

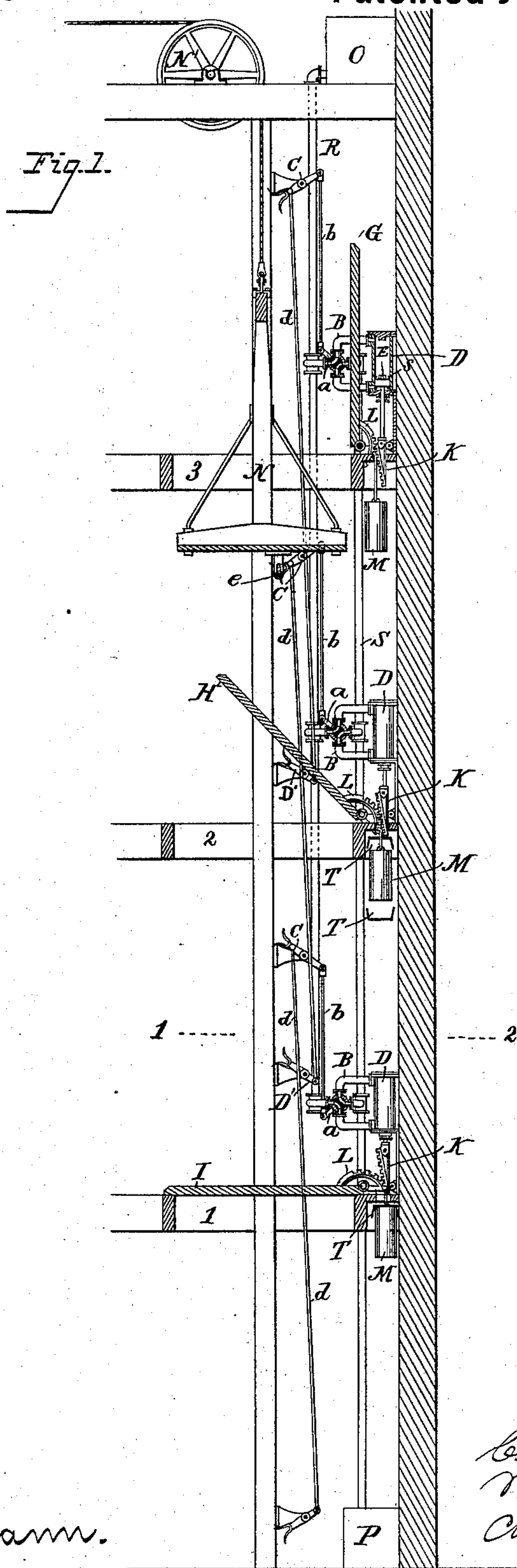
(No Model.)

2 Sheets—Sheet 1.

C. R. OTIS.  
Hatchway.

No. 242,968.

Patented June 14, 1881.



