United States Patent [19]

Johnson

[11] **3,872,810**

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[54] **NEEDLE PROTECTOR**

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[73] Assignee: **Lees Manufacturing Company,** Cannon Falls, Minn.

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[21] Appl. No.: **404,852**

[52] **U.S. Cl.** **112/227**

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

[58] **Field of Search** 112/227, 261, 197, 199

[56] **References Cited**

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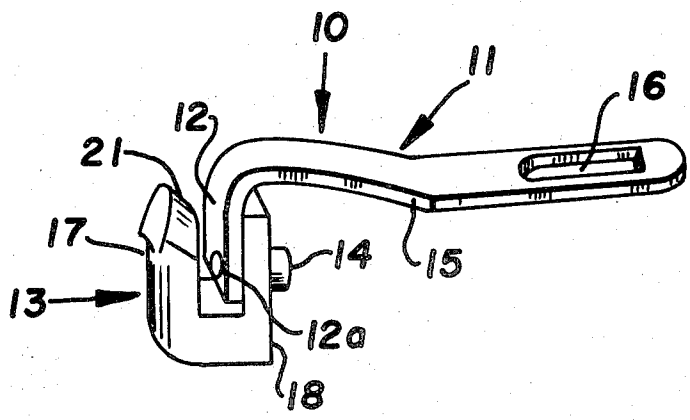
Primary Examiner—Richard J. Scanlan, Jr.

Attorney, Agent, or Firm—James R. Cwayna

[57] **ABSTRACT**

A needle protector and guard for sewing machines arranged to receive the needle at the bottom of its stroke. The protector includes a generally U-shaped member designed to receive the needle between the upstanding arms thereof, while permitting the loopers of the machine to move thereover for proper looping and holding of the thread.

