M. L. WATERMAN.

SEWING MACHINE.

APPLICATION FILED JAN. 29, 1917.

1,318,629.

Patented Oct. 14, 1919.

4 SHEETS—SHEET 1.

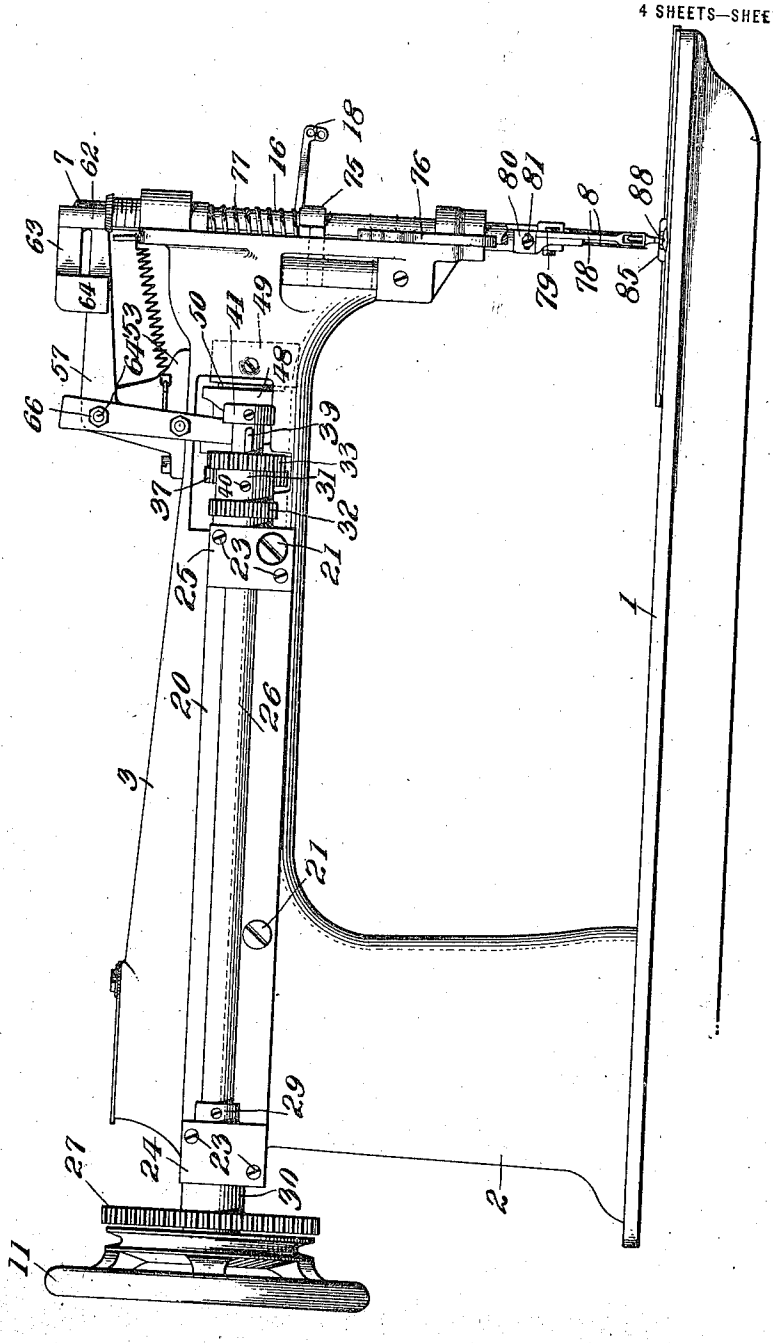


Fig. 1.

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4 SHEETS—SHEET 2.

