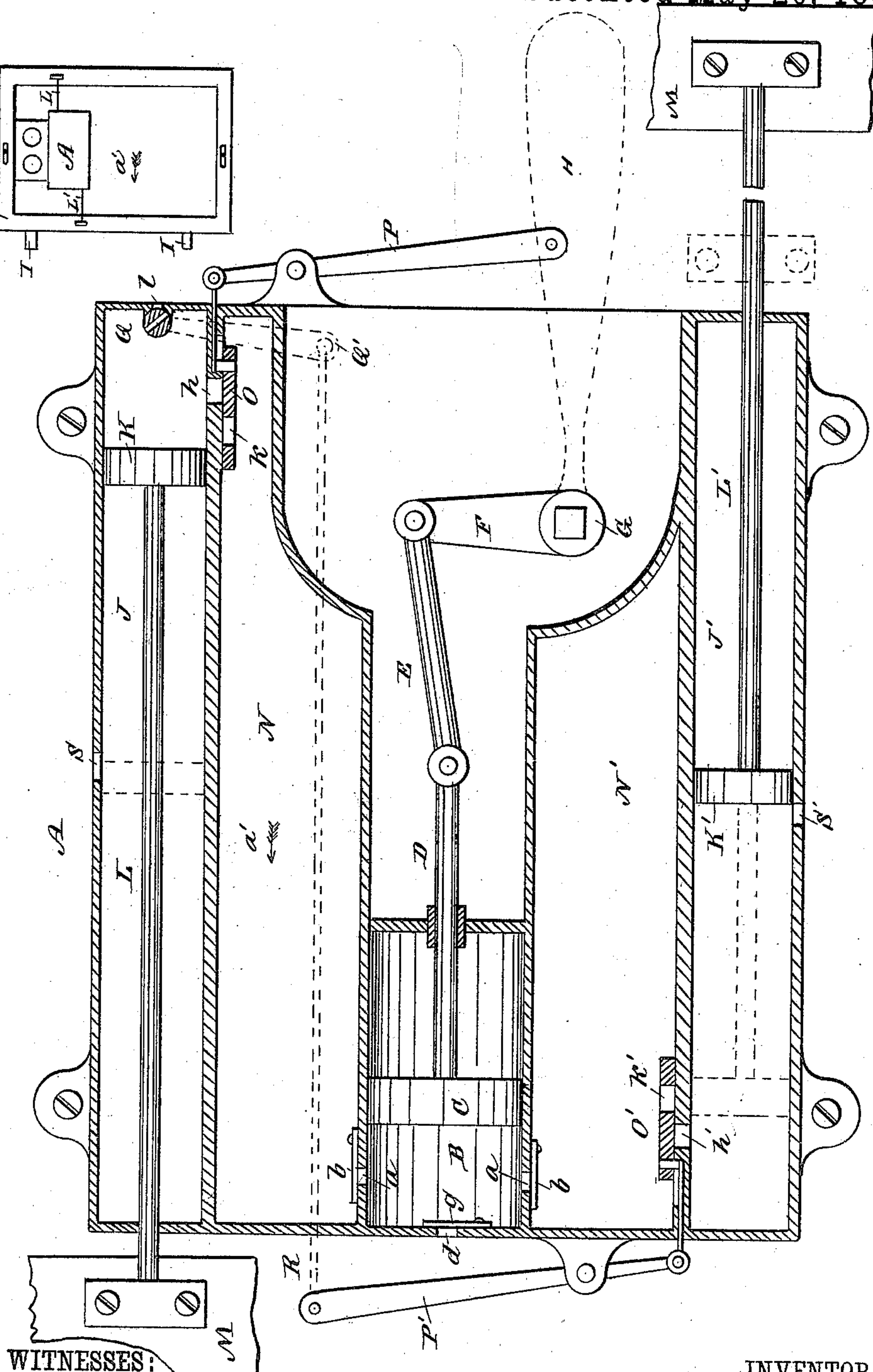
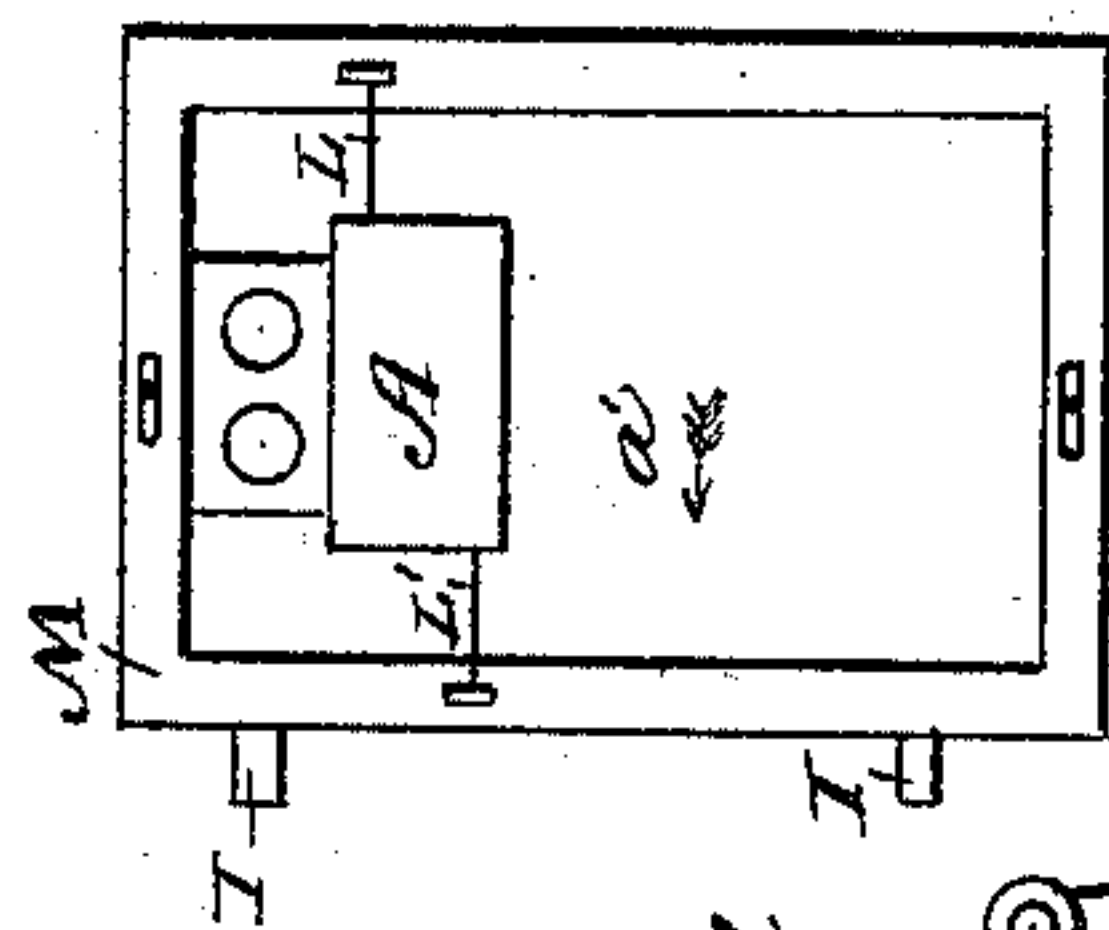


