No. 784,365. PATENTED MAR. 7, 1905.

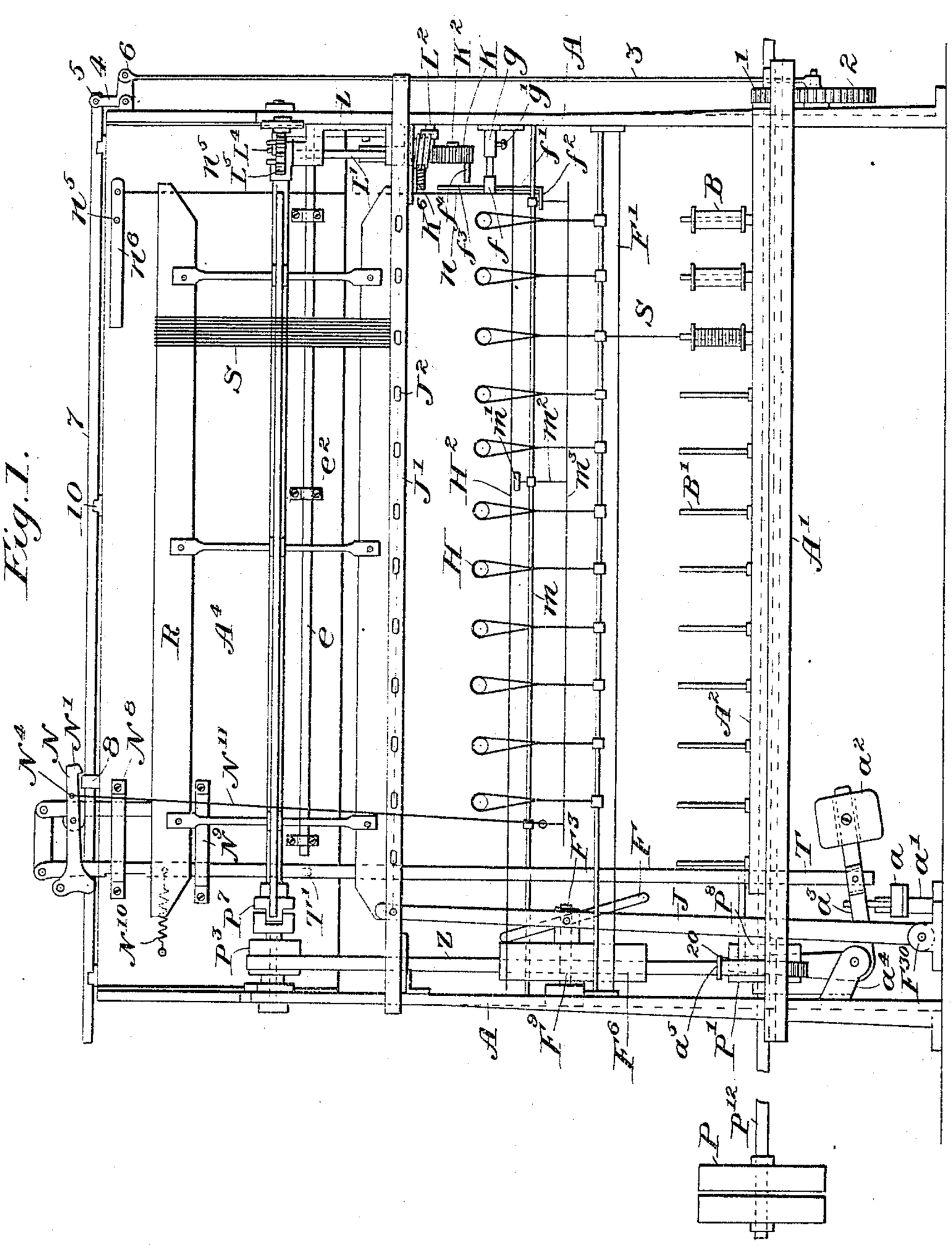
J. E. TYNAN.

REELING MACHINE.

APPLICATION FILED AUG. 19, 1904.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

Fig. 2.

