(No Model.) 2 Sheets—Sheet 1.

J. E. TYNAN.

MACHINE FOR THROWING SILK.

No. 364,784. Patented June 14, 1887.

Fig. 1.

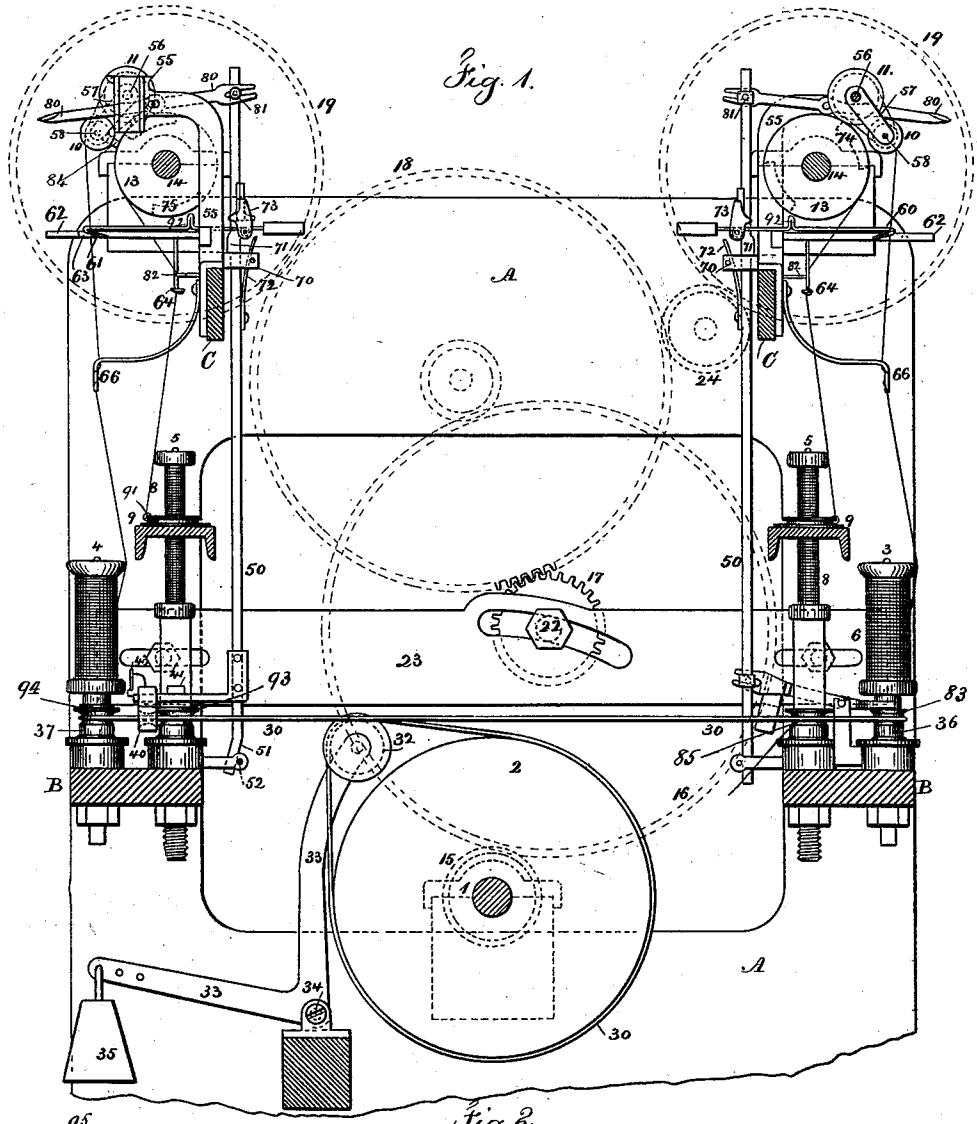
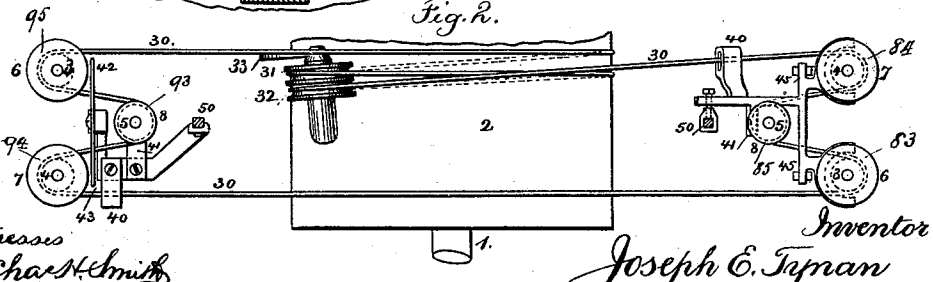


