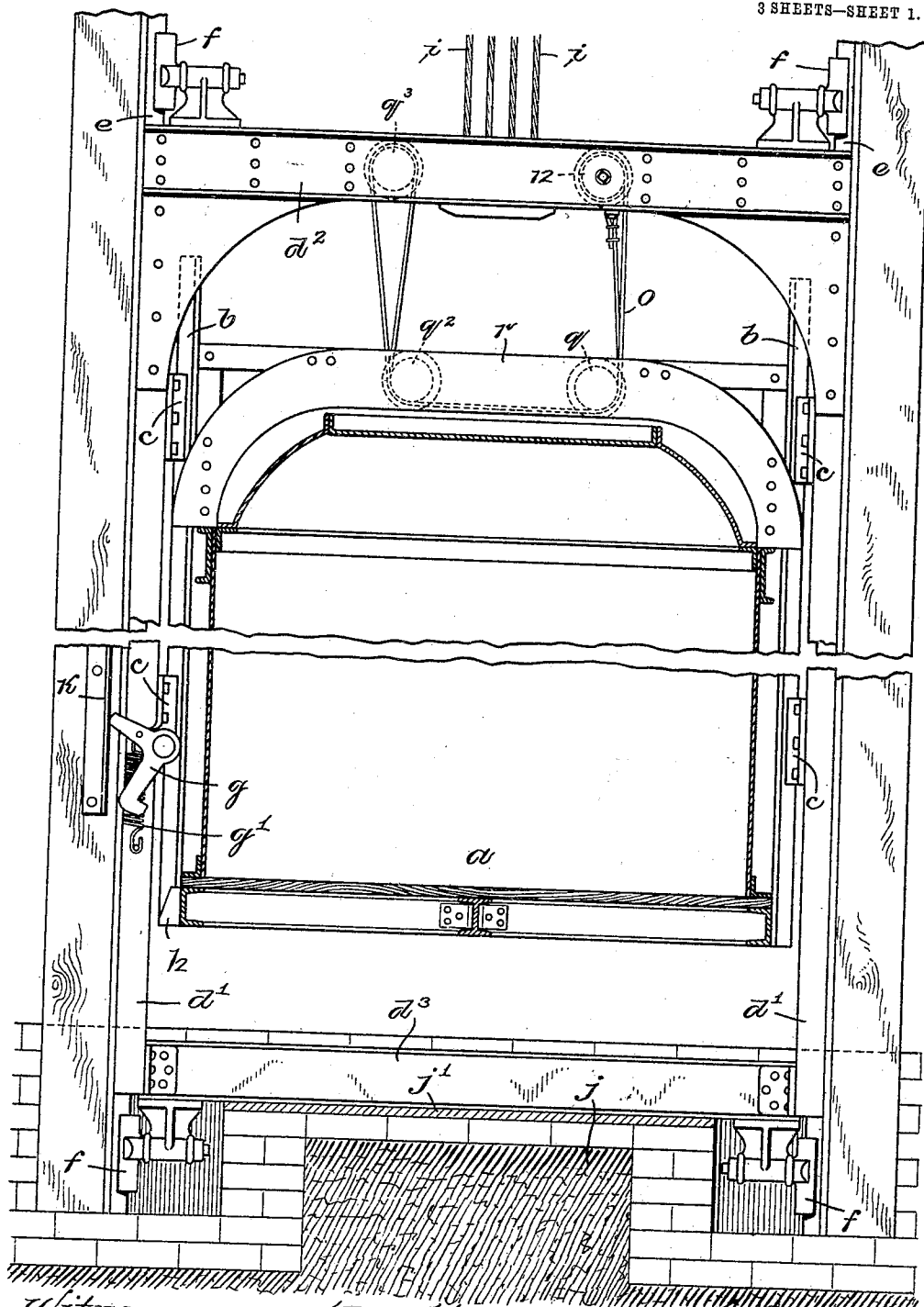


P. H. COSTELLO.  
ELEVATOR SAFETY DEVICE.  
APPLICATION FILED DEC. 23, 1907.

920,437.

Patented May 4, 1909.

