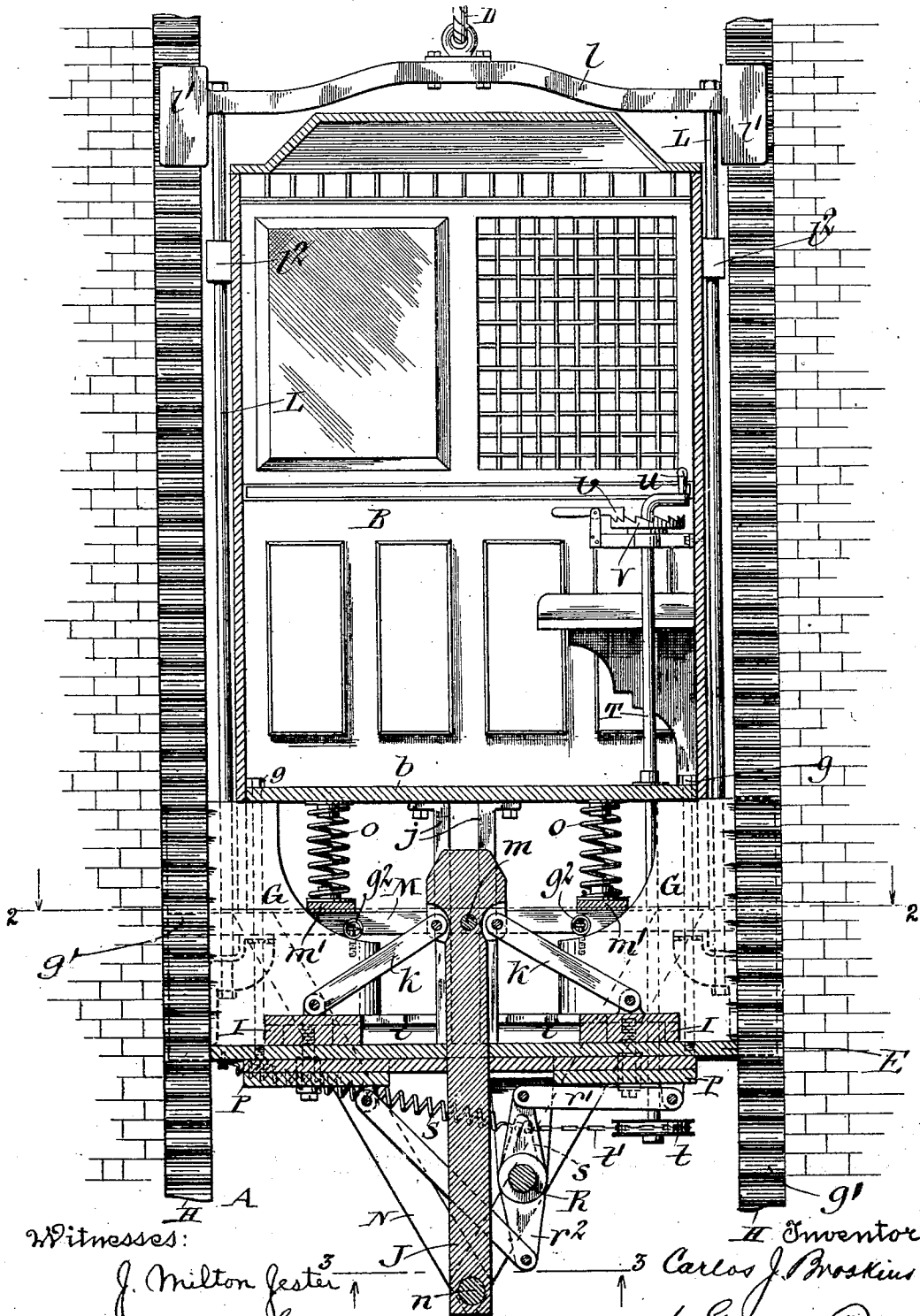


C. J. BROOKINS.
ELEVATOR SAFETY DEVICE.
APPLICATION FILED AUG. 3, 1909.

955,451.

Patented Apr. 19, 1910.

2 SHEETS—SHEET 1.



Witnesses:

J. Milton Jester
Richard Sommer

FIG. I.

