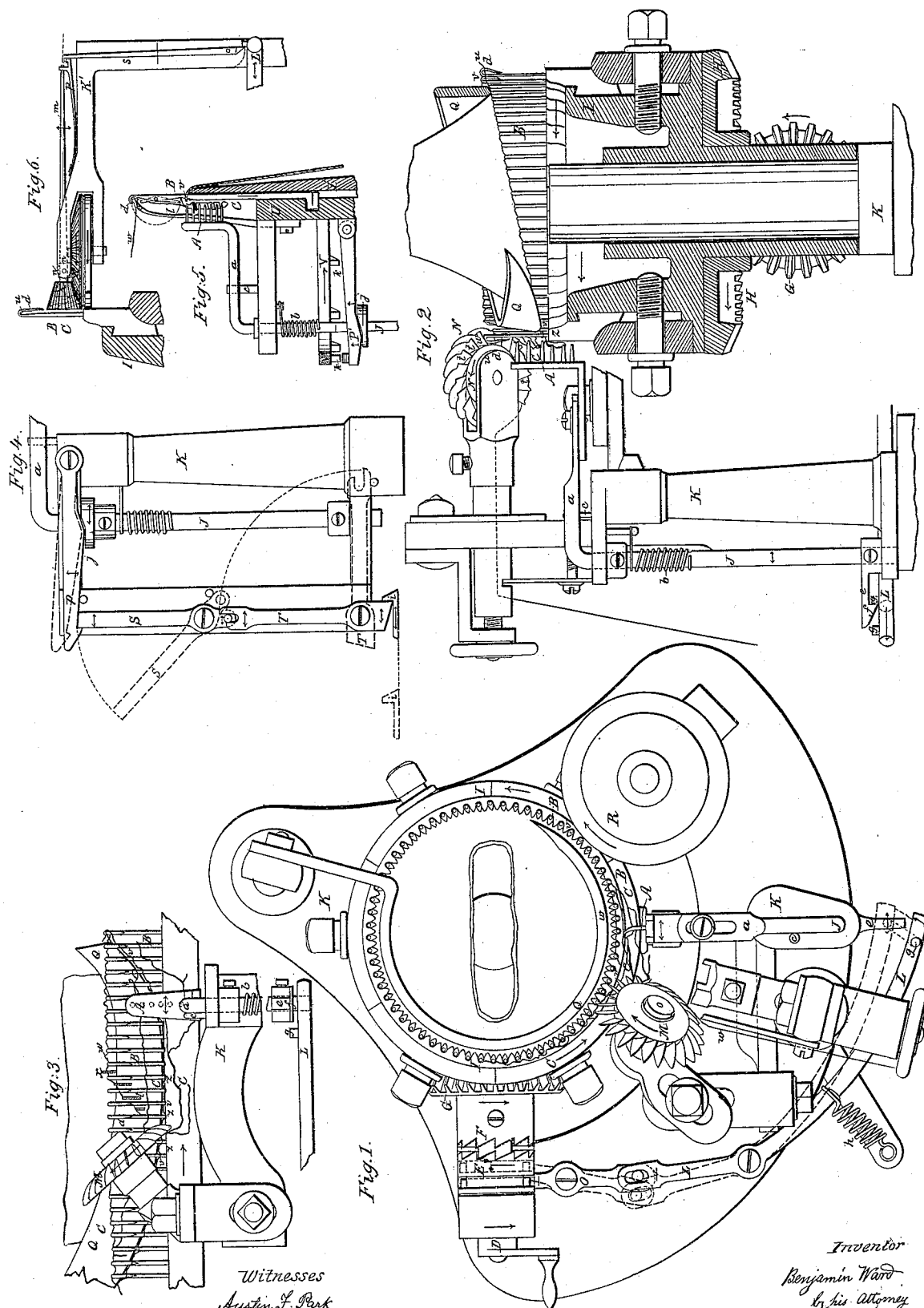


B. Ward.
Stop for Knitting Mach.

N° 76,854.

Patented Apr. 14, 1868.



Witnesses
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Letters Patent No. 76,854, dated April 14, 1868.

