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[54] **SPECULUM INSTRUMENT**
13 Claims, 8 Drawing Figs.

[52] **U.S. Cl.**..... **128/18**
 [51] **Int. Cl.**..... **A61b 1/06**
 [50] **Field of Search**..... **128/6—22,**
6—9(Cursory), 398

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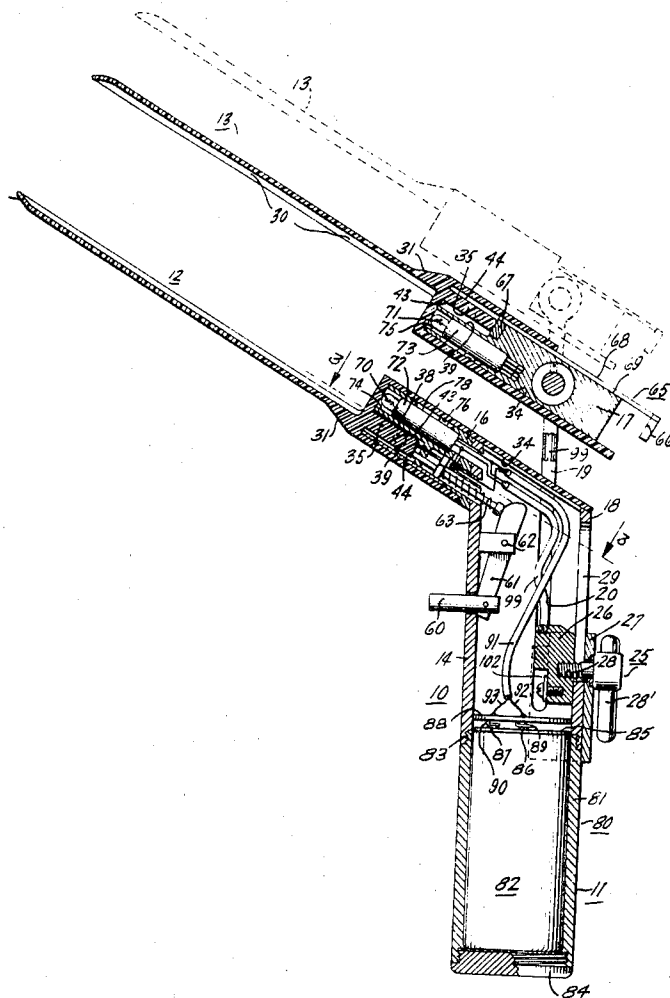
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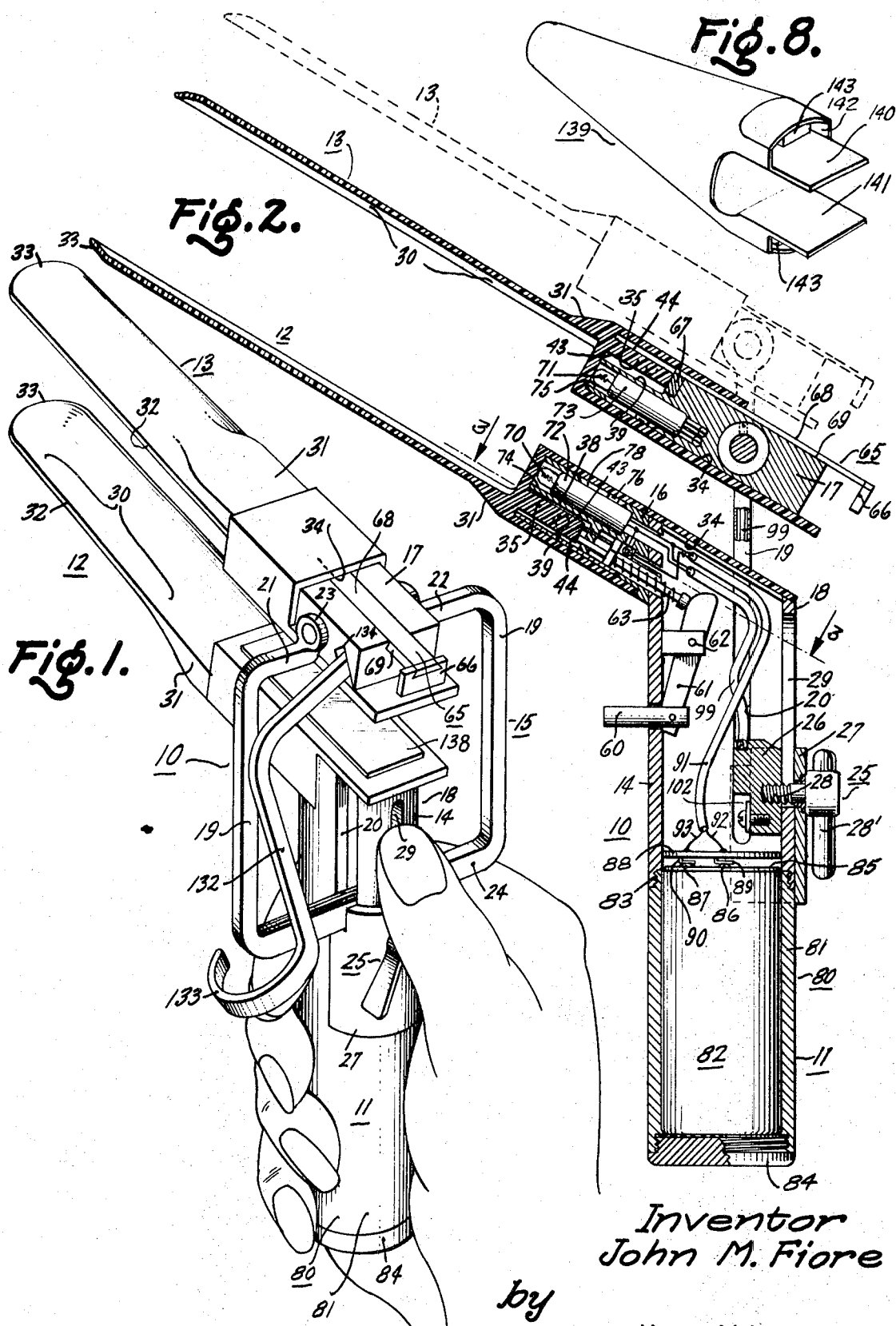
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ABSTRACT: A vaginal speculum instrument comprises a semi-permanent handle light unit, and a pair of separate interchangeable and disposable duckbills which are releasably secured to a spaced pair of adjustable support platforms on the handle light unit. The duckbills include a light transmitting section for transmitting light to the area being examined.





