

W. E. PRALL.

APPARATUS FOR PNEUMATIC RAILWAY-SIGNALS.

No. 172,493.

Patented Jan. 18, 1876.

Fig. 1

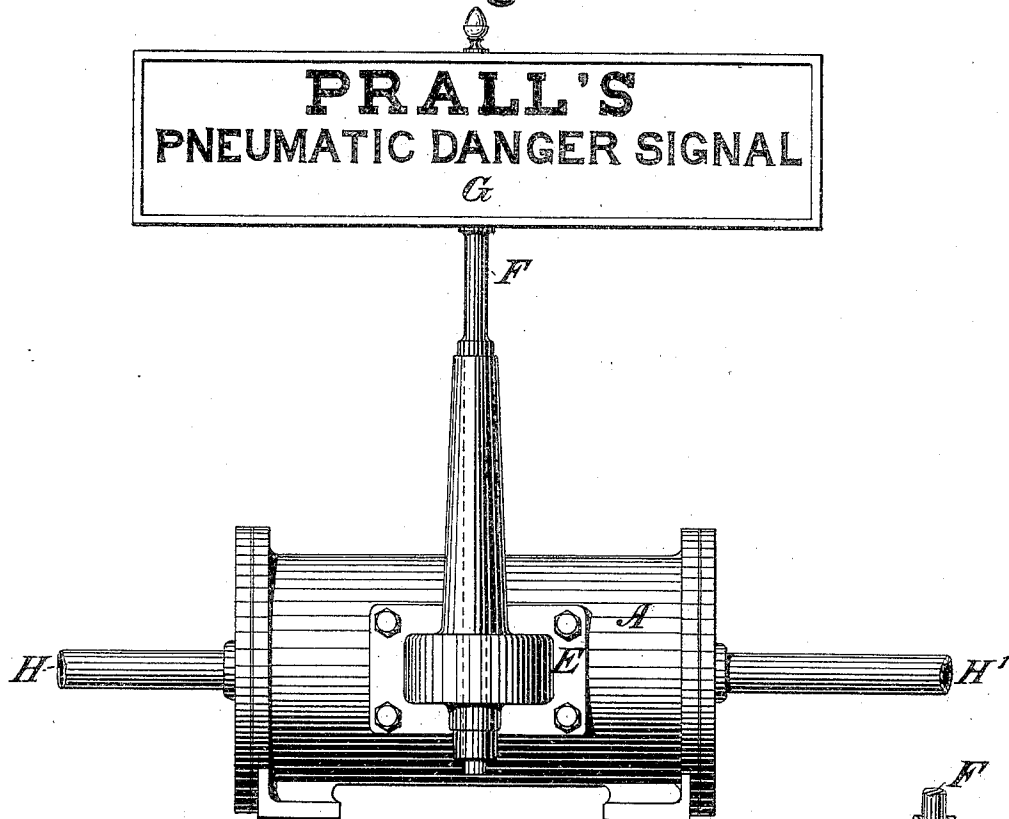


Fig. 2

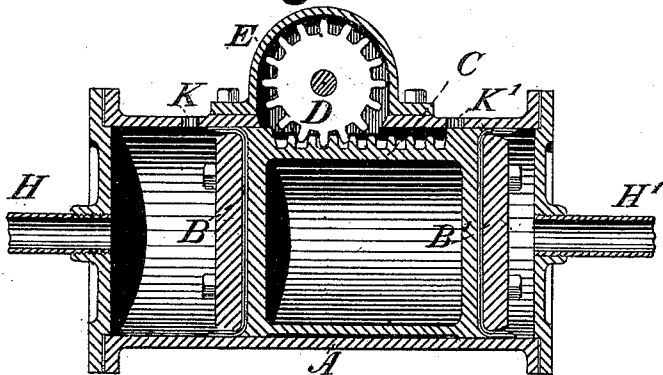
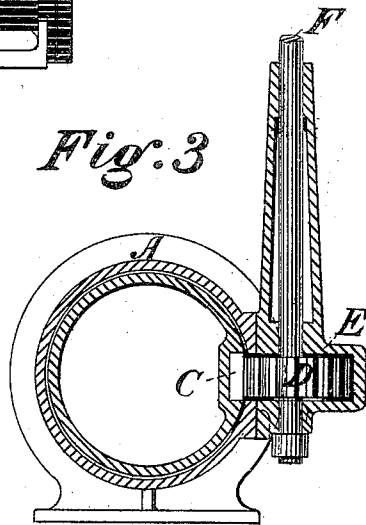


Fig. 3



WITNESSES:

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IMPROVEMENT IN APPARATUS FOR PNEUMATIC RAILWAY-SIGNALS.

Specification forming part of Letters Patent No. **172,493**, dated January 18, 1876; application filed
December 8, 1875.

CASE J.

To all whom it may concern:

Be it known that I, WILLIAM E. PRALL, of Washington city, in the District of Columbia, have invented a new and useful Improvement in Apparatus for Pneumatic Railroad-Signals, which is fully described in the following specification, reference being had to the accompanying drawings.

