

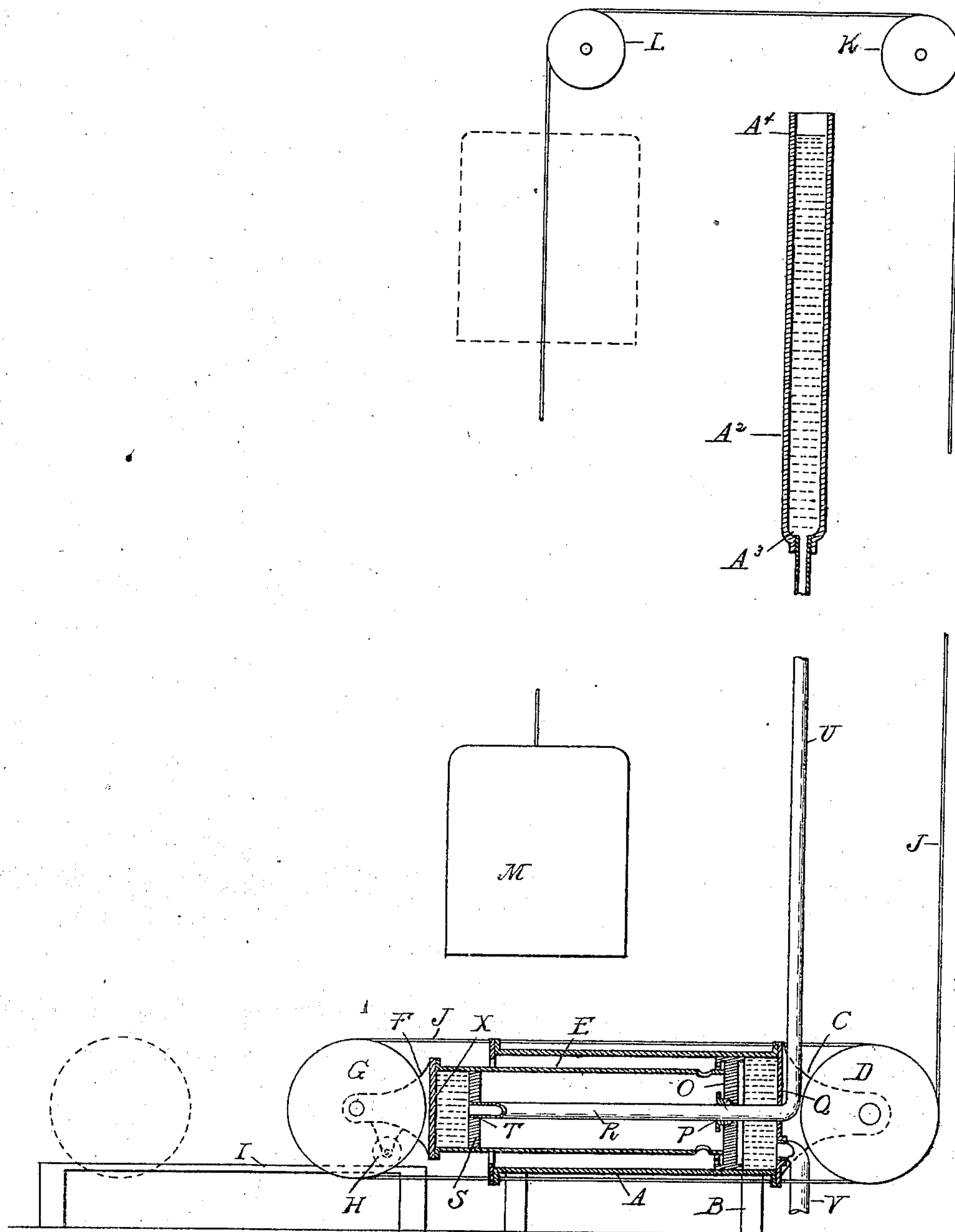
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Patented Feb. 19, 1901.

J. E. WAIT.
HYDRAULIC ELEVATOR.

(Application filed Mar. 19, 1900.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

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HYDRAULIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 668,238, dated February 19, 1901.

Application filed March 19, 1900. Serial No. 9,805. (No model.)

To all whom it may concern:

Be it known that I, JACOB E. WAIT, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Hydraulic Elevators, of which the following is a specification, reference being had therein to the accompanying drawing.

The invention has general reference to elevators, and relates particularly to that type known as "hydraulic" elevators.

