

Dec. 6, 1966

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3,289,902

METHOD AND DEVICE FOR THREADING A SEWING NEEDLE

Filed Feb. 10, 1965

3 Sheets-Sheet 1

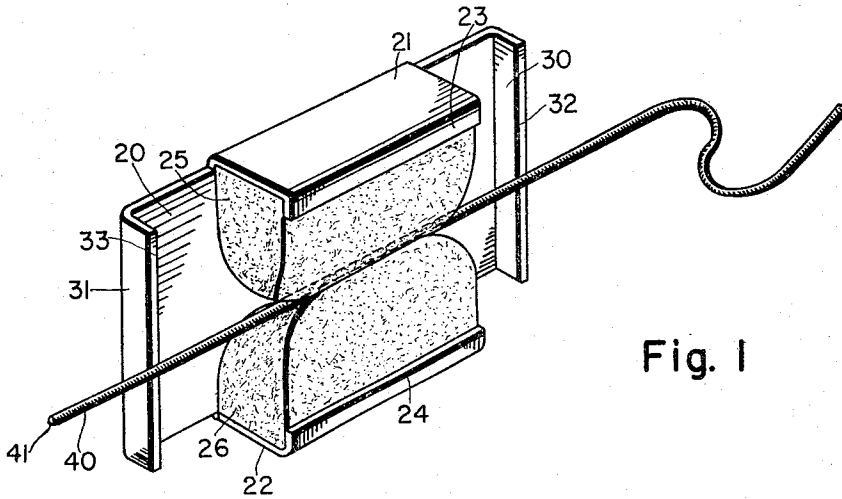


Fig. 1

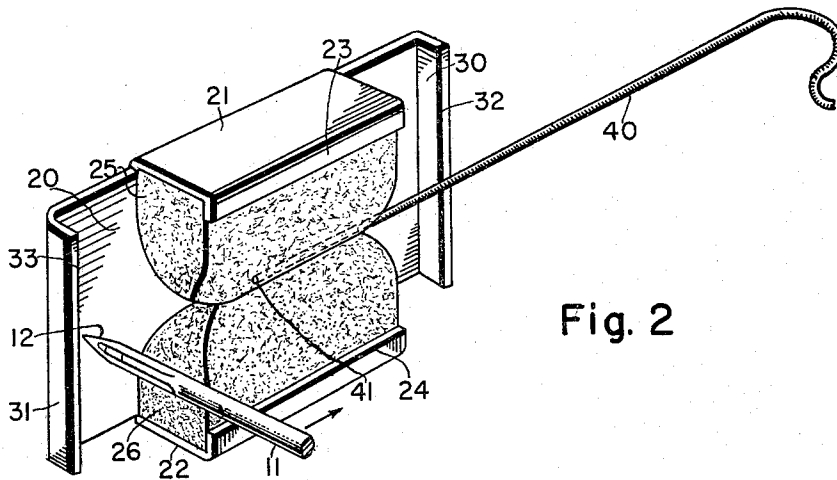


Fig. 2

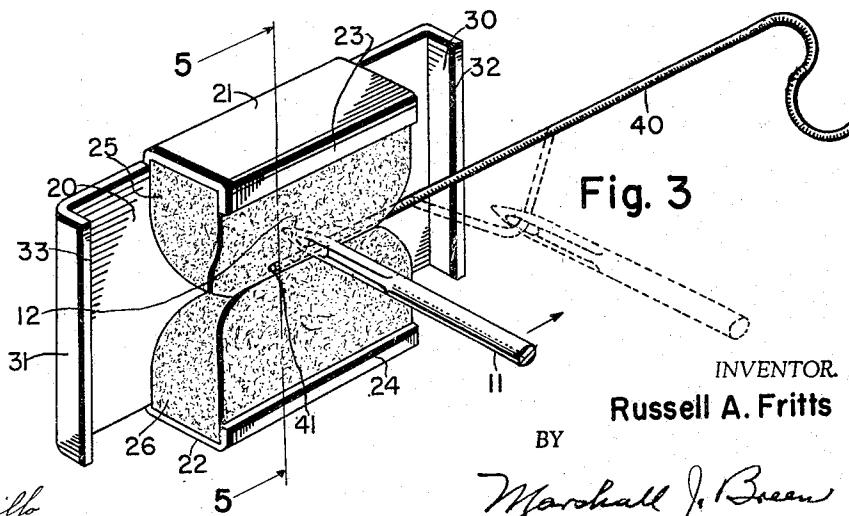


Fig. 3

WITNESS
