Dec. 19, 1939. B. H. GOSTKOWSKI 2,183,716

RELOOPING NEEDLE FOR WOVEN AND KNITTED GOODS

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Fig. 1.

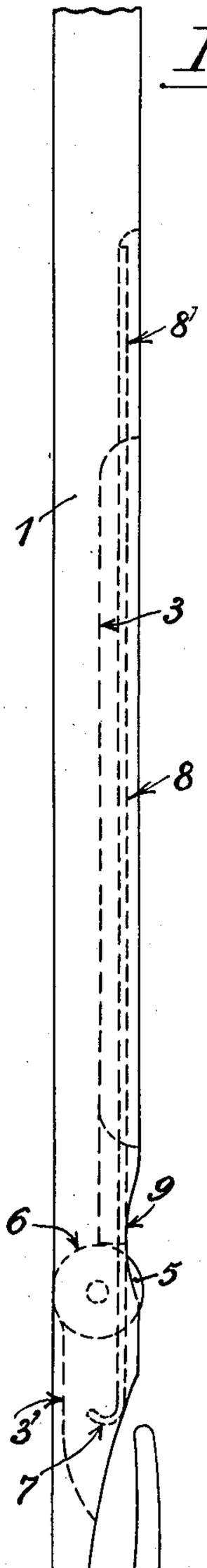


Fig. 3.

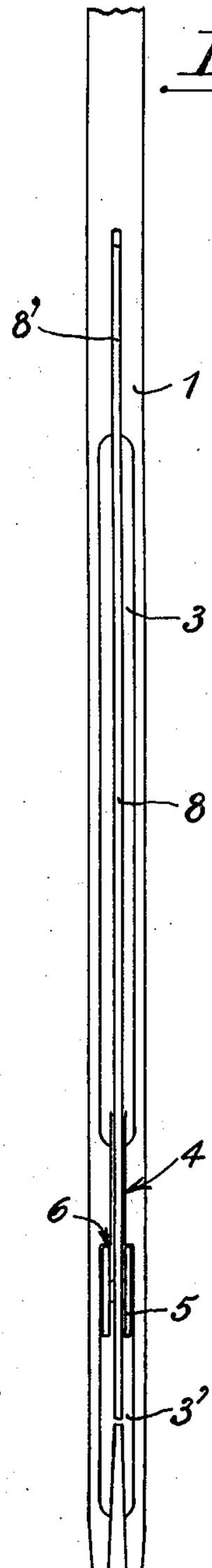


Fig. 2.

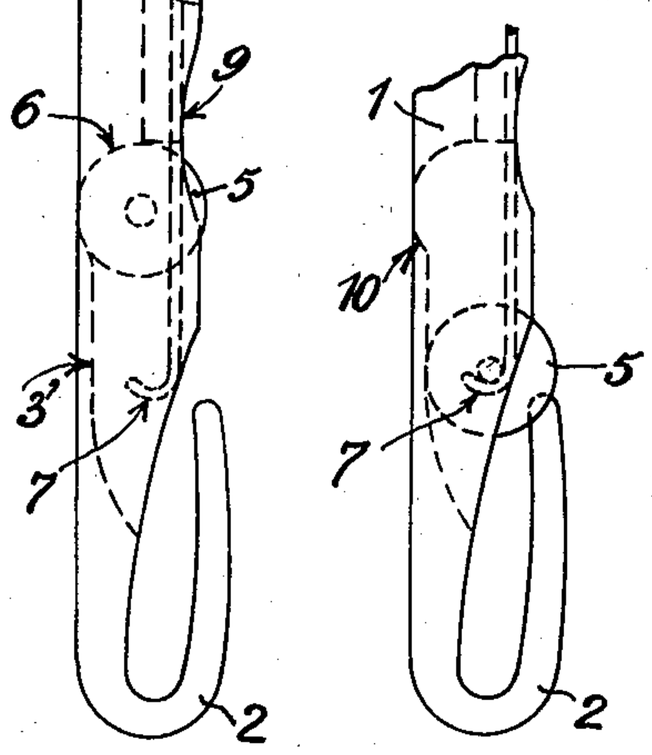
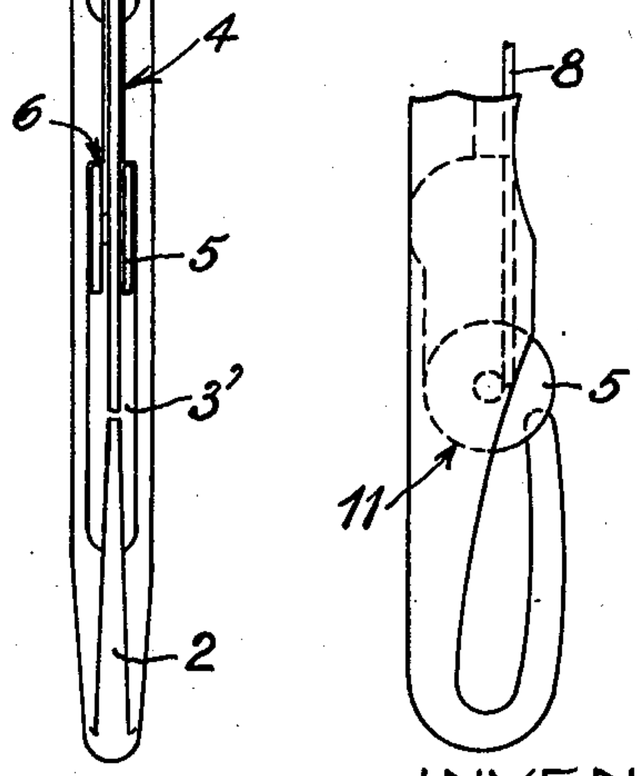


Fig. 4.



