(No Model.)

2 Sheets—Sheet 1.

G. B. MILLS.

ELEVATOR.

No. 456,048. Patented July 14, 1891.

Fig. 1.

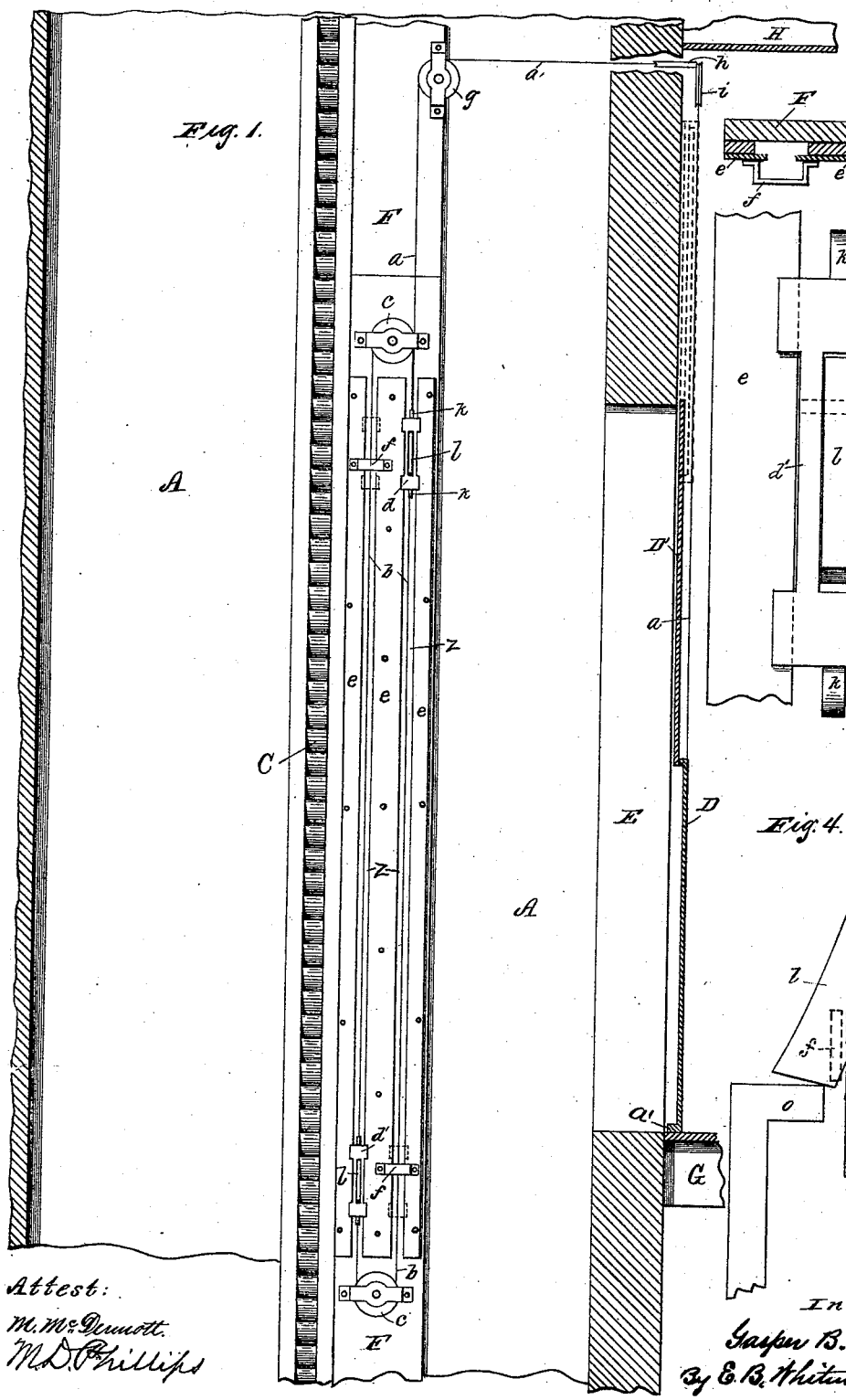


Fig. 2.

