No. 666,226. Patented Jan. 15, 1901.

E. E. BEAN.

FEEDING MECHANISM FOR SEWING MACHINES.

(Application filed Apr. 30, 1900.)

(No Model.) 3 Sheets—Sheet 1.

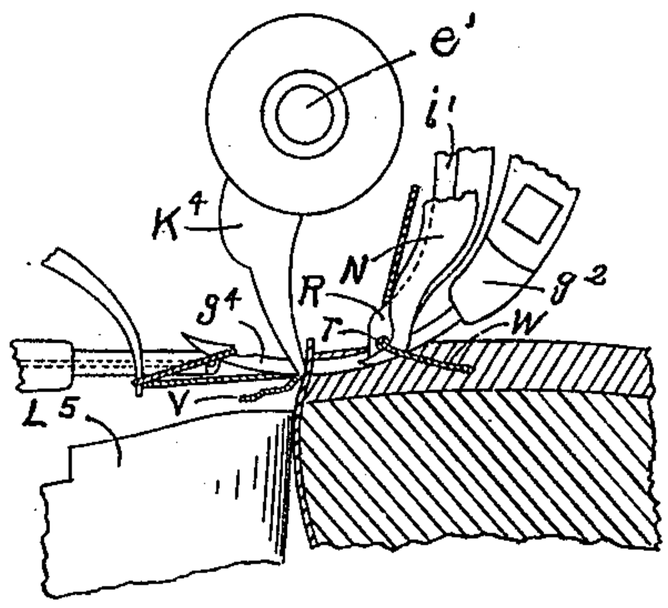

FIG. 1.

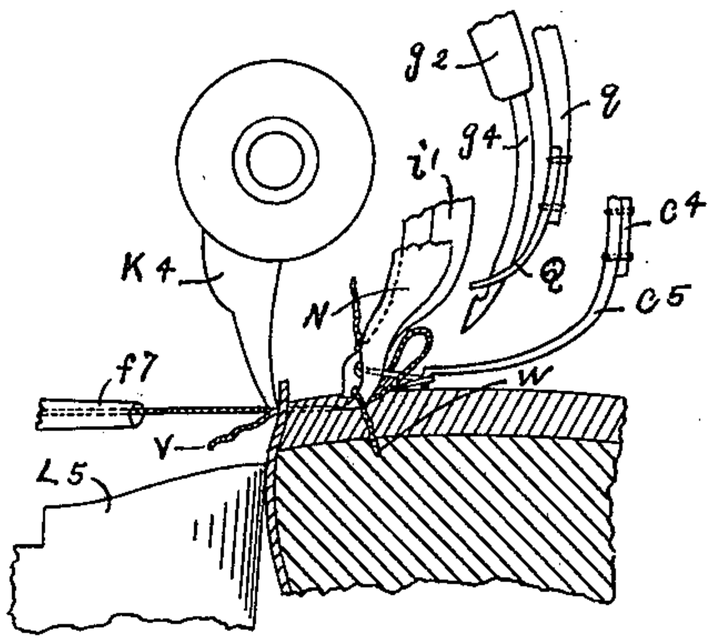

FIG. 3.

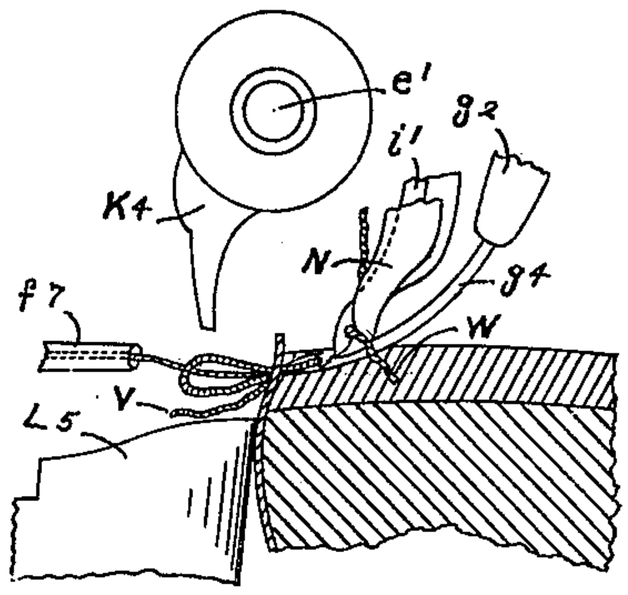

FIG. 2.

