

[54] **INSTRUMENT FOR INSERTING A SUPRAPUBIC CATHETER**

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[52] U.S. Cl. **128/349 R**

[51] Int. Cl. **A61m 25/00**

[58] Field of Search.....128/303, 305, 311, 328, 341, 128/343, 347, 348, 350, 3-8, 349 R

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[57] **ABSTRACT**

An instrument having a curved distal portion insertable through the urethra into the bladder to bring the distal end of the instrument into engagement with the anterior wall of the bladder in register with the suprapubic area of the abdominal wall. After inflating the bladder with a suitable fluid through a longitudinal passage in the instrument and a lateral opening in the curved distal portion thereof, an incision is made through the abdominal wall and the anterior wall of the bladder in register with the distal end of the instrument, which then emerges outwardly through the incision. The distal end of the instrument is provided with a recessed catheter engaging means engageable with a tip portion of a retention catheter and adapted to insert the tip portion of the catheter into the bladder through the incision. Thereafter, the instrument is disengaged from the catheter within the bladder and is then withdrawn from the bladder and the urethra, leaving a portion of the catheter within the bladder. The catheter is then inflated to retain it within the bladder.

3 Claims, 12 Drawing Figures

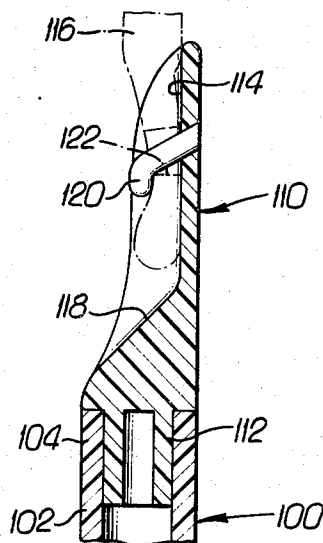


FIG. 1.

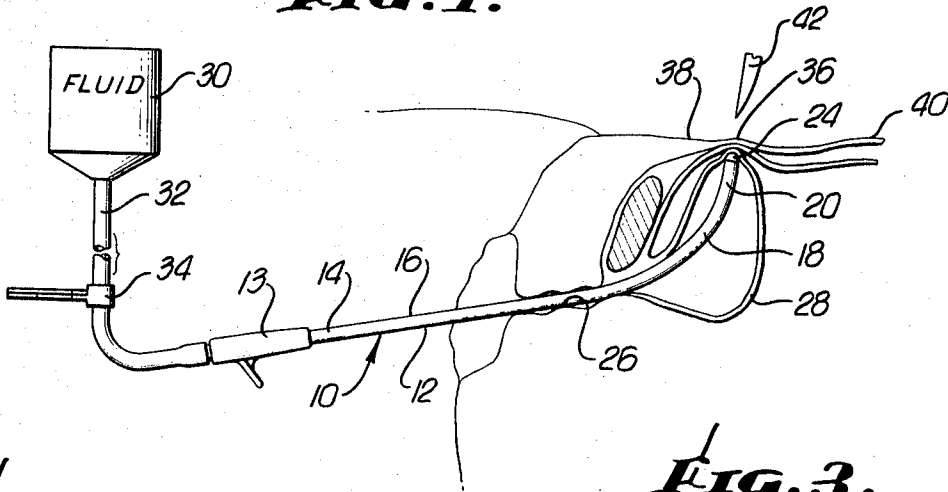


FIG. 2.

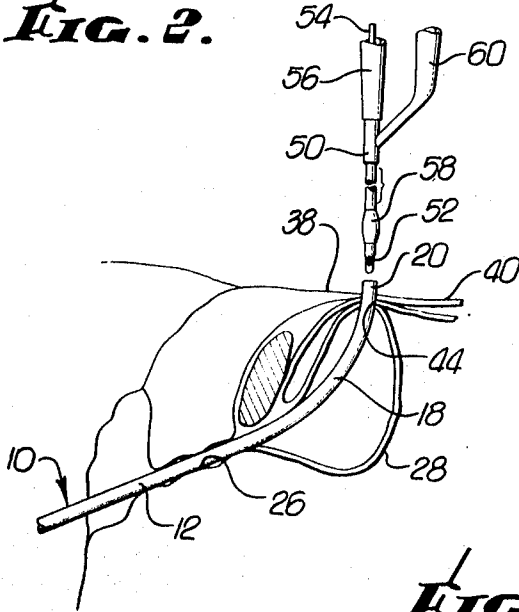


FIG. 3.

