

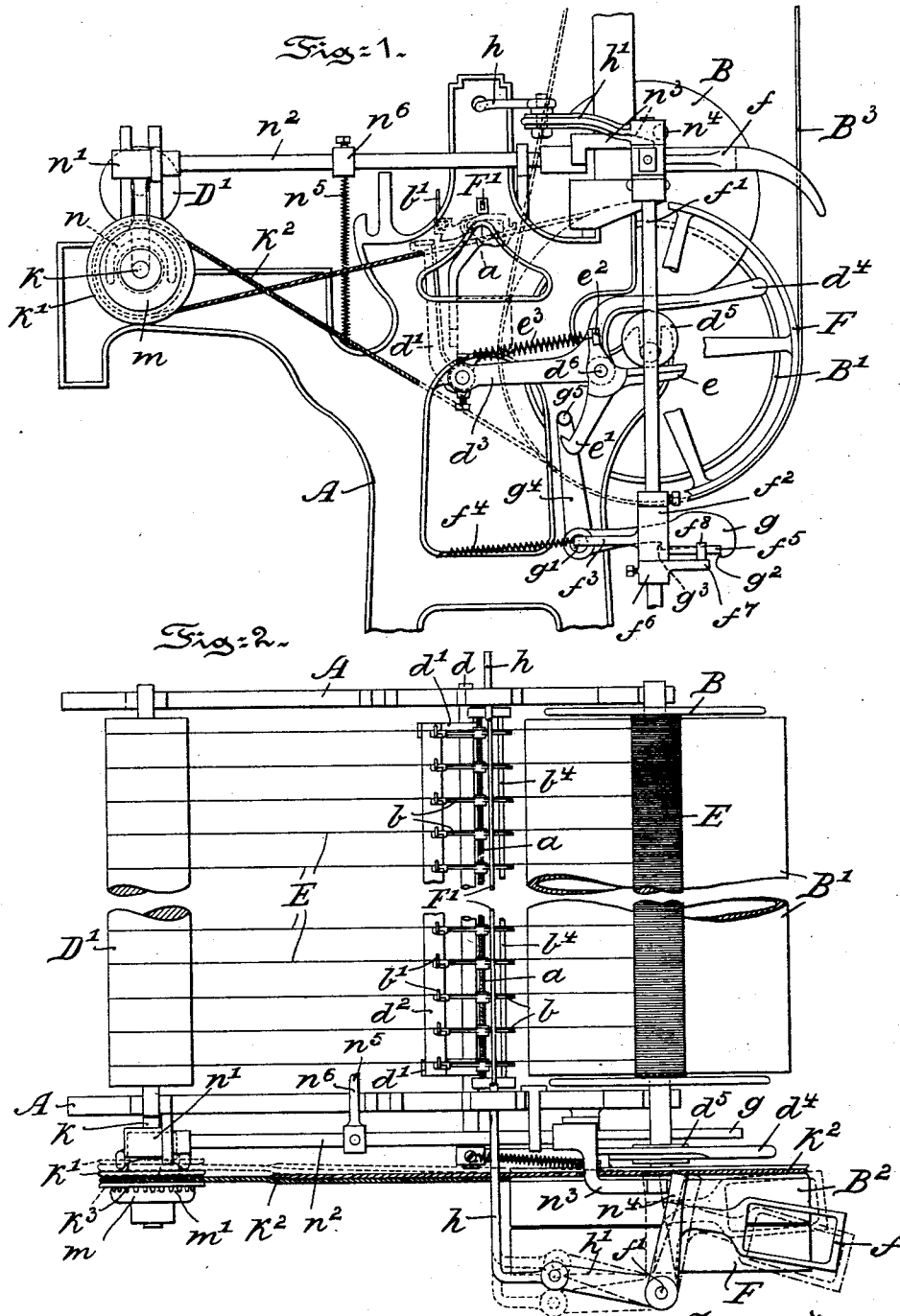
(No Model.)

