Sept. 4, 1923. 1,467,072

R. M. SHARAF

FEED MECHANISM FOR SEWING MACHINES

Original Filed Dec. 11, 1917

Fig. 1.

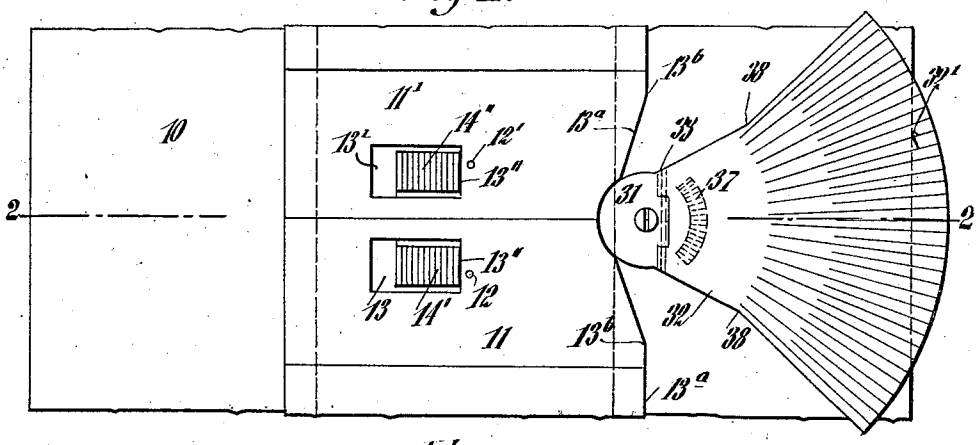


Fig. 2.

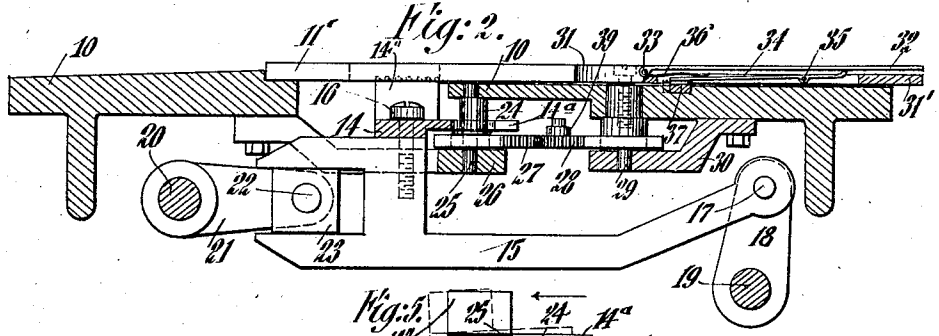


Fig. 5.

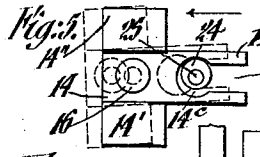
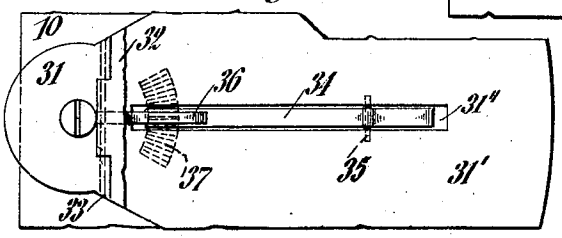


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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FEED MECHANISM FOR SEWING MACHINES.

Application filed December 11, 1917, Serial No. 206,694. Renewed October 29, 1921. Serial No. 511,440.

To all whom it may concern:

Be it known that I, RALPH M. SHARAF, a citizen of the United States, and resident of the borough and county of the Bronx, city and State of New York, have invented certain new and useful Improvements in Feed Mechanisms for Sewing Machines, of which the following is a specification.

This invention has for its purpose to obtain a variable feeding of the goods in sewing machines, particularly to facilitate the work when a curved seam is to be produced. My improved mechanism is of great simplicity, employing what is practically a single feed dog, yet the fabric may be caused to travel evenly, as when the seam is to be straight, or the left-hand portion of the fabric may be caused to be fed either faster or slower than the right-hand portion, as in making seams curved to the right or to the left respectively. The action of the feed mechanism may be modified or adjusted by the operator without stopping the machine, and without even reducing the speed at which the stitching mechanism is operating.

