

(No Model.)

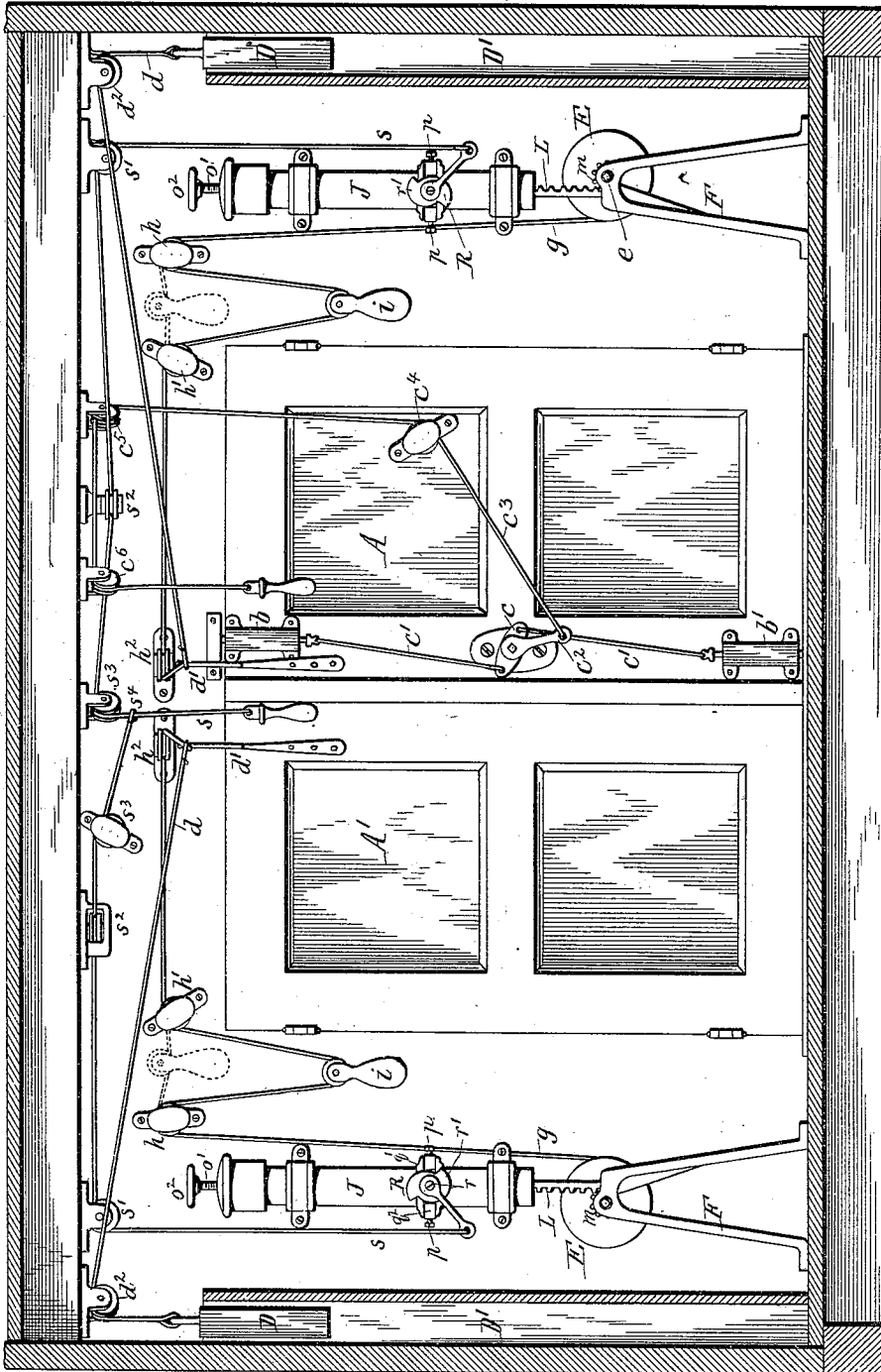
2 Sheets—Sheet 1.

E. BROMBACHER.
DOOR OPERATING DEVICE.

No. 543,979.

Patented Aug. 6, 1895.

Fig. 1.



