

[54] **SELF-RETAINING SURGICAL RETRACTOR**

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[52] **U.S. Cl.**..... **128/20, 269/322, 269/328, 403/59**

[51] **Int. Cl.**..... **A61b 17/02**

[58] **Field of Search** **128/20, 361; 269/322, 325; 403/53, 58, 59, 63**

[56] **References Cited**

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[57]

ABSTRACT

A self-retaining surgical retractor having a retractor holder adapted to be attached to the side rail of an operating table. A retractor blade on a handle is attached to the retractor holder by means of a clamp head which permits four-way movement of the retractor blade for easy positioning. The clamp head may be locked easily and quickly with a single adjustment. The retractor blade is thereby held steady in all planes to provide steady consistent retraction.

11 Claims, 6 Drawing Figures

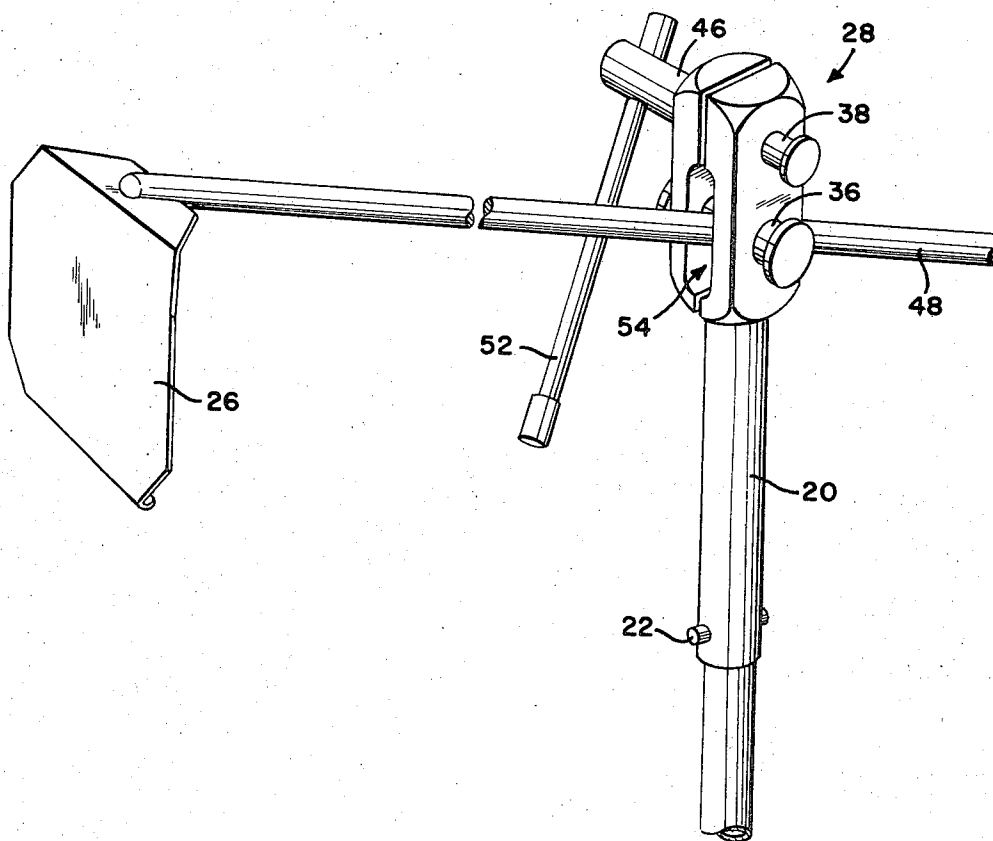


FIG-1

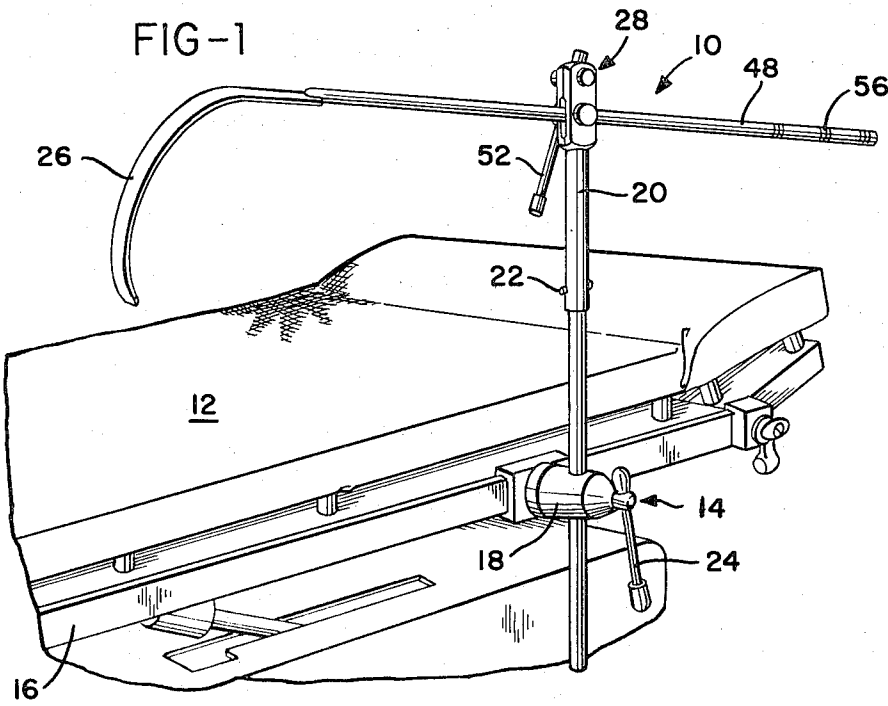


FIG-2

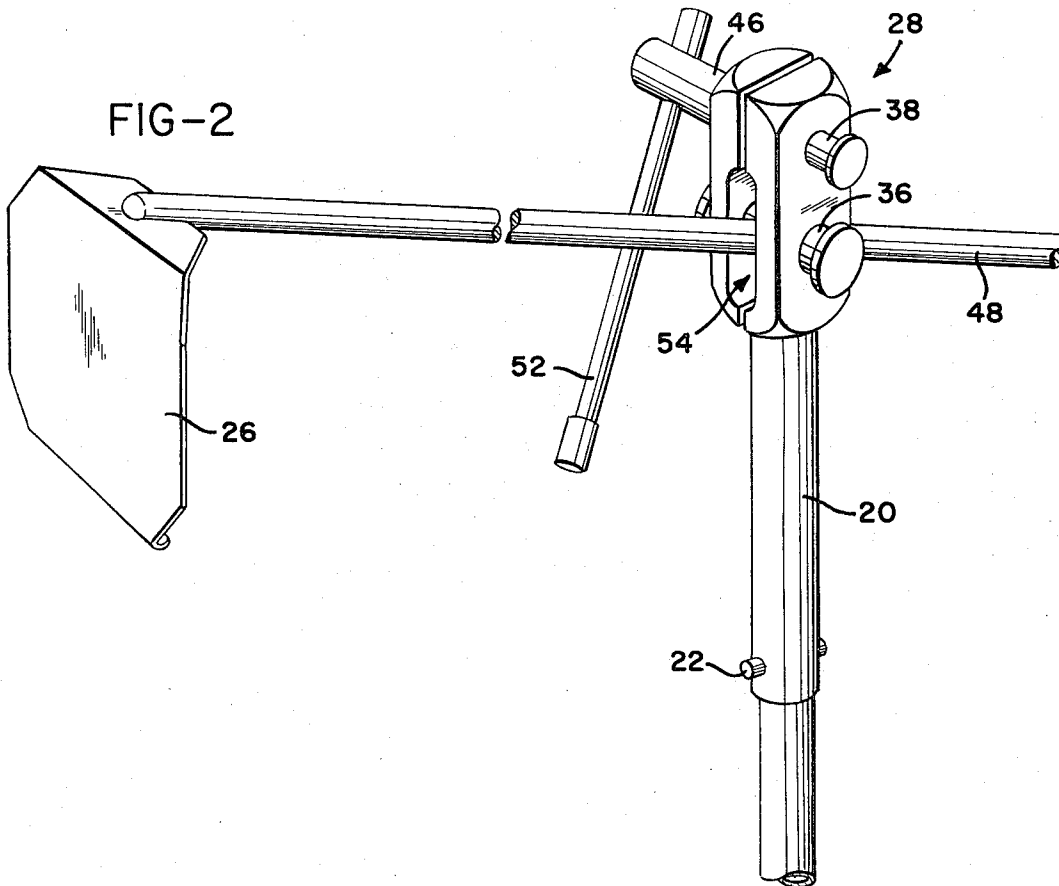


FIG-3

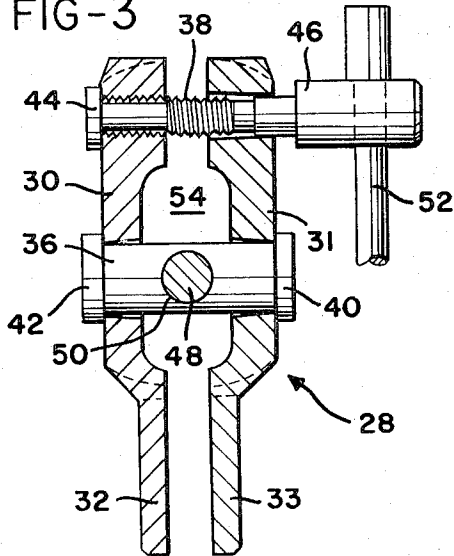


FIG-4

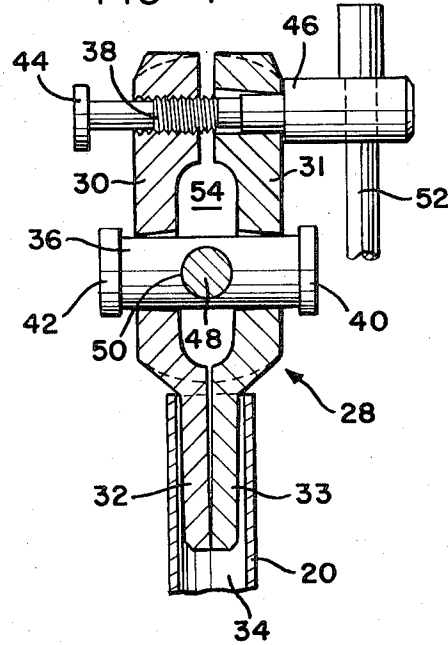


FIG-5

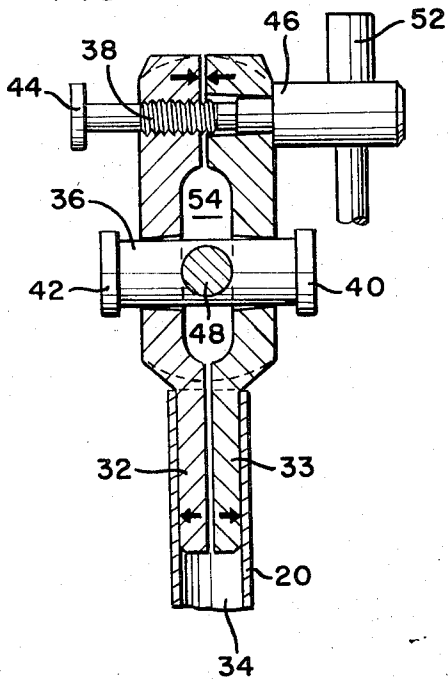
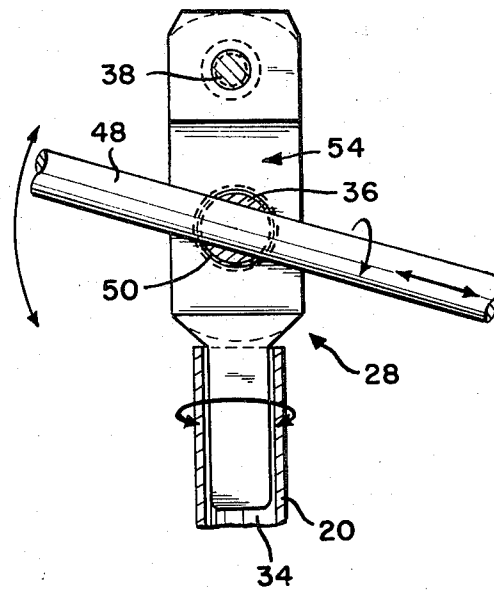


FIG-6



SELF-RETAINING SURGICAL RETRACTOR

BACKGROUND OF THE INVENTION

The present invention relates to a surgical retractor and more particularly to an improved self-retaining surgical retractor.

In a number of surgical operations it is necessary to hold the incision open with a retractor. When a surgeon's assistant is called upon to handle such retractors during an operation, valuable extra hands are lost in the procedure. Similarly, in the treatment of inferior vena cava syndrome during Caesarean section it is necessary that the operator or assistant displace the uterus to relieve the pressure that the uterus places on the inferior vena cava. Again this keeps the operator or assistant from performing other productive tasks.

