

(No Model.)

W. H. HANNA.
SEWING MACHINE NEEDLE.

No. 568,946.

Patented Oct. 6, 1896.

Fig. 1.

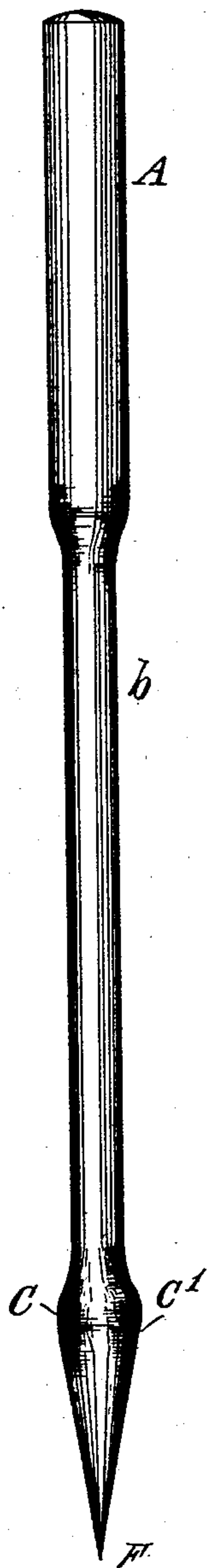


Fig. 2.

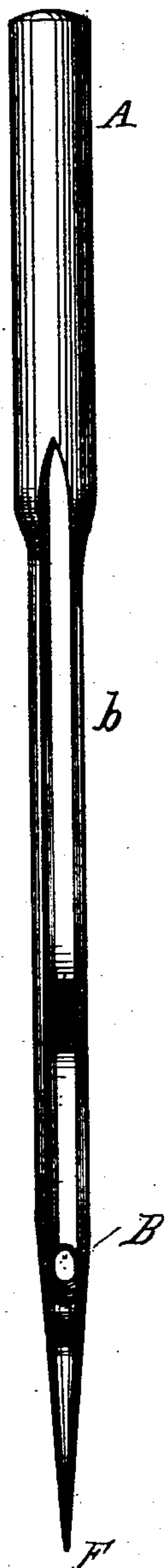


Fig. 3.

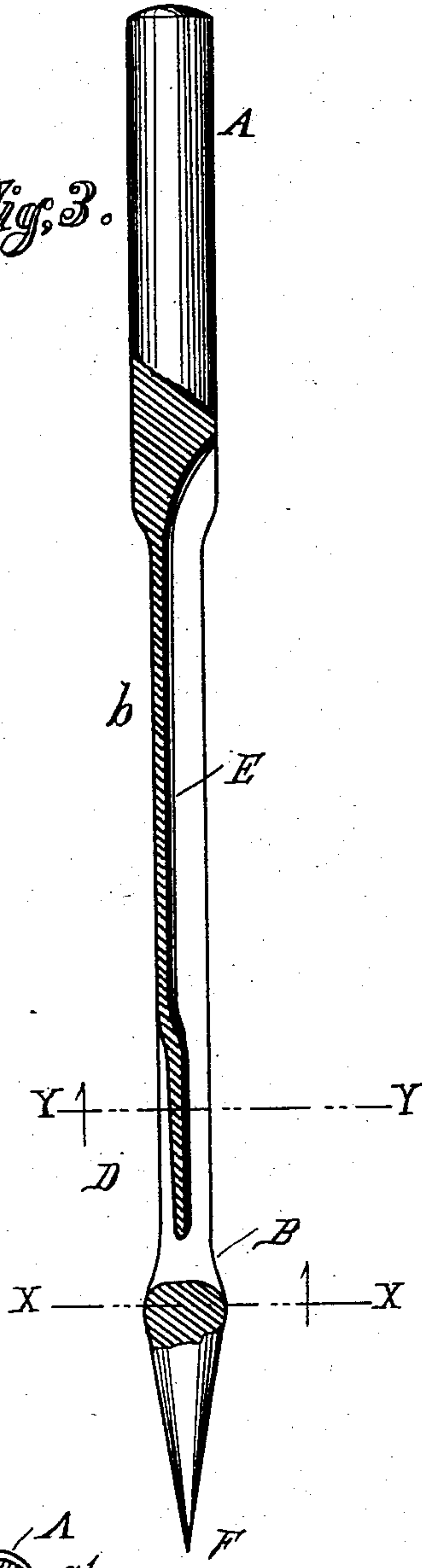


Fig. 5.

