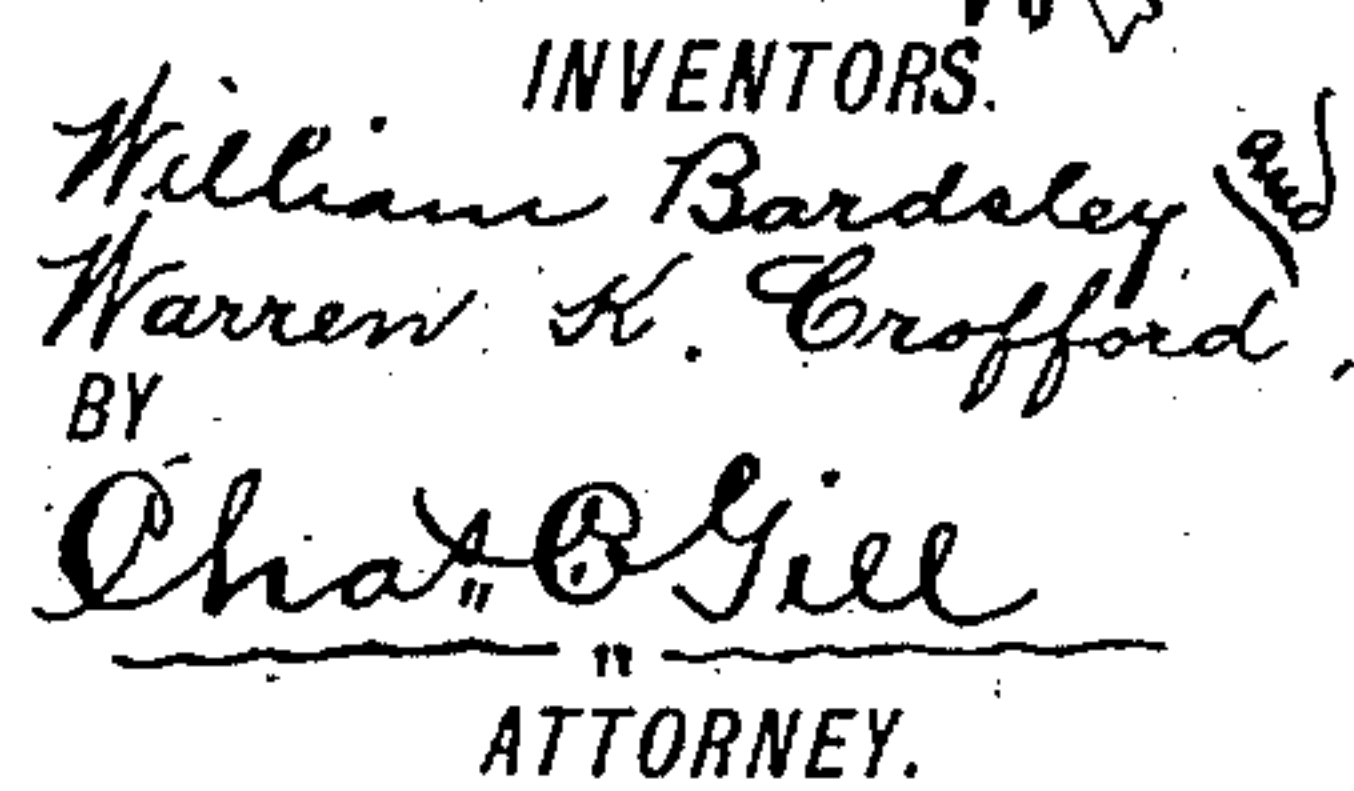
