(No Model.)

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J. E. TYNAN.

DOUBLING AND WINDING MACHINE.

No. 346,693. Patented Aug. 3, 1886.

Fig. 3.

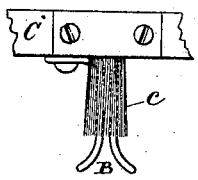

Fig. 1.

Witnesses
Chas. F. Smith
Harold Perrell

Inventor
J. E. Tynan
per Lemuel W. Perrell
Atty

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J. E. TYNAN.

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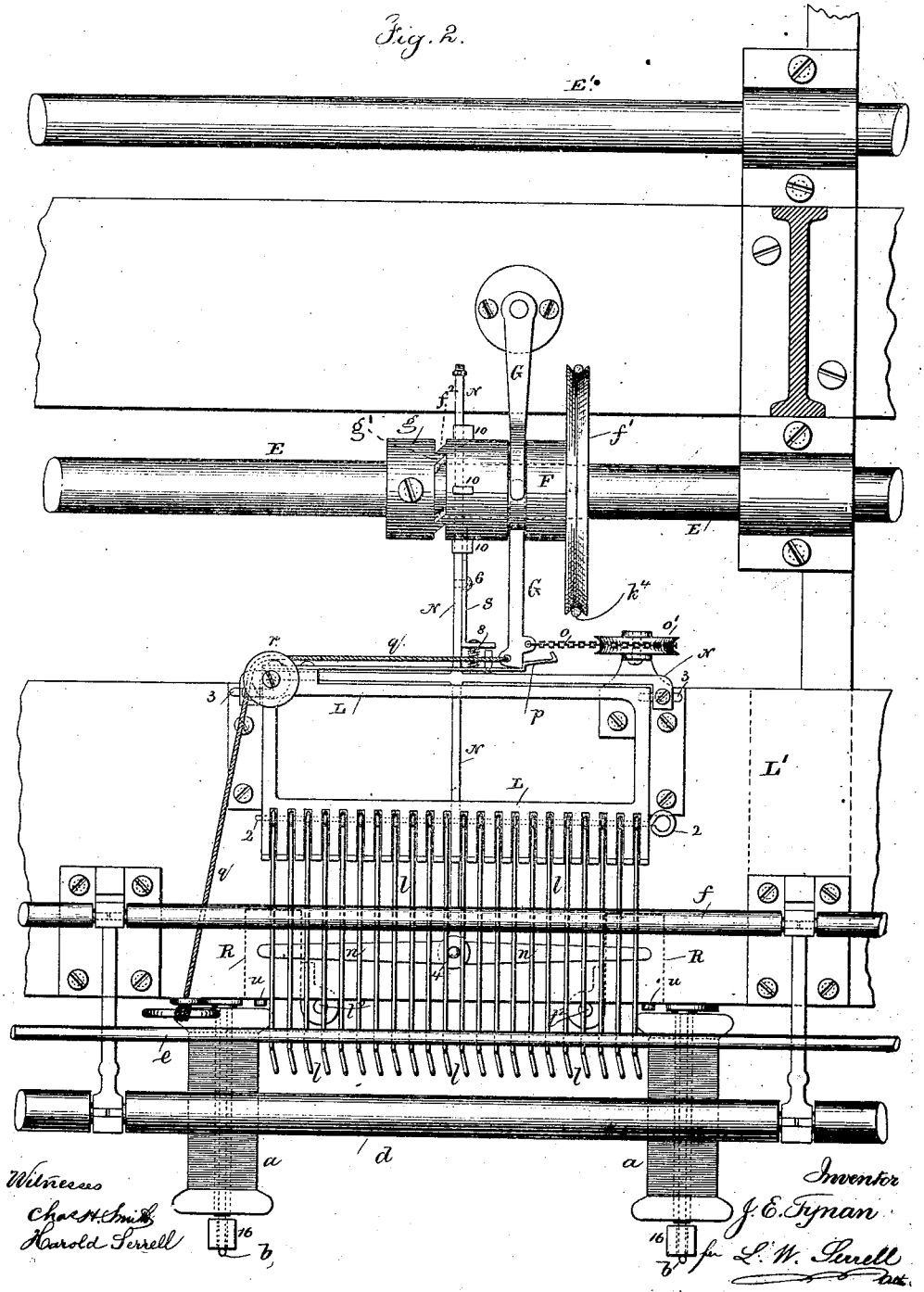
Fig. 2.



