(No Model.)

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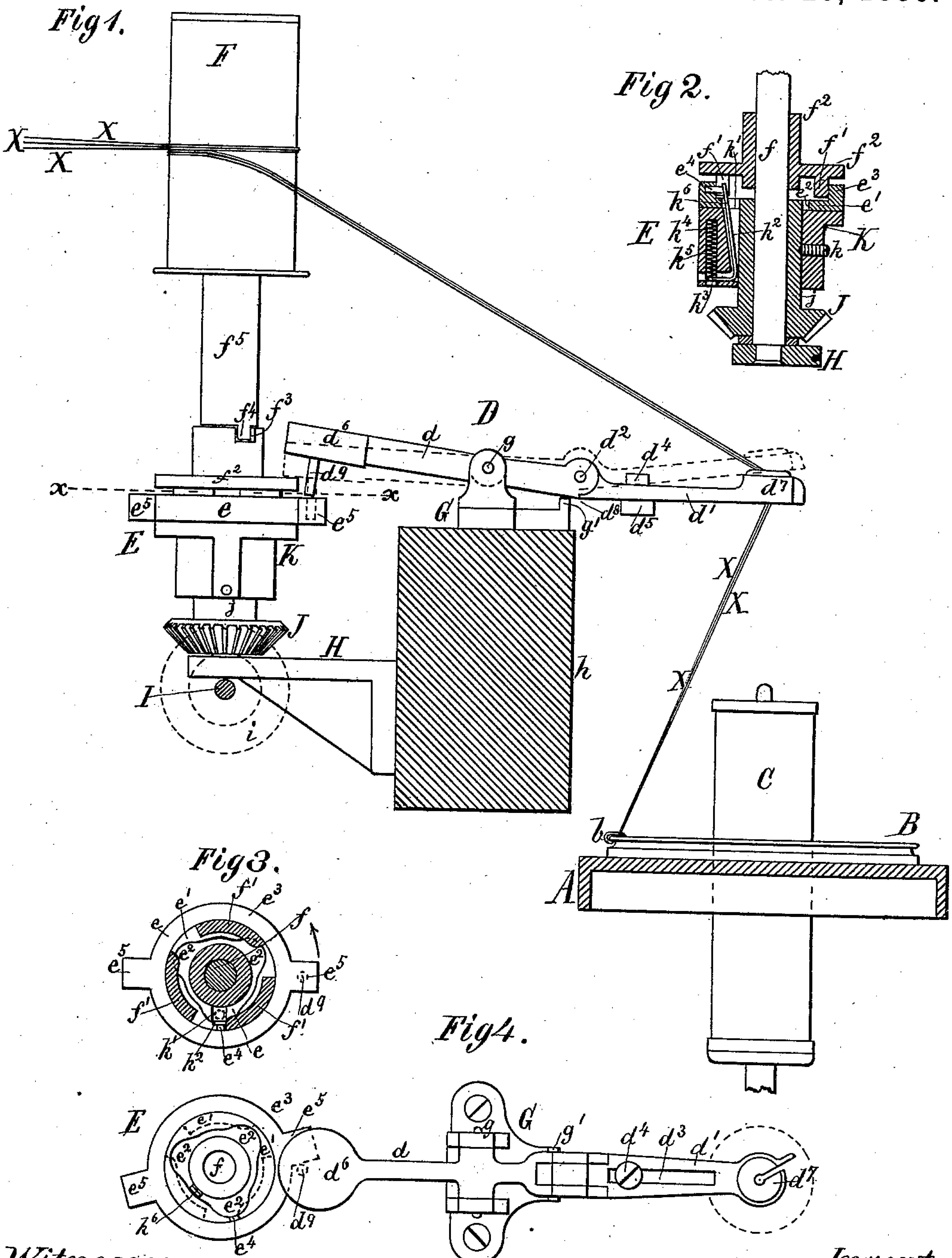
STOP MOTION MECHANISM FOR TWISTING MACHINES.

No. 351,659. Patented Oct. 26, 1886.



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STOP-MOTION MECHANISM FOR TWISTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 351,659, dated October 26, 1886.

