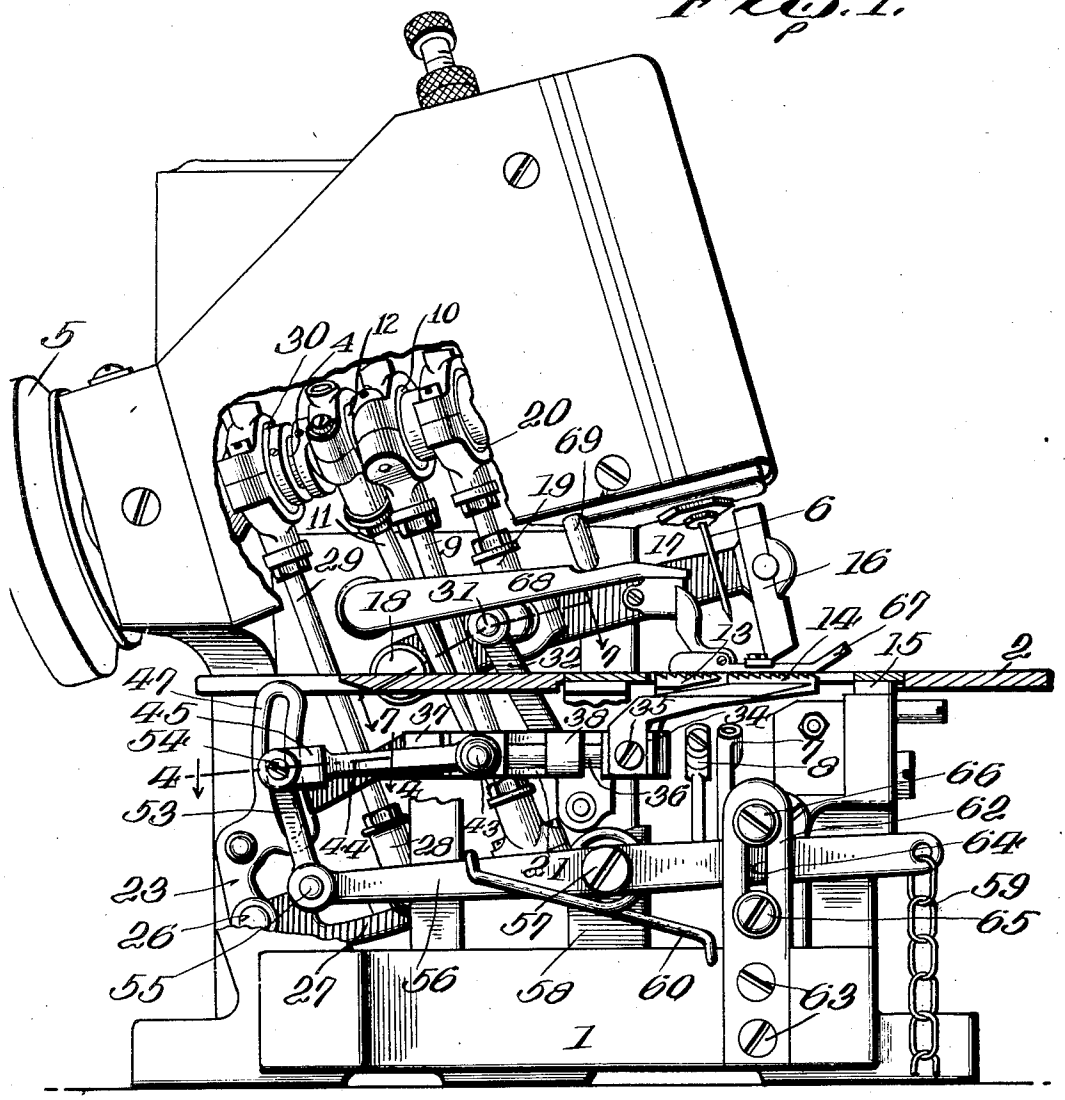
July 30, 1935. G. SAUER 2,009,747

SEWING MACHINE

Filed Aug. 2, 1932 4 Sheets-Sheet 1

Fig. 1.



