

Aug. 4, 1959

R. TAUBER

2,897,820

SURGICAL NEEDLE GUIDING INSTRUMENT

Filed Oct. 23, 1956

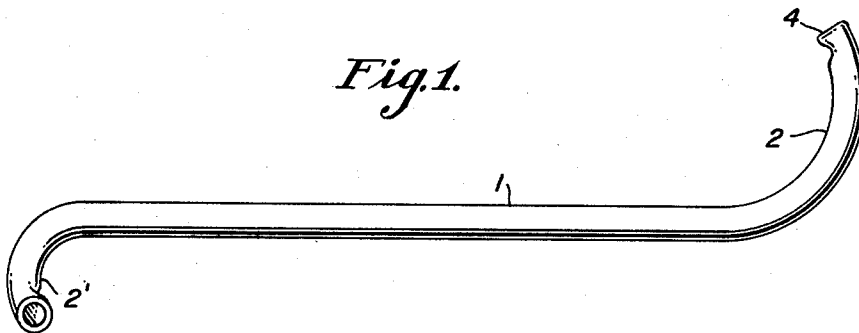


Fig. 1.

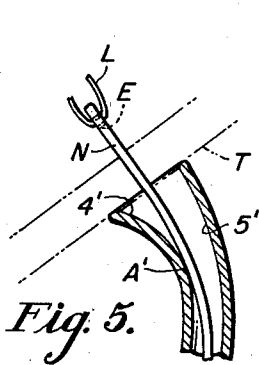


Fig. 5.

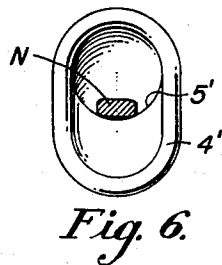


Fig. 6.

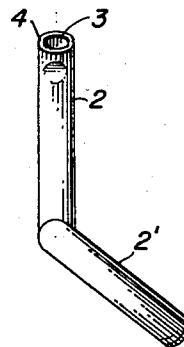


Fig. 2.

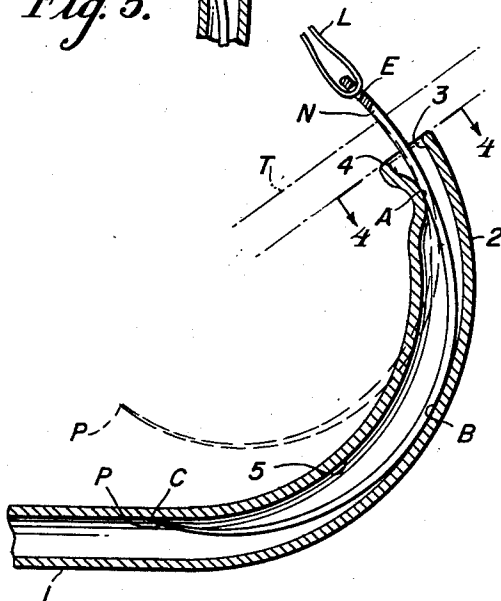


Fig. 3.

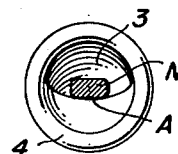


Fig. 4.

INVENTOR

ROBERT TAUBER

BY

Serge R. Heller
ATTORNEY

1

2,897,820

SURGICAL NEEDLE GUIDING INSTRUMENT

Robert Tauber, Philadelphia, Pa.

Application October 23, 1956, Serial No. 617,796

7 Claims. (Cl. 128—334)

This invention relates to a surgical instrument which is useful primarily in ligating body tissues, particularly in body cavities, during the course of remedial surgery.

In surgical operations of various kinds, for example in vaginal hysterectomies, tissue to be ligated is not readily accessible to the surgeon's fingers and sometimes not even clearly visible to him; it has therefore been a common practice for a surgeon to rely heavily on tactile sensations in manipulating the surgical needle, usually releasably clamped in a needle holder, and to position the end of one finger under the tissue structure through which the needle is to be passed, at least until the point of the needle can be felt after having pierced the tissue. As the points of surgical needles used in this way are quite sharp it therefore often happens that the needle point passes through not only the tissue being ligated but also through the surgeon's sterile glove and into the finger being used to guide the needle, giving rise to possible infection either to the surgeon or patient, or both, while other tissues, desirably left free of the needle, may be pierced thereby in passing unless the needle point is properly guided during completion of the ligating pass.

