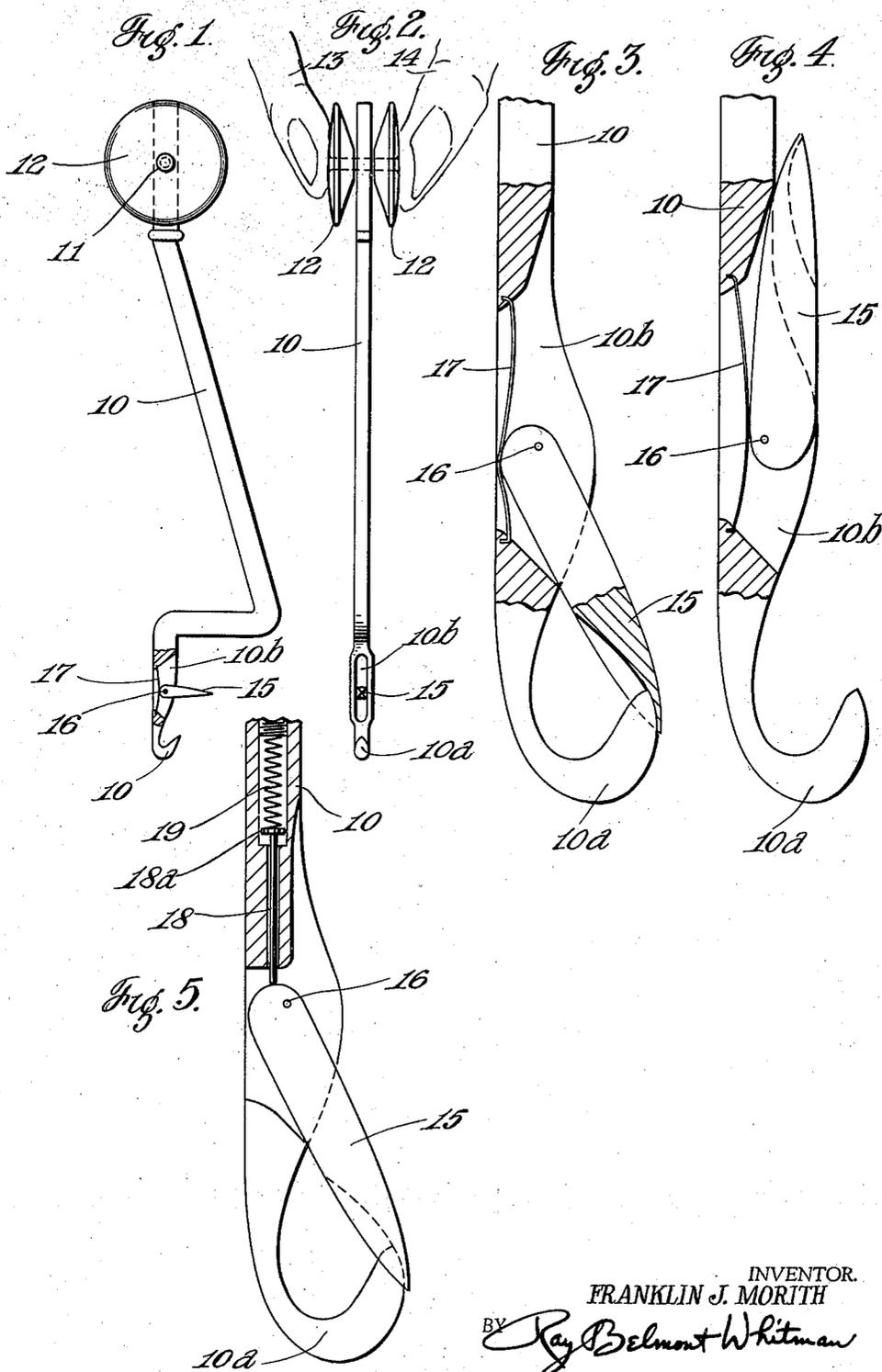


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KNITTING NEEDLE

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KNITTING NEEDLE

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This invention relates to knitting needles, and more especially to improvements in such devices either when used on power-driven knitting machines or on manually-operated needles such as those adapted to correct runs in stockings.

An object of the invention is to provide means in a hand-operated hosiery mender which will eliminate the possibility of the operator either pushing the needle ahead too fast or retarding the action to a degree which will result in improper action.

Another object is to provide means in such a device for making more certain its forward motion on the down stroke during its normal use.

Another object is to include a stop means in the needle which will eliminate the necessity of winding a wire stop known as a "spring back" on to the needle.

A further object is to overcome the necessity of adjusting the pressure at the back of the latch of a knitting needle adapted for use either on a machine or by hand and which includes the use of a hair spring placed under the latch to cause it to operate automatically.

Finally, an object is to provide a knitting needle which is more reliable in operation, either when hand- or machine-driven, more fully automatic, requiring less skill to use when hand-operated, and which will be inexpensive to make and rugged in construction.

All these and other objects as suggested herebelow are attained by the method and means now to be described, and illustrated in the accompanying drawing, in which—

Figure 1 is a side elevational view of a preferred embodiment of this invention for use as a hand-operated hosiery mender.

Fig. 2 is a front elevational view of the device of Fig. 1.

Fig. 3 is a greatly enlarged detail view of the latch mechanism at the operating end of the needle, and showing the latch in down or closed position.

Fig. 4 is a view similar to Fig. 3 but showing the latch in the up or open position.

Fig. 5 is a view similar to Figs. 3 and 4 but showing a modified form of spring-operated latch in which a spiral spring and plunger is used.

