

C. F. GRAY.
SEWING MACHINE.
APPLICATION FILED JUNE 5, 1907.

929,761.

Patented Aug. 3, 1909.
3 SHEETS—SHEET 1.

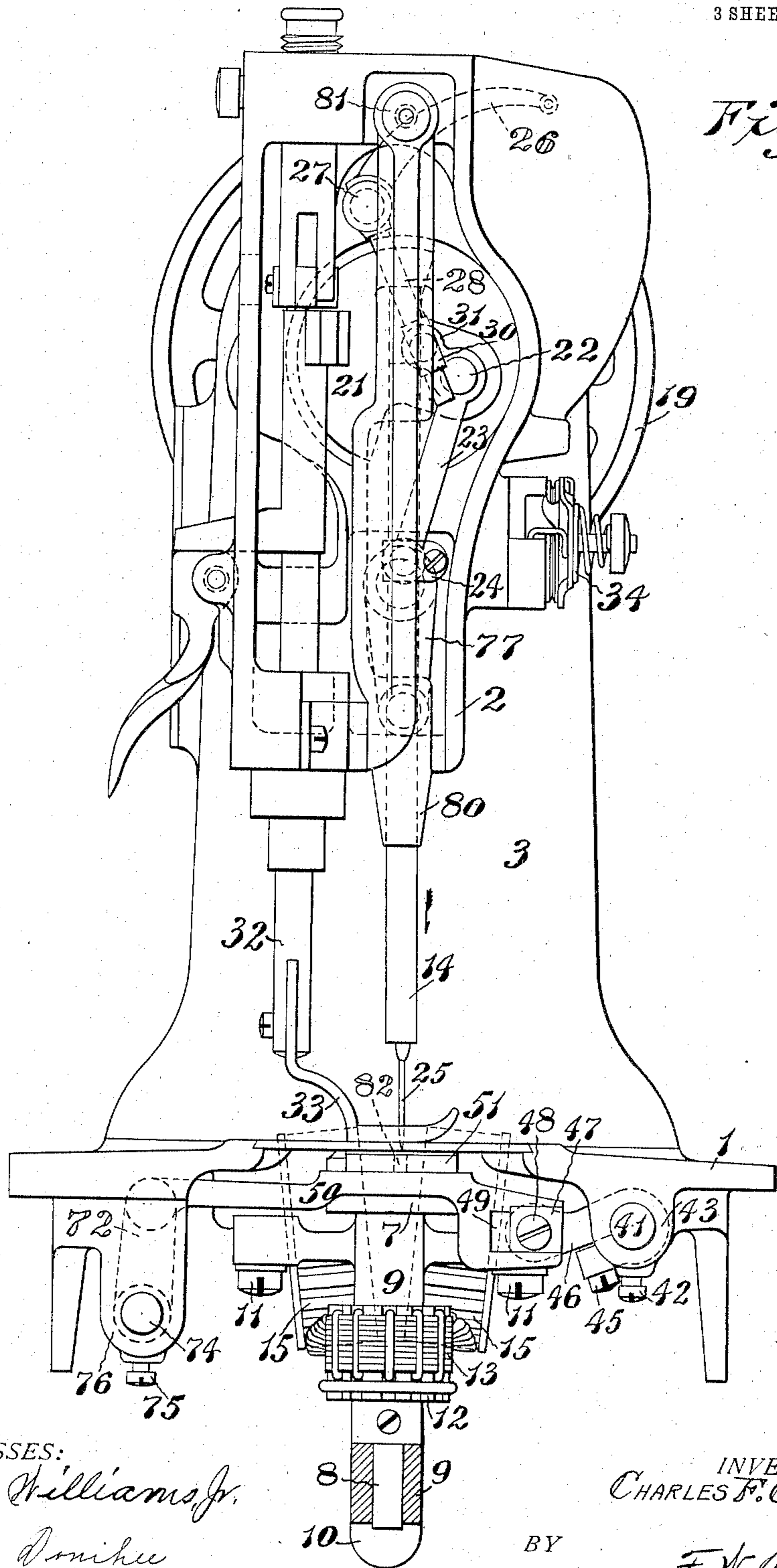


Fig. 1.