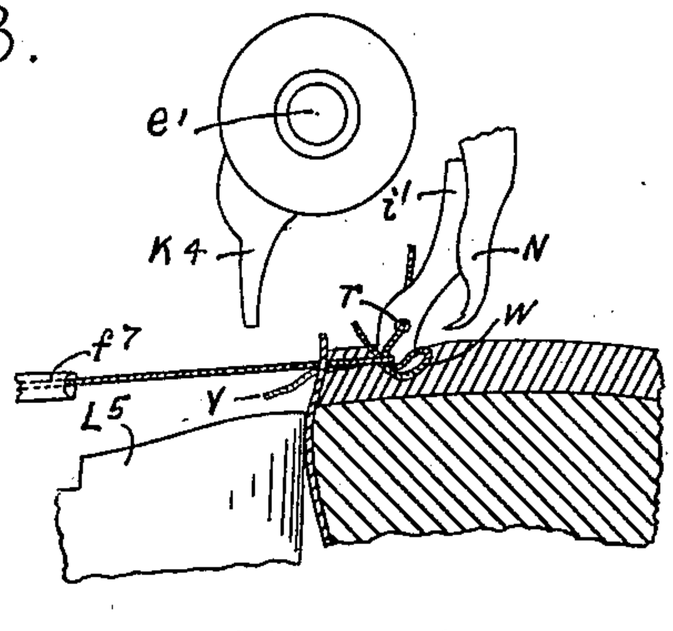

FIG. 4.

WITNESSES.
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FEEDING MECHANISM FOR SEWING MACHINES.

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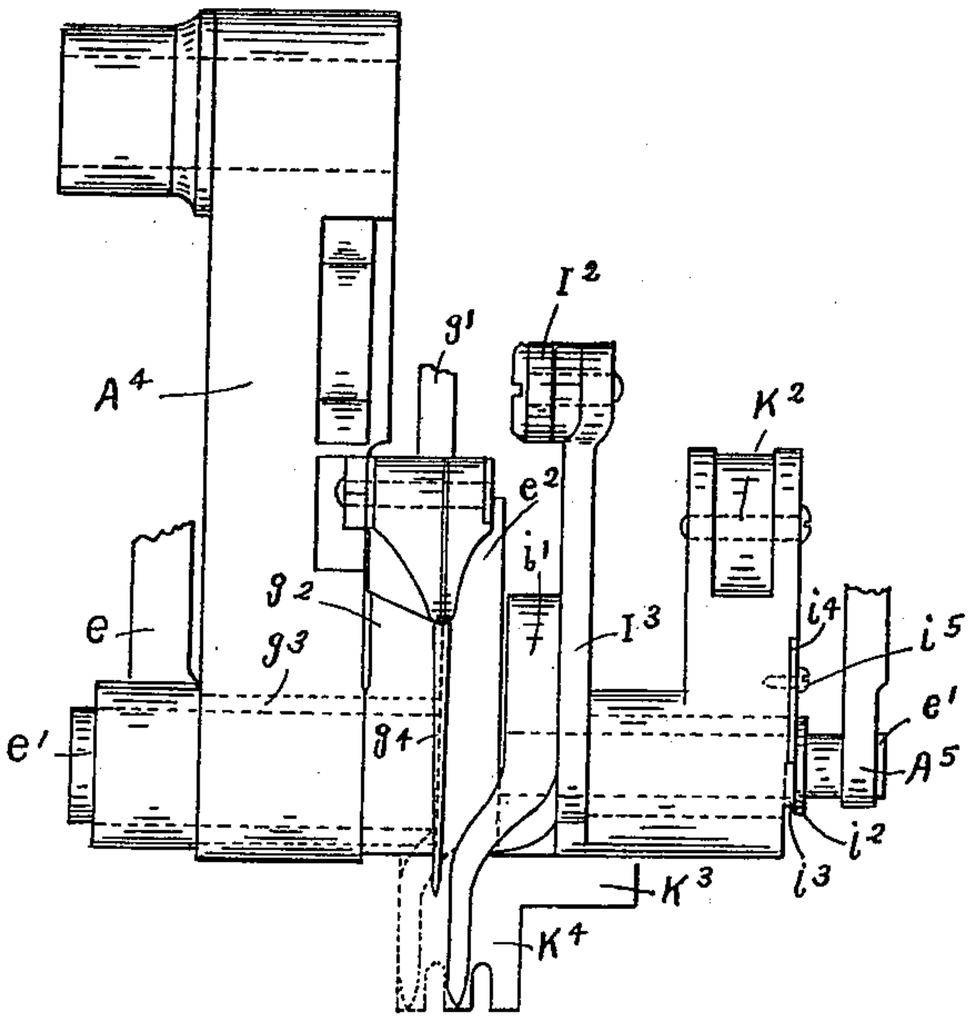
(No Model.) 3 Sheets—Sheet 2.



