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NEEDLEBAR MECHANISM FOR SEWING MACHINES

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Fig. 1.

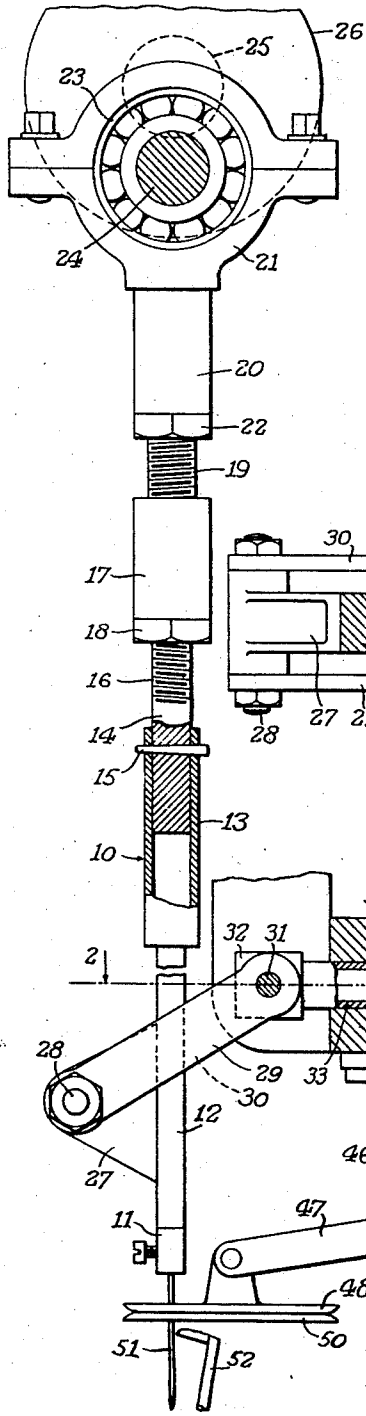
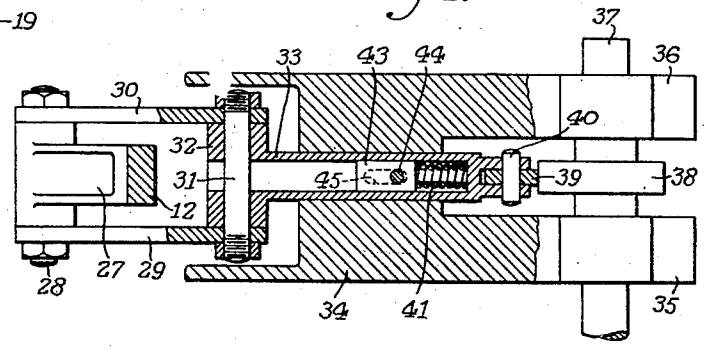
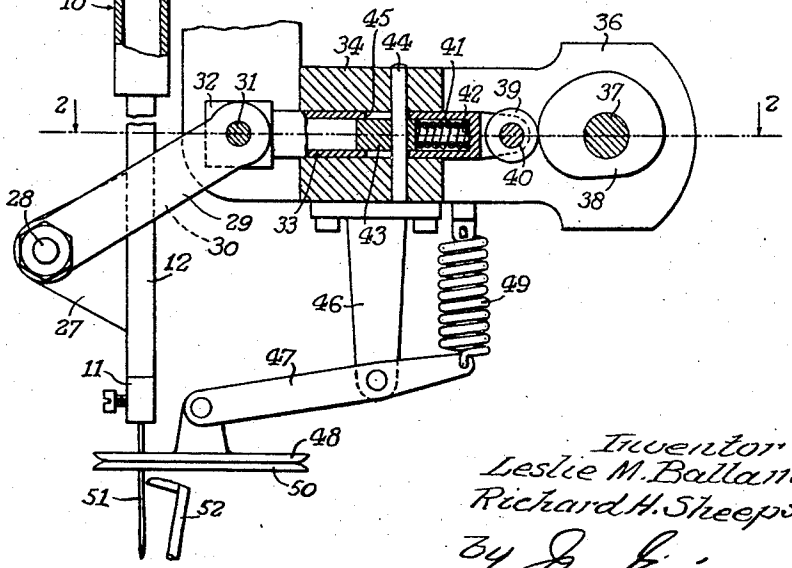


Fig. 2.





