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SURGICAL STITCHING INSTRUMENT FOR EYE AND PLASTIC SURGERY

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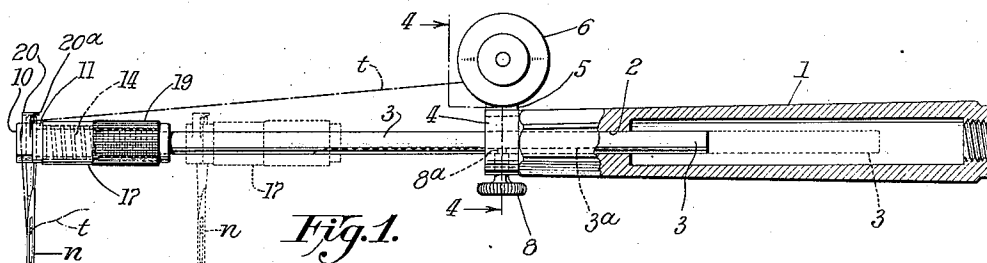


Fig. 1.

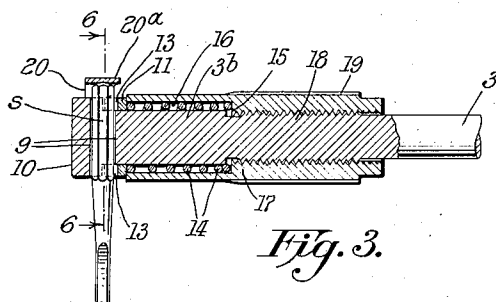


Fig. 3.

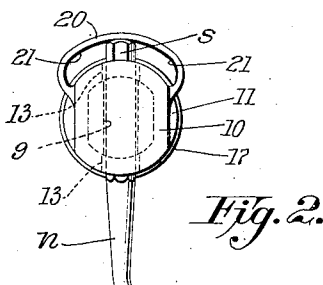


Fig. 2.

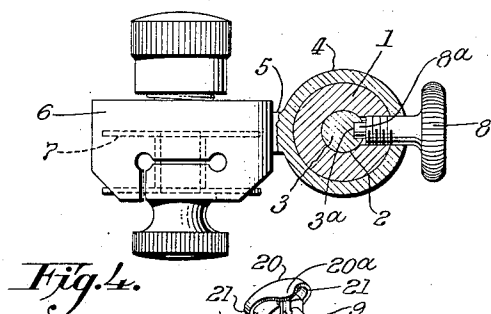


Fig. 4.

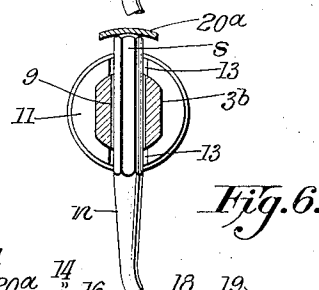


Fig. 6.

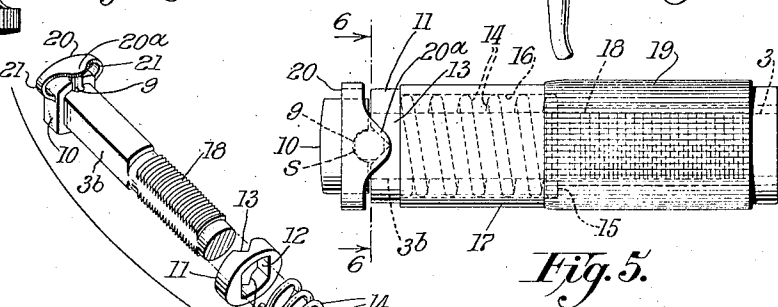


Fig. 5.

Fig. 7.

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UNITED STATES PATENT OFFICE

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SURGICAL STITCHING INSTRUMENT FOR
EYE AND PLASTIC SURGERY

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9 Claims. (Cl. 128—340)

This invention relates to surgical stitching instruments and more particularly to an instrument especially adapted for eye and plastic surgery and other suturing operations in which a relatively small and/or lightweight instrument may be used to advantage.

One object of this invention is to provide a surgical stitching instrument capable of being readily adjusted as to length to adapt it for the specific suturing operation it is to perform. For example, when eye, plastic surgery or other delicate surface operations are to be performed it is desirable that the suturing instrument be relatively small and of light weight so that it conveniently may be held in and manipulated by the fingers of the surgeon. For deep suturing, as, for example, when operating within the abdominal cavity it is essential that the suturing instrument be materially longer than is desirable for surface suturing.

This invention therefore has provided a lightweight suturing instrument in which the needle-carrying bar is telescopically mounted in the handle of the instrument and therefore may be retracted or extended as desired.

