

C. F. GRAY.  
SEWING MACHINE FEEDING MECHANISM.  
APPLICATION FILED MAR. 26, 1904.

4 SHEETS—SHEET 1.

Fig. 4.

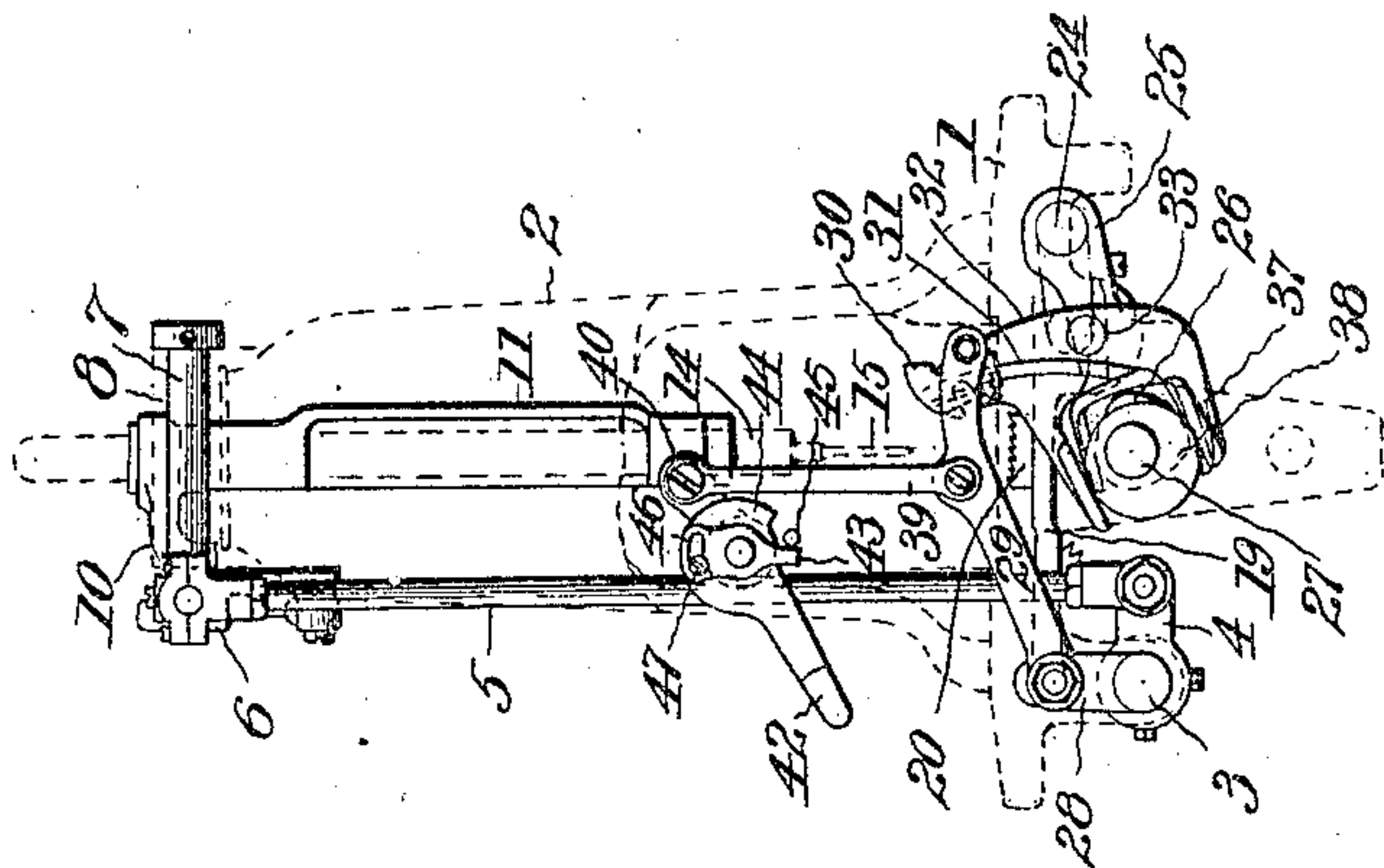
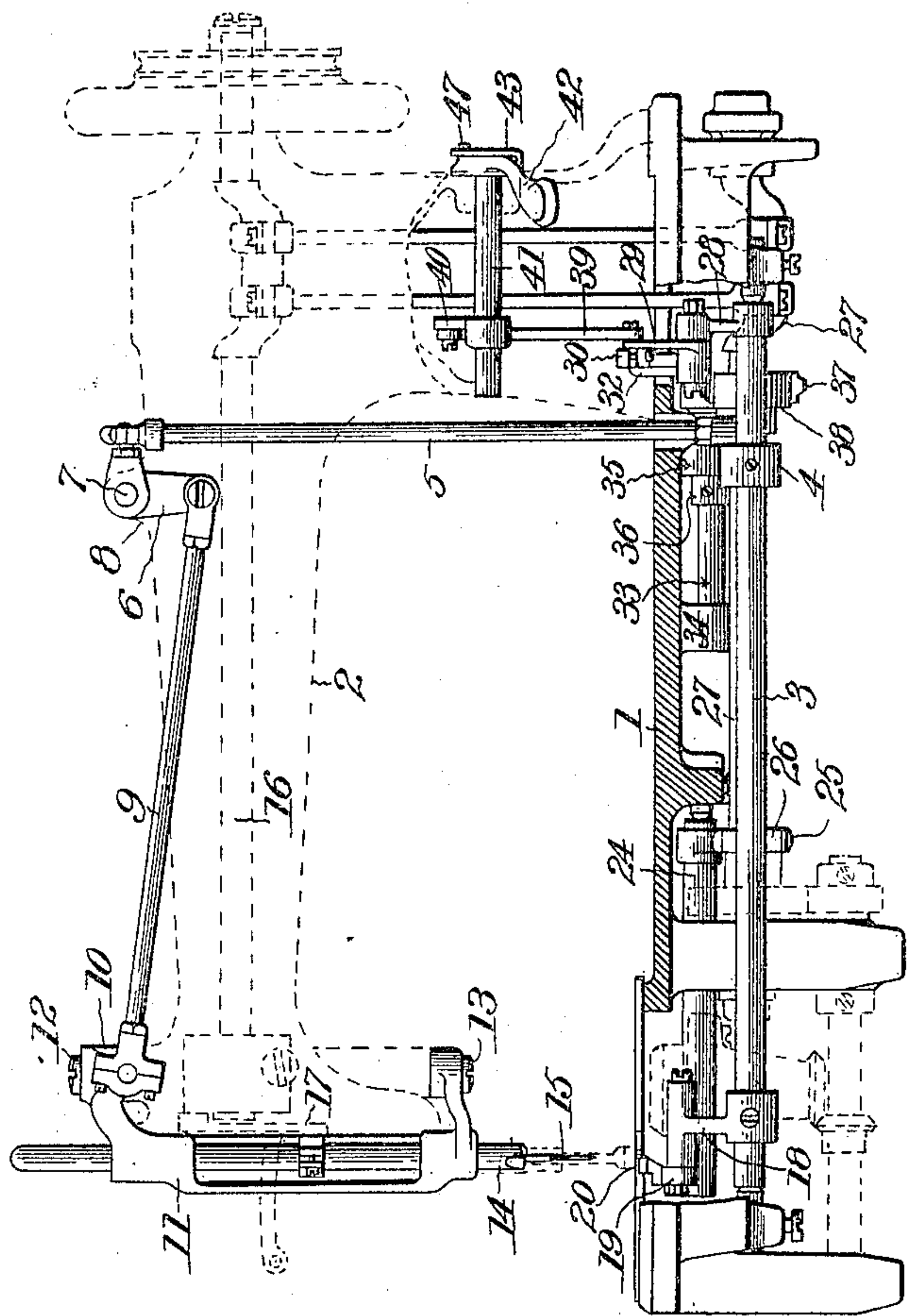


