

4 Sheets—Sheet 1.

**No. 338,713.**

Patented Mar. 30, 1886.

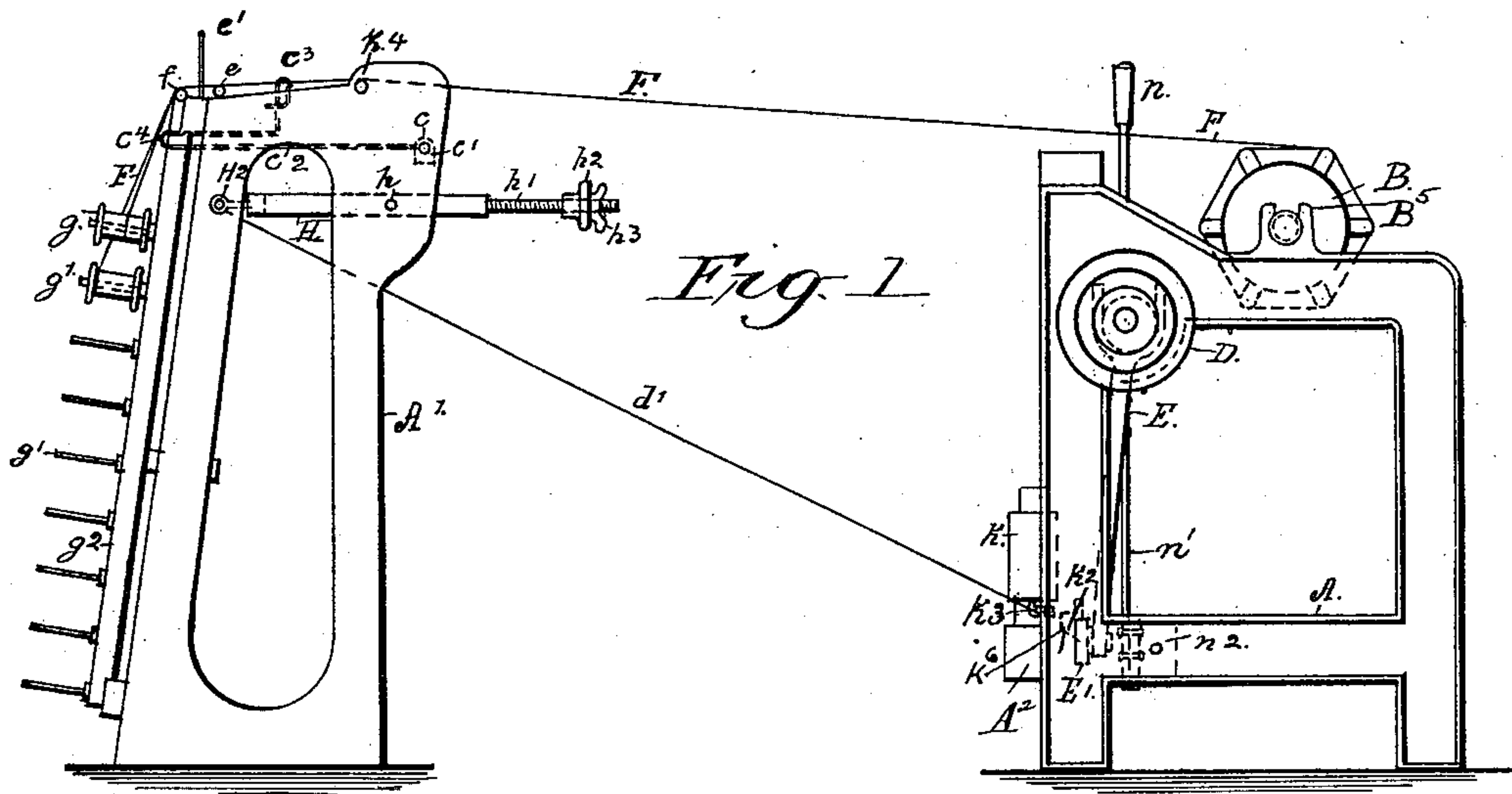
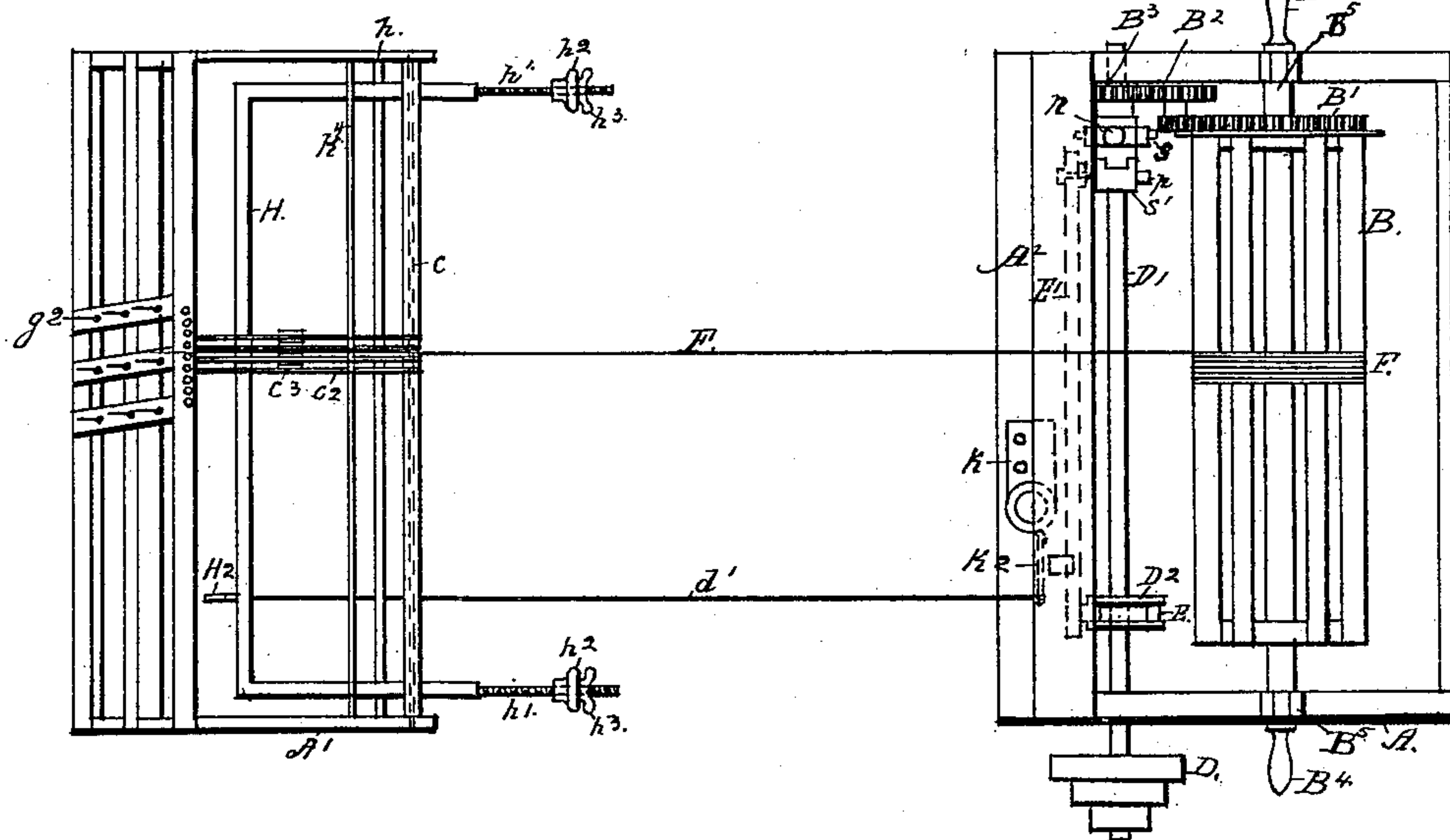


