



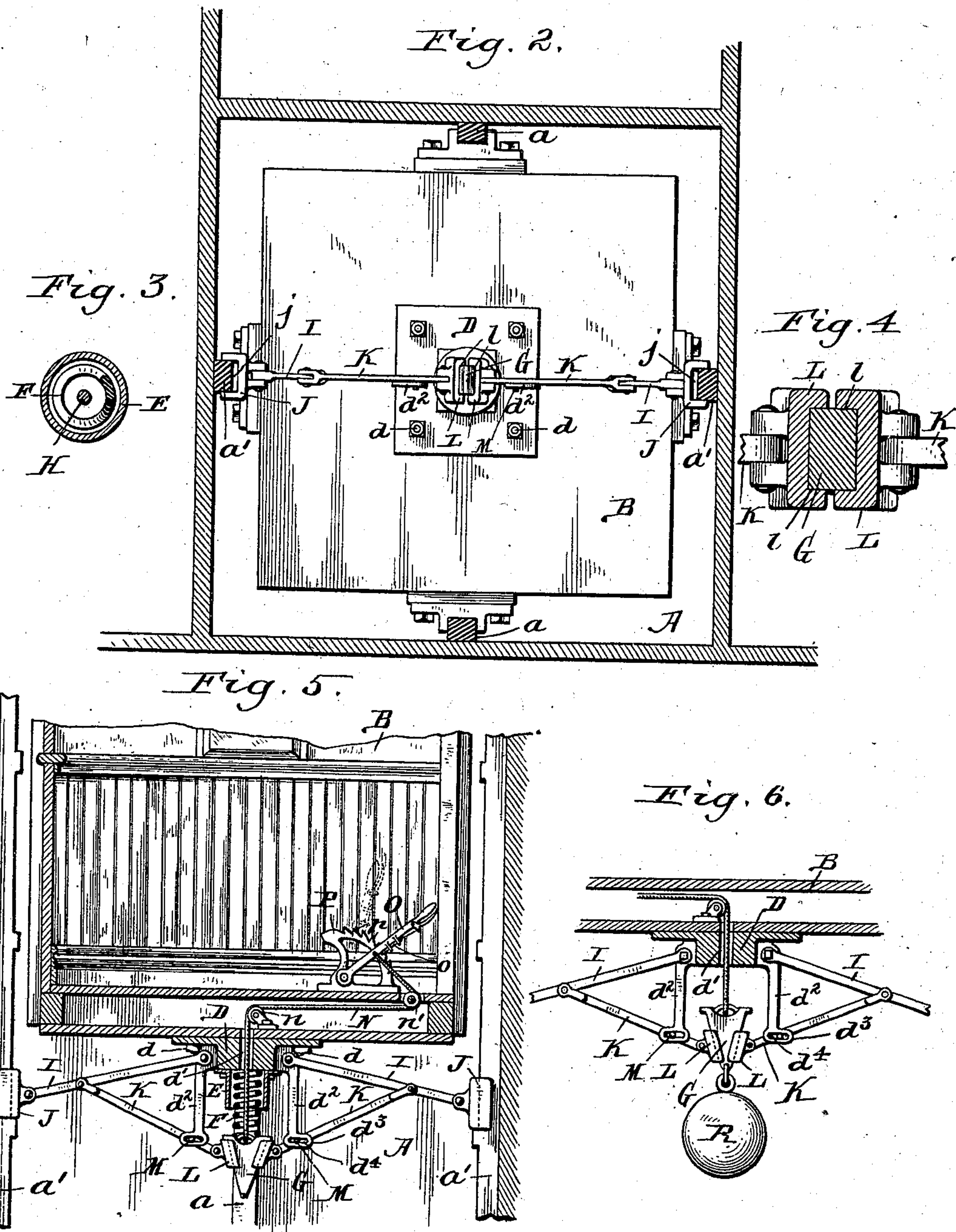


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SAFETY APPLIANCE FOR ELEVATORS.

(Application filed June 15, 1901.)

(No Model.)

2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

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## SAFETY APPLIANCE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 698,041, dated April 22, 1902.

Application filed June 15, 1901. Serial No. 64,680. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE M. MOORE, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Safety Appliances for Elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to safety appliances for elevators; and it has for its object to provide a simple, effective, and positive means to check or stop the descent of the elevator-car in the event of the cable breaking or in case the elevator-car drops suddenly from any other cause.

A further object is to provide durable and effective means whereby the mechanism may be held inactive, but ready to be operated either manually or automatically should the elevator-car descend without being under the control of the operator.

To this end the invention consists of the particular arrangement and combination of parts, as described hereinafter and particularly pointed out in the claims appended hereto.

