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J. H. KNOWLES.

Stop-Motion for Spinning or Twisting Machines.

No. 209,694. Patented Nov. 5, 1878.

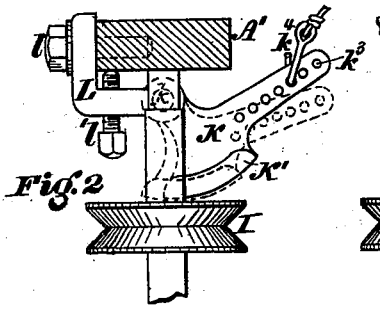

Fig. 2

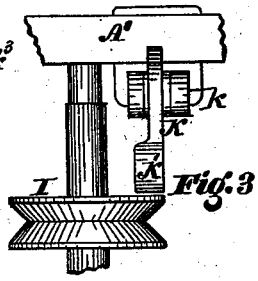

Fig. 3

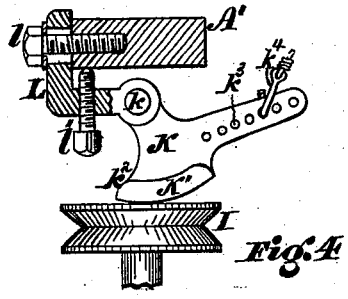

Fig. 4

Fig. 1

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Fig. 5

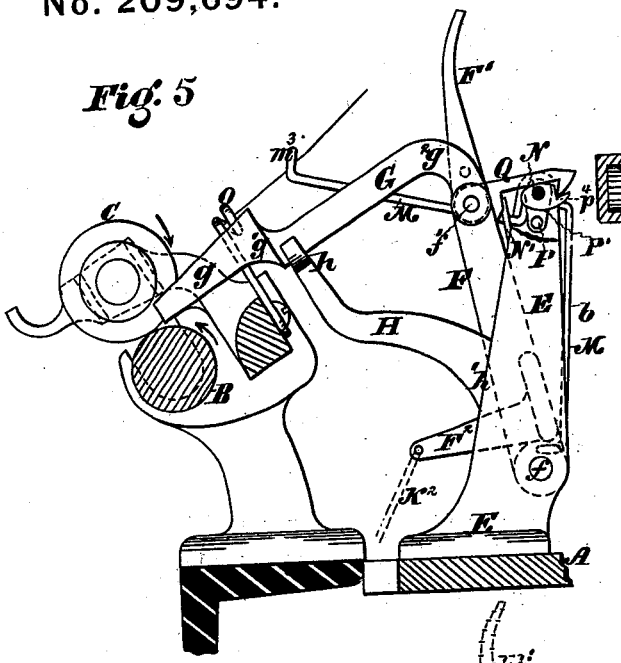


Fig. 7.

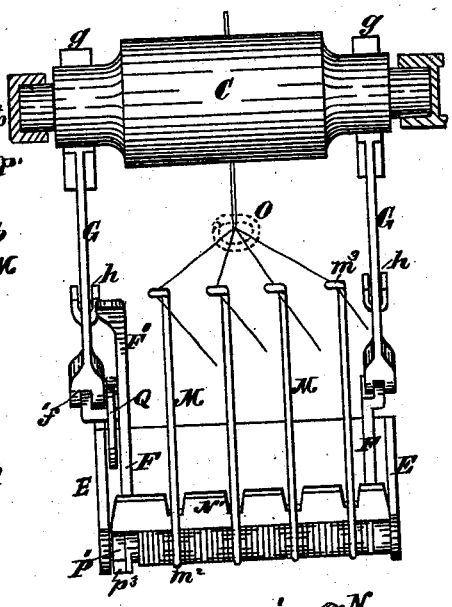
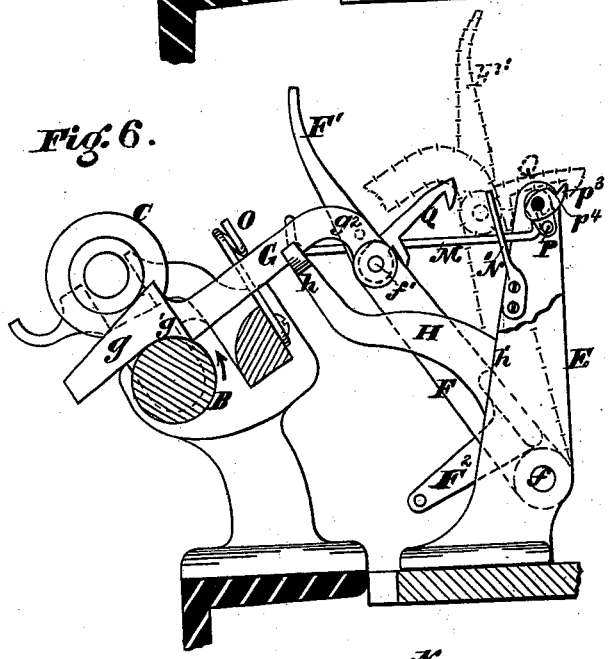


Fig. 6.



