June 12, 1956 R. E. JOHNSON 2,749,863

TAKE-UP MECHANISMS FOR SEWING MACHINES

Filed Nov. 13, 1953 5 Sheets-Sheet 1

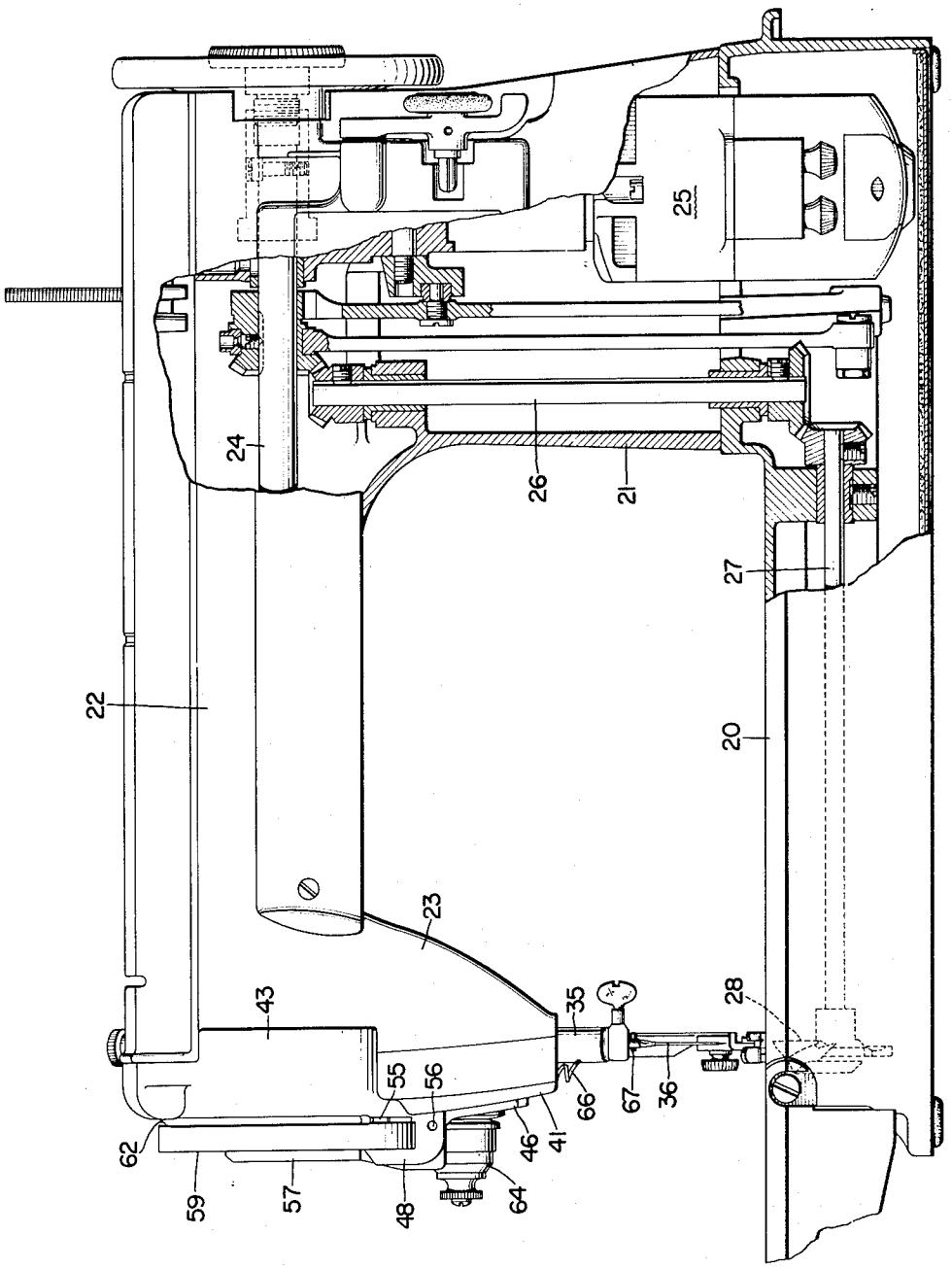


Fig. 1.

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TAKE-UP MECHANISMS FOR SEWING MACHINES

