

June 1, 1943.

W. A. ARNESEN

2,320,709

SPECULUM

Filed Aug. 1, 1941

2 Sheets-Sheet 1

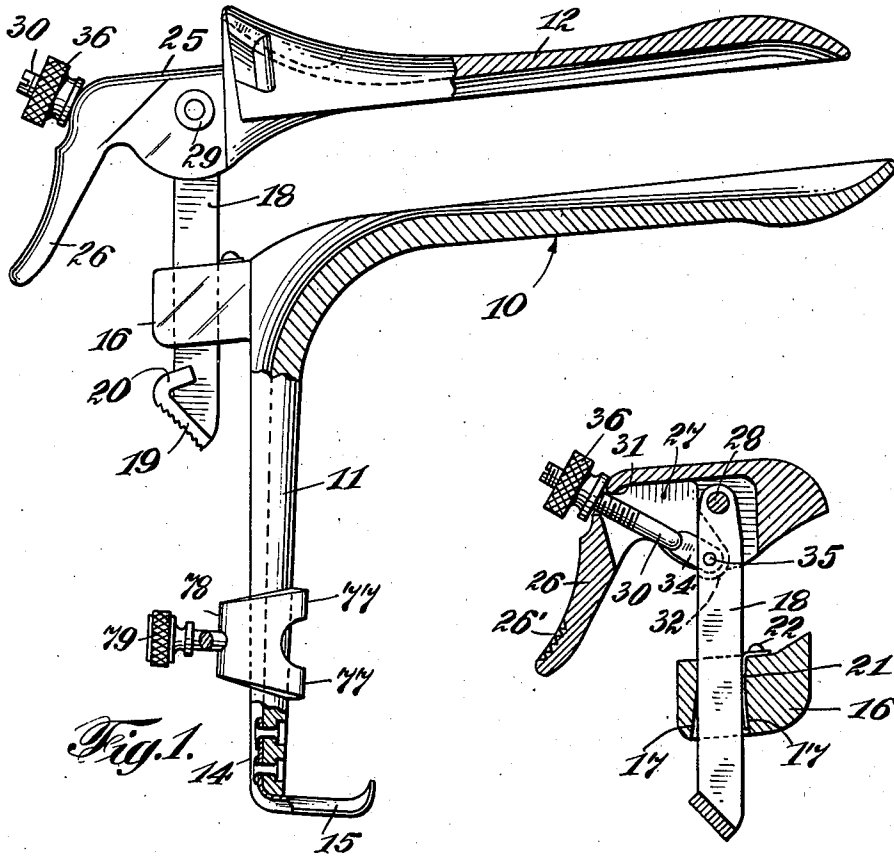


Fig. 1.

Fig. 3.

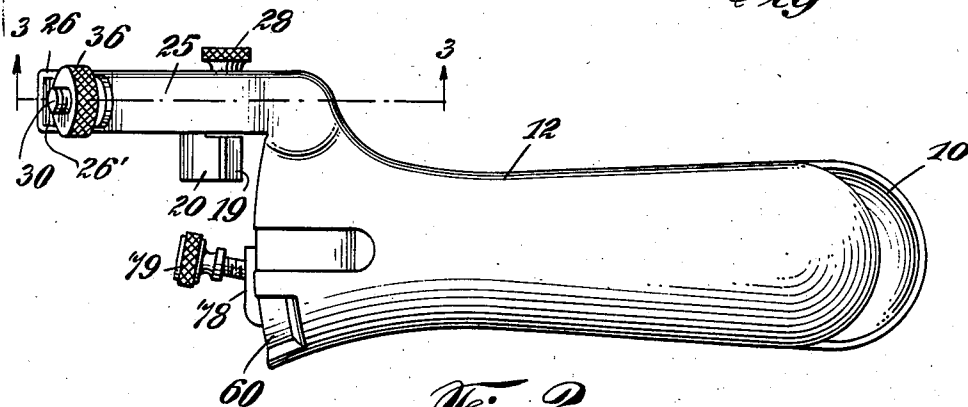


Fig. 2.