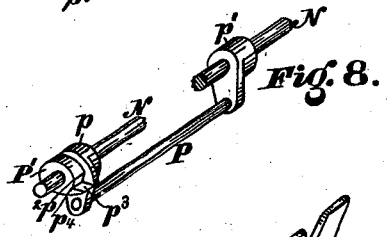


Fig. 8.

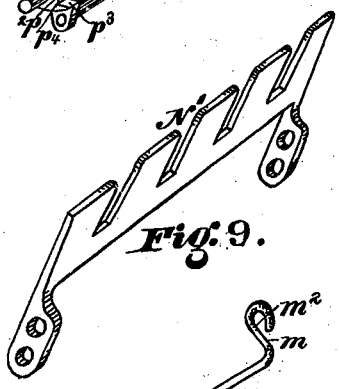


Fig. 9.

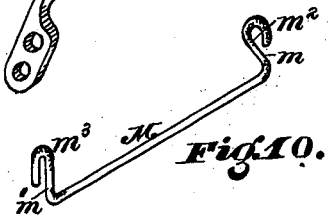


Fig. 10.

Fig. 11.

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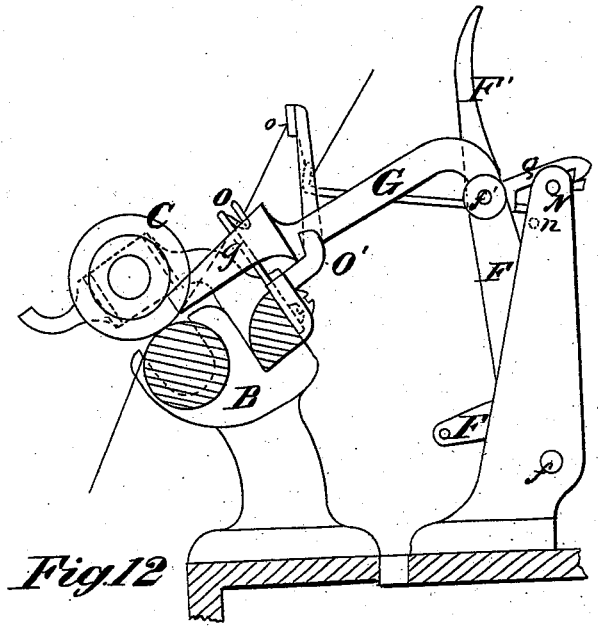

Fig. 12

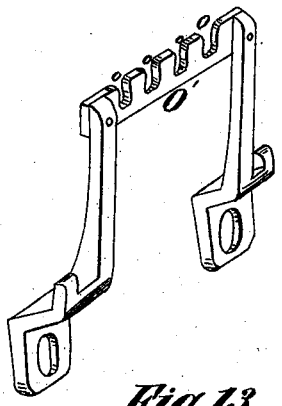

Fig. 13

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UNITED STATES PATENT OFFICE.

JOHN H. KNOWLES, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN STOP-MOTIONS FOR SPINNING OR TWISTING MACHINES.

Specification forming part of Letters Patent No. **209,694**, dated November 5, 1878; application filed April 13, 1878.

To all whom it may concern:

Be it known that I, JOHN HENRY KNOWLES, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Stop-Motions for Spinning or Twisting 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a transverse vertical view of a twisting-machine with my improvements applied thereto. Fig. 2 is a detail side elevation of the whirl and bracket L and lever K. Fig. 3 is a rear end view of the same. Fig. 4 is a partly-sectional view of the same. Figs. 5 and 6 are detail vertical part sections of the dropping mechanisms which raise the upper drawing-roll and lower the lever K to stop the spindle. Fig. 7 is a plan view of the same. Figs. 8, 9, 10, and 11 are detail views. Figs. 12 and 13 are detail views showing a modification of the notched plate or bar for supporting the rods M.

My invention has relation to spinning and twisting machines, and has for its object to provide means for stopping the drawing or feeding rolls, and the fly or twisting-spindles when a thread or yarn being spun or twisted breaks.

The first part of my improvements relates to means for stopping the feeding of the thread; and consists, generally, in the novel construction and combination of devices so arranged and operated that when a thread breaks the top drawing or feeding roll will be elevated, and a cessation of feed thereby produced.

