

No. 816,678.

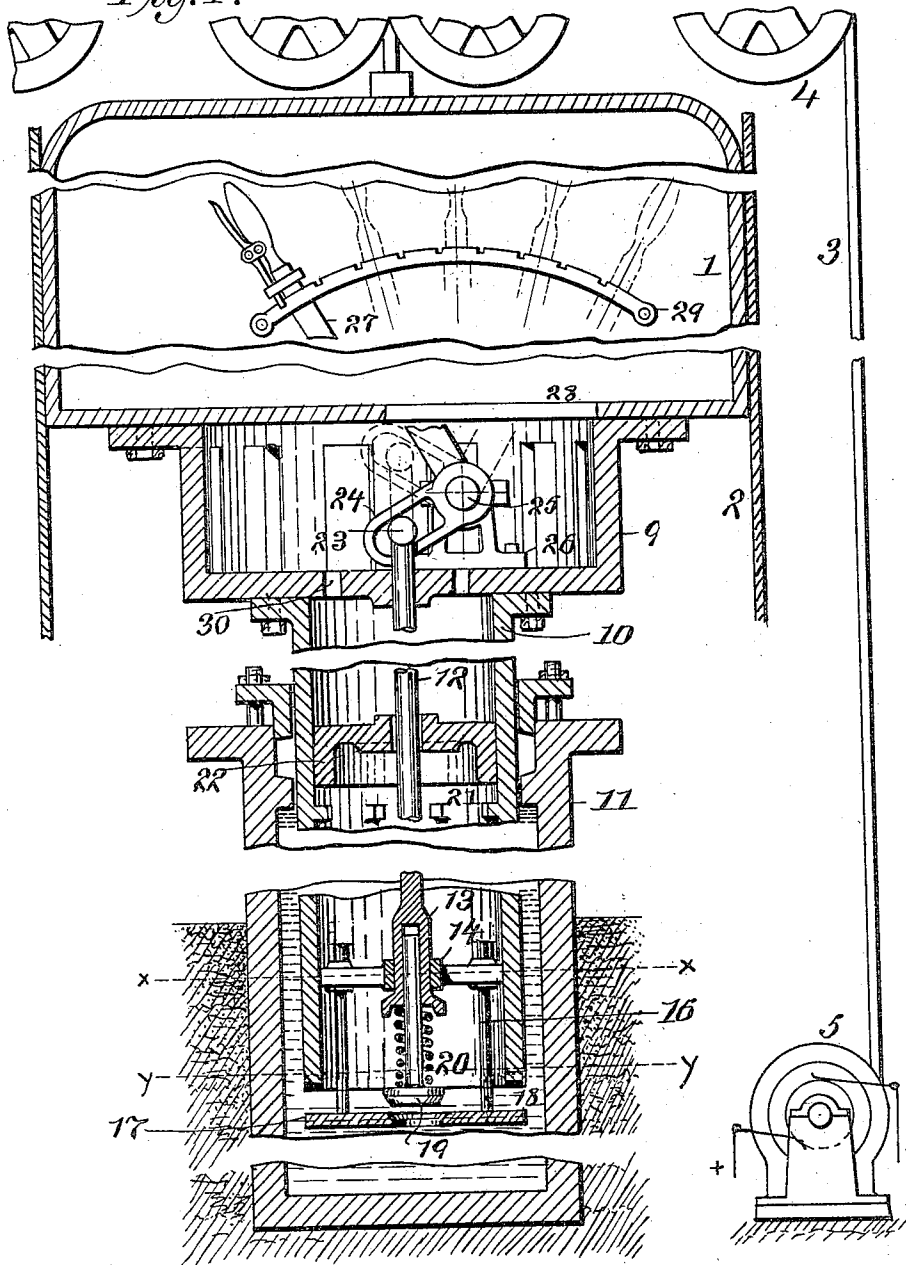
PATENTED APR. 3, 1906.

T. E. MURRAY.  
ELEVATOR.

APPLICATION FILED NOV. 25, 1905.

3 SHEETS—SHEET 1.

Fig. 1.



