

[54] SURGICAL RETRACTOR DEVICE

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[21] Appl. No.: 155,846

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[52] U.S. Cl. 128/20, 287/14, 287/51 R,
128/303

[51] Int. Cl. A61b 17/02, A61b 1/32

[58] Field of Search 128/20; 287/14, 58 R

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[57] ABSTRACT

A surgical retractor device including a frame means, quick release means adjustably mounting a plurality of retractor arm means to said frame means for movement relative thereto, and an automatically self-adjusting retractor blade means mounted to said retractor arm means, said retractor blade means automatically adjusting itself to different lengths and pivotal positions and including means for locking the retractor blade means in a desired adjusted position.

23 Claims, 23 Drawing Figures

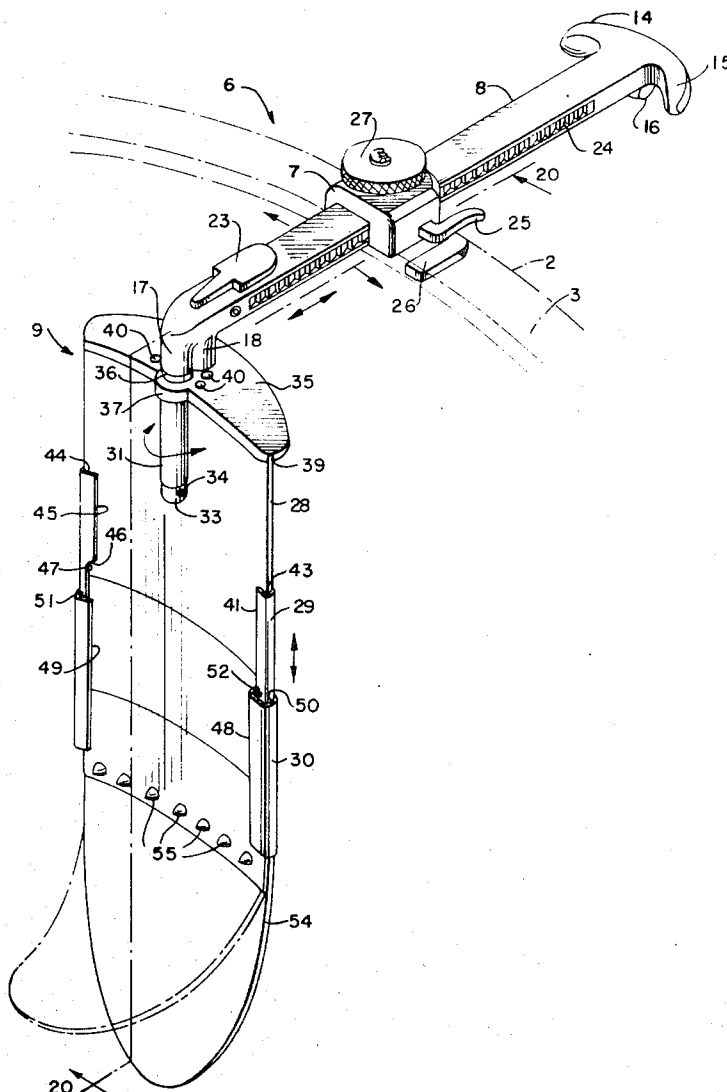


FIG. 2.

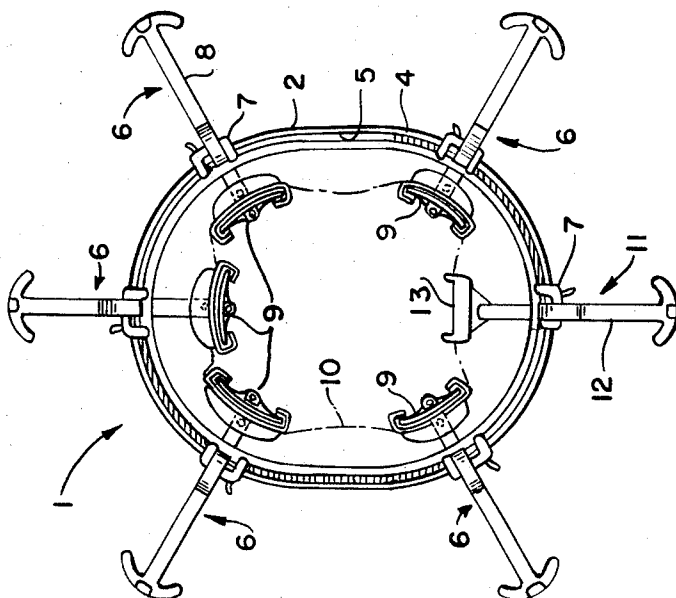
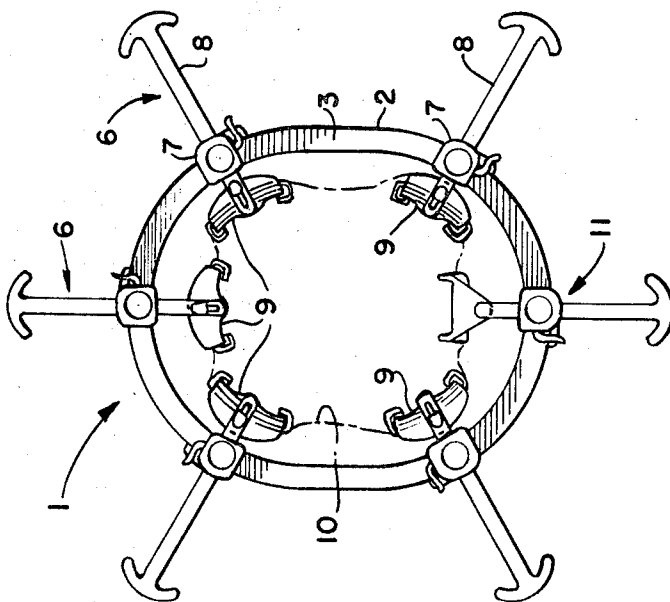


FIG. 1.



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FIG. 3.

