

(No Model.)

5 Sheets—Sheet 1.

P. A. DARRACQ.  
SEWING MACHINE.

No. 406,431.

Patented July 9, 1889.

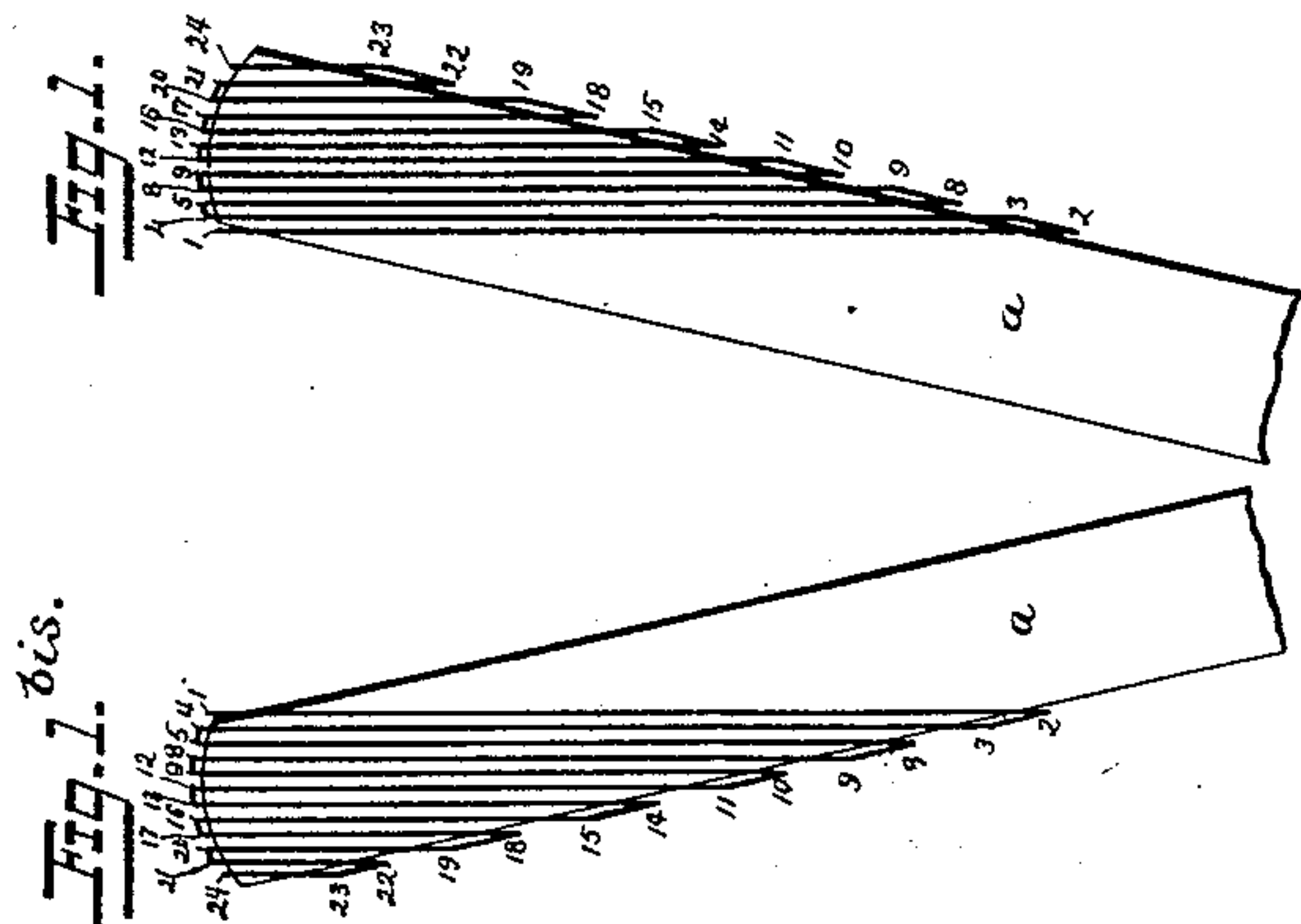


Fig. 11.

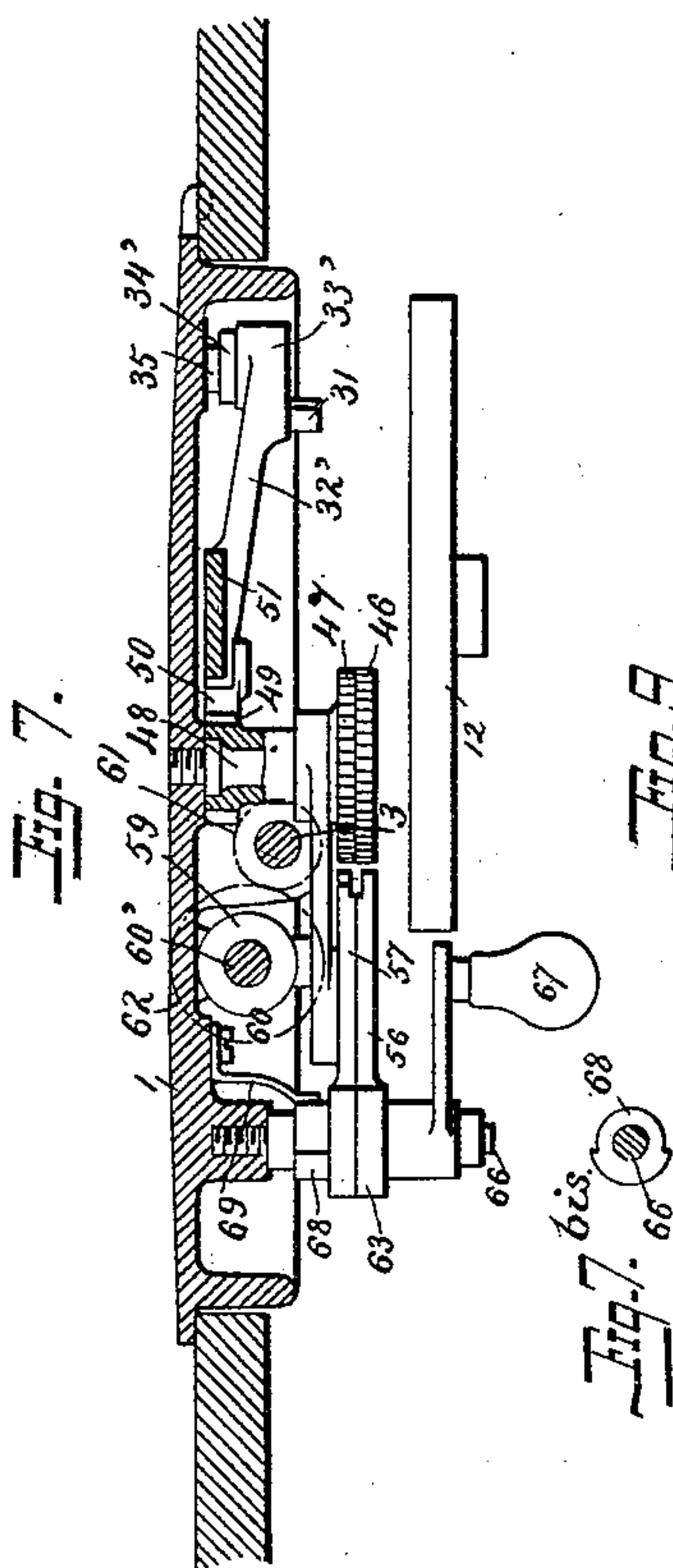
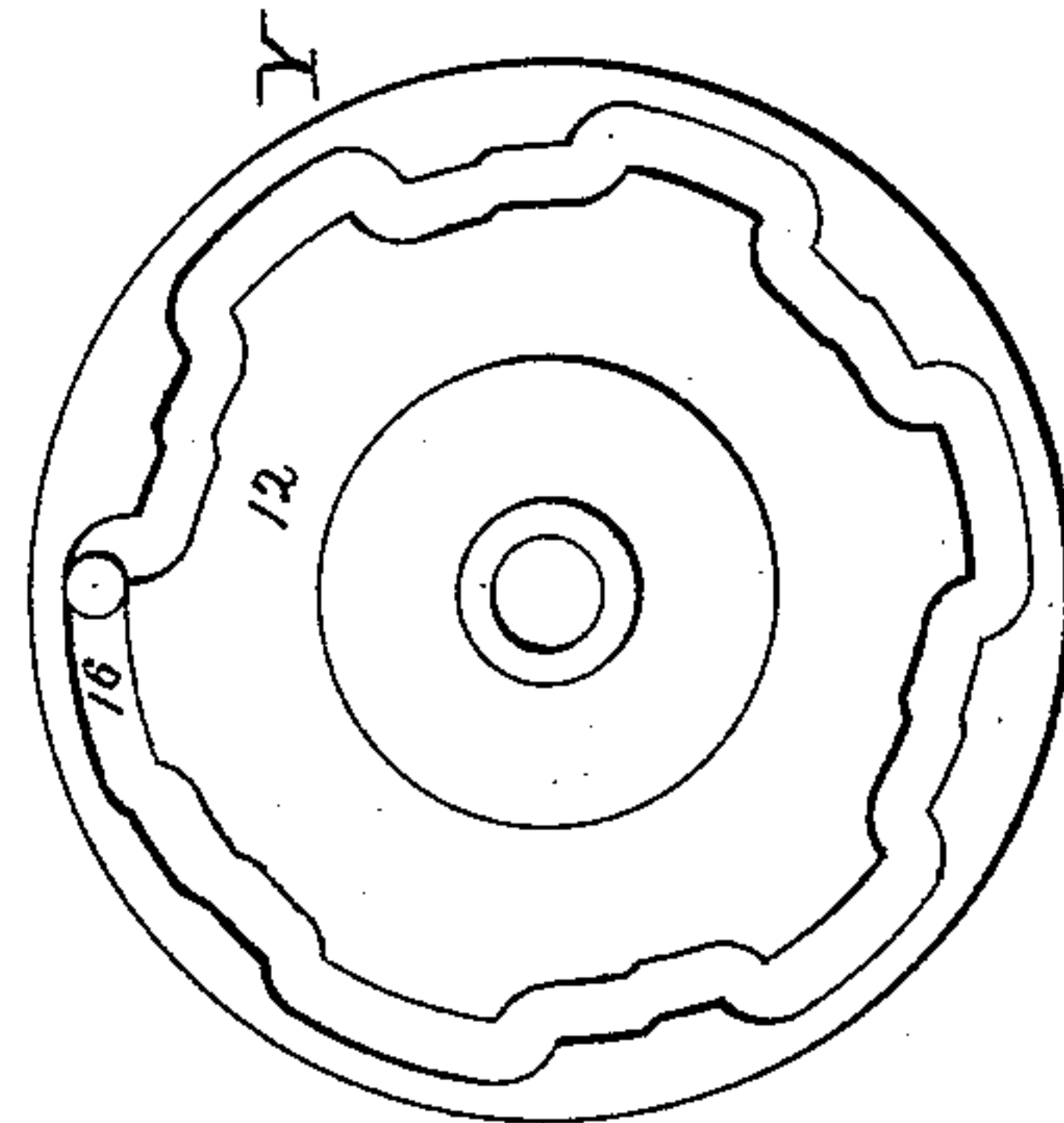


