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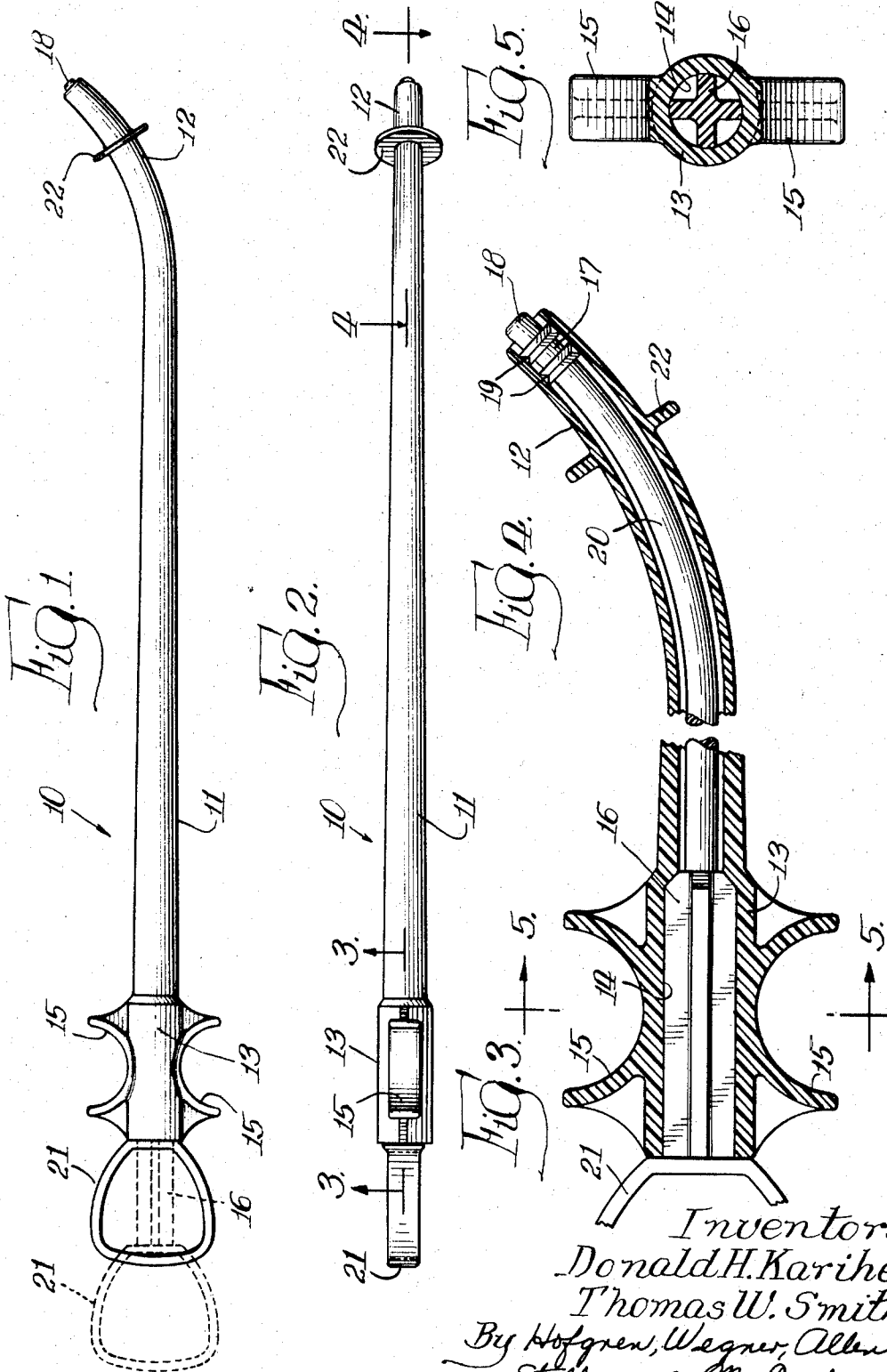
D. H. KARIHER ET AL

3,438,366

SPECIMEN COLLECTOR

Filed July 25, 1966

Sheet 1 of 2



Inventors:-
Donald H. Kariher,
Thomas W. Smith;
By Hofgren, Wegner, Allen,
Stillman & McCord, Attys.