*Attest:*  
*Courtney A. Cooper,*  
*A. Hansmann.*

*Inventor*  
*C. R. Otis*  
*By his attorney*  
*Charles E. Foster*

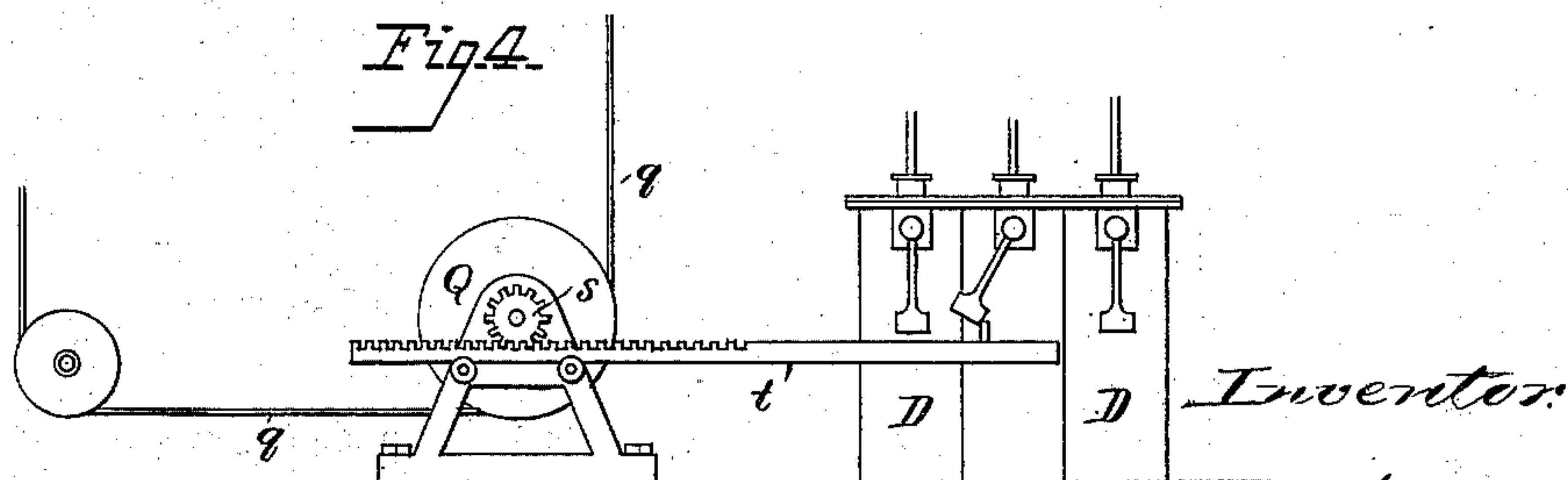
