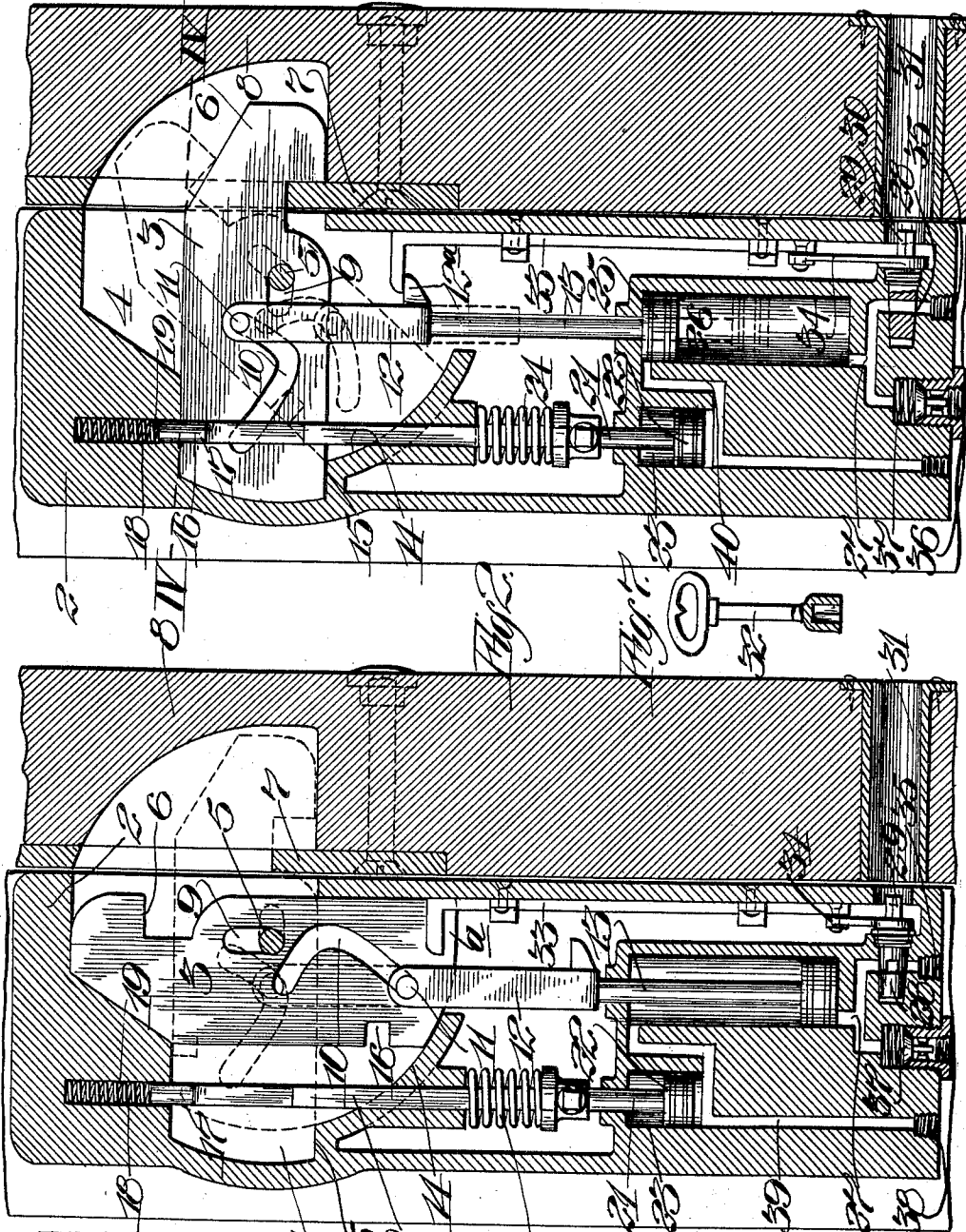


J. C. MESSICK.
PNEUMATIC DOOR LOCK.
APPLICATION FILED JAN. 23, 1912.

1,038,624.

Patented Sept. 17, 1912.

2 SHEETS—SHEET 1.



Witnesses
Thos. Leisberg
R. S. Barry

Fig. 1.
24

Inventor
John C. Messick.
by J. H. Strong
Attorney

1,038,624.

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2 SHEETS—SHEET 2.

Fig. 3.