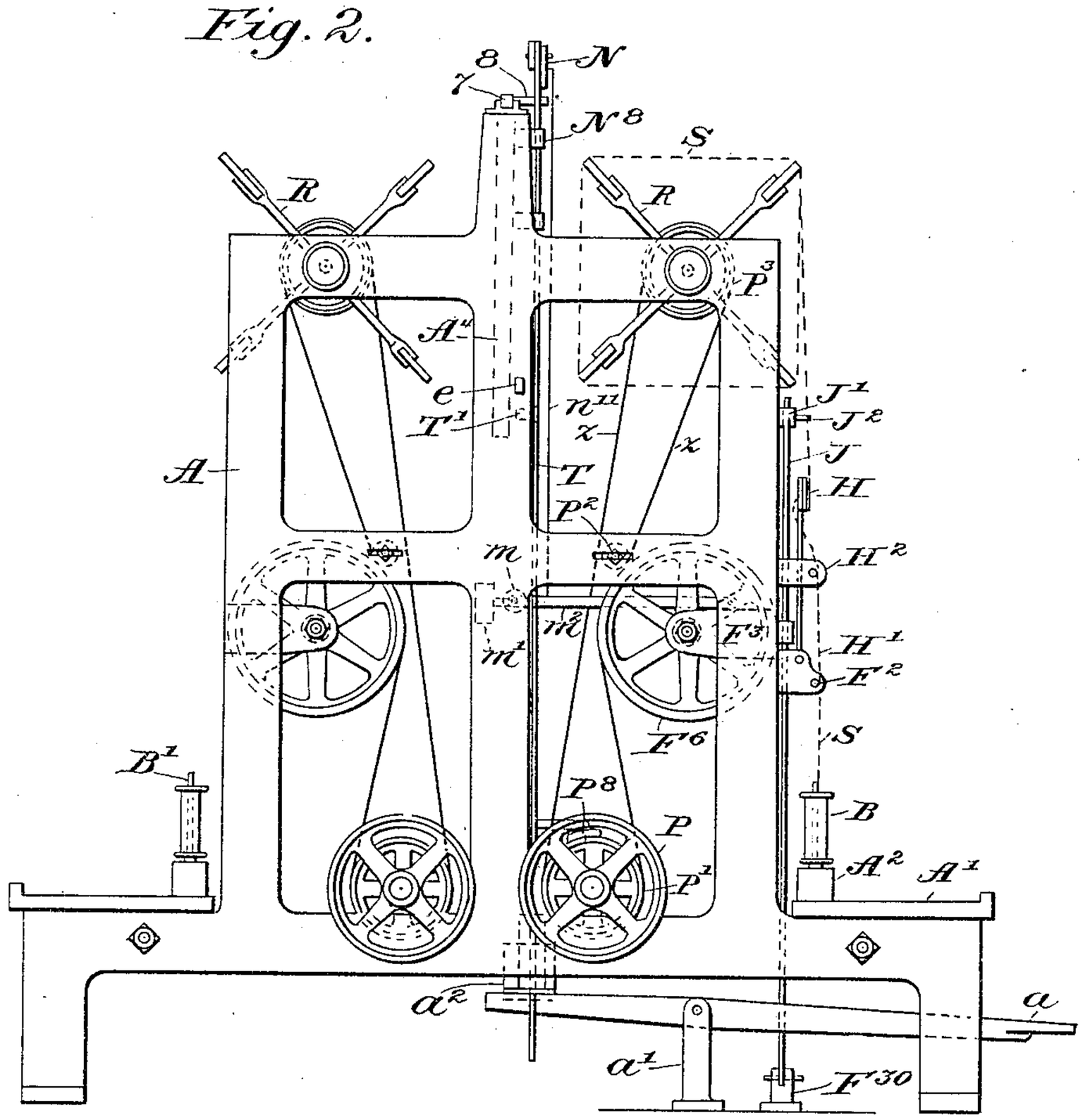
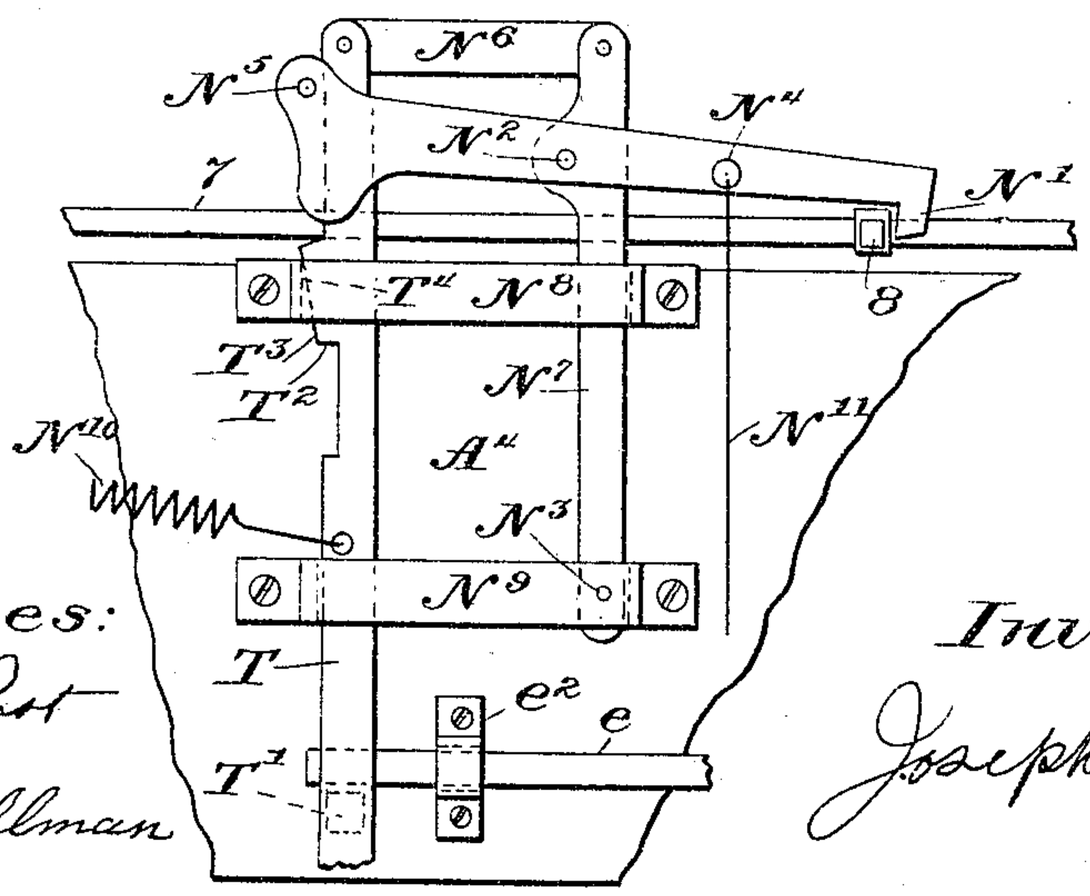


Fig. 4.



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4 SHEETS—SHEET 3.

Fig. 3.

