(No Model.) 2 Sheets—Sheet 1.

A. C. ELLITHORPE.

SAFETY DEVICE FOR ELEVATORS.

No. 248,150. Patented Oct. 11, 1881.

Fig. 1.

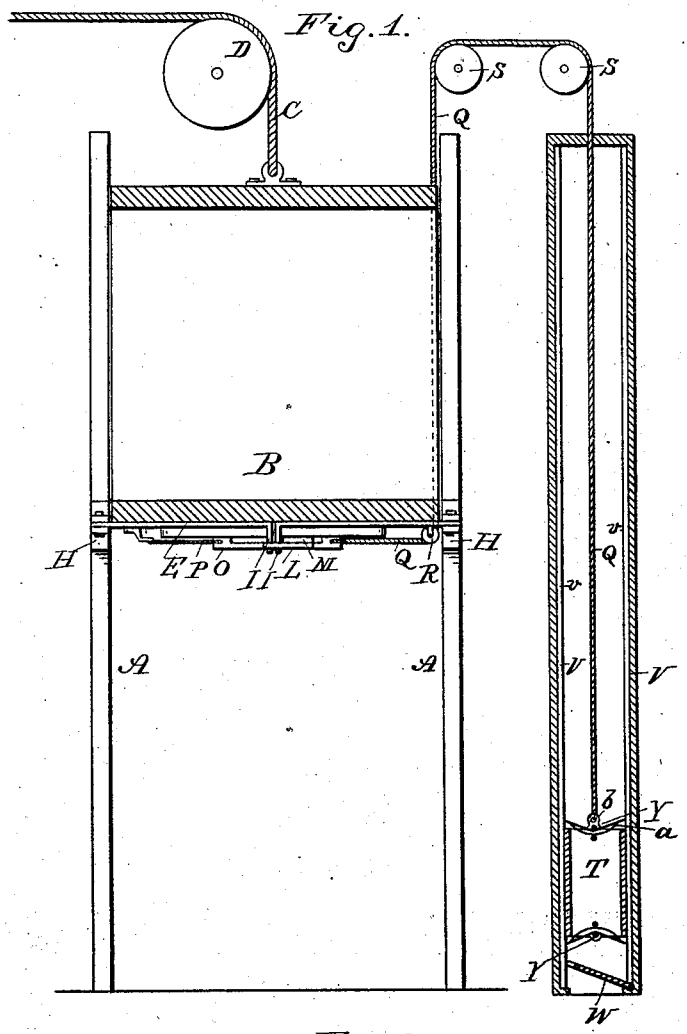

Fig. 2.

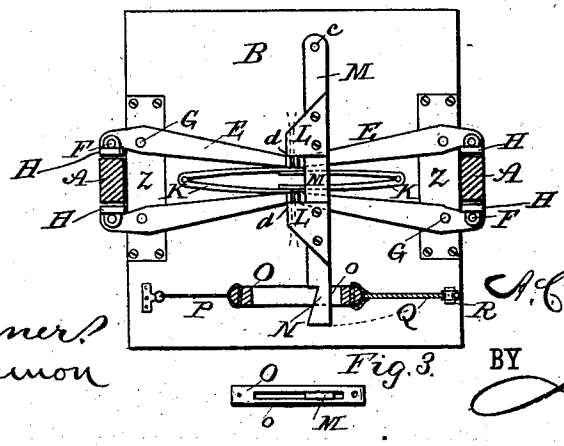

Fig. 3.

