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2,635,568

MECHANISM FOR DESIGN STITCHING

Filed Oct. 8, 1949

4 Sheets-Sheet 1

FIG. 1

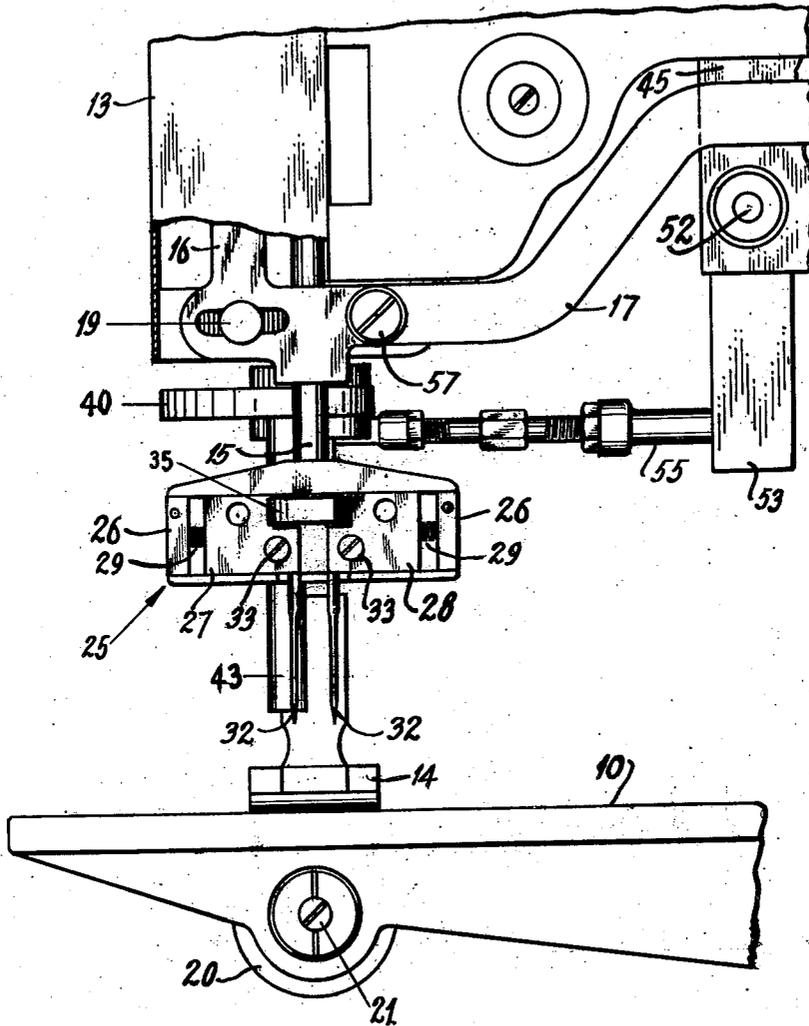
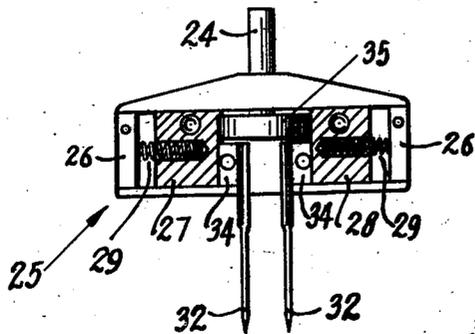