Witnesses
Chas. H. Smith
Harold Serrell

Inventor
J. E. Tynan
per L. W. Serrell
Att.

(No Model.)

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J. E. TYNAN.

DOUBLING AND WINDING MACHINE.

No. 346,693. Patented Aug. 3, 1886.

Fig. 4.

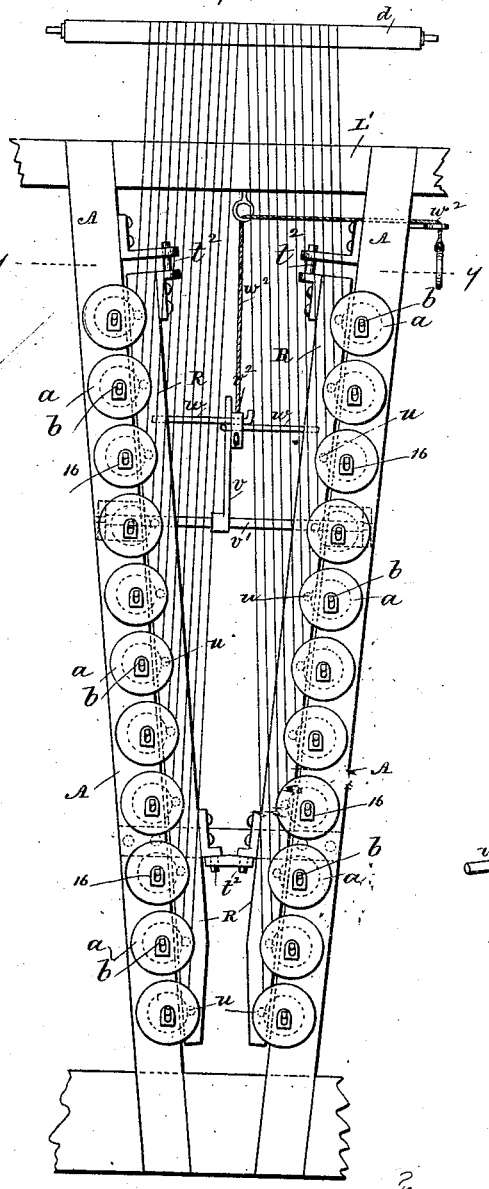

Fig. 5.

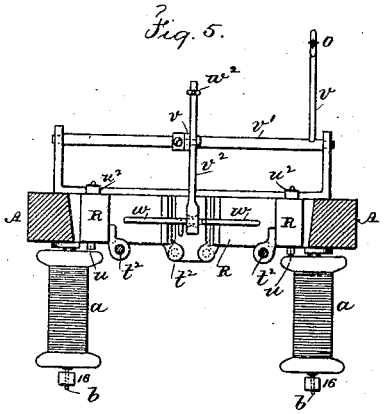

Fig. 6.

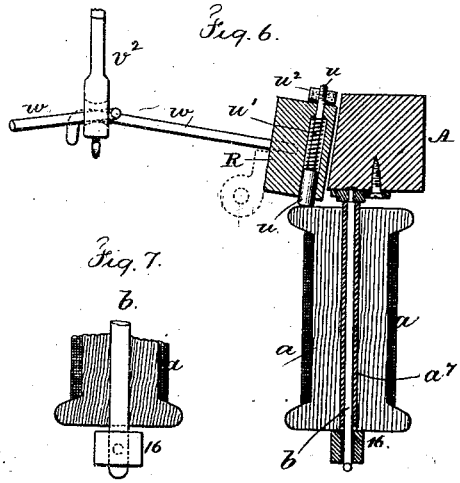

Fig. 7.

Fig. 8.

Witnesses

Chas. H. Smith
Harold Serrell

Inventor

J. E. Tynan.

per Lemuel W. Serrell

atty

(No Model.)

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J. E. TYNAN.

DOUBLING AND WINDING MACHINE.

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Fig. 9.

