

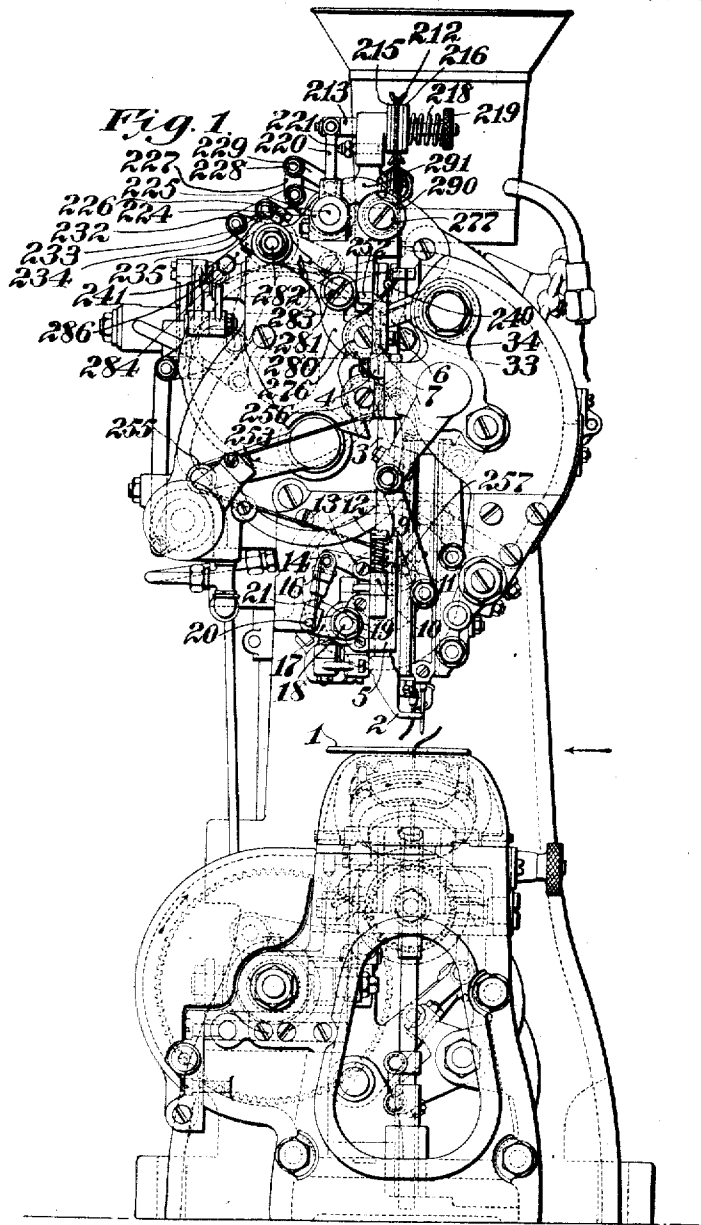
SEWING MACHINE.

APPLICATION FILED MAY 10, 1915.

1,170,024.

Patented Feb. 1, 1916.

7 SHEETS—SHEET 1.



Witness:

E. C. Wurdeman

Inventor:

Laurence E. Topham
by his Attorneys.

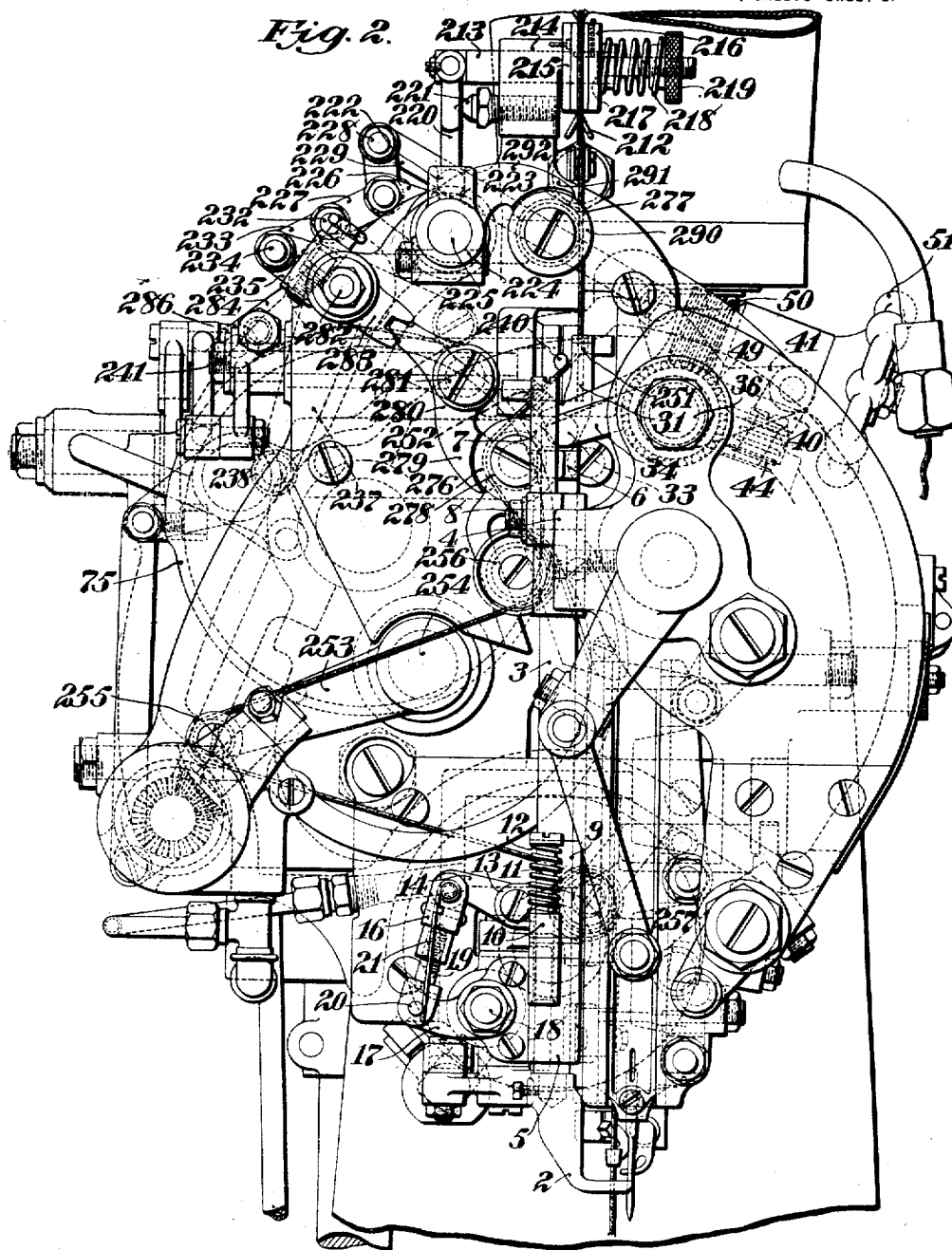
Phillips Van Evren & Fish

1,170,024.