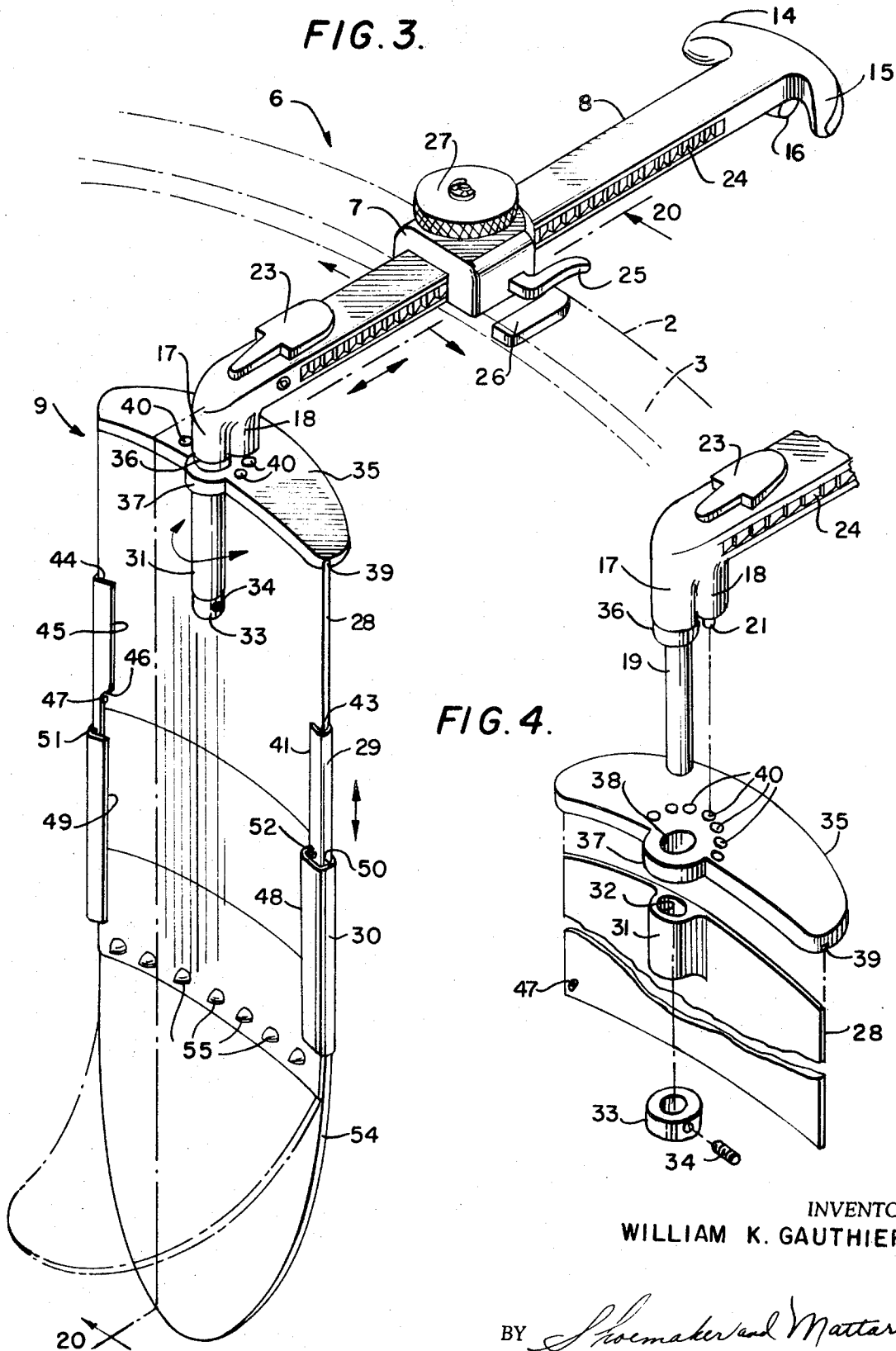
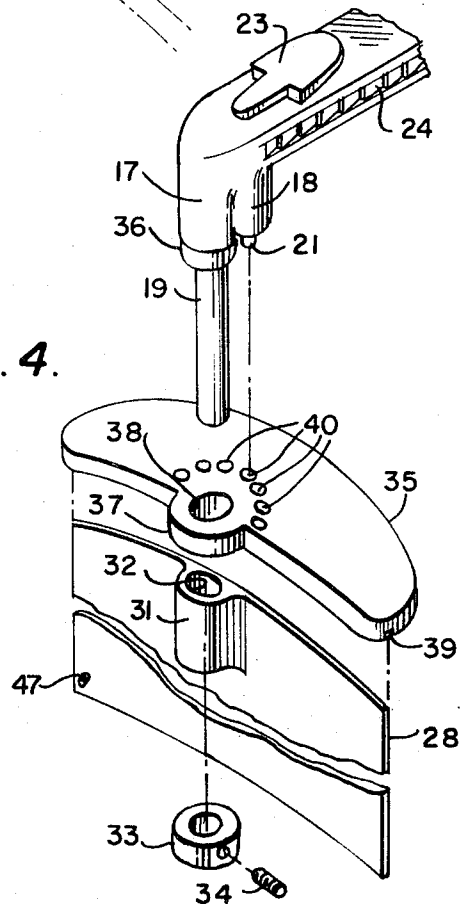


FIG. 4.



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FIG. 5.

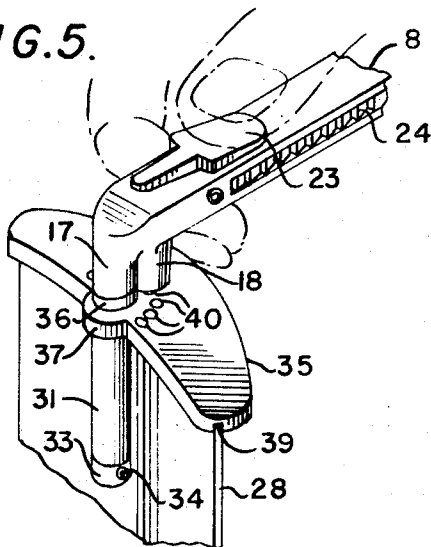


FIG. 6.

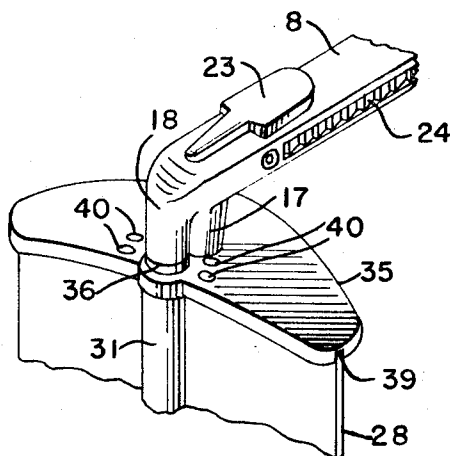


FIG. 7.

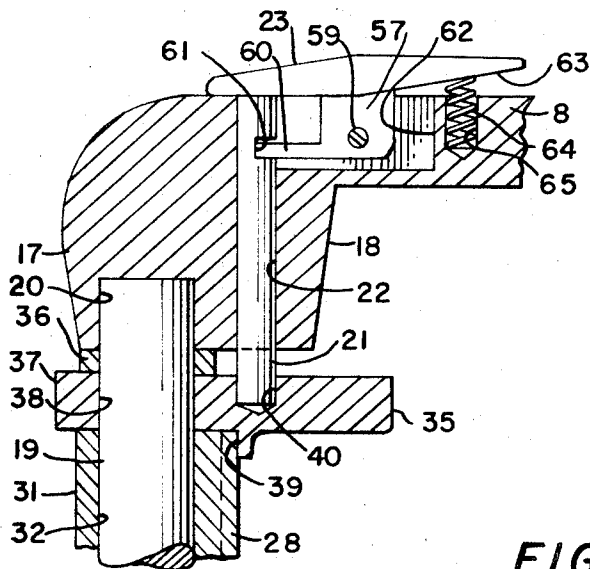


FIG. 8.

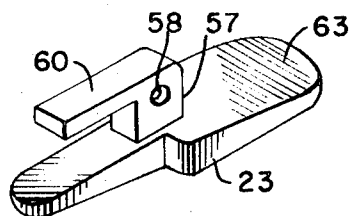


FIG. 9.

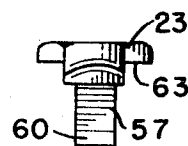
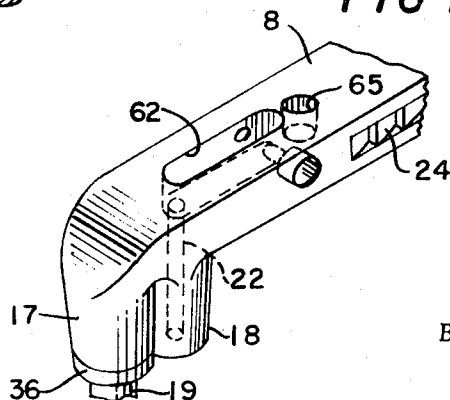


FIG. 10.



