(No Model.) 4 Sheets—Sheet 1.

J. L. FOLLETT.

SEWING MACHINE.

No. 300,458. Patented June 17, 1884.

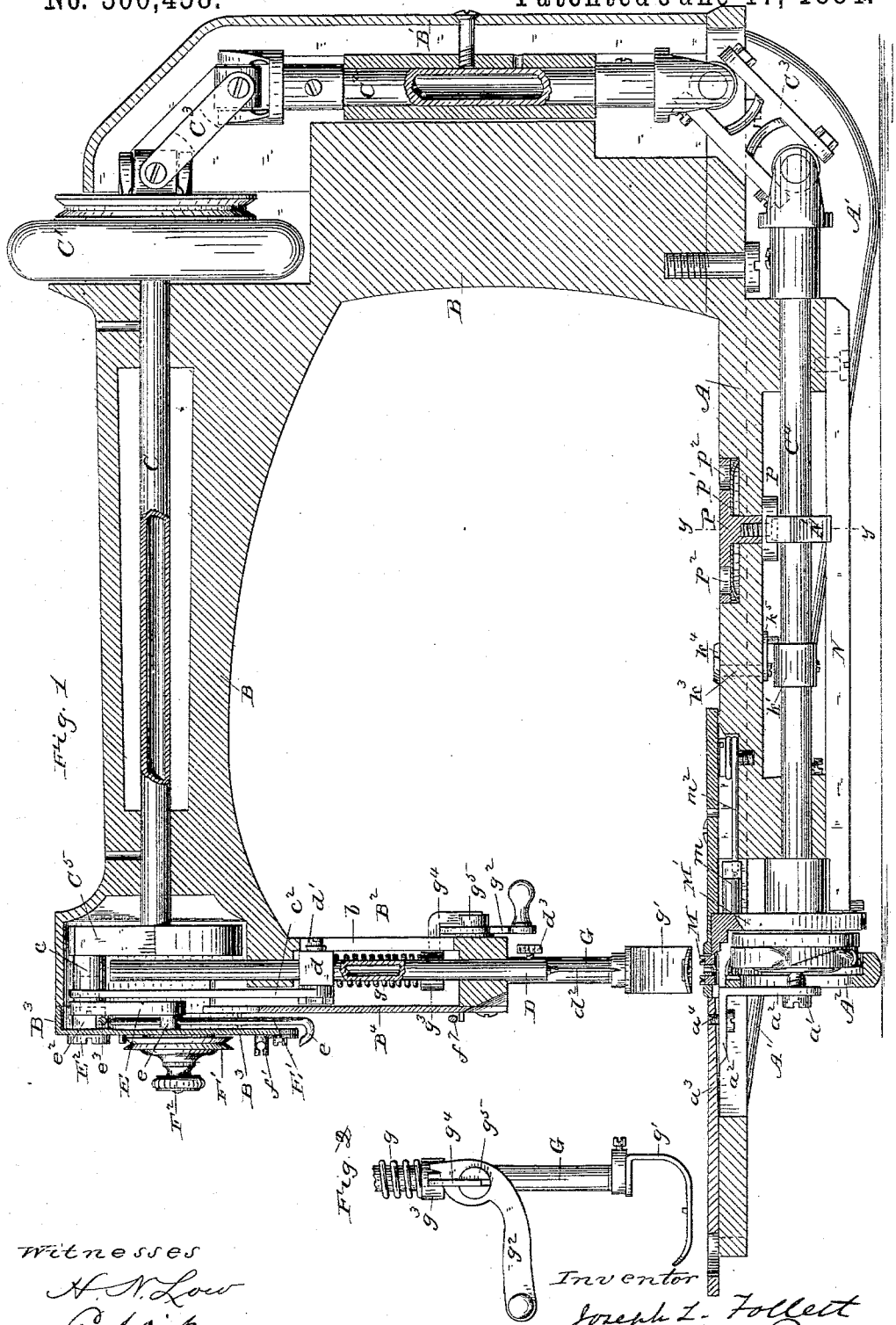

Fig. 1.

Fig. 2.

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(No Model.) 4 Sheets—Sheet 2.

J. L. FOLLETT.

SEWING MACHINE.

No. 300,458. Patented June 17, 1884.

Fig. 4.

