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ALTERNATING PRESSER DEVICE FOR SEWING MACHINES

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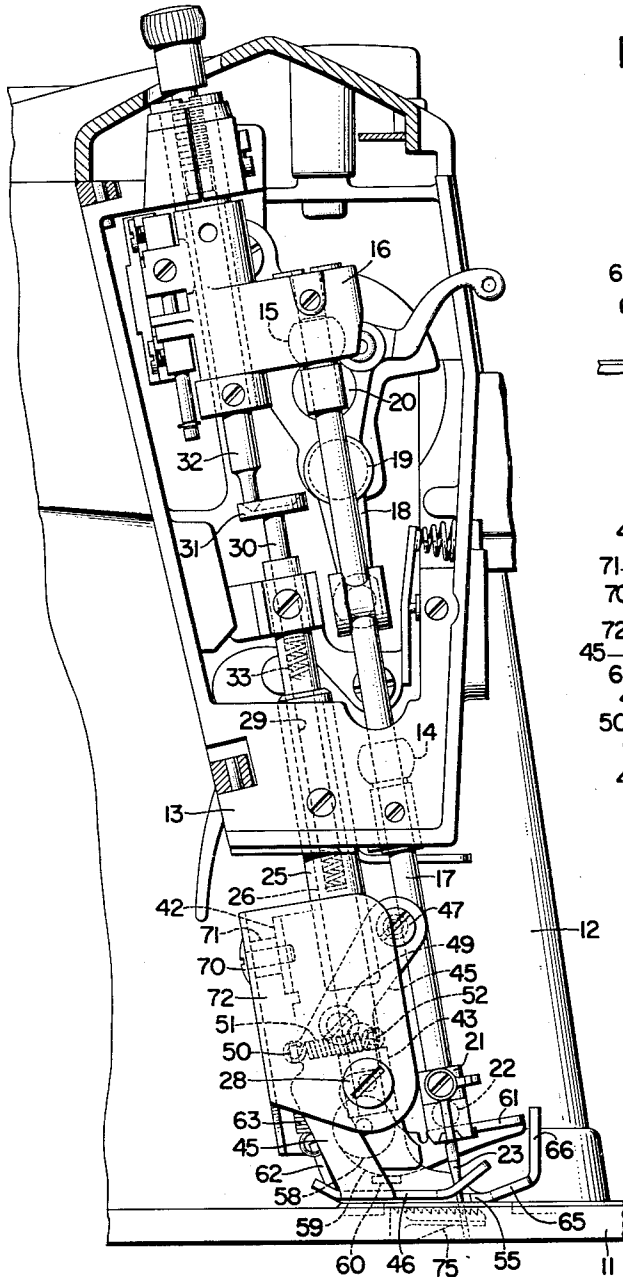


