No. 631.848

Patented Aug. 29, 1899.

J. E. W. FOGAL.

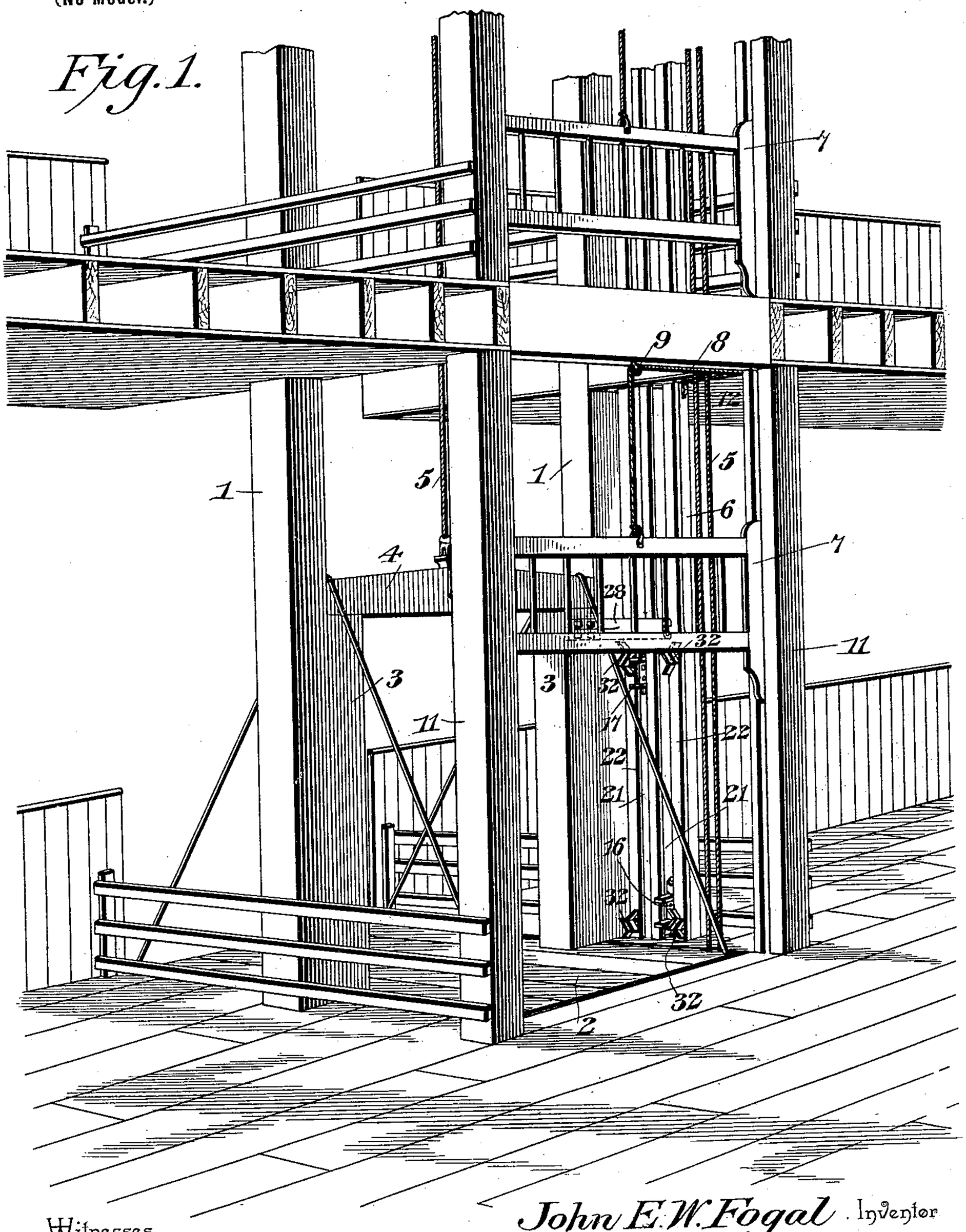
ELEVATOR GATE.

(Application filed Sept. 26, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



Witnesses

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No. 631,848. Patented Aug. 29, 1899.

