

J. R. SCOTT.
SHOE SEWING MACHINE.
APPLICATION FILED DEC. 5, 1907.

1,050,568.

Patented Jan. 14, 1913.

4 SHEETS—SHEET 1.

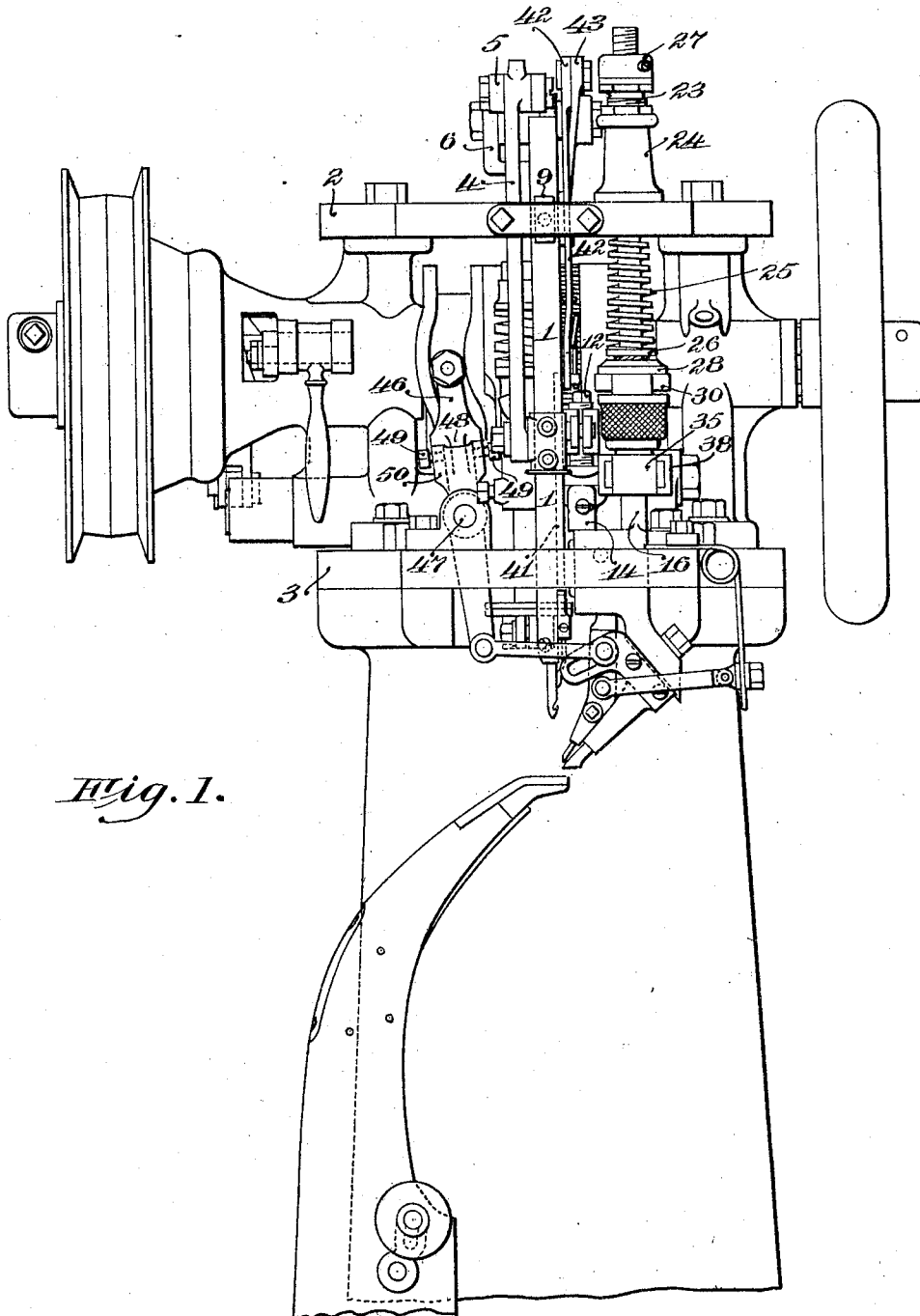


Fig. 1.

Witnesses
Edward S. Day
A. C. Richardson.

