A. H. DE VOE.

PRESSER FOOT MECHANISM FOR SEWING MACHINES.

APPLICATION FILED MAR. 30, 1914.

1,248,827.

Patented Dec. 4, 1917.

Fig. 1.

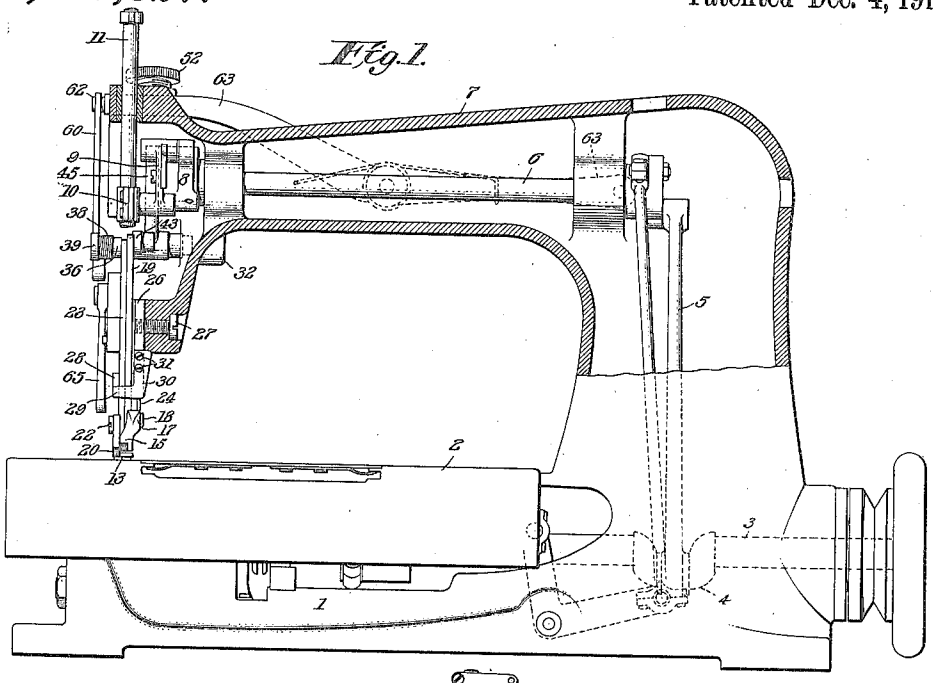
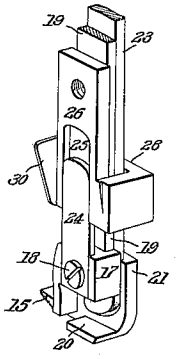


Fig. 4.



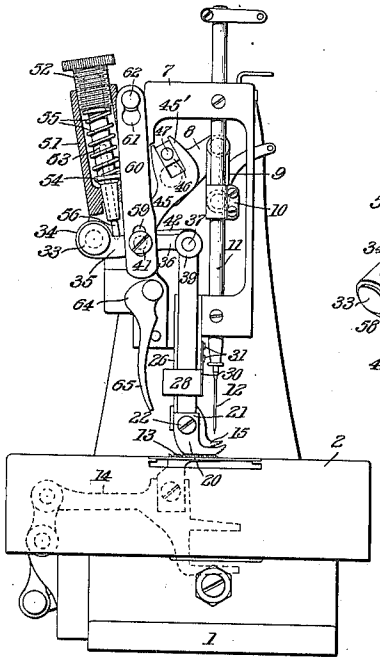


Fig. 2.

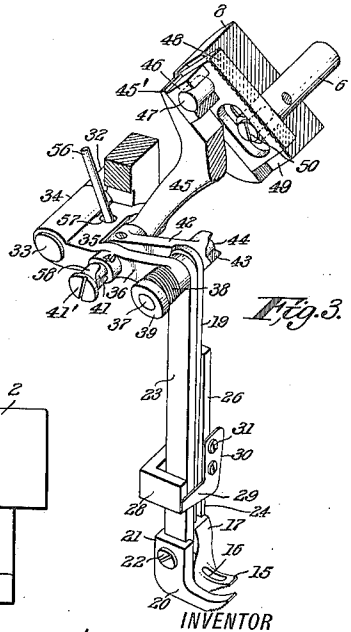


Fig. 3.