To solve this problem self-retaining retractors have been used, thereby freeing the assistant's hands. A common type of self-retaining retractor is disclosed in Thompson "A New Self-Retaining Abdominal Wall Retractor," *American Journal of Surgery*, Vol. 103, May 1962. This type of self-retaining retractor has an L-shaped rod to which the retractor blades are attached by means of slidable universal clamps. Since the L-shaped rod extends across the operating table it is often necessary for the surgeon to work across the rod and/or around the retractor blades extending from it. Other types of self-retaining retractors are even more cumbersome since they often encircle the wound completely.

SUMMARY OF THE INVENTION

In accordance with the present invention, a self-retaining surgical retractor is provided which attaches to the rail of either side of a standard operating table. As such it is substantially out of the way of the surgeon during the operation.

A retractor holder is attached to the rail of the operating table by a movable stirrup holder of the type commonly used and may, thus, be adjusted laterally along the side rail. The retractor holder is a tubular rod which is also adjustable to the desired height within the stirrup holder.

Removably attached to the tubular rod is a clamp head which is adapted to fit into a hollow portion of the tubular rod. The handle of the retractor blade then attaches through a cylindrical pivot pin in the clamp head so as to be in slidable and rotatable contact therewith. The pivot pin serves as a means for a tilting movement of the retractor blade since it rotates with respect to the rest of the clamp head. Because the clamp head is also rotatable around the axis of the tubular rod to which it is attached, the clamp head alone provides for a four-way movement of the retractor blade. In addition since the stirrup holder may be moved along the rail and the height of the tubular rod adjusted within the stirrup holder which itself is rotatable, there exists three more means of adjusting the position of the retractor blade. These multiple modes of adjustment allow the surgeon quickly and easily to position the retractor blade as desired.

The tightening mechanism of the common stirrup holder locks the tubular rod in place. A single other tightening mechanism within the clamp head locks the clamp head and retractor blade in place. This locking of the clamp head against four-way movement is a truly

unique aspect of the present invention since one single adjustment holds the retractor blade steady in all planes. Thus, there is provided steady consistent retraction during surgery and the assistant is free to assist the operating surgeon.

Likewise, since a number of different types of retractor blades may be used interchangeably, the self-retaining retractor blade of the present invention provides a quick and easy means of retraction in numerous surgical situations. A broad blade can be used to retract the rib margin during surgery, whereas a narrow, flat and curved blade can be used to retract viscera. The broad blade may also be used to displace and hold the uterus away from the inferior vena cava to help prevent the inferior vena cava syndrome during Caesarean section.

Accordingly, it is a primary object of the present invention to provide an improved self-retaining retractor useful in a variety of surgical situations; another object of the present invention is to provide a self-retaining surgical retractor which attaches readily to the side rail of an operating table and is capable of being positioned quickly and easily; another object of the present invention is to provide a self-retaining surgical retractor having a clamp head which with one adjustment locks the retractor blade steady in all planes; and it is still a further object of this invention to provide a self-retaining surgical retractor which is completely sterilizable.

Other objects and advantages of the present invention will be apparent from the following description, the accompanying drawing and the appended claims.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of the self-retaining surgical retractor of the present invention attached to an operating table;

FIG. 2 is a perspective view of the clamp head portion of the self-retaining surgical retractor;

FIG. 3 is a sectional view of the clamp head in an open position;

FIG. 4 is a sectional view of the clamp head in assembled but unlocked position;

FIG. 5 is a sectional view of the clamp head in locked position; and

FIG. 6 is another view of the clamp head in assembled, but unlocked position, and showing the planes of movement of the retractor blade.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, which illustrates a preferred embodiment of the invention, there is shown a self-retaining surgical retractor 10 which is attached to an operating table 12 by means of a conventional stirrup holder 14. The stirrup holder 14 is movable along side rail 16 to provide lateral movement of the whole retractor unit 10. Likewise, the barrel 18 of stirrup holder 14 is rotatable to provide for angular position of the retractor 10. A retractor holder 20, in the form of a tubular rod, fits into stirrup holder 14 and the height of retractor 10 may be adjusted by raising or lowering tubular rod 20 within stirrup holder 14. A stop mechanism 22 prevents tubular rod 20 from being lowered too far. The handle 24 is used to tighten and lock stirrup holder 14 in place and to lock tubular rod 20 at the desired height and position.