3 Sheets—Sheet 1.

B. F. MEYER.
AUTOMATIC STOP MOTION.

No. 580,116.

Patented Apr. 6, 1897.



Witnesses:
Thomas M. Smith.
Richard C. Maxwell.

Inventor:
Benjamin F. Meyer,
By J. Walter Douglass
Attorney.

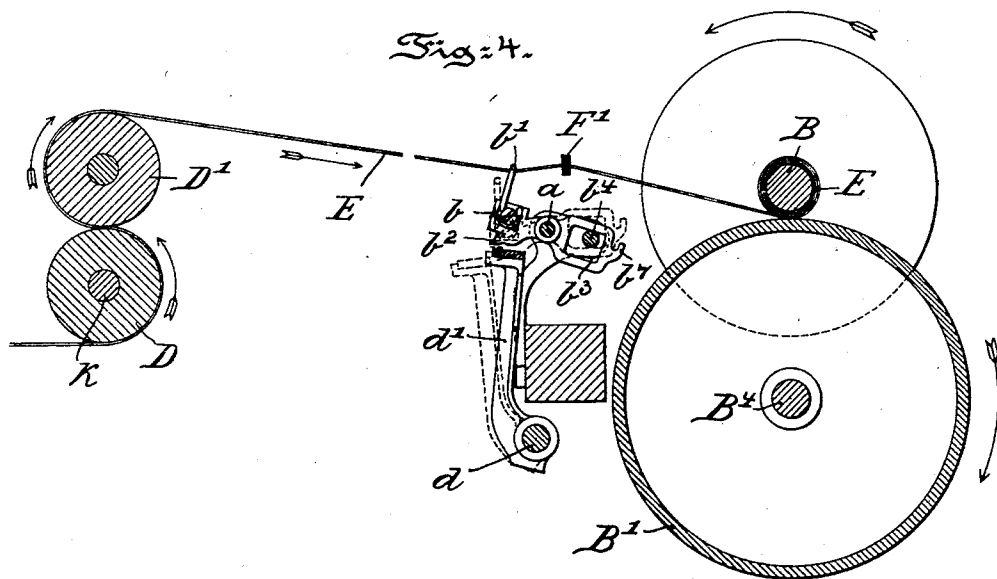
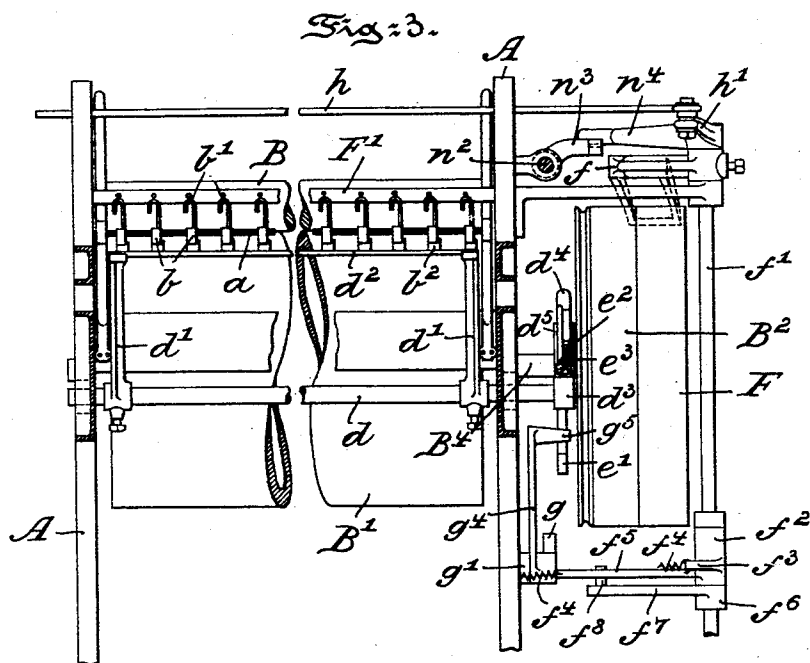
