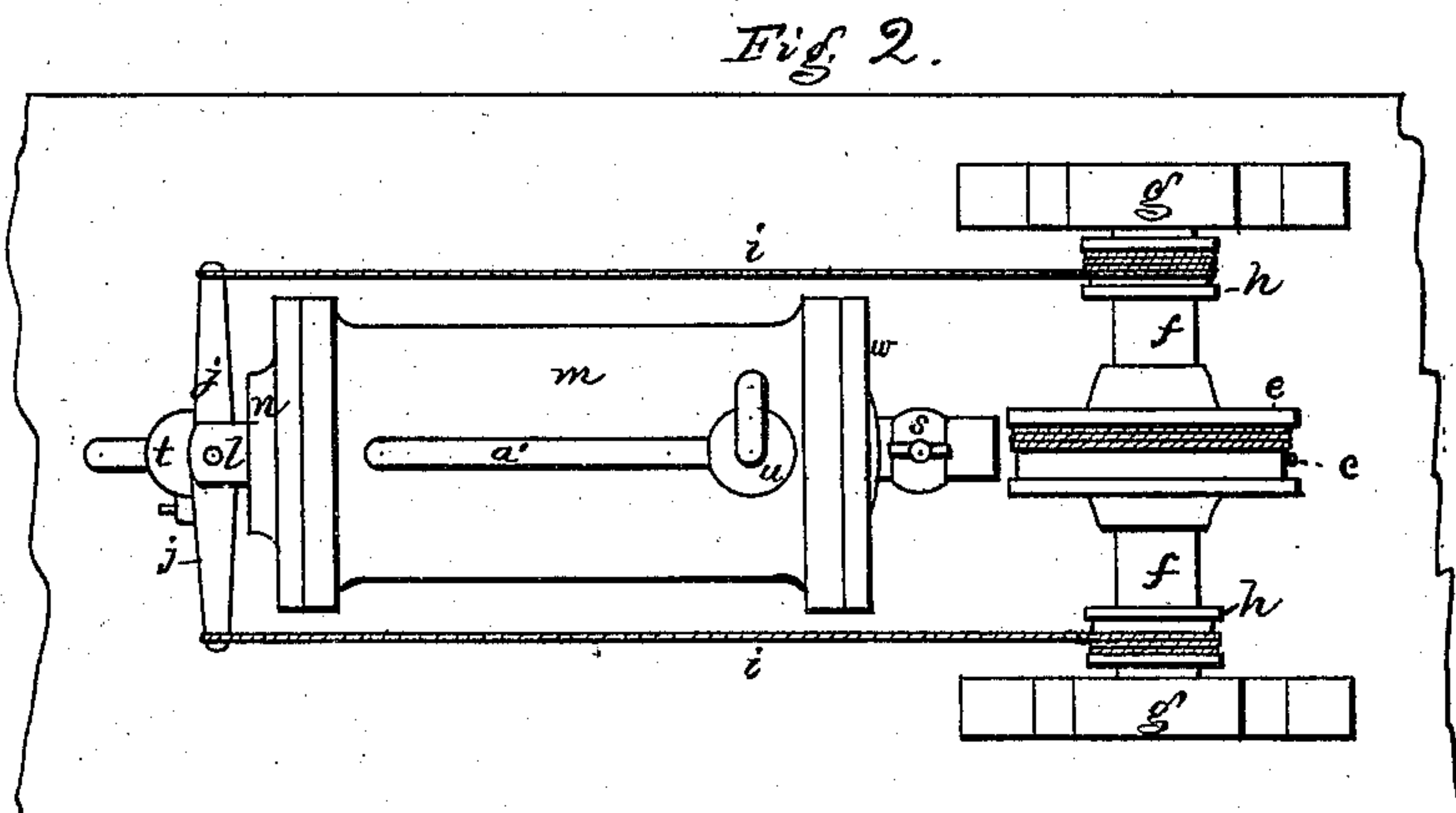