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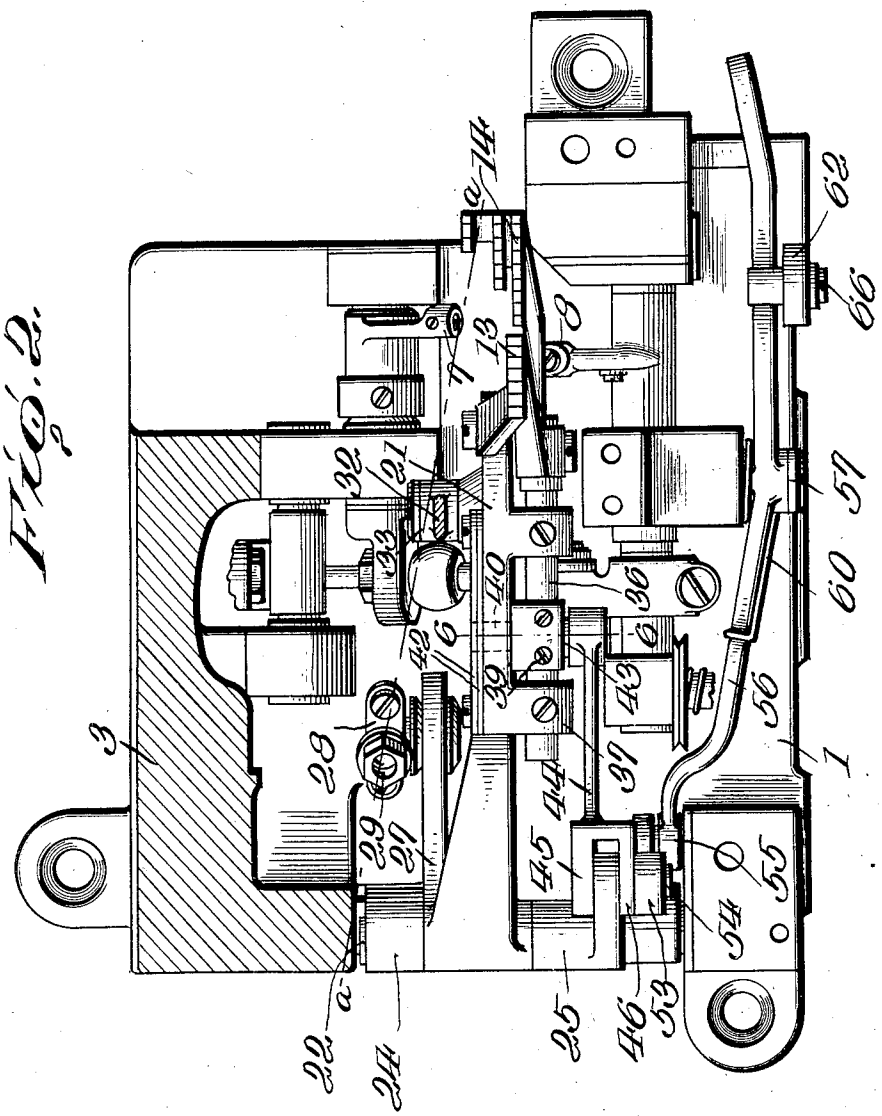
SEWING MACHINE

Filed Aug. 2, 1932 4 Sheets-Sheet 2

FIG. 2.