In the drawings, Figure 1 is a central vertical section through an elevator-shaft and an elevator-car having my improved safety appliance attached thereto. Fig. 2 is a horizontal section through the elevator-shaft, taken on line 2 2, Fig. 1, looking up, to show an inverted view of the elevator-car. Fig. 3 is an enlarged section on line 3 3, Fig. 1. Fig. 4 is an enlarged section on line 4 4, Fig. 1, looking up. Fig. 5 is a central vertical section of an elevator-car and elevator-shaft, showing my appliance to be operated manually. Fig. 6 is a modified form of my invention.

Referring to the drawings in detail, like letters of reference refer to like parts in the several figures.

The letter A designates the elevator-shaft, furnished with the usual guide-rails  $a$ , in which the elevator-car B is guided, and the brake-rails  $a'$ , with which my appliance is designed to coact for the purpose of stopping the car in its descent. The car may be designed to carry freight or passengers and con-

structed in any suitable manner. It is provided with the usual operating-cable C, with which it is raised and lowered, and this cable is attached to the usual operating machinery whereby the elevator-car is raised and lowered, said machinery being operated by any suitable power—such as hydraulic, electric, or any other power—the car having the usual appliances for controlling the same, depending upon the motive power employed. These appliances, however, being common and having no particular connection with my invention, I therefore do not show them in the drawings.

Secured to the bottom of the elevator-car by means of bolts  $d$  is a casting or supporting-piece D, having a central aperture  $d'$  and depending hanger or supporting bars  $d^2$ , each furnished with a laterally-projecting foot  $d^3$  at its lower end and each foot having a horizontally-arranged slot or way  $d^4$  arranged therein.

Bolted to the bottom of the casting or supporting-piece D is a sleeve E, in which is located a spiral spring F, bearing with its upper end against the said supporting-piece and with its lower end against the upper face of a suspended wedge-block G, which is held elevated by a safety cable or rope H, secured to the upper end of said wedge-block and passing through the said spring and the aperture  $d'$  in the supporting-piece D, thence around pulleys  $h$   $h'$   $h^2$   $h^3$  to the operating-cable C, to which it is secured. The spring F is held compressed by the wedge-block G, which is held in its elevated position by the safety cable or rope H, the latter being held taut to keep the wedge-block elevated at all times when the elevator is in working order.

Pivotally secured to the supporting-piece D and extending laterally and downwardly in opposite directions are two brake-levers I, having brake-shoes J pivotally secured to their outer ends, each shoe being grooved or channeled, as at  $j$ , to straddle the adjacent brake-rail  $a'$ , against which it is intended to be forced when the elevator-car drops without being under the control of the operator. A short distance from the said brake-shoes I pivotally secure to each brake-lever a brace-arm K, which extends from its connection to the brake-lever inwardly and downwardly to the



wedge-block G, where each is fitted with a wedge-shoe L, which is pivotally attached thereto. Each wedge-shoe is channeled or grooved, as at  $l$ , to correspond to the width and angle of the wedge-block. Each brace-arm is provided with a projecting pin or stud M, which passes through the horizontally-arranged slot or way  $d^1$ , formed in the foot of each supporting-bar  $d^2$ . The brake-levers and their attached shoes have a tendency to swing downwardly, away from the brake-rails  $a'$ , which forces the brace-arms K and their attached shoes inwardly against the wedge-block G, as their inner ends are held elevated by the projecting pins or studs M.

When the elevator is in proper working condition, the parts assume the position shown in Fig. 1, and in the event of the operating-cable parting the safety cable or rope H, which under proper conditions is held taut, now becomes slack and allows the spring F to expand and force the wedge-blocks G downwardly, thus spreading the wedge-shoes, which causes the brace-arms to swing the brake-levers upwardly and force their attached brake-shoes against the brake-rails  $a'$ , thus checking the descent of the elevator-car as quickly as the spring F can act. By this arrangement positive action is assured and great leverage and power are obtained.

The safety-cable H is preferably detached from the operating-cable when fixing the latter, and in order to reset the parts after the cable is repaired and to allow the safety-cable H to be drawn taut and affixed to the operating-cable provision must be made to draw the wedge-block up and compress the spring F. This can be done in various ways—for instance, by attaching a rope or cable to the safety-cable at its lower end, or, as shown in Fig. 5, by securing one end of the rope N to the wedge-block G, passing the same over pulleys  $n n'$ , and securing its other end to a lever O, which is held operative on a sector P and provided with a spring-bolt  $o$ , adapted to engage any one of a series of notches  $p$  formed on said sector. As the lever O is drawn to the position shown in dotted lines the wedge-block G is drawn up to compress the spring F, where it is held by the rope N, which is held taut by said lever. The safety-cable can now be drawn taut and attached to the operating-cable C, after which the lever O may be released to allow the automatic mechanism freedom of action.

It is to be understood that the operating-lever can be used without the safety-cable H; but in that event full reliance must be placed upon the operator, for as soon as he loses control of the elevator he must release the lever O and allow the spring F to operate the various parts of the appliance.

