No. 856,166. PATENTED JUNE 4, 1907.

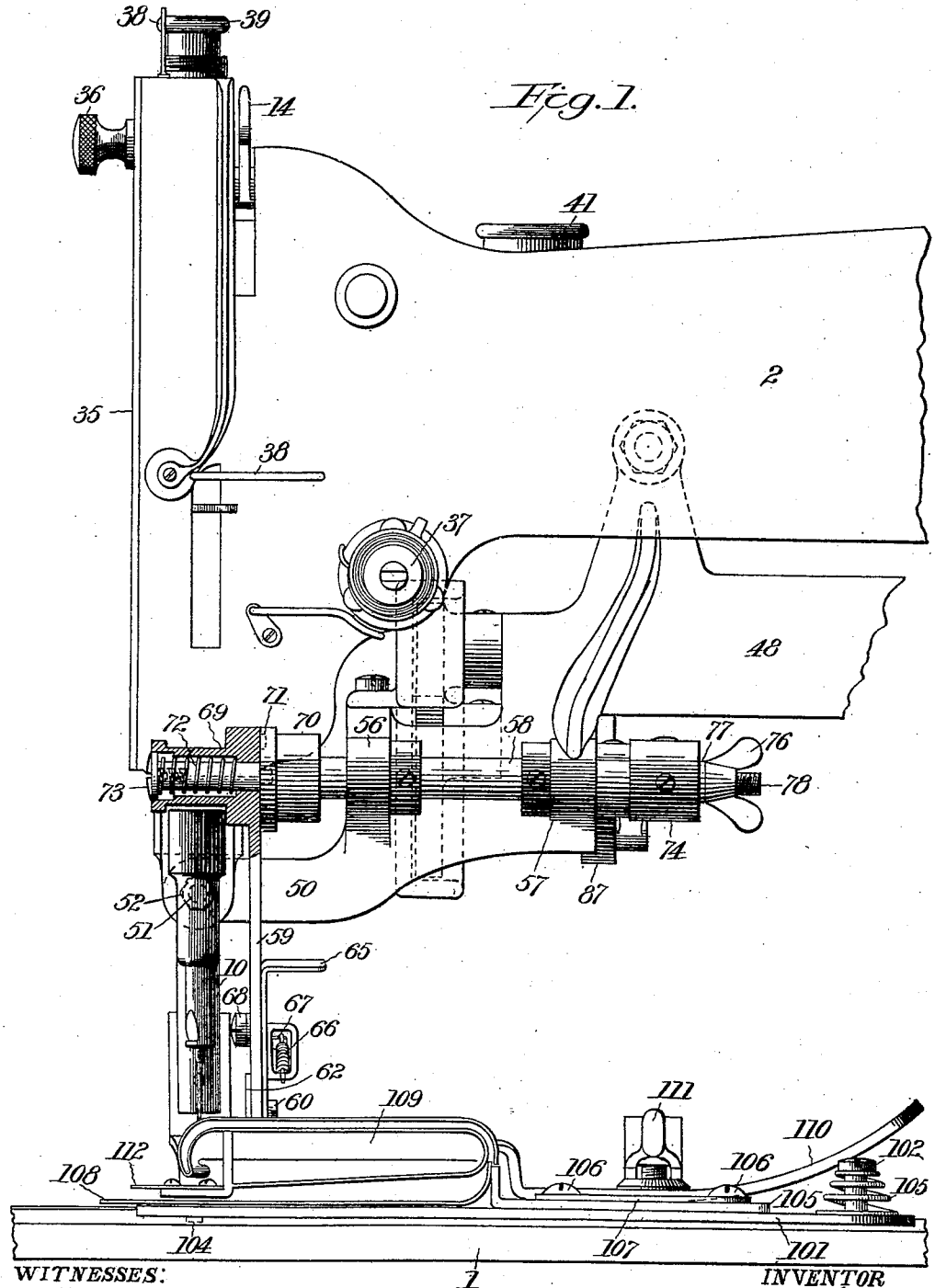
A. LAUBSCHER.

SEWING MACHINE FOR CIRCULAR HEMMING.

APPLICATION FILED JUNE 20, 1905.

5 SHEETS—SHEET 1.

Fig. 1.



