

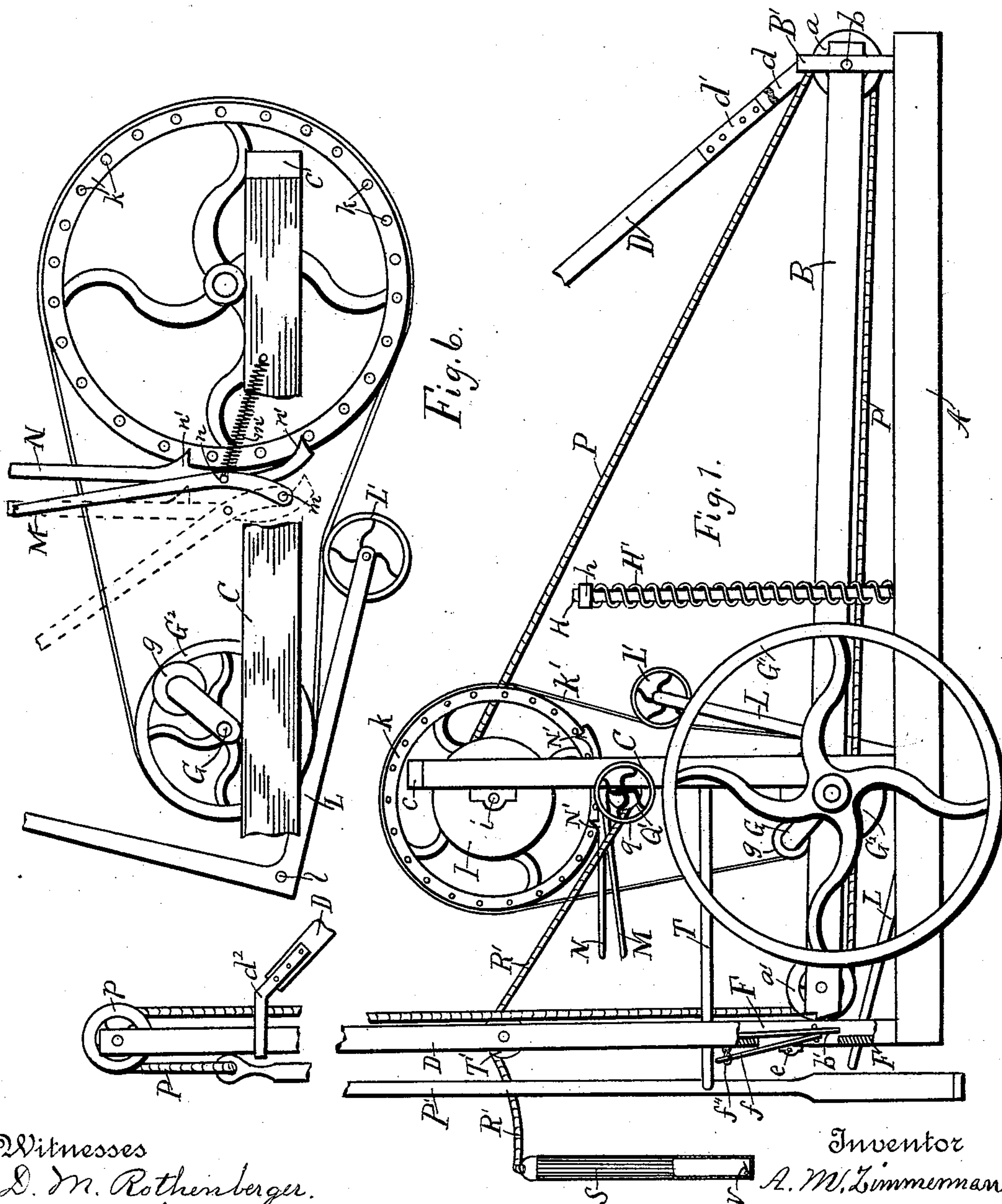
(No Model.)

4 Sheets—Sheet 1.

A. M. ZIMMERMAN.
DRILL OPERATING DEVICE.

No. 541,583.

Patented June 25, 1895.



Witnesses
D. M. Rothensberger.
Ella L. Gerhart

Inventor
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By Attorney Wm. R. Gerhart

(No Model.)

