A. RONTKE.

FEEDING MECHANISM FOR SEWING MACHINES.

APPLICATION FILED JUNE 7, 1912.

1,128,519. Patented Feb. 16, 1915.

2 SHEETS—SHEET 1.

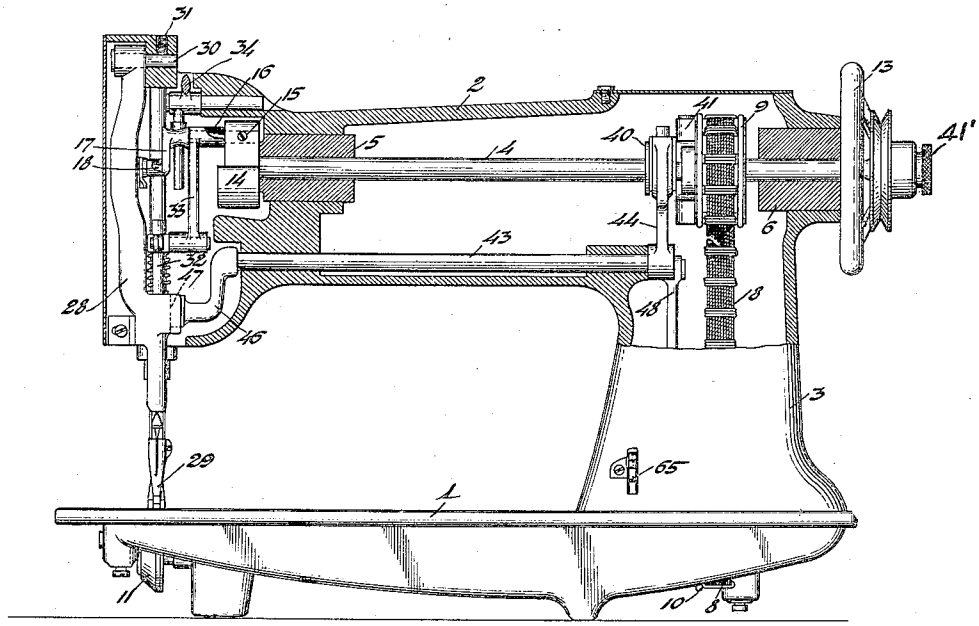


Fig. 1.

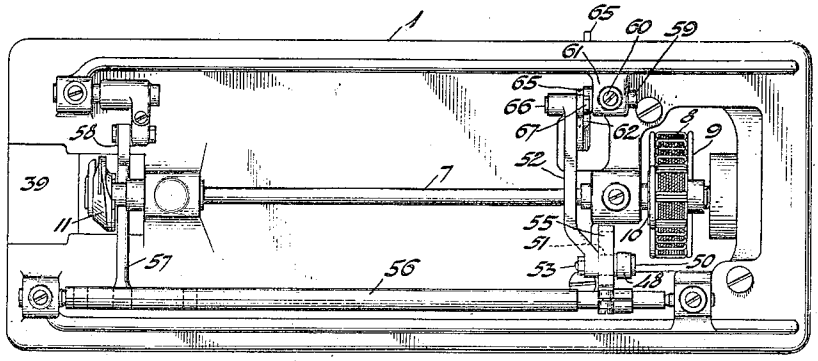


Fig. 2.

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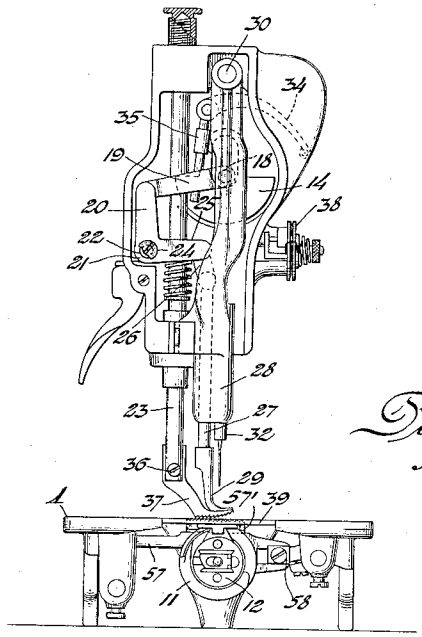


Fig. 3.