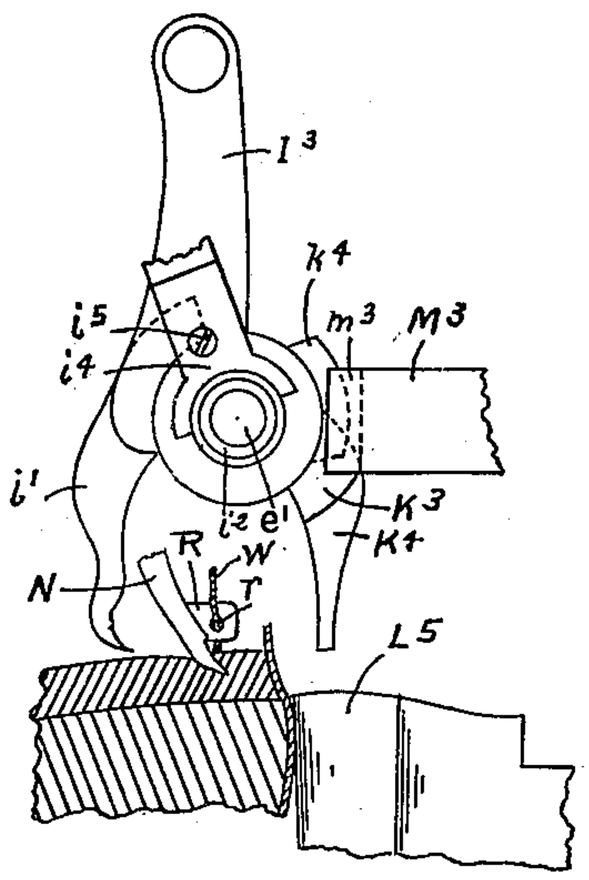


FIG. 5.

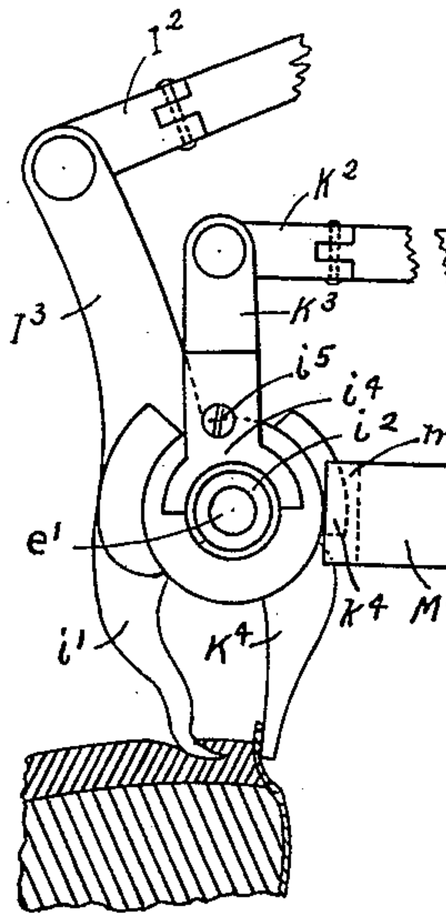


FIG. 6.