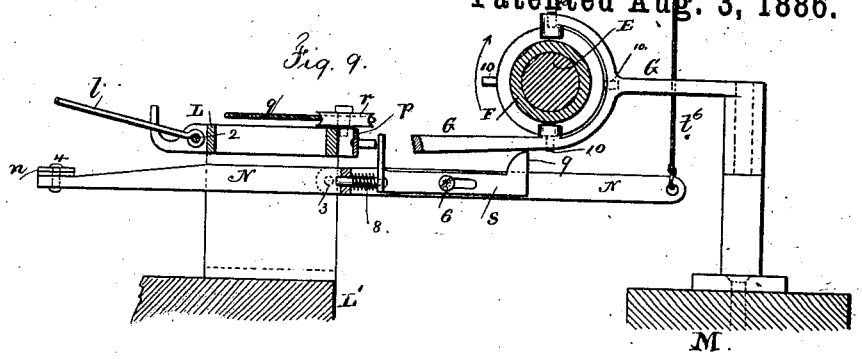


Fig. 10.

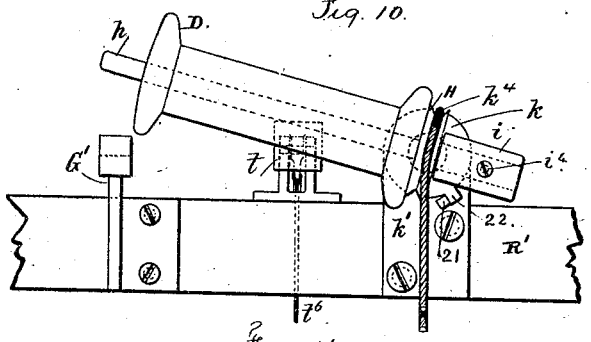
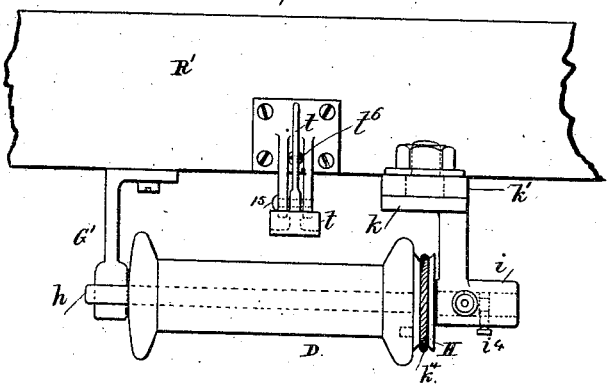


Fig. 11.



Witnesses

Chas. H. Smith

Harold Serrell

Inventor

J. E. Tynan

per Lemuel W. Serrell

atty.

UNITED STATES PATENT OFFICE.

JOSEPH E. TYNAN, OF PATERSON, NEW JERSEY.

DOUBLING AND WINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,693, dated August 3, 1886.

Application filed February 7, 1884. Serial No. 120,003. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. TYNAN, of Paterson in the county of Passaic and State of New Jersey, have invented an Improvement in Doubling and Winding Machines, of which the following is a specification.

This improvement is employed in doubling and winding silk. Difficulty has heretofore arisen at the time the machine stops when a thread breaks, because the momentum of the supply-spools causes them to continue to turn and the threads become loose and are liable to twist together, or to wind around the creel-pins, or otherwise to become displaced, thereby causing waste of valuable material, loss of time, and imperfect work.

In doubling and winding, say, twenty-two threads, it is usual to wind five threads at a time upon spools, and then to take four of such spools, and one spool with two threads wound upon it, and bring these threads all together and wind them upon another spool, thus making six winding operations. The result is that the work is imperfect, the threads are not all of the same length, and some have been laid up with more tension than others, and in case of breakage, or in joining up in the last winding, the knots are large and valuable material is wasted.

In my improved machine only one operation is performed in doubling and winding whatever number of threads may be required. Each thread receives the same tension, and as the threads are exhausted one after another upon the supply-spools other spools are supplied, and the threads joined up without loss, and without any large knots, and very little material is wasted, and the machine is stopped as soon as any thread breaks, so that it can be joined up; hence a given quantity of work can be done at less cost than heretofore, and of a better quality.

In my improved machine I employ diverging creel-bars, arranged so that a large number of spools or bobbins can be held by the same, and the threads draw off parallel, or nearly so, and I apply a compound stop-motion that stops the take-up spool, and also all the creel-bobbins simultaneously, in case any one thread breaks or runs.

