No. 611,662. Patented Oct. 4, 1898.

A. TURNER.

AUTOMATIC ELEVATOR GATE.

(Application filed May 2, 1898.)

(No Model.) 2 Sheets—Sheet 1.

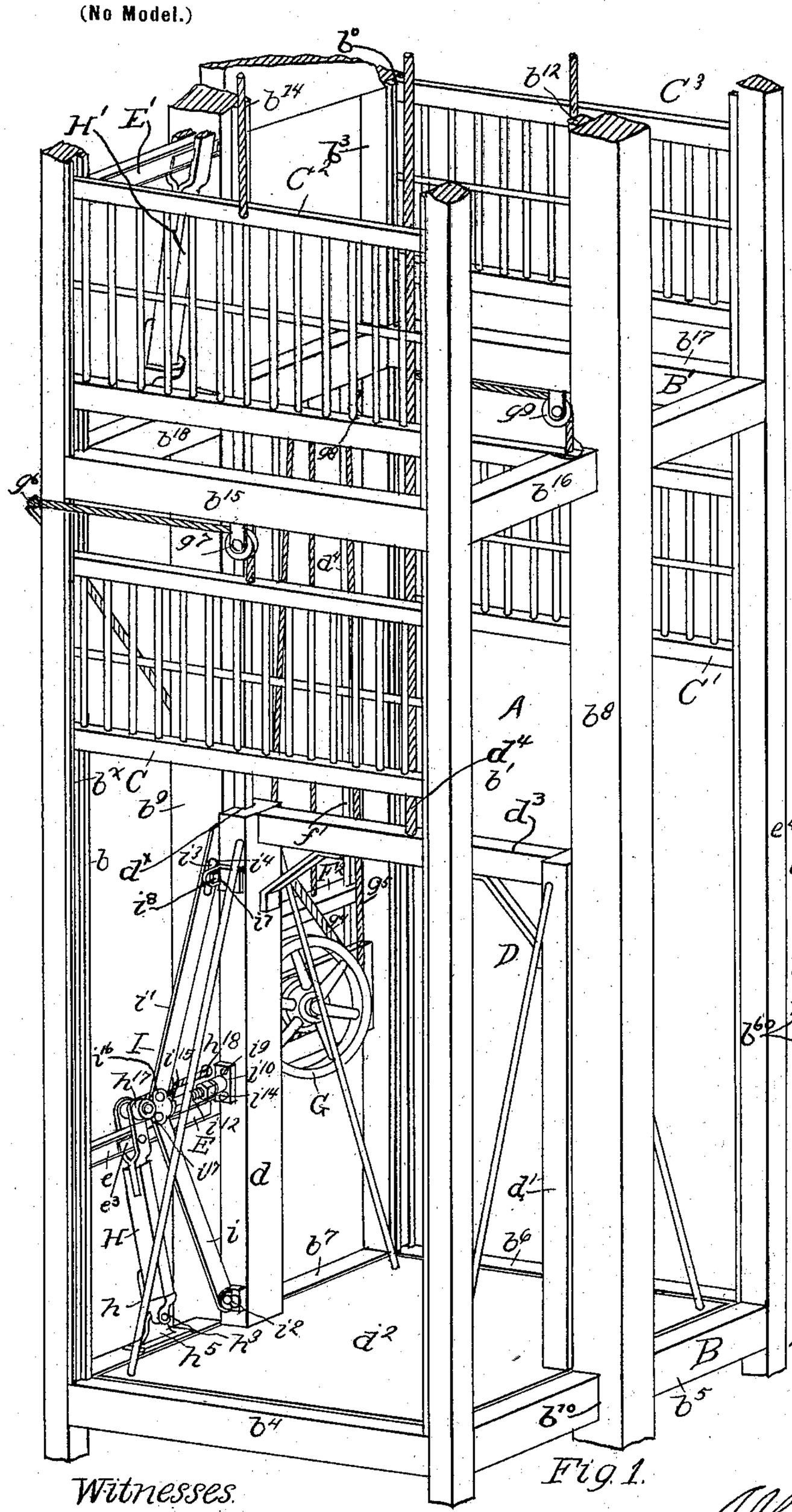

Fig. 1.

