May 18, 1948. A. B. CLAYTON 2,441,931

CHAIN STITCH SEWING MACHINE WITH LOOPER THROW-OUT

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Fig. 4.

Fig. 1.

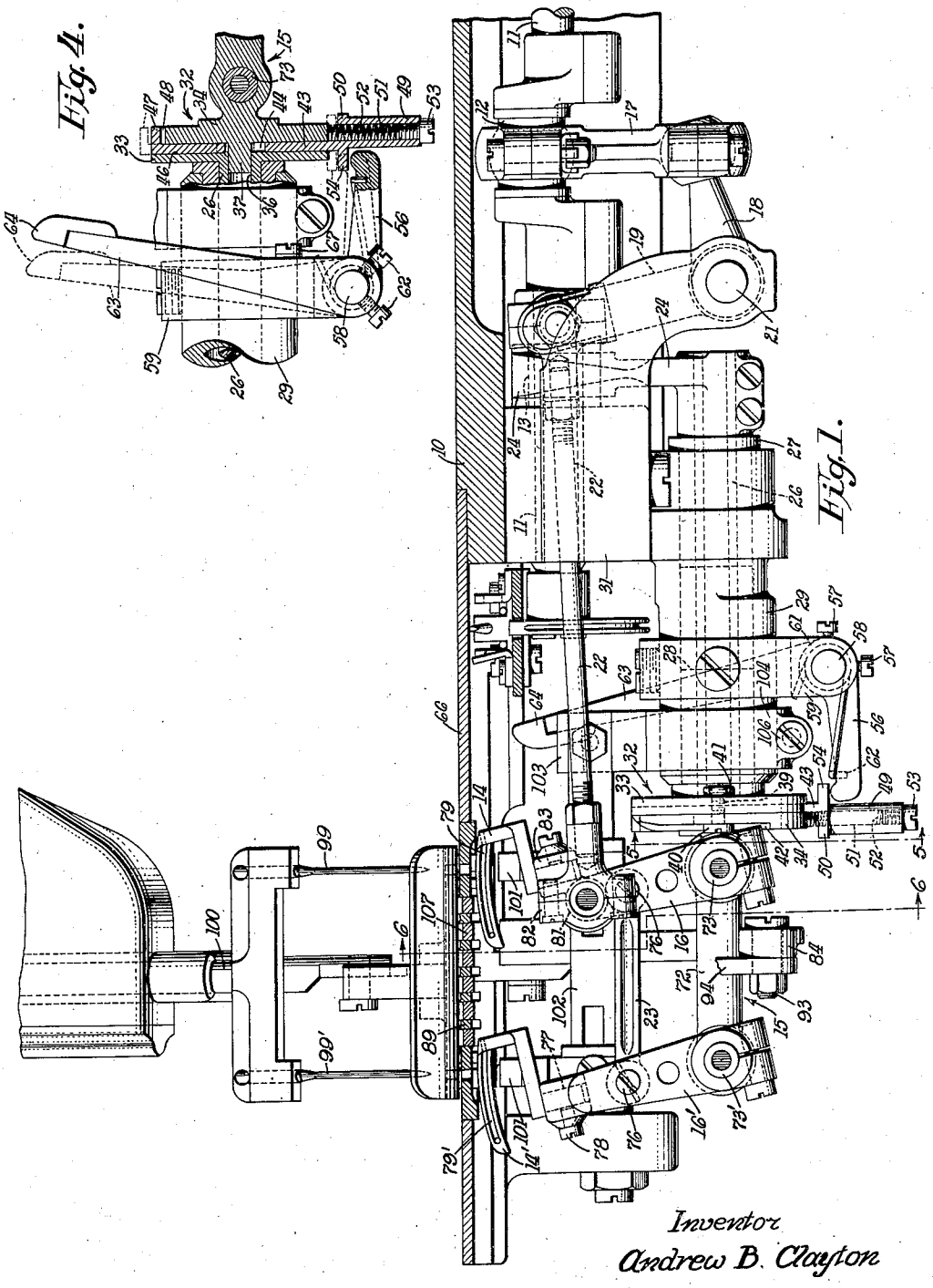

