P. A. HERR.

FEEDING MECHANISM FOR SEWING MACHINES.

APPLICATION FILED JUNE 23, 1914.

1,265,448.

Patented May 7, 1918.

2 SHEETS—SHEET 1.

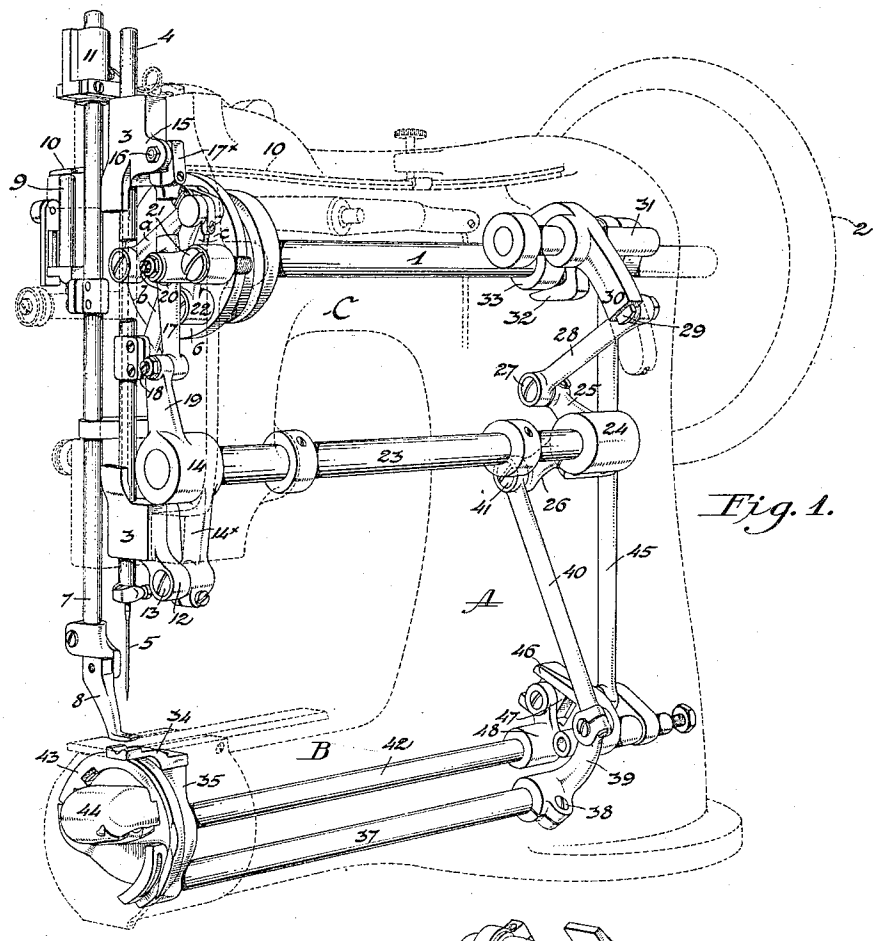


Fig. 1.

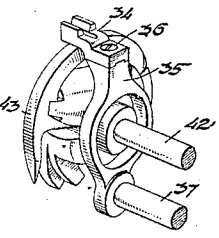


Fig. 2.

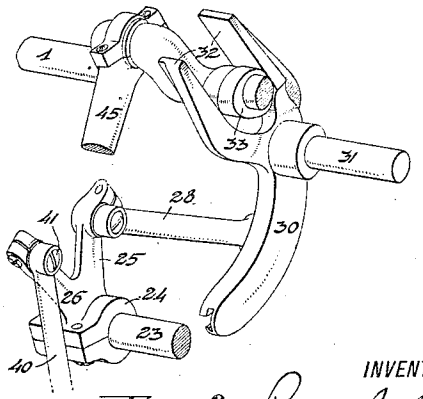


Fig. 3.

