(No Model.)

W. D. HUSE, W. E. SHEEHAN & G. F. DAVIS.

STOP MOTION MECHANISM FOR KNITTING MACHINES.

No. 327,170. Patented Sept. 29, 1885.

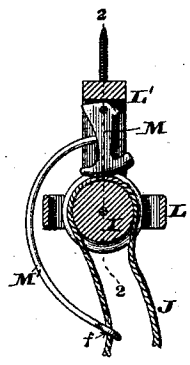


Fig. 2.

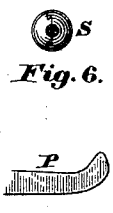


Fig. 6.

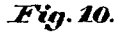


Fig. 10.

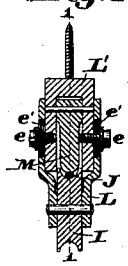


Fig. 3.



Fig. 7.

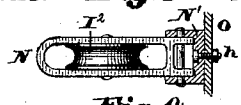


Fig. 4.

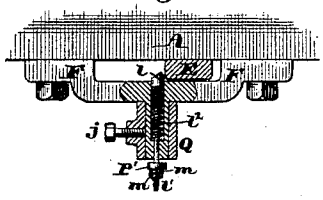


Fig. 5.



Fig. 8.



Fig. 9.

Fig. 1.

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UNITED STATES PATENT OFFICE.

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STOP-MOTION MECHANISM FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 327,170, dated September 29, 1885.

Application filed February 7, 1885. (No model.)

To all whom it may concern:

Be it known that we, WARREN D. HUSE, WILLIAM E. SHEEHAN, and GEORGE F. DAVIS, all of Laconia, in the county of Belknap and State of New Hampshire, have invented jointly new and useful Improvements in Stop-Motion Mechanism for Knitting-Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

Our invention relates to stop-motion mechanism for knitting-machines, and is designed to automatically stop the machine when the yarn breaks and the work is run off from the needles, and at the same time prevent the work so run off from being carried beyond the reach of the operator, and also to automatically stop the machine at predetermined intervals in the progress of the knitting for the purpose of permitting a change of yarns when knitting striped goods; and it consists in certain novel constructions, arrangements, and combinations of devices, which will be best understood by reference to the description of the drawings, and to the claims, to be hereinafter given.

Figure 1 of the drawings represents a transverse section through the bed of a circular-knitting machine, and showing the needle-cylinder and the devices for operating the same with my invention applied thereto in elevation. Fig. 2 is a vertical section on line 1 1 on Fig. 3. Fig. 3 is a section on line 2 2 on Fig. 2. Fig. 4 is a horizontal section on line 3 3 on Fig. 1. Fig. 5 is a front elevation of a portion of the bed and shipper-guide with a portion of said guide, the lever-supporting bar, and the shipper cut in section, and showing in elevation the spring and bolt for locking the shipper. Fig. 6 is a detail showing the ball made in two parts. Fig. 7 illustrates the manner of applying the two parts of the ball to the cord. Figs. 8 and 9 are respectively a side elevation and a plan of a short section of a chain with movable projections or cams thereon which may be used instead of a rope or cord; and Fig. 10 is a side elevation of the tripping-lever, arranged to be used without a truck or roll.

A is the bed of the machine, which is usually mounted upon legs. (Not shown.)

B is the needle-cylinder, having formed upon or secured to its lower end the bevel gear-wheel B′, with which engages the bevel gear-wheel C, mounted upon the driving-shaft D, by means of a suitable spline and groove, so that it may be moved endwise thereon while it is compelled to revolve therewith, and E is the shipper-lever, pivoted at *a* to the rear of the bed A, and supported and guided at the front edge of the bed by the yoke-like stand F, and provided with the arms *b b*, which engage with a circumferential groove formed in the hub C′ of the gear-wheel C, all in a well-known manner.

G is a section of a tubular fabric attached to the needles *c c*.

H is a bar provided with hooks *d d*, which engage with the fabric for the purpose of drawing it upward as fast as it is knit, in a well-known manner. Heretofore this has been accomplished by attaching a cord to the bar H, passing said cord over a pulley suspended from the ceiling of the room directly over the needle-cylinder, and attaching a weight to the other end of the cord, and whenever the yarn broke and the work was run off from the needles the work would be carried up to the overhead pulley, out of reach of the operator, by the sudden descent of the weight, and the machine would continue to run until the operator could move the shipper-lever E to throw the wheel C out of gear with the needle-cylinder.

