

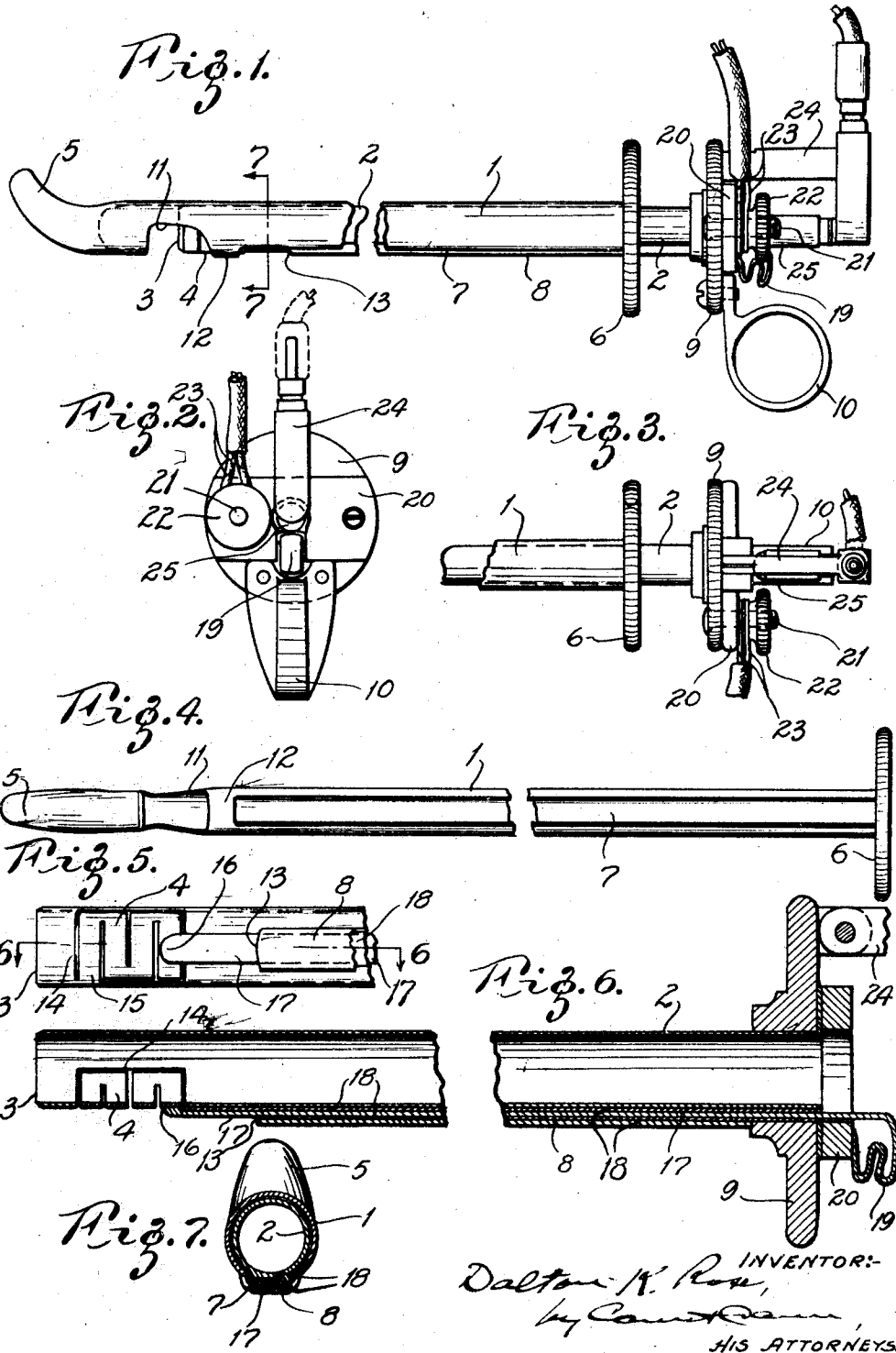
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SURGICAL INSTRUMENT

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SURGICAL INSTRUMENT.

