United States Patent [19]

Kuromegawa

[11] **3,862,611**

[45] **Jan. 28, 1975**

[54] **SEWING MACHINE NEEDLE**

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[52] **U.S. Cl.** **112/222**

[51] **Int. Cl.** **D05b 85/00**

[58] **Field of Search** 112/222, 224; 128/335; 223/102

[56] **References Cited**

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[57] **ABSTRACT**

An improved sewing machine needle for use in sewing synthetic fabrics to prevent skipping of stitches. The needle is constructed to reduce the friction between the thread and the fabric and to influence the formation of a greater than conventional loop size which can be easily hooked by the beak of the shuttle.

1 Claim, 8 Drawing Figures

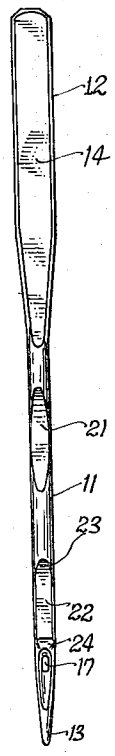


FIG. 1

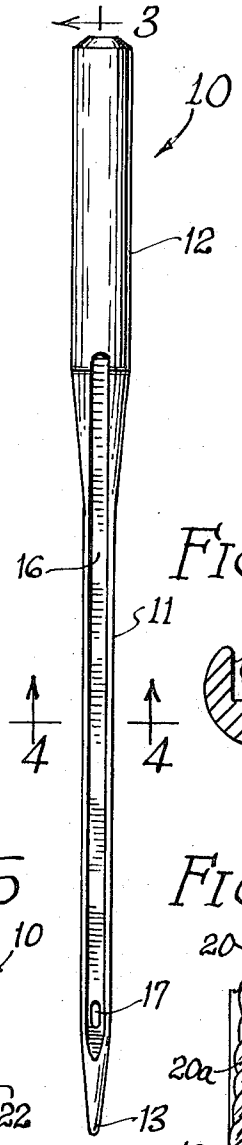


FIG. 2

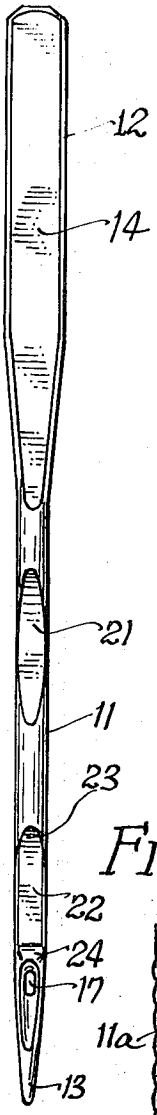


FIG. 3

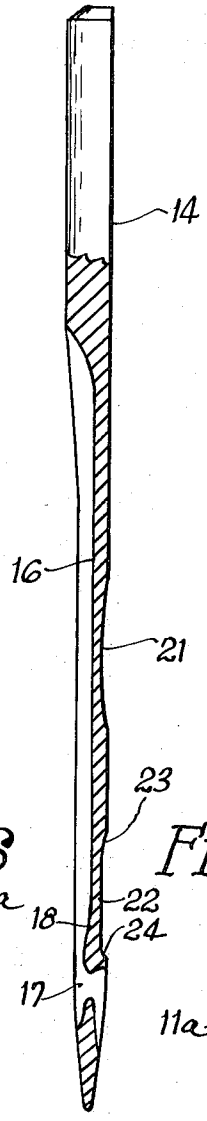


FIG. 4

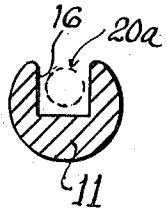


FIG. 5

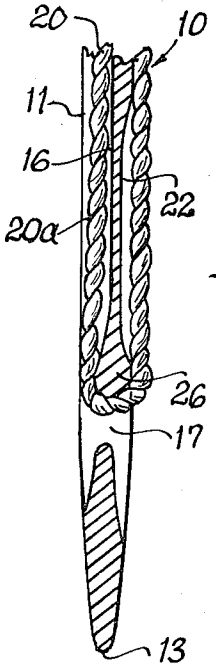


FIG. 5a

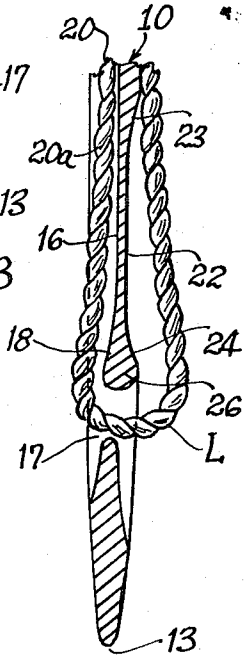


FIG. 6

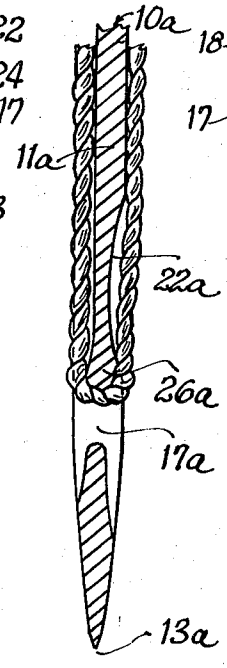
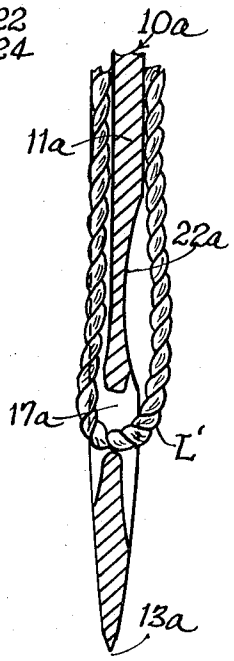


FIG. 6a



SEWING MACHINE NEEDLE

BACKGROUND OF THE INVENTION

This invention relates to improvements in sewing machine needles.

The sewing of modern synthetic, soft and flexible fabrics, such as polyester knits and the like on zig-zag machines has been attended with problems, in particular, the skipping of stitches during normal operation of the sewing machine. It is belived that this condition is due to a combination of factors, one of which is the relatively large area of the needle holes normally provided in the needle plate and the presser foot to accommodate the lateral zig-zag movement of the needle. In its downward travel the needle penetrates the fabric and the friction between the needle and the fabric forces that portion of the fabric disposed over the needle hole downwardly into the hole of the needle plate. In the upward travel of the needle the fabric is drawn into the needle hole of the presser foot. Thus, the fabric is caused to flex in the zone of the needle holes. Accordingly, the fabric is caused to move upwardly with the needle instead of lying flat and permitting the needle to move relative to the fabric. As a result, the thread passing through the fabric does not form a proper loop for engagement by the shuttle beak. The consequence is a skipped stitch.

