

J. J. BRENNAN.  
 PATTERN SETTING MACHINE.  
 APPLICATION FILED JULY 21, 1911.

1,063,114.

Patented May 27, 1913.

7 SHEETS—SHEET 1.

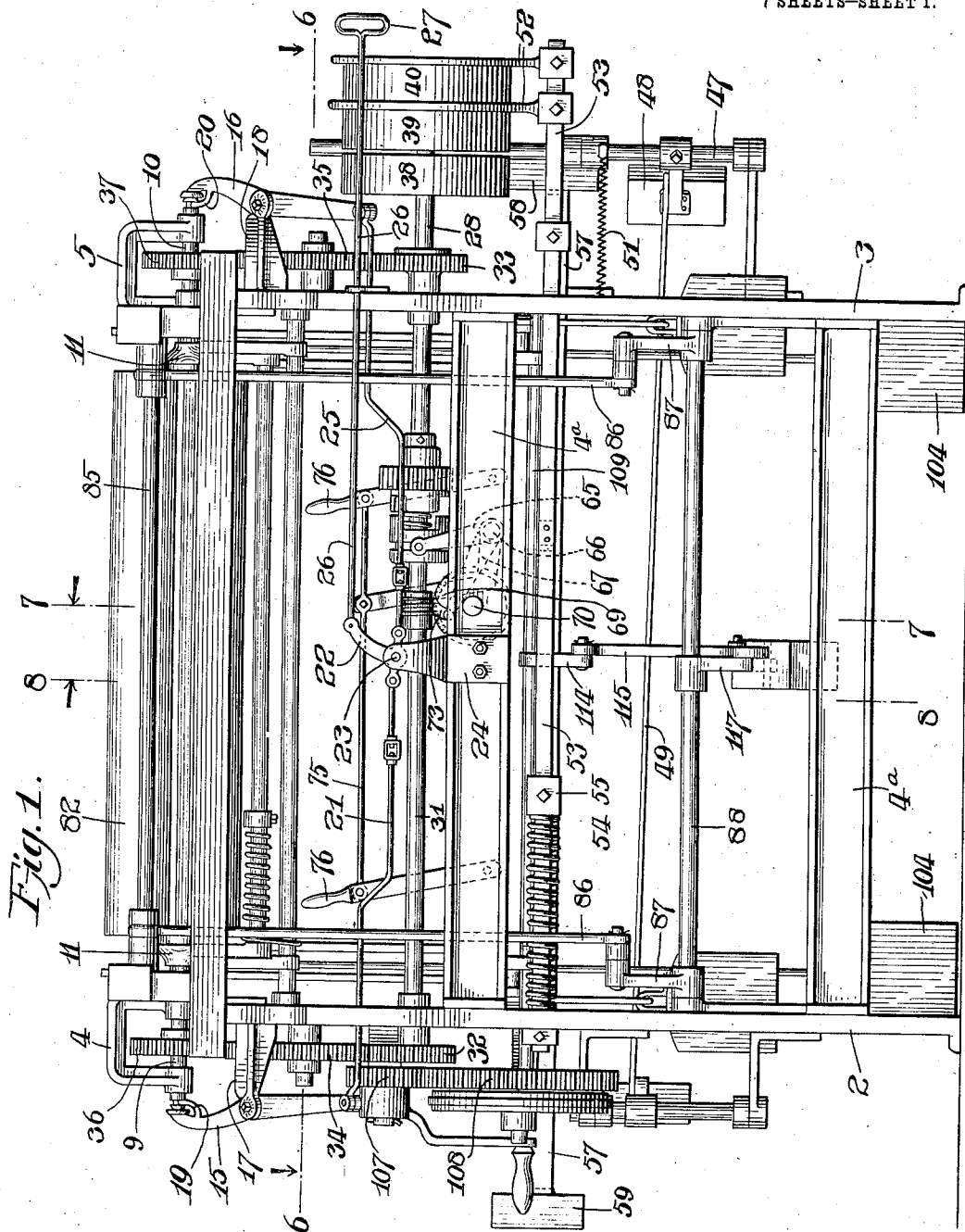


Fig. 1.

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WITNESSES

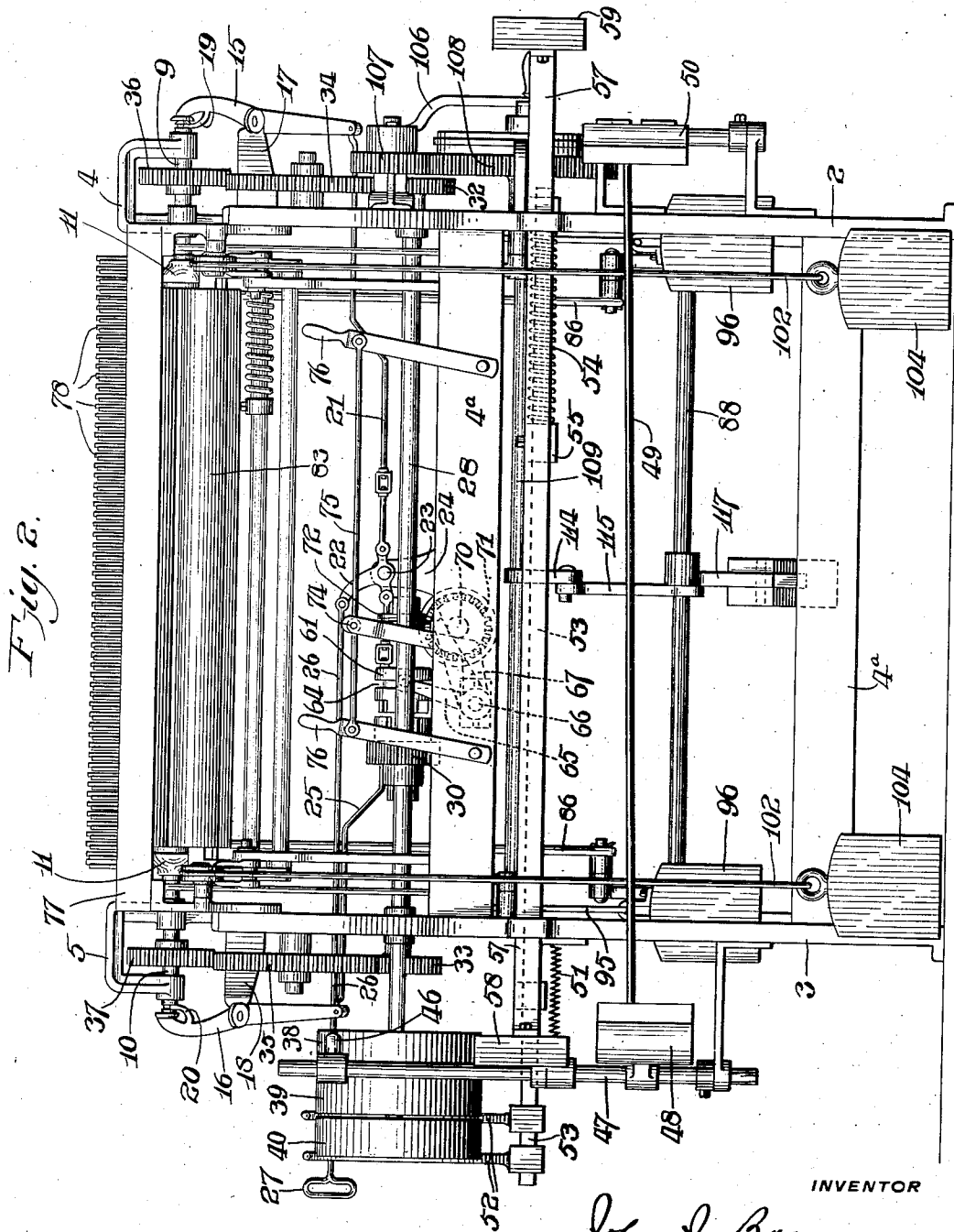
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7 SHEETS—SHEET 2.