Inventor
Leslie M. Ballamy
Richard H. Sheepshanks
By
Attorney

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NEEDLEBAR MECHANISM FOR SEWING MACHINES

Leslie Mark Ballamy, Caterham-on-Hill, and Richard Hasell Sheepshanks, Eyke, Woodbridge, England

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3 Claims. (Cl. 112—221)

This invention relates to needlebar mechanism for sewing machines, and in particular to such mechanism wherein a needlebar which is guided at a position adjacent the usual needle-holder is driven by means of a crank, eccentric or like device, which, in addition to bringing about the reciprocation of the needlebar, also causes the needle-holder to oscillate in a fore and aft direction (i. e. in the direction of the row of stitches), thus compensating for the feeding movement of the material which is being sewn and enabling said material to be fed at a substantially steady rate.

It is the object of the present invention to provide an improved form of mechanism, which is simple in construction and which enables the needlebar itself to be carried in pivotal bearings instead of the usual sleeve of non-circular cross-section within which the needlebar is mounted for rectilinear sliding movement.

In needlebar mechanism for a sewing machine, comprising a needlebar, a crank or equivalent connected operatively with that end thereof remote from the needle-holder, and guiding means for the needle-holder end of the needlebar, the present invention is characterised by the fact that said guiding means comprises a link device which is pivotally connected at spaced points, to the needlebar and to a locating member, respectively, so that the needle-holder is caused to move in a fore and aft direction as the needlebar as a whole reciprocates.

Further there is provided in accordance with the invention needlebar mechanism for a sewing machine, comprising a needlebar, a crank or equivalent connected operatively with that end thereof remote from the needle-holder, and guiding means for the needle-holder end of the needlebar, characterised by the fact that the guiding means comprises a link device connecting the needlebar with a locating member, which latter is caused to change its position as the needlebar reciprocates, thus regulating the movement of the needle-holder in a fore and aft direction.

As a further feature of the invention needlebar mechanism for a sewing machine is provided comprising in combination a needlebar provided with a needle-holder at one end, means at the opposite end for reciprocating said needlebar, a locating member, means for regulating the position of the locating member so that it occupies a predetermined position for each point in the cycle of reciprocation of the needlebar, and a link device connecting the needlebar with the locating member so as to impart a predetermined movement in a fore and aft direction to the needle-holder.

If desired the means, such as a rotating cam, for moving the locating member may be driven from, or in common with the needlebar, and the locating member may comprise a plunger which is mounted for sliding movement in a housing secured to the body of the machine. Where a cam is used for moving the locating member, said locating member may be urged into engagement with said cam by means of a spring, the latter conveniently being disposed within the plunger and being arranged to act between a surface upon the interior of the plunger, and an abutment block which is also disposed within the plunger and is anchored to the housing by means of a pin passing through a slot in the plunger. The needlebar is preferably connected with the locating member by a pair of links disposed one on each side of the needlebar, while the latter may be formed in two parts which are secured together by a device arranged to give way should the force in the needlebar exceed a predetermined value. Thus a sleeve carried by one part of the needlebar may fit telescopically over the other part, said sleeve being connected to said other part by a transverse pin adapted to shear in the event of the needlebar being overloaded.

The invention is illustrated by way of example in the accompanying drawing, in which:

Figure 1 is a side elevation of the needlebar with its mounting and driving mechanism, certain parts being shown in section; and

Figure 2 is a sectional plan taken on the line 2—2 of Figure 1.

The needlebar, which is indicated generally at 10, is formed at its lower end with a needle-holder 11 adapted to grip a single needle, or a set of needles where a plurality of mutually parallel rows of stitching are to be made simultaneously. The lower part 12 of the needlebar 10 is of rectangular cross-section, as will be seen in Figure 2, and it is secured at its upper end to a sleeve 13 which fits slidably over a rod 14, said sleeve being secured to the rod 14 by means of a transverse pin 15, which is sufficiently soft and small in cross-section to shear if the compression (or tension) in the needlebar 10 should exceed a predetermined safe value. The rod 14 is screw-threaded at 16 for engagement with an adjusting member 17, a lock nut 18 being provided. The upper part of the adjusting member 17 is screwed with a spigot 19 having a screw-thread which is of opposite hand to the thread 16 and/or is of

different pitch. The screw-threaded spigot 19 engages within a collar 20 formed upon a bearing holder 21, the adjustment being locked by a nut 22; thus by loosening the nuts 18 and 22 and rotating the adjusting member 17 the operative length of the needlebar 10 may be readily regulated. A ball bearing 23 disposed within the holder 21 is mounted upon a crank pin 24 of a driving crank shaft indicated at 25, the web, or one of the webs, carrying the crank pin 24 being shown at 26.