WITNESSES:

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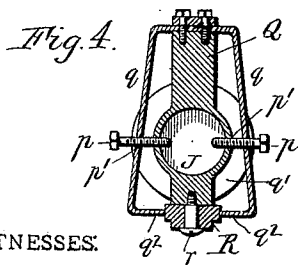
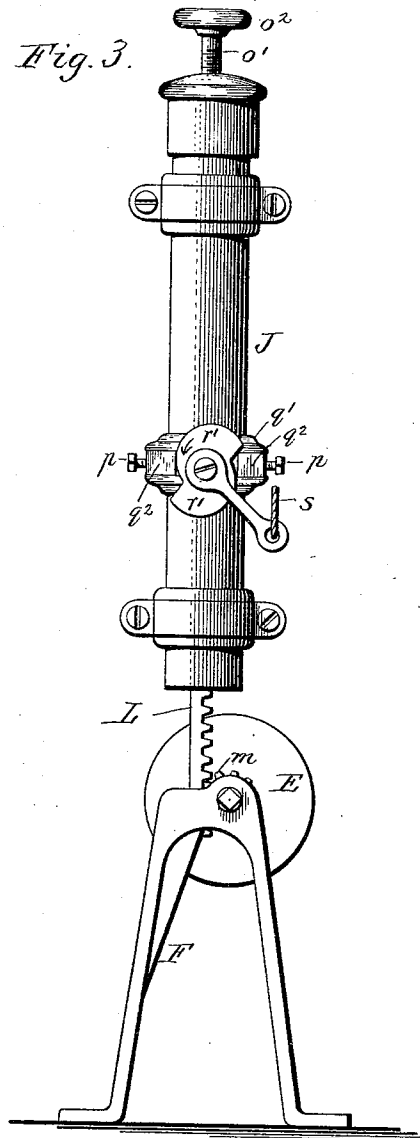
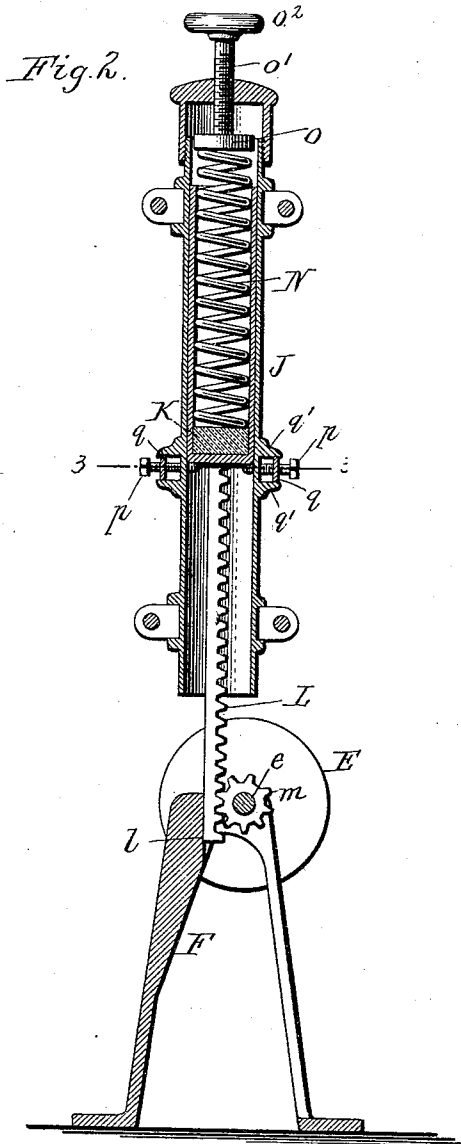
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E. BROMBACHER.
DOOR OPERATING DEVICE.

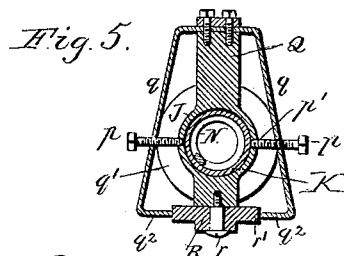
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UNITED STATES PATENT OFFICE.

EMIL BROMBACHER, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF TO
JOHN EIMER, OF SAME PLACE.

DOOR-OPERATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 543,979, dated August 6, 1895.

Application filed April 8, 1895. Serial No. 544,896. (No model.)

To all whom it may concern:

Be it known that I, EMIL BROMBACHER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Door-Operating Devices, of which the following is a specification.

This invention relates more especially to the door-operating mechanisms which are employed for closing the doors of engine-houses after the engine or other apparatus has passed out.

My invention has for its object to provide an efficient device of this class which is reliable in operation and which can be readily reset after closing the door.

In the accompanying drawings, consisting of two sheets, Figure 1 is a sectional front elevation of my improved apparatus applied to the doors of an engine-house. Fig. 2 is a sectional elevation, on an enlarged scale, of one of the actuating-cylinders and connecting parts. Fig. 3 is a side elevation of the same. Fig. 4 is a horizontal section in line 3 3, Fig. 2, showing the spring-catches in the position in which they arrest the descent of the actuating-piston. Fig. 5 is a similar view showing the catches retracted for releasing said piston.