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3 Sheets-Sheet 2

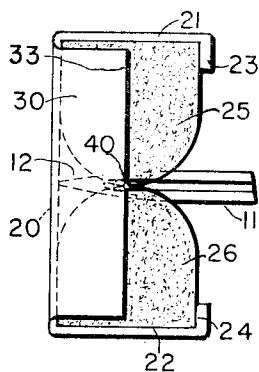


Fig. 4

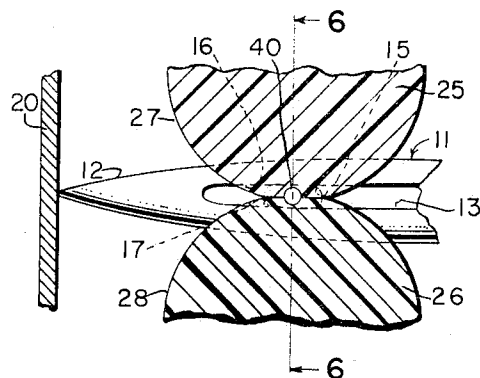


Fig. 5

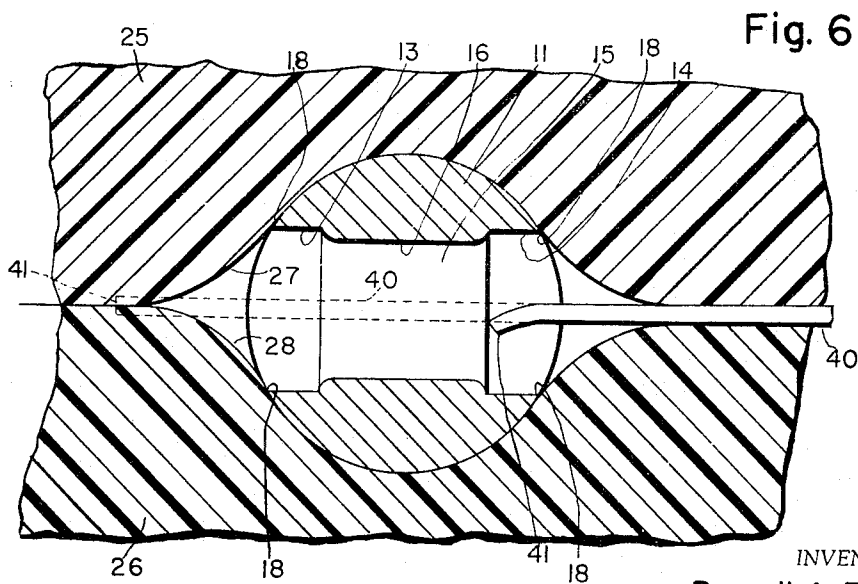


Fig. 6

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3 Sheets-Sheet 3

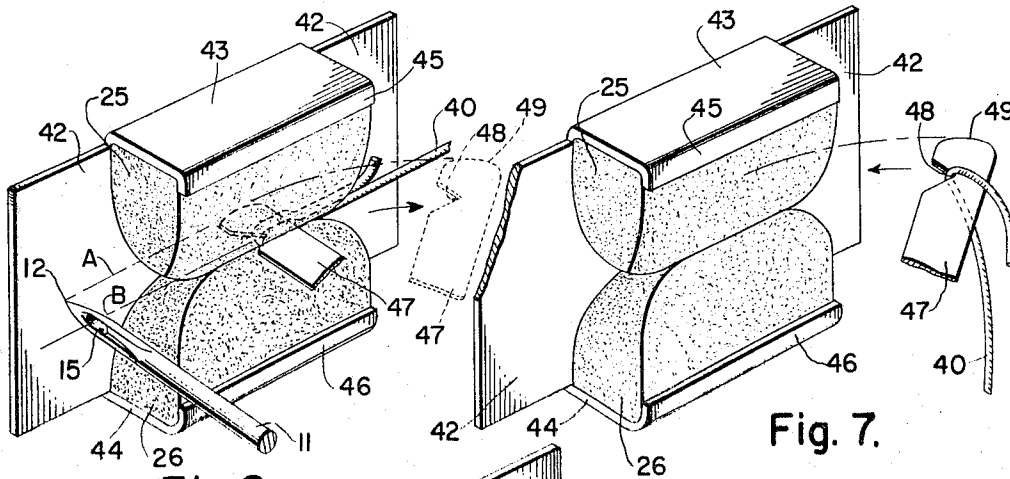


Fig. 8.

