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3 SHEETS--SHEET 1.

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A. J. SCHOLFIELD & J. R. REDMAN.
 LOCK FOR VEHICLE DOORS.
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1,154,439.

Patented Sept. 21, 1915.
 3 SHEETS—SHEET 2.

Fig. 3.

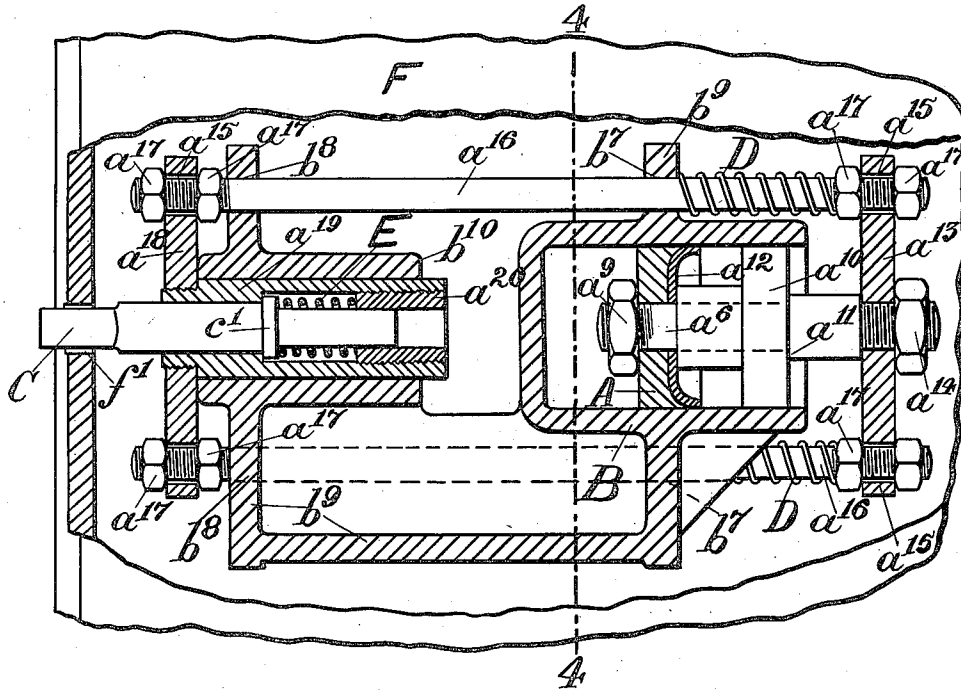
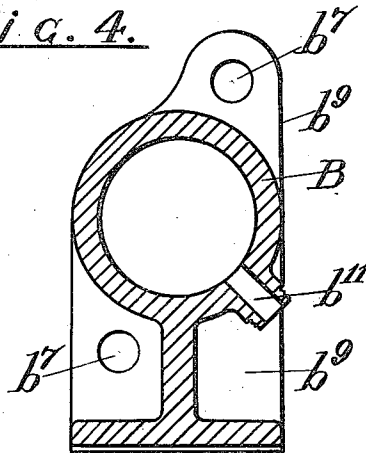


Fig. 4.



Witnesses:
 W. L. Busch
 Matthew Marlow

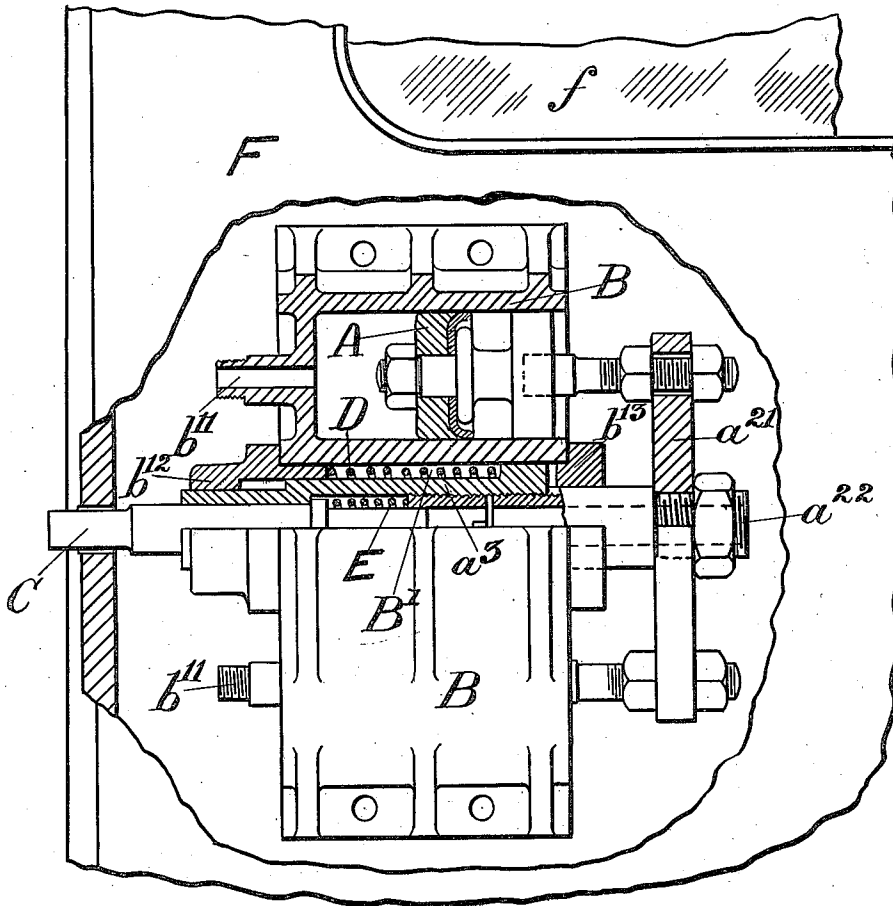
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Fig. 5.



