

[54] **MAGNETIZED SURGICAL INSTRUMENT TRAY RESTRAINT**

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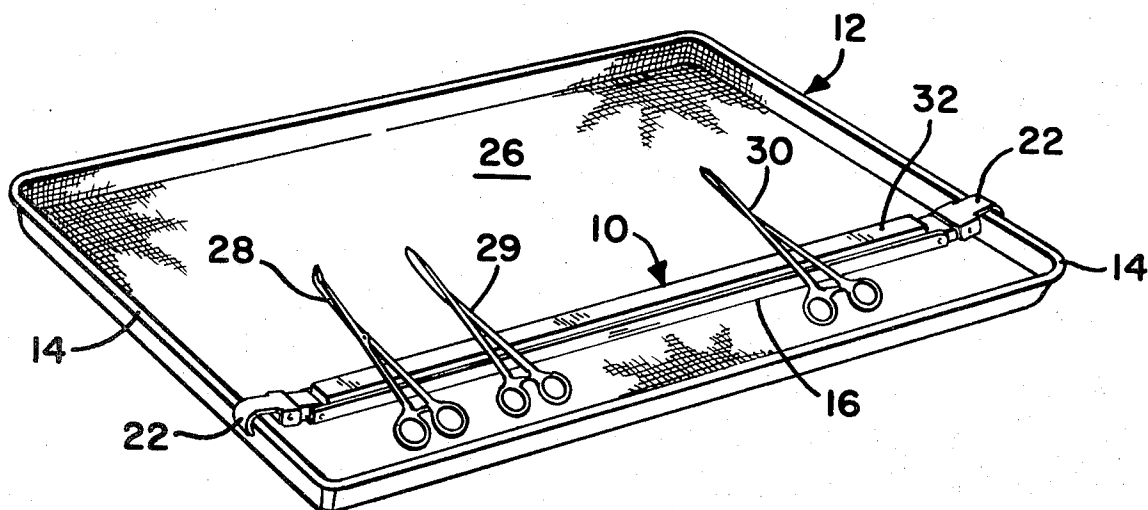
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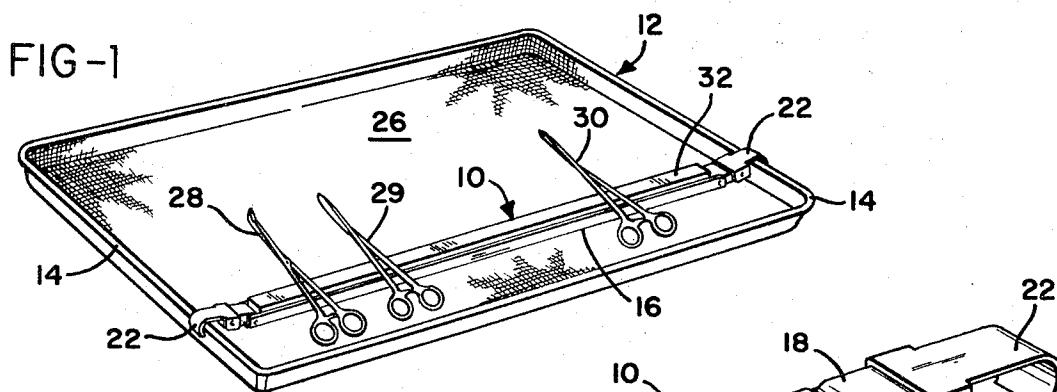
