

June 17, 1969

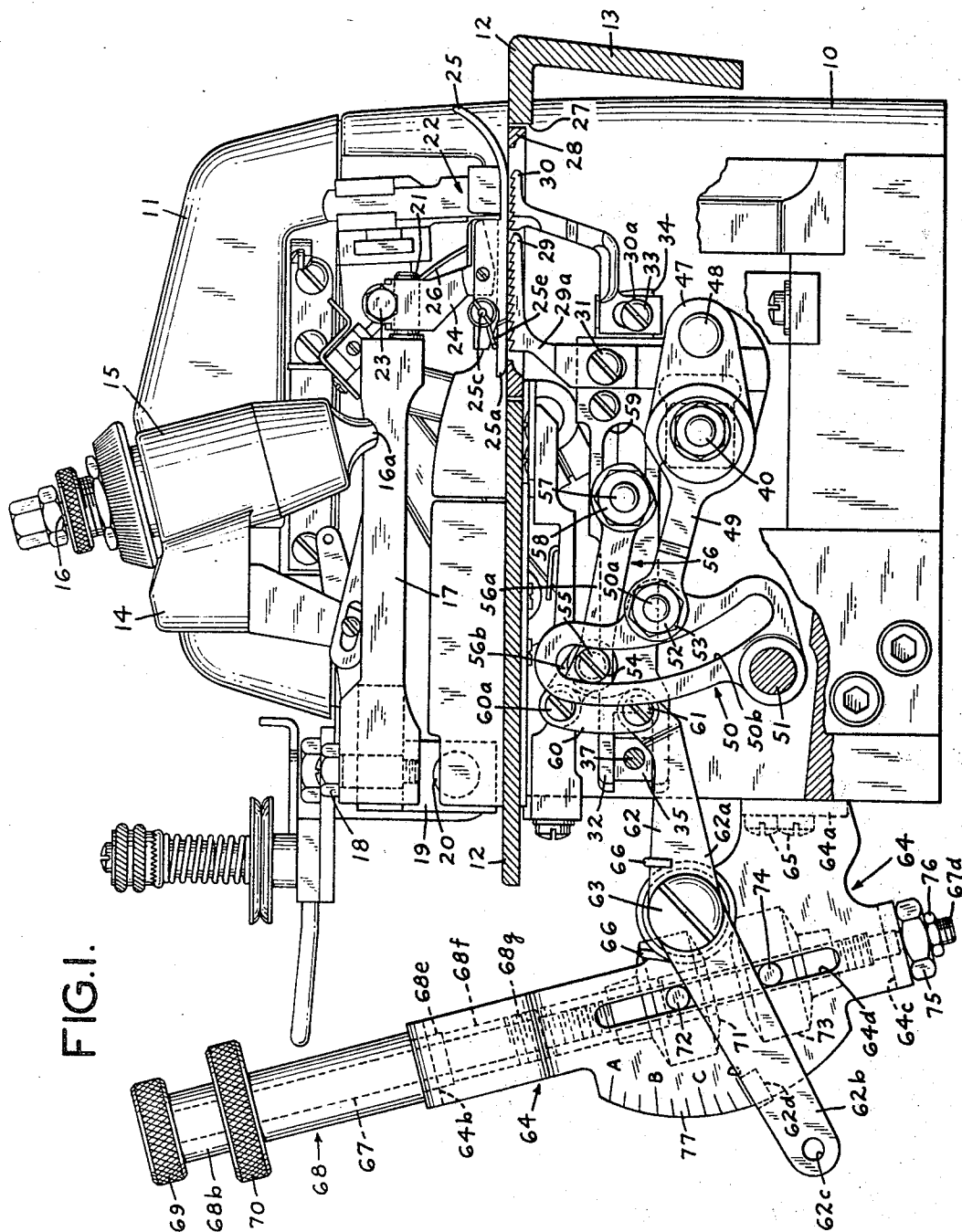
R. H. LUKIN

3,450,079

FEED STROKE ADJUSTING MECHANISM FOR SEWING MACHINES

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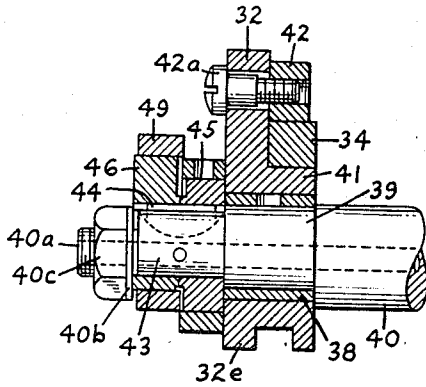


FIG. 4.

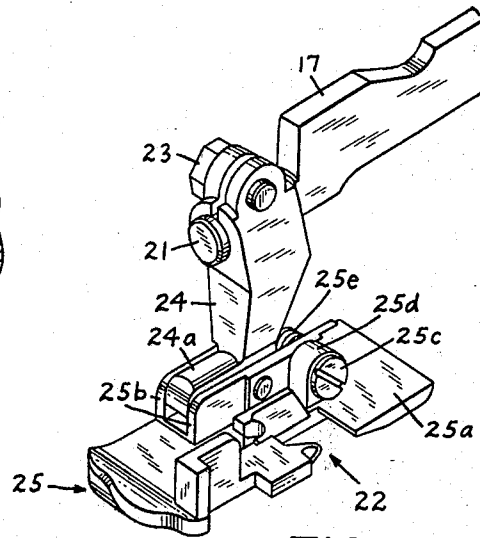


FIG. 2.