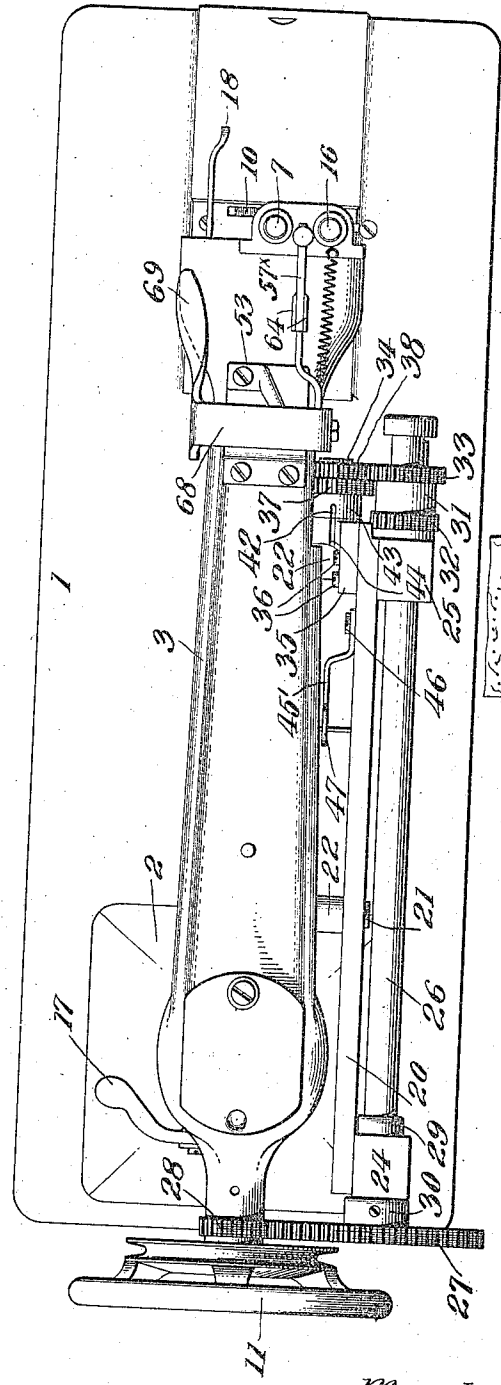


Fig. 2.

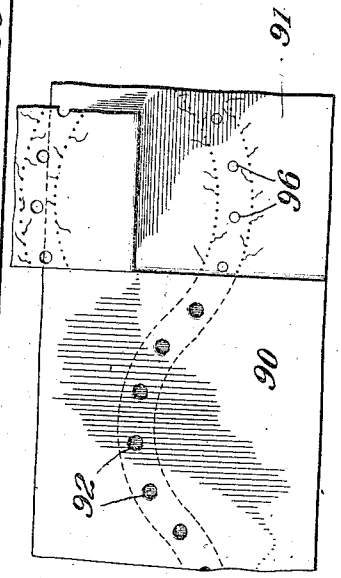


Fig. 10.

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4 SHEETS—SHEET 3.

Fig. 4.

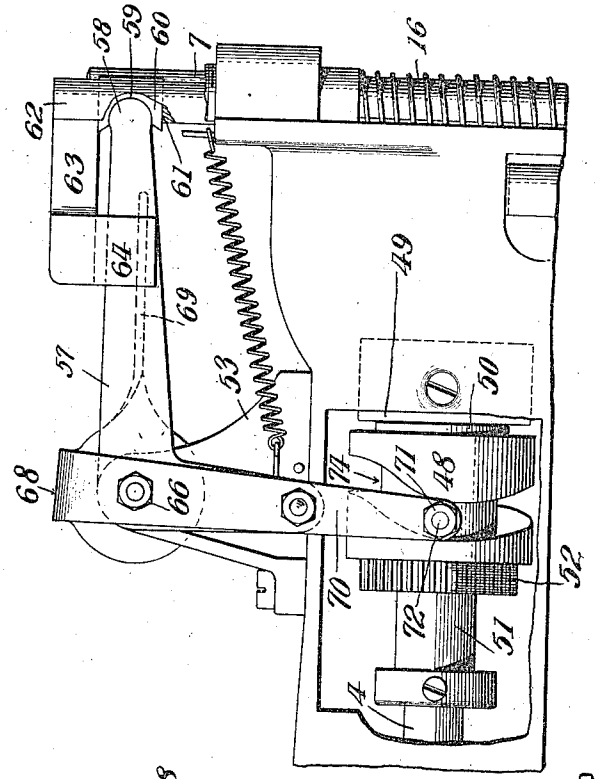
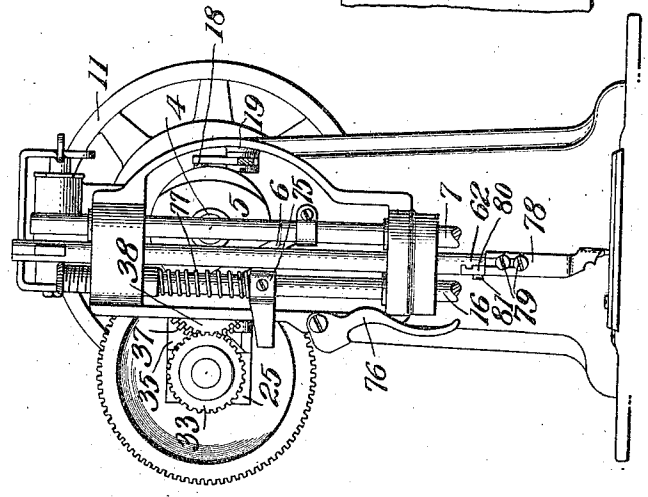


Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 7.

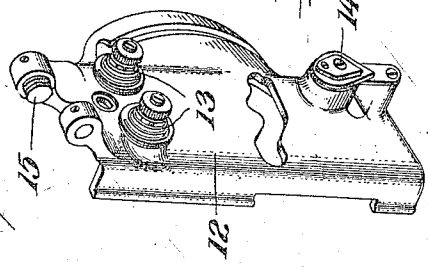


Fig. 8.

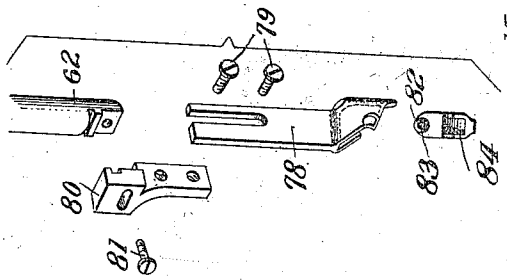
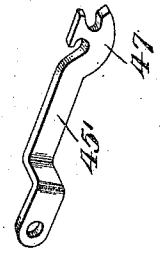


Fig. 9.



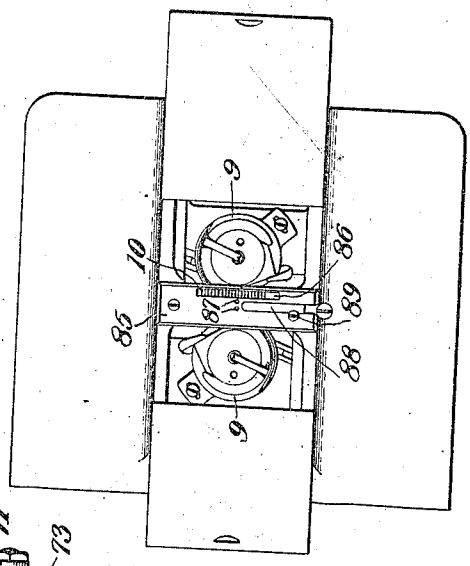


Fig. 6.

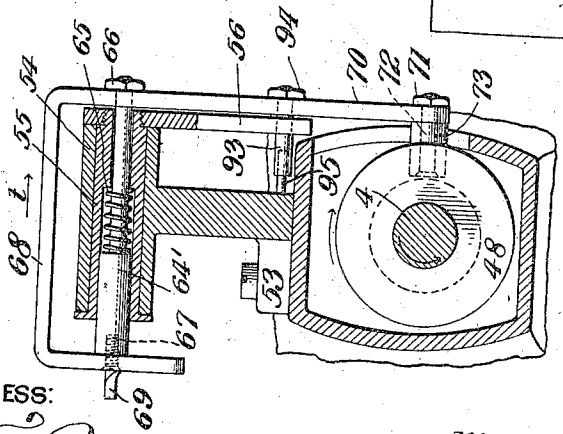


Fig. 5.

