June 19, 1923. 1,459,388

F. E. BERTRAND

WAX THREAD SEWING MACHINE

Original Filed June 8, 1917 2 Sheets-Sheet 1

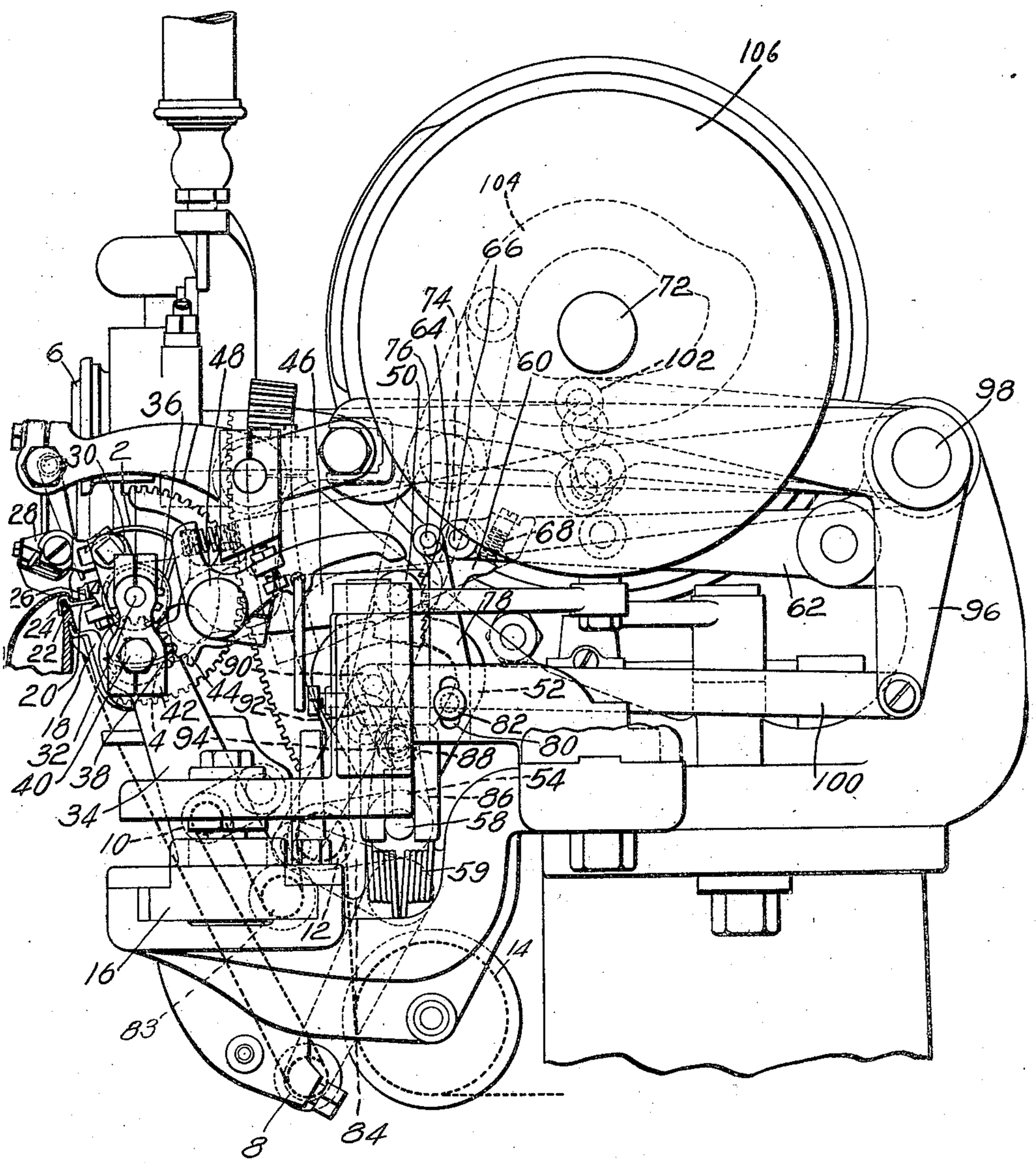

Fig. 1.