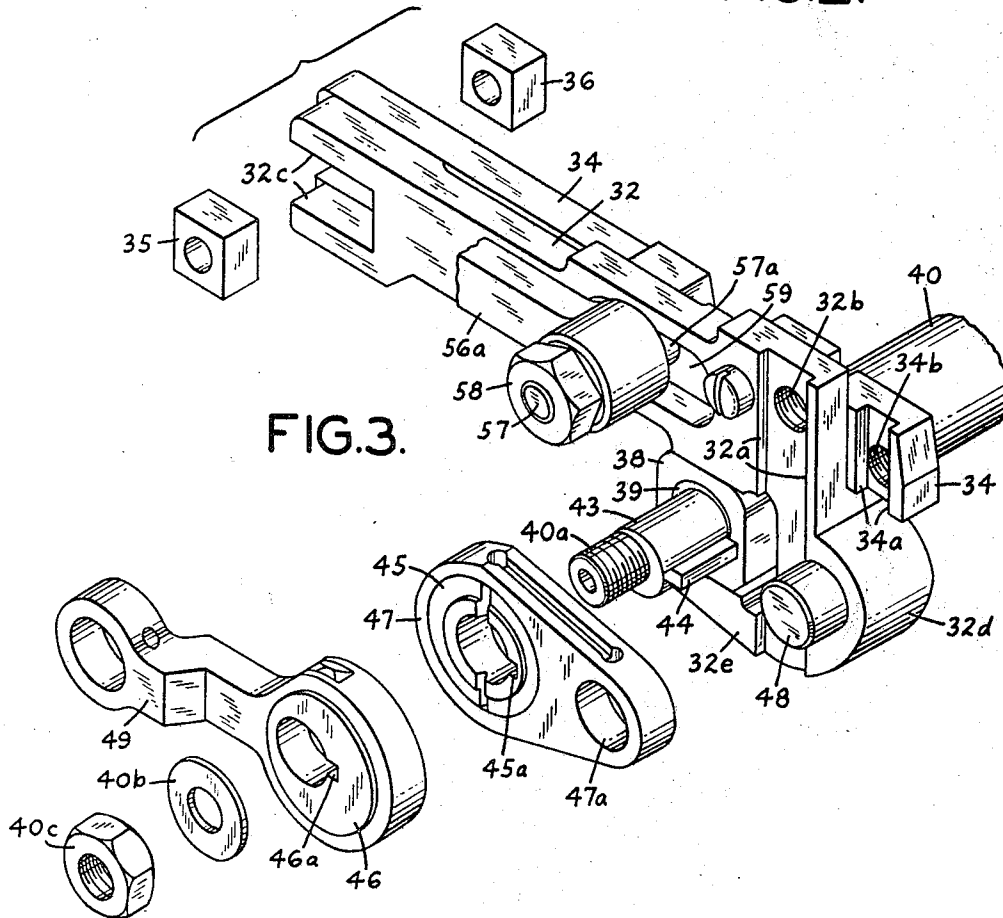


FIG. 3.

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FIG. 5.

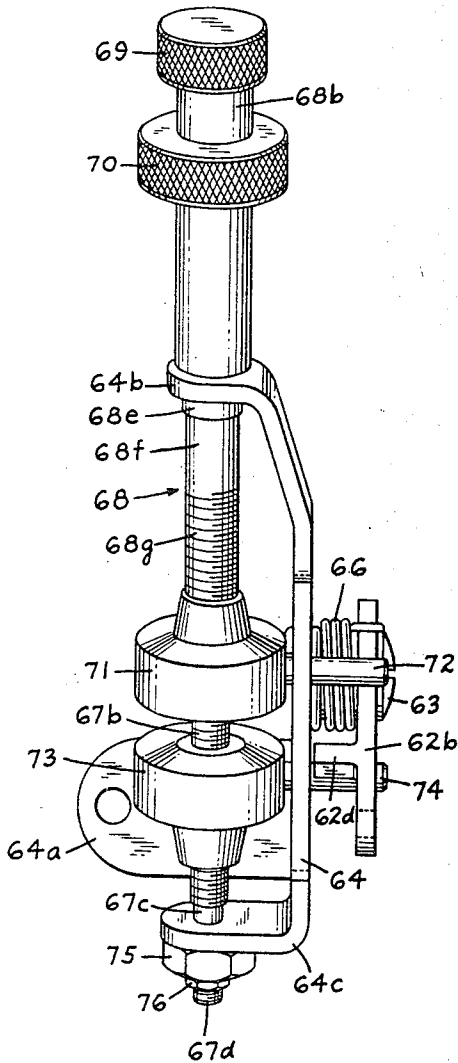


FIG. 7.