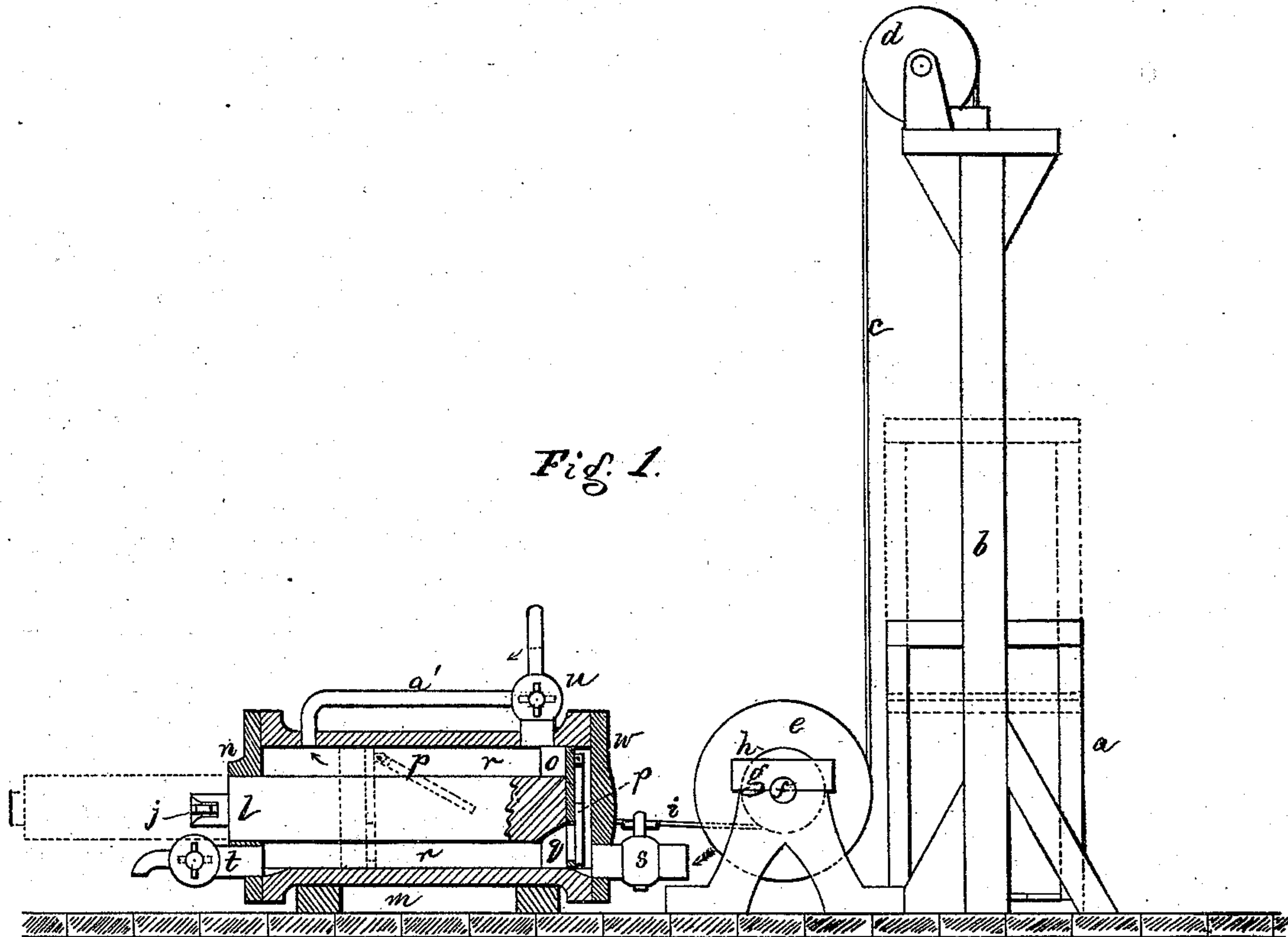