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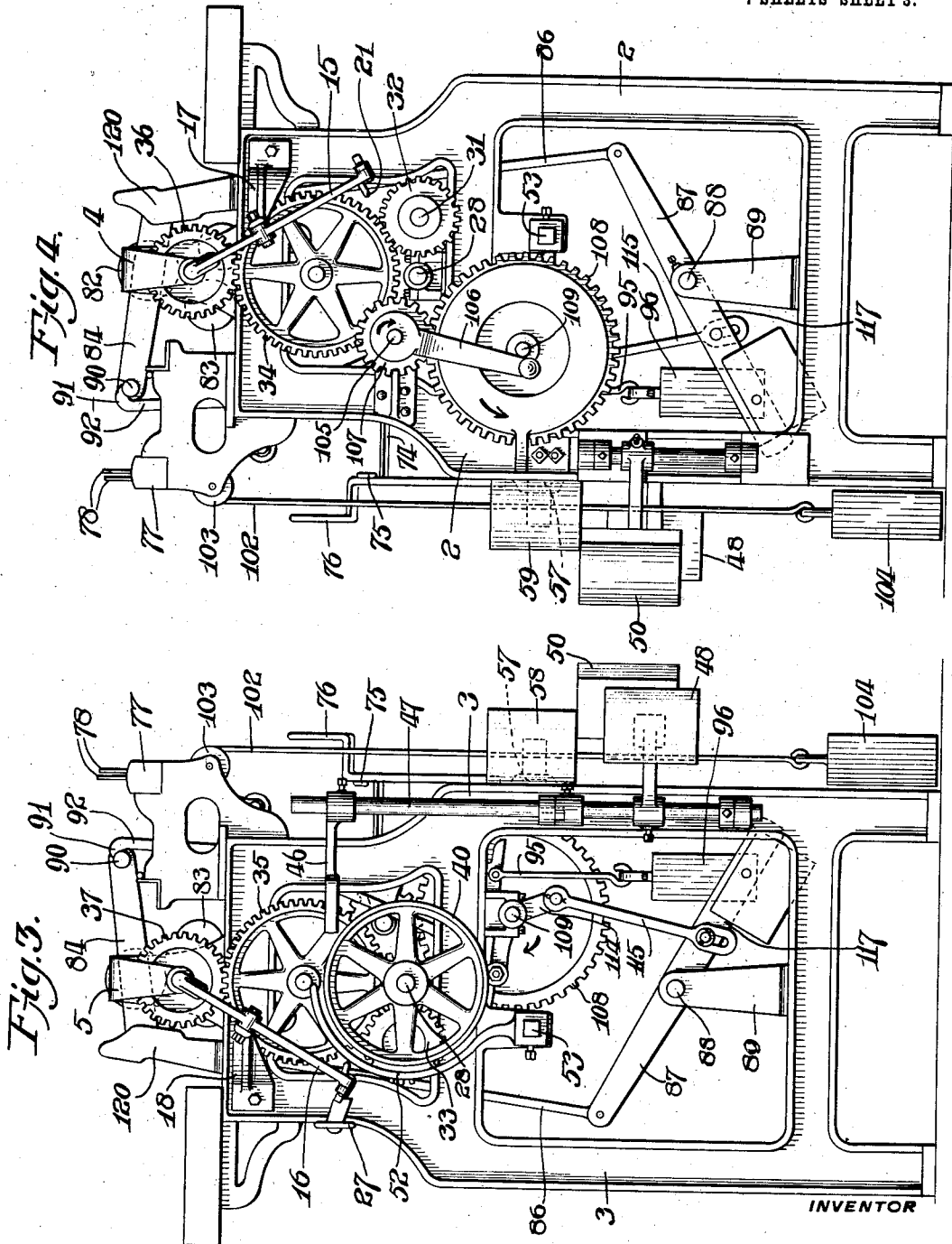
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7 SHEETS—SHEET 3.



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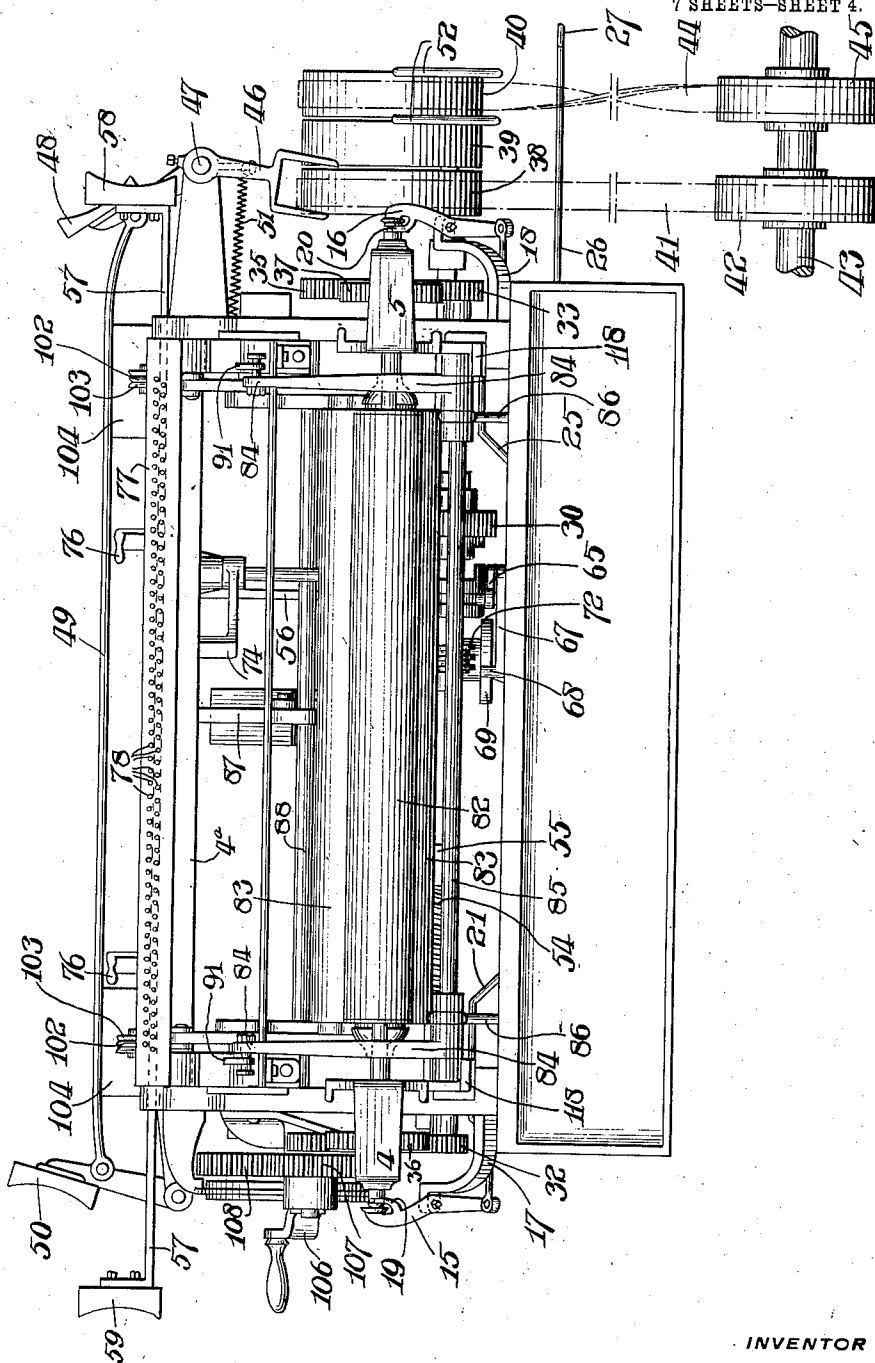
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7 SHEETS—SHEET 4.

