C. F. GRAY.

ZIGZAG STITCH SEWING MACHINE.

APPLICATION FILED MAY 1, 1906.

1,020,089.

Patented Mar. 12, 1912.

4 SHEETS—SHEET 1.

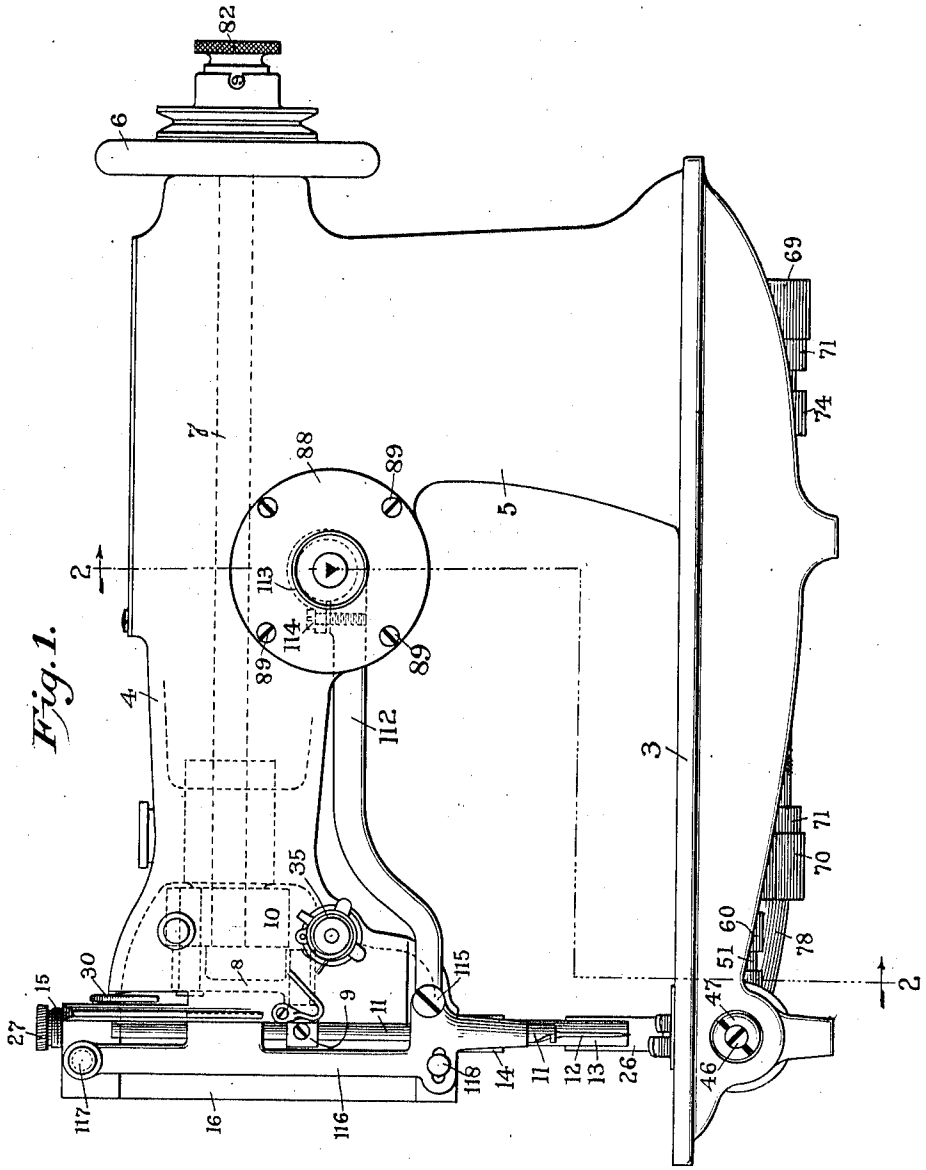

Fig. 1.

