D. S. SEYMOUR.

FEEDING MECHANISM FOR SEWING MACHINES.

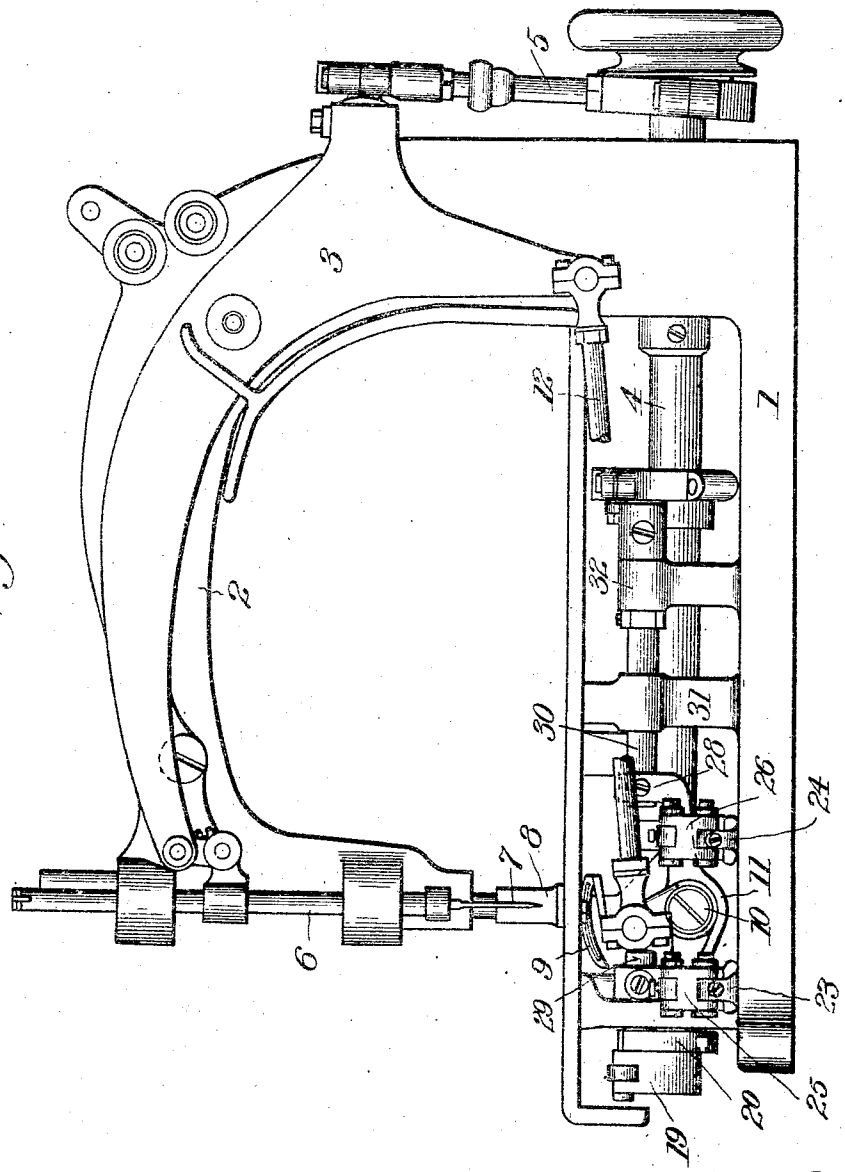
APPLICATION FILED MAR. 30, 1908.

1,144,797.

Patented June 29, 1915.

