

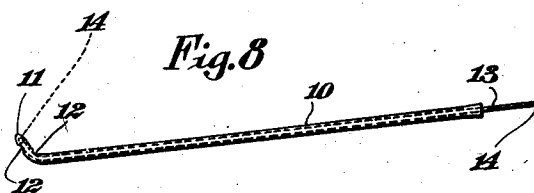
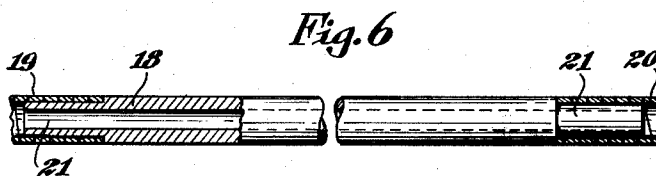
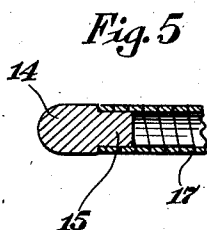
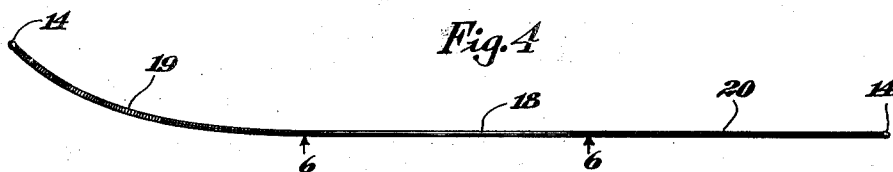
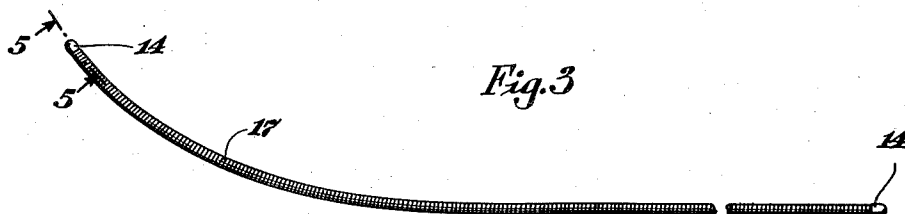
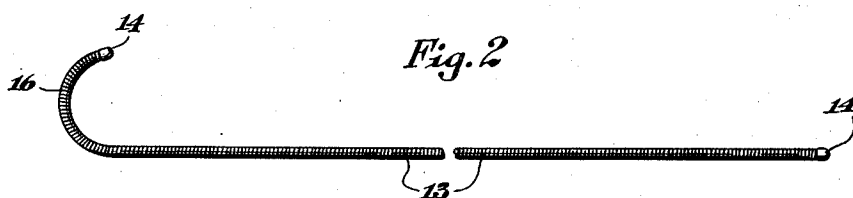
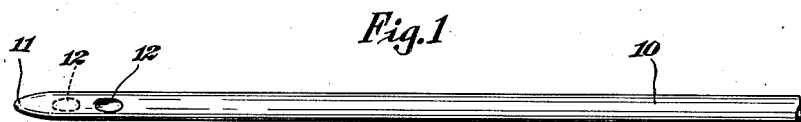
May 24, 1938.

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2,118,631

CATHETER STYLET

Filed April 3, 1935



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UNITED STATES PATENT OFFICE

2,118,631

CATHETER STYLET

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Application April 3, 1935, Serial No. 14,395

2 Claims. (Cl. 128—349)

My present invention relates generally to surgical instruments, and has particular reference to catheter stylets.

The insertion of a urethral catheter (usually composed of soft, flexible rubber or the like) requires the aid of a stylet for imparting a certain degree of rigidity to the catheter. It has been customary practice to employ a stylet in the form of a rigid, solid wire; and to facilitate proper insertion of the catheter the end of the wire is usually curved, whereby a similar curvature is imparted to the tip of the catheter.

Good practice prescribes that a urethral catheter have at least two openings at its inner end, so that if one of them should become clogged, the other would still be available for draining the bladder. Usually, these openings are laterally disposed, but in a preferred form of catheter, one of the openings is at the very tip of the catheter, arranged along an oblique plane.

Despite precautions that are regularly taken, the forward end of the usual stylet frequently protrudes itself from one of the catheter eyes, and this is especially likely to happen with catheters having a forward opening. Because of the rigid and unyielding character of ordinary stylets, such accidental protrusion is dangerous and oftentimes results in injury to the patient.

