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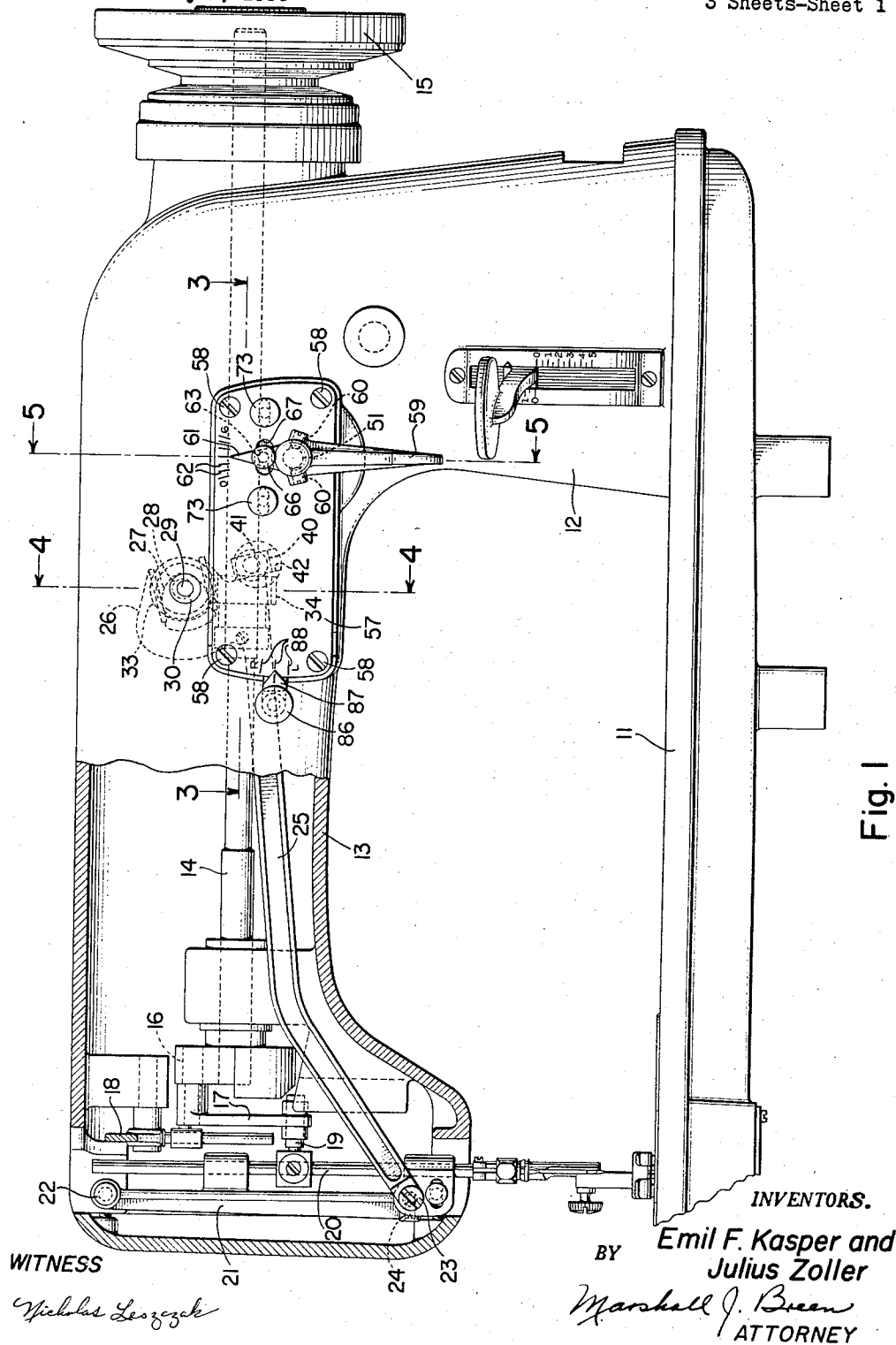
E. F. KASPER ET AL

