

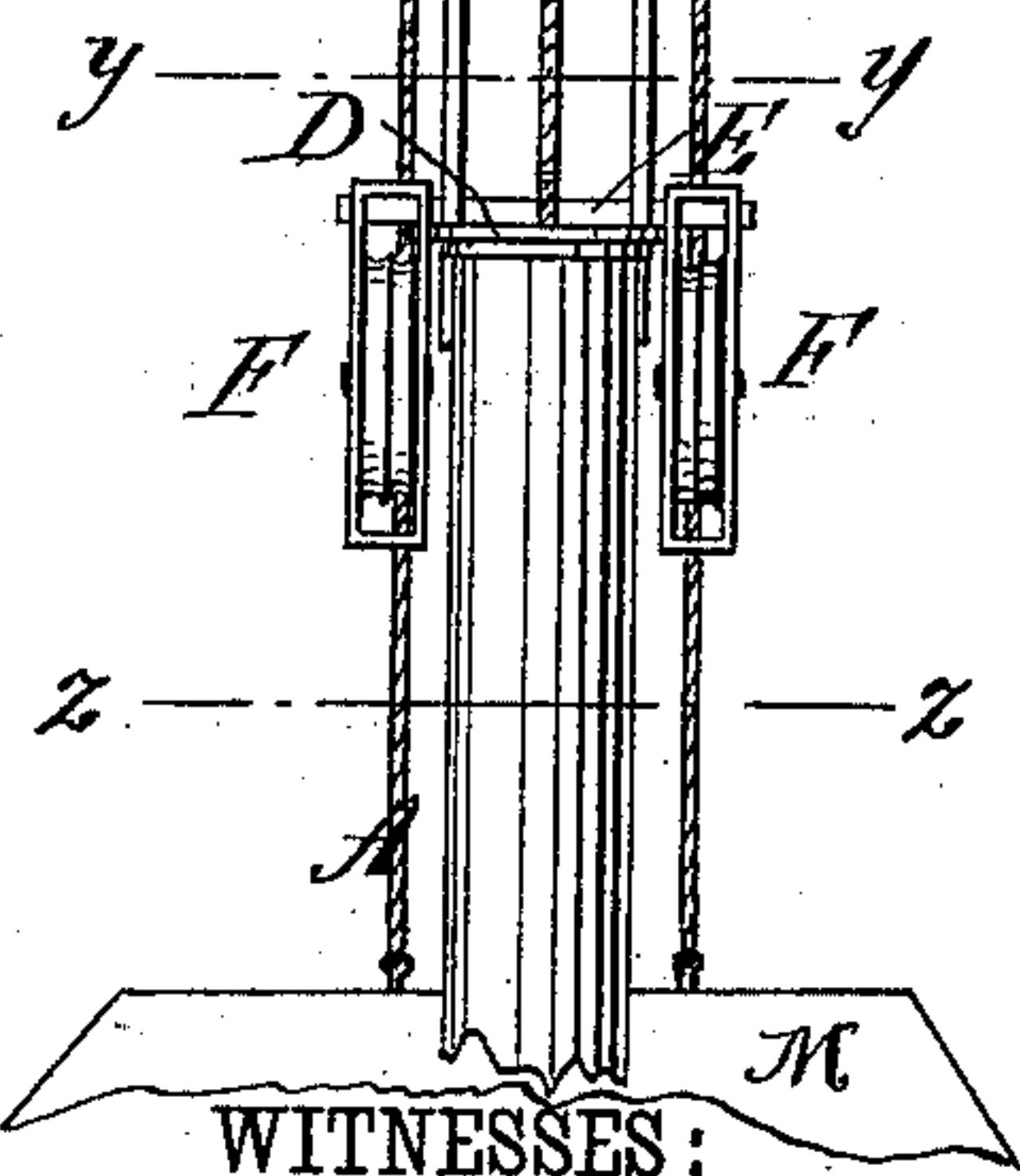
