

(No Model.)

2 Sheets—Sheet 1.

N. V. FITTS.
SAFETY DEVICE FOR ELEVATORS.

No. 500,876.

Patented July 4, 1893.

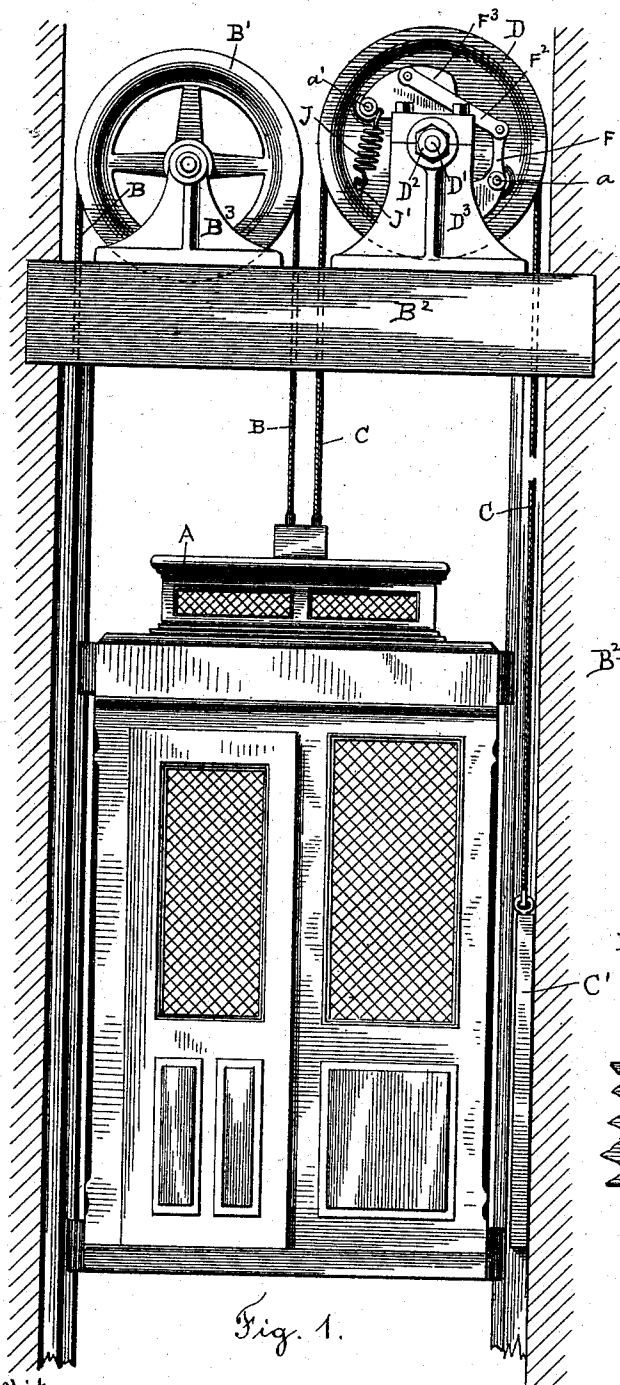


Fig. 1.