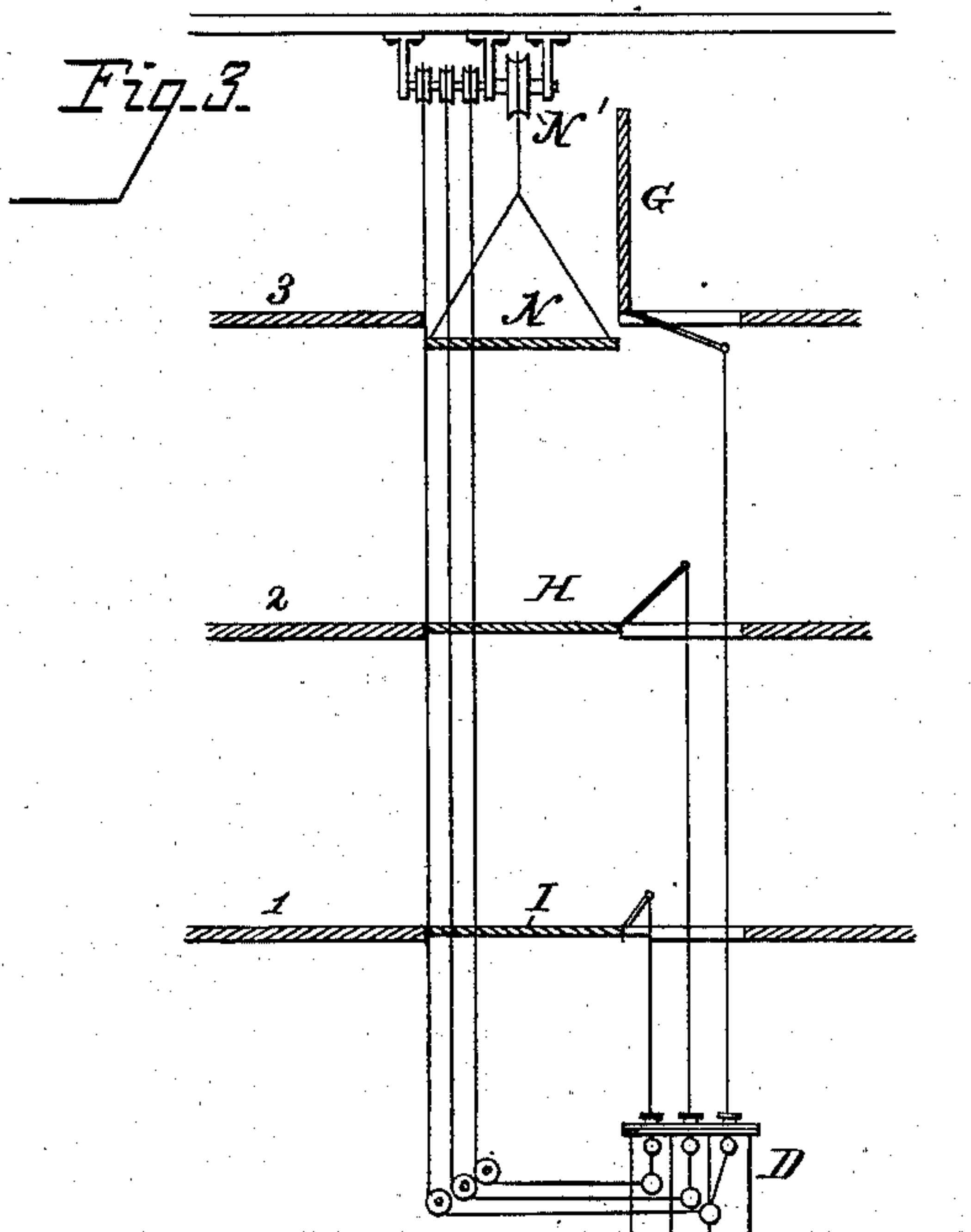
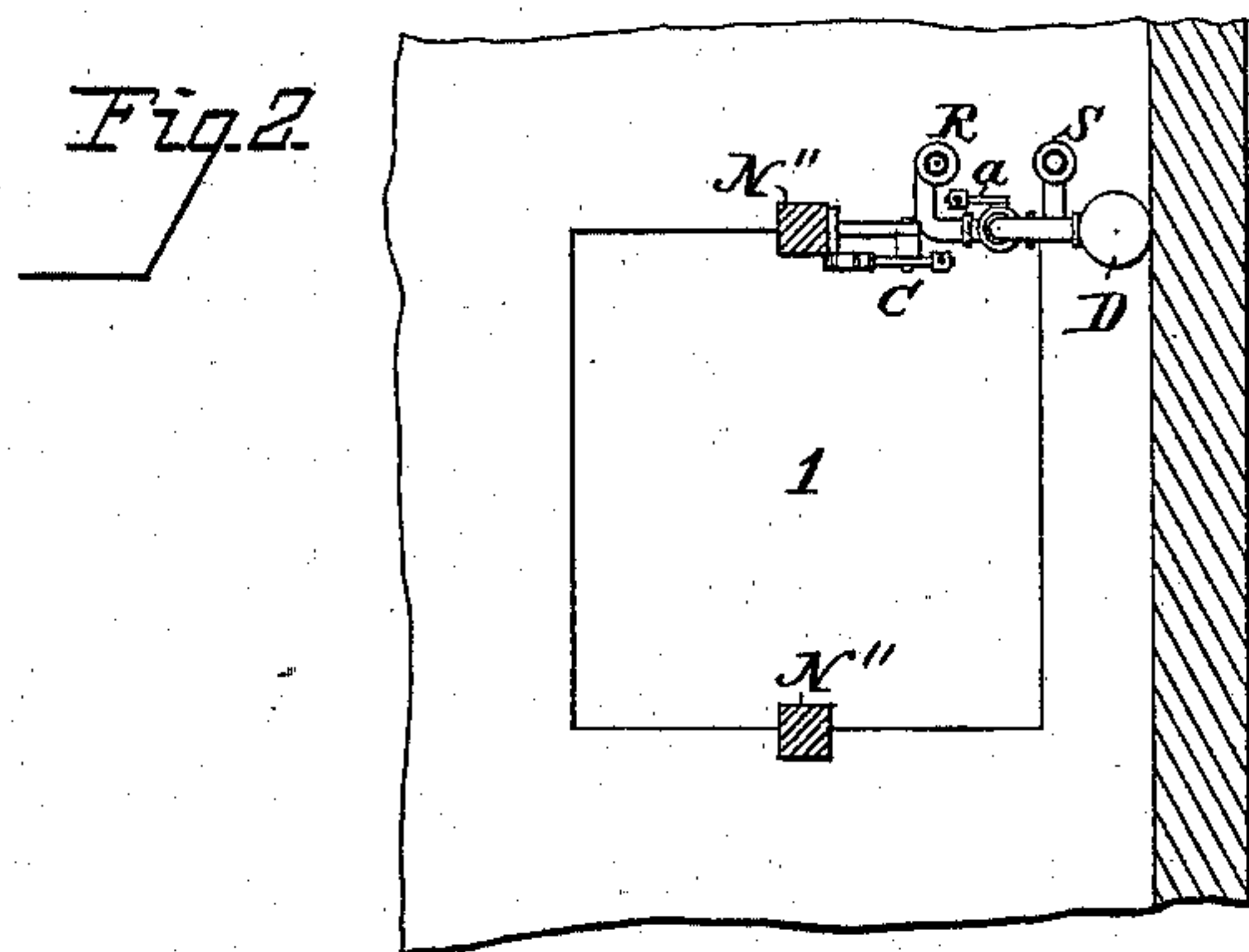
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*Charles E. Foster*