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NEEDLE-JOGGING MECHANISMS FOR SEWING MACHINES

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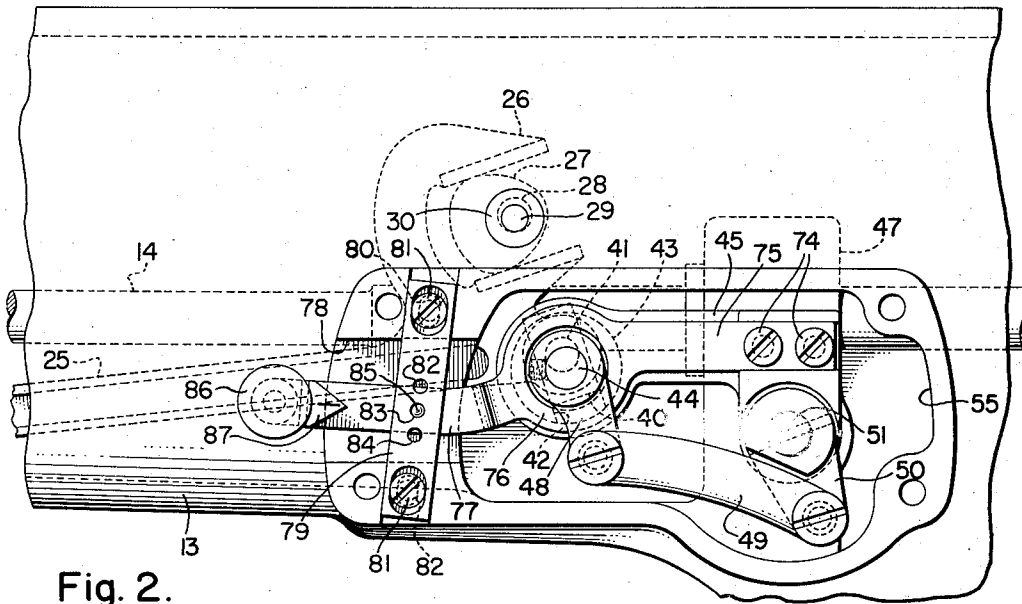


Fig. 2.

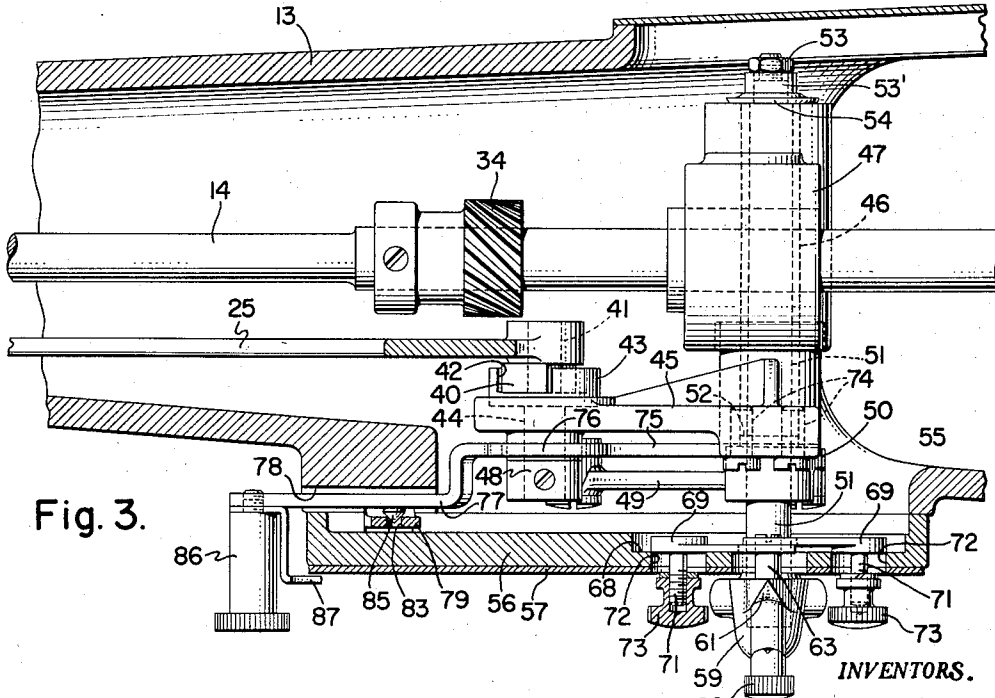


Fig. 3.

WITNESS

Nicholas Leszczak

INVENTORS.
BY *Emil F. Kasper and Julius Zoller*

Marshall J. Brown
ATTORNEY

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Fig. 4.