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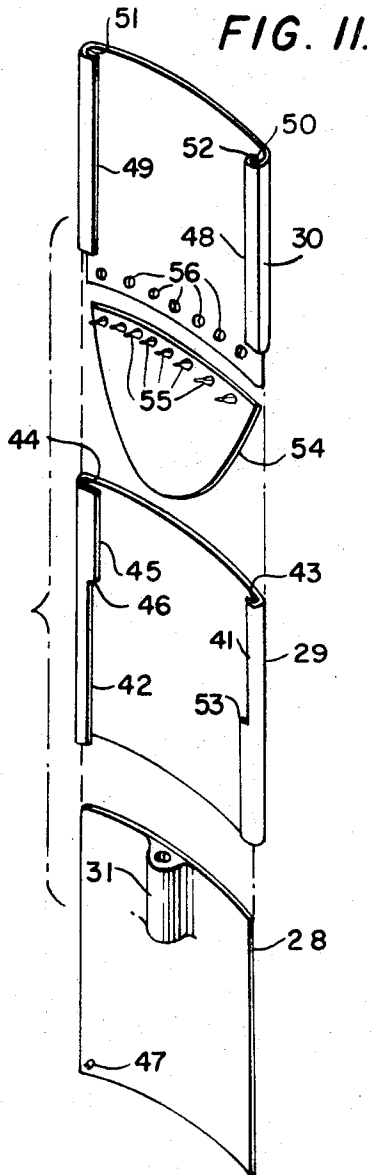
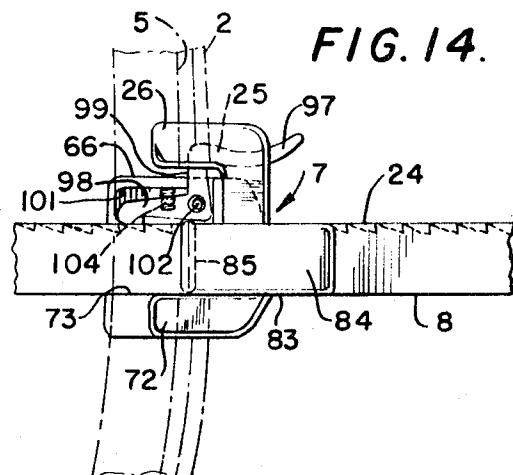
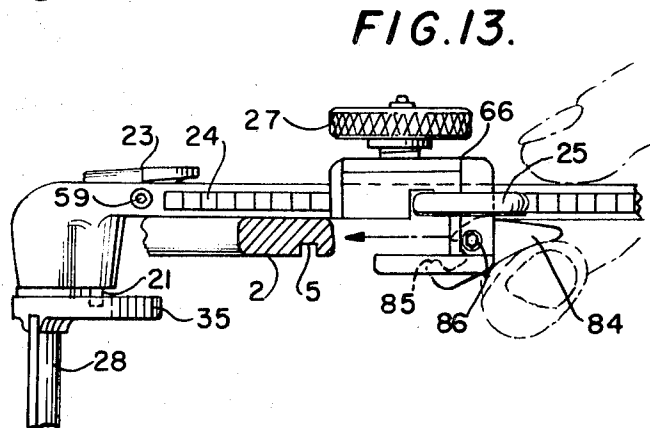
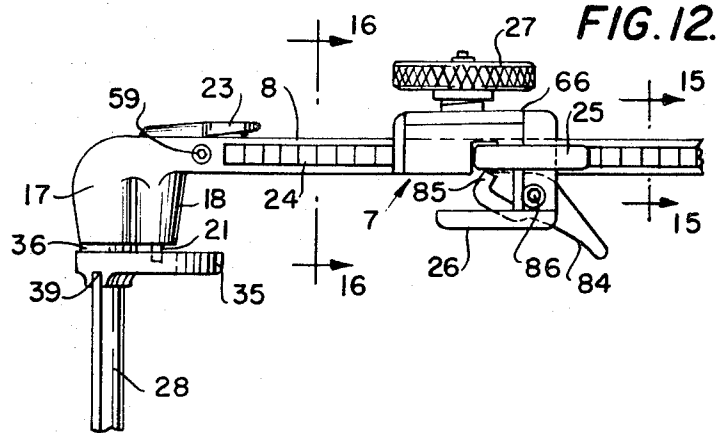
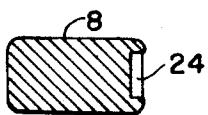


FIG. 15.



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FIG. 16.

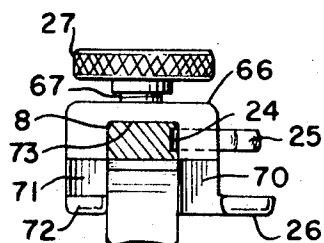


FIG. 17.

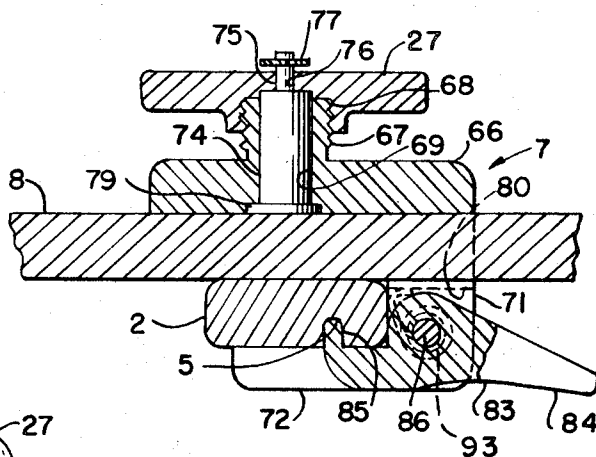


FIG. 18.

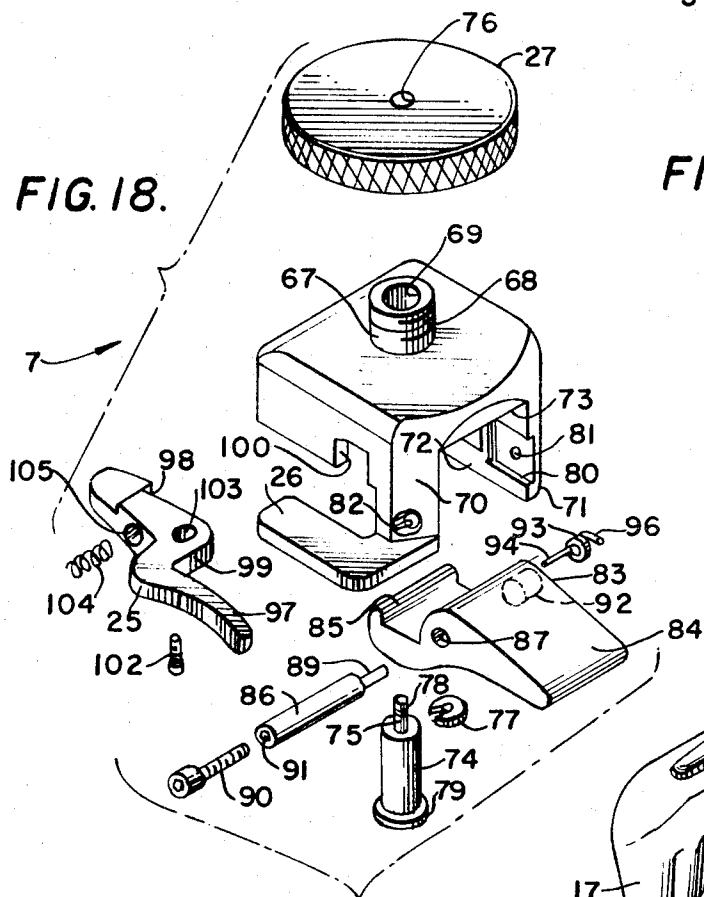


FIG. 18A.

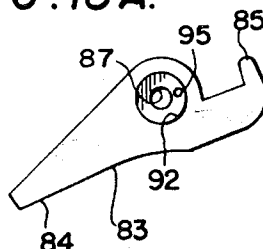


FIG. 20.

