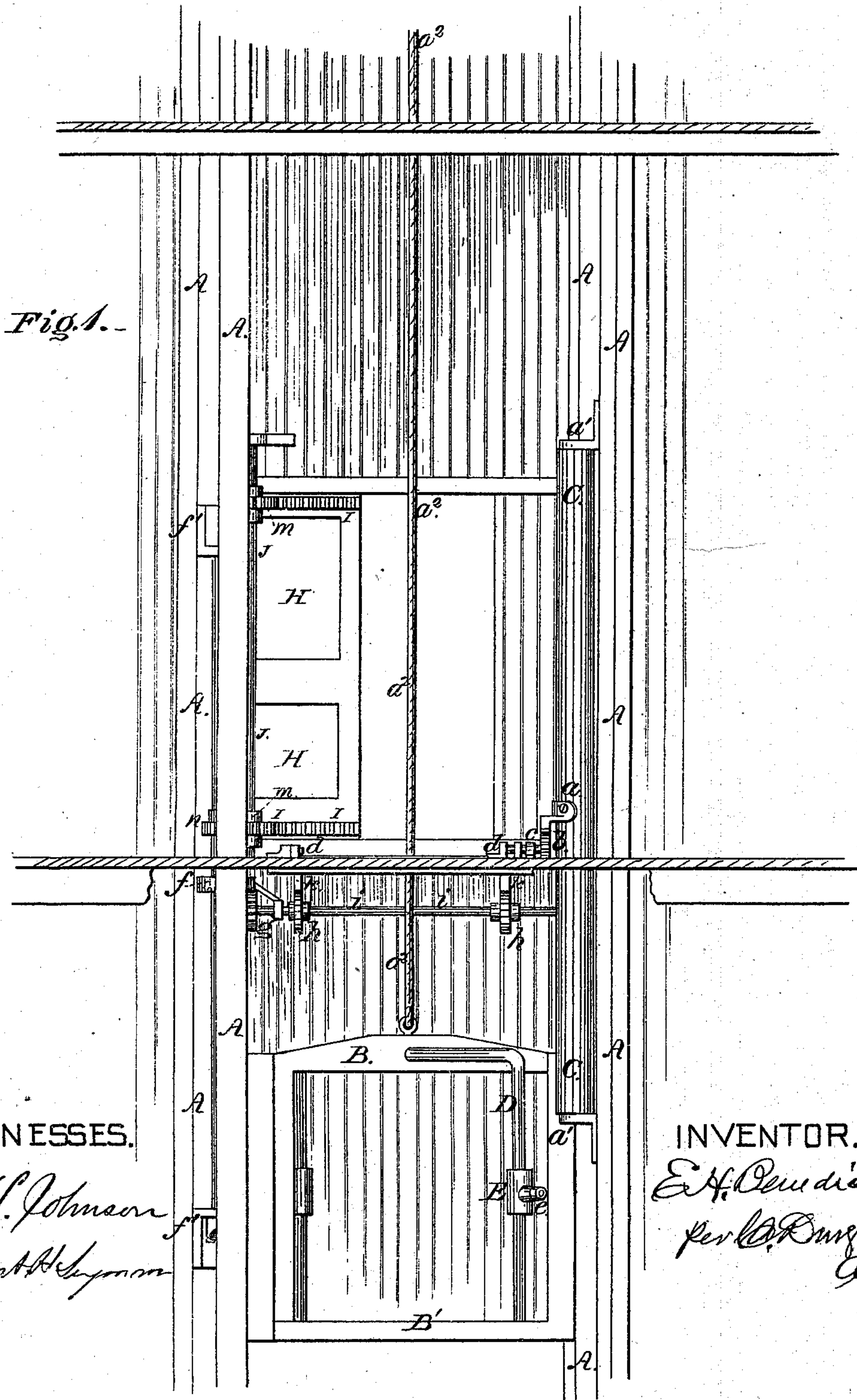


E. H. BENEDICT.
Hatchway-Protectors.

No. 146,799.

Patented Jan. 27, 1874.



WITNESSES.

