

No. 771,000.

PATENTED SEPT. 27, 1904.

G. L. BOURQUIN & R. LOEB.
EMBROIDERING MACHINE.

APPLICATION FILED MAY 26, 1899.

NO MODEL.

3 SHEETS—SHEET 1.

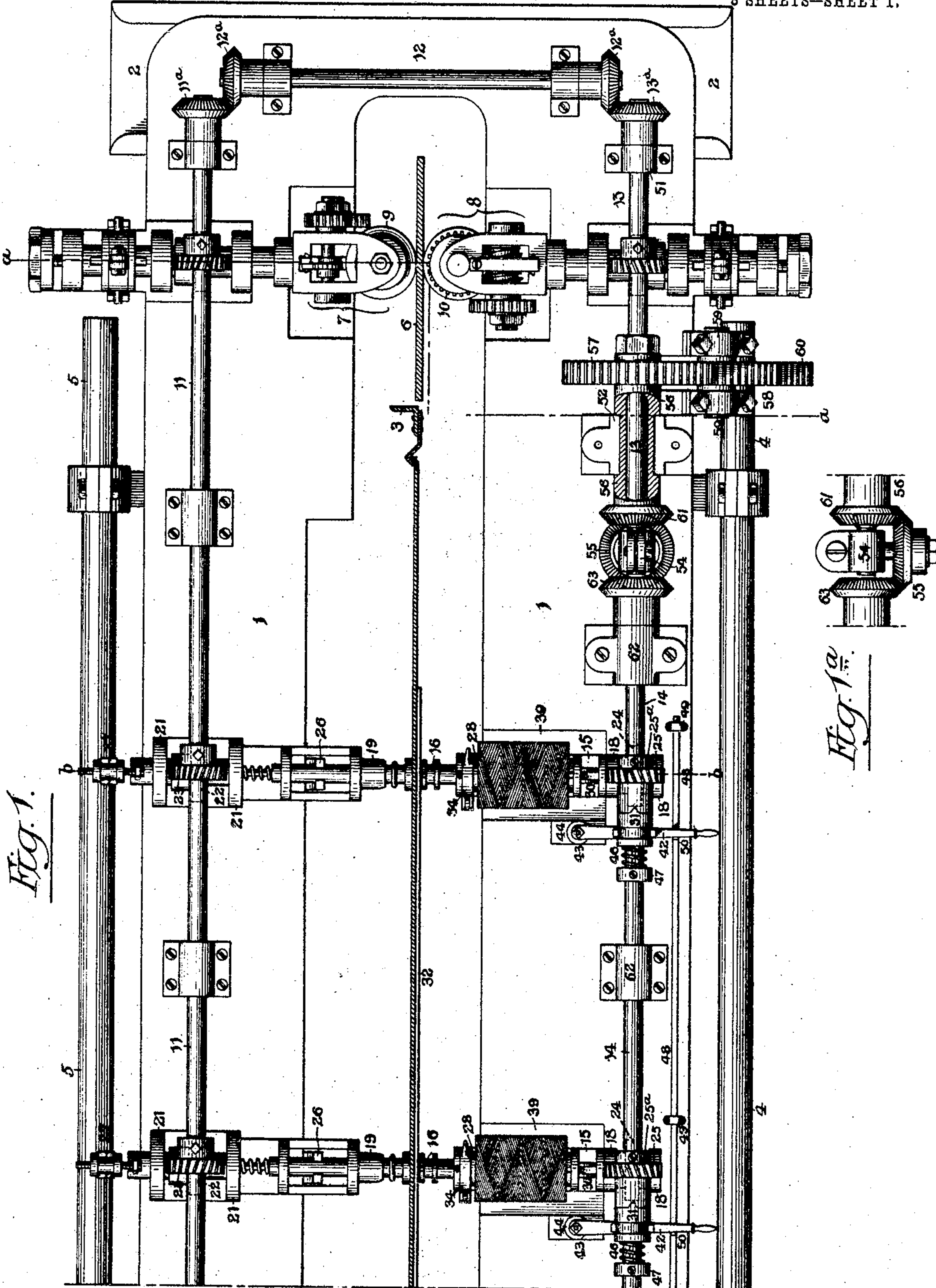


Fig. 1.

Fig. 1a.

Witnesses:-

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Inventors
Gustave Louis Bourquin
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by their Attorneys:-
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3 SHEETS—SHEET 2.