Fig. 8.

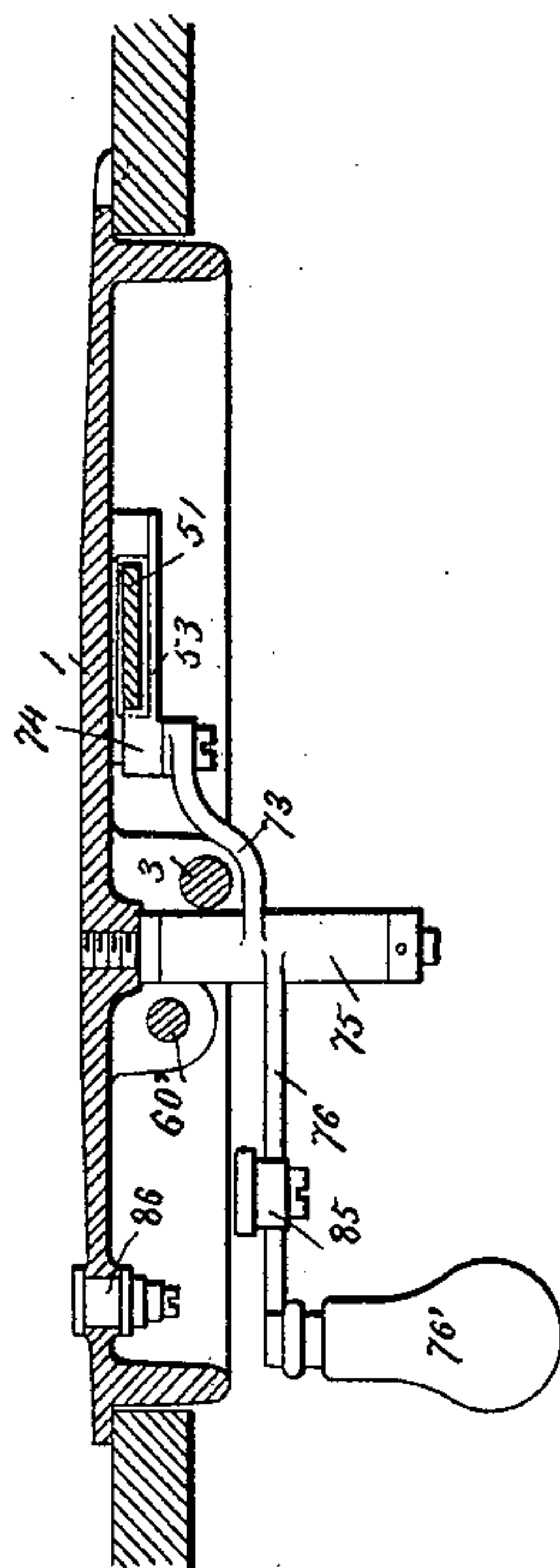
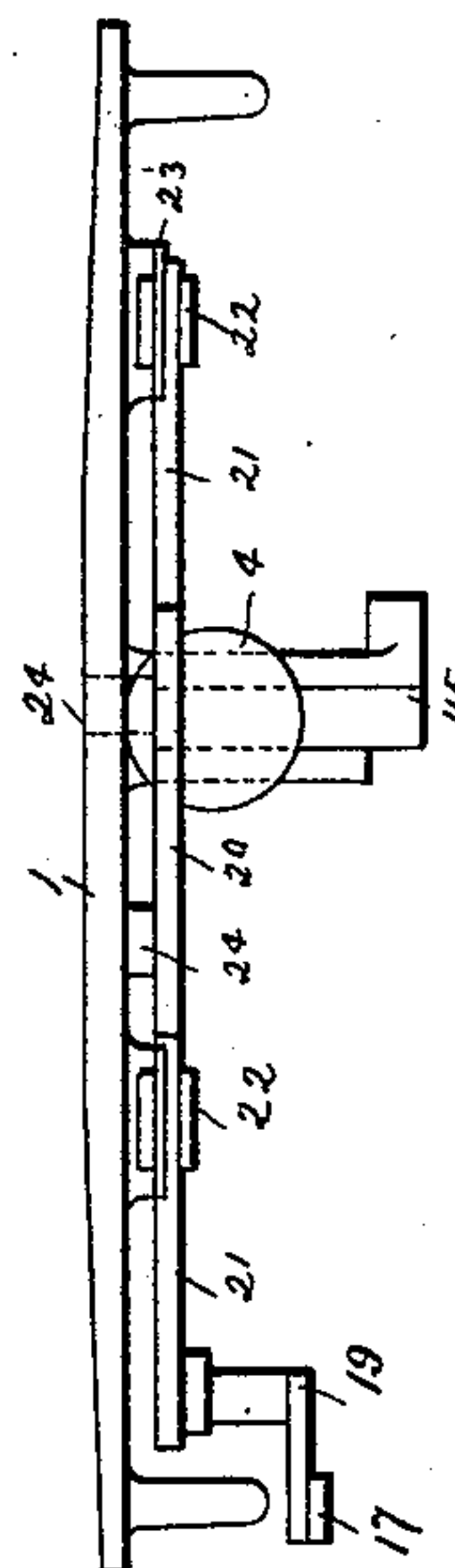


Fig. 10.



Witnesses  
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J. S. Barker

Pierre A. Daracq  
Inventor

By his Attorneys Foster & Freeman

(No Model.)

5 Sheets—Sheet 2.

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Fig. 2.