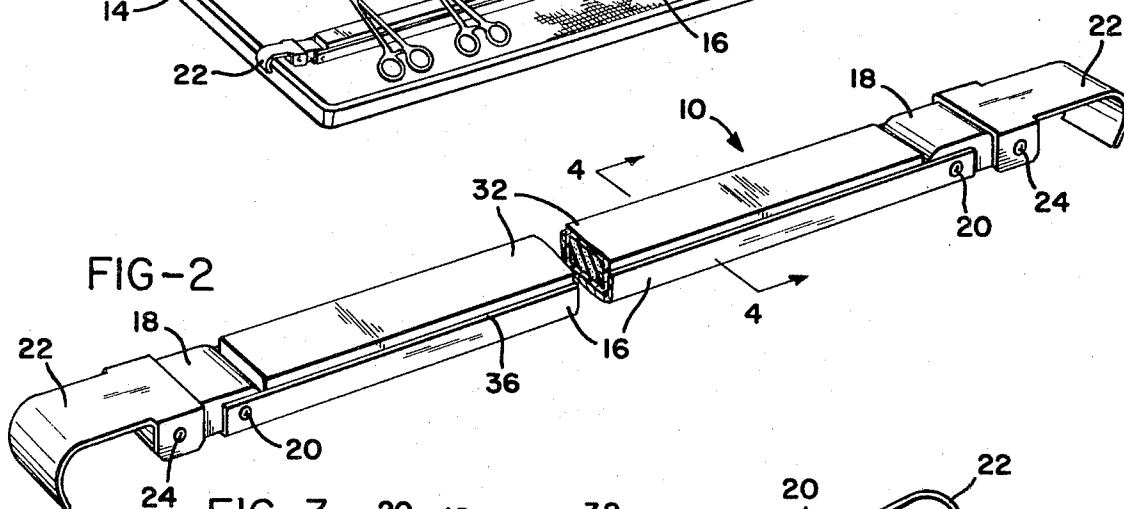
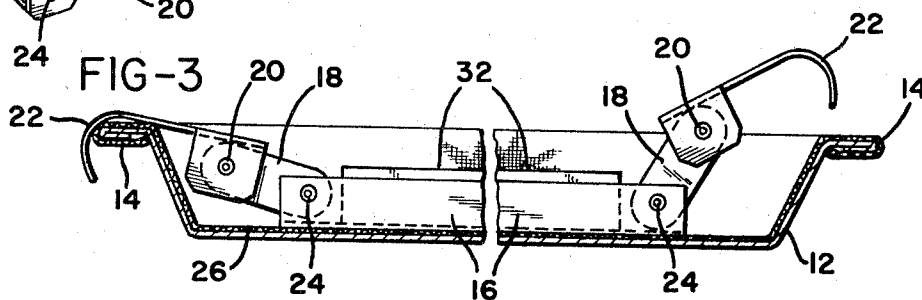
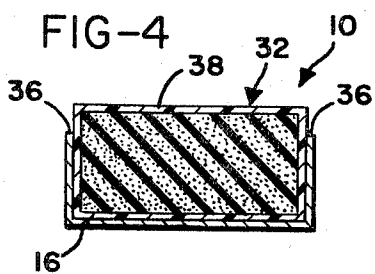
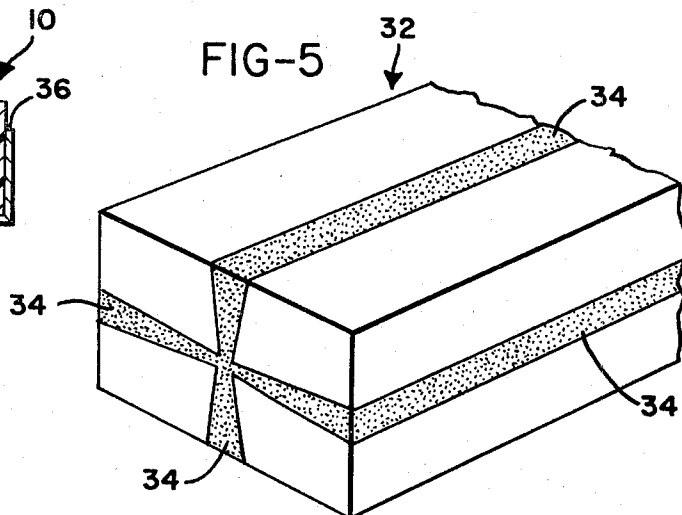
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[57] **ABSTRACT**