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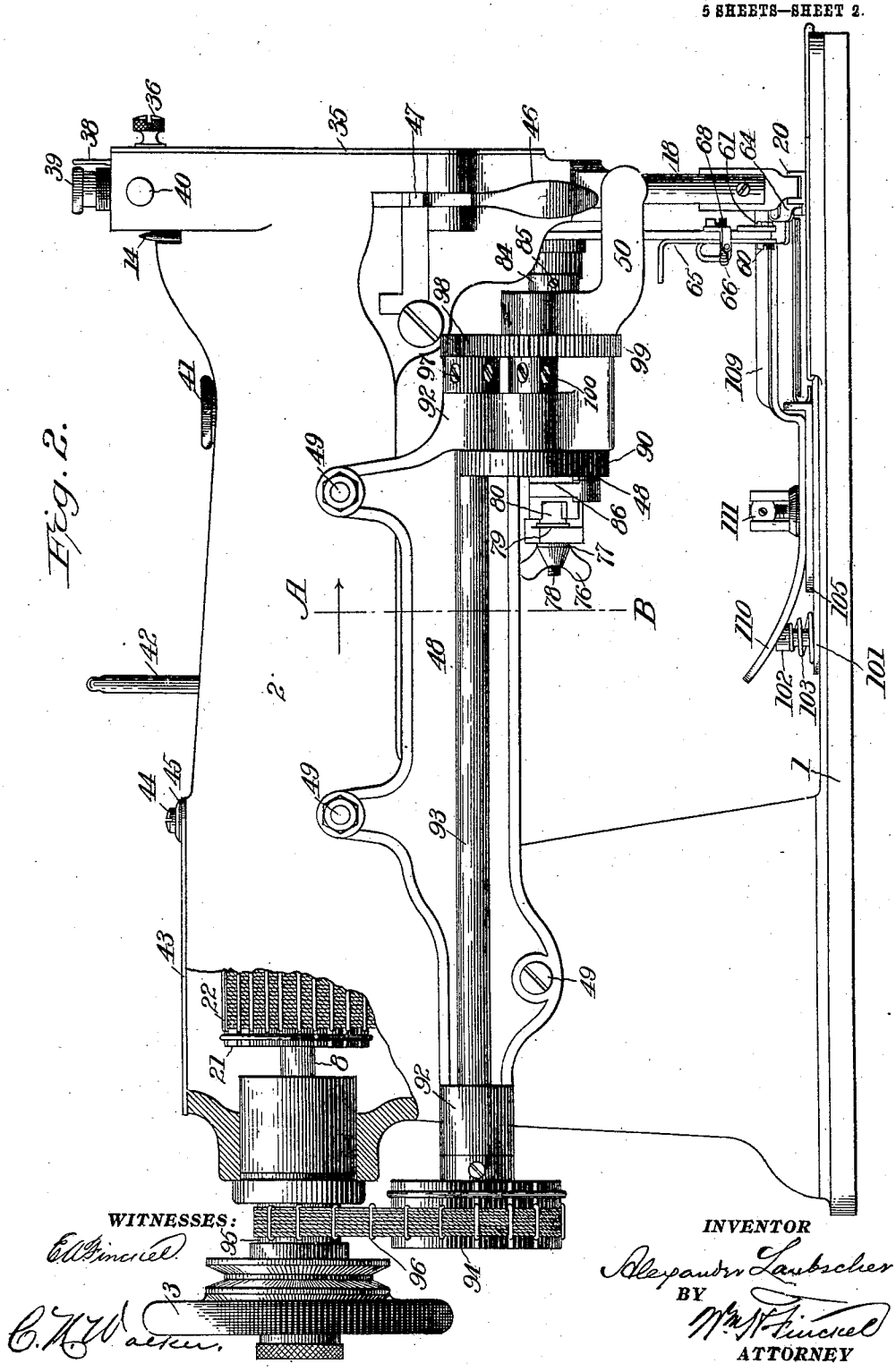
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5 SHEETS—SHEET 2.

Fig. 2.



