A. RONTKE.

SEWING MACHINE.

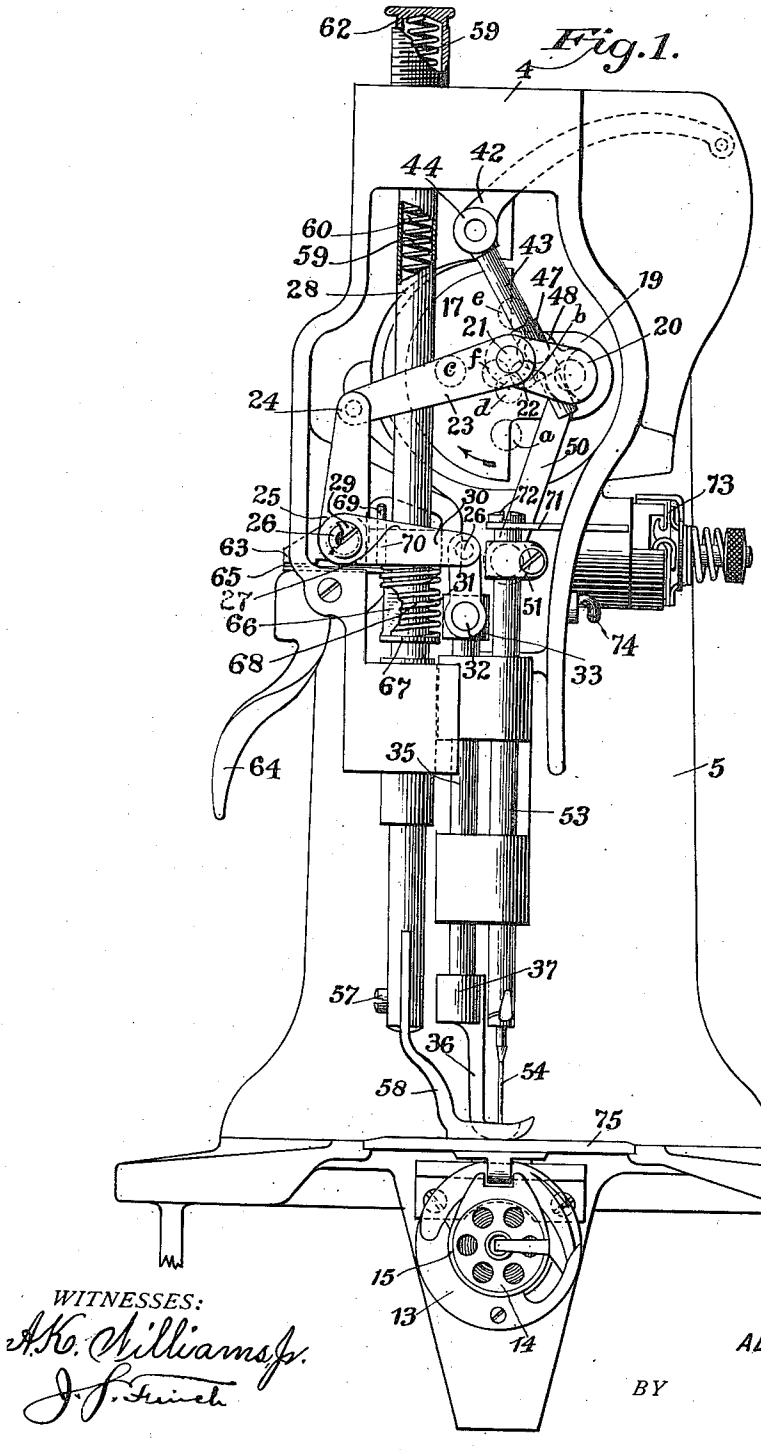
APPLICATION FILED OCT. 13, 1908.

989,538.

Patented Apr. 11, 1911.

3 SHEETS—SHEET 1.

Fig. 1.