The object of our invention is to automatically stop the motion of the needle-cylinder whenever the work is run off, and at the same time to prevent the work being carried out of the reach of the operator under the same circumstances; and to this end we employ two pulleys, I I′, suspended from the ceiling of the room, and a third, I², mounted upon the machine, and pass a cord or chain, J, over the pulley I, under the pulley I², and then over the pulley I′, and attach to one end of said cord or chain the bar H, and to the other end the weight K.

The pulley I is mounted in the yoke-frame L, adjustably secured to the forked stand L′ by the bolts *e e*, which pass through the slots *e′ e′* and screw into the stand L′, as clearly shown in Figs. 1 and 3.

M is a weighted brake-shoe or dog pivoted in the forked stand L′, and provided with the curved arm M′, in the lower end of which is formed an eye, *f*, through which the cord J passes, as shown in Fig. 1. The lower surface of the brake-shoe is made eccentric to its pivot, so that when the cord J is drawn taut from the bar H to the pulley I the brake-shoe will not interfere with the free passage of the cord over said pulley; but when the work is detached from the needles the preponderance of weight upon that side of the brake-shoe M to the left of a vertical line drawn through the center of the pulley I in Fig. 1 will cause said brake-shoe to be swung to the right and thus cause the eccentric lower surface of the shoe to come in contact with the cord J, the friction of which will tend to move said shoe still farther to the right and cause it to impinge with great force upon said cord and arrest its movement over the pulley I.

The pulley I^2 is mounted upon a journal, *g*, set in the forked frame N, which is pivoted to the stand N′, adjustably secured to the bracket O by means of the bolt *h*, which passes through a vertical slot, *i*, formed in the upright portion of the bracket O, as shown in Figs. 1 and 4.

The frame N has the upper portion of its pivoted end made at right angles, or nearly so, to the top edge of said lever, to serve in connection with the stand N′ as a stop to limit the upward movement of said lever above the position shown in Fig. 1, but whenever the tension of the cord or chain J is removed therefrom it is free to move downward, and its weight will depress the long arm of the lever P, pivoted to the bar Q, mounted at its front end upon a downwardly-projecting hub of the guide-stand F, to which it is secured by the set-screw *j*, and secured at its rear end by the bolt *k* to the under side of the rear edge of the bed A, as shown in Fig. 1.

The lever P is connected to the rear end of the lever P′, also pivoted to the bar Q, and provided at its front end with an eye through which passes the stem *l′* of the shipper-locking bolt *l*, which has its bearing in a socket formed in the stand F, and has coiled about its stem the spring l^2, which tends to force said bolt upward to lock the shipper-lever E when it is moved to the right to cause an engagement of the bevel gear-wheels B and C, as shown in Figs. 1 and 5.

The lower end of the stem *l′* of the bolt *l* is threaded, and has fitted thereto two nuts, *m* and *m′*, against which the lever P′ acts to draw down the bolt *l* against the tension of the spring l^2 to release the shipper-lever E when it is desired to stop the revolution of the cylinder, said shipper being moved to the left, when said bolt *l* is depressed, by the reaction of the spring *n*, one end of which is attached to said shipper-lever E, and the other end to the bed A, as shown in Fig. 1.

The cord or chain J is provided at intervals with projections or enlargements S for the purpose of stopping the machine for changing the yarns in knitting striped goods, or when the web is sufficiently long to be cut off, which projections or enlargements when they pass around the pulley I^2, and between it and the rear end of the lever P, will cause a depression of the rear end of said lever and the front end of the lever P′, and through it of the bolt *l*, when the spring *n*, acting upon the shipper-lever E, will cause the gear-wheel C to be thrown out of gear with the wheel B′ and thus stop the revolution of the needle-cylinder.

When a cord is used for raising the fabric as the knitting progresses, we prefer to make projections or enlargements S thereon of metal, either spherical or in the form of two frustums of cones, united at their bases, as shown at *o* in Fig. 1. We make these spheres or cones each in two pieces dovetailed together, as shown in Fig. 6, and form in each half thereof a semicircular groove, which, when the two parts are placed together, form a hole of somewhat less diameter than the diameter of the cord, so that in order to apply them to the cord said cord must be compressed so as to create sufficient friction to prevent the sphere or cone being moved upon the cord by passing between the pulley I^2 and the lever P when once adjusted to the desired position on the cord.

