Aug. 5, 1952 J. P. ENOS 2,605,729

THREAD-CHAIN SEVERING DEVICE FOR SEWING MACHINES

Filed Oct. 22, 1947 2 SHEETS—SHEET 1

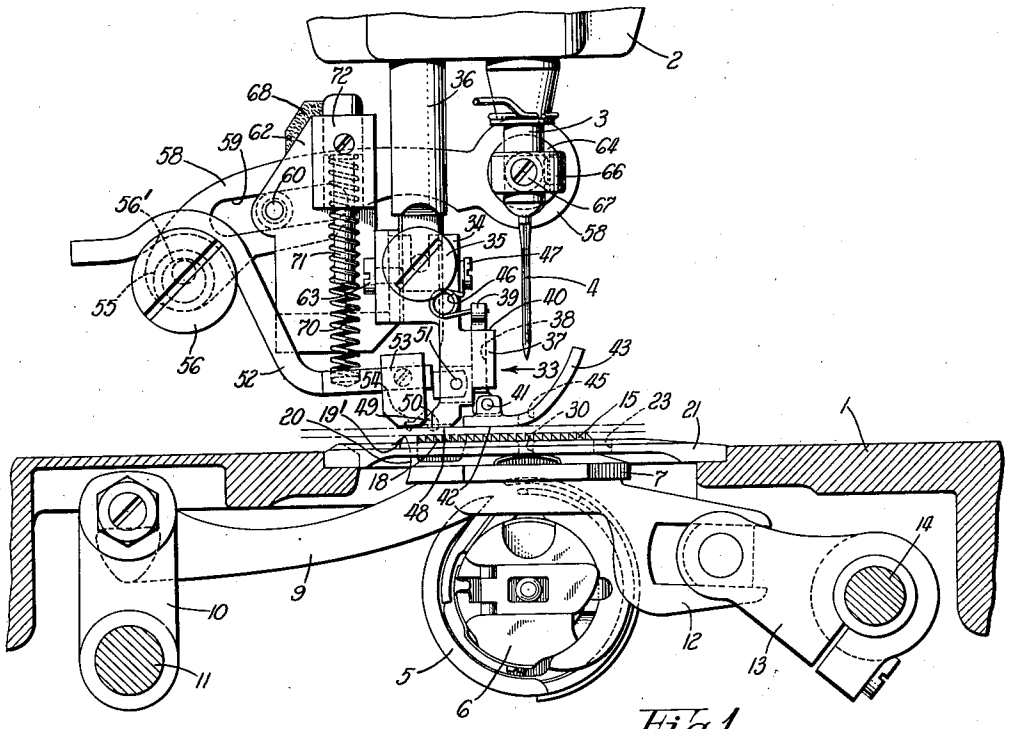


Fig. 1.

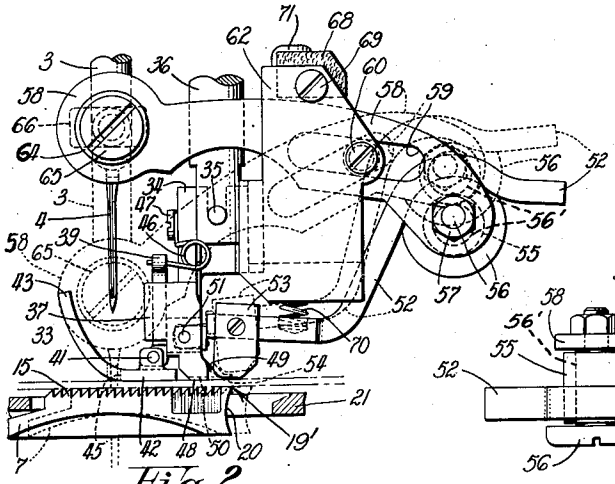


Fig. 2.

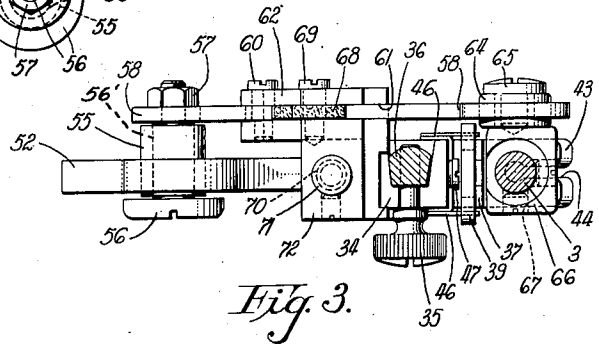


Fig. 3.