Fig. 7.

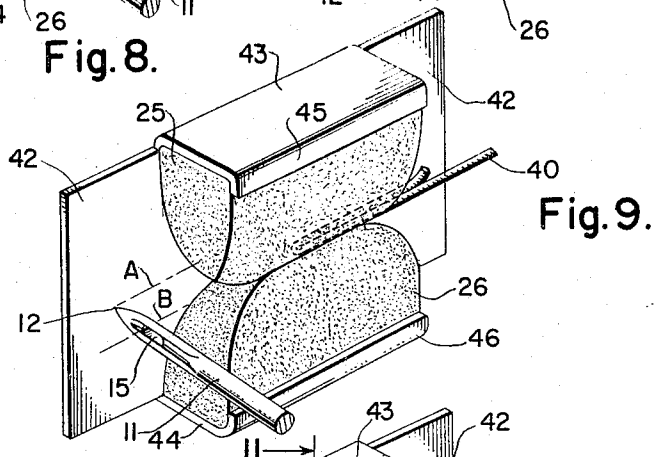


Fig. 9.

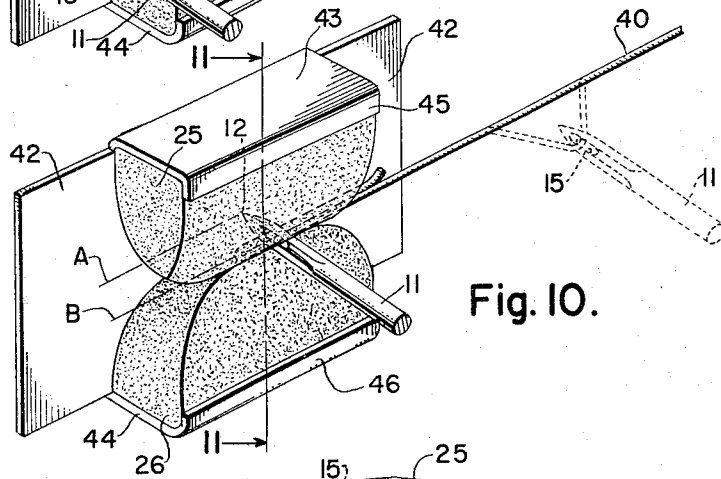
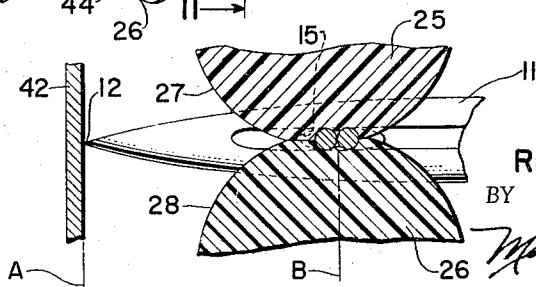


Fig. 10.

Fig. 11.



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1

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METHOD AND DEVICE FOR THREADING
A SEWING NEEDLE

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10 Claims. (Cl. 223-99)

This invention relates to a unique method for effecting the threading of the eye of a sewing needle and to a novel and effective needle threading device, and this application is a continuation-in-part of my United States patent application Serial No. 314,772, filed October 8, 1963, now abandoned.

In accordance with the novel method of the present invention, that portion of the thread to be first introduced through the eye of the needle is completely enveloped between contiguous surfaces of a flexible resilient material which confines, supports, and lends great column strength to the enveloped thread portion. Only the thread and not the enveloping material, however, is passed through the needle eye. Threading is accomplished by orienting the needle eye in alignment with the enveloped thread and forcing the so oriented needle between the contiguous thread enveloping surfaces of the flexible material. The flexible resilient material is deflected about the needle blade, and the enveloped thread is thus supported by the flexible material to the very mouth of the needle eye. The contour of the flexible material as it is deflected about the needle may be controlled by selection of the force used to urge the contiguous thread enveloping surfaces together. A preferable contour is that in which the surfaces deflected apart by the needle engage the needle at the juncture of the needle exterior and the side walls of the needle eye. When this condition exists, the portion of the thread as, for instance, a thread extremity which becomes free as the surfaces of the flexible material part to pass about the needle will be relatively stiff since only a very short length will be free, and furthermore, the thread will be trapped between the needle eye side walls and will have no other place to proceed but through the needle eye. Once a length of the thread is passed through the needle eye it again becomes enveloped between the contiguous surfaces of the flexible resilient material aiding in the drawing of additional thread through the needle eye.

