

J. DANENMARK.
SEWING MACHINE.
APPLICATION FILED SEPT. 13, 1909.

956,300.

Patented Apr. 26, 1910.

2 SHEETS—SHEET 1.

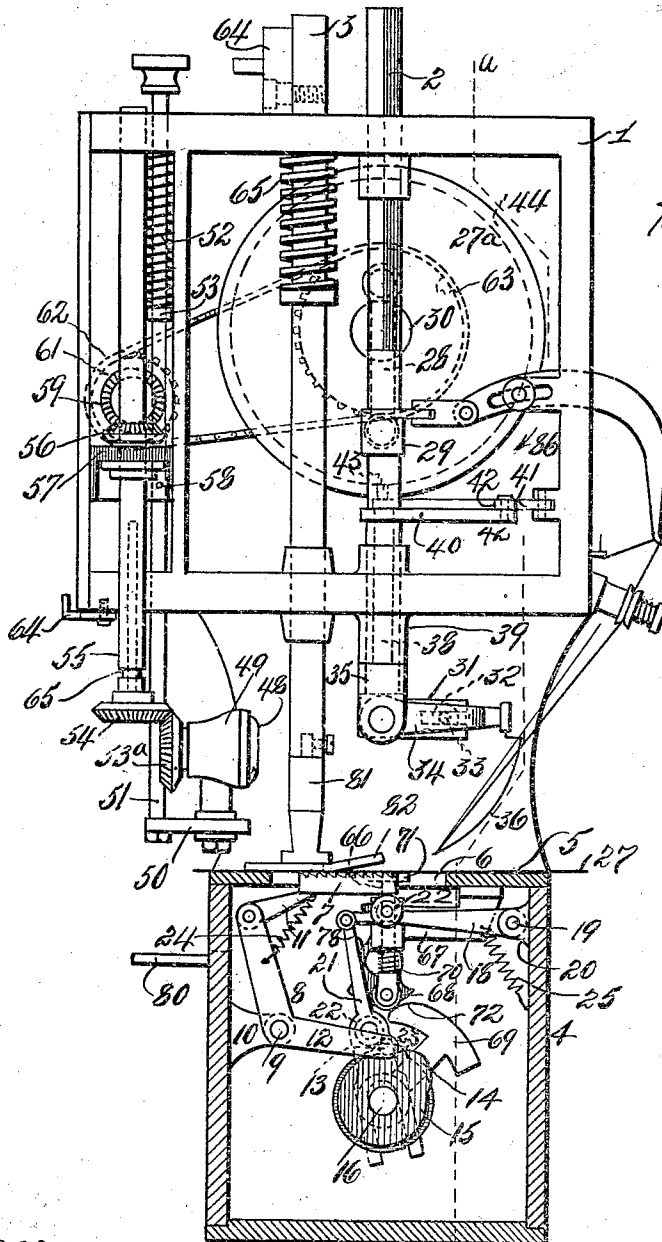


Fig. 1.

