

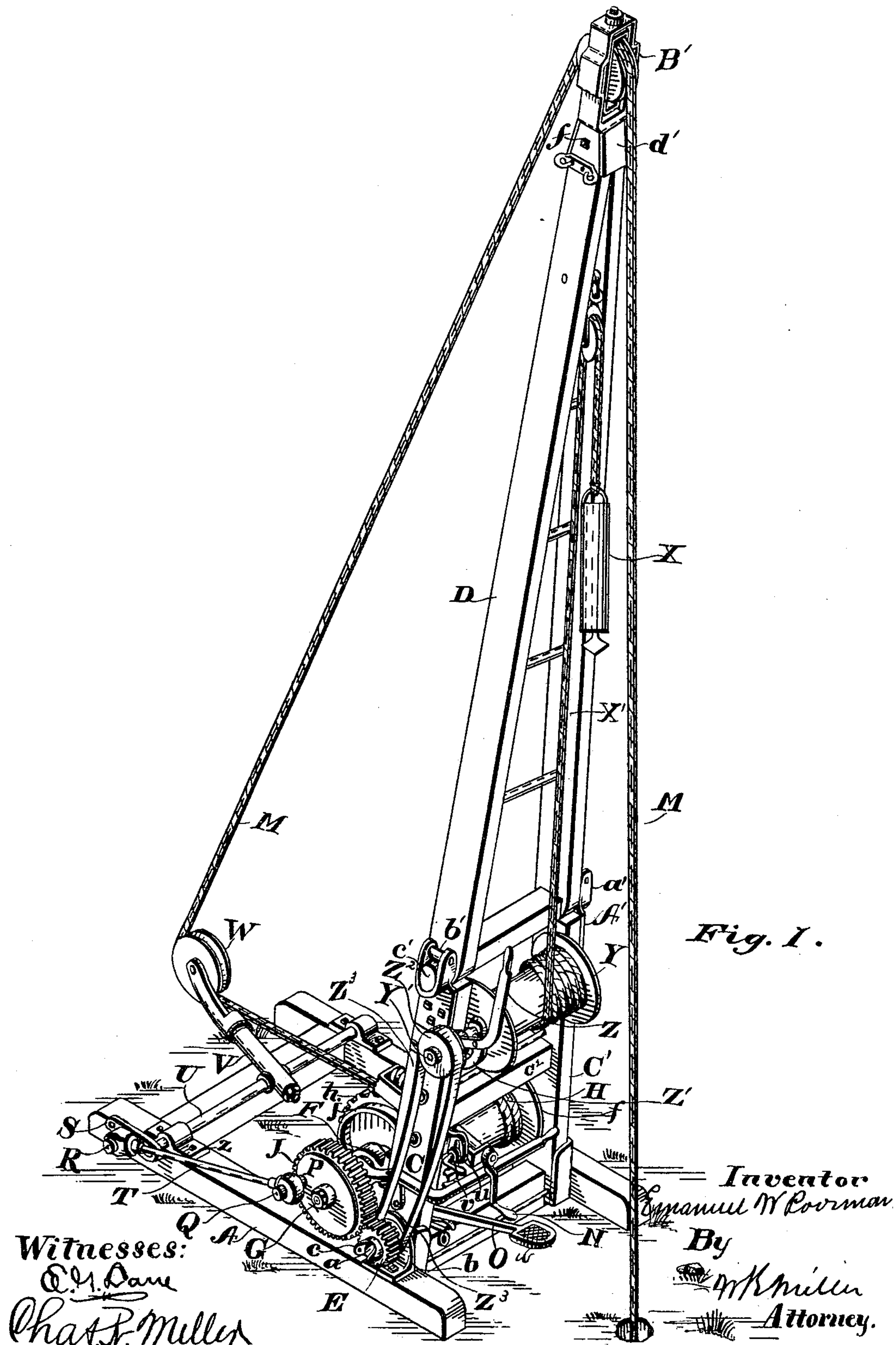
(No Model.)

3 Sheets—Sheet 1.

E. W. POORMAN.  
ROCK AND EARTH DRILLING MACHINE.

No. 403,555.

Patented May 21, 1889.



(No Model.)

3 Sheets—Sheet 2.

E. W. POORMAN.  
ROCK AND EARTH DRILLING MACHINE.

No. 403,555.

Patented May 21, 1889.