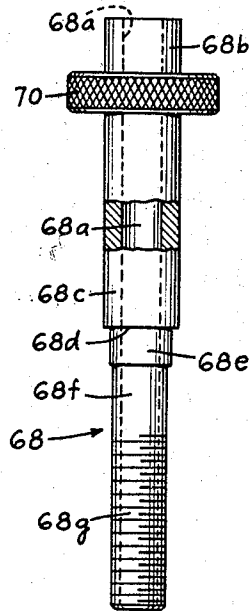
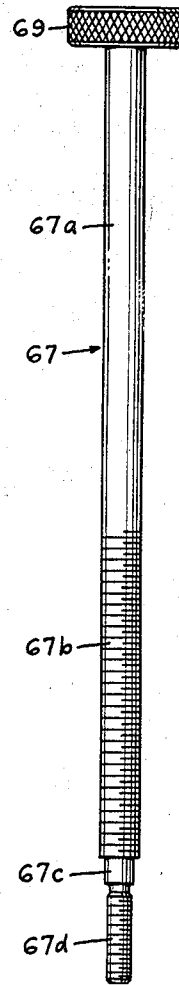


FIG. 6.



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FEED STROKE ADJUSTING MECHANISM FOR SEWING MACHINES

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U.S. Cl. 112—209

13 Claims

ABSTRACT OF THE DISCLOSURE

Adjustable devices for controlling the feed stroke of work feeding mechanism of a sewing machine, with provisions for changing from one to another of two selected feed strokes, by the actuation of a knee press or foot treadle or the like, during the operation of the machine. The machine is provided with two feed dogs that are subject to a differential feed action, one of the feed dogs being capable of having its feed stroke changed in relation to the other feed dog during the operation of the machine to produce the differential action. Two concentrically mounted screw elements, having closely adjacent and readily accessible knurled heads, may be manually rotated to determine two different feed strokes to be imparted to one of the feed dogs, one selected feed stroke being normally imparted to the feed dog and another selected feed stroke being imparted thereto upon the operation of a knee press or the like.

Description of the invention

This invention is concerned with novel mechanism for adjusting the feed stroke of the work feeding mechanism of sewing machines. While certain aspects of the invention which provide for simple and accurate adjustment of such work feeding mechanism have definite advantages when applied to machines having a single feed dog, the present invention is of special utility in connection with sewing machines having a plurality of feed dogs, one of which is adapted for accurate and quick changing of its work feeding action in the course of operation of the machine. A multiple feed dog arrangement of this character is generally characterized as differential feeding mechanism. In the operation of machines having a main feed dog and an auxiliary feed dog, it is frequently found desirable to be able to selectively impart either the same work feeding action to the material being stitched or different extents of work feeding movement to different portions of the work being advanced to and through the stitch forming zone of the machine.

When such different extents of feeding movement are imparted to the work by two feed dogs, one acting in advance of the other in the line of feed, the work may be ruffled or shirred in the region where it is being stitched or it may be stretched in this region and then contract when it leaves the zone in which it is being fed and stitched. To produce the ruffling or shirring effect, the foremost feed dog, which is usually the auxiliary feed dog is adapted to impart a longer feed stroke than is the main or rearmost feed dog. On the other hand, when the stretching action is desired the foremost feed dog advances the work to a shorter extent than the rearmost feed dog, so that the latter stretches the work in the region in which it is being stitched. This is particularly desirable in stitching together an elastic ply and a non-elastic ply of fabric. Another situation in which a differential feeding action is desirable for at least part of a seaming operation is when edges of normally dif-

ferent lengths are being united. This occurs, for example, in stitching a sleeve to a shoulder of a garment.

One important object of the present invention is to provide readily adjustable means for predetermining the normal feed stroke imparted to the work by a feed dog upon each cycle of operation of the machine, and to provide means for quickly and accurately modifying the feed stroke of the feed dog, in the course of operation of the machine, to impart a different extent of feeding movement to the work during particular cycles of operation of the machine. The construction is such that the means for adjusting normal feed stroke and for predetermining the feed stroke to be imparted to a feed dog at any desired intervals during the operation of the machine is readily accessible to the operator and quickly adjustable to select the two different feed strokes desired. Moreover, the construction is such that the adjustment and selection of the two different feed strokes is capable of being very accurately made, by virtue of its being effected by a micrometer type of mechanism.

There are various important features of the invention which contribute toward the foregoing objectives. One of these is the provision of means for quickly bringing about the accurate adjustment of the maximum and minimum stroke length of the differential feed element and providing an indication of the adjustment that has been made. Thus, the operator can determine from a readily viewable indicator just what the maximum and minimum stroke lengths are at any particular adjustment of the control means therefor. This is very simply achieved by the provision of a feed stroke control lever which is operable in a vertical plane, preferably by a spring urging it in one direction, and means under manual control by the operator, i.e. through a knee press, foot treadle, or hand operated member, for swinging the control lever to its other position. Its normal position may be either the maximum or minimum feed stroke, which is selected by appropriate adjustment of one micrometer type mechanism, while the other of the two stroke lengths will be predetermined and indicated by adjustment of another micrometer type mechanism and will be made effective upon operation of the manual control means.