The following are several principal objects and advantages provided by the needle threader embodying this invention:

(1) A hitherto unknown certainty and reliability in the threading of needles is attained.

(2) No fragile part such as the fragile hooks or loops well known in the prior art need be guided through the needle eye, and therefore breakage or distortion of the threading device in the event of a threading failure is obviated.

(3) Since only the thread and no extraneous hooks or loops need be guided through the needle eye, smaller needles can be threaded with any given size of thread.

With the above and additional objects and advantages in view as will hereinafter appear, the accompanying drawings illustrate preferred forms of a needle threading device embodying this invention from which my novel needle threading method may be understood and in which:

FIG. 1 represents a perspective view of a needle threader embodying this invention, showing the thread being oriented therein,

FIG. 2 represents a perspective view of the needle threader of FIG. 1 with the thread and the needle disposed ready for threading,

FIG. 3 represents a perspective view of the needle

2

threader of FIG. 1 with the thread and needle disposed as the thread is introduced into the needle eye,

FIG. 4 represents an end elevational view of the needle threader of FIG. 3.

FIG. 5 represents an enlarged cross sectional view taken substantially along line 5-5 of FIG. 3,

FIG. 6 represents an enlarged cross sectional view taken substantially along line 6-6 of FIG. 5,

FIG. 7 represents a perspective view of another needle threader embodying this invention, showing a thread positioning finger about to deposit and orient the thread between blocks of flexible resilient material,

FIG. 8 represents a perspective view of the needle threader of FIG. 7 with the thread positioning finger between the blocks and about to be withdrawn therefrom,

FIG. 9 represents a perspective view of the needle threader of FIG. 7 with the thread and the needle disposed ready for threading,

FIG. 10 represents a perspective view of the needle threader of FIG. 7 with the thread and needle disposed as the thread is introduced into the needle eye, and

FIG. 11 represents an enlarged cross sectional view taken substantially along line 11-11 of FIG. 10.

Referring particularly to FIGS. 5 and 6, the construction of a typical sewing needle eye portion will first be described. A sewing machine needle 11, as illustrated in FIGS. 5 and 6, is formed with a pointed work penetrating extremity 12 near which begin thread clearance grooves 13 and 14 which extend along opposite sides of the needle blade. Formed between the clearance grooves 13 and 14 is the needle eye 15 which is elongate lengthwise of the needle blade. The sidewalls 16 and 17 of the needle eye are formed substantially in continuation of the sides of the clearance grooves 13 and 14 so that the juncture 18 of the needle eye side walls with the exterior surface of the needle blade occurs at the edges of the thread clearance grooves 13 and 14 as illustrated in FIG. 6. There exists in each size of sewing machine needle a predetermined distance between the pointed work penetrating extremity 12 and the needle eye 15.

Hand sewing needles, although formed with an eye at the extremity opposite the pointed extremity, usually have the eye formed in substantially the same manner as that of a sewing machine needle, i.e., within an elongated eye formed between thread clearance grooves extending along opposite sides of the needle. In each size of hand sewing needles a predetermined distance is usually maintained between the butt of the needle and the needle eye.

Referring to the embodiment of the needle threading device of this invention shown more clearly in FIGS. 1, 2 and 3, which device is adapted to thread both sewing machine and hand needles, the device comprises a flat metal base 20 formed with out-turned flanges 21, 22, one at each side of the base of which flanges the free edges 23, 24, respectively, are in-turned so as to converge. Constrained between the flanges 21 and 22 are a pair of blocks 25 and 26 of flexible resilient material. These blocks 25 and 26 may be formed of rubber, plastic, or any other rubber-like material, as for instance, silicone rubber. The contiguous faces 27 and 28 of the blocks 25 and 26 respectively are preferably tapered and may be rounded as illustrated in FIG. 5 of the drawing or formed at a blunt angle so as to abut along a straight line when no force is exerted urging the blocks together. The size of the blocks 25 and 26 and the distance between the flanges 21 and 22, is however, selected such that the flanges will exert sufficient force upon the blocks 25 and 26 constrained therebetween as to deform the contiguous block faces 27 and 28 into mutual engagement for a width which is at least equal to the dimension of the needle eye

to be threaded taken lengthwise of the needle blade as is clearly illustrated in FIG. 5.

