

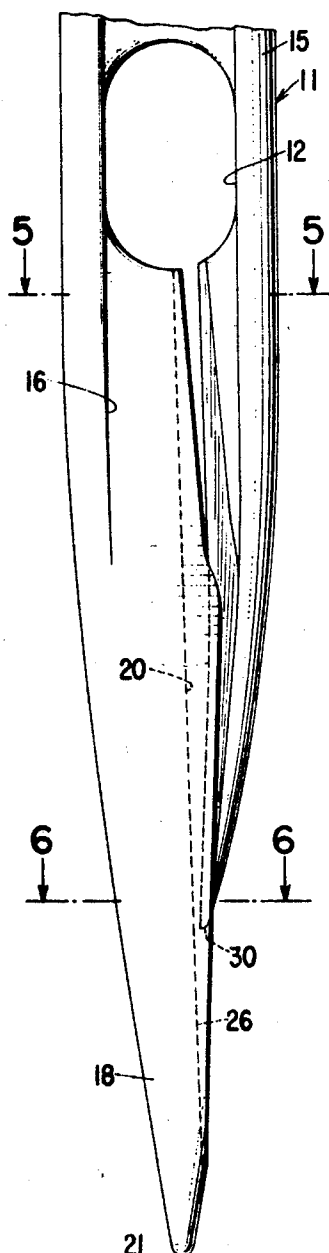
[72] Inventor **Stanley J. Ketterer**
 Morris Plains, N.J.
 [21] Appl. No. 34,162
 [22] Filed May 4, 1970
 [45] Patented June 1, 1971
 [73] Assignee **The Singer Company**
 New York, N.Y.

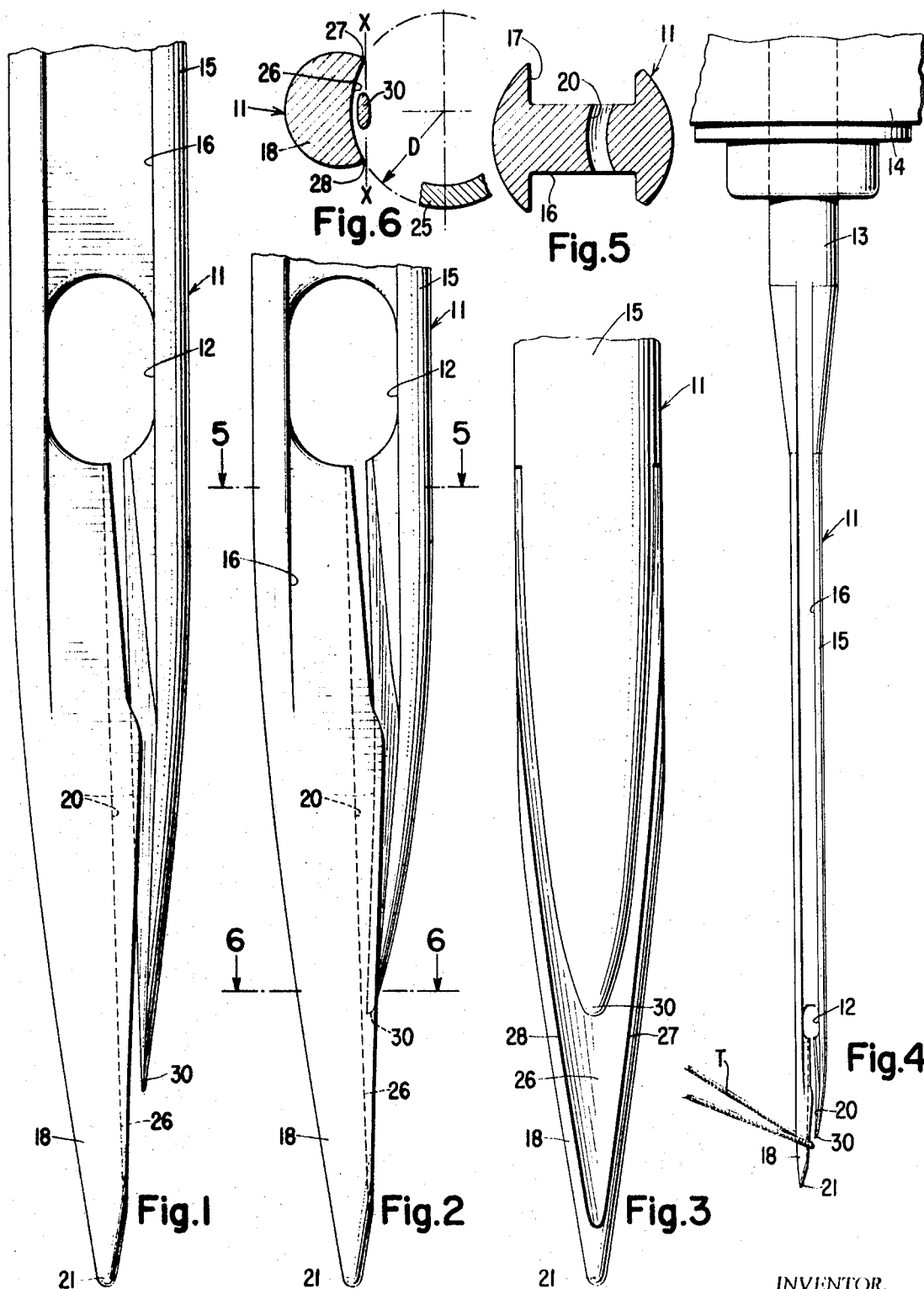
[56] **References Cited**
 UNITED STATES PATENTS
 286,014 10/1883 Jenkins..... 112/224
Primary Examiner—Richard J. Scanlan, Jr.
Attorneys—Marshall J. Breen, Chester A. Williams, Jr. and
 Robert E. Smith