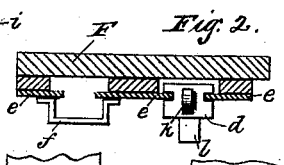


Fig. 3.

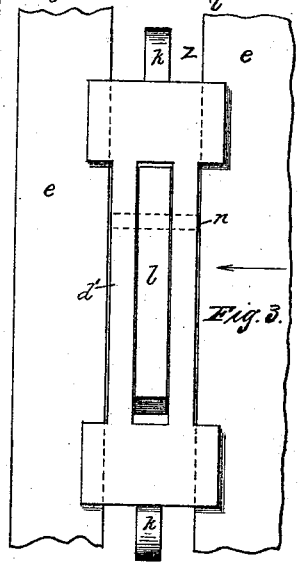
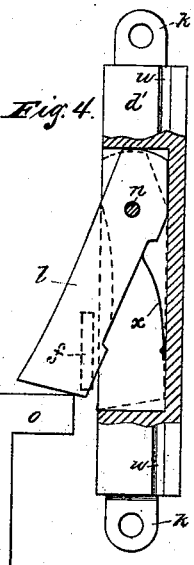


Fig. 4.



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M. D. Phillips

Inventor:

Gasper B. Mills.

By E. B. Whitmore, Atty

(No Model.) 2 Sheets—Sheet 2.

G. B. MILLS.

ELEVATOR.

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Fig. 5.

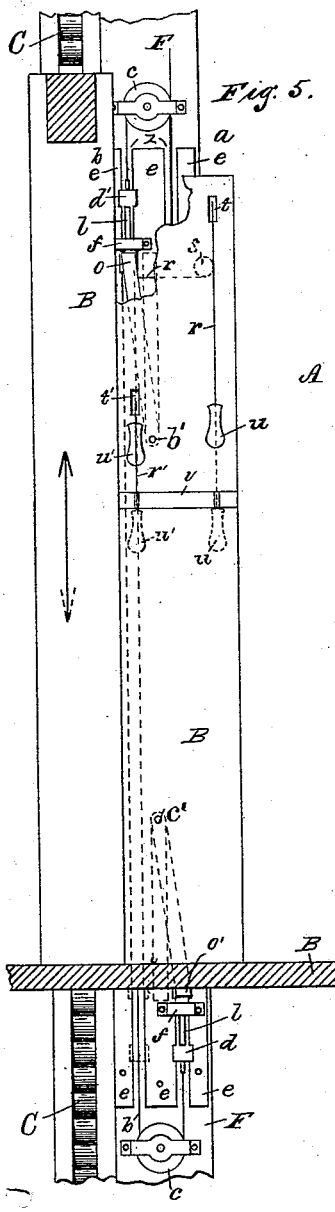


Fig. 6.

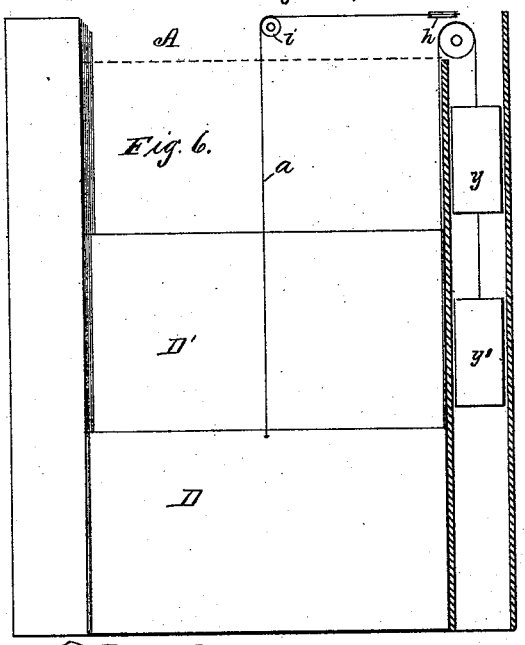


Fig. 8.

