

April 30, 1935.

H. J. MORANVILLE

1,999,251

NEEDLE GUARD

Filed Dec. 21, 1933

2 Sheets-Sheet 1

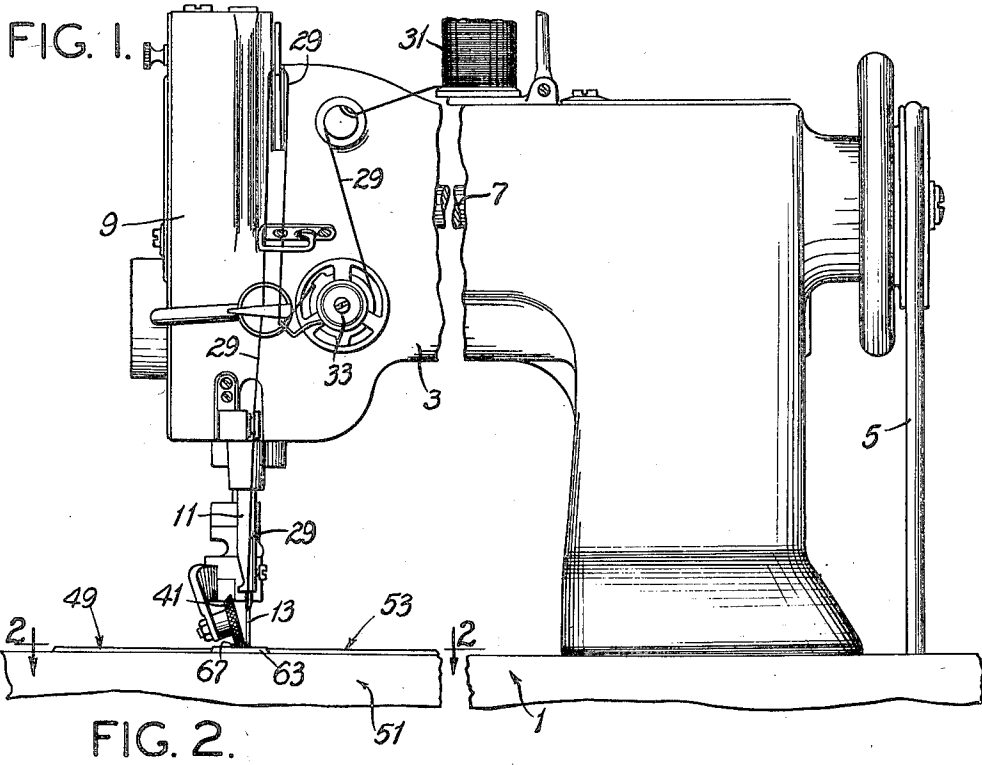


FIG. 2.

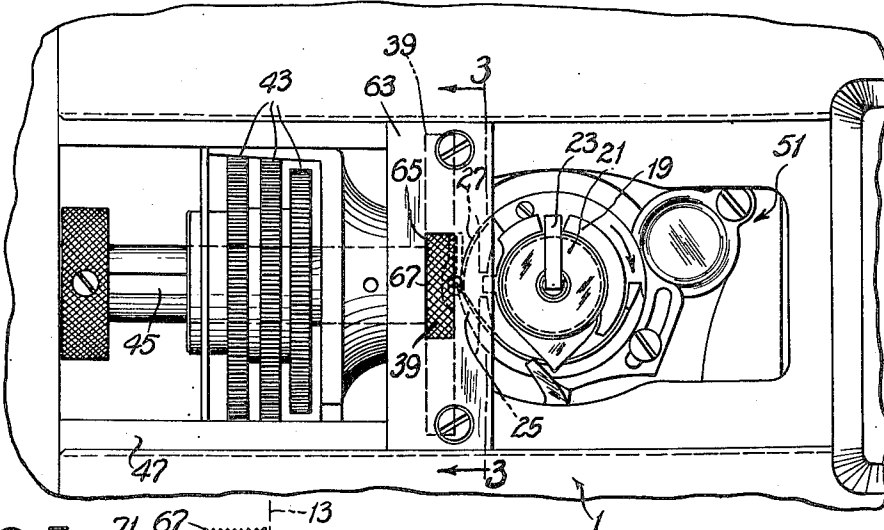
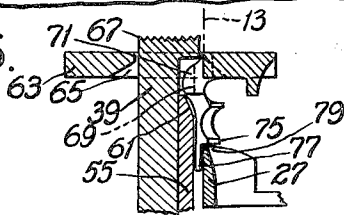


FIG. 5.