4 Sheets—Sheet 2.

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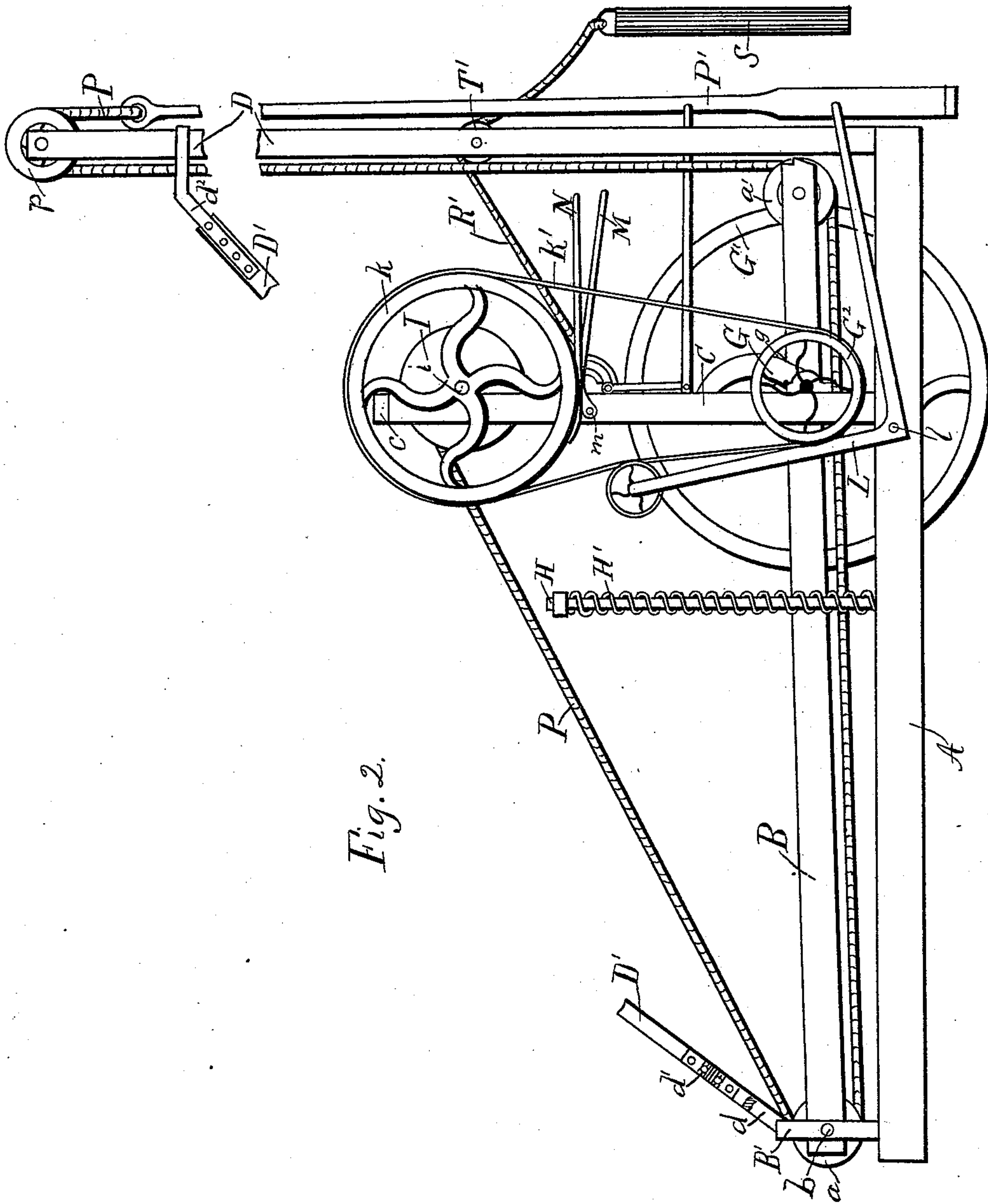


Fig. 2.

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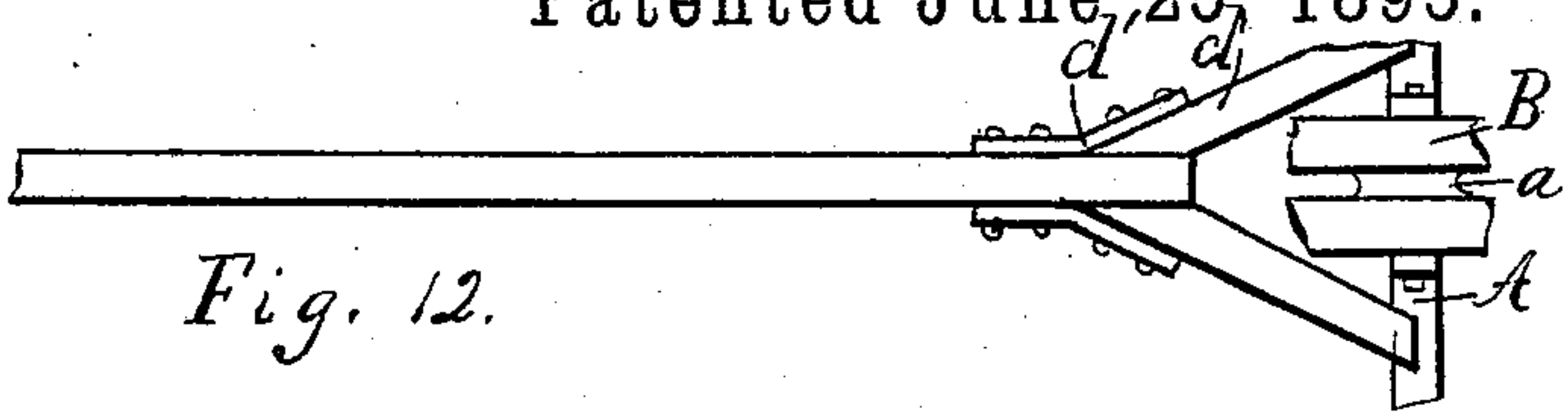
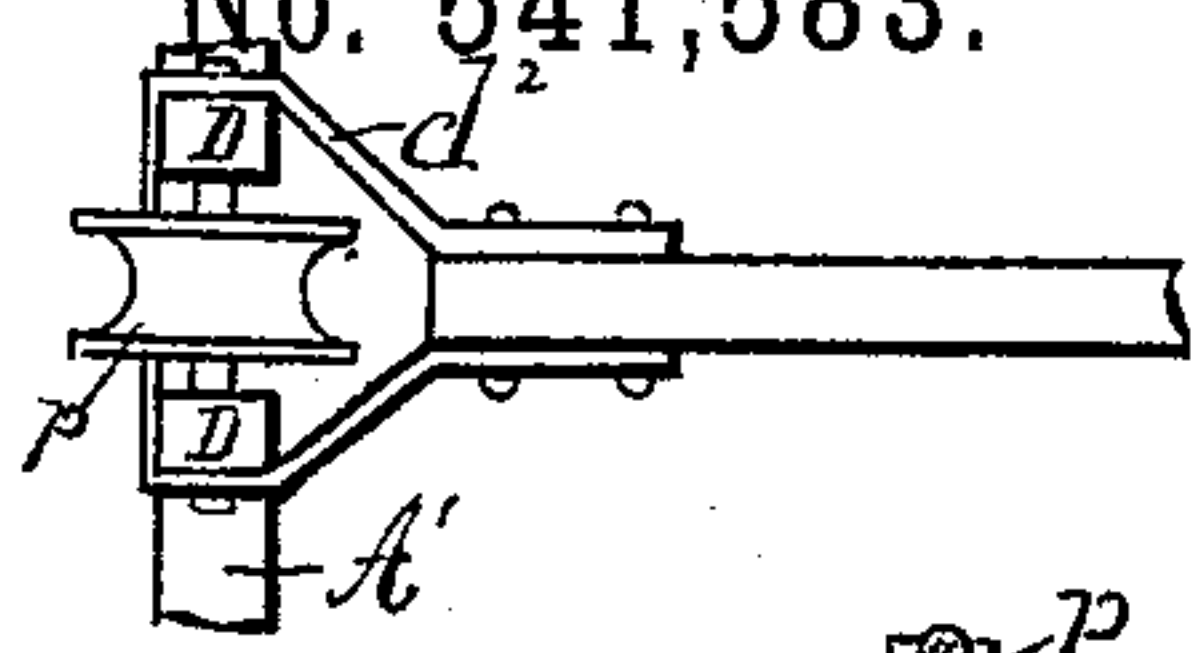


Fig. 12.

