2 Sheets—Sheet 1.

D. A. BURR.

PNEUMATIC SWITCH LOCKING APPARATUS.

No. 183,486. Patented Oct. 24, 1876.

Fig: 1

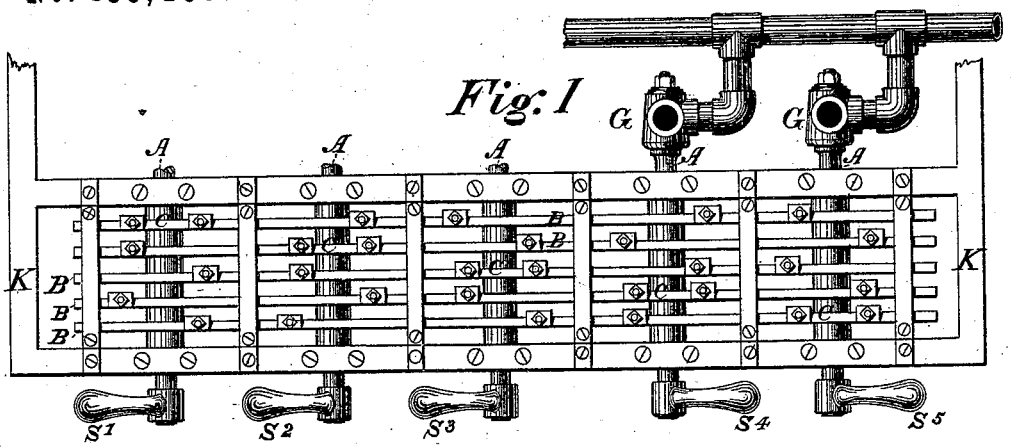


Fig: 3

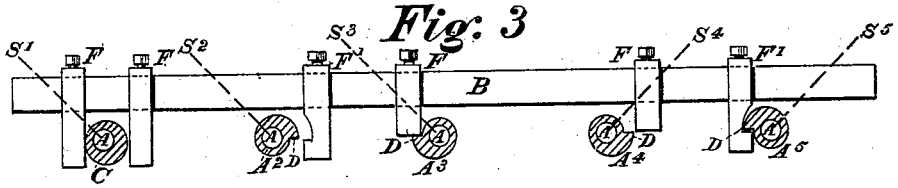


Fig: 4

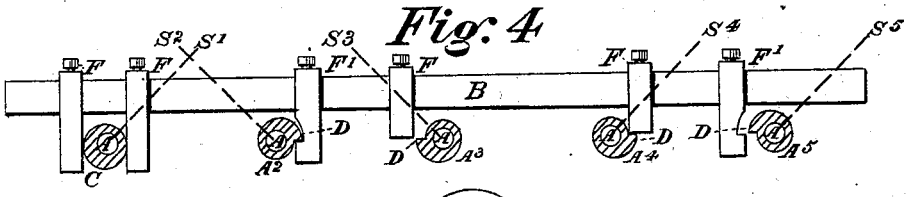
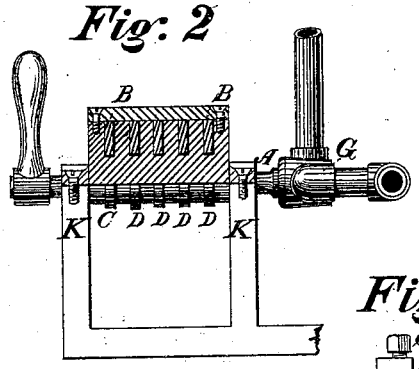


Fig: 2



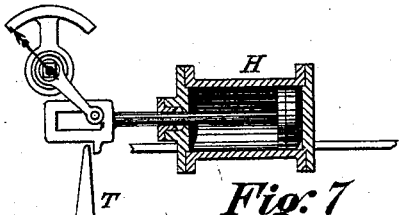


Fig: 7

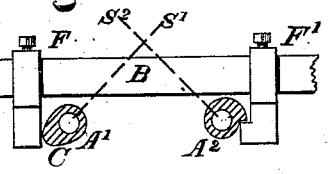
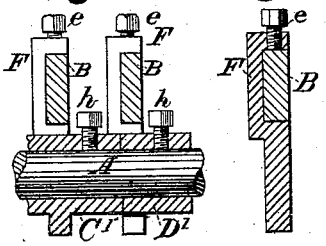


Fig: 5 Fig: 6



Witnesses:

John Everding

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Inventor:

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2 Sheets—Sheet 2.