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7 SHEETS—SHEET 2.



Witness:

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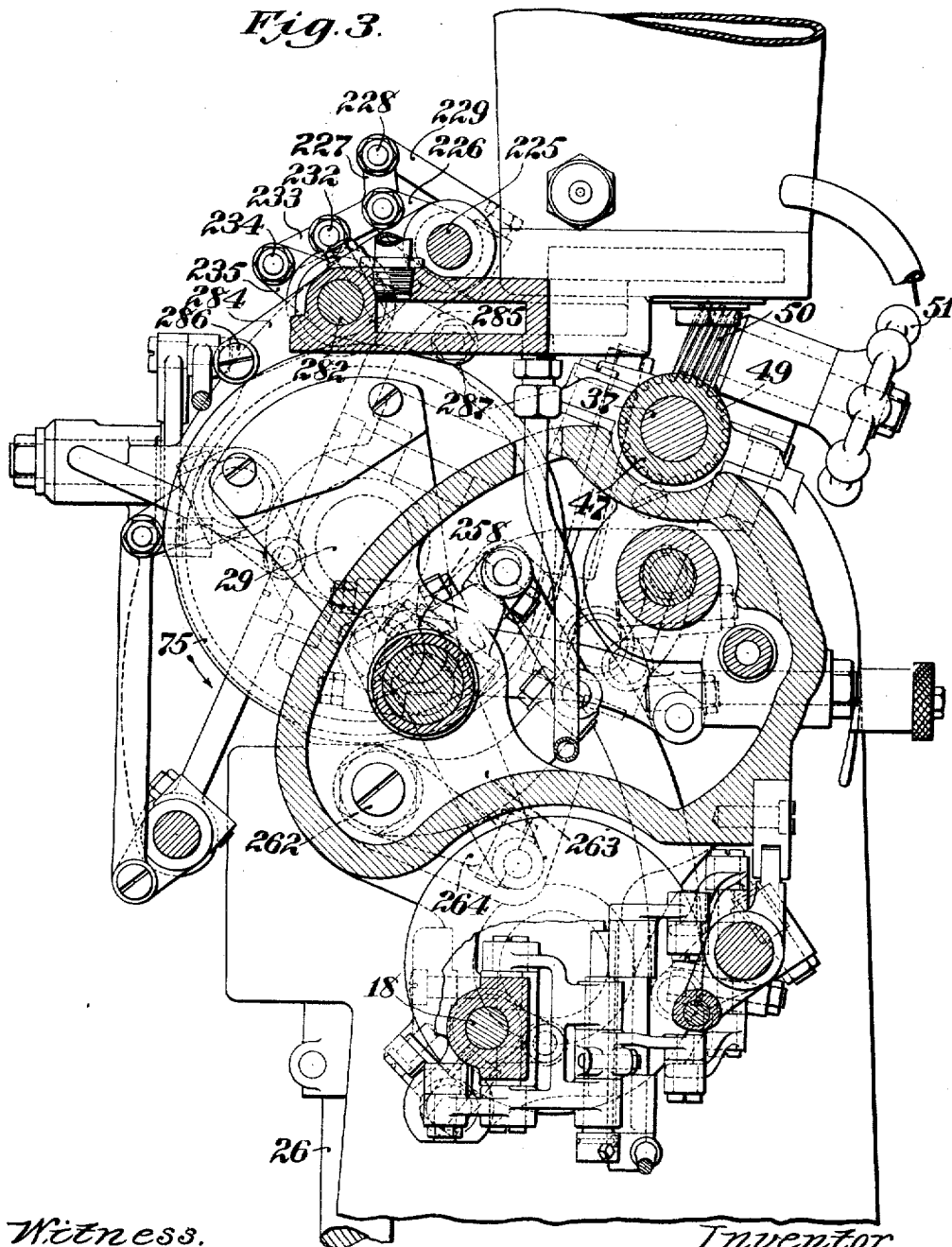
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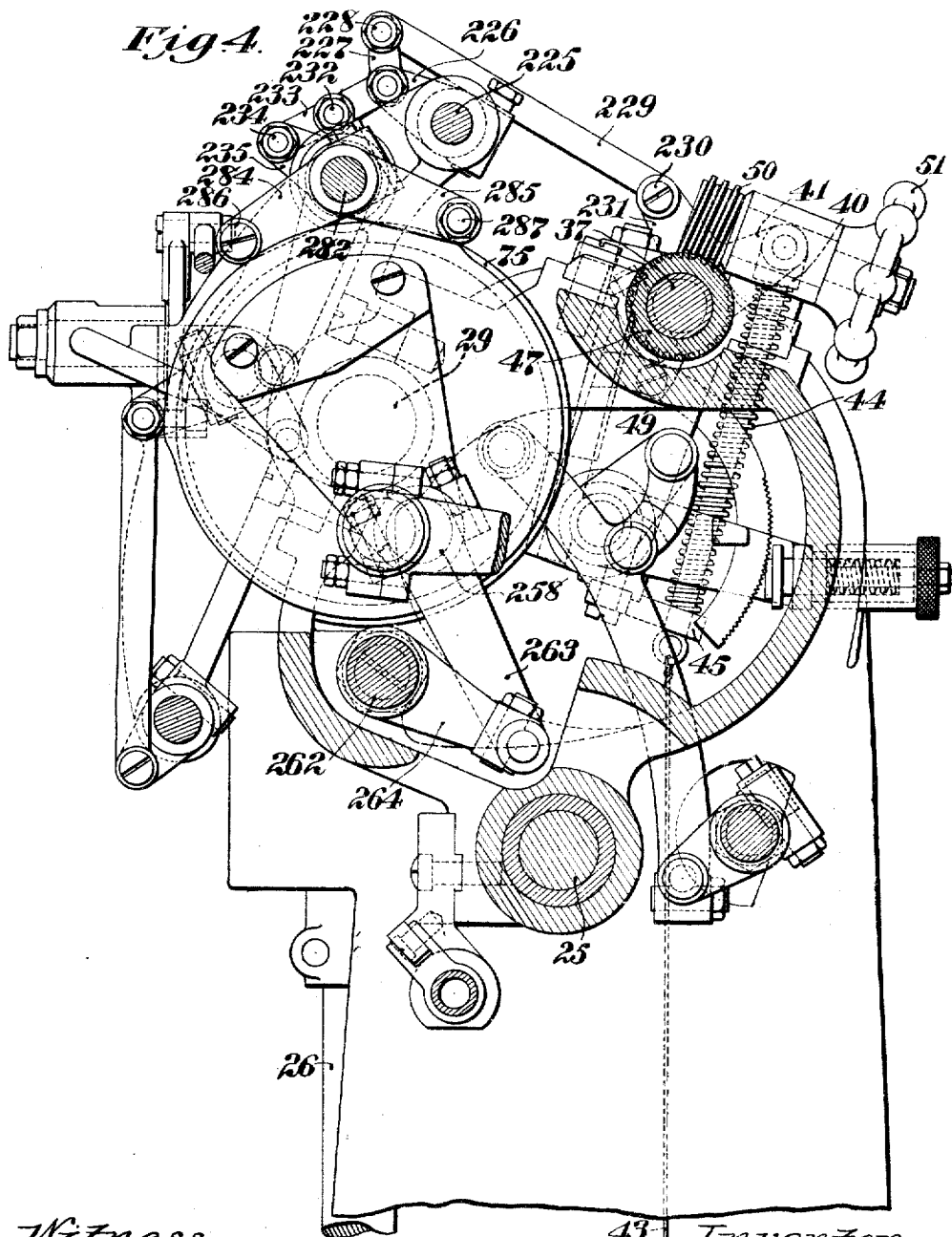
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7 SHEETS—SHEET 4.