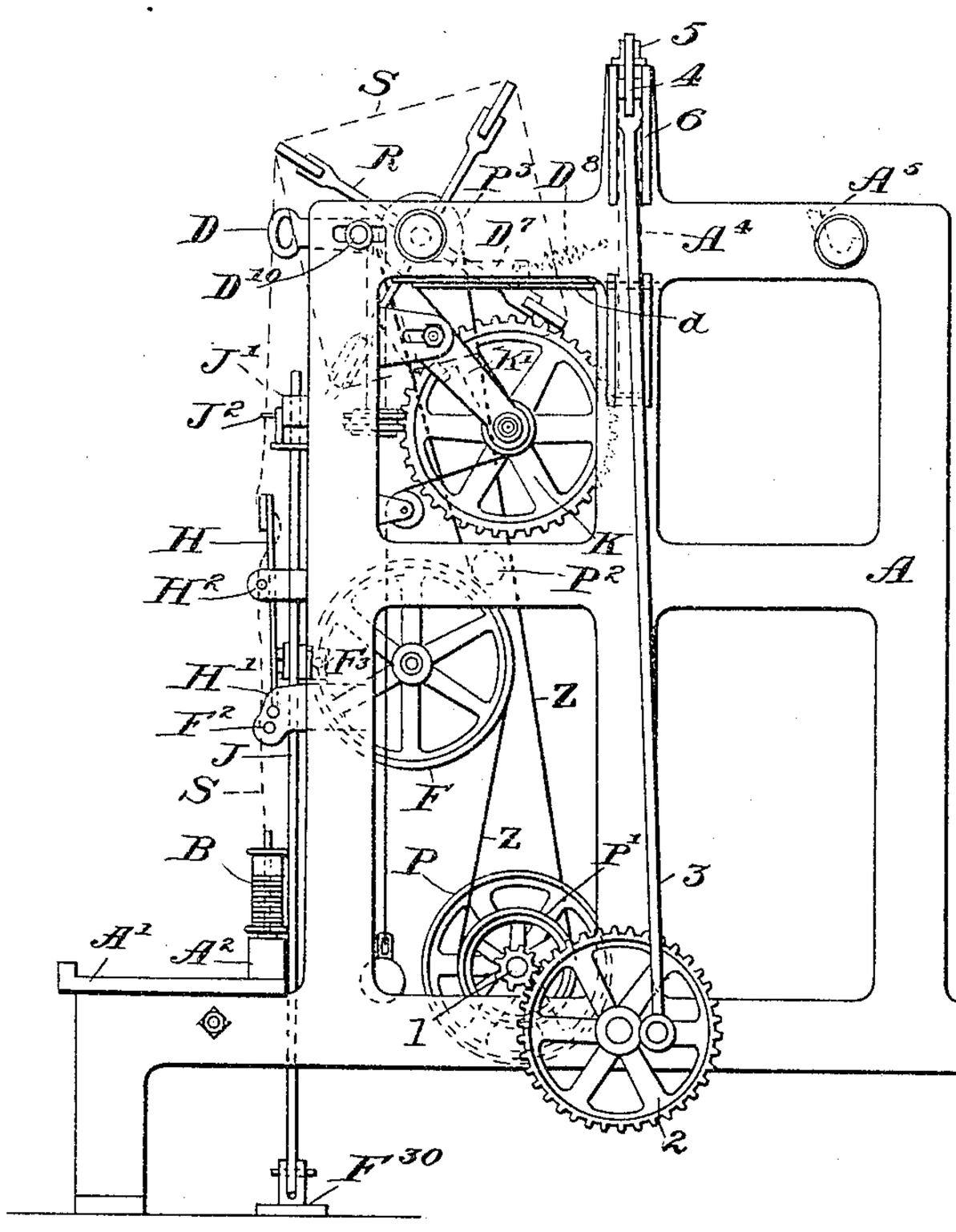
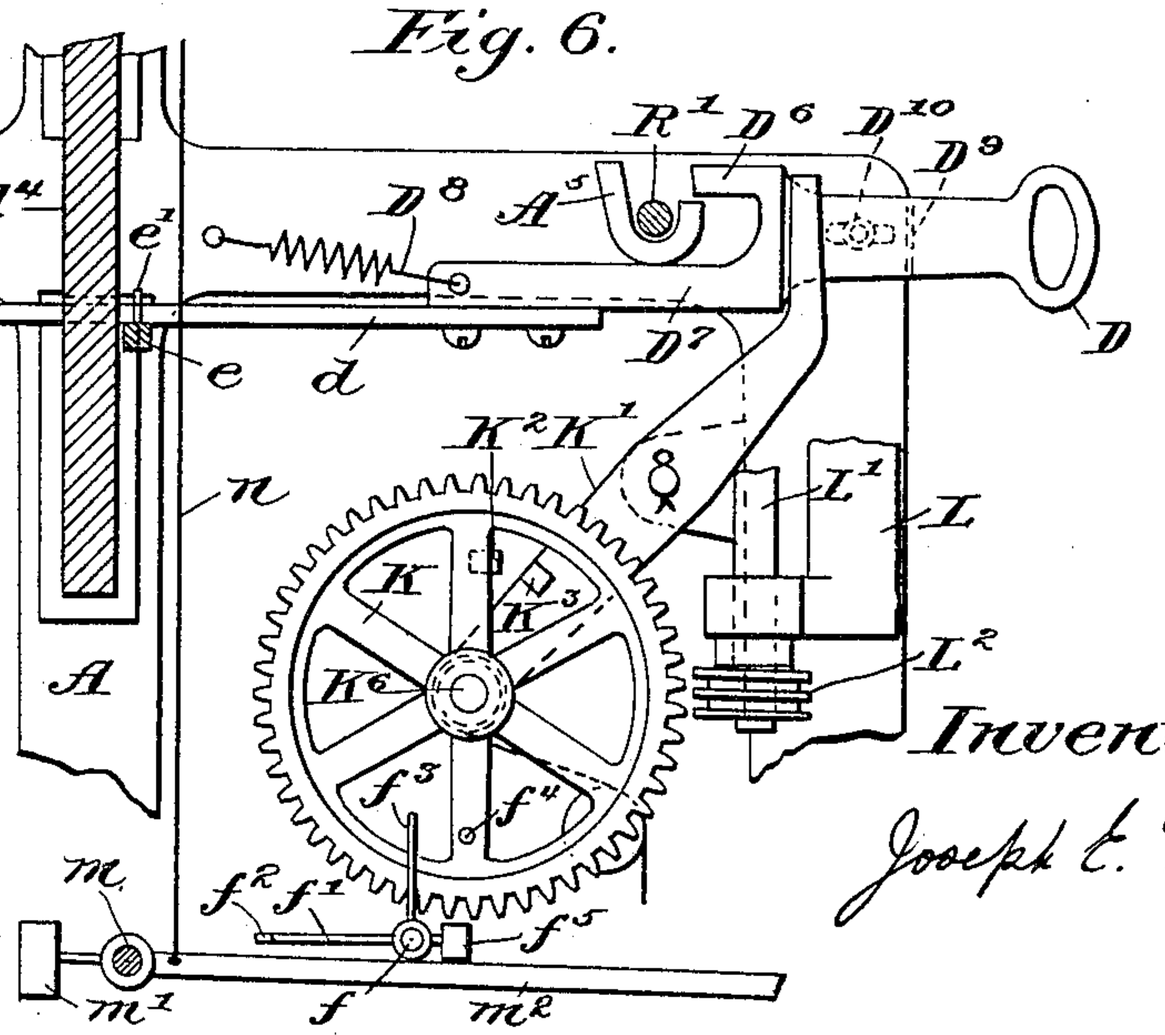


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 5.