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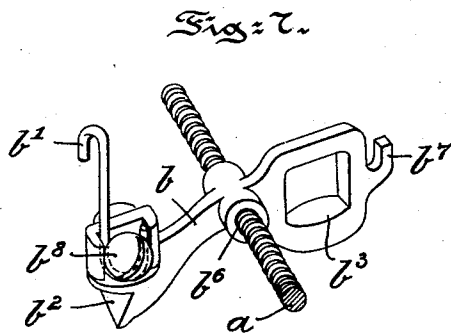
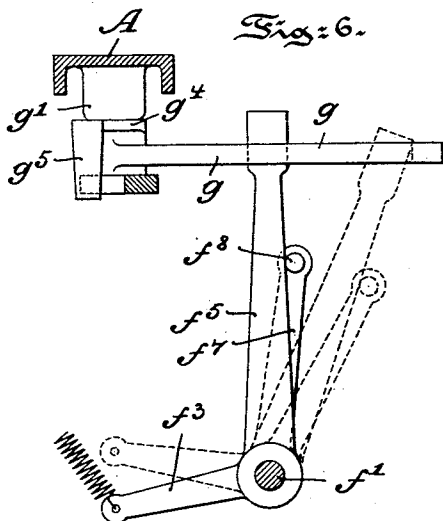
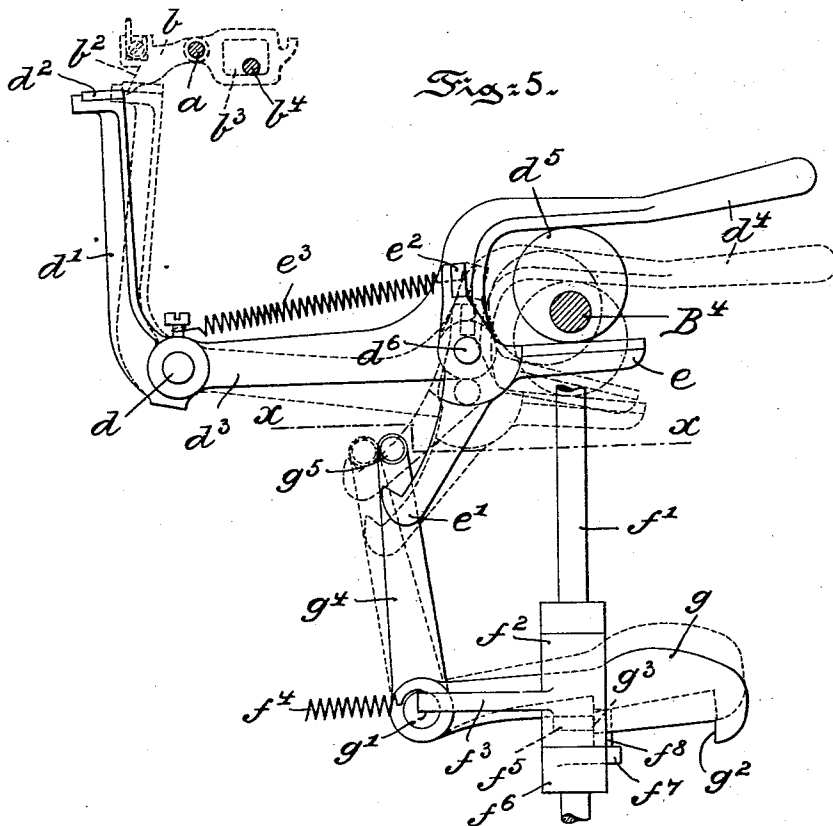
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3 Sheets—Sheet 3.

B. F. MEYER.
AUTOMATIC STOP MOTION.

No. 580,116.

Patented Apr. 6, 1897.



Witnesses:
Thomas M. Smith
Richard C. Maxwell.

