(No Model.) 3 Sheets—Sheet 1.

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L. M. ASHENFELTER, Administratrix.

HANGING AND SLIDING DOOR.

No. 568,152. Patented Sept. 22, 1896.

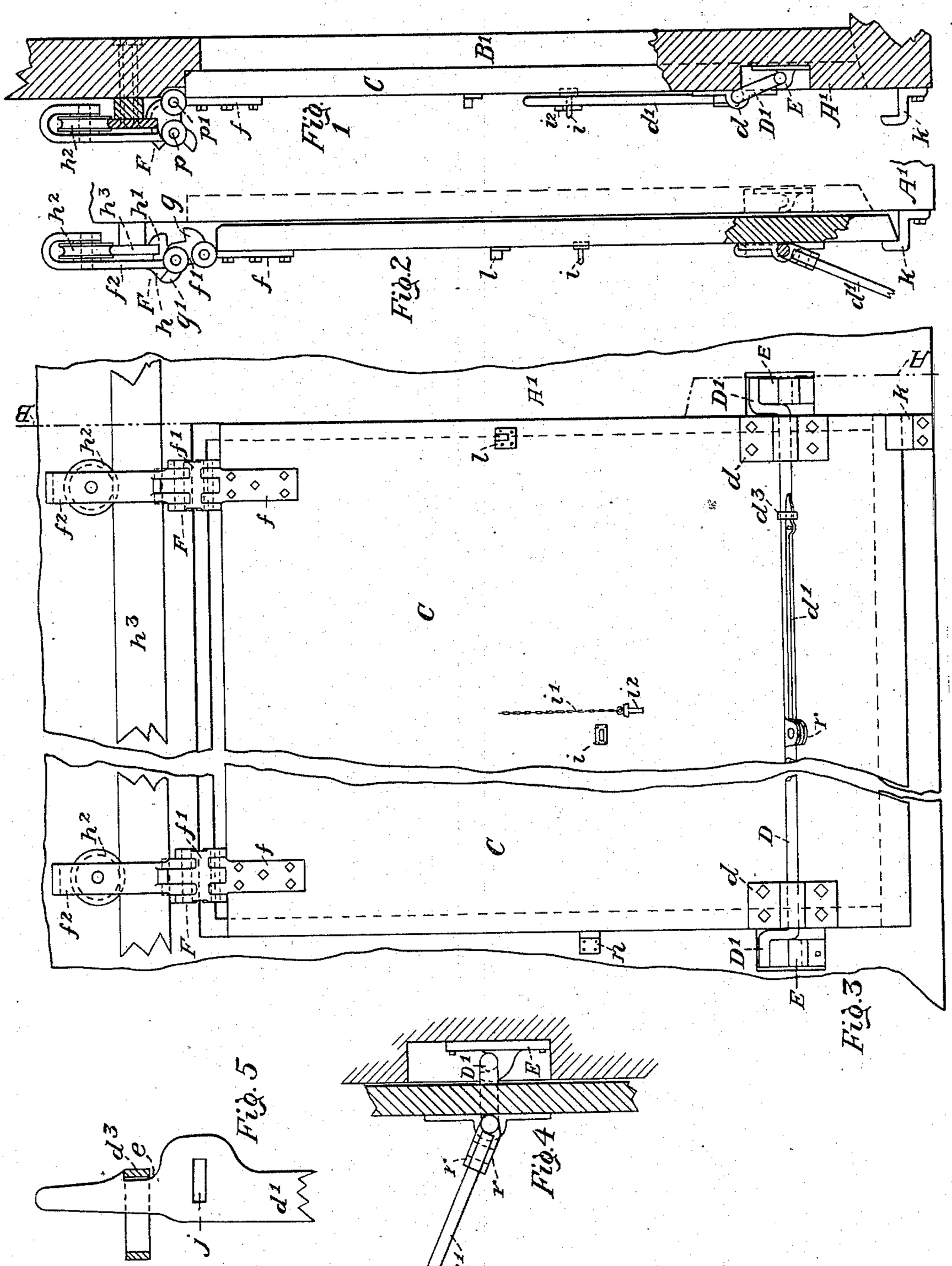

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

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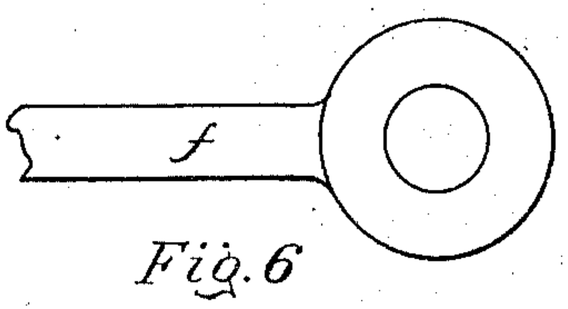

Fig. 6

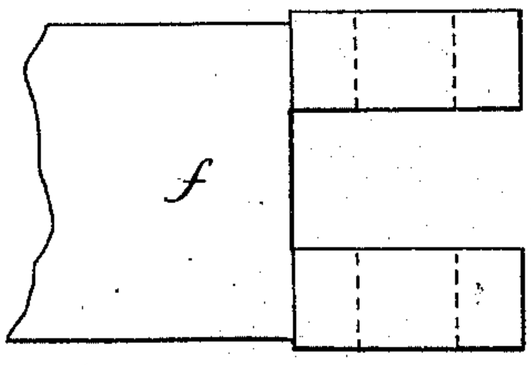

Fig. 7

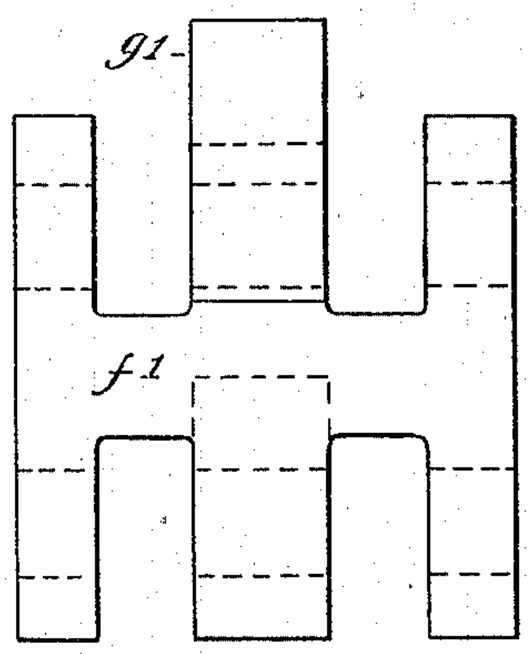

Fig. 8

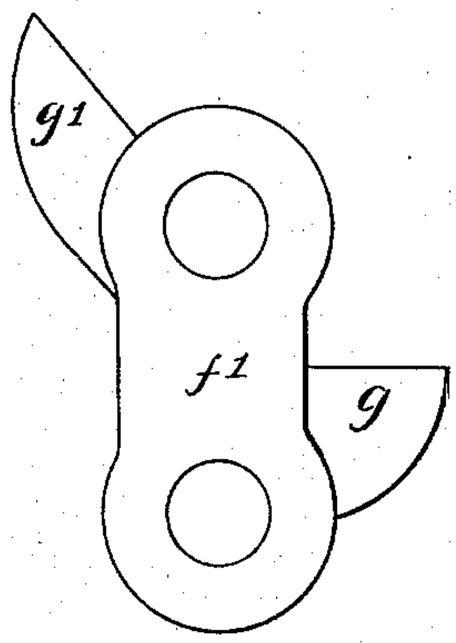

Fig. 9

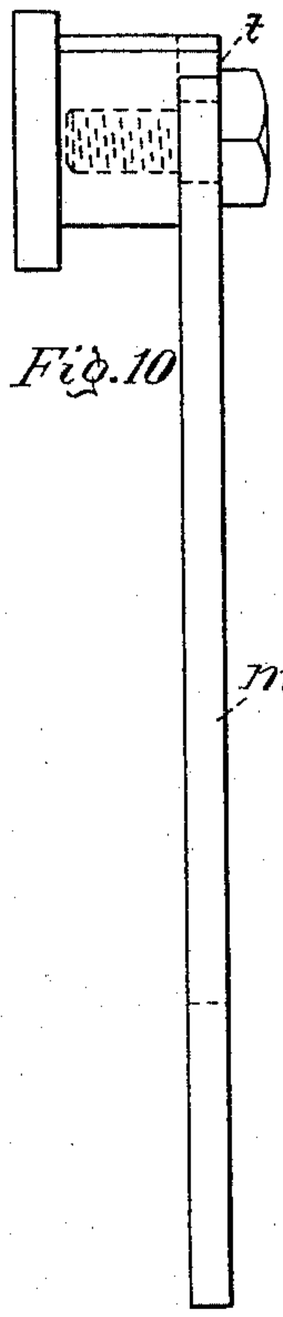

Fig. 10

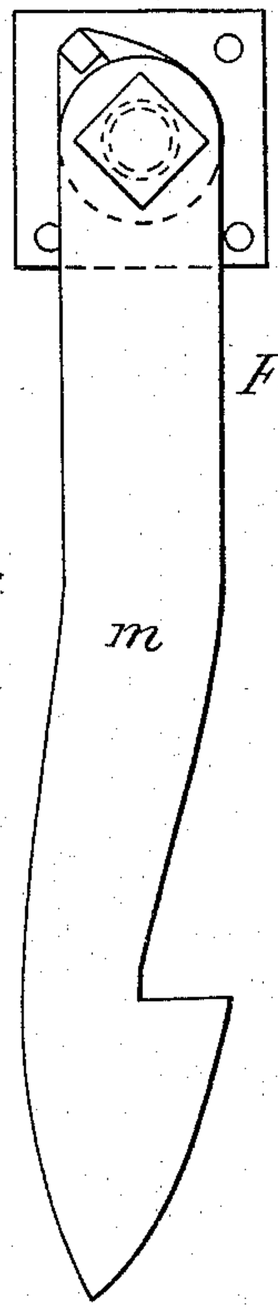

Fig. 11

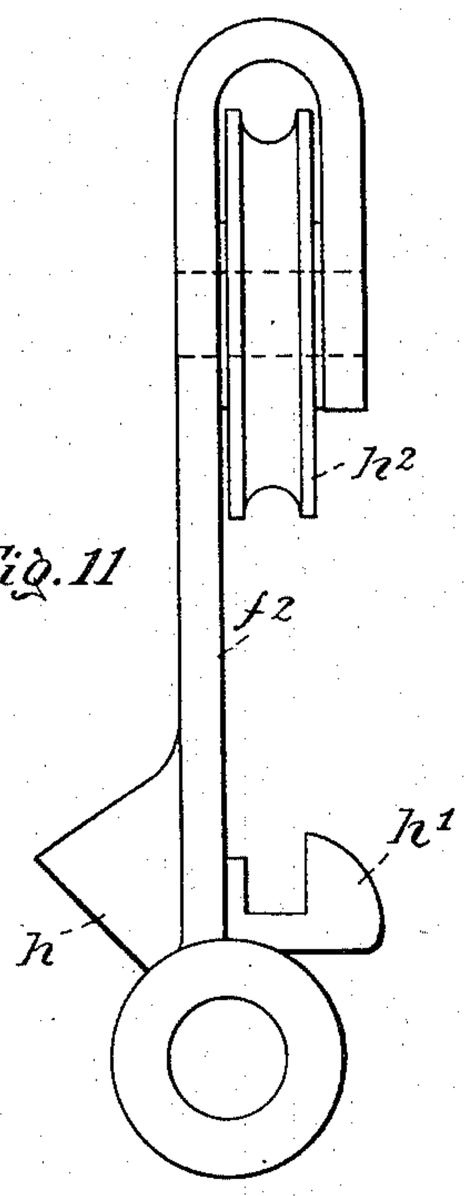

Fig. 12

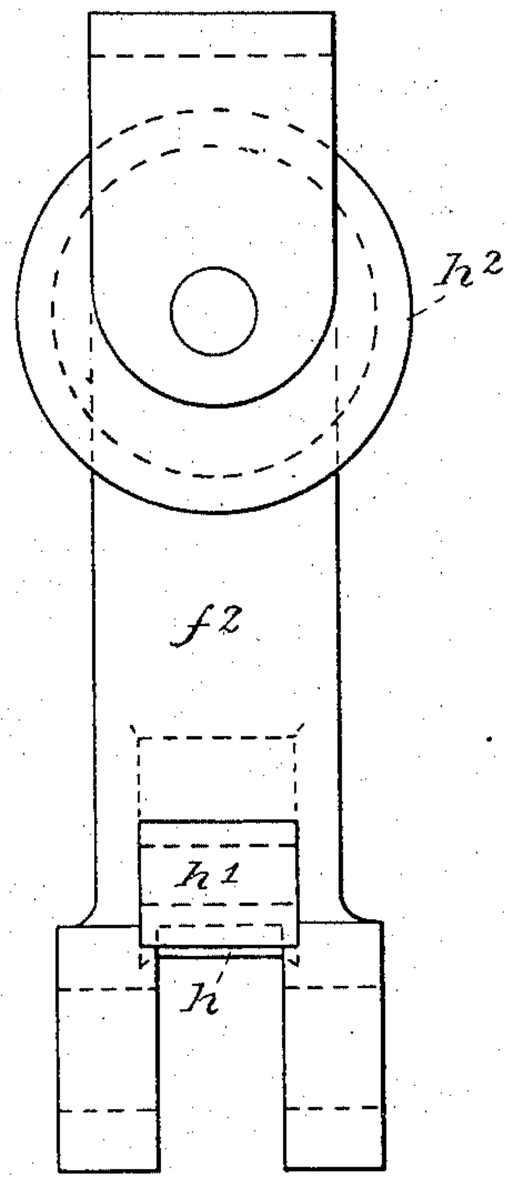

Fig. 13

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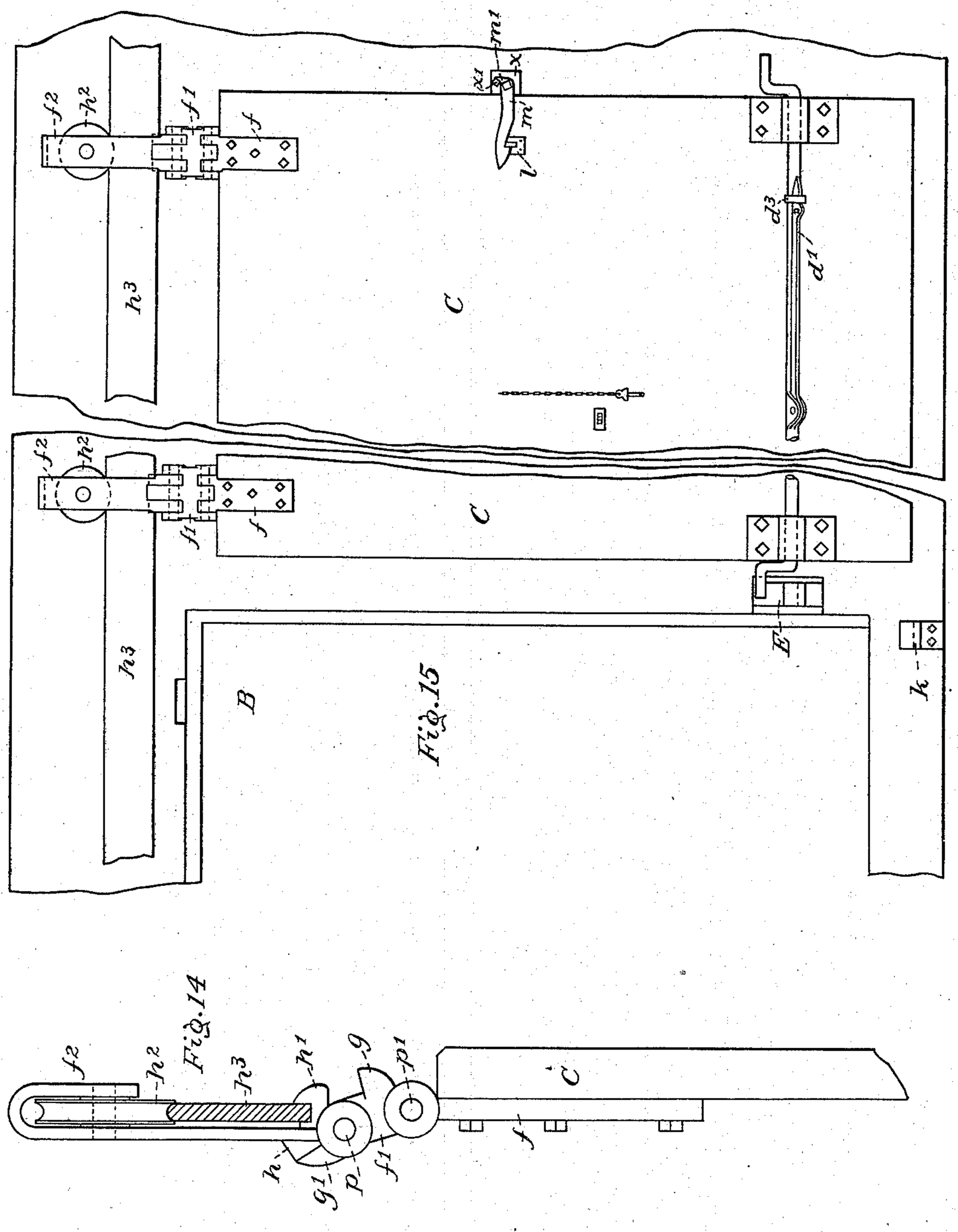

FIG. 15

FIG. 14

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UNITED STATES PATENT OFFICE.

HARRY C. ASHENFELTER, OF SPOKANE, WASHINGTON; LIDA M. ASHENFELTER ADMINISTRATRIX OF SAID HARRY C. ASHENFELTER, DECEASED.

HANGING AND SLIDING DOOR.

SPECIFICATION forming part of Letters Patent No. 568,152, dated September 22, 1896.

