May 31, 1938. A. B. CLAYTON 2,119,316

FEEDING MECHANISM FOR SEWING MACHINES

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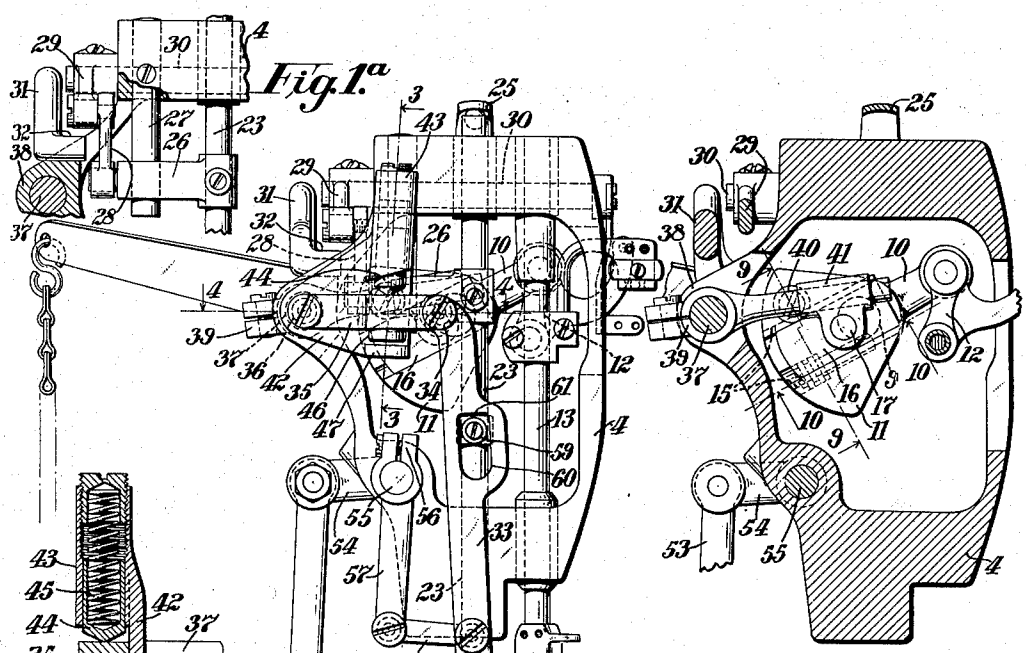


Fig. 1a

Fig. 2.

Fig. 3.

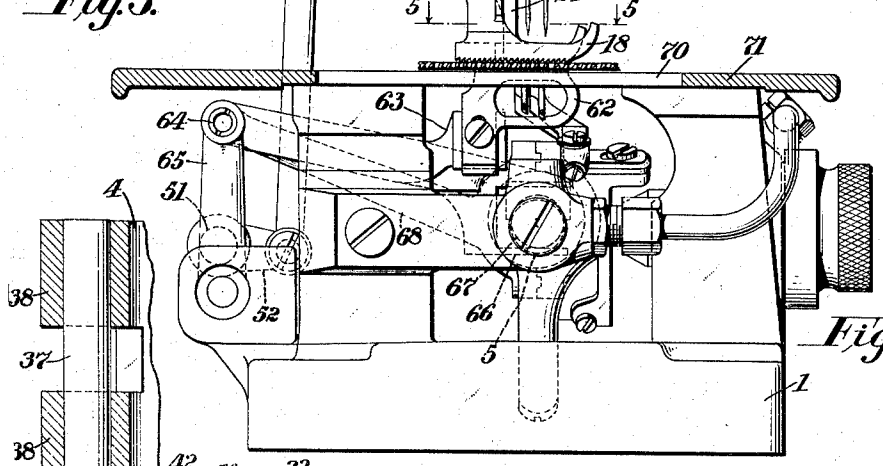


Fig. 1.

Fig. 4.

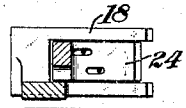


Fig. 5.