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(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

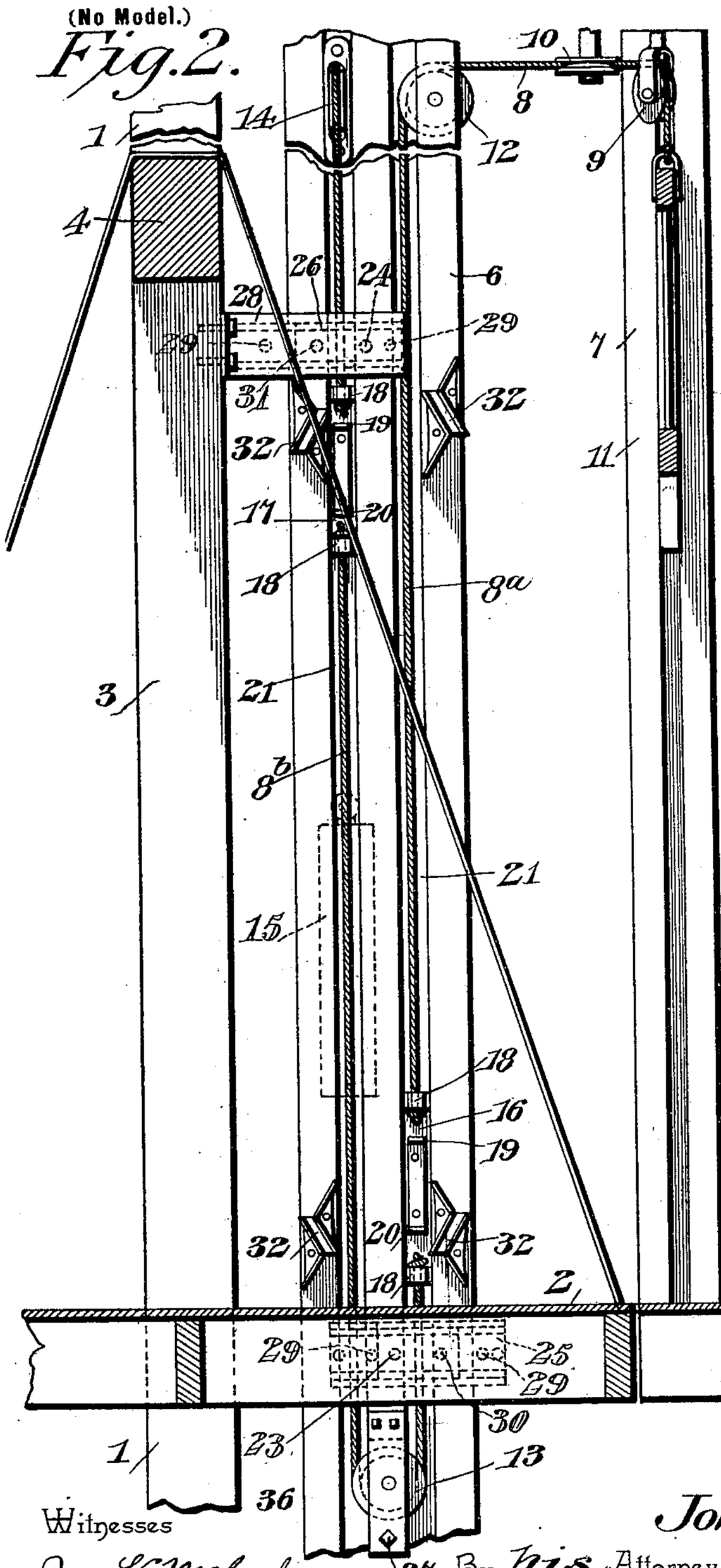


Fig. 5.

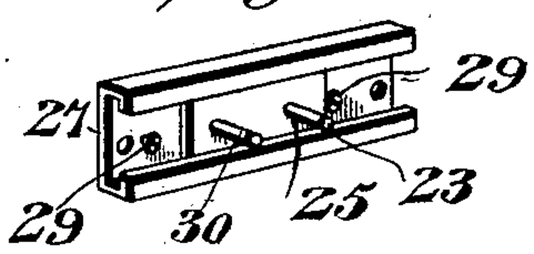


Fig. 6.