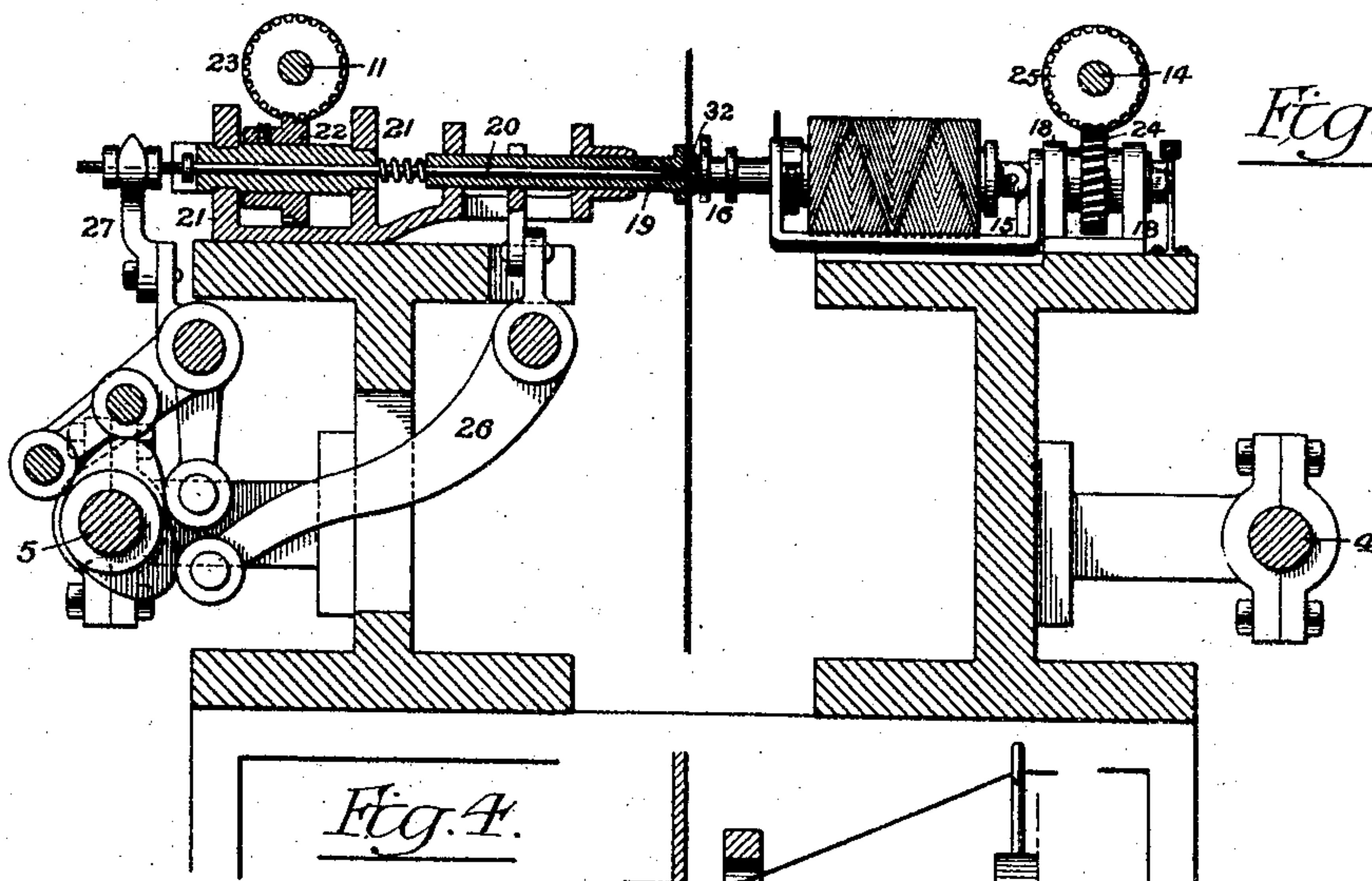
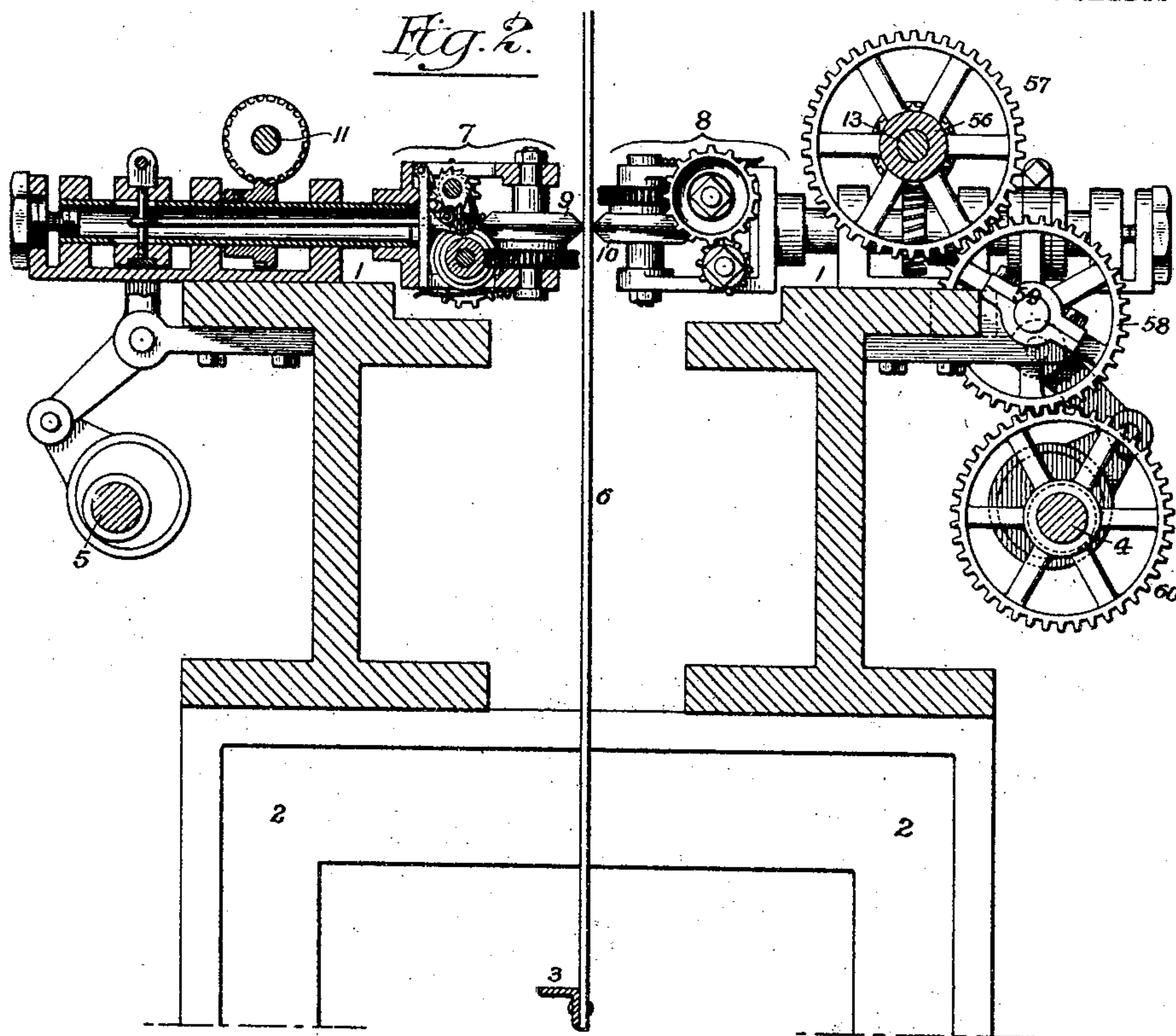