D. A. BURR.

PNEUMATIC SWITCH LOCKING APPARATUS.

No. 183,486. Patented Oct. 24, 1876.

Fig: 8

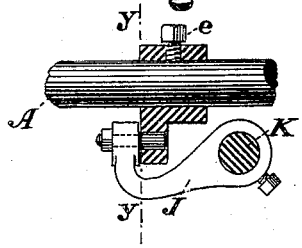


Fig: 9

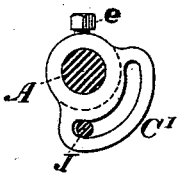


Fig: 10

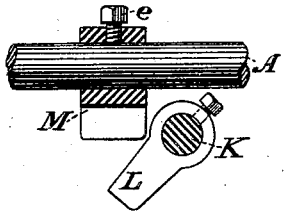


Fig: 11

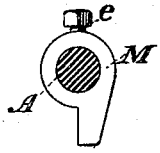


Fig: 12

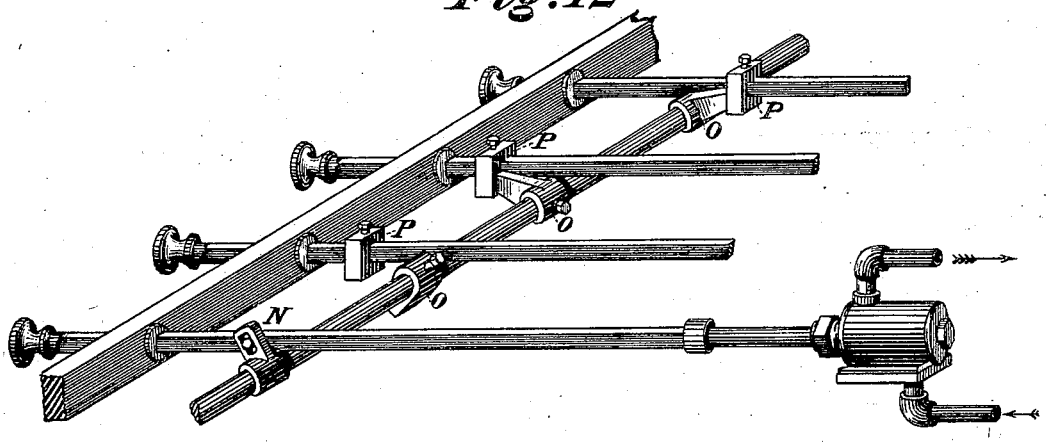


Fig: 13

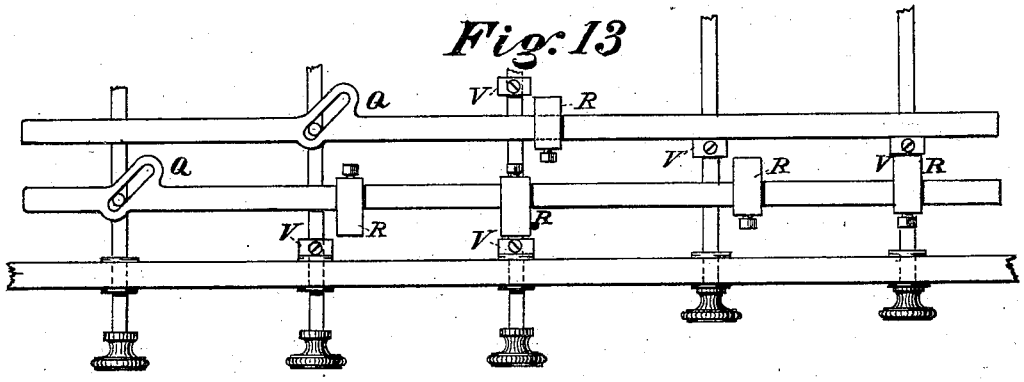
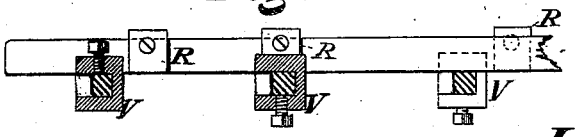