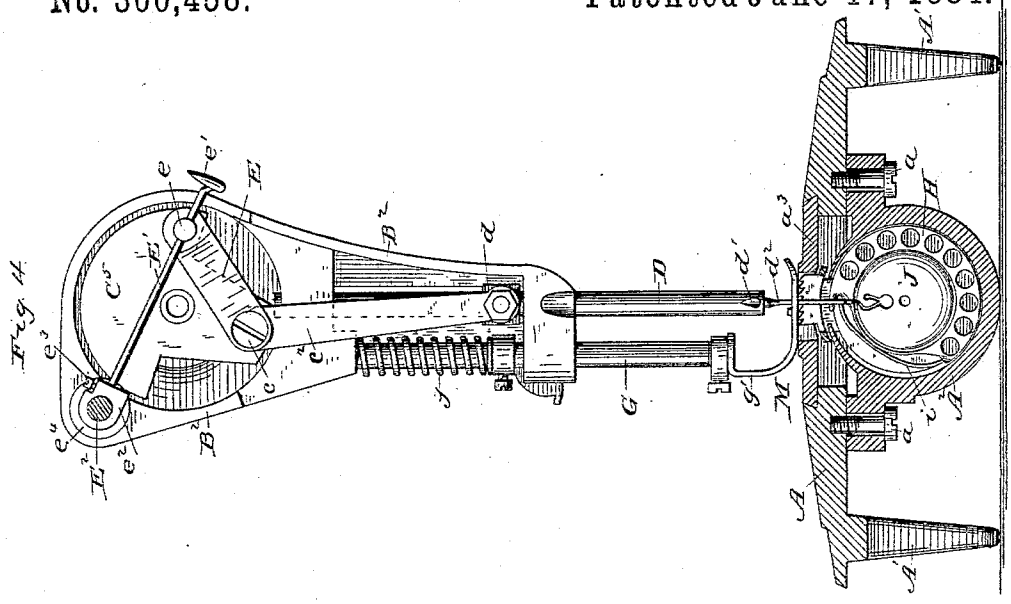
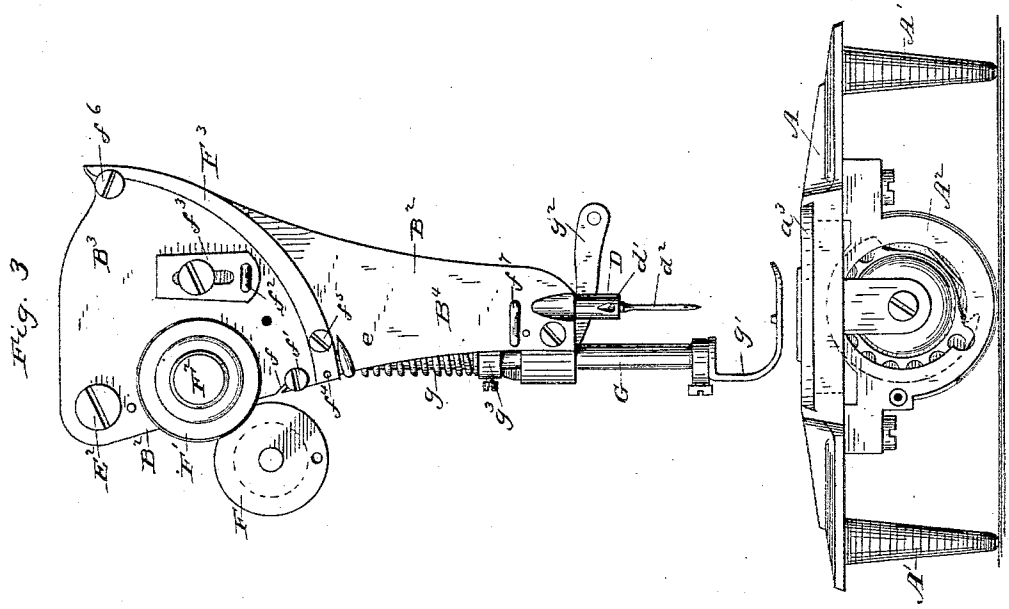


Fig. 3.



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(No Model.) 4 Sheets—Sheet 3.

J. L. FOLLETT.

SEWING MACHINE.

No. 300,458. Patented June 17, 1884.

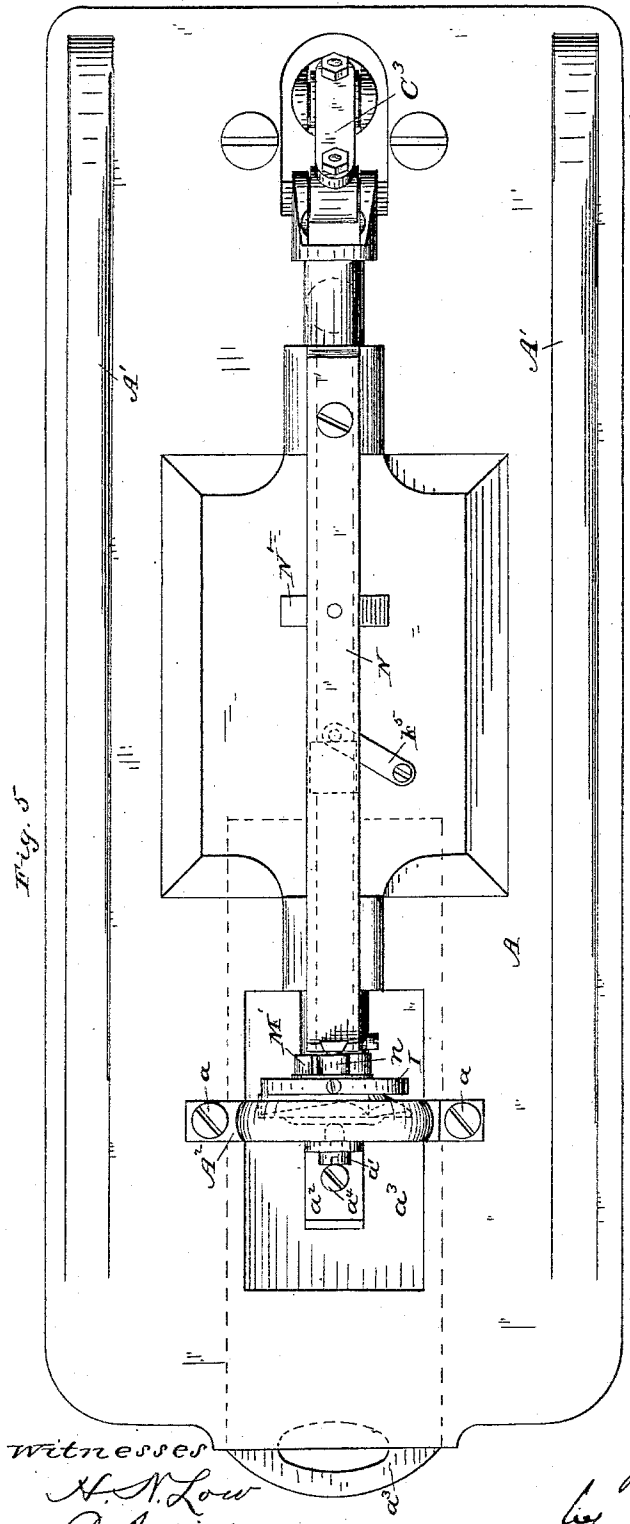

Fig. 5.