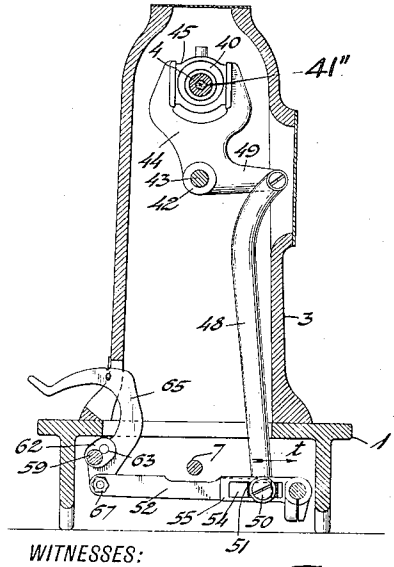


Fig. 4.

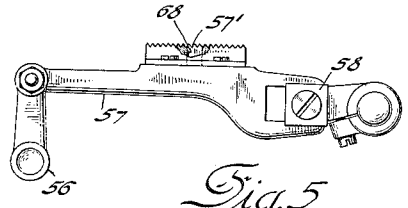


Fig. 5.

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UNITED STATES PATENT OFFICE.

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FEEDING MECHANISM FOR SEWING-MACHINES.

1,128,519. Specification of Letters Patent. Patented Feb. 16, 1915.

Application filed June 7, 1912. Serial No. 702,142.

To all whom it may concern:

Be it known that I, ALBERT RONTKE, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Feeding Mechanism for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in feeding mechanisms for sewing machines, and has for its object to provide machines equipped with upper and under feeding mechanisms with improved means for controlling the amplitude of the feed movements of said mechanisms with respect to each other.

When seaming fabrics together it is frequently desirable to slightly increase or diminish the feed movements of certain plies with respect to an upper or under ply, so that at the finish of the seam the free or selvage edges will be brought into alinement, as when stitching a comparatively wide circular hem fold, or when effecting any other given alinement of the fabrics important to the design, finish or sightliness of the product.

It is believed that the present construction of differential feeding mechanism is the first to include a needle, having lateral movements corresponding to the feed movements of the feeding foot while in the material, without which it would be impossible to practically effect the present positive control of the minimum of differential feed, which minimum of action gives to the present construction the function of feeding the fabric in a manner to insure the desired finish of the product; and that this differentiation of the feed may be conveniently effected, there is provided a lever operatively connected with the under feeding mechanism which, at the will of the operator and during the stitching operation, is adjustable to change the amplitude of feed of the under feeding mechanism.

Referring to the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated; Figure 1 is a view in front side elevation of a sewing machine equipped with the present invention, the arm bracket and a portion of the arm bracket standard being shown in section to better illustrate the means employed for actuating the upper feeding mechanism. Fig. 2 is an underside view of Fig. 1. Fig. 3 is a front end elevation of the arm bracket and sewing machine bed-plate. Fig. 4 is a view in cross section through the arm bracket and arm bracket standard, looking toward the front end of the machine. Fig. 5 is a view of the feed-dog and feed-dog-carrying bar.

The present invention is shown as applied to the Singer 109w class machine, but as it relates only to the construction and application of the fabric-feeding mechanism, only such reference will be made to the other elements of the machine as is deemed essential for a proper understanding of its application.

Referring to the figures, 1 represents the sewing machine bed-plate upon which is mounted the bracket arm comprising the arm bracket 2 and standard 3, 4 the main or needle-bar-actuating shaft journaled within the usual bearings 5 and 6 located in the bracket arm and connected with the lower or hook-driving shaft 7 by an endless belt 8 adapted to engage pulleys 9 and 10 fast on the shafts 4 and 7, respectively, and as said pulleys are of the ratio of two to one, the hook-driving shaft is given two revolutions to one revolution of the needle-bar-actuating shaft.

11 is the loop-taker, 12 the bobbin-case and 13 the hand or band wheel.