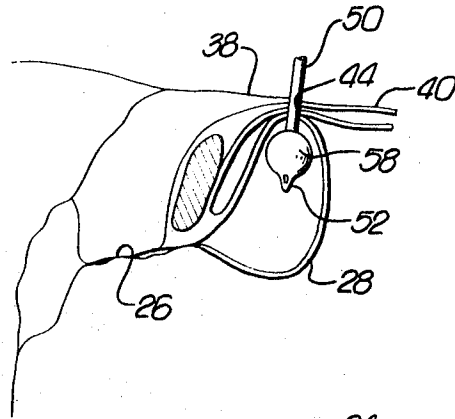


FIG. 4.

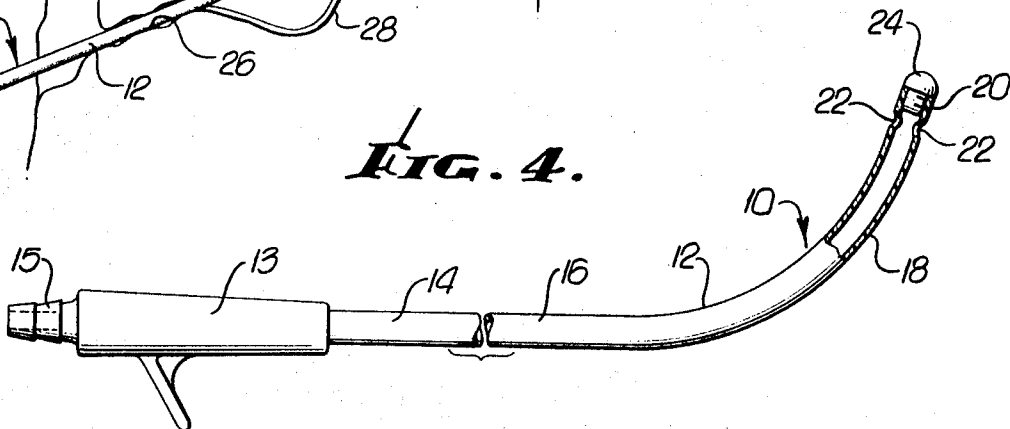
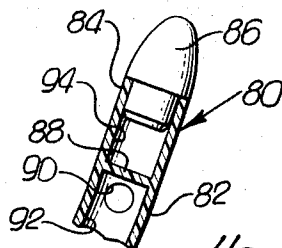


FIG. 5.



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FIG. 6.

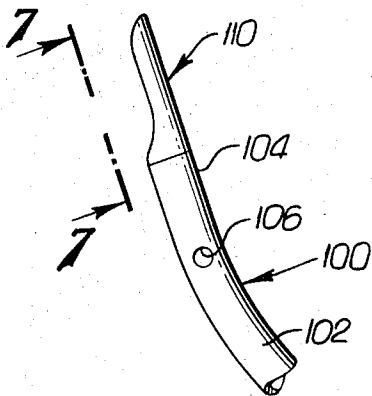


FIG. 7.

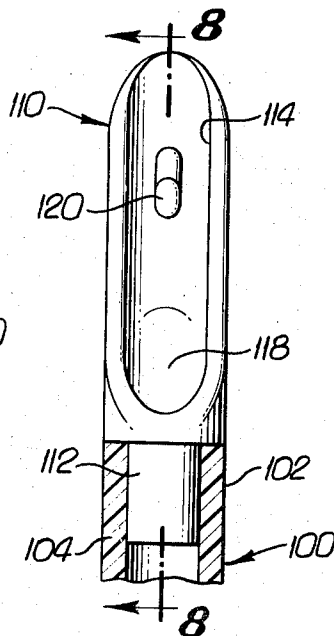


FIG. 8.

