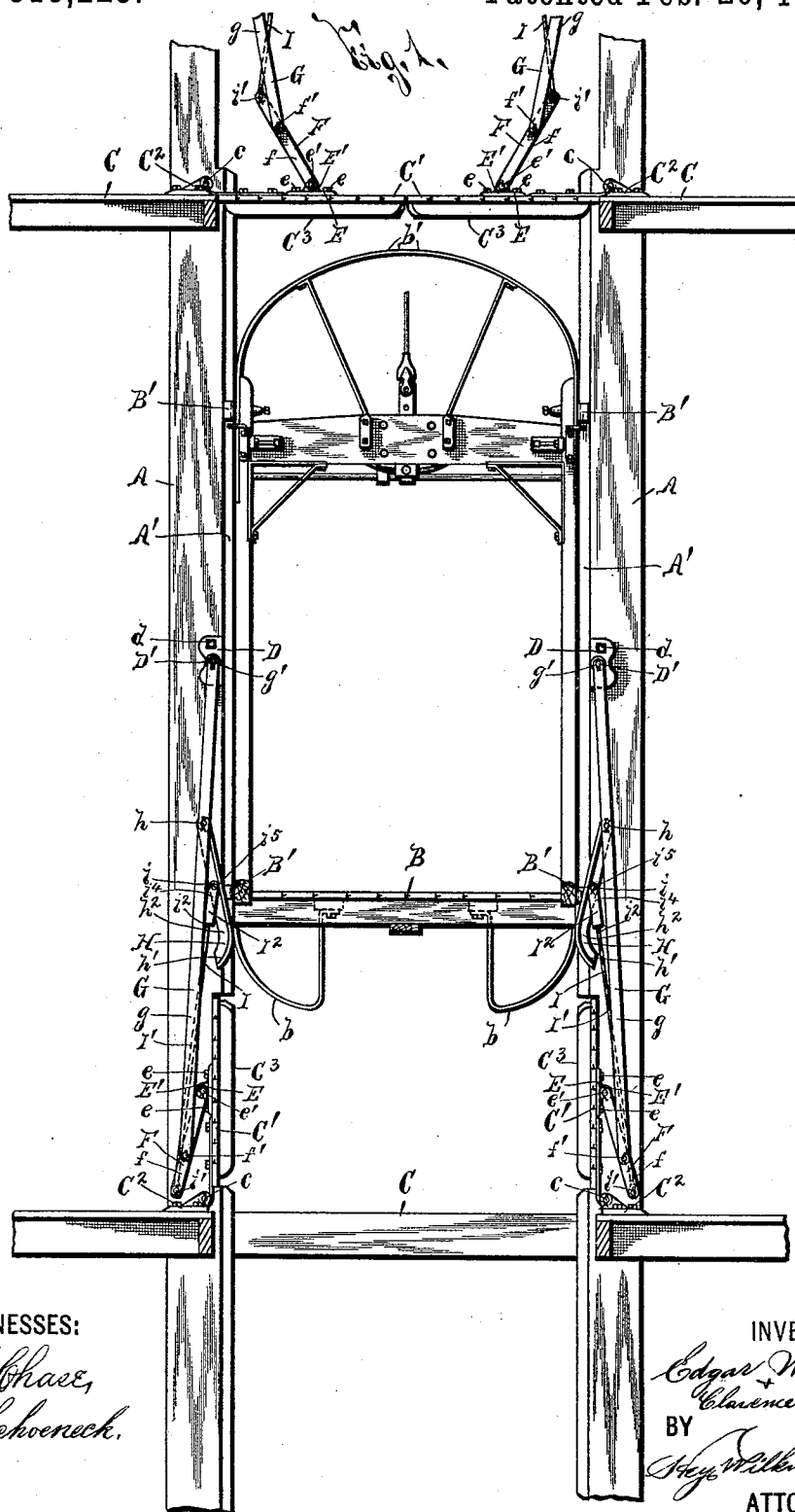


2 Sheets—Sheet 1.

No. 515,225.

Patented Feb. 20, 1894.