Filed Nov. 13, 1953 5 Sheets-Sheet 2

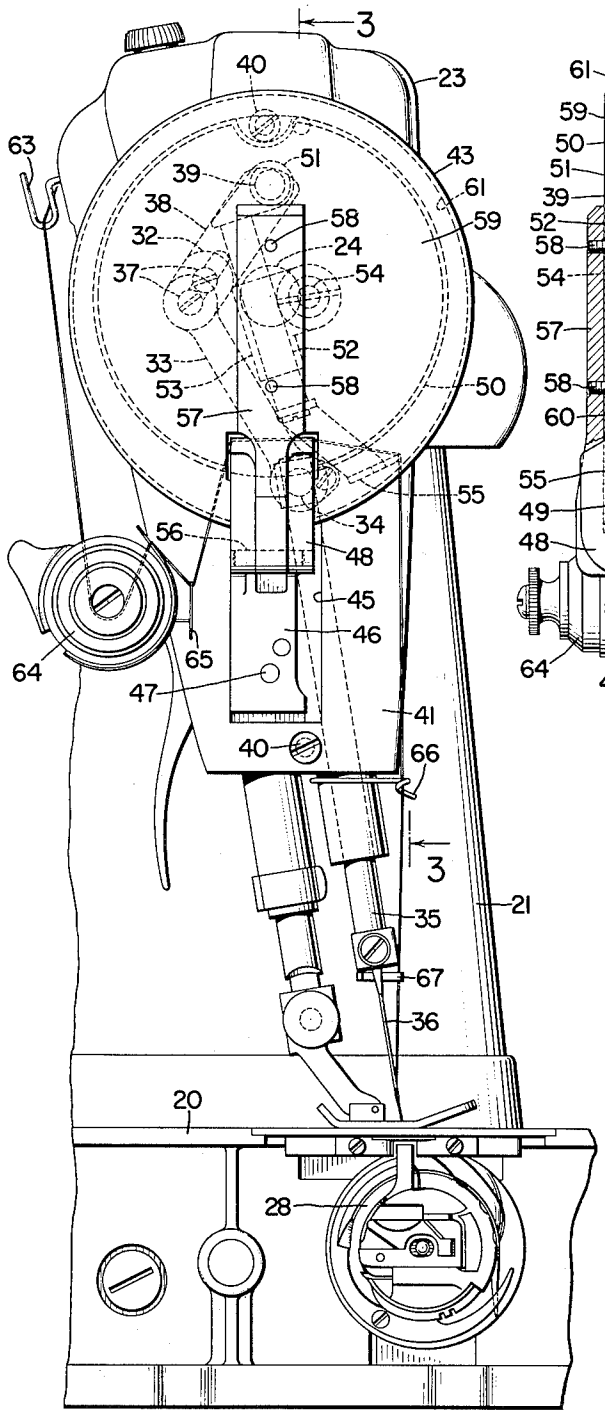


Fig.2.

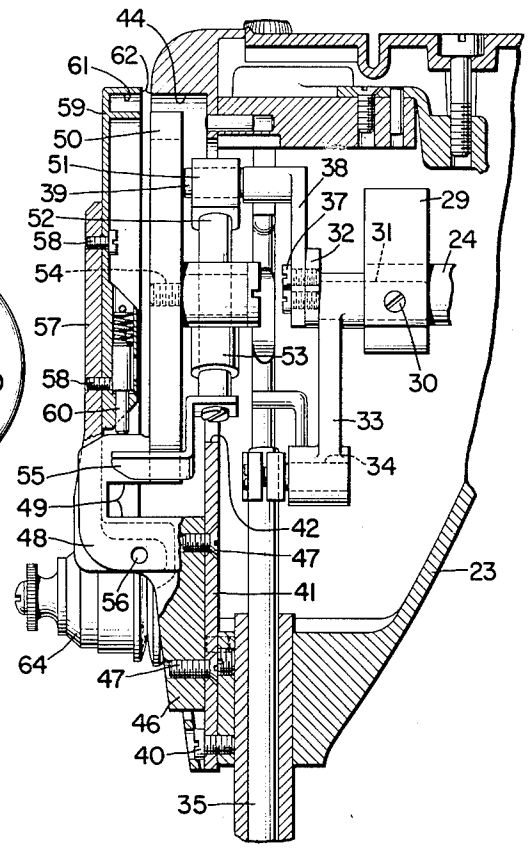


Fig.3.

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TAKE-UP MECHANISMS FOR SEWING MACHINES

Filed Nov. 13, 1953 5 Sheets-Sheet 3

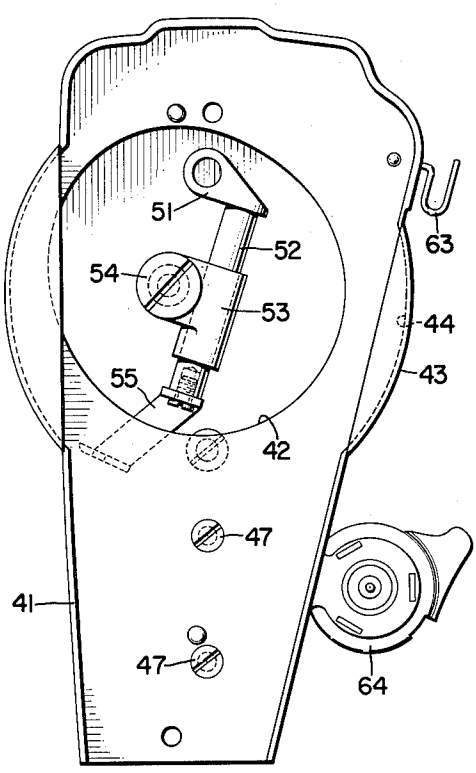


Fig.5.

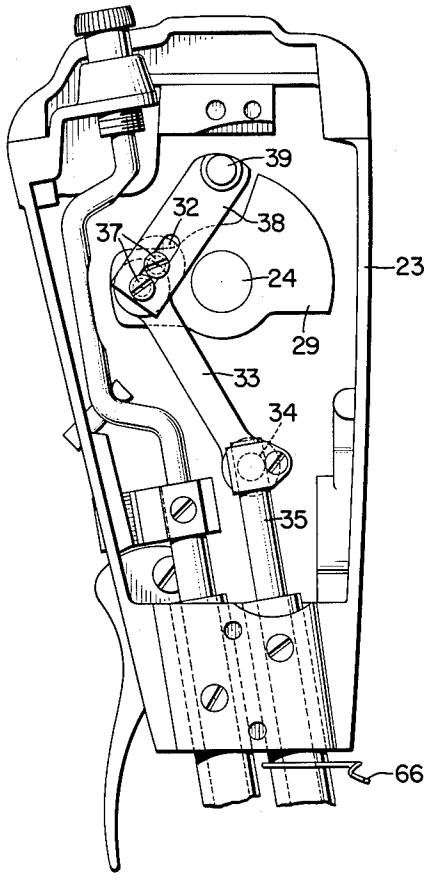


Fig.4.

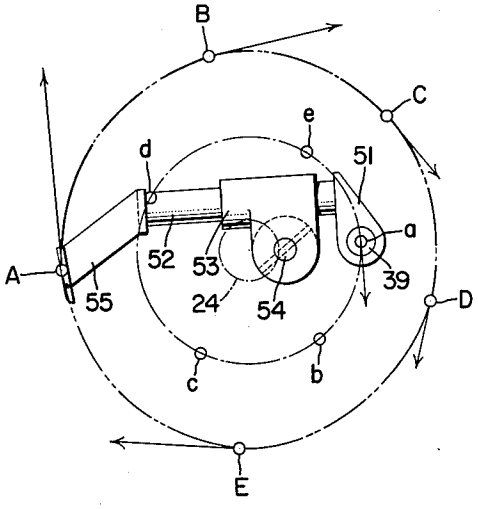


Fig.6.