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Fig. 6.

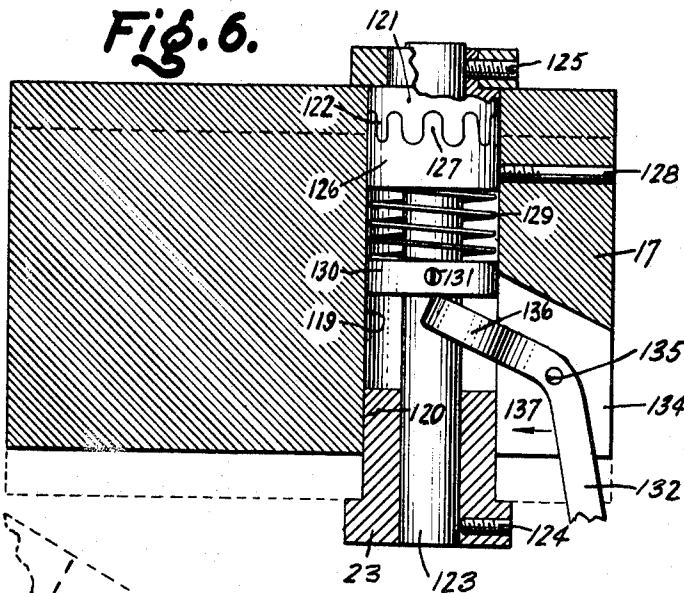


Fig. 4.

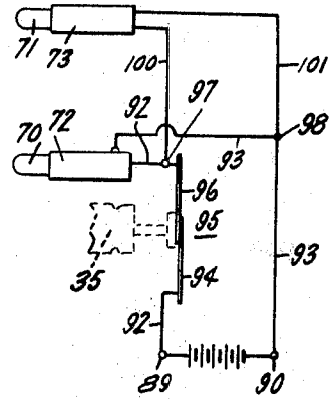


Fig. 7.

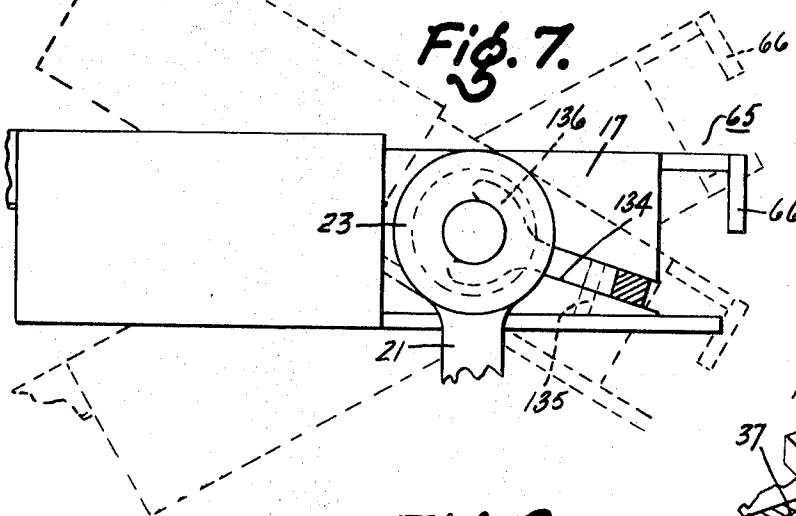


Fig. 5.

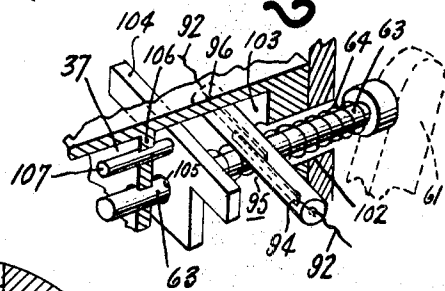
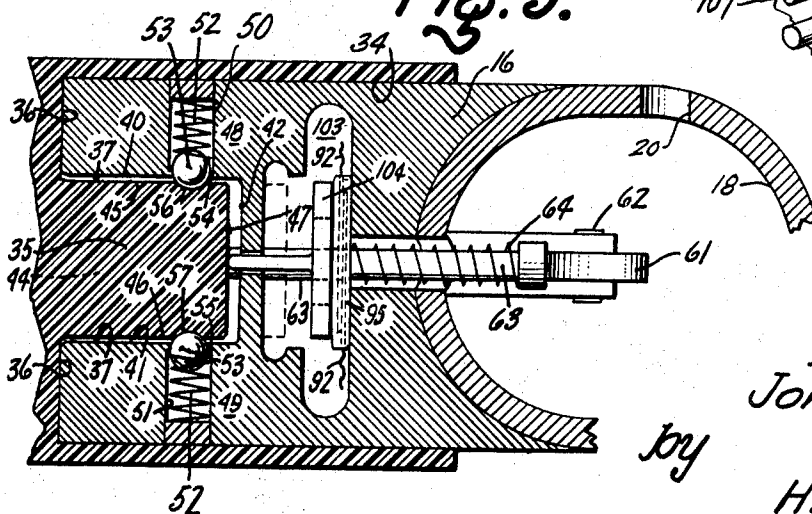


Fig. 3.



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SPECULUM INSTRUMENT

This invention relates to a speculum instrument and, more particularly, to an improved speculum instrument having a permanent or reuseable handle portion and inserting or speculum portions of a rejectible and/or disposable nature.