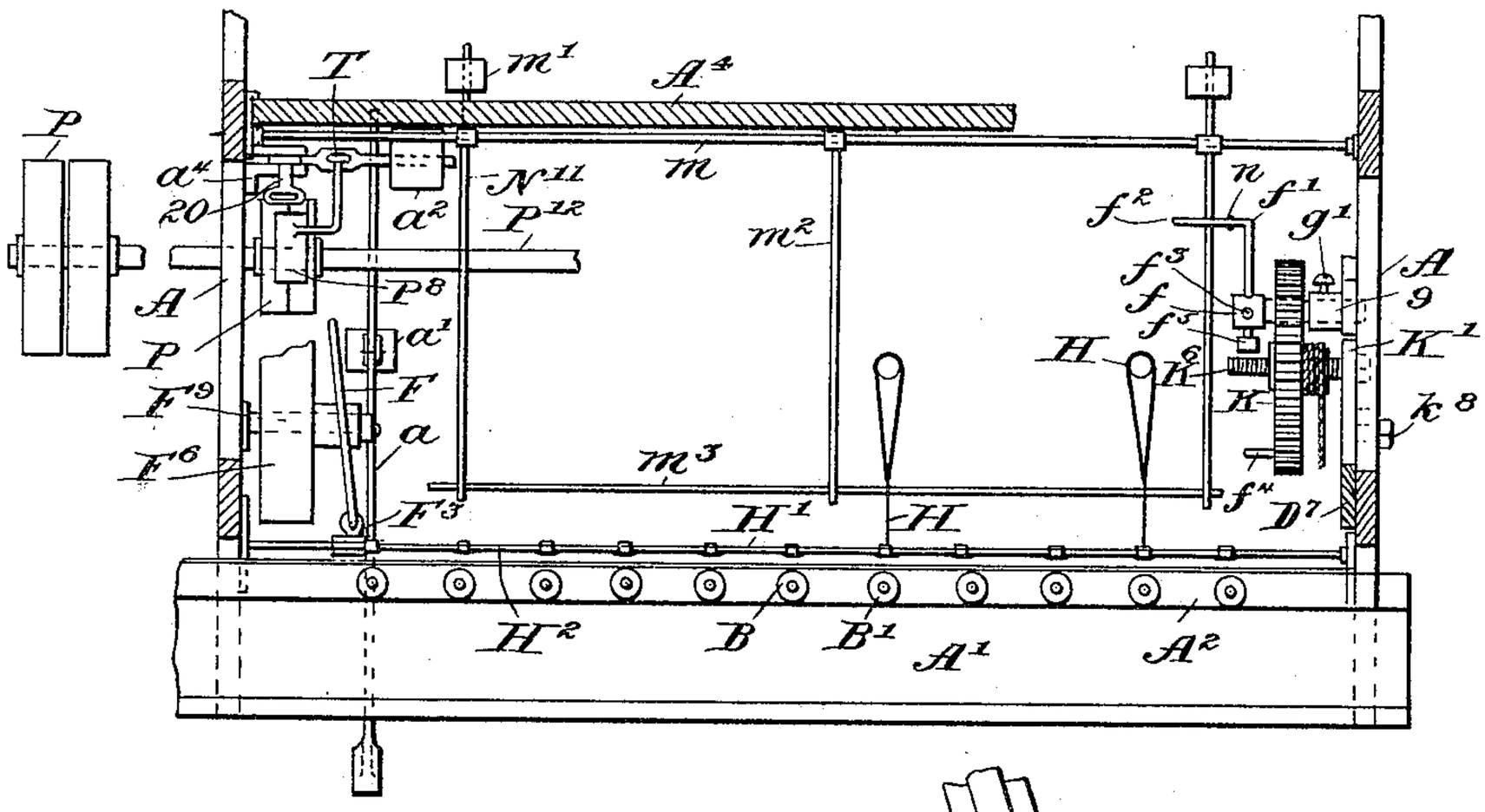


Fig. 7.

