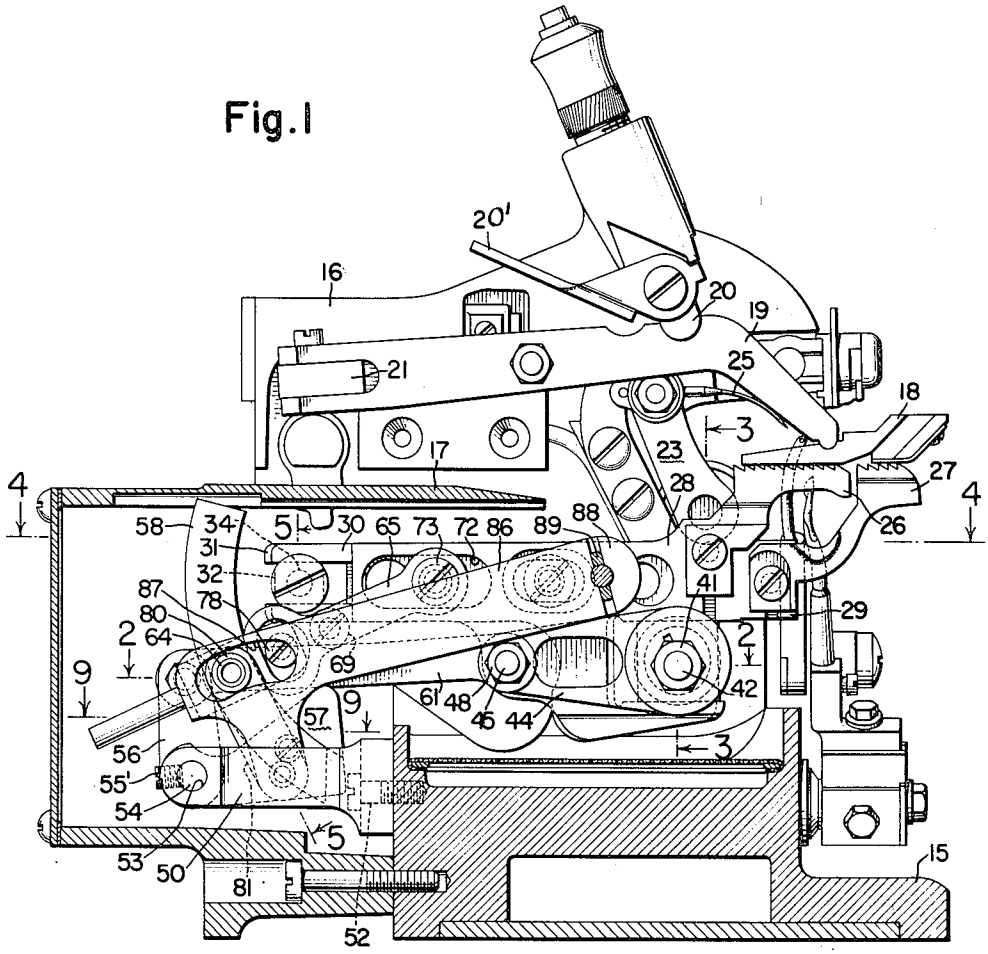
Nov. 27, 1956 N. KNAUS ET AL 2,771,848

FEEDING MECHANISMS FOR SEWING MACHINES

Filed Sept. 14, 1954 4 Sheets-Sheet 1

Fig.1



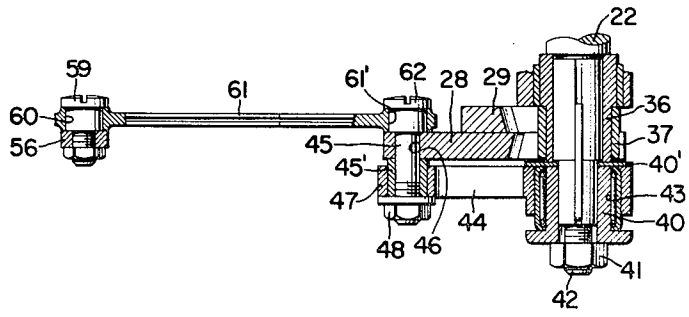


Fig.2

WITNESS

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Nov. 27, 1956 N. KNAUS ET AL 2,771,848