A more specific feature of the invention, which serves to meet the objectives of the invention and contribute to the advantages thereof, is the provision of two stop elements disposed in the path of movement of the control lever mentioned above, and adapted for quick and accurate adjustment into positions which determine the maximum and minimum feed strokes to be imparted to the feed dog. Toward the foregoing end and for the purpose of achieving desirable compactness of the feed adjusting mechanism and the readily accessible disposition of the means by which the operator may select the maximum and minimum stroke lengths to be given to the auxiliary feed dog, two screw threaded control members are concentrically disposed, and each is provided with a knurled head at or near its upper end. This enables the operator to readily turn each of the screw threaded control members to effect the selection of the setting of the two stop means. In the preferred embodiment of the invention, the two knurled heads are disposed adjacent to each other above the two stop means mentioned. A spring will normally urge the control lever against one of said stop means, while the manual operation of said lever by connections from a knee press or the like will carry the control lever against the other stop means. A graduated scale is provided, at a readily visible point, in relation to a portion of the control lever to indicate the stroke length which the control means will establish when the lever is urged against one or the other of the stop means. An important aspect of the

above-described means for adjusting and indicating the maximum and minimum stroke lengths of the auxiliary feed element is the disposition of the knurled head portions of the two screw members above the work supporting surface of the machine in a position where these head portions are readily accessible to the operator and the adjusted position of each of the stop means is readily viewable by the operator.

A further important feature of the invention is the construction of the stroke length adjusting and indicating means in such form that it may be readily attached to any sewing machine having a variable feed sewing mechanism involving a vertically movable control lever for changing the stroke of the feed element in the course of operation of the machine. This enables the ready addition of the adjusting and indicating means in question to any of a variety of existing machines of the character mentioned, which may not originally be equipped with such means.

Other objects, features and advantages of the invention will appear from the following detailed description of a preferred embodiment of the invention that is illustrated in the accompanying drawings, in which:

FIG. 1 shows an overedge sewing machine to which the present invention has been applied, this view being partly in end elevation and partly in vertical section through the stitch forming and work feeding region of the machine;

FIG. 2 is a detail view, in perspective, showing a presser foot embodied in the machine and portions of the means for carrying the same;

FIG. 3 is an exploded perspective view of a main feed bar, an auxiliary feed bar and connections from the main drive shaft for operating said feed bars;

FIG. 4 is a vertical, sectional view taken along the axis of the main drive shaft of the machine and showing the relationship between the main and auxiliary feed bars and the connections for operating the same;

FIG. 5 is an elevational view of the stitch length controlling mechanism embodied in the machine, as seen from the left in FIG. 1;

FIG. 6 is an elevational view of a screw threaded member used to predetermine the maximum stitch length desired; and

FIG. 7 is an elevational view, partially broken away, of the stitch length controlling means adjustable to determine the normal stitch length to be produced.

The invention as disclosed herein is shown as applied to an overedge sewing machine of the general character disclosed in the Wallenberg et al. Patent No. 2,965,056, granted Dec. 20, 1960. Certain details of the machine which are not illustrated and described in the Wallenberg et al. patent are illustrated and described in various other patents referred to in said Wallenberg et al. patent. For the purposes of understanding the present invention it is not believed necessary to show and describe herein all of the details shown and described in the above-mentioned patents.

Turning now to the drawings, there is shown in FIG. 1 the frame structure and other parts of the machine. Thus, it has a main frame comprising a base portion 10 and an upper enclosed housing portion 11. This frame structure carries and largely encloses the stitch forming and work feeding mechanism and other devices embodied in a machine of the character mentioned. Connected with the base portion 10 of the frame of the machine is a work supporting member 12 having a downwardly extending skirt 13, at the right in FIG. 1, which is actually positioned at the front of the machine opposite which the operator sits in performing the desired stitching operations. The upper housing portion 11 of the frame has an outwardly extending arm 14 which overhangs the work support 12. Arm 14 has integrally connected therewith a head 15 which is inclined slightly to the vertical, as seen in FIG. 1. Within the head portion 15 there is

mounted a rod 16 arranged for longitudinal movement within the head portion and carrying at its lower end a yoke 16a adapted to straddle a presser foot carrying arm 17. Suitable spring means is provided within the head portion 15 for urging the presser foot carrying arm 17 downwardly under a pressure determined by the adjustment of the force of spring means (not shown) within the head portion 15 by the devices disclosed as extending upwardly from the latter. Arm 17 is arranged for swinging movement in a horizontal plane about the axis of a bolt 18 which is in screw-threaded engagement with a support block 19. The latter is rigidly secured to a rock shaft 20 mounted in suitable bearing means carried by the base portion 10 of the frame. It should be appreciated that by virtue of this arrangement, the arm 17 is adapted for pivotal or rocking movement in a vertical plane about the axis of the rock shaft 20 and thus serves to urge the presser foot carried by the arm 17 downwardly against the work by the force of the spring means within the head 15.

