March 18, 1969 D. SILVERMAN 3,433,214

METHOD AND APPARATUS FOR EVERTING UNDER PRESSURE A TUBULAR PROBE INTO A BODY CAVITY

Filed Oct. 20, 1965 Sheet 1 of 2

FIG. 1

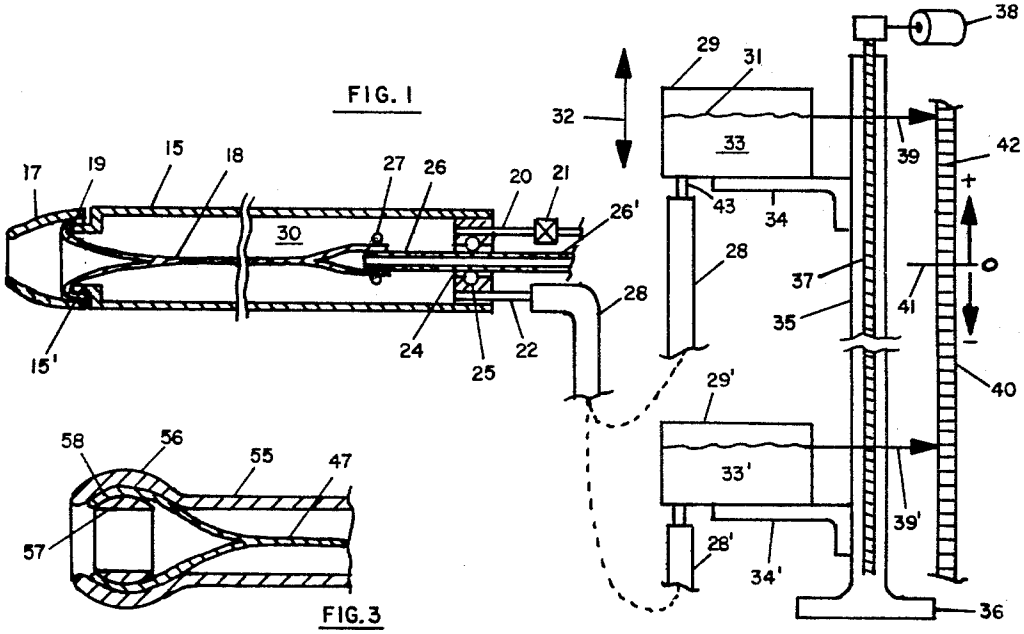


FIG. 3

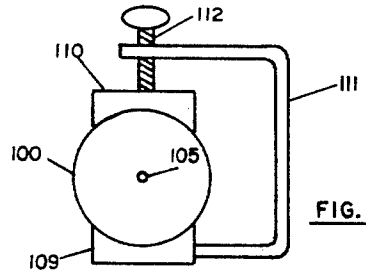


FIG. 7

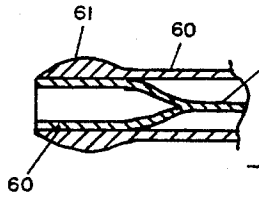


FIG. 4

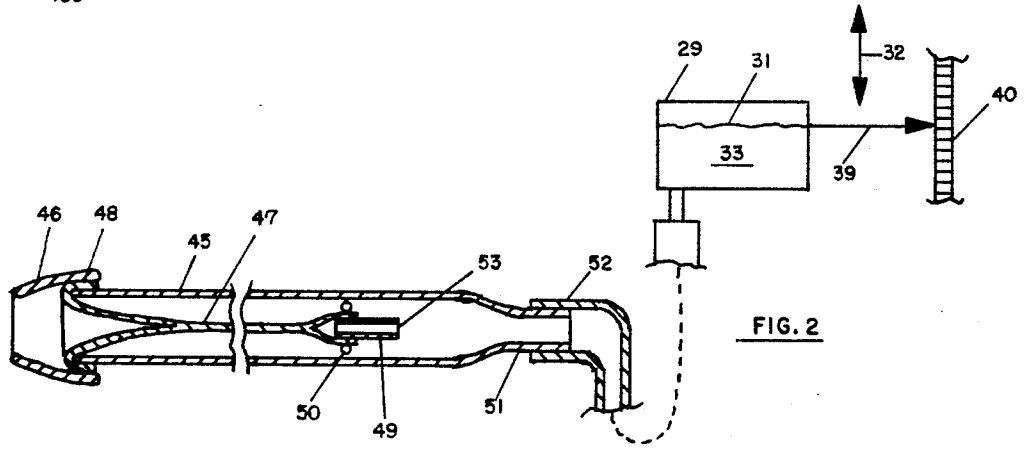


FIG. 2

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METHOD AND APPARATUS FOR EVERTING UNDER PRESSURE A TUBULAR PROBE INTO A BODY CAVITY