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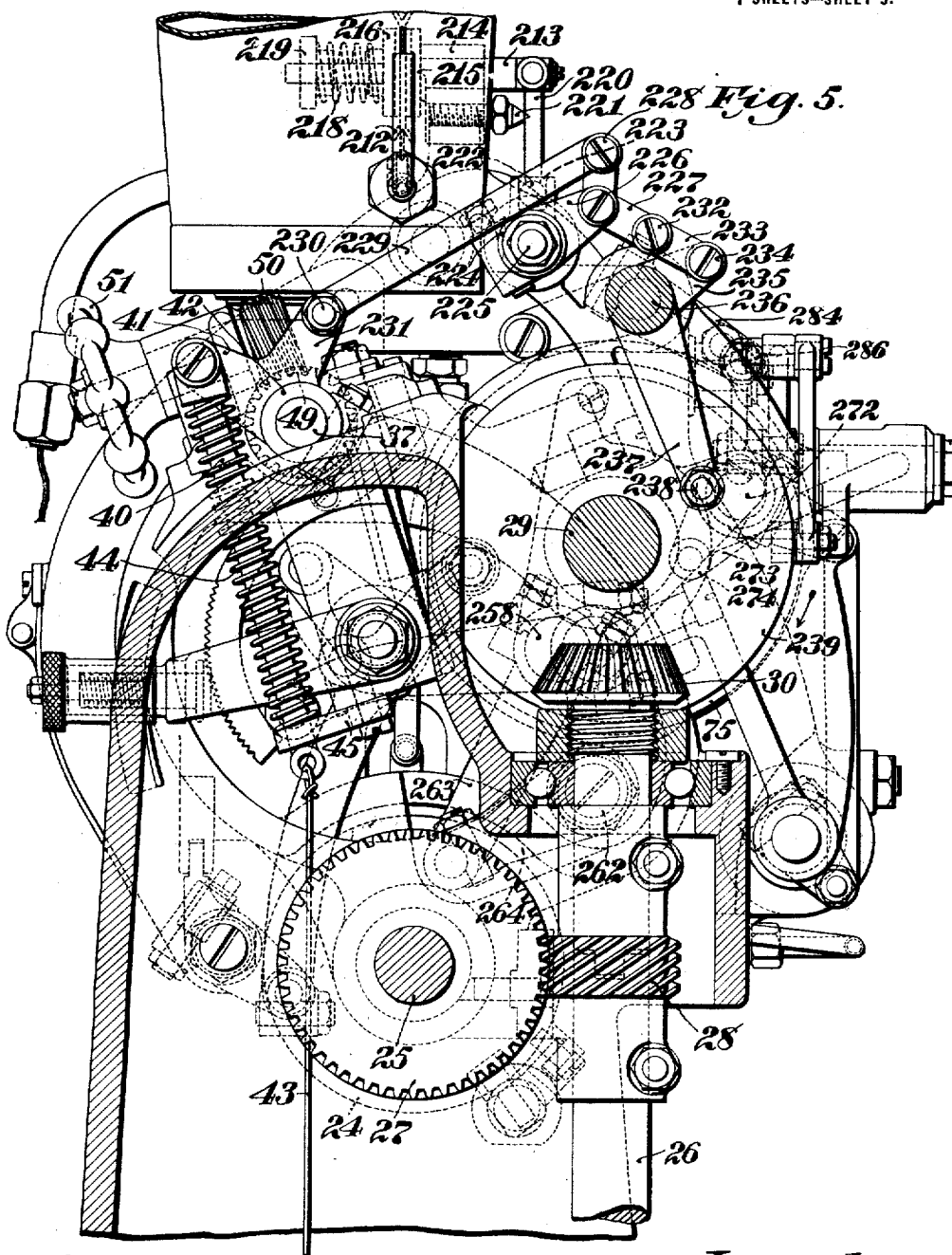
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7 SHEETS—SHEET 5.



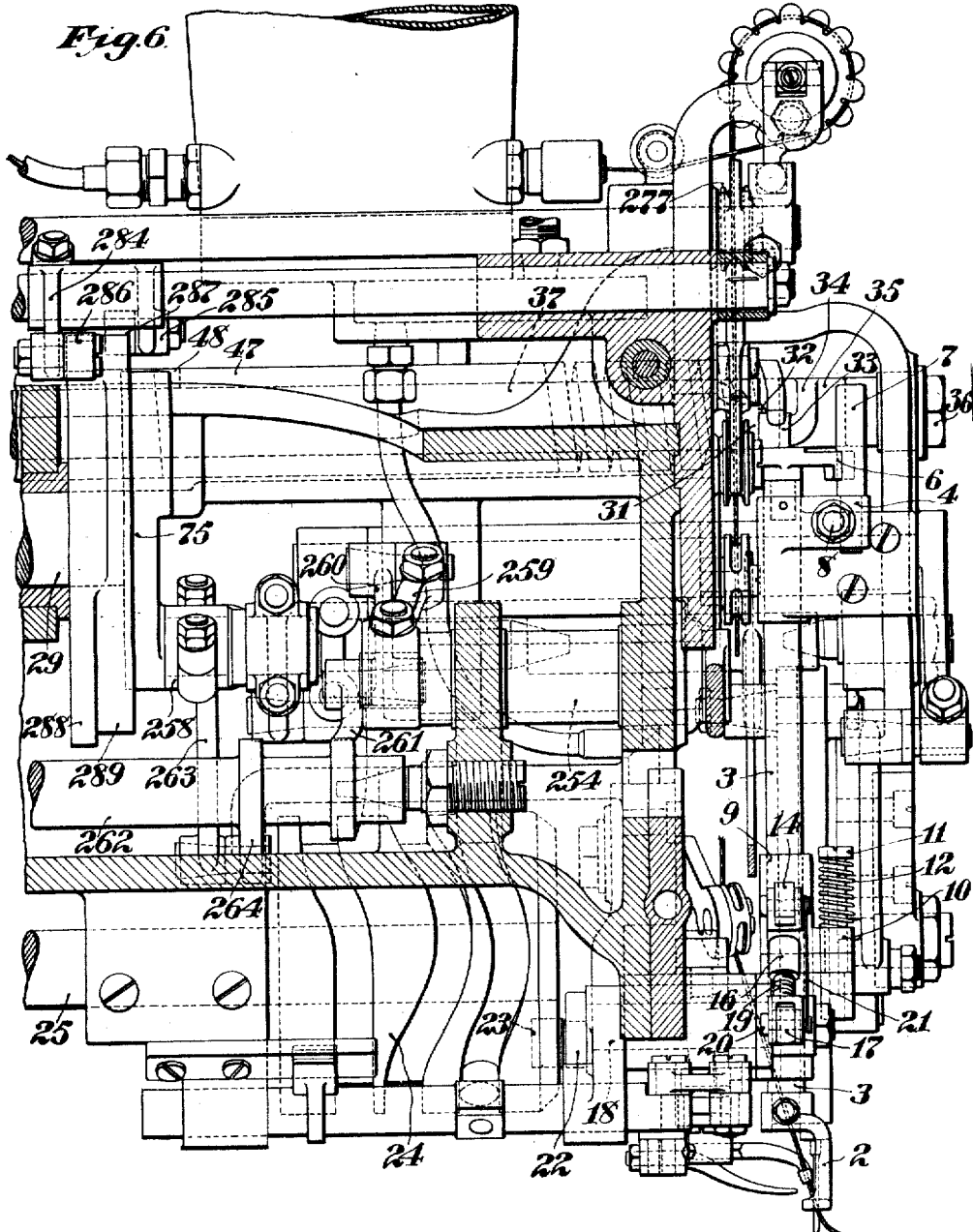
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7 SHEETS—SHEET 7.

