(No Model.)

N. BECKWITH.

ELEVATOR.

No. 502,270. Patented Aug. 1, 1893.

FIG. 1.

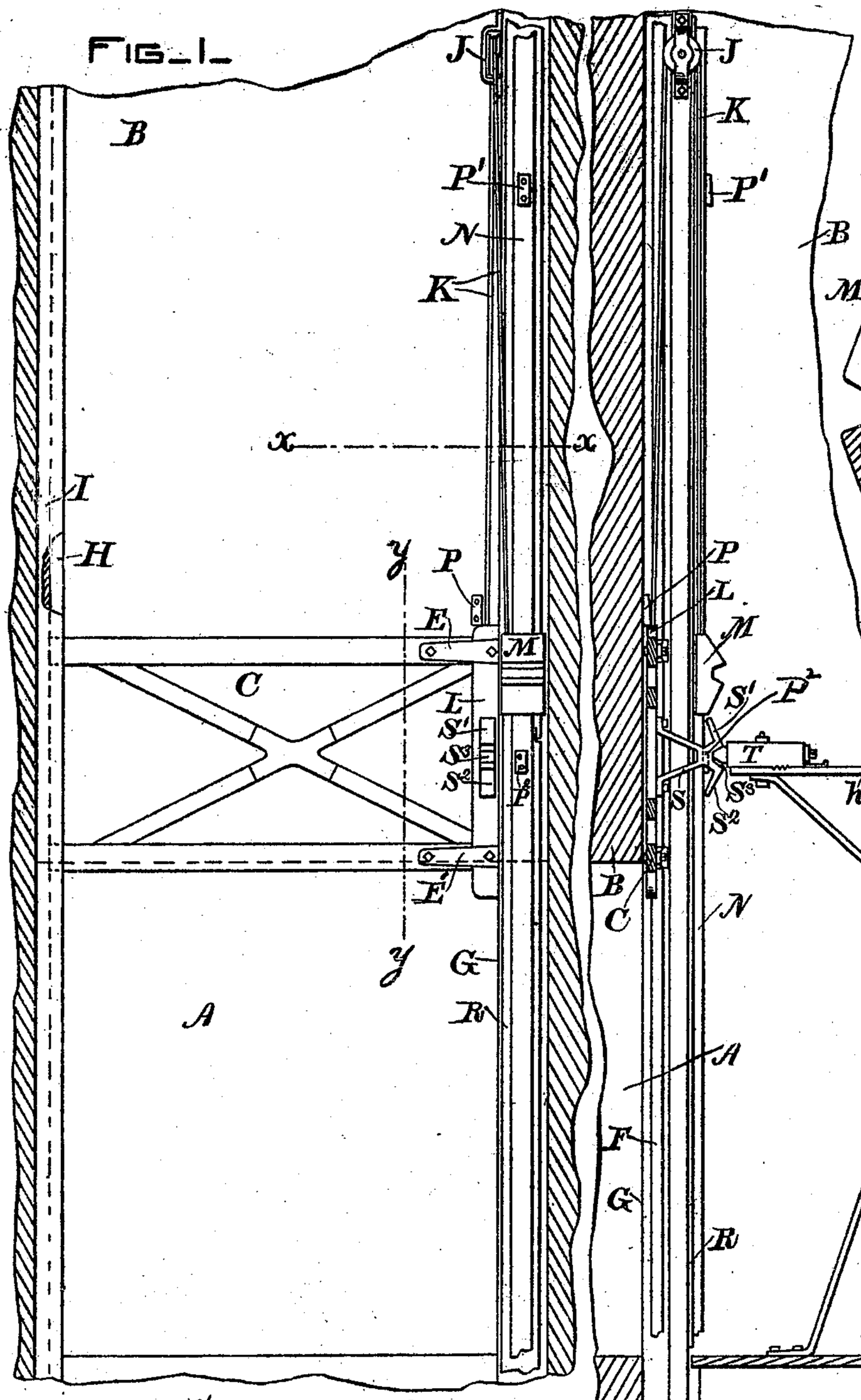
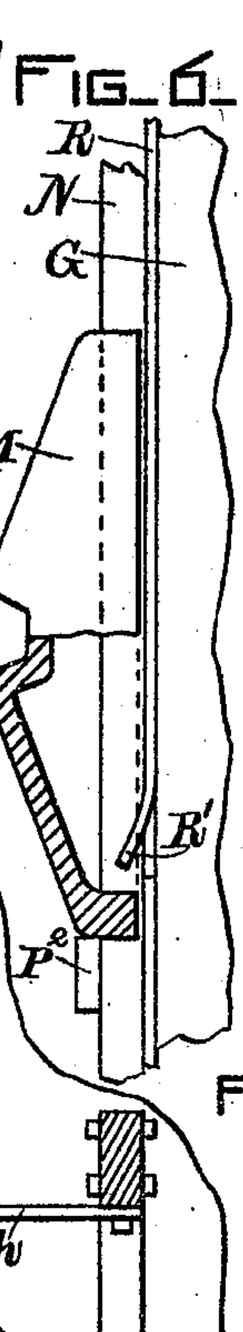


FIG. 6.



