 40 adjacent the rear end thereof. The rear end of the tube 41 is open and is adapted to receive a contact point 48.

In using this forceps in connection with an open snare the electrical connections are the same as with the first described instrument; that is to say, the inactive terminal of the generator 29 is connected to the forceps and the active terminal is connected to the snare. On the other hand, when using the forceps with a gauze sponge as above described, the active terminal of the generator is connected to the forceps and the inactive terminal is connected to an electrode which is applied to the external surface of the body adjacent the part being treated.

Having described my invention, I claim:

1. In a device of the class described, an insulated metallic snare, an insulated metallic forceps, a source of cutting electric current, means for connecting one terminal of said source of current to said snare, and means for connecting the other terminal thereof to said forceps.

2. In a device of the class described for removing undesirable tissue, a tube of insulating material, a metallic snare slidably mounted in said tube, means for drawing said snare into said tube, an insulated metallic member adapted to engage the undesirable tissue, a source of cutting electric current, means for connecting one terminal of said source of current to said snare, and means for connecting the other terminal thereof to said member.

3. In a device of the class described, an insulated metallic snare, a tube of insulating material, a pair of relatively movable jaws connected together at one end and resiliently

- held apart, the connected ends of said jaws being inserted in said tube, means for drawing said jaws into said tube to close them together, a source of cutting electric current, means for connecting one terminal of said source of current to said snare, and means for connecting the other terminal thereof to said forceps. 70
4. In a surgical instrument, a snare, a forceps comprising a pair of relatively movable jaws connected together at one end and resiliently held apart, a supporting body having a bore in which said snare is slidably mounted and a second bore into which the connected ends of said jaws are inserted, the loop of said snare and the jaws of said forceps being located at one end of said body adjacent one another, means for drawing said snare into said first mentioned bore, means for drawing the jaws of said forceps into said second bore to close them together, a source of cutting electric current, means for connecting one terminal of said source of current to said snare, and means for connecting the other terminal thereof to said forceps. 75
5. In a surgical instrument, a snare, a forceps comprising a pair of relatively movable jaws connected together at one end and resiliently held apart, a supporting body having a bore in which said snare is slidably mounted and a second bore into which the connected ends of said jaws are inserted, the loop of said snare and the jaws of said forceps being located at one end of said body adjacent one another, said body having a grooved loop of insulating material at the end of said first mentioned bore adapted to receive the loop of said snare in its expanded position, means for drawing said snare into said first mentioned bore, means for drawing the jaws of said forceps into said second bore to close them together, a source of cutting electric current, means for connecting one terminal of said source of current to said snare, and means for connecting the other terminal thereof to said forceps. 80
6. In a surgical instrument, a snare, a forceps comprising a pair of relatively movable jaws connected together at one end and resiliently held apart, a supporting body having a bore in which said snare is slidably mounted and a second bore into which the connected ends of said jaws are inserted, the loop of said snare and the jaws of said forceps being located at one end of said body adjacent one another, said body having a grooved loop of insulating material at the end of said first mentioned bore adapted to receive the loop of said snare in its expanded position, guards of insulating material projecting laterally from said loop of insulating material and partially covering the jaws of said forceps, means for drawing said snare into said first mentioned bore, means for drawing the jaws of said forceps into second bore to close them together, a source of cutting electric current, means for connecting one terminal of said source of current to said snare, and means for connecting the other terminal thereof to said forceps. 85
7. In a surgical instrument, a snare, a forceps comprising a pair of relatively movable jaws connected together at one end and resiliently held apart, a supporting body having a bore in which said snare is slidably mounted and a second bore into which the connected ends of said jaws are inserted, the loop of said snare and the jaws of said forceps being located at one end of said body adjacent one another, means for drawing said snare into said first mentioned bore, means for drawing the jaws of said forceps into said second bore to close them together, a stop on said forceps adapted to engage the end of said body to limit the motion of said forceps, a source of cutting electric current, means for connecting one terminal of said source of current to said snare, and means for connecting the other terminal thereof to said forceps. 90
- FLORENTINE PETER HERMAN. 95
- 100
- 105
- 110
- 115
- 120
- 125
- 130