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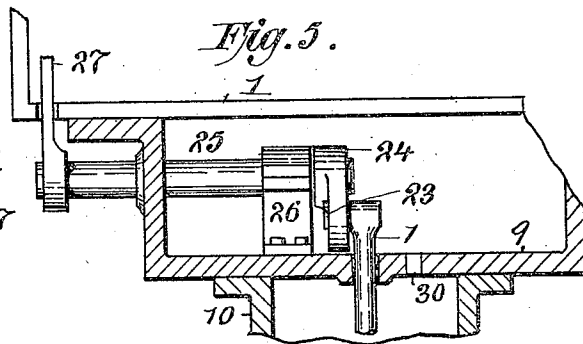
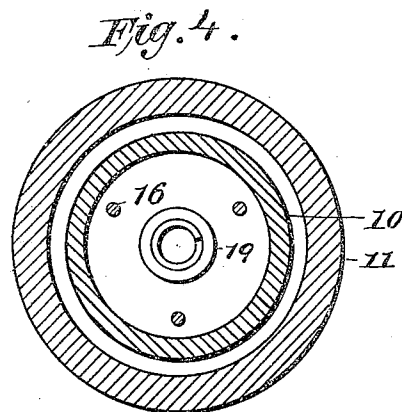
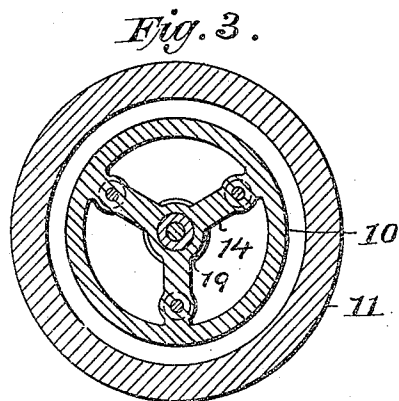
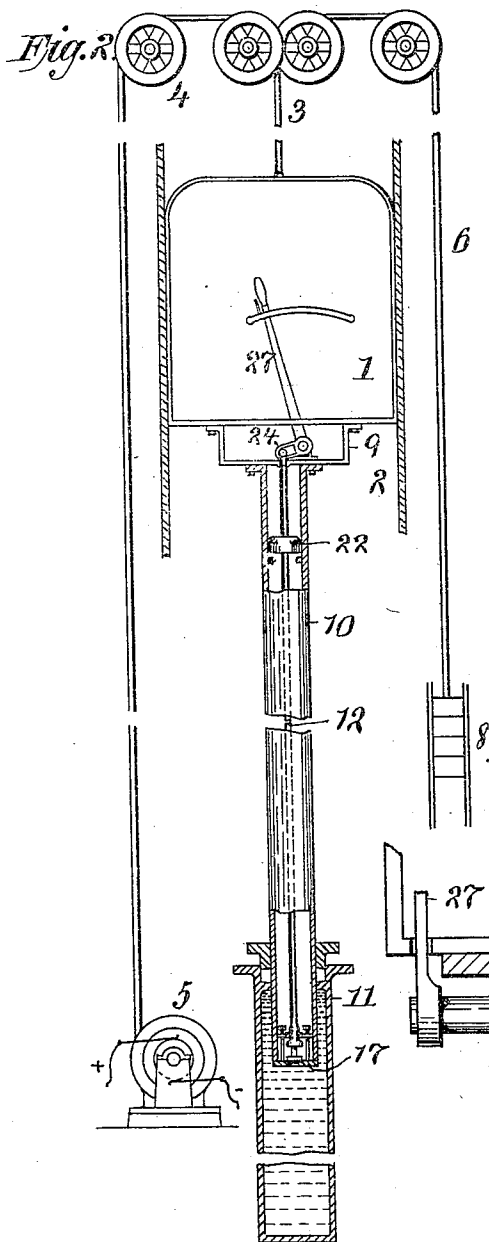
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 6.

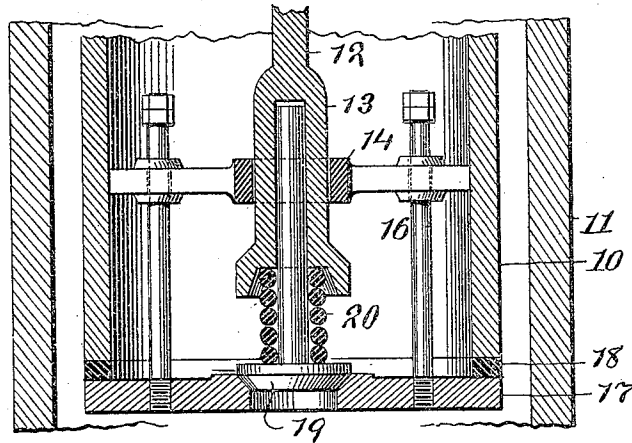


Fig. 7.