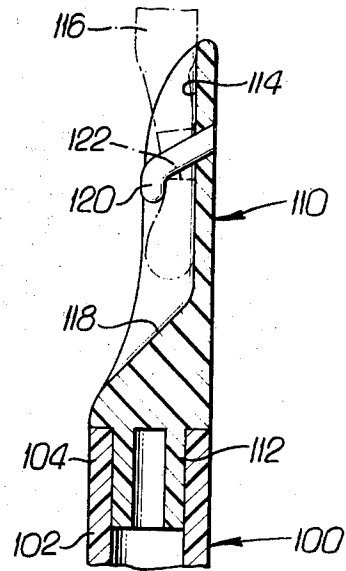


FIG. 10.

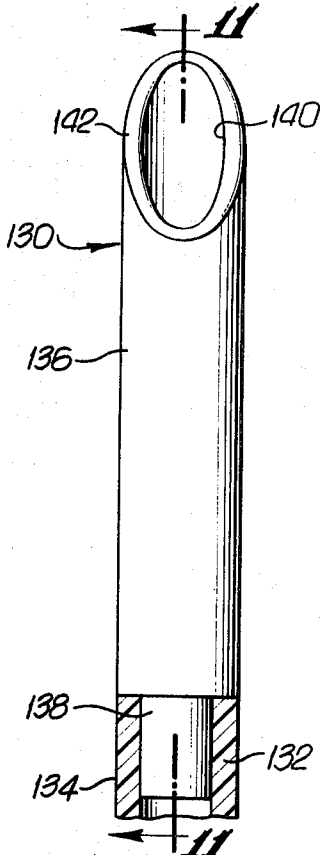


FIG. 11.

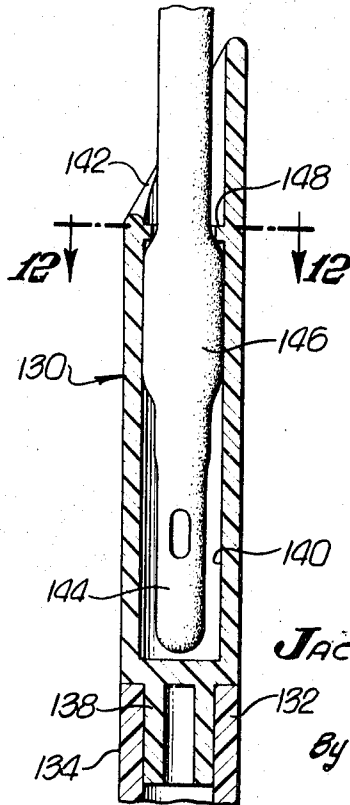


FIG. 9.

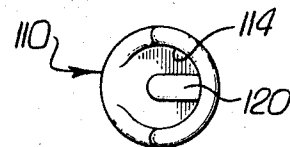
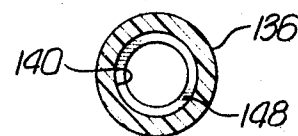


FIG. 12.



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INSTRUMENT FOR INSERTING A SUPRAPUBIC CATHETER

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of my copending application Ser. No. 297, filed Jan. 2, 1970.

BACKGROUND OF INVENTION

The present invention relates in general to catheters and, more particularly, to an instrument for inserting a retention catheter, such as a Foley, mushroom, Malecot, or similar catheter, from a suprapubic location.

Postoperative bladder drainage by way of a retention catheter inserted into the bladder through the urethra has long been conventional. However, urethral insertion has serious disadvantages, among these being a high incidence of urinary tract infection, urethral irritation and swelling making normal urination difficult or impossible, extreme pain upon withdrawing a catheter which has been in place for some time, and the like.

Such disadvantages of urethral insertion can be eliminated or minimized by insertion through a small suprapubic incision, a technique of relatively recent development and one which is being used progressively more extensively. However, prior suprapubic insertion techniques leave much to be desired.

For example, one prior suprapubic insertion technique involves making a blind puncture through the abdominal wall and into the bladder with a trocar after filling the bladder with a suitable fluid, such as water, through a urethral catheter. Subsequently, a retention catheter is threaded through the trocar into the bladder. This procedure has various disadvantages, not the least of which is the inherent hazard involved in making a blind puncture. Another disadvantage of this process is that the catheter, being insertable through the trocar, is sufficiently smaller than the incision made by the trocar that leakage of urine can occur around the catheter.