# UNITED STATES PATENT OFFICE.

CHARLES R. OTIS, OF YONKERS, NEW YORK.

## HATCHWAY.

SPECIFICATION forming part of Letters Patent No. 242,968, dated June 14, 1881.

Application filed April 15, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES R. OTIS, of Yonkers, in the county of Westchester and State of New York, have invented an Improvement in Hatchways, of which the following is a specification.

The objects of my invention are mainly, first, to reduce the labor of opening and closing hatchways; second, to effect these operations automatically and in such time and order that only those necessary for the passage of the platform will be open at one time; and these objects I effect by combining an engine with each hatch-cover and by the use of appliances whereby such engines may be successively brought into operation as the platform traverses the way.

In the drawings, Figure 1 is a sectional elevation of a hatchway illustrating my invention. Fig. 2 is a sectional plan on the line 1 2, Fig. 1; Figs. 3 and 4, modifications.

I have illustrated my invention in connection with an ordinary goods-elevator, where a platform, N, is suspended to a cable passing round a sheave, N', and passes between suitable guides through the hatches 1 2 3 of successive floors, the successive hatches being provided with covers G H I, as usual, and the covers being slit, so that each can be turned down without contact with the rope when the platform is below it.

With each cover I combine an engine, shown as consisting of a cylinder, D, piston E, and piston-rod carrying a wedge-shape rack, K, that gears into a toothed segment, L, at one side of the hatch-cover, and arranged eccentrically to the hinge of the cover. In place of this connection, however, the piston-rod may be jointed to a pitman connected to an arm on the hatch-cover. Each engine is provided with suitable inlet and exhaust ports and valve appliances, whereby a motor-fluid—as air, steam, or water—may be admitted to force the piston in one direction and raise the cover, or exhausted to permit the piston to move back and lower the cover, the engine operating at the start with an increased leverage, owing to the eccentricity of the segment L. The movements are prevented from beginning and terminating abruptly by aprons s on the pistons, which gradually cover and throttle the inlet

and outlet ports as the piston terminates either movement. Additional safety and an easier operation may be secured by the use of a counter-weight, M, that balances the cover, hung to a cord passing over a curved edge of the segment and entering dash-pots T T as it terminates each movement, the air compressed in the pots and escaping slowly, limiting the speed of the engine.