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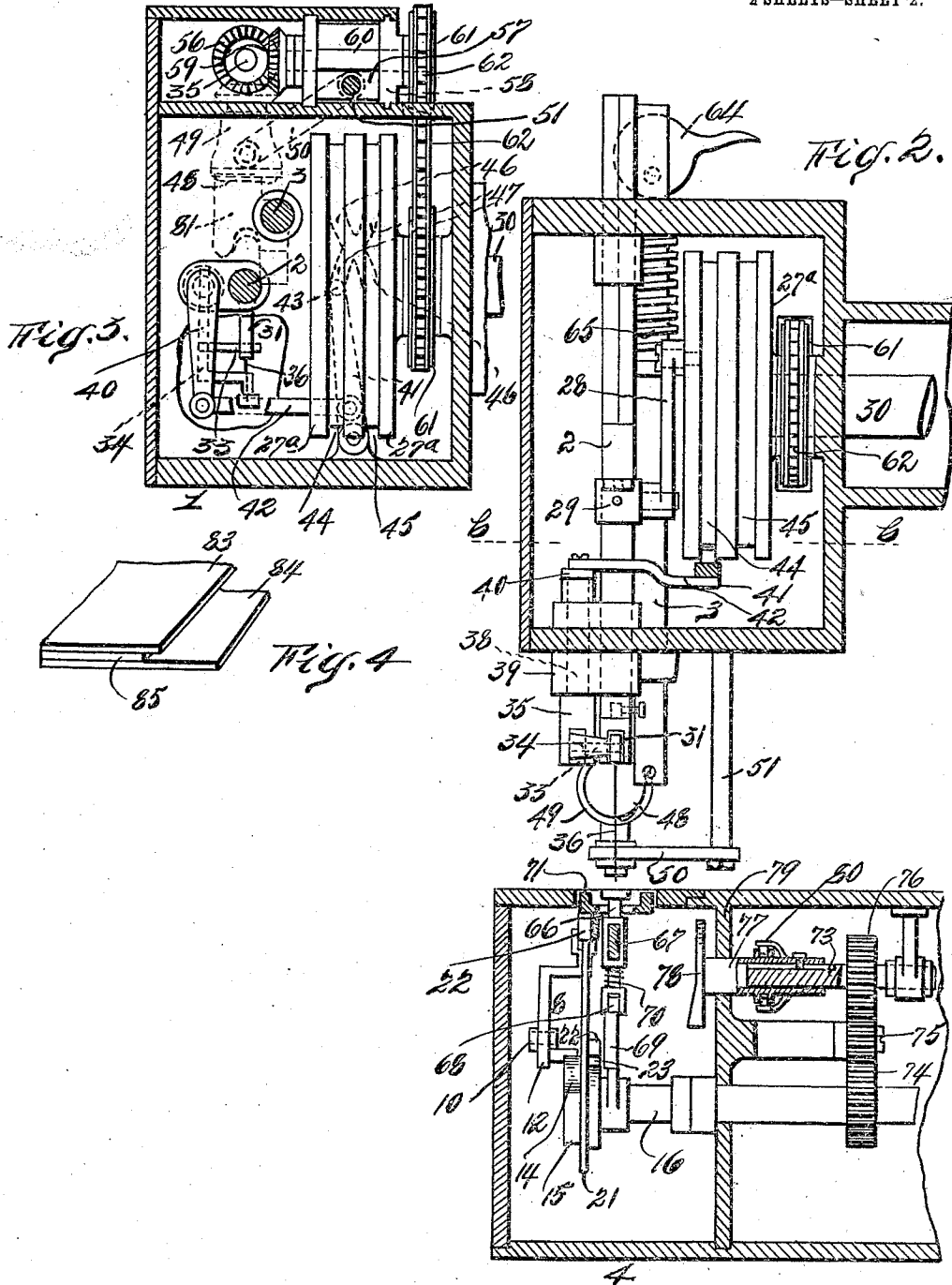
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JACOB DANENMARK, OF NEW YORK, N. Y.

SEWING-MACHINE.

956,300.

Specification of Letters Patent.

Patented Apr. 26, 1910.

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To all whom it may concern:

Be it known that I, JACOB DANENMARK, a subject of the Czar of Russia, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a clear, full, and exact description.

This invention relates to an improvement in sewing machines.

The object of this invention is to provide a combined straight stitching and a felling sewing machine, certain parts of which are so organized, and mounted relatively to each other, as to adapt them for the function of applying straight stitches, or rather a straight line of stitches, or felling stitches as may be desired.

The object of the felling mechanism of my improvement is to adapt the sewing machine to accomplish that which is usually worked by hand.

In order to cause the felling mechanism to properly perform its function, I have found that it is necessary to alter the direction of movement of the thread carrying needle at every other stroke thereof; in other words, for felling purposes I use a curved needle which is caused to pass through the fabric firstly in a direction in line with the direction of feed of the fabric, and upon the next stroke thereof at an angle to the direction of feed of the fabric. To render the above statement clearer it may here be stated that the felling stitch is used to bind two layers of fabric together, there being a filling between the said layers such as in a coat for instance. To stitch the layers of fabric together, the needle is caused, during one stitch, to pass through the fabric only, and upon the next stroke to pass through the fabric and filling, whereby the filling is secured to the fabric.

I will now proceed to describe my invention and finally claim the novel features thereof, reference being had to the accompanying drawings forming part hereof, wherein:—

Figure 1 is a front elevation of my improved sewing machine, partly in section, the front plate for the head of the machine being removed; Fig. 2 is a vertical sectional view taken on a line *a—a* in Fig. 1 the presser-foot being omitted, and certain other parts shown in elevation; Fig. 3 is a sec-

tional plan view, the section being taken on a line *b—b* in Fig. 2; and Fig. 4 is a detail view of that class of work for which my improved felling device is adapted.

