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2,686,486

ROTARY TAKE-UP FOR SEWING MACHINES

Filed Dec. 15, 1951

2 Sheets-Sheet 1

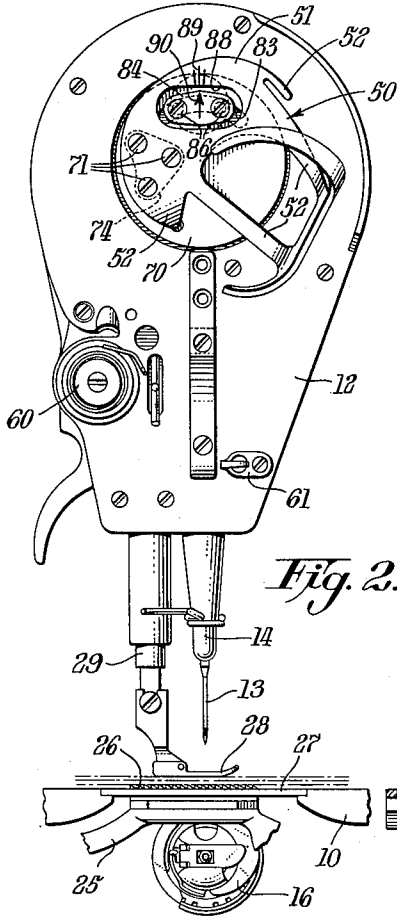


Fig. 2.

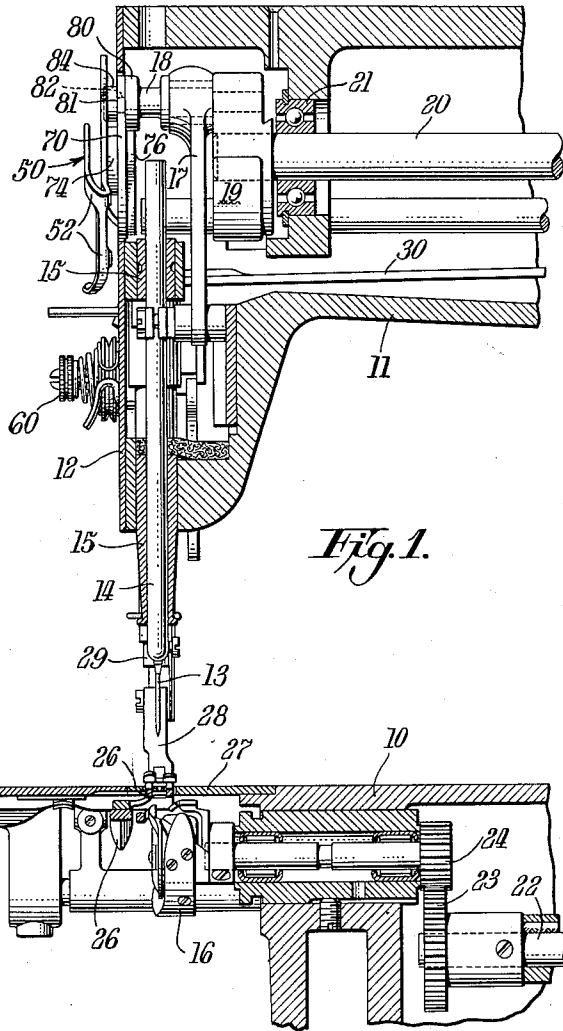


Fig. 1.

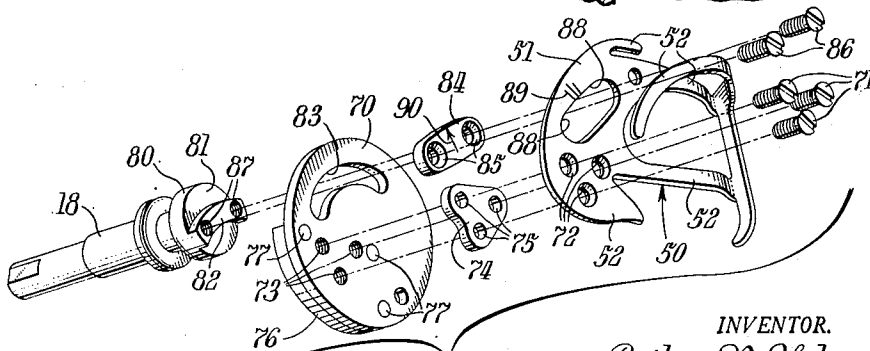


Fig. 3.