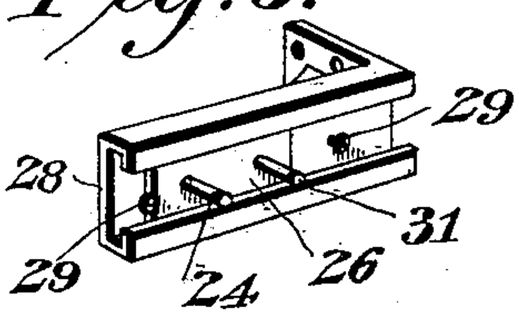


Fig. 4.

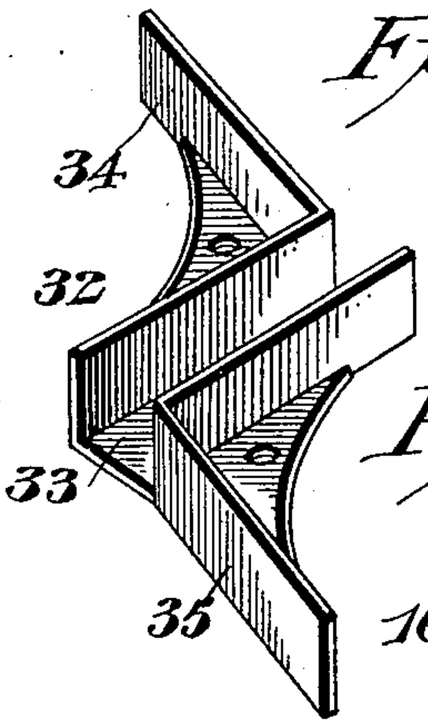


Fig. 8.

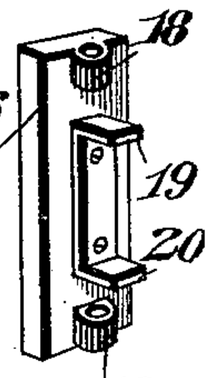


Fig. 3.

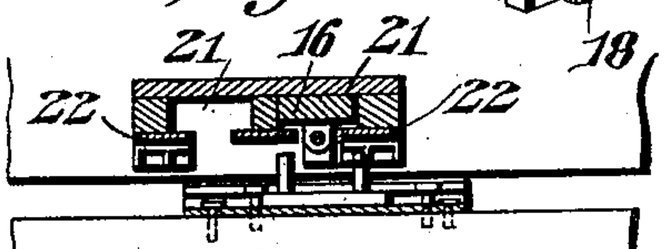
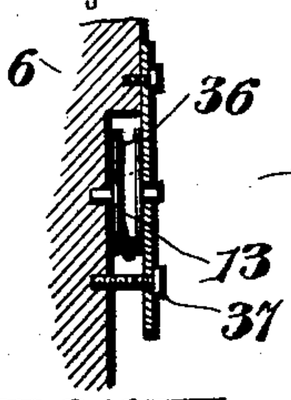


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN E. W. FOGAL, OF QUINCY, ILLINOIS, ASSIGNOR OF ONE-HALF TO H. B. DINES AND J. C. DUSSAIR, OF SAME PLACE.

ELEVATOR-GATE.

SPECIFICATION forming part of Letters Patent No. 631,848, dated August 29, 1899.

Application filed September 26, 1898. Serial No. 691,879. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. W. FOGAL, a citizen of the United States, residing at Quincy, in the county of Adams and State of Illinois, have invented a new and useful Elevator-Gate, of which the following is a specification.