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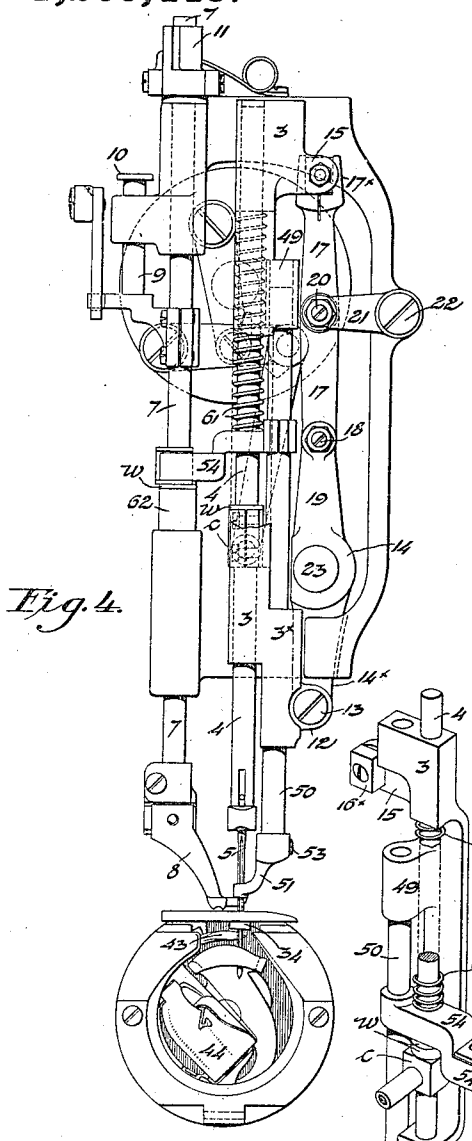


Fig. 4.

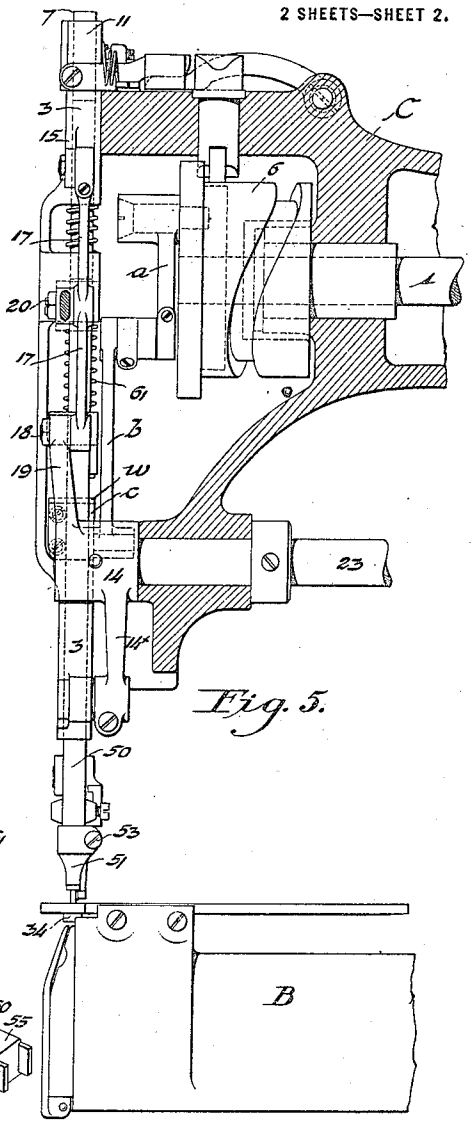


Fig. 5.

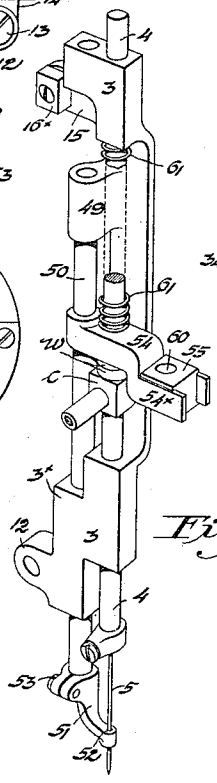


Fig. 6.