The second part of my improvements relates to means for stopping the fly or twisting-spindle; and consists, generally, in the novel combination of devices including a friction-brake, which, when a thread or yarn breaks, will fall by gravity onto a whirl or disk on the spindle and be, by the drawing action of said whirl, so drawn in and wedged between the latter and its own pivotal support, or other rigid bar or brace, as to stop the spindle.

My improvements further consist in certain details of construction hereinafter more fully set forth.

Referring to the accompanying drawings, A designates a spinning-frame, B and C the top and bottom drawing or feeding rolls, and D the fly or twisting-spindles. E represents a stand, consisting of a U-shaped casting, secured on the frame A, there being a stand of this character for each one of the spindles D. F F are levers pivoted at f f in said stand, their opposite extremities being pivoted at f' f' to bars G G, which have wedge-shaped or taper ends g g, formed with shoulders g^1 g^1. Said taper bars G are curved at g^2, near their junction with the levers F, and rest in the bifurcated ends h h of arms H H, which are secured at h' h' to the side standards of the stand E. Said bars are arranged relatively to the drawing or feeding rolls B C, so that when moved forward sufficiently to come into the bite of said rolls, or present their diminished ends or points thereto, they will be drawn in between said rolls until the shoulders g^1 g^1 meet the lower roll, B, the effect being that the top roll, C, is raised and the drawing or feeding of the yarn or thread stopped. The circumstance under which said taper bars will be thus presented to and drawn in between said rolls will be described farther on.

I represents the whirl or pulley on the fly or twisting-spindle D. K is a lever, swiveled at k in a bracket, L, which said bracket is secured to the bolster-rail A′ by a bolt, l, and made vertically adjustable by means of a set-screw, l'. Said lever K has a segmental face, K^1, described from a center different from k, so that the distance between k and the end k^2 of said segment will be less than the distance from k to any other point of said segment. The proportions of said segment with reference to the distance between the pivot k and the upper side of the whirl I are so regulated that when the lever K swings downwardly the point k^2 will not come in contact or will just barely touch said upper side of the whirl, the farther downward swinging of said lever bringing the center or middle of the segment in contact with the upper side of said whirl, so as to cause said lever to be drawn in and wedged between the pivot k and said whirl. The conditions which will produce this depres-

sion of the lever, its frictional contact with and drawing in by the whirl, so as to wedge between the latter and the pivot *k*, thereby stopping the spindle D, will be explained later on in this specification.

M M are thread-rods, of which any desired number may be employed in each of the stands E. Each of these rods is bent at either end, forming short bends m m^1, respectively, and these bends are again curved or bent to form eyes m^2 and hooks m^3.

A rod, N, connects the upper ends of the sides of the stand E, and upon this the rods M are loosely swung, said rod N passing through the eyes m^2. The threads to be wound upon the spindles D pass through the hooks m^3, holding the rods M elevated, and thence through a guide, O, to the rolls B C.

P is a rod parallel with the rod N and swung upon the latter, its ends p p^1 having eyes or openings for the passage of said rod N. The rod P may be swung to and fro beneath the rod N, the extent of its movement being limited by stops e^1 e^2 on one of the sides of the stand E, Fig. 11.

P′ is a ratchet or detent of peculiar form, made fast to or integral with the end or head p. This ratchet has a shoulder, p^2, cut down to a line below the center of the rod N, and a tooth, p^3.

Q is a latch pivoted to one of the levers F, and arranged to engage with the ratchet P′, as hereinafter set forth. F^1 is a handle fast on one of the levers F, and N′ is a notched plate secured to and extending between the arms of the stand E E, its object being to prevent the thread-rods M from descending too far under circumstances hereinafter to be referred to.

The operation is substantially as follows: The threads to be wound on the spindles D proceeding from spools or bobbins 1 2 3, &c., pass beneath the hooks m^3, thence through a guide, O, to the rolls B C, and from the latter to said spindles D. When the spinning or twisting operation is proceeding the several parts described occupy the relative positions shown in Figs. 1 and 5, the thread-rod M being held up, as shown, by the tension of the threads, the rolls B and C being in frictional contact, the taper bars G held back from said rolls by the engagement of the latch Q with the ratchet P′, and the lever K out of contact with the whirl I by means of a wire or cord, K^2, having a hook, k^4, which enters one of a series of adjusting-holes, k^3, in said lever, the other end of said wire or cord being fastened to a rigid arm, F^2, projecting from one of the levers F. As long as the spinning proceeds without one of the threads breaking or running out the positions of these several parts will remain unchanged. When, however, a thread breaks, the rod M, which it sustained by its tension, falls, swinging downward on the rod N. In falling the shoulder m meets the rod P, pushing it back and causing the ratchet P′ to be turned so far that the lower part or line of the shoulder p^2 will come above the center of the rod N. This causes the latch Q to be thrown off the ratchet P′, or to loose its engagement with the shoulder p^2, so that the levers F F are permitted to fall, as their gravity impels them, toward the rolls B C. The thin ends of the taper bars G are thus presented to said rolls, which latter draw said bars between them until the shoulder g^1 meets the roll B, at which time the roll C is elevated out of contact with the said lower roll, the feeding of the thread being thereby stopped. The forward motion of the lever F depresses the outer end of the arm F^2, thereby permitting the lever K to fall until its segmental face comes into contact with the top side of the whirl. The mere frictional contact or gravity of said lever K would have but slight effect upon the whirl were it not that such contact causes the whirl to draw in said lever and wedge it, as already described, such wedging action having the effect of speedily stopping the spindle. To nicely adjust the stopping of the spindle with reference to the elevation of the top roll, C, adjusting-holes k^3 or other appropriate means of adjustment may be provided.

