

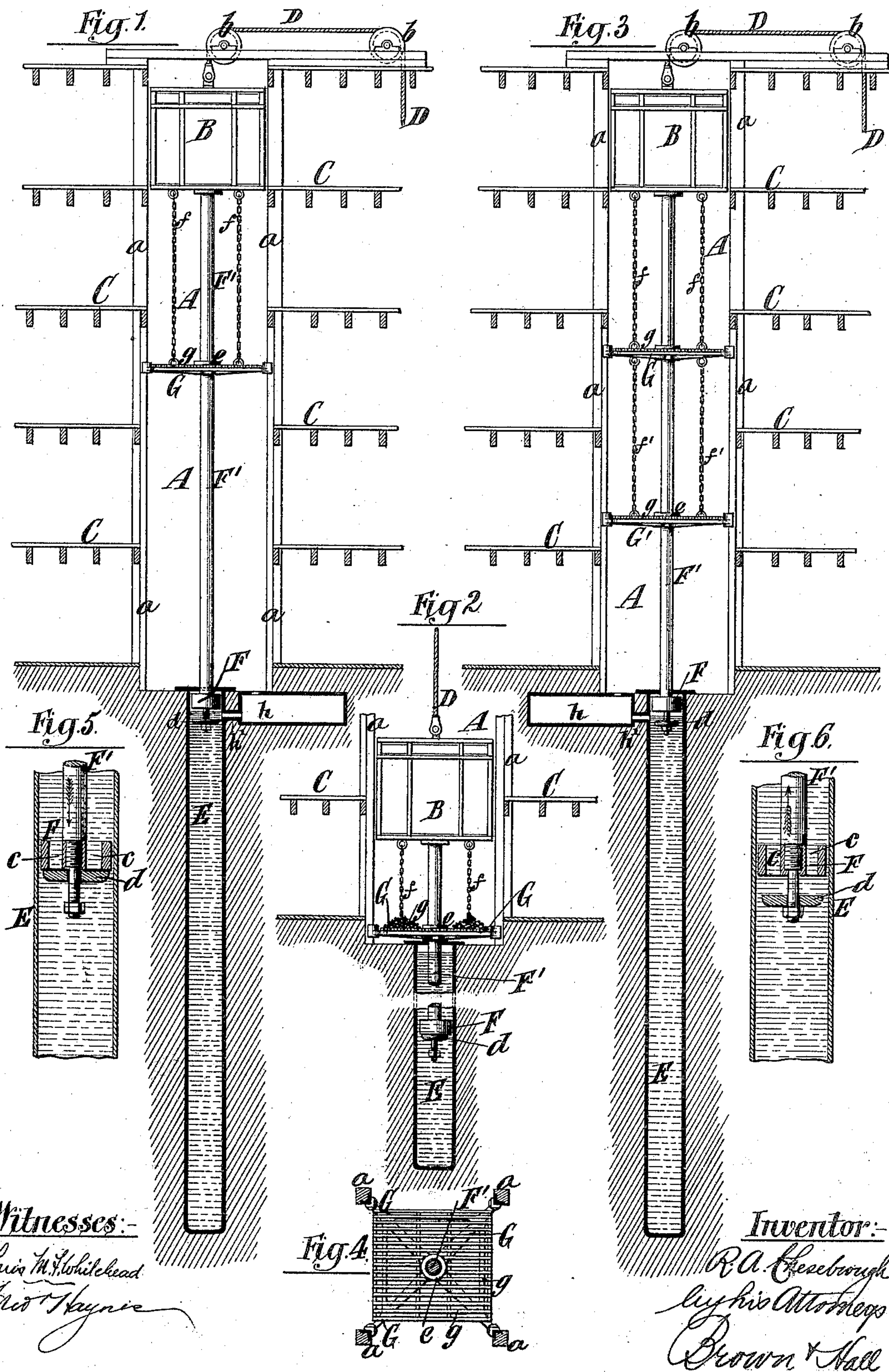
(No Model.)

R. A. CHESEBROUGH.

SAFETY APPLIANCE FOR ELEVATORS.

No. 301,213.

Patented July 1, 1884.



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# UNITED STATES PATENT OFFICE.

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## SAFETY APPLIANCE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 301,213, dated July 1, 1884.

Application filed April 8, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT A. CHESEBROUGH, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Safety Appliances for Elevators, of which the following is a specification.