An instrument tray restraint having a replaceable magnetized bar. The restraint comprises a metal U-shaped channel into which a sterilizable flexible magnetized bar is inserted. The restraint is held onto a surgical instrument tray by tension clamps which facilitate easy attachment, removal, and adjustment of the restraint. The magnetized bar has a sufficient magnetic force to securely, yet releasably hold metallic surgical instruments onto the bar.

7 Claims, 5 Drawing Figures





MAGNETIZED SURGICAL INSTRUMENT TRAY RESTRAINT

BACKGROUND OF THE INVENTION

The present invention relates to a means for holding surgical instruments securely onto an instrument tray and more particularly to a magnetized surgical instrument tray restraint having a replaceable magnetized bar.

When a tray full of instruments accidentally slides during surgery, a minor disaster occurs. The surgeon's concentration is interrupted — often at a critical moment. In addition, crucial time is lost in rearranging and even more time is lost if the surgical surfaces are damaged or the instruments must be sterilized again.

Prior to the present invention no effective means of securely holding instruments on the instrument tray was commercially available. It was, rather, incumbent on those handling the instrument tray to use the utmost care in an attempt to prevent accidental spilling of the instruments.

SUMMARY OF THE INVENTION

In accordance with the present invention, a magnetized surgical instrument tray restraint is provided to securely, yet releasably hold the instruments on the tray. The restraint includes a metal U-shaped channel into which a magnetized bar is inserted. A tension clamp is joined to each end of the U-shaped channel by means of an extensible material. The tension clamps are adapted to fit over the edges of an instrument tray so as to hold the magnetized restraint in place on the tray. Since the tension clamps are extensibly joined to the U-shaped channel, this allows stretching for attachment and removal of the clamps and in addition permits torsional twisting of the restraint as it adjusts itself to the exact tray level.

The magnetized bar which is inserted into the U-shaped channel is a flexible plastic or rubbery material having a magnetizable filler. An intense magnetic field is impressed into this bar so as to provide it with sufficient magnetic force to securely, yet releasably hold magnetically responsive surgical instruments onto the bar.

The magnetized bar is coated with a substantially non-porous heat resistant plastic coating material. This is necessary because the uncoated bar, when heated in an autoclave at 270° F, may give off gases. Thus, it would be unsuitable for surgical purposes. The coated bar, on the other hand, is completely cleanable and sterilizable as are the other parts of the restraint.

The bar is held in place in the U-shaped channel by the magnetic attraction between the magnetized bar and the metal channel as well as by the shape of the channel. As such, it may be easily removed and turned over or replaced when it becomes worn.

Accordingly, it is a primary object of the present invention to provide a means for holding surgical instruments securely onto an instrument tray;

another object of the present invention is to provide a magnetized surgical instrument tray restraint which clamps over the edges of an instrument tray;

a further object of this invention is to provide a magnetized surgical instrument tray restraint which has a replaceable magnetized bar; and

it is still a further object of the present invention to provide a magnetized bar for such instrument tray re-

straints which is sterilizable and which has a sufficient magnetic force to securely yet releasably hold metallic surgical instruments onto the bar.

Other objects and advantages of the 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 an instrument tray having the magnetized restraint of the present invention clamped thereto;

FIG. 2 is a perspective view partially in section showing the magnetized surgical instrument tray restraint of the present invention;

FIG. 3 is an end cross-sectional view of an instrument tray having the restraint of the present invention thereon with one end clamped to the tray and the other end not clamped;

FIG. 4 is a cross-sectional view along the lines 4—4 of FIG. 2; and

FIG. 5 is an end view of the magnetized bar of the present invention, showing the magnetic flux within the bar.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, which illustrates a preferred embodiment of the invention, there is shown a magnetized restraint 10 attached to an instrument tray 12. A typical instrument tray measures approximately 19 × 12¼ inches, is approximately ¾ inch deep, and has a lip 14 around the periphery. Usually such trays are made of sterilizable stainless steel and covered with a sterilized cloth 15 which protects the surgical surfaces and prevents undue noise in placing the instruments on the tray.

As illustrated in FIGS. 1 and 3, the preferred restraint 10 is sized to fit along the length of tray 12. However, it should be apparent that restraints may also be made which fit along the width of the tray. In addition, restraints of other sizes may be made to be attached to trays of other sizes or even other objects in the operating room.

The magnetized surgical instrument tray restraint 10 comprises a U-shaped channel 16 (see FIG. 4) made of a sterilizable metal, preferably 1/32 inch magnetic stainless steel. In order to fit along the length of a typical tray, the channel 16 is approximately 16¼ inches long. It is also 13/16 inch wide and 5/16 inch deep, although other widths and depths may be used. Attached to each end of U-shaped channel 16 is an extensible connector 18 (see FIG. 2) made of a sterilizable material such as rubber. In the form shown each of these rubber connectors 18 is about ¾ inch long and is attached, with a ¾ inch overlap, to channel 16 by a roll pin 20. Likewise, a 1¼ inch clamp 22 is attached, with a ¾ inch overlap, to connector 18 by roll pin 24.

The roll pins 20 and 24 permit pivoting of connector 18 relative to channel 16, and of clamp 22 relative to connector 18. Thus, when attached to instrument tray 12 as in FIGS. 1 and 3, channel 16 will adjust to the level of the surface 26 of tray 12. Since connectors 18 are made of an extensible material they stretch to facilitate attachment and removal of clamps 22 from the edge of tray 12, and to provide the tension required to keep restraint in place on tray 12. Likewise, when restraint 10 is attached to tray 12, connectors 18 permit

torsional twisting of channel 16 relative to tray 12 to further adjust restraint 10 to the level of the tray. In addition, such torsional movement facilitates the placement and removal of the surgical instruments, such as instruments 28, 29 and 30 (see FIG. 1), on restraint 10 since the instruments often bridge between restraint 10 and the edge of tray 12.