FEEDING MECHANISMS FOR SEWING MACHINES

Filed Sept. 14, 1954 4 Sheets-Sheet 2

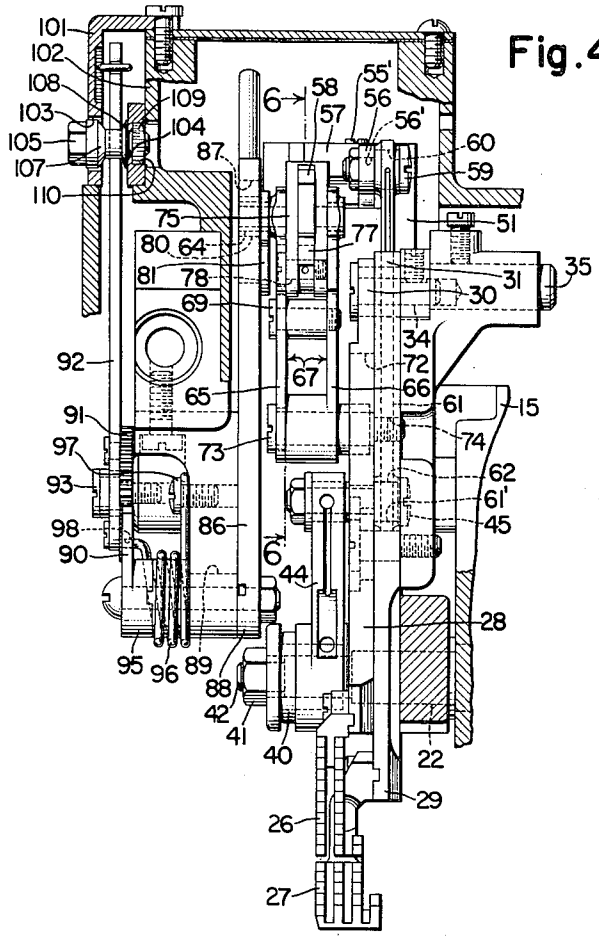

Fig.4

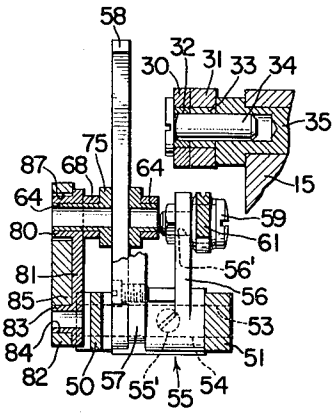

Fig.5

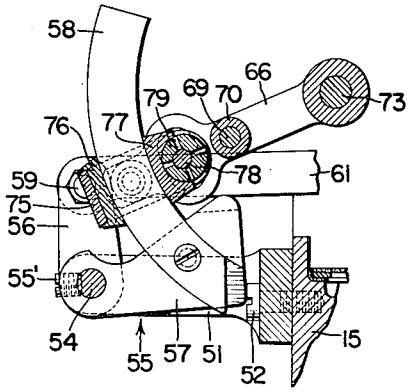

Fig.6

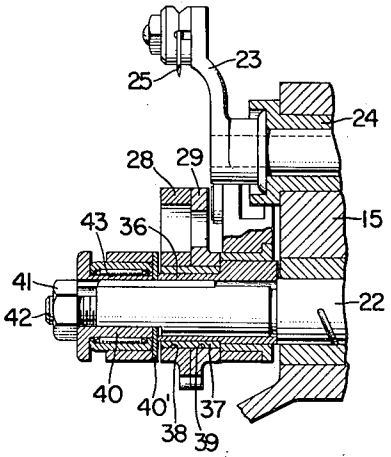

Fig.3

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FEEDING MECHANISMS FOR SEWING MACHINES