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RELOOPING NEEDLE FOR WOVEN AND KNITTED GOODS

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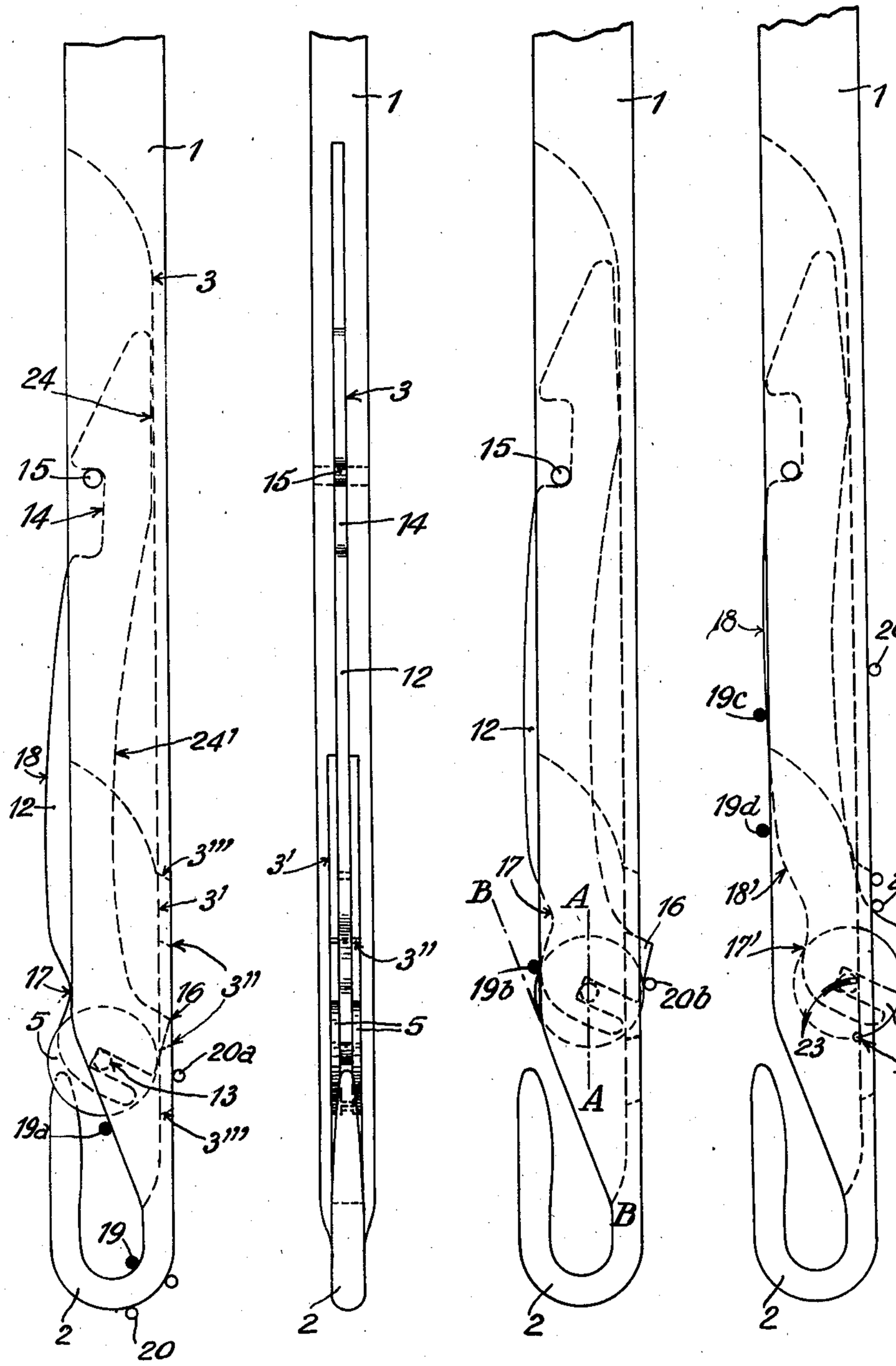
Fig. 5. Fig. 6. Fig. 7. Fig. 8.



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RELOOPING NEEDLE FOR WOVEN AND KNITTED GOODS

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Fig. 9.

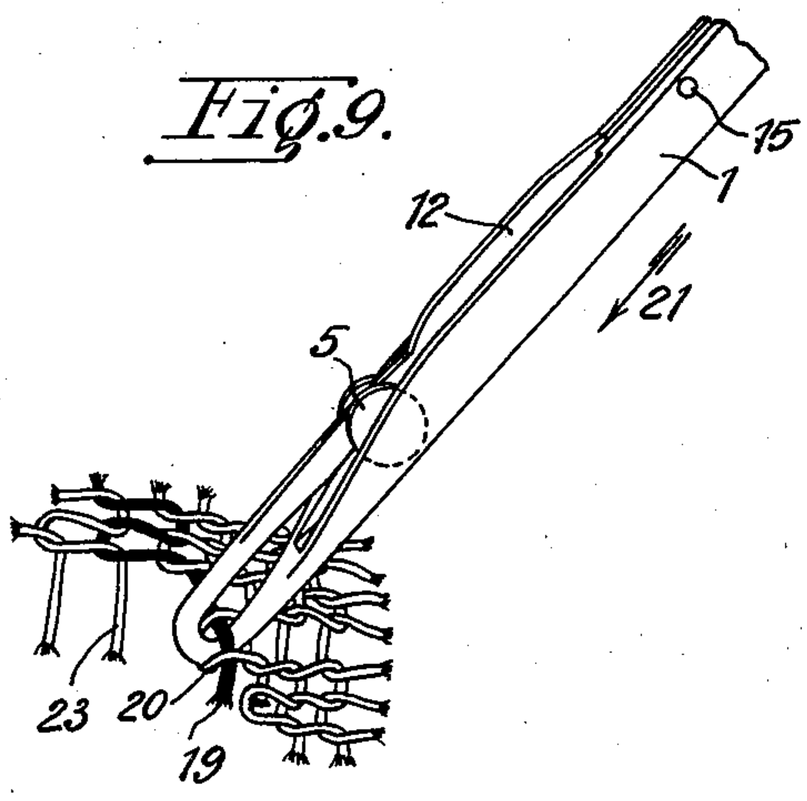


Fig. 10.

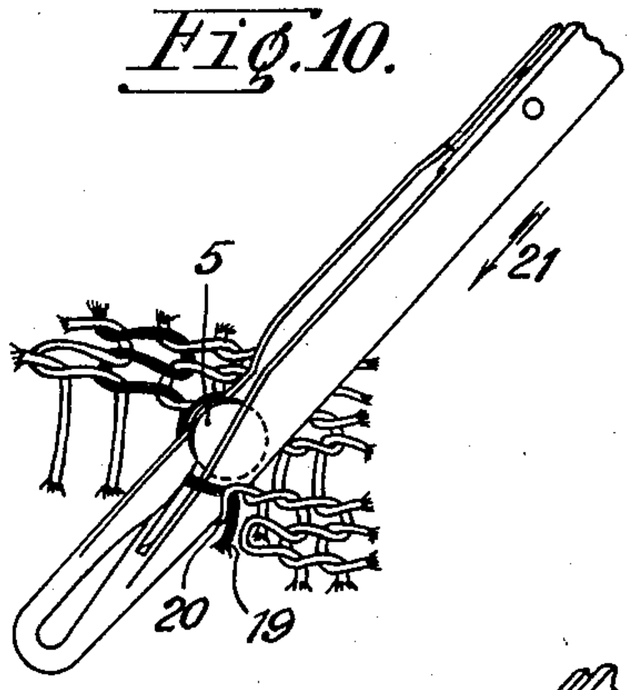


Fig. 11.

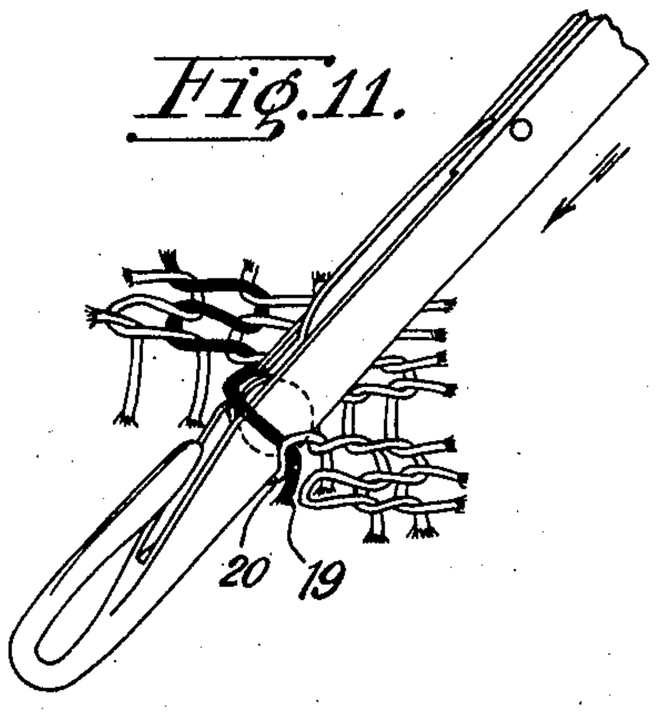


Fig. 12.