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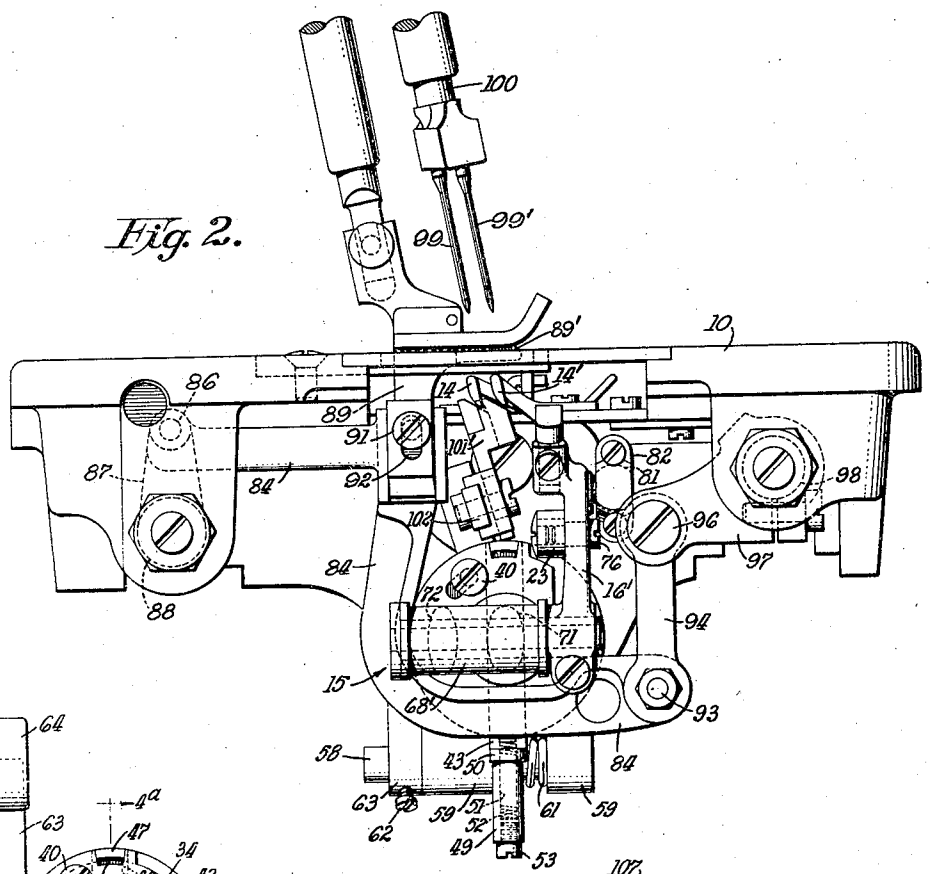
Fig. 2.



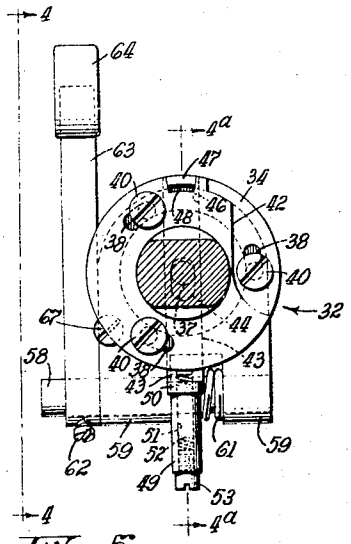


Fig. 5.

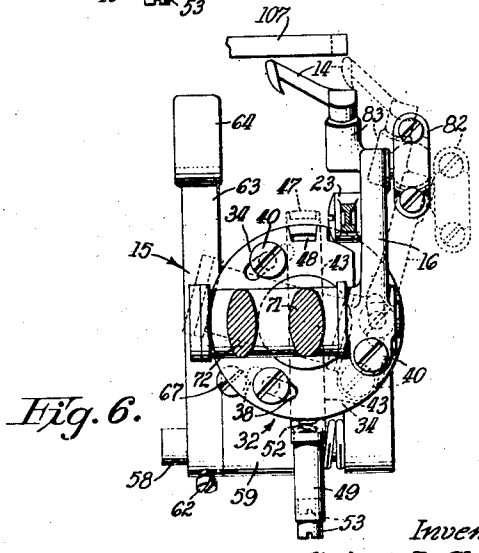


Fig. 6.

