No. 646,968. Patented Apr. 10, 1900.

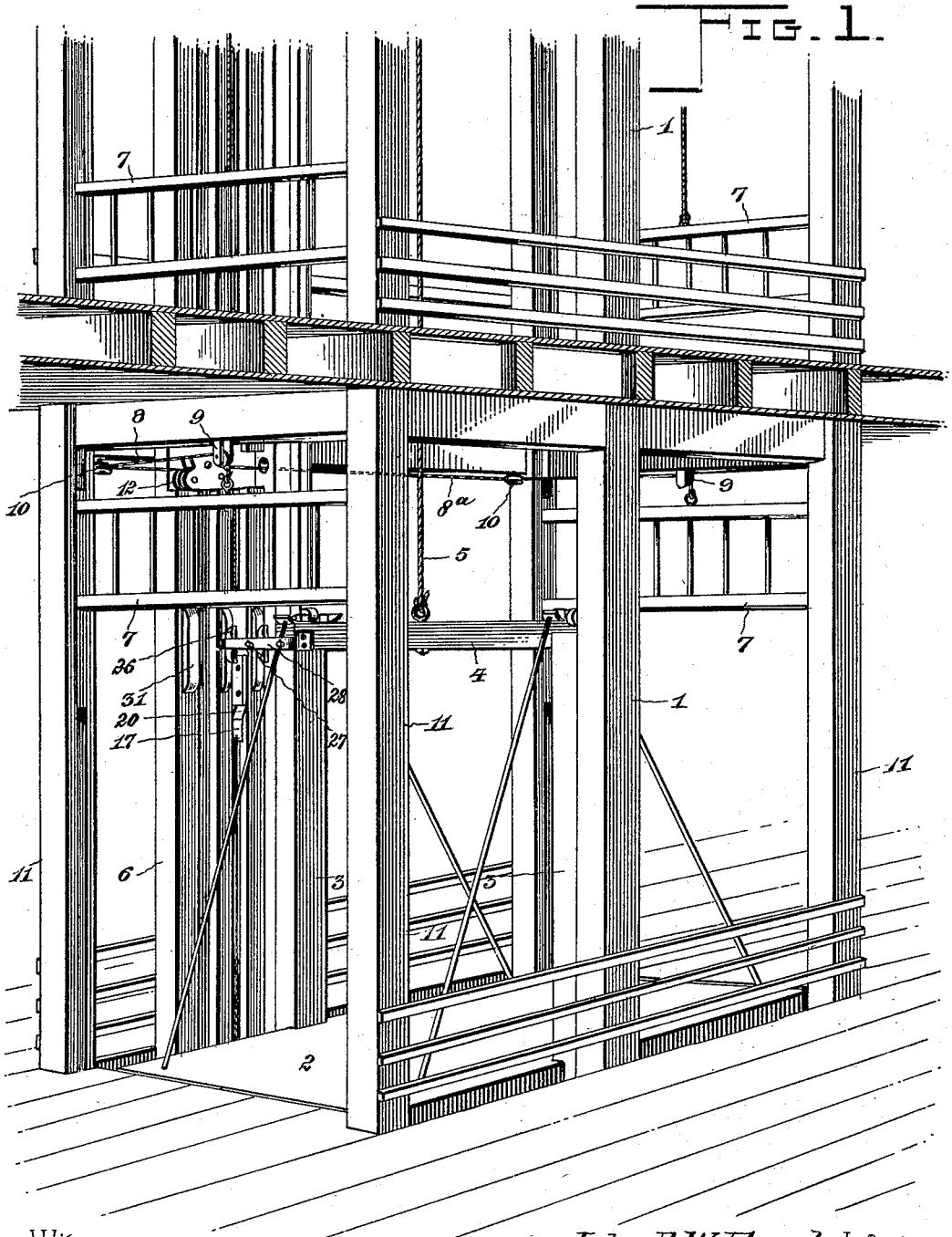
J. E. W. FOGAL.

ELEVATOR GATE.

(Application filed Mar. 13, 1899.)

(No Model.) 3 Sheets—Sheet 1.

FIG. 1.



Witnesses
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(No Model.) 3 Sheets—Sheet 2.

FIG. 2.

