

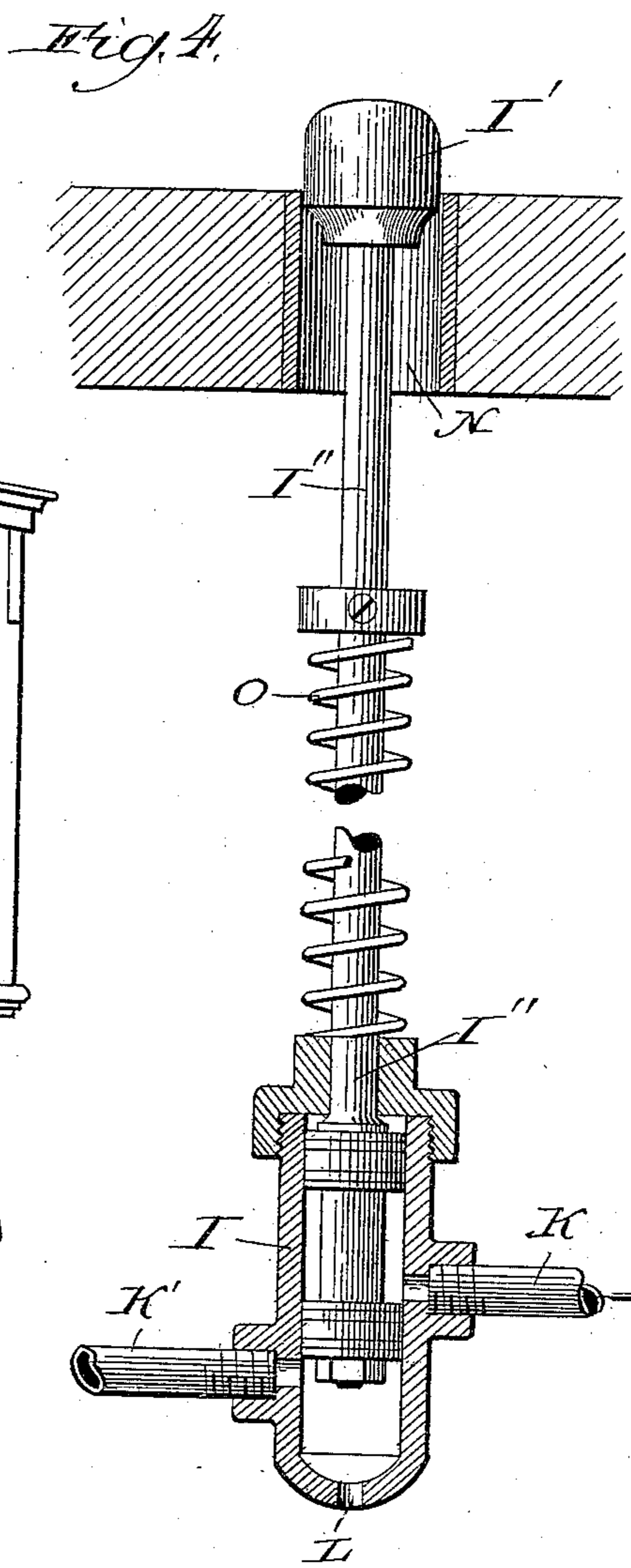
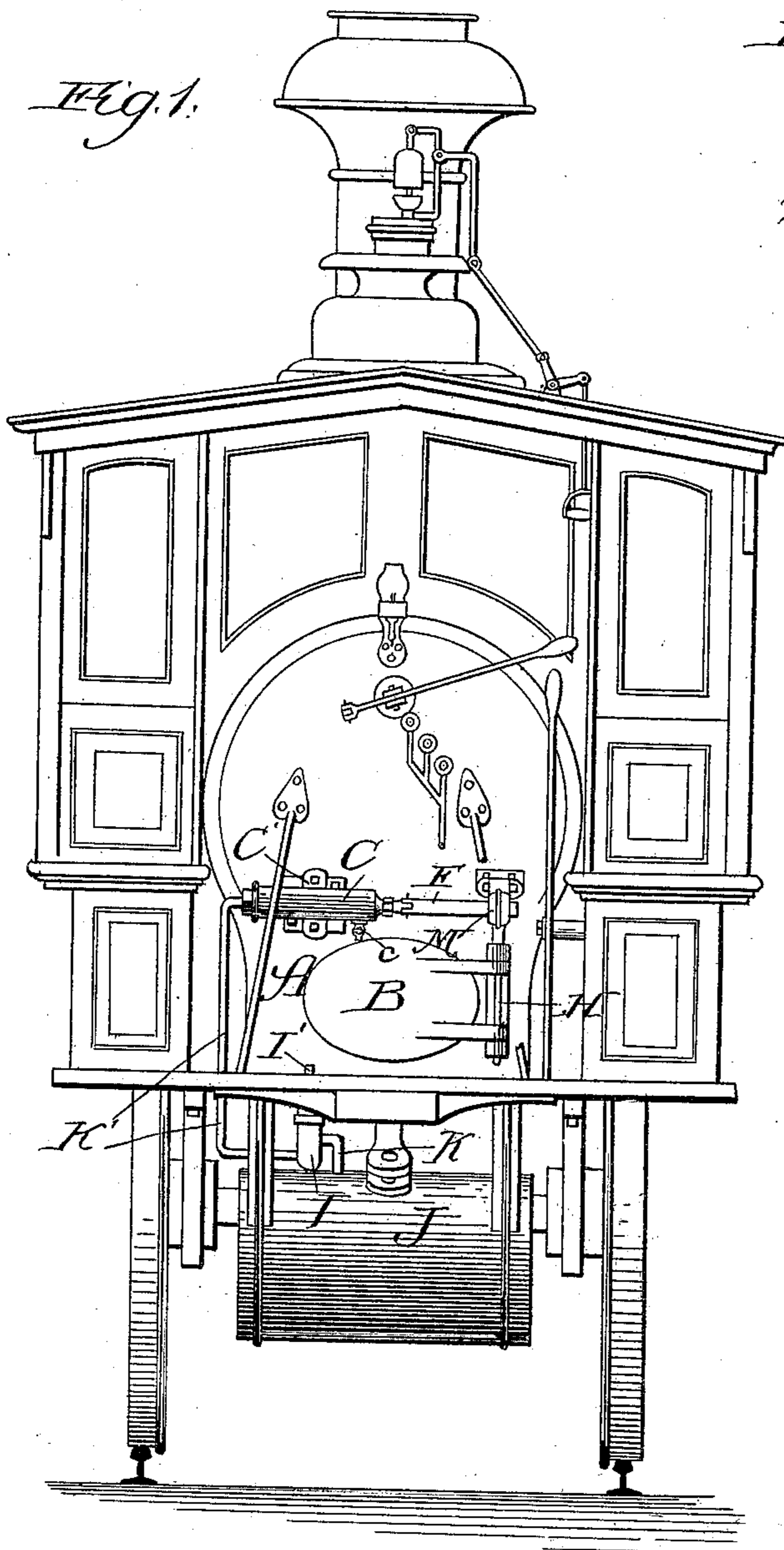
(No Model.)