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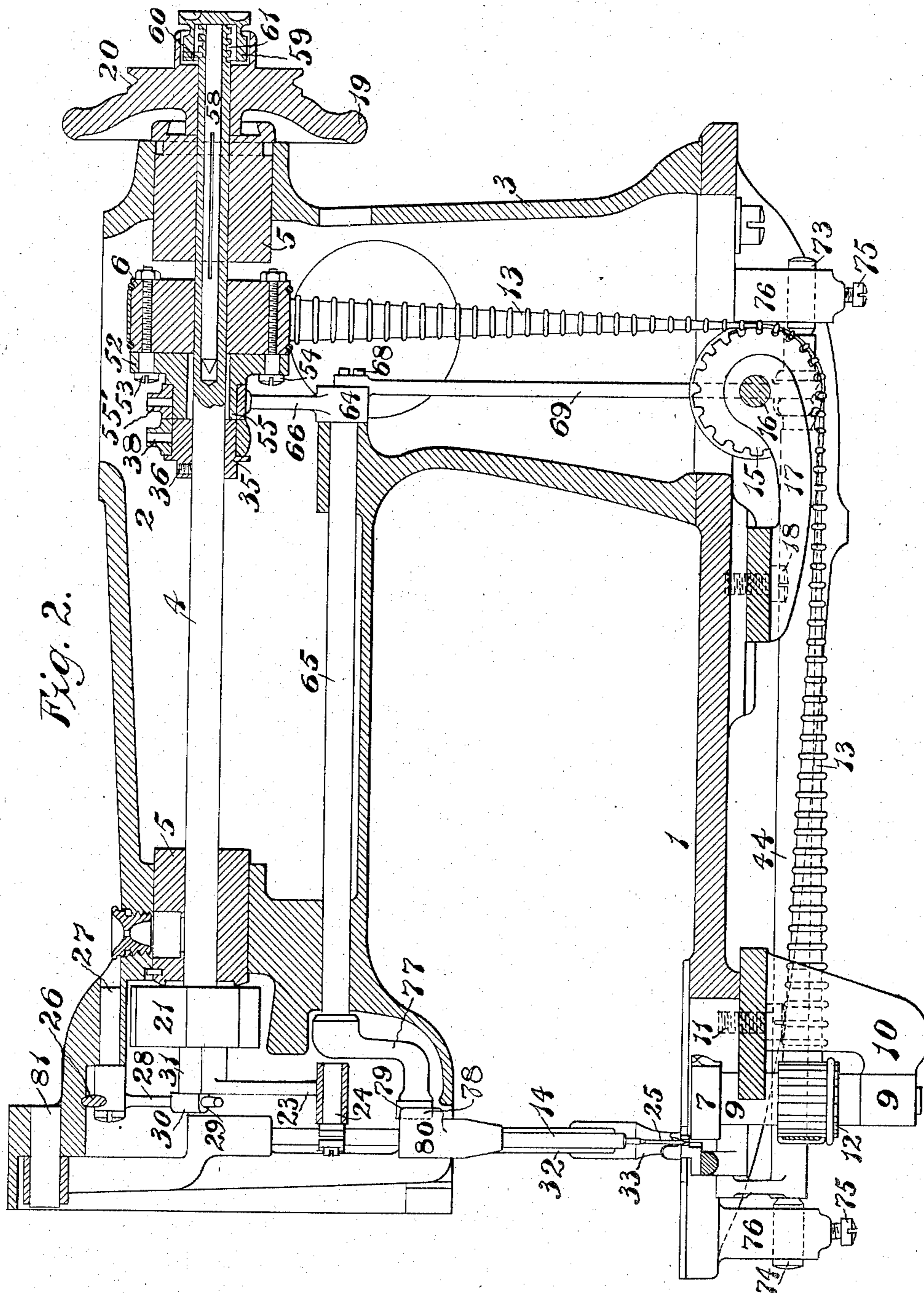


Fig. 2.