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

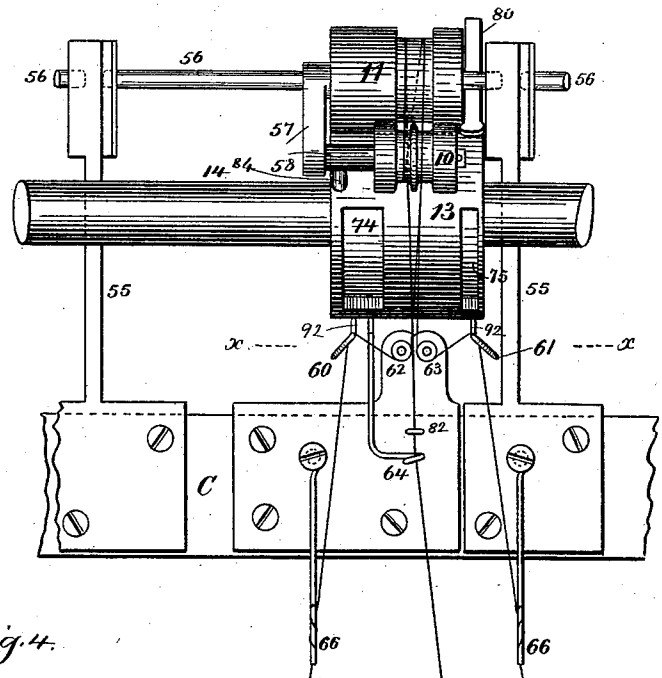
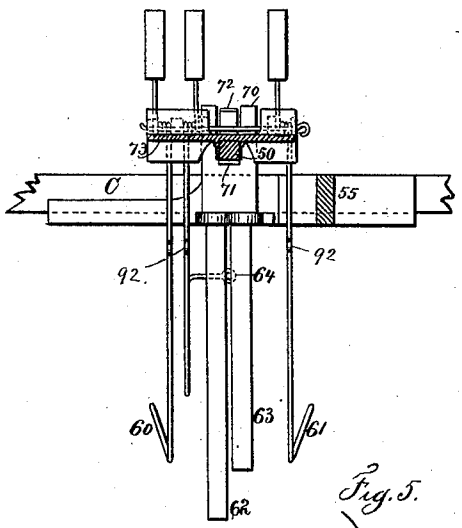


Fig. 4.



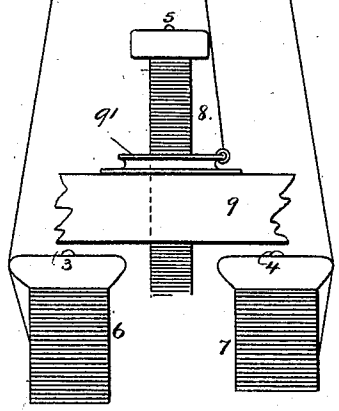
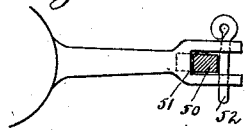


Fig. 5.



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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. 364,784, dated June 14, 1887.

Application filed May 7, 1886. Serial No. 201,417. (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.