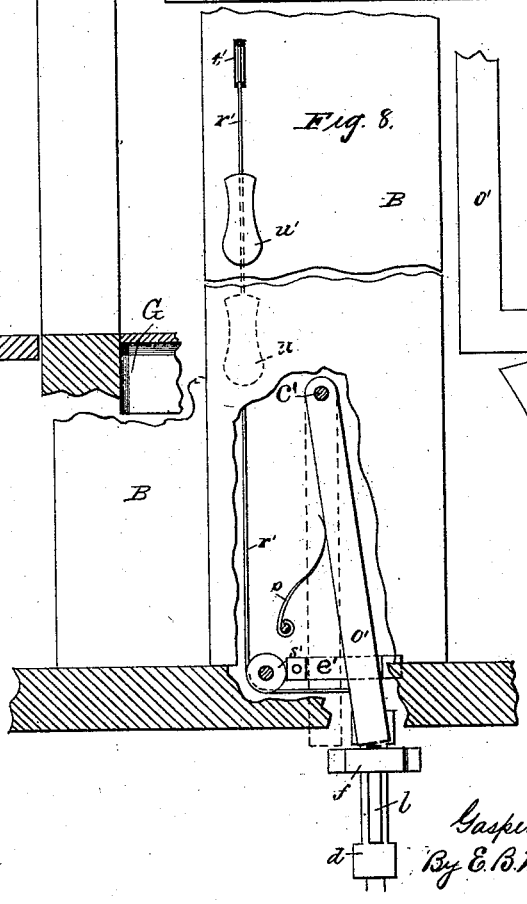
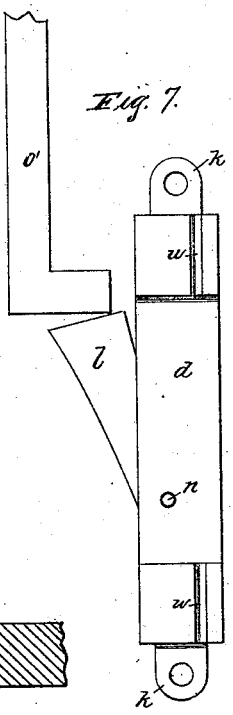


Fig. 7.



Attest:
M. McDermott.
M. D. Phillips.

Inventor:
Gasper B. Mills,
By E. B. Whitmore, Atty

UNITED STATES PATENT OFFICE.

GASPER B. MILLS, OF ROCHESTER, NEW YORK, ASSIGNOR OF ONE-HALF TO GEORGE W. IRELAND, OF PHILADELPHIA, PENNSYLVANIA.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 456,048, dated July 14, 1891.

Application filed December 22, 1890. Serial No. 375,500. (No model.)

To all whom it may concern:

Be it known that I, GASPER B. MILLS, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Devices for Operating Elevator-Doors, which improvement is fully set forth in the following specification and shown in the accompanying drawings.

My invention is a simple and convenient mechanism for opening and closing the doors of elevator-wells, adapted more particularly for use with freight-elevators, the same being hereinafter fully described, and more particularly pointed out in the claim.

Referring to the drawings, Figure 1 is a vertical section through a part of an elevator-well, the doors being shown in two positions by full and dotted lines; Fig. 2, drawn to a larger scale, a horizontal section of the guides and associated parts; Fig. 3, a face view of a sliding block drawn to an increased scale; Fig. 4, a side sectional elevation of a sliding block seen as indicated by arrow in Fig. 3; Fig. 5, a vertical section of a portion of the well and the car therein, parts being shown in two positions by full and dotted lines; Fig. 6, a front elevation of the doors, the box for the counter-weights at one side being vertically sectioned; Fig. 7, a side elevation of a sliding block operated at the lower part of the car; and Fig. 8, a view showing more fully the means for operating the lower push-bar, parts being broken away.

Referring to the parts shown, A is an elevator-well of usual kind, C being a safety rack and guide of common kind at one side thereof, and E a doorway through the wall of the well even with the floor G.