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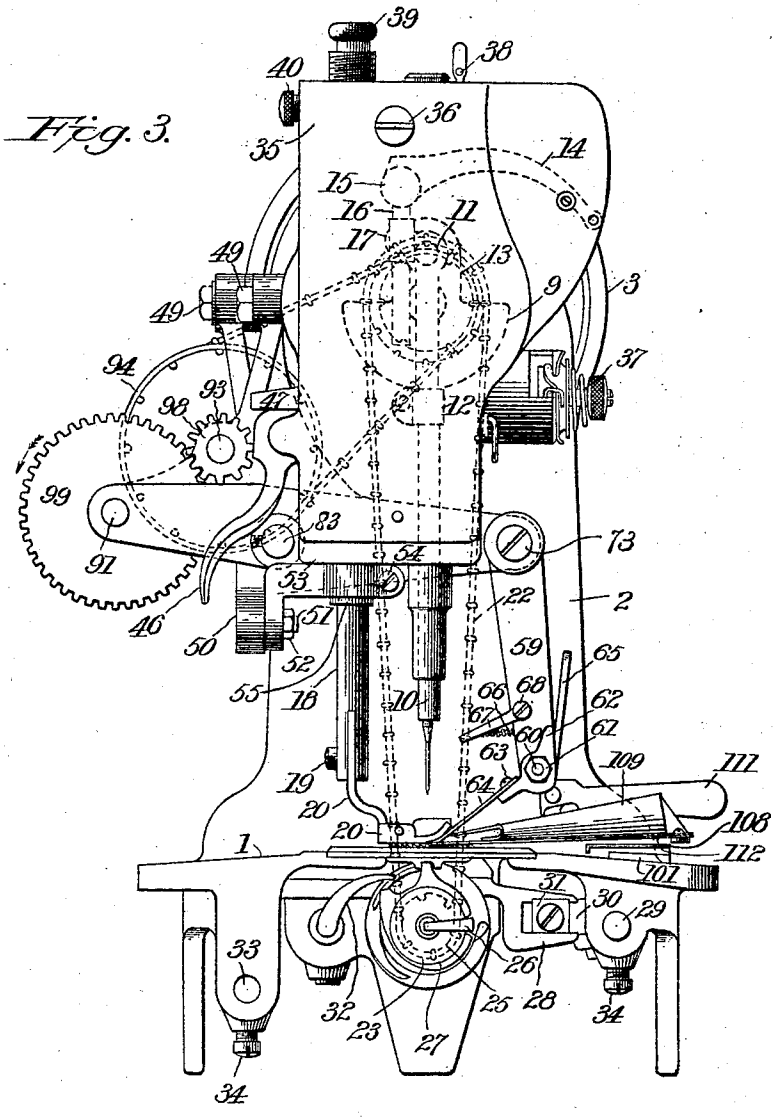
A. LAUBSCHER.

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5 SHEETS—SHEET 3.

Fig. 3.



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5 SHEETS—SHEET 4.

Fig. 4.