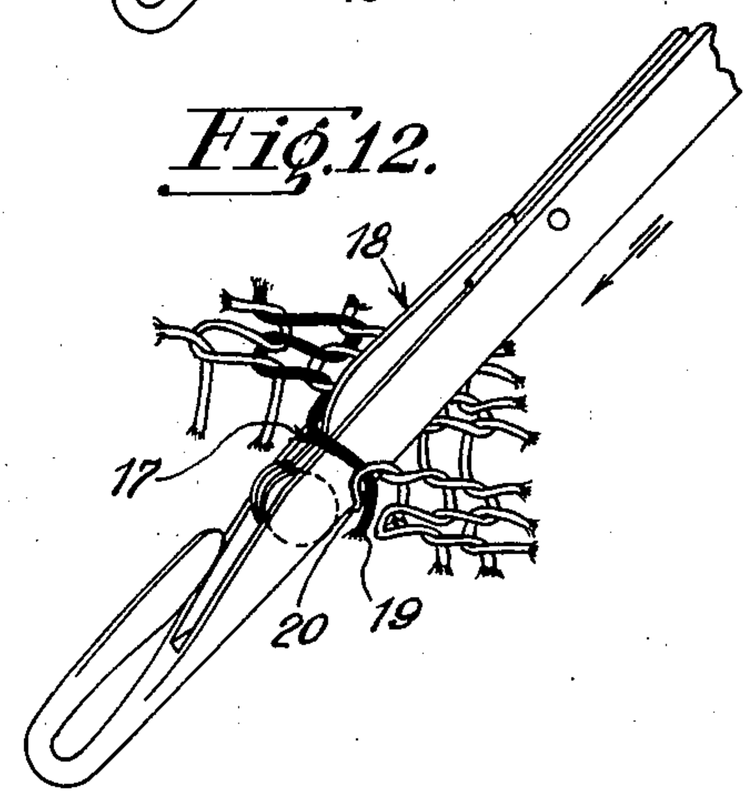


Fig. 13.

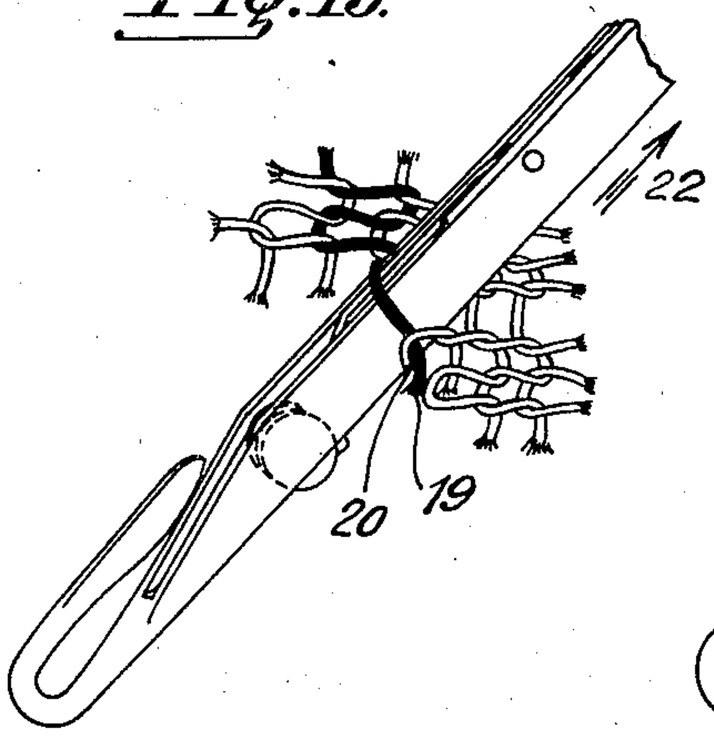
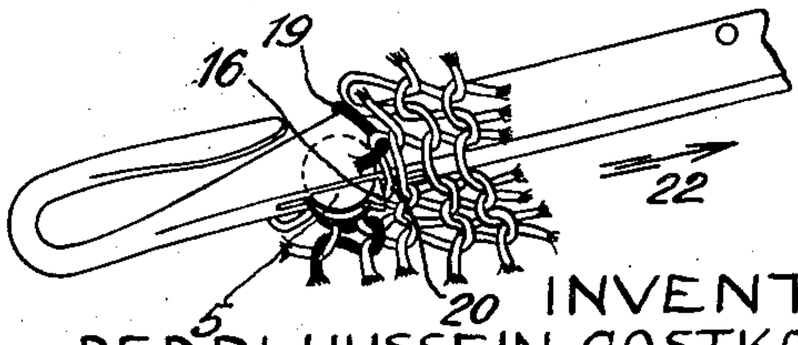


Fig. 14.



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RELOOPING NEEDLE FOR WOVEN AND KNITTED GOODS

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Fig. 15.

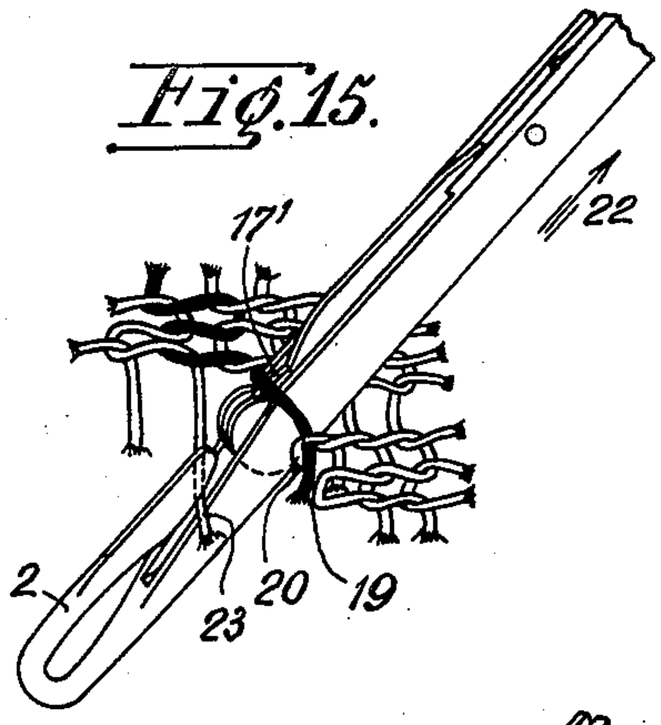


Fig. 16.