Speculum instruments are broadly classified as appliances for opening to view a passage or cavity of the body, and are instruments of extensive use in medical practice for diagnostic and routine examinations, and treatment. More notable kinds of speculums are referred to as Bozeman's speculum, *i.e.* a bivalve speculum, Cusco's speculum, *i.e.* a form of vaginal speculum wherein the blades are expanded by a screw mechanism, Sim's speculum, *i.e.* a form of duck-billed vaginal speculum, and others such as Fergusson's, Gruber's and Stop. Additional kinds of speculum instruments may include proctoscopes, anoscopes, sigmoidoscopes, larynoscopes, etc. Speculum instruments such as the vaginal speculum and nasal speculum are inserted into and distend the appropriate body cavity by the rocking action of, or separation of, duckbills or blades to facilitate medical diagnosis as well as treatment. The body contacting or speculum portions of these instruments are of a reuseable and permanent nature and accordingly are usually integral with or semi-permanently attached to the remainder of the instrument.

The use of a vaginal speculum instrument, for example, for medical examination or treatment brings body contacting blade, valve, or speculum portions in direct contact with vaginal surfaces, and consequently the speculum portion may become contaminated with a variety of infectious and harmful bacteria. For this reason a vaginal speculum instrument is required to be carefully cleaned and sterilized prior to each vaginocopy. Otherwise there is a prevalent danger of transmitting harmful bacteria from one person to another, whether from patient to patient or through the medical practitioner as an intermediary. Therefore, a medical practitioner must have a number of these rather expensive instruments on hand, or examinations must be scheduled in predetermined spaced apart relationship to provide necessary time for the sterilization procedure.

Coupled with the fact that much time and effort is expended in proper cleaning and sterilization of a vaginal speculum instrument, at least the speculum portion of the instrument is usually of metal which is quite cold to the touch and causes discomfort to the person being examined. Metal speculums have also been known to injure delicate tissue in the insertion procedure.

Furthermore, lighting means for vaginal speculums usually requires an electrical conductor passing to the speculum and carrying relatively high voltages, as much as about 110 volts. This requisite always exposes either the practitioner or the subject to burns from the lamp employed or electrical shock, a quite hazardous occurrence.

Other speculum devices as mentioned include the foregoing disadvantages in varying degrees, the vaginal speculum, however, being a salient or foremost example.

Accordingly, it is an object of this invention to provide an improved speculum instrument.

It is another object of this invention to provide a speculum instrument including a handle unit adapted to have any one of a family of rejectible blades or speculums releaseably secured thereto.

It is a further object of this invention to provide a speculum instrument including a semi-permanent or reuseable handle portion adapted to have any one of a family of single use disposable blades or speculums releaseably secured thereto such as those speculums of the aforementioned medical instruments.

It is another object of this invention to provide an improved vaginal speculum instrument having separable and rejectible blade portions.

It is another object of this invention to provide an improved vaginal speculum instrument having separable and rejectible blade portions with interchangeable blades.

It is another object of this invention to provide an improved vaginal speculum instrument having rejectible and single use disposable blade portions.

It is a further object of this invention to provide an improved vaginal speculum instrument having single use automatically ejectible plastic blade portions.

It is yet another object of this invention to provide a vaginal speculum instrument of the foregoing objects having a low voltage electrical energy cell incorporated therewith to provide power for a light source in the instrument.

It is still another object of this invention to provide a handle assembly including a rechargeable battery therein and automatically releaseable speculums connected thereto.

This invention will be better understood when taken in connection with the following description and the drawings in which:

FIG. 1 is an isometric view of a vaginal speculum in accordance with one preferred embodiment of this invention in the hand of a medical practitioner;

FIG. 2 is a cross-sectional and side elevation view of the invention of FIG. 1;

FIG. 3 is a top and cross-sectional view of the lower platform taken along the line 3-3 of FIG. 2;

FIG. 4 is a schematic illustration of the electrical circuit of this invention;

FIG. 5 is an isometric view of the switching means in the electrical circuit of this invention;

FIG. 6 is a top cross-sectional view of the upper platform of this invention illustrating the tilting adjusting mechanism;

FIG. 7 is a side cross-sectional view of the adjusting mechanism of FIG. 6; and

FIG. 8 is an anoscope modification of this invention.

Briefly described, this invention in one of its preferred forms, as applying to a vaginal speculum instrument, includes a permanent or reuseable handle unit with a pair of interchangeable single use disposable blades or duckbills releaseably secured thereto. The handle unit includes appropriate controls to adjust mechanical separation as well as tilting of the blades. A battery cell in the handle unit provides a source of power for illumination means in the form of a light beam issuing longitudinally of the blades. Blade biased releaseable securing means is actuated by a control on the handle to eject the blades therefrom after use.

Referring to FIGS. 1 and 2 there is illustrated one preferred form of this invention as a vaginal speculum instrument 10 in the hand of a medical practitioner. Speculum 10 includes two major parts or units, one part being a handle unit 11 of a permanent or reuseable nature and the other part being rejectible blades 12 and 13 which are releaseably secured to the handle unit 11.

The handle unit 11 includes a handle portion 14 preferably of a hollow cylindrical or hand formed, *i.e.* pistol grip configuration. Adjustably retained within handle portion 14 is a frame assembly 15 adapted for vertical elevation as illustrated in phantom in FIG. 2. A pair of support means such as platforms 16 and 17 are attached to the handle unit 11, one platform 16 being fixed to the upper end 18 of handle portion 14 while a further or opposite platform 17 is adjustably secured to frame assembly 15.

Frame assembly 15 may conveniently be of a length of a metal arm, channel, rod, etc. formed into a loop 19 whose plane is generally parallel to the longitudinal axis of the handle unit 11. More particularly the hollow handle portion 14 may be provided with a kerf-like slot or section 20 extending from and defined by a chord or diameter etc. in the upper end 18 of handle unit 11 axially into handle portion 14. The kerf section 20 defines a track or guide for the vertical adjustment of frame assembly 15 as shown in FIG. 2. The ends 21 and 22 of loop 19 are joined to upper platform 17 by means of a shaft and bearing arrangement 23 which permits partial rotation or arcuate adjustment of platform 17 thereabout.