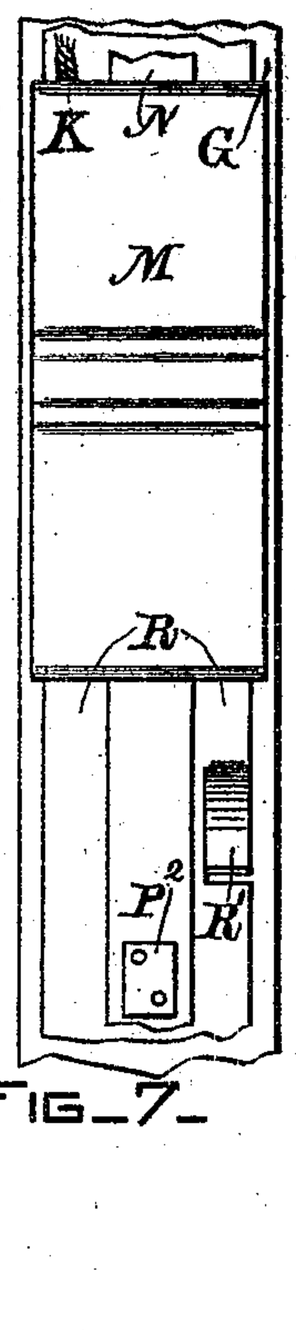


FIG. 7.

FIG. 2.

FIG. 4.

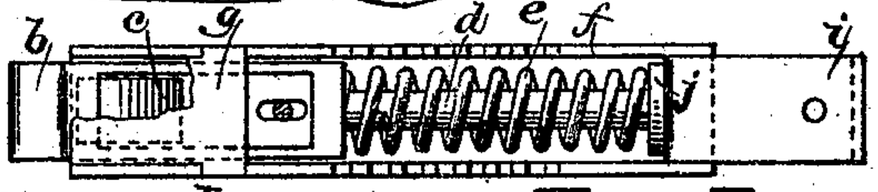


FIG. 5.

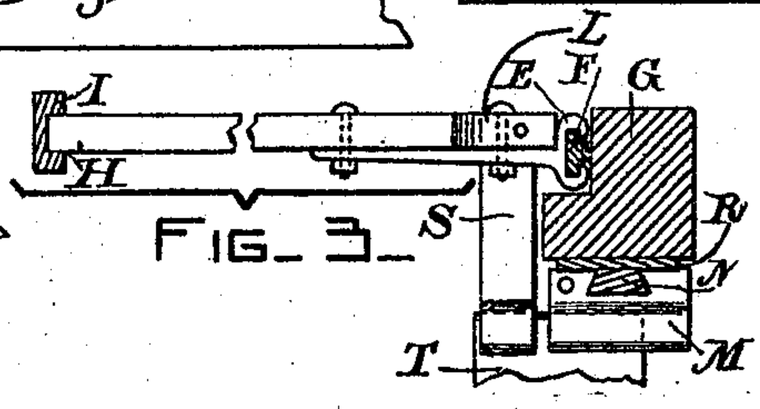


FIG. 3.

WITNESSES

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ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 502,270, dated August 1, 1893.

Application filed April 14, 1893. Serial No. 470,270. (No model.)

To all whom it may concern:

Be it known that I, NELSON BECKWITH, of Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Elevators, which will, in connection with the accompanying drawings, be hereinafter fully described, and specifically defined in the appended claims.

My invention relates to improvements in elevators, whereby the gates which guard the hatchways are automatically opened and closed by the rise and descent of the elevator car, and consists in certain novel details of construction which are hereinafter fully described and pointed out in the appended claims.

In the accompanying drawings:—Figure 1— is an elevation showing my counterbalanced gate, as when raised and not closing the hatchway, and as viewed from the platform of the car, when standing at the open hatchway. Fig. 2— is a sectional elevation taken as on line *y*, *y*, Fig. 1, showing the gate and car in the same position as in Fig. 1, and as viewed from the left of said line. Fig. 3— is a horizontal section taken as on line *x*—*x*, Fig. 1, and as viewed from above said line. Fig. 4— is a sectional elevation of the automatic catch-bar by which the gate is raised and lowered. Fig. 5— is an inverted plan or under side view of the same. Fig. 6— is an enlarged sectional view of the counter-balancing weight, locked in a fallen position. Fig. 7— is an enlarged front view of the same and of the locking device.