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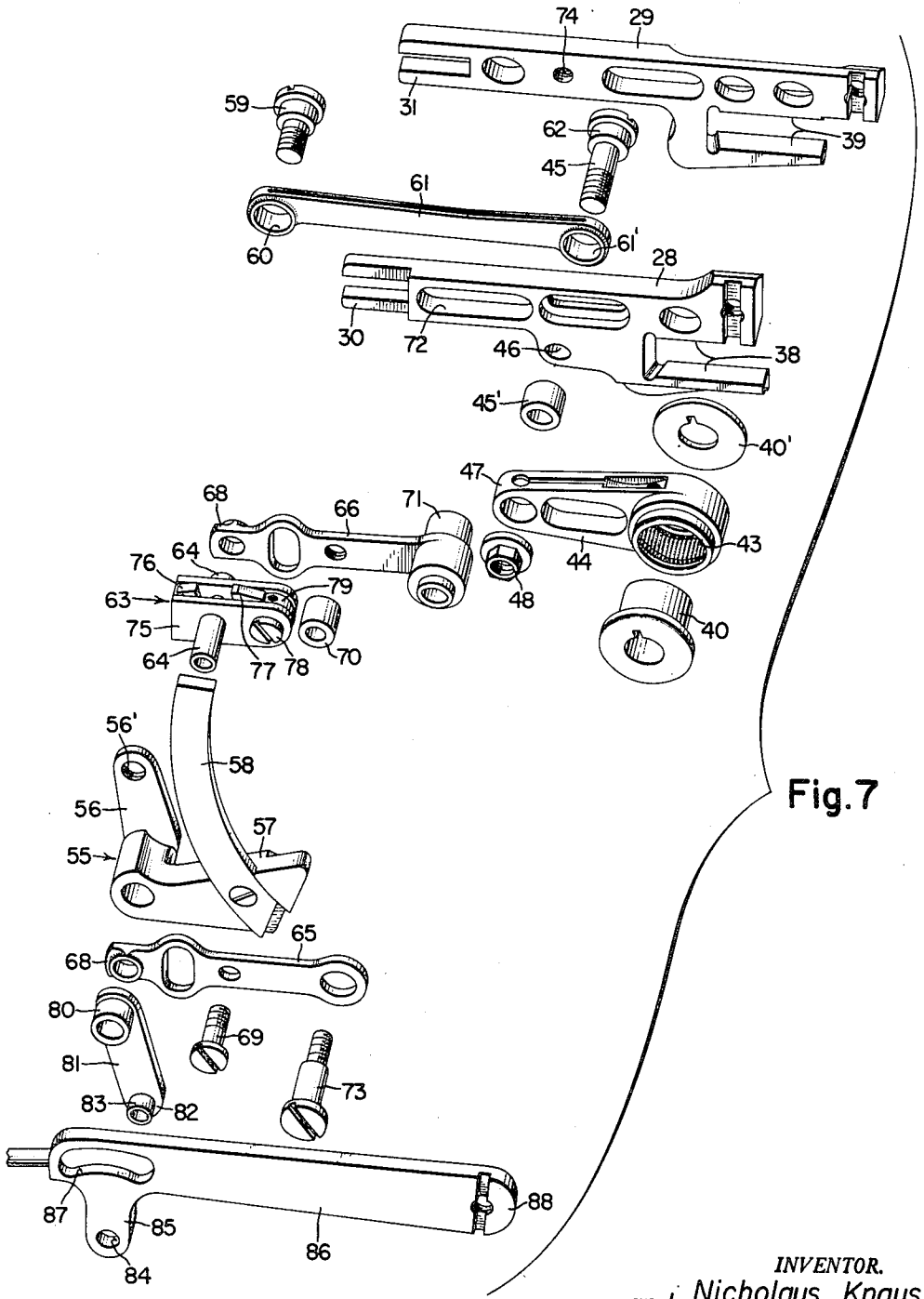

Fig.7

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FEEDING MECHANISMS FOR SEWING MACHINES

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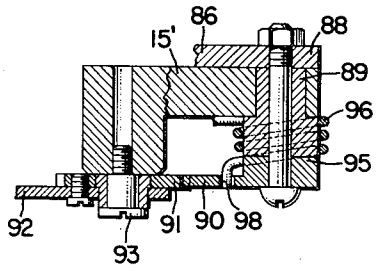
Fig.10



