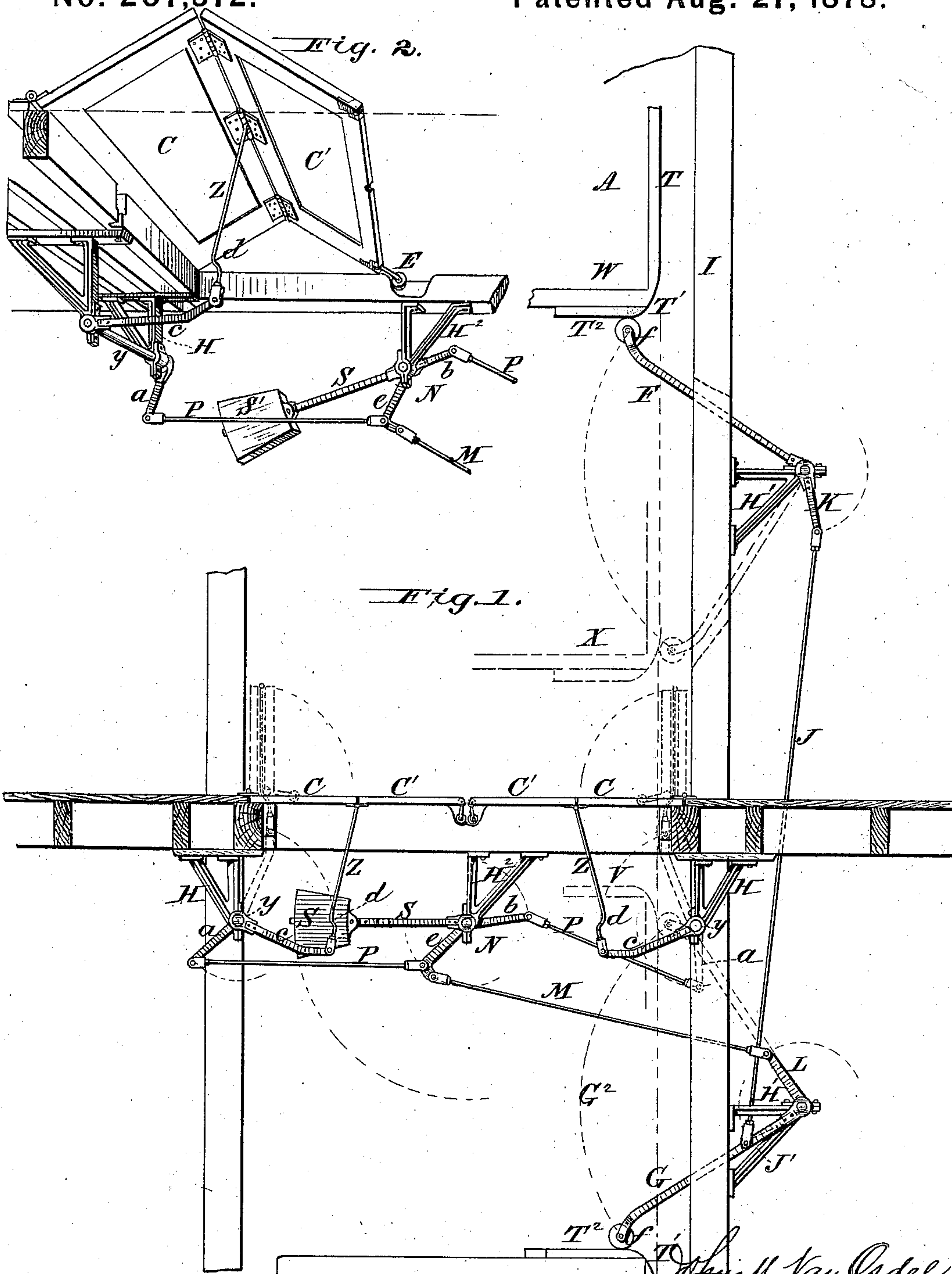


J. M. VAN OSDEL.
Hatchway.

No. 207,572.

Patented Aug. 27, 1878.



