

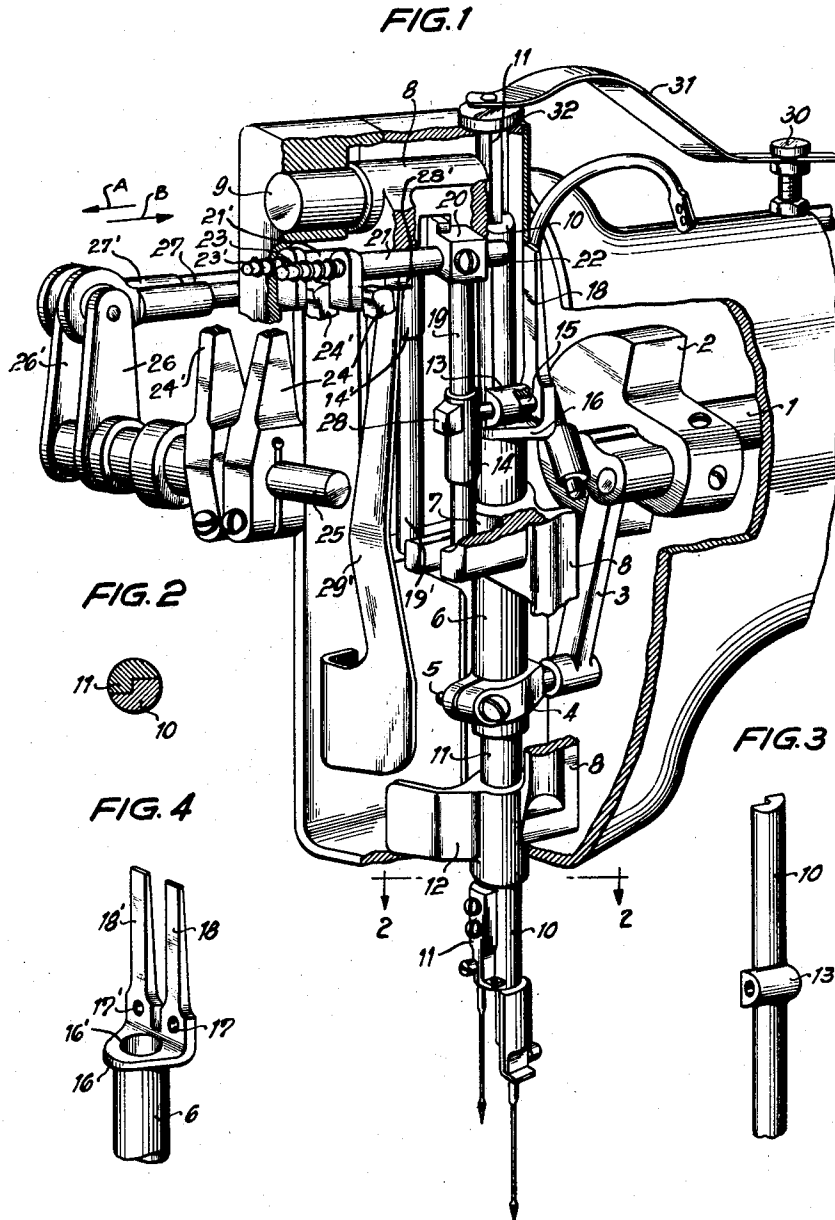
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DOUBLE NEEDLE SEWING MACHINE

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DOUBLE NEEDLE SEWING MACHINE

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The invention relates to a double needle sewing machine, and relates more particularly to such a machine that affords independent immobilizing of either needle.

Double needle sewing machines are used particularly for the sewing around corners. They require absolute certainty in starting and stopping during the run of the sewing machine of either needle with the added desideratum that the de-energized needle carrier is immobilized in its topmost position furthest from the work-piece. These features are usually found in double needle sewing machines now in use. Present sewing machines of this type, however, are deficient therein that they do not provide for sufficient closeness between the two needles, nor for absolute equality among the facilities for starting and arresting the needle carriers, nor furthermore for a sufficient length of bearing surface of the needle carriers to insure adequate vertical guiding thereof.

The instant invention has therefore among its objects to obviate the deficiencies of the prior art, and to provide for independent immobilizing of either needle carrier in the top position independently of the other, extreme closeness between the needles and the carriers thereof, and appropriate vertical guiding.

Generally speaking, the closeness between the needle carriers is accomplished by arranging them in such a manner that they complete a cylinder, with the abutting surfaces therebetween arranged in accordance with a specific Z-pattern; the appropriate guiding is provided by driving the needle carriers from an elongated sleeve which, in turn, is driven from the power drive of the machine.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description of exemplification thereof, reference being had to the accompanying drawings, wherein:

Fig. 1 is a fragmentary perspective view, partly in section, and with certain parts removed and certain other parts shown in distorted position for the sake of clarity of demonstration;

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary perspective view of one of the needle carriers; and

Fig. 4 is a fragmentary perspective view showing the top part of the sleeve that drives the needle carriers.

