

J. E. W. FOGAL.
ELEVATOR GATE OPERATING MECHANISM.

APPLICATION FILED NOV. 1, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

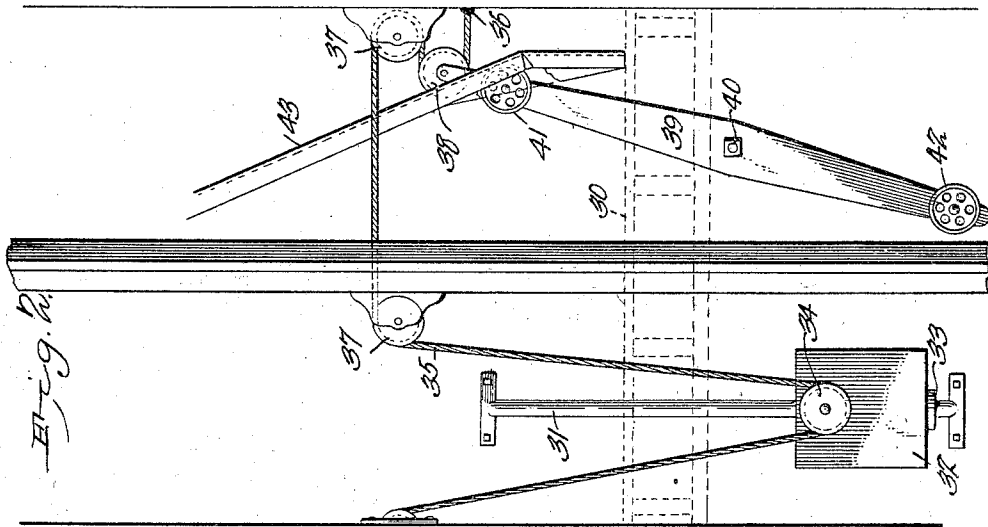


Fig. 2.

Fig. 1.

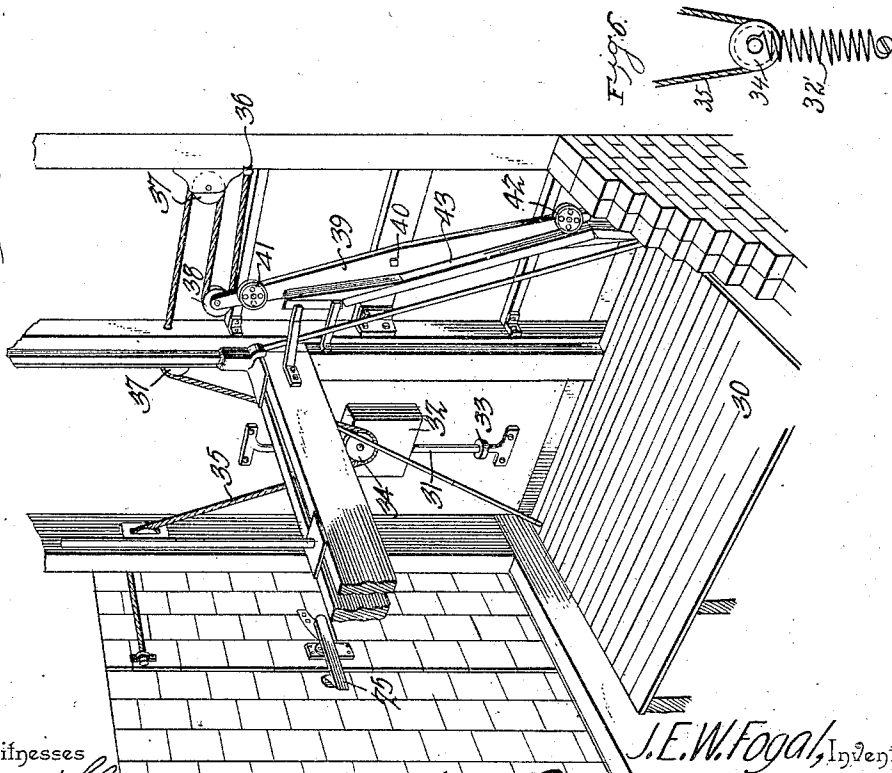


Fig. 3.

Witnesses
E. F. Stewart
Jno & Partner

by

J. E. W. Fogal, Inventor.
Chas. Snow & Co
 Attorneys

No. 725,236.

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2 SHEETS—SHEET 2.

Fig. 4.