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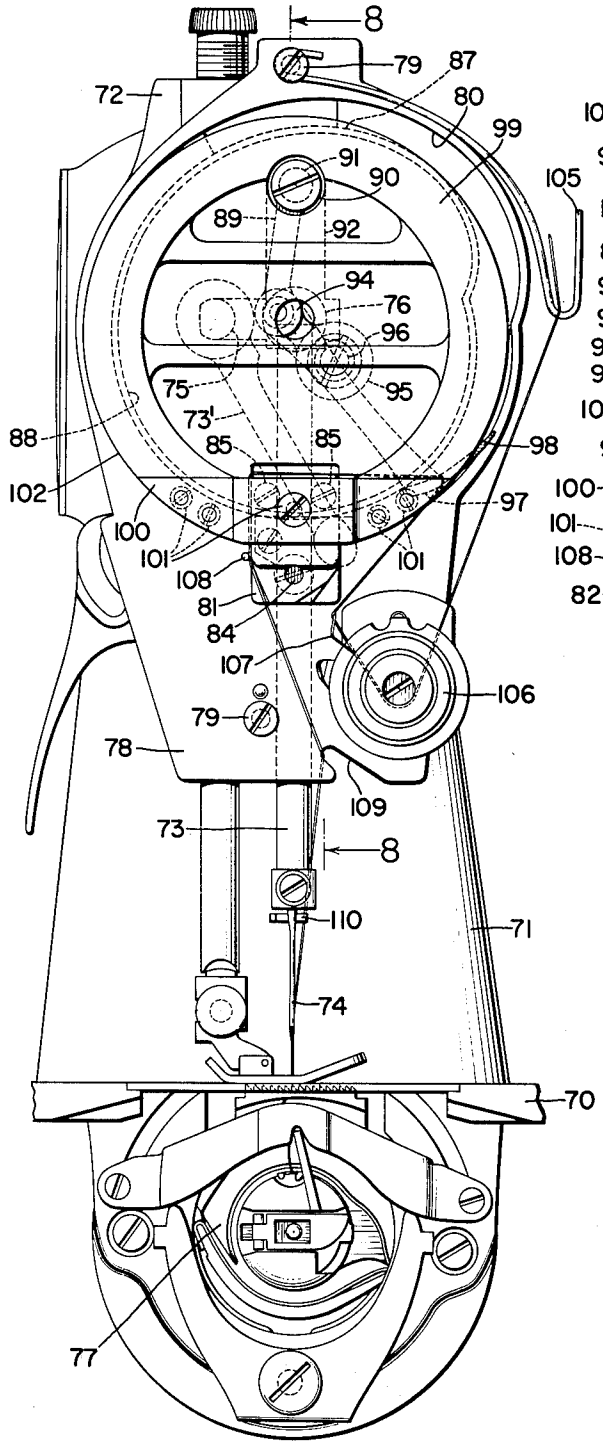
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TAKE-UP MECHANISMS FOR SEWING MACHINES

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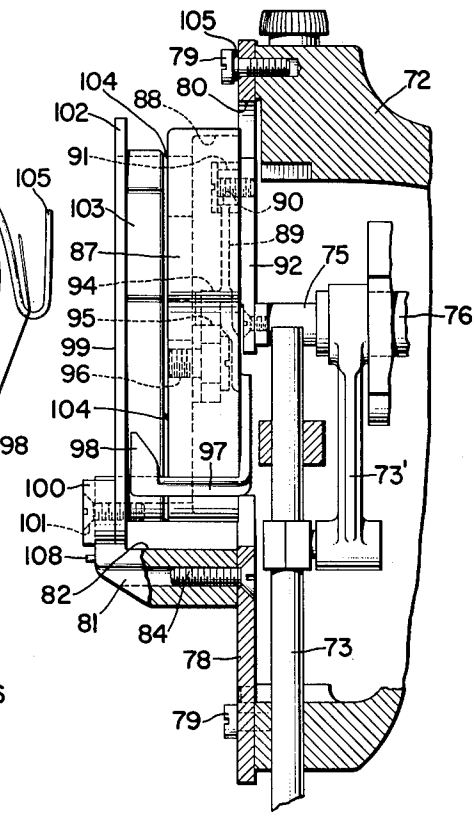


Fig.8.

Fig.7.

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TAKE-UP MECHANISMS FOR SEWING MACHINES

Filed Nov. 13, 1953 5 Sheets-Sheet 5

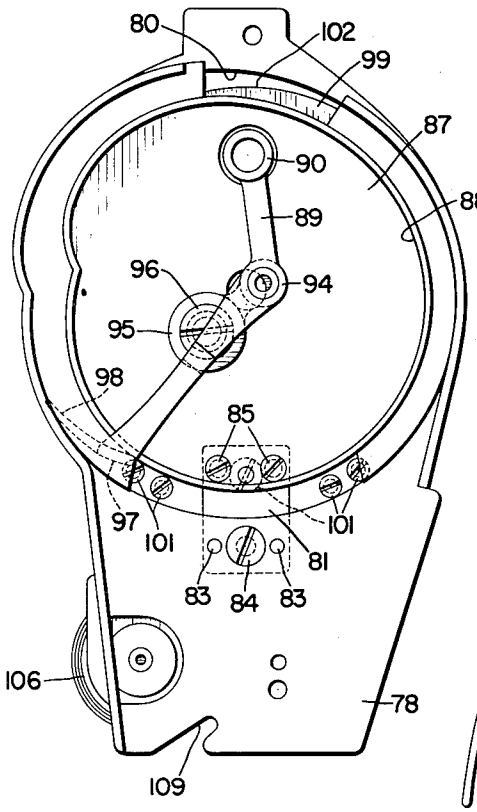


Fig.10.