Fig. 3.



Witnesses  
Max Jeph  
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John Dryden's entry

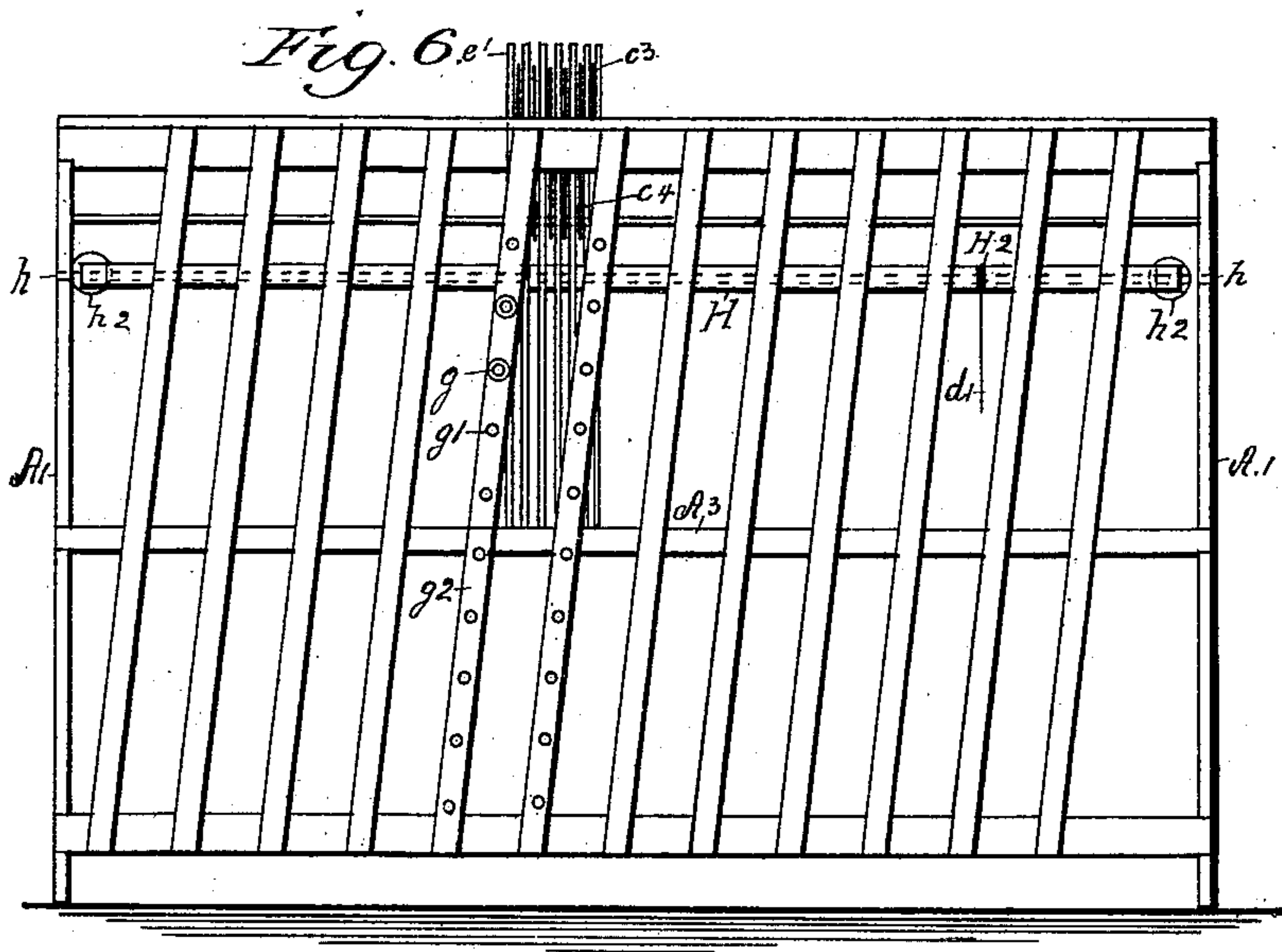
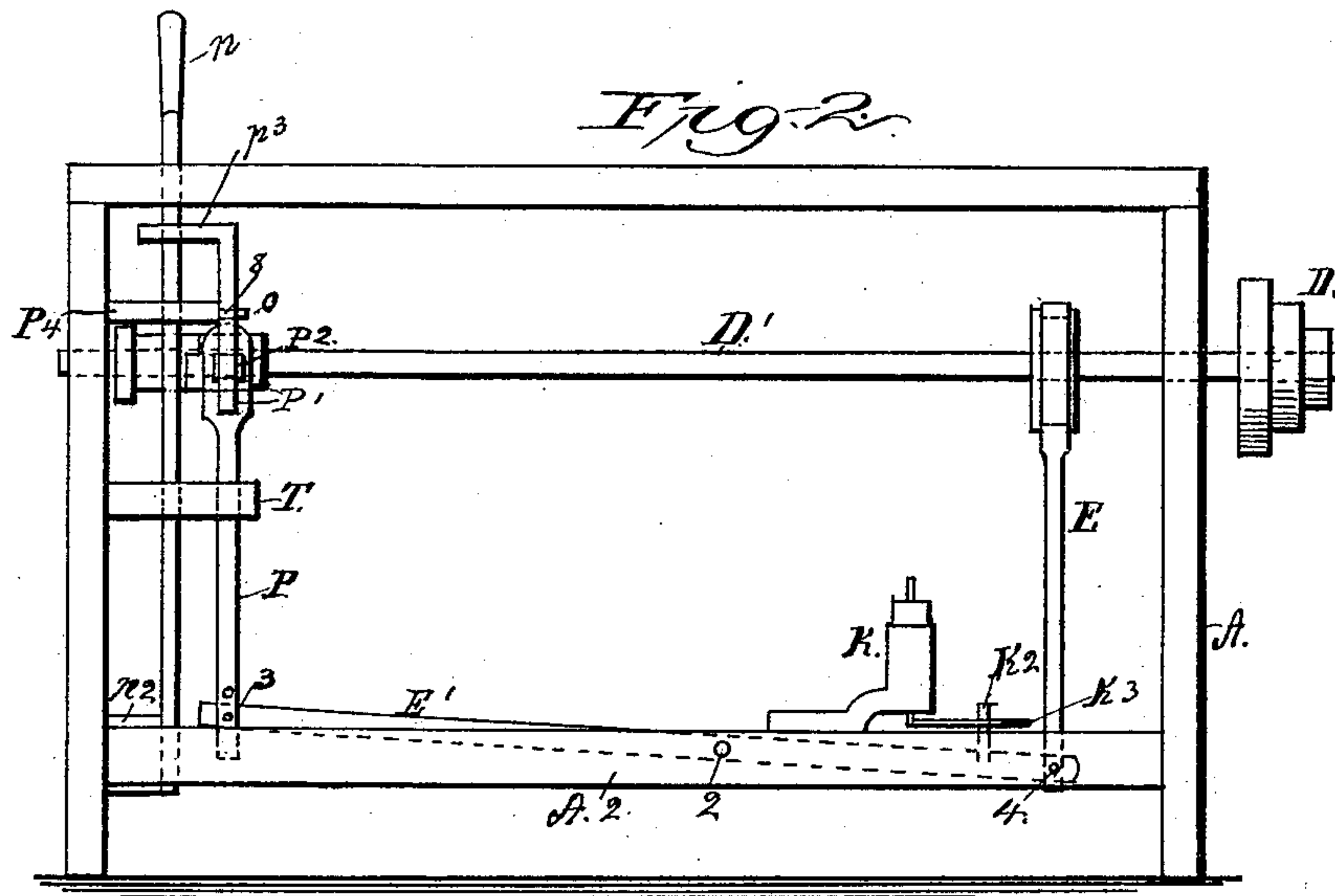
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4 Sheets—Sheet 2.

