

(No Model.)

2 Sheets—Sheet 1.

J. K. JOHNSON.  
SAFETY DEVICE FOR ELEVATORS.

No. 460,874.

Patented Oct. 6, 1891.

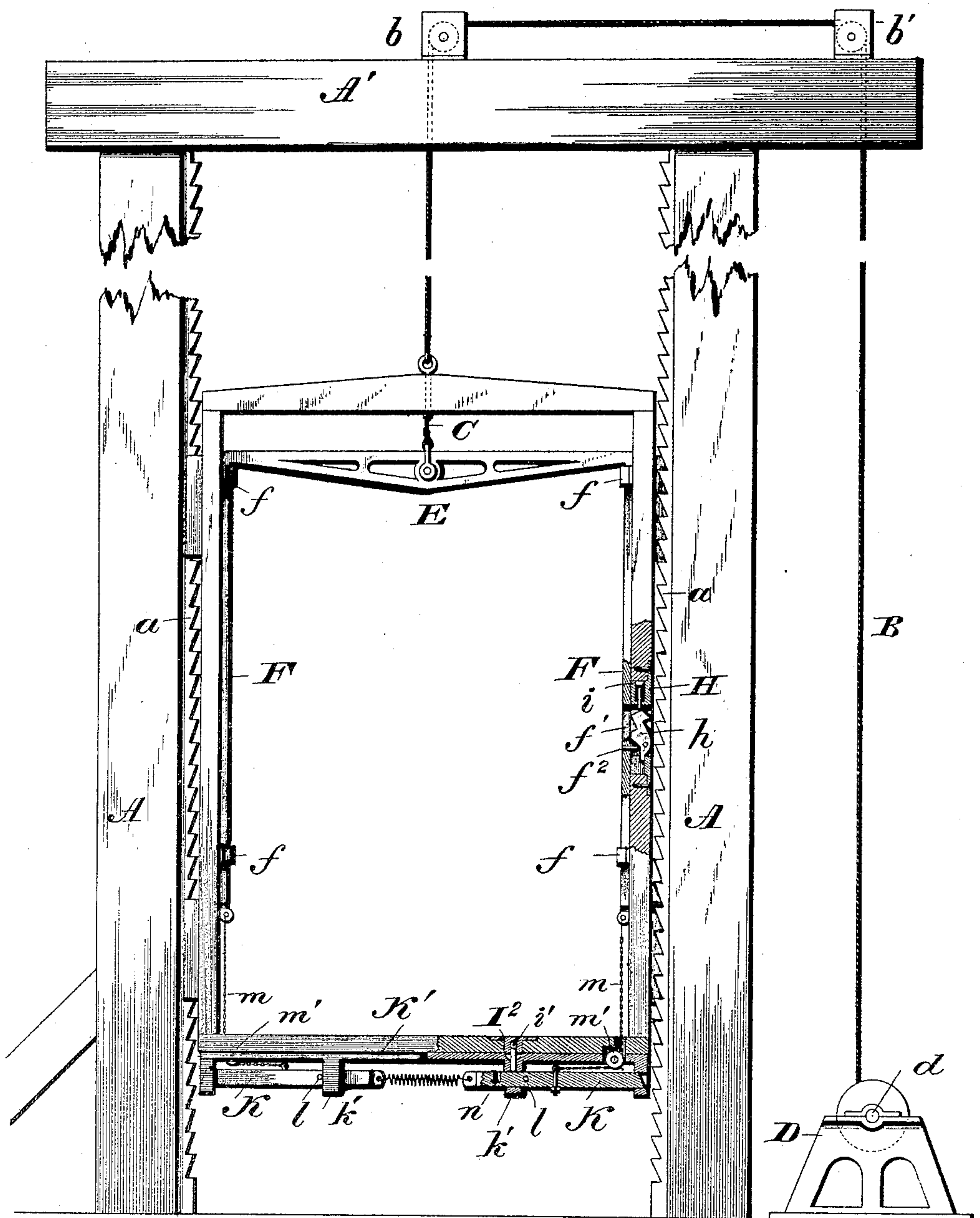


Fig. 1.

John K. Johnson.