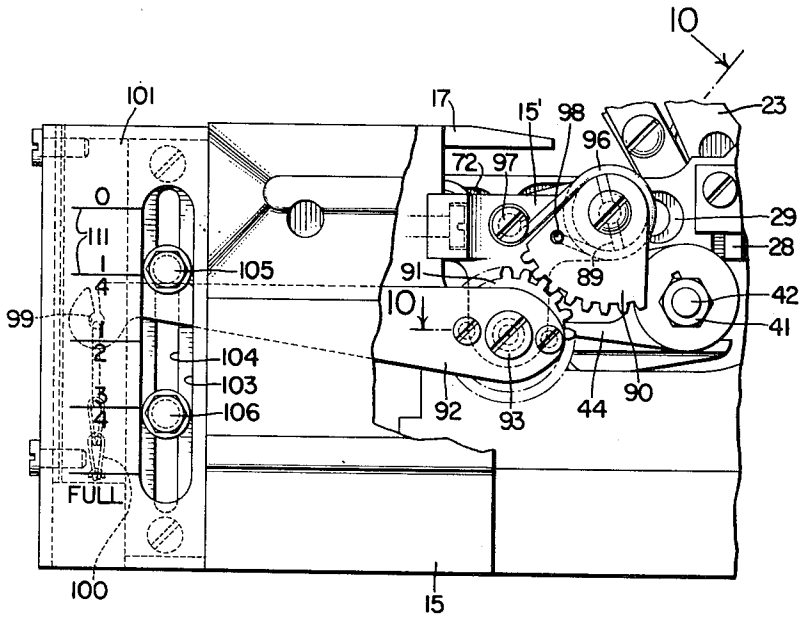


Fig.8

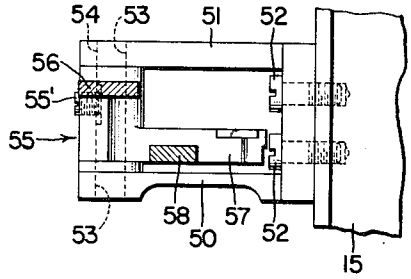


Fig.9

WITNESS

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United States Patent Office 2,771,848
Patented Nov. 27, 1956

2,771,848

FEEDING MECHANISMS FOR SEWING MACHINES

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Application September 14, 1954, Serial No. 455,966

7 Claims. (Cl. 112—209)

This invention relates to feeding mechanisms for sewing machines and more particularly to that type of feeding mechanism known as a differential feed in which two work-feeding elements are adapted to be actuated so as to exert unequal feeding actions on the work, thereby either to stretch or full the work as required.

The invention has as a primary object to provide an improved means for adjusting the length of feeding movement of one of a pair of four-motion feed-dogs of a differential feeding mechanism during the operation of such mechanism.

A further object of the invention is to provide improved means, readily accessible to the operator, for varying the action of that one of the feeding elements which in normal use requires regulation.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

Fig. 1 represents an end elevation, partly in section, of an overseaming machine showing the improved feeding mechanism.

Fig. 2 represents a sectional view taken substantially on the line 2—2 of Fig. 1.

Fig. 3 represents a sectional view taken substantially on the line 3—3 of Fig. 1.

Fig. 4 represents a sectional view taken substantially on the line 4—4 of Fig. 1.

Fig. 5 represents a sectional view taken substantially on the line 5—5 of Fig. 1.

Fig. 6 represents a sectional view taken substantially on the line 6—6 of Fig. 4.

Fig. 7 represents a disassembled perspective view of the main and auxiliary feed-bars and their actuating means.

Fig. 8 represents an end elevation of an overseaming machine embodying the present invention and illustrates the machine with a portion of the frame end wall broken away so as to illustrate a portion of the treadle control actuating means for the auxiliary feed-bar.

Fig. 9 represents a sectional view taken substantially on the line 9—9 of Fig. 1.

Fig. 10 represents a sectional view taken substantially on the line 10—10 of Fig. 8.