Before describing the mechanism of my invention, it may here be stated that I have omitted many of the well known parts of a sewing machine. Such well known parts will, however, be referred to briefly.

Referring to Fig. 1, the numeral 1 indicates the head of my improved sewing machine, the said head being provided with a vertically reciprocating needle-bar 2, and a vertically movable presser-foot bar 3. Beneath the head 1, I have provided a box-like structure 4, having a removable needle-plate 5, the said plate being provided with an opening 6, through which a feed-dog 7 can project and operate to feed the fabric to be stitched.

To operate the feed-dog 7 I have herein illustrated an arbitrary mechanism, which comprises a bell-crank lever 8 pivoted as at 9 to a bracket 10. The upper end of the said bell-crank lever has pivoted thereto an arm 11, which carries the feed-dog 7. The outer end of the member 12 of the bell-crank lever 8 carries a roller 13, which engages a cam 14 on a rotatable disk 15, the said disk being carried and rotated by a shaft 16, which is operated at the rear of the machine in the usual manner. When the disk 15 is rotated, the lever 8 will operate to impart to the feed-dog 7 a reciprocating movement. To cause the feed-dog 7 to rise, at the commencement of the feed stroke, and to fall at the commencement of the return stroke, I provide an arm 18, which is pivoted as at 19 to a bracket 20. The outer end of the said arm has connected thereto a rod 21, having a roller 22 which in turn is reciprocated by a peripheral cam 23. The cam 23 and cam 14 are so timed as to cause the arm 18 to rise, thereby raising the feed-dog 7 at the commencement of the feed stroke. The spring 24 pulls the feed-dog 7 downwardly when the spring 25 pulls the arm 18 downwardly, the said arm being pulled downwardly when the roller 22 leaves the cam 23, which will be at the end of the feed stroke of the dog 7. Fig. 1 illustrates the feed-dog operating mechanism in a position to operate the feed-dog to feed the fabric 27.

To operate the needle-bar 2, I provide a

disk 27^a, which has pivoted thereto one end of a link 28 (see Fig. 2), the lower end of said link being pivotally secured to a block 29 on the needle-bar 2. As the disk 27^a is rotated by the shaft 30, the needle-bar 2 will be caused to reciprocate. The shaft 30 may be operated by any one of a number of devices well known in this art. The lower end of the needle-bar 2 is arranged to receive an ordinary straight sewing needle or an operating arm 31, having a jaw 32, which has in engagement therewith a pin 33 carried by an arm 34, the said arm being pivotally mounted in a swivel block 35, and adapted for radial movement in order that the curved needle 36, which is carried by the arm 34, can perform its function which will hereinafter appear. The block 35 is provided with a stem 38, which is rotatably held by a lug 39 (see Fig. 1). The upper end of the stem 38 carries an arm 40 which is connected to a horizontally movable pivotally mounted arm 41, by a link 42. The outer end of the arm 41 carries a pin 43, which is adapted to slidably fit the grooves 44 and 45 (see Fig. 3) in the disk 27^a, the said grooves being cross connected as at 46 and 47 (see Fig. 4). When the disk 27^a is rotated by the shaft 30, the needle-bar 2 will be reciprocated whereby the needle 36 will be caused to travel through an arc of a circle by reason of the structure hereinbefore described. By reason of the cross connected grooves 44 and 45, the needle 36 will be caused to travel through one stroke in parallelism with the feeding of the fabric, and through the next stroke at an angle thereto; in other words the needle 36 will be caused to change its direction of reciprocation, relative to the feed of the fabric, at every stroke thereof, due to the cross connected grooves 44 and 45.

To coöperate with the needle 36 to form a stitch, I have provided a shuttle or bobbin 48, which is retained by a casing 49. As a shuttle mechanism, and mode of operation, is well known a detailed description thereof will be omitted. The casing 49 which contains the shuttle is carried by a bracket 50, which in turn is mounted on a vertically movable rod 51. The rod 51 passes upwardly through the head 1 and carries a spring 52 abutting a collar 53 at the lower end thereof. To operate the bobbin 48 I have provided a gear 53^a, which has in mesh therewith a pinion 54. The pinion 54 is mounted on a vertically movable rotatable shaft 55, which carries also a gear 56. Adjacent the gear 56 is a vertically movable bearing 57 through which the shaft 55 and rod 51 pass. The shaft 55 is adapted to rotate in the bearing while the rod 51 is fixed thereto by a pin 58 (see Figs. 1 and 3). The bracket 57 carries a pinion 59, which is carried by a shaft 60, the said shaft being ro-

tated by a sprocket wheel and chain 61 and 62, respectively, the sprocket chain being operated by a sprocket wheel 63 carried by the shaft 30, the wheel 63 being twice the diameter of the wheel 61.

