(No Model.) 3 Sheets—Sheet 1.

J. E. TYNAN.

MACHINE FOR THROWING SILK.

No. 398,359. Patented Feb. 19, 1889.

Fig. 2.

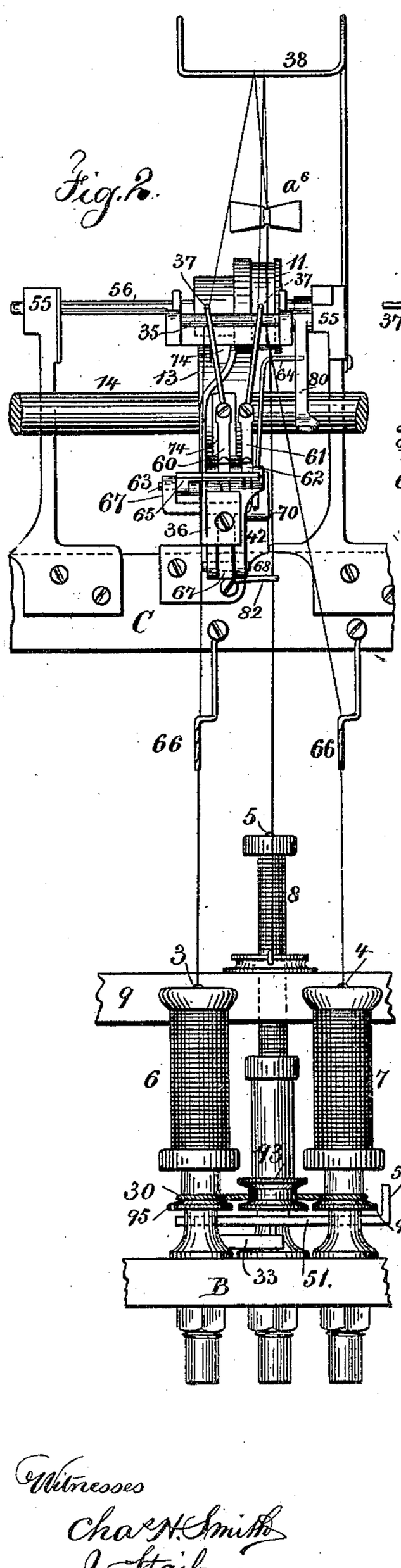
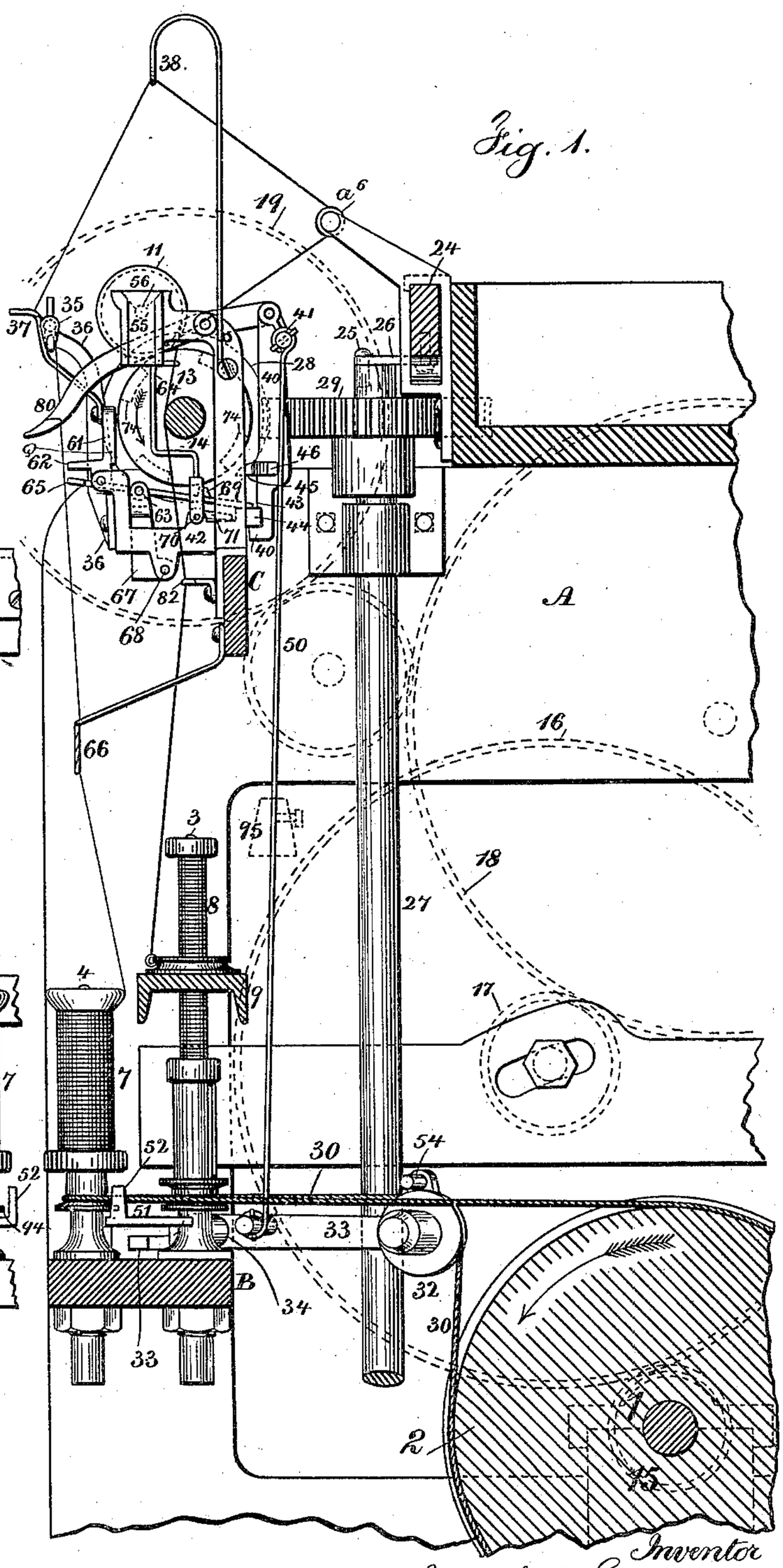


