

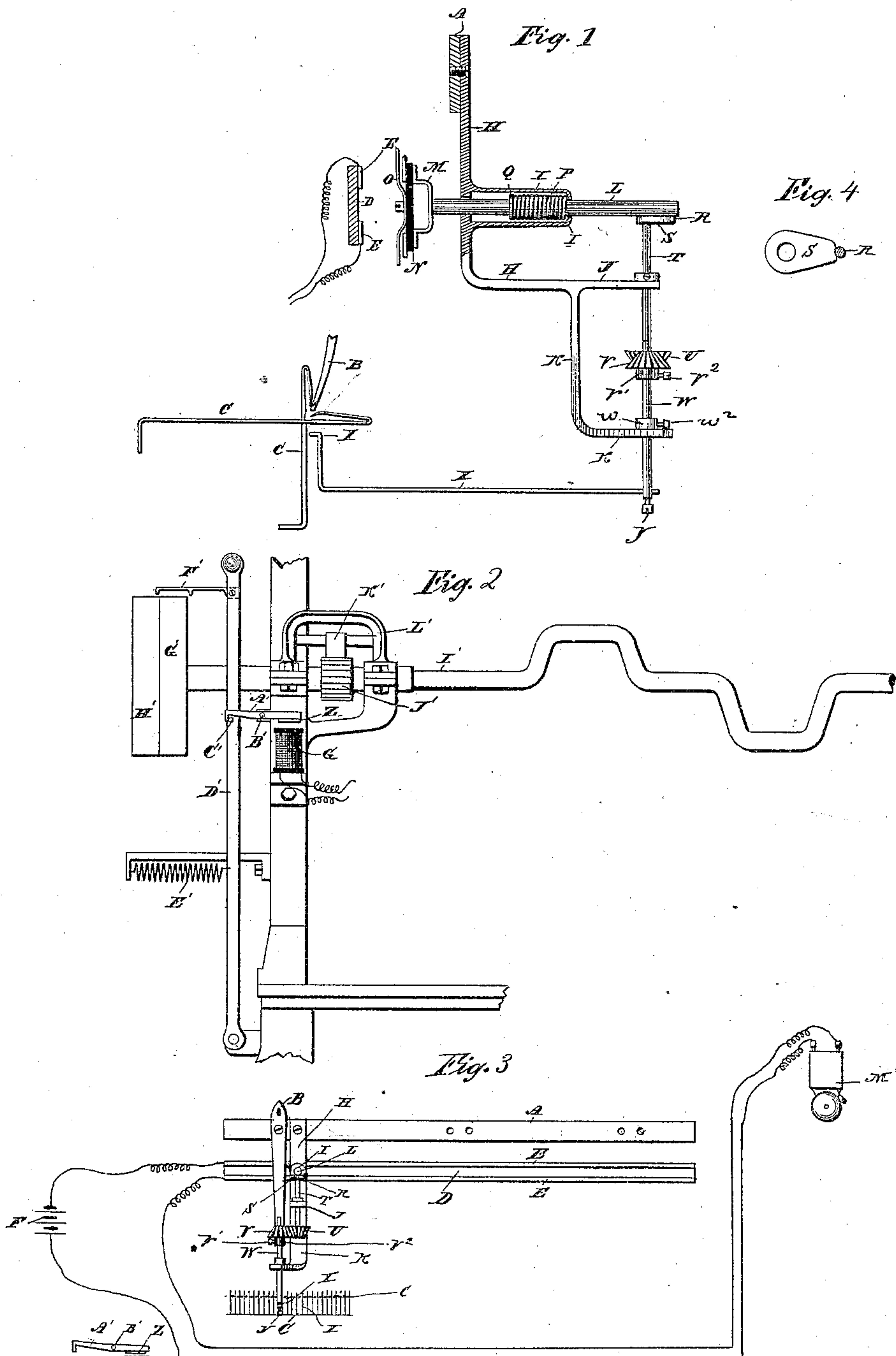
(No Model.)

J. T. ASHWORTH.

STOPPING MECHANISM FOR KNITTING MACHINES.

No. 427,534.

Patented May 13, 1890.



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JAMES T. ASHWORTH, OF BRISTOL, CONNECTICUT.

STOPPING MECHANISM FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 427,534, dated May 13, 1890.

Application filed May 25, 1889. Serial No. 312,106. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. ASHWORTH, residing at Bristol, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Stopping Mechanism for Knitting-Machines; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improved electrical stop-motion for knitting-machines, the object being to provide a simple and reliable mechanism for stopping a machine when a needle breaks or the thread clogs or snarls.