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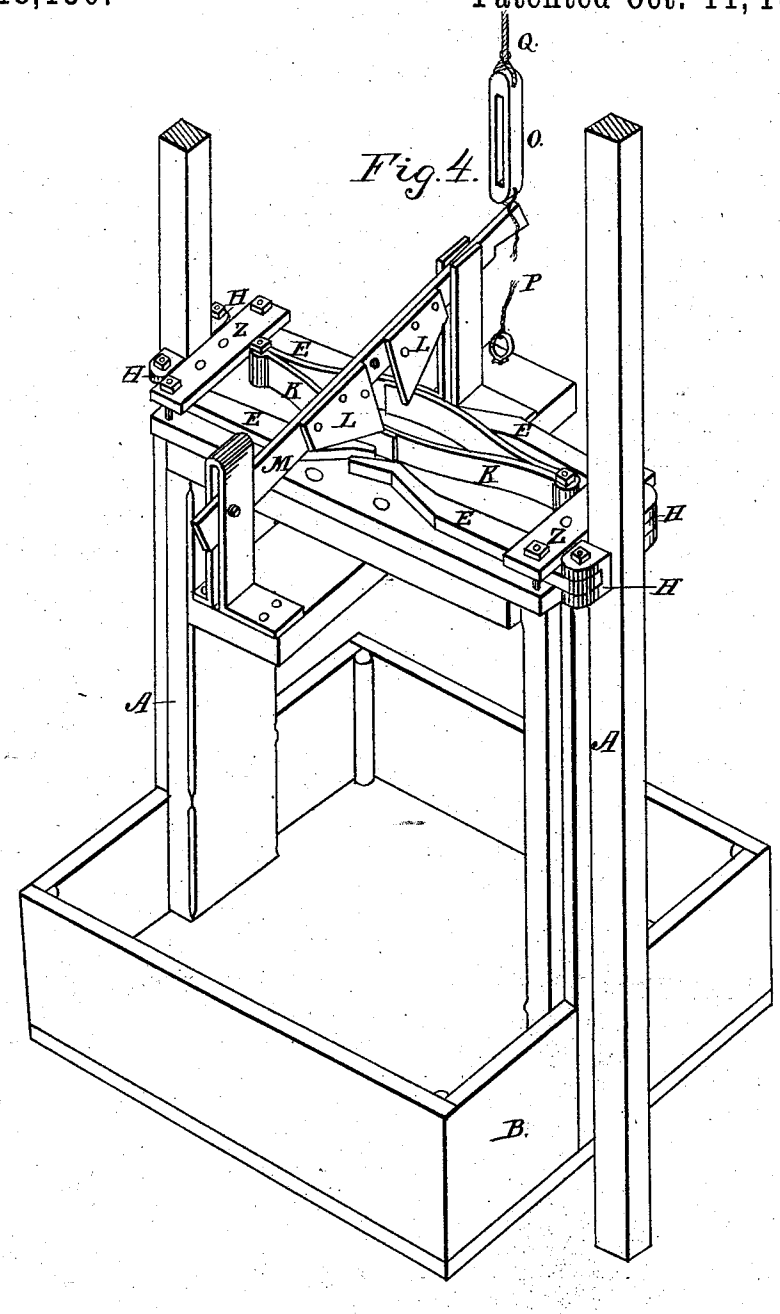
Fig. 4.



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UNITED STATES PATENT OFFICE.

ALBERT C. ELLITHORPE, OF CHICAGO, ILLINOIS.

SAFETY DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 248,150, dated October 11, 1881.

Application filed March 23, 1881. (No model.)

To all whom it may concern:

Be it known that I, ALBERT C. ELLITHORPE, of Chicago, Cook county, Illinois, have invented a new and useful Improvement in Safety Devices for Elevators; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of my improved elevator. Fig. 2 is a bottom view of the elevator-car and brake mechanism. Fig. 3 is a top view of the trip-link, and Fig. 4 is a perspective view of the top of the elevator-car and the brake mechanism.

My invention relates to safety devices for elevators; and it consists, first, in devices for applying to elevator-cars friction-brakes operated by the resistance of air in an auxiliary shaft when the elevator-car rope breaks or is moving with too much velocity.

My invention further consists in certain details of construction, hereinafter more fully set forth.

In the accompanying drawings, A A represent the guide-posts, and B the elevator-car, both of ordinary construction, and operated, in the usual manner, by means of the rope C and pulley D.

V represents an auxiliary air-shaft open at bottom, and provided with a flap-valve, W, opening upward, and guides *v* for the cage T, adapted to reciprocate in the shaft V.

The cage T is hollow and square in cross-section and adapted to fit loosely in the auxiliary shaft V.

Y Y are flexible valves fitting over the heads in the ends of the cage T, and each provided with springs *a*, secured to the heads of the cage and bearing against the under faces of the valves to press the upper valve upward and the lower valve downward somewhat into a cup form.

b is an eyebolt secured centrally in the upper head of the cage T, to which the cable Q is securely fastened. The cable Q passes from the eyebolt *b* up and through a central opening in the upper head of the shaft V, thence around pulleys S S, and thence downwardly outside the elevator-car B, partly around a small pulley, R, as shown in Fig. 1, secured to the bottom of the car, and is attached to the end of the trip-link O, having a central longitudinal slot, *o*, which receives the free end of the trip-lever M, pivoted to the bottom of the car at *c*.

To the outer end of the trip-link O is secured a rope, P, the opposite end of which is secured to an eyebolt or lug securely attached to the bottom of the elevator-car.