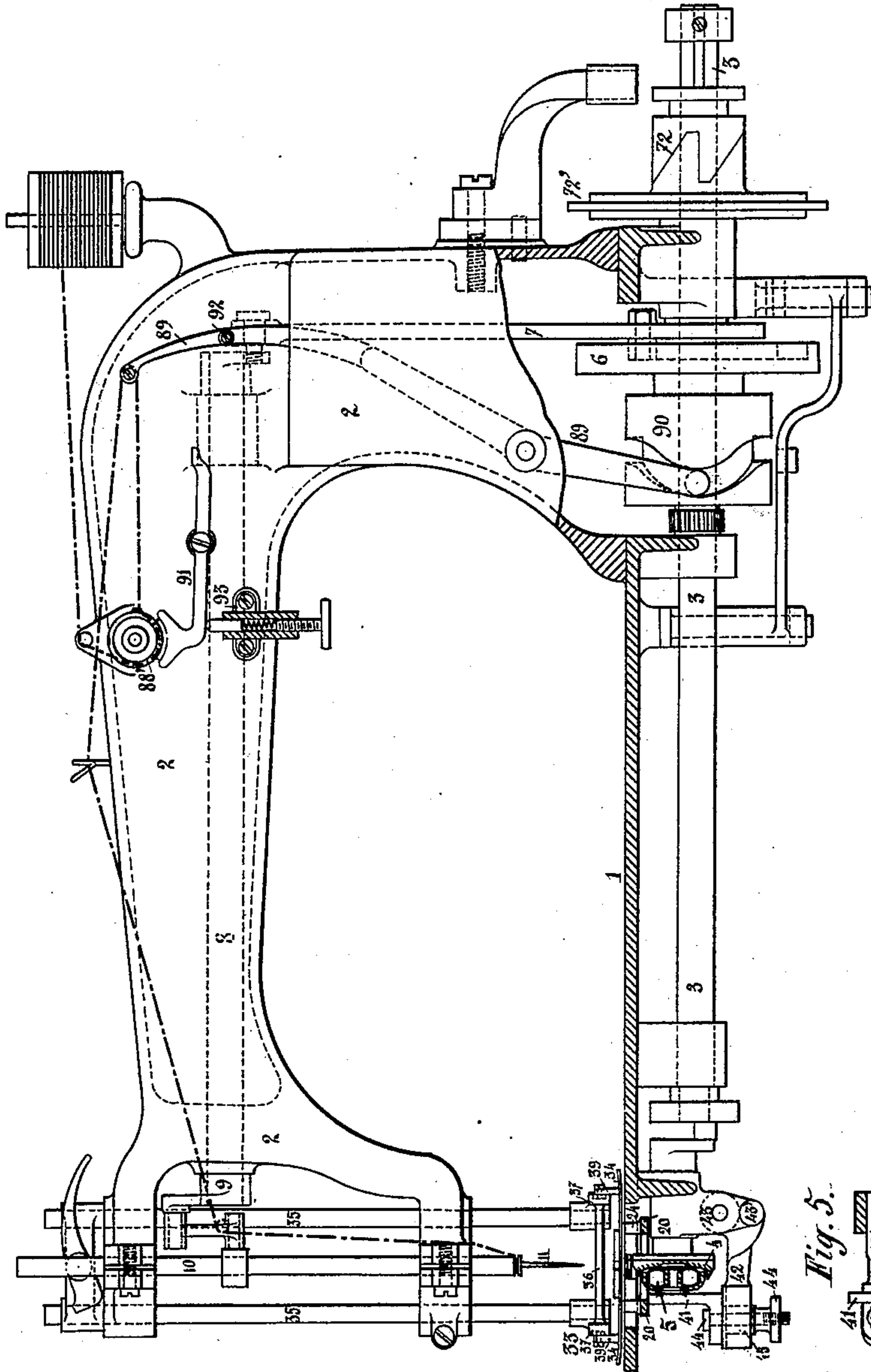


Fig. 3.

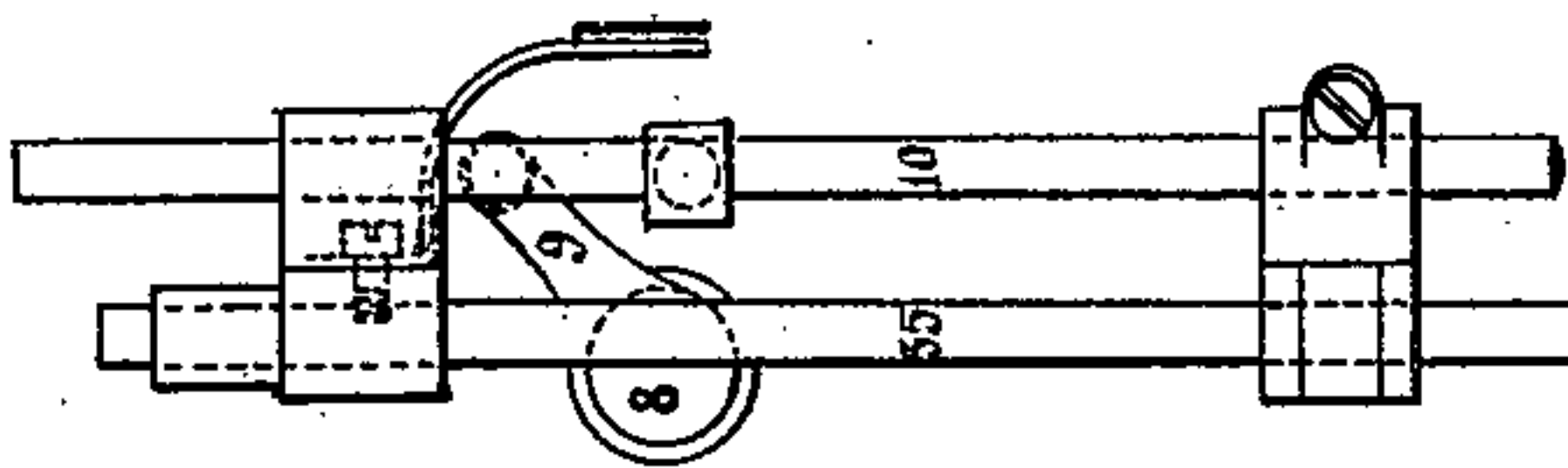


Fig. 4.

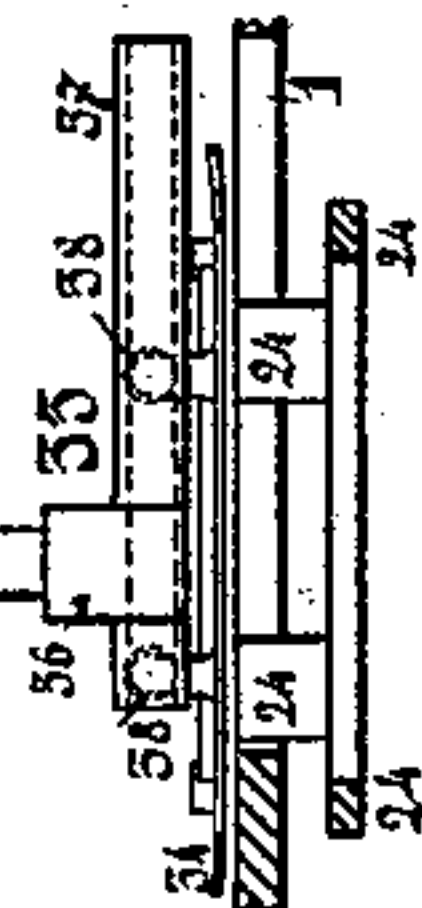
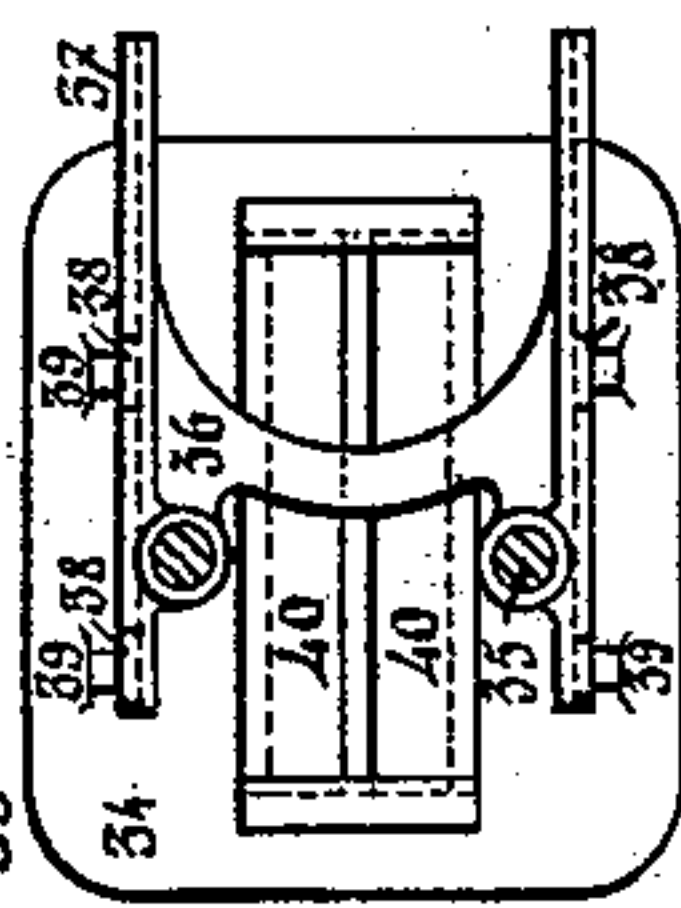


Fig. 5.



