

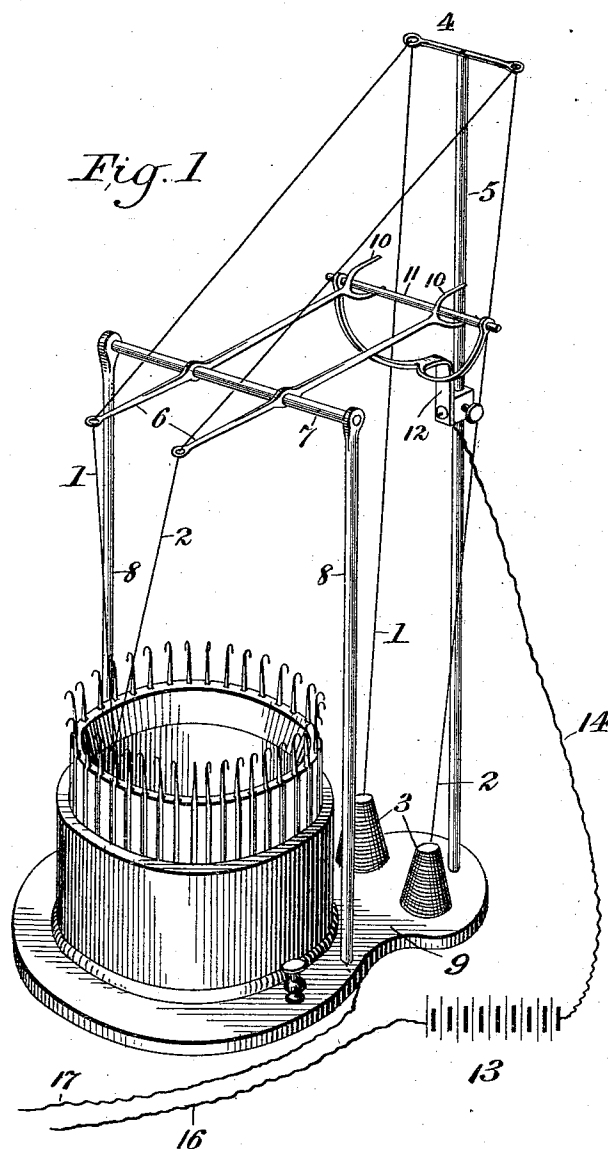
(No Model.)

2 Sheets—Sheet 1.

G. J. MANDERFIELD.
STOP MOTION FOR KNITTING MACHINES.

No. 479,763.

Patented July 26, 1892.



Witnesses

Levy B. Hills
J. A. Goedsborough

Inventor

George J. Manderfield
By his attorney
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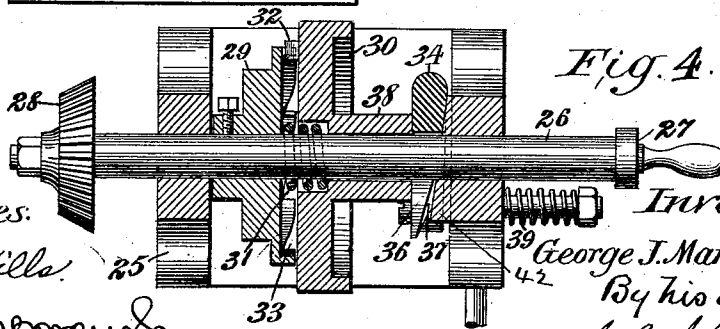
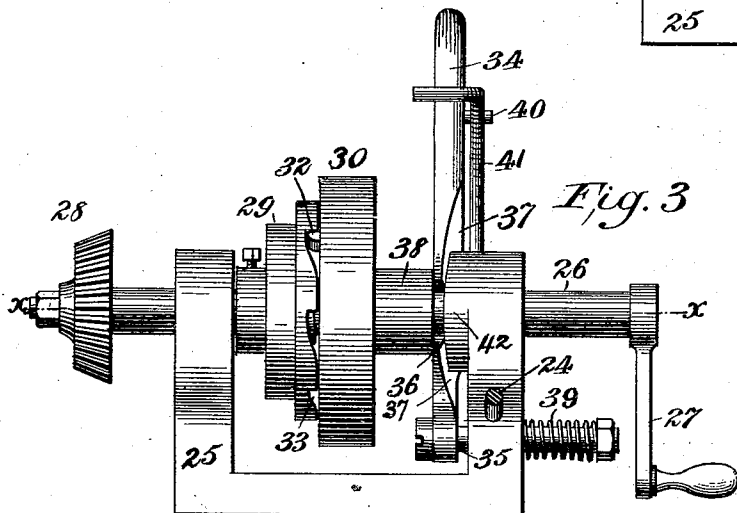
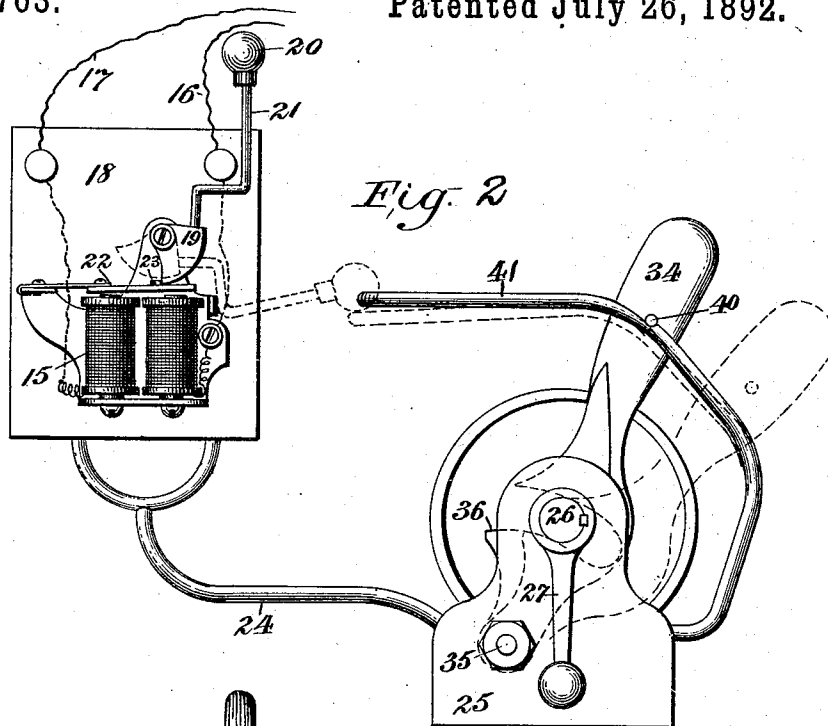
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UNITED STATES PATENT OFFICE.