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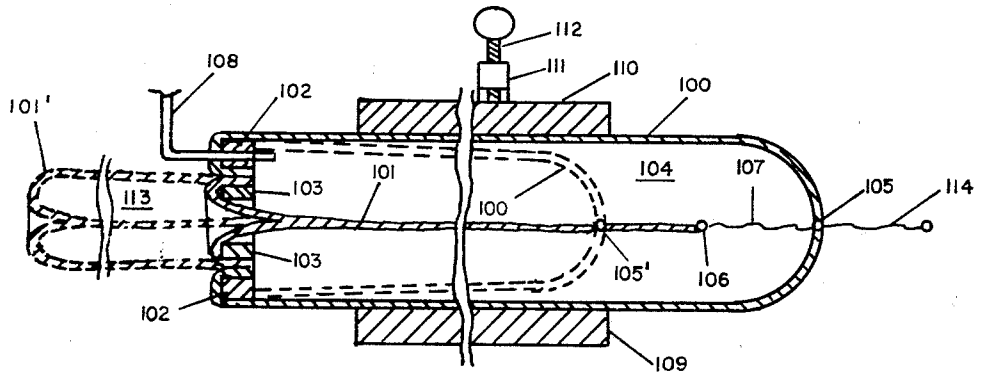


FIG. 6

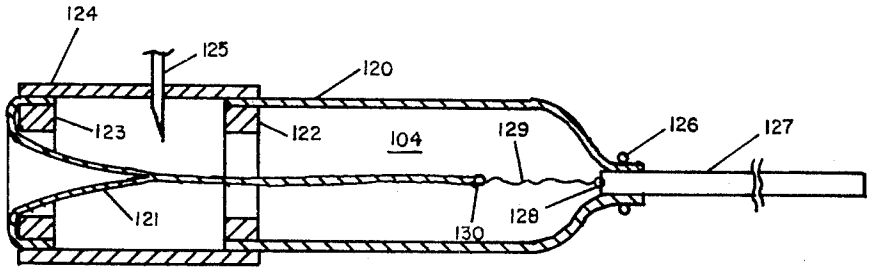


FIG. 8

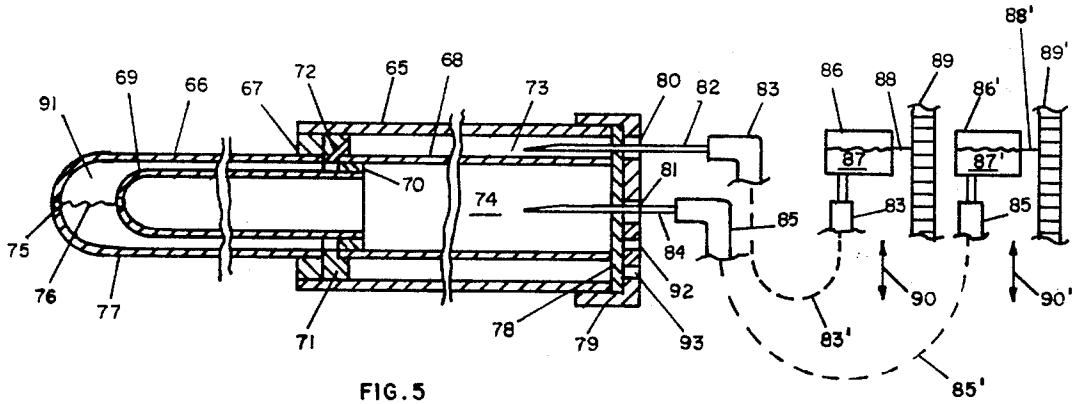


FIG. 5

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3,433,214

METHOD AND APPARATUS FOR EVERTING UNDER PRESSURE A TUBULAR PROBE INTO A BODY CAVITY

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Filed Oct. 20, 1965, Ser. No. 498,256
U.S. Cl. 128—2 26 Claims
Int. Cl. A61b 5/00; A61m 3/00

ABSTRACT OF THE DISCLOSURE

This invention concerns an instrument for the placement of a sampling, inspecting or treating device within an extended tubular cavity. The device consists of a tubular casing, a flexible thin-walled tubular probe inside of the casing with the inside end closed and outside end sealed circumferentially over a first end of the casing. The second end of the casing is closed. A reservoir of liquid is provided that can be raised above and lowered below the level of the casing. The reservoir is connected by conduit to the casing. When the reservoir is raised, liquid flows into the casing causing the tubing to evert out of the end of the casing. When the reservoir is lowered, liquid flows out of the casing, causing the tubing to be inverted back into the casing.