It is a general object of my present invention to provide a stylet of improved structural character, whereby an unusually desirable degree of rigidity is imparted to the catheter, notwithstanding the fact that the stylet itself is of readily yieldable character, adapted to yield instantaneously when its tip encounters an obstacle. Accordingly, in the event that the tip of the present improved type of stylet should accidentally protrude from one of the eyes of the catheter, the likelihood of injury is reduced to a minimum because of the readiness with which the stylet will yield.

A stylet constructed in accordance with my present invention embodies not only the foregoing desirable characteristics, but is, in addition, formed in such a manner that its tip is of relatively blunt and harmless form. Accordingly, it is unusually safe to employ the present type of stylet, even in connection with catheters which have an opening at the extreme front tip thereof.

I have found that the apparently paradoxical combination of yieldability, on the one hand, and rigidity, on the other hand, is capable of simultaneous attainment by forming the stylet of a helically wound strip of spring metal, such as stainless steel. Such a body, when pushed end-

wise, and unimpeded, embodies a remarkable degree of rigidity. At the same time, it is readily flexible so that it adjusts itself readily to curvatures in the urethra. What is of most importance is the fact that when it encounters an unyielding obstacle, it buckles with readiness and manifests an unusually great and desirable yieldability.

One of the features of my invention lies in providing a stylet of this helically wound type, with the ends of the resultant helix plugged by means of a rounded and relatively harmless tip. At least one end portion of the stylet is permanently set into a predetermined gentle curvature.

In a preferred embodiment, I have found it advisable to employ a flexible, resilient, stiffening wire which extends longitudinally through the helix, and which imparts a desirable additional stiffness without detracting from the yieldable characteristics of the helically wound strip.

I achieve the foregoing objects, and such other objects as may hereinafter appear or be pointed out, in the manner illustratively exemplified in the accompanying drawing, wherein—

Figure 1 is a plan view of the forward portion of a typical urethral catheter;

Figure 2 is a view of a stylet constructed in accordance with the present invention;

Figure 3 is a view similar to Figure 2, illustrating a modification;

Figure 4 is a view similar to Figure 2, illustrating a further modification;

Figure 5 is an enlarged cross-sectional view taken substantially along the line 5—5 of Figure 3;

Figure 6 is an enlarged cross-sectional view taken substantially along the line 6—6 of Figure 4;

Figure 7 is an enlarged fragmentary cross-sectional view showing the possible employment of a stiffening wire; and

Figure 8 is a perspective view of the catheter of Figure 1 rigidified by means of the stylet of Figure 2.

The catheter 10 is of well known character, being approximately fifteen inches in length and being composed of soft rubber approximately one-sixteenth of an inch thick. The external diameter of the catheter 10 is about one-fourth of an inch. At its forward end, the rubber merges into a gradual rounded tip 11, and I have illustratively shown two eyes or openings 12 disposed behind the tip and on opposite surfaces. It will be understood that, in some catheters, one of these

openings is disposed along an oblique plane practically intersecting the tip of the catheter.

The catheter of Figure 1 has practically no rigidity at all, and its insertion into the urethra is accomplished with the aid of a stylet of the present character. One form is illustrated in Figure 2. The body of the stylet is composed of a long strip of spring metal, such as stainless steel, helically wound to form a body 13. This body has an external diameter of about three-thirty-seconds of an inch, and the strip of which the helix is formed is less than one-thirty-second of an inch wide and less than one-sixty-fourth inch in thickness.

My invention is obviously not restricted to any specific dimensions, and the foregoing figures are stated merely for the purpose of explaining the general nature of the present construction.

At its opposite ends, the helix is plugged by a rounded tip 14 which is shown most clearly in Figure 5. It consists of a solid body of metal or the like, having a rearward attenuated stem 15, which projects into the end of the helix and is maintained in this position by solder or by any other similar means. The external diameter of each tip 14 is substantially equal to the external diameter of the body of the stylet.

In Figure 2, the end portion of the stylet has been permanently set into a predetermined gentle curvature 16 which has a radius of approximately three-eighths inch. This particular curvature is shown merely by way of example, and the stylet illustrated in Figure 3 has its end portion set into the more gradual curvature 17 which may, for example, have a radius of approximately two inches. The degree of curvature is optional, and stylets constructed in accordance with the present invention may have any predetermined gentle curvature imparted to the end portion, depending upon requirements. This permanent "set" may be produced in accordance with any recognized method of tempering spring metal, and it will be understood that the word "permanent", as used in this connection in the present specification and claims, is intended to signify merely that the normal disposition of the stylet lies along the curvature imparted thereto. This curved portion of the stylet nevertheless embodies the same yieldability and resilience as the uncurved portion thereof. For example, any of the stylets illustrated will straighten out quite readily and exert merely a mild constant tendency to return, when released, to the curvature into which they have been "permanently" set.

