Feb. 18, 1947. J. D. KARLE 2,416,260

NEEDLE-THREADER AND LOOP-LIFTER FOR USE WITH SURGICAL STITCHING INSTRUMENTS

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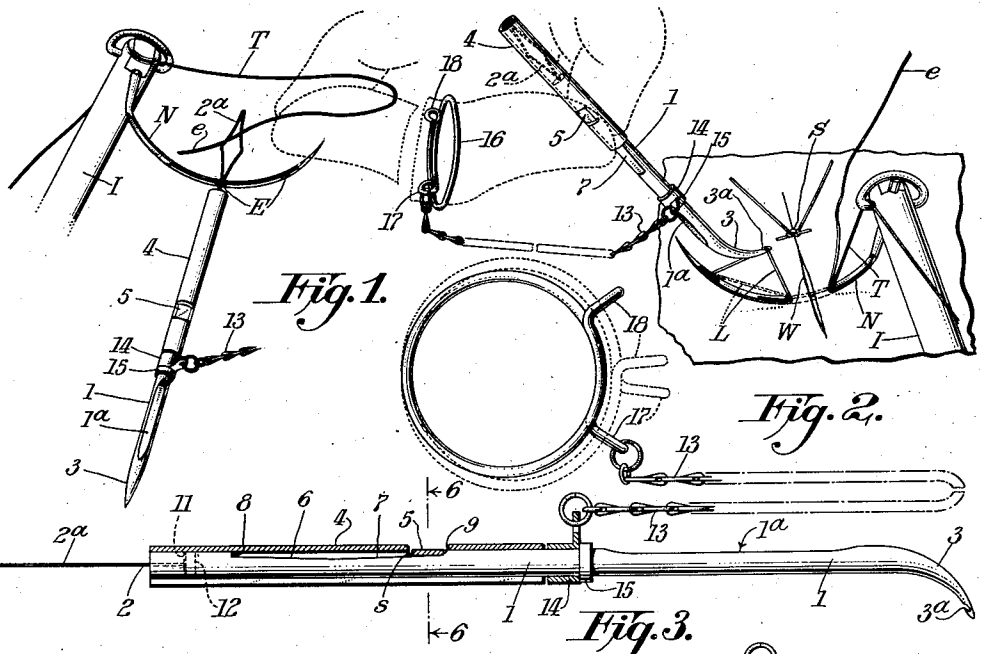


Fig. 1.

Fig. 2.

Fig. 3.

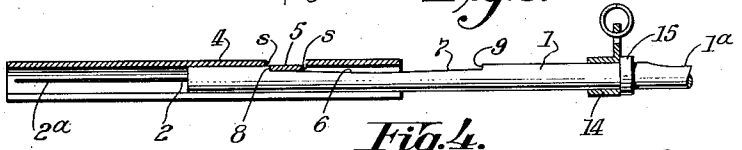


Fig. 4.

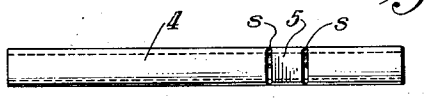


Fig. 5.

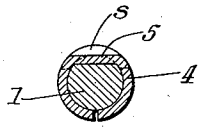


Fig. 6.

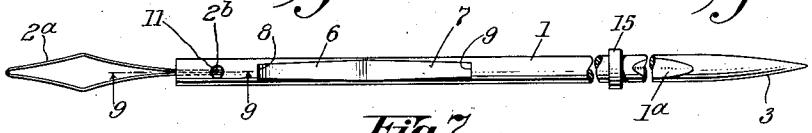


Fig. 7.

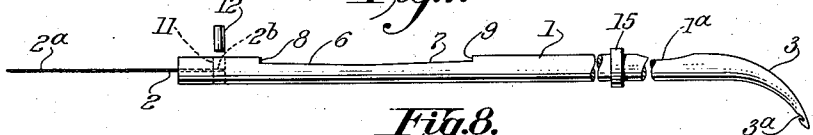


Fig. 8.

