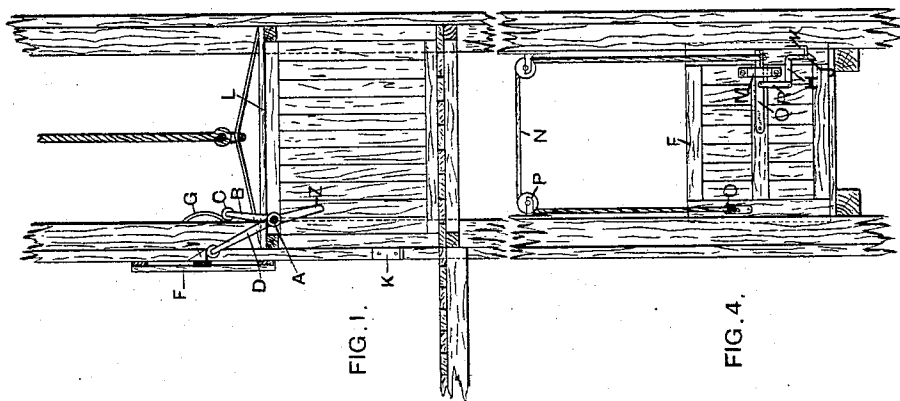
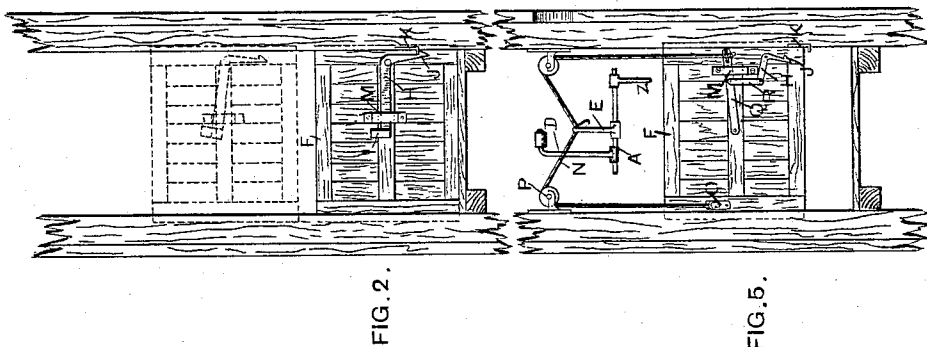
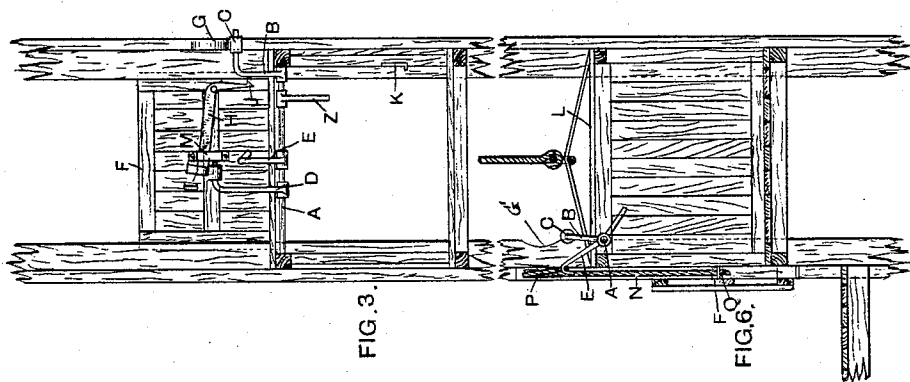


(No Model.)

J. GARNER, T. COCKERILL & C. PORRETT.
HOIST.

No. 479,087.

Patented July 19, 1892.



Witnesses.

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UNITED STATES PATENT OFFICE.

JAMES GARNER, THOMAS COCKERILL, AND CHRISTOPHER PORRETT, OF
MANCHESTER, ENGLAND.

HOIST.

SPECIFICATION forming part of Letters Patent No. 479,087, dated July 19, 1892.

Application filed February 23, 1892. Serial No. 422,561. (No model.) Patented in England October 5, 1891, No. 16,877.

To all whom it may concern:

Be it known that we, JAMES GARNER, THOMAS COCKERILL, and CHRISTOPHER PORRETT, citizens of the United Kingdom of Great Britain and Ireland, residing at Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Hoists, (for which Letters Patent were granted in Great Britain October 5, 1891, No. 16,877,) of which the following is a specification.

This invention relates to hoists; and its objects are to prevent the accidents which now frequently arise through the insecurity of the fastenings of the landing-doors and through their being negligently left open and to secure the automatic opening, closing, and locking of the door.

We will describe our said invention with reference to the accompanying drawings, in which—

Figure 1 represents a transverse section through the hoist and door; Fig. 2, an elevation showing the inside of the door in two positions; Fig. 3, a vertical section through the hoist, showing the door in the raised position; Fig. 4, an elevation similar to Fig. 2 of the door at the bottom landing; Fig. 5, a similar view to that shown by Fig. 4, but with the door partly lifted; and Fig. 6, a transverse section of the hoist at the bottom landing, showing the method of lifting the door.

According to the improvements a rocking shaft A is arranged within or upon the cage of the hoist. Upon this rocking shaft there is fixed an arm B, carrying a guide-bowl C and a second arm D, by means of which the door may be lifted, and which may also be employed to disengage the door-locking device. There may also be fixed to the rocking shaft A a handle Z and one or two hooks or hooked arms E, the function of the handle being to put the apparatus out of action when passing the door at any landing at which the cage is not required to stop. The hook or hooks or hooked arms E are employed for lifting and closing the door F at the bottom landing. Above the landing-doors there is arranged an inclined plane or swell G in such a position that the guide-bowl C on one of the arms attached to the rocking shaft will travel over

and be moved by it. This motion is communicated to the rocking shaft by the arm B and from the rocking shaft to the door-lifting and disengaging arm D.