WITNESSES:

W. E. Chase,
L. Schoeneck.

INVENTORS

Edgar W. Houser
+
Clarence E. Decker

BY

BY
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ATTORNEYS.

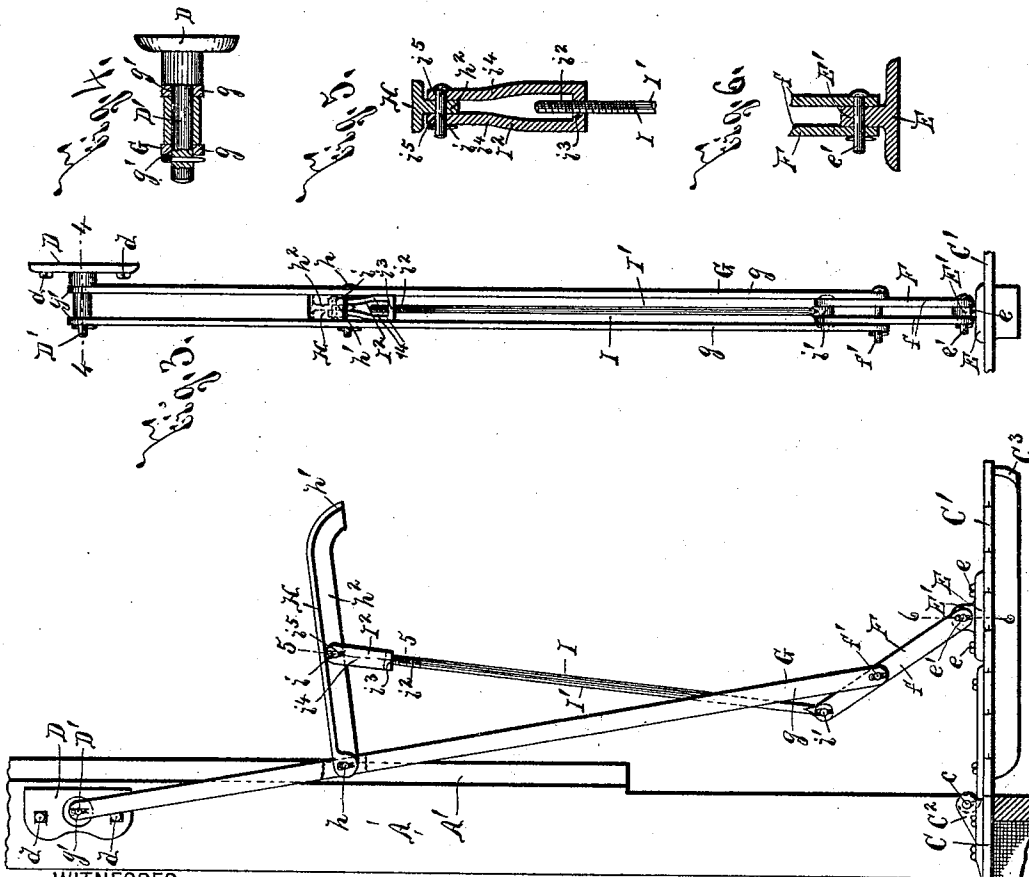
(No Model.)

2 Sheets—Sheet 2.

E. W. HOUSER & C. C. DECKER.
ELEVATOR.

No. 515,225.

Patented Feb. 20, 1894.



WITNESSES:

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ATTORNEYS,

UNITED STATES PATENT OFFICE.

EDGAR W. HOUSER AND CLARENCE C. DECKER, OF SYRACUSE, NEW YORK.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 515,225, dated February 20, 1894.

Application filed January 3, 1893. Serial No. 456,977. (No model.)