5 Claims, 10 Drawing Figures



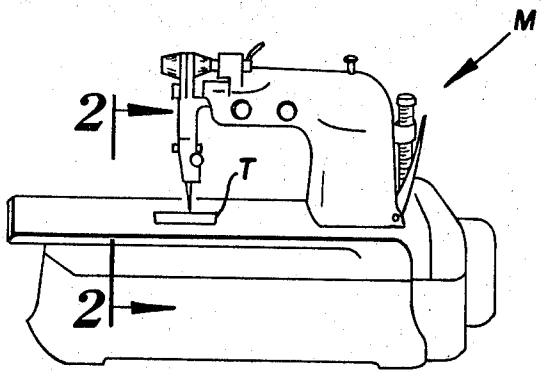


FIG. 1

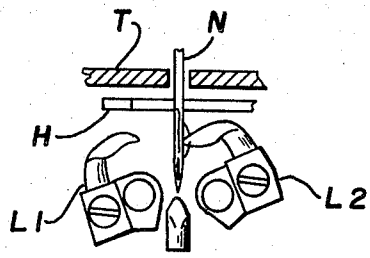


FIG. 2

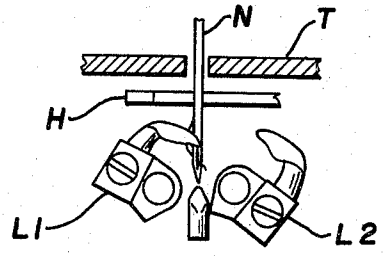


FIG. 3

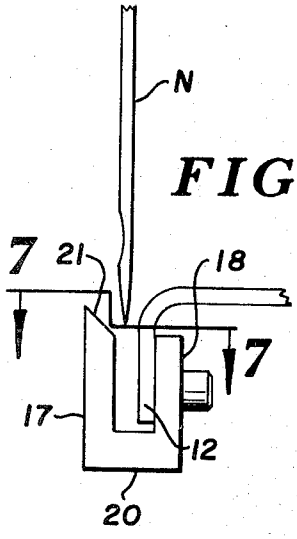


FIG. 5

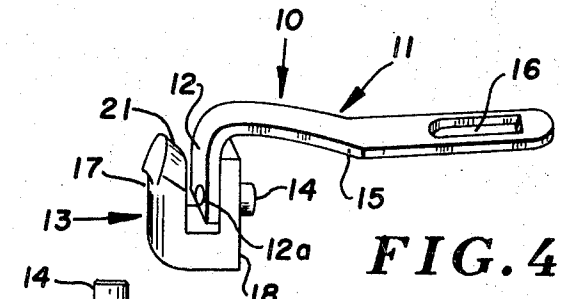


FIG. 4

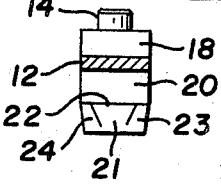


FIG. 7

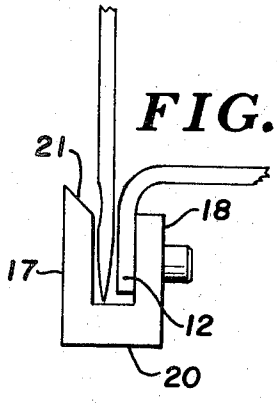


FIG. 6

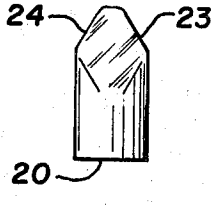


FIG. 8

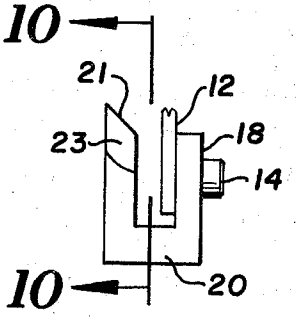


FIG. 9

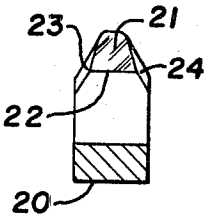


FIG. 10

NEEDLE PROTECTOR

The use of needle guards for sewing machines in not necessarily totally new in the art. Most of these guards, however, do not totally protect the needle but rather are arranged on only one side thereof and this does not give the total protection that is required for the needle.

Applicant is acquainted with the commercial and industrial aspect of sewing materials and it is particularly in this field that such protection devices are of their greatest importance as the shut down of a machine due to needle breakage is very costly.

With applicant's concept, a protector or guard device is provided to receive the needle while allowing its normal rearward and forward shuttling motion and while permitting the normal operation of the loopers of the machine.

It is therefore an object of applicant's invention to provide a needle protector or guard device to receive a needle of a sewing machine therein at the lower extremity of its stroke.

It is a further object of applicant's invention to provide a needle protector or guard device that will receive a needle therein but will permit the normal movement of the needle.

It is still a further object of applicant's invention to provide a needle protector or guard device designed and arranged to permit the nomal operation of the loopers of the machine.

It is still a further object of applicant's invention to provide a needle guard for a sewing machine that due to its particular configuration will act as a guiding device for directing the needle into the protective area.

These and other objects and advantages of applicant's invention will more fully appear from the following description made in connection with the accompanying drawings, wherein like reference characters refer to the same or similar parts throughout the several views, and in which:

FIG. 1 is a front perspective view of a typical sewing machine upon which the invention embodying the concepts of applicant's invention may be utilized:

FIG. 2 is a vertical section taken substantially along Line 2—2 of FIG. 1 showing the positioning of the protector device in conjunction with various other elements of the machine;

FIG. 3 is a view similar to that of FIG. 2 and illustrating the various elements of the machine in a different position;

FIG. 4 is a perspective view of the protective device;

FIG. 5 is a side elevation of the protector and needle of the machine, the needle being in an approaching position;

FIG. 6 is a view similar to that of FIG. 5 and illustrating the needle in its downmost position;

FIG. 7 is a horizontal section taken substantially along Line 7—7 of FIG. 5;

FIG. 8 is a front elevation taken from FIG. 7;

FIG. 9 is a side elevation taken from FIG. 8; and,

FIG. 10 is a vertical section taken substantially along Line 10—10 of FIG. 9.

In accordance with the accompanying drawings, applicant's needle protector is designated **10** and the drawings illustrate its relation to the various operative portions of a sewing machine. A typical machine to which the protector may be attached is illustrated in FIG. 1 and is designated M. The protector or guard is mounted below the throat plate T of the machine and

likewise underlies the trimmer hook H. The concept of applicant's guard **10** is to receive the needle N relatively close to and at the downstroke thereof. During the stroking of the needle, the thread loopers are operative and will move over and across the top of the guide. The operation of the loopers is to strip and hold the thread for the next downstroke of the needle and therefore these loopers must operate relatively close to the needle itself.