3 SHEETS—SHEET 1.



Witnesses:  
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Fig. 1

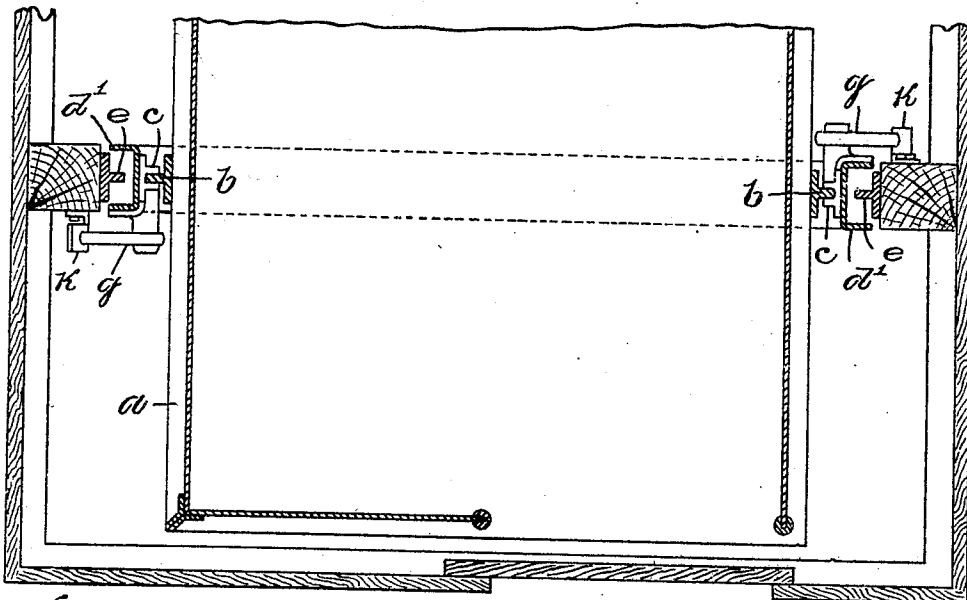
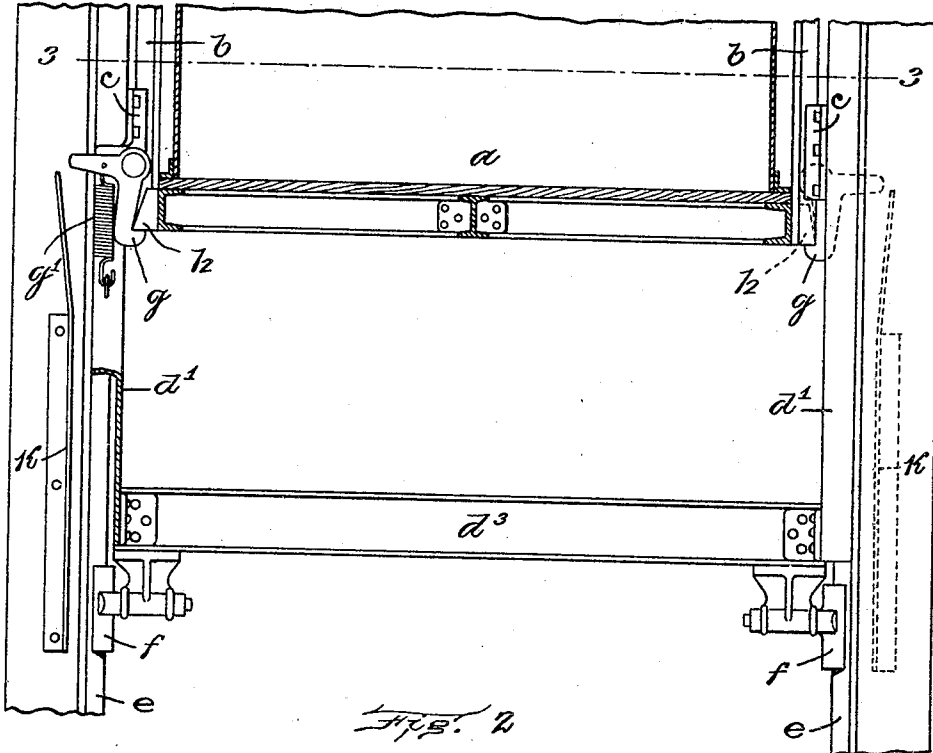
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3 SHEETS—SHEET 2.



