

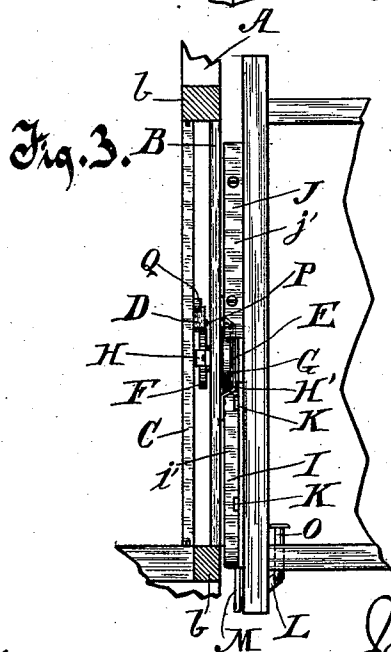
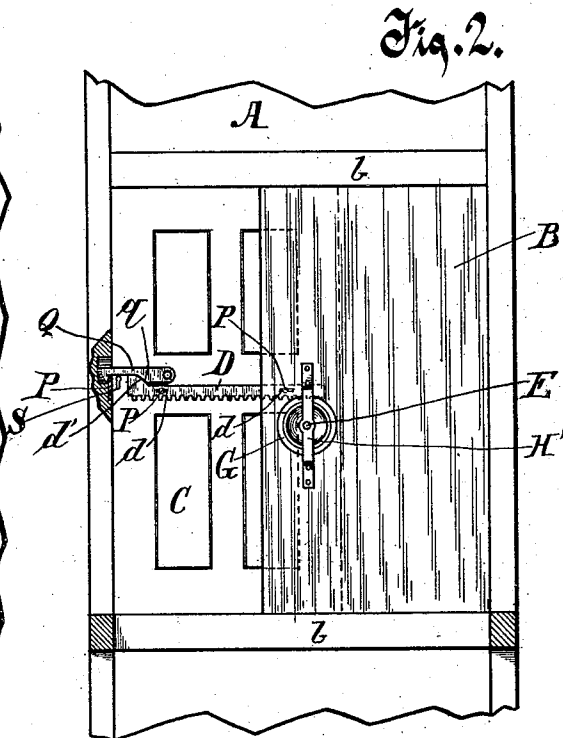
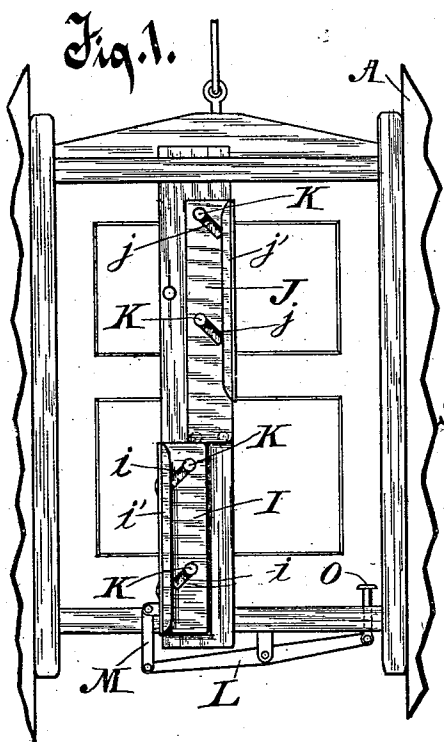
(No Model.)

J. P. RUNKEL.

DEVICE FOR OPERATING DOORS TO ELEVATOR WELLS.

No. 475,022.

Patented May 17, 1892.



Witnesses.

C. N. Keeney.
Arthur L. Morsell.

Inventor.

John P. Runkel
By C. T. Benedict
Attorney.

UNITED STATES PATENT OFFICE.

JOHN P. RUNKEL, OF MILWAUKEE, WISCONSIN.