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FEEDING MECHANISM FOR SEWING-MACHINES.

1,265,448. Specification of Letters Patent. Patented May 7, 1918.

Application filed June 23, 1914. Serial No. 846,727.

To all whom it may concern:

Be it known that I, PARK A. HERR, a citizen of the United States, residing at Saybrook, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Feeding Mechanisms for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to feeding mechanism for sewing machines and its object is to provide compactly arranged and durable mechanism for imparting work-advancing movements to a needle and a feeding needle-guard which receives the needle and aids the effective action of the same.

The improvements are adapted more especially for use in connection with wax-thread machines, and comprise a bodily movable frame disposed adjacent the head of the overhanging arm of the machine and having bearing apertures to receive the reciprocatory needle-bar. The needle-bar frame is pivotally mounted upon the depending arm of a rocker provided with an upwardly extending arm pivotally connected to a lever-arm provided with a fulcrum upon the head of the machine, and having a connection with the upper portion of the needle-bar frame of such character that as the depending arm of the rocker acts to move the lower portion of the needle-bar frame a corresponding and parallel movement is imparted to the upper portion of said frame, and the needle is moved laterally.

Mounted below the throat-plate upon a rock-shaft operatively connected with the feed-rocker actuating shaft is an apertured needle-guard which receives the needle and moves with the same during its feeding action, so that a lateral force is applied to the needle at points located both above and below the work, and the tendency of the needle to deflect or distort under the strain imposed by heavy work, such as leather belting, harness, and the like, is overcome. The actuating shaft for the feed-rocker is connected with the driving shaft of the machine in such manner that an adjustment may be had to vary the effective action thereof and hence the lateral throw of the needle and of the co-operating needle-guard.

The construction above briefly described provides a quick-acting and powerful leverage for the needle-bar frame and also effective means for maintaining the frame within parallel lines throughout its movement.

In the drawings, Figure 1 is a perspective view of the improvements applied to a Singer wax-thread machine designed primarily for sewing heavy leather work. Fig. 2 is a view in detail of the needle-guard and its carrier showing their relation to the shuttle-actuating shaft and shuttle. Fig. 3 is a perspective view of the operative connections between the driving shaft and the feed-rocker actuating shaft. Fig. 4 is a front elevation of a modified form of the improvements applied to a sewing machine, the needle-bar frame supporting an additional guard which surrounds the needle throughout the operation of the machine, and Fig. 5 is a side elevation of the same. Fig. 6 is a detail perspective view of the needle-bar frame and its connected parts.

The improvements are shown applied to the machine comprising the standard A, tubular work-supporting arm B and overhanging arm C, the latter affording bearings for the driving shaft 1 carrying at its end the usual balance-wheel 2. Disposed adjacent the head of the overhanging arm C, is the laterally movable frame 3 having upper and lower bearing apertures in which reciprocates the needle-bar 4 provided with the needle 5 and adapted to receive reciprocatory movements from the driving shaft through the links, *a*, *b*, *c*, pivotally connected to the crank-disk 6. The mechanism for reciprocating the needle-bar forms no part of the present invention; the link construction illustrated, however, is designed to impart a quick downward stroke to the needle and then a temporary cessation of movements while the needle-bar frame is moved laterally to advance the work, after which the needle-bar is moved upward with accelerated speed.

In the head of the overhanging arm is mounted the usual presser-bar 7, supporting the presser-foot 8 and carrying a contact-stud 9 engaged by an adjustable spring 10 whereby the foot 8 is normally pressed downwardly into engagement with the material. In practice, the presser-foot is elevated above the work immediately prior to and during the feeding action of the needle, by means of a clamping-collar 11, which is gripped upon the presser-bar with the application of a lifting force thereto through

certain cam-actuated elements, the specific construction thereof being set forth in an application for patent filed of even date herewith.