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My invention relates to surgical instruments and has for its principal object a device by which operations on the prostate gland and other operations in the urethral canal may be performed quickly and easily with full vision throughout the operation and with a minimum loss of blood. The invention consists principally in a surgical instrument or punch comprising a hollow tube or sheath in which is mounted a hollow tubular member on the end of which is formed a cutting tool and adjacent to the end of which is an electric resistance element whereby the wound may be cauterized immediately after a cut has been made. The invention further consists in the surgical instrument and in the parts and combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawing,

Fig. 1 is a side elevation of a surgical instrument embodying my invention,

Fig. 2 is an end elevation thereof,

Fig. 3 is a part top plan view,

Fig. 4 is a bottom plan view of the outer sheath,

Fig. 5 is a plan view on an enlarged scale of the end portion of the inner tubular member, showing the cutting tool and the heating element,

Fig. 6 is a longitudinal sectional view on the same scale as Fig. 5, on the line 6—6 in Fig. 5, and

Fig. 7 is a cross-sectional view on an enlarged scale on the line 7—7 of Fig. 1.

The device comprises an outer tubular sheath 1 and a hollow tubular member 2 disposed therein and carrying at its end a cutting tool 3 and an electric resistance element 4.

The outer sheath 1 is preferably provided with a rounded and upturned end portion 5. At the other end said outer sheath 1 is provided with an annular end ring 6 whereby it may be held by the surgeon.

The outer sheath 1 is provided with a channel or slot 7 extending longitudinally of the bottom thereof throughout the greater portion of its length. In said slot 7 fits a raised rib portion 8 of the inner supporting tube 2, so that said tube is accurately positioned and guided. Said inner tubular member 2 is provided with an end ring 9 to

which is secured a loop 10 in which the thumb of the surgeon may be inserted to manipulate the inner member and the tool.

Near the end said outer sheath 1 has a cut-away portion 11 adapted to make room for the cutting tool 3 to operate. Adjacent to said cut-away portion of the sheath 1 is a bridge 12 closing the end of the longitudinal slot 7 and adapted to be engaged by a shoulder 13 at the end of said rib portion 8 of the inner tube 2 to act as a stop therefor.

The cutting tool 3 is of suitable tool steel or other material, it is arcuate to conform to the shape of the tube and is formed or mounted at the end of said inner tube. Just behind said cutting tool 3 in an opening 14 provided therefor in the inner tube is the electric resistance element 4 comprising a narrow strip doubled upon itself a plurality of times to form a zig-zag or tortuous path for the electric current. The element is transversely curved to conform to the shape of the tube. The several portions of said resistance member 4 are spaced away from each other and from the tube, except at the forward end 15 where it is connected to the inner tube, and at the rear end 16 where it is connected to a suitable conducting element 17 extending the length of the inner tube in the rib portion thereof 8 and provided with a suitable insulation 18.

At the outer end said conducting member 17 is provided with a rebent portion 19 that is secured to a plate 20 mounted on the end ring 9 of the inner tubular member 2. Said rebent portion 19 of the conducting member 17 accommodates any expansion or contraction that may take place. A binding post 21 and thumb screw 22 are mounted on said plate 20 and adapted to receive contact members 23 of an electric circuit. The circuit passes through the plate 20 of the conducting member 17, thence through the resistance element 4 and back through the inner tubular member 2 of the plate 20 and the second contact member 23. The desired heat of the resistance member 4 enabling it to cauterize a cut is obtained by varying the amount of the current and also by properly proportioning the size, shape and material of the resistance element and the size and material of the inner tubular member 2. These several features are capable of varia-

tion and may be worked out by those skilled in the art.

Pivotaly secured to the end of the inner tubular member 2 is a bracket 24 carrying an electric light 25 adapted to illuminate the interior of the inner tubular member.

