

June 6, 1933.

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1,913,229

SURGICAL APPARATUS

Filed June 26, 1929

5 Sheets-Sheet 1

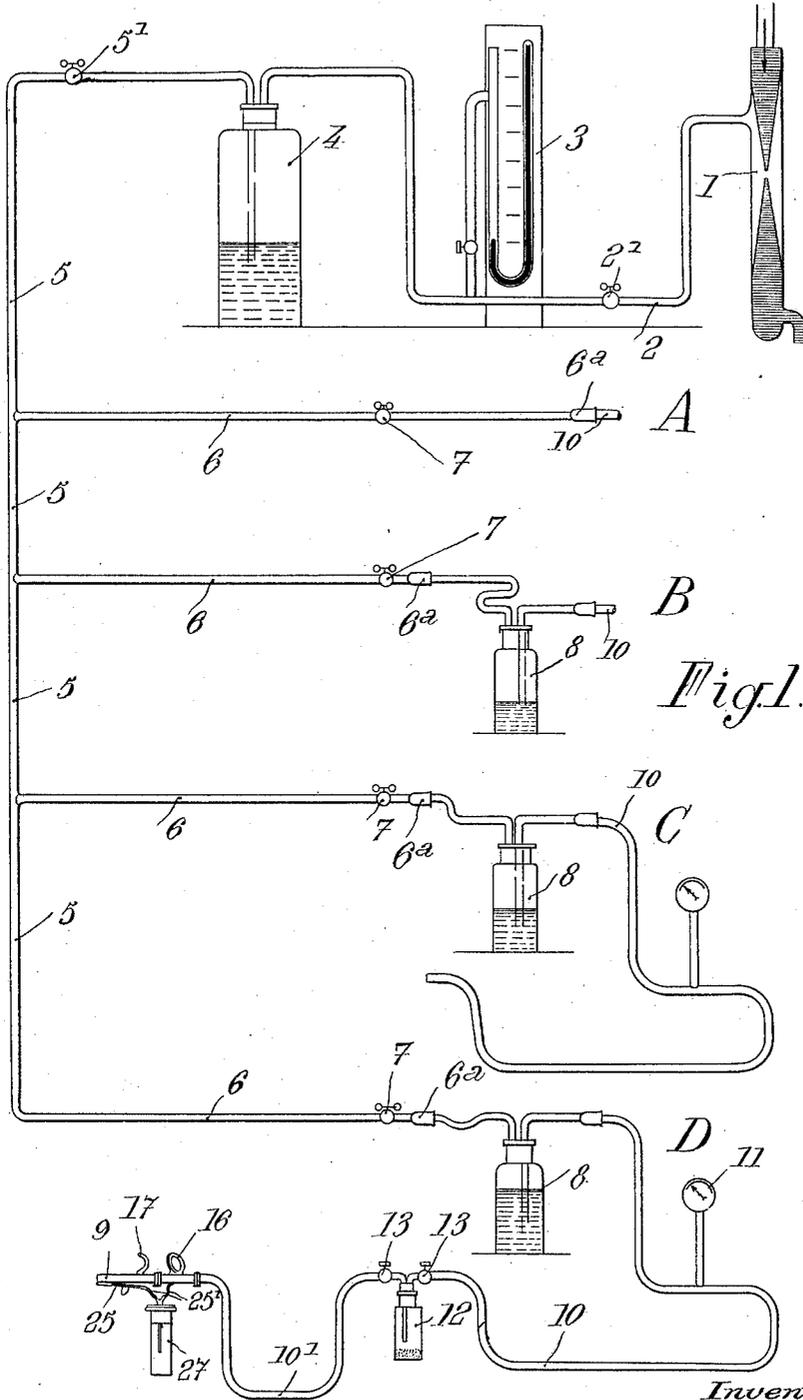


Fig. 1.

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Fig. 2 Fig. 3. Fig. 4. Fig. 5.