FIG. 2



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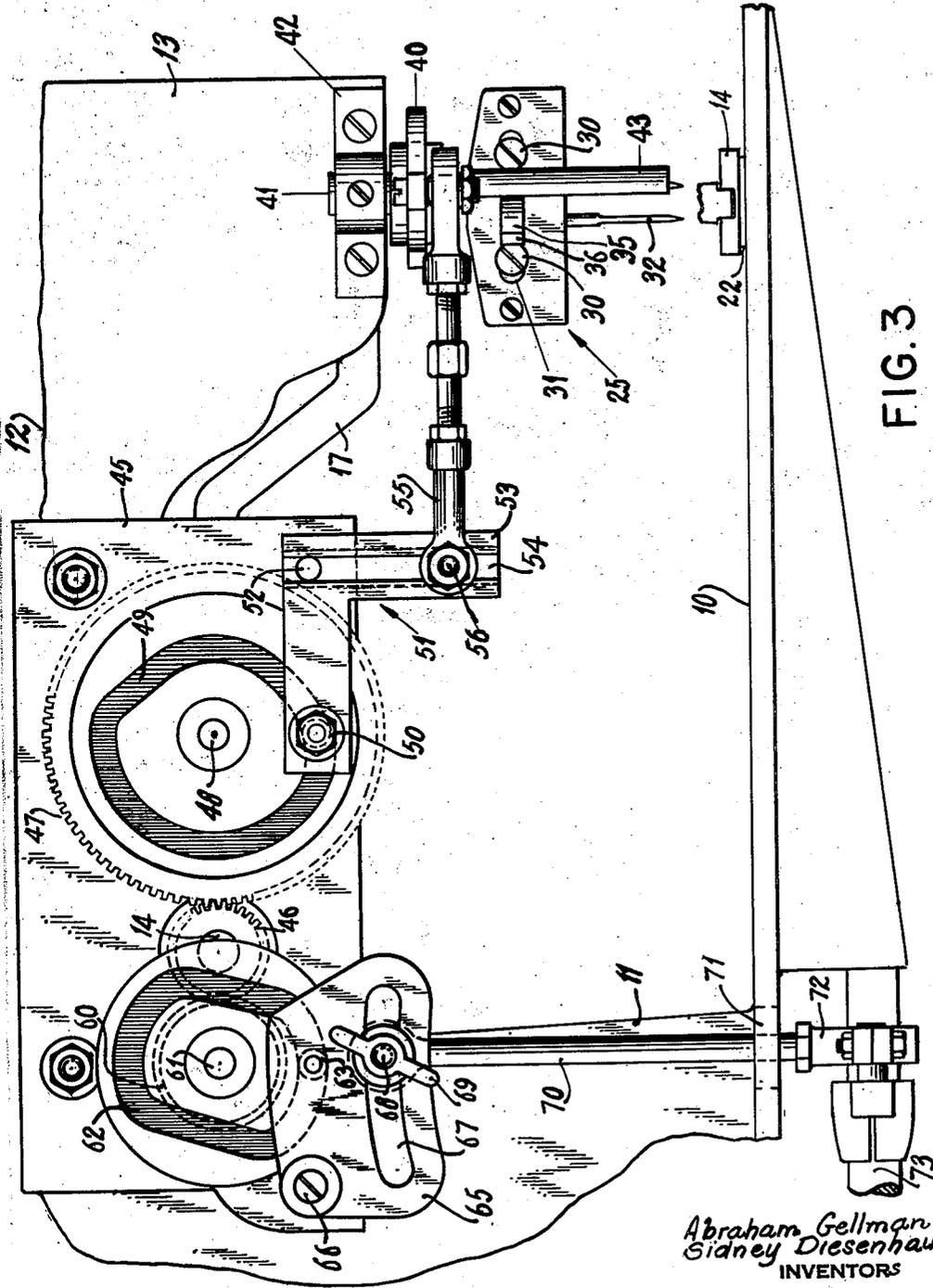