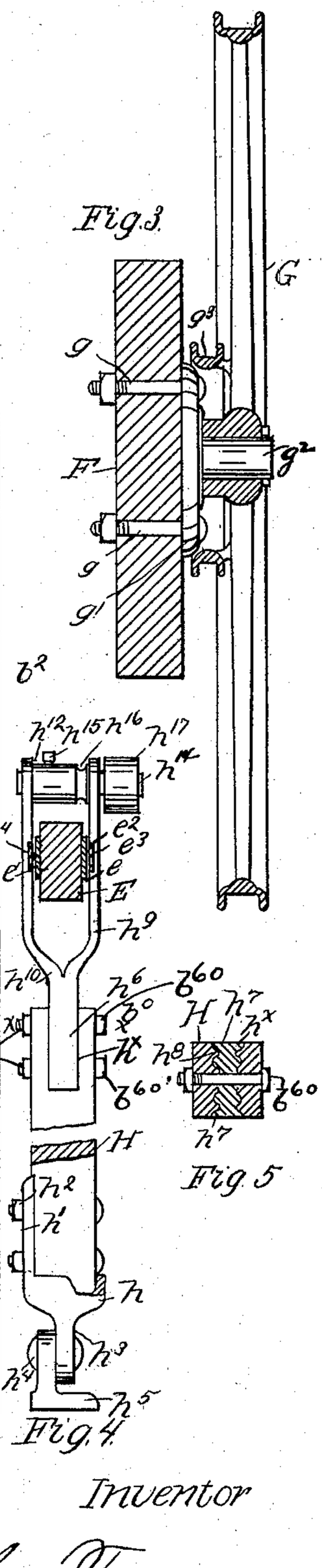

Fig. 3.

Fig. 4.

Fig. 5.

Witnesses.

A. B. Jacobus

L. L. Hasson

Inventor

Allen Turner

By Richards & Manning Atty.

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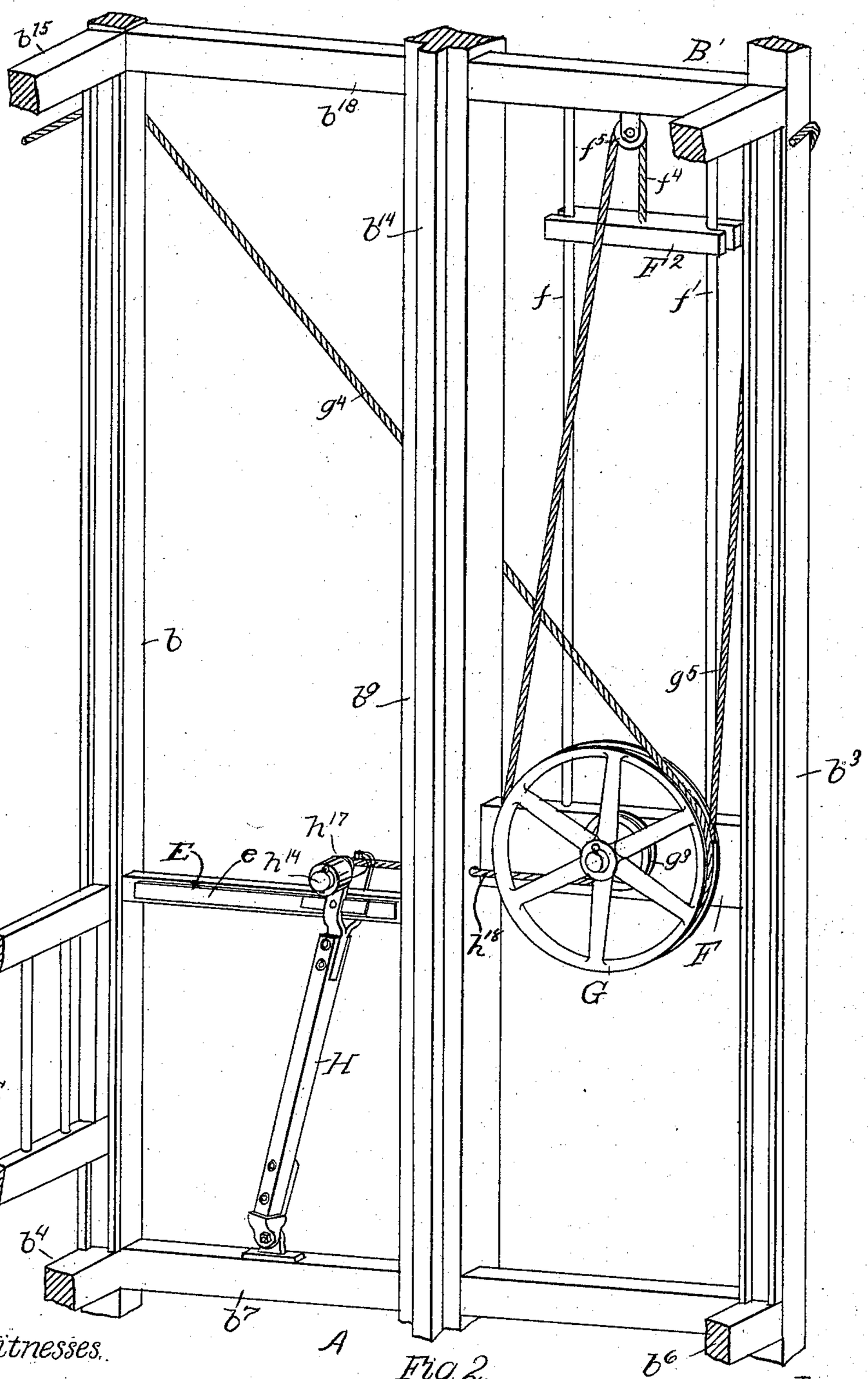

