(No Model.)

W. STEVENS.

HATCH DOOR FOR ELEVATORS.

No. 420,744. Patented Feb. 4, 1890.

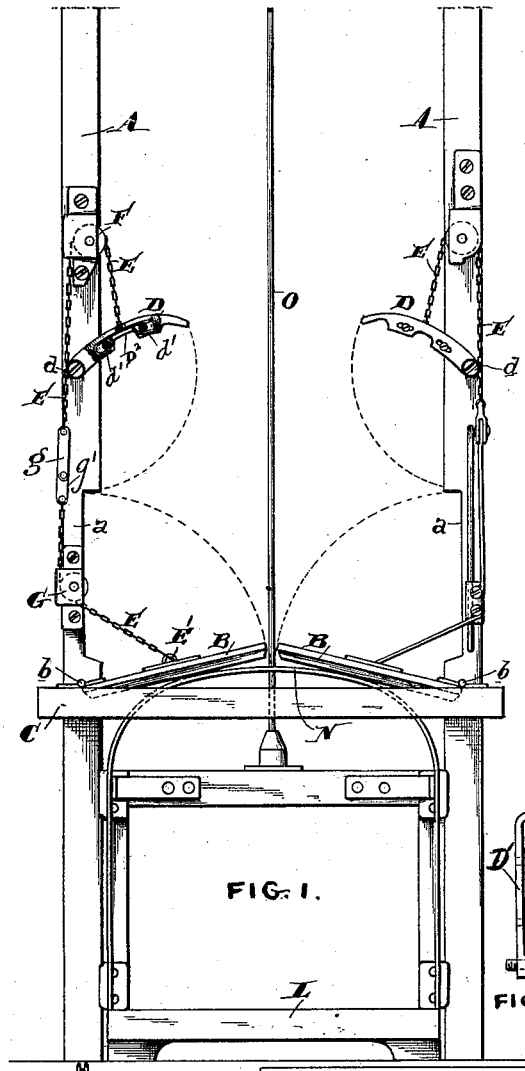


FIG. 1.

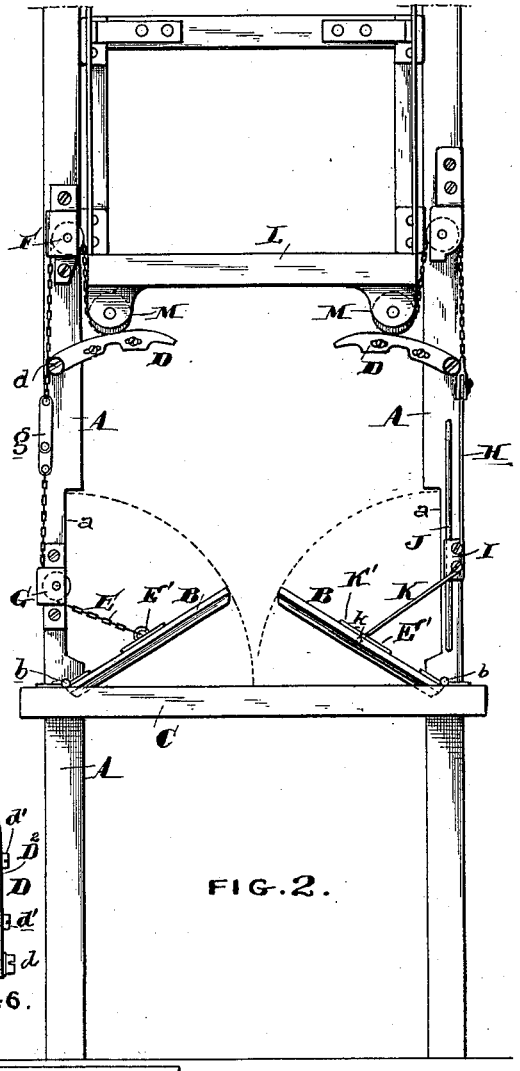


FIG. 2.

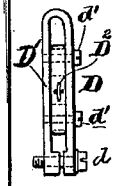


FIG. 6.

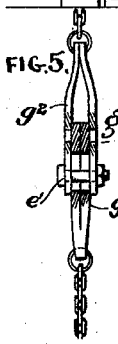


FIG. 5.