5 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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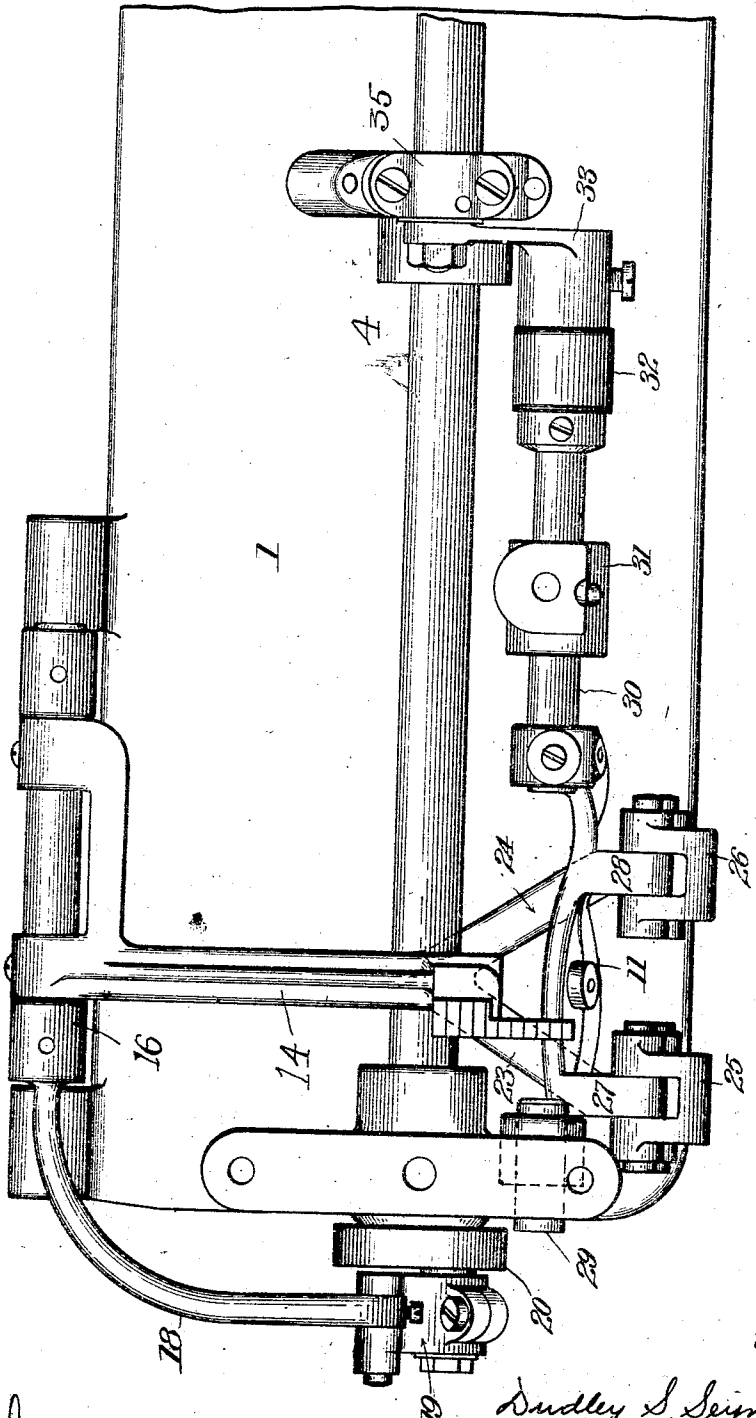
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5 SHEETS—SHEET 2.

Fig. 2.



Witnesses

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5 SHEETS—SHEET 3.

Fig. 3.

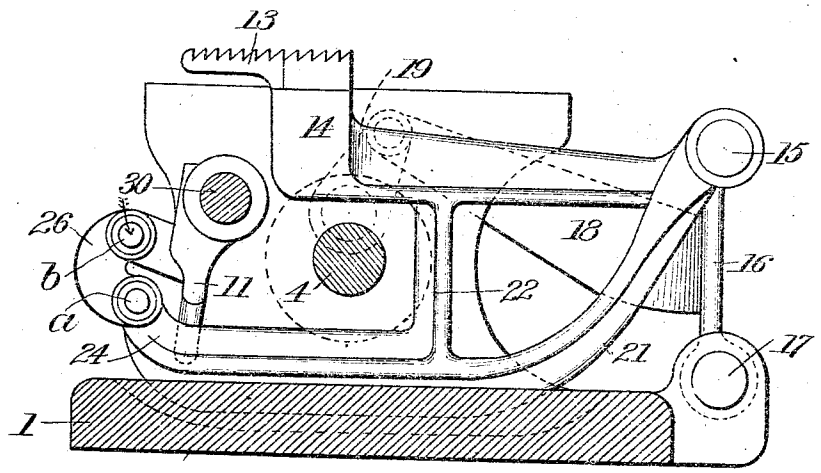
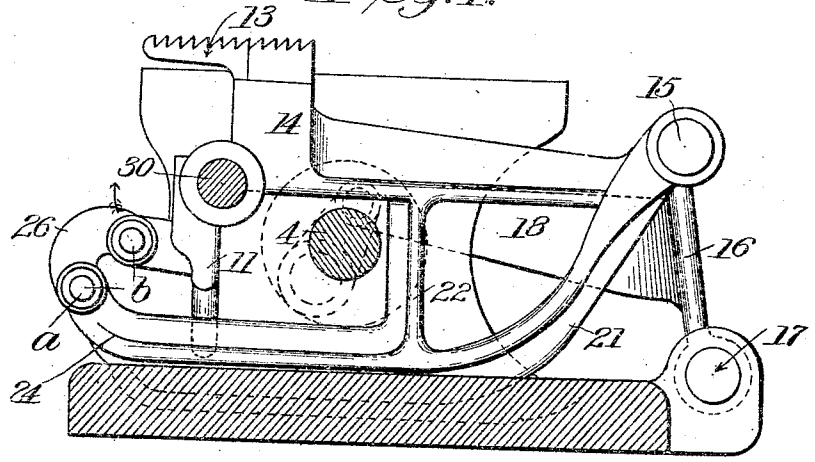