The problem in a large measure has been remedied by the use of a novel presser foot as disclosed in application Ser. No. 248,216 filed Apr. 27, 1972. This presser foot prevents the upward movement of the fabric into the needle hole of the presser foot as the needle is caused to move upwardly. The use of the needle of the present invention complements the use of the above presser foot in that it tends to reduce the friction between the thread and the fabric while effecting the formation of a larger than conventional thread loop for engagement with the shuttle beak.

SUMMARY OF THE INVENTION

One of the objects of this invention is the provision of an improved needle for use on a zig-zag sewing machine for preventing the skipping of stitches in the sewing of certain types of textile fabrics.

Another object of this invention is the provision of a needle for use in a zig-zag sewing machine which tends to reduce the friction between the thread and the fabric so as to prevent the fabric being raised with the upward travel of the needle while effecting the formation of a larger than conventional thread loop for engagement with the shuttle beak to insure against the skipping of stitches in a sewing operation.

Still a further object of this invention is the provision of a sewing machine needle which functions to bring the thread loop into closer proximity to the shuttle beak for more effective engagement of the loop by the beak.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a sewing machine needle in accordance with my invention.

FIG. 2 is a bottom plan view thereof.

FIG. 3 is a longitudinal cross-sectional view taken substantially on line 3—3 of FIG. 1.

FIG. 4 is a cross-sectional view taken substantially on line 4—4 of FIG. 1.

FIGS. 5 and 5*a* are fragmentary cross-sectional views on an enlarged scale, through the lower part of the needle of my invention showing the relationship of the thread to the needle in different operative positions of the needle.

FIGS. 6 and 6*a* are views, similar to FIGS. 5 and 5*a*, showing a conventional needle and the corresponding relationship of thread to needle in similar operating positions.