The falling of a rod, M, which was supported by the thread before the latter broke, and the described motions of the taper bars G and lever K have no effect upon the remaining rods M, which are held up by the unbroken thread, so that when said broken thread is repaired, and the feed-rollers and spindle are again set in operation, work may be proceeded with. To resume work after repairing a broken thread the handle F^1 is taken hold of and the levers F F pushed toward the stand E, the latch Q being caused to engage, as before, with the detent P′, the point of said latch passing down over the shoulder p^2 to the angle p^4 below the center of shaft N. This withdraws the taper bars G from between the rollers B C and lifts the segmental face of the lever K from contact with the upper side of the whirl I, whereupon the action of said rollers and of the spindle D is resumed.

Should all the bobbins of the creel which feeds the spindle D be run out at the same time, it would be desirable to permit said spindle to rotate freely, so as to avoid the friction and heat consequent upon the rubbing of the driving-bands on a stationary whirl. The running out of the bobbins having caused the rods M to drop, the detent P′ becomes turned, so that if the levers F be moved back without lifting said rods the latch Q will automatically engage with the tooth p^3, as shown in dotted lines in Fig. 6. Hence, when this engagement takes place, though the rods M are then lowered and resting on the bar N′, the spindle D is free to rotate, and no movement of said rods M will then affect the rotation of the spindle to stop it or will cause the taper bars G to be presented to the bite of the rolls B C.

When for any cause it is desirable to use less than the whole number of thread-rods in a stand, the rod or rods not in use may be

swung over to the back of the stand, as shown at *b* in Fig. 5. In this position the rod M will not come in contact with the rod N, its bend *m* throwing it out of contact, and hence the rolls B C and spindle D are not stopped thereby.

The slotted or notched bar or plate N′ not only supports the thread-rods M, so as to prevent said rods from falling too far when threads break, but also prevents said rods from being drawn into interference with each other by reason of the convergence of said threads in the guide O. As a substitute for the notched bar or plate N′ the device O′, consisting of a corrugated bar, may be employed, the threads resting separately in the corrugations *o*, whereby they are prevented from converging or drawing their rods M toward each other. When this thread-guide is employed a plain rod or bar, *n*, as shown in Fig. 12, which need not be slotted or notched for the reception of the rods M, may be used in lieu of the slotted plate.

What I claim as my invention is—

1. In combination with the lever F, latch Q, and shaft N, the ratchet or detent P′, having a shoulder, p^2, cut to a point or line below the center of said shaft, substantially as described, whereby, when the point of the latch is below the center of the shaft, said latch will be retained in such position, but when the detent is slightly oscillated said shoulder will raise the point of the latch above the center of the shaft, as described, so that the pulling of the latch will further oscillate the detent until latch and detent are disengaged, as set forth.

2. The combination of stand E, levers F, latch Q, rod N, thread-rods M, and detent P′, having a shoulder, p^2, and tooth p^3, substantially as described, for the purpose of holding back said levers when the thread-bars have fallen and the levers are retracted, as set forth.

3. The thread-rods M, having hooks and eyes at their opposite ends and bends to avoid contact with the rod P, when swung back and out of use, in combination with said rod P and their supporting-rod N, as shown and described.

4. The combination of taper bars G, levers F and K, whirl I, latch Q, detent P′, and appurtenant mechanism, substantially as described, completing connection between said taper bars and levers, whereby a slight movement of the detent will effect a disengagement of latch and detent and allow the levers to fall by their own gravity, as and for the purpose set forth.

5. The lever K, having segmental face, as described, in combination with the whirl or disk I, the spindle D, bracket L, bolster-rail A′, and connecting and operating mechanism, arranged substantially as described, so that after frictional contact of the face of the lever with the whirl or disk the motion of said whirl or disk shall cause the lever to wedge and stop the spindle, as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 12th day of April, 1878.

JOHN HENRY KNOWLES.

Witnesses:

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CHAS. F. VAN HORN.