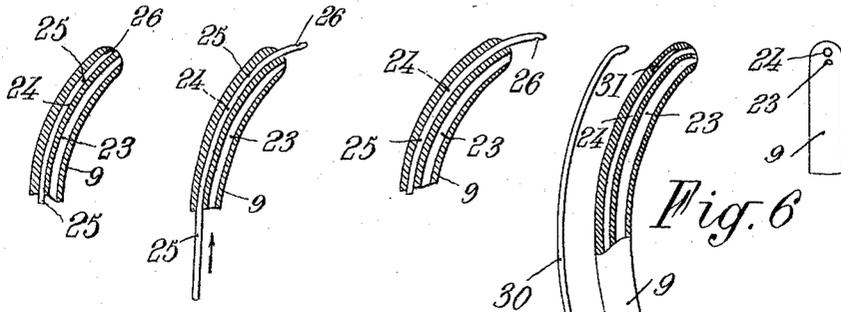


Fig. 6

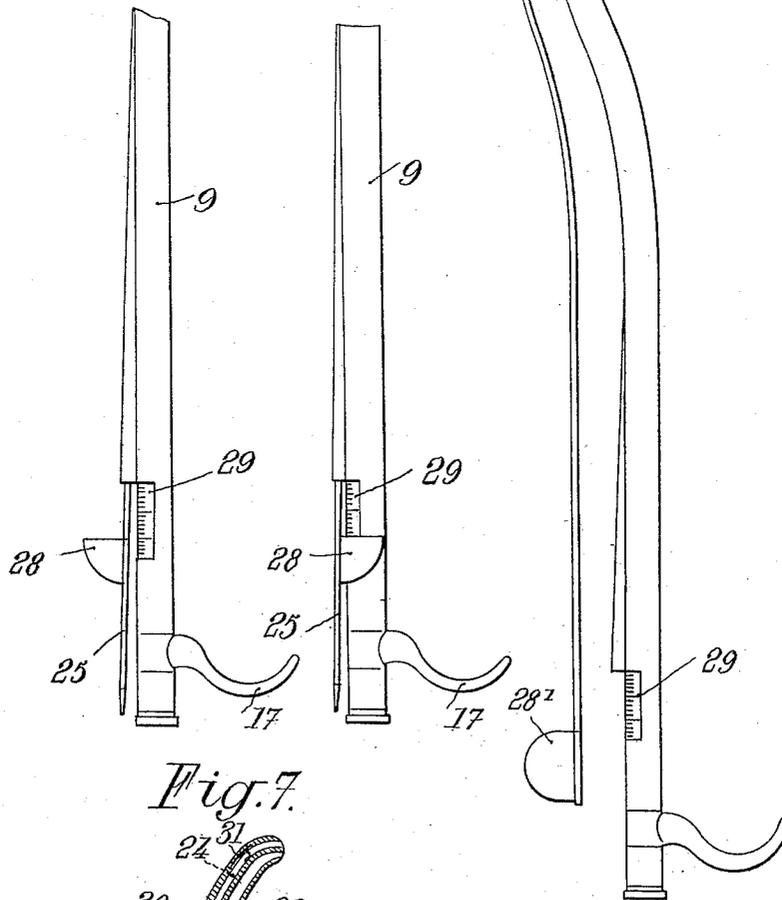


Fig. 7.

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Fig. 8.

