

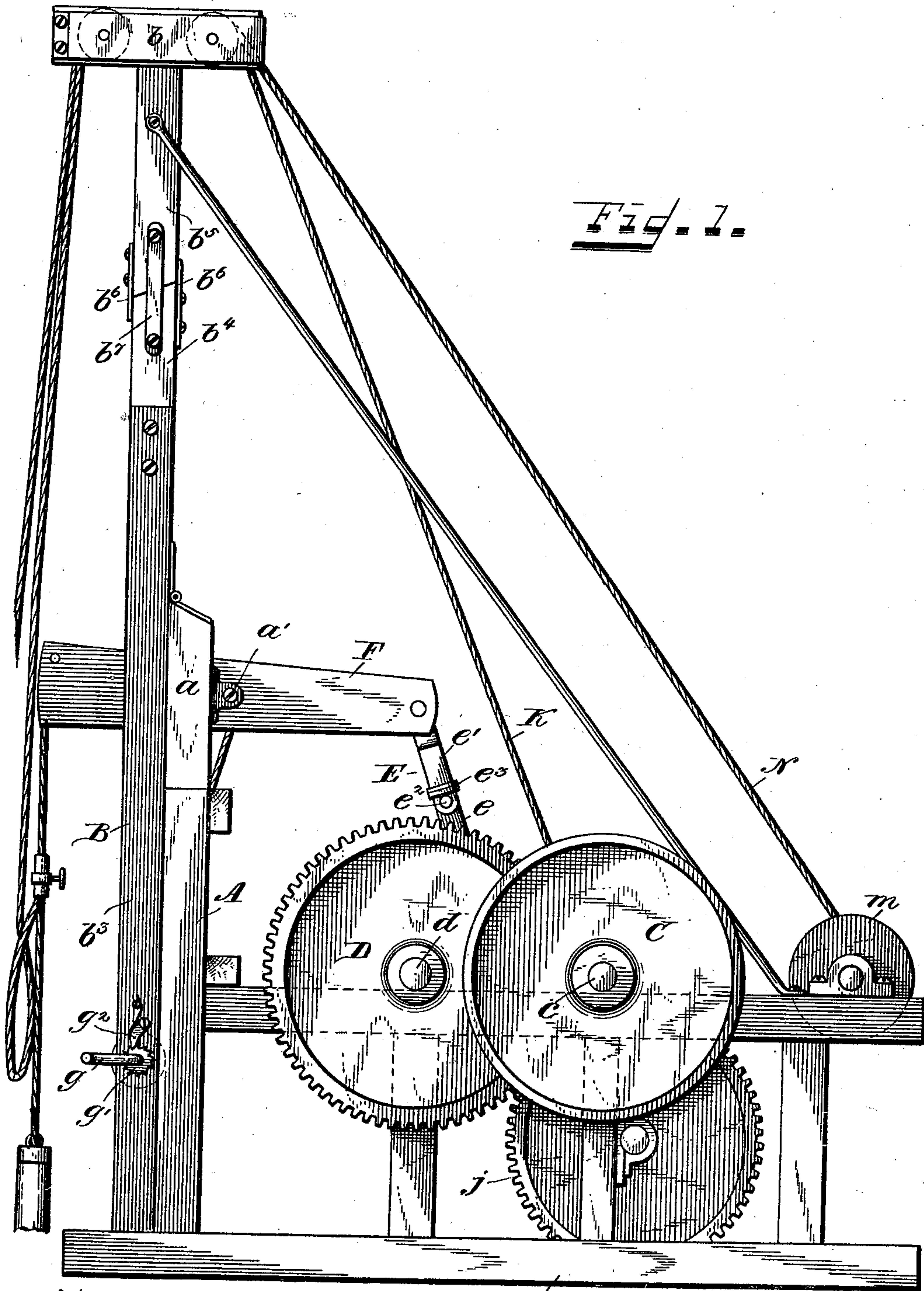
(No Model.)

5 Sheets—Sheet 1.

J. BUTTON.  
WELL DRILLING MACHINE.

No. 506,204.

Patented Oct. 10, 1893.



