

W. J. MARTIN.
CAR DOOR LOCK.

APPLICATION FILED SEPT. 1, 1909.

990,446.

Patented Apr. 25, 1911.

2 SHEETS—SHEET 1.

Fig. 1

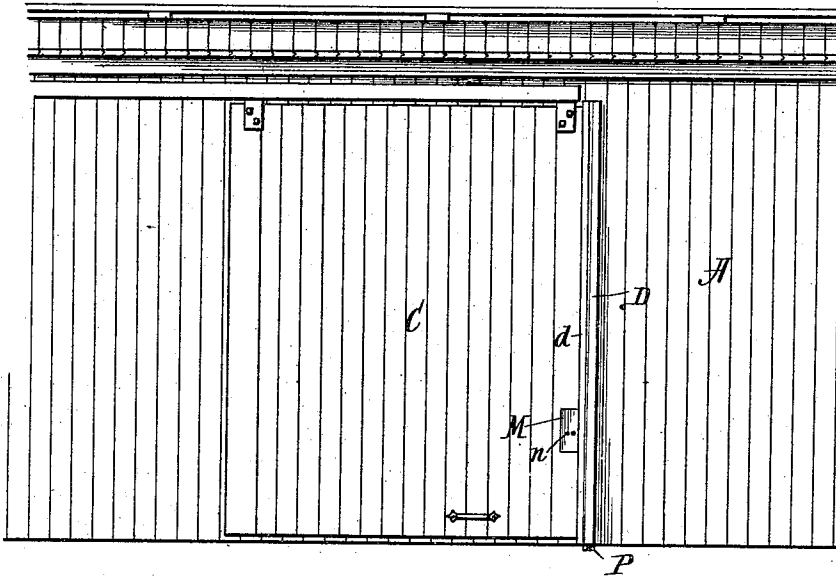


Fig. 2.

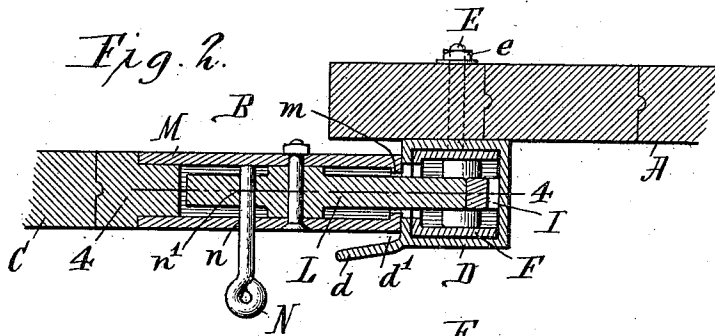
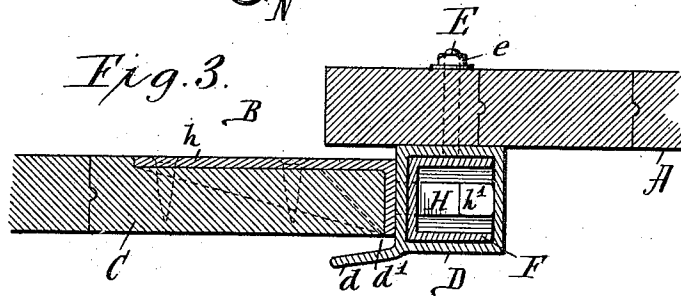


Fig. 3.



Witnesses:
Christ Fink, Jr.,
Eva C Pluckhahn.

William J. Martin, Inventor.

By Emil Neuhart

Attorney.

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2 SHEETS—SHEET 2.