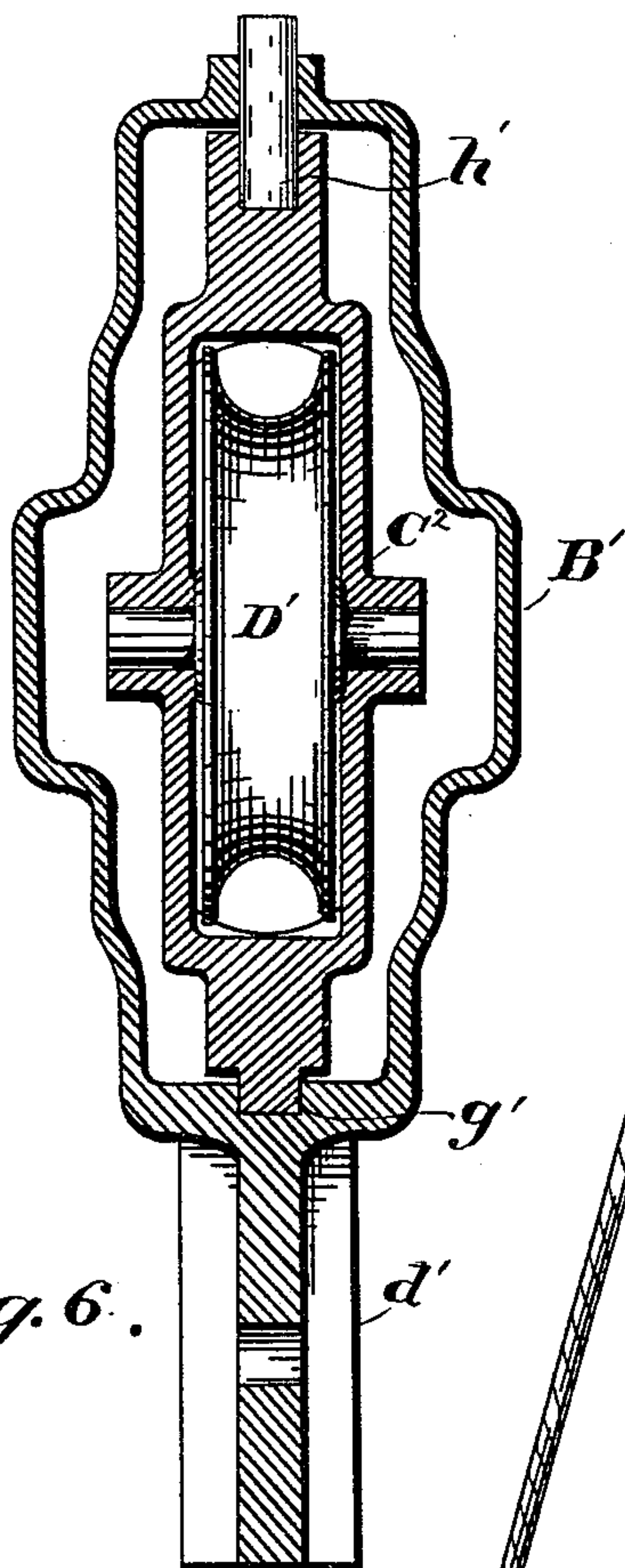


Fig. 6.