Fig. 2.

Witnesses.
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UNITED STATES PATENT OFFICE.

ALLEN TURNER, OF KANSAS CITY, MISSOURI.

AUTOMATIC ELEVATOR-GATE.

SPECIFICATION forming part of Letters Patent No. 611,662, dated October 4, 1898.

Application filed May 2, 1898. Serial No. 679,532. (No model.)

To all whom it may concern:

Be it known that I, ALLEN TURNER, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Automatic Elevator-Gates; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to that class of elevator-gates which are operated by the ascending and descending elevator-car; and it has for its objects, first, the increased velocity of the cable-winding pulley for the gate-elevating ropes; second, to compensate the weight of the gate and release the tension upon the gate-operating ropes; third, the adjustability of the operating-cam upon the elevator-car, and, fourth, the prevention of lateral vibration of the pivotal bar operated by the cam on the car.

My invention consists in the novel construction and combination of parts, such as will be first fully described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a view in perspective of an elevator-hatchway, showing the elevator-car and the improved mechanism for raising and lowering the elevator-gates. Fig. 2 is a side view in detail of a portion of the hatchway with the elevator-car removed and the gate in a closed position, showing the gate-operating mechanism in the hatchway. Fig. 3 is a detail view, in vertical section, of the pulley-supporting bracket and the pulley for the separate gate-operating ropes, showing also the small grooved pulley forming part of the large pulley in the supporting-beam of the hatchway. Fig. 4 is a rear view in elevation of the pivoted bar, which is operated by the cam on the elevator-car, with portions of the bar broken away. Fig. 5 is a cross-sectional view of the bar upon the line x x of Fig. 4.

Similar letters of reference indicate corresponding parts in all the figures.

In the drawings, to which reference is now made, A represents the hatchway as ordinarily provided in buildings for an elevator-car.