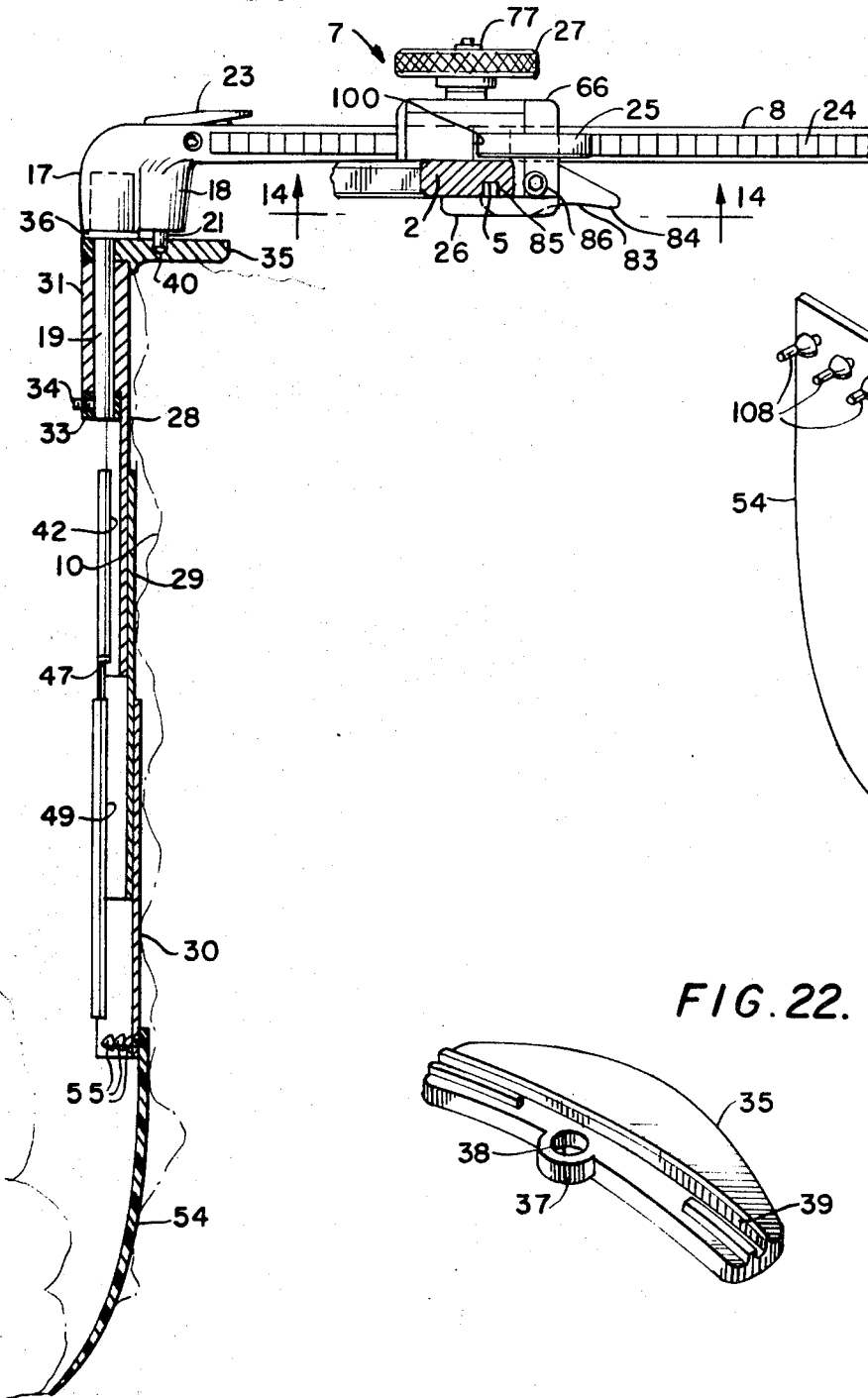


FIG. 21.

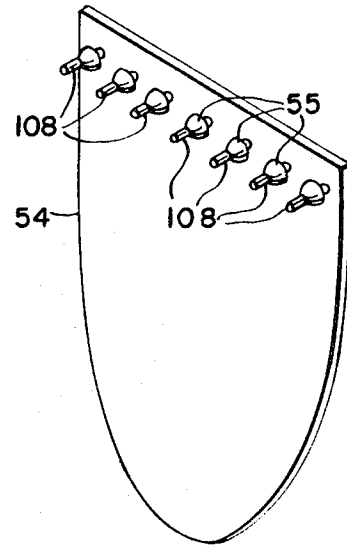
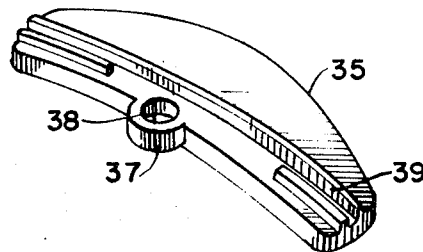


FIG. 22.



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SURGICAL RETRACTOR DEVICE

BACKGROUND OF THE INVENTION

This invention relates to a surgical retractor device for use, for example, in abdominal, thoracic and cardiac surgery to produce traction in any particular direction and to properly retain the engaged tissues surrounding an incision during the performance of surgery on a patient.

Prior art retractor devices are limited in their versatility because they generally do not include means for adjusting the position of the retractor blade relative to an incision for holding the tissue in retracted position. The retractor blades are relatively rigid, non-adjustable means which do not accommodate themselves to different shape or size incisions, as for example on different size patients or for different types of incisions. Moreover, where such prior art retractor devices are made adjustable for adjusting the position of the retractor blade means relative to an incision, the adjustment is cumbersome and relatively difficult to manipulate during performance of surgery on the patient. Accordingly, even when prior art retractor devices are made adjustable, the adjustment of such devices is time consuming and difficult to accomplish and frequently requires the use of both hands by the surgeon or the like performing surgery on a patient. Still further, such prior art retractor devices are difficult to disassemble for sterilization and are relatively difficult to reassemble once they have been sterilized.

The angular and vertical position of some prior art retractor blade means are made adjustable with respect to the associated retractor arm means for adjusting the position of a plurality of tissue engaging retractor blades around all sides of an incision. However, the vertical position of such adjustable blade means must be manually adjusted to either elongate or shorten the retractor blade means, and the blade means is freely pivotally movable relative to the retractor arm means and cannot be locked in a desired angular position.

As a result, with prior art retractor devices unequal forces are applied to the tissue around an incision and adjustment of the retractor blade means relative to the tissue around an incision is difficult and time consuming and takes an undesirable amount of effort and time on the part of the surgeon in order to exert traction in a desired direction and in a desired amount on the tissue surrounding an incision during the performance of surgery on a patient.

SUMMARY OF THE INVENTION

With the present invention, a plurality of retractor arm means are mounted to a frame means by a readily manually operable means which permits both longitudinal and lateral adjustment of the retractor arm means relative to the frame means and a retractor blade means is mounted to the retractor arm means for automatic pivotal movement relative thereto. The retractor blade means includes means whereby the length of the blade automatically accommodates itself to different incisions and includes flexible means for reducing the possibility of tissue necrosis. Means is also provided on the retractor blade means for preventing engaged tissue from passing over the top of the blade means during the performance of surgery, and means is provided cooperatively associated with the retractor blade means and

with the retractor arm means for locking the blade means in a desired angular position.

The retractor device of the present invention includes means whereby the retractor arm means and retractor blade means may be quickly and easily mounted to a frame means through a simple latch mechanism which is easily manipulated with only one hand. The mounting means for mounting the retractor arm means to the frame means includes a ratchet and pawl mechanism whereby the tractive force applied around the edge of an incision can be quickly and easily adjusted simply by pulling on the retractor arm means until the desired retractive force is applied. The ratchet and pawl mechanism will then lock the retractor arm means automatically against movement in the reverse direction.