This invention relates to the placement of a sampling, inspecting, or treating device within an extended cavity or tubular chamber that may have linear and nonlinear portions. Because of the nature of the cavity a rigid mechanical device could not be introduced into such a cavity and a thin flexible member is not self-sustaining and cannot be "pushed" into the cavity.

More specifically, this invention relates to the art of medical apparatus including those instruments which are concerned with the sampling, inspecting, and treating of the walls of internal body cavities. Further, this invention is an improvement on that embodied in my U.S. Patent 3,168,092, issued Feb. 2, 1965, and entitled, "Medical Probing Instrument Having Flexible Extrudable Tubing Adapted To Be Extraverted Under Pressure Into a Body Cavity."

Although the apparatus of my patent is useful for the purposes intended, the present invention extends the application to smaller diameter cavities and permits the manipulation of a wider variety of instrumentation. It also extends the techniques which may be followed in practicing the invention.

Briefly described, my invention utilizes an elongated, fluid confining chamber or casing having circumferential side walls and two end closures. One end closure of the tubular casing has an opening which is adapted to be placed in communication with the cavity. This opening also permits the introduction and/or the retrieval of a thin wall flexible tubing to be introduced into the cavity. A length of such tubing in collapsed form has one end closed and is placed within the casing. One end of the tubing remote from the cavity is closed. The other end of the flexible tubing is open and is secured circumferentially to the opening in the end closure of the casing. The entire length of tubing comprises the end closure for that end of the casing.

Means for introducing a fluid within the casing and about the flexible tubing stored therein is provided and such fluid displaces the tubing progressively from the casing by everting the lead end which is the first to be extruded from the casing.

Thus, the collapsible thin wall flexible tubing is progressively extraverted and progressively projected from

the casing into the cavity as pressure and/or displacement fluid is applied to the annulus between the collapsed tubing and the casing wall. Means are provided for maintaining the displacing fluid within the casing under the maintained pressure and this can include both control and indicator means.

As will become apparent, as the tubing is being the extraverted/extruded, the trailing end of the flexible tubing moves out of the casing and into the extruded inflated tubing. The trailing end may carry a retrieval means and/or may transport into the cavity and within the extraverting tubing a wide variety of instruments which may sample, inspect, or treat the areas within and adjacent the cavity. The collapsed tubing within the casing may contain medicating, sampling, and/or opaquing materials which are brought in direct contact with the walls of the cavity when the flexible tubing is extraverted as described. Such materials within the collapsed tubing might also comprise adhesive, adsorbent or other materials whereby samples of the cavity wall can be obtained.

These and other new and novel techniques and benefits derived from the use of my invention will become apparent as my description thereof proceeds with reference thereof from the attached drawings, wherein:

FIGURE 1 illustrates one embodiment of this invention in which hydraulic means are used to extravert and retrieve the probe.

FIGURE 2 illustrates another specialized embodiment of this invention which is completely disposable.

FIGURES 3 and 4 show alternate embodiments by which the probe is sealed to the casing.

FIGURE 5 illustrates an embodiment employing a probe comprising two separate tubings.

FIGURES 6, 7, and 8 illustrate two embodiments which utilize a constant volume liquid system. FIGURES 7 and 8 show one in which the probe is extraverted by reducing the cross-section of the casing, and FIGURE 8 illustrates one in which the probe is extraverted by reducing the length of the casing.

In FIGURE 1 is shown one embodiment of this invention. The casing comprises a tubular element **15**, which may, for convenience have a first end portion **15**, of reduced diameter to accommodate the turned back cuff **19** of the tubular thin-walled plastic probe **18**, and the nozzle or nose piece **17**. The other end of the casing is closed off by a closure, which can be an integral part of the tubular portion **15**, or, as illustrated, it can be a rigid plug pressed or fastened into the casing. It is also possible to provide a compliant, penetratable, self-sealing closure, such as is illustrated in my copending application, Ser. No. 498,462, filed Oct. 20, 1965, entitled "Method and Apparatus for Placing in and Retrieving a Tubular Probe from a Body Conduit." Such a self-sealing closure permits the passage through and sealing through the closure of the pipes **22**, **20**, etc.