Means are provided to vertically, adjustably, position loop 19 in handle portion 14 for variations of the spaced apart distance between platforms 16 and 17. In one form of this invention, lateral lateral arm 24 of the loop 19 which extends through handle portion 14 has affixed thereto a friction locking device 25 which permits locked adjustment of arm 24, to handle portion 14, and consequently loop 19 at various positions along the length of kerf 20. Friction device 25 comprises a first block or friction member 26 suitably secured to arm 24 and bearing against the inner wall of handle portion 14. Directly opposite block 26 and bearing on the outside wall of handle portion 14 is a second block or friction member 27. Blocks 26 and 27 are engaged by screw means 28 which passes freely through block 27 and through a vertical slot 29, in handle portion 14, but threadedly engages block 26. Screw means 28 includes a suitably shaped thumb engaging handle 28' which bears rotatably against block 27. Consequently, rotation of handle 28' in one direction draws blocks 26 and 27 close together to tightly engage the intermediate wall portion of handle portion 14 therebetween and fixedly adjust the elevated position of loop 19. Rotation of handle 28' in the opposite direction removes the friction forces sufficiently so that the operator may slide friction locking device 25 along the slot 29 to a desired position. Friction device 25 is one means for adjustably positioning loop 19 at different positions of elevation. A number of other friction adjusting means as well as more positive devices as suitable cam, gearing and ratchet arrangements may also be employed in this invention. By the same token, loop 19 may also take the form of a single arm member as a C-member or other semi-loop configuration having appropriate adjusting means at one end in association with handle portion 14, and having platform 17 rotatably attached thereto at the other end. It is preferred on the basis of ease of treatment and vision not to have any portion of the loop 19 along the longitudinal axis of the handle portion 14 or blades 12 and 13, as this may be in the direct viewing line of the examiner or medical practitioner. Alternatively, however, loop 19 itself may be made adjustable to vary the size of its defined opening, as well as maximum separation of the platforms 16 and 17.

One of the most important features of this invention is a combination of single use disposable, non-reuseable blades 12 and 13, and a permanent or reuseable handle unit 14. Since the blades 12 and 13 are usually the only portion of the instrument to come in contact with internal tissue, they are the only parts which need particular cleansing and sterilization. The readily economical disposability of blades 12 and 13 obviates sterilization as well as potential transfer of harmful bacteria. The disposability and ejectibility, etc. of these blades 12 and 13 are more clearly described in connection with the appended drawings, particularly FIGS. 1, 2 and 3.

In FIGS. 1 and 2, blade elements 12 and 13 are illustrated as elements separable from handle unit 11, and as referred to herein, are otherwise known as duckbills, valves, etc. These blades are similar in construction and, therefore, interchangeable with each other on each platform 16 and 17. This interchangeable feature provides for the manufacture of only one kind of blade. While it is not necessary that the blades be of a single use disposable kind, a preferred form of the invention includes the single use disposable blade which is discarded or otherwise rendered non-reuseable after a single use, to obviate cleansing and sterilization procedures and to prevent transmittal of harmful bacteria. The blades may, however, be of a reuseable nature, and thus the practitioner may have a number of blades available for use and only one handle unit. Only the blades will require careful sterilization as the handle unit will not ordinarily require the kind of sterilization necessary for the blades because it does not usually contact the subject.

A number of materials may be employed for the blade elements or speculums including both metals and non-metals. Because of the desirability of having the blade elements of a readily and economically disposable material, and one which represents no discomfort to the patient, non-metals, particu-

larly the plastics, are preferred. The material should also be non-toxic and of sufficient strength to provide the required rigidity without being subject to fracture. Furthermore the material should be resistant to attack by body secretions and have minimal glare characteristics. Among the more suitable plastic materials are nylon, Teflon, and a class of materials known as the linear polyolefins. Of this latter class, linear polyethylene meets the noted requirements while also being advantageously of a readily moldable nature.

As illustrated in FIGS. 1 and 2, each blade 12 or 13 includes an active or working portion 30 and a shank or base portion 31. Active portion 30 is a smooth section having very smooth and rounded edge or peripheral surfaces 32. At the same time the active portion 30 is gently curved about its longitudinal axis to provide a slight channel effect, and the distal ends 33 are also upswept so that when the ends 33 of the blades are brought into contact with each other, a smooth blunt and closed end is attained. It is the usual practice in vaginal speculum instruments to have one of the blades extend longitudinally a greater distance than the other blade. Such an arrangement provides for the reception of one end 33 of one blade into the upwardly curved end 33 of the other blade. Accordingly, one platform may be of a greater length to accomplish the foregoing purpose without effect on interchangeability of the blades, or, the loop 19 or frame assembly 15 may be axially adjustable or tiltable to provide an extended platform.

The shank portion 31 of either blade is adapted to be releaseably secured to the handle unit 11, and in a preferred form to enclose those parts of handle unit 11 which may otherwise come in contact with the subject being examined. In an exemplary embodiment of this invention the blade elements 12 and 13 are releaseably secured to platform members 16 and 17. Platform members 16 and 17 are a part of the permanent handle unit 11 and provide vertical adjustability or separation for the blade elements 12 and 13 as previously described in connection with frame assembly 15. As a convenient configuration, platforms 16 and 17 are of a generally rectangular shape and accordingly the shank portions 31 of blade elements 12 and 13 define hollow generally rectangular chambers 34 which are slidable axially over and enclose the platforms 16 and 17. The platforms may also take other configurations such as frustoconical, conical, elliptical, a configuration which tapers forwardly in a narrowing manner towards end 33, etc. The blade shank chamber 34 also includes the same configuration in cross-section. For example, a tongue or shelf-like surface having rounded sloping lateral edges, and whose upper and lower surfaces slope forwardly towards each other will facilitate assembling and rejecting of blades 12 and 13. The shank or cavity portions of the blades may be extended to cover additional portions of the handle unit 11 so that they may be retained out of direct contact with the person being examined. Also for example, although the defined chamber 34 of the blades 12 and 13 should suitably closely fit all or part of the platforms 16 and 17, the outer periphery or surface of shank portion 31 may take different configurations to provide, for example, a flared extension, funnel, or bell mouth entrance defined by both blade shanks 31 in closely adjacent relationship.

The ejectibility or rejectibility of blades 12 and 13 is a comparable important feature to their disposability. It is preferred that the blades be disposable without the necessity of direct contact therewith by the hands of the medical practitioner or assistants, etc., and also preferably without any contact. One method of disposing of the blades in accordance with this invention is through use of biasing means actuated from the handle unit 11. As illustrated in FIGS. 1 and 2 the shank portions 31 of blades 12 and 13 include a hollow rectangular chamber or recess 34 (FIG. 2) which receives the corresponding platform 16 or 17 therein. In addition, these blades also include a projecting or tongue portion 35 extending from the closed end wall 36 (FIG. 3) of the shank portion 31 axially into the defined recess. This tongue portion 35 fits into a correspondingly defined recess 37 in the corresponding platform forms.

