

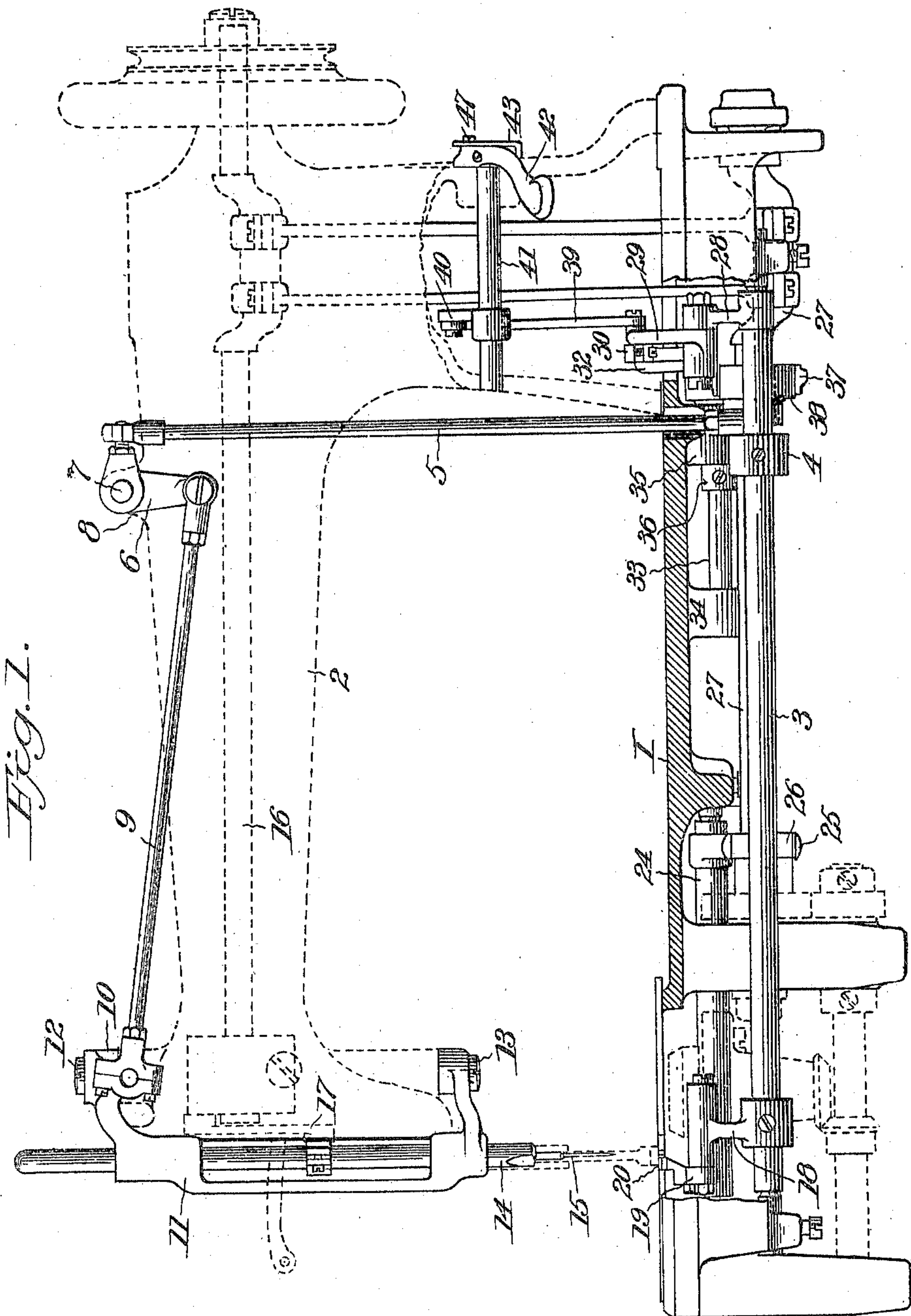
No. 821,587.

PATENTED MAY 22, 1906.

C. F. GRAY.
FEEDING MECHANISM FOR SEWING MACHINES.

APPLICATION FILED MAR. 26, 1904.

3 SHEETS—SHEET 1.



WITNESSES:

C. H. Walker,
J. T. Walker.

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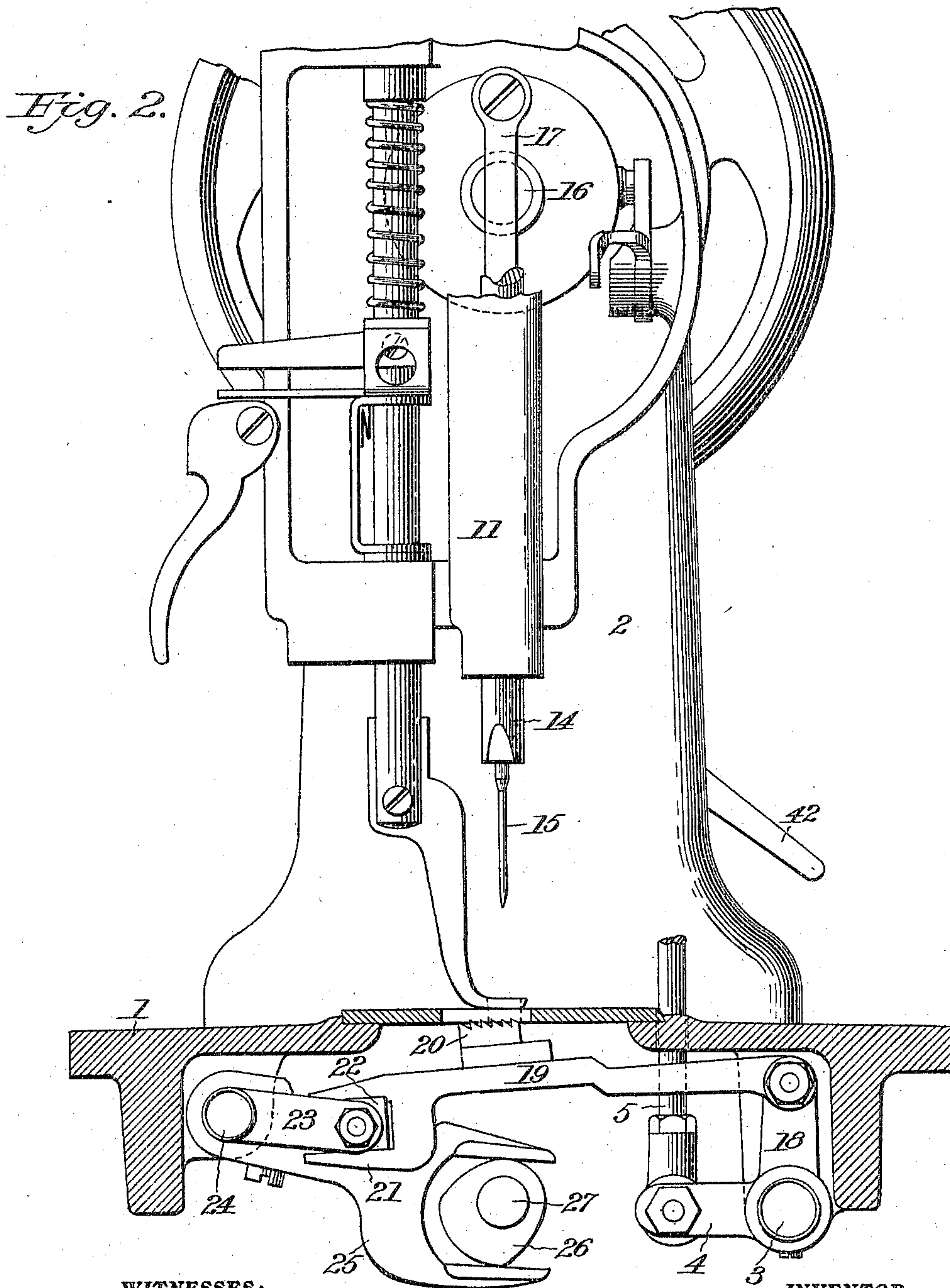
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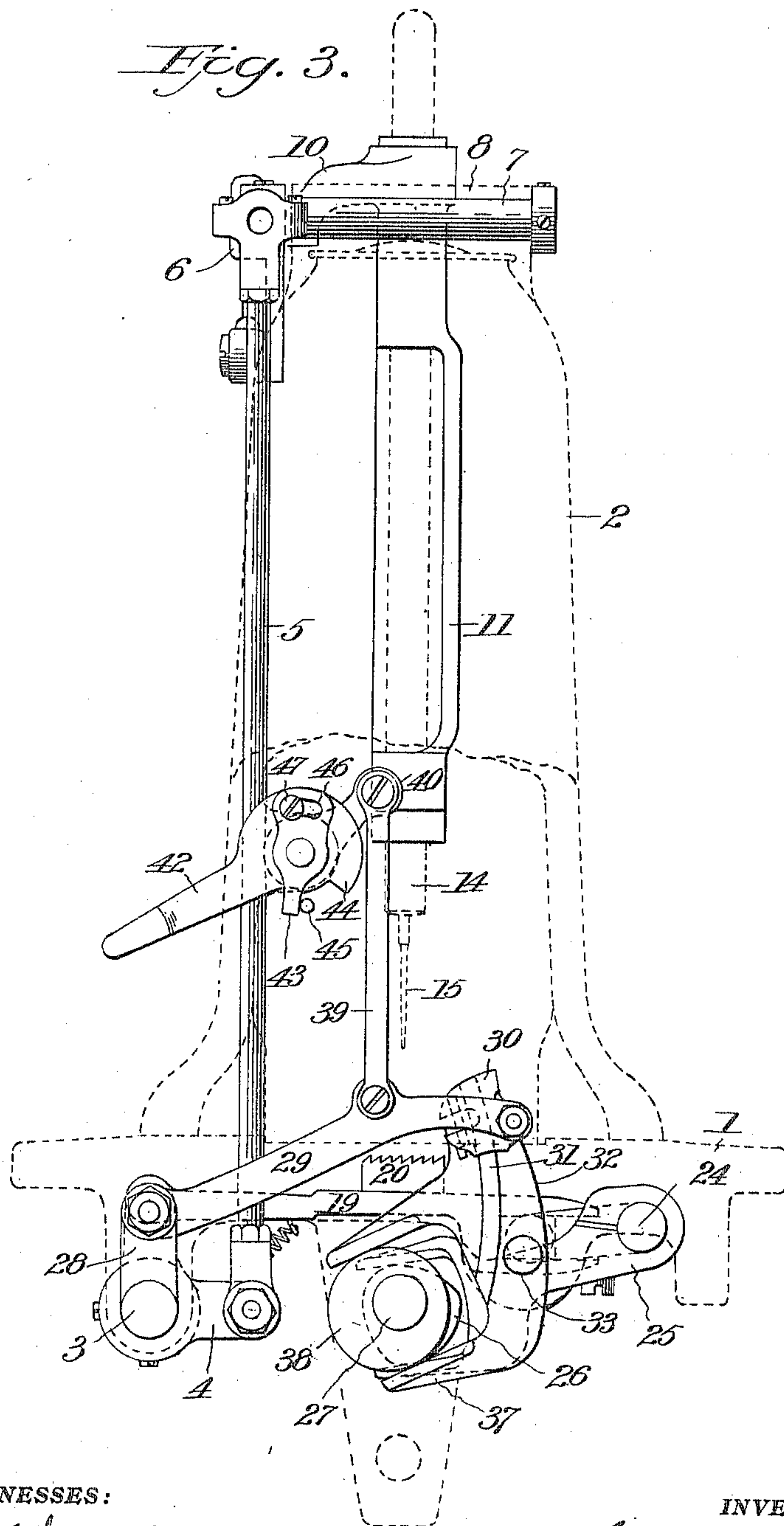
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UNITED STATES PATENT OFFICE.