Fig. 1

WITNESS
William Martin

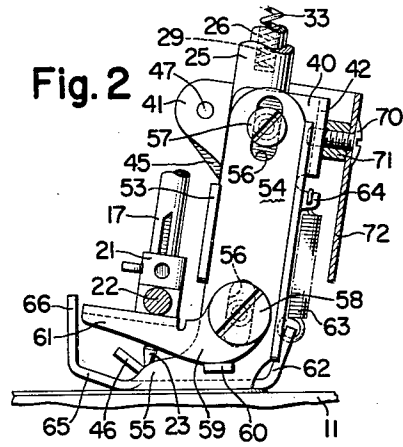


Fig. 2

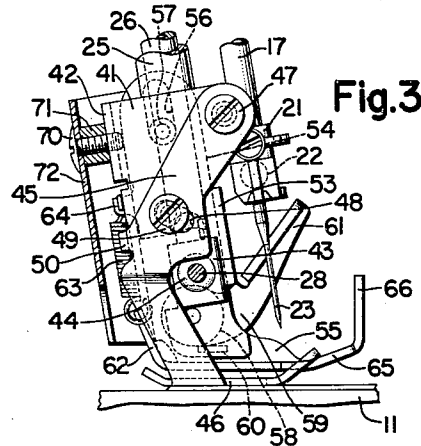


Fig. 3

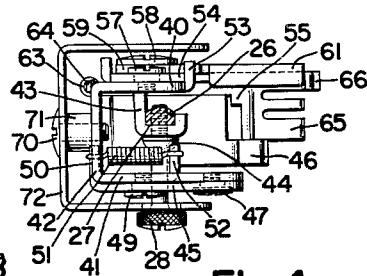


Fig. 4

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ALTERNATING PRESSER DEVICE FOR
SEWING MACHINES

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This invention relates to sewing machine attachments and more particularly to a needle bar operated work manipulating attachment for a sewing machine.

Although the needle bar of a sewing machine is a convenient and accessible source of power for the operation of attachments which manipulate work fabrics at or near the stitching point on a sewing machine, the needle bar is a critical element in the concatenation of threads to form stitches. Any interference with the proper motion of the needle bar by the attachment or any deviation of the path of motion of the needle that may be caused by the presence of the attachment is detrimental to the formation of high quality stitching and may even result in needle breakage or the skipping of stitches.

It is an object of this invention to provide an alternating presser attachment for a sewing machine with a needle bar operated driving device which minimizes lateral displacement of the needle bar out of its normal path of reciprocation and thus does not adversely influence the character of the stitching produced by the sewing machine while the attachment is actuated thereby.

There is, of course, the ever present danger in the operation of a sewing machine that the needle may puncture an operator's finger. When an attachment of the type that is driven by the sewing machine needle bar is utilized, the added hazard is encountered in that the attachment actuating lever which is driven by the needle bar may, at the bottom of its stroke, crush an operator's finger.

It is another object of this invention to provide a finger guard on the sewing machine attachment which will serve, without adversely affecting the operation of the attachment or the sewing machine, to prevent accidental insertion of an operator's finger beneath the attachment drive lever.

With the above 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 of a preferred embodiment in which:

FIG. 1 represents a head end elevational view of a portion of a sewing machine with the end cover plate broken away and having an attachment in accordance with this invention applied thereto,

FIG. 2 represents an elevational view of the attachment taken from the side opposite that illustrated in FIG. 1, with the attachment cover broken away and including only a portion of the sewing machine needle and presser bars,

FIG. 3 represents an elevational view of the attachment taken from that side illustrated in FIG. 1, with the attachment cover broken away and illustrating the position of parts when the needle bar is at the top of its stroke, and

FIG. 4 represents a top plan view of the attachment.

Referring to the drawings, the sewing machine illustrated in FIG. 1 is of the type disclosed in greater detail in the co-pending United States application of Johnson, Serial No. 471,766, filed November 29, 1954, now Patent No. 2,862,468, granted December 2, 1958, to which reference may be had for a more complete understanding of the machine. For the purpose of understanding this

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invention, however, the sewing machine comprises a frame including a bed 11, a standard 12 rising from the bed, and a bracket arm 13 carried on the standard and overhanging the bed. Journaled in a bearing 14 in the bracket arm and a similar bearing 15 in a gate 16 pivoted in the bracket arm is an endwise reciprocatory needle bar 17. Endwise reciprocation is imparted to the needle bar by means of a drive link 18 pivoted to the needle bar and to a crank pin 19 secured for rotation with a shaft 20 journaled lengthwise in the bracket arm. Sidewise jogging motion may also be imparted to the needle bar for the formation of zigzag stitches by mechanism in the sewing machine for oscillating the gate 16 as described fully in the above referenced Johnson application Serial No. 471,766. Such needle bar jogging mechanism, however, forms no part of this invention which would have application equally as well to any conventional non-zigzag sewing machine in which only one needle bar bearing is utilized or in which both needle bar bearings 14 and 15 are fixed in the bracket arm. Secured to the lower extremity of the needle bar 17 is a needle clamping device 21 which includes a thumb screw 22 by which a needle 23 is secured to the needle bar. The attachment of this invention, as will be hereinafter described, is adapted to be actuated by a driving engagement with the thumb screw 22 of the needle clamping device.