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INVENTOR:  
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By *Harding & Tichenor*  
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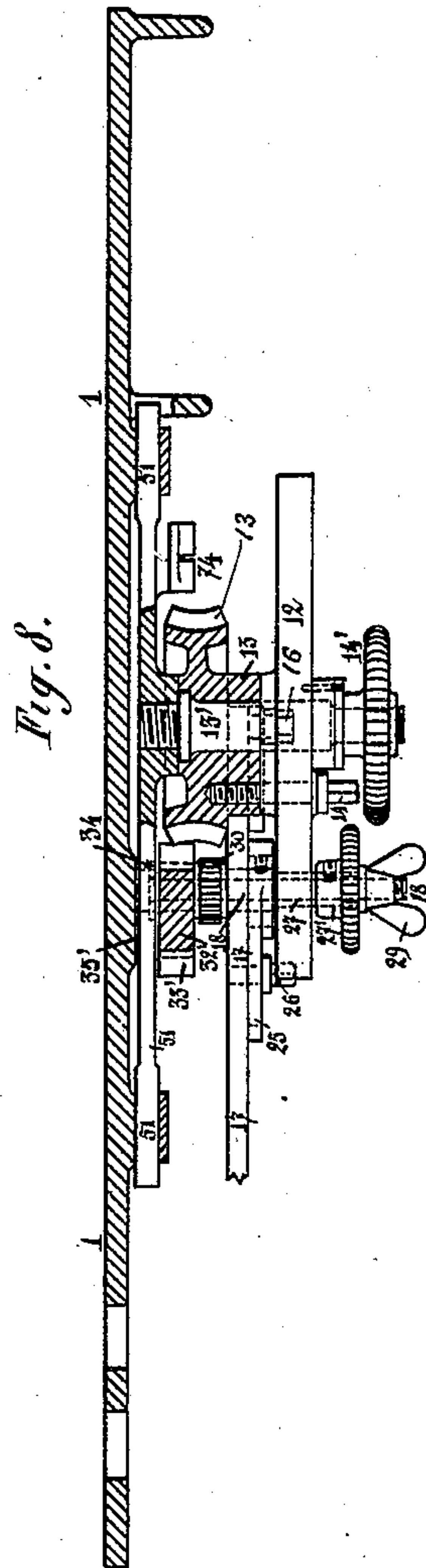
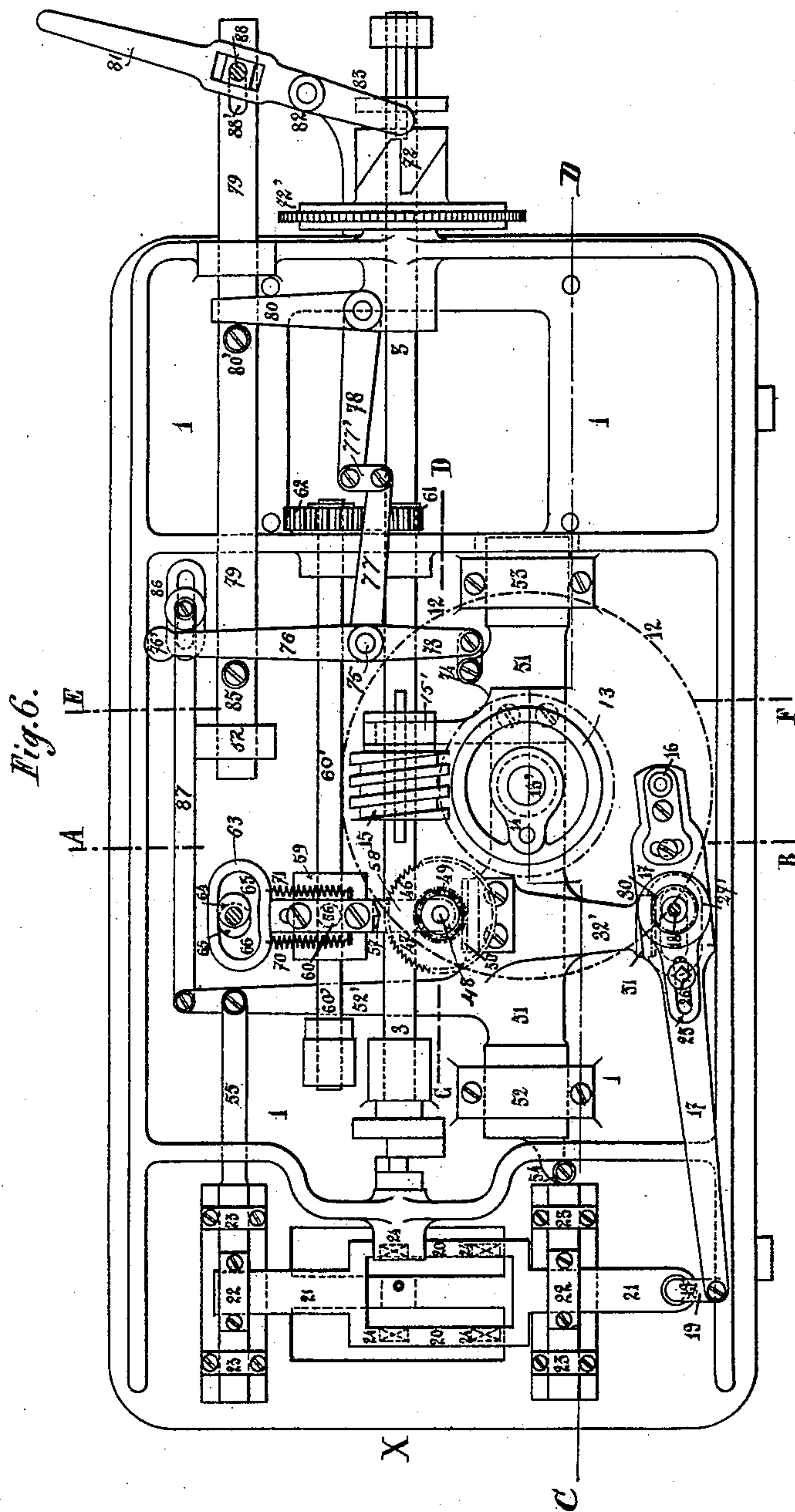
(No Model.)

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P. A. DARRACQ.  
SEWING MACHINE.

No. 406,431.

Patented July 9, 1889.



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(No Model.)

