

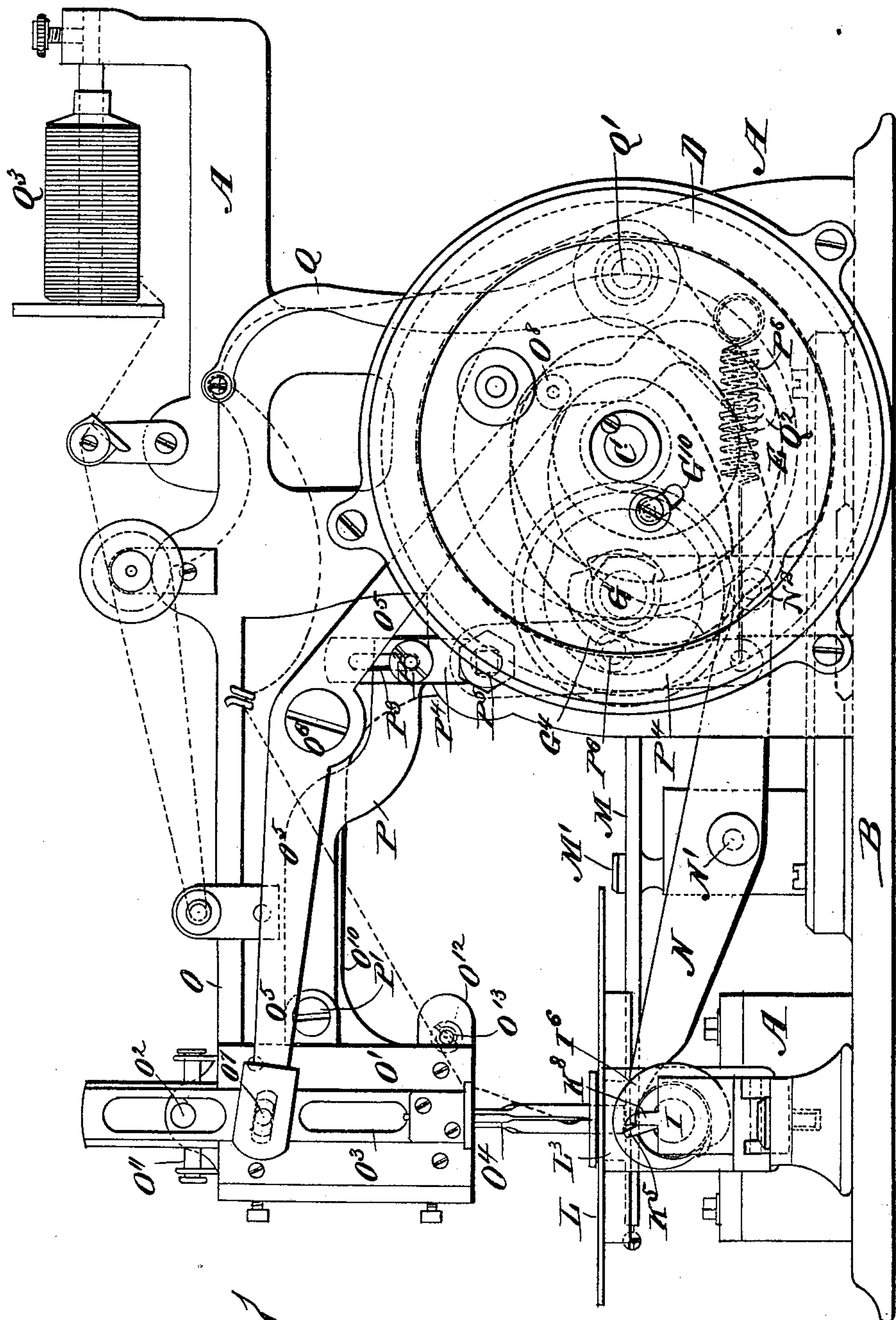
(No Model.)

5 Sheets—Sheet 1.

J. HEGGAN.  
SEWING MACHINE.

No. 405,776.

Patented June 25, 1889.



WITNESSES:  
*F. McArthur,*  
*C. Sedgwick*

*Fig. 1*

INVENTOR:  
*J. Heggan*  
BY *Munn & Co.*  
ATTORNEYS.