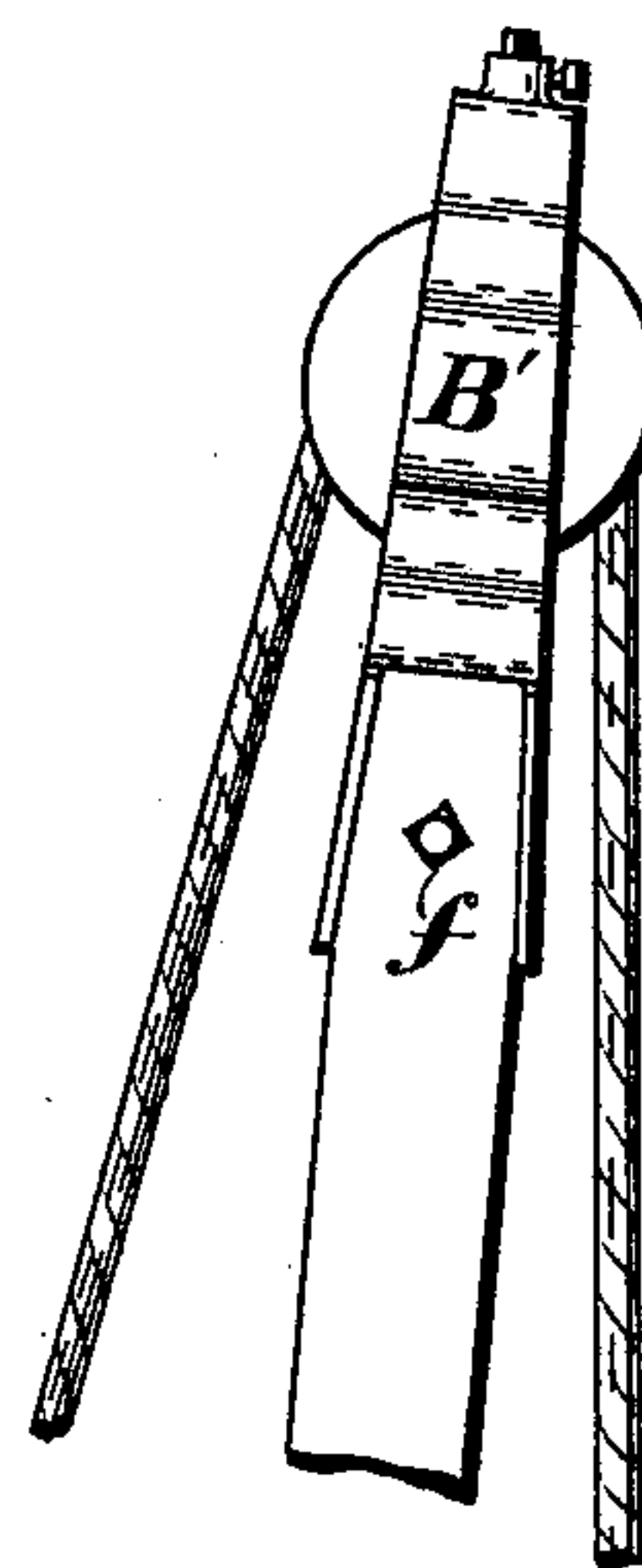


Fig. 7.

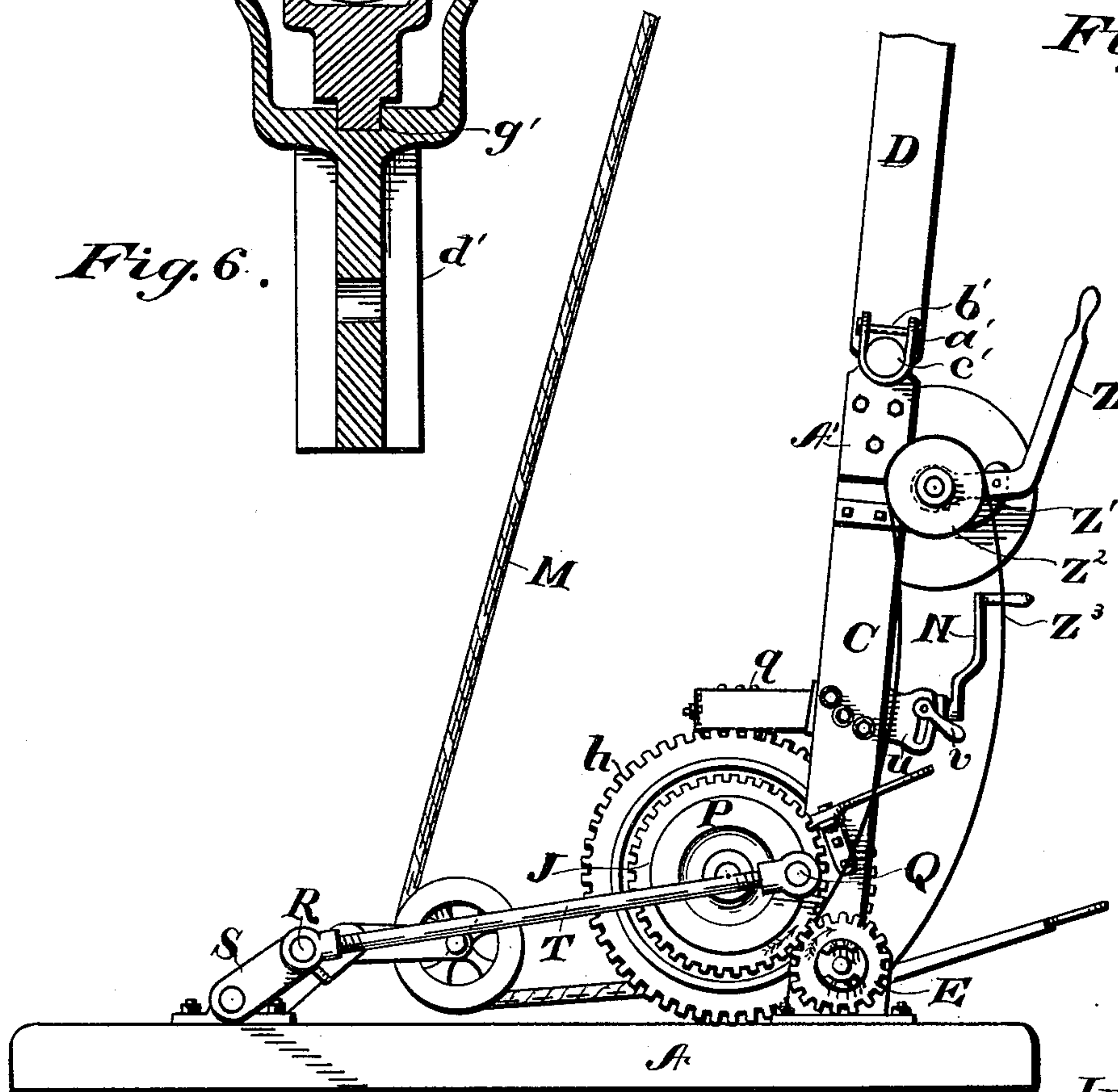


Fig. 2. *Inventor*  
Emanuel W. Poorman  
By,  
Wm. Miller  
Attorney.

