

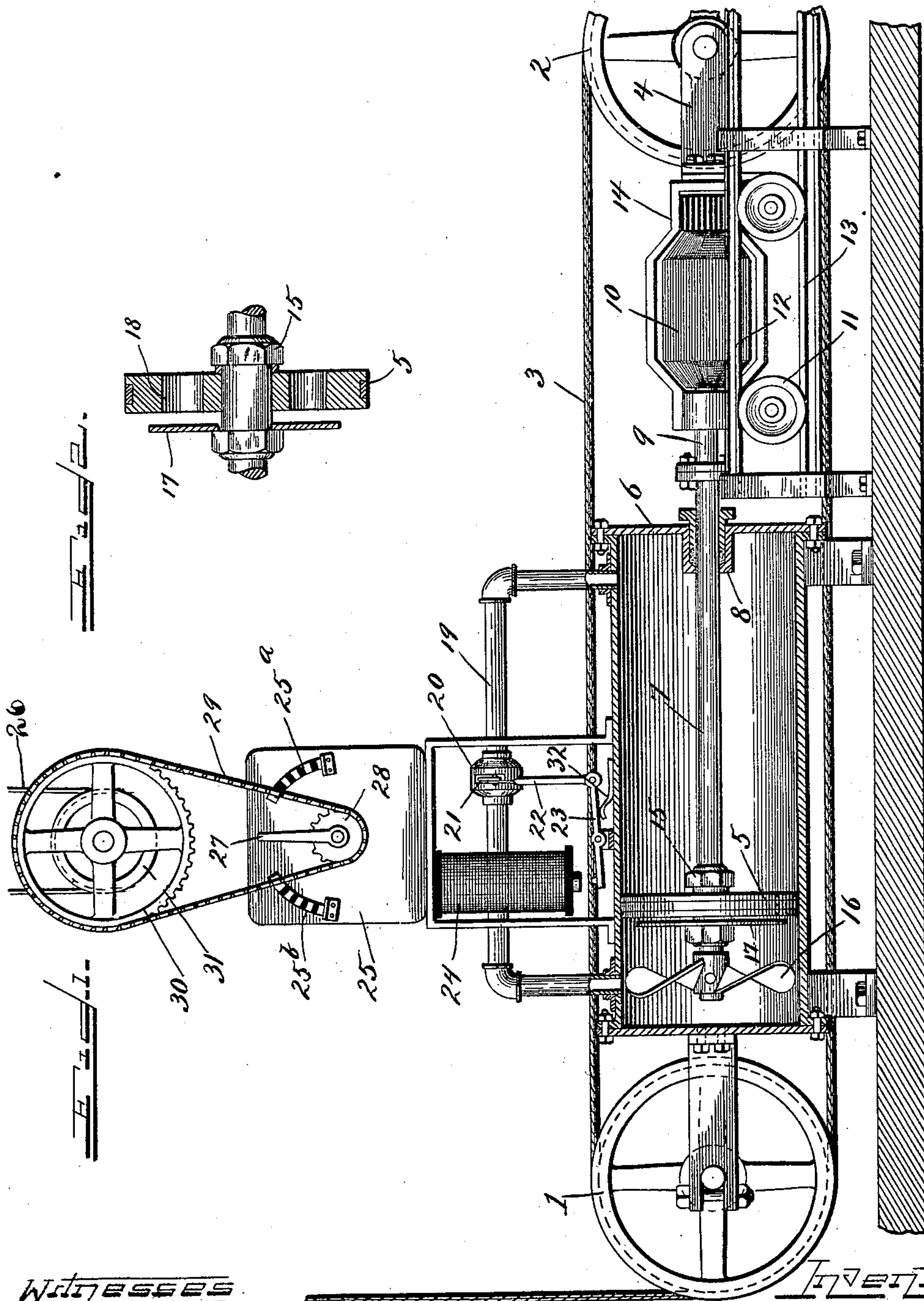
No. 698,857.

Patented Apr. 29, 1902.

J. RICE.
ELEVATOR.

(Application filed Mar. 25, 1901.)

(No Model.)



WITNESSES

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UNITED STATES PATENT OFFICE.

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ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 698,857, dated April 29, 1902.

Application filed March 25, 1901. Serial No. 52,779. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH RICE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have
5 invented certain new and useful Improvements in Elevators, of which the following is a full, clear, and exact specification.