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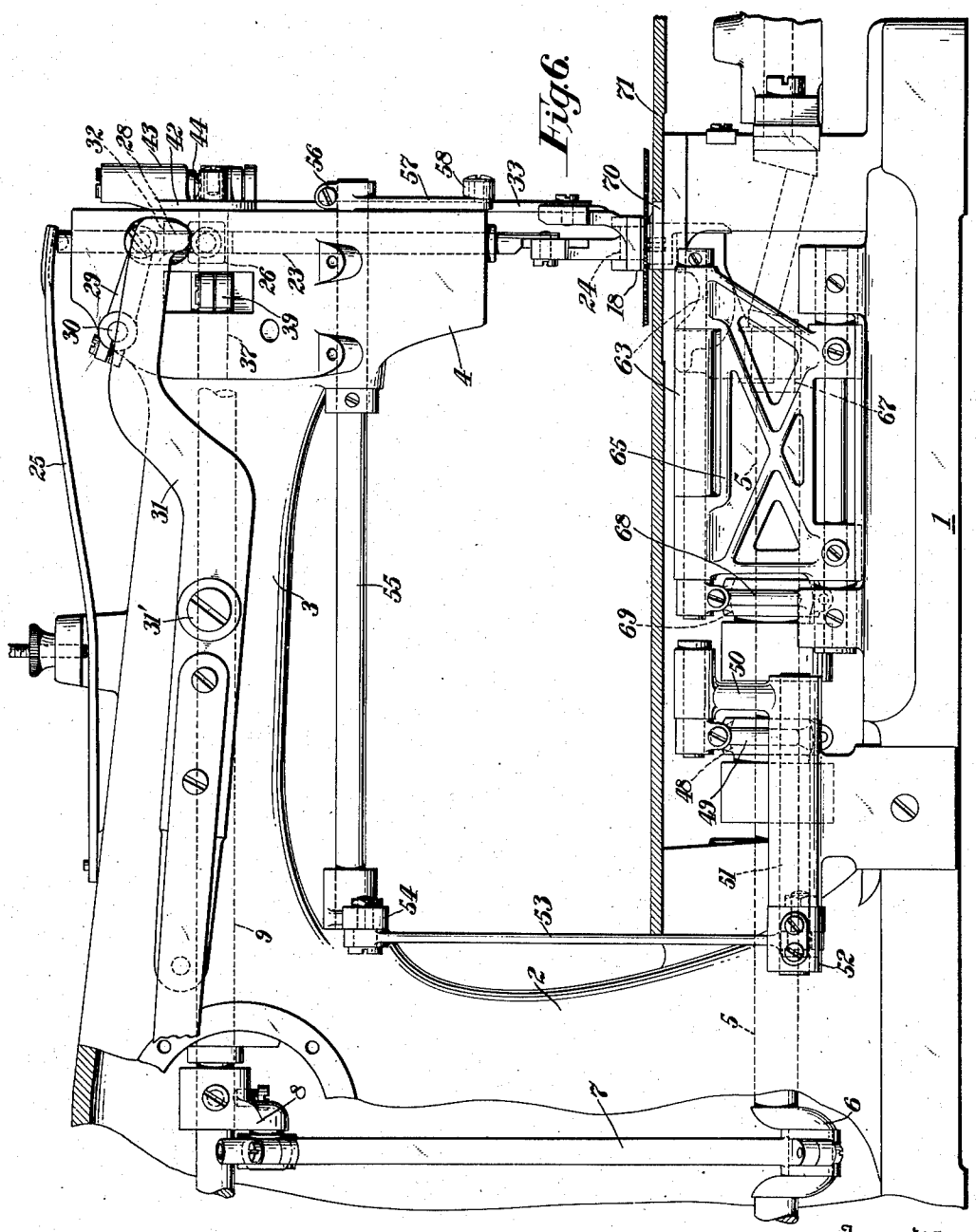
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FEEDING MECHANISM FOR SEWING MACHINES

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Fig. 6.



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FEEDING MECHANISM FOR SEWING MACHINES