It is therefore an object of the invention to provide an instrument adapted to receive the point and at least a substantial part of the shank of a curved surgical needle to inhibit the needle point from piercing tissues not intended by the surgeon to be pierced during a surgical operation while the needle is being drawn through and removed from tissue being ligated.

Another object is to provide a surgical instrument suitable for use in conjunction with curved surgical needles which is adapted to receive the needle point on its emergence from a body of tissue through which it has been passed, to thereafter enclose it as the needle is passed entirely through the tissue, and then to serve as a holder for the needle in subsequent manipulations normally required for completing a ligating operation, the enclosed needle during such manipulations being prevented from contact with other tissues or body structures which might be injured thereby.

A still further object is to provide in a surgical needle guiding instrument a conformation suitable for receiving a surgical needle and for releasably holding it but inhibiting the draft of tissue into the instrument through adherence to the needle in such manner as to wedge the tissue between the two.

Another object is to provide a ligating technique suitable for use by a surgeon especially in operating within a confined space, as within a body cavity, in which the point of the surgical needle after passage through a body of tissue and on its emergence therefrom is in-sheathed in a tubular curved receptacle suitable for firmly but releasably holding it during subsequent manipulations as in drawing the ligature through the tissue body and enabling the needle to be readily removed from the place at which it has passed through the tissue without risk of damage either to or by its point.

Other objects, purposes and advantages of the inven-

2

tion will hereinafter more fully appear or will be understood from the following description of certain embodiments of it illustrated in the accompanying drawing in which:

5 Fig. 1 is a side elevation of the instrument;
Fig. 2 is an end elevation thereof;

Fig. 3 is an enlarged fragmentary transverse section of one needle guiding portion of the instrument with a standard curved surgical needle after insertion therein following passage of its point and a large part of its shank through a tissue structure fragmentarily illustrated in broken lines, and

10 Fig. 4 is a further enlarged end view on line 4—4 in Fig. 3;

15 Figs. 5 and 6 generally corresponding to Figs. 3 and 4 illustrate a slightly different embodiment of the invention.

Referring now more particularly to the drawing, the instrument therein shown conveniently may be made from tubular stock shaped to provide a central rectilinear portion 1 and curved needle guiding ends 2, 2' which preferably are substantially identical but disposed in mutually divergent planes with respect to the axis of the rectilinear portion 1; they may, however, be of different sizes to accommodate correspondingly different sized needles if desired. Hence description of one of them herein will suffice as either may be used for actually guiding a needle to suit the convenience of the surgeon during a single ligating operation, the curvature and angularity of the other with respect to it then affording a secure grip of the instrument to enhance his control of the guide being used.

More particularly each end of the instrument is formed in a curve extending substantially arcuately for somewhat less than 180° from its juncture with the mid-portion 1, the radius of curvature of its arcuate center line being desirably slightly greater than that of the curved needle N with which it is to be used. Slightly back from the mouth 3 of the needle guide the wall of the latter is depressed or otherwise deformed on the inner side of the curve, that is, in the zone of least radius of the tube considered as a segment of a torus to provide a boss 4 which, as will hereinafter appear, forms a guide for the needle and tends to inhibit entry of the tissue T being ligated into the tubular needle guiding passageway 5 in the guide.

45 In carrying out a tissue ligating operation with the aid of this instrument and a curved surgical needle N of usual character it will be understood the latter is normally manipulated initially with the aid of a needle holder (not shown) in which the needle, near its eye E, is clamped during passage of its point P through tissue T.

50 In preparation for this step, or while it is being carried out, the open end of the needle guide appropriate for the needle being used is positioned in supporting relation to tissue T in alignment with the path of the needle point and on the opposite side of the tissue from that at which the point is first inserted or to be inserted. In consequence as the needle point passes through the tissue it enters the tubular passageway 5 in the guide, the boss 4 separating the needle from the edge of the passageway entrance and thus preventing the tissue entering with it or becoming wedged and thus damaged between the needle and the guide. Thereafter as the needle is progressively sent home or nearly so in the guide, its radially inner surface clears the inner wall of the guide at point A on boss 4 (Fig. 3) and then successively contacts a point B on a radially outermost portion of the said inner wall and then a point C on a radially innermost portion of said wall in respect to the curvature of the guide a little less than 180° removed from the point A near its outer extremity. It will be appreciated that the guide curvature is determined with relation to the needle curvature

when freely at rest in such wise that the needle is brought into contact with point A after contacting points B and C and is thereby sprung to a slightly larger than normal radius of curvature so as to be securely but releasably held by friction in the guide passage, normal curvature of the needle being indicated in Fig. 3 in broken lines.