A retractor blade 26 is attached to tubular rod 20 by means of a clamp head 28. As best illustrated in FIGS. 3-5, the jaws 30 and 31 of the clamp head 28 have coupling ends 32 and 33 which are adapted to fit into the hollow portion 34 of tubular rod 20. As shown by one of the directional arrows in FIG. 6, the unlocked clamp head 28 is free to rotate about the axis of tubular rod 20.

FIGS. 3-5 show the clamp head 28 of the present invention in three positions — open, assembled, and locked. In the open form (FIG. 3) jaws 30 and 31 are movable to the extent permitted by a cylindrical pivot pin 36 and a threaded screw 38. That is, each of the jaws 30 and 31 has two holes formed therein. Through the bottom aligned pair of these holes, both of which are conical, cylindrical pivot pin 36 is inserted. Its outer ends have bosses 40 and 42 attached to prevent jaws 30 and 31 from opening beyond a certain extent. Likewise, the top pair of aligned holes in jaws 30 and 31 has a threaded screw 38 inserted therethrough. The hole in jaw 31 is conical, while that in jaw 30 is counterthreaded to engage the threaded portion of threaded screw 38. Again bosses 44 and 46 limit the extent to which the top of jaws 30 and 31 are openable.

Cylindrical pivot pin 36 is pivotable or rotatable, and thus provides for a tilting type movement of retractor blade 26, the handle 48 of which is inserted through a hole 50 in cylindrical pivot pin 36. Handle 48 is slidably and rotatably received within hole 50. Thus as illustrated by the directional arrows in FIG. 6, when clamp head 28 is in the assembled but unlocked position (FIG. 4), blade 26 has three-way movement relative to clamp head 28. Also, as previously mentioned, clamp head 28 itself is further rotatable around the axis of tubular rod 20. Thus, clamp head 28 permits four-way movement of retractor blade 26.

All four of these directions of movement of blade 26 may be locked by use of threaded screw 38. In the drawings, a right handed tightening means is shown, although it is possible to provide a left handed tightening means, if desired. In the right handed arrangement shown, jaw 30 is threaded to receive the threading on screw 38. Slidable handle 52 is used to turn threaded screw 38 which is threadably received in jaw 30. In tightening, handle 52 is turned clockwise and boss 44 forces jaw 31 to press against handle 48 of blade 26 locking it against either sliding, rotating or tilting movement. This inward force on the upper part of jaws 30 and 31 is illustrated by the upper arrows shown in FIG. 5, wherein the locked clamp head 28 is shown. Since threaded screw 38 is at the top of jaws 30 and 31 and handle 48 is thicker than the space 54 which exists between jaws 30 and 31 when they are closed, handle 48 forms a fulcrum forcing coupling ends 32 and 33 of jaws 30 and 31 outwardly and into locking engagement with tubular rod 20. This outward pressure of ends 32 and 33 is illustrated by the lower set of arrows in FIG. 5. Since closed jaws 30 and 31 place pressure of handle 48, locking it in place, and since this also causes the locking of clamp head 28 relative to tubular rod 20, the tightening of threaded screw 38 serves to lock the retractor blade in place and hold it steady in all planes.

It should be further noted that there is threading only on a portion of threaded screw 38. The unthreaded portions permit the turning of threaded screw 38 without moving jaws 30 and 31 when the threading is not

engaged with the counterthreading of jaw 30. Therefore, when jaws 30 and 31 are open, turning screw 38 cannot apply further undesired opening pressure on the jaws and cannot thereby damage bosses 40-46 or the threads of screw 38.

The retractor blade 26 shown in FIG. 1 is thin, flat and curved. The one illustrated is also relatively narrow, although other widths may also be used. Such a blade is conveniently used to retract viscera. It is possible to use a broad, shaped blade such as that shown in FIG. 2, to retract the rib margin or to displace and hold the uterus in treating the inferior vena cava syndrome during Caesarean section. Blades of other shapes and dimensions may also be used depending on the type of blade needed for the particular surgical situation. All such blades may be used with clamp head 28 as long as handle 48 is sized to fit in hole 50.

The blade portion 26 is attached to handle 48 by means of a high intensity spot weld. This eliminates any need for a silver soldering material which presents problems in sterilizing. Likewise, all parts of the retractor are made of a sterilizable metal, such as stainless steel, and the entire retractor assembly 10 may be sterilized prior to the operation.

In addition, the area around this spot weld is ground smooth as are other rough parts on the retractor. This prevents damage to the surgical gloves on the hands of the person setting up the retractor. In that regard, grooves 56 are formed on the end of handle 48 opposite blade 26 in order to provide a means for the surgeon to grip the handle. These grooves 56 are made very fine to also prevent damage to the surgeon's gloves.