[54] **SELF-THREADING NEEDLES**
 4 Claims, 6 Drawing Figs.

[52] U.S. Cl..... 112/224
 [51] Int. Cl..... D05b 85/02
 [50] Field of Search..... 112/224,
 198, 223

ABSTRACT: A sewing machine needle with the pointed extremity formed with a slot extending upwardly into the bottom of the needle eye to define a minor point at one side of and above the main needle point. The slot is nonplanar in transverse configuration and provides a concave recess into the side of the main needle point into which recess the minor point is bent.





WITNESS

William Martine Jr.

BY

Marshall J. Breen
ATTORNEY

INVENTOR,
Stanley J. Ketterer

SELF-THREADING NEEDLES

BACKGROUND OF THE INVENTION

In order to thread an ordinary eye-pointed sewing machine needle, an end of a thread must be passed through the needle eye. To avoid this tedious threading procedure, many self-threading needle constructions have heretofore been proposed in which a slot is provided leading to the needle eye and through which the thread may be introduced laterally into the needle eye. These prior self-threading needles have not been entirely satisfactory because each has failed to satisfy one or more of the following criteria for a successful self-threading needle:

1. It must prevent escape of the thread from the needle eye during sewing.
2. It must not pick (admit undesired strands of thread or work to the needle eye).
3. It must not materially weaken the needle.
4. It must be economically competitive.

The U.S. Pat. No. 112, 980, Mar. 21, 1971, is typical of a construction in which the needle is slotted alongside the eye. This construction has the principal disadvantage that it provides a multiplicity of points which are susceptible to picking work fibers not only during needle penetration of the work, but also during withdrawal.

The U.S. Pat. No. 100, 112, Feb. 22, 1870, has the disadvantage that it is slotted both below and above the needle eye. In sewing on the needle downstroke, both limbs of thread in the needle eye are drawn tightly against the top of the needle eye, and any slot extending from the top of the needle eye, therefore, invites disadvantageous escape of the thread from the eye. This patented needle is also susceptible to the disadvantage of picking work fibers. It is pointed out that when a needle penetrates a workpiece, it stretches and forces aside the fibers which, therefore, are urged back against the needle. By simply locating a point on the needle within the axial projection of the needle shank elsewhere along its length, by no means avoids the possibility of picking because the work fabric fibers tend quickly to assume the cross-sectional shape of the needle and this is particularly so where a slabbed or planar cut is made in the side of a needle.

The U.S. Pat. No. 493, 399, Mar. 14, 1893, discloses a typical construction which avoids the possibility of picking by extending the threading slot upwardly beyond the extent to which the needle penetrates the work fabrics. The expense of forming the long slot, the degree to which the needle blade is weakened, and the propensity for escape of thread from the needle eye make such needles unsuccessful.

BRIEF SUMMARY OF THIS INVENTION

In this invention a self-threading sewing machine needle is provided by including on a conventional needle, a slot either arcuate, V-shaped or otherwise nonplanar in transverse configuration, which extends from near the needle point upwardly to the bottom of the needle eye. The minor point on the side of the needle formed by the slot is then bent into the concave recess formed by the nonplanar slot.

Since during sewing, both limbs of a thread in the needle eye are never drawn against the bottom of the needle eye, escape of a thread once in the eye is obviated.

The single minor point on the needle cannot pick because it is located within a concave recess into which the stretched work fabric fibers will not enter.

The strength of even the smallest diameter needles will not be materially weakened by the construction of this invention since the slot is parallel with the principal direction in which load is applied to the needle.

The very short and the absence of complicated or critical assembly or finishing operation make this needle economically attractive.