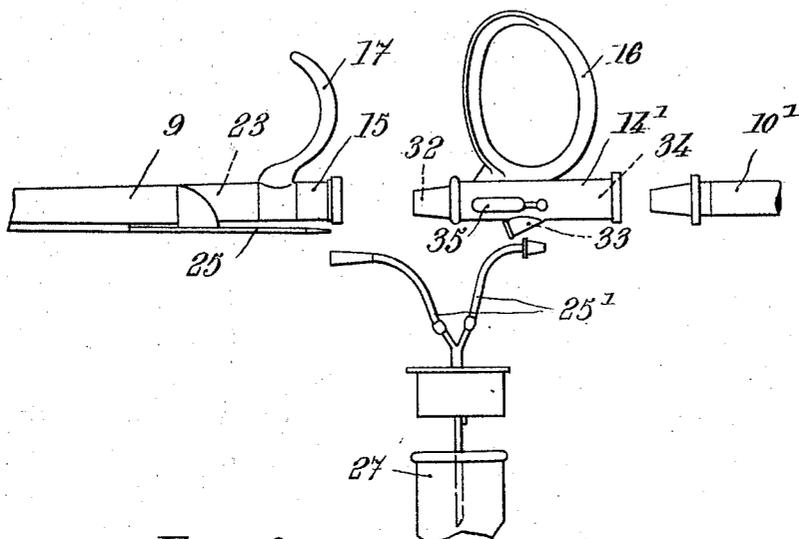
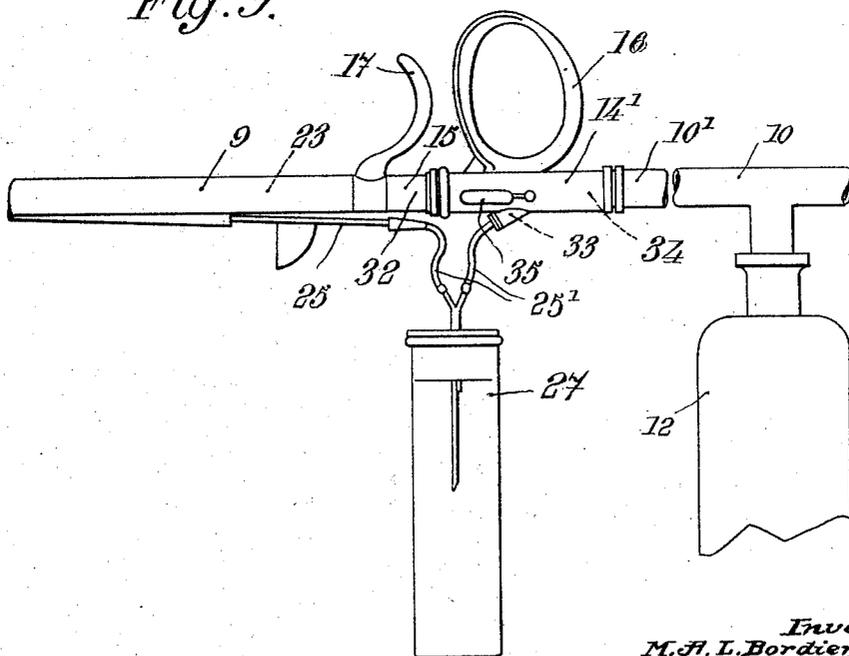


Fig. 9.



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Fig. 10.

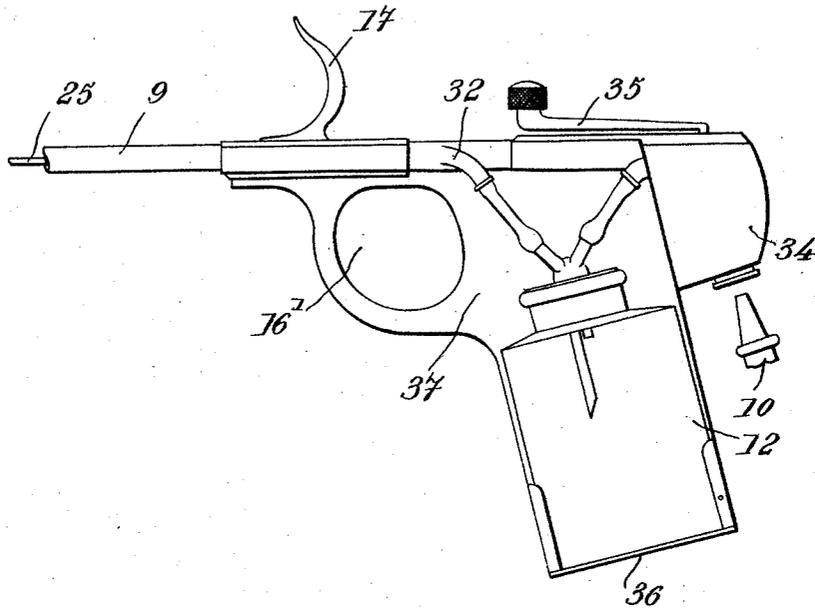
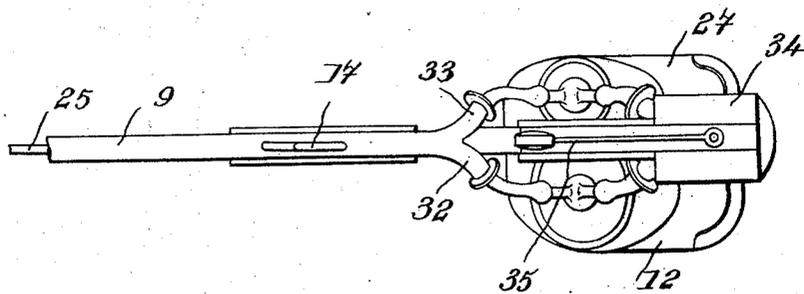