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UNITED STATES PATENT OFFICE.

MAX LEON WATERMAN, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE.

1,318,629. Specification of Letters Patent. Patented Oct. 14, 1919.

Application filed January 29, 1917. Serial No. 145,120.

To all whom it may concern:

Be it known that I, MAX LEON WATERMAN, 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 Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in sewing machines employed more generally in the manufacture of boots, shoes, slippers, &c., common to footwear and has for its object to provide a machine for stitching or for perforating and for stitching and perforating at a single operation, and to this end there is combined with one form of commonly employed stitch-forming and cloth-feeding mechanism means for perforating the fabric during or independent of the seam-formation.

In the accompanying drawings illustrating the invention, Figure 1 is a view in rear side elevation of the present construction, the bracket-arm face-plate being omitted. Fig. 2 is a plan view of Fig. 1. Fig. 3 is a view in front end elevation of Fig. 1. Fig. 4 is an enlarged view in rear side elevation of the front end portion of the arm-bracket. Fig. 5 is a plan view of the front end portion of the bed-plate with the slide plates in position to bring to view the loop-takers. Fig. 6 is an enlarged view, partly in full lines and partly in section, through the front end portion of the bracket-arm to better illustrate the means employed for actuating and discontinuing the action of the perforating punch. Fig. 7 is a view in perspective of the bracket-arm face-plate. Fig. 8 comprises details, in perspective, of the perforating punch, its carrier bracket and a portion of the punch-bar. Fig. 9 is a view in perspective of the gear-latch. Fig. 10 represents one form of product effected by the present construction.

The present invention is herein shown and will be described as applied to a Singer sewing machine, but it is to be understood that it is not limited in its applicability, its mechanism being mounted and actuated independently of the sewing machine proper except as it may be connected with the prime member of its actuating mechanism, and in describing the present invention only such reference will be made to the usual well known parts of the sewing machine as is deemed necessary for a proper understanding of its application.

Referring to the figures, 1 represents the machine-base from which rises the standard 2 carrying the arm-bracket 3 into which is suitably journaled the main or driving shaft 4 carrying at its forward end the shaft-flange 5 operatively connected, by the needle-bar actuating link 6, with the needle-bar 7 provided with the needles, as 8, thus transmitting from said main-shaft stitch-forming movements to said needles, which latter co-operate with the loop-takers, as 9, to form stitches in a manner common to the art. 10 denotes a feed-dog actuated through common means (not shown) to advance the material to the action of said needles, 11 the commonly employed hand or band-wheel and 12 the arm-bracket face-plate provided with the usual thread-tensions, as 13, thread-controller 14 and thread-checks, as 15, one only of which is shown.

16 represents one form of commonly employed spring-depressed material-presser carrying bar broken away at its lower end and the material-presser element carried by said bar omitted to better illustrate the mounting of the perforating punch, said material-presser element being of common construction and may be the same as is employed in the present construction or of any other approved form common to sewing machines generally, of which there are many.

17 represents the feed-adjusting lever common to the present construction which, through commonly employed connections (not shown), acts upon the commonly employed feed-dog actuating mechanism to, at will, control the amplitude of feed movements of the feed-dog and 18 the needle-thread take-up common to the present machine and actuated through a follower 19 tracking a suitable cam-groove (not shown) formed in the shaft-flange 5.

Having made such reference to the elements comprising the feeding and stitch-forming mechanism as is deemed sufficient to an understanding of the application of the invention there will now be described the latter.

20 represents a bearing bracket secured by screws, as 21, passing through hollow lugs, as 22, and threaded into the bracket-arm 3 and to said bearing bracket is secured by

screws, as 23, the bearing lugs 24 and 25 into which is journaled the punch actuating shaft 26 onto which is suitably secured a gear-member 27 meshing with the gear-member 28 carried by the main-shaft 4, the ratio of said gear-members being such as to give to the gear 27 one rotation to three rotations of the main-shaft, the shaft 26 being held against endwise movement by the suitably secured collar 29 and the hub 30 of the gear 27.

