July 23, 1935. P. HLEB 2,009,194

PRESSER FOOT LIFTING MECHANISM FOR SEWING MACHINES

Filed Nov. 24, 1934 2 Sheets-Sheet 1

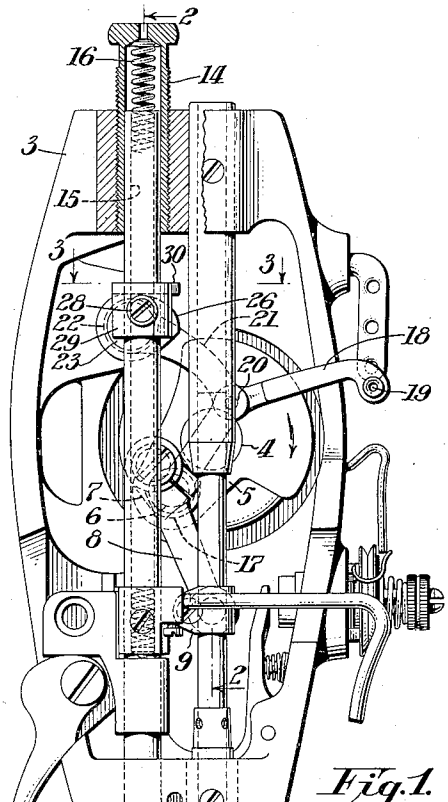


Fig.1.

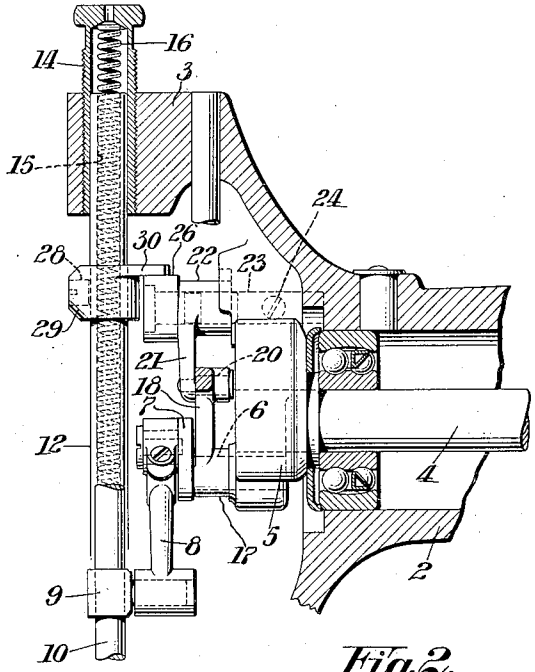


Fig.2.

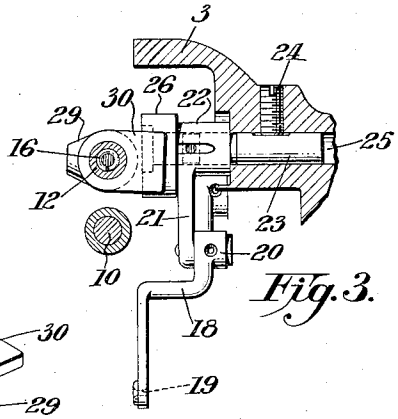


Fig.3.

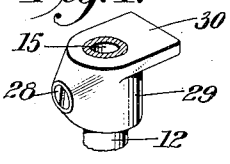


Fig.4.

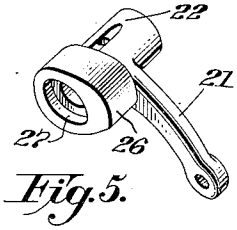


Fig.5.

