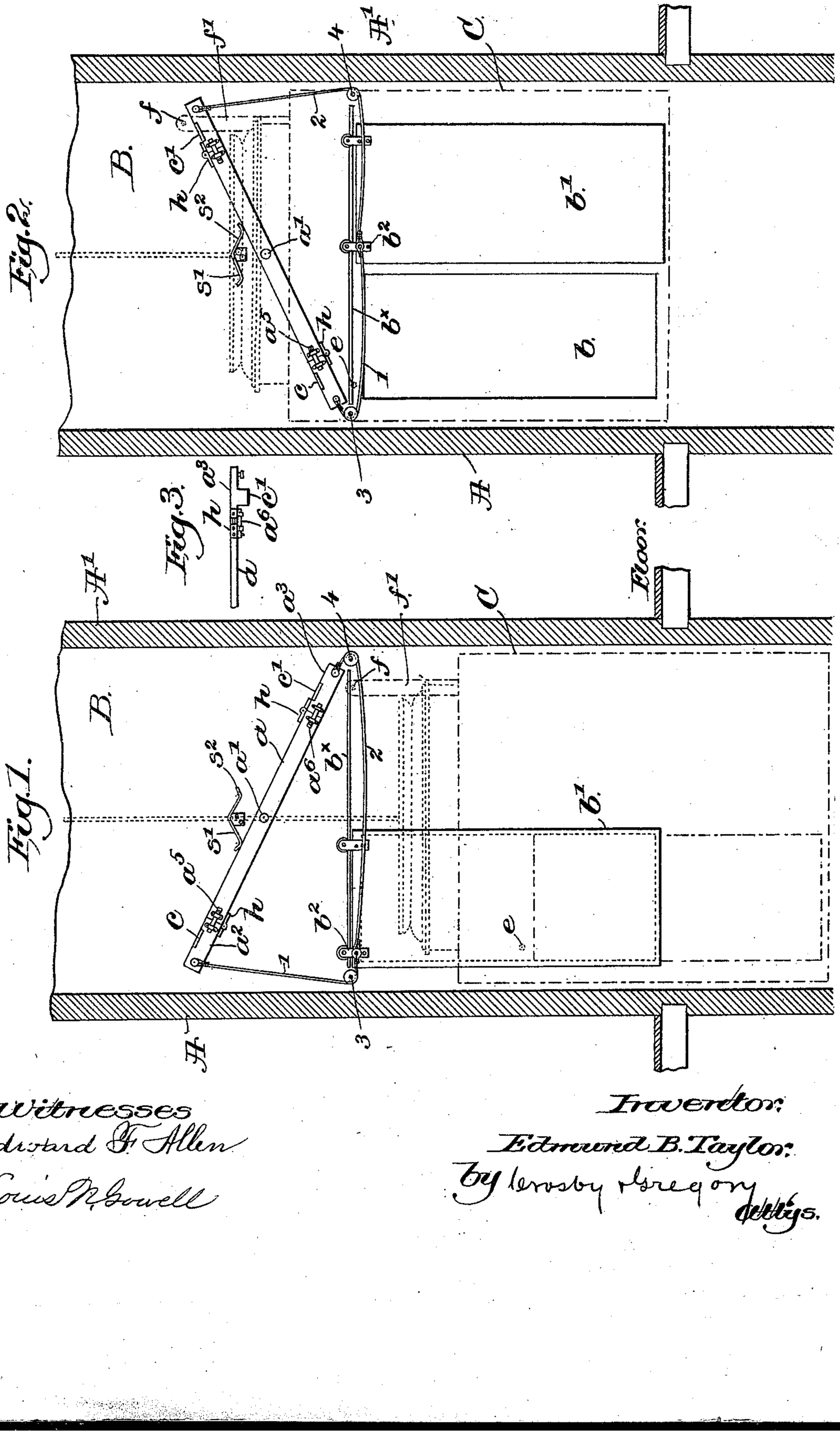
(No Model.)

E. B. TAYLOR.

ACTUATING MECHANISM FOR ELEVATOR DOORS.

No. 504,096. Patented Aug. 29, 1893.



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ACTUATING MECHANISM FOR ELEVATOR-DOORS.

SPECIFICATION forming part of Letters Patent No. 504,096, dated August 29, 1893.

Application filed October 15, 1892. Serial No. 448,953. (No model.)

