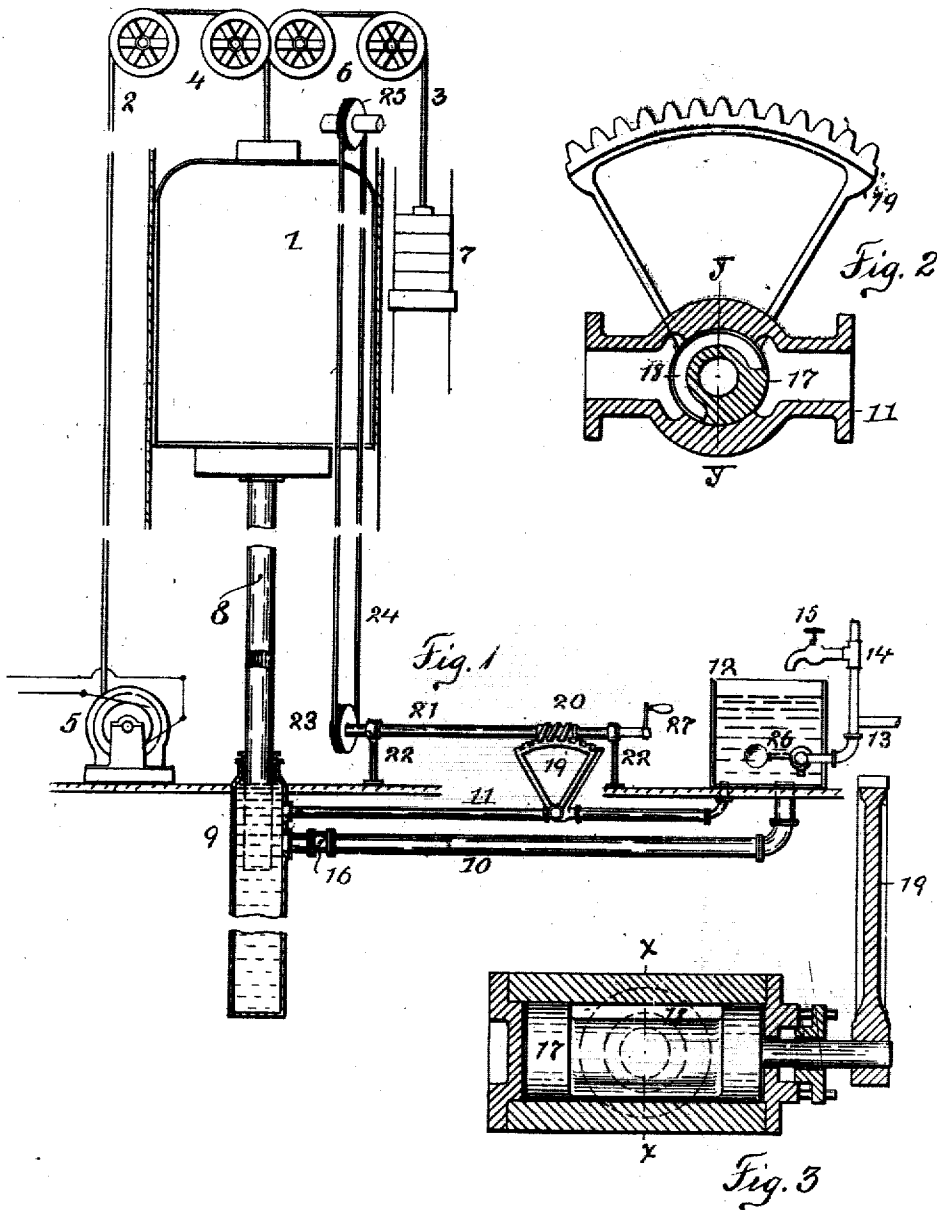


No. 816,677

PATENTED APR. 3, 1906.

T. E. MURRAY.
ELEVATOR.

APPLICATION FILED NOV. 18, 1905.



WITNESSES:

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THOMAS E. MURRAY, OF BROOKLYN, NEW YORK.

ELEVATOR.

No. 816,677.

Specification of Letters Patent.

Patented April 3, 1906.

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To all whom it may concern:

Be it known that I, THOMAS E. MURRAY, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Elevators, of which the following is a specification.