Inventor:
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UNITED STATES PATENT OFFICE.

BENJAMIN F. MEYER, OF CAMDEN, NEW JERSEY, ASSIGNOR TO THE M. A. FURBUSH & SON MACHINE COMPANY, OF SAME PLACE.

AUTOMATIC STOP-MOTION.

SPECIFICATION forming part of Letters Patent No. 580,116, dated April 6, 1897.

Application filed October 15, 1896. Serial No. 608,923. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. MEYER, a citizen of the United States, residing at Camden, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Automatic Stop-Motions, of which the following is a specification.

My invention has relation to a stop-motion for spooling, spinning, doubling, winding, loom, or analogous textile machinery wherein the breaking of a thread shall automatically set in operation the stopping device, and in such connection it relates particularly to the construction and arrangement of such a stop-motion.

The principal objects of my invention are, first, to provide in a stop-motion two arms, a driving-shaft normally adapted to raise and lower said arms in unison, means controlled by the breaking of a thread manipulated by the machine to which the motion is attached whereby the movement of one of said arms is arrested and the other arm is operated independently by the driving-shaft, and mechanism operated by the independent movement of said arm whereby the machine is stopped; second, to provide in a stop-motion a driving-pulley, a loose pulley, a driving-belt, a belt-shifter, a shaft adapted to operate said belt-shifter, a spring-controlled sleeve loosely mounted on said shaft, an arm secured to the belt-shifter shaft, a catch adapted to lock the sleeve against the tension of its spring, means controlled by the breaking of a thread manipulated by the machine whereby the catch is operated to release the sleeve, and means for transferring the motion of the released sleeve to the belt-shifter shaft and to thereby operate the belt-shifter and stop the machine; third, to provide in a stop-motion a driving-pulley, a loose pulley, a belt adapted to drive the driving-pulley, a belt-shifter, a tension or feed roll, and means controlled by the belt-shifter whereby the tension-roll is brought into positive connection with the driving-pulley and driven thereby during the movement of the belt from the driving to the loose pulley, and, fourth, to provide in a stop-motion a latch suspended from a thread manipulated by the machine, a rocking arm adapted to be arrested in its

movement by the dropping of the latch, a belt-shifter, mechanism controlled by the rocking arm whereby the shifter is operated upon the stoppage of the rocking arm, feeding or tension mechanism for the thread, and mechanism controlled by the belt-shifter whereby when the belt-shifter is operated to stop the machine the feeding or tension mechanism is first positively driven and then arrested.

My invention, stated in general terms, consists of a stop-motion for textile machinery constructed and arranged in substantially the manner hereinafter described and claimed.

The nature and scope of my invention will be more fully understood from the following description taken in connection with the accompanying drawings, forming part hereof, and in which—

Figure 1 is a side elevational view of a spooling-machine, and in connection with which is shown a stop-motion embodying main features of my invention. Fig. 2 is a top or plan view of Fig. 1. Fig. 3 is a rear end elevation of Fig. 1, certain portions being removed to more clearly illustrate the construction and arrangement of the rocking arms, the mechanism for operating the same, and the latches suspended from the threads manipulated by the machine. Fig. 4 is an enlarged diagrammatic view illustrating in side elevation and vertical section the latch, a rocking arm, the spooling mechanism, the thread, and the feeding mechanism for the thread. Fig. 5 is an enlarged side elevational view illustrating the construction and relative arrangement of the latch, the rocking arm, the mechanism for operating the arm, and the belt-shifting mechanism controlled by the arm. Fig. 6 is a horizontal section taken on the line *xx* of Fig. 5, and Fig. 7 is an enlarged perspective view of the latch and its supporting-shaft detached from the machine and illustrating a preferred method of securing the latch on its shaft.