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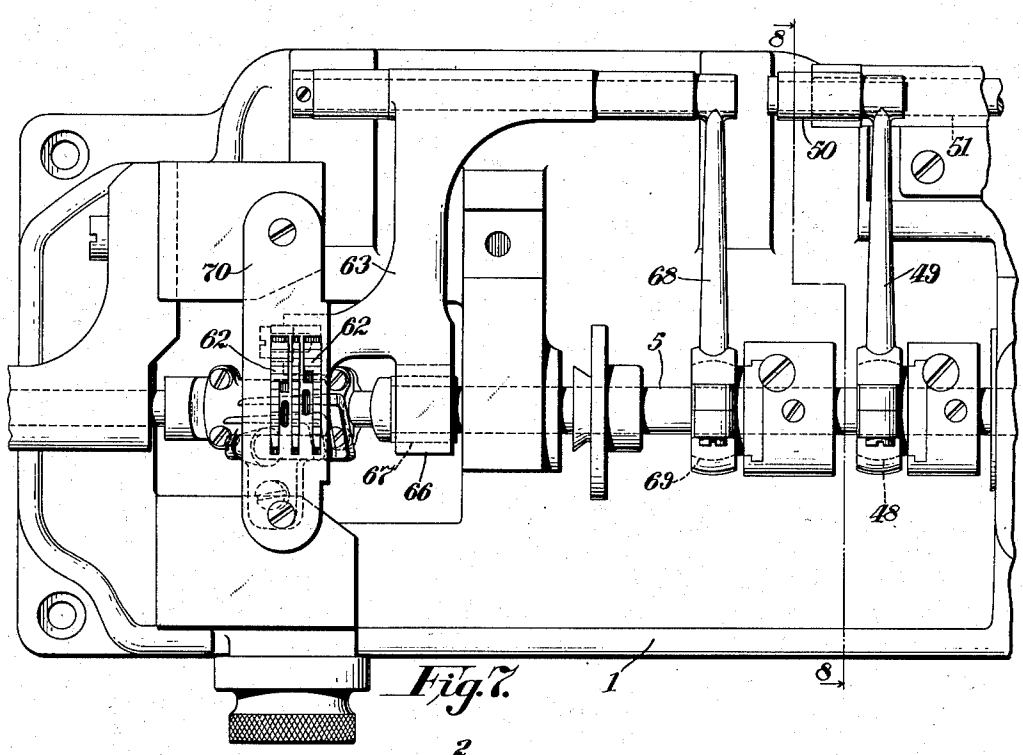


Fig. 7.

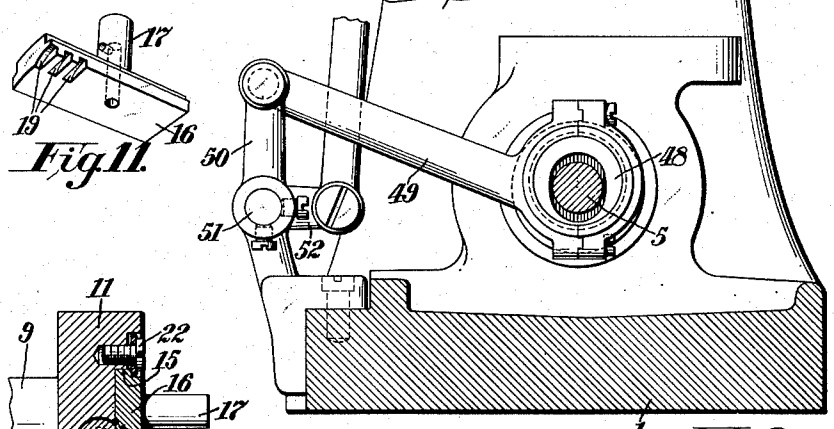


Fig. 11.

Fig. 8.

Fig. 9.

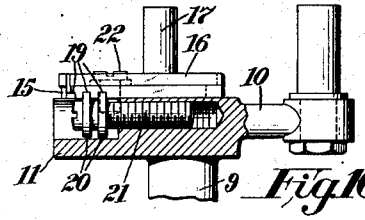


Fig. 10.

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UNITED STATES PATENT OFFICE

2,119,316

FEEDING MECHANISM FOR SEWING MACHINES

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Application November 19, 1936, Serial No. 111,611

6 Claims. (Cl. 112—212)

This invention relates to feeding mechanisms for sewing machines and more particularly to a top feeding mechanism including an upper feeding foot with means for moving it into and out of engagement with the upper surface of the work and for giving it a work-feeding movement in one direction while in engagement with the work and a return movement in the opposite direction while out of engagement with the work.

The invention has for an object to provide a top feeding mechanism of simplified construction which will operate successfully at high-speeds and which does not encumber the space below the sewing machine bracket-arm or around the stitching point.

With the above and other objects in view, as will hereinafter appear, the invention comprises 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.

In the accompanying drawings, Fig. 1 is a front end elevation of a sewing machine embodying the invention. Fig. 1ª is a fragmentary elevation of certain hidden parts of Fig. 1. Fig. 2 is a vertical sectional view through the bracket-arm head of the machine. Fig. 3 is a section on the line 3—3, Fig. 1. Fig. 4 is a section on the line 4—4, Fig. 1. Fig. 5 is a section on the line 5—5, Fig. 1. Fig. 6 is a rear side elevation of the machine. Fig. 7 is a top plan view of a portion of the machine bed. Fig. 8 is a section on the line 8—8, Fig. 7. Fig. 9 is a section on the line 9—9, Fig. 2. Fig. 10 is a section on the line 10—10, Fig. 2, and Fig. 11 is a perspective view of the adjustable crank-pin member of Figs. 9 and 10.