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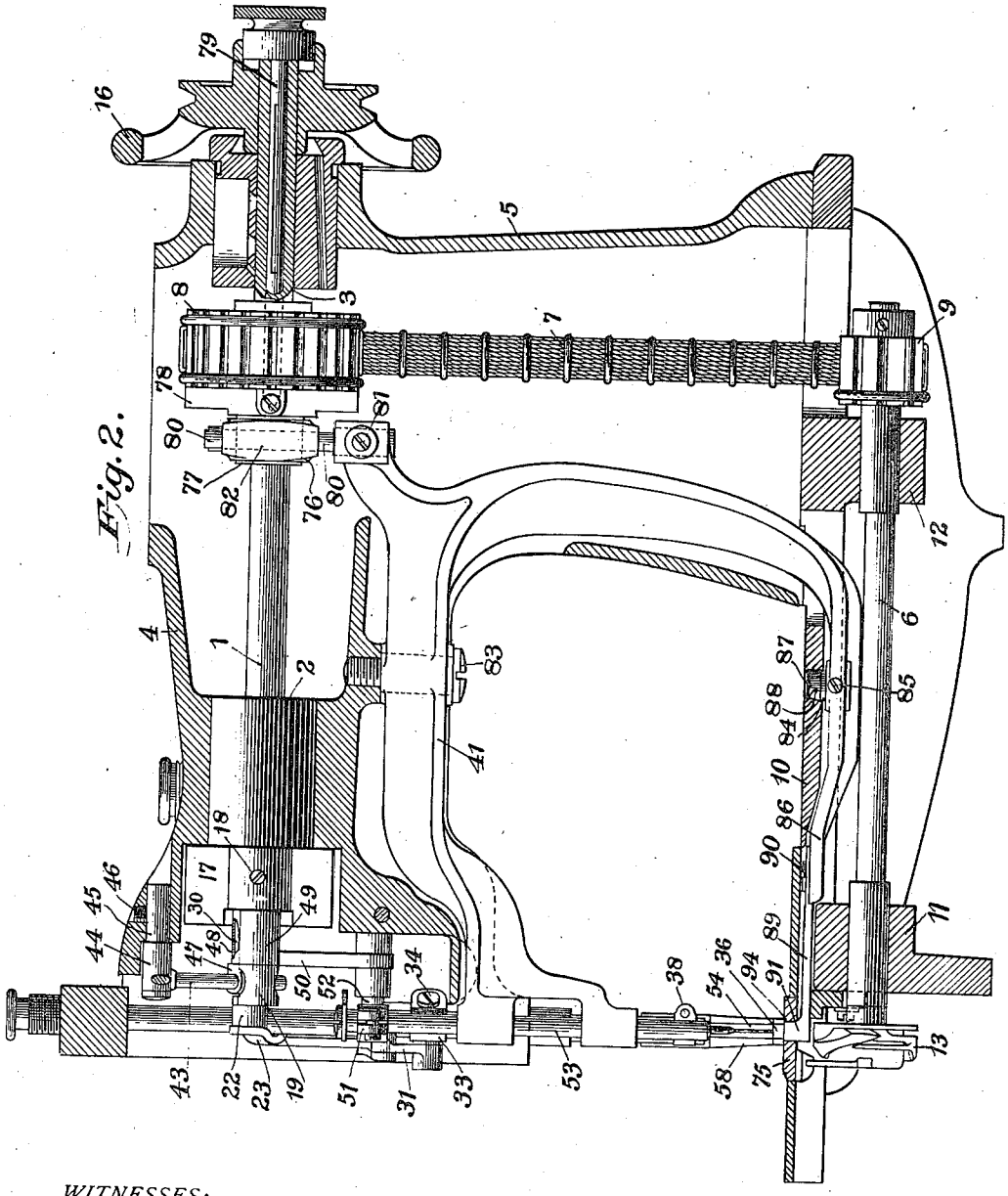
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 4.

Fig. 3.