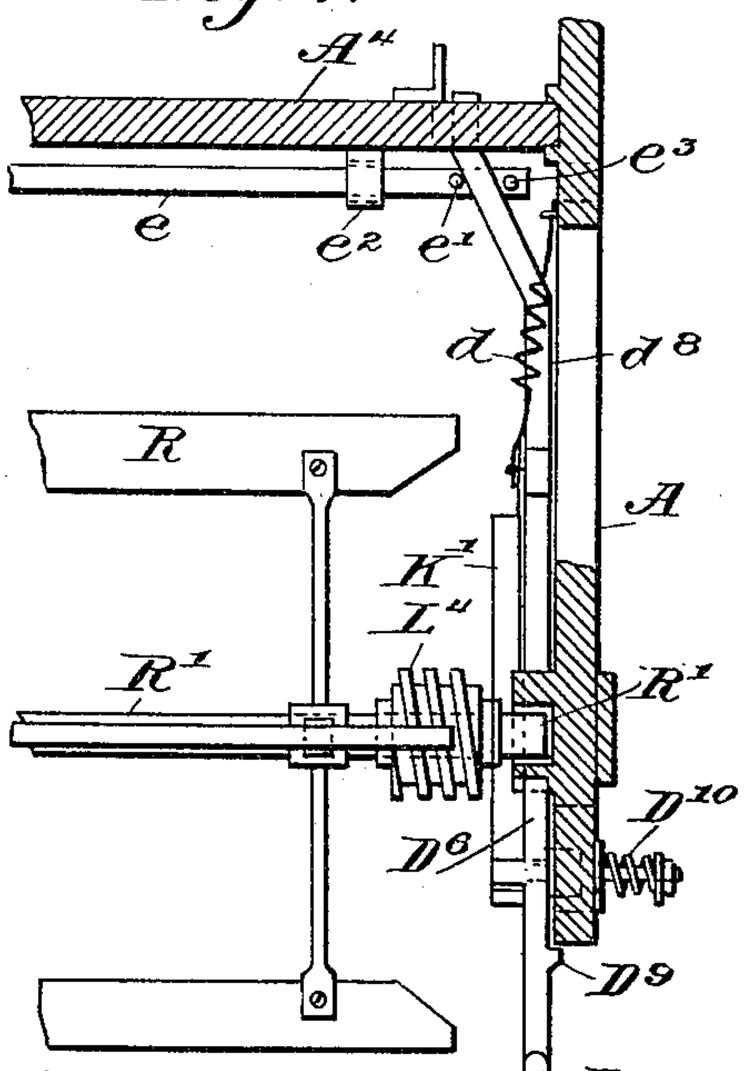


Fig. 8.

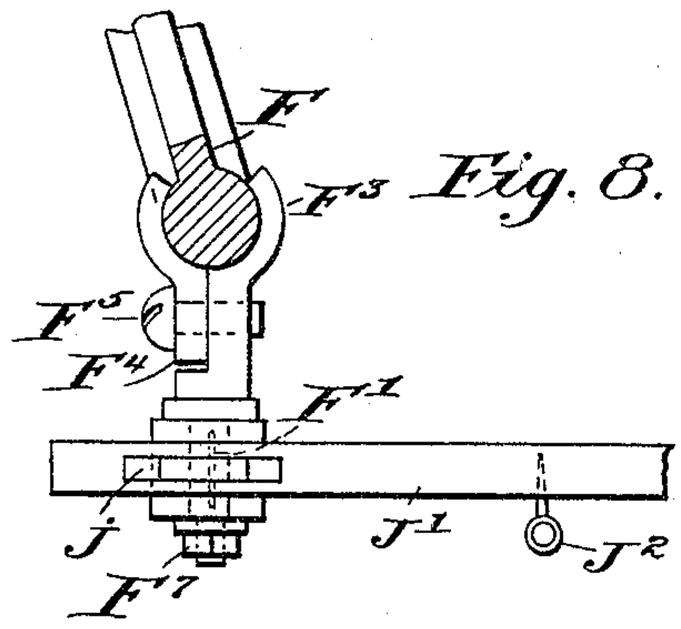
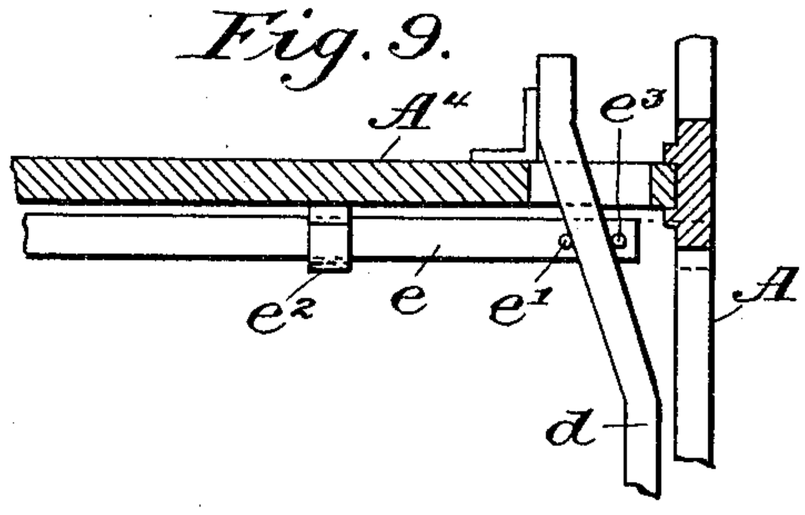


Fig. 9.



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Inventor:

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No. 784,365. Patented March 7, 1905.

UNITED STATES PATENT OFFICE.

JOSEPH E. TYNAN, OF PATERSON, NEW JERSEY.

REELING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 784,365, dated March 7, 1905.

Application filed August 19, 1904. Serial No. 221,423.

To all whom it may concern:

Be it known that I, JOSEPH E. TYNAN, a citizen of the United States, residing at Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Reeling-Machines, of which the following is a specification.

My improvements relate particularly to the method of oscillating the traverse-bar that controls the laying of the thread upon the reel and to the stop-motion and measuring devices provided for the machine.

In the drawings, Figure 1 is a front elevation of the reeling-machine. Fig. 2 is an end elevation of the same, showing the arrangement of the parts at the end of the machine at which the power is applied. Fig. 3 is an end elevation of the same, showing the arrangement of parts at the end of the machine at which the measuring mechanism is located. Fig. 4 is a front elevation of the latch mechanism which controls the stopping and starting of the machine. Fig. 5 is a sectional plan view of one side of the machine. Fig. 6 is an end elevation of part of the machine, showing the measuring mechanism. Fig. 7 is a sectional plan view of a portion of the machine, showing, among other things, the method of locking the reel in the machine. Fig. 8 is a plan view of the cam and grip that causes the oscillating of the traverse-bar, and Fig. 9 is a plan view of mechanism the object of which is to prevent the machine from being started up when the reel is not locked in place.

Throughout the drawings similar letters and figures indicate similar parts.

The frame of the machine is shown at A.

At A′ is a board to hold bobbins.

At A^2 is a rail carrying the pins B′, upon which the bobbins B are placed when the thread is to be drawn from them.

At A^4 is a board upon which the mechanism shown in Figs. 4 and 9 is mounted. This board serves the purpose of preventing the draft of air caused by a revolving reel from passing across and disarranging the threads upon the opposite side of the machine.

At A^5 (best shown in Figs. 3 and 6) is the pocket in the frame, in which rests one end of the reel. The other end of the reel is supported by a clutch, the part P^7 of which is secured to the pulley P^3 and the other part of which is secured to the shaft of the reel. The reel, which is the ordinary reel used in such machines, has four blades R, supported by arms radiating from a central shaft R′. Upon this reel are wound the threads S, which are drawn by the revolution of the reel from the bobbins B upon the pins B′. The reel receives motion from the pulley P^3, revolving on a stud secured to the frame and driven by the belt Z, said belt in turn deriving its motion from the pulley P′, secured to the shaft P^{12} and driven by power applied to the driving-pulley P.

