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THREAD TRIMMING MECHANISMS FOR SEWING MACHINES

Filed May 17, 1954

2 Sheets-Sheet 1

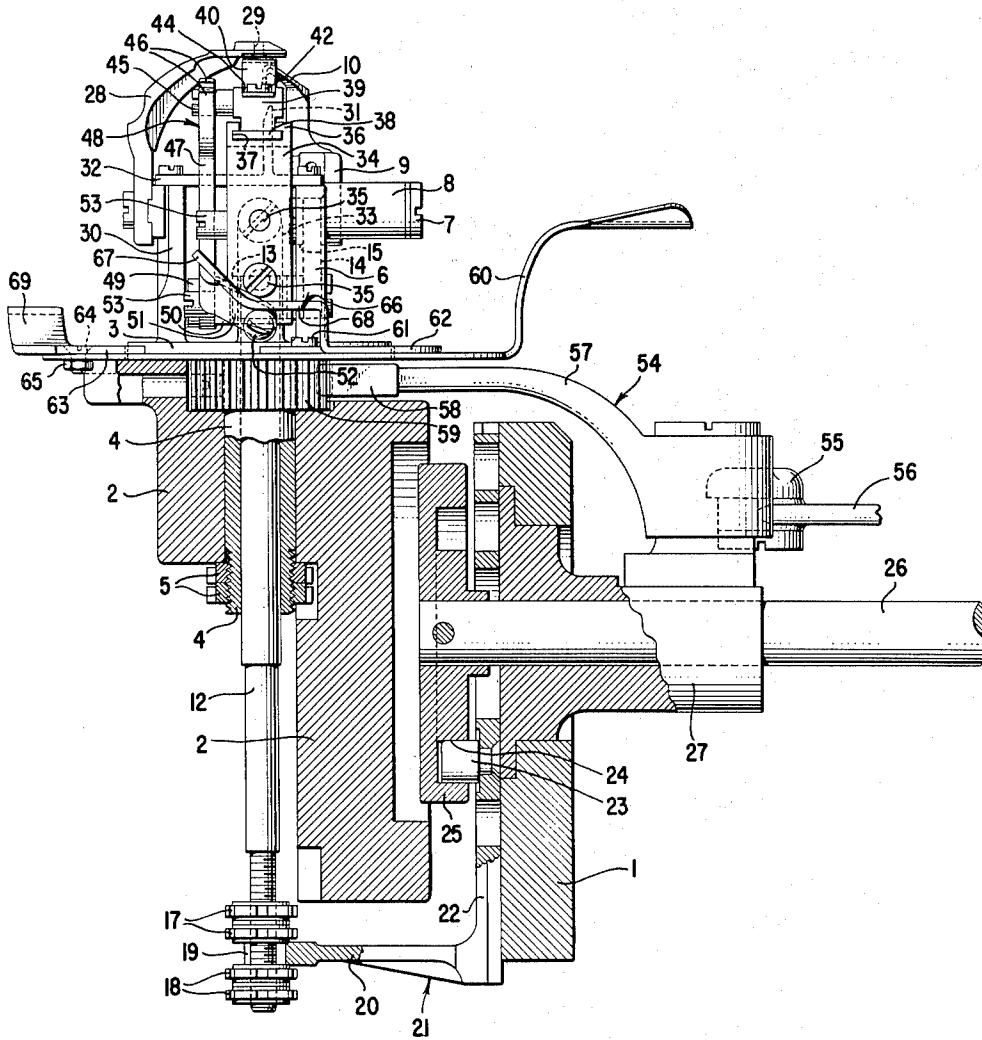


Fig. 1.