Application filed August 16, 1895. Serial No. 559,570. (No model.)

To all whom it may concern:

Be it known that I, HARRY C. ASHENFELTER, a citizen of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented a new and useful Freight-Car Door, of which the following is a specification.

My invention relates to improvements in car-doors which are suspended from overhead tracks by jointed suspension-hinges which operate in conjunction with a double-cranked rod and lever in closing the door into the car-doorway and that when so closed the door may be flush with the outer surface of the car; and the objects of my improvements are, first, to provide facilities whereby a more effective seating of the door is obtained; second, to provide means whereby the door can be more readily raised in shutting, and will open automatically upon releasing the operating-lever; third, to provide means whereby the door may be opened and closed when the car is placed beside a platform which would interfere with the operation of a raising and lowering lever if allowed to project radially from the operating-rod; fourth, to provide automatic means for locking the door open when clear of the doorway, and, fifth, to provide means whereby the door can be forced down and out of the doorway in case of its sticking therein. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation of a car on line A B of Fig. 3, showing the door closed and the position of the parts by which this is accomplished. Fig. 2 is an end elevation of part of a car, showing my door in position when out of the opening. Fig. 3 is a front elevation of same, showing the car and door with a part broken out. Fig. 4 is a detailed sectional view of the crank and lifting-lever when about to operate in closing the door. Fig. 5 is a detail, on large scale, of the lever end and the securing-link. Fig. 6 is a side view, on large scale, of the door-plate of the suspension-hinge. Fig. 7 is a plan view of same. Fig. 8 is a plan view of the connecting-link of the suspension-hinge. Fig. 9 is a side view of same. Fig. 10 is a plan view of the locking-hook and stop-block. Fig. 11 is a side view of same. Fig. 12 is an end elevation of the wheel-frame of the suspension-hinge, showing the wheel or sheave. Fig. 13 is a rear elevation of same. Fig. 14 is a side elevation of my suspension-hinge on large scale. Fig. 15 is a side elevation of a broken portion of a car and door, showing the door open and the engagement of my hook and stop-block.