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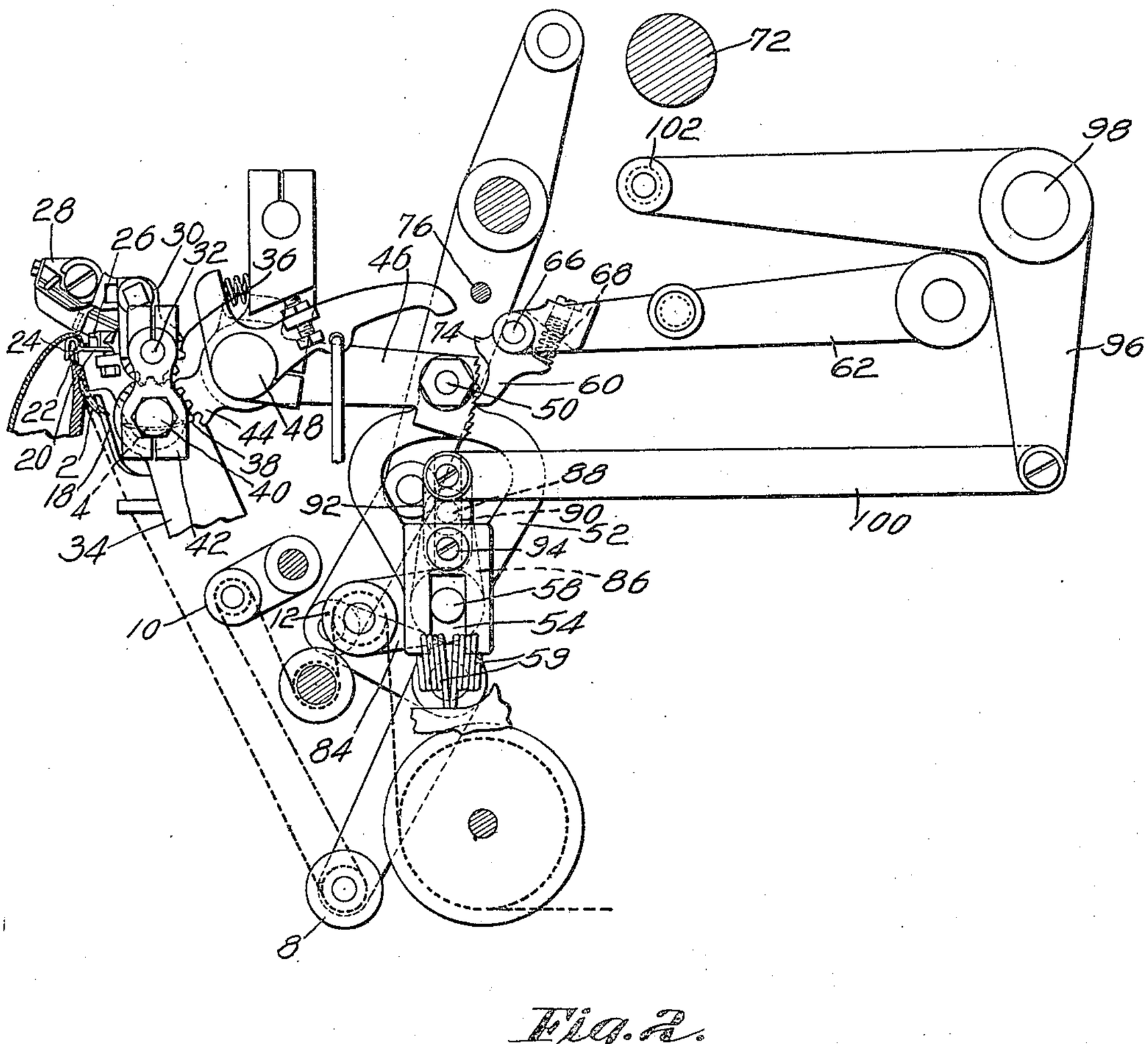

Fig. 2.

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Patented June 19, 1923. 1,459,388

UNITED STATES PATENT OFFICE.

FREDERIC E. BERTRAND, OF LYNN, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

WAX-THREAD SEWING MACHINE.

Application filed June 8, 1917, Serial No. 173,555. Renewed June 26, 1920. Serial No. 392,044.

To all whom it may concern:

Be it known that I, FREDERIC E. BERTRAND, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Wax-Thread 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.