Fig. 1.



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per Lemuel W. Serrell
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(No Model.) 3 Sheets—Sheet 2.

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MACHINE FOR THROWING SILK.

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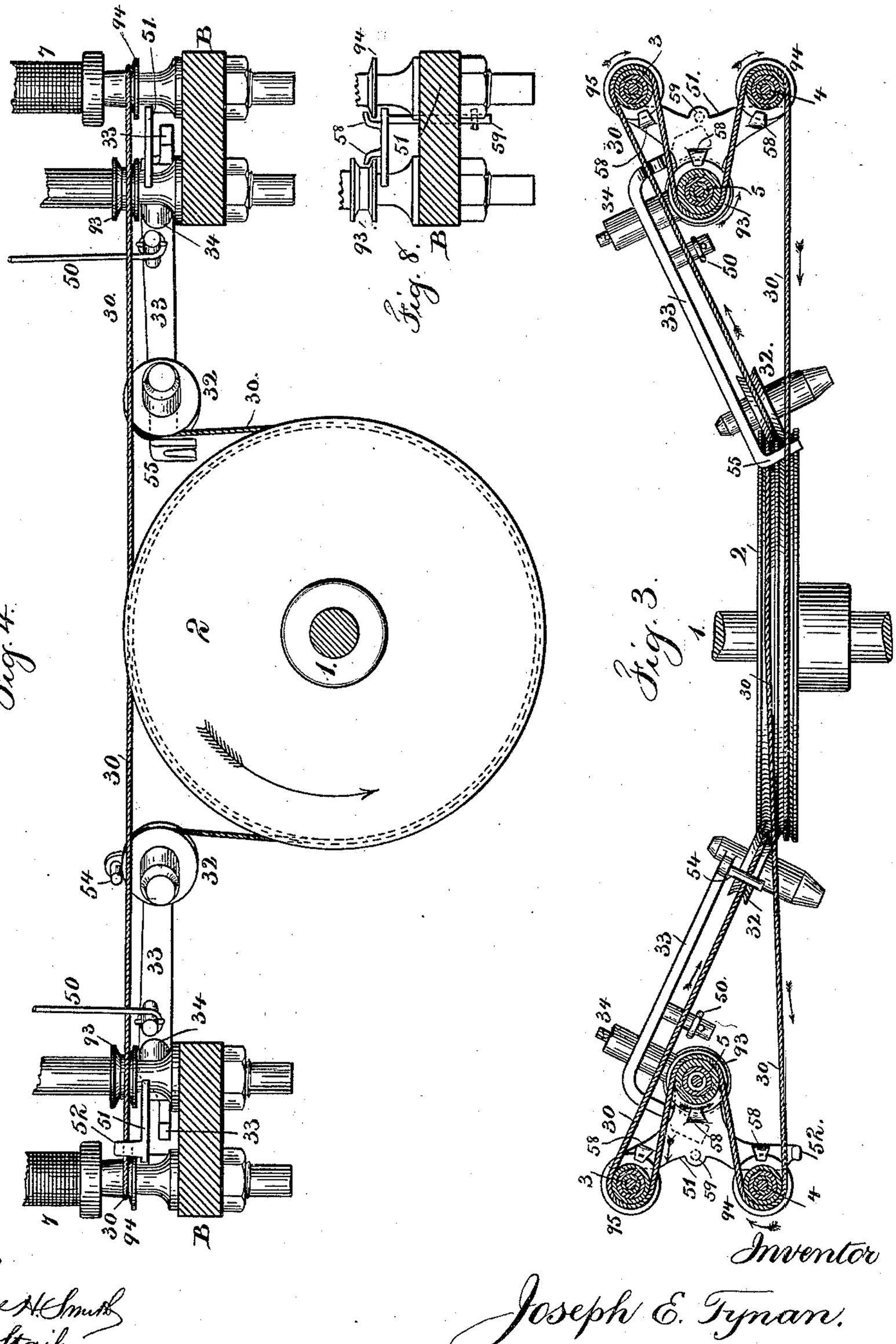

