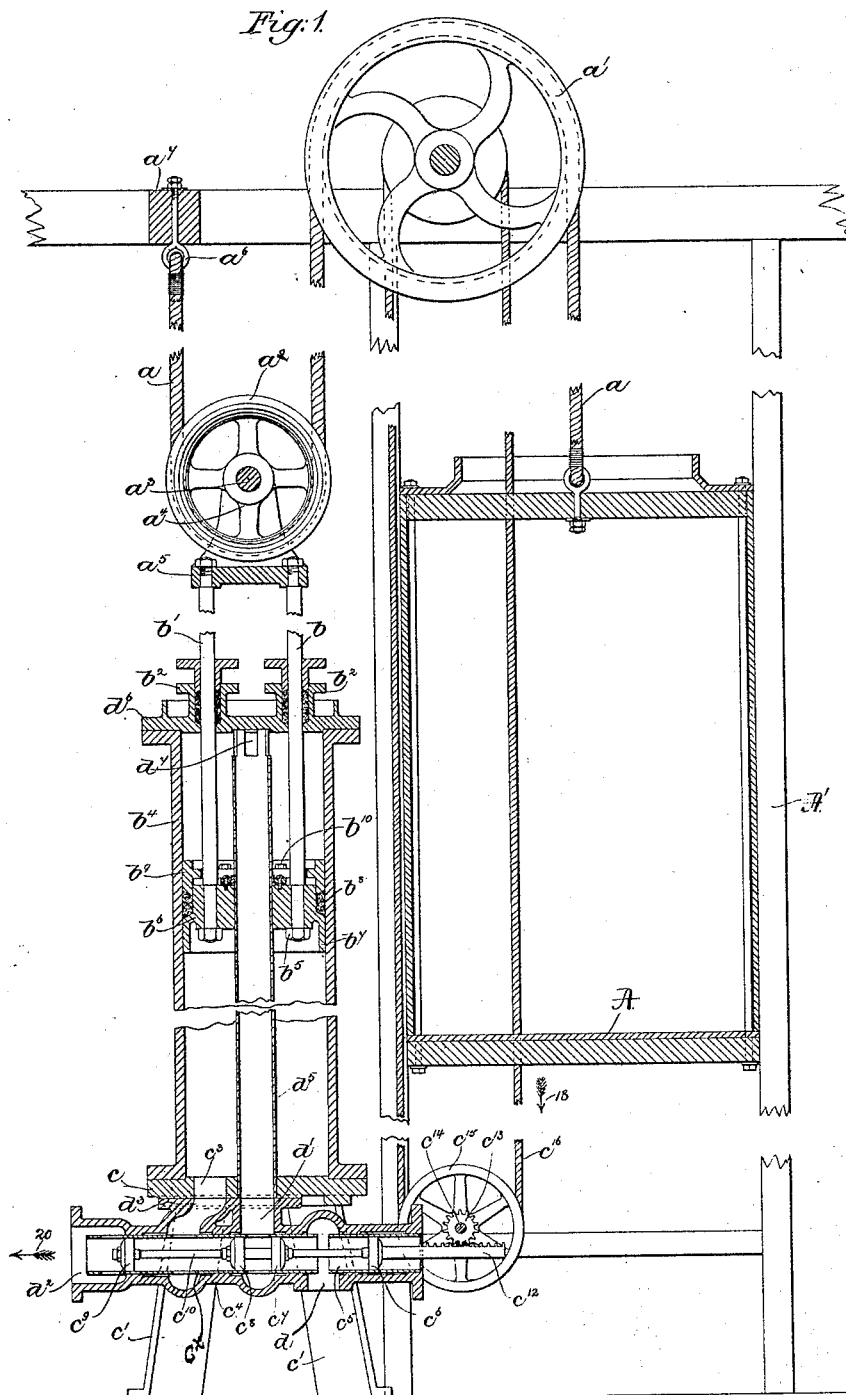


C. WHITTIER.
ELEVATOR MECHANISM.

No. 421,150.

Patented Feb. 11, 1890.



Witnesses.

Edgar A. Goddard.
Frederick L. Emery.

