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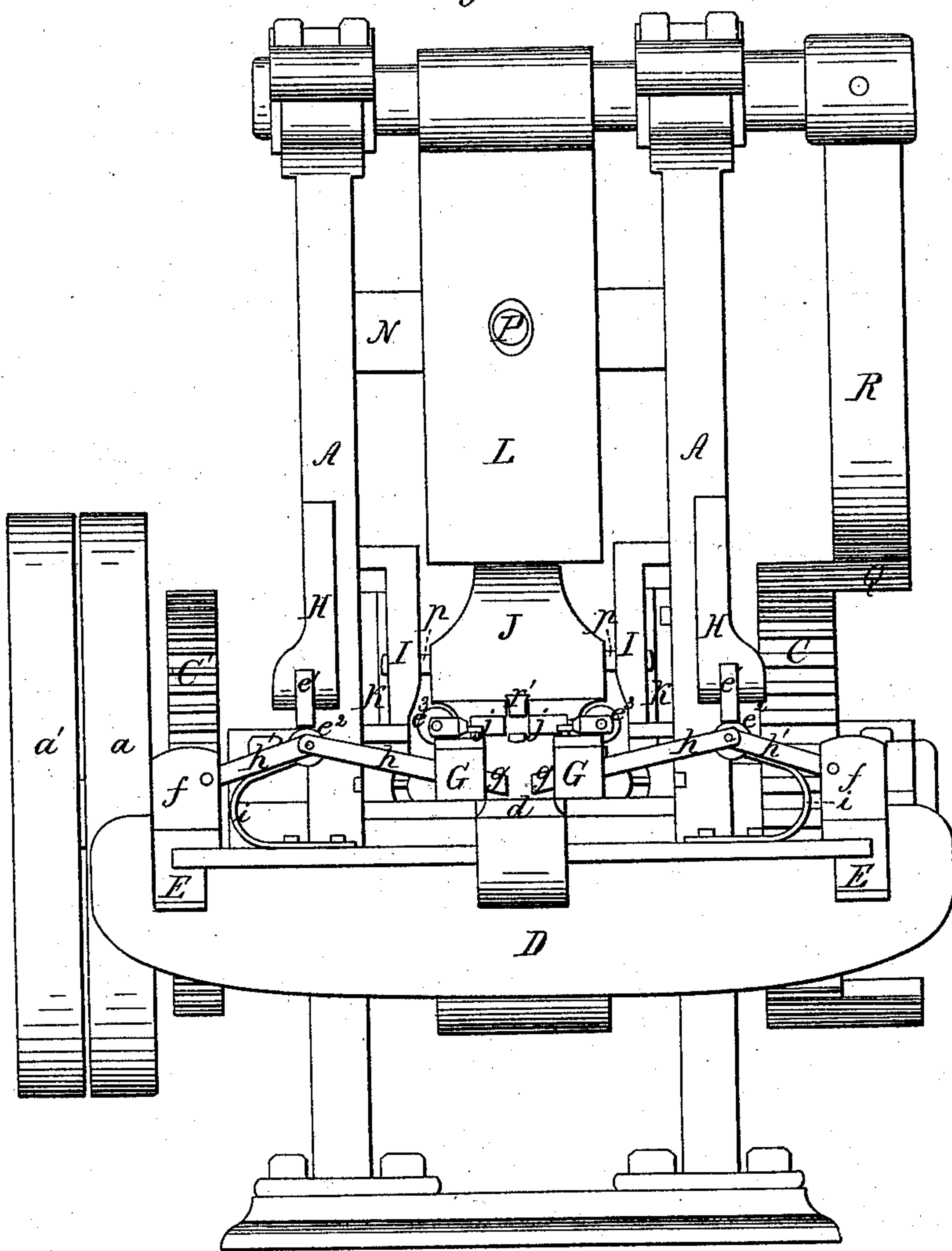
A. M. George.

Spike Machine.

N<sup>o</sup> 7,440.

Patented Jun. 18, 1850.