2 Sheets—Sheet 1.

D. HAWKSWORTH.
DOOR OPENER.

No. 424,060.

Patented Mar. 25, 1890.



Witnesses:
E. Gaylord,
Samuel E. Hibben.

Inventor:
David Hawtesworth,
By Bonning & Bonning & Payson,
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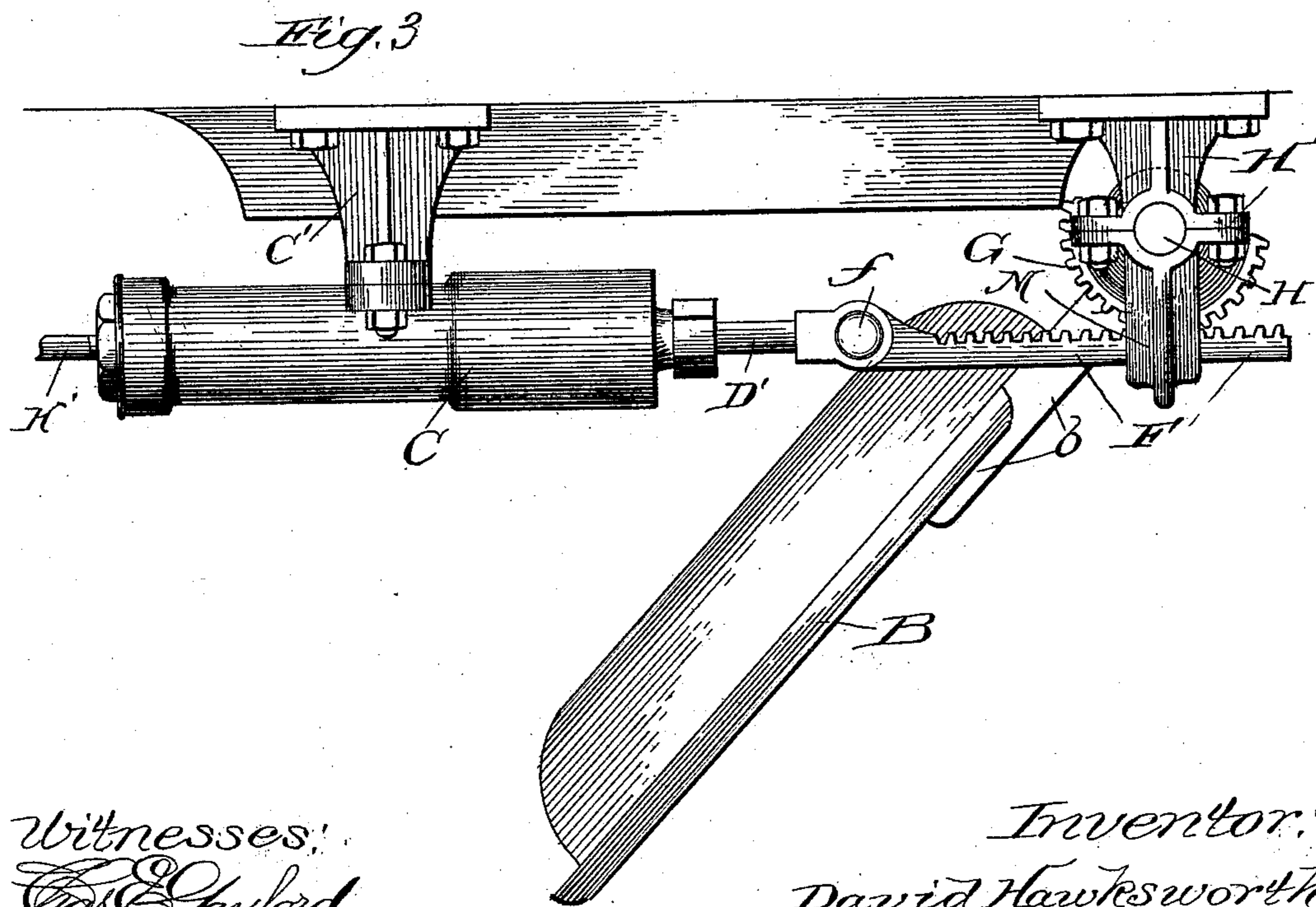
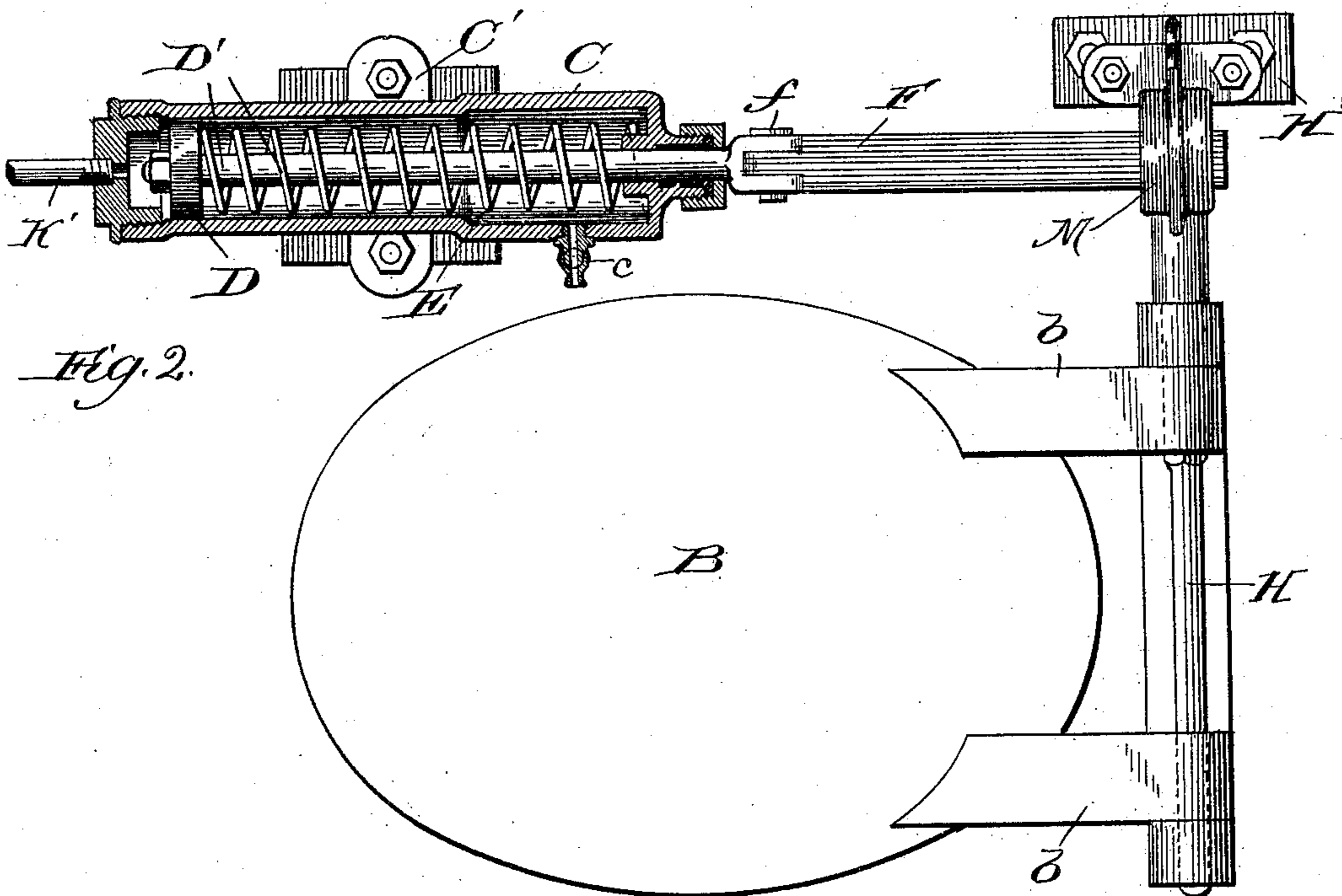
(No Model.)