WITNESS

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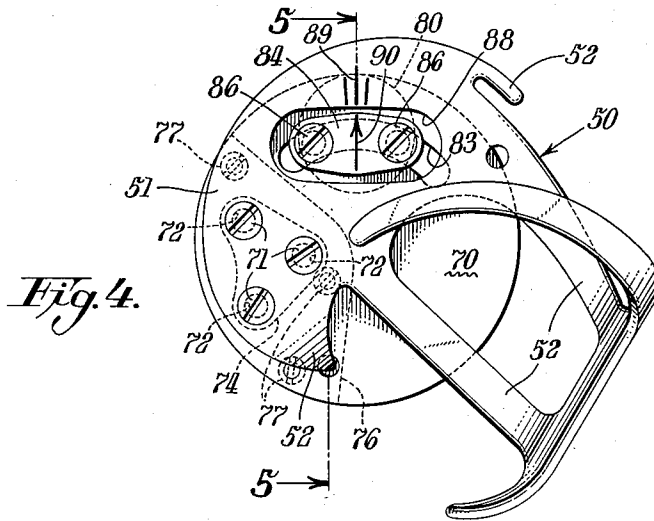


Fig. 4.

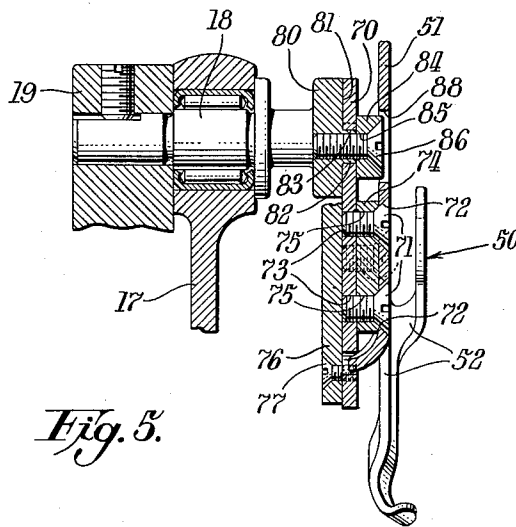


Fig. 5.

WITNESS

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ROTARY TAKE-UP FOR SEWING MACHINES

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Application December 15, 1951, Serial No. 261,806

4 Claims. (Cl. 112-248)

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This invention relates to rotary take-ups for sewing machines, and more particularly to an improved supporting structure and arrangement for a single rotary take-up member.

It is an object of this invention to provide a mounting structure for a single rotary needle thread take-up of the type disclosed in the copending patent application of Van Wagener et al., Serial No. 139,528, filed October 11, 1950, now Patent No. 2,636,464, dated April 28, 1953.

It is also an object of this invention to provide a take-up support which is economical to manufacture and install and which provides for convenient timing regulation with means for locking the parts together in a more positive manner to prevent accidental displacement thereof.

With these and other objects in view as will hereinafter appear, the invention comprises the devices, combinations and arrangement of parts hereinafter described and illustrated in the accompanying drawings of a preferred embodiment in which:

Fig. 1 is a vertical longitudinal sectional view of a portion of a sewing machine having my invention embodied therein.

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

Fig. 3 is an exploded perspective view of the take-up member and the supporting structure thereof.

Fig. 4 is an enlarged elevational view of the take-up member and the supporting structure thereof in assembled relation, and

Fig. 5 is a sectional view taken substantially along the line 5-5 of Fig. 4 and including associated portions of the sewing machine driving mechanism.