Another prior suprapubic insertion technique involves: filling the bladder with water, or other suitable fluid, through a urethral catheter, which is then removed; subsequently inserting through the urethra and into the bladder a rigid instrument having a curved distal portion the end of which is brought into engagement with the anterior wall of the bladder to form a visible outward protrusion of the suprapubic area of the abdominal wall; making a small incision through the abdominal wall and the anterior wall of the bladder in register with the distal end of the instrument, whereupon the distal end of the instrument may be displaced outwardly through the incision; connecting a wire withdrawn from the instrument to the distal end of a retention catheter; pulling the instrument, with the catheter attached thereto by the wire, through the incision, the bladder and the urethra; disengaging the catheter from the wire; and then pulling the catheter back through the urethra and into the bladder. This procedure, while less objectionable in some respects to the blind puncture technique, creates problems of its own. Among these are the excessive irritation resulting from repeated passes through the urethra, with the attendant possibility of infection, and the contamination of the portion of the catheter which is withdrawn through the suprapubic incision in pulling the distal portion of the catheter back through the urethra and into the bladder.

SUMMARY AND OBJECTS OF INVENTION

Generally speaking, an important object of the present invention is to provide a suprapubic catheter insertion instrument which, when used with the proper technique, avoids the hereinbefore-discussed problems and disadvantages associated with prior suprapubic insertion techniques and equipment.

More particularly, an important object of the invention is to provide an instrument which eliminates any necessity for a blind puncture, and which further eliminates any necessity for repeated passes through the urethra.

Another and important object in the foregoing connection is to provide an instrument which requires only a single insertion through the urethra and a single withdrawal therefrom, thereby greatly minimizing urethral irritation and the attendant possibility of infection.

Another object of importance is to provide an instrument usable in such a manner that only the portion of the retention catheter which is required to be within the bladder is ever inserted therein through the suprapubic incision, thereby avoiding contamination of the external portion of the catheter.

Yet another object is to provide an instrument which requires an incision no larger than, or smaller than, the portion of the retention catheter to be received in the incision, which portion may be narrowed by stretching, thereby minimizing the possibility of leakage of urine around the catheter.

Still another object of the invention is to provide an instrument capable of functioning both as a catheter and as a trocar.

The invention may be summarized as comprising an instrument for use in suprapubic catheter insertion technique which includes: inserting through the urethra and into the bladder a curved distal portion of a rigid instrument having one or more lateral openings adjacent its distal end and a longitudinal passage extending from its proximal end to such openings; inflating the bladder with water, or other suitable fluid, through the instrument; engaging the distal end of the instrument with the anterior wall of the bladder with sufficient force to provide a visible protrusion of the suprapubic region of the abdominal wall; making a small incision through the abdominal wall and the anterior wall of the bladder in register with the distal end of the instrument; displacing the distal end of the instrument outwardly through the incision, this occurring automatically in most instances as the result of the outward pressure applied by the instrument; engaging a tip portion of a retention catheter with a catheter engaging means at the distal end of the instrument; displacing the catheter engaging means and a portion of the catheter into the bladder through the incision; disengaging the catheter engaging means from the tip portion of the catheter within the bladder; withdrawing the instrument from the bladder and the urethra, leaving a portion of the catheter within the bladder; and inflating the inflatable portion of the catheter within the bladder to insure retention.

Another and important object of the invention is to provide an instrument having the characteristics set forth in the foregoing summation.

Another object is to provide a catheter engaging means which is recessed to receive at least a part of the tip portion of the catheter therein.

An important object in connection with the presently preferred species of the invention is to provide a catheter engaging means having a channel to receive the catheter tip and a rearwardly slanting, rounded hook insertable into a lateral opening in the catheter tip. With this construction, the instrument can be unhooked from the catheter tip within the bladder very readily by a slight movement of the instrument relative to the catheter tip, which is an important feature.

An object in connection with another embodiment is to provide a catheter engaging means comprising a longitudinal socket in the distal end of the instrument and adapted to receive the catheter tip, insertion into the bladder through the incision being accomplished with the assistance of a catheter probe for stiffening the catheter. A removable closure normally closes the socket in the distal end of the instrument.

An object related to still another embodiment is to provide a catheter engaging means having a recess to receive a part of the inflatable portion of the catheter, and having means to grip such inflatable portion frictionally when it is partly inflated.

