

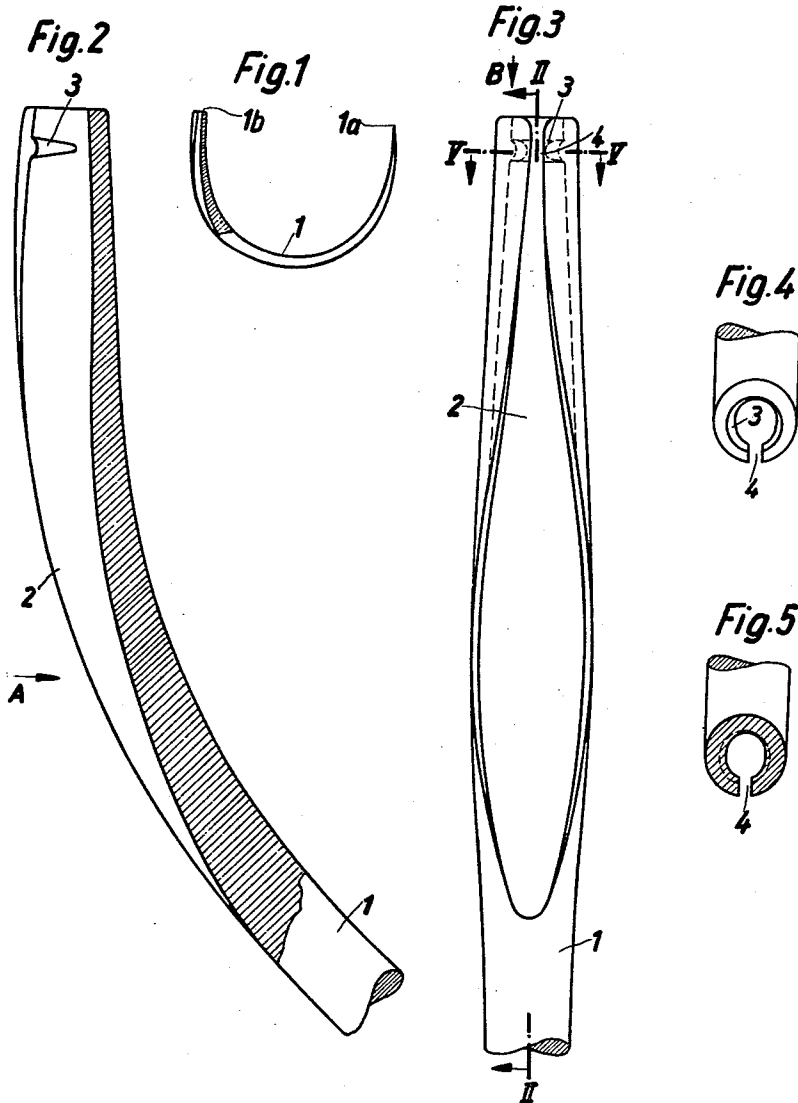
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SURGICAL NEEDLE FOR MEDICAL PURPOSES

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SURGICAL NEEDLE FOR MEDICAL PURPOSES
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The present invention concerns an atraumatic surgical needle. With surgical sewing needles provided with an eye in the manner of ordinary sewing needles, the concentration or location of the thread or catgut at both sides of the eye enlarges the stitch hole so that the latter after the passage of the needle and the double thread portion is not any longer filled by the single thread.

In order to prevent the danger of infection inherent to this situation, so-called atraumatic surgical needles have been created with an axial passage from which the thread or catgut comes out as a single thread only.

However, heretofore great difficulties have been encountered with this type of surgical needle concerning the introduction of the thread into the passage of such needle and in particular in securing the thread in said passage in such a way that it will not accidentally pull itself out of said passage and thereby out of the needle.

It is, therefore, an object of the present invention to provide an atraumatic surgical needle which will overcome the above mentioned difficulties.

It is a further object of this invention to provide an atraumatic surgical needle which will make it possible easily to introduce the thread or catgut into the needle and will furthermore assure that the thread or catgut cannot accidentally be removed from the needle by the ordinary pull occurring when sewing up a wound.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawing, in which:

FIG. 1 illustrates a side view of an atraumatic surgical needle according to the present invention.

FIG. 2 illustrates on a considerably larger scale than that of FIG. 1 a partial longitudinal section through the rear portion of the needle of FIG. 1, said section being taken along the line II—II of FIG. 3.

FIG. 3 is a top view of FIG. 2 as seen in the direction of the arrow A.

FIG. 4 is an end view of FIG. 3 seen in the direction of the arrow B.

FIG. 5 is a section taken along the line V—V of FIG. 3.

The surgical needle according to the present invention is characterized primarily by the following features:

(a) The passage in the needle for receiving one end of the thread or catgut has a portion remote from the rear end of the needle which portion has a diameter substantially corresponding to the thickness of the thread or catgut to be received by said passage. The passage narrows in diameter near the rear end of the needle. Preferably but not necessarily the passage gradually narrows in diameter from said portion toward the rear end of the needle or is near the rear end of the needle provided with inwardly extending beads or both.

(b) The passage is slit open in longitudinal direction and, more specifically, if a curved needle is employed, the needle is preferably slit open along that side thereof which has the largest radius.

(c) The slit has at that portion thereof where the passage has a diameter corresponding substantially to the thickness of the thread to be used likewise a width corresponding approximately to the thickness of the thread so

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that the thread can be pressed through the last mentioned slit portion into the passage.

(d) The thickness of the walls of the slit needle end is so selected that the thread inserted into the slit at its widest portion and introduced into the passage will, when pulled toward the needle end, elastically widen the slit at the needle end and thereby slip into the adjacent passage portion so that the thread will pass through the needle end toward the outside in undamaged condition.

