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F. J. WALLACE

2,649,092

CATHETER

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FIG. 2

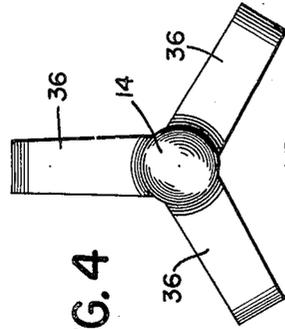
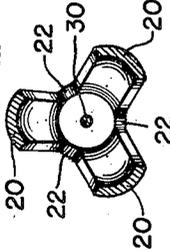


FIG. 4

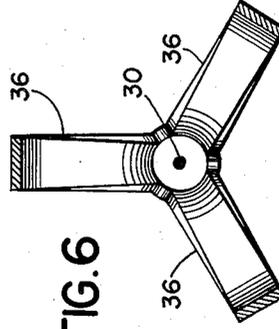


FIG. 6

FIG. 1

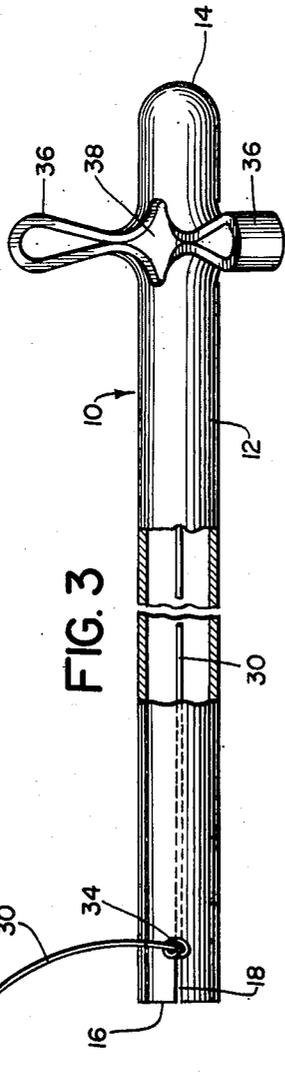
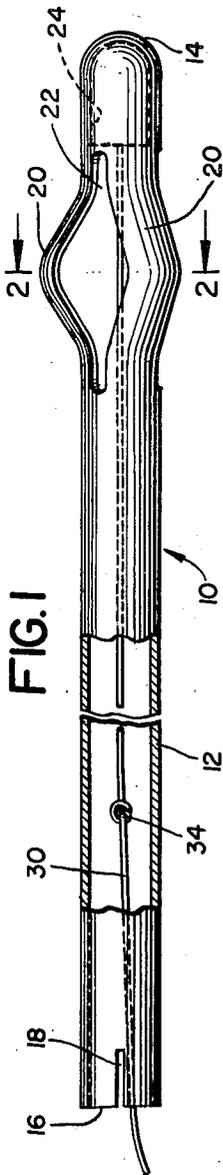


FIG. 3

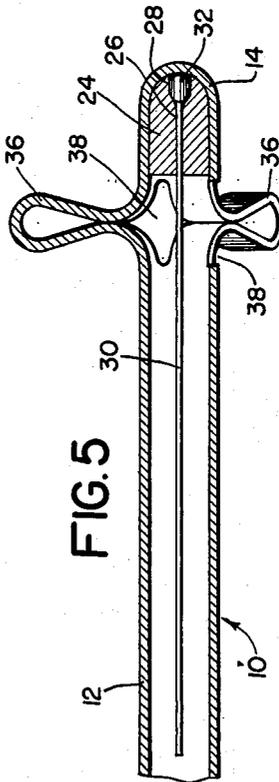


FIG. 5

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CATHETER

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4 Claims. (Cl. 128—349)

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This invention relates to surgical drains and more particularly to catheters adapted to be advantageously employed in various urological procedures.

It is a principal object of the invention to provide a catheter having improved characteristics.

The invention has for another object the provision of an indwelling catheter that may be readily introduced into a body cavity, maintained in the cavity for an extended period of time without accidental dislodgment, and subsequently removed.

A further object of the invention is to provide an indwelling type of catheter which is capable of performing its intended functions in an efficient and trouble-free manner.

