

No. 804,540.

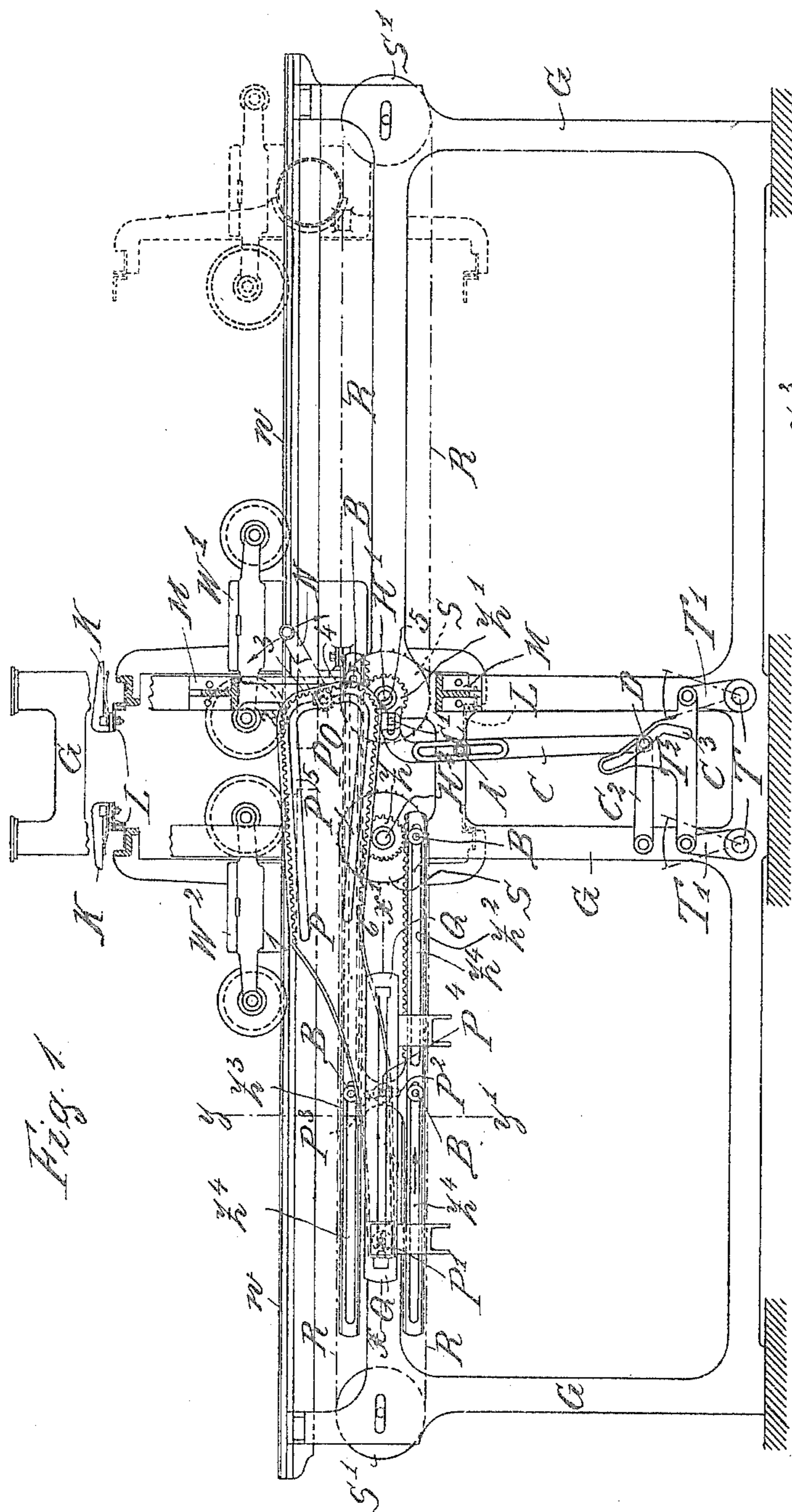
PATENTED NOV. 14, 1905.