BRIEF DESCRIPTION OF A PREFERRED EMBODIMENT

The needle **10** of the present invention comprises a shank or body **11**, a head **12** and a tip **13**. The head **12** is conventional being generally cylindrical with a flat surface **14** and adapted to be inserted in the needle bar of the sewing machine. A channel groove **16** extends longitudinally from the head **12** along the shank **11**, communicates with the eye **17**, and terminates just short of the tip **13**, as illustrated in FIG. **1**. The groove **16** has an average depth greater than that of conventional needles. For example, the depth of the groove **16** in a No. 14 needle, in accordance with the present invention, is approximately 0.20 millimeters greater than that of a conventional needle. Th;us, as will be apparent from FIG. **5** the thread portion **20***a* extending along the shank **11** is substantially wholly contained within the groove **16** and is isolated from the fabric, thereby eliminating any friction between the thread portion **20***a* and the fabric. The lower terminal portion of the groove **16** tapers as at **18**, substantially as shown in FIGS. **3** and **5**.

The surface of the needle diametrically opposite the groove **16** is provided with spaced upper and lower recesses **21** and **22**, respectively, presently to be described. The lower recess **22** which constitutes the zone of the needle traversed by the shuttle beak of a sewing machine, not shown, generally is flat and has inclined end ramp portions **23** and **24**. The ramp portion **24** terminates just short of the eye **17** which results in an enlarged portion **26** immediately adjacent the eye **17**. This portion **26** has a depth which is substantially greater than any portion of the needle along the shank.

In the conventional needle **10***a*, illustrated in FIGS. **6** and **6***a*, the corresponding portion **26***a* immmediately adjacent the eye **17***a* actually has a reduced thickness in relation to the shank **11***a*. It will also be noted that the recess **22***a* in the conventional needle actually is in the form of a channel groove while in the present invention the recess **22** is a low spot on the surface of the needle shank and extends fully across the width of the shank. Accordingly, the thickness of the shank **11** in the zone of the recess **22** is substantially less than the corresponding dimension in the conventional needle **10***a*.

The effect of the enlarged portion **26** on the thread **20** is illustrated in FIG. **5***a*. It will be seen that as the needle **10** begins its upward movement, after having penetrated the fabric, the enlarged portion **26** influences the formation of a loop or bight L which is larger than a loop L', formed by a conventional needle **10***a*, the latter being illustrated in FIG. **6***a*. That, together with the increased clearance provided by the recess **22** of the shank affords an optimum condition for hooking of the thread **20** by the shuttle beak, not shown, which substantially insures against skipping of stitches in a sewing operation.

The upper recess **21** is spaced from the lower recess **22** and, preferably, is arcuately formed in a longitudinal direction. Said recess **21** accommodates a portion of the thread **20** on the side of the needle above the loop L and this has the effect of reducing friction between the thread and the fabric.

The tip **13** of the needle has a rounded or snub nose instead of a sharp piercing point **13***a* as in the conventional needle shown in FIGS. **6** and **6***a*. The snub nose functions to push aside the threads of the fabric as the needle penetrates the fabric instead of cutting through the threads as in the case of conventional needles.

It will be apparent from the foregoing that the needle of my invention, in operation, effects optimum sewing conditions by reducing the friction between the needle and sewing thread and the fabric being stitched so as to facilitate passage of the needle through the fabric with a minimum disturbance of the fabric, while at the same time influencing the formation of a larger than normal thread loop or bight to be hooked by the shuttle beak, thereby insuring the formation of proper stitches in a sewing operation.

Various changes coming within the spirit of my invention may suggest themselves to those skilled in the art; hence, I do not wish to be limited to the specific embodiments shown and described or uses mentioned, but intend the same to be merely exemplary, the scope of my invention being limited only by the appended claims.

I claim:

1. A needle for a sewing macine having an oscillating shuttle having a beak which is adapted to traverse the needle, said needle comprising a head, a reduced shank integral with said head and terminating in a tip, said shank being pierced by a transverse eye spaced from said tip, said shank having on one side a longitudinal groove of substantially uniform depth extending from said head and terminating in said eye, said shank having diametrically opposite said groove a first recess located in the zone of traverse of said beak and terminating at one end in a ramp portion adjacent said eye, said shank having diametrically opposite said groove a second recess spaced from said first recess and disposed intermediate said first recess and said head, the longitudinal cross sectional area of a portion of the shank immediately adjacent and between said eye and said ramp being substantially greater than the cross sectional area of the shank in the zone of said first recess and constituting an enlargement which influences the thread passing through the eye to form a loop of substantial size so as to be easily engaged by said shuttle beak.

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