My present invention is adapted for use in textile machines wherein the breaking of a thread or a series of threads manipulated by the machine is adapted to automatically stop the machine, and although I have illustrated in the drawings the stop-motion embodying my invention as adapted for use in what is

known as a "spooler" or "spooling-machine" it is to be understood that I do not limit myself to the application of my device to such a machine, since the device can, with such
 5 change or modification as will readily suggest itself to the skilled mechanic, be readily applied to spinning, doubling, winding, and loom machines, or, in fact, any textile machine wherein upon the breaking of a manipulated
 10 thread it is desirous to automatically stop the machine.

Referring now to the drawings, A represents the framework of a spooling-machine, in which is supported at one end the spool B and the spooling-drum B', driven by the pulley B² and belt B³. At the other end of the machine and in the frame the two tension-rolls D and D' are supported, and over these tension-rolls the threads E to be spooled are
 15 passed, as shown diagrammatically in Fig. 4. As all of these parts are old and their operation well known, further detailed description is not deemed necessary. The threads E are passed or guided through a reed F', which is
 20 longitudinally movable back and forth across the machine to properly wind each thread upon the spool B in the usual and well-known manner.

Secured in the frame A of the machine parallel with and below the reed F' is a fixed shaft or rod *a*, upon which is loosely supported a series of latches *b*, corresponding in number to the number of threads E, and each latch is provided at one end with a hook *b*¹, by means
 30 of which the latch is hung upon a thread E, as clearly shown in Fig. 4. The hook end of the latch *b* is also provided with a projection or shoulder *b*², and the other end of the latch is cut out or recessed, as at *b*³. Through the
 35 recesses of the latches is passed a rod *b*⁴, serving as a stop to limit the movement of the latches upon the shaft *a*. The hook end of the latch *b* is weighted, so as to be heavier than the recessed end, the object being to permit
 40 the latch normally to be depressed at its hook end.

The latch is held with its hook end elevated by means of the thread E, but should the thread break the weighted hook end carrying
 45 the shoulder *b*² will immediately drop by gravity. Below the supporting-shaft *a* and parallel therewith is placed a rocking shaft *d*, rocking in suitable bearings in the frame A of the machine. To this rocking shaft *d* is
 50 secured at either side of the machine a vertically-disposed rocking arm *d'*, the two arms *d'* being connected at their upper free ends by means of a cross-bar *d*². As the arms *d'* are rocked by the shaft *d*, as hereinafter described, this cross-bar *d*² oscillates in a path
 55 directly below the elevated hook end of the latches *b*, and particularly below the shoulder *b*² thereof. When, however, the hook end of one or more of said latches drops by gravity,
 60 the shoulder or shoulders *b*² thereof will drop into the path of the oscillating cross-bar *d*², and thereby prevent its further oscillation.

To one end of the rock-shaft *d* is keyed or otherwise secured a lever-arm *d*³, arranged in substantially a horizontal plane and having
 70 the substantially right-angled free end *d*⁴, which rests upon an eccentric or cam *d*⁵, carried by the shaft B⁴ of the driving-pulley B² of the spooling-drum B'.

It will be readily understood that the rotation of the eccentric or cam *d*⁵ will ordinarily serve to raise and lower the lever-arm *d*³, which movement is transferred to the shaft
 80 *d*, which is thereby rocked or oscillated in its bearings in the frame A of the machine.