Another object of the invention is to provide an improved and simplified form of needle clamping means operable wholly from the free or needle end of the instrument and adapted yieldingly to grip the straight shank of a needle to prevent the needle from dropping from the needle-clamp and to permit the needle to be turned 360 degrees about the axis of its shank.

Still another object is to provide means operating in conjunction with the yielding needle-clamping means positively to lock the needle in any one of a plurality of angular positions.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawing of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the drawing,

Fig. 1 is a side elevation, partly in section, of a surgical stitching instrument embodying the present invention, showing, in full lines, the needle-supporting bar extended from the handle and, in dotted lines, the bar partially retracted.

Fig. 2 is an enlarged left end view of the instrument shown in Fig. 1, with a portion of the needle broken away.

Fig. 3 is an enlarged longitudinal sectional view of the forward or needle-holding end of the instrument.

Fig. 4 is an enlarged transverse sectional view taken on the line 4—4 of Fig. 1.

Fig. 5 is an enlarged plan view of the left end of the instrument shown in Fig. 1.

Fig. 6 is a transverse sectional view taken substantially on the line 6—6 of Figs. 3 and 5, and

Fig. 7 is a disassembled perspective view of the various elements comprising the left end portion of the instrument shown in Fig. 1.

Referring more specifically to the drawing, the invention is disclosed as embodied in a surgical stitching instrument comprising a lightweight hollow handle 1, having, in one end, a bore 2 in which is slidingly fitted a needle-supporting bar 3. Surrounding one end of the handle 1 is the cylindrical portion 4 of a spool-holder 5 including a cup-like portion 6 housing a spool 7 upon which is wound suturing thread *t* which is led to the eyes of the needle *n*, held at the free end of the bar 3, as later will be described. This spool-holder and the means for supporting the spool therein and the manually releasable spool-locking means for preventing inadvertent rotation of the spool are generally similar to the construction disclosed in my United States Patent No. 2,327,353, August 24, 1943. Inasmuch as this spool-holder forms no part of the present invention detail illustration and description thereof is deemed unnecessary.

The bar 3 is telescopically mounted in the handle and, when desired, may be extended even beyond the position shown in full lines in Fig. 1. Actually the bar 3 may be extended until the right end thereof (Fig. 1) coincides with the right end of the bore 2 in the handle, without adversely affecting the support of the bar in the handle. Likewise, when desired, the bar may be adjusted inwardly into the handle thereby to shorten the over-all length of the instrument. The maximum inward adjustment of the bar would carry the needle-clamping sleeve, later to be described, into contact with the left end of the handle. The bar is locked in its various positions of adjustment by means of a manually actuated thumb-screw 8 threaded through the handle and bearing against the bar. To prevent rotation of the bar in the handle, the bar is formed with a longitudinal slot 3^a into which the reduced inner end 8^a of the thumb-screw is fitted.

The shank *s* of the needle *n* is preferably made octagonal in cross section and the needle-clamp is so constructed that it yieldingly grips the shank

of the needle to prevent the needle from falling therefrom and to permit it to be rotated about the axis of its shank. The needle-clamp is also designed to lock the needle in any one of eight predetermined angular positions.

This needle-clamp comprises a bore 9 formed partially in a head 10 formed on the outer end of the bar 3 and partially in the bar adjacent the head. The semi-circular wall of the bore in the head 10 constitutes a fixed jaw of the needle-clamp which engages one side of the shank of the needle. Cooperating with the fixed jaw is a movable jaw comprising a washer-like member 11 having a central aperture 12 having straight sidewalls slidably fitted upon a flattened portion 3^a of the bar 3 adjacent the head 10. Engagement of the straight sidewalls of the aperture with the flat walls of the bar prevents rotation of the member 11. At diametrically opposite sides of its center, the jaw member 11 is formed with aligned V-shaped notches 13 which face the arcuate wall of the bore 9 in the head 10. The flat walls of the notches are adapted to engage alternate flat sides of the octagonal shank of the needle, as shown in dotted lines in Fig. 5.

The movable clamp jaw is urged toward the stationary jaw by a coil spring 14 surrounding the flattened portion 3^a of the needle-supporting bar 3 and bearing, at one end, against the washer 11 and, at its other end, against a shoulder 15 formed within a bore 16 in a manually rotatable clamp-locking sleeve 17. The sleeve 17 is threaded upon a threaded portion 18 of the bar 3 and has a knurled outer surface 19 which facilitates manual rotation of the sleeve.