J. KNECHT.

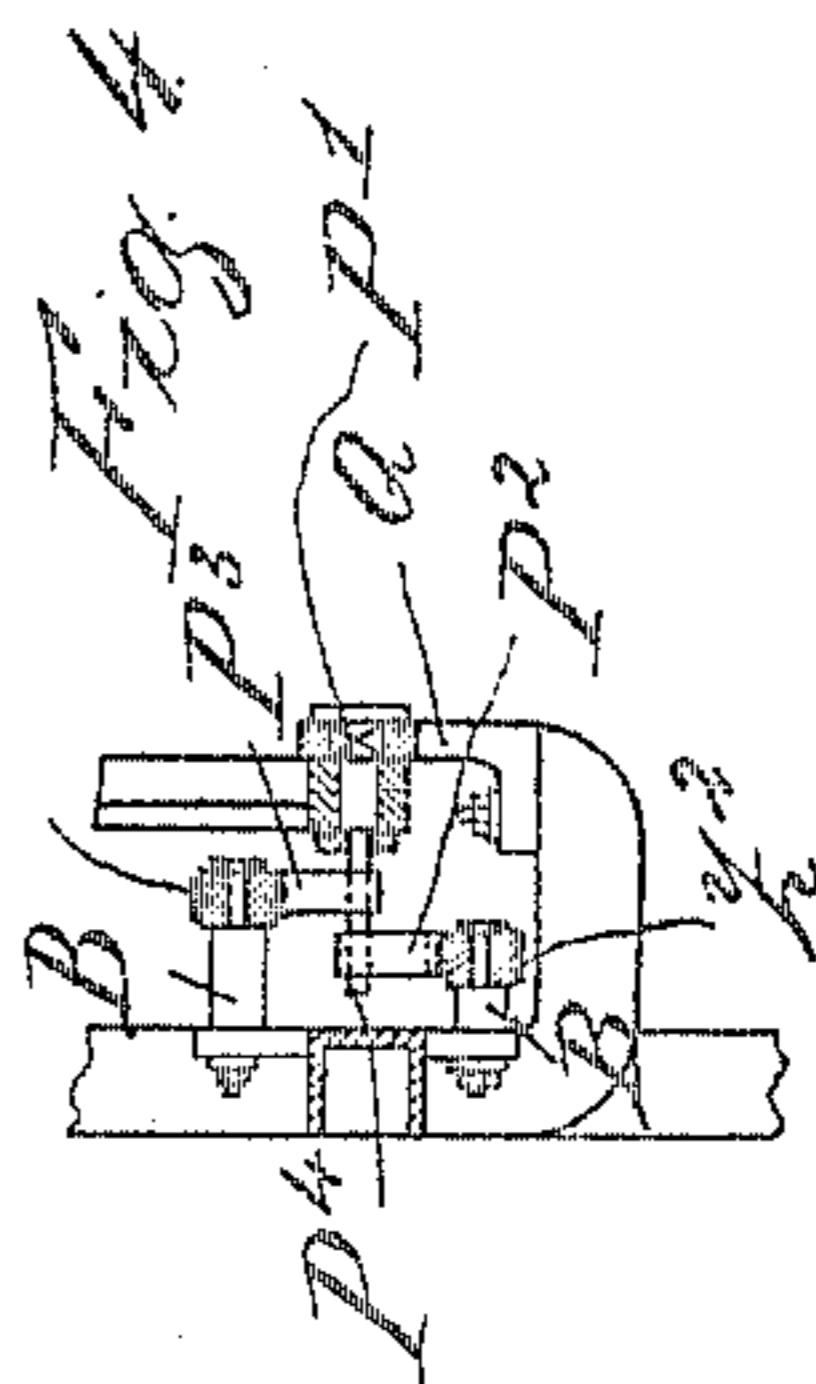
DRIVING MECHANISM FOR HAND OPERATED EMBROIDERING MACHINES.

APPLICATION FILED JAN. 2, 1904.