Similar letters refer to similar parts throughout the several views.

In the drawings, A represents a freight-car having a doorway B and provided with the suspension-track h^3, guide-brackets k, stop-block x, and locking-hook m, angle-stop n, and brackets E, which are set in recesses provided in the side frame of the doorway.

The door C, which fits in the doorway B, is suspended from the track h^3 by the hinges F and is provided with a crank-rod D, which turns in bearings d by means of a lever d', pivotally attached thereto between the ears r and adapted to shut upon the rod by means of such attachment, said rod provided with cranks D', set at an angle with the ears r and adapted to engage the brackets E and operate therein, and a link d^3, provided to engage the notch e in lever d' when the lever is lying longitudinally upon the rod. The lever d' is also provided with an elongated opening j, adapted to engage the pin-iron i when the door is closed, and is held in place by a pin i^2 entering through the pin-iron i in front of the lever d', as shown in Fig. 1. The pin i^2 is provided with a chain i' to prevent it being lost when removed from the pin-iron.

When the door C is moved longitudinally along the car by means of the sheaves h^2 operating on the track h^3 and is clear of the doorway B, the door is stopped by contact with the stop-block x and the locking-hook pivoted thereto engages the hook-iron l, which is fast to the door. This engagement is automatic by reason of the hook m being held in a horizontal position by the contact of the lug m' with the projection x', and as the door slides open the hook-iron l engages the lower edge of the point and the hook drops over the hook-iron as the door strikes the stop-block.

Thus any rebound of the door which may be caused from a sharp contact with the stop-block is avoided and the door is secure from any sliding movement when left open during transit.

When desirable to close the door, the hook m is raised and the door can then be moved back along the track h^3 until opposite the doorway B, when it is stopped by the angle-stop n.

The suspension-hinge F (which I have termed the "connections" between the door and track) are composed of a door-plate f, wheel-frame f^2, and intermediate link f', which is pivotally connected to the plate f and frame f^2 by pivots p and p' and is provided with projections or lugs g and g', which I have termed the "pressure" and "position" blocks, respectively. When the door is opened down and clears the doorway B, the position-block g' engages a projection or angular lug h on the wheel-frame f^2 of the suspension-hinge F, and by this engagement the door is prevented from swinging the link f' to a vertical position, and the pivots p and p' are retained at an angle with the vertical position of the door, as shown in Figs. 2 and 14. As clearly indicated on the drawings, the lower pivot p' is slightly in advance of the upper pivot p when the door is open. This allows the link f' to operate instantly in closing the door and avoids what is commonly termed a "dead-center."

When the door is raised and almost closed into the doorway B by reason of the links f' operating upon the pivots p and p', the pressure-blocks g engage the lower portion of the inner side of the track h^3, and as the door is finally closed these pressure-blocks act on the rail in forcing the upper portion of the door firmly in place, thus preventing a loose seating of the door, which might occur by reason of the side play between the rail and guide-block h', which would prevent the links f' from seating the door snugly in place without my pressure-blocks. These pressure-blocks also prevent any material strain or pressure upon the wheel-frames f^2, which might be occasioned by heavy weights resting or falling against the inner side of the door when closed, the pressure-blocks g acting against the rail h^3, as indicated in Fig. 1.