The forward end of the arm 17 is provided with a cylindrical stud portion 21 to which may be adjustably secured a presser foot unit 22 of the character shown in FIG. 2. Such adjustable mounting of the presser foot unit on the stud 21 is effected by a clamping screw 23 which, when loosened, permits the adjustment of a presser foot carrying member or shank 24 both in an angular relation to the stud 21 and longitudinally thereof. When the desired adjustment has been made the screw 23 will be tightened to retain the parts in the selected position. The presser foot which engages the work is formed in two sections 25 and 25a. The part 25, as shown in FIG. 2, is broken away for clarity of illustration of certain portions of it. Thus the upwardly extending curved part of this portion of the presser foot, as shown in FIG. 1, is not illustrated in FIG. 2. It will be understood that the upwardly curved part of the presser foot may be of conventional form and is provided with an opening there-through for the passage of a curved needle 26 forming part of the stitch forming mechanism of the machine. Portion 25 of the presser foot is of greater length than the portion 25a and has upstanding portions 25b which receive a lower portion 24a of the presser foot carrying member or shank 24. As shown in FIG. 2, the foremost branch of the upstanding portion 25b of section 25 of the presser foot extends toward the right to a sufficient extent to cooperate with an upwardly extending part 25d of the section 25a of the presser foot. A bolt 25c serves to retain the sections 25 and 25a of the presser foot in connected relation, and a spring 25e surrounding the bolt 25c tends to rock the section 25a of the presser foot in a clockwise direction in relation to section 25, as seen in FIG. 2, or in a counterclockwise direction as seen in FIG. 1. The extent to which the portion 25a of the presser foot is thus rocked is limited by its cooperation with a surface on the section 25 of the presser foot.

The cloth plate or work supporting member 12 is provided with an opening 27 which is adapted to receive a throat plate 28. This is of conventional form and is provided with slots or openings through and along which a main feed dog 29 and an auxiliary feed dog 30 are given four motion movements. The throat plate is also provided with an opening for the passage of a needle therethrough. The feed dogs 29 and 30 may be of any desired form and may, for example, have a plurality of toothed sections aligned with each other that are arranged to move through passages or slots within the throat plate. In some instances the feed dogs may be disposed laterally in relation to each other so as to be given their feeding movements along lines that are spaced from but parallel with each other. In the embodiment shown, the auxiliary feed dog 30 engages the work in advance of the main feed dog 29 so that if the auxiliary feed dog is given a somewhat longer work advancing movement or feed stroke than the main feed dog, the work will have a tendency to ruffle

or become shirred at the time it is subjected to the stitching operation.

For operating the feed dog 29 the latter has a shank portion 29a which is adapted to fit into a groove 32a provided in a main feed bar 32 (FIG. 3). A screw 31 cooperating with a slightly vertically elongated opening in the shank 29a of the feed dog 29 serves to secure the latter in a suitably adjusted position on the main feed bar 32, to insure proper engagement with the work. In a similar manner the auxiliary feed dog 30 is provided with a shank 30a adapted to fit into a groove 34a in an auxiliary feed bar 34. A screw 33 cooperating with a vertically elongated opening in the shank 30a of the auxiliary feed dog serves to secure the latter in a properly adjusted position on the auxiliary feed bar 34. By means to be hereinafter described, the two feed bars 32 and 34 are given reciprocatory movements corresponding with the feed stroke desired to be imparted to the work. Also means are provided for lifting and lowering the forward ends of the feed bars to carry the feed dogs into and out of engagement with the work at appropriate times in a cycle of operation of the machine. To enable such lifting and lowering and longitudinal movements to be imparted to the feed bars, the latter are suitably mounted for sliding and rocking movements at their rear ends. Thus the feed bar 32 is forked to provide an opening 32c at its rearward end adapted to receive, in sliding relation, a block 35 which is held against bodily movement but permitted to rock slightly about an axis, the position of which may be adjusted by conventional means. Similarly, the auxiliary feed bar 34 is forked to provide an opening in its rearward end adapted to receive, in sliding relation, a block 36 which is likewise retained against bodily movement but permitted to turn through a suitable angle about an adjustable axis. Such axis for both of the blocks 35 and 36 is provided by an eccentric portion 37 (FIG. 1) of a stud of a character known in the art which is adjustable and locked in a set position in the sewing machine frame. By appropriate turning of the stud and then locking it in the set position, the eccentric portion thereof which cooperates with the blocks 35 and 36 may be retained at the desired elevation for providing the proper feeding action to the two feed dogs.

For lifting and lowering the forward end of the main feed bar 32, the latter has a passage provided between a rearwardly extending portion 32e below the main body of the feed bar and a parallel bottom surface of said main body of the feed bar 32. Within said passage there is mounted a block 38. This is provided with a central opening cooperating with an eccentric portion 39 of a main drive shaft 40 of the machine. It will be apparent that as the shaft 40 rotates, the forward end of the main feed bar 32 will be lifted and lowered at the appropriate times during a cycle of operation of the machine to bring about the desired feed action of the feed dog 29. Simultaneously with the lifting and lowering of the forward end of the main feed bar, the forward end of the auxiliary feed bar 34 will also be lifted and lowered. This is accomplished by having a portion of the auxiliary feed bar slidably mounted on a laterally extending ledge 41 provided on the main feed bar 32. The upper surface of the auxiliary feed bar is engaged by a block element 42 secured by a screw 42a to the main feed bar. The relationship of the parts is such that the auxiliary feed bar is capable of longitudinal movement relative to the main feed bar, but it is rocked upwardly and downwardly at all times simultaneously with the main feed bar.