Figure 1 is a sectional elevation of the doubling-machine, part of the lower portion of the frame being removed. Fig. 2 is a plan of said machine below the line $x\,x$ of Fig. 1. Fig. 3 is a plan of the thread-guide and brush. Fig. 4 is an elevation of the lower part of the doubling-machine, showing the creel-bars and parts carried by such bars. Fig. 5 is a sectional plan of the creel-bars and connected parts at the line $y\,y$ of Fig. 4. Fig. 6 is a sectional plan of one of the creel and brake bars, showing also one of the bobbins in section and a portion of the devices for operating the brake-bar. Fig. 7 represents part of a bobbin in section. It also shows in elevation part of the creel-pin and the fastening for retaining the bobbin upon the creel-pin. Fig. 8 is an elevation of the fastening shown in Fig. 7. Fig. 9 is a sectional elevation of the stop-motion devices. Fig. 10 is an elevation of the bobbin, upon which the doubled thread is wound, of the means for supporting said bobbin, and of the spool-stop lever. Fig. 11 is a plan of the parts shown in Fig. 10.

The bobbins *a* are upon the creel-pins *b*, that project from the bars A A. These bars A A diverge, as seen in Fig. 4, so that the threads may be drawn off the spools or bobbins *a a* nearly parallel to each other, and be led over the roller *d* and bar *e*, and under the roller *f*, and up through the thread-guide B, to the take-up spool D. The rollers *d* and *f* revolve by the action of the threads, and make the winding very uniform, because each thread is moved forward the same or nearly the same distance as the surfaces of the rollers travel.

The thread-guide B has above or below it a brush, *c*, of numerous fibers or hairs, projecting from the rod C. The threads as they pass through between these hairs are held to a greater or less extent by them; hence when a thread breaks it will not spring and fly up to the take-up spool D, but will be held by the brush *c*, so that the thread will be more easily found and joined up by the attendant. The rod C is supported in suitable guides, and receives an end movement in any usual manner, so that the guide B causes the threads to wind evenly along upon the bobbin D as it is revolved.

The shaft E is revolved by suitable power, and has fastened to it the collar *g*, having teeth *g'*, and loosely fitted on said shaft is the sleeve F, having connected therewith the pul-

ley f', said sleeve having teeth f^2, for engagement with the teeth g' upon the collar g. Said sleeve F has a circumferential groove to receive the projecting ends of the arms of the forked lever G, which lever is pivoted upon and supported by the rail M, and said sleeve is moved by this lever to engage the teeth of said sleeve with the teeth of the collar g, and cause the rotation of the sleeve and pulley with the shaft E, or to disengage the said sleeve and pulley from said collar and shaft. The devices for moving this forked lever G are hereinafter described.

From the pulley f' an endless belt, k^4, passes to the pulley H upon the spindle h of the take-up spool D by which the same is rotated. One end of this spindle h enters the tubular bearing i, and is held therein by the end of a screw, i^4, entering a peripheral groove in said spindle. The spindle, however, is free to be revolved. The bearing i is upon an arm extending out from the disk k, that is pivoted to the standard k', and the pivot is in line with the pulley H of the spindle h, so that the spindle and arm can be swung into the position shown in Fig. 10, to allow the spool or bobbin D to be passed upon the spindle or withdrawn from the same without changing the tension of the belt k^4 materially. There is a pin at 21 upon the standard k', and a projection, 22, upon the disk k, for limiting the swinging movement of the spindle h.

When turned down horizontally, the outer end of the spindle h is received into the forked bearing at the end of the arm G', which also serves to retain the spool or bobbin upon the spindle.

The take-up spool D is placed at some distance above the roller f and the shaft E and pulley f', in order that the threads passing from roller f to spool D may be plainly in sight; hence when one breaks it is more easily discovered and mended, and there is time for the winding apparatus to be stopped automatically before the end of the broken thread reaches the spool D and is wound thereon.

The faller-frame L is stationary, and it is supported by the rail or bar L'. One side of the faller-frame is made as a comb or slotted, for the reception of the faller-wires l. Each faller-wire is made with a hook at one end to catch over the thread, and with a pivot-eye at the other end, through which the wire 2 passes.