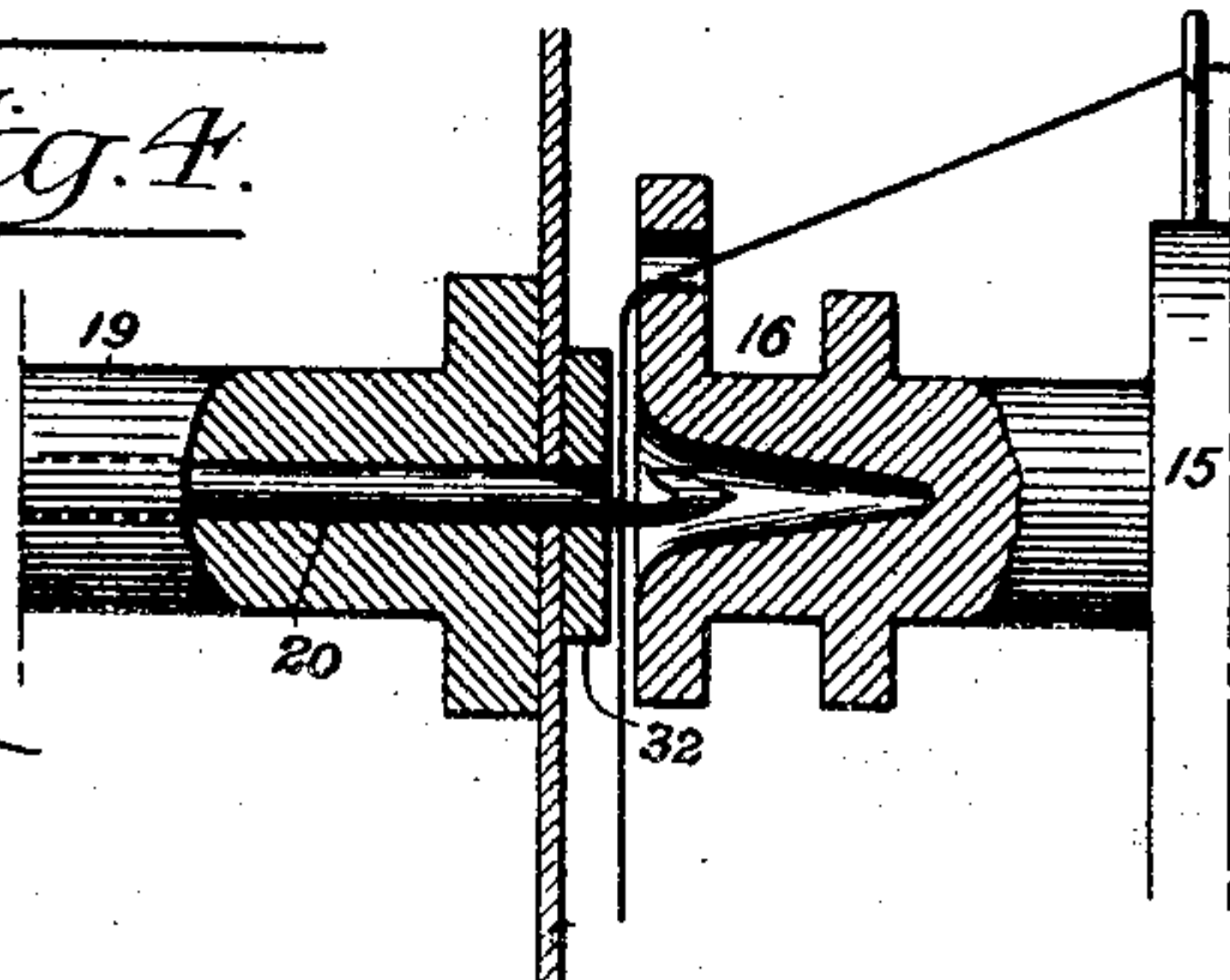