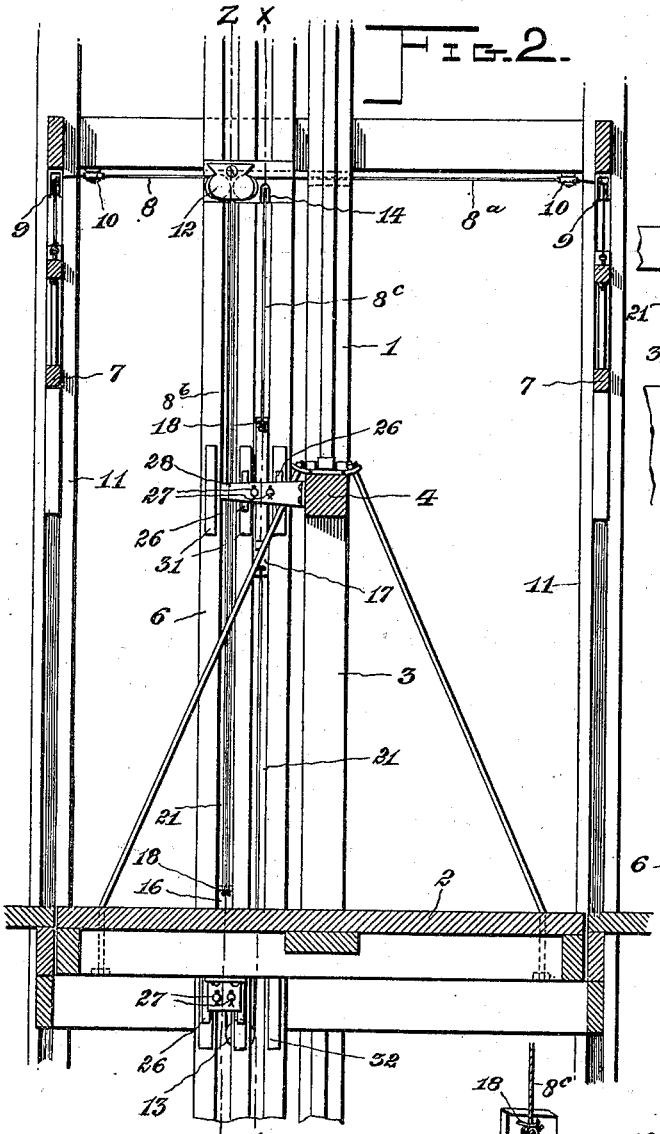


FIG. 3.

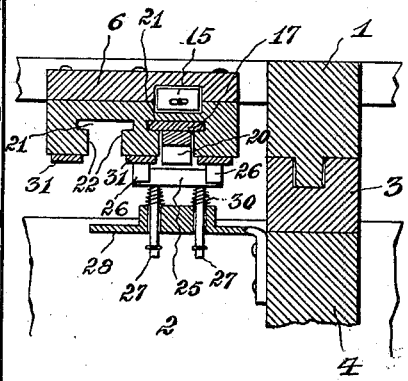


FIG. 4.

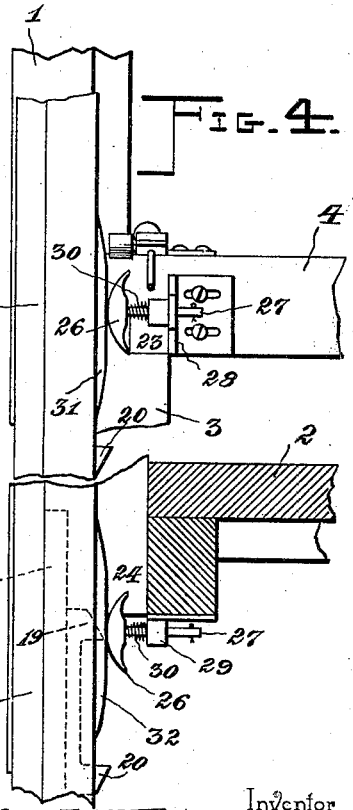


FIG. 6.

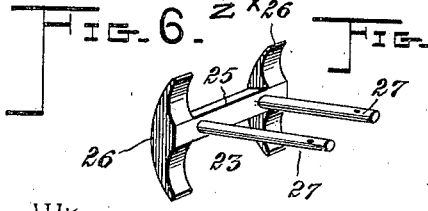
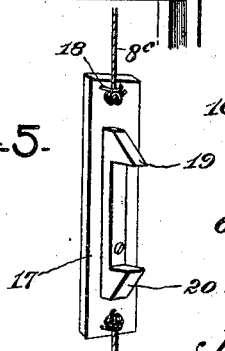


FIG. 5.