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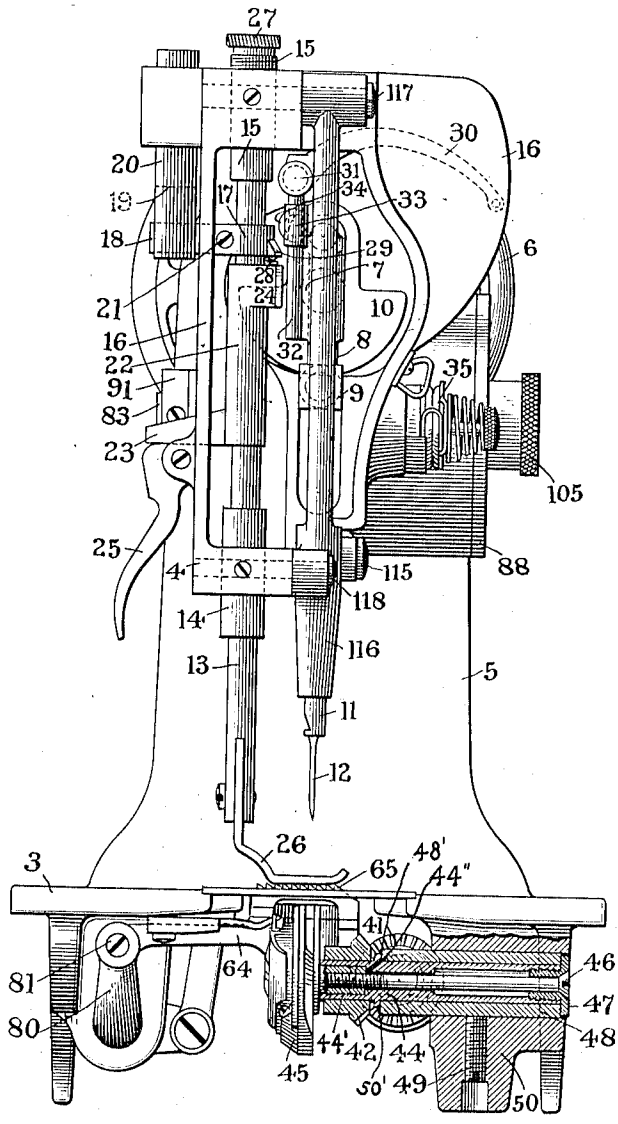
4 SHEETS—SHEET 2.

Fig. 2.



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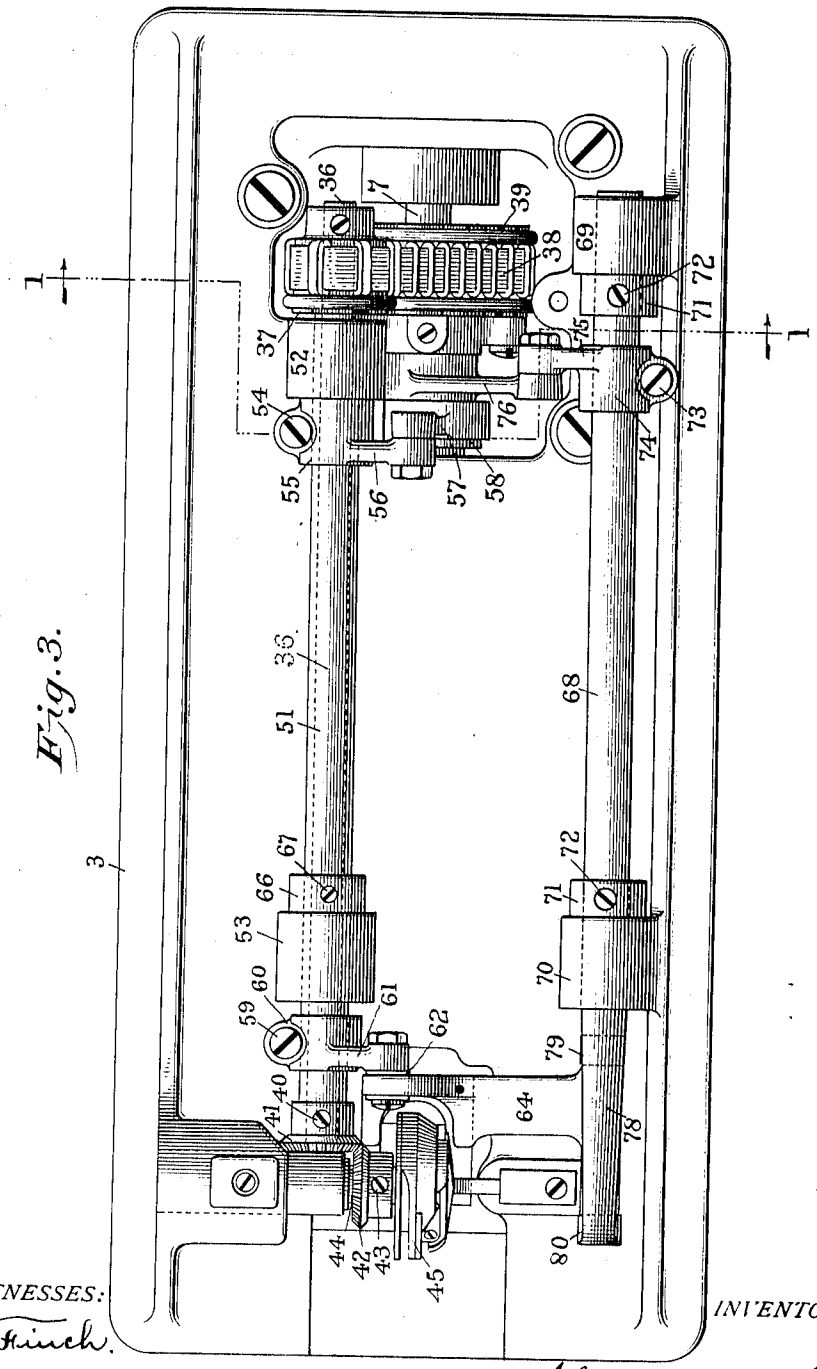