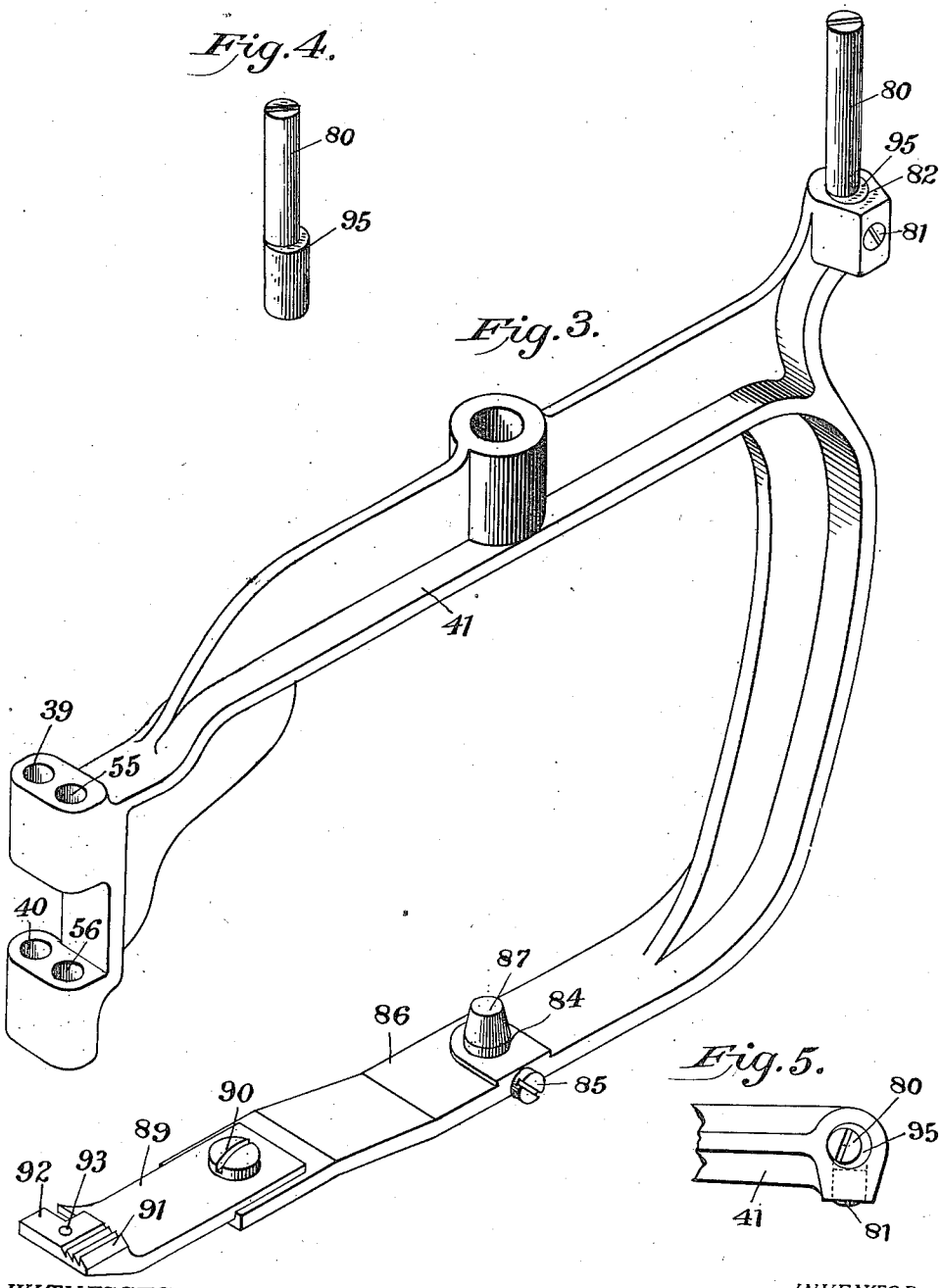

Fig. 5.

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SEWING-MACHINE.

989,538. Specification of Letters Patent. Patented Apr. 11, 1911.

Application filed October 13, 1908. Serial No. 457,557.