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(No Model.) 3 Sheets—Sheet 3.

J. E. TYNAN.

MACHINE FOR THROWING SILK.

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Fig. 5.

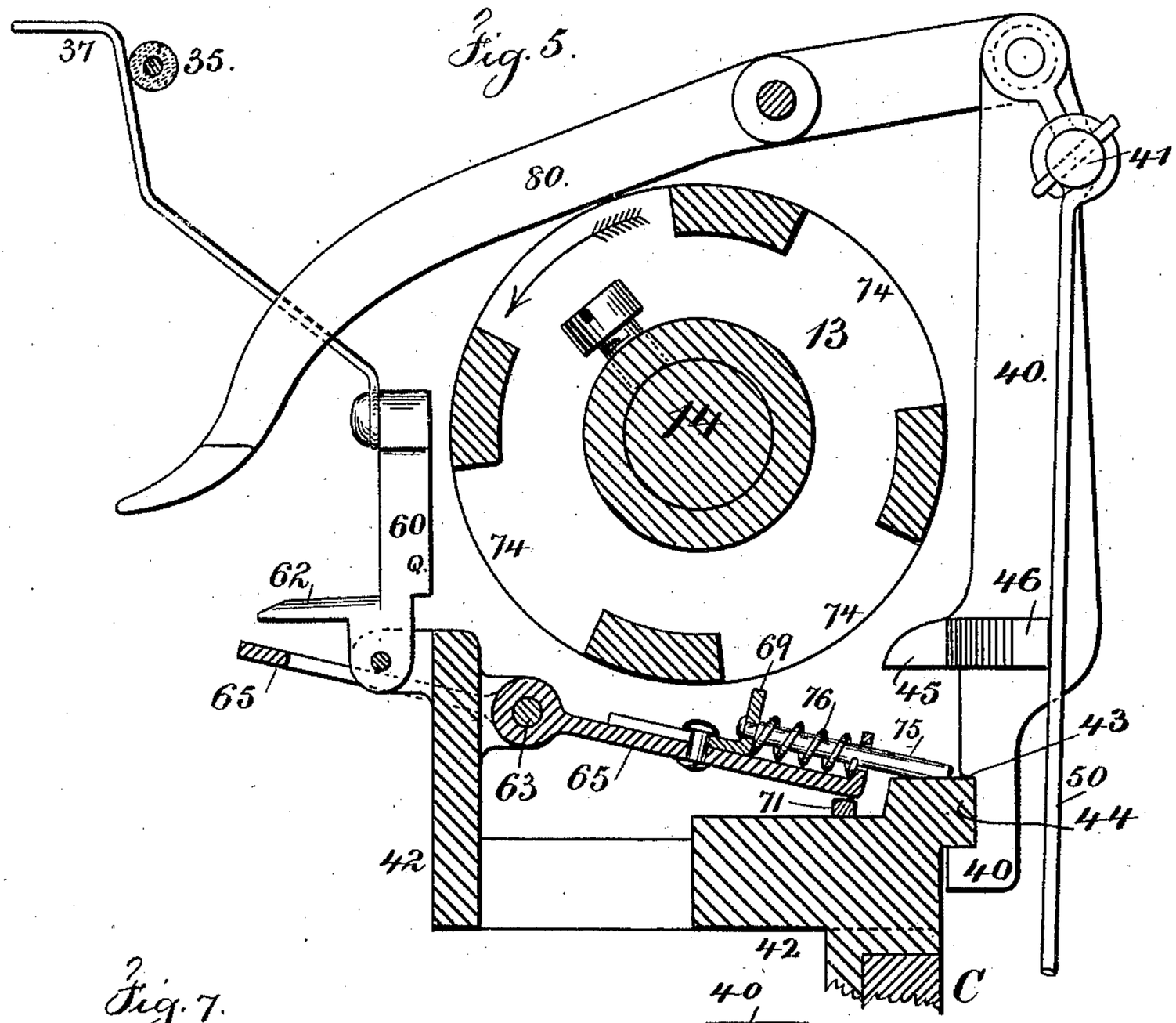
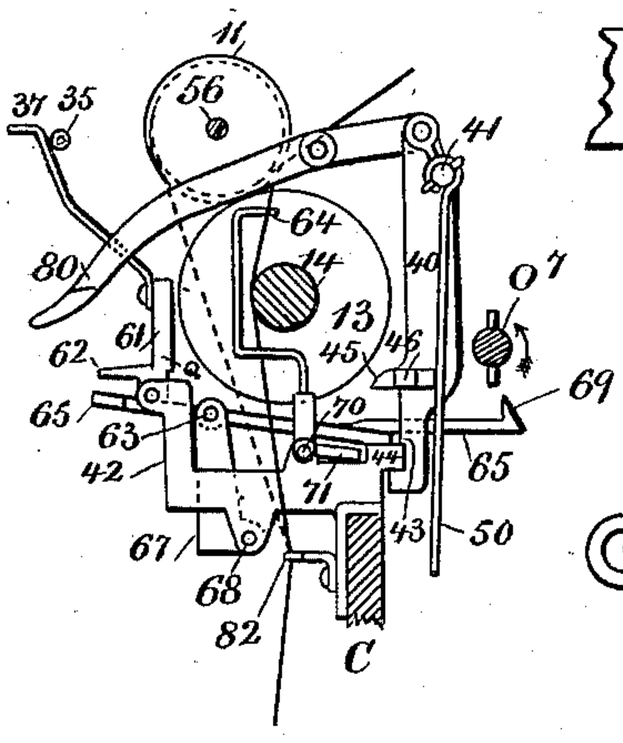