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FIG. 3.

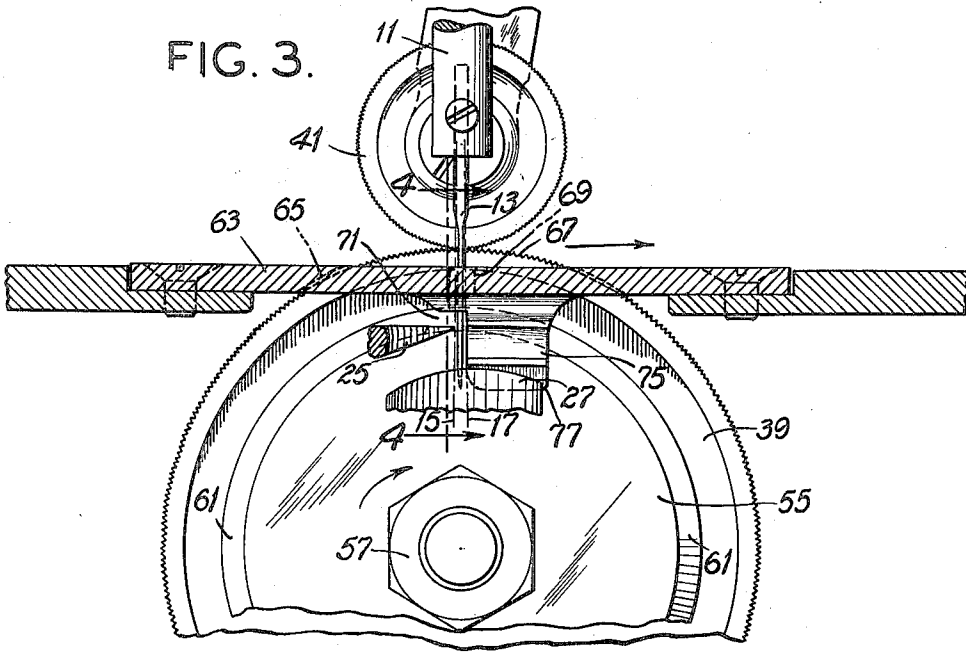


FIG. 4.

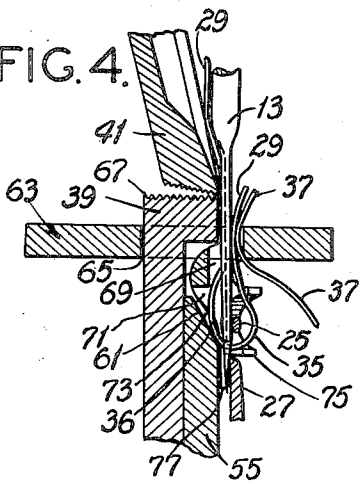
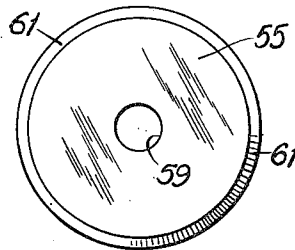


FIG. 6.



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NEEDLE GUARD

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12 Claims. (Cl. 112—227)

This invention relates to needle guards, and with regard to certain more specific features to needle guards for sewing machines.

Among the several objects of the invention may be noted the provision of a needle guard which cooperates with a feed roll and the usual reciprocating needle, said needle having a known component of movement in the direction of motion of the feed roll, said cooperation being such that said guard moves with the roll and with the needle; the provision of a guard of the class described having a thread retainer and cooperating parts which ensure a single and proper size of thread loop adapted to be more positively caught by the known thread hook without breaking the thread or skipping stitches; the provision of apparatus of the class described which appreciably reduces both needle and thread breakage, reduces spoilage of work, and which permits the use of a finer needle on thicker and rougher goods, such as on multi-ply leather having folds therein; the provision of apparatus of this class which as a consequence of the use of finer needles effects a finer and a tighter stitch; and the provision of such apparatus which is relatively simple in structure and which may be applied to present day sewing machines. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which is illustrated one of various possible embodiments of the invention,