The forward end of the shaft 4 is provided with a flange 14 in which is secured, by screw 15, one member 16 of a crank 17, the opposite member 18 of said crank being journaled in a suitable bearing formed in the presser-lifting lever link 19, which in turn is pivotally attached to the arm 20 of the bell-crank presser-lifting lever 21. The lever 21 is fulcrumed on a stud 22 forming a part of the commonly employed presser-bar-lifting collar (not shown) carried by the spring-pressed cloth-presser-carrying bar 23, said lever being held against accidental displacement on the stud 22 by a screw 24. The arm 25 of the lever 21 is pivotally connected with the step feeding foot link 26, the lower end of which latter is pivotally connected with a step feeding foot-carrying bar 27 which is mounted in suitable bearings formed in the oscillating feed-actuating

frame 28 and provided with a feeding foot 29, the upper end of said oscillating frame being pivoted on a stud 30 secured by screw 31 in the head of the bracket arm.

32 represents the needle-carrying bar mounted to oscillate with and move vertically in the frame 28, such vertical movements being effected by the link 33 which is pivotally connected at one end to said needle-bar, its opposite end being fulcrumed on the member 16 carried by the flange 14. The take-up 34 is of usual construction, and is operated in a manner common to take-ups connected with the main shaft, through a suitable link connection, as 35.

37 represents the cloth-presser secured to the lower end of the cloth-presser-carrying bar by screw 36. The needle-thread tension 38 and throat-plate 39 are constructed and arranged in a manner common to sewing machines of the class referred to herein.

Referring to the means for giving to the frame 23 its oscillatory movements, 40 represents a feed eccentric formed integral with the feed eccentric frame 41, which latter is adjustably secured to the face of the pulley 9, the adjustment of said frame being effected by axial adjustments of the knurled head 41′ of the rod 41″ mounted in the main-shaft 4, as pointed out in U. S. patent to W. F. Dial *et al.*, No. 718,988, dated January 27, 1903; accordingly, it is not deemed essential to herein further describe such construction and its manner of adjustment.

42 represents a bell-crank feed-lever suitably secured on the oscillating frame rock-shaft 43, the arm 44 of said feed-lever being forked to embrace an eccentric block 45 mounted on the eccentric 40, the opposite or forward end of said rock-shaft carrying a crank arm 46 which coacts with a groove 47 (shown in dotted lines only, Fig. 1) formed in the frame 28, thus transmitting oscillatory movements from said eccentric to said frame, through the connections 45, 44, 42, 43 and 46.

The construction and operation of the means for giving to the feeding foot its feed movements and to the presser-foot its vertical movements are the same as those illustrated and described in U. S. patent to A. Rontke, No. 989,538, dated April 11, 1911 (see specification commencing with line 63, page 1), except that in the patented construction the needle-carrying bar and step feeding foot-carrying bar are mounted in an oscillating feed-actuating frame designated "41", which frame also carries the feed-dog, while in the present construction the needle-carrying bar and feeding foot-carrying bar are mounted in the oscillating frame 28, which latter, as in the patented construction, is operatively connected with the feed-eccentric carried by the main shaft; accordingly, it is not deemed necessary to further describe the construction and operation of the feeding elements located above the sewing machine bed-plate.

48 represents a feed-connection pivoted at its upper end to an arm 49 of the bell-crank feed-lever 42, its opposite end being fulcrumed on a screw bolt 50 carrying a slide block 51, said bolt passing through a suitable opening formed in the end of the feed-adjusting bar 52 and being secured by a nut 53. The bar 52 acts, through means later to be described, to shift the block 51 in the groove 54 formed in the arm 55 carried by the feed rock-shaft 56, for a purpose later to be explained.

57 represents the feed-dog-carrying bar which is provided with a feed-dog 57′ and pivotally connected to the feed rock-shaft 56 in a manner common to sewing machines generally, the opposite end of said feed-dog-carrying bar being forked to receive a stationary guide block 58, thus transmitting feed movements from the bell-crank feed-lever to the feed-dog, through the connections 48, 50, 51, 55, 56 and 57, it being understood that said feed-dog has movements in a horizontal plane only, as in the construction represented by Patent No. 989,538 referred to previously.