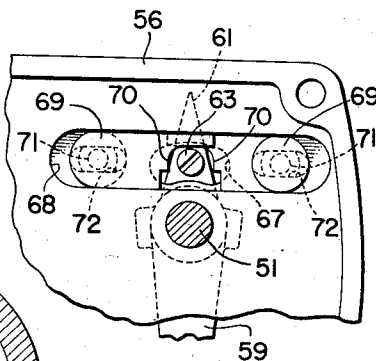
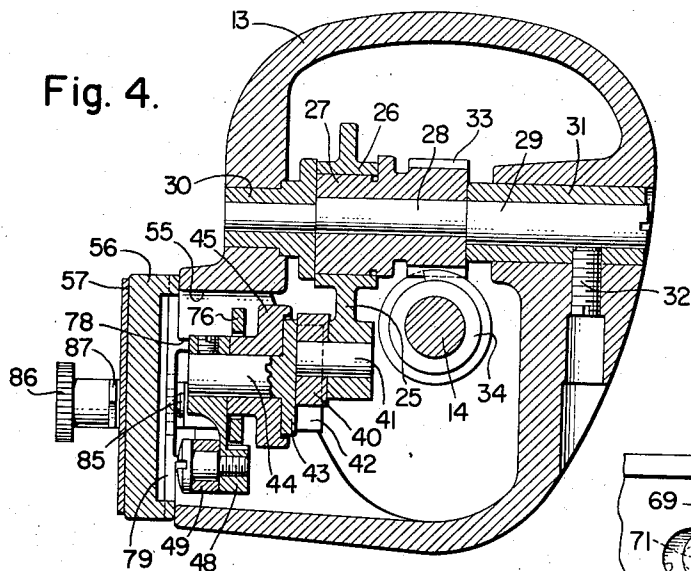


Fig. 6

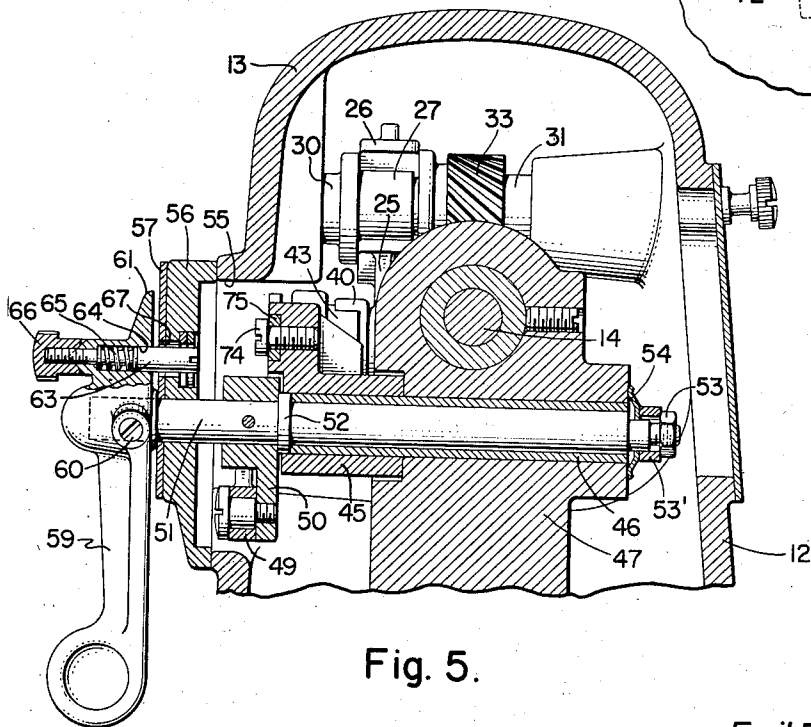


Fig. 5.

WITNESS

Nicholas Leozogak

INVENTORS.
Emil F. Kasper and
BY Julius Zoller

Marshall J. Breen
ATTORNEY

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NEEDLE-JOGGING MECHANISMS FOR SEWING MACHINES

Emil F. Kasper, Karlsruhe, and Julius Zoller, Karlsruhe-Durlach, Germany, assignors to The Singer Manufacturing Company, Elizabeth, N.J., a corporation of New Jersey

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3 Claims. (Cl. 112—158)

This invention relates to zigzag sewing machines of the laterally vibratory needle type, and more particularly, to mechanism for controlling lateral movements and the lateral position of the needle.