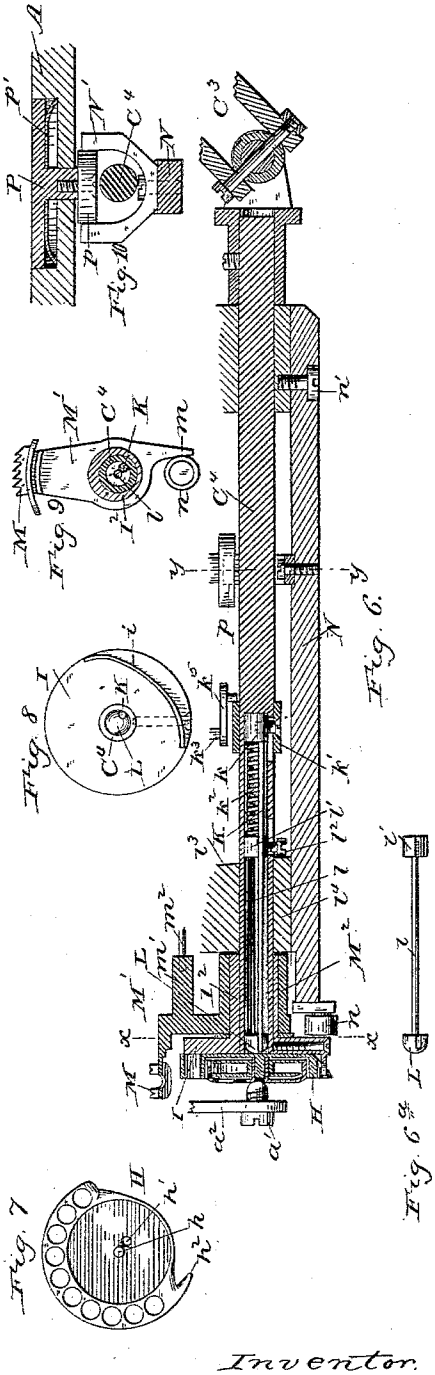

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

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(No Model.) 4 Sheets—Sheet 4.

J. L. FOLLETT.

SEWING MACHINE.

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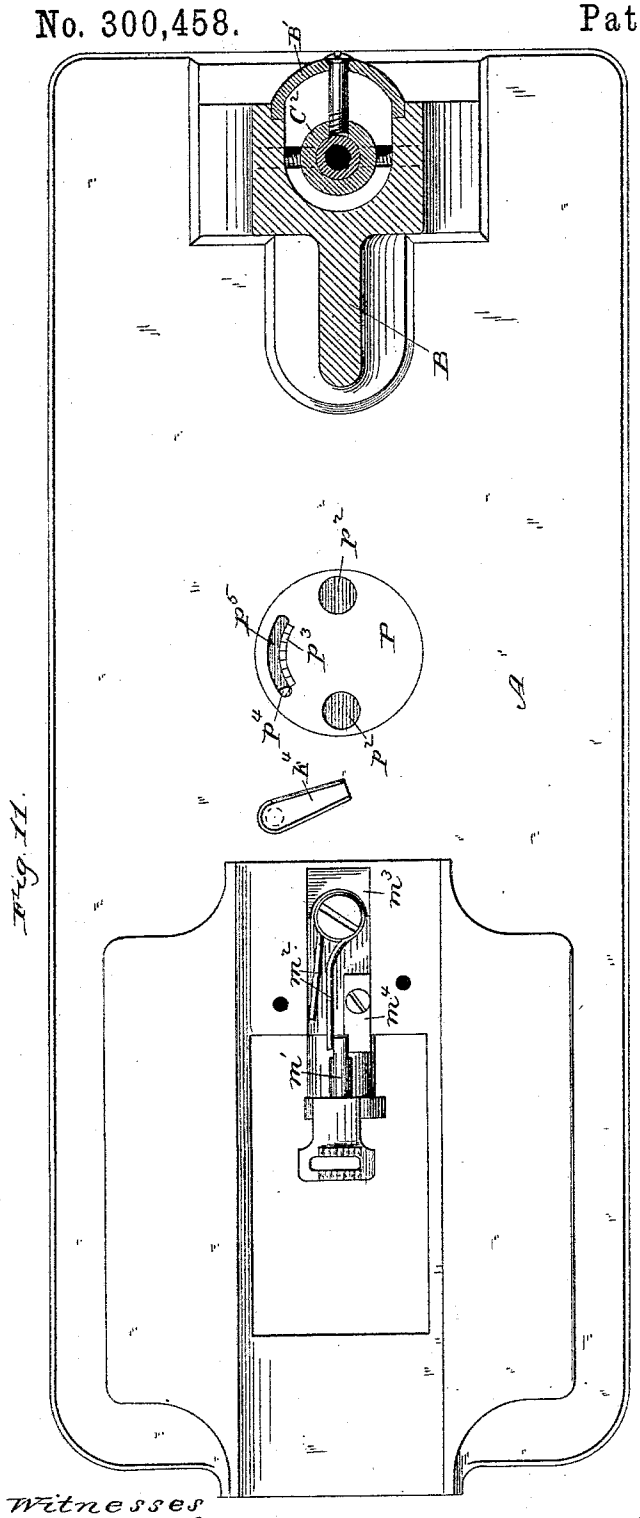

Fig. 11.