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

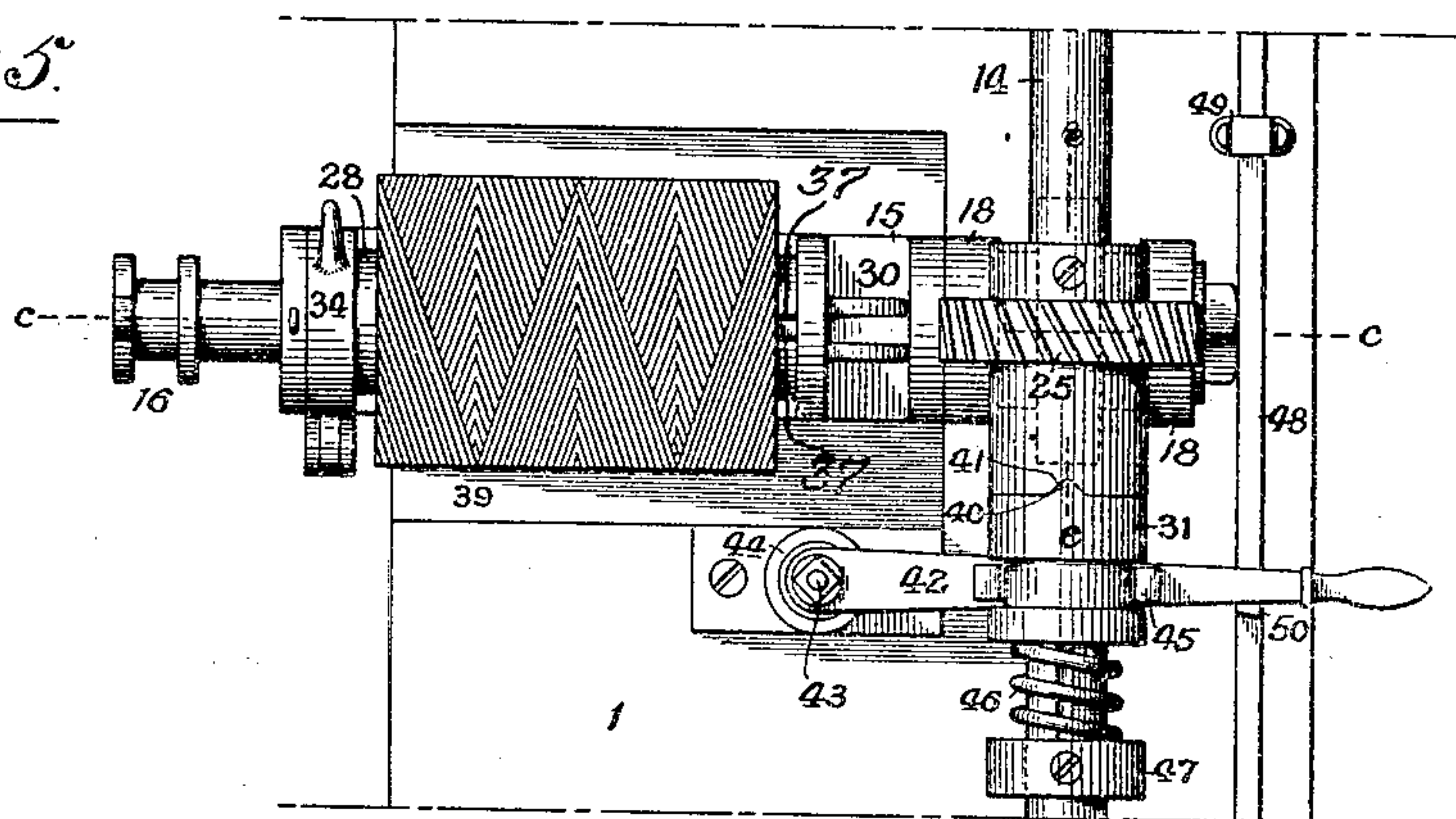


Fig. 6.