Fig. 1



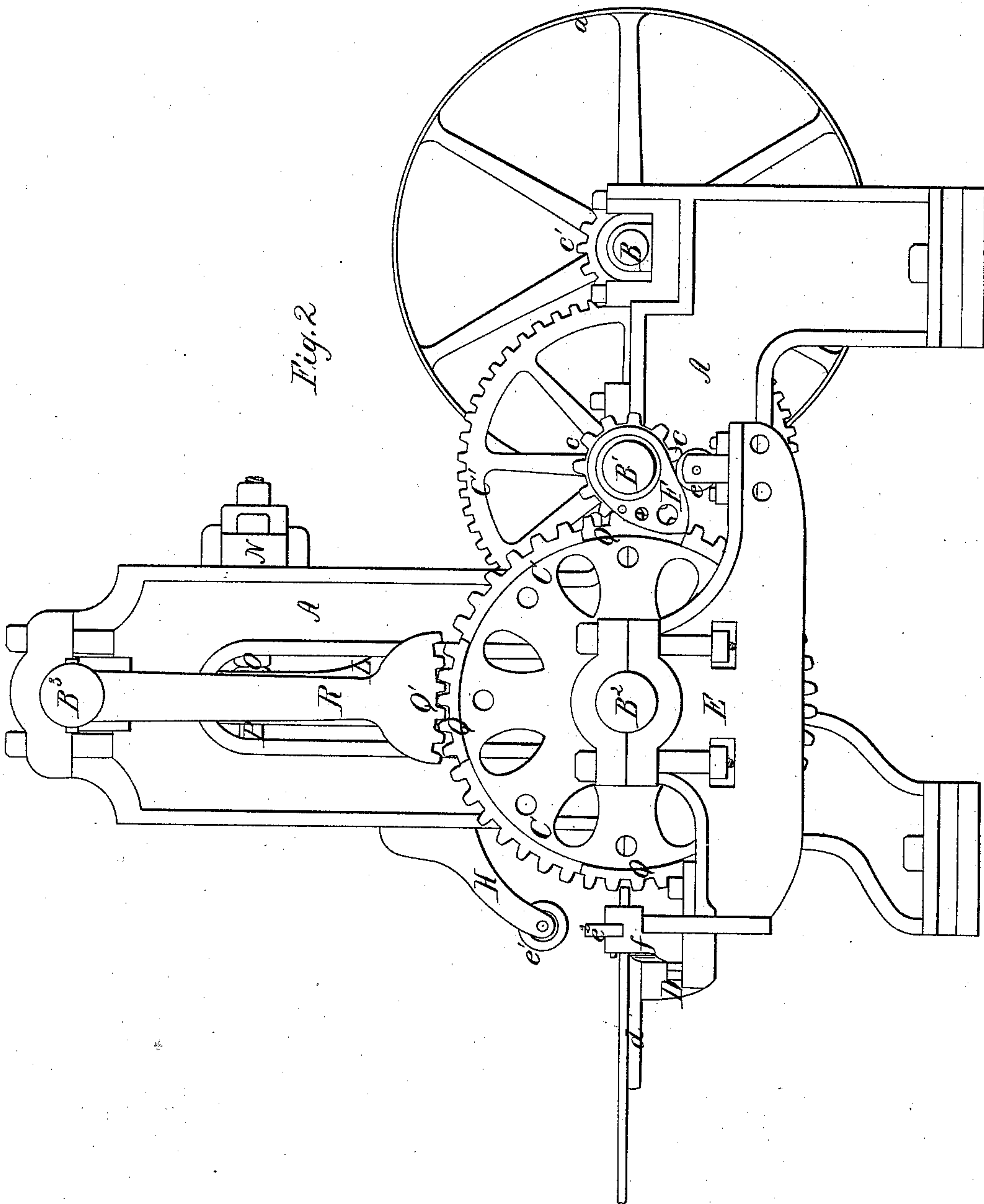
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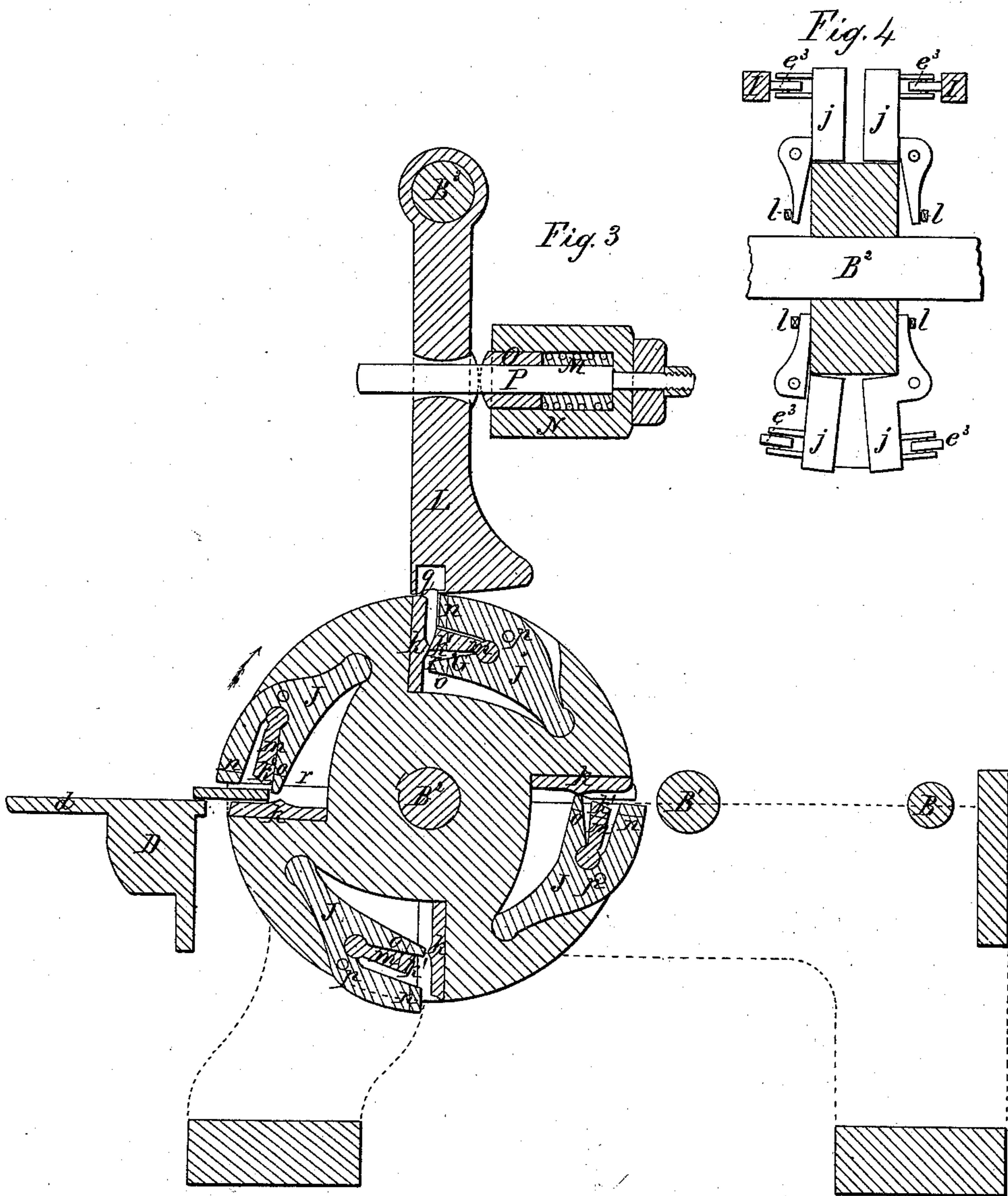
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Patented Jun. 18, 1850.