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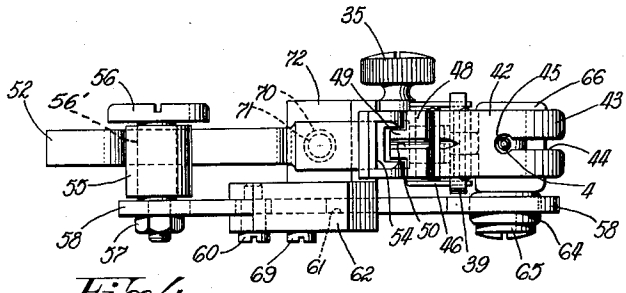


Fig. 4.

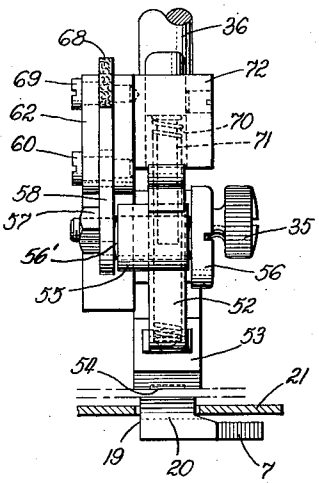


Fig. 5.

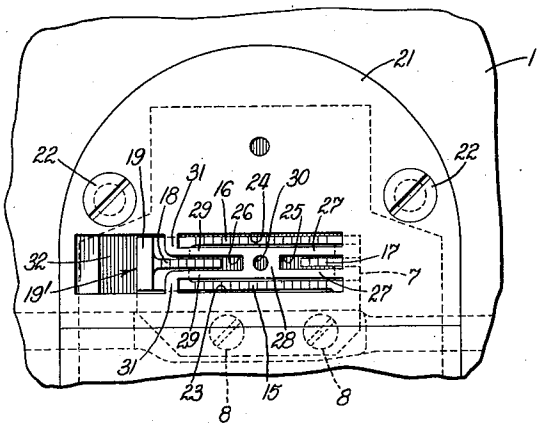


Fig. 6.

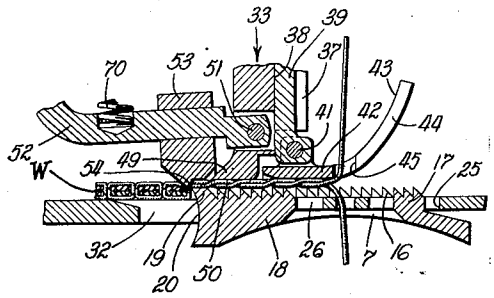


Fig. 7.

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THREAD-CHAIN SEVERING DEVICE FOR SEWING MACHINES

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10 Claims. (Cl. 112—252)

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This invention relates to devices for severing thread-chains extending from stitched articles and is in the nature of an improvement in the thread-severing device of my prior United States Patent No. 2,318,843, May 11, 1943.

The present invention has for its primary object to reduce to a minimum the possibility of marring the work, or the stitches formed in the work, by the complemental thread-chain severing elements.

Another object of this invention is to increase the efficiency of the thread-chain severing device in cases wherein the stitched work is deflected out of the line of seam formation.

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

Fig. 1 is a front end elevation, partly in section, of a portion of a sewing machine containing the improved thread-severing device.

Fig. 2 is a right hand side elevation of the thread-severing device, the needle and presser bars being broken away and the throat-plate of the machine being shown in section.

Fig. 3 is a top plan view of the thread-severing device, with the needle and presser bars shown in section.

Fig. 4 is a bottom plan view of the thread-severing device.

Fig. 5 is a rear end elevation of the severing device, with the throat-plate of the machine shown in section.

Fig. 6 is a top plan view of a portion of the cloth-plate and including the throat-plate and feed-dog of the machine.

Fig. 7 represents a longitudinal vertical section of the thread-severing device.

Referring to the drawings, the sewing machine containing the present improvement has the usual frame including a work-supporting bed-plate 1 and a bracket-arm head 2. Journaled for endwise reciprocation in the head 2 is a vertically disposed needle-bar 3 carrying an eye-pointed needle 4. Complemental to the needle 4 in the formation of lock-stitches is a loop-taker 5 which, in the present case, is in the form of a horizontal-axis rotary hook adapted to cast loops of needle-thread about a mass of under thread contained in a thread-carrier 6 suitably journaled in the rotary hook and restrained against rotation therewith. The present invention, however, is not limited to any particular form of stitch-forming mechanism.