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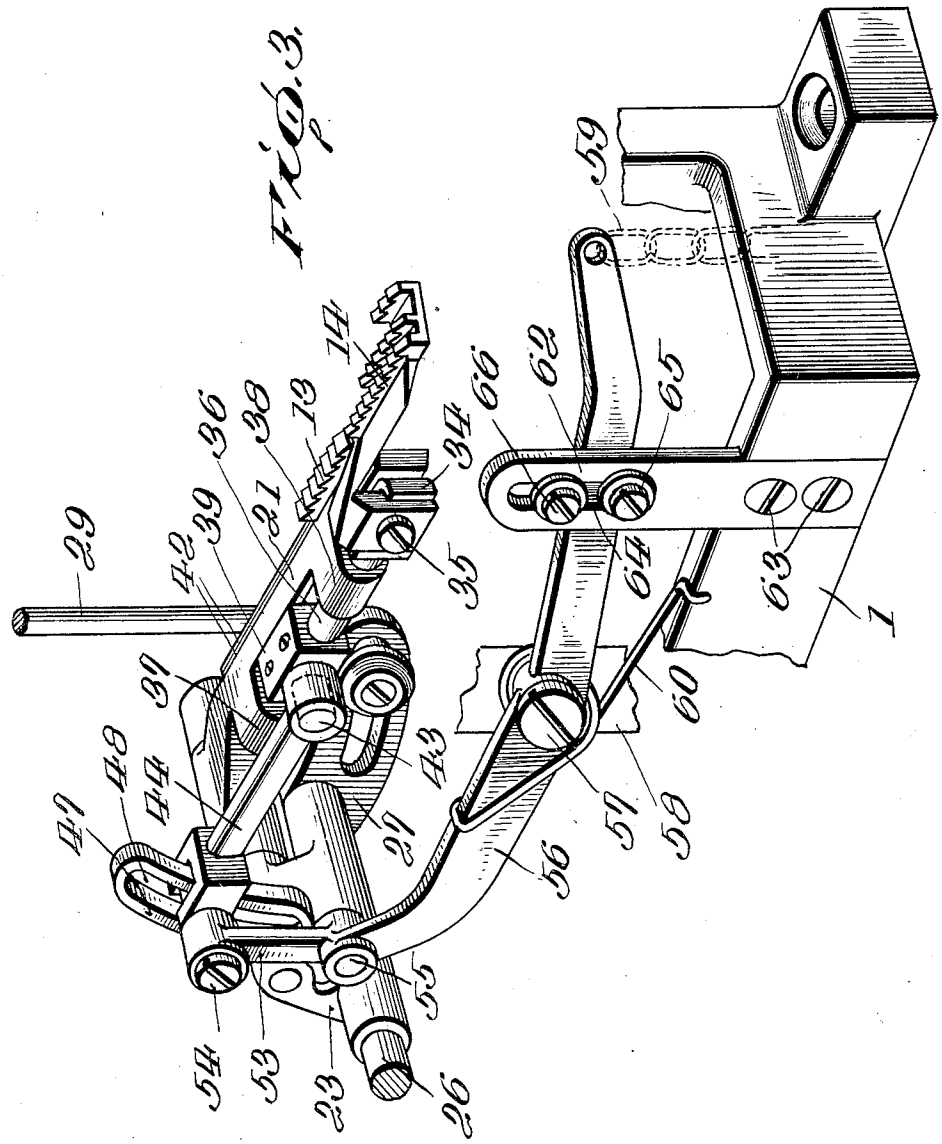
SEWING MACHINE

Filed Aug. 2, 1932 4 Sheets-Sheet 3

Fig. 3.



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SEWING MACHINE

Filed Aug. 2, 1932 4 Sheets-Sheet 4

FIG. 4.

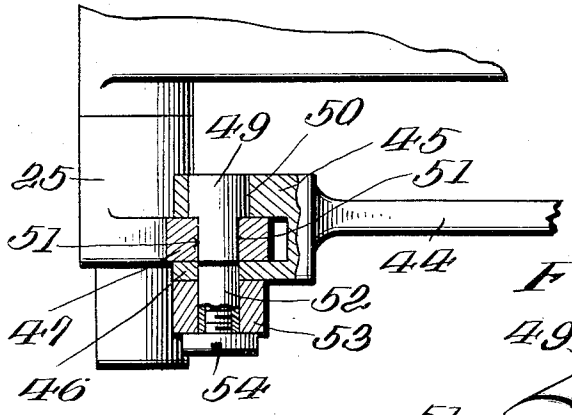


FIG. 5.