Blade locking and biasing means together with an enlarged blade shank portion is shown in FIG. 3. Referring to FIG. 3 which is a cross-section and top view of lower or fixed platform 16, the tongue 35 is illustrated in its operative position in a recess 37 which fits closely about the tongue 35. As such, recess 37 is defined by wide flat support lower walls 38 and 39 (FIG. 2) and narrow opposed side walls 40 and 41 (FIG. 3) interconnected by a back wall 42. Correspondingly, tongue 35 also includes a pair of wide flat upper and lower walls 43 and 44 (FIG. 2), and narrow opposed side walls 45 and 46 interconnected by a well rounded front wall 47.

Each side wall 40 and 41 of platform recess 37 includes detent means 48 and 49 in suitable bores 50 and 51. Each detent means includes a spring 52 biasing a ball 53 partly into recess 37, the projection of ball 53 being limited by constricting portions 54 and 55, of bores 50 and 51, having diameters less than that of balls 53. In connection with the detent means, the side walls 45 and 46 of tongue 35 contain small depressions 56 and 57 which, when tongue 35 is fully inserted into recess 37, engage and receive balls 53 therein. The rounded front surface 48 of tongue 35 facilitates depression of balls 53 against biasing action springs 52 into their bores 50 and 51 by appropriate camming action. Upon register of the balls 53 with depressions 56 and 57, the ball means are biased by means of springs 52 into the depressions 56 and 57 to suitably lock or secure the blade to the platform.

Means are included in combination with the blade locking or securing means to release and eject the blades 12 and 13 from their respective platforms 16 and 17. More particularly the ejecting is of an automatic nature triggered by the medical examiner. Referring again to FIG. 2, when the examiner wishes to eject the blades 12 and 13, upon completion of an examination, for example, the vaginal speculum 10 may be held over a suitable disposing container and plunger 60 depressed. Depressing of plunger 60 causes blades 12 and 13 to be forceably and positively ejected from their respective platforms in the following manner. Plunger 60 is pinned to a lever 61 rotating about a fulcrum 62. Depressing plunger 60 causes the opposite end of lever 61 to bear against the head end of pin 63, in platform 16, to move pin 63 in an axial direction. As noted in FIGS. 2 and 3, the opposite end of pin 63 bears against the front end surface 47 of tongue 35 tending to move tongue 35 out of recess 37 against the retaining action of detent means 48 and 49. However, the leverage or mechanical advantage of lever 61 is adjusted or designed, in combination with the detent means 48 and 49 and depressions 56 and 57, so that a positive but light force in depressing plunger 60 is sufficient to commence moving tongue 35 (and its blade) out of recess 37. At the same time balls 53 of detents 48 and 49 are forced into their respective bores 50 and 51, compressing springs 52 therein, by the camming action of the depressions 56 and 57 against balls 53. However, when the tongue 35 progresses out of recess 37 to the point where the rounded edges of front surface 47 begin to engage the balls 53, as illustrated in phantom view in FIG. 3, the balls 53 engage rounded surface in a spring 52 biased camming action to forcibly but not violently eject the tongue 35 and its blade from platform 16. During the ejecting action, pin 63 is caused to move against the action of a light spring 64 and therefor, after release of plunger 60, plunger 60 is returned by the action of this spring to its original position. While it is preferable to have the blades forcibly ejected, suitable release means may be provided which permit the blades to detach themselves by gravity alone or by very light applied tension. The term ejectible is employed to indicate a biasing force applied to the blades in the releasing mechanism.

Blade 13 is similar in all respects to blade 12 and its locking means in platform 17 is similar in all respects to the locking action of blade 12 in platform 16. However, the ejecting means for blade 13 is not operative by means of plunger 60. Instead, as illustrated in FIG. 2, a separate plunger member 65 is provided in platform 17. Plunger member 65 includes a turned down finger depressing portion 66 projecting from the platform 17 and a further turned down portion 67 extending

into recess 37 of blade 13 and positioned between tongue 35 and the back wall of recess 37. The interconnected arm portion 68 is axially moveable in a guide slot 69 in platform 17. Depressing of plunger 65 causes portion 67 to push against the front surface 47 of tongue 35 for the same releasing and ejecting action as described for blade 13.

One means has been described for releaseably securing and automatically releasing and/or ejecting blades 12 and 13. A number of other mechanical biasing means and also electrical means may be suitably employed. For example, spring biased securing and releasing means are well known in the art as associated with various devices, tools, appliances, cabinetry, etc. These devices and modifications may be suitably employed between a shank portion of a blade and a platform with or without the tongue modification of the embodiment of the present invention. The mentioned means may also be suitably adapted to simultaneously release both blades 12 and 13.

Releaseably secured in this instance means more than the usual joining of two parts for operable purposes. Ordinarily, blade members or speculums are detachable from permanent kinds of connections which are used primarily to assemble the instrument, and requiring additional tools for disassembly. Releaseably secured indicates adaptability for immediate release of only the blades, at the will of the operator without disassembling the instrument. Releaseably secured is in the nature of a latch or lock as opposed to a bolt and nut arrangement, for example. The operator as in the foregoing example depresses a plunger which releases the blade and preferably includes ejecting the blade.