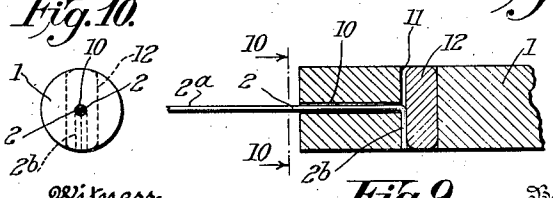


Fig. 10.

Fig. 9.

Inventor

John D. Karle

Witness:

Godfrey Peine

By John F. Heine

Attorney

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NEEDLE THREADER AND LOOP LIFTER FOR USE WITH SURGICAL STITCHING INSTRUMENTS

John D. Karle, Roselle Park, N. J., assignor to The Singer Manufacturing Company, Elizabeth, N. J., a corporation of New Jersey

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5 Claims. (Cl. 128—340)

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This invention relates to a device designed to be used in conjunction with a surgical stitching instrument of the type employing a curved eye-pointed needle such as shown, for example, in my United States Design Patent Des. 133,827, Sept. 22, 1942, and illustrated and described more specifically in my United States Patent No. 2,348,218, May 9, 1944.

In a surgical stitching instrument of this type a suturing thread passes from a spool, carried by the instrument, through a thread-guide at the forward end of the instrument and thence through one or more thread-eyes formed in the blade of the curved needle.

During use of the instrument, the point of the needle is inserted into the flesh tissue at one side of a wound to be closed and is caused to emerge from the tissue at the opposite side of the wound. This passes a loop of the suturing thread through the flesh tissue beneath the surface of the wound. Thereafter the free end of the thread is pulled through the needle puncture and the needle is retracted and withdrawn from the flesh tissue, thereby leaving the suturing thread extending through the needle puncture with a portion thereof projecting, in opposite directions, from the points of entry and emergence of the needle. These portions are thereafter tied together to form the suturing stitch.

Inasmuch as surgical suturing instruments are almost always handled with rubber gloves considerable difficulty heretofore has been experienced in threading the suturing thread through the eye (or eyes) of the needle and also in grasping one limb of the thread loop passed through the flesh tissue to draw the free end of the thread through the needle puncture.

This invention has as an object to provide a simple and inexpensive implement which will serve the dual function of threading the needle and of lifting the free limb of the needle loop and pulling the free end of that limb through the needle puncture in the flesh tissue.

Another object of the invention is so to construct the combined needle-threader and loop-lifter that, when used as a loop-lifter, the needle-threader will be guarded against accidental contact and damage.

Another object of the invention is so to construct the implement that the member which serves as a guard for the needle-threader may also serve as an extension of the handle of the loop-lifter, thereby facilitating the handling of the implement when used to lift thread loops, and

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especially when performing sub-surface or cavity suturing.

Still another object of the invention is to provide simplified means for holding the handle extension of the loop-lifter selectively either in position to expose the needle-threader, for a needle-threading operation, or in position to protect the needle-threader when the implement is used as a loop-lifter.

A further object of the invention is to provide means to attach the combined needle-threader and loop-lifter to the hand of a user so as to prevent accidental dropping of the implement.

A still further object of the invention is to provide improved and simplified means for removably securing the needle-threading wire loop in its supporting element.

With the above and other objects in view, as will be hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings 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 drawings:

Fig. 1 is a perspective view showing my improved implement in the operation of threading a needle of a surgical stitching instrument.

Fig. 2 is a perspective view of the implement being used as a loop-lifter to pick up the free limb of a thread-loop passed through flesh tissue by the surgical stitching needle.

Fig. 3 is a side elevation, partly in section, of my improved implement with the needle-threader guard in retracted position to expose the needle-thread-loop.

Fig. 4 is a fragmentary view, similar to Fig. 3, with the needle-threader guard in advanced position to protect the needle-threader loop.

Fig. 5 is an elevational view of the needle-threader guard.

Fig. 6 is an enlarged transverse sectional view taken on the line 6—6 of Fig. 3.

Fig. 7 is a plan view, with parts thereof broken away, of the principal element of the improved needle-threader and loop-lifter.