My invention relates to the class of appliances for elevators which are designed to check or retard the fall of the elevator car, cab, or platform when the hoisting-rope breaks or any other accident occurs which would allow the car, cab, or platform to fall were it not for such appliances.

In my United States Letters Patent No. 286,684, dated October 16, 1883, I have shown and described in connection with an elevator-shaft and a car, cab, or platform working therein a cylinder fixed at the bottom of the shaft, and a piston or plunger fitting therein and attached to the bottom of the car, cab, or platform in such a manner that the rise and fall of the car, cab, or platform will cause a reciprocating movement of the piston or plunger in the cylinder, and a vent-aperture through which air or other elastic fluid may enter and leave the cylinder, the cylinder being of such length that the piston or plunger remains therein during the whole travel of the car, cab, or platform, and the whole being independent of the mechanism for raising and lowering the car, cab, or platform, and forming a safety appliance for retarding the fall of the car, cab, or platform.

My present invention consists, essentially, in the combination, with an elevator-shaft and a car, cab, or platform working therein, of a cylinder fixed at the bottom of the shaft and adapted to receive and contain a liquid—such as water or oil—and a piston or plunger attached to and working with the car, cab, or platform, and constructed to form a passage to allow liquid to pass downward below it as it ascends, the whole forming a safety appliance independent of the mechanism employed to operate the car or cab. A solid piston loosely fitting in the cylinder, so as to leave an annular space or passage between the cylinder and piston and for the passage of water, could be used where the resistance offered to the upward movement of the piston would not

be an obstacle; but in case it is desired that the piston should move freely upward the piston should be formed with openings or passages and fitted with a valve to open as the piston rises and close as it descends. Such a safety appliance applied to an elevator will prevent the car, cab, or platform from ever descending at too great a speed, even though the hoisting-rope should not break, and hence forms a very desirable addition to an elevator.

In the accompanying drawings, Figure 1 represents a vertical section of my safety appliance employed in connection with an elevator-shaft and car or cab, the car or cab being at the top of the shaft, and the piston-rod being steadied and stayed by a single brace. Fig. 2 is a sectional view corresponding to Fig. 1, the car or cab being near to its lowest position, and portions of the figure being broken away to reduce the height thereof. Fig. 3 is a sectional elevation corresponding to Fig. 1, with two braces for the piston-rod. Fig. 4 is a horizontal section showing the corner-posts of the elevator-shaft and a plan of one of the braces; and Figs. 5 and 6 respectively represent a piston as descending and ascending in a cylinder, and upon a large scale.

Similar letters of reference designate corresponding parts in all the figures.

A designates the shaft, and B the car, cab, or platform, arranged to travel therein, it being guided in any well-known manner upon the corner-posts *a*. I have here represented the shaft A as four floors, C, in height; but obviously the number of floors in buildings in which are elevators will vary greatly.

D designates the hoisting-rope, attached to the top of the car or cab B, and passing around or over sheaves or pulleys *b*. I have not represented any hoisting mechanism, as it forms no part of my invention; but that employed may be of any suitable character.

E designates a tube or cylinder sunk in the earth at the bottom of the shaft A, and composed of cast or wrought iron, as may be most desirable. In this cylinder is a piston or plunger, F, which can move freely therein, and which is attached by a rod, F', to the car or cab A.

The piston or plunger F is best shown in Figs. 5 and 6, and there it will be seen that it



is valvular, or has openings, or passages *c* through it. As here shown, the piston is screwed upon the rod *F'*, and upon the lower end portion of the rod is fitted a valve, *d*, which can slide freely up and down upon the downward prolongation of the rod *F'*.

From the above description it will appear that if the cylinder *E* be filled with liquid the valve *d*, when the car is ascending, will assume the position shown in Fig. 6, and the piston will move freely upward because of the space afforded by the openings *c* and by the space around the piston for the passage of liquid downward. When the car descends, the valve *d* closes, as shown in Fig. 5, and as the liquid can only pass upward around the piston the descent of the latter and the car or cab will be greatly retarded. It is therefore not desirable that the piston should work tightly in the cylinder, and hence no packing for the piston is necessary.