A further important element of this invention is the lighting means which is incorporated in the speculum instrument 10 to facilitate examination and treatment. In a preferred embodiment of this invention the lighting means includes a pair of lamps 70 and 71 incorporated in platforms 16 and 17 as illustrated in FIG. 2. These lamps may be of the prefocused type of about 3 volts. Each lamp 70 and 71 is provided with an electrical socket 72 and 73 contained in suitable bores 74 and 75 in platforms 16 and 17, respectively. The position of the lamps 70 and 71 in the platforms and in a forward position which is out of the line of sight of the practitioner is a salient advantage. The bores are provided in platforms 16 and 17 along the longitudinal axis thereof, but positioned in each platform so that they will be adjacent to each other. The lamps 70 and 71 are positioned in platforms 16 and 17 such that their forward envelope surfaces are just flush with or slightly recessed from the forward end 36 of the platforms. In this manner the blade shanks provide a cover or window from which light issues. Where the blades 12 and 13 may be made of a plastic material of a color such as blue or green, the shank portion of the blades may be provided with a suitable opening in register with the lamps 70 and 71. Alternatively, the blade shanks may have a very thin section in register with lamps 70 and 71 which will transmit sufficient light. The thin section may also be a clear lens covering an opening in the shank portion. Each lamp socket 72 and 73 is axially slidable in its bore and includes a stop pin 76 and 77 (not shown) fitting in a corresponding groove 78 and 79 (not shown) in the respective platforms. In order to replace a lamp, therefore, in the absence of blades 12 and 13, each socket 72 and 73 may be pushed forwardly in its respective bore so that the lamp protrudes from the bore where it may be grasped and suitably removed from the socket. The pins 76 and 77 abut the forward end of slots or grooves 78 and 79 to limit the projection of lamps 70 and 71 from their respective platforms. Each socket 72 and 73 may also be suitably biased rearwardly to maintain their relative position.

An electrical power source 80 for lamps 70 and 71 is provided in handle unit 11. In one embodiment of this invention power source 80 comprises a casing 81 containing one or more electrical energy cells 82 (not shown) such as batteries, particularly for example, rechargeable nickel cadmium batteries. Casing 81 is removably joined to handle portion 14 by means of threaded connection 83. Casing 81 also includes a

removable threaded cap 84 to provide for replacement of batteries 82. By this arrangement the casing 81 is separated from handle unit 11 and may be placed in a suitable recharger to recharge the batteries 82. At the same time a spare power source 80 may be attached to handle portion 14 to enable continued use of the speculum instrument 10.

In one form of this invention both positive and negative battery terminals are brought out at the end of casing 81 joining the handle part 14 by means of an insulating disk 85 having a central positive terminal 86 therein and an annular negative terminal 87 concentric therewith. These terminals are suitably connected to the battery 82 in casing 81 and provide convenient terminals for recharger units. The upper portion or part 14 of handle unit 11 includes an insulating disk 88 having therein a spring loop positive contact 89 and a lateral spring loop negative contact 90 each of which is in registry with the corresponding terminals 86 and 87 of casing 81 and which are engaged therewith upon assembly of casing 81 with upper part 14.

An electrical circuit and light switching means interconnects the power source 80 with lamps 71 and 72. Since the handle unit 11, frame assembly 15 and platforms 16 and 17 are metal, for example an aluminum alloy, the unit may serve as the ground side of the circuit for a single wire circuit. However, it is preferable to employ a two wire, positive and negative, circuit to obviate the occurrences of sparks which may be potentially dangerous in some atmospheres.

Referring to FIGS. 2, 4 and 5, the positive side of the circuit includes a conductor 91 having therein a pair of leads 92 and 93. Leads 92 and 93 are connected to the positive and negative terminals 89 and 90 on disk 88, and pass upwardly into lower platform 16. Referring to FIG. 4, the positive lead 92 is illustrated as being connected to one side 94 of a reed switch 95. From the other side 96 of reed switch 95 a continuation of lead 92 connects to a positive terminal 97 and from there to the positive side of lamp 70. In FIG. 4 the negative lead 93 is shown as connecting to a negative terminal 98 and from there to the negative side of the lamp 70.

As illustrated in FIGS. 2 and 4 the circuit for the upper lamp 71 comprises a further conductor 99 having therein a pair of leads 100 and 101 which are connected to positive and negative terminals 97 and 98, respectively. Conductor 99 passes downwardly into handle 11 to a clamp screw 102 which attaches conductor 99 to loop 19 so that the conductor 99 may pass through a groove or channel in loop 19 upwardly therethrough into platform 17. Leads 100 and 101 then connect to the positive and negative sides, respectively, of lamp 71. It is a desirable feature of this invention, as illustrated in FIG. 4, that insertion of the lower blade 12 will cause both lamps to be simultaneously energized, and, upon rejecting of lower blade 12, both lamps will be automatically deenergized.

As illustrated in FIG. 4 actuation or energizing of reed switch 95 is provided by insertion of tongue 35 of blade 12. This action is best described with respect to FIG. 5. Referring to FIG. 5, the spring biased reject pin 63, as also illustrated in FIGS. 2 and 3, is shown in its operative position passing into platform 16 and through chamber 103 to project into recess 37 of platform 16. A magnet member 104 in chamber 103 also includes an aperture 105 therethrough through which pin 63 passes. Biasing spring 64 bears against one side of magnet member 104 to provide a biasing action for pin 63. The other side of magnet member 104 bears against a wall 106 of chamber 103 in platform 16. Consequently pin 63 may be caused to move axially through aperture 105 with magnet member 104 immobile. Furthermore, magnet member 104 may be moved axially along pin 63 against the biasing action of spring 64. The reed switch 95 is magnetically actuated by magnet member 104 being brought in close relationship with reed switch 95, as is well known in the art. For example, one of the flexible reeds or contact arms of switch 95 includes a magnetic material which is attracted to an adjacent magnet. This attraction flexes or biases the reed into electrical contact with the other reed thereby closing an electrical circuit.

Moving of the magnet 104 away from the switch permits the flexed reed to return to its original open circuit position.

In the instant invention, magnet member 104 includes a projecting pin member 107 which projects through wall 106 into recess 37. Therefore, both the rejecting pin 63 as well as magnet pin 107 project into recess 37 into which a blade tongue 35 is inserted. FIGS. 3 and 4 are illustrative of the pins 63 and 107 extending into recess 37. By inserting tongue 35 of blade 12 into recess 37 pin 107 is moved axially through wall 106. At the same time magnet member 104, which is fixed to pin 107, is moved in chamber 103 to a position adjacent reed switch 95 for actuation thereof. Insertion of lower blade 12 into platform 16 closes the circuit for energization of both lamps. When plunger 60 is depressed, pin 63 is caused to move into recess 37, against the biasing action of spring 64, to eject blade 12. Concurrently magnet member 104 and its pin 107 are moved axially away from switch 95 by action of spring 64, and switch 95 is deenergized.