Witnesses.  
J. Thomson Cross  
James T. Ramsey

A  
Inventor.  
Jesse Button,  
By Parrinson & Parrinson  
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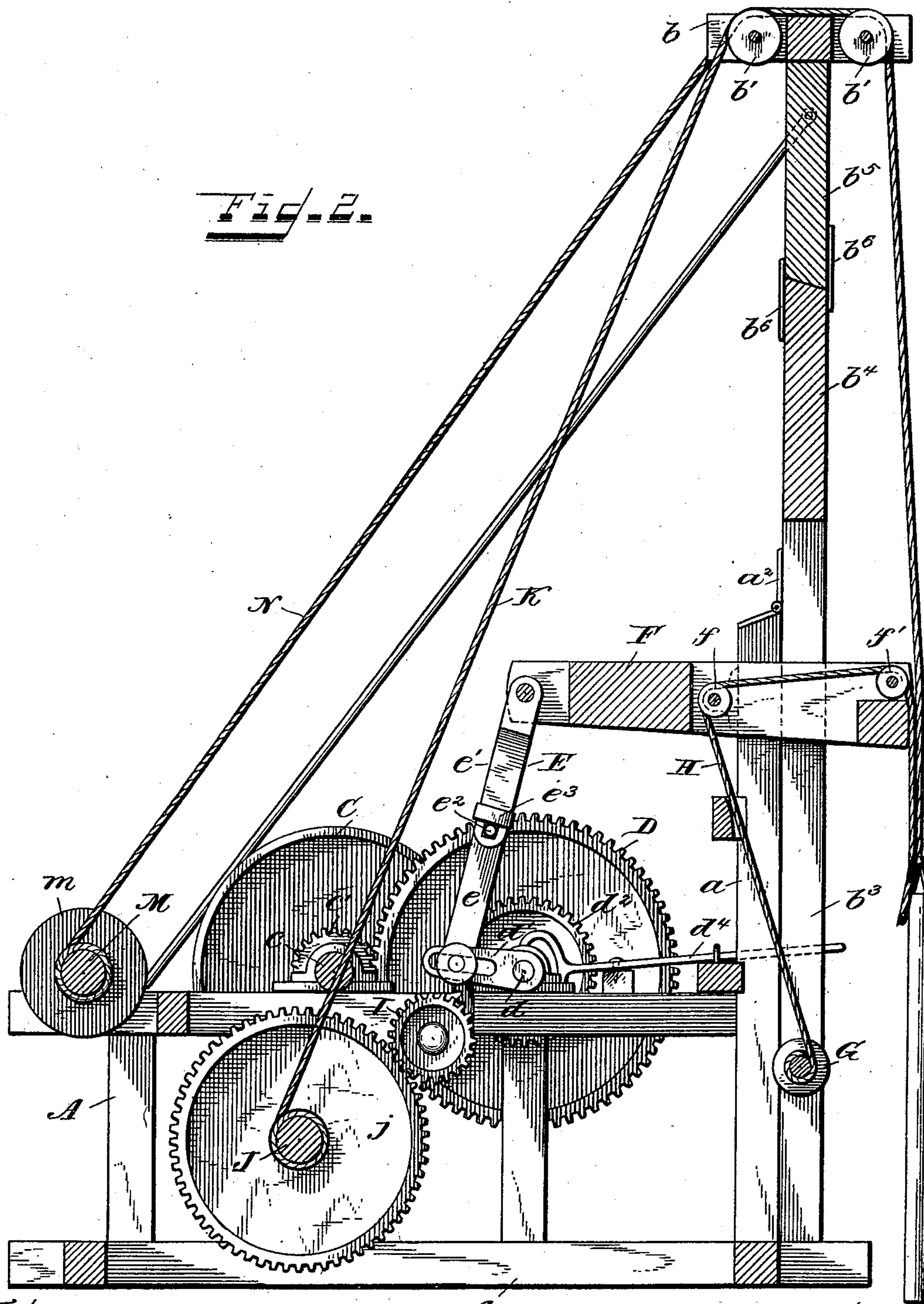
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Witnesses.  
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