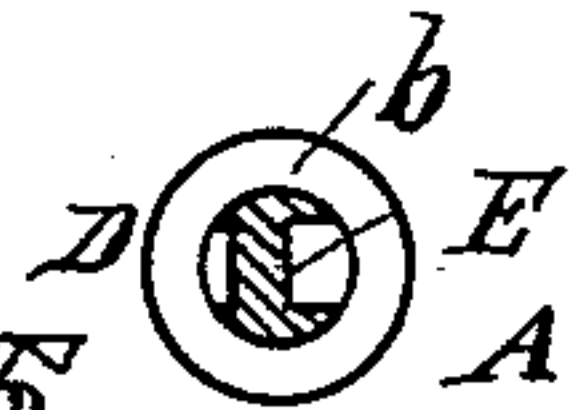


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM H. HANNA, OF PETERSBURG, ILLINOIS.

SEWING-MACHINE NEEDLE.

SPECIFICATION forming part of Letters Patent No. 568,946, dated October 6, 1896.

Application filed September 24, 1894. Serial No. 523,890. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. HANNA, a citizen of the United States, residing at Petersburg, in the county of Menard and State of Illinois, have invented certain new and useful Improvements in Eye-Pointed Sewing-Machine Needles, of which the following is such a full, clear, and exact description as will enable those skilled in the art to which it pertains to make and use my said invention.

My invention relates to improvements in eye-pointed needles constructed with special reference for use in ordinary sewing-machines of that class which employ what is known as the "slack-thread take-up" and in which the shuttle passes through the loop of the thread while the needle remains in the work; and the object of my invention is to remedy the defects that exist in the ordinary needles by a construction which overcomes the cutting or chafing (and consequent weakening) of the thread as it is carried by the needle through the fabrics to admit of a larger thread being carried in the same sized needle and insure the formation of a more perfect loop for the point of the shuttle to enter and pass through.

With these and other ends in view the invention consists of the peculiar construction of the needle, which will be hereinafter fully described and claimed.

To enable others to more readily understand my improvements, I have illustrated the same in the accompanying drawings, in which—

Figure 1 is an elevation of an eye pointed needle embodying my invention. Fig. 2 is another elevation of the needle, looking at the same at right angles to the position shown in Fig. 1 and in the direction indicated by the arrow. Fig. 3 is a longitudinal sectional view taken through the axis of the needle and its eye. Fig. 4 is a transverse section on the line X X of Fig. 3. Fig. 5 is a similar sectional view on the line Y Y of the same figure.

Like letters of reference denote corresponding parts in the several figures of the drawings.

In the common form of sewing-machine needles a short groove is formed in one side

and a long groove in the opposite side of the needle, both grooves extending above and below the needle-eye and well down toward the point of the needle. As is well known, the short groove in one side of the needle, which groove lies close to the shuttle and race, is provided for the protection of the thread while the eye of the needle is passing into and through the work in order that the thread may not be pressed too abruptly against the material during its passage through it, and such grooves also facilitate drilling or punching of the needle-eye.

In the course of my experiments with eye-pointed sewing-machine needles I have found that the grooves are too long below the needle-eye, more particularly the short groove, and in the class of needles which employ a twist or oblique point the short groove is cut too deep above and below the needle-eye and extends well down toward the point, which construction causes the formation of tongues in the hole produced by the needle in its passage through the work, which tongue lies in the hole or perforation opposite to the needle-eye.

With a needle constructed as specified, which produces such tongues at the time of perforating the work, the thread is compelled to push the tongue out of its way in passing through the work, or to be chafed or cut by it, thus weakening the thread by contact of the same with such tongues, and when the material is of fine compact texture, as is often the case, the upper part of the needle-eye is very liable to chafe and cut the thread. To overcome these defects, I provide a needle having a cylindrical body A and a cylindrical stem b integral with said body, said stem having at its lower end integral enlargements C C', which are in line with the grooves D E, formed in opposite sides of the needle.