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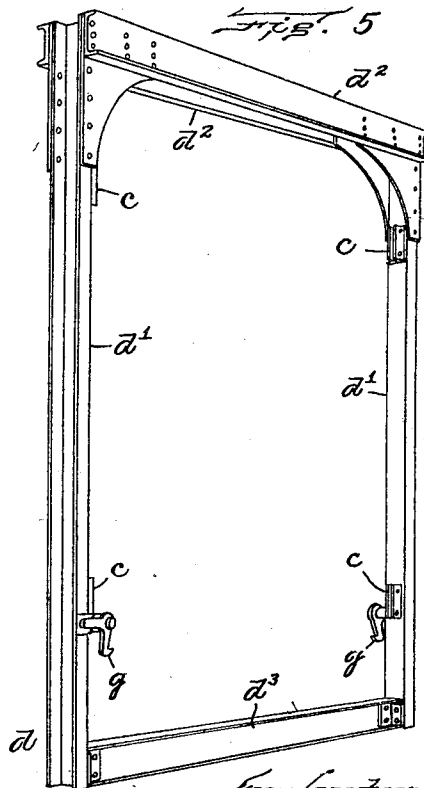
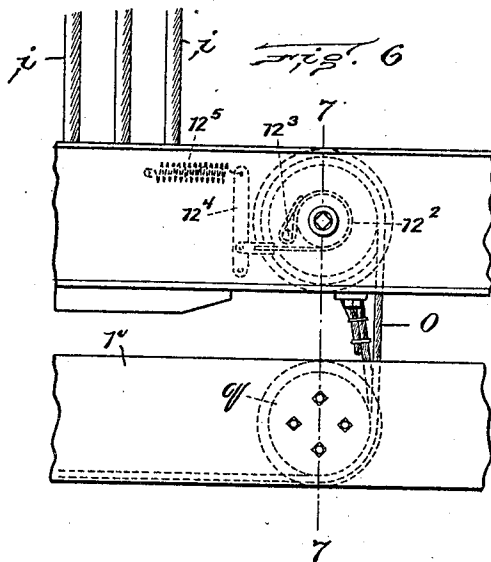
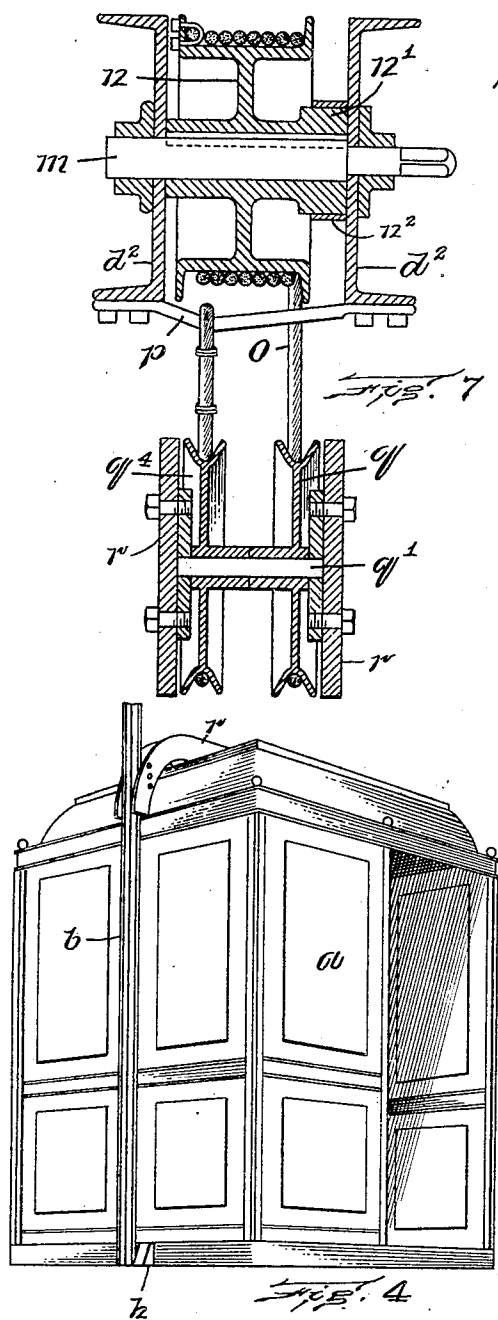
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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

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## ELEVATOR SAFETY DEVICE.

