

[54] **METHOD AND APPARATUS FOR  
EVERTING A FLEXIBLE PROBE INTO  
A CAVITY**

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1965, Pat. No. 3,502,069.

[52] U.S. Cl. .... **128/2 M, 128/262, 156/287**

[51] Int. Cl. .... **A61b 05/00**

[58] Field of Search ..... 128/1.2, 2, 262, 343, 348-351,  
128/356; 25/128 D; 264/165; 156/287, 294;  
137/219

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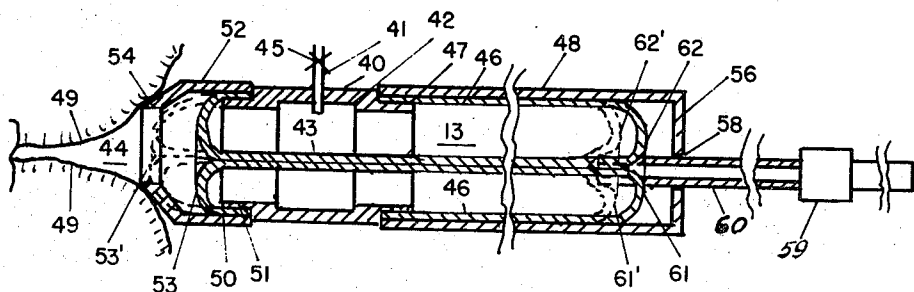
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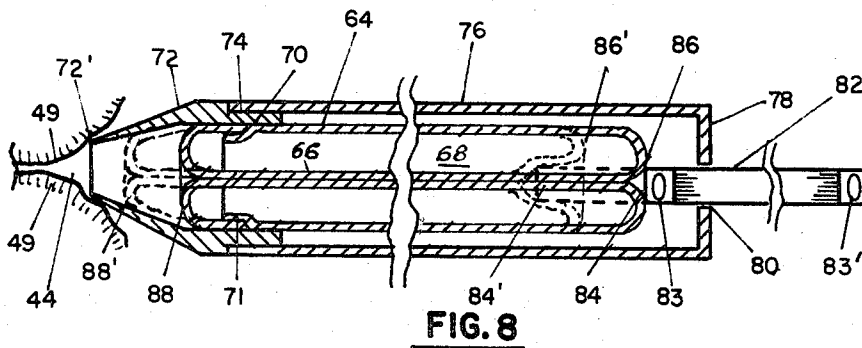
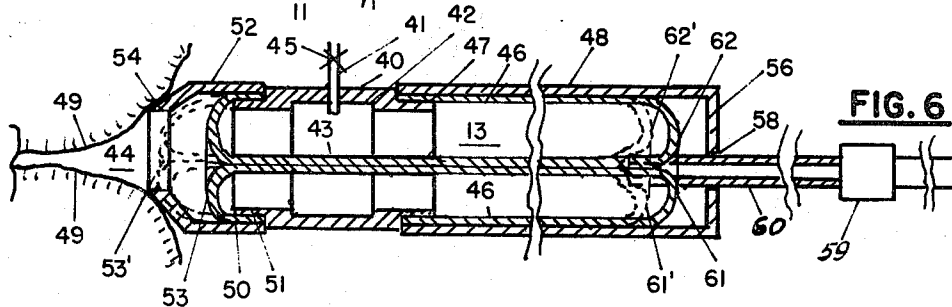
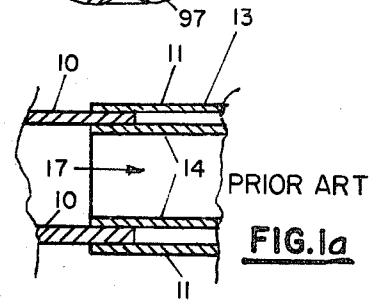
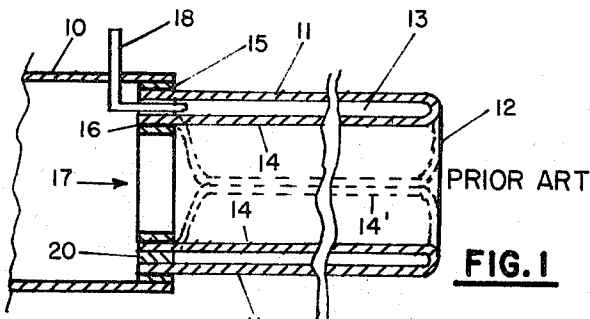
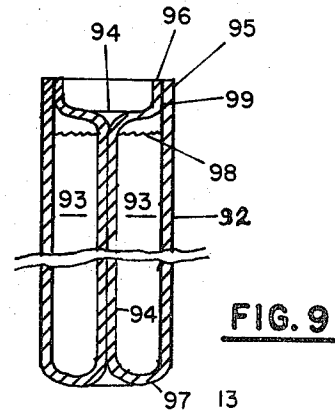
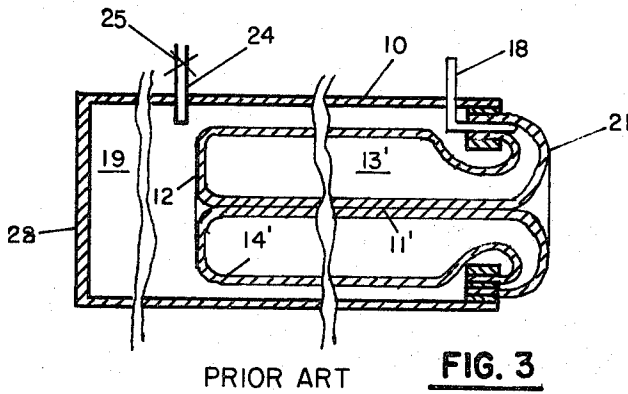
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[57] **ABSTRACT**

