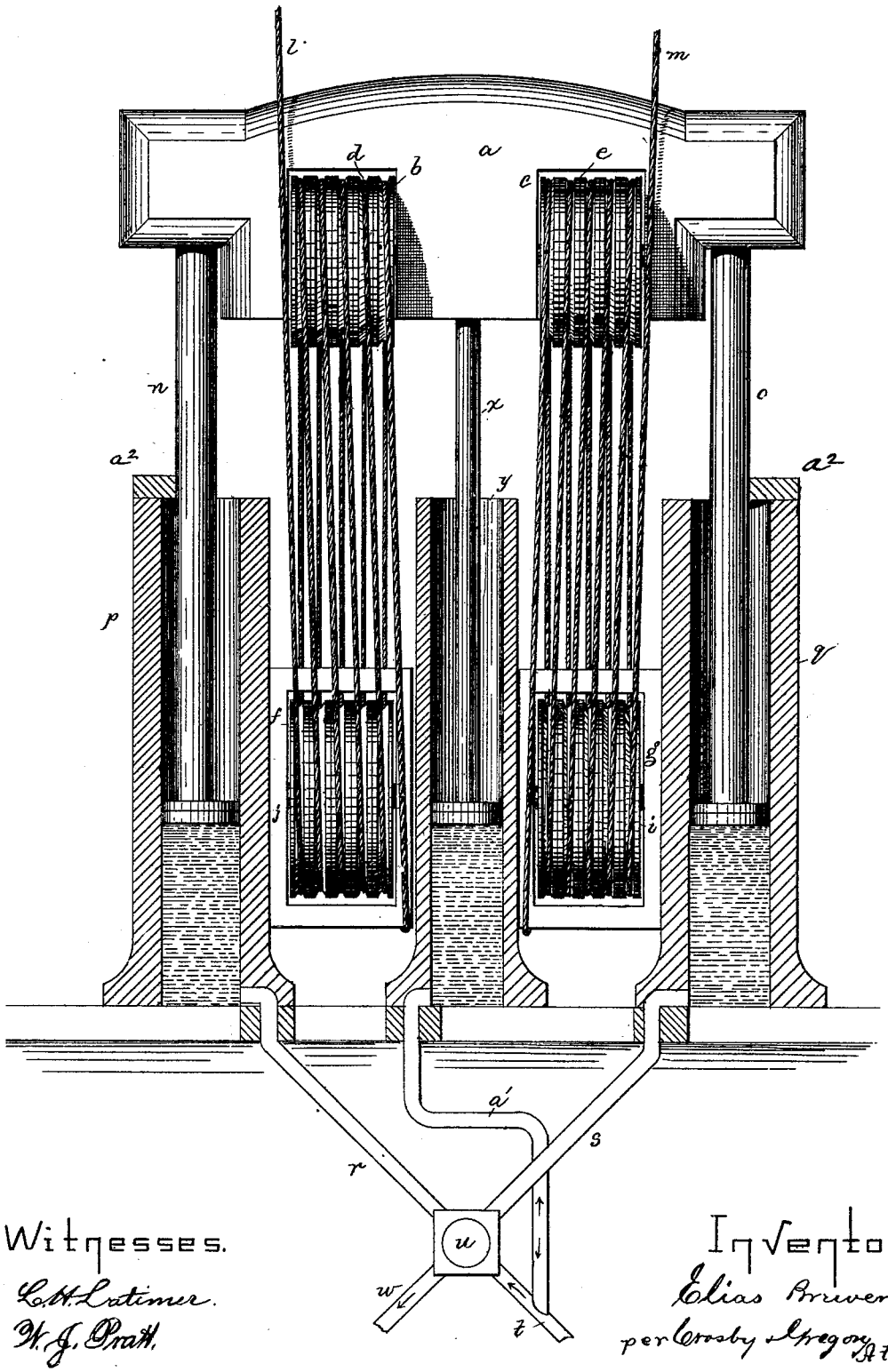
E. BREWER.

HYDRAULIC ELEVATOR.

No. 189,424. Patented April 10, 1877.



Witnesses.
C. H. Latimer.
W. J. Pratt.