The normal operation of the needle is to move forwardly and backwardly on alternative strokes and therefore the guard must allow for this movement.

The guard **10** is illustrated in perspective form in FIG. **4.** As illustrated therein, the guard **10** includes a mounting arm **11** having a generally downwardly directed connecting section **12,** having a threaded passage **12***a* therethrough for connection to the needle receiving portion **13** by a threaded fastener **14.** The mounting arm **11** is horizontally offset as at **15** to accomodate mounting of the same to the machine. A mounting slot **16** is provided in the rearward portion of the arm **11.**

The needle receiving portion **13,** includes a pair of upstanding arm elements **17, 18** and the connecting section **12** is received internally thereof and, as illustrated in FIGS. **5** and **6,** the spacing between the connecting section **12** and the upstanding arm element **17** will permit the needle N to be receivied therebetween. The curvature of the connecting portion **12** is also designed to direct the needle N into the receiving area, should the same accidentally strike the same on the downstroke thereof.

It should be noted that the width of the connecting portion and the arm elements **17, 18** is such as to permit the normal oscillating movement of the needle N.

The particular shape of the guard or protector is particularly illustrated in FIGS. **7, 8, 9** and **10.** As illustrated therein, the first upstanding section **18** is substantially rectangular in shape and extends downwardly to a generally normal connecting portion **20,** which portion **20** is of sufficient length to receive the needle therein by providing proper spacing between the arms **17, 18.**

The upstanding arm **17** is of a particular configuration which will particularly guide the needle N into the receiving area. A first inwardly and downwardly directed guide surface **21** is provided at the uppermost extremity of the arm **17** and extends from the exterior to the interior surface thereof. As illustrated in FIG. **10,** this surface is generated from a decreased interior surface **22** of the arm **17,** which decreased surface is provided by a pair of oppositely disposed upwardly and inwardly extending surfaces **23, 24** extending between the forward or inner surface of arm **17** to the exterior surface thereof. This entire surface formation then basically provides a generally pyramidal configuration with certain sides thereof being generally vertical while adjacent sides thereof, although being generally angular will be generated from a generally curvilinear surface. The entire concept of configuration is to provide a guiding, protective configuration for the needle and the shape of the particular surfaces will accomplish this desire.

The particular position and operation of the guard or protector **10** is illustrated in FIGS. **5** and **6.** As illustrated therein, the needle will be received into the unit at the extremity of its downstroke and the loopers, as

illustrated in FIG. 2 and 3 will be in position to operate thereover and thereabove.

With applicant's guard, the needle is protected at the extremity of the downstroke while still permitting the needle to move in its required directions to perform the sewing operation. The guard provided by applicant then provides a unique protective device which is designed to direct the needle into the protective area while still permitting the various machine elements to function in their normal manner.

What is claimed is:

1. In a sewing machine provided with a needle, a pair of looping mechanisms, which looping mechanisms have loopers arranged on opposite sides of the needle and which are alternatively actuated to receive the thread loop from the needle, a needle protective device including:

a. a first mounting arm;

b. said mounting arm having means for attaching the same to the machine;

c. a needle receiving area provided on said mounting arm in position to receive the needle therein during at least a portion of its upward and downward stroke, said area being defined by a downwardly directed portion of said mounting arm and a laterally spaced, upwardly extending arm, said upwardly extending arm having a plurality of angularly arranged surfaces on the upper portion thereof to normally direct the needle into said receiving area; and,

d. said protective device being positioned relative to the loopers to permit the loopers to pass upwardly and across said receiving area.

2. The structure as set forth in claim **1** and said receiving area including said first laterally spaced, upwardly extending arm and a second upwardly extending arm, said second upwardly extending arm being attachable to said downwardly directed portion of said mounting arm.

3. The structure as set forth in claim **2** and said second arm being spaced from said first arm a dimension to permit said downwardly directed portion of said mounting arm to be received therebetween.

4. The structure as set forth in claim **1** and said downwardly directed portion of said mounting arm being smoothly contoured at the upper portion thereof to direct the needle into said receiving area should the needle contact the same on its downward stroke.

5. The structure set forth in claim **1** and said receiving area being open at the ends thereof.

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