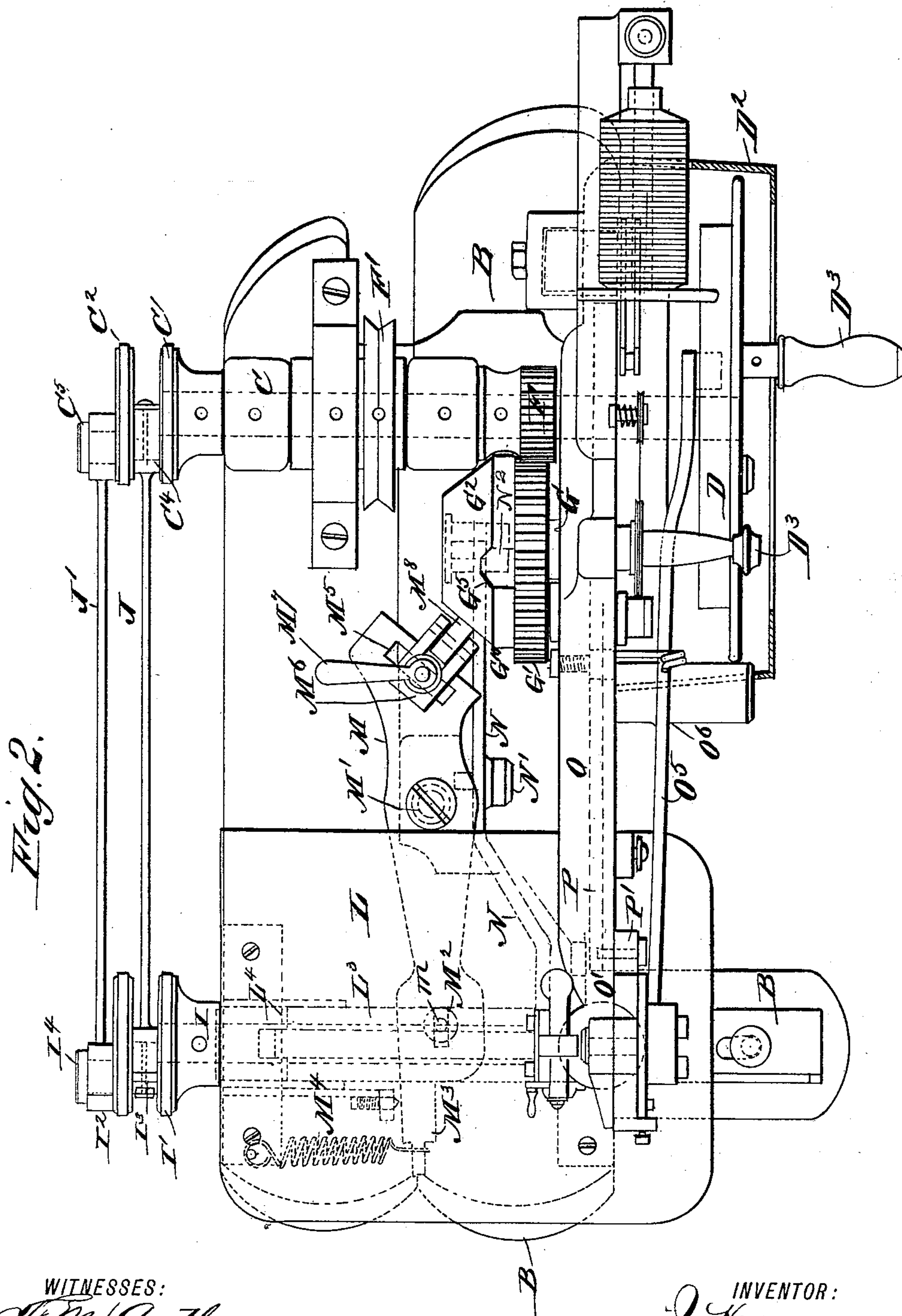
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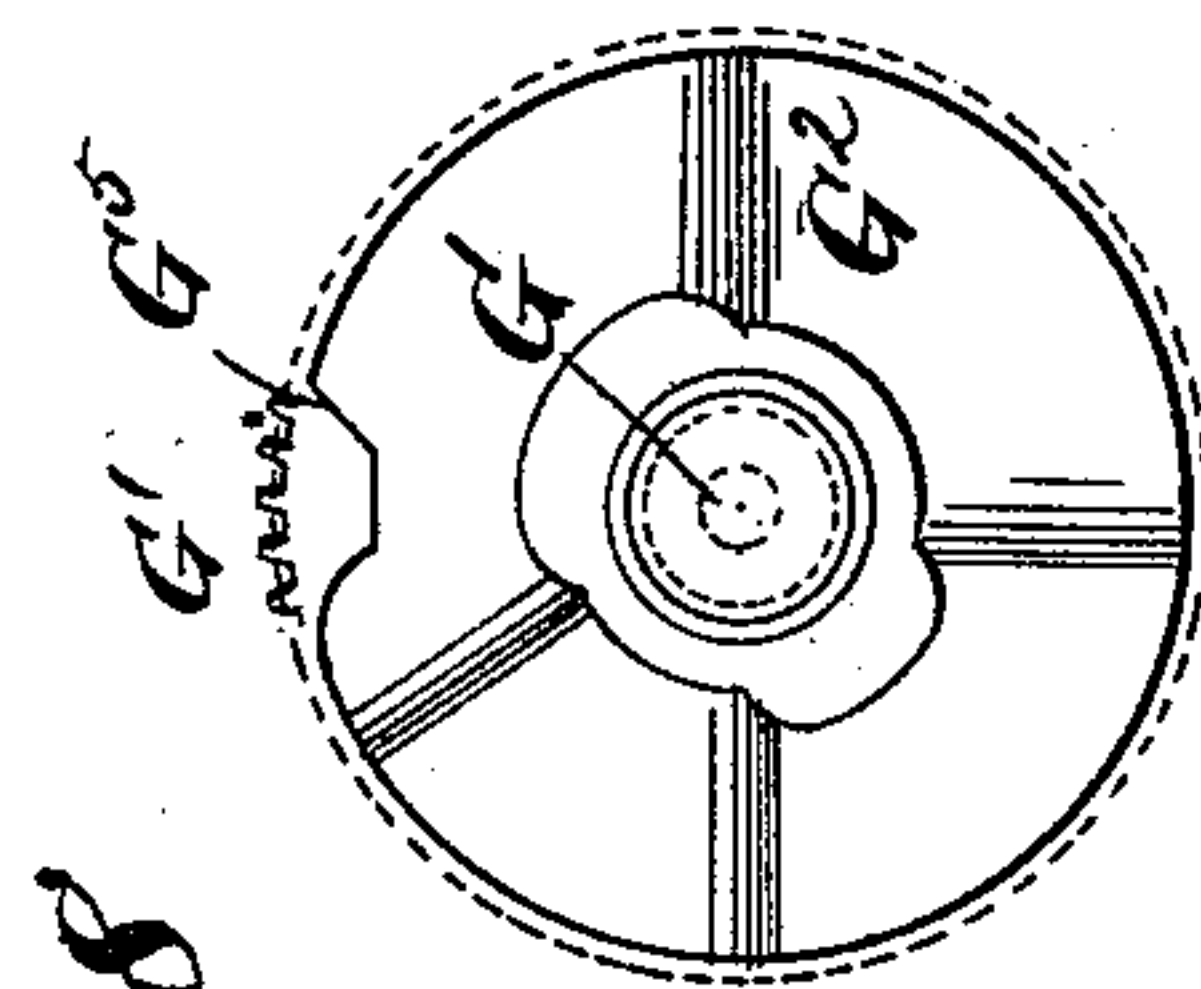
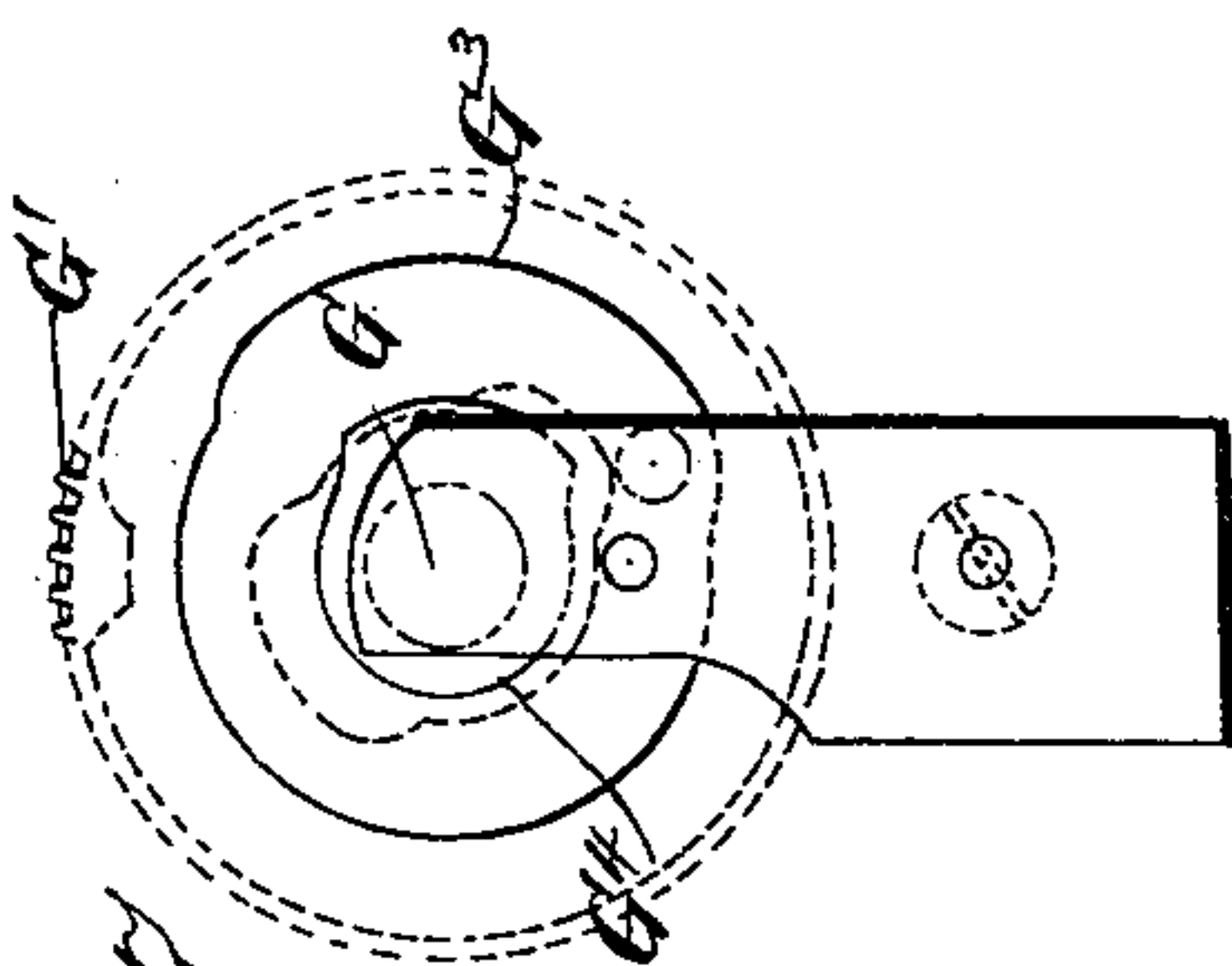