This invention relates to wax-thread sewing machines, and more particularly to the class of machines provided with a work support and a presser-foot for positioning and holding the work during the sewing of a seam.

One object of the invention is to provide wax-thread sewing machines of the above class with an oscillating pull-off, the throw of which is controlled by the position of the presser-foot as determined by the thickness of the work, and is unaffected by the lifting of the presser-foot during each cycle of operation. With this object in view, the invention contemplates the provision of means for rendering the connections intermediate the pull-off and the presser-foot for controlling the throw of the pull-off from the position of the presser-foot, as determined by the thickness of the work, ineffective upon the pull-off during the lifting of the presser-foot. In the preferred form of the invention these connections are rendered ineffective upon the pull-off by moving them to neutral positions before the presser-foot is lifted, and by maintaining them in neutral positions until the presser-foot has been lowered into engagement with the work. In the present embodiment of the invention part of the acting throw of the pull-off is imparted to the pull-off before the presser-foot is lifted, thereby moving the connections to neutral positions, and the remainder of its acting throw is imparted to the pull-off after the presser-foot has been lowered into engagement with the work.

Another object of the invention is to improve the construction and mode of operation of the presser-foot mechanism in machines of the above class.

Other features of the invention consist of certain novel and improved constructions, arrangements and combinations of parts hereinafter described and particularly pointed out in the claims.

The invention will be readily understood from the accompanying drawings illustrating the invention in its preferred form, and the following detailed description of the constructions therein shown.

In the drawings, Figure 1 is a view in side elevation of a shoe sewing machine embodying the invention; and Fig. 2 is a detail view in side elevation illustrating particularly the presser-foot and pull-off mechanisms.

The machine illustrated in the drawings is a machine for sewing uppers and welts to the insoles of welted shoes without first assembling the parts upon a last, and has the same general construction, arrangement and mode of operation as the machine illustrated and described in applicant's pending application Serial No. 861,215, filed September 11, 1914. The machine comprises a curved hook needle 2, a curved work-feeding awl 4, a shuttle 6, a take-up 8, an auxiliary take-up 10, a pull-off 12, a tension wheel 14, and certain other devices co-operating with these parts to form a lockstitch seam, and a feed slide 16, all of which parts, with the exception of the pull-off, are constructed, arranged and operated in substantially the same manner as the corresponding parts of the machine illustrated and described in the patent to French and Meyer No. 473,870, dated April 26, 1892. The machine also comprises a channel guide or work support 18, a member 20 constructed to form a shoulder guide 22 and a sole guide 24, and an upper edge guide 26 having the same construction, arrangement and mode of operation as the corresponding parts of the machine illustrated and described in appli-