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PRESSER FOOT LIFTING MECHANISM FOR SEWING MACHINES

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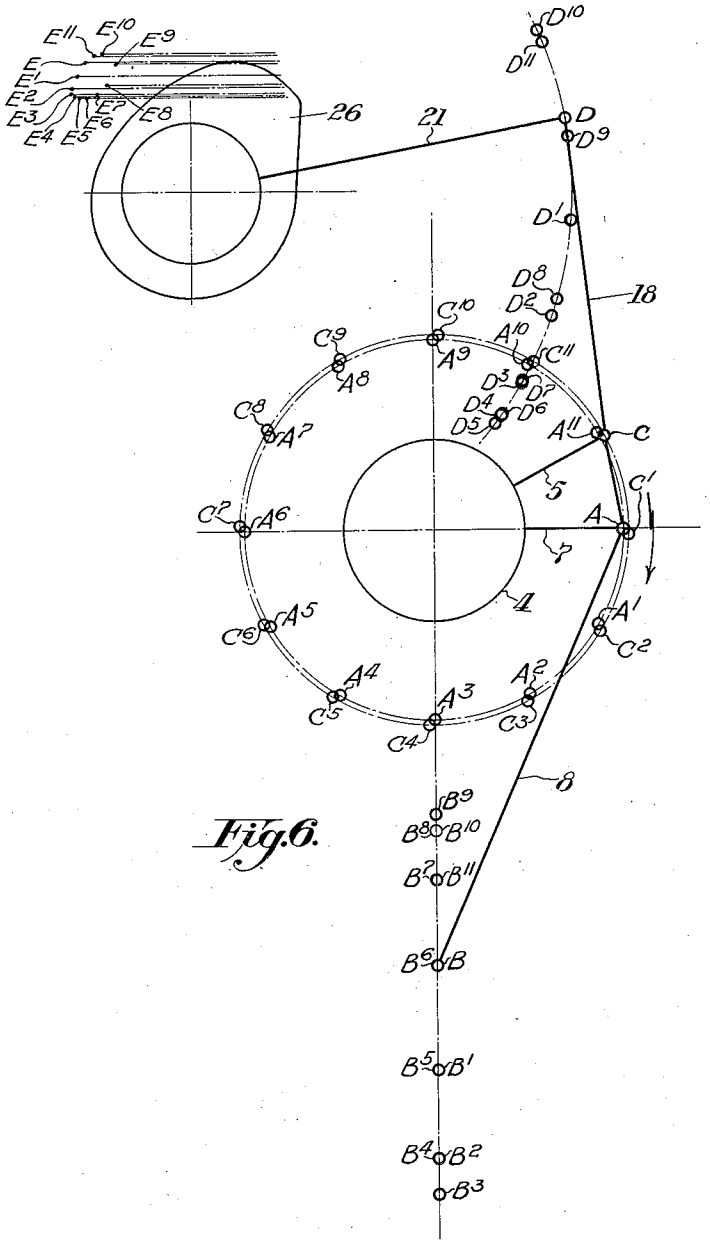


Fig. 6.

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PRESSER-FOOT LIFTING MECHANISM FOR SEWING MACHINES

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Application November 24, 1934, Serial No. 754,560

8 Claims. (Cl. 112—239)

This invention relates to presser-foot lifting mechanisms for sewing machines and has for its object to provide simple means effective at high speeds of operation of a sewing machine for intermittently lifting the presser-foot to an extent requisite for conveniently shifting work for darning, embroidering and like operations.

The invention consists in the presser-foot lifting device hereinafter described in connection with the accompanying drawings, which illustrate a preferred embodiment of the invention.

In the drawings, Fig. 1 is a front end elevation, partly in section, of the bracket-arm head of a sewing machine and of the work-supporting arm thereof. Fig. 2 represents a central vertical section of the bracket-arm head, substantially on the line 2—2 of Fig. 1. Fig. 3 represents a horizontal section of the bracket-arm head on substantially the line 3—3 of Fig. 1. Fig. 4 represents a perspective view of the cam-engaged lug secured upon the presser-bar. Fig. 5 represents a perspective view of the take-up anchoring link provided with a presser-bar lifter cam. Fig. 6 is a diagrammatic view illustrating a cycle of movement of the needle-bar actuating and presser-foot lifting mechanisms.

Referring to the drawings, a sewing machine in which the present invention has been embodied has a frame including a cylindrical work-supporting arm 1 and a hollow bracket-arm 2 terminating in a head 3 overhanging the work-supporting arm.

Journaled for rotation in suitable bearings provided in the bracket-arm 2 is an actuating shaft 4 provided, within the head 3, with a counterbalanced crank-arm 5 carrying a crank-pin 6. The crank-pin 6 has an offset portion 7 pivotally connected by an auxiliary crank-pin to one end of a link 8, of which the opposite end is pivotally connected to a collar 9 suitably secured upon a vertically disposed needle-bar 10. The needle-bar 10 is journaled for endwise reciprocation in suitable bearings provided in the head 3 and carries at its lower end a needle 11.

Also vertically movable in the bracket-arm head 3 is a presser-bar 12 carrying at its lower end a suitable presser-foot 13, said presser-bar having its upper end journaled for endwise movement in a bearingg bushing 14 threaded vertically into the top wall of the bracket-arm head 3, while the lower end of the presser-bar passes through a suitable bearing aperture in the bottom wall of said head. The presser-bar 12 is provided with a longitudinal bore 15 receiving a spring 16 of which one end engages the bottom wall of the bore 15 and the other end engages the capped upper end of the bushing 14. By adjustment of the bushing 14, the downward pressure exerted by the spring 16 upon the presser-bar 12 may be varied.

Pivotally embracing the crank-pin 6 is the sleeved end 17 of an angular take-up lever 18 extending forwardly beyond the head 3 and provided in its free end with a thread-eye 19. Intermediate its ends, the take-up lever 18 has a pivotal connection 20 with a vibratory take-up lever-controlling member, in the form of an anchoring link 21 for the lever 18. The hub-sleeve 22 of the link 21 is pivotally mounted upon a horizontal fulcrum-pin 23 secured by a set-screw 24 in an aperture 25 provided in the bracket-arm head 3. Secured upon or integral with the hub-sleeve 22 of the link 21 is a presser-bar lifter-cam 26 disposed adjacent to the presser-bar 12, said cam having an aperture 27 in its end face to receive the head of the fulcrum-pin 23.