Referring now to the drawings, the reference numeral 15 denotes a frame of an overseaming machine, 16 the head, and 17 a portion of the work support which is carried upon the frame in a conventional manner. A presser-foot 18 is supported on the head 16 and the shank 19 of the foot is engaged by a spring-biased member 20 whereby the foot is normally pressed downwardly toward the work support 17. The rear portion of the shank 19 is mounted on a universal joint 21 in a conventional manner and a lever 20' is provided for relieving the pressure of the spring-biased member 20.

Treadle-actuated means, not herein shown, are provided for raising the shank 19 in opposition to the spring biased means 20 to permit introduction or adjustment of the work beneath the presser-foot 18. Since this mechanism does not form the part of the present invention, a complete disclosure thereof is not deemed necessary.

The machine is provided with a main rotary shaft 22 (see Fig. 3) which is journaled in the frame 15, and the shaft through a link, not herein illustrated, is connected with a needle-carrier 23 pivoted in a bushing 24 so that the rotation of the shaft 22 effects the oscillation of the carrier 23 within its bushing 24. A needle 25 is mounted in the carrier 23 and the oscillation of the latter causes the needle to reciprocate and penetrate the goods that are supported upon the work support 17. Suitable stitch-forming implements or loopers cooperate with the needle to effect the formation of the overseaming stitches, but as these loopers and the manner of and the means for actuating them form no part of the present invention, their illustration and further description are not deemed necessary.

For a more complete description and illustration of the machine of the present type reference may be had to United States Patent No. 2,338,796, dated April 15, 1941.

The present work-feeding mechanism is of the differential type including a main feed-dog 26 and an auxiliary feed-dog 27 which are mounted, respectively, on the side-by-side main and auxiliary feed-dog carriers or bars 28 and 29 slidingly supported at their forked rear ends 30 and 31 upon blocks 32 and 33 (see Figs. 1 and 5). Each of these blocks 32 and 33 is appropriately apertured so that to be snugly entered and supported by a pin 34 which is force-fitted within an apertured bushing 35 secured within a portion of the main frame 15. As will later be described in more detail, the bars 28 and 29 are actuated in a manner such that they will both oscillate and move longitudinally about and relative to the pin 34 of which the longitudinal axis is common to both of the feed-bars.

The feed-bars 28 and 29 receive their rising and falling movements from a feed-lift eccentric 36 carried by the main shaft 22; said eccentric being surrounded by the usual bearing block 37 which fits in ways 38 and 39 formed in the feed-bars 28 and 29.

The feed and return movements are imparted to the main feed-bar 28 from a feed eccentric 40 removably and replaceably keyed upon the outer end of the main shaft 22 and held thereon by a nut 41 which is threaded over the distal end portion 42 of the main shaft 22 spaced between the eccentric 40 and the feed-bar 28 is a conventional washer 40'. The feed eccentric 40 is embraced by the apertured end portion 43 of a pitman 44 which connects the eccentric 40 directly to the main feed bar 28 by means of a bolt 45 which passes through aperture 46 in the feed-bar 28 and through the apertured rear end portion 47 of the pitman 44, which bolt 45 is locked in position by means of a nut 48. A spacer sleeve 45' is disposed over the bolt between the pitman 44 and the feed-bar 28. Thus rotation of the eccentric 40 will, through the medium of the pitman 44, reciprocate the main feed-bar 28 back and forth lengthwise of itself. Alteration of the amplitude of the feed return movements of the main feed-bar 28 is effected by substitution of feed eccentrics of the desired eccentricities, for that eccentric 40 illustrated in the present machine.

The pitman 44, together with its associated eccentric 40, are also adapted to impart feed and return movements to the auxiliary feed bar 29 through the medium of a rocker mechanism. This rocker mechanism comprises a two-armed bracket (see Figs. 1, 6 and 9) having its arms 50 and 51 secured to the machine base 15 by bolts 52. The free end portions of this bracket are apertured as at 53 for rockably receiving therein a shaft 54 upon