Fig. 1.



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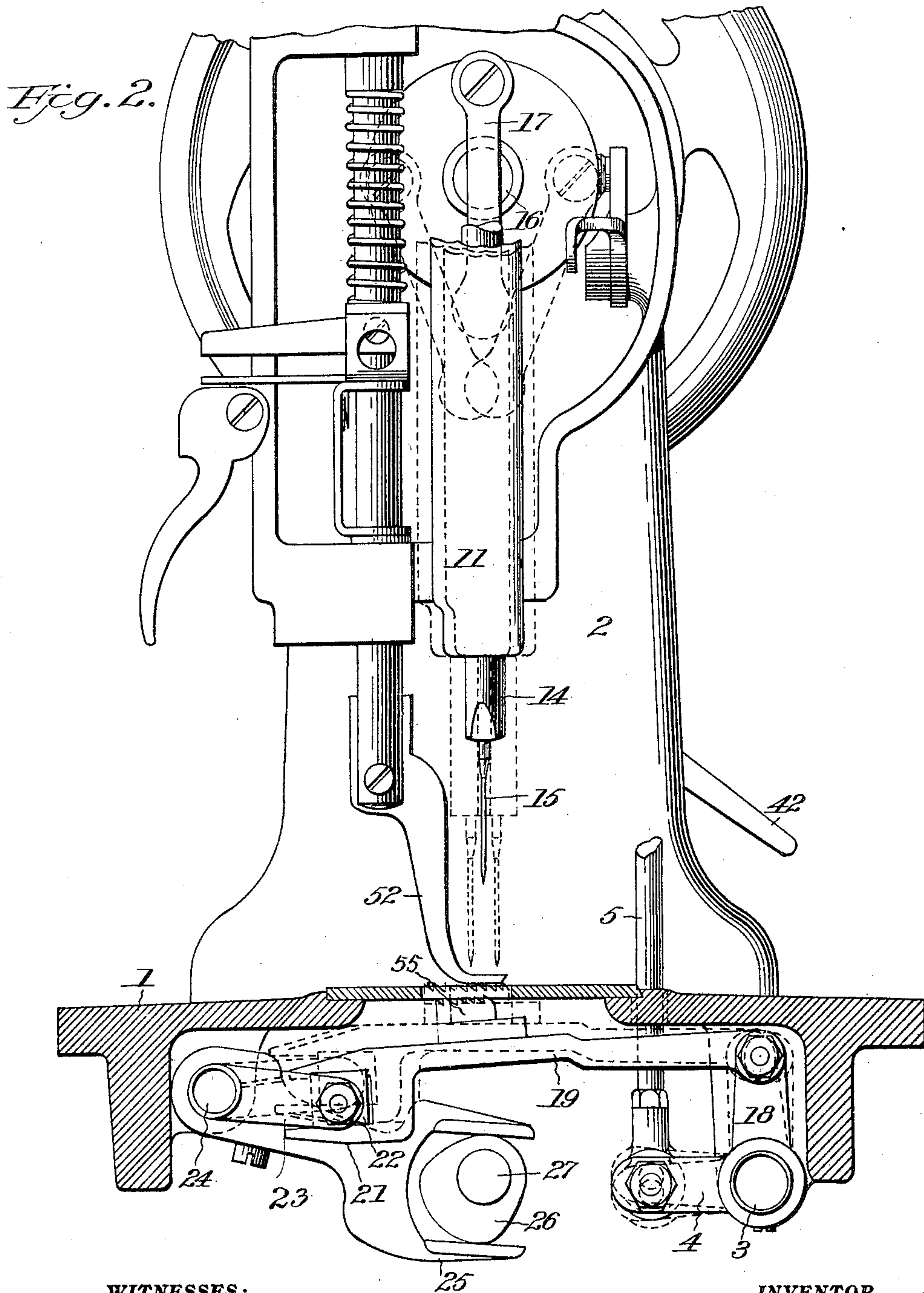
No. 804,220.

PATENTED NOV. 14, 1905.

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4 SHEETS—SHEET 2.