For imparting longitudinal reciprocatory movements to the main and auxiliary feed bars, an extension 43 of the main shaft is eccentrically disposed in relation to the axis of the latter and is arranged to carry two separate eccentric members 45 and 46 (FIGS. 3 and 4). These are keyed to the extension 43 by means of an element 44 which fits into a groove in the extension 43 and into grooves 45a and 46a provided, respectively, in the members 45

and 46. The eccentric member 45 cooperates with a pitman 47 which has an opening 47a (FIG. 3) at its forward end adapted to receive a stud 48 projecting laterally from the forward end of the main feed bar 32. It will be apparent that upon rotation of the shaft 40 the eccentric 45 will reciprocate the pitman 47 longitudinally and impart longitudinal movements to the feed bar 32. A pitman 49 has its forward end surrounding the eccentric 46 so as to be given longitudinal reciprocatory movements by said eccentric upon rotation of the shaft 40. The rearward end of pitman 49 is connected with a segment member 50 mounted for rocking movement about a fixed shaft 51 (FIG. 1). The segment member 50 is connected with the rearward end of pitman 49 by means of screw stud 50a secured in any suitable manner to the segment member 50. An opening through the rearward end of pitman 49 surrounds the screw stud 50a and is retained thereon by a nut 52 having screw threaded engagement with the outer end of the stud 50a. A washer 53 is provided between the inner face of the nut 51 and the adjacent face of the pitman 49 to facilitate free rocking movement of the pitman about the axis of the screw stud 50a. As will be apparent, the rotation of the shaft 40 which in turn rotates the eccentric 46 will reciprocate the pitman 49 and, through the latter, will cause rocking movements to be imparted to the segment 50 about the fixed shaft 51.

Segment 50 has an arcuate opening 50b extending through the same and lengthwise thereof. Within this opening there is slidably mounted a block 54 arranged to be shifted longitudinally of the opening. This block is secured by a screw 55 to a two-armed link 56 which has a forwardly extending arm 56a and an upwardly and rearwardly extending arm 56b. The forward end of arm 56a is connected by a screw stud 57 with the auxiliary feed bar 34 (see FIGS. 1 and 3). A nut 58 serves to retain the forward end of the arm 56a on the stud 57. Screw stud 57 has a shank 57a which extends through an opening 59 in the main feed bar 32 and is connected with the auxiliary feed bar 34. It is in this way that longitudinal movements are imparted to the auxiliary feed bar. The extent of such movements will depend upon the position of the slide block 54 within the elongated opening 50b. In this connection it should be noted that the radius of curvature of the opening 50b is such as to place its center of curvature substantially at the axis of the screw stud 57. The extent to which the auxiliary feed bar is shifted longitudinally upon the rocking of member 50 by pitman 49 will depend upon the position of the block 54 within the opening 50b. Obviously, the higher its position in this opening the greater will be the extent of movement imparted to the auxiliary feed bar. If the block 54 is shifted to substantially the lower end of the opening 50b, no appreciable movement will be imparted to the auxiliary feed bar upon the rocking of member 50.

The upwardly and rearwardly extending arm 56a of link 56 is connected by a screw stud 60a with the upper end of a link 60. The lower end of the latter is connected by a screw stud 61 with the forwardly extending arm 62a of a two-armed lever 62 which is rockably mounted, by means of a screw stud 63, upon a supporting bracket or frame 64. The latter is adapted for attachment to any sewing machine of a variety of different constructions to carry the adjusting means, to be hereinafter described, for controlling the operation of the auxiliary feed dog. For attachment of the frame or bracket 64 to the main frame 10 of the sewing machine, a laterally extending part 64a is preferably integrally formed as a part of the bracket. Part 64a may be secured by screws 65 to the base portion 10 of the frame of the sewing machine. Surrounding the screw stud 63 is a coil spring 66 having one end hooked over the top of the arm 62a and having its other end hooked over a shoulder on the bracket 64. As shown in FIG. 1, this spring is arranged to urge the two-armed lever 62 in a clockwise direction, thus tending to urge the slide block 54 downwardly along the opening 50b. This tends

to shorten the feed movement imparted to the auxiliary feed dog. Rocking of the lever 62 in a counterclockwise direction (FIG. 1) may be effected by a suitable connection, from a knee press or foot treadle or other means operable at the will of the operator, to an opening 62c adjacent the lower end of the arm 62b of lever 62. Downward movement of the arm 62b will serve to lift the slide block 54 upwardly within the arcuate passage 50b, and thus increase the feed stroke imparted to the auxiliary feed dog by the connections previously described from the eccentric 46.

The bracket 64 has its upper end narrower than the main body of the same, and the top portion is bent over at right angles to the main body to provide a ledge 64b. Similarly the lower end of bracket 64 is bent at right angles to the main body of the same to provide a ledge 64c. The two ledges 64b and 64c provide for the assembly of the feed length control elements provided for adjusting the stroke length of the auxiliary feed dog.