WITNESS

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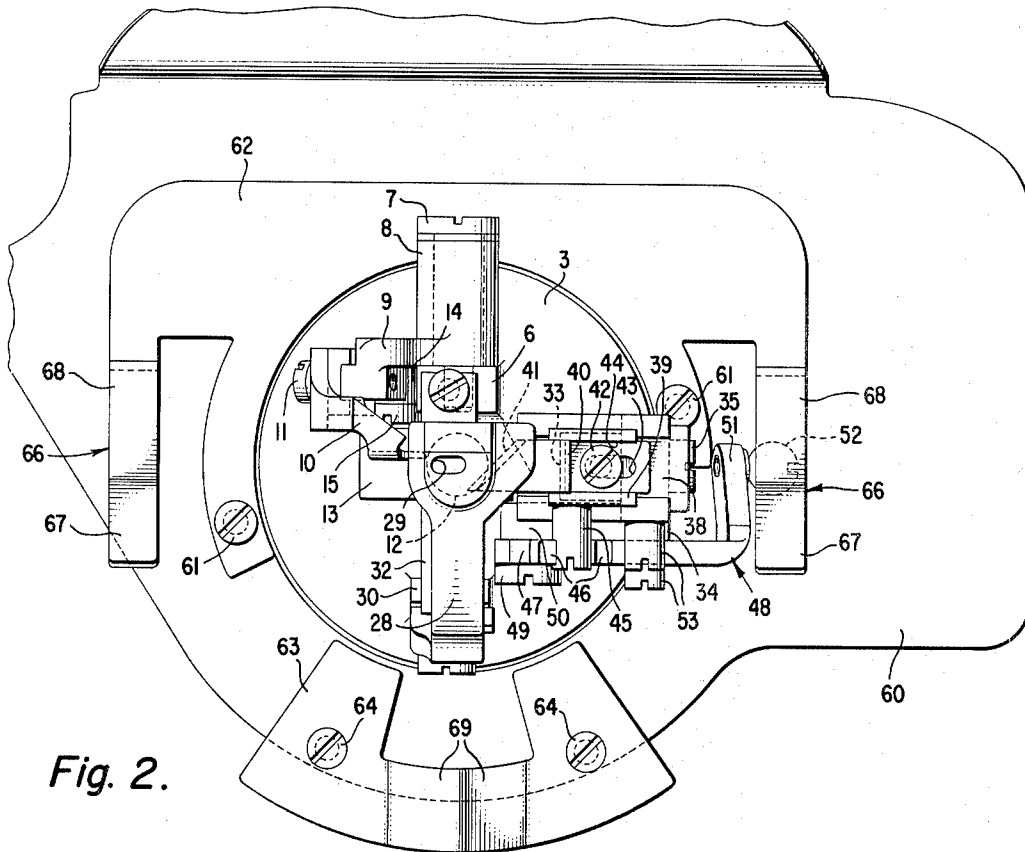


Fig. 2.