IMPROVEMENT IN KNITTING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, BENJAMIN WARD, of the city of Troy, in the county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Knitting-Machines, of which the following is a sufficient description, reference being had to the accompanying drawings, in which—

Figure 1 is a plan,

Figure 2 a sectional elevation, and

Figure 3 an expanded side view of portions of a knitting-machine which embodies the distinguishing features of my invention; and

Figures 4, 5, and 6 illustrate modifications thereof—

Like parts being marked by similar letters in the various figures, and the arrows therein being indicative of the directions in which the contiguous parts move or are movable.

I. Knitting-machines have been heretofore made with a finger or drop-lever resting on or against the yarn where it ran into the needles, and so combined with a device for driving or stopping the machine, that, when the yarn broke or ran out, the finger or drop-lever would move, and cause the machine to stop, by reason of the breaking or running out of the yarn; and knitting-machines have been made with a finger or roller resting in contact with the knit fabric where the latter left the needles, and so combined with a device for driving or stopping the machine, that, when a hole was made in the knit fabric, the finger or roller would drop into the hole, and thereby cause the machine to stop. Examples of such stop-motions are shown in R. Cushman's patent of May 22, 1855.

Knitting-machines having spring-barbed needles have also been so constructed that, when waste or unknit yarn accumulated in the barbs of the needles, the machine would be stopped by the action of the waste or unknit yarn thus accumulated in the needles, as described in N. P. Aikin's patent of July 13, 1858, reissued May 3, 1859; but, before such a machine will stop, the beards of the needles of the machine are liable to be bent out of place and broken off by the accumulated mass of waste or unknit yarn in the needles. Besides, such a stop-motion, which acts only when waste or unknit yarn accumulates in the needles, cannot be used on any knitting-machine which has the common "latch"-needles, (see fig. 5,) so arranged that waste or unknit yarn will not accumulate in but will fall out of the needles, nor on any knitting-machine having spring-barbed needles, whenever the waste or unknit yarn shall be taken out of and prevented from accumulating in the needles by any device or means whatever.

Now, instead of so constructing a knitting-machine that it will be stopped by reason of the breaking or running out of the yarn as it runs into the needles, or in consequence of a hole being made in the knit fabric as it leaves the needles, or by the action of waste or unknit yarn accumulated in the hooks or barbs of the needles, the distinguishing feature of one part of my invention consists in so constructing a knitting-machine that it will be stopped by the action of waste or unknit yarn that has fallen or been taken out of the barbs or hooks of the needles of the machine.

This part of my invention applies to knitting-machines having common spring-barbed needles, shown in figs. 1, 2, 3, and 6, and to such as have "latch"-needles, represented in fig. 5, and is, as well as the other parts of my invention hereinafter specified, especially applicable to knitting-machines which have their needles arranged in the form of a cylinder, and either fixed or movable endwise. In the aforesaid drawing, A is a claw, comb, or series of fingers, so arranged, in respect to the needles B of a knitting-machine, and so combined with mechanism for driving or stopping the machine, that, when the machine is running, the waste or unknit yarn C, (shown by green lines,) which falls or is taken downward out of the hooks or barbs of the needles B, will catch into or engage with and move the said claw, comb, or series of fingers, so as to make the latter control the action of the said driving or stopping-mechanism, and thereby cause the machine to stop.

II. In using knitting-machines having spring-barbed needles, large knots in the yarn sometimes stick in the barbs, that is, in the space *u*, fig. 2, under the barbs *d*; and, when a yarn breaks in knitting, so as to cause

a hole in the knit cloth next to the needles, the yarn that is afterward fed into the needles, and left loose and unknit opposite to such hole, is apt to remain and accumulate in the needles, so as to sometimes bend out and break off their barbs. To lessen or prevent those difficulties is the main object of another part of my invention, which consists in the arrangement, in a knitting-machine having spring-barbed needles, of a stripping-wheel, M, figs. 1 and 3, in such manner that, when the machine is knitting, the said stripping-wheel shall take obstructing knots, or loose or unknit yarn C, out of the needles—that is, out of the space *u* under their barbs *d*—and thereby prevent the injurious retention or accumulation of such knots or yarn in the needles.

In carrying out this part of my invention, I commonly make the stripping-wheel M much like an ordinary "cast-off wheel," as indicated in figs. 1 and 3, and locate the stripping-wheel on the barb-side of the series of needles, and so that it gears into the series of needles at any suitable place where the old loops *v* of the fabric, shown in blue lines, are caused to be down or back on the needles, out from under their barbs, as indicated at *z* in figs. 2 and 3, and where the stripping-wheel will not interfere with the feeding in of the new yarn *w*, indicated by red lines, nor with the knitting-action of the machine.