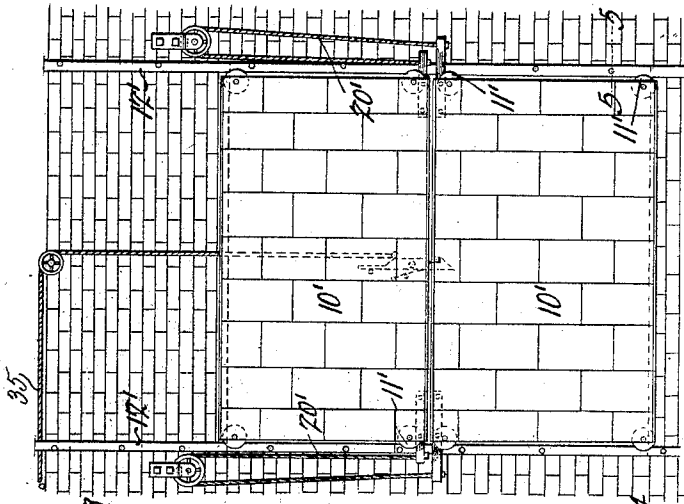


Fig. 5.

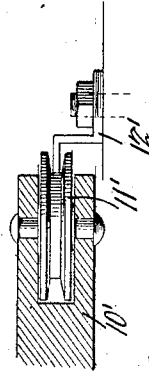
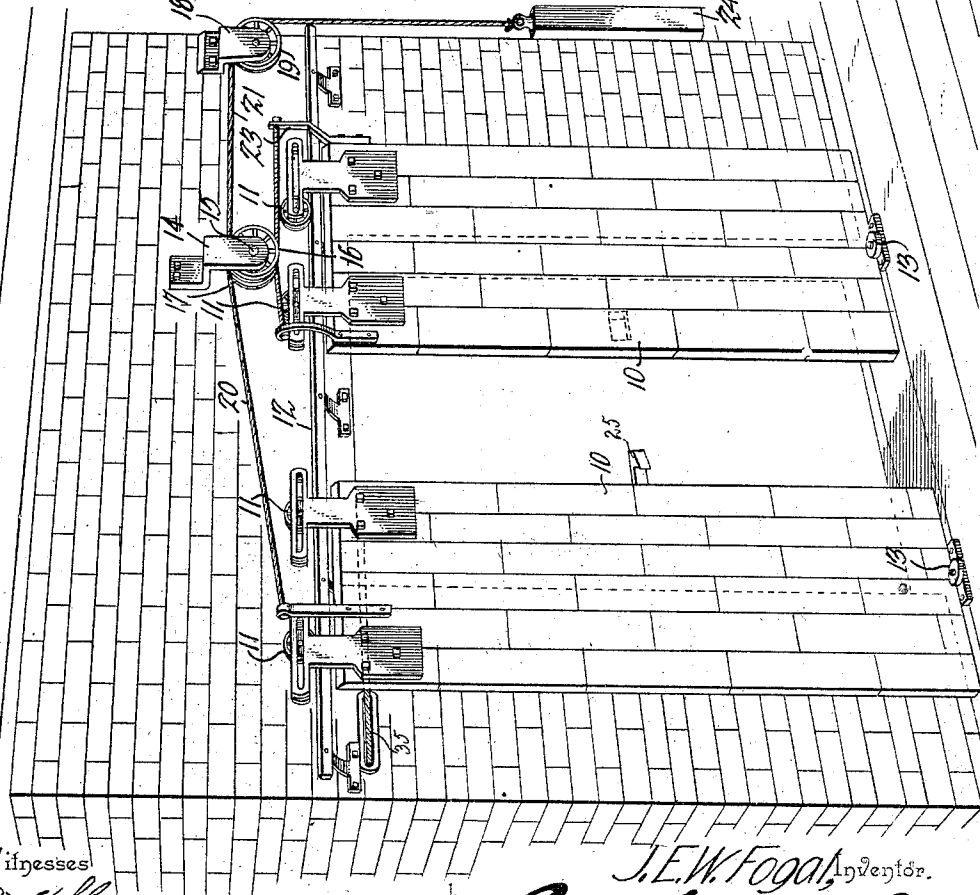


Fig. 3.



Witnesses

E. C. Stewart
J. M. Parker

by

J. E. W. Fogal, Inventor.

C. Knowles
Attorneys

UNITED STATES PATENT OFFICE.

JOHN E. W. FOGAL, OF QUINCY, ILLINOIS, ASSIGNOR OF ONE-HALF TO
HENRY B. DINES, OF QUINCY, ILLINOIS.

ELEVATOR-GATE-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 725,236, dated April 14, 1903.

Application filed November 1, 1902. Serial No. 129,714. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. W. FOGAL, a citizen of the United States, residing at Quincy, in the county of Adams and State of Illinois, have invented a new and useful Elevator-Gate-Operating Mechanism, of which the following is a specification.