Fig. 8 is a side elevation of the element, shown in Fig. 7 but showing, in addition, a wire-loop retaining plug about to be inserted therein.

Fig. 9 is an enlarged sectional view, taken on the line 9—9 of Fig. 7, but with the wire-loop retaining plug in its effective position.

Fig. 10 is a section on the line 10—10 of Fig. 9.

Referring more specifically to the drawings, the invention is disclosed as embodied in a combined needle-threader and loop-lifter comprising a rod-like main body-member 1 having, at one end, a substantially diamond-shaped wire loop 2a, formed from a spring steel wire 2, adapted to serve as a needle-threader, as later will be described, and at its opposite end, a curved and tapered hook-portion 3 designed to serve as a loop-lifter and preferably having therein a thread-engaging notch 3a which prevents the suture thread from accidentally sliding off the hook-portion 3. Slidingly mounted on the member 1 is a sleeve-like sheet metal sheath or guard 4 which, when in the position shown in Figs. 1 and 3, is retracted to expose the needle-threading loop 2a. When the device is to be used as a loop-lifter the sleeve 4 is slid lengthwise of the member 1 to the position shown in Figs. 2 and 4 in which the sleeve serves to protect the wire loop 2a and also as an extension of the handle of the loop-lifter.

To limit the movement of the sleeve on the member 1 and frictionally to retain it in each of its extreme positions thereon, the sleeve is formed with a flattened and depressed slightly resilient portion 5 which, in its oppositely directed movements, alternately engages the oppositely inclined flat surfaces 6 and 7 on the member 1 and abuts the shoulders 8 and 9 thereon. This flattened portion 5 is preferably formed by making two saw cuts *s* across the sleeve 4 and depressing and flattening the metal therebetween.

The wire 2 forming the needle-threading loop 2a is preferably secured to the member 1 by having its free end portions 2b inserted into an axial bore 10, in the member 1, to a position in which they intersect a transverse aperture 11. A plug 12, of slightly less diameter than the aperture 11 and having rounded ends, is thereafter driven into that bore thus causing the end portions 2b of the wire to be turned down and forced into contact with the wall of the aperture 11, as shown in Fig. 9. This securely fastens the wire 2 in the member 1 but permits it to be removed therefrom and replaced by another, should the wire loop be damaged or broken. To remove the wire from the member 1 it is necessary only to drive out the plug 12 and then withdraw the wire from the bore 10. A new wire may then be inserted and secured as above described.

Operation of needle threader

When the device is used as a needle-threader the guard sleeve 4 is retracted, as above described, to expose the wire-loop 2a. The surgical stitching instrument I is then held in one hand of the user with the needle N projecting therefrom. With the thumb and index finger of the other hand grasping the device, the user projects the wire loop 2a through an eye E of the needle, the loop contracting as it passes through the needle-eye and thereafter expanding to its normal position. The user may then release the device and the expanded loop 2a, engaging the walls of the needle-eye, will retain the threader in the position shown in Fig. 1. With the thumb and finger of his hand which previously had held the device, the user projects the end *e* of the suture thread T through the loop 2a, after which he again grasps the device and pulls the loop 2a, and the thread therein, through the eye of the needle, as is common in the use of needle-threaders.

Operation of loop-lifter

When the device is to be used as a loop-lifter the guard sleeve 4 is extended, as shown in Figs. 2 and 4, to protect the needle-threader loop 2a and to afford an extended handle for the loop-lifter.

Fig. 2 illustrates the device being used as a loop-lifter during a suturing operation. In this use, the needle N is passed through the flesh tissue, entering and emerging from opposite sides of the wound W to be closed. In its passage through the flesh tissue, the needle carries with it a bight of the suture thread. One limb L of the bight extends, chord-like, from the point where the needle emerges from the flesh tissue to the eye of the needle adjacent the point thereof. With the device held between the thumb and index finger, the user engages, with the hook 3, the chord-like limb L of the loop which constitutes the free end *e* of the thread. Then by moving the device away from the wound, the free thread-end *e* is drawn through the needle puncture so that it thereafter projects from the flesh tissue at that side of the wound from which the point of the needle emerged. The needle is then retracted and the supply-end of the suture thread projects from the flesh tissue at the opposite side of the wound. The two oppositely projecting portions of the thread are thereafter tied together to complete a suturing stitch as shown at S in Fig. 2.