In this invention a flexible thin-walled tubing probe is everted into a body cavity carrying with it a medical instrument which can be a long slender cylindrical means. The length of tubing is everted and folded over itself to provide a double-walled tubing having an outer wall, an inner wall, with an annular space between, and with a central longitudinal passage inside the inner wall. The two ends are sealed to close this volume and means are provided to fill the closed annular volume with a gas or liquid. The sealed tubing ends are attached, sealed to, or held in contact with a short cylindrical tube which is used as a handle or nozzle, through which the tubing is everted into a body cavity. The long cylindrical element presses on the other folded (back) end of the tubing. This causes fluid to be moved from the back end to the front end, causing the tubing to be everted through the nozzle. The cylindrical element meanwhile moves forward with the tubing, through the nozzle, into the cavity. Various methods of sealing and attaching the tubing to the nozzle are illustrated.

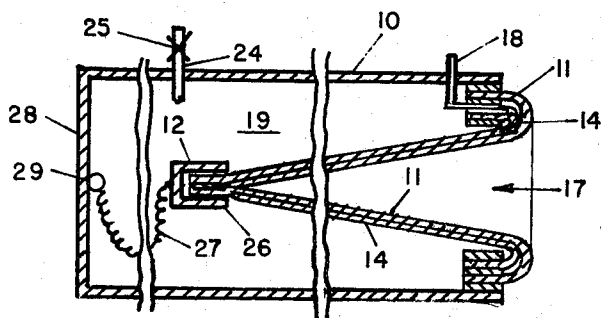
**27 Claims, 13 Drawing Figures**





INVENTOR.