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(No Model.)

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3 Sheets—Sheet 3.

Fig. 7.

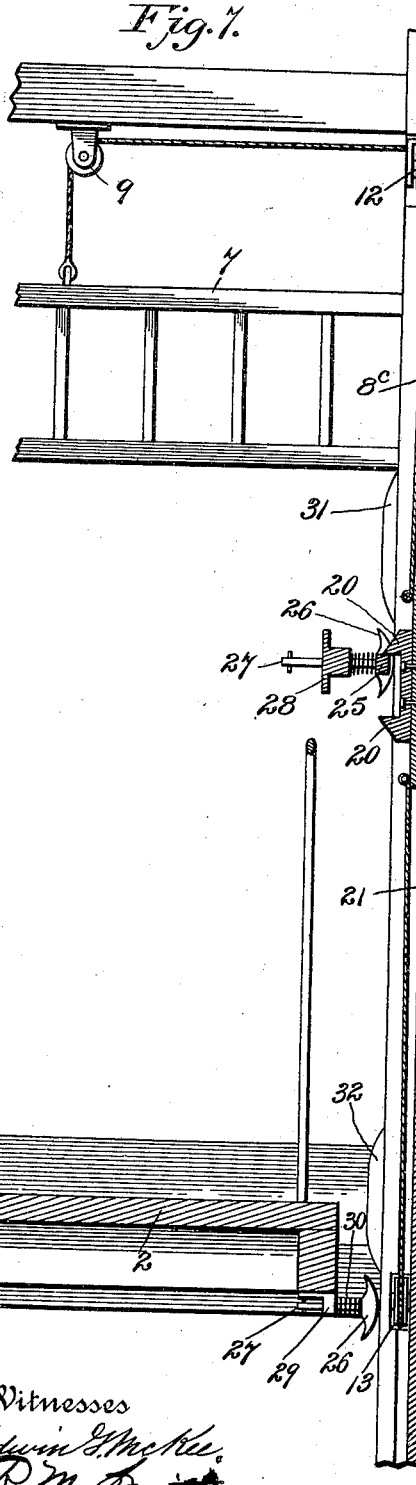
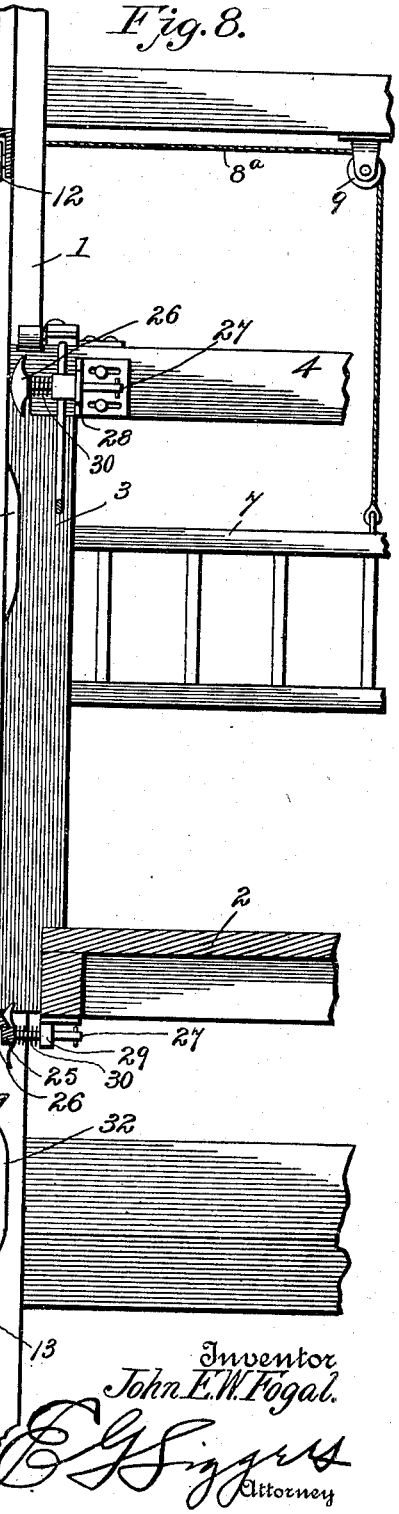


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

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ELEVATOR-GATE.