The micrometer type adjusting elements of the assembly are shown in FIGS. 6 and 7, and in their assembled relation in FIGS. 1 and 5. They include two screw members 67 and 68, member 67 being of relatively small diameter and being adapted to be positioned within the member 68. As best shown in FIG. 6, the member 67 has a rod-like upper portion 67a having a smooth outer surface. Below this part of the member is a screw threaded portion 67b, below which is provided a smooth surfaced, reduced diameter portion 67c, and below the latter is another small diameter portion 67d provided with screw threads. Member 68 has a cylindrical bore or passage 68a extending throughout its length for the reception of member 67 in relatively close fitting relationship, but in a manner permitting ready rotation of member 67 by means of a knurled head 69 secured to its upper end. When the two members 67 and 68 are assembled, the knurled head 69 will rest upon the upper end of member 68. Turning now to the latter it has an upper portion 68b to which is secured in any suitable way, as by a set-screw, a knurled collar 70 by which the screw member 68 may be readily turned. Below the collar 70, the member 68 has a portion 68c which is an extension of the portion 68b and is preferably of the same diameter as the latter. The lower end of part 68c of member 68 provides a shoulder 68d adapted to cooperate with the upper surface of the ledge 64b of the supporting plate 64. A reduced diameter portion 68e of member 68 extends through an opening in the ledge 64b and fits snugly within such opening, but not tightly, thus enabling the turning of member 68 by means of the knurled collar 70. Below the portion 68e, the member 68 is preferably provided with a further reduced diameter portion 68f which has its lower part 68g provided with a screw thread.

A circular block 71 having an upwardly extending, reduced diameter collar is provided with internal threads for cooperation with the threads on part 68g of member 68. Projecting laterally from the main body of block 71 is a pin 72 which extends into the path of the arm 62b of the control lever 62. The latter is rocked by the spring 66, as explained above, to cause the upper edge of the arm 62b of the lever to engage the lower surface of pin 72. This pin extends through an elongated opening 64d provided through the vertical plate-like portion of bracket 64. This opening serves to retain the pin 72 and block 71 against turning movements as the member 68 is manually turned by means of the knurled element 70. It will be apparent that as the member 68 is thus turned in one direction or the other the screw threads 68g will cause the block 71 to be lifted or lowered, depending upon the direction of rotation of the member 68.

The screw member 67, as above-mentioned, is disposed concentrically within the member 68 and has its upper smooth surfaced portion 67a turnably mounted within the cylindrical passage 68a extending through the mem-

ber 68. The portion 67b of member 67 has its screw threads cooperating with internal screw threads provided in a cylindrical block 73, which is similar to block 71. Extending laterally from the block 73 is a pin 74 which passes through the elongated opening 64d in the plate 64 and into the path of the arm 62b of control lever 62 in a region below the latter. By rotation of the member 67 through manual turning of the knurled head 69 the block 73 may be lifted or lowered into a desired position. As the parts are shown in FIG. 1, the position of block 73 is such that the pin 74 is engaged by the lower surface of arm 62b, at the same time that the upper surface of said arm engages the pin 72. However, in the normal use of the control mechanism the block 71 will be moved upwardly from the position shown, by the turning of the knurled head 70, to position the pin 72 at a higher point. As a result, the lever 62 will be rocked in a clockwise direction by spring 66, to carry the under surface of arm 62b upwardly away from pin 74. At the same time the block 54 will be shifted to a lower position in the passage 50b. This permits the control lever 62 to be rocked counterclockwise (FIG. 1), whenever desired, by connections from a knee press or the like to cause the block 54 to be lifted, in the arcuate passage 50b, into the position shown in FIG. 1 for example, and thus increase the feed stroke imparted to the auxiliary feed bar.

To retain the two screw members 67 and 68 in assembled relation on the frame or bracket 64, a nut 75 and a lock nut 76 are provided to cooperate with the threaded lower end 67d of member 67. This arrangement is such that any appreciable axial movement of member 67 is prevented, but the member 67 may be rotated by operation of the knurled head 69 with the nut 75 then turning relative to the under surface of the ledge 64c.

For the purpose of indicating to the operator the two stroke lengths for which the auxiliary feed dog has been set, by the turning of the knurled members 69 and 70, the front face of the main body of the bracket 64 is provided with indicia 77 identified with particular feed strokes. The markings on the scale 77 are read against an inwardly extending projection 62d provided at the upper edge of the arm 62b of lever 62. Thus when the machine is idle, or in the course of normal operation, the particular line or designation on the scale which indicates the normal stroke length that has been set for the auxiliary feed dog is displayed at the upper surface of projection 62d. This is the position assumed when the top edge of arm 62b is engaged with pin 72. When the knee press or the like is operated to swing lever 62 in a counterclockwise direction (FIG. 1), so that the lower edge of the arm 62b engages the pin 74, the stroke length that will be produced by the auxiliary feed dog will again be indicated by the position of the upper surface of projection 62d along the scale 77.

In providing stitching which will result in shirred regions of the line of stitching, the arrangement illustrated is such that normally the feed stroke of the auxiliary feed dog is equal to that of the main feed dog; this is when the upper edge of arm 62b of control lever 62 engages the pin 72. However, in those regions in which ruffling or shirring is desired to be effected, the lever 62 will be rocked in a counterclockwise direction (FIG. 1), by the action of a knee press or the like, to produce a greater work feeding movement by the auxiliary feed dog than by the main feed dog. Depending upon the nature of the seaming operation to be performed, it will be clear that the operator will adjust the position of the two pins 72 and 74 and then permit the control lever 62 to be in its normal position for a part of a stitching operation, and to be shifted in a counterclockwise direction, by operation of a knee press or the like, to increase the feed stroke of the auxiliary feed dog to a predetermined extent at selected points in the formation of a line of stitching.