Fig. 7.



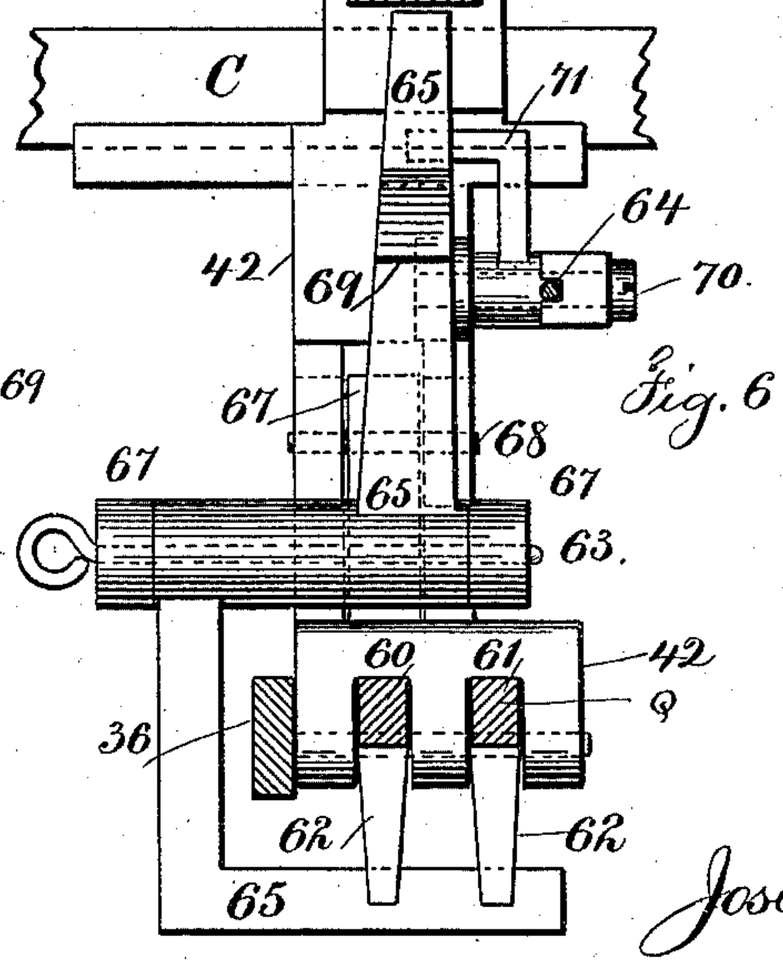


Fig. 6

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UNITED STATES PATENT OFFICE.