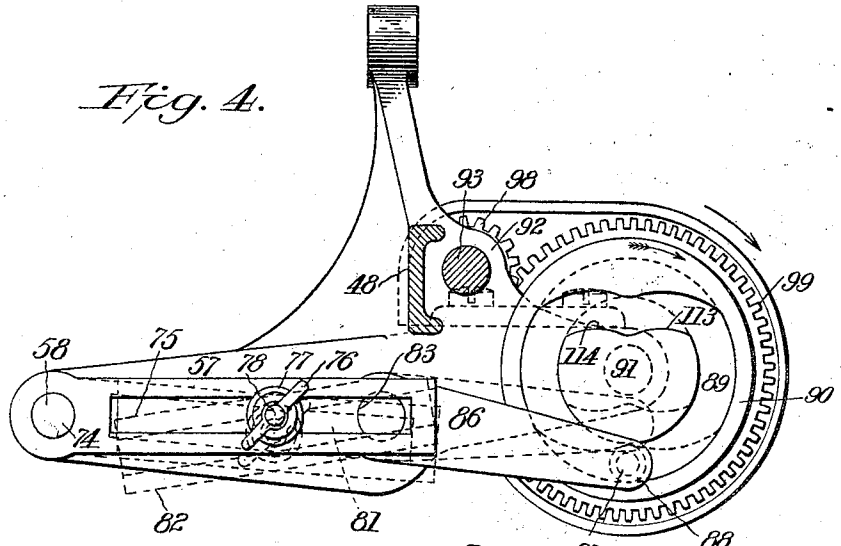
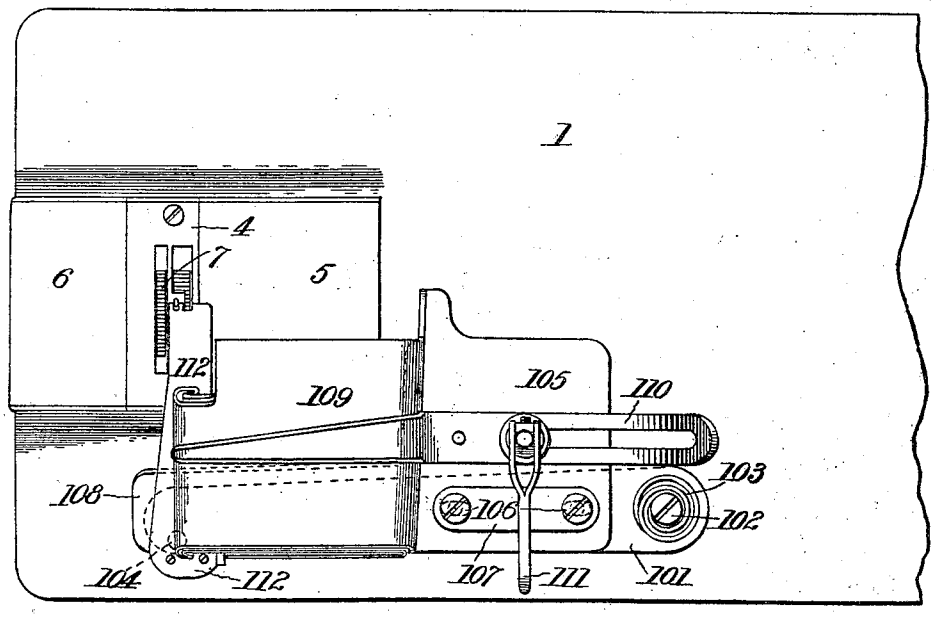


Fig. 5.



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5 SHEETS—SHEET 5.

