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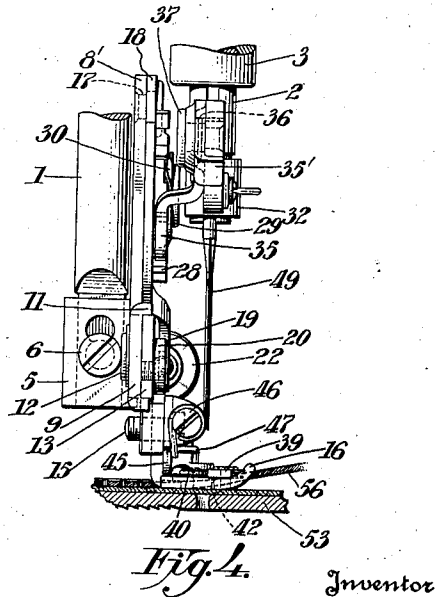
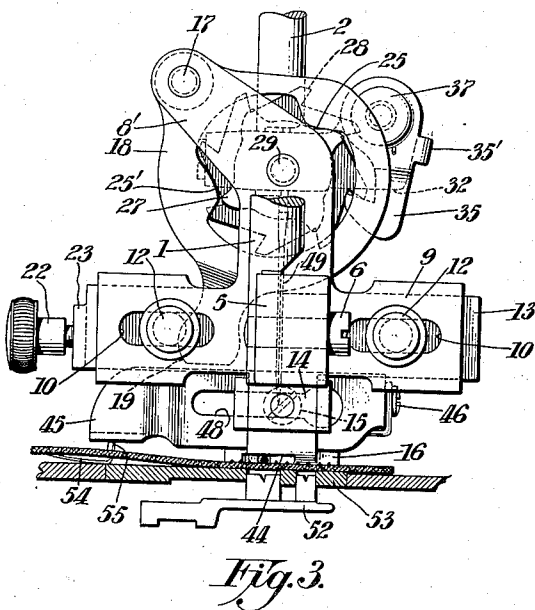
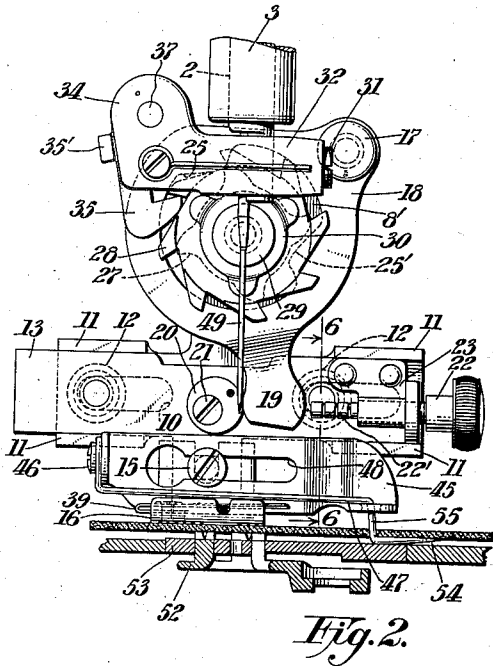
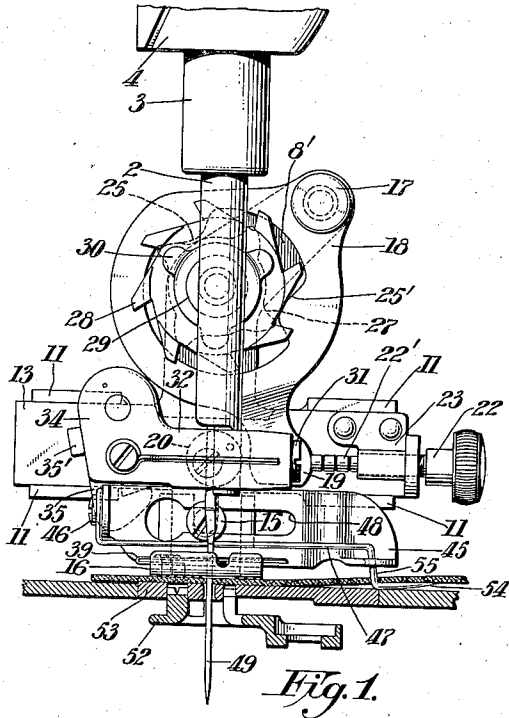
J. D. KARLE