Fig. 7.

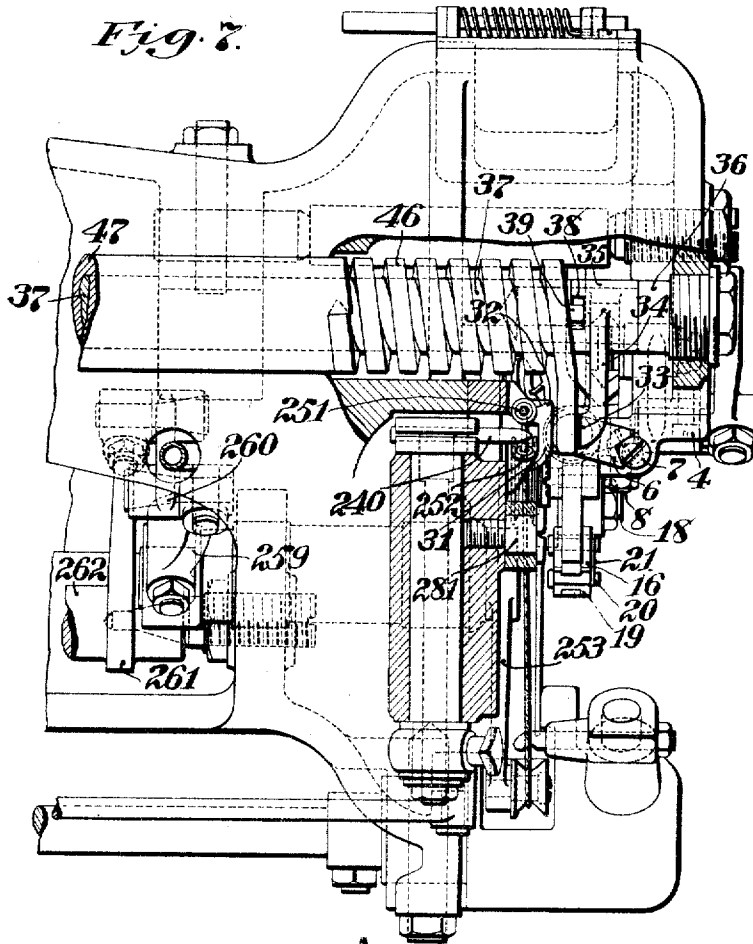
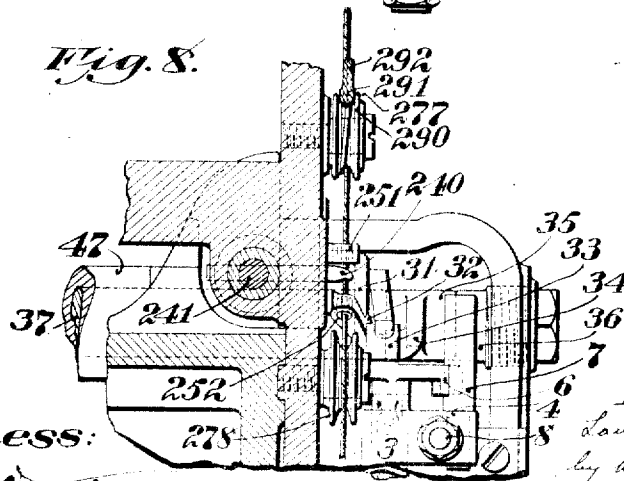


Fig. 8.



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UNITED STATES PATENT OFFICE.

LAURENCE E. TOPHAM, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE

1,170,024.

Specification of Letters Patent.

Patented Feb. 1, 1916.

Original application filed April 15, 1911, Serial No. 621,286. Divided and this application filed May 10, 1915. Serial No. 27,079.

To all whom it may concern:

Be it known that I, LAURENCE E. TOPHAM, a citizen of the United States, residing at Swampscott, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to sewing machines and more particularly to wax thread lock stitch sewing machines.

The objects of the invention are to improve the construction and operation of certain of the thread handling or controlling devices of machines of the class referred to and with these objects in view, the invention consists in the constructions, combinations and arrangement of parts hereinafter described and claimed, the advantages of which will be obvious to those skilled in the art from the following description.

The present application is a division of application Serial No. 621,286, filed April 15, 1911, which fully illustrates and describes a wax thread lock stitch sewing machine employing a straight awl and a straight hook needle. In the drawings accompanying the present application only so much of this sewing machine is illustrated as is necessary to enable the construction and mode of operation of certain of the thread handling or controlling devices to be understood.

Referring to the drawings, Figure 1 is a view in front elevation of the machine; Fig. 2 is a view in front elevation of the head of the machine; Fig. 3 is a vertical sectional view looking toward the rear, illustrating particularly the mechanism for actuating the take-up; Fig. 4 is a vertical sectional view looking toward the rear, illustrating particularly portions of the thread clamp actuating and presser foot mechanisms; Fig. 5 is a view in rear elevation partly in section of the head of the machine; Fig. 6 is a vertical longitudinal sectional view of the front portion of the head of the machine; Fig. 7 is a detail sectional plan view of the front portion of the head of the machine;

and Fig. 8 is a detail view taken partly in vertical section and particularly illustrating the upper end of the presser bar and its thread guiding eyes.

