

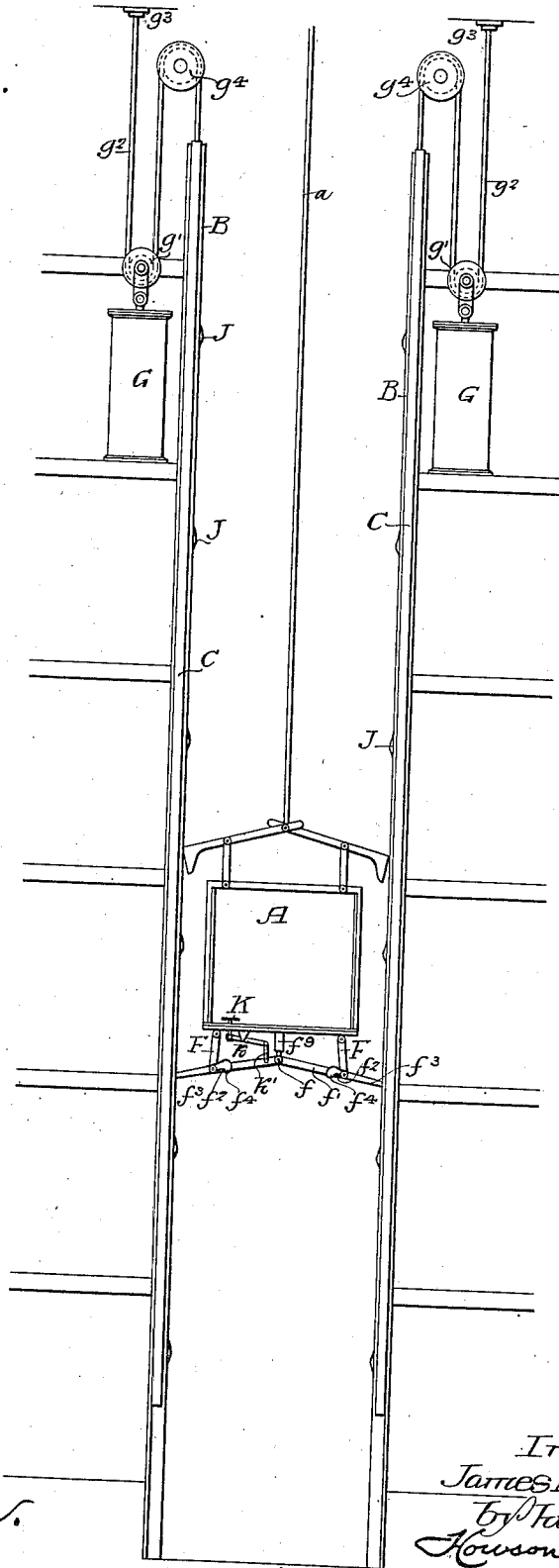
1,002,048.

J. M. FAULKNER.
SAFETY DEVICE FOR ELEVATORS.
APPLICATION FILED SEPT. 6, 1907.

Patented Aug. 29, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
William H. Hoover.
E. H. Helms.