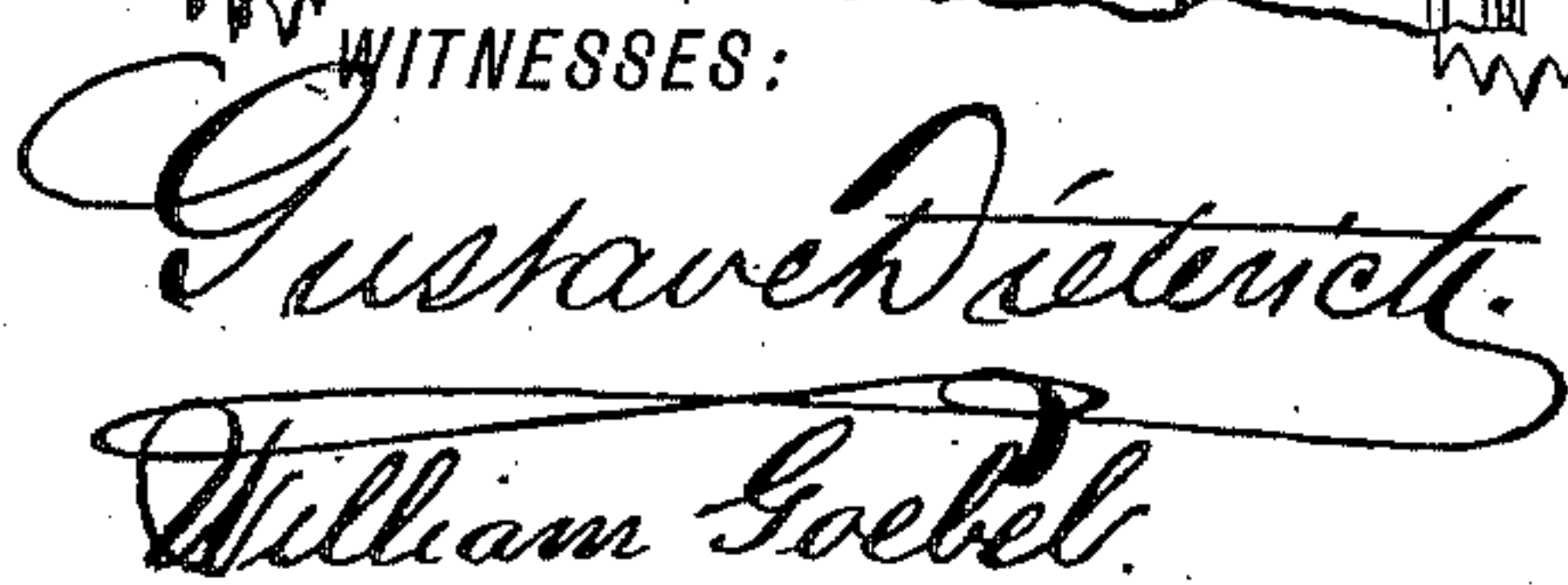