Like numerals refer to like parts throughout the several views.

The embodiment shown in Figs. 1 and 2 includes a needle-shank member 10, shaped substantially as shown, and having a laterally-extending hole near its upper end through which a pin 11 is adapted to freely rotate. This pin ro-

tatably mounts a pair of oppositely-disposed spaced discs 12, 12, somewhat larger in diameter than the width of the operator's thumb and finger ends, and adapted to be lightly held by the thumb and forefinger as shown at 13, 14, respectively.

The lower end of member 10 terminates in a hook portion 10a, shaped substantially as shown in the drawing and being positioned beneath a through slot 10b in member 10 in which a latch member 15 is adapted to pivot about a transverse axis pin 16. The upper and lower edges of slot 10b are slanted outwardly away from each other to permit a sufficient movement of latch 15, as clearly shown in the enlarged detail, Figs. 3 and 4. Referring now to these last named figures, it will be noted that latch 15 which is somewhat pointed at its outer end, terminates at its inner end in a spiral outline and that its axis 16 is positioned off-center so that this upper end represents a cam surface. Thus, the pivot 16 is at the generating point of the spiral, a portion of which comprises the cam-like end surface of latch 15. So, any part of the generated spiral surface can be used, depending on the size of the latch, which, however, governs the pitch of the spiral. The tendency of the spiral-shaped end is to make the latch turn as long as there is any pressure on it, whereas a mere eccentric cam would turn less than 180°, and the pressure would not or could not be made the same at all points. With the spiral curve, it can be shaped to have any pressure operate it at any given point; so, with a light spring at the end of the run of the latch, one can obtain just as much speed of travel as at the beginning.

A flat spring 17 is positioned across the inner or left hand opening of slot 10b, in manner as shown, its ends being flanged at right angles to fit into tiny holes at the upper and lower edges of said slot, the cam end of latch 15 being so arranged as shown that spring 17 is in tension when the latch is down or closed as in Fig. 3 to function so as to automatically move the latch to the up or open position as in Fig. 4, in which position spring 17 is unflexed or no longer in tension. Thus, the arrangement is such that the latch is automatically held open and in the normal operation of the device is closed by the catching of the thread, which when released permits the spring to act to return the latch again to open position.

Fig. 5 shows a modification of the spring arrangement for latch 15 in which instead of a flat spring 17 there is a plunger 18 adapted to

move in a longitudinal opening in member 10 and having a cap 18a and a spiral spring 19 above said cap and in an enlarged opening also longitudinally arranged in shank member 10. The lower end of operating plunger or pin 18 engages the eccentric cam surface of latch 15 in such manner that latch 15 tends to remain in open position by the tendency of compressed spiral spring 19 to elongate and push pin 18 downwardly. That is to say, when the latch 15 is closed the distance between the bearing point of the pin 18 and the pivot pin 16 of the latch is greater than when the latch is up or open; also this bearing point is slightly to the left or away from the hook portion 10a of the needle with reference to pivot point 16 as clearly shown in Fig. 5.

In the embodiment shown in the first four figures the ends of flat spring 17 may be slightly tapered for easy assembly in their tiny holes in shank member 10.

When this device is used on a knitting machine it is of course understood that variations in the shape of the hook 10a may be used as desired. It is also understood that in place of the flat spring 17 previously described, a wire spring somewhat similar in outline may be substituted.

In manual use, as for mending runs in stockings, the operator places the thumb and forefinger 13, 14, lightly in the center of the two discs 12, as shown in Fig. 2. Then the hook portion 10a, suspended loosely below the fingers which thus holds the needle, is dropped downwardly into the material and the movement or operation then is a simple up and down one, the needle taking care of feeding along and picking up one stitch after another in rotation and without "dropping a stitch" to re-weave the threads back to their original woven position in relation to one another.

In hosiery menders heretofore developed, only a very skilled operator can use them successfully. One of the chief troubles is that the operator either pushes the needle ahead too fast or retards the action too much. The button-shaped discs provided for holding the needle are carefully arranged to obviate this difficulty. Also, it was nec-

essary to carefully re-design the shape of the point to that shown in the drawing in order to make the forward motion of the needle on the down stroke more certain in action. Finally, to overcome the necessity of adjusting the pressure at the back of the latch for the different users, applicant has arranged the latch to operate automatically for all users.

Of course it will be understood that these improvements, as regards the automatic operation of the latch, are equally desirable on a knitting machine but that such needles would not of course need the holding discs 12, 12.

It will of course be understood that variations may be made in the details of this disclosure and yet be comprehended within the scope of applicant's rights which are only limited by the appended claims.

Having now described the invention, what is claimed as new and for which Letters Patent of the United States is desired, is:

1. A holding handle for manually-operated knitting needles used in repairing runs in knitted fabrics, consisting of a pair of rotatable finger-engaging members at the extreme upper end of the needle assembly and adapted to fully suspend the needle therefrom in a delicately-swingable and unbalanced manner such that the operator has no control over the forward movement of the needle point.

2. A hosiery mender comprising a needle having its lower end terminate in a hook portion having a pivoted latch and means for automatically returning the latch from any position to open position relative to the hook, said latch-returning means including a true spiral cam near the pivot-point of the latch, and a spring in constant contact with the cam surface from open to closed position, whereby the latch is held in constant spring control.

3. The invention as in claim 2, the upper end of the needle being swingably suspended from finger-holding means.

4. The invention as in claim 2, said spring being generally-flat in shape.

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