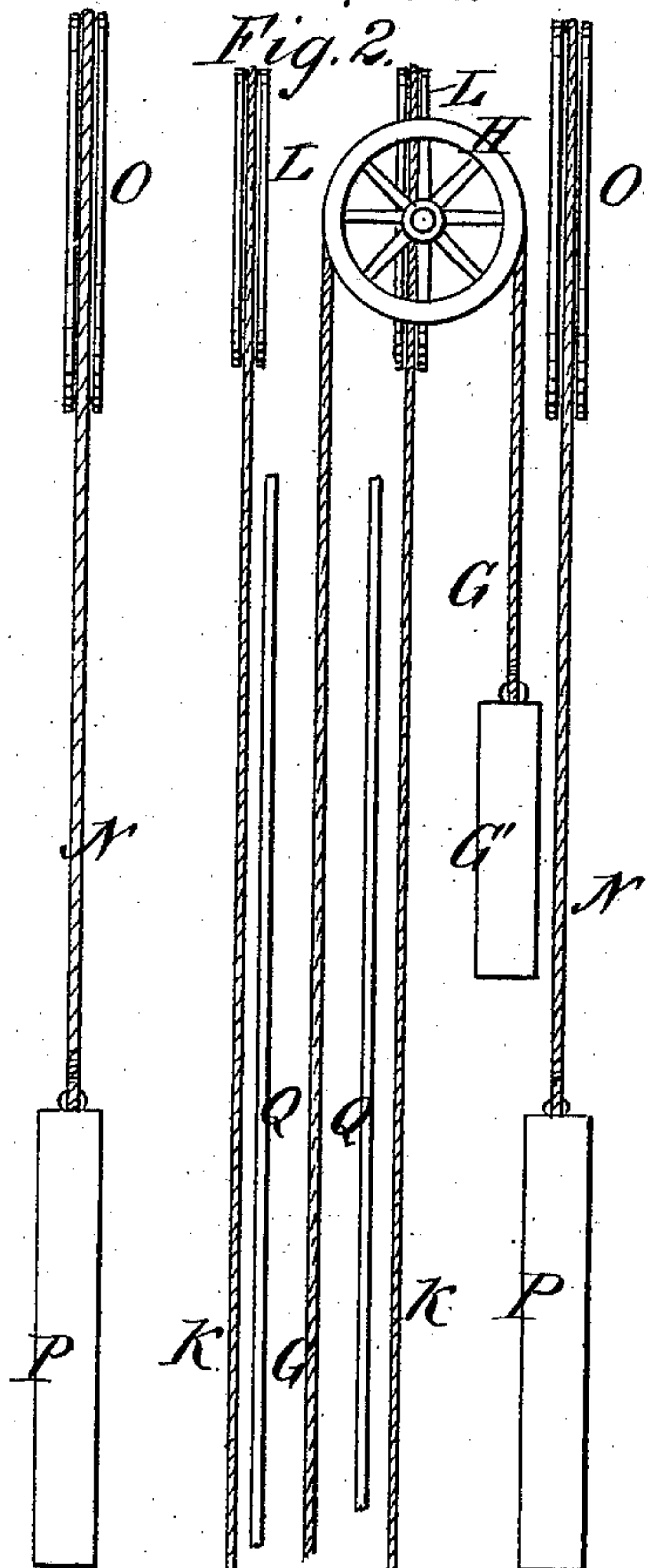
(No Model.)