Fig. 5.



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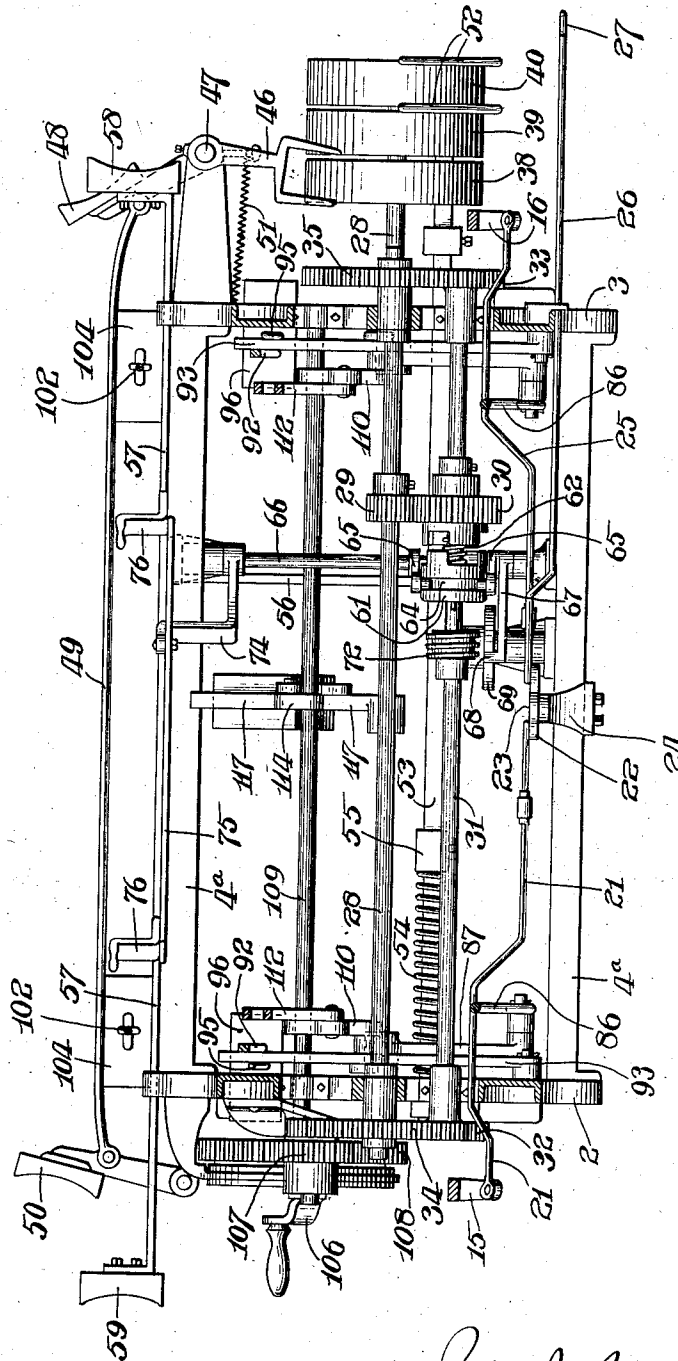
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7 SHEETS—SHEET 5.

Fig. 6.



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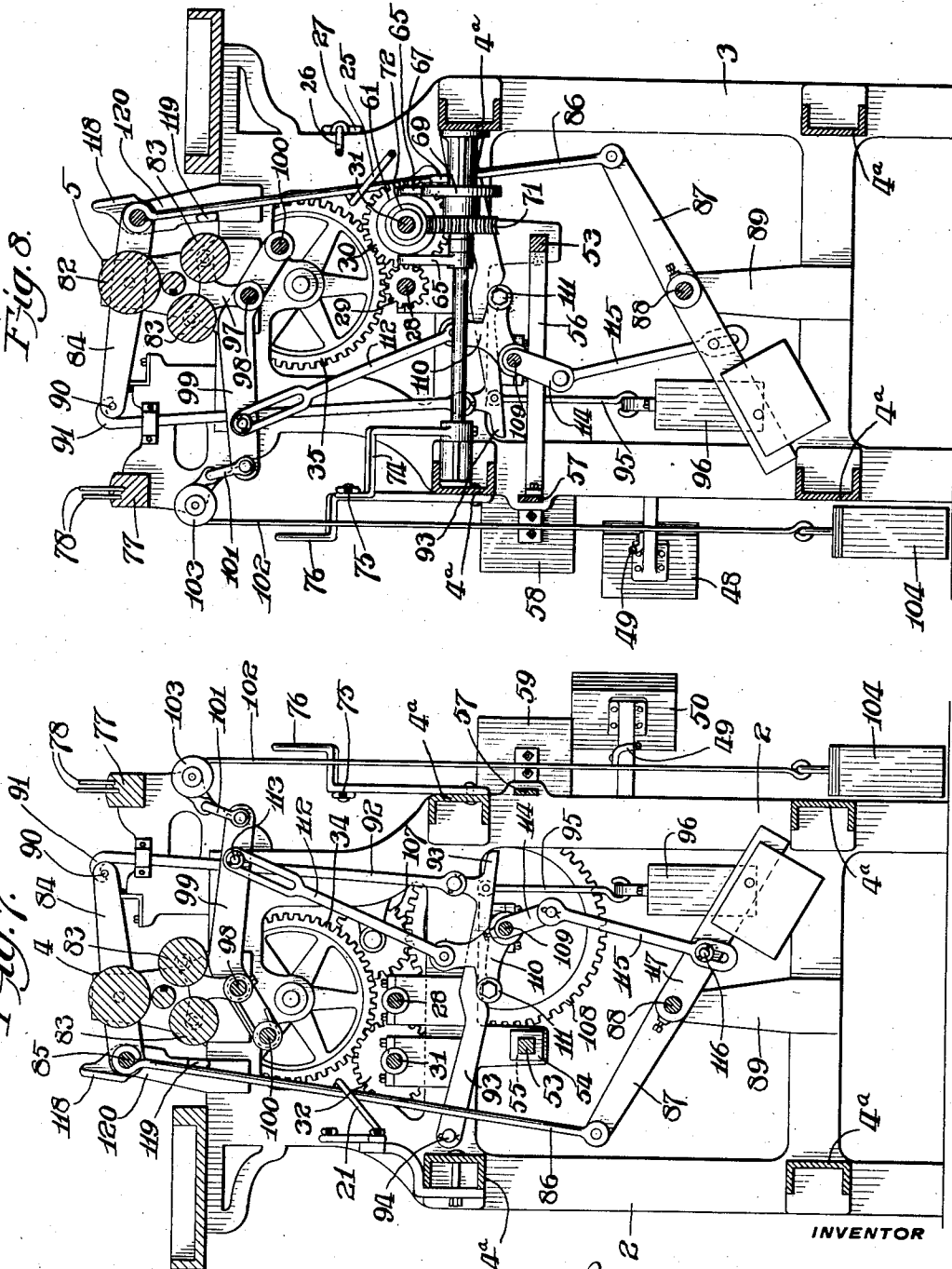
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7 SHEETS—SHEET 6.