In carrying the invention into effect in one of the embodiments which has been selected for illustration in the accompanying drawings and for description in this specification, and referring now particularly to Fig. 1, there is provided a drive shaft 1 of the sewing machine that has a crank 2 and a connecting rod 3 which imparts a vertical reciprocating motion to a sleeve 6. The connecting rod 3 is pivoted to a dog 4 that is removably and adjustably secured to the sleeve 6 by means of a tightening screw 5.

The sleeve 6 is guided in a bearing 7 that is formed in a structure 8 which is suspended by a bolt 9 in the head of the sewing machine. The bearing 7 guides the sleeve 6 vertically. The sleeve 6 is hollow on its in-

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terior and surrounds the two needle carriers 10 and 11 in such a manner that the needle carriers 10 and 11 may reciprocate with the sleeve 6 upon connection thereto and, respectively, may slide relative to the sleeve 6 when disconnected therefrom. The needle carriers 10 and 11 are furthermore guided in a bearing 12 that is formed by the structure 8.

The two needle carriers 10 and 11 complete, as best shown in Fig. 2, a cylinder. The dividing surface between the two needle carriers includes a plane portion that coincides with the axis of that cylinder and two diametrically opposite plane portions that join the first portion at opposite ends thereof at right angle.

Each of the needle carriers 10 and 11 is separately and independently of the other removably connectable to the sleeve 6 for reciprocation therewith, and each is separately transportable by the sleeve 6 upon disconnection therefrom to its topmost position for subsequent immobilizing.

The connection to and disconnection from the sleeve 6, and the immobilizing of the needle carriers 10 and 11 is accomplished as follows. Each needle carrier has a lug or bore structure, for instance the needle carrier 10 has a bore structure 13 as shown in Fig. 1. A pin 15 (Fig. 1) is shiftable axially in the bore of the bore structure 13.

At the top end of the sleeve 6 there are provided two opposite cam surfaces 16 and 16' against which there may abut from above the bore structure 13 of the needle carrier 10 and, respectively, the corresponding bore structure (not shown) of the needle carrier 11. At the top end the sleeve 6 carries furthermore a yoke which includes two arms that carry cam surfaces 18 and 18', respectively, and the arms have openings 17 and 17', respectively. When the bore structure 13 of the carrier 10 abuts from above against the cam 16, its bore will be aligned with the opening 17, and in that position the pin 15 may be pushed in the direction B to engage the opening 17. Similarly, when the corresponding bore of the bore structure of the carrier 11 abuts against the cam surface 16', the bore will be aligned with the opening 17', and the pin of the needle carrier 11 may be pushed likewise in direction B to engage the opening 17'.

The pin 15 of the carrier 10 is secured to a bushing 14 that is vertically slidable on a rod 19; similarly, the pin of the carrier 11 is secured to a bushing 14' that is vertically slidable on a rod 19'. Each of the rods 19 and 19' is horizontally movable in the opposite directions A and B; in Fig. 1, the rod 19 is shown in the active position to which it has been moved in direction B, and the rod 19' is shown in the inactive position to which it has been moved in direction A. In the active position, the pin, for instance the pin 15 of the carrier 10, engages the opening, for instance the opening 17, of the sleeve 6, while in the inactive position the pin is disengaged from the opening. In both the active and inactive positions, however, the pin remains engaged in the bore structure, for instance the pin 15 engaged in the bore of the bore structure 13, so that wherever the bore structure is, either up or down, there will be the corresponding bushing 14 or 14'.

The shifting of the rods 19 and 19' in the horizontal directions A and B is controlled by a shifting mechanism. The rod 19 is connected to a head 20 that is connected to an element 21 that is movable in directions A and B, and is pressed by a spring 23 into the direction B, tending to maintain the rod 19 in the active position. Similarly, the rod 19' is connected to a head (not shown) that is secured to a movable element 21' that is biased by a spring 23'. Each of the movable elements 21 and 21' engages the respective spring 23 and 23', by means of a downward extension. Behind said downward extensions,

there are provided engaging members 24 and 24', respectively. Each of these engaging members is mounted for turning about the same axis. For instance, the engaging member 24 is secured to a shaft 25, and the shaft 25 carries an arm 26 that may be moved by means of a rod 27. The member 24', on the other hand, may be mounted on a hollow shaft that surrounds concentrically the shaft 25, and the hollow shaft may carry an arm 26', the movement of which is controlled by a rod 27'. By moving, for instance, the rod 27 in the direction A, which may be done normally by the operator or automatically, the member 24 will be tilted engaging the element 21 to move it in the direction A, and shifting the rod 19 into the inactive position.

In Fig. 1, the members 24 and 24' have been shown cut-apart, for purposes of illustration. The member 24 is shown in the position in which the rod 27 is moved in the direction B, while the member 24' is shown in a position in which the rod 27' is moved in direction A. Accordingly, the element 21 is not engaged by the member 24, and the spring 23 maintains the rod 19 in the active position, while the element 21' is engaged by the member 24', thereby maintaining the rod 19' in the inactive position.