In FIGURE 1 the closure is shown as a rigid wall having inserted therethrough two small diameter pipes **20** and **22**. Pipe **20** serves, with valve **21** to bleed air from the space **30** when it is being filled with liquid. Pipe **22** serves as a conduit through which fluid is passed into the casing to displace and extravert the tubing probe. The probe **18** is a length of thinwalled flexible tubing placed in collapsed form into the casing. The inner end is first placed over and sealed to, by means of clamp **27**, a long small diameter cylindrical instrument **26**. The instrument illustrated is a flexible semi-rigid walled tube **26**. However, any other type of instrument can be used, as illustrated in my U.S. Patent 3,168,092, issued Feb. 2, 1965. The outer end of the tubing **18** is turned back over the end **15'** of the casing to form a tight fitting cuff **19**. This is locked in position by the nozzle or nose piece **17**.

The instrument **26** and the tubing **18** are of such length that the instrument **26** is passed through an opening **24** in the end closure **16**. Resilient means such as the O ring **25** are used to seal around the surface of the instrument as it moves into and out of the casing. Other means to seal the cylindrical instrument **26** are possible as is well known in the art.

A container or reservoir **29** of liquid **33** is carried by bracket **34** on a column **35** which is supported by a base **36**. The bracket can be moved up or down, as shown by arrows **32** by means shown schematically as a lead screw **37** and motor **38**. Of course, other means, including hand operated means, can be used.

The container **29** has an outlet pipe **43** connected to flexible conduit **28**, which is a continuation of the conduit **28** attached to pipe **22**. The conduit can be simple as a length of rubber tubing.

The level **31** of the liquid **33** is shown by index arrow **39**, which indicates against scale **42** on strip **40**. This scale reads "plus" for positions above the zero level line **41** and "minus" for positions below. The level of the line **41** is substantially the level of the axis of the casing **15**. The reading of the scale opposite the index is the distance (in inches or centimeters) of the liquid level above or below the casing **15**, and is a measure of the hydrostatic pressure in the casing. The reading on scale **42** for the position of the index or resorvoir might be called the "extraverting index," since the rate at which the probe is extraverted is a function of this reading. Similarly the rate of introversion and retrieval is a function of the negative pressure or suction due to the lower position of the reservoir when the "extraverting index" is "minus" or negative.

In use, the reservoir is placed at a negative extraverting index (lower than the level of the casing). The probe **18** and instrument **26** are put in place and the nose piece **17** placed in position. Then the reservoir is raised. As the index approaches zero, liquid will begin to flow from the reservoir into the casing. The valve **21** is opened so that the air in the space **30** can be bled off as the liquid fills the casing. The reservoir is positioned at a desired "plus" index value and left there. Liquid continues to flow into the casing. When the casing is full and the valve **21** closed, the instrument is positioned so that the nose piece is at the mouth of the cavity, and the liquid flowing from the reservoir then extraverts the probe out through the nose piece, turning it inside out as it goes into the cavity. As the probe moves out, the end at **27** also moves out and carries with it the attached instrument **26**. When the probe is fully extraverted into the cavity, the instrument **26** is in the cavity in position for use.

When the examination or treatment of the cavity is completed, the probe is retrieved. There are two ways to do this. One way is to keep the extraverting index the same as for the eversion or extraversion step, and retrieve the probe by pulling on the instrument end **26'**, exposed outside the closure **16**. The other way is to lower the reservoir **29** to position **29'** with a negative index, and cause the liquid to flow out of the casing, causing the probe to be retrieved into the casing. While I have shown an instrument **26** attached to the inner end of the probe **18**, in many areas of use of this invention, a probe will be used without a physical means attached, by means of which it can be introverted back into the casing. With a physical retrieval means such as a cord, rod, or instrument attached to the probe, the retrieval is best accomplished by keeping the reservoir at a positive index while physically retrieving the probe by pulling on the retrieval means. When there is no physical retrieval means, the probe is retrieved by lowering the reservoir to a negative index position, and the higher pressure outside the probe than inside the casing will cause it to be introverted into the casing.