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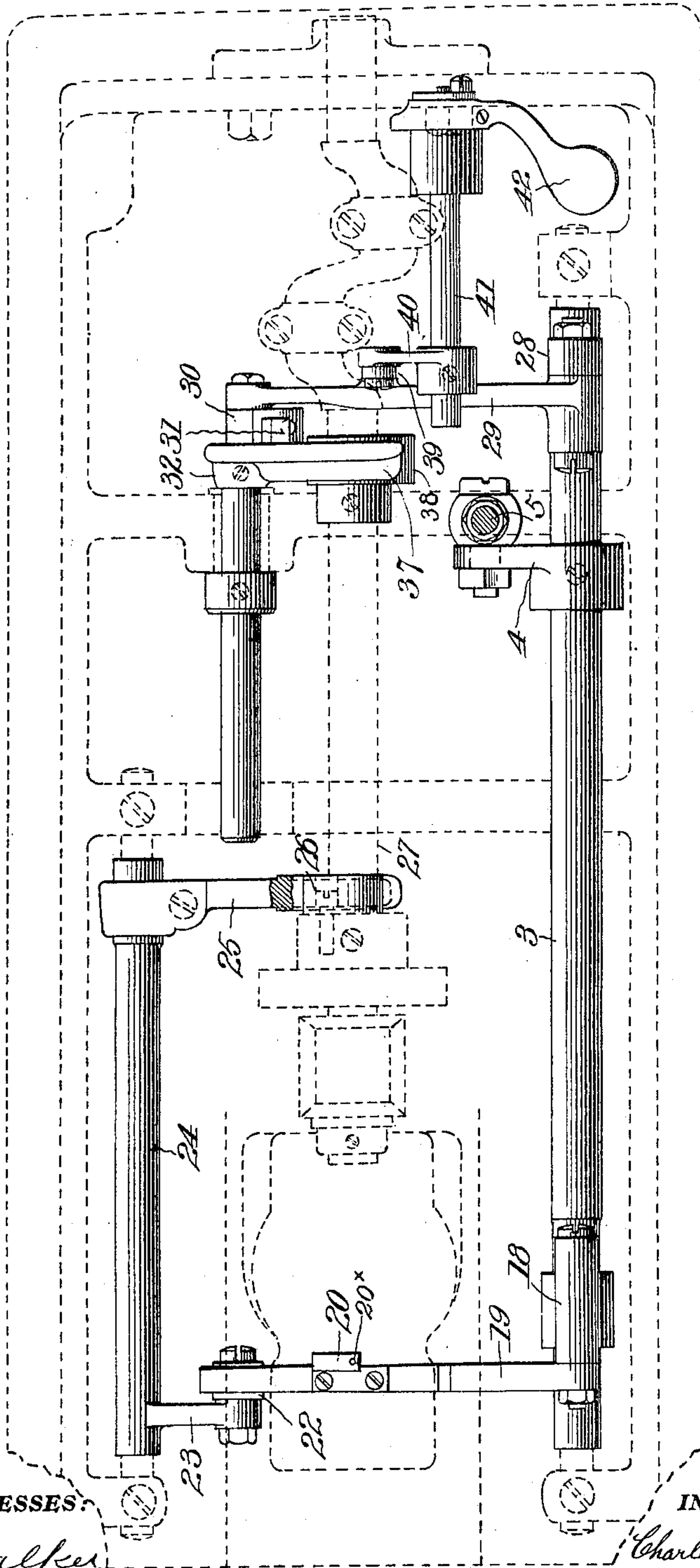
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4 SHEETS—SHEET 3.

