(No Model.) 2 Sheets—Sheet 1.

W. W. BURSON.

STOP MOTIONS FOR KNITTING MACHINES.

No. 576,544. Patented Feb. 9, 1897.

FIG. 6.

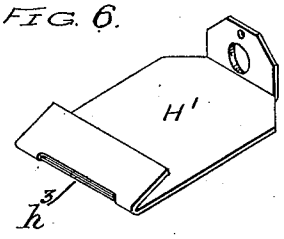

FIG. 1.

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(No Model.) 2 Sheets—Sheet 2.

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FIG. 3.

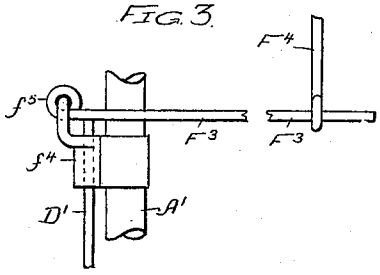


FIG. 4.

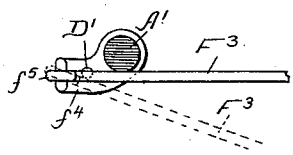


FIG. 5.

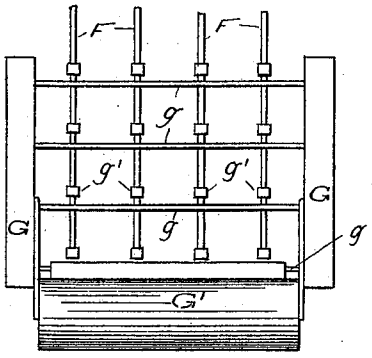
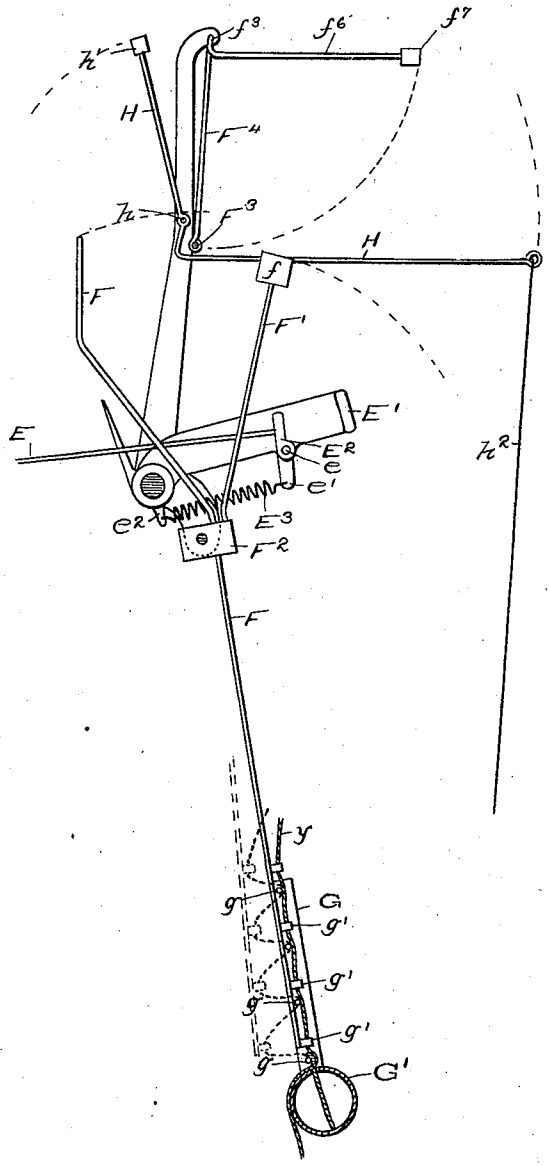


FIG. 2.



WITNESSES:
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INVENTOR:
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UNITED STATES PATENT OFFICE.

WILLIAM WORTH BURSON, OF CHICAGO, ILLINOIS.

STOP-MOTION FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 576,544, dated February 9, 1897.

Application filed January 7, 1896. Serial No. 574,693. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WORTH BURSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Stop-Motion for Knitting-Machines, of which the following is a specification.

My invention relates to improvements in stop-motions for knitting-machines in which one or more yarns are knit and in which a take-up is used; and the objects of my improvement are, first, to provide means for stopping the machine by the breaking of any one of the yarns used; second, to afford means for stopping the machine by the parting of the yarn at a sufficient distance from the needles to save the fabric; third, to stop the machine without breaking the yarn by the action of the large knots or other hindrances to the free passages of the yarn; fourth, to utilize for stop-motion purposes a friction put upon the yarn by a slight oiling given it to aid the knitting process. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 shows the stop-motion attached to a knitting-machine. Fig. 2 shows the trip-lever F in its connection to the yarn and other parts. Figs. 3 and 4 show the relation of the trip-rod D′ and trip-wire F^3. Fig. 5 shows the friction-frame G and oil-cup G′. Fig. 6 shows the suspended knot-arrester H′.