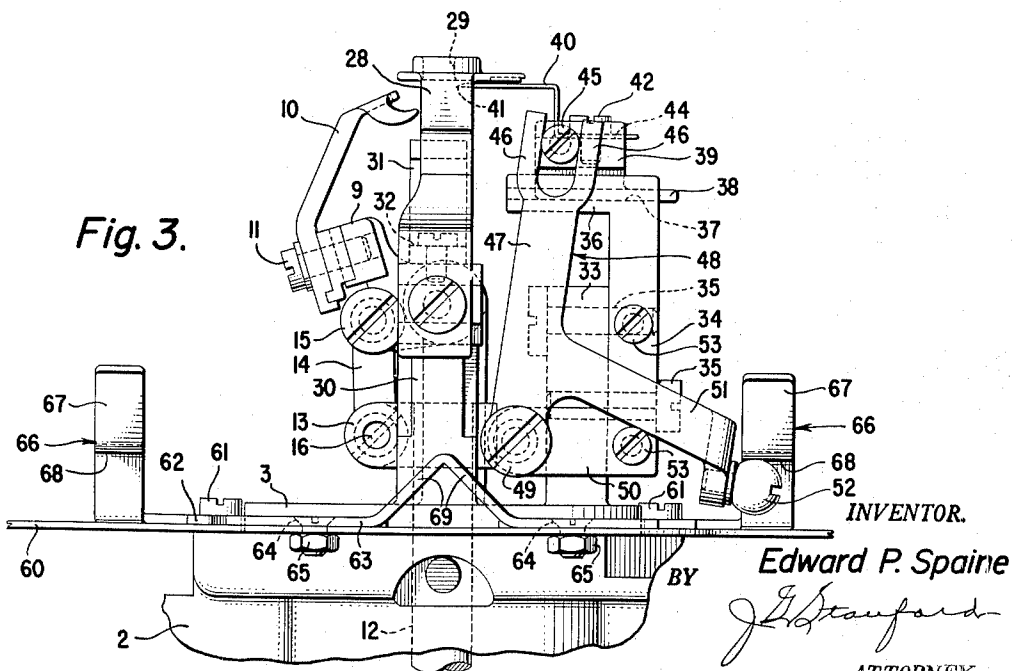


Fig. 3.

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THREAD TRIMMING MECHANISMS FOR SEWING MACHINES

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5 Claims. (Cl. 112—252)

The present invention relates to sewing machines and has for a primary object to provide an improved thread trimming mechanism for a sewing machine.

More particularly, it is an object of this invention to provide an improved thread trimming mechanism in a sewing machine of the group-stitch type having a loop-taker mounted upon a turret which is turned or, in other words, revolved through an arc of 180° at the opposite ends of a tack. In accordance with the present invention, this turning of the turret mechanism is used to actuate the thread trimming mechanism to sever the stitching thread.

Having in mind the above and other objects that will be evident from an understanding of this disclosure, the invention comprises the devices, combinations and arrangements of parts as illustrated in the presently preferred embodiment of the invention which is hereinafter set forth in such detail as to enable those skilled in the art readily to understand the function, operation, construction and advantages of it when read in conjunction with the accompanying drawings in which:

Fig. 1 is a fragmentary elevation view, partly in section, of a turret mechanism of a sewing machine and its actuating and supporting elements, which mechanism embodies the present invention.

Fig. 2 is a fragmentary top-plan view of the turret mechanism per se of Fig. 1.

Fig. 3 is a fragmentary elevation view of the turret mechanism per se of Fig. 1.

Although not limited thereto, the present invention is designed to be and is herein disclosed as used in a tacking machine which is adapted to produce a tack consisting of two closely spaced parallel lines of stitching. Such a tack is particularly useful in the manufacture of bound buttonholes in accordance with the method disclosed in the copending application of S. J. Ketterer, Serial No. 397,536, filed December 11, 1953, for the initial operation of stitching the piping strip to the body material. The presently disclosed embodiment of the invention is designed to produce a straight-line single-thread chain-stitch tack along one side of the buttonhole opening to secure the piping strip to the body material, then reversing and returning along the other side of the buttonhole opening. The thread trimming mechanism is to be actuated at the end of each of the straight line tacks to sever the sewing thread and thus to eliminate cross-over threads which would interfere with the further operations in the manufacture of the bound buttonholes.

More particularly, the present invention is adapted to be embodied in a sewing machine in which the work is fed past the stitching mechanism by a movable work-clamp, shifted laterally, and then reverse fed back past the stitching mechanism, and in which both the needle mechanism and the loop-taker mechanism are mounted upon turrets and are reversed at the completion of each limb of the tack so that the proper relationship will be maintained between the stitching instrumentalities and the direction of feed to insure proper stitch formation

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during both forward and reverse feeding of the work. Such machines are old and well known and it is not deemed necessary to expand this disclosure in relation thereto. Reference is made to my prior Patents Nos. 2,210,638 and 2,499,335 for a more general description of the machine in which the present invention may be incorporated, and which patents also include disclosures of thread-trimming means operated by rotation of the looper-carrying turret mechanism.