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Inventor.
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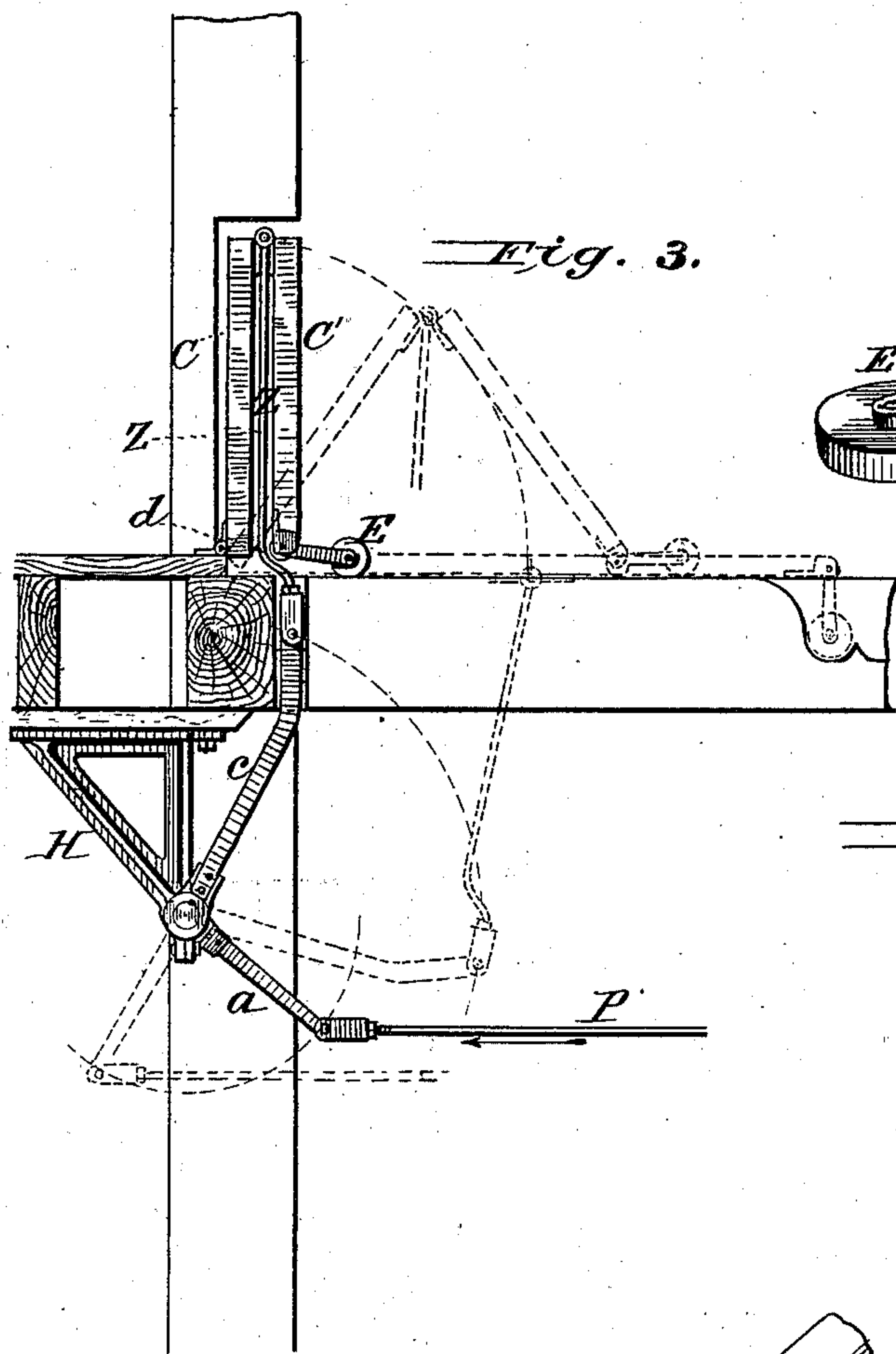


Fig. 3.

