G. K. BANCROFT.

Device for Operating Hatchway-Doors.

No. 217,842. Patented July 22, 1879.

FIG. 1

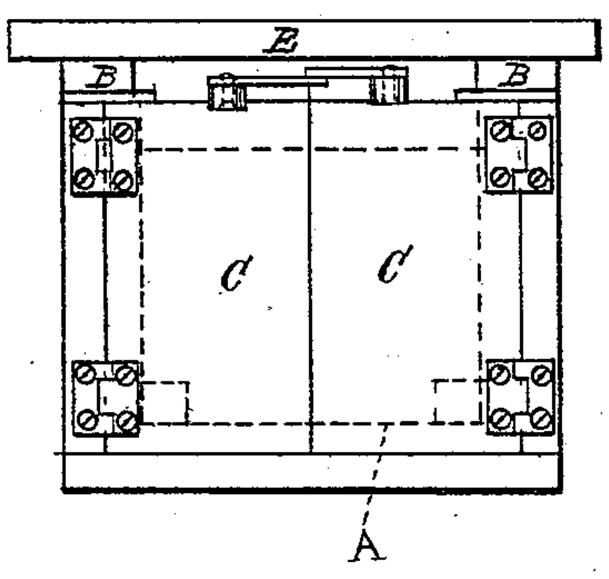


FIG. 4

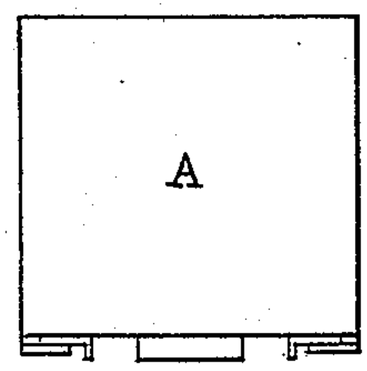


FIG. 2

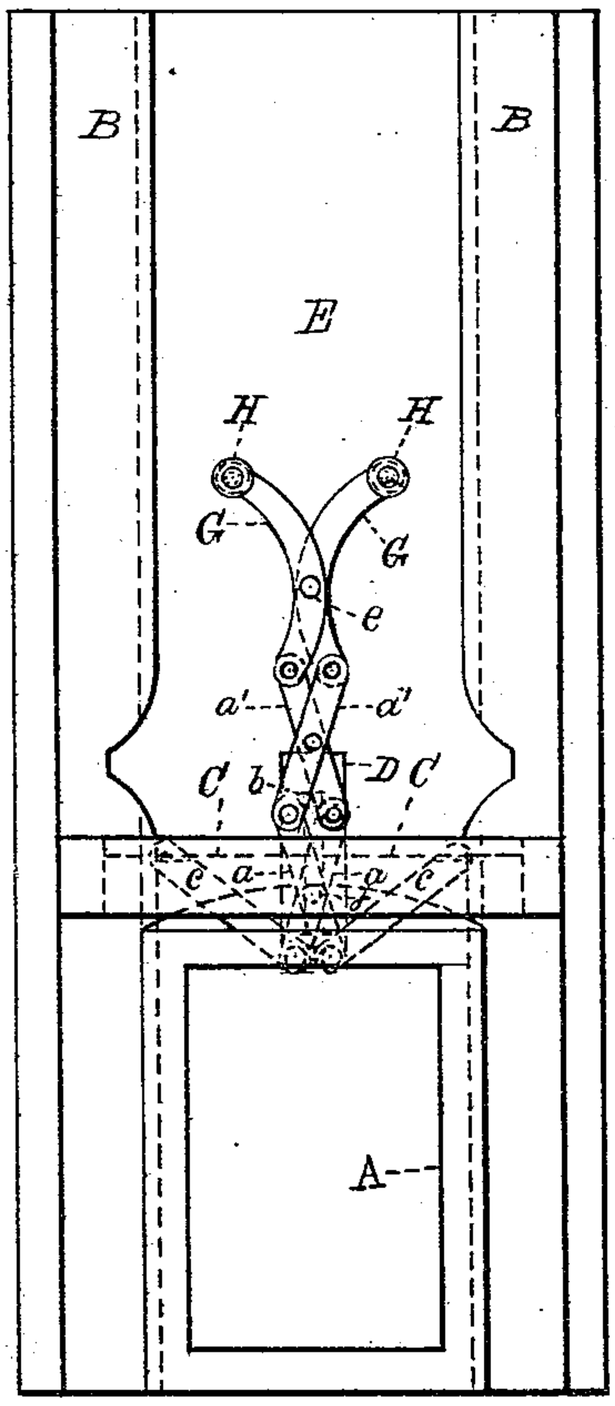