B, Fig. 5, is the car.

F is a line of vertical planking secured to the wall of the well adjacent to the safety-rack or rag-bar, to which is secured in vertical positions three parallel metal guides *e*.

In the two spaces *z z*, formed between adjacent guides, are fitted sliding blocks *d d'* to be operated by the car. Immediately above and below these guides pulleys *c c* are respectively secured to the planking F, around which pulleys cords *b b* run, these cords being secured to lugs *k* at the ends of the blocks, and, with said blocks, forming a continuous circuit around the said pulleys. Normally these blocks stand one near the lower end of the guides and one near the upper end of the guides, as shown in Fig. 1. When the car ascends, it carries the lower block *d'* upward to the top of the guides, which causes the block *d* to descend to the lower end of the guide on account of the rope connection or circuit-cords *b b*. When the car descends, in passing the blocks it acts upon the block *d*, carrying it to the bottom of the guides, which, for reasons above stated, causes the block *d'* to move to the top of the guides. These movements of the blocks, in connection with counter-weights for the doors, open and close the latter by means described farther on. The doors shown are vertically-sliding doors; but horizontally-sliding doors may be equally well operated by the mechanism shown.

To the upper block *d* is secured a cord *a*, which passes upward over a pulley *g*, thence horizontally out of the well over a pulley *h*, Figs. 1 and 6, thence over a pulley *i* over the middle of the doors, thence downward and attaches to the lower door D. The doors D and D' slide in vertical grooves in the casings I in the ordinary manner, and are made, preferably, in half-doors, one sliding outside of the other. The lower door D is provided with a horizontal strip *a'* at its lower edge, which, as said door is lifted, encounters the lower edge of the upper door D', and lifts the latter, both moving upward to the positions shown in dotted lines. When the ascending car moves the sliding block *d'* upward, as above described, it pulls downward on the cord *a*, and thus lifts the doors, the part of the car acting upon the sliding block being so placed that when the floor of the car comes even with the floor G of the building the sliding block *d'* is at its upper position and the doors are raised. In the same manner, when the car is descending, it pushes the sliding block *d* downward, as above described, and thus pulls downward upon the cord *a* and raises the doors.

The parts of the car that encounter the respective sliding blocks are shiftable push-bars *o* and *o'*, (clearly shown in Figs. 4 and 7,) the former at the top and the latter at the bottom of the car. The sliding blocks are each pro-

vided with a pivoted tongue *l*, the tongue of the lower block *d'* pointing downward, as shown in Fig. 4, and the tongue of the upper block *d* pointing upward, as shown in Fig. 7. These tongues are the parts of the respective blocks encountered by the push-bars, the latter being bent outward at their free ends, as shown, to meet the tongues. These tongues are held in recesses in the respective sliding blocks to turn upon pivot-pins *n*, and when in their normal position their free ends project from the faces of the respective sliding blocks, to be encountered by the push-bars, as shown. Simple springs *x*, Fig. 4, of some description, bearing against the rear surfaces of the tongues force them outward to their normal positions. Trips *f* (shown in various figures) are secured to the guides *e* in positions to cross the spaces *z* at right angles with the latter. These trips are rectangular in form, as shown in Fig. 2, and of such dimensions that the respective sliding blocks pass freely beneath them when said sliding blocks are moved by the car, as above described; but these blocks pass close to the trips, so that the latter act to depress the respective tongues *l* or force them back into the recesses in the blocks against the action of the springs, as indicated by dotted lines in Fig. 4. When thus depressed, the tongues are withdrawn from the action of the push-bars, which latter then pass them, also safely clearing the trips themselves.