Witnesses:

*O. H. Rowe*  
*Chas. R. Miller*

(No Model.)

3 Sheets—Sheet 3.

E. W. POORMAN.  
ROCK AND EARTH DRILLING MACHINE.

No. 403,555.

Patented May 21, 1889.

Fig. 8.

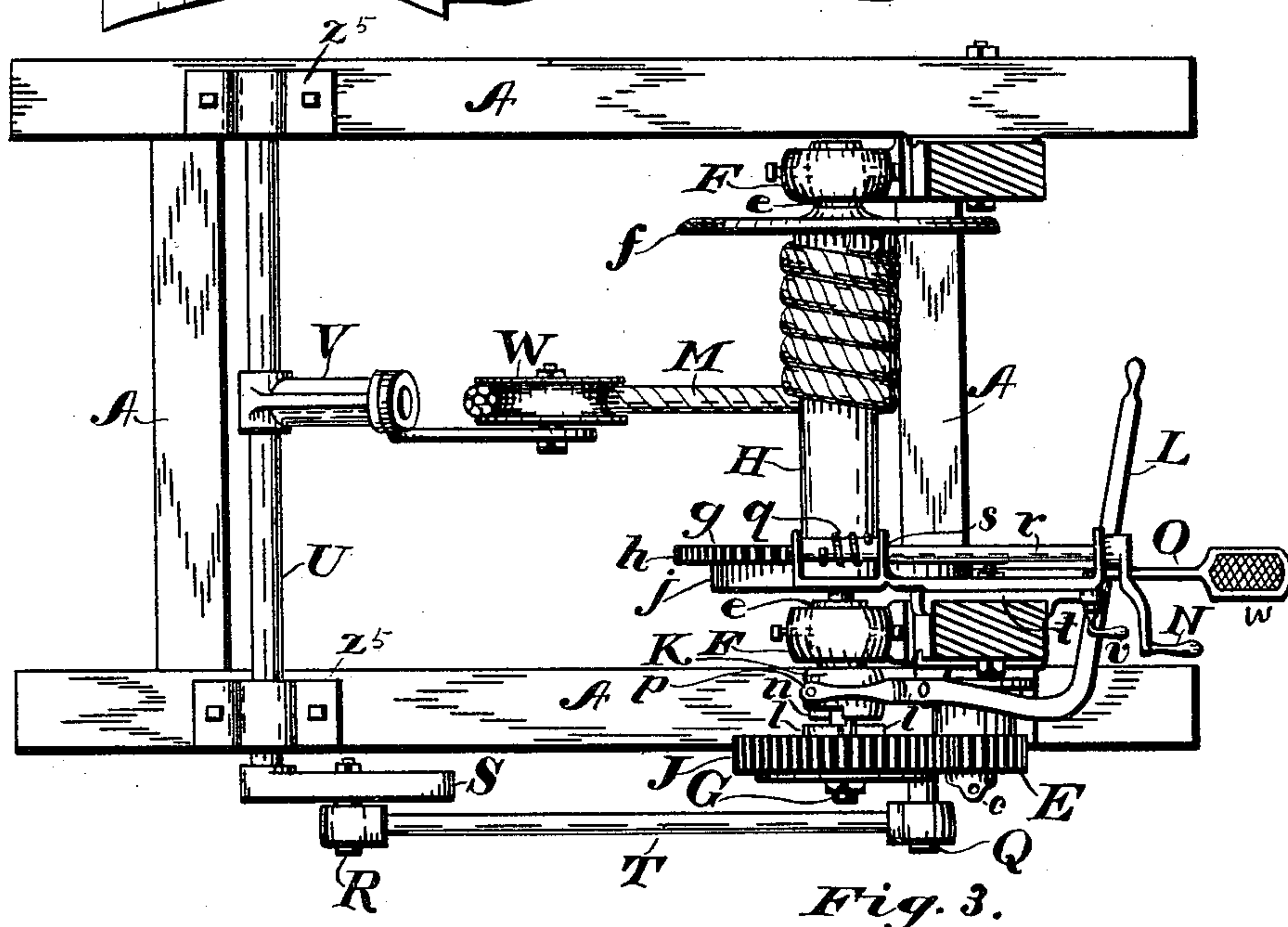
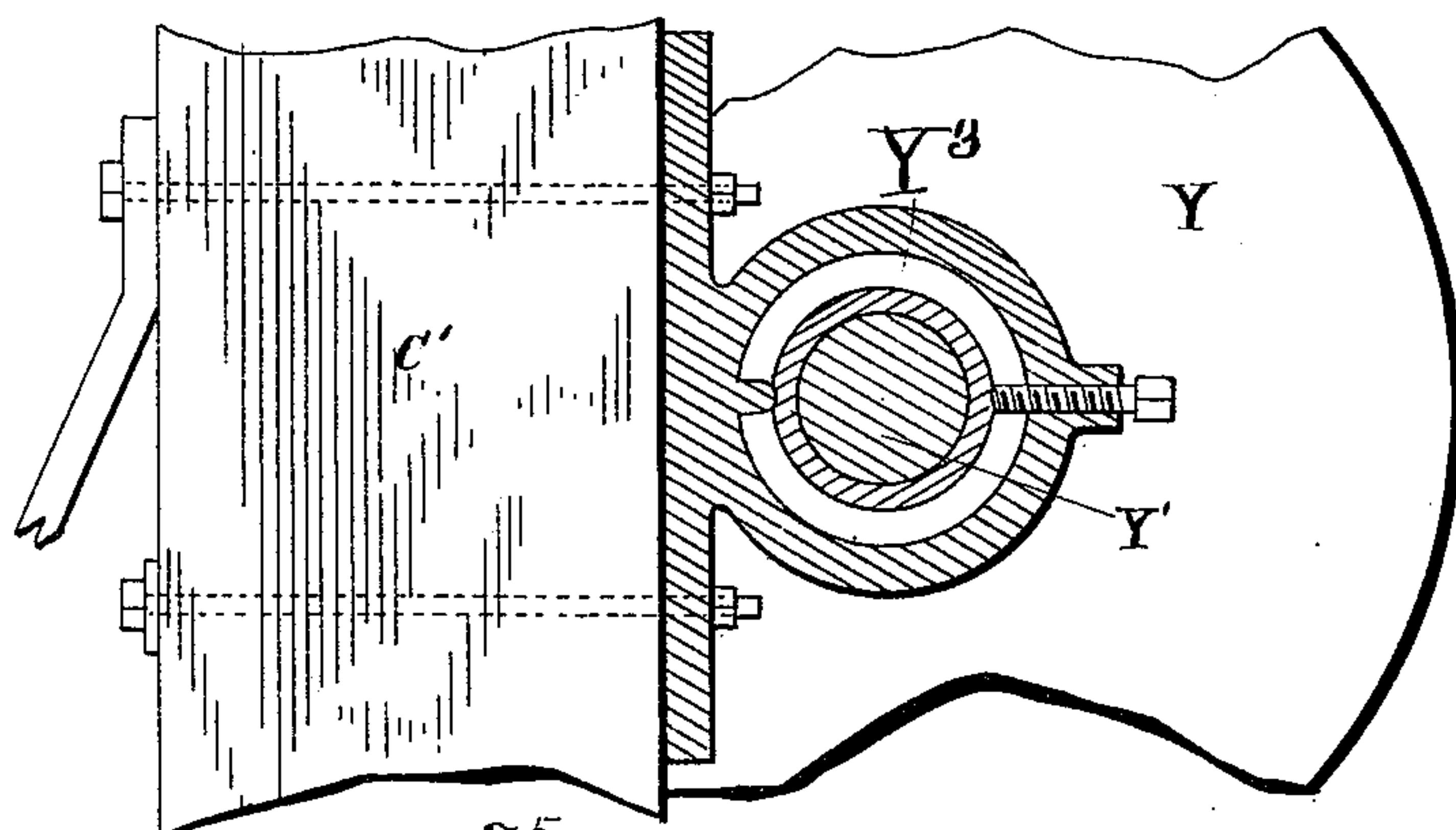