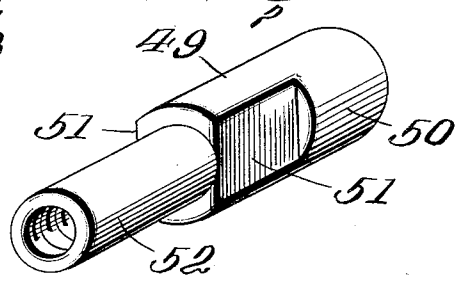


FIG. 7.

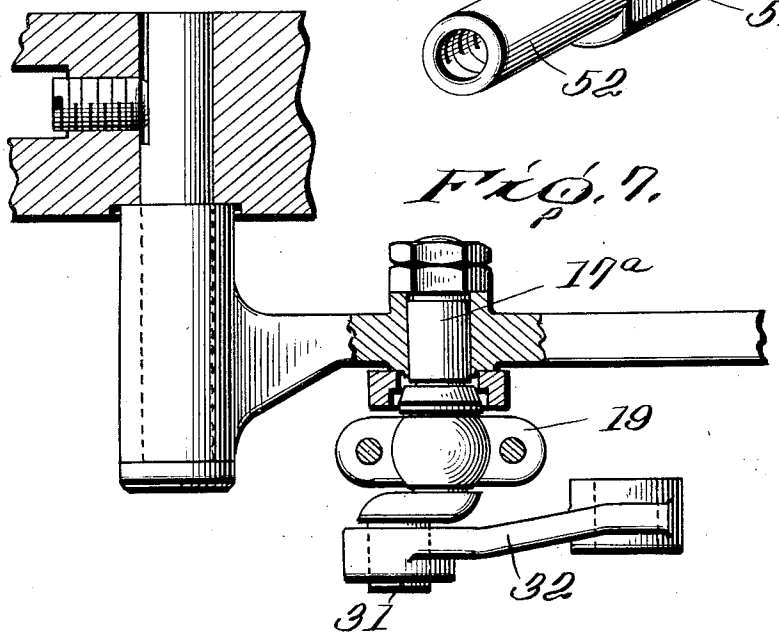
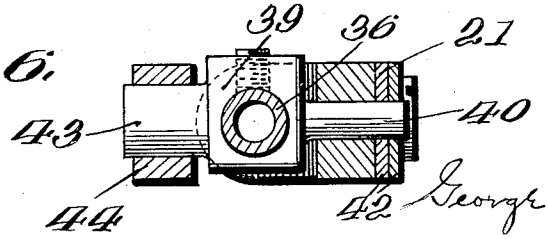


FIG. 6.



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Patented July 30, 1935 2,009,747

UNITED STATES PATENT OFFICE

2,009,747

SEWING MACHINE

George Sauer, Berwyn, Ill., assignor to Union Special Machine Company, Chicago, Ill., a corporation of Illinois

Application August 2, 1932, Serial No. 627,234

8 Claims. (Cl. 112—209)

The invention relates to new and useful improvements in a sewing machine, and more particularly to a treadle controlled differential feeding mechanism which is particularly adapted for use in connection with the overedging machine of the type shown in the patent granted Norman V. Christensen and Frederick F. Zeier, March 25, 1930, No. 1,751,508. In this type of machine, the main shaft is located above the work support and extends in the general direction of the line of feed. The parts beneath the work support are operated by eccentric straps cooperating with eccentrics on the main shaft and extending beneath the work support. The work support terminates at a short distance from the line of feed, so as to provide room for the operation of the eccentric straps. This greatly restricts the space in which the feeding mechanism beneath the work support may be located.

An object of the present invention is to provide a machine of the above type with a differential feeding mechanism and a treadle controlled means for regulating the length of the feed stroke of the auxiliary feed dog, all of which can be placed beneath the work support.

