

[54] **TABLE SUPPORTED SURGICAL
RETRACTOR AND PELVIC SUPPORT**

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[22] Filed: **Apr. 27, 1973**

[21] Appl. No.: **355,034**

[52] U.S. Cl. **128/20, 128/132 D, 269/328**

[51] Int. Cl. **A61b 17/02, A61g 13/00**

[58] Field of Search **128/20, 132, 132 D, 134;
119/103; 269/322, 328; 5/327 R**

[56] **References Cited**

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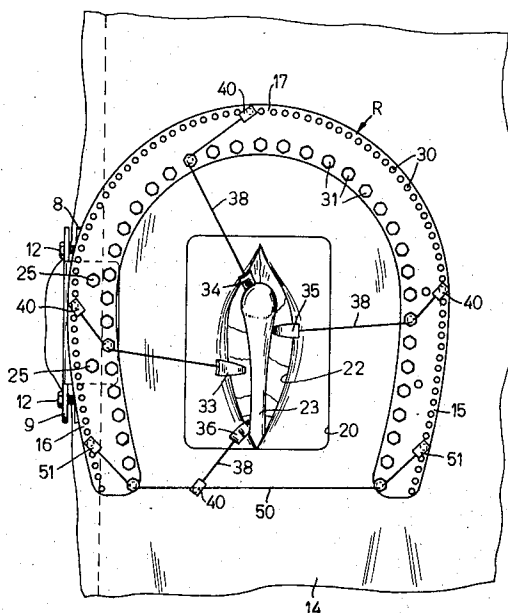
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[57] **ABSTRACT**

An operating table supported surgical retractor assembly for individual retracting blades which hold the various parts of the body away from the surgical area. The assembly includes a generally C-shaped retractor which is particularly designed for hip or shoulder area operations.

A body support for the pelvic region firmly supports the patient on his side during the operation to enable the surgeon to work on the patient and know precisely the location of the patient's bones in the surgical area. The body support also provides a mounting for the retractor when the patient is operated on while lying on his side.