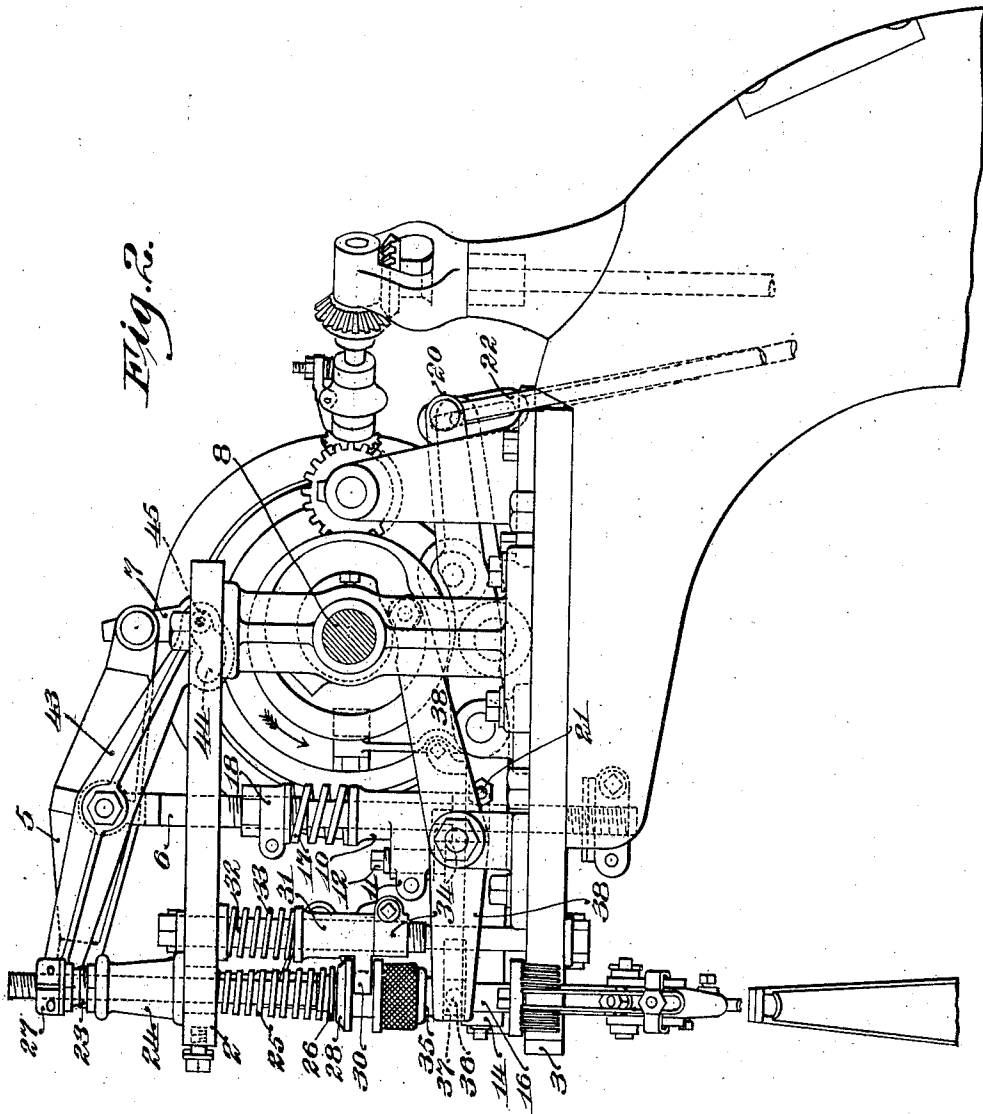
Inventor
Jacob R. Scott
by his Attorneys
Hill, Van Couverghen & Co.

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4 SHEETS—SHEET 2.



Witnesses

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A. C. Richardson.

Inventor

Jacob R. Scott
by his Attorneys
Phillips Van Eenandt Fish

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4 SHEETS—SHEET 3.