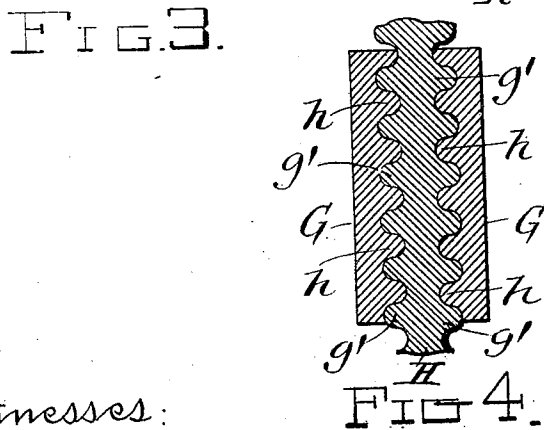
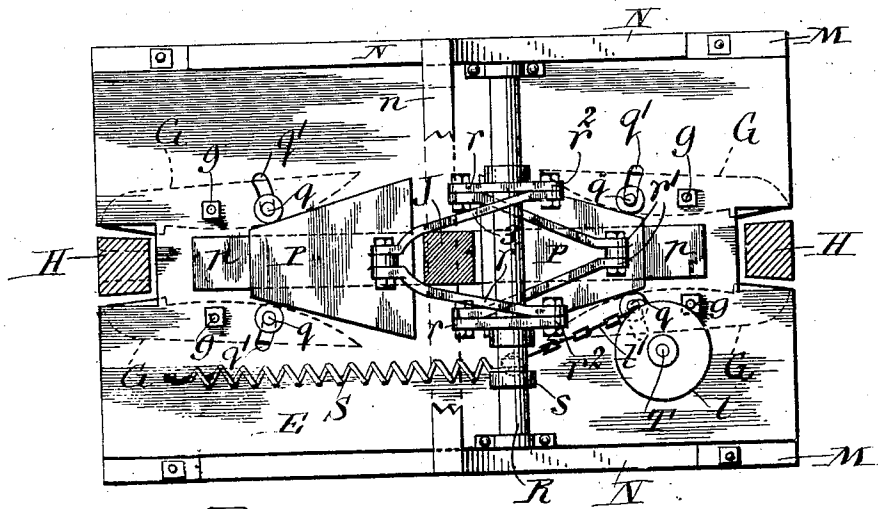
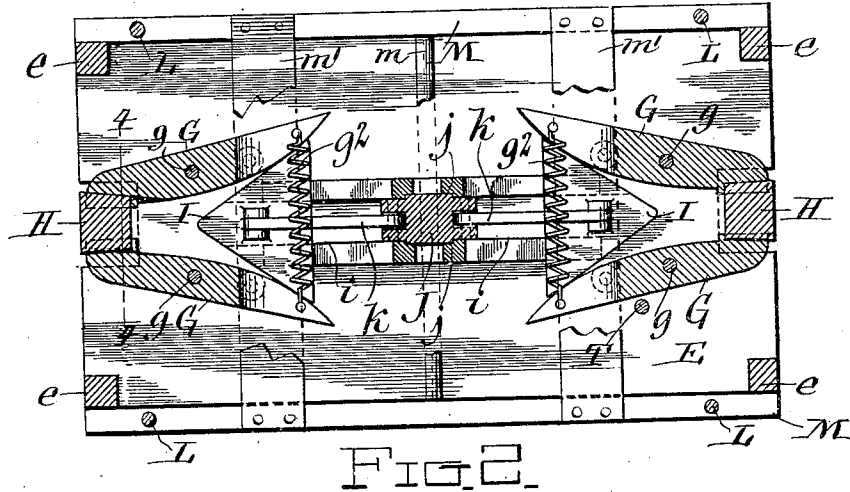
Inventor.
Carlos J. Brookins
by G. E. Popp
Attorneys

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FIG 4.

Inventor
Carlos J. Brookins
by Ciper & Popke
Attorneys.

UNITED STATES PATENT OFFICE.

CARLOS J. BROOKINS, OF RANSOMVILLE, NEW YORK.

ELEVATOR SAFETY DEVICE.

955,451.

Specification of Letters Patent. Patented Apr. 19, 1910.

Application filed August 3, 1909. Serial No. 511,036.

To all whom it may concern:

Be it known that I, CARLOS J. BROOKINS, a citizen of the United States, residing at Ransomville, in the county of Niagara and State of New York, have invented a new and useful Improvement in Elevator Safety Devices, of which the following is a specification.

This invention relates to an elevator safety device which is intended to automatically lock the car or cage of the elevator against downward movement the instant that the cable or lifting device is broken, and which is combined with manual operating means whereby the car may be locked against vertical motion intentionally when it is desired to prevent the car from being moved by any one other than the operator.

The object of this invention is to provide a safety device of this character which is comparatively simple in construction, reliable in operation and which is applicable to elevators without requiring a considerable departure from the construction now in general use.