16 Claims, 18 Drawing Figures



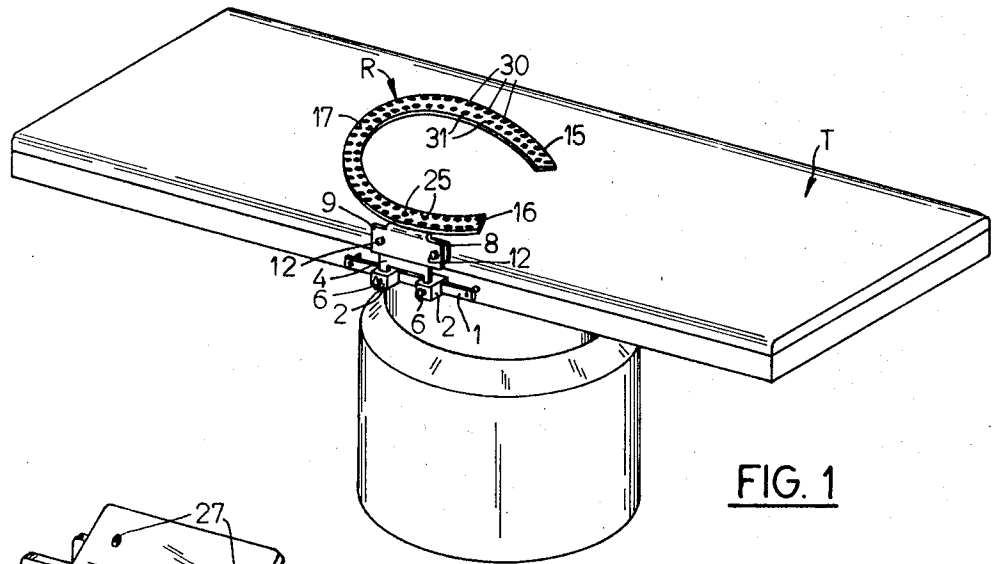


FIG. 1

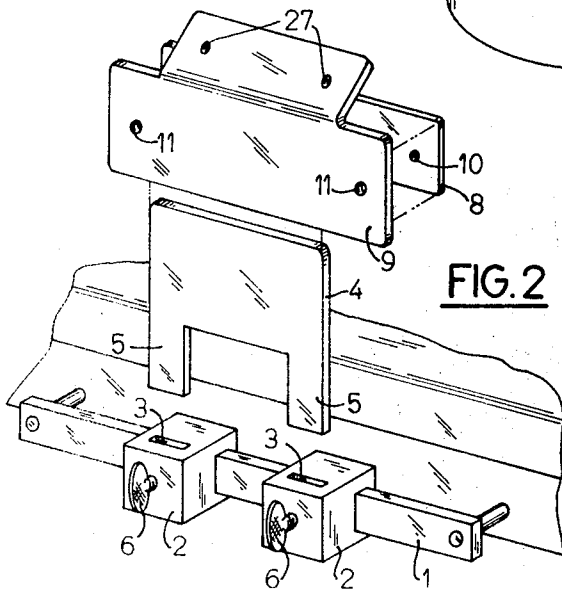


FIG. 2

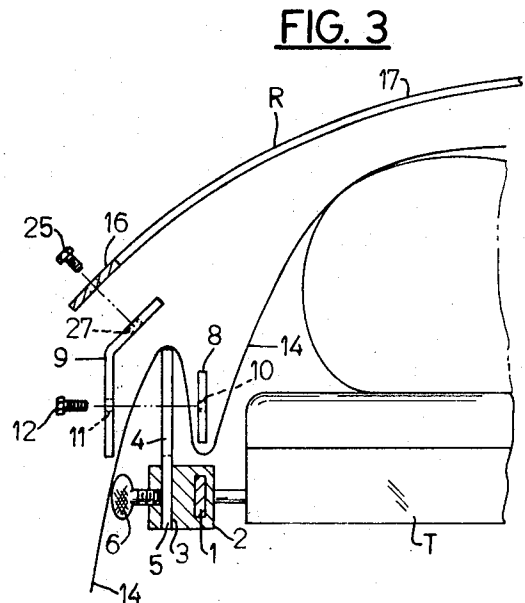


FIG. 3

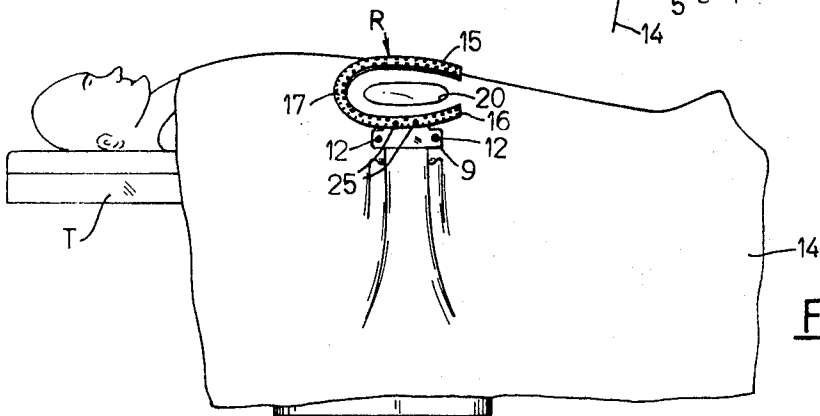