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2 Sheets-Sheet 2

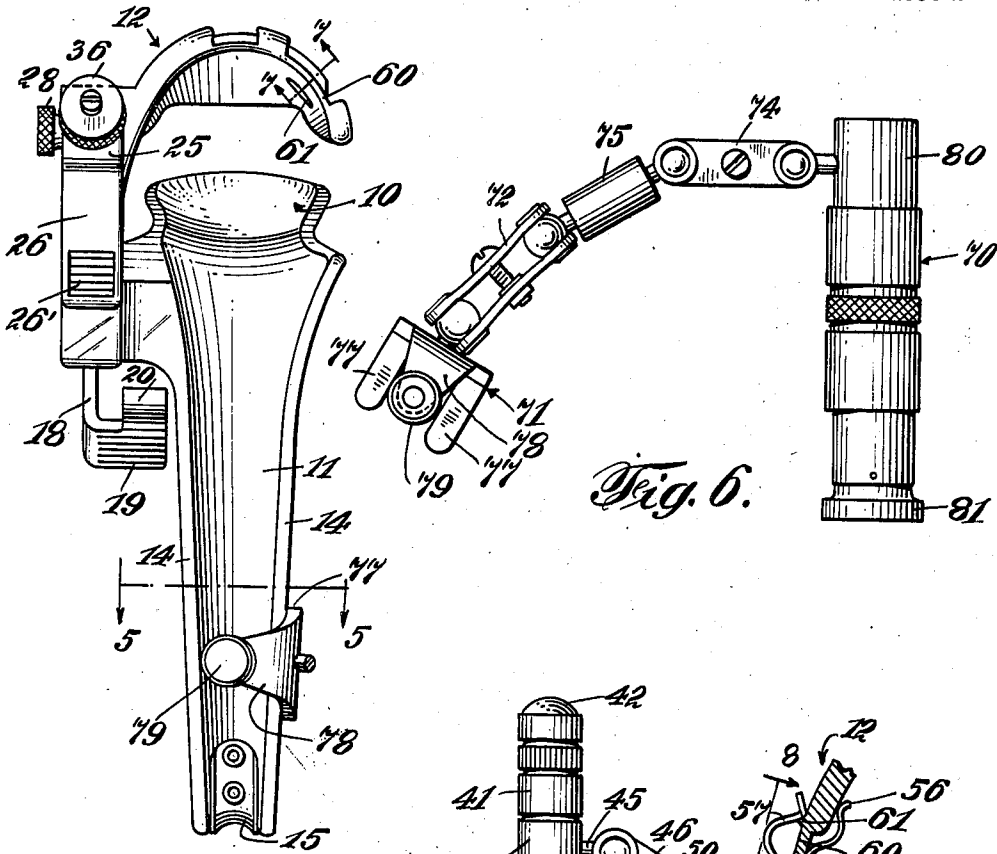


Fig. 4.

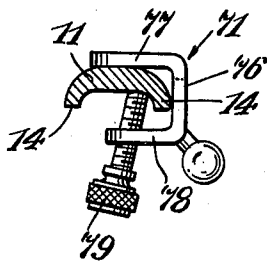


Fig. 5.

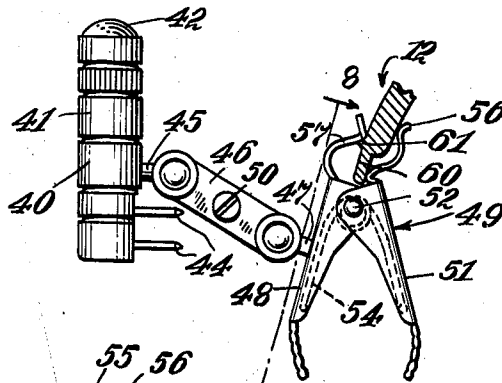


Fig. 7.