In Fig. 6 I have shown a modified form of my appliance. In this case I dispense with the spring F and secure a weight R to the lower end of the wedge-block. As soon as the operating-cable C parts, the weight, which

is held elevated by the safety-cable H, gravitates and draws the wedge-block G down also, thus operating the brace-arms and brake-levers, as above described. It is to be understood that any other suitable force or pressure may be applied to the wedge-block for lowering the same—such as air-pressure, hydraulic pressure, &c.—without departing from my invention.

I am aware that safety appliances of various kinds have been devised for elevators to effect the stopping of the car when the cable parts or when the car accidentally descends for any other reason, and I therefore do not claim a safety appliance, broadly; but

What I do claim is—

1. The combination with the elevator-car and the brake-rails, of brake-levers pivotally secured to the bottom of the elevator-car and extending downwardly and outwardly toward the brake-rails, brace-arms secured to said brake-levers and extending downwardly and inwardly, a safety rope or cable, and mechanism intermediate of said safety rope or cable and the brace-arms for separating or spreading the said brace-arms and forcing the ends of the brake-levers against the brake-rails when the said rope or cable is operated, substantially as set forth.

2. The combination with the elevator-car and the brake-rails, of brake-levers pivotally secured to the bottom of the elevator-car between its center and its outer ends and extending downwardly and outwardly toward the brake-rails, brace-arms connected to said brake-levers, a safety rope or cable held taut, and mechanism connected to said safety rope or cable for causing the brace-arms to force the brake-levers against the brake-rails when for any reason the said rope or cable becomes slack, substantially as set forth.

3. The combination with the elevator-car, its operating-cable and the brake-rails, of brake-levers pivotally secured to the bottom of the elevator-car and extending outwardly and downwardly toward the brake-rails, a safety-cable held taut and secured with one end to the operating-cable, a wedge-block positioned below the car and having the other end of the cable secured thereto, mechanism operated by the wedge-block and adapted to swing the brake-levers against the brake-rails, and means for causing the wedge-block to lower when the operating-cable parts or the safety-cable becomes slack, substantially as set forth.

4. The combination with the elevator-car, its operating-cable and the brake-rails, or brake-levers pivotally secured to the bottom of the elevator-car and extending outwardly and downwardly toward the brake-rails, a safety-cable held taut and secured to the operating-cable with one end, a wedge-block positioned below the car and having the other end of the safety-cable secured thereto, supported brace-arms pivotally connected to the brake-levers between their ends and extend-



ing downwardly and inwardly toward the said wedge-block, wedge-shoes arranged on the inner ends of said brace-arms and adapted to coact with the wedge-block, and means for causing the latter to lower and spread the wedge-shoes when the operating-cable parts and the safety-cable becomes slack, substantially as set forth.

5. The combination with the elevator-car and the brake-rails, of brake-levers pivotally secured to the bottom of said car and extending downwardly and outwardly toward the brake-rails, supported brace-arms pivotally secured to the brake-levers between their ends and extending downwardly and inwardly, a wedge-block positioned between the ends of said brace-arms and arranged for vertical movement, means for keeping said wedge-block in its elevated position, and further means for lowering the wedge-block to force the brake-levers against the brake-rails through the movement of said brace-arms, substantially as set forth.

6. The combination with the elevator-car and the brake-rails, of brake-levers pivotally secured to the bottom of said car and extending downwardly and outwardly toward the brake-rails, brake-shoes arranged on the outer ends of said levers, supporting-arms depending from the bottom of the elevator-car, brace-arms supported by said supporting-arms and being pivotally secured to the brake-levers between their ends, said brace-arms extending downwardly and inwardly from the point of their pivotal connection to the brake-levers, wedge-shoes arranged on the inner ends of said brace-arms, a vertically-movable wedge-block positioned between said wedge-

shoes, a safety-cable held taut and secured to said wedge-block to keep the same elevated, and means for automatically lowering the wedge-block when the safety-rope becomes slack, said movement of the wedge-block forcing the brake-levers and their brake-shoes against the brake-rails through the medium of the wedge-shoes and the brace-arms, substantially as set forth.

7. The combination with the elevator-car and the brake-rails, of a supporting-piece secured to the bottom of said car and having depending supporting-arms with horizontally-arranged slots or ways in their lower ends, brake-levers pivotally secured to said supporting-piece and extending outwardly and downwardly toward the brake-rails, brake-shoes pivotally secured to the outer ends of said brake-levers, a brace-arm pivotally secured to each of said brake-levers between its ends and each having a stud or pin which is guided in the horizontally-arranged slots in the supporting-arms, said brace-arms extending downwardly and inwardly, a vertically-movable wedge-block held between the inner ends of said brace-arms, a safety-cable held taut and being secured to the wedge-block to hold the same elevated, and a spring interposed between the supporting-piece and the wedge-block whereby the latter is lowered to cause the brace-arms to force the brake-shoes against the brake-rails when the safety-cable becomes slack, substantially as set forth.

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Witnesses:

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