I dispense with the raised part in the long groove of the needle adjacent to the eye, heretofore used and technically designated as the "short raise," and increase the depth of the long groove of the needle in that part formerly occupied by the short raise until the groove in that part of the needle extends in depth to or beyond the axial line of the needle. I then still further deepen that portion of the long groove which begins at a point opposite

to and somewhat below the upper termination of the short groove and extends upward into the lower end of the body of the needle until said long groove in its deeper portion attains a depth equal to at least five-sixths of the diameter of the needle. It will be seen that by reason of the gradual decrease in the depth of the short groove at its upper end I am enabled to gradually increase the depth of the long groove proportionately to the decreased depth of the short groove without weakening the needle. The gradual inclination from the shallow portion to the deepest portion of the long groove facilitates the passage of and prevents abrasion of the thread.

The enlargements C C' project beyond the cylindrical surface of the needle below the eye thereof, so that the needle is enlarged below the eye instead of uniformly tapering toward the point, as is the case with the common needle. These enlargements have the same width as the eye and the grooves in the needle.

The stem *b* between the body A and the enlarged part of said stem is cylindrical and not tapering. I am thus enabled to provide at the lower end of the stem *b* and below the eye thereof enlargements of the same width as the eye and the grooves, and which may be equal in their greatest transverse measurement to the diameter of the body A, or may be equal to any intermediate measurement between the diameter of the body and the diameter of the stem. These enlargements incline toward each other and their peripheries contract or converge, so as to terminate in the point F.

The tapering part of the needle, which terminates in the point, begins slightly above the eye and diametrically opposite the grooves in the needle, as shown by the drawings.

The grooves D E only extend below the needle-eye B for a very short distance, as shown, which is just sufficient to admit of the needle-eye being punched or drilled, as is ordinarily done, and thus leave the extreme transverse distance between the enlargements of the needle opposite to the grooves and below the needle-eye the full diameter, or substantially so, of the body of the needle. With this construction the material of the fabric opposite both grooves and the needle-eye is positively pushed or forced out of the path of the thread and the material cannot come in contact with the thread so forcibly or to such extent as to fray or cut the thread, which is due to the fact that my needle as it penetrates the fabric makes a hole sufficiently large to accommodate both the needle and the thread and at the same time obviate the liability to form inwardly-extending tongues on the fabric.

Another advantage secured by making the enlargements C C' below the needle-eye and in line with the grooves is that the long groove E can be cut into the needle-blade

just as deep immediately above the eye as the long groove of an ordinary needle is cut farther up the shaft, thus omitting in my improved needle that portion in the long groove technically termed the "short raise," whereby the lower portion of the long groove immediately above the eye can be cut into the stem to or beyond its longitudinal axis or about two-thirds of the diameter of the shaft without substantially weakening the needle.

The long groove, above the lower shallow part just described, is made deeper than the portion of least depth, so that the deepest part of the groove penetrates the stem beyond its longitudinal axis or about five-sixths of the diameter of the stem, and this deep part of the groove extends from the upper termination of the portion of least depth up to the root of the body.

Provision is made for the amount of metal cut away in removing the short raise and deepening and extending the long groove by decreasing the depth of the short groove in proportion to the increased depth of the long groove. Inasmuch as the full diameter of the stem of the needle is retained immediately above the eye and as the enlargement adjacent to and below the eye on the shuttle side of the needle in passing through the fabric enlarges the hole in the fabric sufficiently for the thread on that side to pass freely the carrying capacity of the short groove of my needle is equal to or greater than that of needles as heretofore commonly constructed.

By cutting the long groove of uniform depth, except the shallow part immediately above the eye, and so that the longest and deepest part of the groove penetrates the shaft beyond its longitudinal axis, and arranging the enlargements in line with the long and short grooves, my improved needle is enabled to carry a larger thread than a needle of the corresponding size constructed in the ordinary manner.