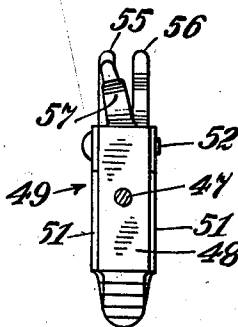


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UNITED STATES PATENT OFFICE

2,320,709

SPECULUM

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12 Claims. (Cl. 128—17)

This invention relates to improvements in specula and more particularly to improvements in specula per se and in their accessory equipment for use in examination and diagnosis of body cavities.

An object of the present invention is to provide a new and efficient speculum of utmost simplicity so constructed as to be operable with a minimum of effort.

Another object of the invention is to provide a speculum made up of two blades secured together for separation and for pivotal movement, one relative to the other, such blades being so joined that separation can be accomplished and maintained without the necessity of manually operated locking devices, such as screws and the like.

Another object of the invention is to provide a speculum in which a lower blade and handle are formed of one-piece construction, such handle serving to receive a sliding member to which an upper blade is pivotally secured.

Another object of the invention is to provide a speculum in which the blades and handle are made of moulded insulating material.

A further object of the invention is to provide a connection between an upper and lower blade of a speculum, which connection comprises a slidable bar fitting in a recess in a part of the handle attached to the lower speculum, the fit between the bar and the recess being such that pressure exerted on the outer end of the two blades will cause the bar to be locked against sliding movement.

An additional object of the invention is to provide a new and improved inspection illumination mechanism of such construction that the light directing member can be quickly clamped or clipped on to any part of the speculum whether such part be flat or curved in any desired fashion.

A still further object of the invention is to provide an improved diagnostic telescope for use in conjunction with specula of the foregoing character, which telescope has a mount therefor capable of being secured to any desired part of the speculum for adjustment of the telescope within wide ranges relative to the speculum.

Other features, object and advantages of the invention will be apparent by reference to the following detailed description of the accompanying drawings wherein

Fig. 1 is a side elevation partially in vertical section of a speculum embodying the invention and showing a part of an inspection telescope mount secured to the handle of the speculum;

Fig. 2 is a plan view of the instrument shown in Fig. 1;

Fig. 3 is a section taken substantially on the line 3—3 of Fig. 2;

Fig. 4 is a view at right angles to the view of Fig. 1 illustrating the speculum;

Fig. 5 is a section taken substantially on the line 5—5 of Fig. 4;

Fig. 6 is a plan view of the inspection telescope and associated mount utilized in conjunction with the speculum;

Fig. 7 is a view of an inspection illumination device with accompanying clip for attaching the same to the speculum, such attachment being illustrated substantially on the line 7—7 of Fig. 4, and

Fig. 8 is a view of the clip associated with the light directing member, such view being taken substantially on the line 8—8 of Fig. 7.

Referring to the drawings the speculum shown therein is made up of a composite lower blade 10 and handle 11 and an upper blade 12. The blade and handle are made in one piece and this composite structure and also the upper blade are preferably moulded of some good insulating material such as a phenol condensation product. The two blades 10 and 12 are of conventional shape with the lower blade 10 being longer than the upper blade 12. The handle 11 is substantially channel shaped, having rearwardly extending walls 14 and it is tapered as shown in Fig. 4. A metallic bottom member 15 is riveted or otherwise secured to the lower end of the handle.

Formed integrally with the handle 11 and lower blade 10 is a boss 16 extending rearwardly and offset laterally from the handle. The boss 16 is provided with a vertical through opening, or rectangular slot, having side walls 17 which are tapered outwardly and downwardly to a slight degree from the midpoint. The opening partially defined by the walls 17 is relatively narrow being of a width equal to that of the bar 18, which width is shown clearly in Fig. 4.

The bar 18 is made of some suitable metal and has the lower end thereof bent inwardly toward the handle as at 19 with an angular extension 20 at the top of such bent over part. The extension 19 may be provided with corrugations or striations as shown in Figs. 1 and 4. The bar 18 passes through the opening in boss 16 and is frictionally held therein by a thin leaf spring member 21, one end of which is bent over the top of the boss and secured thereto by a rivet 22 or by other suitable means.