In Figures 1 and 2, the invention is illustrated as applied to a lock stitch sewing machine having a frame including a bed 10 and a hollow overhanging bracket-arm 11 terminating in a head closed by a face-plate 12. The machine is provided with lock-stitch forming instrumentalities of usual construction; that is, a needle 13 carried at the lower extremity of a needle bar 14 which is journaled for vertical reciprocatory movement in bearings 15-15 in the head of the bracket-arm 11, and a rotary hook 16 which is journaled at the under side of the bed 10. Reciprocatory motion is imparted to the needle bar 14 by means of a driving-link 17 which embraces a crank-pin 18 carried by a counter-balanced crank 19 which is fast on a rotary shaft 20 journaled in bearings, of which one is indicated at 21 in the bracket-arm 11. A bed-shaft 22,

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which is rotated at the same speed as the arm-shaft 20 by suitable means (not shown) within the frame, is connected by means of gears 23 and 24 to drive the hook 16 at twice the speed of shafts 20 and 22. Provided within the bed is the usual drop feed mechanism of which the feed-bar 25 and feed-dog 26 are illustrated. The feed-dog extends upwardly through suitable openings in a throat-plate 27, and is opposed by a presser-foot 28 which is carried by a presser-bar 29 journaled for vertical movement in the bracket-arm 11 and biased toward the throat-plate by means of a spring 30.

In the preferred embodiment shown in the drawings, the needle thread take-up comprises a thread engaging member, indicated generally as 50, which is formed of a single sheet metal stamping. The member 50 is disposed exteriorly of the face plate 12 and is supported for rotation with the arm-shaft 20 in a manner to be described more fully below. The thread engaging member 50 comprises a body portion 51 and a plurality of thread engaging extensions indicated as 52-52, which provide thread manipulating surfaces. The relative arrangement and configuration of the thread manipulating surfaces and the specific manner in which these surfaces coact to engage and control the flow of thread from a tension device 60 to a thread guide 61 and then to the needle does not form a direct part of this invention. These features are described fully in the above referenced copending application of Van Wagener et al. It is sufficient for present purposes to state here that the action of the rotating thread manipulating surfaces is to enlarge and permit the collapse of a loop of the needle thread and thereby to effect a proper control of the thread during the formation of stitches.

The thread engaging member 50 is rigidly secured in fixed position with respect to an intermediate supporting plate 70 by means of three fastening screws 71 which pass through counter-sunk apertures 72 formed in the body portion 51 of the thread engaging member and engage threaded holes 73 formed in the plate 70. A predetermined spaced relationship between the thread engaging member and the support-plate is effected by an interposed spacer 74 which is provided with clearance apertures 75 for the fastening screws 71. The rigidly connected thread engaging member 50 and plate 70 thus provide a sub-assembly which is secured as a unit to the crank-pin 18 for rotation with the arm-shaft 20. Due to the irregular shape, the thread engaging member is not in itself balanced properly. The

take-up sub-assembly, however, is balanced at the center about which it will rotate by means of a counterbalance 76 which is secured by fastening screws 77 to the plate 70 at the side opposite the thread engaging member 50, so as not to interfere with thread manipulation. The illustrated construction in which the plate 70, the spacer 74 and the counterbalance 76 are formed separately and secured together by screws is preferred for ease of manufacture. These three components, however, may be formed as a single part. The thread engaging take-up member 50 in practice must be polished or plated to minimize wear of the thread and must be specially hardened to resist wear. The take-up member is fabricated separately of the support plate so that these relatively expensive finishing operations may be confined thereto.

In order to accommodate the above described subassembly of the thread engaging member and disk for rotation with the arm-shaft 20, the crank pin 18 is extended beyond the needle-bar driving link 17 and provided at its free end with a concentric flange 80 formed with a flat outer face 81. A raised arcuate tang 82 is formed to project from the face 81 of the flange and is adapted to enter an arcuate slot 83 formed in the disk 70. A clamp-block 84 is formed with countersunk apertures 85—85 to accommodate fastening screws 86—86 which pass through the arcuate slot 83 and enter threaded holes 87—87 formed in the tang 82. An access hole 88 is formed in the body portion 51 of the take-up member to expose the clamp block 84. When the fastening screws 86—86 are tightened, the disk 70 is gripped securely between the clamping block 84 and the outer face 81 of the crank pin in a position which is accurately determined by the arcuate rib 82 and the slot 83.