In the accompanying drawings consisting of 2 sheets: Figure 1 is a vertical section of an elevator equipped with my improved safety device. Fig. 2 is a horizontal section in line 2—2, Fig. 1 looking downwardly, and showing the locking means in its operative position. Fig. 3 is a horizontal section in line 3—3, Fig. 1, looking upwardly and showing the locking means in its inoperative position. Fig. 4 is a fragmentary vertical section, on an enlarged scale, in line 4—4, Fig. 2.

Similar letters of reference indicate corresponding parts throughout the several views.

A represents the elevator shaft or well in which the car B for the passengers or freight moves vertically and D represents the elevating cable, rope or line which is operatively connected at its lower end with the car while its upper end is connected with the hoisting drum or other means whereby the car is raised. Instead of connecting the lifting cable directly with the car, this connection is effected by indirect means forming part of my improved safety attachment which is constructed as follows: E represents a horizontal platform, table or auxiliary support which is arranged below the floor *b* of the car and preferably rigidly connected therewith by means of a plurality of

upright posts *e*. On opposite sides of the space between the bottom of the car and the platform E are arranged two pairs of gripping or locking levers G the members of each pair being pivoted to the bottom of the car and the platform by means of upright pins or bolts *g*, or otherwise, so that they are capable of swinging in a horizontal plane. The outer arms of each pair of gripping or locking levers form jaws which are arranged on opposite sides of an upright guiding and locking bar or rail H which is secured rigidly to the adjacent side or wall of the elevator well. The faces of these jaws are each provided with a plurality of locking teeth *h* which are arranged in a vertical row and the opposite sides of the companion guiding and locking rail are provided with vertical rows of corresponding locking teeth *h*¹, so that upon moving the outer arms of the locking levers toward each other they engage their teeth with those on opposite sides of the locking rail, whereby the car and the parts connected therewith will be positively locked against vertical movement in the elevator shaft or well.

The locking levers of each pair are normally turned in the direction in which their outer arms or jaws are disengaged from the locking rail by means of a spring *g*² connected with the inner arms thereof and while the levers are in this position the car and the parts connected therewith are free to move up and down in the elevator shaft or well.

The automatic means for turning the locking levers in the direction for causing their outer arms to engage with the locking rail comprises horizontally and laterally-movable wedges I each of which is guided on a way *i* secured to the upper side of the platform and adapted to engage with the inner sides of the inner arms of the corresponding pair of locking levers. Normally these wedges are retracted or withdrawn inwardly so as to permit the springs *g*² to draw the inner arms of the locking levers together and separate the outer arms thereof, so that the latter do not engage the locking rails, but when the wedges are moved outwardly their inclined faces engage with the inner sides of the inner arms of the locking levers and separate the same, thereby causing the outer arms thereof to be in position to engage and interlock with the companion locking rail. The two wedges I, I are

caused to moved simultaneously outwardly and inwardly by means of a vertically-movable slide J which is guided in suitable ways *j* on the supplemental frame below the car and two toggles or links *k* pivotally connected at their upper inner ends to opposite sides of the slide J while their outer lower ends are pivotally connected with the upper sides of the wedges I, I, as shown in Fig. 1.

The slide forms part of a suspension frame which comprises a plurality of upright suspension bars or rods L arranged preferably between the outer side of the car and the adjacent walls of the elevator well, an upper cross head *l* which is arranged above the car and is connected at its sides with the upper ends of the rods L while its central part is connected with the lower end of the lifting cable, two lower horizontal longitudinal bars M connected with the lower ends of the lifting rods L, a plurality of horizontal cross bars *m*, *m*¹ connecting the longitudinal bars M, the central one *m* being connected with the upper end of the slide J while the side ones *m*¹ are connected with the longitudinal bars M on opposite sides of the center of the car and extend over the inner arms of the locking levers, two hangers N depending from the longitudinal bars M on opposite sides of the platform, and a lower horizontal cross bar *n* connecting the lower ends of the hangers with the lower end of the slide J. The weight of the car is preferably cushioned upon the suspension frame by means of a plurality of springs O interposed between the underside of the car and the cross pieces *m*¹. On opposite sides of the cross head *l* of the suspension or lifting frame the same is preferably provided with guide shoes *l*¹ which embrace the locking bars H so as to confine the lifting frame in the proper position relatively to the locking bars and the car is provided on its upper part with guide-sleeves *l*² which receive the upper parts of the suspension rods L so as to retain this part of the car in its proper relation to the lifting frame.