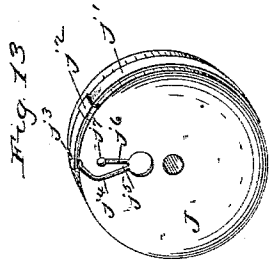

Fig. 13

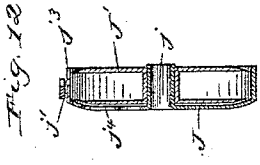

Fig. 12

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UNITED STATES PATENT OFFICE.

JOSEPH L. FOLLETT, OF NEW YORK, N. Y.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 300,458, dated June 17, 1884.

Application filed June 26, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH L. FOLLETT, of the city, county, and State of New York, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

My invention relates to that class of sewing-machines forming what is known as the "lock-stitch," by means of two threads, one of which is carried by a needle operating from one side of the material being sewed, and the other or interlocking thread by a device arranged on the opposite side of such material.

My invention is more particularly directed to that variety of lock-stitch sewing-machines in which a rotary device co-operates with the needle in forming the stitches, the object of my invention being the production of a machine which, while it is simple in construction and efficient in operation, will be capable of running at very high rates of speed at a minimum expenditure of power, at the same time being nearly noiseless. To attain this object it is necessary that the moving parts should be as light as possible consistent with proper strength, that their operation should be positive and regular, and that the use of gears, cams, and vibrating levers should mainly be avoided by the nearly direct utilization of uniform rotary movements.

The invention can best be explained and understood by referring to the accompanying drawings, in which I have represented a sewing-machine of the rotary-shuttle type embodying my improvements in their preferred form.

Figure 1 is a sectional side elevation thereof. Fig. 2 is a detail of the cloth-pressing device. Fig. 3 is an elevation of the front of my machine. Fig. 4 is a similar view, partly in section, the face-plates of the head being removed. Fig. 5 is a reverse plan view. Fig. 6 is a longitudinal sectional view of the parts beneath the bed-plate. Fig. 6^a is a view of the shuttle-brace detached. Fig. 7 is a face view of the shuttle. Fig. 8 is a face view of the shuttle-carrying disk. Fig. 9 is a detail view of the feed, showing the counter-shaft and sleeve of the shuttle-carrier in section on line $x\ x$, Fig. 6. Fig. 10 is a sectional view of the feed-regulating mechanism on line $y\ y$, Figs. 1 and 6. Fig. 11 is a top plan view of the bed-plate, the bracket-arm and vertical shaft being in section. Fig. 12 is an enlarged sectional view of the bobbin and bobbin-case, and Fig. 13 a perspective view of the same bobbin-case.

A is the bed or work plate, to which is secured in any suitable manner the bracket-arm B; or, if preferred, said bracket-arm may be formed integral with said bed-plate. The bed-plate is provided on its under side with strengthening-ribs A′, which are shallow at the front end of the machine, gradually increasing in depth toward the rear end thereof until they are equal in depth to the shuttle-race A^2. The rear portions of the ribs A′ will thus form feet or bearings on which the machine may rest, while the shuttle-race will form a foot or bearing at the opposite end. As these feet or bearings extend below any of the moving parts of the machine they enable the same to stand on a plane surface, if desired, without being let down into the top of the table, the machine being thus raised a sufficient distance to prevent any of the running parts from being damaged by coming in contact with any obstacles. B′ is a removable plate or cover at the rear end of the bracket-arm B, and B^3 B^4 are removable caps or plates on the front of the head B^2.

C is the main or driving shaft, arranged in the upper or horizontal portion of the bracket-arm, and provided with a fly and pulley wheel, C′, of usual construction.

C^2 is a transmitting-shaft journaled in the vertical portion of the bracket-arm, and serving to convey motion from the main shaft C to the counter-shaft C^1, which latter is journaled in suitable bearings beneath the bed-plate A. The shafts C, C^2, and C^1 are connected by universally-jointed links C^3, by which they are strongly and positively united, thus preventing rattling or any movement of one independently of the others. To dispense with surplus weight the shafts C, C^2, and C^1 are preferably made either partially or entirely hollow, and to provide for proper lubrication they may be pierced with small holes at their bearings and filled with oil, which can be confined by corks, screw-plugs, or other appropriate stoppers placed in the ends of the shafts. The needle-bar is driven from the upper shaft, C, which, as before said, is the main

or driving shaft, and the feed and shuttle (or hook, if one be used) are actuated from the lower or counter shaft, C^4. The belt-wheel C' is, it will be noticed, located on the main shaft at a point between the needle-bar connection on the one hand and the universal link-joint connections C^3 on the other hand. This arrangement of parts is material, for the reason that the driving-power is applied directly to the needle-bar-actuating shaft, and is not transmitted to said shaft through the universal link-joint connections, as it would necessarily be were the driving pulley or wheel C' located elsewhere. The power transmitted through the universal link-joint connections is only that comparatively small amount needed to drive the hook and the shuttle. Said connections are therefore subjected to but very little strain, while all the shock and strain and consequent wear and tear which would come upon them were they required to transmit the power to drive the needle-bar are entirely avoided.