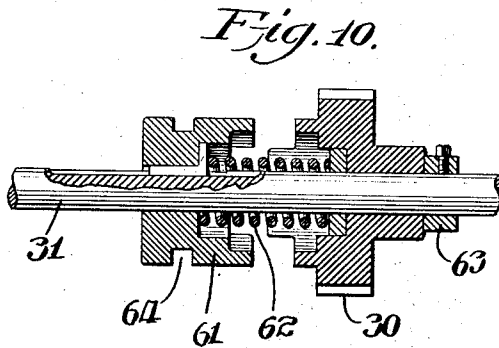
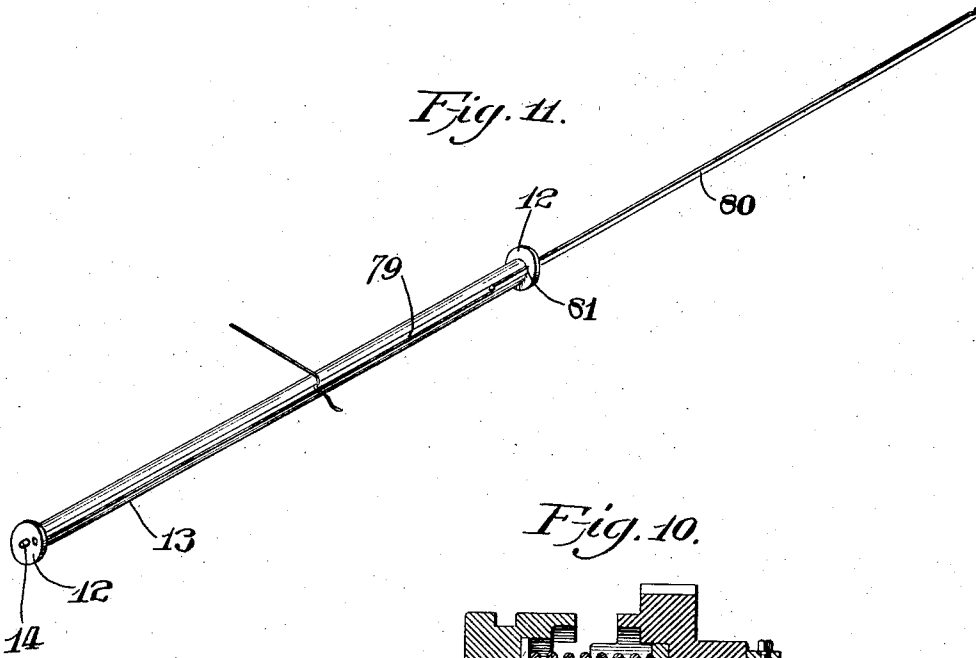
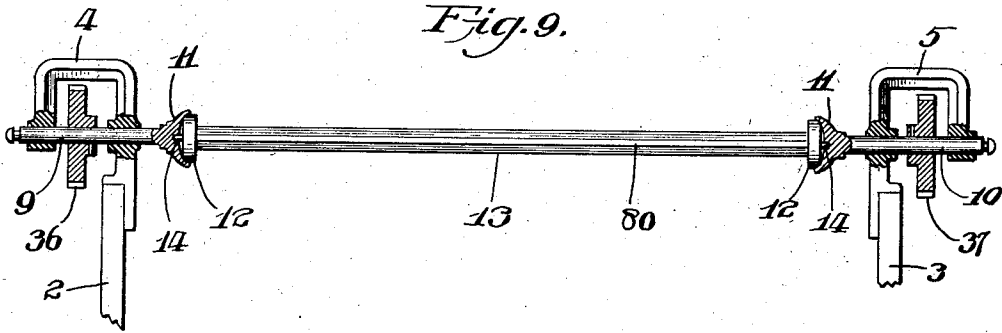


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7 SHEETS—SHEET 7.



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# UNITED STATES PATENT OFFICE.

JOHN J. BRENNAN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO JOHN H. BROMLEY AND EDWARD BROMLEY, COPARTNERS TRADING AS JOHN BROMLEY & SONS, OF PHILADELPHIA, PENNSYLVANIA.

## PATTERN-SETTING MACHINE.

1,063,114.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed July 21, 1911. Serial No. 639,767.

*To all whom it may concern:*

Be it known that I, JOHN J. BRENNAN, a citizen of the United States, residing in the city of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Pattern-Setting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to pattern-setting machines employed in winding on a series of loom spools the requisite lengths of differently colored threads or yarns, according to a pattern, preparatory to the use of such filled spools for weaving therefrom the desired Axminster or other carpet fabric, each spool containing threads corresponding in color with the colors of the pattern representing one pick of the loom. Pattern-setting machines of this class comprise a large number of short bobbins wound with great lengths of variously colored threads. These bobbins are rotatably mounted on pins, at the rear of the machine, from which, or from such of which as contain the suitably colored threads required for the pattern, the threads are drawn forward and wound upon detachable and horizontally disposed loom-spools as aforesaid, until such number of such spools have been so wound, successively, as to contain selected threads sufficient to produce the particular pattern desired in the carpet fabric; the operator suitably selecting such threads from the series of bobbins, according to the particular pattern (indicated by a prescribed design or pattern card placed on the machine) desired to be produced in the carpet fabric subsequently woven therefrom on the loom. In the operation of such machines it is desirable at times when a strand of yarn breaks, to be able, during the winding, to stop the machine, or to reverse its rotative action on the spool being wound, to splice the broken strand, or to correct any defect in the pattern-setting. My invented improvements hereinafter described, in such machines, supply means to effect those objects. Again in the operation of such pattern-setting machines, the effort is to wind up such loom spools with the various threads or strands of yarn thereon of equal length as nearly as

may be, for which purpose the operator depends on her judgment and skill only. As is obvious to weavers, any variation in such lengths necessarily results in a waste of the excess length of all the strands of the spools over the spool having the shortest strands thereon.

Another and the most important part of my improvements hereinafter described, on such machines, consists of means to set the rotative actuating mechanism, acting on the spool being wound, whereby the latter will be operatively disconnected the moment a predetermined definite length of yarns is wound thereon whereby every spool will have strands wound thereon of substantially equal length, and hence avoiding all waste from varying lengths as now common.

To these ends my invention hereinafter described, consists in the combination, in a pattern-setting machine of the type recited, comprising a main frame, a detachable and horizontally-disposed loom-spool, means to guide a plurality of threads or strands of yarn to the loom-spool, a power shaft and actuating mechanism driven thereby adapted to rotate said loom-spool, of novel means to stop the rotative motion of the spool during the winding, means to reverse its rotative motion as desired, means to set the actuating mechanism to wind only a predetermined and unvarying length of strands on the spool, and automatic means to operatively disconnect it from its actuating devices when such unvarying and predetermined length of strands is so wound thereon.

In the accompanying drawings, illustrating my invention—Figure 1 is a front elevation of a pattern-setting machine embodying my invention. Fig. 2 is a rear elevation of the machine. Fig. 3 is an elevation of one end of the machine. Fig. 4 is an elevation of the other end of the machine. Fig. 5 is a plan view of the machine. Fig. 6 is a horizontal section on line 6—6 of Fig. 1. Fig. 7 is a vertical section on line 7—7 of Fig. 1. Fig. 8 is a vertical section on line 8—8 of Fig. 1. Fig. 9 is a view of one of the spools and the rotatable supports therefor and adjuncts, certain parts being shown in section. Fig. 10 is a vertical section of a portion of the clutch device. Fig. 11 is a perspective view of one of the spools

and the rod for retaining the ends of the threads in engagement therewith.

In the form of embodiment of my invention illustrated in the drawings, the main frame of the machine, as generally stated, comprises end standards 2 and 3 and horizontal bars 4<sup>a</sup> extending between and having their ends secured to the standards 2 and 3.

Secured to the tops of the end standards 2 and 3 are brackets 4 and 5 in which are journaled short shafts 9 and 10, respectively. These shafts 9 and 10 are arranged in alinement with each other and are slidably fitted to the brackets 4 and 5 to permit the shafts to be moved toward and from each other. The inner ends of the shafts 9 and 10 are provided with clamping heads which are adapted to embrace and engage the end heads 12 of the spool 13 upon which the threads are to be wound. The end heads 12 are provided with outwardly projecting centering pins 14 which enter depressions in the clamping heads 11. When it is desired to remove the spool 13 from the machine, the shafts 9 and 10 are moved outwardly to disengage the clamping heads 11 from the end head 12 of the spool; and when it is desired to apply a spool 13 to the machine, the spool is placed between the clamping heads 11 and in alinement with the shafts 9 and 10, whereupon the shafts 9 and 10 are moved toward each other to clamp the spool 13 between the clamping heads. The shafts 9 and 10 are moved toward and from each other and are held in their inward or clamping positions by devices which I shall now describe.