which is mounted a rock member generally designated by the numeral 55. A set screw 55' locks the member 55 to the shaft 54. The rock member 55 is formed with two arms 56 and 57 of which the latter is provided with an extension 58 formed as an arcuate member or segment. The free end portion of the arm 56 is apertured as at 56' and is adapted to be connected by means of a bolt 59 to an apertured end portion 60 of a link 61 (see Figs. 2 and 7). The other end portion of the link 61 is apertured as at 61' and is pivotally connected to the main feed-bar 28 by reason of the fact that it is mounted upon a cylindrical shoulder 62 formed upon the bolt 45 which, as hereinabove mentioned, is employed for securing the pitman 44 to the main feed-bar 28. From this it will be understood that as the main shaft 22 rotates the main feed-bar 28 will be reciprocated back and forth by means of the eccentric 40 and its associated pitman 44, and this reciprocatory movement of the main feed-bar 28 will in turn function to reciprocate the link 61 to the end that the rocker 55 will be oscillated about the longitudinal axis of its shaft 54.

Slidingly mounted upon and lengthwise of the rocker arm or segment 58 is a slide block generally designated by the numeral 63, which slide block has projecting from the opposite sides thereof stub-shafts 64—64 upon which are mounted the opposite side portions 65 and 66 of a two-part link member which in Fig. 4 is designated generally by the numeral 67. More specifically, each of the apertured end portions 68—68 of the link arms 65 and 66 is adapted to be pivotally mounted upon one of the stub shafts 64 while the mid-portions of the two members 65 and 66 are secured together by means of a bolt 69 and an associated spacer member 70. The other end portions of the members 65 and 66 carry a hollow sleeve 71 which projects through an aperture 72 formed in the main feed-bar 28 so as to be secured to the auxiliary feed-bar 29 by means of a bolt 73 which is threaded directly within an aperture 74 provided in the auxiliary feed-bar 29. From this it is to be understood that the oscillating movements of the rocker 55 will, through the rocker-arm 58 and the slide block 63, impart reciprocatory movements to the link member 67 which will in turn effect endwise reciprocatory movements in the auxiliary feed-bar 29.

The above noted slide block 63 comprises a U-shaped strap 75 having conventional type convex shoes 76, 77 mounted therein for engaging the opposite edge portions of the rocker arm 58. The free end portions of the U-shaped strap 75 are closed by a bolt 78 and a spacer sleeve 79.

As it may be best observed in Figs. 1, 5 and 7, one of the hollow stub shafts 64 of the slide block 63 is elongated for the purpose of having mounted thereon the upper apertured collar portion 80 of a link 81 of which the lower apertured end portion 82 is provided with a hollow boss member 83 pivotally received within an aperture 84 provided in the projecting end 85 of a crank member 86. It will also be observed that the upper end portion of the link 81 and its projecting collar 80 are freely disposed within an arcuate slot 87 formed in the end portion of the crank 86, which slot 87 functions as a guide for the collar 80.

Referring particularly to Figs. 4, 7 and 10, the end portion 88 of the crank 86 is keyed upon a shaft 89 journaled in a bracket portion 15' of the sewing machine frame 15, which shaft 89 has keyed upon its other end portion a segment gear 90 which meshes with a second segment gear 91 mounted upon a second crank member 92 which is pivotally mounted upon the bracket 15' about the longitudinal axis of a supporting bolt 93. From this it will be understood that by moving the second crank 92 up and down the segment gear 91 will rotate the segment gear 90 to the end that the first crank 86 will be oscillated about the axis of its mounting shaft 89 to the end that the slide block 63 will be shifted lengthwise of its rocker-arm 58 through the medium of the link 81. Furthermore, this movement of the slide block 63 will function to shift the end of the link 67 toward and away from the axis of the rocker 55 to the end that the amplitude of the feed and return movements of the auxiliary feed-bar 29 will be decreased or increased accordingly. In this connection, the present mechanism is designed in a manner such that with the slide block 63 at a position near the base portion of the arm 58 the auxiliary feed bar 29 will be given a back and forth movement which will exactly coincide with that of the main feed-bar 28 to the end that no gathering feed will result. However, as the slide block is moved to its fullest extent toward the base of the arm 58 the timing of the back and forth movements of the auxiliary feed-bar 29 will be such that a stretching of the work will occur because of the differential movement between the feed-bars 28 and 29. By the same token as the slide block 63 is moved outwardly along the crank arm 58 the amplitude of the feed and return movements of the auxiliary feed-bar 29 will increase to the end that a gathering feed action will result.