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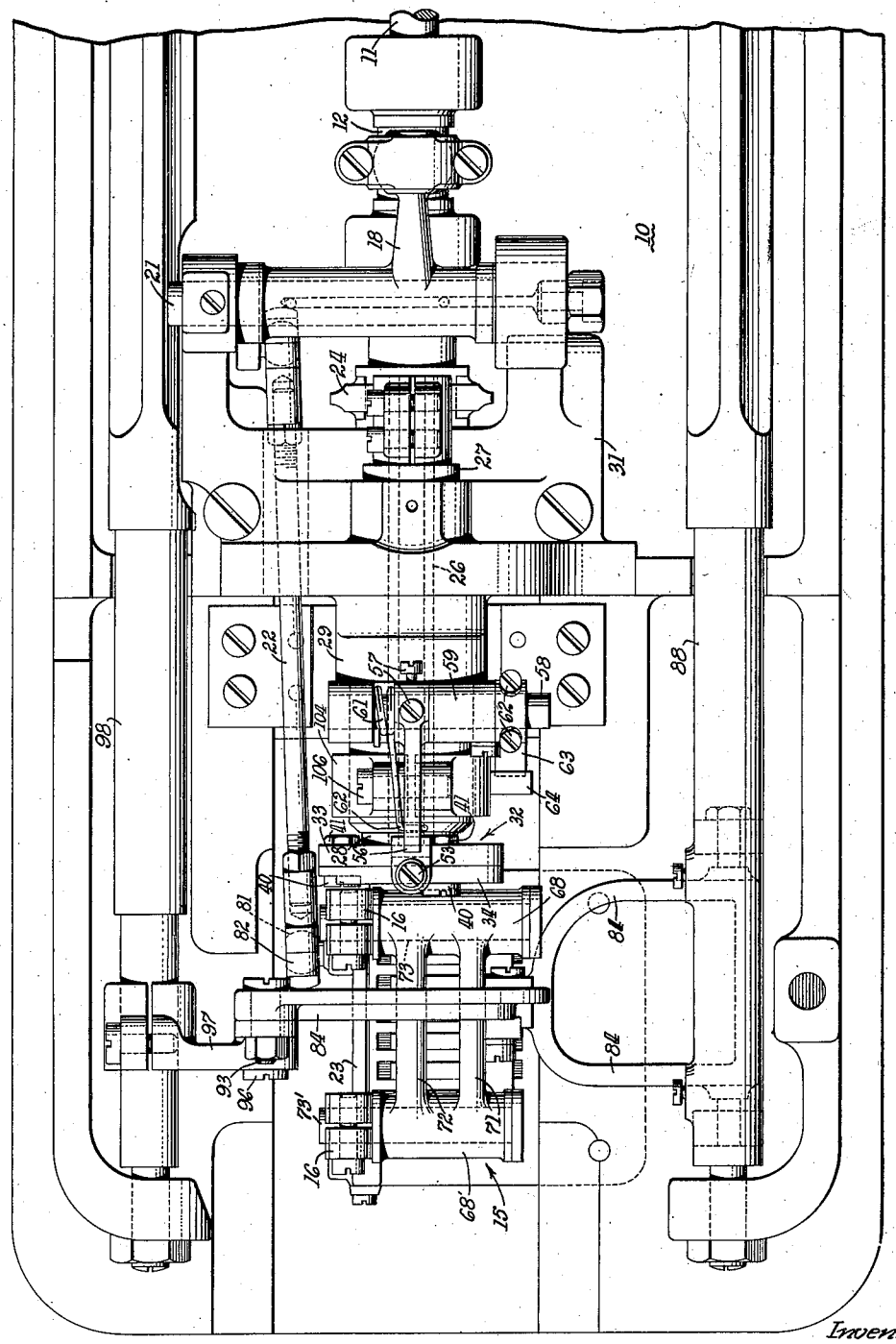

Fig. 3.