*Daniel Silverman*



PRIOR ART

**FIG. 2**

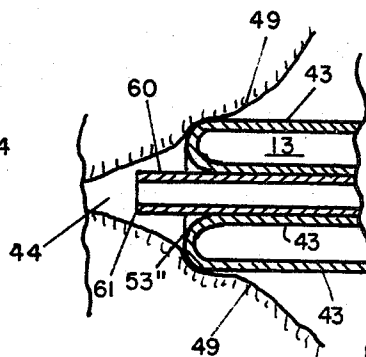


**FIG. 7**

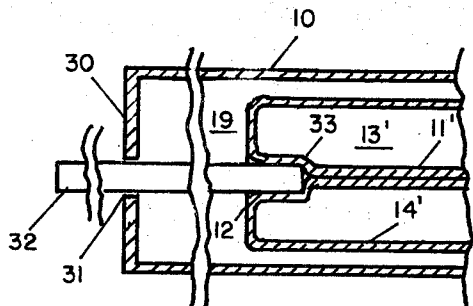


**FIG. 4**

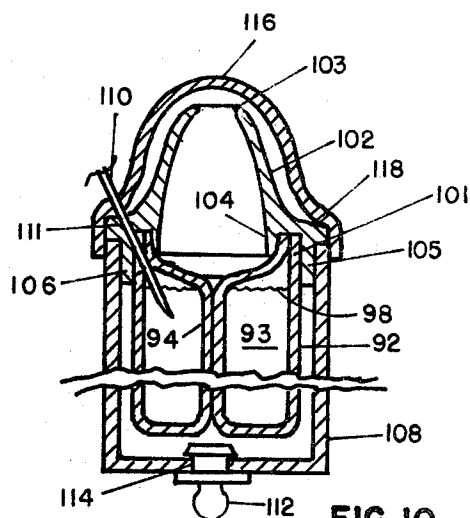


**FIG. 10**

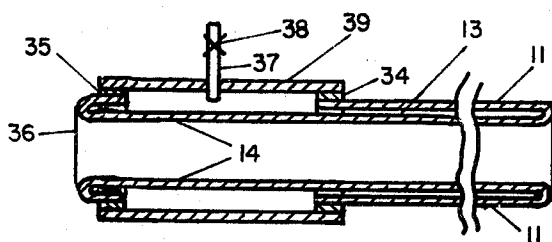


**FIG. 5**

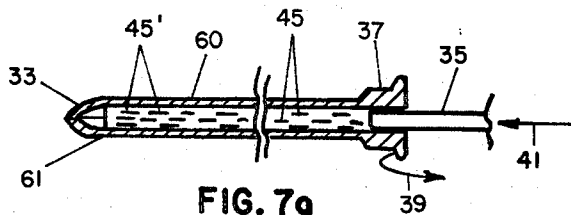


**FIG. 7a**

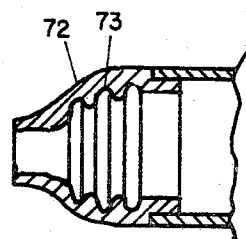


**FIG. 8a**

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# METHOD AND APPARATUS FOR EVERTING A FLEXIBLE PROBE INTO A CAVITY

This invention is a continuation-in-part of my copending application Ser. No. 498,653 entitled "Method and Apparatus for Placing in and Retrieving a Tubular Probe from a Body Cavity," filed Oct. 20, 1965 now U. S. Pat. No. 3,502,069.

This invention is in the field of medical instrumentation. More particularly it concerns means for introducing instrument means into body cavities or conduits for treatment or inspection. It concerns the use of an eversible flexible thin-walled tubing to be everted into the cavity or conduit, to line the walls thereof and to carry into the cavity, inside this lining, a physical medical element, which can be a capsule of medication, a tube for introducing or withdrawing fluid from the cavity, fiber optical or other means for examining the cavity, devices for treating the walls, etc. The device itself, though generally a long slender cylindrical element, need not be a smooth cylinder, but can have a non-cylindrical outer contour.

In the prior art, as represented by my U. S. Pat. No. 3,168,092, such eversible tubings are everted from a pressure-sealed rigid instrument casing into which the tubing is placed, with one end of the tubing sealed circumferentially over an opening in the casing. Means are provided to introduce fluid under pressure into the chamber, which progressively forces the tubing out of the chamber through the opening, causing it to be everted. As it progresses into the cavity, it "rolls" onto the walls of the cavity without sliding or irritation, the interior fluid pressure in the tubing causing the cavity to be distended and the walls gently pushed aside. As the tubing moves into the cavity it can carry medication, an instrument capsule, or a long slender instrument which moves into the cavity inside the lining provided by the previously everted tubing.

In this invention the tubing can be everted from a casing by fluid pressure, as in the prior art. However, even if everted in this way it differs from the prior art in that the tubing is first everted and folded over itself to form a double-walled tubing, with an open central passage through the inside wall. Thus, when the tubing is everted into the cavity, there is an open passage into the cavity beyond the tubing, whereas in the prior art, the end of the tubing in the cavity is closed.

This invention has the further advantage over the prior art instruments in that it can be everted into a cavity or conduit without having a pressure sealed casing, simply by mechanical pressure on the back end of the tubing (the end opposite the end that is being everted into the cavity). The means to press on the back end can be a medical instrument or device, which progressively moves forward with the everting tubing into the cavity, and eventually is exposed beyond the end of the tubing as it is held (by fluid pressure inside the annular space between the double walls of the tubing) in the central passage inside the inner tubing. The medical device should be longer than the folded tubing so that it can be exposed on the front end while still extending on the back end as a handle. Pulling on the back end of the medical device reverses the procedure and causes the tubing to be retrieved out of the cavity and inverted back to its original condition.