No. 920,437.

Specification of Letters Patent.

Patented May 4, 1909.

Application filed December 23, 1907. Serial No. 407,745.

*To all whom it may concern:*

Be it known that I, PATRICK H. COSTELLO, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Anti-Impact Safety Devices for Elevators, of which the following is a specification.

This invention has for its object to provide an elevator safety device for preventing injury to the passengers of an elevator car in case the latter drops from any cause.

The invention consists in providing the car with a frame in which it is supported, the supporting cables being attached to the frame. The car is movable vertically relatively to the frame, and is normally held by latches above the lower end thereof. One or more trips are arranged in the elevator well so that, if the car is released by breakage of the cables or the defective operation of the hoisting mechanism or descends below its regular stopping place at over speed, the latches engage the trips just as the frame reaches the bottom of the elevator well, so that the car is released and permitted to move downwardly relatively to its frame.

In the illustrated embodiment of the invention, a suitable cushioning or braking mechanism is interposed between the frame and the car so that the movement of the car relatively to its frame is gradual, and so that the car comes to a state of rest gradually and is prevented from striking the bottom of the well with the momentum due to the falling of the car and frame.

On the accompanying drawings, I have illustrated one embodiment of the invention.

Figure 1 represents a car, the supporting frame therefor, and the guides of the elevator well. Fig. 2 is a sectional view illustrating the car supported in its normal position with reference to its frame. Fig. 3 represents a horizontal section through the car on the line 3—3 of Fig. 2. Figs. 4 and 5 represent perspective views of the car and the frame. Fig. 6 illustrates the braking or cushioning mechanism. Fig. 7 represents an enlarged section on the line 7—7 of Fig. 6.

Referring to the drawings, *a* indicates an elevator car of any approved style or type. It is provided on its sides with vertical guides *b* which are slidingly engaged with guideways *c c* in a frame indicated as a whole at *d*. The said frame may be formed of any suitable materials, and may be formed in

any desired manner for accomplishing the purpose for which it is intended. As shown, it is formed of structural steel bars comprising the uprights *d' d'*, the parallel top bars *d<sup>2</sup> d<sup>2</sup>*, and the bottom crossbar *d<sup>3</sup>*, all riveted together and properly braced. This frame is arranged to slide up and down relatively to the guides *e* which extend vertically in the elevator well on the side walls thereof. The frame is provided with the usual guide blocks *f* for engaging the guides *e* at its top and bottom as shown in Fig. 1. The car is adapted to move vertically relatively to the frame for a distance of say, two to four feet. It is adapted to be held in an elevated position by the bell crank latches *g g* which are pivoted to the side bars of the frame, and which are adapted to engage lugs *h h* fixed to the bottom of the car. The latches are normally held in their active positions by springs *g'* as shown in Fig. 2. The car is normally held in its elevated position in the frame, and the frame with the car so held, is raised and lowered by the usual hoisting mechanism, including the cables *i*, a portion of which are shown in Figs. 1 and 6.

The bottom of the well, as shown in Fig. 1, is provided with a raised portion or stop, as indicated at *j*, so that, when the frame reaches its lowest extreme of movement, the crossbar will engage the stop or raised portion of the bottom of the well. This stop may be equipped with a layer of cushioning material, as indicated at *j'*. In the well are placed trip cams indicated at *k*. These cams are located below the normal lower limit of the travel of the car and are arranged in the path of the projecting arms of the latches *g*, so that, if an accident should happen to the hoisting mechanism and the car should drop, the arms of the latches will engage the trips just before the frame strikes the stop at the bottom of the well so as to release the car within the frame and permit it to drop relatively to said frame.