A further object of the invention is to provide a differential feeding mechanism of the above type, with a means for regulating the throw of the auxiliary feed dog, which includes positive connections and few parts.

In the drawings—

Figure 1 is a view partly in section and partly in side elevation showing a machine embodying the invention;

Fig. 2 is a view partly in plan and partly in section showing the parts immediately beneath the work support, the loopers and parts of the operating devices therefor being omitted for the sake of clearness, and the outline of the work support being indicated in broken lines;

Fig. 3 is a view in perspective showing the differential feeding mechanism and the treadle control therefor;

Fig. 4 is a sectional view on the line 4—4 of Fig. 1;

Fig. 5 is a perspective view of the coupling pin joining the operating link for the differential feed dog to the bracket on the feed rocker;

Fig. 6 is a sectional view on the line 6—6 of Fig. 2, and

Fig. 7 is a horizontal sectional view showing the pin connecting the eccentric strap to the trimmer lever and the feed bar.

The invention is shown as applied to a sewing machine which includes a supporting bed 1 carrying the usual supporting brackets on which the work support 2 is mounted. Attached to said bed and located at one side of the work support is a standard 3. Mounted for rotation on the standard 3 is a main actuating shaft 4 driven by a belt wheel 5. The needle bar reciprocates in a needle head carried by the bracket and is provided with a needle 6. Cooperating with the needle beneath the work support is a looper which is mounted in a looper carrier 7. Cooperating with the looper beneath the work support and the needle above the work support, is a looper mounted in a carrier 8. The stitch forming mechanism is of the character shown in the patent granted Frederick F. Zeier and Charles F. Rubel, June 21, 1932, No. 1,864,393. The looper cooperating with the needle beneath the work support is actuated by an eccentric strap 9 cooperating with an eccentric 10 on the main shaft 4. The looper which moves over the work support is operated by an eccentric strap 11 cooperating with an eccentric 12 on the main shaft.

The material is fed to the needle by a feeding mechanism which includes a main feed dog 13 and an auxiliary feed dog 14. These feed dogs operate through a throat plate 15 carried by the work support 2. The work support, as shown in Fig. 2, terminates adjacent one side of the feed line which is determined by the feed dogs 13 and 14. The machine is particularly designed for operating at the edge of a fabric, and as shown, the machine is provided with an overedging mechanism.

Operating on the material in advance of the stitching point is a trimming blade 16 carried by a lever 17 which is pivoted at 18. The lever 17 is provided with a stud 17a carrying a ball with which the eccentric strap 19 is connected. This eccentric strap 19 cooperates with an eccentric 20 on the main shaft. The main feed dog 13 is rigidly attached to a feed bar 21 which extends to the rear side of the machine and is pivotally mounted on a pin 22 carried by the feed rocker 23 carrying sleeves 24 and 25 in which the pin is fixed. The feed rocker 23 is pivotally mounted on a pin 26 journaled in lugs on the bed 1. This feed rocker 23 carries a forwardly projecting arm 27 which is provided with a ball stud 28. An eccentric strap 29 is connected to the ball stud 28 and cooperates with an eccentric 30 on the main shaft. This provides a means whereby the main feed bar is moved back and forth, imparting a feeding movement to the main feed dog 13.

The stud 17a carries a pin 31, the center of

which is located nearer the pivotal support 18 for the lever 17 than the center of the stud 17a. A link 32 is connected to this pin 31 and to a pin 33 attached to the feed bar 21. When the lever 17 is raised and lowered for the trimming of the fabric, the feed bar is also raised and lowered, but the up and down movements imparted to the feed bar are less than the reciprocating movements of the trimmer. The feed dog carried by the feed bar moves into engagement with the fabric and lifts the same, while the trimming blade passes through and cuts the fabric. This provides a means whereby ample trimming stroke may be given to the trimming blade without imparting an excessive stroke to the feed bar for raising and lowering the feed dog.