At the point *d*⁶, where the right-angled end *d*⁴ joins the substantially horizontal portion of the lever-arm *d*³, an angle-lever *e* is pivoted, one end of the lever *e* resting against the under surface of the eccentric *d*⁵. The other end of
 85 the lever *e* is preferably hooked, as at *e*¹. The angle of the lever *e*, which is the point *d*⁶ at which the lever is pivoted to the lever-arm *d*³, carries a projection or pin *e*², to which is secured one end of a spring *e*³, the other end of
 90 the spring being secured in the frame A of the machine. This spring *e*³ serves to normally keep the lever *e* pressed against the under surface of the eccentric or cam *d*⁵. As thus constructed it will be readily understood that ordinarily the lever-arm *d*³ and angle-lever *e* will
 95 be raised and lowered in unison by means of the cam or eccentric *d*⁵, the relationship between the lever-arm *d*³ and angle-lever *e* being maintained constant, so that neither moves
 100 with respect to the other. When, however, the cross-bar *d*² and the rock-arms *d'* cease to oscillate by reason of the shoulder *b*² of a latch dropping in the path of the cross-bar *d*², the lever-arm *d*³ will be prevented from raising or
 105 lowering, and this arrest in movement will cause the cam or eccentric *d*⁵ to act only upon the angle-lever *e*. This angle-lever *e* will then be depressed against the tension of the spring *e*³, and its hook *e*¹ will be thrown upward and
 110 toward the rear end of the machine. This movement of the hook *e*¹ is transferred to a belt-shifter *f* through the following preferred mechanism:

The belt-shifter *f* is keyed or otherwise secured to the upper end of a vertically-disposed shaft *f*¹, adapted to rock in suitable bearings
 115 in the frame A of the machine. At the lower end of this shaft *f*¹ is loosely secured a sleeve *f*², having a pin or projection *f*³, to which is secured one end of a spring *f*⁴, the other end
 120 of the spring being fixed in the frame A of the machine. This spring *f*⁴ tends to normally turn the sleeve *f*² on the shaft *f*¹. The sleeve *f*² is also provided with a projection or
 125 arm *f*⁵ at approximately right angles to the projection *f*³, and according to the position of the sleeve *f*² this arm *f*⁵ is adapted to rest or be caught in one of two notches in a catch
 130 *g*. The catch *g* moves in a vertical plane and is pivotally supported upon a short stud *g*¹, secured to the frame A of the machine. (See Figs. 5 and 6.) In the lower surface of the catch *g* is formed two notches, one of

which, g^2 , is at the free end of the catch, whereas the other, g^3 , is between the ends of the same. When, now, the sleeve f^2 is turned against the influence of the spring f^3 , the arm f^5 rests in the intermediate notch g^3 and is prevented from turning. In other words, the notch g^3 serves, through the arm f^5 , to lock the sleeve f^2 against the influence or tension of the spring f^4 . To release the arm f^5 from the catch g and permit the sleeve f^2 to turn under the influence of its spring f^4 , it is necessary to raise the catch g a sufficient distance to permit the arm f^5 to slip out of the notch g^3 . To accomplish this result, I prefer to form integral with the catch g an arm g^4 , extending upward from the point of pivotal support g' and having at its free end a pin or projection g^5 . This pin g^5 is arranged at a height slightly above the hooked end e' of the angle-lever e when said angle-lever is oscillating normally up and down accompanied by the lever-arm d^3 ; but, as previously described, upon the arrest of the movement of the lever-arm d^3 the hooked end e' of the angle-lever e is thrown upward and toward the rear of the machine, and in its movement the pin g^5 is caught by the hook e' and the arm g^4 is pushed to the left or rear end of the machine. This movement of the arm g^4 raises the catch g sufficiently to permit the arm f^5 to slip out of the notch g^3 and to slide on the catch g until caught in the end notch g^2 , which thus serves as a stop or limit to the movement of the sleeve f^2 . To transfer this motion of the sleeve f^2 , caused by the spring f^4 , to the shaft f' and to the belt-shifter f , I prefer to secure on the shaft f' below the sleeve f^2 a collar f^6 , having an arm f^7 , provided with a pin f^8 , projecting upward in the path of the arm f^5 of the sleeve f^2 . When now the arm f^5 is released from the catch g and turned by the spring f^4 , it will strike against the pin f^8 and serve thereby to turn the shaft f' until the belt-shifter rests over the loose pulley F, which is arranged alongside the driving-pulley B² of the spooler-drum B. The belt-shifter f is also provided with the usual hand shifting-rod h , extending across the machine, one end of the rod being pivoted to a bar or handle h' of the shifter f , as clearly illustrated in Figs. 1, 2, and 3.