In machines for making organzine the silk threads are drawn off of two spools, twisted and then laid together and wound upon a third spool.

The objects of this invention are to improve the machine for twisting and laying up silk threads and forming organzine.

By my improvements I am able to obtain uniformity in the twist of the thread and great delicacy in the action of the stop mechanism, and render the belt very sensitive to the action of the stop-motion and belt-shifter by bringing together the devices hereinafter described.

In the drawings, Figure 1 is a vertical section showing the sets of spindles, the driving, feeding, and stop mechanism, and the frame of the machine. Fig. 2 is a plan view of the spindles and the driving-belts, cylinder, and the belt-tightener, and the braking and belt-shifting mechanism. Fig. 3 is an elevation of the feeding device, faller, and detector wires and guides for one set of spindles and part of the bobbins and ring-rail; and Fig. 4 is a plan at about the line *x x*, Fig. 3. Fig. 5 is a plan view of the forked guide for the drop-bar, said drop-bar being in section.

The frame-work of this machine is composed of metal frames A, connected together by the spindle-rails B, and longitudinal rails or frames C, as usual in this class of machinery.

The main shaft 1 is supported in bearings upon the frames A, and upon this shaft is the cylinder or drum 2, that is of sufficient length to receive all the belts in the machine, or there may be a separate drum to each belt. Upon the spindle-rails are the spindles 3 4 5, adapted to receive the spools 6 7 8. The spools 6 and 7 supply the threads that are twisted together and wound upon the spool 8, and there is a ring-rail, 9, with holes through the same for the spindles 5 and spools 8, and this ring-rail is raised and lowered in any usual manner, and upon this ring-rail is a ring and traveler for the thread passing to each spool 8. The threads from the spools 6 and 7 pass up and around the guide-roller 10 and feed-roller 11, and thence to the ring-traveler 91. The driving-roller 13 is upon a shaft, 14, and this shaft receives its motion from the main shaft by a train of gearing consisting of the pinion 15 on the shaft 1, gear-wheel 16, pinion 17, and gears 18 and 19, the latter being on the shaft 14. In order to vary the speed of the driving-roller 13 in relation to the speed of the spindles 3 4 5, I make the pinion 17 changeable by placing the stud or gudgeon 22 upon which the pinion 17 and gear 16 revolve in a slot in the cross-frame 23, such slot being the arc of a circle from the main shaft 1, so that the gear 16 and pinion 15 may remain in their proper relative position, whether the pinion 17 is large or small. This is of importance in silk-throwing machinery, because it allows for the proper extent of twist being introduced into the organzine or warp.

It will be seen that in order to revolve the driving-roller shaft 14 in the proper direction, at the opposite side of the machine a pinion, 24, is introduced between the gears 18 and 19 at that side of the machine.

In connection with my improvement, it is necessary to revolve the spindles 3, 4, and 5 in the proper directions and at the proper relative speeds, the spindles 3 and 4 being revolved in the same direction to twist the separate threads, and the spindle 5 in the reverse direction to lay the two threads together. The pulley on the spindle 5 should be larger than the pulleys on the spindles 3 and 4, as it does not have to revolve as rapidly as those spindles which twist the single threads; and it is further necessary to stop the revolution of one group of spindles when either thread in that group may break. With this object in view I provide for driving two groups of spindles on opposite sides of the machine with one belt, and in so doing I lead the belt in such a manner that it passes for a considerable distance in a straight line through the belt-shifters to the respective pulleys; hence the belt is very sensitive and easily moved by the belt-shifters, and the belt is long and drives six pulleys; hence the number of belts is lessened and they are easily kept in repair, and the convolutions of the belt around the drum and

guide-pulleys are such that the various portions of each belt run free of contact with the other portions and risk of the belt slipping is avoided.