The needle-bar frame 3 is provided with a laterally extending lug 12, apertured to receive a stud-screw 13 clamped within the enlarged apertured end of a depending arm 14ˣ forming part of a rocker 14 adapted to support and to impart lateral movements to the needle-bar frame and the needle-bar journaled therein. A second lug 15 projects from the upper portion of the needle-bar frame and is apertured to receive a screw 16 which serves to secure to the lug a slide-block 16ˣ, embraced by the yoke-end 17ˣ of a lever-arm 17 connected at its lower end by means of stud-screw 18 to the upwardly extending arm 19 of the said rocker 14. The lever-arm 17 is apertured intermediate its ends to receive the fulcrum stud 20 carried at the end of an arm 21 pivotally connected by means of stud-screw 22 to the head of the overhanging arm C.

The feed-rocker 14 is fixed upon the end of a rock-shaft 23 journaled in suitable bearings within the standard A and the head of the overhanging arm. Clamped upon that end of the rock-shaft 23 which projects within the standard A is the collar 24 of a rocker comprising the arms 25 and 26, one of said arms being adapted to receive motion from connections with the main-shaft and the second of said arms being adapted to transmit motion from the main-shaft to an apertured needle-guard which moves below the work-plate simultaneously with the needle to aid the latter in its feeding action upon the work. Arm 25 of the rocker 24 is apertured at its end to receive a pivotal-stud 27 which passes through a similar aperture formed in a link-bar 28 which carries at its upper end a slide-block 29 fitted within the under-cut channel of a segmental lever-arm 30. The lever-arm 30 is provided with a transverse bearing-pin 31 fitted within suitable bearings supported by the standard A, and also with a yoke 32 which embraces an actuating eccentric 33 on the driving shaft 1. It will be seen that the motion of the lever-arm 30, through the intermediaries above described, will impart operative movements to the feed-rocker 14 and hence bodily lateral movements to the needle-bar frame 3. As rock-arm 14ˣ moves rearwardly, the advancing rock-arm 19 will carry the yoke-end 17ˣ of lever-arm 17 rearwardly, and the needle-frame will be maintained within parallel lines throughout its movements.

Means are provided for assisting the needle in its feeding action, the said means comprising a feeding needle-guard 34 formed with a channel in its under face to receive a rib on the upper face of a carrier 35, the guard being secured to the carrier by means of a screw 36. The carrier is rigidly secured upon one end of a rock-shaft 37 mounted in suitable bearings within the tubular work-supporting arm B and having clamped thereon at its opposite ends by means of screw 38, the enlarged split end of a crank-arm 39. The crank-arm 39 is pivotally connected at its opposite end to a pitman 40, the latter being in turn pivotally connected by means of stud 41 to arm 26 of rocker 24. It will be seen that the construction above described is such that feeding movements of the same amplitude are imparted to the needle and to the needle-guard simultaneously from the common actuating member, namely rock-shaft 23, and that one adjustment, through link 28 and segmental arm 30, will serve for both of the feeding elements in question.

The carrier 35 is formed with a circular opening intermediate its ends to afford a clearance space for the shuttle-actuating shaft 42 which it embraces. The shuttle 43 is of the Singer oscillating type and employs the usual barrel thread-case 44. Movements are imparted to the shuttle-actuating shaft by means of a pitman 45 provided with a strap embracing a crank on the main-shaft and connected at its lower end to a rocking yoke member 46 embracing a slide-block 47 carried by a crank-arm 48 mounted on the shuttle-actuating shaft.

In the modified form of the improvements illustrated in Figs. 4, 5 and 6 of the drawings, the needle-bar frame supports an additional needle-guard which surrounds the blade of the needle throughout the operation of the machine, and serves both to aid the feeding action of the needle and to guard the same against deflection during its movement above the work.