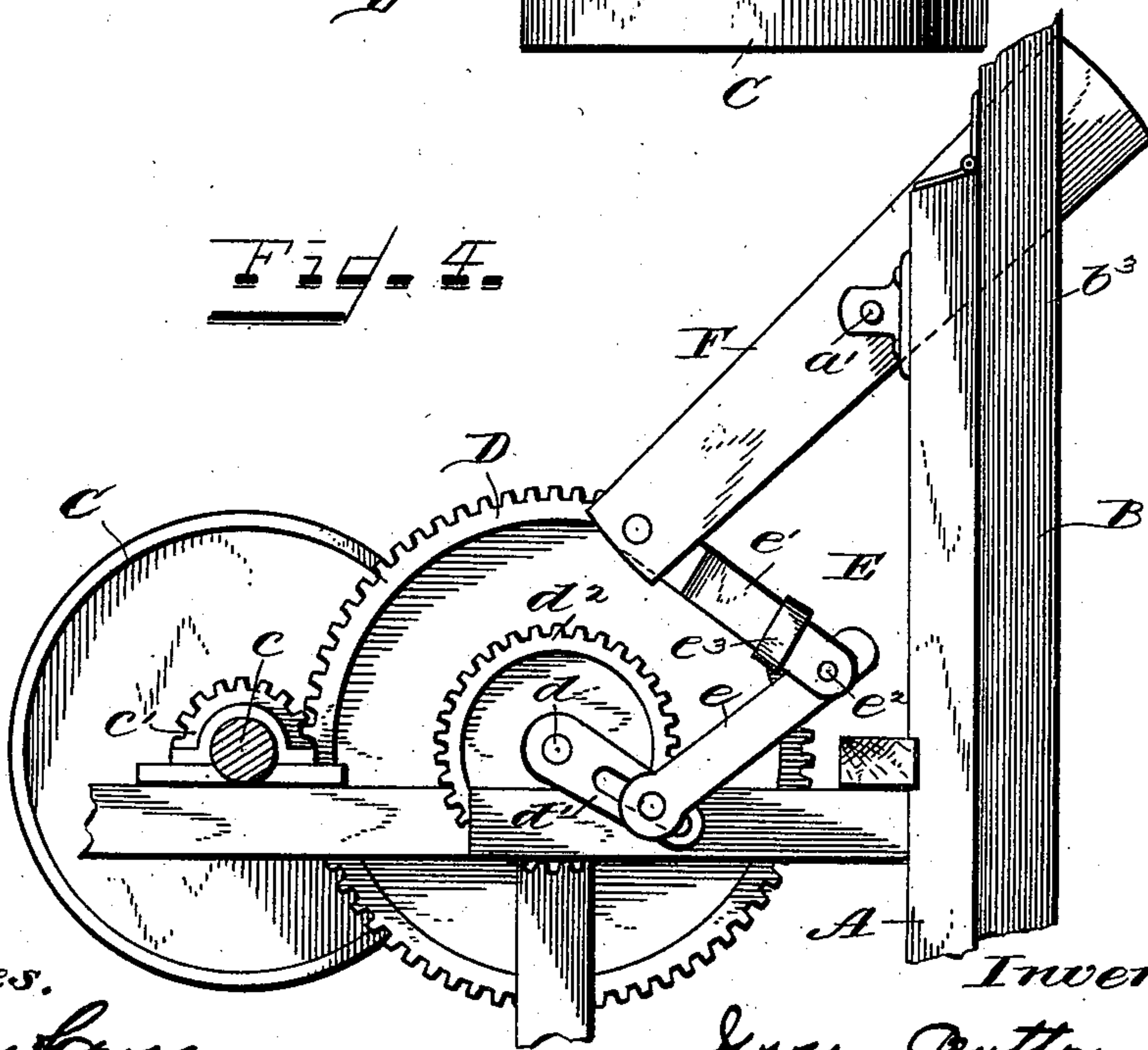
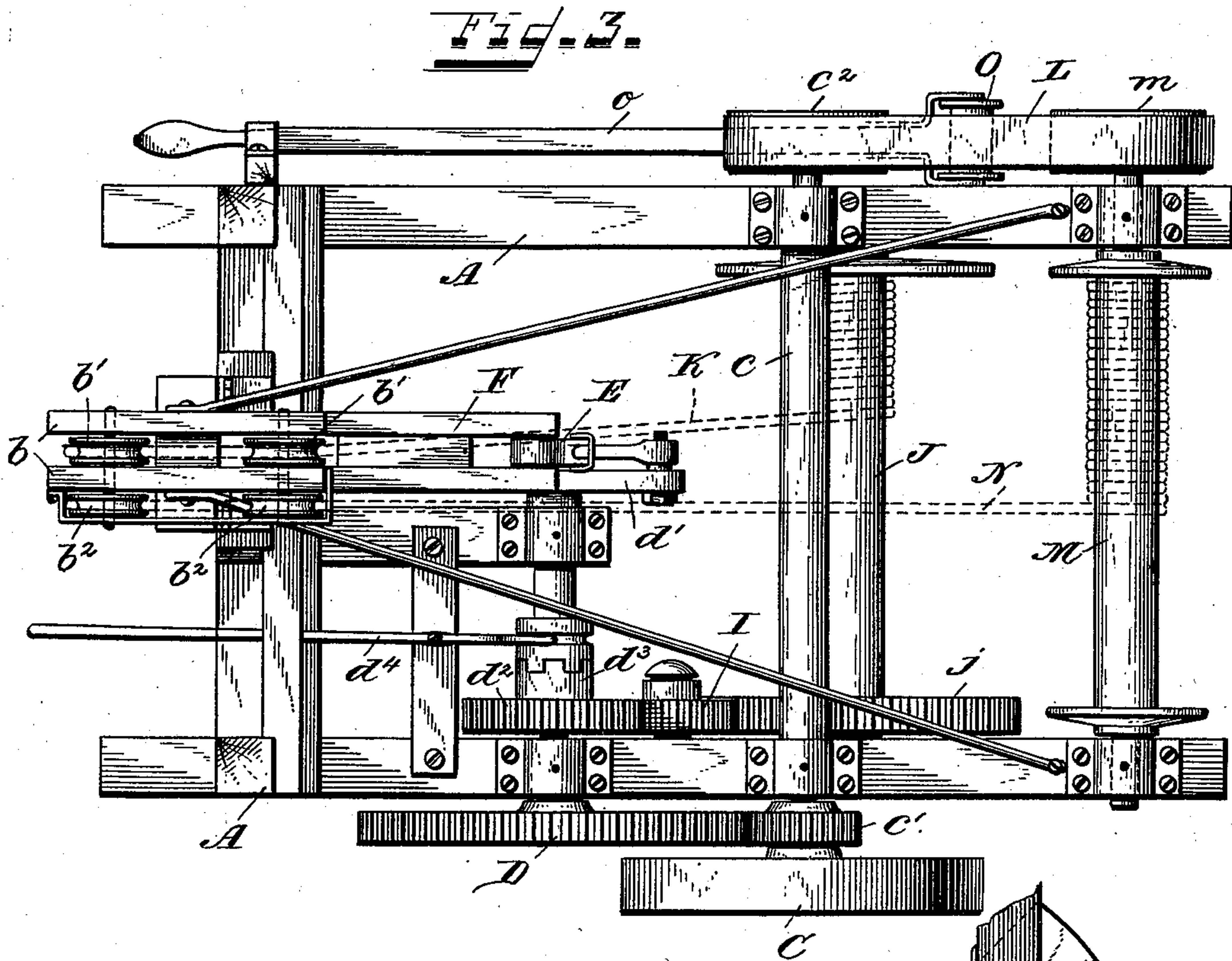
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Witnesses.