FIG. 3

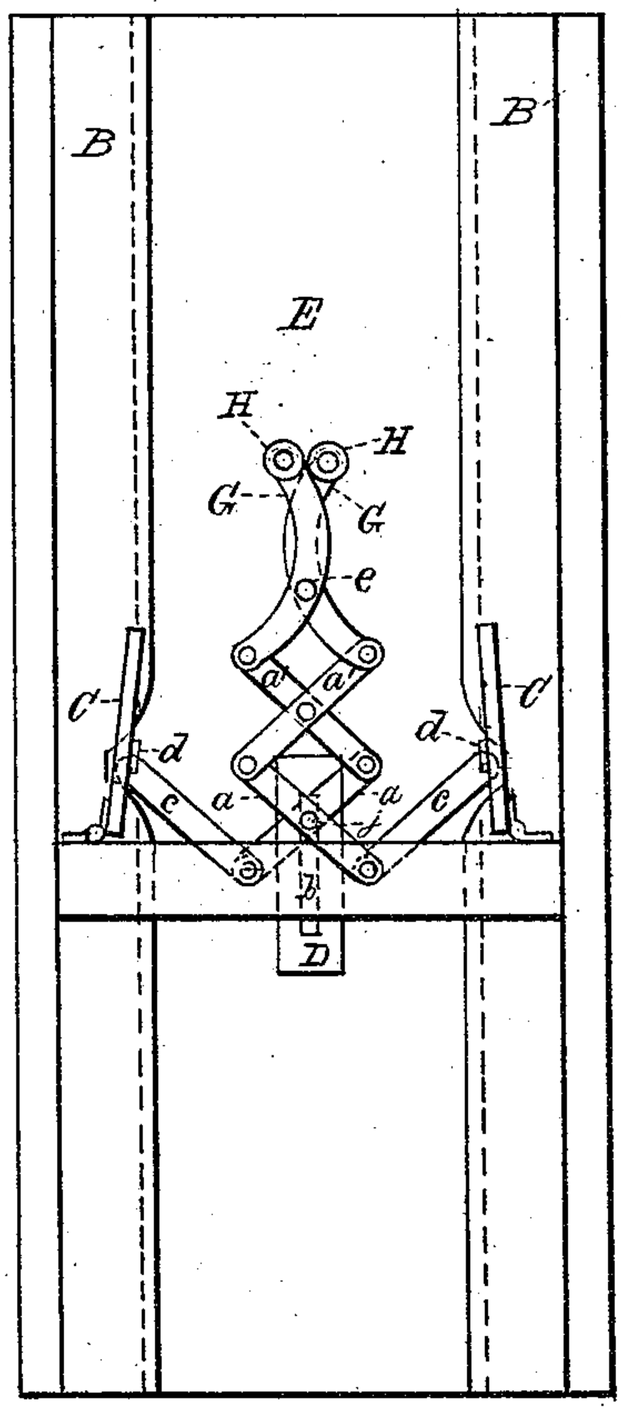


FIG. 5

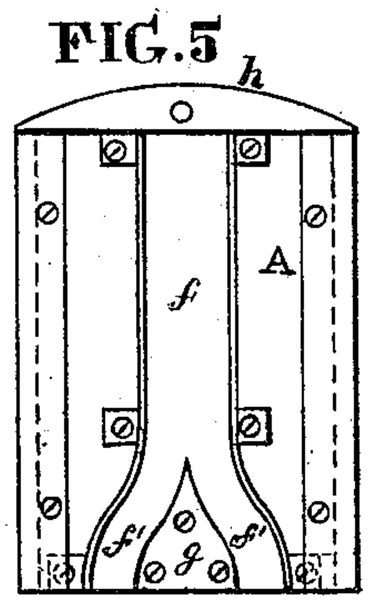


FIG. 6

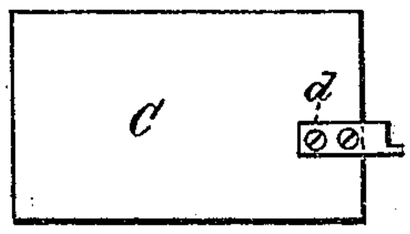
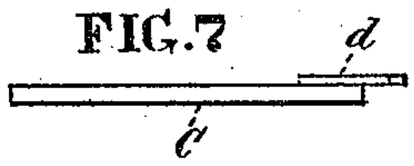


FIG. 7



Witnesses.