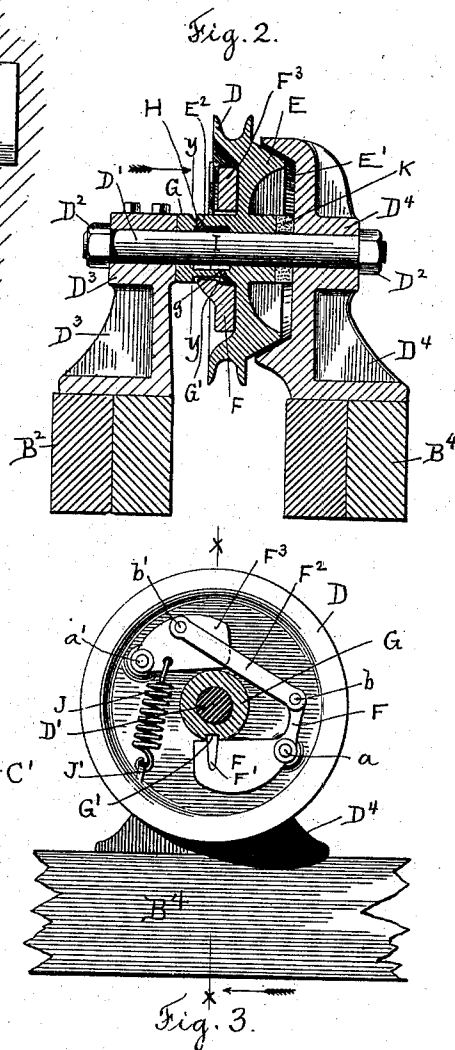


Fig. 2.

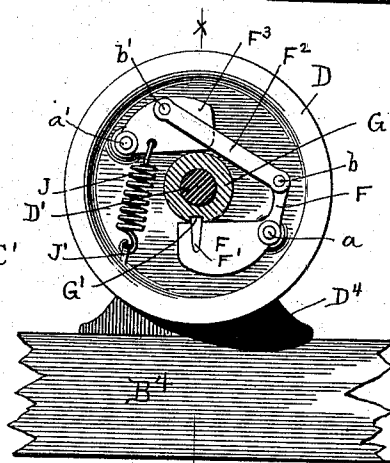


Fig. 3.

Witnesses

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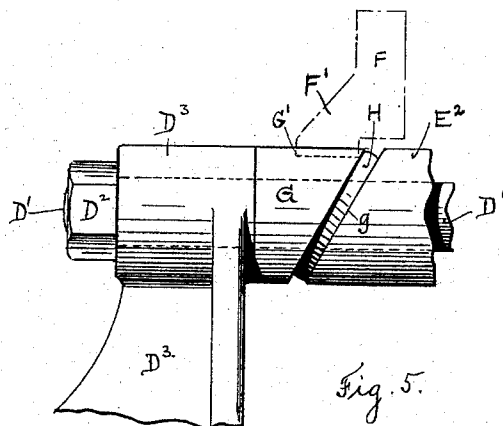
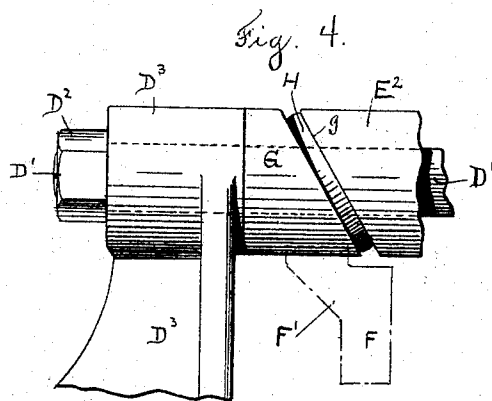
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2 Sheets—Sheet 2.

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SAFETY DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 500,876, dated July 4, 1893.

Application filed September 30, 1891. Serial No. 407,338. (No model.)

To all whom it may concern:

Be it known that I, NORMAN V. FITTS, of the city and county of Worcester, Commonwealth of Massachusetts, have invented certain new and useful Improvements in Safety Devices for Elevators; and I do hereby declare that the following is a full and clear description of the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, forming a part of this specification, and in which—

Figure 1 represents a front view of so much of an elevator as is necessary to illustrate my said invention. Fig. 2 represents a longitudinal section of the counterbalance sheave, on line *x x*, Fig. 3, looking in the direction indicated by the arrow same figure. Fig. 3 represents a cross section on line *y y*, Fig. 2, looking in the direction indicated by the arrow same figure, all as will be hereinafter described. Fig. 4 represents, upon an enlarged scale, a side view of a portion of the parts shown in the drawing Fig. 2, when not seen in section, as will be more fully described hereinafter, and Fig. 5 represents, upon a like enlarged scale, a side view of the same parts shown in Fig. 4, after some of the parts have been turned one half of a revolution, as hereinafter described.