The invention relates to elevators for passengers, goods, &c.

When elevator-cars are hoisted by cables, failure of brakes, injury to the hoisting-gear, breakage of the cable, and various other well-known causes may result in their accidental fall.

The principle of my invention is to retain the cable-hoist preferably actuated by an electric motor and to provide a positive support wholly independent of the hoisting-gear for the car, which support is controllable during its descent, so that the car may be gradually lowered or stopped at will during the lowering.

I show my invention here embodied in a plunger attached to the car provided with electric hoisting-gear, which plunger enters a cylinder containing liquid. The ascent of the plunger when it is hoisted with the car may draw the liquid from a tank into the cylinder. The descent of the plunger, with the car, forces the liquid out of the cylinder and back into the tank. In the return-conduit I arrange a valve, controllable either from within or without the car by the elevator attendant, which being more or less opened regulates the speed of descent of the car or which being closed stops that descent. While the hoisting-gear and descent-controlling means are independent of one another, both coact with the car, the operation of the hoisting-gear being necessary to raise the car before the controlling means can perform its function, and they further specifically coact in that the raising of the car also causes the plunger to draw the necessary liquid into the cylinder.

A further advantage of my device is that it enables me to substitute electric hoisting-gear for hydraulic raising-gear in hydraulic elevators without throwing aside the usually costly plunger and cylinder already installed and which in such hydraulic elevators receive liquid under pressure from the pump. The pump as a source of power is not used. This done, I can get all the advantages of quick hoist, convenient power, and simplicity

incident to electric hoisting, combined with all the safety incident to slow-raising hydraulic apparatus.

In the accompanying drawings, Figure 1 shows the entire device applied to an elevator-car. Fig. 2 is a transverse section of the controlling-valve on the line *x x* of Fig. 3. Fig. 3 is a longitudinal section of said valve on the line *y y* of Fig. 2.

Similar numbers of reference indicate like parts.

The elevator-car 1, which travels in the usual shaft, has connected to it the cables 2 and 3. Cable 2 passes over the fixed pulleys 4 and to any suitable hoisting-drum, which is rotated by the electric motor 5. Cable 3 passes over the fixed pulleys 6 and carries the usual counterweight 7.

To the bottom of the car is connected the hollow plunger 8, which enters the vertical cylinder 9, which cylinder is connected by pipes 10 and 11 to the bottom of water-tank 12. Entering said tank is a pipe 13, leading from the street-main or any other source of water-supply, provided with any suitable valve controlled by the lever and float 26. The arrangement of said valve and float is to be such that should the water in the tank fall below a predetermined level the float in descending will open the valve and admit water until said level is regained. This is simply a guard device to prevent the possibility of the tank becoming emptied. Ordinarily the tank may be filled by the branch pipe 14, provided with a suitable valve or faucet 15. It is to be understood, however, that there is no actual expenditure of water in my device, since it merely travels from cylinder to tank and back as the device operates, so that the object of the float is to guard against leakage and other accidental causes of waste in the system.

The pipe 10 serves to lead the supply of water to the cylinder 9, is preferably larger than the pipe 11, and contains a check-valve of any suitable construction at 16, which prevents backflow from cylinder to tank. Seated in the pipe 11 is an oscillating valve 17, having a circumferential recess 18, which when suitably placed permits flow from the cylinder 9 to tank 12. Said valve is operated by a toothed segment 19, secured on the end of its stem. With said segment 19 engages the worm 20, the shaft 21 of which is supported in fixed standards 22 and carries

the pulley 23. An endless cord 24 passes over said pulley, through the elevator-car, and over a fixed pulley 25, disposed in the shaft above said car.

5 The operation of the device is as follows: Valve 17 being closed by the means described, the motor is controlled, preferably, in the usual way from the car to rotate the hoisting-drum to lift the car by its cable 2. The plunger 8 is thus moved upwardly in cylinder 9, and thus operates in conjunction with gravity, if the tank 12 is at a higher elevation, to draw water from said tank into said cylinder. When the car is to be lowered, the hoisting-gear is operated in the ordinary manner to allow the cable 2 to unwind, and the attendant in the car by means of the cord 24 opens the valve 17, so as to allow the water forced out of the cylinder by the descending plunger to pass again into tank 12. By opening the valve in this way more or less the car can be caused to descend with greater or less rapidity, or by closing the valve it can be stopped at any desired point in its descent. Instead of controlling the valve 17 by the cord 24 within the car I may do so by crank 27 on the valve-shaft.