For certain purposes, it may be advantageous to grasp the device close to hooked end portion thereof. To facilitate this use of the device the member 1 is preferably formed with a flattened portion 1a which affords means for preventing accidental rotation of the device in the fingers of the user.

To prevent accidental dropping of the device, means is provided whereby it may be attached to the thumb or finger of the user. This means preferably comprises a flexible chain 13 connected, at one end, to a sleeve 14 rotatably mounted on the member 1 intermediate one end of the sleeve 4 and a fixed collar 15 on the member 1. The opposite end of the chain 13 is connected to an expansible and contractible split wire ring 16 having off-set end portions 17 and 18. This ring is adapted to be placed upon the thumb or finger of a user as shown, for example, in Fig. 2. The ring normally contracts to the position shown in full lines in Fig. 3 but may be expanded to the position shown in dotted lines in that figure, to facilitate the placing thereof on the thumb or finger of the user, by pressing together the off-set end portions 17 and 18.

From the foregoing it will be apparent that this invention has provided a simple and easily manipulated device adapted to perform two functions in conjunction with the formation of suturing stitches viz. the threading of the needle and the lifting of the loop and pulling out of the free thread end. It will also be apparent that the device contains one element, to wit the sleeve 4, which serves the dual function of protecting the needle-threader loop 2a against accidental damage and also as an extended handle when the device is used as a loop-lifter.

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

1. A device for use in conjunction with a surgical stitching instrument comprising a rod-like member having, at one end, a needle-threading element adapted to thread the needle of the instrument and at its opposite end a curved and tapered portion affording a hook having, on its concave side, a notch adapted to engage and draw

out from flesh tissue the free end of a limb of a thread-loop passed through said tissue by the needle, and guard means on said member shiftable to a position in which it prevents accidental contact with said needle-threading element and constitutes an extended handle for said loop-engaging portion.

2. A device for use in conjunction with a surgical stitching instrument comprising a rod-like member having, at one end, a needle-threading element adapted to thread the needle of the instrument and at its opposite end a curved and tapered portion affording a hook having, on its concave side, a notch adapted to engage and draw out from flesh tissue the free end of a limb of a thread-loop passed through said tissue by the needle, a sleeve slidingly mounted on said member and shiftable thereon to two predetermined positions in one of which it exposes the needle-threading element and in the other of which it envelops said element and constitutes an extended handle for said loop-engaging portion, and friction means for holding said sleeve in each of its two predetermined positions.

3. A needle-threader comprising a rod-like member having at one end a needle-threading element, said rod-like member having, intermediate its ends, a pair of oppositely inclined flat surfaces each terminating in a transverse stop shoulder, a sleeve slidingly mounted on said member and having a depressed portion adapted, in its sliding movements, alternately to engage said stop shoulders to limit the axial movement of said sleeve and yieldingly to bear upon said flat surfaces to retain said sleeve in its adjusted positions and to prevent relative rotation between said member and said sleeve.

4. A needle-threader comprising a rod-like member having in one end an axial bore and a transverse hole intersecting said bore, a spring wire needle-threading loop projecting from the end of said member and having straight leg portions extending into said bore, and a plug driven into said hole and deflecting the extremities of said leg portions substantially at right angles to the adjacent leg portions and binding said extremities against the wall of said transverse hole.

5. A needle-threader comprising a rod-like member having in one end an axial bore and a transverse hole intersecting said bore, a needle-threading element carried in said bore, a plug driven into said transverse hole to hold said needle threading element in said bore, said rod-like member having intermediate its ends at least one inclined flat surface terminating in a transverse stop shoulder, a sleeve slidingly mounted on said member and having a depressed portion adapted, in its sliding movement, to engage said stop shoulder to limit the axial movement of said sleeve and yieldingly to bear upon said flat surface to retain said sleeve in its adjusted position and to prevent relative rotation between said member and said sleeve.

JOHN D. KARLE.

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