FIG. 4

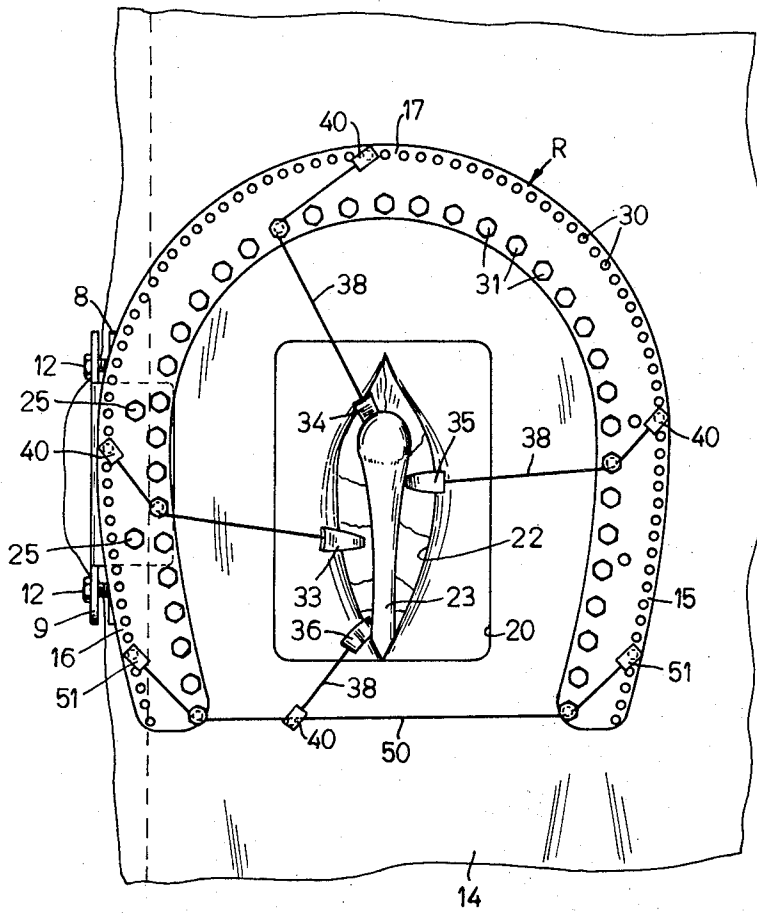


FIG. 9

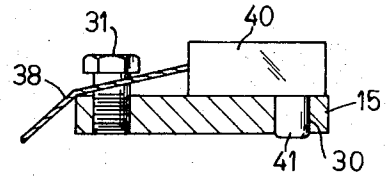


FIG. 8

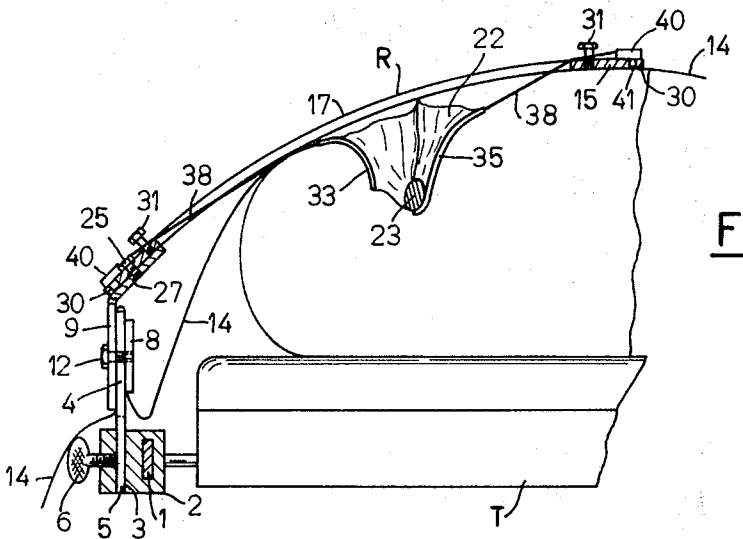


FIG. 10

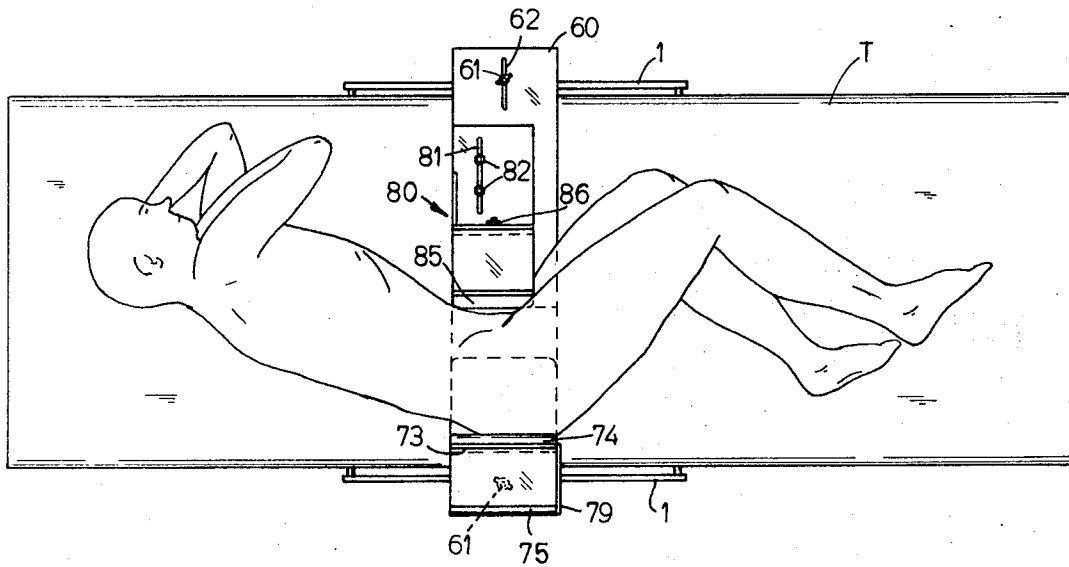


FIG. 11