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Patented May 18, 1948 2,441,931

UNITED STATES PATENT OFFICE

2,441,931

CHAIN STITCH SEWING MACHINE WITH LOOPER THROWOUT

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Application December 5, 1946, Serial No. 714,215

15 Claims. (Cl. 112—200)

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This invention relates to chain stitch sewing machines and more particularly to machines of this type having a plurality of synchronously driven loopers that can easily be positioned to facilitate threading.

A primary object of the present invention is to provide an improved looper throw-out mechanism that will permit a sewing machine operator to move one or more loopers from their normally inaccessible operating position to an accessible position in which the operator can easily thread them.

Another object of the invention is to provide a sewing machine having a mechanism for synchronously driving a pair of loopers, and at the same time to provide this mechanism with an improved means whereby the loopers can selectively be moved from a normally inaccessible operating position to an accessible threading position.

A further object of the invention is to provide an improved chain stitch sewing machine having certain parts advantageously arranged in vertically spaced relationship, comprising a pair of loopers positioned directly below an overhanging feed-dog, a looper-carrier support positioned below the loopers and a feed-bar positioned below the looper-carrier support.

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 accompanying drawings:

Fig. 1 is a vertical, longitudinal sectional view of a portion of a chain stitch sewing machine embodying the invention;

Fig. 2 is a left end fragmentary view of the sewing machine shown in Fig. 1;

Fig. 3 is a bottom plan view of the sewing machine shown in Figs. 1 and 2;

Fig. 4 is a view partly in elevation and partly in cross section, the elevational portion being taken on the line 4—4, and the sectional portion being taken on the line 4^a—4^a of Fig. 5;

Fig. 5 is a fragmentary elevational view taken substantially along the line 5—5 of Fig. 1; and

Fig. 6 is a fragmentary elevational view taken substantially along the line 6—6 of Fig. 1.

For purposes of illustration, the invention is shown as applied to a sewing machine having an

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operating mechanism of the same general construction as that disclosed in my United States Patent No. 2,345,327, dated March 28, 1944. However only as much of the machine is herein shown and described as is essential to an understanding of the present invention.

The sewing machine comprises a work supporting bed-plate 10 carried by a table top (not shown). Supported from the lower face of the bed-plate are a plurality of mechanisms, later to be described. These mechanisms are enclosed by a base-housing, not herein shown, but which is well known in the art.

The sewing machine mechanism comprises a rotary drive shaft 11 incorporating a crank 12 and an eccentric 13 by which, respectively, the requisite endwise reciprocatory or loop-seizing and -shedding movements and vibratory or so-called needle avoiding movements are imparted to a pair of loopers 14 and 14'. Each looper is mounted on its own looper-carrier 16 and 16', and the looper-carriers, in turn, are supported on a lopoer-carried support 15, the latter being more fully described hereinafter.

As previously indicated, endwise reciprocatory movement is imparted to the loopers by the crank 12, which controls this movement of the loopers through the medium of a pitman 17, rock arms 18 and 19 journaled on a stud 21, and through a link 22 connecting the rocker arm 19 with the looper-carrier 16. The second looper-carrier 16' is connected to the first looper-carrier 16 by a link 23, thereby causing the two looper-carriers to rock in unison and their loopers 14, 14' to reciprocate in synchronism.

The sidewise or laterally vibrating movements of the loopers are effected through the medium of an eccentric actuated fork 24 and a tubular rock shaft 26, the latter extending longitudinally of the bed-plate 10 and being journaled in bushings 27, 28 fitted within a bearing support 29. The support 29 forms a part of a bracket 31 depending from the underside of the bed-plate 10 and thus the support 29 carries the rock shaft 26, the left end of which, as viewed in Fig. 1, supports a looper throw-out device designated generally by the numeral 32, and the looper throw-out device carries the looper-carrier support 15, hereinbefore mentioned.