A represents an open door or hatchway in the wall B of the elevator well; C is the gate which guards the same.

D is the elevator car.

To the upper and lower bars of the gate are bolted two iron arms E and E′ formed at their outer ends to interlock with and slide upon a T-shaped guide-rail F secured to the post G, as clearly shown in Fig. 3. The opposite ends of the gate bars move up and down in a guiding and supporting groove H on jamb I. At a suitable distance above gate C there is secured to post G a pulley J. Over this pulley a cord K runs and is attached at one end to the vertical bar L of gate C, and at its opposite end to the counter-balancing weight M. This weight has a dove-tail groove on its back side, which adapts it to run up and down on the guide-rail N on post G. A gate stop P is secured to wall B, adjacent to guide-rail F, to limit the upward movement of the gate, and a similar stop P′ is secured to the post adjacent to guide-rail N, to limit the upward movement of the counter-poising weight. A similar stop P^2 is secured to the post below the normal descent of the weight, to arrest the latter in case of its falling accidentally by the breaking of its cord. A thin iron wearing plate R is secured to post G, parallel with guide-rail N, against which the weight chafes. This thin plate is cut and a lip R′ turned outward therefrom which, in case of an accidental fall of the weight, as before referred to, will spring into a notch or recess in the back of the weight and thus hold the same down, as shown in Fig. 6, and prevent its being carried up by the lifting device on the car, and repeatedly dropped before the accident to the cord is discovered.

Upon the vertical bar L, of the gate, is secured an angular bracket or catch S, which projects into the path of a catch-bar T that is mounted on the top of the car, and travels up and down therewith. Catch S presents to bar T two inclined faces S′ and S^2 and an intermediate V-shaped notch S^3. Weight M presents a similar contour to the yielding-catch-bar T, which engages by turns both the catch and the weight, as the car moves up and down. The yielding catch-bar T and its immediate attachments and connections constructed, combined and arranged to operate together as hereinafter described, constitute one of the novel features of my present invention. The details of its construction are shown in Figs. 4 and 5. The outer and contracted end of the bar presents two inclined faces *a* and *b* and back of said faces a vertical opening through the bar admits an anti-friction roll *c*, which revolves freely on a pivot which extends centrally through the sides of the bar. The diameter of the roll is a little greater than the depth of the bar and therefore it projects both upward and downward beyond the sides of the bar. A diminished cylindrical arm *d* is formed on the inner portion of the catch-bar, and on the arm a spiral spring *e* acts against a shoulder thereon, to thrust the bar outward. An iron casing *f* incloses the bar,

through the ends of which the bar has a horizontal movement. An iron plate *g* rests upon the wooden beam *h* of the car to receive the wear of roll *c*. This plate is formed to interlock with notches in the lower edges of casing *f*, which shuts down onto and is bolted through beam *h*, and secures the plate and other parts in their proper positions, as shown. A spring-adjusting slide *i* having an upturned forked end *i'*, is also adjustably secured upon the beam by casing *f* resting down thereon at its rear end. The fork *i'* bears against a washer *j* which is interposed between the fork and the end of spring *e*. Another metallic washer *j'* is placed between the casing and a pin j^2, which limits the forward thrust of the catch-bar under the action of spring *e*. If the spring becomes "set" and thus loses some of its elastic force and fails to properly thrust the catch-bar outward, it may be compressed and thus increased in expansive force by driving its adjusting plate *i* inward against the spring to the requisite degree and then securing the plate to beam *h* by turning nut *f'* so as to more firmly clamp the casing *f* upon the plate; or by directly screwing or otherwise fastening the plate to the beam in the position to which it may be so adjusted. A slot in the casing under nut *f'* allows it to be adjusted longitudinally on the beam, to bring the outer end of the catch-bar into proper relation to the catches on the gate and counterpoising weight.