2 Sheets—Sheet 1.

No. 442,280.

Patented Dec. 9, 1890.



(No Model.)

2 Sheets—Sheet 2.

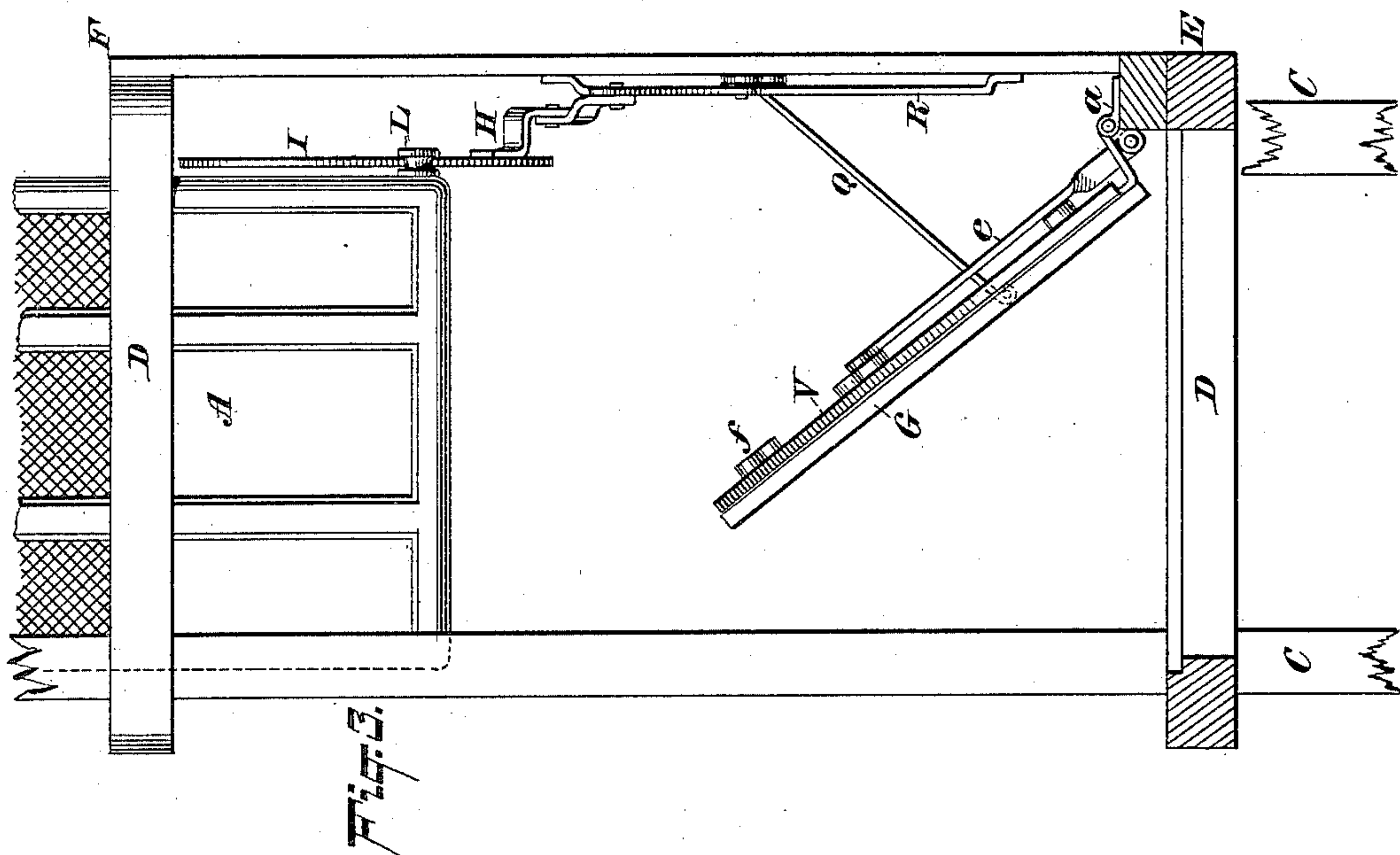
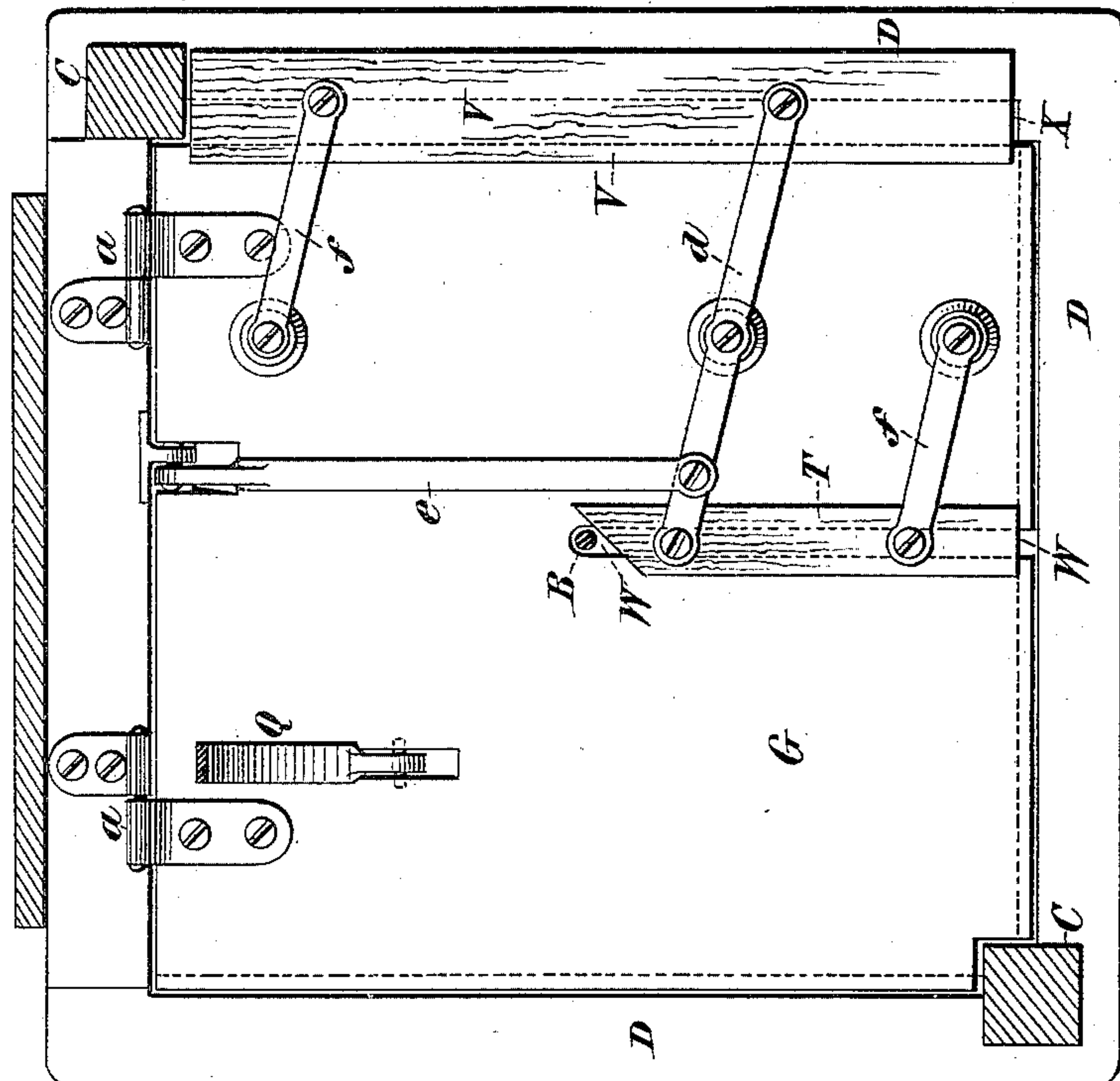
W. BARDSLEY & W. K. CROFFORD.