In using the instrument, the inner tubular member 2 is pushed as far forward as possible in the outer sheath 1, so that the cutting tool 3 rests in the end portion of the outer sheath, and the cutting edge is covered. The instrument is inserted into the urethral canal and when the cut-away portion 11 of the outer sheath is adjacent to the prostate gland or other growth or diseased portion that is to be operated on, the inner tubular member 2 is retracted, thus giving a clear view of the diseased portion or of the growth to be cut. The outer sheath 1 and the inner tubular member 2 are then manipulated so that the cutting tool 3 is brought into position to make a cut. Then the inner tubular member 2 is pushed forward, causing the cutting tool 3 to make its cut; and, immediately (by any suitable means not shown in the drawing) the electric current is turned on through the resistance element 4. Said resistance element immediately becomes quite hot and cauterizes the wound. The heating of the cauterizing element is turned so that cauterization takes place simultaneously with the completion of the cut. The inner tubular member may again be retracted, an inspection made, and such additional cut or cuts as are advisable may be made, the wound in each case being immediately cauterized, as above described.

The above described instrument has numerous advantages. It is simple and easy to operate, and the member being operated on is always in view of the surgeon. The wound made by the cutting tool is immediately cauterized, thus preventing the risk of a patient bleeding to death and also making it possible for the surgeon to see the results of the operation without having the vision impaired by a flow of blood.

Obviously, numerous changes may be made without departing from the invention; and I do not wish to be limited to the precise construction shown.

What I claim is:

1. A surgical instrument comprising a support, a cutting tool thereon, an electric heating element adjacent to said cutting tool whereby it may be moved into engagement with the wound by slight continued movement of said cutting tool support after operating said tool and a source of electric current for said heating element, whereby a cut made by the cutting tool may immediately be cauterized.

2. A surgical instrument comprising a hollow sheath, a support for a cutting tool slidably mounted therein, a cutting tool at

the end of said support, said sheath having a cut-away portion adapted to permit said cutting tool to function, and a cauterizing element on said support adjacent to said cutting tool whereby it may be moved into engagement with the wound by slight continued movement of said cutting tool support.

3. A surgical instrument comprising a hollow sheath, a hollow tubular member therein, a cutting tool at the end of said inner tubular member, said sheath having a cut-away portion adapted to permit said cutting tool to function, and a cauterizing element on said inner tubular member immediately behind said cutting tool and adapted to cauterize the wound made by said cutting tool immediately after the cutting tool has operated.

4. A surgical instrument comprising an outer sheath having a cut-away portion, a support for a cutting tool slidable in said sheath, a cutting tool at the end of said support adapted to extend into the cut-away portion of said outer sheath, an electric resistance element carried by said support adjacent to said cutting tool, and an electric conductor carried by said support and insulated therefrom, said resistance element being electrically connected to said inner tubular member and said conductor so that by turning on electric current said resistance element may be heated to cauterize the wound.

5. A surgical instrument comprising an outer sheath having a cut-away portion, an inner tubular member in said sheath, a cutting tool at the end of said inner tubular member adapted to extend into the cut-away portion of said outer sheath, an electric resistance element carried by said inner tubular member adjacent to said cutting tool, an electric conductor carried by said inner tubular member and insulated therefrom, said resistance element being electrically connected to said inner tubular member and said conductor so that by turning on electric current said resistance element may be heated to cauterize the wound and means for illuminating the interior of said inner tubular member.

6. A surgical instrument comprising an outer sheath, an inner tubular member slidable in said sheath, a cutting tool at the end of said inner tubular member, an electrical conductor extending along said inner tubular member and insulated therefrom, said inner tubular member having an opening in its wall adjacent to said tool, and an electric resistance element disposed in said opening, said element being connected at one end with said conductor and at the other end with said tubular member and being elsewhere spaced away from said tubular member and the resistance element serving to

cauterize the wound when heated by the passage of electric current therethrough.

7. A surgical instrument comprising a hollow sheath, a hollow tubular support slidable therein, a cutting tool of tool metal at the end of said support, said sheath having a cut-away portion for said cutting tool, an electric resistance element on said support adjacent to said cutting tool whereby it may

be moved into engagement with the wound by slight movement of said support after operating said tool and means permitting electric current to pass through said resistance element to heat it and cauterize the wound.

Signed at St. Louis, Missouri, this 14th day of April, 1926.

DALTON K. ROSE.