

A. D. HOFFMAN.
Safety-Elevator.

No. 222,702.

Patented Dec. 16, 1879.

Fig. 2.

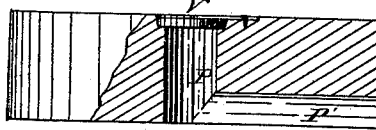
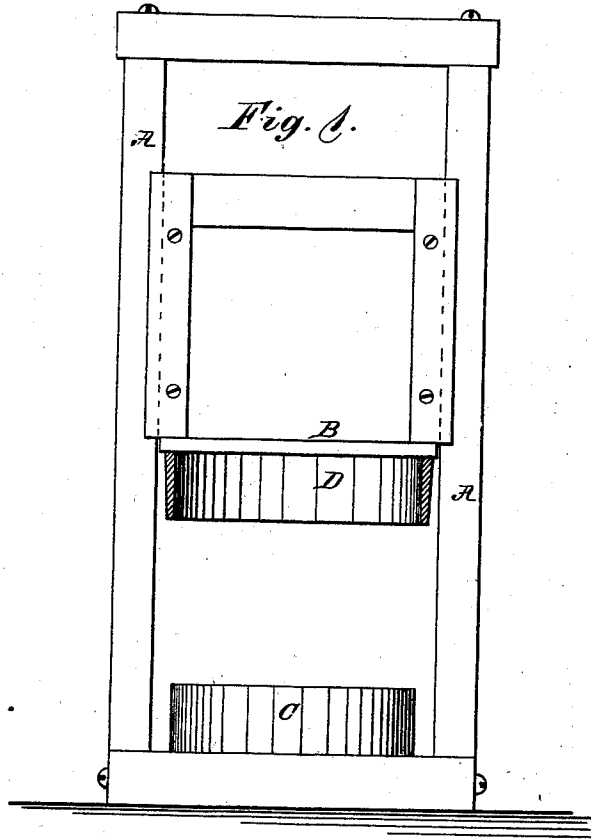


Fig. 1.



WITNESSES.

J. B. Townsend
W. L. Adams

INVENTOR:

Austin D. Hoffman
per M. E. Danton
Attorney

UNITED STATES PATENT OFFICE.

AUSTIN D. HOFFMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO CHARLES H. MITCHELL, OF SAME PLACE.

IMPROVEMENT IN SAFETY-ELEVATORS.

Specification forming part of Letters Patent No. **222,702**, dated December 16, 1879; application filed September 16, 1879.

To all whom it may concern:

Be it known that I, AUSTIN D. HOFFMAN, of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Safety-Elevators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to safety devices for passenger-elevators, and has for its object to impede the fall of the elevator-cab, and especially to arrest the same gently at the bottom of the shaft in case the ropes break, to prevent serious injury to the occupants.

To this end my invention consists in an automatic check or relief valve which opens freely when the car begins to ascend, to relieve vacuum beneath the car at that time, but closes tightly when the car is descending.

Figure 1 is a front elevation of my invention. Fig. 2 is a vertical section of the base-block.

The drawings illustrate the essential parts of an elevator concerned in my improvements.

A A are the upright guides, located on opposite sides of the shaft. B is the car-platform. C is a stationary cylindric plunger firmly placed at the bottom of the shaft and concentric therewith; and D is a cylinder, open at the bottom, and secured to the under side of the car-platform in position and of proper size to set down loosely over the plunger C when the car is dropped to the bottom of the shaft.

In case the rope which lifts the car is broken when the latter is raised to a considerable height and the car falls, owing to the absence or failure of means to arrest the same, the open cylinder D gathers a body of air, which is in some degree compressed by the fall, and which, at the bottom, is inclosed between the platform B and the plunger D, forming a cushion, by which the car is arrested without violent concussion.

Sufficient space is provided between the plunger and the open cylinder to allow the air

to escape only slowly, and, preferably, this space is reduced, as the cylinder descends over the plunger, by making one or the other, or both, in a slight degree tapering.

In order to facilitate the starting of the car upward when, in the course of its regular use, it has been lowered to the bottom of the shaft, the check-valve V is provided, which opens a passage, P P', leading to the free air, to admit air freely between the cylinder and piston.

The valve V closes tightly when the elevator-car is descending, and does not permit any air to escape by way of the passage P; but it opens freely when the car commences to ascend, to admit air freely below the car, so as to relieve the partial vacuum which would otherwise occur upon the starting of the car. The quantity of the resistance offered to the starting of the car by the partial vacuum would be equal to the resistance offered to its descent by the compression of the air below the car.

By arranging the open cylinder D beneath the car, as shown, it serves, in the fall of the car, as a parachute, to gather a body of air, which is compressed by the forcible descent before reaching the plunger C.

Beneath a car having a plane bottom, and, still more, beneath one having a closed cylinder depending therefrom the air may readily escape to the sides without greatly impeding the fall of the car; but in the case of the parachute described the car is retarded in its fall in proportion as the air is less free to escape.

By reason of the great compressibility of air, moreover, it is practicable, in the use of air already somewhat compressed, for the cushion to employ a shorter cylinder and plunger than would otherwise be necessary to obtain the same effect, saving materially in the weight added to the car and in the cost of construction.

The plunger C may be made of brick or stone permanently in place, with or without a top plate of iron. The open cylinder should be made of boiler-iron, which will be at once light and strong.

Of course the parachute and plunger need not be cylindric; but that form is preferred for obvious reasons. The parachute or open cylinder should be as large in diameter as the

size of the platform will permit, and in depth, say, about one inch for every foot to which the car may be raised.

Having thus described my invention, I claim—

In combination with the plunger C and open cylinder D, the valve V and passage P, P', substantially as described, and for the purposes set forth.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

AUSTIN D. HOFFMAN.

Witnesses:

M. E. DAYTON,

W. C. ADAMS.