HATCHWAY FOR ELEVATORS.

No. 442,280.

Patented Dec. 9, 1890.

Fig. 2



WITNESSES:

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# UNITED STATES PATENT OFFICE.

WILLIAM BARDSLEY, OF KEARNEY, NEW JERSEY, AND WARREN K. CROFFORD, OF NEW YORK, N. Y.

## HATCHWAY FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 442,280, dated December 9, 1890.

Application filed January 30, 1890. Serial No. 338,650. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM BARDSLEY, a citizen of the United States, and a resident of Kearney township, New Jersey, and WARREN K. CROFFORD, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Hatchway-Door Mechanisms, of which the following is a specification.

The invention relates to improvements in hatchway-door mechanisms; and it consists in novel leverage devices connected with the doors at the several floors of the building, whereby the carriage or hoist on its ascent and descent may automatically open and close said doors in succession.

The invention further consists in the door having slides thereon for closing the space formed by one of the vertical guides between the side of the door and adjacent edge of the floor, and also the space provided to receive the cable or hoist-rope, whereby when the door is closed any excess of draft up through the hatchway may be avoided. The slides on the door are in connection with each other and with a rod, which is hinged to the floor and operates while the door is being opened to withdraw the slides from over the spaces they previously covered, and during the closing of the door to move said slides to their former position over said spaces. During the ascent of the carriage or hoist a cam or projection on the top thereof comes into contact with the door and turns it upward on its hinges, and after the hoist or carriage has passed through the opening thus made in the floor a small wheel or projection on the side and adjacent to the lower end of the carriage engages the leverage mechanism and insures the gradual closing of the door. Upon the descent of the hoist or carriage the aforesaid small wheel or projection comes into contact with the leverage mechanism and opens the doors in succession, thus permitting the downward passage of the carriage through the hatchway, the door at each floor closing automatically and gradually as the carriage passes it.

Referring to the accompanying drawings, Figure 1 is a side elevation of a portion of the

elevator-carriage and hatchway, showing the carriage in position to ascend through one of the floors of the building; Fig. 2, a like view of same, illustrating the carriage as having passed partly through one floor, the hatchway-door being partly open and broken away so as not to conceal the leverage mechanism; Fig. 3, a like view of same, showing the carriage as having passed entirely through one floor of the building and partly through the second floor thereof; and Fig. 4, a horizontal section on the dotted line 4 4 of Fig. 1, and illustrating the upper surface of one of the hatchway-doors.

In the drawings, A designates the elevator hoist or carriage; B, the cable or rope by which the carriage may be elevated or lowered; C C, the guides between which the carriage travels on its ascent and descent; D D, the hatchway-framing at the floors E F of the building, and G the hatchway-door provided at each floor and hinged at one edge, as at *a a*, in order that it may be readily opened and closed at will.

Upon that side of the elevator-shaft adjacent to the hinged edge of the door G is pivotally secured the lever H, having the substantially vertical extension or arm I, whose convex edge J operates as a cam and is engaged by the small grooved wheel L, secured to the carriage during the ascent and descent of the latter. The lever H is provided with a downward extension or arm M, whose lower end is pivoted to the upper end of the link N, the lower end of which is secured to the lever P, as illustrated in Fig. 1. The lever P is pivoted at its end *b* to the wall of the elevator-shaft and at its other or free end is secured to the upper end of the connecting-arm Q, the lower end of which is attached to the door G at a point suitably removed from the edge thereof to insure the proper opening and closing of the door under the action of the leverage mechanism. Upon the wall of the elevator-shaft is provided the confining and guide plate R, which preserves the proper relation of the lever P with the wall of the elevator-shaft and insures the proper direct reciprocation of the end of said lever when the mechanism is actuated.

Upon the upper end of the carriage A is



furnished the projection or cam S, of any suitable form or construction, adapted to press against the lower surface of and open the door G on the ascent of the carriage.

5 During the ascent of the carriage A the projection S thereon presses against and opens the door G, as indicated in Fig. 2, and after the carriage has moved upward sufficiently far to bring the roller L to the upper edge of the open door said roller engages the cam-  
10 edge of the lever-arm I and by its pressure thereon prevents the door from immediately closing as soon as the carriage has passed it. Upon the continued ascent of the carriage,  
15 however, the weight of the gradually-closing door draws the lever-arm I to its initial or substantially vertical position, the cam-edge of said arm constantly pressing against the roller L, this movement being gradual and  
20 governed by the movement of the carriage and the convexity of the cam-edge J. The door G is thus caused to close with a gradual regular movement after the carriage has passed beyond it. Upon the descent of the  
25 carriage the roller L comes into contact with the upper end of the lever-arm I, and by riding against the cam-edge of said arm turns lever H on its pivot and gradually opens the door G, in order that the carriage may have  
30 an unobstructed passage downward. As the carriage passes downward on its continued descent, the door closes after it, being sustained in its movement by resting on the projection or cam S.