A specific embodiment of my present invention is illustrated by the accompanying drawings, in which

Figure 1 is a partial plan view of a sewing machine with my improved feed mechanism applied thereto;

Figure 2 is a vertical section substantially on line 2—2 of Figure 1;

Figure 3 is a plan view, with the throat plates removed, showing details of the mechanism;

Figure 4 is a plan view on an enlarged scale, showing certain details of the actuating member and its locking mechanism, the major portion of said actuating member being broken away; and

Figure 5 is a detail plan view illustrating the operation of the feed dog.

10 is the usual table of a sewing machine, provided with the customary guideway for the throat plates 11, 11′ provided with needle holes 12, 12′, and with openings 13, 13′, through which the portions 14′, 14″ of the feed dog 14 project. These portions are toothed or serrated in the well-known manner, but for the sake of clearness the serrations have been omitted from Figure 5. The feed dog is carried by a feed bar 15, to which it is pivoted, as by an approximately vertical screw 16, the openings 13, 13′ being wide enough to allow the feed dog to swing on the pivot 16, to about the extent indicated by the dotted lines in Figure 5. The feed dog portions 14′ and 14″ are to the left and to the right respectively of the pivot 16. The feed bar 15 is operated in any well-known or approved manner, and is preferably of the four-motion type, its longitudinal movement being obtained by connecting it pivotally at 17 with a crank 18 on a rock shaft 19, while the up-and-down movement of the feed bar is produced by means of a rock shaft 20 having a crank arm 21 to which is pivoted at 22 a block 23 in sliding engagement with the forked end of the feed bar.

The feed dog 14 has an arm 14^a extending forwardly, that is to say, toward that portion of the machine at which the operator is seated, said arm having a longitudinal slot 14^b (preferably open at the forward end) at the inner or rear end of which there is a recess 14^c of circular curvature, the center of said recess being in line with the longitudinal axis of the slot 14^b, and the diameter of the recess being greater than the width of said slot. As shown in Figures 3 and 5, the slot 14^b and the recess 14^c together form an opening of substantially key-hole shape. The slotted or forked arm 14^a receives or straddles a cam or eccentric 24 rigidly secured to a short vertical shaft 25 which is journaled in stationary bearings, say in the table 10 and in a bracket 26 secured thereto. The space between said table and said bracket is sufficient to allow the arm 14^a to move up and down with the feed bar 15, and yet preserve an operative relation of said arm to the eccentric 24, the diameter of which is approximately equal to the width of the slot 14^b.

When the eccentric has a position symmetrical to the normal line of feed, as in Figure 3, that is to say, when the center of said eccentric lies in the vertical plane extending directly forward through the axis of the shaft 25, the two portions 14′, 14″ of the feed dog will evidently remain in transverse alignment during the reciprocation of the feed bar, and both portions 14′, 14″ will therefore feed the fabric to the same extent. If, however, the shaft 25 is turned to bring the eccentric 24 to one side, as in Figure 5, this eccentric will cause the arm 14^a and the other parts of the feed

dog to swing on the pivot 16, as indicated by dotted lines, when the feed dog is on its active stroke, the direction of which is indicated by the arrow. Owing to this swinging motion of the feed dog, superimposed on the rectilinear motion of the pivot 16, one of the portions of the feed dog (the portion 14′ in Figure 5) will have its throw or feed movement relatively reduced, while the other portion (14″ in Figure 5) will have its throw relatively increased, that is to say, one feed dog portion will feed the goods faster than the other feed dog portion. This is a desirable feature in case a curved seam is to be produced (curved to the left, with the adjustment shown in Figure 5). During the return movement of the feed bar 15 and feed dog, the latter will be swung on its pivot back to the normal transverse position indicated by full lines, this being due partly to the engagement of the eccentric 24 with the walls of the slot 14ᵇ, and partly to the fact that, at the end of the return stroke of the feed bar 15, the forward edges of the dog portions 14′, 14″ are brought against the transversely aligning rear edges 13″ of the openings 13, 13′ (Figure 1). The widened portion or recess 14ᵉ allows for this swinging motion when the eccentric is adjusted to one side, as in Figure 5.