DEVICE FOR OPERATING DOORS TO ELEVATOR-WELLS.

SPECIFICATION forming part of Letters Patent No. 475,022, dated May 17, 1892.

Application filed October 8, 1891. Serial No. 408,111. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. RUNKEL, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Automatic Doors for Elevator-Wells, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention relates to automatic doors for elevator-wells; and it consists in certain improvements upon the invention covered by Letters Patent issued to me in the United States under date of June 5, 1888, and numbered 384,083.

In my former device the opening and closing of the door in the passage of the elevator-cage up and down the shaft were accomplished through the medium of a gear engaging a rack upon the door, in connection with a second set of movable rack-plates adapted to be thrown into and out of engagement with another gear upon the inner end of the shaft carrying the first-named gear. In practice it has been found that this construction is undesirable under certain conditions or circumstances—as, for instance, should the door be only partly open, either by design, accident, or otherwise, the movable rack-plates upon engaging their gear-wheel would close or open the door, as the case might be, some time before said rack-plates had ceased to mesh with their gear. The result of this would be that after the door was closed or opened completely in the manner described the rack-plates would still continue to rotate the gear in mesh therewith, and through the connecting-shaft also continue to rotate the gear engaging the rack secured to the inner side of the door. It is obvious that such a strain would result in great damage to the parts and occasion irreparable injury.

It is therefore one of the objects of my invention to overcome the above pointed-out disadvantage in a simple and efficient manner, and a further object is to provide a suitable locking mechanism whereby the door is locked and unlocked automatically by the action of the rack secured to the side of said door.

With the above objects in view the inven-

tion consists in the improved construction and combination of parts, as hereinafter more fully set forth and described.

In the accompanying drawings, Figure 1 is a front elevation of the cage and a portion of the shaft with the front wall of said shaft and the door removed. Fig. 2 is an elevation looking upon the innerside of the door of the shaft, and Fig. 3 is an edge elevation.

Like letters of reference refer to like parts throughout the several views.

In the drawings, A indicates an elevator-shaft, and B the front wall or side thereof, having therein an opening closed by a door C, which slides laterally in grooves or ways *b b* and has attached to its inner side a horizontal toothed rack D. A rotatable shaft E passes through the side B of the elevator-shaft and carries upon its outer end a gear F and upon its inner end an anti-frictional roller G. The ends of the elevator-shaft have bearings in brackets *H H'*, secured, respectively, to the outer and inner faces of the side B. On the side of the elevator-cage corresponding to said side B of the elevator-shaft are two movable plates I and J, which are provided with diagonal slots *i i* and *j j*, respectively, through which they are secured movably to the side of the cage by means of pins K K, passing therethrough, said pins being provided with heads to retain the plates thereon. A lever L is pivoted on the under surface to the floor of the car and at one end is attached by means of a connecting-rod M to the lower end of the rack-plate I, while at the other end the lever is provided with a treadle O, projecting up through an aperture in the floor of the car and adapted to receive pressure from the foot of the operator. These plates operate in the same manner and are similar in all respects to the plates shown in my former Letters Patent, excepting that the angular flanges thereof, which in the present illustration of my invention I have designated by the letters *i'* and *j'*, the former being the flange of the lower and the latter the flange of the upper plate, are not provided with teeth along their inner margin engaging a pinion or gear. Instead of this arrangement, however, I construct the flanges with perfectly plane surfaces and adapt the same when moved in-

wardly to bear against the anti-frictional roller G, which I employ as a substitute for the pinion or gear above referred to.

