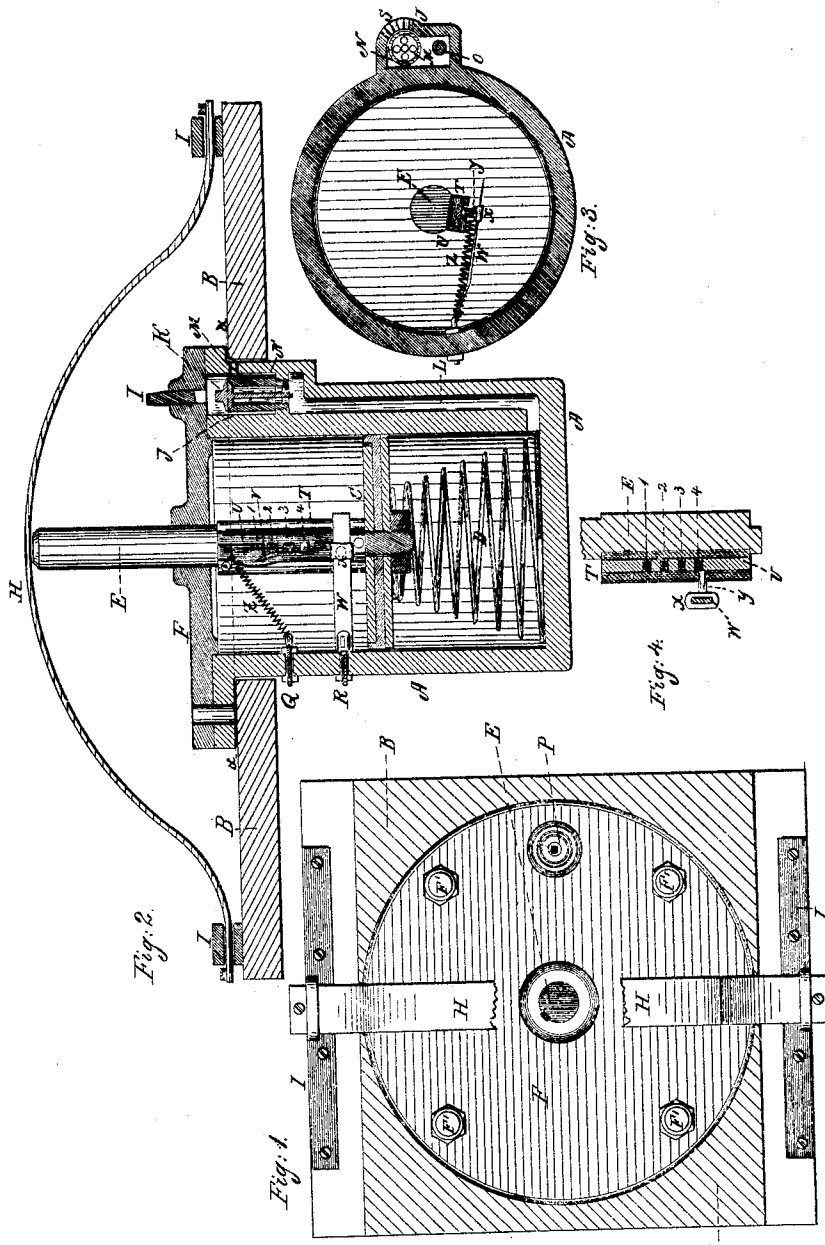


A. J. ELDER.  
 Railroad-Car Telegraph.

No. 107,601.

Patented Sept. 20, 1870.



Witnesses:  
 Chas. Sherburne  
 J. W. Wolf

Inventor:  
 Alexander J. Elder

# UNITED STATES PATENT OFFICE.

ALEXANDER J. ELDER, OF CHICAGO, ILLINOIS.

## IMPROVEMENT IN ELECTRO-MAGNETIC RAILROAD-SIGNAL APPARATUS.

Specification forming part of Letters Patent No. 107,601, dated September 20, 1870.

*To all whom it may concern:*

Be it known that I, ALEXANDER J. ELDER, of the city of Chicago, in the county of Cook and the State of Illinois, have made certain new and useful Improvements in Distance-Indicators for Railroad-Trains; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure 1 represents a top-plan view of my improved indicator. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a transverse section in the plane of the line X X, Fig. 2; and Fig. 4 is a detached section of the piston-rod.

Similar letters of reference in the drawings denote corresponding parts.

My invention has for its object to provide improved means for indicating the distance of a railroad-train from any station or point along the line of road; and it consists, first, in a mechanism composed of an upright cylinder containing a piston and its rod, located between the rails of a railroad and connecting with an electrical circuit, the piston and rod being so placed and arranged as to be forced rapidly downward within the cylinder by a passing train, and permitted to ascend with a slow or regulated motion during or after the passage of the train, for the purpose of alternately opening and closing the circuit, so that the number of interruptions shall indicate at a station the distance of a train therefrom, the indication being either by sound, or by a dial suitably arranged for the purpose, or by other proper means.