Suitable mechanism is provided for enabling the operator to throw the eccentric 24 to one side or the other of the normal or central position shown in Figure 3. In the particular construction illustrated, this mechanism comprises a toothed sector 27 held to turn with the eccentric 24, preferably by being rigidly secured thereto, and in mesh with a similar toothed sector 28 mounted to swing about a stationary axis as by being secured to a short vertical shaft 29 which is journaled in the table 10 and in a bracket 30 attached thereto. With the sector 28 is held to turn an actuating member located on top of the table 10, and preferably flush with the throat plates, as shown in Figure 2. The fabric being sewed passes over this actuating member, and by exerting manual pressure on top of the goods to one side or the other, the operator can, without interrupting or slackening the stitching process, swing this actuating member laterally to modify the position of the eccentric 24 in the desired manner. The actuating member may be a solid sector-shaped plate secured rigidly to the shaft 29, and preferably provided with converging ridges or corrugations 32′ to guard against slipping of the goods. In the drawings, I have shown a special construction, by which the actuating member is automatically locked in its adjusted position, but it is not absolutely essential to provide a locking arrangement, since probably in most cases the actuating member would remain in any position to which it may be shifted, even if not locked in such position. In the particular embodiment illustrated, the actuating member comprises a body section 31 secured rigidly to the shaft 29, and an auxiliary section 32 connected to the section 31 by a horizontal hinge 33 which in the normal position extends at right angles to the line of feed, as shown. The body section 31 has a portion 31′ of reduced thickness extending forwardly under the section 32 and preferably of the same outline. This base portion 31′ is provided with a longitudinal (radial) slot 31″ in which is adapted to swing vertically a locking lever 34, pivoted to said base portion 31′ at 35. The forward end of the lever engages the hinged section 32 from below and tends to throw it up into the normal position as shown in Figure 2, this action being obtained with the aid of a spring 36 secured to the actuating member and pressing down on the rear end of the lever 34. This rear end, when thrown into its lower position, is in locking engagement (Fig. 2) with a stationary curved rack or toothed arc 37 secured to the top of the table 10, and concentric with the shaft 29. When no downward pressure is exerted on the goods and on the actuating member, the spring 36 will hold the lever 34 in its locking position, preventing accidental swinging of the actuating member about the axis of the shaft 29. If, however, downward pressure is exerted by the operator on the fabric, and through it on the actuating member, the hinged section 32 will be swung downward on the pivot 33, thus rocking the lever 34 on its fulcrum 35 sufficiently to throw the rear end of said lever out of engagement with the locking teeth 37. The actuating member is then free to swing laterally for adjusting the cam or eccentric 24, as described above. As soon as the operator ceases to press downward, the spring 36 will restore the lever 34 to the locking position and thus hold the actuating member against accidental swinging on the axis of the shaft 29.

The edges of the throat plates adjacent to the actuating member may be formed as shown at 13ᵃ to serve as stops for the side edges of the actuating member, the angles at 13ᵇ corresponding to the angles at 38.

In order to guide the operator in the proper manipulation of the actuating member, I may connect with this mechanism a suitable indicator located above the fabric and intended to be kept in registry with a guide line marked on the upper face of the fabric. A connection for controlling such indicator is shown at 39, which designates a horizontal rod or link connected pivotally at 40 with the toothed sector 28, and at its other end with the indicator mechanism (not

shown). This indicator mechanism may be of the type disclosed in my application for Letters Patent of the United States, Serial No. 92,140, filed April 19, 1916, the free end of link 39 being, for instance, pivotally attached to a crank at the lower end of the shaft 152 shown in said application.

Figure 1 of the drawings indicates that the particular mechanism shown is intended for a two-needle sewing machine, but I do not wish to restrict myself to such.

I have illustrated a preferred and satisfactory embodiment of my invention, but it is obvious that changes may be made therein within the spirit and scope thereof, as defined in the appended claims:

I claim:

1. A feed mechanism comprising a longitudinally reciprocating feed bar and a feed dog pivoted to said bar and provided with feed teeth on opposite sides of its pivot, the pivot being carried by and adapted to reciprocate with said feed bar.