The metal base 20 is forced with up-turned extensions 30 and 31, one at each end of the base 20 of which extensions the extremities 32 and 33 provide thread guiding surfaces at opposite sides of the blocks 25 and 26 so disposed that a thread 40 which is stretched across the thread guiding surfaces 32 and 33 and between the blocks 25 and 26 will be oriented into a predetermined straight thread path along the line of the thread as illustrated in FIG. 1.

In using the needle threader of the embodiment shown in FIG. 1-6 thread 40 after it is introduced between the blocks 25 and 26 and between the thread guiding surfaces 32 and 33 as illustrated in FIG. 1, is drawn lengthwise over one of the thread guiding surfaces, as for instance, surface 32 until the extremity 41 of the thread has been drawn between the blocks 25 and 26 as illustrated in FIG. 2. The extremity 41 of the thread will then be completely enveloped between the contiguous surfaces 27 and 28 of the blocks 25 and 26, and the extremity 41 will assume a predetermined position between the blocks 25 and 26, i.e., along the line of the thread as illustrated in FIG. 1. It is necessary in order to thread the needle that the extremity 41 of the thread enveloped between the blocks 25 and 26 be concentrated into a cross sectional shape which is not larger than the cross sectional area of the needle eye. The thread may be severed cleanly to provide this concentration, or twisted together if it is of multi strand formation, and a plurality of limbs of thread may be passed simultaneously through the needle eye if this condition of concentration is met.

The needle to be threaded is then positioned with its point 12 abutting the base 20 of the needle threader. The base 20 is located parallel to and at that dimension from the thread path which coincides with the dimension of the needle from the center of the eye 15 to the pointed extremity. The needle 11 with the point 12 touching the base 20, is then turned until the needle eye extends in the direction of the thread path and the needle eye will be oriented in alignment with the thread path. This alignment can be readily sustained so long as the point 12 is maintained in engagement with the base 20.

With the needle eye sustained in alignment with the thread path as illustrated in FIG. 2, needle threading is accomplished simply by effecting a relative motion of the sustained needle relatively to the blocks 25 and 26. The needle in passing between the blocks 25 and 26 will deflect the contiguous thread enveloping surfaces 27 and 28 of the blocks in the manner illustrated in FIG. 6. With the selection of a proper force biasing the blocks together, the contour of the deflected surfaces 27 and 28 of the blocks 25 and 26 immediately in front of the needle eye may be controlled so as to engage the needle exterior at the junctures 18 of the needle eye sidewalls 16 and 17 with the needle exterior. The thread extremity 41 when it reaches the mouth of the needle eye as illustrated in FIG. 6 will thus become free of the envelopment by the blocks 25 and 26, but the thread extremity will be relatively stiff because of its extremely short length, and furthermore, it will be constrained by the contour of the deflected surfaces 27 and 28 of the blocks 25 and 26 so that there is no place for it to go but through the eye of the needle.

As illustrated in FIG. 6 in dotted lines, the thread extremity 41 after it has been pushed through the eye of the needle will again be enveloped by the contiguous surfaces 27 and 28 of the blocks as they converge behind the needle. Thereafter as the needle is moved relatively to the thread, the thread will be both pushed through the eye of the needle from the leading edge of the needle and pulled from the eye at the trailing edge until the needle clears the blocks 25 and 26 at which time the thread may be readily withdrawn from between the blocks.

It will be appreciated that when a hand sewing needle is to be threaded the butt end of the needle will be positioned against the base 20 and in all other respects needle threading then is accomplished in exactly the same manner as described above with respect to sewing machine needles. It will also be appreciated that either the needle 11 or the blocks 25 and 26 or both may be shifted during needle threading.

The embodiment illustrated in FIGS. 7-11 inclusive, discloses another arrangement for positioning and orienting the thread 40 between blocks 25 and 26.

Thus, a flat metal base 42 is formed with out-turned flanges 43, 44, one at each side of the base. These flanges have inturned free edges 45, 46, respectively. Constrained between the flanges 43 and 44 are the blocks 25 and 26, as in the embodiment described supra.