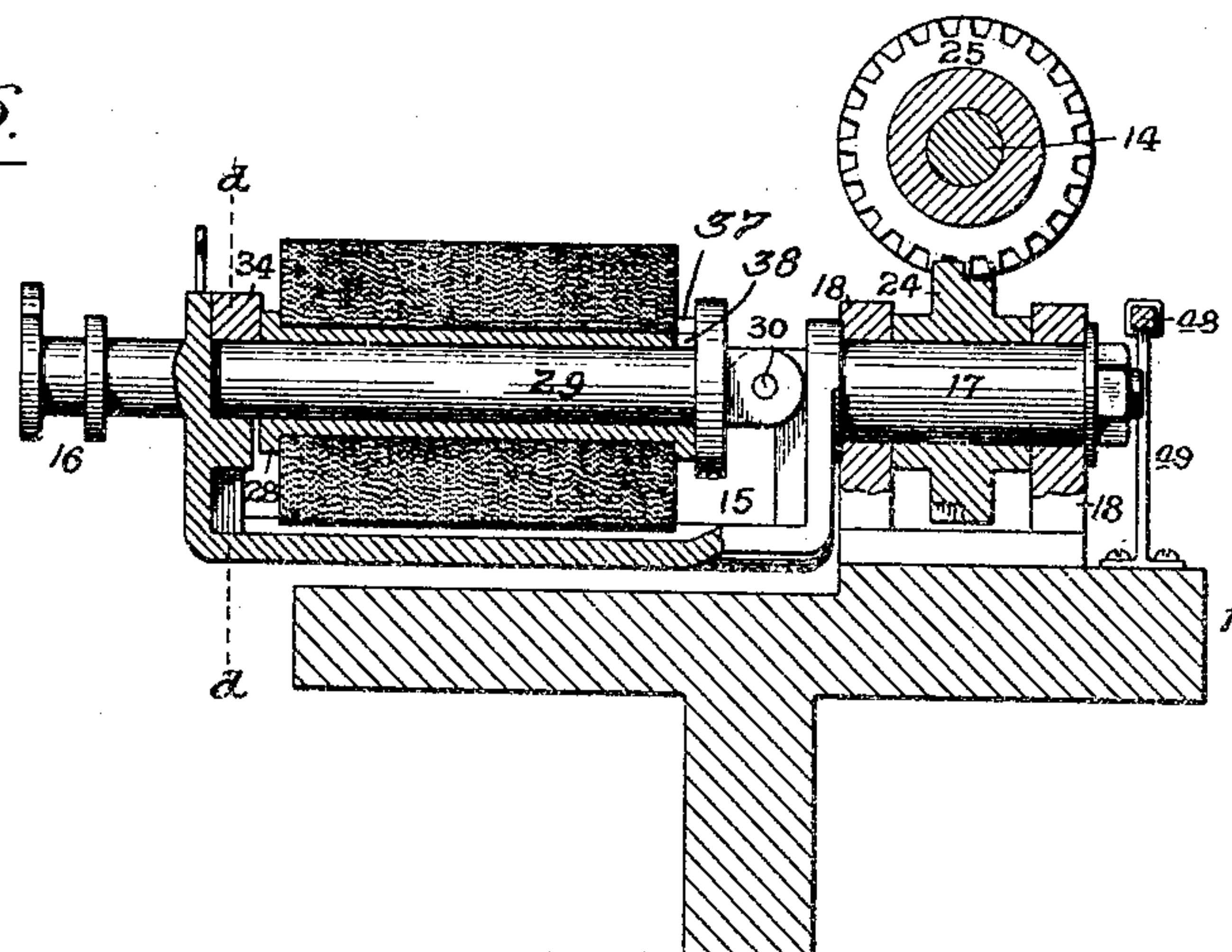


Fig. 7.

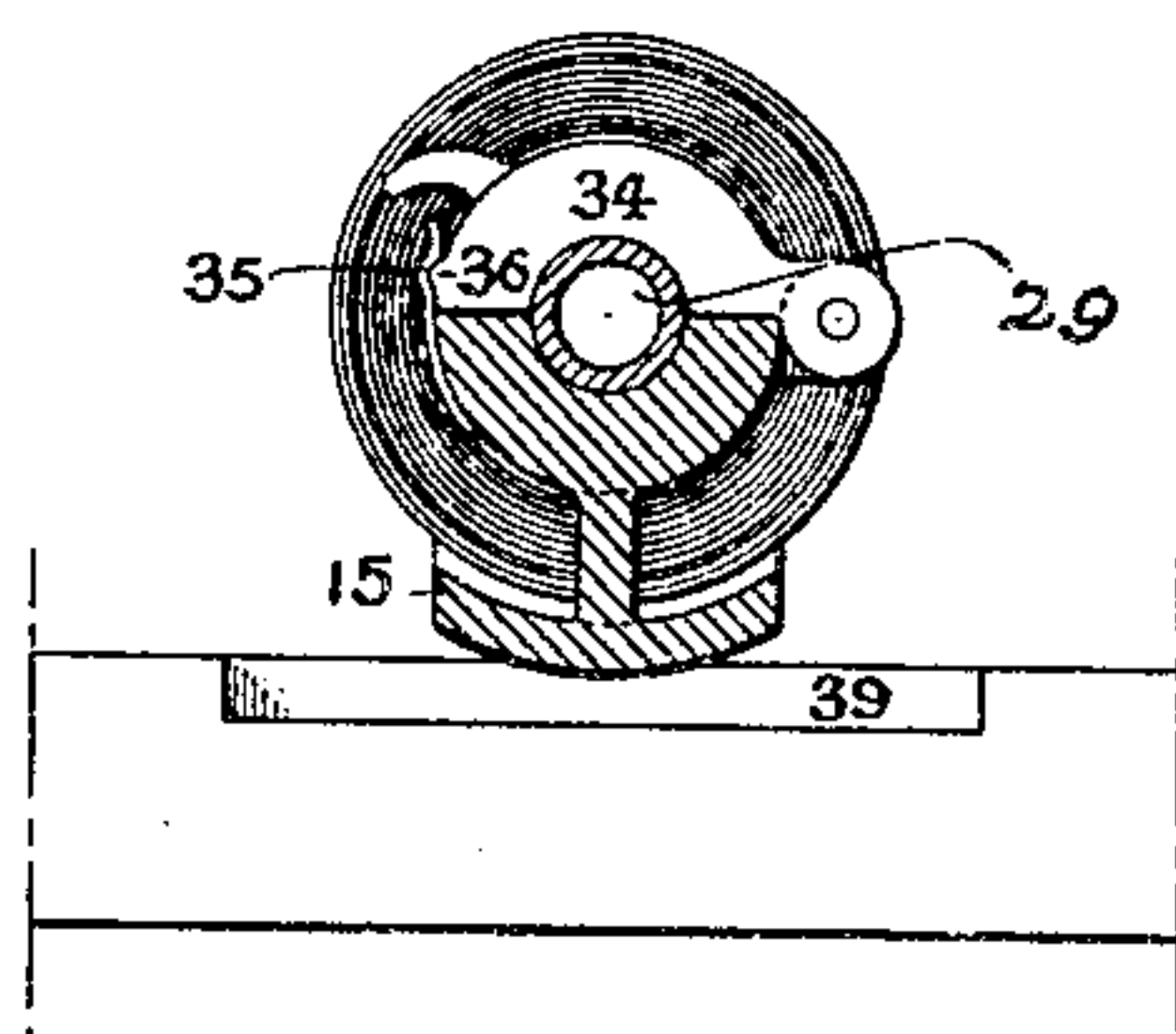
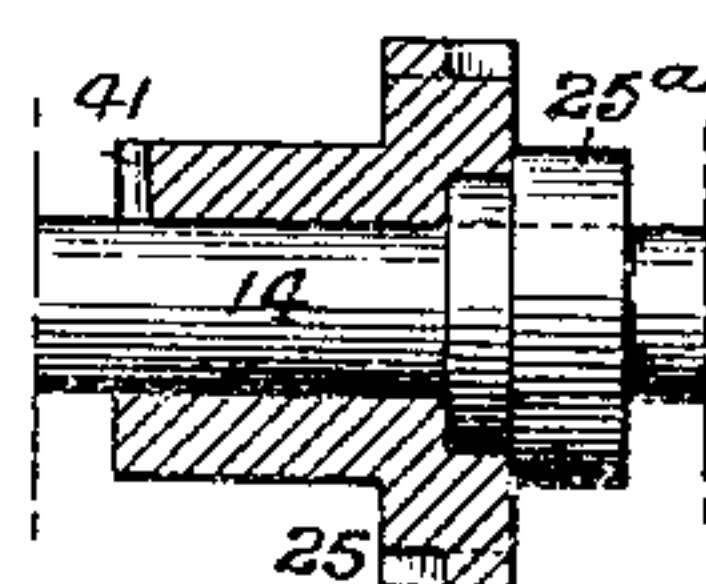


Fig. 8.