Referring particularly to Figs. 4, 8 and 10, it is to be observed that the shoulder portion 95 of the segment gear 90 is provided with a spring 96 of which one end is locked about a lock screw 97 fastened to the bracket 15' while the other end is locked as at 98 to the segment gear 90 to the end that the spring will urge the segment gear 90 to turn in a counterclockwise direction as viewed in Fig. 8. In other words, the spring 96 will effectively urge the slide block 63 to move in a direction toward the base portion of the segment arm 58.

Referring particularly to Figs. 4 and 8, the free end portion of the second crank 92 is provided with a notch 99 for receiving a chain 100 which may be connected in a conventional manner to a foot treadle so that the operator may manually shift the slide block 63 back and forth to produce various degrees of differential feeding movement between the main and auxiliary feed-bars 28 and 29. In this connection it is to be understood that the spring 96 operates in a manner such as to urge constantly the free end portion of the crank 92 in an upward direction.

The free end portion of the crank 92 operates up and down in a chamber formed between two spaced opposing walls 101 and 102 of the sewing machine frame, which walls have aligned vertically disposed slots 103 and 104. Positioned within these apertures 103 and 104 are a pair of bolts 105 and 106 each carrying a sleeve 107 having a skirt 108 whose diameter is greater than the width of the slot 104. A nut 109 is positioned on each of the bolts 105 and 106 and is located within a recess 110 formed behind the slot 104. From this it will be appreciated that each of the bolts may be backed away from its associated nut 110 so as to permit the bolts to be adjusted lengthwise of the slot 104 to any desired position, and thereafter the bolt may be retightened so that the nut 110 and its associated skirt 108 will function to lock the bolt in any desired position of adjustment. From this it will be understood that the bolts 105 and 106 function as adjustable stops to arrest the upward and downward movements of the crank 92 to the end that the operator may adjust the upper and lower limits of the movement of the slide block 63. If desired, indicia 111 and numerals may be provided upon the face of the frame wall 101 to show the operator the amount of differential feed adjustment effected by the movements of the crank 92.

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

1. Differential feeding mechanism for a sewing machine, comprising, a main rotary shaft, a plurality of eccentric elements carried upon said shaft, a pair of feed-dog carriers supported for oscillatory and reciprocatory movement with each carrier embracing an eccentric element so as to be oscillated thereby, a pitman having one

end thereof embracing one of said eccentric elements and its other end connected directly with a first of said carriers for imparting reciprocatory movement thereto, a rocker pivotally mounted about a fixed axis, means pivotally connecting one of said eccentric elements with said rocker thereby to oscillate said rocker about its axis, means separate from said last mentioned means slidably connected with said rocker and pivotally connected with the second of said carriers for imparting reciprocating movements to such carrier, and manually operable means for shifting the slidable connection between said last mentioned means and said rocker thereby to vary the amplitude of reciprocatory movement imparted to said second carrier by said rocker.

2. Differential feeding mechanism for a sewing machine, comprising, a main rotary shaft, a plurality of eccentric elements carried upon said shaft, a pair of feed-dog carriers supported for oscillatory and reciprocatory movement with each carrier embracing an eccentric element so as to be oscillated thereby, a pitman having one end thereof embracing one of said eccentric elements and its other end connected directly with a first of said carriers for imparting reciprocatory movement thereto, a rocker pivotally mounted about a fixed axis, means pivotally connecting one of said eccentric elements with said rocker thereby to oscillate said rocker about its axis, means separate from said last mentioned means slidably connected with said rocker and pivotally connected with the second of said carriers for imparting reciprocating movements to such carrier, manually operable means for shifting the slidable connections between said last mentioned means and said rocker thereby to vary the amplitude of reciprocatory movement imparted to said second carrier by said rocker, and manually adjustable means associated with said manually operable means for arresting the movement thereof in various selected positions.