Inventor.
Elias Brewer
per Crosby Gregory Attys.

UNITED STATES PATENT OFFICE.

ELIAS BREWER, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN HYDRAULIC ELEVATORS.

Specification forming part of Letters Patent No. **189,424**, dated April 10, 1877; application filed January 10, 1877.

To all whom it may concern:

Be it known that I, ELIAS BREWER, of Boston, county of Suffolk, and State of Massachusetts, have invented Improvements in Hydraulic Elevators, of which the following is a specification:

This invention relates to hydraulic elevators, and consists in a cross-head, two sets of sheaves carried thereby, and two end pistons, in combination with two independent cylinders, and a central cylinder and piston for a counter-balance, as hereinafter described.

The drawing represents, partially in section, sufficient of an elevator to illustrate this invention. The cross-head *a* is provided with two sets of sheaves, *b c*, arranged in recesses *d e*. Other sets of sheaves, *f g*, are arranged on stationary shafts in brackets *i j*, between the cylinders. Two ropes, *l m*, extend over these sets of sheaves, as shown in the drawings. One end of each rope is connected with some stationary part of the elevator, and the other end with the platform of the car in any usual way. Instead of placing the sheaves at the ends of the cross-head, as usual, and lifting the cross-head by means of a central piston, thereby subjecting the cross-head to great strain at its center, the cross-head is arranged to be positively lifted at each end with equal force, by means of independent cylinders and pistons of equal size, and in addition to these two cylinders a central piston, connected with the cross-head, operates within a central cylinder, having connection with the main in such manner that the water in the central cylinder, acting upon the head of the central piston, serves as a counter-balance substantially for the weight of the car, the water in the central cylinder re-entering the main when the car descends.

The piston-rods *n o* secured to the ends of the cross-heads enter the cylinders *p q*, to be connected by pipes, as at *r s*, with the main *t*. A three-way or other suitable cock will be used at *u* to admit water into the cylinders to raise the pistons and car, and as the car falls the cock will permit the discharge of the water through a pipe, *w*, into the sewer.

Attached at or near the center of the cross-head is a piston, *x*, fitted to a cylinder, *y*. This piston and cylinder, situated at the center of the cross-head, assist in keeping the strain even thereon, and acts as a counter-balance for the weight of the car. The water will flow into the cylinder *y*, from the main, through a branch, as at a^1, as the car rises, and as it descends the water will be forced by the weight of the car back again into the main.

Instead of forcing the water back into the main it may be forced back and upward into a suitable tank, and when the cross-head is again raised the water from the tank will follow the central piston. In this way the water for the central counter-balance may be used over and over. This plan permits the saving of water.

I do not claim the use of two cylinders, one lifting at each end of the cross-head, nor do I, broadly, claim the use of a car-counterbalancing cylinder containing water in connection with an elevator. In some instances I propose to employ a three-armed or cross-shaped cross-head, and with them use either three or four pistons and cylinders; but in all cases the centrally-placed car-counterbalancing cylinder will be employed.

The outlet of the cylinder *y* will be of proper size to permit the descent of the car at the desired speed. By means of three cylinders the movement of the car is rendered very steady, and as the ropes and sheaves are arranged it is impossible to detach the ropes from the sheaves, should the car be obstructed, as now happens in the class of elevators wherein the sheaves are at the outer ends of the cross-heads.

In this invention it is deemed necessary to always use two ropes, and two sets of sheaves for each rope, each rope and its set of sheaves being arranged aside from the center of the cross-head. The pistons are all connected positively with the cross-head, and always move together and with the cross-head each time that the car rises and falls.

Guides for the cross-head are considered unnecessary. Bearing portions a^2 may be applied at the upper ends of the cylinders to steady the outer sides of the piston-rods.

I claim—

The cross-head, its two sets of sheaves, and two equal pistons, positively attached at the

ends of the cross-head, in combination with two stationary equal cylinders, *p q*, adapted to be connected with the main or service and waste pipes, as described, to lift the cross-head at its end, and with a central car-counterbalancing cylinder and piston arranged to operate, all substantially as described.

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

ELIAS BREWER.

Witnesses:
GEO. W. GREGORY,
W. J. PRATT.