It is obvious that when the cage is moved vertically within the shaft and the lever is operated so as to cause the plate to move inwardly as they engage the roller, the latter is rotated by friction. It follows, therefore, that if the operator desires to open or close the door and the same happens to be partly open it will of course be fully opened or closed before the flange of the plate is past the anti-frictional roller. Instead of a heavy strain upon the rack-bar and other parts, as is the case when the pinion or gear is employed, as in my former device, the flange will simply continue to bear against the anti-frictional roller, and finally slip by or pass clear of the same without further rotation thereof, inasmuch as the moment the door reaches its limit and becomes fully opened or closed, as the case may be, it will be impossible to further turn the rotatable shaft, as the flange upon the rack-plate will merely bear against the anti-frictional wheel, and has only to overcome the friction necessarily encountered in order to pass clear of the same.

Upon reference to Fig. 2 of the drawings the operation of my improved automatic locking device will be readily understood. It will be seen that the rack secured to the inner side of the door is provided with two elongated slots *d d*, which receive guide-pins P P. The outer end of the rack upon its upper edge is beveled upwardly and outwardly, as indicated at *d'*.

The letter Q indicates a latch, which is pivoted at its inner end to the door and has its outer end hooked to engage a catch R in the side wall of the shaft. The under edge of this latch is also beveled inwardly and downwardly, as indicated at *q*, to register with the bevel of the rack.

When it is desired to open the door, the operator of course presses upon the foot-treadle, which throws the movable plates I and J inwardly. The elevator-cage in its vertical movement will cause the movable plates to engage frictional roller G, and when this takes place rack D is given a slight lateral movement independent of any movement of the door until the guide-pins P P reach the extremities of the slots. The effect of this lateral movement is to bring the two beveled surfaces of the rack and latch into engagement, which causes the latter to be elevated clear of the catch R. The door is now free to be moved in its slides or guideways by the continued rotation of the gear-wheel acting upon rack D. In closing the door of course the reverse operation takes place—that is to say, when the beveled surface of the rack reaches the corresponding surface of the latch the latter is permitted to drop into engagement with its catch and the door thus securely locked.

In order to make provision for the locking and unlocking of the door independent of the

action of the rack-bar, I have provided the same with a keyhole S, into which a key may be inserted adapted to act upon latch Q. I have also thought best to employ, in connection with the inwardly-moving plates, a roller or rollers, preferably arranged in the edge of one of the plates and bearing against the edge of the contiguous plate. This of course relieves the friction between the contacting edges and permits a much easier movement.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a device for automatically operating elevator-well doors, the combination of a movable plate provided with an angular bearing-surface, means for throwing said plate laterally, a horizontally-moving elevator-well door, a rack-bar secured thereto, and a rotatable shaft carrying upon its outer end a gear-wheel meshing with the rack and upon its inner end an anti-frictional roller adapted to be engaged in the ascent or descent of the elevator-cage by the laterally-moving plate as the same is moved inwardly, substantially as set forth.

2. The combination of a horizontally-moving elevator-well door, a bar secured thereto, a latch having its inner end pivoted to the door and its outer end hooked to engage a catch, and mechanism engaging the bar so as to first throw it into contact with the latch and release the same and then subsequently move the door horizontally in its slides or ways, substantially as set forth.

3. The combination of a horizontally-moving elevator-well door, a bar secured thereto having the upper edge of its outer end beveled and also provided with elongated slots, guide-pins passing through said slots, a latch having its inner end pivoted to the door, its outer end hooked to engage a catch and its under edge beveled to register with the beveled surface of the bar, and mechanism engaging the bar so as to give it a horizontal movement, substantially as set forth.

4. The combination of a horizontally-moving elevator-well door, a rack-bar secured thereto having the upper edge of its outer end beveled and also provided with elongated slots, guide-pins passing through said slots, a latch having its inner end pivoted to the door, its outer end hooked to engage the catch and its under edge beveled to register with the beveled surface of the bar, a rotatable shaft carrying upon its outer end a gear-wheel engaging the rack-bar and upon its inner end an anti-frictional roller, movable plates adapted to be thrown into engagement with said roller, and means for operating the plates, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN P. RUNKEL.

Witnesses:

C. T. BENEDICT,

ARTHUR L. MORSELL.