*Fig. 3.*



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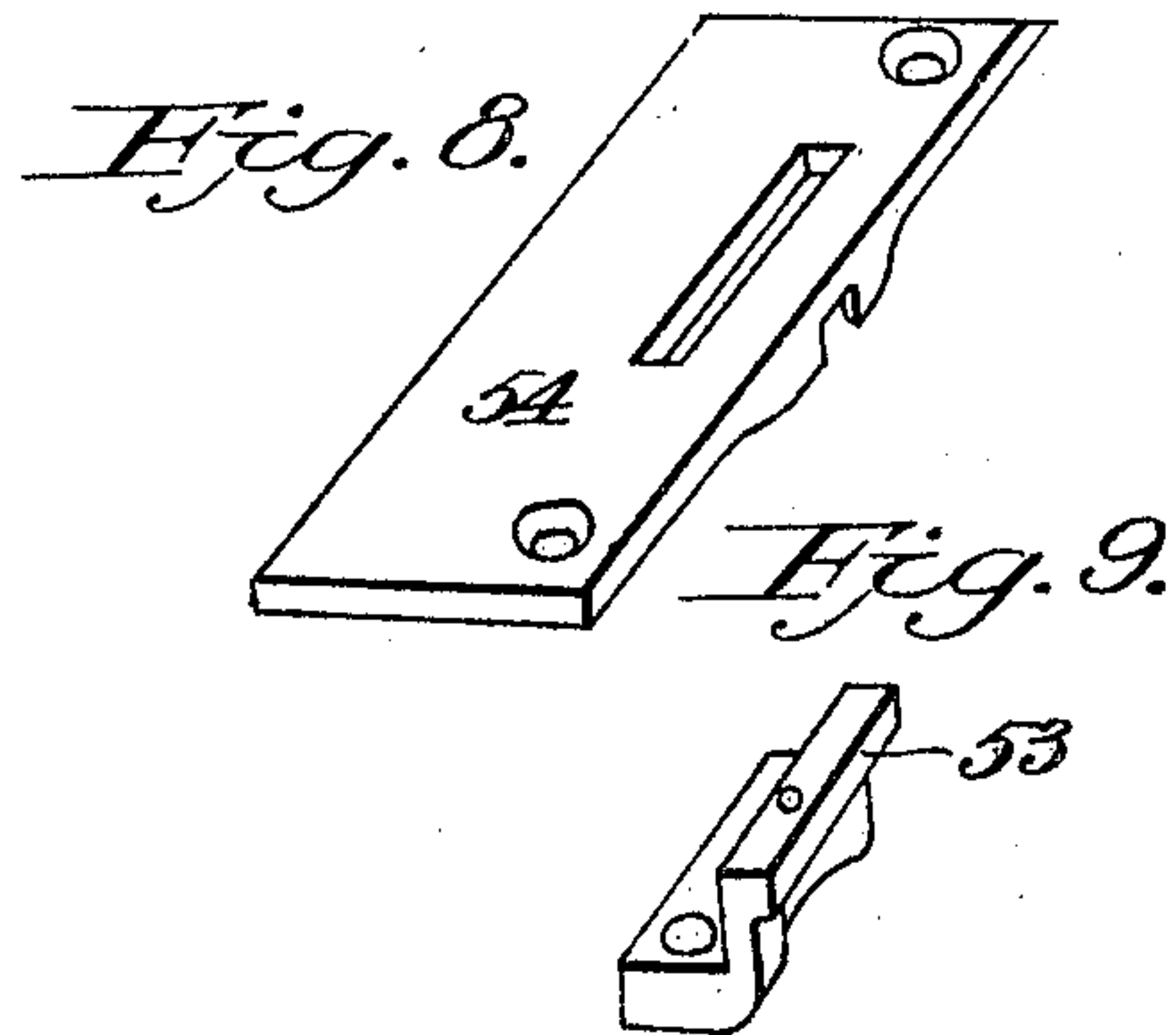
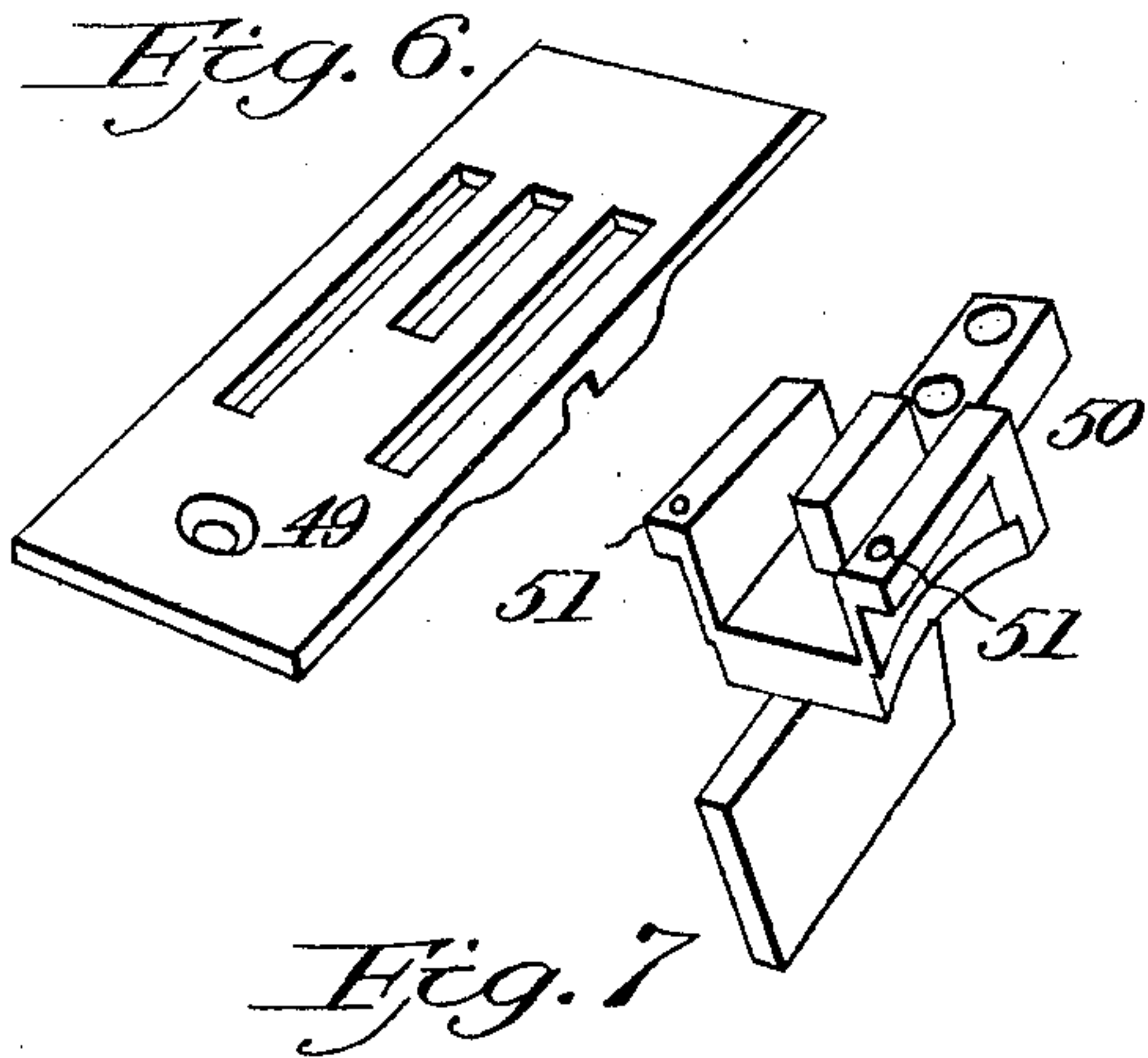