Fig. 3.

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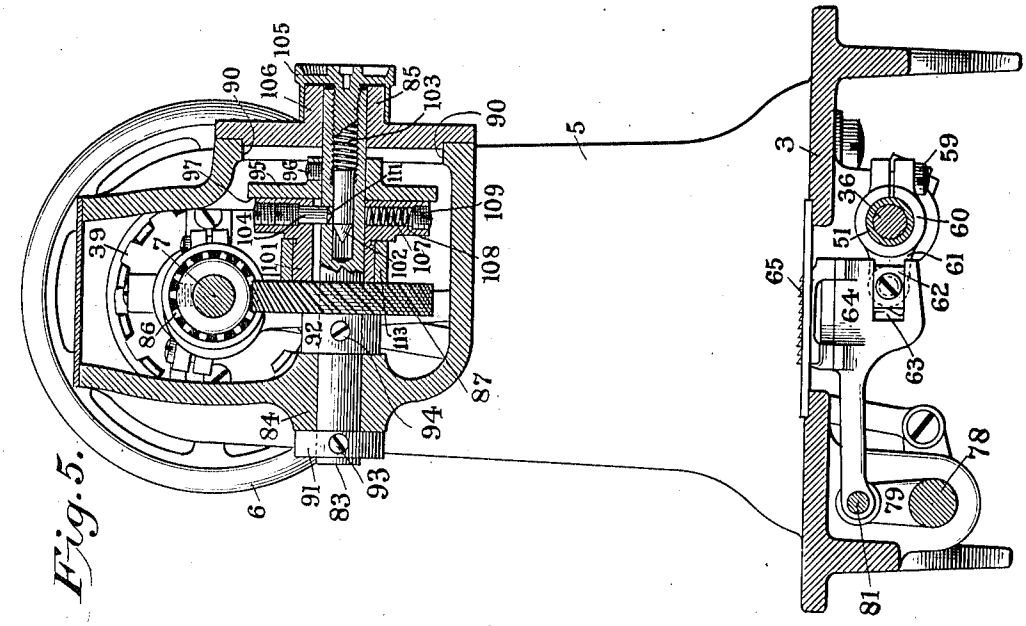

Fig. 5.