The bushing 14 carries opposite to the pin 15 a nose 28, and the bushing 14' carries a similar nose 28'. A leaf spring 29' is provided to engage the underside of the nose 28', when the bushing 14' has been lifted to its top position; a similar leaf spring is provided for the nose 28, but has been omitted from the drawing.

On the arm of the sewing machine there is mounted a screw 30 which carries a leaf spring 31 from which there is suspended an elongated abutment piece 32.

The operation is as follows. In the following, the arresting and immobilizing will be described in connection with the needle carrier 11 and the parts pertaining thereto, as these are shown in that position in Fig. 1.

The operator will move the rod 27' in the direction A, whereupon the member 24' will move the element 21' in the direction A against the force of the spring 23'. By this movement, the rod 19' will be moved into the inactive position, whereby the pin of the bushing 14' will be disengaged from the opening 17', thus releasing the carrier 11 from positive engagement with the sleeve 6. During the subsequent upward stroke of the sleeve 6, the cam 16' will push the bore structure, and thereby the carrier 11, upwardly. During this upward movement, the pin of the bushing 14' that is still engaged in the bore of the bore structure of the carrier 11 will also be raised and will take along upwardly the bushing 14' until the upper end of the carrier 11 abuts against the abutment piece 32. At the same time, the spring 29' will engage the underside of the nose 28' of the bushing 14', maintaining the bushing 14' and therewith the carrier 11 immobilized in the uppermost position.

To start again the working of the needle carrier 11, the operator will move the rod 27' in the direction B, thereby releasing the element 21' to move in direction B under the force of the spring 23', resulting in a shift in direction B of the rod 19'. This shift will separate the nose 28' from the leaf spring 29', thereby freeing the nose 28' from the support by that spring. That shifting will also bring the far end of the pin that is carried by the bushing 14' into abutment with the cam surface 18' (Fig. 4), and the spring 23', will exercise the pressure in the direction B. During the following upward stroke of the sleeve 6, the opening 17' will reach a position of alignment with the pin, and the spring 23' will press the pin into the opening 17', thereby completing the interconnection for tied reciprocation of the carrier 11 with the sleeve 6.

It will be apparent to those skilled in the art that the novel principles of the invention disclosed herein in connection with specific exemplification thereof will suggest various other modifications and applications of the same.

It is accordingly desired that in construing the breadth of the appended claims they shall not be limited to the specific exemplification of the invention described herein.

Having thus described the invention, what we claim as new and desire to be secured by Letters Patent, is as follows:

1. In a double needle sewing machine having a power drive, in combination, two needle carriers disposed immediately adjacent each other and reciprocable together for double needle sewing, each needle carrier having the shape of a portion of a cylinder and being immobilizable independently of the other, said needle carriers together forming in cross-section a continuous circular area and being longitudinally movable relative to each other and completing said cylinder, the abutting surface between said needle carriers being axially of said cylinder including a plane portion intersecting the axis of said cylinder and two diametrically opposite portions parallel and offset from each other, each said last-named portions forming a right angle with said first-named portion, a sleeve defining on its interior a corresponding circle and surrounding both needle carriers and being in driving connection with said power drive to be reciprocable thereby, for driving said needle carriers, means operable from the exterior of said sewing machine for releasably coupling each needle carrier independently of the other with said sleeve including cam means between each needle carrier and said sleeve and actuable to move each needle carrier to its top-most position upon uncoupling from said sleeve, and means to immobilize the carrier in said position.

2. In a double needle sewing machine having a power drive, in combination, two needle carriers disposed adjacent each other and reciprocable together for double needle sewing, and each needle carrier being immobilizable independently of the other, a sleeve surrounding both needle carriers and being in driving connection with said power drive to be reciprocable thereby for driving said needle carrier, means operable from the exterior of said sewing machine for releasably coupling each needle carrier independently of the other with said sleeve including a bore structure formed on each needle carrier and defining a horizontal bore, said sleeve having two openings each alignable with a bore of a needle carrier, a pin movably disposed in each bore, and a movable shifter connected to each pin and operable to move said pin axially of said bore for interconnection with and, respectively, disconnection from, an opening of said sleeve for releasably connecting said needle carriers with said sleeve.

3. In a double needle sewing machine, as claimed in claim 2, two cams formed on said sleeve, each of said two cams being operable to cooperate with a bore structure for moving the needle carrier thereof upwardly upon removal of said pin from its opening in said sleeve.

4. In a double needle sewing machine, as claimed in claim 2, two elongated cams formed on said sleeve, each operable to engage the end of a pin for guiding it towards an opening of said sleeve, whereby when a pin is disengaged from the opening of said sleeve it may be pressed towards engagements with said cam and upon relative longitudinal movement of said sleeve and said needle carrier, said elongated cam will guide said pin towards said opening for subsequent engagement therein, and resilient means operable for pressing said pins in a direction towards said elongated cams for subsequent engagement with said opening.

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