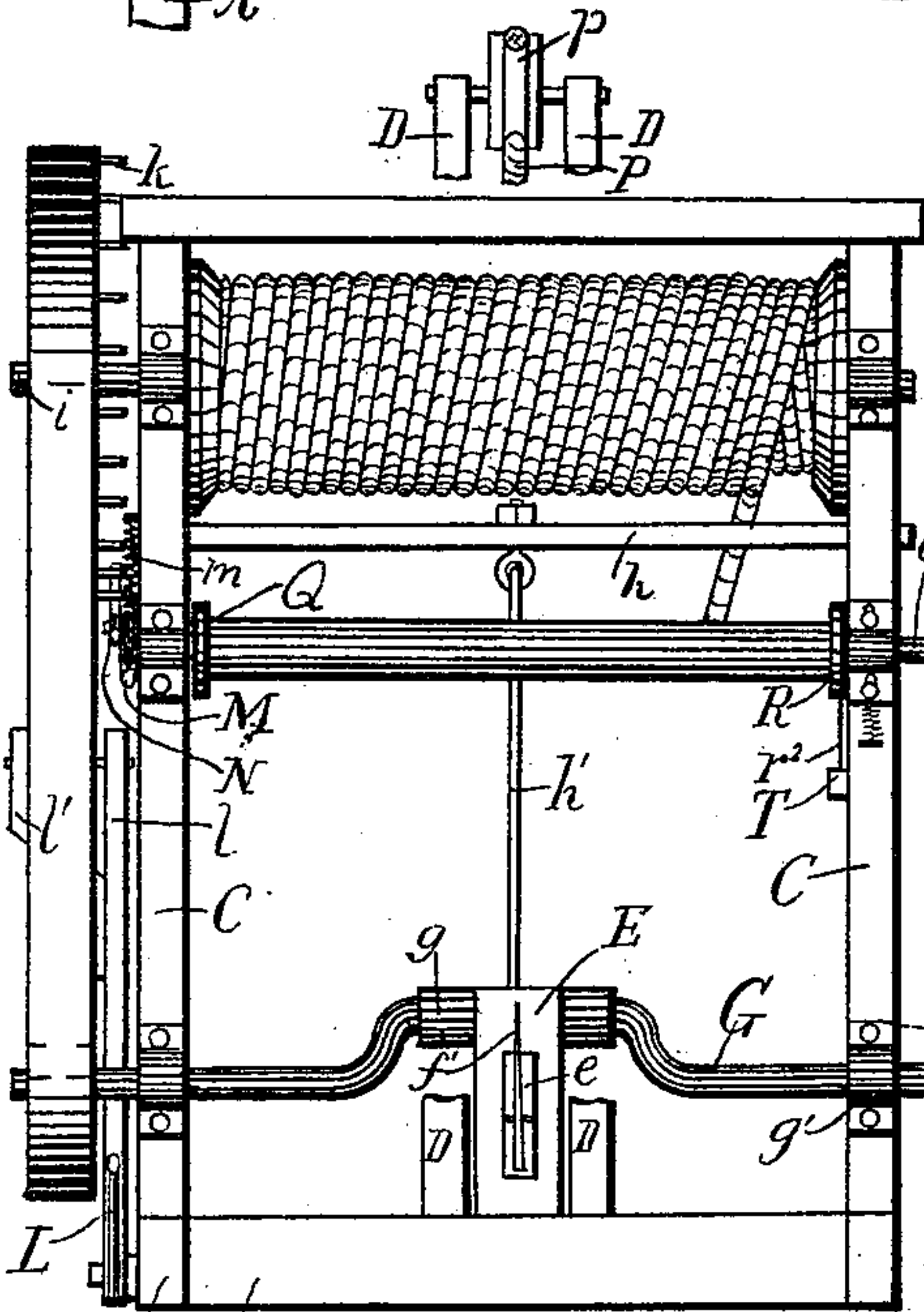


Fig. 4.