The auxiliary feed dog 14 is secured to a bracket 34 by means of a screw 35. This bracket 34 is attached to the forward end of the auxiliary feed bar 36. This auxiliary feed bar 36 is cylindrical in shape, and is mounted for reciprocation in spaced lugs 37 and 38 carried by the main feed bar. Located on the auxiliary feed bar between the spaced lugs 37 and 38 is a block 39. The block 39 carries a pin 40 which extends through a slot in the main feed bar 21. This main feed bar carries guide plates 42, 42, between which the pin 40 is guided. The purpose of this pin and the guide plates is to maintain the auxiliary feed bar horizontal and prevent any angular or twisting movement of the auxiliary feed bar in the supporting lugs therefor. The block 39 is provided with a pin 43 with which a link 44 is connected. This link imparts reciprocations to the auxiliary feed bar. This particular mounting for the auxiliary feed bar and the operating connection thereof forms no part of the present invention per se, but is shown, described and claimed in the application of Frederick F. Zeier and Clarence C. Smith, filed November 5, 1930, Serial No. 493,648.

The link 44 is provided with forks 45 and 46 which are spaced and receive therebetween a bracket arm 47 formed integral with the feed rocker 23. This bracket arm is provided with a slot 48. A pin 49 having a cylindrical head 50 and a flat-sided portion 51, and also a cylindrical portion of reduced diameter 52, serves as a connecting means between the forked end of the link 44 and this bracket arm 47. The cylindrical portion 50 of the pin is housed within the fork 45, the flat-sided portion 51 of the pin is housed within the bracket, and the reduced cylindrical portion 52 extends through the fork 46 and projects therefrom.

A link 53 is pivotally connected to the projecting portion of the pin at its upper end, and is secured to the pin by a screw 54 threaded into the end of the pin. The lower end of the link 53 is pivoted at 55 to a lever 56. The lever 56 is mounted on a fulcrum support 57 carried by a bracket 58 attached to the bed of the machine. The lever lies beneath the work support and extends to the front of the machine. A flexible chain or the like 59 is connected to the free end of the lever, and to a suitable treadle or knee shift for operating said lever. A spring 60 encircles the fulcrum support for the lever and bears at one end against the bed and at its other end against the lever, and normally tends to turn the lever in a counter-clockwise direction as viewed in Fig. 1. The bracket 62 secured by screws 63, 63 to the bed of the machine, extends up alongside of the lever 56. This bracket is slotted at 64, and is provided with two stop lugs 65 and 66, one above and the other below the free end of the lever 56. These studs may be shifted in the slot to different set positions. When the treadle is released, the free end of the lever will be raised by the spring until the lever contacts with the lug 66. This will place the pin 49 to which the link 44 is attached at a definite set position in the slot in the bracket arm 47. When the treadle is depressed, and the free end of the lever moves into contact with the stop lug 65, and the pin 49 will be raised in the slot 48 of the bracket arm 47. This will increase the throw of the auxiliary feed dog. By shifting these stop lugs, the desired throw of the auxiliary feed dog relative to the main feed dog may be obtained. When the pin 49 is at the lower end of the slot, the connection of the link 44 is so nearly in alinement with the pivotal connection between the main feed bar and the feed rocker, that the feed dogs will move substantially in unison. By depressing the treadle without stopping the machine, the stroke of the auxiliary feed dog may be increased, and when the treadle is released, the stroke of the auxiliary feed dog will be shortened.

Cooperating with both the main and the auxiliary feed dog is a presser foot 67 carried by a lever 68 pivotally supported on the standard. Said presser foot is yieldingly moved into contact with the material by a plunger 69 which is spring-pressed.

