(No Model.)

C. WHITTIER.

ELEVATOR.

No. 275,003. Patented Apr. 3, 1883.

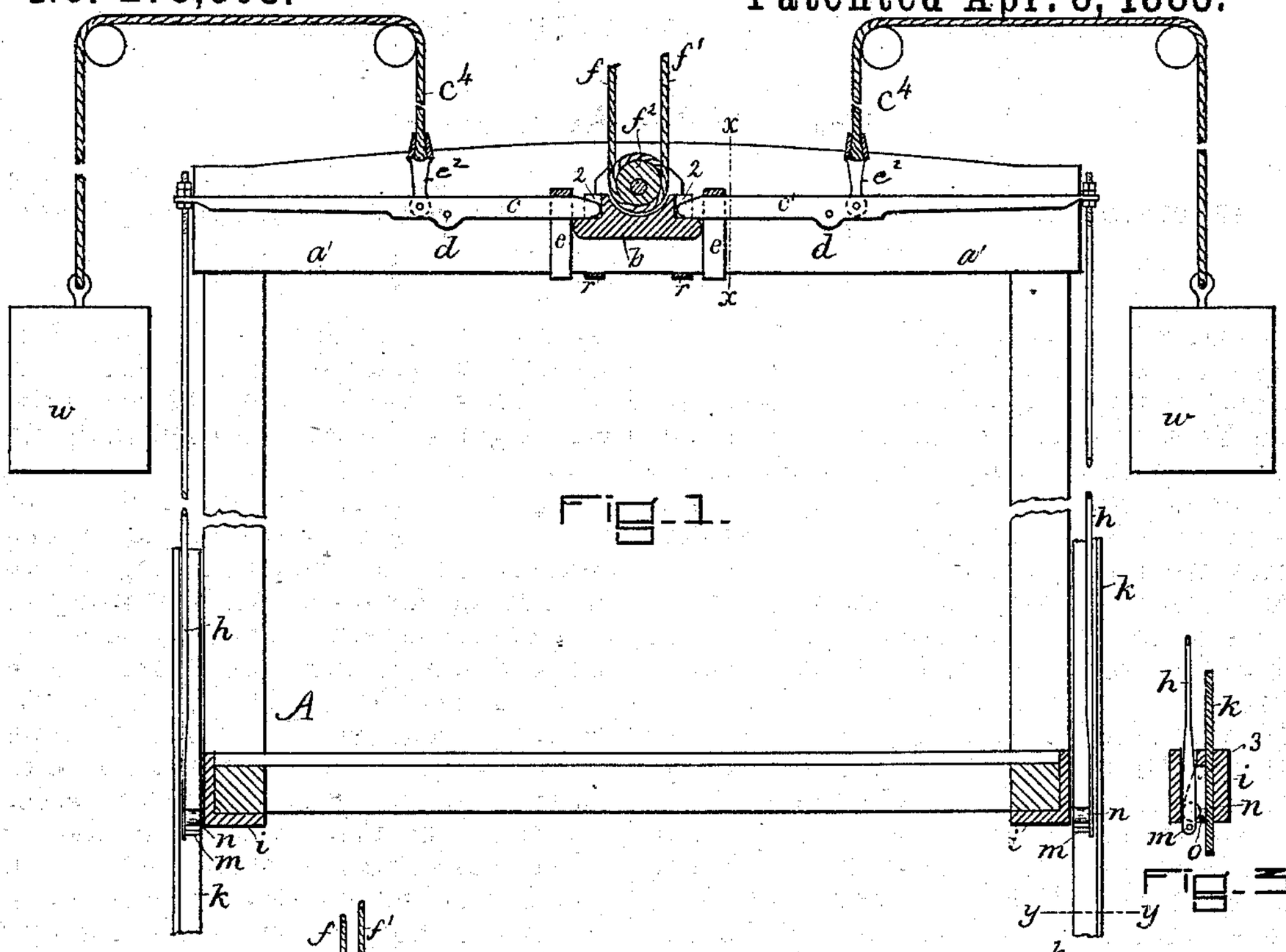

Fig. 1.