Like letters of reference refer to like parts in the several figures.

A A' represent the hinged doors of an engine-house, and *b b'* represent the usual spring bolts or latches arranged at the top and bottom of one of the doors for holding the same in a closed position. These bolts may be operated in any common manner, but they are preferably operated simultaneously from an oscillating-lever *c* pivoted centrally to the inner side of the door which carries the bolts, and having its arms connected with the bolts by rods *c'*, so that upon turning the lever in one or the other direction the bolts are retracted or projected. The lever *c* has an actuating-arm *c²*, which is operated by a cord *c³* extending over guide-pulleys *c⁴*, *c⁵*, and *c⁶*, arranged on the adjacent door and the ceiling of the engine-house and terminating in a handle, which hangs within convenient reach of the driver when seated on the engine.

The doors are provided with any suitable means for opening them upon the withdrawal

of the sliding bolts *b b'*, the means shown in the drawings consisting of weights *D*, guided in upright tubes or casing *D'*, and connected by cords *d* with arms *d'*, secured to the upper portions of the doors near their meeting edges. The cords *d* pass over the usual guide-pulleys *d²*.

The closing devices of the doors are exactly alike, and a description of one will therefore suffice for both.

E is a rotary horizontal drum journaled at the upper end of a standard *F*, and *g* is a cord or cable wound upon said drum and extending upward over guide-pulleys *h h'* arranged on the front wall of the engine-house above the upper edge of the door, thence around the front side of a similar guide-pulley *h²* arranged on said wall opposite the fixed arm *d'* of the door, and thence to said arm, to which latter the cord is secured. A weight *i* is preferably suspended from the portion of the cord *g* between the guide-pulleys *h h'*, so as to take up the slack of the same when the door is closed, and thereby prevent entanglement of the cord. One end of the drum-shaft *e* is made square or flat sided, as shown, to enable it to be turned by a crank having a corresponding socket.

J is an upright actuating-cylinder suitably supported above the drum *E* and containing a piston or plunger *K*. This piston is connected to the upper end of a gear-rack *L*, which extends downward through the open lower end of the actuating-cylinder and meshes with a pinion *m* secured to the shaft of the rotary drum. The lower portion of this gear-rack is guided in an upright way or groove *l* formed in the standard *F*, as shown in Fig. 2.

N is a spring arranged within the actuating-cylinder and tending to force the piston downward in the cylinder, so as to cause the rack-bar to turn the pinion of the rotary drum and wind the cord *g* upon the latter for closing the door. This spring is interposed between the upper side of the piston and a follower or adjustable head *o* arranged in the upper portion of the cylinder. This follower is provided with an upwardly-extending adjusting-screw *o'*, which engages with an internally screw-threaded opening formed in

the cap or head of the actuating-cylinder, and which is provided at its projecting end with a hand-wheel o^2 for turning it. By turning the adjusting-screw in one or the other direction the follower is raised or lowered and the tension of the spring is diminished or increased accordingly. The piston preferably consists of a tube open at its upper end and closed at its lower end and inclosing the spring, as shown in Fig. 2.

p represents movable stops or catches whereby the piston is held in its elevated position against the pressure of the spring. In the construction shown in the drawings these catches consist of horizontal bolts which are adapted to pass through openings p' formed in diametrically-opposite sides of the actuating-cylinder, so as to project into the path of the piston, as shown in Fig. 2. The stop-bolts are carried by spring-arms q , arranged on opposite sides of the cylinder and secured at their rear portions to a lug Q projecting from the rear side of the cylinder, while their front portions are free to expand or contract. These springs yieldingly hold the stop-bolts in engagement with the piston.

The spring-arms are guided between horizontal flanges q' formed on the adjacent portion of the actuating-cylinder, and they are preferably bent from a single strip of spring-metal, as shown in Figs. 4 and 5.

R is a releasing device whereby the free front portions of the spring-arms are spread or expanded for drawing the stop-bolts out of engagement with the piston, so as to permit the depression of the latter by the compressed spring. This releasing device preferably consists of an oscillatory cam interposed between the free ends of the spring-arms q and turning upon a horizontal pivot r secured to the front side of the cylinder. This cam is provided on opposite sides of its pivot with cam-faces r' , which bear against inwardly-turned lips or flanges q^2 formed at the front ends of the spring-arms, so that upon turning the cam in the direction of the arrow in Fig. 3 the arms are spread or deflected outward sufficiently to withdraw the bolts clear of the piston, as shown in Fig. 5, while upon turning the cam in the opposite direction, so as to bring the small radius of its faces in contact with the lips of the spring-arms, the latter are allowed to contract to the position shown in the remaining figures.

