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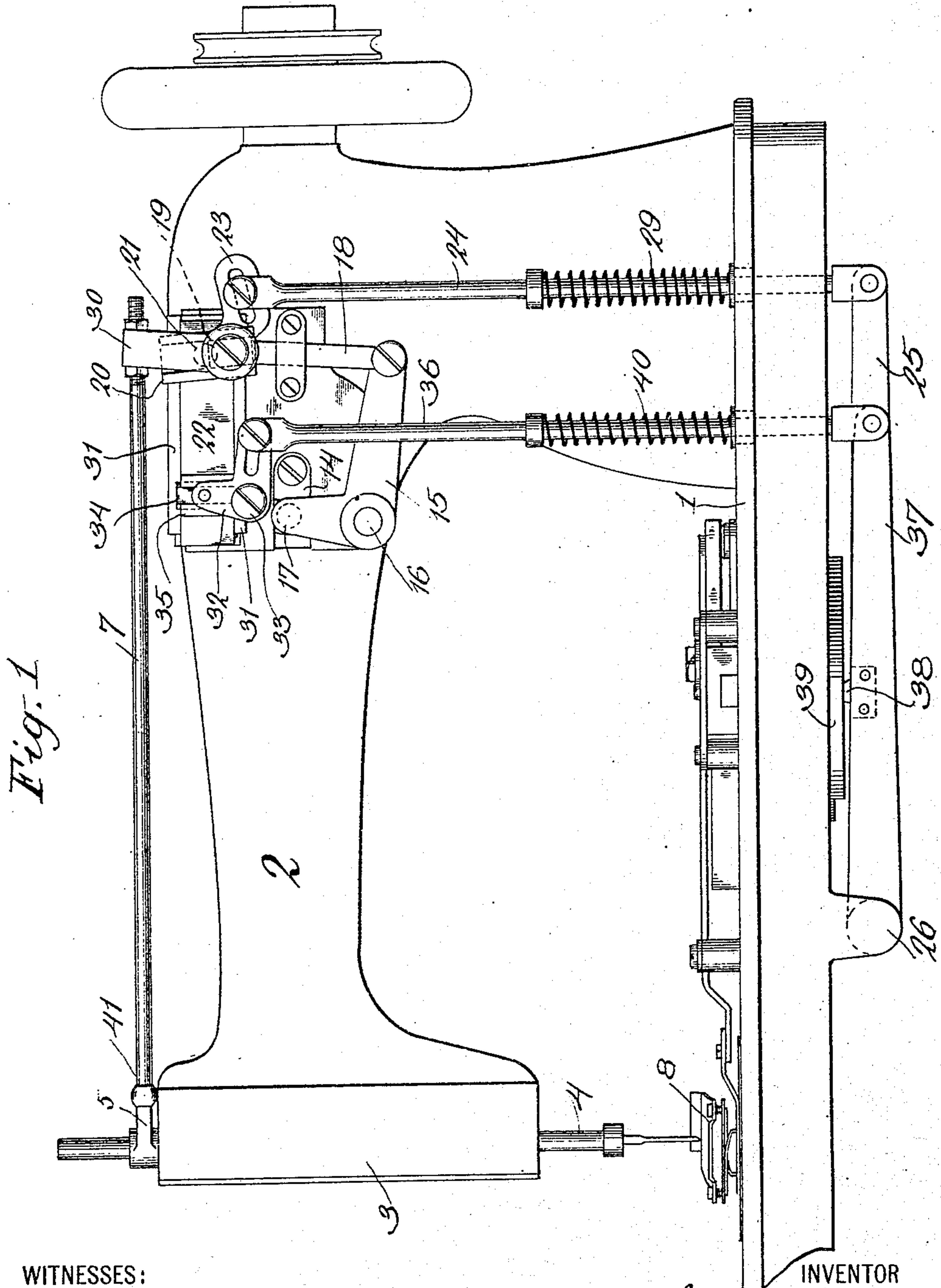
No. 787,177.

PATENTED APR. 11, 1905.

J. T. HOGAN.
BUTTONHOLE SEWING MACHINE.

APPLICATION FILED NOV. 18, 1904.

3 SHEETS—SHEET 1.



WITNESSES:

J. W. B. B. B.
Benj. E. Teale

INVENTOR

James J. Hogan
BY
Chapin Heywood Mather
his ATTORNEY.