The outer ends of the shafts 9 and 10 are engaged by the upper ends of levers 15 and 16 which are fulcrumed on brackets 17 and 18 projecting outwardly from the end standards 2 and 3, respectively; and the upper portions of the levers 15 and 16 are provided with short arms 19 and 20 which extend into circumferential grooves formed in the shafts 9 and 10, whereby, when the upper ends of the levers 15 and 16 are moved toward and from each other a short distance, the shafts 9 and 10 will be correspondingly moved toward and from each other. The lower end of the lever 15 is connected by a rod 21 to one arm of a three armed lever 22 which is fulcrumed as at 23 on a bracket 24 secured to one of the bars 4<sup>a</sup> of the main frame. The lower end of the lever 16 is connected by a rod 25 to another arm of the lever 22; and the third arm of the lever 22 is connected to one end of a rod 26 which extends outwardly through and is slidably fitted to a bracket on the main frame. The outer end of the rod 26 is provided with a suitable handle 27 by means of which the rod 26 may be manually operated to rock the lever 22 on its fulcrum.

The arms of the lever 22 are so related to each other and to the levers 15 and 16 that when the rod 26 is drawn outwardly to the position shown in the drawings, the shafts 9 and 10 will be moved inwardly by the levers 15 and 16 to clamp the spool 13 between the clamping heads 11, and that when the rod 26 is moved inwardly, the shafts 9 and 10 will be drawn outwardly by the arms 19 and 20 of the levers 15 and 16 to disengage the clamping heads 11 from the spool 13. When the rod 26 is drawn outwardly to the position shown in the drawings, to clamp the spool 13, the parts are held in the clamping position by the arm of the lever 22 connected to the rod 21 moving to a position a slight distance above the horizontal center of the fulcrum 23 and by the arm of the lever 22 connected to the rod 25 moving to a position a slight distance below the horizontal center of the fulcrum 23.

The main driving shaft 28 of the machine extends between and is journaled in suitable bearings in the end standards 2 and 3 of the machine, and the shafts 9 and 10 and therewith the spool 13 is actuated from the main shaft 28, as follows: Secured to the main shaft 28 is a pinion 29 coacting with a gear wheel 30 which is loosely mounted on a supplemental shaft 31. The gear wheel 30 is adapted to be clutched to and unclutched from the supplemental shaft 31 by devices and for purposes hereinafter described. The supplemental shaft 31 extends between and is journaled in suitable bearings in the end standards 2 and 3. The ends of the shaft 31 extend outwardly beyond the standards 2 and 3 and are provided with gear wheels 32 and 33 which co-act with idlers 34 and 35 journaled in bearings on the end standards 2 and 3, respectively. The idlers 34 and 35 co-act with gear wheels 36 and 37 secured to the shafts 9 and 10, respectively. It will thus be seen that the spool 13 may be rotated from the main shaft 28 when the gear wheel 30 is clutched to the supplemental shaft 31. One end of the main driving shaft 28 extends outwardly from the end standard 3 and is provided with three pulleys 38 and 39 and 40 which are arranged adjacent each other, as shown. The outer pulleys 38 and 40 are mounted to turn loosely on the shaft 28, and the intermediate pulley 39 is fixed to the shaft 28. The loose pulley 38 is driven by a direct belt 41 from a pulley 42 on a power shaft 43 which is suitably mounted adjacent the spool winding machine. The loose pulley 40 is driven by a cross belt 44 from a pulley 45 on the power shaft 43. It will thus be seen that the loose pulleys 38 and 40 are driven in opposite directions to each other from the power shaft 43. It will also be seen that if the belt 41 be shifted

from the loose pulley 38 to the fixed pulley 39, the main shaft 28 and perforce the spool 13 will be rotated in one direction; and that if the belt 44 be shifted from the loose pulley 45 to the fixed pulley 39, the main shaft 28 and perforce the spool 13 will be rotated in the reverse direction.

In order that the operator of the machine may shift the belt 41 from the loose pulley 38 to the fixed pulley 39 and back again, I provide a bifurcated belt-shipper arm 46 through which the belt 41 extends. The arm 46 is secured to a vertical rock shaft 47 which is mounted in brackets projecting from the end standard 3. The shaft 47 is provided with an arm 48 which is connected by a rod 49 to an arm 50 pivoted to a bracket projecting from the end standard 2. The belt-shipper arm 46 is maintained normally in the position shown in the drawings, with the belt 41 passing around the pulley 38, by the action of a spring 51 extending between and attached to the end standard 3 and an arm projecting from the rock shaft 47. It will thus be seen that by moving the arm 48 inwardly, the belt-shipper arm 46 will shift the belt 41 from the loose pulley 38 to the fixed pulley 39 and that the main shaft 28 will be rotated in the direction of movement of the belt 41 until the pressure is removed from the arm 48 to permit the spring 51 to return the belt-shipper arm 46 to the normal position and thus move the belt 41 from the fixed pulley 39 back to the loose pulley 38.

Two operators usually attend the machine, one being stationed at one end thereof and the other being stationed the other end thereof, and the purpose of providing the arm 50 is to permit the operator stationed at that end of the machine to move the belt-shipper arm 46 to shift the belt 41 from the fixed pulley 39 back to the loose pulley 38 against the pressure of the operator at the other end of the machine holding the belt-shipper arm 46 against the action of the spring 51, so that either operator may stop the machine at will, for a purpose hereinafter explained.

In order that the operator of the machine may shift the belt 44 from the loose pulley 40 to the fixed pulley 39 and back again, I provide a pair of belt-shipper arms 52 between which the belt 44 extends. The arms 52 project from a horizontal bar 53 which extends between and is mounted to slide in bearings in the standards 2 and 3. The belt-shipper arms 52 are maintained normally in the position shown in the drawings, with the belt 44 passing around the loose pulley 40, by the action of a spring 54 encircling the bar 53 and having its ends bearing against the end standard 2 and a block 55 secured to the bar 53. The bar 53 is connected by an arm 56 to a horizontal bar 57

which extends between and is slidably fitted to the end standards 2 and 3. The ends of the bar 57 extend outwardly and are provided with arms or blocks 58 and 59 adjacent the arms 48 and 50, respectively, whereby the operator at one end of the machine by moving the arm 58 inwardly, the bars 53 and 57 will be moved against the action of the spring 54 and the belt 44 will be shifted by the arms 52 from the loose pulley 40 to the fixed pulley 39 and the main shaft 28 will be rotated in the direction of movement of the belt 44 until the pressure is removed from the arm 58 to permit the spring 54 to return the belt-shipper arms 52 to the normal position and thus move the belt 44 from the fixed pulley 39 back to the loose pulley 40. The purpose of providing the arm or block 59 is that the operator at that end of the machine may move the belt-shipper arms 52 to shift the belt 44 from the fixed pulley 39 back to the loose pulley 40 to stop the machine when desired.