My invention relates to operating devices for elevator-gates, and has for its object to provide a simple and efficient construction and arrangement of parts designed for automatically opening and closing the gates of an elevator-shaft as the car respectively approaches and leaves the floor at which each gate is located.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a gate-operating mechanism arranged in operative relation with an elevator. Fig. 2 is an elevation of the gate-operating mechanism, showing the elevator-car and contiguous parts in section. Fig. 3 is a detail horizontal section of the clutch mechanism, showing the relative arrangement of coöperating car and gate clutch members as the former is being deflected into engagement with the latter by means of the trip-cam. Fig. 4 is a detail view in perspective of the trip and shifting cam. Figs. 5 and 6 are detail views in perspective of the lower and upper car clutch members located, respectively, upon the platform and upright of the car. Fig. 7 is a detail vertical section showing the brake mechanism for the gate-supporting cable. Fig. 8 is a detail view in perspective of one of the gate clutch members.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates an elevator-guide, which may be of the ordinary or any preferred construction, arranged in an elevator shaft or well, and 2 the elevator-car platform, from which rise the uprights 3, connected at their upper ends by a cross-bar 4, the suspending and operating cable 5 of the elevator-car being connected with said cross-bar, as in the ordinary practice.

Arranged parallel with and contiguous to the elevator-guide is a supporting plate or bar 6, held in a fixed position by any suitable means and having mounted thereon the operating devices which, in connection with complemental devices upon the car, serve to open and close the gate 7 of the elevator-shaft, said gate having in connection therewith an operating cable or chain 8, traversing a direction-pulley 9 upon the frame above the center of the gate, a similar pulley 10 upon one of the side standards 11, which constitutes one of the gate-guides, a third direction-pulley 12, mounted upon the support 6, a fourth direction-pulley 13, located upon said support 6 at an interval below the pulley 12, and a fifth direction-pulley 14, located approximately in the plane of the pulley 12, but with its axis at right angles to that of the pulley 12, said cable having at its extremity opposite to the gate a suitable counterbalancing device, such as a weight 15, which is sufficient to support the gate in any position in which the latter may be arranged.

Carried by the gate operating and supporting cable 8 at the portions 8^a and 8^b between the direction-pulleys 12 and 14 and the pulley 13 are gate clutch members, consisting of clutch-plates 16 and 17, preferably let into the cable by having the contiguous extremities of separated portions of the cable engage with fastening-ears 18 at opposite extremities of said plates, and each of said clutch-plates carries upper and lower spaced clutch-ears 19 and 20, arranged in vertical alinement. Also the intermediate portions 8^a and 8^b of the gate operating and supporting cable operate in channels or guides 21, formed upon the support 6 and preferably cross-sectionally dovetailed in construction, with overhanging front flanges 22, by which the clutch-plates 16 and 17 are held from lateral vibration and are guided in their vertical reciprocation during the movements of the gate in opposite directions. The clutch-ears 19 and 20, however, project through and slightly beyond the slots in the face of the guides thus formed, where they are in position to be engaged by clutch-pins 23 and 24 on the car clutch members carried by the elevator-car. These car clutch members, in addition to the pins, include horizontally-mov-

able pin-carrying slides 25 and 26, mounted in horizontal guides 27 and 28, secured, respectively, to the platform 2 and one of the uprights 3 of the elevator-car, and fixed stops 29 are located in the paths of movement in opposite directions of said slides to limit such movements. Each slide, however, carries an additional or trip pin, (that on the slide 25 being indicated at 30 and that on the slide 26 at 31,) and in coöperation with said trip-pins are trip or shifting cams 32, two of which are arranged at intervals in the path of each of the pins 30 and 31. The construction of this shifting cam is shown in detail in Fig 4 and embodies a diagonally-disposed channel 33, adapted to receive a trip-pin and cause the movement of the slide to carry said pin in one direction or the other horizontally or in a path transverse to that of the elevator-car during the motion of said car, and, furthermore, each shifting cam is provided with an upper deflecting or shifting ear 34 and a lower deflecting or shifting ear 35, said ears being arranged to incline in opposite directions from the channel or the cam proper and being adapted to operate substantially as hereinafter described.