Fig. 3.

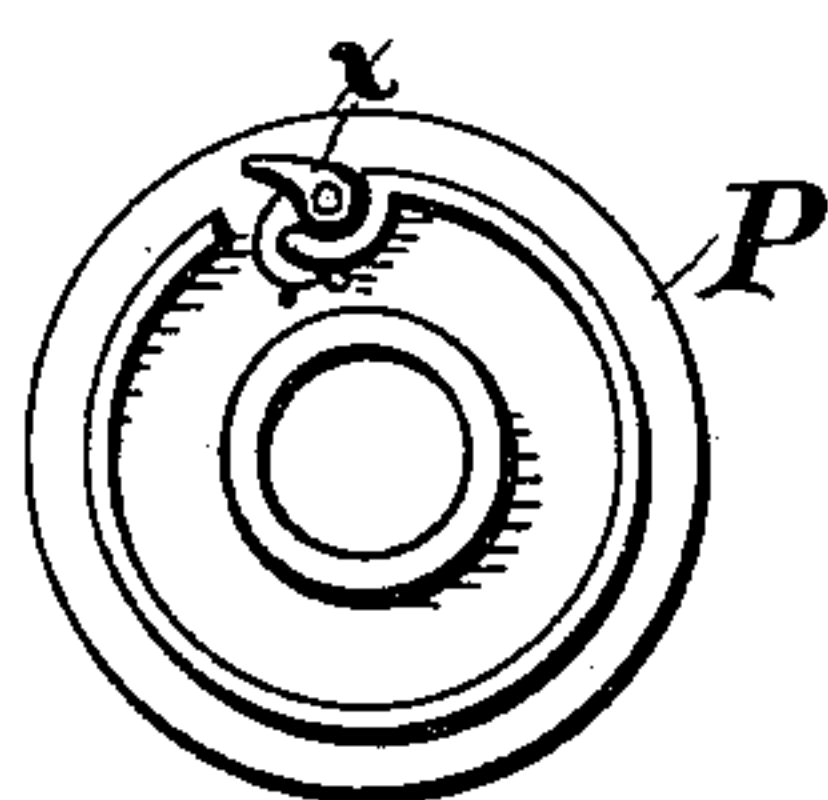


Fig. 5.