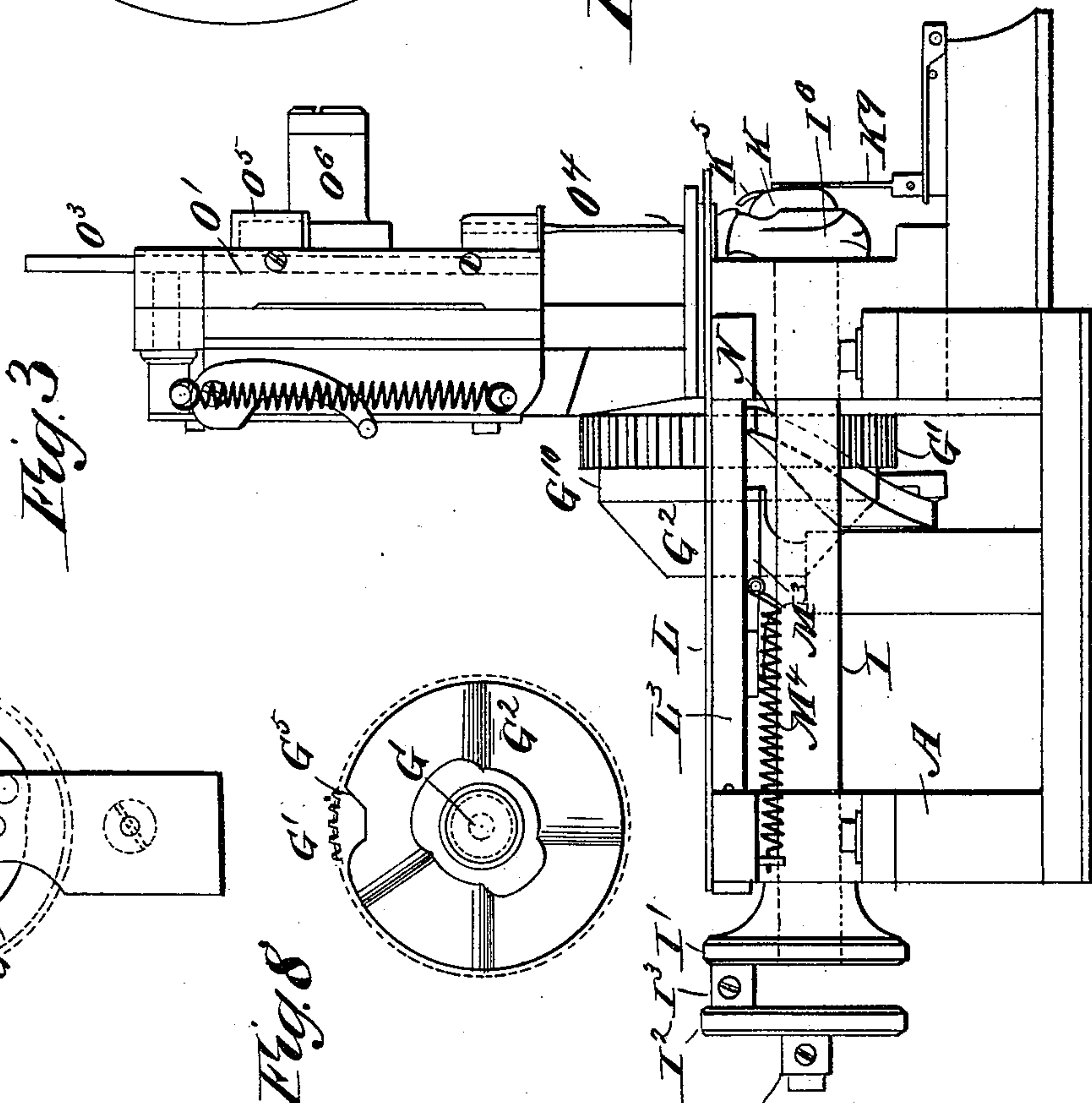
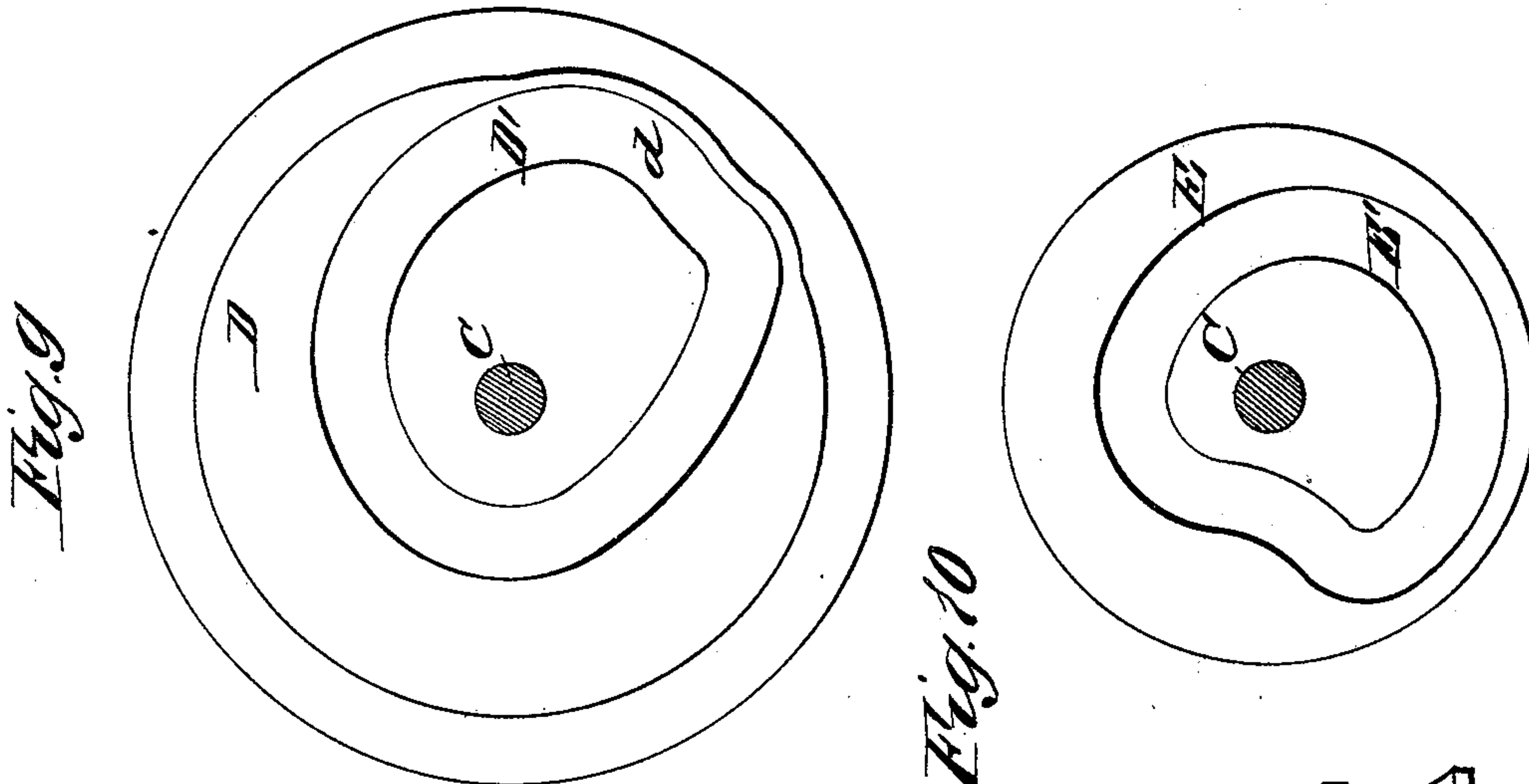
WITNESSES:  
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5 Sheets—Sheet 3.