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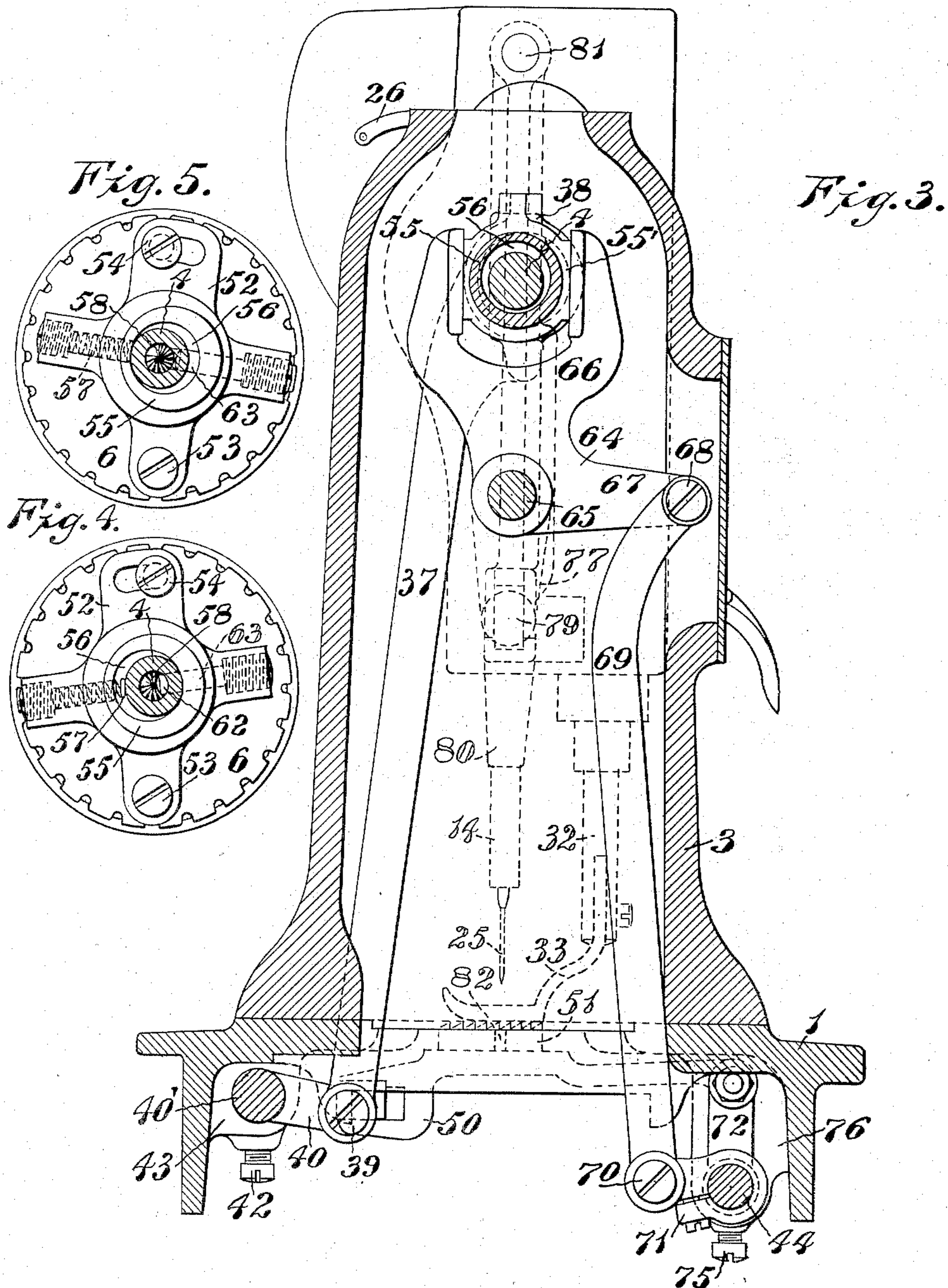
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CHARLES F. GRAY, OF SIERRA MADRE, CALIFORNIA, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE.

No. 929,761.

Specification of Letters Patent.

Patented Aug. 3, 1909.

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To all whom it may concern:

Be it known that I, CHARLES F. GRAY, a citizen of the United States, and a resident of Sierra Madre, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

The problem before me in the production of my present invention was the production of a higher speed lighter running compound feeding sewing machine than those heretofore known, and to that ultimate end I have produced and combined in my machine as an entirety various features essential to said end.

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 feeding mechanism. Fig. 2 is a front side elevation, partially in section. Fig. 3 is a cross-section, in elevation, of the arm standard and bed-plate, together with working parts shown partially in full and partially in dotted lines. Fig. 4 is a front side view, in elevation, of the main shaft belt-driving pulley, and attached eccentric and eccentric frame for controlling the length of the feed movements of the material, the feed eccentric being shown adjusted concentrically to the axis of the main or needle-driving shaft. Fig. 5 is a view similar to Fig. 4, showing the eccentric adjusted to the position of greatest feed movement.