To enable those skilled in the art to which my invention belongs to make and use the same I will now describe the invention more in detail.

Many devices have heretofore been devised and used with a view to prevent serious accidents, in case of injury to, or the breaking of some material part of the elevating mechanism while in use, and the object of my invention is to accomplish the said result by mechanism both new in construction, combination and arrangement, whereby many of the objections to prior devices are obviated.

In the drawings the elevator car is marked A, B, the hoisting or elevating cable which runs over the sheave B', supported from timber B², in front, its bearing B³, being fastened thereto. Sheave B', is supported in rear in a similar manner—the journal on which it turns being fixed in bearings B³, the front one resting on timber B², and the rear one on timber B⁴.

C, is the counter weight cable, to which is attached at its free end the counter weight

C², the other end being attached to the top of the elevator car. In Fig. 1, the counter cable C, is shown broken, and the counter weight C¹, is shown raised up from its normal relative position to the carriage or car A. for the purpose of illustrating its path of motion. The counter weight, it will be understood, is down when the car is up, and up when the car is down—the motion of one being the reverse of the other.

To render the counter cable, sheave and counter weight in their combined action means of safety, in case of any breakage or disarrangement of the elevating mechanism and elevating cable, they are combined as follows:—Counter weight cable C, passes over a grooved sheave D, which is fitted to turn loosely on a journal D', having nuts D², D³, on its ends to clamp it rigidly to the bearings D³, D⁴, supported on the timbers B², and B⁴. Sheave D, is provided with a friction cone E, which is properly fitted to work in combination with a friction cup E', on the inner face of the bearing D⁴. The inner hub E², of sheave D, is made with a bevel surface *g*, that works in contact with the rocking washer H,—a key I, in journal D', preventing washer from turning while leaving it free to rock laterally to conform freely to the rotating bevel surface *g*, of hub E². To the inner face of sheave D, which is cored out between hub E², and the periphery, is pivoted a spur weight F, provided with a spur F'. Spur weight F, is provided with an arm that extends beyond pivot *a*, and is connected by a pivot *b*, to one end of a link or connection F², which in turn is pivoted at *b'*, to a counter weight F³, pivoted at *a'*, to the inner face of sheave D, as fully shown in the drawings.

On journal D', is arranged a loose collar G,—the end next to the rocking ring or washer H, being beveled off to correspond to the bevel of hub E², and a groove G', is cut longitudinally in the outer surface of collar G, to receive spur F', when the elevator is stationary or in ordinary use,—spring J, serving to keep the parts F, F', and F³, in the relative positions, as shown in Fig. 3—one end of the spring J, being hooked to an ear J', on the inner side of sheave D, while the other end is hooked to the balance weight F³.

A rubber cushion K, is arranged on journal D', and between the outer hub of sheave D,

and the inner face of cup bearing D^4 , which is compressed when the friction cone E, is forced into the friction cup E' , as hereinafter described and for the purpose stated. In small elevators, a metallic hub may be extended from the inner side of bearing piece D^4 , to take the place of rubber cushion K, and in which case friction cone E, and cup E' , may be omitted—the friction between the hubs on sheave D, and bearing piece D^4 , being sufficient to hold sheave D, rigid.