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UNITED STATES PATENT OFFICE.

GUSTAVE LOUIS BOURQUIN, OF MERCHANTVILLE, AND RUDOLF LOEB,
OF CAMDEN, NEW JERSEY, ASSIGNORS TO SAID LOEB.

EMBROIDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 771,000, dated September 27, 1904.

Application filed May 26, 1899. Serial No. 718,329. (No model.)

To all whom it may concern:

Be it known that we, GUSTAVE LOUIS BOURQUIN, a citizen of the Republic of Switzerland, residing at Merchantville, and RUDOLF LOEB, a citizen of the United States, residing at Camden, in the county of Camden and State of New Jersey, have invented certain Improvements in Embroidering-Machines, of which the following is a specification.

Our invention relates to embroidering-machines; and it consists of certain improvements on the machine for which we filed application for Letters Patent August 6, 1898, Serial No. 687,946, the present improvements greatly reducing the complexity of the machine therein described and claimed and constituting a machine capable of producing a greater amount of work in a better manner than hitherto possible with embroidering-machines of this character.

Our invention consists, further, of novel means for operating and controlling the looper and thread-feeding mechanism.

Our invention is fully illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of sufficient of an embroidering-machine of the type described to illustrate our invention. Fig. 1^a is a side view of a portion of the mechanism shown in Fig. 1. Fig. 2 is a sectional view of the machine on the line *a a*, Fig. 1, showing the pantograph mechanism. Fig. 3 is a sectional view on the line *b b*, Fig. 1, showing the needle mechanism and the looper mechanism. Fig. 4 is an enlarged sectional view of the end of the needle-carrier and the looper. Fig. 5 is a plan view, on an enlarged scale, of the flier carrying the thread and the looper and the mechanism for operating and controlling the same. Fig. 6 is a sectional elevation, on an enlarged scale, of the flier and its operating mechanism, taken on the line *c c*, Fig. 5. Fig. 7 is a cross-section of the flier on the line *d d*, Fig. 6; and Fig. 8 is a sectional view of a detail of the looper-driving mechanism, taken on the line *e e*, Fig. 5.

The general operation of this type of embroidering-machine being fully described in

our application before referred to now on file, it will not be necessary to dwell upon the same in this specification.

In the drawings herewith, 1 represents the bed-plate of an embroidering-machine, mounted on the supporting-legs 2. The bed-plate is cut away at the center to provide space for the movement of the work-holding frame 3, to which the material to be embroidered is secured in the usual well-known manner.

4 and 5 are the driving-shafts, which receive their motion from any suitable source of power, and they are mounted in suitable bearings on the opposite sides of the machine.

6 represents one of the pantograph-plates, and 7 and 8 are the pantograph mechanisms carrying the wheels 9 and 10 in engagement with the same, 7 being the front pantograph mechanism, carrying the wheel 9, which receives its rotary motion from the shaft 5; and 8 being the rear pantograph mechanism, carrying the wheel 10, which is rotated by the shaft 4. The mechanisms driven by the shafts 4 and 5 for rotating these wheels 9 and 10 of the front and rear pantograph mechanisms is the same as that employed in the machine forming the subject of our application now on file before referred to and need not be explained in detail in this specification. In addition to the rotary motion imparted to the wheels 9 and 10 of the pantograph mechanisms the entire pantograph mechanism is turned so as to bring these wheels at different angles to the pantograph-plate 6, thereby moving said plate and the work-carrying frame connected therewith so as to bring the fabric carried thereby into the proper position with relation to the needles and loopers to receive embroidery corresponding to the design on the pattern-plate which is followed by the operator. The front pantograph mechanism receives its motion from a shaft 11, mounted in suitable bearings on the bed-plate of the machine, said shaft being moved directly by the operator in following the design on the pattern-plate. To transmit this motion to the rear pantograph mechanism, we employ a counter-shaft 12, mounted in suitable bearings on the bed-plate

at the end of the machine, and this shaft serves to drive the shaft 13, which is in operative engagement with the rear pantograph mechanism. The counter-shaft 12 is provided with bevel-gears 12^a at each end of the same, meshing with similar gears 11^a and 13^a, carried by the shafts 11 and 13, respectively. The shaft 13 is a short shaft, and in addition to driving the rear pantograph mechanism it carries mechanism connected to and adapted to impart an intermittent movement to a shaft 14, arranged in line with the shaft 13. This shaft 14 serves to drive the fliers 15 and the loopers 16, carried thereby. The mechanism for imparting the intermittent movement to the shaft 14 will be more fully described hereinafter.