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The work W (shown in section in Fig. 7) is intermittently advanced past the needle 4 by a feed-dog 7 of the drop-feed type. The feed-dog 7 is secured by screws 8 upon a horizontally disposed feed-bar 9, of which the rearward end is pivotally connected to the upper end of a vertically disposed rocker 10 carried by a feed-advance rock-shaft 11 which may be supported and actuated in any usual or suitable manner to impart work-advancing movements of variable amplitude to the feed-dog 7. At it forward end, the feed-bar 9 has a fork 12 operatively connected to a crank-arm 13 of the usual feed-lift rock-shaft 14. The present invention, however, is not limited to any particular form of feed-dog actuating mechanism.

The feed-dog 7 has two outer rows of teeth 15 and 16 which are preferably equal in length, a relatively short intermediate row of teeth 17 disposed in front of the needle path and in the line of seam formation, and another intermediate row of teeth 18 disposed rearwardly of the needle path and also in the line of seam formation. The rear row of teeth 18 of the feed-dog extends rearwardly beyond the outer rows of teeth 15 and 16, and terminates in a thread-severing member 19. The thread-severing member 19 has a horizontally flattened upper face disposed in a plane containing the work-engaging edges of the several rows of feed-dog teeth; said member 19 being widened crosswise of the line of seam formation and at opposite sides of the row of teeth 18 so that the opposite side faces of the member 19 are disposed in the planes containing the outer side faces of the outer rows of teeth 15 and 16. The upper rear edge of the feed-dog member 19, which is substantially normal to the line of feed, is formed as a sharpened cutting edge 19' by hollow grinding the rear end portion 20 of said member.

In its operative work-advancing movements, the feed-dog 7 is projected through a slotted throat-plate 21 which is secured by screws 22 upon the bed-plate 1. The throat-plate 21 is cut away to provide parallel outer slots 23 and 24 for the rows 15 and 16 of feed-dog teeth, a front intermediate slot 25 for the feed-dog teeth 17, and a rear intermediate slot 26 for the feed-dog teeth 18. The throat-plate as thus cut away is provided with spaced front parallel bars 27 which are connected by a land 28 with the spaced rear parallel bars 29; the land 28 containing a needle-aperture 30. At their rearward ends, the bars 29 of the throat-plate terminate in front of the thread-severing member 19 and are anchored to

the throat-plate by oppositely directed and alined ribs 31. The throat-plate 21 is cut away rearwardly of the ribs 31 to provide a wide slot 32 for the thread-severing member 19; the slot 32 being elongated sufficiently to afford clearance rearwardly of the thread-severing member 19 to permit severed thread particles to drop down through the throat-plate.

Opposed to the feed-dog 7 is presser-foot 33 having an upper shank-portion 34 secured by a screw 35 to the lower end of the usual spring-depressed presser-bar 36 journaled for endwise vertical movement in the bracket-arm head 2. A forwardly offset lower portion 37 of the presser-foot shank is provided with a guideway 38 for a vertically movable T-shaped supporting bar 39, of which the divergent arms overlie a shoulder 40 formed by offsetting the lower portion 37 of the presser-foot shank. Hinged to the lower end of the supporting bar 39, by a transverse pivot-pin 41 is a work-engaging sole-plate 42 having an upturned toe 43 formed with a slot 44 terminating at its inner end in a needle-clearance opening 45. Engaging and bearing downwardly upon the divergent upper arms of the T-shaped supporting bar 39 are the ends of a spring 46 secured by a screw 47 upon the upper shank-portion 34 of the presser-foot, whereby the sole-plate 42 is yieldingly depressed to an extent limited by the engagement of the arms of the supporting bar 39 with the shoulder 40.

The lower shank-portion 37 of the presser-foot terminates in a work-engaging face 48 disposed rearwardly of the sole-plate 42; the shank-portion 37 being suitably recessed at its lower front side to afford the requisite clearance for the heel of the sole-plate 42. At its rearward side and medianly of the width thereof, the shank-portion 37 is formed with a relatively narrow extension-piece 49 providing a continuation of the work-engaging face 48. The work-engaging face 48 and the continuation thereof in the extension-piece 49 are formed with a groove 50 in alinement with the line of seam formation and functioning to guide the thread-chain T which connects stitched articles.

Pivotally connected to the shank-portion 37 of the presser-foot by a pivot-pin 51 disposed horizontally crosswise of the line of seam formation, is a carrier-arm 52 extending rearwardly from the presser-foot. Suitably secured upon the carrier-arm 52 is a cutter-block 53 which is recessed in its lower front face to provide clearance for the extension-piece 49 of the presser-foot and to form, in the lower face of the cutter-block 53, a cutting-edge 54. The cutting-edge 54 extends across the line of seam formation and is disposed in close proximity to the rearward end of the extension-piece 49 of the presser-foot, whereby the cutting-edge 54 is traversed by the cutting-edge 19' of the feed-dog in its work-advancing movements.