Further, the mounting means includes means whereby the position of the retractor arm means and blade means longitudinally of the frame means may be quickly and easily adjusted and then locked in position.

The retractor blade means is mounted to the retractor arm means for pivotal or oscillatory movement relative thereto and includes a quickly and easily manually operated means for latching or locking the retractor blade means in any desired angular position relative to the retractor arm means from 0° to 90°. The retractor blade means itself includes telescoping or slidably engaged portions which enables the length of the retractor blade to automatically adjust itself to different incisions and thus renders the retractor blade means equally capable of use on a small child or a large adult patient during the performance of various types of surgery. A flexible, removable tip means is on the retractor blade means for reducing the possibility of tissue necrosis, and a flange or lip means is provided at the top of the retractor blade means for preventing the engaged tissue at the edge of an incision from slipping over the top of the retractor blade means.

The retractor device of the present invention requires the use of only one hand to mount the retractor arm means and retractor blade means to a frame means and to adjust the retractor arm means and retractor blade means to any one of several positions relative to an incision during the performance of surgery on a patient. Moreover, the retractor device is constructed so as to be easily assembled and disassembled and accordingly may be prepared for sterilization much more readily than prior art retractor devices.

The retractor device according to the present invention may be made from aluminum, stainless steel, plastic or any other suitable material.

OBJECTS OF THE INVENTION

It is an object of this invention to provide a retractor device which is economical and simple in construction and which is readily adjustable to several positions for adjusting the location and amount of tractive force applied to the tissue surrounding an incision during the performance of surgery.

Another object of this invention is to provide a retractor device which requires the use of only one hand to mount a retractor arm means and associated retractor blade means to a frame means and to adjust the position of the retractor arm means and retractor blade means relative to the frame means and to the tissue surrounding an incision.

A still further object of this invention is to provide a retractor blade means which is automatically self-adjusting to different vertical and angular positions.

An even further object of this invention is to provide a retractor blade means which includes means for adjusting the angular position thereof and for locking the blade in an adjusted angular position.

Yet another object is to provide a retractor blade means which includes telescopically engaged portions arranged to automatically adjust the length of the retractor blade means so as to accommodate the retractor blade to different size and shape incisions.

Yet another object of this invention is to provide a retractor blade means which includes a removable flexible tip portion for preventing tissue necrosis and which includes a lip or flange means for preventing the tissue at the edge of an incision from slipping over the top of the retractor blade means.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of the retractor device according to the present invention positioned relative to an incision.

FIG. 2 is a bottom view of the retractor device shown in FIG. 1.

FIG. 3 is a top perspective view of the retractor device of one retractor arm means and retractor blade means in the retractor device of FIG. 1.

FIG. 4 is an exploded perspective view of a portion of the retractor arm means and retractor blade means of the retractor device seen in FIG. 3.

FIG. 5 is a top perspective view of the retractor blade means in one adjusted angular position relative to the retractor arm means.

FIG. 6 is a top perspective view similar to FIG. 5 with the retractor blade means in a second adjusted angular position.

FIG. 7 is a sectional view in elevation of a portion of the device shown in FIG. 6 and illustrates the mechanism for latching or locking the retractor blade means in a desired adjusted angular position.

FIG. 8 is a bottom perspective view of the operating lever means used to manipulate the latch in FIG. 7.

FIG. 9 is a front view of the lever means seen in FIG. 8.

FIG. 10 is a top perspective view of the retractor arm means with the latch means removed therefrom.

FIG. 11 is an exploded perspective view of the retractor blade means and illustrates the relative order in which the telescopically engaged portions are assembled to the carrier blade.

FIG. 12 is a side view of a portion of the retractor arm means and retractor blade means with the mounting means thereon for mounting the retractor arm means to a frame means.

FIG. 13 is a view similar to FIG. 12 with the mounting means about to be positioned on a frame means and showing the position of the latch means for mounting the retractor arm means to a frame means.

FIG. 14 is a bottom view of the retractor arm means mounted on a frame means shown in phantom line.

FIG. 15 is a sectional view of the retractor arm means taken along line 15—15 in FIG. 12.

FIG. 16 is a sectional view of the retractor arm means and is taken along line 16—16 in FIG. 12.

FIG. 17 is an enlarged sectional view of the mounting means for mounting the retractor arm means to the frame means.

FIG. 18 is an exploded perspective view of the mounting means.

FIG. 18A is a side view of the latch means shown in FIG. 18.

FIG. 19 is a top perspective view of the retractor arm means showing one form of ratchet means in the side of the arm means wherein the ratchet means is removable.

FIG. 20 is a view in section taken along line 20—20 in FIG. 3.

FIG. 21 is a top perspective view of the flexible tip portion which is mounted to the end of the retractor blade means.

FIG. 22 is a bottom perspective view of the flange or lip means which is positioned at the top of the retractor blade means for preventing the tissue at the edge of an incision from passing over the top of the retractor blade means.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings, wherein like reference numerals refer to like parts throughout the several views, the retractor device is indicated generally at 1 in FIGS. 1 and 2 and comprises a generally oval shaped one-piece frame means 2 substantially rectangular in cross section, having a flat relatively smooth upper surface 3 and a flat relatively smooth bottom surface 4 with a channel 5 therein extending completely around the frame means. A plurality of retractor means 6 are mounted to the frame means 2 and each comprises a mounting means 7, a retractor arm 8 and a retractor blade 9.

As seen in FIGS. 1 and 2, the retractor blades 9 are engaged with the tissue at the edge of an incision 10 and hold the tissue in retracted position. A further retractor means 11 is mounted to the frame means at one end thereof and includes a retractor arm 12, mounting means 7 and fixed retractor blade 13.

Referring now to FIG. 3, each retractor arm 8 is elongated and is substantially rectangular in cross section. A plurality of finger-grip portions 14, 15 and 16 are on one end of the retractor arm 8 for aiding in grasping the retractor arm to adjust it laterally relative to the frame means 2. A pair of downwardly projecting, substantially rounded bosses 17 and 18 project perpendicularly from the underside of the retractor arm 8 at the opposite end thereof.

An elongate pin 19 is press fitted or otherwise suitably secured at one end thereof in a shallow recess 20 in the boss 17 and projects downwardly therefrom a substantial distance. A latching pin 21 is reciprocatably mounted in a bore 22 extending through boss 18 and is connected to be reciprocated by a lever 23 on top of the retractor arm 8. A plurality of ratchet teeth 24 extend along one side of the retractor arm 8 for cooperation with a pawl mechanism 25 in the mounting means 7 for enabling the retractor arm 8 to be adjusted laterally with respect to the frame 2 and latched in an adjusted position relative thereto. A retaining or clamping hook 26 on the mounting means 7 extends under the frame means 2, and a clamping nut 27 is on top of the mounting means 7 for clamping the mounting means and retractor arm 8 to the frame means 2 in a desired adjusted position relative thereto.