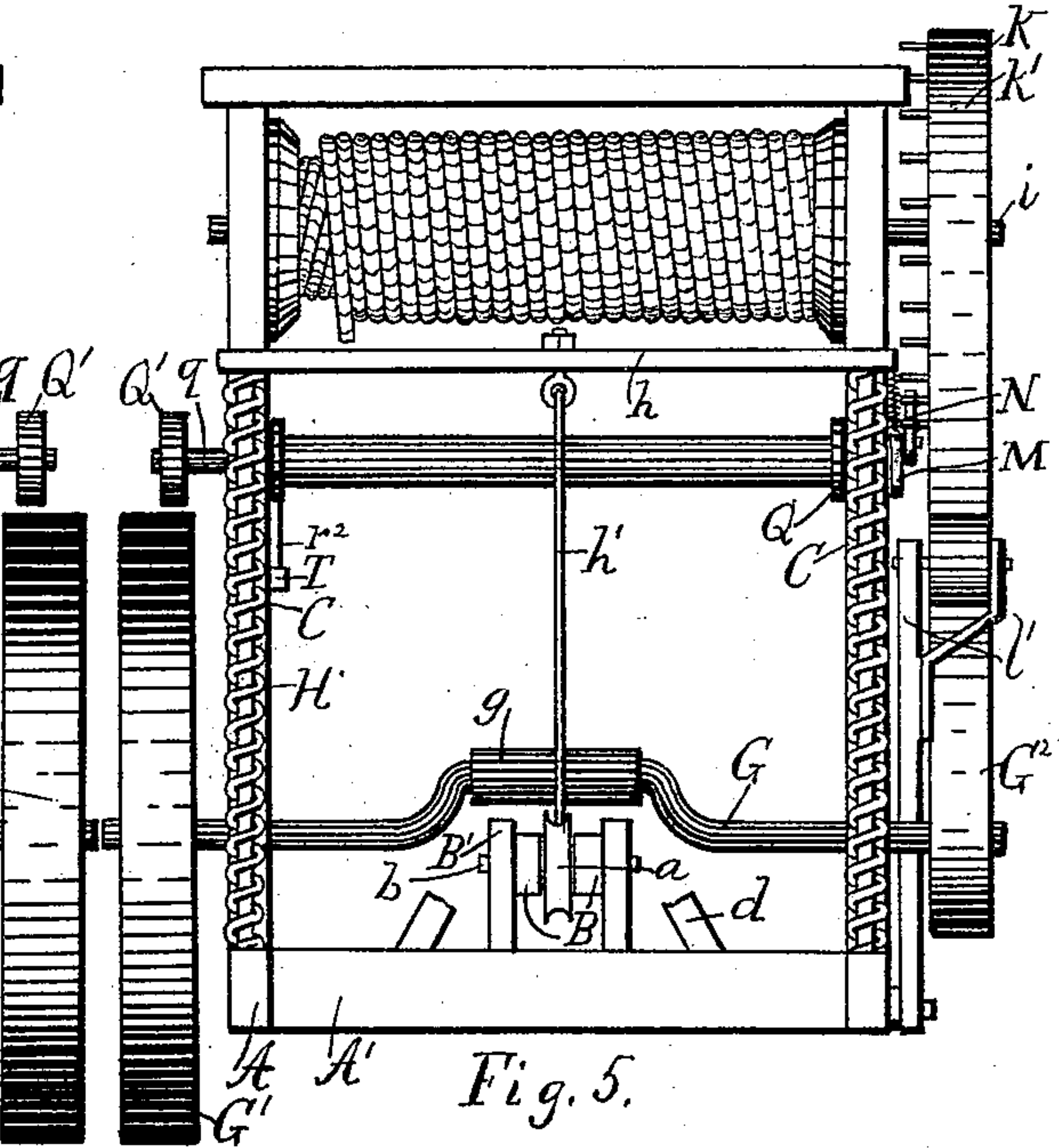


Fig. 5.

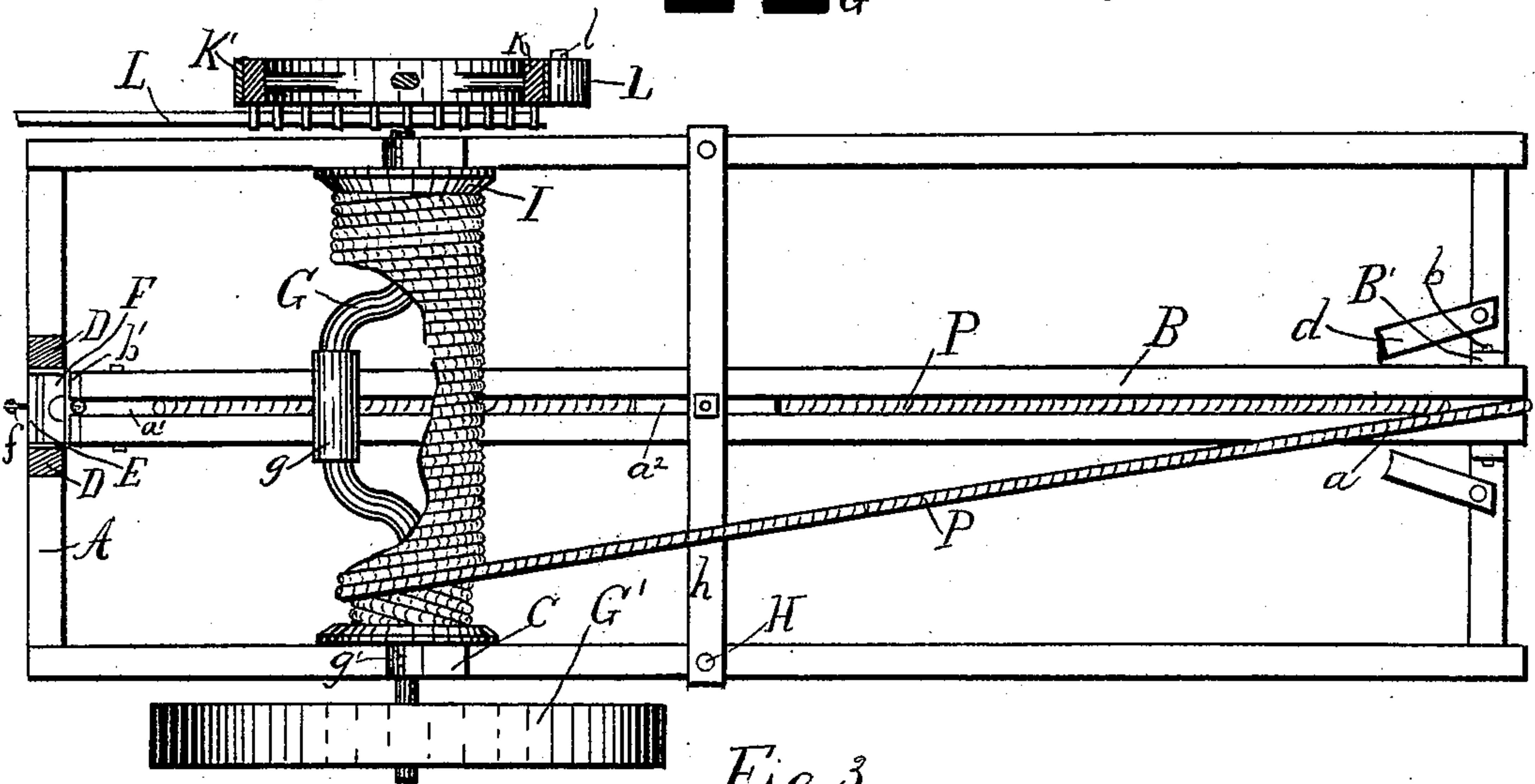


Fig. 3.