The magnitude of the extraversion index to be used in any specific operation is a function of the length, thickness, and diameter of the probe, the material of which the probe is made, and the condition of the walls of the cavity (such as whether the walls of the cavity have collapsed and pressure is required to lift or spread them). In any case, the pressure in the casing is under the precise control of the operator by shifting the position of the reservoir, as needed. Because of the large area of liquid surface in the reservoir, the level **31** changes but little as liquid flows into or out of the chamber. This system does not require the normal use of valves, pressure indicator, or pump as in other systems, and still provides smooth control of the displacement, eversion and inversion processes.

In FIGURE 2 is shown another embodiment which is a simple, specialized application of the embodiment of FIGURE 1. Tube **45** which can be a fairly rigid, thick-walled plastic tube is the casing. This tube **45**, perhaps with an additional nose piece or nozzle **46** comprises a disposable enema tube, or the like. Inside the casing **45** is a length of collapsed thin-walled tubing **47**, which is sealed **48** over the end of casing **45**. At its inner end, the tubing **47** is fitted with and sealed over a short piece of tube **49**, which, in effect, is a perforated plug. The casing **45** is connected by inlet **51** to conduit **52** connected to reservoir **29**, filled with liquid **33**. The mounting of the reservoir **29**, and index **39** and other features are similar to the same features of FIGURE 1, although some details have been omitted from FIGURE 2 for convenience.

The enma tube **45** is inserted into the colon. The reservoir **29** is raised. Liquid **33** flows through conduit **52** into casing **45**, displacing and extruding the tubing **47** to its full length. While there will be some flow of liquid through the bore **53** of tube **49**, if the flow of reservoir liquid is great enough (large positive extraverting index) the tubing will be extraverted rapidly. The length of the tubing **47** can be anything desired so as to place the point of water entry some distance into the colon. Liquid flows from the reservoir **29** through conduit **52**, casing **45**, extruded tubing **47**, and tube **49** into the colon, so as to "flush down" the colon. When inflow of water is to be stopped, the reservoir can be lowered, or a clamp placed on conduit **52**, as is well known. The tubing **47** can be withdrawn into the casing **45** by means such as described in connection with FIGURE 1, or it can be left extruded and the assembly of **45** and **47** pulled out of the colon.

In FIGURES 1 and 2, I show the tubing clamped between the casing and nozzle, or nose piece. A preferred embodiment is indicated in FIGURE 4 in which the tubing **47** is permanently fastened to the casing **45**, such as by molding or cementing along the circumferential contact **62**. Also, the plastic tube **60** which comprises the casing can have an appropriate contour **61** molded on its end, in accordance with the projected use to which it is to be placed. In FIGURE 3 is shown another embodiment in which the tubing **47** is clamped in a depression **58** on the inside surface of the casing **55**, by an appropriately shaped ring **57**. Also, extension **51** on the opposite end of the casing **45**, FIGURE 2, can be a seperate tube in an appropriate end closure. As shown, the conduit **52** is attached to a reduced diameter portion **51** of the casing **45**. It can also be the full diameter of the casing **45**, with the conduit **52** adapted to connect with it in pressure tight relation. Or, if desired, the "casing" **45** can be one end portion of a long flexible plastic tube or conduit **52**. The embodiments of FIGURES 2, 3, and 4, might be considered as disposable instruments, with the portions **46, 45, 47, 49** (and possibly **52**) prepared and stored for use in sterile condition, and disposed of after use.

In FIGURE 5 is shown another embodiment of this invention in which two tubular probes are used, one inside of the other. These are shown schematically in extraverted position, as tubing **66** fastened to termination **67**, which is fastened to tubular casing **65**. Similarly, tubing **69** is fastened to termination **70** which is fastened to tubular casing **68**. Casing **68** is of smaller diameter than

65 and is adapted to be inserted into 65 and to be centered and positioned by ring 71. There is one or more holes 72 drilled through ring 71 so that the space 73 between the two casings 65, 68, can communicate with the space 91 between the two probes 66, 69. The two probes at their closed ends are fastened together by means of a short tension member 76 attached by any desired means to the closed ends 75, 77, of the probes 66 and 69, respectively.

The space 73 can be closed by an annular plug or seal, and the inner casing closed off in any desired way. However, I prefer to make the lengths of the casings 65, 68, such that their open ends are in one plane. They are sealed against a resilient diaphragm 78 pressed against their ends by end cap 79. Cap 79 is held to casing 65 by means not shown. It has two or more openings 80, 81, through which needles or small tubes 82, 84, can be pressed in such a manner that the compliant material of 78 will seal them against pressure. Thus needle 82 communicates with space 73 and 84 with space 74.

