

No. 693,027.

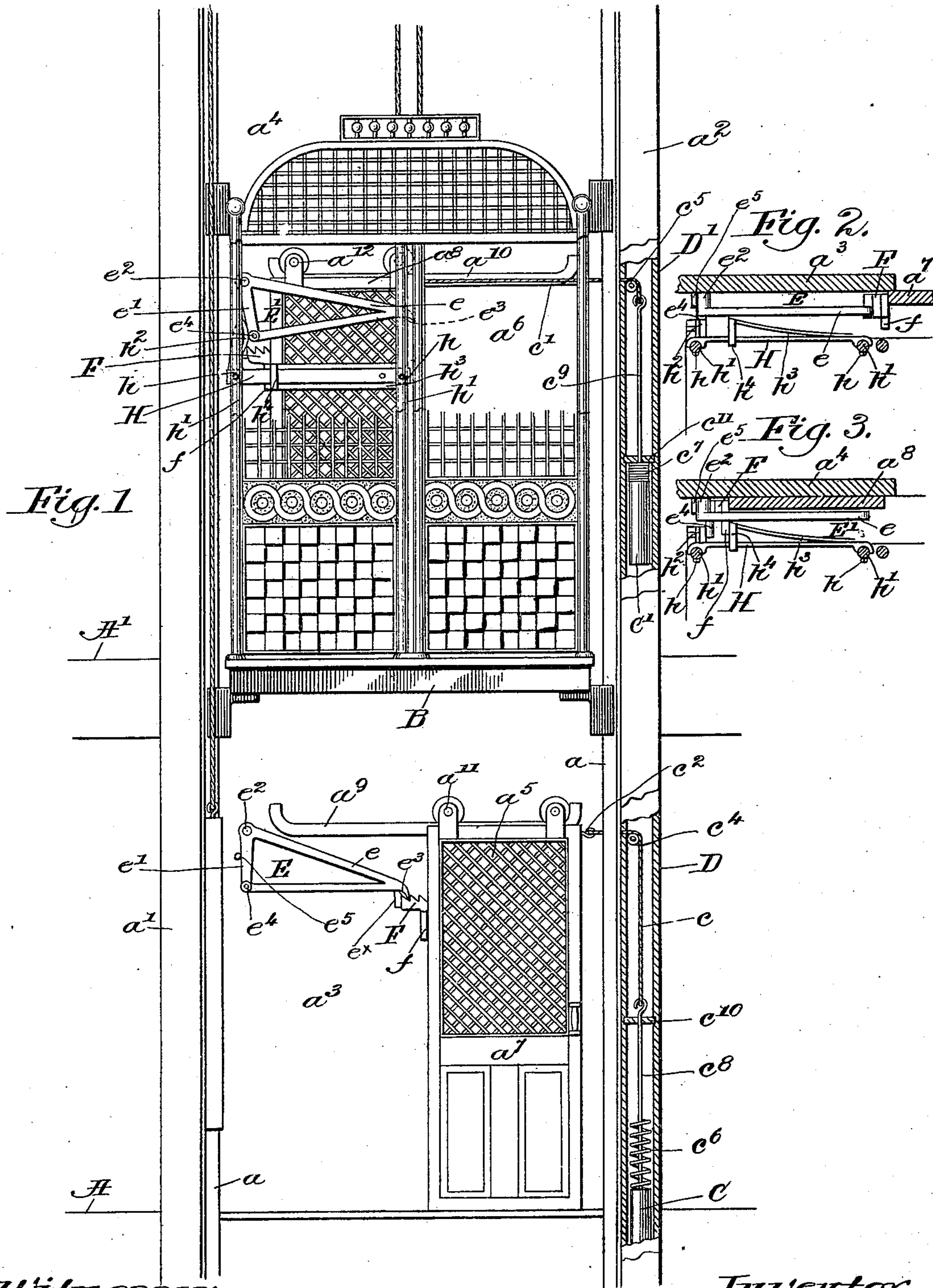
Patented Feb. 11, 1902.

G. F. JOYCE.

SAFETY ATTACHMENT FOR ELEVATORS.

(Application filed Nov. 12, 1897.)

(No Model.)



Witnesses:

A. C. Harmon
Thomas J. Drummond

Inventor:

George F. Joyce.
by Crosby & Gregory attys.

UNITED STATES PATENT OFFICE.

GEORGE F. JOYCE, OF BROOKLINE, MASSACHUSETTS.

SAFETY ATTACHMENT FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 693,027, dated February 11, 1902.

Application filed November 12, 1897. Serial No. 658,243. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. JOYCE, of Brookline, county of Norfolk, State of Massachusetts, have invented an Improvement in Safety Attachments for Elevators, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to elevators, and more particularly to safety devices or means for controlling the operation of the doors closing the entrances to the shaft. Briefly stated, the need of such devices is to avoid, so far as possible, any chance that the doorways may be left in an unprotected condition, whether by failure of the operator to close them properly upon starting the elevator or by the accidental or unauthorized opening of the door, even though duly closed originally.