FIG. 3

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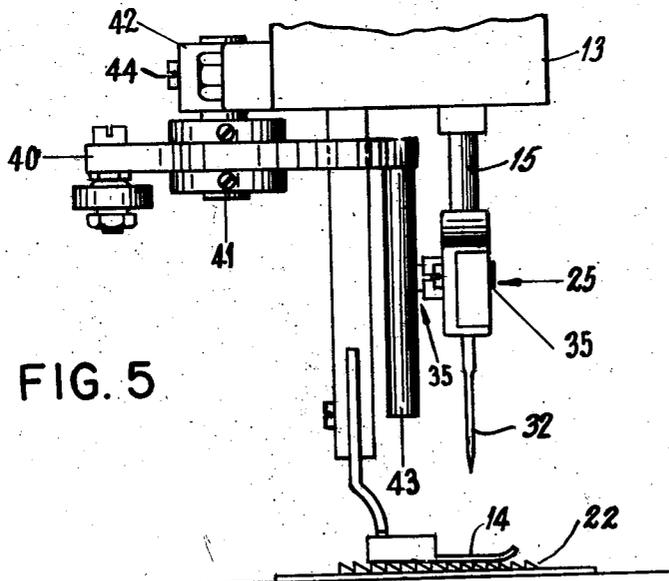
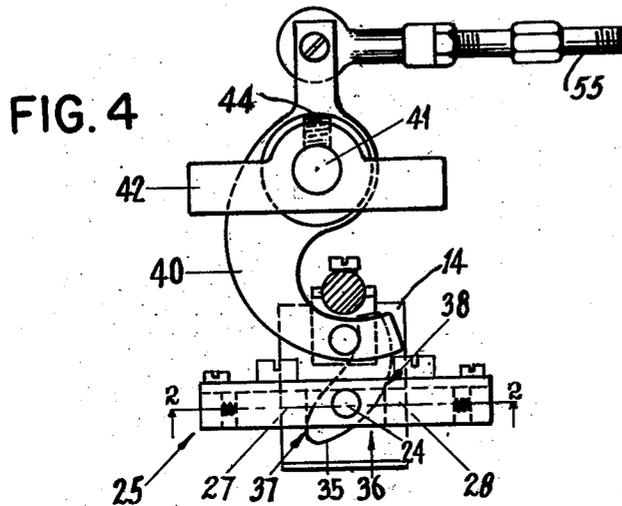
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MECHANISM FOR DESIGN STITCHING

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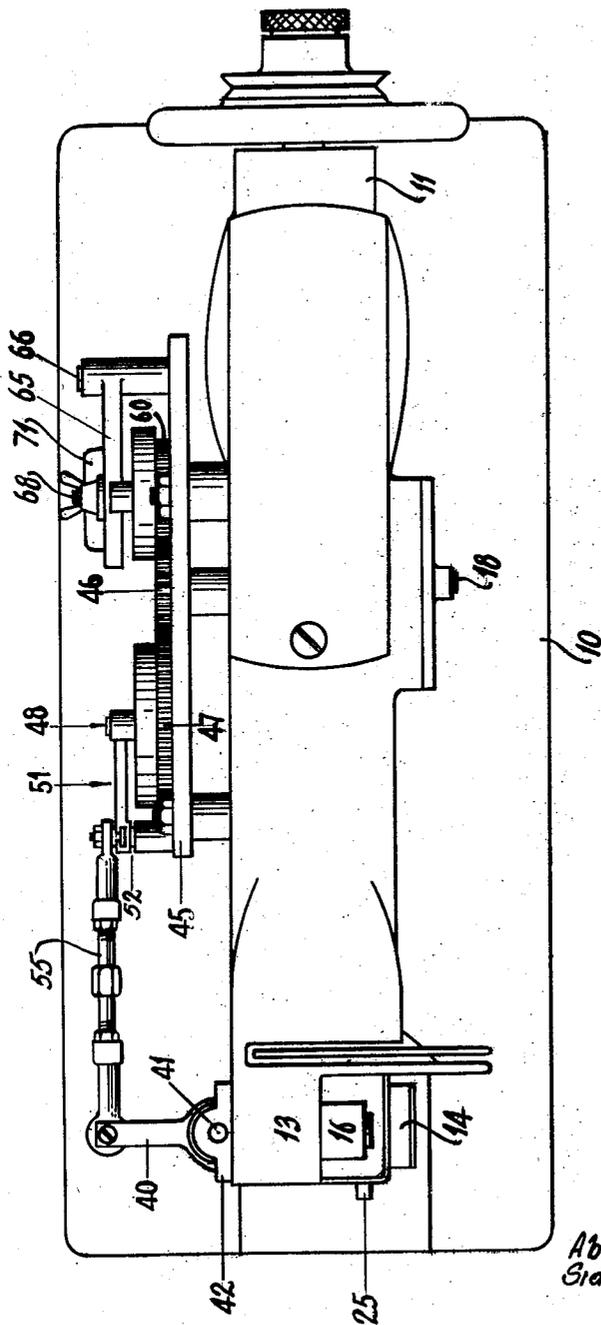
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MECHANISM FOR DESIGN STITCHING

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FIG. 6



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MECHANISM FOR DESIGN STITCHING

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Application October 8, 1949, Serial No. 120,356

10 Claims. (Cl. 112—98)

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This invention relates to sewing machines and more particularly to a zig-zag sewing machine having two needles and having means whereby the needles are vibrated so that they move relatively to each other in opposite directions while the machine is in full operation.