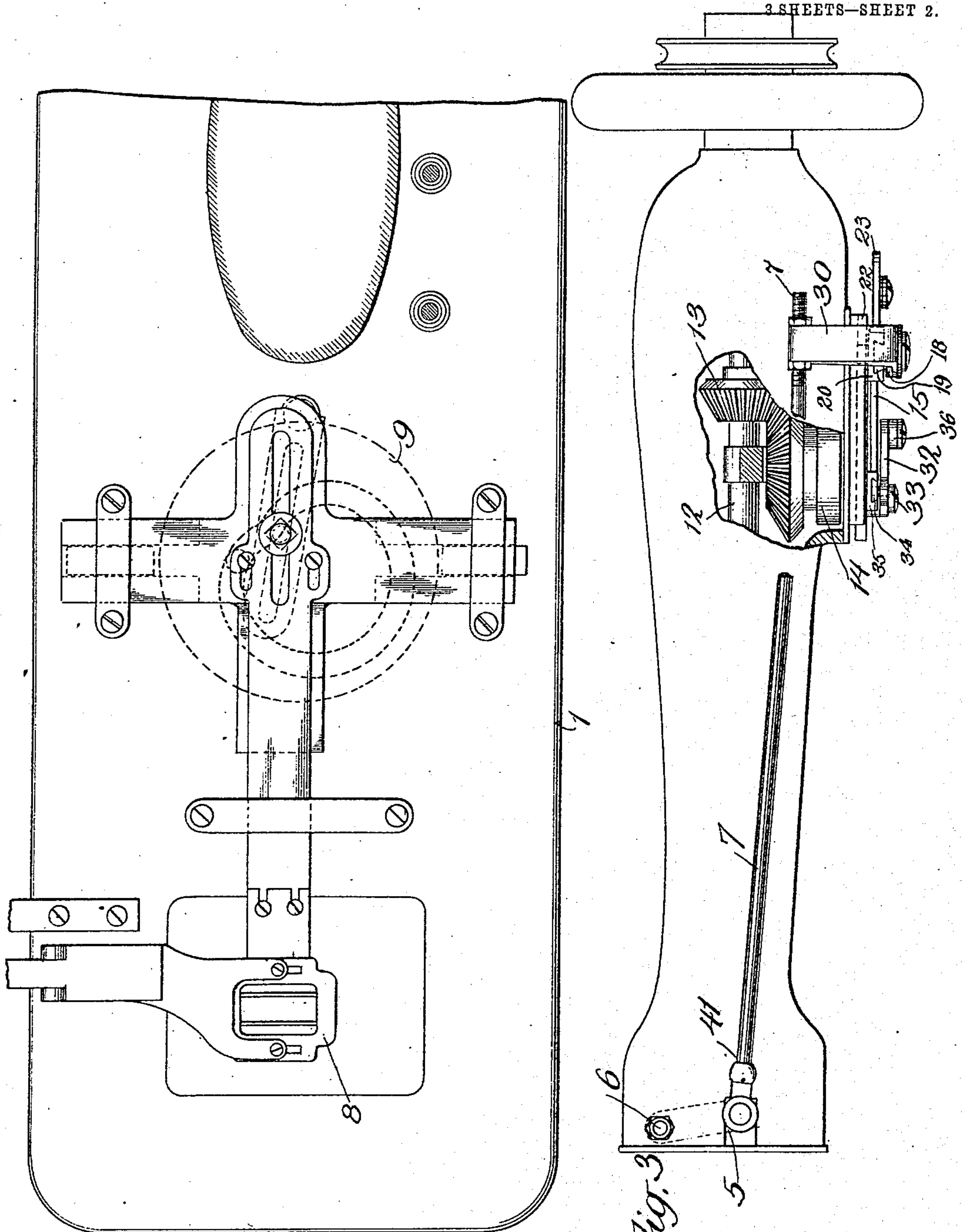
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3 SHEETS—SHEET 2.



WITNESSES:

J. W. B. B. B.
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Fig. 2

Fig. 3

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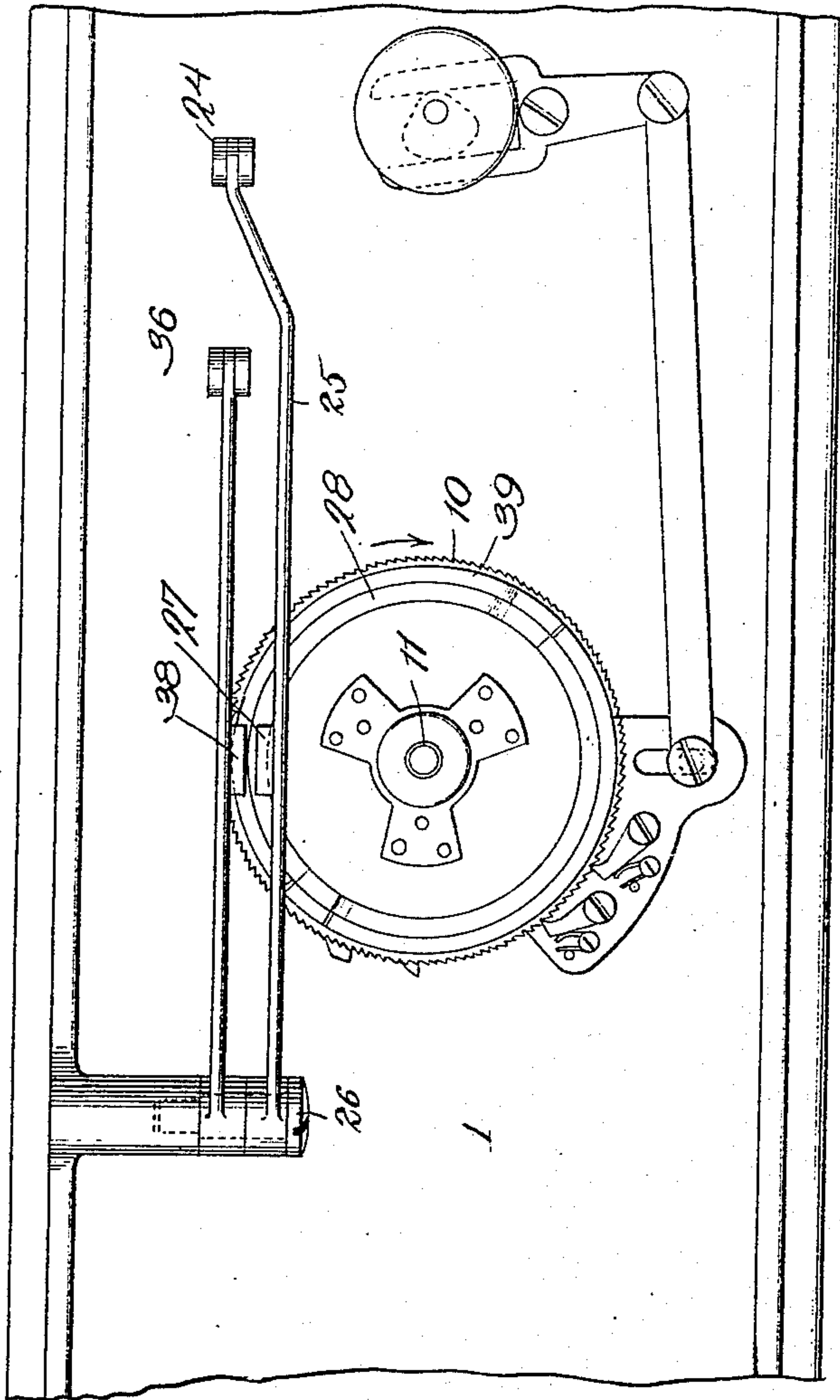


