April 12, 1927. 1,624,716

F. CERBO

URETHROSCOPE

Filed Feb. 17, 1927

Fig. 1.

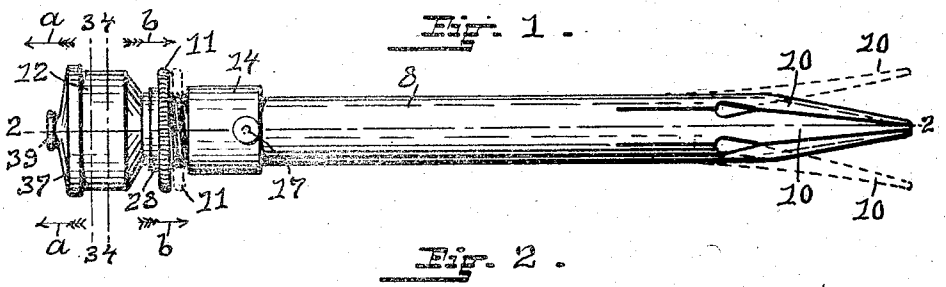


Fig. 2.

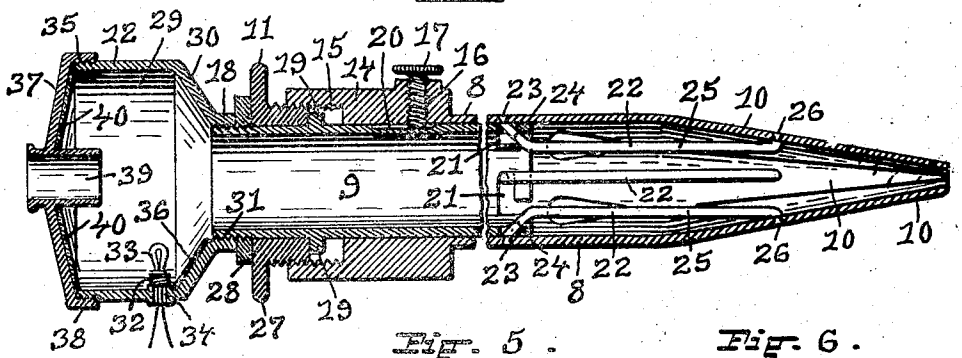
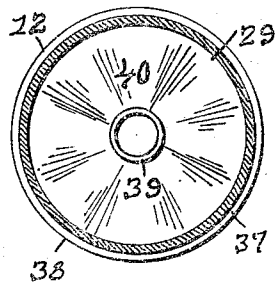
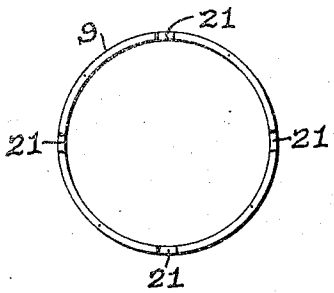


Fig. 5.

Fig. 6.

Fig. 3.





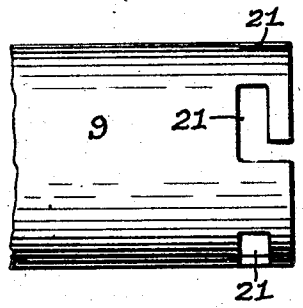
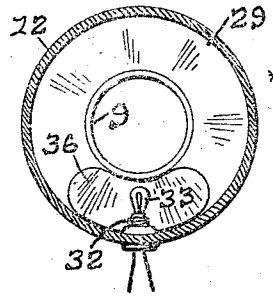
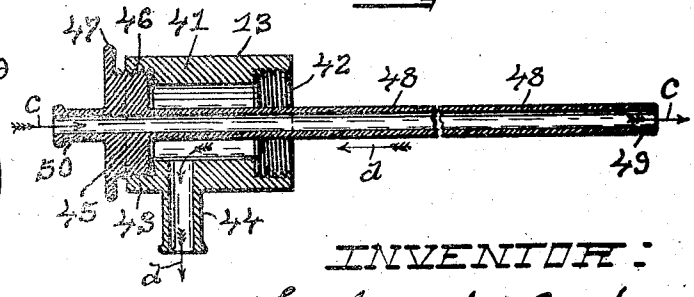


Fig. 4.

Fig. 7.





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UNITED STATES PATENT OFFICE.

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URETHROSCOPE.