The foregoing objects, advantages, features and results of the present invention, together with various other objects, advantages, features and results thereof which will be evident to those skilled in the catheter art in the light of this disclosure, may be achieved with the exemplary embodiments of the in-

vention illustrated in the accompanying drawings and described in detail hereinafter.

DESCRIPTION OF DRAWINGS

In the drawings:

FIGS. 1 to 3 are fragmentary sectional views illustrating semidiagrammatically successive steps involved in the preferred technique of inserting a retention catheter into a patient's bladder through a suprapubic incision in the abdominal wall and the anterior wall of the bladder using an alternative embodiment of the instrument of the invention;

FIG. 4 is a longitudinal sectional view illustrating the instrument used in the technique shown in FIGS. 1 to 3;

FIG. 5 is a fragmentary longitudinal sectional view of another alternative instrument of the invention;

FIG. 6 is a fragmentary side elevational view of an instrument constituting the presently preferred embodiment of the invention;

FIG. 7 is an elevational view taken as indicated by the arrowed line 7—7 of FIG. 6;

FIG. 8 is a longitudinal sectional view taken as indicated by the arrowed line 8—8 of FIG. 7;

FIG. 9 is an end view, taken from the left as viewed in FIG. 8;

FIG. 10 is an elevational view of still another embodiment of the invention;

FIG. 11 is a longitudinal sectional view taken as indicated by the arrowed line 11—11 of FIG. 10; and

FIG. 12 is a transverse sectional view taken as indicated by the arrowed line 12—12 of FIG. 11 of the drawings.

DESCRIPTION OF EXEMPLARY EMBODIMENTS OF INVENTION

FIGS. 1 to 4

Referring initially to FIG. 4 of the drawings, illustrated fragmentarily therein is an instrument 10 of the invention which, in view of the functions it performs, may be termed a "cystotrocar-catheter." The functioning of the instrument 10 as both a catheter and a trocar will become evident in the course of describing the procedure in which it is used.

The instrument 10 comprises simply a rigid tube 12, of metal, plastic, or other suitable material, having a proximal end 14 equipped with a grip or handle 13 provided with a tubing connector 15 which communicates with the interior of the tube 12. A straight or substantially straight intermediate portion 16 terminates in a curved distal portion 18 having a distal end 20. The curved distal portion 18 is provided adjacent the distal end 20 with one or more lateral openings 22 which communicate with the distal end of the longitudinal passage formed by the tube 12 and leading to the tubing connector 15. The distal end 20 is provided with a removable closure 24 which is rounded externally so that the closure may act as an obturator facilitating insertion of the distal end 20 and the curved distal portion 18 through a patient's urethra 26, FIGS. 1 to 3, and into the patient's bladder 28. The closure 24 may be removably secured to the distal end 20 of the instrument 10 by threading it thereinto. Alternatively, the closure 24 may be threaded onto the distal end 20, or it may be pressed into or onto the distal end, etc.

In the particular construction illustrated, the instrument 10 is of a diameter and a length suitable for use with female patients. However, it may be used with male patients by suitably modifying its length and diameter, and also its curvature.

Considering the technique with which the instrument 10 of the invention is used, the distal end 20 of the instrument is first inserted through the urethra 26 into the bladder 28, into the position shown in FIG. 1, for example. Then, a suitable fluid, such as water, is introduced into the bladder 28, through the tube 12 and the lateral openings 22, in a quantity sufficient to inflate or distend the bladder, as shown in FIG. 1 of the drawings. This may be accomplished readily by connecting a fluid source 30 to the tubing connector 15 by means of an

elastomeric tube 32 equipped with a clamp 34. As will be apparent, fluid for distending the bladder 28 may be introduced by disengaging the clamp 34. When the bladder has been distended to the proper degree, the clamp 34 is reengaged with the elastomeric tube 32 to prevent further fluid introduction and to prevent reverse flow.

It will be apparent that, in the foregoing operations, the instrument 10 functions as an urethral catheter.

The next step, also shown in FIG. 1, is to bring the closed distal end 20 of the instrument 10 into engagement with the anterior wall of the bladder with sufficient force to provide a visible external protrusion 36 in the suprapubic region 38 of the abdominal wall 40. This can be accomplished readily by suitable manipulation of the instrument 10 by means of the handle 13.