Fig. 1 is a side elevation of a sewing machine showing the application of the invention thereto;

Fig. 2 is a horizontal section taken on line 2—2 of Fig. 1, a pair of cover plates having been removed;

Fig. 3 is an enlarged vertical section taken on line 3—3 of Fig. 2;

Fig. 4 is a vertical section taken on line 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 4 but showing the needle removed; and,

Fig. 6 is an end view of a guard wheel per se.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

At present a feed roll is used for advancing

the leather or the like in sewing machines while the needle reciprocates through the leather. As the feed roll and leather advance, the reciprocating needle, by the driving machinery, is given a sideward component of movement with the advancing roll edge so as to prevent sideward bending of the needle while passing through the leather. In combination with a structure of the above nature is used a needle guard beneath the feed roll consisting of a throat plate through which the needle passes, the throat plate having a thread retainer thereon. The throat through the throat plate is required to be large enough to accommodate the sideward component motion of the needle. Below the throat plate is the needle guard portion proper which has a recess surrounding the needle on three sides besides the thread retainer. This prior construction results in sideward movement of the needle often being interfered with and consequent needle breakage.

At the same time, in this prior construction, the stationary guard has no clearance at the rearward portion for accommodating a second rearward loop of the thread which, as well as a forward loop, inevitably forms upon the retraction of the needle. As a consequence of this lack of rearward clearance, the second loop of thread is forced to the front of the needle where it is often picked up by the thread hook in normally hooking the desired loop of thread in front of the needle. The result is skipping of stitches and thread breaking as well as needle breaking.

This invention overcomes all of the above difficulties and permits the use of a much finer needle. When a finer needle is used for a given class of work, the stitching may be made closer because of the smaller size of hole involved, and furthermore the stitching is tighter because the smaller size of hole more tightly grips the thread which passes therethrough. The present invention reduces the needle breakage on a given machine which operates substantially all day, from the order of three to six needles, down to one needle or less. The invention also permits the needle to ride over thick folds and the like without skipping stitches and without breakage of either the thread or the needle.

Referring now more particularly to Fig. 1, there is shown at numeral 1 a sewing machine bed upon which is mounted the sewing machine arm 3 and head 9. The sewing machine illustrated is one for sewing leather but this is to be interpreted as being merely illustrative.

The machine has a drive 5 for a head shaft

7 which operates parts in the head 9 for causing the needle chuck 11 to reciprocate and to have a slight forward and rearward oscillating movement. The oscillating movement causes the
 5 needle 13 also to oscillate forward and backward as it reciprocates up and down. The forward and rearward positions of oscillation are shown in Fig. 3 by numerals 15 and 17 respectively. The purpose of these oscillations is to cause the needle
 10 to have a component of movement with the leather which is sewn as said leather moves in a direction indicated by the arrow shown in Fig. 3.

A branch from said drive also rotates a bobbin holder 19. The bobbin itself is shown at numeral
 15 21 and a bobbin lock at numeral 23. The rotary bobbin holder includes a hook 25 (see Figs. 2, 3 and 4), and directly ahead of the same a hook needle guard 27. The bobbin holder being rotary, and the hook 25 and needle hook guard
 20 27 being mounted thereon, said hook and guard also rotate according to the arrow shown in Fig. 2.

Generally speaking, it is the function of the needle 13 to descend with a loop of thread 29
 (Fig. 4). The thread is drawn from a spool 31
 25 on the arm 3 (Fig. 1) and through a suitable tensioning device 33 and driven through the material (not shown). When the needle 13 retracts (Fig. 4) a loop 35 is effected, through which passes the hook 25, the action of the hook drawing
 30 said loop 35 to surround in a known manner the bobbin thread 37.