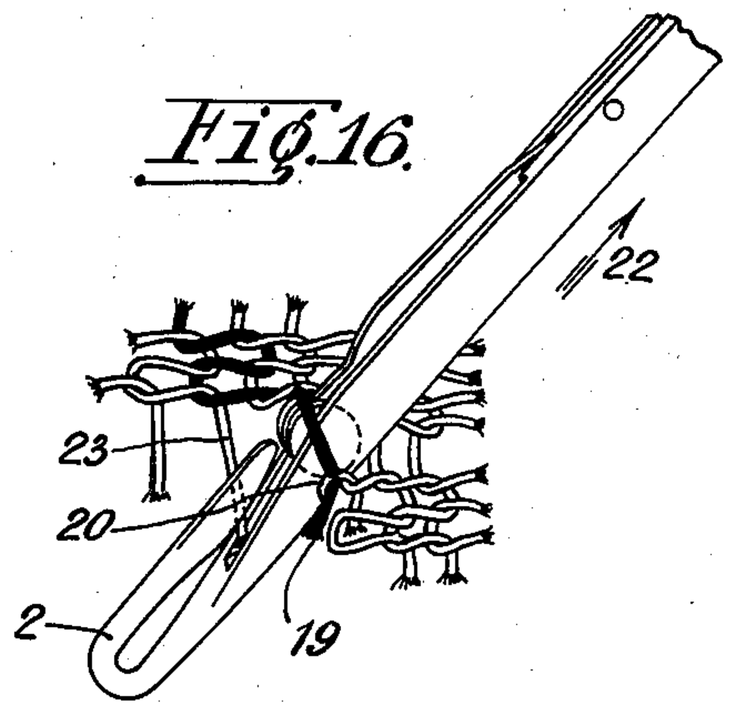


Fig. 17.

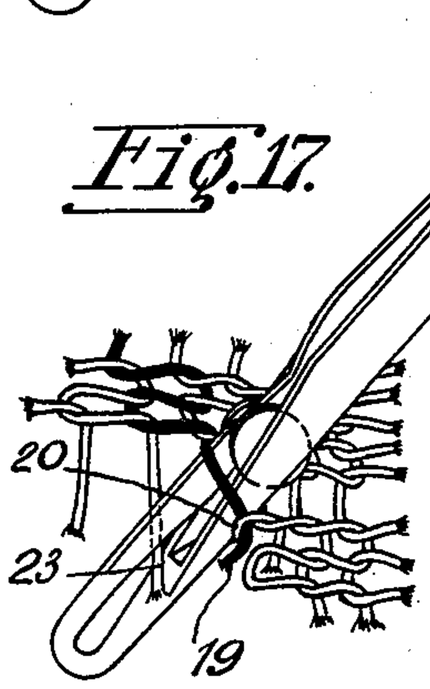


Fig. 18.

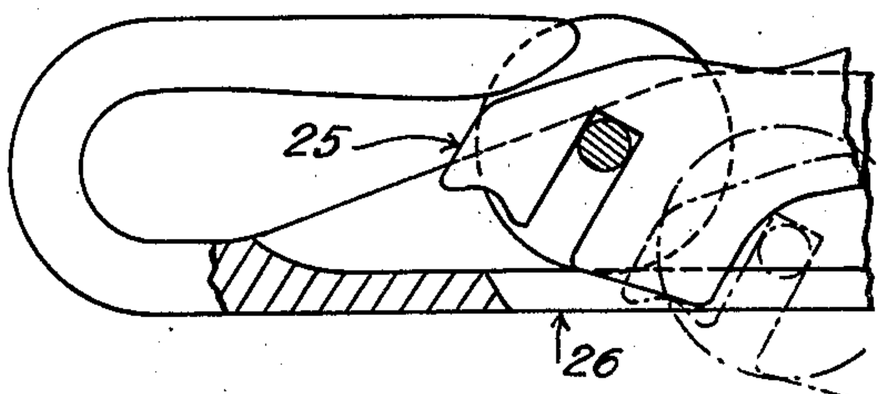


Fig. 19.

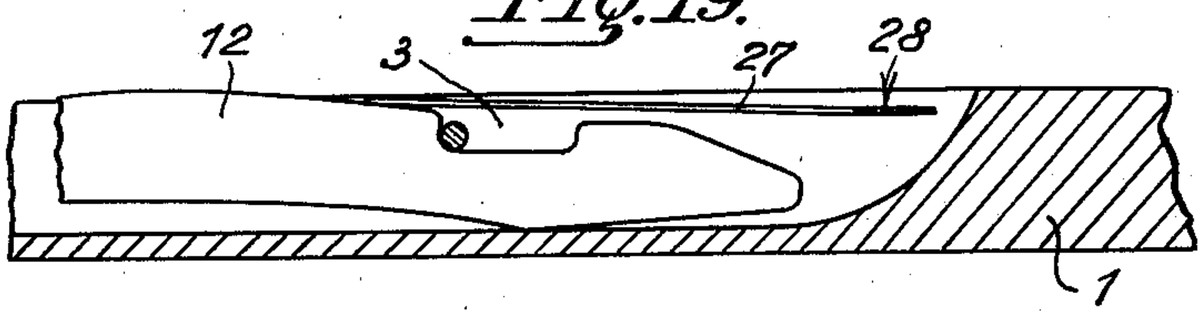


Fig. 20.

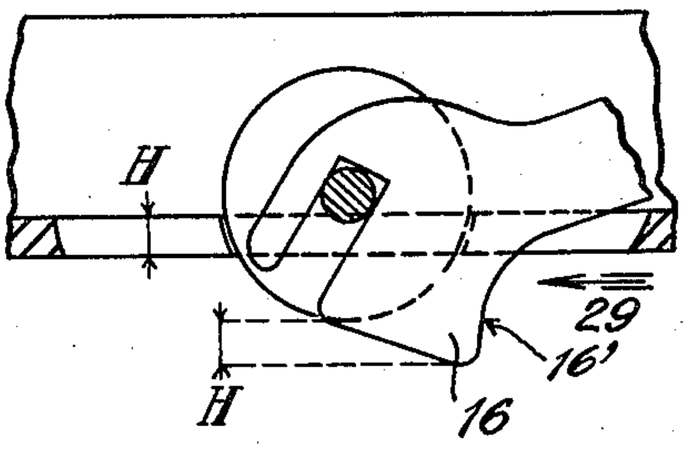
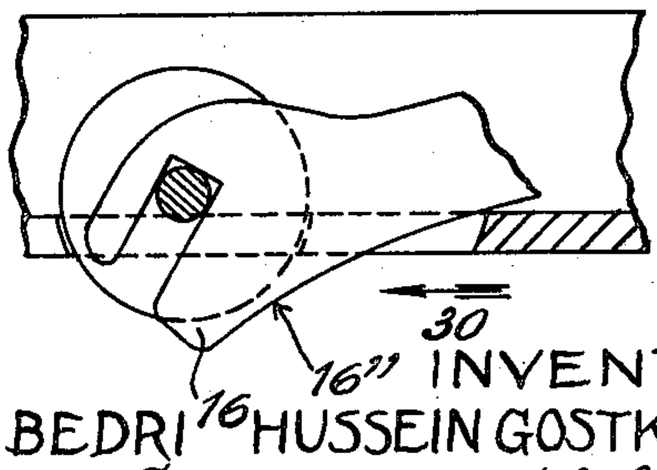


Fig. 21.



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UNITED STATES PATENT OFFICE

2,183,716

RELOOPING NEEDLE FOR WOVEN AND KNITTED GOODS

Bedri Hussein Gostkowski, Geneva, Switzerland

Application May 10, 1938, Serial No. 206,972
In Germany May 24, 1937

13 Claims. (Cl. 66—117)

There are actually two different kinds of relooping needles, viz, the so-called latch and slider needles.

With both these needles it is necessary to use a certain amount of force to move the latch or the slider, and this force has to be supplied by the loops. The highest mechanical effort exerted on the loops occurs when use is made of needles with sliders and this mechanical effort can be considerably reduced when use is made of needles with latches. Yet even in this case there is with certain needles the force, small as it may be, of a spring to be overcome. Further, attention must be drawn, in particular with regard to the superior needles with latches to the fact that the to and fro movement is executed completely, or else it may easily happen, that the loop sliding up along the needle does not reach the tip of the latch and again slides down the latter; the work must then be interrupted or the needle slips out of the fabric.