Fig. 11.



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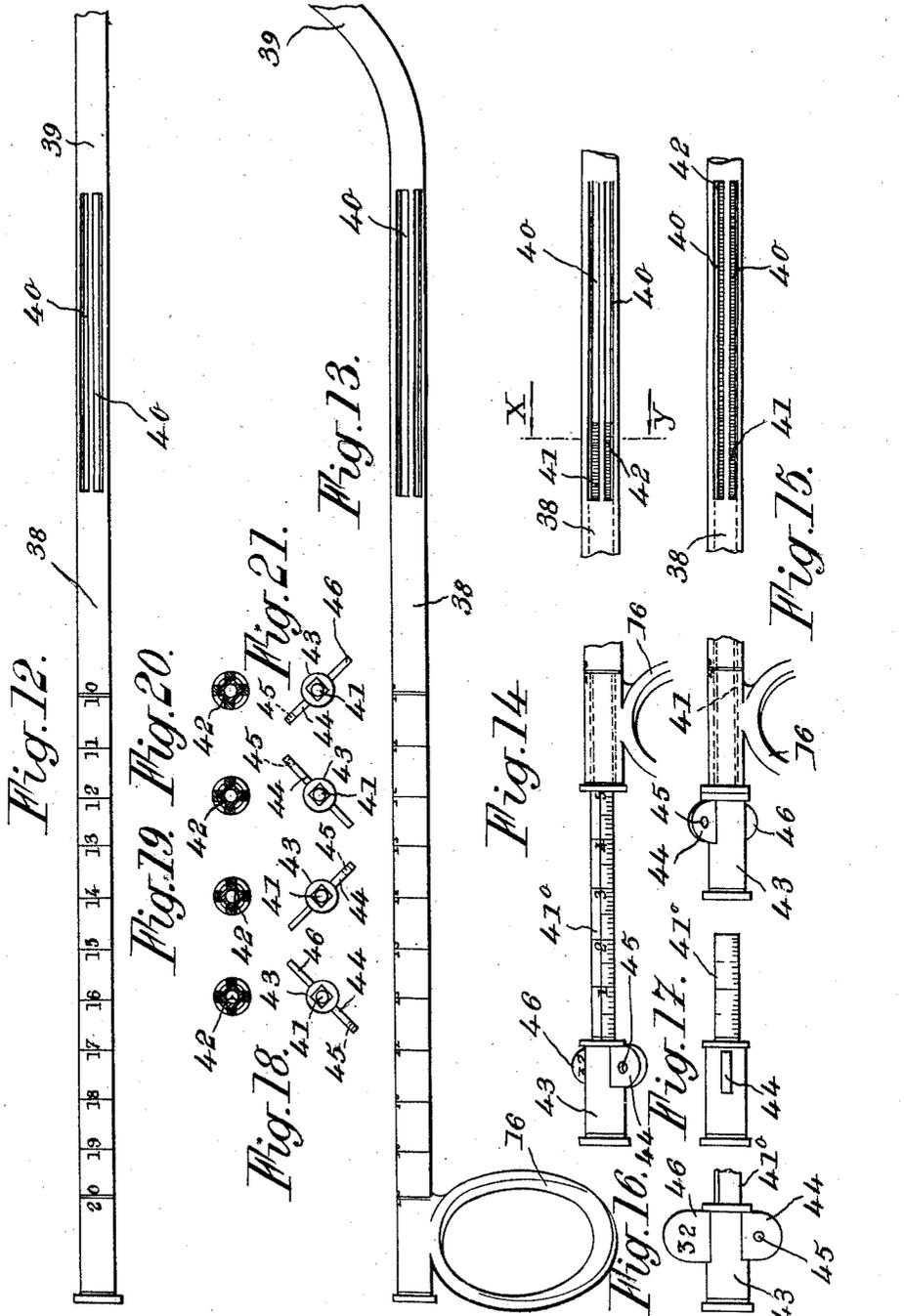
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SURGICAL APPARATUS