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 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 and has to do more particularly with the means employed for advancing the material to the action of the stitch-forming mechanism, the main object being to so synchronize the feed movements of the needle and feed-dog as to positively insure a uniform step-by-step advancement of the superposed plies of material being stitched.

Another object of the invention is to provide means for controlling the feed movements of the material either in a right line or in a curvilinear direction to the right or left of said right line.

The invention also consists in the matters hereinafter described and referred to in the appended claims.

Referring to the accompanying drawings, in the several figures of which like parts are similarly designated, Figure 1 is a view in front end elevation of a sewing machine equipped with my improved mechanism; Fig. 2, a view in front side elevation, partially in section and partially in full lines, of the mechanism shown in Fig. 1; Fig. 3, a view in perspective of the oscillating feed-actuating frame; Fig. 4, a view in perspective of the pin for connecting the feed eccentric strap with the oscillating feed-actuating frame; and Fig. 5 a plan view of the feed-actuating pin and that portion of the oscillating feed-actuating frame in which the pin is mounted, said pin being shown as adjusted to a position at right angles to that shown in Fig. 3.

In describing my improvements, only such limited reference will be made to the usual well-known parts of the sewing machine as is deemed necessary for a proper understanding of the invention.

In the particular type of sewing machine herein referred to, the upper or needle-bar-actuating shaft 1 is journaled within the usual bearings 2 and 3 located in the overhanging arm 4 and arm standard 5, respectively, and is connected with the lower or hook-driving shaft 6 by an endless belt 7 adapted to engage pulleys 8 and 9 fast on said respective shafts, and as said pulleys are of the ratio of two to one the hook-driving shaft is thereby given two revolutions to one revolution of the needle-bar-actuating shaft.

10 is the sewing machine bed-plate; 11 and 12, suitable lugs depending from said bed-plate and in which the shaft 6 is journaled; 13, the loop-taker carried by the shaft 6; 14, the bobbin; 15, the bobbin-case and 16 the band wheel secured upon the shaft 1.

The forward end of the shaft 1 is provided with a flange 17 in which is secured, by a screw 18, one member 19 of the crank 20, the opposite member 21 of said crank being journaled in a bearing 22 formed in the presser-lifting lever link 23 which, in turn, is pivotally attached to the upper end 24 of the bell crank presser-lifting lever 25. The lever 25 is fulcrumed upon a stud 26 forming a part of the presser-bar-lifting collar 27, which latter is adjustably secured, by the commonly-employed pinch joint (not shown) upon the cloth-presser bar 28, said lever being restrained against movement lengthwise of the stud 26 by a screw 29. The opposite end of the lever 25 is pivotally connected with the step-feeding foot link 31, the lower end of which latter is pivotally mounted upon the stud 32 forming a part of the step-feeding foot collar 33 which in turn is secured by pinch screw 34 upon the step-feeding-foot-carrying bar 35 mounted in suitable bearings 39 and 40 formed in the oscillating feed-actuating frame 41. The step-feeding foot 36 forms an integral part of the collar 37 which is secured by a pinch screw 38 to the bar 35.

The needle thread take-up is of the usual form of construction, and comprises the thread take-up arm 42, operating arm 43 and tubular bearing 44, which latter is mounted upon a stud 45 secured by screw 46 in the head of the overhanging arm 4. The operating arm 43 passes through a suitable opening in the enlarged head 47 of the stud 30. The stud 30 is mounted to oscillate in a tubular bearing 48 formed integral with the tubular bearing 49 and needle-bar-connecting link 50, the bearing 49 being mounted to turn on the member 19. The link 50 is

connected by a pinch collar 51 and stud 52 with the needle-carrying bar 53 carrying the needle 54, said needle-carrying bar being mounted in suitable bearings 55 and 56 formed in the upper free end of the oscillating feed-actuating frame 41.

To the lower end of the cloth-presser bar 28 is secured by screw 57 the reciprocating cloth-presser 58, which latter is resiliently held in its depressed position by a spring 59 mounted in the tubular portion 60 of said bar, the upper end of the spring 59 abutting against the inner wall 61 of the adjusting screw 62.