T. CLAY.  
WARPING MACHINE.

No. 338,713.

Patented Mar. 30, 1886.



Witnesses  
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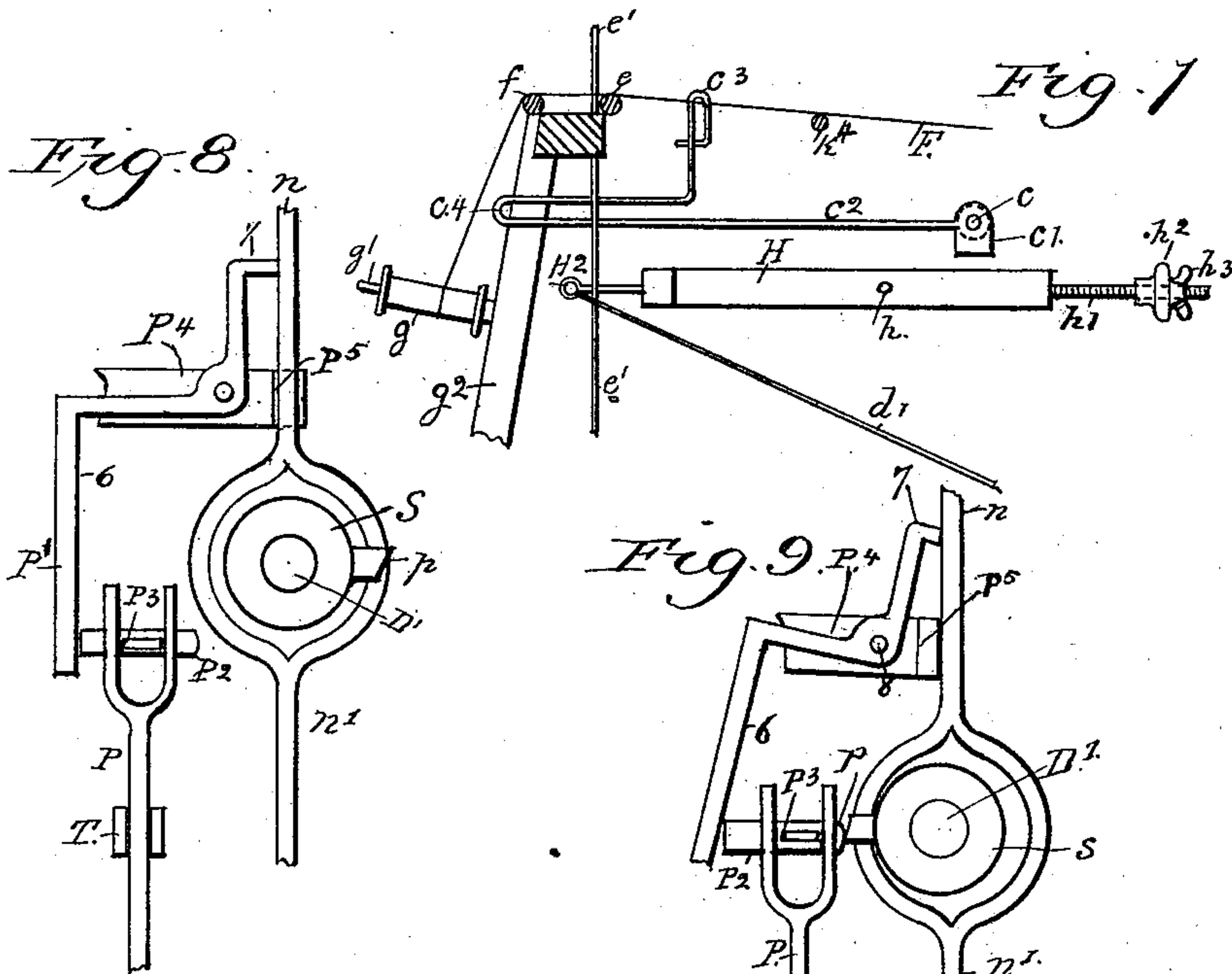
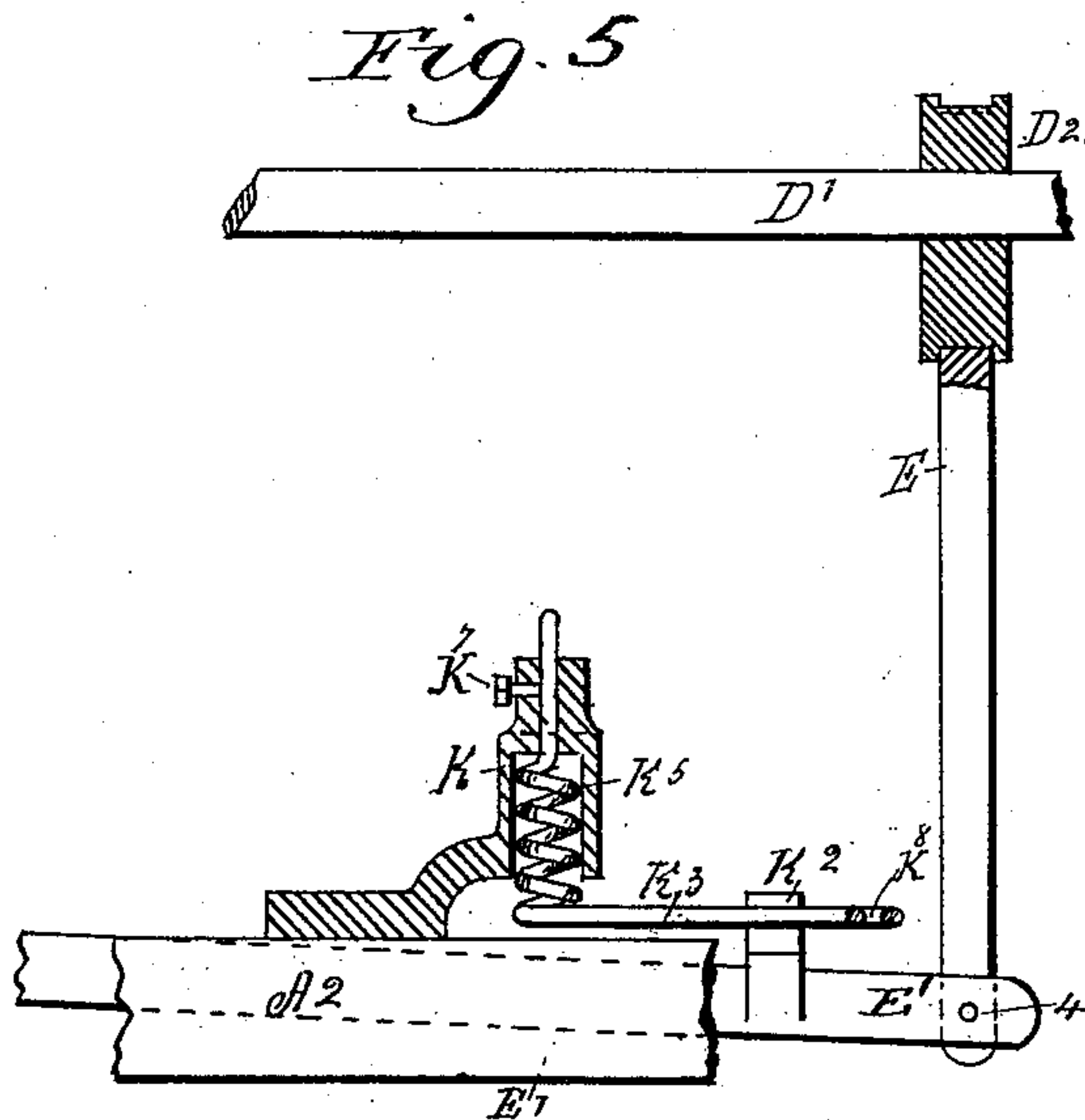
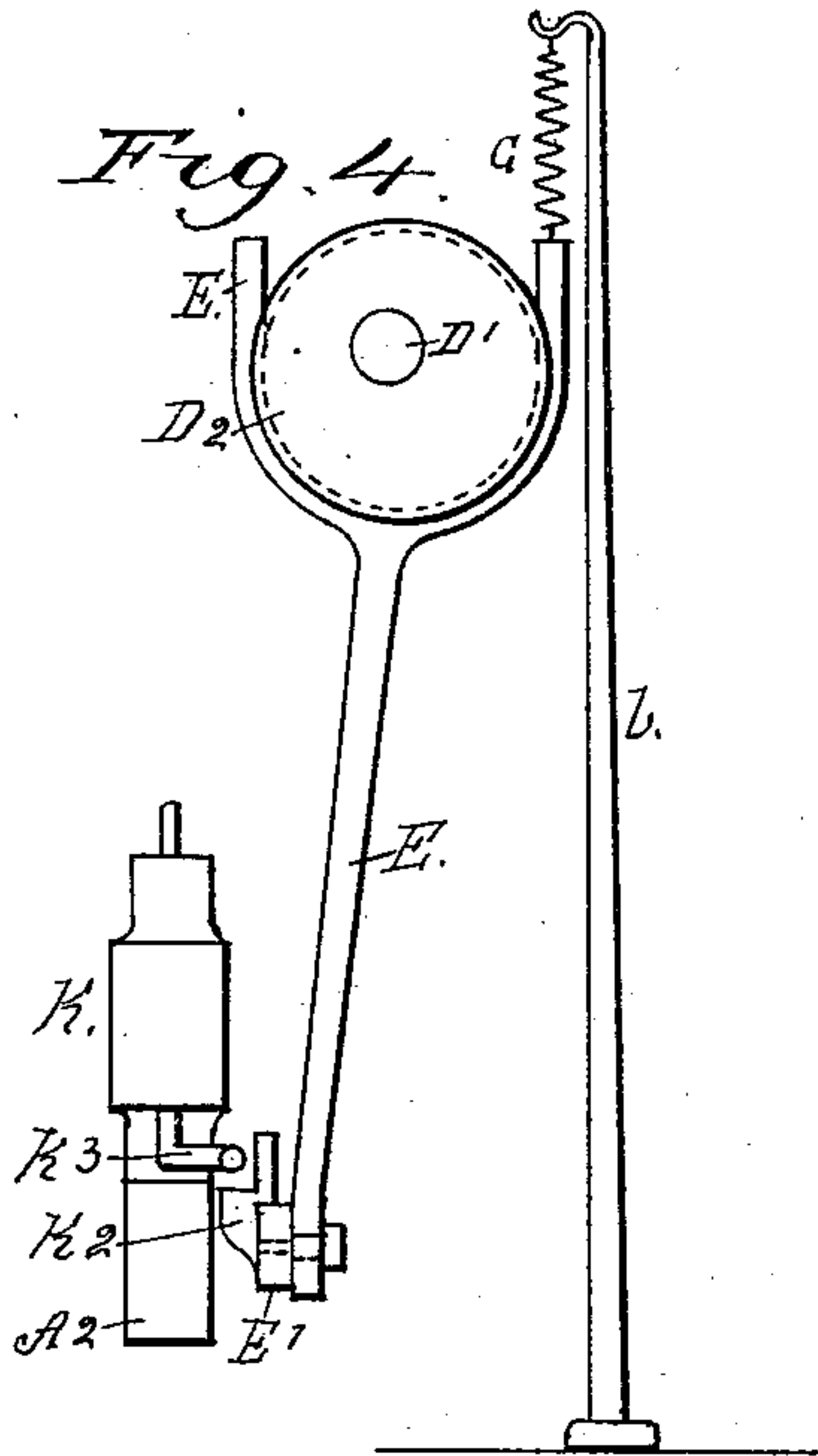