Journaled in a bushing 25 in the bracket arm for endwise movement therein, is a presser bar 26 formed at its lower extremity with a slabbled seat 27 which is transversely drilled and tapped to accommodate a fastening screw 28 by which either a conventional presser foot (not shown) or an attachment such as that illustrated in the drawings may be rigidly secured. The presser bar 26 is formed with an axial bore 29 in which is telescopically arranged a plunger 30 having an enlarged cup-shaped head 31. Threaded in the bracket arm is an adjusting rod 32 which engages the cup-shaped head of the plunger 30 and serves to regulate the tension in a presser bar spring 33 constrained in the bore 29 between the presser bar and the plunger 30.

Referring particularly to FIGS. 2, 3 and 4, the alternating presser attachment of this invention comprises a generally U-shaped sheet metal attachment frame including side portions 40 and 41 joined at the rear by a base portion 42. Struck inwardly from the base and side portion 40 is a bracket 43 adapted to embrace the slabbled seat 27 in the lower extremity of the presser bar. The bracket 43 is apertured to accommodate the fastening screw 28 and is clamped rigidly against the presser bar by a flange 44 on the fastening screw 28.

As best illustrated in FIG. 3, the upright shank 45 of a work feeding foot 46 is pivoted to the side portion 41 of the attachment frame on a fulcrum screw 47. The shank 45 is slotted, as at 48, through which slot passes a stop screw 49 threaded into the side portion 41 of the frame to limit swinging movement of the work feeding foot about the fulcrum screw 47. A tang 50, offset inwardly from the work feeding foot shank 45, carries one extremity of a tension spring 51 which is anchored at its opposite extremity on a tang 52 struck inwardly from the side portion 41 of the attachment frame. The spring 51 thus biases the work feeding foot forwardly, that is counterclockwise, as viewed in FIGS. 1 and 3.

As illustrated in FIGS. 2 and 4, the side portion 40 of the attachment frame is formed along its outer edge with an outturned lip 53 which serves as a guide for the shank 54 of a work holding foot 55. The shank 54 is formed with spaced upper and lower slots 56, the upper slot accommodating a shouldered screw 57 threaded into the side portion 40 of the attachment frame and the lower slot accommodating a fulcrum screw 58 on which an at-

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tachment actuating lever 59 is pivoted. Struck out from the shank 54 of the work holding foot and disposed in operative engagement beneath the attachment actuating lever 59 is a follower lug 60. The actuating lever is formed with an arm 61 which is disposed, as illustrated in FIGS. 1 and 2, beneath the thumb screw 22 of the needle clamping device on the needle bar and in a position substantially perpendicular to the needle bar when the needle bar is at the bottom of its stroke. The work holding foot 55 is formed with an upstanding heel portion 62 to which is secured one extremity of a tension spring 63 which is anchored at its opposite extremity on a tang 64 struck rearwardly from the side portion 40 of the attachment frame. The spring 63 thus biases the work holding foot upwardly and serves to maintain the follower lug 60 in engagement with the actuating lever 59.

The work holding foot 55 is formed with a toe portion 65 on which is formed an upstanding guard post 66. As illustrated in FIGS. 1 and 2, the guard post is disposed to extend adjacent to the path of travel of the free extremity of the attachment actuating lever in front of the needle bar and in front of the actuating lever arm 61.

Secured by a fastening screw 70 and a washer 71 to the rear of the base portion of the attachment frame is a U-shaped attachment cover 72 which shields the mechanism of the attachment.

The attachment of this invention operates in conjunction with the conventional four-motion feed dog 75 of the sewing machine to insure an even rate of feed of a plurality of plies of fabric being stitched.