Upon reference to Fig. 2 it will be seen that the belt 30 passes around the pulleys of the spindles 3, 4, and 5 in the following manner: From the fast pulley 84 of the spindle 4, around the fast pulley 85 of the spindle 5, then around the pulley 83 of the spindle 3, and across the machine to the fast pulley 94 of the spindle 4 of the opposite group of spindles, thence around the fast pulleys 95 and 93 of the spindles 5 and 3 respectively of that group back to the drum 2, over and around beneath that drum, up over the guide-pulley 31, thence around the drum 2 a second time, over the guide-pulley 32 to the pulley 84 at the place of beginning. In this manner I am able to prevent the band slipping on the drum, because it passes around the same twice, and one portion of the belt does not come into contact with any other part, and the belt is very sensitive to the belt-shifters, thereby reducing the wear on the bands and rendering the same very durable.

The guide-pulleys 31 and 32 are preferably upon an axis or gudgeon that is at a slight inclination, as shown in my Patent No. 336,027, and this axis is supported by the bent lever 33, pivoted at 34, and provided with a weight, 35, whereby the slack of the belt is taken up and the proper tension maintained on the same.

The fast pulleys upon the spindles 3, 4, and 5 are above the loose pulleys 36 37, and the belt-shifter 40 acts upon the belt to move the same down upon the loose pulleys when the spindles are to be stopped. This belt-shifter is placed so as to act upon the belt as it approaches the spindle 4, and by depressing the belt at this point or raising it the belt will be caused to run off of the fast pulleys upon the loose pulleys, or the reverse, in the group of spindles.

There is a finger, 41, projecting from the stock of the belt-shifter and forming a brake for the spindle 5, and two spring-fingers, 42 43, which are adjacent to the spools upon the spindles 3 and 4 and form brakes for the same. These brakes are out of contact with the respective spindles or spools, except when the belt-shifter is depressed for shifting the belt from the fast to the loose pulleys. The particular form of the belt-shifter and the respective brakes may be varied. At one side of the machine I have shown these parts as pivoted at 45 and acting by leverage when moved by the drop-bar 50. At the other side of the machine I have shown the same parts as bolted to the drop-bar 50 and rising and falling with the same; and in this case the lower end of the drop-bar is inclined, as shown at 51, so that as it moves against the guide 52 the brakes will be carried laterally and brought into contact with the respective spindles or spools at the same time that the belt is shifted. It is preferable to fork the guide 52 for the inclined lower end of the drop-bar to pass through, as shown in Fig. 5.

In cases where the threads pass one or more times around the feed-roller one convolution is liable to run upon another and bind it to the roller, and the threads will wind upon the feed-roller and form waste, and this risk is increased where the feed-roller is driven by contact with a feeding-drum. I avoid these difficulties by leading the threads around a grooved guide-roller and a grooved feed-roller, as hereinafter stated, so that the threads are kept separate and are not subjected to lateral pressure.

Rising above the frames A and the shaft 14 of the driving-rollers are the brackets 55, which project outwardly and are provided with vertical slots in their faces for the reception of the ends of the shaft 56, that passes through the feed-roller 11, and there is a link, 57, projecting downwardly from the shaft 56 and having a gudgeon, 58, upon which the guide-roller 10 revolves. There is a stop, 84, projecting from the link 57 on the gudgeon 58, and this stop takes against the periphery of the driving-roller 13 and keeps the guide-roller 10 from contact with said roller 13. The surface of the feed-roller 11 is made smaller in the middle portion, so that the thread passing around this portion of the roller will not come into contact with the surface of the driving-roller 13, and in the surface of the guide-roller 10 there are two grooves for the threads.