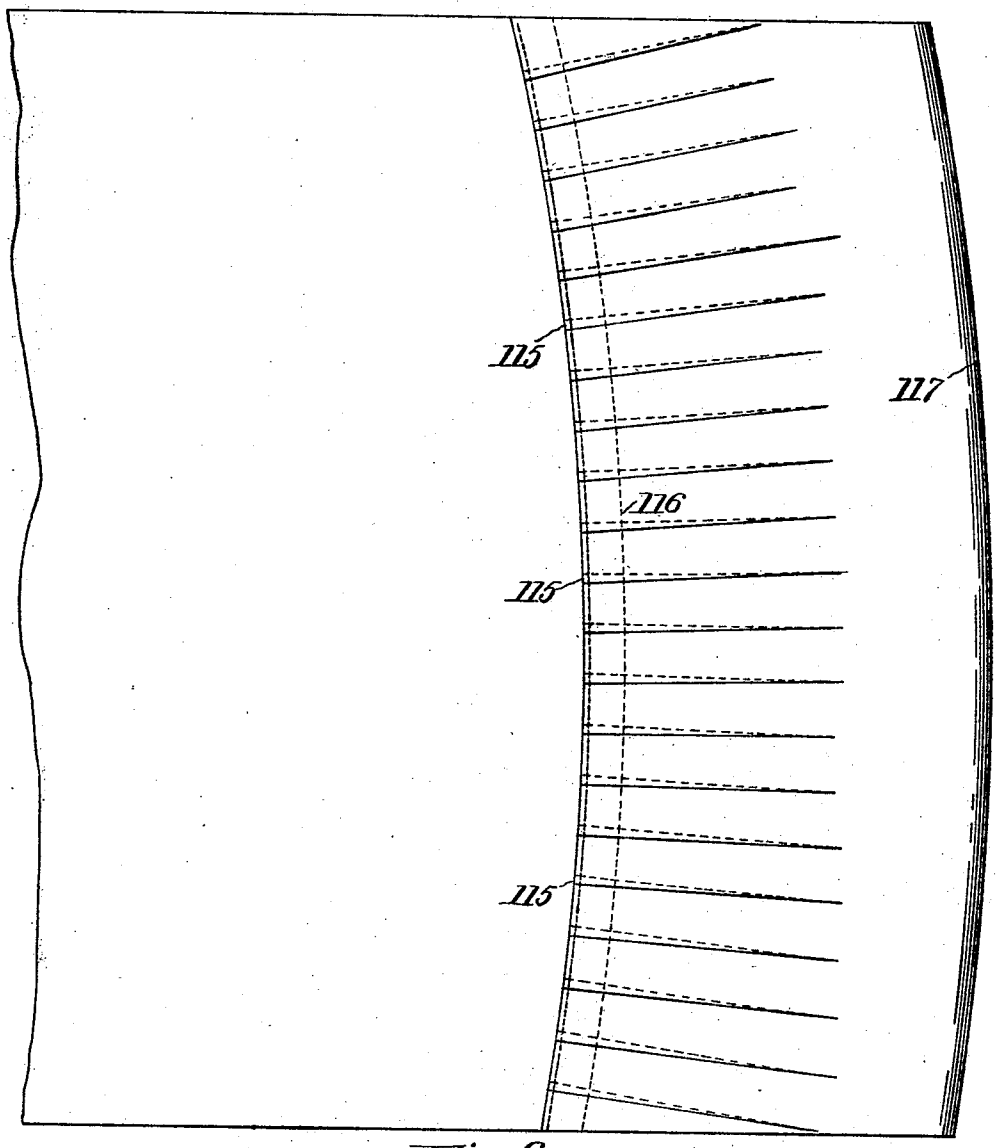


Fig. 6.

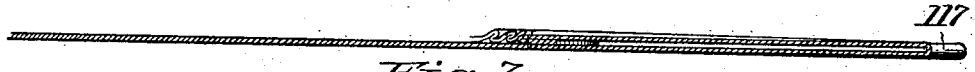


Fig. 7.

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UNITED STATES PATENT OFFICE.

ALEXANDER LAUBSCHER, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE FOR CIRCULAR HEMMING.

No. 856,166. Specification of Letters Patent. Patented June 4, 1907.

Application filed June 20, 1905. Serial No. 266,146.

To all whom it may concern:

Be it known that I, ALEXANDER LAUBSCHER, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented a certain new and useful Improvement in Sewing-Machines for Circular Hemming, of which the following is a full, clear, and exact description.

This invention relates to improvements in sewing machines for ruffling and hemming, and has for its object to provide automatic mechanism for effecting circular hemming.

In the manufacture of articles, such, for instance, as ladies' aprons, it is desirable to give to the bottom edge a circular shape and to finish such edge with a hem of from one to three inches in width. To do this it is necessary to make a gather in the hem fold at intervals, and the fullness or number of such gathers depends upon the width of the hem-fold and the radius of such circular portion. Prior to this invention it has been the common practice to form such gathers or folds by hand intervention. The present invention avoids the necessity of this manual operation, and the invention consists in so combining the relative action of the stitch-forming mechanism, hem-folder which is also hereinafter referred to as a "hemmer" and as a "hem-folding attachment," and the gatherer that the formation of the hem-fold and the placing of the required gathers is automatically accomplished, there being provided means for adjustably controlling the extent of movement of the crimping or gathering blade to meet the requirements of various radii and widths of hem-folds, all as will be described now, and finally claimed.

In the accompanying drawings, illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a front side elevation of a portion of the sewing machine, showing some parts in section. Fig. 2 is a rear side elevation. Fig. 3 is a front end elevation. Fig. 4 is a sectional view on the line A—B, Fig. 2, of the ruffler actuating mechanism. Fig. 5 is a plan view of a portion of the bed-plate, front and back slide-plates, throat-plate, feed-dog and the scroll-guide for forming the hem-fold. Fig. 6 is a plan view of the hem-fold. Fig. 7 is a cross-section of the hem-fold of Fig. 6.

The invention is herein shown and will be described as applied to the Wheeler & Wilson sewing machine commercially known as "High Speed, No. 61," but it is to be understood that the invention is not limited in its applicability, its mechanism being mounted and actuated independently of the sewing mechanism proper excepting as it may be connected with a common source of power.