The foregoing circuitry and switching means is exemplary of a number of switch devices and arrangements actuated by attachment or insertion of a blade element to a handle unit. Furthermore, a separate hand or finger switch may be employed to energize or deenergize the lamps either with or without the blade actuated switch as described above.

As previously described with respect to FIGS. 1 and 2, the frame assembly 15 is vertically adjustable to increase or decrease the spaced apart parallelism of blades 12 and 13. In their parallel adjacent relationship the blades may not be contiguous along a substantial portion of their lateral periphery, but their forward ends should meet to provide a smooth blunt surface to facilitate insertion. Also, it is often preferable to have the frame assembly 15 pre-adjusted to provide a desired distance between platforms and at the same time to have the ends of the blades meet for an entry relationship. Accordingly, for this and other reasons the upper platform is rotatably positioned on frame assembly 15 for limited arcuate or pivot movement. Provision is also made to fixedly adjust the angularity of platform 17 with respect to platform 16 over a number of positions as illustrated in FIG. 6.

In FIGS. 1 and 6 the free or open ends 21 and 22 of loop 19 are illustrated as fixed to platform 17. As shown in FIG. 6, platform 17 includes a lateral bore 119. The end 21 of loop 19 is provided with a bearing arrangement 23 including a fixed bushing 120 which is inserted into bore 119 as a bearing around which platform 17 may rotate. The opposite end 22 of loop 19 is also provided with a fixed bushing gear 121 which is inserted into the opposite end of bore 119 and which also acts as a bearing about which platform 17 may rotate. Bushing gear 121 includes a number of splines or teeth 122 which project axially into bore 119. The bushings 120 and 121 are retained in spaced axial relationship and within bore 119 by means of a pin or shaft 123 which extends axially through bore 119 and into each bushing. Set screw 124 and 125 are inserted radially into each bushing to engage shaft 123. As indicated in FIG. 6 in phantom, the platform 17 may also have limited lateral movement over bushings 121 and 122 until stopped by the bushing shoulders.

There is positioned axially on shaft 123 a gear member 126 having a number of teeth 127 in engagement with the teeth 122 of bushing gear 121. As illustrated, gear member 126 is affixed to platform 17 by means of one or more set screws 128, but is axially slidable on shaft 123. A compression spring 129 is fitted axially over shaft 123 and bears against the opposite side of gear member 126. The opposite end of spring 129 is contained by a stop washer 130 secured to shaft 123 by a set screw 131. In FIG. 1 an adjusting arm 132 includes a thumb catch 133 at the lower end and extends upwardly through a large slot 134 in platform 17. In FIG. 6 the arm member 132 after passing through slot 134 is pinned to platform 17 by pivot pin 135 and then curves at an angle to partially encircle shaft 123. In FIG. 6 the pivot pin is lower in depth, into the paper, than shaft 123 as corresponding to FIG. 1. This partial encirclement or fork arrangement 136 is more clearly illustrated in FIG. 7.

In order to adjust the angularity of the platform 17 the operator, as illustrated in FIG. 1, places his thumb in thumb catch 133 and presses arm 132 outwardly or away from handle unit 11. This causes, in FIG. 6, arm 132 to be moved about pivot pin 135 in the general direction of arrow 137. This causes the fork 136 to press against stop washer 130. However, stop washer 130 is fixed to shaft 123 as are the bushings 120 and 121 and gear member 126. Consequently the pivoting action at pivot pin 135 pulls the pivot 135 and platform 17 in the direction of the phantom lines. Since gear member 126 is fixed to platform 17, gear member 126 (teeth 127) is disengaged from bushing 121 (teeth 122). The motion of platform 17 also compresses spring 129 so that, so long as the operator holds arm 132 outwardly the platform may be freely rotated about bushings 120 and 121. When the desired angularity is reached, the operator releases arm 132 and platform 17 is returned to its initial lateral position as shown in FIG. 6 by the action of spring 129. This movement reengages teeth 122 and 127 on bushing 121 and gear member 126, respectively, to retain platform 17 in its adjusted angular position. As illustrated in FIG. 7 the platform 17 may be adjustable throughout a range which will elevate as well as depress the plane of platform 17 from its parallel position with respect to platform 16. Finer adjustment may be attained through the use of gear and bushing members 120 and 121 having a greater number of teeth.

The foregoing arrangement is exemplary of a large number of adjusting movements which may be satisfactorily employed in this invention. A reversal of the action may be employed so that gear member 126 is disengaged from bushing gear member 121 without the necessity of lateral motion of platform 17. Other adjusting means such as screw means, friction grip, etc. may also be employed in this invention.

In some instances, it may be desirable to reuse blades 12 and 13 or to have blades 12 and 13 of a relatively non-disposable material. For such an occurrence it is also highly desirable to retain the sterility of blades 12 and 13. This is accomplished by utilizing a very thin pliable material bag or closed ended sleeve which fits over each blade 12 and 13. After useage the impervious bags are permanently disposed and discarded and new bags fitted over blades 12 and 13. In the meantime, however, the blades 12 and 13 have been prevented from making contaminating contact. Suitable clear plastics such as polyethylene plastic may be utilized as bag material. Portions of these bags may also cover other parts of speculum instrument 10 including portions of handle unit 11.

In making some diagnosis or examination the medical practitioner may require a microscope slide to provide a smear test. This usually involves removing the smear test material from the confines of the instrument to another location and another object. As illustrated in FIG. 1, the section 138 of blade 12, may be a part of blade 12 which is removable therefrom or an attachment to the blade. The section 140 is utilized as a slide and is in an exceptionally convenient locale for this purpose.

The convenience features of the present invention are adaptable to use in a number of other important medical instruments where portability, sufficient and directed light, automatically ejectible, and disposable contact elements are desired. These instruments include, for example, an anoscope, otoscope, proctoscope, ophthalmoscope, larynscope, sigmoidoscope, etc. In this connection blades 12 and 13 or other cavity insertion portions of reduced size may be employed with the invention as illustrated. The present instrument may also be conveniently modified to have platforms of much reduced length and thickness or be manufactured in smaller version so that smaller blades or other contact element configurations may be employed therewith.