The visible external protrusion 36 produced by the foregoing manipulations locates the closed distal end 20 of the instrument very accurately. Next, the physician, utilizing a scalpel 42, or other appropriate cutting instrument, makes a small incision, at the center of the protrusion 36, through the abdominal wall 40 and the anterior wall of the bladder 28. Normally, this incision need not be more than of the order of 2 to 4 millimeters in length.

The incision through the abdominal wall 40 and the anterior wall of the bladder 28, which incision is designated generally by the numeral 44 in FIGS. 2 and 3 of the drawings, is made while maintaining the closed distal end 20 of the instrument 10 in pressural engagement with the anterior bladder wall. Consequently, when the incision 44 is sufficiently large, the closed distal end 20 is automatically displaced outwardly through the incision. In practice, the closed distal end 20 simply pops into view when the incision is large enough. Thus, the instrument 10 performs its aforementioned trocar function.

Once the closed distal end 20 of the instrument 10 has emerged through the suprapubic area 38 of the abdominal wall 40, the closure 24 is removed, as by unscrewing it, or otherwise removing it, as shown in FIG. 2.

Continuing to refer to FIG. 2 of the drawings, the physician next takes a retention catheter 50 and inserts at least the tip portion 42 thereof into the distal end 20 of the instrument 10. To stiffen the catheter 50 for insertion of the portion 52 thereof into the distal end 20 of the instrument, a catheter probe 54 is inserted through the drainage branch 56 of the catheter into the tip portion.

Next, the physician inserts the catheter 50 through the incision 44 into the bladder 28 by an inward force applied to the catheter, as stiffened by the probe 54. At the same time, the distal end 20 of the instrument 10 is withdrawn through the incision 44 into the bladder 28. It will be understood that such movement of the instrument-catheter combination may readily be carried out by concurrent movement of the physician's hands. In effect, the instrument-catheter combination is threaded through the patient's body by the physician, with one hand on the instrument 10 and the other on the probe-stiffened catheter 50, until the catheter has been inserted to the required extent. The catheter 50 is provided with external indicia, not shown, indicating the depth of insertion.

After the catheter 50 has been inserted to the proper extent, the instrument 10 is withdrawn from the bladder 28 and the urethra 26, as shown in FIG. 3. Thereafter, the inflatable portion 58 of the catheter 50 is inflated through the inflation branch 60 of the bifurcated device. The inflated portion 58 then retains the tip portion 52 within the bladder 28 in draining communication with the interior thereof.

Although the instrument 10 of the invention has been disclosed in connection with a Foley catheter, it will be understood it may be employed with any catheter capable of being retained in position once inserted. It will also be understood that if the physician desires to run the catheter 50 all the way through the patient's body for any reason, this can be done without contamination by pushing or pulling it through the tubular instrument 10. It may be pushed through by means

of the catheter probe 54, or pulled through by a wire, not shown, threaded through the drainage openings in the tip portion 52 of the catheter.

Reviewing some of the advantages of the instrument 10 of the present invention, which advantages also apply to the instruments described hereinafter, it will be apparent that it minimizes urethral irritation since the only operations involving the urethra are insertion and subsequent withdrawal of the instrument therethrough. Another advantage is that the suprapubic incision 44 is made with the protrusion 36 formed by the closed distal end 20 of the instrument 10 as a positive reference, thereby avoiding all of the hazards inherent in making a blind or obscured puncture or incision. As previously pointed out, it is necessary only to make an incision large enough to permit the instrument to act as a trocar. In view of the smallness of the incision, and the fact that the outside diameter of the portion of the catheter 50 to be disposed in the incision can be about the same as the outside diameter of the instrument itself, or even larger if it is stretched during insertion by means of the catheter probe 54, the tissues surrounding the incision engage the catheter snugly to prevent urine leakage around the outside of the catheter.

Another distinct advantage of the invention is that the entire procedure hereinbefore discussed can be carried out without an assistant, which is an important feature.

FIG. 5

This figure of the drawings illustrates an instrument 80 which is virtually identical to the instrument 10 and which includes a tube 82 having a distal end 84 closed by a removable closure 86. The instrument 80 differs in that the tube 82, instead of being open throughout, is closed adjacent its distal end 84 by a partition 88 between the distal end 84 and lateral openings 90 communicating with the distal end of the longitudinal passage 92 formed by tube 82. On the other side of the partition 88 is a longitudinal socket 94 for the closure 86, or a catheter tip.