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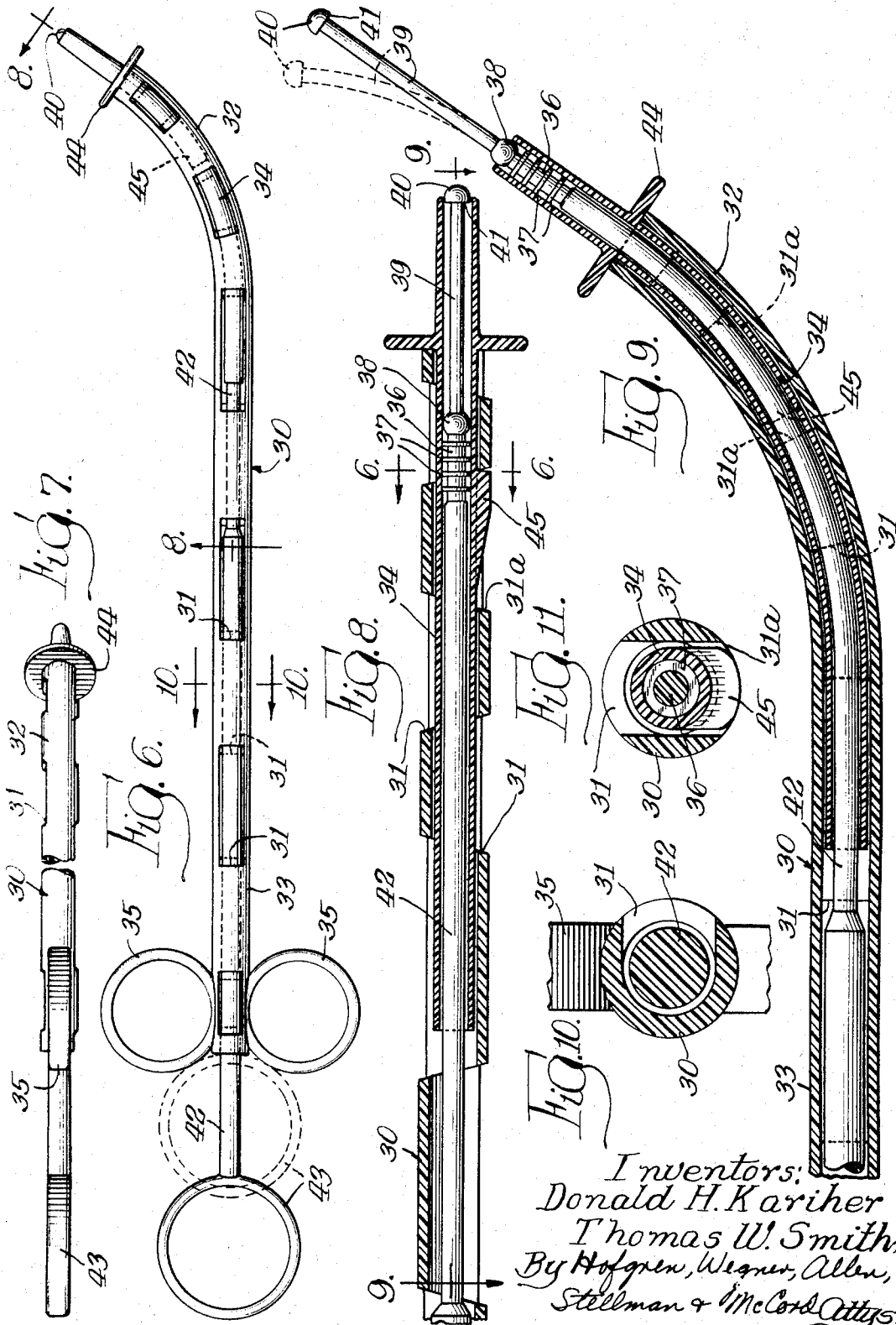
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SPECIMEN COLLECTOR

Donald H. Kariher and Thomas W. Smith, Rochester, N.Y., assignors to Hollister Incorporated, a corporation of Illinois

Continuation-in-part of application Ser. No. 523,436, Jan. 27, 1966. This application July 25, 1966, Ser. No. 573,146

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4 Claims

ABSTRACT OF THE DISCLOSURE

A cervical canal specimen collector including a hollow tube having an upturned end. A piston near the outer upturned end of the tube is movable manually from a first position where it closes the end of the tube to provide for ease of insertion of the device, to a position drawn within the tube to draw fluids within the tube for subsequent microscopic inspection. Additionally, a probe may be carried by the outer end of the piston, which probe may penetrate further into the organs involved and at the same time, when withdrawn, scrape cell-carrying fluids from adjacent tissue for subsequent examination.