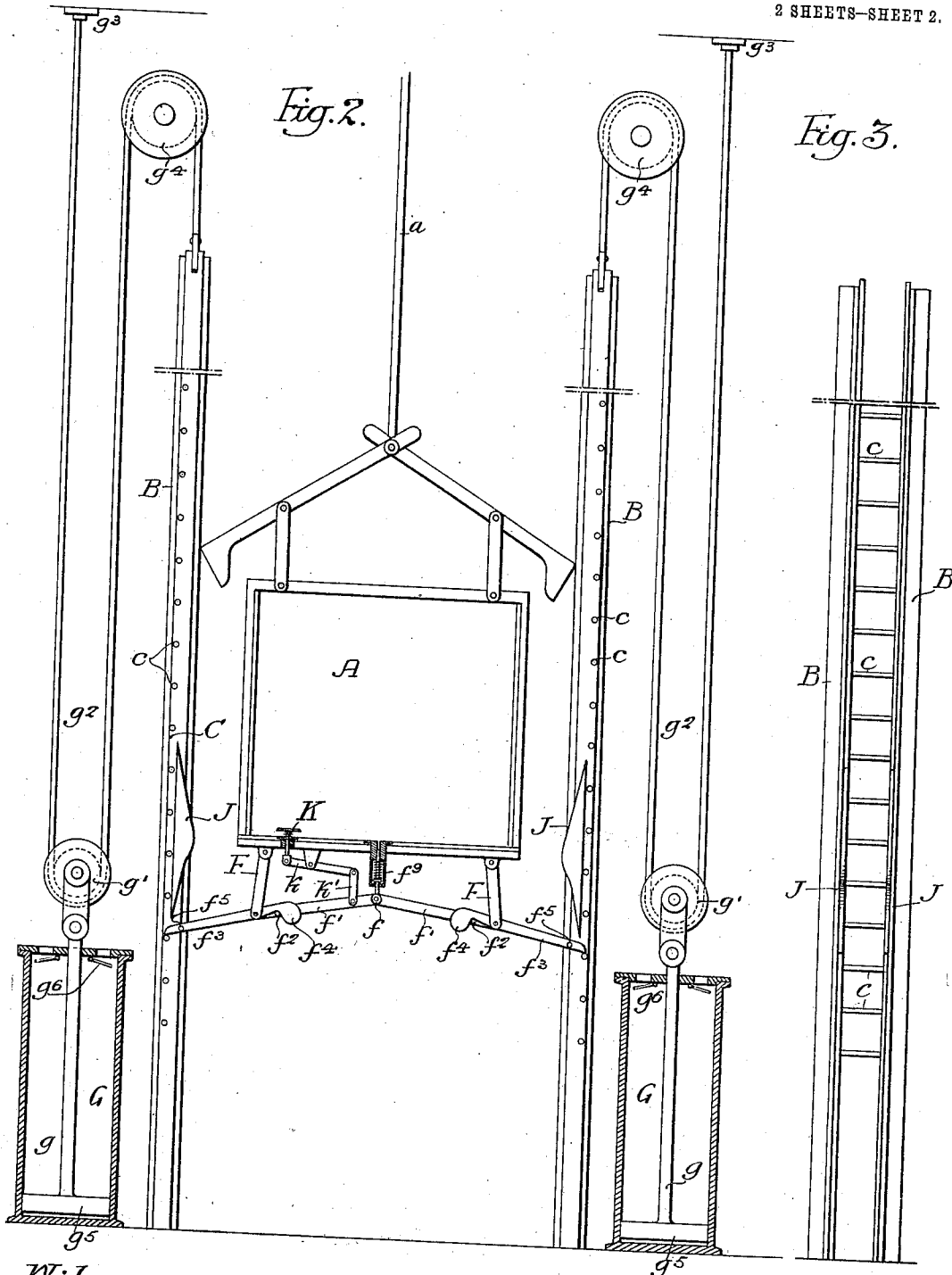
Inventor
James M. Faulkner.
by His Attorneys,
Howson & Howson

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Witnesses:
 William H. Kuroki,
 Titus Nelsons.

Inventor:
 James M. Faulkner
 by His Attorneys,
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UNITED STATES PATENT OFFICE.

JAMES M. FAULKNER, OF PHILADELPHIA, PENNSYLVANIA.

SAFETY DEVICE FOR ELEVATORS.

1,002,048.

Specification of Letters Patent. Patented Aug. 29, 1911.

Application filed September 6, 1907. Serial No. 391,656.

To all whom it may concern:

Be it known that I, JAMES M. FAULKNER, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Safety Devices for Elevators, of which the following is a specification.

One object of my invention is to provide a relatively simple and reliable device for safely bringing an elevator car to rest in the case of the failure or breakage of its suspending cables.

I also desire to provide an elevator safety stop device which shall be certain in action as well as unlikely to get out of order or require frequent attention or repairs, its construction being such that it shall operate to stop the car in the event of a breakage of its suspending cables without permitting said car to attain an excessive or dangerous speed.

Another object is to provide a device applicable to an elevator car which shall at all times be in condition to automatically bring the elevator car to rest, and which after having acted shall automatically return to a condition ready for further use, at the same time being capable of control by an operator in the elevator car if this be desired.

It is further desired to provide an elevator car with mechanism whereby it shall be gradually retarded in its downward movement after leaving each floor until it has approached to within a predetermined distance of another floor, after which such car shall be automatically released.