M. L. WYMAN.  
HYDRAULIC ELEVATOR.

No. 174,171.

Patented Feb. 29, 1876.



Witnesses.

L. H. Lathrop,  
W. J. Pratt.

Inventor.

Martin L. Wyman  
PER Crosby Gregory Attys



# UNITED STATES PATENT OFFICE.

MARTIN L. WYMAN, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF  
AND CHARLES E. MOORE, OF SAME PLACE.

## IMPROVEMENT IN HYDRAULIC ELEVATORS.

Specification forming part of Letters Patent No. 174,171, dated February 29, 1876; application filed  
July 15, 1875.

*To all whom it may concern :*

Be it known that I, MARTIN L. WYMAN, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Hydraulic Elevators, of which the following is a specification:

This invention relates to hydraulic elevators for hoisting purposes, and consists in the combination of the piston of an hydraulic elevator with a valve, whereby the quantity of water or other liquid employed will be governed by the weight of the car and its load, or the work being performed; and, also, in the combination of such piston and cylinder of valves, as hereinafter specified, whereby the passage of the water through the cylinder is controlled.

Figure 1 represents a side view of sufficient of an elevator to show my present improvement, and Fig. 2 is a top view thereof.

The car *a*, of any suitable size or kind, is guided by the guide-rails *b*, or in any well-known way, and is raised and lowered through the agency of a suspensory rope or chain, *c*, or ropes leading over pulley *d*, and wound on the winding-drum *e*, suitably connected with shaft *f*, supported in bearings *g*, the shaft being provided with smaller drums *h*, to which are attached ropes *i*, connected with the cross-head *j*, carried by the piston *l*, the latter being arranged within the cylinder *m*, and being fitted to move through a stuffing-box of any well-known construction made in the cylinder head *n*, the piston-head *o* fitting the interior of the cylinder. This piston *l* is sufficiently large in diameter to occupy a space equal to about one-half the capacity of the interior of the cylinder *m*, and the piston-head *o* has a valve, *p*, made to swing or open away from that head of the cylinder through which the piston *l* works, the way or passage *q*, covered by the valve *p*, leading through the piston-head *o*, and into the water-space *r* about the piston *l*. The inlet-valve is lettered *s*, and there are two outlet-valves, *t* and *u*, the former being situated at the end of the cylinder, and connected with the drain, while the valve *u* is connected with the top of the cylinder, as hereinafter described. This valve *u* is a three-way valve or stop of ordinary construction, and the

valves or stops *s t* are such as are ordinarily employed with hydraulic elevators, and they are all controlled through a hand-rope by the operator of the car as the car moves, so as to open and close the said valves or stops, as may be required. This hand-rope for operating the valves being commonly employed on elevators is not herein shown. The ropes or bands *i*, two or more, are adapted to lead from the cross-head *j*, under and about the drums *h*, and the hoisting-rope or suspensory, one or more, leading under the drum *e* from the opposite direction, so that one set of ropes winds up, while the other unwinds, and vice versa. Assuming the car down, and all the valves or stops closed, then to cause the car to ascend with a heavy load, pull on the hand-rope and open inlet-valve *s* and outlet-valve *t*, and the water, acting against the large piston-head, will push out the piston, and, through the ropes *i* and shaft and suspensory, the car will be raised. The car may be stopped at any place by closing valve *s*. When the car is to descend the stops or valves *s t* are closed, the valve *u* is opened, and the weight of the car, drawing on the suspensory, and acting through the shaft *f*, ropes *i*, and piston, causes the piston to move into the cylinder, and the water passes out through the valve *u*.

Now, instead of wasting all the water contained between the piston-head and the end *w* of the cylinder, I connect with the three-way stop *u* and the cylinder a saving-pipe, *a'*, its end opposite from the valve or stop *u* opening into the cylinder back of the piston-head *o*, and about one-half the water in advance of the piston-head flows through such saving-pipe into the space *r* back of the piston-head and about the piston, and the remaining portion of the water is forced through the stop or valve *u* into the drain, and is wasted. The car descends until at the point where it is desired to have it rest, then all the valves are again closed. Now, as the car is to be again elevated, if the load is light, less force or power is needed to elevate it than if the load were heavy, and consequently a small quantity of water will suffice to elevate the car, if a small quantity can be used. This small quantity of water can be used, and in the fol-



lowing way: The load being light, only the inlet-valve *s* will be opened, and as the piston is moved back by the water coming into the inlet, the water before led into space *r* by the saving-pipe *a'* when the car descended, (such space being equal to about half the capacity of the cylinder,) having no outlet, forces the valve *p* in the head *o* open, as shown in dotted lines, and the water in space *r* passes into the space in front of the piston-head, and is saved, and as the car again descends the valve *u* is opened, and about one-half the water in front of the head *o* is again returned to the space *r* through pipe *a'*, and in this way a large quantity of water is saved, especially when the elevator-car is not being worked to its full capacity, as is often the case.

If, however, the load should be heavy, then the valve *t* is opened, when piston *l* starts back, which gives to the cylinder its full capacity, and water in the space *r* will pass through valve *t* into the drain.

I may employ other well-known connections between the piston and the car instead of those shown, but I prefer those shown, the gist of this invention being in the provision for controlling the water according to the weight to be raised. Instead of locating the valve that allows the water in the space *r* back of the piston-head to pass in front of the piston in the piston-head, I may connect the two ends, or the side of the cylinder near its ends, by means of a pipe having in it a valve or stop through which water may pass from space *r* to the space in front of the piston-head. I may use the saving-pipe *a'* for this purpose, the water from space *r* passing through it, and through one of the passages

of the three-way stop, it being placed by a hand-rope in proper position for that purpose. It is, of course, understood that instead of the three-way stop, and the other stops shown, I may use poppet or other well-known valves to open and close, as and in the times described, passages for the flow of the water, as set forth.

I claim—

1. The combination, in an hydraulic elevator, of the cylinder, piston, and valved piston-head, adapted to allow the water in the cylinder back of the piston-head to pass into the cylinder in front of the piston-head, substantially as described.

2. The combination, with the cylinder and piston, provided with a head and valve therein, of a stop or valve and saving-pipe adapted to lead the water in advance of the piston-head back into the cylinder, substantially as and for the purpose described.

3. The combination, with the cylinder, inlet-valve, two outlet-valves, and saving pipe, of a piston and head, provided with a valve, and adapted to operate substantially as and for the purpose described.

4. The combination, with the cylinder and valved piston, stop or valve *u*, and connected saving-pipe, of the cross-bar, ropes *i*, shaft *f*, drums *h e*, suspensory and car, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MARTIN L. WYMAN.

Witnesses:

G. W. GREGORY,  
L. H. LATIMER.