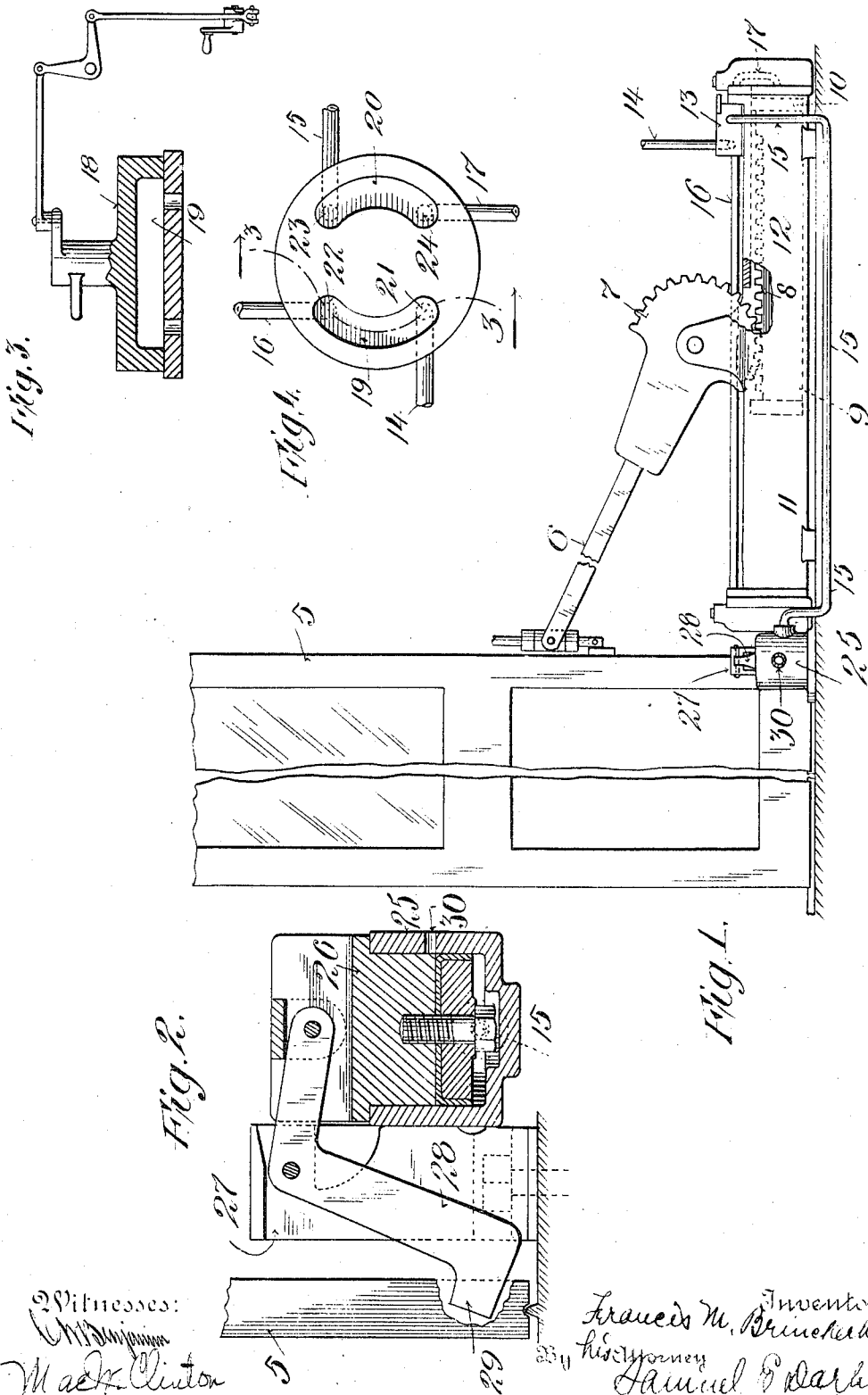


F. M. BRINCKERHOFF.
 COMBINED DOOR OPERATING AND LOCKING DEVICE.
 APPLICATION FILED DEC. 24, 1910.

1,038,837.

Patented Sept. 17, 1912.



Witnesses:
 Mark Clinton

Inventor
 Francis M. Brinckerhoff
 Samuel P. Darby

UNITED STATES PATENT OFFICE.