From the above it will be noted that the main feed shaft extends in the general direction of the line of feed, although at an acute angle thereto. The axis of the main shaft lies substantially in the line *a*, *a* of Fig. 2, while the feed is in the direction of the arrow shown in this figure. The work support terminates at a short distance from the line of feed. The machine is particularly designed for stitching along the edge of a fabric, and therefore, it is not necessary to extend the work support any great distance to the right of the trimming line, as viewed from the front of the machine. The operating eccentric straps for the part beneath the work support pass down along the side of the work support. The feeding mechanism is all beneath the work support and consists of very few parts positively connected. The control lever for the auxiliary feed dog is likewise beneath the work support. By this simplified arrangement of the control means and the operating parts for the auxiliary feed dog, a feeding mechanism has been provided for this particular type of machine, so that a differential feeding action may be obtained whenever desired.

It is obvious that minor changes in the arrangement of parts and the details of construction may be made without departing from the spirit of the invention as set forth in the appended claims.

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

1. A sewing machine comprising in combination a supporting bed, a work support carried thereby, a standard at one side of said work support, a main shaft mounted on said standard and extending in the general direction of the line of feed, a differential feeding mechanism located beneath the work support and including a main feed bar, a main feed dog carried thereby, an auxiliary feed bar, an auxiliary feed dog carried thereby, means for reciprocating said feed dogs and imparting to the auxiliary feed dog a differ-

ential movement including a shiftable link for varying the throw of the auxiliary feed dog, said means being operated from said main shaft above the work support, means operated from said main shaft for raising and lowering said feed bar, and treadle-controlled means located beneath the work support for varying the stroke of the auxiliary feed dog including a lever pivoted intermediate its ends and having a direct connection at one end to said shiftable link and at its other end to a treadle.

2. A sewing machine comprising in combination supporting bed, a work support carried thereby, a standard at one side of said work support, a main shaft mounted on said standard and extending in the general direction of the line of feed, a differential feeding mechanism located beneath the work support and including a main feed bar, a main feed dog carried thereby, an auxiliary feed bar, an auxiliary feed dog carried thereby, means operated from said main shaft for raising and lowering said feed bar, a feed rocker to which said main feed bar is connected, means operated by the main shaft and connected to said feed rocker for oscillating the same, a bracket arm carried by the feed rocker, a link having a shiftable connection with the bracket arm and connected to the auxiliary feed bar for reciprocating the same, and a treadle-controlled means located beneath the work support for varying the stroke of the auxiliary feed dog, including a lever pivoted intermediate its ends and connected at one end to said shiftable link and at its other end to a treadle.

3. A sewing machine comprising in combination a supporting bed, a work support carried thereby, a standard at one side of said work support, a main shaft mounted on said standard and extending in the general direction of the line of feed, a differential feeding mechanism located beneath the work support and including a main feed bar, a main feed dog carried thereby, an auxiliary feed bar, an auxiliary feed dog carried thereby, means operated from said main shaft for raising and lowering said feed bar, a feed rocker to which said main feed bar is connected, means operated by the main shaft and connected to said feed rocker for oscillating the same, a bracket arm carried by the feed rocker, a link having a shiftable connection with the bracket arm and connected to the auxiliary feed bar for reciprocating the same, a lever mounted beneath the work support to one end of which the treadle is adapted to be connected, and a link connected to the other end of said lever and operating to shift the actuating link for the auxiliary feed bar to different set positions on the bracket arm.

4. A sewing machine comprising in combination a supporting bed, a work support carried thereby, a standard at one side of said work support, a main shaft mounted on said standard and extending in the general direction of the line of feed, a differential feeding mechanism located beneath the work support and including a main feed bar, a main feed dog carried thereby, an auxiliary feed bar, an auxiliary feed dog carried thereby, means operated from said main shaft for raising and lowering said feed bar, a feed rocker to which said main feed bar is connected, an arm projecting from said feed rocker, means actuated by the main shaft and connected to said arm for oscillating the feed rocker, a slotted bracket arm carried by the feed rocker, a link pivoted to the auxiliary feed bar and having a forked end straddling the bracket arm, a pin extending from said forked end of the link and through the slot in said bracket arm, a link connected to said pin, and a lever to one end of which said last-named link is connected at the other end, the other end of said lever being adapted to be connected to a treadle whereby said lever may be manually shifted to move the pin to different set positions on the bracket arm for varying the throw of the auxiliary feed dog.