# UNITED STATES PATENT OFFICE.

A. M. GEORGE, OF NASHUA, NEW HAMPSHIRE.

## SPIKE-MACHINE.

Specification of Letters Patent No. 7,440, dated June 18, 1850.

*To all whom it may concern:*

Be it known that I, AMMI M. GEORGE, of Nashua, in the county of Hillsboro and State of New Hampshire, have invented certain new and useful Improvements in Spike-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of this specification and in which—

Figure 1 is a front elevation of my spike machine, Fig. 2 is a side elevation of the same, Fig. 3 is a longitudinal section through the die-wheel, and Fig. 4 is a transverse section through the same.

By my machine the spike rod is cut into suitable lengths or slips, which are headed at one end and pointed at the other, these several operations following each other in rapid succession; it consists essentially of a revolving wheel, containing the dies for gripping and pointing the spike, acting in combination with a pair of knives, for severing the spike rod, and a heading tool, by which the head of the spike is pressed into shape.

In the drawing A is the frame of the machine to which the several members are secured; it is formed in this instance of two cast iron side pieces connected by cross-ties. Three parallel transverse shafts B, B<sup>1</sup>, B<sup>2</sup>, are supported in pillow blocks upon this frame; the one (B) nearest the hinder extremity of the machine is the driving shaft and is fitted with a fast, *a*, and a loose pulley, *a*<sup>1</sup>, to which the power of the prime mover is transmitted by a belt. The shaft (B<sup>2</sup>) nearest the front of the machine is that of the die-wheel; one extremity of this shaft is fitted with a cog wheel C whose teeth mesh into those of a pinion *c*, secured to the intermediate shaft B<sup>1</sup>, which in turn receives motion from the driving shaft B, through the intervention of a wheel C<sup>1</sup>, and pinion *c*<sup>1</sup>.