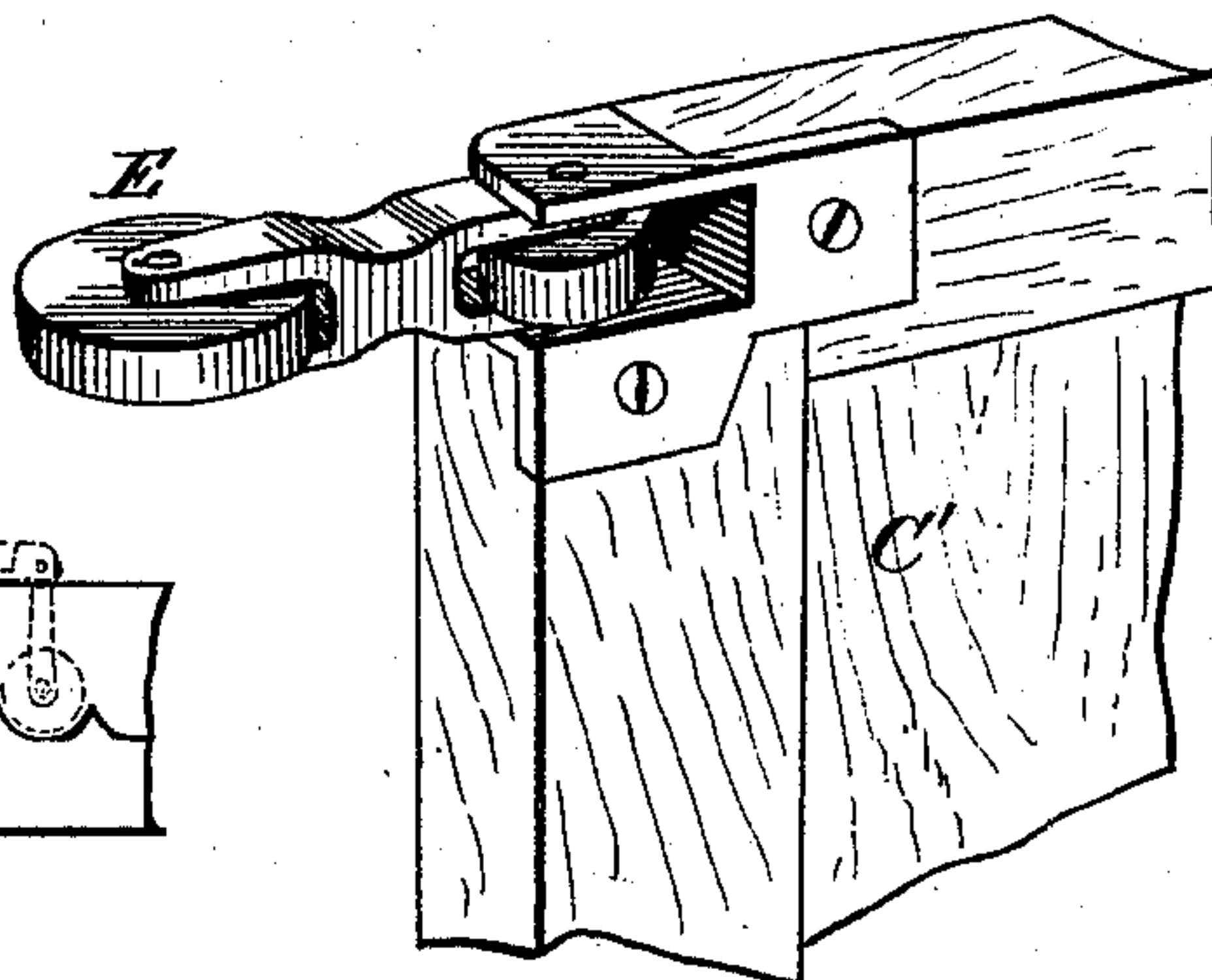


Fig. 4.