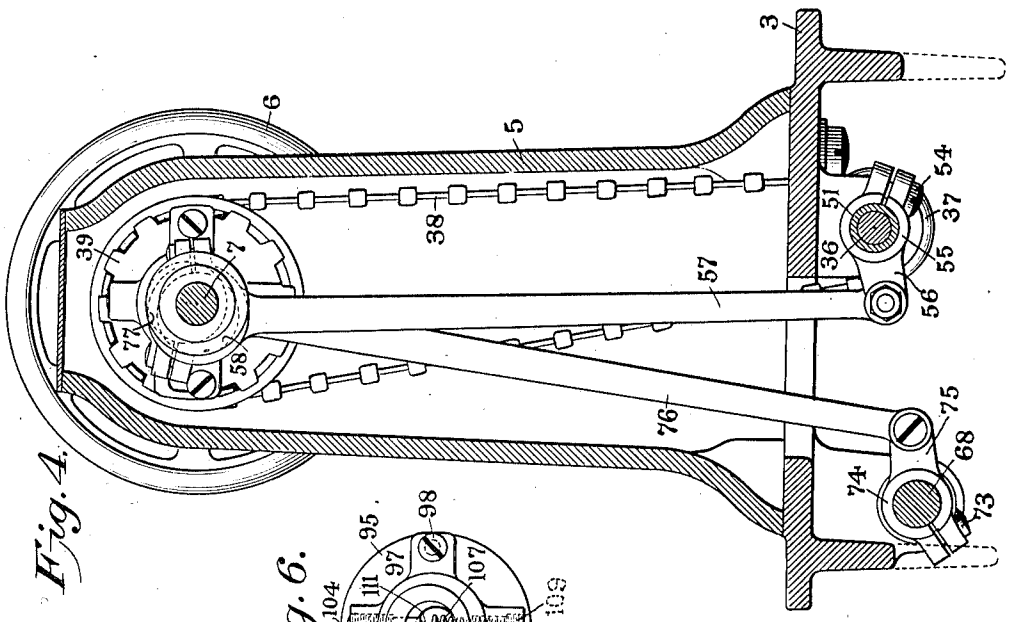

Fig. 4.

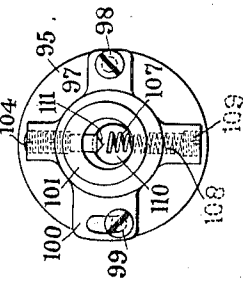

Fig. 6.

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UNITED STATES PATENT OFFICE.

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ZIGZAG-STITCH-SEWING MACHINE.

1,020,089. Specification of Letters Patent. Patented Mar. 12, 1912.

Application filed May 1, 1906. Serial No. 314,671.

To all whom it may concern:

Be it known that I, CHARLES FREDERICK GRAY, a citizen of the United States, and a resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented a certain new and useful Improvement in Zigzag-Stitch-Sewing Machines, of which the following is a specification.

This invention relates to improvements in zigzag or overseaming sewing machines and has for its object to provide a combination or construction which makes practical the operation of such class of machines at a speed substantially the same as the speed of the present commercial high-speed straight-away sewing machines.

To obtain the object of the invention the feed movements of the feed-dog and the zigzag movements of the needle-bar are controlled by separately mounted eccentrics, the latter being provided with adjusting means for independently controlling the amplitude of said movements, which form of construction avoids any dwell in said movements except such as is incident to the reverse movements of the connections operated by said eccentrics when the latter, in their rotations, pass the line of reverse motion. To better facilitate the coaction of the needle and loop-taker, the eccentric bearing is timed relatively to the vertical movements of the needle so that the reverse action of its lateral movements coincides with the reverse action of its vertical movements, thus effecting the minimum of lateral movement of the needle, when in the material, at substantially the time when the loop of needle-thread is being formed and the needle is presenting such loop to the action of the loop-taker, thus avoiding the liability of the needle being deflected sufficiently to endanger the loop of needle-thread from being caught by the seizing point of the loop-taker.

Referring to the drawings, in the several figures of which like parts are similarly designated, Figure 1 is a front side elevation of a zigzag sewing machine equipped with my improved mechanism; Fig. 2 a front end elevation of the same, the hook driving shaft and its bearings being shown in section; Fig. 3 an underside view of Fig. 1; Fig. 4 a view in section on the line 1—1, Fig. 3; Fig. 5 a view in section on the line 2—2, Fig. 1 and through the front end portion of the bed-plate, showing the feed-dog and its carrier in full lines, and the feed rock-shaft and hook driving shaft in section; and Fig. 6 a front side elevation of a portion of the needle adjusting mechanism shown in section in Fig. 5.

3 is the sewing machine bed-plate, 4 the overhanging arm, 5 arm standard, 6 band wheel, 7 needle-bar actuating shaft and 8 needle-bar link, which latter operatively connects, through the needle-bar collar 9 and disk 10, the needle-bar 11 with its actuating shaft 7.

12 is the needle and 13 is the presser bar, the latter mounted in the usual bearings 14, 15, in the head 16 of the overhanging arm 4 and depressed in the usual manner by the commonly employed presser-bar spring (not shown).