1 is the bed-plate of the sewing machine, 2 the overhanging arm, 3 the band-wheel, 4 the throat-plate, 5 the back slide-plate, 6 the front slide-plate, 7 the feed-dog, 8 the needle-actuating shaft, and 9 the flange secured to the front end of the needle-actuating shaft and connected by stud 11, stud-collar 12 and link 13 with the needle-bar 10. 14 is the take-up fulcrumed by stud 15 to the overhanging arm and provided with an extension 16 which latter passes through a collar 17 on the link 13, through which link motion is transmitted to the take-up. 18 is a presser-bar to the lower end of which is secured by screw 19 the presser-foot 20. 21 is an index-pulley, secured to the needle-actuating shaft 8, which coacts with the driving-belt 22 for transmitting motion through index-pulley 23 secured to the lower or hook-driving shaft (not shown,) to the loop-taker 24. 25 is the bobbin-case mounted in loop-taker 24. 26 is a latch for holding the bobbin 27 in position in the bobbin-case 25. 28 is the feed-dog carrying-bar. 29 is a pintle-screw upon which one end of the feed-lift rock-shaft (not shown) is mounted. 30 is a lever secured to the feed-lift rock-shaft and provided with a block 31 which coacts with the feed-bar 28 to give, through suitable connections not shown, vertical movements to the feed-dog. 32 is a finger connected with the lower hook-driving shaft and at a predetermined time moved to coact with the bobbin-case to move it radially for the passage of the needle-thread around the bobbin. 33 is a pintle-screw upon which one end of the feed rock-shaft (not shown) is mounted, said rock-shaft, through suitable connections not shown, giving to the feed-dog its forward and backward movements for effecting the feed of the material. 34 are set-screws for controlling the adjustment of the pintle-screws 29 and 33. 35 is the face-plate secured by screw 36 to the front end of the overhanging

arm. 37 is the tension mechanism. 38 are thread leaders. 39 is an adjustable bearing for the upper end of the presser-bar. 40 is a set-screw for holding said adjustable bearing in position. 41 is the oil-well for oiling the front bearing of the needle-actuating shaft and, through suitable oil ducts, other parts operatively connected with said shaft. 42 is the spool wire. 43 is the arm-cap. 44 is the arm-cap screw, and 45 the arm-cap screw washer. 46 is the presser lifter-lever and 47 presser-bar lifter-collar. All of these several parts may be, as previously stated, constructed and combined as herein shown and described or otherwise.

Referring now to the parts more intimately connected with the improvement, 48 is a bracket secured by screws 49 to the overhanging arm 2 and provided with an extension 50, which latter is drilled out to embrace a steadying bolt 51, secured by nut 52, in a bracket 53, said bracket secured by pinch-screw 54 on the lower bearing 55 of the presser-bar. The bracket 48 is provided with two arms 56 and 57 which extend out toward the front of the machine, the free end of said arms being provided with bearings in which is mounted the crimping-blade rock-shaft 58, said rock-shaft being provided with an adjustably secured depending lever 59 to the lower end of which is pivoted by screw 60 and nut 61, a bracket lever 62 to which in turn is secured by one or more screws 63, the crimping-blade 64. A hand-lever 65 is formed on or applied to the bracket lever 62 and connected by a spring 66 with a bracket 67, which latter is secured by screw 68 to the depending lever 59, said spring and connection acting to hold the end of the crimping-blade in contact with the material. The upper end of the depending lever 59 is formed with a hub 69 into which the end of the rock-shaft 58 projects, and between the hub 69, and a collar 70 fast on the rock-shaft 58, is a clutch, such as a pin and socket connection 71, so that when the hub 69 is moved outward against the resiliency of a spring 72 located in the hub 69 and encircling the shaft 58, the clutch is separated, thus permitting the depending lever 59 and its attached crimping-blade to be swung upward and out of operative position, the spring encircling the rock-shaft 58 being resiliently held in opposition to the outward movement of the hub 69 by a screw 73 tapped into the end of the rock-shaft 58.