Assuming that the elevator-car is in the position indicated in the drawings, with its floor in the plane of a floor of the building and the elevator-gate being elevated or opened, it will be seen that the upward movement of the car will cause the engagement of the trip-pin 30 on the slide 25 of the lower car clutch member to enter the cam 32 at its lower end, and the cam will cause the slide to move toward the right, or in a direction transverse to the path of the car, until the clutch-pin 23 is in the vertical plane of the upper clutch-ear 19 of the coöperating gate clutch member. At this point the trip-pin 30 is released by the cam 32, and the farther upward movement of the car causes the contact of the clutch-pin 23 of the car clutch member with the upper ear 19 of the gate clutch member, and hence the elevation of the member 8^a of the gate-supporting cable, until the trip-pan 30 reaches and enters the lower end of the upper cam, located contiguous to the same member 8^a of the cable. Said upper cam, however, is inclined in the opposite direction (or inwardly toward its upper end) to the lower cam, and hence the engagement of the trip-pin 30 with said upper cam causes the sliding movement of the slide 25 inwardly or in the opposite direction and withdraws the clutch-pin 23 from engagement with said upper ear 19, whereupon the car is free to move independently of the gate. This engagement of the clutch-pin 23 with the ear 19 has caused the elevation of the member 8^a of the gate-supporting cable, and hence the lowering or closing of the gate, and when the gate reaches its closed position the clutch-pin is disengaged from the clutch-ear. On the other hand, assuming that the parts are in the position illustrated in the drawings, if the car moves downwardly the trip-pin 31 of the slide 23 of the upper car clutch member will engage the adjacent cam 32 and will be moved to bring the clutch-pin 24 into engagement with the lower ear 20 of the clutch-plate 17, thereby causing the downward movement of the member 8^b of the gate-supporting cable, and hence the closing of the gate. The disengagement of the clutch-pin 24 from the ear 20 will occur when the trip-pin 31 comes into engagement with the oppositely-inclined lower cam, located adjacent to the member 8^b of the cable. Furthermore, as the car approaches a floor downwardly a reversal of the above-described operation will occur. The trip-pin 30 entering the upper cam-channel will be deflected to bring the clutch-pin 23 into engagement with the lower ear 20 of the clutch-plate 16, and hence the member 8^a of the gate-supporting cable will be carried downwardly with the car to elevate the gate until the trip-pin 30 engages and enters the lower cam-channel 33, whereupon the slide 25 will be moved inwardly to disengage the clutch-pin 23 from the clutch-ear to leave the parts in the positions illustrated in Fig. 2. Obviously an upward movement of the car toward a floor of the building will bring into operation the upper clutch-slide 25 and the clutch-plate 17.

In operative relation with one of the direction-pulleys, preferably that indicated by the numeral 13, is a yielding brake-plate 36, engaged by a tension-bolt 37, and by tightening this bolt any desired frictional contact between the plate and said pulley may be obtained to resist to a greater or less extent the rotation of said pulley, and hence serve to check the momentum of the elevator-gate in approaching the limit of either its opening or closing movement. This is to avoid jarring the gate and the attached mechanism when operated by the mechanism above described, particularly when the elevator-car is run at a high rate of speed.

The specific relation between the shifting cams for the clutch-slides of the car members and the plural-eared clutch-plates of the gate members insures the engagement during the upward movement of the car of the upper clutch-ear and during the downward movement of the car of the lower clutch-ear, and by reason of this construction I am enabled to secure a positive engagement of the clutch members, which insures an efficient operation of the gate during the movement of the car in either direction, and should the slides 25 and 26 become displaced horizontally when not in engagement with the cams the deflecting or shifting ears 34 and 35 are arranged in the paths of the trip-pins to return them to such positions as to insure their entrance into the cam-channels. In other words, said deflecting-ears 34 and 35 operate as safety devices to insure that relation between the parts which is necessary to obtain the desired result without necessitating attention upon the part of the operative.

It will be understood, furthermore, that various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. Gate-operating mechanism for elevators, consisting of clutches, comprising gate members, mounted for movement in paths parallel with the elevator-car and operatively connected with the gate, and upper and lower car members, mounted upon the car for movement in paths transverse to that of the car, and adapted respectively for engagement with said gate members, and shifting cams for moving the car members alternately in opposite directions, to cause the arrangement thereof alternately in and out of operative relation with the gate members, substantially as specified.