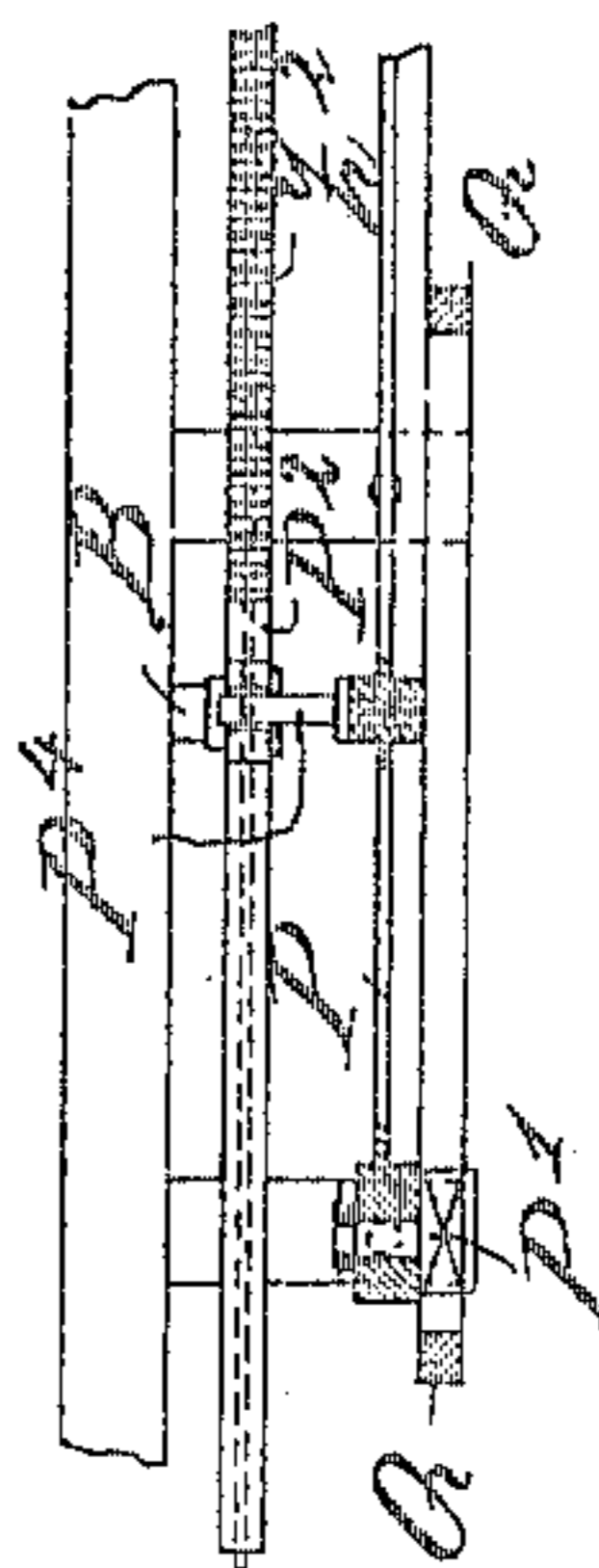
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No. 804,540.

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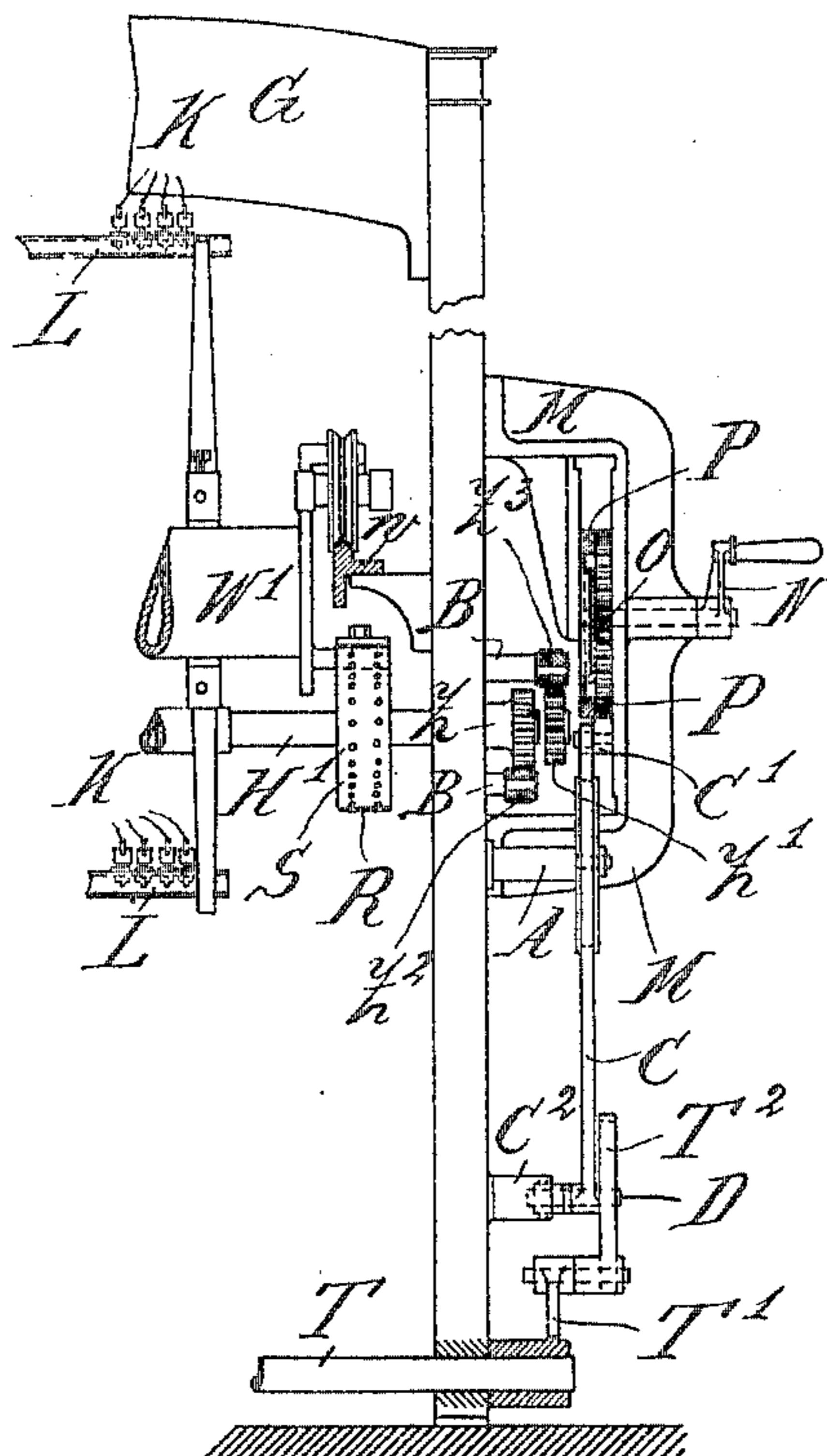
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DRIVING MECHANISM FOR HAND OPERATED EMBROIDERING MACHINES.

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Fig. 2.



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3 SHEETS—SHEET 3

Fig. 5.

Fig. 7.

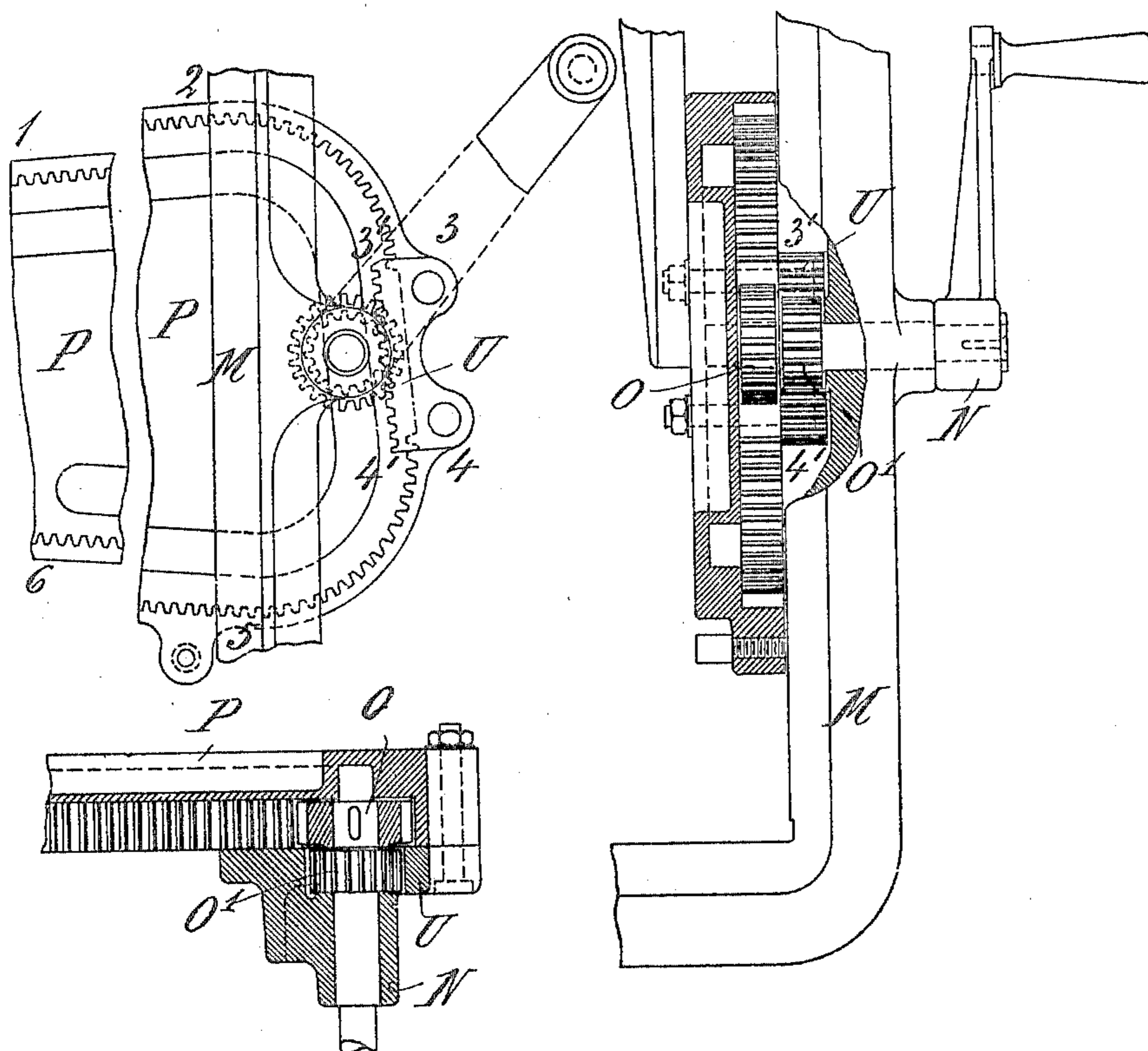


Fig. 6.

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UNITED STATES PATENT OFFICE.

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DRIVING MECHANISM FOR HAND-OPERATED EMBROIDERING-MACHINES.

No. 804,540.

Specification of Letters Patent.

Patented Nov. 14, 1905.

Application filed January 2, 1904. Serial No. 187,520.

To all whom it may concern:

Be it known that I, JAKOB KNECHT, a citizen of the Confederation of Switzerland, and a resident of Chemnitz, in the Kingdom of Saxony, German Empire, have invented a new and Improved Driving Mechanism for Hand-Operated Embroidering-Machines, of which the following is an exact specification.

My invention relates to a new and improved driving mechanism for hand-operated embroidery-machines, and has for its purpose to simplify the means for actuating the machine. In the constructions hitherto known the operator has to reverse the direction of the crank, by means of which the carriages are advanced and moved back three times for finishing each stitch. Besides this the operator has at the same time to actuate two levers by feet, whereby the gearings are commutated, the needle-tongs are opened and closed, and the resting carriage is bolted and unbolted. Furthermore, the operator has to lead the pantograph by means of the left hand.

My invention shows the advantage that the hand lever or crank, by means of which the advancing and moving back of the carriages is effected, needs only be once reversed for accomplishing one stitch and that at the same time during this movement of the crank the opening and closing of the needle-tongs, as well as the bolting and unbolting of the carriage, is effected.

In order to make my invention more clear, I refer to the accompanying drawings, in which—

Figure 1 is a side view of the machine. Fig. 2 is a partial longitudinal view showing only that side of the machine at which the driving mechanism is situated. Fig. 3 is a section on line *xx* of Fig. 1. Fig. 4 is a section on line *yy* of Fig. 1. Figs. 5 to 7 show a modified form of the detail parts of the new driving mechanism.

In the drawings, G is the frame of the machine. *W'* *W*² are carriages running upon rails *w* and carrying the needle-tongs K, carried by supports L.