My invention has for its object the provision of means compact and simple in construction and operation, particularly adapted for ready application to existing structures, and presenting nothing to demand the attention of the operator, whether of an elevator in a crowded business block or in a private house, the automatic closure and locking of each door being preferably insured at all times at which the elevator-car is not in proper position for entrance.

The various features of my invention will be fully illustrated and described in the accompanying drawings and specification and set forth in the claims.

In the drawings, Figure 1 is a view in elevation of an elevator-shaft and adjacent portions of two floors of a building, with the elevator-car shown at the upper of the floors and partly broken away to reveal the operating parts. Fig. 2 is a plan view of the operating parts at the left of Fig. 1, with the door and parts shown in the position illustrated in the lower half of Fig. 1, while in Fig. 3 a similar view is presented of the parts in the position illustrated in the upper part of Fig. 1, the entrance-door being open.

In the preferred embodiment of my invention selected for description, and illustrated in the drawings the reference-letters A A' designate the floors of a building provided with an elevator-shaft, in which a a are the

vertical tracks supported by suitable uprights a' a^2 , and on these tracks runs the elevator cage or car B, all of these parts being of usual construction or of suitable desired construction.

a^3 a^4 designate, respectively, the partitions dividing the shaft from the corridor or room into which the doorways a^5 a^6 lead, the doorway a^5 being at the lower portion of Fig. 1 shown as closed by the door a^7 , while in the upper portion of the same figure the door a^8 is shown as run back, leaving the doorway a^6 open for entrance or exit to or from the elevator-cage B.

The supports for the doors may be of any suitable construction, and I have shown them as consisting of tracks a^9 a^{10} , of well-known type, to receive the trolleys a^{11} a^{12} , by which the doors are hung.

I preferably provide means tending constantly to cause closure of the doors, such means comprising in the instance illustrated weights C C', connected to their respective doors by flexible carriers c c' , attached to the door in any suitable way, as by hooks c^2 , and for the sake of convenience arranged to travel in vertical boxes D D', adjacent to or forming a part of the uprights a^2 . These boxes may be formed in a continuous structure and are so illustrated, being slightly broken away to reveal the weights, &c. The flexible carriers are respectively run over direction-pulleys c^4 c^5 , and the weights are in my preferred construction provided with auxiliary means governing the movements of the door in such a manner as to permit it to be opened with but slight effort at first, the tractive effect increasing as the door recedes from closed position, the increase in tractive effect being counterbalanced by the momentum of the door, and smoothness of operation thus insured. The means to accomplish this I have illustrated in this instance as springs c^6 c^7 , seated at one end upon the upper ends of the weights and surrounding the carriers or extensions thereof, as the hook-rods c^8 c^9 . Suitable means are provided in the paths of the springs to engage their upper ends as the weights are raised and approach their uppermost position, the springs being at that time compressed, as illustrated in the case of the spring c^7 , the engaging means illustrated con-

sisting of stops or slides $c^{10} c^{11}$, inserted transversely in the boxes D D'.

It will be readily seen that at the beginning of closing movement of the door the combined effect of the spring and weight will cause the door to rapidly overcome its inertia, and after it has acquired sufficient momentum the tractive effect is diminished by the disengagement of the spring from the stop, after which the weight alone draws the door.

Passing now to the means for automatically locking the door at both ends of its range of movement, the simple nature of the improved devices employed in accordance with my invention will be readily understood upon inspection of the preferred forms illustrated.

To lock the door in closed position, I prefer to use a detent engaging a block or rack near the rear edge of the door, and one form of such detent is designated by the reference-letter E, being shown in the shape of a right-angle triangle mounted pivotally at the angle between the hypotenuse e and its short limb e' , as at e^2 , and adapted at the other end of the hypotenuse to engage with the rack F, attached to the rear of the door, so that the exertion of force to open the door will tend to cause downward movement of the door, keeping the trolleys firmly seated upon their track, thus avoiding any tendency to displace the door. This detent may be of any suitable material, and I preferably either provide it with a cushion e^3 at the under side of its point or place a cushion e^x on the rack, or both, so that when the point drops down against the rack it will do so without noise, the point, however, entering sufficiently between the teeth of the rack to take up the wear of any thrust upon the door. At a suitable portion of the detent—in this instance adjacent the right angle—the contour of the detent is suitably arranged to present a projection, lug, or the like e^4 , preferably in the form of a friction-roller, as illustrated, and for a purpose to be described. This may best be understood by referring to the detent E' in the upper portion of Fig. 1, the parts similarly lettered in this detent corresponding in arrangement and function to the same parts in the detent E.