By the arrangement above described, wherein the sleeve f^2 is the part directly operated by the release of the catch, it is obvious that the shaft f' and shifter f may be moved by hand either to stop or start the machine without operating the sleeve f^2 and its arm f^5 , and hence by my preferred construction the introduction of the automatic shifting or stop device does not impair or interfere with the use of the ordinary hand shifting appliances of the machine.

During the passage of the threads E over and through the tension-rolls D and D' these rolls are caused to rotate and by their momentum will ordinarily continue to rotate for some time even when the machine is stopped and the threads E no longer wound upon the

spool. The threads would therefore sag and tangle in the machine between the tension-rolls and the spool, and this would especially occur should for any reason the spool and winding-drum B be suddenly stopped. To obviate this difficulty, I have devised a mechanism by means of which one of the tension-rolls is connected with and driven positively by the driving-pulley B² at the moment the belt is shifted or transferred from the fast to the loose pulley, but before the belt has completely left the fast or driving pulley B². The tension-rolls are thus brought directly under control of the driving-pulley of the winding or spooling drum B, and when this pulley and drum cease to rotate the rolls are stopped. By preference this mechanism consists of the following elements or parts: On the shaft k of one of the rolls, preferably the lower roll D, is loosely mounted a disk k' , the periphery whereof is grooved to receive a belt or cord k^2 , connecting the disk k' with the driving-pulley B². This disk k' ordinarily rotates idly upon the shaft k , and on its outer surface is formed a series of teeth k^3 . On the end of the shaft k adjacent to the toothed face of the disk k' is firmly secured a disk m , having teeth m' on that face contiguous to the toothed face of the disk k' . When now the disk k' is shifted on the shaft k until its toothed face engages the toothed face of the disk m , the two disks are locked together and the motion of the idle-disk is transferred to the shaft k .

To shift the idle-disk k' , I prefer to use a forked clutch n , suspended from a sleeve or collar n' , secured or fixed to a rocking shaft n^2 , arranged along the side of the machine and having suitable bearings in the frame A. At the front end of the machine the shaft n^2 is provided with a horizontally-arranged arm or projection n^3 , adapted when depressed to rock the shaft n^2 in one direction. This arm or projection n^3 extends in the path of a horizontally-arranged projection n^4 , carried by the belt-shifter f , and is adapted to be depressed when the projection n^4 rides over the end of said arm n^3 . The shaft n^2 is rocked in the opposite direction by means of a spring n^5 , one end of which is secured to a pin or projection n^6 , carried by the shaft n^2 , and the other end is secured in the frame A. When the belt-shifter f is shifted to the position indicated in full lines in Fig. 2, that is to say, the belt is almost off of the driving-pulley B², the shaft n^2 is rocked to operate the clutch n , which throws the idle-disk k' into engagement with the other disk m . The continued revolution of the driving-pulley is then transmitted positively to the shaft of the tension-roll D, and the tension-rolls at that instant are positively driven by the driving-pulley of the drum B. As the shifter f is shifted to bring the belt on the loose pulley F the driving-pulley ceases to rotate and at the same instant the tension-roll D is stopped. From the above description it will be understood, therefore, that in the shifting of the belt

from the driving to the loose pulley the tension-roll D is first brought into positive connection with the driving-pulley, and therefore controlled in its movement thereby, and both the driving-pulley and roll D are stopped at the next instant, when the belt is completely shifted from the driving-pulley to the loose pulley F.

In Fig. 7 there is illustrated a preferred way of mounting the latch *b* upon the fixed shaft *a*, so as to permit of an adjustment of the latch on the shaft toward the sides of the machine. This is accomplished by threading the shaft *a* and the opening *b*⁶ of the latch *b*, through which the shaft *a* extends. The threaded connection between the latch *b* and shaft *a* is sufficiently loose to permit the fall of the hook end of the latch, as previously described.