Fig. 4.



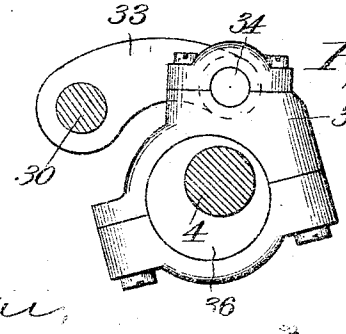


Fig. 5.

334

Witnesses

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5 SHEETS—SHEET 4.

Fig. 6.

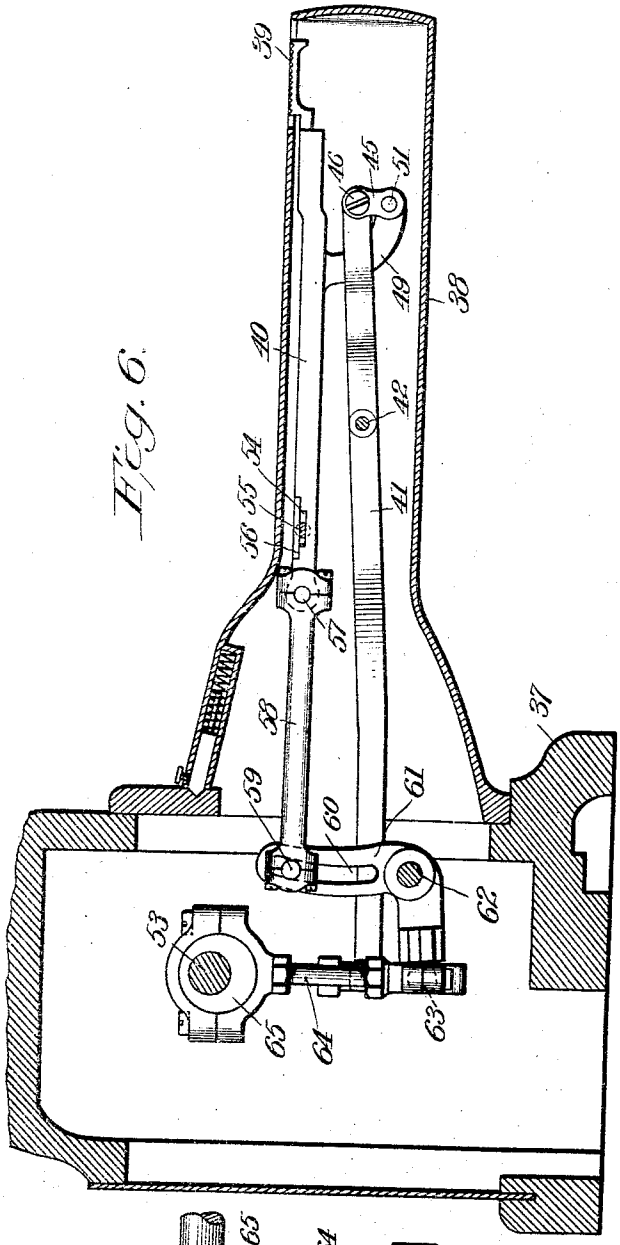


Fig. 7.