III. But it is especially important that the large knots, and the loose or unknit yarn, should be out of the needles where the new yarn is fed into them; and another part of my invention consists in arranging, in a knitting-machine, just forward of the "sinker-wheel," or whatever other device shall feed the new yarn into the needles, a stripping-wheel, M, so that the latter shall take the large knots, or the loose or unknit yarn, out of the needles at a point just forward of the place where the new yarn *w* is fed into them, and so that the knots, or more or less of the loose or unknit yarn thus taken out of the needles, may be cast off, with the old loops *v*, over the barbs of the needles, on to the knit fabric, by the usual knitting-action of the machine. In fig. 3, the stripping-wheel M is shown taking loose or unknit yarn C out of the needles, just forward of the place where the new yarn *w* is fed into the needles by the blades *x* of a sinker-wheel, N, which is broken off in figs. 3 and 1, but shown full in fig. 2. In figs. 1, 2, 3, Q is a cam, pressing the fabric down on the needles, so as to slide the old loops *v* below the barbs *d*, as at *z* in fig. 2, and R is a wheel for pressing in the points of the barbs where the old loops are cast off.

IV. Another part of my invention consists in the combination, in a knitting-machine, of a stripping-wheel, M, arranged so as to take loose or unknit yarn out of the needles, and a claw, finger, comb, or any other suitable device, so arranged, in respect to the said stripping-wheel and needles, and so combined, by any suitable device or devices, with any suitable mechanism for stopping the machine, that, when the machine is running, the loose or unknit yarn which shall be taken out of the needles by the said stripping-wheel may catch on or engage with and move the said claw, comb, finger, or other device, and thereby cause the machine to stop. In carrying out this part of my invention, I locate the stripping-wheel, and the comb or its substitute, on the hook-side of the needles, and so that the stripping-wheel gears into the needles at any suitable place where the old loops *v* shall be out from under the hooks, and where the stripping-wheel, and comb, or its substitute, shall not interfere with the ordinary knitting operations of the machine.

V. Another part of my invention, in knitting-machines which have a circular series of spring-barbed needles, consists in so combining, with the series of needles, a cam, Q, or its equivalent, for pressing or holding the knit fabric or old loops back on the needles, and a stripping-wheel, M, that the said cam or its equivalent will press or hold the old loops or knit fabric back on the needles, below or beyond the points of their barbs, at the place where the stripping-wheel is arranged to take loose yarn out of the needles, substantially as shown by figs. 1, 2, and 3 of the aforesaid drawings.

VI. Another part of my invention, in knitting-machines which have a circular series of spring-barbed needles, consists in so combining, with the series of needles, a stripping-wheel, M, a cam, Q, or its equivalent, for pressing or holding the old loops or knit fabric back on the needles, a comb, A, or its equivalent, for engaging with yarn taken out of the needles by the stripping-wheel, and a mechanism for stopping the machine, that, while the said cam or its equivalent presses or holds the old loops or knit fabric back on the needles at the point where the stripping-wheel takes loose yarn out of the needles, the yarn taken out of the needles by the stripping-wheel shall engage with the said comb or its equivalent, and thereby put the stopping-mechanism in action, so as to stop the machine, substantially as shown by the aforesaid drawings, and herein specified.

In carrying the aforesaid parts of my invention into practical operation, I drive and stop the knitting-machine either by having a rotary sliding clutch, engaged with and disengaged from another clutch geared with or upon the machine, or by having a belt or band run on and off from a driving-pulley of the machine, or by any other well-known or suitable mechanism; and I combine any such driving or stopping-mechanism with the comb or other device which catches into or engages with and is moved by loose or unknit yarn hanging out of or projecting from the needles, below or not opposite to their hooks or barbs, by means of any suitable mechanical devices whatever, the devices hereinafter specified for that purpose being given as illustrations, to enable persons skilled in making and using knitting-machines to make and use my invention.