17 is the presser bar guide collar constructed with an extended portion 18, which latter enters a groove 19 formed in the guide rod 20 secured in the head 16 of the overhanging arm, the guide collar being secured to the presser bar by a pinch screw 21, said guide rod and extended portion 18 of the guide collar 17 acting to prevent axial movement of the presser bar 13.

22 is the presser bar lift collar provided with lugs 23 and 24, the former co-acting with the presser bar lift lever 25 to raise the presser bar and its attached cloth presser 26. The lug 24 of the lift collar 22 has formed in it a pocket for the reception of a spring 28 which abuts against a projection 29 formed on the guide collar 17. From the foregoing it will be understood that the presser-bar passes freely through the lift collar 22, enabling the presser bar 13 to move vertically without carrying with it the presser bar lift collar 22, but when the presser bar lift lever 25 is moved to raise the lift collar 22 the latter will come in contact with the guide collar 17 and cause the presser bar to be moved vertically.

30 is the take-up pivoted to the head of the overhanging arm by a suitable pivot screw, as 31, and provided with an arm 32, which latter passes through a swivel sleeve 33 mounted in an offset portion 34 formed integral with the needle-bar link 8.

35 is the usual needle-thread tension.

36 is the lower main or hook-driving shaft which is provided at its rear end with a grooved pulley 37, which latter is connected by a suitable belt 38 with a grooved pulley

39 secured on the upper or needle-driving shaft 7, the pulleys 37 and 39 being of the ratio of two to one, thus giving to the shaft 36 two revolutions to one revolution of the needle actuating shaft 7. To the forward end of the hook-driving shaft 36 is secured, by suitable screws, as 40, a bevel gear 41, which meshes with a bevel gear 42 secured, as by screw 43, to the rotary loop-taker shaft 44, to which latter is secured the loop-taker 45 by a screw 46 passing through a screw 47 tapped into the end of the shaft 44 and threaded into a hub 44′ formed on the rear side of the loop-taker, which hub is seated in the drilled out portion 44″ of the shaft 44.

48 is a bushing secured by screw 49 in the sewing machine frame 50, the inner end 48′ of said bushing 48 contacting with an annular ring 50′ formed on the shaft 44, thus confining the bushing 48 between said annular ring and the head of the screw 47, and, in connection with the screw 46, securing the parts 42, 44, 45 and 47 against movement in the direction of the length of said bushing, but leaving said parts free to be driven by the gear 41.

51 is a tubular feed lift rock-shaft mounted in bearings 52 and 53 formed on the underside of the bed-plate 3 and in which tubular rock-shaft the hook-driving shaft 36 is mounted. To the tubular rock-shaft 51 is secured by screw 54 a collar 55, which latter is provided with an arm 56 which, in turn, is pivotally attached to one end of a connection 57, its opposite end embracing an eccentric 58 secured on the upper or needle-driving shaft 7. To the forward end of the tubular rock-shaft 51 is secured by screw 59 a collar 60 provided with an arm 61, which latter is provided with a slide block 62 which enters a slot 63 formed in the feed-dog carrying bar 64 and upon which latter is mounted the feed-dog 65.

66 is a collar secured by a screw 67 to the tubular rock-shaft 51 which, in connection with the pinch collar 55, acts to hold the tubular rock-shaft 51 in its adjusted position.

From the foregoing it will be understood that the rotary movements of the eccentric 58, mounted on the needle actuating shaft 7, through suitable connections, give to the feed-dog 65 its vertical movements.

68 is the feed rock-shaft mounted in bearings 69 and 70 formed on the underside of the bed-plate 3 and held in adjusted position by the collars 71, 71, and screws 72, 72. To the feed rock-shaft 68 is secured by screw 73 a pinch collar 74 provided with an arm 75 which is pivotally attached to one end of a connection 76, its opposite end embracing an eccentric 77 secured on the needle actuating shaft 7. The forward end of the feed rock-shaft 68 is yoke-shaped, consisting of a base portion 78 and arms 79 and 80, into which is mounted a shaft 81 upon which is pivoted one end of the feed-dog carrying bar 64.

From the foregoing it will be understood that the rotary movements of the eccentric 77 mounted on the needle actuating shaft 7, through suitable connections, give to the feed-dog its feed movements.