The principal object of this invention is therefor to provide a new and novel means for everting a tubing into a constricted cavity or conduit and to have the everted tubing open at the front end so as to have an open central passage. It is also an important object of this invention to evert the tubing into the cavity by mechanical means as well as by fluid means. It is another important object to have an everting system which does not require a rigid pressure retaining casing and fluid pump means, and to provide a simple, inexpensive and disposable device.

These and other important objects and the principles of this invention will be made clear from the following description of the various embodiments of this invention taken in conjunction with the attached drawings, in which:

FIGS. 1 and 1a illustrate embodiments of this invention as illustrated in part in my copending application Ser. No. 498,653.

FIGS. 2 and 3 illustrate two embodiments which are variations of FIG. 1, in which fluid pressure is used to evert the tubing. In FIG. 2, the central passage through the tubing is closed off by means of a pressure clip. In FIG. 3 it is closed off by inflating the annular volume inside the double-walled tubing with fluid to close off the central passage.

FIG. 4 illustrates a modification of FIG. 3 in which pressure of a pushrod on the end of the inflated tubing causes it to be everted.

FIG. 5 illustrates another method of sealing the double-walled tubing to a tubular handle.

FIG. 6 illustrates the method of using the tubing assembly of FIG. 5.

FIGS. 7 and 7a illustrate the forward end of the everted tubing when the push-rod or -tube has progressed entirely through the tubing. FIG. 7a illustrates certain features of a push-tube.

FIGS. 8 and 8a illustrate embodiments in which the double-walled tubing is filled with fluid before being placed in intimate contact with the handle or nozzle; FIG. 8a illustrates a feature of the nozzle.

FIGS. 9 and 10 illustrate two methods of filling and sealing the double-walled tubing. FIG. 10 includes a handle or nozzle attached to and made part of the tubing.

Referring now to the drawings, and in particular to FIG. 1, I show an embodiment which is illustrated as FIG. 14c in my copending application Ser. No. 498,653. This comprises a tubular casing 10. At one end is attached a long flexible eversible thin-walled tubing 14 which has been everted over itself to form two walls 11 and 14 extending from a fold 12, with an annular volume 13 therebetween, and a central passage 17 inside of the inner wall 14. The two ends of the tubing are sealed together by annular ring 20 and attached to the end of casing 10 by means 15, 16. The ends can be sealed separately to ring means 20, and then attached to the casing, as shown, or they can be sealed together and then attached to the casing, or they can be sealed separately to the casing as in FIG. 1a. Each of these three systems will be described more fully. Suffice it to say that the everted and folded tubing is sealed to enclose a sealed annular volume 13 into which volume fluid can be introduced, by means such as pipe 18, or other means as will be illustrated in connection with other figures.

The illustration in FIG. 1 shows the probe or tubing 11, 14 after it has been everted from the casing 10. One way of everting the tubing from the casing 10 is illustrated in FIG. 2. Here I show the double-walled tubing inverted into the tubular casing 10. The end 12 is closed and attached to removable metal spring clip 26 which effectively seals closed the central passage 17. The casing 10 is closed by back wall 28 and has a pipe 24 and valve 25 through the wall, through which fluid can be introduced under pressure into the space 19. This pressure causes the tubing to be everted out of the front end of casing 10, carrying with it the clip 26. The clip 26 is attached by a fixed length of tension member or cord 27 which is attached at 29 to the back wall 28. As the tubing 11, 14 is everted, the clip moves out until the cord 27 is stretched taut, and then, as the tubing moves farther the clip is pulled off the tubing, and the tubing is then in the form and position illustrated in FIG. 1.

In FIG. 1 I show the annular space 13 between inner and outer walls 14, 11 provided with a pipe 18 through which fluid can be introduced into the annular space 13. As fluid is introduced through pipe 18, the volume 13 expands, the outer wall extends to its maximum diameter, and the inner wall 14 is compressed to the position 14' (FIG. 1). In this position of wall 14', the inner passage 17 is effectively closed off.