cant's pending application referred to above. The channel guide 18 is mounted upon the feed slide, and is arranged to engage in the channel of the insole to support the same, as shown clearly in the drawings. The member 20 is also mounted upon the feed slide, and is arranged to embrace the marginal portion of the insole, the shoulder guide 22 engaging the shoulder of the insole, and the sole guide 24 supporting the marginal portion of the insole upon its inner side. The machine is also provided with a presser-foot 28 for engaging the outer face of the marginal portion of the upper and clamping the same against the member 20, and also acting to depress the member 20 to cause the shoulder guide and sole guide to grip the sole. The construction and arrangement of the presser-foot 28 are substantially the same as in the machine illustrated in the application referred to, but the mechanism for actuating the presser-foot is different from the presser-foot actuating mechanism of the machine of the application. The presser-foot is constructed to form a welt guide for guiding the welt at the sewing point into position for the welt to be attached to the upper and insole by the stitches. The presser-foot is mounted upon an arm 30 pivoted upon an extension of the awl stud 32, which is mounted upon an upright 34 on the feed slide. The presser-foot is mounted in this manner so that it may be lifted and depressed during each cycle of operations, and so that it will be reciprocated with the feed slide. During each cycle of operations the presser-foot is depressed when the feed slide is in retracted position, and before the awl pierces the work, and remains in depressed position until after the feed slide has advanced and the needle has pierced the work. After the needle has advanced through the work, and before the feed slide retracts, the presser-foot is lifted a predetermined distance away from the channel guide or from the work, and is held in raised position during the retracting movement of the feed slide. To enable the presser-foot to be actuated in this manner, the arm 30 is formed with a gear segment 36, the teeth of which mesh with the teeth of a gear segment 38 pivoted upon a stud 40 mounted on the upright 34. For the sake of strength and rigidity, the ends of the awl stud 32 and the stud 40 are connected by a plate or block 42 clamped to the ends of the studs. The teeth of the gear segment 38 also mesh with the teeth of the gear segment 44 formed at the forward end of a lever 46 pivoted upon a stud 48. Pivoted at 50 to the rear end of the lever 46 is a frame 52, the lower end of which is formed with a slot 54 in which engages the end of the rock shaft 58, the rock shaft serving as a guide for the lower end of the frame. The frame is held in elevated position by springs 59 which act through the frame, the lever 46 and the gear segment 38 on the arm 30 to hold the presser-foot in depressed position. The presser-foot is lifted during each cycle of operations by means of a pawl 60 mounted on a cam lever 62 and arranged to engage teeth 64 formed on the rear end of the lever. The pawl 60 is pivoted at 66 upon the cam lever 62, and is acted upon by a coiled spring 68 which tends to keep the acting end of the pawl in engagement with the ratchet teeth 64. In order to disengage the pawl 60 from the ratchet teeth 64 on the lever 46 to permit the presser-foot to be depressed into engagement with the work by the action of the springs 59 during each cycle of operation, the pawl is formed with a projection 74 arranged to engage a fixed pin 76 as the cam lever swings upwardly, and thereby swing the pawl rearwardly. The pin 76 is mounted at the upper end of an arm 78 adjustably secured at its lower end to the frame.

During each cycle of operations, starting with the cam lever in its uppermost position, the pawl 60 then being held out of engagement with the teeth 64 on the rear end of the cam lever 46 and the presser-foot being held in depressed position by the action of the springs 59, the presser-foot mechanism has the following mode of operation: As the forward end of the cam lever 62 moves downwardly, the projection 74 on the pawl 60 is disengaged from the pin 76, and the springs 59 act to move the acting end of the pawl into engagement with one of the ratchet teeth 64. The continued downward movement of the forward end of the cam lever then carries downward the rear end of the lever 46. This movement of the lever 46 through the gear segment 38 swings the arm 30 in a direction to lift the presser-foot. As the forward end of the cam lever swings upwardly, the pawl 60 is disengaged from the teeth 64 on the rear end of the lever 46 by the engagement of the projection 74 on the pawl with the pin 76. The vertical position of the rear end of the lever 46 at the time during the downward or presser-foot-lifting movements of the cam lever when the pawl 60 engages one of the ratchet teeth 64, is determined by the position of the presser-foot, which varies with the thickness of the parts of the work lying respectively between the presser-foot and the member 20, and between the said member and the channel guide. The pawl 60 will engage one of the ratchet teeth 64 on the lever 46 at substantially the same point in the downward movement of the forward end of the cam lever, regardless of the position of the lever 46, so that the presser-foot will always be lifted a substantially uniform distance, regardless of the thickness of the work. The

arm 78 which carries the pin 76 is adjustable vertically on the frame. To enable the arm to be adjusted vertically, a vertical slot 80 is formed in the frame, and the arm is secured to the frame by means of a bolt 82 passing through the slot and threaded into the arm. By adjusting the arm vertically the vertical position of the pin 76 may be varied to vary the point in the downward movement of the cam lever 62 at which the pawl 60 engages one of the ratchet teeth 64 on the lever 46, and thus to vary the distance which the presser-foot is lifted.

The thread from the supply passes about the tension wheel 14, over the pull-off roll, under the stationary thread roll 83, over the thread roll of the auxiliary take-up, under the thread roll of the main take-up, and thence upwardly to the work.