Similar letters of reference denote the same part throughout the several views.

In the drawings, A represents the knitting-machine, B the driving-belt, B′ the tight pulley on a driving-shaft, and B^2 the loose pulley, which constitute the well-known means of driving this class of machines. The upright rod A′, fastened to the knitting-machine, supports the friction-frame G, the trip-lever F, the take-up E, and trip-wire F^3. The belt-shifting lever D is pivoted at d to a support on the machine. A draft-pin d' in the outer end of said lever engages the outside of the belt B. The trip-rod D′ has its lower end loosely connected to the inner end of lever D at d^2, and its upper end, guided in the hole f^4, rests against the trip-wire F^3, Figs. 1, 3, and 4. The friction-frame G is formed of the cross-wires g, held in place and supported on the rod A′. These cross-wires g coact with eyes g', fastened to the lever F, in giving a necessary friction to the yarn. An oil-cup G′, in which there is a wick g^2, against which the yarn y rests, furnishes a slight touch of oil to the yarn, which tends to make its passage over the friction-bars more equable than dry yarn would be and aids in giving a very satisfactory friction to the yarn, Figs. 1, 2, and 5.

The trip-lever F is conveniently made of one rod F, passing through and held by the block F^2, and another rod F′, fastened in the same block. On the lower end of the lever F are the eyes g', placed so as to come between the cross-wires g. The upper end of the lever extends enough above its pivotal support to reach the trip-wire F^3. The rod F′, fastened in block F^2, has the weight-block f fastened on its upper end. The trip-wire F^3 is loosely pivoted to a support held on rod A′ at f^5, the outer end being held by the trip-wire holder F^4, pivoted to a support at f^3. A right-angle bend in this lever f^6 has on the outer end the weight f^7, the action of which is normally to hold the trip-wire in operative position against its support, Fig. 2.

It is desirable frequently to have two or more single yarns run from separate bobbins or cones and united in one yarn-carrier, in which case there should be a lever F for each single yarn and a take-up wire E to supply each yarn-carrier. The take-up E is fastened to the upper end of the rocking lever E^2, which is pivoted at e to the support E′. The coiled spring E^3 is connected to lever E^2 at e' and to support E′ at e^2, the normal operation of which is to swing the take-up wire upward and backward when the yarn y breaks between the yarn-carrier and the friction device G, Fig. 1.

It is desirable to arrest a knot or other part of yarn which is too large to knit with safety without breaking the yarn or causing injury to the fabric, so that the operative can remove the obstruction and thus save the piece. To accomplish this result, the knot-tripping lever H, pivoted at h to a support, is bent, so that the raising of the outer end shall trip wire F^3 and thereby stop the machine in the same manner as if tripped by the lever F or take-up E. On the inner end of lever H is a counterbalancing-weight h', and to the outer end

is suspended, by a flexible cord or wire h^2, preferably, the knot-arresting weight H′. It is desirable that this weight should be light, so as to be readily lifted by tender yarn without breaking, and hence is given an advantage in length of lever over the weight h'. Knot-arresting weight H′ is provided with a hole or slot h^3 of sufficient size to permit the yarn and properly-tied knots to pass through, but not large enough to permit dangerous bulk to pass, and hence the yarn lifts weight H′ and the counterbalancing-weight h' causes trip-wire F^3 to be sprung at once, while the yielding weight H′ is carried toward but not into the friction-frame G and thus save a breakage of yarn and injury to the fabric, Figs. 1, 2, and 6.

In operation the yarn is passed alternately over a wire g and through an eye g', over the support E′, through an eye in the outer end of the take-up, and through a yarn-carrier, to be engaged by the needles, Figs. 1 and 2. It is readily seen that the yarn holds lever F in working order until it parts below friction-frame G, when, being drawn through said friction, the weight f on the lever F′ swings the upper end of lever F against the trip-wire F^3, which moves said wire out of line with the upper end of rod D′, Figs. 3 and 4, which permits the weighted end of lever D to fall, bringing pin d' against the belt B, carrying it from the driving-pulley B′ to the loose pulley B^2, which of course stops the machine. The trip-wire F^3 is in like manner moved away from its position of support by the take-up wire E, swinging upward, and backward when the yarn parts forward of the friction-frame G, as also by lever H when a knot lifts weight H′. It should be noted that the weight of lever D is aided by the friction of the belt against pin d' in shipping said belt to the loose pulley.