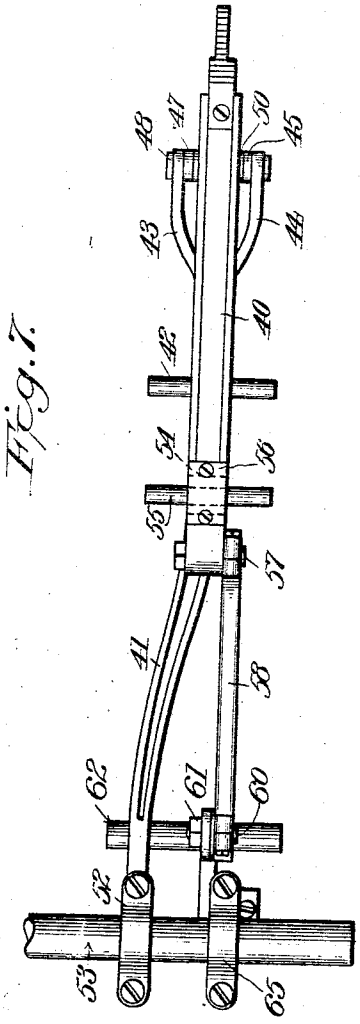
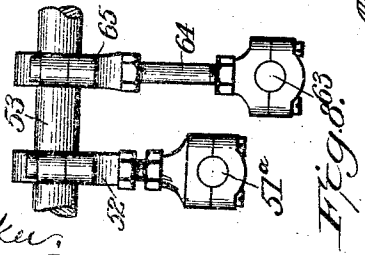


Fig. 8.



Witnesses.

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5 SHEETS—SHEET 5.

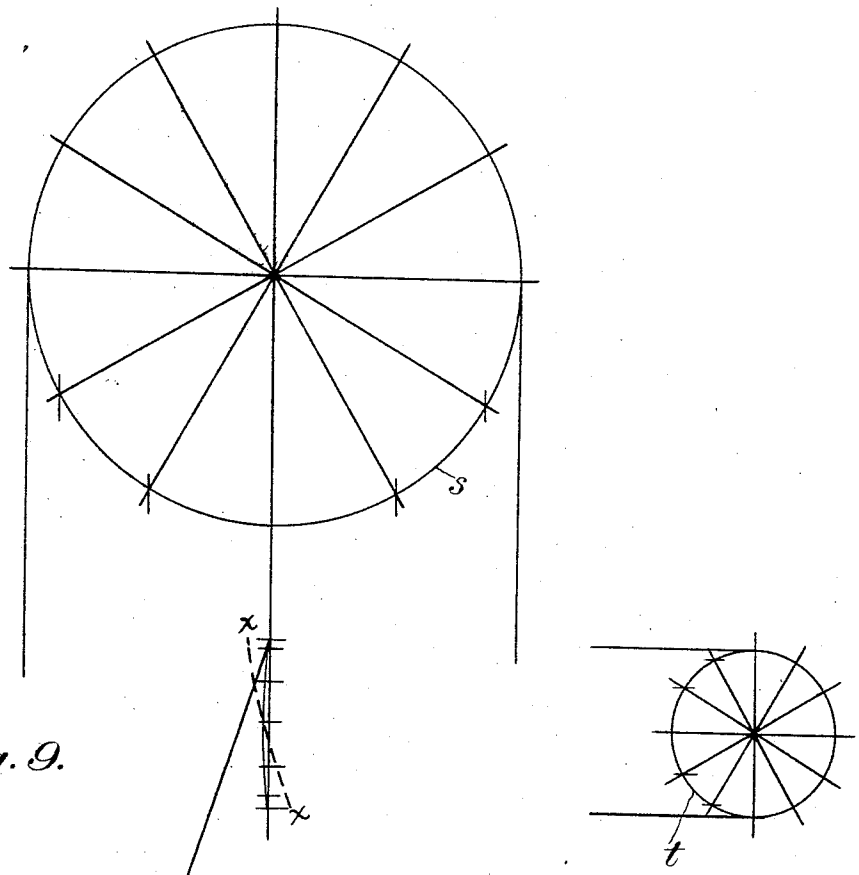


Fig. 9.

Witnesses

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UNITED STATES PATENT OFFICE.

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FEEDING MECHANISM FOR SEWING-MACHINES.

1,144,797. Specification of Letters Patent. **Patented June 29, 1915.**

Application filed March 30, 1903. Serial No. 424,120.