The machine illustrated in the drawings has no provision for adjusting the feed stroke of the main feed bar and feed dog. However, the feed stroke imparted to the main feed bar and feed dog may be very quickly changed by substituting a different eccentric element 45 for that provided in the machine at any particular time. Such a change can be very readily accomplished by removing the nut 40c and various other elements from the free end of the drive shaft 40, and replacing the feed eccentric 45 by a different eccentric adapted to impart a different feed movement to the main feed bar. Feed eccentric 46 may be similarly replaced if desired, but ordinarily the feed stroke adjusting means above described in relation to the auxiliary feed bar will take care of desired changes in the extent of feed of the latter.

What is claimed is:

1. In a sewing machine having a main drive shaft, work feeding mechanism comprising a four motion feed dog, connections from said drive shaft for operating said work feeding mechanism, said connections including adjustable means for varying the feed movement imparted to said feed dog, and a control lever rockable about an axis to shift said adjustable means to vary the feed movement imparted to said feed dog, the combination which comprises a pair of stop elements cooperating with said lever to limit the rocking movement of said lever in either direction, a pair of elongated parallel screw elements adapted to adjust the position of said stop elements, one of said elongated screw elements being partially disposed within another of said screw elements, said one of said screw elements projecting from said another of said screw elements at both ends of the latter, said screw elements having manually turnable knobs at adjacent ends thereof for turning said screw elements to position said stop elements in their desired positions for predetermining the maximum and minimum feed movements to be imparted to said feed dog.

2. In a sewing machine as set forth in claim 1, said sewing machine having a main frame, a separate frame detachably secured to said main frame externally thereof, said separate frame having means for retaining said screw elements, said manually turnable means, and said stop elements.

3. In a sewing machine as set forth in claim 2, said control lever being rockably mounted on said separate frame.

4. In a sewing machine as set forth in claim 3, a feed stroke indicating scale carried by said separate frame, and means connected with said control lever arranged to cooperate with said scale to indicate the feed strokes determined by the positions in which said stop elements are located.

5. In a sewing machine having a main frame, a main drive shaft, differential work feeding mechanism having main and auxiliary feed dogs, connections from said drive shaft for imparting four motion movements to said feed dogs, and readily adjustable means for varying the feed movements imparted to at least one of said feed dogs, the combination which comprises a rockably mounted feed stroke control lever, adjustable stop elements disposed in the path of movement of said lever, spring means

normally urging said lever into engagement with one of said stop elements, means operable at will during the operation of the machine for shifting said lever into engagement with another of said stop elements, connections from said control lever to said first mentioned connections whereby the feed stroke of at least one of said feed dogs is varied during the operation of the machine, screw elements having manually turnable knobs secured thereto for rotating said screw elements, said knobs being readily accessible to the operator of the machine, and connections from said screw elements for adjusting the positions of said stop elements longitudinally of said screw elements as the latter are rotated by said knobs, said screw elements being concentrically disposed, with a portion of one within the other.

6. In a sewing machine as set forth in claim 5, said turnable knobs being disposed close to each other near the adjacent ends of said screw elements.

7. In a sewing machine as set forth in claim 5, said connections from said screw elements for adjusting said stop elements comprising screw threaded members having their threads engaged with those on said screw elements, whereby said members shift longitudinally of said screw elements as the latter are turned by said knobs.

8. In a sewing machine as set forth in claim 7, a member disposed externally of the frame of the machine carrying a readily visible feed stroke indicating scale, and means associated with said control lever cooperating with said scale to indicate the feed stroke that will be imparted to said one of said feed dogs at the particular position in which the control lever is located.

9. In a sewing machine as set forth in claim 5, means cooperating with said screw elements for holding the latter against longitudinal movement, and said stop elements having members connected therewith which are in screw threaded engagement with said screw elements.

10. In a sewing machine as set forth in claim 9, one of said screw elements being mounted within the other and having portions at each end extending beyond the ends of said other screw element.

11. In a sewing machine as set forth in claim 5, a bracket connected with the main frame of said machine in a readily visible position, said screw elements and said stop elements being mounted on said bracket.

12. In a sewing machine as set forth in claim 11, said feed stroke control lever being rockably mounted on said bracket and having a portion extending into said main frame of the machine.

13. In a sewing machine as set forth in claim 12, said bracket carrying a readily visible feed stroke indicating scale, and means associated with said control lever cooperating with said scale to indicate the feed stroke that will be imparted to said one of said feed dogs at the particular position in which the control lever is located.

References Cited

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60 RICHARD J. SCANLAN, JR., *Primary Examiner*.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,450,079 Dated June 17, 1969

Inventor(s) R. H. Lukins

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

"Lukin" should be changed to -- Lukins -- on the three pages of drawings, and in the heading in column 1.

Col. 5, line 14, change "food" to -- feed --

SIGNED AND
SEALED

DEC 2 - 1969

(SEAL)

Attest:

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Commissioner of Patents