FRANCIS M. BRINCKERHOFF, OF NEW YORK, N. Y., ASSIGNOR TO NATIONAL PNEUMATIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF WEST VIRGINIA.

COMBINED DOOR OPERATING AND LOCKING DEVICE.

1,038,837.

Specification of Letters Patent.

Patented Sept. 17, 1912.

Application filed December 24, 1910. Serial No. 599,210.

To all whom it may concern:

Be it known that I, FRANCIS M. BRINCKERHOFF, a citizen of the United States, residing at New York, in the county and State of New York, have made a certain new and useful Invention in Combined Door Operating and Locking Devices, of which the following is a specification.

This invention relates to combined door operating and locking devices.

The object of the invention is to provide a combined door operating and locking device which is simple in construction, and efficient in operation.

A further object is to provide a device of the character referred to wherein pressure medium is employed as the power for operating the door, the exhaust from the power cylinder being utilized to accomplish the operation of the locking device.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawing, and finally pointed out in the appended claims.

Referring to the accompanying drawing, and to the various views and reference signs appearing thereon, Figure 1 is a view in elevation, parts broken out, and parts in section showing a combined door operating and locking device embodying the principles of my invention. Fig. 2 is a view in vertical section of the door lock and its operating cylinder and piston. Figs. 3 and 4 are detail views, somewhat diagrammatic, illustrating a construction of controlling valve and its operation.

The same part is designated by the same reference sign wherever it occurs in the several views.

In the drawing 5 designates the door, and 6 an operating arm having suitable connection thereto. The operating arm 6, is connected to a segment gear 7, arranged to mesh with a rack 8, connected intermediate the pistons 9, 10, and constituting, in effect the connecting piston rod of the pistons 9, 10. The pistons are arranged to operate in cylinders 11, 12. In the particular arrangement shown these cylinders are in line with each other and are closed at their remote ends and are freely open to the atmosphere

at their proximate ends. The segment gear 7 operates through the casing of said cylinders. When pressure medium, such, for instance, as compressed air is supplied to the closed end of one cylinder and the closed end of the other cylinder is opened to exhaust the connected pistons 9, 10, are shifted from one limit of their movement to the other thereby causing segment 7 to be rocked, and, with it, the door operating lever 6, and consequently moving the door to its open or its closed position, as the case may be.

The operating medium may be supplied to the cylinders, and exhausted therefrom in many different ways. A simple arrangement is shown for illustrative purposes wherein a valve casing 13 is employed, into which the pressure medium is supplied from a convenient source, as, for instance, through the supply connection 14, and from which the pressure medium is exhausted through the exhaust connection 15. The remote or closed end of each cylinder also communicates with the valve casing through connections 16, 17. Within the casing is a control valve 18, by which these various connections are controlled.

The arrangement and operation of the valve and the ports in the valve casing is shown more clearly in Figs. 3 and 4. The valve 18 is provided with recesses or ducts 19, 20, on its under surface to coöperate with the ports 21, 22, 23, 24, formed in the valve casing seat and which communicate respectively with the connections 14, 16, 15, 17. In the position shown pressure is supplied from the source through connection 14, port 21, duct 19, port 22, and connection 16, to the closed end of cylinder 11. At the same time the closed end of cylinder 12 is opened to exhaust through connection 17, port 24, duct 20, port 23 and exhaust connection 15. The connected pistons therefore will, under these circumstances, be shifted toward the right to the limit of their movement and will be held in this position till the valve is again operated to vary the connections of pressure supply. This movement of the connected pistons serves to operate the door operating lever to move the door to, say, its closed position, this being the position in which it is shown in the drawing.

In many cases it is desirable to positively lock the door in its closed position and to release the lock before the door can be