A flat elongated positioning finger 47 having a V-shaped thread locating notch 48 near its free or guiding end 49 is adapted to be pivoted or otherwise shiftably supported to enable the finger to move into a position that brings the end 49 into contact with base 42 in the plane formed by the contiguous faces 27 and 28 of the blocks 25 and 26, respectively. Similarly, the needle 11 is adapted to move along a path between the contiguous faces 27 and 28 of the blocks 25 and 26 with the needle point 12 in contact with the base 42. The distance between the apex or point at which the sides of the notch 48 converge and the end 49 of the finger 47 is made equal to the distance between the longitudinal center of the elongated eye 15 and the point 12 of the needle 11 to be threaded, such distance being indicated in the drawings by the distance between the parallel dot-dash lines A, B. With the needle 11 and the finger 47 in the same plane and oriented as illustrated in FIG. 8 and with the point 12 and the end 49 contacting the flat metal base 42, the line A is drawn along the face of the base 42 parallel with the line B which is drawn through the center of the needle eye 15 and passes through the apex of the notch 48 of finger 47.

To thread the needle 11 using the needle threader of the embodiment shown in FIGS. 7-11, the operator need merely drape an end portion of the thread 40 across the notch 48 (FIG. 7) so that a limb of the thread lays on each side of the finger thereby to form a thread loop, then swing the finger 47 and the two limbs of thread carried thereby in a path that brings the end 49 into contact with the base 42, and thereafter slide the finger along the surface of the base and then between the contiguous faces 27 and 28 of blocks 25 and 26 to a predetermined point roughly half the length of the blocks (FIG. 8). The finger 47 is then retracted along the same path, the pressure applied by the blocks 25 and 26 serving to restrain the thread 40 from sliding out from between the blocks with the retracting finger. As the finger 47 is withdrawn, the pressure applied by the blocks 25 and 26 presses the two limbs of the thread 40 into a parallel relationship between the contiguous faces 27 and 28, as seen more clearly in FIG. 11, straddling the dot-dash line B. With the thread now positioned and oriented between the blocks 25 and 26 the operator has only to slide the needle between the contiguous faces 26 and 27 as in the prior described embodiment, maintaining the needle eye in alignment with the thread between the blocks 25, 26 and the two limbs of the thread 40 will pass through the needle eye 15 (FIGS. 10 and 11). The needle 11 is now threaded and the operator may pull the needle and the thread away from the threader as indicated by the dotted outline of the needle and thread shown in FIG. 10.

The embodiments of the needle threader illustrated and described hereinabove are designed for a needle of one particular dimension, however, it will be readily apparent that guide surfaces other than the base 20 or 42 may be provided for sustaining the needle eye in alignment with the thread path and with provision for an adjustment of

5

the position of the guide surface relative to the thread path so as to accommodate needles of various sizes and positioning fingers dimensioned to match the needle size.

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

1. The method of threading the eye of a needle comprising sandwiching that portion of a length of thread which is first to be introduced through the needle eye in a predetermined thread path between opposed surfaces of a flexible resilient medium, sustaining the eye of a needle to be threaded in alignment with said predetermined thread path, and causing relative motion between said sustained needle and said flexible resilient medium to move said needle past said thread portion and deflect said flexible resilient medium from said thread portion immediately in front of said needle eye.

2. The method of threading the eye of a needle as set forth in claim 1 wherein said sandwiching includes utilizing a notched positioning finger by draping the portion of thread across the notch of the positioning finger, sustaining the notch of the positioning finger in alignment with said predetermined thread path, causing relative motion between the thread carrying sustained positioning finger and said flexible resilient medium to move the thread carrying positioning finger to a predetermined point between the opposed surfaces of the flexible resilient medium and then withdrawing the positioning finger from between the opposed surfaces of the flexible resilient medium leaving the portion of thread sandwiched between the opposed surfaces of the flexible resilient medium along said predetermined thread path.

3. The method of threading the transverse eye of a needle having a substantially cylindrical exterior which comprises, positioning a thread extremity in a predetermined path between two opposing faces of a flexible resilient thread gripping material, sustaining said needle to be threaded with the needle eye in alignment with said predetermined thread path, shifting said sustained needle and said thread gripping material relatively past each other, and applying that force urging said opposing faces of said thread gripping material yielding into mutual engagement so as to envelop said thread extremity between said opposing faces in the absence of said needle and so as to deflect said opposing faces into diverging arcs each face engaging the exterior of said needle at the juncture of said needle exterior with a sidewall of said needle eye during said needle shifting step.