Witnesses

L. S. Elliott  
J. M. Johnson

Inventor

by *[Signature]*  
Attorney

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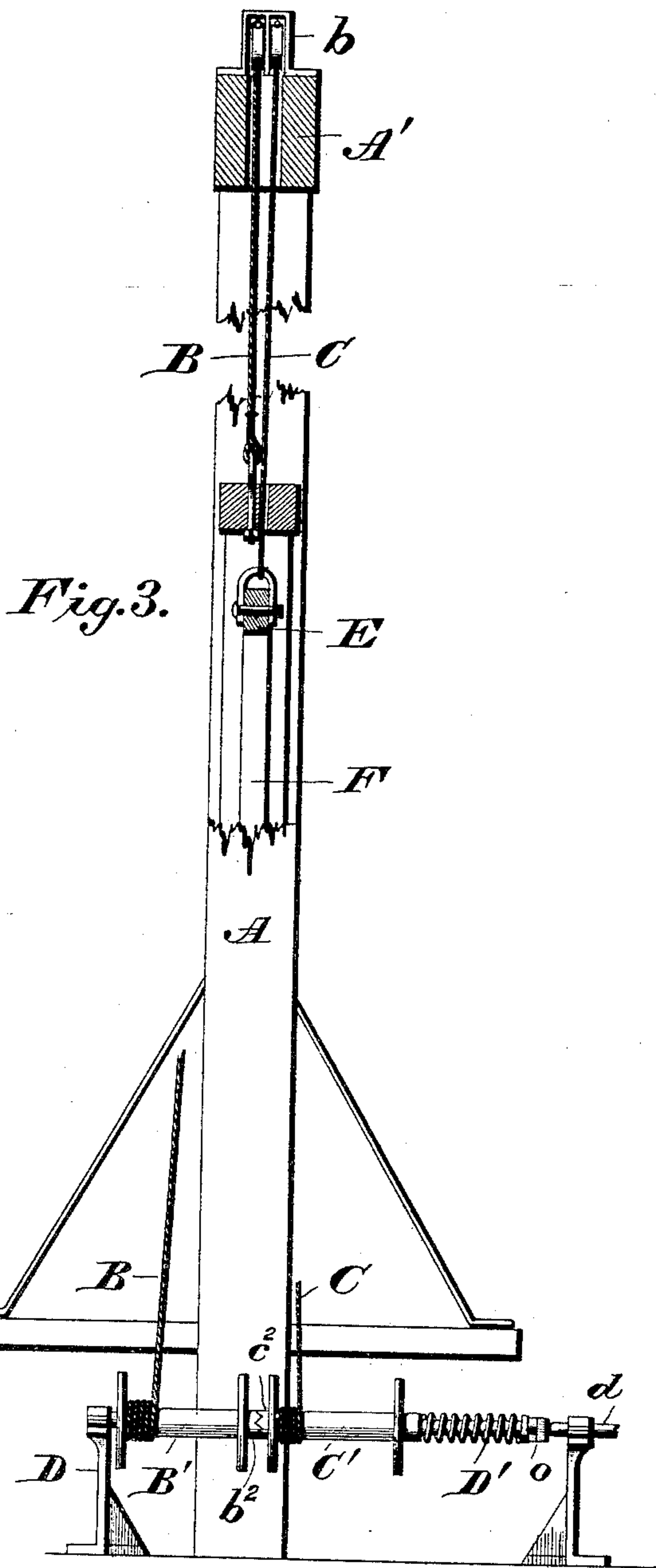
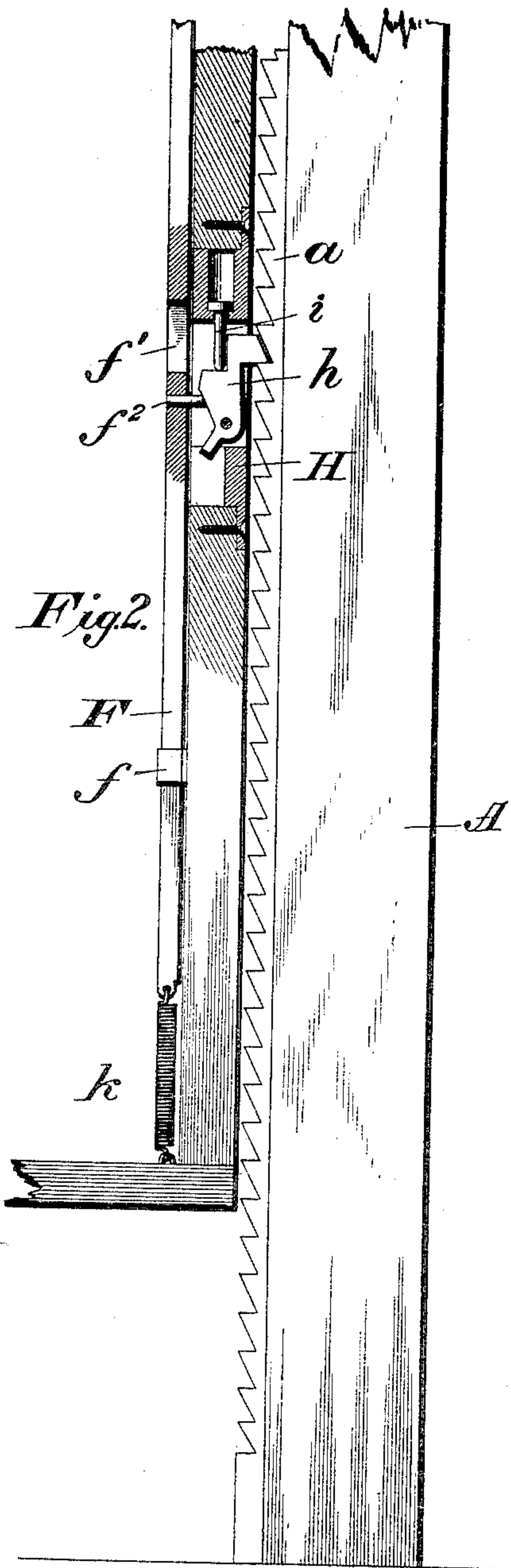
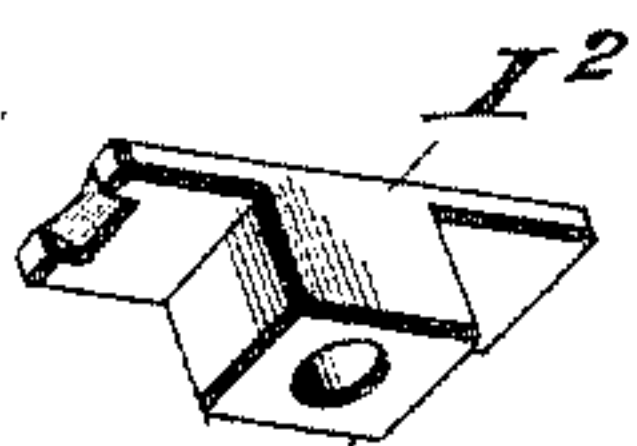