A block 27 is secured to the portion 12 of the needlebar and carries a transverse pin 28 serving as the pivotal mounting for one end of each of a pair of links 29 and 30. The opposite ends of these links are connected together by a pin 31, which is freely rotatable within a locating member constituted by a transverse bush 32 formed upon the extremity of a tubular plunger 33. This plunger is horizontally slidable within a housing 34, which is secured to a convenient fixed part of the sewing machine, and which is provided with a pair of arms 35 and 36 suitably fitted with bearings for a driving shaft 37. The latter is driven from, or in common with, the crank shaft 25, so that the two shafts rotate at equal speeds. The shaft 37 is fitted with a cam 38, the shape of which will be seen more clearly in Figure 1, said cam being arranged to be engaged by a follower roller 39 pivotally mounted upon the adjacent end of the plunger 33 by means of a transverse pin 40. In order to maintain the roller 39 in contact with the periphery of the cam 38, said plunger 33 contains a coiled compression spring 41, which at one end bears against the end interior surface 42 of the plunger, while its opposite extremity engages with an abutment block 43, which is anchored with respect to the housing 34 by means of a transverse pin 44. A pair of diametrically opposed slots 45 formed in the plunger 33 permit the requisite axial movement of said plunger, and at the same time prevent rotation thereof relative to the housing 34 owing to the restraining action of the transverse pin 44. This, of course, also keeps the bush 32 truly parallel with the pin 28 in the block 27 and thus avoids the creation of unnecessary friction in the mounting of the links 29 and 30. To the under side of the housing 34 a bearing bracket 46 is secured and serves as the pivotal attachment for a lever 47 carrying a presser foot 48 at its extremity, the opposite end of said lever 47 being connected with the housing 34 by means of a coiled tension spring 49 in order to create the necessary downward pressure upon the presser foot 48. The usual throat plate of the sewing machine is indicated at 50 and the needle or needles at 51; it will, of course, be obvious that looper mechanism, indicated at 52, would be provided beneath the throat plate 50 and would be operated by any suitable form of mechanism (not shown) in order to secure a proper stitching action.

The needlebar mechanism which is illustrated is intended primarily for sewing material (not shown) which is fed between the throat plate 50 and the presser plate 48 at a smooth, constant rate, so that it is necessary for the needle or needles 51 to move forwards (i. e. to the right) while it or they are penetrating the material which is being sewn, said needle or needles being caused to return (i. e. move to the left) when they are clear of said material. This effect is to some extent obtained owing to the somewhat oscillational movement which is imparted to the needlebar 10 as the crank shaft 25 rotates in a clockwise direction, but the forward movement of the needles or needles 51, which results from the action of the crank shaft 25 during the descending stroke of the needlebar 10, is modified to produce exactly the desired action by suitably shaping the cam 38. Thus as the needlebar 10 descends, the locating member constituted by the plunger 33 and bush 32 has its position so regulated from instant to instant that the needle or needles 51 do not drag the material as the latter is penetrated by the needle or needles.

The invention is primarily intended for use in machines where a number of needlebars are arranged to operate side by side so as to produce numerous parallel rows of stitching in sheet material, such as quilting, composed of kapok or other fibrous substances. The various needlebars in such a machine are usually driven by a common crank shaft, such as 25, but are arranged in various phases so that they execute their penetrating strokes in a predetermined sequence. With such machines it is particularly desirable that the material to be sewn should be fed steadily past the needles, and the improved arrangement achieves this result. The invention is, however, equally applicable to sewing machines in which a single needlebar is used.

It will be appreciated that the arrangement described is given merely as an example and that various modifications are possible.

What we claim is:

1. Needle bar mechanism for a sewing machine, comprising a rigid needle bar, means at one end of the bar to receive a needle, a continuously rotatable crankshaft, a crank on said shaft pivotally carrying that end of the needle bar remote from the needle, and a link pivoted at one end to the needle bar adjacent the needle and extending laterally from said needle bar, a locating member, the opposite end of said link being pivotally connected to the locating member, said crank and said link forming the sole supporting and locating means for the needle bar.

2. Needle bar mechanism for a sewing machine, comprising a rigid needle bar, means at one end of said bar to receive a needle, a continuously rotatable crankshaft, a crank on said shaft, said crank pivotally carrying that end of the needle bar remote from the needle, a locating member, a cam driven in common with the crankshaft and operative to move the locating member in a direction laterally of the needle bar, and a link pivotally connected at one end to the needle bar at a position adjacent the needle, said link extending laterally from said needle bar and pivotally connected at the end remote from the needle bar to the locating member, the said crank and the link forming the sole supporting and locating means for the needle bar.

3. A construction as defined in claim 2 wherein the locating means is guided rectilinearly, and wherein a spring urges the said locating means into engagement with the cam.

LESLIE MARK BALLAMY.
RICHARD HASELL SHEEPSHANKS.