No. 405,776.

Patented June 25, 1889.



**WITNESSES:**

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(No Model.)

5 Sheets—Sheet 4.

J. HEGGAN.  
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No. 405,776.

Patented June 25, 1889.

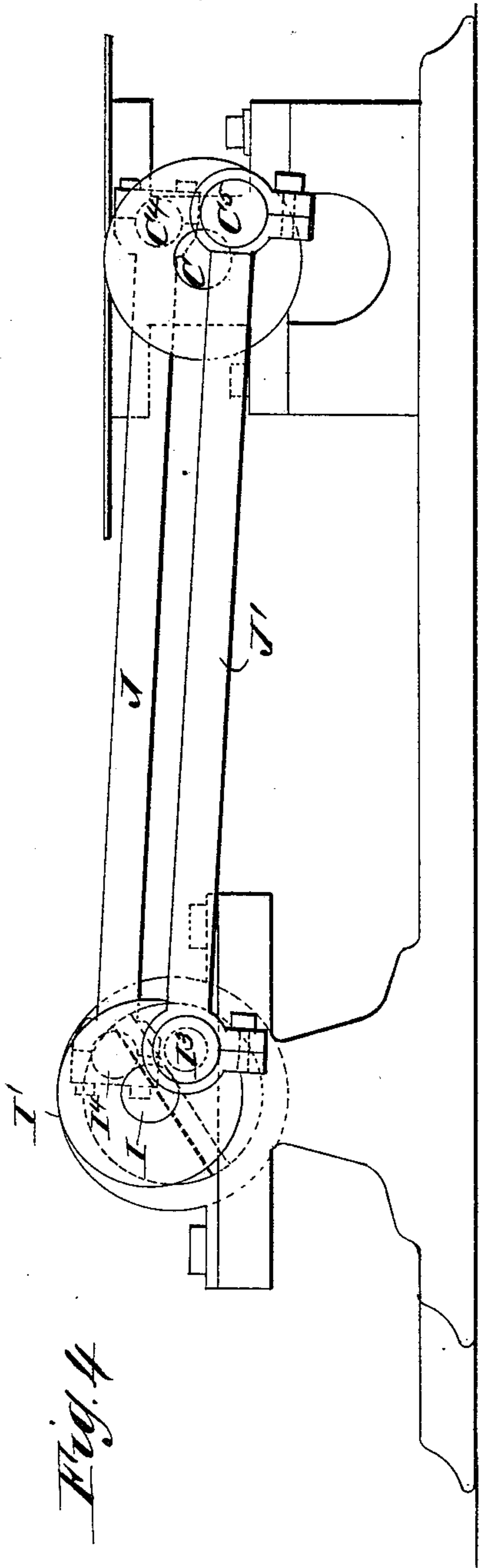


Fig. 4