To all whom it may concern:

Be it known that we, EDGAR W. HOUSER and CLARENCE C. DECKER, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Elevators, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

Our invention relates to improvements in elevators of the particular class set forth in the Patent No. 458,627, issued September 1, 1891, to E. W. Houser, and has for its object the production of a device for opening and closing the elevator shaft doors or guards as the car moves up and down, which is extremely simple in construction, practical and effective in operation, and occupies but a minimum amount of space so as to enable it to be placed in elevator shafts in which there is but little distance between the car and the wall of the shaft; and to this end the invention consists, essentially, in hinged elevator shaft doors or guards, a car, a support or guide at the side of the car, a lever having one end hinged to the door at a point between the extremities thereof, an actuating lever having one end arranged normally in the path of the car, a link having its central portion hinged to the opposite end of the actuating lever and having one end hinged to the door lever at a point between the extremities thereof and the other end hinged to said support or guide, and a second link having one end hinged to the outer end of the door lever and the other end hinged to the actuating lever.

The invention consists furthermore in the detail construction and arrangement of the parts, all as hereinafter more particularly described and pointed out in the claims.

In describing this invention, reference is had to the accompanying drawings, forming a part of this specification, in which like letters indicate corresponding parts in all the views.

Figure 1 is an elevation of an elevator car, a portion of two floors of a building shown as above and below the elevator car, and as provided with elevator shaft doors or guards, supports or guides for the elevator car, and our improved invention illustrated as oper-

atively secured to said doors and supports or guides. Fig. 2 is an enlarged elevation of a detached portion of one of the supports or guides, one of the elevator shaft doors or guards and our door operating mechanism connected to said parts for opening and closing the door. Fig. 3 is an edge view of the detached shaft door operating mechanism shown at Fig. 2 and its detached plates secured to the door and to the corresponding guide or support for the car. Fig. 4 is an enlarged horizontal sectional view, taken on line —4—4—, Fig. 3, and Figs. 5 and 6 are enlarged vertical sectional views, taken on lines —5—5— and —6—6—, Fig. 2.

It is frequently the case that elevator shafts, which are to be provided with doors, are of but slightly greater cross sectional area than the car, so that but little space intervenes between the car and the wall of the shaft, and consequently it is often necessary to cut through the wall of the shaft to obtain the requisite room for the shaft door opening and closing mechanism operated by the movement of the car. It frequently happens, however, that the elevator shaft is so constructed or so placed with reference to adjoining rooms that it is impracticable to cut through its wall, and often it is impossible to provide such a shaft with elevator shaft doors.

Our present invention has been designed for the express purpose of use when but little space intervenes between the car and the adjacent wall of the elevator shaft to be provided with the door opening and closing mechanism, and is of such construction as to occupy but a minimum amount of space when the door is open, and as to permit of its ready and practical operation in order to reduce to a minimum the amount of power required in operating the same.

—A— represents the elevator car guides or supports, only a portion of which are here illustrated, and —B— the elevator car, which is shown as interposed between two floors —C—C— having elevator doors —C'—C'—.

At the lower end of the car —B— are rounding faces —b—b— which, as presently described, actuate our door operating mechanism to open the door —C'—C'—, and at the upper end of the car —B— is a curved face —b'—, which engages the under faces of said

doors in the usual manner, and elevates them to the position assumed by the lower doors at Fig. 1. The elevator shaft doors or guards —C'—C'—, which are of the same construction as the doors shown in the aforesaid patent, No. 458,627, are hinged at —c—c— to supports —C²—C²— secured to the top face of the floors —C—C— or other suitable support at the side of the guides or supports —A—A—. As clearly seen at Fig. 1 the guides or supports —A—A— are formed with guide ribs —A'—A'—, which are engaged by suitable guide arms —B'—B'— upon the elevator car —B—. Portions of said guide ribs —A'—A'— directly above the doors —C'—C'— are cut away for enabling the doors to swing upwardly beneath the said ribs, and, as also clearly seen at Fig. 1, the doors —C'—C'— are formed on their normally lower faces with ribs —C³—C³— which, when the doors are open, are aligned with the ribs —A'—A'— and form, essentially, continuations of said ribs for supporting and guiding the elevator car when passing the doors —C'—C'—. —D—D— are plates secured by suitable fastening means —d— to the corresponding faces of the car guides or supports —A—A—, and —E—E— are plates secured by suitable fastening means —e— to the central portions of the top faces of the doors —C'—C'—. As best seen at Figs. 3 and 4 each of the plates —D— is formed with a projecting spindle —D'—, and, as best seen at Figs. 3 and 6, each of the plates —E— is formed with a projecting ear —E'—. —F—F— are door levers each consisting of a pair of bars —f—f— hinged at their lower ends to a pin —e'— mounted in the corresponding ear —E'—, and —G—G— are links each consisting of a pair of bars —g—g— arranged at the opposite sides of the corresponding levers —F—F— and having their lower ends hinged by a pin —f'— to the central portions of said levers —F—F—, and their upper ends provided with eyes —g'—g'— registered with the corresponding spindles —D'—D'—. Consequently one of the levers —F— and one of the links —G— form a toggle between one of the shaft doors —E— and the corresponding support or guide —A—, and, as said door moves upwardly as presently described, the lever —F— swings on the pin —e'— and the link —G— on the spindle —D'—, and the lever —F— swings between the bars —g—g— of the link —G— until its normal lower end is almost directly above its normal upper end, as shown at Fig. 1. —H—H— are actuating levers each having one end hinged at —h— to the corresponding link —G— and the other end formed with a downturned extremity —h'—. As clearly seen at Figs. 1 and 2 each of the levers —H— is of slightly less width than the distance between the bars —g—g— of the corresponding link —G— in order that the outer end of said link may swing freely between said bars, and said lever is formed on its normal lower face