1 is the bed-plate of the sewing machine, 2 the overhanging arm, 3 the arm standard and 4 the main or needle-driving shaft mounted to rotate in bearings 5, 5 secured in the overhanging arm 2.

6 is the main shaft belt-driving pulley, 7 the loop-taker and 8 the loop-taker shaft mounted in bearings 9, 9 formed in the bracket 10, said bracket being adjustably secured to the underside of the bed-plate by screws 11, 11.

12 is the loop-taker shaft pulley operatively connected by a belt 13 with the pulley 6 carried by the main shaft 4, the pulleys 6 and 12 being of the ratio of two to one, thus giving to the loop-taker two revolutions to one complete actuation of the needle-carrying bar 14.

15, 15 are idlers for directing and supporting the belt 13, said idlers being mounted to

rotate upon a shaft 16 carried by a bracket 17 secured by screws 18, 18 (one only of which is shown in dotted lines, Fig. 2) to the underside of the bed-plate, and 19 is the commonly-employed band-wheel provided with a belt-groove 20.

21 is a disk carried by the shaft 4 and provided with a stud 22 upon which is journaled one end of a link 23, the opposite end of said link being operatively connected by a stud collar 24 with the needle-bar 14, thus, through the rotary movements of the shaft 4, effecting the necessary vertical movements of the needle 25 to form stitches.

26 is the take-up pivoted upon a stud 27 secured in the overhanging arm, said take-up being provided with an arm 28 which passes through and works freely in an opening 29 formed in a swivel pin 30 mounted in an arm 31 forming an integral portion of the link 23, thus, through the rotation of the stud screw 22, motion is transmitted to the take-up.

32 is the presser-bar which is constructed, mounted and controlled in the usual manner and provided at its lower end with one form of commonly-employed cloth-presser 33, and 34 is the usual needle thread disk tension.

35 is a feed-lift eccentric secured by a screw 36 to the main shaft 4.

37 is the feed-lift eccentric connection provided at its upper end with a strap 38 which embraces said eccentric, the lower end of said connection being jointed by a stud screw 39 to an arm 40 which forms an integral part of the feed-lift rock-shaft 40' arranged beneath the bed-plate and mounted between suitable pintle bearings, as 41, secured, as by screws 42, in suitable lugs, as 43, depending from the underside of the bed-plate in substantially the same manner as the feed rock-shaft 44 is arranged and mounted on the opposite side of the belt 13, as shown in Fig. 2.

To the forward end of the feed-lift rock-shaft is adjustably secured, by a screw 45, an arm 46 carrying at its outer end a slide-block 47 which is held against displacement by a screw 48, said slide-block entering a groove 49 formed in the feed-dog-carrying bar 50 which carries the feed-dog 51; thus, through the connections described, the feed-dog 51 is given its vertical or feed-lift movements through the rotary movements of the feed-lift eccentric 35 carried by the main shaft 4.

52 is the feed-adjusting eccentric frame pivoted by a screw 53 to the side of the belt-

driving pulley 6 and held in alinement with the face of said pulley by the screw 54. The frame 52 carries an eccentric 55 provided with a central opening 56 which is of greater diameter than the shaft 4, thus permitting the spring 57, which is mounted in the frame 52 and abuts against the shaft 4, to normally hold the eccentric 55 concentrically to the axis of said shaft.

58 is the feed-adjusting rod mounted in and concentrically to the shaft 4 and provided at its outer end with an adjusting nut 59 carrying a pin 60 which, when caused to traverse the screw thread 61, adjusts the rod 58 in the direction of its length. The inner end of the rod 58 is cone shaped and, by the action of the adjusting means 59, 60 and 61, it is caused to coact with the end 62 of the screw 63 carried by the frame 52, thus, in opposition to the resiliency of the spring 57, forcing the eccentric 55 to the desired eccentricity, relatively to the shaft 4, for effecting the desired feed movement.

64 is a bell crank lever secured upon the inner end of the oscillating shaft 65, the arm 66 of said lever being bifurcated to embrace the yoke 55' on the eccentric 55, and the arm 67 being operatively connected, by a stud screw 68, with the feed-adjusting connection 69, which latter is in turn jointed by a stud screw 70 to an arm 71 secured upon the rear end of the feed rock-shaft 44, the forward end of said shaft having secured upon it an arm 72 which in turn is jointed to the feed-dog-carrying bar 50; thus, through the connections comprising the parts 55, 55', 64, 68, 69, 70, 71, 44, 72 and 50, feed movements are transmitted to the feed-dog 51. The feed rock-shaft 44 is mounted between pintle bearings 73 and 74 secured by screws 75, 75 in suitable bearings formed in lugs 76, 76 depending from the underside of the bed-plate 1.