O. P. RICE.

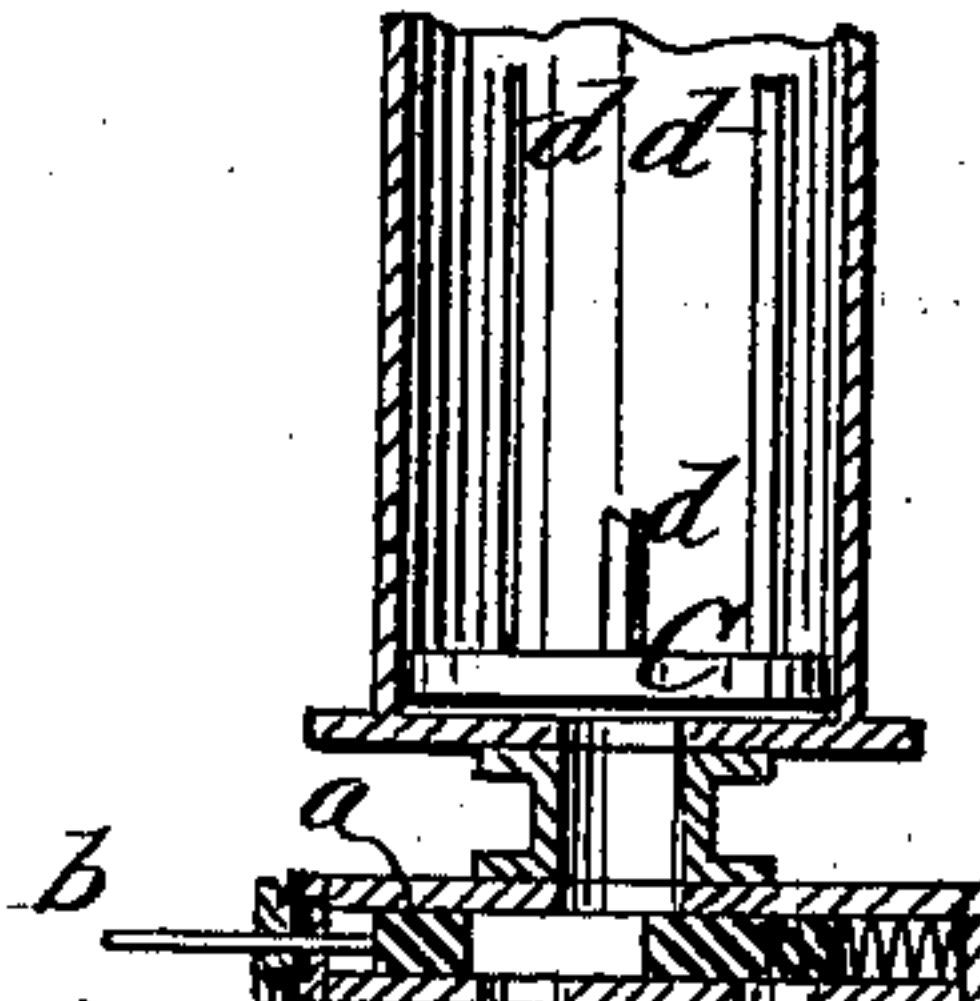
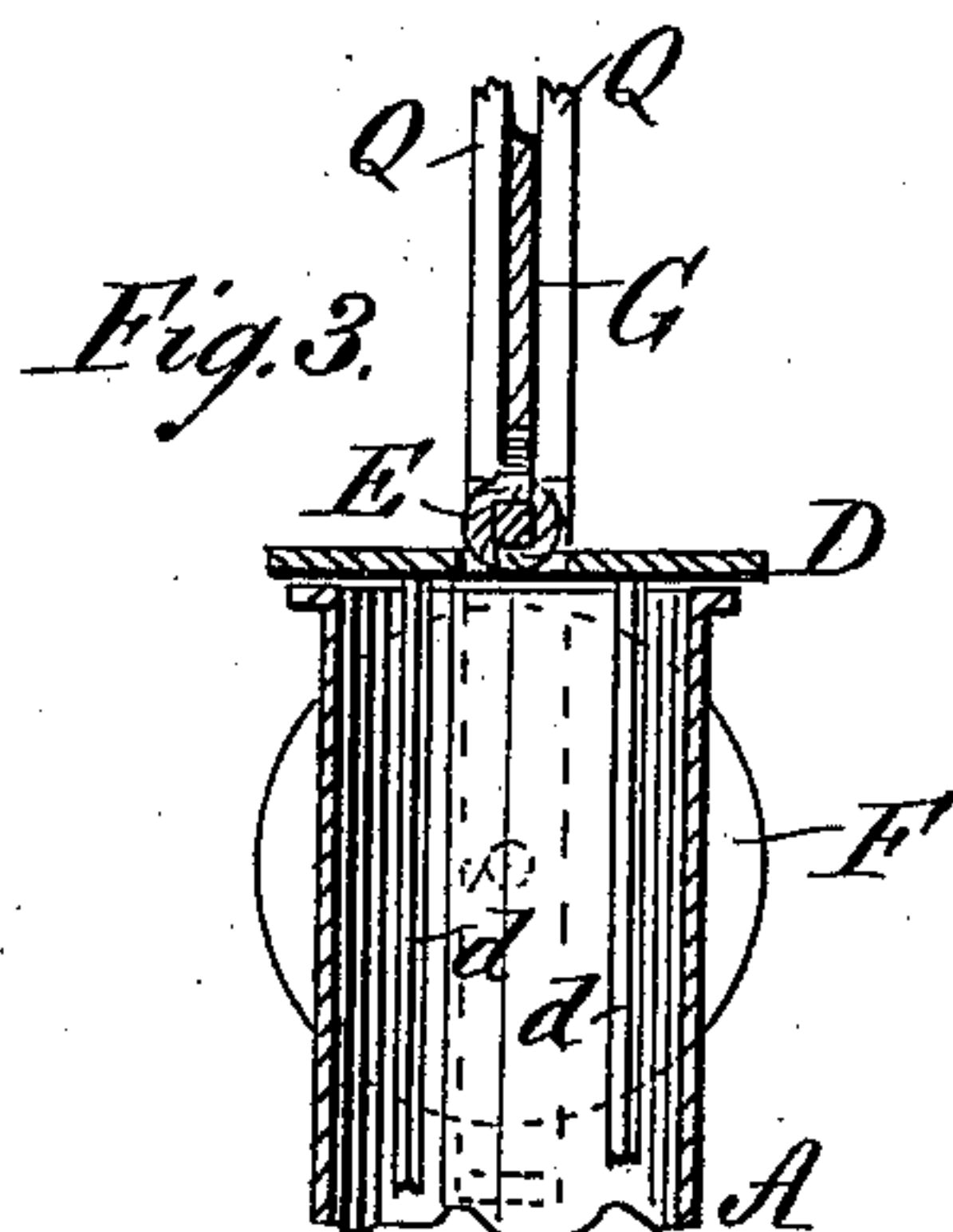