The machine is provided with fallers H, pivoted upon the rod H′. The thread in passing from the bobbin B to the reel passes over a rod F′, in front of a rod H^2, through the eye of the faller H, and through the guide J^2 upon the traverse-bar J′. The tension of the thread when it is being drawn from the bobbins by the revolution of the reel keeps the fallers H upright against the rod H^2, although the natural tendency of the fallers is to fall backward. When a thread breaks, the faller H relating to it tips backward to the position shown in Fig. 5 and falls upon the rod m^3 of the rock-lever m, which rock-lever is so balanced by the adjustable weights m' that the rod m^3 is kept in its most elevated position when the machine is running. The faller H, tipping back, as I have said, when a thread breaks or a bobbin is empty, overbalances the rock-lever m, so that the rod m^3 descends. A link N^{11} has one of its ends secured to this rock-lever, as shown in Fig. 1, and its other end secured at N^4 to a lever N, having the tooth N′.

A rod 7 runs the entire length of the frame and slides in the brackets 10. The shaft P^{12} has upon one end the gear-wheel 1, which meshes with the gear-wheel 2, revolving upon a stud. One end of a rod 3 is secured to a crank-pin on the gear-wheel 2, and the other end of the rod 3 is secured at 6 to the bell-crank lever 4, rocking on a support secured to the frame of the machine. The other end of the bell-crank lever is secured at 5 to the rod 7, and consequently this rod 7 is given a

constant reciprocating lateral motion by the revolution of the shaft P^{12}. In order to disclose clearly the object of this laterally-moving rod 7, I refer to Figs. 4 and 1, where two brackets N^8 and N^9 are mounted upon the board A^4. These brackets inclose a drop-rod T and an upright N^7, which is pivoted at N^3. The upper end of the upright N^7 is connected by the link N^6 with the drop-rod T. Upon the upright N^7 is mounted the lever N, swinging at N^2 and having the tooth N'. This lever is weighted at the end farthest from the tooth N', so that unless the tooth end is drawn down by the link N^{11} the other end will be the lowest and the tooth N' will be kept above the path of the block 8, which is secured to the rod 7.

At N^5 is a pin the purpose of which is to impinge against the drop-rod T when the tooth end of the lever N is drawn downward, and so limit the stroke of the lever. The drop-rod T when the machine is running is latched at T^2 upon the shoulder T^4 of the bracket N^8. A spring N^{10} tends to keep the rod latched. When the link N^{11} is drawn downward by the action of the fallers, as hereinbefore described, it draws the tooth N' into the path of the block 8 upon the laterally-moving rod 7. The block, impinging against the tooth N', causes the upright N^7 to swing at N^3, and by means of the link N^6 the drop-rod T is unlatched and is caused to fall by the weight a^2. When the drop-rod falls, the wedge T^3 (shown best in Fig. 4) imparts a lateral motion to the link N^6 and the upright N^7, so that when the drop-rod has fallen the tooth N' rests at a point where the block 8 upon the laterally-moving rod 7 does not reach it. The weight a^2, which causes the rapid descent of the drop-rod, is upon a bell-crank lever secured to the drop-rod and mounted in a bracket a^4, secured to the frame of the machine. This mechanism is shown best in Figs. 1 and 5. The opposite end of this bell-crank lever carries a belt-shipper 20, which as the drop-rod T descends throws the belt Z from a fast pulley to a loose pulley. Secured to the drop-rod is the brake-shoe P^8, which the descent of the drop-rod brings in contact with the upper surface of the loose pulley, which pulley, having the belt Z upon it, is held from revolving while the shaft P^{12} revolves within it. The parts are thus brought to a stop.

It would be as well at this point to state that the machine shown in Fig. 1 is in reality but one section of a machine. The shaft P^{12} extends the entire length of a machine and driven by the pulley P continues at all times to revolve, whether any particular section of the machine is stopped or going. The laterally-moving rod 7 also runs the entire length of the machine and driven by the gear-wheels 1 and 2 and the rod 3 and its connections at all times maintains its reciprocating lateral motion and acts as a stopper on all sections on both sides of the machine. In all other respects each section is a separate machine, and its operation has no effect upon the operation of adjoining sections. For the purpose of starting up a section after it has been stopped for any cause I have provided the lever *a*, having a foot-piece at its outer end and having its inner end underneath and adjacent to the lever carrying the weight a^2. This lever *a* is supported by and swings within the bracket *a'*. (See Fig. 2.) When the operator presses his foot upon the outer end of the lever *a*, the inner end of the lever raises the drop-rod T and through the action of the spring N^{10} causes the part T^2 to latch upon the ledge T^4. The raising of the drop-rod raises the pulley-brake P^8 and through the medium of the bell-crank lever mounted in the bracket a^4 causes the belt-shipper 20 to move the belt Z from the loose pulley to the fast pulley. The reel now begins to revolve. The tension on the threads causes them to sustain the fallers, and the rod m^3, overbalanced by the weights *m'*, rises, carrying upward the link N^{11} and allowing the weighted end of the lever N to raise the tooth N' above the path of the block 8 on the laterally-moving rod 7.