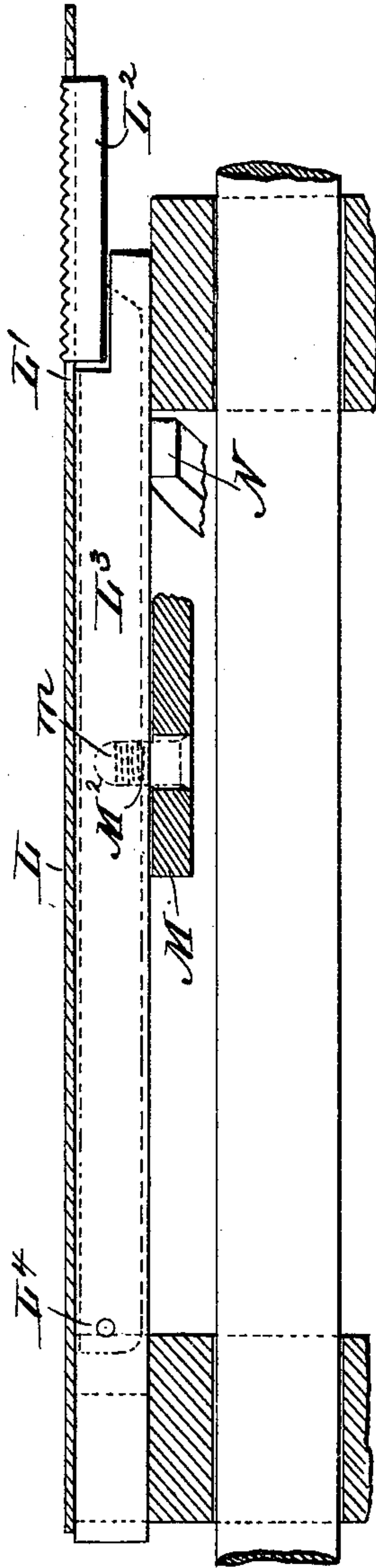


Fig. 5

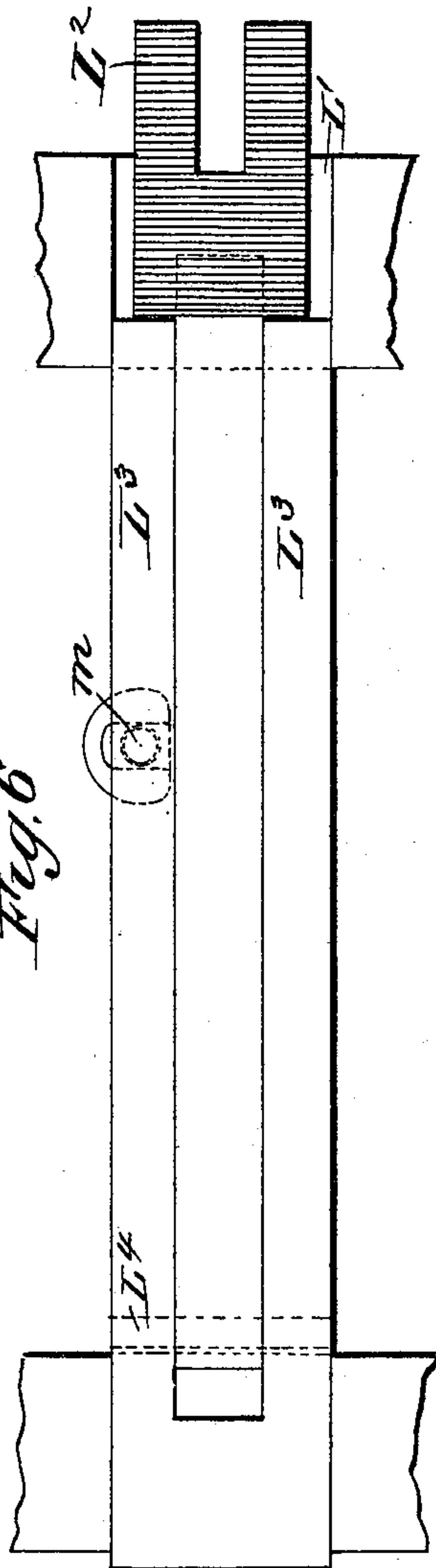


Fig. 6

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(No Model.)

5 Sheets—Sheet 5.

J. HEGGAN.  
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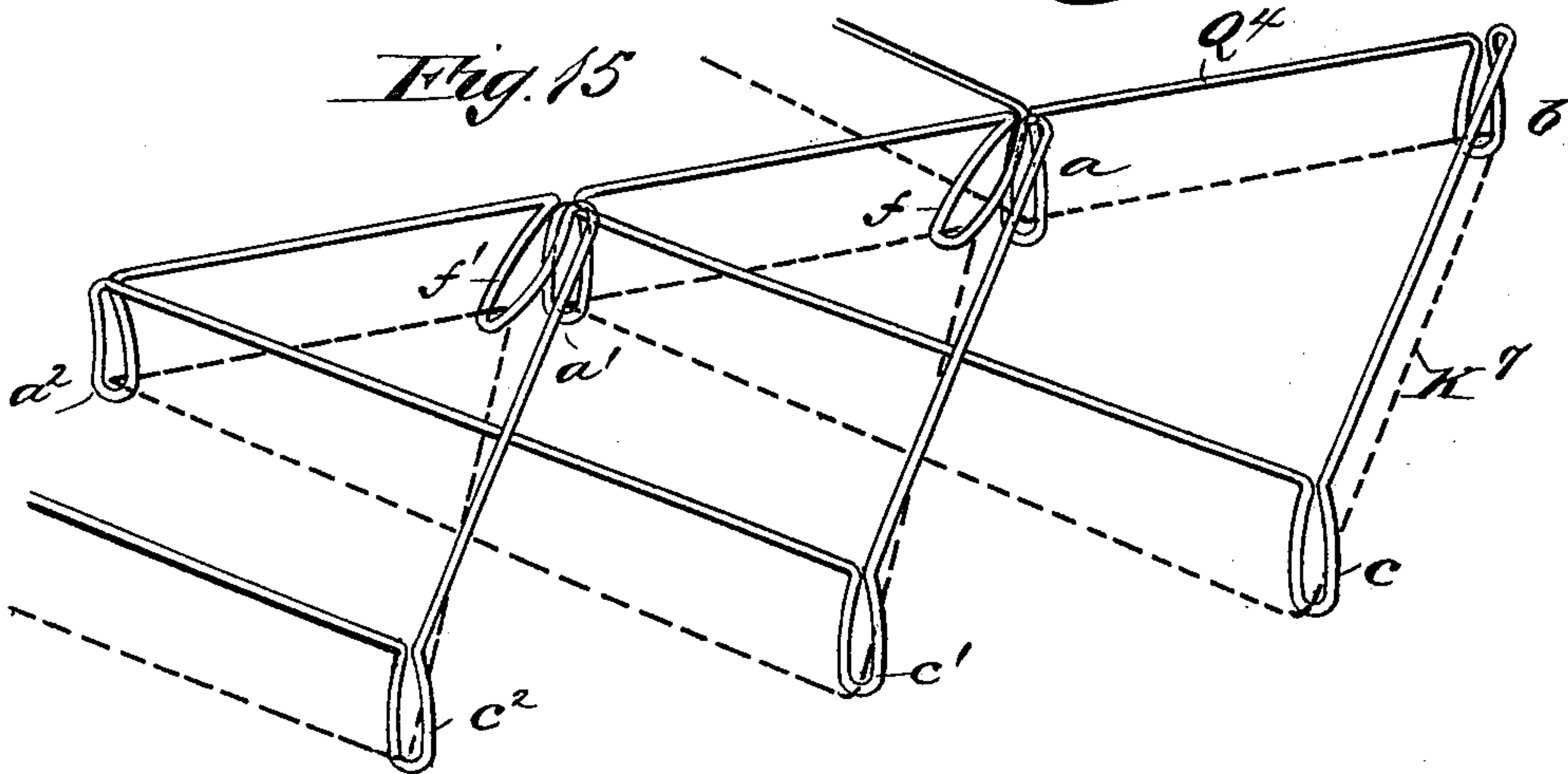
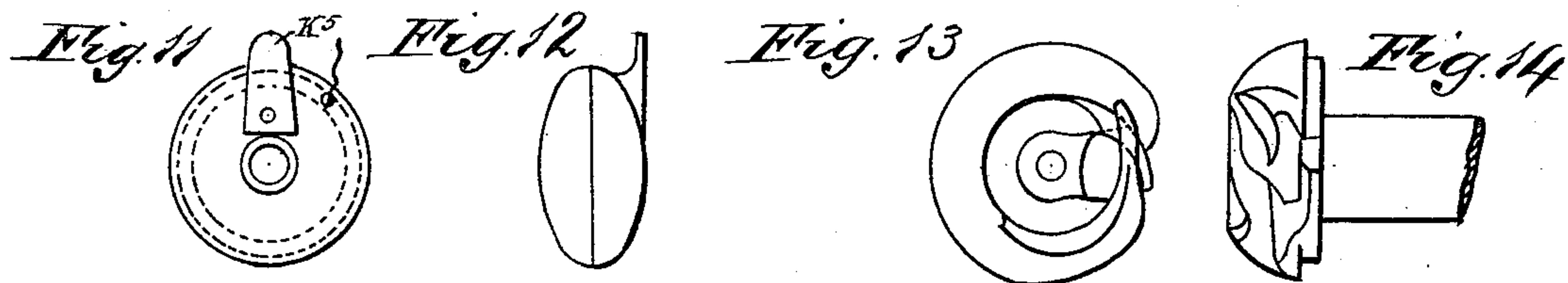