The threads from the spools 6 and 7 pass up over the faller-wires 60 61, down beneath the cylindrical guides 62 63, up over one of the grooves in the guide-roller 10, around the feed-roller 11, back again and around the guide-roller 10 in the other groove, over the feed-roller 11, down against the surface of the driving-roller 13, down through the stationary eye 82, and through the eye of the detector 64 to the ring-traveler of the spool 8. By passing the threads around the feed-roller and guide-roller in the manner described the requisite tension is obtained for drawing the threads along, and the possibility of one convolution winding upon another convolution is entirely avoided, and by connecting the gudgeon of the guide-roller with the axis of the feed-roller the two can be taken out and handled together, which greatly facilitates the operations in introducing or mending the threads. I prefer to make use of the guide-fingers 66, pointing downwardly and in line with the axis of the respective spools 6 and 7, so that each thread will be twisted around its finger as it passes upwardly over the faller-wires and down below or through the guide, (at 62 63,) and up to the feed-roller, thus giving sufficient tension to hold down the fallers and prevent them stopping the machine, except when a thread breaks, and such thread will diverge from such finger to the edge of the spool as such spool revolves and twists the thread, and the two threads will be laid together by the ring-traveler, the twist extending up through the

eye of the detector 64 to the surface of the driving-roller 13.

It is to be understood that no care or attention of the attendant is required to wrap the thread around the finger 66, and in starting the machine it is only necessary to pass the thread over the faller-wire and rollers, and as the thread is drawn upwardly and twisted by the revolution of the spool it is carried against and wrapped around said finger by the revolution of the spool from which the thread is drawn.

In case either thread breaks, it is easily repaired, because the feed-roller 11 and guide-roller 10 can be lifted together, so that the shaft 56 is above its bearings, and the threads can be passed over and then under the respective rollers and the parts returned to place; and to further facilitate this repairing of the threads I make the cylindrical guide 62 longer than the guide 63, so that the thread can easily be slipped in between the two guides by pressing it against the side of the projecting guide 62. These guides 62 and 63 are preferably glass tubes slipped upon wires that project from the brackets upon the frame of the machine.

The drop-bar 50 is provided with a stop, 71, that rests upon the top of the jaw 70, and there is a spring, 72, that presses the stop 71 over the jaw. Upon the drop-bar is a cross-head, 73, to which are pivoted the faller-wires 60 61 and the detector 64. These faller-wires and detector are counterbalanced, so that the weighted ends will descend when the outer ends are not held down by the respective threads. Upon each faller-wire and detector is an upwardly-bent loop or projection, 92, adjacent to the under side of the driving-roller 13, and in this driving-roller 13 there are recesses 74 75, and these recesses may be at one side only, or they may be at both sides. The part of the roller between these recesses is plain and against it the doubled thread passes, and the portions of the feed-roller 11 that are in contact with the driving-roller 13 are wider than the recesses; hence the feed-roller 11 cannot drop into these recesses. At one side of each bracket 55 is a lever, 80, passing beneath the shaft 56, and having at its back end a jaw through which passes the screw 81 into the drop-bar 50. The operation of these parts is that whenever either thread from the spool 6 or 7 breaks, or the organzine, passing down to the ring-traveler, breaks, the stop-motion is brought into action by either faller-wire 60 or 61 or the detector 64, swinging by the counterweight, so that the projection thereon passes up into either the recess 74 or 75, and the driving-roller 13, as it revolves, presses against the projection on the faller-wire or detector, forcing the drop-bar 50 backwardly and unlatching the stop 71, and allowing said drop-bar to descend and shift the belt from the fast to the loose pulleys and apply the brakes to such pulleys, and at the same time the lever 80 lifts the feed-roller 11 from contact with the driving-roller 13 and stops the feed. The parts remain in this position until the threads have been repaired or a fresh spool inserted, and when the threads have been placed in their proper positions the machine is started by simply pressing the outer ends of the faller-wires 60 61 and the detector 64 with the edge of the left hand and placing the thumb on the lever 80, and thereby bringing the feed-roller in contact with the driving-roller 13 and shifting the belt from the loose to the fast pulleys of the respective spindles, and at the same time the loose threads are guided by the right hand as the winding progresses until the slack is taken up. These arrangements that allow the starting to be done with one hand greatly increase the facility with which the machine can be used.