82 is the feed adjusting screw which, through suitable connections, adjusts the eccentric 77 so as to give to the feed-dog the desired length of feed movements. The means for operatively connecting the eccentric 77 with the adjusting screw 82 are the same as those illustrated and described in U. S. Patent No. 718,988, Jan. 27, 1903, to Dial *et al.*, for sewing machine feed actuating mechanism, to which reference may be had for a detailed understanding of the construction and relative action of the parts comprising such means.

The description of the sewing machine thus far has been confined to features common to the construction of Wheeler & Wilson sewing machines, and may be as herein pointed out or of any approved form of construction.

83 is a cam shaft mounted, in bearings 84 and 85, transverse to the needle actuating shaft 7, the two shafts being operatively connected by gears 86 and 87, the two gears being of the ratio of two to one, thus giving to the cam shaft 83 one revolution to two revolutions of the needle actuating shaft 7. The shaft bearing 85 is located in a cap 88 which latter is secured, by screws 89, to a suitable seat 90 formed on the side of the overhanging arm.

91 and 92 are collars located on opposite sides of the bearing 84, which collars act, through the set screws 93 and 94, to hold the shaft 83 in the desired adjustment.

95 is a disk secured by screw 96 to the shaft 83, and to the face 97, see Fig. 6, of the disk 95 is adjustably secured, by a pivot screw 98 and steadying screw 99, a frame 100, which latter has formed integral with it an eccentric bearing 101, thus permitting the frame and eccentric bearing to be adjusted on the pivot screw 98 concentric with or eccentric to the cam shaft 83, dependent upon whether it is desired to effect the straight ordinary seam or to move the needle laterally so as to effect a line of zig-zag stitches. The desired adjustment of the frame 100 and eccentric bearing 101 is effected by the taper 102 of the screw 103 acting upon the inner end of the screw 104, which latter is threaded into the frame 100, the former screw 103 being threaded into the cam shaft 83 and provided with a head 105 which is hollowed out to fit over the hub 106 of the bearing 85.

107 is a spring mounted in a suitable

pocket 108 formed in the frame 100 and opposite the screw 104, the spring 107 being held compressed in the pocket 108 by the cam shaft 83 and screw 109.

In Fig. 6 the cam shaft 83 is omitted, such figure comprising only the disk 95, frame 100, eccentric bearing 101, spring 107 and screws 98, 99, and 109; accordingly, the spring 107 is shown as extending into the shaft hole 110 of the disk 95. In Fig. 5 the adjusting screw 103 is shown adjusted to the position for giving to the eccentric bearing 101 its greatest eccentricity relatively to the shaft 83. As the screw 103 is turned outward the taper 111 of the screw 104, through the action of the spring 107, rides the taper 102 of the screw 103, thus causing the eccentric bearing 101 to assume a position less eccentric to the shaft 83, and when the two points of the tapers 102 and 111 of the screws 103 and 104 are brought into alinement the eccentric bearing 101 will occupy a position concentric with the shaft 83.

112 is a connection one end of which is mounted upon the eccentric bearing 101 by the employment of the usual eccentric strap 113, which latter is provided with an adjusting screw 114. The opposite end of the connection 112 is pivotally attached, by screw 115, to the needle-bar carrying frame 116 which, in turn, is pivoted by the screw 117 to the head 16 of the overhanging arm 4.

118 is a steadying screw threaded into the head 16 and adjusted to prevent lateral movements of the needle-bar carrying frame 116 in the direction of the feed of the material.

From the foregoing it will be understood that the eccentric bearing 101, through the connection 112, effects the lateral movements of the needle-bar carrying frame 116, and that the amplitude of such lateral movements is controlled by the adjusting screw 103 acting upon the inner end of the screw 104, thus swinging the eccentric bearing 101 on its pivot screw 98.

I claim—

In a sewing machine, a stitch-forming and cloth-feeding mechanism including a feed-dog, a needle-bar actuating shaft, an eccentric carried by said shaft, connections between said feed-dog and eccentric for giving feed-movements to said feed-dog, a vibrating frame, a needle-bar mounted in said frame, a cam-shaft mounted transverse to and operatively connected with said needle-bar actuating shaft and provided with an eccentric bearing, and connections between said eccentric bearing and said vibrating frame for giving to said needle-bar movements in directions transverse to the feed of the fabric.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 30th day of April, A. D. 1906.

CHARLES FREDERICK GRAY.

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