CHARLES FREDERICK GRAY, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR
TO WHEELER & WILSON MANUFACTURING COMPANY, OF BRIDGE-
PORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

FEEDING MECHANISM FOR SEWING-MACHINES.

No. 821,587.

Specification of Letters Patent.

Patented May 22, 1906.

Application filed March 26, 1904. Serial No. 200,183.

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 Feeding Mechanisms for Sewing - Machines, 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 and an underfeed mechanism.

The invention comprises a reciprocating needle having also a motion substantially in the direction of the length of feed, a feed-dog having a four-motion or other equivalent feed, the two coöperating while the needle is in the material to advance or feed the material, and means for simultaneously adjusting the throw of the needle and of the feed-dog longitudinally of the feed to vary the length of stitch without in any wise interfering with the reciprocating movement of the needle, but, on the contrary, maintaining the relative timing of the feeding mechanisms with respect to one another and to the needle reciprocation, all as will now be described 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 side elevation of a sewing-machine containing the invention, the arm and other features being shown in dotted lines. Fig. 2 is a front elevation, on a larger scale, the upper portions broken away and the bed-plate shown in section. Fig. 3 is a rear elevation, the stitch-regulating mechanism and needle-vibrator being in full lines and the frame and arm being in dotted lines.

The invention is herein shown as applied to the well-known Wheeler & Wilson vertical-hook vibrating-needle sewing-machine, but is not limited to this single use.

1 is the bed-plate, and 2 the overhanging arm. 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, having the feed-dog 20. 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 underfeed 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 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 described, 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, there-

fore, 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 underfeed, 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.

The invention is designed to be applied to ordinary sewing-machines without other alterations than those necessary to apply the new parts and effect the desired cooperation of elements.

Parts herein shown and not particularly described may be of usual or approved construction and arrangement, and, as an instance, reference is made to the fact that there is used a spring-depressed presser of usual or approved construction and mode of operation.

When an underfeed 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 underfeed 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 feeding mechanism for sewing-machines, the combination of a needle, means for reciprocating it and means for vibrating it, an underfeed-dog, means for imparting horizontal and vertical movements to the underfeed-dog and connections between the needle-vibrating mechanism and the underfeed mechanism for operating them conjointly to feed the work, and an adjusting mechanism for conjointly adjusting these two mechanisms and maintain the relative timing of the two feed mechanisms with respect to each other and to the reciprocating movement of the needle throughout their range of adjustment for effecting the proper feed of the work.

2. In a feeding mechanism for sewing-machines, the combination of a needle, means for reciprocating and means for vibrating said needle, an underfeed-dog, means including rock-shafts for imparting horizontal and vertical movements to the underfeed-dog, and means connecting the needle-vibrating and the underfeed mechanisms so that they conjointly feed the work, and a common adjusting mechanism therefor whereby the needle mechanism and the underfeed mechanism may be conjointly adjusted and the relative timing of the two with respect to each other and to the reciprocating movement of the needle maintained throughout their range of adjustment.

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

CHARLES FREDERICK GRAY.

Witnesses:

WM. H. NEAVITT,

WM. H. FINCKEL.