E. N. Johnson
Robert H. Johnson

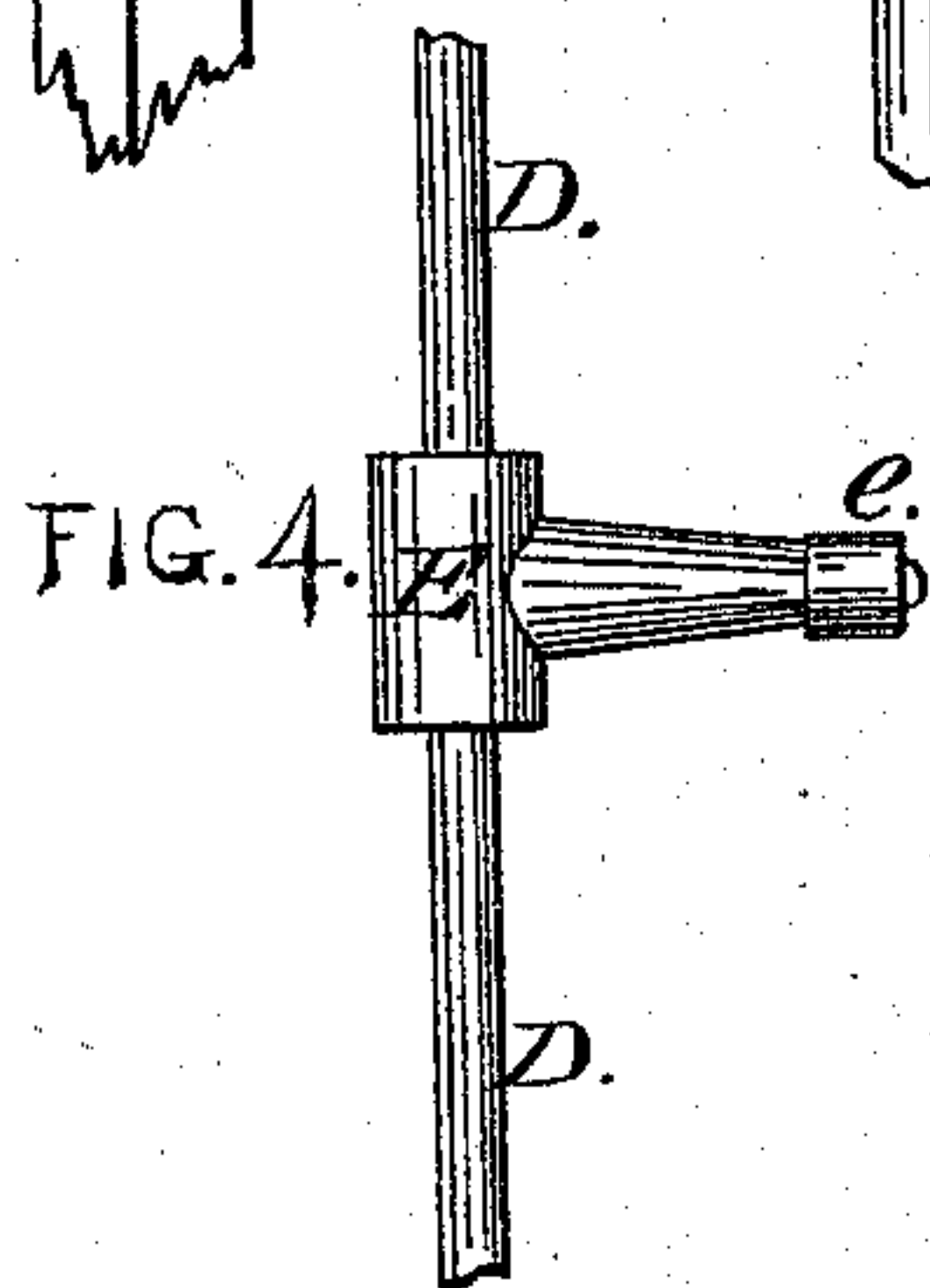