Application filed June 7, 1886. Serial No. 204,334. (No model.)

To all whom it may concern:

Be it known that I, EDWIN F. SHAW, a citizen of the United States, residing at Bridesburg, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Stop-Motion Mechanism for 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 appertains to make and use the same.

My invention consists in certain constructions and combinations of parts, as will be hereinafter described and specifically claimed, whereby an improved self-adjusting coupling for the feed-roller of a ring-frame or twisting-machine is produced, the same causing the feed-roller to be stopped when the feed-yarn is broken, and set in motion again when the feed-yarn is reunited with the twisting mechanism.

In the accompanying drawings, Figure 1 is a view of my invention in elevation, and of a supporting-bar, a ring-rail, and a driving-shaft in section. Fig. 2 is a vertical central section of the lower portion of the feed-roller-operating and automatic coupling and uncoupling mechanism, the stationary arbor being shown in elevation. Fig. 3 is a horizontal section in the line *x x* of Fig. 1. Fig. 4 is a top view of the stationary arbor, coupling-ring, spring-actuated pawl and its head and thread-guiding lever, the feed-roller and its coupling-collar being removed.

A in the drawings represents a ring-rail in section; B, a ring; C, a spool; D, a yarn-guide, E, a feed-roller-coupling device, and F a feed-roller.

The ring-rail, spool, and ring are of ordinary construction, and are parts of an ordinary twisting-machine, the ring-rail A having a suitable vertically-oscillating motion. The rings B, which are suitably fastened to the ring-rail A, are provided with ordinary travelers, *b*, through which the yarns X X X pass on their way to the spool C. The yarn-guiding and motion-arresting device (designated by the letter D) guides the yarns centrally toward the twisting mechanism below, and when the yarn breaks causes the feed-roller to stop. This device consists of an arm, *d*, weighted at d^6, and suitably pivoted at *g* to a fulcrum-stand, G, and of an auxiliary arm, *d'*, pivoted at d^2 to arm *d*. The auxiliary arm *d'* is provided with a longitudinal slot, d^3, through which a set-screw, d^4, of a balance-weight, d^5, is passed, and in which said set-screw can be moved in order to more or less counterbalance the heavy end d^6 of the arm *d* which is adjacent to the feed mechanism. The end of the arm *d'* is formed into a slotted head, d^7, and through this latter the yarns X X X are guided after leaving the feed-roller F. The pivoted portions of the arms *d* and *d'* are provided with abutting steps d^8, which permit the arm *d'* to be swung upward from, but not below, its normal horizontal position. The fulcrum-stand G is provided with a projection, *g'*, upon which the end having the arm *d'* pivoted to it, rests, and is thus kept in its normal position. The weighted end portion d^6 of the arm *d* is provided with a pin, d^9, which stands in a position to be thrown into range with lugs e^5 of the coupling mechanism, and thus serves for operating said coupling mechanism, as will be hereinafter described.

The feed and coupling mechanism revolves around a stationary vertical arbor, *f*, which is fastened to a bracket, H, on the upper front bar, *h*, of the frame of the machine.

A horizontal shaft, I, (shown in section in Fig. 1,) is the driving-shaft of a number of feeders arranged in a row opposite their respective spools, which are provided with bevel-wheels J, similar to the one shown in Fig. 1, while the shaft I is provided with similar bevel-wheels, as illustrated by dotted lines at *i*, which gear into the wheels J. Each wheel J is provided with an elongated hub, *j*, to which a pawl-head, K, is fitted and adjusted vertically by means of a set-screw, *k*, as shown in Fig. 2. The pawl-head K is provided with an angular mortise, *k'*, and an angular flat yielding bar or pawl, k^2, the latter being fitted loosely into said mortise, so as to freely move therein, as will be presently described. Above the horizontal foot k^3 of the pawl k^2 a vertical socket, k^4, is provided in the pawl-head K, and into this socket a spring, k^5, is inserted, which bears upon the foot k^3 of the pawl, and thus keeps the upper portion, k^6, of the pawl at its greatest distance from the center of the arbor *f*.