5. A sewing machine comprising in combination a supporting bed, a work support carried thereby, a standard at one side of said work support, a main shaft mounted on said standard and extending in the general direction of the line of feed, a differential feeding mechanism located beneath the work support and including a main feed bar, a main feed dog carried thereby, an auxiliary feed bar, an auxiliary feed dog carried thereby, means operated from said main shaft for raising and lowering said feed bar, said main feed bar having spaced lugs in which said auxiliary feed bar is mounted for reciprocation, means for preventing said auxiliary feed bar from oscillating in said lugs, a link pivoted to the auxiliary feed bar intermediate said spaced lugs, a feed rocker to which said main feed bar is pivotally connected, a slotted bracket arm carried by the feed rocker to which said link is shiftably connected, and treadle-controlled means for shifting said link to different set positions.

6. A sewing machine comprising in combination a supporting bed, a work support carried thereby, a standard at one side of said work support, a main shaft mounted on said standard and extending in the general direction of the line of feed, a differential feeding mechanism located beneath the work support and including a main feed bar, a main feed dog carried thereby, an auxiliary feed bar, an auxiliary feed dog carried thereby, means operated from said main shaft for raising and lowering said feed bar, said main feed bar having spaced lugs in which said auxiliary feed bar is mounted for reciprocation, means for preventing said auxiliary feed bar from oscillating in said lugs, a link pivoted to the auxiliary feed bar intermediate said spaced lugs, a feed rocker to which said main feed bar is pivotally connected, a slotted bracket arm carried by the feed rocker to which said link is shiftably connected, a lever located beneath the work support and adapted to be connected to a treadle, and a link connected to said lever and to the first-named link for shifting the connection thereof to the bracket arm to different set positions.

7. A sewing machine comprising in combination a supporting bed, a work support carried thereby, a standard at one side of said work support, a main shaft mounted on said standard and extending in the general direction of the line of feed, a differential feeding mechanism located beneath the work support and including a main feed bar, a main feed dog carried thereby, an auxiliary feed bar, an auxiliary feed dog carried thereby, means operated from said main shaft for raising and lowering said feed bar, said main feed bar having spaced lugs in which said auxiliary feed bar is mounted for reciprocation, means for preventing said auxiliary feed bar from oscillating in said lugs, a link pivoted to the auxiliary feed bar intermediate said spaced lugs, a feed rocker to which said main feed bar is pivotally connected, a slotted bracket arm carried by the feed rocker to which said link is shiftably connected, a lever located beneath the work support and adapted to be connected to a treadle,

a link connected to said lever and to the first-named link for shifting the connection thereof to the bracket arm to different set positions, a spring for moving said lever in one direction, and spaced stop lugs for limiting the movement of said lever and for determining the set position of the connection between the link and the bracket arm.

8. A sewing machine comprising in combination a supporting bed, a work support carried thereby, a main feed bar located beneath the work support, a feed dog carried thereby, means for raising and lowering said main feed bar, a feed rocker to which said main feed bar is connected for imparting feeding movements to the feed dog, an auxiliary feed bar, means for raising and lowering said auxiliary feed bar in timing with said main feed bar, means connecting said auxiliary feed bar to said feed rocker for moving said auxiliary feed bar endwise and imparting feeding movements to the auxiliary feed dog including a shiftable link whereby the extent of movement imparted to the auxiliary feed dog may be varied, a lever located beneath the work support and extending from a point adjacent the feed rocker to a point adjacent the front of the machine, means for pivotally supporting the lever intermediate its ends, means for directly connecting the rear end of said lever to said link for shifting the same and a flexible means connected to the other end of said lever and adapted to be connected to a treadle whereby said lever may be shifted.

GEORGE SAUER.