The engine-valves may be operated by rods or ropes accessible to the platform or from the different floors, Fig. 3, or automatically by contact with the platform or with some moving part of the apparatus. Thus all the engines may be arranged on one floor and connected by rods to the different covers, and an endless rope passing over the drum-pulley, or a rope attached to the platform, may be provided with arms or stops that as the rope is raised or lowered will successively move the engine-valves to admit pressure to raise each cover as the platform approaches and open the exhaust after the platform has passed, thereby keeping the covers shut, except when necessarily opened for the passage of the platform. Effective arrangements for securing such operations are shown in the drawings.

In Fig. 1 a water-tank, O, at the top of the building is connected through a vertical pipe, R, with a series of valve-casings containing each a two-way cylinder-valve, B, and having two branches connecting with pipes leading to the opposite ends of the cylinder, and a third branch leading to an exhaust-pipe, S, connecting with all the valve-chests. Each valve-spindle has an arm, a, connected by a rod, b, to the outer end of a forked lever, C, arranged near to one of the guides and below the next upper floor, and to the inner end of each lever C is connected the end of a rod, d, that extends to the outer end of a lever, D', arranged near the guide and at a point a little above the second floor below. These levers and rods are at one side, out of the way of the platform, which is provided with a lateral pin, e, extending from a bracket bolted to the under side, which pin, entering between the forks of the levers, swings the same as the platform moves up and down. Thus, as shown in Fig. 1, a lever, C, has just been depressed by contact with the pin e of the descending platform, and the valve



of the engine that operates the cover H has been turned to admit the water to the upper end and discharge it from the lower end of the cylinder, thereby raising the cover, which will  
 5 be in a vertical position by the time the platform reaches it. As the platform passes with its pin *e* into contact with the lever *D'* above the cover H it will depress the inner end of such lever, and the valve of the uppermost engine will be turned so as to lower the hatch-  
 10 cover G, the cover H being lowered as the platform passes the next to the lowest lever, *D'*. Thus on the upward movement of the platform the covers above are successively  
 15 raised and those below are successively lowered, and the operations reversed as the platform descends.

The discharge-water may be received into a tank, P, and thence pumped into the tank O,  
 20 and as the pressure is lowest in the upper engines the cylinders may be of successively increasing diameters. It will be apparent that the hatches may have each two leaves, hinged at opposite sides, instead of one, as shown, and  
 25 that in such case either one engine to each leaf or rod and lever connections, whereby one leaf is operative from the other, may be used.

In the arrangement shown in Fig. 4 a winding drum or pulley, Q, receives a rope, *q*, attached at one end to the platform, and is revolved as the platform moves. The rotation  
 30 of the pulley slides a bar, *t*, geared with a pinion, *s*, and the movement of the bar operates successively the valve-arms of the different cylinders.  
 35

Without, therefore, limiting myself to the arrangement shown, I claim—

1. The combination, with the cover of a hatchway, of an engine and appliances, substantially

as described, whereby the said cover is raised 40 and lowered by the action of the engine, substantially as set forth.

2. The combination, in a hatchway and with the series of covers, of a series of engines connected each to one of the hatch-covers, and  
 45 appliances, substantially as described, whereby the valves of said engines may be operated from the different floors, substantially as set forth.

3. A hatchway provided with covers, operating-engines, and appliances, substantially as described, whereby the valves of said engines will be automatically and successively ad-  
 50 justed to raise each cover as the load approaches and lower it after it has passed, substantially as set forth. 55

4. The combination of the series of covers and respective engines, pipe R, supplying the motor-fluid, valves B, and levers C *D'*, connected to the different valves, and arranged to  
 60 be struck by a pin on the platform or other moving part of the apparatus, substantially as set forth.

5. The combination of a platform-cover, toothed segment arranged eccentrically to the  
 65 hinge thereof, and engine carrying a wedge-shaped rack, substantially as and for the purpose set forth.

6. The combination, with the cover, of a counter-weight, dash-pots, and operating-en-  
 70 gine, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHAS. R. OTIS.

Witnesses:

JOHN McMAHON,  
 CHARLES E. FOSTER.