On the elevator-car, suitably supported, as upon or integral with a base H, in turn suitably attached to the elevator-car, as by screws h passing into the upright frame members h' thereof, is a projection h^2 , adapted to serve as a cam to engage and operate the detents E E' as the elevator-car travels up and down in its shaft, and this cam is presented at such point that it only engages the projection e^4 of the detent at such times as the elevator-car is directly opposite one of the doorways, and its effect is to throw the projection e^4 sidewise to rotate the detent about its pivot into substantially the position in which the detent E' is shown, raising the point from the rack and releasing the door, the detent being main-

tained in this position preferably as long as the elevator is opposite the doorway, so that the door may be freely opened. As soon as the elevator-car begins to rise or descend, the cam is carried up or down, as the case may be, away from the projection e^4 , and the detent released, dropping into position to engage the rack and automatically lock the door as it is closed. A suitable limiting-stop, as the pin e^5 , may be provided to hold the detent in position to engage the rack as the door slides to. The shape of the cam and its position relative to the projections e^4 may be varied as desired to provide for a longer or shorter engagement between the two and for various other purposes.

The means for automatically engaging and holding the door in open position after it has once been opened I prefer (without restricting myself to such construction) to combine with the means for locking the door shut, thus reducing the number of parts constituting the safety devices, making their adjustment more simple, and facilitating their adjustment by workmen of comparatively slight experience and their maintenance in operative condition. Accordingly as a convenient way of accomplishing this desirable purpose I have shown the pieces of which the racks F are formed as constituting combination keeper devices, as it were, having extensions f projecting into the shaft beyond the plane of the doors sufficiently far to engage a catch h^3 —in this instance a spring—on the carrier H, the catch being so arranged when of the form illustrated that as the doors respectively are pushed back during the opening movement the projections f press the spring back toward the elevator-car until they have passed the head h^4 of said catch, after which the spring is free to regain its outermost position, standing to the right of the projection f and in the way of the closing movement of the door, this being best seen in Fig. 3. The contour of the head h^4 is such, preferably, that no resistance is offered to the movement of the elevator-car upward or downward, and when the elevator-car leaves the floor at which it has been standing the head of the spring is carried away from the door-hold f , releasing the latter and permitting the door to be free to close under the influence of the means tending to draw it out.

It will be obvious that many changes may be made in the contour and details of construction of the parts making up my safety device without departing from the spirit and scope of my invention, and accordingly I do not limit myself to the exact construction shown.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with an elevator-car and its shaft provided with a door, of locking means mounted on the shaft and arranged to lock said door in closed position; means tend-

ing constantly to close said door when open; means carried by the elevator-car to retract said locking means and permit opening movement of said door when said car is opposite the same; and means on the exterior of said car acting upon opening movement of said door to automatically and directly engage the latter and retain it in open position during the period of proximity of the car thereto, substantially as described.

2. The combination with an elevator-car and its shaft, the latter having a door; of devices mounted on said shaft and car respectively, to lock said door, the former acting in closed position, and the latter in open position, of said door; keeper devices mounted on said door and arranged to cooperate directly with said locking devices respectively; and means carried by said car to engage the locking device on said shaft and release said door at times, all operating substantially as and for the purpose set forth.

3. In an elevator, an elevator-shaft having a door, a car to traverse said shaft, means tending normally to close said door when open, locking devices on said shaft to hold said door closed, means on the car to automatically release the said locking devices when the car is in opposition to the door, a spring-catch on the exterior of the car, and a projection on said door to engage said catch when the door is open.

4. In an elevator, a car and its shaft, a series of doors leading to the shaft, a detent, and a cooperating keeper device for each door to hold the same in closed position, a cam device on said car to engage said detents successively when said car is in opposition to said doors respectively, to release the latter,

a spring-catch carried by said car on its exterior, a projection carried by each door, said catch cooperating with the projections in similar succession to retain the doors in opened position, and a base forming a unitary structure with said cam device and catch to support the same on said car.

5. In an apparatus of the class described; a series of keeper devices, and a corresponding and cooperating series of locking devices; and a combined cam and spring-catch-bearing structure arranged to be carried past said series, to engage the same respectively in succession, the cam to control the operation of said locking devices, and the spring-catch to engage said keeper devices operatively, substantially as described.

6. In an elevator, an elevator-shaft having a door, a car to traverse said shaft, means tending normally to close said door when opened, a ratchet mounted on the door, a cushioned detent on the shaft and adapted to engage said ratchet to hold the door closed, means on the car to automatically release said detent from the ratchet when the car is in opposition to the door, and means on the exterior of the car acting upon the opening movement of said door to automatically and directly engage the latter to retain it in its open position during the period of proximity of the car thereto.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE F. JOYCE.

Witnesses:

ZEPH. R. FORBES,
B. F. BAKER.