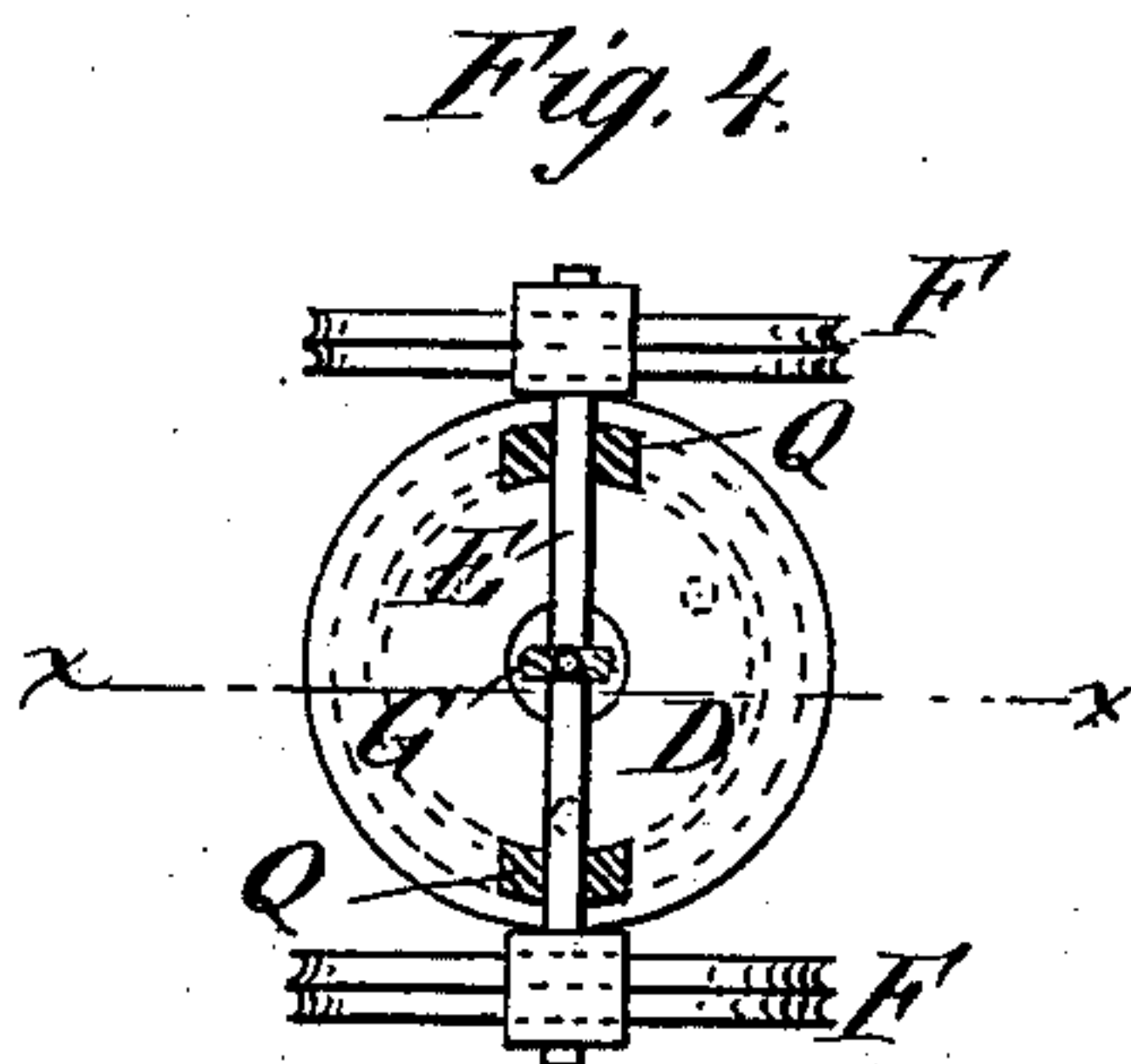
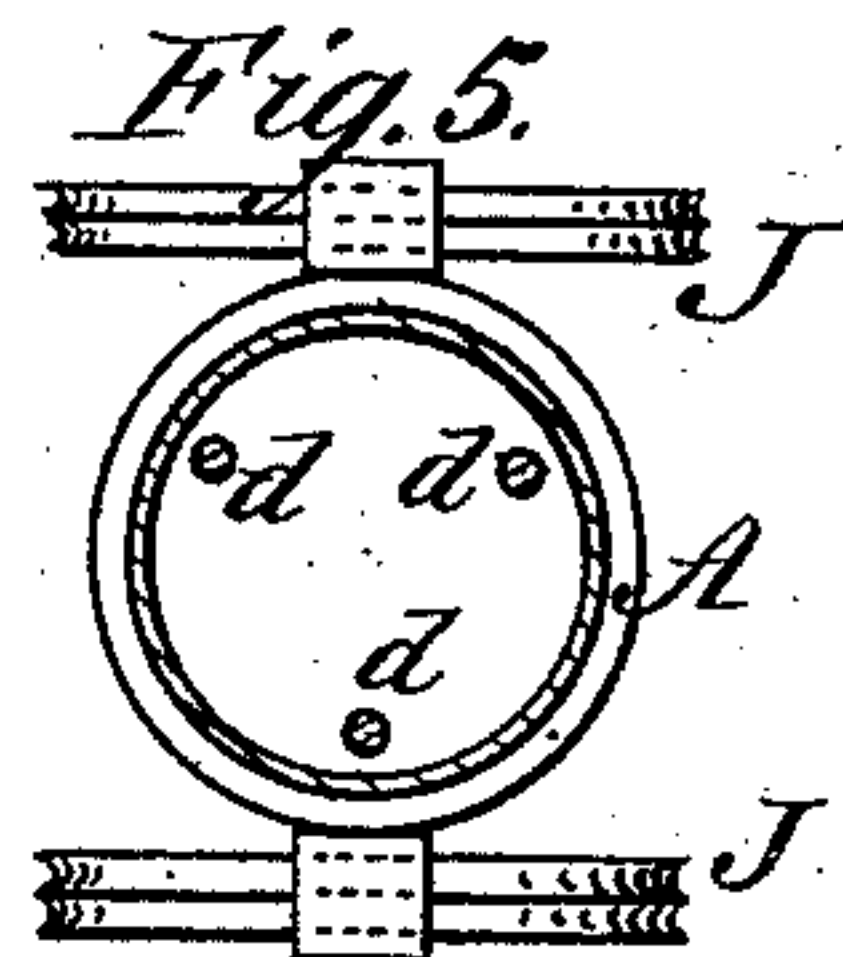
