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PLUGGING DEVICE FOR CATHETERS

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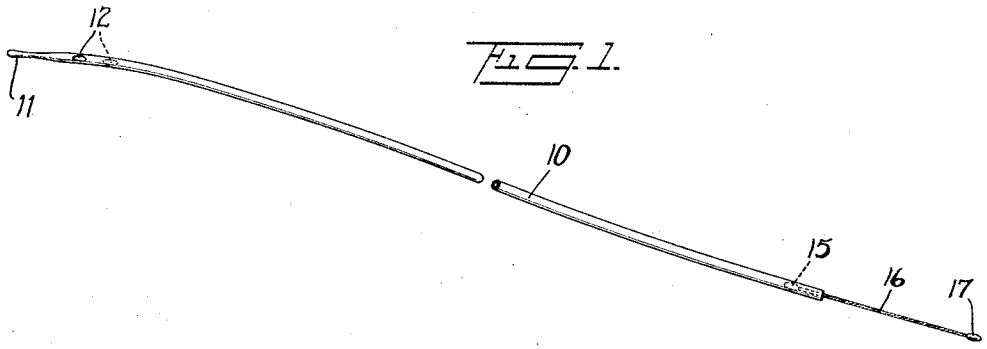


FIG. 1.

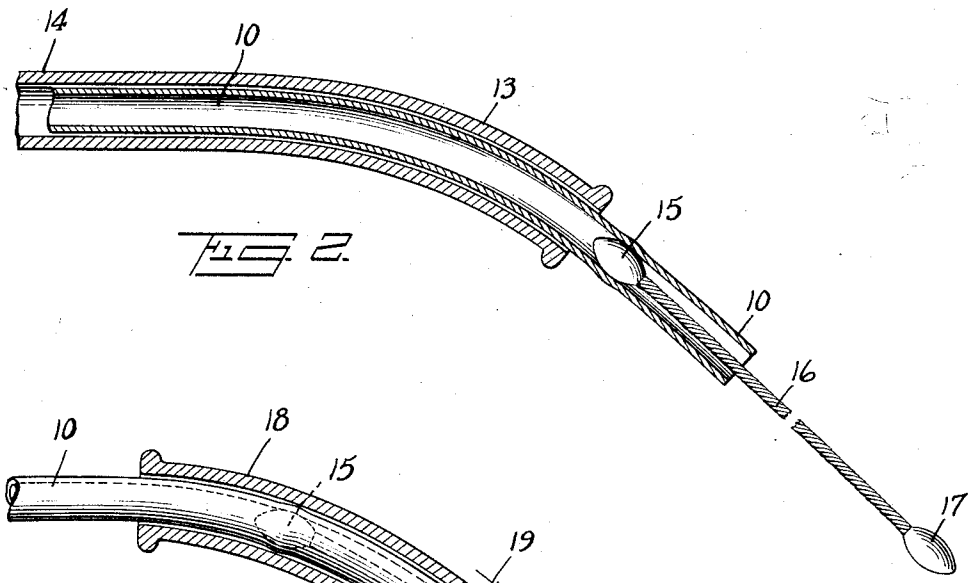


FIG. 2.

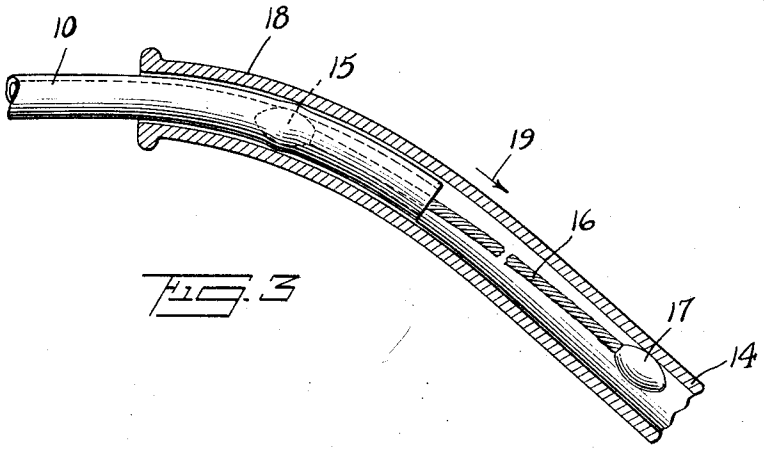


FIG. 3.

INVENTOR
Reinhold H. Wappler
BY
Frederick Breitenfeld
ATTORNEY

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UNITED STATES PATENT OFFICE

REINHOLD H. WAPPLER, OF YONKERS, NEW YORK

PLUGGING DEVICE FOR CATHETERS

Application filed June 9, 1931. Serial No. 543,081.