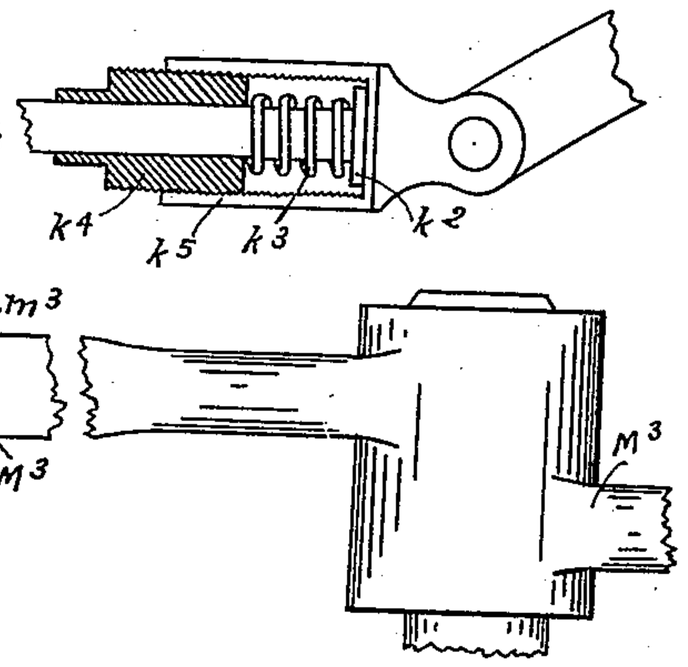


FIG. 7.

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FEEDING MECHANISM FOR SEWING MACHINES.

(Application filed Apr. 30, 1900.)

(No Model.) 3 Sheets—Sheet 3.