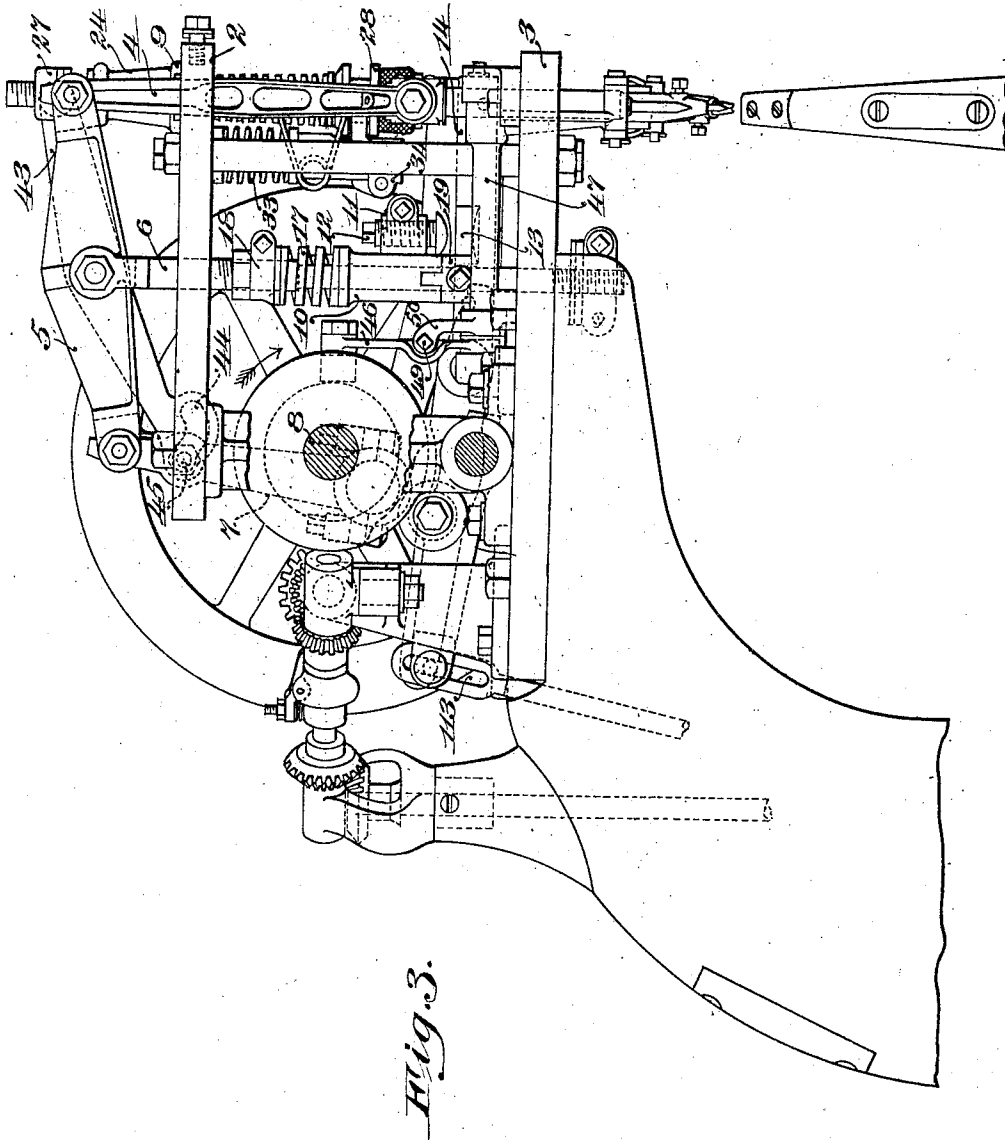


Fig. 3.

Witnesses

Edward S. Day
A. C. Richardson.

Inventor

Jacob R. Scott
by his Attorneys
Phillips Van Curen & Fish

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4 SHEETS—SHEET 4.

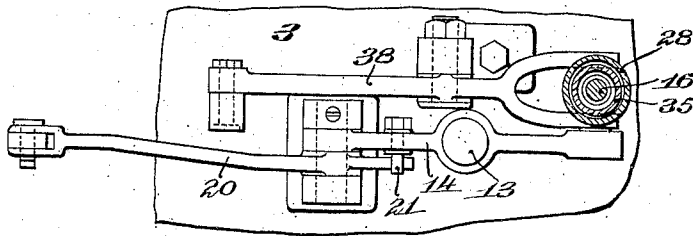


Fig. 4.