Now, regarding Fig. 1, when the push-bar *o* of the ascending car encounters the tongue of the sliding block *d'* and lifts the latter to the position shown in dotted lines near the upper ends of the guides, said sliding block passes under the trip *f*, which depresses the tongue out of the way of the push-bar, and no further upward motion of the sliding block occurs. At this position of the sliding block, it will be noted, the doors are thrown up. Likewise, when the car is descending along the well and carries the sliding block *d* to its lowest position the latter passes back of the trip *f*, near the lower end of the guides, which trip depresses the tongue out of the way of further action by the push-bar *o'*. The push-bars *o o'* are pivoted, respectively, at *b' c'* to the car, the former reaching upward from its pivot and the latter downward from its pivot. Both push-bars are capable of swinging slightly laterally in a vertical plane. These push-bars are held by the pivots, so that when they occupy vertical positions, as shown by dotted lines in Fig. 5, they will pass by the respective sliding blocks without touching them, in which case the passage of the car in either direction does not move the doors. The lateral movements of these push-bars are limited by some simple means, as yokes *e'*, Fig. 8. They are held in inclined positions—that is to say, in positions in which to encounter the sliding blocks—by simple springs *p*, of any convenient form or construction. To bring them to vertical positions, so as to avoid the sliding blocks, I employ cords *r r'*, Figs. 5 and 8, provided with handles *u u'*, to be manipulated by the person operating the car. The cord *r*, which actuates the upper push-bar *o*, is secured to the latter near its upper end and passes horizontally around a pulley *s* on the outside of the car, thence upward and over a pulley *t* to the inside of the car, with the handle *u* in convenient reach of the operator. The cord *r'* for the lower push-bar *o'* is secured near the lower end of the latter and passes around the pulley *s'* at the outside of the car, thence upward and over pulley *t'* to the inside of the car. *v*, Fig. 5, is a lock or holder for the handles, provided with grooves in which to receive the two cords. When either of the handles is released from the holder, the spring of the push-bar operated by the handle throws the push-bar in position to act upon the sliding blocks in its way as the car moves up and down; but when either handle is pulled down and caught under the holder the push-bar operated by it is pulled to a vertical position against the action of the spring, and clears the sliding block, as above described.

The counter-weights *y y'* are intended to balance only a part of the weight of the respective doors, leaving with the latter a preponderance of weight sufficient to carry them down and close them; and to prevent the doors closing with a too rapid fall or too suddenly the push-bars are so arranged with reference to the sliding blocks that before the tongue of the block *d'* lets go the push-bar *o* (when the car is ascending) the lower push-bar will pass above the tongue of the sliding block *d* and catch the same. This allows the doors to close only as rapidly as the car moves up, the block *d* following under the ascending car. The parts operate similarly to prevent the too rapid descent of the doors when the car moves downward—that is to say, before the lower push-bar is released from the sliding block *d* the tongue of the sliding block *d'* is brought to a point just above the upper push-bar, so that said sliding block can descend only as fast as the car descends.

The tongues of the two sliding blocks have a bearing at their pivoted end directly against parts of the respective blocks, so that the pivot-pins of the tongues will be relieved of the stress or pressure due to the action of the push-bar.

It is understood that the guides, sliding blocks, cords, &c., are repeated for the doors of each story.

In case a horizontally-sliding door is employed, the cord *a* instead of turning downward over the pulley *i*, passes onward in a horizontal direction and is attached to the sliding door near its edge farthest from the pulley *h*. The movements of the sliding blocks above described then operate to slide the door one way or the other, as is the case with the vertically-sliding doors, a weight being employed to close the door. After the

cord *a* is brought out of the well around the pulley *h* it is only a matter of judgment in attaching it to any kind of a door.

What I claim as my invention is—

In a device for operating elevator-doors, parallel guides within the well, in combination with sliding blocks between the guides, cords connecting said blocks passing over pulleys, a shiftable counterweighted door, a cord connecting said sliding blocks with the door, a car provided with laterally-swinging spring-pressed push-bars to operate the sliding blocks, an operating-handle connected with each of said push-bars, and rests or holders for said handles, substantially as shown.

In witness whereof I have hereunto set my hand, this 13th day of December, 1890, in the presence of two subscribing witnesses.

GASPER B. MILLS.

Witnesses:

ENOS B. WHITMORE,

M. S. MCDERMOTT.