The subject matter of the invention is a needle, with which all these inconveniences are eliminated, and this due to the fact that it has, in a longitudinal groove in the shank of the needle and near the hook ending said shank, a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and brings the loop taking it along over said hook, and in the other end position on the contrary lies at a short distance from the bent back part of the hook.

As however the loop sliding upwards along the shaft out of the inside of the hook should, when the needle is forced forward, travel as far as possible over its path without friction and impediment, it has further been provided that the so constructed rolling member or small wheel can when rolling back disappear into a cavity in the groove of the needle. Then in order to be able during the following working movement to draw the small wheel out of this position, the front part of the shank is, finally, at corresponding points provided with a notch to enable the downward sliding loop to reach from behind the circumference of the roller and thus to raise said roller out of the cavity and bring it into the rolling position.

Practice has however shown that the operation in question does not always take place readily and particularly that the small wheel does not always roll out of the cavity as desired, but is more often simply displaced. The consequence is an increase in the effort exerted on the loop in question.

By increasing the diameter of the rolling member and widening the cavity, so that the small wheel lying therein projects from behind over the rear part of the shank, the back loop already raised and sliding along the rear part of the shank simultaneously with the front loop can be made to reach the small wheel and raise it out of the cavity. When the needle withdraws from the working fabric, the small wheel is then so to speak delivered by the back loop to the front loop, since it is known that with regard to the moving direction of the needle the back raised loop precedes the front loop to be raised.

If, however, as just pointed out, a small wheel of greater diameter is chosen, this means nothing else but another wider part of the needle exerting on the loops a greater mechanical effort and this is to be avoided.

In order to eliminate the inconveniences just mentioned, a further object is to provide a needle having a small wheel with a slider capable of a limited swinging and sliding movement in a front groove in the shank; this slider has aside from a rear rest-point for engaging the small wheel adjacent its axle, the feature of utilizing the axle of the wheel as the front rest-point, while profiled parts provided on the front and back side of the slider serve to transmit the impulsions received from the loops to the small wheel, so that the latter is readily raised from a cavity and made to roll.

It has already been proposed to use in the shank sliding sliders as well as rectilinear guided sliders and also sliders that are capable of moving and swinging simultaneously. The former sliders mentioned have however the disadvantage that they render more difficult the penetration of the needle into the fabric. In particular because it is necessary to provide these sliders with an under projection which widens the profile of the needle and causes a useless and even dangerous stretching of the loops. This was the reason why the slider was then made slidable and capable of swinging, in order that during the penetration of the needle the preceding loop picked up could raise each time the slider provided with the back projection; the slider was then sunk again by the following loop to be raised entering into contact with its upper edge so that a smoother sliding through was the result. When, however, the needles constructed in this way draw back, the slider is so to speak jammed between the two above named loops and

brought along into the closing position against the action of a spring. This jamming however causes once more a useless and defective mechanical effort of the loops, in particular because the action of a spring is to be overcome, which only discharges the loops when the needle is forced forward, and stretches them all the more in the other direction. This spring cannot in this known execution be dispensed with, since it prevents the slider from sliding under the action of its own weight and ensures moreover a sliding back movement of the slider in the rear rest position, which would not otherwise be effected in a regular manner.

The accompanying drawings show by way of example a relooping needle according to the invention with its small wheel and an improved needle of this kind having a small wheel and a slider. The working and the advantages of these needles will be made clear by the following explanations, accompanying said drawings.

Fig. 1 is a side view and Fig. 3 a plan view of the needle according to the first embodiment with a wheel; Fig. 2 shows the hook in side view; Fig. 4 shows said hook in a slight variant; Figs. 5, 7 and 8 show side views of a needle according to the second embodiment, with a wheel and a slider, on a larger scale and in the close position, in an intermediate position and in the lowest position of the small wheel; Fig. 6 is a corresponding plan view of Fig. 5; Figs. 9 to 17 show in perspective a view of the whole working when a loop is raised, and are all seen from above, so that the upper side of the fabric is visible, with the exception of Fig. 14, which corresponds to a view seen from underneath; Figs. 13 to 21 relate to some variants which can be made in the needle according to the invention and these are shown on a greater scale compared to that of Figs. 5 to 8.

The needle according to Figs. 1 to 4 consists of a body 1 with a hook 2. In the shank is provided a longitudinal groove 3, which by means of a narrow part at 4 is divided into two parts, of which the second and foremost is designated by the numeral 3'. In said groove 3' lies a small wheel 5 constructed in the form of a grooved wheel, which can roll to and fro between two end positions in the groove. Fig. 1 shows the hindmost end position, which is limited by the abutments 6 forming the narrow part 4. Fig. 2 shows the foremost end position which is limited by the end 7 of a wire 8 which is bent round in the form of a hook.

Said wire has its rear end 8' jammed in the shank of the needle, and this at a certain distance from the hook 2, near the rear end of the shank. Further on, it lies free in the groove 3, then in the groove of the wheel 5. The latter is effected with a certain play, so that no friction can in any way arise between wheel and wire and the latter, besides limiting the forward rolling movement, further serves to prevent the wheel from falling out.

The working of this needle is easy to see from Figs. 1 and 2.

A loop sliding up over the hook 2 and along the shank arrives tangentially over the wheel 5 and takes same along with it without friction and in rolling movement, to the position according to Fig. 1.

If the loop slides down again, the wheel is likewise taken along without friction and in rolling movement, to the position according to Fig. 2. In said position however the entry into the hook 2 is closed and the loop, led by the circumference of the wheel, sides over the hook 2.

For this operation the upper surface of the shank lying on the side of the loop can be made rectilinear or for instance as shown in the drawings, have a notch 9, owing to which the loop arrives a little lower down behind the wheel, which itself lies in the corresponding end position in a hollow 10 in the groove 3', into which it constantly rolls.

The needle, as well as the wheel are preferably made of material capable of being magnetized and are magnetized, so that the wheel 5 remains in the end position, being subjected to no friction or hindrance except a very small magnetic force.

With the variant according to Fig. 4 the difference lies in the fact that the foremost end position of the wheel 5 is determined by the inner abutment 11, while the end of the wire 8 is straight.

Of course the wire 8 can be made considerably shorter, yet it is preferable to provide its point of fixation 8' as far from the wheel 5 as possible so that should any eventual contact between the wire and the wheel occur in the course of the roliing movement, the braking and elastic action of the wire remains as small as possible.

The needle according to the second embodiment shown in particular in Figs. 5 to 8 consists likewise of a body 1 with a hook 2 and comprises like the needle just described a small wheel 5 which can roll to and fro in the wider front part 3' of a groove 3 the back part of which is narrower. At 3'' the broader part of said groove penetrates into the shank of the needle, so that the small wheel can reach a lower position corresponding to Fig. 8, in which the groove-opening, the length of which is somewhat smaller than the diameter of the wheel holds back the small wheel, i. e., prevents it from falling through.

In the narrow part of the groove 3 as well as in the notch of the small wheel extends a slider 12 which has two rest points one in front on the axle 13 of the small wheel and the other at the back inside the groove 3.