The principal object of the invention is to provide a counterbalance for the car in the form of a hydrostatic column and to so arrange and combine the column with the hydraulic lifting mechanism that the former will counterbalance the car at every point of its travel.

Another object of equal importance is to construct the column in such manner that in addition to performing the function as above set forth it will constantly counterbalance the dead-weight of the cable, varying in hydrostatic pressure to compensate for the variance of the dead-weight caused by the movement of the car.

With these principal objects in view my invention consists in the novel construction of a counterbalance and in the peculiar construction, arrangement, and combination of various other parts of the elevator mechanism, as will be hereinafter described, and shown in the drawing, in which the figure is a sectional elevation of the hydraulic lifting mechanism, showing the car in diagram.

The reference-letter A designates the cylinder of usual form mounted upon supports, such as B, and having at one end brackets or supporting-arms C, in which one or more sheaves D are journaled.

E designates the piston, which extends beyond one end of the cylinder in the usual manner and has secured thereto bracket-arms F, in which are journaled sheaves G, corresponding in number and size to the sheaves in the brackets C.

H is the usual carriage supporting the outwardly-projecting end of the piston, which travels upon suitably-supported tracks I.

The cable J passes over the sheaves D and in the usual manner and over sheaves K

and L and is attached at its free end to the car M, as plainly shown in the drawing.

The parts thus briefly described are of the usual construction in well-known types of hydraulic elevators and constitute no part of my present invention. The counterbalancing mechanism, however, I consider as entirely new, and the same will now be fully described. The piston is of the hollow type, as plainly shown in the drawing, and the head O thereof is centrally apertured, as at P, the opening registering with a similar opening formed in the cylinder-head Q. A pipe R extends through the two openings and projects within the piston, in proximity to the head X thereof, as shown, where it is supported by a head S. This head is apertured, as at T, to receive the pipe end and to permit the latter to extend therethrough and is preferably fixedly secured to the pipe. The hydrostatic column constituting the counterbalance is contained within a vertical pipe U, which communicates, in the manner indicated in the drawing, with the pipe R. The height of the vertical pipe is sufficient to permit of a hydrostatic pressure being exerted by the column equivalent to the weight of the car and the weight of that portion of the cable between the car at its lowest point and the sheave L. The latter weight is generally termed and will be hereinafter referred to as the "dead-weight" of the cable, which is at its maximum when the car is at its lowest position.

V designates the usual water-supply pipe, which communicates with the cylinder through a suitable port in cylinder-head Q.

From the construction and arrangement of the counterweight as set forth it will be obvious that while the piston is forced outward from the cylinder in the usual manner by the water-supply or any other suitable means the hydrostatic column assists in elevating the car by exerting a pressure upon the head X of the piston. Also as the dead-weight of the cable diminishes during the ascension of the car the hydrostatic pressure is correspondingly decreased by the lowering of the column.

In order that the flow of the water from the hydrostatic column into the hollow piston will not interfere with the falling of the column below a certain point, such as A³, necessary

to counteract the weight of the car, I enlarge the capacity of the vertical pipe at a certain point, the enlargement being designated by the letter A². This enlargement is of the same capacity as the capacity of the piston and is formed in the pipe U above the point A³, the enlargement extending from this point to the point A⁴, the latter indicating the height of the water column necessary to counterbalance the car plus the maximum dead-weight of the cable.

The advantage of employing the hydrostatic column for counterbalancing in place of the ordinary weight is that the jumping of the car when stopped suddenly owing to the fall of the weight which moves at the same velocity as the car is obviated. This follows from the fact that the fall of the water column is slight in comparison with the fall of the usual weight and the velocity is correspondingly decreased. By constructing the water column so that the hydrostatic pressure will vary to compensate for the variance in

the dead-weight of the cable I am enabled to dispense with the use of the compensating chains that heretofore have been found necessary in use.

What I claim as my invention is—

In a hydraulic elevator, the combination with the car, of the cable, the cylinder and a hollow piston therein for operating the cable, a pipe extending through one cylinder-head and the adjacent head of the piston, a head attached to the pipe and arranged within the piston, and an upright pipe communicating with the pipe extending within said cylinder, said upwardly-extending pipe being provided with an enlargement equal in capacity to the capacity of the piston, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

JACOB E. WAIT.

Witnesses:

L. J. WHITTEMORE

H. C. SMITH.