No. 887,154

PATENTED MAY 12, 1908.

J. VAN VLECK.

ELEVATOR.

APPLICATION FILED JUNE 29, 1907.

2 SHEETS—SHEET 1.

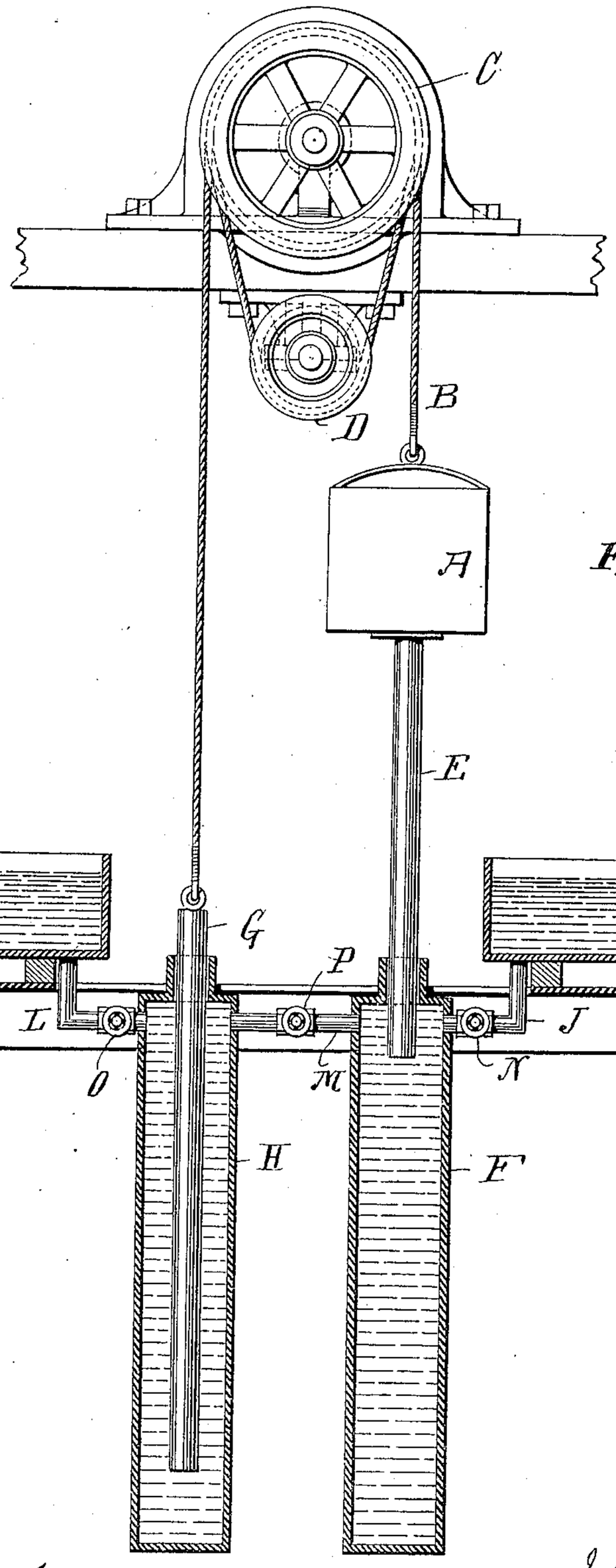

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

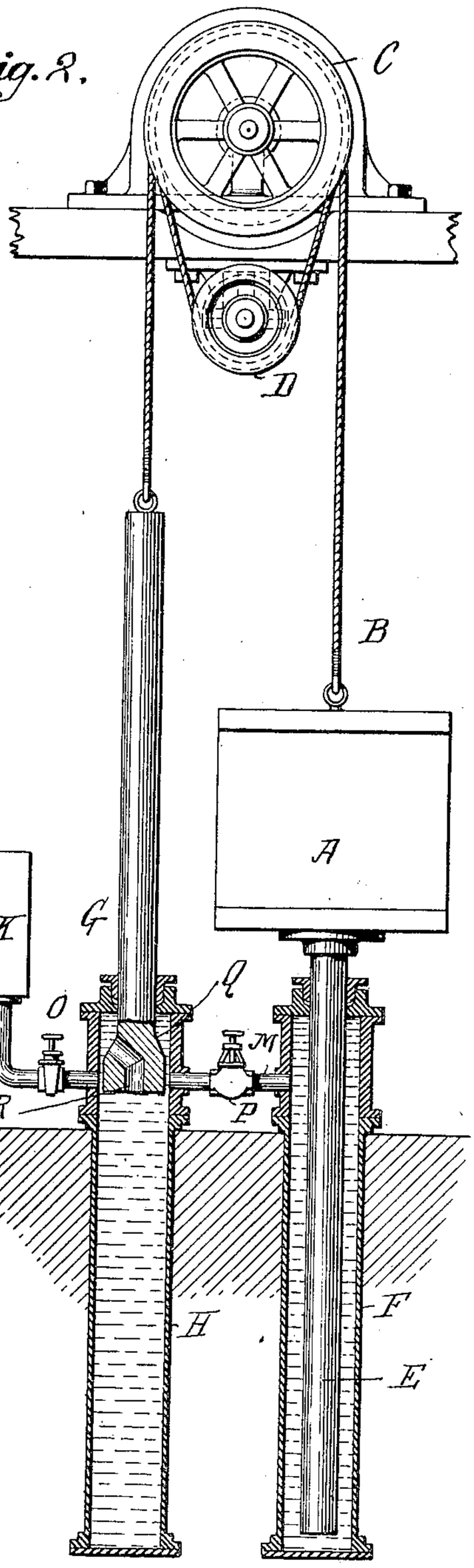
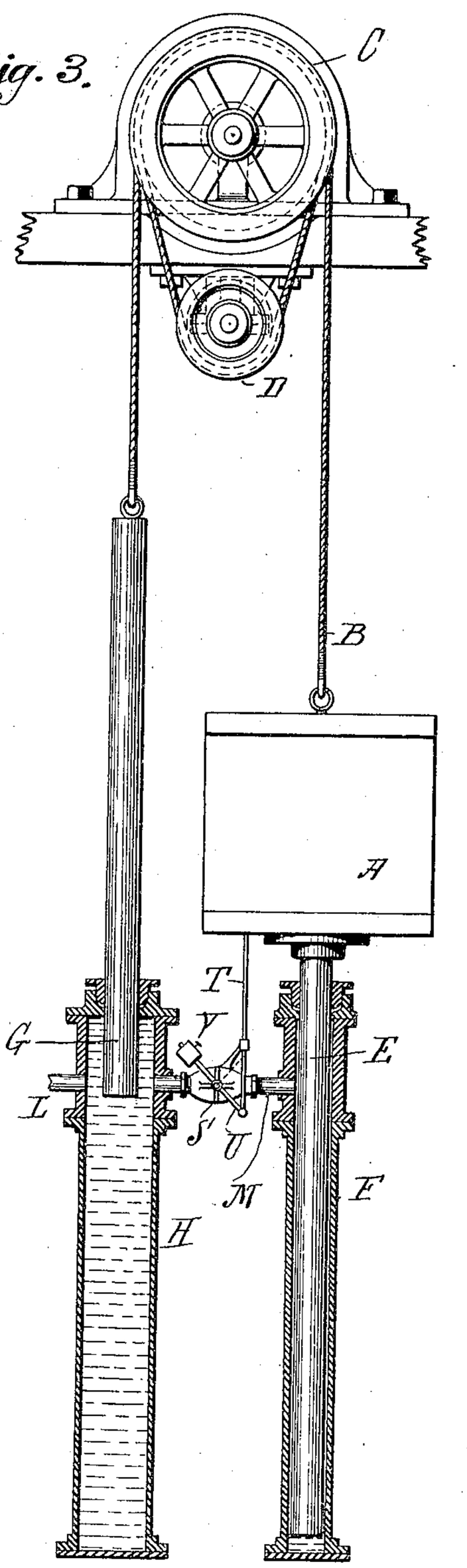


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN VAN VLECK, OF NEW YORK, N. Y.

ELEVATOR.

No. 887,154. Specification of Letters Patent. Patented May 12, 1908.

Application filed June 29, 1907. Serial No. 381,391.

To all whom it may concern:

Be it known that I, JOHN VAN VLECK, a citizen of the United States, residing at New York, in the county of New York 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 elevator mechanism, and has for its object increased safety.