With these ends in view my invention consists in certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a detached view, partly in side elevation and partly in vertical transverse section, of a stop-motion embodying my invention. Fig. 2 is a broken view in front elevation, showing the mechanism for automatically releasing the shipping-lever and the ratchet and pawl for preventing the retrogression of the hand-crank shaft. Fig. 3 is a view in front elevation in the nature of a diagram, showing a throw-bar having a thread-carrier and an upright frame applied thereto, the stationary longitudinal contact-strips, parts of both rows of needles, the electric connections between the strips, and an operating-magnet and a signal-bell; and Fig. 4 is an enlarged detached view of the coupling cam and pin, the former being shown in plan and the latter in transverse section.

As herein shown, the machine to which my invention is applied is designed for knitting cuffs, and has the ordinary throw-bar A, which is horizontally reciprocated in the usual manner to move the thread-carriers B, only one of which is shown, back and forth over the spring-needles C, which are arranged in vertical and horizontal rows, only a portion of them being shown. I furnish the machine with a stationary bar D, located below the said throw-bar, parallel therewith, practically corresponding to the same in length, and provided with two horizontal parallel contact-strips E E, insulated from each other and

respectively connected to the opposite electrodes of an electric circuit, including a battery F and an electro-magnet G. An upright frame H, provided with a box I and arms J and K, is secured to the said throw-bar by the side of each of the thread-carriers thereof. A horizontal spindle L, mounted in the said frame and extending longitudinally through the said box, is provided upon its inner end with a yoke M, carrying a cross-piece N of insulating material, to which is attached a flexible contact-spring O, forming the circuit-closer of the device and arranged to electrically connect the parallel strips E E, and thus close the said electric circuit, the spindle being thrown inward to engage the circuit-closer with the said strips, as described, by means of a spiral spring P, inclosed within the box, encircling the spindle and having its outer end engaged with the box and its inner end with a collar Q, attached to the spindle. The said circuit-closer is normally held away from the strips against the tension of the said spring by means of a depending coupling-pin R, mounted in the outer end of the spindle and normally seated in a shallow recess formed in the apex of a coupling-cam S, attached flatwise to the upper end of a vertical cam-shaft T, mounted in the arm J of the frame H, before described, the sides of the cam being curved, so that when the cam-shaft is turned in resetting the stop-motion the pin will ride up on them and be automatically re-seated in the said recess. The lower end of the said shaft is provided with a small bevel-pinion U, engaging with a similar pinion v , having a collar v' , carrying a set-screw v'' , and adjustably secured by the said set-screw to the upper end of a short vertical shaft W, mounted in the arm K of the frame, and provided at its lower end with a horizontal perforation, which receives one end of an adjustable wire stop-finger X, held in place by a set-screw Y. Said finger X is bent to stand close to the needles, in front of which it travels back and forth in partaking of the reciprocation of the throw-bar, the lower end of the said arm K being bent so as to bring the pinion v and the stop-finger X in the same vertical plane as the adjacent carrier B, which the said finger extends under, as shown by Fig. 3 of the drawings. The said shaft W is vertically supported by means of a collar w , pro-

vided with a set-screw w^2 , impinging upon the shaft and resting upon the upper face of the arm K of the frame H. By loosening the set-screws r^2 and w^2 the shaft W may be vertically adjusted through the pinion r and the collar w , whereby the stop-finger may be vertically adjusted with respect to the needles. As the shaft W revolves only when operated by the finger X, and then only for a partial revolution, the friction in the bearings or between the gears will be sufficient to hold it in any position to which it may be adjusted; or any suitable means may be employed for this purpose, if found necessary. After the right position of vertical adjustment has been secured for the finger the set-screw is turned to bind the pinion upon the shaft again. By loosening the set-screw Y the stop-finger may be laterally adjusted with respect to the needles. Provision is therefore made in these two features for setting the stop-finger to just the right place.

The construction above described represents one form of mechanism for establishing a connection between the needles and the circuit-closer. It is obvious, however, that other mechanical contrivances for making this connection may be resorted to. An armature Z, located in the presence of the poles of the magnet G, is secured to one end of a latch A', hung on a pivot B', and notched to engage with a pin C', carried by the shipping-lever D' of the machine, the said lever having a spring E' connected with it to move it, when released from the latch, to cause its shipper F' to move the belt from the driving-pulley G' to the loose pulley H'. Other means than those just described for utilizing the circuit to shift the belt may, however, be employed for carrying out my invention. In order to prevent any stitches from being lost by a reverse movement of the machine after the belt has been shifted, I provide the hand-crank shaft I' with a ratchet-wheel J', which is engaged by a pawl K', hung in a frame L', and arranged to let the shaft turn forward freely, but to at once lock it when it begins to turn backward, thus stopping the throw-bar simultaneously with the closing of the circuit.

If desired, a bell M' may be located in the circuit, as shown by Fig. 3 of the drawings, to signal the stopping of the machine to its attendant.