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(No Model.)

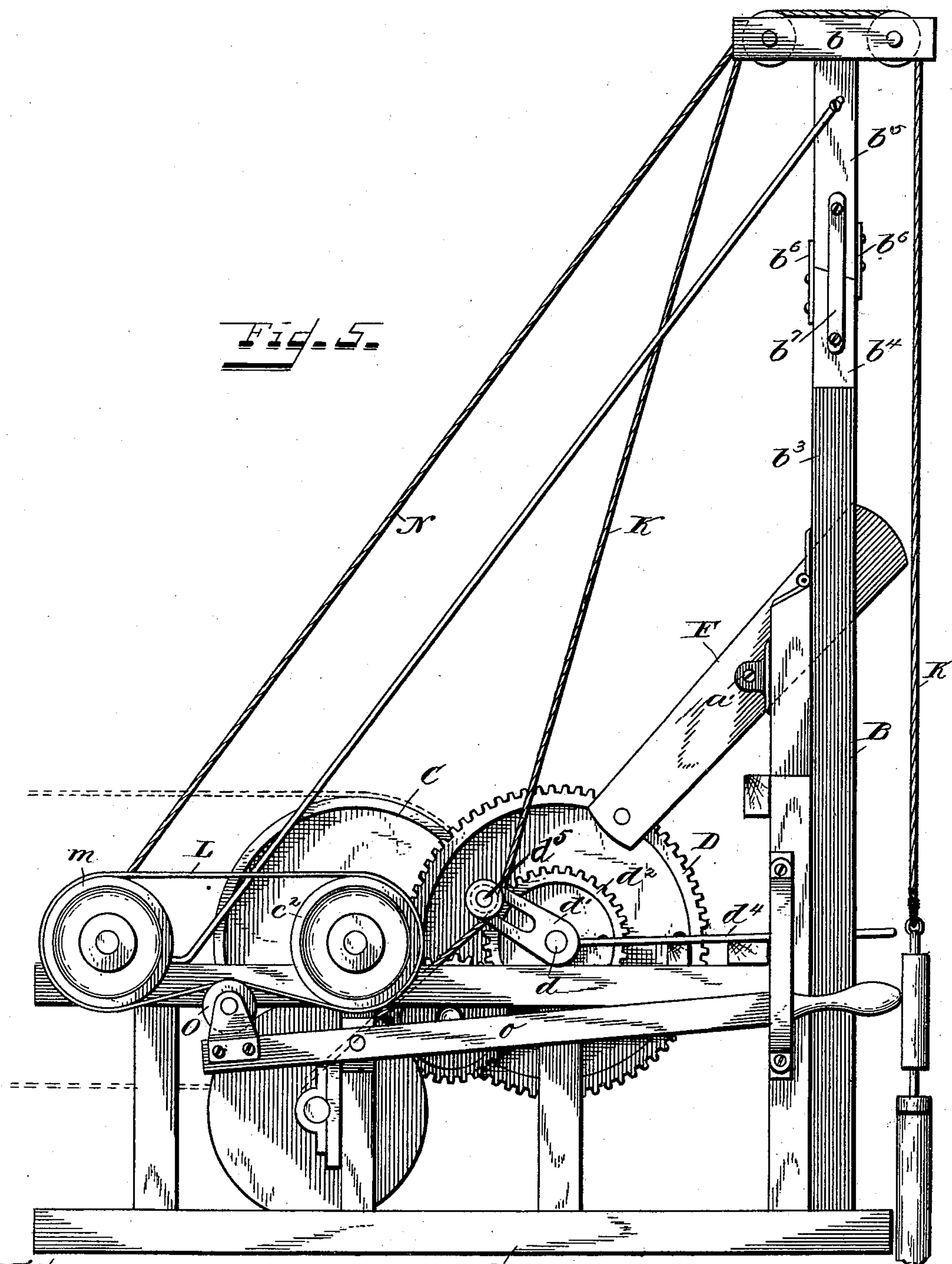
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Fig. 5.