Fig. 16

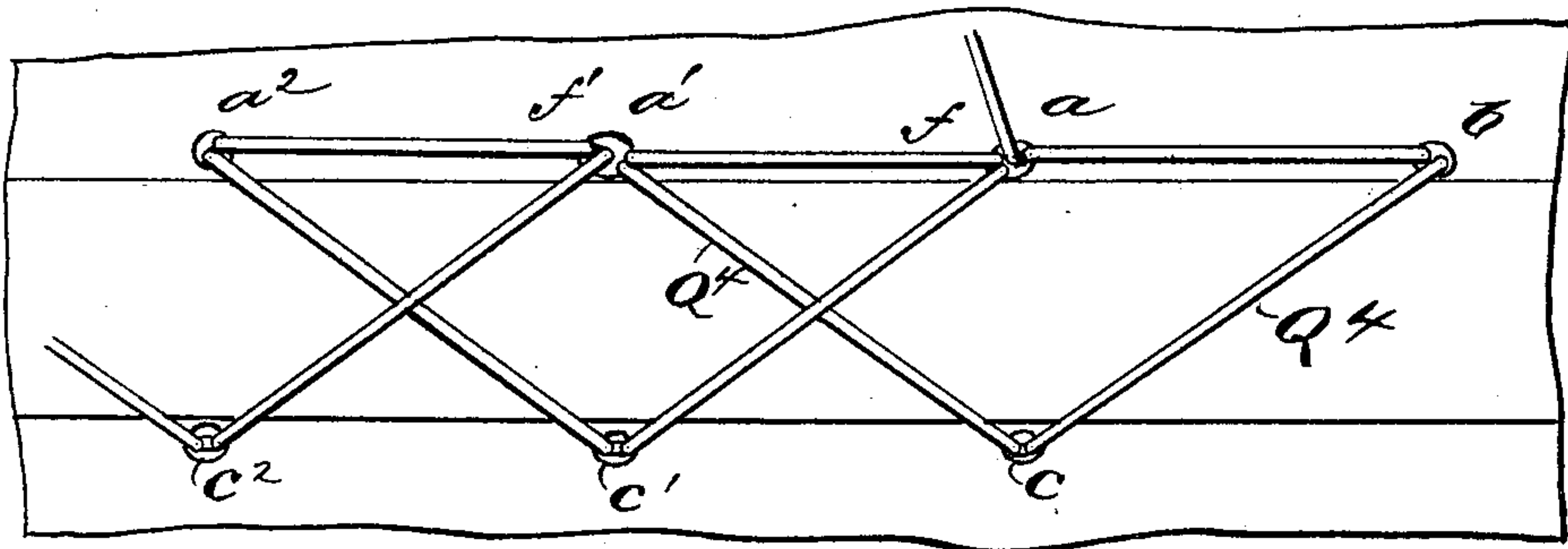
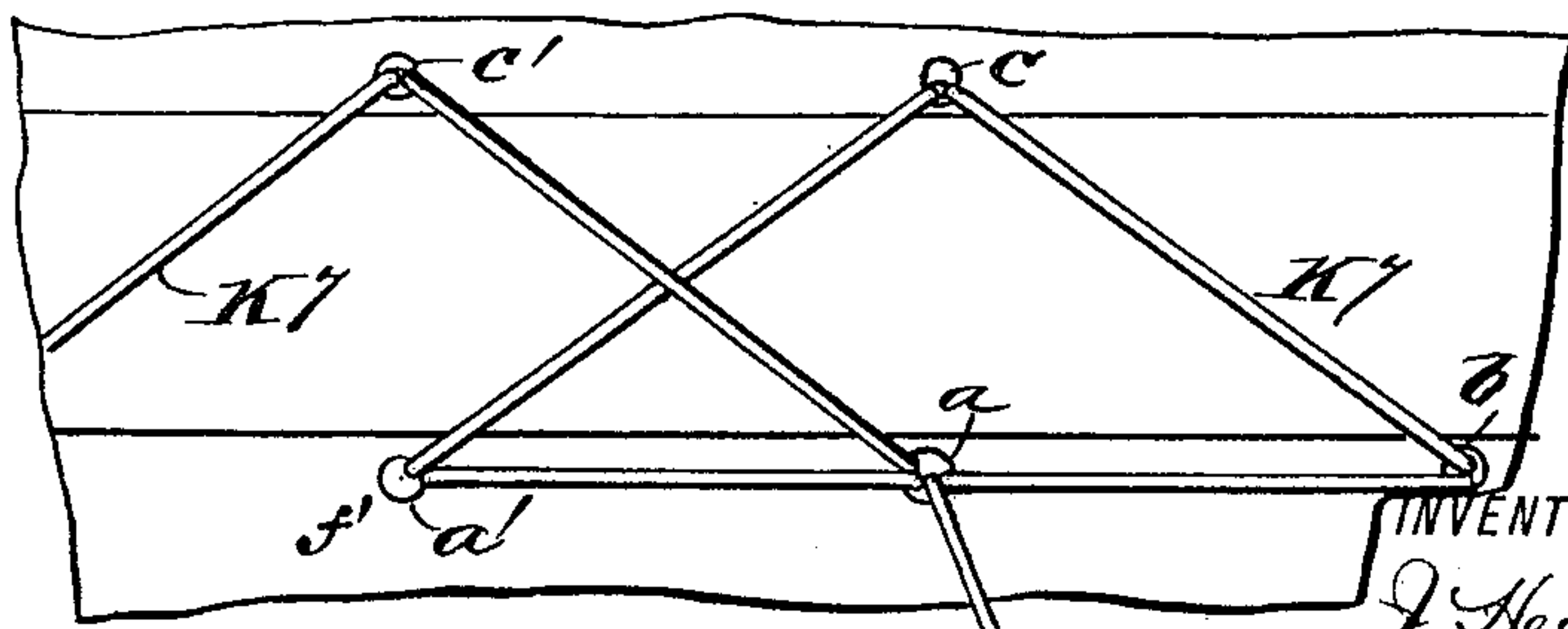


Fig. 17



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# UNITED STATES PATENT OFFICE.

JAMES HEGGAN, OF PERTH AMBOY, NEW JERSEY, ASSIGNOR TO S. M. SCHWAB, JR., & CO., OF NEW YORK, N. Y.

## SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 405,776, dated June 25, 1889.

Application filed June 28, 1888. Serial No. 278,405. (No model.) Patented in England March 14, 1887, No. 3,836.

### *To all whom it may concern:*

Be it known that I, JAMES HEGGAN, of Perth Amboy, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Sewing-Machines, (patented in England March 14, 1887, No. 3,836,) of which the following is a full, clear, and exact description.