To the end that the foregoing objects may be attained, a catheter constructed in accordance with this invention preferably comprises a tubular member closed at its forward end and having a drainage opening at its rearward end. The tubular member is formed with a plurality of circumferentially spaced longitudinal slots adjacent the forward end. The entire tubular member is preferably flexible and distortable, and is fabricated so that the portions thereof defining the longitudinal slots normally project axially outwardly beyond adjacent portions.

The catheter is provided with a flexible means within the tubular member and anchored to the closed end. This means is adapted to retract the closed end of the tubular member with respect to the other end to thereby flex the projecting portions further outwardly. The catheter also includes means adapted to releasably maintain the closed end of the tubular member in retracted position.

While the catheter of this invention may be made of any one of a variety of materials, including rubber and certain synthetic resins, I recommend that the catheter be made from thermoplastic polyethylene.

It has heretofore generally been the practice to make indwelling catheters of rubber. Experience has demonstrated that indwelling rubber catheters, when used for long term drainage of the bladder, often become encrusted with deposits of urinary salts. Withdrawal of such catheters, after deposition or crystallization of urinary salts on their outer surfaces, may be extremely painful and may at times require an open operation before they can be removed. Moreover, deposition of urinary salts reduced the lumen or drainage channel of the catheter, thereby preventing adequate elimination of urine.

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I find that catheters constructed in accordance with this invention and made of polyethylene may be readily inserted into a body cavity, such as the bladder, retained in desired position in the bladder for an extended period of time, then readily removed without undue pain or injury to the patient.

Among the principal advantages of using polyethylene instead of conventional materials in catheters is that polyethylene catheters are non-irritating and non-toxic and do not support the deposition and crystallization of urinary salts thereon. Further, polyethylene is smooth, chemically inert, and resistant to acids and alkalis; possesses requisite flexibility when extruded or molded into thin tubes; and has a low water absorption factor, all of which characteristics contribute materially to the value of polyethylene as a suitable catheter material.

The enumerated objects, as well as other objects, together with the advantages attainable by the practice of this invention, will be readily apparent to persons skilled in the art upon reference to the following detailed description, taken in conjunction with the annexed drawing, which respectively describe and illustrate a catheter constructed in accordance with the invention.

In the drawing:

Figure 1 is a view in elevation of a catheter embodying the invention, partly broken away and partly in central longitudinal cross section;

Figure 2 is a view taken along line 2—2 of Figure 1;

Figure 3 corresponds to Figure 1 and illustrates the parts of the catheter in another relative position;

Figure 4 is a view in end elevation as seen from the right of Figure 3;

Figure 5 is a view taken along line 5—5 of Figure 4; and

Figure 6 is a view taken along line 6—6 of Figure 3.

Referring to the drawing, wherein like reference numerals denote corresponding parts throughout the several views, numeral 10 generally indicates a surgical drain tube or catheter, that may be considered as being in the category of a Pezzar type catheter, and comprises a tubular member 12 closed and rounded at its forward end 14 to facilitate introduction into a body passage. The tubular member is open at its rearward end 16 for drainage purposes, and is provided with a slot 18 that merges with the rearward extremity. The tubular member includes a plurality of outwardly projecting portions 20

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that define a like number of elongated longitudinal circumferentially spaced slots 22. The tubular member is fabricated from a suitable material, preferably molded or extruded polyethylene. The entire tubular member is preferably flexible and at least outwardly projecting portions 20 are both flexible and distortable to permit of ready deformation, whereby closed end 14 may be moved or retracted in the direction of open end 16.

Anchored within closed end 14 is a plug 24 having a central bore 26 and a recess 28. A flexible member 30, also preferably made of polyethylene, extends through central bore 26 and has a head 32 that is positioned in plug recess 28 (Figure 5). Flexible member 30 has an enlarged part 34 that may be obtained by knotting the member at the proper location.

For the purpose of outlining the manner of using the catheter, it is first assumed that the parts are in the relative position shown in Figure 1. A stylet (not shown) is inserted in tubular member 12 and its forward end is brought to bear against the rearward end of plug 24. The stylet is moved forwardly with respect to the tubular member, causing portions 20 to be extended due to their flexibility, and the catheter and stylet are inserted in a body passage to the desired location, such as into the bladder. The stylet is then removed, allowing the parts of the catheter to return to the position shown in Figure 1.