The work to be sewn is supported in the machine by means of a flat work support formed by the throat plate 1 which is provided with the usual slot through which the needle and awl operate.

The presser-foot 2 which coöperates with the work support to position the work is of usual construction, and is secured to the lower end of a presser bar 3. During the greater part of the cycle of operation of the machine the presser-foot is held against the work by the pressure of a comparatively heavy spring, so that the work is tightly clamped between the presser-foot and work support. During the feeding movement of the work, however, the presser-foot is raised from the work so as to offer no resistance to the feeding movement. At the end of the feeding movement the presser-foot is released and is again pressed against the work by said spring so that it has an opportunity to accommodate itself to the thickness of the stock. The presser-foot remains pressed against the work until the beginning of the next feeding movement, when it is again lifted and the cycle of operations repeated.

To enable the presser-foot to be actuated as above described, the presser bar 3 is slidably mounted in brackets 4 and 5 on the machine frame. The presser bar is kept from turning in its sliding bearings by an arm 6 extending radially from it near its upper end, the outer end of which arm is bifurcated to slidably engage a pin 7 projecting upwardly from the bracket 4. The lower end of the pin 7 is somewhat reduced to form a stud which is eccentric to the axis of the pin, and which is secured in a recess in the bracket 4 and clamped therein by a binder 8. The eccentric stud allows the pin 7 to be turned to compensate for wear between the pin and the bifurcated arm 6.

The means for automatically raising the presser-foot during each cycle of the stitch-forming operations, includes a collar 9 slidably mounted upon the presser bar above the bracket 5. The collar 9 is provided with a forwardly extending ear or lug 10 which is

bored to slide upon a pin 11 extending upwardly from the bracket 5. A helical compression spring 12 surrounding the pin 11 between the enlarged head of said pin and the lug 10 tends to normally press the sleeve 9 down in contact with the bracket 5 which thus acts as an abutment for the sleeve. The sleeve 9 is also provided with two lugs 13 which extend to the left, and between which is pivoted a lifting arm 14. When the free end of the arm 14 is raised, the arm 14 is first turned freely with relation to the sleeve 9 which is held down by the spring 12, until a cam which is formed on the inner end of said arm, is turned into gripping engagement with the presser bar 3 locking it in the sleeve 9, after which the presser bar 3 and sleeve 9 are lifted together during the continuation of the upward movement of the arm 14. The arm 14 is oscillated by an adjustable link 16 which connects the free end of the arm 14 with the end of an arm 17 which extends radially from the forward end of a rock shaft 18. The adjustable link 16 is formed in two parts, the upper part forming a threaded socket for the reception of a screw-threaded pin 19 which forms the lower part of the link. The lower end of the screw-threaded piece 19 is bifurcated and is secured to the outer end of the arm 17 by a removable pin 20 which is held in place by a wire spring 21 which engages a slot in the side of the projecting end of the pin 20. Adjustment of the link 16 is had by removing the pin 20, moving the link out of engagement with the arm 17, and adjusting the screw and socket connection. The rock shaft 18 is journaled in the machine frame and is given an oscillatory motion by means of an arm 22 extending radially from the rear end of the rock shaft, which arm carries a roller 23 running in a cam path cut in the front face of a cam wheel 24 mounted upon the continuously rotating shaft 25. The shaft 25 is journaled in the machine frame and is driven from the vertical shaft 26 by means of a gear wheel 27 meshing with a spiral gear 28 on the shaft 26. The vertical shaft 26 is in turn driven from the main driving shaft 29 by means of bevel gears 30. The normal direction of rotation of these driving shafts is indicated by arrows in various figures of the drawings. The timing of the cam path which oscillates the rock shaft 18 is such that the rock shaft 18 is oscillated to lift the arm 14 to raise the presser foot just before the feeding movement of the work takes place, and to lower the arm 14 to release the presser foot after the completion of the work feeding movement.

When the arm 14 is in its lowered position, the sleeve 9 is pressed against the bracket 5 and the presser bar is free to advance just itself in accordance with the varying

thickness of the work, so that, when the arm 14 is afterward raised, it will grip the presser bar in whatever position the presser bar may be and lift the presser foot a predetermined distance from the surface of the work, regardless of the thickness of the work. A fixed amount of motion is communicated to the lifting arm 14, but the amount of lifting movement imparted to the presser bar 3 may be varied by adjusting the inclination of the arm 14 by means of the adjustable link 16. By shortening the link 21, the amount of free movement of the lifting arm 14 before its cam-shaped end 15 grips the presser bar will be increased, and the amount of lift imparted to the presser foot will be correspondingly decreased, since only the lifting movement of the arm 14 after the cam has gripped the presser bar is effective to raise the presser bar.

To enable the presser foot to be raised by the operator with the parts of the machine in any position which they assume during a cycle of operations, and particularly when the parts are in a position to permit the removal or insertion of work, a treadle is provided and suitable connections whereby the presser foot may be raised at the will of the operator. To enable the presser foot to be thus raised the upper end of the presser bar is offset rearwardly to form an upwardly extending plate 31 which is provided with a horizontal forwardly extending ledge or shoulder 32. This shoulder 32 engages over the top of a round finger 33 which extends rearwardly from the extreme end of a lifting arm 34 and which also bears against the flattened top of the main portion of the presser bar. The shoulder 32 and the flat upper surface of the main portion of the presser bar thus form between them a laterally extending slot for the reception of the finger 33, so that when the arm 34 is lifted it will raise the presser bar. The arm 34 is formed on a sleeve 35 which is rotatably mounted upon a pin 36 which forms the forward bearing of a rock shaft 37. The rear end of the sleeve 35 has formed in it notches or recesses 38 in which are engaged forwardly projecting lugs 39 on the rock shaft 37. The lugs 39 are sufficiently smaller than the notches 38 to allow the sleeve 35 enough lost motion with relation to the rock shaft 37 so that the lever arm 34 is free to turn idly about its bearing on the pin 36 when the presser bar is raised and lowered by the automatically operated lifting arm 14 during the normal operation of the machine. The rock shaft 37 is turned to raise the arm 34 and presser bar 3 by means of a sliding bar or rod 40 secured to the laterally projecting arm 41 of a bell crank lever 42 rigidly mounted upon the rear end of the rock shaft. The sliding bar 40 is drawn downwardly by a wire 43 running to a suitable