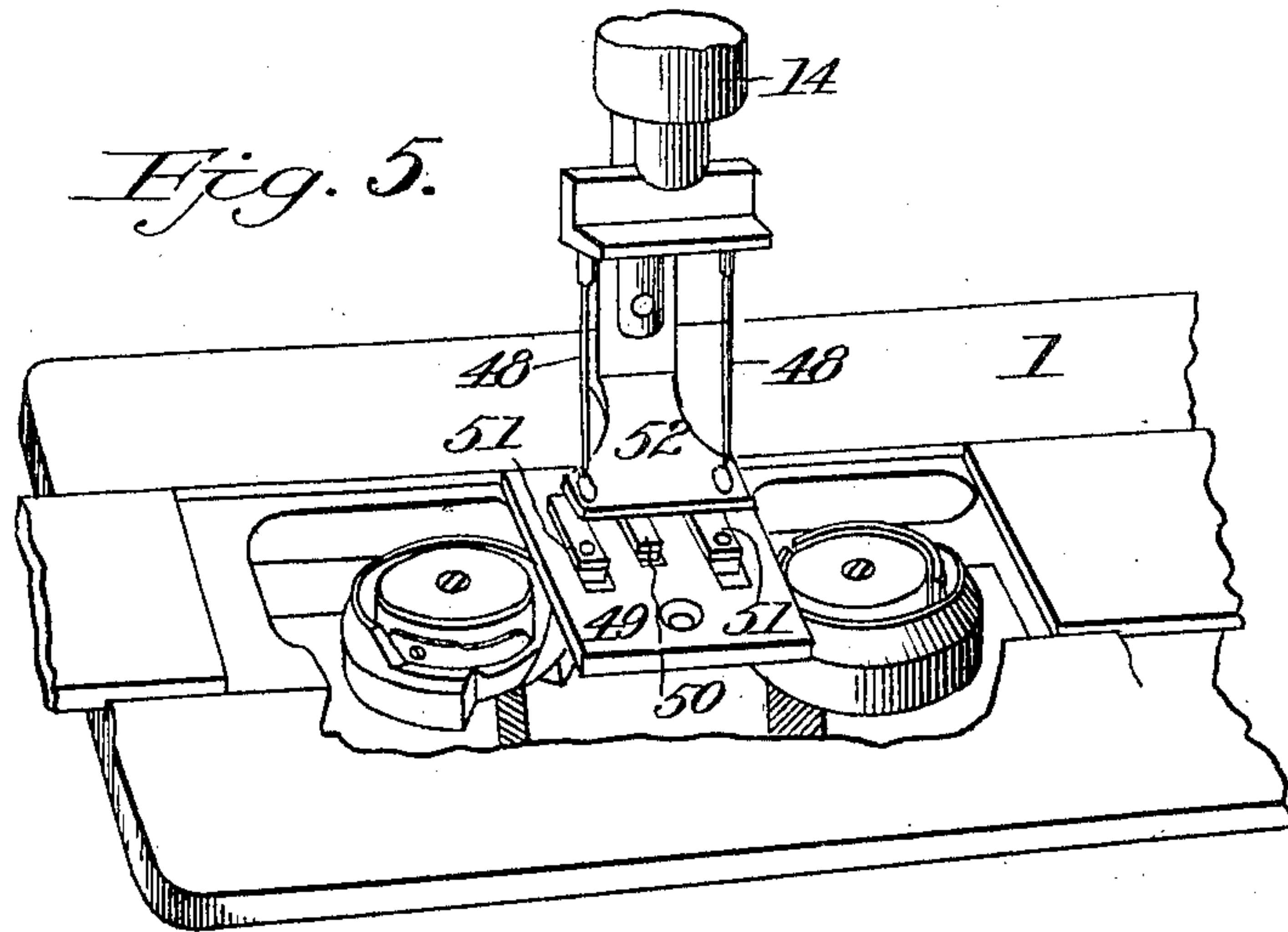
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# UNITED STATES PATENT OFFICE.