With the above and additional objects and advantages in view as will hereinafter appear this invention is illustrated in

the accompanying drawing of a preferred embodiment in which:

FIG. 1 is an elevational view of the tip of a sewing machine needle taken from a direction exposing the needle eye and showing the threading slot as it is formed in the needle,

FIG. 2 is an elevational view of the tip of the sewing machine needle as in FIG. 1 but illustrating the minor point formed by the slot after it has been polished and bent,

FIG. 3 is a right side elevational view of the tip of the sewing machine needle of FIG. 2,

FIG. 4 is an elevational view of a sewing machine needle made as illustrated in FIG. 2 and shown secured in a sewing machine needle clamp with a thread loop in place on the needle point and drawn to one side in preparation for insertion of the thread into the needle eye,

FIG. 5 is a cross-sectional view of the needle taken substantially along line 5-5 of FIG. 2, and

FIG. 6 is a cross-sectional view of the needle taken substantially along line 6-6 of FIG. 2.

DETAILED DESCRIPTION

Illustrated in the accompanying drawing is a sewing machine needle 11, which apart from the self-threading construction below the thread accommodating eye 12, is conventional.

The needle 11 includes an enlarged butt 13 adapted to be received in a needle clamp 14 carried on a sewing machine needle bar (not shown). Extending from the butt is a needle blade 15 preferably of cylindrical form and provided on diametrically opposite sides with lengthwise grooves 16 and 17. One of the grooves 16, referred to as the long groove extends from the needle butt 13 to the tapered point 18 of the needle below the needle eye 12, while the other groove 17 which is referred to as the short groove is formed only in the vicinity of the needle eye. The grooves 16 and 17 accommodate the needle thread during work penetration by the needle in sewing and influence, for instance, the formation of loops in the proper limb of the needle thread for desired cooperation with the sewing machine loop taker.

The sewing machine needle, which as thus far described can be threaded by passing an extremity of a sewing thread endwise through the needle eye, is made self-threading in accordance with this invention by the provision in the tapered point 18 of a thread entry slot 20 extending from slightly above the tip 21 of the tapered point 18 to the bottom of the needle eye 12.

As shown in the cross-sectional views FIGS. 5 and 6, the thread entry slot is nonplanar in transverse configuration and may, for instance, be circular in form. The slot 20 may be cut by a tubular cutter having substantially the same outer diameter D as the needle shank 15. A portion of such a cutter is shown at 25 in FIG. 6. This cut may be formed readily by the known techniques of electrodeposition milling. It will be appreciated that the transverse configuration of the slot is not limited to a circular shape but might also be formed in a V-shape or the like which would result in formation of a concave recess 26 in the tapered needle point 18 as best shown in FIG. 6. The lips 27 and 28, one at each side of the concave recess in the needle point 18 provide protective shields across which the fibers of a work fabric can stretch as along line X-X of FIG. 6 during needle penetration so that the recess 26 defines a pocket in which the work fabric fibers do not enter.

Formation of the thread entry slot 20 defines alongside the main needle point 18, a minor point 30 which terminates above the main needle point 18 and as shown in FIG. 1 proud of the recess 26 immediately after the slot 20 is cut. As a final step in the manufacture of the self-threading needle of this invention, the minor point 30 which is shortened somewhat by polishing and deburring, is bent inwardly toward the main needle point 18 until the minor point 30 is disposed within the recess 26 as shown clearly in FIGS. 2 and 6. In this way, the minor point is shielded against picking strands of work fabric during needle penetration.

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FIG. 4 illustrates the manner in which a thread T may be inserted laterally into the needle eye 20. A loop of the thread is placed around the needle shank and drawn down onto the main needle point 18 below the minor point 30. The thread loop is then drawn sideways to the left as viewed in FIG. 4 to flex the main needle point away from the minor point 30 and open the thread entry slot 20. While maintaining the sideways pull to keep the minor point 30 out of the recess 26 as shown in FIG. 4, the thread T is drawn upwardly into the slot 20 and into the needle eye 12. When the lateral force of the thread is removed, the main needle point 18 will return to the position shown in FIG. 2 and the thread will be confined in the needle eye.

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

1. A self-threading sewing machine needle including a blade formed transversely with a thread accommodating eye and with a tapered extremity beneath said threaded accommodating eye defining a main needle point, said needle being formed with a thread entry slot extending from one side of said main needle point and leading upwardly into the bottom of said

thread accommodating eye, said slot being nonplanar in transverse configuration providing a concave recess into the side of the main needle point and defining a minor point at one side of said needle, said minor point being bent inwardly toward said tapered extremity and into a position completely within said concave recess.

2. A self-threading needle as set forth in claim 1 in which said needle blade is formed with diametrically opposed lengthwise grooves between which grooves said thread accommodating eye extends, said thread entry slot extending upwardly along said grooves and into the bottom of said thread accommodating eye.

3. A self-threading needle as set forth in claim 1 in which said thread entry slot extends at an angle of no greater than 30 degrees relative to the central axis of the needle blade.

4. A self-threading needle as set forth in claim 1 in which the thread entry slot is circular in transverse configuration and has an outside diameter substantially equal to that of the needle blade.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,581,688 Dated June 1, 1971

Inventor(s) Stanley J. Ketterer

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 22, "1971" should read -- 1871 --,
Column 4, line 14, insert -- degrees -- after "3".

Signed and sealed this 31st day of August 1971.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents