

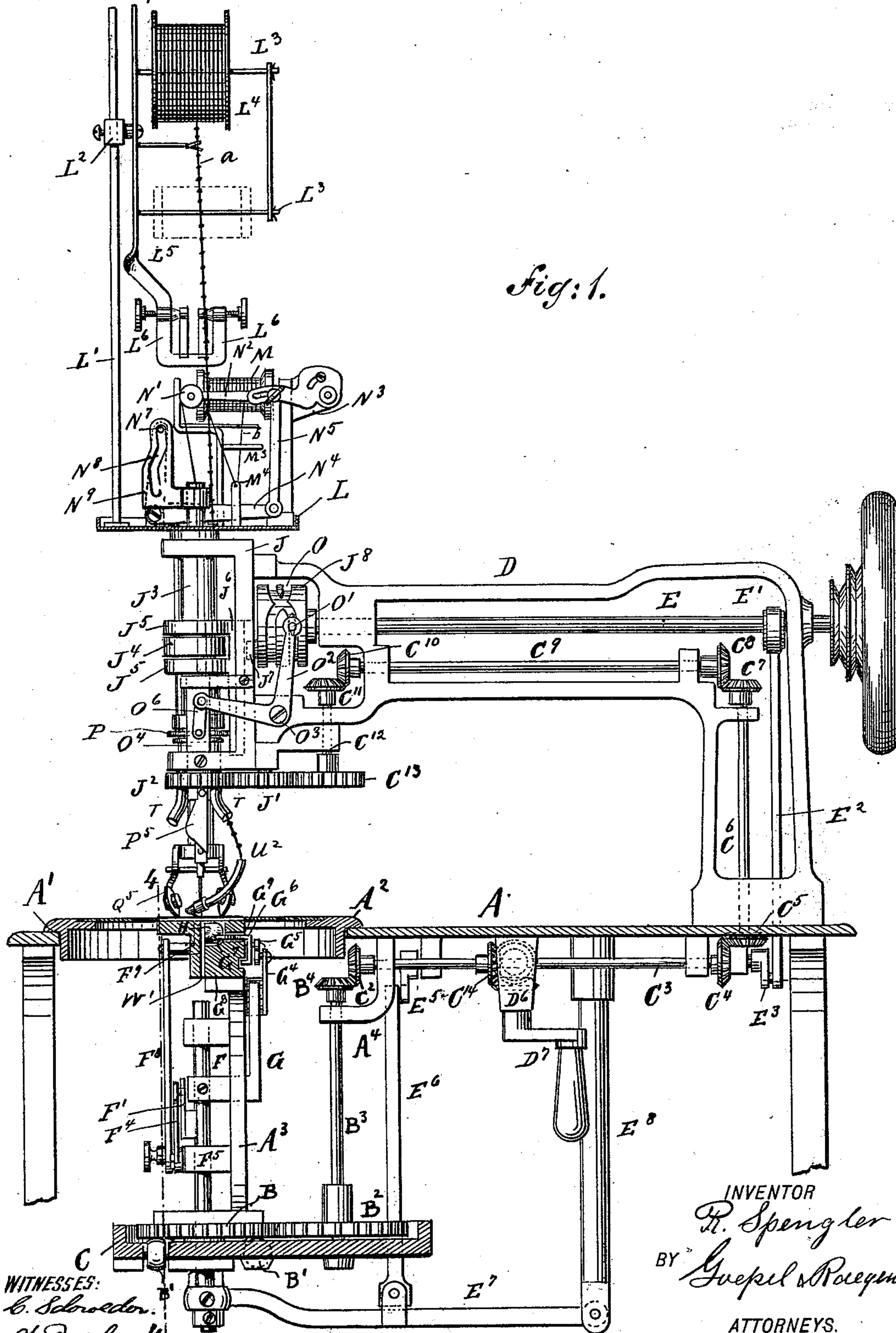
(No Model.)

4 Sheets—Sheet 1.

R. SPENGLER.
EMBROIDERING MACHINE.

No. 514,138.

Patented Feb. 6, 1894.



WITNESSES:
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(No Model.)

4 Sheets—Sheet 2.

R. SPENGLER.
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Fig. 2.

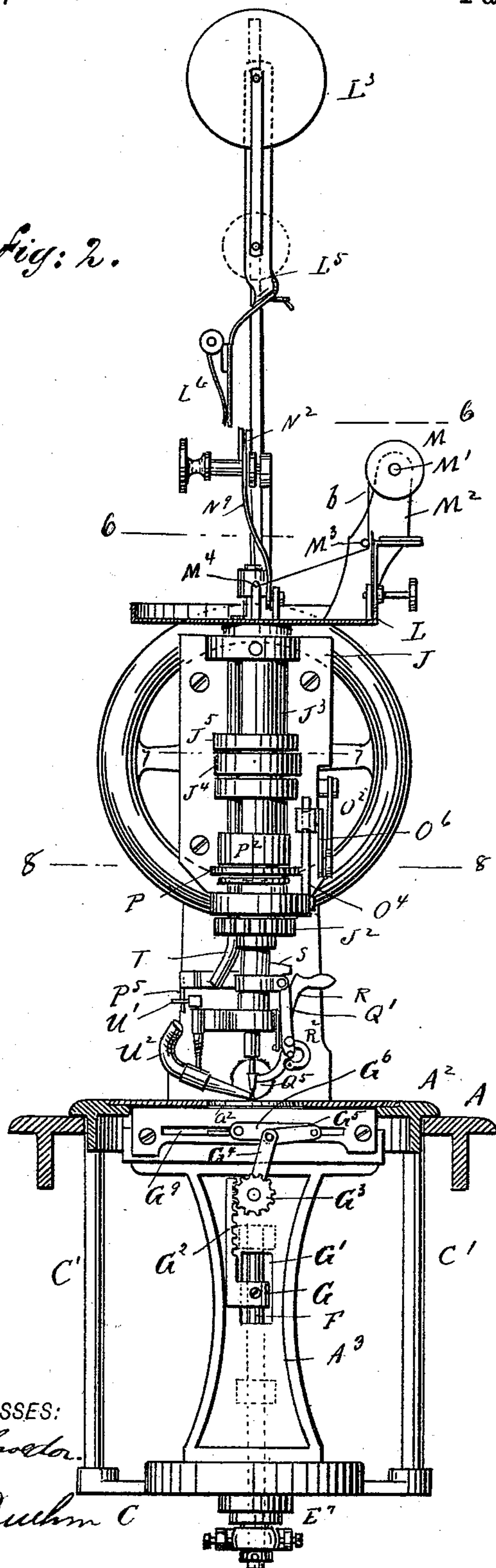


Fig. 6.

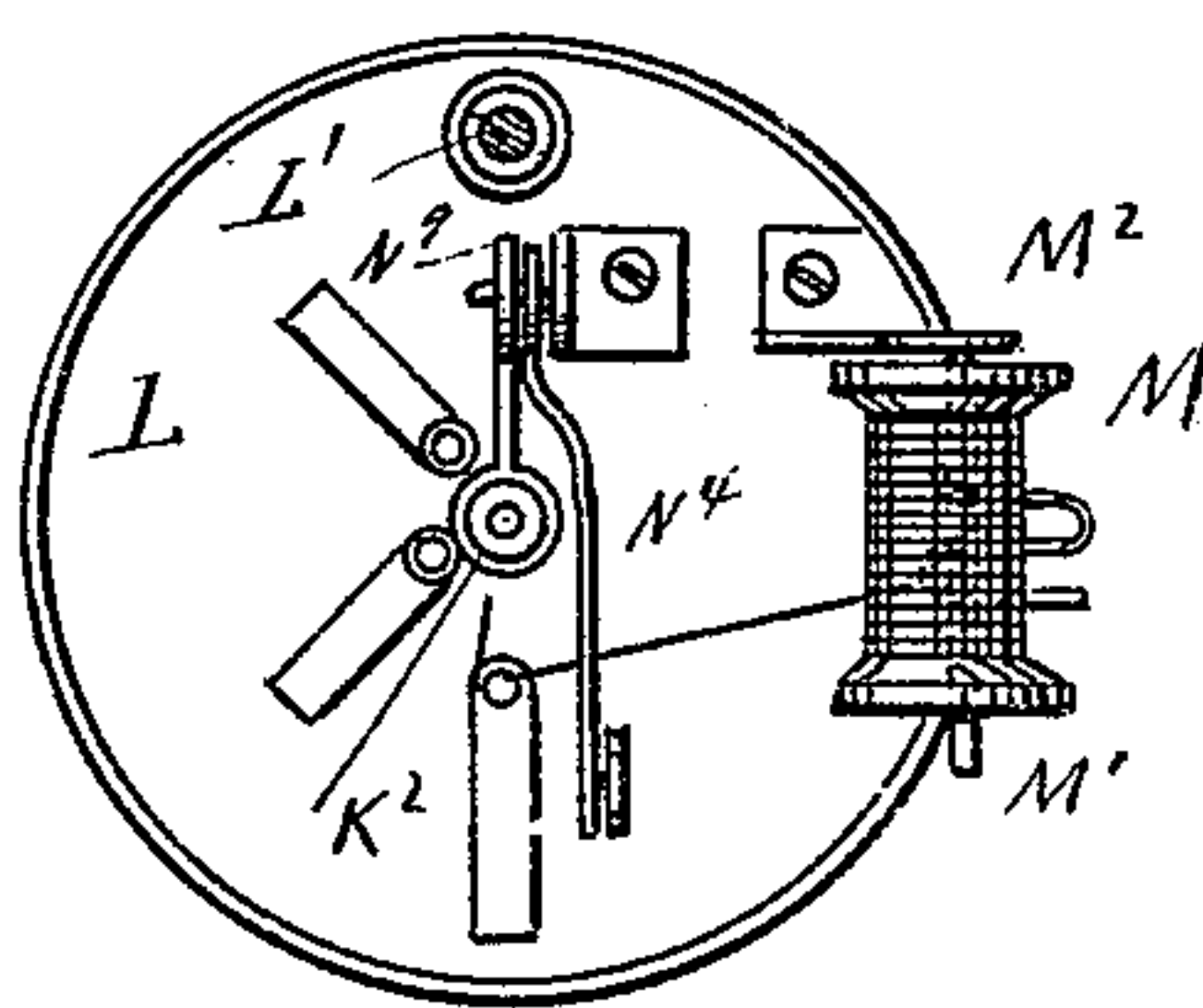


Fig. 7.

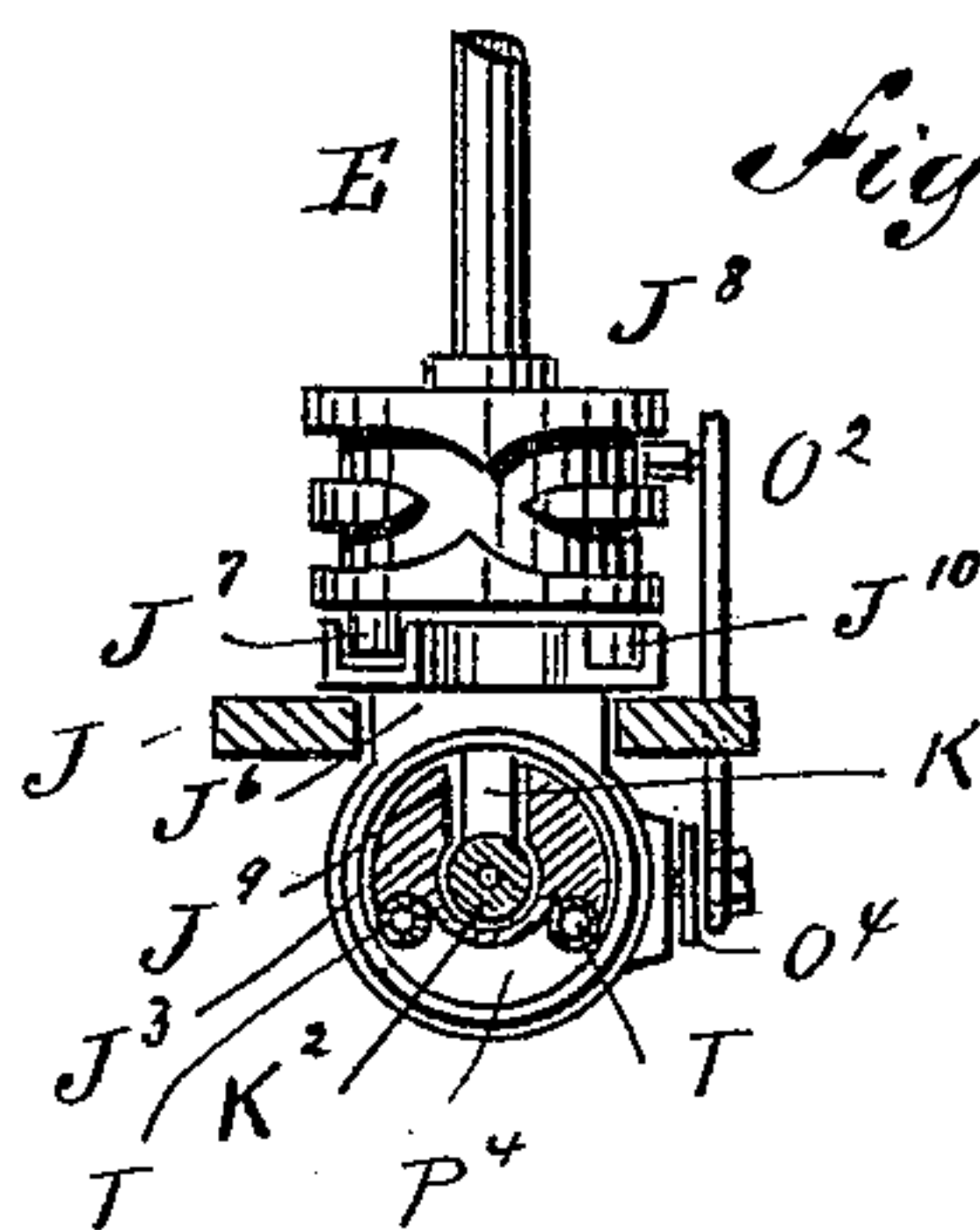
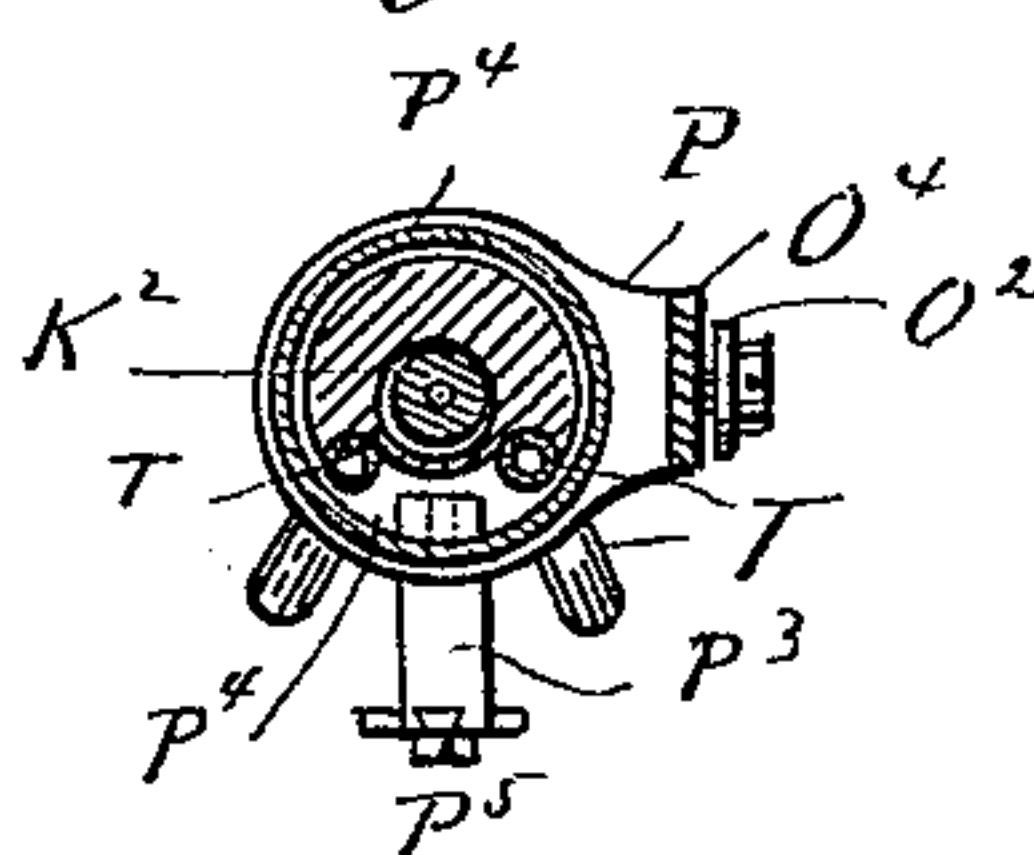


Fig. 8.



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4 Sheets—Sheet 3.

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Fig. 3.

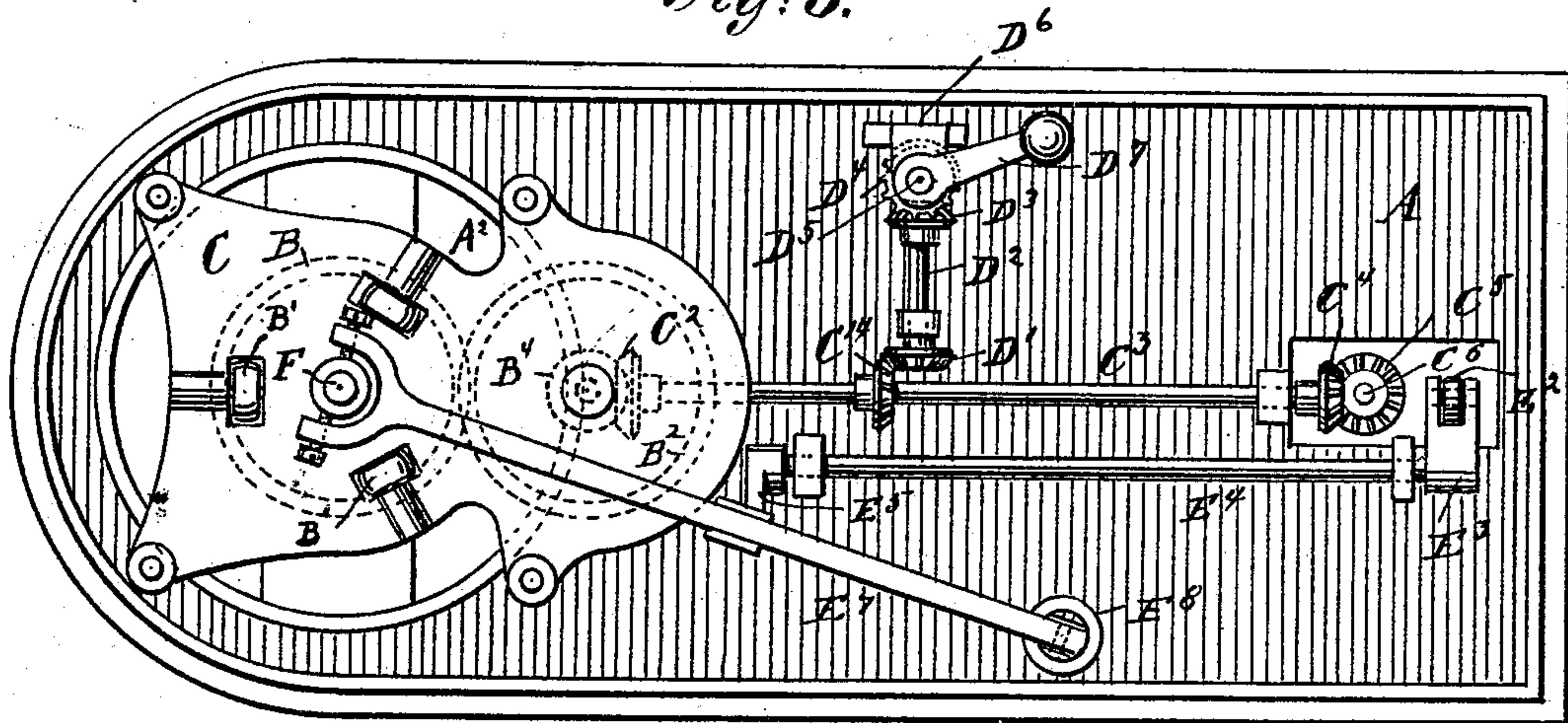


Fig. 5.

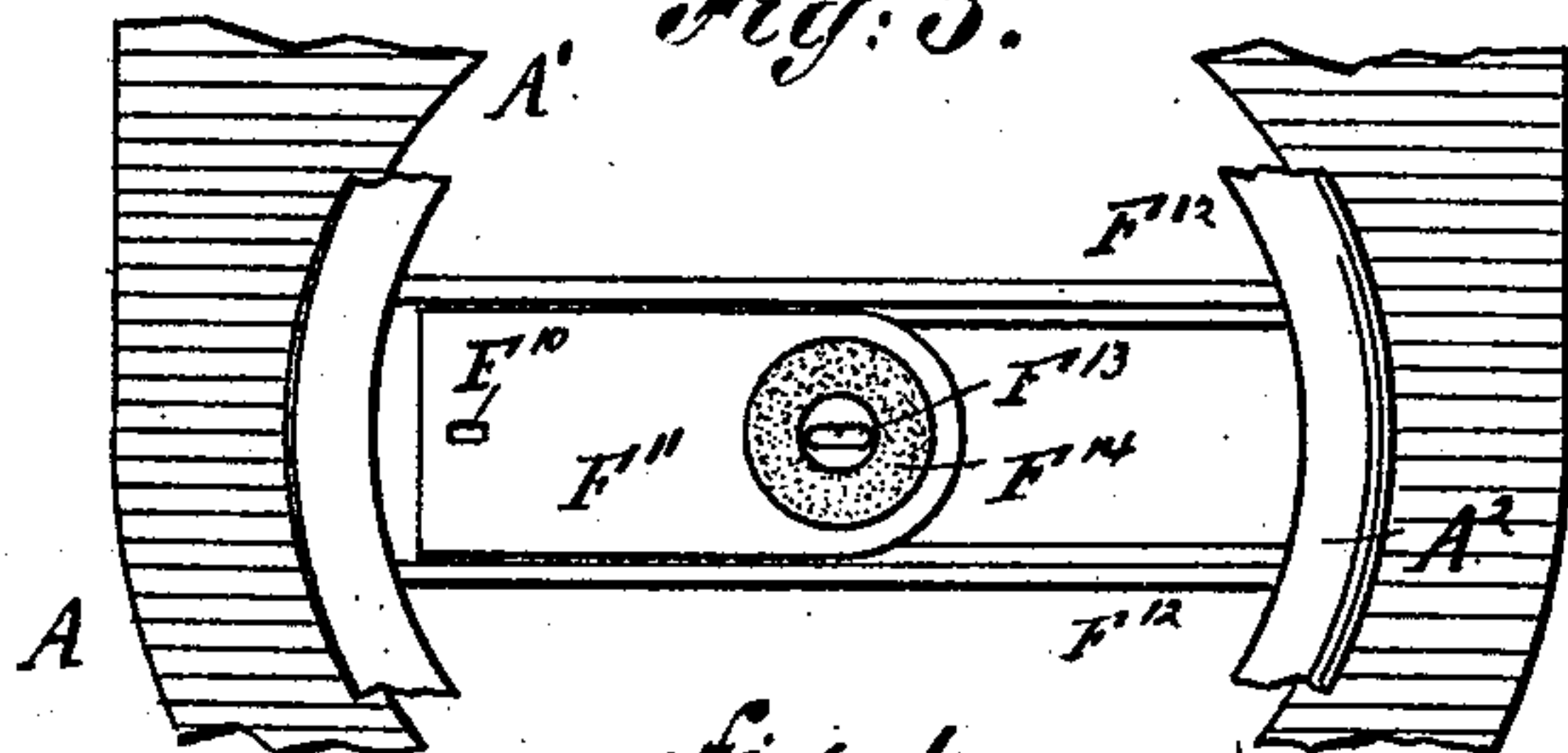


Fig. 4.

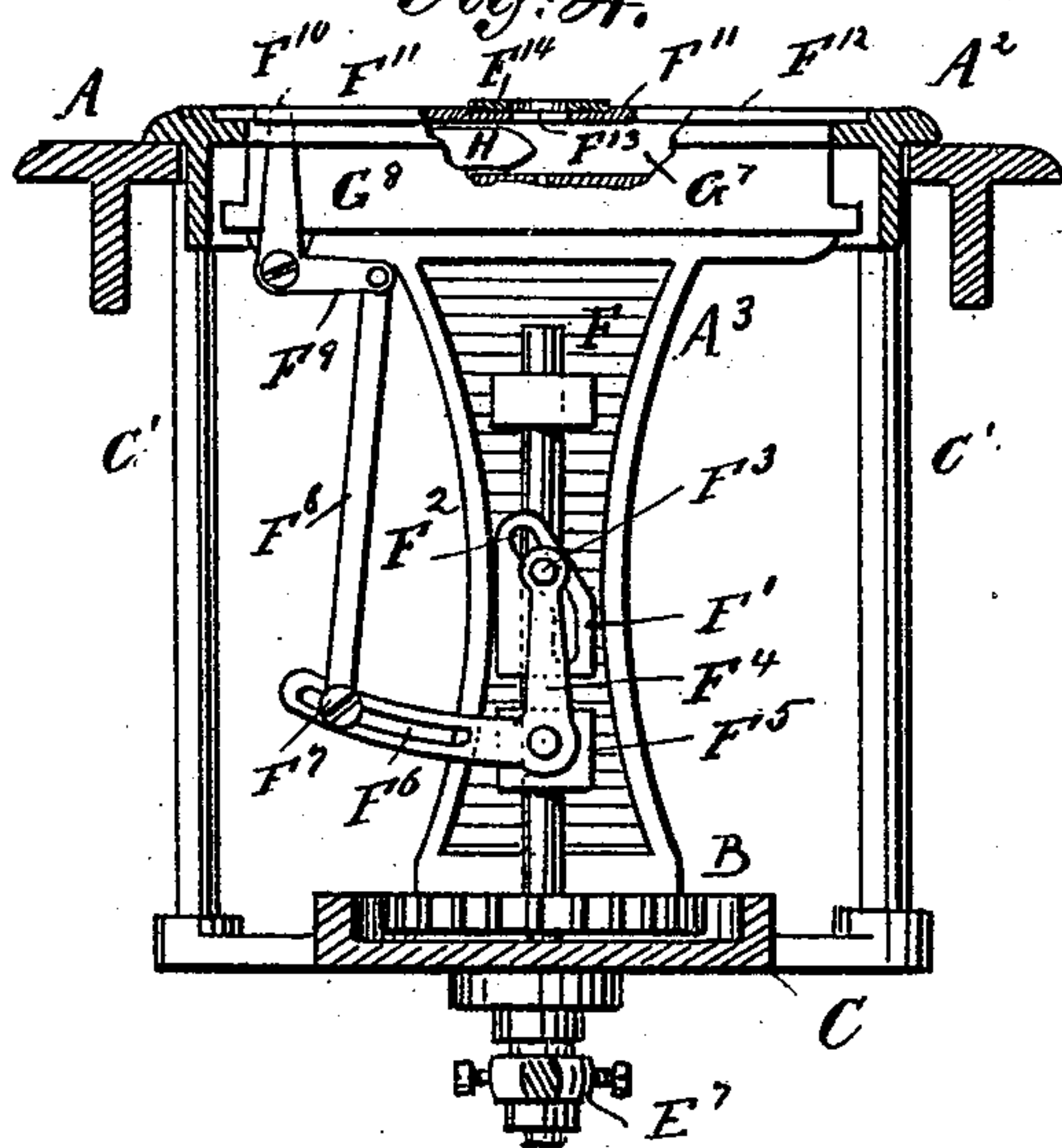
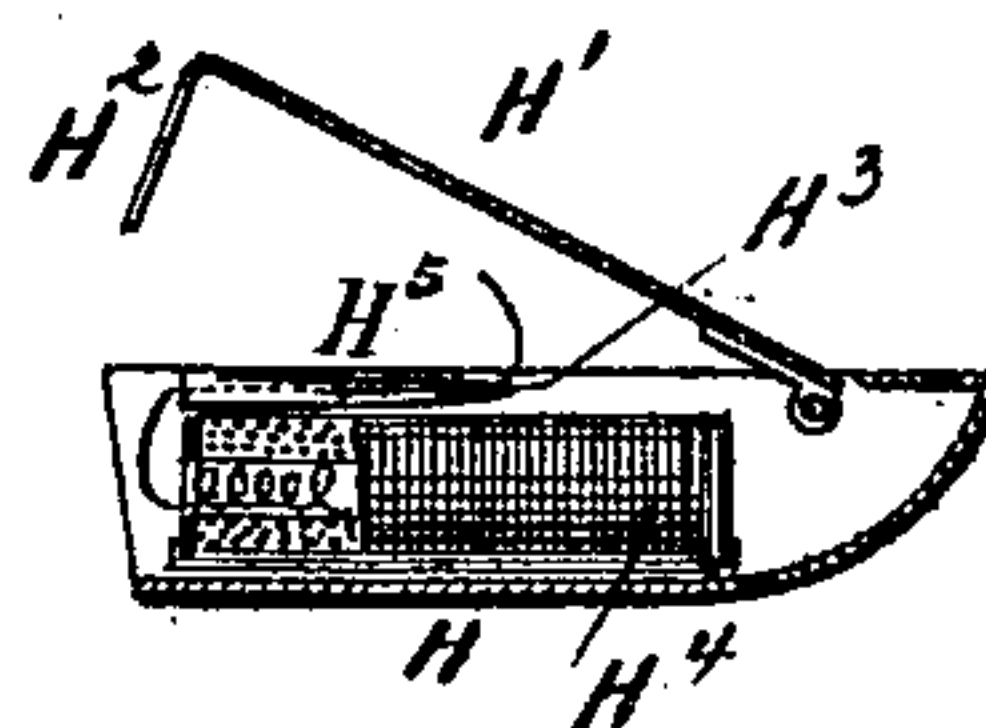


Fig. 15.



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(No Model.)

4 Sheets—Sheet 4.

R. SPENGLER.
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Fig. 9.

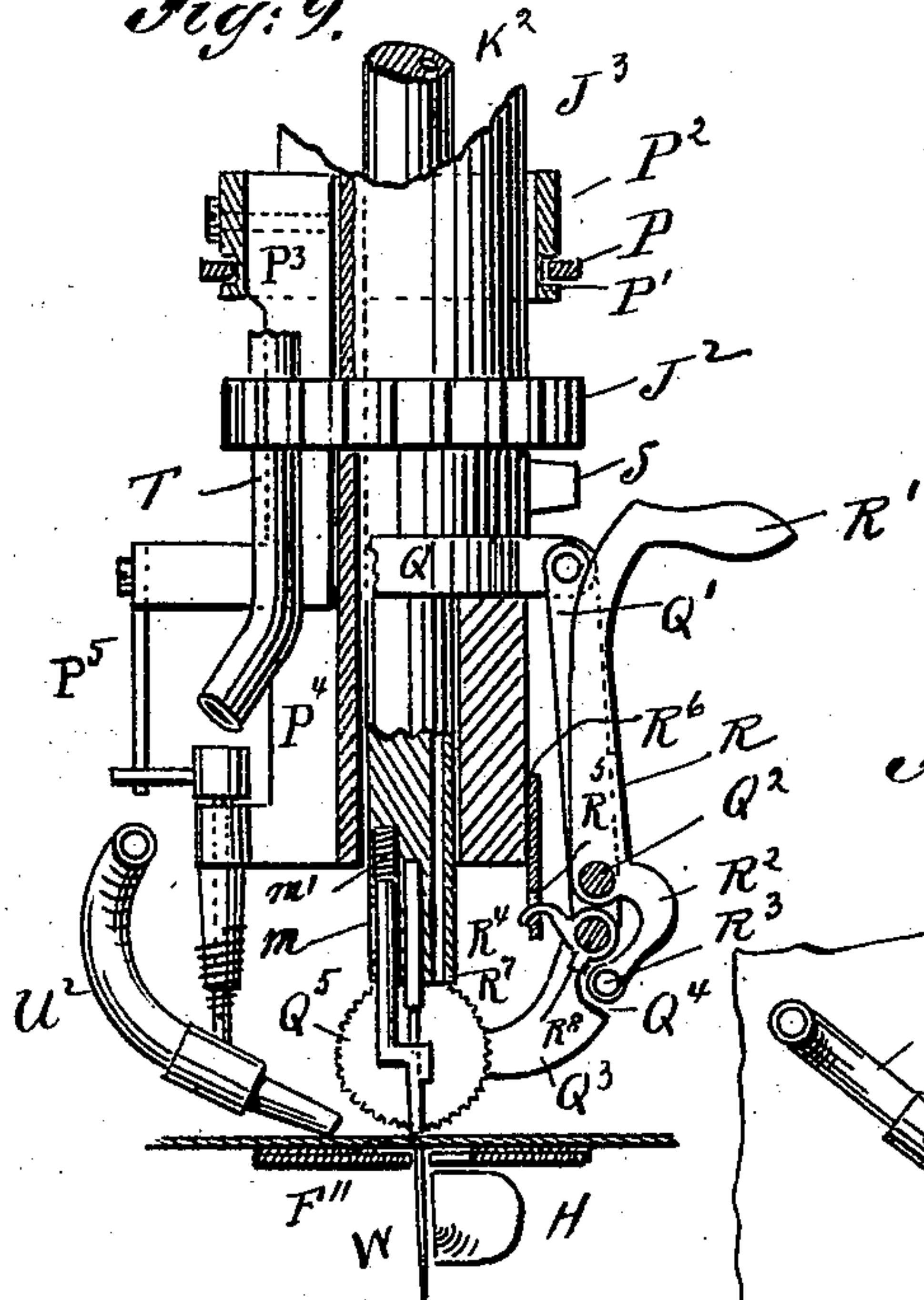


Fig. 10.

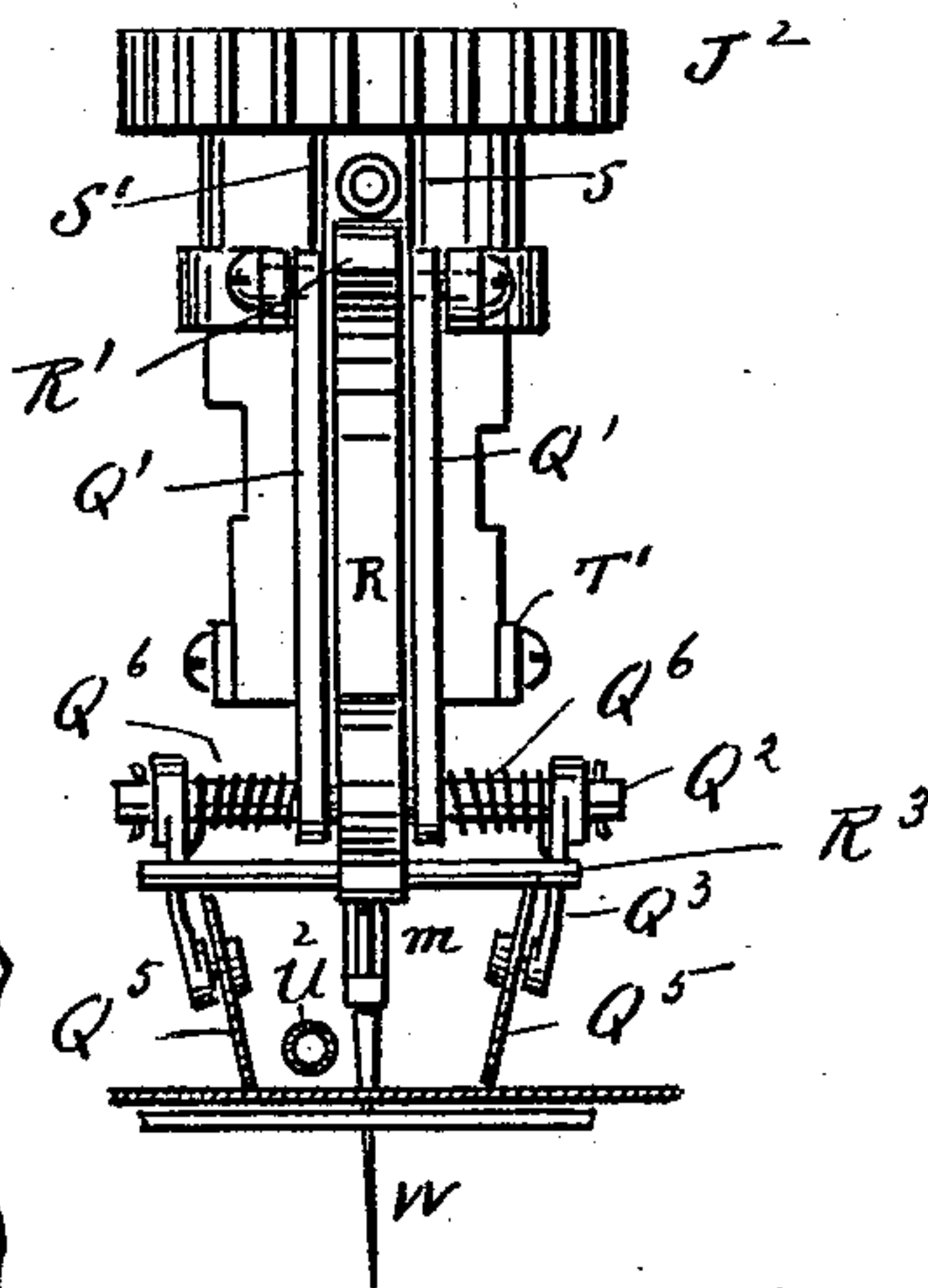


Fig. 11.

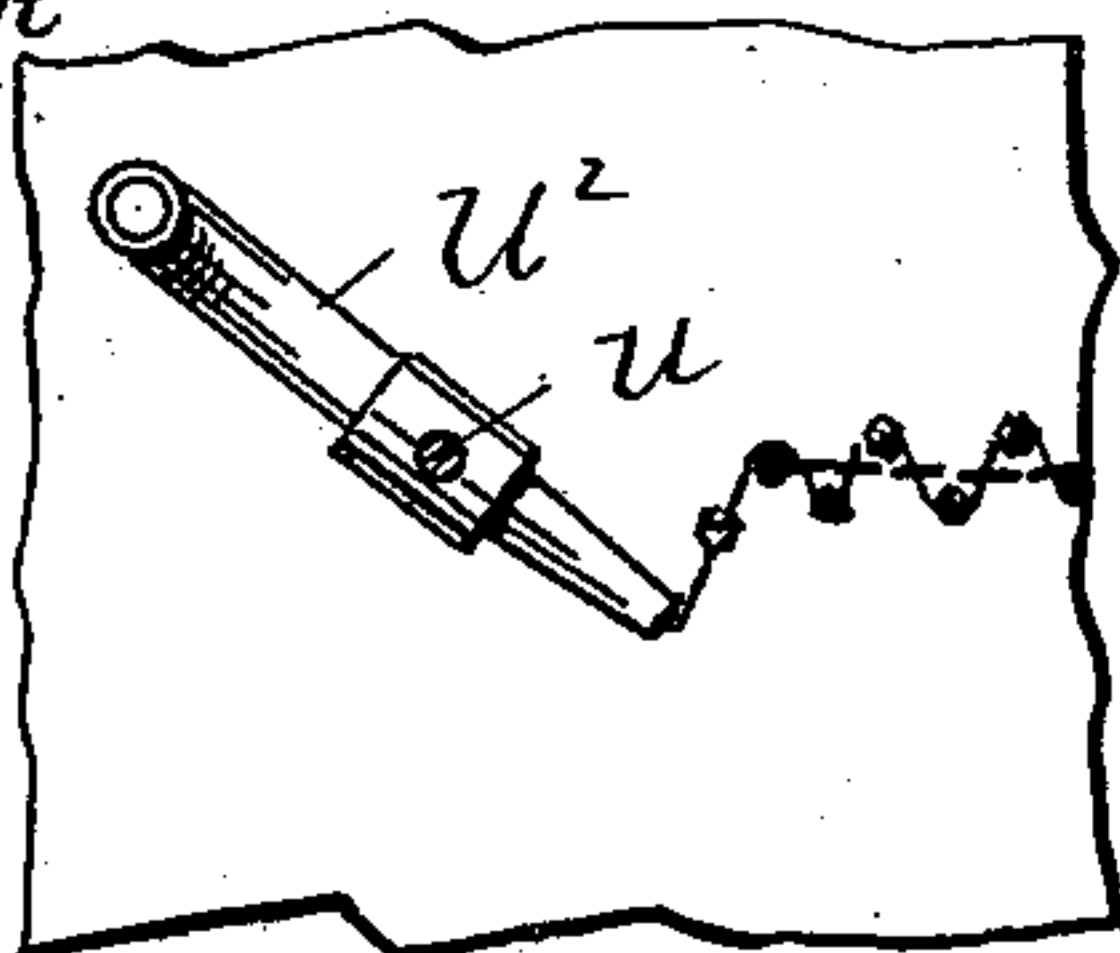


Fig. 12.

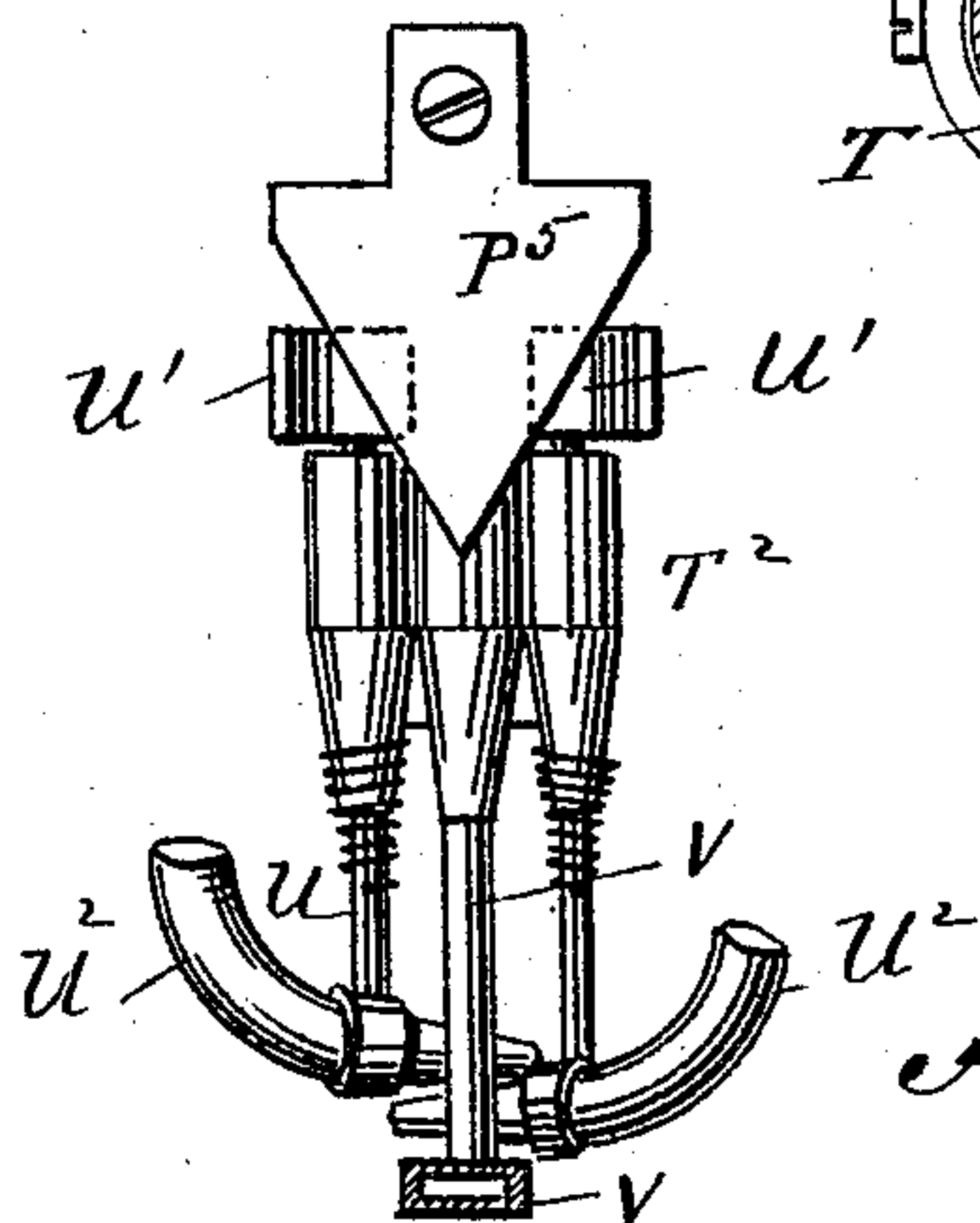


Fig. 16.

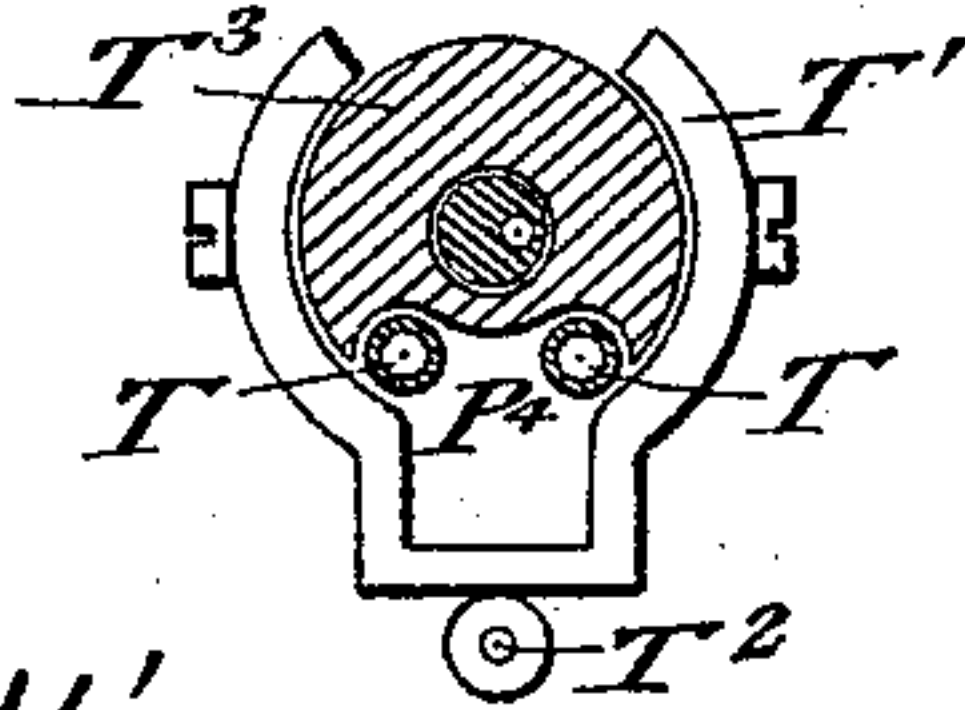


Fig. 13.

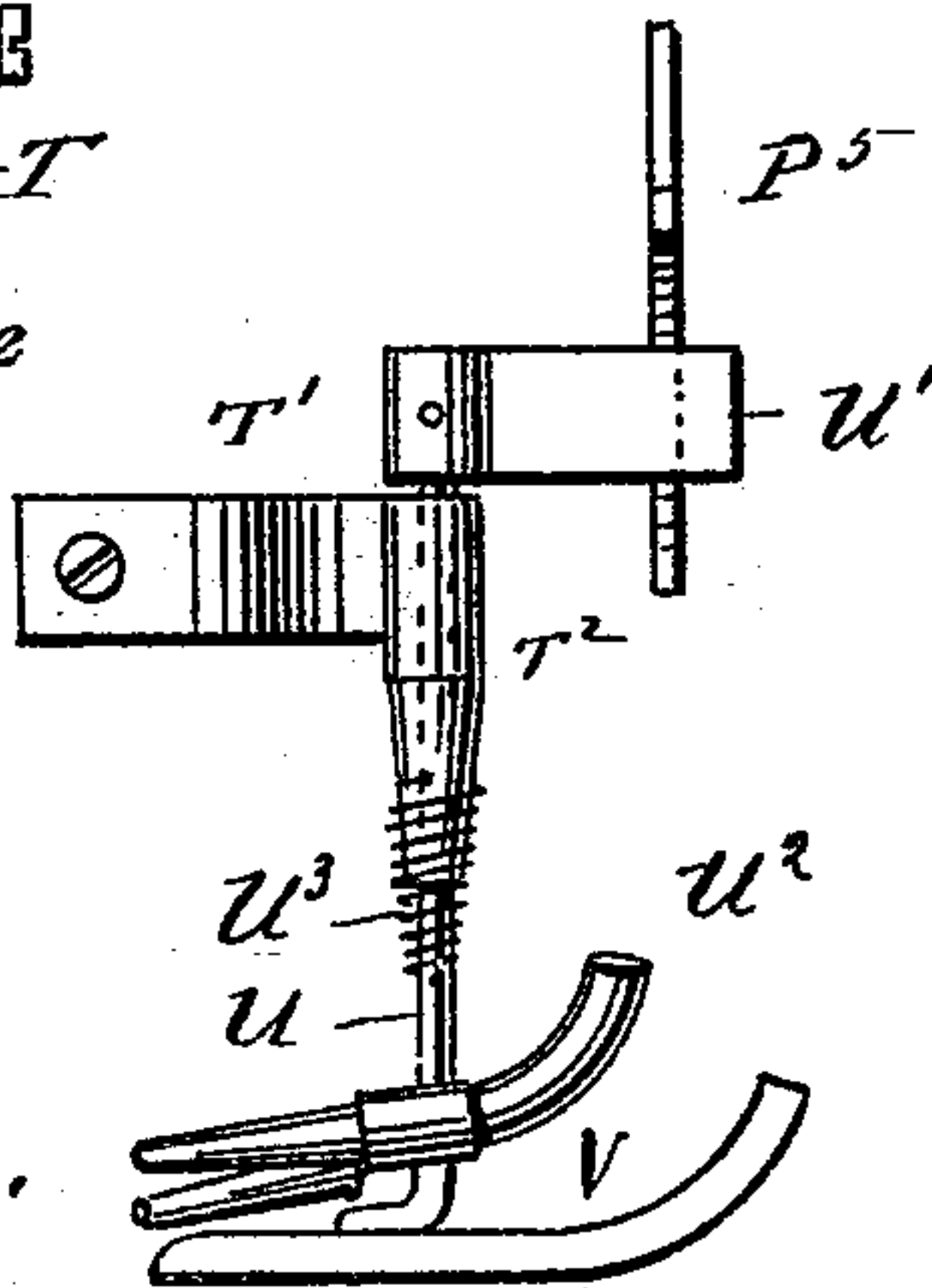
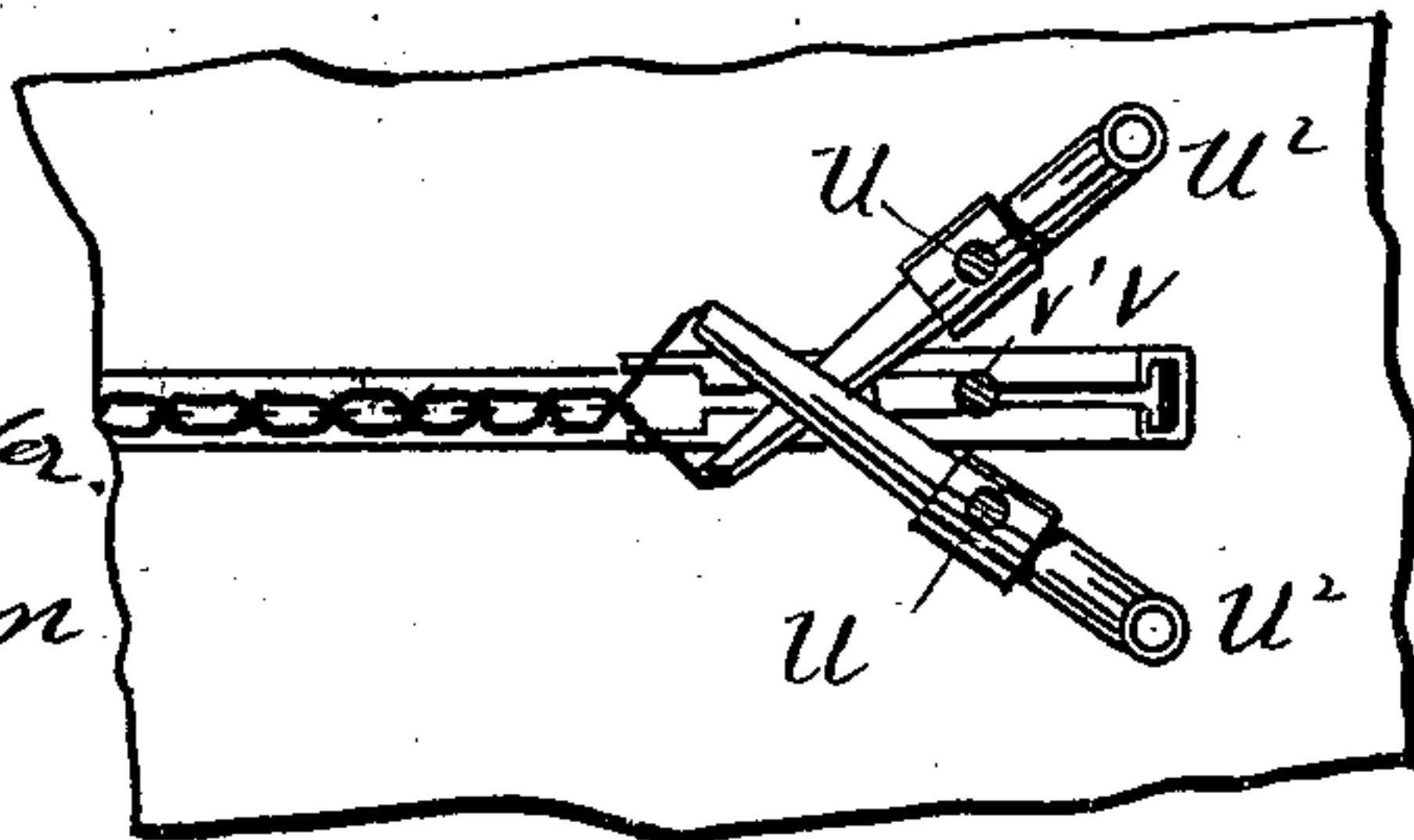


Fig. 14.



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UNITED STATES PATENT OFFICE.

REINHART SPENGLER, OF NEW YORK, N. Y., ASSIGNOR TO JOHN NADAY
AND SIGMUND L. FLEISCHER, OF SAME PLACE.

EMBROIDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 514,138, dated February 6, 1894.

Application filed September 13, 1892. Serial No. 445,760. (No model.)

To all whom it may concern:

Be it known that I, REINHART SPENGLER, a citizen of the Republic of Switzerland, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

This invention relates to improvements in sewing-machines.

10 The object of my invention is to provide a sewing-machine which is adapted for producing fancy patterns by means of thread cords, beaded cords, braids or other material applied on fabric by means of lock stitches, and
15 which machine is so constructed that most intricate patterns can be produced very rapidly and easily by means of the same.

20 The invention consists in various constructions and combinations of parts and details, as will be fully described and set forth hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a side-elevation of my improved sewing-machine, parts being omitted and others being
25 in section. Fig. 2 is an end-elevation of the same, parts being omitted and others shown in section. Fig. 3 is a plan-view of the under side of the bed-plate of the machine. Fig. 4 is a sectional-view on the line 4 4, Fig. 1,
30 parts being omitted and others broken out. Fig. 5 is a plan-view of the turn-table. Fig. 6 is a sectional plan-view on the line 6 6, Fig. 2. Fig. 7 is a sectional plan-view on the line 7 7, Fig. 2. Fig. 8 is a sectional plan-view on the line 8 8, Fig. 2. Fig. 9 is a detail side-view of the presser-bars, braid-feeders, parts
35 being broken out and others in section. Fig. 10 is a view at right angles to Fig. 9, showing the arrangement of the presser-wheels. Fig. 11 is a plan-view, partly in section, showing the swinging key-tubes for the beads. Fig. 12 is a detail-view of the cord and braid feed-device. Fig. 13 is a side-view of the same. Fig. 14 is a sectional plan-view of the construction shown in Figs. 12 and 13. Fig. 15
45 is a detail sectional-view of the shuttle and bobbin. Fig. 16 is a plan view of the detachable collar for holding the supports for the swinging cord-guide.