5 Sheets—Sheet 4.

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FIG. 13

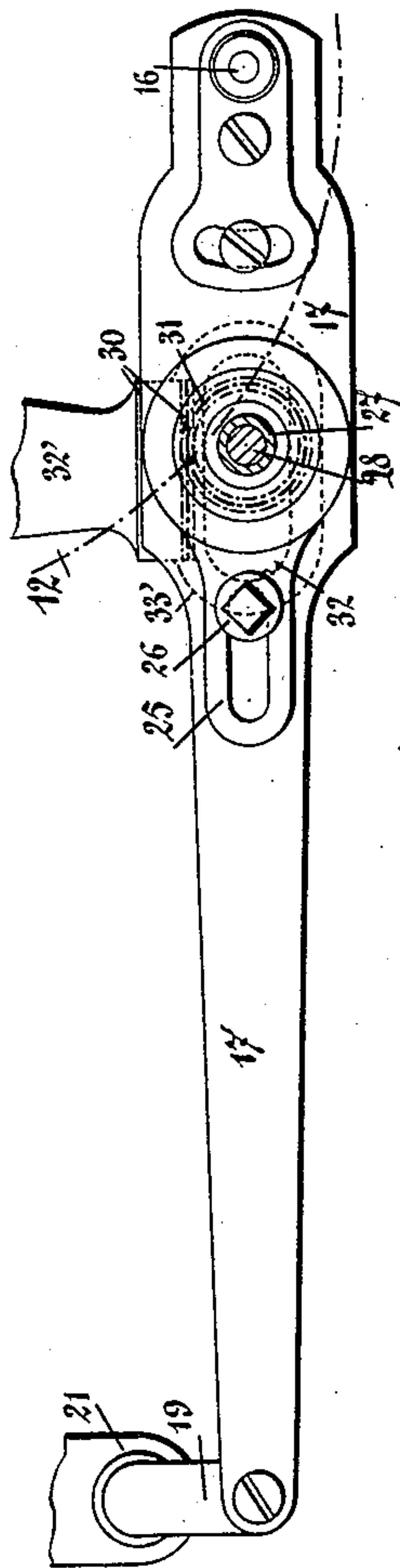


FIG. 12

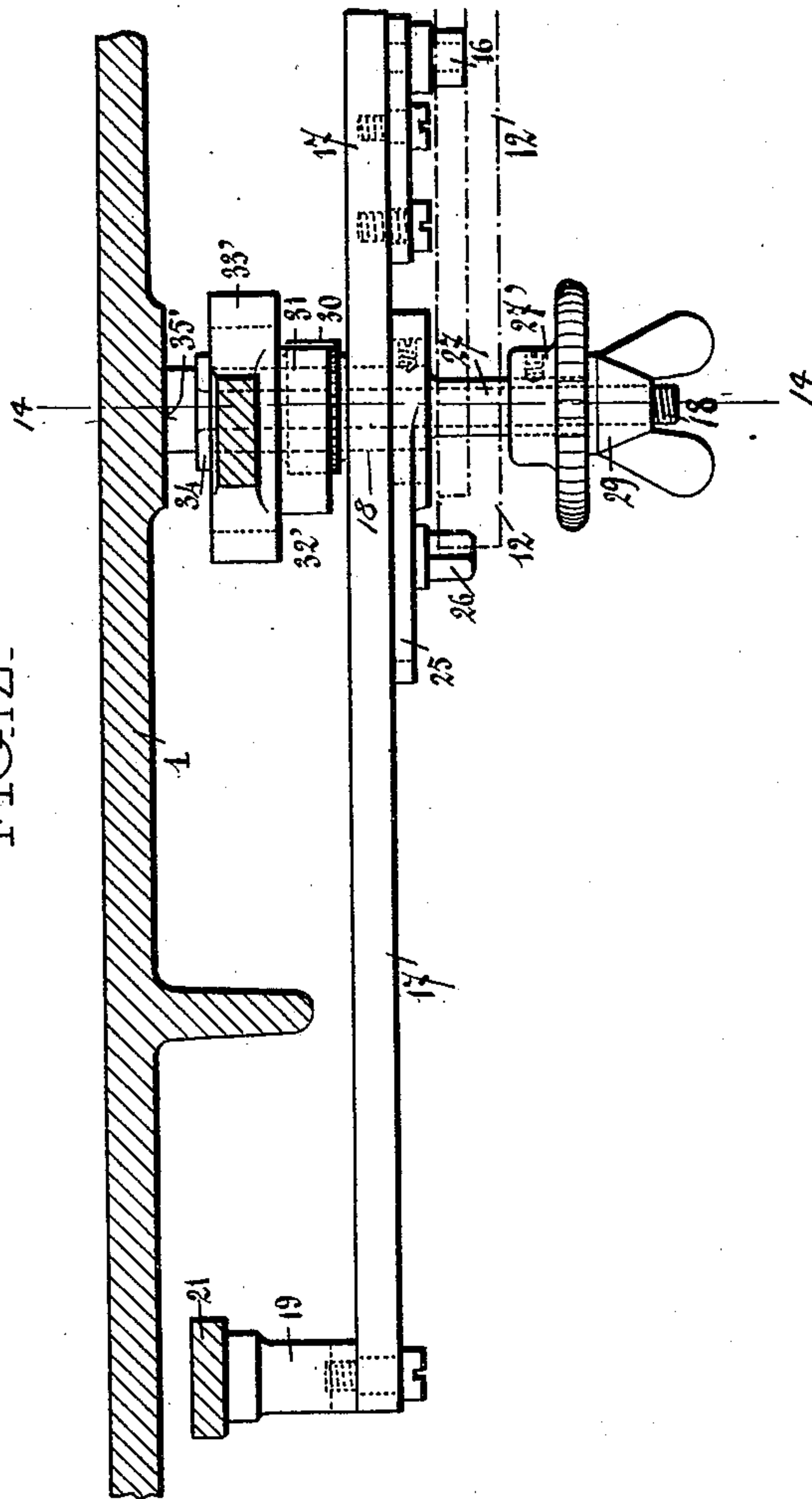
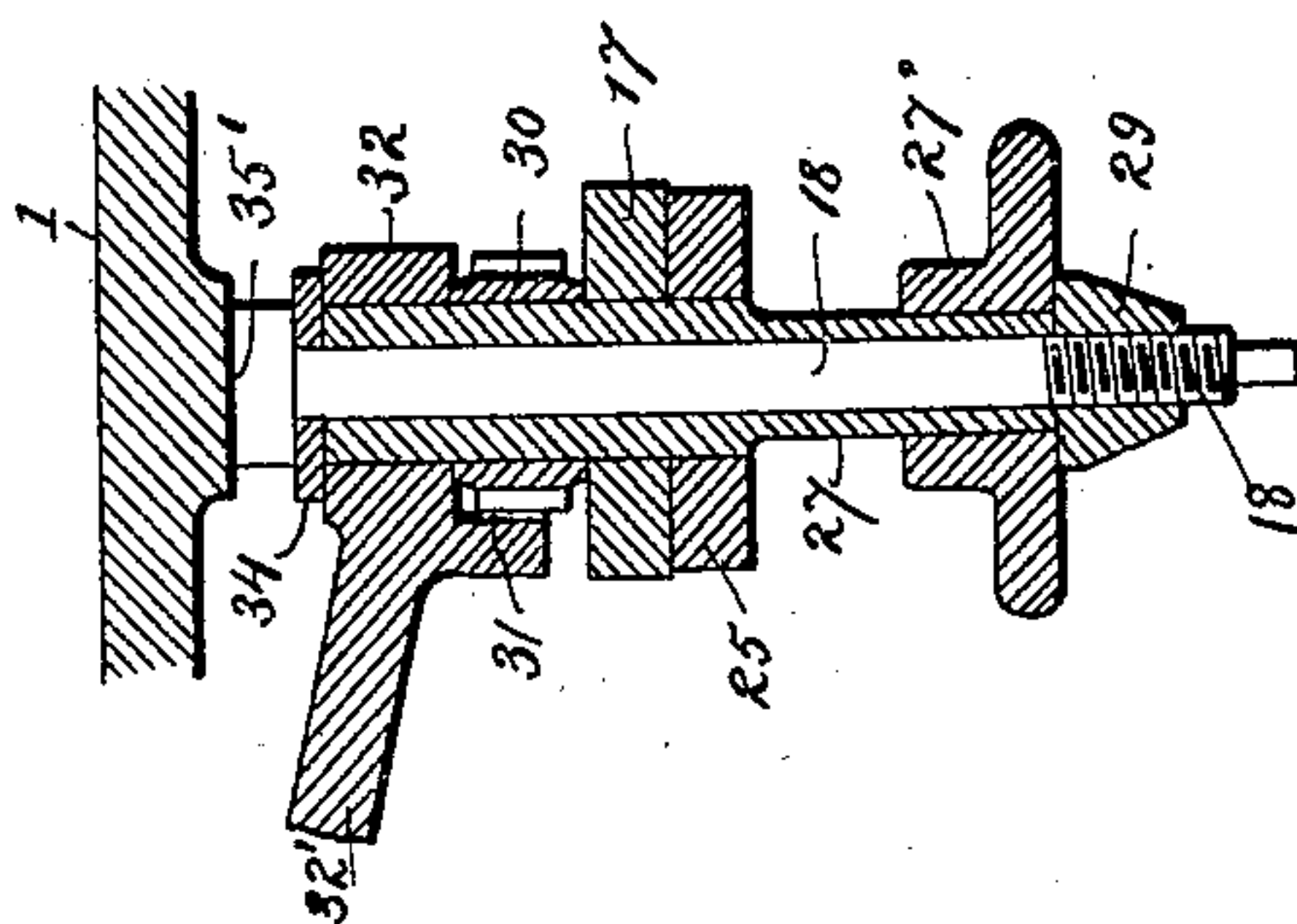


FIG. 14



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(No Model.)

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FIG. 16.

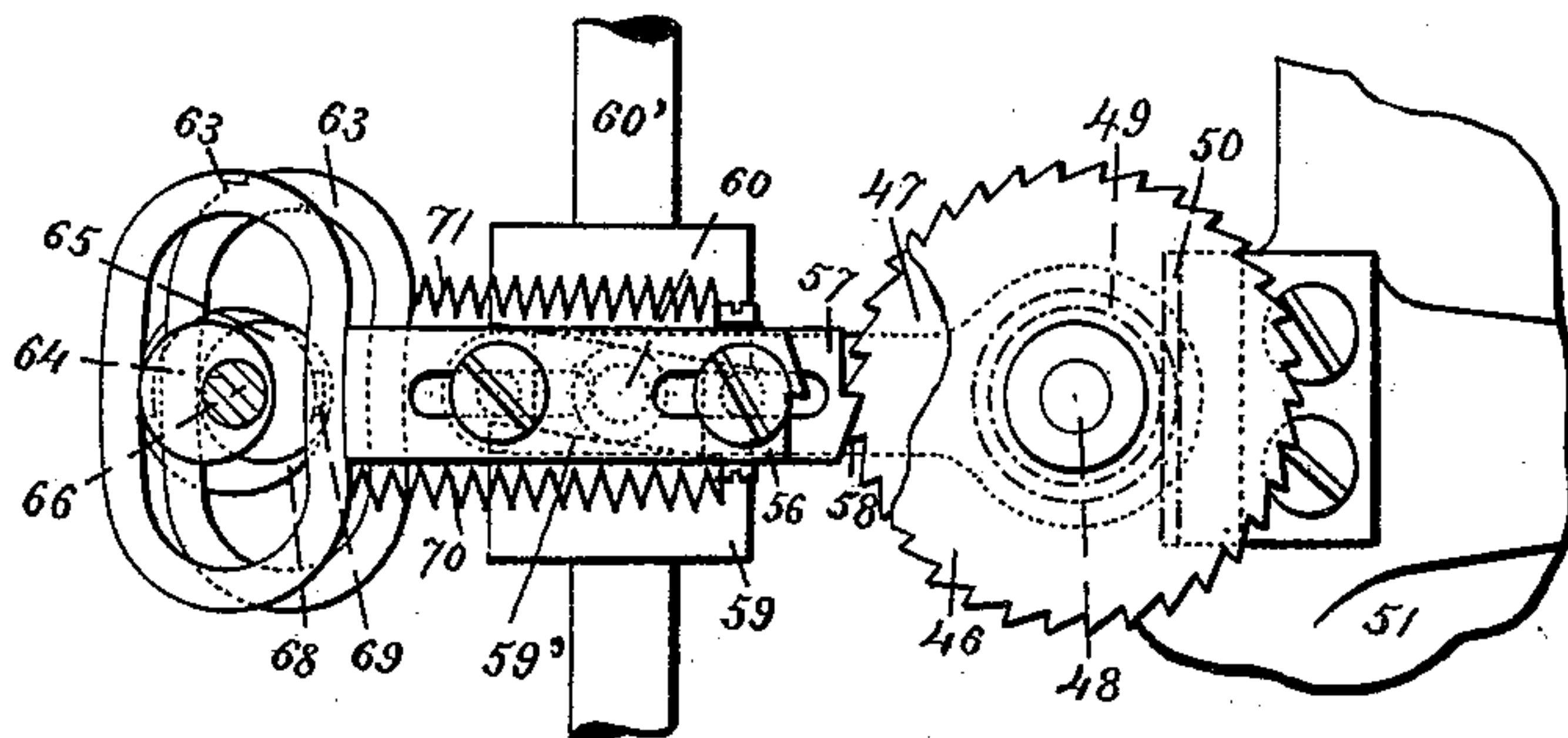


FIG. 17.