The wheel-frame f^2 is provided with a guide-block h', a wheel or sheave h^2, and the angular projection h. The guide-block h' serves to guide the wheel-frame along the track and also to hold the door in a vertical position when the block g' comes in sharp contact with the angular projection h. It is obvious that a door dropping from the position indicated in Fig. 1 to that in Fig. 2 would acquire considerable force, and when the bottom of the door came in contact with the guide-bracket k the top portion of the door would have a tendency to buckle outward, and if not checked this force would throw the wheels or sheaves from the track. To avoid this the hook of the guide-block h' is provided, and engages the track h^3 on the inner side, as shown in Fig. 2. This guide-block also keeps the wheel from being lifted from the track when the door is raised in closing.

As hereinbefore described, the lever d' can be closed and locked upon the rod D. This provision is made to avoid all danger from the lever projecting and swinging when the car-door is open, the pivot attachments of the lever providing for the opening and closing of the door when the car is close to a high platform or bank, as will hereinafter be more fully described.

It will be noticed upon reference to Fig. 4 that the longitudinal center line of the lever d' is not in line with the center of the cranks D' D'. This angle is equal to that between the pivots p and p', occasioned by the contact of the blocks h and g' of the suspension-hinges F, the radius upon which the pivot p' operates being equal with the radius of the cranks. Thus the cranks D' operate in unison with the links f' in raising and closing the door and in maintaining it in a vertical position during the operation.

The angle of the cranks and lever also provides for the automatic opening of the door, as when the pin i^2 is removed from the pin-iron the weight of the door acting upon the cranks D' turns the rod D in its bearings and the cranks D' throw the door clear of the opening.

When desirable to close the car-door from the position shown in Fig. 3, when close to a platform or bank of earth, the crank-rod D is turned in the bearings d until the cranks D' engage the brackets E. The link d^3 is then slipped from the end of the lever d' and the lever is opened. (This position of the lever and cranks is shown in Fig. 4.) The lever is then pressed upward and the cranks D' operate in the brackets E, the hinges F operating as heretofore described, and the door is seated in the doorway, the cranks D' forcing the lower part of the door snugly in place. The opening j in the lever engages the pin-iron i, and the pin i^2 secures the lever in place.

If there be plenty of space at the side of the car in which to operate the lever, it may be opened from the crank-rod before the cranks engage the brackets E, and the lever employed during the complete operation of closing the door.

To open the car-door from the position shown in Fig. 1, when there is plenty of space at the side of the car, the pin i^2 is removed and the door allowed to drop by reason of its own weight and the angle of the cranks with the lever. The lower end of the door engages the guide-brackets k, and the door, cranks, and lever assume the positions shown in Fig. 2, when the lever can be locked upon the rod, as heretofore explained, and

the door shoved to one side and fastened in the position shown in Fig. 15, the guide-brackets *k* guiding the lower part of the door.

If the space be limited at the side of the car, the lever is employed to lower the door until reaching the position indicated in Fig. 4, when the lever is then closed upon the rod and the cranks are disengaged from the brackets, as shown in Fig. 3.

In case the door should bind in the doorway by reason of the swelling of the door or the swagging of the car, the cranks D′ are operated in the brackets E in a reverse direction to that in closing the door, and the door is forced open at the bottom, and, if still binding at the top, the cranks operate against the top of the recesses containing the brackets E, and the door is forced down and out of the doorway.

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

1. In car-doors; the suspension means thereof adapted to operate upon a track attached to a car or other structure and constituting a door-plate *f*, wheel-frame f^2 provided with angle-block *h*, and a link *f′* connecting said door-plate and wheel-frame and provided with the position-block *g′* adapted to engage the angle-block *h* when the door is open and the pressure-blocks *g* provided to engage said track when the door is shut, substantially as shown and described.

2. The combination with a car or other structure provided with an overhead track, guides *k*, and block *x* provided with projections *x′* and having a hook *m* pivotally attached thereto provided with an angular projection *m′* adapted to engage the projection *x′* in retaining the hook in a horizontal position; of a door provided with means of suspension adapted to slide on said track comprising a door-plate *f*, wheel-frame f^2 and a link *f′* connecting said plate and frame and adapted to lie at an angle with the vertical position of the door when open and to engage said track when closed, and with a hook-iron *l* adapted to automatically engage the hook *m* when stopped by the block *x* and operate therewith in sustaining the door in an open position, substantially as shown and set forth.