The invention relates to certain improvements in mechanism for automatically opening and closing the gates or doors of elevator-hatchways.

The principal object of the invention is to provide a mechanism for automatically opening and closing the doors, such mechanism being so arranged as to permit the car or platform to pass and repass any number of floors without opening any of the doors and being automatically adjusted to operative position as the car approaches a floor either in ascending or descending the shaft, but the doors remaining closed until released by the operator.

A further object of the invention is to provide a mechanism of this class in which the doors are normally locked, any door being opened at the option of the operator, the doors being maintained in open position while the car is opposite the floor, but immediately closing as soon as the car is moved in either direction.

A still further object of the invention is to provide a device of this character operable in connection with either horizontally or vertically-movable doors or gates.

With these and other objects in view the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a perspective view of the interior of an elevator-shaft, illustrating a door-opening mechanism constructed and arranged in accordance with the invention, the parts being shown in operative position with the car or platform opposite the hatchway. Fig. 2 is an eleva-

tion of the mechanism shown in Fig. 1, the parts being in inoperative position. Fig. 3 is a perspective view looking from the exterior of the shaft and showing a pair of horizontally-movable doors and the opposing mechanism therefor. Fig. 4 is an elevation illustrating the arrangement of the door-closing mechanism as applied to vertically-sliding doors or gates. Fig. 5 is a sectional plan view on the line 5 5 of Fig. 4 and drawn to an enlarged scale to illustrate one of the guiding devices for the vertically-movable door. Fig. 6 is a detail view illustrating a slight modification of the invention.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

While the device forming the subject of the present invention may be employed in connection with gates or doors of any size or character, it is intended principally for use in connection with fire-doors, where it is not desirable to automatically open and close each door as the car passes the floor and where the doors are formed of fireproof material and of such weight as to prevent the operator from opening and closing the same by hand without the exercise of considerable force.

Referring first to Fig. 3 of the drawings, 10 designates a pair of horizontally-movable doors parting in the center and provided with guide-wheels 11, mounted in the usual manner on a horizontal supporting-track 12 above the hatchway, while the lower ends of the doors are held in position by small guide-rollers 13. The doors may be of any desired construction, formed of any suitable material, and mounted on either upper or lower guide-ways and adapted to separate, or in some cases a single sliding door may be used without departing from the invention.

At a point above the supporting-track 12 is a bracket 14, forming a support for a spindle 15, to which are secured two sheaves 16 and 17, and a similar bracket 18 carries the supporting-spindle of an idler 19. The sheave 16 serves as a guide for a flexible cord or chain 20, of which the opposite ends are secured to the two door members 10, so that when one or other of the doors is moved to closed position the opposite door will also

be closed. The two sheaves 17 and 19 form guides for a weighted chain or cord 21, connected at one end to an arm 23, carried by one of the doors and provided at its opposite end with a counterbalance-weight 24, which normally serves to maintain both doors in closed position, the closing movement imparted to one door by the weight being transmitted to the other door through the cord or chain 20.

The doors are normally locked by a catch 25, preferably arranged at the inner side of the doors, although suitable connections may be made to effect the release of the catch from the outer side of the doors, if preferred.

In Fig. 4 is illustrated a slight modification, the doors 10' being movable vertically and being connected by a flexible chain or cord 20', so that one door-section will counterbalance the other and on the opening movement the upper section rises while the lower section descends, both door-sections being provided with suitable guiding-rollers 11', adapted to vertically-disposed guideways 12'. The upper door-section is connected to one end of a weighted rope or chain 35, through which the opening movement of the doors is effected from the interior of the elevator-shaft in the manner hereinafter described. When vertically-movable doors are used, the upper door-section is made somewhat heavier than the lower section, so that when released the doors will automatically close.

The elevator-shaft is provided with the usual guideways for the reception of a car 30, and at a point adjacent to each door is a vertically-disposed bar 31, secured at its upper and lower ends to one of the walls of the shaft and adapted to receive and guide a counterbalancing-weight 32 of sufficient size to counteract the weight 24 and effect the opening movement of the doors when operatively connected thereto. The weight 32 normally rests on a flange or collar 33 and remains inoperative until adjusted to position on the approach of the car, the latter effecting a movement of the weight to operative position when opposite each doorway, but the doors being retained in closed position by the holding-catch 25 until the latter is released by the operator.