To all whom it may concern:

Be it known that I, DUDLEY S. SEYMOUR, a citizen of the United States, residing at Oak Park, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Feeding Mechanisms for Sewing-Machines, of which the following is a description, reference being had to the accompanying drawing and to the letters and figures of reference marked thereon.

My invention relates to feeding mechanisms, and more especially feeding mechanism adapted to be used in connection with stitch-forming mechanism.

An object of my invention is to provide a feeding mechanism of the four-motion type, which shall have a work-feeding movement practically through the entire stroke of the feed dog, and which work-feeding movement shall also be substantially parallel with the work support.

A further object of my invention is to provide a feeding mechanism which shall receive its vertical or fabric-engaging movements from a swinging link, so disposed and operated as to give a feeding movement to the feed dog, which is substantially parallel with the work support.

Further objects of my invention will in part be obvious and will in part be hereinafter more fully described.

In the drawings, which show by way of illustration one embodiment of my invention, Figure 1 is a front view of a flat bed sewing machine, having my feeding mechanism applied thereto; Fig. 2 is a top plan view of the feeding mechanism and its operating means; Fig. 3 is a detail, partly in section, showing the feed bar and its operating mechanism in side elevation; Fig. 4 is a similar view of the parts in a different position; Fig. 5 is a detail of the means for giving the feed dog its vertical movements; Fig. 6 is a view partly in section, showing my improved feeding mechanism applied to a sewing machine of the end cylinder type; Fig. 7 is a plan view of the feeding mechanism shown in Fig. 6; Fig. 8 is a detail of the feeding mechanism shown in Fig. 6; and Fig. 9 is a diagrammatic view on an enlarged scale, showing the path of movement of the feed dog disclosed in Fig. 6.

It should be understood that my improved feeding mechanism may be used in connection with any type of sewing machine, whether a flat bed machine, a cylinder machine, or any other type of machine, and that in the present embodiment of my invention, said feeding mechanism is shown by way of illustration only in connection with a flat bed and a cylinder machine. It should also be understood that other forms of stitching mechanism may be used in connection with my feeding mechanism and the stitch-forming mechanism herein shown is only by way of illustration.

In Fig. 1, the bed plate 1 has rising therefrom an overhanging arm 2, on which is pivotally mounted a needle lever 3, which is operated from the main shaft 4 by a suitable link 5. At the forward end of the overhanging arm 2 is a needle bar 6, carrying a needle 7, which is suitably connected to the needle lever 3. The presser foot 8 is of the usual construction and will not need further description. Coöperating with a needle underneath the work support is a looper 9, which is pivoted at 10 to a looper support 11. Said looper receives its vibration from link 12, which is pivoted to the needle lever in the usual manner. The feed dog 13 is secured in any suitable manner to a feed-bar 14, which is pivoted at 15 to a swinging frame 16, fulcrumed at 17 on the bed plate 1. Said frame 16 receives its rocking movement through an arm 18, which is pivoted at its forward end to a link 19, connected in turn to a crank pin adjustably secured to the disk 20, carried on the forward end of the shaft 4. This means for rocking the swinging frame 16, and giving to the feed dog its lateral or feeding movements is of the usual construction and will not need further description. It has been customary in this type of machine to mount a three cornered cam on the main shaft directly underneath the feed bar, which cam would give the vertical movements to the feed bar. Considerable disadvantage has been found, however, from using a mechanism of this character, especially on machines working on material containing considerable grit, as the movements of the feed dog would cause the grit to fall upon the feed cam and soon wear away the same, so that a new cam would have to be substituted.

One of the objects of my invention is the doing away of this three-cornered feed cam and substituting therefor a positive link motion, which will give to the feed dog proper feeding movements. To this end, I have formed integral with the feed bar a forwardly and downwardly projecting frame 21, which frame extends underneath the main shaft 4, and is connected to the feed bar near its forward end by a suitable upright supporting leg 22. The forwardly projecting frame 21 in front of the supporting leg 22 is divided, forming two spaced arms 23 and 24. Each of the arms 23 and 24 carries a bearing at its outer end to which are pivotally connected links 25 and 26, respectively. Said links 25 and 26 at their upper ends are pivoted respectively to lugs 27 and 28, carried by the looper support 11. The link 26, as shown in the present embodiment of my invention is forked at each end, and a suitable pivot pin connects said link to the frame, and also to the projecting lug. In the present embodiment of my invention, I have shown the lugs 27 and 28 as formed integral with the looper frame. The looper-supporting frame 11 at its forward end is secured to a stud 29 mounted in a bracket on the work support, and at its other end is secured to a short shaft 30 which extends through brackets 31 and 32 carried by the bed plate 1 and carries a crank arm 33, on its outer end. Said crank arm 33 carries a ball stud 34, at its outer end, which engages a suitable socket in an eccentric strap 35, coöperating with an eccentric 36 on the main shaft 4.