In FIG. 3, I show the double-walled tubing 11, 14 in the inverted position inside the casing, with the inner space 13' in expanded condition and with walls 11', 14'. Now, if fluid is introduced through pipe 24 into the closed space 19, since the internal passage 17 is closed off, the pressure in space 19 will force the tubing to be everted from the casing 10.

In FIG. 4 I show a variation of FIG. 3, in which the tubing 11', 14' is everted mechanically instead of by fluid pressure. In

FIG. 4, the back wall 30 has an opening 31 through which a long slender cylindrical element 32 is inserted and pressed into the center of the tubing. Pressure by member 32 on the tubing at 33 causes fluid from the back 12 of the tubing 11' to be pushed forward into the front end, causing the tubing 11' to be everted out of the casing 10. As this action progresses, the element 32 becomes enclosed deeper and deeper into the tubing 11', where it is pressed on laterally by the enclosing tubing due to the fluid pressure in space 13'. Thus longitudinal force on member 32 will cause the tubing to be everted, while tension on member 32 will cause the tubing to be inverted and drawn back into the casing. Fluid pressure in space 19 is not required to evert the tubing if the member 32 is used, and with the opening 31 the pressure inside the space 19 is the same as outside of the casing.

The member 32 can be a rod, as shown in FIG. 4, or a tube, as shown in FIG. 6. Also, the cylindrical member can be a medical instrument, such as a fiber optics assembly as shown in FIG. 8, and so on. The slender elongated element need not be a smooth cylindrical element, since the tubing 11' will accommodate itself to a variable contour of the element. The element must be longer than the tubing (or it must have a handle extension) if it is to be able to evert the full length of tubing and still provide a length for handling at the back end.

In FIG. 5 I show another way in which the enclosed annular space 13 can be formed. In FIG. 1 the tubing is everted and folded on itself and sealed to a thin ring 20. In FIG. 1a the two ends of 11 and 14 are sealed separately to the outside and the inside of the end of the casing 10.

In FIG. 5 I show the two ends sealed respectively to the two ends of a length of tubular casing or a handle 39 (one end passing through the interior of 39). The seal can be performed by means of ring 34 at one end and 35 at the other end. The pipe 37 through which fluid is introduced into the internal annular space 13 passes through the wall of tube 39. It is clear therefore that the ends of the tubing after folding can be sealed directly together (as will be described in connection with FIGS. 8 and 9), or sealed to a thin ring and then attached to a casing as in FIG. 1, or the ends can be sealed separately to a tubular handle as in FIGS. 1a, 5 and 10. The essential requirements being the folded tubing with the annular space filled with fluid, the annular space sealed, and the tubing placed in operating contact with a tubular handle or nozzle. The contact can be by deliberate attachment or sealing or by simply being confined within a tube with frictional contact or tapering diameter to hold the tubing in contact with the tube as will be described in connection with FIG. 8.

In FIG. 6 I show a variation of FIG. 5, in which the handle 40 has two smaller diameter stepped ends. The ends of the tubing 47, 51 are placed over the ends respectively of the handle, and locked in position on one end by means of nozzle or nose piece 52, with tubing-directing opening 54, and on the other end by tube or casing 48, which is used essentially as a guide for the tubing 46, and at the back end 56, through opening 58 as a guide for the cylindrical element 60, which in this case is illustrated as a flexible thickwalled tube of small bore.

When fluid is introduced through pipe 41 into the annular space 13, the inner wall 43 will be compressed. Then pressure on tube 60, forcing it to the left and its end 61 will cause the tubing at 62 to press on the fluid, transferring some fluid to the front end 53 causing the tubing at 53 to move forward to 53' to be everted. The tubing end at 62 moves to 62' while the end of the tube 60 at 61 moves to 61' and the tubing at 53 moves to 53'. As 60 is pushed in, to the left, the tubing 53 will be everted out of the nose piece 52 and into the mouth of a cavity 44 represented as confined by walls 49. To invert the tubing back into the tube 48, the tube 60 is pulled to the right until all the tubing is back in the tube 48 and the end wall 62' of tubing 46 reaches position 62.