In the drawings, there is illustrated a frame member 1 forming a portion of the bed of the machine, to which frame member there is secured (by means not shown) a turret-carrying block 2. There is provided a turret 3 having a tubular depending shank 4 journaled in the block 2. The lower end of the shank 4 is threaded and receives a pair of lock nuts 5 which secure the same against longitudinal motion relative to the block 2. Mounted on the turret 3 is a post 6 into the upper end of which is threaded a pivot-screw 7 having mounted thereon for pivotal movement the hub 8 of a looper-carrier 9. A looper 10 is secured to the looper-carrier 9 by a screw 11. Oscillation about the pivot-screw 7 is imparted to the looper-carrier 9 by a rod 12 slidably mounted in the bore of the hollow or tubular shank 4 of the turret 3, which rod 12 has secured to the upper end thereof a bracket 13 and which rod 12 is connected to the looper-carrier 9 by a link 14 that is pivotally connected at one end to the looper-carrier 9 by a pivot-screw 15 and is pivotally connected at the other end to the bracket 13 by a pivot-screw 16. The lower end of the rod 12 is threaded and receives two pairs of lock nuts 17 and 18 which serve as collars adjustably mounted axially of the rod, and which embrace the forked end 19 at the free end of an arm 20 of a slide 21 having a second arm 22 arranged at a right angle to the arm 20. The arm 22 carries a cam follower 23 that cooperates with the cam groove 24 in a face cam 25 that is secured to the end of the main or bed-shaft 26 of the machine, the bed-shaft 26 being journaled in a bushing 27 carried by the frame member 1. Upon rotation of the bed-shaft 26 and cam 25, reciprocation will be imparted to the slide 21 and the rod 12, which reciprocation of the rod 12 will, through the link 14, impart oscillation to the looper-carrier 9 and looper 10. The looper 10 is of the nodding-type and will function in a well known manner in cooperation with a threaded needle (not shown) in the formation of a single-thread chain-stitch. There is also provided a needle-throat member 28 having a needle-aperture 29, which member 28 is carried by a post 30 rising from the turret 3, and a needle-guide 31 carried by a bar 32 secured to the upper ends of the posts 6 and 30.

The thread trimming mechanism is carried by a post 33 rising from the turret 3 and comprises a bracket 34 secured to the post 33 by screws 35. The upper end of the bracket 34 is formed to define a horizontal arm 36 having a slot 37 cut into the upper surface thereof, the slot having undercut longitudinal edges that are adapted to receive slidably the base 38 of a blade-carrying slide-block 39. A trimmer blade 40 having a cutting edge 41 is adjustably secured to the slide-block 39 by a screw 42 extending through an elongated slot 43 in the shank of the blade 40, the shank of the blade being received within a slot 44 formed in the upper surface of the slide-block 39 to insure proper alignment of the same relative to the slide-block. A laterally extending stud 45 is threaded into the side of the slide-block 39, which stud 45 is arranged between the tines 46 of one arm 47 of a bell-crank lever 48 that is pivoted by means of a pivot-screw 49 to an arm 50 of the bracket 34. The second arm 51 of the bell-crank lever 48 has a ball-shaped cam follower 52 screwed into the end thereof. Oscillation of the bell-crank lever 48 is limited by a pair of stop-studs 53 threaded into the

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bracket 34 and arranged one upon each side of the lever arm 51 in position to be contacted by the lever arm 51 at the point of the intended limit of travel of the same. It will, of course, be evident from the above disclosure that raising and lowering of the lever-arm 51 will move the slide-block 39 relative to its support and will thereby impart a cutting stroke to the trimming blade 40.

In the usual manner, the turret is adapted to be rotated by mechanism including a bell-crank lever 54 pivotally mounted on the bushing 27 having one arm 55 that is pivotally connected to a cam actuated lever 56 and having a second arm 57 that carries a segment gear 58 that meshes with a gear 59 secured to the shank 4. When the bell-crank lever 54 is pivoted by the lever 56, the gear 58 will impart rotation to the gear 59 and thereby impart rotation to the turret 3.

