July 30, 1935. R. H. WAPPLER 2,009,825

ASEPTIC CATHETER HANDLING DEVICE

Filed April 3, 1933

Fig. 1

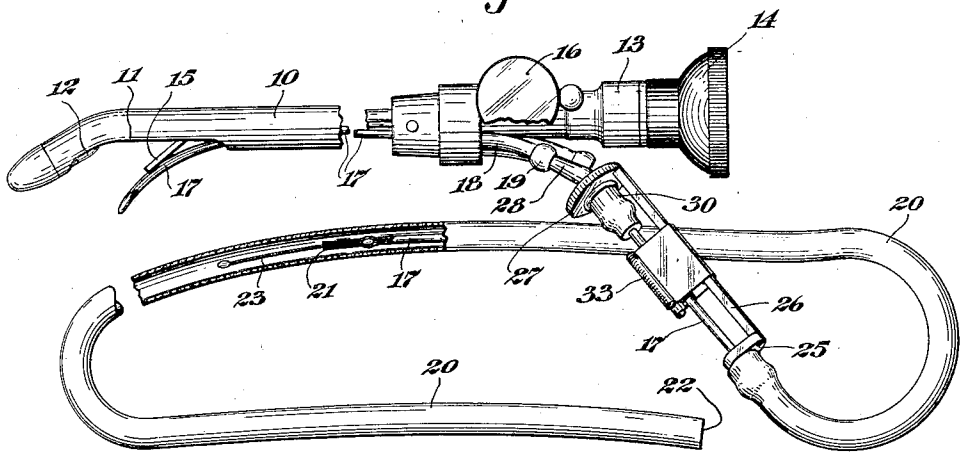


Fig. 2

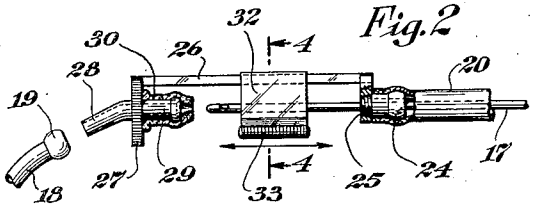


Fig. 3

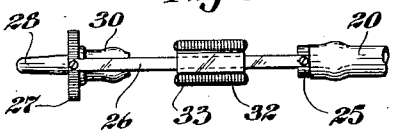


Fig. 4

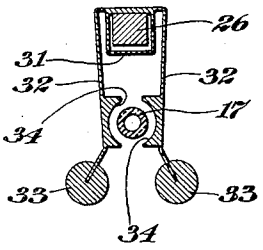


Fig. 5

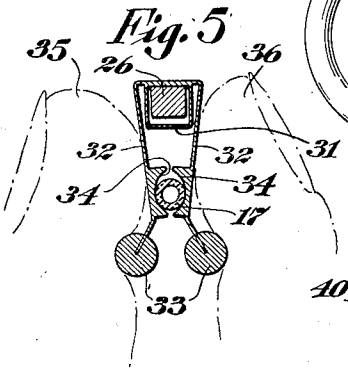


Fig. 6

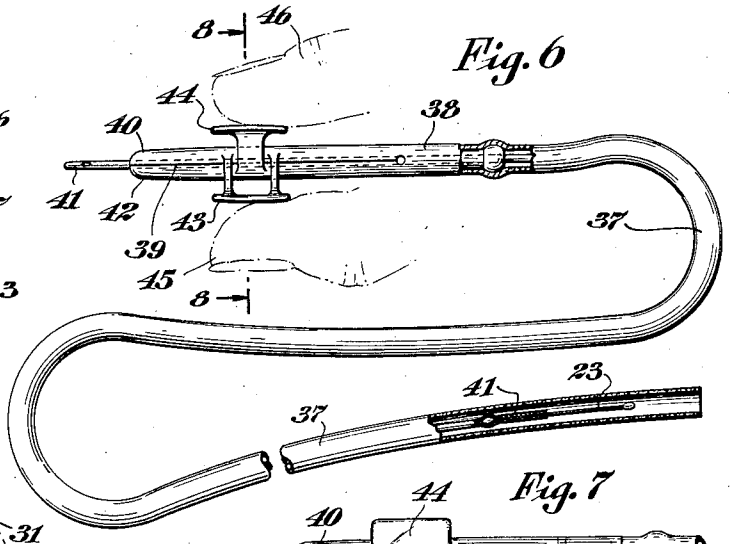


Fig. 7

Fig. 8



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UNITED STATES PATENT OFFICE

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ASEPTIC CATHETER-HANDLING DEVICE

Reinhold H. Wappler, Yonkers, N. Y.; Frederick C. Wappler executor of said Reinhold H. Wappler, deceased

Application April 3, 1933, Serial No. 664,165

14 Claims. (Cl. 128—349)

My present invention relates generally to surgical instruments, and has particular reference to the manipulation of catheters.