E E represent four brake-levers, fulcrumed at G to the plates Z, secured to the bottom of the car-elevator B, as shown in Fig. 2. The brake-levers E are each provided on its outer end with a brake-shoe, H, pivoted at F to the brake-lever, and adapted to clamp the guide-posts A when operated.

The inner ends of the brake-levers E are each provided with a projecting lug, *d*, adapted to be received in a recess between the jaws L L, secured to the trip-lever M.

K K are semi-elliptic springs secured to the bottom of the elevator car, each between a pair of brake-levers, the spring acting to throw the inner ends of the brake-levers outwardly when released from the trip-lever M, and the brake-shoes to bite or clamp the guide-posts. In Fig. 4, I have shown the brake mechanism as applied to the top of the car-elevator. In lieu of the semi-elliptic springs K, above described, for operating the brake-levers, other forms of springs may be employed or any similar device for operating the brake-levers.

The auxiliary shaft V is preferably arranged parallel with and near the guide-posts A, although it may be arranged at any distance from the elevator without departing from the spirit of my invention.

It will be observed from the arrangement and construction of the parts as above described that as the elevator-car ascends the cage in the auxiliary shaft descends, and vice versa, and the valves Y are so arranged that in the ascent and descent of the cage T, when it and the elevator-car are moving at the ordinary rate of speed, the valves will not be pressed outward by the resistance of the air in the shaft V, but will assume the positions shown in Fig. 1. If, however, the elevator-car, from any cause, is moving with too great velocity downward, for example, or the rope C should break, a corresponding increase of velocity is

imparted to the cage upward, and the resistance of the air in the shaft V between the cage and the head of the shaft will press out the upper valve Y, preventing the escape of air down the sides of the cage T, thus imparting an increased strain on the cable Q sufficient to break the smaller cable, P, between the slotted trip-link O and its attachment to the bottom of the elevator-car, whereby the trip-lever is swung, the brake-levers released, and the friction-shoes clamp the guide-posts at either side, actuated by the springs.

In the upward movement of the cage T the flap-valve W opens to admit air to prevent a tendency to form a vacuum below the cage.

In the downward movement of the cage, in case of the breakage of the connection P, as before described, the valve W will be closed by the pressure of the air above N, and the resistance of the air in the space between the upper face of the flap-valve W and the lower end of the cage will press the lower valve Y upward and outward against the interior sides of the shaft V, and an air-cushion will thus be formed at the lower end of the cage to allow it to descend easily to the bottom of the shaft.

The object of making the cage T hollow is to introduce sufficient weight to secure proper tension to the cable Q and insure the descent of the cage in the auxiliary shaft V.

What I claim as my invention is—

1. The combination, with an elevator-car provided with a brake mechanism, of an auxiliary air-shaft, a cage reciprocating in said shaft and provided with an upper and lower valve operated by the resistance of air in the shaft, and a connection between the cage and elevator-car adapted to be broken or detached by the resistance of the air when an accelerated speed is imparted to the car, substantially as described.

2. The combination, with an elevator-car, B, of the pivoted trip-lever M, having jaws L, brake-levers E, provided with brake shoes H and lugs *d*, guide-posts A, springs K, and slotted trip-link O, secured to the car by the detachable cord P, substantially as described.

3. The combination, with the guide-posts A and elevator-car B, provided with the trip-lever M, having jaws L, brake-levers E, springs K, slotted trip-link O, and detachable cord P, of the cable Q, air-shaft V, and cage T, provided with the upper and lower spring-valves, Y, substantially as described.

4. The hollow cage T, provided with upper and lower heads, valves Y, and springs *a*, substantially as described.

5. The combination, with the auxiliary air-shaft V, provided with guides *v* and valve W, of the hollow cage T, provided with upper and lower heads, and spring-valves Y, substantially as described.

6. In an elevator or inclined-way safety device, a balanced cord secured at one end to a cage reciprocating in an auxiliary air-shaft, and attached at its other end to the elevator-car by a cord adapted to break and allow the brakes to be applied to the guide-posts, substantially as described.

7. The combination, with the detachable or breaking connection P, of the slotted link O, trip-lever M, cable Q, and cage T, substantially as described.

8. The combination, with an elevator-car and an auxiliary air-shaft, of a cage reciprocating in the air-shaft, connected by a cable with the elevator-car, and provided with upper and lower spring-valves expanded by the resistance of air in the shaft upon the accelerated motion of the car, whereby, if the lifting-rope of the elevator-car breaks, the movement of the car will be retarded by the resistance of the air in the shaft on the expanding upper valve, substantially as described.

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Witnesses:

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AMOS W. HART.