Upon the pawl-head K a coupling-ring, *e*, is placed, which comprises a flange, e', with inner cam formations, e^2, an upper concentric rim, e^3, a lug or pin, e^4, and a number of outer lugs, e^5. The lug or pin e^4 is above the plane of the flange e', just at the outer vertex or extremity of one of its cam formations e^2. The coupling-ring *e* is held in a position concentric to the arbor *f* by means of a number of concentric lugs, f', formed on a loose collar, f^2, of the arbor *f*, which lugs fit loosely into the rim e^3. The spaces between said lugs are in turn occupied by the upper end portion of the pawl k^2, and they are large enough to extend from the outer extremity of the cam formation to its inner extremity, or, in other words, from its longest to its shortest central distance. When the pin e^4 is in contact with one of the end surfaces of one of the lugs f', the outermost portions of the cam formations e^2 occupy central positions with respect to the end surfaces of the lugs f', thus exposing fully the said end surfaces, and allowing the pawl k^2 to bear against one of them and propel it and the collar f^2. When the motion of the ring *e* is arrested, the pawl k^2 moves ahead, propelling the collar f^2 by means of a lug, f', and glides along the stationary surface of the cam formation e^2, toward the innermost portion of it, and is thereby gradually moved out of range of the lugs f' into a continuous passage between the cam formations and the upright arbor, and owing to this the collar f^2 and feed-roller F cease to move. The pawl k^2 continues to revolve around, gliding along the cam formations e^2 without remaining in any one of the spaces between the lugs, and without impinging on the end surfaces of said lugs f', and during this operation the lug f', at the opposite end of the space occupied by the pin e^4, approaches the said pin, the coupling-ring *e* standing at rest and the collar f^2 moving with the feed-roller by reason of the withdrawing pawl impinging upon the end surface of the lug f' until the pin e^4 has come in contact with the rear end of lug f', as shown in Fig. 3, and thus all chance for an accidental start of the collar f^2, while the yarn remains in its broken condition, is avoided until the yarn is reunited. The upper part of the collar f^2 is notched, as at f^3, into which notches corresponding lugs, f^4, of the lower shank, f^5, of the feed-roller F are fitted, as shown in Fig. 1, and whereby the motion of the collar is communicated to the feed-roller. The feed-roller is made, by preference, of metal, and hollow in order to be less weighty, and is covered with roughened leather in order to create the requisite friction for unwinding the yarns from the feed-spools. The shank f^5 is loosely fitted to the arbor *f*, so that its weight is supported by the collar f^2, coupling and uncoupling ring *e*, and pawl-head K, and thus serves to keep said parts sufficiently close together without the use of more inconvenient and complicated connections.

While the twisting-machine is in operation the arm *d* is held down upon the projection g' through the tension of the yarns X X X, and the pin d^9 is held out of range of the lugs e^5 of the revolving coupling-ring *e*, as seen in Fig. 1, and the coupling-ring *e* is moved around by means of friction, while the collar f^2 is moved around by the pawl k^2 bearing against one of the lugs f', as seen in Fig. 3. If by accident one of the yarns X is broken, the tension at the head d^7 is diminished, and the weighted portion d^6 of the arm *d* swings down, thus moving the pin d^9 in range with lugs e^5. One of these lugs strikes the pin d^9, and the motion of the ring *e* is stopped thereby, while the pawl-head continues its revolving motion, carrying the pawl k^2 along the cam formations e^2 of the stationary ring *e*. The pawl being thus guided toward the center of the arbor *f*, is gradually moved out of range of the lugs f', and finally leaving this range and moving the lugs over the cam formations, moves on without moving the collar f^2, thus bringing the roller F to a stop. The operator of the machine thus warned, reunites the broken yarn, whereupon the now again increased tension upon the head d^7 causes the weighted end portion, d^6, to rise and move the pin d^9 out of the range of the lugs e^5. The ring *e* is now permitted to revolve, which it does, while the resistance of the yarn spools offered to their being unwound retards the motion of the collar f^2 and causes the lugs f' to be moved partly over the spaces between the cam formations e^2 and in range of the pawl k^2, whereupon the pawl will come in contact with one of the lugs f' and communicate its motion to the feed-roller F. While the feed-roller F and collar f^2 with its lugs f' are held stationary by the resisting yarn-strands, the ring *e* revolves with the pawl-head K, and the pin e^4 approaches one of the lugs f' ahead, and finally comes in contact with it, thus insuring a registering of the pawl k^2 with one of the spaces between the lugs f', giving the pawl k^2 time to fully enter such space between the lugs f', it being allowed by the shape of the cam formation to enter this space under the action of the spring, and at the same time the pawl is prevented from being carried too far over the lugs before the pawl-spring k^5 has had time to move the pawl fully between the lugs f'. If very thin yarns are to be twisted, their tension is diminished by moving the balance-weight d^5 forward toward the head d^7, and vice versa if thicker yarns are to be twisted.