2 Sheets—Sheet 2.

D. HAWKSWORTH.
DOOR OPENER.

No. 424,060.

Patented Mar. 25, 1890.



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UNITED STATES PATENT OFFICE.

DAVID HAWKSWORTH, OF PLATTSMOUTH, NEBRASKA.

DOOR-OPENER.

SPECIFICATION forming part of Letters Patent No. 424,060, dated March 25, 1890.

Application filed December 5, 1889. Serial No. 332,648. (No model.)

To all whom it may concern:

Be it known that I, DAVID HAWKSWORTH, of Plattsmouth, Cass county, Nebraska, have invented a new and useful Improvement in Door-Openers, of which the following is a specification.

As is well known, the work imposed upon firemen on locomotives is very severe, and much time and labor are expended in opening and closing the door by hand. Moreover, as the fireman has to first open the door and then go for the coal, the fire is liable to be chilled and the working power of the locomotive interfered with.

It is my object to obviate these difficulties by providing a device to enable the fireman to open the door by means of his foot, leaving his hands free to handle the shovel; and my invention consists of the details and features of construction hereinafter described and claimed.

In the drawings, Figure 1 is an elevation of the rearend of a locomotive, showing my device applied to the furnace-door; Fig. 2, an elevation of the door and opener; Fig. 3, a plan view thereof with door partly open, and Fig. 4 a sectional view of the operating-valve and connections.

A is the boiler-head; B, the door; C, a cylinder fastened to the boiler-head; D, the piston, and D' the piston-rod; E, a spring coiled around such rod; F, a rack-bar; *f*, a pin connecting the piston-rod and bar F; G, a toothed quadrant; H, a hinge-pin supporting the door; H', a bracket secured to the boiler-head and supporting such pin; I, the operating or foot valve apparatus; I', a push-button at the end of the valve-stem I''; J, the air-reservoir; K, a pipe leading from such reservoir to the valve I; K', a pipe leading from such valve to the cylinder C, and L the exhaust-port of the valve I.