In its modified form, the needle-bar frame 3 is provided with an upper bearing boss 49 in register with a lower bearing boss 3ˣ. Journaled within bearing apertures formed in the aforesaid bosses, is an endwise movable bar 50 which supports at its lower end a guard-foot 51 formed with a needle aperture 52, the guard-foot being clamped upon its supporting bar by means of screw 53, and in a position to receive the needle 5. Fixed upon the bar 50 intermediate its ends is an arm 54 which is apertured to receive the needle-bar and is provided with a yoke-end 54ˣ, the branches of the yoke being adapted to fit within transverse channels formed in the opposite faces of a wearing block 55, the latter being formed with an aperture 60 to receive the presser-bar 7. Surrounding the needle-bar is a light coiled spring 61, its upper end abutting a wall of the needle-bar frame and its lower end being pressed upon the upper face of arm 54.

The needle in its upward movement does

not leave the aperture in the guard-foot 51, inasmuch as the foot partakes of the rise of the needle beginning at a point when the eye of the needle approaches the lower portion of the foot. To accomplish this result the arm 54 is so disposed upon the bar 50 that at a predetermined point during the rise of the needle-bar 4 the collar *c* on the needle-bar will engage the lower face of the arm and will carry the bar 50 upward, the aforesaid action being against the pressure of spring 61. Immediately upon the downward movement of the needle the spring 61 will act upon the bar 50 to cause a corresponding descent of the guard-foot 51, until the wear-block 55 supported by arm 54 engages a collar 62 fixed upon the presser-bar 7. At this point the guard-foot 51 will be held slightly above the work during the further descent and succeeding partial rise of the needle. In practice, suitable washers *w* of felt or the like are interposed between the collars *c* and 62 and the arm 54 to avoid the shock of impact between the arm and the collars in question.

It will be seen that the connection between the bar 50 and the presser-bar is such that the guard-foot 51 is maintained out of engagement with the work whatever its thickness may be, so that the work is entirely relieved of downward pressure and moves freely upon its supporting work-plate during the feeding action of the needle. As the needle rises from the position shown in Fig. 4 the point of the shuttle 43 is slightly retracted and is quickly advanced to seize the loop thrown out by the needle. The needle continues its rise for a brief interval and then pauses in its upward movement while the rocker 14, through the instrumentalities described, imparts a bodily lateral movement to the needle-bar frame 3 and thereby advances the needle 5, upper guard 51 and lower guard 34 to impart a feeding movement to the work. During the feeding movement of the needle the presser-foot 8 is maintained in slightly elevated position above the work, by the action of the clamping lever and its lifting mechanism, and at the end of the feeding movement the foot 8 falls into contact with the work and holds the same as the needle moves upward. When the eye of the needle reaches a point immediately below the guard-foot 51, collar *c* comes into contact with the lower face of arm 54 and an upward movement is imparted to the bar 50 for the purpose of maintaining the foot 51 in effective position with respect to the needle throughout the reciprocation of the latter, as hereinbefore described.

It will be understood that the improvements are susceptible of various modifications within the scope of the invention. For example, a buffer spring may be interposed between the wear-block 55 and collar 62, and means independently of those described may be employed to maintain the guard-foot 51 out of contact with the work.

Having thus set forth the nature of the invention, what I claim herein is:—

1. In a sewing machine, the combination with a frame including a work-support, of a feeding implement, a movable support for said feeding implement, means for moving the feeding implement toward and from the work-support, pivotally connected plural-armed rockers arranged in substantially parallel relation with the movable support and directly connected thereto, and actuating means connected with one of said rockers, whereby the rockers are caused to act simultaneously and with like effect to impart bodily movements to said movable support.

2. In a feeding mechanism for sewing machines, the combination with a frame, a movable support, a feeding implement mounted in said support, means for moving said implement toward and from the work, a feed-rocker provided with two arms, a pivotal connection between one point on said movable support and the first of said arms, and a rock-lever serving as a connection between another point on said movable support and the second of said arms, said connections being adapted to move said support bodily in the direction of feed.