GEORGE J. MANDERFIELD, OF ROYER'S FORD, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO J. M. LEWIN, SAMUEL LEWIN, W. S. G. FINKBINER, AND A. R. SAYLOR.

STOP-MOTION FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 479,763, dated July 26, 1892.

Application filed October 19, 1891. Serial No. 409,113. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. MANDERFIELD, a citizen of the United States, residing at Royer's Ford, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Stop-Motions for Knitting-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to stop mechanism for knitting and other machines, and has for its object to provide a construction whereby the stoppage of the machine may be effected instantly upon the breaking or running out of the yarn or thread or the knotting or kinking of the same.

Heretofore stop-motions for knitting-machines have generally been composed of a loose pulley on the driving-shaft, said pulley being driven by a constantly-running driving-belt, in combination with an adjacent wheel fixed on the shaft and a belt-shifter to slip the belt from one pulley to the other, the said belt-shifter being operated by mechanism set in motion by the breaking or knotting of the yarn. It is well known, however, that this arrangement is objectionable, for the reason, among others, that at least one revolution of the shaft is required entirely to shift the belt from the fast to the loose pulley, and it is necessary therefore to provide for an unusual length of yarn between the needles and the primary shifter-actuating mechanism in order to prevent the knotted or broken portion from reaching the needles before the machine comes to rest. It is to overcome these and other difficulties that my improvement is designed, and I have herein shown and will now proceed to describe one form of mechanism in which I have embodied the invention.

Reference being had to the accompanying drawings, forming part of this specification, Figure 1 is a perspective view of a common form of circular-knitting machines embodying my invention. Fig. 2 is a detail view of my clutch-tripping mechanism. Fig. 3 is a side elevation of the driving-shaft, showing

the clutching mechanism; and Fig. 4 is a horizontal section taken on the line *xx* of Fig. 3.

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

Referring to Fig. 1, the yarn 1 2 runs from the spools or bobbins 3 up through eyes in the ends of the cross-bar 4 at the upper end of a vertical standard 5, thence downward through eyes in the ends of pivoted arms 6 to the needles of the machine. The arms 6 are loosely pivoted upon a horizontal cross-bar 7, supported by any suitable standards, such as 8, rising from the base-plate 9 or other part of the machine-frame. The ends of the arms opposite the guide-eyes have metallic forks, as at 10, and said forks are arranged to straddle a horizontal metallic bar 11, supported by an adjustable bracket 12, carried, preferably, by the standard 5. The pivotal point of the arms 6 is placed nearer the eye end of the arm in order that the opposite ends may fall and cause the upper prong of the fork to strike the metallic bar 11, when the yarn running through the eyes breaks and no longer offers any resistance to the opposite end of the lever. Instead of this arrangement, however, the arms may be pivoted centrally of their length and be weighted at their forked ends.