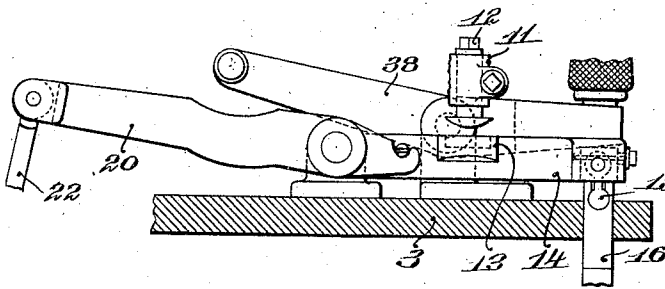


Fig. 5.

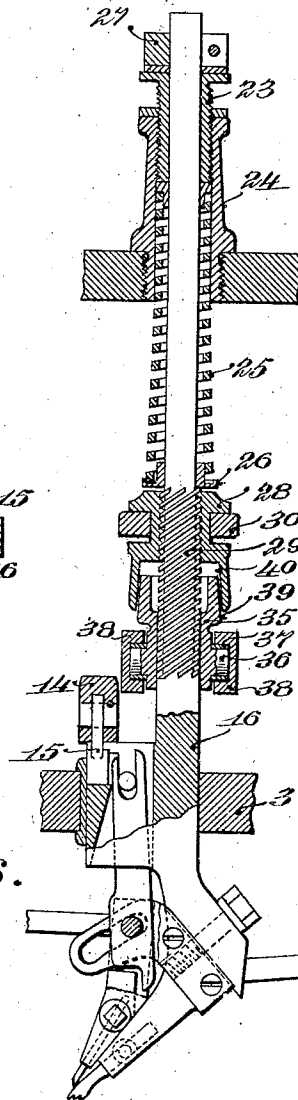


Fig. 6.

Witnesses

Edward S. Day
A. C. Richardson.

Inventor

Jacob R. Scott
by his Attorneys

Phillips Van Curen & Ash

UNITED STATES PATENT OFFICE.

JACOB R. SCOTT, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SHOE-SEWING MACHINE.

1,050,568.

Specification of Letters Patent.

Patented Jan. 14, 1913.

Application filed December 5, 1907. Serial No. 405,235.

To all whom it may concern:

Be it known that I, JACOB R. SCOTT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Shoe-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 shoe sewing machines and more particularly to shoe sewing machines which comprise a straight hooked needle and devices cooperating therewith to form a chain stitch, and in which the shoe is supported, during the sewing operation, upon a horn which extends inside of the shoe.

The invention is intended primarily as an improvement on the well-known McKay shoe sewing machine which has been extensively used for many years and the construction of which is disclosed with substantial accuracy in United States Patents No. 36,163, dated August 12, 1862, and No. 45,422, dated December 13, 1864.

In the McKay sewing machine, as the needle rises through the work with a loop of thread, the presser foot and feed point are raised a short distance to free the work from the upper surface of the horn so as to allow the thread to be drawn from the preceding loop without binding upon the upper surface of the horn and to allow the work to be fed. As the needle reaches the limit of its upward stroke the work is fed by the feed point and then the presser foot and feed point are allowed to descend, the presser foot at this time being pressed against the work with a yielding spring pressure so that it automatically accommodates itself to variations in the thickness of the work. The stitches are tightened and set by the upward pull of the needle on the loop of thread drawn up by the needle, and during the pulling action of the needle to tighten and set a stitch the presser foot is prevented from rising by the engagement of a projection on the movable fulcrum bar of the needle which engages a projection on the presser foot bar or on a lever connected to the bar. The result of this mode of operation is that the layers of material being sewed are pulled together and compressed

solely by the pull exerted upon the loop of thread drawn up by the needle.

The principal object of the present invention is to improve the mode of operation of the presser foot and stitch forming devices of machines of the same general type as the McKay shoe sewing machine so that the layers of material will be more firmly pressed together and a tighter seam produced than is possible where the compression of the materials and the tightness of the seam depends entirely upon the pull exerted upon the loops of thread by the needle.

Other objects of the invention are to improve the construction and arrangement of certain of the parts of shoe sewing machines of the type referred to and particularly the mechanism for actuating the needle bar so as to decrease the strain upon the thread and permit the machine to be run at a higher rate of speed, and to improve the mechanism for actuating the cast-off whereby it is rendered more certain and reliable in operation.