Fig. 4.



Witnesses

L. S. Elliott.  
J. K. Johnson

John K. Johnson.

Inventor



Fig. 5.

by

Attorney



# UNITED STATES PATENT OFFICE.

JOHN K. JOHNSON, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF  
ONE-HALF TO FRANCIS F. BURDETT, OF SAME PLACE.

## SAFETY DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 460,874, dated October 6, 1891.

Application filed May 21, 1891. Serial No. 393,533. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN K. JOHNSON, a citizen of the United States of America, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Elevators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to certain new and useful improvements in elevators; and it consists more especially in providing means for raising and lowering the elevator cage or car and arresting the downfall of the same in case of a break in the hoisting rope or ropes or in the mechanism for operating said ropes; and it further consists in providing an improved form of hoisting-drum or windlass and in providing the cage with safety-catches which are adapted to engage with the rack-bars at the sides of the elevator-shaft, so that said safety-catches will engage with the rack-bars and be held in locked engagement therewith should the hoisting rope or ropes or mechanism for operating the same be broken and the cage otherwise fall.

In the accompanying drawings, forming part of this specification, Figure 1 is a side view, partly in section, of an elevator shaft and cage, showing my improvements applied thereto. Fig. 2 is a detail view, partly in section, of a car and partly of the elevator-shaft, showing one form of catch in locked engagement with the rack-bar. Fig. 3 is an end view showing the side of the cage and the windlass or hoisting-drum. Figs. 4 and 5 are detail perspective views.

A A designate the vertical beams of the elevator-shaft, which are provided with the usual rack-bars *a a*. The upper connecting cross-beam A' at the top of the elevator-shaft carries guide-pulleys *b* and *b'*, over which pass the hoisting-rope B and safety-rope C. The hoisting-rope is preferably of about twice the diameter of the safety-rope and is attached to the upper part of the elevator-cage in the usual manner and passes over the

guide-pulleys on the upper cross-beam and from there downward to the drum B' of the windlass D. The safety-rope C is attached to the movable cross-bar E, located within the cage or car, and passes through the upper rigid cross-piece of the cage, over the pulleys carried by the upper cross-beam A', and from there down to the drum C' of the windlass.