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UNITED STATES PATENT OFFICE

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SURGICAL APPARATUS

Application filed June 26, 1929, Serial No. 373,719, and in Belgium July 5, 1928.

The present invention relates to surgical apparatus.

One of the objects of the invention is to provide means for applying steady suction to aspirating devices such as are in current use in medical and surgical practise.

Another object is to provide a special form of aspirating device permitting the continuous evacuation of pus or other liquids from a cavity.

A further object is to provide a special form of catheter operative to evacuate liquids contained in a cavity, the catheter having a movable suction orifice whose position may be indicated by reference points visible on the outside of the apparatus.

Still further objects will appear in the course of the detailed description now to be given with reference to the accompanying drawings, in which:—

Fig. 1 represents, diagrammatically, a suction device constructed in accordance with the invention;

Figs. 2, 3 and 4 represent one form of device for the continuous evacuation of pus or other liquids;

Figs. 5, 6 and 7 show a variant of the structure illustrated in Figs. 2 to 4;

Figs. 8 and 9 show how suction may be applied to devices of the type represented in Figs. 2 to 7;

Figs. 10 and 11 illustrate a variant of the suction producing apparatus shown in Figs. 8 and 9;

Figs. 12 and 13 show a special form of catheter for the urethra;

Figs. 14 and 15 represent the catheter shown in Figs. 12 and 13 combined with a suction tube and indicating device;

Figs. 16 to 21 show the catheter in various operating positions, each figure including a section taken on line X Y of Fig. 14 and an end view of the indicating extremity of the instrument.

Referring to "Fig. 1" of the drawings, there is shown an aspirator 1,—a conduit 2 communicating with a reservoir 4 via a valve 2',—a suction distributing conduit 5 controlled by valve 5' extending from under the liquid contained in reservoir 4,—a plurality

of suction conduits 6 fitted with valves 7 and "universal" connectors 6^a—a plurality of flasks 8 connected to elements 6^a and communicating via conduits 10 with the instrument to be used (one such instrument is shown at station D),—and pressure gauges 11 indicating the terminal pressures.

The hereinabove described assembly is designed primarily to "cushion" and eliminate rapid changes in depression produced by aspirating pump 1. This is accomplished in part (1) by reservoir 4, (2) by the resistance offered by increasing lengths of conduits 5, 6 i. e. the suction will be more even at station D than at station A, and finally (3) by the increasing depths of liquid poured into flasks 8 i. e. the suction at D is rendered more regular than at C by the difference in level of the liquid contained in flasks 8 serving these two stations. From the foregoing, it will be seen that stations A to D offer a series of sources of suction of increasing constancy so that when a crude operation not requiring regular suction is to be effected, the operating instrument may be connected directly to conduit 10 at station A without even the interposition of a "cushioning" flask 8, and when, contrariwise, a very constant source of suction is desired as, for example when pus or some other pathological liquid is to be removed from the bladder, the uterus or the prostate, the operating instrument (which may be of the type hereinafter to be described) may be mounted as shown in Fig. 1, in series with conduit 10, a flask 12 fitted with inlet and outlet control valves 13, 13' serving to receive the liquids aspirated by the operating instrument via a conduit 10'.