WITNESSES:

L. E. Fischer.

W. P. Stewart

INVENTOR

Albert H. De Voe

BY

Henry J. Miller

ATTORNEY

UNITED STATES PATENT OFFICE

ALBERT H. DE VOE, OF WESTFIELD, NEW JERSEY, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

PRESSER-FOOT MECHANISM FOR SEWING-MACHINES.

1,248,827. Specification of Letters Patent. Patented Dec. 4, 1917.

Application filed March 30, 1914. Serial No. 828,184.

To all whom it may concern:

Be it known that I, ALBERT H. DE VOE, a citizen of the United States, residing at Westfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Presser-Foot Mechanisms for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention has for its primary object to provide a simple and effective alternating presser mechanism for sewing machines and particularly for machines of that type in which the needle-bar is actuated by a rock-shaft journaled within and longitudinally of the bracket-arm and operatively connected with the main- or driving-shaft journaled beneath the work-plate.

In one of the simpler embodiments of the improvement a work-engaging foot is connected with an actuating element upon the rock-shaft through a plurality of permanently and pivotally connected elements acting in opposition to a spring in lifting the latter, said permanent connections insuring against shocks which would be imposed by the impact of one of such elements upon another, as in constructions heretofore devised. In a more specific form, the improvement comprises, in conjunction with automatically acting means for reciprocally lifting a plurality of presser-feet, adjusting means for varying the range of such lifting action.

In the preferred form of the improvement, the work-engaging feet are carried by bars of which one is pivotally attached to a swinging frame having a fixed fulcrum and itself sustaining a movable fulcrum upon which is mounted a rocking frame having one arm to which the second of said bars is pivotally attached and another arm forked to embrace a crank-pin adjustably secured upon and sustained by the needle-actuating rock-shaft, a pressure-spring being applied to said swinging frame to impose alternately the requisite pressure upon the work-engaging feet through their respective carrying bars. By the described independent connection of the foot-bars with the swinging lever, which may be at different distances from its fixed fulcrum, pressures of different intensities corresponding with their respective requirements may be imposed upon the individual work-engaging feet, one of which may be opposed to the feed-dog of a lower feeding mechanism and moved therewith in the feeding action.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of a double-chain-stitch sewing machine of the well-known Singer type embodying the present improvements, and Fig. 2 an end view of the same with the face-plate of the bracket-arm removed. Fig. 3 is a perspective view of the alternating presser mechanism detached, and Fig. 4 a similar view of a portion of the presser mechanism taken from the opposite side.

Within the base 1 of the sewing machine frame and beneath the work-plate 2 is journaled the main-shaft 3 having the crank 4 connected by means of the pitman 5 with a crank upon the rear end of the needle-bar actuating rock-shaft 6 journaled within the tubular overhanging arm 7 of the frame. The rock-shaft 6 has at its forward end the crank-plate 8 carrying a stud connected by means of the link 9 with a similar stud of a collar 10 fixed upon the reciprocating needle-bar 11 which carries the needle 12 coöperating in practice with a suitable looper in the production of stitches. The feeding mechanism comprises the feed-dog 13 operating through a suitable aperture in the throat-plate and mounted upon the feed-bar 14 receiving the usual lateral work-advancing and rising-and-falling work-engaging movements through suitable connections with the main-shaft.

