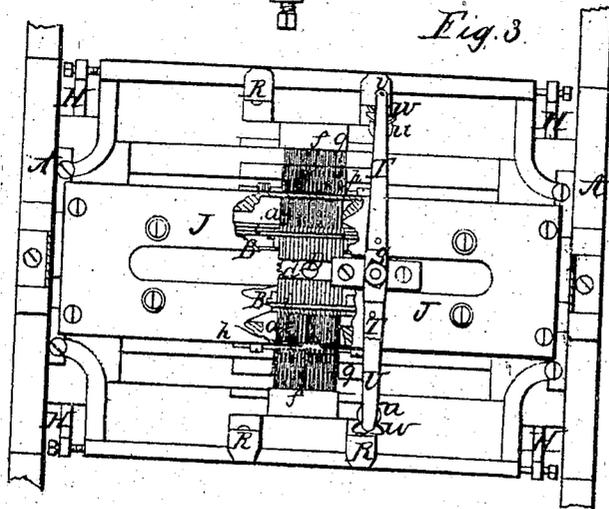
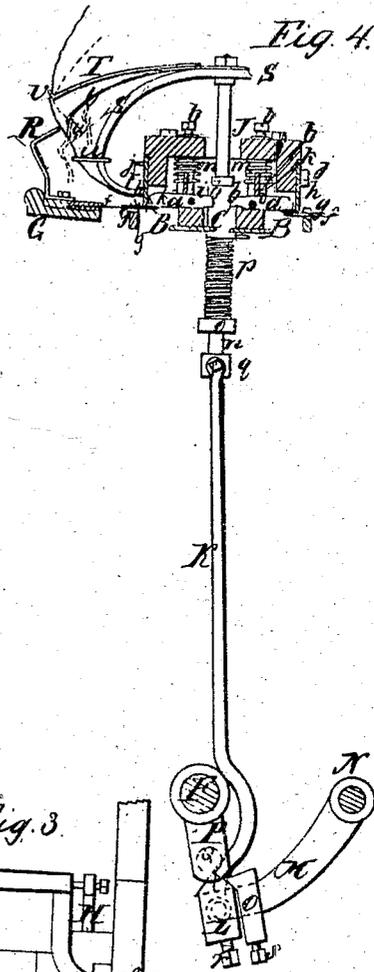
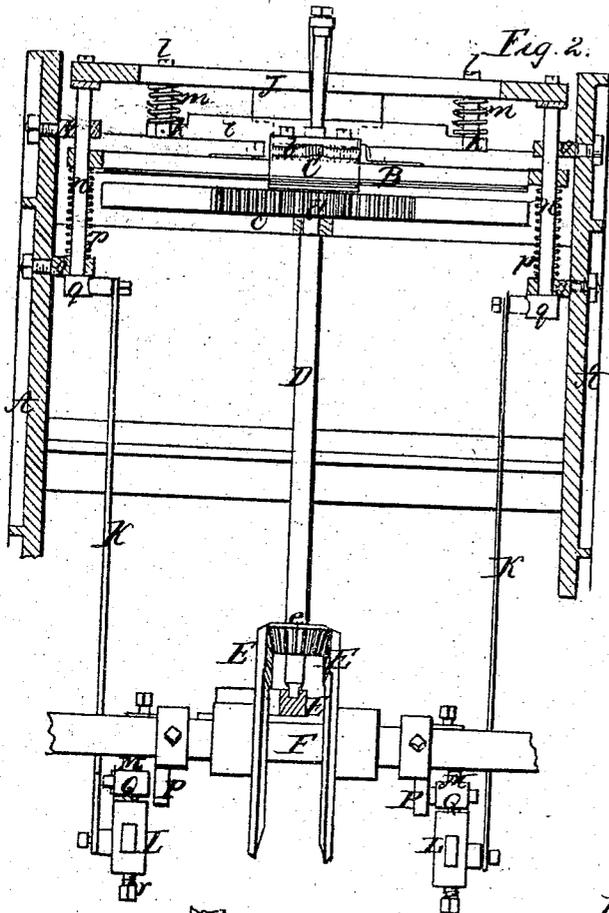


I. M. HOPKINS.
Knitting Machine.

2 Sheets—Sheet 2.

No. 10,910.

Patented May 16, 1854.



UNITED STATES PATENT OFFICE.

ISRAEL M. HOPKINS, OF PASCOAG, RHODE ISLAND

KNITTING-MACHINE.

Specification of Letters Patent No. 10,910, dated May 16, 1854.