The invention has for its object certain improvements in sewing machinery for the production of "French vein" or hem-stitch; and it consists in the parts which will be hereinafter described, and pointed out in the claim.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a front elevation of the improvement. Fig. 2 is a plan view of the same. Fig. 3 is an end view of the same. Fig. 4 is a rear view of the parts employed for communicating motion from the driving-shaft to the hook or looper shaft. Fig. 5 is an enlarged side view of the feed-plate and certain adjacent parts shown in section. Fig. 6 is an enlarged plan view of the same. Figs. 7 and 8 are opposite end views of the stud or counter-shaft, showing the cams carried thereby. Figs. 9 and 10 are inner face views of the cams on the driving-shaft. Figs. 11 and 12 are side and end views, respectively, of the bobbin-carrier. Fig. 13 is a face view of the hook or looper. Fig. 14 is a side view of the said hook and its shaft. Fig. 15 is an enlarged perspective view of the stitch formed by the sewing-machine. Fig. 16 is an enlarged plan view of the stitch, and Fig. 17 is an enlarged inverted plan view of the same.

The frame A of the sewing-machine is secured on a suitable base and carries on one side a driving-shaft C, which extends from the front to the rear. The rear end of the driving-shaft C is provided with fixed heads C' and C<sup>2</sup>, each of which is provided with a crank C<sup>4</sup> or C<sup>5</sup>, said cranks standing at right angles to each other. The front end of the driving-shaft C is provided with a cam-wheel D, having on its inner face a cam-groove D'. A casing D<sup>2</sup> covers the cam-wheel D, which is provided on its front face with a crank-handle D<sup>3</sup>, serving to arrest or retard the move-

ment of the wheel by hand whenever desired. On the drive-shaft C is also secured a smaller cam-wheel E, having in its face a cam-groove E'. A gear-wheel F and a grooved pulley F' are also fixed on the drive-shaft C.

On the frame A and parallel with the drive-shaft C is mounted to rotate a short shaft G, carrying a gear-wheel G', which meshes into the gear-wheel F, the former having three times as many teeth as the latter. On the rear end of the shaft G is secured a bevel-faced cam G<sup>2</sup>, and on the front end of the said shaft is fastened a cam-wheel G<sup>3</sup>, provided in its face with a cam G<sup>4</sup>. (See Fig. 7.) The periphery of the cam G<sup>2</sup> is provided with a depression G<sup>5</sup>.

The hook or looper shaft I is mounted at one side of the machine in a position parallel with the drive-shaft C. The rear end of the shaft I carries two crank-heads I' and I<sup>2</sup>, each provided with a crank I<sup>3</sup> or I<sup>4</sup>, respectively, standing at right angles to each other. The relative position of these cranks corresponds with the position of the two cranks C<sup>4</sup> and C<sup>5</sup> on the inner end of the drive-shaft C. A rod J is connected by its respective ends with the cranks C<sup>4</sup> and I<sup>3</sup>, and a similar rod J' has its ends engaged respectively with the cranks C<sup>5</sup> and I<sup>4</sup>. On the front end of the shaft I is secured a hook or looper I<sup>6</sup>, in the head of which is formed a recess, into which fits a casing K, holding the usual bobbin. A short arm or lug K<sup>5</sup> is formed in the front of the casing K, which latter is also provided with an opening K<sup>6</sup>, through which passes the thread K<sup>7</sup> when unwound from the bobbin. A fixed pin K<sup>8</sup> (see Fig. 1) engages the lug K<sup>5</sup>, so as to prevent the bobbin-casing K from turning. A spring-arm K<sup>9</sup> holds the bobbin-casing K on its seat on the hook or looper I<sup>6</sup>.

The work-plate L is provided with a slot L' (see Fig. 5) for the reception of the serrated feed-plate L<sup>2</sup>, secured on the outer end of a feed-lever pivoted at its inner end at L<sup>4</sup> to the sliding arm L<sup>3</sup>, working in suitable bearings over the hook or looper shaft, as shown in Figs. 5 and 6. In the arm L<sup>3</sup> is formed a recess M<sup>2</sup>, engaged by a pin m, formed on a lever M, pivoted at M' to the frame A. On the end of the lever M, extend-



ing from the pin *m*, is formed an extension *M*<sup>3</sup>, (shown in dotted lines, Fig. 2,) on which is secured one end of a spiral spring *M*<sup>4</sup>, fastened by its other end to the work-plate *L*.  
 5 The other end of the lever *M* is provided with a slot *M*<sup>5</sup>, arranged parallel with the face of the cam *G*<sup>5</sup>, and containing a movable block *M*<sup>6</sup>, provided with screw-binding means *M*<sup>7</sup>, to hold the said movable block *M*<sup>6</sup> in place on  
 10 the slotted end of the lever *M*. A roller *M*<sup>8</sup> is journaled in the said block *M*<sup>6</sup>, and engages the face of the cam *G*<sup>2</sup> by the action of the spiral spring *M*<sup>4</sup>. This device serves to regulate the length of the stitch, as the block  
 15 *M*<sup>6</sup> can be adjusted in the slot *M*<sup>5</sup> of the lever *M*, so as to increase or diminish the length of the said lever *M*, thereby lengthening or shortening the stroke of the sliding arm *L*<sup>3</sup>, carrying the feed-plate *L*<sup>2</sup>.  
 20 To the frame *A* is pivoted at *N*<sup>1</sup> a lever *N*, the outer end of which rests under the arm *L*<sup>3</sup>, as shown in Fig. 5. The inner end of the lever *N* is provided with a roller *N*<sup>2</sup>, (shown in dotted lines, Figs. 1 and 2,) which engages  
 25 the periphery *G*<sup>10</sup> (see Fig. 2) of the beveled cam *G*<sup>2</sup>. The outer end of the lever *N* holds the feed-plate lever up until the roller *N*<sup>2</sup> drops into the depression *G*<sup>5</sup> of the cam *G*<sup>2</sup>. When this takes place, the lever *N* swings  
 30 with its outer end downward, so that the feed-plate lever with the feed-plate *L*<sup>2</sup> swings downward, the serrated top of the feed-plate then passing below the top of the work-plate.  
 On the main frame *A* is formed the fixed  
 35 arm *O*, which carries at its outer end the fixed part *O*<sup>11</sup> and *O*<sup>12</sup>, on which is pivoted the head *O*<sup>1</sup> by means of a pin *O*<sup>2</sup>. In the head *O*<sup>1</sup> is held to slide the needle-bar *O*<sup>3</sup>, carrying at its lower end the needle *O*<sup>4</sup>. To the frame *A* is  
 40 pivoted at *O*<sup>6</sup> a lever *O*<sup>5</sup>, the outer end of which is provided with a slot engaged by a pin *O*<sup>7</sup>, held on the needle-bar *O*<sup>3</sup>. The other end of the lever *O*<sup>5</sup> is provided with a roller *O*<sup>8</sup>, engaging the cam-groove *D*<sup>1</sup> in the cam-wheel  
 45 *D*. A stop or pin *O*<sup>13</sup> is secured on the fixed part *O*<sup>12</sup>, and serves to limit the inward movement of the swinging head *O*<sup>1</sup>. A bent arm *P* has one end jointed at *P*<sup>1</sup> to the head *O*<sup>1</sup>, while the other end is provided with a pin *P*<sup>2</sup>,  
 50 engaging a slot *P*<sup>3</sup> in the upper end of the lever *P*<sup>4</sup>. This lever is pivoted to the frame at *P*<sup>5</sup>, and is provided with a roller *P*<sup>6</sup>, which engages the periphery of the cam *G*<sup>4</sup>. A spiral spring *P*<sup>8</sup> has one end engaged to the frame,  
 55 and the other end engaged to the lower end of the lever *P*<sup>4</sup>, so as to hold the roller *P*<sup>6</sup> against the cam *G*<sup>4</sup>.  
 The take-up lever *Q* is pivoted at *Q*<sup>1</sup> to the frame, and has its lower end provided with a  
 60 roller *Q*<sup>2</sup> engaging the cam-groove *E*<sup>1</sup>, formed in the cam-wheel *E*. The upper end of the lever *Q* engages and actuates the needle-thread *Q*<sup>4</sup> as it comes from the spool *Q*<sup>3</sup>. The arrangement of said cam is such as to momentarily arrest the action of the lever *Q*.  
 65 The presser bar and foot are arranged in the

fixed part *O*<sup>11</sup> and *O*<sup>12</sup>, and operate over the work-plate in the usual manner.