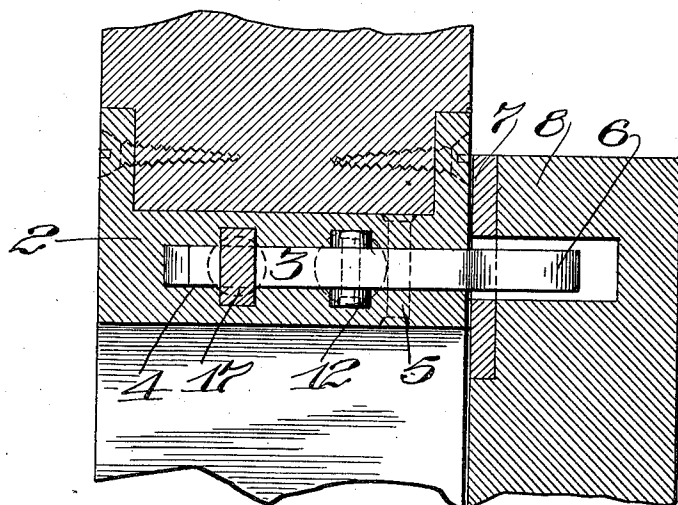
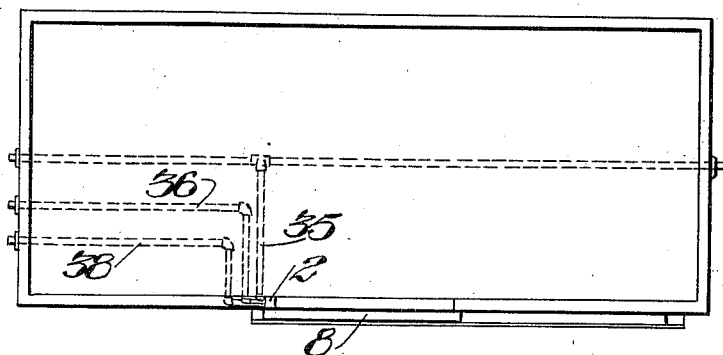


Fig. 4.

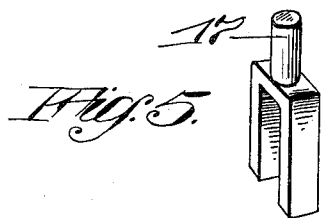


Fig. 5.

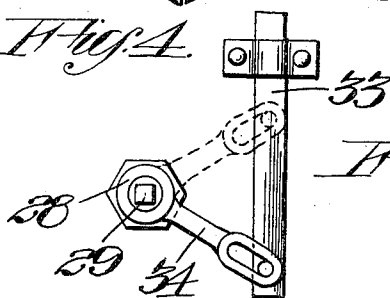


Fig. 6.

Witnesses:
Chas. K. Steeg
R. S. Barry

Inventor:
John C. Messick
W. J. H. Strong
his Att'y

UNITED STATES PATENT OFFICE.

JOHN C. MESSICK, OF SAN RAFAEL, CALIFORNIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-THIRD TO ROBERT G. JONES AND ONE-THIRD TO WILLIAM F. JONES, BOTH OF SAN RAFAEL, CALIFORNIA.

PNEUMATIC DOOR-LOCK.

1,038,624.

Specification of Letters Patent.

Patented Sept. 17, 1912.

Application filed January 23, 1912. Serial No. 672,839.

To all whom it may concern:

Be it known that I, JOHN C. MESSICK, a citizen of the United States, residing at San Rafael, in the county of Marin and State of California, have invented new and useful Improvements in Pneumatic Door-Locks, of which the following is a specification.

This invention relates to locks and more particularly to a pneumatic lock for car doors and other doors erected in such structures as may conveniently provide air under pressure to operate the apparatus.

The object of the present invention is to provide a simple, powerful and safe lock structure, and particularly to provide a pneumatic operable device in combination with a stationary structure such as a car and a movable door or member to be locked to the stationary member.

It is also an object of the present invention to provide a pneumatically operable lock involving details of construction for the control of air at suitable pressures to lock and unlock the device; means being provided whereby the air utilized in locking the bolt may be automatically closed.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a horizontal section through a part of a car body and door with the lock in horizontal cross section. Fig. 2 is a detail, vertical sectional view through the lock structure, showing the parts in elevation in the open position. Fig. 3 is a detail view, showing the door in locked position. Fig. 4 is a horizontal section on line IV—IV, Fig. 2. Fig. 5 is a perspective view of the detent. Fig. 6 is a detail view of the valve-closing device. Fig. 7 is a view of the key.