In the operation of a machine provided with my invention the several stop-fingers normally travel back and forth in front of the needles and as close to them as possible and give clearance. Then when a needle breaks or the thread clogs or snarls the finger at once fouls with the broken needle or the yarn. Its inner end is thus retarded, while its outer end moves on with the throw-bar, but only for a very short distance, for a very slight movement of the bar after the inner end of the finger has been fouled will be sufficient to turn the shafts W and P and dislodge the pin R from the shallow recess in

the cam S at the upper end of the shaft T. The spindle being now free is at once thrown forward by its spring, whereby the circuit-closer is engaged with the parallel longitudinal strips, the circuit closed, the magnet energized, the armature thereof attracted to its poles, and the latch disengaged from the shipping-lever, which is at once operated by its spring to shift the belt, the ratchet-wheel and pawl at once locking the hand-shaft to prevent any back action of the machine and a loss of stitches. When the needle has been replaced or the snarled yarn removed, the stop-finger is manually turned to place again, whereby the coupling-cam operates automatically to retract the circuit-closer spindle and seat the coupling-pin in its recess again, the resetting of the device being thus made automatic.

I would have it understood that I do not limit myself to the exact construction shown and described, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An electric stop-motion for knitting-machines, having two parallel contact-strips, an electric circuit including such strips, a battery, and a magnet, a circuit-closer adapted to connect the strips and mounted to travel back and forth in proximity thereto, a stop-finger traveling back and forth in close proximity to the needles, connection between the said circuit-closer and finger, whereby the former is released when the latter is retarded, and devices released by the magnet for stopping the machine.

2. An electric stop-motion for knitting-machines, having two parallel contact-strips, an electric circuit including such strips, a battery, and a magnet, a circuit-closer adapted to connect the strips and mounted to travel back and forth in close proximity thereto, a stop-finger traveling back and forth in close proximity to the needles, connections including provisions for rendering the finger vertically and laterally adjustable between the said circuit-closer and finger, whereby the former is released when the latter is retarded, and devices released by the magnet for stopping the machine.

3. An electric stop-motion for knitting-machines, having two parallel contact-strips, an electric circuit including the said strips, a battery, and a magnet, a circuit-closer adapted to connect the strips and thus close the electric circuit, a stop-finger traveling back and forth in close proximity to the needles, and normally-coupled connections between the circuit-closer and finger adapted to be uncoupled by the detention of the finger and to be automatically recoupled when the same is reset, substantially as set forth.

4. An electric stop-motion for knitting-ma-

chines, having two parallel contact-strips, an electric circuit including the said strips, a battery, and a magnet, a traveling circuit-closer, a stop-finger, normally-coupled connections between the said circuit-closer and finger, whereby when the finger is detained the said connections are uncoupled and the circuit-closer released for closing the circuit, devices controlled by the magnet for stopping the machine, and a ratchet and pawl co-operating with the stop-motion to prevent a back action of the machine and a loss of stitches after the stop-motion has operated, substantially as set forth.

5 5. An electric stop-motion for knitting-machines, having two parallel contact-strips, an electric circuit including the said strips, a battery, and a magnet, a throw-bar, a frame carried thereby, a circuit-closer mounted in such frame and adapted to close the electric circuit, a spring-actuated spindle carrying the circuit-closer, a stop-finger, normally-coupled devices between the outer end of the spindle and the finger, and devices released
25 by the magnet for stopping the machine.

6. An electric stop-motion for knitting-machines, having two parallel contact-strips, an electric circuit including the said strips, a battery, and a magnet, a circuit-closer traveling back and forth in front of the strips, a spring-actuated spindle carrying the said circuit-closer, a pin located in the outer end of the spindle, a cam having a shallow recess in its apex engaged by the said pin, a shaft carrying the cam, a stop-finger coupled with the shaft, and devices released by the magnet for
35 stopping the machine.

7. An electric stop-motion for knitting-ma-

chines, having two parallel contact-strips, an electric circuit including the said strips, a battery, and a magnet, a throw-bar, a frame carried thereby, a circuit-closer secured to a spring-actuated spindle mounted in the frame, two rotatable shafts mounted in the frame and carrying pinions meshing together, a coupling between one shaft and the spindle, a stop-finger carried by the other shaft, and devices released by the magnet for stopping the machine.

8. An electric stop-motion for knitting-machines, having two parallel contact-strips, an electric circuit including the said strips, a battery, and a magnet, a throw-bar, a frame carried thereby, a circuit-closer secured to a spring-actuated spindle mounted in the frame, two rotatable shafts mounted in the frame and carrying pinions meshing together, a coupling between one shaft and the spindle, a stop-finger carried by the other shaft, which is vertically adjustable through its pinion, and devices released by the magnet for stopping
50 55 60 the machine.

9. An electric stop-motion for knitting-machines, having two contact-strips, a circuit-closer traveling in front of the same, an electric circuit including the strips, a battery, a magnet, and a bell, and devices released by the magnet for stopping the machine.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JAMES T. ASHWORTH.

Witnesses:

CHAS. B. SHUMWAY,
WM. T. BOOTH.