The pull-off 12 consists of a roll mounted upon an arm 84 secured to the rock shaft 58. A second arm 86 is secured to the rock shaft, and carries a pivotally mounted block 88 engaging in a groove 90 in an oscillating lever 92 pivoted at 94 on the frame 52. The lever 92 is given a back-and-forth movement during each cycle of operations, by means of a cam lever 96 pivoted upon the shaft 98 and connected with the lever 92 by means of a link 100. The cam lever 96 carries a cam roll 102 engaging in a cam groove 104 in a cam disk 106 mounted on the main shaft 72. As far as described, the pull-off mechanism is similar to the pull-off mechanism of the machine of the French and Meyer patent referred to above, and acts in a well-known manner to produce variations in the throw of the pull-off arm in accordance with variations in the position of the presser-foot due to changes in the thickness of the work, to cause the pull-off to draw off from the supply during each cycle of operations the proper quantity of thread for the succeeding stitch. As the stock varies in thickness the lever 46 and the frame 52 will be moved to vary the distance of the block 88 from the axis of oscillation of the lever 92 to vary the throw of the pull-off. Upon an increase in the thickness of the stock the rising of the presser-foot will lower the rear end of the lever 46 and the frame and increase the distance between the block 88 and the axis of the lever 92, thereby causing an increase in the stroke of the pull-off arm 84. In a corresponding manner, upon a decrease in the thickness of the stock, the rear end of the lever 46 and the frame 52 will be elevated, thereby diminishing the distance of the block 88 from the axis of oscillation of the lever 92, which will result in diminishing the throw of the pull-off arm 84.

When the pull-off is in the position which it assumes at the beginning of its thread-pulling stroke, the arm 86 and the oscillating lever 92 lie in inclined positions to the left of a line joining the centre of the pivotal connection 50 and the centre of the rock shaft 58, as shown in Fig. 1, and when the pull-off is in the position which it assumes at the end of its thread-pulling stroke, the arm 86 and the oscillating lever 92 will occupy inclined positions to the right of said line. In the usual machine of the type of the present machine, the thread-drawing stroke of the pull-off starts before the feed slide retracts and is completed during the retracting movement of the slide and the pull-off of the present machine has the same timing relatively to the feed slide. The presser-foot, however, of the present machine is held in raised position during the retracting movement of the slide. In order that the throw of the pull-off may not be affected by the lifting of the presser-foot, but that it may be determined by the position of the presser-foot while the presser-foot is engaged with the work, the cam groove 104 in which the cam roll 102 engages is so constructed and timed as to actuate the came lever 96 to swing the oscillating lever 92 and the arm 86 from their inclined starting positions at the left of the line connecting the centre of the pivotal connection 50 with the centre of the rock shaft 58, to a position in line with or substantially central relatively to this line, as shown in Fig. 2, before the presser-foot is lifted. This movement of the arm 86 will swing the arm 84 upwardly to actuate the pull-off to draw a certain amount of thread from the supply. Only a part of the thread-pulling stroke is imparted to the pull-off, however, before the presser-foot is lifted, the remainder of the complete thread-drawing stroke being imparted to the pull-off after the presser-foot is lowered into engagement with the work. With the lever 92 and the arm 86 in central positions, as shown in Fig. 2, the lifting of the presser-foot will not affect the position of the pull-off arm 84. The cam groove 104 in which the cam roll 102 engages is formed with an idle portion which engages the roll while the presser-foot is lifted so that the lever 92 and the arm 84 are held in central position until the presser-foot is lowered into engagement with the work. After the presser-foot is lowered, the cam roll 102 is engaged by an active portion of the cam groove 104 which acutates the cam lever 96 to swing the lever 92 and the arm 86 into inclined positions at the right of the line connecting the centre of the pivotal connection 50 and the centre of the rock shaft 58 to complete the stroke of the pull-off.

Having explained the nature and object of the invention, and having specifically described a machine embodying the inven-

tion in its preferred form, what is claimed is:

1. A wax-thread shoe sewing machine, having, in combination, stitch forming devices, a work support, a presser-foot, means for lifting the presser-foot during each cycle of operations, an oscillating pull-off, means for actuating the pull-off to draw thread from the supply during each cycle of operations, connections controlled by the position of the presser-foot as determined by the thickness of the work for varying the active throw of the pull-off, and means for rendering said connections ineffective upon the pull-off during the lifting of the presser-foot.