By the aforesaid construction it will be seen that the function of the electric motor is simply to hoist the car and that the drum or other means of winding the cable associated therewith need not be provided unless desired with any brake or other device for arresting the car in descending. Whether such brake is provided or not the plunger and piston serve positively to support and to control the descent, and so to prevent any possibility of the car falling because of accident to motor or hoisting-gear. It is to be noted that the cylinder 9 is not a motor-cylinder and that no pump is combined with it to cause the car to be raised by hydraulic pressure therein.

In practice I may also use the electrically-actuated hoisting-gear in the ordinary manner, both raising and lowering the car through its control, and employ my present device to determine some fixed and definite speed of descent. In such case the cord for operating the valve 17 from within the car may be omitted, and the valve 17 may be set by the crank 27, for example, to some selected degree of opening which will allow escape of water to regulate the descent of the car at only the predetermined speed, as so many feet per minute. The presence of my invention will in no wise interfere with the speed of electric hoisting, since the flow of water into the cylinder through the pipe 10, purposely made large in diameter, will be free and unimpeded.

I claim—

1. The combination with an elevator-car and hoisting-gear therefor, of a vertical rigid support secured to said car, a cylinder containing liquid disposed below said car and receiving said support, a liquid-escape conduit communicating with said cylinder and means for regulating the escape of liquid from said cylinder through said conduit upon the descent of said car.

2. The combination with an elevator-car and hoisting-gear therefor, of a closed liquid-receptacle, a tank, means positively actuated by said car for causing a flow of liquid from said tank to said receptacle on the ascent of said car and for forcing said liquid out of said receptacle and into said tank on the descent of said car and means for controlling the escape of liquid from said receptacle to said tank.

3. The combination with an elevator-car and hoisting-gear therefor, of a vertical supporting-plunger, a cylinder containing liquid disposed below said car and receiving said plunger, a tank communicating with said cylinder and means controllable within said car for regulating the escape of liquid from said cylinder to said tank.

4. The combination with an elevator-car and hoisting-gear therefor, of a vertical supporting-plunger, a cylinder containing liquid disposed below said car and receiving said plunger, a tank, a duct between said tank and cylinder, a check-valve in said duct constructed to prevent flow of liquid from cylinder to tank, a second duct between said duct and said cylinder and a valve for regulating liquid-flow through said last-named duct.

5. The combination with an elevator-car and hoisting-gear therefor, of a vertical supporting-plunger, a cylinder containing liquid disposed below said car and receiving said plunger, a tank, a duct between said tank and cylinder, a check-valve in said duct constructed to prevent flow of liquid from cylinder to tank, a second duct between said tank and said cylinder, a valve for regulating liquid through said last-named duct and means controllable within said car for actuating said valve.

6. The combination with an elevator-car and hoisting-gear therefor, of a vertical supporting-plunger, a cylinder containing liquid disposed below and receiving said plunger, a tank, a duct between said tank and said cylinder, a check-valve in said duct constructed to prevent flow of liquid from cylinder to tank, a second duct between said tank and said cylinder, a valve for regulating liquid-flow through said last-named duct, a rack-segment carried by said valve-stem, a worm engaging with said segment and an endless cord for actuating said worm and extending within said car.

7. The combination with an elevator-car and hoisting-gear therefor, of a hollow vertical supporting-plunger, a cylinder below said car containing liquid and receiving said plunger, a tank, a duct between said tank and said cylinder, and a valve in said duct.

5 8. The combination with an elevator-car and hoisting-gear therefor, of a vertical supporting-plunger, a cylinder below said car containing liquid and receiving said plunger, a tank, means for delivering a supply of liquid to said tank, a duct between said tank and said cylinder, means for preventing flow through said duct from cylinder to tank, a

second duct between tank and cylinder and a valve in said last-named duct.

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

THOMAS E. MURRAY.

Witnesses:

WM. H. SIEGMAN,
PARK BENJAMIN, Jr.