An object of this invention is to provide means whereby the amplitude of the vibrations of both needles may be simultaneously varied while moving to or from each other.

Another object of this invention is to provide a zig-zag sewing machine having a carrier mounted on the needle bar and having two needle holders slidably mounted in the carrier and spring pressed toward each other, a lever pivotally mounted in the carrier between the needle holders and adapted to impart lateral movement to the needle holders in opposite directions, and means for imparting oscillating movement to the lever.

Another object of this invention is to provide in combination with a zig-zag sewing machine having a vibrating needle bar, a carrier mounted on the needle-bar and having two needle holders movable laterally of the line of feed, the combined mechanism being adapted for imparting limited lateral movements to the needles in timed relation with the vibrating movements of the needle bar.

With the above and other objects in view, the invention will be hereinafter more particularly described, and the combination and arrangement of parts will be shown in the accompanying drawings and pointed out in the claims which form part of this specification.

Reference will now be had to the drawings, wherein like numerals of reference designate corresponding parts throughout the several views, in which:

Figure 1 is a front view of a fragmentary portion of a sewing machine embodying the invention.

Figure 2 is a front view of a carrier for two needle holders, shown in cross-section, the section being taken on line 2—2 in Figure 4.

Figure 3 is a rear elevation of the sewing machine shown in Figure 1.

Figure 4 is a top plan view of the needle carrier and the actuating lever for the needle holders in operative relationship and removed from the sewing machine.

Figure 5 is an end view of a fragmentary portion of the sewing machine with the needle carrier mechanism in operative position.

Figure 6 is a top plan view of the sewing machine.

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In the illustrated embodiment of the invention, the numeral 10 indicates the work supporting base of a zig-zag sewing machine embodying my invention and which comprises the usual tubular standard 11, having an overhanging arm 12 with a head 13 at its free end. A presser-foot 14 presses on the work.

The needle-bar 15 of the sewing machine is carried by the usual needle-bar frame 16 which is pivotally mounted in the head 13 and vibrated relatively thereto by the usual vibrating connection 17 and by an adjustable eccentric carried by a transverse shaft 18. A stud 19 secured in the head 13 prevents movements of the needle-bar frame 16 in the direction of the feed of the material. A rotary hook or loop taker 20 disposed below the work supporting base 10 and mounted on a horizontal shaft 21 carries a bobbin thread which cooperates with the needle thread to form zig-zag stitching. A feed-dog 22 is given four-motion feeding movements and serves for advancing the work. The zig-zag sewing machine is well known in the art and needs no further description.

For the purpose of this invention, a carrier 25 has an extension stud 24 suitably fixed to the lower end of the needle-bar 15. The carrier 25 is of channel shape in cross-section and defined by end bars 26. Two needle holders 27, 28 are mounted in the carrier 25, the holders being pressed toward each other by springs 29. The needle holders are retained in the carrier by screws 30 threaded into the needle holders and passing through a slot 31 in the carrier.

The needles 32 are firmly held in the needle holders by screws 33 which draw recessed end portions 34 of the holders together in gripping relation with the needles.

The needles are formed with flat faces and the needles are gripped in the holders with the flat faces facing each other to permit the needle points to be moved close together.

A horizontal lever 35 is pivotally mounted on the extension stud 24 and passes through a slot 36 in the carrier 25. The lever 35 has opposite faces 37, 38 in contact respectively with the needle holders 27, 28 and when the rear portion of the lever 35 is turned to the right, it moves the needle holders away from each other against the action of the springs 29 which tend to bring the needles toward each other.

A further lever 40 is pivotally mounted on a shaft 41 secured in a bracket 42 and fixed by a threaded bolt 44 to the head 13. The forward end of the lever 40 has an elongated downwardly extending upright rod 43 of a length to permit

contacting relation with the rear end of the lever 35 in all its up and down positions during operation of the sewing machine.

The mechanism for actuating the needles in timed relation with the normal zig-zag movements of the needles comprises a support plate 45 which is suitably attached to the rear face of the overhanging arm 12. Extending through the plate 45 is the transverse shaft 14 of the sewing machine on which the main driving gear 46 is rotatably carried.