Patented May 20, 1884.



WITNESSES:

Thos. G. Boston
C. Sedgwick

A. W. Fuller

Miss To

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALONZO W. FULLER, OF BOSTON, MASSACHUSETTS.

PNEUMATIC LOCK.

SPECIFICATION forming part of Letters Patent No. 299,066, dated May 20, 1884.

Application filed January 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, ALONZO W. FULLER, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and Improved Lock, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved lock for safe and vault doors, in which lock the bolts are thrown and drawn by means of compressed air.

The invention consists in a casing provided with two cylinders, each containing a piston, which pistons move in opposite directions, and are connected with a frame, to which the bolts are fastened. An air-compressing device is provided in the casing, and by means of the compressed air either piston can be operated, so that by means of the above mechanism the bolts can be passed into apertures for receiving them, or withdrawn from the same.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 is a longitudinal sectional elevation of my improved lock. Fig. 2 is a diagram of the inner side of the safe-door on which the lock is held.

The lock-casing A, which is provided with means for holding it on the inner surface of a safe-door, is provided with an air-compressing cylinder, B, in which a piston, C, works, which is mounted on the inner end of a piston-rod, D, passing through a stuffing-box in the end of the cylinder B, and which piston-rod is connected by a connecting-rod, E, with a crank-arm, F, of a key-shaft, G, provided with a fixed or removable key or handle, H.