The presser-foot bar 3 is raised by a cam lever 64 and lowered by a spring 65, when the cam lever is raised. This is a well known element in sewing machines.

When the bobbin 48 is not in use for felling purposes the bracket 50 may be pulled up thereby causing the bobbin 48 and gears 53^a and pinion 54 to come away from the needle-plate 5, whereby ample space is left for ordinary stitching. These last named elements may be locked in the raised position by means of a latch 64, the shaft 55 being provided with an annular groove 65 adapted to receive the latch.

Another feature of my invention comprises a device which is designed to raise the work to be felled into the path of the felling needle 36. The device referred to comprises a spindle 66, which is carried by a bracket 67 and which is adapted for vertical movement therein. The lower end of the spindle carries a roller 68, which is contacted by a wiper 69 at certain predetermined intervals during the rotation of the shaft 16. A spring 70 forces the spindle downwardly after it has been raised by the wiper 69. The upper end of the spindle 66 carries a plate 71. It will be seen in Fig. 1 that the periphery of the wiper 69 is for the greater part concentric with the shaft 16, the portion 72 of the wiper being beveled to provide a cam action in order to raise the spindle. The amount of rise of the spindle 66 will be just enough to raise the work into the path of the needle, but not enough to bring the plate 71 into the path of the needle.

As can be seen in Fig. 2, I have provided a countershaft 73 which is actuated by the main shaft 16 through the gears 74, 75 and 76. The shaft 73 has slidably mounted thereupon a sleeve 77 which carries, in this instance, an ordinary hook 78, the said hook being identical with the hook now used for chain stitching. A lock stitch bobbin may be mounted on the shaft 73 in place of the hook 78. As can be seen in Fig. 2 the sleeve passes through the wall 79 of the structure 4 and is moved into the path of the straight needle when the machine is to be used for straight stitching. The sleeve 77 is operated by a lever 80 (see Fig. 1).

To hold material 27 in contact with the feed-dog 7 I provide a presser-foot 81, having an outwardly and upwardly extending projection 82, in order that the plate 71 can rise, thereby bringing the material 27 into the path of the needle 36, without contacting with the said presser-foot 81. The presser-foot 81 is removably secured to the presser-

foot bar 3 in order that the ordinary presser-foot may be substituted when the machine is to be used for straight stitching. By referring to Fig. 2, it will be seen that the operating arm 31 is detachably secured to the needle-bar 2 in order that an ordinary straight needle can be substituted therefor for straight stitching. When the machine is to be used for straight stitching the hook 78 may be brought into operative relationship with the straight needle by means of the lever 80. When the machine is used for straight stitching the bobbin 48 and co-operating parts will be drawn up away from the needle-plate 5 and locked by the latch 64; as the plate 71 is not needed for straight stitching the needle plate 5 may be removed, whereby the vertically movable spindle 66 and co-operating parts may be removed from the machine and another needle-plate, having an opening similar to the opening 6 in the plate 5, substituted therefor.

The operation of felling will now be described.

In order to carry out the function of felling, I have arranged the disk 27^a to cause the needle to pass through the fabric 83 and 84, see Fig. 4, during one stroke, in a straight line, that is to say, in line with the feed of the fabric, and during the next stroke of the needle, the said needle is turned at an angle to the feed of the fabric and passed through the fabric 83 and 84 and also through the lining 85; in other words the needle is caused to pass through the fabric in a straight line and at an angle to the feed thereof at every alternate stroke. By referring to Figs. 2 and 3 it will be seen that the grooves 44 and 45 in the disk 27^a are cross connected as at 46 and 47, the groove 44 controlling the straight stitch of the needle. Presuming that the disk 27^a is rotated in the direction of the arrow 86 in Fig. 1, the groove 44 will hold the needle 36 in line with the feed of the fabric, whereby the said needle is caused to pass through the fabric and stop adjacent the bobbin 48, while the link 28 is crossing the lower dead center. During the next upward stroke of the link 28, the needle 36 will be withdrawn from the fabric, the bobbin in the meantime having engaged the thread. After the needle 36 has left the fabric the groove 46 will switch the pin 43 from the groove 44 to the groove 45, that is to say, the said groove 46 will switch the pin 43 to the groove 45 just before the link has reached its upper center. The switching of the pin 43 pulls the arm 40 toward the disk 27^a, whereby the needle 36 is caused to lie at an angle with respect to the feed of the fabric. During the next revolution of the disk 27^a the needle 36 will be passed through the fabric and lining therebetween and finally reach the bobbin 48. Upon the upward