The retractor blade means 9 is automatically self-adjusting and comprises a carrier blade 28 and a pair of telescopically engaged blades 29 and 30, telescopically received over the carrier blade 28. The carrier blade 28 includes an elongate boss 31 on the concave side thereof having a bore 32 therethrough through which the pin 19 is received for pivotally mounting the blade to the arm 8. The carrier blade is held to the pin 19 by means of an annular collar 33 fitted on the end of the pin 19 below the boss 31 and secured to the pin by means of a set screw 34. An arcuate, generally kidney shaped retaining flange or lip 35 is disposed between the upper edge of carrier blade 28 and the bottom ends of bosses 17 and 18 and is held in spaced relationship to the bottom ends of bosses 17 and 18 by means of a spacer collar 35 disposed about the pin 19 and in engagement with the bottom of boss 17. The retaining flange or lip 35 projects rearwardly a substantial distance beyond the convex side of carrier blade 28 and prevents tissue at the edge of an incision from riding up over the top of the blade 28. A semicircular boss 37 as on the concave edge of retaining lip 35 and has a bore 38 therethrough through which the pin 19 is received. A relatively shallow arcuate notch or groove 39 is formed in the underside of retaining lip 35 adjacent the concave edge thereof and the upper edge of blade 28 is received therein. A plurality of relatively shallow spaced apart holes or openings 40 are in the top surface of retaining lip 35 and are arranged in an arc in line with the pin 21 and cooperate with the lower end of the pin which extends into a respective one of the openings 40 to lock the blade 9 in a given angular position.

The opposite edges 41 and 42 of blade 29 are reversely bent over the concave surface thereof to define a pair of channel means 43 and 44 slidably received over the opposite edges of carrier blade 28 so that the blade 29 is freely slidably received on blade 28 and is held thereon by the inturned edges 41 and 42. The edge 42 includes an enlarged portion 45 defining a shoulder 46 which cooperates with a short pin 47 adjacent one corner of the carrier blade 28 to limit downward movement of the blade 29 relative to blade 28. The opposite edges 48 and 49 of blade 30 are similarly reversely bent to define a pair of channels 50 and 51 slidably received over the edges 41 and 42 of blade 29 so that the blade 30 is freely slidably received on the blade 29 and is held thereon by the inturned edges 48 and 49. A relatively short inturned tab 52 is formed at the upper inner corner of edge 48 and cooperates with a shoulder 53 on edge 41 of blade 29 to limit downward movement of blade 30 relative to blade 29. A flexible blade tip 54 is attached to the bottom edge of blade 30 by means of a plurality of laterally projecting snap buttons 55 received through a plurality of aligned openings 56 adjacent the bottom edge of blade 30. The flexible tip 54 is tapered down to a very thin feather edge around the peripheral edge thereof so as to define a soft flexible portion at the lower end of the retractor blade for engaging the tissue in an incision.

Referring now to FIGS. 4 and 11, the manner of assembly of the retractor blade 9 is shown. Blade 29 is first positioned on blade 28 by sliding the opposite edges of blade 28 into the channels 43 and 44 at opposite edges of blade 29. Blade 29 then falls or slides down blade 28 until shoulder 46 comes into contact with stop pin 47. Blade 30 is then similarly positioned over the opposite edges of blade 29 and falls or slides

downwardly along blade 29 until stop tab 52 comes into contact with shoulder 53 on blade 29. The flexible blade tip 54 is then put on the lower edge of blade 30 by snapping the buttons or tabs 55 through the openings 56 along the bottom edge of blade 30. The retaining lip or flange 35 is then positioned on top of blade 28 with upper edge of blade 28 received in notch or channel 39. The pin 19 on retractor arm 8 is then inserted through bore 38 in retaining lip 35 and bore 32 in blade 28 and the retaining collar is positioned over the lower end of pin 19 and fixed thereto by means of the set screw 34.

Referring to FIGS. 7 through 10, the mechanism for locking the retractor blade in an adjusted angular position, including lever 23 and pin 21, can best be seen. A vertically downwardly extending pivot arm 57 projects from the underside of lever 23 at approximately the mid-portion thereof and has a laterally extending opening or bore 58 formed therethrough adjacent the lower end thereof for receiving a pivot pin 59. An operating arm 60 extends laterally from the lower end of pivot boss or arm 57 and is received at its outer end in a shallow notch or recess 61 formed adjacent the upper end of pin 21 for reciprocating the pin 21 in bore 22 when the lever 23 is pivoted about pivot pin 59. The pivot arm 57, operating arm 60 and upper end of pin 21 are received in an elongate cavity or recess 62 in the upper surface of retractor arm 8. The undersurface of lever 23 is upwardly tapered from approximately the mid-portion thereof to the rearward end thereof as at 63 for providing clearance so that the lever may be pivoted about the pin 59. A coil spring 64 is received in a shallow cavity 65 adjacent one end of the cavity 62 in the upper surface of retractor arm 8 and is in engagement at one end with the tapered surface 63 of lever 23 to maintain the lever 23 and operating arm 60 in the position shown in FIG. 7 with the lower end of pin 21 received in an opening 40 to lock the retractor blade in an adjusted position. When the rearward end of lever 23 is depressed against the bias of spring 64, the operating arm 60 is raised and causes the pin 21 to be raised, removing the lower end thereof from the opening 40 so that the retractor blade is free to pivot and seek its own position relative to the tissue engaged at the edge of an incision. When the retractor blade has assumed its natural angular position, the lever 23 is released and the pin 21 moves downwardly under the influence of spring 64 into one of the openings 40 to lock the retractor blade in its angular position.

Referring now to FIGS. 12 through 18 and particularly to FIG. 18, details of construction of the mounting means 7 for adjustably mounting the retractor arm 8 to the frame 2 can be seen. The mounting means 7 comprises a one-piece body 66 having a relatively short upstanding boss 67 projecting vertically upwardly from the upper surface thereof and externally threaded at 68. A bore 69 is formed through the boss 67 and body 66. A pair of spaced apart legs 70 and 71 depend from opposite corners of one side of body 66, and the clamping hook or arm 26 extends laterally from the lower end of leg 70 under the body 66 in spaced offset relationship thereto. A similar clamping arm 72 extends laterally under the body 66 in spaced relationship thereto from the lower end of the other depending leg 71. The clamping arms 26 and 72 are spaced downwardly from the undersurface of body 66 a distance substantially equal to the thickness of the frame means 2. A longitudi-

dinally extending channel 73 is formed in the undersurface of body 66 extending from the front to the rear thereof for slidably receiving the retractor arm 8 there-through and has a depth substantially equal to the thickness of the retractor arm 8. A clamping shaft or pin 74 is reciprocatably received through bore 69 in body 66 and extends upwardly beyond the upper end of boss 67. The upper end 75 of pin 74 is of reduced diameter and is received through a central opening 76 in the center of clamping nut 27. A suitable retaining means such as a circlip 77 or the like is received in a shallow circumferential notch 78 adjacent the upper end of reduced diameter portion 75 for preventing accidental removal of nut 27 from the threaded boss 67 and thus avoiding the possibility of the nut 27 being accidentally removed during the performance of surgery on a patient and dropped into the incised wound in the patient. The lower end of clamping pin 74 includes an enlarged flattened portion 79 for engaging the upper surface of retractor arm 8 and clamping the retractor arm 8 between the clamping pin 74, frame 2 and clamping arms 26 and 72 when the nut 27 is threaded down tightly against the upper end of pin 74. The reduced end 75 and circlip 77 permit the nut 27 to be completely unthreaded from threads 68 and spun freely on the reduced diameter portion 75 without being removed therefrom.