The releasing-cam is provided with an actuating-arm which is operated by a cord s , extending upward therefrom and passing around guide-pulleys s' , s^2 , and s^3 , arranged on the ceiling of the engine-house and terminating near the door of the engine-house and within convenient reach of the fireman or other attendant stationed on the rear of the engine, so that the fireman can operate said cord as the engine leaves the house. The free end of the cam-operating cord s , connected with the door-closing device of the other door A' , is fastened to the depending

portion of the corresponding cord first mentioned, as shown at s^4 , so that both of said cords are operated simultaneously.

When the doors are closed, the door-opening weights D are elevated in a well-known manner, as shown in Fig. 1. The door-closing devices are placed in their normal operative position by turning the drum-shafts in the proper direction to cause the pinions m to raise the rack-bars L and the pistons connected therewith, so as to compress the springs N . As soon as the pistons pass upward beyond the stops or catches p the latter are forced inward by the reaction of the deflected spring-arms q and caused to engage with the pistons, thereby arresting the descent of the latter. During the ascent of the pistons, the latter hold the catches p in their retracted position, and the cams R stand in the positions shown in Figs. 1 and 2, whereby the spring-arms q are allowed to contract as soon as the pistons pass the catches. By the backward movement of the rotary drums, the cords g are partly unwound therefrom and the slack is taken up by the weights i , as shown by full lines in Fig. 1.

When it is desired to leave the engine-house, the driver pulls the bolt-operating cord c^3 , thereby withdrawing the bolts $b b'$, and allowing the weights D to open the doors in a well-known manner, the slack in the door-closing cords g permitting the doors to open and the weights i hung thereon being raised to the position shown by dotted lines in Fig. 1 by the taking up of this slack. As the engine passes through the door the fireman pulls the cam-releasing cord s , whereby the cams R are turned and caused to expand the spring-arm q , thereby withdrawing the catches p and allowing the springs N to depress the pistons of the actuating-cylinders. The rack-bars L taking part in the descent of the pistons turn the rotary drums through the medium of the pinions m , thereby winding the cords g upon the drums and closing the doors.

The springs N are tensioned sufficiently to overcome the door-opening weights D .

Upon releasing the operating-cords of the cams R the spring-arms q return the cams to their normal position.

Upon returning to the engine-house the fireman or other attendant enters the same through the usual small or side door, resets the door-closing devices in the manner hereinbefore described, and then opens the main doors.

The tubular piston should be made of such a length that its upper portion extends above the catches p when the piston is in its lowermost position, so as to prevent the catches from engaging over the upper end of the piston.

I claim as my invention—

1. The combination with a rotary drum and a door-operating cord wound thereon, of an actuating cylinder and piston, a pressure de-

vice operating against said piston, intermediate gearing whereby the movement of the piston is transmitted to said drum, a catch whereby said piston is held in its normal position, and a releasing device whereby said catch is withdrawn from engagement with the piston, substantially as set forth.

2. The combination with a horizontally movable door, of a rotary drum having a pinion, a guide roller arranged above the drum, a door-operating cord having one end secured to said drum, passing upward and laterally over said guide roller and having its opposite end connected with the door, an actuating cylinder and piston, a pressure device operating against said piston, a gear rack connected with said piston and meshing with the pinion of the drum, and a catch whereby said piston is held in its normal position, substantially as set forth.

3. The combination with a rotary drum and a door-operating cord wound thereon, of an actuating cylinder and piston, a spring arranged in said cylinder and bearing at one end against said piston, an adjustable head or follower bearing against the opposite end of said spring, intermediate gearing whereby the movement of said piston is transmitted to said drum, and a catch whereby the piston is held

in its normal position, substantially as set forth.

4. The combination with a rotary drum and a door-operating cord wound thereon, of an actuating cylinder and piston, intermediate gearing connecting said piston with said drum, a spring arm carrying a catch adapted to interlock with said piston, and a releasing cam engaging against said spring arm, substantially as set forth.

5. The combination with a rotary drum and a door-operating cord wound thereon, of an actuating cylinder and piston, a pressure device operating against said piston, intermediate gearing connecting said piston with said drum, a spring arm carrying a catch adapted to interlock with said piston, a releasing cam engaging against said spring arm and having an actuating arm, and an operating cord connected with said actuating arm and passing around suitably-arranged guide pulleys, substantially as set forth.

Witness my hand this 28th day of March, 1895.

EMIL BROMBACHER.

Witnesses:

CARL F. GEYER,
KATHRYN ELMORE.