Located at any convenient point in proximity to the machine is a battery or other source of electric energy, as 13. One of the poles of this battery is connected by the wire 14 to the metallic bar 11 through the bracket 12, as shown. The other pole is in metallic connection with the pivoted arms 6 through the cross-piece 7, one of the standards 8, the wire 17. Interposed in the electric circuits 13, 14, 12, 11, 10, 6, 7, 8, 16, and 17 is the electro-magnet 15, which is the immediate mechanism for releasing the clutching devices.

During the normal operation of the machine the circuit above described is open or broken between the forks 10 and the bar 11, the running of the yarn through the eyes in the other ends of the arms 6, keeping the arms balanced so that neither prong of the forks at the opposite ends touches the bar 11. As soon, however, as a knot strikes the eye

the forked end of the arm will be tipped up and the lower prong of the fork 10 will contact with the bar 11, thereby closing the circuit and energizing the magnet; or should one of the yarns break the forked end of the lever, being the heavier, drops and the upper prong contacts with the bar 11, with the same result—viz., the closing of the circuit.

I will now describe the mechanism for clutching and unclutching the operating-shaft of the machine to the constantly-running belt-pulley 30. The shaft 26 carries at one end a gear-wheel 28, adapted to impart motion to the knitting-machine in a manner well understood. A handle 27 may be applied to the other end of the shaft for turning the machine by hand, when desired. Fixed upon the shaft is the wheel 29, having notches 33 in its side face, said notches being preferably formed in an annular rim, as shown. Loosely journaled upon the shaft adjacent to the wheel 29 is the constantly-driven belt-pulley 30. This pulley not only turns freely upon the shaft, but slides lengthwise thereon, so as to be engaged with and disengaged from the fixed notched wheel 29 by mechanism presently to be described. The pulley 30 is provided on its face adjacent to the fixed wheel with one or a series of pins or teeth 32 to engage the notches of the wheel 29. The shaft is journaled in uprising arms of a small frame 25. Pivoted at one end to this frame below the shaft is a clutching-lever 34. This lever extends up beyond the shaft and has a weighted end conveniently shaped to form a hand-hold, by which the lever is operated. At about midway of its length this lever is cut away or recessed, as shown at 36, so as to straddle the shaft, and above and below this cut-away portion the lever is provided with the cam-surfaces 37 on one side, the opposite side being plain and flat and serving as a bearing-face for the end of the hub 38 of the belt-pulley 30. The arm of the frame 25 nearest the lever is provided with an oppositely-shaped cam-surface 42. In order to provide for the lateral movement of the lever in the direction of the length of the shaft when it is thrust up into engagement with the cam-surface 42, it is pivoted at its lower end on a loose pin 35, set in the frame and having a stiff spring 39 tending to hold the arm against the side of the frame, as will be understood from Figs. 3 and 4 of the drawings. Encircling the shaft between the adjacent faces of the fast and loose wheels 29 30 and conveniently housed in a recess in the latter is a spring 31, tending to force and hold the wheels apart. When the lever 34 is in the position indicated by the dotted lines in Fig. 2, the wheels are held apart by the spring 31 and the loose wheel runs freely on the shaft without operating the machine. When the clutch-lever is pushed up into the position shown in full lines in Fig. 2, the cam-surfaces 37 and 42 cooperate to thrust the lever laterally along the

shaft, pushing on the end of the hub 38 and causing the pulley 30 to be clutched to the fixed wheel 29. To hold the parts in their clutched position, a spring 41 of any convenient form is secured to the frame in the path of a pin 40, projecting from the side of the lever, a notch being cut in the spring, into which the pin takes when the lever reaches its locked position.

I will now describe the mechanism for tripping the catch and allowing the lever to fall. 20 denotes a weight on the upper end of a short rod 21, fixed in a block 19, pivoted as shown, the parts being so arranged that the rod moves in the path of the spring 41, the end of which is preferably bent to insure the engagement therewith of the weight.

The numeral 15 denotes an electro-magnet mounted on any suitable frame, such as 18, to which also the block 19 is pivoted. The wires 16 and 17 are connected to the opposite end coils of the magnet, as clearly shown in Fig. 2 of the drawings, so that the magnet is included in the circuit heretofore explained. A spring-armature 22 is fixed so that when the magnet is energized it will be drawn down out of the path of the pivot-block of the weight-arm 21 and allow the latter to fall. The armature is preferably provided with a stud to engage the pivot-block; but it may be otherwise constructed to effect the same result. The frame 18 is supported in any suitable manner and located in any convenient position, it only being necessary that they shall be so arranged that the weight 20 will strike the spring 41 when the weight-arm is allowed to fall. I have herein shown the frame as supported by an arm or bracket 24 from the frame 25, carrying the driving and clutching devices.