The cross-bar E has attached thereto vertical side bars F F, which pass through suitable guides or loops *f f* and are drawn down by springs attached to their lower ends and to the cage. These side bars are provided with recesses *f'*, and the sides of the cage adjacent thereto are recessed or cut away for the reception of castings or fixtures H, which support pivoted pawls or catches *h*, as shown. The pawls or catches are curved on one side, and with said curved edges pins *f*<sup>2</sup>, carried by the vertical bars F F, engage, said pins being located a short distance below the recesses *f'*, so that when the bars F are in their normal position—that is, at the limit of their downward movement—these pins will bear against the lower ends of the pawls to hold the upper ends thereof out of engagement with the rack-bars *a*. The upper part of the casting or fixture H has a recess, within which is placed a gravity locking-pin *i*, which is adapted to engage the notched portion of the pawl when said pawl is in engagement with the rack-bar *a*, and when the pawl is out of engagement with the rack-bar it rests upon the upper portion thereof. This pin provides an automatic lock for the pawl in addition to the lock provided by the pin *f*<sup>2</sup>.

In Fig. 2 of the drawings the bars F F are shown as being connected to the floor of the cage by springs *k*, which springs exert a downward pull upon said bars sufficient to overcome the spring-pressure of the movable drum C', over which the safety-rope passes.

In addition to the catches located in the sides of the cage I provide, in some instances, a bottom lock attached beneath the floor of the cage, said lock consisting of bolts K K, which are carried by a frame or casting K', having depending apertured lugs *k'*, in which the bolts K move. These bolts are drawn toward each other by a spring and have stop-pins *l l* for limiting their inward movement,



and between the inner and outer lugs are eye-bolts or perforations, to which are attached chains or flexible connections *m*, which pass over guide-pulleys *m'* and are attached to the lower ends of the vertically-moving bars *F*. The bolts *K* have vertical perforations *n*, and the floor of the cage is provided with vertical apertures, in which lie locking-pins *i'*, which are adapted to rest upon the upper edges of the bolts when they are withdrawn and enter the recesses *n* when the bolts are projected.

It will be noted that the safety catches or bolts *K* will act in unison with the catches or pawls *h*, and that either one or the other may be dispensed with without affecting the other.

The hoisting-windlass *D* is provided with a shaft *d*, which is supported in suitable bearings and turned in the usual manner, said shaft having rigidly fixed thereon a drum *B'*, over which the hoisting-rope *B* passes. The end of this drum is provided with a clutch-face *b<sup>2</sup>*, which engages with the clutch-face *c<sup>2</sup>* of the drum *C'*, over which passes the safety-cord *C*, the clutch-faces being held in contact with each other by a spring *D'* on the shaft *d*. The pressure of this spring can be adjusted to force the clutch-faces against each other with a greater or less amount of pressure, as may be desired, by turning the nuts *o* at one end of the threaded shaft. The object of providing such construction is that should the hoisting-rope break and the engine continue to drive the shaft of the windlass the drum *C'* would slip on the shaft, the strength of the safety-cord being such that it would cause the rotation of the drum *C'* against its frictional contact with the fixed drum.

From the foregoing description it is obvious that when the hoisting-rope breaks the pressure will be upon the safety-cord so as to elevate the cross-bar *E* and automatically throw the safety-catches in engagement with the rack-bars to prevent the descent of the cage, and that as soon as these safety-catches are thus caused to engage with the rack-bars they will be locked.

To unlock the catches it will be necessary for the operator to insert a suitable tool or implement and elevate the locking-pins *i* out of engagement with the notched upper ends of the pawls *h*, and also remove the plates *I<sup>2</sup>* and raise the pins *i'*, which hold the bolts *K* in fixed engagement with the rack-bars.

By the means hereinbefore described it will be observed that when the hoisting-rope breaks the cage is not only held against a downward movement, but also against an upward movement.

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

1. In combination with an elevator-cage having a hoisting-rope and a safety-rope, for the purpose set forth, a windlass consisting of a drum fixed to the shaft thereof, over which the hoisting-rope passes, and a drum, over which the safety-cord passes, loosely

mounted on the shaft and held in frictional contact with the hoisting-drum, substantially as set forth.