JOSEPH E. TYNAN, OF PATERSON, NEW JERSEY.

MACHINE FOR THROWING SILK.

SPECIFICATION forming part of Letters Patent No. 398,359, dated February 19, 1889.

Application filed December 2, 1887. Serial No. 256,728. (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 Machines for Throwing Silk, of which the following is a specification.

The present invention is a modification of and improvement upon the device for which Letters Patent No. 364,784 were granted to me June 14, 1887, and a reference is hereby made to the said patent for such parts and their mode of operation as are shown herein.

The peculiar features of the present invention will hereinafter be specially described and claimed.

In the drawings, Figure 1 is a vertical cross-section of the spindle rail and frame and elevation of the spools and parts at one side of the machine. Fig. 2 is a front elevation of one group of spools and parts acting with them. Fig. 3 is a plan view showing two groups of spindles—one at each side of the machine—and the belts for driving the same. Fig. 4 is an elevation of the belts and mechanism for driving and stopping the spindles. Fig. 5 is a modification of the stop mechanism actuated by the fallers. Fig. 6 is a plan view, in larger size, of the rocking lever and faller-stand, the fallers and detector being in section. Fig. 7 is a detached elevation of the detector and the parts acting with it, and Fig. 8 is a detached view of the brake-plates and the device for holding down the pulleys and spindles.

The frame A, spindle-rail B, and longitudinal frame C are of ordinary character, and the shaft 1 is provided with the drum 2 or range of pulleys. I prefer to have one pulley for each pair of belts that pass to opposite groups of spools. The spindles 3, 4, and 5 occupy triangular positions, as seen in Fig. 3, and the ring-rail 9 is made to rise and fall as the winding of the thread proceeds upon the spool 8. The spools 6 and 7 on the spindles 3 and 4 supply the threads, which are twisted by the revolution of the spindles and laid together by the revolution of the spindle 5 in the opposite direction. The threads pass from the spools 6 and 7 up against the guide-fingers 66, and are wrapped around them to give the proper tension by the revolution of the spools and spindles. The driving-roller 13 is upon the shaft 14 and receives its motion from the shaft 1 through suitable gearing, such as the wheels 16, 18, and 19 and pinions 15 and 17. The feed-roller 11 is upon the shaft 56, and the ends thereof are supported in the brackets 55, and there is a starting-lever, 80, pivoted upon one of the brackets 55, and passing below the shaft 56 near one end thereof.

All the parts before named correspond to those set forth in my said patent, No. 364,784, and do not require further description herein. I, however, remark that there are not any loose pulleys on the spindles, and the driving-roller 13 is made as a cylindrical shell with mortises 74 through the shell, instead of recesses cut into the surface of the roller.

I do not make use of a guide-roller in front of the feed-roller; but I employ a traverse-bar, 24, reciprocated longitudinally by suitable means, such as by a crank-pin, 25, and link or connecting-rod 26. The crank-pin 25 is at the upper end of a shaft, 27, in bearings upon one of the frames A, and receiving motion from a worm, 28, on the shaft 14, acting upon the worm-wheel 29 on the shaft 27. By this means the traverse-bar 24 receives a small endwise reciprocation sufficient to move the threads as they draw over the respective fingers and prevent such threads wearing grooves in said fingers.

The fallers, instead of occupying nearly a horizontal position, as usual, stand nearly vertical above the pivots on which they swing. The hooks 37 of the fallers extend forward from the pivots, and they are nearly counterpoised by the weight portions of each faller, which extend to the rear of the pivots. By this construction the leverage of the hook causes the faller to descend when a thread breaks, and in so doing the weight portion of the faller is moved over the pivot, and increases rapidly the efficient action of the faller in moving the stop mechanism, but when the parts are in a normal position there is but little pressure of the faller against the thread. The threads, after they leave the guide-fingers 66, pass up behind and over a thread-support, 35, preferably in the form of a glass rod, upon the standard 36, that is fastened to the faller stand or frame 42, and then the threads pass