Fig. 3.

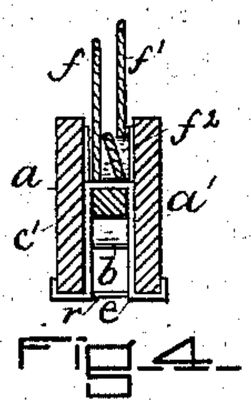

Fig. 4.

Fig. 5.

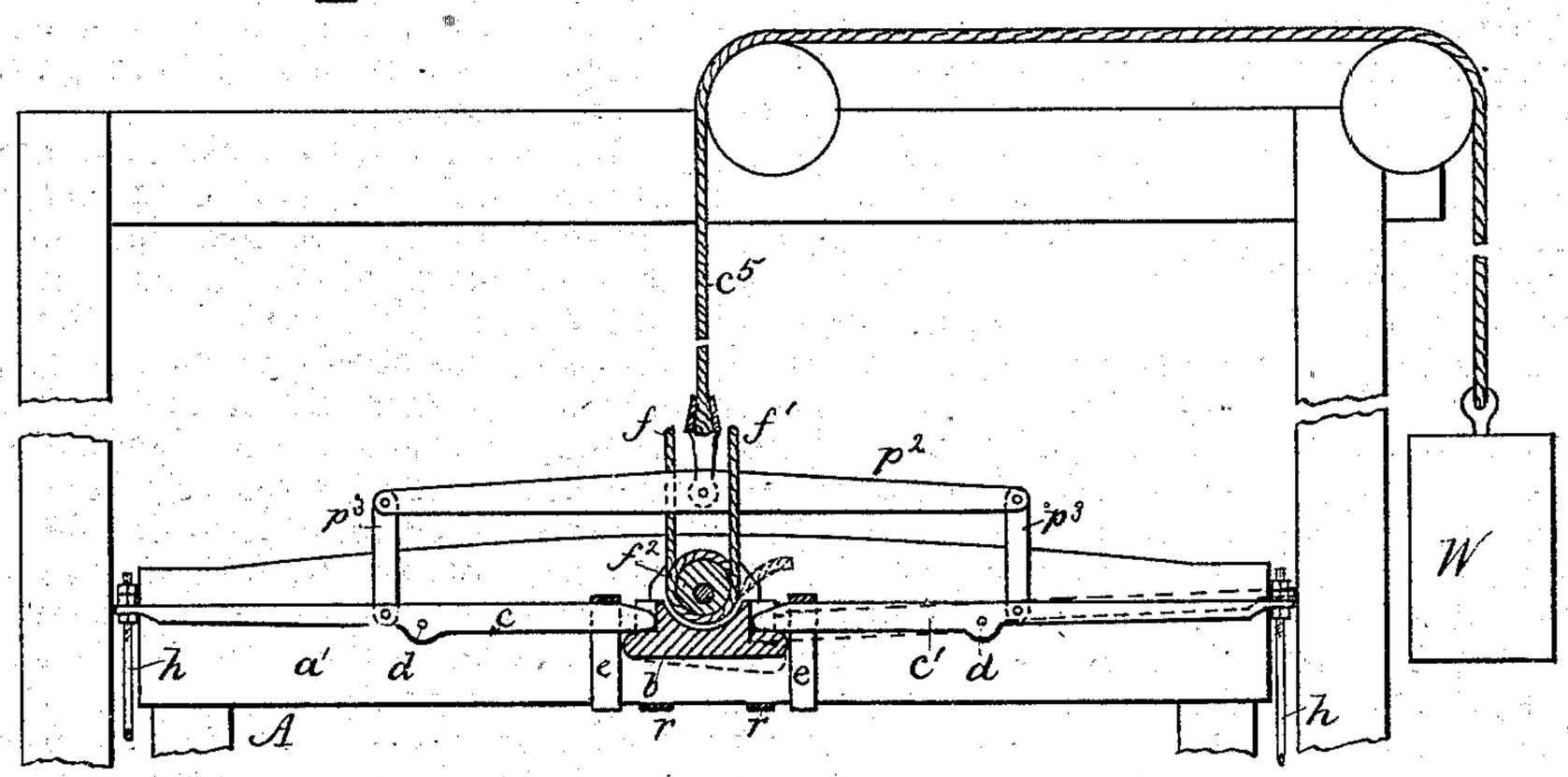

Fig. 2.