Referring now to Figs. 2 to 4, 8 and 9 of the drawings, there is shown an aspirating instrument designed to be used in connection with the suction apparatus represented in Fig. 1 and comprising a main suction tube 9 having two passages 23 and 24 formed therethrough,—a handle or finger-grip 17,—a hollow flexible tube 25 terminating at its operating end in a lateral orifice 26 and having a slightly smaller diameter than passage 24,—an indicating flag 28 designed to indicate the orientation of orifice 26 and the

depth of the latter relatively to a graduated scale 29,—an intermediate connecting element 14, fitted with a finger-piece 16, and having a conical male element 32 formed at one end thereof adapted to coact with a correspondingly formed female portion 15 of tube 9, a female portion 34 delivering to a receiving flask 12, a branch 33 adapted to coact with a Y connection 25¹ receiving liquid from tube 25 and delivering to flask 27,—and a valve 35 adapted to divert the suction either into tube 9 via 32 or into tube 25 via 33.

The manner in which this aspirating instrument operates will be better understood after the structure shown in Figs. 5 to 7 has been described. The apparatus shown in these latter figures is composed of a body portion 9 traversed by a pair of passages 23, 24, passage 24 having an elongated recess 31 formed therein adjacent the free extremity thereof. A flexible rod 30 having a body portion whose diameter is slightly less than that of passage 24 and a tip of substantially the same diameter as the latter is mounted in passage 24 and carries an index flag 28¹ adapted to indicate the position of the tip relatively to index 29 engraved in, or mounted on element 9. This instrument is designed to evacuate pus and similar liquid continuously in contradistinction to the intermittently operating instruments now in current use, and functions in the following manner.

The body of the instrument is first introduced into the cavity to be emptied of liquid, the tip of rod 30 extending beyond the end of element 9 and serving as a sort of guide into the pocket or pockets (intrauterin or intraprostatic, for example) to be evacuated. Receiving flask 12 having first been connected in the manner shown in Fig. 1, valves 13, 13 are opened and a depression is produced in passage 23, causing the liquids contained in the pocket or pockets to be aspirated into flask 12. In the intermittently operating instruments previously in use, the evacuating operation has to be interrupted from time to time and the instrument removed so as to permit air to enter the pocket being evacuated. In the present type of instrument, rod 30 being of lesser diameter than passage 24, air enters through the interspace between these elements and is drawn off continuously with pus or the like through passage 23. The complete evacuation of the cavity, being operated on, may, therefore, be effected without interruption once the instrument is in place. If, for any reason, it be desired to introduce passage 23 of the instrument somewhat further into the cavity under treatment, rod 30 is drawn downward until its enlarged tip-portion lodges in recess 31, thus permitting air to pass freely through the whole length of passage 24 (Fig. 7) while passage 23 is being advanced.

The instrument illustrated in Figs. 2 to 4 is more especially designed for operating on anatomical structures of the type of Fallopian tubes and operates both continuously and intermittently. Passage 24 is first fitted with a flexible rod of the type of element 30 shown in Fig. 6 i. e. of lesser diameter than said passage and shank 9 (connected to the receiving and control structures represented in Figs. 8 and 9) is introduced into the neck of the uterus. Valve 35 is then manipulated to turn the suction into passage 23 so as to remove the undesirable uterine liquids. When the tip of the instrument has been introduced into the uterus up to a point adjacent the entrance of the Fallopian tube to be operated on, rod 30 is withdrawn and replaced by a hollow tube 25. The suction is then switched over into tube 25 and the latter is advanced up into the Fallopian tube the distance desired, the pus and other pathological (or physiological) liquids being collected in receiver 27, index flag 28 indicating to the operator the exact position of working orifice 26 at all stages in the operation. When the desired amount of liquid has been collected (the instrument here operates like those of the "intermittent" type) the instrument is withdrawn.