1,997,419

ATTACHMENT FOR SEWING MACHINES

Filed Dec. 1, 1931

2 Sheets-Sheet 1



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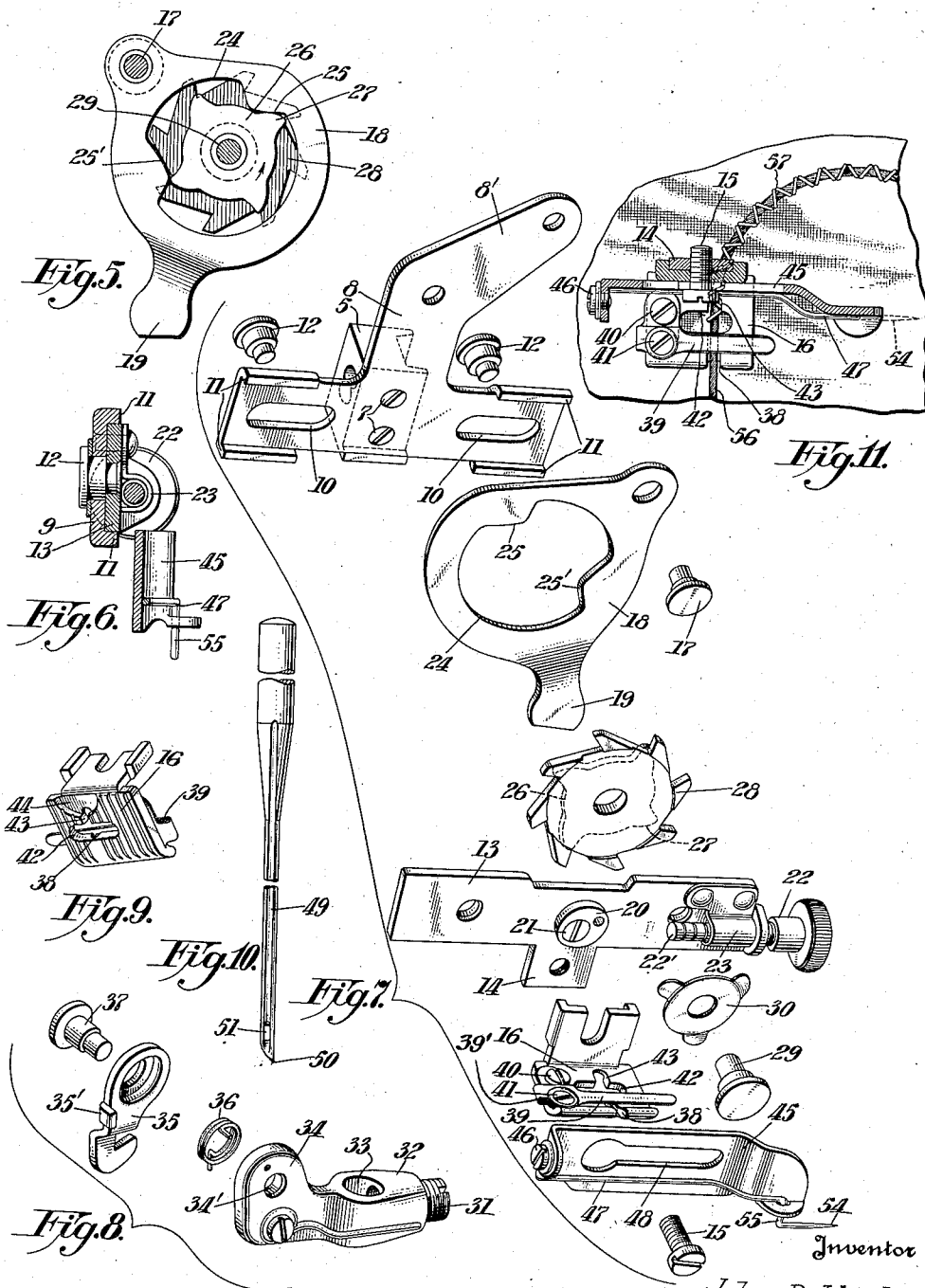
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ATTACHMENT FOR SEWING MACHINES

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

1,997,419

ATTACHMENT FOR SEWING MACHINES

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Application December 1, 1931, Serial No. 578,262

17 Claims. (Cl. 112—16.0)

This invention relates to attachments for sewing machines, and has for its primary object to provide an improved zigzag-stitching attachment for vibrating the material laterally of the line of seam formation.