The practical operation of the described devices is as follows:—Starting with the several parts in the positions shown in Figs. 1 and 2, the car D being moved upward by the power employed to propel the same presses the catch-bar T against the upper side of the notch in the gate catch. The upward movement of the gate being blocked and resisted by stop P, the catch bar is forced backward against the force of its actuating spring and out of the notch in catch S. Such resistance of the catch forces the roll *c*, in the catch-bar, onto plate *g*, and thus the bar is rolled back instead of sliding, thereby greatly diminishing the friction of that movement. The car then moves upward and the catch-bar as soon as it is carried above the notch is forced gradually outward onto incline S', and passing the gate catch engages the lower incline of the weight and yieldingly passes up said incline and enters the notch in the weight, and then moves onward carrying the weight with it. When the weight is thus raised the gate is thereby caused to descend by gradually relieving it from the stress of its sustaining counter-balance. When the gate has thus reached its lowest position and is guarding the door or hatchway A, the weight M will have reached the stop P', and the resistance of the stop to any further upward movement of the weight will have become positive and unyielding; consequently the further progress of the car in that direction will cause the catch-bar to be forced out of the weight-catch as it was previously forced out of the gate-catch, by the resistance of the catch to the progressive movement of the car, thus obstructed through the yielding-bar. When the car, after having thus forced the bar past the resisting weight-catch, again descends, the catch-bar will come into contact with the upper incline on weight M, and be forced back thereby until it reaches and enters the central notch; then the continued descent of the car will through such engagement of the bar carry the weight with it, and through the cord connecting the weight and gate, will cause the latter to rise as the car descends; and just before the car reaches its position opposite the hatchway A the gate rises into contact with stop P, and by reason of said stop arrests the downward movement of the weight, when the continued descent of the car forces the catch-bar out of contact with, and past, the weight-catch and into contact with the gate-catch, as shown in Fig. 2. Now if the car continues its descent the gate will be positively forced down thereby, by means of said engagement of the catch-bar with the gate-catch, and at the same time the weight will be positively forced to rise, through stress on its connecting cord, until it reaches its stop P', when its upward movement will be arrested by the stop, and consequently the car continuing its downward movement, the catch-bar will be again forced out of the gate-catch in the manner described; when the catch-bar, in descending, is thus forced out of either of the catches, the anti-friction roll *c* is forced into contact with the inner face of the upper side of casing *f*, and rolls back thereon, and thus again relieves the friction of the movement, as it did when the car was moving in the opposite direction, by rolling against plate *g*; thus the hatchway is automatically closed and guarded by the gate when the car is absent therefrom, and opened when the car is present, by a mechanism exceedingly simple and reliable and safely effective; as has been before referred to, should the weight from the breaking of the cord or other cause drop to the stop p^2 near the lower end of the guideway, in passing the lip R' it would spring the lip back to return into the notch in the back side of the weight after the latter had reached its stop; and in this locked position the catch-bar would be forced to pass the weight without raising it, in the same manner as it is forced to do so by the other stops which have been described; and thus the wear and tear and annoyance of a repeated raising and dropping of the weight until the accidentally broken cord is repaired will be avoided.

I claim—

1. The hatchway gate C arranged to be moved vertically in suitable guideways; the catch S secured to the gate and projected into the elevator well, and formed with inclines S' and S^2 and the intermediate notch S^3; the counter-balancing weight M having a catch formed thereon consisting of corre-

sponding inclined faces and central notch and adapted and arranged to be operated by the same device that engages catch S; cord K connecting gate C and weight M; pulley J upon which the gate and weight are suspended by cord K; stops P and P′ arranged in the paths of the gate and weight and by which their upward movements are respectively limited and resisted; and the spring-actuated catch-bar T secured to the elevator car and formed with inclined faces *a*, *b*, and arranged to successively engage and release catches S and M while moving up and down with the car; all substantially as and for the purposes specified.

2. The catch-bar mechanism consisting of casing *f*, in which the bar T is mounted so as to be free to move as described, and thereby attached to the car; spring *e*, mounted upon the arm of the bar and arranged to thrust the bar outward longitudinally; and bar T mounted in said casing and arranged to be so acted upon by spring *e*, and having inclined faces *a*, *b*, and a single roll *c*, pivoted thereto and projecting beyond the upper and under sides of the bar, and moved by the bar so as to have its peripheral bearing above or below the bar accordingly as the pressure which forces the bar inward is against face *a*, or face *b*, all as and for the purposes specified.

3. The catch-bar mechanism consisting of the combination of casing *f*, in which the bar is mounted and by which it is secured to the car; the catch-bar T having inclined faces *a* and *b* and roll *c*, and arranged to move in said casing as described; spring *e* arranged to thrust the bar longitudinally outward; and slide *i* by which the spring may be adjustably compressed against the bar; all as and for the purposes specified.

4. The combination of catch M; guide-rail N, elastic lip R′, and stop P^2, whereby the catch M, when it has accidentally fallen against stop P^2, is locked in that position and prevented from being carried up by the catch-bar, as and for the purposes specified.

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