50 Similar letters of reference indicate corresponding parts.

The bedplate A of the sewing-machine is provided with a circular opening A' below the needle-bar and in said opening the circular plate A² is fixed. Below said plate is arranged a cross-bar G⁸ having a downwardly-projecting leg A³, the lower end of which is secured to a cog-wheel B that is supported on anti-friction rollers B' mounted in slots of a supporting-plate C which is suspended by
55 means of rods C' from the under side of the bed-plate, the shape of said supporting-plate being clearly shown in Fig. 3. The cog-wheel B engages a cog-wheel B² also arranged upon the supporting-plate C and fixed on a vertical shaft B³ guided at its lower end in the supporting-plate C and at its upper end in an arm A⁴ projecting from the under side of the bed plate A, which shaft B³ is provided at its upper end with a beveled cog-wheel B⁴ engaging a beveled cog-wheel C² on one end of a shaft C³
60 mounted in suitable bearings on the under side of the bedplate in the direction of the length of said bedplate, which shaft C³ carries at the end opposite the one carrying the cog-wheel C² a beveled cog-wheel C⁴ engaging the beveled cog-wheel C⁵ mounted on the lower end of a vertical shaft C⁶ suitably mounted in the vertical part of the arm D of the sewing-machine, said shaft C⁶ carrying at its upper end a beveled cog-wheel C⁷ that engages the beveled cog-wheel C⁸ on one end of the shaft C⁹ mounted within the horizontal part of the arm D and carrying at its opposite end a beveled cog-wheel C¹⁰ that engages a beveled cog-wheel C¹¹
65 mounted on the upper end of a vertical shaft C¹² in the free end of the horizontal part of the arm D and projecting down through said arm, which shaft C¹² carries at its lower end a cog-wheel C¹³ for a purpose that will be set forth hereinafter.

The horizontal shaft C³ on the under side of the bedplate A is provided with a beveled cog-wheel C¹⁴ that engages the beveled cog-wheel D' on the short shaft D² arranged on
70 the under side of the bedplate at right angles to the shaft C³ and said shaft D² is provided with the beveled cog-wheel D³ that engages the beveled cog-wheel D⁴ mounted on the upper end of the short vertical shaft D⁵ supported in the bracket D⁶ projecting downward from the under side of the bedplate,
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which shaft D⁵ is provided at its lower end with the crank-handle D⁷ for turning it. By turning said crank-handle D⁷, rotary motion is transmitted by means of the shafts D² and C³ and the several beveled cog-wheels to the cog-wheels B² and C¹³ and from the cog-wheel B² it is transmitted to the cog-wheel B, the leg A³ and the cross-bar G⁸, so that the operator by merely turning the crank-handle D⁷ in one direction or the other, can readily turn the cross-bar G⁸ in one direction or the other.

In the arm D the main-shaft E of the usual construction of sewing-machines is mounted and by means of an eccentric E' and connecting-rod E² operates the crank E³ on one end of the rock-shaft E⁴ mounted on the under side of the bedplate, which rock-shaft is provided at the end opposite the one having the crank E³, with a crank E⁵, which is connected by a connecting-rod E⁶ with a rocking-lever E⁷, one end of which is pivoted to the lower end of the rod E⁸ projecting downward from the bedplate. The swinging end of said lever E⁷ is connected by a universal joint with the rod F passing vertically through the supporting-plate C in such a manner that said rod F can reciprocate with the rocking-lever E⁷ and can turn in the free end of the same. The cog-wheel B, previously described, is fixed on said rod F so that the rod turns with the cog-wheel. The plate F' having an angular cam-groove F² is fastened to the rod F and into said cam-groove F² a pin F³ passes from one end of an angle-lever F⁴ that is pivoted on a bracket F⁵ projecting from the standard or leg A³ and through which bracket the rod F passes, the other arm of said angle-lever F⁴ being provided with a segmental slot F⁶ in which a pin or screw F⁷ is mounted adjustably, which screw or pin F⁷ is connected by the connecting rod F⁸ with one end of the angle-lever F⁹ pivoted to the turn-table A² and having its upper end passed into a slot F¹⁰ of a plate F¹¹ that is mounted to slide on two track-bars F¹², formed on the cross-bar, which slide-plate F¹¹ is provided with a needle-slot F¹³ and with a slight annular depression in which a flat ring F¹⁴ is mounted loosely, the upper surface of which ring F¹⁴ is serrated, or said ring may be provided with a surface of rubber or sand-paper, or other material producing considerable friction. Said ring passes through an opening a² in the plate A³, Fig. 2.

The several parts just described are clearly shown in Figs. 3, 4 and 5.

On the rod F an angular arm G is fixed which has a horizontal portion and a vertical portion, the horizontal portion passing through a vertical slot G' of the leg A³ and the vertical portion of said arm is provided with a rack G² that engages a pinion G³ mounted on the side of the leg A³, said pinion having an arm G⁴ that is connected by a link G⁵ with a shuttle-carrier G⁶, which shuttle-carrier is mounted to reciprocate in the groove G⁷ in the top cross-piece G⁸ of the leg A³. One arm of the shuttle-carrier G⁶ passes through

a longitudinal slot G⁹ of said cross-piece, as shown in Figs. 1 and 2. As the rocking-lever E⁷ rocks up and down, the cog-wheel G³ is alternately turned in opposite directions, whereby the reciprocating motion of the shuttle-holder G⁶ is obtained. At the same time the feeder-plate F¹¹ is reciprocated for the reason that the cam-plate F' moves up and down and acting on the pin F³ of the angle-lever F⁴, which is pivoted on a fixed support, rocks said angle-lever and from the same the rocking-motion is transmitted by the bar F⁸ to the angle-lever F⁹, which in turn acts on the feeder-plate F¹¹. The stroke of the feeder-plate can be varied by adjusting the pivot or screw F⁷ in the slot F⁶ of the angle-lever F⁴. The shuttle H is made of the usual shape and is provided with a hinged top H' having the bent spring H² for locking it in place. The shuttle contains the bobbin H⁴ composed or formed of thread wound in the shape of a cylinder, from the interior of which the thread is unwound, as indicated and shown in Fig. 15. This permits of using the bobbin without rotating the same during use, the thread passing out of one end of the shuttle and passes over a spring-strip H³ against which it is pressed by a fine spring H⁵, so as to give the shuttle thread the desired tension. As both the feeding-plate and the shuttle-carrier are supported on the leg A³, it is evident that said feeding-plate and shuttle-carrier are rotated with the leg, but always operate the same whether they are being rotated or not.

On the end of the arm D of the machine the head J is fastened and to the under side of the same a cog-wheel J' is mounted that engages the cog-wheel C¹³, previously described, and said cog-wheel J' engages the cog-wheel J² fixed below the lower end of the head J on the vertical sleeve J³ mounted in said head, so that when the cog-wheel C¹³ is turned by turning the crank-handle D⁷ below the bedplate A, rotary motion is transmitted from the cog-wheel C¹³ by means of the cog-wheel J' and the cog-wheel J² to the said sleeve. The sleeve J³ is provided with a loose collar J⁴ mounted between two brackets J⁵ projecting from a plate J⁶ mounted to slide vertically in the head J, which plate J⁶ is reciprocated in the usual and well known manner from the driving-shaft E by means of a cam-groove J¹⁰ and a pin J⁷ projecting from the pulley J⁸ on the end of said shaft E. From said loose collar J⁴ a pin K passes through the longitudinal slot J⁹ in the sleeve J³ into the reciprocating needle-bar K² that passes longitudinally through the sleeve J³, so that when the collar J⁴ is reciprocated vertically, it reciprocates the needle-bar without reciprocating the sleeve J³, and at the same time when said sleeve J³ is turned on its longitudinal axis, the needle-bar is turned with it.

Above the top of the head J a circular horizontal plate L is fixed to the upper end of the sleeve J³ and is provided with a vertical standard L' on which the block L² is held verti-

cally adjustable. Said block is provided with a frame L^5 having one or two arms L^3 upon which the spools L^4 can be placed that carry beaded cords a or braid or plain cord, silk cord or any other fancy cord or analogous device that is to be applied on the fabric. Said cords pass through tension-devices L^6 of any approved construction supported on the lower end of the frame L^5 . According to the class of work the spools L^3 may be omitted entirely. The spool M containing the sewing-thread b is mounted on the spool-holder M' projecting from the bracket M^2 on the plate L . From said spool the thread b passes over a tension-rod M^3 to a tension-eye M^4 and then passes up over the roller N' of a take-up lever N^2 which is pivoted on the bracket of the standard N^3 on the plate L . From the roller N' of the take-up lever the thread passes through the bore of the tubular needle-bar K^2 . An angle-lever N^4 is pivoted on the plate L and one end of the same is connected by a connecting-rod N^5 with the take-up lever N^2 , the same being adjustable by means of a slot and screw in the usual manner, to vary the throw of the take-up lever. The other end of said angle-lever N^4 carries a pin N^7 which passes through the angular slot N^8 of the plate N^9 fixed to the upper end of the reciprocating needle-bar K^2 , so that when said needle-bar reciprocates the piece N^9 passes up and down and by the action of its slot on the pin N^7 , the angle-lever N^4 is rocked and in turn reciprocates the take-up lever and gives the same sufficient throw to draw the thread b taut.

The pulley J^8 on the end of the shaft E has a double cam-groove O in which the pin O' works that projects from one end of an angle-lever O^2 pivoted at O^3 to the end of the arm D , and said angle-lever O^2 is connected at its opposite end by a link O^6 with the vertically-reciprocating piece O^4 guided in the arms of the head J , and to said vertically-reciprocating piece O^4 a ring P is secured, which projects into an annular groove P' of a loose collar P^2 surrounding the sleeve J^3 and mounted to move up and down on the same. From said loose collar P an arm P^3 projects down through a longitudinal recess P^4 in the sleeve J^3 and to the lower end of the same a detachable cam-piece P^5 is fastened for a purpose that will be set forth hereinafter. The loose collar P^2 is reciprocated vertically and can turn with the sleeve J^3 and while turning rotates within the ring P , which can only reciprocate and not turn on its axis. The sleeve J^3 is provided a short distance below its lower end and some distance below the cog-wheel J^2 with a fixed collar Q to which two links Q' are pivoted, in the lower ends of which a transverse shaft Q^2 is mounted to rock, and on each end of said shaft Q^2 a curved arm Q^3 is fixed, provided near its upper end with a notch Q^4 and on the lower end of each arm Q^3 a disk Q^5 having a serrated edge is mounted to turn. The shaft Q^2 is provided with two helical

springs Q^6 each having one end secured to the shaft Q^2 and the opposite end bearing against one of the arms Q^3 to press the same downward. Between the two links Q' a lever R is pivoted, having a handle R' at its upper end, and provided at its lower end with a curved arm R^2 , on the end of which the cross-rod R^3 is held, that can enter the notches Q^4 of the arms Q^3 . A latch R^4 adapted to enter the aperture R^5 of a plate R^6 projecting downward from the lower end of a sleeve J^3 is mounted on the transverse pin R^7 of the links Q' , and is provided with a projection R^8 on which the lower arm R^2 of the lever R can act, all for the purpose which will be set forth hereinafter.