treadle, not shown. In order to raise the treadle after it is released by the foot of the operator, a helical compression spring 44 is coiled about the rod 40 between the enlarged upper end of said rod and a plate 45 which is secured to the machine frame, and through which the bar 40 is slidably received. When the operator depresses the treadle, the wire 43 is drawn down, turning the rock shaft 37, which by means of the lug-and-notch connection 39 and 38 raises the arm 34 to lift the presser bar. At the time when the needle and awl are out of the work and permit its easy removal the lifting arm 14 is in its downwardly turned position and out of its gripping engagement with the presser bar so that the presser bar is free to slide up and down through the sleeve 9 which is held down against the bracket 5 by the spring 12. The presser bar may, however, be raised by the treadle when the machine is at any position in its cycle of operation. If the treadle is depressed to raise the presser bar when it is gripped in the sleeve 9 by the lifting arm 14, the presser bar 3 and sleeve 9 will be lifted together until the arm 14, whose outer end is held by the link 16, is turned sufficiently to disengage its cam shaped end 15 from the bar, after which the sleeve 9 will be no longer raised, but the presser bar will be freely lifted through said sleeve. The downward pressure which normally holds the presser foot against the work is supplied by a comparatively heavy helical spring 46 wound over the rock shaft 37, the forward end of which spring is extended laterally and bears down upon the finger 33 of the arm 34, and the rear end of which spring is secured to the forward end of a sleeve 47 rotatably carried upon the rock shaft 37. For convenience of construction the sleeve 47 is formed of front and rear portions, which are secured against rotation relatively to each other under the action of the spring 46 by means of a toothed connection 48. Gear teeth 49 are cut in the rear portion of the sleeve 47 and mesh with a worm cut on a shaft 50 which is adapted to be manually turned by means of the handle 51 to adjust the tension of the spring 46 against the presser bar.

The tension device comprises a thin circular plate or wheel 212 the edge of which is formed with serrations which are alternately offset to form a peripheral thread receiving groove in which the thread is held from slipping relatively to said wheel. The wheel 212 is loosely mounted to rotate on a bar 213 which is slidably mounted in a bracket 214 projecting upwardly from the head of the machine. A suitable friction device is provided for retarding the rotation of the wheel 212 so that a strain or tension may be put upon the thread as it is drawn from the work side of the tension device.

The friction device comprises two friction disks or brakes 215 and 216 between which the wheel 212 is adapted to be clamped. The friction disk 215 is secured to one side of the bracket 214 and the friction disk 216 is slidably splined upon the bar 213. The right end of the bar 213 is somewhat reduced to form an annular shoulder or abutment 217 which is adapted to be engaged by a corresponding shoulder formed on the interior of the hub of the friction disk 216 and limit the movement of the disk 216 to the left on the bar 213. A helical compression spring 218 extending between the disk 216 and a knurled nut 219 on the end of the bar, normally presses the disk 216 against the stop shoulder 217, except at such times as the bar 213 is drawn to the left to apply the disk 216 directly to the side of the wheel 212. When the bar 213 is drawn to the left, the disk 216 is brought against the side of the wheel 212, and the continued movement of the bar 213 withdraws the shoulder 217 from its engagement with the disk 216 so that the wheel 212 is frictionally clamped between the brake disks 215 and 216 to put a tension on the thread as it is drawn over the wheel 212. The degree of tension put on the thread may be varied by adjusting the tension of the spring 218 by means of the nut 219. When it is desired to relieve the thread of the strain put on it by the friction device, the bar 213 is released, whereupon the spring 218 will draw the bar 213 to the right until the stop shoulder 217 is brought into engagement with the disk 216 and relieves the wheel 213 from the pressure of the disk 216 so that it may be freely turned.

The means for actuating the bar 213, as above described to apply and release the friction device, comprises a vertical lever 220 pivotally secured to the left end of the bar 213 and fulcrumed against the point of an adjustable pin 221 on the side of the bracket 214. The lower end of the lever 220 is formed with a ball 222 which is received in a cylindrical recess 223 in the top of the sleeve 224 which is mounted upon the forward end of a rock shaft 225. The rock shaft 225 is oscillated to actuate the lever 220 through the ball-and-recess connection and operate the friction device as above described. The ball-and-recess connection also holds the lever 220 from moving forwardly or backwardly, and so maintains the bar 213 from turning in its sliding bearing in the bracket 214. The rock shaft 225 is oscillated by means of a radially extending arm 226 mounted upon its rear end. A bell crank lever 227 is pivoted at its elbow to the end of the arm 226. One arm of the bell crank lever 227 is pivotally connected at 228 to one end of a link 229, the other end of which is pivotally connected at 230 to the

upwardly extending arm 231 of the bell crank lever 42 which is adapted to be turned by the presser foot lifting treadle hereinbefore described. The other arm of the bell crank lever 227 is pivotally connected at 232 to one end of a link 233, the other end of which is pivotally connected at 234 to an arm 235 extending from a rock shaft 236. The rock shaft 236 is journaled in the machine frame and is oscillated by a downwardly extending arm 237 which carries a cam roller 238 running in a cam path cut in the rear face of the cam wheel 239. During the normal operation of the machine the connecting point 230 is stationary and the bell crank lever 227 fulcrums about the point 228 so that the motion of the cam actuated arm 237 is transmitted through the shaft 236, the arm 235, the link 233 and the bell crank 227 to oscillate the rock shaft 225 to apply and release the friction device of the thread tension once during each cycle of the stitch forming operations. The oscillation of the rock shaft 225 is constant in amount and is timed by the cam wheel 239. The timing of the application and release of the tension put upon the thread by the friction device may be varied within certain limits by the adjustment of the fulcrum pin 221 by which more or less lost motion is allowed between the lever 220 and the pin 221, and the period during which the thread is held under tension shortened or lengthened respectively. The timing of the application and release of the friction device, with respect to the other operations of a stitch forming cycle, will be hereinafter described with relation to the timing of the thread locks.

In addition to the above described automatic means to actuate the friction device, a manually operable release is provided. The manually operable release is actuated by depressing the treadle which raises the presser foot and the friction on the thread tension is released simultaneously with raising of the presser foot, so that the thread may be freely drawn out under no tension when the work is removed from the machine. When the presser foot lifting treadle is depressed, the bell crank 42 is turned to draw the link 229 downwardly and to the right. This acts to turn the bell crank 227 so that the toggle which is formed by one arm of the bell crank 227 and the link 233, is broken and the arm 226 is moved downwardly to the left to turn the rock shaft 225 and release the friction disks from the wheel 212.