WITNESSES

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ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 275,003, dated April 3, 1883.

Application filed January 11, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES WHITTIER, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Elevators, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to elevators, and has for its object to render the operation of the safety-stop more certain and efficient than heretofore.

My invention consists partly in the combination of the stopping device proper, with operating-levers therefor controlled by the counter-weights, and the hoisting or suspending ropes and the attaching device by which they are connected with the elevator-car, in such a manner that upon the breaking of the suspending-rope the counter-weights will actuate the stopping devices and cause them to arrest the downward movement of the car. The stopping device employed consists preferably of a metal or hard roll contained in a tapering or wedge-shaped recess in the guide-block at the bottom of the car, it co-operating with the guide-rail at the side of the elevator-well. The said roll normally rests supported upon a fixed pin in the lower and wider portion of the said recess, and a finger connected by a rod with the stop-operating lever acts, when the hoisting-rope breaks, to raise the said roll toward the contracted top of the said recess, so that it becomes wedged in between the guide-block and rail, locking them together, and thus stopping the car. The stop-operating lever has one arm connected with the counterbalance-weight and its other arm acted upon by a block or yoke containing an eccentrically-pivoted pulley, around which the hoisting-rope is turned, so that if either portion of the hoisting-rope breaks the other portion will be locked between the periphery of the eccentric pulley and its inclosing-block. By the breakage of one portion of the hoisting-rope the point of application of the upward or suspending force, which had before been divided between the two ropes at either side of the pulley, and thus had the effect of a single force at the middle of the pulley, will be carried to one side of the pulley, and will thus change the effect of the upward forces upon the stop actuating levers, one of which will be moved by the counterbalancing-weight to throw its corresponding stop into operation.

Figure 1 is a vertical section of a sufficient portion of an elevator-car, its guides, and suspending-rope, and stop-actuating mechanism embodying this invention, it showing the arrangement where independent counter-weights are used, one at each side of the car. Fig. 2 is a modification in which a single counter-weight is employed. Fig. 3 is an end elevation of the guide-block at the lower portion of the elevator-car. Fig. 4 is a section on the line *x x*, Fig. 1, and Fig. 5 a section on the line *y y*.

The elevator-car A, of any usual construction, has at its top two or more transverse beams, *a a'*, between which are contained the suspending block or yoke *b* and the stop-operating levers *c c'*, which are pivoted upon transverse pins *d*, fixed in the said beams *a a'*. One end of each of the said levers is extended through a strap, *e*, which, passed down beneath the beams *a a'*, as shown, and projecting beyond the said strap, enters a recess, 2, in the block *b*, which latter thus receives the weight of the car upon it through the levers *c c'* and straps *e*.

The block *b* and the car sustained thereon, as described, are supported and raised and lowered by the double hoisting-rope *f f'*, passed once around a pulley, f^2, eccentrically pivoted in the said block, so that if either portion of the said rope should break the other portion in running off would rotate the said pulley, causing the rope to be wedged between it and the block, and thus securely hold the rope, as described in Letters Patent No. 134,179, granted to me December 24, 1872, in which, however, the block *b* was shown as positively connected with the frame-work of the elevator-car, and was not adapted to co-operate with the stop-operating levers *c c'*, as in this present invention. The outer ends of the levers *c c'* are extended to the sides of the car, where they are connected with rods *h*, which pass down along the side of the car, and through the guide-blocks *i* thereof, which latter embrace the guide-rails *k*, fixed upon the frame-work of the

building. The rods *h* are provided at their lower ends with fingers *m*, which lie beneath the stopping devices (shown as metal rollers *n*) contained in wedge-shaped recesses 3 in the said guide-blocks *i*, the said rollers, however, being normally supported upon pins *o* in the lower and wider portions of the said recesses. (See Fig. 3.)