This application is a continuation-in-part of our co-pending application Serial No. 523,436 filed January 27, 1966, (now abandoned).

This invention relates to a specimen collector and more particularly to a specimen collector particularly adapted to withdraw fluids from the cervical canal.

It is a general object of the present invention to produce a new and improved cervical canal specimen collector of the character described.

It is a more specific object of the invention to provide a specimen collector easily insertable into the cervical canal and usable to obtain a specimen of the fluids therein and subsequently to eject the fluid for microscopic examination.

In recent years a widely used method of detecting early uterine cancer has been employed by gynecologists. This test is often referred to as the Pap smear test and it has consisted of obtaining a sample of cells off the outer surface of the vaginal portion of the cervix for microscopic and other examination. The most commonly used specimen collector has been a simple wooden paddle which is inserted at the desired location and then removed, and the material clinging thereto is processed for further examination. One of the limitations of this method is that the material clinging to the paddle has been limited to that which is immediately adjacent the opening of the cervical canal. As sloughed material indicative of uterine cancer may linger in the upper regions of the cervical canal for some time, physicians have been seeking ways of obtaining specimens of the fluid present in such higher regions in order to make a more thorough and complete gynecological examination.

One method for obtaining specimens from such higher regions has been to use a device provided with bristles, which is inserted into the uterine cavity with the thought that fluid in such higher regions will adhere to the bristles. For the most part, this method has been discarded as too dangerous as a routine office procedure.

Another method for obtaining specimens of cervical fluid is to use a bulb attached to a tube, which is inserted into the cervical canal, and with suction draw fluid into the end of the tube. One of the difficulties encountered with this method is that the cervical fluid is very thick and will tenaciously cling to the side of the tube

so that it cannot be expelled from the tube by blowing air from the bulb through the tube.

According to the present invention, however, there is provided a cervical canal specimen collector which can be safely and easily inserted into the cervical canal and moved the desired distance upwardly therein and when so positioned can positively effect a withdrawal of the fluid present in such upper regions. Furthermore, after the device has been withdrawn, the fluid collected therein can be positively discharged from the collector for subsequent examination.

Other and further objects and advantages of the present invention will become readily apparent from the following description and the accompanying drawings, in which:

FIG. 1 is a side elevational view of a cervical canal specimen collector made in accordance with the present invention;

FIG. 2 is a bottom view of the apparatus shown in FIG. 1;

FIG. 3 is an enlarged horizontal section taken along line 3—3 of FIG. 2;

FIG. 4 is an enlarged horizontal section taken along line 4—4 of FIG. 2;

FIG. 5 is a vertical section taken along line 5—5 of FIG. 3;

FIG. 6 is a side elevational view of a modified form of a specimen collector made in accordance with the present invention;

FIG. 7 is a bottom view of the right-hand portion of FIG. 6;

FIG. 8 is a sectional view taken along line 8—8 of FIG. 6;

FIG. 9 is a sectional view taken along line 9—9 of FIG. 8;

FIG. 10 is a vertical section taken along the line 10—10 of FIG. 6; and

FIG. 11 is a vertical section taken along the line 11—11 of FIG. 8.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail two embodiments of the invention, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiments illustrated. The scope of the invention will be pointed out in the appended claims.

Referring now to the drawings, FIGS. 1—5, the specimen collector 10 comprises a tube 11, preferably made of plastic or the like and being straight throughout the greater portion of its length but having an upturned end at its outer extremity. The inner portion of the tube 11 is enlarged as at 13 forming therein a cylindrical chamber 14. Integrally formed on the outer surface of the enlarged portion 13 are finger grips 15 to assist in the manipulation of the device.