The invention consists in the combination in an elevator mechanism with the car, and means for raising and lowering said car, of two liquid containing vessels, and means connected to said car for displacing liquid from one vessel while the car is moving in one direction, and from the other vessel while the car is moving in the opposite direction; also in means for preventing the bottom of the car from striking the top of the cylinder beneath it or any other solid abutment there located; also in the various combinations and instrumentalities set forth in the claims.

In the accompanying drawings—Figure 1 is an elevation of my apparatus showing the cylinders and supply tanks in vertical section. Figs. 2 and 3 are similar views showing more particularly devices for preventing the bottom of the car from striking the top of the cylinder beneath it, or any other solid abutment there located.

The car A is operated by the usual traction hoist, of which B is the hoisting cable connected to the top of the car and passing around the hoisting drum C and fixed idler D. The hoisting drum is rotated by any suitable motor. Connected to the bottom of the car A is a plunger E which enters the vertical cylinder F. Connected to the end of the hoisting cable B is a plunger G, which enters the vertical cylinder H. The car is, therefore, suspended by the cable B which is connected to the plunger G and is also supported from below on plunger E. The cylinders F, H, are supplied with water from any suitable source, such as the tank I, communicating with cylinder F by pipe J, and the tank K communicating with cylinder H by pipe L. The two cylinders are connected to one another by the pipe M. Valves N, O, P, are disposed respectively in pipes J, L, M.

The cylinders being filled with water from the tanks, the operation is as follows: As the car rises the plunger E is moved upward in cylinder F, and the plunger G descends in cylinder H. When the car descends plunger G rises in cylinder H, and plunger E moves down in cylinder F. While the car is moving in one direction the liquid is displaced from one of the two cylinders F, H, and while the car is moving in the other direction the liquid is displaced from the other of said cylinders. If the valve P be shut and the valves N and O be opened, then the liquid displaced from the cylinder F may pass back to the tank I, and the liquid displaced from the cylinder H may pass back to the tank K. If the valves N and O be shut and the valve P be opened, then the liquid displaced from one cylinder will pass into the other. If either valve N or O be shut, and valve P be opened, then the liquid displaced in the cylinder which is not in communication with its supply tank will pass through the pipe M to the other cylinder and the tank therewith associated. In any case the flow of displaced liquid will be easily regulated by suitable adjustment of the valves.

In Figs. 2 and 3, I have illustrated a construction in which but one source of water supply namely, the tank K connecting with cylinder H is preferably used, the liquid then passing from cylinder H to cylinder F by the pipe M. I also show in these figures means for preventing the plunger E from striking the top of the cylinder F or any solid abutment which may be there located. In Fig. 2 the plunger G is enlarged at its lower end, as shown at Q, so that only a narrow space is left between the plunger and cylinder wall. There is also an opening R through said enlarged portion Q, which is of sufficient size to permit of sufficiently free movement of the plunger in its cylinder. The arrangement is such that just before the bottom of the car reaches any solid abutment at the top of cylinder F, the enlarged portion Q of plunger G comes in front of the opening of pipe M. Hence, the flow of liquid displaced by plunger E from cylinder F and passing through pipe M to cylinder H is very greatly retarded and a substantial water cushion is produced under the lower end of plunger E.

In the construction shown in Fig. 3, I arrange in the pipe M a valve S, operated by the vertical rod T, pivoted to the valve lever U. Any suitable means, as for example, a weight V on the lever U, may be provided, to hold the valve S normally open (see dotted lines). When the car A, however, nears any solid abutment at the top of cylinder F, the car bottom strikes the upper end of rod T, push-

ing it down, so closing the valve S, and preventing flow of water from cylinder F. In such case the cylinder F, as in Fig. 2, receives its water supply from cylinder H, and this cylinder only is connected to tank K.

The special advantage of this apparatus is its safety. No matter where a part may break or become disconnected the car cannot rapidly fall, or be jerked violently to the top of its path. For, it is obvious, that if the break or disconnection occur any where in the devices which are associated with the car through the plunger E, the car will still be controlled by the plunger G, while on the other hand, if similar accident occur anywhere in the devices which are associated with the car through the hoisting cable B, the car will still be controlled by the plunger E. In case of breakage of cable B, both plungers E and G will descend together, and approximately at the same speed, which speed in the construction shown in Figs. 2 and 3, may be regulated by suitable adjustment of the valve O.