The pull-off by which during each cycle of the operations of the machine enough thread is pulled from the supply for the formation of the succeeding stitch is indicated at 240 and consists of a finger clamped to the right hand end of a rock shaft 241 horizontally and laterally journaled in the

machine frame. The throw of the pull-off 240 is constant and in order to cause it to pull off the required amount of thread, which varies with the thickness of the material being stitched, the pull-off finger is arranged to pass between two thread guiding eyes 251 and 252 through which the thread passes on its way from the tension device to the work. These eyes are formed directly on the upper end of the presser bar so that their position, with relation to the pull-off, is changed by any variation in the thickness of the work being operated upon. The thread passes from the tension device downwardly through the eye 251, then laterally across beneath the pull-off finger 241 to the eye 252. The pull-off finger engages the thread between the eyes during its downward stroke and it will be obvious that since the stroke of the pull-off is constant, the amount of thread pulled from the supply by the pull-off will vary with the position of the eyes and more especially with the position of the eye 252. During its downward movement the pull-off pulls thread from the supply through the eye 251 in the direction in which the thread leads through the eye, this eye acting merely as a thread guide to keep the thread at the right of the pull-off. The eye 252, therefore, forms the essential part of the thread measuring device since upon its position depends primarily the amount of thread pulled off by the pull-off, although the eye 251 performs an important and useful function in leading the thread to the eye 252 so that it will be properly engaged with the pull-off. When the presser foot is raised, the eyes 251 and 252 are raised and a greater amount of thread will be pulled off between them by the downward movement of the pull-off finger.

The main take-up is indicated at 253 and consists of an arm secured to the forward end of a rock shaft 254 and provided at its free end with a take-up roll 255 which co-operates with the thread guiding rolls 256 and 257 to draw out a loop in the needle thread. To secure ease, smoothness and certainty of operation, when the machine is running at high speed, the rock shaft 254 carrying the take-up arm 253, is operated through suitable connections from a continuously rotating crank 258 which is carried upon the front face of the cam wheel 75. These connections consist of an arm 259 upon the rear end of the rock shaft 254, a link 260 connecting said arm with an arm 261 carried by a rock shaft 262 which is journaled to the machine frame, and a link 263 connecting a second arm 264 on the rock shaft 262 to the continuously rotating crank pin 258.

Front and rear thread locks indicated at 276 and 277 act intermittently during the

cycle of operations to clamp the thread between the take-up and pull-off, and between the pull-off and tension respectively. The front thread lock 276 closes so that the thread is clamped throughout the action of the pull-off, the rear thread lock at this time being open so that the thread may be pulled through the tension by the pull-off. The rear thread lock 277 closes so that the thread is clamped throughout the action of the take-up, the front lock at this time being open so that the stitch is set against the rear lock. The setting of the stitch against the rear thread lock pulls the thread taut through the thread guiding eyes of the pull-off and insures that no slack thread is left so that the proper amount of thread will always be drawn by the pull-off through the tension. The thread locks are so timed that the thread is not released by one lock until after it is clamped by the other lock, so that the thread at no time is free between the supply and the needle, and the feed of the thread is perfectly controlled during the entire operation of the machine. The times at which the thread is held by both locks occur immediately after the operation of the take-up and immediately after the operation of the pull-off.

The front lock, indicated generally by 276, consists of a thread roll 278 and a cooperating clamping shoe 279 which is adapted to grip the thread against the roll. The clamping shoe 279 is formed on the lower end of a lever 280 pivoted at 281 to the frame of the machine. The mechanism for oscillating the lever 280 to actuate the thread lock comprises a rock shaft 282, which carries upon its forward end an arm 283, bifurcated at its free end to engage the lever 280 and which carries upon its rear end two laterally extending arms 284 and 285, bearing on their free ends cam rollers 286 and 287 respectively, which run against two cam surfaces 288 and 289 formed side by side around the periphery of the cam wheel 75. These two cam surfaces 288 and 289 are so proportioned relatively to each other that the rollers 286 and 287 are always adjacent their respective cams, so that no lost motion occurs between the rock shaft and these driving cams. The timing of the cams is such that the clamping shoe 279 is moved to grip the thread just after the take-up has set the stitch and before the pull-off acts, and is moved to release the thread after the pull-off has drawn the thread from the supply and just before the rotary hook draws out the loop which it passes over the bobbin case to its greatest extension. The thread handling parts are so arranged that the hook at this time pulls the thread just taut, and so draws down the thread which has been taken from the supply by the pull-off.

The rear thread lock, indicated generally by 277, consists of a thread roll 290 over which the thread is carried in a complete turn and a cooperating clamping shoe 291 which is adapted to grip the thread against the roll. The clamping shoe 291 is formed on the free end of a laterally extending arm 292 integral with the sleeve 224 which is mounted on the rock shaft 225. The rock shaft 225 is oscillated as hereinbefore described under the operation of the friction device of the thread tension. During the operation of the machine the rock shaft 225 begins to turn to the right after the pull-off finger begins its descent. The rock shaft 225 is turned slowly enough to the right and the clamping shoe 291 has sufficient motion relative to the roll 290, so that the thread is not gripped by the rear thread lock until after the completion of the pull-off stroke. The application of the friction device to the thread tension wheel is preferably so timed that the pull-off will draw thread freely through the tension device during the first part of its stroke and will draw thread against the tension of the friction device during the last part of its stroke. Such timing of the friction device is attained by adjusting the fulcrum pin 221 so that as the rock shaft 225 is turned to the right the lever 220 will not engage against the fulcrum pin 221 and move the bar 213 to apply the friction device to the wheel 212, until the pull-off is nearing the completion of its stroke. The above timing of the friction device saves needless work on the part of the pull-off in drawing the thread from the supply under tension during the first part of its stroke, since it is only during the last part of the pull-off stroke that the tension is needed to insure that the thread be taut over the pull-off so that no extra thread will be stolen from the supply. Moreover, the application of the friction device while the wheel 212 is moving obviates the extra strain which would otherwise be put upon the thread in starting the wheel 212 against the static friction of the friction disks 215 and 216 which would be greater than is the moving friction of the wheel 212 against said friction disks. It is obvious, however, that the pin 221 may be so adjusted that the lever 220 will be in contact therewith when the rock shaft 225 begins its turning movement to the right so as to put the thread under tension during the entire stroke of the pull-off, if so desired. When the presser foot lifting treadle is depressed to raise the presser foot, the rock shaft 225 will be turned to the left, as hereinbefore described, and will release the clamping shoe 291 from the thread. The amount of turning imparted to the rock shaft 225 by the treadle will be sufficient to move the lever 220 out of contact with the pin 221 and so release the fric-

tion device from the thread tension wheel. When the machine is turned to free the work from the needle and awl so that it may be easily removed, the front thread lock is open, and the thread is thus entirely free to be drawn out from the supply as the work is removed from the machine.

The invention having thus been described, what is claimed is:—

1. A sewing machine, having in combination, stitch forming devices, a work support, a presser foot, a thread tension device acting to put tension on the thread as the thread is drawn through said device, a thread lock, and means under the control of the operator for simultaneously releasing the tension on the thread, opening the thread lock and raising the presser foot to permit the removal and insertion of the work.

2. A sewing machine, having in combination, stitch forming devices, a thread tension device acting to put tension on the thread as the thread is drawn through said device, a thread lock, and means under the control of the operator for simultaneously releasing the tension on the thread and opening the thread lock to permit the thread to be freely drawn from the supply on the removal of the work.