Referring now to the drawing in detail, FIG. 1 illustrates a curved needle according to the invention. However, the invention, while being described in detail in connection with this type of needle, is equally well applicable to straight needles. As will be evident from FIG. 1, the needle, generally designated with the reference numeral 1, has a point or front end 1a and a rear end 1b. The needle is provided with an axial passage 2 (FIG. 2) which may be spaced from the end 1b of the needle for instance but not necessarily by a distance approximately equalling 1/3 of the length of the needle. As will be evident from FIG. 3, the passage 2 narrows toward the needle end. The widest portion of the passage 2 remote from the needle end has a diameter approximately equalling the greatest diameter of a thread or catgut to be used in connection with the respective needle.

At that side of the curved surgical needle which has the largest radius of curvature the passage 2 is slit open in longitudinal direction of the needle. The thus formed slit 4 has adjacent the widest portion of the passage 2 a width which corresponds substantially to the greatest width of said passage 2. From this point of the widest width of slit 4, said slit narrows toward the needle end as is clearly evident from FIG. 3.

The threading or introduction of the catgut or thread into the needle according to the present invention is effected in the following manner. The needle is held in such a way that the slit 4 is up. Thereupon the thread or catgut is held over the widest portion of the slit in such a way that one end of the catgut can be properly held between the thumb and the forefinger of the hand holding the needle. Thereupon the thread portion above the widest portion of the slit is pressed by the finger against said widest portion of the slit while the thread portion beyond and adjacent the needle end is grasped between the forefinger and the thumb of the other hand and pulled downwardly into the narrower portion of the slit while simultaneously the other hand exerts a pull on the thread. As a result thereof, the thread will bend apart the walls of the narrower slit portion so that the thread will slip through said narrower slit portion into the adjacent passage portion. Inasmuch as simultaneously a pull is exerted on the thread beyond said needle end, the thread portion which was originally inserted into the widest portion of the passage will slip into the narrower portion of the passage adjacent the needle end where it will be firmly and safely held against any pull exerted on the thread during the sewing operation. This is due to the fact that as soon as the thread or catgut has slipped through the narrower slit portion, the walls adjacent said narrower slit portion will elastically move again toward each other and thereby exert a firm clamping pressure on the adjacent thread portion. The holding pressure exerted by the end portion of the needle upon the thread may further be increased by providing the passage 2 at the rear end of the needle with inwardly extending beads 3 (see FIGS. 4 and 5). These beads extend from the slit over a portion of the inner wall and decrease in height toward the bottom of the passage 2. The passage walls confining the slit 4 gradually decrease in thickness from the bottom of the passage toward said slit portion so that they can elastically be spread apart and will elastically

move toward each other again when the spreading pressure ceases.

It is, of course, to be understood that the widest portion of the passage and of the slit must be sufficiently long to be able to receive such a length of the thread that the latter can be firmly held in and pressed down into this portion by a finger during the first phase of the threading operation.

After the sewing operation has been completed, it is merely necessary to exert a strong pull in the direction of the needle axis on the thread portion protruding from the needle end in order to completely remove the thread from the needle whereupon the latter can be used for further sewing operations.

The surgical needle according to the invention in addition to being reemployable, has the following advantages over heretofore known needles of the general type involved. Above all, the needle according to the present invention is free from bores transverse to the needle axis which bores weaken the cross section of the needle and bring about the danger that the needle will break at the weakened portion. Furthermore, the needle is relatively simple in production and permits the production of needles of smallest dimensions.

The needle according to the present invention furthermore permits the employment of catgut thread of ordinary design without an end knot and a thickening or arming of the thread end by means of a sleeve or the like as it is mostly required with heretofore known surgical needles. Foremost, however, the needle according to the invention permits a simple and fast threading-in of the catgut thread without the danger of being damaged thereby.

The needle according to the invention has the further special advantage that due to the shape of the slit, it will be impossible for the thread to be pulled out of the passage by the ordinary sewing pull. If the needle according to the invention is held at a right angle toward the protruding or free portion of the thread during the sewing operation, a considerable increase in the pull on the thread is possible without pulling the thread out of the passage of the needle.

It is, of course, to be understood that the present invention is, by no means, limited to the particular construction shown in the drawing but also comprises any modifications within the scope of the appended claims.

Thus, while the surgical needle according to the present invention is preferably made of carbon steel, the needle of the invention is, of course, not limited to this particular material.

What I claim is:

1. A surgical needle having a point at its front end and having a wider rear end, said needle having a longitudinal passage extending from an outer needle surface portion spaced from said point and said rear end to said rear end while gradually increasing in depth from said surface portion toward said rear end, that portion of said passage which is near said rear end of said needle having a width narrower than the width of said passage over the major length thereof, said needle being provided with a longitudinal slit along said passage to thereby form a slit-like opening of said passage along the same, said slit having its widest portion near said surface portion and decreasing in width gradually from said widest portion toward said rear end.

2. A surgical needle having a shank with a point at its front end and with a considerably wider rear end, said needle having a longitudinal passage extending from an outer shank surface portion spaced from said front and rear ends to said rear end while gradually increasing in depth from said surface portion toward said rear end, said needle being provided with a longitudinal slit extending along said passage and first increasing in width from said surface portion to a widest portion and then gradually decreasing in width from said widest portion toward said rear end, said passage gradually decreasing in diameter from said widest portion toward said rear end and having passage restricting means near said rear end.

3. A surgical needle according to claim 1, in which the wall portion of the needle at the rear end thereof is slightly elastically bendable to allow temporary widening of said slit for permitting the pulling of a thread to be used with said needle through said slit toward the needle end.

4. A surgical needle according to claim 2, in which said passage near said needle end is provided with inwardly extending bead means.

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