One of the most difficult problems in urology is the sterile handling of ureteral catheters during the process of catheterization. The fact that these catheters are inserted deep into the body, and are in many cases employed for the purpose of withdrawing a true specimen from the ureters or kidneys, makes it essential that the greatest care be taken in maintaining the catheters in sterile condition, both exteriorly and interiorly, not only for the purpose of permitting a wholly uncontaminated specimen to be withdrawn, but also to prevent accidental infection.

The delicate structural characteristics of a catheter, coupled with its relatively great length, makes it particularly difficult to maintain the catheter in a wholly sterile condition during the process of insertion. The catheter is usually inserted into position through a catheter tunnel forming part of a suitable endoscopic instrument, the instrument being provided with illuminating and telescopic means to permit the operator to control the movements of the catheter under illuminated vision. An instrument of this character is also usually provided with deflecting means which are controllable by the operator to guide the forward end of the catheter into the proper directions. With his eye glued to the eyepiece of the telescope, and with his mind occupied with the proper control of the catheter by the deflecting means, it is necessary for the operator at the same time to advance the catheter from the rear, step by step, through the instrument. Not only does this entail repeated undesirable grasping of the catheter itself by the hands of the operator, but it frequently happens that the catheter brushes against the face of the operator or against the body of the patient. While the procedure is not essentially a difficult one, it is obviously one whose technique has not been developed, heretofore, to a thoroughly aseptic degree.

It is a general object of my present invention to provide a means for facilitating an aseptic and sterile manipulation of the catheters in general, and especially a procedure of the foregoing character.

It is a more particular object of my invention to provide an improved catheter-handling device, of sterilizable characteristics, which may be efficiently employed for aseptically effecting an insertion of a catheter into the human body, e. g., into one or the other of the ureters.

My present device consists, briefly and essentially, of an elongated, flexible, sterilizable tube adapted to accommodate the rearward portion of the catheter, thereby protectively enclosing the latter, in combination with a catheter-grasping member carried or mounted at the forward end of the tube and adapted to releasably engage the forwardly projecting portion of the catheter.

From one aspect, the elongated, flexible tube constitutes by itself an important novel feature of my present invention. The tube is preferably of soft rubber, of sufficient length to accommodate the entire catheter therein, and of a cross-sectional size which efficiently ensheaths the catheter yet permits it to be loosely accommodated so as to be longitudinally movable.

Another feature of my invention lies in the association, with a tube of the foregoing character, of a catheter-grasping member which is easily manipulable by the operator to effect an aseptic grasp and release of the catheter.

In a preferred embodiment, the grasping member is mounted for longitudinal reciprocation along a direction which forms a smooth continuation of the axis of the tube, thereby permitting a step-by-step advancement of the catheter in a forwardly longitudinal direction without any danger of kinking the catheter. A particular feature of my invention lies in providing an efficient and improved guiding means for the grasping member, whereby its reciprocal movements are constrained to a predetermined direction.

In the preferred construction hereinbefore alluded to, I also provide a means for securing the present device, forwardly of the catheter-grasping member, to the rear end of a catheter tunnel.

In another embodiment, the catheter-grasping member is of simpler structural nature and is associated with the forward end of the tube so as to be manipulable, by means of finger grips, to releasably grasp the catheter, but without being itself longitudinally reciprocable relative to the tube.

In general, my present device is one which is simple in structural nature, inexpensive to manufacture, easy to use, thoroughly sterilizable as a unit, and highly efficient and desirable from the standpoint of primary function in permitting asepsis of a catheter.

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 side view of an endoscopic instrument, partly broken away, showing the man-

ner in which a device of the present character is associated therewith;

Figure 2 is a side view of a portion of the present device, partly in section;

Figure 3 is a plan view of Figure 2;

Figure 4 is an enlarged cross-sectional view taken substantially along the line 4—4 of Figure 2;

Figure 5 is a view similar to Figure 4, showing the manner of use;

Figure 6 is a side view of a modified construction;

Figure 7 is a plan view of Figure 6; and

Figure 8 is a cross-sectional view taken substantially along the line 8—8 of Figure 6.