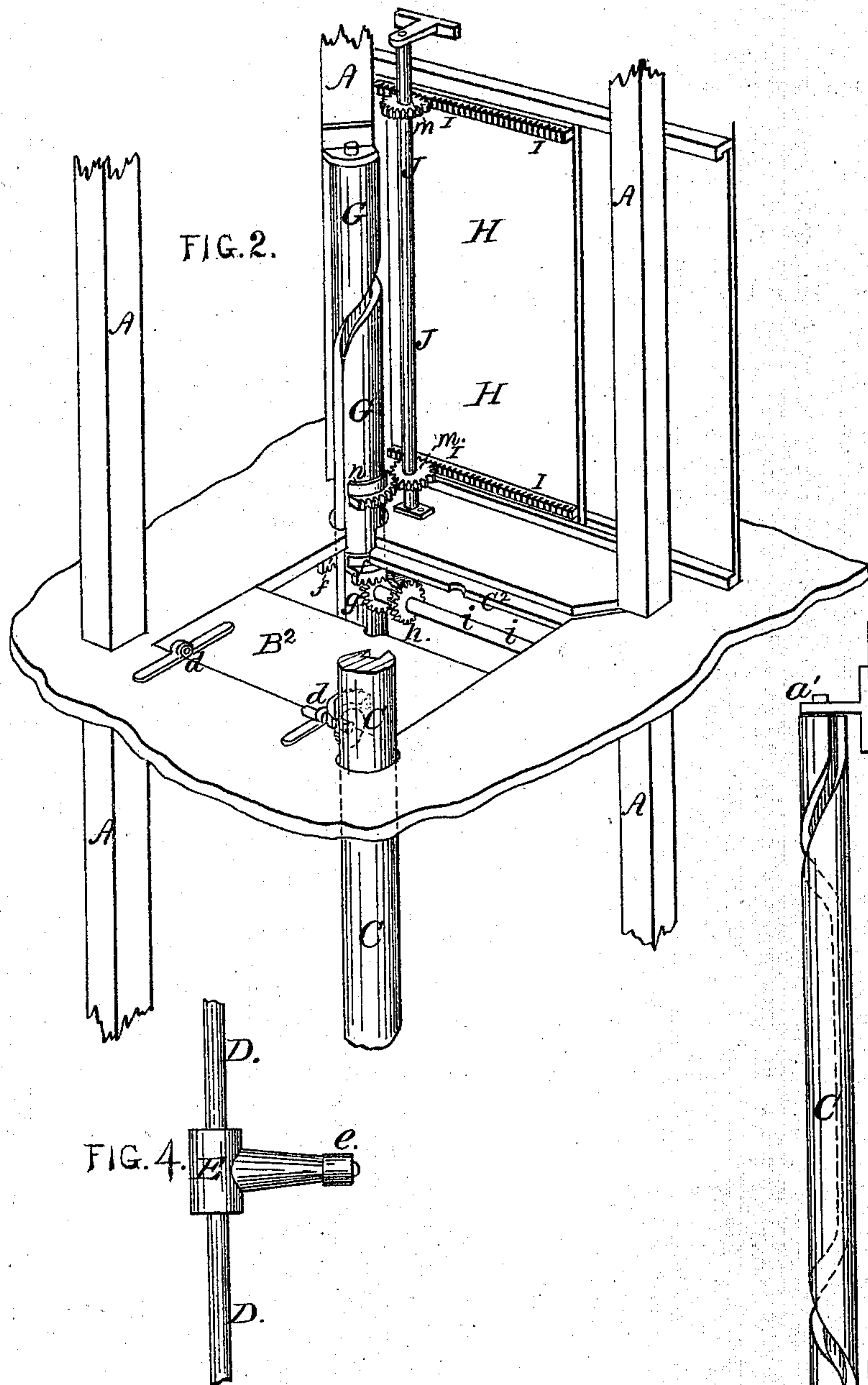
INVENTOR.