The operation is as follows: The tension of spring J, is so arranged and adjusted that the weights F, F^3 , will be held in the relative position shown in Fig. 3, when the elevator carriage A, is descending at its greatest maximum speed for safety, but in case of the breaking of any part of the operating mechanism, cable B, or such derangement of the parts as to let the carriage A, drop, or descend at a dangerous speed, the speed of sheave D, will impart sufficient centrifugal force to weights F, F^3 , to cause them to swing out on their pivots a, a' , and thereby draw spur catch F' out of the notch G' , in the beveled collar G, which then ceases to move, and the movement of beveled hub E^2 , forces washer H, against the now stationary beveled collar G, the wedging resistance of which forces sheave D, laterally until its cone E, is wedged in the conical cup E' , of cup bearing D^4 , thereby firmly and rigidly locking sheave D, to the cup bearing D^4 , when the friction of counter cable C, in the groove of the now stationary sheave D, will be sufficient to check the descent of the elevator car and bring it to a stop. To release the sheave from its locked position, it is only necessary to turn either the sheave D, or collar G, back a little, when the rubber cushion K, will force sheave D, back, thus separating its friction cone E, from contact with the friction cup E' , and the parts assume the relative positions shown in Figs. 2 and 3. The collar G, and hub E^2 , are cored or turned out so they will turn freely over the spline I, which is fastened rigidly in the journal D' , as indicated in Fig. 2, but fits loosely in the slot cut in the washer H,—the slot being a little deeper and wider than the portion of key I, that projects beyond the surface of journal D' ,—whereby washer H, is prevented from turning around on the journal D' , but is left free to rock laterally thereon to conform to the changing positions of the beveled surfaces of hub E^2 , and collar G, when they both are rotated at the same time on journal D' , and this is illustrated by Figs. 4, and 5, of the drawings. In Fig. 4, collar G, is shown locked to turn with hub E^2 , of sheave D, spur F' , of spur weight F, resting in groove G' , in collar G, and when so locked collar G, is turned on journal D' , with the same speed as sheave D, and its beveled hub E^2 , a portion of the latter being shown in Figs. 4 and 5.

In Fig. 5, collar G, and hub E^2 , of sheave D, are shown after having made one half of a

revolution on stationary journal D, from the positions in which they are shown in Fig. 4, and as washer H, cannot turn on, or rotate with collar G, and hub E^2 , on stationary journal D, it will be seen that its upper part has rocked to the right while its lower part has rocked to the left, in conforming to the rotating beveled surfaces of collar G, and hub E^2 , of sheave D. It will be understood that the hole in washer H, is made larger than journal D' , so that it can rock back and forth as above described without any binding on journal D' . Assuming that the parts are in the relative positions shown in Fig. 5, and the elevator car should fall, the increased speed of sheave D, would cause spur F' , to be lifted from the groove or slot G' , in collar G, and the latter would stop, and hub E^2 , and sheave D, would also stop, since they cannot turn unless collar G, turns with them. The result is, the beveled hub E^2 , being forced against the inclined face of washer H, which in turn is forced against the beveled end of the collar G, sheave D, and its cone E, are thus forced to the right on journal D' , until cone E, wedges into friction cup E' , and thus the further motion of sheave D, on journal D' , is arrested and the car is stopped as before explained.

It will be observed that the locking parts employed in my safety device are not liable to break or slip, but are sure and positive in their action to lock sheave D, rigidly between the bearings D^3 and D^4 , while journal D' , and its nuts D^2 , D^2 , hold the bearings from spreading. Pawls and ratchets are not used to arrest the motion of sheave D. Consequently all the objections and dangers to their use in safety devices for elevators are avoided by my invention.

The construction is very simple, and is easily understood by an ordinary mechanic, which renders its use in ordinary elevators quite inexpensive and safe. The entire mechanism occupies but little more space than the common counter weight, sheave and cable.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination of the journal D' provided with spline I washer H, cup-bearing D^4 , sheave D provided with the friction cone E' and the beveled hub E^2 , beveled collar G, and pivoted weight F having a spur F' normally engaging said collar, substantially as shown and for the purpose set forth.

2. The combination with sheave D, provided with beveled hub E^2 and friction cone E, of journal D' , cup bearing D^4 , pivoted weights F, F^3 , link F^2 , spring J, grooved collar G normally engaged by one of said weights, and rocking washer H, substantially as and for the purposes set forth.

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