My present invention relates generally to surgical instruments and appliances, and has particular reference to catheters.

The process of inserting a catheter into one or the other of the kidneys, for the purpose of obtaining specimens of urine and thereby arriving at accurate diagnoses, is one which necessarily requires that the catheter, and especially the lumen thereof, be and remain in a sterile condition. One of the general objects of my present invention is to provide a plugging device of novel and sterilizable character to permit the rear end of the catheter to be efficiently plugged during the various procedures which precede the actual collection of a specimen.

The difficulty in providing a suitable and practical plug for a relatively small article such as a catheter is complicated by the fact that the catheter is flexible and is usually inserted into the body cavity through a catheter tube which is curved. For example, the usual catheter tube which is associated with a cystoscope containing a telescope and illuminating means is curved at its rear end and also at its forward end, these curvatures being desirable to facilitate the insertion of the catheter and to enable the forward end of the catheter to be maintained under illuminated vision as it emerges from the inner end of the catheter tube. Furthermore, it is customary to remove or withdraw the cystoscope prior to the draining of a specimen, and a practical plugging device must therefore be capable of fulfilling its function and remaining in place during the procedure of withdrawing the cystoscope over the inserted catheter. Any rigid and unyielding plug is unsuitable for the reason that the curved catheter tube cannot be withdrawn over it.

A feature of my present invention lies in the provision of a sterilizable catheter plugging device which is so constructed as to be capable of efficient and practical manipulation during the application thereof to plug the catheter; and to permit the withdrawal of a curved catheter tube rearwardly over the plugged catheter without disturbing the plugged relationship.

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

Figure 1 is a perspective view of a typical catheter, showing my present plugging device associated therewith;

Figure 2 is an enlarged cross-sectional view through the rear end of a catheter, showing the same in position within the rear end of a typical catheter tube; and

Figure 3 is a view similar to Figure 2, showing the manner in which the curved catheter tube may be withdrawn over the plugged catheter.

I have illustratively shown a long, thin, and flexible catheter 10 of customary construction and nature and having a closed forward end 11 to the rear of which are openings 12 through which the desired specimen may be caused to enter and flow rearwardly through the catheter.

In Figure 2, I have illustrated the rear curved end 13 of a typical catheter tube 14, this tube being usually of metal and being associated with a cystoscope or similar instrument which is inserted into the body cavity prior to the insertion of the catheter 10. In accordance with my present invention, the rear open end of the catheter 10 may be plugged after the insertion thereof through the catheter tube 14 by means of a device illustrated most clearly in Figures 2 and 3 and comprising a rounded, preferably ellipsoidal, plugging element 15 and a resiliently flexible stem 16. The head 15 is preferably of sterilizable metal and the stem 16 is constructed of twisted strands of suitable wire which cause the same to be normally straight yet yieldably and resiliently flexible. The stem 16 is integrally associated with the head 15 and is preferably provided at its rear end with a second enlarged and rounded head 17.

The entire plugging device is capable of sterilization; and after this has been accomplished, it is a relatively simple matter to grasp the stem 16 at a distance from the

particular plugging end to be employed, and thereupon to force the plugging element, such as the element 15, into the rear end of the catheter to be plugged. This may be accomplished without contacting the operative head so that it remains sterile, and it is because of the peculiar and novel construction of the stem 16 that a "pushing" of the plugging element is capable of accomplishment. In this connection, it must be borne in mind that the extreme fineness of the catheter bore and the flexibility of the catheter material makes it comparatively difficult to push something into the catheter to plug the same. The stem 16, as stated, is, however, sufficiently rigid and staunch to permit the plugging element 15 to be inserted into the plugging relationship shown in Figures 2 and 3.

After this has been accomplished, the cystoscope and the catheter tube 14 are withdrawn from the body cavity, as indicated by the arrow 19, in order to leave the plugged catheter in position. This necessitates a yielding of the plugging device, not only during the initial passage thereover of the rear curved end 13 of the catheter tube 14, but also during the ultimate passage thereover of the forward curved end 18 of this tube, as illustrated in Figure 3. My present plugging device, though normally straight and substantially rigid, is nevertheless resiliently yieldable and flexible, as illustrated in Figure 3, to permit the catheter tube to be withdrawn in the contemplated manner.

The final procedure is then extremely simple, since it is only necessary to grasp the stem 16 and to withdraw the plugging device from the rear end of the catheter, thereby permitting an uncontaminated specimen to be withdrawn or drained through the catheter.