The operation of my device is as follows: The feed bar is moved laterally to feed the fabric by the swinging of the rocking frame 16. The feed bar receives its vertical movements through the combined action of the lateral movements of the feed bar and the swinging movements of the looper support. When the looper support swings about its axis through the action of the eccentric 36 on the main shaft, the lugs carried thereby and connected to the swinging links move the upper end of said swinging links in the arc of a circle about the axis of the looper support. At the same time, the feed bar moves laterally, swinging the lower end of said links. When the parts are in the position shown in Fig. 4, the feed dog is rising above the work support into engagement with the fabric, so as to begin its forward or feeding movement. At this time, that is the beginning of the forward movement the looper-supporting shaft is being rocked by the eccentric 36, to bring the looper into proper position for its forward movement, or in the direction of the arrow, as shown in Fig. 4. As the pivotal point *a* of the swinging link moves backward, the pivotal point *b* is slightly raised, and the resulting movement is a movement of the feed bar or feed dog substantially parallel with the work support. When the pivotal point *a* is substantially under the pivotal point *b*, there is little or no movement of the looper support, but owing to the position of said pivotal points the feed dog will still move in a line substantially parallel to the work support. After the pivotal points above referred to reach the position shown in Fig. 3, the feed dog has practically completed its forward movement, and the looper support is now oscillated in the opposite direction to give a needle-avoiding movement to the looper. At this time the pivotal point *a* is substantially under the pivotal point *b*, and as the looper support swings in the direction of the arrow Fig. 3, it will be seen that the feed dog will be quickly lowered beneath the work support. It will, therefore, be seen that the looper support with the arm for operating the same, and also the projecting arms to which the links are attached, form a lever, the axis of which is the axis of the looper support, which lever operates to give the feed dog its rising and falling movements.

In Fig. 9 I have shown on an enlarged scale the path of movement of the feed dog in my cylinder machine. The path of movement of the feed dog in a flat bed machine, would be practically the same, the only difference being that the upper end of the link in the flat bed machine moves in the arc of a circle, as indicated in the dotted lines *x*—*x* in said figure. This direction of movement, however, has little or no effect upon the path of movement of the feed dog.

In the modification shown in Fig. 6, the work support 37 has a forwardly projecting cylindrical bed plate 38. The feed dog 39 is mounted in any suitable way on the forward end of the feed bar 40. Said feed bar 40 is supported at its forward end by a lever 41, pivoted at 42 to the work support. Said lever at its forward end is forked, providing spaced arms 43 and 44. The arm 44 carries a swinging link 45, which is pivoted thereto at 46, while the arm 43 carries a swinging link 47 secured thereto by a pivot pin 48. The feed bar 40 is preferably cut away centrally, so as to lighten the same, and near its forward end said feed bar carries a downwardly projecting curved arm 49, which, as shown in the present embodiment of my invention is formed integral with said feed bar. The downwardly projecting arm 49, extends between the spaced arms 43 and 44, and carries a bearing 50 at its forward end, in which is located a short shaft 51, to the outer ends of which are secured the links 45 and 47. The lever 41 at its rear end carries a ball stud 51ª, to which is connected an eccentric strap 52, coöperating with an eccentric carried by the main shaft 53. The