It is an object of this invention to provide an improved mechanism for controlling the bight, that is, the extent of lateral vibratory motion imparted to the needle, and for determining a neutral position of non-vibration of the needle at either the center or at one side of the field of lateral throw of the needle.

Another object of this invention is to provide separate independently adjustable bight and neutral position controls either one of which may be shifted without disturbing the registry of the other with indicia fixed on the sewing machine frame.

With the above and other objects and advantages in view as will hereinafter appear, this invention comprises the devices, combinations and arrangements of parts hereinafter described and illustrated in the accompanying drawings of a preferred embodiment in which:

Fig. 1 represents a front elevation view of a sewing machine having this invention applied thereto and with a portion of the machine frame broken away to expose the laterally vibratory needle bar mechanism,

Fig. 2 represents an enlarged front elevational view of the bracket arm portion of the sewing machine of Fig. 1 with the bight adjusting lever and the frame cover plate removed to expose the bight and neutral position controlling mechanism,

Fig. 3 is a cross-sectional view taken longitudinally of the arm substantially along line 3—3 of Fig. 1,

Fig. 4 is a cross-sectional view taken transversally of the arm substantially along line 4—4 of Fig. 1,

Fig. 5 is a cross-sectional view taken transversally of the arm substantially along line 5—5 of Fig. 1, and

Fig. 6 is an enlarged view of a fragment of the frame cover plate for the bight and neutral position controlling mechanism taken from the inside of the cover plate and illustrating the mechanism for limiting the extreme positions of the bight control lever.

Referring to Fig. 1, this invention is applied to a sewing machine with a conventional frame including a bed 11, a standard 12 rising from the bed and a hollow bracket arm head 13 overhanging the bed. Journalled lengthwise in the bracket arm head is a main shaft 14 carrying a hand wheel pulley 15 and a counterbalanced crank pin 16 which is embraced by a needle-bar driving link 17 and also slidably pivoted to one arm of a needle thread take-up lever 18 pivoted in the bracket arm head. The needle-bar driving link 17 embraces a pin 19 pivotally secured to a needle-bar 20 journalled for endwise reciprocatory movement in a needle-bar gate 21 which is suspended for lateral vibratory movement about a pivot pin 22 fast in the bracket arm head.

Freely pivoted on an eccentric shank portion of a pivot pin 23 secured in the needle-bar gate by a set screw 24 is an actuating member 25 which, in the preferred embodiment as illustrated in Fig. 1, takes the form of a pit-

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man bifurcated at 26 to embrace a driving cam 27 which, as best illustrated in Fig. 4, is journalled on an eccentric portion 28 of a stud shaft 29 fixed transversely of the bracket arm head in bushings 30, 31 and secured by a set screw 32. The driving cam 27 is preferably formed integral with a helical gear 33 arranged in mesh with a helical gear 34 fast on the main shaft 14. Gears 33 and 34 are chosen such that the driving cam 27 will rotate at half the speed of the main shaft 14, and the cam is timed so as to shift the actuating member in only one direction of its oscillatory movement between successive penetrations of the needle.

The oscillatory movement of the actuating member 25 about the pivot pin 23 is converted into lateral vibratory movement effective to impart lateral jogging movement to the needle-bar gate by means of a control connection between the actuating member 25 and the bracket arm head 13 of the machine frame.

Referring particularly to Figs. 2-5, the control connection comprises a slide block 40 journalled on a pivot pin 41 fast in the actuating member 25. The slide block is accommodated in a guide slot 42 formed diametrically across the end face of a guide member 43. The guide member is formed with a cylindrical shank 44 journalled transversely in the free extremity of a support arm 45 which in turn is journalled on a cylindrical tubular bearing bushing 46 fast in a boss 47 formed on the machine frame within the hollow bracket arm head.