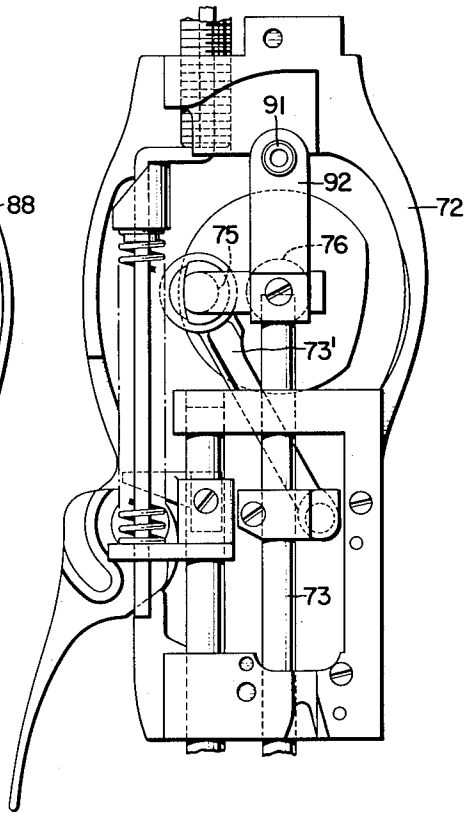


Fig.9.

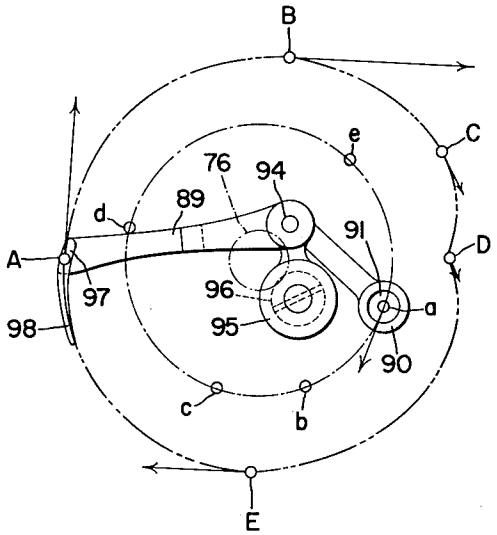


Fig.11.

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2,749,863

TAKE-UP MECHANISMS FOR SEWING MACHINES

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Application November 13, 1953, Serial No. 392,003

15 Claims. (Cl. 112—248)

This invention relates to thread-controlling mechanisms for sewing machines and, more particularly, to rotary needle-thread take-ups for lock-stitch sewing machines.

In the formation of lock stitches by sewing machines, whether employing a movable hook or a shuttle, control of the needle-thread concatenation is accomplished primarily by the needle-thread take-up. It is desirable in these machines that the take-up draw in and pay out thread precisely in accordance with the thread requirements of the stitch-forming instrumentalities so that the needle-thread will be under proper control at all times. The needle-thread requirements of both hooks and shuttles are basically similar in that the needle-thread loop after being enlarged and passed about the under thread mass, must be drawn up and set into the work fabric rapidly, usually in less than a third of the cycle of stitch formation. During the remaining two thirds or more of the stitching cycle the needle-thread must be paid out by the take-up in varying amounts. First, the take-up must provide slack thread to accommodate penetration of the work by the needle, and then as the needle begins to withdraw and in so doing throws out a loop for seizure by the hook or shuttle, this slackening process must be retarded so as to maintain a precise control of the needle-thread loop at the critical point of loop seizure. Finally after loop seizure, the needle-thread must be slackened rather quickly as the hook or shuttle spreads the needle-thread loop about the bobbin of under thread.

In the past, many varieties of take-up mechanisms have been utilized with varying degrees of success.

The so-called "link take-up" comprising an oscillatory or reciprocatory linkage, including a thread-engaging lever-arm, has been developed to the point at which the thread requirements of the hook or shuttle may be matched very closely. When operated at very high speeds link take-ups are inherently troublesome from the standpoint of excessive vibration. Moreover, the action of link take-ups upon the thread is a harsh one, and they present a design and safety problem because of the exposed swinging take-up lever.

Rotary take-ups have been used to obviate one or more of the difficulties found in link take-ups. It is well recognized that a rotary take-up will present less of a vibration problem and will act upon the thread in a smooth and gentle manner. However, the difficulty with rotary take-ups has been that of providing a precise control of the thread in accordance with the critical demands of a hook or shuttle. For this reason, successful rotary take-ups have in the past taken one of two forms, either they are disproportionately large and with a plurality of thread-engaging parts, or they employ a plurality of separate small rotating members.

From the standpoint of cost, vibration, and design, the most desirable take-up would involve a single rotating thread-engaging member which is small enough to be accommodated inconspicuously within a normal sewing machine frame. Attempts along this line have been made

in the past, however, in most instances these take-ups operated to utilize only a fraction of the motion of the thread-engaging element in order to take-up the thread quickly and to set the stitch. The thread is then disengaged or released from this take-up element and slackened out of control during a major portion of the remainder of the stitch-forming cycle. These prior take-ups, therefore, serve only to set the stitch and fail to provide the precise control of the needle-thread at the remaining critical points in the stitching cycle.

It is an object of this invention to provide a rotary take-up comprising a single rotary thread-engaging member.

It is a further object to provide a single rotary take-up mechanism arranged to provide a continuous and positive control on the thread during both the thread take-up and the thread slackening portions of the stitch-forming cycle.

A more specific object of this invention is to provide a rotary take-up mechanism having a single thread-engaging member arranged to travel in a non-circular path and at non-uniform velocity so as to provide a thread-controlling action precisely in accordance with the thread requirements of the stitch-forming instrumentalities.

With these and other objects and advantages in view, as will hereinafter appear, this invention comprises the devices, combinations and arrangements of parts hereinafter described and illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevational view, partly in section, of a sewing machine having the take-up of my invention applied thereto;

Fig. 2 is an end elevational view of a portion of the sewing machine of Fig. 1;

Fig. 3 represents a cross-section taken substantially along line 3—3 of Fig. 2;

Fig. 4 is a fragmentary end elevational view of the sewing head of the sewing machine of Fig. 1 with the end-cover plate removed;

Fig. 5 is an elevational view of the inside of the end cover-plate of Figs. 1, 2 and 3;

Fig. 6 is a view of the take-up thread-engaging member of Fig. 2, together with a diagrammatic representation of the path of motion of the thread-engaging member and the velocity thereof at various critical positions during a cycle of operation;

Fig. 7 is an end elevational view of a sewing machine and including a modified form of my invention;

Fig. 8 represents a cross-section taken substantially along line 8—8 of Fig. 7;

Fig. 9 is a fragmentary end elevational view of the sewing head of the sewing machine of Fig. 7 with the end cover-plate removed;

Fig. 10 is an elevational view of the inside of the end cover-plate of Figs. 7 and 8; and

Fig. 11 is a view of the take-up thread-engaging member of Fig. 7 together with a diagrammatic representation of the path of motion of the thread-engaging member and the velocity thereof at various critical positions during a cycle of operation.