3. In jointed suspension means adapted to doors and having frames operating on overhead tracks, the pivotally-connected links thereof provided with means for engaging said track when said door is closed and with means for engaging said frames adapting said links to lie in an angular position with the vertical position of the door when open, substantially as shown and set forth.

4. In doors suspended from overhead tracks attached to cars or other structures the combination of the jointed suspension means thereof each comprising a wheel-frame f^2 provided with the angular block *h*, door-plate *f* and a link *f′* connecting said frame and plate and provided with the pressure-block *g* adapted to engage said track when the door is closed and with the position-block *g′* adapted to engage said block *h* when the door is open, with the rod D attached in bearings *d* and provided with ears *r* and a lever *d′* pivotally connected thereto and adapted to shut upon and open from the rod D and fasten thereupon by means of a sliding link d^3 engaging notch *e*, and cranks D′ set at an angle with said ears to provide for the more secure closing and automatic opening of the door and adapted to engage the brackets E attached in recesses provided in said structure, substantially as shown and set forth.

5. The combination with a car or other structure having a doorway C, and provided with recesses cut in the lower side portion of said doorway, brackets E attached in said recesses and a suspension-track h^3 over said doorway, of a door suspended from said track by hinges F adapted to swing the door in and out of said opening each comprising a door-plate *f*, a wheel-frame f^2 provided with the angular block *h*, and a link *f′* connecting said plate and frame and provided with the pressure-blocks *g* adapted to engage the track h^3 when the door is closed and with the position-block *g′* resting against the block *h*, of the wheel-frame, when the door is open retaining the link at an angle with the vertical position of the door, said door also provided with the crank-rod D operating in bearings *d* and having cranks D′ and ears *r* set at an angle therewith and provided with a lever adapted to shut upon the rod D and a link d^3 providing for the locking of the lever upon the rod by engagement with the notch *e*, said lever also adapted to open from the rod when the crank D′ engages the brackets E and to raise the door into the doorway B and provided with a slot *j* to engage the pin-iron *i* being held in a vertical position by the pin i^2 passing through an aperture in said pin-iron, substantially as shown and set forth.

6. In jointed suspension means providing for the suspension of a door from an overhead track attached to the side of a car or other structure; the pivotally-connected links thereof adapted to lie at an angle with and sustain the door in a vertical position when open providing thereby for the instant operation of the links when closing the door by avoiding a dead-center between the pivotal connections thereof, and when closing to engage the overhead track and operate thereon in securely seating the door and resisting pressure upon the inside of the door, substantially as shown and set forth.

7. The combination with a car or other structure having a doorway C provided with recesses cut in the lower side portion thereof brackets E attached in said recesses, a suspension-track h^3 over said doorway, guide-blocks *k* below said doorway an angle-stop *n* at the edge thereof and a stop-block *x* and horizontal locking-hook *m* attached to the side of the car; of the door C provided with

the pivoted suspension means operating on said track, constituting a door-plate attached to said door, a wheel-frame operating on said track and provided with a guide-block h' and angle-block h, and a link f' connecting said plate and frame and provided with a position-block g' adapted to sustain the link at an angle when the door is open by engagement with said angle-block h and a pressure-block adapted to securely seat the door when closed; crank-rod D operating in bearings d and having ears r containing a lever d' adapted to shut upon the rod D, a link d^3 providing for the locking of the lever upon the rod by engagement with the notch e, when the door is open and the cranks D′ set at an angle with the lever and adapted to engage the brackets E when the door is stopped in position by the angle-stop n and to raise the door into the doorway B and provided with a slot j to engage the pin-iron i and locked in position by a pin i^2 passing through an aperture in said pin-iron; and a hook-iron l fastened to said door and adapted to raise the hook m and engage therewith when the door is opened and stopped by the stop-blocks x; substantially as shown and set forth.

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