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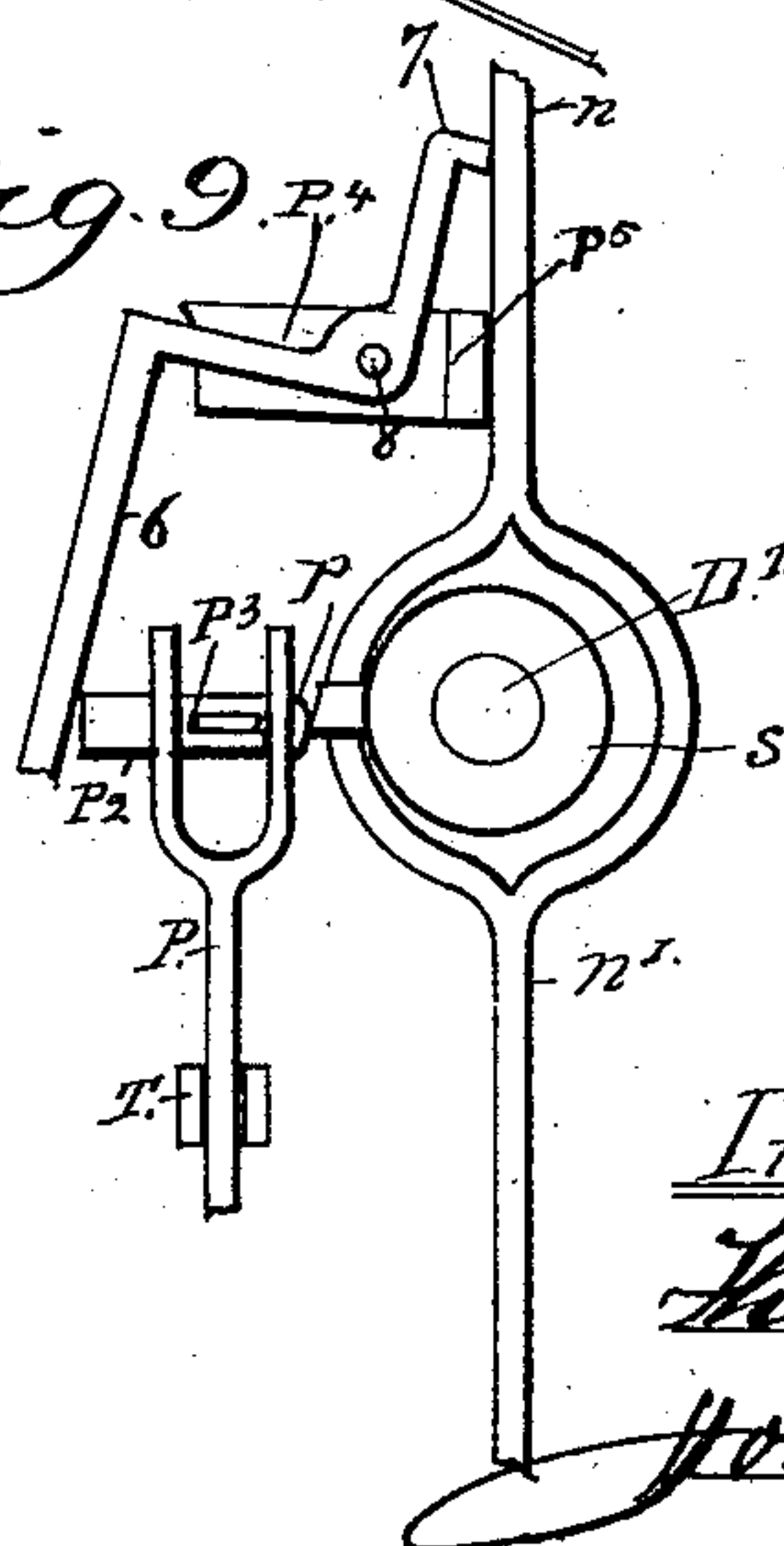
T. CLAY.  
WARPING MACHINE.