with a rib —h²— of less width than its normal upper face.

—I—I— are links each having one end hinged at —i— to the central portion of the corresponding lever —H—, and the other end hinged at —i'— to the normal upper end of the adjacent lever —F—. Said links —I—I— are each preferably constructed of a lower section —I'— formed with a screw-threaded upper end —i²— and an upper section —I²— composed of a central bar —i³— formed with a screw-threaded socket for engaging the screw-threaded end —i²— of the lower section —I'— and with upwardly extending arms —i⁴—i⁴— arranged on opposite sides of the rib —h²— of the lever —H— and formed with eyes —i⁵—i⁵— for receiving the pivotal pin —i— previously described. As the elevator car is descending the rounding faces —b—b— engage the normal upper faces of the actuating levers —H—H— and depress said levers into the position shown at Fig. 1. The links —I—I— thereby depress the normal upper ends of the levers —F—F—, rock said levers on their pivots —e—e'—, and elevate the normal lower ends of said levers —F—F— for opening the doors. As clearly seen at Figs. 1, 2 and 3 the links —I—I— are arranged in a plane interposed between the planes of the inner faces of the bars —g—g— composing the links —G—G—, and are free to swing between said bars, thus permitting our improved door operating mechanism to operate in a very limited space not greater, if desired, than the width of the guides or supports —A—A—. Moreover, as is evident to one skilled in the art, the construction of our improved door operating mechanism is such as to permit the door to be opened with a minimum amount of power, and to cause the door when opening or closing to move at a substantially uniform speed.

The operation of our invention will be readily perceived from the foregoing description and upon reference to the drawings, and it will be particularly noted that the same is simple in construction, practical in operation, durable and effective in use, and that it occupies but a minimum amount of space.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an elevator, the combination with the car a guide support therefor, and a shaft door; of a lever having one end hinged to the door, an actuating lever having one end arranged normally in the path of the car, whereby the car in its movement rocks said lever, a link having its central portion hinged to the actuating lever and having one end hinged to the door lever at a point between the two extremities thereof and the other end hinged to said support, and a second link having one end hinged to the outer end of the door lever and the other end hinged to the actuating lever, substantially as and for the purpose set forth.

2. In an elevator, the combination with a car a guide support therefor, and a shaft door; of a lever having one end hinged to the door, an actuating lever having one end arranged normally in the path of the car, whereby the car in its movement rocks said lever, a link having its central portion hinged to the actuating lever and having one end hinged to the door lever at a point between the two extremities thereof, and the other end hinged to said support, and a second link consisting of two sections having their opposite ends adjustably secured together, the outer end of one section being hinged to the outer end of the door lever and the other end of the other section being hinged to the actuating lever at a point between the two extremities thereof, substantially as and for the purpose specified.