Another object of the invention is to provide an improved piercing element or needle adapted more particularly for use with my improved zigzag attachment.

Another object of the invention is to provide an improved zigzag-stitching attachment whereby cord may be attached to the material by zigzag stitches.

Another object of the invention is to provide the attachment with improved means for holding the material at a given point for circular work.

Another object of the invention is to provide improved adjusting means whereby the extent of lateral movement imparted to the presser-element of the attachment may be varied, and the presser-element adjusted relative to the needle.

Another object of the invention is to provide a zigzag attachment which is operated during a small part of the stitch-forming cycle, thus insuring that the needle is clear of the work before the lateral shifting movement of the zigzag attachment is begun and that the shifting movement is completed before the usual sewing machine feed-dog engages the work.

A further object of the invention is to provide a zigzag-stitching attachment that does not materially obstruct the view of the operator and which is light in construction, and can be manufactured and assembled at little expense.

With the above and other objects in view, as will hereinafter appear, the invention consists in the devices, combinations, and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

Figure 1 is a front elevation of an embodiment of the zigzag-stitching attachment forming the subject of the invention, showing the needle in its lowest position.

Figure 2 is a front elevation of the attachment showing the needle in its highest position.

Figure 3 is a rear elevation of the attachment showing the position of the needle-bar at the beginning of the work-shifting movement.

Figure 4 is a left side elevation or edge view of the attachment.

Figure 5 is a detail of part of the actuating means.

Figure 6 is a detail section taken along the line 6—6 of Figure 2.

Figures 7 and 8 are disassembled perspective views of the attachment.

Figure 9 is a bottom perspective view of the presser-foot.

Figure 10 is a left side elevation of the needle.

Figure 11 is a top plan view showing the attachment used for circular cording.

In the embodiment of this invention selected for illustration, 1 is the usual spring-pressed presser-bar and 2 is the usual reciprocating needle-bar journaled in the bearing 3 carried by the head 4 of a well known "Singer" family type sewing machine.

The attachment comprises a channeled block 5, adapted to be secured by the usual fastening screw 6 to the angular lower portion of the presser-bar 1. Secured to the block 5 by the screws 7 is a plate, designated generally as 8, having an upstanding inclined arm 8' and a cross-arm 9 formed with elongated apertures 10, and outwardly projecting lips 11 which form a guiding channel. The block 5 and plate 8 constitute a supporting frame. Slidably held in the guiding channel by the rivets 12 is a bar 13 having a depending portion 14 to which is secured by means of the screw 15 the presser-foot 16, hereinafter described. Fulcrumed upon the upstanding arm 8' of the plate 8 by the stud-pin 17 is a swinging member 18 having its lower end 19 extending down between an eccentric stop 20, adjustably secured to the slide-bar 13 by the screw 21, and the end of the knurled headed adjustable stop-screw 22, fitted to a threaded aperture in the lug 23 fixed upon the end of the slide-bar. The slide-bar 13 may be adjusted relative to the swinging member 18 by changing the positions of the adjustable eccentric 20 and the adjustable screw 22. As the presser-foot is carried by the slide-bar 13, it is obvious that by changing the position of the slide-bar the position of the presser-foot is changed as also its field of vibration. The swinging member 18 has an opening 24 with inwardly extending projections 25 and 25' adapted to embrace and engage a cam-element 26 having a plurality of circumferentially spaced projections 27. Fixed to the cam-element 26 is a ratchet-wheel 28, the cam-element and ratchet-wheel are rotatably mounted on the upstanding arm 8' of the plate 8 by means of the bearing-pin 29. A friction disk 30 is interposed between

the head of the screw 29 and the ratchet-wheel 28.

Secured to the needle-bar 2 by the usual set-screw 31 is a needle-clamp 32, apertured at 33 to receive the angular lower portion of the needle-bar 2. The needle-clamp 32 has a laterally extending arm 34 apertured at 34'. Carried by the laterally extending arm 34 is a pivotally mounted pawl 35 having a stop 35' and constantly urged in a counterclockwise direction by the coiled spring 36 which has one of its ends fixed to the pawl and the other end fixed to the arm 34. The stop 35' abuts the arm 34, thus limiting the extent to which the pawl 35 will move counterclockwise. The component parts are secured together by the rivet or pivot-stud 37 which constitutes the pivot of the pawl 35.