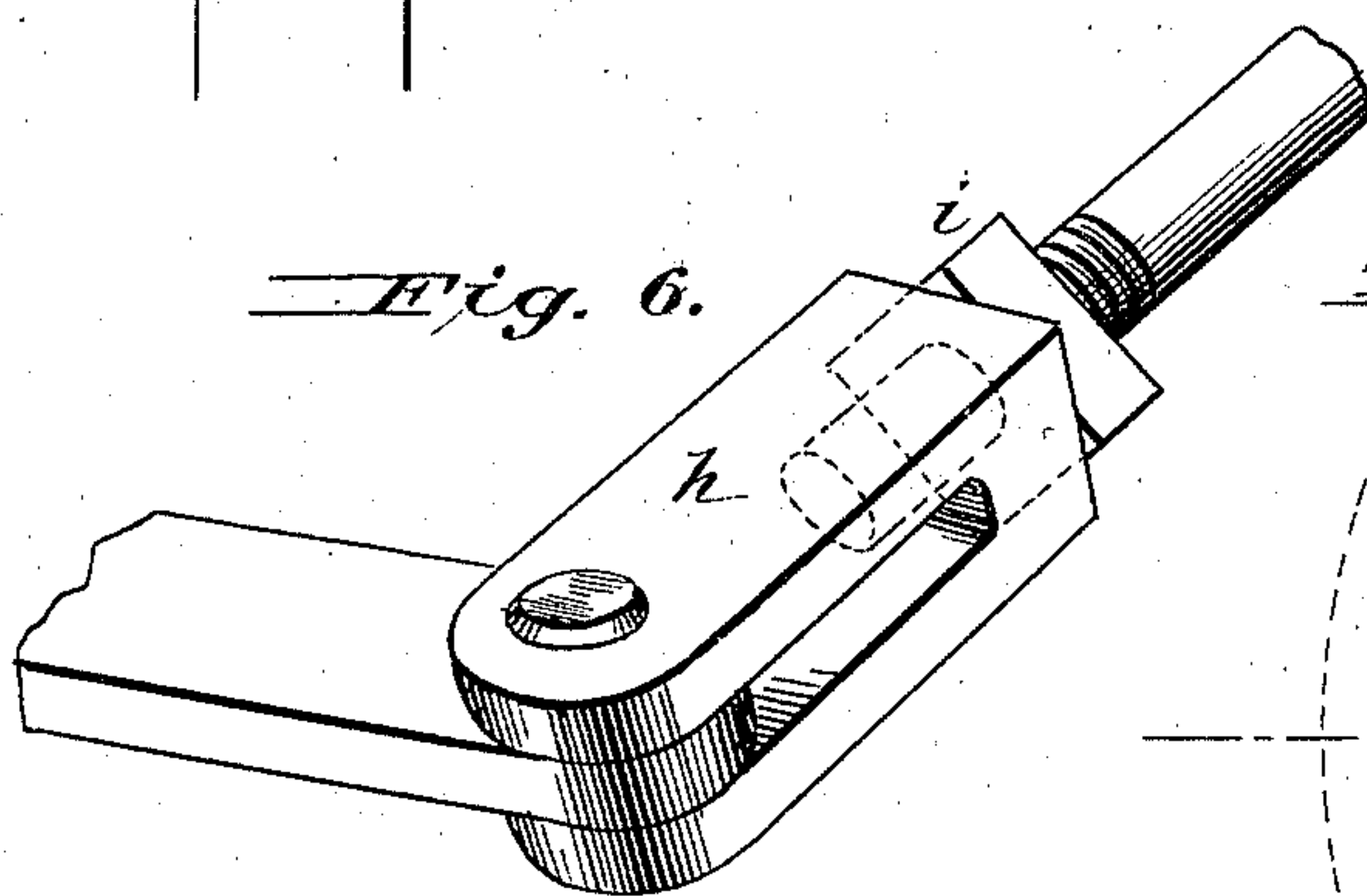