To the end of the rock-shaft 58 opposite to that upon which the depending lever 59 is mounted is secured a lever 74 provided with a slot 75 into which is adjustably secured, by a nut 76 and washer 77, a bolt 78, said bolt being provided with a collar 79 (Fig. 2,) which, in opposition to the tightening of the nut 76, secures the bolt in the desired position. The inner end of the bolt is provided with a slide-block 80 which enters a slot 81 in a lever 82, which lever is secured to a rock-shaft 83 mounted in a bearing formed in the bracket 48, said bracket located parallel with the bearings of the rock-shaft 58, the rock-shaft 83 being provided at its opposite end with a collar 84 and set-screw 85 for preventing its endwise movement. The lever 82 is formed or provided with a lever 86, which at its free end is provided with a roller-stud 87 and roller 88 tracking in a groove 89 formed in a controller-cam 90, secured on a shaft 91, said shaft being mounted in bearings formed in the bracket 48 and parallel with the shafts 58 and 83.

Mounted in bearings 92 on the bracket 48, is an intermediate shaft 93, the rear end of which is connected by pulleys 94 and 95 and belt 96 to the needle-actuating shaft 8, the proportionate diameter of said pulleys being as two to one, thus giving to the shaft 93 one revolution to two of the needle-actuating shaft 8. To the opposite or forward end of the intermediate shaft 93 is secured by screws 97 a gear 98 which meshes with a gear 99 secured by screws 100 to the end of the shaft 91 opposite to that upon which the controller cam 90 is secured.

The diameters of the two gears 98 and 99 are of the proportion of three to one, thus giving to the gear-wheel 99 and controller cam 90 one revolution to three revolutions of the shaft 93, and as the shaft 93 has one revolution to two revolutions of the needle-actuating shaft 8, it follows that the gear 99 and cam 90 make one rotation to six rotations of the needle-actuating shaft.

101 is a base-plate pivotally mounted by screw 102 and spring 103 upon the bed-plate 1 of the sewing machine and held in operative position by a pin 104, which enters a suitable hole in the bed-plate 1. 105 is a plate adjustably secured to the base-plate 101 by screws 106, and washer 107, said screws passing through slots in said plate 105 and engaging the base-plate 101. The plate 105 is provided with a blade 108 which acts upon the underside of the material to assist in preventing the material from becoming wrinkled as it is fed to the action of the stitch-forming mechanism.

109 is a hemmer, hem-folder or hem-folding attachment, having a scroll portion, Fig. 1, provided with a laterally extended lever-handle 110 which is longitudinally slotted, Fig. 5. This lever-handle is secured in place by a screw-post fast on the plate 105 and projecting through the slot in the lever-handle, Figs. 1, 2 and 5. On the screw-post is pivoted a cam-lever 111, the cam end of which bears upon a washer, Fig. 5, interposed between it and the lever-handle. When the cam-lever is released, the lever-handle may be depressed and thereby the scroll portion will be raised and can be swung toward the

operator. The attachment is provided with a blade 112, herein designated a "separator," secured at one end to a projection from the scroll-portion and having a free end extending toward the needle beneath the scroll-portion, and this scroll-portion is cut away, Fig. 5, above the separator in the neighborhood of the needle so as to bare the separator to the action of the crimping blade 64 for forming ruffles or plaits alternately with a predetermined number of stitches.

The operation is as follows: The material being positioned in the hem-folder for the action of the stitch-forming mechanism, the machine is started. During the formation of the first four stitches the roller 88 will travel the concentric portion of the controller cam groove 89, thus holding the levers 86 and 74 and consequently the crimping-blade 64, inactive, but during the formation of the fifth stitch the roller 88 will travel the eccentric portion 113 of the cam groove 89, causing the levers 82 and 74 through the adjustable connection comprising the parts 76 to 80 inclusive, to be rocked downward thus through the connections 58 and 59 moving the crimping-blade backward or away from the needle and as the sixth stitch is formed the roller 88 will travel the eccentric portion 114 of the cam groove 89, thus giving to the crimping-blade through the several connections a movement forward or toward the needle, thus forming the plait or fold alternately with every sixth stitch. Referring to Fig. 6, the individual plaits or folds 115 are overlapped a distance sufficient to meet the requirements of the difference in radius of the seam 116 relatively to the edge of the material 117, and this change in size of plait is effected by the adjustment of the connection comprising the parts 76 to 80, inclusive. The adjustment of the connection comprising the parts 76 to 80 inclusive, toward the axis of the shaft 83 will lessen the throw of the crimping-blade 64, and the adjustment of such connection toward the axis of rock-shaft 58 will effect an increased throw of said crimping-blade, thus enabling the operator to control the size of the plait. Any other number of stitches than six may be the standard governing the formation of the plaits, but it has been found that the described operation gives satisfactory results in general practice.