The measuring device which forms part of this invention is more simple in construction and efficient in operation than the devices usually employed for this purpose. Fig. 7 shows a worm L^4 upon the end of the central shaft R' of the reel. This worm (see Fig. 1) drives a worm-wheel L^5 upon the shaft L', mounted in the bracket L, which bracket is secured to the frame of the machine. At the lower end of this shaft L' is another worm, L^2, which meshes with the teeth of the worm-wheel K and causes said wheel to revolve. Referring to Fig. 6, it will be seen that the wheel K revolves upon a stud K^6, secured in the pivoted lever K'. Upon the wheel K is a lug K^2, and upon the lever K' is a lug K^3. The wheel K is also provided with a pin f^4. The use of these parts will be described hereinafter. A slide D is loosely secured to the frame of the machine by the stud D^{10}, which stud is securely fastened in the slide, but is capable of being moved laterally in a slot in the frame of the machine. A coiled spring upon the outer end of the stud keeps the slide D pressed closely against the frame. These parts are shown in detail in Fig. 7. A further spring D^8 inclines to keep the slide pulled inward, and a shoulder D^9 upon the slide limits its inward movement. At D^6 is a wing forming part of the slide D. This wing is adjacent to the shaft R' of the reel, resting in the bearing A^5. If the slide D is pushed slightly to the left, so that the shoulder D^9 will no longer impinge against the frame of the machine, the spring D^8 will pull the slide inward and the wing D^6 will cover the end R' of the reel-shaft. This is the position the

parts are in when running, the wing D^6, besides answering a further purpose hereinafter mentioned, being a protector to prevent the reel from being thrown out of the machine when it is running at a high rate of speed. It will be noticed, particularly in Fig. 6, that the upper part of the lever K′ rests against a projection on the slide D, which projection really sustains the weight of the wheel K when the parts are in the position shown in said Fig. 6. Therefore when the slide D is moved inward, so that the wing D^6 is over the shaft R′, the lever K′ moves so as to allow the teeth of the wheel K to mesh with the worm L^2.

A stud *f* is secured by a screw *g′* in a hub 9. On the stud *f* is a hinged lever *f′*, having the fingers f^2 and f^3. The weight f^5 is for the purpose of balancing this finger f^2, which finger rests adjacent to one of the bars m^2 of the rock-lever *m* that operates the stop-motion device. When through the revolution of the worm-wheel K the pin f^4 presses against the finger f^3, the finger f^2 will force down the bar m^2 of the rock-lever, and so bring the stop-motion mechanism of the machine into action the same as would be the case if a thread should fail and a faller should fall. The above is exactly what takes place when a sufficient number of yards of thread have been wound upon the reel. The worm L^4 as the reel revolves drives the worm-wheel L^5. The latter by means of the shaft L′ drives the worm L^2, and the latter meshes with the teeth of the wheel K and causes said wheel to revolve until the pin f^4 presses against the finger f^3.

When the required number of yards of thread have been wound upon a reel and the section of the machine containing such reel has stopped, the operator then desires to lift the reel from the machine and replace it with an empty one. His first movement is to pull the slide D outward and allow the spring D^{10} to hold it against the frame of the machine, so that the shoulder D^9 will lock upon the frame. Figs. 6 and 7 show this part of the mechanism most in detail. The outward movement of the slide moves the wing D^6 from over the reel-shaft R′, and the reel is free to be lifted out, as the clutch at the other end of the reel is readily separated when the end of the reel held by the wing D^6 is free. The outward movement of the slide D causes an outward movement of the upper part of the lever K′, and the wheel K thereupon swings out of mesh with the worm L^2 to the position shown in Fig. 6. The wheel K is then free to be revolved until the lug K^2 upon the wheel is against the lug K^3 on the lever K′, which is the position it should be in when a new measuring operation is started. The wing D^6 on the slide D prevents the operator from removing a reel from the machine without pulling out the slide D, so as to allow a readjustment of the measuring mechanism. When a new reel is put in the machine and the shoulder D^9 is released from its impingement against the frame, the wing D^6 again protects the shaft R′ of the reel, and the wheel K again comes into mesh with the worm L^2.

In order that the operator may not start up the machine without releasing the slide D to throw the wheel K into mesh with the worm L^2 and allow the protecting-wing D^6 to slide over the shaft R′ of the reel, I have applied to the machine a locking device which consists, primarily, of the bar *e*, Fig. 1, sliding in the brackets e^2, which are secured to the board A^4. In this rod *e*, Figs. 7 and 9, are two pins *e′* and e^3. Resting between these pins and extending through an opening in the board A^4 is a bent rod *d*, the forward end of which is secured to the part D^7 of the slide D. The moving in and out of the slide D causes the bend in the rod *d* to act as a wedge between the pins *e′* and e^3, causing the rod *e* to slide laterally in one direction when the slide D is moving in and in the other direction when the slide is moving out. In Fig. 4 is shown a lug T′ upon the drop-rod T. The rod *e* is shown slid above this lug, which is the position it assumes when the slide D is pulled out. It is obvious from Fig. 4 that in any effort made to raise the drop-rod T and start the machine the lug T′ will strike against the rod *e* and prevent the drop-rod from being raised. When the slide D is allowed to go back to its running position, the rod *e* will move laterally to such a position that it will not interfere with the raising of the drop-rod T. Another feature of this arrangement is that when the machine is running the slide D cannot be pulled outward and the measuring interrupted or the bearing A^5 left unprotected by any accident or carelessness, as the position of the parts is such that any effort to pull it out would move the rod *e* laterally and cause its end to strike against the lug T′ on the drop-rod T. As the rod *e* would therefore be unable to move any distance, the slide D, interlocked with it, could not be pulled forward.

In reeling-machines the usual method of moving the traverse-bar is by the motion of a crank applied to one end of the bar. This has never been satisfactory, for the reason that it is impossible to make a perfect skein from a crank motion. By reason of the slowness of the crank in turning at each extreme of its stroke the skeins produced are thicker on the edges than in the center. I therefore decided to move the traverse-bar in the present machine with a cam instead of with a crank; but to do so successfully I was obliged to provide a form of cam which will give a large rubbing-surface, so as to minimize the wear, a grip capable of being adjusted in case of wear of the cam or of itself, and a method of connecting the grip with the traverse that

will enable the grip to adjust itself to the different positions assumed by the surface of the cam against which it rubs. This latter feature is particularly valuable in minimizing the shock to the parts at the turning-points of the traverse motion.

Referring to Fig. 1, the traverse-bar of the machine is shown at j'. This bar slides in supports and receives a lateral reciprocating motion from the traverse-lever j, which lever has its upper end pivoted to the traverse-bar and its lower end pivoted to the standard F^{30}, secured to the floor. The traverse-bar is provided with the eyes j^2, one for each thread to be laid upon the reel. The traverse-lever j is oscillated by means of the cam F through the medium of the grip F^3, secured to the traverse-lever. The cam F is secured to the pulley F^6 upon the stud F^9. This pulley F^6 receives its motion from the belt Z as said belt passes up from the driving-shaft to drive the reel. Fig. 2 best illustrates this part of the device. At P^2 is shown a tightening-pulley capable of being adjusted, which pulley presses the belt Z against the pulley F^6. The pulley P^2 can be used to tighten the belt when necessary.