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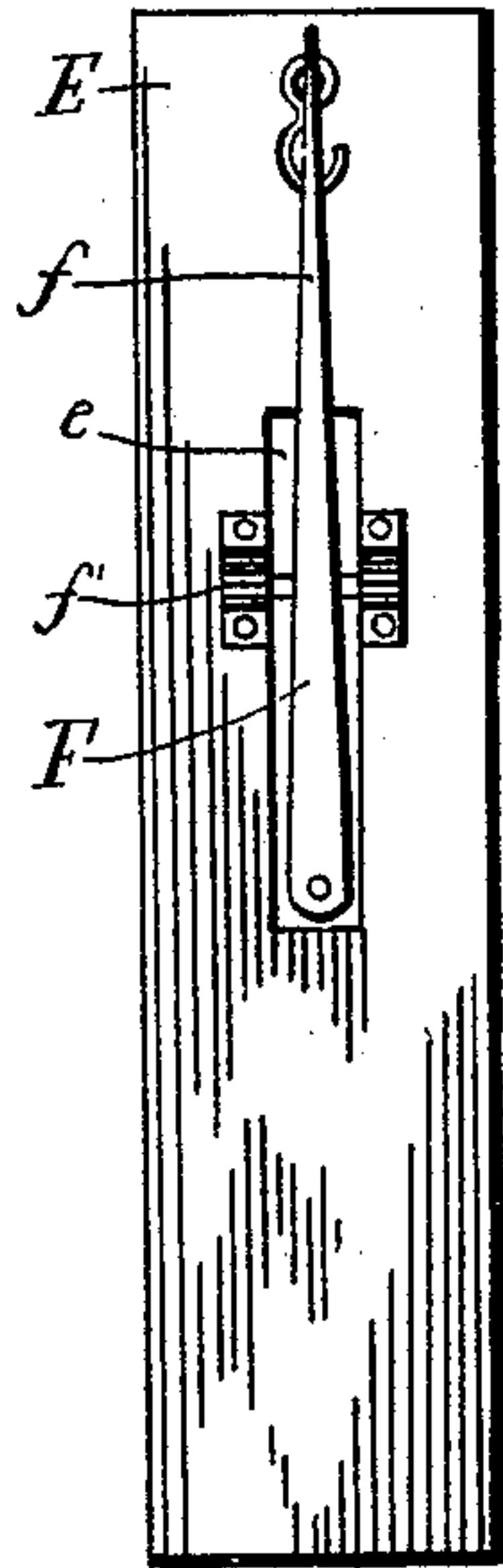


Fig. 10.

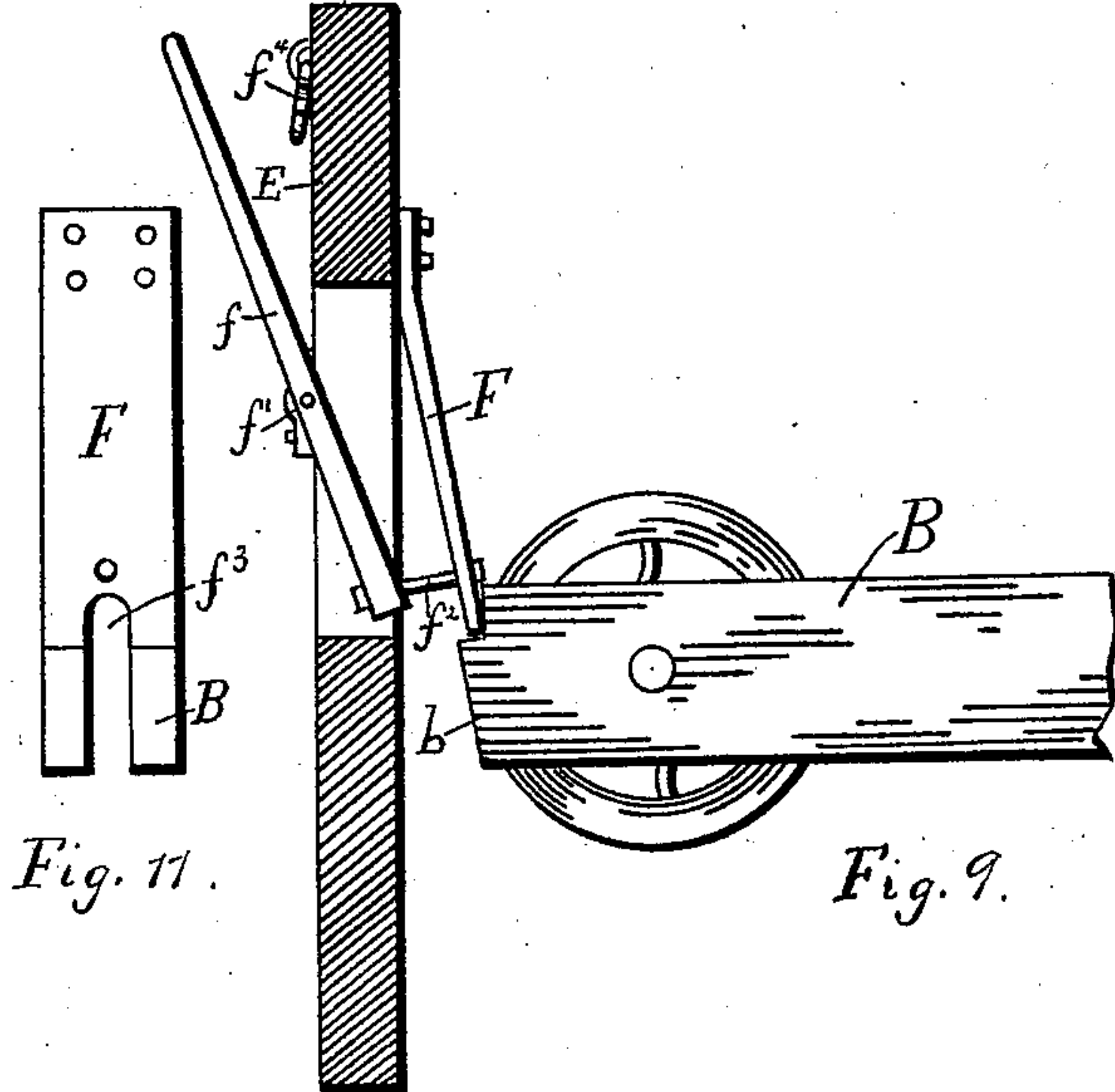


Fig. 9.