The concept of a semi-permanent and single use automatically rejectible body cavity contacting portion of the instant invention is readily adaptable to such instruments as anoscopes, proctoscopes, otoscopes, and sigmoidoscopes as follows. The foregoing instruments generally utilize cavity inserting portions which are generically of a tubular configura-

tion including frustoconical, the essential difference being the effective length and shape of the cavity inserting portion. The present handle unit may incorporate any one of the mentioned cavity inserting portions, in one manner as follows.

Referring to FIG. 8, a frustoconical type tubular member 139 includes a pair of diametrically opposed shank-like portions 140 and 141 each of which include a recess 142 with a tongue member 143 therein similar to the tongues 35 of blades 12 and 13. With the frame assembly 15 set at a predetermined position, the tubular member 139 is joined to platforms 16 and 17 so that tongues 143 engage the platforms as do tongues 35 of blades 12 and 13 and the recesses 142 receive platforms 16 and 17 therein. The lighting means as well as the reject means remain similar to the embodiments of FIGS. 1 and 2. Rejection may require simultaneous depression of plungers 60 and 65. Alternately, however, the tubular member 139 may have engaging means thereon which are activated by separation or closing of the platforms, for example, the platforms moving into predetermined cavities or shoulders, etc. in the tubular speculum. The tubular member 139, while preferably of a single use disposable material such as the materials noted for blades 12 and 13, may also be used in conjunction with an annular frustoconical shaped disposable thin film bag.

The present invention may be extended to include blades or cavity inserting portions of other speculum devices such as, for example, a nasal speculum, which usually includes a vertical handle and laterally adjustable blades. The unit as depicted is simple in nature so that means may be included to simply release the platform 16 and frame assembly 15 from handle unit 14 and replace them with devices more appropriate for the examination. For example, removal of frame assembly 15 and use of an appropriate lower blade 12 provides a convenient throat examining instrument. Such means in keeping with the teachings of this invention include the automatic ejecting of releaseable secured blade or cavity insertion portions.

This invention thus provides a hand held speculum device where the hand portion is of a permanent or reusable nature while the patient contact portion is of a single use disposable non-reusable nature. Further, the disposable portion is automatically releaseable by the medical practitioner. Light means are included as an integral portion of the handle unit and directed to the point of examination.

While other modifications of this invention and variations of apparatus may be employed within the scope of this invention and have not been described or illustrated, the invention is intended to include all such modifications as may ordinarily be embraced within the following claims.

I claim:

1. A single use disposable duckbill blade member comprising in combination:

- a. an elongated rigid self-supporting blade member having a shank portion;
- b. an extending portion connected to and extending axially from said shank portion and having an axially extending channel surface therein;
- c. said shank portion defining an axial cavity therein for receiving a part of a speculum instrument in releaseably securing relationship;
- d. said extending portion extending substantially beyond said speculum part; and
- e. a section in a wall of said cavity adjacent said extending portion defining light transmitting means therethrough.

2. The invention as recited in claim 1 wherein said duckbill is of a polyolefin material.

3. The invention as recited in claim 1 wherein said shank portion includes means to retain a microscope slide member thereon.

4. A speculum instrument utilizing a tubular body inserting portion comprising in combination:

- a. a handle unit;
- b. a source of electrical energy in said handle unit;
- c. a pair of opposite support means on said handle unit;

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- d. a lamp means in at least one of said support means and energized by said source of electrical energy;
 - e. a hollow tubular single use disposable speculum supported on said support means; and
 - f. releasable securing means interconnecting said tubular speculum and said handle unit.
5. The invention as recited in claim 4 wherein said release means biases said speculum in a direction away from said handle unit.
6. In a speculum instrument the combination comprising:
- a. a handle unit;
 - b. a pair of opposite support means on said handle unit;
 - c. a single use disposable speculum member releaseably secured to each said support means;
 - d. adjustable means between one of said support means and said handle unit to vary the spaced apart distance of said support means;
 - e. rotating adjusting means operatively connected to one of said support means to angularly adjust one of said support means relative to the other;
 - f. lighting means in said handle unit; and
 - g. and light transmitting means in said speculums to direct light axially between said speculums.
7. In a speculum instrument the combination comprising:
- a. a handle unit including:
 - 1. a handle portion;
 - 2. a frame assembly adjustably positioned on said handle portion;
 - 3. a support means on said frame assembly; and
 - 4. an opposite support means on said handle portion;
 - b. a speculum member releaseably secured to each said support means to extend therefrom in generally parallel spaced apart relationship to each other;
 - c. releaseable securing means interconnecting each said speculum with its said support means to release said speculums from said support means; and
 - d. and adjustable means interconnecting said frame assembly and said handle portion to vary the spaced apart distance between said support means.
8. The invention as recited in claim 7 wherein said releasable securing means biases said speculums from said support means to automatically eject said speculums.
9. The invention as recited in claim 7 wherein at least one of

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said support means includes rotating adjusting means interconnecting said support means to said frame assembly to adjust said support means in angular relationship to the other said support means.

10. The invention as recited in claim 9 wherein at least one of said support means includes lighting means therein to direct light axially along and between said speculums.

11. The invention as recited in claim 10 wherein an electrical power source for said lighting means is contained within said handle portion.

12. The invention as recited in claim 11 wherein electrical switching means is contained within one of said support means and between said support means and one of said speculum member so that securing of said speculum member to said support means actuates said switch means to provide power for said lighting means.

13. A vaginal speculum instrument comprising in combination:

- a. a handle unit including:
 - 1. a casing-like handle portion; and
 - 2. a frame assembly projecting from said handle portion;
- b. adjusting means on said frame assembly engaging said handle portion to axially adjust said frame assembly in said handle portion;
- c. a support means secured to said frame assembly;
- d. an opposite support means retained by said handle portion in spaced relationship to said support means on said frame assembly;
- e. similar interchangeable speculums on each of said support means;
- f. releaseable securing means interconnecting each of said speculums and its support means;
- g. rotating adjusting means interconnecting said support means on said frame assembly with said frame assembly to adjust said supporting means in angular relationship to said opposite supporting means on said handle portion; and
- h. each said support being positioned with respect to said handle portion, said frame assembly and said adjusting means so that the speculum on said opposite means on said handle portion axially overlaps the other support means on said frame assembly.

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