My invention relates to hydraulic elevators, and more particularly to that portion of the
10 mechanism for imparting motion to the traveling sheave in one direction for raising the elevator and for controlling the movement of said sheave in the other direction for lowering the elevator; and my invention has for
15 its primary object to move the elevator by the agency of propelling means acting against a volume of water or other liquid, whereby the complicated and costly pumping mechanism and valve-controlling appliances heretofore
20 employed may be dispensed with.

More specifically stated, the object of my invention is to impart motion to the traveling sheave in one direction for raising the elevator by means of a propeller acting directly
25 against the body of liquid in which is situated the piston for controlling the movement of the sheave in the opposite direction.

With these ends in view my invention consists in certain features of novelty in the construction, combination, and arrangement of
30 parts by which the said objects and certain other objects hereinafter appearing are attained, all as fully described with reference to accompanying drawings, and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a side elevation of my improved apparatus, partly in vertical section; and Fig. 2 is a detail sectional view of the valved piston hereinafter described.
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1 is a fixed sheave which may be journaled and supported in any suitable manner, and 2 is the traveling sheave, and around these sheaves passes the cable 3, which is connected
45 to the elevator-car in the usual or any suitable manner.

The traveling sheave 2 is mounted in a yoke 4, which is connected with a piston 5 in any suitable manner for causing the sheave 2 to
50 travel back and forth in unison with the movement of the piston. This piston 5 is located

in a hydraulic cylinder 6 and is provided with piston-rod 7, passing through stuffing-box 8 in the end of the cylinder 6, and coupled or secured in any suitable manner to the shaft
55 9 of a motor 10. The motor 10 may be of the electric or any other suitable type of motor and is mounted upon a suitable truck having wheels 11, running between upper and lower track-rails 12 13 for supporting and guiding
60 the motor, and to the frame 14 of the motor is secured the yoke 4, which supports and carries the traveling sheave 2.

The piston-rod 7 is rotatably mounted in its stuffing-box 8 and is also rotatably secured
65 to the piston 5 in a suitable bearing 15, which also constitutes a stuffing-box for forming a tight joint where the piston-rod passes through the piston, and on the end of the piston-rod opposite that to which the motor
70 is attached is supported and secured a propeller 16 of any suitable construction, the example of propeller shown in the drawings being an ordinary two-blade screw-propeller, such as used on vessels.
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The piston 5 is provided with a valve 17, which closes one or more openings 18 in the piston when the latter moves in one direction, but which is opened by the force of the water or other liquid contained in the cylinder 6
80 when the piston moves in the opposite direction. Thus it will be seen that when the propeller 16 is rotated by means of the motor 10 it will move toward the right-hand end of the cylinder and force the piston and its rod 7 in
85 the same direction, thus moving the sheave 2 and raising the elevator-car in the usual manner; but should the rotation of the propeller 16 cease the weight of the car would of course tend to force the piston 5 back again
90 to its original position, and this reverse movement of the piston would cause the valve 17 to close the openings 18 and prevent the water from escaping through the piston, and consequently prevent the piston from moving, thus holding the car at a standstill.
95 When it is desired to lower the car, however, and permit the piston to move toward the left, the liquid on the left-hand side of the piston may be transferred to the right-hand
100 side, as the piston moves by any suitable means under the control of the operator in the

car. For this purpose I have shown opposite ends of the cylinder connected together by a by-pass pipe 19, which is of sufficient diameter to permit the water or other liquid in the cylinder to pass by the piston with the desired degree of rapidity. This by-pass pipe is provided with any suitable valve 20, which is under the control of the operator in the car. As a means for thus controlling the valve I have shown the same provided with an arm 21, which is connected by link 22 to an armature-lever 23, arranged within the magnetic field of a magnet 24, and the circuit through the latter is controlled by any suitable switch-box 25, which is operated from the car by means of a hand rope or cable 26, connected to the switch in any suitable manner. In the example shown in the drawings the switch-arm 27 is secured to a sprocket-wheel 28, which is connected by sprocket-chain 29 to a sprocket-wheel 30, and this in turn is connected to a pulley 31, around which the hand-cable 26 passes. The valve 20 being the usual or any suitable graduated valve employed for like purpose in elevator systems, it will be seen that when the magnet 24 is energized the valve will be opened and the liquid in the left-hand end of the cylinder 6 allowed to escape therefrom into the right-hand end of the cylinder, thus permitting the piston to move toward the left and permitting the car to descend with a degree of rapidity corresponding to the fluency with which the water thus passes around the piston, and when it is desired to stop the car it is simply necessary to break the circuit through the magnet 24, whereupon the valve will be again closed by any suitable means—such, for instance, as a spring 32, bearing under the armature-lever 23.