During the ordinary operation of the car while being raised and lowered, the same rests with its bottom on top of the slide J although it may be otherwise supported on the suspension frame during the normal operation of the parts. While thus supported, the car and the suspension devices rise and fall in unison and the main wedges I, I are drawn inwardly so as to cause the locking levers to assume a position in which they do not interfere with the free vertical movement of the car and connecting parts. If the cable should break and thus remove the support for the suspension frame, the latter under its own weight aided by the expansion of the springs O, will cause the suspension frame to drop quickly in advance

of the downward movement of the body of the car, which movement of the suspension frame is transmitted by the links *k* to the main wedges I, I, so that the latter are moved outwardly and the locking levers are turned in the direction for causing the jaws thereof to interlock with opposite sides of the locking rails and instantly arrest the further downward movement of the suspension frame and the car or load carried thereby. The parts remain in this locked position until repairing of the cable has been effected and the upward pull on the same again raises the suspension frame relatively to the car, during which movement of the parts the main wedges are again withdrawn inwardly from the locking levers and the latter are disengaged from the locking rails.

Owing to the link connection between the slide of the suspension frame and the main wedges, the latter are shifted into their operative position very quickly and with great power, so that the downward movement of the car is arrested before the same can acquire any speed and the car is held firmly in position on the guard or locking rails until repair of the elevator mechanism has been effected, thereby permitting of making this safety mechanism of comparatively light construction and avoiding the addition of any considerable weight to the elevator for effecting this purpose.

At times it is desirable to positively lock the car intentionally in the elevator well, so that it cannot be raised or lowered by any one other than the operator, this being the case when it is desired to effect repairs on the elevator or when the operator desires to leave the car at one floor of the building and prevent any one else from interfering with the same while the car is left alone. The mechanism whereby such intentional locking of the elevator may be effected is combined with the automatic mechanism above described and may be variously constructed, but preferably consists of the mechanism which is shown in the drawings and which is constructed as follows: P, P represent two auxiliary or manual wedges which slide laterally and horizontally in opposite directions on guides arranged on the underside of the platform and each engaging with its opposite inclined sides with rollers arranged on pins *q* which project downwardly from the inner arms of the pair of locking levers through segmental slots *q*¹ in the platform. These wedges are caused to move inwardly and outwardly in unison by means of a horizontal rock shaft R journaled transversely in bearings on the underside of the platform and provided with a pair of upwardly projecting rock arms *r* which are connected by a pair of links *r*¹ with one of the lower or auxiliary wedges and also provided with a pair of downwardly-projecting rock arms *r*²

which are connected by a pair of links g^3 with the other lower or auxiliary wedge. This rock shaft is normally turned in the direction for causing its arms and links to draw the lower wedges inwardly by means of a spring S which is preferably connected at one end with the underside of the platform and at its other end with an upright arm s on the rock shaft R. The lower or auxiliary wedges are moved outwardly when desired for the purpose of spreading the inner arms of the locking levers and causing the outer arms thereof to engage or interlock with opposite sides of the locking rails by means of an upright hand shaft T journaled in suitable bearings on the car and the platform, a drum t arranged on the hand shaft below the platform, a chain, cord or line t^1 connected at one end with the upper rock arm s while its opposite end is wound around the drum t , a crank or handle u arranged on the upper end of the hand shaft, a ratchet wheel V secured to the hand shaft near its upper end and a detent pawl v arranged on a stationary part of the car within the same and adapted to engage with the teeth of the ratchet wheel.

When it is desired to intentionally lock the elevator in the well, against either upward or downward movement, the operator turns the hand shaft in the proper direction for winding the chain t^1 on the drum t , whereby the rock shaft and intermediate connecting mechanism are shifted in the direction for pushing the lower wedges outwardly and causing the locking levers to grip the locking rails. The parts are held in this position by means of the detent pawl engaging with the adjacent tooth of the ratchet wheel and when it is again desired to release the car, so as to permit of raising and lowering the same, it is only necessary to disengage the pawl from the ratchet wheel when the resilience of the spring causes the lower wedges to be drawn inwardly through the medium of the intermediate mechanism, thereby permitting the springs g^2 to shift the locking levers into their inoperative position. While thus operating the locking device by the manual shifting mechanism, the automatic shifting mechanism is not disturbed but remains in a condition of readiness for operating automatically should the lifting cable or some part of the suspension frame connected therewith become broken.

Instead of arranging the locking mechanism below the passenger or freight compartment of the elevator, the same may be arranged above this compartment or elsewhere to suit the particular car or the conditions where the car is installed.