The apparatus shown in Figs. 10 and 11 is a conveniently operated form of the device represented in Figs. 2 to 4. Here, tube 25 is arranged to penetrate into the center of shank 9 of the instrument and connects with arm 33 of a Y tube whose second arm 32 communicates with passage 23, receivers 12 and 27 being mounted on a unitary base 36, and the whole instrument taking the form of a gun having a suction chamber 34 (controlled by a valve 35 similar to the one shown in Fig. 9) adapted to be connected to suction tube 10.

The instrument represented in Figs. 12 to 21 is especially designed for evacuating operations to be effected on the prostate or any of the other anatomical elements forming part of the posterior urethra. Here, a graduated catheter having a tubular body portion 38, a slotted portion 40 composed of four apertures having approximately the length of the posterior urethra, a bent tip 39, and a finger piece 16, is fitted with a tube 41 terminating in a laterally directed orifice 42 and carrying a graduated, square shank-piece 41^o and a pair of ears 44, 46, ear 44 being perforated at 45 or otherwise marked to distinguish it from ear 46. Tube 41 forms a sliding fit with tube 38.

The instrument, in operation, is connected to conduit 10¹ (Fig. 1) at 43, tube assembly 38, 39, 40, 41 is inserted into the urethra the required distance and orifice 42 is turned so as to work in one of slots 40, square, graduated shank-piece 41^o and ears 44, 46 indicating the relative positions of elements 40 and 42 and

the particular portion of the posterior urethra being operated on. Figs. 19 to 21 show the instrument with operating orifice 42 positioned in four different quadrants.

5 While the instrument shown in Figs. 5 to 9 has been represented as connected to the suction device in Fig. 1, it is obvious that any one of the instruments illustrated in Figs. 2 to 4, 10 and 11, or 12 to 21 may be operated in connection therewith, the particular station chosen depending on the nature of the operation to be effected.

What I claim is:—

1. An instrument of the class described comprising a body portion having a pair of passages extending longitudinally therethrough, and a solid rod inserted in one of said passages and having a sufficiently small section to permit the passage of air through the space between the rod and the walls of the passage into which it is inserted.

2. A structure as defined in claim 1, in combination with means for indicating the position of the extremity of the rod extending through the passage.

3. In an instrument of the class described, a body member, a second member telescoping within said body member adjustable to different angular positions therein, and adapted to extend beyond one end thereof or to be drawn wholly within such end, and means spaced from said end for indicating the relative longitudinal and angular displacement of said members.

35 4. In an instrument of the class described, a body member, a second member slidably and rotatably mounted in said body member and adapted to extend beyond one end thereof or to be drawn wholly within such end, and means spaced from said end for indicating the relative longitudinal and angular displacements of said members.

45 5. In an instrument of the class described, a body member, a second member slidably and rotatably mounted in said body member and adapted to extend beyond one end thereof or to be drawn wholly within such end, and means spaced from said end for indicating the relative longitudinal and angular displacements of said members, said second member being rotatable at all points of its sliding movement.

50 6. In an instrument of the class described, a body member, a second member telescoping within said body member adjustable to different angular positions therein and adapted to extend beyond one end thereof or to be drawn wholly within such end, means spaced from said end for indicating the relative longitudinal and angular displacement of said members, said members having a passage extending from said end to permit withdrawal of matter therefrom by suction and a second passage to permit access of air to said end during a suction operation.

7. An instrument of the class described comprising a body portion having a pair of passages extending longitudinally therethrough, and a member inserted in one of said passages and having a sufficiently small section to permit the passage of air through the space between the member and the walls of the passage into which it is inserted.

8. In an instrument of the class described, a body member having a longitudinal opening therethrough, a member slidably mounted in said opening and adapted to extend beyond one end thereof or to be drawn wholly within such end, said opening and member being arranged to form a passage to permit access of air to said end, and cooperating means in said opening and member to close said passage when the member is drawn within the opening.

9. An instrument of the class described comprising a body portion having a pair of passages extending longitudinally therethrough, a hollow tube extending through one of said passages and slidable therein, a pair of suction conduits positioned to be connected to said hollow tube and to one of said passages, and valve means operative to divert the suction into either one of said suction conduits.

In testimony whereof I have signed this specification.

MARCEL ARMAND LOUIS BORDIER.

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