To the forward end of the oscillating shaft 65 is secured a depending lever 77, the end 78 of which enters a groove 79 formed in the needle-bar swinging frame 80, the upper end of said frame being pivoted upon a stud 81 secured in the overhanging arm, thus, through the connections comprising the parts 55, 55', 64, 65, 77 and 80, lateral movements in line with the seam are transmitted to the needle. The leverage given the connections for operatively connecting the lever 64 with the needle and the connections for operatively connecting said lever with the feed-dog-carrying bar is proportioned so as to transmit from the feed eccentric 55 lateral movements of the needle and feed movements of the feed-dog of like amplitude.

The feed-dog 51 is provided with a needle-hole 82 into which the needle descends and is housed during the feed movements of the feed-dog, thus effecting a combined four-motion and needle feed.

What I claim is :—

1. In a feeding mechanism for sewing machines, a needle, a needle-carrying bar, a needle-bar swinging frame in which said needle-carrying bar is mounted, a needle-bar actuating shaft, a feed-dog, a feed-dog-carrying bar, an adjustable feed eccentric carried by the needle-bar-actuating shaft, means for adjusting said eccentric relatively to the axis of said needle-bar-actuating shaft, an oscillating lever actuated from said eccentric, and connections between said oscillating lever and needle-bar swinging frame and between said oscillating lever and the feed-dog-carrying bar for effecting feed movements of like amplitude of both the needle and the feed-dog, in combination with means, including a feed-lift eccentric, for giving to the feed-dog vertical movements in opposite directions.

2. In a feeding mechanism for sewing machines, a needle-bar swinging frame, a needle-carrying bar mounted in said frame and having movements in line with the stitched seam, a feed-dog-carrying bar provided with a feed-dog, a needle-bar-driving shaft carrying a belt-driving pulley, a loop-taker shaft, a pulley carried by said loop-taker shaft, a belt for operatively connecting said pulleys, said belt being guided and driven in directions substantially transverse to each other, an adjustably mounted frame pivotally secured to the side of said belt-driving pulley and provided with an eccentric, means for adjusting said eccentric relatively to the axis of said needle-bar-driving shaft, a bell-crank lever operated from said eccentric, connections between said lever and the swinging frame and between said lever and the feed-dog-carrying bar for transmitting feed movements of like amplitude to the needle and feed-dog, in combination with means including a feed-lift eccentric for giving to said feed-dog vertical movements in opposite directions.

3. In combination; the main shaft 4, the compound-feed actuating shafts 44 and 65, the vertical loop-taker shaft 8, the eccentric 55 on the main shaft, the connections whereby said eccentric oscillates said shafts 44 and 65, wheels 6 and 12 on said main shaft and loop-taker shaft, respectively, the guide wheels 15 and the belt 13 extending from said wheel 6 around said wheels 15 to said wheel 12, all substantially as described whereby the needle, loop-taker and compound feed are driven to produce a stitch.

4. In a feeding mechanism for sewing machines, a needle, a needle-carrying bar, an oscillating frame in which the needle-carrying bar is mounted, a feed-dog, a feed-dog-carrying bar, a main shaft carrying a feed eccentric, means for adjusting said eccentric relatively to the axis of said main shaft, an oscillating shaft, and connections between

said oscillating shaft and feed eccentric and
between said oscillating shaft and needle-
bar-carrying frame for giving to the needle
lateral movements in the line of feed, said
5 feed eccentric, needle-oscillating shaft and
connections for operatively connecting said
oscillating shaft with the feed eccentric be-
ing housed within the arm standard of the
sewing machine, and connections between
10 said feed eccentric and feed-dog-carrying bar
for giving to said feed-dog feed movements
corresponding in length to the lateral move-

ments of the needle in the line of feed, in
combination with means for giving to the
feed-dog vertical movements in opposite di- 15
rections.

Signed at Sierra Madre, in the county of
Los Angeles, and State of California this 28th
day of May A. D. 1907.

CHARLES F. GRAY.

Witnesses:

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N. H. HOSMER.