When the needle bar is raised, as illustrated in FIG. 3, the thumb screw 22 on the needle clamp moves upwardly and away from the arm 61 of the attachment actuating lever 59 thus allowing the spring 63 to draw the work holding foot 55 upwardly out of engagement with the work. When the needle is raised, therefore, the force of the presser spring 33 is exerted on the work by way of the work feeding foot 46. Thus, when the sewing machine feed dog partakes of its feed advance stroke, which occurs while the needle is raised, the attachment work feeding foot 46 is free to swing about the fulcrum screw 47 and move with the feed dog 75 to insure an even rate of feed of all of the plies of fabric being stitched.

On the down stroke of the needle bar and while the sewing machine feed dog partakes of an idle return motion, the thumb screw of the needle clamp will engage the attachment actuating lever arm 61 and turn the actuating lever in a clockwise direction as viewed in FIG. 1. The actuating lever by way of the follower lug 60 will force the work holding foot 55 downwardly into engagement with the work fabrics until at the bottom of the needle bar stroke, as illustrated in FIGS. 1 and 2, the work feeding foot 46 will be elevated and will thus be free to be returned by the spring 51.

It will be appreciated that at the bottom of the needle bar stroke, the needle bar by way of the attachment actuating lever 59 will have lifted the attachment frame, the work feeding foot, and the sewing machine presser bar in opposition to the presser bar spring 33. Therefore, the forces exerted on the needle bar are considerable and have in prior art attachments been applied at an angle to the axis of the needle bar so as to deflect the needle bar seriously and thereby interfering with the stitch forming process.

As illustrated in the drawings and particularly FIG. 2, the location of the fulcrum 58 of the attachment actuating lever and the formation of the driven arm 61 of

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this lever, are such that the lever arm is disposed substantially perpendicular to the longitudinal axis of the needle bar at the bottom of the needle bar stroke. The forces exerted on the needle bar in lifting the attachment in opposition to the presser bar spring thus occur substantially axially of the needle bar and minimize lateral deflection of the needle bar.

Since the work fabrics are guided to the stitching point by the operator, the operator's fingers during operation of the sewing machine are apt to be located immediately in front of the work holding and work feeding feet of the attachment. The guard post 66 on the toe of the work holding foot 55 serves as a deterrent to the inadvertent positioning of an operator's finger either in the path of the needle or between the work holding foot and the attachment actuating lever arm 61.

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

1. In combination with a sewing machine having a presser bar, and an endwise reciprocatory needle bar, an alternating presser attachment comprising an attachment frame, means for securing said attachment frame on said sewing machine presser bar, a work feeding foot, means pivotally securing said work feeding foot on said attachment frame, a work holding foot, means slidably securing said work holding foot on said attachment frame for translatable movement substantially parallel to the longitudinal axis of said sewing machine presser bar, an attachment actuating lever, an arm formed on said lever, means pivoting said lever with respect to said attachment frame for operative engagement of said lever arm by said needle bar, means locating said last named pivoting means so that the actuating lever arm is perpendicular to the longitudinal axis of said needle bar when the needle bar is at the lower end of its stroke, and means on said work holding foot disposed in driven engagement with said actuating lever.

2. In combination with a sewing machine having a presser bar, an endwise reciprocatory needle bar, and a needle clamp on said needle bar, a work manipulating attachment comprising an attachment frame, means on said attachment frame for securing said attachment on said sewing machine presser bar, an attachment actuating lever, an arm formed on said lever, means pivoting said lever with respect to said attachment frame for operative engagement of said lever arm by said needle clamp, means locating said last named pivoting means so that the actuating lever arm is substantially perpendicular to the axis of said needle bar at the bottom of the needle bar stroke, a work manipulating member, means supporting said work manipulating member on said attachment frame, means operatively connecting said actuating lever with said work manipulating member, a work engaging foot carried on said work manipulating member, a toe portion formed on said work engaging foot, and an upturned finger guard means carried on said toe portion and disposed in front of said lever arm and above the level of said lever arm at the bottom of the needle bar stroke.

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