Near this rear part the slider has a notch 14 which in cooperation with a pin 15 of the shank limits the liberty of movement lengthwise. Immediately behind the small wheel the slider has an under projection 16 which in the lowest position of the small wheel (see Fig. 8) behind the shank projects over the lowest position of the small wheel. To let through this projection the narrower part of the groove 3 in front between the positions 3''' is led through the shank of the needle.

The connection with the small wheel is effected in that the corresponding end of the slider is constructed in the shape of a fork and received therein the axle of the small wheel. Further the upper edge of the slider has immediately behind the small wheel an incipent notch 17 behind which a raised part 18 of the upper edge leads to the notch 14.

Attention is drawn to the middle position, according to Fig. 7, occurring between both end positions of Figs. 4 and 8 during the forward movement of the needle, in which position the best practical measurements of every part of the needle can be determined. In this position, in which the axle of the small wheel lies on the middle line A—A of the shank of the needle, the small wheel whose diameter is slightly greater than the width of the shank containing it, ex-

ceeds this shank on either side to an equal yet proportionately small extent. Simultaneously the small wheel is however tangential to a line B—B, which extends the direction of the rising part from the inside of the hook to the upper edge of the shank, while the slider strikes backwards against the pin 15.

It is to be remarked that the length of the slider to the pin is immaterial, so that the notch 14 and the correspondingly situated pin 15 may be if desired far removed from the small wheel.

The measurements of the projection 16 are chosen according to the following points of view: it must approximately, as shown in Fig. 20, exceed the circumference of the wheel by a height H which corresponds to the height or thickness of the wall of the shank of the needle inside the groove. This, in order that the small wheel can be raised by a loop travelling behind the shank of the needle up to the inner flat part of the part of the groove in question, in order to be able to roll there without difficulty.

Then the outer or upper-edge-part 17' of the slider (see Fig. 8) must however, also run, at least approximately, parallel to the under edge 16' of the projection 16.

Further the lowest part of the notch 17 as is easily gathered from Fig. 5 must, with regard to the highest part of the projection 16 be located behind.

Finally the raised part 18 of the upper edge of the slider must in the inmost position of the latter (according to Fig. 8) project still a little over the upper edge of the shank.

In Figs. 9 to 17 the loop about to be raised in a working operation has been represented in black so that this operation may be better understood. Said loop, which has been designated as the front loop has the reference numeral 19 while the so called back loop just raised is designated by the numeral 20. The appellations front and back loop are justified in that in the working operation to be described the first loop slides along in front and the second behind the shank.

In the issuing position according to Fig. 9 the slider and small wheel can, as shown, either be in the close position, which is the case, when the operator is in the middle of the work, or they can also be in the open position according to Fig. 8, when the operator is just beginning to work. The loops lie in both cases, as shown in Fig. 5 at 19 and 20.

The needle is now from the position shown, driven in the direction of the arrow 21 into the fabric and soon reaches the position according to Fig. 10, in which the front loop 19 is about to come against the small wheel 5 and to move the latter behind in a rolling movement. Owing to its slight tension, this front loop 19 during the movement of the needle hastens after the loop 20, as this can be inferred from the positions of these loops shown at 19*a* and 20*a* in Fig. 5.

When the needle is advanced, these loops arrive in the position according to Fig. 11, in which the loop 19 now over the small wheel, accelerates, owing to the frictionless rolling of the latter, its movement with regard to the needle, so that it suddenly reaches the position designated by the numeral 19*b* in Fig. 7, in which it neither precedes nor hastens after the loop 20*b*. Simultaneously with the rolling of the small wheel the slider 12 was brought into its back end position to strike against the pin 15. It is still only possible both for the end of the slider and the small wheel to swing round the pin 15 as centre. The rolling movement of the small wheel which has just taken place from the previous close position in the last position described is actually the first movement which occurs, taking place over a very short distance along the groove 3' in the direction of the axis of the shank, until the small wheel comes over the opening 3'' and there becomes free, to move across the direction of the shank. The small wheel however remains previously in its middle position, because the small wheel and slider as will be seen from the positions 19*b*, 20*b* of the loops in Fig. 7, are brought between the latter. It is to be remarked that during this operation the loops are practically in no way subjected by any wider parts to an effort greater than the penetration of the smooth shank of the needle requires.

When the needle is driven further into the position according to Fig. 12, the loop 19 reaches the notch 17 of the slider, which is simultaneously raised a little out of the shank by the loop 20 meeting the projection 16. Said operation can be understood with the help of Fig. 7, in that, the loop 20*b*, which now slides up the back part of the shank 1, forces the projection 16 into the shank, while the loop 19*b*, which slides up the front part of the shank, moves along the part 17' into the lowest part of the notch 17. The two loops are in no wise however drawn away from each other or stretched in an inadmissible way because the edge 17' runs approximately parallel to the edge 16' (see Fig. 8). The needle thus forces through the fabric, as if the shank were running smoothly over its whole length.

Nor do any of the loops, when the needle is pushed further into the end position according to Fig. 13, meet with any considerable resistance. The loop 20, which now lies behind the projection 16 has below it toward the lower end of the needle the smooth back part of the shank of said needle. The front loop 19 on the contrary comes against the raised upper edge 18 of the slider, which though constantly swinging round the pin 15 is sunk into the shank and the small wheel 5 is pushed under to its end position into the opening 3''. This movement takes place without any friction or application of force and finally the two loops are found in the positions 19*c* and 20*c* of Fig. 8, and this again with the loop 19*c* lagging behind.

As will be seen in the last named Fig. 8, the slider is so constructed that in said lowest position it projects slightly though very little over the front edge of the shank, so that the loop 19 presses it securely down and there holds it rather firm.

Of course the needle can be pushed into the fabric as far as is liked, the stroke however on same will of necessity be limited.

The arrow 22 in Fig. 13 shows that the needle is now drawn back. During this drawing back operation the loops 19 and 20 slide down along the shank, yet while the loop 19 is first being taken along so that it again, with regard to the new sliding direction, hastens after the loop 20, until the positions 19*d*, 20*d* represented in Fig. 8 are reached, which correspond to the view from underneath of Fig. 14. Here the loop 20*d* is situated close behind the projection 16 of the slider 12, which through the further advance of this loop is raised and pressed forward, so that the small wheel has difficulty to turn round the edge K of the opening 3'' in the direction of the arrow 23. This rotation is partly executed,

but the small wheel is also partly raised from the edge K and raised up into a position, approximately as shown in Fig. 7, though moved a little more forward. This depends on the inclination of the needle with regard to the fabric, on the actual position of the downward sliding loop 19 and on the profile of the part 18' of the front edge of the slider which has come against the last named loop, whereby the swinging and moving action of the slider and small wheel is influenced.

At a given moment, when the loop 20 is sliding over the side of the projection 16, the loop 19 arrives in the lowest part of the notch 17 which with regard to the point of the hook lies behind the side of the projection 16. This again corresponds to the movement of the loop 19 hastening after the loop 20.

The slider has, as already said, swung, also moved a little forward. Both loops however go past the slider, without being in any way pulled apart by a sudden widening of the needle or subjected to too great a mechanical effort.

When the needle is further drawn back according to Fig. 15 the loop 19 slides over the front of the sloping outer edge portion 17' of the notch 17, and the immaterial resistance here occurring contributes to move the small wheel a little further forward, into a position, where it then under the influence of the loop brought and rising upon same is moved according to Fig. 16 readily into the rolling. Simultaneously, however, the hook 2 has seized another loop.