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UNITED STATES PATENT OFFICE.

ARTHUR JAMES SCHOLFIELD, OF RIDGE BANK, TODMORDEN, AND JOHN RICHARD REDMAN, OF SANDBED, HEBDEN BRIDGE, ENGLAND.

LOCK FOR VEHICLE-DOORS.

1,154,439.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, ARTHUR JAMES SCHOLFIELD and JOHN RICHARD REDMAN, both subjects of the King of Great Britain, and residing, respectively, at Ridge Bank, Todmorden, in the county of York, England, and 8 Wood Villas, Sandbed, Hebden Bridge, in the county and country aforesaid, have invented new and useful Improvements in or Relating to Locks for Vehicle-Doors, of which the following is a specification.

This invention relates to locks for vehicle doors and is primarily intended for use in connection with railways, the chief object being to construct a lock for each door which can be locked and unlocked by the driver, or other person on the engine, and unlocked by the guard.

According to this invention each lock comprises a piston and cylinder arrangement that is adapted to be put into fluid connection with a high pressure or vacuum system to project a bolt to its forward or locking position against the action of a spring which returns the bolt to its unlocked position immediately the pressure or vacuum is released, a supplementary spring allowing the bolt to be forced inward from its locking position by the closing of the door.

In the accompanying drawings: Figure 1 is a longitudinal section and Fig. 2 is a plan of a lock for use with a high pressure system and applied to a railway carriage door. Fig. 3 is a similar view to Fig. 1 showing a lock for use with a vacuum system. Fig. 4 is a section taken on line 4—4 of the lock shown in Fig. 3. Fig. 5 is a similar view to Fig. 3 showing a lock provided with two cylinders.

A indicates the piston, B the cylinder, C the bolt, D the spring, E the supplementary spring, F the carriage side, and G the carriage door.

The apparatus shown in Figs. 1 and 2 comprises a cylinder B whose external diameter is conveniently made slightly less than the thickness of the carriage side F so that it can occupy a position within such side below the lower frame of the window *f*, lugs *b* or a plate connected with the cylinder B affording a convenient means for securing it in

position. The inner end of the cylinder is closed by a detachable or other cap *b*¹ connected by a union *b*² or other fitting with a branch pipe *b*³ which leads to the main pressure supply pipe not shown in the drawings. This pipe is connected with the high pressure fluid supply through the intervention of a valve which is under the control of the driver or other person on the engine. Release valves may also be fitted on the engine and in the guard's van or other compartment to enable the pressure to be released by the guard or driver. The cylinder is shown formed with two internal diameters to receive a correspondingly shaped piston, the shoulders *b*⁴ and *a* that are respectively formed on the cylinder B and piston A by the variation of the diameters constituting a stop to limit the inward movement of the piston. The inner end of the latter is shown fitted with a leather cup ring *a*¹, but any other appropriate packing may be substituted therefor. The outer end of the piston is reduced in diameter and is there screw-threaded at *a*² to receive a sleeve or socket *a*³ within which is slidably mounted the locking bolt C. The sleeve *a*³ is conveniently formed with two external diameters and is supported at its outer end in a cap *b*⁵ which fits the cylinder B and the two diameters of the sleeve. The shoulders *a*⁴ and *b*⁶ that are respectively produced on the sleeve and cap by the variation of the diameters constitute a stop which limits the outward motion of the piston A. The sleeve so formed is encircled by the spring D which exerts pressure between the cap *b*⁵ and the piston A and normally tends to retain the latter at the inner end of the cylinder B. A portion of the sliding bolt C within the sleeve is reduced in diameter at *c* to enter a hole *a*⁵ formed in a portion of the piston and is normally retained in its extended position in relation to the sleeve *a*³ by the supplementary spring E which encircles the reduced portion of the bolt and presses a collar *c*¹ thereon against a shoulder *a*⁶ in the sleeve. The outer end of the bolt C enters a hole *f*¹ in a guide plate *f*² that is fixed to the carriage side, a suitably formed plate *g* being attached to the edge of the

door G to receive such bolt when the latter occupies its forward or locking position. The end of the bolt C is rounded on its front face at c^2 or is otherwise formed to allow the door G to close and press the bolt inward in the event of its having been caused to assume its locked position when the door is open.