The machine is shown provided with the usual work-stripping presser-foot 15 formed with the needle-aperture 16 and having its shank 17 secured by means of the fastening screw 18 to the lower end of the presser-bar 19 and with the walking foot 20 having its shank 21 secured by the fastening screw 22 to the lower end of the swinging bar 23. The presser-foot shank 17 has also secured thereto by means of the screw 18 the upwardly extending rigid guide-arm 24 fitted within a lateral channel 25 of the guide-bar 26 depending from the head of the bracket-arm formed with a seat upon which it is rigidly secured by means of the screw 27.

The bar 26 is provided with the lateral

stirrup 28 embracing the bars 19 and 23 and serving to guide the latter in its swinging movements. The guide-aperture of the stirrup is closed by the spring cross-member 29 of the plate 30 secured by screws 31 to the forward edge of the guide-bar 26, thereby confining the foot-bar 23 to a limited range of movement.

Secured in a suitable boss 32 of the bracket-arm head is the fulcrum-pin 33 upon which is mounted the boss 34 of a swinging frame 35 having a forward extension 36 apertured to sustain the lateral stud-pin 37 fixed in the upper end of the foot-bar 23. The stud 37 is surrounded by a spring 38 having one end secured to the collar 39 fixed thereon and the other end connected with the arm-extension 36.

Journaled in a boss 40 of the frame 35 36 intermediate the pins 33 and 37 is the pin 41 having secured thereon the hub of a rocking frame formed with a lateral arm 42 having a boss 43 entered by the lateral stud-pin 44 at the upper end of the presser-bar 19, and a separate upwardly inclined arm 45 formed with the laterally directed fork 45′ embracing a block 46 apertured to receive the actuating crank-pin 47 secured upon the crank-plate 8. As represented in Fig. 3, the crank-pin 47 is formed upon a block 48 adjustably fitted within a radial channel 49 of the crank-plate 8 in which it is adjustably secured by means of the screw 50 passing through said block and into the end of the rock-shaft 6 with its head countersunk in the face of said block. By this means the crank-pin 47 may be adjusted toward and from the shaft to vary its action upon the presser-feet.

Formed in the rearward side of the bracket-arm head is the socket member 51 having applied to its threaded upper end the bushing 52 to which is fitted the plunger-pin 53 formed with an annular flange 54 normally disposed near the bottom of the socket and between which and the adjacent end of the bushing 52 is interposed the pressure spring 55. The plunger-pin 53 is shown with a reduced portion extending through the bottom of the socket member and provided with a loose axial pin 56 of which the tapered lower end rests in a recess 57 formed in the upper face of the swinging frame 35 about midway between the fulcrum-pin 33 and the pivotal pin 41.

The point of engagement of the plunger-pin upon the frame 35 is so close to the fulcrum-pin 33 that its movement is very slight in the normal operation of the presser-lifting mechanism, and the degree of compression of the spring in opposite extreme positions of the plunger-pin is accordingly slight, so that the action of the spring is substantially uniform. As the point of attachment of the walking foot 20 to the swinging frame 35 36 is more distant from the latter's fulcrum 33 than is the pin 41 from which the work-stripping presser-foot 15 is sustained by said swinging frame, it is evident that the pressure of the spring upon the former is much less than its action upon the latter, so that a comparatively strong pressure applied in stripping the work from the needle is not imposed upon the walking foot which is enabled to perform its respective function in clamping the work upon the feed-dog with a much lighter pressure.

The outer portion of the pivotal pin 41 sustains a roller 58 confined in position thereon by the head of a screw 41′ tapped into the end of the pin 41. The roller is embraced by the slot 59 in the lower portion of a link 60 having at its upper end the slot 61 entered by the pin 62 in the forward end of the presser-lifting rock-lever 63 by means of which the swinging frame 35 36 may be raised to lift the presser-feet connected therewith. The rounded lower end of the link 60 is adapted for engagement with the cam-shaped portion 64 of the presser-foot lifting finger-lever 65 adapted to be operated for a like purpose.