Fig: 14



Witnesses:

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UNITED STATES PATENT OFFICE.

DAVID A. BURR, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN PNEUMATIC SWITCH-LOCKING APPARATUS.

Specification forming part of Letters Patent No. **183,486**, dated October 24, 1876; application filed July 29, 1876.

To all whom it may concern:

Be it known that I, DAVID A. BURR, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Pneumatic Apparatus for Moving Railway-Switches and Signals, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

The object of my invention is to lock any one of a series of cocks or valves in an apparatus for operating railway switches or signals with compressed air, by the movement of any other cock or valve in the series, and to prevent thereby the movement of any one or more designated switches or signals after any other particular one has been moved to a given position, so long as this last remains in that position, this interlocking of the appliances for moving the several signals and switches serving to prevent such a mismove or misplacement thereof as might result in an accident to the trains governed thereby.

The invention consists in combining, with the rods operating the cocks or valves controlling the admission of air to the several signals and switches, of a system arranged to be actuated by an operator at a given point, sliding or rocking bars placed at right angles transversely to the length of the said valve-rods, and moved thereby through the intervention of crank-pins, eccentrics, or like well-known mechanical devices on the one engaging counterpart devices on the other, the movement of the transverse bar by the operation of any one valve-rod serving to produce an engagement—or a disengagement, as the case may be—of locking devices on said bar with one or more of the remaining valve-rods selected for the purpose.

In the accompanying drawings, Figure 1 is plan view of my improved interlocking apparatus for a pneumatic railway switch or signal system, as constructed with partially-rotating valve-rods, and sliding lock-bars, Fig. 2 illustrating the same by a transverse section. Figs. 3 and 4 are elevations of one of the lock-bars in its first and second positions respectively, the valve-rods being cut in cross-section. Fig. 5 is a longitudinal section through a portion of one of the valve-rods, illustrating the combination of the adjustable locking-cams, and eccentric therewith; and Fig. 6, a transverse section through a lock-bar, and one of the adjustable lock-plates thereon. Fig. 7 is a view in elevation of an indicating-piston and rod, and of one end of a lock-bar, to be actuated by the movement of the piston, through the intervention of a tripping-lever, or its equivalent. Fig. 8 is a sectional view, illustrating the combination of a slotted cam with a rotating valve-rod, and with the arm and pin of a transverse rotating lock-bar, Fig. 9 being an elevation of the slotted cam. Fig. 10 is a sectional view, illustrating the relative positions of the locking devices on the rotating valve-rod and rotating lock-bar when disengaged, Fig. 11 being an elevation of the locking-piece on the valve-rod. Fig. 12 is a view in perspective, illustrating the rotating lock-bar, in combination with sliding rods for operating the pneumatic cocks or valves; Fig. 13, a plan view of the sliding valve-rods, in combination with sliding lock-bars, Fig. 14 being a sectional view thereof.

A A, Figs. 1 to 6, are rods operating the cocks or valves G G regulating the admission of air from an air main or reservoir to the respective switches and signals upon a railway at a given station. These valve-rods extend over a frame, K, which supports a series of transverse bars, B B, and are fitted at their outer ends with suitable handles S^1 S^2, &c., by which they are operated. The transverse bars B B are so supported in the frame K as to be capable of a free longitudinal movement at right angles to the valve-rods.