The instrument may then be manipulated at will to draw the needle eye and a desired length of ligature L through tissue T without risk of impaling adjacent tissues or the surgeon's finger on the needle point, the needle of course first being released from the needle holder with the aid of which it was initially entered through tissue T and into the guide.

As noted above, the ends of the instrument are desirably substantially identical, although they may be made of different curvature to accommodate different sizes of needles; as their planes of curvature preferably diverge at an angle of about 135° this divergence, when the length of the rectilinear portion 1 is about a hand's breadth or slightly less, enables the end guide not at the moment being used for reception of a needle to embrace the surgeon's hand and thus steady his grip on the instrument and facilitate his placing the mouth of the guide at the other end of the instrument at a desired location for precise reception of the needle. Furthermore while as stated the instrument conveniently may be made wholly from tubular stock, it will be obvious that if preferred the rectilinear portion 1 may be solid with the tubular end portions appropriately secured thereto.

In the embodiment of the invention illustrated in Figs. 5 and 6 there is formed at the mouth of the guide a lip 4' curved inwardly on a short radius thus in effect supplanting boss 4 in the guide shown in the preceding figures. The presence of this lip inhibits the pinching or wedging of the tissue between the needle and guide during entry of the former into the later since, like boss 4, it insures the outermost point A' of contact between the needle and the inner wall of the guide being located at an appreciable distance from the outer extremity of the guide passageway 5'. It is thus impossible with either construction for the tissue adjacent the point of emergence of the needle to be caught between the needle and guide to impair the freedom of withdrawal of the guide and needle therefrom or to risk injury to the tissue itself.

It will of course be apparent that the instrument may readily be cleaned and sterilized by autoclaving, immersion in an antiseptic fluid or otherwise, and used repeatedly in an indefinite number of times, as no part of it is subjected to appreciable wear.

While I have herein illustrated and described certain embodiments of the invention with considerable particularity it will be understood I do not intend to be limited thereby in any way as changes in the form, proportions and size of the instrument and its several parts will occur to those skilled in the art and may be made if desired without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described my invention, I claim and desire to protect by Letters Patent of the United States:

1. A surgical instrument of the character described comprising a rectilinear mid-portion, a tubular end portion curved in approximate conformity with a curved surgical needle and adapted to receive at least the point of such needle after its passage through living tissue and means proximate the free extremity of said end portion disposed in the passage therein in the zone of its least radius operative to maintain the needle out of contact with said extremity to thereby inhibit passage of the tissue therebetween during insertion of the needle into said end portion.

2. An instrument as defined in claim 1 in which said means comprise the wall of the tubular end portion proximate its extremity indented to form a boss projecting into the passage in said portion.

3. An instrument as defined in claim 1 having an opposite end portion curved in a plane disposed angularly to the plane of curvature of the first end portion, either of said end portions being adapted to partially embrace the hand of an operator grasping the rectilinear portion when manipulating the instrument.

4. An instrument as defined in claim 1 in which the extremity of said curved portion defines substantially an elliptical plane figure lying normal to the axis of the curved tubular portion with said axis intersecting the major axis of the elliptical figure at a point more nearly adjacent one end thereof than the other.

5. An instrument as defined in claim 1 in which said means comprise a sharply inwardly curved lip at that portion of its extremity radially innermost in relation to the radius of curvature of the curved tubular end portion.

6. An instrument as defined in claim 1 in which said means comprises the wall of its tubular curved end portion deformed proximate its extremity in its zone of least radius of curvature to provide a zone on the inner wall of the tube of lesser radius of curvature than the rest of the tubular portion.

7. In combination with an instrument of the character described comprising a rectilinear portion and a tubular curved end portion, a resilient curved surgical needle within the curved end portion of the instrument engaging at spaced points a radially inner portion of the inner wall of said end portion adjacent its outer extremity, a radially outer portion of said inner wall substantially midway circumferentially between said extremity and the rectilinear portion of the instrument and a radially inner portion of said inner wall at a point circumferentially more remote from said extremity than said radially outer portion, said inner wall portions defining an arc of larger radius than the normal radius of curvature of said needle.

References Cited in the file of this patent

UNITED STATES PATENTS

659,422	Shidler	Oct. 9, 1900
2,544,282	Sinclair et al.	Mar. 6, 1951
2,589,499	Lake	Mar. 18, 1952
2,601,564	Smith	June 24, 1952

FOREIGN PATENTS

800,886	France	May 11, 1936
---------	--------	--------------