3. In an elevator, the combination with the car a guide support therefor, and a shaft door; of a lever having one end hinged to the door, an actuating lever having one end arranged normally in the path of the car, whereby the car in its movement rocks said lever, a link having its central portion hinged to the opposite end of the actuating lever, and having one end hinged to the door lever at a point between the two extremities thereof, and having the other end hinged to said support, and a second link having one end hinged to the outer end of the door lever and the other end hinged to the central portion of the actuating lever, substantially as and for the purpose set forth.

4. In an elevator, the combination with the car a guide support therefor, and a shaft door, of a plate having one extremity secured to the door and the other provided with a projecting ear, and a second plate secured to said support and formed with a projecting spindle; of a lever having one end hinged to the ear of the plate secured to the door, an actuating lever having one of its ends arranged normally in the path of the car, whereby the car in its movement rocks said lever, a link having one end hinged to the door lever at a point between the two extremities thereof and the other end hinged to the spindle projecting from the plate secured to said support, and a second link having one end hinged to the outer end of the former lever and the other end hinged to the actuating lever, substantially as and for the purpose specified.

5. In an elevator, the combination with the car a guide support therefor, and a shaft door; of a lever having one end hinged to the door, an actuating lever having one end arranged normally in the path of the car, whereby the car in its movement rocks said lever, a link having its central portion hinged to the opposite end of the actuating lever and having one end hinged to the door lever at a point between the two extremities thereof, and having the other end hinged to the outer end of said support, and a second link consisting of a lower section having its lower extremity hinged to the door and its upper end screw-

threaded, and an upper section formed with a central bar engaging with the screw-threaded end of the former section and provided with arms extended upwardly above said central portion and having their upper ends hinged to said actuating lever at a point between the extremities thereof, substantially as and for the purpose set forth.

6. In an elevator, the combination with the car a guide support therefor, and a shaft door; of a lever having one end hinged to the door, an actuating lever formed with a down-turned end arranged normally in the path of the car whereby the car in its movement rocks said lever, said lever being provided on its normally lower face with a projecting rib, a link having its central portion hinged to the opposite end of the actuating lever and having one end hinged to the door lever at a point between the two extremities thereof and having the other end hinged to the outer end of said support, and a second link consisting of a lower section having its lower extremity hinged to the door and its upper end screw-threaded, and an upper section formed with a central bar engaging with the screw-threaded end of the former section and provided with arms extended upwardly above said central portion and having their upper ends arranged on opposite sides of said rib and hinged thereto, substantially as and for the purpose specified.

7. In an elevator, the combination with a car a guide support therefor, and a shaft door; of a lever having one end hinged to the door, an actuating lever having one end arranged normally in the path of the car, whereby the car in its movement rocks said lever, a link composed of separated bars arranged on opposite sides of the actuating lever and having their central portions hinged to the opposite end of said actuating lever, whereby the actuating lever swings between said bars, said link having one end hinged to the door lever at a point between its two extremities thereof and having the other end hinged to said support, and a second link having one end hinged to the outer end of the door lever and the other end hinged to the central portion of the actuating lever, substantially as and for the purpose set forth.

8. In an elevator, the combination with a car a guide support therefor, and a shaft door; of a lever consisting of separated bars having their corresponding ends hinged to the door, an actuating lever having one end arranged normally in the path of the car, whereby the car in its movement, rocks said lever, a link composed of separated bars arranged on opposite sides of the former lever and the actuating lever and having their central portions hinged to the opposite end of said actuating lever, whereby the actuating lever swings between said bars, said link having one end hinged to the door lever at a point between the two extremities thereof and having the other end hinged to said support, and a sec-

ond link arranged in a plane interposed between that of the separated bars of the former link, whereby the second link swings between said bars, said latter link having
5 one end interposed between the projecting ends of the bars forming the door lever and hinged thereto, and having its opposite end hinged to said actuating lever at a point interposed between the extremities thereof
10 substantially as and for the purpose specified.

In testimony whereof we have hereunto signed our names, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 15th day of December, 1892.

EDGAR W. HOUSER.
CLARENCE C. DECKER.

Witnesses:
CLARK H. NORTON,
M. BAXTER.