From the position according to Fig. 16 the small wheel rolls frictionless to the end position and brings the loop over the hook which is closed by this small wheel, as shown in Fig. 17. Moreover the exit position shown in Fig. 9 is reached, with the loop 20 occupying the former position of the loop 19 and the loop 19 occupying the previous position of the loop 23.

On the next to and fro movement of the needle the operations just described are repeated.

From what has already been said it follows that the different members of the needle have the advantage of certain particular relations which were mentioned at the beginning of this description and which can be recapitulated as follows:

The raising of the outer edge portion 17' lies substantially parallel to the edge 16' of the projection 16.

This projection exceeds the circumference of the small wheel by a height H, which corresponds to the thickness H of the wall of the shank of the needle inside the groove.

The lowest part of the notch 17 lies with regard to the point of the hook further back than the side of the projection 16.

In the lowest position of the slider, the upper edge of same projects slightly over the front end of the shank.

Finally the operations already described with the help of Fig. 7 are complied with in an excellent manner.

The inner back edge 24 of the slider need have no particular form, but merely the possibility of swinging round the pin 15 and the sliding of the slider must be ensured a little play.

The back-edge-part 24' is made concave, especially in order that the slider may be lighter and this result is also obtained by the fact that the slider is bored at different points to provide perforations.

The needle according to the last described embodiment has, like other needles with sliders, the advantage that it can in no manner slip out in the course of the work, as is often the case with needles provided with latches. If, for instance, with the needles provided with latches the stroke of the to and fro movement is unintentionally shortened, it may happen that the needle is drawn back with the slider half-open; then the slider slides into a front loop to be raised next and brings the latter with the loop sliding along the shank over the hook, which then contains no more loops and slips out. This accident cannot occur with the needle according to the invention.

With the known slider-needles provided with a back-drawing spring it may however happen, in particular, if the fabric is not tightly stretched, that the loop sliding along in front of the shank makes it impossible to bring the slider forward against the action of the spring and against the friction arising from the pressure of the loop along the bottom surface of the needle-groove. In this case the loop slips off the slider and arrives in the hook with the loop that has already been taken up. The hook, then, contains two loops, for instance the loops 19 and 23 of Fig. 16. On the next to and fro movement of the needle, the matter can of course be put right once again, the needle however stops once or several times in succession, and this leads to an irregular execution of the work undertaken. This is impossible with the needle according to the invention. In the latter there is neither an increase in friction nor the action of a spring to be overcome, so that slider and small wheel are taken along regularly and readily to the close position.

Another advantage to be remarked is the fact that the path travelled over by the working needle in its to and fro movement, that is to say the stroke of the needle, can be maintained considerably shorter with the needle just described than with the usual needles with sliders. With the latter the slider cannot on the one hand be made considerably wider than the width of the shank and on the other hand the slider must when pushed forward, give with the front edge of the hook a smooth surface. The hook of the needle cannot thus be considerably wider than the shank of the needle, but must for this reason be rather far removed longitudinally therefrom, i. e., there must be a rather great hook-opening to prevent the loop sliding along the shank in front of the slider from slipping off the hook. This lengthens the needle unnecessarily and consequently the stroke necessary in the working.

With the needle according to the invention the hook-opening can be considerably diminished longitudinally, because the hook of the needle can be made a little wider than the needle, owing to the slight lift which the loop brought over the hook receives from the small wheel. The shortening of the stroke of the needle saves time in working and diminishes the friction on the loops.

Practice has further proved, that the needle according to the second embodiment described can never slip out, even when several rows of loops lying side by side have to be picked up. The needle readily picks up both the series lying with regard to the direction of working to the left and to the right, and this has hitherto never been attained. This is peculiarly advantageous when owing to a hole in the fabric several rows of loops have sprung up on either side of said

hole, for then for instance on one side of the hole a row lying on the right can be picked up and then on the other side of the hole a row lying on the left, which row is immediately tied with the first named row, and so forth, whereas hitherto the process was to pick up all the rows lying side by side on one side of the hole and to hold them fast with a thread, till all the rows lying side by side on the other side were likewise and similarly picked up.

Fig. 18 shows on a larger scale a variant of the front end of the slider, which is intended, through the arrangement of a front edge-part 25 rising and projecting over the small wheel, to facilitate or at least to bring the rising movement of the loop sliding up from the hook on to the small wheel, while the small wheel is rolling back a little earlier than in the case already described. The arrangement must of course be such that the nose formed by this bevel on the end of the slider projects over the back 26 of the needle nowhere in the hindmost and lowest position shown in dot and dash line.

Fig. 19 shows, how a small spring 27 can be fixed behind in the groove 3 of the shank of the needle, for instance, by pressing its back part 28 drawn in black, between the side walls of the shank, with the object of jamming very slightly the slider 12 in its rear rest position and thus to ensure the corresponding open position of the needle, so that the latter is constantly ready for work. If such a spring is absent, the needle can be opened very easily, while it is being driven into the fabric in the usual manner. It opens readily and on the following drawing back movement executes its work correctly.

Figs. 20 and 21 show, how by altering the inclination of the back edge of the projection 16 the needle can be constructed so as to close early or late. In the embodiment according to Fig. 20 this rear edge 16′ lies almost perpendicular to the direction of the shank, so that slider and small wheel are very quickly raised by a loop arriving in the direction of the arrow 29 against said edge. In the embodiment according to Fig. 21, the edge 16″ is on the contrary very much inclined, so that a loop sliding along the back part of the shank-part in the direction of the arrow 30 will produce a slow rising of slider and small wheel.

By means of a suitable inclination of the edge 16′ or 16″ the working speed of the needle can especially be influenced. Thus the needle must correspondingly be more or less inclined according to the fabric treated. The more or lesser grossness or fineness of the fabric can finally influence the working, so that in the event of different fabrics having to be treated, needles can be made having projections of different shapes.

What I claim is:

1. A relooping needle for woven and knitted fabrics, having located in a longitudinal groove in the shank of the needle near the hook ending said shank a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and brings the loop taking it along over said hook, and in the other end position, on the contrary, lies at a short distance from the bent back part of the hook.

2. A relooping needle for woven and knitted fabrics, having located in a longitudinal groove in the shank of the needle near the hook ending said shank a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and brings the loop taking it along over said hook, and in the other end position, on the contrary, lies at a short distance from the bent back part of the hook, the longitudinal groove having in the end position of the rolling member opposite the hook, a hollow, into which the rolling member constantly rolls under the action of the loops and then rolls out again under the same action.

3. A relooping needle for woven and knitted fabrics, having located in a longitudinal groove in the shank of the needle near the hook ending said shank a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and brings the loop taking it along over said hook, and in the other end position, on the contrary, lies at a short distance from the bent back part of the hook, the shank having opposite the end position of the rolling member, opposite the hook a notch.

4. A relooping needle for woven and knitted fabrics, having located in a longitudinal groove in the shank of the needle near the hook ending said shank a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and brings the loop taking it along over said hook, and in the other end position, on the contrary, lies at a short distance from the bent back part of the hook, the rolling member being constructed like a grooved wheel and a wire suspended axially in the longitudinal groove and fixed near the end of the needle opposite the hook reaching with its free end into the groove and preventing the wheel from falling out.