The looper throw-out device 32 (Fig. 4) includes a pair of face abutting disks or plates 33 and 34, the disk 33 being formed as an integral part of and therefore rockable with one end of the horizontally disposed looper rock shaft 26. This disk 33 is provided with a concentric recess

36 slightly smaller in diameter than the bore of the tubular rock shaft 26, for accommodating a pilot pin 37 protruding concentrically from the disk 34. The disk 34, and the looper-carrier support 15, carried thereby, are mounted for limited angular movement with respect to the disk 33 and thus the disk 34 and the support 15 can be swung beyond the normal rocking movement afforded them by the disk 33 and the rock shaft 26. The disks 33 and 34 (Figs. 1, 5 and 6) are held in face abutting relationship by three axially disposed bolts 40 which pass through arcuately slotted holes 38 provided in the disk 34. Thereafter, the bolts pass through threaded holes 39 (Fig. 1) in the disk 33, and a nut 41 is screwed to the protruding end of each bolt, thereby providing a means for positioning the bolts so that their heads are spaced a clearance distance from the face of the disk 34. The outer face of the disk 34 is partly cut away as at 42, (Fig. 5), thereby providing a clearance sufficient for operation of the looper support 16. A latch bar 43, which is longitudinally slotted as at 44 to allow the pilot pin 37 to pass therethrough, slides in a vertically extending diametrical channel 46 provided in the inner face of the disk 33. The upper end of the bar 43 carries a horizontally projecting tapered latch-lug 47, that is positioned to engage or be released from a complemental tapered recess 48 formed in the upper periphery of the disk 34. The lower end of the latch bar 43 is in the form of an inverted T (see Fig. 1), one arm 50 of which carries a stem 49 having a bore 51 accommodating a coiled compression spring 52 for downwardly biasing the latch bar 43 and thereby causing the tapered lug 47 to enter the tapered recess 48. The spring 52 is retained in the bore 51 by a screw 53 threaded into the lower end thereof. Positioned for engagement with the under side of another arm 54 (Fig. 1) of the inverted T-shaped member, is one end of an arm 56, the other end of which, by means of set screws 57, is secured to a shaft 58. The shaft 58 is pivotally supported in a bifurcated bracket 59 depending from the bearing support 29. A spring 61 surrounds the shaft 58 and, by means of a spring end 62 thereof, downwardly biases the arm 56 away from contact with the arm 54 of the latch bar 43. The clearance provided between the arm 54 and the end of the arm 56 allows the arm 54 to move in response to the eccentric 13 during the normal rocking of the shaft 26. The shaft 58 projects beyond the bracket 59 and has secured to it by means of set screws 62, the lower end of an operating lever 63. The upper end of the lever 63 is provided with a finger pad 64, which can easily be reached by the sewing machine operator when the cover-plate 66 of the sewing machine is removed. An intermediate part of the lever 63 abuts against the overhanging head of a stop-screw 67 carried by the bracket 59, thereby limiting the downward movement of arm 56 away from the arm 54.

The looper-carrier support 15, which is in the form of a rectangular frame (Fig. 3), is rockable about an axis that is an extension of the axis of the shaft 26 and the support is fashioned from a pair of spaced cylindrical members 68 and 68' joined by a pair of spaced cylindroid bars 71 and 72, the latter being positioned horizontally and extending longitudinally of the bed-plate 10. Journaled in each of the cylindrical members 68 and 68' are hollow fulcrum rock pins 73 and 73', extending perpendicular to the bars 71—72 and to the shaft 26, and to the front end of each of the pins is clamped the lower end of one of the substantially vertically disposed looper-carriers. The looper-carriers 16 and 16' are rockable with the pins 73 and 73' and are each provided with a hole for accommodating pivot-screws 76 which support link 23 in proper operating position. The upper end of the looper-carrier 16' (Fig. 1), by means of a bore 77 and screw 78, supports the conventional looper 14' having a thread groove 79'. The upper end of the looper-carrier 16 is provided with a horizontally protruding ball 81 that is encompassed by a split socket 82 adjustably held onto the end of the link 22, and the upper end of the looper-carrier 16 is additionally provided with an offset portion 83 arranged to support a second conventional looper 14, having a thread groove 79.