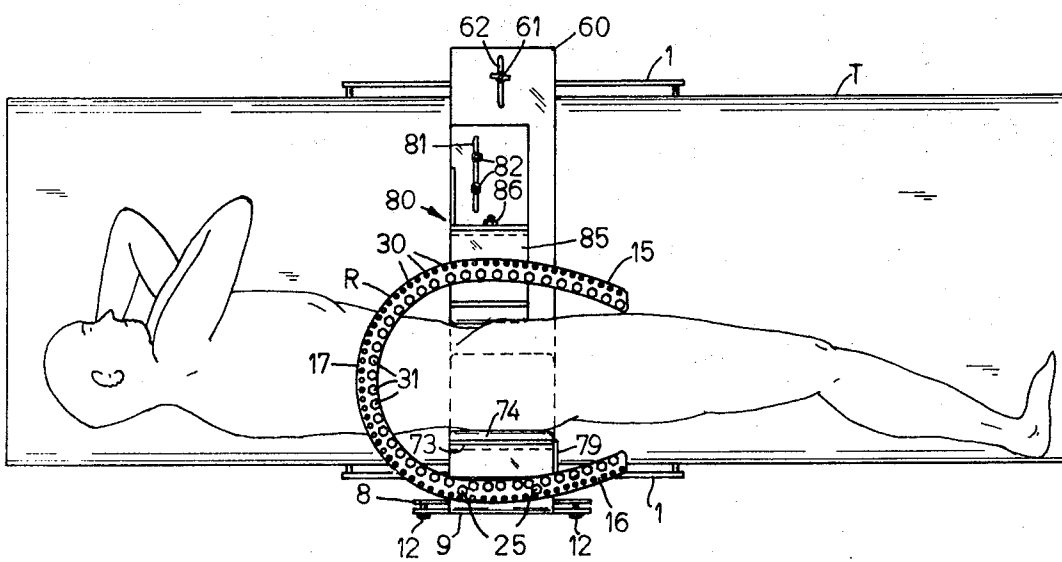


FIG. 12

FIG. 14

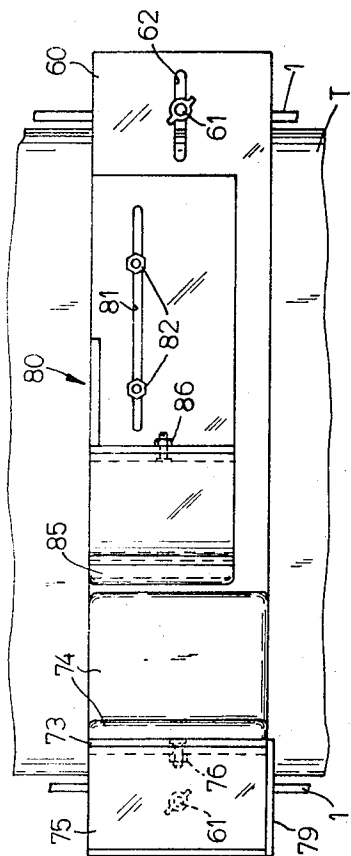


FIG. 15

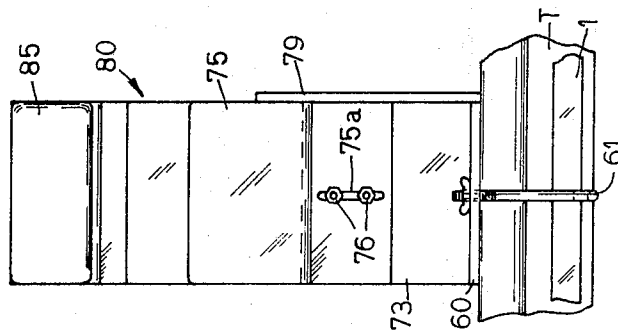


FIG. 13

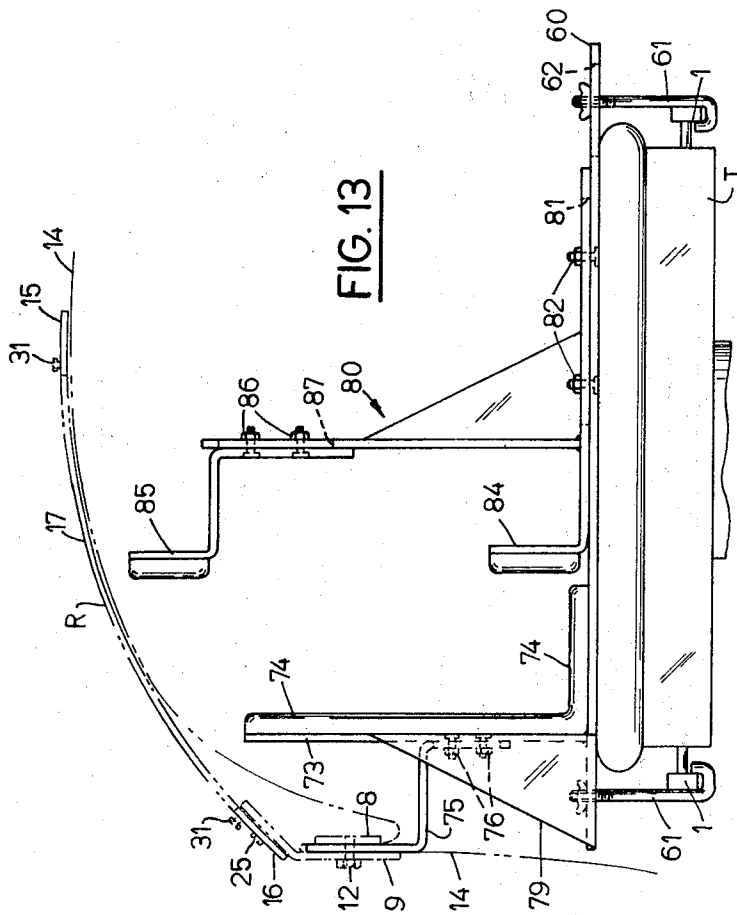
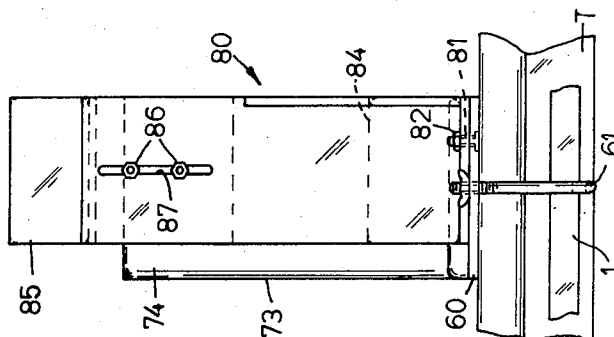