I do not claim, broadly, the arrangement of the three spindles, as shown in the drawings, and driving them by one endless belt, as that forms the subject of my application for Patent No. 199,883, filed April 23, 1886. In cases where pins or projections have been used on the driving-roller to act on the faller-wires they are liable to catch the threads, especially when mending such threads. This difficulty is avoided by making the recesses in the driving-roller to act upon the stop-motion.

I am aware that in drawing-heads the upper roller has been provided with a grooved tripper and a projection within the groove to act on the stop-motion lever if the sliver breaks or is too thin. In my improvement the recesses are in the driving-roller itself and are free from the objections and difficulties heretofore experienced, where there are pins to act on the stop mechanism, and around which the threads are liable to become entangled.

I claim as my invention—

1. The combination, with the spindles 3 4 5 and their fast and loose pulleys in groups at the opposite sides of the machine, of the endless driving-belt 30, the cylinder or drum 2, and the two guide-pulleys 31 32, the belts being passed around the respective pulleys and twice around the driving-drum, substantially as and for the purposes set forth.

2. The combination, with the drum 2, spindles 3 4 5, and their respective fast and loose pulleys, of the belt 30, passing around the pulleys of the three spindles, the belt-shifter 40, and the brakes 41 42 43 for the respective spindles, and the drop-bar 50, with which the belt-shifter is connected, substantially as specified.

3. The drop-bar 50, having an incline at its lower end, and a guide, 52, in combination with the belt-shifter 40, brakes 41 42 43, and the spindles 3, 4, and 5 and their pulleys, substantially as set forth.

4. The combination, with the driving-roller 13, of the feed-roller 11 and the shaft 56 for the same, the grooved guide-roller 10 and the gudgeon and link for the same, and the slotted brackets 55 for the shaft 56, substantially as set forth.

5. The driving-roller 13, having recesses in

the face thereof, in combination with a stop mechanism having a faller-wire that rests against the thread, and moves when the thread breaks and enters one of the recesses and comes into contact with and is moved by the recessed roller, substantially as set forth.

6. The driving-roller 13, having recesses in its surface, in combination with the faller-wires 60 61, detector 64, cross-head 73, drop-bar 50, to which the cross-head is fastened, supports for the drop-bar, the lever 80, and the feed-roller 11 and its shaft 56, beneath which the lever 80 passes, substantially as set forth.

7. The combination, with the driving-roller, feed-roller, and the guide-roller, of the faller-wires 60 61, the detector 64, the cylindrical guides 62 and 63, the drop-bar 50, supports for the same, and the belt-shifter, substantially as set forth.

8. The combination, with spindles for the supply and winding spools, the feed-roller, and the stop-motion faller-wires, of the cylindrical guides 62 and 63, one of which projects beyond the other, for the purposes and substantially as set forth.

9. The faller-wires 60 61 and the detector 64, adjacent to each other, so as to be simultaneously held down by one hand, and the starting-lever 80, that can be operated by the thumb of the same hand, in combination with the feed-roller 11 and the spindles for the bobbins, substantially as set forth.

10. The combination, with the downwardly-projecting guide-fingers 66, around which the threads are wrapped by the revolution of the spools, and the spindles 3 and 4, of the stop mechanism having the faller-wires 60 61, the feed-roller, and a guide between the faller-wires and the feed-roller, substantially as set forth.

11. The combination, with the feed-roller and the driving-roller, of two faller-wires for the two threads, and the detector for the double thread and the drop-bar and mechanism, substantially as specified, for stopping the bobbins and the feed-roller, the driving-roller acting on either faller-wires or detector to bring into action the stop mechanism, substantially as set forth.

12. The combination, with the stop mechanism and the feed-roller, of the guides 62 63, beneath and between which the threads pass and ascend together after being carried separately over the faller-wires of the stop-motion, substantially as specified.

Signed by me this 5th day of May, A. D. 1886.

JOSEPH E. TYNAN.

Witnesses:

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WALLACE L. SERRELL.