Secured by a set-screw 28 upon the presser-bar 12, for vertical adjustment thereupon, is a collar 29, from which extends a lug 30 overlying the cam 26. The spring 16 acts to depress the presser-bar 12 to an extent whereby the under face of the lug 30 is engaged by the cam 26, a preferred adjusted position of the collar 29 being such that the presser-foot 13 is held slightly above the work-support in the lowest position of the presser-foot. With this arrangement, the cam 26 is in constant wiping engagement with the collar-lug 30. It will be understood that for the purpose of actuating the cam 26, the arm of the take-up lever 18 which connects the crank-pin 6 to the take-up carrying member 21 constitutes, in effect, a link.

In Fig. 6 of the drawings, A represents the position of the needle-reciprocating crank 7 when the needle is about to enter the work, and B represents a corresponding point in the vertical path of movement of the needle-bar. The corresponding position of the take-up actuating crank-pin 6 is represented as at C, the pivotal connection 20 of the take-up lever 18 with the anchoring link 21 as at D, while E represents the corresponding point in the vertical path of movement of the presser-bar 12. It may be here mentioned that the travel of the point E is shown in an oval path merely for illustration purposes, it being understood of course that the presser-bar is confined to right line movements. Progressive points in the paths of movement of each of said elements are represented by the same letters but with consecutively higher exponents. From the diagram-

matic illustration in Fig. 6 it will be readily understood that the presser-bar 12 descends very rapidly from the time the needle enters the work until the needle approaches completion of its downward movement. The descending movement is now retarded and, in fact, is not completed until after the needle starts to rise. Furthermore, the initial work-disengaging movement of the presser-foot is slow comparatively to the movement of retraction of the needle from the work, whereby there is produced the general effect of a dwell in the movement of the presser-foot until the needle is withdrawn from the work, which occurs when the crank 7 is substantially at A^6, the needle-bar at B^6, the pivotal connection 20 at D^6 and the presser-bar at E^6. The presser-bar is thereafter rapidly lifted, while the needle is out of the work, to provide for manipulation of the work. In other words, the variable motion imparted to the vibratory member or anchoring link 21 lends itself favorably to the employment of a lifting cam having an easy lifting effect upon the presser-bar.

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

1. In a sewing machine, a work-support, a presser-foot carrying bar movable toward and from said work-support and provided with a cam-engaged lug, a vibratory member, a cam carried by said vibratory member in operative engagement with said lug, a rotary shaft, an actuating element carried by said shaft, and a link connecting said actuating element to said vibratory member.

2. In a sewing machine, a work-support, a presser-foot carrying bar movable toward and from said work-support and provided with a cam-engaged lug, a vibratory member having a hub fulcrumed adjacent to said presser-bar, a cam carried by the hub of said vibratory member in operative engagement with said lug, a rotary shaft, an actuating element carried by said shaft, and a link connecting said actuating element to said vibratory member.

3. In a sewing machine, an endwise reciprocatory presser-foot carrying bar provided with a cam-engaged lug, a vibratory member, a cam carried by said vibratory member, a spring acting to yieldingly hold said lug in engagement with said cam, a rotary shaft, an actuating element carried by said shaft, and a link connecting said actuating element to said vibratory member.

4. In a sewing machine, an endwise reciprocatory presser-foot carrying bar provided with a cam-engaged lug, a member fulcrumed for vibratory movements about an axis transverse to said presser-bar, a cam carried by said member, a spring yieldingly holding said lug in engagement with said cam, a rotary actuating shaft, a crank-arm carried by said shaft and provided with a crank-pin, and a link connecting said crank-pin and member.

5. In a sewing machine, a work-support, a vertically movable presser-foot carrying bar, a collar secured for vertical adjustment upon said presser-bar and having a lug projecting laterally therefrom, a member fulcrumed adjacent to said presser-bar for vibratory movements about a substantially horizontal axis, a cam carried by said member and underlying said lug, a spring acting to yieldingly hold said lug in engagement with said cam, a horizontally disposed rotary shaft, an actuating element carried by said shaft, and a link connecting said actuating element to said member.

6. In a sewing machine, a reciprocatory needle-carrying bar, a presser-foot carrying bar, a take-up lever provided with a thread-eye, and take-up lever actuating means including a vibratory take-up lever controlling member, provided with presser-bar lifting means.

7. In a sewing machine having a frame including a work-support, a rotary actuating shaft, a reciprocatory needle-carrying bar, a presser-bar movable toward and from said work-support, a needle-thread take-up lever operatively connected to said rotary shaft, a link pivotally anchoring said take-up lever to said frame, and presser-bar lifting means actuated by said link.

8. In a sewing machine having a frame including a work-support, a rotary actuating shaft, a reciprocatory needle-carrying bar, an endwise reciprocatory presser-foot carrying bar provided with a cam-engaged lug, a needle-thread take-up lever operatively connected to said rotary shaft, a link pivotally connected to said take-up lever and having a hub fulcrumed upon said frame, a presser-bar lifting cam carried by the hub of said link, and a spring acting to hold said lug in engagement with said cam.

PETER HLEB.