under the hooks 37 of the fallers, and go over the standing guide-finger 38 to the porcelain roller or guide a^6 upon the traverse-bar 24, where they come together, and from there they go around the feed-roller 11, and pass down in front of the arm of the detector 64, near to or against the shaft 14 and through the fixed guide 82 to the ring-traveler and spool 8. To allow for this way of leading the thread the feed-roller 11 does not coincide in position with the driving-roller 13, but the end portion of the feed-roller 11 projects beyond the end of the driving-roller 13; hence there is ample room for the introduction of the detector, which is placed just below the feed-roller, and brings the stop-motion into action in case the thread leaving the roller becomes entangled with that part of the thread on the roller, as sometimes occurs when there are knots or rough places on the threads. If there were nothing to stop the parts at such a time, the feed-roller would draw the thread from the back bobbin as well as from the front ones, and lap them around itself. This danger I entirely avoid, for when the thread leaving the roller becomes entangled with the thread on the roller the angle of the thread below the roller is changed to the position shown by dotted lines in Fig. 7, which allows the arm of the detector to fall forward and cause the stop mechanism to be brought into action, as hereinafter described.

At the back end of the starting-lever 80 the hanging latch 40 is pivoted, and the link 50 hangs from the stud 41, which is to the rear of the latch-pivot, so that the weight of the link 50 and parts of the stop-motion therewith connected, or a weight upon the link 50, as seen at 95, may tend to swing the lower end of the latch 40 toward the frame C and the faller-stand 42, that is bolted upon such frame C. The shoulder 43 on the latch 40 rests upon the back end, 44, of the faller-stand 42 when the parts are in the normal position, and when the stop-motion is brought into action the latch 40 is pushed backwardly to move the shoulder 43 off the part 44 and allow the parts to drop, and the flange 45 limits the downward motion, and the finger 46 being in front of the link 50 prevents the latch 40 being swung too far back by the action of the stop mechanism hereinafter described. When the latch 40 and link 50 descend, the starting-lever 80 is raised at the front end and the feed-roller 11 lifted to stop the feeding of the threads.

The faller-stand is made with a bracket projection at the front end, forming jaws for the pivots of the fallers 60 and 61. These fallers are made as vertical weights Q slightly to the rear of the pivots on which they swing, so as nearly to counterpoise the weight and leverage of the hook ends 37 of the fallers, thus causing the fallers to bear very lightly on the threads and prevent the danger of the faller moving and carrying the thread with it and stopping the action when a thread has not broken; but as soon as a thread breaks and the faller-hook moves away from the thread-support 35 the efficiency of the same in bringing into action the stop mechanism is increased, because the weight of the faller acts with increased leverage as it descends toward a horizontal position, and there is a projecting finger, 62, on the faller to act upon the rocking lever 65 when the threads break and the faller descends. This lever 65 is pivoted at 63 in the swinging yoke 67, that is within a mortise in the faller-stand and is pivoted to the latter at 68. The rear end of this lever 65 is the heaviest, so that in a normal position it rests upon the part 44, and upon the lever 65 is a stud or claw, 69, that comes into one of the mortises in the driving-roller 13 whenever one of the fallers descends, and the said roller 13 acts against the claw to move the lever 65 endwise, the yoke 67 swinging while this movement takes place, and the back end of this lever 65 pushes the latch 40, so that the shoulder 43 passes off its support, and the link 50 and stop mechanism descend to stop the action of the belt that rotates the group of spindles, as hereinafter described. As the rocking lever 65 is moved backward and unlatches the latch 40, such latch falls and the flange 45 carries down with it the rear end of the said rocking lever 65, and thereby keeping the claw 69 clear from the driving-roller, and simultaneously the yoke 67 swings forward again by its own weight, carrying with it the rocking lever 65 and returning it to the normal position; but the rocking lever cannot rise again by the weight of the faller to cause the claw to come into contact with the driving-roller, because the flange 45 remains above the rear end of the rocking lever until the latch 40 is raised to start the parts.

The detector 64 is pivoted at 70 upon the faller-stand 42, and it stands nearly vertically, and the wire thereof is behind the threads as they are laid together and pass down from the feed-roller 11. When the detector 64 falls forward, a finger, 71, that projects from the lower part of the detector in below the rocking lever 65, raises such rocking lever and causes the claw 69 to engage the roller 13 and bring into action the stop mechanism. This operation takes place whenever the doubled thread breaks, or whenever the threads become entangled and commence to wind on the feed-roller, as before described, or whenever the thread slackens in consequence of a ring-traveler being thrown off. It will now be apparent that when the attendant has mended a thread and he is about to start the parts he places one finger under the front end of the rocking lever 65, to prevent the weight of the fallers moving said lever 65 and bringing the claw again into contact with the roller 13, and then with the thumb the outer end of the lever 80 is depressed to lift the link 50 and hold it by the latch 40, and start the driving mechanism of the spindles, and to bring the feed-roller 11 into contact with the driving-

roller 13, and the other hand of the operator is free to guide the threads to place as they are drawn up, and there is no separate operation required to pass the threads into the hooks of the faller-wires, because it is only necessary to guide the threads as they draw up and cause them to pass in below the hooked ends of the faller and lead off between them to the finger.