In figs. 1 and 2, the knitting-machine is driven from a rotary shaft, D, by a sliding clutch, E, engaging with a clutch on a pinion, G, gearing into a wheel, H, on the needle-cylinder I; and the comb A is combined with the driving-clutch E by having that comb on an arm, *a*, of a shaft, J, pivoted in a fixed frame, K, with the arm *a* held lightly, by a spring, *b*, against a stop, *c*, and with an arm, *e*, having a detent, *f*, fig. 2, which will hold and release a stud, *g*, on a lever, L, which has a tension-spring, *h*, fig. 1, and is jointed to a lever, O, that operates the clutch E, so that, when the machine is running, with the arm *a* against the stop *c*, and the detent *f* holding the stud *g* of lever L, (see dotted lines in fig. 2,) if loose or unknit yarn C shall hang out of the needles, or project therefrom below their barbs *d*, such yarn will then catch on the comb A, and move the comb, with the arm *a*, shaft J, arm *e*, and detent *f*, so as to release the stud *g*, and let the spring *h*, by the levers L and O, disengage the clutch E from the clutch F, and thereby stop the machine.

In fig. 4, the comb-arm *a* releases a catch, *i*, which is to be in the place of the stud *g* on the lever *L* in fig. 1, by turning a cam, *j*, on and with the shaft *J*, so as to thereby raise a detent, *P*, and consequently disengage a lever, *S*, so as to set free a lever, *T*, and thereby release the catch *i*.

Fig. 5 is a section of a part of a knitting-machine that has a fixed needle-cylinder, *I'*, with latch-needles, *B*, which, in knitting, are moved endwise on the cylinder *I'* by a rotary surrounding cam-ring, *U*; and the cam *j*, on the comb-arm shaft *J'*, which is carried by the cam-ring *U*, raises a catch-lever, *P'*, so that the latter engages with teeth *k* on and thereby moves an ordinarily stationary surrounding detent-ring, *V*, so as to release any suitable stopping-device, in combination with the ring *V*, and thereby stop the machine, whenever the comb *A* shall catch into and be moved by loose or unknit yarn *C*, fig. 5, hanging out of or projecting from the needles below their hooks *d* and latches *l*.

Fig. 6 shows a part of a knitting-machine which has spring-barbed needles fixed in a rotary cylinder, *I*, and a fixed arm, *K'*, which holds a round disk, *W*, by its axis, with its edge, which may be elastic, against the needles or needle-cylinder, so as to make the disk turn as the needle-cylinder revolves, and which also holds a roller, *X*, that bears on and is revolved by the disk *W*, and has its spindle *m* turn in a pivoted bearing, *n*, and supported by a detent-spring, *p*, so that, when, in knitting, loose or unknit yarn hangs out of or projects from the needles below their barbs, such yarn will engage with and go through between the disk *W* and roller *X*, so as to raise that roller, and depress the spring *p*, and release a lever, *s*, and thereby set free a stopping-lever, *L*.

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

A claw, comb, or equivalent device, arranged in respect to the needles of a knitting-machine, and combined with mechanism for stopping the machine, substantially as described, so that yarn which has fallen or been taken out of the needles will catch on or engage with the claw, comb, or equivalent device, and cause the machine to stop.

I also claim, in a knitting-machine having spring-barbed needles, a stripping-wheel, *M*, arranged, as described, so as to take knots or loose yarn out of the needles, and thereby prevent the injurious retention or accumulation of such knots or yarn in the needles, substantially as herein set forth.

I also claim the arrangement, in a knitting-machine having spring-barbed needles, of a stripping-wheel just forward of the "sinker-wheel," or device for feeding yarn into the needles, substantially as herein set forth.

I also claim, in knitting-machines, a series of needles and a stopping-mechanism, combined with a comb, or its equivalent, and a stripping-wheel, substantially as described, so that yarn taken from the needles by the stripping-wheel will engage with the comb or its equivalent, and stop the machine.

I also claim, in knitting-machines, a stripping-wheel and a cam or its equivalent, combined with a circular series of spring-barbed needles, substantially as described, so that the cam or its equivalent will press or hold the knit fabric or old loops back on the needles at the place where the stripping-wheel is arranged to take waste or loose yarn out of the needles.

I also claim, in combination with a series of needles in a knitting-machine, a stripping-wheel, a cam, or its equivalent, for pressing or holding the knit fabric back on the needles at the point where the stripping-wheel acts, a comb, or its equivalent, for engaging with yarn taken from the needles by the stripping-wheel, and a stopping-mechanism, substantially as herein set forth.

In testimony whereof, I hereunto set my hand, this twenty-first day of January, eighteen hundred and sixty-seven.

BENJAMIN WARD.

Witnesses:

AUSTIN F. PARK,
JAMES W. WOOD.