The endoscopic instrument of Figure 1 is merely illustrative of the type which may embody a catheter tunnel and which may be employed for the purpose of inserting a catheter into one of the ureters. The illustrated endoscope 10 has a lateral fenestra 11, and an illuminating lamp 12 is mounted at the forward end. A telescope 13 is associated with the instrument and is provided with the usual eyepiece 14 and with a forward objective lens (not shown) which commands a view out of the fenestra 11. The instrument I have shown is also provided with a deflector 15 which is controlled from the rearward portion of the instrument by the rotatable knob 16. Rotation of this member causes the deflector to assume positions of varying obliquity, whereby the deflector is caused to bear downwardly upon the forward end of a catheter 17 and thereby guide the latter into the proper direction.

The instrument is provided with a catheter tunnel 18 whose rearward end is shown at 19 in Figures 1 and 2. The forward end of this tunnel is in the tube 10 near the fenestra 11, so that a catheter pushed through this tunnel from the rear will emerge through the fenestra 11 and in a position ready to be acted upon by the deflector 15.

The present device consists of an elongated, flexible tube 20, preferably of rubber, and of sufficient length to accommodate almost the entire catheter 17 when the latter is in its retracted position. Since the catheter of Figure 1 is shown partly projected from the fenestra 11, the rear end 21 is disposed in the midportion of the tube 20. Before the catheter is inserted into the tunnel 18, the rear end is positioned in the tube 20 nearer to the rear end 22 of the latter.

I have illustratively shown the rear end 21 of the catheter 17 plugged with a device 23 of the character illustrated and described in my patent application Serial Number 543,081, now Patent No. 1,906,678, dated May 2, 1933, although, obviously, the employment of this plugging device is not essential.

The forward end of the tube 20 is mounted on a nipple 24 which is preferably in screw-threaded engagement with the rear arm 25 of the device shown most clearly in Figures 2 and 3. Projecting forwardly from the arm 25 is the squared metallic guide rod 26; and at the forward end of the latter is a means for attaching the device to the rear end 19 of the tunnel 18. I have illustratively shown a disc-shaped end member 27, preferably knurled on its periphery, and provided with the forwardly projecting, slightly tapered nipple 28. On the rear of the member 27 is another nipple 29 upon which I prefer to mount a rubber sleeve 30.

The parts are so constructed and arranged that the rod 26 is parallel but offset from the axis of the tube 20, and the nipple 29 is lined up with the nipple 24, and hence with the axis of the tube 20.

Slidably mounted on the rod 26 is the catheter-grasping device which consists of a sleeve 31 encircling the rod 26, and a pair of depending, resilient, metallic arms or jaws 32. These arms preferably terminate at their free lower edges in the knurled finger grips 33.

On the inner surfaces of the members 32 I provide a pair of opposed complementary grasping jaws 34 which are somewhat elongated in the direction of the axis of the device, and are of concave configuration so as to conform substantially to the cross-sectional curvature of the catheter 17, as shown most clearly in Figures 4 and 5.

In the device illustrated, the resilience of the jaws keeps them normally in spaced relationship, on opposite sides of the catheter 17, whereby a slight pressure by the thumb and forefinger of the operator (indicated by the reference numerals 35 and 36 in Figure 5) will squeeze the jaws together to effect a releasable grasp of the catheter.

In use, the catheter is first threaded into the tube 20 through the forward end thereof, so that only the forward portion of the catheter protrudes. The entire assembly, from the nipple 28 rearwardly, may then be sterilized by boiling or otherwise. The entire assembly may then be removed from the sterilizing chamber without any danger of recontaminating the catheter, either exteriorly or interiorly, since the latter is protectively enclosed by the tube 20. A convenient grasp may be obtained at the finger grips 33, or elsewhere along the metallic portion of the device. The device is then attached to the tunnel 18, preferably in a frictional manner, and this is preferably accomplished after the endoscopic device is in position within the body. By then manipulating the grasping member, the catheter may be engaged, advanced, released, reengaged, and readvanced, so as to accomplish a step-by-step threading of the catheter, first through the nipples 29 and 28, and then through the tunnel 18. It is to be observed that this is all accomplished without the slightest danger of contaminating the sterile catheter. Even if the tube 20 brushes against the face of the operator, or elsewhere, the enclosed catheter is nevertheless protected in an aseptic manner.