The weight 32 is provided with a guiding pulley or sheave 34, around which passes a flexible cord or chain 35, secured at one end to one of the door-sections and at its opposite end to an eyebolt or other securing device 36 within the elevator-shaft. The intermediate portion of the cord or chain is passed over a pair of stationary guiding-sheaves 37 and a movable sheave 38, said movable sheave being carried by a rocking lever 39, pivoted on a stud 40 at one side of the shaft. The lever 39 is provided with small antifriction-rollers 41 and 42, arranged near the ends of said lever and adapted for contact with a cam-bar 43, arranged at one side of the elevator-car

30. The cam-bar is formed of metal, preferably in the form of an angle-iron, and arranged at such an angle that by contact with one or other of the rollers 41 42 it will raise the weight 32 from the inoperative position illustrated in Fig. 2 to the operative position shown in Fig. 1, the weight when elevated tending to open the doors, but operating only when the catch 25 is released. The opposite end portions of the cam-bar are approximately in vertical planes or arranged at angles much less than the intermediate portions of the bar, while the length of said bar is greater than the distance between the two rollers 41 and 42 in order that the second roller may be engaged by the bar before the latter moves out of contact with the first roller, and thus prevent sudden falling of the weight 32. In the operation of this portion of the mechanism Fig. 1 shows the position assumed by the parts as the car in traveling upward arrives opposite a doorway. The angle-bar 43 has in this case engaged the lower roller 42 and has moved the rocking lever 40 on its pivot-stud to an extent sufficient to elevate the weight 32. Should the operator desire to open the door, it is only necessary to release the catch 25, the weight opening the doors automatically and elevating the counterbalancing-weight 24, or when vertical doors, such as are shown in Fig. 4, are employed the weight 32 may be somewhat smaller, as in this case it is merely necessary to have a weight slightly heavier than the difference between the weight of the upper and lower door-sections. If the operator releases the catch, the weight 32 descends and opens the doors, the rocking lever remaining in the position shown in Fig. 1. Should the car descend, the doors will gradually close as the weight 24 descends, abrupt movement being prevented by a contact of the roller 42 with the cam-bar, or should the car ascend the upper portion of the cam-bar comes into contact with the upper roller 41 before the cam-bar moves from contact with the roller 42 and prevents any abrupt closing movement.

Should the operator desire to continue the ascending or descending movement without opening the door, the effect is the same, the cam-bar remaining in contact with one or other of the antifriction-rollers and preventing the abrupt descent of the weight 32. The operation is the same in either direction of travel of the car, the antifriction-roller 41 engaging one side of the cam-bar while the roller 42 is on the opposite side of said bar.

It is obvious that a tension or compression spring 32' may be substituted for the weight 32, as shown in Fig. 6, the spring being placed under tension by the operation of the cam-bar and so connected to the doors as to open the same while the spring is retracting.

Having thus described my invention, what I claim is—

1. In combination, a car, a door, a door-closing means, a normally inoperative door-

opening means, means carried by the car for adjusting the door-opening means to operative position in advance of the arrival of the car-platform at a floor-level, and a manually-operable catch for holding the door in closed position.

2. In combination, a car, a door, a door-closing means constantly tending to keep the door in closed position, a normally inoperative door-opening means of a strength or force sufficient to open the door against the opposing force exerted by the closing means, means carried by the car for adjusting the door-opening means to operative position, and a manually-operable catch for holding the door in closed position.

3. In combination, a door, a door-closing means, a normally inoperative door-opening means, a catch for holding the door in closed position, a lever pivoted at a point intermediate of its length to a support adjacent to the door, means connecting the lever to the door-opening means, and a cam carried by the car and adapted to engage one end of the lever when the car is moving in one direction and the opposite end of said lever when the car is traveling in the opposite direction.

4. In combination, an elevator-car, a door, a pivoted lever, a weight, a plurality of guiding-sheaves of which one is carried by the lever and a second by the weight, a flexible

means passing around the several sheaves and connected at one end to the door and at the opposite end to a fixed point, antifriction-rollers carried by said lever, and a cam-bar carried by the car and adapted to successively engage said rollers.

5. In combination, a pair of sliding doors connected for simultaneous movement in opposite directions, a weight constantly tending to close said doors, a second weight arranged adjacent to the doors and normally inoperative, a guide for said second weight, a rocking lever, a plurality of guiding-sheaves of which one is carried by the lever and the second by the weight, a flexible means secured at one end to the door and at its opposite end to a fixed point, said flexible means being guided around the sheaves, antifriction-rollers disposed at points near the upper and lower ends of the rocking lever, and an inclined cam-bar carried by the car and adapted to successively engage said antifriction-rollers.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN E. W. FOGAL.

Witnesses:

J. E. WALSH,

J. FRIEDLANDE.