E. H. Benedict
Per C. D. Duggin
Att'y

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WITNESSES.

E. N. Johnson
Robert H. Seymour

INVENTOR.

E. H. Benedict
per [Signature] Atty

UNITED STATES PATENT OFFICE.

EDMUND H. BENEDICT, OF TREMONT, ASSIGNOR OF ONE-HALF HIS RIGHT
TO GEORGE H. CLARK, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN HATCHWAY-PROTECTORS.

Specification forming part of Letters Patent No. **146,799**, dated January 27, 1874; application filed
September 9, 1873.

To all whom it may concern:

Be it known that I, EDMUND H. BENEDICT, of Tremont, Westchester county, New York, have invented certain Improvements in Hatchway-Protectors, of which the following is a specification:

My invention relates to devices for preventing accidents occurring from open hatchways; and consists in a novel construction, combination, and arrangement of parts, which have for their object to produce a hatchway-protector more perfect in its action than has heretofore been made.

Figure 1 is a side elevation of a hatchway and elevator with my improvements attached. Fig. 2 is a perspective view of the same without the elevator. Figs. 3 and 4 are parts in detail.

A A represent the posts of the hatchway; B B', the elevator, guided in its travel by two of the posts diagonally opposite each other. The other two posts are provided with grooved cylinders C G, plainly shown in the perspective view. These cylinders or posts are pivoted, at either end, in bearings $a' a' f' f'$, secured to the posts A A, and are capable of turning on their pivots. The groove cut in these cylinders is plainly shown in the perspective view and Fig. 3. It will be seen that it commences at one extremity and turns, in a gradual spiral, partly around the cylinder, when it continues in a straight line to within some distance of the other extremity, where it again turns, in a similar spiral, to the other end, but in the reverse direction. The two uprights of the elevator adjacent to the posts carrying the cylinders are each provided with a projecting arm on the collar E, which arms carry on their outer extremity an anti-friction roller, e . The collar E may be provided with a set-screw for adjustment. H H represent a sliding door, provided at either end with a rack, I. J J is an upright shaft, carrying the pinions $m m$, which gear with the racks on the sliding door H. n is a segment of a pinion secured on the cylinder G, which meshes with the lower pinion on the shaft J. f is another segment of a crown-pinion, secured to the cylinder G below the flooring. $i i$ represent a horizontal shaft turning in proper bearings, and to which are secured

three pinions—one, g , which gears with the crown-pinion on the cylinder G, and two others, $h h$, which work in racks $k k$, attached to the under side of the horizontal sliding door C², which closes half the hatchway-opening. B² is a swing-door, which closes the other half of the hatchway-opening, is hinged to the floor at d , and operated by a segment of a crown-gear, a , attached to the cylinder C. This segment-gear meshes in a pinion, b , secured to a short spindle, on which the arm c , secured to the door B², is keyed. a^2 is the rope by which the elevator is operated.

The parts, being constructed and arranged substantially as described, will operate, to open and close the doors of the hatchway, as follows: The elevator, ascending the roller e on the arm projecting from the standard D, enters the groove in the roller G, and, in passing along the spiral portion of this groove, will turn the cylinder on its pivots. This motion of the cylinder will be communicated to the pinions $m m$ and g . The former will operate on the racks I I and open the door H, while the latter, operating the shaft $i i$, on which are secured the pinions $h h$, withdraws the horizontal sliding door C². The opposite arm now enters the groove in cylinder C, and, passing along its spiral portion, turns the cylinder. This motion will be communicated to the pinion b by the pinion a , and the door B² will be thrown up. The arms now run in the straight portion of the grooves and hold the cylinder stationary, but, on arriving at the upper spiral of the grooves, a repetition of the foregoing operation is had, only in the reverse direction, and the doors are accordingly closed.

The object of showing the mechanism under the flooring in the drawings, for operating the horizontal sliding door, is for the purpose of illustrating two different ways of operating the doors for closing the hatchway-opening—*i. e.*, this and the mode of operating door B²; but, in practice, instead of this sliding door, a hinged door, similar to B², can be arranged to swing downward, being operated by the pinion n on the cylinder G.

I claim—

1. The combination, with the platform B, provided with cams e , of the vertically-grooved

cam-shafts C and G, sliding doors H and C², and hinged door B², all arranged and acting, in co-operation with each other, substantially in the manner described.

2. In combination with the cam-shaft G and door H, the segment *n* and racks and pinions I I *m m*, or equivalents thereof, for automatically operating the door H, substantially in the manner described.

3. The combination, with the vertically-grooved cam-shafts C and G, swinging door B², and sliding doors H and C², of the segment

a, and pinion *b*, racks I I, pinion *m m*, and segment *n*, and racks *k k*, pinions *h h g*, and segment *f*, all constructed and operating, substantially as described and specified.

4. The doors B² C², combined with the rotating cam-shafts, arranged to open one above and the other below the floor, substantially in the manner described and specified.

EDMUND H. BENEDICT.

Witnesses:

E. H. JOHNSON,

HERMANN WENDT.