Referring more particularly to Fig. 1 of the drawings, the present invention is illustrated as applied to a lock-stitch sewing machine employing a rotary hook. The sewing machine of Fig. 1 is provided with a frame including a bed 20 from which rises a standard 21 which supports a bracket arm 22 terminating in a sewing head 23. Journaled in the bracket-arm is a main shaft 24 which is driven as by an electric motor 25. The main shaft 24 is geared through a vertical shaft 26 to a bed shaft 27 which rotates at twice the speed of the main

shaft. A rotary hook 28 is secured directly to the outboard extremity of the bed shaft.

Referring to Fig. 3, the main shaft 24 is provided in the sewing head 23 with a crank mechanism including a counterbalance 29 which provides a needle-bar actuating crank. Carried in the counterbalance by means of a set screw 30 is a needle-bar actuating crank pin 31 formed with a head 32. A needle-bar driving link 33 is fitted at one end on the crank pin and at the other end embraces a pin 34 which is carried by a needle-bar 35. The needle-bar is journaled for endwise reciprocatory motion in the sewing head and carries at its lower end a needle 36. Fastened to the head 32 of the needle-bar actuating crank pin 31, as by screws 37, is an additional crank member 38 formed with a take-up actuating crank pin 39.

Secured to the sewing head by screws 40 is an end cover-plate 41 which is formed with a circular aperture 42 within which the take-up operates. The cover-plate is formed about the aperture 42 with an oval-shaped protuberance 43 which is formed with a similarly oval-shaped counterbore 44. The counterbore 44 is joined by a downwardly extending slot 45 within which slot is seated a bridge piece 46 secured to the face plate by screws 47. The bridge piece is provided with an outward projection 48 which is formed with an inwardly extending slot 49. Fast on the bridge piece above the slot 49 and disposed within the counterbore 44 is a non-circular disk 50 which is disposed in a plane substantially perpendicular to the axis of the sewing machine main shaft 24. The disk 50 is thus rigidly supported in a fixed position with respect to the sewing machine frame.

The moving parts of the take-up mechanism of this invention are carried by the disk 50 and are adapted to be actuated by the take-up actuating crank-pin 39. To this end, crank-pin 39 is embraced by a bearing member 51 in the form of an apertured lug which is carried at one extremity of a cylindrical take-up member 52. A control member in the form of a block or bushing 53 slidably embraces the take-up member, and the bushing is, in turn, pivotally secured to the inner surface of disk 50 by a pivot screw 54. As indicated in Figs. 2 and 6, the pivot screw 54 is offset from the axis of the sewing machine main shaft, but the axis of this pivot screw is disposed within the path of rotation described by the take-up actuating crank-pin 39. Secured at the free extremity of the cylindrical take-up member 52 in a thread-engaging finger 55 which is bent to extend about the periphery of the disk 50 and to project outwardly beyond this disk. It will be noted that the slot 49 in the bridge piece is formed sufficiently large to accommodate the passage of the thread-engaging finger.

As shown clearly in the diagram of Fig. 6, the circular path described by the take-up actuating crank pin 39 approaches and recedes from the offset pivotal axis of the control member pivot 54. The resulting path of motion of the thread-engaging finger 55, therefore, is in a non-circular path as shown in dashed lines in Fig. 6. The non-circular shape of the disk 50, above referred to, is formed to coincide substantially with the shape of the path described by the thread-engaging finger 55.

Pivoted as at 56 to the projection 48 on the bridge piece 46 is an angle bracket 57 to which is secured, as by screws 58, a take-up guard plate 59. The guard plate may be turned about pivot 56 to expose the disk 50 and the thread-engaging finger 55, and is provided with a spring-biased latch pin 60 for the purpose of releasably maintaining the guard plate in closed position. The inner surface of the guard plate is provided with an oval slot 61 shaped in a manner corresponding to the periphery of the disk 50 and adapted to accommodate the free extremity of the thread-engaging finger 55.

When in closed position, as in Fig. 3, the guard plate is disposed generally parallel to the disk 50 and spaced slightly therefrom to provide a needle-thread accommodating slot 62 which is open upwardly and broken only by the bridge piece 46 at the bottom. Both the disk 50 and the slot 62 between disk 50 and the guard plate 57, therefore, are disposed within the path of travel of the thread-engaging finger 55.

The thread path through the take-up is best illustrated in Fig. 2. From a suitable supply the thread is directed through guide wire 63 downwardly about the usual tension device 64 and a check spring 65 associated with the tension device. From the check spring the thread leads upwardly and through the slot 62 between the guard plate and the disk 50. The thread is then directed over both the bridge piece and the thread-engaging finger 55. From the slot 62, the thread is led downwardly through a wire guide 66 on the sewing head and a guide member 67 on the needle-bar 35 to the eye of the needle.

It will be appreciated that not only the guides 63, 66 and 67, but also the tension device 64 and the above described rotary take-up are "self-threading." By self-threading it is meant that the operator may properly thread each of these instrumentalities by a single movement of one hand without releasing her grip upon the thread.

The operation of the rotary take-up of my invention can best be illustrated with reference to Figs. 2 and 6. Fig. 6 illustrates the thread-engaging member of Fig. 2, together with a diagrammatic illustration of the path of movement of the thread-engaging finger 55 as well as the take-up actuating crank pin 39, and the relative instantaneous velocities at various critical points during a typical stitching cycle. For this purpose, the instantaneous velocity of the crank pin 39 has been assumed to be constant and of the magnitude illustrated. The velocities of the thread-engaging finger at the various points are correspondingly proportionate to the length of the vectors illustrated.