The operation is as follows: Power is imparted to the machine through the medium 70 of the pulley *F*<sup>1</sup>. The rotary motion of the drive-shaft *C* and its cam-wheel *D* reciprocates the needle-bar *O*<sup>3</sup> and the needle *O*<sup>4</sup> through the motion of the lever *O*<sup>5</sup>. Rotary motion is imparted to the looper-shaft *I* by 75 means of the rods *J* and *J*<sup>1</sup> and the crank-pins, and the speed of the said shaft conforms to the speed of the drive-shaft, so as to produce the revolution of the shaft *I* and its hook for each stroke of the needle *O*<sup>4</sup>. The 80 serrated face of the feed-plate *L*<sup>2</sup> projects upward through an opening in the work-plate, and the said feed-plate is reciprocated by means of the sliding arm *L*<sup>3</sup>, rocking lever *M*, and beveled cam *G*<sup>2</sup>. The arrangement is 85 such that when the feed-plate *L*<sup>2</sup> has moved rearward—that is, from the operator sitting in front of the machine—the first stroke of the needle takes place. Then the feed-plate moves forward—that is, toward the operator—after 90 which the needle makes the second stroke, and then the feed-plate moves again rearward. During the next third stroke of the needle the feed-plate drops by the roller *N*<sup>2</sup> engaging the depression *G*<sup>5</sup> of the cam *G*<sup>2</sup>. At the same time 95 the feed-plate is moved forward without engaging the cloth on the work-plate. The feed-plate, when now in its outermost position, rises and again engages the cloth, and then moves rearward, after which the next or first 100 stroke of the needle again takes place, as above described. Thus during three full strokes of the needle the feed-plate *L*<sup>2</sup> carries the cloth once forward and twice successively rearward. The first and second strokes of 105 the needle take place when the swinging head *O*<sup>1</sup> is in its left-hand position; but when the needle makes the third stroke the head *O*<sup>1</sup> swings to the right, so as to place the third stitch alongside the first one. After the first 110 stroke of the needle, as above described, the cloth moves forward, so that the second stitch is formed directly on the first stitch of the preceding set of stitches. The swinging side movement is imparted to the needle *O*<sup>4</sup> 115 and its head *O*<sup>1</sup> through the medium of the arm *P*, lever *P*<sup>4</sup>, roller *P*<sup>6</sup>, and cam *G*<sup>4</sup>. This side movement of the head and needle takes place simultaneously with the dropping of the feed-plate, so as to produce the stitch herein- 120 after more fully described. The straight or flat part of the cam *D*<sup>1</sup> (at *d*, Fig. 9) engages the roller *O*<sup>8</sup> when the needle is at the lower point of its stroke, so as to arrest and hold the needle and insure the engagement of the 125 hook or looper with the thread.

The stitch before mentioned is more fully shown in Figs. 15, 16, and 17. When the needle *O*<sup>4</sup>, with its thread *Q*<sup>4</sup>, first descends through the cloth, it forms, with the looper 130 *I*<sup>6</sup> and its thread *K*<sup>7</sup>, the loop *a*, after which, when the needle is withdrawn, the feed-plate



5  $L^2$  moves the cloth forward, so that when the  
 needle descends it forms, with the looper  $I^6$   
 and the threads  $Q^4$  and  $K^7$ , the loop  $b$ . When  
 the needle is withdrawn, the feed-plate  $L^2$   
 moves the cloth rearward, and the head  $O'$   
 now swings to the right, so that the needle in  
 descending passes through the cloth and  
 forms a loop  $c$  with the looper  $I^6$  and the  
 threads  $Q^4$  and  $K^7$  alongside the loop  $a$ . When  
 10 the needle is now withdrawn, the feed-plate  
 $L^2$  moves the cloth rearward, and the head  $O'$   
 swings to its former position, so that the  
 needle now forms, with the looper and the  
 threads, a loop  $a'$  in front of the loop  $a$ . When  
 15 the needle now withdraws, the feed-plate  $L^2$   
 moves forward, so that the needle in descend-  
 ing forms, with the looper and the threads, a  
 loop  $f$  alongside the loop  $a$ , previously de-  
 scribed. When the needle is now withdrawn  
 20 from the cloth, the feed-plate moves rearward,  
 and at the same time the head  $O'$  swings to  
 the right, so that a new loop  $c'$  is formed in  
 front of the loop  $c$  and alongside the loop  $a'$ .  
 The above-described operation is then re-  
 25 peated—that is, the next loop  $a^2$  is formed in  
 front of the loop  $a'$ —after which the loop  $f'$   
 is formed alongside the loop  $a'$ , and then a  
 loop  $c^2$  is formed in front of the loop  $c'$  and  
 alongside the loop  $a^2$ , &c.  
 30 It is understood that the swinging of the  
 head  $O'$ , carrying the needle, and the motion

of the looper in connection with the forward  
 and backward motion of the feed-plate pro-  
 duce the French vein or hem-stitch above  
 described. The length of the stitch that is 35  
 between the loops  $a a' a^2$ , &c., depends on the  
 adjustment of the friction-roller block  $M^6$  in  
 the slot  $M^5$  in the lever  $M$ , as before described.

Having thus described my invention, what  
 I claim as new, and desire to secure by Let- 40  
 ters Patent, is—

In a sewing-machine of the character here-  
 inbefore described, the combination, with the  
 pivotally-mounted vibrating head, the needle-  
 bar carrying the needle and sliding in said 45  
 head, the looper-shaft, and means for operat-  
 ing these parts, as specified, of the reciprocating  
 feed-plate and sliding arm  $L^3$ , to which it is  
 attached, the pivoted lever  $M$ , vibrating in a  
 horizontal plane and engaging said arm, the 50  
 pivoted lever  $N$ , which vibrates vertically for  
 raising the feed-plate, and the cam  $G^2$ , actuat-  
 ing both the aforesaid levers  $M N$ , as shown  
 and described, whereby the needle is caused  
 to make three strokes and the feed-plate one 55  
 forward and two rearward movements in the  
 same space of time, as and for the purpose  
 set forth.

JAMES HEGGAN.

Witnesses:

E. R. PIERCE,  
 R. H. BARNES.