The mechanism, herein shown, also provides a four-motion lower feed mechanism (Figs. 2 and 3) comprising a feed-bar 84, one bifurcated end of which is connected, by means of pivot pins 86, to the upper end of a feed rocker 87, this in turn being carried by a feed-drive rock shaft 88. From the pin 86 the feed bar extends forward horizontally to a point at which is supported the rear stem of a forwardly overhanging feed dog 89. The feed dog is adjustably held in position by a screw 91 passing through a slotted hole 92. From the point of supporting the feed dog 89, an arm of the feed-bar extends downwardly and then horizontally forward below the hereinbefore described looper-carrier support 15; the looper-carrier support being spaced below the forwardly overhanging portion of the feed-dog 89. The forward end of the feed-bar 84 is connected (Fig. 2) through the medium of a pivot-pin 93, a vertically disposed link 94, and a second pivot-pin 96 to a rock arm 97 carried by the feed-lift rock shaft 98. The means, for operating the above described feed-drive and feed-lift rock shafts, are conventional and therefore require no detailed description or illustration.

Each of the inclined needles 99 and 99' (Figs. 1 and 2) carried by the inclined needle bar 100, are guided at the end of their downward stroke by a pair of adjustably mounted needle guides 101 and 101'. These needle guides form no part of the present invention but are the subject of a copending patent application, Serial No. 718,705 filed December 27, 1946, therefore, suffice it to say, each needle guide is adjustably mounted for vertical and horizontal adjustment on a horizontally disposed support bar 102. The right end of this bar, as seen in Fig. 1, is supported from an upwardly extending arm 103 of a clamping ring 104 that is adjustably held to the external surface of the bearing support 29 by a bolt 106.

Figs. 1 and 2 show that parts of the mechanism are compactly and advantageously placed by having the two loopers 14 and 14', during their normal operation, positioned directly below the overhanging portion 89' of the feed-dog 89. Also the looper-carrier support 15 is directly below the loopers and a horizontal portion of the feed-bar 84 is directly below the looper-carrier support. The feed-bar 84 receives advancing and lift motions from the rock shafts 88 and 98, that are located on opposite sides of the loopers and the looper-carrier support, and due to the position of the said feed-bar, the looper-carrier support is afforded sufficient space for its requisite movements.

In order for the loopers 14 and 14' to cooperate with the needles 99 and 99' to produce proper stitching, the loopers must be located below the

overhanging portion 89' of the feed-dog 89 and throat-plate 107 and when in this position they are difficult, if not impossible, for an operator to thread. When an operator, using the mechanism of this invention, wishes to thread the loopers, he removes the cover-plate 66 and presses the finger pad 64 of operating lever 63. This moves the lever to the dotted position shown in Fig. 4 and causes the end of the arm 56 to engage the arm 54 of the inverted T-shaped bar. Further movement of lever 63 compresses the latch spring 52, moves the latch bar 43 upwardly and disengages the latch-lug 47 from the tapered recess 48. This unlatches the disk 34 from disk 33, and allows the operator to swing the loopers 14 and 14' to an accessible position. Fig. 6 depicts this movement for looper 14, looper-carrier 16, looper-carrier support 15, and the disk 34. When the loopers are swung back into operative position, the seating of the latch-lug 47 in the disk-recess 48 insures that the loopers are properly positioned to perform their functions.

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

1. In a chain stitch sewing machine having a looper normally in a position inaccessible to the operator and having a rock shaft and a reciprocating rod for operating said looper; a first disk mounted on an end of said rock shaft, a second disk adjustably and concentrically held to said first disk; a latch member carried by one of said disks and releasably engaging the other disk, means for unlatching said latch member, and means carried by said second disk for supporting said looper.

2. In a chain stitch sewing machine having a looper normally in a position inaccessible to the operator and having means for imparting endwise reciprocatory and sidewise vibratory movements to said looper; a disk carried by one of said means for imparting movement to said looper, a second disk pivoted on said first disk, a latch normally biased to hold said disks together as a unit, means for releasing said latch, and means carried by said second disk for supporting said looper.

3. In a chain stitch sewing machine having a looper normally in a position inaccessible to the operator and having a rock shaft and a reciprocating rod for operating said looper; a disk mounted on an end of said rock shaft and having a diametrical channel and a concentric recess, a complemental disk having a tapered recess and being formed with a concentric pilot pin the latter being arranged to enter said concentric recess, a latch bar slidably mounted in said diametrical channel and having a tapered latch lug arranged to enter said tapered recess, a spring carried by said latch bar and arranged to bias said latch into said recess, means normally spaced from said latch-bar for compressing said spring and unlatching said latch, and means carried by said complemental disk for supporting said looper.