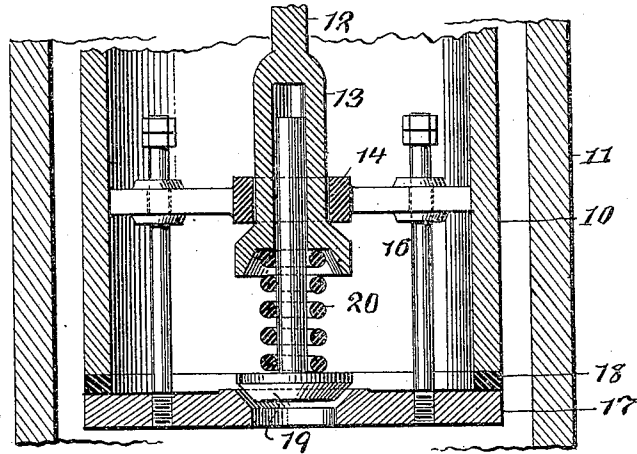
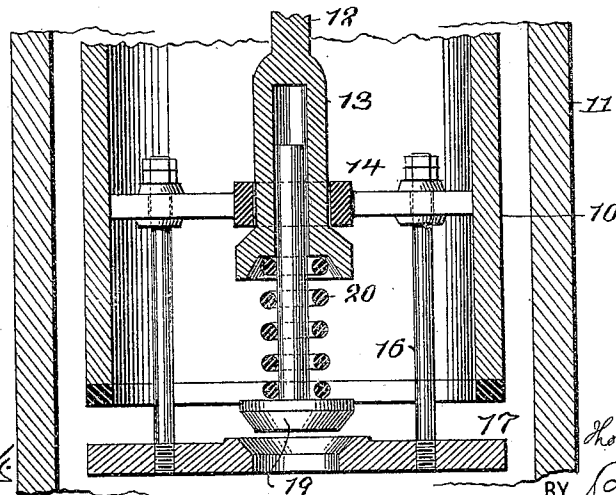


Fig. 8.



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# UNITED STATES PATENT OFFICE.

THOMAS E. MURRAY, OF BROOKLYN, NEW YORK.

## ELEVATOR.

No. 816,678.

Specification of Letters Patent.

Patented April 3, 1906.

Application filed November 25, 1905. Serial No. 288,997.

*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.

The invention has for its object to prevent falling of the car and to allow of the speed of descent thereof to be regulated as may be desired.

The apparatus for raising and lowering the car may be of any known type, and preferably is electrically actuated.

My invention, which is used in conjunction with said apparatus and without requiring modification thereof, consists in the combination, with the car, of a closed liquid-containing receptacle, a tube connected to said car and entering said receptacle, and means for regulating the flow of liquid from said cylinder to said tube. Through the regulation of the liquid-flow from cylinder to tube the speed of the car in descending may be controlled.

The invention further consists in the device for providing an air-cushion in the tube, which gradually arrests the motion of the car at the bottom of its shaft in case of too quick descent and in the various combinations set forth in the claims.

In the accompanying drawings, Figure 1 is an enlarged vertical section broken in several places to permit the working mechanism to be shown on a sufficiently large scale for purposes of clearness. Fig. 2 is a general view showing my device applied to an elevator-car arranged in the usual shaft. Fig. 3 is a horizontal section on the line *x x* of Fig. 1. Fig. 4 is a horizontal section on the line *y y* of Fig. 1. Fig. 5 is a side view of the mechanism for actuating the regulating-valve rod. Fig. 6 is a vertical section of a part of the liquid-containing cylinder, the tube therein, the check-valve, and the regulating-valve seated in said check-valve, the parts being in the position which they assume when both the regulating-valve and check-valve are closed. Fig. 7 is a similar view showing the position assumed by the parts when the car is descending, the check-valve being then closed and the regulating-valve open. Fig. 8 is a similar view showing the position of the parts when the elevator-car is ascending, both

the check-valve and the regulating-valve then being open.

Similar numbers of reference indicate like parts.

1 is an elevator-car disposed in the vertical shaft, (indicated at 2.) A cable 3, attached to the upper part of the car, passes over fixed pulleys 4 and is connected to any suitable hoisting apparatus 5, preferably electrically actuated and controlled. The cable 6, also connected to said car, passes over fixed pulley 7 and carries the usual counterweight 8.

To the bottom of the car 1 is secured the cage 9, and on the under side of said cage is bolted a tube 10, which enters through any suitable stuffing-box, the vertical liquid-containing cylinder 11.

12 is a valve-rod, having at its lower end an enlargement 13, which passes through the central sleeve of a spider 14, fixed within the tube 10. Passing freely through said spider are vertical headed rods 16, which carry the check-valve 17, which valve closes the lower end of tube 10. Between the valve 17 and the end of tube 10 may be interposed any suitable elastic packing-ring 18. Seated in the check-valve 17 is a valve 19, the stem of which enters a central recess in the enlargement 13 at the end of rod 12. Between the valve 19 and the lower extremity of rod 12 is interposed a helical spring 20. Near the top of the tube 10 and on the inner wall thereof are formed projections 21, and loose on the rod 12 above these projections is a downwardly-flanged piston 22. The valve-rod 12 extends upward through a central opening in the bottom of the cage 9 and at its upper end is provided with a pin 23, which is received in a slot formed in a crank-arm 24, fast on shaft 25, which shaft is journaled in a standard 26 within said cage and in one wall of said cage. On the end of shaft 25 is an operating hand-lever 27, which extends upwardly through an opening 28 in the bottom of the car and may be held in any desired position, as indicated by the dotted lines in Fig. 1, by the usual spring-latch engaging in notches on the upper edge of an arc-shaped bar 29, fixed in said car.