As the needle 13 withdraws, the thread 29 is drawn up and the bobbin thread 37 functions as an interlock in the stitch. During this operation,
 35 the needle 13 has the rearward component of movement illustrated in Fig. 3 and the leather through which the needle is reciprocating is also moved rearwardly by a feed roll 39 which moves in a counterclockwise direction (Fig. 3). An idler pressure roll 41 cooperates with the feed
 40 roll 39 to maintain the material in proper relationship with respect to the needle 13. Selective speed gears 43 driven by suitable branch from said drive 5 effect operation of the feed
 45 roll 39. The gears 43 may be selected before operation by a speed change device 45 located in a gear box 47 which is provided with a cover 49 during actual operation. The bobbin 19 is located in a box 51 which is covered with a
 50 cover 53 during operation. In Fig. 2 said covers 49 and 53 are shown removed.

The above features are in general known and it is the purpose of this invention to provide an improvement thereon. Heretofore, stationary
 55 needle guards have been used for preventing needle and thread breakage. These have not been entirely satisfactory and the present invention comprises a guard disc 55 attached within the
 60 cupped interior of said feed roll 39, the attachment being made by means of a central nut 57 on a stud which passes through a hole 59 in the disc 55. The edge of the disc 55 is bevelled as shown at numeral 61.

In conjunction with the disc 55 is used an improved throat plate 63 having a slot 65 therein for accommodating the projecting part 67 of the
 65 feed roll 39. This throat plate 63 includes a throat 69 through and in which the needle 13 reciprocates and oscillates. The open portion 71 through which the throat 69 is formed lies closely to the beveled contour 61 of the plate 55 as shown
 70 at numeral 73 in Fig. 4. Directly to the rear of the needle 13 is formed on the portion 71 a channel shaped thread retainer 75 through which the

hook 25 draws the thread after the hook 25 has entered the loop 35.

Extending downwardly from the thread retainer 75 is a lip, 77 (Fig. 5) which is just cleared by the hook needle guard 27, the upper edge of the guard 27 passing below the lower lip of the thread
 5 retainer 75. Thus any dirt which gathers at point 79 (Fig. 5) is removed from the hook needle guard during its rotary action. Heretofore the presence of dirt in this location has often
 10 distorted the loop 35 such that an improper cooperation with the hook 25 was effected. The result was irregularity in the stitching.

It will be appreciated that the hook needle guard 27 as shown in Fig. 4, is for the purpose
 15 of preventing the needle in its downward position from moving to the right (Fig. 4) thus to avoid its being struck by the hook 25. After the needle has been withdrawn, there is no longer any necessity for the hook needle guard, which passes
 20 on.

The operation of the device is as follows, assuming that the needle 13 is reciprocating and oscillating, and that the feed roll 39 is rotating:

The needle 13 drives down the thread 29
 25 through the material, carrying the same through the throat plate 63 and through the throat 69 down in front of the thread retainer 75. Then the needle 13 rises and at the same time executes a rearward component of movement with the
 30 leather which is being driven by the roll 39. As the needle rises the forward loop 35 is formed and at the same time a rearward loop 36 also naturally occurs. The bevel 61 of the disc 55 permits
 35 this rearward loop 36 to form. This is the first advantage of the invention over the prior needle guards. Prior needle guards make no provision for receiving said second loop 36 which therefore
 40 forces out too far the loop 35; or the prior guards deflect the loop 36 forwardly (to the right, Fig. 4). In either event, either irregularity of stitching, or thread breaking resulted.

At this stage, there is no relative motion between the thread loop and the needle guard disc 55, because said disc is rotating with the feed roll
 45 39 and thus is moving with the rearward component movement of the needle 13. The inner (right-hand) movable needle guard 27 on the bobbin support 19 is in the position shown on Fig. 4. Thus it will be seen that the needle 13 is prevented from being deflected laterally (to the left
 50 or right, Fig. 4). Also, the upper edge of the movable needle guard 27 being cleaned, no dirt interferes with the effectuation of the loop 35.

The next operation is for the hook 25 to catch the loop 35 and thereafter to turn the loop over the bobbin thread 37. The thread retainer 75
 55 ensures that the loop 35 which is thereafter extended shall be properly guided as the hook draws out of the loop.

Lastly, the needle 13 withdraws through the throat 69 of the throat plate 63 to pull the extended loop 35 tightly against the bottom of the leather, retaining the bottom threads 37 as a
 60 thread interlock.