As hereinbefore set forth, the trimming blade is designed to be automatically actuated by the rotation of the turret mechanism at the completion of each tack. To this end, there is provided a guard-plate 60 secured to the upper portion of the turret-carrying block 2 by screws 61, and carried by this guard-plate 60 are cams 62 and 63. The cam 62 is secured in position by the screws 61 which also fasten the plate 60 in position, and the cam 63 is secured to the plate 60 by the screws 64 and cooperating nuts 65. The cam 62 is formed with two cam surfaces 66 that are arranged upon opposite sides of the turret 3 in position to be engaged by the ball-shaped cam follower 52 on the lever arm 51 at each end of the swing of the same as the turret is reversed. The cam surfaces 66 each include a cam portion 67 designed to depress the cam follower 52 and a holding portion 68 which maintains the follower 52 in depressed position. The cam 63 is disposed at an intermediate point in the arc of travel of the cam follower 52 as the turret is turned and includes a pair of cam surfaces 69 that are designed to lift the follower 52. Each of the cams 62 and 63 may be formed of sheet metal.

It will, of course, be apparent that with the machine in position for sewing, the trimmer blade 40 will be retracted and held in retracted position in that the follower 52 is under the holding portion 68 of one of the cam surfaces 66, as illustrated in the drawings. Upon completion of the tack, the turret 3 will be rotated through an arc of 180° to reposition the parts for optimum cooperation during feeding of the work in the opposite direction. During rotation of the turret 3, the lever-arm 51 will be swung in an arc about the center of rotation of the turret, and will contact the cam 63. When the follower 52 rides up the inclined cam surface 69, the bell-crank lever 48 will be pivoted in the direction that will advance the slide-block 39 and the trimmer blade 40 carried thereby, thus imparting a cutting stroke to the trimmer blade. In the usual manner, at the time the trimmer blade 40 is advanced, the thread extends from the last stitch in the work, downwardly about the looper, and then upwardly to the needle and eventually to the supply. The thread is taut at this time and the cutting edge 41 of the trimmer blade is formed to contact and sever the work-limb of the thread closely adjacent the work. The turret will continue to rotate and near the end of the arc of rotation the follower will contact the underside of the other cam surface 67, which thus depresses the same to retract the trimmer-blade 40.

The preferred embodiment of the invention herein illustrated is specifically designed to be used in the manufacture of bound buttonholes, as hereinbefore set forth, in which the full stitching cycle of the machine is designed to produce two separate parallel-arranged tacks of single-thread chain-stitches. The thread trimming means is designed to be actuated at the completion of each tack. Therefore, the cam 62 provides a cam surface 66 at each end of the arc of travel of the follower 52 for depressing the same, and the cam 63 is designed to provide two cam surfaces 69 which will lift the follower 52 regardless of

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the direction of rotation of the same relative thereto. It will be understood that in the machine as above noted, when operation is initiated, a first tack will be made, after which the turret will be rotated, which actuates the thread trimmer means. The machine will then automatically proceed with the formation of a second tack, and the stitching cycle is completed by reverse rotation of the turret to its starting position, which also actuates the trimmer.

Numerous alterations of the structure herein disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to a preferred embodiment of my invention which is for purposes of illustration only and not to be construed as a limitation of the invention. All such modifications which do not depart from the spirit of the invention are intended to be included within the scope of the appended claims.