The instrument 80 is used in the same way as and has the same advantages as the instrument 10 so that no further description is necessary.

In the instrument 10, the distal end 20 of the tube 12 acts as a recessed catheter engaging means for receiving therein the tip 52 of the catheter 50 during insertion into the bladder 28. Similarly, the distal end 84 of the tube 82 of the instrument 80 acts as such a recessed catheter engaging means. Different catheter engaging means are embodied in the instruments illustrated in FIGS. 6 to 12 of the drawings, as will now be described.

FIGS. 6 to 9

In these figures of the drawings is illustrated an instrument 100 which is generally similar to the instruments 10 and 80 in that it is provided with a curved distal portion 102 terminating in a distal end 104. The instrument 100 is provided with a longitudinal passage, not shown, from its proximal end, not shown, to one or more lateral openings 106 corresponding to the analogous lateral openings in the instruments 10 and 80.

The instrument 100 includes a catheter engaging means having the form of a catheter engaging tip 110 provided at its proximal end with a reduced-diameter stem 112 pressed into the distal end of the tubular body portion of the instrument. The catheter engaging tip 110 is what might be termed generally spoon shaped and, in cross section, has the configuration of an arcuate channel 114 which extends longitudinally to the distal extremity thereof. The channel is of a size and shape to receive a catheter tip 116, FIG. 8, and terminates at its rearward or proximal end in an inclined cam surface 118. Within the channel 114 intermediate its ends is a rearwardly inclined hook 120 the end of which is rounded to minimize urethral irritation, the length of the hook being less than the diameter of the catheter tip for the same reason. As shown in FIG. 8, the hook 120 is so located and proportioned as to be insertable into a lateral opening 122 in the catheter tip 116. The instrument 100 may be used with any catheter having a tip provided with such a lateral opening.

The technique involved in using the instrument 100 is generally similar to that described previously. Once the necessary suprapubic incision has been made, in the manner hereinbefore set forth, and the catheter engaging tip 110 has emerged through the incision, the physician engages the catheter tip 116 with the hook 120 by inserting the latter into one of the lateral openings 122 in the catheter tip. Then, by slowly withdrawing the instrument 100 through the urethra, the catheter engaging tip 110 guides and inserts the catheter tip 116 into the bladder through the suprapubic incision, by drawing it into the bladder through the incision. As soon as the catheter has been inserted the desired distance, the physician can unhook the catheter engaging tip 100 from the catheter tip 116 readily, within the bladder, by a slight motion of the instrument 100 relative to the catheter tip in a direction to disengage the hook 120 from the opening 122. In the process of unhooking the instrument 100 from the catheter tip 116, the cam surface 118 engages the extremity of the catheter tip and assists in the unhooking process. Thereupon, the instrument 100 may be withdrawn from the bladder through the urethra. The catheter, not shown, with which the catheter tip 116 is associated is retained in the bladder in any known manner, as by inflating an inflatable portion thereof in the manner hereinbefore discussed.

As will be apparent, the instrument 100 itself is all that is necessary to insert the catheter into the bladder, it being unnecessary to rely on a catheter probe, or the like, for assistance. Thus, a catheter can be inserted into a bladder through a suprapubic incision much more simply with the instrument 100. In all other respects, the instrument 100 operates in the same way as and has all of the advantages of the instrument 10. Consequently, a further discussion herein is unnecessary.

FIGS. 10 to 12

These figures of the drawings show fragmentarily an instrument 130 which is similar to the instruments 10, 80 and 100 and which includes a curved distal portion 132 terminating in a distal end 134 carrying a catheter engaging means or tip 136 having a stem 138 pressed into a longitudinal socket in the distal end of the body portion of the instrument.

In this case, the catheter engaging tip 136 is provided therein with a longitudinal socket 140 and terminates in a distal end 142 inclined at an acute angle to the axis of the tip. The socket 140 is of a diameter and length to receive therein a catheter tip 144, FIG. 11, having an inflatable portion 146. A part of the inflatable portion 146 is disposed within the socket 140 axially inwardly of a radially inwardly projecting annular protrusion or rib 148. When the part of the inflatable portion 146 axially behind the annular rib 148 is inflated slightly, it is gripped and prevented from withdrawal from the socket 140 by the annular rib 148.