FIG. 16



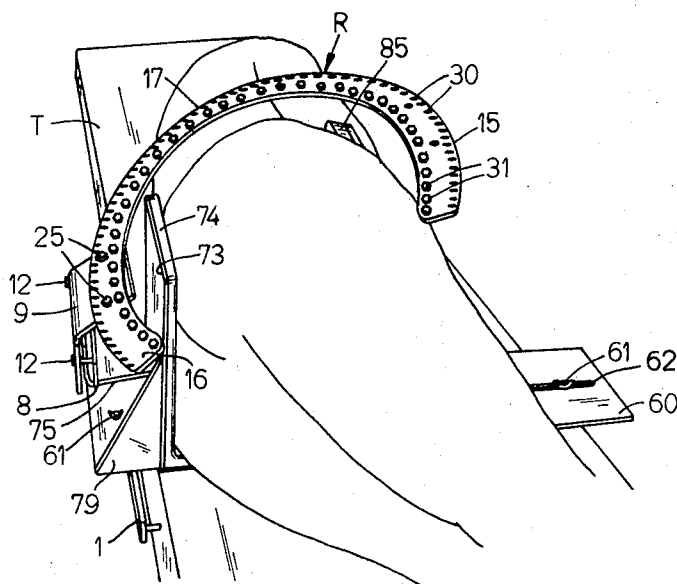


FIG. 17

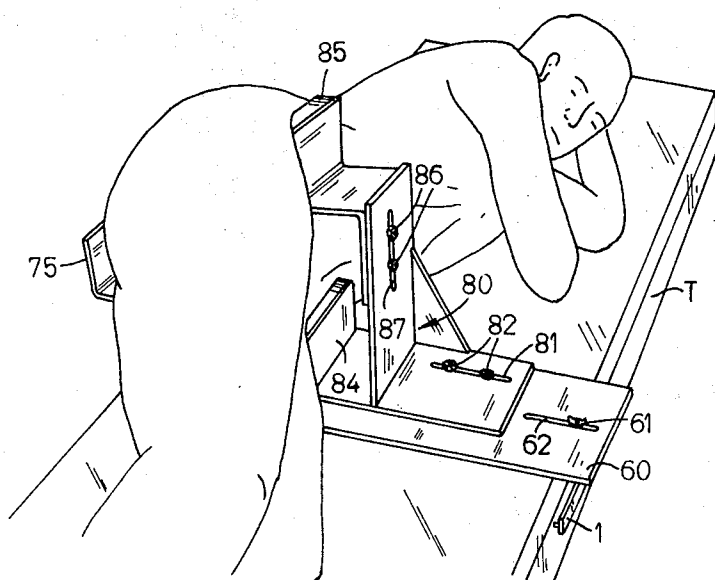


FIG. 18

TABLE SUPPORTED SURGICAL RETRACTOR AND PELVIC SUPPORT

BACKGROUND OF THE INVENTION

Table supported surgical retractors of various shapes have been proposed and have employed different means for adjustably positioning the retracting blades. However, these retractors have not proven to be entirely satisfactory for a number of reasons.

Some of the shortcomings of some prior art retractors are that they did not insure that the area being operated on was sterile, did not provide for a sufficiently great number of positions of the retracting blades, did not transmit the retracting blade force to the table itself but instead transmitted this force to other portions of the patient and were difficult to quickly assemble, disassemble and clean.

Some examples of prior art table supported surgical retractors are shown in the U.S. Pat. Nos. 3,040,739, issued June 26, 1962; 3,572,326, issued Mar. 23, 1971; and 2,586,488, issued Feb. 19, 1952.

SUMMARY OF THE PRESENT INVENTION

The present invention provides a table supported surgical retractor for shoulder or hip operations and is C-shaped in form and held rigidly by its side to the operating table. The retractor extends upwardly and at an inclined angle over the operating table and over the patient located beneath the retractor. The open end of the C-shaped retractor permits the surgeon to move the arm or leg of the patient during the operating procedure. The retractor provides a great variety of anchoring points for the flexible cables to which the retracting blades are attached, and the retractor also provides a number of projections around which the flexible cables can be trained so as to permit them to be directed at the proper angle from the area being operated on. The retractor blades can be quickly and easily adjusted and supported on the retractor.

Another aspect of the invention relates to such a C-shaped retractor having means detachably secured across its open end and to which means the retractor blade cables may be attached, thereby providing 360° of anchoring positions around the area being operated on.

Another and important aspect of the present invention relates to such a retractor having an anchoring means for rigidly securing it to the table in such a manner that a sterile barrier isolates the anchoring means, the component parts of the operating table, and the retractor from contaminating the wound site.

Generally the present invention provides a C-shaped retractor held rigidly by one of its sides to the operating table and which retractor extends at an inclined angle over the patient for hip or shoulder surgery, and which permits the necessary range of motion of the patient's limb which is necessary in hip or shoulder operating procedures.

The retractor provided by the present invention is particularly strong, durable, and easily assembled, disassembled, cleaned and rendered sterile.

Another aspect of the invention relates to a body support for the pelvic regions and for securely holding the patient on his side on the operating table for hip operations. The pelvic support includes means for anchoring the C-shaped surgical retractor above the patient's hip

by anchoring one side of the retractor to the pelvic support, which retractor then extends over the operating table and patient and at an inclined angle. The entire arrangement insures that the patient is securely held in position so that the surgeon knows the position of the various parts of the body during the operation and permits the surgeon to move the limbs or joints during the operating procedure.

These and other objects and advantages of the present invention will appear hereinafter as this disclosure progresses, reference being had to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an operating table on which the retractor of the present invention is mounted;

FIG. 2 is an enlarged, fragmentary view showing the parts in exploded relationship, of the mounting for the retractor shown in FIG. 1;

FIG. 3 is a transverse sectional view through the retractor, and further showing the various parts in exploded view for the sake of clarity;

FIG. 4 is a side elevational view of the present invention as applied to an operating table and with the patient on the table and under the retractor;

FIG. 5 is a perspective, exploded view of three of the mounting portions shown in FIG. 2;

FIG. 6 is a side elevational view of the mounting means shown in FIG. 2, but when in the assembled relationship;

FIG. 7 is a view similar to FIG. 3, but showing the parts in assembled relationship;

FIG. 8 is a cross sectional view through the retractor and showing the blade anchoring means located in the retractor, the view being taken generally along the line 8-8 in FIG. 9, but on an enlarged scale;

FIG. 9 is a plan view showing the retractor in place over the patient;

FIG. 10 is a view generally similar to FIG. 7, but furthermore showing the retracting blades in place in the operation side in the patient;

FIGS. 11 to 18 are views of a modification of the invention and including a pelvic support;

FIG. 11 is a plan view of a patient being supported by the pelvic support of the present invention;

FIG. 12 is a view similar to FIG. 11, but showing the retractor of the present invention mounted on the pelvic support;

FIG. 13 is a transverse, elevational view of the pelvic support shown in FIGS. 11 and 12, but on an enlarged scale and without the patient located therein;

FIG. 14 is a plan view of the FIG. 13 showing;

FIG. 15 is an elevation view of the FIG. 13 device and taken from the surgeon's side of the table;

FIG. 16 is an elevational view of the FIG. 13 support, but taken from the opposite side of the table;

FIG. 17 is a perspective view of a patient lying on the table with the pelvic support and retractor located over a patient, certain parts being omitted for clarity such as the sterile barrier; and

FIG. 18 is a perspective view of the patient in the pelvic support without the retractor being located in place.