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TO WHEELER & WILSON MANUFACTURING COMPANY, OF BRIDGEPORT,  
CONNECTICUT, A CORPORATION OF CONNECTICUT.

## SEWING-MACHINE FEEDING MECHANISM.

No. 804,220.

Specification of Letters Patent.

Patented Nov. 14, 1905.

Application filed March 26, 1904. Serial No. 200,184.

*To all whom it may concern:*

Be it known that I, CHARLES FREDERICK GRAY, 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-Machine Feeding Mechanisms, of which the following is a full, clear, and exact description.

The object of this invention is to provide a sewing-machine in which the feed of the material is effected conjointly by the needle or needles and an under-feed mechanism.

The invention comprises a combined reciprocating and vibrating needle mechanism and an under-feed mechanism moving lengthwise of the feed of the work substantially as in an ordinary four-motion feed, but having a needle hole or holes, according to the number of needles employed, the two mechanisms connected so as to conjointly effect the feed of the work while the needle is or needles are in the work, all as I will proceed now more particularly to set forth and finally claim.

In the accompanying drawings, illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a side elevation, portions of the frame being in section and portions in dotted lines. Fig. 2 is a front elevation on a larger scale, the bed-plate being in section and portions of the upper works broken away, the relative movements of the needle laterally and the under-feed movements being indicated by the dotted-line positions of these parts. Fig. 3 is a top plan view with portions of the frame and the main shaft in dotted lines. Fig. 4 is a rear elevation, the frame being shown in dotted lines. Fig. 5 is a perspective view of portions of a two-needle vertical-hook machine. Fig. 6 is a perspective view of the throat-plate; and Fig. 7 a perspective view of the smooth-face feed-dog for use therewith, same as in Fig. 5, but detached. Fig. 8 is a perspective view of a one-needle throat-plate, and Fig. 9 a perspective view of a smooth-face feed-dog for use therewith.

The bed-plate 1 and overhanging arm 2 and other parts not specifically mentioned may be of the usual Wheeler & Wilson sewing-machine type, and while the invention is herein shown as applied to a Wheeler & Wilson sewing-machine having a vertical hook and vibrating needle-bar it is not thus limited.

3 is the feed rock-shaft, mounted in suitable bearings under the bed-plate lengthwise thereof, and to this rock-shaft is fixed an arm 4, connected by a rod 5 with a bell-crank lever 6, fixed to a shaft 7, mounted to rock in a bearing 8 on the arm 2. This bell-crank lever is connected by a rod 9 with an arm 10 on the needle-vibrating gate 11, which is pivoted at 12 and 13 on the end of the arm 2 and carries the reciprocating needle-bar 14, having needle 15. The needle-bar is reciprocated by usual means, such as the upper shaft 16, and a link 17, having an eccentric or other usual connection with said shaft, and hence while the needle is being reciprocated in a right vertical line it may be vibrated laterally of the arm 2 substantially in the line of feed of the material. The rock-shaft 3 is provided also with an arm 18, to which is secured the feed-dog carrier 19. This carrier is forked at 21, and this fork receives a slide-block 22, mounted upon an arm 23, fixed to a rock-shaft 24, mounted in suitable bearings beneath the bed-plate, and said rock-shaft 24 is actuated by the engagement of its forked arm 25 with the cam 26 on the main driving-shaft 27. By these means the under-feed mechanism is caused to rise as the needle enters the goods and moving with the lateral motion of the needle advances the material the length of a stitch while the needle is in the material and then drops and recedes to its first position while the needle rises out of the material preparatory to the formation of another stitch.

The rock-shaft 3 is provided at the rear with an arm 28, connected by a link 29 with a block 30, frictionally and slidably mounted upon an arcuate rib 31, projecting from a lever 32, fixed to a short rock-shaft 33, mounted in bearings 34 35, depending from the under side of the bed-plate 1 and held in place by a set-collar 36. The lever 32 has a fork 37, engaging a cam 38 on the main shaft 27. The rib 31 may be described from the axis of motion of the link 29 on the arm 28 as a center and is interposed between the shaft 33 and main shaft 27 and projects above both shafts. The fork 37 extends laterally from the lever 32, and hence as the cam 38 is rotated the lever 32 is rocked upon the shaft 33 as a center and the rib member is vibrated laterally and by its link 29 rocks the shaft 3; and since shaft 3 is connected with the needle-gate, as before de-



scribed, it follows that the rocking motion of shaft 3 is converted into a vibrating motion of the needle-gate, needle-bar, and needle and also imparts the four-motion feed to the feed-dog. If, therefore, the extent of rocking motion of the shaft 3 be varied, a corresponding variation in the length of vibration of the needle and extent of longitudinal movement of the feed-dog must follow synchronously. This extent of rocking motion of the shaft 3 is varied by connecting the link 29 by link 39 with an arm 40 on the rock-shaft 41 of the ordinary stitch-regulating lever 42, mounted in the upright of arm 2, so that as said stitch-regulating lever is vibrated the link 29 will be raised or lowered, as the case may be, and consequently the block 30 will be shifted lengthwise of the rib respectively toward or from the center of motion (shaft 33) of the lever 32 and the throw of the link 29 and the extent of rocking movement of shaft 3 diminished or increased accordingly.