FIG. 7 illustrates the forward end 53' of the everted tubing when the front end 61 of the tube 60 has progressed all the way through the inner passage 17 inside the tubing 49 and is exposed to the space 44 inside the cavity walls 49. In this posi-

tion the tube 60 can pass fluid into the cavity space 44, or drain fluid out of that space. It may also be desirable to place a control means 59 (FIG. 6) in the tube 60 such as a valve or check valve, for the purpose of controlling the flow of fluid out of or into the space 44. Such means are illustrated in my copending application S.N. 565,556 entitled "Medical Instrument for Everting a Thinwalled Flexible Tubing and Method," filed July 15, 1966 now U. S. Pat. No. 3,506,011. Tube 60 can also be used for introducing instruments into the space 44, such as fiber optics viewing means, or sensors of various types.

To this end I show in FIG. 7a a variation of FIG. 7 in which the tube 60 has additional features. For example, the front end 61 has movable closure means that can mechanically close off the end 61 of the tube 60 to prevent the tubing 46 from being forced into the tube 60 at 62 (FIG. 6) by pressure in the annular space 13. This can be an orange peel type of closure with a plurality of flexible petals 33 which can be pushed aside as the cylindrical instrument 35 is inserted into and through the tube 60. Also at the back end of the tube 60 is a flange or handle 37 by means of which a manual holding force 39 can be placed on the tube 60 as the instrument 35 is forced into the tube 60 by force 41. A third feature is a series of discontinuous spaced longitudinal slits 45 along the length of the tube to increase its flexibility and to permit it to follow a tortuous passage through which it might be led by the tubing 46. By this means a very flexible tube 60 can be led through a tortuous passage with ease, whereas the less flexible instrument 35 would not follow. Then after the tube 60 is in place the instrument 35 is inserted, and by being forced into the tube 60 is caused to traverse the tortuous path. The handle 37 facilitates the introduction of instrument 35.

I show at 45' a closer spacing of slits to make the front end of the tube as flexible as possible since it is always the front end that is most difficult to lead around a bend. The rounded end 33 should assist in leading the tube 60 around bends. It will be desirable also to make the tube 60 out of some material that has a low coefficient of friction on its surface. One such material is Teflon, a product of the duPont Company, and well known for this property.

In FIG. 8 I show another embodiment which is a variation of FIG. 6. In FIG. 8 I show the two ends 70, 71 of the tubing sealed to each other, to close the annular volume 68, after fluid is introduced into (to fill) the space 68. Although a gas can be used for this purpose, a liquid is preferred to a gas, to fill the space 68, since the eversion of the tubing at one end responds more rapidly to pressure on the other end, because of the incompressibility of the liquid.

This tubing inverted on itself and folded at 86, filled with liquid and with the two ends 70, 71 sealed together, is inserted into a nose piece, nozzle or handle, 72. The front end of the nozzle 72 tapers down to a smaller diameter opening 72'. I envisage as shown in FIG. 8a that the inner wall of the nozzle 72 will have one or more ridges or convolutions 73 into which the tubing 88 will be pressed to provide a firm anchor for the tubing inside the nozzle as the inner wall 66 is everted out of the nozzle. At its other end the nozzle has a step 74 over which is slipped a tubular guide 76. This has a back end wall 78 with opening 80, through which a cylindrical element 82 is inserted. This element 82 is illustrated as being a fiber optics element with lenses 83 at each end. Any other type of slender cylindrical element can be used, such as a rod, tube, etc. Since fiber optical devices are well known in the art no further description is required.

As the end 84 of the element 82 presses on the end 86 of the tubing, fluid in 68 is pushed forward to evert the tubing at 88 forward to 88', and farther, out through the opening 72' into the cavity space 44. When the end 84 passes completely through the tubing 84 (as in FIG. 7) the front lens 83 will image the internal walls 49 onto the fiber optics bundle and back to the rear lens 83'. To invert the tubing back into the casing, the cylindrical element 82 is pulled back.

It will be clear from the description of FIGS. 6, 7 and 8 that the tube 60 can have a large enough internal diameter so that

the fiber optics device 82 can be inserted through the tube 60 into the space 44 after the tube 60 has been inserted into the cavity. Because of the possible stiffness of the fiber optics element compared to the tube 60, it may be easier to insert the tube 60 and then insert the fiber optics into the cavity through the tube 60 rather than directly, as in FIG. 8.