The fliers 15, carrying the loopers 16, are provided with hubs 17, adapted to suitable bearings 18 on the bed-plate of the machine at one side of the work-holding frame. On the opposite side of the bed-plate are the needle-carriers 19, in which the needles 20 are arranged, and these needle-carriers are adapted to suitable bearings 21, the needles being arranged in line with the loopers. Both needles and loopers are rotated through the medium of the shafts 11 and 14, respectively, which are mounted above the same, the needle-carriers being provided with gears 22, meshing with similar gears 23, carried by the shaft 11, and the hubs 17 of the fliers being provided with gears 24, meshing with similar gears 25, carried by the shaft 14. Mechanism to move the needles into and out of engagement with the material to be embroidered, including arms 26 and 27, connected thereto, is located beneath the bed-plate of the machine and is driven by the shaft 5.

Instead of the usual fixed spool for carrying the thread, with a series of thread-guides and automatic stop-motions for stopping the machine when a thread breaks, we arrange a series of fliers 15, adapted to carry removable spools 28, which fliers and spools move constantly in one direction when the machine is in operation. As noted above, the fliers are driven through the medium of the gears 24 and 25. A spindle 29 for the spool is hinged at 30 to the flier, so that it may be raised to fit a new spool in place when the thread from one gives out. The gears 25, mounted on the shaft 14 and serving to drive the fliers 15, are each provided with clutches 31 for throwing them out of action when a thread breaks. These clutches are operated by the attendant in charge of the embroidering mechanism, and this arrangement permits any one of the loopers to be thrown out of action without disturbing any of the rest or the necessity of stopping the machine to splice a thread. This is an important feature where the machine is one of great length. The fliers 16 are driven continuously, and to provide for the necessary pauses in the rotation of the loopers car-

ried by the same to make the stitch special controlling mechanism is interposed between the shafts 13 and 14, before referred to. By this arrangement, which is timed with the pantograph mechanism, the needle is always presented to the looper at the proper angle to receive the thread and make the stitch, and the making of a stitch is assured every time the needle passes through the material to be embroidered.

The needle-carriers 19 are mounted on the bed-plate of the machine and are of the same construction and are operated in substantially the same manner as the needle-carriers of our former application. Their rotative movement is intermittent, backward and forward, determined by the movement of the index-point moved by the operator in following the design on the pattern-plate, whereby the pantograph mechanisms are operated. The needle-carriers are provided with the usual means for moving them into and out of engagement with the material to be embroidered. In order that the material may be kept at the proper tension to receive the embroidery-stitches, a stitch-plate 32 is arranged in line with the face of the loopers and adjacent thereto, suitably supported, so that it maintains one position with relation to the needles and loopers.

The embroidering-thread is carried by spools 28, mounted in the fliers 15, which are driven from the shaft 14 through the medium of the gears 24 and 25. The hubs 17 of the fliers, which carry the gears 24, are mounted in suitable bearings 18, secured to the bed-plate of the machine. The spindles 29 for the thread-spools 28 are hinged at 30 to the fliers, which are provided with seats 33 at the outer ends of the same for the ends of the spindles. To this seat is hinged a cover 34, adapted to hold the spindle in place, and this cover is retained in its closed position by a spring 35, engaging a lug 36 on the cover. The end of the spool is notched at 37 and is adapted to engage a lug 38 on the spindle 29, so that the spool will be positively driven by the same. The spindle is preferably hollow for the sake of lightness. To accommodate the flier as it is constantly rotating, the bed-plate of the machine is cut away at 39.

The gears 25, which drive the gears 24 to rotate the fliers 15, are loose on the shaft 14, and clutches 31, splined to this shaft, are provided for the purpose of connecting these driving elements to operate the fliers and loopers. To prevent lateral movement of the gears 25 on the shaft 14, we provide collars 25^a, (shown clearly in Fig. 8,) having reduced portions adapted to fit cut-out portions in the face of the gears 25, the engagement of these gears 25 with the gears 24 preventing any lateral movement in the opposite direction. The sleeve of the clutch is provided with a single tooth 40, adapted to engage a notch 41 in the hub of the

gear 25. This sleeve is actuated by a lever 42, pivoted at 43 to a support 44, mounted on the bed-plate of the machine, and this lever carries a yoke 45, adapted to engage the sleeve, whereby positive movement of the same is effected. The clutches are normally in engagement with the gears 25 and are held in this position by a spring 46, interposed between the clutch-sleeve and a collar 47, fixed to the shaft 14. The outer end of the lever 42 rests on a bar 48, carried by suitable supports 49, mounted on the bed-plate of the machine. This bar is provided with a series of lugs or stops 50, adjacent to the levers 42, adapted to hold said levers when it is desired to throw any one of the clutches out of engagement with the gears 25. The portion of the bar adjacent to these lugs or stops is inclined upward slightly, so that the lever must be raised slightly when it is moved to engage said lugs.