The upper blade 12 also has a boss 25 which ex-

tends rearwardly and is displaced laterally from the top blade. The boss 25 has a downwardly and outwardly extending finger 26, one surface of which is striated as shown at 26'. The boss 25 is hollowed out as shown at 27 (Fig. 3) to receive the upper end of the bar 18. A pivotal connection between this boss and the bar 18 is accomplished by use of a headed screw 28 passing through one wall of the boss, through an opening in the top of the bar 18, and into threaded contact with internal threads of a metallic insert 29 in the other wall of the boss. The hollowed out part 27 also accommodates a part of an adjustment screw member 30 which extends outwardly through an opening 31 in the wall of the boss at the top of the finger 26. One end of the threaded member 30 is pivotally secured to the bar 18. Such pivotal connection is facilitated by providing a recess or indentation in one surface of the bar 18, the outlines of such recess being shown by dotted line 32 of Fig. 3. The depth of such recess or indentation is approximately one-half the thickness of the bar 18. The inner end of the member 30 is flattened out as shown at 34 in Fig. 3 to a thickness equal approximately to the depth of the recess 32. An integral pin 35 on the part 34 fits in an opening in the bar 18 with free movement between the member 30 and the bar 18. When the parts are properly assembled, the member 30 is retained in pivotal connection with the bar 18 by the walls of the hollowed part 27 which are so spaced as to prevent separation of the flattened out part from the bar 18. A nut 36 is threaded on to the member 30 exteriorly of the boss 25.

By reference to Fig. 1 it will be seen that the angle between the lower blade 10 and the handle 11 is slightly greater than 90° and that the bar 18 is so disposed in the slot in the boss 16 that its path of movement is substantially parallel to the rear edge of the handle 11. Also in the position shown in Fig. 1 the upper blade 12 is substantially parallel to the lower blade 10 but the angular relation between these parts can be varied by adjustment of the nut 36. Rotation of this nut on the threaded member 30 in one direction causes the upper blade 12 to have its tip diverging relative to the plane of the top edge of the blade 10 while rotation in the opposite direction permits the upper blade to lie in a converging line relative to this plane. Due to the path of movement of the bar 18 through the slot in boss 16, it follows that the blades can be separated by a movement of this bar, which movement can be accomplished readily by an operator holding the handle 11 in one hand. For example, pressure by the operator's thumb on the part 19 will serve to move the bar 18 upwardly while similarly the operator can move the bar 18 downwardly by engaging his thumb over the extension 20 and depressing the bar. Similarly the operator can rotate the upper blade about the axis defined by the member 28 by pressing on the tip of the finger 26 formed integrally with the boss 25 of the upper blade.

While the blades can be separated by a simple sliding movement of the bar 18, the relation between this bar and the opening in boss 16 is such that the blades are effectively held in any adjusted position thereof against displacement during use of the instrument in the examination of a body cavity. The angular relation between the bar 18 and the two blades 10 and 12 is such that pressure exerted at substantially any point forward of the boss 25 to draw the blades together serves to wedge the bar 18 in the through opening of boss 16 to such an extent as to prevent

sliding of the bar. The tapered wall 17 plus the spring 21 assure that such wedging action can take place. The effective dimensions (which determine the desired friction between bar and aperture walls) of the aperture through boss 16 remain constant being unchanged by set screws extending into the aperture or by any other agency requiring manual operation. Consequently the necessity for thumb screw locking devices and the like present in prior instruments of this character has been overcome.