It will be seen that I employ a stationary arbor, *f*, and connect the bevel-wheel J fast to the revolving pawl-head K, which carries the spring-actuated pawl; also, that the coupling-ring *e* is applied loosely around the shaft and rests upon the horizontal flange of the pawl-head, and also that the coupling-collar f^2 and the feed-roller F are fitted loosely upon the stationary arbor. By this construction of the parts the feed-roller, its collar f^2, and coupling-ring e will remain stationary whenever the pin d^9 interlocks with the lugs e^5 of the coupling and uncoupling ring e, which will occur whenever a yarn, X, breaks and allows the unbalanced yarn-guide D to assume the position shown by dotted lines in Fig. 1, and while the roller and the other parts named remain stationary the wheel J and pawl-head K are continuously revolved around the arbor, without any damage, until the broken yarn is reunited and the unbalanced yarn-guide is, by the strain upon the yarn, caused to reassume the position shown in full lines in Fig. 1, whereupon the feed-roller F, its collar f^2, and coupling and uncoupling ring e again revolve with the pawl-head K and bevel-wheel J around the stationary arbor f.

The weight of the feed-roller F and collar f^2 is sufficient to prevent the described parts from being accidentally lifted and put out of working-order. This renders the use of tension-springs, rigid collars, and the like unnecessary, and enables the operator to immediately remove and replace or exchange parts of the feed-motion whenever necessary. It is evident that by adopting a stationary upright arbor, f, I avoid the construction of extra bearings, as used for horizontal revolving shafts, thus reducing expense of construction, and I am enabled to use a loose and easily-removable driving-wheel, J, while with a revolving horizontal shaft the wheel must be fastened to the same, and is not easily and quickly removed or replaced. Another great advantage of my invention is this, that I use only one feed-roller, while in the old constructions pressing feed-rollers are employed in pairs, and must be kept in action by weights or springs, causing additional cost and rendering the machine unnecessarily heavy. Finally, the friction of the vertical feed-roller in my organization can be increased by winding the yarn twice, thrice, or more times around it, which can be done without breaking the yarns and while the machine is running, which is an operation impossible to perform on old constructions.

It will be understood that while the notches f^3 of the collar f^2, together with the lugs f^4 of the feed-roller, afford a convenient means for detaching the roller from the collar, and will preferably be adopted by me, I do not limit myself to making the collar separate from the roller, as the collar and roller can be constructed together without changing the construction of the coupling-collar where it engages with the pin of the coupling-ring and the pawl of the pawl-head.

What I claim is—

1. The combination of stationary arbor f, driving-wheel J, pawl-head K, having a yielding pawl, k^2, coupling-ring e, having cam-formations e^2 and lugs e^5, collar f^2, having lugs f' and notch f^3, feed-roller F, having lugs f^4, and unbalanced yarn-guide D, having guide-head d^7 and stopping-pin d^9, substantially as and for the purpose described.

2. The combination of the stationary arbor f, driving-wheel i, wheel J, provided with pawl-head K, having a mortise, k', and socket k^4, spiral spring k^5, pawl k^2, having a foot, k^3, coupling-ring e, having the cam formations e^2, pin e^4, and lug or lugs e^5, the collar f^2, having lugs f', the feed-roller F, and the yarn-guide D, having pin d^9, and pivoted at g, substantially as and for the purpose described.

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

EDWIN F. SHAW.

Witnesses:
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