These objects and other advantageous ends I secure as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1, is a diagrammatic side elevation of an elevator shaft illustrating an elevator car therein and provided with my invention; Fig. 2, is a side elevation on a larger scale than Fig. 1 and also to some extent diagrammatic, illustrating in detail the construction of the various parts of my invention, and Fig. 3, is a front elevation of one of the movable ladder like or toothed structures forming part of the device.

In the above drawings, A indicates an elevator car hung from cables *a* in any desired manner and operating in a suitably constructed shaft having the necessary guide

ways (not shown) for said car. In addition, the shaft is provided with auxiliary guide ways B on opposite sides thereof, on which are mounted vertically movable ladder like or toothed structures or racks C having, in the form of my invention illustrated transverse members or rungs *c*. To the upper end of each of these structures C is attached a cable g^2 , which, after passing around a pulley g^4 supported in any desired manner at the top of the shaft, extends downwardly around a pulley g^1 and again upwardly to a point of support g^3 . Each pulley g^1 is attached to the end of a piston rod g operating in a cylinder G and provided with a piston g^5 . The cylinders G are relatively long, usually half as long as the distance between the floors of the building having the elevator shaft, and each of them has at its upper end, one or more inwardly opening check valves g^6 . At each floor of the building are placed cams J projecting outwardly from points adjacent to the ladder like structures or racks C.

The elevator car has suspended from its under side a pair of links F and each of these has pivoted to it a lever f^3 and one end of a link f' . The two links f' are pivotally connected under the center of the car and may, if desired, have connected to them a downwardly acting spring f^9 tending at all times to swing outwardly the lower ends of the links F and bring the two links f' into the same straight line.

The levers f^3 are weighted at their adjacent or inner ends as indicated at f^4 , and are prevented from turning on their pivotal supports (carried by the lower ends of the links F) by means of stout pins f^2 . The outer arms of the levers f^3 project sufficiently to engage with the rungs or teeth *c* of the ladder like structures or racks C and are preferably curved on the upper side of their outer ends so as to easily pass the teeth or rungs *c* when moved bodily upward, as when the elevator car is raised in the shaft. On the descent of the car however, they are maintained by the weights f^4 in such a position as to engage said teeth or rungs and are prevented from turning on their pivots by means of the pins f^2 . In addition, the outer ends of the levers f^3 carry transverse pins f^5 placed so as to be engaged by the cams J adjacent to each floor of the building and cause said levers f^3 to

be moved inwardly to such an extent as to temporarily draw said outer ends out of engagement with the teeth or rungs *c*.

With this arrangement of parts it will be seen that as the car is raised in the shaft, the outer ends of the levers *f*³ strike successively against the teeth or rungs *c* without interfering with the movement of the car. As soon, however, as the car moves downwardly, either under normal conditions or under the conditions existing on account of the breakage of the suspending cables, the outer ends of the levers engage the teeth or rungs *c* and thereby lock the car to the ladder like structures or racks *C*. These are thereafter moved downwardly by gravity acting on the car and consequently cause an upward movement of the pistons *g*⁵ in their cylinders *G*, which is resisted by the vacuum formed below said pistons and also by reason of the compression of the air in said cylinders above the pistons owing to the action of the valves *g*⁶. A gradually increasing retarding force is thus inserted on the elevator car. This is thereafter brought to rest when the compression of the air in the cylinders has reached a certain point, and when such action takes place under normal conditions of operation, the various parts are so arranged that as the car approaches a floor in its descent, the cams *J* will act to move inwardly the levers *f*³ and so release the ladder like structures from the car, which is thereafter brought to rest by the operator in the ordinary manner. The compressed air within the cylinders *G*, as well as the weight of the pistons *g*⁵, now serves to return said pistons to the bottoms of these cylinders, thereby raising the toothed structures or racks *C* to their normal positions ready to be again engaged by the levers on the elevator car, when this continues its descent. Under abnormal conditions, as when the car starts to drop in its shaft, even though the cams *J* act to disconnect the levers *f*³ from the teeth or racks at the first floor passed, the downward movement of the car would be sufficiently rapid, though still not excessive or dangerous, as to cause said levers to pass said cams and to engage the toothed structures before these had been returned to their relative normal positions by the compressed air in the cylinders. Consequently, the compression of the air in said cylinders would be carried to a much higher point than before, until it was sufficient to bring the falling car to absolute rest. It will thus be seen that under normal operating conditions the descent of the car is accompanied by a successive pulling down and releasing of the two ladder like structures or racks, while under abnormal conditions these latter are caused to operate upon the car so as to bring it to rest be-

fore it reaches the bottom of the shaft, and that without permitting it to attain an excessive speed.