Reciprocably mounted within the chamber 14 is a plunger 16 generally X-shaped in cross section as shown in FIG. 5. A piston 17 is positioned adjacent the outer end 12 of the rod with the piston being provided with a rounded outer portion 18 and with seals 19 sealingly engaging the inner surfaces of the tube portion 12. A piston rod 20 is secured at one end to the piston 17 and at its other end to the plunger 16.

A manually engageable member 21 positioned exteriorly of the enlarged portion 13 is secured to the plunger 16 so that movement of the member 21 serves to move the plunger, the piston rod, and hence the piston.

In use, the device is in the position shown in the drawings, i.e., with the piston 17 located at its outermost position so that its rounded end 18 protrudes or projects beyond the end of the curved portion of the tube. When so positioned, there is provided a closed-end blunt instru-

ment easily insertable into the cervical canal without causing either injury or discomfort. When so inserted, the member 21 is moved outwardly to draw the piston back into the tube and such movement, because of the seals 19, draws by suction cervical canal fluid into the thus open end of the tube. The depth of penetration of the end 12 into the cervical canal is limited by a disc 22 secured to the end 12 as shown.

When the specimen collector is then withdrawn, the fluids collected may be forcibly and positively ejected from the tube by moving the member 21 to its original position and moving the piston outwardly to the open end of the tube. It will be realized, of course, that all fluids are thus fully removed from the tube for further examination.

Referring now to the second embodiment of the invention shown in FIGS. 6-11, the specimen collector comprises a cylindrical outer tube 30 provided with alternately spaced openings 31 on opposite sides thereof. The openings are provided merely to adapt the outer tube to a configuration which is easily molded by injection molding techniques as presently known. The outer tube 30 is provided with an upturned end portion 32 integrally connected to a straight portion 33. Secured within the upturned portion 32 of the outer tube 30 is a hollow inner tube 34. At the opposite end of the outer tube 30 is a pair of finger grips 35 to facilitate handling of the device.

Located within the hollow tube 34 is a piston 36 provided with a plurality of rings 37 providing a close fit with the interior surface of the tube 34. The piston 36 terminates in a rounded end portion 38 from which extends an axial probe 39 terminating in a rounded end 40 but formed, as shown in the drawings, in a general "umbrella" shape so as to provide the annular shoulder 41 for the purposes hereinafter described. The piston 36 is secured to a piston rod 42 which extends through the outer tube 30 and outwardly therefrom, and a finger ring 43 is secured to the outer end thereof as shown for the purpose of moving the piston rod and hence the piston within the tubes.

A disc of clear plastic 44 is secured to the hollow tube as is a generally wedge-shaped stop or catch member 45.

In assembling the device, the hollow tube 34 is inserted within the upturned end of the outer tube 30 until the disc 44 is seated against the end of said outer tube, at which time the wedge-shaped lock or catch 45 will have passed just into an opening 31a in the outer tube, thus locking the hollow tube securely in position within the outer tube. The piston rod 42, piston 36, and probe 39 are integrally formed of a single piece of flexible plastic which then may be inserted through the straight end of the outer tube to complete the assembly.

The device shown in FIGS. 6-11 is used generally similarly to the specimen collector previously described. Upon insertion, the piston rod is withdrawn to position the parts in the manner shown in FIG. 8 thereby providing a rounded end for insertion into the cervical canal. The clear disc serves to determine the amount of penetration and yet permits the physician to observe the insertion as it is taking place. When inserted, the finger portion 43 is moved toward the outer tube to cause the piston and probe to move to the position shown in FIG. 9. The probe at this time will have penetrated substantially through the cervical canal and into the uterus and when withdrawn (by outward movement of the finger portion 43) the probe 39 will not only collect additional fluids, the edge portions 41 serve to scrape fluids from the surrounding tissue thus increasing the volume of the specimen obtained as well as securing fluid from the uterine area. Withdrawal of the piston rod also withdraws the piston and the suction thereby created pulls in additional fluid from the surrounding area. When the parts are returned to the position shown in FIG. 9, the outer end of the probe serves something as a shield to prevent loss of fluid withdrawn into the inner hollow

tube and then the specimen collector may be withdrawn from the vagina and the specimen obtained submitted for examination.