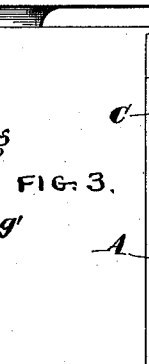
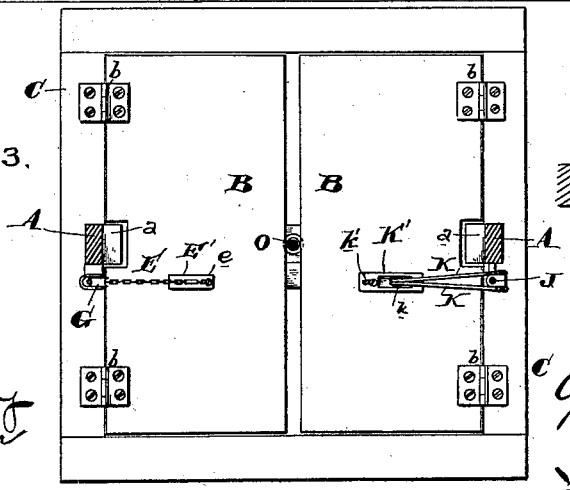


FIG. 3.



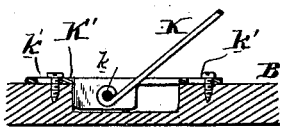


FIG. 4.

WITNESSES:

Henry Dunn

A. J. Dunn

INVENTOR:

Wm. Stevens

By his atty

Thos. Dunn

UNITED STATES PATENT OFFICE.

WILLIAM STEVENS, OF PHILADELPHIA, PENNSYLVANIA.

HATCH-DOOR FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 420,744, dated February 4, 1890.

Application filed May 6, 1889. Serial No. 309,759. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM STEVENS, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Hatch-Doors for Elevators, of which the following is a specification.

My invention relates to hatch-doors for elevators; and it consists of certain improvements, which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

More particularly my invention relates to hatch-doors which are automatically opened to allow the elevator to pass, and are closed again after its passage. Ordinarily the arms or levers by which the hatch-doors are operated have projecting arms extending outside of the elevator-shaft and connected with the doors, in order to obtain sufficient leverage to raise the doors even with the sides of the shaft, so that they shall not project into the shaft in the path of the elevator-platform and prevent its descent. This feature is unobjectionable where the shaft is open or where there is room on each side of the elevator-guides for the arms to project into; but it often happens that there is no room upon the outside of these guides, and it is not convenient (and oftentimes it is impossible, as where the elevator-shaft is bounded by brick walls or masonry) to cut away sufficient space for these arms to work in.

It is the object of my present invention to devise a hatchway-gate which shall be automatically opened and closed to allow the passage of the elevator without having the ends of the arms or levers projecting outside of the shaft or beyond the outside of the guides.

In carrying out my invention I employ single-armed levers pivoted to the sides of the guides and projecting into but not outside of the elevator-shaft. These levers are connected with the hatch-doors by suitable connections passing over guides arranged above the fulcrums of the levers, so that the closing of the hatch-door lifts the arms out into the shaft, and a lowering of the levers opens the doors. By the use of connections passing over guides above the pivot-points of the levers single-armed pivoted levers may be employed, thus dispensing with arms projecting outside of the shaft.

A further improvement consists in making the connections between the levers and hatch-door adjustable in the manner hereinafter described.

In the drawings, Figure 1 is a side elevation of an elevator-shaft embodying my improvements, with the elevator ascending. Fig. 2 is a similar view with the elevator descending. Fig. 3 is a cross-sectional view on the line *x x* of Fig. 1. Fig. 4 is a sectional side elevation of a portion of one of the doors, showing the manner of attaching the link or connection thereto. Fig. 5 is a sectional side elevation, on an enlarged scale, of the adjusting-link; and Fig. 6 is a plan view of one of the levers detached.

A A are the elevator-guides, having recessed or cut-out portions *a* to receive the doors B when they are opened. The doors are hinged at *b* to the floor C.

D are the arms or levers loosely pivoted at *d* to the guides B and normally projecting into the elevator-shaft.

