

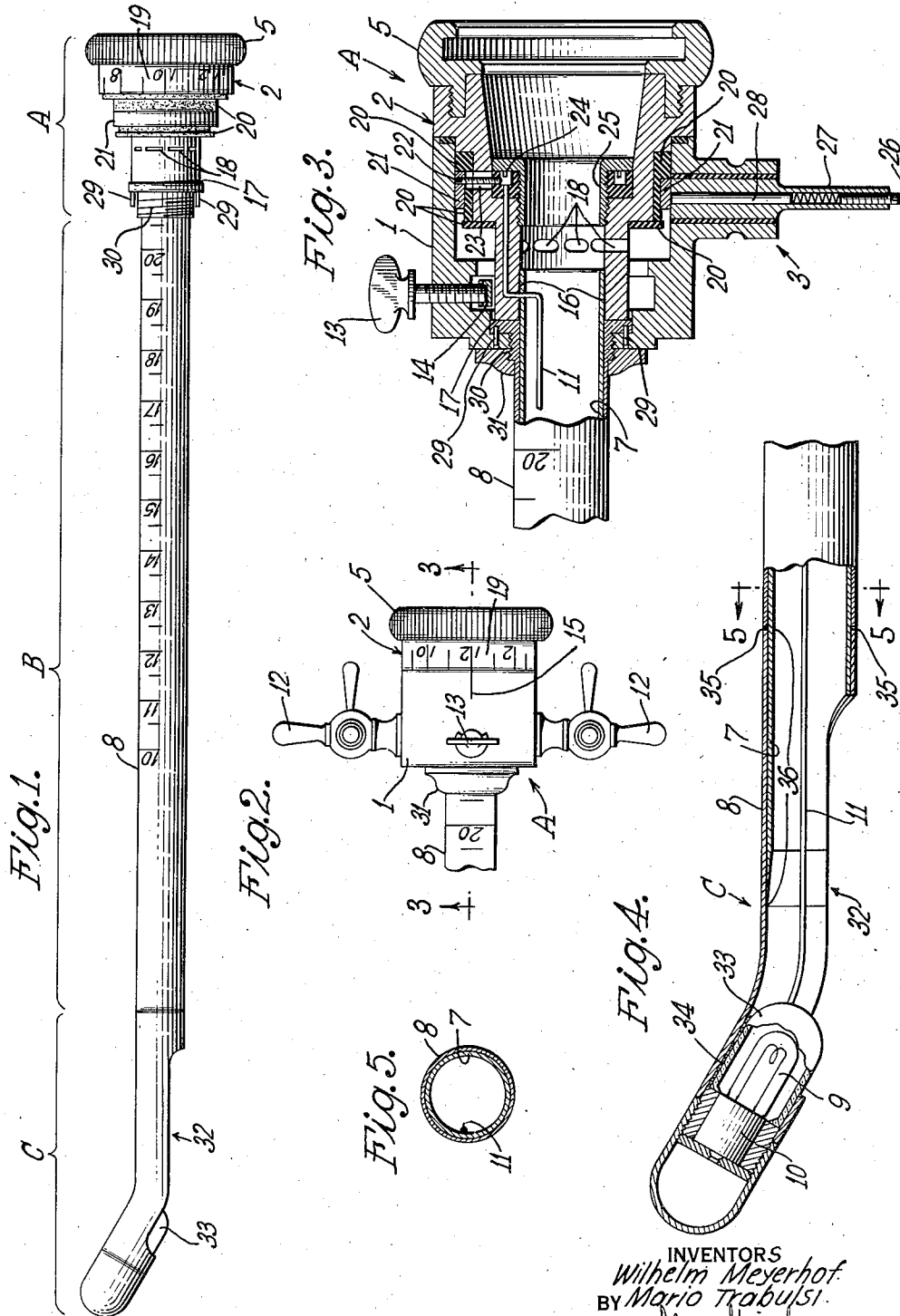
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CYSTOSCOPE

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CYSTOSCOPE

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This invention relates to improvements in cystoscopes, i. e. devices for introducing light and operating instruments into the bladder to permit of ocular examination and treatment of the same.