Inventor

Charles Whittier
by Leroy H. Emery
att'y

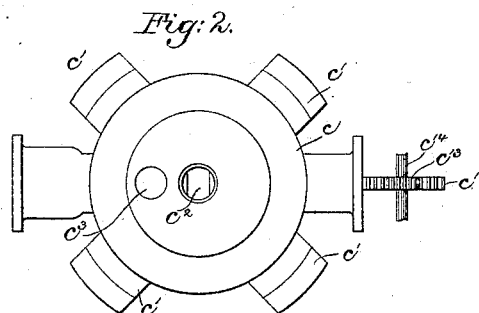
(No Model.)

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attys

UNITED STATES PATENT OFFICE.

CHARLES WHITTIER, OF BOSTON, MASSACHUSETTS.

ELEVATOR MECHANISM.

SPECIFICATION forming part of Letters Patent No. 421,150, dated February 11, 1890.

Application filed August 9, 1889. Serial No. 320,222. (No model.)

To all whom it may concern:

Be it known that I, CHARLES WHITTIER, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Elevator Mechanism, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to hydraulic elevators, and has for its object to improve the construction and operation of the same.

One feature of my present invention consists in locating within the cylinder containing the piston for actuating the elevator-car a stand-pipe performing the double office of an inlet and outlet pipe for the water used to elevate the car, whereby the said pipe is removed from danger of being injured or deranged, and the objectionable noise caused by the water passing through the said pipe is substantially obviated, the said stand-pipe enabling the apparatus to be made more compact than heretofore.

Another feature of my invention consists in providing the cylinder referred to with an independent base, to which may be detachably secured a valve-casing containing the valve for controlling the admission of water to the cylinder. The base referred to is preferably provided with supports or legs, and the valve-casing is secured to the under side of the said base and is readily accessible for purpose of repairs or cleansing, the said legs or supports enabling the said base to be turned in any direction and yet present an open space, for a purpose to be described. The valve-casing referred to is preferably made independent of the base, so that the said valve-casing may be turned into any desired position before being permanently secured to the base to enable the apparatus to be set up in irregular and limited spaces and at the same time secure perfect alignment of the valve mechanism and the hoisting-ropes. The particular features in which my invention consists will be pointed out in the claims at the end of this specification.

Figure 1, in section and elevation, shows a sufficient portion of a hydraulic-elevator apparatus embodying my invention to enable it to be understood; and Fig. 2 is a top or plan view of the base with the cylinder removed.

A represents a car of any usual or well-known construction suspended in an elevator-well or hoistway A' by a cable or rope a , passed about the sheave a' , located at the top of the building, and about a similar sheave a^2 , mounted on a shaft a^3 , having bearings in uprights a^4 , secured to a cross-head a^5 , the opposite end of the rope being firmly secured, as at a^6 , to a cross-bar a^7 at the top of the building, the parts enumerated being of any usual or well-known construction. The cross-head a^5 is connected, as herein shown, by two piston-rods $b b'$, passed through suitable stuffing-boxes b^2 in the head of the closed cylinder b^4 , the said rods being connected at their other end in any usual or well-known manner, as by nuts b^5 , to the piston b^6 , provided on its lower side with a depending lip or flange b^7 , fitted water-tight in the cylinder b^4 . The piston b^6 above the lip b^7 , as herein shown, is made of smaller diameter to leave an annular groove or space, in which is placed packing b^8 , normally kept compressed by the follower-plate b^9 , secured to the top of the said piston, as by bolts b^{10} . The cylinder b^4 rests upon and is supported by a base c , provided with legs c' , preferably four in number, only two of which are shown in Fig. 1, the said cylinder being bolted or otherwise secured to the said base.

The base c is provided, in accordance with my invention, with a preferably central opening or port c^2 , and with a second port c^3 , located at one side thereof. The base has secured to its under side by bolts, (not shown,) or in any other suitable manner, a valve-casing c^4 , herein shown as provided with tubular sleeves c^5 , having openings c^x , which communicate with the ports of the valve-casing, the said sleeves forming a cylindrical passage for the piston-valves $c^6 c^7 c^8 c^9$, mounted on a single valve-stem c^{10} , provided at one end, as herein shown, with teeth to form a rack-bar c^{12} , with which meshes a pinion c^{13} on a shaft c^{14} , provided with a pulley c^{15} , with which is connected the usual shipper mechanism, herein shown as a shipper-rope c^{16} , by operating which the said valves may be moved to admit and discharge water into and from the cylinder b^4 , as will be described.