The revolutions of the spindles 6 and 7 wrap the threads around the guide-fingers 66, and the revolution of the spool 8 throws the descending thread within the stationary guide-hook 82, and the operations proceed automatically.

The movement endwise of the traverse-bar 24 and guides a^6 is sufficient to traverse the threads slightly upon the standing guide-finger 38 and the feed-roller 11, and against the detector-wire 64 and shaft 14 and fixed guide 82, and prevent the said parts becoming worn into grooves or notches. These parts are horizontal and parallel to each other at the portions where the thread touches them, so that the thread can be traversed freely upon them.

If the swing-yoke 67 is dispensed with, the rocking lever 65 can be pivoted upon the faller-stand, as shown in Fig. 5. In this case the claw 69 will be made with a pusher, 75, that slides in supports on the rocker-lever 65, so that the pusher and claw will be moved together by coming into contact with the end of one of the mortises in the roller 13 to act upon the latch 40 and stop mechanism. In this case a spring, 76, is used to return the pusher and claw to their normal position. The parts of the fallers and detector remain unchanged. The belt 30 passes around the respective pulleys 93 94 95 of the spindles 3, 4, and 5, as in aforesaid patent; but the tightener-pulley 32 acts in connection with the stop mechanism, the lever 33 of said pulley 32 being pivoted at 34 and suspended by the link 50. Hence when the latch 40 and link 50 are raised by the starting-lever 80 the belt is tightened, and when the latch 40 is pushed back and drops until its flange 45 rests on the back end of the rocking lever the pulley 32 is lowered and the belt loosened, and it becomes incapable of driving the spindles; but there would be a slow movement by the friction of the parts were it not that I apply a brake to the respective pulleys and spindles.

The brake-plate 51 is a loose separate plate, and is adapted to occupy the space between the three triangular-placed spindles, 3, 4, and 5, and it is below the pulleys 93 94 95, and rests upon the tapering upper part of the spindle-sockets or upon projections thereon; and the projecting ends of the plate 51 are curved to conform circumferentially to the spindle-sockets, and the lever 33 has an end that passes in beneath the middle of the brake-plate 51, so that when the pulley 32 is lowered and the belt slackened the brake-plate 51 is lifted bodily into contact with the under side of the pulleys 93 94 95, the ends of the plate 51 adapting themselves and taking an even bearing upon the under sides of the said pulleys, so as to stop the same by the friction as nearly simultaneously as possible.

Upon the brake-plate 51, at one side of the machine, is a finger or stud, 52, to prevent the slack belt slipping off the pulley 94; but I find that at the other side of the machine the lever near the end that passes beneath the brake-plate serves this purpose. Upon the levers 33 there are guide-fingers 54 and 55 to prevent the belts slipping off the tightening-pulleys 32. The parts at the two sides of the machine that act with the respective groups of pulleys are alike, with the exception of the fingers or studs and guides for the belts, as seen in Figs. 3 and 4.

It will be apparent that the parts of the stop-motion will not be changed in their mode of operation if the force required to unlatch the catch 40 is derived from a separate shaft instead of from the driving-roller 13 and shaft 14. An illustration of the manner in which this can be done is shown in Fig. 7, wherein the rocking lever 65 has a lateral and rearward projection or continuation that passes at one side of the latch 40, and has at or near its end the claw 69 to be acted upon by a cam or tooth on a revolving shaft, o^7, in a convenient position for giving the required movement to the parts when a faller or detector acts on the rocking lever. The projection or claws, against which the revolving device acts to give end motion to the rocking lever and liberate the stop-motion, may be varied according to the character and location of the revolving device without altering the mode of operation of the parts

Upon the brake-plates 51 there are curved fingers 58, that pass over the edges of the respective spindle-pulleys, so that the pulleys are free to revolve without touching these fingers; but when either spool or bobbin is pulled off its spindle said spindle cannot become detached because the overhanging finger limits the upward movement of the spindle and its pulley. The vertical guide-pin 59, attached at its upper end to the brake-plate 51, serves to guide said plate, and a cross pin or head at the lower end of the pin 59 forms a stop to prevent the brake-plate being lifted too high.