Fig. 4

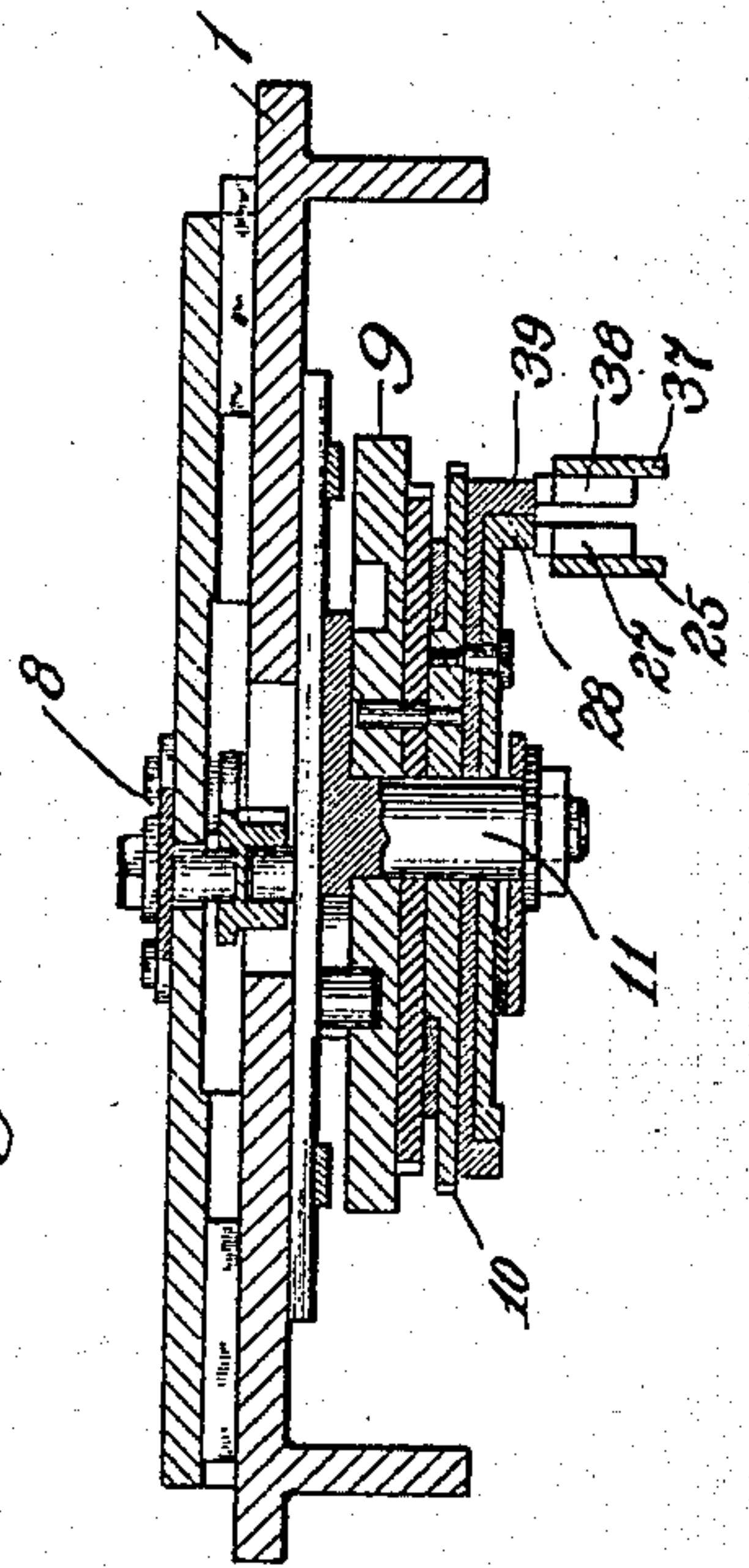


Fig. 5

WITNESSES:
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Fig. 6

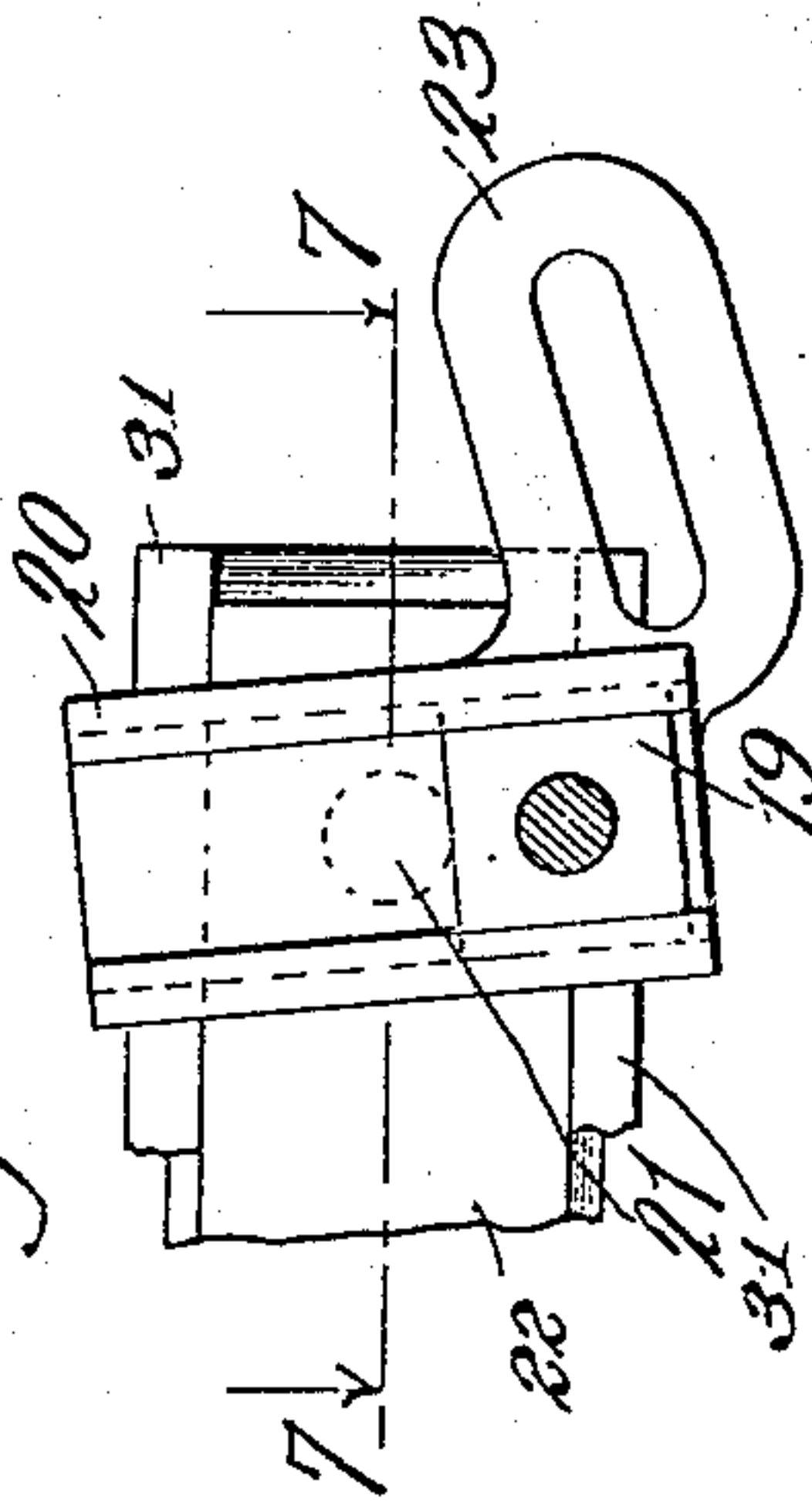
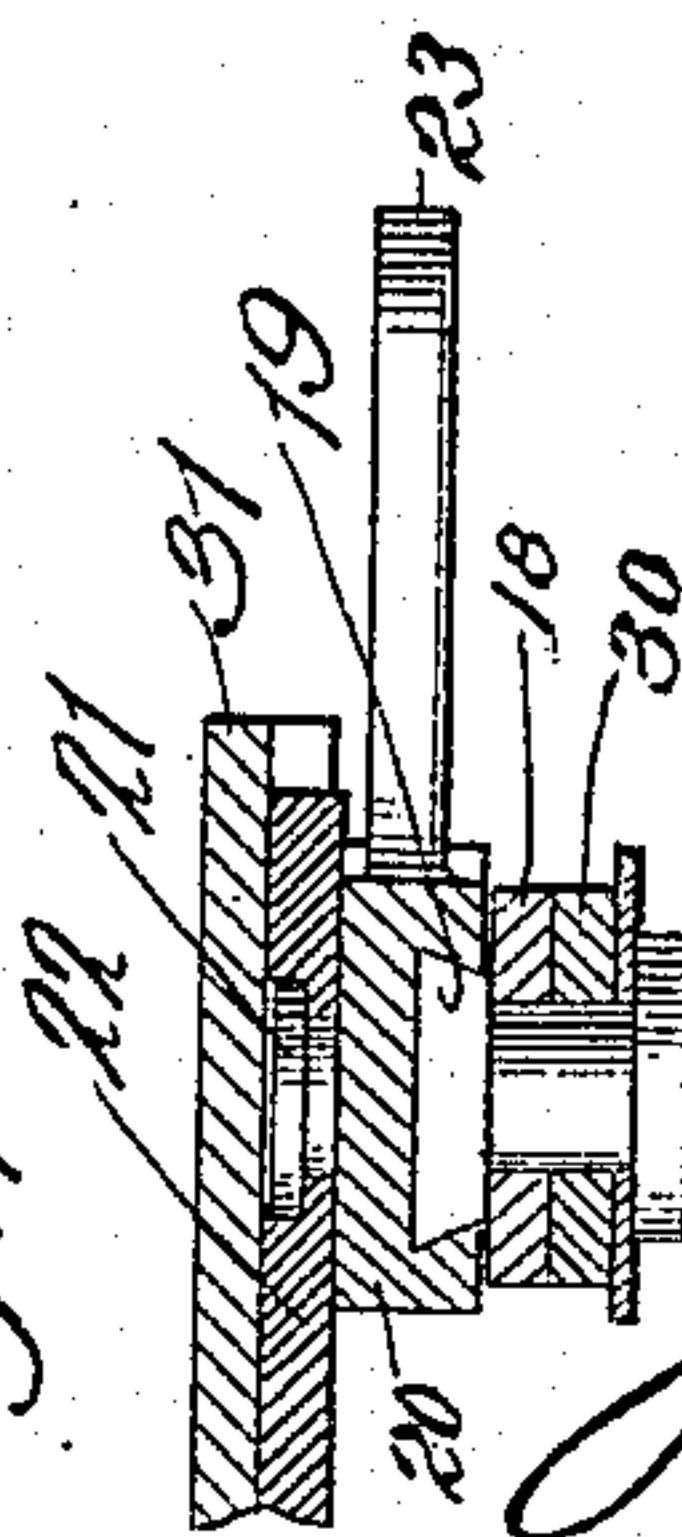


Fig. 7



INVENTOR

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UNITED STATES PATENT OFFICE.

JAMES T. HOGAN, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO THE NATIONAL MACHINE COMPANY, OF MAMARONECK, NEW YORK, A CORPORATION OF NEW YORK.

BUTTONHOLE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 787,177, dated April 11, 1905.

Application filed November 18, 1904. Serial No. 233,246.

To all whom it may concern:

Be it known that I, JAMES T. HOGAN, a citizen of the United States of America, and a resident of Jersey City, county of Hudson, State of New Jersey, have invented certain new and useful Improvements in Buttonhole-Sewing Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My present invention relates to improvements in buttonhole-sewing machines, and particularly to improvements in machines for sewing square-end buttonholes.

My invention consists in an improved means for automatically controlling the jogging movements of the needle to produce overseaming-stitches to vary both the amplitude and field thereof, whereby side stitches for either side of the buttonhole may be produced and barring-stitches for the end thereof.

The main object of my invention is to simplify the mechanism and render the movements of the various parts easy and simple in character, so that the machine may be capable of operation at extremely-high speeds.

My invention also consists in certain novel details of construction and combination of parts, as will hereinafter be more fully set forth.