The object of my invention is to operate a pneumatic railway-signal by a direct pressure of air in each direction, both to display and to reverse the signal, instead of employing, as heretofore, the pressure of air in one direction and the action of a weight or spring in the other, thus obviating the danger of a premature reversal of the signal by the action of the weight, because of an accidental escape of the air sustaining the same; and said invention consists in combining the lever or gearing for actuating a signal with a reciprocating slide or plunger valve, moving in a pneumatic cylinder or valve-chest, and operated in each direction by compressed air admitted thereto alternately from the opposite direction, the valve operating to open or uncover at the termination of its stroke in either direction exhaust-vents formed in the cylinder or chest.

In the accompanying drawings, Figure 1 is a side elevation of my improved apparatus; Fig. 2, a central longitudinal section, and Fig. 3 a central transverse section thereof.

A is a simple cylinder or valve-chest, closed at each end, made of sufficient strength to withstand the pressure of compressed air, and finished with a true smooth inner surface. B B' are two piston-heads, moving freely within the cylinder, and which are packed, in the customary manner, with rings or disks of leather, rubber, or other suitable material to form a close joint with the sides of the cylinder. The two pistons are connected, so as to move in unison, and form, in fact, the heads of a single valve, by means of rods or bars, or by a continuous web. C is a straight rack interposed longitudinally between the heads. D is a toothed wheel or pinion, secured upon the end of a rod, F, within a casing, E, bolted centrally upon one side of the cylinder, over an opening cut away therein, as shown in Figs.

2 and 3. The rod F is supported in suitable bearings, (see Fig. 3,) and forms a journal for the pinion-wheel, which is secured thereto, so that the revolution of the wheel in the one direction or the other, produced by the reciprocating movement of the rack C, will operate to turn the rod in a corresponding manner. G is a signal, secured to the outer or upper end of the rod, and which is displayed or reversed as the rod turns in the one direction or the other. H H' are pipes, connected by means of suitable automatic valves or "commutators" at the points from which it is desired to operate the signal in one direction or the other with an air-main charged with compressed air. K K' are exhaust-vents, pierced in the sides of the cylinder at such points as that they will form a communication between the respective ends of the cylinder and the outer air whenever the valve-head or piston at either end, being driven inwardly, has completed its inward movement. (See Fig. 2.) The length of the rack C, and consequently the distance between the piston valve-heads, is determined by the amount of movement which it is desired to impart to the signal, and the length of the cylinder A is so proportioned as that when the movement of the rack C is exhausted in either direction the valve-head on that side shall touch, or nearly touch, the head of the cylinder.

It is evident that a crank-lever secured to, and projecting at right angles from, the signal-rod F, and pivoted loosely to, or otherwise engaging, a simple notch in a bar, between the heads of the valve, may be substituted for the rack C and pinion D; and also that, in like manner, by the use of a lever pivoted to or engaging a connecting-bar between the heads of the valve, the reciprocating movement of the valve may be applied to produce a reciprocating, instead of a rotary, movement of the signal; and I contemplate the substitution of any of the known mechanical devices for communicating the movement of the valve to the signal.

The operation of my apparatus is positive and simple. Let H represent the pipe connected with the commutators or air-valves to

be actuated for displaying the signal, and H' the pipe connected with the commutators designed for reversing the signal. So soon as an approaching locomotive, striking the signal-commutator, has admitted a charge of compressed air into the pipe H, the valve-head B at that end of the cylinder will be immediately forced inward, and the corresponding movement of the rack C produced thereby, actuating the pinion D and signal-rod F, will cause the danger-signal to be displayed, as required. Just as the valve-head B is about to complete its stroke upon its inward movement it uncovers and opens the exhaust-vent K at that end of the cylinder, so that the charge of compressed air, having done its work, immediately exhausts itself.

The inward movement of the valve-head B, operating to display the signal, will carry the opposite head B' outward against the opposite end of the cylinder, and the signal and valve-heads will remain unchanged in their position until the locomotive, passing the point from which it is desired to reverse the signal, shall, by striking the appropriate commutator, admit a charge of air to the pipe H', which will serve to force inward the head B', and, opening the vent K', then exhaust itself. This inward movement of the head B' operates to reverse the signal previously displayed, as above described.

It is evident that where the signal is used

upon a single-track road the signal may be operated by a train passing in either direction, if the pipes H H' be each extended in both directions, and connected at their ends with the necessary commutators to admit air thereinto from the air-main.

The connection of the valve with the signal-rod may be made by carrying a valve-rod out through either head of the cylinder, and forming a rack upon said valve-rod, to engage a spur-wheel upon the signal-rod, or otherwise converting the reciprocating movement of the valve-rod into a rotary movement of the signal-rod; and in such case the valve may be made of a hollow cylinder, with a single transverse partition therein, the cylinder portion serving to properly cover and uncover the exhaust-vents.

I claim as my invention—

In combination with a railway-signal to actuate the same, a reciprocating valve or piston, moved in opposite directions by pneumatic pressure admitted alternately to its opposite ends, and automatically relieved from such pressure by means of exhaust-vents opened thereby at the completion of each stroke thereof, substantially as herein set forth.

W. E. PRALL.

In the presence of—
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