I claim as my invention—

1. The combination, with the spindles, their sockets and pulleys, of a driving pulley or drum and belt, a tightening-pulley, and a lever for supporting and moving the tightening-pulley, a suspending link and latch for holding up the pulley-lever, the fallers, and mechanism for moving the latch off its support and allowing the pulley to descend and slacken the belt when one of the threads is broken, and a loose brake-plate below the spindle-pulleys and between and guided by the spindle-sockets, which brake-plate is lifted by the lever of the tightener-pulley and

pressed against the under side of the spindle-pulleys to stop their rotation when said belt is slackened, substantially as set forth.

2. The combination, with the group of three spindles, their sockets and pulleys, of a driving pulley or drum and belt, a tightening-pulley and lever for the same, and a loose brake-plate below the spindle-pulleys and between and guided by the three spindle-sockets, which brake-plate is lifted by said lever and pressed against the under side of the spindle-pulleys to stop their rotation when the driving-belt is slackened, substantially as set forth.

3. The combination, with the driving-roller 13 and the feed-roller 11, and their respective shafts, of the lever 80, a hanging latch pivoted to the end of said lever 80, a support for the shoulder upon the latch, the link 50, hung to the rear upper part of the latch, the driving mechanism for the spindles, and the mechanism for stopping the same and the fallers, and intermediate mechanism, substantially as specified, for moving the shoulder of the latch off its support when the stop mechanism is to be brought into action, substantially as set forth.

4. The combination, with the feed-roller 11 and the driving-roller 13, of the faller-stand, the fallers pivoted upon the stand, the rocking lever 65, against which the fallers act, and the lever 80 and latch, and the claw for the roller to act upon in giving motion to the latch, substantially as set forth.

5. The combination, with the faller-stand and the feed and driving rollers, of the fallers pivoted to the faller-stand, the rocking lever and its claw, the detector having a finger that acts upon the rocking lever, the lever 80, and the latch 40, pivoted to said lever 80, substantially as and for the purposes set forth.

6. The combination, with the faller-stand, the feed and driving rollers, the rocking lever, lever 80, and latch, of pivoted fallers each having the hooked end projecting in one direction above the pivot and a nearly vertical counter-weight above and at the other side of the pivot, so that the hooked end bears with but little pressure on the thread and the power of the faller increases as it descends, substantially as specified.

7. The combination, with the starting-lever, of a latch pivoted at its upper end to the starting-lever, the link 50, pivoted to the latch at the rear portion thereof, so that the weight tends to move the latch toward its support, the fallers, feed and driving rollers, and intervening mechanism for acting upon the latch, substantially as set forth.

8. The combination, with the spindles, a driving drum and belt, a tightener-pulley, and its lever, of the lever 80, a link suspended from the starting-lever, a latch connected to the lever 80, a faller and a rocking lever with a claw and pushing-point acting against the latch, and a revolving roller acting against the claw to move the same endwise and disconnect the latch, substantially as specified.

9. The combination, with the spindles, a driving drum and belt, a tightener-pulley, and its lever, of the lever 80, a latch hanging from the end of the lever 80, and a link hung from its upper end and behind the latch, so as to limit the backward movement of the latch, and the mechanism, substantially as specified, for acting on the latch when a thread breaks, substantially as set forth.

10. The combination, with the feed-roller, the driving-roller, and the fallers, rocking lever, latch, and lever to raise the feed-roller, of a detector pivoted below the shaft of the driving-roller and the upper end bearing against the thread above the shaft of the driving-roller and below the feed-roller, so as to be brought into action when the angle of the thread is changed by said thread becoming entangled on the feed-roller, substantially as set forth.

11. The combination, with the fallers and stop mechanism, of a starting-lever and a rocking lever and feed-roller, the starting-lever being above and adjacent to the rocking lever, as specified, so that the fallers can be controlled by one hand applied to the rocking lever and the starting-lever can be simultaneously actuated by the same hand, substantially as set forth.

12. The combination, with the feed-roll, of the thread-support 35 in front of the feed-roll and over which support the threads pass from behind, of the stop-motion fallers in front of such thread-support and adjacent to each other, said fallers having projecting ends, so that the threads as guided by one hand will pass in below the hooked ends of the fallers as the threads are drawn taut by the feed-roll.

13. The combination, with the rocking lever and lever 80, of a latch pivoted to the said lever 80 and having the flange or projection 45 extending over the rocking lever, and mechanism, substantially as specified, to give motion to the rocking lever and unlatch the latch, the flange 45 returning the rocking lever to a normal position as the latch falls, substantially as set forth.

Signed by me this 22d day of November, 1887.

JOSEPH E. TYNAN.

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