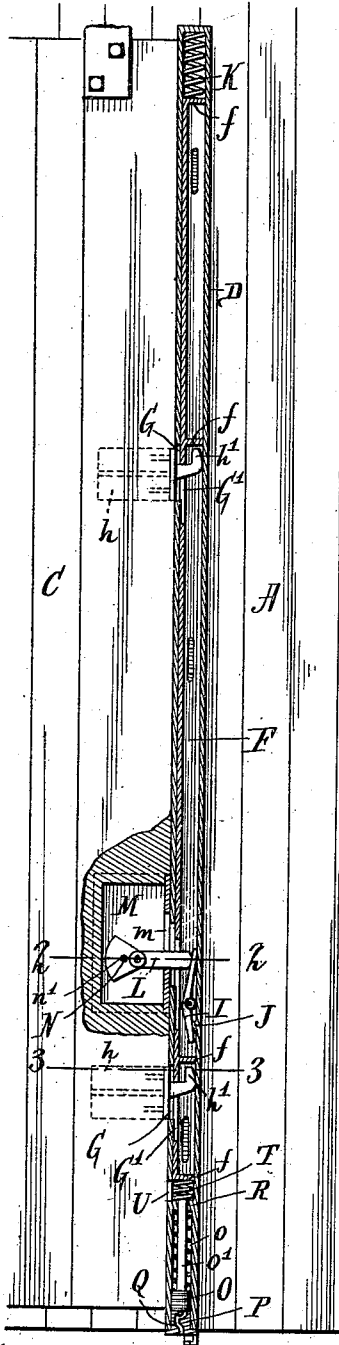


Fig. 4.

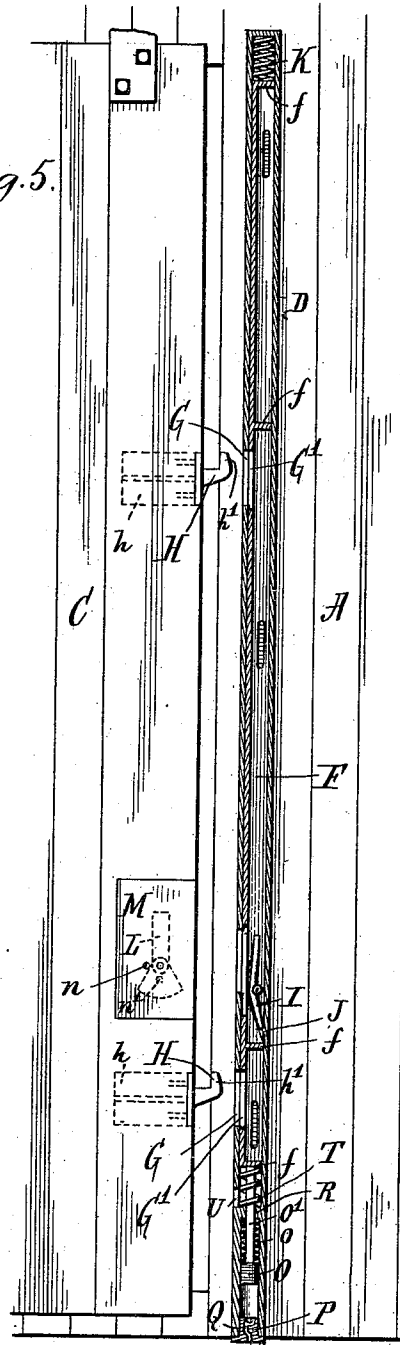


Fig. 5.

Christ Feinle, Jr.,
Eas. C. Buckham

Witnesses:

William J. Martin, Inventor.
By Emil Neubach
Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM J. MARTIN, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF TO FRANCIS J. CARR, OF BUFFALO, NEW YORK.

CAR-DOOR LOCK.

990,446.

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To all whom it may concern:

Be it known that I, WILLIAM J. MARTIN, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Car-Door Locks, of which the following is a specification.

My invention relates to air-controlled locks for sliding-doors and particularly for railway-car doors, so as to minimize, if not entirely prevent burglary.

My invention has for its object the provision of simple and effective means whereby a car or other sliding door, upon being closed, will become locked automatically and cannot be opened except by the use of compressed-air or some other powerful agent.

To these ends the invention consists in the construction, arrangement, and combination of parts to be hereinafter described and particularly pointed out in the subjoined claims.

In the drawings,—Figure 1 is a side elevation of a portion of a car equipped with this improved door-lock. Fig. 2 is an enlarged horizontal section taken on line 2—2, Fig. 4. Fig. 3 is an enlarged horizontal section taken on line 3—3, Fig. 4. Fig. 4 is a vertical section on a reduced scale, taken on line 4—4, Fig. 2, the car-door being broken away to show the weighted trip-arm in elevation within its casing and the door being shown in closed position. Fig. 5 is a similar section showing the door open and the locking-plunger elevated.

Referring now to the drawings in detail, like letters of reference refer to like parts in the several figures.