To all whom it may concern:

Be it known that I, ISRAEL M. HOPKINS, of Pascoag, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Knitting Machinery; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a transverse vertical section of a complete double knitting frame, having my improvements. Fig. 2, is a longitudinal vertical section through those parts of the machine which make the loops; showing also some of the driving machinery. Fig. 3, is a plan view, showing only those parts which form the loops. Fig. 4, is a transverse vertical sectional view of the principal working parts, showing them in a different position to that shown in Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

The first part of this invention relates to certain means of causing the locking bar to descend and lock the sinkers firmly, previously to the commencement of the retreat of the needles, and the closing of their barbs by the pressed bar, whereby, after the depressions of the thread are made between the needles by the sinkers, the passage under the points of the needles, is more effectually secured, and thus the dropping of loops is more effectually prevented.

The second part of the invention relates to certain devices by which the thread is prevented running out from the bobbins, and has a slight back drag given to it, at the commencement of the laying of every new row of loops upon the needles, for the purpose of taking up the slack sometimes left in the thread, when the traverser commences its return, and making a tight selvage.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

A, is the frame of the machine.

B, B, are the two fixed bars to which the two sets of sinkers, *a, a*, are attached in a well known manner; the said bars forming also guide for the traverse of the slur, C, to raise the sinkers successively; and the raising of the sinkers being performed by means of a

partly curved groove, *b*, in either side of the slur, C, which receives the back ends of a toothed rack, *c*, which gears with, and receives motion from, a pinion, *d*, at the upper end of an upright shaft, D, which receives an intermittent alternate circular motion, by means of a bevel pinion, *e*, near its lower end, and two bevel wheels, E, E, which are only toothed on a portion of their circumference, secured to the driving shaft, F; the change in the direction of the successive movements of the shaft, D, being produced by moving its step, E', by means not necessary to be described or shown, so as to bring the pinion in gear, alternately with the two wheels, E, E, which are on opposite sides of it. The slur, C, carries the double traverser or thread guide, S, which guides the thread to the two sets of needles and sinkers.

The needle bars, G, G, which carry the needles, F, F, are each attached to a pair of L shaped levers, H, H, which are pivoted to the sides of the framing, A, and derive such a motion from a cam, on the driving shaft, not shown, and from a vertically sliding frame, I, to which they are attached, as to give the needles the necessary movements back and forth between the sinkers and the fixed dents or teeth, *g, g*, by which the loops are pushed under the barbs of the needles, or over their ends, as required.

The two presser bars, *h, h*, and the two locking bars, *i, i*, for the two sets of needles and sinkers, are attached to the under side of a horizontal plate, J, which extends nearly the whole length of the machine; the presser-bars being attached rigidly by screws, *j, j*; but the locking bars being attached so as to give elastic pressure. Each locking bar is connected at each end with a pin, K, which slides vertically through a hole in the plate, J, but which is prevented from being withdrawn therefrom downward, by a bolt, L, which screws into the top end of the pin, and has a head which is too large to pass through the plate. The pin, *k*, is surrounded, between the plate J, and the presser bar, with a helical spring, *m*; and hence any pressure given to the locking bar, by the plate, J, is elastic or yielding.

The plate, J, has two rods, *n, n*, attached at opposite ends to its under side and fitted

to work vertically in guides, *o, o*, attached to the sides of the frame. These rods, *n, n*, are surrounded by helical springs; *p, p*, which are applied to them in such a way as to push them upward; but the extent of their upward motion is limited by stops, *q, q*, at their lower ends, which come in contact with the lower guides, *o, o*, as is shown in Fig. 2. They are connected at their lower ends, by connecting rods, *K, K*, with shoes *L, L*, which are adjustable upon, but firmly secured by set screws, *r, r*, to two arms, *M, M*, of a horizontal rock-shaft, *N*. Each of the arms has another shoe, *O*, nearer its shaft, also adjustable and secured by a set screw, *s*. Upon the driving shaft, *F*, there are two arms, *P, P*, one nearer each arm, *M*, carrying each a stud and friction roller *Q*, which comes in contact with the shoes, *O*, and *L*, on the neighboring arm, *M*, and, in passing, depresses the arm and pulls down the plate, *J*.