The manipulation of the slidable member along the rod 26 is extremely simple, and the operator may safely keep his eye at the eyepiece 14, and keep his mind on the guidance of the inner end of the catheter in the body, without any danger of kinking, twisting, or contaminating the catheter. The guiding effect of the rod 26 assures straightforward proper advancement of the catheter, step by step, into and through the tunnel 18.

After the catheter has been entirely inserted, it is a relatively simple matter to disconnect either the tube 20 (by unscrewing the nipple 24), or the entire device (by releasing the nipple 28). In either event, the tube or the device is withdrawn rearwardly over the rear end of the catheter. In some instances, it is also desirable to withdraw the endoscopic instrument, itself, rearwardly over the inserted catheter, thereby leaving the catheter alone in the body, with its inner end properly positioned, and its outer end projecting from the body. The removal of the plugging device 23, where one is used, is then a relatively simple matter, and a specimen may safely be

withdrawn in an absolutely uncontaminated condition.

In the event that the catheter is to be manipulated rearwardly during the operative procedure, this may also be accomplished in an aseptic manner, by simply manipulating the grasping member in an opposite direction, i. e., causing it to grasp the catheter toward the front, and releasing the catheter after it has been retracted along the guide rod **26**.

In Figures **6–8**, I have illustrated a slight modification in which an elongated, flexible tube **37**, similar to the tube **20**, is associated at its forward end with an elongated tubular member **38**, the latter being split longitudinally, as at **39**, to provide two opposed complementary jaws **40** and **42**. These jaws are also elongated in a longitudinal direction and are adapted to engage the catheter **41** in a releasable manner as the latter projects from the forward end of the tube **37**.

The difference between the jaws **40** and **42** and the jaws **34**, previously described, is that it is preferable to construct the jaws **40** and **42** in a resilient manner, whereby they normally engage the catheter between them. The disengagement may be effected by providing finger grips **43** and **44**, each grip being carried by the remote jaw. That is, the grip **43** is carried by the jaw **40**, while the grip **44** is carried by the jaw **42**, as shown most clearly in Figure 8. By pressing upon these grips with the thumb and forefinger **45** and **46**, as indicated in Figure 6, the jaws **40** and **42** are caused to spread and thereby release the catheter. This permits the jaws to be moved longitudinally along the catheter into a different position at which a new grasp may be obtained.

In using this device, the catheter is accommodated within the tube **37**, as before, with its forward end projecting slightly from the forward end of the jaws **40**, **42**. The entire assembly may then be sterilized, and when it is withdrawn from the sterilizing chamber it may be handled with safety without any danger of contaminating the catheter **41**. The device is not attached to the catheter tunnel, as is the preferred embodiment, but the operator is enabled to feed the catheter forwardly through the tunnel by alternately releasing, shifting, and reengaging the catheter by means of the jaws. For example, the finger grips **43**, **44** are pressed together to release the jaws; the entire device is slid rearwardly over the catheter for about an inch; the finger grips are then released to enable the jaws to engage the catheter; and the catheter may then be forced forwardly through the tunnel for a corresponding distance. These steps are then repeated until the desired amount of the catheter has been inserted. The catheter-grasping device of this embodiment moves with the tube **37** in each case, and not relative to the tube as in the construction of Figures 1–5. The objective, viz., to manipulate the advancement and retraction of the catheter in an aseptic manner, is, however, the same and is accomplished with facility, despite the absence of any guiding effect of a supporting rod of the character shown at **26**.

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 sterilizable device for aseptically controlling the movements of a catheter through a catheter tunnel, comprising an elongated, flexible tube adapted to accommodate the rearward portion of the catheter, and a manually controllable member carried by the forward end of said tube for releasably grasping the forward portion of the catheter, said member comprising a pair of resilient jaws adapted to engage the catheter between them, and finger grips controlling the opening and closing of said jaws.

2. A sterilizable device for aseptically controlling the movements of a catheter through a catheter tunnel, comprising an elongated, flexible tube adapted to accommodate the rearward portion of the catheter, and a manually controllable member carried by the forward end of said tube for releasably grasping the forward portion of the catheter, said member comprising a pair of resilient jaws normally engaging the catheter between them, and finger grips controlling the opening of said jaws.

3. A sterilizable device for aseptically controlling the movement of a catheter through a catheter tunnel, comprising an elongated, flexible tube adapted to accommodate the rearward portion of the catheter, and a manually controllable member carried by the forward end of said tube for releasably grasping the forward portion of the catheter, said member comprising a pair of elongated, resilient jaws having complementary cylindrical grasping surfaces adapted to conform to and engage the catheter between them, and finger grips carried by said jaws and controlling the opening and closing of said jaws.