Beneath the presser-lifting lug 63 formed integral with the collar 27, and immediately above the presser-lifting lever 64, is positioned a wearing plate 65 provided with a downwardly extending portion 66 and step 67, the latter encircling the bar 28 and being acted upon by a spring 68 to hold said plate in its depressed position except when acted upon by the presser-lifting lever 64. A pin 69 riveted in the plate 65 and passing through an opening 70 formed in the collar 27 serves to hold the opening in the step 67 in alinement with the bar 28.

71 is a thread controller secured to the upper end of the needle-carrying bar 53 by screw 72; 73, the needle thread tension; 74, the thread guide and 75 the throat-plate, each of which is constructed and arranged in a manner common to sewing machines of the class herein described.

Referring to the means employed for giving to the frame 41 its oscillating movements, 76 is a feed eccentric strap encircling the feed eccentric 77, which latter is adjustably secured to the disk 78 forming a part of the belt-driving pulley 8. The mounting of the eccentric 77 and its adjustment by the rod 79 is substantially the same as that pointed out in U. S. Patent No. 718,988, May 27, 1903, to W. F. Dial *et al.;* accordingly, it is not deemed essential to herein further describe such form of construction and manner of adjustment.

80 is the oscillating frame driving pin, the lower end of which is secured by screw 81 in the frame 41, its upper end passing through an opening 82 formed in the eccentric strap 76. The frame 41 is mounted to oscillate upon oppositely arranged pivotal bearings comprising the fulcrum stud 83 and pivot pin 84, the former being threaded into the overhanging arm and the latter secured by screw 85 in the arm 86 of said frame, the tapered portion 87 of the pin 84 entering an opening 88 of like shape formed in the bed-plate 10.

89 is a frame extension secured by screw 90 to the arm 86 and provided at its free end with a raised serrated portion 91 termed the "feed-dog" and also with an integral portion 92 provided with an opening 93 for the passage of the needle, said portions 91 and 92 tracking in a suitable slot 94 formed in the throat-plate 75, it being understood that the frame 41 and parts rigidly secured thereto are movable in opposite directions in a given plane only.

In the present embodiment of my invention, the vertical axis of the fulcrum stud 83 and pivot pin 84 intersects the horizontal axis of the hook-driving shaft 6, and the connections for operatively connecting shaft 1 with the frame 41 are so arranged that when the eccentric portion 95 of the pin 80 is adjusted from the position shown in Fig. 3 to that shown in Fig. 5, the oscillating movements of the needle will extend an equal distance on opposite sides of the horizontal axis of said shaft, such adjustment of the eccentric portion 95 being the most desirable when the material to be stitched is manually guided, and for the reason that the feed movements of the needle then approach nearest a right line, or a line of feed such as is effected by the commonly-employed "four-motion feed".

When edge stitching collars, cuffs, bands, etc., in connection with the commonly-employed edge guides, it is desirable that the material be advanced in a manner to influence the edge thereof to travel against the guide without manual assistance, and to effect such result is the purpose of the eccentric portion 95 of the pin 80.

The adjustment of the eccentric portion 95 as illustrated in Fig. 3 would cause the feed movements of the needle to be positioned slightly back of the horizontal axis of the shaft 6, so that when employing an edge guide at the right of the seam the step-feed movements of the needle would be slightly to the right of a right line of feed, thus causing the material to be slightly inclined toward said edge guide. Should the eccentric portion 95 be adjusted to a position opposite to that shown in Fig. 3, it will be readily understood that the feed movements of the needle would be positioned slightly forward or on the opposite side of the horizontal axis of the shaft 6, thus causing the material to be inclined slightly to the left of a right line of feed.

As the oscillating movements of the frame 41 are controlled by an eccentric, and as the needle and feed-dog are both employed for effecting the feed of the material, it follows that the oscillating movements for effecting such feed occur during the time that the needle is in the material and that the reverse movements occur after the needle has been withdrawn; accordingly, no further reference will be made to the oscillating movements of the needle and feed-dog in describing the movements of the parts for effecting the intermittent vertical movements of the cloth-presser 58 and step-feeding foot 36.