FIG. 9 illustrates one way in which the everted, folded-back tubing with outer wall 92, fold 97, inner wall 94 and annular space 93 is filled with liquid to a level 98. The two ends 96, 95 can be sealed together as shown at 99, or in overlapped relative position as in FIG. 8. The sealing can be by cementing or by heat sealing or welding of the material of the tubing if thermoplastic, and so on, as is well known in the art. The material of which the tubing is made is not critical so long as it has the proper strength and flexibility, and many materials well known in the art can be used, such as polyethylene, rubber, viscose cellulose, etc.

In FIG. 10, I show a further variation of FIG. 9 in which the two ends of the walls 92, 94 are sealed together and into and to a cylindrical nozzle or nose piece 102 inside slot 101. The nozzle has retaining and sealing walls 104, 105 to hold the tubing. Also, there are means to slide and hold at 106 a length of tube 108 as a guide for the tubing. The nozzle tapers to a smaller diameter at 103. The tubing can be filled with liquid 93 to level 98 before being sealed into the nozzle. However, if the nozzle is made of elastomeric material the tubing can be sealed into slot 101 before filling, and it can be filled with liquid through a needle 110 piercing the nozzle, such as at 111. After filling through 111 the needle 110 is withdrawn and the hole will seal itself.

A disposable dust cap 116 is provided which covers the nozzle and is positioned by shoulders 118 to protect and keep clean the nozzle and tubing. Similarly the opening 114 in the back end of the casing 108 is closed with a disposable plug 112. Thus the entire tubing and nozzle can be sterilized in assembled condition, and be protected by the casing 108, plug 112 and cover 116 until ready for use. At that time the cover 116 is removed, the tubing is filled with fluid by needle 110. The needle is removed, plug 112 removed, the pusher element inserted and the device is ready for use.

While I have shown a number of embodiments, they all have one thing in common: The tubing is formed by everting and folding approximately one-half of the length over the other half to form an outer wall, and an inner wall, with an internal passage inside the inner wall. When the internal annular space is filled with a fluid, such as a gas under pressure, or a liquid, then the inner wall will be compressed, reducing or closing off the inner passage. When this tubing is sealed to a ring, a length of tube, a handle, or just sealed to itself and filled with liquid, and inserted into a tubular guide and handle, it can be everted through the handle (and into a cavity) at one end by pressing on the other end.

It is important to have a handle with which to hold the end of the filled tubing, so that as it is everted, it can be directed into a specific cavity or conduit. Where the tubing ends are sealed to a substantially rigid tube or tubular casing, as in FIGS. 5 and 6, that tube can be the handle (or at least part of the handle, with the tube 48 being another part). When the tubing is sealed to a ring, and the sealed ends fastened to a tube or casing as in FIGS. 1, 1a and 2, the tube or casing is the handle. In FIG. 8, where the end of the filled tubing is inserted into the nozzle or nose piece 72, with its tapering inner wall, the nozzle 72 and/or the casing 76 which fits and fastens to the nozzle, can be the handle.

While my invention can be used with a handle but without a guide such as 76, the guide or casing is preferred because the liquid filled tubing is heavy, very pliant, and hard to push on unless it is properly contained or guided. Thus the casing 76 guides and holds the tubing and also guides the pushing element 82.

While I have shown a number of embodiments, these are only by way of example, and various modifications and variations can be made to the embodiments shown by one skilled in the art, all of which are considered to be part of this invention.

I claim:

1. Apparatus for the insertion into and the removal of a flexible eversible tubular probe from an elongated constricted cavity, comprising,

- a. an eversible tubular probe comprising
  - a length of eversible tubing, one portion of said tubing inverted over itself and folded to produce an annular cylindrical container having an inner and an outer wall with an annular volume therebetween, and an inner longitudinal passage defined by said inner wall,
  - b. means including at least the two ends of said eversible tubing to seal said annular container, and sealing said container, to form a closed annular volume,
  - c. said closed annular volume filled with fluid, whereby said longitudinal passage will be constricted at least to a small diameter,
  - d. substantially rigid tubular handle means surrounding and in intimate contact with at least a portion of said fluid filled probe at a first end thereof, the second end of said probe extending axially out of a second end of said handle means, said handle means tapering to a smaller diameter at the first end thereof,
  - e. and including tubular guide means extending from said handle means and enclosing said fluid filled probe substantially to the second end thereof, the outer end of said guide means closed with a plate having a central opening, and
  - f. including slender cylindrical means slidably received in said opening adapted to press through said central opening on said second end of said probe along its axis.