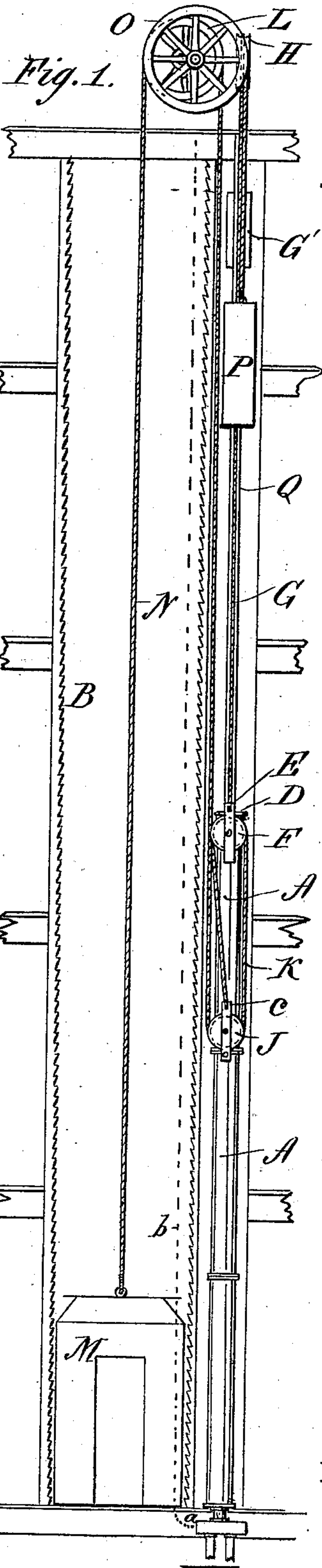
HYDRAULIC ELEVATOR.