With the above objects in view a feature of the present invention contemplates the provision of means for actuating the presser foot so as to compress the layers of material between the presser foot and the horn, with a greater force than is produced by the pull of the needle on the loop of thread or by the spring which allows the presser foot to accommodate itself to variations in the thickness of the work. In the machine herein-after described as embodying the preferred form of the invention, the presser foot is actuated by mechanism including a locking device, which device does not release the presser foot so as to allow it to accommodate itself to the thickness of the stock until the work has been compressed between the presser foot and the horn with the desired amount of force. The needle draws up a loop of thread and the feed point feeds the work in the same manner as in the McKay machine, but after the work has been fed and while the needle remains in its highest position, the presser foot is forced down toward the horn by its actuating mechanism to compress the work between the presser foot and horn. The continued movement of the presser foot actuating mechanism releases the presser foot, which then is free to accommodate itself to the thickness of the

material. This feature of the present invention, broadly considered, contemplates the use of any suitable locking device. The preferred form of locking device, however, comprises cooperating friction surfaces, as thereby lost motion is prevented, and the actuating mechanism for the presser foot can act with certainty to raise the presser foot to the desired distance during the upward stroke of the needle. This is important in machines of the same general type as the McKay sewing machine, since the position of the presser foot, when raised, determines the extent of the upward movement of the needle and the length of the loop drawn up by the needle, and upon the length of this loop depends, to a great extent, the tightness of the seam, as is fully explained in the United States patents hereinbefore referred to. Preferably the locking device is mounted directly upon the presser foot bar as thereby any lost motion in the other parts of the presser foot actuating mechanism produces no effect upon the seam.

Another feature of the present invention contemplates yieldingly mounting the abutment on the needle bar fulcrum post which cooperates with the presser-foot in determining the extent of the upward movement of the needle bar. The provision of this yielding abutment, in the place of a rigid abutment, allows the fulcrum post to yield at the beginning of the upstroke of the needle, so that no sudden jerk is exerted upon the thread and the machine can be run at a higher rate of speed without danger of breaking the thread. Also the provision of this yielding abutment prolongs the dwell of the needle at the limit of its downward stroke while the whirl is laying the thread in the hook of the needle, so that a smaller eccentric for operating the needle bar can be used than is required in the McKay machine and less movement of the fulcrum post is required, which is an advantage when the machine is operated at a high speed.

Other features of the present invention consist in an improved mechanism for actuating the cast-off, and in certain improved devices, combinations and arrangements hereinafter described and claimed.

The novel features of these mechanisms and devices and their advantages will be apparent to those skilled in the art from the following description taken in connection with the accompanying drawings in which—

Figure 1 is a view in front elevation of the head of a machine embodying the same in their preferred form; Fig. 2 is a view in side elevation of the head of the machine looking from the right of Fig. 1; Fig. 3 is a view in side elevation of the head of the machine looking from the left of Fig. 1; Fig. 4 is a detail view illustrating the construction and arrangement of the cam and

treadle operated levers for actuating the presser-foot bar; Fig. 5 is a view in side elevation of the parts illustrated in Fig. 4; Fig. 6 is a detail sectional view illustrating the presser-foot bar and a portion of the mechanism by which it is actuated and controlled.

The machine in which the several features of the present invention are embodied in their preferred form has the same general construction and arrangement of parts as the McKay shoe sewing machine hereinbefore referred to and comprises a horn upon which the shoe is supported, a straight hooked needle secured at the lower end of a vertical reciprocating needle bar, a cast-off, a presser-foot secured to the lower end of a vertical presser-foot bar, and a feed point.

The needle bar 1 is mounted to reciprocate in guideways in the upper and lower plates 2 and 3 of the head of the machine, and is connected by a link 4 to a lever or walking beam 5 pivotally mounted at its center upon the upper end of the needle bar fulcrum post 6 and connected at its rear end by a link and strap 7 to an eccentric crank pin on the cam shaft 8, the construction being the same as in the McKay machine. The fulcrum post has a limited rising and falling movement as in the McKay machine so as to cause the needle to dwell at the limit of its upward and downward movements and the needle is held in position during the movements of the fulcrum post by means of a friction block 9 mounted in the upper plate of the head of the machine.