2. Gate-operating mechanism for elevators, consisting of clutches, comprising gate members, mounted for movement in paths parallel with the elevator and operatively connected with the gate, and each gate member having upper and lower projecting elements, and upper and lower car members, mounted upon the car for movement in paths transverse to that of the car, and adapted respectively for engagement with said gate members, and shifting cams for moving the car members alternately in opposite directions, to cause the arrangement thereof alternately in and out of operative relation with different projecting elements of the gate members, substantially as specified.

3. An elevator-gate-operating mechanism consisting of clutches, comprising gate members, mounted for movement in paths parallel with the elevator-car, and operatively connected with the gate, each gate member having upper and lower clutch-ears, and upper and lower car members, mounted upon the car for movement in paths transverse to that of the car, and each having a clutch-pin for engagement with the clutch-ears of one of the gate members, and upper and lower deflected cams for moving the car members alternately in opposite directions, to cause the arrangement of the clutch-pins thereof alternately in and out of operative relation respectively with the upper and lower clutch-ears of the coöperating gate members, substantially as specified.

4. An elevator-gate-operating mechanism consisting of clutches, comprising gate members, mounted for movement in paths parallel with the elevator-car, and operatively connected with the gate, each gate member having upper and lower clutch-ears, and upper and lower car members, mounted upon the car for movement in paths transverse to that of the car, and each having a clutch-pin for engagement with the clutch-pins of the gate members, and also having trip-pins for movement respectively with said clutch-pins, and upper and lower deflecting-cams arranged in the paths of said trip-pins, for shifting the latter alternately into and out of operative relation with the clutch-ears of the car members, substantially as specified.

5. An elevator-gate-operating mechanism consisting of clutches, comprising gate members, mounted for movement in paths parallel with the elevator-car, and operatively connected with the gate, each gate member having upper and lower clutch-ears, and upper and lower car members, mounted upon the car for movement in paths transverse to that of the car, and each having a slide carrying clutch and trip pins, and upper and lower deflecting-cams, arranged in the paths of said trip-pins, for alternately throwing the clutch-pins into and out of operative relation with the clutch-ears of the gate members, substantially as specified.

6. An elevator-gate-operating mechanism consisting of clutches, comprising gate members, mounted for movement in paths parallel with the elevator-car, and operatively connected with the gate, each gate member having upper and lower clutch-ears, and upper and lower car members, mounted upon the car for movement in paths transverse to that of the car, and each having a slide carrying clutch and trip pins, and upper and lower deflecting-cams arranged in the path of the trip-pin of each slide, said cams being inclined respectively in opposite directions for actuating the trip-pin to move the slide alternately in opposite directions, and arrange the clutch-pin in operative relation, respectively, with different clutch-ears of the gate members, substantially as specified.

7. An elevator-gate-operating mechanism consisting of clutches, comprising gate members, mounted for movement in paths parallel with the elevator-car, and operatively connected with the gate, each gate member having upper and lower clutch-ears, and upper and lower car members, mounted upon the car for movement in paths transverse to that of the car, and each having a slide carrying clutch and trip pins, and upper and lower oppositely-inclined deflecting-cams arranged in the path of the trip-pin of each slide, for actuating said trip-pin to arrange the coöperating clutch-pin alternately in and out of operative relation with the clutch-pins of a gate member, each deflecting-cam having terminal oppositely-inclined shifting ears, to guide the trip-pin into operative relation with the cam, substantially as specified.

8. An elevator-gate-operating mechanism consisting of clutches comprising gate members, mounted for movement in opposite directions in paths parallel with the elevator-car, and operatively connected with the gate, and upper and lower car members, mounted upon the car for movement in paths transverse to that of the car, each car member being adapted to coöperate with one of the gate members,

and shifting devices in operative relation with each car member, for moving the same alternately into and out of operative relation with its coöperating gate member, substantially as specified.