No. 338,713.

Patented Mar. 30, 1886.



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(No Model.)

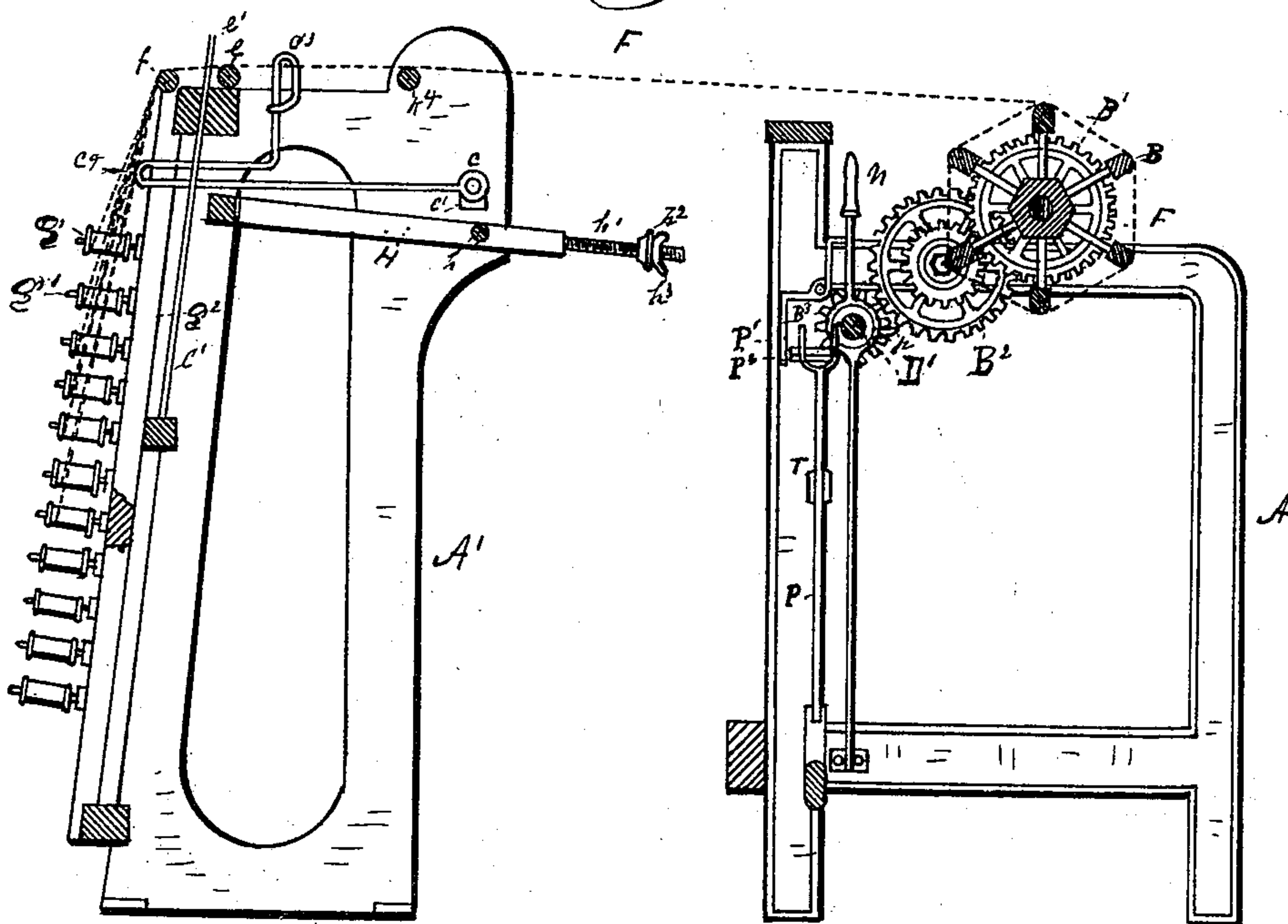
4 Sheets—Sheet 4.

T. CLAY.  
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Patented Mar. 30, 1886.

*Fig. 10.*



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# UNITED STATES PATENT OFFICE.

THOMAS CLAY, OF PATERSON, NEW JERSEY.

## WARPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 338,713, dated March 30, 1886.

Application filed November 7, 1883. Serial No. 111,071. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS CLAY, a subject of the Queen of Great Britain, residing at Paterson, Passaic county, State of New Jersey, have  
5 invented a new and useful Improvement in Warping-Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The object of my invention is to provide a  
10 reliable stopping mechanism for warping-machines, whereby the feeding devices will be stopped automatically and instantly on the cessation of a thread. I attain this object by the construction hereinafter fully explained,  
15 and pointed out in the claims.

Figure 1 of the drawings shows one end of a warping-machine in elevation, having my invention attached thereto. Fig. 2 is a front elevation of the reel-frame, showing part of  
20 my invention attached. Fig. 3 is a plan of the machine. Fig. 4 shows the eccentric-rod, spring-box, &c., in elevation. Fig. 5 is a detached view of the spring-box, spring, eccentric, shaft, &c., the spring-box and eccentric  
25 being in section, with spring-lever, stop-rod, shaft, and arm shown in elevation. Fig. 6 shows the creel-frame and fallers in elevation. Fig. 7 is a detail view of a portion of the stopping mechanism, &c., part sectional. Fig. 8  
30 shows part of the stopping mechanism in the position occupied during the operation of the machine. Fig. 9 shows the parts of Fig. 8 in the position occupied by them when the machine is stopped; and Fig. 10 is a longitudinal  
35 sectional elevation of the machine, taken on a line about midway the same, looking toward the clutch on the shaft D'.

A and A' represent separate parts of the frame of a warping-machine to which my in-  
40 vention is attached.

On the upper rails of the frame A there are suitably arranged and secured bearings B<sup>3</sup>, in which bearings there is journaled a reel, B, having handles B<sup>4</sup>, arranged on the ends of the  
45 reel-shaft. The reel B at one of its ends is provided with a gear-wheel, B', which wheel is fast on the reel-shaft.