A relatively shallow rectangularly shaped spring retaining recess 80 is formed on the inner surface of leg 71 in opposed facing relationship to leg 70 and has a relatively small shallow opening or recess 81 in the center thereof. An opening 82 in alignment with opening 81 is formed through the leg 70. A latching lever 83 having a finger engaging portion 84 at one end thereof and a latching or locking flange 85 at the other end thereof adapted to be received in the channel 5 in the undersurface of frame 2 is pivotally mounted between the depending legs 70 and 71 of body means 66 about a pivot pin 86 received through a bore 87 formed through a thickened portion 88 of the latching means 83. The pivot pin 86 includes a reduced diameter end portion 89 which is received in the opening 81 in leg 71. The length of pin 86 is such as to extend completely across the space between the opposed facing surfaces of legs 70 and 71 and an allen screw 90 is extended through opening 82 in leg 70 into an opening 91 in the adjacent end of pin 86 to maintain the pin 86 in position between legs 70 and 71. The bore 87 through lever 83 is enlarged at one end 92 thereof for receiving a helical spring 93. One end 94 of the spring extends axially into bore 92 and is received in a small opening or bore 95 at the bottom of enlarged diameter portion 92. The opposite end 96 of spring 93 extends laterally and when in position, engages against the side of recess 80 to serve as a retainer for the spring. When finger engaging portion 84 is depressed against the action of the spring 93, the latching flange 85 is moved out of channel 5 in the frame 2 to free the mounting mechanism 7 from the frame.

The pawl mechanism 25 includes a finger engaging portion 97 at one end thereof and a ratchet engaging portion or shoulder 98 at the other end thereof. The portions 97 and 98 are laterally offset relative to one another by short laterally extending portion 99 which is received through a notch or recess 100 in the side of body 66 adjacent leg 70 so that the ratchet engaging portion 98 is disposed inside a cavity 101 formed in the

underside of body 66 with the finger engaging portion 97 disposed outside the body 66. A pivot pin, such as an allen screw or the like 102 extends through an opening 103 in the pawl mechanism 25 adjacent the juncture of laterally extending portion 99 and ratchet engaging portion 98 and into the underside of body 66. A suitable spring means 104 is positioned between the ratchet engaging portion 98 and the side of the body 66 for normally urging the ratchet engaging portion 98 into engagement with the ratchet teeth 24. A shallow opening or cavity 105 is formed on the back side of ratchet engaging portion 98 of pawl mechanism 25 forming a seat for the spring 104.

In use, a mounting means 7 is assembled on a retractor arm 8 with the retractor arm received in the longitudinally extending channel means 73 in the undersurface of body 66 of mounting means 7. The nut 27 is loosened to enable the retractor arm 8 to be moved longitudinally through the channel 73. A retractor blade means 9 is then assembled to one end of the retractor arm means 8 as aforescribed with the plane of the retractor blade disposed at substantially 90 degrees to the plane of the retractor arm 8. The mounting means 7 is then brought into position on the frame means 2 with the clamping arms 26 and 72 disposed under the frame means and the body portion 66 disposed over the frame means. The latching flange 85 is held in an inoperative position by depressing the finger engaging portion 84 until it is brought into alignment with the channel 5 in the undersurface of frame 2. The finger engaging portion is then released, enabling the spring 93 to urge the latching flange 85 into the channel to latch the mounting means and retractor arm to the frame 2. The retractor arm is then grasped and pulled backward through the mounting means to the desired position to exert a desired amount of traction on an incision and is automatically locked in that position by the ratchet and pawl mechanism 24 and 25. Lever 23 is then manipulated to remove pin 21 from openings 40 in the retainer lip 35 on the retractor blade to enable the retractor blade to assume its natural position relative to the tissue engaged at the edge of the incision, and the lever is then released, enabling the spring 64 to urge the pin 21 downwardly into an opening 40 to lock the retractor blade in said adjusted angular position. The retractor blade 9 is normally fully extended under the action of gravity as seen in FIG. 3, but when the flexible tip 54 engages tissue in the incised wound of the patient, the blade seeks its own level and accordingly automatically accommodates itself to different sized incisions. The clamping nut 27 is then tightened to force the end 79 of clamping pin 74 down on top of the retractor arm 8 and to simultaneously pull the clamping arms 26 and 72 up against the bottom of frame 2 to securely clamp the mounting means and retractor arm in a desired longitudinally adjusted position relative to the frame 2. When it is desired to release traction on the incision, the pawl mechanism 25 is manipulated to free the ratchet arm for movement through channel 73 toward the incision. The entire retractor assembly, including the mounting means, retractor arm and retractor blade assembly can be easily removed from the frame simply by depressing the finger engaging portion 84 of latch 83 to release or remove the latching flange 85 from channel 5 in the frame after which the retractor assembly can be simply lifted away from the frame.

With the exception of circlip 77, all of the components of the retractor assembly described herein are assembled by means of allen screws, and the device may be quickly and easily disassembled for sterilization or the like when desired.

Referring now to FIG. 19, a slightly modified form of the invention as shown, and in this form of the invention, the ratchet teeth 24' are provided on a separate track which is removably mounted in a channel 106 in the side of retractor arm 8' by means of a plurality of allen screws 107.

In FIG. 21, the flexible blade tip 54 is shown with protruding tips 108 on the ends of snap buttons or retainers 55 for aiding in pulling the buttons 55 through the openings 56 in the bottom of blade 30 to assemble the flexible tip to blade 30. After the tip 54 is assembled to the blade, these ends 108 may be cutoff, if desired.

The unique construction of the retractor blade assembly 9 is such that the blade assembly cannot be accidentally disassembled since the collar 33 must first be removed from pin 19 and the blade assembly removed from the retractor arm in order to remove the retaining lip 35 which must be removed before the blades 29 and 30 can be removed from carrier blade 28.

The frame 2, retractor arm 8 and mounting means 7 are preferably made from aluminum, and the blades 28, 29 and 30 are preferably made from stainless steel, although the frame, retractor arm, mounting means and retractor blade assembly could be made from other materials such as plastic or the like, if desired.

As this invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, the present embodiment is therefore illustrative and not restrictive, since the scope of the invention is defined by the appended claims rather than by the description preceding them, and all changes that fall within the metes and bounds of the claims or that form their functional as well as conjointly cooperative equivalents, are therefore intended to be embraced by those claims.

I claim:

1. A surgical retractor comprising a frame defining a central opening, a quick-release mounting means releasably and movably secured to said frame, a retractor blade support arm slidably mounted in said mounting means for movement of said retractor blade support arm transversely of said frame to different retracted positions, manually operable latch means on said mounting means and releasably engaging said retractor blade support arm for latching said retractor blade support arm in said different retracted positions relative to said frame, elongated retractor blade means attached at one end thereof to one end of said retractor blade support arm and its other end projected through said central opening for disposition in an incised wound to retract and hold the flesh surrounding the incised wound to enable a surgeon to have access to the wound, and additional readily manually operable latch means carried by said mounting means for latching said mounting means and retractor blade support arm to said frame in different operative positions along said frame, said mounting means, said retractor blade support arm and said retractor blade means being easily and quickly attachable to and removable from said frame as a unit and by the use of only one hand.

2. A surgical retractor as in claim 1, wherein said retractor blade means includes a retaining lip means on the attached end portion thereof to prevent tissue from slipping over said end of said blade means during performance of surgery on a patient.

3. A surgical retractor as in claim 2, wherein said retaining lip means on said retractor blade means comprises a generally kidney shaped flange having an arcuate channel means in one surface thereof adjacent the concave edge thereof, the one end of said retractor blade being received in said channel means, a semicircular boss on the concave edge of said flange, an opening through said boss for receiving a pivot pin carried by said retractor arm means, and a plurality of arcuately arranged openings in the other surface of said flange for engagement with said pin to latch said retractor blade means against oscillatory movement.

4. A surgical retractor as in claim 3, wherein said means mounting said retractor arm means to said frame means includes means for latching said retractor arm against movement relative to said frame means, said latch means including a clamping pin extended through one side of said mounting means into engagement with one surface of said retractor arm means, clamping nut means cooperatively engaged with the other end of said clamping pin for urging said clamping pin against one side of said retractor arm means, and clamping arm means connected to said mounting means and extending on the other side of said frame means for exerting a force against said frame means when said clamping nut means is turned against said clamping pin to securely clamp said frame means and said retractor arm means between said clamping arm means and said clamping pin.