When each latch is turned on the threaded shaft independently of the others, the grouping of the latches into required position can be effected, and this position will be determined by the number and arrangement of the threads E. The latch *b* is also provided with a hook *b*⁷ at its recessed end, upon which hook a weight may be suspended to hold the latch, with its hook end *b*⁷ elevated, out of the path of the cross-bar *d*² when the latch is not required to be suspended from a thread E.

The hook *b*⁷, by preference, is a double hook and constructed so that either end may be used to suspend the latch from the thread. Thus the lower hook is secured, by a nut or screw *b*⁸, to the latch, and should the upper hook wear through, or nearly through, the hook may be reversed, so that the lower hook can be used to suspend and the upper hook secured to the latch by the screw *b*⁸.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a stop-motion, a driven shaft, a cam or eccentric secured thereto, an upper arm resting upon the cam or eccentric and adapted to be raised and lowered thereby, an angle-arm pivoted to said arm and resting on the lower portion of the periphery of said cam or eccentric, a spring adapted to confine the angle-arm to the cam, said upper arm and angle-arm being normally adapted to move in unison upon the rotation of the cam or eccentric, means controlled by the breaking of a thread manipulated by the machine to which the stop-motion is attached for arresting the movement of the upper arm, whereby the lower angle-arm is operated independently by the cam, and mechanism controlled by the independent movement of said angle-arm, whereby the machine is stopped, substantially as and for the purposes described.

2. In a stop-motion, a driving-pulley, a loose pulley, a driving-belt, a belt-shifter, a shaft adapted to operate said belt-shifter, a spring-controlled sleeve loosely mounted on

said shaft, an arm secured to the belt-shifter shaft, a catch adapted to lock the sleeve against the tension of its spring, means controlled by the breaking of a thread manipulated by the machine, whereby the catch is operated to release the sleeve, and means for transferring the motion of the released sleeve to the belt-shifter shaft and thereby operate the belt-shifter and stop the machine, substantially as and for the purposes described.

3. In a stop-motion, a belt-shifter, a horizontally-arranged shaft, a clutch suspended therefrom, a tension or feed roll, an idle-disk rotating loosely upon the shaft of the roll and having a toothed face, a disk fixed to the shaft of the roll and having a toothed face adjacent to the toothed face of the idle-disk, an arm secured to the horizontally-arranged shaft and adapted to be depressed by the movement of the belt-shifter to thereby through the clutch throw the idle-disk into engagement with the fixed disk, a driving-pulley, and a belt connecting the idle-disk therewith, substantially as and for the purposes described.

4. In a stop-motion, a driving-pulley, a loose pulley, a belt adapted to drive the driving-pulley, a belt-shifter, a tension or feed roll, and means controlled by the belt-shifter whereby the tension-roll is brought into positive connection with the driving-pulley and driven thereby during the movement of the belt-shifter in shifting the belt from the driving to the loose pulley, substantially as and for the purposes described.

5. In a stop-motion, a series of latches, each latch having at one end a weighted hook by means of which the latch is suspended from a thread manipulated by the machine to which the stop-motion is attached, a shoulder formed at the hooked end of each latch, the other end of each latch being recessed, a shaft upon which the latch is pivotally supported, and a rod passed through the recesses of the latches to constitute a stop to limit the movement of the latches on said shaft, substantially as and for the purposes described.

6. In a stop-motion, a series of latches and a fixed and threaded shaft upon which the latches are directly pivoted, said latches being loosely threaded to said shaft so as to permit of the rotary movement of the latches on the shaft upon the breaking of a thread or threads in the machine to which the stop-motion is attached and to also permit of a horizontal adjustment of each of the latches on said shaft independently of the other latches, substantially as and for the purposes described.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

BENJAMIN F. MEYER.

Witnesses:

J. WALTER DOUGLASS,
THOMAS M. SMITH.