The head 17 serves not only as an alternate head, so that either head may be selected for use, in which case it may be desirable to make one head slightly larger than the other, but it serves the additional function of completing the structural nature of the plugging device so as to render the same devoid of all projecting parts, ends, or rough edges of the wire strands of the stem. Furthermore, the rear head facilitates the grasping and manipulation of the device not only during its insertion into plugging relationship but also during a withdrawal of the plugging device when a draining is to be accomplished.

Either of the plugging elements at the ends of the stem may serve as an efficient means for plugging a device such as a catheter, not only because of the rigid and unyielding character of these elements but also because of the rounded and ellipsoidal shape thereof. The stem being smaller in diameter than that of either plugging element, it is possible to insert the latter well into the end of the catheter without any likelihood of having the same ejected accidentally either by fluid pressure or by accidental engagement of the projecting end of the plugging device during the procedural steps outlined.

Obviously, although I have illustrated and described my invention as it appertains to the plugging of a catheter for one specific purpose, it will be readily understood that the employment of the invention is not restricted to such a specific use but may find wide applicability in analogous uses or analogous arts.

Furthermore, it will be obvious that changes in the details herein described and illustrated for the purpose of explaining the nature of my invention 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—

1. A plugging device for a hollow, flexible catheter insertable through a curved catheter tube to position the forward end of the catheter within a body cavity, said device comprising a rounded plugging element snugly insertable into the rear end of the catheter, and a resiliently flexible stem on said element, whereby said plugging element may be inserted in sterile condition and whereby the curved catheter tube may thereupon be withdrawn rearwardly over the plugged catheter.

2. A plugging device for a hollow, flexible catheter insertable through a curved catheter tube to position the forward end of the catheter within a body cavity, said device comprising a rounded plugging element snugly insertable into the rear end of the catheter, and a resiliently flexible stem on said element, whereby said plugging element may be inserted in sterile condition and whereby the curved catheter tube may thereupon be withdrawn rearwardly over the plugged catheter; said stem comprising a normally straight, metallic wire formed integrally with said plugging element and of slightly reduced diameter.

3. A plugging device for a hollow, flexible catheter insertable through a curved catheter tube to position the forward end of the catheter within a body cavity, said device comprising a rounded plugging element snugly insertable into the rear end of the catheter, and a resiliently flexible stem on said element, whereby said plugging element may be inserted in sterile condition and whereby the curved catheter tube may thereupon be withdrawn rearwardly over the plugged catheter;

said stem comprising a metallic wire formed of twisted strands and rigidly secured to said plugging element, the overall diameter of said wire being less than that of said plugging element.

4. A plugging device for a hollow, flexible catheter insertable through a curved catheter tube to position the forward end of the catheter within a body cavity, said device comprising a rounded plugging element snugly insertable into the rear end of the catheter, and a resiliently flexible stem on said element, whereby said plugging element may be inserted in sterile condition and whereby the curved catheter tube may thereupon be withdrawn rearwardly over the plugged catheter; said stem being provided at its rear end with an alternate rounded plugging element adapted to facilitate manipulation of the stem.

5. A plugging device for a hollow, flexible catheter insertable through a curved catheter tube to position the forward end of the catheter within a body cavity, said device comprising a rounded plugging element snugly insertable into the rear end of the catheter, a normally straight, resiliently flexible stem on said element and of less diameter than that of said element, and an alternate rounded plugging element on the rear end of said stem; whereby a desired plugging element may be inserted into the catheter in sterile condition and whereby the curved catheter tube may be thereupon withdrawn rearwardly over the plugged catheter.

6. A plugging device for a hollow, flexible catheter insertable through a curved catheter tube to position the forward end of the catheter within a body cavity, said device comprising an ellipsoidal plugging element snugly insertable into the rear end of the catheter, and a resiliently flexible wire stem secured to one end of said element and of reduced diameter, whereby manipulation of said stem permits the plugging element to be inserted into the catheter in sterile condition, and whereby the flexibility of the stem permits the catheter tube to be withdrawn rearwardly over the plugged catheter.

7. As a new article of manufacture, a sterilizable plugging device for a hollow catheter, comprising a normally straight, resiliently flexible wire stem composed of twisted strands, and a slightly enlarged, ellipsoidal plugging element on each end of said stem and adapted to be pushed into an end of a catheter by means of said stem.

In witness whereof, I have signed this specification this 6th day of June, 1931.

REINHOLD H. WAPPLER.