2. A feed mechanism comprising a longitudinally reciprocating feed bar, a feed dog pivoted to said bar and provided with an arm extending substantially in the direction of the path of said feed bar, a guide engaging said arm, and means for shifting said guide so that its center will be either in longitudinal alignment with the center of said arm, or out of such longitudinal alignment.

3. A feed mechanism comprising a reciprocating feed bar and a feed dog having a central portion pivoted to said feed bar and active portions at each side of the pivot, the pivot being carried by and adapted to reciprocate with said feed bar.

4. A feed mechanism comprising a reciprocating feed bar, and a feed dog having active portions located on opposite sides of said feed bar rigid relatively to each other and a central portion pivoted to said feed bar, the pivot being carried by and adapted to reciprocate with said feed bar.

5. A feed mechanism comprising a laterally reciprocating feed bar, and a feed dog pivoted to said bar to permit lateral movement of said feed dog about said pivot and having feed teeth on opposite sides of said bar.

6. A feed mechanism comprising a laterally reciprocating feed bar and means pivoted thereto to permit lateral movement of said feed dog about said pivot and having feed members on opposite sides of the pivot.

7. A feed mechanism comprising a reciprocating feed bar, a feed member pivotally connected with said feed bar and having a guideway extending lengthwise of the path of said bar, a normally stationary cam engaging said guideway, and means for altering the position of said cam to modify the action of said feed member.

8. A feed mechanism comprising a reciprocating member, a feed member pivotally connected with said reciprocating member and having a guideway extending lengthwise of the path of reciprocation, an eccentric engaging said guideway and mounted to turn about a stationary axis approximately parallel to that of the pivotal connection between said feed member and said reciprocating member, and means for altering the position of said eccentric.

9. A feed mechanism comprising a reciprocating member, a feed member pivotally connected therewith and adapted to have lateral movement with said pivot, an eccentric engaging said feed member and mounted to turn about an axis approximately parallel to that of the pivotal connection between the feed member and said reciprocating member, and means for turning said eccentric on its axis.

10. A feed mechanism comprising a longitudinally-reciprocating and vertically-moving feed bar, a feed member pivoted to said feed bar, an eccentric mounted to turn about an upright axis, said feed member engaging the eccentric and being movable relatively thereto both lengthwise of the eccentric axis and transversely thereto, and means for altering the position of said eccentric to modify the action of the feed member.

11. A feed mechanism comprising a reciprocating member, a feed member pivotally connected therewith and having a guideway of substantially key-hole shape, an eccentric engaging said guideway, and means for altering the position of said eccentric.

12. A feed mechanism comprising a reciprocating member, a feed member pivotally connected therewith and having a guideway of substantially key-hole shape, an eccentric engaging said guideway, a throat plate having a stop surface to engage the feed member when the eccentric is within the wide portion of said key-hole guideway, and to insure a normal or central position of said feed member at that time, and means for altering the position of said eccentric.

13. A feed mechanism comprising a reciprocating member, a feed member pivotally connected therewith, adjustable means engaging said feed member to control its pivotal movement, and a throat plate provided with a stop to engage the feed member at the end of its ineffective or return stroke and insure a normal or central position of said feed member at that time.

14. A feed mechanism, comprising a reciprocating member, a feed member pivotally connected therewith, eccentric means engaging said feed member and movable to cause it to swing on its pivot and adapted to vary the swinging of said feed member, and an actuating member mounted to turn and operatively connected with said means.

15. A feed mechanism, comprising a recip-

rocating member, a feed member pivotally connected therewith, eccentric means engaging said feed member and movable to cause it to swing on its pivot and adapted to vary the swinging of said feed member, an actuating member operatively connected with said means, and means for normally locking said actuating member.

16. A feed mechanism, comprising a reciprocating member, a feed member pivotally connected therewith, means engaging said feed member and movable to cause it to swing on its pivot, a movable actuating member comprising a body section operatively connected with said means, an auxiliary section movable relatively to said body section, and a locking device controlled by the movement of said auxiliary section relatively to the body section.