It will be observed that the rocking of the shaft 6 to impart operative movements to the needle communicates corresponding movements to the rocking frame 42 45, whereby the said rocking frame is caused to move upon the stud-pin 41 as a fulcrum to force the work-stripping foot 15 upon the work and simultaneously lift the frame 35 36 in opposition to the spring 55 to lift the walking foot from the work and permit its return to advance position under the action of the spring 38 after each feeding movement. In the reverse movement of the rocking frame, the walking foot is lowered upon the work and the work-stripping foot is lifted independently of the action of the spring upon the frame 35 36.

When the foot 15 is thrust upon the work, the spring acts thereon through the pin 41 through a comparatively short leverage, while the thrust of the foot 20 upon the work is effected by the action of the spring through the pivotal pin 37, and thereby through an increased leverage, whereby the walking foot is applied to the work under a pressure of much less intensity than is the work-stripping foot.

It is evidently immaterial to the present invention, in certain of its aspects, whether one or more work-engaging feet be employed, and what are the details of construction and arrangement of the connections between the presser-foot or feet and the needle-actuating rock-shaft. It will therefore be seen that the present improvement as herein shown and described is susceptible of material modification without departure from the invention.

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

1. In a sewing machine, the combination with a work-engaging foot and automatically acting lifting means therefor, of a spring for pressing said foot upon the work, a connection between said spring and foot and comprising a thrust-receiving member for said spring having a range of movement shorter than the lifting movement of said foot, and means for varying the range of action of said lifting means.

2. In a sewing machine, the combination with a plurality of work-engaging feet and means for imparting thereto reciprocal lifting movements, of a spring for pressing said feet upon the work, connections between said spring and feet and comprising a common thrust-receiving member for said spring having a range of movement shorter than that of either of said feet, and adjusting means for varying the range of action of said lifting means.

3. In a sewing machine, in combination, stitch-forming mechanism comprising a reciprocating needle, a work-engaging foot, a bar sustaining said foot, a rock-shaft connected with and actuating said needle, an actuating element carried by said rock-shaft, a pivotally mounted actuated element embracing said actuating element, and a single pivotal connection between said actuated element and said bar.

4. In a sewing machine, the combination with a rock-shaft, an actuating element mounted thereon, means for varying the range of action of said actuating element, a work-engaging foot, a foot-bar, a rocking frame having one arm pivotally connected with said bar and another arm embracing and deriving vibratory movements from said actuating element, a movable fulcrum for said rocking frame and a spring for pressing said fulcrum lengthwise of said bar.

5. In a sewing machine, the combination with a rock-shaft and an actuating element carried thereby, of a plurality of work-engaging feet, bars by which said feet are carried, a swinging frame to which one of said bars is pivotally connected, a fixed fulcrum for said frame, a rocking frame having one arm to which the other of said bars is pivotally attached and a second arm embracing and deriving vibratory movements from said actuating element, a fulcrum for said rocking frame sustained by said swinging frame intermediate its own fulcrum and the first-named bar, and a spring applied to said swinging frame and acting to press said feet upon the work.

6. In a sewing machine, the combination with a rock-shaft and a crank-pin secured adjustably thereon, of a plurality of work-engaging feet, bars by which said feet are carried, a swinging frame to which one of said bars is pivotally connected, a fixed fulcrum for said swinging frame, a rocking frame having one arm to which the other of said bars is pivotally attached and a second arm embracing and deriving vibratory movements from said crank-pin, a fulcrum for said rocking frame sustained by said swinging frame intermediate its own fulcrum and the first-named bar, and a spring applied to said swinging frame and acting to press said feet upon the work.

7. In a sewing machine, in combination, stitch-forming mechanism comprising a reciprocating needle, and a work-engaging foot, a shaft, an actuating element carried by said shaft, an operative connection between said actuating element and the needle, and a plurality of motion-transmitting elements connecting said actuating element with said foot, all of said motion-transmitting elements being connected together by means solely of a pivotal character.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ALBERT H. DE VOE.

Witnesses:
H. A. KORNEMANN, Jr.,
E. J. ARNOLD.