35 Among the advantages of the lever mechanism above described it may be mentioned that the movement of the door is at all times under control, that the movements of the levers are lateral against the walls of the hatchway, and hence occupy the minimum amount  
40 of space, neither interfering with the movement of the carriage nor requiring the enlargement or cutting away of the elevator-shaft, and that when the door G is open the  
45 outer end of the lever P is adjacent to its upper end and in that position firmly holds the door completely open, so as not to interfere with or catch against the lower edge of the carriage during the descent of the latter.

50 The door G has provided upon its upper surface the slide T and wing V, the former to cover the cable or rope slot W and the latter the space X between the edge of the door and the framing D when the door is closed, the  
55 purpose of the slide T and wing V being when the door is closed to prevent all undue draft through the elevator-shaft. When the door is being opened the slide T moves from over the slot W, so as not to interfere with the rope  
60 B, and the wing V moves inward upon the door, thereby avoiding contact with the adjacent guide C, and during the closing of the door the slide and wing move back to their normal positions. The slide T and wing V  
65 are connected by the link d, pivoted at its center upon the door, and this link is connected

by a rod e with the framing or floor surrounding the door, said rod serving when the door is being opened to draw the end of the link d toward the hinged edge of the door and  
70 through said link to withdraw the slide T and wing V from over the slot W and space X, and when the door is being closed the rod e forces the link d outward and through it moves the slide T and wing V back to their  
75 normal positions. The hinged edge of the door G travels on a longer radius than the pivoted outer end of the rod e, and hence when the door is being opened said rod draws the inner end of the link d inward and during  
80 the closing of the door forces said end of said link outward. In order to secure due parallelism in the movements of the slide T and wing V, the links f f are provided, and they perfectly accomplish the result desired.

The lever mechanism on the ascent and descent of the carriage actuates the doors, and the movement imparted to the latter causes the slide T and wing V to have their simultaneous movements.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In an elevator-hatchway-operating mechanism, the lever H, pivoted at one end to the wall of the elevator-shaft and having at its  
95 other end the substantially vertical cam-extension I, said lever and cam-extension having their rocking movement on a plane parallel with the face of said wall, combined with the lever P, pivoted at one end to said  
100 wall and having its movement on a plane parallel therewith, mechanism, substantially as described, connecting said lever P with the lever H and with the upper surface of the hinged door, and the carriage provided with  
105 a projection or wheel L to engage said cam-extension I, substantially as and for the purposes set forth.

2. The lever H, pivoted to the wall of the elevator-shaft and having the cam-extension I to engage a projection or wheel on the carriage, combined with the lever P, also pivoted on the wall of the elevator-shaft, the link-connection between the said levers, the guide R for the lever P, and the arm Q, connecting the lever P with the door G, substantially as set forth.

3. The hinged door G, having the sliding wing V, combined with the link d, pivoted to said door and said wing, and the rod e, pivoted at one end to said link and the other end hinged to the framing surrounding the door, the relation of the hinged end of said rod e with the hinges of the hatchway-door being such that upon the door being opened  
120 the rod e and the inner end of the link d will be drawn toward said hinges, and thereby move the slide V inward upon the door, and during the closing of said door the rod e and the inner end of the link d will be  
125 forced in a direction from the hinged edge of the door and move the said slide V out-



ward, the whole being arranged and operating substantially as and for the purposes set forth.

5 4. The door G, having the sliding wing V and slide T, combined with the pivoted links *d f* and rod *e*, which connects the link *d* with the floor or framing surrounding the door and draws the said wing and slide toward each other or forces them farther apart, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 25th day of January, A. D. 1890.

WILLIAM BARDSLEY.  
WARREN K. CROFFORD.

Witnesses:

CHAS. C. GILL,  
E. D. MILLER.