Application filed February 17, 1927. Serial No. 169,112.

The present invention relates to an improvement in urethroscopes, and more particularly to an improvement upon instruments of this character such as are disclosed in patents heretofore obtained by me, namely 1,003,232, dated September 12, 1911, 1,044,328, dated November 12, 1912 and 1,139,015, dated May 11, 1915.

Such instruments include means for dilating the urethral or other channel and illuminating the dilated channel.

The invention of the present application is, as above stated, particularly adapted for use as a urethroscope or endoscope, said instrument being provided at its distal end with means whereby the urethral or other passage into which the instrument is inserted may be temporarily dilated, for the purpose of permitting a physician to make a visual examination as well as treat the urethral channel in which the instrument is inserted.

Instruments heretofore proposed for this purpose have been more or less objectionable in that the relation of the dilating device to other parts of the instrument, as well as the illuminating means have been, or proved to be unsatisfactory owing to the complicated mechanical arrangements of the parts. Also the lamp bulb was frequently broken owing to its location relative to the other parts of the instrument.

The present instrument, like others for the same general purpose, is provided with means for illuminating the dilated channel and one of the objects of the present invention is to avoid objections that have been incident to the arrangement of circuit wires and terminals for the lamps in the instruments heretofore employed. Among the objections to prior instruments, as above noted, is the fact that the location of the lamp bulb relative to the other parts was such that injury might result if the lamp were broken; and further the connection between the several tubes and dilators has been such that they could not be readily separated, not only increasing the cost of manufacture, but rendering it practically impossible to maintain the several parts in the desired sanitary condition.

The object of my present invention is to improve the construction of a urethroscope whereby the urethroscope is simplified in construction, is easily disassembled for sanitary reasons, the lamp is placed at the sight end of the instrument, the cost of manufacturing reduced and in which all of the above referred to detrimental features are wholly eliminated.

My invention consists in the peculiar and novel construction of a urethroscope, said urethroscope having details of construction as will be more fully set forth hereinafter and claimed.

Figure 1 represents a side view of my improved urethroscope somewhat enlarged, showing the dilators in their normal or closed positions in full lines and in their expanded or open positions, in dotted lines.

Figure 2 is a still further enlarged longitudinal sectional view taken centrally on line 2, 2, of Figure 1 with the greater portion of the central part of the urethroscope broken away.

Figure 3 is an enlarged transverse sectional view through the removable sight and lamp member and taken on line 3, 3, of Figure 1, looking in the direction of the arrows *a*, *a*.

Figure 4 is an enlarged transverse sectional view similar to Figure 3 and taken on line 4, 4 of Figure 1, and looking in the direction of the arrows *b*, *b*.

Figure 5 is an enlarged end view of the dilator end of the inner tube.

Figure 6 is an enlarged side view of the dilator end of the inner tube, and

Figure 7 is a central longitudinal sectional view through the irrigating member of the urethroscope, which takes the place of the sight and lamp member, when the act of irrigating is being performed on the patient.

In the drawing, Figure 1 represents my improved urethroscope as a whole, and it consists essentially of the relatively stationary outer tube 8, the relatively non-revoluble but longitudinally movable inner tube 9, in circumferential and longitudinal contact with the outer tube 8, as shown in Figure 2, a plurality of laterally movable comparatively short dilator arms 10, 10, forming an integral extension of the inner or dilator end of the outer tube 8, an operating member 11, a removable sight and lamp member 12, on the head end, and a removable irrigating member 13, which also goes on the head end of the instrument, when the sight and lamp member 12 is removed.

The length and diameter of the outer tube 8 may be of any suitable dimensions, such for example as will permit the instrument to be readily inserted into the urethral passage. One end portion of the outer tube 8, which may be termed the outer or head end is provided with a slightly enlarged cylindrical head 14 having internal screw-threads 15 and a radial screw-threaded hole 16 in which is a knurled headed screw 17.

The inner tube 9 has an externally screw-threaded head 18, a collar 19, a slight longitudinal groove 20 in which the inner end of the screw 17 has a sliding fit, and which allows longitudinal movement of the inner tube 9, but prevents the inner tube 9 from turning on its axis when the inner end of the screw 17 is in the groove 20. The inner or dilator end of the inner tube 9 has a series, preferably four, of bayonet joint slots 21, 21, as shown in Figures 2, 5 and 6. The dilator arms 10, 10, may be straight or curved and when closed form a cone shaped apex or inner end on the instrument. Secured to each of the dilator arms 10, 10, is a wire operating member 22 having an end 23 secured to the dilator arm 10 by riveting or other means, an inclined portion 24 in a bayonet joint slot 21 in the end of the inner tube 9, and a straight portion 25 terminating in an end 26 secured to the dilator arm 10 by riveting or other means, as shown in Figure 2.