It is one object of our invention to provide a cystoscope allowing examination, and surgical and therapeutical treatment of the bladder in every direction without the need of turning the cystoscope in the urethra of the patient, and without doing harm to or needing the aid of the patient, the operator having complete control over the instruments used.

A further object of our invention is to provide in a cystoscope immobility to the desired degree of the irrigating and water outlet tubes and the electric leads.

It is also an object of our invention to provide a cystoscope allowing lateral movement of the instruments, and the possibility of marking exactly the spot of an observed process so that at subsequent seatings this spot may be found, even by another physician, without the necessity of further explorations.

Other objects and advantages will appear from the following specification and the drawing forming a part thereof.

The cystoscopes hitherto used consist of two main parts, i. e. the sheath and the optical system to be introduced into the sheath. The sheath consists of a metallic round tube of oval or other suitable shape. It has at its terminal a lighting lamp and an opening for the issue of the operating instruments and for observations. At its initial part it has a handle provided with water inlet and outlet cocks, and means for attaching the electrical leads and the optical system. The optical system to be introduced into the sheath is provided, at the distal part near the objective lens, with a lever which can be moved by two knobs near the ocular. On a higher level, openings are provided for the entry of operating instruments which pass alongside through the sheath and come out at the terminal opening thereof.

In order to perform a cystoscopy, the cystoscope, i. e. the assembly constituted by the sheath and the optical system, is introduced by the physician into the patient's urethra; this having been done, the beak of the cystoscope is located within the bladder, while its body is in contact with the membrane of the urethra, and the handle and the ocular are outside. As mentioned above, the beak of the cystoscope has an opening which allows the vision. It is, however,

clear that only those parts of the bladder, which lie in the direction of said opening, can be seen, and that in order to perform a complete cystoscopy, inside the urethra, a series of successive turning movements of the cystoscope must be carried out, thereby changing the direction of the opening of the cystoscope so that various parts of the bladder may be observed or treated. Said movements cause traumatism in the urethra.

The visual angle of the telescope has a diameter of about 25 mm., and in order to observe a process under water having an extension of 10 square centimeters or more, the physician must perform a continuous rotating movement of the instrument in order to estimate the extension of the observed process. During this rotating movement, the water inlet and outlet rubber tubes and the electric leads entangle and trouble greatly the operator and annoy the patient. If during the cystoscopical examination some process is found, the physician will note on the filing card of the patient according to the usual method that the process is located at "3 o'clock." In making such note, the physician calculates, on the basis of his experience, the direction of the opening of the cystoscope, having in mind the dial of a timepiece, because he has not other means to exactly identify the observed spot and to find out the depth at which the opening is to be found.

At the next seating, during which the surgical or therapeutical treatment of the observed process is performed or continued, the physician will try, again on the basis of his experience, to place the cystoscope in the direction noted on the filing card. In the majority of cases, the exact direction desired cannot be found, and, therefore, the physician must search again.

In order to perform the coagulation of a papilloma or the catheterism of the ureter, the physician introduces the fitted instruments through the openings. As the cystoscope allows him only the movement in the direction of the introduction of the instrument, while the deflector or lid allows only the movement from above downwards, when the instrument insinuates itself at the side of the process under treatment, the physician must perform again semi-circular movements of the instrument, because the cystoscope does not allow him to make lateral movements.

The above mentioned difficulties can be overcome by the use of an improved cystoscope according to our present invention, a preferred embodiment of which is described in the following specification and the accompanying drawing, in which

Fig. 1 shows the cystoscope assembly without part 1 of the handle;

Fig. 2 shows the handle seen from above;

Fig. 3 is an enlarged longitudinal, sectional view of the handle formed by parts 1 and 2, the section being taken through line 3—3 of Fig. 2;

Fig. 4 is a longitudinal sectional view of the rotating beak, and

Fig. 5 is a vertical cross-section through the body of the cystoscope tube along line 5—5 of Fig. 4.