As previously mentioned, the gear wheel 30 is adapted to be clutched to and unclutched from the shaft 31, and for this purpose I provide the following mechanism: Splined on the shaft 31 adjacent the gear wheel 30 is a clutch collar 61 provided with teeth projecting toward the gear wheel 30. The hub of the gear wheel is also provided with teeth which project toward the clutch collar 61. The clutch collar 61 is movable toward and from the gear wheel 30 and the teeth of the collar 61 are adapted to pass into and from the spaces between the teeth of the hub of the gear wheel 30. It will thus be seen that when the collar 61 is engaged with the gear wheel 30 it will be caused to rotate with the shaft 31, and that when the collar 61 is disengaged from the gear wheel 30 it will be free to rotate upon the shaft 31. The clutch collar 61 is held normally in the position shown in the drawings, disengaged from the gear wheel 30, by a spring 62 interposed between the collar 61 and gear wheel 30 and encircling the shaft 31. A suitable thrust collar 63 is fixed to the shaft 31 adjacent the gear wheel 30 to prevent movement thereof when the collar 61 is moved into engagement with the gear wheel against the action of the spring 62.

The clutch collar 61 is provided with a circumferential groove 64 to receive pins projecting from arms 65 which extend from and are fixed to a horizontal rock shaft 66 mounted in bearings in the frame of the machine and extending transversely of the shaft 31 beneath the collar 61. The shaft 66 is provided with an arm 67 having a projection 68 which rests upon a cam 69 secured to a cam shaft 70 journaled in a bracket on one of the bars 4<sup>a</sup> of the frame. The shaft 70 is provided with a worm wheel 71 which is engaged by worm 72 on the

shaft 31, whereby when the shaft 31 is rotated, the shaft 70 and cam 69 will be rotated at a slow rate of speed. The projection 68 of the arm 67 is pressed against the  
 5 cam 69 by the action of the spring 62 in pressing the clutch collar 61 away from the gear wheel 30 so that the projection 68 will follow the contour of the cam 69 during the rotation thereof. The cam 69 has a high  
 10 portion concentric to the shaft 70 and extending almost entirely around the cam and being interrupted by a low portion or notch 73 in which the projection 68 rests when the parts are in the normal position shown in the drawings. When the projection 68 is  
 15 within the notch 73 the clutch collar 61 is not engaged with the gear wheel 30, and when the projection 68 is engaged with the high portion of the cam 69 the clutch collar 61 is in engagement with the gear wheel  
 20 30. The rock shaft is provided with an arm 74 connected to a bar 75 which is connected at its ends to hand levers 76 which are fulcrumed on the machine frame and which  
 25 may be moved to rock the shaft 66.

When the parts for controlling the gear wheel 30 are in the positions shown in the drawings, and power is applied to the main shaft 28, the gear wheel 30 is rotating idly  
 30 upon the shaft 31, and the mechanism between the shaft 31 and the spool 13 is at rest. When it is desired to start the rotation of the spool 13, one of the levers 76 is operated by hand to rock the shaft 66 and  
 35 cause the arms 65 to move the clutch collar into engagement with the gear wheel 30 thereby clutching the gear wheel 30 to the shaft 31 and causing it through its connections to rotate the spool 13. At the same  
 40 time the shaft 66 is rocked, as just described, the arm 67 is thereby moved to move its projection 68 out of the notch 73 in the cam 69, and the cam 69 starts to rotate through the gearing connecting it to the shaft 31.  
 45 Immediately after the shaft 31 starts to rotate with the gear wheel 30 the hand pressure is removed from the lever 76 and the clutch collar 71 is held in engagement with the gear wheel 30 against the action of the  
 50 spring 62 by the projection 68 on the arm 67 engaging the high portion of the cam 69. The spool 13 continues to rotate until the slowly moving cam 69 has made substantially a revolution or until the low portion  
 55 or notch 73 of the cam is returned to the position shown, to permit the projection 68 to enter the notch 73 and thereby permit the spring 62 to move the clutch collar 61 from engagement with the gear wheel 31 and thus  
 60 automatically stop the rotation of the shaft 31 and spool 13, after it has rotated a predetermined number of revolutions.

It will be observed that while the spool 13 is being rotated the predetermined number  
 65 of revolutions under the control of the cam

69 in either a forward or reverse direction in accordance with the belt 41 or 44 employed to drive the main shaft 28, the machine may be started and stopped at will by the belt-shipper devices hereinbefore described, without affecting the automatic  
 70 stopping mechanism, so that the machine will be automatically stopped after the desired predetermined number of revolutions has been given to the spool 13 irrespective  
 75 of the number of times that the rotation of the spool has been stopped and started by the manually operated belt-shipper devices. This forms an important feature of my invention as will hereinafter appear.

A number of threads of different colors are wound upon the spool 13, side by side, in accordance with the prescribed design of the fabric into which the threads are to be  
 80 woven after the removal of the spool from the winding machine. The threads are drawn into the winding machine from suitably supported outside spools located adjacent the machine; and in passing to the  
 85 spool 13 from the outside spools, the threads are drawn over a horizontal bar 77 and between guide pins 78 projecting upwardly therefrom. The threads are set side by side  
 90 between the guide pins 78 in accordance with the prescribed design and the threads are then drawn to the spool 13 and their ends laid over a longitudinal groove 79 formed in the body of the spool 13. A rod or bar  
 95 80 is then laid over the ends of the threads and forced into the groove 79 thereby forcing the ends of the threads into the groove and retaining them therein by friction, so that when the spool 13 is rotated, the threads  
 100 will be drawn from the outside spool and wound upon the spool 13.

Before forcing the rod or bar 80 into the groove 79, one end of the bar is passed through and slightly beyond an aperture 81 in alinement with the groove 79 in one of  
 105 the end heads of the spool, so that after the threads have been wound upon the spool 13 the bar 80 may be drawn from the spool through the aperture 81 when desired, after the spool has been removed from the winding machine.

In order that the threads may be wound tightly upon the spool 13 I provide an upper presser roller 82 and two presser rollers 83 which extend parallel to the spool 13 and which are yieldingly supported in a manner  
 120 to exert pressure against the threads being wound upon the spool and to permit them to move from the spool as the body of threads being wound thereon increases in diameter.

The upper presser roller 82 has its ends journaled in a pair of arms or levers 84 the forward ends of which are connected to a  
 125 shaft 85 which is supported by the upper ends of bars 86. The lower ends of the 130

bars 86 are connected to arms 87 which are secured to and extend from a rock shaft 88 which is mounted in brackets 89 on the end standards 2 and 3. The forward ends of the arms or levers 84 are provided with pins 90 which are engaged by hooks 91 formed on the upper ends of bars 92. The lower ends of the bars 92 are connected to arms 93 which are pivoted, as at 94, to the end standards 2 and 3. The free ends of the arms 93 are provided with depending hooks 95 which support suitable weights 96. When the parts are in the position shown in the drawings, the weights 96, through the arms 93 and bars 92 draw down upon the rearward ends of the arms 84 and tending to move them about the axis of the shaft 85 and causing the roller 82 to press against the threads being wound upon the spool 13 and permitting the roller 82 to move upwardly against the action of the weights 96.

The lower presser rollers 83 have their ends journaled in brackets 97 extending upwardly from a horizontal shaft 98 which extends between and is mounted to turn in a pair of arms 99 which project from a horizontal shaft 100 extending between the end standards 2 and 3. The free ends of the arms 99 are provided with links 101 which are connected to upper ends of straps 102. The straps 102 pass over pulleys 103 mounted on the end standards 2 and 3, and the lower ends of the straps 102 are provided with suitable weights 104 which tend to raise the arms 99 and press the rollers 83 against the threads being wound upon the spool 13. The brackets 97, being free to move about the axis of the shaft 98, permit the rollers 83 to adjust themselves and bear with equal pressure against the threads. As the body of threads being wound upon the spool 13 increases in diameter the rollers 83 may move downwardly from the spool against the action of the weights 104.