In Fig. 2, the sewing machine parts are illustrated at a point in the stitch-forming cycle shortly after seizure of the needle-thread loop by the hook and as the needle-thread loop is being expanded and carried by the hook about the bobbin. The take-up in Figs. 2 and 3 rotates in a clockwise direction. As is indicated in Fig. 2, the bridge piece partially supports the thread at this point, and as the thread-engaging finger 55 passes through the slot 49 in the bridge piece, the thread is momentarily supported entirely by the bridge piece and, thus, prevented from dropping out of the take-up mechanism. As the thread-engaging finger emerges from the slot 49 and re-engages the thread, the needle-thread loop will have been carried about the bobbin by the hook and the needle-thread must be rapidly drawn up and the stitch set. In Fig. 6, point E corresponds to the point at which the thread-engaging finger emerges from the slot in the bridge piece while point B corresponds to the point at which the stitch is set. Point E to point B in Fig. 6 thus represents the take-up portion of the cycle of take-up operation. It will be apparent that the velocity of the thread-engaging finger is far greater from point E to point B than during the remainder of the cycle. In addition, the path of motion of the finger 55 is not circular but rather is somewhat oval-shaped, it being elongated in the direction from E to B thus lengthening the path of motion during the take-up action. On the path of motion of the crank pin 39 in Fig. 6, the points marked in lower case letters indicate the positions of the crank pin corresponding to each of the illustrated critical points of the thread-engaging finger 55. It will be apparent that due to the location of the control member 53 and its pivotal axis 54, the movement of finger 55 from E to B is accomplished in approximately 90° of crank and main shaft rotation or approximately a fourth of the stitch-forming cycle.

Point C in Fig. 6 represents the point at which the needle penetrates the work. It will be noted that the velocity of the thread-engaging finger 55 has been reduced considerably at this point so that the slack thread will be payed out in accordance with the demands of the

descending needle and without objectionable uncontrolled thread existing in the system.

Point D in Fig. 6 corresponds to the point of needle-loop seizure by the hook. The velocity of the finger **55** at this point in the cycle is at a minimum so that the giving up of thread by the take-up is retarded at this point. With this arrangement the take-up retains positive control over the needle thread during loop seizure and the danger of excessive looseness of thread is obviated at this critical point in the stitching cycle.

As the parts continue to move from point D, the needle thread is picked up by the hook and a loop is drawn down around the bobbin. The take-up, therefore, must give up the necessary amount of slack thread quickly after loop seizure. The diagram of Fig. 6 indicates that with the take-up of my invention, the velocity of the take-up finger increases very quickly from point D to point E and thus matches perfectly the increased thread demands of the hook.

It will be appreciated that an infinite variety of hook sizes may be utilized with the take-up of my invention and that differences in thread requirements of various hooks may be satisfied not only by dimensional changes in the take-up member but also by a proper choice of the position of the pivotal axis of the control member **53**. In all cases, my take-up mechanism positively controls the thread during the entire stitching cycle and provides proper amounts of thread at all times in precise accordance with the requirements of the stitch-forming instrumentalites.

Figs. 7–11 illustrate a modified form of the take-up of my invention, and in addition, show the take-up as applied to a lock-stitch machine of the type employing an oscillatory shuttle.

The sewing machine of Figs. 7–10 is provided with a frame styled similar to that of Fig. 1 and including a bed having a work-supporting plate **70**, a vertical standard **71**, and a bracket arm terminating in a sewing head **72**. As in the sewing machine of Fig. 1, a needle bar **73** carrying a needle **74** is journaled for reciprocation in the sewing head **72**. The needle-bar is actuated by means of a link **73** which embraces a needle-bar actuating crank pin **75** which is fixed in a needle-bar actuating crank mechanism on a main shaft **76** journaled in the bracket arm. The machine differs from that of Fig. 1 primarily in that an oscillatory shuttle **77** is provided beneath the work-supporting plate **70** to cooperate with the needle. The shuttle may be oscillated in one-to-one relation with the rotation of the main shaft by suitable means known in the art.

The sewing head **72** is closed by means of an end cover-plate **78** secured in place by screws **79**. The end cover-plate is apertured as at **80** to accommodate the take-up mechanism and is provided beneath the aperture with a bridge piece **81** which is slotted as at **82** and is secured to the end cover-plate by locating pins **83** and a fastening screw **84**. Secured to the bridge piece by screws **85** is a disk **87** formed with an inturned periphered rim **88** which is somewhat heart-shaped and extends within the aperture **80** of the end cover-plate.

The rotary thread-engaging member of the take-up mechanism is carried by the disk **87** and is adapted to be actuated from the needle-bar actuating crank mechanism on the main shaft in a manner similar to that of the above described form of Figs. 1–6. The modified form, however, differs in that the rotary take-up mechanism is provided by means of a lever **89** formed at one end with a bearing **90** adapted to embrace a take-up actuating crank pin **91** carried by a crank **92** which is secured to the needle-bar actuating crank pin **75**. Between its ends as at **94** the lever **89** is pivoted to an anchor link **95** which, in turn, is pivoted to the disk **87** as by screw **96** at a point within a projection of the path of motion described by the take-up actuating crank pin **91**. The free end of the take-up lever is formed with a thread-engaging finger **97** bent to extend about the peripheral rim **88** of the disk **87**. The finger **97** is also formed with a thread-control-link tail **98**.

A guard-plate **99** is disposed adjacent disk **87** and is secured in place on the bridge piece **81** by means of a bracket member **100** and screws **101**. The guard plate **99** is formed with a substantially circular outer edge portion **102** and with a heart-shaped inner portion **103** which is shaped substantially similar to the disk **87**. The inner portion **103** of the guard plate is disposed in spaced relation to the disk **87** to define a narrow thread-accommodating slot **104**. Both the slot **104** and the disk **87** are disposed completely within the path of motion described by the thread-engaging finger **97**.