The construction of lever F here shown enables a very close and cheap adjustment to be made of the friction to be placed upon the yarn. It is plain that the nearer upright weight f is held the less the friction will be. It is plain also that as weight f leaves the perpendicular its effective action on trip-wire F^3 is increased, varying from zero when over the center to its entire weight when horizontal from the center. This enables a very slight friction to be given to the yarn and still have an effective weight to act in tripping the mechanism.

Trip-wire holder F^4 in normal holding position, Fig. 2, is a little past its "dead-point" as regards the pressure from trip-wire F^3 and rests against its support, the weight f^7 on arm f^6 holding it in such a position until overcome by lever F, take-up E, or lever H.

Attention is invited to the fact that trip-wire F^3 may be acted on, first, by lever H when weight H′ is lifted by a knot; second, by lever F, where the yarn parts before reaching the friction-frame G; third, by the take-up E when the break occurs after passing frame G. The construction here shown is designed to afford ample length of yarn to stop the machine without damage to the fabric.

Various changes can be made in the within-described mechanism without departing from the scope of my invention.

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

1. In a stop-motion for knitting-machines, the combination of a driving-shaft, a tight and loose pulley thereon, a driving-belt, a belt-shifting lever, provided with a draft pin or part, pivoted outside the horizontal plane of the driving-shaft so that the operating end thereof shall approach the loose pulley and draw the belt thereon, a trip-rod, and a tripping mechanism, whereby the weight of the lever and the friction of the belt acting on the draft-pin, when said lever is tripped, shall draw the belt from the driving to the loose pulley, and stop the machine substantially as described.

2. The combination of a shifting-lever pivoted above the plane of the driving-shaft adapted to engage a driving-belt, and held in position by a tripping mechanism, a driving-shaft, provided with a tight and loose pulley, a driving-belt, and a tripping mechanism, whereby the belt is drawn from the tight to the loose pulley, by the weight of the lever moving in the arc of a circle, when said lever is tripped substantially as specified.

3. The combination of a friction device for the yarn, consisting of an oil-saturated wick, metal bars, and a trip-lever engaging the yarn between said friction-bars, said trip-lever held in place by the yarn until said yarn is broken, a trip-wire adapted to hold the belt-shifting lever until tripped, a swinging trip-wire holder, and a take-up wire, adapted to stop the machine when any one of the yarns breaks, substantially as set forth.

4. The combination of an oil-cup and oil-saturated wick, metal cross-bars, a trip-lever engaging the yarn between the bars and held by the tightness of the yarn, a trip-wire, a trip-rod and a belt-shifting mechanism, whereby the breaking of the yarn shall start the belt-shifter into operation, and stop the machine, substantially as specified.

5. The combination of friction-bars, a trip-lever engaging the yarn between said bars and held by the tightness of the yarn, a trip-wire, a trip-rod, and a belt-shifting mechanism, whereby the breaking of the yarn shall start the belt-shifter in operation, and stop the machine, substantially as described.

6. The combination of a trip-lever, adapted to engage and be held in place by the unbroken yarn, a trip-wire, a trip-rod, a swinging trip-wire holder, pivoted outside the line of pressure on said trip-wire, and a belt-shifting mechanism, whereby the breaking of the yarn shall start the belt-shifter in operation, and stop the machine, substantially as set forth.

7. The combination of a friction device to engage the yarn between the take-up, and the

bobbin, a shifting-lever, a trip-wire, a trip-rod, adapted to hold the shifting-lever, a swinging trip-wire holder, pivoted outside the line of pressure on said trip-wire, and a take-up wire, whereby the breaking of the yarn shall permit the take-up to move the trip-wire outside the line of its holding position, and start the shifting-lever in operation, substantially as set forth.

8. The combination of a shifting-lever, a trip-wire, a trip-rod adapted to hold the same in working position and to cause the machine to stop when tripped, a yarn friction mechanism, a counterbalanced lever pivoted in reach of the trip-wire and adapted to trip the same by the resistance of the yarn and to pay it to the machine without breaking, substantially as set forth.

9. The combination of a shifting-lever, a trip-wire, a trip-rod adapted to hold the same in position and to cause the machine to stop when tripped, a counterbalanced lever pivoted in reach of the trip-wire and adapted to trip the same by the resistance of the yarn, to yield the yarn to the needles and to stop the machine without breaking the yarn, substantially as specified.

10. The combination of a knot-arresting part yieldingly held in the line of the yarn's travel from the bobbin to the knitting-needles, a counterbalanced lever connected to the knot-arresting part, and a tripping mechanism supported within reach of the counterbalanced lever, and adapted to be operated thereby, operating to stop the machine when a knot engages and moves the knot-arresting part and to feed yarn to the machine without breaking it, substantially as specified.

WILLIAM WORTH BURSON.

Witnesses:
W. T. LATHROP,
H. D. EASTMAN.