The presser-foot 16, previously referred to, is formed with a cord-guiding channel 38 in its toe, and a flat L-shaped spring 39, one leg of which is fixed to the sole-plate by the screw 40, the other or transverse leg overlying a portion of the channel 38 and extending over the edge of the sole-plate. The two legs of the L-shaped spring 39 are connected by an edge bend 39' and are vertically spaced apart. An adjusting screw 41 is provided for varying the tension exerted by the transverse leg of the flat spring 39 on the cord. This construction constitutes a self-threading cord-guide and provides means for varying the tension on the cord. The work-engaging portion of the sole-plate is serrated and is provided with a transverse elongated needle-opening 42 having its rear edge cut away at 43 to allow the cord to pass under the heel of the presser-foot without raising the presser-foot. The heel of the sole-plate is recessed in the form of a semicircle as shown at 44, in Figure 9, to facilitate the turning of sharp corners in following the pattern to be corded.

A plate 45 to which is secured by the screw 46 an impaling pin 47 is removably and adjustably secured to the depending portion 14 of the slide-bar 13 by the screw 15 and keyhole-slot 48. The function of the impaling pin 47 will be described hereinafter.

The needles of the "Singer" family sewing machines are set so that the eye of the needle is on a line which is approximately at right angles to the line of seam-formation, to facilitate seizure of the needle-loop by the loop-taker. In using a zigzag attachment, when the needle is above the work, the needle-thread extends from the needle-eye to the previous stitch and during the work-shifting movement of the zigzag attachment which carries the thread toward the needle, the regular pointed needle is apt to either split the thread or to penetrate the work in rear of the thread causing irregularities in the stitch formation. These conditions are overcome by the improved needle 49 shown in Figure 10. The needle 49 differs from the regular needle in that the point 50 is offset from the vertical axis of the needle into alignment with the front side, and the needle is abruptly tapered towards its point by shortening the portion of the needle from the eye 51 to the point to substantially half of the distance of that of the regular needle.

Operation

Assuming the needle-bar and needle to be in the position indicated in Figure 1, the presser-foot being in a position to be shifted from right to left, the needle-bar moves upward in the usual manner until it reaches the position indicated in

Figure 3. At this point the pawl 35 engages a tooth of the ratchet-wheel 28 and, as the needle-bar continues its upward movement to the position indicated in Figure 2, the ratchet-wheel 28 is rotated one-eighth of a revolution. The cam-element 26 being fixed to the ratchet-wheel 28 is also moved one-eighth of a revolution. The rotation of the cam-element 26 causes one of the circumferentially spaced projections 27 to contact the inwardly extending projection 25 and force the swinging member 18 to swing clockwise about its pivot 17; this swinging movement causing the lower end 19 of the member 18 to abut the adjustable eccentric stop 20 and shift the slide-bar 13 and the presser-foot 16 to the left, laterally of the line of feed. The shifting of the presser-foot 16 occurs while the usual four-motion feed-dog 52 is below the throat-plate 53 and is completed just prior to the point in the cycle when the feed-dog 52 contacts the work. After the feed-dog 52 has fed the work forward the needle descends, forming the stitch, and on the upward stroke of the needle the pawl 35 again engages the ratchet-wheel 28 and rotates it and the cam-element 26 one-eighth of a revolution. This causes one of the circumferentially spaced projections 27 to contact the inwardly extending projection 25' and cam the swinging lever 18 counterclockwise about its pivot 17; this swinging movement causing the lower end 19 of the swinging lever 18 to act against the end 22' of the knurled headed screw 22 and shift the slide-bar 13 and presser-foot 16 to the right, the parts again assuming the positions, as indicated in Figure 1. From the foregoing it will be observed that in the rotation of the cam-element 26, its peripheral projections successively engage those of the swinging lever 18 to vibrate the same and thus reciprocate the slide-bar and presser-foot.

To advance the ratchet-wheel 28 one step requires only one-fourth of an inch movement of the needle-bar with this construction. The short period of time required is only a small fraction of the complete stitch-forming cycle, consequently the shifting movement is started after the needle is clear and is completed before the feed-dog engages the work.