In bearings in the sides of the frame A is journaled a driving-shaft, D', having on one  
50 end of the same a pulley, D.

On the rear of the frame A', and secured thereto, is a creel, g<sup>2</sup>, having arranged therein

suitably a series of pins, g', to accommodate bobbins g, that are placed thereon, as shown in Fig. 10. The upper part of the frame A' 55 is provided with transverse horizontal rods f, e, and K<sup>4</sup>.

Having described the parts that are considered old, I proceed to describe those embodying my invention. 60

On the top of the inner rail, A<sup>2</sup>, of the frame A there is fastened a spring-box, K. This box has a spiral spring, K<sup>5</sup>, arranged in it, and is sufficiently elevated above the rail to allow the lateral projecting arm K<sup>3</sup>, with which the 65 spring is provided, to operate freely. The vertical top part of the spring is secured in the box by a set-screw, K<sup>7</sup>, that passes through one side of the box K and bears against the top of the spring, as shown in Fig. 5. 70

To the rail A<sup>2</sup> is pivoted, on a pivot, 2, a lever, E'. This lever has centrally arranged and secured to its side a shouldered stop, K<sup>2</sup>. The lever E' is arranged at a distance from the rail A<sup>2</sup> sufficient to keep the stop from touch- 75 ing the rail when reciprocated by the lever E', to which the stop is secured.

To one end of the lever E' there is pivoted an eccentric-rod, E, on a pivot, 4. The rod E has a bifurcated top part that is adapted to 80 the eccentric D<sup>2</sup> and arranged in a channel that is prepared therefor in the said eccentric D<sup>2</sup>. The eccentric D is arranged on the driving-shaft D' between the forks of the upper bifurcated end of the eccentric-rod E that is 85 to engage therewith. This eccentric is keyed or otherwise secured to its shaft D'.

To one of the forks of the eccentric-rod E is attached the lower end of a spiral spring, G, the opposite end of which spring is secured to 90 the upper hooked end of a standard, b. The lower end of this standard is secured to the floor. To the other end of the lever E' there is pivoted, by a pivot, 3, a rod, P. This rod has a bifurcated top part, the forks of which 95 are adapted to receive and accommodate a slide-bar, P<sup>2</sup>. The slide-bar P<sup>2</sup> is arranged in square openings that are prepared therefor in the forks of the rod P, and is made slightly round on its inner end, to adapt it to a lug, p, 100 arranged in the clutch member S', hereinafter referred to. The slide-bar P<sup>2</sup> is provided on its side between the forks of the rod P with a stop, P<sup>3</sup>, which is made short enough to per-



mit the outward movement of the bar  $P^2$  when the same is engaged by the lug  $p$  and the bar's inward movement when the same is engaged by the lever  $P'$ , the bar  $P^2$  being stopped in  
 5 exact position in both movements inward and outward by the stop which engages the inner sides of the forks of the rod  $P$ .

Opposite the slide-bar  $P^2$ , and arranged on the driving-shaft  $D'$ , is a clutch composed of  
 10 two clutch members,  $S$  and  $S'$ . The clutch member  $S'$ , which is keyed or otherwise secured to the shaft  $D'$ , is provided with a lug,  $p$ , which lug is arranged to engage a slide-bar,  $P^2$ , which bar is located in the forks of the rod  
 15  $P$ , as shown in Figs. 8 and 9. The clutch member  $S$  is composed of a sleeve that is arranged on and slides over the shaft  $D'$ . This sleeve is provided with a pinion,  $B^3$ , cast on its outer end, and a circumferential groove  
 20 centrally therein to accommodate a clutch-shifter,  $n$ , which shifter is arranged in the said groove prepared therefor in the sleeve or clutch member  $S$ . The pinion  $B^3$  is arranged to engage, when the feeding devices are in op-  
 25 eration, with a gear-wheel,  $B^2$ . The wheel  $B^2$ , which is journaled on a stud,  $o'$ , is provided with a pinion,  $O$ , which last-mentioned pinion gears with a gear-wheel,  $B'$ , arranged on the shaft of the reel  $B$ . The stud  $o'$  is secured to  
 30 the frame  $A$ . The shifter  $n$  is held rigid at its lower end to the inner edge of a bracket,  $n^2$ , by means of screws. The bracket is rigidly secured to the frame  $A$ .

Rigidly secured to the frame  $A$  there is a  
 35 bracket,  $P^4$ , which has in its inner edge a recess or notch,  $P^5$ , into which recess or notch the shifter  $n$  enters to hold the clutch members in engagement.

To the inner end of the bracket  $P^4$  there is  
 40 pivoted on a pivot,  $8$ , lever  $P'$ . The lever  $P'$  has a depending part,  $6$ , to engage the slide-bar  $P^2$ , and a lateral projecting part,  $7$ , to engage the shifter  $n$ , as seen in Figs. 8 and 9.

In an eye,  $K^8$ , Fig. 5, formed in the end of the arm  $K^3$  of the spring  $K^5$ , there is secured  
 45 one end of a flexible link,  $d'$ . The opposite end of this flexible link is secured in an eye-stud,  $H^2$ , which stud is secured in the back part of a tripping frame,  $H$ . The tripping-frame  $H$ , which is arranged on a rod,  $h$ , that is  
 50 journaled in the different sides of the frame  $A$ , has in each of its arms a terminal longitudinal-extending pin,  $h'$ , which pin or rod is provided with a screw-thread to accommodate a screw  
 55 balance-weight,  $h^2$ , and a thumb-nut,  $h^3$ , that have a corresponding screw-thread, and which are screwed on the rods  $h'$ , as shown in Fig. 7. A rod,  $C$ , extends from side to side of frame  
 60  $A'$ , being attached thereto at its ends. This rod has arranged on it horizontally at right angles thereto a series of faller-wires,  $C^2$ . The fallers  $C^2$  have a suitable eye formed on their inner ends to adapt them to journal on the rod  
 65  $C$ ; also an eye,  $C^3$ , on the top of the same, to accommodate the warp-thread  $F$ , which passes through the eye  $C^3$ . The outer ends of the faller-wires are arranged between vertical

guide-wires  $e'$ , arranged in the frame  $A'$ , and the fallers are separated at their inner ends by washers  $C'$ , Fig. 10.