On the inner side of each door there is fulcrumed a bent or bell-crank lever H, one part of which I is in the path of the lifting-arm D. The opposite end of this lever is formed as a catch J to engage with a fixed projection K on the door-jamb or hoist-framing, thus forming a locking device which cannot be actuated or interfered with from the outside. It will be understood that each of the doors slides upward and downward in suitable grooves or guides to close and open the entrance to the cage and that it is incapable of any other motion. As the cage L ascends the lifting-arm D comes into contact with the part I of the bent lever H, and by its continued motion it disengages the catch J from the fixed projection K.

By reference to Figs. 2 and 3 it will be seen that the motion of the bent lever H is limited by the staple or bridge-piece M, which is firmly secured to the door. The continued motion of the cage therefore presses the bent lever against the upper part of the bridge-piece, and as its free motion therein is thus arrested the door is lifted into the position indicated by dotted lines in Fig. 2.

Instead of the arrangement for lifting the door illustrated by the drawings, the arm D, after liberating the locking device, may be caused to engage with a fixed projection on the door, either directly or with the bent lever intervening. When the door has been lifted to a sufficient height, the arm D may be disengaged by means of the guide-roller C, traveling over a swell or incline, such as G, Figs. 1 and 3. This swell is preferably fixed at such a height above the landing that the door is not disengaged until the cage commences to move away from the landing. If the motion of the cage should be downward from the landing, the door naturally falls with the descent of the arm D; but if its motion is upward, the arms B and D being rigidly connected, the travel of the guide-roller on the arm B over the swell naturally causes the simultaneous displacement of the arm D, thereby liberating the door, which then falls

by its own weight into the closed position, whereupon the catch J engages with the projection K and the door becomes locked automatically. India-rubber or spring buffers may be employed to deaden the shock of the falling door or it may be partly counter-weighted. Should the cage be required to stop at any landing in its descent, it must be lowered below the landing and then be caused to reascend, as the apparatus is constructed to liberate and lift the door in the upward motion only; or, if preferred, a modification of the arrangement hereinafter described with reference to the door of the bottom landing may be adapted to each landing where the door may frequently be desired to be opened and closed and locked automatically during the descent of the cage. Since the cage cannot generally descend below the bottom landing, so as to actuate the apparatus in its ascent thereto, as hereinbefore described, the rope N may be employed for lifting the door, as illustrated by Figs. 4, 5, and 6. One end of this rope is fixed or attached to the door at O. Thence it passes over the pulley P, across the hoist-well to the second similar pulley, and thence downward again to the door, to which it is secured by attaching the end to the lever Q, to which the bent lever H, carrying the catch J, is connected through the link R. When the hoist approaches the door F, the arm B rides into a cam-recess G' and rocks the shaft, so that the hook or hooked arm E engages with the rope and pulls it downward, as shown by Figs. 5 and 6. This pull upon the rope first lifts the latch or lever Q, thus liberating the catch J. The lever Q then comes into contact with the bridge-piece and its free motion is stopped; but the pull upon the rope being still exerted by the continued descent of the cage it follows that the door must now be lifted, and it accordingly moves upward until the cage is stopped. The door is held in the open position so long as the cage remains at the bottom of the hoist; but immediately upon its ascent it is closed and automatically locked by the reversal of the motion. Instead of one hook or hooked arm, as illustrated by the drawings, two may be employed, in which case it is preferred to arrange them so as to engage with the rope near to the pulleys P P; also, instead of a separate hook or hooks or hooked arms the hook may be formed by suitably bending the arm D.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. The combination and arrangement, in a

hoist having vertically-sliding doors, with a locking device consisting of a bent lever, a catch, and a fixed projection, of a rocking shaft mounted in the cage and having secured thereon an arm arranged to trip said lever and raise the door, substantially as hereinbefore described, and as illustrated by the accompanying drawings.

2. The combination and arrangement, in a hoist having vertically-sliding doors, of a door-locking device consisting of a bent lever, a catch, and a fixed projection, with a rocking shaft having the arm B and the hook E secured thereon, a cam-surface to engage the arm B, and the rope N, adapted to be engaged by the hook E and to liberate the locking device and lift the door, substantially as hereinbefore described, and as illustrated by the accompanying drawings.

3. The combination, in a hoist having vertically-sliding doors, of a door-locking device consisting of a bent lever and catch pivoted on the door and a fixed projection on the door-casing, a rocking shaft mounted in the cage, an arm on said rock-shaft arranged to trip the lever and lift the door, a second arm arranged to travel in proximity to the framework, and a cam-surface on said framework lying in the path of said second arm, substantially as described.

4. The combination, in a hoist, of a vertically-sliding door having pivoted thereon the lever H and latch Q, the link R, connecting said parts, the bridge M, spanning the latch, the rope N, attached at one end to the door and at the other end to the latch and running over pulleys P, and a cage having a rock-shaft mounted thereon carrying a hooked arm to engage with said rope, substantially as described.

5. In a hoist, the combination, with vertically-sliding doors having pivoted catches and devices whereby they may be operated, of a cage having the rock-shaft A, mounted therein, carrying the arms B, D, and E, and a handle Z, and cam-surfaces on the framework to engage the arm B and cause the arms D E to operate the catches, substantially as described.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 20th day of January, 1892.

JAMES GARNER.
THOMAS COCKERILL.
CHRISTOPHER PORRETT.

Witnesses:

WILLIAM E. HEYS,
GEO. W. ROWE.