The operating member 11 is in the form of an externally screw-threaded sleeve in screw-threaded engagement with the internal screw-threads 15 in the head 14 and has a knurled flange 27. The operating member 11 is rotatably secured to the head end of the inner tube 9 by the bearing ring 19 on the inner tube 9 and the collar 28 situated also on the inner tube 9, as shown in Figure 2.

The sight and lamp member 12 is in the form of a short cylindrical body member 29 having a bevelled inner end portion 30 which merges into an internally screw-threaded end 31, which screws over the externally screw-threaded head end 18, of the inner tube 9 and secures the sight and lamp member 12, to the inner tube 9. This body member 29 also has a lamp socket 32 in which is an electric lamp 33, which is electrically connected to a source of electric energy, not shown, by wires, through an opening 34 in the body member 29. The outer end of body member 29 also has external screw-threads 35 and a reflector 36 is placed back of the lamp 33 on the bevelled end portion 30, as shown in Figures 2 and 4. A dished sight member 37 is constructed to have an internally screw-threaded flange 38, which screws over the external screw-threads 35 of the body member 29, a central sight tube 39, which extends into the body member 29 and a dished circular reflector 40 on the inside of the sight member 37, as shown in Figures 2 and 3.

All of the parts of the instrument can be made of German silver or other suitable metal or material.

By means of this improved construction the urethroscope when inserted, or in use, may be easily and quickly manipulated so as to accurately and positively operate the dilator arms simultaneously to the desired extent, thereby correspondingly enlarging that portion of the urethral passage and temporarily producing a complete dilation of the folds of the cavity, preparatory to examinations, irrigation or other operations.

It will be understood that by reversely manipulating the parts, the dilator arms 10 may be closed or moved inwardly so that they will clasp any body located between them, and the instrument can then be employed like a forceps to withdraw such body from the previously dilated channel.

In the use of my improved urethroscope, the instrument first sterilized is inserted into the urethral passage or other channel to the extent desired followed by turning the operating member 11 to the right thereby correspondingly moving the inner tube 9 lengthwise, when the inner edges of the bayonet joint slots 21, 21 in the end of the inner tube 9, engaging with the inclined portions 24, 24 of the wire operating members 22, 22, will cause the dilator arms 10, 10 to expand or open, as shown in dotted lines in Figure 1. The lamp casing 12 is now screwed upon the section 18 of the inner tube 9 and the electric lamp 33 is lighted, by closing a switch, not shown. Light from the lamp 33 is now reflected from the reflector 36 onto the reflector 40 and the light from the reflector 40 is then reflected into and through the inner tube 9 and onto the expanded parts thus acted upon. The physician may then make a visual examination or inspection of the thus acted upon parts by looking through the sight tube 39.

At the completion of the operations the lamp 33 is put out, the sight and lamp member 12 is removed from the inner tube 9, by unscrewing it, the operating member 11 is turned to fully open the dilator arms, the screw 17 is withdrawn from the groove 20 in the inner tube 9 and such inner tube is then given a partial turn to the left by grasping the outer end 18. This last operation brings the inclined portions 24, 24, of the wire operating members 22, 22 into the open end of the bayonet joint slots 21, 21, and the inner tube 9 may now be drawn entirely out of the outer tube 8 by unscrewing the operating member 11 from the head 14. All of the parts of the instrument are thus easily separated and may now be thoroughly cleaned or sterilized, for sanitary reasons.

By the use of my improved construction in urethroscopes, the instrument is easily and quickly taken apart for sterilizing the parts and for minor repairs, the sight and lamp member is easily and quickly removed from the instrument when not in use, therefore there is no breakage of the lamp by the use of instruments through the urethroscope, the act of irrigating is more sanitary than heretofore and a more perfect urethroscope is produced, than has previously been devised.

If desired, the improved instrument may be employed for irrigating the channel in which it is inserted. For this purpose the sight and lamp member 12 is detached and the irrigating member 13, illustrated in detail in Figure 7, substituted therefor.