Beneath the faller-frame is the balanced stop-lever N, in the form of a cross, and the pivots 3 at the ends of the cross-piece secure the same to the faller-frame. At the end of the stop-lever, beneath the faller-wires, is a pivot, 4, by which the fingers n are attached to the stop-lever. These fingers n extend out beneath the faller-wires, so that if a thread breaks its faller-wire drops upon one of the fingers and moves the balanced stop-lever; but the fingers can be swung around on their pivot 4, so as to allow either faller-wire to hang down out of the way, as indicated by dotted lines, Fig. 1, the fingers being afterward turned back to place. This allows for easily lowering and throwing out of action or raising again one or more of the faller-wires, according to the number of threads to be doubled and wound.

The cord or chain o is attached to one arm of the forked lever G, and passes over the pulley o' to the weight o^2. p is a spring-latch, that holds the forked lever in its normal position, and q is a cord attached to the forked lever and passing around the pulley r, by means of which the forked lever can be drawn to its normal position, and latched by spring-latch p, the weight o^2 being simultaneously raised.

Upon the stop-lever N there is a sliding liberator, s, the same being slotted for the attaching-screw 6, and having a guide-pin and spring at 8, by which the toe 9, at the other end of the liberator, is kept toward the sleeve F of the pulley f'. Upon this sleeve F are tappets 10, that revolve close to the end of the toe 9, but do not touch the same when the parts are in their normal position; but if the balanced stop-lever N is moved by the breaking of a thread and the descent of one of the faller-wires, or by other means, the toe 9 is brought up into the path of the tappets 10, and the liberator is moved endwise by one of them, and said liberator presses against a pin on the spring-latch p, and moves said latch, allowing the weight o^2 to move the forked lever G and slip the sleeve F out of contact with the collar g, and the pulley f' stops instantly. This causes the take-up spool to stop, and it also applies a brake to each of the creel-bobbins, as hereinafter described, so that their inertia will not cause such creel-bobbins to revolve and unwind the threads. The same movement of the forked lever G and disengagement of the sleeve F and pulley f' from the driving-shaft is produced if the take-up spool becomes full, for I apply upon the rail R' a spool-stop lever, t, pivoted at 15 to a bracket, R², on the rail R', and to the rear end of said stop-lever is attached a cord or wire, t^4, which is also attached to the back end of the stop-lever N, so that as soon as the take-up spool becomes sufficiently full for the thread to touch the end of the spool-stop lever and carry it down the back end will be raised, and the balanced stop-lever N lifted to bring the toe of the liberator into the path of the tappets 10, and cause the forked lever G to be freed from the spring-catch, and thereby stop the machine.

Parallel with the creel-bars A are the brake-bars R, which are pivoted at t^2 t^2 to brackets extending from the bars A, so that they may be rocked upon such pivots. In these bars, opposite the base of each creel-bobbin, is a hole receiving the brake-pin u, the inner portion of which is reduced in size to receive around it the spring u'; and u^2 is a nut by which to adjust the brake-pin endwise. The weight o^3 is connected to the bent lever v, mounted upon the pivot v'; and v^2 is a link having an L-shaped slot for a screw or pin in the upper end of lever v.

w w are lever-arms extending from the rocking brake-bars R, and connected to the link r^2.

When the forked lever G is released and the weight o^2 descends, as aforesaid, the lever r and link r^2 move the rocking brake-bars R by the arms w and press the brake-pins u into contact with the respective creel-bobbins, stopping them instantly and preventing the bobbins from revolving by their momentum and unwinding the threads. As soon as the attendant pulls upon the cord w^2, the link v^2 is raised, and the same is free to go forward and liberate the brakes from the spools, so that the broken thread can be seized and drawn off freely and joined up, as usual, and as soon as this is done, or a new creel-bobbin inserted in place of an exhausted one, the machine is started by drawing upon the cord q, as before stated, and restoring the parts to their normal positions.

It will be apparent that my improvement is available with any desired number of supply spools or bobbins, and that with a small number they may be in one range.

In doubling and winding it is usual to place the spools or supply bobbins upon creel-pins; hence the holes in the bobbins speedily wear large from the revolution of the bobbins as they unwind, and the bobbins being of wood wear unequally, and the threads are often broken by the irregular movement of the bobbin in unwinding unless the machine is run at a low speed.