31 represents a gear carrying sleeve slidably mounted on the shaft 26 to turn with the latter and onto said sleeve are suitably secured gear-members 32 and 33, the latter of greater diameter than the former. 34 denotes a bearing stud suitably secured in the bracket 35 secured by screws, as 36, to the bracket 20 and onto said stud is mounted to turn together the gear-members 37 and 38 of unlike diameters, thus at will, transmitting a greater or lesser speed to the gear 38, dependent upon whether the gear 33 is in mesh with the gear 38 or the gear 32 with that of gear 37, such adjustment of gear-members being effected by adjusting the sleeve 31 to bring into mesh the gears 32 and 37 or as illustrated in the figures. The sleeve is slidably secured to rotate with the shaft 26 by the spline 39 and held against accidental movement in the direction of its length by the set-screw 40, the lug 25 and suitably secured collar 41 acting to limit the oppositely directed adjustments of said sleeve. When it is desired to change the combination of the gear drive just referred to, the operator, by manual manipulation of the band-wheel, brings into alinement the groove 42, in the hub 43 of the gear 37, and the groove 44 formed in the bracket 35 when the latch 45′ is oscillated on its pivot-screw 46 to a position to seat the blade 47 of said latch in the alined grooves 42—44, thus locking the gears 37 and 38 against rotation while the sleeve 31 is shifted to bring into mesh the selected gear-member, after which the latch is returned to its normal position.

48 represents a punch actuating cam journaled on the main-shaft 4 and held against movement in the direction of the latter by the suitably secured block 49 and washer 50, at one side, and at its opposite side by the flanged collar 51 held by a suitable screw to turn the said main-shaft with its end of smallest diameter in contact with the gear-member 52 carried by the cam 48 in mesh with the gear-member 38 journaled on the stud 34, thus transmitting from said main-shaft, through the elements pointed out, rotary movements to said punch actuating cam, the driving and driven relationship of the gear-members for actuating the cam 48 is such that the latter is rotated in a direction opposite to that of said main-shaft.

53 represents a bracket suitably secured on the upper side of the bracket-arm and provided with a tubular head 54 into which is journaled a bearing stud 55 threaded into a bellcrank-lever, comprising the vertically and horizontally arranged arms 56 and 57 respectively, the free end 58 of the latter being seated in a circular bearing 59 formed in a block 60 movably mounted in a slot 61 formed in the punch carrying bar 62 and to the extreme upper end of the latter is fixed a bracket-arm 63 which, at its free end, carries oppositely arranged downwardly projecting lugs, as 64, embracing the arm 57 to hold said punch carrying bar against movement about its longitudinal axis.

64′ represents a stud-bolt journaled in the bearing stud 55 and having movements in the direction of its length in opposition to the resiliency of the spring 65 and to said stud-bolt is fixed, by nut 66 and screw 67, the latter shown in dotted lines only, Fig. 6, a cam-follower adjusting-yoke comprising the horizontal portion 68, handle 69 and the vertically arranged cam-follower adjusting-arm 70, the latter at its lower end having secured to it by nuts 71 a stud 72 carrying a cam-follower 73 tracking a groove 74 in the punch actuating cam 48. 75 denotes the material-presser carrying-bar lifting collar and 76 the lever acting on said collar to, at will, effect vertical movements of the bar 75 in opposition to the resiliency of the spring 77.

78 represents a perforating punch adjustably secured by screws, as 79, to a punch holding bracket 80 which, in turn, is adjustably secured by screw 81 to the lower end of the punch carrying bar 62, said punch being provided with a circular cutting edge 82 and with an opening 83 for the passage of the cut-out portions of the material, said opening terminating in a pocket 84 from which latter said cut-out portions are freed from the perforating operation. 85 denotes a throat or needle-plate provided with the feed-dog opening 86, needle openings, as 87, an anvil 88 secured by screw 89 against accidental movement and in position to receive the cutting edge of said punch.