4. A sterilizable device for aseptically controlling the movements of a catheter through a catheter tunnel, comprising an elongated, flexible tube adapted to accommodate the rearward portion of the catheter, and a manually controllable member carried by the forward end of said tube for releasably grasping the forward portion of the catheter, said member comprising a pair of resilient jaws normally spaced from the catheter on opposite sides thereof, and finger grips controlling the closing of said jaws.

5. A sterilizable device for aseptically controlling the movements of a catheter through a catheter tunnel, comprising an elongated, flexible tube adapted to accommodate the rearward portion of the catheter, and a manually controllable member carried by the forward end of said tube for releasably grasping the forward portion of the catheter, said member comprising an elongated, tubular element aligned with said flexible tube and longitudinally split to provide a pair of complementary elongated jaws adapted to engage the catheter between them.

6. A sterilizable device for aseptically controlling the movements of a catheter through a catheter tunnel, comprising an elongated, flexible tube adapted to accommodate the rearward portion of the catheter, a manually controllable member carried by the forward end of said tube for releasably grasping the forward portion of the catheter, and means for mounting said member so as to permit longitudinal movement thereof relative to said tube.

7. A sterilizable device for aseptically controlling the movements of a catheter through a catheter tunnel, comprising an elongated, flexible tube adapted to accommodate the rearward por-

tion of the catheter, a manually controllable member carried by the forward end of said tube for releasably grasping the forward portion of the catheter, means for mounting said member so as to permit longitudinal reciprocations thereof relative to said tube, and means for guiding said reciprocations along a predetermined direction forming a smooth continuation of the axis of said tube.

8. A sterilizable device for aseptically controlling the movements of a catheter through a catheter tunnel, comprising an elongated flexible tube adapted to accommodate the rearward portion of the catheter, a rigid, longitudinal supporting rod carried by the forward end of said tube, and a manually controllable member slidably mounted on said rod and adapted to releasably grasp the forward portion of the catheter.

9. A sterilizable device for aseptically controlling the movements of a catheter through a catheter tunnel, comprising an elongated, flexible tube adapted to accommodate the rearward portion of the catheter, a squared longitudinal guide rod carried by the forward end of said tube, and a manually controllable member for releasably grasping the forward portion of the catheter, said member being slidably mounted on said guide rod.

10. A sterilizable device for aseptically controlling the movements of a catheter through a catheter tunnel, comprising an elongated, flexible tube adapted to accommodate the rearward portion of the catheter, a rigid, longitudinal supporting rod carried by the forward end of said tube, a manually controllable catheter-grasping member slidably mounted on said rod, and means for securing said device at the forward portion of said rod to the rear end of said tunnel.

11. A sterilizable device for aseptically controlling the movements of a catheter through a catheter tunnel, comprising an elongated, flexible tube adapted to accommodate the rearward portion of the catheter, a rigid, longitudinal supporting rod carried by the forward end of said tube, a manually controllable catheter-grasping member slidably mounted on said rod, and an attachment nipple carried by the forward end of said rod and aligned with the axis of said flexible tube, said nipple being adapted to secure the device to the rear end of said tunnel.

12. A sterilizable device for aseptically controlling the movements of a catheter through a catheter tunnel, comprising an elongated, flexible tube adapted to accommodate the rearward portion of the catheter, a squared longitudinal guide rod carried by the forward end of said tube, a manually controllable catheter-grasping member slidably mounted on said guide rod, an attachment nipple carried by the forward end of said rod and adapted to secure the device to the rear end of said tunnel, and a flexible bushing in said nipple and aligned with the axis of said flexible tube.

13. A sterilizable device for aseptically controlling the movements of a catheter through a catheter tunnel, comprising an elongated, flexible tube adapted to accommodate the rearward portion of the catheter, a squared longitudinal guide rod carried by the forward end of said tube, a manually controllable catheter-grasping member slidably mounted on said guide rod, and an attachment nipple carried by the forward end of said rod for securing the device to the rear end of said tunnel, said catheter-grasping member comprising a saddle engaging said rod, and a pair of complementary jaws carried by said saddle.

14. In a device for aseptically controlling the movements of a catheter through a catheter tunnel, a guide rod, means at the forward end of the rod for securing it to the rear end of said tunnel, means at the rear end of the rod for supporting the forward end of an elongated, flexible tube, and a catheter-grasping member carried by said rod.

REINHOLD H. WAPPLER.