The switch-box 25, it will be seen, is provided with two sets of contacts 25^a 25^b. One of these controls the magnet 24 and the other the motor 10, so that by pulling the hand-cable 26 in one direction the motor will be energized and the car raised by means of the propeller, and pulling the cable in the opposite direction will cut off the circuit from the motor and connect the same with the magnet 24 for opening the valve 20 and permitting the car to descend, while an intermediate position of the switch 27, where it contacts with neither of the contacts 25^a 25^b, will cut out both the magnet 24 and motor 10, and the valve 20 at such time being closed the car will stop, because of the inability of the piston 5 to move against the water or other liquid confined in the end of the cylinder in which the propeller is located.

In describing and claiming my invention I use the term "propeller" as a generic expression, meaning any of the well-known or suitable devices capable of receiving locomotion by acting directly against a fluid; but it will nevertheless be understood that it would be no departure from my invention to hold the propeller stationary and move the liquid-

confining chamber or cylinder by the force of the current produced by the propeller; nor would it be any departure from my invention to supply the propeller with water or liquid through the by-pass 19 or any other by-pass of suitable size instead of directly through the piston itself.

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

1. The combination of a liquid-confining chamber, a propeller therein, means for operating the same in said chamber and means mechanically connecting said propeller with the object to be elevated for imparting its propelling force thereto, substantially as set forth.

2. The combination of a liquid-chamber, a piston therein, a piston-rod connected to said piston, means located on one side of the piston and connected with said piston-rod for forcing the liquid in a direction away from the piston and thereby reacting on said rod, means for relieving the pressure on the other side of said piston, and means for operatively connecting said piston-rod with the object to be lifted, substantially as set forth.

3. The combination of a liquid-chamber, a revolving propeller therein having blades, a piston having a piston-rod operatively related to said propeller and also located in said chamber, means for revolving said propeller and means for connecting said piston-rod to the object to be elevated, substantially as set forth.

4. The combination of a liquid-confining chamber, a piston having a rod therein, a by-pass around said piston, a valve for controlling said by-pass, a propeller in said chamber operatively related to said piston-rod, and means operatively relating said piston-rod to the object to be elevated, substantially as set forth.

5. The combination of a liquid-confining chamber, a valved piston having a rod therein, a by-pass around said piston, means for controlling said by-pass, a propeller operatively related to said piston-rod and having operative connection therethrough with the object to be elevated and means for operating said propeller, substantially as set forth.

6. The combination of a liquid-confining chamber, a piston therein operatively related to the object to be elevated, a by-pass around said piston, a valve for controlling said by-pass, a propeller operatively related to the object to be elevated, an electric motor for operating said propeller, a magnet for controlling said valve, a switch for closing the circuit through either said motor or magnet and means for operating said switch, substantially as set forth.

7. The combination of a liquid-chamber, a propeller and a piston in said chamber, a motor for operating said propeller movable bodily therewith, a by-pass for permitting the wa-

ter or liquid in said chamber to pass said piston and means for controlling said by-pass, substantially as set forth.

5 8. The combination of a liquid-chamber, a piston and a propeller therein, a piston-rod passing through said piston and connected to said propeller, and a motor for rotating said rod, substantially as set forth.

10 9. The combination of a liquid-chamber, a piston located in said chamber, a piston-rod connected to said piston, a propeller on said piston-rod located within said chamber, a
15 truck, a motor mounted on said truck and operatively connected with for rotating said piston-rod, a sheave operatively connected with

said truck, a fixed sheave and a cable passing around said sheaves, substantially as set forth.

10. The combination of a liquid-confining chamber and a propeller having propelling blades or paddles located therein, one of said 20 parts (the chamber and propeller) being movable with relation to the other by the propelling action of said blades or paddles, and means for connecting said movable part with the object to be lifted, substantially as set 25 forth.

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Witnesses:

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