When the sleeve 17 is backed off to the right from the position shown in Fig. 3, the left end of the sleeve will be separated from the jaw 11 which, however, will be maintained in pressure contact with the shank of the needle by the spring 14. With the parts in that position the needle shank will be yieldingly gripped between the fixed and movable jaws and therefore will be held against dropping from the instrument. The needle may then be rotated about the axis of its shank to any desired one of eight predetermined angular positions. In each of those positions the flat walls of the V-shaped notches 13 in the movable jaw will engage alternate flat faces on the octagonal shank of the needle, as hereinbefore explained. When the desired angular setting of the needle has been obtained the sleeve 17 is screwed to the left (Fig. 3) against the member 11 and increases the pressure of the clamp jaws on the shank of the needle, thereby positively locking it against axial displacement or further rotation.

Secured at its opposite ends to the head 10 of the needle-supporting bar 3, is a combined needle-stop and thread-guiding member 20. This member has its mid-portion 20^a spaced from the head 10 and off-set to overlie the shank of the needle thereby limiting the upward movement of the needle. At each side of the needle-shank the member 20 provides a loop 21 which affords a guide for the suturing thread in its passage from the spool 7 to the needle. The thread guide to be used will depend upon whether the needle projects to the right or to the left of the axis of the instrument.

From the foregoing it will be apparent that this invention has provided an improved lightweight surgical stitching instrument particularly adapted for delicate suturing operations but which, by extension of the needle-

carrying bar, may also be utilized to advantage for deep suturing operations.

Having thus set forth the nature of the invention, what I claim herein is:

1. An extensible surgical stitching instrument comprising a handle, a needle-supporting bar telescopically mounted in said handle for endwise adjustment relative thereto, means to lock said bar in said handle in its various positions of axial adjustment, and a needle-clamp at the outer end of said bar.

2. An extensible surgical stitching instrument comprising a handle, a needle-supporting bar telescopically mounted in said handle for endwise adjustment relative thereto, means to prevent relative rotation between said bar and handle, means to lock said bar in said handle in its various positions of axial adjustment, and a needle-clamp at the outer end of said bar.

3. An extensible surgical stitching instrument comprising a handle, a slotted needle-supporting bar mounted for axial adjustment in said handle, means carried by said handle and entering the slot in said bar for preventing rotation of the bar in the handle, means to lock said bar in said handle in its various positions of axial adjustment, and a needle-clamp and actuating means therefor at the outer end of said bar.

4. An extensible surgical stitching instrument comprising a hollow handle having a reduced bore in its forward end, a slotted needle-supporting bar slidably mounted in said bore for axial adjustment, a needle-clamp at the outer end of said bar, and a thumb-screw threaded through said handle and bearing against said bar to hold the bar against axial movement and having a portion entering the slot in the bar to hold the bar against rotation in the handle.

5. A surgical stitching instrument comprising a needle-supporting bar, a yielding needle-clamp at one end of said bar, and manually actuatable means located at said free end of the needle-supporting bar and adjacent said needle-clamp to tighten the grip of the needle-clamp thereby to prevent rotation of the needle therein.

6. A surgical stitching instrument comprising a needle-supporting bar having a fixed needle-clamping jaw adjacent one end, a complementary movable needle-clamping jaw slidably mounted on said bar, spring means acting on said movable jaw to urge it into yielding contact with a needle resisted by said fixed jaw, and means, supplemental to said spring means, acting directly on said movable jaw positively to force it into clamping contact with the needle.

7. A surgical stitching instrument comprising a needle-supporting bar having, adjacent one end, a fixed needle-clamping jaw, a complementary movable needle-clamping jaw slidably mounted on said bar, a sleeve mounted on said bar and having an internal abutment, a coil spring surrounding said bar and having one end in contact with said movable jaw and its other end in contact with said abutment, said spring urging said movable jaw into yielding contact with a needle abutting said fixed jaw, and means for adjusting said sleeve on said bar to cause it to press said movable jaw into positive locking contact with said needle.

8. A surgical stitching instrument comprising a needle-supporting bar, a fixed needle-clamping jaw provided by said bar adjacent one end thereof, a movable needle-clamping jaw comprising a washer-like member slidably mounted on said bar, said member being formed with spaced

and aligned V-shaped needle-shank receiving notches in the face thereof adjacent said fixed jaw, a sleeve rotatably mounted upon the forward end portion of said bar and having an internal abutment, a coil spring surrounding said bar within said sleeve and having one end thereof in contact with said abutment and its opposite end in contact with said movable jaw to cause said jaws yieldingly to grip a needle-shank, and a screw-threaded connection between said sleeve and bar whereby rotation of said sleeve in one direction causes it to force said movable jaw into

locking contact with a needle shank held in said jaws.

9. A surgical stitching instrument as set forth in claim 8 in which the washer-like member comprising the movable needle-clamping jaw is formed with a central aperture having straight sidewalls which contact flat sidewalls on said needle-supporting bar, thereby to prevent rotation of said jaw against rotation on said bar and to maintain said V-shaped notches in a predetermined position relative to the fixed jaw.

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