In order to apply the sphere or cone to the cord, the two halves are placed as shown in Fig. 7, and are then forced together by means of a pair of pinchers or pliers, and they may be adjusted to any desired position upon the cord J by separating them and moving them to the new position and uniting them again in the same manner.

If it is desired to use a chain instead of a cord for carrying the lever-operating projections, the chain may be made as illustrated in Figs. 8 and 9, each link being provided with a transverse groove, *r*, upon one side thereof, and a screw-hole extending through said link at right angles to the groove *r*, and the cam-projection S has its base made to fit into said groove, and is secured in position on the link by means of a single screw, as indicated in dotted lines in Fig. 8.

The rear end of the lever P may be made plain, as shown in Fig. 10, or it may be forked and provided with the anti-friction roll *s*, for the projections or enlargements S to act upon, as shown in Fig. 1.

In knitting striped goods in which the stripes are parallel with the courses of stitches knitted, it is necessary to change the yarns at intervals, or, in other words, to substitute a yarn of a given color for a yarn of another color at the end of each stripe. This change is made automatically in some machines, the widths of the several stripes being determined by a pattern mechanism which controls the yarn-changing mechanism so as to cause such change to take place when a given number of courses have been knitted. An objection to

this is that a change in the size of the yarn changes the widths of the stripes and also the length of the stocking or other garment being knitted, whereas it is very desirable in knitting a given pattern to make the stripes of the same widths whether fine or coarse yarn is used.

A great many other machines are in use in which no automatic yarn-changing devices are employed, but the change is made by the operator stopping the machine at the proper time, making the necessary change in the yarns, and then starting the machine again. This is objectionable because of the liability of imperfect work being produced on account of neglect on the part of the operator.

Both of the foregoing objections are entirely overcome by our invention, the stripes always being knit of a corresponding width in all of the articles knit, whether the yarn is fine or coarse, and the machine being automatically stopped whenever the stripe has been knitted to the desired width, the spheres or projections being first adjusted to the desired varying or uniform distances apart, as the case may be, to give the desired number and widths of stripes.

The operation of our invention will be readily understood from the foregoing without further description.

We are aware of the inventions described in Letters Patents Nos. 143,051, September 23, 1873; 256,533, April 18, 1882, and 297,487, April 22, 1884, and do not claim anything contained therein; but

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In combination with the bed, needle-cylinder, and needles of a knitting-machine, and its operating-gears, a shipper-lever, a spring for moving said lever in one direction, a bolt for locking said shipper-lever against the tension of said spring, a bar provided with hooks for engaging the knitted fabric, two suspension-pulleys arranged above the machine, a pivoted frame, provided at its pivoted end with a shoulder or stop to limit its upward movement, and located upon the rear of the bed, a third pulley mounted in said pivoted frame, a cord or chain connected at one end to said work-supporting bar, and passing over one of the upper pulleys, under the lower pulley, and then over the other one of the upper pulleys, and having a weight attached at the other end thereof, and a compound lever connected at one end to the shipper-locking bolt, and its other end extended to a point beneath and in close promixity to said lower pulley and its pivoted frame, all constructed, arranged, and adapted to operate to stop the machine when work becomes detached from the needles substantially as described.

2. In combination with the needle-cylinder, its needles, and operating-gears, the shipper-lever E, the spring *n*, the locking-bolt *l l'*, the spring l^2, the levers P and P', the bar H, provided with hooks, the cord or chain J, the pulleys I, I', and I^2, and the adjustable projections or enlargements S upon said cord or chain, and the weight K, all arranged and adapted to operate substantially as and for the purposes described.

3. In combination with the needle-cylinder and needles of a knitting-machine, the bar H, the cord J, connected at one end to said bar, guiding-pulleys for said cord, and a weight attached to the other end of said cord, the pendent brake-shoe or dog M, having its lower end eccentric to its axis, and provided with the arm M', having its lower end constructed to rest against said cord below the first of said pulleys, as shown, whereby when the cord is taut, the shoe or dog M is raised from contact with the cord, and when the cord becomes slack said shoe engages with said cord and clamps it between it and the pulley I, substantially as described.

4. In combination with the cord J, the sphere or cone S, made in two parts dovetailed together and clamped firmly to said cord in a fixed position, substantially as described.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this day of of February, A. D. 1885.

WARREN D. HUSE.
WILLIAM E. SHEEHAN,
GEORGE F. DAVIS.

Witnesses:
FRANK P. HOLT,
GEORGE W. ROSS.