The construction of the cam F and the grip F^3 is shown best in Fig. 8. The cam F has a rounded periphery which the grip F^3 partly encircles. The grip is secured to the traverse-lever j by means of the stud and nut F^7. Fig. 8 also shows the traverse-lever j passing through a slot in the traverse-bar j' and secured to the traverse-bar by the pin F.

The grip F^3 is formed in two parts, the portion F^4 thereof being removable and being held in place by the screw F^5. This construction facilitates the fitting of the parts and also their adjustment in case of wear of the surface of the cam or the mouth of the grip. The grip is loosely fitted in its bearings in the traverse-lever j, so that it can turn slightly, as the different positions the periphery of the cam assumes in its revolution require the mouth of the grip to accommodate itself to them. The fact that the grip can turn freely upon its axis also prevents the varying angle assumed by the traverse-lever from causing the mouth of the grip to lock upon the cam. The manner in which the grip partly encircles the periphery of the cam gives a large wearing-surface and allows the rounded periphery of the cam to turn in the rounded mouth of the grip as its varying position necessitates, and the ability of the grip to turn and accommodate itself to the variations in the angle of the cam presented to it causes the mecanism to run with a minimum of friction and but little shock at the ends of the lateral motion imparted by the cam.

In Fig. 1 is shown a signaling device the purpose of which is to warn the operator when a section of the machine has stopped by the operation of the measuring mechanism. The lever n^6 is pivoted at n^5 to the board A^4 and is connected by a wire n to the lever f', one end of said wire being secured to the arm f^2 of said lever. When the required number of yards of thread has been wound upon a reel and the lever f' is moved by the measuring mechanism to operate the stop-motion of the machine, the arm f^2 pulls down the wire n and the lever n^6 swings upward, so that it can be seen by the operator. This enables the operator to differentiate at once between a stoppage that occurs through the failure of a thread and a stoppage that occurs through the reel being full.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a reeling-machine the drop-rod T having the latch T^2 and the incline T^3, the ledge T^4 upon which the latch T^2 rests when the machine is running, means to move the latch upon the ledge when the drop-rod is raised, the pivoted upright N^7, the link N^6, connecting said pivoted upright with the drop-rod T, and the weighted lever N, pivoted upon the upright N^7, and having the tooth N', in combination with the link N^{11}, secured to the toothed end of the lever N, the reciprocating rod 7 having the lug 8, means for reciprocating the rod, and means to cause the link N^{11} to draw the tooth N' into the path of the lug 8, and, through connected operative mechanism, to stop the machine, substantially as and for the purpose described.

2. In a reeling-machine the rod e having supports e^2 and carrying the pins e' and e^3 or their equivalent, the bearing A^5, the reel R having the shaft R', a slide D, having the wing D^6 to close the top of the bearing A^5 in certain positions of the mechanism, and the slide D having the inclined portion d, adapted to slide between the pins e' and e^3 and move the rod e laterally, in combination with the drop-rod T having the lug T', said lug having a locking engagement with the rod e, substantially as and for the purpose set forth.

3. In a reeling-machine the rod e having supports e^2 and carrying the pins e' and e^3 or their equivalent, the slide D and means for sustaining the same, the slide D having the inclined portion d, adapted to slide between the pins e' and e^3 and move the rod e laterally, the pivoted lever K' actuated by the slide D, and carrying the stud K^6, the worm-wheel K revolving on the stud K^6, and the worm L^2, said worm and worm-wheel forming parts of a measuring device, in combination with the drop-rod T having the lug T', said lug coöperating with the rod e to form a lock operating in connection with the worm-wheel K, substantially as and for the purpose set forth.

4. In a reeling-machine, the slide D, the pivoted lever K' having the stud K^6, the worm-wheel K revolving on the stud K^6, and having the lug K^2, the lug K^3 on the pivoted lever K', adapted to engage the lug K^2, the pin f^4 upon

the worm-wheel K and a stop-motion mechanism, set in operation by impact of said pin, in combination with the worm L^2 and means for driving the same, said worm and worm-wheel forming parts of a measuring device, substantially as and for the purpose described.

5. The frame A, the bearing A^5, the reel R, the shaft R′, the slide D having the wing D^6 adapted to close the top of the bearing A^5, the shoulder D^9 upon the slide D, a spring D^8, or its equivalent, actuating slide D, and means for sustaining the slide D in combination with the pivoted lever K′, carrying the stud K^6, the worm-wheel K revolving on the stud K^6, and the worm L^2, said worm and worm-wheel forming parts of a measuring device, substantially as and for the purpose described.

6. The reel R and its shaft R′, bearings for the shaft, the worm L^4 upon the shaft of the reel, the upright shaft L′ and means for sustaining the same, the worm-wheel L^5 upon the upper end of the shaft L′, and in gear with the worm L^4, the worm L^2 at the lower end of the shaft L′ the pivoted lever K′ carrying the stud K^6, the worm-wheel K mounted on the stud K^6, and driven by the worm L^2, the pin f^4 upon the worm-wheel K, the stud f, the lever f', having the fingers f^2 and f^3 and swinging on the stud f, the rock-lever m having the bar m^2, and means to cause the reel to revolve, in combination with a stop-motion mechanism operated by the rock-lever, substantially as and for the purpose described.

7. The lever n^6 pivoted at n^5, the lever f' having the arms f^2 and f^3, and the link n, connecting one end of the lever n^6 with the lever f', in combination with the worm-wheel K and its bearing, said worm-wheel forming part of a measuring device and carrying the pin f^4 to press against the arm f^3 of the lever f' at a certain period of the revolution of the wheel K, and so move the lever f', and, through the medium of the link n, pull down one end of the lever n^6, substantially as and for the purpose described.

JOSEPH E. TYNAN.

Witnesses:
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