B B′ represents the separate floor-landings.

b b' are the vertical corner-posts which are upon one side of the hatchway, and b^2 b^3 the corner-posts upon the other side of the hatchway.

b^4 b^5 b^6 b^7 are the horizontal connecting-beams to the corner-posts at the level of the floor-landing B, and b^{15} b^{16} b^{17} b^{18} at the level of the floor-landing B′.

b^8 is an elevator guide-beam between the corner-posts b' b^2, and b^9 the guide-beam between the corner-posts b b^3. Upon the inner side of the beam b^8 is a longitudinal guide-rail b^{12}, and upon the inner side of the beam b^9 is a guide-rail b^{14}. In the sides of the corner-posts b b' which are opposite each other is a groove $b^\times$, and in the corresponding side of the corner-posts b^2 b^3 is a groove b^0, which extends in the longitudinal direction of said posts. Between the corner-posts b b' and in the respective grooves $b^\times$ is a vertically-sliding gate C, and in the groove b^0 in the corner-posts b^2 b^3 is a sliding gate C′.

D represents the elevator car or cage, d d' are upright side beams of the car, and d^2 is the platform, connected with the lower ends of said beams. In the side of the beam d opposite the beam b^9 is a vertical groove $d^\times$, which receives the guide-rail b^{14} on the said guide-beam b^9. In the side portion of the beam d' opposite the beam b^8 is a vertical groove which receives the guide-rail b^{12} on the beam b^8.

With the inner side portion of the corner-post b toward the beam b^9, at a point a little less than one-third the described distance from the level of the floor-landing B toward the floor-landing B′ above, is connected one end of a stationary bar E, the other end of which bar is connected with the guide-beam b^9. On one side of bar E is a longitudinal plate e, and upon the other side of said bar is a plate e'. (See Fig. 3.)

With the inner side portion of the corner-post b^3, in line with the outer side portion

thereof, is connected a bracket F, which extends toward the beam b^9 and is a short distance above the plane of the bar E. With the inner side portion of the bracket F is rigidly connected, by means of the bolts $g\,g$, the plate g', upon which is a journal g^2.

Upon the journal g^2 is a rope-winding pulley G, and between said pulley and the plate g' is a small-sized pulley g^3, which is upon the side and is a part of the inner side of the said pulley G.

With the periphery of the pulley G is connected fixedly the separate ropes g^4 g^5, one of said ropes g^4 extending from the pulley G, outside of the beam b^9, toward the corner-post b, over a pulley g^6 in fixed bearings on the outer side portion of the said corner-post b, a short distance below the plane of the floor-landing B', thence over a sheave g^7, connected with the horizontal connecting-beam b^{15} upon the level of the floor-landing B', and attached to the sliding gate C. The other rope g^5 extends from pulley G around the outside portion of the corner-post b^3 and over a pulley g^8 on said corner-post, and thence to a sheave g^9 on the inner side portion of the connecting-beam b^{17}, and attached to the gate C'.

Extending from the upper side portion of the bracket F to the under side portion of the beam b^{18} are separate guide-rods f' f', on which guide-rods is a sliding weight F^2. With the sliding weight F^2 is connected one end of a rope f^4, and the other end extended over a sheave f^5 on the under side of the beam b^{18} on the floor-level B, thence downwardly and connected with the side of the pulley G opposite to the side with which the rope g^4 is connected.

With the upper side portion of the beam b^7, beneath the bar E and equidistant from the corner-post b and the guide-beam b^9, is connected the vibrating bar H. The lower end of the bar H is extended within a socket h, upon the upper side portion of which socket is a flange h', through which flange and the bar H extend the securing-bolts h^2. Upon the lower end of the socket h is a lug h^3, which is connected, by means of the pivot h^4, with a bracket-plate h^5, secured to the connecting-beam b^7. In the upper end portion of the bar H is a slot $h^\times$, within which slot is a bar h^6, secured by the bolts b^{60} to the bar H, the inner side portions of which slot are corrugated. The end of the bar h^6 is also corrugated, as at h^8, to fit and be clamped within the slot in the upper end of bar H. (See Fig. 4.) The upper end portion of the bar h^6 is in two separate parts h^9 h^{10} or forked, which forked ends extend on opposite sides of the bar E. A short distance above the upper side portion of said bar E and between the forked ends h^9 h^{10} is a cylindrical block h^{12}, and through the forked ends of the bar H extends a pin h^{14}, which is secured from rotation within the said ends. The block h^{12} is prevented from rotating by the screw-bolt h^{15}, which impinges upon the pin h^{14}. In the block h^{12} is a groove h^{16}, with which block is connected in groove h^{16} one end of a rope h^{18}, the other end of which rope is wound once about the pulley g^3 on the pulley G and connected with said pulley. On the pin h^{14} on the outer side of the forked portion h^9 of the bar H is an antifriction-roller h^{17}. On the inner side portion of the forked portion h^9 of the vibrating bar H is a recess e^2, in which is a spring-plate e^3, which bears against the plate e on the side of the bar E. In the other forked portion h^{10} of the bar H is a spring-plate e^4 in a recess in the said portion of the bar E in the same manner as the spring-plate e^3.