The length of slot 83 is considerably greater than the length of the tang 82, so that by loosening the fastening screws 86—86, the position of the take-up member and disk 70 may be shifted angularly in order to regulate the timing of the take-up with respect to the stitch-forming instrumentalities. In the preferred embodiment, the center of curvature of the arcuate slot 83 and of the tang 82 corresponds to the axis of the rotary shaft 20 so that a shift of the angular position of the take-up member does not alter the path in which the take-up travels but only the timing of the take-up with respect to the stitch-forming instrumentalities. It is clear, therefore, that with the instant arrangement, regulation of the timing is not effective to alter the extent of the take-up action. One or more timing marks 89 are formed on the thread engaging member 50, which in conjunction with indicia 90 formed on the clamp block serves to provide visual indication by which regulation of the timing of the take-up is facilitated.

The rib and slot connection not only locates the take-up positively with respect to the crank-pin to which it is secured but also provides a positive interlocked driving connection therebetween, while the clamp arrangement provides for securely maintaining the take-up in place on the crank-pin and for convenient regulation of the take-up timing. It will be apparent from the above described embodiment that the present invention provides a simple form of construction which is economical to manufacture and affords a serviceable rotary take-up supporting structure.

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

1. In a rotary take-up mechanism for a sewing machine having stitch-forming instrumentalities and an actuating mechanism for said instrumentalities including a rotary shaft and a crank member, a thread take-up support-plate disposed in engagement with said crank member, said support-plate and said crank member being provided with complementary interlocking surfaces formed to provide angular movement of said support plate with respect to said crank member about the axis of rotation of said shaft, one of said surfaces being of arcuate configuration having a center of curvature coincident with the axis of movement of said rotary shaft, a thread engaging member secured to said support-plate in selected angular position, and means clamping said support-plate with respect to said crank member comprising a clamp-block disposed at the opposite side of said support-plate from said crank member, and a fastening connection between said clamp-block and said crank member.

2. In a sewing machine having an actuating mechanism including a rotary shaft and a crank member secured for circular movement about the axis of rotation of said shaft, a rotary thread take-up mechanism comprising a support-plate, a thread engaging member secured in spaced relation to said support-plate, said crank member and said support plate being provided with a complementary interlocking tang-and-slot connection, said slot being of arcuate configuration having a center of curvature coincident with the axis of movement of said crank-member, and means maintaining said complementary connection in interlocked relationship comprising a clamp block arranged at the side of said support-plate opposite said crank member, and a releasable fastening connection between said block and said crank member.

3. In a sewing machine having a crank member, a rotary take-up comprising, a support-plate formed with a slot defining evenly spaced arcuate side walls having a center of curvature coinciding with the axis of rotation of said crank member, a thread engaging member fixed at the outer side of said support-plate, a flange formed on said crank member providing an abutment for the inner side of said support-plate, a projection extending from said flange into said support-plate slot, said projection formed to contact both of said arcuate side walls and to occupy only a portion of the length of said slot thereby providing a limited range of angular positions of said take-up with respect to said shaft, a clamp block arranged at the outer side of said support plate and having fastening connections with said shaft projection for maintaining said take-up support plate in selected angular position with respect to said shaft, and complementary indicia formed on said clamp block and said thread engaging member to provide visual indication of the relative angular position of said take-up with said shaft.

4. In a sewing machine having an endwise reciprocable needle bar, a needle, and means for actuating said needle including a rotary shaft, a crank pin secured to said shaft, and a link embracing said crank pin and drivingly connected with said needle bar, a rotary needle thread take-up comprising a take-up member formed with thread engaging surfaces, a take-up support plate, fastening means securing said take-up member in fixed relative relation to said support

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plate, and clamp means associated with said needle-bar actuating crank-pin maintaining a driving relation between said crank-pin and said take-up support plate, said clamp means including, a flange formed concentrically on the free extremity of said crank-pin, an arcuate tang extending axially from said flange said tang having a center of curvature corresponding with the axis of said rotary shaft, said support plate being formed with an arcuate tang accommodating

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slot, and a clamp block engaging said support plate and having a fastening connection with said tang.

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