Upon the fulcrum post is mounted a sleeve 10 provided with a horizontal arm 11 in which an adjustable screw bolt 12 is clamped. The lower end of this screw bolt during the downward movement of the fulcrum post, is arranged to engage a stop 13 formed on a lever 14 pivoted at its rear end on the lower plate 3 of the head of the machine and connected at its front end by means of a link 15 to the presser-foot bar 16. The screw bolt 12 thus forms an abutment, carried by the fulcrum post 6, to engage the stop lever 14 and limit the downward movement of the fulcrum post. The sleeve 10 on the fulcrum post is pressed downwardly by means of a spring 17 coiled around the post and interposed between the sleeve and an adjustable nut 18 on the post. The downward movement of the sleeve under the force of the spring is limited by a stop 19 on the post which stop is provided with projections engaging slots in the lower end of the sleeve to prevent it from turning. The abutment 12 which contacts with the stop lever 14 during the downward movement of the fulcrum post 6 is thus yieldingly mounted, and the fulcrum post is permitted to yield downwardly just before the needle begins its upward movement,

so that no sudden jerk is exerted upon the thread and the dwell of the needle is long enough to enable the thread to be laid in its hook.

5 To enable the presser foot to be raised by the operator when the work is to be inserted in the machine, a lifting lever 20 is provided, the forward end of which extends under a pin 21 projecting laterally from the stop lever 14 and the rear end of which is connected to a treadle-actuated rod 22, the arrangement being such that a depression of the rod raises the stop lever and the presser-foot bar connected thereto.

15 The presser-foot bar is guided at its lower end by a guideway in the lower plate of the head of the machine, and at its upper end extends through an adjustable sleeve 23 screw-threaded into a fixed sleeve 24 extending upwardly from the upper plate of the head of the machine. A spring 25 is coiled around the presser-foot bar and is interposed between the lower end of the adjustable sleeve 23 and a collar 26 upon the rod. This spring acts, when the presser-foot bar is released, to hold the presser-foot yieldingly in contact with the work, and permits the presser-foot to accommodate itself to variations in the thickness of the work. By 30 adjusting the adjustable sleeve 23, the tension of the spring can be increased or diminished as desired. The downward position of the presser-foot, when no work is in the machine, is determined by an adjustable block 27 secured to the upper end of the presser-bar and arranged to engage the upper end of the adjustable sleeve 23.

The locking device which forms a part of the mechanism by which the presser-bar is 40 lifted a uniform predetermined distance from the upper surface of the work regardless of its thickness, and by which the presser-foot is depressed to compress the work between the presser-foot and the horn, consists of two members, one of which is a nut 28 engaging a screw-thread 29 of steep pitch cut on the presser-foot bar. This nut, when not engaged by the other member of the locking device, is free to turn, so that it 50 offers no resistance to the rising and falling movement of the presser-foot. The nut is supported by an arm 30 projecting from a sleeve 31 mounted on a vertical rod 32 at the rear of the presser-foot bar. A spring 33 is coiled around this rod and acts to force the nut supporting sleeve 31 downwardly. The downward movement of the sleeve 31, under the force of the spring 33, is limited by an adjustable stop nut 34 on the rod. 60 The arm 30 supports the nut 28 by engaging a groove in the nut, which groove is wide enough to permit a limited longitudinal movement of the nut independently of the arm, the upper and lower surfaces of the 65 arm acting as stops to limit the independent

movement of the nut in each direction. The other member of the locking device consists of a block 35 mounted to slide freely on the presser-foot bar below the nut member. The block 35 is provided with laterally projecting pins 36 upon which blocks 37 are 70 mounted which are received in slots in the forked forward end of an actuating lever 38, the rear end of which is provided with a roll engaging a cam groove in a disk on the cam shaft, the cam groove and lever acting to raise and lower the block at the proper times during the operation of the machine. The upper end of the block 35 is provided with a slightly tapering friction surface 39 80 which is adapted to engage a corresponding friction surface 40 formed on the nut member of the locking device. When the block 35 is raised it engages the nut 28 and lifts it independently of the arm 30 until the lower surface of the groove in the nut engages the lower surface of the arm. During this independent movement of the nut the pressure of the friction surfaces on each other is slight and the nut rotates on the bar 16. During the continued upward movement of the block the arm 30 and sleeve 31 are raised with the nut 28, and the spring 33 forces the friction surfaces together with a heavy pressure so that the nut 95 is held from rotation and the presser-foot bar is raised. The throw of the actuating lever 38 is uniform and inasmuch as the friction surfaces of the nut and block are always forced together with a heavy pressure 100 at the same point in the upward movement of the block and there is no lost motion of rotation between the block and nut thereafter, the presser-foot is always lifted a certain and uniform distance. During the 105 downward movement of the locking device to depress the presser-foot, the nut is held in engagement with the block by the spring 33 acting on the nut supporting sleeve 31 until the sleeve strikes the stop 34, and as 110 the block 35 continues its downward movement the nut 28 is moved downwardly independently of the sleeve and arm 30. The presser-foot is thus moved downwardly a greater distance than it was raised, and the work is compressed between the presser-foot 115 and horn by the force exerted by the spring 25 acting on the presser bar 16 and by the force required to separate the friction surfaces 39 and 40 on the nut and block, which latter force is greatly in excess of that exerted by the spring 25, since the spring continues to hold the friction surfaces in engagement, and the surfaces have become wedged together by the action of the springs 25 and 33 during the upward movement of the 120 presser bar. The downward movement of the presser-foot takes place at the end of the feeding movement when the needle is in its highest position, and the force with which 130