59 represents a fulcrum stud adjustably secured by screw 60 in a lug 61 depending from the bed-plate 1, said stud having formed integral with it a disk 62 provided with a stud 63 upon which is pivotally mounted a feed-adjusting lever 65 which is given rocking movements on said stud for a purpose now to be explained. To the lower end of the feed-adjusting lever 65 is pivotally attached, by stud screw 66 and nut 67, one end of the feed-adjusting bar 52, thus enabling the operator, through the manipulation of said feed-adjusting lever, to adjust the block 51 with respect to the axis of the feed rock-shaft 56, the adjustment of said block toward the axis of said rock-shaft increasing the extent of feed movement of the feed-dog, and its adjustment in the opposite direction lessening the amplitude of said feed movements.

In the operation of feeding mechanisms comprising an upper feeding foot, in connection with an under feeding member, as in the present instance, it is well understood that when the feeding foot is moved to the limit of its downward stroke the needle occupies a like position, and as the needle starts to rise the presser-foot is lifted above the fabric, followed by giving feed movements to the upper and under feeding members, and at the completion of the feed movements the feeding foot is raised, the needle withdrawn from the fabric, and the cloth-presser moved down upon the fabric, when the feeding members are returned to their initial positions, the needle

in its descent entering the elongated opening 68 in the feed-dog.

To effect a like amplitude of feed movement of the upper and lower feeding members is the purpose of the adjustable eccentric 40. When the feed-adjusting lever 65 occupies its zero position, as shown in Fig. 4, the upper feeding members and under feeding member will be given feed movements of like amplitude, but when, through the manual manipulation of said lever, the slide block 51 is moved in the direction indicated by the arrow *t*, the feed movements of the feed-dog will be of greater extent than those of the upper feeding member, and when moved in the opposite direction from the adjustment shown in Fig. 4, the feed movements of the upper feeding member will be of greater extent than those of the lower feeding member, with the result that in the absence of the needle the ply of fabric in contact with the feeding mechanism of greater amplitude will be gathered, as in the earlier constructions of differential feeding mechanisms.

In the present construction the needle is employed to effect a positively controlled minimum of differential feed not practical in connection with the earlier constructions,—a minimum of differential feed which effects such a slight fullness of the fabric as to be unnoticeable, but sufficient to permit a given design or figure to be continued from one to another piece of like figured fabric without distorting or mismatching the lines, and such positive control of the feed movements of the superposed plies is due to the ply of fabric having the greater feed movement causing the needle to slightly elongate the needle opening in the ply partaking of the shorter feed movement.

Claims:—

1. In a sewing machine, a stitch-forming and cloth-feeding mechanism including upper and under feeding elements, a needle-carrying bar and a needle, the latter having feed movements while in the fabric coincident with and corresponding to the amplitude of the feed movements of said upper feeding element, of feed adjusting means common to both of said feeding elements, and means for giving to one of said feeding elements feed movements of a different amplitude than the feed movements of the other of said feeding elements.

2. In a sewing machine, a stitch-forming and cloth-feeding mechanism including upper and under feeding elements, a needle-carrying bar and a needle, the latter having feed movements while in the fabric coincident with and of the same amplitude as the feed movements of said upper feeding element, of feed adjusting means common to both of said feeding elements and a second feed adjusting means located convenient of manipulation by the operator during the stitching operation, for effecting a change in the amplitude of the feed movements of said under feeding element independent of the extent of the feed movements of its coacting feeding element.

3. In a sewing machine, a stitch-forming and cloth-feeding mechanism including upper and under feeding elements, a feed rock shaft, a needle-carrying bar and a needle, the latter having feed movements while in the fabric coincident with and of the same amplitude as the feed movements of said upper feeding element, of feed adjusting means common to both of said feeding elements and a second feed adjusting means including a feed adjusting lever operatively connected with said feed rock-shaft and extending out through the sewing machine frame convenient of manipulation by the operator during the stitching operation, for effecting a change in the amplitude of the feed movements of said under feeding element independent of the extent of the feed movements of its coacting feeding element.

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

ALBERT RONTKE.

Witnesses:

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T. W. CUTTING.