Interposed between the shaft 13, which operates the rear pantograph mechanism, and the shaft 14, which rotates the fliers and the loopers carried thereby, is the mechanism for giving the loopers the intermittent rotative movement. This shaft 13 is mounted in suitable bearings 51 and 52 and has an enlarged portion which carries at its extreme end a spindle-bearing 54 for a bevel-gear 55. Adapted to the enlarged portion of the shaft 13 is a sleeve 56, having a gear-wheel 57, which receives its motion from an intermediate gear-wheel 58, mounted in suitable bearings 59, secured to the bed-plate of the machine, from a gear-wheel 60, carried by the main driving-shaft 4. At the opposite end of the sleeve 56 is a bevel-gear 61, meshing with the bevel-gear 55. The shaft 14 is carried by a series of bearings 62, (two of which are shown,) and this shaft carries at its end a bevel-gear 63, meshing with the bevel-gear 55, through which connection the shaft 14 receives its continuous rotative movement. When the driving-shaft 4 is in motion, the sleeve 56, mounted on the shaft 13, is driven in the same direction, and this motion being transmitted to the shaft 14 through the medium of the bevel-gears 55, 61, and 63 said shaft 14 is simply rotated in one direction, as the bevel-gear 55 is simply turned on its axis, as the shaft 13 is stationary. If, however, the pantograph mechanism is thrown into action, the shaft 13 is set in motion, and the bearing 54 for the bevel-gear 55 is turned, and instead of imparting an uninterrupted movement to the shaft 14 an intermittent movement is imparted to said shaft, it turning faster when moving in the same direction as the sleeve 56 and being held temporarily when turned in the opposite direction, its intermittent movement being determined by the shaft 13 for operating the rear pantograph mechanism and controlled by the operator, so that the loopers may always be presented to the needles in the right position when a stitch is to be formed in the fabric operated upon.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination in an embroidering-machine of the character described, of the bed-plate, needle mechanism and looper mechanism mounted on the bed-plate, a work-holding frame, pantograph-plates at each end of said frame, pantograph-wheels bearing on both the front and back of each plate, means for operating the several pantograph mechanisms in unison, said means serving also to rotate the needle mechanism and looper mechanism, said looper mechanism being driven by a shaft disconnected from the pantograph-driving shaft but in line therewith, and means connecting said shafts whereby the looper mechanism may be given an intermittent rotative movement, substantially as described.

2. The combination in an embroidering-machine of the character described, of the bed-plate, needle mechanism and looper mechanism mounted on the bed-plate, a work-holding frame, pantograph-plates at each end of said frame, pantograph mechanisms in engagement with said plates, shafts mounted on the bed-plate and serving to rotate the needles and loopers, said shafts being moved directly by the operator in following the design on the pattern-plate, a shaft for driving the looper mechanism arranged in line with the pantograph-operating shaft, and coacting mechanism disposed between said shaft whereby a continuous rotative movement may be imparted to the looper independently of the intermittent movement of the pantograph mechanism, substantially as described.

3. The combination in an embroidering-machine of the character described, of the bed-plate, needle mechanism and looper mechanism carried thereby, a shaft for driving one side of the pantograph mechanism and the needle mechanism, a shaft for driving the opposite side of the pantograph mechanism, a shaft in line with said latter shaft and coacting therewith for driving the looper mechanism, and means connecting said shafts, the needle mechanism being given a partial rotation only in both directions while the looper mechanism is moved continuously in one direction, the mechanism connecting the looper-driving shaft and the pantograph-operating shaft in line therewith, serving to change the speed of the looper mechanism intermittently, such changes being coincident with the changes of motion of the needle mechanism, in order to present the needles to the loopers in the proper position, substantially as described.

4. The combination in an embroidering-machine of the character described, of a series of loopers adapted to be given an intermittent continuous movement, shafts for driving said loopers, fliers mounted on the shafts and carrying the looper, a pantograph-shaft, and a looper-driving shaft mounted in line with said

pantograph-shaft and operatively connected to, but not forming part of, said pantograph-shaft, substantially as described.

5 5. The combination in an embroidering-machine of the character described, of a series of loopers, shafts for driving said loopers, fliers to which the loopers are connected carrying the spools of embroidery-thread, spindles for the thread-spools hinged to the fliers, 10 means for retaining the spools in the fliers, and means for giving said fliers a continuous intermittent rotative movement, substantially as described.

15 6. The combination in an embroidering-machine of the character described, of a series of loopers, shafts for driving said loopers, fliers to which the loopers are connected carrying spools of embroidery-thread, spindles for said thread-spools hinged to the fliers, 20 means for retaining the spools in the fliers, and lugs carried by said spindles adapted to engage the spools and hold the same in operative engagement therewith, substantially as described.

25 7. The combination in an embroidering-machine of the character described, of a series of loopers, fliers to which the loopers are connected carrying the spools of embroidery-thread, spindles for said thread-spools hinged 30 to the fliers, and means for retaining the spools in the fliers comprising a hinged cover adapted to rest over the end of the spindle and hold it to its seat, with means for retaining said cover in place, substantially as described.

35 8. The combination in an embroidering-machine of the character described, of a series of loopers, shafts for driving the same, gears fixed to said shafts, a driving-shaft, a series of gears loose on the same, means for maintaining said gears in engagement with the gears 40 of the looper-shaft, a series of clutches independently operated for maintaining an opera-

tive connection between the driving-shaft and the looper-shafts, and independent means for throwing the clutches into and out of engagement with the loose gears, substantially as described. 45

9. The combination in an embroidering-machine of the character described, of a series of loopers, shafts for driving the same, gears 50 fixed to said shafts, a driving-shaft, a series of gears loose on the same held against lateral movement and meshing with the gears of the looper-shafts, and a series of clutches for maintaining an operative connection between the 55 driving-shaft and the looper-shafts, said clutches carrying a single tooth adapted to engage a notch in the hub of the loose gears, and controlled by levers mounted on posts adjacent to the fliers, with means for holding 60 said clutches in engagement with the loose gears, substantially as described.

10. The combination in an embroidering-machine of the character described, of a series of loopers, shafts for driving the same, gears 65 fixed to said shafts, a driving-shaft, a series of gears loose on the same meshing with the gears of the looper-shafts, a series of clutches for maintaining an operative connection between the driving-shaft and the looper-shafts, 70 levers for controlling said clutches, a rail carried by suitable supports on the bed-plate of the machine upon which the clutch-levers rest, and lugs adapted to hold said levers when the clutches are moved out of engagement with 75 the loose gears, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GUSTAVE LOUIS BOURQUIN.
RUDOLF LOEB.

Witnesses:

MURRAY C. BOYER,
JOS. H. KLEIN.