C C are eccentrics, and D D catches formed upon sleeves, which are made to fit closely upon the valve-rods, and are fixed and prevented from turning thereon by means of set-screws *h h*. (See Fig. 5.) The eccentrics and catches consist of offsets from the periphery of the sleeve, at one end thereof, each catch having a flat face formed in a radial line, the body of the offset being to the right or left, as required.

F F′ are narrow plates, made to embrace the lock-bar laterally, (see Figs. 5 and 6,) and to project downward therefrom, either with a

simple straight edge, (see F F, Figs. 3 and 4,) or with a notched edge. (See F′ F′.) They are secured upon the bar by means of set-screws *e e*, which engage the top of the bar.

The valve-rods and lock-bars are so arranged as that there shall be at least one lock-bar for each valve-rod. An eccentric, C, is secured upon each valve-rod, and it is embraced between two of the plates F F, which project for the purpose from some one of the lock-bars B, (see Figs. 3 and 4,) so that it may produce a movement of that bar, causing it to slide back and forth, when, owing to the partial revolution of the valve-rod in opening and closing a cock, it is itself partially revolved.

If it be found desirable to cause the movement of the valve-rod A to throw the bar B in but one direction, it is only necessary to take off one of the lateral plates F, embracing the eccentric. (See Fig. 5.)

A catch-sleeve is placed upon each valve-rod in line with each lock-bar, by movement of which it is to be locked in such manner as that a catch or hook, D, thereon, may be engaged by a counterpart lock or catch plate, F′, upon the lock-bar.

As the lock-plates F F′ and the sleeves carrying the eccentrics C and hooks D all admit of adjustment and removal, they may be readily arranged and adjusted upon the valve-rods and lock-bars to meet any requirements of an interlocking system, and the order of arrangement may be readily changed at pleasure.

The operation of the locking devices is illustrated by the two Figs. 3 and 4, Fig. 3 representing them in their relative positions when the air-valve, controlled by the lever or handle S^1 and rod A, and consequently the switch or signal governed thereby, is in one position, (closed,) and Fig. 4 the same reversed with the valve open.

In Fig. 3 the valve-handle S^1 is thrown over to the left, (see dotted lines indicating its position,) so that the eccentric upon the valve-rod, operating against the plate F on the right, shall serve to throw the slide-bar B and its lock-plates F F′ to the right. The effect of this is to withdraw the lock-plate F from its engagement with the catch D on the valve-rod A^2, leaving that rod and its valve unlocked. The same movement, however, which thus unlocks the valve-rod A^2 locks the valve-rod A^3 by carrying its lock-plate over the catch-hook thereon, and at the same time, in like manner, it will unlock the valve-rod A^4 and lock A^5. It will be, moreover, seen from the dotted lines representing the position of the handles or levers, and, consequently, the position of the valves, that in the arrangement of locking devices as here represented, while the valves A^2 and A^3 are respectively unlocked and locked in one position of the bar, the valves A^4 and A^5 are respectively locked and unlocked in its opposite position, although this arrangement may be readily changed by a change in the adjustable locking-hooks D and plates F F′. If, now, the position of the valve A^1 be reversed by turning its handle to the right, as shown in Fig. 4, the locking-bar B will be thrown to the left, and the interlocking, as above described, will be reversed, and the valves A^2 and A^4 will be locked and the valves A^3 and A^5 unlocked, their respective positions remaining unchanged, as indicated by the dotted lines, Fig. 4.