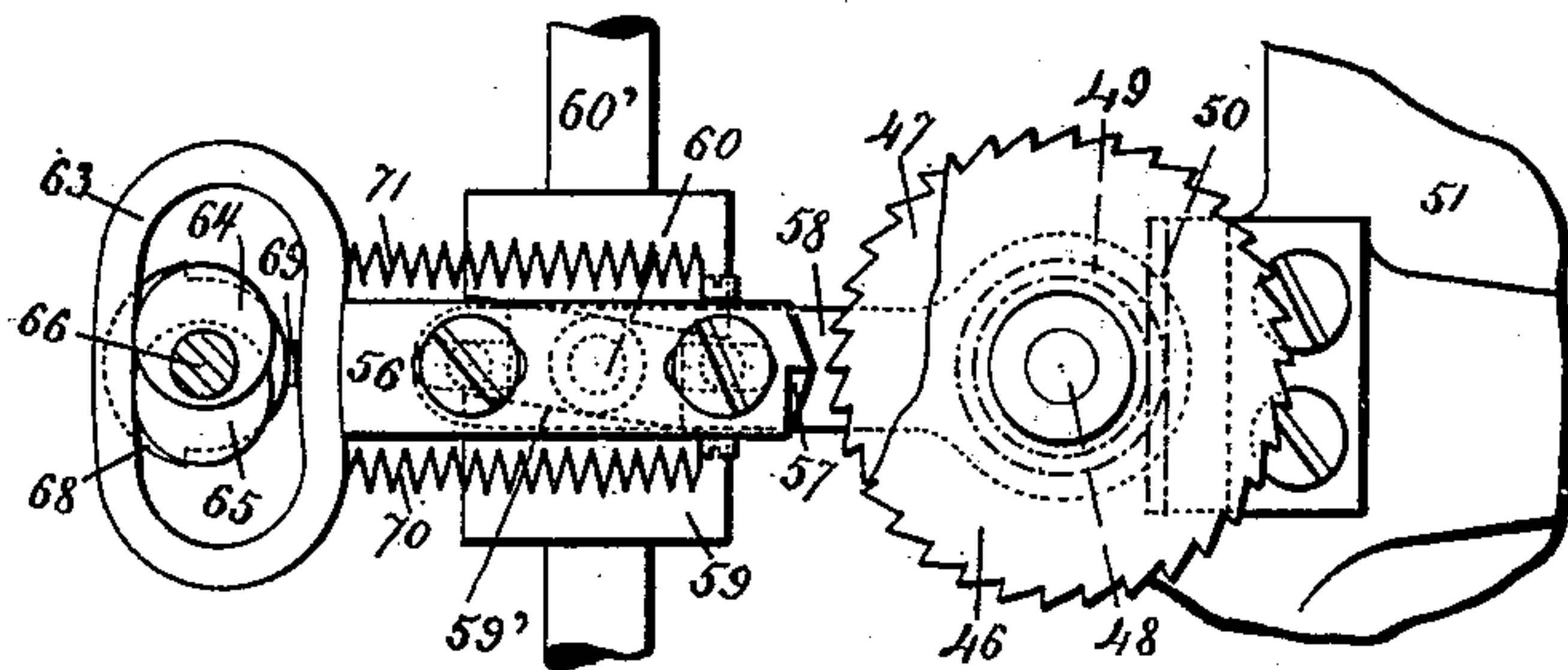
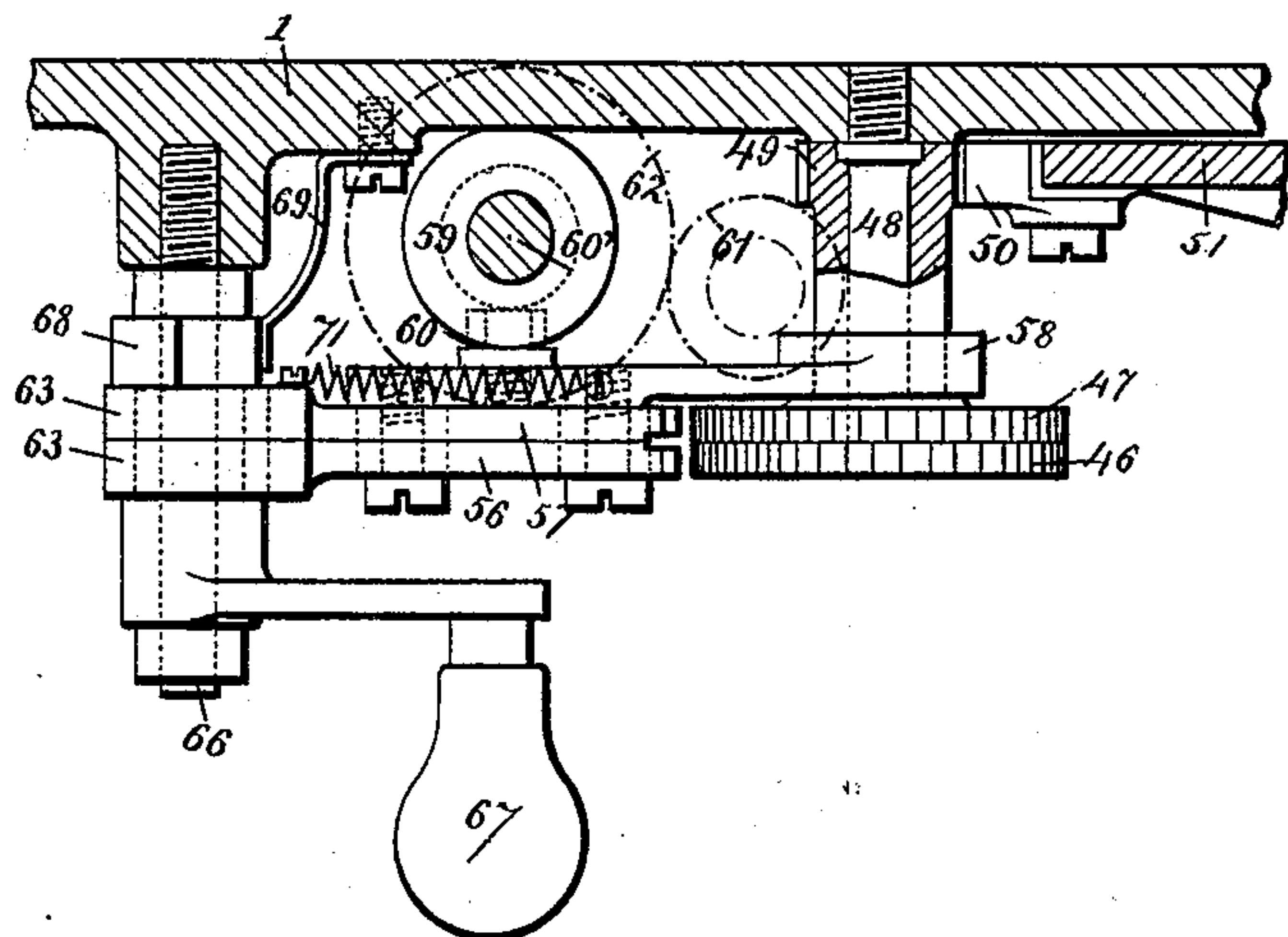


FIG. 15.



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# UNITED STATES PATENT OFFICE.

PIERRE ALEXANDRE DARRACQ, OF LE PRÉ ST. GERVAIS, FRANCE.

## SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 406,431, dated July 9, 1889.

Application filed October 14, 1887. Serial No. 252,341. (No model.) Patented in France February 22, 1887, No. 181,742, and in England August 22, 1887, No. 11,446.

*To all whom it may concern:*

Be it known that I, PIERRE ALEXANDRE DARRACQ, mechanical engineer, a citizen of the Republic of France, residing at Le Pré St. Gervais, in the Republic of France, have invented a new and useful Improved Sewing-Machine, of which the following is a specification, which invention is patented in France February 22, 1887, No. 181,742, and in England August 22, 1887, No. 11,446.

The object of this invention is to provide machinery for producing the fan-like arrangement of stitches which occurs in the manufacture of corsets, the object of which is to secure the ends of the whalebones or "stays" in the pockets wherein they are usually inserted and impart an ornamental appearance to the corset, the stitches on both the right and left of the corset being executed mechanically and automatically.

My machine consists of a sewing-machine altered to suit the proposed purpose. It comprises all the usual parts existing in sewing-machines, and is provided in addition with special mechanical arrangements for effecting the displacement of the corset in a longitudinal and transverse direction either to the right or left in such manner that the needle descends at suitable places, and that the machine shall stop at the completion of each course of fan-sewing.

In the annexed drawings, Figure 1 represents, on an enlarged scale, a diagram of the mechanical fan-sewing produced by my machine to the right. Fig. 1<sup>bis</sup> is a similar diagram, showing the sewing on the left. Fig. 2 is a view of the machine in front elevation and partly in section, in order to show the sewing mechanism more clearly, also the management of the thread and the presser-foot. Fig. 3 is a partial end view of Fig. 2, showing the presser-foot more clearly. Fig. 4 is a detail in plan of the presser-foot. Fig. 5 is a detail in plan of the shuttle-holder. Fig. 6 is a general plan view of the under side of the machine, representing specially the driving mechanism for producing the longitudinal and transverse movements of the corset. Fig. 7 is a transverse section of Fig. 6, taken through the line A B. Fig. 7<sup>bis</sup> is a detached view showing the stop-disk 68. Fig.

8 is a longitudinal section taken through the line C D, Fig. 6. Fig. 9 is a transverse section of Fig. 6, taken through the line E F. Fig. 10 is an elevation of Fig. 6, looking at the end X. Fig. 11 is a detail view in plan of the repeating-cam for producing the variable longitudinal movements of the corset. Fig. 12 is an enlarged elevation of the mechanism by which longitudinal movements are imparted to the feeder-slide, parts being in section. Fig. 13 is an inverted plan view of the parts shown in Fig. 12, parts being in section. Fig. 14 is a sectional view on the line 14 14, Fig. 12. Fig. 15 is an enlarged sectional elevation of the parts which impart lateral movements to the feeder-slide. Figs. 16 and 17 are inverted plan views of the parts shown in Fig. 15, showing them in different positions.

The whole of the figures have been simplified as much as possible for the purpose of facilitating the comprehension thereof.