In Figs. 1 and 2 the needle 54 is shown as about to pierce the material in its downward movement, the cloth-presser 58 and step-feeding foot 36 are down upon the material and the frame 41 is in its retracted position ready to effect a feed movement, when the further movement of the shaft 1 for one-quarter of its rotation causes the crank member 19 to be advanced to the position indicated by dotted circle *a*, and the crank member 21 to the position indicated by dotted circle *b*, it being observed that the axis of said member 21 is slightly eccentric to the axis of the shaft 1; and through such movement of the parts 19 and 21, the oscillating bell crank presser-lifting lever 25 will be slightly rocked upon its fulcrum 26, the step-feeding foot at such time being down upon the material, and owing to said lever 25 being attached to the presser-bar, through the connections previously pointed out, the reciprocating cloth-presser will be lifted above the material and the needle moved to the limit of its downward stroke. During the second quarter-rotation of the shaft 1, the crank members 19 and 21 will be advanced to the positions indicated by dotted circles *c* and *d*, respectively, the movement of such members causing the cloth-presser 58 to be positioned back upon the material and the needle to be elevated slightly above the same. The third quarter-rotation of the shaft 1 will cause the crank members 19 and 21 to move to the positions indicated by dotted circles *e* and *f*, respectively, such movement causing the step-feeding foot 36 to be elevated and the needle to be carried slightly by its limit of upward stroke. The fourth quarter-rotation of the shaft 1 to its starting position will return the several parts above referred to to the positions which they occupy in Figs. 1 and 2.

By reference to Fig. 2 it will be seen that the step-feeding foot 36 is in direct vertical alinement with the raised portion comprising the feed-dog 91 and integral part 92, and as the step-feeding-foot-carrying bar 35 is mounted in the oscillating frame 41, a positive synchronous movement of the cloth-feeding members is produced under all conditions of feed adjustment.

What I claim is:—

1. In a sewing machine, stitch-forming and cloth-feeding mechanism including an oscillating feed-actuating frame of rigid construction and having free ends, one of which latter is provided with a needle bar carrying an eye-pointed needle and its opposite end with a rigidly secured feed-dog, said feed-dog having movements in opposite directions in the same plane and of the same amplitude as the oscillating movements of said needle-bar.

2. In a sewing machine, stitch-forming and cloth-feeding mechanism including an oscillating feed-actuating frame of rigid construction and having free ends, one of which latter is provided with a needle bar carrying an eye-pointed needle and its opposite end with a rigidly secured feed-dog, said feed-dog having movements in opposite directions in the same plane and of the same amplitude as the oscillating movements of said needle-bar, in combination with means, including an eccentric operatively connected with the actuating mechanism of the sewing machine, for giving to said frame and parts carried by it oscillating movements.

3. In a sewing machine, stitch-forming and cloth-feeding mechanism including an oscillating feed-actuating frame of rigid construction and having vertically-arranged free ends, the upper free end of said frame being provided with a needle-carrying bar and its opposite end with a rigidly secured feed-dog, said feed-dog having oscillating movements in the same horizontal plane and of the same amplitude as the oscillating movements of said needle-bar.

4. In a sewing machine, stitch-forming and cloth-feeding mechanism including a needle, a step-feeding foot and an oscillating feed-actuating frame of rigid construction having free ends, one of which latter carries a rigidly secured feed-dog having oscillating movements in a given horizontal plane, the opposite free end of said frame being provided with suitable carrying bars for transmitting reciprocating movements to said needle and step-feeding foot, substantially as described.

5. In a sewing machine, stitch-forming and cloth-feeding mechanism including a needle bar carrying an eye-pointed needle, a needle-bar-actuating shaft, a step-feeding foot, a step-feeding-foot-carrying bar connected by a link with its actuating mechanism, and an oscillating feed-actuating frame of rigid construction and having free ends, one of which latter carries a rigidly secured feed-dog having oscillating movements in a given plane and of the same amplitude as the oscillating movements of said needle-bar, the opposite free end of said frame being provided with suitable bearings in which are mounted to move vertically said needle-carrying bar and step-feeding-foot-carrying bar, in combination with an eccentric carried by said needle-bar-actuating shaft and operatively connected with said frame.