No. 300,132.

Patented June 10, 1884.



WITNESSES:
Dorn Twitchell.
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UNITED STATES PATENT OFFICE.

OLIVER P. RICE, OF NEW YORK, N. Y.

HYDRAULIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 300,132, dated June 10, 1884.

Application filed March 20, 1883. (No model.)

To all whom it may concern:

Be it known that I, OLIVER P. RICE, of the city, county, and State of New York, have invented a new and useful Improvement in Elevators, of which the following is a full, clear, and exact description.

The object of the invention is to facilitate the operation and increase the efficiency of hydraulic elevators by combining the parts as hereinafter described, and pointed out in the claim.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is an elevation of a hydraulic elevator made in accordance with my invention. Fig. 2 is an elevation showing the arrangement of the pulleys, counterpoise-weights, cylinder, guide-bars, &c. Fig. 3 is a sectional elevation of the cylinder taken on the line *x x* of Fig. 4; and Figs. 4 and 5 are sectional plan views taken, respectively, on the lines *y y* and *z z* of Fig. 2.

A represents a vertical metallic hollow cylinder of any required length and diameter, preferably entirely open at the top for free admission of air, and fitted at the bottom with the valve *a*, for the supply and discharge of water for operating the piston-head C, fitted in the cylinder. This valve is operated by a cord running through the elevator and returning on the outside, so that a pull in either direction that the cage may be moving will actuate the valve. The piston-head C is attached rigidly to the plate D by the three iron rods *d*, which are of about the same length as the cylinder A, so that the plate D will stand near the top of the cylinder when the piston-head is at the bottom of the cylinder. A single rod, or more than three rods, might be used for connecting plate D and piston C, if desired; but the three rods are preferred. Upon the plate D is secured the cross-bar E, to the ends of which are suspended the double pulleys F F, and to the center of this cross-bar is attached the rope G, which passes up over the pulley H, secured at the top of the building, and has the counterpoise-weight G' attached to its outer end, which weight is about equal in amount to the weight of the piston C and its attachments, plus fifteen pounds per square inch of

area of the piston-head, the normal pressure of the atmosphere.