SPECIFICATION forming part of Letters Patent No. 646,968, dated April 10, 1900.

Application filed March 13, 1899. Serial No. 708,896. (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 consisting, essentially, in an improvement upon the device described and claimed in my copending application, Serial No. 691,879, filed September 26, 1898, and designed for automatically opening and closing the gates of an elevator-shaft as the car respectively approaches and leaves the floors at which said gates are 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 the 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 adjacent parts in section. Fig. 3 is a detail horizontal section of the clutch mechanism, showing the relative arrangement of the coöperating car and gate members as the former is being repressed out of engagement with the latter by means of the shifting-cam. Fig. 4 is a detail side view of the same. Fig. 5 is a detail view in perspective of the gate member of a clutch. Fig. 6 is a similar view of a car member. Fig. 7 is a vertical section taken on the line x x of Fig. 2. Fig. 8 is a vertical section taken on the line z z of Fig. 2.

Similar reference characters 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 the elevator shaft or well, and 2 the elevator-car platform, from which rise 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 adjacent 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 adjacent to one of the side standards 11 of the shaft, and 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, with its axis located approximately in the horizontal plane of the axis of the pulley 12, but with its axis at right angles to that of said pulley 12, the cable having its extremity opposite to the gate attached to a suitable counterweight 15, which is sufficient to support the gate in any position in which the latter may be arranged. In the construction illustrated the elevator-shaft is provided with duplicate opposite gates, which necessitates the addition of an auxiliary cable-section 8^a, traversing a series of pulleys 9, 10, and 12, corresponding with those above described, and suitably connected at its extremity opposite to the gate with the main gate-operating cable.

Carried by the gate operating and supporting cable, at its parallel portions 8^b and 8^c between the direction-pulleys 12 and 14 and the pulley 13, are gate clutch members consisting of similar plates 16 and 17, preferably let into the cable by having the contiguous extremities of separated portions of the cable engaged with terminal eyes or keepers 18 thereof, and each of said clutch-plates carries upper and lower spaced clutch-ears 19 and 20, arranged in a vertical plane and having inclined outer or remote sides and abrupt or shouldered inner or adjacent sides. Also the intermediate portions 8^b and 8^c of the gate operating and supporting cable operate, preferably, in channels or guides 21, formed upon the support 6 and cross-sectionally dovetailed in construction, with overhanging front flanges 22, by which the clutch-plates 16 and

17 are held from transverse vibration and are guided in their vertical reciprocation during the movement 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 upper and lower car clutch members 23 and 24, arranged upon the car respectively at the upper end of the adjacent car-upright 3 and the car-platform 2. Each of these car members is provided with a clutch-dog 25, which is arranged to span one of the guides in the support 6, and at opposite sides of the dog are arranged shoes 26, having inclined or beveled terminals and adapted to traverse parallel ways formed by the portions of the surface of the support at opposite sides of said guides. Also each of said car members, which is yieldingly held in operative relation with the guide in which the coöperating gate member is mounted, (to cause said shoes to traverse the ways,) is provided with stems 27, fitted in guide-openings in bracket-plates 28 and 29, by which said car members are respectively attached to the car, and coiled upon each of the stems is a dog-actuating spring 30, by which the said yielding contact between the shoes and the ways is maintained. Arranged upon the ways, in the paths of the shoes of the car members, are terminally beveled or reduced shifting-cams 31 and 32, arranged at points near the limits of movement of the gate members, it being obvious that the path of movement of each gate member is limited by the extent of movement of the connected gate. The various antifriction-rolls with which the gate is provided to facilitate its movement form no part of my present invention, and hence while indicated in the drawings do not require specific description.