The rod *F'* may be of metal or wood, and, if of metal, will preferably be hollow or tubular, to give it increased stiffness, with less metal than in a solid rod. When the rod *F'* is of considerable length, there might be liability of its bending or buckling and breaking when a loaded car is supported upon it, and to the end that it shall not be liable to such accident I employ braces *G*, which consist of arms radiating from a hub or sleeve, *e*, fitting loosely the rod *F'*, and through which said rod may slide, the arms being guided in any suitable manner by the posts *a*.

In Figs. 1 and 2 I have shown only a single brace, *G*, connected by chains or other connections, *f*, with the car *B*; but in Fig. 3 I have shown a second brace, *G'*, suspended by chains or connections *f'* from the first brace, *G*. When the car or cab descends, these braces deposit at the bottom of the shaft; but in ascending the car or cab picks up first the brace *G*, and then the brace *G'*, and so sustains the rod *F'*. In order that the chains *f f'*, as they are deposited on the braces as the car descends, may not drop down through and become entangled, each brace preferably supports a grating, screen, or other floor, *g*, as shown in Fig. 4, on which the chain is laid or deposited.

Obviously, if the cylinder *E* is filled with liquid, as shown in Fig. 1, when the piston is at the top of its stroke, that volume of water cannot be held by the cylinder when the piston is at the bottom of the cylinder, owing to the displacement of the rod *F'*. If the rod be hollow, liquid may be admitted to it as the piston descends, so as to reduce the displacement; but even this would or might not be sufficient. In order to obviate this difficulty, I connect with the upper end of the cylinder *E* by a pipe, *h'*, a reservoir, *h*, and when the piston descends the liquid displaced from the cylinder will pass into the reservoir which is shown in Figs. 1 and 3.

In lieu of employing chains for raising the brace or braces *G*, I may employ a piston-

rod having collars which act upon the braces to raise them on coming against the under side thereof; or, in lieu of a rod having collars, a rod having portions of different diameter forming a shoulder or shoulders might be employed. In either case the hole in the top of the cylinder should be large enough to permit the passage of the collars or shoulders.

The advantage resulting from the use of the valve *d* is that the piston can then move upward freely as the car or cab rises; but in some cases the piston might be made solid and without a valve, and if fitted loosely in the cylinder it would greatly retard the fall of the car or cab, although it would not offer a great resistance to the upward movement of the car or cab at a normal speed.

I am aware that a cylinder and piston or plunger placed below an elevator car, cab, or platform have been employed as a means of raising and lowering the same, and I make no claim to such an apparatus as of my invention. In such an apparatus the water or other fluid is forced into the cylinder under pressure to raise the elevator car, cab, or platform, and all parts of the apparatus must be of very fine construction to be absolutely water-tight, so that when water is forced in below the piston the latter and the superposed car or cab will be elevated. In my apparatus there is no necessity of a tightly-fitting piston, and the apparatus is not and cannot be employed to raise the car or cab, but forms a safety appliance entirely independent of the mechanism for that purpose. In my apparatus the water or liquid remains a constant quantity in the cylinder, and when the car or cab is hoisted it draws up the piston, and the liquid above passes down around the loosely-fitting piston and through the downwardly-opening valve, if the piston is provided with a valve.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with an elevator-shaft and a car, cab, or platform working therein, of a liquid-cylinder at the bottom of said shaft and a piston or plunger attached to and moving with the car or cab, and constructed to form a passage to allow liquid to pass downward below it as it ascends, the whole forming a safety appliance independent of the mechanism employed to operate the car or cab, substantially as herein described.

2. The combination, with an elevator-shaft and a car, cab, or platform working therein, of a liquid-cylinder at the bottom of the shaft, a valvular piston or plunger attached to and moving with said car or cab, and a valve applied to said piston or plunger, and serving to permit a free passage of the piston or plunger upward through the liquid in the cylinder, and to retard its downward movement by the liquid in the cylinder, the whole forming a safety appliance independent of the mechanism employed to operate the car, cab, or platform, substantially as herein described.



3. The combination, with an elevator-shaft and a car, cab, or platform working therein, of a liquid-cylinder at the bottom of said shaft, a valvular piston or plunger loosely fitting said cylinder and attached to and moving with said car or cab, and a valve applied to said piston or plunger and serving to permit a free upward passage of the piston or plunger through the liquid in the cylinder, and to retard its downward movement by the liquid in the cylinder, the whole forming a safety appliance independent of the mechanism employed to operate the car, cab, or platform, substantially as herein described.

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