The reference letter A designates a car having the usual door-opening B and sliding-door C; the latter being guided for movement on a rail in the usual manner.

While I have shown this invention applied to a railway-car, it may, however, be used for locking doors of jails, ware houses, banks, and other places where it is desired to guard against intrusion or theft.

The operative parts constituting this improved lock, are in part secured to the side wall of the car adjacent to the door-opening and in part to the door. Secured to the side wall of the car and acting both as the door-jamb and as a housing for the operative parts, is a tube D advisedly made rectangu-

lar in cross-section. This tube extends from the bottom of the car-body to a point above the upper end of the car-door opening and it may be made of cast metal or formed of rolled sections of metal connected together in any rigid and approved manner. Said tube has a retainer flange *d* extending from one of its outer corners, almost parallel with the side of the car so as to provide a groove *d'* into which the edge of the door C is adapted to enter. In order to guard against removal of the tube from the car, it is bolted to the car-body in the manner shown in Figs. 2 and 3; one of the ends of the bolts E being preferably fastened to the inner wall of the tube by casting the metal around the bolts and when applied to the body of the car, these bolts are passed through the side wall and have nuts *e* applied to their inner projecting ends, thus making it necessary to first obtain access to the interior of the car before the tube can be removed therefrom. If desired, said tube may be fastened in any other suitable manner. Slidable within said tube is a locking-plunger F extending from a point near the upper end of said tube to within a short distance from its bottom; said plunger being preferably of channel-shape in cross-section, as shown in Figs. 2 and 3; and connecting the front and rear walls thereof at the top, at the bottom, and at the intermediate points are cross webs *f* which serve to strengthen the plunger without materially increasing the weight of the same. The upper and lower webs also serve as bearings for the ends of springs, to be hereinafter described.

The edge wall of the housing or inclosing tube facing the edge of the door and the corresponding edge wall of the plunger are provided with openings G, G¹, respectively, through which are adapted to extend lock-hooks H projecting from the edge of the car door. These hooks are formed on a webbed casting *h* secured to the inner side and to the edge of the car door, as best shown in Figs. 2 and 3; and the ends of said hooks are turned upwardly, as at *h*¹, so that when they are entered into the tube and the plunger lowered, the edge wall of the latter at points directly above its openings G¹ will engage the upwardly-directed portions of said hooks and lock the door against opening. The normal position of the plunger is

that shown in Fig. 5, at which time the car-door is unlocked and the plunger held in elevated position. The plunger is so held by a dog I pivotally held between the inner and outer walls of the plunger and having its lower end engaging a tooth or projection J formed on the inner surface of the housing or inclosing tube. When the plunger is in this position, the car-door may be closed without locking the same, as the lock-hooks may enter the tube and project through the opening G¹ in the plunger without actuating any part of the device.

In order to lock the door when closing the same, it is necessary to disengage the dog I from the tooth or projection J so that the plunger may lower and in so doing, engage the lock-hooks entered into the housing or inclosing tube. This plunger may lower by gravity to interlock with the lock-hooks; but I prefer to depend upon a powerful spring K which I interpose between the upper end of the plunger and the upper closed end of its inclosing tube. In fact it is my intention that the spring shall be so powerful as to resist a pressure upward of 200 pounds to the square inch so that it will be almost impossible by ordinary means to cause the plunger to be elevated out of interlocking position with the lock-hooks.

The means employed to disengage the lock-dog I from the tooth or projection on the inclosing tube, is a simple weighted trip-arm L pivotally held within a metallic casing M secured to the car-door; said arm being so weighted that normally it stands in a vertical position within said casing, as shown in Fig. 5, and when in this position no portion thereof projects out of said casing. The edge of said casing has an opening *m* through which said trip-arm is adapted to extend when the door is being closed and it is desired to lock the same. In order to swing said trip-arm in a position for engaging the lock-dog I so as to release the plunger and permit it to lower, a pin or other suitable tool may be inserted into the casing M through the opening *m* so as to engage the weighted lower end of said trip-arm and force the same rearward and upward. This will cause the upper end of said arm to swing downward and outward through the opening *m* and for the purpose of retaining said trip-arm in this position, the casing is provided with an opening *n* through which a pin N is to be inserted so as to enter a corresponding opening *n*¹ in the weighted portion of the trip-arm. When the trip-arm is in the position last-mentioned, it will act upon the lock-dog I when closing the door, and release the locking-plunger F so that it may lower to lock the door. After the door is locked, the pin N is removed from the openings *n*, *n*¹. When the locking-plunger is lowered and interlocked