On the forward end of the main shaft C is a balanced crank, C^5, having a crank-pin, *c*, which is connected by a pitman, c^2, to a block or collar, *d*, secured to the needle-bar D, which latter reciprocates vertically in bearings formed in head B^2 of the bracket-arm B in a well-known manner. An eye-pointed needle, d^2, of ordinary construction, excepting that it is very much shorter than those generally used in lock-stitch machines, is secured in the lower end of the needle-bar D by a set-screw, d^3, or in any other suitable way. To prevent the needle-bar from turning, the screw-bolt *d'*, by which the block *d* is fastened to the said needle-bar, is arranged in a slot, *b*, of the head B^2. As the needle-bar is one of the moving parts of a sewing-machine which consumes the most power in its operation, I preferably make my needle-bar hollow to lessen its weight, this construction being found much better for the high rates of speed for which my machine is especially designed than that ordinarily employed.

To the crank-pin *c* is rigidly secured a crank-arm, E, in the outer end of which is arranged a swiveled crank-pin, *e*, through which passes loosely the take-up lever E', pivoted on a stationary screw-pin, E^2, entering a threaded hole in the front end of the head B^2 of the bracket-arm B, said screw-pin also serving to secure the upper cap or face plate, B^3, in place. The take-up lever consists of single wire, which is straight for the greater portion of its length, its outer or free end being formed into a hook, *e'*. This wire is secured into a block, e^2, by a set-screw, e^3, said block being loosely pivoted on the pin E^2. A washer, e^4, is preferably arranged on the pin E^2, between the block e^2 and the front face of the head B^2. The crank-arm E is so arranged relatively to the take-up lever and so timed in relation to the movements of the needle-bar that the swiveled crank-pin *e*, which slides back and forth on the take-up lever, will be farthest from the fulcrum of said lever when the needle is in the work and the take-up is moving downward, and will be nearest to said fulcrum during the early part of the downward movement of the needle-bar when the take-up is moving upward. From the relative arrrangement of the take-up lever and rotating swiveled crank-pin it results that the upward movement of the former (which is the movement by which it performs its function of tightening the stitches) will be very rapid, being performed during about one-fourth of a revolution of the crank-pin, while the time occupied by its downward movement will be about three times as long, or during about three-fourths of a revolution of said crank-pin. The reasons for these movements of the take-up will be further explained in connection with the operation of the needle and shuttle in forming the stitches.

The needle-thread is carried by a spool, F, held on a horizontal spool-pin, said thread passing from said spool into a small guide-slot, *f*, in the face-plate B^3; thence through a perforated and slotted guide-pin, *f'*; thence around a tension-wheel, F', of ordinary construction, the frictional contact of felt or other suitable washers, between which said wheel is held, being adjusted by a thumb-nut, F^2. From the tension-wheel the thread passes through a guide-eye, f^2, carried by a plate, f^3, which is slotted to permit it to be adjustably secured to the face-plate B^3 by a suitable set-screw. A light check tension-spring, F^3, is fastened to the edge of the face-plate B^3, preferably by a dowel-pin, f^4, and set-screw f^5, as shown, the tension of said spring being regulated by an adjusting-screw, f^6, arranged near its upper end, said adjusting-screw also serving to prevent the thread, which passes from the guide-eye f^2 beneath said spring, from escaping from the end thereof. The check tension-spring F^3 is shown as being curved to conform to the path traversed by the hook *c'* of the take-up lever E', and this construction of said spring is deemed preferable, as it enables said hook to work in close contact with said spring throughout its entire movement. From the check tension-spring the thread passes through guides f^7 and *d'* on the face-plate B^4 and in the lower end of the needle-bar, respectively, to the eye of the needle.

The presser-bar G, carrying at its lower end the presser-foot *g'*, and yieldingly held against the work by a spiral spring, *g*, is raised by a cam-lever or lifter, g^2, projecting forward toward the operator, so as to be conveniently accessible. To prevent the presser-bar from turning, the collar g^3, against which the spring *g* bears, is provided with a right-angular lug, g^4, the vertical portion of said lug engaging the driving-slot of the screw g^5, on which the cam-lever or lifter g^2 is pivoted. This construction serves the double purpose of preventing the presser-bar from turning and the pivot-screw g^5 from becoming loose.

The rotary shuttle H is loosely sustained between a disk, I, and a shuttle-race, A^2. The disk I is secured to the forward end of the

counter-shaft C^1 by a set-screw or in any other suitable manner, said disk being provided on its face with a segmental flange, *i*, which constitutes the shuttle-driver. Said disk is steadied on the counter-shaft by an eccentric sleeve, I^2, serving to operate the feed. The shuttle H is circular in outline, excepting that a portion of its periphery, corresponding in extent to the length of the flange *i*, is cut away to form a seat for said flange, so that the latter may properly engage the shuttle. The shuttle is provided with a circular recess for the reception of the bobbin, and at the center of said recess is a pivot-pin, *h*, adapted to loosely enter a sleeve, *j*, of the bobbin-case J, on which sleeve the bobbin J′ is loosely pivoted. The length of the sleeve *j* is slightly greater than the depth or thickness of the bobbin and case, so as to leave room for the bobbin to rotate freely between the case and the inside of the rotary shuttle, and to prevent the edge of the periphery of the case from coming in contact with said inside of the shuttle. To the outside of the bobbin-case is secured a tension-spring, *j′*, on which is placed a small regulating-slide, j^2. The tension-spring is bent to conform to circle of smaller radius than that of the periphery of the bobbin-case, so that when the slide is at a distance from the free end of said spring the entire stress thereof will be exerted on the bobbin-thread passing between said free end and the bobbin-case. To lessen the tension of the bobbin-thread, the slide is pushed toward the free end of the spring, thus slightly raising the same from the thread. The bobbin-case is threaded by drawing the bobbin-thread into a notch, j^3, on the inner side of said case, then beneath the free end of the tension-spring *j′*, into the slot j^4, around the point j^5, and through the slot j^6, into the hole j^7, through which it issues to the work. The draft on the bobbin-thread caused by its tension will be sufficient to prevent the bobbin-case from turning while the shuttle rotates, the bobbin remaining stationary with its case, excepting that said bobbin will turn to yield or unwind its thread, as the latter is required. This construction admits of a uniform tension of the thread, which is undisturbed by the rotary shuttle, the bobbin and case being always at the same distance from the work as the latter passes the needle-hole in the cloth-plate. As the bobbin only turns to permit of the unwinding of its thread, it is obvious that there will be no twisting or untwisting of the bobbin-thread, as occurs in some rotary-shuttle machines heretofore constructed.