The cystoscope according to the invention consists of two main parts, the sheath and telescope. The sheath comprises the handle A, the body B and the beak C, and is formed by an internal and an external assembly.

The handle A is formed by 2 parts, a fixed external part 1 and a movable semi-internal part 2. This movable part 2 is provided with a dial 19 for the reading of the observed angle with reference to dash 15, or for indicating the direction of the opening of the beak C. Said fixed part 1 is provided with water inlet and outlet cocks 12, and an electric contact generally denoted with reference number 3; these parts 12 and 3 are not moved during the cystoscopy, neither troubling the operator nor annoying the patient. Part 2 has a collar 5 for fastening the telescope.

The body B is formed by two round and parallel tubes 7 and 8. The internal tube 7 is soldered at 16 to part 2 of the handle, while the external tube 8 begins near the part 2 at 17 and is provided with two pins 29 to receive and fix part 1. The tubular body is graduated by the metrical or any other system for the depth measures.

The rotating beak has a convex shape and is provided with an opening 32 for the issue of instruments and for observation. It bears the chamber 33 for the lighting lamp 9. A reflecting mirror 34 is fitted beneath this lamp in order to increase the intensity of the light. The beak is accurately set against the external tube 8 at 35, and is connected with the internal tube 7 by soldering at 36. The beak which rotates together with the internal tube 7, allows examination and surgical treatment of the bladder in any direction. The parts which are in contact with the urethra, need not be moved during cystoscopy, and allow also the lateral movement of the operating instruments.

The internal assembly comprises part 2 of the handle, the internal tube 7 of the body and the beak which are straightly connected with each other, while the external assembly comprises part 1 of the handle, and the external tube 8 of the body straightly connected therewith.

The internal assembly is adapted to rotate independently from the external assembly. If the internal assembly is caused to rotate, part 2 of the handle, which is provided with the dial 19, turns relative to part 1 of the handle, which is provided with a reference dash 15, thus indicating by the observed angle the direction of the opening of the beak.

After the sheath has been introduced into the urethra of the patient, the external tube 8 rests in contact with the urethral walls while the rotating beak remains inside the bladder. Since the movement of the beak is independent from the external tube 8, the physician can turn it in every direction without causing traumatism to the urethra. If the process to be observed is localized, it is sufficient to read on the dial the

number indicated by dash 15, in order to see at what a depth the cystoscope finds itself, and the observation can be recorded on the filing card of the patient in an exact manner. On performing another cystoscopical examination of the same patient, the physician will read the filing card and introduce the cystoscope until the depth marked, and he will direct the opening of the beak of the sheath to "2 o'clock" by reading the dial.

For the treatment of any process, suitable instruments may be introduced through the opening of the beak, and when the instruments insinuate themselves at the side of the spot in sight, the physician may turn the beak towards the opposite side, having thus a lateral movement of the instruments.

The external assembly, and the cocks 12 and contact 3 need not be moved during the cystoscopy.

Referring now to the details of the device shown by way of example in the accompanying drawing, Fig. 1 shows the assembly without external part 1 of the handle. Part 2 of the handle is connected with the internal tube 7 by soldering and fitted at 17 against external tube 8, as shown in Fig. 3. Fig. 1 also shows a contact ring 21, insulating rings 20, water inlet apertures 18, dial 19 and ring 5 for fastening the telescope. External tube 8 is provided with pins 29 for inserting part 1 of the handle, which is fixed by collar 31 and is threaded at 30, as shown in Fig. 3.

Fig. 2 illustrates the complete handle provided with the dial 19, and it also shows the position of the cocks 12. A screw 13 is provided for fixing the rotating movement.