To all whom it may concern:

Be it known that I, EDMUND B. TAYLOR, of Lowell, county of Middlesex, State of Massachusetts, have invented an Improvement in Actuating Mechanism for Elevator-Doors, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

A very common form of elevator apparatus now in use comprises a well or passageway for the elevator car or cage, extending to the top of the building, said well having at each floor a suitable opening normally closed by a sliding door. Generally the doors are opened and closed by the elevator attendant at the stopping and starting of the cage, but this is objectionable, as the attendant becomes careless and often opens or closes the door at the wrong time, and sometimes neglects altogether to close it.

Many devices have been proposed which have for their object the operation of the doors automatically, and this invention belongs to such class.

My invention has for its object the production of a very simple device which will automatically open and close the doors in an elevator well, by or through the movement of the cage, and which may be readily applied to many elevator apparatus now in use, with but little change and small cost.

In accordance therewith my invention consists in an elevator well provided with an opening, a door therefor, and a traveling cage, combined with a lever pivoted to the interior of the well and in the path of movement of the cage, and connections between said door and lever, the cage engaging one or the other lever arm and positively moving the lever on its pivot in one or the other direction when the cage approaches or recedes from the opening to thereby open and close the door positively, substantially as will be described.

Other features of this invention will be hereinafter described and particularly pointed out in the claims.

Figure 1, shows in vertical section an elevator well, looking from within toward the outside, with my invention in place, the door being shown closed, and the cage in dotted lines, as just beyond the floor level. Fig. 2, is a similar view, the door being shown as open and the cage, indicated by dotted lines, is at the floor level; and Fig. 3, is a detail to be referred to.

The side walls A, A′ of the elevator well are herein shown in section, and as solid, for convenience of illustration, and the front wall B of the well, in which the usual door openings are made, is also supposed to be solid, though the composition or structure of the walls is immaterial in so far as my invention is concerned.

I have herein shown a lever a pivoted at its center a' upon the inner side of the front wall B a short distance above the top of the door opening, said lever being substantially twice as long as the width of the door opening.

The door opening b, see Fig. 2, is closed in usual manner by a sliding door b', herein shown as supported on a rail $b^{\times}$ at its top, and is connected to the ends a^2, a^3 of the lever a by flexible connections 1, 2, fastened to said ends respectively, and to the door b^2 near its forward edge, said connections passing over suitable sheaves or rolls 3, 4 secured to the wall.

The lever ends a^2, a^3 are provided with lugs or projections c, c' substantially at right angles thereto, and normally in the paths of movement of pins e, f respectively, said pins, shown in dotted lines, being placed on the outer front side of the cage C, also shown in dotted lines.

As an inspection of the drawings will show, the pin e is located a little above the top of the cage door-way, and the pin f is elevated by a suitable standard f' some distance above the top of the cage and at the side nearest the wall A′.

Viewing Fig. 1, the door b' is closed, and let it be supposed that the cage in its upward movement has reached the position shown. The lug c' is in the path of the pin f and will be engaged thereby upon the farther upward movement of the cage, and by the time the cage floor has reached the floor level, see Fig. 2, the lever a will have been moved into the position shown in Fig. 2, the pin f having passed out of engagement with and beyond the lug c', and during such movement of the lever the door b' has been drawn back from the opening b by the connection 2. With the

parts in the position shown in Fig. 2, farther upward movement of the cage will bring the pin *e* into engagement with the lug *c* and the lever will assume the position shown in Fig. 1, closing the door by the connection 1. If the cage moves down from the position shown in Fig. 2, the pin *f* will engage lug *c'* and depress the end a^3 of the lever, closing the door. When the cage is above the lever *a*, and moving down, the pin *e* will engage the upturned end a^2 of the lever, see Fig. 2, and will depress it to open the door by the time the cage reaches the floor level. Thus it will be seen that no matter whether the cage is going up or down each door will be opened upon the approach, and closed at the departure of the cage, by the action of one or the other of the pins *e*, *f*, upon its corresponding lug upon the lever *a*.

As shown in the drawings, I have secured to the wall B above the pivot *a'* a spring having divergent arms *s'*, s^2 to act upon the lever at opposite sides of its center. When one of the pins on the cage has elevated one of the lever ends to the highest point, compressing the spring arm on the same side of the pivot, and has passed out of engagement with the lever, the spring arm will press the lever back into normal position, slightly elevating the depressed and lowering the elevated end of the lever until the lugs *c*, *c'* are again in the paths of the pins *e* and *f*. The connections 1 and 2 are not drawn taut between the lever ends and the point b^2 on the door, in order to permit a slight movement of the lever without moving the door.