At the top and bottom of the casing A the two cylinders J and J' are formed, containing the pistons K K', provided with the piston-rods L L', projecting from the opposite ends of the cylinders J J', and connected with the frame M, carrying the bolts I.

Between the cylinder B and the cylinders J J' the air-chambers N N' are formed, which are in communication with the cylinder B by ports a, closed by valves b.

The cylinder B is provided in its closed end with a port, d, closed by an inside valve, g.

The cylinders J J' are provided at their op-

posite ends with the ports h h', which can be closed by slide-valves O O', having the ports k k'. The sliding valves O O' are connected with levers P P', pivoted on the ends of the casing. The cylinder J is provided in the working end with a port, l, which can be closed by a rocking valve, Q, provided with an arm, Q', connected by a connecting-rod, R, with the lever P'. The cylinders J J' are provided with the outlet-ports S S', at about half their lengths from the working ends.

The top and bottom bolts on the safe-door can be operated from the frame M by means of angle or elbow levers.

The slide-valves O O' can be replaced by rocking valves.

The operation is as follows: The door is closed and the valve O is so adjusted that the chamber N will be in communication with the cylinder J. Then the piston C is operated by means of the key or handle H, or any other suitable device to compress the air in the cylinder B, which compressed air passes into the chambers N N' and acts on the piston K and pushes the same in the direction of the arrow a', and moves the bolt-frame M in the same direction, thereby passing the bolts I into their apertures in the safe-frame, thus locking the door in place. When the bolts are in their apertures, the piston K will have passed the aperture S, and the compressed air can escape from the cylinder. At the time that the safe is to be opened, the lever P' is operated by a key or by the time-lock or other contrivance, and thereby the valve O' is moved in such a manner as to permit the compressed air to pass into the cylinder J' and force the piston K' in the inverse direction of the arrow a', thereby moving the frame M in the same direction and withdrawing the bolts from the apertures or the safe-frame, thus permitting the door to be opened. In order that the piston K' can move the frame M in the inverse direction of the arrow a', the compressed air must be removed from behind the piston K. As it may happen that the piston K does not pass the exhaust-port S, and the compressed air in the cylinder J would not escape, I have arranged the outlet-port l, the valve Q of which is opened from the lever P' as soon as the lever P' shifts the valve O', thus permitting the com-

pressed air in the cylinder J to escape. If continued pressure should be needed to hold the bolts in place after being thrown for the purpose of locking, the outlet-aperture S in the cylinder J could be dispensed with, and the air would be permitted to escape from the cylinder J by means of the valve Q only.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

10 1. The combination, with a lock having two cylinders containing pistons connected at their opposite ends to the bolt mechanism of the lock, of a third cylinder on said lock containing an air-compressing piston and connected
15 with the other two cylinders by suitable valve mechanism, to admit air alternately on opposite sides of said pistons, substantially as herein shown and described.

20 2. The combination, with the casing A, having the cylinders B and J J', of the pistons C K K', the bolt-frame M, connected with the pistons K K', and of means for working the piston C in the cylinder B, substantially as herein shown and described.

25 3. The combination, with a casing, A, having cylinders B and J J', and the chambers N N', of the valves O O', connecting said chambers with cylinders J J', and located in rear of the pistons C K K', a bolt-frame connected

with the pistons K K', at their opposite ends, 30 and means for operating the piston C in the cylinder B, substantially as herein shown and described.

4. The combination, with the casing A, having the cylinders B J J' and the compartments 35 N N', of the pistons C K K', the valves O O', connecting chambers N N' with cylinders J J', as shown, the levers P P', outside of the casing and connected to said valves, a bolt-frame connected with the pistons K K', as 40 shown, and of means for operating the piston C in the cylinder B, substantially as herein shown and described.

5. The combination, with a lock-casing having two cylinders, each containing a piston 45 connected to the bolt mechanism of a lock, which pistons work in opposite directions, of an air-compressor, openings for admitting compressed air into the cylinders, and connected 50 mechanism for permitting the compressed air to escape from one cylinder at the same time that the air is being admitted into the other cylinder, substantially as herein shown and described.

ALONZO WM. FULLER.

Witnesses:

ANDREW BELL.

ENOCH E. COFFIN.