2. A wax-thread shoe sewing machine, having, in combination, stitch forming devices, a work support, a presser-foot, means for lifting the presser-foot during each cycle of operations, an oscillating pull-off, connections controlled by the position of the presser-foot as determined by the thickness of the work for controlling the throw of the pull-off, and means for actuating the pull-off constructed and arranged to impart the first part of the acting stroke to the pull-off to move the connections to neutral positions before the presser-foot is lifted, and to impart the remainder of the acting stroke to the pull-off after the presser-foot has been lowered into engagement with the work.

3. A wax-thread shoe sewing machine, having, in combination, stitch forming devices, a work support, a presser-foot, a lever operatively connected with the presser-foot, means acting on the lever to lift the presser-foot during each cycle of operations, a frame carried by the lever, an oscillating lever pivoted on the frame, a pull-off lever mounted on a fixed axis, a variable connection between the oscillating lever and the pull-off lever for actuating the pull-off lever, and means for actuating the oscillating lever constructed and arranged to place the same in neutral position relatively to the pull-off lever during the lifting of the presser-foot.

4. A wax-thread shoe sewing machine, having, in combination, stitch forming devices, a work support, a presser-foot, a lever operatively connected with the presser-foot, means acting on the lever to lift the presser-foot during each cycle of operations, a frame carried by the lever, an oscillating lever pivoted on the frame and having a guide, a pull-off lever mounted on a fixed axis, a block carried by the pull-off lever, engaging in the guide, and means for actuating the oscillating lever constructed and arranged to place it in a position substantially parallel with the line of movement of the frame before the presser-foot is lifted.

5. A wax-thread shoe sewing machine, having, in combination, stitch forming devices, a work support, a presser-foot, a lever operatively connected with the presser-foot, means acting on the lever to lift the presser-foot during each cycle of operations, a frame carried by the lever, an oscillating lever pivoted on the frame, a pull-off lever mounted on a fixed axis, a variable connection between the oscillating lever and the pull-off lever for actuating the pull-off lever, and means for actuating the oscillating lever constructed and arranged to impart the first part of the acting stroke to the pull-off lever to move the oscillating lever to neutral position relatively to the pull-off lever before the presser-foot is lifted, and to impart the remainder of its acting stroke to the pull-off lever after the presser-foot has been lowered into engagement with the work.

6. A wax-thread shoe sewing machine, having, in combination, stitch forming devices, a work support, a presser-foot, a presser-foot lever, a series of gear teeth formed on the lever, a pivoted gear segment meshing with said teeth, a second lever, a series of gear teeth formed thereon meshing with the teeth of the gear segment, a series of ratchet teeth formed on the second lever, a cam lever, a pawl mounted thereon for engaging said ratchet teeth to actuate the second lever to lift the presser-foot, a device for disengaging the pawl from the ratchet teeth during each cycle of operations, and a spring acting yieldingly on the second lever to engage the presser-foot with the work.

7. A wax-thread shoe sewing machine, having, in combination, stitch forming devices, a work support, a presser-foot, a lever operatively connected with the presser-foot, a frame pivoted upon the lever, a guide for the lower end of the frame, a spring acting yieldingly on the frame to engage the presser-foot with the work, a series of ratchet teeth formed on the lever, a cam lever, a pawl carried by the cam lever for engaging said ratchet teeth to actuate the first lever to lift the presser-foot, and a device for disengaging the pawl from the ratchet teeth during each cycle of operations.

8. A wax-thread shoe sewing-machine, having, in combination, stitch forming devices, a work support, a presser-foot, a lever operatively connected with the presser-foot, a frame pivoted upon the lever, a guide for the lower end of the frame, an oscillating pull-off, connections controlled by the position of the frame for controlling the throw of the pull-off, a spring acting yieldingly on the frame to engage the presser-foot with the work, a series of ratchet teeth formed on the lever, a cam lever, a pawl carried by the cam lever for engaging said ratchet teeth to actuate the first lever to lift the presser-foot, and a device for disengaging the pawl from the ratchet teeth during each cycle of operations.

9. A sewing machine having, in combina-

tion, stitch forming devices, a work support, a presser foot, means for lifting the presser foot during each cycle of operations, pull-off mechanism actuated during each cycle of operations to draw thread from the supply, connections controlled by the position of the presser foot as determined by the thickness of the work for varying the effective operation of the pull-off mechanism, and means for rendering said connections ineffective upon the pull-off mechanism during the lifting of the presser foot.

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