Figure 11 illustrates the method of using the impaling pin 47 and the cording presser-foot 16 with the zigzag attachment. The work is pierced at the center of curvature by the point 54 of the impaling or centering pin 47, and drawn over the point 54 until the work is held on the vertical part 55 of the impaling pin. The cord 56 is slipped under the flat spring 39 and drawn to the left until it enters the channel 38; the surplus cord being then pulled towards the operator so that the zigzag stitches will be started at the end of the cord. When the machine is operated the needle descends first on one side of the cord 56 and then on the other; the work being shifted laterally of the line of feed after each stitch-forming operation. The feed-dog 52 operates in the usual manner to feed the work forward. It will be obvious, however, that by adjusting the eccentric stop 20 and stop-screw 22 the needle may be made to pierce both edges of the cord or the needle may be made to pierce the cord and the work alternately. In the illustration in Figure 11 the needle pierces the work at the sides of the cord; the cord being secured to the work by the zigzag stitches 57. It will also be observed that the stop 20 and screw 22 may be so positioned or backed off that the lower end 19 of the swinging lever 18 will vibrate there-

between without affecting the position of the presser-foot, so that plain sewing may be accomplished without removing the attachment from the machine.

From the foregoing description considered in connection with the accompanying drawings, the construction, manner of operation and several advantages of my improved attachment will be clearly and fully understood. It is apparent that such a device has a wide variety of uses, and it will be understood that the form, construction and arrangement of the several elements employed may be varied. Therefore, the privilege is reserved of resorting to all such legitimate changes therein as may be fairly embodied within the spirit and scope of the appended claims.

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

1. A zigzag-stitching attachment comprising a member adapted to be secured to the presser-bar, a second member having an upstanding arm and a cross-arm formed with a channel secured to said first member, a slide-bar carrying a presser-foot fitted in said channel, a swinging lever having its lower end in operative engagement with said slide-bar fulcrumed on the upstanding arm of said second member, a cam also attached to the upstanding arm of said second member for actuating said swinging lever, and means for actuating said cam.

2. In a zigzag-stitching attachment for sewing machines the combination of, a plate adapted to be attached to the presser-bar having an upstanding arm and a cross-arm, a bar slidably mounted on said cross-arm, a swingable member fulcrumed to the upstanding arm of said plate with its lower end in operative engagement with said bar, said member having an opening with inwardly extending projections, a cam-element adapted to engage said projections, and means for actuating said cam.

3. In combination with a sewing machine having a needle-bar and a presser-bar, a plate secured to said presser-bar, a slide-bar carrying a presser-foot mounted on said plate, a swingable member pivoted on said plate and in operative engagement with said bar, a cam for actuating said member, and means for actuating said cam comprising a pawl carried by the needle-bar and a ratchet-wheel connected to said cam.

4. In combination with a sewing machine, a presser-foot, means for vibrating said presser-foot laterally of the line of seam formation, and an impaling pin adjustably secured to said presser-foot for circular sewing.

5. In combination with a sewing machine having a reciprocating needle and a presser-bar, a plate secured to said presser-bar, a slide-bar carrying a presser-foot slidably mounted on said plate, a swingable member pivoted to said plate, an adjustable operative connection between said bar and said swinging member, and means for vibrating said member transverse to the line of seam formation.

6. In combination with a sewing machine having a reciprocating needle-bar, a presser-foot, means for vibrating said presser-foot laterally of the line of seam formation, and a needle carried by said needle-bar, said needle having its point offset from the vertical axis of the needle and into alignment with the front side of the needle.

7. In combination with a sewing machine, a zigzag-stitching attachment and a needle having

its point offset from the vertical axis of the needle into alignment with the front side of the needle, said needle having its point abruptly tapered.

8. In a sewing machine, the combination with the needle, needle-bar and four-motion feed-dog of a presser-foot adapted to vibrate laterally of the line of seam-formation, and means for vibrating said presser-foot including a pawl carried by the needle-bar, and a ratchet-wheel positioned to be actuated by said pawl as the needle-bar is nearing the end of its up-stroke.