3. Differential feeding mechanism for a sewing machine, comprising, a main rotary shaft, a plurality of eccentric elements carried upon said shaft, a pair of feed-dog carriers supported for oscillatory and reciprocatory movement with each carrier embracing an eccentric element so as to be oscillated thereby, a pitman having one end thereof embracing one of said eccentric elements and its other end connected directly with a first of said carriers for imparting reciprocatory movement thereto, a rocker pivotally mounted about a fixed axis, means pivotally connecting one of said eccentric elements with said rocker thereby to oscillate said rocker about its axis, means separate from said last mentioned means slidably connected with said rocker and pivotally connected with the second of said carriers for imparting reciprocating movements to such carrier, spring means biasing the slidable connection between said last mentioned means and said rocker toward the axis of rocker oscillation thereby to produce a minimum amplitude of reciprocatory movement of said second carrier, and manually operable means for shifting the slidable connection relative to said rocker and away from the axis of rocker oscillation thereby to produce increasing increments of reciprocatory movement of said second carrier.

4. Differential feeding mechanism for a sewing machine having a frame, comprising, a main rotary shaft, a plurality of eccentric elements carried upon said shaft, a pair of feed-dog carriers each embracing at its front end portion one of said eccentric elements so as to be oscillated thereby, a support carried by said frame and engaging the rear end portions of said carriers for supporting such end portions and forming an axis common to both carriers with reference to which axis the carriers have pivotal and longitudinal movements, a pitman having one end thereof embracing one of said eccentric elements

and its other end connected directly with a first of said carriers for imparting reciprocatory longitudinal movement thereto, a rocker pivotally mounted about a fixed axis, means pivotally connecting one of said eccentric elements with said rocker thereby to oscillate said rocker about its axis, means separate from said last mentioned means slidably connected with said rocker and pivotally connected with the second of said carriers for imparting reciprocating movements to such carrier, and manually operable means for shifting the connection between said last mentioned means and said rocker thereby to vary the amplitude of reciprocatory movement imparted to said second carrier by said rocker.

5. Differential feeding mechanism for a sewing machine, comprising, a main rotary shaft, a plurality of eccentric elements carried upon said shaft, a pair of feed-dog carriers supported for oscillatory and reciprocatory movement with each carrier embracing an eccentric element so as to be oscillated thereby, a pitman having one end thereof embracing one of said eccentric elements and its other end connected with each of said two carriers for imparting reciprocatory movement thereto, and manually operable means interposed between said pitman and one of said two carriers for creating selective amplitudes of differential reciprocatory movements between said two carriers.

6. Differential feeding mechanism for a sewing machine, comprising, a main rotary shaft, a plurality of eccentric elements carried upon said shaft, a pair of feed-dog carriers supported for oscillatory and reciprocatory movement with each carrier embracing an eccentric element so as to be oscillated thereby, a pitman having one end thereof embracing one of said eccentric elements and its other end connected directly with a first of said carriers for imparting reciprocatory movement thereto, a rocker pivotally mounted about a fixed axis, means pivotally connecting said pitman with said rocker thereby to oscillate said rocker about its axis, means separate from said last mentioned means slidably connected with said rocker and pivotally connected with the second of said carriers for imparting reciprocatory movement to such carrier, and manually operable means for shifting the slidable connection between said last mentioned means and said rocker thereby to vary the amplitude of reciprocatory movement imparted to said second carrier by said rocker.

7. Differential feeding mechanism for a sewing machine, comprising, a main rotary shaft, a plurality of eccentric elements carried upon said shaft, a pair of feed-dog carriers supported for oscillatory and reciprocatory movement with each carrier connected with an eccentric element so as to be oscillated thereby, a pitman having one end thereof embracing one of said eccentric elements and its other end connected directly with a first of said carriers for imparting reciprocatory movement thereto, a rocker pivotally mounted about a fixed axis, means pivotally connecting said first carrier with said rocker thereby to oscillate said rocker about its axis, means slidably connected with said rocker and pivotally connected with the second of said carriers for imparting reciprocating movements to such carrier, and manually operable means for shifting the slidable connection between said last mentioned means and said rocker thereby to vary the amplitude of reciprocatory movement imparted to said second carrier by said rocker.

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