S and S' are rollers provided at their outer circumference with studs engaging with corresponding openings in the belt R, led around the rollers S S'. The rollers S are adjustable, so as to be able to regulate the tension of the belts R. The carriages *W'* *W*² are so fastened to the belt R that they are moved inward or

outward according to the movement of the belt. The rollers S are mounted upon axles *H'* *H*², firmly connected with toothed wheels *Z'* *Z*, respectively.

*Z*² *Z*³ are racks engaging with the toothed wheels *Z* *Z'*, respectively. These racks are guided by bolts B, mounted upon the frame G and projecting through slots *Z*⁴, provided in the racks.

N is a crank for actuating a pinion O, mounted upon the crank-shaft carried by the support M, fastened to the frame G.

P is a lever provided with a U-shaped rack gearing with the pinion O. Q is a slotted guide secured to the frame. The lever P is provided on its left-hand end with a bolt P', projecting into and guided by the slotted guide Q, so as to allow a pivoting and a longitudinal movement of the lever P. The racks *Z*² *Z*³ are provided with a forked projection P² P³, respectively, whereas the lever P carries a stud P⁴, engaging with the forked end of one of the projections P² and P³. The lever P is provided with a slot P⁵, having the shape of the U-shaped rack 1 2 3 4 5 6 of the lever P. The axle of the pinion O projects through this slot P⁵, so that the pinion O is always kept in engagement with the U-shaped rack of the lever P.

If the crank N is moved from the position shown in Fig. 1 in the sense of the upward-directed arrow, Fig. 1, the lever P is raised and pivoting around the axle P', so that the stud P⁴, carried by P, enters the projection P³ of the rack *Z*³. By further rotating the crank in the above sense the lever P is moved to the right, thereby advancing the rack *Z*³ to the right. In consequence thereof the toothed wheel *Z'* and the roller S are rotated, whereby the carriage *W'*, fastened to the belt R, is moved outside to the position shown in dotted lines. When the pinion O arrives at the point 6 or end of the rack, the crank is turned in opposite sense, so that the carriage *W'* is moved inward to the position shown in Fig. 1 in full lines. If the pinion O passes the curved part 5 4 of the rack of lever P, this lever is lowered in turning around pivot P', so that the pin P⁴ leaves the projection P³ and begins to enter the projection P² of the rack *Z*². In further rotating the crank in the sense of the downwardly-directed arrow, Fig. 1, the lever P is further lowered, enters the projection P², and then moves in passing through

the part 2 1 of the rack of the lever P the rack Z^2 to the right, as indicated by the arrow. Thereby the toothed wheel Z and the roller S are rotated so as to move the carriage W^2 outward. When the pinion O arrives at point 1 of the rack, the crank is again reversed and turned in the direction indicated by the upwardly-directed arrow, so that the carriage W^2 is again returned to the position shown in the drawing Fig. 1.

In the lower part of the frame G two shafts T are mounted, which are in the embroidering-machines hitherto known operated by means of a foot-lever or foot-levers, so as to open and close the needle-tongs K and to bolt and unbolt the carriages in their resting positions. The means for accomplishing these latter operations are well known, but not shown in the drawings for the sake of clearness. In my arrangement these shafts T T are actuated in simple manner by turning the crank N in the following manner: The shafts T T are firmly connected with levers T' T', the ends of which are connected by means of a cross-piece T^2 , having a slot C^3 . C^3 is a lever fastened to frame G. This lever C^3 carries on its outside end a lever C by means of a bolt D, guided in the slot C^3 of cross-piece T^2 . Lever C is slotted in its upper part and guided by means of a stud A, fastened upon frame G. The upper end of lever C is curved and forked, so as to engage with a stud C' , mounted upon lever P. If the pinion O moves upon the rack part 2 to 5 or inversely, the stud C' enters the forked end of C, raises and lowers the lever C, whereby the shafts T T receive their proper oscillation for closing and opening the needle-tongs and bolting or unbolting the carriages $W' W^2$.