A transverse frame D, is hung immediately in front of the main frame upon the front extremities of two parallel levers E, E, which turn upon the opposite extremities of the die-wheel shaft B<sup>2</sup> as fulcra, their hinder extremities being each fitted with a friction wheel *e* which is acted upon by one of a pair of cams F secured to the opposite extremities of the intermediate shaft B<sup>1</sup>. This hanging frame has an apron *d* at its center on which the spike rod is introduced; it also supports the carriages G, G, to which the knives *g*, *g*, are secured, by which the spike rod is cut

into suitable lengths. These carriages are constructed to move from or toward each other in slides or grooves on the hanging frame; they are each connected with a standard *f*, at the adjacent extremity of the hanging frame by a pair of toggle-jointed levers *h*, *h*<sup>1</sup>, which are maintained in the bent position in which they are represented in Fig. 1 by a spring *i* bearing upon their lower face and secured to the hanging frame. An arm H is projected from the main frame immediately above the joint of the levers; each of these arms is fitted with a friction roller, *e*<sup>1</sup>, and a corresponding friction wheel *e*<sup>2</sup>, is fitted upon the pivot of the joint of each pair of levers.

The die-wheel is secured to the shaft B<sup>2</sup>. It contains in this example four sets of dies which as the wheel revolves receive in succession the extremity of the spike rod inserted between the knives *g*, *g*. The dies *j*, *j*, act upon the sides of the rod and are moved from and toward each other in the direction of the axis of the wheel; they are pivoted near their inner extremities to the die-wheel which is fitted with springs *l*; these bear against the inner extremities of the dies and tend to force their outer extremities away from each other. The outer extremity of each of these dies is fitted with a friction wheel *e*<sup>3</sup>, which runs on a track I, secured to the adjacent inner side of the side-pieces of the main frame; the faces of these tracks at their front extremities are at a sufficient distance from each other to admit the friction wheels *e*<sup>3</sup> when the dies are opened by the springs *l* to their full extent; thence they gradually converge until they are sufficiently near to each other to bind against the friction wheels when the dies are nearest together, which takes place when they are gripping the spike; the faces of the tracks are then parallel to each other for the rest of their length, which is sufficient to keep the dies gripping the spike until it is properly headed and pointed. The pointing dies *k*, *k*<sup>1</sup>, are arranged to act upon the upper and lower sides of the inserted spike rod; one of them, *k*, is fixed in the die wheel, the other *k*<sup>1</sup>, is secured to a tongue *m* projected from a forked clamp J, which is pivoted to the die-wheel. The forked extremities of the clamp project above and below the tongue *m*; the upper one *n* acts in combination with the outer part of the fixed pointing die *k* to grip the spike, thus forming



with the side gripping dies a socket or box in which the slip of rod cut off by the knives is securely held during the heading and pointing. The lower  $o$  of the forked extremities of the clamp forms the stop or gage which governs the distance to which the spike rod is inserted. The clamp is opened to admit the spike-rod by means of pins  $p$  which are projected from its sides and which run upon stationary curved guides or tracks  $K$ ; the latter are sloped off at their lower extremities to pass within the circle described by the pins but for the rest of their length are at a sufficient distance from the axis of the die-wheel to keep the clamp open until the spike rod is inserted and cut by the knives.

The heading of the spike is effected by means of a die  $q$ , secured in the lower curved face of an arm  $L$  depending from a shaft  $B^3$ , parallel with the die-wheel shaft  $B^2$ , and supported in pillow blocks on the uppermost part of the main frame. This heading arm is forced forward by means of a spiral spring  $M$  inserted in a socket formed in a transverse bar  $N$ , connecting the two side pieces of the main frame. The spiral spring acts through the intervention of a follower  $O$ , which is guided upon a central rod  $P$  and bears against a protuberance on the hinder face of the heading arm  $L$ . The heading arm is moved backward at proper intervals to form the head by means of sets of cog teeth  $Q$ , which are secured to the rim of the cog wheel  $C$ , and which correspond in number and position to the sets of dies in the die-wheel; these sets of teeth on the rim of the cog-wheel engage with a similar set  $Q^1$  on the curved extremity of an arm  $R$  secured to the shaft  $B^3$  of the heading arm  $L$ . The heading die  $q$ , compresses and shapes the upper face of the head of the spike, the lower face being shaped by a countersunk socket formed in the outer end of the fixed die  $k$  in the die-wheel.