5. A surgical retractor as in claim 1, wherein a flexible tip is on said blade means at said other end to prevent tissue necrosis and the like in tissue when engaged by the blade.

6. A surgical retractor as in claim 5, wherein said flexible tip on said blade means includes a plurality of snap means along one edge thereof received through a plurality of openings along the other end of said retractor blade, said flexible tip being tapered to a thin edge about the margin thereof.

7. A surgical retractor as in claim 1, wherein said mounting means includes a channel means extending along said frame means, and said latch means carried by said retractor arm means includes means engageable with said channel means to attach said retractor arm means to said frame means for movement therealong.

8. A surgical retractor as in claim 7, wherein said mounting means further includes cooperatively inter-engaged ratchet and pawl means on said retractor arm means and on said mounting means to enable the retractor arm means to be adjusted transversely relative to said frame means, said ratchet and pawl means including a plurality of ratchet teeth extending along one side of said retractor arm means and a pawl means pivotally carried by said mounting means and engageable with said ratchet teeth in a manner to enable said retractor arm means to be pulled in a first direction to exert traction on tissue at the edge of an incision and to latch said retractor arm means against return movement, said pawl means being operable with one hand to release said retractor arm means for movement in said return direction.

9. A surgical retractor as in claim 1, wherein said retractor blade means is collapsible and comprises a plurality of freely slidably interengaged blade portions including a first blade portion connected to said retractor arm means for oscillatory movement relative thereto, a second blade portion having its opposite edges turned inwardly in a reverse direction to define channel means at the opposite sides thereof, the opposite edges of said first blade portion being slidably received in said channel means, and a third blade portion having the opposite edges thereof turned inwardly in a reverse direction to define channel means at the opposite edges thereof, the opposite edges of said second blade portion being freely slidably received in said channel means of said third blade portion so that said first, second and third blade portions are telescopically engaged with one another, and cooperating stop means on said first and second blade portions for limiting relative movement between said first and second blade portions in a first direction, and cooperating stop means on said second and third blade portions for limiting relative movement between said second and third blade portions in said first direction.

10. A surgical retractor as in claim 7, wherein said frame means has a top side and an underside, and said channel means is in the underside thereof adjacent an outer edge of said frame means, and said latch means includes a pivotally mounted lever having channel engaging flange means at one end thereof slidably engaged in said channel means and a finger engaging portion at the other end thereof for pivoting said latch means to remove said flange means from said channel means, and spring means normally urging said flange means into said channel means to latch said mounting means to said frame means.

11. A surgical retractor as in claim 1, wherein said frame means is generally ring-shaped.

12. A surgical retractor comprising a frame defining a central opening, retractor blade support arm means movably mounted on said frame for movement transversely of said frame, retractor blade means pivotally mounted on one end of said retractor blade support arm means at substantially a right angle thereto and disposed in said central opening for disposition in an incised wound, and readily manually operable latch means on said one end of said retractor blade support arm means and said retractor blade means to positively latch the retractor blade means in different selected pivoted positions, said latch means including cooperatively interengaged projection and recess means on said retractor blade support arm means and said retractor blade means.

13. A surgical retractor as in claim 12, wherein said latch means for latching said retractor blade means against pivotal movement includes an elongate pin means reciprocatably received through a bore in said retractor arm means and extending at one end beyond the end of a boss means on said retractor arm means, said retractor blade means including a plurality of relatively shallow openings or cavities arranged in an arc in alignment with said pin means so that said one end of said pin means extends into a selected one of said openings to latch said blade means against pivotal movement, the other end of said pin means being engageable with and operable by a lever means mounted on said retractor arm means.

14. A surgical retractor as in claim 12, wherein is included means mounting said retractor arm to said frame means, said mounting means including a channel means extending along said frame means, and latch means carried by said mounting means and including means engageable with said channel means to attach said retractor arm means to said frame means for movement therealong.

15. A surgical retractor as in claim 14, wherein said mounting means further includes ratchet and pawl means on said retractor arm means and said mounting means to adjust the transverse position of said retractor arm relative to said frame means, said ratchet and pawl means including a plurality of ratchet teeth extending along one side of said retractor arm means, and a pawl means pivotally carried by said mounting means and engageable with said ratchet teeth means in a manner to enable said retractor arm means to be pulled in a first direction to exert traction on tissue at the edge of an incision and to latch said retractor arm means against movement in a reverse direction, said pawl means being operable to release said retractor arm means for movement in said return direction.

16. A surgical retractor comprising a frame defining a central opening, a mounting means movably mounted on said frame for movement along said frame, a retractor blade support arm slidably received in said mounting means for movement transversely of said frame to different retracted positions and movable with said mounting means along said frame, and a cooperatively interengaged, manually releasable ratchet and pawl on said retractor blade support arm and said mounting means to hold said retractor blade support arm in desired different retracted positions and enabling said retractor blade support arm to be grasped with one hand and moved relative to said frame to a desired retracted position whereat the ratchet and pawl positively hold the retractor blade support arm against return movement until manually released.

17. A surgical retractor as in claim 12, wherein said retractor blade means is mounted to said retractor arm means for oscillatory movement relative thereto.

18. A surgical retractor as in claim 17, wherein means is cooperatively connected with said retractor arm means and with said means blade means to latch said retractor blade means against oscillation.

19. A surgical retractor as in claim 18, wherein said frame means is generally ring-shaped.

20. A surgical retractor as in claim 16, wherein a channel means extends along said frame, and latch means is carried by said mounting means and includes means engageable with said channel means to attach said retractor arm to said frame for movement therealong.

21. A surgical retractor as in claim 20, wherein said ratchet and pawl means includes a plurality of ratchet teeth extending along one side of said retractor arm means and a pawl means pivotally carried by said mounting means and engageable with said ratchet teeth means in a manner to enable said retractor arm means to be pulled in a first direction to exert traction on tissue at the edge of an incision and to automatically latch said retractor arm means against return movement, said pawl means being operable by one hand to release said retractor arm means for movement in said return direction.

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22. A surgical retractor as in claim 16, wherein a retractor blade means is on said retractor blade support arm, said retractor blade means being collapsible and comprising a plurality of freely slidably interengaged blade portions including a first blade portion connected to said retractor arm means for oscillatory movement relative thereto, a second blade portion having its opposite edges turned inwardly in a reverse direction to define channel means at the opposite sides thereof, the opposite edges of said first blade portion being slidably received in said channel means, and a third blade portion having the opposite edges thereof turned inwardly in a reverse direction to define channel means at the opposite edges thereof, the opposite edges of said second blade portion being freely slidably received in said channel means of said third blade portion so that said first, second and third blade portions are telescopically engaged with one another, and cooperating stop means on said first and second blade portions for limiting relative movement between said first and second blade por-

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tions in a first direction, and cooperating stop means on said second and third blade portions for limiting relative movement between said second and third blade portions in said first direction.

23. A surgical retractor as in claim 22, wherein said retractor blade means is pivotally mounted to said retractor blade support arm, means for latching said retractor blade means against pivotal movement comprising an elongate pin means reciprocatably received through a bore in said retractor arm means and extending at one end beyond the end of a boss means on said retractor arm means, said retractor blade means including a plurality of relatively shallow openings or cavities arranged in an arc in alignment With said pin means so that said one end of said pin means extends into a selected one of said openings to latch said blade means against pivotal movement, the other end of said pin means being engageable with and operable by a lever means mounted on said retractor arm means.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,749,088 Dated July 31, 1973

Inventor(s) WILLIAM KOHLMANN GAUTHIER

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

GAUTHIER

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Signed and sealed this 18th day of December 1973.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

RENE D. TEGTMEYER
Acting Commissioner of Patents