Attached upon opposite sides of the cylinder A, at any suitable point below its upper end, and in line with the pulleys F F, are the stationary pulleys J J. The outer ends of the elevator-ropes K K are made fast, as shown at *c* in Fig. 1, a little above the pulleys J J, and are passed thence over the pulleys F F and J J, as illustrated in said figure, thence up over the pulleys L L at the top of the building, and thence down into the elevator-well B, and are attached at their inner ends to the top of the elevator platform or cage M.

N N represent two ropes, which are attached at their inner ends to the top of the platform or cage M and pass from thence up over the pulleys O O, secured at the top of building, and have the counterpoise-weights P P attached to their outer ends, which weights together are about equal in amount to the weight of the cage or platform M.

Q Q represent guide-bars attached at their lower ends to the upper end of the cylinder A, and stayed in any suitable manner at their upper ends from the building. They are for the purpose of guiding the up and down movement of the cross-piece E, plate D, and piston-head C.

In assembling the parts of the elevator mechanism, the cylinder A having been set and properly stayed and the water-connections made with the water-main or with an elevated water-tank, the cylinder A will then be filled with water by moving the valve *a*, or by any other suitable means. The piston-head C will then be put into the cylinder, so as to rest upon the surface of the water in the cylinder. The valve *a* will then be moved to permit the outflow of the water from the cylinder, which will permit the piston-head C to settle to the bottom of the cylinder, thus excluding all pressure of air from beneath the piston-head. The elevating-ropes K K will then be passed around the pulleys F F and J J, and their ends made fast, as at *c*, and the weight G' will be attached to the rope G, which, as above mentioned, counterpoises the weight of the piston-head C and its attachments and the normal pressure of the atmosphere upon the piston-head C.

The operation of the elevator is as follows:

The cage M being at the bottom of the well B and the piston-head C at the bottom of the cylinder A, to elevate the cage the attendant will set the valve *a* by means of the valve-cord *b* to admit the supply of water under pressure to the bottom of the cylinder A under the piston-head C, which will force the piston-head upward in the cylinder, and this upward movement of the piston-head (through the rods *d d*) will force the pulleys F F upward and away from the pulleys J J, which will cause the ropes K K to shorten in the well B and elevate the cage in a well-known manner. Upon the entrance of the water in the cylinder A, the water, it will be seen, will balance the pressure of air upon the upper side of the piston-head C, so that the weight G' becomes an active force in elevating the cage to the extent of such air-pressure—viz., fifteen pounds to the square inch of area of the piston-head, whatever that may be; and this elevating force, together with that of the counterpoise-weights P P, requires but little water-pressure in the cylinder to elevate the cage and its load. The cage having reached the top of the well B, the valve *a* will be automatically moved to cut off the supply of water to the cylinder A, bringing the cage and elevating mechanism automatically at rest, where they will be held by the water in the cylinder. To lower the cage, the attendant will set the valve *a* so as to open the exit-pipe and permit the discharge of the water in the cylinder A, which will tend to create a vacuum in the cylinder, rendering the weight G' neutral, and thus permitting the load in the cage to cause the cage and piston-

head C to gradually sink in the well and cylinder to their original position, the slow outflow of the water from the cylinder serving as a positive brake to the too rapid descent of the cage. Upon the cage M reaching the bottom of the well, the valve *a* will be automatically moved to cut off both the water supply and discharge pipes, leaving a small quantity of water in the cylinder.

The speed of travel of the cage may be regulated by the attendant by opening or closing the valve more or less, and the elevator may be stopped at any desired point of its course by cutting off the supply or discharge pipe.

Instead of using water under pressure for operating the elevator, it will be understood that steam or compressed air may be used and not depart from the spirit of my invention.

The weight of the attendant is sufficient to lower the cage when the load has been removed.

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

The combination, with the well B and cage M, of the vertical cylinder A, open at top, valved at bottom, and carrying stationary side pulleys, J J, the piston-head C, and plate D, connected by rods *d*, the cross-bar E, guided by bars Q, attached to plate D and carrying pulleys F F, the end-weighted ropes G N N, and superposed pulleys H O, whereby the elevator-cage and piston-head may always move in the same direction, as described.

OLIVER P. RICE.

Witnesses:

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C. SEDGWICK.