The operation of the device is as follows: Upon the ascent of the car the check-valve 17 is moved downwardly by the liquid-pressure within the tube, so that the lower end of the tube is fully opened. As the tube 10 is carried upward by the car there is consequently

a free escape of liquid from said tube into the cylinder 11. When the car begins to descend, the pressure of the liquid below the check-valve 17 raises it, causing it first to strike the regulating-valve 19, which thus becomes seated and held to its seat by the compressed spring 20, and afterward the check-valve 17 meets and closes the lower end of the tube. This state of affairs is shown in Fig. 6, and under such conditions no liquid would enter the tube 10 from the cylinder 11, and the descent of the elevator would therefore be stopped. By raising the rod 12, however, the regulating-valve 19 may be permitted to lift to any desired extent, depending upon the amount of raising of said rod. This is indicated in Fig. 7, where the rod 12 has been lifted and the valve 19 is beginning to rise to an extent which will be limited by the striking of the end of its stem against the bottom of the recess in the end of the valve-rod. It will thus be obvious that by suitably setting the valve-rod 12 the regulating-valve 19 can be caused to open to any desired degree during the descent of the car and that the quantity of liquid which will pass from the cylinder 11 to the tube 10 during such descent, and hence the speed of descent of said tube and elevator-car, will depend upon the extent of opening of said valve 19.

The object of the piston 22 is to prevent sudden shock in case through the failure of the hoisting mechanism or through any other cause the car should fall or move downward too rapidly. The liquid then acting on the bottom of the loose piston 22 compresses the air in the space in the tube 10 above it, which air can escape only through the relatively small openings 30 in the bottom of the cage 9. It will be obvious that an air-cushion is thus provided which receives and gradually stops the car at the end of its downward movement.

The preferable mode of operation of the device is as follows: When the car ascends, the hand-lever 27 may be in the position shown in Fig. 1 and remain in that position until the car reaches the top of its path. When the car begins its descent and when the parts would normally take the position shown in Fig. 6, the lever is thrown over to any one of the positions indicated by dotted lines, Fig. 1, or as shown in Fig. 7, with the result of lifting the valve-rod 12, thereby more or less opening the valve 19 and so regulating the liquid-flow from cylinder to tube, and hence the speed of descent.

I claim—

1. In combination with an elevator-car, and hoisting-gear therefor, a closed liquid-containing receptacle, a tube connected to

said car and entering said receptacle and means for regulating the flow of liquid from said cylinder to said tube.

2. In combination with an elevator-car, and hoisting-gear therefor, a closed liquid-containing receptacle, a tube connected to said car and entering said receptacle, means for regulating the flow of liquid from said cylinder to said tube and a device within said car for controlling said regulating means.

3. In combination with an elevator-car, and hoisting-gear therefor, a closed liquid-containing receptacle, a tube connected to said car and entering said receptacle, and a check-valve at the lower end of said tube.

4. In combination with an elevator-car, and hoisting-gear therefor, a closed liquid-containing receptacle, a tube connected to said car and entering said receptacle, a check-valve at the lower end of said tube, a valve seated in said check-valve, and means for controlling said last-named valve.

5. In combination with an elevator-car, and hoisting-gear therefor, a closed liquid-containing cylinder disposed below said car, a tube depending from said car and entering said cylinder and means in said tube for regulating flow of liquid from said cylinder into said tube.

6. In combination with an elevator-car, and hoisting-gear therefor, a closed liquid-containing receptacle, a tube connected to said car and entering said receptacle, a valve having its seat in the bottom of the tube, a valve-rod for operating said valve extending through said tube, and means within said car for operating said valve-rod.

7. In combination with an elevator-car and hoisting-gear therefor, a closed liquid-containing receptacle, a tube connected to said car and entering said receptacle, a valve-rod, a valve having its seat in the bottom of said tube and provided with a stem entering a recess in the end of said valve-rod and a spring between said valve and valve-rod end.

8. In combination with an elevator-car and hoisting-gear therefor, a closed liquid-containing cylinder, a tube having openings at its upper end and connected to said car and entering said cylinder, a valve for controlling the inflow of liquid from said cylinder to said tube, a rod for said valve extending through said tube, a loose piston on said rod and means for retaining said piston in the upper part of said tube.

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

THOMAS E. MURRAY.

Witnesses:

WM. H. SIEGMAN,  
PARK BENJAMIN, Jr.