If desired, I may under some conditions, employ a foot piece *K* within the car and connect this by means of a lever *k* and a link *k'* with one of the links *f'*. This foot piece would be normally maintained in the raised position shown, though by it an operator could so move the links *f'* and the levers *f*³ as to hold the latter in such position as to prevent their engagement with the teeth or rungs of the ladder or rack.

I claim:—

1. The combination with an elevator car of a vertically movable rack-like structure mounted adjacent thereto; an air cushioning device including means for normally maintaining said rack-like structure in an elevated position arranged to retard movement of said structure; and means on the car for automatically and successively engaging and disengaging the rack-like structure to alternately connect it to and disconnect it from said car as the latter moves downwardly.

2. The combination with an elevator car, of a rack like structure vertically movable adjacent to the same, means whereby said structure is normally maintained in a raised position, with mechanism carried by the car and independent of the suspension means thereof for automatically connecting said rack like structure to the car whenever the latter is moved downward under normal operating conditions.

3. The combination with an elevator car of a vertically movable rack like structure mounted adjacent thereto, means for normally maintaining said structure in an elevated position, a device carried by the car for engaging the rack like structure and connecting it to the car when the latter is moved downwardly, and means for automatically disconnecting the car and the structure at a predetermined point.

4. The combination with an elevator car, of a vertically movable structure adjacent thereto, means constructed to successively connect and disconnect said structure and car a predetermined number of times as the latter moves downwardly, and means for retarding the downward movement of said structure.

5. The combination with an elevator car of a vertically movable structure mounted adjacent thereto; means on the car placed to automatically engage and then disengage said structure as the car moves downwardly; and an air cushioning device for applying gradually increasing retarding force to said structure when it is moved by the car.

6. The combination with an elevator car of a vertically movable structure mounted adjacent thereto, means for applying a

gradually increasing retarding force to said structure when the latter is moved downwardly, and automatically acting means for mechanically connecting said structure and the car each time the car moves downwardly.

7. The combination with an elevator car of a vertically movable structure mounted adjacent thereto, means for applying a gradually increasing retarding force to said structure when the latter is moved downwardly, automatically acting means for mechanically connecting said vertically movable structure and car when the car moves downwardly, and automatically acting means for disconnecting the structure from the car at a predetermined point or points.

8. The combination with an elevator car of a vertically movable rack like structure or structures adjacent to said car, a lever or levers carried by the car so as to engage the teeth of said structure or structures each time the car moves downwardly, and means for applying a retarding force to resist the downward movement of said structure or structures.

9. The combination with an elevator car, of cylinders each having an inwardly opening valve at one end, a piston for each cylinder, a pulley connected to each piston, cables each having one end attached to a fixed support and passed around said pulleys respectively, an elevator car, vertically movable rack structures mounted adjacent to the car and respectively connected to the second ends of the cables, with mechanism

on the car capable of engaging said rack structures.

10. The combination with an elevator car, of a bar mounted thereon, a vertically movable rack structure mounted adjacent to the car so as to be capable of engagement with said bar when the bar moves downwardly, a cam or cams mounted adjacent to the path of movement of the rack structure and capable of causing movement of said bar out of engagement with the rack structure, and means for retarding the downward movement of said structure.

11. The combination with an elevator car of links hung therefrom, two other links connected to each other and respectively pivoted to said first links, a lever pivoted to each of the first links and provided with means whereby its movement on its fulcrum is limited, vertically movable rack structures mounted so as to be capable of engagement by said levers, a pulley mounted above each rack structure, cylinders, pistons therein, a pulley attached to each piston and cables each having one end connected to a rack structure and passing around one set of said pulleys, the second end of each cable being attached to a fixed support.

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

JAMES M. FAULKNER.

Witnesses:

WILLIAM E. BRADLEY,
JOS. H. KLEIN.