The shuttle-race A^2 is fastened to the under side of the bed-plate A by screws *a* passing through holes in ears formed integral with said shuttle-race, said holes being preferably slightly larger than said screws, so as to permit of a slight adjustment of the shuttle-race, as occasion may require. The shuttle is not intended to be taken from the machine until it is worn out, and the bobbin-case and bobbin are held in position by an adjustable device herein shown as a screw, *a′*, secured to a bracket, a^2, depending from a sliding cover, a^3, movable in ways arranged longitudinally of the bed-plate A. Said bracket is preferably detachably fastened to said slide by a screw, a^4, as shown; and it is obvious that the bracket may be rendered adjustable by slotting the hole in the horizontal portion of said bracket through which the screw a^4 passes. In such case a simple projection or lug formed integral with the vertical portion of the bracket may be substituted for the screw *a′*, if desired. By drawing the sliding cover a^3 outward, or to the left, Fig. 1, the bobbin-case and bobbin are rendered readily accessible and are left free to be examined or removed when necessary.

As above stated, the shuttle is not intended to be taken from the machine until worn out, and it is therefore necessary to provide means for easily removing the bobbin-case and bobbin from the shuttle, so that the bobbin may be removed when the thread is exhausted. To this end I have arranged a bobbin-ejector, K, within the hollow or partially hollow lower shaft, C^4. This ejector K, which consists of a suitable wire or rod, is secured to a small cylindrical block, *k*, placed within the shaft C^4, and the block and ejector are held within said shaft by the stress of a spiral spring, k^2, also placed within the shaft. The block *k* is connected by a pin or screw passing through a slot in the shaft to a sliding sleeve, *k′*, arranged on the exterior of the shaft. To operate the ejector a small shaft or pin, k^3, is inserted through the bed-plate A, said pin having an arm or handle, k^4, on the upper side of the bed-plate, and an arm, k^5, on the lower side of the bed-plate, the latter arm being provided with a pin or projection engaging the collar *k′*. When the bobbin-case and bobbin are to be removed, the sliding cover a^3 is drawn out, thus leaving the bobbin-case and bobbin free. The arm or handle k^4 is then moved to the left, Figs. 1 and 11, by the finger of the operator, thereby pressing the ejector outward against the stress of the spring k^2, the outer end of the ejector passing through a perforation, *h′*, in the rear wall of the shuttle against the bobbin, thus forcing the latter and its case out of the shuttle.

In order to obviate any possibility of my machine skipping stitches, owing to the high rates of speed, inaccuracy of adjustment, expansion or contraction of the metal with varying temperatures, or any other causes, I have provided means for pressing the shuttle slightly outward in a direction at right angles to the path of its rotation at the moment when its point is approaching the needle to take the loop of needle-thread, thus certainly insuring the proper engagement of the shuttle with the needle-thread at every stitch. After the point of the shuttle has entered the loop of needle-thread, the shuttle is released, so that said loop may be carried round the shuttle and the locking-thread running from the bob-

bin therein without undue friction. The means for accomplishing this result consists of a small block, L, arranged in the end of the hollow shaft C^4, the end of said block being rounded to permit the loops of the needle-thread to pass it easily. This block L, which I term a "shuttle-brace," is connected by a wire or rod, l, with another block, l', also arranged in the shaft C^4 at some distance from the end thereof, as shown. A screw-pin, l^2, the head of which engages a stationary cam-surface, l^3, in a lug, l^4, depending from the lower side of the bed-plate A, is inserted in the block l', said screw-pin passing through a slot in the shaft C^4. The said screw-pin is held in contact with said cam-surface by the spiral spring k^2, which serves to retract the shuttle-ejector K, the said spring pressing against the block l', as shown. The spring k^2 is thus caused to perform a double function. The stationary cam-surface l^3 is so formed that at the moment when the point of the shuttle is advancing to catch the loop of needle-thread the head of the pin l^2 has reached a slight depression in said cam-surface, so that by virtue of the stress of the spring k^2 the shuttle-brace L will be yieldingly pressed against the shuttle, causing the latter to come into proper engagement with the needle, thus insuring the passage of the point of the shuttle into the loop of the needle-thread. As soon as this result is accomplished, the pin l^2 will have passed the depression in the cam-surface, and the shuttle-brace will be retracted to admit of the easy passage of the loop of needle-thread around the shuttle, as above stated. As actually constructed, in my machine the cam-surface l^3 will give a play to the shuttle-brace of only about a thirty-second of an inch, which is sufficient for the purpose in view; but for clearness of illustration said cam-surface is shown somewhat exaggerated in Figs. 1 and 6. The blocks L l' are notched on their edges for the passage of the bobbin-ejector K.