The instrument 130 is used in generally the same way as the instrument 10. After the catheter engaging tip 136 has emerged through the suprapubic incision, the catheter tip 144, and part of the inflatable portion 146 thereof, are inserted into the socket 140 in the catheter engaging tip 136, and axially behind the annular rib 148. The inflatable portion 146 of the catheter tip 144 is then inflated sufficiently for the annular rib 148 to grip the catheter tip securely. Thereupon, the instrument 130 is drawn outwardly through the urethra until the catheter engaging tip 136 and the catheter tip 144 gripped thereby are pulled through the suprapubic incision into the bladder. Once the catheter has been inserted into the bladder through the suprapubic incision to the required extent, the inflatable portion 146 thereof is deflated to disengage the catheter from the catheter engaging tip 136 within the bladder. Thereupon, the instrument 130 is withdrawn from the bladder and the urethra, and the inflatable portion 146 is inflated to its normal extent to retain the catheter within the bladder. In all other respects, the instrument 130 has the same mode of operation and the same advantages as the instrument 10 so that no further discussion is required herein.

Although exemplary embodiments of the invention have been disclosed for purposes of illustration, it will be understood that various changes, modifications and substitutions may be incorporated in such embodiments without departing from the scope of the invention as set forth in the claims appearing in the next section hereof.

I claim as my invention:

1. An instrument for inserting a suprapubic catheter, said instrument having a curved distal portion terminating in a distal end insertable through the urethra into the bladder and through an incision in the anterior wall of the bladder and the overlying suprapubic area of the abdominal wall to the exterior of the body, said instrument having a longitudinal passage therein from its proximal end toward its distal end and having a lateral opening therein adjacent and communicating with the distal end of said passage, said instrument having catheter engaging means at its distal end engageable with a tip portion of a retention catheter for inserting such tip portion of the catheter through the incision into the bladder, said catheter engaging means being disengageable from the catheter within the bladder, said catheter engaging means being recessed to receive therein at least a part of the tip portion of the catheter, said instrument being a tube from its proximal end to its distal end and being provided with a closure at its distal end, and said tube being closed at a point spaced from the distal end of said instrument and between the distal end of said instrument and said lateral opening.

2. An instrument for inserting a suprapubic catheter, said instrument having a curved distal portion terminating in a distal end insertable through the urethra into the bladder and through an incision in the anterior wall of the bladder and the overlying suprapubic area of the abdominal wall to the exterior of the body, said instrument having a longitudinal passage therein from its proximal end toward its distal end and having a lateral opening therein adjacent and communicating with the distal end of said passage, said instrument having catheter engaging means at its distal end engageable with a tip portion

of a retention catheter for inserting such tip portion of the catheter through the incision into the bladder, said catheter engaging means being disengageable from the catheter within the bladder, said catheter engaging means being recessed to receive therein at least a part of the tip portion of the catheter, said catheter engaging means comprising a hook insertable into a lateral opening in the tip of the catheter, said hook being inclined laterally outwardly and rearwardly toward the proximal end of said instrument, and having its tip spaced laterally from the instrument, so that it can be disengaged from the tip of the catheter within the bladder by a slight movement of said instrument relative to the catheter tip, said catheter engaging means including a longitudinally extending channel into which said hook projects laterally and rearwardly, and a sloping cam surface at the rearward or proximal end of said channel which is engageable by the tip of the catheter in response to a slight movement of said instrument to assist in disengaging said hook from the catheter tip.

3. An instrument for inserting a suprapubic catheter, said instrument having a curved distal portion terminating in a distal end insertable through the urethra into the bladder and through an incision in the anterior wall of the bladder and the overlying suprapubic area of the abdominal wall to the exterior of the body, said instrument having a longitudinal passage therein from its proximal end toward its distal end and having a lateral opening therein adjacent and communicating with the distal end of said passage, said instrument having catheter engaging means at its distal end engageable with a tip portion of a retention catheter for inserting such tip portion of the catheter through the incision into the bladder, said catheter engaging means being disengageable from the catheter within the bladder, said catheter engaging means comprising means for receiving therein and gripping a part of an inflatable portion of the catheter when same is partly inflated, and said receiving and gripping means comprising a socket having an inwardly extending protrusion engageable with the inflatable portion of the catheter.

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