The valve-casing c^4 is provided with a port d , constituting the water-inlet port, and with

the port d' , communicating with the central opening c^2 in the base, and with a port d^2 , forming the discharge-port for the said casing, and with a port d^3 , which registers with the port c^3 in the base.

The base c has secured to it a stand-pipe d^5 , of any desired form in cross-section, communicating with the port or opening c^2 in the base and extended up into the cylinder b^4 , so as to form a continuation of the said opening, the said stand-pipe being entirely concealed within the cylinder, and, as herein shown, extended into a recess on the under side of the cylinder-head d^6 . The stand-pipe d^5 , at or near its upper end, is preferably provided with a series of ports or openings d^7 , through which the water from within the pipe may pass into the cylinder b^4 above the piston b^6 , and vice versa. As shown in Fig. 1, the valves are on their centers and the car A is held suspended in the hoistway. If now it is desired to ascend, the shipper-rope will be operated in the direction indicated by arrow 18, so as to move the valve-stem c^{10} and the valves attached thereto toward the left or in the direction indicated by arrow 20, so that the valve c^7 will uncover the port d' and the valve c^9 will open the port d^2 . In this case the water will enter by the port d and flow through the port d^2 , stand-pipe d^5 , and passages d^7 into the cylinder b^4 above the piston, thus forcing the latter toward the bottom of the cylinder and elevating the car. The water in the cylinder b^4 below the piston passes therefrom through the port c^3 , d^3 , and d^2 , preferably, to the discharge or waste-water-tank. (Not shown.) When the elevator has reached the extent of its upward movement, the shipper-rope is moved in the opposite direction to bring the valves into their central position, if it is desired to stop the elevator-car at its extreme upper position, and if it is desired to descend the said rope will be still further moved in the direction opposite to that indicated by arrow 18, so as to close the inlet-port d by the valve c^7 and connect the port d' with the port d^3 , the exhaust-port d^2 being at such time closed. The piston b^6 will now be moved upward by the weight of the car as the latter descends, and the water contained in the cylinder b^4 above the said piston will pass through the opening d^7 into the stand-pipe d^5 , thence through the ports d' d^3 c^3 into the cylinder below the piston, and when the valves are again moved to cause the car to ascend the water in the cylinder b^4 below the piston will be forced, as described, through the ports c^3 d^3 and exhaust-port d^2 . The stand-pipe d^5 , being located within the cylinder b^4 , is removed from danger of derangement and damage, and the disagreeable noise occasioned by the water passing through the said pipe is reduced to

a minimum, for the reason that the cylinder, being full of water at all times, envelops said pipe and prevents vibration of the same by the passage of the water through it.

By making the base c independent of the cylinder and concentric therewith the said base and the valve-casing attached thereto may be turned into any desired position to make the proper connections with the operating parts—as, for instance, with the valve-operating mechanism, to secure perfect alignment of the valve-operating mechanism and hoisting-ropes. This is especially advantageous where the space in which the mechanism is placed is limited in size and is irregular in outline, as by means of the movable base perfect alignment of the operating parts is secured and the hoisting-ropes may be brought into correct working or operative position.

By making the piston movable on the stand-pipe within the cylinder I obtain an effective apparatus of simple construction, and, the piston being substantially light as compared with the cylinder, the friction is reduced to a minimum and a saving in power required is effected.

I claim—

1. In an elevator mechanism, the combination, with a closed cylinder and its piston operatively connected to the car, and a valve-casing provided with two ports communicating with the said cylinder, of a pipe connected to one of said ports and extended into the cylinder through the piston, and having its opposite end communicating with the interior of the cylinder above the piston to form a liquid inlet and outlet for the cylinder at one side of its piston, and a valve to control said ports, substantially as described.

2. In an elevator mechanism, the combination, with a vertical cylinder and its piston operatively connected to the car, of an independent base concentric with the cylinder, and a valve-casing secured to said base below said vertical cylinder, a valve in said casing, and mechanism to operate said valve, substantially as described.

3. In an elevator mechanism, the combination, with a cylinder and its piston operatively connected to the car, of a base provided with openings c^2 c^3 , communicating with the cylinder, and a pipe communicating with the opening c^2 and extended within the cylinder through the piston, substantially as described.

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

CHARLES WHITTIER.

Witnesses:

JAS. H. CHURCHILL,
EMMA J. BENNETT.