with the lock-hooks of the door, a powerful medium will be required to elevate the same against the action of the spring K at the upper end of the inclosing tube; and for this purpose a piston O is held for reciprocating movement within the lower end of the housing or inclosing tube and in order to receive said piston, the housing or tube is provided with a cylindrical bore *o* closed at its lower end by a casting P having a circuitous passage Q therein through which the power agent, such as compressed air, steam, or the like, is adapted to enter and act against the under side of the piston to elevate the same. This circuitous passage is provided to guard against the insertion of a tool through the casting P for the purpose of raising the piston and in turn elevating the locking-plunger to disengage it from the lock-hooks of the door.

The piston O has a piston-rod *o*¹ passing through a diaphragm or partition R in the tube and surrounded by a spring S bearing at one end against said diaphragm or partition and at its other end against the upper end of said piston, the purpose of which spring is to hold said piston in its normal or lowermost position. Between said diaphragm or partition R and the lower end of the locking-plunger F is a buffer-spring T adapted to receive the jar of the plunger as it lowers and also to relieve the lock-hooks H of strain, due to such jar. When said plunger is lowered, the buffer-spring T is compressed and the upper end of the piston-rod *o*¹ is out of engagement with said plunger; the piston therefore travels a short distance when actuated by a power-agent before the rod thereof comes in contact with said plunger; but after contact therewith, said plunger is caused to be elevated and become disengaged from the lock-hooks of the door. The extent to which said plunger is elevated being sufficient to bring the lower end of the lock-dog I above the tooth or projection J projecting into the tube from one of its edge walls and as said lock-dog clears said tooth or projection, its lower end swings against the wall of said tube and prevents lowering of the plunger. After the piston is raised sufficiently by the application of a power-agent thereto to engage the lock-dog of the plunger with the tooth or projection on the inclosing tube, the air may escape from the lower end of the tube in any suitable manner to permit the piston to assume its normal or lowermost position. Upon opening the door, the trip-arm L will swing into vertical position. In order that the plunger may work freely within the inclosing tube, it is supplied with oil in any suitable manner; and for the purpose of permitting the surplus oil to escape, an opening U is provided in the tube directly above the diaphragm or partition R.

Having thus described my invention, what I claim is,—

1. A locking-device for doors comprising a tube closed at its ends, a piston within the lower end of said tube, a locking-plunger vertically movable within said tube, a spring above said plunger and acting thereagainst, and a buffer-spring beneath and in contact with said plunger, said plunger being adapted for locking engagement with a door.

2. In a locking-device for doors, the combination with a structure having a door-opening and a door for closing said opening provided with a lock-hook, of a tube secured to said structure adjacent said door-opening and having an opening, a hollow locking-plunger vertically movable within said tube and provided with an opening through which and the opening in said tube the lock-hook of said door is adapted to extend, retaining-means for holding said plunger in elevated position, a releasing-element for releasing said retaining-means, and a spring acting against the upper end of said plunger to cause the same to lower and engage said lock-hooks.

3. In a locking-device for doors, the combination with a structure having a door-opening and a door for closing said opening provided with lock-hooks having upturned ends, of a tube secured to said structure, a piston within the lower end of said tube, a hollow locking-plunger within said tube and adapted to be elevated by said piston, a spring acting against the upper end of said plunger, and a buffer-spring against which the lower end of said plunger is adapted to act, said tube and plunger having openings through which the lock-hooks of the door extend and are adapted to be engaged by said plunger.

4. In a locking-device for doors, the combination with a structure having a door-opening and a door for closing said opening provided with lock-hooks, of a tube secured to said structure adjacent said door-opening and having openings, said tube having also a transverse partition near its lower end, a hollow locking-plunger vertically movable within said tube and provided with openings through which and the openings in said tube the lock-hooks of said door are adapted to extend, a piston within said tube below said partition having a piston-rod guided in said partition, a spring surrounding said piston rod and bearing at one end against the underside of said partition and at its other end against said piston, and a buffer-spring between said partition and the lower end of said locking-plunger.