In order that the car may be easily raised to its elevated position, I journal in the top bars *d<sup>2</sup>* of the frame, a shaft *m*, the end of which is square so that it may be turned by a crank or other suitable tool. On this shaft is secured a winding drum *n* to which is attached one end of a rope or cable *o*. The other end of the rope is attached to a suitable portion of the frame, such for instance, as the crossbar or brace *p*. The cable passes

from the drum  $n$  around and under a loose pulley  $q$  mounted on a shaft  $q'$  attached to arches  $r$  extending across the top of the car. From the pulley  $q$ , the cable passes under a  
 5 similar pulley  $q^2$  journaled on a shaft similar to that of  $q'$ , passing upwardly and around a pulley  $q^3$  mounted on a shaft journaled in the top bars of the frame, thence downward and around the pulley loose on the same  
 10 shaft on which the pulley  $q^2$  is mounted, then under a pulley  $q^4$  on the shaft  $q'$  and thence to the crossbar  $p$ . By means of a crank or other suitable implement, the shaft  $n$  may be rotated so as to rotate the drum  $n$  and by  
 15 winding the cable thereon, to raise the car relatively to the frame until the latches  $g$  may engage the lugs or projections  $h$  on the car.

In order that the descent of the car relatively to its frame may be checked or cushioned, the drum  $n$  is formed with a hub  $n'$  which serves as a brake-wheel. Around the brake-wheel is passed a band brake  $n^2$ , one end being attached to a fixed pin  $n^3$  and the  
 25 other end attached to a lever  $n^4$  which is drawn outward by a spring  $n^5$  so as to cause the brake band to frictionally engage the hub  $n'$ .

From the description thus given, it will be  
 30 apparent that, should the car fall, the frame will drop upon the bottom of the well, and that just before the impact, the latches will be released so as to permit the car to gradually cease its downward movement and  
 35 come to a state of rest without injuring the passengers.

Having thus explained the nature of my said invention and described a way of constructing and using the same, although  
 40 without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is:—

1. In an elevator safety device, the combination with a car, of a frame, relatively to  
 45 which the car is vertically movable, interposed between the car and the hoisting mechanism, means on the frame for supporting the car, means for automatically releasing said  
 50 car from said supporting means, and means for retarding movement of the car when released from said frame.

2. In an elevator safety device, the combination with a car, of a frame relatively to  
 55 which the car is vertically movable and adapted to be attached to the supporting cables, said car being connected to said frame entirely independently of said cables, a latch for holding said car above the bottom

of the frame, and a trip in the well for tripping the latch to release the car.

3. In an elevator safety device, the combination with a car, of a frame relatively to which the car is vertically movable and adapted to be attached to the supporting  
 65 cables, a latch for holding the car above the bottom of the frame, means for tripping the latch, and means for retarding the movement of the car relatively to the frame.

4. In an elevator safety device, a frame  
 70 adapted to slide in the elevator well and to be supported by the hoisting cables, a car movable vertically within the frame, means for retarding or cushioning the movement of the car relatively to the frame, a latch for  
 75 holding the car against downward movement relatively to the frame, and means in the elevator well for tripping said latch.

5. In an elevator safety device, a frame adapted to slide in the elevator well and to  
 80 be supported by the hoisting cables, a car movable vertically within the frame, means for elevating the car in the frame, means for holding said car in its elevated position, and  
 85 means in the elevator well for tripping said holding means.

6. In an elevator safety device, a frame adapted to slide in the elevator well and to be supported by the hoisting cables, a car  
 90 movable vertically within the frame, means for elevating the car in the frame, means for holding said car in its elevated position, means in the elevator well for tripping said holding means, and a brake for retarding or  
 95 cushioning the free downward movement of the car, when it is released, relatively to said frame.

7. The combination with an elevator car, of a support for said car, releasable connections for holding said car and support normally in fixed relative positions, the car  
 100 being mounted to move vertically relatively to its said support when said connections are released, hoisting mechanism connected to said support and having no direct connection  
 105 with the car, means for automatically releasing the car from its support when the latter reaches a predetermined point of travel, and means for retarding movement of the car when released from its said sup-  
 110 port.

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

PATRICK H. COSTELLO.

Witnesses:

M. B. MAY,

P. W. PEZZETTI.

Correction in Letters Patent No. 920,437.

It is hereby certified that the name of the second-mentioned assignee in Letters Patent No. 920,437, granted May 4, 1909, upon the application of Patrick H. Costello, of Boston, Massachusetts, for an improvement in "Elevator Safety Devices," was erroneously written and printed "Bartholomew H. Conig," whereas the said name should have been written and printed *Bartholomew H. Couig*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 18th day of May, A. D., 1909.

[SEAL.]

C. C. BILLINGS,  
*Acting Commissioner of Patents.*