3. In a feeding mechanism for sewing machines, the combination with a movable support, a feeding implement slidably mounted in said support and means for bodily moving said implement relative to said support, of a feed-rocker formed with an arm connected with said support at one point, a lever operatively connected with said rocker, and a connection between another point of said movable support and the lever, said connections being adapted to impart substantial parallel motion to said support in the direction of feed.

4. In feeding mechanism for sewing machines, the combination with a movable frame, of a feeding implement and a supporting bar therefor adapted to reciprocate within said frame, a feed-rocker provided with a depending arm directly connected to and acting to sustain said frame, a lever operatively connected with said rocker, and a direct connection between the lever and the frame, whereby the latter is maintained within parallel lines throughout the effective action of said rocker.

5. In a feeding mechanism for sewing machines, in combination, a feeding implement and means for actuating the same, a presser-member adapted to contact with the work, a guard-member for the feeding implement adapted to partake of its movements, and means controlled by the presser-

member, for insuring the maintenance of the guard-member permanently free from engagement with the work.

6. In a sewing machine, the combination with a frame including a work-support and an overhanging arm, of a needle-bar, a laterally movable frame mounted upon said arm having upper and lower bearing apertures to receive the needle-bar, a feed-rocker adapted to impart to said frame lateral movements, a driving shaft, an adjustable connection between the driving shaft and said feed-rocker, a needle-guard mounted below the work-support for lateral movement in a path parallel, relatively to the path of movement of the needle, with the direction of movement of the needle-frame, and an operative connection between said feed-rocker and the needle-guard whereby the latter is caused to move laterally with the needle-bar frame.

7. In a feeding mechanism for sewing machines, in combination, a feeding implement and means for actuating the same, a presser-member adapted for contact with the work, a guard member for the feeding implement adapted to partake of its movements, and a connection between the presser-member and the guard-member for arresting the latter in its descent while free from engagement with the work.

8. In feeding mechanism for sewing machines, the combination with a movable frame, of a reciprocatory needle-bar mounted in said frame and carrying a needle, a second bar mounted in said frame and carrying a guard-foot surrounding the needle, a spring tending to press the guard-foot toward the work, a presser-bar, a stop carried by said presser-bar and adapted to maintain the needle-guard in elevated position above the work, a connection between the needle-bar and the guard-bar whereby the latter is caused to partake of the reciprocatory movements of the needle-bar, and means for imparting bodily lateral movements to the movable frame.

9. In feeding mechanism for sewing machines, the combination with a movable frame, of parallel bars supported within said frame and carrying respectively a needle and a guard-foot for said needle, means for imparting bodily lateral movements to said frame, and means for reciprocating the needle-bar, an arm carried by the needle-guard bar and formed with an aperture to receive the needle-bar, a stop-member carried by said needle-bar, a spring tending to press the said arm upon said stop-member, and a presser-bar provided with a stop-member adapted to engage the arm of the needle-guard supporting bar.

10. In feeding mechanism for sewing machines, the combination with a frame, of a rock-shaft journaled within said frame and actuating means therefor, a plural-armed rocker fixed upon said rock-shaft, a reciprocatory needle-bar and a movable-support therefor mounted upon one arm of the rocker, a lever connected to the opposite arm of the rocker and provided with a movable fulcrum, a connection between said lever and the upper portion of the needle-bar support, and means for varying the effective action of the plural-armed rocker.

11. In feeding mechanism for sewing machines, the combination with a frame including an overhanging arm, of a driving shaft mounted within said arm, a segment-lever operatively connected with the driving shaft, a rock-shaft having an adjustable link connection with the segment-lever, a needle-bar operatively connected with the driving shaft, a movable carrier for said needle-bar, a plural-armed rocker carried at the end of said rock-shaft and directly connected to the needle-bar carrier, and a lever directly connected with said rocker and adapted to maintain the parallelism of the carrier throughout its movement.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

PARK A. HERR.

Witnesses:
W. LEE HELMS,
H. A. KORNEMANN, JR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."