As previously pointed out the fabric feeding and stitch-forming mechanism is of usual construction and enters into the present organized machine as means having conjoint action with the inventive features for effecting the present product.

Having set forth the details in construction the following relative adjustments and coöperation of parts will be readily understood.

Supposing the elements as occupying their coöperative positions, as in the figures, for effecting at a single operation the product represented by Fig. 10, the two plies of material 90 and 91 are advanced to the action of the needles and punch by means common to the present sewing machine construction

and the punch given its perforating movements by the cam 48 through the connections pointed out, but owing to the means employed for giving to said cam its rotary movements about the main-shaft 4 the perforations as 92 have a wider spacing than the successive stitch formation, the relative arrangement of said spacing being capable of control by the adjustments previously pointed out.

When it is desired to discontinue the perforating operation and continue the seam-formation, the operator moves the cam-follower adjusting-yoke, in opposition to the resiliency of the spring 65, in the direction indicated by the arrow *t*, Fig. 6, a distance sufficient to withdraw the cam-follower 73 out of engagement with the cam-groove 74 of the cam 48. Through the manipulation of the hand-lever 69 the yoke is rocked to a position to bring the stud-bolt 93 in line with the pin 95 secured in the bracket 53, when the resiliency of the spring 65 acts to seat the inner end of the bolt 93 against the free end of the pin 95, thus disconnecting the punch from its actuating mechanism and registering it out of possible engagement with the material being acted on, said stud-bolt being secured by a nut 94 in the arm 70 and passing freely through an opening (not shown) in the arm 56 of the bellcrank-lever and when it is desired to discontinue the seam-formation and continue the perforating operation the operator removes the needles 8.

In Fig. 10 the product is shown as comprising two plies, the perforations being effected in the upper ply only which leaves in the under ply impressions, as 96, it being understood that through the vertical adjustment of the punch relatively to its holder 80 perforations in single or multiple plies may be effected and in the latter any number less than the full number.

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

1. In a machine of the character described, the combination with a stitch-forming and a material feeding mechanism, of a perforating punch and means for actuating the latter to effect perforations in a number less than the full number of plies of material being acted on simultaneously with the seaming and feeding operations.

2. In a machine of the character described, the combination with a stitch-forming and a material feeding mechanism, of a perforating punch and means for actuating the latter to effect perforations in a number less than the full number of plies of material being acted on simultaneously with the seaming and feeding operations and means for discontinuing said perforating operation without suspending the seam formation.

3. In a machine of the character described, the combination with a stitch-forming and a material feeding mechanism, of a perforating punch and means for actuating the latter to effect perforations in the material being acted on simultaneously with the seaming and feeding operations, and means for varying the spacings of the successive perforations and means independent of the latter means for spacing the successive stitch-formations.

4. In a machine of the character described, the combination with a stitch-forming and a material feeding mechanism, of a perforating punch and means for actuating the latter to effect perforations in the material being acted on simultaneously with the seaming and feeding operations, and means for varying the spacings of the successive perforations with respect to given spacings of the successive stitch-formations.

5. In a machine of the character described, the combination with a stitch-forming and a material feeding mechanism, of a perforating punch and means for actuating the latter to effect perforations in the material being acted on simultaneously with the seaming and feeding operations, means for varying the spacings of the successive perforations with respect to given spacings of the successive stitch-formations and means for locking the punch actuating means against accidental movement when effecting the adjustments of said means for varying the amplitude of the spacings of said successive perforations.

6. In a machine of the character described, the combination with a stitch-forming and a material feeding mechanism, of a perforating punch and means for actuating the latter to effect perforations in the material being acted on simultaneously with the seaming and feeding operations, means for varying the spacings of the successive perforations and successive stitch-formations and means for locking the actuating mechanism of the organized machine against accidental movement when effecting the adjustments of said means for varying the spacings of the successive perforations and successive stitch-formations.

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

MAX LEON WATERMAN.

Witnesses:
STANLEY N. SMITH,
WM. A. SAUTTER.