In the embodiment of the invention illustrated 1 represents the bed of a sewing machine frame having a standard 2, and an overhanging bracket-arm 3 terminating in the head 4.

Journaled in the bed 1 is the main shaft 5 which is formed with the crank 6 connected by the pitman 7 to the crank-arm 8 fast on the upper rock-shaft 9 journaled in the bracket-arm 3.

The rock-shaft 9 has forged integral therewith a crank-arm 10 and counter-balance head 11; the crank-arm 10 being connected by the link 12 to the needle-bar 13 carrying the needles 14.

The counter-balance head 11 is formed with an undercut guideway 15 extending radially of the axis of the rock-shaft 9 and in which is slidably fitted the slide-block 16 carrying the crank-pin 17 which imparts rising and falling movements to the top feeding foot 18 through mechanism to be described.

The slide-block 16 is formed in its under face with transverse grooves 19, Fig. 11, entered by the flanges 20 on the head of the adjusting screw 21 threaded into the counter-balance head 11. A clamp-screw 22 when tightened, holds the slide-block 16 securely in adjusted position. By loosening the clamp-screw 22 and turning the adjusting screw 21, the crank-pin 17 may be adjusted toward or away from the axis of the rock-shaft 9 to vary the amplitude of lifting movements imparted to the upper feed-foot.

Slidable vertically in the head 4 is the presser-bar 23 to the lower end of which is fixed the presser-foot 24 the smooth under face of which bears upon the work at all times during a sewing operation, being held yieldingly thereupon by the usual presser-spring 25 of the leaf type which bears at its free end upon the upper end of the presser-bar 23 and reacts against the machine frame. The presser-bar 23 has rigidly fixed thereto a lateral arm 26 which is guided by the fixed pin 27 in the head 4 and has connected thereto the lower end of a link 28 which is pivotally connected at its upper end to the forward end of an arm 29 fast on the usual thread-controller rock-shaft 30 journaled in the head 4. The usual manually-operated presser-lifting lever 31 is pivoted at 31' on the bracket-arm 3 and has at its forward end a lateral extension 32 underlapping the forward end of the arm 29 and adapted to engage and lift the latter and the presser-bar 23 connected therewith, for removal and insertion of work.

The top feed-foot 18 is mounted on the lower end of the vertical feed-bar 33 which is pivotally hung at 34 upon the forward end of the lever 35 fulcrumed at its rearward end upon the stud-pin 36 coaxially integral with the rock-shaft 37 journaled in the spaced bearings 38, 38 on the frame head 4. The rock-shaft 37 has adjustably clamped thereon, between the bearings 38, 38, the split hub 39 of a crank-arm 40 embraced by the slide-block 41 which, in turn, embraces the adjustable feed-lift crank-pin 17.

The rock-shaft 37 has forged integral therewith a plate-like head 42 which has formed integral therewith a cylindrical housing 43 for a spring-pressed plunger 44 backed by a coil spring 45; the plunger bearing upon the lever 35 and normally holding the leather button 46 on the under side thereof in contact with the unyielding

ledge 47 at the lower edge of the head 42. Through the described mechanism the crank-pin 17 imparts up-and-down movements to the feed-bar 33; the down movements being imparted to the feed-bar through the coil spring 45 which is made stiff enough for the purpose and which may yield to prevent the application of crushing pressures to the work or damage to the mechanism. This mechanism constitutes power-driven means which reacts against the machine frame independently of the presser-foot spring 25 and includes a lost-motion spring-and-shoulder connection 44, 47 which is yielding in one direction to lower the feed-bar 33 and is positive in the opposite direction to raise the feed-bar 33.

The feed-bar 33 receives its feed-and-return movements from the adjustable top-feed eccentric 48 on the main-shaft. The eccentric 48 is connected by the pitman 49 to the crank-arm 50 fast on the rock-shaft 51 which also has fixed to it a crank-arm 52 connected by the vertical link 53 to the crank-arm 54 fast on the rock-shaft 55. The rock-shaft 55 has clamped thereon the split-hub 56 of a depending crank-arm 57 which is connected by the link 58 to the top feed-bar 33.