Meshing with the gear 46 is a needle vibrating cam gear 47, rotatably supported by the plate 45 upon a pivot 48. The gear 47 has a cam groove 49. Extending into the cam groove 49 is a roller 50, rotatably carried by a rocker arm 51, at one end thereof. The arm 51 is pivotally mounted on a pin 52 extending from the plate 45. The arm 51 terminates in an adjustment segment 53 having a slot 54 in which the head of a bolt 56 is suitably slidable. This arrangement serves for connecting a vibrating connection 55 to the arm 51. The connection 55 is connected to the lever 40 and serves to oscillate the said lever.

The adjustment provided by the slot 54 serves for actuating the levers 35 and 40 and for varying the transverse motions of the needles. A feed cam gear 60 meshes with the gear 46. The gear 60 is rotatably mounted on a pivot 61 secured to the plate 45. The feed cam gear 60 has a cam groove 62. Projecting into the cam groove 62 is a roller 63 rotatably carried by a feed rocker arm 65. The arm 65 is pivoted to the plate 45 on a pivot screw 66.

The arm 65 has an arcuate slot 67 through which extends a screw 68 having a wing nut 69 upon its front end and coupling a feed connecting rod 70 to the arm 65 at its rear end. The slot 67 serves to decrease or increase the length of the stitch by varying the motion of the feed-dog 22. The rod 70 extends downwardly through an opening 71 in the base 10. At its lower end the rod 70 is connected by an arm 72 to the rock shaft 73 of the sewing machine. The gear 47 has a greater number of teeth than the teeth on the feed cam gear 60. This ratio causes the less rapidly rotating needle vibrating cam to vibrate the needle-bar frame in the required relation to the feed caused by the feed cam.

For the purposes of the fancy stitching that the machine provides, the feed cam is operated at a ratio of 3 to 1 while the needle vibrating cam is operated at a ratio of 6 to 1.

It is to be noted that we have removed the feed connection which ordinarily drives the feed of the machine and that we have substituted a cam feed. The ordinary feed acts with every stroke of the needle, while with the cam feed the machine can work with any number of strokes.

In accordance with the patent statutes we have described and illustrated the preferred embodiment of our invention, but it will be understood that various changes and modifications can be made therein without departing from the spirit of the invention as defined by the appended claims.

We claim:

1. A sewing machine comprising a needle bar, means for imparting movement to said needle bar, a carrier mounted on said needle bar, two needle holders horizontally slidable in said carrier, horizontally-positioned springs on the carrier and respectively actuating the needle holders inwardly toward each other, a lever pivotally mounted in said carrier between said needle hold-

ers and adapted to impart lateral movement to said needle holders in opposite directions, and means for imparting oscillating movement to said lever in timed relation with the movement of the needle bar.

2. A sewing machine comprising a needle bar, means for imparting lateral movement to said needle bar, a carrier mounted on said needle bar, two needle holders horizontally slidable in said carrier, horizontally positioned spring means reacting between the carrier and the respective holders to move the holders inwardly toward each other, a lever pivotally mounted in said carrier between said needle holders and adapted to impart lateral movement to said needle holders in opposite directions, and means for imparting oscillating movement to said lever in timed relation with the movement of the needle bar.

3. In a sewing machine having a head and comprising a laterally movable needle bar, a carrier fixed to the lower end of said needle bar, two needle holders horizontally slidable in said carrier, horizontally-positioned springs respectively reacting between the carrier and the respective holders to actuate the holders inwardly toward each other, a lever pivotally mounted in said carrier between said needle holders and adapted to impart lateral movement to said needle holders in opposite directions, a vertical rod mounted to oscillate in said head and to actuate said lever, and a cam for imparting oscillating movements to said rod and to said lever in timed relation with the movement of the needle bar.

4. In a sewing machine the combination of a needle-bar, a rotary hook operable about a horizontal axis, feeding mechanism for advancing the work, mechanism for vibrating said needle-bar laterally of the line of feed, a carrier mounted on said needle bar, a pair of needle holders laterally movable therein, horizontally-positioned spring means in said carrier reacting between the carrier and the respective needle holders for urging the needle holders laterally inwardly toward each other, a lever for moving the needle holders laterally away from each other against said spring means, and actuating means for imparting limited lateral movements to said lever and said needles in timed relation with the movements of said needles caused by said vibrating needle-bar.