Assuming that the elevator-car is in the position indicated in the drawings, with its platform 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 from said floor will cause the deflection or repression of the lower car member by the contact of the shoes of said member with the adjacent shifting-cam to carry the dog of the lower car member over the lower ear of the coöperating gate member (and simultaneously cause the deflection of the upper car member to disengage its dog from that gate member with which it has been coöperating) and subsequently cause said dog of the lower car member to engage the upper ear of the coöperating gate member, whereupon the continued upward movement of the car will cause said dog of the lower car member to impart upward movement to the coöperating gate-member, thus imparting upward movement to the portion 8^b of the gate operating and supporting cable, corresponding downward movement to the connected portion 8^c of the cable, and the elevation of the counterweight, at the same time allowing the gate to descend by gravity. During the elevation of the gate member on the cable portion 8^b the other gate member will be lowered, and when the lower car member reaches the upper set of shifting-cams it will be repressed or deflected to disengage the dog of said lower car member from the ear of the coöperating gate member, the gate then being in its closed position. As the car approaches a floor from below the opening of the gate is accomplished by the engagement of the upper car member with the coöperating gate member, the dog of the said upper car member being carried over the lower ear of the adjacent shifting-cam and dropped between said ears to engage the upper ear, and thus carry the gate member upward to elevate the gate. On the other hand, as the car approaches a floor from above the lower car member is deflected by the upper shifting-cam adjacent to its coöperating gate member to carry the dog over the upper clutch-ear and drop it above and in operative relation with the lower clutch-ear, whereupon the continued downward movement of the car causes the communication of motion through said lower car member to the coöperating gate member, said lower clutch member being subsequently disengaged from the coöperating gate member by the lower cam to release the gate for subsequent closing movement by the engagement of the upper car member with the lower clutch-ear of the gate member on the portion 8^c of the operating-cable.

It will be seen from the foregoing description that I have provided two gate members operatively connected with a gate for simultaneous movement in opposite directions, each gate member having spaced upper and lower engaging elements consisting of the described clutch-ears 19 and 20, and have also provided upper and lower car members adapted for respective engagement with said gate members, each car member being yieldingly held in position to engage its coöperating gate member, and have also provided upper and lower shifting-cams, so arranged as to carry each car member over and beyond the near clutch-ear of its coöperating gate member or that clutch-ear which it first reaches in approaching a gate member, and cause the engagement of said car member with the far or remote ear of the coöperating gate member, whereby when a car member engages a gate member the clutch-dog of the former is arranged between the abrupt or shouldered terminals of the gate member to insure the positive communication of motion from the car to the gate and reduce the possibilities of accident. Furthermore, should a gate be opened partly by hand, whereby the gate members are located at the intermediate points of their paths of movement, and hence not in operative relation with the stationary shifting-cams, the beveled or cam-faced portions of the clutch-ears on the gate members will serve to deflect or repress the car members, and thus insure the above-described location of the clutch-

dog between the abrupt or shouldered portions of said clutch-ears. Thus the relation between the parts is such as to adapt the gate members of the clutches to constitute safety devices which maintain the gate in a certain definite relation to the car throughout that portion of the movement of the car when a car member is in engagement with a clutch member, or, in other words, during the movement of a gate. It will be understood, furthermore, that in practice various changes in the form, proportion, size, and minor details of construction within the scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having described my invention, what I claim is—

1. An elevator-gate-operating mechanism consisting of clutches, comprising gate members mounted for movement in guideways parallel with the elevator-shaft and operatively connected with the gate for simultaneous movement in opposite directions, each member having upper and lower clutch-ears, and upper and lower car members or dogs mounted upon the car for movement in paths transverse to that of the car, each of said car members comprising a pair of terminally-beveled shoes operating at opposite sides of the guideway, and a bar rigidly connecting the shoes and spanning the guideway and forming the dog proper, and shifting-cams arranged in the paths of said shoes, substantially as described.

2. Gate-operating mechanism for elevators embodying 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 on the car for movement in paths transverse to that of the car and adapted respectively to engage the gate members, each car member comprising a yielding clutch-dog, shoes carried by the opposite ends of the dog, a stem extending backward from the dog, a spring encircling said stem and acting to urge the dog outward from the car, a supporting-bracket for the dog having its base portion slotted and adjustably connected to the car, and shifting devices for the car members, substantially as and for the purpose specified.

3. In operating mechanism for automatic elevator-gates, clutches comprising gate members, and car members coöperating therewith, a counterbalance-weight for the gate, and a double guide comprising sections fastened flatwise together and provided in their meeting faces with opposing grooves forming an inclosed guideway for the counterbalance-weight, one of the sections having guideways for the gate members formed in its exposed face, substantially as described.

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:
E. M. WHIPPLE,
A. R. HARVEY.