opened in order to prevent the unauthorized or inadvertent opening of the door. It is among the special purposes of my invention to provide such a locking means and to combine the same with the power mechanism employed to operate the door so as to secure cooperative action thereof. In carrying out my invention I propose to utilize the exhaust of the operating medium to operate the lock, and a simple arrangement is shown for accomplishing the desired object wherein I employ a small vertical cylinder 25, in which operates a weighted piston 26. Connected to the casing of the cylinder 25, is a standard 27, upon which is pivotally mounted a rock lever 28, having one end pivotally connected to the weighted piston 26, and its free end 29, turned outwardly to form a stop. Normally, with the cylinder 25, exhausted of pressure and the weighted piston in its lowermost position, the free end 29, of the lever 28, is in position to engage behind the rear edge of the door when the latter is in closed position, thereby forming a positive lock to hold the door closed. In order to release the lock when it is desired to open the door the valve 18 is manipulated to open one of the cylinders 11, 12, say cylinder 12, to pressure supply, and the other cylinder, 11, to exhaust. The exhaust pipe 15, delivers to the cylinder 25, at a point below the piston 26. The pressure of the exhaust thus raises the piston 26, thereby effecting the release of the lock lever end 29 from engaging relation with respect to the door. The instant this release of the lock is effected the door begins to move under the influence of the pressure supplied to cylinder 12. When the piston 26, rises a sufficient distance it uncovers a port 30, through which the exhaust pressure finally escapes. In case the door or its operating mechanism should stick, or, from other cause, should fail to move before the exhaust pressure finally escapes from the cylinder 25, after performing its work of raising the piston 26, and releasing the stop lock 29, said stop lock will swing back in place as a stop and will prevent the door from being opened until a further exhaust pressure is supplied to the cylinder 25, and this is accomplished by suitable reverse manipulations of the valve 18, first to supply operating pressure to cylinder 11, in the example above given, and then to again exhaust the same through the cylinder 25. The same operation is also necessary in case, through leakage or otherwise, the exhaust pressure from the cylinders 11, 12, is insufficient to operate the weighted piston 26.

From the foregoing description it will be seen that I provide an exceedingly simple and efficient door locking device combined with a door opening mechanism, which is pneumatically operated, and wherein the

door is efficiently locked in its closed position, and the exhaust from the operating mechanism utilized to release the lock. By this arrangement it will be seen that an operating pressure is applied to open the door but does not become effective to move the door until the lock is released by the exhaust from the opposite side of the motor. In this way I avoid the necessity of employing part of the operating pressure to effect a release of the door lock, and consequently am enabled to utilize the full pressure of the medium to effect the door operation.

While I have shown a specific form of pressure motor for operating the door my invention, as defined in the claims is not to be limited to this particular form of motor, as other forms may be employed with equal facility in carrying out my invention, the essential feature being the utilization of the exhaust of pressure medium from the motor to accomplish the desired release of the door lock and in combining the lock operating means with the door operating motor to accomplish this result. I have found, however, a motor constructed as described, to possess desirable characteristics in that equal pressure areas are employed for the operating pistons, stuffing boxes are avoided, and an even steady operation of the doors is accomplished.

Having now set forth the objects and nature of my invention, and a construction embodying the principles thereof, what I claim as new and useful, and of my own invention, and desire to secure by Letters Patent is,—

1. In a combined door operating and locking device, a pneumatic motor having pressure supply and exhaust connections, means for controlling the same, door operating devices actuated by the motor, a lock for the door, and means operated by the exhaust of pressure from the motor for releasing the lock.

2. In a combined door operating and locking device, a pneumatic motor having pressure supply and exhaust connections, means for controlling said connections, door moving devices operated by said motor, an auxiliary cylinder and piston, the motor exhaust connections delivering to said auxiliary cylinder, and a door lock device operated by said piston.

3. In a combined door operating and locking device, a pneumatic motor having pressure supply and exhaust connections, means for controlling the same, door moving devices operated by said motor, an auxiliary cylinder having an exhaust opening, a weighted piston operating in said cylinder, the motor exhaust connections delivering to said cylinder, and a door lock device operated by said piston.

4. The combination with a door motor,
of a lock for retaining the door in its closed
position, a supplementary motor for said
lock, said supplementary motor operated by
5 exhaust from the door motor, and means for
automatically limiting the duration of the
time of action of said supplementary motor.

5. The combination with a pneumatic door
motor, of an automatic lock for the door,
10 and a pneumatic releasing device for the
said door connected to the exhaust of said
motor.

6. The combination with a pneumatic

door motor, of an automatic lock for the
door, a pneumatic releasing device for said 15
lock, connected to the exhaust of the door
motor and means for controlling the period
of action of said releasing device.

In testimony whereof I have hereunto set
my hand in the presence of the subscribing 20
witnesses, on this 19th day of December
A. D. 1910.

FRANCIS M. BRINCKERHOFF.

Witnesses:

MAE W. CLINTON,
S. E. DARBY.