The presser-bar 23 carries a lateral roller-stud 59 which is received in the clearance slot 60 in the feed-bar 33. When the presser-bar 23 is lifted for removal of work, the roller stud 59 engages the wall 61 at the upper end of the clearance slot 60 and lifts the feed-bar 33 and foot 18; the spring 45 yielding to this lifting movement.

The top feeding-foot 18 preferably works in opposition to the conventional four-motion feed-dog 62; the two elements 18 and 62 clamping the work between them during the feeding stroke and releasing it for the return stroke. The feed-dog 62 is carried by the usual lower feed-bar 63 which is fulcrumed at 64 on the feed-rocker 65 and has a forked portion 66 which embraces the feed-lift eccentric 67 on the main shaft 5. The feed-rocker is actuated by the usual pitman connection 68 with the adjustable bottom feed-eccentric 69.

By virtue of the strong but light-weight construction of the top feed-bar and its actuating mechanism, working speeds of 4000 or more cycles per minute may be successfully attained. This cannot be accomplished with alternating top-feed and presser mechanisms of the usual type wherein the reaction of the top-feed-lowering mechanism is used to lift the presser-bar, as there is too much inertia in the moving parts. The present top-feed foot is yieldingly depressed but positively lifted by mechanism entirely independent of the presser-bar which, in the present instance, functions at all times to hold the presser-foot yieldingly down upon the work. The lower feed-dog 62 works through slots in the usual throat-plate 70 which is flush with the cloth-plate 71 and may be considered as a part thereof.

By adjusting the top feed-lift crank-pin 17, the amplitude of the rising and falling movement of the top feed-bar 33 may be adjusted to suit the character of the work being stitched; thick spongy work, or work having heavy cross-seams therein, requiring a higher lift than relatively less compressible work of uniform thickness. The rock-shaft 37 may also be adjusted relative to the split hub 39 of the arm 40 to position the feed-bar 33 and feed-foot 18 at the desired general working elevation.

The invention is not to be understood as limited to the details of construction and relative arrangements of parts shown and described as various modifications thereof may obviously be made by those skilled in the art within the spirit and scope of the invention.

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

1. In a sewing machine, a frame including a work-support and an overhanging bracket-arm, a reciprocatory needle-bar journaled in said bracket-arm, a needle-bar-actuating shaft journaled in said bracket-arm, a needle-bar-actuating crank and counter-balancing head on said shaft, a link connection between said crank and needle-bar, an adjustable crank mounted on said counter-balancing head, a top feed-bar, feed-bar lifting means connected to said adjustable crank, and adjustable means to impart feed-and-return movements to said feed-bar.

2. In a sewing machine, a frame including a work-support and an overhanging bracket-arm, a reciprocatory needle-bar journaled in said bracket-arm, a needle-bar-actuating shaft journaled in said bracket arm, a needle-bar-actuating crank and counter-balancing head on said shaft, a link connection between said crank and needle-bar, said counter-balancing head having an undercut guideway therein, a slide-plate adjustably mounted in said guideway, a crank-pin carried by said slide-plate, a top feed-bar, feed-bar lifting means connected to said crank, and means to impart feed-and-return movements to said feed-bar.

3. In a top feed mechanism for sewing machines, the combination with a work-support, a top shaft, and a crank on said shaft, of a feed-lift rock-shaft connected to be actuated by said crank and having at one end a head, a lever fulcrumed at one end on said head, a feed-bar pivotally hung from the other end of said lever, a spring carried by said head and bearing down upon said lever, means on said head to lift said lever, and means to impart swinging movements to said feed-bar.

4. In a sewing machine, a work-support, a rock-shaft above said work-support, a lever transverse to and fulcrumed on said rock-shaft, a vertical feed-bar pivotally hung from said lever, spring means carried by said rock-shaft and bearing down upon said lever, positive means carried by said rock-shaft to lift said lever, and means to swing said feed-bar.

5. A shaft having a crank-arm and a counter-balancing head thereon formed with a guideway, a slide-block adjustable in said guideway, a feed-lift crank on said slide-block, a reciprocatory needle-bar connected to be actuated by said crank-arm, a top feed-bar, means actuated by said feed-lift crank for lifting said feed-bar, and means to impart feed-and-return movements to said feed-bar.

6. A rock-shaft having at one end thereof a head formed with a socket, a compression spring and plunger housed in said socket, a lever fulcrumed on said head substantially coaxially with said rock-shaft, said lever being engaged at its upper side by said plunger, lifting means on said head adapted to engage the under side of said lever, a top feed-bar freely suspended from said lever, and means to swing said feed-bar in timed relation to the oscillatory movement of said rock-shaft.

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