The operation for forming a stitch is as follows: If the pinion O engages with rack part 3 4 of lever P, the needle-tongs of carriage W' are closed, then the needle-tongs of carriage W^2 are opened, the carriage W' is unbolted, the bolt P^4 of lever P leaves the fork P^2 of the rack Z^2 and enters the fork P^3 of rack Z^3 . As long as the rack part 4 5 6 engages with pinion O carriage W' is moved outward. If pinion O has arrived at 6, the pinion is rotated in opposite sense, so as to move along rack part 6 5 of lever P, thereby moving the carriage W' inwardly. As long as pinion O engages with rack part 5 4 carriage W' is bolted and the needle-tongs of W^2 are closed. As long as pinion O engages with part 4 3 the needle-tongs of carriage W' are opened, the carriage W^2 is unbolted, pin P^4 of lever P leaves fork P^3 of rack Z^3 and enters fork P^2 of rack Z^2 . When the pinion O engages with rack part 3 2 1, carriage W^2 is moved outward. The pinion O is then rotated in opposite sense, whereby the operation above described is repeated. When the pinion O is moved by the operator along rack part 3 4 or inversely, the resistance offered by the mechanism is greater than that upon

the other part of the U-shaped rack, as the the needle-tongs K, which are usually kept closed by springs, must be opened. In order to avoid this disadvantage, the following modification (shown in Figs. 5 to 7) may be made use of: Instead of arranging only one pinion O upon the crank-shaft, as shown in the above-described arrangement, two pinions O O' are arranged side by side upon the crank-axle. The teeth of the U-shaped rack are cut away between 3 4, and a special toothed plate 3' 4' is fastened to the lever P, so as to engage with pinion O', which is of somewhat smaller diameter than pinion O. The force to be exerted upon the crank by the operator will therefore be always the same during the operation.

Having thus fully described the nature of my invention, what I desire to secure by Letters Patent of the United States is—

1. In an embroidering-machine, the combination with embroidering mechanism including carriages provided with needle-holding means, of mechanism for operating said carriages comprising a crank, a toothed wheel operated thereby, a lever P, a horseshoe-shaped rack carried thereby and engaging said toothed wheel, a pivot-bolt P' for said lever, a guideway on the machine-frame for guiding said pivot-bolt, gears Z Z', operatively connected to said carriages, toothed bars engaging said gears and provided with means whereby the same may be alternately connected to said lever, substantially as described.

2. In an embroidering-machine, the combination with embroidering mechanism including carriages provided with needle-holding means, of mechanism for operating said carriages comprising a crank, a toothed wheel operated thereby, a lever P, a horseshoe-shaped rack carried thereby and engaging said toothed wheel, a pivot-bolt P' for said lever, a guideway on the machine-frame for guiding said pivot-bolt, gears Z Z', operatively connected to said carriages, toothed bars engaging said gears and provided with means whereby the same may be alternately connected to said lever, shafts T T and means for operating said shafts in accordance with the movement of said lever P, substantially as described.

3. In an embroidering-machine, the combination with embroidering mechanism including carriages provided with needle-holding means, of mechanism for operating said carriages comprising a crank, a toothed wheel operated thereby, a lever P, a horseshoe-shaped rack carried thereby and engaging said toothed wheel, a pivot-bolt P' for said lever, a guideway on the machine-frame for guiding said pivot-bolt, gears Z Z' operatively connected to said carriages, toothed bars engaging said gears and provided with means whereby the same may be alternately connected to said lever, shafts T T and means for operating said shafts consisting of a bar C joined to said

lever P, cranks T' T', a cross-piece T² connecting said cranks and having a curved slot and a bolt D guided by said curved slot and connected with bar C, substantially as described.

4. In an embroidering-machine, the combination with embroidering mechanism including carriages provided with needle-holding means, of mechanism for operating said carriages comprising a crank, a toothed wheel operated thereby, a lever P, a horseshoe-shaped rack carried thereby and engaging said toothed wheel, a toothed bar U fixed to the lever P, a toothed wheel O' also operated by said crank and engaging said toothed bar U,

a pivot-bolt P' for said lever, a guideway of the machine-frame for guiding said pivot-bolt, gears ZZ', operatively connected to said carriages, toothed bars engaging said gears and provided with means whereby the same may be alternately connected to said lever, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAKOB KNECHT.

Witnesses:

M. BÖHME,
M. EICHLER.