feed bar 40, near its rear end is cut out, forming a rectangular slot 54, which receives a flat pin 55, having its outer ends rounded to engage suitable bearings in the bed plate, so that said pin may turn freely therein. A plate 56 is secured to the feed bar 40, and serves as a means to retain the flat pin 55 in the recess 54. Said pin 55 serves as a means for supporting the rear end of the feed dog, and it will be obvious that said feed dog may be moved laterally and turned about the axis of said pin 55. As a means for reciprocating the feed bar 40, I have provided the rear end thereof with a stud 57, to which is secured a link 58. The opposite end of the link 58 engages a pin 59, adjustably mounted in a slot 60, in one arm of a rock lever 61, pivoted at 62 to the bed plate. The other arm of the rock lever 61 carries a ball stud 63, which engages an eccentric strap 64, coöperating with an eccentric 65 on the main shaft 53. As the shaft 53 rotates, the rock lever 61 will be oscillated and impart to the feed bar lateral or feeding movements. At the same time, the eccentric strap 52 is reciprocated, which vibrates the lever 41, and gives to the upper end of the links 45 and 47 a substantially vertical movement. The combined action of the lateral movements of the feed bar 40 and the up and down movements of the links 45 and 47, produce a movement in the feed dog which is substantially parallel with the work support during the entire feeding movements, as shown in Fig. 9, wherein the work support is indicated by the line *z*—*z*. In this Fig. 9, the circle *s* indicates the travel of the feed dog, while the circle *t* indicates the lift of the feed dog and the curved line *p* indicates the path of movement of a point in the feed dog. In view of the diagrammatic view given, it is not thought that further description of the operation of the feeding mechanism shown in these figures is necessary.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A feeding mechanism including in combination, a work support, a feed dog, a feed bar carrying said feed dog and having an arm provided with spaced outer ends, means for giving said feed bar movements to feed the fabric, means to move the feed bar to carry the feed dog into and out of engagement with the fabric including parallel links disposed on opposite sides of the line of feed and at their lower ends connected with said outer ends of the arm, and means for supporting said links and moving the same up and down.

2. A feeding mechanism including in combination, a work support, a feed dog, a feed bar having an arm provided with spaced outer ends, means for giving said feed dog movements to feed the fabric, means to move said feed dog into and out of engagement with the fabric, including spaced parallel links pivoted to the outer spaced ends of the arm carried by said feed bar and disposed on opposite sides of the line of feed, a lever having arms to which said links are pivoted at their upper ends.

3. A feeding mechanism including in combination, a work support, a feed dog, a feed bar, an arm carried by said feed bar and projecting downwardly and forwardly therefrom, the forward end of said arm being forked, links pivoted at their lower ends to said forked arm and disposed on opposite sides of the line of feed, and a lever to which said links are pivoted at their upper ends.

4. A feeding mechanism including in combination, a work support, a feed dog, a feed bar, an arm carried by said feed bar and projecting downwardly and forwardly therefrom, and having its forward end forked, a lever, the axis of which is substantially perpendicular to the plane of movement of the feed dog, said lever having spaced arms, links pivoted at the lower ends to the forked end of the arm on said feed bar, and at their upper ends to the arms of said lever.

5. The combination of a main shaft, a feeding mechanism including a feed rocker, means for oscillating the same from said shaft, a feed bar pivoted at one end to said feed rocker, a feed dog carried by said feed bar, a looper support extending in a direction substantially at right angles to the plane of movement of the feed bar, means for oscillating said looper support, a looper mounted on said looper support, means for oscillating said looper and means operated by said looper support and connected to the other end of the feed bar for giving said feed bar its rising and falling movements.

6. The combination of a main shaft, a feeding mechanism including a feed rocker, means for oscillating the same from said main shaft, a feed bar pivoted at one end to said feed rocker, a feed dog carried by said feed bar, a looper support extending in a direction substantially at right angles to the plane of movement of the feed bar, a looper mounted on said looper support, means for oscillating said looper, means for oscillating said looper support from said main shaft, a link connecting said looper support to the other end of said feed bar, whereby the oscillation of said looper support will give the rising and falling movements to said feed bar.

7. The combination of a main shaft, a feeding mechanism including a feed rocker, means for oscillating said feed rocker from said shaft, a feed bar pivoted at one end to said feed rocker, a feed dog carried by said feed bar, said feed bar having an arm extending downwardly and forwardly, there-

from, a looper support extending substantially at right angles to the plane of movement of the feed bar, a link pivoted at its lower end to said arm and at its upper end to the looper support, a looper mounted on said looper support, means for oscillating the looper, and means for oscillating the looper support.

8. The combination of a looper, a looper support, means for oscillating said looper support, a feeding mechanism including a feed dog, a feed bar, said feed bar having a downwardly and forwardly projecting arm, said arm being forked at its forward end, links pivoted at their lower ends to said forked arm, said looper support having spaced arms to which said links are pivoted at their upper ends.