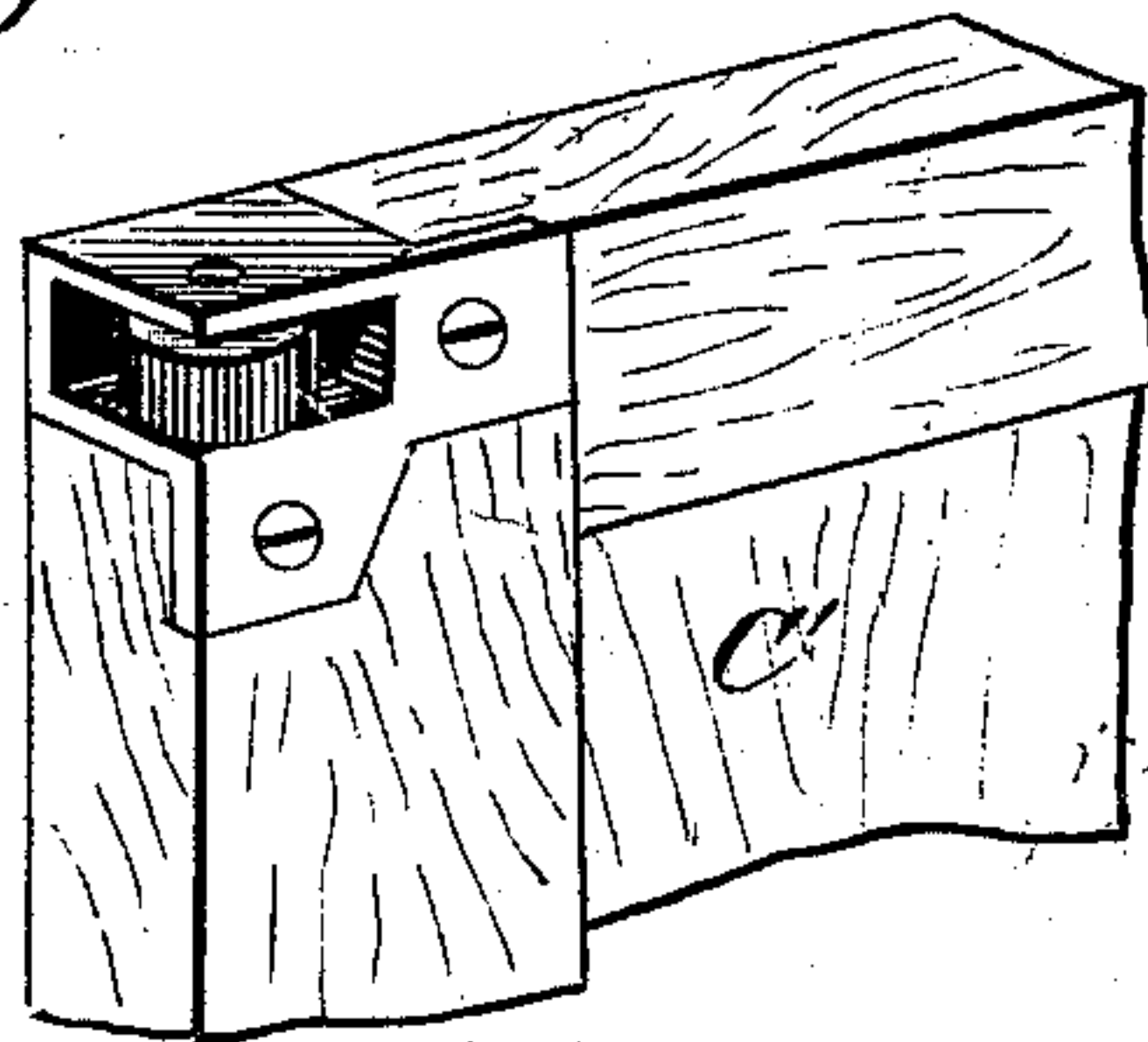