In order that the body cavity under examination through the aid of the speculum just described can be illuminated, the present invention provides an accessory for such speculum for this purpose. By reference to Figs. 7 and 8, it will be seen that a tubular member 40 has an adjustable condensing lens cap 41 fitting frictionally over one end thereof with a condensing lens 42 in the end of the cap. The tubular member 40 has an electric light bulb socket in the end thereof under the cap 41 to receive an electric light bulb. Two terminal members 44 are provided for connection to conductors of electric current. Extending outwardly from the tubular member 40 is a stud 45 having a round head adapted to be held between the ends of two bar spring members 46, which members have openings in their ends. A similar ball is formed on the end of a second stud 47 held between the opposite ends of the bars 46, such stud extending from one part 48 of a clip indicated generally at 49. The two bars 46 are held together adjustably by a screw and nut arrangement indicated generally at 50. The clip 49 in addition to having one part 48, has a similar part 51, the two parts being hinged together with a pin 52 and normally separated apart at their lower ends by a spring 54 having its ends extending along the parts 48 and 51 with its mid-part coiled around the pin 52. The part 51 has two separate fingers 55 and 56 extending outwardly from the upper end thereof. These parts are curved with a substantial ogee curvature. The part 48 has a finger 57, the base of which is intermediate the outer ends of the bases of the fingers 55 and 56 but the top of which is twisted to contact a part of the finger 55 when the clip is not in engagement with any supporting structure. The finger 57 also has a substantially ogee curvature differing slightly however from the curvature of the fingers 55 and 56.

The clip just described makes possible the attachment of the illuminating device directly to the speculum previously described, or for that matter, to any speculum. The shape of the fingers 55, 56 and 57 is such that the clip can be attached to a curved part of a speculum or to a flat part thereof. To facilitate attachment of the clip to the speculum previously described, the upper blade 12 has a part shown at 60 of reduced thickness in the flared pivoted end thereof. In addition, a small rib 61 is formed integrally with the blade 12 in the under surface thereof and adjacent the part 60 of reduced thickness. As shown in Fig. 7 the two fingers 55 and 56 engage the top surface of the blade while the other finger 57 engages the under surface thereof with a bend in this blade resting against rib 61. When the illuminating device is so clipped to the upper blade, the light directing carrier 40 can be adjusted to illuminate any part of a body cavity.

The invention also provides an inspection telescope and improved mount therefor, such mount

being of a character whereby it can be attached readily to any part of the speculum, including the handle. By reference to Fig. 6 it will be seen that the telescope, indicated generally at 70, is attached to a clamp member, indicated generally at 71, through the agency of two double ball connections 72 and 74 with an interposed bar 75. These ball connections are of the type described in conjunction with the illuminating device and accordingly are not described in detail. The clamp member 71 has an intermediate portion 76 connecting two spaced prongs 77 to a single prong 78 which is in substantial parallelism to the prongs 77. The prong 78 tapers outwardly as shown in Fig. 6 and is disposed intermediate the outer edges of the prongs 77. A thumb screw 79 passes through a threaded aperture in the prong 78 and such aperture extends through the prong 78 at a slight angle to the perpendicular, as clearly shown in Fig. 5. The purpose of such angular inclination of this aperture is to permit the end of the thumb screw 79 to draw the connecting part 76 of the mount more firmly against the wall to which the clamp is attached. For example, if the telescope is to be attached to the handle of the speculum, such attachment can be accomplished as shown in Figs. 4 and 5 wherein it will be seen that the two prongs 77 contact the forward surface of the handle while the end of the thumb screw 79 bears against the rear surface of the handle drawing the connecting part 76 against one of the rearwardly directed walls 14 of the handle.

The construction of the telescope 70 per se forms no part of this invention but it is to be understood that the portion 80 thereof has an objective lens therein while the portion 81 has a cooperating lens therein with an eyepiece provided in association with the lens. The telescope is so constructed that the distance between the two lenses can be varied to change the focus thereof.

The clamping member 71 in addition to being attached to the handle of the speculum as shown, obviously can be attached to any other part of the speculum. Furthermore, this attachment member can be secured to a conventional thumb screw by inserting the prongs 77 underneath the head of such a screw and on each side of the shank thereof and then turning the screw 79 to contact the top of such thumb screw head. The double ball connection spaced with the bar 75 permits the telescope to be moved into such a position as will enable a user to inspect any desired part of a body cavity into which the speculum has been introduced.