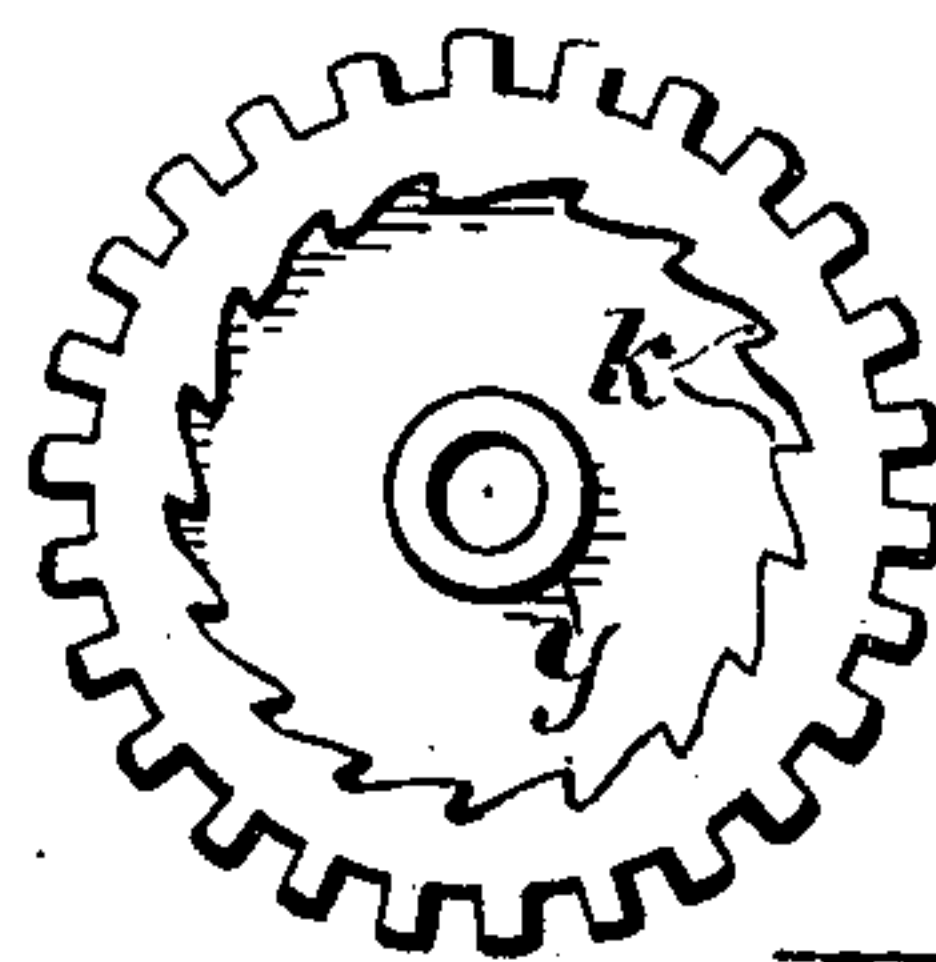


Fig. 4.

WITNESSES:

*E. H. Davis*  
*Chas. F. Miller*

INVENTOR,  
*Emanuel W. Poorman*

BY

*W. K. Miller*  
ATTORNEY.



# UNITED STATES PATENT OFFICE.

EMANUEL W. POORMAN, OF CANTON, OHIO.

## ROCK AND EARTH DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 403,555, dated May 21, 1889.

Application filed May 18, 1888. Serial No. 274,234. (No model.)

*To all whom it may concern:*

Be it known that I, EMANUEL W. POORMAN, a citizen of the United States, and a resident of Canton, county of Stark, State of Ohio, have  
5 invented a new and useful Improvement in Rock and Earth Drilling Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.  
10

My invention relates to improvements in rock and earth drilling machines; and it consists in providing a light, portable, and inexpensive machine that may be operated by  
15 animal or other power.

With these ends in view my invention consists of the hereinafter-described machine and of the detail and combination of parts, as set forth in the claims.