Fig. 6.

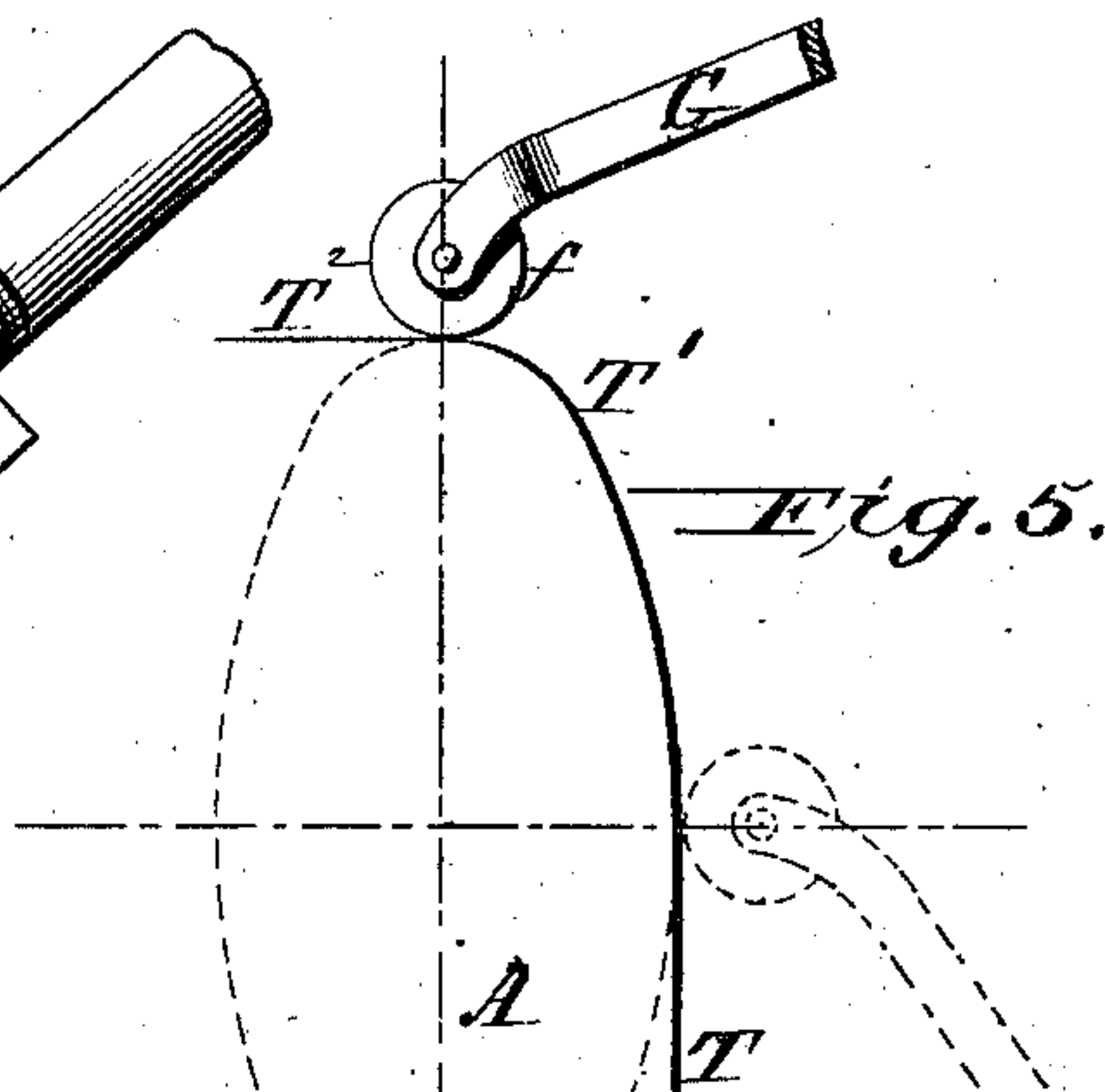


Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN M. VAN OSDEL, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN HATCHWAYS.

Specification forming part of Letters Patent No. **207,572**, dated August 27, 1878; application filed July 27, 1878.

CASE C.

To all whom it may concern:

Be it known that I, JOHN M. VAN OSDEL, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Self-Closing Hatchways for Elevators; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

In the construction of self-closing hatchways for elevators it is often desirable to adapt the opening and closing mechanism with special reference to the use of such hatchways in business-houses so that the elevator-car can be loaded and unloaded from opposite sides. To obtain this advantage I have arranged and adapted the operating mechanism so as to leave a clear passage-way across the platform of the car. The arrangement of primary levers, operating with long sweeping movements, in combination with a car bearing-way of peculiar construction, for opening and closing the doors, of two hinged leaves each, and provided with leading-rolls, to start and lead out the flap-leaves, is substantially the same as in two separate patents, Cases A and B, granted to me, bearing even date herewith; but in these the advantages of my present invention cannot be obtained by reason of the arrangement of the operating devices above the hatchway.

The invention herein consists in the arrangement and adaptation of the mechanism for operation beneath the doors, leaving the way clear above and across the platform of the car at the hatchway.

In this new arrangement of the operating mechanism the doors, of two sections of two hinged leaves each, are opened by upward-operating push-bars, connected with and controlled by the movements of the primary levers, whereas in my said patents the doors are lifted or pulled up from above to open them. This difference involves in this patent a new method of opening the doors, while maintaining the important advantages of requiring little force to open them and without noise.

Referring to the drawings, Figure 1 repre-

sents a vertical section of a portion of the shaftway of an elevator, with one set of doors in the position as closed, the operating devices connected therewith, and a part of the elevator-car A in the position it occupies below the doors, as at U, to open them in ascending, or to allow the doors to close in its descent, while the elevator A (shown above the hatchway as at W) is in the position it occupies after closing the doors in its ascent, or in the position it occupies to commence opening the doors in its descent; Fig. 2, a perspective, looking from below, the doors covering one-half of the shaftway, and showing the doors partly opened by the action of the upward-push bar; Fig. 3, a detail section enlarged, showing one section of the doors folded open by the push-bar, which lies between the folded leaves; Fig. 4, a detail of the leading-roll of the flap-leaf of the doors and of the supporting-rolls thereof enlarged; Fig. 5, a detail, enlarged, of a part of the bearing-way of the elevator-car, showing the point of impact of the horizontal plane T² upon the roll end *f* of the lower primary lever to open the doors, the form of the curves to give a variable movement in opening, and, by dotted lines, the bearing of said lever upon the vertical plane of said bearing-way to hold said doors open; and Fig. 6, a detail of the screw-coupling lock-nut connection for the several parts, for making their proper adjustments to determine the opening and closing of the doors and the equal bearing of the primary levers upon the elevator bearing-way.