DESCRIPTION OF A PREFERRED EMBODIMENT

The retractor R made in accordance with the present invention is shown in FIGS. 1 to 10 as secured in the side of an operating table. The table R itself is conventional and is shown in FIG. 1 and has the usual side rail 1 secured along each of its sides and on which are mounted a pair of slideable blocks 2 each having an aperture 3 (FIG. 2) extending downwardly therethrough. Anchoring means are provided for the retractor and include an anchoring plate 4 having a pair of downwardly extending portions 5 which are received in the corresponding holes 3 in the blocks, and this plate is held captive in the blocks by the set screws 6 threadably engaged in the blocks and which can bear against the blocks 5 to hold the anchoring plate 4 detachably but rigidly in the blocks. The anchoring means also includes a pair of brackets 8 and 9 which have alignable threaded holes 10 and unthreaded holes 11, respectively, extending therethrough. Cap bolts 12 extend freely through the unthreaded holes 11 and are threadably engagable in the holes 10.

It will be noted that the brackets 8 and 9 are on opposite sides of the anchoring plate 4 and, as shown in FIG. 3, a sterile barrier, such as a drape 14 is located over the anchoring plate and between it and the two brackets 8 and 9. When the cap screws 12 hold the anchoring means in assembled relationship, the sterile barrier 14 permits only the brackets 8 and 9 and the retractor R to be exposed. The other elements, such as the anchoring plate 4 and the operating table itself are covered by the sterile barrier 14. Thus, it is a rather easy matter to clean the parts which are exposed and insure their sterility before the operation.

As shown in FIG. 9, the sterile barrier 14 has an opening 20 cut therein and immediately over the area of the patient in which the surgeon will work. Also shown in FIG. 9 is the opening 22 itself in the patient and the bone structure 23 to which the surgeon must have a clear access.

The retractor R is of generally C-shaped configuration and has two side legs 15 and 16 and an intermediate portion 17. As shown in FIG. 10, the retractor R is also curved in a generally longitudinal direction of the C-shaped retractor so as to closely fit the contour of the patient's body when the patient is located beneath the retractor. If necessary, the patient can be propped up or held firmly against the retractor with pillows or sand bags (not shown) that are positioned beneath the patient's body.

Generally, it will be noted that the C-shaped retractor is mounted by one of its legs to one side of the operating table only, and the retractor then extends over the table and the patient located beneath it and also extends, as shown in FIG. 10, in an upwardly inclined direction over the patient. This particular positioning of the retractor, relative to the patient and the table, affords the surgeon complete and good accessibility to the area of the patient in which the operation is to be performed. The retractor is completely and rigidly supported by the table itself and when in use, as will appear, the force of the retractor blades (to be described) is not transmitted to other parts of the patient, but instead these forces are transmitted directly to the operating table.

It should also be noted that the C-shaped retractor R provides an open end opposite from the intermediate portion 17 and this open end of the retractor permits the limb, that is to say, the leg when a hip operation is being performed or an arm when a shoulder operation is being performed, to be moved or shifted by the surgeon during the operation so that the bones can be properly handled and operated on, or the necessary implants properly made. Even though the retractor thus provides an open end for such limb movement, the retractor provided by the present invention also provides a 360° adjustment of the retractor blades, as will appear.

The retractor is rigidly bolted by two bolts 25 which extend therethrough and which threadably engage in the threaded apertures 27 of the bracket 9.

The retractor R can be quickly positioned in place over the patient because the retractor R, brackets 8 and 9, anchor plate 4, bolts 12 and the sterile barrier 14 can all be assembled ahead of time and then the anchor plate simply inserted in the blocks 2.

The retractor has a series of apertures 30 extending all around its outer edge and also has a series of projections 31 in the form of cap bolts which are located completely around the inner edge of the retractor.

A number of retracting blades 33, 34, 35 and 36 are shown in use in FIG. 9 and these blades themselves are conventional and are used to retract the soft tissue, tendons, muscles or other portions of the body, away from the bone or other area to be worked on. In other words, the retractors forcibly hold back various parts of the body so the surgeon has access to the area and as is known, these retractor blades eliminate the need for attendants at the operating table. The blades each have a flexible cable 38 attached at one end to the blades, and the other end of the cables have a block 40 rigidly fixed thereto and from which a plug or pin 41 (FIG. 8) extends. The plugs 41 are adapted to fit snugly in any one of the apertures 30 and thus rigidly anchor that end of the cable. Any number of these retracting blades may be used during the operation as necessary, and generally speaking, the blades act with a leverage action against the bone structure and are applied with considerable force to the various tissues and other members of the body to hold the area open to the surgeon. Thus, the force necessary to be transmitted by the blades is considerable, and this force is absorbed by the retractor itself and consequently, by the operating table, through the flexible cables and the blocks 40 and pins 41. The retractor is supported independently of the patient and consequently, the force of the retracting blades is transmitted directly to the operating table.

The blades, flexible cables, and their anchoring blocks 40 and pins 41, as well as any other exposed metal in the area, is preferably made of stainless steel and is rendered sterile before use. The parts heretofore described are simple in construction and free of crevices or other hard to clean cracks or surfaces and can easily be rendered sterile.

The retracting blades must be pulled away from the opening in any one of a variety of different angles, and the retractor provided by the present invention insures that any desired angle of thrust for the retractor is immediately and easily selectable by the surgeon, and that the surgeon can easily and quickly apply the retracting blade and anchor it with the proper amount of force

and in the proper direction. This is accomplished by providing the easily insertable plugs for anchoring the end of the cable, which plugs may be located in the holes in a variety of positions around the edge of the retractor. The projections 31 are provided so the cables 5 can be trained therearound so that the cable extends to the wound area at the precise line of thrust desired by the surgeon. Thus, the surgeon first places the retractor at the desired location in the patient's opening, positions the cable away from the wound at the desired angle, trains the cable around the appropriate projection 31, and then inserts the pin 41 in the appropriate hole 30 to maintain the proper tension in the cable.