The speculum previously described possesses many advantages over arrangements of similar character heretofore used in this art. The connection between the upper and the lower blades permits the blades to be separated both by a sliding movement of one relative to the other and by pivotal movement of the upper blade about the top of the sliding bar. The sliding movement, as before explained, can be accomplished with facility by a user since for example, the thumb of the right hand of the user can either raise or lower the sliding mechanism without any loss of time usually required with complicated locking mechanisms. In addition, the elevating arrangement is offset laterally from the line of vision of the speculum so that complete observation of a body cavity can be made. Furthermore, this offset arrangement presents no obstacle to instrumentation through the specu-

lum. The pivotal arrangement permits a simple adjustment of the limits of convergence of the ends of the speculum while the downwardly extending finger 26 serves to limit upward divergence of the speculum blades. This pivotal arrangement with limiting screw part also facilitates disassembly of all of the parts of the speculum for sterilization.

Since the blades of the speculum as well as the handle are made of some suitable moulded insulating material, it is possible to mat the inner surfaces of the blades so that objectionable light reflection from such surfaces can be eliminated. Since these parts are made of insulating material, it follows that electrical instruments can be used in association therewith with complete safety. For example, electrically energized instruments can be used for cauterization, coagulation or desiccation without endangering the safety of the patient as would be the case if a metallic speculum were used. The moulded insulating material of the blade, in addition, possesses lower surface tension which decreases friction whereby the blades can be more readily introduced into a body cavity without causing the muscular contraction experienced with blades of metal. The simplified pivotal arrangement of the blades permits dilation of the body cavity by a simple pressing on the finger 26 with the thumb of the same hand holding the handle of the instrument.

From the foregoing it will be seen that the present invention comprises a new and improved speculum, a new illuminating device which can be readily attached thereby and a telescope with simplified attachment mechanism, which can be used with more efficiency and with greater speed and adaptability than devices of kindred nature heretofore employed in this art. It is to be understood that the invention is capable of modification beyond the hereinbefore described embodiment thereof and accordingly any limitations imposed thereupon are to be only those set forth in the following claims.

What I claim is:

1. A speculum comprising upper and lower blades, the lower blade having an integral handle being provided with a narrow through aperture of substantially constant effective dimensions parts of the end walls of which are flared downwardly outwardly, a straight bar passing through said aperture with a frictional fit therein, a thin member in said aperture between a wall of the aperture and an edge of the bar, a pivotal connection between the upper end of said bar and said upper blade, said bar being slidable at such an angle relative to the lower blade and said frictional fit being such that pressure to draw the outer ends of said blades together wedges the bar in the aperture against sliding movement.

2. A speculum comprising upper and lower blades, a bar slidably passing through the lower blade, the upper blade having a recess therein to receive the upper end of said bar, means for pivotally connecting the upper end of said bar to said upper blade, an adjustment rod pivotally secured to said bar within said recess and having a portion extending through said upper blade, and an adjustment member on the outer end of said rod, said adjustment member being adjustable to limit the arc of rotation of said upper blade about its pivot.

3. A speculum comprising upper and lower blades, a bar slidably passing through the lower blade, the upper blade having a recess therein to receive the upper end of said bar, means for

pivotaly connecting the upper end of said bar to said upper blade, an adjustment rod pivotaly secured to said bar within said recess and held in assembly with the bar by the walls of said recess, said rod having a portion extending through said upper blade, and an adjustment nut on the outer end of said rod, said adjustment nut being adjustable to limit the arc of rotation of said upper blade about its pivot.

4. A speculum comprising upper and lower blades, a bar slidably passing through the lower blade, the upper blade having a recess therein to receive the upper end of said bar, means for pivotaly connecting the upper end of said bar to said upper blade, the upper portion of the bar having a depression in one side wall and an aperture in the depression, an adjustment rod pivotaly secured to said bar within said recess by a stud on the rod passing through said aperture, said rod having a portion extending through said upper blade, and an adjustment nut on the outer end of said extension, said adjustment nut being adjustable to limit the arc of rotation of said upper blade about its pivot.