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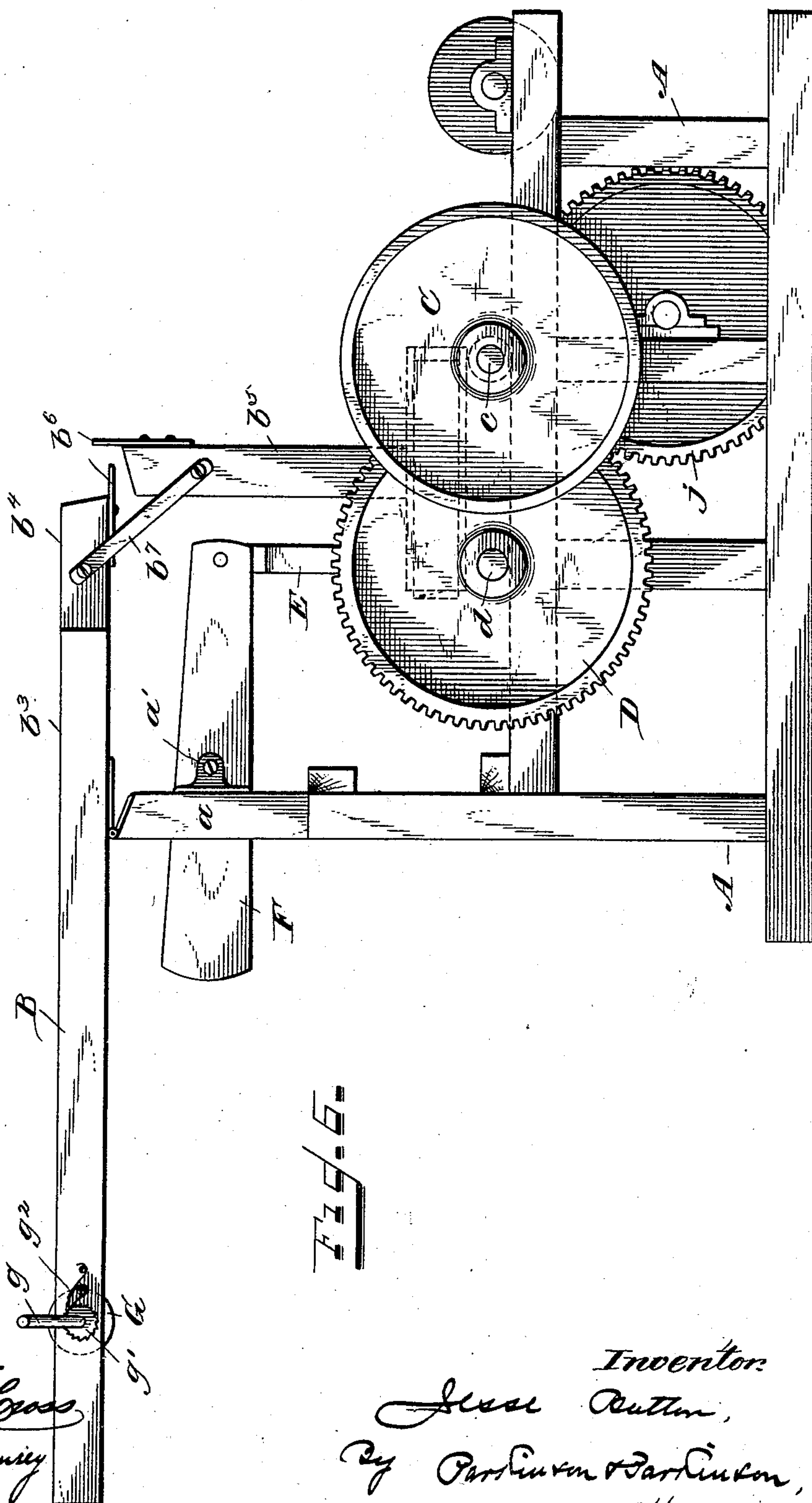
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Patented Oct. 10, 1893.



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# UNITED STATES PATENT OFFICE.

JESSE BUTTON, OF SPRINGFIELD, MASSACHUSETTS.

## WELL-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 506,204, dated October 10, 1893.

Application filed December 4, 1891. Serial No. 413,976. (No model.)

*To all whom it may concern:*

Be it known that I, JESSE BUTTON, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Well-Drilling Machinery, of which the following is a specification.

The object of my invention is to provide a well drilling machine by which the operations of spudding, pipe-driving, drilling and sand pumping can be carried out rapidly and efficiently.

My invention consists in improvements in the construction of the walking beam and the mechanism for operating it; in an improved construction and arrangement of the mechanism for spudding and pipe-driving; in improved mechanism for feeding the tools; in improvements in the construction of the mast, and in various improvements in the construction and arrangement of the mechanism.

In the drawings: Figure 1 is a side view of a well-drilling machine, embodying my invention, from the side upon which the main driving pulley is mounted. Fig. 2 is a vertical longitudinal section of the machine; Fig. 3 a top plan view; Fig. 4 a side view of a portion of the machine showing the position of the walking beam and its pitman when the tools are being withdrawn; Fig. 5 a side view showing the machine arranged for spudding, and Fig. 6 a side view showing the parts arranged for transportation.