On the side of the beam d of the elevator-car D toward the vibrating lever H are separate adjustable bars i i' in separate inclined planes, forming a variable cam I. The lower end of the bar i is pivotally connected with a lug i^2, secured to the beam d near the upper surface of the platform d^2 of the car D, near the outer side portion of said beam and in the path of the antifriction-roller h^{17} on the vibrating bar H. In the upper end portion of the bar i' is a slot i^3, extending a short distance in the longitudinal direction of said bar, the under side portion of which bar in rear of the slot i^3 is beveled at i^4. Near the upper end of the beam d of the elevator-car is a lug i^7, which is the same as the lug i^2, through which lug extends a guide-bolt i^8, which bolt extends within the slot i^3 of the bar i'.

At a point on the beam d equidistant from the lugs i^2 and i^7 is a socket-plate i^9, in which is a socket i^{10}, in which socket is loosely extended one end of an externally-screw-threaded adjusting-bolt i^{12}, upon which is a nut i^{14}, which nut is turned against the socket i^{10}. Upon the outer end of the bolt i^{12} is an internally-screw-threaded sleeve i^{15}, upon the upper side of which sleeve is a flange i^{16}, with which is pivotally connected the lower end of the bar i', and upon the under side of said sleeve is a flange i^{17}, with which is pivotally connected the upper end of the bar i.

The devices heretofore explained for raising and lowering the elevator-gates C^2 C^3, which are connected with the hatchway and above the floor level or landing B', are the same as described above the landing B. With the cross-beam d^3 of the elevator-car D is connected the elevating-cable d^4, which is connected with the usual elevating devices for raising and lowering the car.

In the operation of the improved mechanism it will be observed that in the position of the elevator-car as seen in Fig. 1 the gates C C' are both in an elevated position, thus giving access to the elevator-car from the sides of the hatchway, the upper end of the vibrating lever H being forced rearwardly in an inclined position and held in said position

by the bars $i\ i'$ of the variable cam I. Consequently the slack in the ropes $g^4\ g^5$, connected with the gates C C', is wound upon the pulley G. At the same time the compensating weight F^2 is in a position near the ceiling-line under the floor-landing B' and the rope f^4 wound around the pulley G. The moment the elevator-car D is given an upward movement the antifriction-roller h^{17} moves over the inclined plane of the bar i of the cam I and the gates C C' by their own weight descend, causing the pulley G to rotate and pay out the ropes and wind the rope h^{18} upon the pulley g^3, and consequently the tension upon the vibrating bar H draws the upper end of the said bar forward and in the direction of the guide-beam b^9. As soon as the elevator-car has passed one-half the distance to the upper floor-landing B' the vibrating bar H passes from the cam I and the gates C C' are in the lowest position required to close the hatchway, and at the same time the weight F^2 descends. Above the floor-landing B' the gates $C^2\ C^3$ are in a closed position until the bar i' of the variable cam I on the elevator-car comes into contact with the antifriction-roller upon the vibrating bar H, and the gates $C^2\ C^3$ are caused to move upwardly, reaching their highest point as the platform d^2 of the elevator-car D reaches the level of the floor-landing B'. The vibrating bar H raises the gates by the purchase of the rope h^{18} on the pulley g^3. Both pulleys G g^3 being upon the same journal or pivot, a combined movement is communicated to the pulley G. The weight of the weight F^2 is very nearly that of the gates, so that it is only necessary to raise a weight equal to the slight difference between the weight of the weight F^2 and that of the gates. I may, however, dispense with the weight F^2 where a small-sized gate is in use.