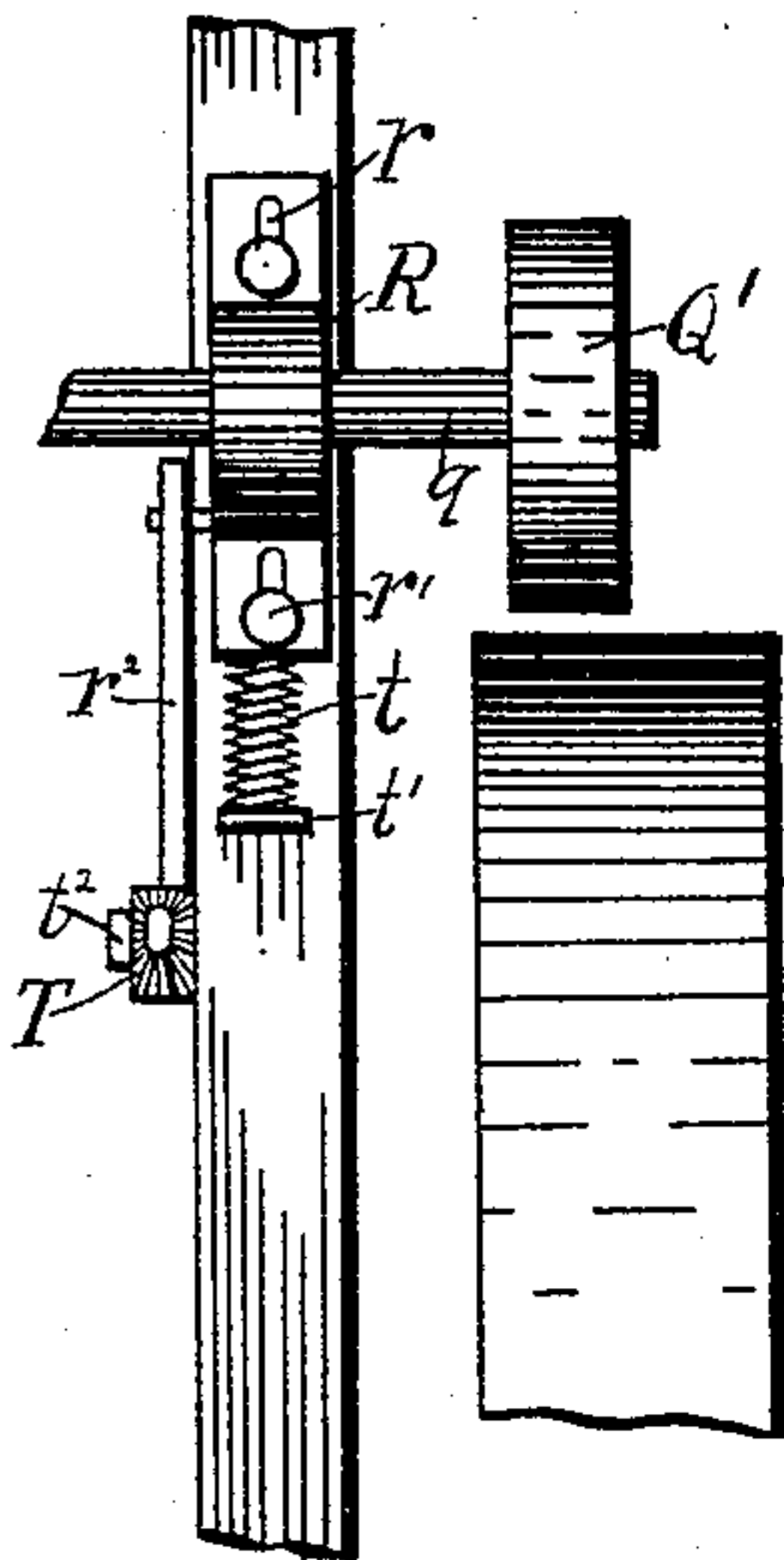


Fig. 7.