4. In a sewing machine having a looper, a looper throw-out mechanism for supporting said looper comprising a pair of complemental members, means for latching one of said members to the other member whereby the two members can be caused to move in unison, and means normally spaced from said members and said means for unlatching said latching means and thereby permitting relative movement of one member with respect to the other member.

5. In a chain stitch sewing machine having a looper, a looper throw-out mechanism for supporting said looper comprising a pair of complemental members, a latch bar carried by one of said members and arranged to engage the other member, a lever arm normally spaced from said latch bar, and means for moving said lever arm into contact with said latch bar and thereby releasing said latch.

6. In a chain stitch sewing machine having a looper, a looper throw-out mechanism for supporting said looper comprising a pair of complemental members, a latch bar carried by one of said members and arranged to engage the other member, a lever arm for operating said latch bar, a spring for biasing said lever away from contact with said latch bar, and an operating lever having a finger pad accessible to the operator.

7. A chain stitch sewing machine comprising a rock shaft, a first disk carried on the end of said rock shaft, a second disk supported from said first disk, a latching means for latching said two disks one to the other, a looper-carrier support carried by said second disk, a plurality of looper-carriers supported by said looper-carrier support, a looper on each of said looper-carriers, a connecting means for joining said looper-carriers at a point other than said looper-carrier support, and means for releasing said latching means, whereby said plurality of loopers can be moved to a point accessible for threading.

8. A chain stitch sewing machine comprising an overhanging feed-dog; a plurality of loopers operatively positioned directly below the overhanging portion of said feed-dog; a looper-carrier support positioned directly below said loopers; a feed-drive rock shaft located on one side of said feed-dog, said plurality of loopers, and said looper-carrier support; a feed-lift rock shaft located on the other side of said feed-dog, said plurality of loopers, and said looper-carrier support; and a feed-bar driven from said two rock shafts and arranged to support said feed-dog and having a portion positioned directly below said looper-carrier support, said loopers, and said overhanging portion of said feed-dog.

9. In a looper mechanism for chain-stitch sewing machines having a looper-carrier support, a plurality of looper-carriers pivotally mounted upon said support, loopers carried by said looper-carriers, means for rocking said looper-carriers for imparting endwise movements to said loopers, and operative connections for rocking said looper-carrier support for imparting sidewise movements to said loopers, the improvement which consists in the provision in said operative connections of releasable latch means providing for swinging said support beyond its normal range of operative movement, thereby to position said loopers for convenient threading.

10. In a chain-stitch sewing machine, a looper-carrier support means having a portion pivoted about an axis, a looper-carrier mounted on said looper-carrier support on a second axis which is perpendicular to said first axis, a looper carried by said looper-carrier, means for imparting loop seizing movements to said looper, and a releasable latch mechanism formed as a part of said support means and providing means for swinging said looper about said first axis to a position convenient for threading.

11. A looper-carrier support means in accordance with the preceding claim in which the releasable latch mechanism includes a pair of face abutting disks.

12. In a chain-stitch sewing machine, a looper-carrier support means having a portion pivoted about an axis, a plurality of looper-carriers mounted on said looper-carrier support on a plurality of second axes which are perpendicular to said first axis, a plurality of loopers at least one being carried by each of said looper-carriers, means for imparting loop-seizing movements to said loopers, and a releasable latch mechanism formed as a part of said support means and providing means for swinging said loopers about said first axis to a position convenient for threading.

13. A looper-carrier support means in accordance with the preceding claim in which the releasable latch mechanism includes a pair of face abutting disks.

14. A looper-carrier support means in accordance with the second preceding claim in which the releasable latch mechanism includes a pair of face abutting disks one having a diametrical channel for accommodating a latch bar, and the other disk having a latch member engageable by said latch bar.

15. A looper mechanism for chain-stitch sewing machines, comprising, a member mounted for rocking movements about an axis, means for rocking said member, a looper-carrier support rockable about the same axis, a latch means spaced between said member and said support and arranged to releasably latch said support to said member, and means conveniently positioned for releasing said latch means when it becomes desirable to rock said support independently of said member.

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The following references are of record in the file of this patent:

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