A flexible magnetized bar 32 is inserted into channel 16. Preferably bar 32 is an extruded plastic or rubbery material which contains a magnetic filler. As such bar 32 is readily magnetizable. It has been found that an intense magnetic field can be impressed into bar 32 and that this can be done so that the lines of flux 34 (FIG. 5) of the magnetic field run down the center of each side of the bar 32. This is desirable since it localizes the magnetic force along the center of bar 32 which acts as a fulcrum for instruments 28, 29 and 30 when they are placed on bar 32. Thus, it is easy to position surgical instruments 28, 29 and 30 on tray 12 and across bar 32 and to remove them from the tray. In this regard, it should be emphasized that the magnetic force which is impressed into bar 32 is strong enough to hold most magnetically metallic surgical instruments securely in place and yet weak enough to permit instantaneous removal of the instruments from restraint 10.

In order to fit into a channel 16 of the size previously disclosed, magnetized bar 32 should be approximately 15 $\frac{1}{8}$ inches long, $\frac{3}{8}$ inch wide, and $\frac{1}{8}$ inch thick. At this thickness the surface of bar 32 will be about $\frac{1}{8}$ inch above the edge 36 (FIG. 4) of channel 16. As such only the rubbery surface of bar 32 will be contacted by instruments 28, 29 and 30, and the instruments will not be placed against the metal edge 36 of channel 16. Placing the surgical instruments on a metal surface not only causes unnecessary clatter which may interrupt the surgeon's concentration, but may also damage the surgical surfaces of the instruments.

Bar 32 is held in channel 16 by the magnetic attraction between the magnetized bar and the metal channel and by the shape of channel 16. Since bar 32 is only magnetically held in place, it is removable from channel 16. This is convenient since with prolonged use bar 32 will become scuffed and worn on its surface. In that event, it is possible to remove bar 32 to clean it, turn it over, or replace it. With channel 16 preferably 16 $\frac{1}{4}$ inches long, $\frac{3}{4}$ of which is taken up by connectors 18, a 15 $\frac{3}{8}$ inch bar fits into the channel with a $\frac{1}{8}$ inch clearance. This 1/16 inch at each end of channel 16 leaves room for prying bar 32 out of the channel.

Another important feature of the present invention is the fact that bar 32 has a coating 38 on its surface. This coating is substantially non-porous and is heat resistant to the extent that it may be heated safely in an autoclave. The coating 38 is preferably of a latex material which may or may not contain a dye. This coating is necessary since the uncoated material of bar 32 may give off undesirable gases when heated in an autoclave at 270° F. Therefore, a low porosity latex coating is

used to prevent this from happening and to render bar 32 sterilizable. In addition, coating 38 presents an attractive surface which can be scrubbed and otherwise cleaned without damage to bar 32.

Since coated bar 32 is sterilizable, and metal channel 16 and connectors 18 are also sterilizable, restraint 10 may be sterilized in the same manner as other surgical equipment. The sterilized restraint 10 may be simply clamped to sterilized tray 12 by the person arranging the tray, and thereafter the surgical instruments are placed on restraint 10. The magnetized restraint of the present invention holds the surgical instruments securely in place and in the desired order despite whatever movement or jostling of the tray occurs. During the operation, the instruments are easily removed from the magnetized restraint and presented to the surgeon for use.

While the articles herein described constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to these precise articles, 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 magnetized surgical instrument tray restraint comprising:

a U-shaped channel,

a flexible magnetized bar retained within said channel, said bar having sufficient magnetic force to securely yet releasably hold metallic surgical instruments onto said bar, and

tension clamps extensibly joined to each end of said U-shaped channel by rubber connectors and adapted to fit over the edges of an instrument tray so as to hold the magnetized restraint in place on said tray.

2. A magnetized surgical instrument tray restraint as set forth in claim 1 wherein said magnetized bar is an extruded plastic having a magnetic filler therein.

3. A magnetized surgical instrument tray restraint as set forth in claim 2 wherein said magnetized bar is coated with a substantially non-porous latex material.

4. A magnetized surgical instrument tray restraint as set forth in claim 2 wherein said magnetized bar has an intense magnetic field impressed therein, the flux of said field running down the center of each side of said bar.

5. A magnetizable surgical instrument tray restraint as set forth in claim 1 wherein said magnetized bar is removable from said U-shaped channel.

6. A magnetized surgical instrument tray restraint as set forth in claim 1 wherein said rubber connectors are attached to the ends of said U-shaped channel and to said tension clamps by roll pins.

7. A magnetized surgical instrument tray restraint as set forth in claim 1 wherein all parts are sterilizable.

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