3. A sewing machine, having in combination, a needle, an awl, a take-up, a pull-off, a tension, a front thread lock between the take-up and pull-off, a rear thread lock between the pull-off and tension, the parts being so timed that the front thread lock is open, the rear thread lock is closed and the thread is held by the tension at the time when the needle and awl are out of the work, and manually operable means for opening the rear thread lock and releasing the tension so that the thread may be freely drawn from the supply when the work is removed from the machine.

4. A sewing machine, having in combination, a needle, an awl, a work support, a presser foot, a take-up, a pull-off, a tension, a front thread lock between the take-up and pull-off, a rear thread lock between the pull-off and tension, the parts being so timed that the front thread lock is open, the rear thread lock is closed and the thread is held by the tension when the needle and awl are out of the work, and manually operable means for simultaneously lifting the presser foot, opening the rear lock, and releasing the tension so that the work may be easily removed from the machine.

5. A sewing machine, having in combination, stitch forming devices, a thread tension device acting to put tension on the thread as the thread is drawn through said device, a thread lock, power driven means connected to and arranged to apply and release the tension and open and close the

lock, and manually operable means connected to said power driven means and operating therethrough to independently release the tension and open the lock.

6. A sewing machine, having in combination, stitch forming devices, a thread lock, a thread tension device acting to put tension on the thread as the thread is drawn through said device, power driven means including a cam and connections between the cam and the tension and thread lock to apply a tension to the thread and to lock the thread during each cycle of stitch forming operation, and manually operable means connected to and arranged to actuate said connections independently of the cam to release the thread lock and tension.

7. A sewing machine, having in combination, stitch forming devices, a thread lock, a tension, power driven means including a toggle for actuating the thread lock and tension, and manually operable means connected to and adapted to independently actuate the toggle to unlock the thread lock and release the tension.

8. A sewing machine, having in combination, stitch forming devices, a tension including a friction device, a cam for applying and releasing the friction device, connections between the cam and friction device including a toggle, and manually operable means connected to and arranged to actuate the toggle independently of the cam to release the friction device.

9. A sewing machine, having in combination, stitch forming devices, a thread tension including a friction device, a lever connected to and arranged to actuate the friction device, power driven means connected to and arranged to oscillate the lever, a fulcrum for the lever which is adjustable to vary the timing of the movement communicated by the power driven means through the lever to the friction device.

10. A sewing machine, having in combination, stitch forming devices, a tension including a friction device, a bar, a spring to move the bar in one direction to release the friction, a lever connected to and arranged to move the bar in the opposite direction to apply the friction, power driven means connected to and arranged to oscillate the lever, a fulcrum for the lever against which the lever is moved during a part of each cycle of operations to apply the tension and away from which the lever is moved during the remainder of the cycle to allow the bar to be drawn by the spring to release the tension.

11. A sewing machine, having in combination, stitch forming devices, a thread tension wheel, a friction device for the tension wheel comprising a friction disk adapted to bear against said wheel, a slidably mounted bar upon which the friction disk is loosely

splined, a spring on the bar acting to press the disk in a direction to engage the wheel, an abutment on the bar engaging the disk and limiting its movement under the action of the spring, and power driven means acting on the bar during a part of each cycle of operations to withdraw the abutment from the movable disk to allow the spring to hold the disk against the wheel and acting during the remainder of the cycle to allow the abutment to engage the friction disk and release it from the wheel.

12. A sewing machine, having in combination, stitch forming devices, a thread tension wheel, a friction device for the wheel comprising stationary and movable friction disks, a slidably mounted bar upon which the movable friction disk is loosely splined, a spring mounted on the bar and pressing the movable disk toward the fixed disk to engage the wheel therebetween, an abutment on the bar limiting the movement of the movable friction disk under the action of the spring, and power driven means acting on the bar during a part of each cycle of operations to withdraw the abutment from the movable disk to allow the spring to hold the disk against the wheel and acting during the remainder of the cycle to allow the abut-

ment to engage the movable disk and release it from the wheel.

13. A sewing machine, having in combination, stitch forming devices, a thread lock, and power driven means to open and close the lock including a rock shaft bearing two oppositely extending arms, cam rollers upon the ends of the arms, and a cam wheel having two cam surfaces formed thereon to cooperate with the cam rollers.

14. A sewing machine, having in combination, stitch forming devices, a pull-off, a thread tension, a thread lock constructed to grip the thread between the pull-off and tension, and a common power driven means for actuating the tension and lock arranged to put a tension upon the thread during the action of the pull-off and to grip the thread in the lock at the completion of the thread drawing movement of the pull-off.

15. A sewing machine, having in combination, stitch forming devices, a pull-off, a thread tension between the pull-off and the thread supply including a friction device, and means for actuating the friction device to put a tension on the thread during the latter part only of the thread drawing movement of the pull-off.

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splined, a spring on the bar acting to press the disk in a direction to engage the wheel, an abutment on the bar engaging the disk and limiting its movement under the action of the spring, and power driven means acting on the bar during a part of each cycle of operations to withdraw the abutment from the movable disk to allow the spring to hold the disk against the wheel and acting during the remainder of the cycle to allow the abutment to engage the friction disk and release it from the wheel.

12. A sewing machine, having in combination, stitch forming devices, a thread tension wheel, a friction device for the wheel comprising stationary and movable friction disks, a slidably mounted bar upon which the movable friction disk is loosely splined, a spring mounted on the bar and pressing the movable disk toward the fixed disk to engage the wheel therebetween, an abutment on the bar limiting the movement of the movable friction disk under the action of the spring, and power driven means acting on the bar during a part of each cycle of operations to withdraw the abutment from the movable disk to allow the spring to hold the disk against the wheel and acting during the remainder of the cycle to allow the abut-

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15. A sewing machine, having in combination, stitch forming devices, a pull-off, a thread tension between the pull-off and the thread supply including a friction device, and means for actuating the friction device to put a tension on the thread during the latter part only of the thread drawing movement of the pull-off.

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Corrections in Letters Patent No. 1,170,024

It is hereby certified that in Letters Patent [No. 1,170,024, granted February 1, 1916, upon the application of Laurence E. Topham, of Swampscott, Massachusetts, for an improvement in "Sewing-Machines," errors appear in the printed specification requiring correction as follows: Page 4, line 11, for the word "ertending" read *extending*; same page, line 28, for the word "mav" read *may*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 7th day of March, A. D., 1916.

[SEAL.]

Cl. 112-20.

J. T. NEWTON,

Acting Commissioner of Patents.

It is hereby certified that in Letters Patent [No. 1,170,024, granted February 1, 1916, upon the application of Laurence E. Topham, of Swampscott, Massachusetts, for an improvement in "Sewing-Machines," errors appear in the printed specification requiring correction as follows: Page 4, line 11, for the word "ertending" read *extending*; same page, line 28, for the word "mav" read *may*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

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J. T. NEWTON,

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