In the illustrated embodiment of my invention 2 represents a casing which may be of sheet metal, cast iron or other appropriate material, chambered to conform to and to provide the necessary spaces for the several movable members, one of which, as the bolt 3, is mounted in a chamber 4 at the upper end of the casing 2 and is adapted to swing about a stationary lug 5 in the casing. The bolt 3 may be flat and provided with a hook portion 6 which, when turned out-

wardly, will enter a keeper 7 attached to a door structure 8. The flat bolt 3 is provided with a slot portion 9 adapted to permit the bolt to move transversely and swing about the fixed stud 5 and there is also provided in the bolt 3 an arcuate groove 10 of such proportions and design as will effect the desired swinging and transverse sliding movement of the bolt when the latter is actuated through means of a crosspiece 11. This is shown as projecting through the slot 10 and carried in the sides of a yoke 12 secured to the upper end of a piston rod 13.

The casing 2 is shown as provided with a curved seat or abutment surface 14 with an arc struck approximately from the center of the transverse pin 5, and when the cross-head 11 moves vertically, it in combination with the arcuate slot 10 causes the bolt 3 to rock from the position shown in Fig. 1 about the journal 5 until the lower end *a* of the bolt 3 is carried above a horizontal shelf 15, when further movement of the crosshead 11 acting upon the curved walls of the slot 10 shifts the bolt transversely across the journal 5, thus locking the door 8.

The uppermost edge of the bolt 3 is provided with a recess 16 into which there is adapted to snap a detent 17 slidable in a pocket 18 and normally projected by an expansible spring 19 in said pocket. The lower end of the detent 17 is normally supported upon the upper arms 20 of a piston rod 21 to which is connected at the lower end a piston 22 movable in a cylinder 23 formed or made in the casing 2. The piston rod 21 is surrounded adjacent its connection with the piston 22 by a heavy helical spring 24, the function of which is to normally depress the piston rod 21, thus allowing the detent 17 to be projected downwardly by its spring 18.

The piston rod 13 of the yoke 12, which carries the crosshead 11, is provided at its lower end with a piston 25 slidable in a cylinder 26 in the casing 2; the cylinder at its lower end communicating with the air chamber 27, into which air may be admitted from the pneumatic system of a car, when the lock is provided on such a car, through means of a valve 28, provided with a stem 29, projecting outwardly toward the

front edge of the casing 2, which is provided with an opening 30.

When the door 8 is moved into position to close the opening of the car, an aperture 31 in the car door registers with the opening 30 of the lock casing, so as to permit the insertion of a suitable key, as 32, whereby an operator may turn the valve 28 to admit air into the chamber 27, and thence beneath the piston 25; the pressure of the air effecting an upward movement of the piston and the yoke 12 and the crosshead 11, which latter coöperating with the curved walls of the slot 10, first swings the bolt 3 about the journal member 5 until it assumes a substantially horizontal position, when the continued movement of the piston under air pressure will cause the crosshead 11 to shift the bolt 3 transversely until it is carried over the shoulder 15 of the lock case, at which time the door will be effectually locked, as indicated in Fig. 3.

For the purpose of insuring the cutting off of the air supply in the chamber 27 by the closing of the valve 28 in the event that the operator negligently omits to close the valve, this operation will be automatically produced by the upward movement of the yoke 12, which is here shown as provided with a projection 12^a adapted to encounter in its upward movement a link 33 guided in suitable bearings in the casing 2; the lower end of the link being appropriately connected to a lever 34 attached to the valve stem 29, the timing of the movement of the link 33 being such that as the uppermost limit of movement of the yoke 12 is reached, at which time the bolt 3 will be practically thrown, the projection 12^a on the yoke will encounter the link 33, and this will be moved sufficiently to automatically close the valve 28, thus cutting off the supply of air to the chamber 27 and cylinder 26.