The carrier-arm 52 is bent to overlie a roller 55 carried by an eccentric-portion 56' of a shouldered stud 56 secured by a nut 57 upon the rearward end of an actuating lever 58. Intermediate its ends, the lever 58 is lengthwise provided with a slot 59, through which extends a fulcrum-screw 60 spanning a lever-confining slot 61 formed vertically in a bracket 62 secured by a screw 63 to the upper portion 34 of the presser-foot shank. The apertured forward end of the lever 58 is entered by a roller 64 carried by a stud-screw 65 threaded into a block 66 secured by screws 67 upon the lower end of the needle-bar 3. The lever 58 performs endwise sliding as well as pivotal movements in the bracket-slot 61 and, in order to lubricate the lever 58, a piece of suitable lubricant absorbent material 68 is secured by a screw 69 in the slot 59 above the lever 58.

The lever 52 is held in engagement with the roller 55 of the stud 56 by means of a coil-spring 70 embracing a post 71 depending from a lug 72 of the bracket 62; the spring 70 having its upper end disposed in an aperture in the lug 72 and having its lower end seated in an aperture provided in the upper face of the lever 52. By angular adjustment of the stud 56, the eccentric-portion 56' thereof may be turned to vary the lowest position of the cutter-block 53 carried by the lever 52.

In the operation of the machine, the vertically reciprocating needle-bar 3 actuates the lever 58, thereby rocking the carrier-arm 52 and automatically raising and lowering the cutter-block 53; the latter reaching its lowest position determined by the roller 55 of the stud 56 when the needle-bar reaches the upper end of its stroke. The cutting-edge 54 of the cutter-block 53 is thereby momentarily lowered at the proper time, in the absence of work-plies under the cutter-block, to position the cutting-edge 54 for thread-shearing cooperation with the cutting-edge 19' of the feed-dog. From this it will be understood that during the major portion of the normal stitch-forming cycle, the cutter-block 53 is lifted to an extent which reduces to a minimum the possibility of marring stitches formed in the work-plies. However, as soon as the finishing ends of the stitched work-plies pass the cutter-block 53, the latter will be momentarily lowered in each stitch-forming cycle into a position whereby the thread-chain extending from the work-plies will be promptly severed close to the work and at a point spaced from the needle-path a sufficient distance to provide the necessary length of thread for beginning the next stitching operation.

While the thread-chain formed in the absence of work is normally guided by the presser-foot 50 in the line of feed, some operators have a tendency to pull the stitched work away from the line of feed. The present construction provides for that contingency by forming the lower thread-severing member so as to extend the full width of the feed-dog. This is permitted by the special throat-plate construction hereinbefore described and which includes the supporting ribs for the throat-plate bars 29.

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

1. In a sewing machine, stitch-forming mechanism including a reciprocatory needle bar, a needle carried thereby, a work-support, a feed-dog operating through said work-support for advancing work across the path of needle-reciprocation, a primary thread-chain severing member carried by said feed-dog, a complemental thread-chain severing member movable from above said work-support and rearwardly of said needle into and out of thread-severing relation with said primary severing member in the absence of work between said members, and automatically acting means operated by said needle-bar in each stitch-forming cycle for moving said complemental severing member into and out of engagement with the work being stitched.

2. In a sewing machine, a work-support, stitch-forming mechanism including a reciprocatory needle bar, a needle carried thereby, a primary

thread-severing member having effective thread-severing movements in the direction of movement of stitched work through the machine, means for actuating said member, a complemental thread-severing member disposed rearwardly of said needle and movable in the absence of work into position for coaction with said primary severing member for severing the stitching thread extending from said needle, said members being movable into thread-shearing relation from opposite sides of the plane of the work, and automatically acting means including said needle-bar for moving said complemental severing member out of engagement with the work being stitched during each stitch-forming cycle.

3. In a sewing machine, stitch-forming mechanism including a reciprocatory needle bar, a needle carried thereby, a work-support, a feed-dog operating through said work-support, a presser-foot opposed to said feed-dog and movable toward and from said work-support, a primary thread-chain severing member carried by said feed-dog, a bracket supported for movement with said presser-foot, a carrier-arm pivotally mounted on said bracket, a complemental thread-chain severing member supported by said carrier-arm and movable into position for thread-shearing coaction with said primary severing member, and means including a lever mounted on said bracket and connected to said needle-bar and carrier-arm for actuating said carrier-arm in each stitch-forming cycle for intermittently moving said complemental severing member toward and from said work-support.