With the above described retractor and its mounting to the table, the patient is securely held beneath the retractor and a sterile barrier is provided over the wound area. The surgeon can stand closely adjacent the hip or shoulder area to be worked on, and the limb of the patient can be manipulated as required. Because the patient is held firmly in position on his back in the illustration shown in FIGS. 1 to 10, the patient will not inadvertently be moved during the operation. The surgeon must know the position of the patient, which position may be difficult to ascertain when the patient is covered by the sterile barrier, or due to the fact that considerable force is also applied during these surgical procedures or a considerable range of movement of the patient's limbs by the surgeon is necessary during these surgical procedures.

The retractor R is particularly designed for hip and shoulder surgical procedures which usually requires a great number of blades, hooks, claws, etc. at any one time and which must direct their force often through a 360° range of motion. This wide range of adjustment is possible with a C-shaped retractor R because of the provision of a cable 50, as shown in FIG. 9, which can be extended across the open end of the C-shaped retractor and then anchored at each of its ends by its anchoring blocks 51. This cable 50 extending across the open end of the retractor is used to fasten the end of the retractor cable directly thereto. Thus, the 360° range of adjustment is provided, but nevertheless, the C-shaped retractor permits the surgeon to move the limb the necessary amount.

The present table mounted retractor is readily adapted to the inclined position, which is desirable for hip and shoulder operating procedures, permits a wide variety of retracting devices to be used, permits a range of motion of the limb, provides absolute sterility that has become absolutely necessary in large joint procedures, such as complete joint replacement and in addition, the retractor assembly is strong, durable and easily cleaned.

PELVIC SUPPORT

In some surgical procedures such as on the hip of the patient, it is preferable to have the patient lie on his side during the operation. As previously stated however, it is essential that the body of the patient does not inadvertently shift during the operation and this shifting heretofore has occurred due to the considerable force necessary to be applied to the various bones of the body during the operation and/or the placement of implants in the patient. The procedure is furthermore complicated by the fact that it is often difficult for the surgeon to ascertain during the operation, the exact position of the body and more particularly the position of

the hip components, and the placement of these components at an exact spacial relationship is extremely important if they are to function properly. Thus, the position of the patient is difficult to ascertain precisely during the operation, particularly when the patient is covered with the sterile barrier.

Consequently, a body support as shown in FIGS. 11 to 18 is provided so as to securely hold the patient on his side during the operation and still permit the necessary movement of the limb by the surgeon during the operation, as heretofore mentioned. The body support hereinafter described, holds the patient on his side and permits surgery on the hip joint with the surgeon located at the back side of the patient. This pelvic support has proven particularly valuable in maintaining the position of the patient with certainty which is required when some hip components must be placed in the patient at the exact spacial relationship for proper functioning thereof.

More particularly, the pelvic support includes a base plate 60 which extends across the width of the operating table and is securely held down on the table by the J-bolts 61, one of which extends through a slot 62 in member 60 to thereby accommodate tables of different width. The J-bolts engage the side rails 1 along each side of the table. The pelvic support includes a first brace member 73 which may be secured directly to the base plate 60 and extends upwardly therefrom from the surgeon's side of the operating table. This first brace member is provided with a padding 74 so as to avoid bruising of the patient. Attached to the surgeon's side of the first brace member is an L-shaped bracket 75 which is held by bolt means 76 to the brace 73. More specifically, the L-shaped bracket 75 has a slot 75a therein and through which the bolt means 76 extend. Thus, the bracket 75 can be adjusted vertically to the desired position so that the retractor R, which is attached to the plate 9, can be positioned at the proper vertical height and directly over the patient. More specifically, the retractor R is secured to the bracket 75 by plates 8 and 9 and bolts 12. Here again, the sterile barrier is interposed over the anchor bracket 75 and between this bracket and plates 8 and 9. A gusset plate 79 is provided between the brace 75 and the base plate 60 so as to prevent bending of the brace 73 when the patient is clamped against it.

A second brace member 80 is adjustably positioned in the transverse direction to the base plate 60 by means of slot 81 (FIG. 14), and bolt means 82 extending through the base plate 60 and through the slot 81. This second brace means includes two vertically spaced, vertical, padded holders 84 and 85 which bear against the two pelvic bones of the patient. The holder 85 is vertically adjustable by the bolt means 86 which extend through the slot 87 in the bracket 80 and also through the holder 85. Thus, the vertical space between holders 84 and 85 may be adjusted to accommodate different size patients. Holders 84 and 85 are pressed against the patient firmly so the patient is clamped between brace 73 and the holders 84 and 85 of the second bracket 80. This arrangement holds the patient firmly in place, but at the same time permits the surgeon to move the patient's leg during the operating procedure.

I claim:

1. A table supported surgical retractor assembly comprising a generally C-shaped retractor including

two legs, an intermediate portion and an open end; means for rigidly securing one of said legs of said retractor to an operating table and at an inclined angle above said table, a series of apertures in and around said retractor, a series of projections arranged around said C-shaped retractor, and a retracting blade having a flexible cable secured at one end thereto, said cable having a plug secured to its other end for insertion in any one of said apertures, said cable being positioned around any one of said projections so as to position said cable at a desired angle within the area bounded by said retractor.