Fast on the shank 44 of the guide member 43 is a rock arm 48 to which a link 49 is pivotally connected. The link 49 is also pivotally connected to a rock arm 50 fast on a shaft 51 journalled in the cylindrical tubular bearing bushing 46. Turning of the shaft 51 thus will effect angular adjustments of the guide member 43 about the axis of the cylindrical shank 44 thereof and consequently will effect changes in the inclination of the guide slot 42. Referring to Fig. 1 in which the slide block 40 and guide slot 42 are indicated in dashed lines, it will be understood that when this inclination of the guide slot 42 corresponds substantially with the tangent to an arc having its center at the pivot pin 23 of the actuating member, the actuating member will oscillate freely about the pivot pin 23 and no lateral vibratory movement will be imparted to the needle-bar gate. As the guide slot 42 is turned out of coincidence with the tangent to an arc having its center at the pivot pin 23, the slide block 40 moving in the slot during oscillation of the actuating member 25 will give rise to a component of lateral vibratory movement of the actuating member and hence of the needle-bar gate. The lateral vibratory movement of the needle-bar which is frequently termed "bight" in the art is thus controlled in the present invention by the angular position of the shaft 51.

As best illustrated in Fig. 5, the shaft 51 is provided with a shoulder 52 which engages the free extremity of the bushing 46. At the opposite extremity of the bushing, the shaft is threaded to accommodate a nut 53 which confines a washer 53' and a dished spring 54 between the shaft 51 and the boss 47. The pressure exerted by the spring 54 may be adjusted by means of the nut 53 to provide sufficient resistance to turning of the shaft 51 to hold the shaft in any desired position of angular adjustment and thereby prevent accidental turning movement thereof during operation of the sewing machine.

Turning of the support arm 45 in which the guide member 43 is journalled will have no appreciable effect upon the bight adjustments previously described, but will instead affect bodily movement of the guide member 43 with respect to the slide block 40 and consequently, will effect changes in the neutral position of non-vibration of the needle-bar. Thus when the guide member is shifted bodily to a position in which the slide block move-

ment occurs midway in the guide slot and symmetrically about the axis of turning movement of the guide member 43 in its supporting arm 45, the lateral vibratory movements of the needle-bar gate regardless of the position of bight adjustment will occur symmetrically about a central neutral position of non-vibration. Similarly, when the guide member is shifted bodily to a position in which the slide block movement occurs in one or the other extremities of the guide slot, the lateral vibratory movements of the needle-bar gate will occur all to one side either to the right or to the left of a neutral position of non-vibration depending upon the particular extremity of the guide slot in which the slide block is positioned.

The front wall of the bracket arm head 13 is formed with an aperture 55 providing an access opening exposing the above described control mechanism for the needle-jogging mechanism. A cover plate 56 and an indicia plate 57 are secured by the fastening screws 58 to the bracket arm head in a position closing the access aperture 55. As illustrated in Fig. 5, the cover and indicia plates are apertured to provide a clearance opening for the bight adjusting shaft 51 and a bight adjusting handle 59 is secured to the shaft outside the indicia plate as by the set screws 60. The handle 59 is formed with a pointed extremity 61 which cooperates with indicia 62 provided on the indicia plate 57 to indicate the position of bight adjustment of the control mechanism. A plunger 63 is seated in a counterbored hole 64 formed in the pointed extremity of the handle with a coil spring 65 disposed in the bore and urging the plunger inwardly into a stopped position as determined by a knurled nut 66 threadedly engaging the plunger 63 at the outside of the handle. The contiguous surfaces on the knurled nut 66 and the pointed extremity of the handle are scalloped as best illustrated in Fig. 3 so that the plunger may be constrained in a retracted position simply by turning the knurled nut until the scalloped portions of the nut and the handle are out of register. The cover and indicia plates are formed with an arcuate opening 67 to accommodate the plunger 63, as illustrated in Figs. 3, 5 and 6, the inside of the cover plate is formed with a shallow slot 68 extending on each side of the arcuate opening 67. A pair of stop members 69 slidably arranged in interleaved relation in the shallow slot 68 are each formed with an abutment surface 70 disposed for engagement with the plunger 63 and with a threaded stud 71 extending through an elongated aperture 72 in the cover and indicia plates and provided with a clamp nut 73 by which each stop member may be secured in selected position in the shallow slot 68. The plunger 63 when retracted will not engage the abutment surface of either stop member. When in extended operation position, however, the plunger 63 will be disposed between the abutments the positions of which may be adjusted independently so as to provide selective adjustment of both the maximum and the minimum possible bight settings.