9. The combination of a feeding mechanism including a feed dog, a feed bar, an arm carried by said feed bar projecting downwardly and forwardly therefrom, said arm being forked at its forward end to form spaced members, a looper support having its axis perpendicular to the plane of movement of said feed dog, said looper support having spaced arms, links pivoted to the spaced arms on said looper support, and to said spaced members, a looper carrier pivoted to said looper support between said spaced arms, and means for oscillating said looper carrier.

10. The combination of a main shaft, a feed dog, a feed bar carrying said feed dog, a rocking frame to which said feed bar is pivoted, means for oscillating said rocking frame from said main shaft, said feed bar carrying an arm which projects downwardly beneath the main shaft and forward of the same, a looper support parallel with said main shaft, means for oscillating said looper support from said main shaft, and a link connected to said arm carried by said feed bar and to said looper support.

11. A sewing machine including in combination, a needle, a looper, a looper support, means for giving said looper loop-taking and loop-leaving movements on said support, a feeding mechanism including a feed bar, means for moving the feed bar back and forth, a feed dog carried by said feed bar, means for connecting the feed bar to the looper support, and means for operating said looper support to give said looper its needle-avoiding and to give said feed bar its rising and falling movements.

12. In a sewing machine, a needle, a looper, means for giving said looper loop-taking and loop-leaving movements, means to give said looper a needle-avoiding movement, a feeding mechanism including a feed dog, a feed bar supporting said feed dog, means for moving said feed bar to give said feed dog its feeding movements, and means operated by said means for giving the looper its needle-avoiding movement for moving the feed dog into and out of engagement with the fabric.

13. In a sewing machine, a needle, a looper, a looper support on which said looper is pivoted, means for swinging said looper on its pivot into and out of the needle loop, means for oscillating said looper support for giving said looper a needle-avoiding movement, a feed dog, and means connected with said oscillating looper support for giving said feed dog one of its movements.

14. In a feeding mechanism, a main shaft, a feed dog, a bar for supporting said feed dog, a vibrating part upon which said feed dog is pivoted, said feed bar being formed of two forwardly projecting arms connected by a cross bar, said cross bar being located between the pivotal point of the feed bar and the main shaft, whereby it can be removed without removal of the main shaft and means connected with one of said arms for raising and lowering said feed bar.

15. A feeding mechanism for sewing machines, including in combination, a feed dog, a feed bar, means for giving said feed dog lateral movements, and means for giving said feed dog up and down movements, including a swinging arm, and a link curved on the arc of a circle connecting said arm to said feed bar.

16. In a sewing machine the combination of a looper mechanism, including a looper supporting member, a feeding mechanism, including a vibrating part, a feed bar pivoted thereto, and means for pivoting said feed bar to said looper support, whereby said looper support may impart to said feed bar a rising and falling movement.

17. In a sewing machine, the combination of a looper mechanism including a rocking frame, a rocking member carried by said frame, a looper supported by said rocking member, and a feeding mechanism including a feed dog, a rocking frame connected to said feed dog, the direction of movement of the looper supporting member and the rocking frame being opposite to one another.

18. In a sewing machine, a looper mechanism including a looper support, a looper pivoted to said looper support, means for vibrating said looper on said support, means for vibrating said looper support, a feeding mechanism including a feed bar, a vibrating part to which said feed bar is connected, an arm carried by said feed bar, an arm carried by said looper support, and a link for pivotally connecting said arms.

19. In a sewing machine, the combination of a main shaft, an oscillating support located adjacent said shaft, means for oscillating said support from said shaft, a looper pivotally supported on said support, a feeding mechanism including a feed bar, a vibrating part to which said feed bar is pivot-

ed, an arm carried by said feed bar and extending underneath said shaft and said oscillating support for the looper, an arm carried by the looper support and a link for connecting said arms.

20. A sewing machine including in combination, a main shaft, a looper support located adjacent said main shaft, means for oscillating said support from said shaft, a looper pivoted to said support, means for vibrating said looper on its pivot, a feeding mechanism including a rocking frame, a feed bar pivoted to said rocking frame, means for rocking said frame from said shaft, an arm carried by said feed bar, extending underneath said shaft, and a looper support, an arm carried by the looper support, and a link for connecting said arms.

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

DUDLEY S. SEYMOUR.

Witnesses:
C. McNeil,
R. Taubert.