17. A feed mechanism, comprising a reciprocating member, a feed member pivotally connected therewith, means engaging said feed member and movable to cause it to swing on its pivot, a movable actuating member comprising a body section operatively connected with said means, an auxiliary section movable relatively to said body section, a locking lever fulcrumed on the body section and controlled by the movement of the auxiliary section relatively to the body section, and stationary holding means adapted for engagment with said lever.

18. A feed mechanism comprising a reciprocating member, a feed member pivotally connected therewith, means engaging said feed member and movable to cause it to swing on its pivot, an actuating member comprising a body section, mounted to turn about an upright axis, and operatively connected with said means, an auxiliary section hinged to said body section about a horizontal axis, and extending over a portion of said body section, a locking lever fulcrumed on said portion of the body section and engaged by said auxiliary section, stationary holding teeth adapted for engagement with said lever and disposed in an arc, the center of which is on said upright axis, and a spring for causing said lever to engage said holding teeth and to swing the auxiliary section away from the body section.

19. A feed mechanism, comprising a reciprocating member, a feed member pivotally connected therewith, means engaging said feed member and movable to cause it to swing on its pivot, and an actuating member adapted to be engaged by the goods being fed, said actuating member being mounted to turn about an upright axis and operatively connected with said means.

20. A feed mechanism comprising a reciprocating member, a feed member pivotally connected therewith, adjustable means engaging said feed member to control its pivotal movement, and an abutment arranged to engage said feed member on its return stroke to insure a normal position of the feed member at the end of its return stroke.

21. A feed mechanism comprising a reciprocating member, a feed member pivotally connected therewith, means engaging said feed member and movable to cause it to swing on its pivot, and a movable actuating member having a roughened surface adapted to be engaged by the goods to be fed, said actuating member being operatively connected with said means.

22. A feed mechanism comprising two portions adapted to produce a differential action, a movable actuating member adapted to be engaged by the goods being fed, and an operative connection from said actuating member to modify the action of the feed mechanism.

23. A feed mechanism comprising a longitudinally reciprocating feed bar, and a feed dog pivoted to said bar and provided with material engaging portions rigid relatively to each other and at opposite sides of said pivot, said portions being arranged parrallel to each other and longitudinally of the line of feed.

24. A feed mechanism comprising a longitudinally reciprocating feed bar, and a feed dog pivoted to said bar along its longitudinal reciprocating axis, and a pair of material engaging portions carried by said dog, one of said portions disposed at each side of said pivot.

25. A feed mechanism comprising a longitudinally reciprocating feed bar, and a feed dog pivoted to said bar along its longitudinal reciprocating axis, a pair of material engaging portions carried by said dog, one of said portions disposed at each side of said pivot, and means for swinging said dog during the reciprocating movement of said bar.

26. A feed mechanism comprising a longitudinally reciprocating feed bar, and a feed dog pivoted to said bar along its longitudinal reciprocating axis, a pair of material engaging portions carried by said dog, one of said portions disposed at each side of said pivot, means for swinging said dog during the reciprocating movement of said bar, and controllable means adapted to vary the extent of said swinging movement.

27. In a sewing machine, a reciprocating feed dog having a pair of rigidly connected spaced parallel material engaging portions, a central pivot, and means for swinging said dog during its reciprocating movement.

28. In a sewing machine having a pair of rigidly connected material engaging portions, and means for varying the extent of the throw of said material engaging portions relatively to each other.

29. In a sewing machine, a feed dog having a pair of rigidly connected material engaging portions, means for varying the extent of the throw of said material engaging portions relatively to each other, a control member, and means normally fixing the position of said control member.

30. A material feeding apparatus comprising mechanism for imparting feeding movements of relatively varying extents to the material at spaced points, and a material supporting member operable to control the relative extents of such feeding movements.

31. A material feeding device comprising mechanism for imparting feeding movements of relatively varying extents to the material at spaced points, a material supporting member composed of a plurality of sections and operable to vary the relative extents of such feeding movements, and means for locking said member in any position of adjustment to which it may be moved, said locking means being constructed to be rendered operative and inoperative by movement of the sections of said member relatively to each other.

In testimony that I claim the foregoing as my invention, I have signed my name.

RALPH M. SHARAF.