Thus, the surgeon may take the sterilized retractor 10, place tubular rod 20 in the stirrup holder 14, and position it. Since the stirrup holder 14 itself is usually not sterilized an aide locks the retractor holder 20 in place by tightening handle 24. The surgeon then positions retractor blade 26 and by merely tightening handle 52 of clamp head 28 locks the retractor blade steady in all planes. As such the retractor of the preferred embodiment provides steady consistent retraction and frees the surgeon's assistants to aid him elsewhere. All of this is accomplished easily, quickly, and without any danger to the sterile condition of the retractor blade or the surgeon's gloves.

While the article herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise article, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. A self-retaining surgical retractor, comprising:
 - a tubular rod adapted to fit into a movable stirrup holder on the side rail of an operating table,
 - a clamp head mounted on one end of said tubular rod so as to permit rotation of said clamp head around the axis of said rod,
 - a retractor blade, a handle attached to said blade, said handle being attached to said clamp head so as to be in slidable, rotatable contact therewith, said clamp head also adapted to permit tilting of said handle, and
 - a single means to tighten said clamp head so as to lock said handle in place and at the same time lock said clamp head against rotation around the axis of

said tubular rod, thereby holding said retractor blade steady in all planes.

2. A self-retaining retractor as set forth in claim 1 wherein said clamp head has two movable jaws having a pair of aligned conical holes therein with a cylindrical pivot pin inserted therethrough, said cylindrical pivot pin having a hole therein adapted to receive said handle in slidable and rotatable contact therewith, said pivot pin being pivotable to permit tilting of said handle.

3. A self-retaining retractor as set forth in claim 2 wherein said tubular rod has a hollow portion, and wherein said coupling portion of said clamp head consists of coupling ends to said jaws, said coupling ends adapted to fit into said hollow portion of said tubular rod so as to permit rotation of said clamp head around the axis of said rod.

4. A self-retaining retractor as set forth in claim 3 wherein said means to tighten said clamp head consists of a threaded screw inserted through another pair of holes in said jaws, one hole of which is conical, and threadably received in the one of said holes so as to permit opening and closing of said jaws by turning said screw, the closing of said jaws causing pressure to be applied on said handle locking it in place and at the same time causing outward pressure to be exerted at the end of the coupling ends of said jaws to prevent said clamp head from rotating around the axis of said tubular rod, thereby holding said retractor blade steady in all planes.

5. A self-retaining retractor as set forth in claim 1 wherein said retractor blade is thin, flat and curved.

6. A self-retaining retractor as set forth in claim 1 wherein said blade is broad and shaped.

7. A self-retaining retractor as set forth in claim 1 wherein all parts of said retractor are made of sterilizable stainless steel.

8. A self-retaining retractor as set forth in claim 1 wherein said handle has a series of fine grooves along the end opposite the blade.

9. A self-retaining retractor as set forth in claim 1 including means to adjust the height of said tubular rod

by raising or lowering its position within said stirrup holder.

10. A self-retaining retractor as set forth in claim 9 wherein said tubular rod has a stop mechanism to prevent said rod from being lowered beyond said stop mechanism.

11. A self-retaining surgical retractor made entirely of sterilizable stainless steel, comprising:

a tubular rod adapted to fit into a movable stirrup holder on the side rail of an operating table, one end of said tubular rod having a hollow portion, a clamp head having two movable jaws, each with a coupling piece which is adapted to fit into said hollow portion of said tubular rod so as to permit rotation of said clamp head around the axis of said rod, each jaw also having two holes therein,

one aligned pair of holes in said jaws being conical and having a cylindrical pivot pin inserted therethrough,

said cylindrical pivot pin having a hole therein adapted to slidably receive the handle of a retractor blade, the other aligned pair of holes in said jaws having a threaded screw therethrough, one of said holes being conical and the other being adapted to threadably receive said screw so as to permit opening and closing of said jaws by turning said screw, and

a retractor blade, a handle attached to said blade, said handle having a series of fine grooves along the end opposite said blade, said handle being suitable for insertion through said hole in said cylindrical pin and being of sufficient thickness such that when said screw is tightened the jaws of said clamp head apply pressure on said handle locking it in place and at the same time causing outward pressure to be exerted on said coupling pieces at the end of said jaws to prevent said clamp head from rotating around the axis of said tubular rod, thereby holding said retractor blade steady in all planes.

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