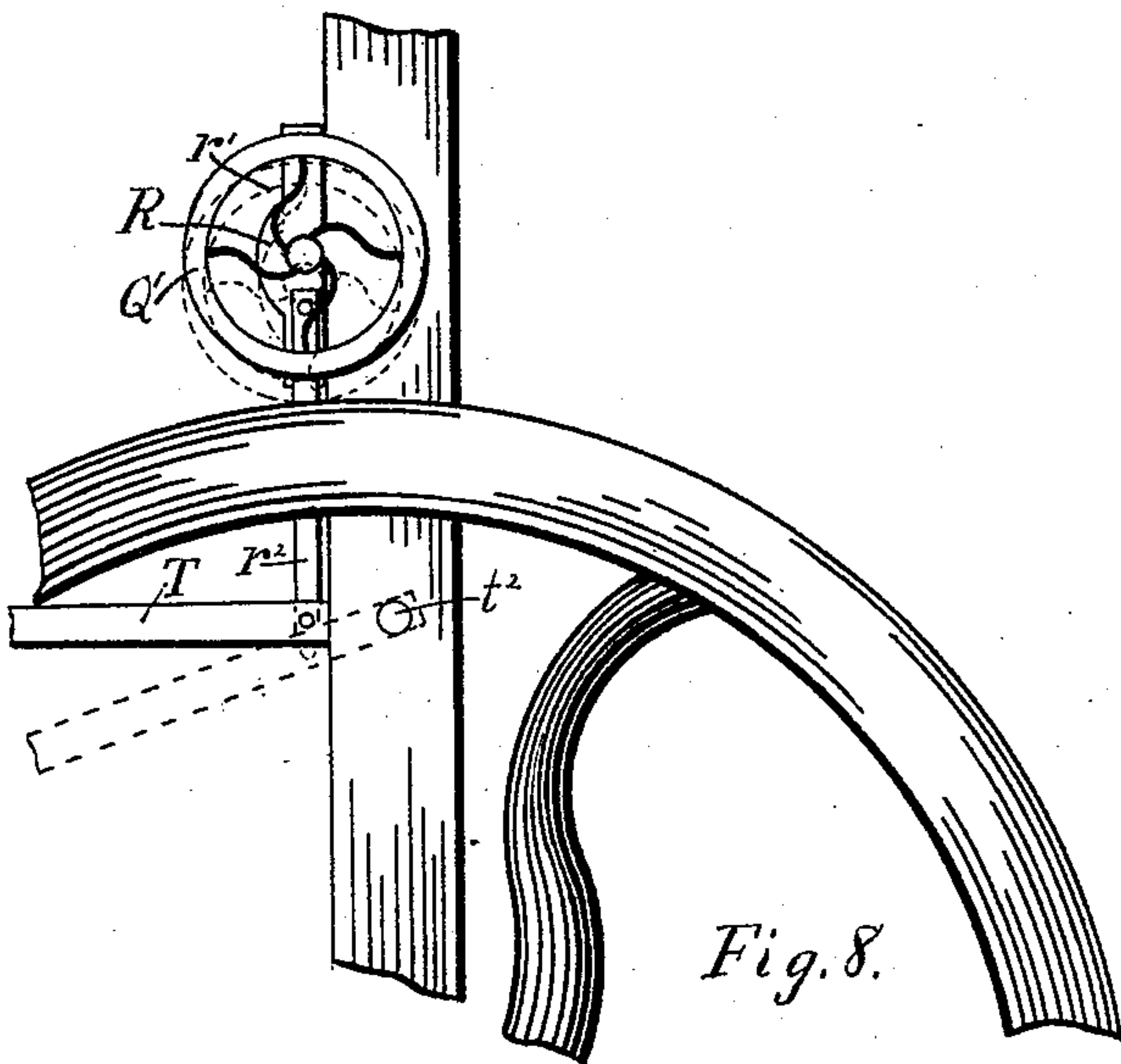


Fig. 8.

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UNITED STATES PATENT OFFICE.

ABRAHAM M. ZIMMERMAN, OF MARTINDALE, PENNSYLVANIA.

DRILL-OPERATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 541,583, dated June 25, 1895.

Application filed May 2, 1893. Serial No. 472,729. (No model.)

To all whom it may concern:

Be it known that I, ABRAHAM M. ZIMMERMAN, a citizen of the United States, residing at Martindale, in the county of Lancaster and State of Pennsylvania, have invented certain Improvements in Drill-Operating Devices, of which the following is a specification.

This invention relates to improvements in mechanism for operating drills with an up-and-down motion; and the invention consists in the construction and combination of the various parts, as hereinafter fully described, and then specifically pointed out in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is an elevation of the side of the device on which the power is applied, and Fig. 2 a similar view of the reverse side. Fig. 3 is a top plan view, parts being cut away to more fully show the mechanism for imparting an up-and-down motion to the drill. Fig. 4 is a front end elevation, the derrick and connecting parts being cut away; and Fig. 5 a rear end elevation. Fig. 6 is an enlarged inner face view of the device for feeding the drill forward. Fig. 7 is an enlarged elevation of the device for imparting motion to the drum carrying the cleaner, and Fig. 8 a side view thereof. Fig. 9 is an enlarged side view of the mechanism for holding the drill-actuating lever in a depressed position; Fig. 10, a similar front view of the same, and Fig. 11 a face view of the spring. Fig. 12 is a top plan view of the derrick and its connections.

Similar letters indicate like parts throughout the several views.

Referring to the details of the drawings, A indicates the longitudinal beams of the frame, and A' the transverse beams thereof.

B is the drill-actuating-lever, formed of two parallel plates and having one end fulcrumed on a rod, *b*, supported in posts B', located on the rear transverse beam A'. A sheave-pulley, *a*, is mounted on rod *b* between the plates of lever B, and a similar pulley, *a'*, is journaled between the forward ends of said plates. Toward the front end of the frame there are posts C located on the longitudinal beams A, with the tops thereof connected by a cross-piece, *c*. Between the upper ends of the posts there is located a drum, I, the spindles *i* of which are journaled in bearings in said posts.

On the front transverse beam A' are erected the vertical members of a derrick, consisting of two posts D, between the upper ends of which is journaled a sheave pulley, *p*. These posts are braced by a stay, D', the upper end of which is connected therewith by a strap, *d*², that embraces both posts and has its ends bolted to the stay. The lower end of the stay is supported by legs *d*, connected with it by straps *d'*. These legs straddle posts B' and are bolted to the rear beam A'. A rope, P, is wound about drum I and thence passes around sheave-pulleys *a* and *a'* and over sheave-pulley *p*, and has attached to its end the drill P'. Toward the lower ends of posts C a crank-shaft G is journaled in bearings, *g'*, on the front faces of said posts, the crank in which shaft has an elongated friction-roller, *g*, thereon which engages and depresses lever B as the crank-shaft revolves. On one end of the crank-shaft there is keyed a belt-wheel, G', through which motion is communicated to the machinery, and on the other end there is a pulley, G², geared by a belt, K', with a pulley, K, above it on one of the spindles *i* of drum I.

Between posts C and B' on the beams A there are erected circular rods or posts H, that pass freely through openings in a cross-bar, *h*, which bears on springs H', coiled around rods H and resting on beams A. Cross-bar *h* is connected with lever B by a tie-rod, *h'*, the lower end of which is secured to a filling-block, *a*², placed between the plates of lever B. The springs H, acting through cross-bar *h* and the tie-rod, raise the front end of lever B each time it is depressed by the downward movement of the crank-shaft G.

From the inner face of the periphery of pulley K there project horizontal ratchet-pins *k*, adapted to be engaged by two pawls *n'* on a lever, N, fulcrumed between said pawls at *n* on the lever M, the end of which is pivoted on a pin, *m*, on the side of the adjacent post C. The levers M and N are held in position to keep pawls *n'* in engagement with pins *k* by a coiled spring, *m'*, having one end secured to lever M and the other to a pin in post C above said lever. Pawls *n'* are so arranged on lever N that while one of them is engaged with one of pins *k*, the other rests between two of said pins. These pawls prevent drum I from revolving under the strain put thereon.

and paying out rope enough to render the same so slack as to prevent it from communicating the motion of lever B to the drill.