2. The retractor assembly set forth in claim 1 including anchoring means for rigidly fastening said retractor leg to said table, said anchoring means including an anchor plate secured to said table, a bracket located on one side of said anchoring plate, said retractor being located on the other and opposite side of said anchoring plate, a flexible sterile barrier inserted between said anchoring plate and said retractor and also between said anchoring plate and said bracket and also extending over a patient located beneath said retractor to thereby provide a sterile barrier over said patient.

3. The retractor assembly as set forth in claim 2 including means for releasably securing said anchor plate to said table whereby said anchor plate, retractor, bracket and sterile barrier can all be removed from said table together as a unit.

4. The retractor set forth in claim 1 including cable means extending across the open end of said C-shaped retractor, means for releasably fastening said cable means at each of its ends to said retractor, said cable means providing anchoring means across said open end for a retractor blade assembly.

5. A table supported surgical retractor assembly comprising a generally C-shaped retractor including two legs, an intermediate portion and an open end; anchoring means for rigidly securing one of said legs of said retractor to an operating table and at an inclined angle above said table, said anchoring means including an anchor plate secured to said table, a bracket located on one side of said anchoring plate, said retractor being located on the other and opposite side of said anchoring plate, a flexible sterile barrier inserted between said anchoring plate and said retractor and also between said anchoring plate and said bracket and also extending over a patient located beneath said retractor to thereby provide a sterile barrier over said patient; said retractor having a series of apertures in and around said retractor, and a series of projections arranged around said C-shaped retractor; and a retracting blade having a flexible cable secured at one end thereto, said cable having a plug secured to its other end for insertion in any one of said apertures, said cable being positioned around any one of said projections so as to position said cable at a desired angle within the area bounded by said retractor; means for releasably securing said anchor plate to said table whereby said anchor plate, retractor, bracket and sterile barrier can all be removed from said table together as a unit.

6. The retractor set forth in claim 5 including cable means extending across the open end of said C-shaped retractor, means for releasably fastening said cable means at each of its ends of said retractor, said cable means providing anchoring means across said open end for a retractor blade assembly.

7. A surgical retractor assembly for being supported rigidly on an operating table and comprising a generally C-shaped retractor, means for rigidly securing said retractor to said operating table and at an inclined angle above said table, said retractor having a series of apertures and a series of projections arranged therearound, a flexible cable having a retracting blade secured at one end for insertion in an opening in a patient and a plug secured to the other end of said cable for insertion in any one of said apertures in said retractor, said projections acting to abut against and position said cable at a desired angle within the area bounded by said retractor.

8. The retractor assembly set forth in claim 7 including anchoring means for rigidly fastening said retractor to said table, said anchoring means including an anchor plate secured to said table, a bracket located on one side of said anchoring plate, said retractor being located on the other and opposite side of said anchoring plate, a flexible sterile barrier inserted between said anchoring plate and said retractor and also between said anchoring plate and said bracket and also extending over a patient located beneath said retractor to thereby provide a sterile barrier over said patient.

9. The retractor assembly as set forth in claim 8 including means for releasably securing said anchor plate to said table whereby said anchor plate, retractor, bracket and sterile barrier can all be removed from said table together as a unit.

10. A body support for being mounted transversely across an operating table for a patient undergoing surgery, said support comprising a base member mounted on said table, a first brace member secured to said base member and extending upwardly therefrom, a second brace member secured to said base member in transversely spaced relation from said first member and also extending upwardly from said table, said second brace member including a pair of vertically spaced pelvic area holders, one of said holders being vertically adjustable relative to the other holders, a C-shaped surgical retractor detachably secured to one of said braces and extending at an inclined angle over said braces so as to be positioned over a patient located between said braces, said retractor and braces being arranged so as to permit freedom of movement by a surgeon of the patient's leg while the patient is located between said braces and under said retractor, and means for adjusting one of said braces transversely relative to one another so as to firmly support a patient between said braces when said patient is lying on his side on said table.

11. The retractor assembly set forth in claim 10 including anchoring means for rigidly fastening said retractor to said one of said braces, said anchoring means including an anchor plate secured to one of said braces, a bracket located on one side of said anchoring plate, said retractor being located on the other and opposite side of said anchoring plate, a flexible sterile barrier inserted between said anchoring plate and said retractor and also between said anchoring plate and said bracket and also extending over a patient located beneath said retractor to thereby provide a sterile barrier over said patient.

12. The retractor assembly as set forth in claim 11 including means for releasably securing said anchor plate to said one of said braces whereby said anchor plate,

retractor, bracket and sterile barrier can all be removed as a unit from said one of said braces.

13. A table supported surgical retractor assembly comprising a generally C-shaped retractor including two legs, an intermediate portion and an open end; means for rigidly securing one of said legs of said retractor to an operating table with said retractor arranged at an inclined angle above said table, cable anchoring means located around said retractor, and a series of cable engaging projections arranged around said C-shaped retractor and cables for engagement in said anchoring means and for being trained around said projections so as to vary the direction of pull of said cables.

14. The retractor assembly set forth in claim 13 further characterized in that said securing means includes

an anchor plate secured to said table, a bracket located on one side of said anchoring plate, and said retractor is located on the other and opposite side of said anchoring plate.

15. The retractor assembly as set forth in claim 14 including means for releasably securing said anchor plate to said table whereby said anchor plate, retractor, and bracket can all be removed from said table together as a unit.

16. The retractor set forth in claim 13 including cable means extending across the open end of said C-shaped retractor, means for releasably fastening said cable means at each of its ends to said retractor, said cable means providing anchoring means across said open end for a retractor blade assembly.

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