As in FIGURE 1, each of the needles or tubes 82 and 84 are connected by flexible conduits or tubing 83, and 85, respectively, to reservoirs 86, 86', respectively. The reservoirs are adapted to tbe positioned vertically in accordance with arrows 90, 90', their position being shown by indexes 88, 88' placed along scales 89, 89', respectively.

In normal use, the probes will be introverted into the inner casing 68, space 74. The reservoirs 86, 86' are positioned to a negative "extraversion index" (below the elevation of the instrument casing). They are filled with a suitable liquid. They are then both raised so that liquid will flow into spaces 73 and 74, thus extraverting the probes to the position indicated. It will be desirable to bleed air from the casing by inserting suitable needles (as shown in my copending application Ser. No. 498,462) through openings 92, 93, and through diaphragm 78 into spaces 74 and 73, respectively.

Now the probes are in fully extraverted condition and both reservoirs are at a positive extraverting index. If it is desired to retrieve the probes, the reservoir 86 is maintained at its present level, and 86' is lowered to a negative index. Thus, liquid will flow out of 74 and the tubing 69 faced with a higher pressure on its outside surface, in space 91 than on its inside surface, in space 74, will be introverted at the termination 70 and will be driven into casing 68, carrying with it (due to the member 76) the outer tubing 66. The outer tubing 66 still has the same pressure on it as before, so it will introvert at the remote end, in a manner which is the reverse of the process of extraversion. Thus, by control of the level of the two reservoirs, 86, 86', the probes can be extraverted or intraverted at will, without manual handling.

In FIGURE 6 is shown another embodiment. It is like FIGURE 5 in that it has two eversible thin-walled flexible tubings, an outer tubing 100 fastened to termination 102, and inner tubing 101 fastened to termination 103. The two terminations 102, 103, are sealed together to define a fixed volume 104 inside of 100 and outside of 101. The ends of the two tubings 105, 106, are joined with a tension member 107. Means are provided for sealing a fine needle 108 through the termination 102 (or other siutable place) by means of which fluid can be introduced into space 104. Consider that a fixed volume of liquid is placed in 104 to distend 100 to its maximum volume and collapse 101 to its minimum volume. Thereafter the needle is removed and the opening sealed.

Means are provided to reduce the volume 104. This can be by manual squeezing, or by such clamp means as the rails 109, 110, confining the sides of the tubing 100, (FIGURE 7) clamp frame 111 and thumb screw 112. As the volume 104 is reduced, the liquid forces the inner tubing 101 to be extraverted through its termination 103 to the dotted position 101'. As the inner tubing 101 moves out, its trailing end 106 pulls on tension member 107 which pulls on the end 105 of outer tubing 100. Thus, when 101 moves to position 101', outer tubing 100 correspondingly moves to dotted position, with corresponding position 105'. When it is desired to retract or invert the tubing 101' back to 101, the squeezing pressure by the rails 109, 110, is removed, and the fluid flows back from 113 to 104. If desired, a tension member 114 tied to 105, can be used to pull back 105', 107', and 106' and the inner tubing 101 to its fully inverted position.

In FIGURE 8 is shown a modification of FIGURE 6 in which the volume 104 is reduced, not by lateral squeezing, but by longitudinal shortening. The two tubings 120, 121 are similar and attached to terminations 122, 123, respectively, which are part of a casing 124. The two tubings are joined at their closed ends 128, 130, by tension member 129. The outer tubing 120 is also joined by clamp 126 to a rigid member or rod 127. The volume 104 is again filled through needle 125, as before, to provide a fixed volume of liquid. By pushing on 127, the end of the outer tubing 120 is pushed in, reducing the volume 104, and forcing the inner tubing to be everted out of the termination 123. To retrieve the tubing 121 after it has been everted, rod 127 is pulled, which pulls 129, 130, and tubing 121, forcing liquid back into 104 and lengthening and enlarging the volume of the outer tubing 120.

Referring again to FIGURE 5, it is possible to provide in the space 91, through needle 82, a polymerizing cement. Then, when the tubings are everted, and pressed outward against the wall of the cavity, the surface of the tubing 66 will assume all of the convolutions of the inner surface of the cavity. This expanded condition is maintained until the cement has polymerized and binds the two tubings together. While the cement will hold them together, they can still be inverted to be withdrawn from the cavity. After retrieval, they can be everted again to show the contour of the cavity.