The usual counter-weights, *w*, for the elevator-car will be attached to the arms c^2 of the levers *c c'* by ropes c^4, and the point of connection between the levers and ropes is such that the weights have a tendency to turn the levers on their pivots and lift the outer ends of the said arms and their connected rods *h* to raise the rollers *n* into the upper narrow parts of the recesses 3, where they will wedge between the guide-blocks *i* and rails *k*, and thus wholly arrest the movement of the blocks and car connected therewith. This tendency of movement of the levers by the counter-weights is, however, counterbalanced by the upward pull of the hoisting-ropes on the block *b* and arms of the levers *c c'* supported thereon, the levers being thus normally retained in the position shown in Fig. 1. In case, however, one of the hoisting-ropes breaks, as shown in Fig. 2, the other rope becomes fixed between the pulley f^2 and block *b*, so that the weight is now supported wholly by it, and the transfer of the suspending force wholly to one side of the pulley f^2 thus causes it to be unequally divided between the ends of the levers *c c'*, one of which is almost relieved of upward force, so that the counter-weight acts to raise its outer end, as shown in the dotted lines, Fig. 2, and thus throw the stopping device *n* into operative position to check the descent of the car.

In the construction illustrated in Fig. 1 two counter-weights will be employed, each being connected by an independent rope, c^4, extended over a suitable sheave with one of the levers *c c'*; but when it is desired to employ a single counter-weight, as shown at *w*, Fig. 2, its suspending-rope c^5 may be connected with the middle of a cross-bar or yoke, p^2, the ends of which are connected by links p^3 with the levers *c c'*, which thus operate the same as when the independent weights are employed. If both the hoisting-ropes should break, the block *b* would drop and both the levers *c c'* would be actuated to operate the stopping devices at both sides of the car; and in order to prevent the block from falling into the car, cross-pieces *r* are connected with the beams *a a'*, which sustain the said block when not held by the hoisting-rope.

I am aware that an automatic safety-stop has been actuated by the counter-weight, and also that a cylinder in a wedge-shaped recess in the guide-block of the car has been employed as a safety-stop previous to my invention, and I do not claim these devices by themselves.

It is obvious that other kinds of stopping devices might be used in connection with the counter-weights and hoisting-ropes and their block or yoke in carrying out the present invention.

I claim—

1. The combination, with a double hoisting-rope, of two stopping devices and actuating mechanism therefor, each under the control of the said rope, as described, whereby, when either portion of the said rope breaks, one part of the said actuating mechanism and its stopping device is operated to arrest the downward movement of the car, substantially as set forth.

2. In an elevator, the guide-rails, recessed guide-blocks, stopping devices *n* therein, the operating-levers, the counter-weight, and the hoisting-rope acting on the said levers as described, combined with the rods *h*, connected with the said levers, and provided with pins or fingers to lift the said stopping devices on the breaking of the rope, substantially as described.

3. The stopping devices at the sides of the car and their operating-levers, combined with the independently-movable car-sustaining yoke or block, against which the ends of the said levers act, the eccentric pulley carried by the said block or yoke, and the hoisting-ropes encircling the said pulley, substantially as described.

4. The elevator-car, the yoke, its eccentric pulley, the rope extended about the pulley, the two pivoted levers engaged at their inner ends by the said yoke or block, against which they are kept pressed by a counter weight or weights, and the straps, the guide-rails, recessed guide-blocks, and the stopping devices, combined with means to lift one of the stopping devices into operative position when the lever to operate it is permitted to turn on its fulcrum by reason of a suspending-rope having been broken, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES WHITTIER.

Witnesses:

G. W. GREGORY,

B. J. NOYES.