Fig. 3 shows the assembly of the individual parts of the handle and their connection with the body of the instrument. Part 1 is inserted into the terminal of the external tube 8 at the pins 29, and is fixed by collar 31. Screw 13 rests at 14 when it is screwed on in order to stop the rotating movement. The electric contact 3 comprises a fixing pin 26 that pushes the spring 27 towards the contact pin 28, and the latter towards contact ring 21. Pin 28 remains in permanent contact with ring 21 without fixing the same.

The internal tube 7 is connected by soldering at 16 with part 2, which abuts at 17 against the terminal of the external tube 8. Thus, if part 2 of the handle is caused to rotate, the internal tube 7 turns with it simultaneously. Fig. 3 also shows protecting ring 25, and the insulating rings 20 of the contact ring 21. The electric current is conducted to this ring 21 at any position of the same, and it is transmitted to the wire 11 by the screw 22 passing through aperture 23, which has a larger diameter than the screw.

As shown in Fig. 4, the rotating beak has a convex form, and a diameter which is equal to that of the external tube 8; it is fastened against the latter at 35 and soldered on the internal tube 7 at the surface 36. Thus, the beak rotates together with internal tube 7 and with piece 2. The beak is provided with an opening 32 for the issue of instruments and for observation. The chamber 33 contains the lamp 9, socket 10, and the mirror 34.

As will be evident from the above description, the invention is not limited to the specific embodiment presented herein for illustration, and is susceptible of numerous modifications within

the scope and spirit of the invention as defined in the appended claims.

We claim:

1. In a cystoscope, an internal assembly comprising an internal tube connected with a tubular beak provided with an aperture for performing an endoscopy; an external assembly comprising an external tube concentrically surrounding said internal tube and having an outer diameter equal to that of said tubular beak; one end of said external tube being accurately set against and aligned with an adjacent end of said tubular beak; said internal assembly being capable of an independent rotating movement relative to said external assembly.

2. In a cystoscope, an external assembly comprising an external tube; an internal assembly comprising an internal tube rotatably and concentrically arranged within, and fitting into said external tube, and being soldered to a tubular beak which has an aperture for performing an endoscopy, an outer diameter equal to that of said external tube, and is accurately set against an end of, and aligned with said external tube; said internal assembly being capable of an independent rotating movement relative to said external assembly.

3. A cystoscope comprising a sheath which consists of an external assembly, and an internal assembly capable of being rotated independently from said external assembly; said sheath comprising a handle, a body, and a tubular beak; said body comprising an external tube and an internal tube which is rotatably and concentrically arranged within said external tube; said internal tube being rigidly connected with said tubular beak which has an outer diameter equal to that of said external tube, and is accurately set against an end of, and aligned with said external tube; said handle comprising an external part connected with an end of said external tube, and a semi-internal part connected with an end of said internal tube, and capable of being

rotated relative to said external part which carries water inlet and outlet cocks, electric contact means and a reference dash for an indicator.

4. A cystoscope comprising a sheath which consists of an external assembly and an internal assembly capable of being rotated independently from said external assembly; said sheath comprising a handle, a body, and a tubular beak; said body comprising an external tube, and an internal tube rotatably and concentrically arranged within said external tube; said beak comprising a chamber for an electric lamp, and a reflecting mirror, being provided with an opening for the issue of instruments and for observation, having an outer diameter equal to that of said external tube, being soldered to an end of said internal tube, and fitted against and aligned with said external tube; said beak, due to its rotating movement, being adapted to afford the lateral movement of the instruments.

5. In a cystoscope, a sheath comprising a handle, a body and a tubular beak having an opening; said handle consisting of an external part and a semi-internal part capable of being rotated relative to said external part; said body being formed by an external tube and a concentrically arranged internal tube, which is rotatable within and independently from said external tube; one of the ends of said internal tube being connected to said semi-internal part of the handle and the other end of said internal tube being connected to the beak; one of the ends of said external tube serving for the insertion of said external part of the handle and the other end of said external tube terminating against the beak; said beak having an outer diameter equal to that of said external tube, being soldered to the adjacent end of said internal tube, accurately set against the end of and aligned with said external tube and rotatable together with said internal tube.

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