Fig. 7 illustrates an arrangement of the bar B whereby, while its movement in one direction to lock or unlock the remaining valves is produced by the opening of the governing-valve, its movement in the opposite direction is dependent upon the movement of an indicating device, H, operated automatically by the movement of the switch or signal actuated by the valve. In this case but one plate, F, is secured to the lock-bar, to receive the thrust of the eccentric upon the valve-rod, and a simple centrally-pivoted lever, T, is interposed between the end of the bar B and the rod of the indicating-piston H, so that the movement of the piston consequent upon the proper movement of the switch or signal following the opening of the valve will bear against one end of the lever, and throw its opposite end against the bar B and force it back. By this arrangement the operator cannot unlock the signals and switches locked by his first movement until the proper position of the switch or signal is assured by the movement of the indicator-piston H.

Where the movement of the indicator-piston is vertical, instead of horizontal, a crank movement must be substituted for the lever T, (illustrated in Fig. 7,) and, in fact, many well-known and equivalent devices may be employed as a substitute for those herein referred to to transmit motion from an indicating device, H, to the lock-bar B.

A partially-rotating lock-bar, K, may be substituted for the sliding lock-bar B, and such an arrangement is illustrated in Figs. 8 to 11. In such case a slotted eccentric, C′, Fig. 9, is substituted for the cam C upon the valve-rod, and a pin upon an arm, J, projecting from the lock-bar K, (see Fig. 8,) engages the slot, so that the partial revolution of the valve-rod will produce a partial revolution of the lock-bar K. Both the lock-bar K and valve-rod A are provided with lugs L M, (see Figs. 10 and 11,) combined therewith by means of embracing-sleeves, and adjusted and secured at proper points thereon each by means of a set-screw. These lugs are so arranged as that the movement of a lock-bar, K, produced by means of the arm J and eccentric C′ upon a valve-rod, will throw up the lugs L on said lock-bar, in front of and at right angles to the lugs M, on the remaining valve-rods to be locked, and, engaging these lugs, will effectually prevent a movement of said rods.

Figs. 12, 13, and 14 illustrate the use of sliding valve-rods actuating, in the one case, (see Fig. 12,) a partially-rotating, and in the other (see Fig. 13) a sliding, lock-bar. In the first case (Fig. 12) the partial revolution of the

lock-bar is produced by means of a pin upon the sliding valve-rod engaging a slotted arm, N, upon the lock-bar, and the partial rotation of the lock-bar is made to lock the remaining valve-rods by means of lugs O O, which, when brought to a horizontal, or nearly horizontal, position, engage stops P P, secured upon the sliding rods, and thereby prevent their movement. The lugs O upon the lock-bar and the stops P upon the valve-rods are made adjustable, and secured by set-screws, as shown in the drawings. In the second case (see Figs. 13 and 14) the sliding of the lock-bar is produced by means of a pin upon the sliding valve-rod engaging a cam-slot, Q, on the sliding bar, and the sliding of the lock-bar to and fro is made to lock and unlock the remaining valve-rods by means of stops R, which are brought, by the movement of the sliding bar, in or out of register and engagement with counterpart stops V upon the valve-rod.

The stops R and V are made adjustable, may be readily removed and replaced, and are secured by set-screws.

I claim as my invention—

1. In an apparatus for operating railway switches and signals by means of compressed air, the combination, with each or any rod actuating an air-valve or cock therein, of a transverse rod or bar to be actuated by the movement of said valve-rod, and which shall, when so actuated, lock or unlock thereby one or more of the remaining valve-rods, substantially in the manner and for the purpose herein set forth.

2. An adjustable cam or eccentric, C, secured upon the rod A, actuating any one of the valves or cocks in a pneumatic switch and signal apparatus, combined with and working against one or more adjustable bearing-plates, F, secured upon a transverse locking-bar, B, for the purpose of actuating said bar by the movement of the first, and thereby locking the remaining cocks or valves in said apparatus, substantially as and for the purpose herein set forth.

3. The combination, substantially as herein described, of the bar locking one or more of the valve-rods in a pneumatic switch and signal system, with the device indicating automatically the movements of the switches and signals, the lock-bar being actuated by the indicating device, substantially in the manner and for the purpose herein set forth.

DAVID A. BURR.

In the presence of—
J. M. BURR,
CHAS. H. LUNGREN.