This invention relates to a needle-bar drive mechanism for a sewing machine and more particularly for a zigzag stitching type of sewing machine.

The invention has as a primary object to provide a needle-bar reciprocating link with connecting end pins which will not be loosened by vibration during operation of the sewing machine.

Another object of the invention is to provide a needle-bar reciprocating link with a shim serving as a locking means for the end connecting pins of the link.

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.

In the drawings:
Fig. 1 is an end elevation of a sewing machine head embodying the invention, the face plate being removed and the needle bar and gate partly broken away to expose the parts.

Fig. 2 is a vertical sectional view taken substantially on a line 1—1 of Fig. 1, with the needle bar shown in raised position.

Fig. 3 is an exploded detail view of the improved needle bar reciprocating link.

Fig. 4 is an enlarged sectional view of the improved needle bar reciprocating link pivot pin, taken on the line 2—2 of Fig. 1.

Referring more specifically to the drawings, the invention is disclosed as being embodied in a sewing machine having a frame including a head 11 carried by the usual bracket-arm 12, the head being closed at its outer end by the usual detachable face-plate 13. Rotatably journaled in a suitable bearing 14 provided in said bracket-arm 12 is a horizontally disposed actuating shaft 15, having one end extending from the head to a driving power source (not shown). At its opposite end, the actuating shaft 15 carries an actuating element or counterbalanced crank 16 provided with a crank-pin 17 connected by a link 18 with the usual take-up lever 19 suitably fulcrumed within the hollow head 11. Pivotally journaled upon a pin 20 carried by an offset portion of the crank-pin 17 is bifurcated journal sleeve 21 having depending and spaced ears 22 between which the upper end of the improved needle-bar reciprocating link 23 and the shim 24 are pivotally mounted by a pin 25 for swinging movements about an axis transverse to the axis of the actuating shaft 15. The lower end of said link 23 is similarly pivoted on a pin 26 between upstanding spaced ears 27 of a bifurcated journal sleeve 28 pivoted upon a stud 29 extending from a collar 30 suitably secured upon a vertically reciprocatory and laterally vibratory driven member or needle-bar 31.

The needle-bar 31 carries at its lower end a needle 32 and is journaled for endwise reciprocation in suitable bearings provided upon a vibratory gate 33. The flattened upper end of the gate 33 is disposed within the bifurcated lower end of a supporting member 34 adjustably threaded vertically into the upper wall of the bracket-arm head. The gate 33 is pivotally hung upon a screw stud 35 horizontally spanning the slot in the supporting member 34 to provide for swinging movements of the gate 33 about a pivotal axis substantially transverse to the axis of the actuating shaft 15. The lower end of the gate 33 is formed with opposed flat walls 36 slidably disposed between guide walls 37 of a guide-way formed by vertically slotting the lower wall of the bracket arm head 11 in a direction whereby the gate 33 is confined to swinging movements in a vertical plane. The needle bar 31 is restrained against turning in the gate bearings therefor, in a manner well known in the art, by a split guide-lug 38 on the collar 30, which guide-lug is slidably disposed in a vertical guide-slot 39 provided in the gate 33. An arm 40 for laterally vibrating the gate 33 extends horizontally from the gate 33 and is connected to a suitable operating mechanism. The mechanism for vibrating the arm 40 and gate 33 may be of any well known type such as that shown in the Patent No. 2,005,670, issued to C. M. Esames.

The improved needle-bar reciprocating link 23 is made, as shown in Fig. 3, so that the width of the link is slightly less than the width of the slot between the ears 22 and the ears 27. Holes 41 and 42 are drilled in the members 28 and 23, respectively, to receive the pin 26. Holes 43 and 44 are drilled in the members 28 and 23, respectively, to receive the pin 25. The link 23 is drilled and tapped intermediate its ends at 45 to receive a screw 46. The locking member or shim 24 is the same length and depth as the link 23 and of such a thickness as to function as a shim between the link 23 and the ears 22 and 27, respectively. Two slots 47 and 48 are provided in one edge of the shim 24 near its ends and the pins 25 and 26 are formed with circumferential grooves 49 and 50 to receive the slotted portions.
2,669,208

47 and 48, respectively, of the shim 24. The shim 24 is formed with a hole 51 through which the screw 46 passes to enter the threaded hole 45 in the link 23 when the parts are in the assembled position.

From the foregoing description, it will be understood that the link 23 may be placed between the ears 22 and 27 and the pins 29 and 28 may then be inserted through the holes 41, 42 and 43, 44, respectively, at opposite ends of the link until the left edge of the groove of each pin is aligned with the right face of the link. The shim 24 may then be dropped between the right face of link 23 and the ears 22 and 27, so that the slotted portions 41 and 48 of the link 24 engage in the grooves 49 and 50, respectively. The screw 46 may then be inserted through the hole 51 in the shim 24 and threaded into the hole 45 in the link 23. Since the slots 41 and 48 are in the same edge of the shim 24, the shim cannot rotate about the screw 46 and become disengaged from the grooves 49 and 50. As will be evident, the present construction provides a simple and easily assembled means of securely holding the pins 25 and 26 in place while at the same time providing a means to shim the link 23 to the correct working clearances between the ears 22 and between the ears 27. This results in a smoother and quieter operation of the needle-bar and eliminates the possibility of machine failure due to loosened connecting link pivot-pins.

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

1. A sewing machine having a frame, an actuating crank, and a reciprocable and laterally vibratable driven member carried by said frame, only one connecting link extending between said crank and said driven member, pivotal connections connecting said link to said crank and said driven member, each of said pivotal connections comprising a pivot pin having a peripherally grooved portion, a pivot pin locking shim extending parallel to said link and having slots in one edge entered by the grooved portion of said pins, and means securing said shim to said link.

2. In a sewing machine, a frame, a rotary actuating element carried by said frame, a crank-pin carried by said element, a reciprocatory and laterally vibratory needle-bar carried by said frame, a journal stud carried by said needle-bar, a bifurcated journal sleeve carried by said crank-pin, a second bifurcated journal sleeve carried by said stud, a connecting link having its ends positioned in the bifurcated portions of said sleeves, pivot pins connecting said link to the bifurcated portions of said journal sleeves, said pivot pins having circumferentially grooved portions, a pivot pin locking shim extending parallel to said connecting link into the bifurcated portions of said journal sleeves, said shim having slots in one edge entered by the grooved portions of said pivot-pins, and fastening means securing said shim to said link.

RALPH E. JOHNSON.

References Cited in the file of this patent
UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,694,746</td>
<td>Landahl</td>
<td>Dec. 11, 1928</td>
</tr>
<tr>
<td>2,005,073</td>
<td>Eames</td>
<td>June 18, 1935</td>
</tr>
</tbody>
</table>