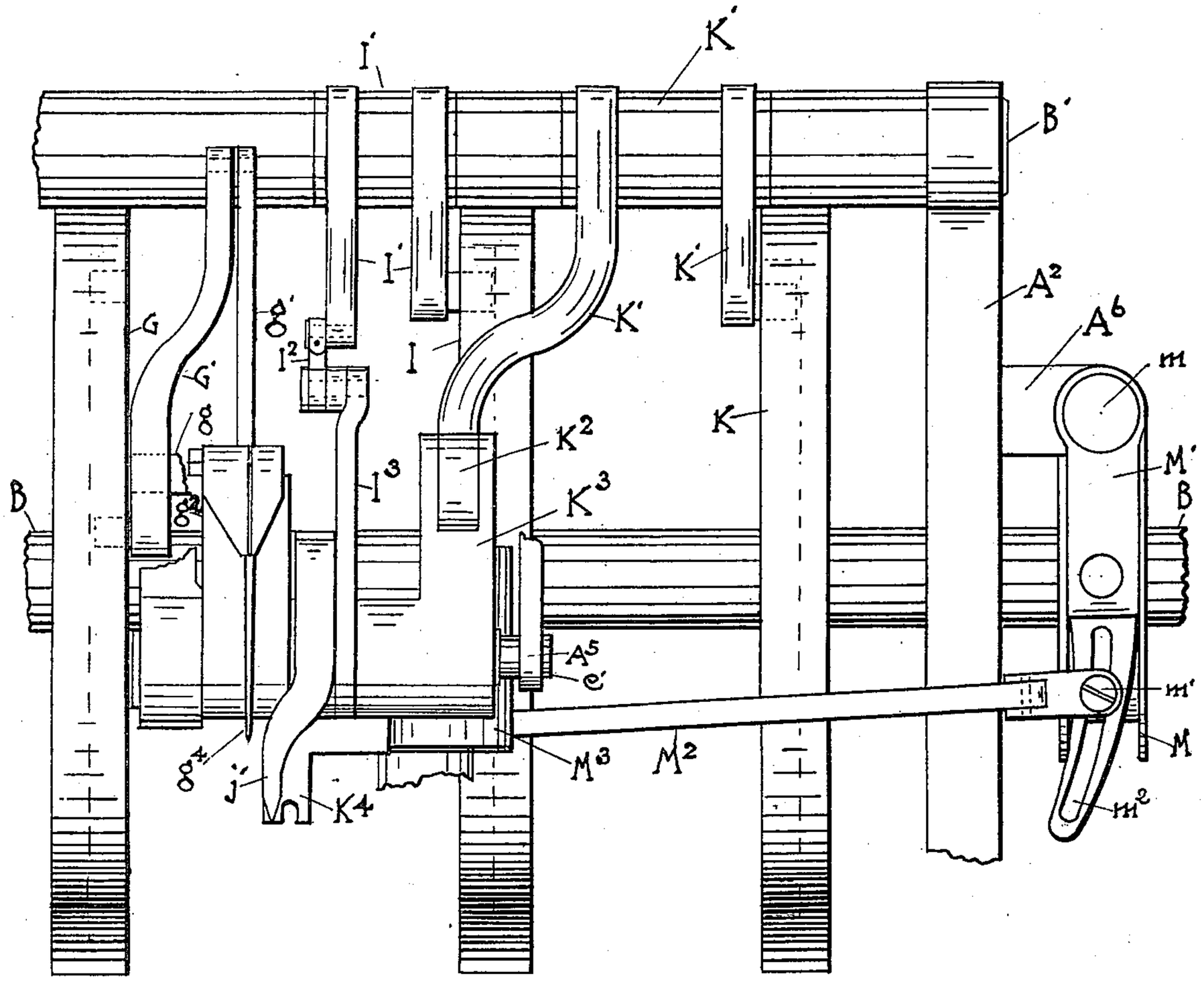

Fig. 8

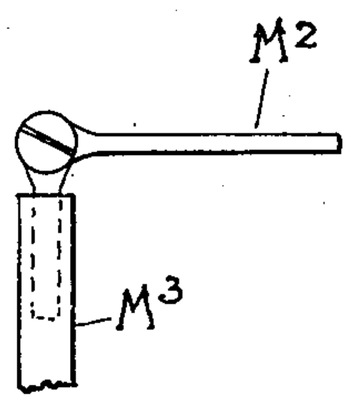

Fig. 9.

Witnesses
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Inventor
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by Louis H. Lamman
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UNITED STATES PATENT OFFICE.

EDWIN E. BEAN, OF WARNER, NEW HAMPSHIRE, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE LOOP LOCK MACHINE COMPANY, OF PORTLAND, MAINE.

FEEDING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 666,226, dated January 15, 1901.

Original application filed October 11, 1899, Serial No. 733,278. Divided and this application filed April 30, 1900. Serial No. 14,799. (No model.)

To all whom it may concern:

Be it known that I, EDWIN E. BEAN, a citizen of the United States, and a resident of Warner, in the county of Merrimac and State of New Hampshire, have invented certain new and useful Improvements in Feeding Mechanism for Shoe-Sewing Machines, of which the following is a specification.

This application is a division of my application for shoe-sewing machines which was filed October 11, 1899, Serial No. 733,278.

This invention relates particularly to a feeding mechanism which I use in connection with the machine described in said application, but which is of such a nature that it may be used in connection with other shoe-sewing machines.

The feeding mechanism now in most general use comprises a short awl or feed-point which either moves from the operator and engages the sole in the channel or toward him and engages the upper. In either case the back-rest must be released as the feed-awl is moved laterally to feed along the shoe, so that the operator has to hold the shoe firmly enough to resist the thrust of the feed-awl, that it may be enabled to penetrate the stock far enough to secure a firm hold therein to feed along the shoe. As the firmness with which the awl engages the work is practically solely dependent on the operator, the uniformity with which the stitches are taken is largely dependent on him—that is, he may force along the shoe too fast and make the stitches too long or retard the natural feed and make them too short. As the feed-awl and the spring of the back-rest are the only parts which act to hold the shoe in place, and they act on different parts of the shoe and in different directions, there is a considerable tendency to tip the shoe in the hands of the operator, so that it will not be in the proper position at the time the needle enters the work to make the fresh stitch. Much, therefore, depends on the firmness, steadiness, and accuracy with which the operator holds the shoe just before and while it is being fed along.

The object of my invention is to provide a feeding mechanism which will engage the work firmly without assistance from the operator, and will then feed along the shoe a definite distance and will hold it in precisely the correct position for the needle to penetrate it after it has been fed along. I accomplish this object by a mechanism which consists of an arm called a "feeding-spur," which engages a channel in the sole, and a feeding-clamp which engages the upper and acts in opposition to the spur, so that the "between substance" is clamped between said spur and feeding-clamp, the latter being operated so that they are swung toward each other, so as to engage the work simultaneously, then are moved laterally to feed along the shoe, and then are swung apart and moved back laterally for the next stitch.