From the foregoing description the operation of the machine will readily be understood to be generally as follows: So long as the yarn is running smoothly through the eyes in the ends of the pivoted levers 6 these levers will be balanced, as before explained, and neither of the prongs of the forked ends will make contact with the cross-bar 11. Consequently no current will pass, the circuit being broken at this point. As soon, however, as the yarn breaks or runs out or a knot or kink passes through either of the eyes the forked end of one of the levers is lowered or raised, as the case may be, and one of the prongs strikes the cross-bar 11, completing the electric circuit and allowing the current to pass. This energizes the magnet and draws down the armature 22, releasing the pivot-block 19 and allowing the weight-arm 21 to fall and the weight 20 to strike the spring-catch 41. This of course frees the weighted clutch-lever 34 and allows the same to drop of its own weight, when the spring 31, encircling the shaft between the wheels, instantly forces them apart, bringing the machine to rest. In order to set the mechanism again, it is only

necessary to push the lever 34 up into place and to raise the weight-arm 21 till the spring-armature catches under the heel of the pivot-block, when the machine may be threaded up again in the ordinary manner and the operation of knitting be resumed.

I do not intend to be restricted to the details of the mechanism herein shown and described, as the same may be considerably modified without departing from the spirit or scope of the invention.

What I claim, and desire to secure by Letters Patent, is as follows:

1. The combination of a shaft, a fixed wheel thereon having a notched rim, a driving-wheel loose upon the shaft and having a tooth to engage the notched rim of the fixed wheel, a spring encircling the shaft and holding the wheels normally apart, a cam projection on the bearing for the shaft, and a cam-shaped lever working between the bearing and the hub of the loose wheel, substantially as described.

2. The combination of a shaft, a fixed wheel thereon, a loose wheel thereon, a spring encircling the shaft between the wheels and holding them normally apart, a cam-shaped projection on the shaft-bearing nearest the loose-wheel, a pivoted lever having a cam-surface co-operating with the cam on the shaft-bearing, and a spring encircling the pivot-pin of the lever and holding the latter up to the cam on the bearing, substantially as described.

3. In a stop-motion for knitting-machines and the like, the combination of an operating-shaft, a drive-wheel normally loose thereon, a wheel fixed on the shaft and adapted to be engaged with the loose wheel, a cam-shaped lever for forcing and holding the wheels together, a spring-catch for holding the lever up to its work, a weight arranged to strike and release the spring-catch, a guide through which the yarn passes, and an electric circuit, including the guide and the mechanism for dropping the weight, substantially as described.

4. The combination of a shaft, a wheel fixed thereon and having notches, a driving-wheel normally loose on the shaft, a spring encircling the shaft between the wheels and holding them normally apart, a weighted cam-shaped lever for forcing and holding the

wheels together, and a spring-catch for holding the lever up to its work, substantially as described.

5. The combination of a shaft, a wheel fixed thereon, a driving-wheel loose thereon, a spring encircling the shaft between the wheels and holding them normally apart, a cam on the shaft-bearing adjacent to the loose wheel, and a wedge-shaped cam working between the bearing and the loose wheel for causing it to engage the fixed wheel, substantially as described.

6. The combination of a shaft, a wheel fixed thereon, a driving-wheel loose thereon, a spring encircling the shaft between the wheels, a cam on the shaft-bearing adjacent to the loose wheel, a pivoted lever having a wedge-shaped cam and adapted to work between the shaft-bearing cam and the loose wheel, and a catch for holding the lever up to its work, substantially as described.

7. The combination of a shaft, a wheel fixed thereon, a drive-wheel loose thereon, a spring encircling the shaft between the wheels, a cam on the shaft-bearing adjacent to the loose wheel, a pivoted lever having a wedge-shaped cam and adapted to work between the shaft-bearing cam and the loose wheel, and a catch for holding the lever up to its work, the lever being weighted to fall upon the release of the catch, substantially as described.

8. In a stop-motion for knitting-machines and the like, the combination of an operating-shaft, a drive-wheel normally loose thereon, a fixed wheel on the shaft, a spring interposed between the wheels and holding them normally apart, a weighted cam-shaped lever for forcing the wheels together and holding them in engagement, a spring-catch for holding the lever up to its work, a weighted trip-arm for the catch, a magnet whose armature is arranged to hold the trip-arm elevated, a guide through which the yarn passes, and an electric circuit including the guide and the magnet, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE J. MANDERFIELD.

Witnesses:

SAML. LEWIN,
A. R. SAYLOR.