Many of the parts enter into the ordinary construction of sewing-machines—viz., the cast-metal table 1, the arm 2, the driving-shaft 3, the shuttle-carrier 4, the shuttle 5, the cam 6, operating the crank-rod 7, working the shaft 8, communicating by the crank 9, the movement of this needle-carrier 10 carrying the needle 11. All these parts exist in some form or other in sewing-machines, and serve to produce the ordinary sewing-stitch with two threads.

In order to combine the mechanism for right and left fan-sewing, as represented in Figs. 1 and 1<sup>bis</sup>, I have adopted the following dispositions: *a a* represent the ends of the whalebones, which require to be confined by the said "fan-sewing" working to the right in Fig. 1 and to the left in Fig. 1<sup>bis</sup>. I place the corset in position upon the machine to make the stitch number 1. The corset is moved mechanically longitudinally of the fan to make a second stitch (2.) It is then moved laterally a distance equal to the thickness of the thread and longitudinally to make a third stitch, (3,) followed by a longitudinal movement to make a fourth stitch (4.) Again moved transversely and longitudinally for the stitch 5, and so on until the twenty-fourth stitch, if the fan is to be



composed of twelve threads, the number being variable. The machinery that I have devised has therefore to move the corset longitudinally and laterally. Moreover, the longitudinal movements must vary constantly in dimension in a considerable proportion, the greatest movement being between stitches 1 and 2, and the least between stitches 23 and 24. Moreover, the stitches which are parallel to the side of the whalebone have to be in a straight line, while those which confine the end thereof have to be arranged in an arc of a circle or in a form corresponding with the end of the bone. Lastly, the machine must stop as soon as the fan-stitch is completed. To effect the longitudinal movements—that is to say, those which produce the longitudinal stitches—I make use of a cam 12, represented in plan, Fig. 11. This cam consists of a plate 12, in which is formed a cam-groove Y, which plate is arranged beneath the working bed or table of the machine upon a movable carriage, (referred to hereinafter,) and is secured by a screw 14 to a worm-wheel 13, from which it receives a slow rotary motion. The worm-wheel 13 is driven by a worm 15 splined upon the driving-shaft 3, so that it may slide upon this shaft as it is moved longitudinally thereof with the carriage 51, to which it is connected by a fork 15' projecting from the said carriage and engaging a groove formed in the hub of the said worm.

The wheel 13 is mounted upon a vertical axis 13' carried by the moving carriage 51 mounted underneath the table of the machine. A roller 16 fixed at the extremity of an oscillatory lever 17 mounted on an axis 18 is guided in the irregular cam-groove Y in the cam-plate 12 and transmits irregular movements of oscillation to the said lever corresponding to the sinuosities of the cam-groove, which the roller 16 follows constantly. The lever 17 is connected by a link 19 to the feeder slide or frame 20 21, which serves, as usual, to carry forward the material, and which is guided by guides 22, which are themselves capable of sliding transversely in other guides 23 placed underneath the table of the machine. From this arrangement it results that the corset, carried forward by the feeders 24 upon which it is placed, will undergo the irregular longitudinal movement in the direction of the guide 21 of the feeder under the effect of the rotary motion of the driving-shaft 3.

Since it is desirable to vary the amplitude of vibrations of the free end of the lever 17, I have devised means whereby the position of the fulcrum or pivotal support of the said lever may be shifted to a limited extent between its ends. For this purpose the sleeve 27, which forms the axis of oscillation or fulcrum of the lever, passes through a slot formed therefor in the lever and carries a slotted plate 25 adapted to be secured to the lever 17 by a screw 26, thus forming a means for securing the pivotal sleeve 27 to the lever after adjustment. The sleeve 27 carries above the

lever 17 a pinion 30, which gears with a rack 31 carried by an arm 32' extending from the carriage 51. The sleeve is provided with a milled nut 27', by which it may be turned in order to cause a lateral movement thereof in the direction of the length of the lever by reason of the engagement of the pinion with the rack, and to steady and properly direct such movement I extend the sleeve 27 and the bolt 18 upon which said sleeve is mounted upward through a slot formed in the end of the arm 32', the head of the bolt being provided with a washer 34, which washer and bolt-head move between the upper face of the arm 32' and a smoothed surface 35' of the under face of the working-bed of the machine. 29 is a wing-nut mounted upon the screw-threaded lower end of the bolt 18, and serving, when tightened against the milled nut 27, to keep the parts in the position to which they are adjusted. Therefore, in order to alter the axis of oscillation of the lever 17 it suffices—the screw 26 being slackened—to unscrew the wing-nut 29, which will allow the sleeves 27, and, in consequence, the pinion 30, to be turned by means of the milled nut 27'. The rack 31, with which gears the pinion 30, being fixed, it follows that in turning the pinion 30 the axis of oscillation 18 of the lever 17 will be moved and the amplitude of the movement of this lever varied accordingly.

The bars 20 of the feeder-slide are provided with four claws 24, and the presser-foot 33 is disposed in such manner that its plate 34 follows the longitudinal movements of the said feeder-slide and the corset moved thereby for the purpose of avoiding frictional contact therewith, which would be inconvenient and likely to injure the corset. For this purpose there are employed two vertical guide-rods 35, supporting at their lower extremities an open frame 36, of which the two longitudinal sides form open guides 37, in which are mounted the anti-friction wheels 38, carried by supports 39, formed integral with the plate 34. It will be readily seen that in consequence of this disposition the plate 34 will be able to move freely longitudinally, and in consequence to follow smoothly all the longitudinal movements of the corset. In order to permit the work of fan-stitching to be followed the plate is cut away on each side of the passage of the needle and the openings covered with plates of crystal 40, held in slides formed on the plate 34.

Below the feeder 20 works the shuttle 5, held in its carrier by means of a vertical bearing-plate 41 fixed to a support 42, hinged at 43 to a frame fixed to the table of the machine. The position of the system formed by the pieces 41 and 42 is insured by a spring-bolt 43'. It will therefore be understood that in order to disengage the shuttle it suffices to draw the bolt 43', which permits the oscillation up and down of the support 42, and in consequence the removal of the bearing-plate



41 in such manner as to allow the shuttle to be withdrawn. The piece 41 is adjustable in position longitudinally by means of a bolt and nut 44, which passes through a slot 45 in the support 42.

In order to cause the lateral movements of the slide 20 carrying the feeders, which cause the stitches 2 to 3, 4 to 5, 6 to 7, &c., to be formed, the movable carriage 51 is connected with the slide in the manner shortly to be described, and is operated upon by what I term a "reversible driver"—that is, an operating mechanism for moving the carriage which is adapted to move in reverse directions to cause the carriage to be reciprocated in opposite directions. This mechanism is illustrated in Figs. 6, 7, 15, 16, and 17, wherein 46 and 47 represent ratchet-wheels, the teeth of which incline in opposite directions in order to effect the movement of the corset either to the right or left, according to the direction of the stitch. The said ratchet-wheels are mounted upon a vertical axis 48 fixed under the table of the machine and carrying a pinion 49, which receives movement from the ratchets 46 and 47, to which it is fixed. The pinion 49 gears with a rack 50, fixed upon the driving-carriage 51, which is guided in its supports 52 and 53, fixed underneath the table of the machine.

The carriage 51 is provided with a horizontal arm 52', which is connected by a rod 55 with one of the slides 22, and is also provided with a lug 54, which bears against the end of the other slide 22. It will therefore be seen that the carriage 51 has imparted to it a movement to the right or left of the slides 22; the claw-carrier 20, and therefore the corset, will participate in the same movement, which is the necessary transverse movement for the passage from one longitudinal stitch to another, which determines the spread of the threads in the fan.

The movement of the ratchet-wheels 46 to 47 is operated at the desired moment by pawls 56 and 57, mounted one above the other, so as to be capable of sliding upon a lever 58, oscillating upon the axis 48 of the ratchet-wheels 46 and 47. The oscillatory movement of the lever, and therefore that of the pawls 56 and 57, is produced by the cam 59, in the groove 59' of which is guided a roller 60, carried by the lever 58. The cam 59 is keyed upon a shaft 60', parallel to the driving-shaft, and the movement is transmitted by two toothed wheels 61 and 62, which are in the relation of one to two in size. The heads of the pawls 56 and 57 terminate in yokes 63, within which act upon each, respectively, the cams 64 and 65, keyed upon an axis 66, fixed underneath the table, and which can be turned by means of a handle 67. Upon the axis 66, above the heads of the pawls 56 and 57, is keyed a stop-wheel 68, which, combined with a stop 69, only permits the rotation of the cams 64 and 65 through a quarter of a turn in either direction, the extreme points of this rotation, Fig. 16, corresponding to the disen-

gagement of one of the pawls 56 or 57 and to the engagement of the other. The medium position of the stop-disk 68, Figs. 7, 7<sup>bis</sup>, 15, and 17, corresponds to the disengaged position of the two pawls 56 and 57—that is to say, to the position of repose of the ratchets 46 and 47. Two springs 70 and 71 act respectively upon each pawl 56 and 57, in order to assure their engagement with their respective ratchet-wheels when either of them is in a working position according to the direction of the movement.

The movement of the carriage 51 in one direction or the other also operates one-half of a clutch 72 in such manner that its disengagement may take place just at the moment when the fan-stitching is terminated. (See Figs. 6 and 9.) For this purpose an oscillating lever 73, connected with the carriage 51 by means of a link 74, is formed with a boss 75, carrying two lever-arms 76 and 77.