In the drawings, Figures 1, 2, 3, and 4 show the parts of the feeding and sewing mechanism in the various positions which they assume with respect to each other while the stitch is being taken. Fig. 5 is a front elevation of the parts which are carried on the needle-shaft. Figs. 6 and 7 are side elevations of the feeding mechanism, showing the parts in their opened and closed positions. Fig. 8 is a front elevation of the parts of the machine which comprise my invention. Fig. 9 is a detail view.

The main shaft B carries the cams G, I, K, and M, which are provided with grooves of the proper configuration to produce the desired motions in the parts which they control. A shaft B′ is secured to the frame A^2 of the machine, and levers G′, I′, and K′ are pivoted thereon, and one arm of each lever is provided with a suitable pin which engages the cam-groove in the face of its corresponding cam, so that each lever will be oscillated at the proper time. The opposite ends of said levers are connected by links g', I^2, and K^2, respectively, to the segments g^2, I^3, and K^3 on shaft e'.

The needle-segment g^2, which carries the needle g^4, is secured to a short hollow shaft or sleeve g^3, which projects from the left-hand side thereof and is journaled in the lower part of the bracket A^4. (See dotted lines in Fig. 5.)

Suitable means are provided for oscillating the needle-segment as is required. The awl-segment e^2 is made fast to the shaft e', the larger end of which is journaled on the bracket A^4 inside of the sleeve g^3, its smaller end being journaled in the bracket-piece A^5. The two brackets A^4 and A^5 are suitably secured to the frame of the machine. The larger end of the shaft e' extends through the bracket A^4 and has a crank-arm e secured thereto for oscillating it, the hub of the arm being larger than the outside diameter of the sleeve g^3 and serving as a collar to keep the needle and awl segment from sliding laterally on their respective journals.

The feed-spur i' is firmly secured to the side of the segment I^3 which is nearest to the awl-segment, and a sleeve i^2 is secured to the said segment I^3 and projects from the opposite side of said segment from the awl-segment, it being journaled to the smaller part of the shaft e'. The combined length of the segment I^3 and its sleeve i^2 are equal to the distance between the awl-segment e^2 and the bracket A^5, minus the length of the longest stitch required. The segment I^3 may therefore oscillate and slide laterally on the shaft e'. The feed-spur i' has a swinging forward-and-backward movement during the formation of the stitch and also forward-and-back lateral movements, its swinging movements being communicated to it from the cam-shaft through the universally-jointed connecting-rod I^2, the universal joint being provided to accommodate the compound movements of the feed-spur segment. The lateral movements of the segment I^3 are indirectly transmitted to it through the feed-clamp segment K^3, which will be more fully described hereinafter. The compound movements of the feed-spur are such that it is caused to swing forward and engage the between substance of the sole at a point between the needle and the channel-guide N and then pass laterally in the direction of and past the path of the needle a sufficient distance to allow the needle in its movements to pass by it, (see dotted position in Fig. 5,) carrying the shoe along with it a distance equal to the desired length of the stitch.

The feed-clamp K^4 is firmly secured to the under side of segment K^3 at a point below the axis of the motion of the latter. This segment is hollow and is journaled on the sleeve i^2 of the segment I^3 and oscillates thereon. It is prevented from sliding laterally on the sleeve i^2 by a tongue-piece i^4, which is secured to the upwardly-projecting arm of the clamp-segment K^3 by the screw i^5 and which engages an annular groove i^3 in the projecting end of the sleeve i^2. The feed-clamp K^4 has two swinging movements forward and back, which are simultaneous with the corresponding movements of the feed-spur i', so that they move simultaneously toward each other and from each other on opposite sides of the between substance and clamp and hold the material firmly between them as they approach each other and release it as they recede. The feed-clamp segment K^3 is moved laterally by the horizontally-swinging lever M^3. The lever M^3 is swung by means of cam M, which acts to swing the lever M', the latter lever being pivoted to lug A^6 by pintle m and being connected by the link M^2 to the end of said lever M^3. Universal joints are provided at both ends of link M^2, as shown in Figs. 8 and 9. The forward end of said lever M^3 is provided with a vertical groove m^3, (see dotted lines, Figs. 6 and 7,) into which a vertical tongue k^4 projects from the clamp-segment K^3 and fits so that it may move freely. As the feed-spur segment I^3 is connected to the clamp-segment K^3, so that it cannot move laterally in either direction with respect thereto, both the feeding-spur and the clamp will be moved simultaneously when the lever M^3 is swung back and forth. The particular manner in which the several movements of the feed-spur and clamp are accomplished will be readily understood without further description or illustration. The lower end of the clamp k^4 is forked or cloven, the distance between the two arms which form the forks being just sufficient to permit the needle and awl to pass directly between them while they are holding the upper against the shoulder on the sole. As the thickness of the between substance is variable and greater at those portions of the shoe which include the counter and toe-cap, it will be apparent that some means must be provided to regulate the force with which the clamp and spur will engage the between substance, so that it will be substantially the same at all times, and I accomplish this by simply providing a spring k^3 in the connecting-rod K^2, which operates the feeding-clamp, (see Fig. 7,) so that the force which acts to swing the clamp against the work will act through said spring.