It will be seen from the foregoing that we have provided a cervical canal specimen collector which can be inexpensively made, to the extent that it can be of the "throw away" type after use, and yet one which is more efficient than the collectors presently available for collecting and ejecting a proper fluid specimen.

We claim:

1. A cervical canal specimen collector comprising an outer tube having a straight portion and an upturned end portion, a hollow tube positioned within the end portion of the outer tube, a piston in the hollow tube adjacent the outer end thereof, a piston rod connected at one end of said piston and extending through said hollow tube and out of the other end of said outer tube, a probe on the outer end of the piston and extending axially therefrom, said probe having an inner portion of smaller diameter than said hollow tube and an outer end of larger diameter than the inner portion, said probe being movable in the hollow tube by said piston rod from a first position wherein the outer end of the probe projects slightly beyond the outer end of the hollow tube to provide a closed blunt instrument for insertion into the cervical canal to a second position, moving the piston rod toward the terminus of said hollow tube and moving the probe outwardly therefrom and to a third position withdrawing the probe within said hollow tube and moving the piston therewith to draw fluid from the canal into the hollow tube, and a manually actuable member connected to the other end of the piston rod for moving the piston from said first to said second and then to said third position.

2. A cervical canal specimen collector comprising an outer tube having a straight portion and an upturned end portion, a hollow tube positioned within the end portion of the outer tube and having a portion extending beyond the terminus of said end portion, a piston in the hollow tube and closely fitting the interior thereof, a probe on the outer end of the piston and extending axially therefrom, scraping means adjacent the outer end of the probe, a piston rod connected at one end to the piston and extending through the hollow tube and the outer tube, said piston being movable in the hollow tube by said rod from a first position wherein the outer end of the probe projects slightly beyond the outer end of the hollow tube to provide a closed blunt instrument for insertion into the cervical canal to a second position, moving the piston rod toward the terminus of said hollow tube and moving the probe outwardly therefrom and to a third position withdrawing the probe within said hollow tube to draw fluid from the canal into the hollow tube, and a manually actuable member connected to the other end of the piston rod for moving the piston from said first to said second and then to said third position.

3. A cervical canal specimen collector comprising an outer tube having a straight portion and an upturned end portion, a hollow tube positioned within the end portion of the outer tube and having a portion extending beyond the terminus of said end portion, a piston in the hollow tube and closely fitting the interior thereof, a probe on the outer end of the piston and extending axially therefrom said probe terminating in a rounded portion having an umbrella-shaped outer portion having a circumferential scraping edge, a piston rod connected at one end to the piston and extending through the hollow tube and the outer tube, said piston being movable in the hollow tube by said rod from a first position wherein the outer end of the probe projects slightly beyond the outer end of the hollow tube to provide a closed blunt instrument for insertion into the cervical canal to a second position moving the piston rod toward the terminus of said hollow tube and moving the probe outwardly therefrom and to a third position withdrawing the probe within said hollow tube

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to draw fluid from the canal into the hollow tube, and a manually actuable member connected to the other end of the piston rod for moving the piston from said first to said second and then to said third position.

4. A cervical canal specimen collector comprising an outer tube having a straight portion and an upturned end portion, a hollow tube positioned within the end portion of the outer tube and having a portion extending beyond the terminus of said end portion, a disc of transparent plastic secured to the hollow tube, a locking member secured to the hollow tube spaced from the disc thereon whereby said hollow tube may be inserted in the upturned end of said outer tube until said locking member engages an opening in said outer tube and the disc engages the terminus of the end portion of said outer tube to secure said hollow tube in position in said end portion, a piston in the hollow tube and closely fitting the interior thereof, a probe on the outer end of the piston and extending axially therefrom, scraping means adjacent the outer end of the probe, a piston rod connected at one end to the piston and extending through the hollow tube and

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the outer tube, said piston being movable in the hollow tube by said rod from a first position wherein the outer end of the probe projects slightly beyond the outer end of the hollow tube to provide a closed blunt instrument for insertion into the cervical canal to a second position moving the piston rod toward the terminus of said hollow tube and moving the probe outwardly therefrom and to a third position withdrawing the probe within said hollow tube to draw fluid from the canal into the hollow tube, and a manually actuable member connected to the other end of the piston rod for moving the piston from said first to said second and then to said third position

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WILLIAM E. KAMM, *Primary Examiner*.