My feeding mechanism consists of a feed-surface, M, secured to or formed integral with an arm projecting from a lever, M', the latter having a sleeve, M^2, surrounding the eccentric sleeve I^2 of the shuttle-driving disk I. The lever M' terminates at its lower end in a finger, m, adapted to come in contact with an adjustable stop, n, secured to the forward end of an adjusting bar or lever, N, pivoted on a screw, n', by which said bar is secured to one of the lugs beneath the bed-plate in which the counter-shaft C^4 has its bearings. The lever M' is provided near its upper end with a laterally-projecting arm, m', against which bears a spring, m^2, arranged within a recess, m^3, in the bed-plate A. (See Fig. 11.) A block or stop, m^4, preferably made of horn or some similar hard non-resonant substance, is arranged within the recess m^3 to limit the backward movement of the arm m'. The stop n is also preferably covered by a ring of similar hard non-resonant substance, thereby avoiding the noise incidental to the striking contact of metallic surfaces.

The position of the adjusting-bar N is regulated by a small disk, p, which I will term a "secondary disk," eccentrically secured to the stem of a larger adjusting-disk, P, arranged in a circular recess in the upper side of the bed-plate A, said stem passing through a hole in said bed-plate. The disk p is embraced by a yoke, N', fastened to the adjusting-bar N. To prevent the accidental turning of the disks p P by the action of the feed-lever M' in the stop n or the jarring of the machine, the pin p', preferably in the form of a washer, as shown, is placed in the recess of the bed-plate beneath the disk P. Said disk P is provided with finger-holes p^2 to facilitate its adjustment, and a graduated scale, p^3, which latter and the stationary index-finger p^4, secured to the bed-plate A, assist in determining the proper adjustment of the feed. A segmental slot, p^5, in the disk P permits of the proper movement of said disk relatively to the stationary index-finger p^4. In addition to its primary function, the adjusting-bar N serves as a guard for the lower shaft.

It may here be observed that the feed-lever M' is a lever of the third class, the weight being the work engaged by the feed-surface M, the power being applied by the eccentric sleeve I^2, while the stop n, when engaged by the finger m, serves as a fulcrum for said lever. If, however, said stop be so adjusted that it will be out of contact with said finger during a portion of the rotation of the eccentric sleeve I^2, the action of the spring m^2 on the arm m', projecting laterally from the upper end of the lever M', will hold said upper end and the feed-surface stationary until the finger m comes in contact with the stop n, when the stress of the spring m^2 will be overcome and the eccentric will cause the lever to swing from its lower end, thus moving the upper end of said lever, and consequently the feed-surface and work, forward the length of the stitch to be made. It will thus be apparent that the adjustment of the stop n so as to leave a greater or lesser distance between said stop and the finger m during a portion of the rotation of the eccentric will result in such adjustment of the feed as may be required. Of course, if said stop be so adjusted that there will be no space between it and the finger m during any part of the rotation of the eccentric, the full throw of the latter will be exerted on the feed-lever and the movement of the feed-surface will be correspondingly great.

The operation of my stitch-forming mechanism is as follows: The needle-thread being disposed and the needle threaded, as hereinbefore described, the needle descends through the work held beneath the presser-foot to its lowest point, which is a little below the top of the circular path described by the point h^2 of the shuttle. As the needle begins its ascent, it throws out a loop of thread, which is caught by the point of the shuttle, which at this moment has just crossed the vertical path of the needle, as indicated in Fig. 4, the shut-

tle being at this time pressed outward by the shuttle-brace L, operating as hereinbefore described. The needle now continues to ascend and the shuttle moves forward, drawing the needle-thread from above and carrying the loop entirely around the shuttle, and its bobbin-case and bobbin and the locking-thread carried thereby. When the point of the shuttle has just passed the position indicated by Fig. 3 and the needle has again begun to ascend, the take-up hook e', which in the meantime has been moving slowly downward, and has just begun to rise, moves upward with great rapidity, drawing the loop of needle-thread upward, away from the advancing-point of the shuttle and into the work, thus tightening and completing the stitch before the point of the needle has again reached the work. As the needle again pierces the goods, the take-up hook moves downward, leaving the needle-thread slightly held by the check tension-spring F^5, which yields the thread to the shuttle as the latter requires it in expanding the loop during the formation of the succeeding stitch. Thus the operation continues indefinitely while the machine runs.

It is obvious that instead of the rotary shuttle which I have herein shown and described, a rotary hook might be employed in my machine with only such changes as any mechanic skilled in sewing-machines could easily make, the feeding, take-up, and needle-operating mechanism, as well as the means shown for connecting the upper and lower shafts, remaining unchanged.

While I have in the foregoing description indicated the preferred construction and arrangement of the several parts in which my improvements are embodied, I desire it to be understood that I do not restrict myself to the same specifically, for it is manifest that the details of construction can be varied considerably in many particulars without substantially changing the principle or mode of operation.

What I claim as new and of my invention is—

1. The combination, with a swiveled crank-pin bearing, of a vibratory take-up lever pivoted to a stationary part of the machine, and extending through and adapted to slide in said swiveled crank-bearing during the rotary movement of the latter, substantially as hereinbefore set forth.

2. The combination, with a take-up lever consisting of a straight wire provided with a hook at one end and a block to which said wire is secured at its opposite end, of a stationary pivot-pin for said block, and a swiveled rotary crank-pin bearing adapted to slide on said take-up lever and impart positive variable movements thereto, substantially as hereinbefore set forth.

3. The combination, with the take-up lever pivoted to a stationary part of the machine, of the rotating crank-pin for operating the needle-bar, the rigid arm secured to said crank-pin, and a pin swiveled to said arm and arranged to furnish a sliding bearing for the take-up lever, substantially as and for the purposes hereinbefore set forth.