The machine is put in motion by means of a belt encircling the fast pulley  $a$ , a heated spike rod is then applied to the apron  $d$ , and as the die-wheel revolves is shoved between the open knives  $g$ , into the socket formed by the dies, which have been opened to receive it, the side gripping dies by the springs  $l$  at their inner extremities and the clamp by means of the pins  $p$  running upon their tracks  $K$ . The spike rod is shoved into this open socket until its extremity strikes the gage  $o$ ; as now the die wheel turns upward (as indicated by the arrow in the drawing, Fig. 3), the hanging frame  $D$  is also raised by the cams  $F$  acting upon the hinder extremities of the levers  $E$ , in such manner that the apron  $d$  is kept in contact with the lower face of the spike rod; by this movement of the hanging frame, the friction wheels  $e^2$  of the toggle-jointed levers  $h$   $h^1$ ,

are brought in contact with those  $e^1$  of the arms  $H$ , which being stationary prevent their further rise; as the hanging frame continues to move upward by the action of the cams these toggle-jointed levers are forced more nearly in line with each other thus forcing the knife carriages  $G$  with their knives  $g$  toward each other and severing the part in the dies from the rest of the rod. The hanging frame is then lowered to its first position by the continued revolutions of the cams  $F$ , while the die wheel continues to revolve. As the dies are thus carried upward, the friction wheels  $e^3$  of the side gripping-dies  $j$ , enter between the converging tracks  $I$ , and these dies are caused to grip the severed slip of rod, while at the same time the appropriate set of cog-teeth  $Q$ , on the rim of the wheel  $C$ , engaging with those on the arm  $R$ , put the heading arm in motion and cause its curved face to roll over the end of the slip in the dies, thus pressing the head of the spike and at the same time depressing the clamp  $J$ , which, acting upon the movable pointing die  $k^1$ , forces it toward the stationary one  $k$ , and forms the point of the spike. As the die-wheel continues to revolve the last tooth of the set  $Q$  on the rim passes the curved arm  $R$  which being thus liberated is returned to its first position by the action of the spiral spring  $M$  upon the heading arm  $L$ ; the friction wheels  $e^3$ , of the side gripping dies also pass the hinder extremities of their tracks  $I$ , thus allowing the springs,  $l$ , to reopen the dies, while the clamp  $J$ , as it descends by the rotation of the die-wheel opens by its own weight thus completely freeing the finished spike which drops from the dies. In order that the movable pointing die may not be forced too far inward by the action of the heading arm upon the clamp  $J$ , a pin  $r$ , is projected from the side of the socket in which the tongue works to stop the further motion of the tongue in that direction when it has arrived at its proper position. By the continued motion of the machine the several sets of dies on the die-wheel are brought in succession behind the hanging frame  $D$ , and receive successive slips of the spike rod, the hanging frame being raised by the cams  $F$ , to sever the rod as each set of dies are brought into action. It will be perceived that the head of the spike is formed out of that part of the severed slip which projects beyond the dies; the length of this projecting portion is governed by the distance of the knives from the outer extremities of the dies, and this distance is regulated to suit spike heads of different dimensions by sliding the hanging frame outward or inward on its supporting levers. The heading dies in this instance are of the proper form to make what is styled a hook headed spike but it is obvious that by vary-



ing the forms of the dies, heads of other forms can be made.

Having thus described my improved spike machine what I claim therein as new and  
5 desire to secure by Letters Patent—

1. The rising and falling guide and cutter frame in combination with a moving series of dies, whereby the spike rod is guided into the moving dies and a slip of proper  
10 length cut off to form the spike, the knives being operated by levers which force them toward each other whenever the movement of the frame brings the levers in contact with stationary arms projected from the main  
15 frame.

2. The forked and hinged clamp (J) constructed substantially as herein set forth in such manner that when open its inner fork

performs the office of a gauge to regulate the length of the spike, and when closed its outer  
20 form grips the shoulder of the spike during the heading and its inner fork is withdrawn to allow the formation of the point.

3. The combination of the arm L with the clamp J and its tongue *m*, by means of  
25 which the heading, gripping, and pointing of the spike are effected substantially as herein described at one operation.

In testimony whereof I have hereunto set my signature this twenty-eighth day of  
30 February A. D. 1850.

AMMI M. GEORGE. [L. s.]

Witnesses:

C. G. A. BURTON,  
A. W. SAWYER.