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S. MISHKIN ET AL
NEEDLE HOLDER SUTURING INSTRUMENT

3,452,755

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FIG. 1

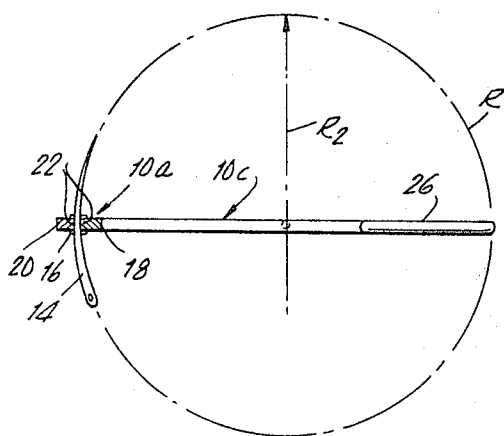
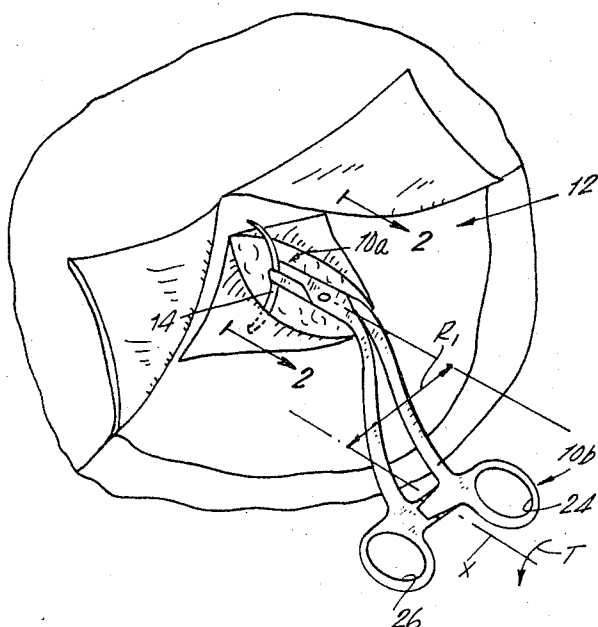


FIG. 2

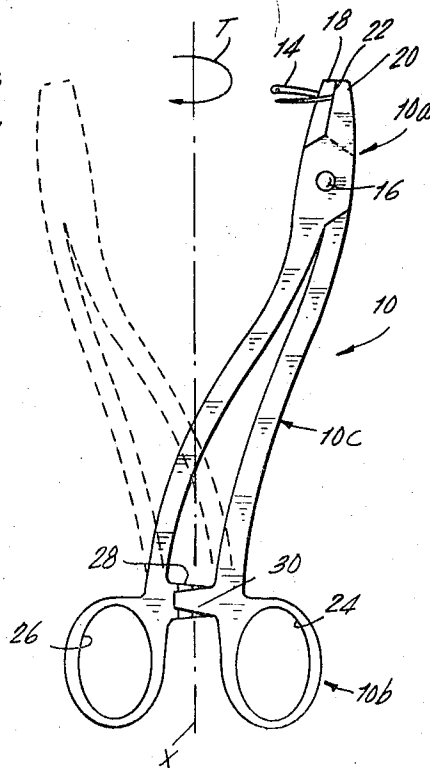


FIG. 3

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NEEDLE HOLDER SUTURING INSTRUMENT
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5 Claims

ABSTRACT OF THE DISCLOSURE

An instrument of the type having a pair of jaws pivotally mounted to open and close relative to each other for engaging an object. One end of the instrument includes holding means positioned generally symmetrically about a first axis and the jaws are located at the other end of the instrument and generally symmetrically located about a second axis. An intermediate section connects the handle elements to the jaws and extends generally laterally relative to the said axes and the said axes are generally parallel to each other.

The present invention relates generally to medical accessories, and more particularly to an improved suturing instrument.

The application of sutures internally of an operation cavity is often made difficult by the limitations imposed by the operation cavity on freedom of movement and visibility. To partially offset these difficulties, use is made of a curved suturing needle which is easier to manipulate within the confines of the operation cavity. Nevertheless, there is still much to be desired in the way of simplifying suturing techniques, and it is believed that through improved design and construction of suturing instruments that considerable progress can be made to achieve this simplification.

It is an object of the present invention to provide an improved suturing instrument, designed primarily for use with a curved suturing needle such as is used in applying internal sutures, which simplifies the movements required by the surgeon to perform the suturing operation.

More particularly, a suturing instrument demonstrating the foregoing and other objects of the present invention contemplates the feature of being designed with a predetermined axis of rotation which, in a preferred embodiment, coincides with the plane of symmetry of the instrument handle formed on the proximal end thereof. Forward of the proximal end, the instrument body includes an intermediate section which is angularly offset from the axis of rotation, and at the distal end thereof the instrument terminates in a pair of clamping jaws for supporting the suturing needle. By virtue of this construction, a simple twisting movement of the instrument handle about the axis of rotation produces the somewhat more complicated rotative movement required of the suturing needle for the suturing purposes at the distal end of the instrument, where the suturing needle is supported within the clamping jaws. This is in contrast to conventionally constructed suturing instruments which require substantially the same manipulating movements at the proximal end as is desired for the suturing needle at the distal end.

The above brief description, as well as further objects, features and advantages of the present invention, will be more fully appreciated by reference to the following detailed description of a presently preferred, but nonetheless illustrative embodiment in accordance with the present invention, when taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a perspective view illustrating the suturing

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instrument hereof in a typical use within an operation cavity;

FIG. 2 is an isolated end view of the suturing instrument and suturing needle as seen in the direction of the arrows taken on line 2—2 of FIG. 1; and

FIG. 3 is a plan view of the suturing instrument and suturing needle in various rotated positions thereof illustrated in full line and phantom line perspective.