A channel-guide N is secured to the frame of the machine in any suitable manner and engages the channel in the sole at a point a short distance in advance of the path of the needle, it being located as near as possible to the path of the needle without interfering with the movements of the feeding-spur.

The operation of the feeding mechanism above described is as follows: Assuming that the shoe has been fed along and a new stitch is about to be taken, the clamp will be in engagement with the upper, the spur in engagement with the channel in the sole, the spur and clamp each completely neutralizing the thrust of the other, the space between the forks and the end of the clamp will be in register with the path of the needle, and the feeding-spur will be on the left-hand side of the path of the needle next to the stitch which has just been taken, as shown in dotted lines in Fig. 5. The awl is then advanced and punctures a hole in the between substance for the needle. Then the needle advances and passes through

the between substance, the looper threads the needle, as shown in Fig. 1, and the needle draws a loop of thread back through the between substance, as shown in Fig. 2. As the needle when it draws back the loop would lay the thread from the preceding stitch over the fork of the clamp which is between the preceding stitch and the stitch which is being taken it has been found necessary to swing the clamp back out of engagement with the upper, so that this will not occur. The clamp is therefore given a forward and backward movement independent of the feed-spur at the time the needle is drawing the loop in, it being first swung back sufficiently to allow the thread from the preceding stitch to be drawn under it, as shown in Fig. 2, then being advanced and forcing the upper against the sole just as the thread is drawn tight against the upper by the needle, thus assisting the needle in drawing in the upper tight against the sole, so that the thread may be drawn tight against the upper and held in this position until the stitch is locked by the locking-loop. (See Fig. 3.) This feeding-clamp, moreover, has a lasting action, since it draws in the upper to some extent when it clamps the same against the sole before the awl passes through the work, and it holds the upper in this position, so that the hole in the upper will be held in register with the hole in the sole as the needle is passing therethrough to receive its loop, thus avoiding all possibility of the awl's drawing the upper away from the sole as it recedes and of the needle's making a new hole in the upper. The lasting action above referred to is of especial advantage when the shoe is poorly lasted and has the advantage of making the upper fit the last smoothly under all conditions. After the stitch has been set the spur and clamp are both swung out of engagement, as shown in Figs. 4 and 6, and are then moved laterally and swung toward each other, so that they engage the work at a new point. Then they are both moved laterally in the opposite direction, feeding along the shoe, so that the shoe will be in the proper position for the next stitch. The length of the stitch will obviously be regulated by the length of the throw of the end of lever M^3, and any well-known means for adjusting the length of this throw may be used. The particular means shown for varying the length of throw of lever M^3 consists of a slot m^2 in lever M', in which the pivot-screw m' of link M^2 may be adjusted, thus varying the longitudinal movement of link M^2. While the spur and clamp are being moved laterally to engage the new position on the work, the shoe will be held in position between the channel-guide N and the back-rest L^5. As the clamp and spur both swing about the same axis as the needle and awl the force with which they act to resist the thrust of the awl and needle will act directly in line with the path of the awl and needle, so that their thrust will be more perfectly resisted and there will be no tendency to tip the shoe in the hands of the operator as is the case when the thrust is resisted by a back-rest, which must necessarily press against the shoe below the path of the needle. I have, furthermore, found that by having the clamp engage the upper directly on each side and on a level with the path of the needle the needle will penetrate a much thicker between substance without the aid of an awl than has before thought to be possible, so that I am enabled to do away wholly with the awl and back-rest. When the clamp and spur come into engagement with the upper and sole and move laterally, they will engage the shoe firmly and carry it along in such a manner that it cannot tip away from or toward the operator, and it will thus be brought into precisely the right position for the next stitch almost without guidance on the part of the operator, it being only necessary to swing the shoe to the proper angle and keep the channel-guide in the channel. As the full force of the feed-spur is resisted by the feed-clamp and each engages the between substance with a force which is determined by the tension of spring k^3 there will be a positive engagement between the spur and the sole at all times which will not tend to throw the shoe out of position in the least, but will tend, on the contrary, to bring it into proper position if it should happen to be slightly out of position. The distance which the shoe is fed along is also always the same and practically out of control of the operator.