I claim:

1. In an elevator mechanism, a car, a traction device for raising and lowering said car, two liquid containing vessels and means in each of said vessels and connected to said car for displacing liquid from one vessel while the car is moving in one direction and from the other vessel when the car is moving in the opposite direction.

2. In an elevator mechanism, a car, a traction device for raising and lowering said car, two liquid containing vessels, means in each of said vessels and connected to said car for displacing liquid from one vessel while the car is moving in one direction, and from the other vessel when the car is moving in the opposite direction, and means for regulating the amount of liquid so displaced.

3. In an elevator mechanism, a car, a traction device for raising and lowering said car, two liquid containing vessels, and means in each of said vessels and connected to said car for displacing a body of liquid from one vessel to the other while said car is moving in each direction.

4. In an elevator mechanism, a car, a traction device for raising and lowering said car, two liquid containing vessels, means in each of said vessels and connected to said car for displacing a body of liquid from one vessel to the other while said car is moving in each direction, and means for regulating the amount of liquid so displaced.

5. In an elevator mechanism, two liquid containing cylinders, a plunger in each cylinder, a car carried by one of said plungers, and a traction device connected to said car and to the other plunger for simultaneously raising said car and lowering said last named plunger.

6. In an elevator mechanism, two liquid containing cylinders, a plunger in each cylinder, a car carried by one of said plungers, a cable connecting said car to the other of said plungers and a traction device for actuating said cable to raise and lower said car.

7. In an elevator mechanism, two liquid containing cylinders, a plunger in each cylinder, a car carried by one of said plungers, a traction device connected to said car and to the other plunger for simultaneously raising said car and lowering said last named plunger, and a duct connecting said cylinders.

8. In an elevator mechanism, two liquid containing cylinders, a plunger in each cylinder, a car carried by one of said plungers, a traction device connected to said car and to the other plunger for simultaneously raising said car and lowering said last named plunger, a duct connecting said cylinders, and means for regulating liquid flow through said duct.

9. In an elevator mechanism, two liquid containing cylinders, a plunger in each cylinder, a car carried by one of said plungers, a traction device connected to said car and to the other plunger for simultaneously raising said car and lowering said plunger, and means for preventing said car from meeting a solid abutment at the bottom of its path.

10. In an elevator mechanism, two liquid containing cylinders, a plunger in each cylinder, a car carried by one of said plungers, a traction device connected to said car and to the other plunger for simultaneously raising said car and lowering said plunger, and means controlled by said car for preventing said car from meeting a solid abutment at the bottom of its path.

11. In an elevator mechanism, two liquid containing cylinders, a plunger in each cylinder, a car carried by one of said plungers, and means connected to said car and to the other plunger for simultaneously raising said car and lowering said last named plunger; said last named plunger being constructed to prevent said car from meeting a solid abutment at the bottom of its path.

12. In an elevator mechanism, two liquid containing cylinders, a plunger in each cylinder, a car carried by one of said plungers, a traction device connected to said car and to the other plunger for simultaneously raising said car and lowering said last named plunger; said last named plunger being constructed to prevent said car from meeting a solid abutment at the bottom of its path.

13. In an elevator mechanism, two liquid containing cylinders, a plunger in each cylinder, a car carried by one of said plungers, a traction device connected to said car and to the other plunger for simultaneously raising said car and lowering said last named plunger; and a duct connecting said cylinders; said last named plunger being constructed to retard the flow of liquid through said duct.

14. In an elevator mechanism, a car, a traction device for actuating said car, two

liquid containing cylinders, a plunger in each cylinder, a car carried by one of said plungers, means for suspending said car connected to the other of said plungers, and means for retarding the downward movement of both said car and said last named plunger upon failure of said suspension means.

15. In an elevator mechanism, a car, a traction device for actuating said car, two liquid containing cylinders, a plunger in each cylinder, a car carried by one of said plungers, means for suspending said car connected to the other of said plungers, a duct connecting said cylinders, and means for regulating escape of liquid from one of said cylinders.

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

JOHN VAN VLECK.

Witnesses:
GERTRUDE T. PORTER,
EDWIN H. DIETERICH.