2. The combination, in a hoisting device for elevators, having a hoisting-rope and safety-rope for operating safety-catches attached to the cage, of a driven shaft having rigidly fixed thereto a drum over which the hoisting-rope passes, said drum having a frictional clutch-face, a drum loosely mounted on said shaft and having a corresponding clutch-face, a spring for holding the movable drum in contact with the fixed drum, and means for regulating the frictional contact of the drums with each other, substantially as set forth.

3. The combination, in an elevator, of a car or cage having a cross-bar *E*, movably secured thereto, to which are rigidly attached depending bars *F*, said depending bars having inwardly-projecting pins, the vertical side pieces of the cage carrying safety-catches adjacent to said inwardly-projecting pins, which are adapted to be thrown outwardly for engagement with rack-bars *a* when the cross-bar *E* is moved toward the top of the cage, substantially as set forth.

4. The combination, in an elevator, of a cage having a movable cross-bar *E*, depending bars secured thereto and connected with the cage, a hoisting-rope attached to the main frame of the cage and a safety-rope connected to the cross-bar *E*, means for connecting the depending bars *F* with spring-retracted bolts, and automatic locking devices for holding the bolts projected and in engagement with the rack-bars *e e* when said bolts have been projected, substantially as set forth.

5. The combination, in an elevator, of a cage having a hoisting-rope and a safety-rope, a cross-bar *E*, having vertically-depending bars connected movably to the cage, said bars being provided with inwardly-projecting pins, spring-retracted bolts *K*, connected to the depending bars, safety-catches *h h*, carried by the cage, and automatic locking-pins *i* and *i'* for holding the catches and bolts projected when the depending bars are elevated, substantially as shown, and for the purpose set forth.

6. In combination with an elevator-cage having movable side bars *F*, adapted to be operated by a safety-cord *C* in the manner set forth, of safety-catches *h*, having a curved side, with which pins *f<sup>2</sup>*, carried by the bars *F*, engage, so as to retract the catches *h* when the pins *f<sup>2</sup>* lie below the pivots thereof and project the same when moved above the pivot, substantially as set forth.

7. The combination, with an elevator-cage, of the bars *F F*, having apertures *f'* and projecting pins *f<sup>2</sup>*, safety-catches *h*, pivoted to the sides of the cage adjacent to the pin and aperture, said catch having a curved inner side, with which the pin *f<sup>2</sup>* engages, and a recess or shoulder, with which a locking-pin *i* will engage when the catch is projected by



the pin  $f^2$ , carried by the sliding bar F, substantially as set forth.

5 8. The combination, in an elevator, of a windlass constructed substantially as shown and provided with a hoisting-drum and a drum over which the safety-cord passes, said drums being held in frictional contact with each other, the safety-cord being attached to the movable bar E within the elevator-cage, 10 said bar having depending bars F F, to which springs are attached, said springs serving to hold the cross-bar E against the pull or strain of the friction-drum, together with safety-catches constructed substantially as shown, 15 and which are adapted to be thrown in engagement with the rack-bars when the cross-bar E is raised.

9. The combination, in an elevator-cage, of side pieces having recesses within which are 20 located safety-catches, vertically-movable bars F, connected to a safety-rope, inwardly-projecting pins  $f^2$ , carried by said depending bars, said pins contacting with the safety-catches, so as to project the same when the 25 bars F are elevated and retract the same when lowered, said safety-catches being adapted to engage with rack-bars, the bars F being automatically held so that the projecting pins carried thereby will lie below the

pivot of the safety-catches, for the purpose 30 set forth.

10. The combination, in a cage for elevators, of vertically-movable bars F, secured to the cage, a safety-rope connected to said bars, a spring for holding said bars normally de- 35 pressed, the cage being provided with safety-catches  $h$ , sliding bolts K, flexible connections  $m$ , connecting the bolts with the depending bars, and independent automatic locking mechanism operating simultaneously 40 upon the locking-bolts and safety-catches to hold them in engagement with the rack-bars of the elevator-shaft, substantially as shown, and for the purpose set forth.

11. The combination, with an elevator-cage, 45 of spring-retracted bolts K, vertically-movable bars F, connected to a safety-rope, flexible connections N, attached to the safety-bolts and to the bars F, and locking-pins  $i'$  and removable plates  $I^2$ , let into the floor of 50 the cage, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN K. JOHNSON.

Witnesses:

E. W. JOHNSON,  
H. L. BEALL.