20 Figure 1 is a view in perspective of a rock and earth drilling machine illustrating my invention. Fig. 2 is a side elevation of a portion of the same. Fig. 3 is a plan view of a portion of the same. Fig. 4 is a side elevation of gear-wheel, showing internal rack.  
25 Fig. 5 is an elevation of rack-wheel, showing spring-pawl. Fig. 6 is a sectional view of sheave-wheel and supporting-frames. Fig. 7 is a side elevation of same; and Fig. 8 is an enlarged detail sectional view of the pivoted journal-box  $Y^3$ , of the usual and well-known construction, showing it secured to the standard  $C'$ , similar letters of reference indicating  
30 corresponding parts in all the figures of the drawings.

A represents the foundation or supporting-frame;  $CC'$ , vertical standards rigidly secured to said frame and held in desired relation by a strut, as  $C^2$ . To the upper portion of said  
40 standards there is pivotally secured a derrick, D, which will be hereinafter described.

A driving-pinion, E, is loosely mounted on a stud-pin,  $a$ , projected from a supporting-plate,  $b$ . Said pinion is provided with coupling-lugs  $c$ , which form a part of a universal  
45 coupling, by which a coupling may be made by use of the ordinary tumbling-rod with an animal or other power.

Hangers F are secured to the bottom portion  
50 of the standards C and  $C'$ , in which the jour-

nal-boxes  $e$  are pivotally secured, by which the shaft G is supported. On said shaft there is formed a winding-spool, H, having heads  $f$  and  $g$ , the head  $g$  having about its periphery a series of cogs,  $h$ , and on the face thereof a  
55 face-wheel,  $j$ .

On the end of the shaft G there is loosely mounted a spur-wheel, J, the teeth of which engage with the teeth on the driving-pinion E. On the outer face of said wheel J there is  
60 provided an internal rack,  $k$ . On the inner face of said wheel there are provided coupling-lugs  $l$ , that engage the lug  $n$  of a clutch, K. Said coupling is secured to the shaft G by a pin or feather in the usual way of constructing such parts, and is also provided with an  
65 annular groove in which the prongs  $p$  of shifting lever L are loosely secured, said lever having a pivotal connection with the standard C, about which it may be vibrated to engage  
70 or disengage the lugs  $n$  of the sliding clutch with the lugs  $l$  on the wheel J, that when so engaged the spool H may be rotated with the wheel J to wind up the rope M, and when disengaged to allow the wheel to rotate about  
75 the shaft G, the spool being held in position by a worm,  $q$ , engaging the cogs  $h$  of the spool-head  $g$ . Said worm is supported by a shaft,  $r$ , which is supported in a frame,  $s$ , pivotally secured to the standard C and plate  $t$ , as  
80 shown in Fig. 3, said plate having a slotted projecting arm,  $u$ , through which is passed a clamping-screw,  $v$ , by which the worm  $q$  may be secured either in or out of engagement  
85 with the wheel  $g$ , and on the outer end of the shaft  $r$  there is provided a hand-crank, N, which will be hereinafter explained.

A brake-lever, O, is provided, which is pivotally secured to and supported by the main frame, the said lever having on its outer end  
90 a foot-plate,  $w$ , and on its inner end a shoe adapted to rest on the face of the wheel J, which will be hereinafter explained.

A rack-plate, P, carrying a spring-pawl,  $x$ , is placed upon the hub  $y$  of the wheel J and  
95 secured in position by a link-pin or nut and washer, the pawl  $x$  resting in the notches  $k$  of the rack. The said plate P also supports and carries a crank-pin, Q, which is connected to  
100 a similar pin, R, in a lever, S, by a connecting-



rod, T, said rod having journal-boxes on each of its ends adapted to the crank-pins aforesaid, substantially as shown. The lever S is mounted on the end of rock-shaft U, which is supported by journal-boxes  $z^5$ . On said shaft there is mounted an arm, V, on the outer end of which is provided a sheave-wheel, W, adapted to the drill-rope M, substantially as shown in the drawings, and by which said rope is operated. To operate the sand-pump X, a spool, Y, is provided, as shown, near the upper end portion of the standards C C'. One of the journal-boxes, Y<sup>3</sup>, by which the spool-shaft Y' is supported, has a pivotal connection with the standard C', the box for the other end supported on the inner end of a hand-lever, Z, said lever having a pivotal connection with a supporting-bracket, Z'. On the end of the shaft Y' there is mounted a pulley, Z<sup>2</sup>, to correspond with a similar pulley on the inner face of the driving-pinion E. A driving-belt, Z<sup>3</sup>, is placed about the pulleys, as shown. To tighten the belt to put the spool Y into action, the lever Z is drawn over and down, by which action the rope X' will be wound about the spool, drawing up the pump X. To lower the pump, the lever may be raised, allowing the weight of the pump to reverse the movement of the spool, the speed of which may be regulated by maintaining a necessary amount of friction on the belt.

To the top of the standards C C' the derrick D is removably secured by means of the plates A', secured to said standards, provided with a journal-box, a', and removable fastenings b', by which trunnions c' on the derrick may be secured, whereby the derrick may be vibrated over its pivotal connection with the standards for the purpose of adjusting the top of the derrick over the desired point, said position or adjustment being secured by guy-ropes in the usual way.

