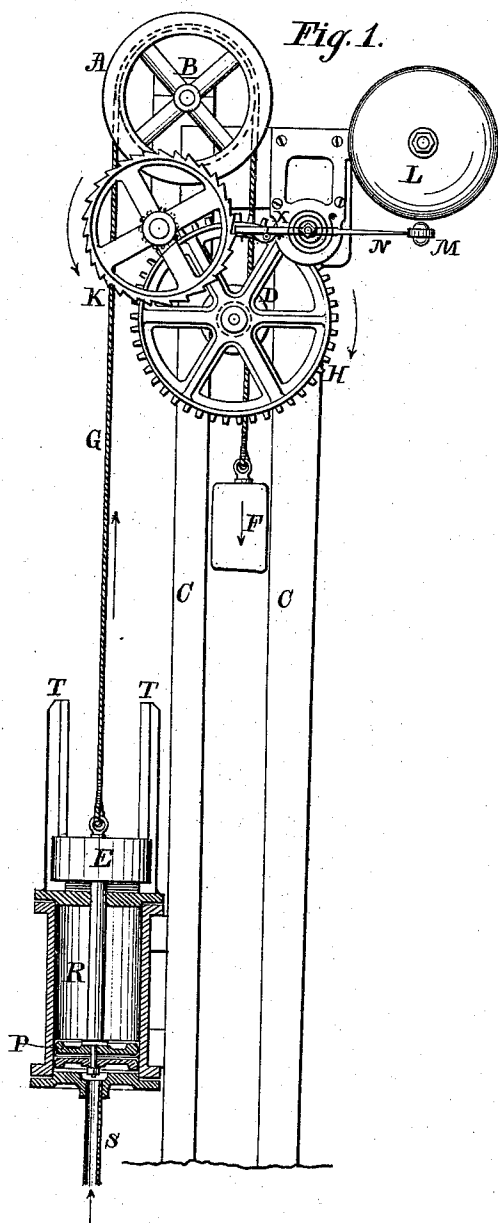
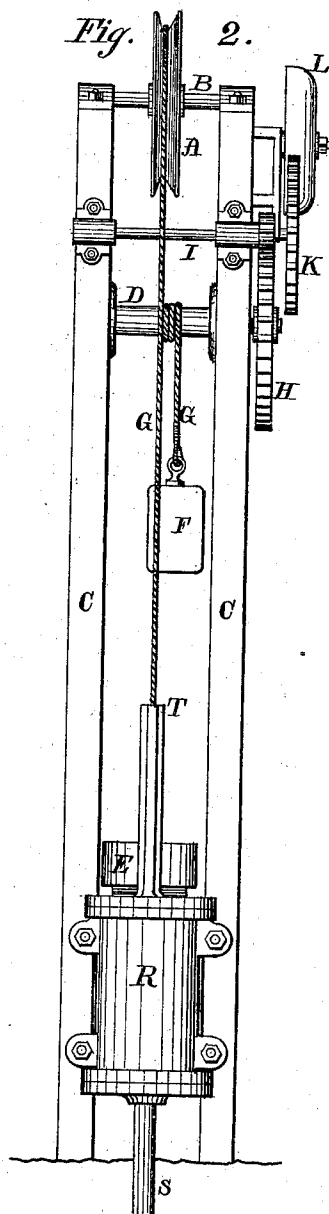


W. E. PRALL.  
PNEUMATIC RAILWAY SIGNALING APPARATUS.  
No. 173,811.                      Patented Feb. 22, 1876.



Witnesses:

*John Evending.*  
*L. A. Jackson.*



Inventor:

*Wm. E. Prall.*  
*By David A. Gurr.*  
*Atty.*

# UNITED STATES PATENT OFFICE.

WILLIAM E. PRALL, OF WASHINGTON, D. C., ASSIGNOR TO PRALL RAILWAY  
SIGNAL AND TELEGRAPH COMPANY, OF NEW YORK, N. Y.

## IMPROVEMENT IN PNEUMATIC RAILWAY-SIGNALING APPARATUS.

Specification forming part of Letters Patent No. **173,811**, dated February 22, 1876; application filed  
January 18, 1876.

*To all whom it may concern:*

Be it known that I, WILLIAM E. PRALL, of Washington, District of Columbia, have invented a new and useful Improvement in Signals for Railway-Crossings, which said improvement is fully set forth in the following specification, reference being had to the accompanying drawings:

The object of this invention is to produce an automatic ringing of an alarm-bell at road-crossings, and other points of danger, upon a railway whenever a train approaches.