4. A device for threading the eye of a needle comprising, a flexible resilient medium formed with opposing surfaces, means for urging said opposing surfaces of said medium into mutual engagement, means for defining a linear thread path between said surfaces, means for sustaining a needle to be threaded with the eye of the needle in alignment with said thread path, and said sustained needle and said flexible resilient medium being relatively movable past each other in the direction of said thread path.

5. A device for threading a needle of substantially cylindrical exterior and formed with a transverse eye of which the sidewalls extend to a juncture with the needle exterior at the mouth of the eye, comprising a pair of resilient thread gripping members, means supporting said thread gripping members with surfaces on each member urged into engagement, means for defining a linear thread path between said surfaces, means for sustaining a needle to be threaded with the eye of said needle in alignment with said thread path, said sustained needle and said supported thread gripping members being relatively movable in the direction of said thread path with said needle in engagement with said surfaces of each said thread gripping members, and said supported thread gripping members each having sufficient resiliency so as to engage on the leading edge of said needle at the juncture of said needle eye sidewall with said needle exterior during said

6

movement of said sustained needle relatively to said supported thread gripping members.

6. A device for threading the eye of a needle comprising a pair of flexible resilient blocks each formed with a tapered side terminating in a straight linear surface, means for supporting said blocks with said straight linear surfaces parallel and in mutual engagement, means for urging said supported blocks together to deform said tapered sides into mutual engagement for a width at least equal to the dimension of the needle eye to the thread taken lengthwise of said needle, means for defining a thread path between said supported blocks substantially coincident with said mutually engaged straight linear surfaces, means for sustaining a needle to be threaded with the eye of the needle in alignment with said thread path, and said sustained needle and said supported and urged blocks being relatively movable past each other in the direction of said thread path.

7. A device for threading the eye of a needle comprising, a flexible resilient medium formed with opposing surfaces, means for urging said opposing surfaces of said medium into mutual engagement, means for depositing a thread between said surfaces along a predetermined thread path, means for sustaining a needle to be threaded with the eye of the needle in alignment with said predetermined thread path, and said sustained needle and said flexible resilient medium being relatively movable past each other in the direction of said predetermined thread path.

8. A device for threading a needle of substantially cylindrical exterior and formed with a transverse eye of which the sidewalls extend to a juncture with the needle exterior at the mouth of the eye, comprising a pair of resilient thread gripping members, means supporting said thread gripping members with surfaces on each member urged into engagement, means for defining a predetermined thread path between said surfaces and for depositing a thread between said surfaces along said predetermined path, means for sustaining a needle to be threaded with the eye of said needle in alignment with said predetermined thread path, said sustained needle and said supported thread gripping members being relatively movable in the direction of said thread path, with said needle in engagement with said surfaces of each said thread gripping members, and said supported thread gripping members each having sufficient resiliency so as to engage on the leading edge of said needle at the juncture of said needle eye sidewall with said needle exterior during said movement of said sustained needle relatively to said supported thread gripping members.

9. A device for threading the eye of a needle comprising, a flexible resilient medium formed with opposing surfaces, means for urging said opposing surfaces of said medium into mutual engagement, means for depositing and orienting a portion of a thread in a predetermined location between said surfaces along a predetermined thread path, said last named means including a movable thread carrying and positioning member adapted to direct said portion of thread to said predetermined location, means for sustaining a needle to be threaded with the eye of the needle in alignment with said thread path, and said sustained needle and said flexible resilient medium being relatively movable past each other in the direction of said thread path.

10. A device for threading the eye of a needle comprising, a flexible resilient medium formed with opposing surfaces, means for urging said opposing surfaces of said medium into mutual engagement, means for depositing a thread between said surfaces along a predetermined thread path, said last named means including a thread carrying member formed with a notch adapted to accommodate a loop of thread, means for sustaining said loop carrying member with said notch in alignment with said predetermined thread path, and said thread carrying member and said flexible resilient medium being relatively mov-

able past each other in the direction of said predetermined thread path, means for sustaining a needle to be threaded with the eye of the needle in alignment with said predetermined thread path, and said sustained needle and said flexible resilient medium being relatively movable past each other in the direction of said predetermined thread path.

References Cited by the Examiner

UNITED STATES PATENTS

2,777,623 1/1957 Bolzer ----- 223—99

5 JORDAN FRANKLIN, *Primary Examiner.*GEORGE H. KRIZMANICH, *Examiner.*