When it is desired to feed the drill forward the handle of lever N is raised and depressed so as to engage pawls n' alternately with successive ratchet-pins; but when the rope is to be run out to lower the drill into the well both pawls are disengaged from the ratchet-pins by lowering the handle of lever M, as shown by broken lines in Fig. 6.

Normally belt k' rests loosely on pulleys G^2 and K, so that no motion is conveyed from the former to the latter while the drill is being operated; but when the drill is to be drawn out of the hole belt k' is tightened on the pulleys by the pressure on the belt of a friction-roller, L' . This roller is journaled between jaws l' on an arm of a lever, L, fulcrumed to the side of the frame at l , and is engaged with the belt by pressure on the other arm of said lever. When pressure is not exerted on said other arm of lever L the weight of the friction-roller holds it out of contact with the belt. While the drill is being drawn from the hole it is preferable that lever B should be kept stationary, with its vibrating end in a depressed position, as shown in Fig. 9. For this purpose a post, E, is located on the front beam A' between posts D of the derrick, and the upper end of a flat spring, F, is fastened to the inner face of said post E with its lower end adapted to normally engage shoulders b' on the ends of the plates of lever B, the free end of spring F having a slot f^3 cut through it to avoid contact with sheave-pulley a' . Post E has a slot e cut therein, through which works the lower end of a lever, f , fulcrumed at f' and having said lower end connected with the lower end of spring F by a link, f^2 . To disengage spring F from shoulders b' and keep it from contact therewith, the upper end of the lever is pushed toward post E and engaged by a hook, f^4 , thereon, as shown in Fig. 1.

Below drum I there is located a drum, Q, having its spindles q journaled in boxes on the front faces of posts C. One of the spindles q is journaled in a vertically movable box, R, on the post C adjacent to belt-wheel G' and carries on its outer end a pulley, Q' , adapted to be brought into contact with said belt-wheel. Box R is secured to the post C by headed bolts, r' , passing through slots r in the ends of the box and is held in its most elevated position by a coiled spring, t , having its lower end resting on a seat, t' , and its upper end bearing against the bottom of box R. A lever, T, is fulcrumed at its rear end on a pin, t^2 , projecting from the inner face of the post C to which journal-box R is attached. This lever is connected with said journal-box by a rod, r^3 , secured thereto between the handle and fulcrum-pin. One end of a rope, R' , is wound around and fastened to drum Q, the other end passing over a sheave-pulley, T' , located between the derrick posts D, and attached to a cleaner, S, in the bottom of which

there is hinged a valve, V. When it is desired to relieve the hole from the dust occasioned by the drilling of the rock, the drill is drawn therefrom and the cleaner lowered to the bottom, where it is joggled up and down until it becomes filled with dust, when it is raised to the surface by depressing the handle of lever T and bringing pulley Q' into contact with belt-wheel G' .

I use two sheave-pulleys on the lever B to relieve the strain on the drum around which the rope is coiled, the sheave-pulley at the rear of said lever being found to materially break the shock on the drum occasioned by the movements of the lever. After the depression of the lever by the crank the weight of the drill would be sufficient to again raise the free end thereof, but as the effect of this would be to lessen the force of the stroke of the drill, I use the springs H' to raise the lever. In the ordinary working of the machine, spring t is not needed to hold journal-box R up, but it is employed to prevent the temporary lowering of said journal-box resulting from any unusual jarring of the mechanism.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a drum, of a ratchet-wheel on one of the spindles thereof, a supporting-lever pivoted at one end, a pawl-lever having two prongs adapted to engage the ratchet-wheel, said pawl-lever being pivoted between its prongs to the supporting-lever between the fulcrum and handle thereof, and means for holding said prongs in the path of the ratchet-wheel, substantially as and for the purpose specified.

2. In a drill-operating device, the combination, with a lever and a derrick having sheave-pulleys attached thereto, of a device for vibrating the free end of the lever, a drum located above the lever, a drill-rope wound about the drum and passing around said sheave-pulleys, a ratchet-wheel on one of the spindles of the drum, a supporting lever pivoted at one end below the ratchet-wheel, a pawl-lever having two prongs adapted to engage the ratchet-wheel and fulcrumed between said prongs to the supporting-lever between the fulcrum and handle of said supporting lever, and means for holding the handle of said supporting lever in an elevated position, substantially as and for the purpose specified.

3. The combination, with a drum, of a pulley on a spindle of the drum and having a ratchet on one side thereof, a pulley on the end of the operating shaft, a slack belt passing around the two pulleys, a supporting lever pivoted at one end, a pawl-lever having two prongs adapted to engage the ratchet on the pulley, said pawl-lever being pivoted between its prongs to the supporting-lever between the fulcrum and handle thereof, and a lever having a friction-roller thereon and constructed to engage said roller with the slack

belt to tighten the same on the pulleys, substantially as and for the purpose specified.

4. In a drill-operating-device, the combination, with an operating-lever pivoted at one
5 end, a drum located above the same, a rope coiled about the drum and passing around sheaves in the ends of said lever, a crank-shaft adapted to depress the free end of the operating-lever, a pulley on a spindle of the
10 drum, having a ratchet on one side thereof, a pulley on an end of the crank-shaft, a slack-belt connecting the pulleys, a supporting-lever pivoted at one end, a pawl-lever having two prongs adapted to engage the ratchet on
15 the pulley, said pawl-lever being pivoted between its prongs to the supporting-lever be-

tween the fulcrum and handle thereof, means for tightening the slack belt on the pulleys, a post adjacent to the free end of the operating-lever, a spring-plate secured at one end 20 and having the other end normally adapted to engage the free end of said operating-lever, a lever pivoted to the post and having one end connected with the free end of the spring, and means for securing the other end 25 of said lever to hold the end of the spring out of engagement with the operating lever, substantially as and for the purpose specified.

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