The stitch-regulating lever has a stop-finger 43 and a stop-shoulder 44 to cooperate with a fixed stop-pin 45 on the arm 2 to set its range of movement. The stop-finger is made adjustable toward and from the stop-shoulder 44 by means of a slot 46 in it and a binding-screw 47, connecting the finger with the lever. By movement, therefore, of the stitch-regulating lever, or, as it is herein termed, the "stitch-regulator," both the needle-feed and the under feed, which cooperate to feed the material as it is being stitched, are simultaneously adjustable and by movement of a single device and without turning any screws.

As thus far described in detail by reference to the drawings the invention herein is in all essential particulars the same as that forming the subject of my application, filed March 26, 1904, Serial No. 200,183. To further improve and increase the utility of a combined upper and under feed, I have constructed the under feed to include a feed-dog provided with a needle hole or holes, depending upon the use of a single needle or a plurality of needles, as the production may require, and made such change in the construction of the throat-plate as was necessary to accommodate the application of the desired feed-dog, as is illustrated by Figs. 6 and 8, wherein the slots for the reception of the cloth-actuating surfaces of the complementary feed-dogs illustrated in Figs. 7 and 9 are of sufficient length to accommodate the movements of the feed-dogs when adjusted for their longest feed movements. As shown in Fig. 3 the feed-dog 20 has a single needle-hole 20<sup>x</sup>. As shown in Figs. 5, 6, and 7 two needles 48 are used and a three-hole throat-plate 49 and a three-part feed-dog 50. The needle-holes 51 are made in the side members of said feed-dog. As shown in Figs. 8 and 9 a single feed-dog

53 may be used in a single-slot throat-plate 54 in connection with the main invention, and, furthermore, a many-pointed three-part feed-dog 55, as shown in Fig. 2, may be used also. In all cases the grip of the feed-dog upon the work while the needles are in the work and in the feed-dog needle-holes serves to effect the feeding of the work. The needles being in the feed-dog needle-holes while feeding are thereby prevented from being sprung. The presser-foot 52 in the several instances is of the spring-depressed variety, operating substantially as usual, but having needle-holes to correspond in number with the number of needles used and of a length equal to the length of the longest stitch to permit the lateral movements of the needles in feeding the work.

While the invention is shown as applied to a two-needle and to a one-needle machine, it is to be understood as applicable to a machine having any number of needles and provided with a feed-dog having either plain or toothed surfaces with needle-holes corresponding to the number of needles used.

When an under feed alone is used, the work is raised from the throat-plate and carried by the feed-dog against the friction of the cloth-presser, and in case of an upper or needle feed the friction is exerted against the throat-plate. In the former instance when two or more plies of fabric are being sewed there is liability of the upper ply not feeding as freely as the under ply, and hence the work is imperfect. In the needle-feed the friction is somewhat of an impediment to perfect work. When, however, the under feed and needle-feed are combined, as in this invention, there is substantially no friction and the plies will travel evenly.

What I claim is—

1. In a sewing-machine, a combined reciprocating and vibrating needle mechanism, and an under-feed mechanism cooperating to effect the feed of the work while the needle is in the work, said under-feed mechanism including a feed-dog provided with a complementary needle-hole.

2. In a sewing-machine, a combined reciprocating and vibrating needle mechanism, and an under-feed mechanism cooperating to effect the feed of the work while the needle is in the work, said needle mechanism including a plurality of needles and said under-feed mechanism including a feed-dog provided with as many needle-holes as there are needles.

3. In a sewing-machine, a needle-bar and needle, means to reciprocate them vertically, a gate in which the needle-bar is mounted, means to move said gate transversely to the vertical movements of the needle-bar, a feed-dog provided with a needle-hole and means for actuating said feed-dog, combined with adjusting means common to both the needle-



carrying gate and feed-dog for conjointly effecting a like amplitude of feed movement of the needle and feed-dog while the needle is in the material, substantially as described.

5 4. In a sewing-machine, a combined reciprocating and vibrating needle mechanism, said needle mechanism including a plurality of needles, an under-feed mechanism including a feed-dog provided with as many needle-holes  
10 as there are needles, said needle mechanism and under-feed mechanism cooperating to effect the feed of the material while the needles are in the goods, combined with adjusting means common to both the needles and feed-  
15 dog actuating mechanism for conjointly effecting a like amplitude of feed movements of

the needles and feed-dog, substantially as described.

5. In a sewing-machine, a needle and means to impart to it reciprocating and vibrating 20 movements, combined with an under-feed mechanism having a feed-dog provided with a needle-hole with which the needle coacts to assist the feed of the material when the feed-  
25 dog and needle are actuated to feed the material.

In testimony whereof I have hereunto set my hand this 22d day of March, A. D. 1904.

CHARLES FREDERICK GRAY.

Witnesses:

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WM. H. FINCKEL.