After the winding operation and prior to the removal of a spool 13 from the machine and the placing of another spool therein, the presser rollers 83 are moved downwardly against the action of the weights 104 and the presser roller 82 is moved forwardly and downwardly after the hooks 91 have been disengaged from the pins 90 to relieve the roller 82 from the weights 96. This operation takes place to afford ample room for the removal of the spools 13, the insertion of the spools 13 and the attachment of the threads to the spools 13; and in order to effect the operation of moving the presser rollers away from the spool 13 I provide the following: Journaled in a bracket on the end standard 2 is a shaft 105 the outer end of which is provided with a hand crank 106. The shaft 105 is also provided with a pinion 107 which co-

shaft 109 extending between and journaled in bearings on the end standards 2 and 3. The shaft 109 is provided with arms 110 adjacent the arms 93, and the arms 110 are provided with projections 111 which extend beneath the arms 93, whereby when the arms 110 are raised the arms 93 will be raised by the projections 111. The arms 110 are connected to the lower ends of bars 112, the upper ends of which are longitudinally slotted and embrace pins 113 projecting from the arms 99. The shaft 109 is also provided with an arm 114 which is connected to the upper end of a bar or link 115 the lower end of which is longitudinally slotted and embraces a pin 116 projecting from a weighted arm 117 which extends from the rock shaft 88.

By turning the crank 106 nearly a complete revolution until it comes to rest against the outwardly projecting end of the shaft 109, the gear wheels 107 and 108 and shaft 109 will be turned in the direction of the arrows to raise the arms 110 and thereby raise the arms 93. During the initial movement of the shaft 109 the arms 110 and 93 are moved upwardly and the hooks 91 are thereby moved upwardly from engagement with the pins 90. As the shaft 109 continues its movement the arm 114 and link 115 raise the arm 117 in a manner to rock the shaft 88 and lower the arms 87. As the arms 87 move downwardly they draw down the bars 86 which in turn draw the arms 84 down between projections 118 and 119 on brackets 120 on the end standards 2 and 3, thereby causing the arms 84 to assume upright positions and the presser roller 82 to move rearwardly and downwardly from the spool 13.

While the roller 82 is being moved out of the position shown, the turning of the shaft 109 in the direction of the arrow, causes the arms 110 to move over the center of the shaft 109 and to move downwardly on the rearward side thereof, thereby causing the links 112 to draw the arms 99 downwardly against the action of the weights 104 and thereby move the presser rollers 83 downwardly from the spool 13. The parts are held in position with the presser rollers 82 and 83 away from the spool 13 by the weight of the roller 82 and its connected parts holding the arm 87 down and the arm 117, link 115 and arm 114 up.

After the presser rollers 82 and 83 have been moved into the inoperative position by turning the crank 106 in the direction of the arrow, the presser rollers may be moved back into operative position, when desired, by turning the crank 106 back in a direction opposite to the arrow nearly a complete revolution or until the crank 106 comes to rest against the shaft 109, as shown in the drawings. During the initial reverse move-

ment of the crank 106, the shaft 109 is turned to cause the arm 114 to move the arm 117 downwardly, thereby raising the arms 87 and bars 86 and causing them to raise the shaft 85 and therewith the arms 84 and presser roller 82 into the position shown in the drawings. At the same time the roller 82 is being returned to the operative position shown, the arms 110 are operating the links 112 to permit the weights 104 to return the arms 99 and therewith the presser rollers 82 to the operative position shown. As the arms 93 move downwardly during the return of the presser rollers to the operative position, the hooks 91 are re-engaged with the pins 90 so that the weights 96 will act upon the arms 94 after the crank 106 comes to rest against the shaft 109.

The operation of the machine, briefly described, is as follows: The hand crank 106 is turned in the direction of the arrow to move the presser rollers 82 and 83 out of operative position. An empty spool 13 is then placed between the clamping heads 11 and the handle 27 is operated to move the clamping heads 11 toward each other to clamp the spool. This being done, differently colored threads of the outside bobbins are selected and drawn over the bar 77 and their ends laid over the groove 79 in the spool 13, the differently colored threads being selected and arranged between the guiding pins 78 in accordance with the corresponding colors of the prescribed design representing one pick of the loom in which the spool is to be used. The rod or bar 80 is then laid over the ends of the threads and forced down into the groove 79 to secure the ends of the threads to the spool, after which the crank 106 is operated to move the presser rollers 82 and 83 back into operative position. The main shaft 28 of the machine may now be set in motion by operating the belt-shipper 46 to shift the belt 41 from the loose pulley 38 to the fixed pulley 39 or the belt-shipper 52 may be operated to shift the belt 44 from the loose pulley 40 to the fixed pulley 39, in accordance with the direction in which it is desired to wind the threads upon the spool 13. It may here be remarked that in order to have the differently colored threads properly inserted in the loom during the weaving operation, in accordance with the colors of the design, it is necessary to wind the threads in one direction on certain spools and to wind the threads in a reverse direction on certain spools, as is well known in this art. The lever 76 is now operated to rock the shaft 66 and raise the projection 68 of the arm 67 from the low portion or notch 73 of the cam 69, thereby clutching the gear wheel 30 to the shaft 31 and causing it and perforce the spool 13 to be rotated by the main shaft 28. The hand pressure is removed from the le-

ver 76, after the spool 13 starts to rotate, and the projection 68 rests upon the high portion of the cam 69, which starts to slowly rotate when the gear wheel 30 is clutched to the shaft 31. The spool 13 continues to rotate, drawing the threads from the outside bobbins and winding them upon the spool 13, until the low portion or notch 73 in the cam 69 comes into position beneath the projection 68, whereupon the projection 68 drops into the notch 73 and unclutches the gear wheel 30 from the shaft 31 and stops the further rotation of the spool 13. It will thus be seen that the rotation of the spool 13 is automatically stopped after a predetermined length of the threads has been wound upon the spool, the length wound upon the spool being controlled by the ratio of the gearing between the shaft 31 and spool 13 and between the shaft 31 and cam 69. The threads are caused to be tightly wound upon the spool 13 by the yielding presser rollers 82 and 83.

Should it be desired to stop the rotation of the spool 13 to splice a broken thread or to renew a thread or for any purpose, the driving belt is manually shifted from the fixed pulley 39 to its loose pulley; and when it is again desired to start the rotation of the spool 13, the driving belt is shifted back to the fixed pulley 39. It will be observed that the stopping and starting of the main shaft 28 by shifting the driving belt also stops and starts the cam 69. Therefore, the rotation of the spool 13 will be automatically stopped by the cam 69 after the predetermined length of threads has been wound on the spool, irrespective of the number of times that the rotation of the spool has been stopped and started by manually shifting the driving belt to and from the pulley 39. After the rotation of the spool 13 has been automatically stopped by the cam 69, the crank 106 is again operated to throw the presser rollers 82 and 83 out of operative position. The handle 27 is operated to free the ends of the spool from the clamping heads 11 and the spool with the threads wound thereon is moved from the clamping heads 11 toward the bar 77 to permit the insertion of an empty spool 13. After the empty spool has been inserted and clamped between the clamping heads 11, the previously wound spool is moved back drawing the threads extending therefrom over the groove 79 in the empty spool. A rod or bar 80 is then laid over the threads and forced into the groove 79 to secure the threads to the empty spool, whereupon the short length of threads extending between the filled and empty spools is severed by a pair of scissors or other suitable cutting device, and the filled spool is removed from the machine.

The operation just described is repeated

until the desired number or set of spools have been wound with threads corresponding with the colors of the prescribed design representing one pick of the loom. The threads are then all removed from the guide bar 77 and a new set of threads are drawn from the outside bobbins over the bar 77 and arranged between the guiding pins 78 in accordance with the corresponding colors of the prescribed design representing the next succeeding pick of the loom, and the machine is operated to wind the desired number of spools with threads corresponding with the design representing this pick. Thus successive sets of spools are wound with threads corresponding in colors with the colors of the prescribed design representing the successive picks in the loom, the operator reading the design and arranging the threads in accordance therewith.