In the drawings one of the hatchways is shown, the guide-posts for the elevator being omitted, and in which I represents the post to which the primary levers are secured and through slots in which they operate.

So far as the construction, arrangement, and operation of the devices herein are identical with my said patents, it is deemed unnecessary to specifically describe such parts in this patent.

While the connections of the primary levers are such as to operate them toward and from each other in long sweeping movements, and to balance each other, as in my said patents, there is, however, an important difference arising from the connection of the secondary lever with the over primary lever in the pres-

ent invention, whereby the rod J has a pulling action only by the weight of the upper primary lever pulling upon the lower primary lever, so that said rod has no pushing action, as in said patents. This is effected by connecting said rod J direct to the lower primary lever at a point, J', Fig. 1, intermediate between its axis-pin and its roll end, and making the connection of said rod with the axis-pin of the upper primary lever by the secondary lever K, whereby the weight of the upper primary lever constantly pulls upon the lower primary lever and is balanced thereby, whereas in my said patents the rod J alternately pushes and pulls. This connection causes both said primary levers to move simultaneously in opposite directions, to effect, through the intervention of the movements of the elevator bearing-way, the proper movements of the doors.

The devices connecting the doors with the primary levers are suspended by hangers H from the under side of the floor-timbers, so as to bring such devices beneath the hatchway, while the levers are mounted upon brackets H¹ outside of post I. A two-armed secondary lever, N, is mounted upon the central double boxed bracket H², and from one of its arms, e, a connecting-rod, M, leads to a secondary lever, L, Fig. 1, on the axis-pin of the lower primary lever. This gives the connection of the primary levers with the counterpoise S', the carrying-arm S of which, being fixed to the axis of the central two-branched lever N, is controlled in its movements by the primary levers.

For the purpose of bringing the connected pushing-bars Z Z, by which the doors are opened, near the centers of the length of said doors, rock-shafts y (shown more clearly in Fig. 2) are suspended in hangers H H to the floor-timbers, or in boxes attached to the vertical parts of the hatchway; and these rock-shafts are connected, by elbow-levers c c, to these push-bars, and by secondary levers a a, Fig. 1, to rods P P, one of which is united to the secondary lever e and the other to a similar lever, b, fixed to the axis-pin of the counterpoise. This gives the connection of the rock-shafts with the push-bars, the counterpoise S, and with the primary levers through the connecting-rod M and the secondary lever e, and thereby operate the rock-shafts y y and push-bars in unison with the movements of said primary levers. The rock-shafts carry at one end an elbow-arm, c, which connects by pivot to the lower end of the push-bar Z, the upper end of which terminates in an eye, to make the connection with the axis-pin of the folding hinge of the doors, as shown in Fig. 2.

It will be noticed that the positions of the rock-shafts y are outside of a vertical line drawn through the hinges of the outside leaves of the doors, as shown in Fig. 3, in order that the center of gravity of the doors, when in vertical positions, will be inside of the line of the shafts, so that the weight of the doors will

cause the rock-shafts to partially revolve in the closing movements of the doors. The position of the arms c c when the doors are opened requires the elbow-bend, so that the upper ends of said arms c may rest vertically against the frame-work, as shown in Fig. 3.

The push-bars Z are curved at d at their lower ends, to allow them, when the doors are pushed open, to pass over the angle of the frame-work and upward between the folded doors.

As in my patent, Case A, referred to, the primary levers are operated by a bearing-way arranged vertically near one corner of the elevator, and having a long vertical plane, T, with end curves T¹, of quarter-ellipses in form, and terminating in horizontal planes T² at the top and bottom of the elevator.