2. Apparatus as in claim 1 in which said sealing means includes said tubular handle means.

3. Apparatus as in claim 2 in which the end of said outer wall of said tubing is sealed to a second end of said tubular handle means, the end of said inner wall is passed through said handle means and sealed to the first end of said handle means.

4. Apparatus as in claim 3 including means to fill said annular volume with fluid comprising conduit means through the wall of said handle means.

5. Apparatus as in claim 2 in which the ends of both said outer and said inner walls are sealed to one end of said handle means.

6. Apparatus as in claim 1 in which said inner and said outer walls are sealed together circumferentially to form said closed annular volume and one end of said sealed tubing with annular volume filled with fluid is inserted into said handle means.

7. Apparatus as in claim 1 in which said tapering portion has at least one circumferential convolution on its inner surface.

8. Apparatus as in claim 1 including means to introduce fluid into said closed annular volume comprising conduit means through the wall of said closed annular volume.

9. Apparatus as in claim 1 including means to introduce fluid into said closed annular volume comprising means to fill said annular container with liquid before said container is sealed to form said closed annular volume.

10. Apparatus as in claim 1 in which said cylindrical means comprises rod like means.

11. Apparatus as in claim 10 in which said rod like means comprises fiber optical means.

12. Apparatus as in claim 1 in which said cylindrical means comprises non-collapsible tubular means.

13. Apparatus as in claim 12 in which said tubular means includes removable closure means on the end pressing on said tubing.

14. Apparatus as in claim 12 in which said tubular means includes handle means on the end opposite to that which presses on said tubing.

15. Apparatus as in claim 12 in which said tubular means is constructed of a material having low coefficient of surface friction.

16. Apparatus as in claim 12 in which said tubular means has a plurality of longitudinal disconnected slits in its wall.

17. Apparatus as in claim 1 in which said guide means at one end is attached to the second end of said handle means,

said guide means closed at the other end, completely enclosing said probe, and including also cover means to enclose and seal the first end of said handle means.

18. The method of everting a tubular surgical probe into an elongated animal-body cavity, said probe comprising a length of eversible tubing, one portion of said tubing inverted over itself and folded to produce an annular cylindrical container having an inner wall and an outer wall with an annular volume therebetween, and an inner longitudinal passage inside said inner wall, sealing means including at least the ends of said inner and said outer walls to form a closed annular volume, said closed annular volume filled with fluid, at least a first end of said fluid filled probe inside of and in intimate contact with a substantially rigid tubular handle means, and extending out of a second end of said handle means, and including tubular guide means extending from said handle means and enclosing said fluid filled probe substantially to the second end thereof, comprising the steps of

- a. placing the first end of said handle means at the mouth of said body cavity, and
- b. pressing the second end of said fluid filled surgical probe toward the second end of said handle means, with a slender cylindrical means adapted to press on said second end of said probe along its axis.

19. The method of claim 18 including the step of continuing to press on said probe by said cylindrical means until said first end progresses through said handle means, into said cavity, and through said probe.

20. The method of claim 18 including the additional step of pulling the second end of said cylindrical means out of said handle means to cause said probe to be retrieved from said

cavity and to be intraverted into and through said handle means.

21. The method of claim 19 in which said cylindrical means is a slender flexible non-collapsible tube, with the additional step, after said tube has progressed through said probe of inserting into and pressing a rod-like instrument means through said tube until its first end extends into said cavity past the first end of said tube.

22. The method as in claim 19 including the additional step of removing fluid from said annular space until said inner passage is open.

23. The method as in claim 22 including the additional step, after substantially all fluid is removed from said annular space, of retrieving together said cylindrical means and said probe.

24. The method as in claim 18 in which said cylindrical means is a slender flexible non-collapsible tubular means, said tubular means having a plurality of longitudinal, disconnected slits in its wall.

25. The method as in claim 18 in which said cylindrical means is a slender flexible non-collapsible tubular means, said tubular means made of a material having low coefficient of surface friction and having removable closure means on the end pressing on said tubing.

26. The method as in claim 18 in which said cylindrical means comprises fiber optical means.

27. The method as in claim 18 in which said cylindrical means is a slender flexible non-collapsible tubular means including handle means on the end opposite to that which presses on said tubing.

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