It consists in counterbalancing a weight whose gravitation operates suitable mechanism for ringing the alarm-bell, by means of a second heavier weight, whose gravitation operates to wind up and elevate the first, the preponderant weight being lifted to relieve the first by means of a pneumatic piston operated by compressed air admitted thereto by an approaching train, the exhaust of the air leaving the preponderant weight and piston free to re-elevate the first.

In the accompanying drawings, Figure 1 is a front elevation of the clock-work and gong, with the pneumatic piston in section; and Fig. 2 a side elevation of the apparatus.

A is a grooved pulley-wheel secured upon a shaft, B, revolving in suitable bearings upon the top of a supporting-frame consisting of four uprights, C C.

D is a second shaft revolving below the first, parallel thereto, and in a right line tangential to its circumference, and which is in like manner supported by suitable bearings in the frame work.

E and F are weights suspended from each end of a cord, G, which passes over the pulley-wheel A, and is carried around the shaft D with several turns so as to insure such frictional contact therewith as will cause the shaft to revolve if the cord be drawn in one direction or the other.

H is a large cog-wheel secured to the outer end of the shaft D, and gearing into a small pinion upon the shaft I of a ratchet-wheel, K.

L is a large gong, and M its hammer, secured upon the outer end of a pivoted spring-

actuated lever, N, whose inner end engages the teeth of the ratchet-wheel K, so as to be lifted and released by each tooth successively during the revolution of the ratchet-wheel. When the inner arm of the lever N is thus lifted, the hammer M is thereby carried away from the bell and compresses the hammer-spring, but so soon as disengaged the hammer is released to strike the bell with the full force of the spring. The revolution of the ratchet-wheel in one direction will thus cause repeated strokes of the hammer upon the bell in rapid succession, while its revolution in the opposite direction will produce no effect, the lever being provided with a spring-joint, X, so as to yield in that direction sufficiently to allow the wheel to revolve.

The weight F, suspended from the cord G, is made so heavy as that when left free to gravitate, it will, by means of the friction of said cord upon the shaft A, cause a revolution of the wheels H and K, and the consequent movement of the hammer-lever to produce a ringing of the bell L.

The weight E, suspended from the opposite end of the cord G, is, however, made so far heavier than the weight F, as to more than counterbalance it, so that when it is left unsupported it will operate to raise the said weight F to its highest point.

P is an air-tight piston properly packed, working freely in a cylinder, R, and which is connected by means of a suitable piston-rod with the heavy weight E.

S is a pipe, through which compressed air may be admitted to the piston, and T T are guides to steady the movement of the weight over the cylinder.

The operation of the apparatus is as simple as its construction.

When the piston P is left unsupported in the cylinder R, the weight E drops to its seat upon the top of the cylinder. When in this position its preponderance causes the lesser weight F to be lifted to its highest point, as illustrated in the drawing.

If, now, a charge of compressed air be admitted through the pipe S to the piston P, it

will force it up, and with it the weight E, and the opposite weight F, being thus left unsupported, will fall, and by its gravity cause the revolution of the gearing H I K, which, so long as continued, will operate, as described, to ring the bell.

So soon as the pressure of air against the piston is removed by its exhaust from the pipe I, the weight F, falling back, will elevate the weight E to its first position.

The admission of air to the pipe S from an air main or reservoir by an approaching train, and its exhaust therefrom after the train has passed, may be accomplished by means of suitable valves to be actuated by devices which the passing train will operate.

It is evident that one or more springs properly adjusted may be substituted for either the weight E or the weight F, or for both of them, the spring substituted for the weight F to actuate, when released, the hammer of the bell, being wound up by the release of a heavier, more powerful spring, substituted for the weight E. This heavier spring being wound up—to liberate the lesser bell-spring—and thereafter released again to wind up said

lesser spring, by the movement of the piston P, as described. I therefore claim the springs as equivalent devices for the weights.

I contemplate, furthermore, the application of the power obtained by the gravitation of a weight, F, arranged as described, or the elasticity of an equivalent spring, to the movement of any form of signal in substantially the manner above set forth.

I claim as my invention—

1. A weight actuating by its gravity suitable mechanism for ringing an alarm-bell, combined with a preponderant weight, uplifted by a pneumatic piston and operating, when unsupported thereby, to elevate the first, substantially as and for the purpose herein set forth.

2. A pneumatic piston, P, combined with a weight, E, overbalancing and supporting a weight, F, which serves to operate, when released, suitable mechanism for ringing an alarm, substantially as herein set forth.

W. E. PRALL.

In the presence of—

GEORGE C. LAY, Jr.,  
FRED H. COMSTOCK.