The irrigating member 13 consists of a cylindrical head member 41 having an internally screw-threaded inner end 42, which screws over the externally screw-threaded head end 18 of the inner tube 9, an internally screw-threaded outer end 43 and an outlet tube 44 to which may be connected a rubber tube, not shown, for carrying away the remedial or other fluids used in irrigating. Screwed into the screw-threaded outer end 43 in the outer end of the head member 41 is a screw-threaded plug 45, having external screw-threads 46, a knurled flange 47 and an enlongated central tube 48, the inner end 49 of which extends preferably into the dilator end of the instrument, when in use, and the outer end of which terminates into an inlet tube 50, on the outer face of the plug 45, as shown in Figure 7. A rubber tube and bulb, not shown, may be secured to this inlet tube 50, for forcing remedial or other fluids through the tube 48.

When irrigating, the remedial fluid flows or is forced through the central tube 48 to the enlarged portion of the urethra, as indicated by the arrows *c*, *c*, in Figure 7 and then it flows back between the central tube 48 and the inside of the inner tube 9, through the head member 41 and then out through the outlet tube 44, as indicated by the arrows *a*, *a*, in Figure 7. The remedial liquid is thus kept entirely out of contact with the external portions of the body, and by this new construction very little if any enters between the outer tube 8 and the inner tube 9.

Having thus described my invention what I claim is:

1. In a urethroscope, an outer tube, a plurality of dilator arms formed integral with the outer tube and when closed forming a cone shaped end on the outer tube, an inner tube in surface contact with the outer tube, a dilating member having an inclined portion secured to each dilator arm, the inner tube having bayonet joint slots into which the inclined portion of each dilating member engages, means for reciprocating the inner tube relatively to the outer tube, and means for preventing the inner tube from turning on its axis relatively to the outer tube.

2. In a urethroscope, an outer tube, a plurality of dilator arms formed integral with the outer tube and when closed forming a cone shaped end on the outer tube, an inner tube in surface contact with the outer tube, a wire having an inclined portion and a straight portion fixed to each dilator arm, the inner tube having at its inner end a bayonet joint slot for each wire, the inclined portion of each wire adapted to enter the bayonet joint slot, whereby the inner tube is operatively connected to the dilator arms and easily disconnected when required, means for reciprocating the inner tube relatively to the outer tube, and means for preventing the inner tube from turning on its axis.

3. In a urethroscope, an elongated outer tube having a head end and a plurality of dilator arms forming an apex end for the outer tube, an elongated inner tube in surface contact with the outer tube, means for operatively connecting and disconnecting the inner tube and the dilator arms, a detachable sight and lamp member on the head end of the urethroscope and having an electric lamp, means for reflecting light into the inner tube, means for electrically connecting the electric lamp to a source of electric energy, and means for reciprocating the inner tube relatively to the outer tube.

4. In a urethroscope, an elongated tube having a head end and a plurality of dilator arms forming an apex end for the outer tube, an elongated inner tube in surface contact with the outer tube, means for operatively connecting the inner tube with the dilator arms, a detachable sight and lamp member on the head end of the inner tube and having an electric lamp, a reflector, a sight tube, means for electrically connecting the lamp with a source of electric energy and means for reciprocating the inner tube relatively to the outer tube.

5. In a urethroscope as described, the combination of a tube having dilating members at one end, means for expanding said dilators, a casing adapted to be detachably secured to the other end of said tube, an electric lamp within said casing, a primary reflector adjacent the electric lamp, between the lamp and the tubular body of the instrument, a sight tube in the end wall of said casing, and an annular reflector surrounding said sight tube and adapted to receive reflected light from the primary reflector.

6. In a urethroscope, the combination of the following instrumentalities, an outer tube 8, an inner tube 9, dilator arms 10, 10, an operating member 11, a sight and lamp member 12, said outer tube 8 having a head

end 14 and a screw 17 screw-threaded through the head end 14, said inner tube 9 having a slight longitudinal groove 20 into which the screw 17 enters, wire operating members 22, 22 on the dilator arms 10, 10, each wire operating member 22 having an inclined portion 24 which enters a bayonet joint slot 21 in the inner tube 9, said sight and lamp member 12 having an electric lamp 33, reflectors 36 and 40, and a sight tube 39 for the purpose described.

In testimony whereof I have hereunto set my hand.

FERDINANDO CERBO.