stroke of the link 28 the needle 36 will be withdrawn from the fabric and lining therebetween, but just before the link 28 has reached its upper center, the groove 47 will cause the pin 43 to go back to the groove 44, whereby the needle 36 is then in position to apply another straight stitch. When the needle is drawn to its angular position it will stop slightly out of center of the bobbin 48. In order to compensate for the difference in the time of engagement of the hook of the bobbin 48 when the needle is applying a straight stitch and an angular stitch, I preferably cause the bobbin 48 to rotate twice for every revolution of the disk 27^a.

Having now described my invention what I claim and desire to secure by Letters Patent is:—

1. In a sewing machine, a rotatable disk having cam grooves therein, a rectilinearly reciprocating needle-bar actuated by said disk and adapted to receive a needle at the lower end thereof, a swivel block mounted adjacent said needle-bar, an angularly movable arm carried by said swivel block, a curved needle carried by said arm, removable means carried by said needle-bar adapted to actuate the arm carried by said swivel block, a looper adapted to engage the thread carried by said curved needle, and means adapted to cause said needle to change its direction of reciprocation at every consecutive revolution of said disk, said means being controlled by the cam slots in said disk.

2. In a sewing machine, a rotatable disk having cam grooves therein, a rectilinearly reciprocating needle-bar actuated by said disk and adapted to receive a needle at the lower end thereof, a swivel block mounted adjacent said needle-bar, an arm carried by said swivel block adapted for angular movement, a curved needle carried by said arm, an arm carried by said needle-bar, adapted for removal therefrom and adapted to actuate the arm carried by said swivel block, a looper adapted to engage the thread carried by said curved needle, and means actuated by said disk adapted to cause said needle to change its direction of reciprocation at every revolution of said disk.

3. In a sewing machine, a rotatable disk having cam grooves therein, a rectilinearly reciprocating needle-bar actuated by said disk and adapted to receive a needle at the lower end thereof, a swivel block mounted adjacent said needle-bar, an arm carried by said swivel block adapted for angular movement, a curved needle carried by said arm, an arm carried by said needle-bar adapted for removal therefrom and adapted to actuate the arm carried by said swivel block, a looper adapted to engage the thread carried by said curved needle, means actuated by said disk adapted to cause the said needle to change its direction of reciprocation at every

revolution of said disk, and means adapted to raise the material to be sewed into the path of said needle at every forward stroke thereof.

- 5 4. In a sewing machine, a frame, a needle plate, a feed-dog, a reciprocating needle-bar adapted to receive a straight sewing needle, an oscillatory arm mounted adjacent to said needle-bar, said arm being adapted to receive a curved sewing needle, an arm adapted for attachment to said needle-bar when said straight needle is removed, means carried by the arm last named adapted to actuate said oscillatory arm when said curved
10 needle is mounted thereupon, a shiftable stitch forming mechanism below said needle plate adapted to cooperate with said straight needle, a vertically movable rotatable bobbin above said needle plate adapted to cooperate with said curved needle, means adapted to lock said bobbin in its raised position
15 when said straight needle is used, and means

adapted to shift said stitch forming mechanism out of operative position.

5. In a sewing machine, a frame, a head 25 on said frame, a rectilinearly reciprocating needle-bar adapted to receive a needle at the lower end thereof, a block independent of said needle-bar and carried by said head adapted for rotary movement in a horizontal 30 plane, a movable arm carried by said block, a needle carried by said arm, means carried by said needle-bar adapted to actuate said arm to cause said needle to enter the material to be sewed, means adapted to partially 35 rotate said arm at every stroke of the needle-bar, and a stitch forming mechanism adapted to cooperate with said needle.

Signed at New York city, N. Y., on this 14th day of July 1909.

JACOB DANENMARK.

Witnesses:

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ABRAM SHLIVEK.