What I claim is:—

1. In a sewing machine for circular hemming, the combination of stitch-forming and cloth-feeding mechanisms, a hem-folder having upper and lower cloth-guiding portions, a crimping-blade and a separator, said separator located between the upper and lower cloth-guiding portions of said hem-folder, and connections between said crimping-blade and stitch-forming mechanism for forming plaits in the hem-fold at predetermined intervals separated by a multiple of stitches.

2. In a sewing machine for circular hemming, stitch-forming mechanism, including a needle-actuating shaft, a cloth-feeding mechanism, a hem-folder having upper and lower cloth-guiding portions, and a ruffling mechanism having a separator arranged between the upper and lower cloth-guiding portions of the hem-folder, and a crimping-blade arranged to work over and upon the separator combined with horizontally mounted rock-shafts, levers projecting radially from said rock-shafts, means for adjustably coupling said levers between their ends, and a cam and connections for driving said cam from the needle-actuating shaft.

3. In a sewing machine for circular hemming, the combination of a needle-actuating shaft, a cam, a cam-shaft, and means connecting said needle-actuating shaft and cam-shaft for actuating said cam, a crimping-blade and coacting separator, said crimping-blade, through suitable connections, controlled by said cam to effect a fold of the material at predetermined intervals in the stitching intermediate certain multiples of stitches, and a hemmer adjustably secured to the sewing machine bed-plate for presenting the hem-fold to the action of the stitch-forming mechanism and having an upper and a lower cloth-guiding portion between which the separator is arranged.

4. In a sewing machine for circular hemming, the combination of a stitch-forming mechanism including a needle-actuating shaft, a cloth-feeding mechanism, a hemmer, a crimping-blade, a depending lever to which said crimping-blade is secured, a rock-shaft on which said lever is adjustably secured and which rock-shaft is provided with a projecting lever, a second parallel rock-shaft provided with a projecting lever, an adjustable coupling for said projecting levers, a cam, with which the second projecting lever is connected for controlling the action and inaction of said crimping-blade, and connections between said cam and the needle-actuating shaft comprising a cam-shaft and an intermediate shaft for effecting rotary movements of said cam.

5. In a sewing machine for circular hemming, the combination of a stitch-forming mechanism including a needle-actuating shaft, a cloth-feeding mechanism, a hemmer, a ruffling mechanism including radially projecting levers adjustably connected between their ends, a crimping-blade and connections including a rock-shaft for connecting said crimping-blade and projecting levers, a cam-shaft, a cam connected with said projecting levers for effecting movements of said levers at predetermined intervals, an intermediate

shaft, and connections for coupling said intermediate shaft with its driving needle-actuating shaft and driven cam-shaft.

6. In a sewing machine for circular hemming, stitch-forming and cloth-feeding mechanisms, a hemmer having upper and lower cloth-guiding portions, and a ruffling mechanism including a crimping-blade, and a separator lying between the upper and lower cloth-guiding portions of the hemmer, said ruffling mechanism having means, including adjustably coupled levers, for controlling the width of the plaits or gathers formed thereby, and means, including a cam, for effecting the operation of the ruffling mechanism for the formation in the hem-fold of single plaits or folds at predetermined intervals.

7. In a sewing machine for circular hemming, the combination of stitch-forming and cloth-feeding mechanisms, a hemmer having upper and lower cloth-guiding portions, a separator lying between the cloth-guiding portions of the hemmer, a crimping-blade, and connections between said crimping-blade and stitch-forming mechanism for forming plaits in the hem-fold at predetermined intervals.

In testimony whereof I have hereunto set my hand this 19th day of June A. D. 1905.

ALEXANDER LAUBSCHER.

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