I claim as my invention:

1. An elevator safety device comprising a car, a lifting cable connected with the car, locking rails arranged on opposite sides of

the car, a suspension frame adapted to be connected with the lifting cable and to support said car but capable of vertical movement independently of said car and provided centrally with a slide, two pairs of locking levers pivoted on opposite sides of the car and each having jaws on their outer arms which are adapted to engage with opposite sides of one of the locking rails, wedges each engaging between the inner arms of one pair of locking levers and guided in a way carried by said car, and links connecting said wedges with opposite sides of said slide.

2. An elevator safety device comprising a car, a lifting cable connected with the car, locking rails arranged on opposite sides of the car, a suspension frame adapted to be connected with the lifting cable and to support said car but capable of vertical movement independently of said car and provided centrally with a slide, springs interposed between the car and said suspension frame, two pairs of locking levers pivoted on opposite sides of the car and each having jaws on their outer arms which are adapted to engage with opposite sides of one of the locking rails, wedges, each engaging between the inner arms of one pair of locking levers and guided in a way carried by said car, and links connecting said wedges with opposite sides of said slide.

3. An elevator safety device comprising a car, a lifting cable connected with the car, locking rails arranged on opposite sides of the car, a suspension frame adapted to be connected with the lifting cable and to support said car but capable of vertical movement independently of said car and provided centrally with a slide, two pairs of locking levers pivoted on opposite sides of the car and each having jaws on their outer arms which are adapted to engage with opposite sides of one of the locking rails, springs for yieldingly holding said locking levers out of engagement from said locking rails, wedges each engaging between the inner arms of one pair of locking levers and guided in a way carried by said car, and links connecting said wedges with opposite sides of said slide.

4. An elevator safety device comprising a car, a lifting cable connected with the car, locking rails arranged on opposite sides of the car, a suspension frame adapted to be connected with the lifting cable and to support said car but capable of vertical movement independently of said car, two pairs of locking levers pivoted on opposite sides of the car and each pair adapted to engage with opposite sides of one of the locking rails, wedges each operating one pair of said levers for causing the same to grip the adjacent locking rail, and means for causing said wedges to move in unison comprising a rock

shaft having arms on its opposite sides, and links connecting said arms with said wedges.

5 5. An elevator safety device comprising a car, a lifting cable connected with the car, locking rails arranged on opposite sides of the car, a suspension frame adapted to be connected with the lifting cable and to support said car but capable of vertical movement independently of said car, two pairs
10 of locking levers pivoted on opposite sides of the car and each pair adapted to engage with opposite sides of one of the locking rails, wedges each operating one pair of said levers for causing the same to grip the adjacent locking rail, means for causing said
15 wedges to move in unison comprising a rock shaft having arms on its opposite sides, links connecting said arms with said wedges, a hand shaft having a drum and a crank, a chain or cable connected at one end with an arm on the rock shaft while its opposite end
20 winds around said drum, a ratchet wheel arranged on the hand shaft, and a detent pawl adapted to engage with said ratchet wheel.

25 6. An elevator safety device comprising a car, a lifting cable connected with the car, locking rails arranged on opposite sides of the car, a suspension frame adapted to be connected with the lifting cable and to support
30 said car but capable of vertical movement independently of said car, two pairs of locking levers pivoted on the car and each pair adapted to be engaged with opposite sides of one of the locking rails, a pair of
35 automatic wedges operating on said levers and movable on guides carried by the car, a

pair of links connecting said automatic wedges with the suspension frame, a pair of manual wedges also operating on said levers and guided on ways carried by the car, and
40 means for operating said manual wedges.

7. An elevator safety device comprising a car, a lifting cable connected with the car, locking rails arranged on opposite sides of the car, a suspension frame adapted to be
45 connected with the lifting cable and to support said car but capable of vertical movement independently of said car, two pairs of locking levers pivoted on the car and each pair adapted to be engaged with opposite
50 sides of one of the locking rails, a pair of automatic wedges operating on said levers and movable on guides carried by the car, a pair of links connecting said automatic wedges with the suspension frame, a pair of
55 manual wedges also operating on said levers and guided on ways carried by the car, and means for operating said manual wedges comprising a horizontal rock shaft carried by the car and having arms on its opposite
60 sides which are connected with the manual wedges, an upright hand shaft mounted on the car and operatively connected with the rock shaft, and a detent device for holding said hand shaft in place.

Witness my hand this 26th day of July, 1909.

CARLOS J. BROOKINS.

Witnesses:

CHAS. H. EVANS,
DE LISLE BROOKINS.