5. In a sewing machine the combination of a pivotally mounted needle-bar, a rotary hook operable about a horizontal axis, feeding mechanism for advancing the work, mechanism for vibrating said needle-bar laterally of the line of feed, a carrier mounted on said needle-bar, a pair of needle holders laterally movable in said carrier, horizontally-positioned spring means in said carrier for urging the needle holders laterally inwardly toward each other, a lever for moving the needle holders laterally away from each other against said spring means, and actuating means for imparting limited lateral movements to said lever and said needles in timed relation with the movements of said needles caused by said vibrating needle-bar.

6. In a sewing machine having an overhanging head, the combination of a pivotally mounted needle-bar, a rotary hook operable about a horizontal axis, feeding mechanism for advancing the work, mechanism for vibrating said needle-bar laterally of the line of feed, a carrier mounted on said needle-bar, a pair of needle holders movable in said carrier, horizontally-positioned spring means in said carrier for urging the needle

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holders inwardly toward each other, a lever pivotally mounted in said needle carrier and having opposite faces in contact respectively with said needle holders for moving the needle holders away from each other against said spring means, a lever pivotally mounted in said head for actuating said needle actuating lever, and means for imparting limited movements to said levers and said needles in timed relation with the movements of said needles caused by said vibrating needle-bar.

7. In a sewing machine having an overhanging head, the combination of a pivotally mounted needle-bar, a rotary hook operable about a horizontal axis and coacting with said needle-bar, feeding mechanism for advancing the work, mechanism for vibrating said needle-bar laterally of the line of feed, a carrier mounted on said needle-bar, a pair of needle holders movable in said carrier, horizontally-positioned spring means in said carrier reacting between the carrier and the respective needle holders for urging the needle holders toward each other, a lever pivotally mounted in said needle carrier and having opposite faces in contact respectively with said needle holders for moving the needle holders away from each other against said spring means, a lever pivotally mounted in said head and having a downwardly extending upright rod at one end in engagement with said needle actuating lever for moving said lever in one direction, and means for imparting movements to said levers and said needles in timed relation with the movements of said needles caused by said vibrating needle-bar.

8. In a sewing machine having an overhanging head, the combination of a pivotally mounted needle-bar, a rotary hook operable about a horizontal axis and coacting with said needle-bar, feeding mechanism for advancing the work, mechanism for vibrating said needle-bar laterally of the line of feed, a carrier secured to said needle-bar, a pair of needle holders movable in said carrier laterally of the line of feed, horizontally-positioned springs in said carrier reacting between the carrier and the respective needle holders for urging said needle holders inwardly toward each other, a lever pivotally mounted in said needle carrier and having opposite faces in contact respectively with said needle holders for moving said needle holders away from each other against said spring means, a further lever pivotally mounted in said head and having a downwardly extending upright rod at one end in engagement with said needle actuating lever

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for moving said lever in a direction causing compression of said springs, and means for imparting movements to said levers and said needles in timed relation with the movements of said needles caused by said vibrating needle-bar.

9. In a sewing machine having an overhanging head, a pivotally mounted needle-bar, a transverse shaft, a rotary hook operable about a horizontal axis, feeding mechanism for advancing the work, and mechanism for vibrating said needle-bar laterally of the line of feed; a needle carrier secured to said needle-bar, a pair of needle holders movable in said carrier laterally of the line of feed, horizontally-positioned springs in said carrier reacting between the carrier and the respective needle holders for urging said needle holders inwardly toward each other, a lever pivotally mounted in said needle carrier and having opposite faces in contact respectively with said needle holders for moving said needle holders away from each other against said springs, a further lever pivotally mounted rearward of said head and having a downwardly extending upright rod at one end in engagement with said needle actuating lever for moving said lever in a direction causing movement of said needle holders away from each other and compression of said springs, and means driven by said transverse shaft for imparting movements to said levers and said needles in timed relation with the movements of said needles caused by said vibrating needle-bar.

10. The invention as defined in claim 9, wherein a support plate is mounted on said machine, said transverse shaft extending through said support plate and having a driving gear thereon meshed with a gear for driving a needle vibrating cam to vary the width of the stitching, and meshed with a further gear for driving a feed cam for actuating a feed advance rock shaft to vary the length of the stitching.

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