9. Gate-operating mechanism for elevators consisting of clutch members mounted for movement in paths parallel with the elevator-car and operatively connected with the gate for simultaneous movement in opposite directions, in combination with other spaced upper and lower clutch members, carried by, and movable laterally with relation to the path of, the car, and each having a clutch-pin to engage one of the first-named clutch members, and shifting cams, located in the paths of elements of the second-named clutch members, for moving the same alternately in opposite directions, to cause the arrangement of the clutch-pins alternately in and out of operative relation with the first-named clutch members, substantially as specified.

10. An elevator-gate-operating mechanism consisting of counterbalanced gate supporting and operating cable, of which intermediate portions are arranged parallel with the path of movement of the car, for simultaneous movement in opposite directions, clutches comprising gate members having plates attached to and carried respectively by said parallel portions of the gate-supporting cable, and each having upper and lower clutch-ears, and upper and lower car members consisting of slides mounted upon the car for movement in paths transverse to that of the car, and each having a clutch-pin for engagement alternately with the upper and lower ears of one of the gate members, and also having a trip-pin, and stationary oppositely-disposed deflecting-cams arranged in the path of the trip-pin of each of said car members, for actuating the same to move the coöperating clutch-pin into and out of operative relation with the ears of the coöperating gate member, substantially as specified.

11. An elevator-gate-operating mechanism consisting of clutch-plates operatively connected with a gate supporting and operating cable, and each provided with a plurality of spaced ears, clutch-slides mounted upon the elevator-car for movement in a direction transverse to the path of said car, and each having a trip-pin and a clutch-pin, of which the latter is adapted to engage one of said clutch-ears, and oppositely-inclined upper and lower deflecting-cams arranged in the path of each of said trip-pins, and provided with upper and lower deflecting or shifting ears, adapted to guide a trip-pin into the deflecting-cam, substantially as specified.

12. An elevator-gate-operating mechanism consisting of a gate supporting and operating cable, provided with a gate-counterbalancing device, and having intermediate oppositely-movable portions arranged parallel with the path of movement of the elevator-car, a direction-pulley traversed by the gate-supporting cable between said parallel portions thereof, clutches having their members arranged respectively upon said parallel portions of the cable and the elevator-car, cams for causing opposite movements of one of said clutch members, to secure the alternate engagement and disengagement of the clutch members during the movements of the elevator-car, a brake-plate arranged in operative relation with said direction-pulley, and adjusting devices for said brake-plate, substantially as specified.

13. In an elevator-gate-operating mechanism, the combination of movable clutch-plates mounted for movement in paths parallel with the elevator-car and operatively connected with the elevator-gate, each clutch-plate having spaced upper and lower clutch-ears, upper and lower clutch-slides mounted upon the car for movement in paths transverse to that of the car, each clutch-slide being provided with parallel pins, of which one is adapted to engage with one of the clutch-ears of one of said clutch-plates during the movement of the elevator-car in one direction, and with the other clutch-ear of said clutch-plate during the movement of the elevator-car in the opposite direction, and shifting devices, arranged in operative relation with the other pins of said clutch-slides, for adjusting the first-named pins to cause the engagement thereof with, and disengagement thereof from, the ears of said clutch-slides, substantially as specified.

14. In combination with an elevator-car, an elevator-gate, and a counterbalanced gate-supporting cable having simultaneously and oppositely movable portions arranged on lines parallel with the path of movement of the elevator-car, of fixed cross-sectionally dovetailed guide-channels arranged parallel with, and adjacent respectively to, said parallel portions of the gate-supporting cable, movable clutch-plates mounted respectively in said guide-channels and attached respectively to the adjacent parallel portions of the cable, each of said clutch-plates having upper and lower spaced ears projecting through the open side of the guide-channel, upper and lower slides mounted upon the elevator-car for movement in paths transverse to that of the car, and each having a clutch-pin projecting toward for engagement with, the ears on one of said clutch-plates, and means for shifting the clutch-slides alternately in opposite directions, to arrange said clutch-pins in and out of operative relation with the ears of the clutch-plates, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN E. W. FOGAL.

Witnesses:
H. L. SIMPSON,
GEO. M. JANES.