If desired a thin layer of this polymerizing compound can be placed on the inner surface (before inversion) of the outer tubing 66, so that when everted into the cavity and expanded to press on the walls, the polymerizing material will harden to show the fine detail of the surface. Another possibility is to make the outer tubing itself of a polymerizing material. Pressure inside of 69 will press the outer tubing 66 against the cavity surface and hold it there while it hardens in the shape of the cavity walls.

One material that can be used for this purpose is Devcon, which is manufactured by the Dow Chemical Company of Midland, Mich. However, there are many other plastic compositions of this sort described in the literature which can be used to make a true replica of the inner surface of the cavity.

This invention is susceptible to a wide variety of embodiments, some of which have been described, and many more of which will be obvious to one trained in the art, and is not to be construed as being limited to the scientific apparatus and processes described above. The scope of this invention is limited only by the scope of the appended claims.

I claim:

1. A medical instrument for placing a long flexible tubular probe into a tubular cavity comprising,

a tubular casing, an opening in a first end and a closure across the second end of said casing,

a collapsed thin-walled flexible tubing inside said casing, the inner end of said tubing closed, the outer end of said tubing sealed circumferentially over said opening,

a reservoir containg liquid,

means to elevate said reservoir above and to lower said reservoir below the position of said casing, and

conduit means connecting the interior of said casing with said reservoir,

whereby when said reservoir is raised above the position of said casing liquid will flow from said reservoir into said casing and out through said opening, extraverting said tubing through said opening and when said

reservoir is lowered below the position of said casing liquid will flow from said casing into said reservoir, thereby causing said tubing to be intraverted into said casing.

2. The medical instrument of claim 1 in which the closed end of said tubing is connected to a tension member passing through and sealed into said end closure.

3. The medical instrument of claim 2 in which the closed end of said casing is sealed with a rigid closure and said tension member is sealed through said closure by means of a pressure gland.

4. The medical instrument of claim 1 in which said closure comprises a wall of elastomeric material through which a small diameter cylindrical element can be passed and sealed.

5. The medical instrument of claim 1 in which means are provided to bleed air from said casing as liquid flows into said casing.

6. The medical instrument of claim 2 in which said tension member comprises a small diameter thick-walled tube sealed into the closed end of said tubing.

7. Medical apparatus for irrigating an elongated body cavity comprising,

a tubular member serving as a casing,

a length of collapsed thin-walled flexible tubing in said casing,

a first end of said tubing circumferentially sealed over a first end of said casing, the second end of said tub- sealed over a short perforated plug,

a reservoir of liquid attached by conduit means to the second end of said casing, and

means to vary the vertical spacing of said reservoir with respect to said casing,

whereby when said reservoir is raised above said casing liquid will flow from said reservoir into said casing, causing said tubing to be everted from said casing, whereupon said liquid will flow from said casing through said tubing and through said plug into said cavity.

8. The medical instrument of claim 7 in which the said tubing is sealed circumferentially to said casing by cement means.

9. The medical instrument of claim 7 in which the tubing is sealed circumferentially to said casing by means of a clamping ring.

10. A medical instrument for extraverting a long tubular probe into an elongated constricted body cavity comprising, a first tubular casing, a first thin-walled flexible evertible tubing closed at one end and sealed at its other end circumferentially to a first end of said first casing, said first tubing forming an extension of said first casing, a second tubular casing inserted into and sealed to said first tubular casing, a second thin-walled flexible everible tubing closed at one end and sealed at its other end circumferentially to the first end of said second casing, said second tubing forming an extension of said second casing, the closed ends of said two tubings joined with a tension member, a first liquid reservoir means connected by conduit means to the interior of said second casing, a second liquid reservoir means connected by conduit means to the space between the said first and second casings, and means to adjust the vertical positions of said first and second reservoir means with respect to said instrument.

11. A medical instrument for placing and retrieving a thin-walled flexible tubing within an elongated constricted body cavity, comprising,

a tubular casing, at least part of which is flexible,

an opening in the first end of said casing,

the second end of said casing sealed with a flexible tubular closure,

a length of thin-walled flexible tubing inside said casing,

a first end of said tubing sealed circumferentially over said opening,

the second end of said tubing sealed against fluid flow through said tubing,

means for introducing fluid into said casing, and

means for changing the outer contour of said casing to reduce the internal volume of said casing,

whereby when the outer contour of said casing is changed and the internal volume reduced, fluid is forced out of said casing through said opening causing said tubing to be extraverted out of said opening.

12. The apparatus of claim 11 in which the closed end of said tubing is connected by a tension member to said flexible tubular closure.