Reference is now made to the drawings and in particular to FIG. 1, wherein there is shown a suturing instrument 10 demonstrating features of the present invention. The instrument 10 is illustrated in a typical use for applying internal sutures within what will be understood to be an operation cavity 12. As is generally understood, when applying sutures internally of an operation cavity use is made of a curved suturing needle 14, the radius of curvature of which is usually related to the size of the operation cavity. In accordance with the present invention, the distal end 10a of the instrument 10 which, in practice, supports the suturing needle 14 within the operation cavity 12 is offset from the proximal end 10b of the instrument which is held and manipulated by the surgeon placing the sutures. An essential feature of the suturing instrument 10 hereof is that with a simple twist of the wrist, the surgeon, while maintaining the proximal end 10b of the instrument in position relative to a predetermined axis of rotation X, can move the suturing needle 14 through a rotative path of movement R about this axis of rotation X. This simplified twisting wrist movement T which is performed by the surgeon at the proximal end 10b of the instrument thus achieves the required, somewhat more complicated rotative movement R for the suturing needle 14 at the distal end 10a of the instrument. In contrast to this, the application of internal sutures with known suturing instruments requires the same manipulating movements at the proximal end thereof as is desired for the suturing needle at the distal end.

Turning now more specifically to a preferred construction for the suturing instrument 10 hereof, this construction according to an essential feature of the present invention contemplates designing the instrument to have a predetermined axis of rotation X which, as clearly shown in FIG. 3, may conveniently coincide with the plane of symmetry of the handle which is formed at the proximal end 10b of the instrument. The construction of the instrument 10, except for the feature thereof related to this axis of rotation X and the rotative movement R resulting at the distal end 10a thereof, is otherwise very similar to the construction which is now characteristic of known suturing instruments. That is, the instrument 10 includes an elongated two-piece body formed by the distal and proximal ends 10a and 10b, respectively, and an intermediate, angularly offset body section 10c which connects these two ends together. Each body section which includes the integrated body section 10a, 10b and 10c is substantially identical in configuration. Moreover, these two body sections 10a-c are arranged for pivotal movement about a pivot pin 16, preferably located at the distal end 10a of the instrument. A cooperating pair of jaws 18, 20 respectively having facing needle-gripping surfaces 22 thereon are formed on each of the distal ends 10a of the two elongated body sections 10a-c. At the proximal end 10b of the instrument, each of the body sections 10a-c are formed with conventional finger grips 24 and 26, each of which is further formed with cooperating lateral extensions 28 and 30 which are adapted to abut with each other and thereby limit the closing movement of the two body sections with each other at this end of the instrument so that at the opposite distal end 10a thereof the suturing needle 14 is firmly gripped by the jaws 18, 20 but not crushed therebetween. The intermediate body section 10c of each body section 10a-c has

an appropriate curvature to provide the angularly offset relationship between the distal and proximal ends 10a, 10b of the instrument 10.

In the embodiment illustrated herein, the extent to which the intermediate body sections 10c of each body half 10a-c is offset relative to the predetermined axis of rotation X is related to the curvature of the suturing needle 14. More particularly, for optimum results the distance R_1 (see FIG. 1) at which the gripping jaws 18, 20 are offset from the plane of symmetry of the finger grips 24, 26 by virtue of the curvature of the intermediate body sections 10c should be equal to the curvature radius R_2 of the suturing needle 14 so that the rotative path of movement R for this needle will have as the center thereof the predetermined axis of rotation X. Experience has indicated, however, that as long as the foregoing conditions are substantially met, i.e. the distance R_1 is substantially the same as the radius R_2 of the needle 14, that twisting movement T about the axis of rotation X provides a controlled needle movement throughout the rotative path R which greatly facilitates the application of internal sutures. This controlled needle movement, in turn, eliminates much of the difficulty in suturing procedures within the confined areas of an operation cavity 12, where visibility as well as freedom of movement is often severely limited.

A latitude of modification, change and substitution is intended in the foregoing disclosure and in some instances some features of the invention will be employed without a corresponding use of other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

What is claimed is:

1. A medical instrument for a manipulative surgical procedure of the type having a pair of jaws mounted to be opened and closed relative to each other comprising: an elongated body having a proximal end and a distal end, a handle means at the proximal end of the body, said handle means including holding elements located generally symmetrically about a first axis, said jaws being mounted at the distal end of said body for closing, relative to each other, to grip an object during said surgical procedure, said jaws being located generally symmetrically about a second axis when the jaws are in the closed position relative to each other, said first and second axes being substantially parallel to each other, and an intermediate means comprising a pair of intermediate body sections,

each formed in one piece with one of said holding elements and one of said jaws, said intermediate body sections extending laterally relative to said axes such that the first and second axes are offset relative to each other so that when the instrument is rotated about one of said axes in the performance of a surgical procedure, the other axis follows a cylindrical path about said one axis and said distal end, said proximal end and said intermediate body sections all being generally coplanar.

2. A medical instrument as claimed in claim 1 wherein said jaw are clamping jaws mounted for closing movement towards a predetermined plane containing the said second axis for engaging an object therebetween, said predetermined plane being spaced from said first axis a selective distance for establishing the radius of curvature of said rotative element when said second axis is rotated about said first axis.

3. A suturing instrument as claimed in claim 1, wherein said handle is generally symmetrical about said first axis.

4. A medical instrument as claimed in claim 1 wherein said jaws are clamping jaws mounted for closing movement toward said second axis for engaging said object.

5. A medical instrument as claimed in claim 1 including a pivot for said pair of jaws about which said jaws are pivotally movable in being closed relative to each other.

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81—5.1; 128—321; 140—121