On the upper end of the derrick there is provided a metal frame, B', having flanged sockets d', in which the side bars of the derrick are secured by the through-bolt f. In said frame B' there is provided a sheave-frame, C<sup>3</sup>, for the support of sheave-wheel D', said frame having a pivotal connection with the frame B' at the bottom and top at g' and h', whereby said sheave-frame may oscillate to adapt the wheel to the position of the rope M.

The operation of the machine is as follows:  
 55 The driving-pinion E and wheel J rotating as indicated by the arrows, (see Fig. 2,) the rack k on the wheel J, engaging the pawl x on the plate P, the plate and crank-pin Q, connecting-rod T, lever S, arm V, sheave-wheel W, and rope M are carried from the position shown in Fig. 2 to the position shown in Fig. 1, by which movement, the rope-spool H being secured from rotation by the worm g engaging the teeth h of wheel g, the rope, with the drill, will be raised a certain height, at which instant the crank-pin Q will pass a line drawn through the center of the spool-shaft G and

the crank-pin R, and the weight of the drill will throw the parts forward into position shown in Fig. 2, at which instant the pawl will again engage the rack-teeth k and repeat the movement. To furnish rope to the drill as the work progresses, the handle-crank N is operated, which, through the medium of the worm upon its shaft, rotates the drum H and permits the rope M to unwind. To raise the drill from the hole, release the rope M from engagement with the pulley W, throw the worm out of mesh with the worm-wheel g, which is done by slackening the clamping-screw v and vibrating the frame upon the pivot, and then press the hand-lever L in, which movement will couple the wheel J to the spool-shaft G, thus rotating the drum H, which will wind up the rope M and raise the drill. To lower the drill and to control the descent of the same, the clutch K is disengaged and the drum H permitted to rotate independent of the shaft G, but under the control of the operator, by means of the shoe upon the end of the brake-lever O engaging the wheel j. To operate the sand-pump X, the lever Z is used, by which the pulley Z<sup>2</sup> is raised to tighten the belt Z<sup>3</sup>, which will cause the spool Y to rotate and wind up the rope X', and to slack the belt the weight of the pump will reverse the rotary movement of the spool, unwind the rope, and allow the pump to be lowered into the hole at such speed as may be desired by regulating the pressure on the belt.

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

1. The combination, with the supporting-frame A, of a driving-pinion, E, shaft G, wheel J, loosely mounted thereon, said wheel having on its inner face clutch-lugs and on its outer face a series of internal rack-teeth, k, plate P, having on its inner face a pawl, x, and on its outer face a crank-pin, Q, connecting-rod T, crank-pin R, lever S, rock-shaft U, arm V, sheave W, and rope M, whereby the drill may be raised or dropped alternately, substantially as described, and for the purpose set forth.

2. The combination, with the supporting-frame A, having standards C and C', of a driving-pinion, E, shaft G, wheel J, loosely mounted thereon, hangers F, having journal-boxes e pivotally secured therein, a spool, H, brake-wheel j, lever O, clutch K, and lever L, whereby the raising of the rope and drill may be under the control of the operating-power and the descent of the same controlled by the foot of the operator on the lever O, substantially as described.

3. The combination of the driving-pinion E, shaft G, wheel J, loosely mounted thereon and provided with rack-teeth k, a ratchet-plate, P, mounted on said shaft G and provided with a pawl, x, which engages the rack-teeth k, the rock-shaft U, the connecting-rod T, connecting said rock-shaft with said ratchet-plate, a vibrating arm, V, secured to the said rock-



shaft, a sheave, W, journaled in said arm, rope M, spool H, upon which the rope is wound, worm-wheel *g*, and worm *q*, whereby the drill may be lowered or raised during the  
5 operation of the drilling, substantially as set forth.

4. The combination of the driving-pinion E, wheel J, geared therewith, clutch *k*, and spool H, mounted upon the shaft of the wheel J,  
10 rope M, wound upon said spool, brake-wheel *j*, secured to said spool, the lever O, for operating the brake-wheel *j*, and the lever N, for operating the clutch, whereby the drill may be raised and lowered, substantially as set  
15 forth.

5. In a rock and earth drilling machine, the

combination of the driving-pinion E, a gear-wheel, J, having peripheral cogs and a series of internal rack-teeth, a ratchet-plate loosely mounted thereon, a pawl to engage the rack-  
20 teeth, a rock-shaft, U, provided with an arm, S, a rod, T, for connecting said rock-shaft and ratchet-plate, and an arm, V, secured to said rock-shaft and provided with a sheave, substantially as set forth.

25 In testimony whereof I have hereunto set my hand this 28th day of April, A. D. 1888.

EMANUEL W. POORMAN.

Witnesses:

W. K. MILLER,

CHAS. R. MILLER.