The valve 28 is shown as controlling air pressure from the train pneumatic system and from which a pipe 35 may be continued and connected to the lock casing 2, and there is also connected to the lock casing 2 a pipe or other suitable connection 36 into which air may be admitted from any suitable source, when the car on which the lock is mounted is at a station, storage house, depot or other point where the car may be loaded. After the loading of the car has been accomplished, the attendant may couple up the connection 36 to a convenient source of air supply and turn air there-through into the chamber 27 without moving the valve 28. There may be provided between the connection 36 and the lock casing 2 a suitable valve 37 which normally is closed, so that when the valve 28 is open, air will not pass outwardly through the connection 36, since both the connections 35 and 36 communicate into the common chamber 27; and

if a valve, as 37, were not provided, this escape of air would occur. It will thus be seen that the swinging bolt 3 may be closed at will by the application of air under pressure to the piston 25 and that this air may be applied through the train system by means of the valve 28 and the connection 35 with the train system; or air under pressure may be provided to actuate the piston 25 through any other suitable source of supply by the connection 36.

When the bolt 3 has been turned to horizontal position as in Fig. 3, and shifted so that its lower end *a* is carried across the shoulder 15, the detent 17 then automatically snaps into the recess 16, as this registers with the face of the detent, and thereafter the bolt 3 cannot be moved laterally until the detent 17 has been elevated so as to release the bolt by being carried out of the slot 16. This release of the bolt 3 from the control of the detent 17 is accomplished by the application of air under suitable pressure to the lower end of the piston 22 and air is conducted to the chamber 23 in which the piston 22 moves through a suitable connection, as 38, into which air may be admitted under the desired pressure, passing into a chamber 39 and thence into cylinder 23. The pressure of air necessary to move the piston 22 will, of course, be determined by the downward thrust of the expansible spring 24 which normally forces the piston 22 downwardly. When the desired pressure of air in chamber 29 has been reached, the piston 22 will move upwardly carrying the arms 21, which straddle the sides of the bolt 3, into contact with the downwardly projecting end of the detent 17 and this will be forced upwardly out of the slot 16 compressing the spring 19. As soon as the detent 17 has been elevated to release the bolt 3, air flowing from the chamber 39 through a duct 40 enters the upper part of the chamber or cylinder 26 and forces downwardly the piston 25, which in turn moving the crosspiece 11, effects first a transverse movement of the bolt 3 in the lock casing 2 until the end *a* of the bolt rides off of the horizontal shoulder 15, when further downward movement of the crosspiece 11 swings the bolt 3 about the fixed pivot 5 until the hook 6 of the bolt enters the chamber 4 of the lock casing, thus releasing the door.

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

1. In a lock, the combination with a chambered case, of a stationary pivot, a bolt mounted upon said pivot having a swinging and shifting movement relatively thereto, and a pneumatically operated member connected to said bolt and adapted to swing and shift the same about the pivot.

2. In a lock, the combination with a cham-

bered case, of a stationary pivot, a bolt mounted upon said pivot having a swinging and shifting movement relatively thereto, a pneumatically operated member connected
5 to said bolt and adapted to swing and shift the same about the pivot, and an automatically projected detent adapted to lock the bolt in shifted position.

3. In a lock, the combination with a chambered case, of a stationary pivot, a bolt
10 mounted upon said pivot having a swinging and shifting movement relatively thereto, a pneumatically operated member connected to said bolt and adapted to swing and shift
15 the same about the pivot, an automatically projected detent adapted to lock the bolt in shifted position, and pneumatically operative means adapted to retract said detent to release the bolt.

20 4. A pneumatic lock comprising a casing having a bolt capable of a swinging and shifting movement in the casing, a detent adapted to lock the bolt in shifted position, and pneumatically operable means for re-
25 leasing the detent and shifting and swinging the bolt.

5. A pneumatically operable lock comprising a casing, a swinging and sliding bolt mounted in said casing, a pneumatically projected piston for operating said bolt, a
30 valve controlling the movement of said piston, and means whereby said valve may be automatically closed.

6. A pneumatic lock comprising a casing adapted to be attached to a suitable struc-
35 ture, a keeper on a part movable relative the first named structure, a bolt turnable and shiftable in said casing and adapted to engage said keeper, a pneumatically operated
40 member adapted to actuate said bolt, to engage the keeper, a detent for locking the bolt against shifting movement, and a pneumatically controlled element operative upon said detent.

In testimony whereof I have hereunto set
45 my hand in the presence of two subscribing witnesses.

JOHN C. MESSICK.

Witnesses:

W. F. JONES,
ROBERT G. JONES.