I will now proceed to describe a machine embodying my invention, with reference to the accompanying drawings, and will then point out the novel features in claims.

In the drawings, Figure 1 is a view in side elevation of a machine embodying my invention. Fig. 2 is a top view thereof with the overhanging arm removed. Fig. 3 is a top view of the overhanging arm removed, certain parts being broken away and in section in order to show the parts beneath them. Fig. 4 is an under side view of the machine, showing the controlling-cams, the feed-wheel, and the operating means therefor. Fig. 5 is a view in central transverse section through the bed of the machine, the plane of section being taken transversely through the axis of the feed-plate. Fig. 6 is a detail detached view showing particularly a rocking guideway and

some correlated parts. Fig. 7 is a view thereof in horizontal section, the plane of the section taken upon the line 7 7 of Fig. 6.

The machine illustrated comprises the usual bed-plate 1, overhanging arm 2, and front head 3. The needle-bar 4 is mounted to reciprocate vertically in a swinging gate 5, pivoted to a support 6, and a connecting-rod 7 connects the vibrating gate with the means for imparting lateral vibrating movements thereto and constitutes, therefore, a movement-transmitting means. A work-clamp 8 presents the work for stitching beneath the needle-bar, and the said clamp may be fed longitudinally backward and forward by any suitable means, as by a heart-shaped cam 9 and suitable intermediate mechanism. The heart-shaped cam is connected with a feed-wheel 10, rotatably mounted upon a stud 11, suitable means being provided for imparting a step-by-step movement to the said feed-wheel.

A drive-shaft 12 for the machine is located in the overhanging arm 2 and imparts movement through suitable bevel-gearing 13 to an operating-cam 14. This operating-cam imparts continuous reciprocating movement of unvarying amplitude to a vibrating element, here shown in the form of a bell-crank lever 15. Said bell-crank lever is pivotally mounted at 16, and the short arm thereof is provided with a cam-follower 17, which engages a cam-groove in the said cam 14. The long arm of the bell-crank lever 15 is connected, by means of a link 18, with a slide 19. The slide 19 is mounted in a rocking guideway 20, said guideway pivotally mounted at 21 upon a slide 22. The rocking guideway 20, as shown more clearly in Fig. 6, has a slotted extension or arm 23, to which is adjustably secured the upper end of a connecting-rod 24. The lower end of the connecting-rod 24 is connected to a lever 25, pivoted to the bed-plate at 26 and provided with a cam-follower 27. Said cam-follower engages a cam 28, carried by the feed-wheel 10, a spring 29 operating to hold the cam-follower against the cam. Vibration of the bell-crank 15 will cause the slide 19 to reciprocate backward and forward

in the guideway 20, and if the guideway is arranged oblique with respect to a straight line intersecting the point of connection of the connecting-rod 7 with the swinging gate 5 and passing midway between the limits of travel of the slide 19 in the guideway 20, as shown in Fig. 1, the effect of this will be to cause a relative lateral or sidewise movement of the slide at each reciprocation.

Attached to the slide 19 is an arm 30, to which the inner end of the connecting-rod 7 is adjustably secured. Lateral movement of the slide 19 will then be transmitted through the connecting-rod 7 to the vibrating gate 5, whereby lateral or jogging movement will be imparted thereto. It will be clear that the extent of the lateral movements imparted to the gate 5 for each reciprocation of the slide along same will depend upon the angle of the guideway 20. The position of the guideway 20 is determined by the cam 28 through the cam-follower lever 25 and the connecting-rod 24, so that it is only necessary to provide a cam 28 of the proper contour to vary the amplitude of the jogging movements at will. Further, by adjustment of the connecting-rod 24 along the slotted arm 23 the angular movement imparted to the rocking guideway may be varied for a given throw of the cam. I have also shown means for shifting the field of operation of the jogging movements by laterally shifting the slide 22, and thereby the point of support 21 of the rocking slide 20. The slide 22 is mounted between stationary guides 31 and is engaged by a bell-crank lever 32, pivotally mounted upon the arm 2 at 33. One end of the said lever 32 is pivoted to a small slide 34, mounted to move in ways 35, secured to the slide 22 at right angles to its path of movement, and the other arm of the said bell-crank lever 32 is adjustably connected to the upper end of a connecting-rod 36. The lower end of the connecting-rod 36 is connected to a lever 37, pivoted at 26 to the bed of the machine and provided with a cam-follower 38, which engages the operating-face of a cam 39, secured with the cam 28 to the feed-wheel 10. A spring 40 holds the cam-follower 38 against the operating-face of the cam 39. The cam 39, through the cam-follower lever 37, connecting-rod 36, and bell-crank lever 32, controls the position of the slide 22 and pivotal support 21 for the slide 20, and hence controls the field of operation of the jogging movements, as will be well understood. By this means the work and the needle may be correctly positioned with respect to each other, so that side stitches may be produced upon either side of the buttonhole, or the work and needle may be centered with respect to each other at the time barring-stitches are effected. I wish it to be understood, however, that while the foregoing means for positioning the work with respect to the needle is preferred and is a part of my pres-

ent invention and is claimed herein other means may be employed for this purpose in combination with the novel means for controlling the lateral jogging movements of the needle within the scope of my invention.