Secured to the support arm 45 by fastening screws 74 is a spring arm 75 having an enlarged apertured portion 76 disposed to encircle the shank portion 44 of the guide member 43 and an offset arm portion 77 extending in a space defined by a channel 78 formed in the bracket arm head between the head and the cover plate 56. Spanning the channel 78 in the bracket arm head is a bar 79 formed with elongated slots 80—80 to accommodate fastening screws 81—81 by which the bar is secured to the bracket arm. Spaced lengthwise of the bar are three holes 82, 83 and 84 any one of which may be entered by the conical free extremity of a pin 85 carried by the spring arm 75. The pin 85 when seated in the hole 82 locks the supporting arm in a position of adjustment in which the neutral position of vibration of the needle bar gate will occur at the right hand side of the field of vibratory motion of the gate; when in hole 83, at a position centrally of the field; and when in hole 84, at the left hand side of the field. The position of the pin 85

may be changed readily to any desired hole by depressing the free extremity of the spring arm toward the bracket arm head to move the pin completely clear of the bar 79. The spring arm may then be turned freely to a new position of adjustment and when released, the conical free extremity of the pin 85 will automatically locate the pin centrally of whichever hole 82, 83, 84 has been selected for the new position of adjustment.

Manipulation of the spring arm 75 is facilitated by a handle 86 secured to the offset free extremity 77 of the spring arm 75 at the outside of the cover plate 56 as illustrated in Fig. 3. Clamped between the handle 86 and the spring arm 75 is a pointer 87 bent to overlie the indicia plate 57, the indicia plate being provided with indicia 88 cooperating with the pointer to indicate the position of adjustment of the spring arm either in left, right or central position of non-vibration of the needle-bar gate.

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

1. In a sewing machine having a needle-bar gate supported for lateral vibratory movement, a needle-bar gate actuating member pivotally connected to said gate, and means driven by said sewing machine for imparting oscillatory movement to said actuating member about said pivotal connection with said gate, means converting oscillatory movement of said actuating member into lateral vibratory movement of said needle-bar gate comprising, a tubular cylindrical bushing fixed in said sewing machine, an arm supported for turning movement on the outside of said tubular cylindrical bushing, a guide member journaled for turning movement in the free extremity of said arm, said guide member being formed with a radially extending guide slot, a shaft journaled coaxially within said tubular cylindrical bushing, linkage means operatively connecting said guide member to said shaft for turning movement in response to turning movement of said shaft, and a block slidably arranged in said guide slot and pivotally secured to said needle-bar gate actuating member.

2. In a sewing machine having a needle-bar gate supported for lateral vibratory movement, a needle-bar gate actuating member pivotally connected to said gate, and means driven by said sewing machine for imparting oscillatory movement to said actuating member about said pivotal connection with said gate, means converting oscillatory movement of said actuating member into lateral vibratory movement of said needle-bar gate comprising, a tubular cylindrical bushing carried on said sewing machine, an arm journaled on said bushing, a guide member journaled in the free extremity of said arm, said guide member being formed with a radial guide slot, a shaft journaled in said bushing, a rock arm fast on said shaft, a rock arm fast on said guide member, a link pivotally interconnecting said rock arms, and a block slidably arranged in said guide slot and pivotally secured to said needle-bar gate actuating member.

3. In a sewing machine having a frame formed with an access aperture, a needle bar gate supported by said frame for lateral vibratory movement, a needle bar gate actuating member pivotally connected to said gate, and means driven by said sewing machine for imparting oscillatory movement to said actuating member about said pivotal connection with said gate, means converting oscillatory movement of said actuating member into lateral vibratory movement of said needle bar gate comprising, a tubular cylindrical bushing carried in said sewing machine frame, a cantilevered portion of said tubular bushing extending free of said sewing machine frame and exposed in said access aperture, a slide block pivotally secured to said needle bar gate actuating member and exposed in said access aperture, and a control unit insertable through said access aperture, said control unit including an arm, bearing means formed on said arm for rotatably embracing the outside surface of the cantilevered portion of said tubular cylindrical bushing, a

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guide member disposed at one side of said arm, said guide member being formed with a radial guide slot to accommodate said slide block, a shank fast on said guide member and journaled in the free extremity of said arm, a rock arm fast on said shank at the opposite side of said arm from said guide member, a shaft, bearing means formed on said shaft for rotatably engaging the inside surface of said tubular cylindrical bushing, a rock arm fast on said shaft, and a link pivotally interconnecting said rock arms.

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