the presser-foot is depressed is sufficient to firmly compress the layers of material between the presser-foot and horn.

The cast-off of the machine is of usual construction, and is timed to operate in the usual manner. The cast-off is secured to the lower end of a bar 41 which is yieldingly connected at its upper end to a link 42, the upper end of which is pivotally connected to a lever 43 mounted upon the same center as the walking beam 5 which actuates the needle bar. This lever, at its rear end, is provided with a suitably shaped cam slot 44 which is engaged by a pin 45 projecting laterally from the link 7, connected to the rear end of the walking beam 5. By forming the slot 44 directly in the rear end of the actuating lever 43, a strong and durable construction is provided and the cast-off is actuated positively and with certainty in the required manner.

The mechanism for supporting and actuating the feed point is the same as in the commercial McKay sewing machine with the exception that the cam-operated arm 46, instead of being rigidly mounted upon the rock shaft 47, is loosely mounted thereon, and is provided with a rib 48 which extends between two adjustable stop screws 49 mounted in an arm 50 rigidly secured to the shaft 47. By means of this construction the mechanism for actuating the feed point can be adjusted to vary the throw of the feed point as may be desired.

The operation of the various parts of the machine illustrated in the drawings and above described has been indicated in the description already given and will be readily understood by those skilled in the art.

The nature and scope of the present invention having been indicated and a machine embodying the various features of the invention in their preferred form having been specifically described, what is claimed is:—

1. A chain stitch shoe sewing machine, having, in combination, a hooked needle, a horn to enter the shoe, means located in the horn for laying the thread in the hook of the needle, means for feeding the work, a presser foot, a spring acting when the presser foot is released to hold the presser foot against the work, and mechanism for actuating the presser foot constructed to engage the presser foot and raise it a uniform distance regardless of variations in the thickness of the work to permit the work to be fed and to depress the presser foot through a greater distance to compress the work between the presser foot and horn after the work is fed.

2. A shoe sewing machine, having, in combination, stitch forming mechanism, a work support, a presser foot, and mechanism for actuating the presser foot constructed to

raise the presser foot a uniform distance regardless of variations in the thickness of the work, to depress the presser foot through a greater distance to compress the work between the presser foot and work support and to release the presser foot to allow it to accommodate itself to variations in the thickness of the work.

3. A chain stitch shoe sewing machine, having, in combination, a hooked needle, a horn to enter the shoe, means located in the horn for laying the thread in the hook of the needle, a presser foot, mechanism for actuating the needle, means controlled by the presser foot for varying the retracting stroke of the needle, a feed point on the same side of the work as the presser foot, mechanism for actuating the feed point to feed the work while the needle is out of the work, and mechanism including a locking device for actuating the presser foot to raise the presser foot a uniform predetermined distance regardless of variations in the thickness of the work, and to depress the presser foot through a greater distance after the work has been fed to compress the work between the presser foot and horn.

4. A chain stitch shoe sewing machine, having, in combination, a hooked needle, a horn to enter the shoe, means located in the horn for laying the thread in the hook of the needle, a presser foot, mechanism for actuating the needle, means controlled by the presser foot for varying the retracting stroke of the needle, means for feeding the work, and mechanism including a locking device for actuating the presser foot constructed to engage the presser foot and raise it a uniform distance regardless of variations in the thickness of the work, to depress the presser foot through a greater distance to compress the work between the presser foot and horn, and to release the presser foot to allow it to accommodate itself to variations in the thickness of the work.