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

1. A thread trimming mechanism for a sewing machine having an oscillatable turret journaled in a support and a stitching mechanism including a loop-taker mounted upon said turret, said thread trimming mechanism comprising an upstanding post on said turret, a slide-block carried by said post for sliding movement relative thereto, a trimmer blade carried by said slide-block and adapted upon sliding movement of said slide-block to sever a sewing thread adjacent the point of stitch formation, and means for imparting sliding movement to said slide-block upon rotation of said turret comprising a lever pivotally mounted upon said turret at a point intermediate the ends of the lever and having first and second lever-arms, operative connections between said first lever-arm and said slide-block for imparting sliding movements to the latter upon pivotal movements of said lever, and cam means carried by said support and presenting a cam surface in the path of travel of the second lever-arm as said turret is rotated to contact said second lever-arm and thereby pivot said lever.

2. A thread trimming mechanism for a sewing machine having an oscillatable turret journaled in a support and a stitching mechanism including a loop-taker mounted upon said turret, said thread trimming mechanism comprising an upstanding post on said turret, a slide-block carried by said post for sliding movement relative thereto, a trimmer blade carried by said slide-block and adapted upon sliding movement of said slide-block to sever a sewing thread adjacent the point of stitch formation, and means for imparting sliding movement to said slide-block upon rotation of said turret comprising a lever pivotally mounted upon said turret at a point intermediate the ends of the lever and having first and second lever-arms, operative connections between said first lever-arm and said slide-block for imparting sliding movements to the latter upon pivotal movements of said lever, and cam means carried by said support and presenting first and second cam surfaces in the path of travel of the second lever-arm as said turret is rotated to contact said second lever-arm, said first cam surface being designed to pivot said lever to impart a cutting stroke to said trimmer blade, and said second cam surface being designed to pivot said lever in the opposite direction from said cutting stroke and thereby to retract said trimmer blade and to hold the same in retracted position.

3. A thread trimming mechanism for a sewing machine having an oscillatable turret journaled in a support, a stitching mechanism including a loop taker mounted upon said turret, and means for rotating said turret through an arc of substantially 180° upon the completion of a tack, said thread trimming mechanism comprising an upstanding post on said turret, a slide-block carried by said post for sliding movement relative thereto, a trimmer blade carried by said slide-block and adapted upon sliding movement of said slide-block to sever a sewing thread

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adjacent the point of stitch formation, and means for imparting sliding movement to said slide-block upon rotation of said turret comprising a lever pivotally mounted upon said turret at a point intermediate the ends of the lever and having first and second lever-arms, operative connections between said first lever-arm and said slide-block for imparting sliding movements to the latter upon pivotal movements of said lever, and cam means carried by said support and presenting first and second cam surfaces in the path of travel of said second lever-arm as said turret is rotated to contact said second lever-arm, said first cam surface being arranged at an intermediate point in the arc of travel of said second lever-arm and being designed to pivot said lever to impart a cutting stroke to said trimmer blade, and said second cam surface being arranged at the end of the arc of travel of said second lever-arm and being designed to pivot said lever in the opposition direction from said cutting stroke and thereby to retract said trimmer blade and to hold the same in retracted position when said second lever-arm is in the end position in its arc of travel.

4. A thread trimming mechanism as set forth in claim 3 in which there is provided a second cam means similar to said first mentioned cam means, one of said cam means being arranged to cooperate with said second lever-arm in each direction of rotation.

5. A thread trimming mechanism for a sewing machine

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having an oscillatable turret journaled in a support and a stitching mechanism including a loop-taker mounted upon said turret, said thread trimming mechanism comprising an upstanding post on said turret, a bracket secured to said post, a slide-block mounted in said bracket for sliding movements in a plane parallel to said turret, a trimmer blade carried by said slide-block and adapted upon sliding movement of said slide-block to sever a sewing thread adjacent the point of stitch formation, and means for imparting sliding movement to said slide-block upon rotation of said turret comprising a bell-crank lever pivoted to said bracket and having first and second lever-arms, operative connections between said first lever-arm and said slide-block for imparting sliding movements to the latter upon pivotal movements of said lever, and cam means carried by said support and presenting a cam surface in the path of travel of the second lever-arm as said turret is rotated to contact said second lever-arm and thereby pivot said lever.

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