The door of a locomotive supplied with my improvement is supported by means of a hinge-pin H, which is squared into the door-lugs *b b*, the door being held on the pin by nuts or other suitable means. The pin H is supported by a bracket H', bolted to the boiler-head, and in which the pin is free to turn. To the pin I attach securely a toothed quadrant G, of any suitable dimensions and material. I next construct a cylinder C and attach it se-

curely to the boiler-head by means of a bracket C'. This cylinder is provided with a piston D and piston-rod D'. To the outer end of this rod I attach by means of a pin *f*, or in any other separable manner, a rack-bar F, the teeth of this bar meshing with the quadrant H, a guide M being preferably provided to keep the rack and quadrant in engagement. The cylinder C is further provided with a small cock *c* to allow air to escape from and enter the cylinder as the piston travels to and fro. Next I make the foot or operating valve apparatus I. (Shown more particularly in Fig. 4.) This valve apparatus has three ports—one connecting by means of a pipe or hose K with the main air-reservoir J on the locomotive, one by means of a pipe or hose K' with the cylinder C, and the last an exhaust L opening into the air. This valve apparatus is placed preferably beneath the foot-board of the cab, and at the upper end of the valve-stem I'' is a push-button I', which projects a short distance above the cab-floor and slides in a bearing or guide N. A spring O is provided to restore the button when the pressure is removed. When in the position shown in Fig. 4, the valve is placed to allow air to escape from the cylinder C through the exhaust; but when the valve is moved downward in the manner hereinafter described communication is established between the reservoir J and the cylinder C, allowing compressed air to pass into the latter to open the door. The cylinder C is preferably attached to the boiler-head above the door B, and the foot-valve should be so placed as to bring the push-button I' within easy reach of the fireman.

The device operates as follows: When the fireman desires to feed the fire, he pushes down the button I' with his foot. This forces the valve downward and allows air to pass from the reservoir to the cylinder C. The pressure of the air forces the piston toward the right, carrying the piston-rod and rack-bar along with it. The latter causes the quadrant and hinge-pin to turn, and the door is opened. (See Fig. 3.) As soon as the firing is completed the fireman removes his foot, and the valve I being carried upward by means of the spring O, the exhaust opened, and the air in the cylinder allowed to escape. As soon as the exhaust is opened the spring

E will force the piston toward the left and close the door by means of the rack and quadrant.

If for any reason the device becomes inoperative, the pin *f* may be removed and the door opened and closed by hand. If desired, the rack-bar may be omitted and teeth formed on the piston-rod, which is made long enough to reach the quadrant.

I have shown and described herein one form in which the device may be made, wherein air-pressure is utilized to open the door and a spring to close it; but it is evident that the pressure of the air might be employed to both open and close the door, so that, a connection being made with the boiler, steam might be used in place of air, and I contemplate these and similar changes in construction, the gist of my invention consisting in the use of steam, air, or similar pressure to open or open and close a furnace-door. Furthermore, although I have shown the device as applied to a locomotive-furnace door, I do not intend to limit myself to such application, since it can evidently be used to open and close any other door, and that whether it be a furnace-door or not, and whether it slides or is hung on hinges to swing horizontally or vertically, or, in short, any door whatsoever, and, instead of using the rack-bar and quadrant, the piston-rod might be attached directly to the door, the cylinder being attached at the right side of the door.

I claim—

1. A door-opener comprising a cylinder, a

piston and rod operated by fluid-pressure, a rack-bar attached to such rod, a hinge-pin supporting the door and carrying a toothed quadrant meshing with the rack-bar, whereby as the piston is moved back and forth the door is opened and closed, substantially as described.

2. A door-opener comprising a cylinder, a piston and rod operated by fluid-pressure, a rack-bar attached to the piston-rod, a hinge-pin supporting the door and carrying a toothed quadrant meshing with the rack-bar, and a valve for regulating the admission and exhaust of air or steam to and from the cylinder, substantially as described.

3. The combination of the cylinder C, piston D and rod D', rack-bar F, door B, supported on pin H, quadrant G, valve apparatus I, connected with cylinder C and reservoir J, push-button I', for operating the valve, and spring E, substantially as described.

4. In a door-opener, a valve apparatus I, placed beneath the foot-board of the cab, connecting with the main air-reservoir and the door-opening mechanism, and operated by means of a push-button I' and spring O, substantially as described.

5. In a door-opener, the combination of the cylinder C, piston D and rod D', rack-bar F, quadrant G, and valve apparatus I, operated by push-button I', substantially as described.

DAVID HAWKSWORTH.

Witnesses:

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