The increased depth in the long groove of the needle begins opposite to (and somewhat below) the upper termination of the short groove, so that if by reason of a kink in the thread or from other cause the thread on the shuttle side of the needle should draw upon the fabric to such extent as to press the fabric into the long groove above the eye and thereby form a tongue on the fabric the long groove of my needle is of such depth that there is room enough for the thread to move freely between the inner end of said tongue and the bottom of said groove.

In the ordinary eye-pointed sewing-machine needle the long groove is provided for the purpose of admitting the thread to pass loosely through it and the work. In sewing-machines employing the slack-thread take-up and a shuttle passing through the loop of the thread while the needle remains in the work the length of the thread carried by the needle and passing through the fabric at each stroke of the needle is equal to twice the

length of said stroke, and hence the speed at which the thread travels through the fabric and the long groove of the needle is just twice the speed of the needle. This causes
 5 constant wear and strain on the thread at the eye of the needle, especially if tongues of the fabric extend into the groove of the needle, and hinder the free movement of the needle-thread. As stated, all this length of
 10 thread must traverse the fabric at twice the speed at which the point of the needle travels; hence the necessity to make the long groove as deep as the metal will admit, in order to allow room for the thread to pass loosely
 15 along the groove and through the fabric to and through the eye. As the needle descends, the thread passing the upper terminus of the short groove is brought into contact with the periphery of the stem on the
 20 short-groove side of the needle, thereby causing the edge of the fabric adjacent to the perforation to be drawn against the thin edges of the long groove with such force as to form a tongue of the fabric projecting into
 25 the long groove.

When the needle descends to such extent that the eye of the needle is below the bottom of the shuttle-race, the thread extends downward in the long groove of the needle through
 30 the fabric to and through the needle-eye and thence upward through the short groove alongside the periphery of the stem of the needle to the fabric.

When the needle is arrested in its downward movement and immediately thereafter is lifted a short distance to form the loop for the shuttle-point to enter, the upward movement of the needle causes still further elongation of the tongue in the fabric, and this
 35 elongated tongue enters the groove, leaving still less space for the thread to pass loosely, thereby obstructing and retarding the free passage of the thread just at the instant when the thread should pass most freely and loosely
 40 through the long groove in order to facilitate the formation of the full-sized loop for the shuttle to pass through. To obviate this defect, I enlarge the point of the needle, as described, and deepen the long groove by cutting the same further inward beyond the axis
 45 of the stem, such deeper portion of the groove extending from a point above the terminal of the short groove upward to the root of the body, as shown in Fig. 3. By thus deepening
 50 the long groove the thread can pass freely

through the groove while the shuttle is drawing the thread to enlarge the loop to the proper size to permit the shuttle to pass freely through the loop. The passage of the thread through the deep groove, as described, also
 60 obviates the cutting of the thread, which in needles as ordinarily constructed is caused by the shuttle drawing the thread against the edge of the short groove.

In view of the foregoing it is obvious that
 65 the deep grooves and the enlargements contiguous to and below the eye of the needle facilitate the formation of perfect loops for the entrance of the shuttle and the passing of the thread freely to the shuttle.
 70

Slight changes in the details of construction can be made without departing from the spirit or sacrificing the advantages of my invention.

I do not claim, broadly, the use of the long
 75 groove having a depth greater than the depth of the short groove, nor do I claim, broadly, the use of the enlargements near the lower end of the needle, but I restrict myself to the form of grooves and the form and position of
 80 enlargements particularly described and specifically claimed.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—
 85

A sewing-machine needle of the class described, having a body, a reduced stem integral with said body and pierced by a transverse eye, said stem having on one side a longitudinal short groove terminating in said eye
 90 and decreasing in depth upwardly and on the diametrically opposite side, a long groove having its upper termination in the body of the needle and its lower termination in the eye of the needle, the depth of said long groove
 95 from its lower end upward increasing proportionately with the decreasing depth of the short groove; said needle also having a tapering point below said eye; also having integral enlargements below and contiguous to said
 100 eye in line with both of said grooves and of the same width as the grooves in the stem of the needle; as set forth.

In witness whereof I have hereunto subscribed at Petersburg, Illinois, this 12th day
 105 of September, A. D. 1894.

WILLIAM H. HANNA.

Witnesses:

JESSE M. OTT,
 EMMA WOLDRIDGE.