Thomas F. Bewley.

John Haworth.

Inventor

Gideon K. Bancroft.

per Stephen Ustick Attorney

UNITED STATES PATENT OFFICE.

GIDEON K. BANCROFT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOHN STEWARD AND JOHN S. STEVENS, OF SAME PLACE.

IMPROVEMENT IN DEVICES FOR OPERATING HATCHWAY-DOORS.

Specification forming part of Letters Patent No. **217,842**, dated July 22, 1879; application filed May 8, 1878.

To all whom it may concern:

Be it known that I, GIDEON K. BANCROFT, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Automatic Opening and Closing Doors for Elevators, which invention is fully set forth in the following specification.

The nature of my invention consists in the combination of a system of lazy-tongs with each pair of drop-doors, and with the car, in such a manner that the lowest pair of levers, having a friction-wheel upon their fulcrum-pin adapted to rise and fall in a vertical groove, and having a link-connection with the under side of the doors near their hinged edge, and the upper end of the set of lazy-tongs being jointed to a pair of levers which have friction-wheels adapted to work in a groove at the rear side of the car as it passes up and down over said wheels, the groove being bifurcated and widening at its lower end, the upward movement of the car as the groove passes the friction-wheels causes them to recede from each other and close the doors, and its downward movement operates to open them for the free passage of the car when the car is above them.

When the car is below a pair of doors and advancing to the next story above, a curved bar on the top of the car bearing against the under side of the doors opens them, whereby the wheels are drawn toward each other, and as the car advances upward a wedge in the widened part of the groove passing between the wheels expands them apart and closes the doors. The reverse operation on the lazy-tongs again opens the doors upon the descent of the car.

In the accompanying drawings, Figure 1 is a top view of a pair of drop-doors, C C, in connection with vertical ways, which guide the car in its up-and-down movement. Fig. 2 is a front elevation. Fig. 3 is a like elevation with the lazy-tongs in their expanded position, the car being removed. Fig. 4 is a bottom view of the car. Fig. 5 is a rear view. Fig. 6 is a bottom view of one of the doors C. Fig. 7 is an edge view of the same.

Like letters of reference in all the figures indicate the same parts.

A represents the car, and B B vertical ways, which guide it up and down. C C are the drop-doors of the second story of a building, the car A resting upon the first floor. *a a* and *a' a'* are two pairs of lazy-tongs. On the rear side of the lower pair, *a a*, is a friction-wheel or pin, *j*, adapted to movement up and down in the vertical slot *b* of the plate D, which is permanently fastened to the wall E. To the lower end of the tongs *a a* are jointed the inner ends of the strips *c c*, to the outer ends of which strips are pivoted the plates *d d*, which are fastened by means of screws to the lower sides of the doors C C, as shown in Fig. 6.

G G are curved levers, which are jointed together by means of the pivot *e*, the rear end of which is fast in the wall E. Their lower ends are pivoted to the upper ends of the tongs *a' a'*, and they have on their upper ends friction-wheels H H.

The rear side of the car A has a vertical groove, *f*, as seen clearly in Fig. 5, which is widened out at its lower end and is bifurcated, so as to form two grooves, *f' f'*, by means of the permanent wedge *g*. The car has a curved bar, *h*, which, in the upward movement of the car, as it approaches the lower sides of the doors C C, bears against them and opens them to form a free passage for the car. After the car has passed the doors, the wedge *g*, passing between the friction-wheels H H, spreads them apart, whereby the lazy-tongs are contracted, as seen in Fig. 2, and the pivoted strips *c c* are drawn downward and close the doors; and in the descent of the car the widened out grooves *f' f'* take hold of the friction-wheels H H and draw them together as the car descends, and the narrowed groove *f* is approached by the wheels, thereby spreading the lazy-tongs apart and opening the doors to admit of the car passing through them.

I have only shown one series of lazy-tongs;

but for every additional story another series is used to operate in the same manner.

I claim as my invention—

1. The levers G G, in combination with the lazy-tongs and the car having the grooved way *f f' f'*, for the automatic opening and closing of the doors, substantially in the manner and for the purpose set forth.

2. The combination of the strips *c c* and pivoted plates *d d* with the lazy-tongs *a a* and the doors C C, substantially as and for the purpose set forth.

GIDEON K. BANCROFT.

Witnesses:

THOMAS J. BEWLEY,

STEPHEN USTICK.