In the drawings, A represents a portion of the elevator-car, and in which U, Fig. 1, designates the top horizontal plane T² of the bearing-way in position to act upon the roll f of the lever G, to commence opening the doors in the upward movement of the elevator, and which completes such movement when it reaches the dotted lines at V, the end of the primary lever having passed through the curved dotted line G², giving a long sweep and an extended movement of the lever in opening the doors. This action of the lower primary lever releases the upper primary lever of the weight of the lower one, and allows the former to descend by its own gravity to the dotted position shown at X. This movement of the lower primary lever sets in motion the devices for opening the doors. In the ascent of the elevator-car through the elevator-way, the vertical bearing-plane T engages the roll end f of the upper primary lever, and retains it until the elevator reaches the point X, when said roll end of the upper primary lever passes around beneath the lower curved end of the bearing-way, and rests against the lower horizontal plane. The gravity of the doors and the connecting-rod J keeps the roll in contact with this plane in its upward movement, and thus allows the doors to close as fast as the elevator moves. In the descending movement of the elevator, when it arrives at the point W it comes in contact with the roll end f of the upper primary lever and depresses it to the point X. This movement raises the connecting-rod J, and with it the lower primary lever, G, which gives motion to the door-opening devices, as in the ascent of the elevator, and, having thus opened the doors, passes through, bringing the vertical plane of the bearing-way in contact with the lower primary lever, and thus holds the doors open until the top of the elevator-car reaches the dotted lines V, where the roll end of said lower lever passes round the curved end and upon the upper horizontal plane, and follows it down to the point U, thus allowing the doors to close, corresponding to the movement of the elevator.

The several connecting-rods are made adjustable to effect the exact arrival of the doors

to their stationary points simultaneously, while the primary levers should be adjusted to give equal bearing upon the bearing-way of the elevator. This is obtained by right and left screw-threads on the ends of the several connecting-rods adapted to fit into screw-threaded couplings *h*, and, when so adjusted, to be locked by means of lock-nuts *i*, as shown in Fig. 6.

If the elevator is arranged for a fast movement, the primary levers are made of greater length than is required for a slow-moving elevator. The quarter-ellipse form of the end curves of the bearing-way slows the final movement of the doors in opening, and allows the doors to commence their closing movement with a slower speed, and thereby maintain the proper contact of the roll ends of the primary levers with the bearing-way, and prevent the elevator from running away from them.

The doors are adapted for either a side or corner-post elevator, and the guideways are arranged in the frame-work in the usual manner.

The several dotted curves show the equal arcs described by all the parts indicated in the opening and closing movements of the doors.

The counterpoise is made adjustable upon its arm to effect the perfect closing of the doors.

The door-flaps are provided with notches, to allow the elevator-cable to pass between them when closed.

In the operation of the primary levers it will be noticed that one of the horizontal planes acts first upon one of said levers to open the doors, while the action of both of said levers upon the vertical plane holds the doors open, with the ends of said levers at the limit of their movement toward each other. The counterpoise balances the movements of all the doors by positive connections. The functions of the leading-rolls *E* and the supporting-rolls of the door-flaps are illustrated in Figs. 1, 2, and 3. As in my said patent, Case B, the upper primary lever is so connected by the rod *M* to the two-armed lever *N* as to form a safety attachment, so that in the event of the accidental falling of the elevator-car from any cause this safety-point will give way and free the primary lever from operating connection with the doors, and thus leave the doors closed and arrest the falling of the elevator; but this

severance can only occur by the sudden falling of the elevator, as this connection is not otherwise subject to any strain or force sufficient to endanger its separation under the working of the elevator.

I claim—

1. The mechanism for opening the doors, consisting of the push-bars *Z Z*, connected with the primary levers by intermediate devices and a counterpoise, arranged for operation below the hatchway.

2. In self-closing hatchways for elevators, the push-bars *Z Z*, hinged centrally to the doors *C C'*, and operated by rock-shafts *y y*, connecting with the counterpoise and the operating-levers, substantially in the manner and for the purpose stated.

3. The separate push-bars *Z Z*, having the bends *d*, connected to the joint of the folding-leaves *C C'* and to the ends of separate elbow-levers *c c*, in combination with separate side shafts *y y*, the arms *a a*, the connecting-rods *P P*, the intermediate arms *b e*, and the rod *M*, making the connection of these several parts with the primary operating-levers, all constructed and adapted to allow the elbow-levers and the push-bars to fold against and over the hatchway-sills.

4. The rock-shafts *y*, arranged below the doors and outside of a vertical line drawn through their outside hinges, *d*, in combination with the elbow-levers *c* on said rock-shafts and the push-bars connected with said doors, as stated.

5. The combination, with the primary levers connected by the rod *J*, as stated, of the rod *M*, the central two-armed lever *N*, the counterpoise *S*, the rock-shafts *y y* and their connections with said lever *N*, and the doors, of two hinged leaves each, all constructed and adapted for operation substantially as described.

6. The push-bars *Z Z*, connected, arranged, and operated to stand between the doors *C C'* when folded vertically.

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

JOHN M. VAN OSDEL.

Witnesses:

A. E. H. JOHNSON,
J. W. HAMILTON JOHNSON.