As has before been stated, when the shoe is fed along the feeding-spur is moved from one to the other side of the needle's path. This has a twofold advantage. First, as more fully explained in the specification of the prior patent, the spur draws the locking-thread at right angles to the path of the looping-hook, and, second, the spur is kept as near as possible at all times to the path of the needle, so that there is less hindrance to the operator in tipping the shoe to the various inclinations necessary, and the spur will engage the sole in the channel just before it moves to feed along the shoe at a point which is as near as possible to the path of the needle. It will be understood in this connection that the operator works from a center which is located in the path of the needle, and in order that he may easily tip the shoe, so that the bottom of the sole may be horizontal at the point where the stitch is being formed whatever the curve of the bottom, it is essential that the parts which engage the shoe do so at points which are as near as possible to the path of the needle. Moreover, in sewing about the toe of the shoe, particularly if the toe is rather pointed, if the spur had to engage the channel considerably in advance of the needle the shoe would be thrown out of position or the spur would not engage at all. When a channel-guide is used, it would also

be difficult to keep it in the channel, as the guide must be held in front of the spur at all times. It will thus be apparent that by moving the spur across the path of the needle each time the shoe is fed along I secure important advantages.

From the foregoing description it will be observed that I have produced a feeding mechanism which overcomes various imperfections in prior mechanisms which have been produced for this purpose.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is as follows:

1. A shoe-sewing machine comprising a shaft which is held against longitudinal movement in either direction, a needle-segment which is journaled thereon, means for holding said segment against lateral movement, two feed-segments which are journaled on said shaft an arm projecting from each segment, one of which is adapted to engage the upper and the other the sole of the shoe, connections between said segments which permit independent oscillations but prevent independent lateral movement thereof, a lever which is connected to one of said segments, means for swinging said lever so as to cause said segments to slide on said shaft, and means for swinging said segments so that their respective arms will be out of engagement with the work when they are moved in one direction and in engagement therewith when moved in the other.

2. A shoe-sewing machine comprising a shaft which is held against longitudinal movement in either direction, a needle-segment which is journaled thereon, means for holding said segment from lateral movement thereon, two feed-segments having arms which are adapted to engage the sole and upper respectively one of which has a laterally-extending sleeve secured thereto, and is journaled on said shaft, the other segment being journaled on said sleeve, means for holding the latter segment from lateral movement in either direction on said sleeve, but permitting oscillation thereon, means for causing said sleeve to slide on said shaft and means for swinging said segments so that their respective arms will be in engagement with the work when the sleeve is moved in one direction and will be out of engagement therewith when the sleeve is moved in the opposite direction.

3. A shoe-sewing machine comprising an oscillating needle, a spur consisting of an arm having a pointed end, a clamp-arm, means for moving said spur and clamp in opposite directions so that the pointed end of the spur will engage the sole at one side of the path of the needle, and the clamp will press the upper against the edge thereof, means for simultaneously moving both spur and clamp arms laterally while in engagement so that the pointed end of said spur crosses to the opposite side of the path of the needle and permits the passage of the needle through the sole while the spur is in engagement therewith, means for moving said spur and clamp-arms out of engagement, and for moving them laterally back to their initial positions.

In testimony whereof I have affixed my signature in presence of two witnesses.

EDWIN E. BEAN.

Witnesses:
LOUIS H. HARRIMAN,
M. C. JAQUITH.