To ensure retention of the catheter in the bladder, the rearward end of tubular member 12 is gripped in one hand and flexible member 30 is moved rearwardly with the other hand. This causes retraction of closed end 14 with respect to the other end of the tubular member and effects further outward projection of portions 20 until they assume the position shown in Figure 3. The parts of the tubular member are retained in the position shown in Figure 3 by bringing the portion of flexible member 30 immediately forward of enlarged part 34 in registry with slot 18 so that enlarged part 34 bears against the outer surface of tubular member 12.

When the parts are in the position shown in Figure 3, portions 36 of the tubular member constitute lateral wings that prevent accidental removal of the catheter from the bladder; and adequate drainage is obtained through openings 38, the interior of the tubular member, and open rearward end 16.

To withdraw the catheter from the bladder, flexible member 30 is placed out of registry with slot 18, allowing closed end 14 to be protracted from the position shown in Figure 3 to that of Figure 1. The catheter may then be removed or, if desired, a stylet may be inserted in tubular member 12 and actuated to further protract forward end 14 with respect to the remainder of the tubular member before removal.

Thus it will be seen that the construction herein shown and described is well adapted to accomplish the objects of the present invention. It will be understood, however, that the invention may be embodied otherwise than here shown, and that in the form illustrated certain obvious changes in construction may be made. Therefore, I do not wish to be limited precisely to the construction herein shown, except as may be required by the appended claims considered with reference to the prior art.

I claim:

1. In a catheter, a tubular member closed at its

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forward end and having a drainage opening at its rearward end, said tubular member having a plurality of circumferentially spaced longitudinal slots formed therein adjacent the forward end, the portions of the tubular member intermediate the extremities of the slots being flexible and distortable and projecting outwardly beyond adjacent portions, means within the tubular member for retracting the forward end thereof with respect to the rearward end to flex said portions further outwardly, said means comprising a flexible member anchored at one end to the forward end of the tubular member, and means carried by the flexible member and adapted to engage the tubular member for releasably retaining the forward end of the tubular member in retracted position.

2. In a catheter, a tubular member closed at its forward end and having a drainage opening at its rearward end, said tubular member having a plurality of circumferentially spaced longitudinal slots formed therein adjacent the forward end, the portions of the tubular member intermediate the extremities of the slots being flexible and distortable and projecting outwardly beyond adjacent portions, means within the tubular member for retracting the forward end thereof with respect to the rearward end to flex said portions further outwardly, said means comprising a plug at the closed end of the tubular member and a flexible member anchored to the plug and extending through the drainage opening, and means carried by the flexible member and adapted to engage the tubular member for releasably retaining the forward end of the tubular member in retracted position.

3. In a catheter, a tubular member closed at its forward end and having a drainage opening and a slot at its rearward end, said tubular member having a plurality of circumferentially spaced longitudinal slots formed therein adjacent the forward end, the portions of the tubular member intermediate the extremities of the longitudinal slots being flexible and distortable and projecting outwardly beyond adjacent portions, means within the tubular member for retracting the forward end thereof with respect to the rearward end to flex said first-mentioned portions further outwardly, said means comprising a flexible member anchored to the closed end of the tubular member and movable into and out of registry with the first-mentioned slot, said flexible member having an enlarged part adapted to bear against the tubular member when the flexible member is in registry with the slot to maintain the forward end of the tubular member in retracted position.

4. In a catheter, a tubular member closed at its forward end and having a drainage opening and a slot at its rearward end, said tubular member having a plurality of circumferentially spaced longitudinal slots formed therein adjacent the forward end, the portions of the tubular member intermediate the extremities of the longitudinal slots being flexible and distortable and projecting outwardly beyond adjacent portions, means within the tubular member for retracting the forward end thereof with respect to the rearward end to flex said first-mentioned portions further outwardly, said means comprising a flexible member anchored to the closed end of the tubular member and movable into and out of registry with the first-mentioned slot, said flexible member having an enlarged part adapted to bear against the exterior of the tubular mem-

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ber when the flexible member is in registry with the slot to maintain the forward end of the tubular member in retracted position, said tubular member and said flexible member being formed from a thermoplastic material comprising polyethylene.

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