The thread path through the take-up extends from a supply through the wire guide **105** to the tension device **106**, a check spring **107**, then into the slot **104** between the guard plate **99** and the disk **87** and to a wire guide **108** on the bridge piece to a thread-guiding slot **109** formed in the bottom edge of the end cover-plate, and then to the usual guide **110** on the needle bar and to the needle.

Fig. 11 which illustrates the path of motion of the thread engaging finger **97**, indicates the velocity of the finger, at the same five critical points during the stitching cycle as are illustrated and discussed with reference to Fig. 6.

Briefly, from point E to point B the finger **97** is taking up the needle-thread, stitch setting occurring near point B. As shown by the corresponding positions of the take-up actuating crank pin **91**, marked in lower case letters, the take-up action from E to B is accomplished in less than one-third of the stitching cycle, the velocity of the finger being increased to a maximum during take-up.

The path of motion of the finger **97** is generally heart-shaped being also elongated in the direction from E to B. C represents the point of needle penetration. At point D, which coincides with needle-loop seizure by the shuttle, the velocity of the thread-engaging finger **97** is decreased to a minimum value. In addition, the path of motion of the finger **97** dips inwardly at the point of loop seizure, which together with the decrease in velocity provides for a retardation of the thread slackening process and a corresponding factor of precise control over the needle thread.

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

1. A rotary take-up mechanism for a sewing machine having a frame, a shaft journaled for rotation in said frame, and a crank mechanism including a crank-pin carried for rotation with said shaft, said take-up mechanism comprising a frame extension disposed axially opposite said crank mechanism, means rigidly securing said frame extension to said sewing machine frame, a take-up member disposed between said frame extension and said crank mechanism, a bearing carried by said take-up member and journaled on said crank-pin, a control link operatively connected to said take-up member, means pivotally securing said control link to said frame extension on an axis disposed within the path of motion described by said crank-pin, and a thread-engaging finger projecting from said take-up member in the direction of said frame extension.

2. A rotary take-up mechanism for a sewing machine having a frame, a shaft journaled for rotation in said frame, and a crank mechanism including a crank-pin carried for rotation with said shaft, said take-up mechanism comprising, a frame extension including a take-up supporting member disposed axially opposite said crank mechanism, a bridge-piece fixed to said take-up supporting member, and means rigidly securing said bridge-piece to said sewing machine frame, a take-up member disposed between said take-up supporting member and said crank mechanism, a bearing carried by said take-up member and journaled on said crank-pin, a control link operatively connected to said take-up member, means pivotally securing said control link to said take-up supporting member

on an axis disposed within the path of motion described by said crank-pin, and a thread-engaging finger projecting from said take-up member, said thread-engaging finger being disposed to extend about the edge of said take-up supporting member.

3. In a lock-stitch sewing machine having a bracket arm, a rotary shaft journaled in said bracket arm, a needle-bar journaled for endwise reciprocatory motion in said bracket arm, a crank mechanism carried by said shaft, and needle-bar driving connections with said crank mechanism, a rotary take-up mechanism comprising a single thread-engaging finger, means actuated by said crank mechanism for imparting motion to said thread-engaging finger in a non-circular path, a plate having a periphery shaped to coincide substantially with the non-circular path of motion of said thread-engaging finger, and means rigidly supporting said plate from said bracket arm in a position completely within the path of motion of said thread-engaging finger.

4. In a lock-stitch sewing machine having a bracket arm, a rotary shaft journaled in said bracket arm, a needle-bar journaled for endwise reciprocatory motion in said bracket-arm, crank mechanism carried by said shaft, and needle-bar driving connections with said crank mechanism, a rotary take-up mechanism comprising a plate rigidly supported on said bracket-arm, said plate having an inner and an outer face, said inner face being disposed in axially spaced relation to said crank mechanism, a single thread-engaging finger extending about the edge of said plate, means carried adjacent the inner face of said plate and actuated by said crank mechanism for imparting motion to said thread-engaging finger in a non-circular path, and means disposed adjacent the outer face of said plate for confining a loop of thread within the path of motion of said thread-engaging finger.

5. In a lock-stitch sewing machine having a bracket arm, a rotary shaft journaled in said bracket arm, a needle-bar journaled for endwise reciprocatory motion in said bracket-arm, a crank mechanism carried by said shaft, and needle-bar driving connections with said crank mechanism, a rotary take-up mechanism comprising a single thread-engaging finger, means actuated by said crank mechanism for imparting motion to said thread-engaging finger in a non-circular path, a plate having a periphery shaped to coincide substantially with the non-circular path of motion of said thread-engaging finger, means rigidly supporting said plate from said bracket arm in a position completely within the path of motion of said thread-engaging finger, and a guard member secured in spaced relation to said plate to define therebetween a slot adapted to confine a thread loop within the path of motion of said thread-engaging finger.

6. In a sewing machine having a frame and a shaft journaled in said frame, a thread take-up mechanism comprising, a support member carried by said frame, means associated with said support member defining a thread compartment at one side of said member, a take-up member pivotally supported on said support member at the side thereof opposite said thread compartment, a finger carried by said take-up member and extending into said thread compartment, and means for actuating said take-up member comprising a crank member carried by said shaft, and an operative connection between said crank member and said take-up member.

7. In a sewing machine having a frame, a shaft journaled in said frame, and a crank mechanism including a take-up actuating crank-pin carried by said shaft, a rotary take-up mechanism comprising, a take-up member, a thread-engaging finger carried by said take-up member, mechanism actuated by said crank mechanism for imparting motion in a non-circular path to said thread-engaging finger, said mechanism comprising a bearing carried by said take-up member and journaled on said take-up actuating crank-pin, a control link operatively connected with said take-up member between said bearing

and said thread-engaging finger, a plate having periphery shaped to coincide substantially with the non-circular path of motion of said thread-engaging finger, means pivoting said control link to said plate, and means securing said plate to said sewing machine frame in a position completely within the path of motion of said thread-engaging finger and with the pivotal axis of said anchor link being disposed within the path of motion of said crank-pin.