A represents the frame of the machine; B the mast; C the main driving pulley, mounted upon a shaft  $c$ , which carries a pinion wheel,  $c'$ , meshing with a gear wheel, D, mounted upon a shaft,  $d$ , which carries at its inner end a crank arm  $d'$ , to which is pivoted one end of a pitman, E, the other end of which is pivoted to a walking beam, F, carried in suitable bearings,  $a'$ , preferably in standards,  $a$ , rigidly mounted in the frame. The working end of the walking beam is of segment shape, the curve being such that the bearing point of the drill rope will always be in the same vertical line. The walking beam may be used with a temper screw in the usual way, but I prefer to employ the mechanism for feeding the drill, shown in the drawings, in which G represents a windlass, preferably mounted in

the mast, and carrying a rope or cable, H, which takes over a sheave,  $f$ , mounted in the walking beam at or near its fulcrum point, and also over a second sheave  $f'$ , at the end of the beam. The windlass is provided with a suitable crank,  $g$ , and a ratchet,  $g'$ , and pawl,  $g^2$ , or other suitable locking device. The shaft,  $d$ , carries a gear wheel  $d^2$  loosely mounted, but adapted to be locked in engagement with the shaft by means of a clutch  $d^3$ , of any suitable construction. The wheel,  $d^2$ , meshes with a gear wheel, I, which in turn meshes with a gear wheel,  $j$ , mounted upon a shaft which carries or serves as the main or drill rope reel, J.

K is the drill rope which passes over sheaves  $b'$ , mounted in the cross piece,  $b$ , at the top of the mast and may be attached by suitable clamps either to a temper screw or to the rope H. The shaft,  $c$ , carries at the side of the machine, opposite to that on which the main driving pulley is mounted, a pulley,  $e^2$ , which is connected by a belt, L, to a pulley,  $m$ , mounted on a shaft which carries or serves as the sand reel, M.

N is the sand rope which takes over sheaves,  $b^2$ , upon the mast.

O is an idler pulley carried by a lever,  $o$ , and serving as a tightener, for the belt L, which ordinarily runs loosely. By actuating the lever and causing the idler to press upon the belt the latter is caused to adhere to the pulleys and motion is transmitted to the sand reel.

The lower part of the mast B is made two part to afford space for the play of the walking beam and for the feed windlass. These parts,  $b^3$ , are hinged at,  $a^2$ , to the standards,  $a$ , and when the machine is in use are secured to the standards by bolts or other locking device which can be readily unfastened or removed. This permits the mast to be folded over the machine when it is to be moved. I prefer to provide the upper part of the mast with a swinging joint whereby the top may be tipped or lowered independently of the hinges. For this purpose the portion of the mast above the hinges is in two sections,  $b^4$ , and,  $b^5$ , meeting on a diagonal line and adapted to be made rigidly continuous by means of plates,  $b^6$ , bolted or otherwise secured to the respective parts. Plates,



$b^7$ , are pivotally secured to each part. By removing the bolts securing one of the plates,  $b^6$ , to section,  $b^4$ , of the mast, and the bolts securing the other plate,  $b^6$ , to the part,  $b^5$ , the upper part of the mast can be slipped from its bearing and either swung or slid downward, the swinging plates,  $b^7$ , limiting the downward movement. When the machine is to be moved, the bolts are removed from the standards and the mast swung into a position nearly horizontal as shown in Fig. 6. By unfastening the plates,  $b^6$ , the upper end of the mast may be swung downwardly so that it will rest upon some rigid portion of the machine or frame. This doublejointed arrangement of the mast permits a compact arrangement of the parts for transportation without the necessity of dismantling the machine, and hinging the mast in such manner as to make the hinges serve as a fulcrum, makes it an easy matter to raise it to its working position. The pitman E is preferably made in sections  $e$  and  $e'$  jointed at  $e^2$ . In the form shown, one section takes as a tongue between jaws on the other section, and the respective sections may be locked in alignment with each other by sliding a sleeve  $e^3$  over the jaws and tongue. It is obvious that a pin and holes, or other manner of locking may be employed in place of the sliding sleeve.