13. Apparatus as in claim 11 in which said means for changing the outer contour of said chamber comprises means for reducing the transverse cross sectional area of said chamber.

14. Apparatus as in claim 11 in which said means for changing the outer contour of said chamber comprises means for forcing said flexible closure longitudinally into said chamber, thereby reducing the effective length of said chamber.

15. The method of everting a long flexible tubular probe into a tubular cavity from an apparatus in which said probe is placed inside of a tubular casing, the inner end of said probe closed, the outer end of said probe circumferentially sealed over one end of said casing, the second end of said casing closed, a reservoir of liquid connected by conduit to said casing, comprising the steps of,

placing said opening in said casing against the mouth of said cavity,

starting with the level of said reservoir below the level of said casing, elevating said reservoir above the level of said casing until liquid flows from said reservoir into said casing, and

maintaining the raised level of said reservoir until sufficient liquid has flowed into said casing to evert said probe from said casing into said cavity.

16. The method as in claim 15 with the added steps of leaving said probe in said cavity for a finite time, and lowering said reservoir to a level below that of said casing, whereby liquid will flow out of said casing into said reservoir and retrieve said probe into said casing.

17. The method as in claim 15 with the additional steps of leaving said probe in said cavity for a finite time, keeping the elevation of said reservoir above that of said casing and mechanically drawing said probe back into said casing, by retrieval means attached to the end of said probe, whereby said probe will progressively invert at the extreme portion inside said cavity until it is progressively retrieved into said casing.

18. An instrument for placing and retrieving a thin-walled flexible tubing within an elongated constricted cavity, comprising,

a substantially rigid tubular casing,

a first opening across a first end of said casing,

a first length of thin-walled flexible tubing inside of said casing,

a first end of said first tubing sealed circumferentially over said first opening,

the second end of said first tubing sealed against fluid flow through said tubing,

a second opening in the second end of said casing,

a second length of thin-walled flexible tubing,

a first end of said second tubing sealed circumferentially over said second opening and extending longitudinally from said casing,

the second end of said second tubing sealed against fluid flow through said tubing,

means for introducing fluid into the space inside said casing and inside said second tubing, and

means for changing the external configuration of said second tubing so as to reduce the internal volume of said second tubing,

whereby fluid is forced out of said second tubing through said first opening, thereby extraverting said first tubing out of said first opening.

19. Apparatus as in claim **18** in which said means to change the external configuration of said second tubing comprises means to laterally compress said second tubing to a reduced cross-sectional area.

20. Apparatus as in claim **18** in which said means to change the external configuration of said second tubing comprises means for forcing said second end of said second tubing longitudinally inside of itself and into said casing.

21. Apparatus as in claim **20** in which said second tubing surrounds in tight contact a long cylindrical member of diameter less than the diameter of said second opening, and said means for forcing said second tubing into said casing comprises said long cylindrical member.

22. Apparatus as in claim **21** in which said long cylindrical member comprises a rod-like cylindrical member.

23. Apparatus as in claim **18** in which the second ends of said first and second tubings are connected together.

24. A medical instrument for placing and retrieving a thin-walled flexible tubing within an elongated cavity comprising:

a tubular casing,

a first eversible tubing inside said casing, a first end of said first tubing sealed circumferentially over a first end of said casing, the second end of said first tubing sealed against fluid flow through said first tubing,

a second eversible tubing, a first end of said second tubing sealed over the second end of said casing and extending longitudinally from said casing, the second end of said second tubing sealed against fluid flow through said second tubing,

means to fill said casing and said second eversible tubing with fluid, and

means to cause said second eversible tubing to invert and force fluid into said first eversible tubing, thereby causing said first eversible tubing to evert.

25. Apparatus as in claim **24** including long slender cylindrical means inserted into second end of said second eversible tubing, whereby pushing longitudinally on said cylindrical means will cause said second eversible tubing to invert.

26. A medical instrument for placing and retrieving a thin-walled flexible tubing within an elongated constricted cavity, comprising,

a substantially rigid tubular chamber,

an opening across a first end of said chamber,

a length of thin-walled flexible tubing inside said chamber,

a first end of said tubing sealed circumferentially over said opening,

the second end of said tubing sealed against fluid egress,

the second end of said chamber sealed by a flexible tubing closure over the said second end of said chamber,

means for introducing fluid into said chamber and into said flexible closure, and

means for pressing said flexible closure longitudinally into said second end, forcing fluid longitudinally along said chamber and extraverting said tubing out of said opening.

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