8. In a sewing machine having a frame, a shaft journaled in said frame, and a crank mechanism including a take-up actuating crank-pin carried by said shaft, a rotary take-up mechanism comprising a plate rigidly supported on said frame, said plate having an inner and an outer face, said inner face being disposed in axially spaced relation to said crank mechanism, a single thread-engaging finger extending about the edge of said plate, means carried adjacent the inner face of said plate and actuated by said crank mechanism for imparting motion to said thread-engaging finger in a non-circular path, said means comprising a take-up member, means securing said thread-engaging finger to said take-up member, a bearing carried by said take-up member and journaled on said crank-pin, a control link operatively connected to said take-up member, and means pivotally securing said control link to said plate on an axis disposed within the path of motion described by said crank-pin, and a guard member disposed in spaced relation to the outer face of said plate to define therebetween a slot adapted to confine a thread loop within the path of motion of said thread-engaging finger.

9. In a sewing machine having a frame, a needle supported for endwise reciprocation in said frame, and mechanism in said frame operatively connected to reciprocate said needle, a rotary needle-thread take-up mechanism comprising in combination a rotary thread-engaging finger, means driven by said needle actuating mechanism for imparting motion to said thread-engaging finger in a non-circular path, a pair of substantially planar thread-guiding members, a bridge piece joining said members and maintaining said members in spaced relation defining a thread-accommodating slot therebetween, and means supporting said thread-guiding members from said sewing machine frame with said thread-accommodating slot and said bridge piece disposed within the path of motion described by said thread-engaging finger.

10. A rotary take-up mechanism for a sewing machine having a frame, a shaft journaled for rotation in said frame, and a crank-pin carried for rotation with said shaft, said take-up mechanism comprising a frame extension disposed axially opposite said crank mechanism, means rigidly securing said frame extension to said frame, a cylindrical take-up member, a bearing carried by said cylindrical member and journaled on said crank-pin, a slide-block disposed to embrace said cylindrical member, means pivotally securing said slide block to said frame extension on an axis parallel to that of said crank mechanism and disposed within the path of motion described by said crank-pin, a thread-engaging finger carried by said cylindrical member at the side of said slide-block opposite from said bearing, said thread-engaging finger projecting from said cylindrical take-up member in the direction of said frame extension, and said frame extension being formed with a substantially planar thread-guiding slot extending transversely of the axis of said crank mechanism and disposed entirely within the path of motion described by said thread-engaging finger.

11. In a lock-stitch sewing machine having a bracket-arm, a rotary shaft journaled in said bracket arm, a needle-bar journaled for endwise reciprocatory motion in said bracket-arm, a crank mechanism carried by said shaft, needle-bar driving connections with said crank mechanism, and a take-up actuating crank-pin carried by said crank mechanism, a rotary take-up mechanism comprising a single thread-engaging finger, a take-up member

supporting said thread-engaging finger, bearing means carried by said take-up member and journaled on said crank-pin, a control link pivotally supported with respect to said bracket-arm on an axis disposed within the path of motion described by said crank-pin, means slidably connecting said control link with said take-up member to provide a non-circular path of motion of said thread-engaging finger, a plate having a periphery shaped to coincide substantially with the non-circular path of motion of said thread-engaging finger, and means rigidly supporting said plate from said bracket-arm in a position completely within the path of motion of said thread-engaging finger.

12. A rotary take-up mechanism for a sewing machine having a frame, a shaft journaled for rotation in said frame, and a crank mechanism including a crank-pin carried for rotation with said shaft, said take-up mechanism comprising, a frame extension including a take-up supporting member disposed axially opposite said crank mechanism, a bridge piece fixed to said take-up supporting member and means rigidly securing said bridge piece to said sewing machine frame, a take-up member disposed between said take-up supporting member and said crank mechanism, bearing means carried by said take-up member and journaled on said crank pin, a thread-engaging finger projecting from said take-up member and disposed to extend about the edge of said take-up supporting member, a block slidable along said take-up member between said bearing means and said thread-engaging finger, means pivotally securing said block to said take-up supporting member on an axis disposed within the path of motion described by said crank-pin.

13. A rotary take-up mechanism for a sewing machine having a frame, a shaft journaled for rotation in said frame, and a crank-pin carried for rotation with said shaft, comprising a frame extension secured to said frame and disposed axially opposite said shaft, a take-up lever disposed between said frame extension and said crank pin, a bearing carried at one end extremity of said lever and journaled on said crank-pin, a thread-engaging finger projecting from the opposite extremity of said take-up lever in the direction of said frame extension, and means confining said thread-engaging finger for motion in a non-circular path comprising an anchor link, means pivoting said anchor link to said take-up lever means pivoting said anchor link to said frame extension on an axis disposed within the path of motion described by said crank-pin.

14. A rotary take-up mechanism for a sewing machine having a frame, a shaft journaled for rotation in said frame, and a crank mechanism including a crank-pin carried for rotation with said shaft, said take-up mechanism comprising a frame extension including a take-up supporting member disposed axially opposite said crank mechanism, a bridge piece fixed to said take-up supporting member, and means rigidly securing said bridge piece to said sewing machine frame, a take-up lever disposed between said take-up supporting member and said crank mechanism, bearing means carried by said take-up lever and journaled on said crank-pin, an anchor link pivoted to said take-up lever, means pivotally securing said anchor link to said take-up supporting member on an axis disposed within the path of motion described by said crank-pin, and a thread-engaging finger projecting from said take-up lever, said thread-engaging finger being disposed to extend about the edge of said take-up supporting member.

15. In a sewing machine having a frame, a shaft journaled in said frame, and a crank mechanism including a take-up actuating crank-pin carried by said shaft, a rotary take-up mechanism comprising a plate rigidly supported on said frame, said plate having an outer face and an inner face disposed axially opposite said crank mechanism, a take-up lever disposed between the inner face of said plate and said crank mechanism, an operative connection between said take-up lever and said take-up actuating crank-pin, a single thread-engaging finger projecting from said take-up lever and extending about the edge of said plate, an anchor link pivoted to said take-up lever, means pivoting said anchor link to the inner face of said plate on an axis disposed within the path of motion described by said crank-pin, and a guard member supported on said frame in spaced relation to the outer face of said plate to define therebetween a slot adapted to confine a thread loop within the path of motion of said thread-engaging finger.

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