6. In a sewing machine, stitch-forming and cloth-feeding mechanism including an oscillating feed-actuating frame of rigid construction and having free ends, one of which latter is provided with a needle bar carrying an eye-pointed needle, and its opposite end with a rigidly secured feed-dog having movements in opposite directions in the same plane and of the same amplitude as

the oscillating movements of said needle-bar, and means, including an adjustable connection, between said frame and the actuating mechanism of the sewing machine for varying the field of oscillation of said needle-carrying bar and feed-dog, substantially as described.

7. In a sewing machine, stitch-forming and cloth-feeding mechanism including an oscillating feed-actuating frame of rigid construction and having free ends, one of which latter is provided with a needle bar carrying an eye-pointed needle, and its opposite end with a rigidly secured feed-dog having movements in opposite directions in the same plane and of the same amplitude as the oscillating movements of said needle-bar, and means, including an adjustable eccentric, between said frame and the actuating mechanism of the sewing machine for varying the amplitude of vibration of said needle-carrying bar and feed-dog, substantially as described.

8. In a sewing machine, stitch-forming and cloth-feeding mechanism including a needle-bar-actuating shaft and an oscillating feed-actuating frame of rigid construction and having free ends, one of which latter is provided with a needle-carrying bar, and its opposite end with a rigidly secured feed-dog having movements in opposite directions in the same plane, and connections between said frame and said needle-bar-actuating shaft comprising an adjustable eccentric, an eccentric strap encircling said eccentric, and an eccentric pin for operatively connecting said strap with said frame whereby the degree of feed movement is adjusted and the field of oscillation of said needle-carrying bar and feed-dog varied.

9. In a sewing machine, stitch-forming and cloth-feeding mechanism including a needle-bar-driving shaft, a loop-taker-driving shaft and an oscillating feed-actuating frame of rigid construction and carrying a rigidly secured feed-dog and a reciprocating needle-carrying bar, said frame being mounted to oscillate upon oppositely arranged pivotal bearings the vertical axis of which latter intersects the horizontal axis of said loop-taker-driving shaft, in combination with means, including a feed eccentric, for transmitting movements from the actuating mechanism of the sewing machine to said oscillating frame, substantially as described.

10. In a sewing machine, stitch-forming and cloth-feeding mechanism including the following instrumentalities: a needle-bar-driving shaft, a loop-taker-driving shaft, an oscillating feed-actuating frame of rigid construction and carrying a rigidly secured feed-dog and a reciprocating needle-bar, said frame being mounted to oscillate upon oppositely arranged pivotal bearings located one above and the other below the plane of travel of the material acted upon, an eccentric so mounted as to be capable of adjustment relatively to the axis of said needle-bar-driving shaft, a strap encircling said eccentric, an adjustably mounted pin for operatively connecting said strap with said frame, said pin being provided with an eccentric portion whereby the feed-dog and needle-carrying bar may be adjusted to different fields of oscillation, a step-feeding-foot-carrying bar mounted to move vertically in and oscillate bodily with said feeding frame, and a reciprocating cloth-presser bar mounted in suitable bearings in the head of the overhanging arm and provided with a cloth-presser, said presser-bar being automatically controlled to raise the cloth-presser from the material during the feed movements of the needle and feed-dog, substantially as described.

11. In a sewing machine, stitch-forming and cloth-feeding mechanism including an oscillating feed-actuating frame of rigid construction and having free ends, one of which latter is provided with a needle-bar carrying an eye-pointed needle, and its opposite end with a rigidly secured feed-dog having movements in opposite directions in the same plane and of the same amplitude as the oscillating movements of said needle-bar, and adjusting means in operative relationship with said frame for varying the field of oscillation of said needle-carrying bar and feed-dog, substantially as described.

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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