5. As an accessory for a speculum, a light carrying member, a spring clip for connecting said accessory to a speculum, a double ball connection between said clip and said light carrying member, the upper end of one part of said clip having a pair of spaced ogee curved extensions, the upper end of the other part of said clip having a central ogee curved extension twisted to cause the end thereof to be movable toward one extension of said pair of extensions.

6. As an accessory for a speculum having a rib in the under surface thereof, a light carrying member, a spring clip for connecting said accessory to a speculum, a double ball connection between said clip and said light carrying member, the upper end of one part of said clip having a pair of spaced ogee curved extensions, the upper end of the other part of said clip having a central ogee curved single extension twisted to cause the end thereof to be movable toward one extension of said pair of extensions, said pair of extensions adapted to engage the upper surface of said speculum while the single extension engages said rib.

7. An accessory for a speculum comprising an adjustable telescope, a member for securing said accessory to a speculum, a pair of double ball connections with an interposed spacer connecting said telescope to said attachment member, said attachment member being of generally U-shape with one leg forming spaced prongs, the other leg being provided with a through aperture for the passage of a threaded member.

8. An accessory for a speculum comprising an adjustable telescope, a member for securing said accessory to a speculum, a pair of double ball connections with an interposed spacer connecting said telescope to said attachment member, said attachment member being of generally U-shape with one leg forming spaced prongs, the other leg being provided with a through aperture for the passage of a threaded member, said aperture being inclined from the perpendicular of the leg through which it passes to cause said threaded member to draw the connection between the legs against a wall to which the attachment member is attached.

9. A speculum comprising a handle, a lower blade, an upper blade, a straight bar passing through an aperture of substantially constant effective dimensions in the lower blade, the upper blade being pivotaly connected to the upper end of said bar, said bar passing through said aperture at such an angle relative to the lower blade as to be slidable upon the application of linear longitudinal pressure to an end of the bar, said bar having such a frictional fit in said aperture and said angularity being such that pressure applied forwardly of the bar to draw the ends of the blades together wedges the bar in the aperture against sliding movement.

10. A speculum comprising a handle and an integral angularly extending lower blade of insulating material, an upper blade, a straight metallic bar passing through an aperture of substantially constant effective dimensions in the lower blade, the upper blade being pivotaly connected to the upper end of said bar, said bar passing through said aperture at such an angle relative to the lower blade as to be slidable upon the application of linear longitudinal pressure to an end of the bar, said bar having such a frictional fit in said aperture and said angularity being such that pressure applied to the blades at a point along the blades forward of the bar to draw the blades together binds the bar in the aperture against sliding movement.

11. A speculum comprising a handle, a lower blade, an upper blade, a straight bar passing through an aperture of substantially constant effective dimensions in the lower blade, the upper blade being pivotaly connected to the upper end of said bar, said bar passing through said aperture at such an angle relative to the lower blade as to be slidable upon the application of linear longitudinal pressure to an end of the bar, said bar having such a frictional fit in said aperture and said angularity being such that pressure applied forwardly of the bar to draw the ends of the blades together wedges the bar in the aperture against sliding movement, and thumb engaging formations on the lower end of said bar whereby said bar can be manipulated for sliding movement in either direction by the thumb of a hand holding said handle.

12. A speculum comprising a handle and an integral angularly extending lower blade of insulating material, an upper blade, a straight metallic bar passing through an aperture of substantially constant effective dimensions in the lower blade, the upper blade being pivotaly connected to the upper end of said bar, said bar passing through said aperture at such an angle relative to the lower blade as to be slidable upon the application of linear longitudinal pressure to an end of the bar, said bar having such a frictional fit in said aperture and said angularity being such that pressure applied to the blades at a point along the blades forward of the bar to draw the blades together binds the bar in the aperture against sliding movement, and thumb engaging formations on the lower end of said bar whereby said bar can be manipulated for sliding movement in either direction by the thumb of a hand holding said handle.

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