In order to regulate the height to which the elevator-gates are to be raised by the gate-operating mechanism, the nut i^{14} on the threaded bolt i^{12} is turned so as to permit the meeting ends of the bars $i\ i'$ of cam I to be moved or adjusted in position toward the beam d of the elevator-car, so as to lessen in degree the angle of the cam and also prevent the shock in the striking of the antifriction-roller h^{17} on the vibrating bar H with the inclined planes of the cam.

The corrugated inner side portions of the slot $h^{\times}$ on the upper end of bar H and the similar corrugations on the bar h^6 strengthen the joint, so that the shock to the joint can be better sustained when the roller h^{17} strikes the cam on the elevator-car, and the forked end of the said bar upon the horizontal guide-bar prevents the lateral sway of the bar from its position in the path of the cam.

I am aware of the Letters Patent to G. C. Hawkins, No. 517,117, dated March 27, 1894. In his invention the elevator-gate whenever operated is raised its full height. In my invention I aim to control the height to which the gate is elevated in the passage of the elevator-car, and thus raise the gate only part way from the level of the floor toward the upper floor-landing and not expose more of the hatchway-opening than is actually necessary.

Having fully described my invention, what I now claim as new, and desire to secure by Letters Patent, is—

1. In a hatchway, a sliding elevator-gate, and an elevator-car, a cam upon the side of the elevator-car, elevating devices upon the side of the hatchway connected with the elevator-gate, and a vibrating bar pivotally connected at its lower end with a suitable bearing upon the side of the hatchway, and also connected with the gate-elevating devices, an elevator-car and separate bars, on separate inclined planes upon said car pivotally connected with each other at the meeting ends, an adjusting screw-threaded bolt and an adjusting-nut upon said car for the meeting ends of said bars and connecting devices upon said car for the outer ends of the respective bars for the purpose described.

2. In a hatchway, a sliding elevator-gate, a pivoted vibrating bar in said hatchway, and combined pulleys of different size upon a journal, in the side of the hatchway, a rope connected with one periphery of the combined pulley, and also with said sliding gate, and another rope connected with the vibrating bar and the periphery of the other pulley, an antifriction device on said vibrating bar, an elevator-car, lugs on said car and separate bars in separate inclined planes, pivotally connected with each other at one end and adjustably connected with said lugs at the other end, and in the path of the antifriction device in the said pivotal vibrating bar, and an adjusting screw-bolt upon the elevator-car, for the meeting ends of said inclined bars, for the purpose described.

3. In a hatchway a sliding elevator-gate and an elevator-car, a cam upon the side of the elevator-car, elevating devices upon the side of the hatchway connected with the elevator-gate and a vibrating bar pivotally connected at its lower end with a suitable fixed bearing upon the side of the hatchway and also connected with the gate-elevating devices and having a forked upper end, a horizontal stationary guide-bar upon the side of the hatchway adapted to receive the forked end of the said vibrating bar and antifriction devices upon the side of the forked upper end of the vibrating bar in the path of the cam upon said elevator-car for the purpose specified.

4. In a hatchway, a movable gate, and a horizontal stationary guide-bar, a vibrating bar pivoted at its lower end to a fixed support in the hatchway, and separate pulleys varying in circumference on suitable fixed

bearings in the hatchway, operating-ropes connected with the larger pulley and extending over suitable sheaves and connected with the gate and a second rope connecting the small-sized pulley with said vibrating bar, an elevator-car and a cam on said car adapted to come in contact with said vibrating bar in its passage in the hatchway, and a compensating weight and a separate rope connected with the large-sized pulley, and extending over a suitable sheave and connected with said weight, and stationary upright guides for said weight, for the purpose described.

ALLEN TURNER.

Witnesses:
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