The operation of a machine for sewing a complete buttonhole is as follows: Jogging movements of an amplitude sufficient for side stitching are imparted by the cam 14 through the bell-crank lever 15, connecting-link 18, slide 19, and connecting-rod 7 to the vibrating gate while the work is being fed longitudinally by the clamp feeding means, the cam-followers 27 and 28 resting upon properly-disposed dwell portions of the cams 28 and 39 at this time. When the end of the buttonhole is reached, the cam 39 reaches a point where it raises or lowers the lever 37 (in accordance with on which side of the buttonhole the overseaming is first made) so as to move the slide 22 and pivotal support 21 to a central position, thereby centering the needle and work with respect to each other. At this moment the cam 28 will rock the guideway 20 upon its support, so as to increase the angle thereof with respect to the perpendicular, thereby increasing the amplitude of lateral movements imparted to the needle-gate through the connecting-rod 7 to effect barring-stitches. When the barring-stitches at this end of the buttonhole are completed, the cam 28 will further shift the slide 22 and support 21 so that the needle and work will be positioned with respect to each other on the opposite side of the buttonhole and the cam 39 will return the rocking guideway 20 to its normal position, so that overseaming-stitches will be initiated upon the side of the buttonhole opposite to that last operated upon. Stitching of this character will be continued while the work-clamp is again moved longitudinally by its feeding means until the opposite or starting end of the buttonhole is again reached. At this point the cam 28 again centers the needle and work with respect to each other, while the cam 39 shifts the guideway 20 to a position for barring-stitches. When the barring-stitches are completed, the cams 28 and 39, respectively, operate to shift the support 21 and slide 20 to their initial positions, and a cycle of operation has been completed. It may here be stated that while the slide 19 has a vertical as well as a lateral movement, and hence a similar motion is imparted to the inner end of the connecting-rod 7, lateral movement only is imparted to the vibrating gate, the said connecting-rod being connected with the gate by a suitable joint 41, by which binding or springing of the parts is prevented. Further, it will be noted that sufficient play is left between the connecting-rods 24 and 36, respectively, and the bed of the machine at the points through which they penetrate same so as to permit lateral movements of the said connecting-rods due to the shifting of the slide 22 and the rocking of the

ell-crank 32 and of the guideway 20 upon their supports.

In the use of the term "angularly" throughout the specification and claims as applied to the guideway 20 I intend to define the same as obliquely arranged with respect to a straight line intersecting the point of connection 41 of the connecting-rod 7 with the swinging gate and passing midway between the limits of travel of the slide 19 in the guideway 20.

It will be obvious that the foregoing is but one embodiment of my invention and that the same is capable of many and varied modifications within the spirit and scope of my invention, and, further, that certain parts may be employed in connection with other parts of different construction. Hence I do not desire to be limited only to the precise details of construction and combination of parts herein.

What I claim is—

1. In a sewing-machine, the combination with stitch-forming mechanism, including a vertically-reciprocating needle-bar, of an angularly-arranged guideway, a slide guided thereby, means connecting said slide with said needle-bar, means for reciprocating said slide and guideway with respect to each other to transmit jogging movements to the needle-bar for producing overseaming side stitches, and means for increasing the amplitude of the jogging movements thus imparted, to produce end barring-stitches.

2. In a sewing-machine, the combination with stitch-forming mechanism, including a vertically-reciprocating needle-bar, of an angularly-arranged guideway rotatably mounted, a slide guided thereby, means connecting said slide with said needle-bar, means for reciprocating said slide along said guideway to transmit jogging movements to the needle-bar for producing overseaming side stitches, and means for rotatably moving the guideway to angularly adjust same, whereby the amplitude of the jogging movements imparted to the needle-bar may be increased to produce end barring-stitches.

3. In a sewing-machine, the combination with stitch-forming mechanism, including a vertically-reciprocating and laterally-vibrating needle-bar, of an angularly-arranged guideway, a slide guided thereby, said slide connected with said needle-bar, means for reciprocating said slide along the guideway to produce the laterally-vibrating movements of the needle-bar, and means automatically controlled in the operation of the machine for angularly adjusting the guideway, thereby regulating the amplitude of the lateral movements imparted to the needle-bar.

4. In a sewing-machine, the combination with stitch-forming mechanism, including a vertically-reciprocating needle-bar, of an angularly-arranged guideway, a slide guided thereby, means connecting said slide with said needle-bar, means for reciprocating said slide

along said guideway to transmit jogging movements to the needle-bar for producing side stitches, and a cam for angularly adjusting the guideway, whereby the amplitude of the jogging movements thus imparted may be increased to produce end barring-stitches.