By the arrangement described, immediately the driver puts the locks in fluid communication with the high pressure supply each bolt is shot forward to its locking position against the action of the spring D which encircles the sleeve and all the doors which have been previously shut are at once locked, any door that has been left open becoming automatically locked as soon as it is shut. On arriving at the station the driver or guard releases the fluid pressure in the main pipe and cylinders whereupon the springs D at once return the bolts C to their unlocked position to enable passengers to open the carriage doors. In the event of an accident taking place such for example as a collision between two trains, any serious damage inflicted on the carriages would break or destroy one or more of the pipe connections and allow the springs D to return the bolts to their unlocked position. If desired each branch pipe b^3 may be provided with a release valve which may be connected with a chain, button, or other device adapted to be put into operation by an occupant of the carriage to release the pressure, or to warn the driver or guard that the pressure is to be released, so as to enable the doors to be opened in case of necessity or emergency.

Referring to the example shown in Figs. 3 and 4 which is intended for use on a train fitted with a vacuum system, the cylinder B is made with as large an internal diameter as the thickness of the carriage side will permit and the piston A within such cylinder is mounted on a rod a^6 between a nut a^9 and a guide a^{10} which is secured against a shoulder a^{11} on the rod a^6 by the nut a^9 a leather packing ring a^{12} being interposed between the piston A and a portion of the guide a^{10} . The rod a^6 is reduced in diameter at its outer end and is secured to a cross bar a^{18} by a nut a^{14} . This cross bar is formed near its ends with holes a^{15} to receive the ends of two rods a^{16} which are connected to such cross bar by nuts a^{17} . These rods pass through guide holes b^7 b^8 in the framing b^9 and are connected at their opposite ends to a cross bar a^{18} by nuts a^{17} . This cross bar is rigidly connected to a sleeve a^{19} which is slidably mounted in a casing b^{10} forming part of the framing b^9 and placed coaxially with the cylinder B. The sleeve is similarly formed internally to the sleeve a^5 in Fig. 1 and is fitted with a screwed plug a^{20} for the spring E to bear against. In this example

the piston A is normally retained toward the outer end of the cylinder B by two springs D D which encircle the rods a^{16} between the nuts a^{17} and a portion of the framing b^9 , if desired, however, a single spring D may be placed in the vacuum cylinder B for returning the piston to its outer position when the vacuum is released. The inner end of the vacuum cylinder is formed with a connection b^{11} arranged to be put in fluid communication with the source of vacuum which is under the driver's control and the vacuum can be released from the pipe system and cylinders by the driver or guard in a similar manner to that described with reference to the high pressure system. When the air is exhausted from the vacuum cylinders it draws the pistons to the inner ends thereof, thereby causing the cross bars and connecting rods to force the bolts to their locking position against the action of the springs D. When the vacuum is released the springs D return the pistons to the outer ends of the cylinders to withdraw the bolts to their unlocked position by the connections aforesaid, the springs E operating upon the bolts C in the manner hereinbefore described with reference to Fig. 1.

In the event of one cylinder giving an insufficient amount of area to produce the power required to work each lock two or more cylinders may be employed and in the example shown in Fig. 5 the bolt C is mounted in a sleeve a^5 in a casing or cylinder B¹ that is centrally disposed between two cylinders B B. These cylinders are fitted at their inner ends with connections b^{11} arranged to be put into fluid communication with the source of vacuum and contain the pistons A which are connected with the sleeve a^5 by a cross bar a^{21} which is rigidly connected with a central rod a^{22} secured to the sleeve a^5 , caps b^{12} b^{13} entering the cylinder B¹ and serving as stops to limit the movement of the pistons A in either direction.

What we claim by our invention and desire to secure by Letters Patent in the United States is:—

1. In a door lock, the combination, with a cylinder, a piston slidable therein and controlled by fluid pressure and provided with a guide for the locking bolt; of a main spring operating to slide the piston in one direction, a locking bolt slidable longitudinally in the said guide independently of the piston, and an auxiliary spring operating to press the said bolt forwardly in its guide and permitting it to move rearwardly without sliding the said piston.

2. In a door lock, the combination, with a cylinder, a piston slidable in the cylinder and controlled by fluid pressure, and a sleeve secured to the piston and provided with a guide for the locking bolt; of a main spring operating to slide the piston in one direc-

tion, a locking bolt slidable in the said guide independently of the piston and provided with an abutment which limits its forward movement in the guide, and an auxiliary
5 spring arranged in the said sleeve between the said abutment and the piston and permitting the locking bolt to slide rearwardly without sliding the piston.

In testimony whereof we affix our signatures in presence of two witnesses.

ARTHUR JAMES SCHOLFIELD.
JOHN RICHARD REDMAN.

Witnesses:

ERNALD SIMPSON MOSELEY,
MALCOLM SMITHURST.