The employment of the automatic mechanism for stopping the rotation of the spools 13, insures the winding of the same length of threads on the different spools corresponding with the different picks of the loom, thereby causing the threads of all the spools in the loom to run out at the same time and preventing waste of threads.

I claim:

1. In a pattern-setting machine, the combination of a supporting frame, means to support a detachable spool, means to rotate said spool-supporting means in either direction, including means governing the direction of rotation thereof; means to automatically stop the rotation of the spool after it has rotated a predetermined number of revolutions, including a cam device and a clutch mechanism; means operative to move the last named means into and out of operative position, and manually operated means to stop and start the rotation of the spool without affecting the automatic stopping means when it is in operative position.

2. In a pattern-setting machine, the combination of a supporting frame, a rotatable spool support, comprising a pair of oppositely disposed and longitudinally adjustable short shafts, a loom spool adapted to be removably supported between said shafts, means for rotating said supporting shafts in unison of time and in either direction, means to automatically stop the rotation of said spool supporting shafts after they have rotated the spool a predetermined number of revolutions, and means to shift said automatic stopping mechanism into and out of operative position.

3. In a pattern-setting machine, the combination of a supporting frame, including a pair of oppositely-disposed brackets, a pair of alining short shafts slidably mounted longitudinally in said brackets, and carrying each a spool clamping head, a spool having means on its opposite ends adapted to be en-

gaged by said clamping heads, means to simultaneously shift both of said spool-supporting shafts, toward each other to clamp the spool, and in the opposite direction to release the spool, means to rotate said shafts, including a clutch device movable into operative position to start the rotation of said spool-supporting shafts, means for automatically moving said clutch device into inoperative position after a predetermined number of revolutions of said spool-supporting shafts, and independent means to start and stop the rotation thereof at any time without affecting said clutch device when it is in operative position.

4. In a pattern-setting machine, the combination of a supporting frame, a main shaft, means to start and stop the rotation of said shaft, a supplemental shaft, gearing between said shafts, including a gear wheel mounted to turn freely on said supplemental shaft, a clutch device movable to an operative position clutching said gear wheel to said supplemental shaft, and movable to an inoperative position unclutching said gear wheel from said supplemental shaft, means for automatically moving said clutch device into its inoperative position after said supplemental shaft has rotated a predetermined number of revolutions, a rotatable spool support, and gearing between said supplemental shaft and said spool support.

5. In a pattern-setting machine, the combination of a supporting frame, means to support and rotate a loom spool, means to guide a plurality of threads to a spool removably supported by said rotating means, means including a cam and cam shaft and actuating mechanism governed thereby, operating to automatically stop the rotation of the spool after it has rotated a predetermined number of revolutions, and other means to stop and start the rotatable spool support at any time without affecting the automatic stopping mechanism.

6. In a pattern-setting machine, the combination of a supporting frame, rotatable means to removably support a loom spool, means to guide a plurality of threads to said rotated spool, means to automatically stop the rotation of the spool after it has rotated a predetermined number of revolutions, comprising a cam, a cam shaft, worm mechanism actuating said shaft, a clutch device actuated by said cam, operating to shift the spool rotating means into and out of operative position, and means to stop and start the rotation of the spool without affecting the automatic stopping means when it is in operative position.

7. In a pattern-setting machine, the combination of a supporting frame, rotatable means to support a loom spool, means to automatically stop the rotation of the spool after it has rotated a predetermined number

of revolutions, the last named means being constructed and adapted to permit both forward and reverse movements of the rotatable spool-supporting means, and independent devices to stop and start the rotation of the spool at any time without affecting the operative automatic stopping mechanism.

8. In a pattern-setting machine, the combination of a supporting frame, a rotatable spool-supporting means, a loom spool detachably supported thereon, a plurality of yieldingly-supported presser rollers extending under, adjacent to and parallel with said spool when in operative position on said rotatable supporting means, bearings for said rollers adapted to permit an automatic downward movement of said rollers effected by the progressive enlargement of the spool being wound, connecting actuating devices between the main shaft of the machine and said rotatable spool-supporting means, and mechanism to shift the direction of rotation thereof.

9. In a pattern-setting machine, the combination of a supporting frame, rotatable spool-supporting means, a main shaft, a supplemental shaft and a gear wheel loosely mounted thereon, clutch mechanism controlling said movable gear wheel relatively to its shaft, a pinion on the main shaft adapted to be engaged by said gear wheel, fixed gears on said supplemental shaft engaging connecting actuating devices on the rotatable spool-supporting means, and means to rotate the main shaft in either direction at will, consisting of a pair of loose pulleys and an intermediate fixed pulley, thereon, a plurality of belt-shifting mechanisms, resilient means normally maintaining said belt shifting mechanisms in opposition to each other to engage and disengage respectively with the main shaft to actuate it in either direction as desired, and connecting means between said belt shifting devices to adapt them to be simultaneously actuated by an operative at either side of the machine.

10. In a pattern-setting machine, the combination of a supporting frame, a main shaft, a supplemental shaft, gearing between said shafts, a clutch device controlling said gearing and movable to an operative position causing one shaft to be rotated by the other and movable to an inoperative position permitting one shaft to rotate independently of the other, a cam shaft, gearing between said cam shaft and said supplemental shaft, a cam carried by the cam shaft, means operated by said cam for automatically moving said clutch device into its inoperative position, a rotatable spool support, and gearing between said supplemental shaft and said spool support.

11. In a pattern-setting machine, the combination of a supporting frame, a main shaft, a supplemental shaft, gearing between

said shafts, a clutch device controlling said gearing and movable to an operative position causing one shaft to be rotated by the other and movable to an inoperative position permitting one shaft to rotate independently of the other, a cam shaft, gearing between said cam shaft and said supplemental shaft, a cam carried by the cam shaft, means operated by said cam for automatically moving said clutch device into its inoperative position, a rotatable spool support, gearing between said supplemental shaft and said spool support, and manually operated means to start and stop the rotation of the main shaft.

12. In a pattern-setting machine, the combination of a supporting frame, means to detachably support a loom spool, devices to rotate said spool-supporting means, means to guide a plurality of threads to said spool, devices to yieldingly-support a presser roller beneath and in parallelism with said spool and in contact with the threads being wound thereon, means to shift said yieldingly supported presser roller into inoperative position relatively to said spool in order to remove the same from its rotatable supporting means, and connecting actuating gearing including a clutch device, between said means and the main shaft adapted to stop and start the rotation of the spool-supporting means.

13. In a pattern-setting machine, the combination of a supporting frame, means to detachably support a loom spool, devices to rotate said spool supporting means, means to guide a plurality of threads to said spool to be wound thereon, means to yieldingly-support a pair of presser rollers mounted in spaced relation and in parallelism with each other and with said spool in a plane immediately beneath the latter, means to vertically adjust said yielding support, said means permitting a gradual downward movement of the presser rollers effected by contact with the progressive enlargement of the spool being wound, means to shift said presser rollers into inoperative position when the spool is filled to permit the removal of the latter, and actuating devices, connected with the main shaft, adapted to stop and start the rotation of the spool-supporting means.

14. In a pattern-setting machine, the combination of a supporting frame, means to detachably support a loom spool, devices to rotate said spool-supporting means, means to guide a plurality of threads to said spool to be wound thereon, a presser roller with yielding means to support it over and in contact with the loom spool, another presser roller with means to support it yieldingly under and in operative contact with the loom spool, means to adjust the yielding pressure of both of said rollers against the

threads on the spool as it is being wound,  
means to shift each of said presser rollers  
into inoperative position to permit access to  
or the removal of the spool, and actuating  
5 devices connected with the main shaft,  
adapted to stop and start said spool-support-  
ing and rotating devices.

In testimony whereof, I have hereunto  
affixed my signature this 14th day of July  
A. D. 1911.

JOHN J. BRENNAN.

Witnesses:

A. M. BIDDLE,  
R. A. DUNLAP.

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