The operation of the mechanism is as follows:  
 Motion is imparted to the driving-shaft  $D'$  from the pulley  $D$  in the usual way. The motion given to the shaft  $D'$  rotates the clutch-  
 70 member  $S'$  and eccentric  $D^2$ . The eccentric  $D^2$  imparts an up-and-down movement to the eccentric-rod  $E$ , which rod imparts a like movement to the lever  $E'$  and its stop  $K^2$ . The lever  $E'$ , which is in motion, reciprocates the rod  
 75  $P$  and slide-bar  $P^2$ . The rod  $P$  is guided and supported in its vertical position by the slotted arm  $T$ . The bobbins  $g$ , which contain the thread  $F$ , are placed in position on the pins  $g'$ . The several warp-threads employed in forming the warps are taken from the bobbins  $g$   
 80 upward to the rod  $f$ , over said rod forward to the rod  $e$ , over the said rod  $e$  forward to and through the faller-eyes  $C^3$ , forward to and over the rod  $K^4$ , and forward to the reel  $B$ , to which the several threads  $F$ , after each of them have  
 85 been pressed forward in the manner stated, are secured to the said reel  $B$ . The clutch-shifter  $n$  is pushed sidewise inward in line with the shaft  $D'$  and enters the recess or  
 90 notch  $P^5$ , which action puts the spring-shifter in tension and carries the clutch part  $S$  over the shaft  $K$  into engagement with the clutch parts  $S'$ , and the pinion  $B^3$  into engagement  
 95 with wheel  $B^2$ . This wheel  $B^2$ , by means of pinion  $O$  and wheel  $B'$ , rotates the reel  $B$ , which starts the feed of thread and the formation of the warps by unwinding the thread  $F$  from off the bobbins  $g$ , and winding the same on the  
 100 reel  $B$ . The tripping-frame, having been brought to a suitable balance for automatic action by means of the screw balance-weights  $h^2$  and held to such balance by thumb-nuts  $h^3$ , occupies the position shown in Fig. 1. On the cessation of a thread, the faller-wires  $C^2$ ,  
 105 which are supported in their elevated positions thereby, are left unsupported and fall down on the tripping-frame  $H$ . At their touch the said frame  $H$  trips and removes the tension from the flexible link  $d'$ , which permits the  
 110 arm  $K^3$  to recede and engage the stop  $K^2$ , and takes its place on the shoulder  $K^6$  of the said stop  $K^2$  when the stop end of the lever is depressed by the action of the eccentric thereon. The arm  $K^3$ , having taken its place on the  
 115 shoulders  $K^6$ , holds that end of the lever  $E'$  in its depressed position, and prevents its further reciprocation. The depression of the stop end of the lever  $E'$  elevates the opposite end of the lever  $E'$  until the slide-bar  $P^2$  is  
 120 about central with the shaft  $D'$ , which puts the bar  $P^2$  in suitable position to be engaged by the lug  $p$ . This lug in its engagement with the bar  $P^2$  forces the slide-bar outward into engagement with the depending part 6 of the  
 125 lever  $P'$ , forcing the said part 6 outward, and by the same action forcing the part 7 inward against the shifter  $n$ . This action removes the shifter  $n$  from the notch or recess  $P^5$ , and permits the said shifter, which is in tension, to



spring outward and carry with it the clutch member S with its pinion B<sup>3</sup>, thus disengaging the clutch parts S and S' and automatically stopping the reel B and the further feed of thread. The vertical guides e' guide the fallers in their descent, while the washers C' keep the fallers separated on the rod C. The spring G adapts itself to the wants of the rod E, and keeps said rod in constant engagement with the eccentric D<sup>2</sup>. The reel B, when the same is to be removed, is lifted and carried by the handles B<sup>4</sup>. When the thread F is restored, the tripping-frame H is placed in its former position, which action, by means of the link d', removes the arm K<sup>3</sup> from the shoulder K<sup>6</sup>, which permits the reciprocation of the lever E' and places the stopping devices in position for automatic action on the cessation of a thread. The shifter n is pushed inward in the manner before stated and placed in the recess or notch P<sup>5</sup>, which action engages the clutch members S and S', and puts the pinion B<sup>3</sup> into engagement with the wheel B<sup>2</sup>, and by means of the pinion O and wheel B' rotates the reel B and starts the feed of thread to continue the operation of forming the warps.

Having described my invention, I claim and desire to secure by Letters Patent—

1. The combination of the lever E' with the rod E, eccentric D<sup>2</sup>, shaft D', means for operating the same, spring G, standard b, and the frame A, said spring and eccentric operating on said rod to reciprocate the said lever, substantially as set forth.

2. The combination of the reciprocating lever E', provided with the stop K<sup>2</sup>, with reciprocating rod E, means for operating said lever and rod, spring K<sup>5</sup>, having arm K<sup>3</sup>, for engaging stop K<sup>2</sup>, box K, provided with a set-screw for securing said spring, rail A<sup>2</sup>, for supporting box K, link d', eye-stud H<sup>2</sup>, tripping-frame H, rod h, threaded rod h', balance-weight h<sup>2</sup>, thumb-nut h<sup>3</sup>, and fallers C<sup>2</sup>, substantially as and for the purpose set forth.

3. The combination of lever E', rod E, and eccentric D<sup>2</sup> with the rod P, reciprocated by said devices, the arm T, for guiding said rod, the frame A, the slide-bar P<sup>2</sup>, having stop P<sup>3</sup> on its side, the clutch member S', having lug p, the shaft D', for rotating said clutch member, the lever P', shifter n, bracket P<sup>4</sup>, having notch P<sup>5</sup>, the clutch member S, the reel B, and the gearing for rotating said reel, substantially as set forth.

4. The combination, with the tripping-frame H and fallers C<sup>2</sup>, for tripping said frame, of the rod C, to which said fallers are attached, the stop K<sup>2</sup>, spring K<sup>5</sup>, the flexible link d, the guides e', creel g<sup>2</sup>, pins g', lever P', rod P, slide-bar P<sup>2</sup>, bracket P<sup>4</sup>, having a notch, P<sup>5</sup>, the frame A, the driving-shaft D', the clutch members S S', eccentric-rod E, and lever E', substantially as set forth.

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Witnesses:

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