It is sometimes desirable to have the doors at one or more of the floors of the building remain closed unless manually opened, as for instance, in a building where one or more intermediate floors are unoccupied, or little used. To adapt my herein described apparatus to such conditions, I have made the lever ends a^2 and a^3 separate, and have hinged them to the extremities of the lever *a* by any suitable spring-controlled hinge *h*, the end a^2 turning on its hinge downwardly, and the end a^3 upwardly, as shown in Figs. 1 and 2. The ends a^2, a^3 are normally prevented from turning on their hinges by suitable bolts a^5, a^6, so that they move with the lever *a*, but when it is desired to throw any door operating device out of automatic action the bolts are drawn, leaving the ends free to be moved on their hinges. Referring to Fig. 1, and supposing the bolts a^5, a^6, to be withdrawn, the door is shown as shut and when the cage rises the pin *f* will first engage its lug *c'* and turn the end a^3 on its hinge until said pin passes out of engagement therewith without moving the lever *a*, and the pin *e* will thereafter impinge against the lug *c* and will press the end of the lever upward for a short distance against the spring arm *s'* until the pin passes out of engagement with the lug. When the cage descends, the above action is reversed, the end a^2 yielding to the pressure of the pin *e*, and turning on its hinge, while pin *f* depresses the lever at one end and raises the other slightly against the spring arm *s'*, until the pins one after another leave their respective lugs. This movement of the lever and its ends a^2, a^3 is permitted by the slackness of the connections 1 and 2.

It is evident that any suitable spring may be used to co-operate with the lever, or its weight alone may be sufficient to return it to its normal position after disengagement of the pins and lugs, and any suitable locking device may be substituted for the bolts shown between the lever and its hinged ends, the gist of my invention consisting in an actuating lever connected with the door and operated by the cage to open and shut the door, and I do not wish to restrict myself to the specific construction and arrangement of parts as herein shown.

I claim—

1. An elevator well provided with an opening, a door therefor, and a traveling cage, combined with a lever pivoted to the interior of the well and in the path of movement of the cage, and connections between said door and lever, the cage engaging one or the other lever arm and positively moving the lever on its pivot in one or the other direction when the cage approaches or recedes from the opening, to thereby open and close the door positively, substantially as described.

2. An elevator well provided with an opening, a door therefor, and a traveling cage having upon its exterior two pins or projections at different heights, combined with a lever pivoted to the interior of the well, connections between it and the door, and lugs on the lever each in the path of movement of and to be engaged by one of said pins, whereby the lever is turned in one or the other direction by the movement of the cage to simultaneously open or close the door positively, substantially as described.

3. In an apparatus for actuating elevator doors, a lever pivoted to the inner wall of the well, a spring to act upon each side of the pivotal point of said lever to maintain it in normal position and a lug upon each of the lever ends, and a door connected to and moved by the lever, combined with a cage, pins thereon in different horizontal planes to engage said lugs singly and move the lever to open and shut the door, the connections permitting and the spring taking up lost motion of the lever, substantially as described.

4. An apparatus for actuating elevator doors, comprising a pivoted lever having separate hinged ends adapted to move in opposite directions, a lug on each end, and locking devices to normally maintain said ends rigid with the lever, combined with a cage provided with external pins or projections to engage said lugs and move the lever in one or the other direction and adapted, to turn the lever ends on their hinges without actuating the lever when the locking devices are disengaged, substantially as described.

5. An elevator well provided with a door opening, a sliding door therefor, and a traveling cage having an upper and lower pin upon its exterior, combined with a spring-pressed lever connected with the door, and a lug at each lever end in the path of movement of one of said pins, movement of the cage toward the door bringing one of said pins into engagement with its lug to turn the lever, the other pin engaging its lug thereafter and restoring the lever to its first position, the respective lugs being brought automatically into the paths of movement of the pins, substantially as described.

6. A pivoted lever having ends a^2, a^3 hinged thereto, and locking devices therefor, lugs c, c' on said ends, a sliding door, and flexible connections between the door and lever ends, combined with a cage, pins e, f to engage and move the lugs c, c' respectively, and a spring having arms s', s^2 to act upon opposite sides of the pivotal point of said lever, to place the lugs in the paths of the pins, substantially as and for the purposes described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDMUND B. TAYLOR.

Witnesses:
FREDERICK L. EMERY,
JOHN C. EDWARDS.