4. The combination, with a vibratory take-up lever adapted to engage the thread when moving in one direction only, of means, substantially as described, for lightly holding said thread when left by the take-up, yielding it only as it is required by the shuttle, as set forth.

5. The combination, with a vibratory take-up lever, of a curved check tension spring arranged near the path described by the thread-hook of said lever, substantially as set forth.

6. The combination, with a vibratory take-up lever adapted to engage the thread when moving in one direction only, of a check tension spring serving to gently hold the thread subject to the requirements of the shuttle when said take-up lever is moving in the opposite direction, substantially as set forth.

7. The combination, with the presser-bar and a screw on which the lifter for said bar is pivoted, of a lug secured to said bar, and having its vertical portion arranged to move in a guide-slot in said screw, whereby the presser-bar and screw are prevented from turning, substantially as set forth.

8. The combination, with a rotating shuttle and shuttle-carrier, of a yielding or spring-acting shuttle-brace arranged to work through an opening in the rear of the carrier, and normally impelled in the direction of the shuttle by spring-pressure, and means, substantially as described, for retracting the said carrier from the shuttle against the stress of its impelling-spring during a predetermined portion of the rotation of the latter, substantially as hereinbefore set forth.

9. The combination, with a rotary shuttle and a shaft by which said shuttle is operated, of a shuttle-brace arranged within a recess in said shaft, and means, substantially as set forth, for causing said shuttle-brace to intermittingly press said shuttle toward the needle, as described.

10. The combination, with a rotary shuttle and a shaft by which said shuttle is operated, said shaft being provided with a central recess, of a shuttle-brace arranged within said recess, a spring for pressing said shuttle-brace outward, also arranged within said recess, a stationary cam-surface, and an intermediate device connected with said shuttle-brace and engaging said cam-surface in its rotation, substantially as set forth.

11. The combination, with a bobbin-ejector placed in rear of the shuttle, of a shuttle provided with an aperture for the passage of said ejector, substantially as set forth.

12. The combination, with a bobbin-ejector and a shuttle pierced for the passage thereof, of a device for projecting the ejector into said shuttle, and a spring for retracting said ejector, substantially as set forth.

13. The combination, with a rotary shuttle

pierced for the entrance of a bobbin-ejector, of a shaft for operating said shuttle, a bobbin-ejector arranged within said shaft, and means for projecting and retracting said ejector, substantially as set forth.

14. The combination, with a shuttle, its operating-shaft, and a bobbin-ejector, all arranged beneath the bed-plate of the machine, of a device for operating said ejector, said device passing through said bed-plate and having an actuating-handle on the upper side thereof, substantially as described.

15. The combination, with a shuttle-brace and a bobbin-ejector, of a spring adapted to assist in the operation of the former, and serving also to retract the latter after the bobbin has been forced from the shuttle, substantially as set forth.

16. The combination, with a rotary shuttle and a hollow operating-shaft for the same, of a shuttle-brace and a bobbin-ejector, both arranged within said shaft, substantially as set forth.

17. The combination, with a feed-adjusting bar provided with a yoke, of a disk arranged within said yoke, and means for adjusting said disk from the upper surface of the bed-plate, substantially as set forth.

18. The combination, with a pivoted feed-adjusting bar carrying a stop which serves as a fulcrum for the feed-lever, of means for changing the position of said bar, whereby said feed-lever is caused to come in contact with said stop sooner or later in the course of its movement, as set forth.

19. The combination, with a rotary shaft arranged beneath the bed-plate, of a feed-adjusting bar arranged below said shaft, and serving as a guard therefor, substantially as set forth.

20. The combination, with a feed-lever, of an eccentric for operating the same, an adjustable stop, a projection or finger on said lever for engaging said stop, an adjusting-bar by which said stop is carried, and means for changing the position of said adjusting-bar, whereby said feed-lever is caused to have contact with said stop sooner or later in the course of its movement, substantially as set forth.

21. The combination of the feed-lever, a stop which serves as a fulcrum for the same, an adjusting-bar to which said stop is secured, a yoke on said adjusting-bar, an adjusting-disk arranged within a recess in the bed-plate, and a secondary disk eccentrically secured to said adjusting-disk and arranged within the arms of said yoke, substantially as set forth.

22. The combination, with a movable feed-regulating disk provided with a graduated scale and a segmental slot, of a stationary index-finger arranged within said slot, substantially as set forth.

23. A bed-plate provided on its under side with strengthening-ribs, said ribs being made deeper as they run rearward until they reach a depth equal to that of the shuttle-race secured to the forward end of the said bed-plate, combined with said shuttle-race, so that it and the ribs form a supporting-base for the machine, substantially as set forth.

24. A bobbin-case having a notch in its edge and thread-slots in its face, converging to form a point around which the thread is drawn, in combination with a tension-spring secured to the periphery of said bobbin-case, with its free end between said notch and one of said thread-slots, substantially as set forth.

25. The combination, with a bobbin-ejector, of ejector-actuating mechanism arranged to be operated by hand from above the bed-plate of the machine, for the purpose of ejecting the bobbin, substantially as and for the purposes set forth.

26. The combination of the upper main or driving shaft for actuating the needle-bar, the lower counter-shaft for imparting movement to the feed and hook or shuttle, intermediate universal-joint connections, substantially as described, whereby the two shafts are caused to revolve in unison, and the driving pulley or wheel located on said upper shaft at a point intermediate between the needle-bar and the universal-joint connections, substantially as and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 22d day of June, 1883.

JOSEPH L. FOLLETT.

Witnesses:

WILLIAM J. TATE,

A. O. WEBBER.