9. In combination with a sewing machine, a presser-foot having a sole-plate formed with an elongated needle-aperture and a cord-guiding channel, a resilient member overlying said channel, and means for vibrating said presser-foot laterally of the line of seam formation.

10. In combination with a sewing machine having a reciprocating needle, straightaway work-feeding mechanism, a presser-bar, a presser-foot, and means for vibrating said presser-foot with a predetermined amplitude relative to said presser-bar and laterally of the line of seam formation including adjustable means for changing the field of said predetermined amplitude of lateral vibration of the presser-foot.

11. In combination with a sewing machine having a reciprocating needle, a presser-foot, and means for vibrating said presser-foot laterally of the line of seam formation including devices adjustable independently of each other for determining the limits of the lateral vibratory motion of the presser-foot.

12. A zigzag-stitching attachment for sewing machines comprising a member adapted to be secured to the presser-bar, a plate carried by said member, a pivot-stud carried by said plate, a ratchet-wheel mounted on said stud, a cam fixed to said ratchet-wheel, a swingable lever having an opening which receives said cam for actuation thereby, a pawl adapted to be actuated by the needle-bar of the sewing machine, on its upward stroke for imparting a step-by-step rotary movement to said ratchet-wheel and cam, and a presser-foot actuated by said swingable lever.

13. A zigzag-stitching attachment for sewing machines comprising a member adapted to be secured to the presser-bar, a plate carried by said member, a pivot-stud carried by said plate, a ratchet-wheel mounted on said stud, a cam fixed to said ratchet-wheel, a swingable lever having an opening which receives said cam for actuation thereby, a pawl adapted to be actuated by the needle-bar of the sewing machine on its upward stroke for imparting a step-by-step rotary movement to said ratchet-wheel and cam, and a presser-foot having an elongated needle-opening and a serrated work-engaging face actuated by said swingable lever.

14. A zigzag-stitching attachment for sewing machines comprising a frame adapted to be secured to the presser-bar, a pivot-pin carried by said frame, a ratchet-wheel mounted to rotate on said pivot-pin, a cam carried by said ratchet-wheel and having a plurality of circumferentially spaced projections, a vibratory lever mounted on a pivot carried by said frame and having an opening which receives said cam, a presser-foot actuated by said vibratory lever, and means for actuating said ratchet-wheel, said means comprising a pawl adapted to be actuated by the needle-bar of the sewing machine on its upward stroke.

15. A zigzag-stitching attachment for sewing machines comprising a block adapted to be se-

- cured to the presser-bar of a sewing machine, a plated mounted on said block, a pivot-pin carried by said plate, a ratchet-wheel rotatably mounted on said pivot-pin, a cam carried by said ratchet-wheel and having a plurality of circumferentially spaced projections, a vibratory lever mounted on a pivot-pin carried by said plate, said lever having a centrally located opening which receives said cam, a presser-foot vibrated by said lever, means for varying the vibratory movement of said presser-foot, and a pawl adapted to be actuated by the needle-bar of the sewing machine on its upward stroke for imparting a step-by-step movement to said ratchet-wheel.
16. A zigzag-stitching attachment for sewing machines comprising a block adapted to be secured to the presser-bar of a sewing machine, a plate mounted on said block, a pivot-pin carried by said plate, a ratchet-wheel rotatably mounted on said pivot-pin, a pawl adapted to be actuated by the needle-bar for imparting a step-by-step rotary movement to said ratchet-wheel, a cam carried by said ratchet-wheel and having a plurality of circumferentially spaced projections, a vibratory lever mounted on a pivot-pin carried by said frame, said lever having a centrally located opening which receives said cam, a presser-foot vibrated by said lever, means for varying the vibratory movement of said presser-foot, and means for adjusting said presser-foot relative to said needle.
17. A zig-zag-stitching attachment for sewing machines having in combination, a member adapted to be secured to the presser-bar, a presser-foot provided with an elongated needle-opening and a serrated work-engaging portion, and mechanism for vibrating said presser-foot relative to said member, said mechanism including a ratchet-wheel, a cam fixed to said ratchet-wheel, a swingable lever having an opening which receives said cam for actuation thereby and a pawl adapted to be actuated by the needle-bar of the sewing machine on its upward stroke for imparting a step-by-step rotary movement to said ratchet-wheel and cam and an adjustable device for rendering said mechanism ineffective to vibrate the presser-foot.

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