5. A chain stitch shoe sewing machine, having, in combination, a hooked needle, a work support, a presser foot, means for feeding the work, and mechanism for actuating the presser foot constructed to raise the presser foot a uniform distance regardless of variations in the thickness of the work before the work is fed, and to depress the presser foot through a greater distance after the work is fed to compress the work between the presser foot and work support.

6. A chain stitch shoe sewing machine having, in combination, a hooked needle, a work support, a presser foot, means for feeding the work, and mechanism for actuating the presser foot constructed to raise the presser foot a predetermined uniform distance regardless of variations in the thickness of the work before the work is fed, to depress the presser foot through a greater

distance after the work is fed to compress the work between the presser foot and the work support, and to release the presser foot to allow it to accommodate itself to variations in the thickness of the work.

7. A shoe sewing machine, having, in combination, a hooked needle, a work support, a presser foot, mechanism for actuating the needle, means controlled by the presser foot for varying the retracting stroke of the needle, a presser foot bar, a friction locking device mounted directly on the bar, and mechanism for actuating the locking device constructed to raise the presser foot from the work support, to depress the presser foot through a greater distance to compress the work between the presser foot and work support and to release the presser foot to allow it to accommodate itself to variations in the thickness of the work.

8. A shoe sewing machine, having, in combination, a hooked needle, a work support, a presser foot, mechanism for actuating the needle, means controlled by the presser foot for varying the retracting stroke of the needle, a presser foot bar, a rotatable nut having a screw-threaded engagement with the bar and provided with a clutch surface, a non-rotatable block provided with a cooperating clutch surface, and means for actuating the block to clutch the nut and then move the nut to raise the presser foot.

9. A shoe sewing machine, having, in combination, a hooked needle, a work support, a presser foot, mechanism for actuating the needle, means controlled by the presser foot for varying the retracting stroke of the needle, a presser foot bar, a locking device comprising a rotatable clutch member having a screw-threaded engagement with the bar and a non-rotatable cooperating clutch member, means for actuating one of said members to bring said members into engagement and then move said members to raise and lower the presser foot, and means for supporting the other member arranged to limit its movement with the bar in a direction to lower the presser foot and permit it to move independently of the bar for a limited distance in the opposite direction.

10. A shoe sewing machine, having, in combination, a hooked needle, a work support, a presser foot, mechanism for actuat-

ing the needle, means controlled by the presser foot for varying the retracting stroke of the needle, a presser foot bar, a locking device comprising a rotatable clutch member having a screw-threaded engagement with the bar and a non-rotatable cooperating clutch member, means for actuating one of said members to bring said members into engagement and then move said members to raise and lower the presser foot, and a movable spring pressed support in which the other member is mounted to have a limited longitudinal movement independently of the presser bar.

11. A shoe sewing machine, having, in combination, a hooked needle, a work support, a presser foot, a needle actuating lever, a movable fulcrum therefor, a stop connected with the presser foot and adjusted thereby and a yielding abutment connected to said fulcrum arranged to engage said stop and yieldingly support the fulcrum at the beginning of the retracting stroke of the needle.

12. A shoe sewing machine having, in combination, a hooked needle, a work support, a presser foot, a needle actuating lever, a movable fulcrum therefor, a stop connected with the presser foot and adjusted thereby, an abutment connected to said fulcrum arranged to engage said stop and determine the retracting stroke of the needle, and means for permitting the fulcrum to yield at the beginning of the retracting stroke of the needle.

13. A shoe sewing machine having, in combination, a hooked needle, a cast off, a work support, a presser foot, a needle actuating lever, a movable fulcrum post therefor, means controlled by the presser foot for limiting the movement of the fulcrum post to vary the retracting stroke of the needle, a cast off actuating lever mounted on the fulcrum post and provided with a cam slot immovable with relation to the lever, and mechanism for actuating the needle lever provided with a pin engaging said cam slot.

In testimony whereof I affix my signature, in presence of two witnesses.

JACOB R. SCOTT.

Witnesses:

FRED O. FISH,
ANNIE C. RICHARDSON.