The friction rollers, *Q, Q*, come in contact with the shoes, *O, O*, immediately after the threads are laid across the needles, and depressed between them by the sinkers, in the form of loops, through the joint action of the needle guide and slur; at which time, the needles occupy the position shown in Fig. 1. As the friction rollers, by their contact with the said shoes, *O, O*, force down the arms, *M, M*, and through them the plate, *J*, the locking bars are brought down upon the sinkers and hold them secure against any upward movement of their points. Fig. 1, represents the operation at this point. The downward motion of the plate, *J*, continues as the friction roller passes over the shoe, *O*, and the shoe, *L*, until the presser bar is brought down far enough to close the bars of the needles; but just before the presser bar reaches the needles, they commence their retreat, for the purpose of bringing the row of loops, just described as having been made, under the barbs, and carrying the row previously made over the closed barbs, the ends of the needle, and the last row of loops. The strength of the springs, *m, m*, is such, that the sinkers will be held down or locked firmly enough to prevent the possibility of their points being raised by any action of the needles or loops; and as the locking bar descends previously to the commencement of the retreat of the needles, the points of the sinkers cannot be raised to allow any one of the loops to be drawn from under them by the retreat of the needles. This insures protection against the dropping of any of the loops, and therefore is important, as it makes a more perfect fabric.

The reason for making the shoes, *L*, and *O*, both adjustable on the arm, *M*, is, that the interval of time between the commencement of the operation of the locking-bar

and the operation of the presser-bar may be regulated, and that the time of operation of both may be properly regulated in relation to the commencement of the retreat of the needles. The traverser, *S*, has eyes at its points, *t*, and also some distance above at, *u*; but previously to the threads passing through these eyes, they pass through eyes, *v*, in springs, *T, T*, of which there is one attached to each side of the traverser. Between each spring, *T*, and the traverser, *S*, is another spring, *U*, to which is attached a piece of metal plate, *w*, which, when free, occupies such a position as to produce a slight drag upon the thread, as it passes from the eye, *v*, to the eye at, *u*, and thus create a proper tension on it during the operation of the sinkers, at all times, except at the commencement of the sinking of each row, when its delivery requires to be temporarily stopped or checked, and a slight back drag produced. This back drag and suspension or checking of the delivery, is produced by two small straight edged metal tongues, *R, R*, attached rigidly to the needle bar in such positions that, at the termination of the sinking of the several rows of loops, the plate, *w*, is brought opposite to one and the other tongue successively, and that, when the needle bar is thrown out, as shown in Fig. 4, the said plate, *w*, will stand behind the tongue. When the needle-bar moves back for the needles to receive a new row of loops, the thread is seized between the edge of the tongue, *R*, and the back of the plate, *w*, and as the motion of the needle-bar continues, the spring, *U*, is caused to bend by its pressure, as indicated in dotted lines in Fig. 5. This movement of the tongue, *R*, and plate, *w*, while they grasp the thread, produces a slight back draft on the thread, when required by any slack, and draws it tight around the selvage needle, and the thread continues to be held or to have its delivery retarded by the tongue and plate during a sufficient portion of the movement of the traverser, in laying the thread on the needles, to draw the selvage and next succeeding loops tight; after which the plate, *w*, works clear of the tongue, and springs back to its natural position, where it continues to exercise the proper draft during the sinking of the remainder of the loops of the row. When the traverser finishes its traverse in one direction, the plate, *w*, is brought in front of the edge of the tongue, *R*, as shown in Fig. 1, but when the needle bar is moved forward, to withdraw the needles from the sinkers, the elasticity of the spring, *U*, allows the plate, *w*, to slip over the edge of the tongue, *R*, to the position shown in Fig. 4, ready for grasping the thread, when the needle-bar again moves toward the sinkers. The tongues do not interfere with the thread, as the movement of

the traverser is concluding, as they simply push it aside, as it comes in contact with their sides.

What I claim as my invention, and desire to secure by Letters-Patent, is,—

1. Attaching the locking bars, *i, i*, to the same plate or head, *J*, with the presser-bar, in such a manner as to allow them a limited movement, irrespective of the plate or head, under the influence of springs, *m, m*, applied substantially as described, whereby the said bars are enabled to lock the jacks some time before the termination of the descent of the presser-bars, to close the barbs; and hence, before the commencement of the retreat of the needles; but the necessary con-

tinuation of motion of the plate or head, to bring down the presser-bars, is not prevented.

2. The combination of the spring, *U*, and the plate, *w*, attached to the traverser, and the tongues, *R, R*, attached to the needle-bar; the several parts operating substantially as described, to arrest or retard the thread, or produce a back drag, as may be required, to tighten the selvage at the commencement of each row of loops.

ISRAEL M. HOPKINS.

Witnesses:

S. H. WALES,
L. F. COHEN.