In machines of the walking beam type it has heretofore been necessary to disconnect the pitman from the crank when the tools are drawn out of the well by means of the drill rope reel. In the machine herein described, by slipping up the sleeve  $e^3$  which locks the joints in the pitman and throwing the rear end of the walking beam downward as shown in Fig. 4, the pitman joint will work back and forth under the walking beam while the beam is idle and the shaft in motion. Throwing the rear end of the beam downward throws its working or segment end out of the line of the tools as they are drawn out. For driving and spudding I provide the crank arm  $d'$  with a sheave  $d^5$ . In commencing operations or when driving the pitman is disconnected and the drill rope carried under the sheave  $d^5$ . The revolution of the crank, by its action on the drill rope, raises and lowers the drilling tool or drive-weight, as the case may be. By placing the drill rope reel beneath and slightly in the rear of the shaft which carries the crank, the drill rope occupies such a position relatively to the crank, that the changes from drilling to spudding or driving, or the reverse, can be conveniently and quickly made. The location of the drill rope reel also gives the drill rope a long and direct run from the top of the mast, so that it feeds back and forth regularly upon the spool when wound.

I claim—

1. In a well drilling machine the combination with the walking beam of a driven shaft provided with a crank arm; a jointed pitman connecting the crank arm and the walking

beam; and means for locking the jointed sections of the pitman into rigid connection, substantially as described.

2. In a well drilling machine the combination with the walking beam of the driven shaft  $c$  carrying the crank arm  $c'$ , the pitman E consisting of sections  $e$  and  $e'$  and the sleeve  $e^3$ , substantially as and for the purpose specified.

3. In a well drilling machine, the combination of the driving pulley C, the shaft  $c$ , the pinion wheel  $c'$ , the gear wheel D, the shaft  $d$ , the crank arm  $d'$ , the jointed pitman, E, and the walking beam F adapted to oscillate in the mast B, substantially as and for the purpose specified.

4. In a well drilling machine, the mast B having sections  $b^4$  and  $b^5$  connected by plates  $b^6$  and pivoted plates  $b^7$  substantially as and for the purpose specified.

5. In a well drilling machine, the combination with the frame A and standards  $a$ , of the mast B, hinged to said standards, and having sections  $b^4$  and  $b^5$  connected by plates  $b^6$  and pivoted plates  $b^7$ , substantially as and for the purpose specified.

6. The combination in a well drilling machine of a driving shaft; a counter shaft carrying a crank arm; a walking beam; a jointed pitman connecting the crank arm with the walking beam; a second counter shaft carrying the drill rope reel; gearing connecting the two counter shafts and means for disconnecting the gearing between the two counter shafts, substantially as and for the purpose specified.

7. The combination in a well drilling machine of a driving shaft; a counter shaft carrying a crank arm; a sheave on the crank arm; a walking beam; a jointed pitman connecting the crank arm with the walking beam; a second counter shaft carrying the drill rope reel; gearing connecting the two counter shafts, and means for disconnecting the gearing between the counter shafts, substantially as and for the purpose specified.

8. The combination in a well drilling machine of a driving shaft; a counter shaft carrying a crank arm; a walking beam; a jointed pitman connecting the crank arm and the walking beam; a second counter shaft, carrying the drill rope reel, arranged below and in rear of the walking beam so that the drill rope will normally clear the crank arm; a sleeve on the crank arm; gearing connecting the two counter shafts, and means for disconnecting the gearing between the counter shafts, substantially as and for the purpose specified.

9. The combination in a well drilling machine of a driving shaft; a counter shaft carrying a crank arm; a walking beam; a jointed pitman connecting the crank arm and the walking beam; a loose pinion on the counter shaft; means for locking the loose pinion to the counter shaft; a shaft carrying the drill rope reel; a gear wheel thereon and an inter-



mediate wheel meshing therewith and with the loose pinion substantially as and for the purpose specified.

10. In a well drilling machine the combination of a shaft; a crank arm carried thereby; a walking beam; a jointed pitman connecting the crank arm to the walking beam; means for locking the jointed sections of the pitman into rigid connection; a sheave on the crank arm; a rope reel and a rope adapted to carry the drilling tool or drive weight, substantially as and for the purpose specified.

11. In a well drilling machine, the combina-

tion of a shaft; a crank arm carried thereby; a walking beam; a jointed pitman connecting the crank arm and the walking beam; means for locking the jointed sections of the pitman into rigid connection; a sheave on the crank arm; a rope reel and a rope adapted to carry the drilling tool or drive weight, substantially as and for the purpose specified.

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