From the above, it will be seen that not only is there effected a saving in thread breakage and needle breakage but that improved workmanship and a saving in material stitched is effected.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all

matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

5 I claim:

1. A needle guard for a sewing machine having a reciprocating and laterally moving needle, comprising means guarding the needle in descended position on at least two sides thereof, said guarding means moving with the needle in the direction of its sideward component of movement.

2. A needle guard for a sewing machine having a reciprocating and laterally moving needle and a bobbin, comprising means backing the needle on the side opposite the bobbin, said backing means moving with the needle in the direction of its sideward component of movement.

3. A needle guard for a sewing machine having a reciprocating and laterally moving needle, a feed roll and a bobbin, comprising means backing the needle, said backing means moving with the feed roll in the direction of the sideward component of needle movement, said guard being attached to said feed roll.

4. A needle guard for a sewing machine having a reciprocating and laterally moving needle, comprising means backing the needle in descended position, said backing means moving with the needle in the direction of its sideward component of movement, and a relief portion on said backing means permitting said needle to effect a loop on its backed side as well as on the opposite side thereof.

5. A needle guard for a sewing machine having a reciprocating and laterally moving needle, comprising means backing the needle in descended position, and a relief portion on said backing means permitting said needle to effect a loop on its backed side as well as on the opposite side thereof.

6. A needle guard for a sewing machine having a reciprocating and laterally moving needle, comprising means backing the needle in descended position, said backing means moving with the needle in the direction of its sideward component of movement, a relief portion on said backing means permitting said needle to effect a loop on its backed side as well as on the opposite side thereof, a throat plate having a throat through which said needle passes in its movement, and a thread retainer extending from said throat plate and located adjacently to the needle.

7. A needle guard for a sewing machine having a reciprocating and laterally moving needle, comprising means backing the needle in descended position, said backing means moving with the needle in the direction of its sideward component of movement, a relief portion on said backing means permitting said needle to effect a loop on its backed side as well as on the opposite side thereof, a throat plate having a throat through which said needle passes in its movement, a thread retainer extending from said throat plate and located adjacently to the needle,

said sewing machine having a rotary bobbin carrier which carries another movable needle guard, and means extending from said retainer and cooperating with said last-named needle guard to remove foreign material therefrom.

8. A needle guard for a sewing machine having a rotary feed roll and reciprocating needle, the latter having a component movement with the roll, comprising a guard disc sunk into the roll and adapted to lie adjacent to the needle in downward position of the same.

9. A needle guard for a sewing machine having a rotary feed roll and reciprocating needle, the latter having a component movement with the roll, comprising a guard disc sunk into the roll and adapted to lie adjacent to the needle in downward position of the same, and a relieved portion arranged peripherally of said disc and adjacent to the eye of the needle in the said downward position of the latter.

10. A needle guard for a sewing machine having a rotary feed roll and reciprocating needle, the latter having a component movement with the roll, comprising a guard disc sunk into the roll and adapted to lie adjacent to the needle in downward position of the same, a bevelled portion arranged peripherally of said disc and adjacent to the eye of the needle in the said downward position of the latter, a throat plate having a throat above said bevelled portion, and a thread retainer opposite said bevelled portion.

11. A needle guard for a sewing machine having a rotary feed roll and reciprocating needle, the latter having a component movement with the roll, comprising a guard disc sunk into the roll and adapted to lie adjacent to the needle in downward position of the same, a bevelled portion arranged peripherally of said disc and adjacent to the eye of the needle in the said downward position of the latter, a throat plate having a throat above said bevelled portion, a thread retainer opposite said bevelled portion, said sewing machine having a movable needle guard opposite said disc, and means extending from said throat plate adapted to cooperate with the said last-named guard to remove foreign material therefrom as it moves.

12. A needle guard for a sewing machine having a rotary feed roll and reciprocating needle the latter having a component of movement with the roll, comprising a guard disc sunk into the roll and adapted to lie adjacent to the needle in downward position of the same, a bevelled portion arranged peripherally of said disc and adjacent to the eye of the needle in the said downward position of the latter, a throat plate having a throat above said bevelled portion, a thread retainer opposite said bevelled portion, said sewing machine having a movable needle guard opposite said disc and within the radius of the bevelled portion, and means extending from said throat plate adapted to cooperate with the said last-named guard to remove foreign material therefrom as it moves.

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