5. In a locking-device for doors, the combination with a structure having a door-opening and a door for closing said opening provided with lock-hooks, of a tube secured to said structure adjacent said door-opening

and having openings through which said locking-projections are adapted to extend, a hollow locking-plunger vertically movable within said tube and provided with openings registering with those in said tube, a spring acting against the upper end of said plunger, and means at the lower end of said tube to elevate said locking-plunger against the action of said spring.

6. In a locking-device for doors, the combination with a structure having a door-opening and a door for closing said opening, of a tube secured to said structure adjacent said door-opening and provided with openings in its edge wall facing said door and with an internal tooth or projection, a hollow locking-plunger vertically movable within said tube and having an opening registering with one of the openings in said tube, means on the door adapted to enter the tube through its other opening for releasing said lock-dog from its tooth or projection, locking-means on the door adapted to extend into said plunger to be engaged thereby, and power actuated means for elevating said plunger within said tube.

7. In a locking-device for doors, the combination with a structure having a door-opening and a door for closing said opening, of a tube secured to said structure adjacent said door-opening and having openings in the edge wall facing said door and an internal tooth or projection on its opposite edge wall, a locking-plunger vertically movable within said tube and having means to engage said tooth or projection, means to cause said locking plunger to be elevated, locking-elements on the door adapted for engagement with said plunger through one of the openings in said tube, means on said door to release said plunger from said tooth or projection, and means at the upper end of said tube to cause said plunger to lower.

8. In a locking-device for doors, the combination with a structure having a door-opening and a door for closing said opening, of a tube secured to said structure adjacent said door-opening and provided with an internal tooth or projection, a locking-plunger vertically movable within said tube, means on said door with which said plunger is adapted to interlock, a pivoted lock-dog carried by said plunger and normally engaging said tooth or projection, a pivoted trip-arm on the door adapted to engage said lock-dog to release the same from said tooth or projection and permit said plunger to lower, and power-actuated means at the lower end of said tube adapted to elevate said plunger.

9. In a locking-device for doors, the combination with a structure having a door-opening and a door for closing said opening, of a tube secured to said structure adjacent said door, a locking-plunger vertically movable within said tube and adapted to lock

- said door when closed, retaining means for holding said plunger elevated, a weighted trip-arm on the door normally out of operative position and adapted to be swung into operative position to release said retaining-means and permit said locking-plunger to lower, means for holding said trip-arm in inoperative position, and power-actuated means for elevating said plunger.
- 10 10. In a locking-device for doors, the combination with a structure having a door-opening and a door for closing said opening, of a tube secured to said structure adjacent said door, a locking-plunger vertically movable within said tube and adapted to lock said door when closed, retaining-means for holding said plunger elevated, a casing on said door having an opening in one of its walls, a weighted trip-arm pivotally held within said casing and normally in a vertical position and adapted to be swung into horizontal position so as to project through the edge of said casing, said trip-arm having an opening adapted when swung into horizontal position to register with the opening in the wall of said casing, a pin extending through the opening in said casing and entering the opening in said trip-arm to hold the latter in horizontal position, and power-actuated means for elevating said plunger.
- 15 11. In a locking-device for doors, the combination with a structure having a door-opening and a door for closing said opening provided with lock-hooks, of a tube secured to said structure adjacent said door-opening and having a circuitous inlet-passage at its lower end, a horizontal partition near its lower end and an internal tooth or projection a distance above said partition, said tube having also openings in the wall against which the edge of the door is adapted to bear, a locking-plunger vertically movable in said tube and held elevated when said door is open, retaining-means carried by said plunger for engagement with the tooth or projection in said tube, a buffer-spring between the partition in said tube and the lower end of said plunger, a piston in said tube between said partition and said circuitous inlet-passage having a piston-rod guided in said partition and adapted to pass through said buffer-spring and act against the lower end of said plunger, a spring surrounding said piston-rod and bearing at one end against said partition and at its other end against said piston, means on the door for releasing the retaining-means of the plunger from engagement with said tooth or projection, and a spring acting against the upper end of said plunger to cause the same to lower.
- 20 25 30
- In testimony whereof, I have affixed my signature in the presence of two subscribing witnesses.
- WILLIAM J. MARTIN.
- Witnesses:
ELLA C. PLUECKHAHN,
EMIL NEUHART.