As appears in Fig. 9, the upper part of the inner edge of the lever R is curved in the shape of a cam and is to be acted upon by a cam-pin S projecting from the needle-bar K^2 and passing through a vertical slot S' of the sleeve K . One, two or more tubes T pass longitudinally through the recess P^4 on the sleeve J^3 and terminate a short distance below the cog-wheel J^2 and serve for conducting the cord, narrow braid or beaded cord from the spools L^3 on the spool-holders. In sleeves T^2 of a detachable collar T' on the lower end of the sleeve J^3 vertical shafts U are mounted to turn on their longitudinal axis, and each shaft U is provided at its upper end with a laterally-projecting arm U' on which the cam-piece P^5 can act and at its lower end is provided with a curved tapering guide-tube U^2 for the cord. Each rod U is surrounded by a helical spring U^3 , one end of which is fastened to said rod U and the other end to the sleeve T^2 for the purpose of pressing the arms U' against the edges of the cam-piece P^5 . As shown in Figs. 9 and 11, only one curved guide-tube U^2 is used. As shown in Figs. 12, 13 and 14, two are used in conjunction with a third flattened tube V held on the rod V' projecting downward from the collar T' which guide-tube V however is not mounted to rock. The needle W is fastened in the lower end of the needle-bar and adapted to pass into the needle-hole W' of the sewing-plate. Adjacent to said needle-bar an annular presser-bar m is mounted movably in the lower end of the needle-bar and is pressed downward by the spring m' interposed between the upper end of the presser-bar and the top of the recess for receiving the upper end of the presser-bar. If the cam-piece P^5 is omitted the guide-tube U^2 remains fixed and can be used to feed cord, braid, &c., in a straight line.

The operation is as follows:—When the shaft E is rotated, the needle-bar is reciprocated vertically in the usual manner and the shuttle is moved horizontally by means of the devices previously described. In case only the sewing-thread is used, ornamental figures can be produced on the face of the fabric by suitably shifting and turning the fabric. To

form the most intricate designs it would be very difficult to shift the fabric on the sewing-plate. In my improved sewing-machine the cloth-feeder can easily be shifted by means of the crank-handle D^7 and the mechanism described, and at the same time the needle-bar, the sleeve in which the same is guided, and the thread-supports of said sleeve are reciprocated in entire uniformity with the cloth-feeder. There is no danger of twisting off the needle or twisting the thread, and as the cloth-feeder, shuttle-operator and the needle-bar can easily be shifted, any desired or intricate pattern can readily be produced. As the needle-bar descends, the cam-pin S on the same strikes the curved cam-edge of the lever R , Fig. 9, whereby the lower end of said lever R is pressed inward sufficiently to cause the cross-rod R^3 to act on the arms Q^3 supporting the serrated wheels W , whereby said wheels are lifted off the fabric, while the needle pierces the fabric, but when the needle-bar rises, the springs Q^6 can press the serrated wheels Q^5 upon the fabric, which wheels in turn press the fabric upon the roughened friction-ring F^{14} of the cloth-feeding plate F^{11} , Fig. 5, so that when said feeding-plate reciprocates the fabric is shifted, the serrated disks Q^5 rotating slightly as said fabric is shifted. Then at the next downstroke of the needle-bar, the said wheels are again lifted, and so on. As the needle-bar descends, the presser m also presses down the fabric, or in case cords are used, presses said cords firmly against the fabric and holds them in proper position for the needle and also holds them when the needle begins to rise. The latch R^4 normally holds the links Q' upon the support for the serrated disks Q in the proper position, but when it is desired to change the needles or adjust the same, said disks must be swung out of the way. This is accomplished by swinging down the lever R which acts on the projection R^8 of the latch R^4 and withdraws the same from the aperture R^5 and the plate R^6 , thus permitting of swinging up the links Q and the entire presser-mechanism. In case cords of any desired shape, color or material are to be sewed on the fabric, either one or more, said cords are passed through tubes T and then through corresponding tubes U^2 . As shown in Fig. 1, but a single tube U^2 is used, and for that reason the cam-piece P^5 has only one cam-edge. In case two tubes U^2 are used, as shown in Figs. 12 and 13, the cam-piece P^5 must have two edges and is shaped as a triangle. As said cam-piece reciprocates vertically with the sliding collar P^2 it acts on the arms U' of the rods U supporting the tubes U^2 and according to the configuration of the cam-edge, gives the same different movements. Fig. 11 shows the tube U^2 having a zig zag motion, that is, the beaded cord is carried in a zig zag line across the line of the sewing-thread. In Fig. 14 a braid and two cords are sewed on the fabric and in this case the cam is so arranged as to cause the tubes U^2

to lay the cords in a zig zag line and a short straight portion between each crossing. Said cam is operated, as described, by the lever O^2 , which reciprocates the ring P and the same reciprocates the collar P^2 with which the support for the cam is connected. The tubes V and U^2 , as also the cams acting on the latter, can readily be interchanged, and the machine thus easily adjusted for producing any desired kind of work. Usually the beaded cord and braid and fancy cords when applied on garments are to produce intricate and complicated figures, and it has been quite difficult and slow work to shift the fabric to produce the desired figures in a satisfactory way and without straining the needle or breaking the thread.

By means of my improved mechanism for shifting the cloth-feeder uniformly with the needle-bar, and the devices that guide the various fancy cords to the needle uniformly, all this can be accomplished in a most simple manner and very rapidly and at a very small expense and the cords or braids are sewed to the fabric by means of a permanent lock-stitch.

I am aware that chain stitch embroidery-machines have been made in which the needle-bar is mounted to rotate with the rotating knotting-hook, and do not claim this broadly.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A sewing machine, constructed with a vertically-reciprocating needle-bar and axially rotative, a cloth-feeder mounted to reciprocate horizontally, a horizontal bar mounted to rotate on the same axis as the needle and having a straight horizontal guide for a shuttle holder, a horizontally-reciprocating shuttle-holding device in said guide, said reciprocating cloth-feeder, the horizontal shuttle guide bar and the reciprocating shuttle-holding device all being mounted to rotate on the same vertical axis and with the needle-bar, and mechanism below the bed-plate for operating said shuttle-holding device and said reciprocating cloth-feeder, substantially as set forth.

2. A sewing machine, constructed with a needle-bar, and shuttle-operating devices, swinging guide-tubes for cords or braids attached to the needle-bar and mounted to rotate with said needle-bar, a reciprocating cam for operating said swinging guide-tubes and means for reciprocating said cam from the driving-shaft of the machine, substantially as set forth.

3. In a sewing-machine, the combination, with a bedplate, of a rotating-piece below the same, a rotative vertically-reciprocating needle-bar, a leg projecting downward from said piece, cloth-feeding and shuttle-operating devices supported by said leg, a vertically-reciprocating rod guided by said leg, a lever connected by universal joint to the lower end of said rod, and means for rocking said lever

from the main driving-shaft of the machine, substantially as set forth.

4. A sewing machine, constructed with the usual arm of a needle-bar at the end of the same mounted to rotate in the same, which needle-bar is mounted to rotate on its longitudinal axis, means for reciprocating said needle-bar from the main shaft of the machine, a grooved cam-pulley on said main shaft, a lever actuated from said cam-pulley, a reciprocating cam adjacent to the needle and operated by said lever, and swinging guide-tubes adjacent to the needle, which guide-tubes are actuated by said cam, said cam and swinging guide-tubes being mounted to turn with the rotative needle-bar, substantially as set forth.

5. In a sewing-machine, the combination, with a reciprocating needle-bar, of a sleeve for guiding the same, swinging levers below said guide-sleeve, serrated disks on the ends of said levers and means for swinging said levers from the reciprocating needle-bar, substantially as set forth.

6. In a sewing-machine, the combination, with a reciprocating needle-bar, of a sleeve for guiding the same, swinging levers extending from said sleeve, serrated disks on the ends of said levers, a cam-lever adapted to act on the swinging levers and a cam-pin on the reciprocating needle-bar adapted to act on said cam-levers, substantially as set forth.

7. In a sewing-machine, the combination, with a reciprocating needle-bar and a sleeve

for guiding the same, of links pivoted to said sleeve, swinging levers supported by the links, serrated wheels on the ends of said swinging levers, a latch for locking the links in place, and a handle for disengaging said latch, substantially as set forth.

8. In a sewing machine, the combination with a reciprocating needle-bar mounted to rotate on its longitudinal axis, of swinging guide-tubes adjacent to the lower end of the needle-bar, arms on supporting shafts of the said guide-tubes, a reciprocating cam adapted to act on said arms, which swinging guide-tubes, arms on the supporting shafts of the same and cam all turn with the needle-bar, substantially as set forth.

9. In a sewing-machine, the combination, with the rotative piece below the bedplate, of a reciprocating feeder-plate on the same, a ring mounted loosely in the upper face of said feeder-plate and having a roughened upper surface, a rotating needle-bar, and means for turning said needle-bar and said piece simultaneously in the same direction, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

REINHART SPENGLER.

Witnesses:

OSCAR F. GUNZ,
CHARLES SCHROEDER.