5. A relooping needle for woven and knitted fabrics, having located in a longitudinal groove in the shank of the needle near the hook ending said shank a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and brings the loop taking it along over said hook, and in the other end position, on the contrary, lies at a short distance from the bent back part of the hook, the rolling member being constructed like a grooved wheel and a wire suspended axially in the longitudinal groove and fixed near the end of the needle opposite the hook reaching with its free end into the groove and preventing the wheel from falling out, one of the end positions of said wheel being determined by a hook-shape bending of the free end of said wire, while the other is determined by an abutment on the shank of the needle.

6. A relooping needle for woven and knitted fabrics, having located in a longitudinal groove in the shank of the needle near the hook ending said shank a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and brings the loop taking it along over said hook, and in the other end position, on the contrary,

lies at a short distance from the bent back part of the hook, a slider capable of sliding and swinging in the groove in the shank of the needle being provided and having upon said needle a predetermined point of contact forming a rear rest point, and also a point of engagement or contact with the rolling member near its axle which forms a front rest point, whereby the rolling member is made to roll partly by said slider actuated by the loops, which at every stroke of the needle lifts the rolling member out of a hollow containing it into the rolling position.

7. A relooping needle for woven and knitted fabrics, having located in a longitudinal groove in the shank of the needle near the hook ending said shank a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and brings the loop taking it along over said hook, and in the other end position, on the contrary, lies at a short distance from the bent back part of the hook, a slider capable of sliding and swinging in the groove in the shank of the needle being provided and having upon said needle a predetermined point of contact forming a rear rest point, and also a point of engagement on contact with the rolling member near its axle which forms a front rest point, whereby the rolling member is made to roll partly by said slider actuated by the loops, which at every stroke of the needle lifts the rolling member out of a hollow containing it into the rolling position, the front end of the slider being made in the shape of a fork, penetrating into a notch of the rolling member shaped like a wheel and containing the axle of the small wheel.

8. A relooping needle for woven and knitted fabrics, having located in the longitudinal groove in the shank of the needle near the hook ending said shank a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and brings the loop taking it along over said hook, and in the other end position, on the contrary, lies at a short distance from the bent back part of the hook, a slider capable of sliding and swinging in the groove in the shank of the needle being provided and having upon said needle a predetermined point of contact forming a rear rest point, and also a point of engagement on contact with the rolling member near its axle which forms a front rest point, whereby the rolling member is made to roll partly by said slider actuated by the loops which at every stroke of the needle lifts the rolling member out of a hollow containing it into the rolling position because a rear projection of the slider so projects in the swinging direction of same over the circumference of the rolling member that the projection, pressed into the shank by the sliding past movement of a loop, determines a lifted position of the slider and of the rolling member, from which the latter can roll in the direction of the shank to the hook.

9. A relooping needle for woven and knitted fabrics, having located in a longitudinal groove in the shank of the needle near the hook ending said shank a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and brings the loop taking it along over said hook, and in the other end position, on the contrary, lies at a short distance from the bent back part of the hook, a slider capable of sliding and swinging in the groove in the shank of the needle being provided and having upon said needle a predetermined point of contact forming a rear rest point, and also a point of engagement or contact with the rolling member near its axle which forms a front rest point, whereby the rolling member is made to roll partly by said slider actuated by the loops, which at every stroke of the needle lifts the rolling member out of a hollow containing it into the rolling position because a rear projection on the slider so projects in the swinging direction of same over the circumference of the rolling member that the projection, pressed into the shank by the sliding past movement of a loop, determines a lifted position of the slider and of the rolling member, from which the latter can roll in the direction of the shank to the hook, the slider having a hollow behind the rolling member and the upper edge of the slider rising from the lowest part of said hollow against the rolling member running substantially parallel to the under part leading from the edge of the projection against the rolling member.

10. A relooping needle for woven and knitted fabrics, having located in a longitudinal groove in the shank of the needle near the hook ending said shank a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and brings the loop taking it along over said hook, and in the other end position, on the contrary, lies at a short distance from the bent back part of the hook, a slider capable of sliding and swinging in the groove in the shank of the needle being provided and having upon said needle a predetermined point of contact forming a rear rest point, and also a point of engagement or contact with the rolling member near its axle which forms a front rest point, whereby the rolling member is made to roll partly by said slider actuated by the loops, which at every stroke of the needle lifts the rolling member out of a hollow containing it into the rolling position because a rear projection of the slider so projects in the swinging direction of same over the circumference of the rolling member that the projection, pressed into the shank by the sliding past movement of a loop, determines a lifted position of the slider and of the rolling member, from which the latter can roll in the direction of the shank to the hook, the slider having a hollow behind the rolling member and the upper edge of the slider rising from the lowest part of said hollow against the rolling member running substantially parallel to the under part leading from the edge of the projection against the rolling member, the lowest part of the hollow lying behind the edge of the projection with regard to the longitudinal direction of the slider.

11. A relooping needle for woven and knitted fabrics, having located in a longitudinal groove in the shank of the needle near the hook ending said shank a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and

brings the loop taking it along over said hook, and in the other end position, on the contrary, lies at a short distance from the bent back part of the hook, a slider capable of sliding and swinging in the groove in the shank of the needle being provided and having upon said needle a predetermined point of contact forming a rear rest point, and also a point of engagement or contact with the rolling member near its axle which forms a front rest point, whereby the rolling member is made to roll partly by said slider actuated by the loops, which at every stroke of the needle lifts the rolling member out of a hollow containing it into the rolling position because a rear projection of the slider so projects in the swinging direction of same over the circumference of the rolling member that the projection, pressed into the shank by the sliding past movement of a loop, determines a lifted position of the slider and of the rolling member, from which the latter can roll in the direction of the shank to the hook, the slider having a hollow behind the rolling member and the upper edge of the slider rising from the lowest part of said hollow against the rolling member and running substantially parallel to the under part leading from the edge of the projection against the rolling member, the back upper edge part of the slider so rising behind the hollow that, when the slider swings completely in the shank it projects a little over the front edge of the shank.

12. A relooping needle for woven and knitted fabrics, having located in a longitudinal groove in the shank of the needle near the hook ending said shank a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and brings the loop taking it along over said hook, and in the other end position, on the contrary, lies at a short distance from the bent back part of the hook, a slider capable of sliding and swinging in the groove in the shank of the needle being provided and having upon said needle a predetermined point of contact forming a rear rest point, and also a point of engagement or contact with the rolling member near its axle which forms a front rest point, whereby the rolling member is made to roll partly by said slider actuated by the loops, which at every stroke of the needle lifts the rolling member out of a hollow containing it into the rolling position, the back end of the slider being provided with a notch, which cooperates with a pin passing through the shank, in order to limit the sliding movement of the slider and to establish its centre.

13. A relooping needle for woven and knitted fabrics, having located in a longitudinal groove in the shank of the needle near the hook ending said shank a member lying free and rolling between two end positions, which when touched tangentially by the loops sliding along the shank is taken along in rolling movement and in one of its end positions closes the hook opening and brings the loop taking it along over said hook, and in the other end position, on the contrary, lies at a short distance from the bent back part of the hook, a slider capable of sliding and swinging in the groove in the shank of the needle being provided and having upon said needle a predetermined point of contact forming a rear rest point, and also a point of engagement or contact with the rolling member near its axle which forms a front rest point, whereby the rolling member is made to roll partly by said slider actuated by the loops, which at every stroke of the needle lifts the rolling member out of a hollow containing it into the rolling position, the rear end of the slider cooperating in the rear end position of the latter with a spring lying in the groove of the shank, which spring jams slightly the slider in said position.

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