E are the chains or ropes forming a flexible connection between the levers D and the doors B and passing over guides F, (which are preferably rollers or wheels,) located above the fulcrums or pivot-points *d* of the levers. These chains or ropes E also pass over suitable guides below the fulcrums or pivot-points *d* and a little above the hinge-points *b* of the doors B, and are connected to the doors B preferably by means of small plates E′, adjustably secured to the doors B by means of screws passing through the slots *e*, whereby slight adjustment of the leverage is obtained. The passing of the chain or rope connecting the lever and the door over guides located above the lever-fulcrum will, it is apparent, render a two-armed lever unnecessary, and consequently dispense with arms projecting on the outside of the guides A, for when the lever D is depressed it will draw the chain or rope E over the guide-roller F and raise the door B without the necessity of exerting any force from a point on the outside of the guides A. By means of an adjusting-link *g* the length of the chain or rope E may be adjusted, if required, so as to exactly open the door B. This link *g* is preferably constructed in the manner shown in Fig. 5, consisting of the slotted piece *g′*, adjustably connected to the two-

armed piece g^2 by means of a bolt e', the piece g^2 being provided with two or more holes to receive the bolt e' for different adjustments. By this means the length of the chain or rope E may be increased or diminished, as required, to make the doors B open and close exactly.

On the right-hand side of Figs. 1, 2, and 3 is shown a modification of the connections between the levers D and the doors B, in which the chain or rope E, after passing over the guide F, is connected to a vertical rod or link H, having secured to its end a slide I, which is adapted to run upon a vertical guide-rod J, secured to the side of the elevator-guide A. This slide is also connected to the door B by means of a link K, pivoted to the slide I at i and to the door B at k. It is apparent that the operations of these two constructions are similar. When the lever D is depressed, the rod H is drawn up, the slide I moving on the guide-rod J and carrying with it the pivoted link or connection K, which raises the door B. In order to obtain a better leverage and insure the door B being fully opened, I prefer to have the link or connection K pivoted to the door B at a point below the upper surface of the door, which may be accomplished by forming a slot or recess in the door and pivoting the link or connection K preferably in an adjustable piece K′, fitting into the recess in the door and secured to the door by means of screws passing through slots k' in the piece K′, whereby the position of the piece K′ may be adjusted. (See Fig. 4.) In this manner a better leverage is obtained for the purpose of raising the door into an upright position in the recess a when the link or connection K is drawn up by the slide I.

L is the elevator-platform, which I prefer to provide with guide-rollers M upon its lower surface, adapted to strike the levers D to operate them.

N is a bow above the platform to raise the doors when the elevator ascends.

O is the rope or cable by which the elevator is raised or lowered. I prefer to construct the levers D in the manner shown in Fig. 6, consisting of two arm-pieces D′ and an inner sliding piece D^2, secured between the two arms of the lever D by screws d'. By means of slots formed either in the sliding piece D^2 or the arms D′ the position of the piece D^2 may be adjusted. To this adjustable piece D^2 the chain or rope E is secured.

The operation of my invention is as follows: Normally the weight of the doors keeps them closed and also keeps the levers D drawn up or projecting into the elevator-shaft. As the elevator ascends, the bow N, coming in contact with the doors B, raises them. (See Fig. 1.) This raising of the doors B loosens the tension of the chains or ropes E upon the levers D and allows them to drop out of the path of the elevator, as indicated in dotted lines in Fig. 1. After the elevator has passed through the hatchway the doors B close by their own weight, drawing up again the levers D, so that they project into the shaft as the elevator descends. The platform L comes in contact with the levers D and forces them down, thus raising the doors B for the elevator to pass, when they again close by gravity. I prefer to use wheels or rollers M upon the lower surface of the platform L to operate the levers D and to act as guides for the chains or ropes while the levers are being operated by the descending elevator.

I prefer the details of construction here shown; but it is apparent that they may be modified in many ways without departing from the principles of my invention, and are not to be taken as limitations of it.

What I claim as new, and wish to secure by Letters Patent, is—

1. The combination of the hinged door, a pivoted lever, an adjustable piece carried by the said lever and adjustable to or from the pivot-point thereof, and a connection between said adjustable piece of the lever and the hinged door, whereby the length of that part of the arm of the lever acting upon said connection may be adjusted by the movement of the adjustable piece to or from the pivot-point of the lever.

2. In an elevator, the combination of a hinged hatch-door, a pivoted lever projecting into the shaft, a vertically-guided slide, a connection between said vertically-guided slide and the door, and a flexible connection between said slide and lever passing over a guide located above said lever.

3. In an elevator, the combination of a hinged hatch-door, a pivoted lever projecting into the elevator-shaft, a vertical guide-rod secured to the side of the elevator-shaft, a vertically-movable slide guided by said vertical guide-rod, a connection between said slide and the hatch-door, a guide located above the pivoted lever, and a flexible connection between said lever and sliding rod passing over said guide.

In testimony of which invention I have hereunto set my hand.

WM. STEVENS.

Witnesses:
ERNEST HOWARD HUNTER,
S. T. YERKES.