I make use of a tubular sleeve, a', upon each creel-pin. The same fits into the hole in the bobbin and revolves with it, thus preventing wear upon the bobbin. There is a head or hooked end to each creel-pin, so that the tubular sleeve is retained when the spool is drawn off. Each creel-pin has a stop, 16, at its outer end for holding the bobbin in place. This stop is removable, so that the spool or bobbin can be placed on or taken off the creel-pin. It is preferable to employ the slotted stop shown in Figs. 4 and 6 when the sleeve a' is used; but if this sleeve is not employed then the forked stop with a prong to enter a hole in the creel-pin, as shown in Figs. 7 and 8, may be used.

This machine will usually be made double, there being the same parts applied at each side of the frame and the shafts E E' geared together.

I claim as my invention—

1. The combination, with the faller-wires, of a balanced stop-lever beneath the faller-wires, and movable fingers and pivots by which said fingers are attached to said lever, and a stop mechanism, substantially as specified, that is brought into action by said balanced stop-lever, substantially as set forth.

2. The combination, with the faller-wires and balanced stop-lever, of a liberator connected with said balanced stop-lever, a forked lever, sliding sleeve and pulley, fixed collar, the revolving shaft, tappets on the sleeve, a spring-latch to hold the forked lever, and a weight or spring to move such forked lever, substantially as set forth.

3. The combination, with the revolving shaft E, of the fixed collar g, a sliding sleeve, tappets upon said sleeve, a forked lever, a balanced stop-lever, mechanism, substantially as specified, for acting upon said balanced stop-lever to tilt the same, a spring-latch, a liberator, a weight to move the forked lever, and a cord by which the parts can be restored to their normal position, substantially as set forth.

4. The combination, with the take-up spool and its pulley, of a stop-lever, t, to be acted upon by the thread wound on the spool, a balanced stop-lever, N, a connection between the levers N and t, a revolving shaft, pulley f', collar g, and sleeve F, a forked lever, a liberator upon the balanced stop-lever N, tappets to act upon the liberator, a spring-latch, and means for rotating the take-up spool from the pulley f', substantially as set forth.

5. The combination, in a doubling-machine, of a balanced stop-lever, N, means for acting upon said balanced stop-lever upon the breakage of a thread or threads to tilt the same, a take-up spool and means for rotating the same, a stop-lever applied to the take-up spool, a connection, t^6, between the balanced stop-lever N and stop-lever t, stationary creel-pins for supporting the bobbins, a rocker brake-bar, spring-actuated brakes carried by said brake-bar, and means, controlled by the balanced stop-lever, for operating the brake-bar upon the breaking of a thread or upon the take-up spool becoming full, substantially as set forth.

6. The combination, with the creel-bobbins, of the rocker brake-bar, brake-pins upon said bar, springs for pressing said pins against the bobbins, and mechanism for moving the brake-bar to simultaneously stop all the creel-bobbins, substantially as set forth.

7. The combination, with a range of creel-pins and bobbins, of a rocker brake-bar, spring-actuated brake-pins carried by said rocker brake-bar, the lever G, and mechanism, substantially as specified, for connecting the rocker brake-bar with said lever G, substantially as set forth.

8. The combination, with the range of stationary creel-pins, creel-bobbins, rocker brake-bar and springs upon the same, of the lever-arms w, slotted link v^2, lever v, weight-latch p, liberator s, collar f, provided with tappets 10, balanced stop-lever and fallers, the lever G, and connections from said lever G to the lever v, substantially as set forth.

9. The combination, with the take-up bobbin, of a spindle having a belt-pulley, a pivoted arm having a bearing for the inner end of the spindle, a notched bearing for the outer end of the spindle, a belt for driving the spindle, and means for operating said belt, substantially as set forth.

10. The combination of a balanced stop-lever, the pulley f', and sleeve F, loose upon the driving-shaft, a collar, g, fast to said shaft,

a liberator connected with said balanced stop-lever, a forked lever, G, a latch for holding said forked lever G, and tappets upon the sleeve F, for giving an end movement to the liberator when the balanced stop-lever is actuated, substantially as set forth.

11. The combination, with the creel-bar, rocker brake-bar, creel-bobbin, and creel-pin, of a removable stop, 16, to hold the bobbin in place, substantially as set forth.

Signed by me this 4th day of February, A. D. 1884.

JOSEPH E. TYNAN.

Witnesses:
GEO. T. PINCKNEY,
WILLIAM G. MOTT.