5. In a sewing-machine, the combination with stitch-forming mechanism, including a vertically-reciprocating and laterally-vibrating needle-bar, and a work-clamp for presenting the work for stitching, of an angularly-arranged guideway, a slide guided thereby, said slide connected with said needle-bar, means for reciprocating said slide along said guideway to produce the laterally-vibrating movements of the needle-bar, a feed-wheel for controlling the position of said work-clamp, and a cam operated from said feed-wheel for angularly adjusting the guide to vary the amplitude of the lateral movements imparted to the needle-bar.

6. In a sewing-machine, the combination with stitch-forming mechanism, including a vertically-reciprocating needle-bar, of an angularly-arranged and pivotally-mounted guideway, a slide guided thereby, means connecting said slide with said needle-bar, means for reciprocating said slide along said guideway to transmit jogging movements to the needle-bar, means connecting with said guideway for angularly adjusting same to vary the amplitude of the said jogging movements, said means capable of manual adjustment with respect to said guideway, substantially as set forth.

7. In a sewing-machine, the combination with stitch-forming mechanism, including a vertically-reciprocating needle-bar, of an angularly-arranged guideway, a slide guided thereby, means connecting said slide with said needle-bar, means for reciprocating said slide and guideway with respect to each other to transmit jogging movements to the needle-bar for producing overseaming-stitches, and means for shifting the position of the needle and work laterally with relation to each other to vary the field of such jogging movements.

8. In a sewing-machine, the combination with stitch-forming mechanism, including a vertically-reciprocating needle-bar, of an angularly-arranged guideway, a support therefor, a slide for said guideway, means connecting said slide with said needle-bar, means for reciprocating said slide and guideway with respect to each other to transmit jogging movements to the needle-bar for producing overseaming-stitches, and means for laterally shifting the support for said guideway, thereby shifting the field of operation of the said jogging movements.

9. In a sewing-machine, the combination with stitch-forming mechanism, including a vertically-reciprocating needle-bar, of an angularly-arranged guideway, a support therefor, a slide for said guideway, means connect-

ing said slide with said needle-bar, means for reciprocating said slide and guideway with respect to each other to transmit jogging movements to the needle-bar for producing over-
 5 seaming-stitches, a cam, and means operated thereby for laterally shifting the support for said guideway, thereby shifting the field of operation of said jogging movements.

10 10. In a sewing-machine, the combination with stitch-forming mechanism, including a vertically-reciprocating needle-bar, of an angularly-arranged guideway, a laterally-movable support upon which said guideway is pivotally mounted, a slide for said guideway,
 15 means connecting said slide with said needle-bar, means for reciprocating said slide along said guideway to produce overseaming-stitches, a feed-wheel, a cam operated thereby, and means intermediate said cam and said
 20 guideway-support for laterally moving same to vary the field of operation of the said jogging means.

11. In a sewing-machine, the combination with stitch-forming mechanism, including a
 25 vertically-reciprocating needle-bar, of an angularly-arranged guideway, a support therefor, a slide for said guideway, means connecting said slide with said needle-bar, means for reciprocating said slide and guideway with re-
 30 spect to each other to transmit jogging movements to the needle-bar for producing over-seaming-stitches, and means for laterally shifting the support for said guideway, thereby shifting the field of operation of the said jog-
 35 ging movements, said means manually adjustable for adjusting the extent of shifting movement imparted upon a movement thereof.

12. In a sewing-machine, the combination with stitch-forming mechanism, including a
 40 vertically-reciprocating needle-bar, of an angularly-arranged guideway, a support there-

for, a slide for said guideway, means connecting said slide with said needle-bar, means for reciprocating said slide along said guideway to transmit jogging movements to the needle-bar for producing overseaming side stitch means for angularly adjusting the said guideway to vary the amplitude of the jogging movements, whereby end barring-stitches may be produced, and means for laterally shifting the support for said guideway for shifting the field of operation of the said jogging movements.

13. In a sewing-machine, the combination with stitch-forming mechanism, including vertically-reciprocating and laterally-vibrating needle-bar, of an angularly-arranged guideway, a support upon which said guideway is pivotally mounted, a slide for said guideway, means connecting said slide with said needle-bar, means for reciprocating said slide along said guideway to produce the laterally-vibrating movements of said needle-bar, a feed-wheel, and cams controlled in the movements therefrom for angularly adjusting the guideway, and for laterally shifting the support therefor.

14. In a sewing-machine, the combination with stitch-forming mechanism, including vertically-reciprocating and laterally-vibrating needle-bar, of an angularly-arranged guideway, a slide therefor, means for connecting said slide with said needle-bar, a cam vibrating member operated by said cam, a link connecting said vibrating member with said slide, a feed-wheel, and means controlled therefrom for angularly adjusting the guideway.

JAMES T. HOGAN.

Witnesses:

D. HOWARD HAYWOOD,
 HARRIS W. SLATER.