4. In a sewing machine, a work-support, stitch-forming mechanism including a reciprocatory needle-bar, a primary thread-severing member having effective thread-severing movements in the direction of movement of stitched work through the machine, means for actuating said member, a complemental thread-severing member disposed rearwardly of said needle and movable in the absence of work into position for coaction with said primary severing member, yielding means biasing said complemental thread-severing member toward thread-severing position, and needle-bar operated means for intermittently moving said complemental severing member away from said work-support.

5. In a sewing machine, a work-support, stitch-forming mechanism including a reciprocatory needle bar, a needle carried thereby, a primary thread-severing member having effective thread-severing movements in the direction of movement of stitched work through the machine, means for actuating said member, a complemental thread-severing member disposed rearwardly of said needle and movable in the absence of work into position for coaction with said primary severing member, said members being movable into thread-shearing relation from opposite sides of said work-support, yielding means biasing said complemental thread-severing member toward thread-severing position, and including a lever actuated by said needle-bar for intermittently moving said complemental severing member out of engagement with the work being stitched.

6. In a sewing machine, a work-support, a presser-bar, stitch-forming mechanism including a reciprocatory needle bar, a needle carried thereby, primary and complemental thread-chain severing members operable toward and from each other from opposite sides of said work-support and intermittently brought into thread-chain shearing relationship with each other in the absence of work therebetween, means for actuating said primary thread-severing member, a spring yieldingly biasing said complemental thread-severing member toward thread-severing position, a bracket carried by said presser-bar, a lever having a sliding fulcrum on said bracket and operatively connected to said needle-bar, and means actuated by said lever and effective in each stitch-forming cycle for moving the spring-biased complemental severing member out of engagement with the work being stitched.

7. In a sewing machine, a work-support, stitch-forming mechanism including a reciprocatory needle-bar, primary and complemental thread-chain severing members operable toward and from each other from opposite sides of said work-support and intermittently brought into thread-chain shearing relationship with each other in the absence of work therebetween, means for actuating said primary severing member, a carrier-arm for said complemental thread-severing member, and means including an operative connection with said needle-bar for actuating said carrier-arm to move said complemental severing member yieldingly toward and positively away from said work-support.

8. In a sewing machine, stitch-forming mechanism including a reciprocatory needle-bar, a work-support, a work-advancing feed-dog operating through said work-support, a primary thread-chain severing member carried by said feed-dog, a presser-foot opposed to said feed-dog, a carrier-arm pivotally mounted upon said presser-foot, a complemental thread-chain severing member mounted upon said carrier-arm and disposed rearwardly of said presser-foot to extend across the line of seam formation, a supporting bracket, a lever fulcrumed upon said bracket and operatively connected to said needle-bar for actuation thereby, an adjustable eccentric-stud carried by said lever in position for engagement by said carrier-arm, and a spring yieldingly biasing said carrier-arm into engagement with said stud.

9. In a sewing machine, stitch-forming mechanism including a reciprocatory needle, a work-support including a throat-plate provided with a needle-aperture, said throat-plate being cut away to form a plurality of feed-slots including parallel outer rows of feed-slots and an intermediate feed-slot disposed between said outer rows of slots rearwardly of said needle-aperture in the line of seam formation, said intermediate slot being separated from said outer slots by parallel throat-plate bars terminating at their rearward ends in divergent ribs closing the rearward ends of said outer slots on a line substantially normal to the line of feed, and said intermediate slot terminating in a thread-severing member slot disposed rearwardly of said ribs and having its side edges in substantial alinement with the outer edges of said outer feed-slots, a work-advancing feed-dog having outer and intermediate rows of teeth operating through said feed-slots of the throat-plate, the intermediate row of teeth of the feed-dog terminating in a primary thread-severing member provided with a cutting edge substantially equal in width to said thread-severing member slot of the throat-plate, a presser-foot opposed to said feed-dog, a complemental thread-severing member mounted on said presser-foot and means yieldingly depressing said complemental thread-severing member toward said throat-plate.

10. In a sewing machine, a horizontal work-

support, stitch-forming mechanism including a needle and means for reciprocating said needle, primary and complemental thread-chain severing members operable toward and from each other from opposite sides of said work-support and intermittently brought into thread-chain shearing relationship with each other in the absence of work therebetween, means located at the under side of said work-support for positively reciprocating said primary thread-severing member back and forth relative to said work-support, a crank located at the upper side of said work-support and connected for actuation by said needle-reciprocating means, and means including operative connections between said crank and said complemental thread-severing member for intermittently moving said complemental thread-severing member into and out of contact with the work being stitched and into and out of contact with said primary thread-severing member in the absence of work therebetween.

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