In Figure 4, I have illustrated on a somewhat smaller scale a modified construction in which the mid-portion 18 of the stylet is composed of a truly rigid, rod-like element, preferably tubular in character, as shown most clearly in Figure 6. A flexible, resilient portion 19 is mounted at one end of the element 18 in alignment therewith and consists of a helically wound strip of spring metal, as hereinbefore described. A similar flexible, resilient portion 20 is mounted at the opposite end of the element 18. At the free end of each of the helical portions a plug 14 is mounted in the manner most clearly shown in Figure 5.

Each of the helices may be secured to the rod-like portion 18 in any desired manner, preferably by providing attenuated portions 21 on the element 18 over which the helix ends are disposed, and secured in position by means of solder or the like. It will be observed that the external diameter of the portion 18 is thus substantially equal

to the external diameter of the helically wound portions.

The advantage of the construction of Figure 4 lies in the fact that the expense of winding the helix for the full length of the stylet is saved, the midportion not requiring the degree of yieldability which the end portions should have in order for the stylet to be safely used. In the embodiment of Figure 4, I have shown the portion 19 permanently set into a gentle curvature similar to that of Figure 3, and I have shown the opposite end portion substantially straight. Any suitable curvatures may be provided, and they are preferably different in degree, so that the operator using the device of Figure 4 may have at his immediate disposal a stylet which is virtually equivalent to two different stylets of different curvatures, depending upon which end he inserts into the catheter.

In any of the embodiments herein illustrated, it may be desirable to insert an additional stiffening wire of the character illustrated at 22 in Figure 7. This wire is of flexible, resilient material; it extends longitudinally through the helix; and its ends are preferably secured to the rounded plugs at the ends of the helix. To accomplish this, it is preferable to construct each of the plugs 23 (see Figure 7) with a longitudinal bore 24 into which the end of the stiffening wire 22 projects. It is held in this position by means of solder or the like.

Where the helix has been given a predetermined curvature, the stiffening wire 22 is given a similar and corresponding curvature. Where the stylet is constructed with a rigid portion, as in Figures 4 and 6, the wire 22 extends preferably through the rigid portion, and it is for this reason that this rigid portion is preferably tubular in nature.

Any selected stylet may be employed with any selected catheter, and in Figure 8 I have illustrated, by way of example, the manner in which the stylet of Figure 2 serves to reinforce the catheter of Figure 1 to permit its insertion into the urethra. It will be observed that the catheter tip does not conform completely to the natural curvature of the portion 16. This is of no moment, because, presumably, the curvature imparted to the tip of the catheter by the stylet of Figure 2 is the degree of bending which the operator desires to have. Should he desire a lesser degree of angularity, he would employ a stylet having a more gradual curvature.

The reinforced catheter embodies just the proper degree of rigidity which is necessary to facilitate its insertion. It is not too stiff or rigid, as is frequently the case with ordinary stylets, nor is it too yielding to permit proper manipulation. Of primary importance is the safe character of the present stylet. Should its tip by accident project from one of the eyes of the catheter, no injury is likely to occur, firstly, because the tip is blunted, and, secondly, because the stylet embodies a yieldability which causes it to give immediately when pressed against an obstruction. This readiness to yield and to bend at isolated points is inherent in the helical structure and is one of the characterizing features of the present stylet. The stylet as a whole, at the same time, embodies the requisite amount of rigidity for the primary purpose of facilitating insertion of the catheter.

In general, it will be understood that changes in the details, herein described and illustrated for the purpose of explaining the nature of my in-

vention, may be made by those skilled in the art without departing from the spirit and scope of the invention as expressed in the appended claims. It is, therefore, intended that these details be interpreted as illustrative, and not in a limiting sense.

Having thus described my invention, and illustrated its use, what I claim as new and desire to secure by Letters Patent is—

10 1. A catheter stylet comprising a rigid, tubular portion, a pair of flexible, resilient portions mounted at opposite ends thereof in alignment therewith, each of said flexible portions comprising a helically wound strip of spring metal, a
15 rounded tip plugging the free end of each helix, and a flexible, resilient, stiffening wire extending

longitudinally through said rigid and flexible portions and having its ends secured to said tips.

2. A catheter stylet comprising a rigid, tubular portion, a pair of flexible, resilient portions mounted at opposite ends thereof in alignment therewith, each of said flexible portions comprising a helically wound strip of spring metal, a rounded tip plugging the free end of each helix, the end portion of one of said helixes being permanently set into a predetermined gentle curvature, and a flexible, resilient, stiffening wire extending longitudinally through said rigid and flexible portions, said wire having a permanent set conforming to said curvature and having its ends secured to said tips.

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