When the carriage 51, under the action of the pinion 49, gearing with the rack 50, moves toward the needle it is the lever-arm 77, which, by the intervention of the link 77' and the bent lever 78, transmits the movement to the knocking-off bar 79 by the lever-arm 80 acting upon a friction-pulley 80'. The bar 79 is connected by means of a slot to the knocking-off lever 81, which is hinged at 82 and which by a fork 83 acts upon the half of the clutch 72. When the movement of the carriage 51 takes place in the opposite direction—that is to say, away from the needle—it is the lever-arm 76 which by the roller 85 acts directly upon the bar 79 to operate the disengagement, as in the previous case. The lever-arm 76 serves also to bring back the carriage 51 to its point of departure by means of the handle 76' after each operation of fan-stitching. This double disengagement mechanism, which thus controls the operation in each direction, either right or left, is adjusted so that the half of the clutch 72 leaves the driving-pulley 72' at once after the execution of the last stitch of each fan is completed.

The number of threads in a fan will vary in different cases. I have combined my mechanism in such manner that it can lend itself to these variations. For a small number of threads the movement of the carriage 51 is naturally less than for a greater number. I regulate, therefore, the depth of engagement of the clutch according to the number of stitches by means of the slide or slot 88', in which the pivot 88, working the lever 81, can vary its position. Moreover, the cam 12 can be readily dismantled, being simply fixed by the screws 14' and 14. I employ, therefore, a series of cams, of which the working-grooves are cut so as only to produce a number of longitudinal displacements corresponding to the number of threads.

86 designates an indicator connected with the carriage in any suitable manner, as with the arm 51 thereof, by means of the link or rod 87. This indicator extends upward



through a slot in the bed-plate of the machine and serves to indicate the position of the carriage 51, the upper face of the bed-plate being provided with a scale, if desirable, in proximity to the slot through which the indicator projects, upon which scale is indicated the proper point to which the indicator should be brought for starting the machine.

Before putting the machine in operation the indicator ought to be put at the position corresponding to that of starting the mechanism. This putting in place of the indicator 86 is effected by the use of the lever-arm 76, worked by a handle 76', which by the intervention of the arm 52' of the carriage 51 transmits the movement to the indicator 86 by the rod 87. The supply of the thread to the needle is effected, the same as in other machines for plain stitching, by means of a tension device 88' and of the take-up 89 worked by means of the cam 90, keyed upon the driving-shaft.

In the longitudinal stitch of the fan the tension of the thread requires to be complete, and for this purpose I have placed a brake 91, acting upon the tension-disk 88' by the effect of the take-up 89, which by the roller or tappet 92, at the moment when the needle descends comes to act upon the lever of the brake 91, in such manner as to disengage this from the tension-disk for the purpose of leaving the same to act freely for the tightening of the stitch. The action of the brake upon the tension-disk is regulated by the device 93.

I claim—

1. In a sewing-machine, the combination, with a stitch-forming mechanism, and a presser foot or plate, of the longitudinally-movable slide carrying the feeders, a laterally-movable carriage, connections between the carriage and slide whereby the movements of the carriage are transmitted to the slide, a lever mounted on the carriage and connected with the slide to impart thereto its longitudinal reciprocations in regular succession to cause the stitches to be laid, a cam for imparting the successive movements to the lever, and a driver for the cam, substantially as set forth.

2. In a sewing-machine, the combination, with the stitch-forming mechanism and the presser foot or plate, of the longitudinally-movable slide carrying the feeders, a laterally-movable carriage, connections between the carriage and slide whereby the movements of the carriage are transmitted to the slide, a lever which imparts longitudinal reciprocations to the slide in regular succession to cause the stitches to be laid, an adjustable fulcrum-support for the lever mounted upon and movable with the carriage, a cam for imparting movements to the lever also mounted upon the carriage, and a driver for the cam, substantially as set forth.

3. In a sewing-machine, the combination, with the stitch-forming mechanism and the presser foot or plate, of the slide carrying the

feeders, the carriage 51, connections between the carriage and the slide, a slotted arm carried by the carriage, a slotted lever connected with the slide which imparts longitudinal reciprocations thereto in regular succession to cause the stitches to be laid, an adjustable fulcrum-support passing through the slots in the lever and the said arm, a clamp for holding the fulcrum-support after adjustment, and a cam for moving the lever, substantially as set forth.

4. In a sewing-machine, the combination, with the stitch-forming mechanism and the presser foot or plate, of the slide carrying the feeders, the carriage 51, with which the slide is connected, provided with a slotted arm having a rack 31, the slotted lever 17, connected with the slide, the sleeve 27, passing through the slots in the arm and lever and constituting an adjustable fulcrum for the lever, a pinion 30, mounted upon the stem and meshing with the said rack, an adjustable plate 25, secured to the lever through which the sleeve 27 passes, and a clamp for securing the sleeve after adjustment, substantially as set forth.

5. In a sewing-machine, the combination, with the stitch-forming mechanism and the presser plate or foot, of the slide carrying the feeders movable both laterally and longitudinally, a sliding carriage connected with the said slide to impart lateral motions thereto, a step-by-step driving device for moving the carriage, a lever mounted upon the sliding carriage and connected with the said slide to move it longitudinally, a cam for imparting irregular vibrations to the lever, and a driver for the cam, substantially as set forth.

6. In a sewing-machine, the combination, with the stitch-forming mechanism and the presser foot or plate, of the slide carrying the feeders, a sliding carriage, a main driving-shaft 3, the lever connected with the slide to move it longitudinally, a cam which drives the lever mounted upon the carriage, a worm splined to and movable upon the said driving-shaft and connected to move with the carriage, and a worm-wheel connected with the said cam, substantially as described.

7. In a sewing-machine, the combination, with the stitch-forming mechanism, the presser plate or foot, and the slide carrying the feeders, free to be moved laterally, of the sliding carriage connected with the slide, the rack and pinion by which the carriage is moved, the ratchet-wheels 46 47, having teeth inclined in opposite directions, connected to move the said pinion, the vibrating lever 58, the pawls which respectively engage with the ratchet-wheels carried by and sliding upon the said lever, and a shifting device for sliding the said pawls, whereby they are independently brought into engagement with their respective ratchet-wheels, substantially as described.

8. In a sewing-machine, the combination, with the stitch-forming mechanism, the presser foot or plate, and the slide carrying the feeders, free to be moved laterally, of the



sliding carriage connected with the slide, a rack and pinion for moving the carriage, the ratchet-wheels having teeth inclined in opposite directions connected to rotate the said pinion, pawls engaging, respectively, with the said ratchet-wheels and provided with the yokes 63, the said pawls being free to slide toward and from the ratchet-wheels, and the cams 64 65, engaging with the yokes for bringing the pawls into and out of engagement with the ratchet-wheels mounted upon a shaft provided with an operating-handle, substantially as described.

9. In a sewing-machine, the combination, with the stitch-forming mechanism, the presser foot or plate, and the slide carrying the feeders free to be moved laterally, of a sliding carriage connected with the slide, the rack and pinion by which the carriage is moved, the ratchet-wheels 46 47, having teeth inclined in opposite directions connected to rotate said pinion, the vibrating lever 58, a cam by which the lever is vibrated, the pawls 56 57, which engage with the said ratchet-wheels respectively, supported upon said lever, on which they are free to slide toward and from the ratchet-wheels, and each provided with a yoke 63, the springs which tend to move the pawls into engagement with the ratchet-wheels, and the cams engaging with the said yokes for regulating the position of the pawls in respect to their ratchet-wheels, substantially as set forth.

10. In a sewing-machine, the combination, with the main driving-shaft, the stitch-forming mechanism, the presser-foot, and the slide carrying the feeders, of a sliding carriage connected with the said slide, a feeding mechanism for the carriage by which it is moved in either direction, a clutch on the main driving-shaft, a clutch-shifter, and the independent connections between the sliding carriage and the clutch-shifter, whereby the latter is operated when the sliding carriage reaches the end of its movement whichever direction it be moved, substantially as set forth.

11. In a sewing-machine, the combination,

with the main driving-shaft 3, the stitch-forming mechanism, the presser foot or plate, and the feeder-slide, of the sliding carriage connected with the feeder-slide, the clutch 72, the clutch-shifter having two contacts 80' 85, the lever 76, connected with the sliding carriage, and arranged to bear against the contact 85, and move the clutch-shifter when the carriage moves in one direction, and the train of levers 73, 77, 78, and 80, connected with the carriage and adapted to bear upon the contact 80', and move the shifter when the carriage moves in the opposite direction, substantially as set forth.

12. In a sewing-machine, the combination, with the main driving-shaft 3, the stitch-forming mechanism, the presser plate or foot, and the feeder-slide, of the sliding carriage connected with the feeder-slide, the clutch 72 on the main driving-shaft, the sliding bar 79, connected with the sliding carriage and provided with a slot 88', the clutch-shifting lever, and the block carrying the pivot-pin 88, which enters the slot 88', and connects the said sliding bar and the lever, adjustable in a slot in the lever, substantially as set forth.

13. In a sewing-machine, the combination, with the stitch-forming mechanism, the presser-foot, the feeder-slide, and the sliding carriage connected therewith to move the same, of an indicator 86, extending above the bed-plate of the machine, a connecting-bar between the said indicator and the sliding carriage, whereby the two are caused to move together, and a handle for moving both the said indicator and the sliding carriage, whereby the parts may be brought to the proper position for starting, substantially as described.

In testimony whereof I have hereunto subscribed my hand in the presence of the two subscribing witnesses.

PIERRE ALEXANDRE DARRACQ.

Witnesses:

LOUIS TULLIGER,  
JEAN ROBELET.