It consists, secondly, in arranging an induction and eduction valve within an air-chamber communicating with the main cylinder beneath the piston, to permit a rapid downward motion of the latter and a slow or regulated upward motion, whereby the indications are given at the station distinctly or at the proper intervals.

In the accompanying drawings, A is a metal cylinder, supported in an upright position within a suitable strip or block, B, by means of the flange around its upper end.

C is a piston resting upon a spiral spring, D, within the cylinder, and provided with a rod, E, which extends vertically through the cover

F of the cylinder, which cover is secured in place by the screw-bolts F'. The piston should be so packed as to fit the cylinder with close contact, and the rod should pass through a stuffing-box in the cover, so that both shall work as nearly air-tight as possible.

The cylinder and its supporting-block are placed between the ties of a railroad, and a bent spring, H, is extended from one tie to another, so that its center shall be immediately over the piston-rod.

The ends of the bent spring may pass through stringer I, affixed to the block B, if desired, instead of through the railroad-ties.

J is a valve-chamber formed upon the side of the cylinder, containing the outlet-valve K, and connecting with the cylinder beneath the piston by means of an air-passage, L. The seat for the outlet-valve is formed in the end of a short tube, M, placed concentrically within the chamber in such a manner as to leave an annular air-space, N, around it, as shown.

O is the induction-port, located in one end of the valve-chamber J, and communicating with the passage L beneath said chamber. The valve for this port is formed by a screw-pin, P, passing through the cover of the cylinder, as shown.

Q R are short conductors, affixed one above the other in the side of the cylinder, and insulated from the same by any suitable means. Their outer ends are connected to the wires of a galvanic battery located at any desired point or station along a railroad. The most simple method of forming this connection would be to connect the wires directly to those of a telegraph-line, the former passing through the ground under the track, after first having been surrounded by a proper insulator.

The operation is as follows: The cylinder and its attachments are placed between the ties of a railroad-track at the required distance from a station. A suitable wheel or projection upon the locomotive or upon the cars in passing over the indicator strikes the bent spring H and forces the piston instantly to the bottom of the cylinder, compressing the spring D in the operation. At this downward motion the air beneath the piston is forced out of the cylinder through the outlet-valve K and the openings S, formed in the side of the valve-chamber. After the passage of the train the

piston is forced upward by the tension of the spring D, the air being gradually admitted beneath the piston through the induction-port O, causing the piston and its rod to ascend slowly.

The degree of speed at which the piston shall ascend is regulated by adjusting the end of the screw-valve P nearer to or farther from the induction-port O.

The piston-rod E is flattened upon one side to receive an insulating-block, T, composed of india-rubber or other suitable material. The face of this block is grooved longitudinally, and within the groove is secured a metal plate, U, provided with a curved longitudinal guide, V. I prefer to attach the block T to the piston-rod by means of screws, but in this case the heads of the screws must be countersunk, to prevent their touching the plate U. By this construction the plate is completely insulated from the piston-rod.

W is a flat spring secured to the inner end of the conductor R, and upon this spring a slide, X, is placed, carrying a short pin, Y, which bears against the plate U when the piston is raised.

To complete the circuit from the battery located at any given point along the line of road a spring, Z, connects the upper end of the plate U with the short conductor Q. I employ a spiral or coiled spring for this purpose to prevent the upward and downward movements of the piston and at the same time preserve the circuit unbroken. Now, as the piston and rod are forced down by a passing train the pin Y bears against that side of the guide next the conductors until the top of the guide is reached, thus keeping the circuit unbroken. When, however, the piston begins its ascent the pin passes to the opposite side of the guide with its end resting upon the plate U and its side against the insulating-block. As the piston continues to ascend the circuit is broken by the end of the pin coming in contact with the insulating-blocks 1 2 3 4, let into the face of the plate U, as shown, each break being indicated at the station either by sound at the battery or by an indicator suitably adjusted for the purpose. By this arrangement it is evident that the circuit will be broken as many times as there are insulating-blocks in the plate U, each break being indicated at the station. By this means the distance of a train from any station or point is determined with the utmost accuracy.

In order to obtain the indications with distinctness, it is absolutely necessary that the piston and rod shall ascend slowly after having been forced down by a passing train. If permitted to ascend with the same speed with which they descend, the indications would be too rapid to be noted. The slow upward movement is effected by admitting the air gradually beneath the piston, as previously mentioned.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A distance-indicator for railroads consisting of an upright cylinder containing a piston and its rod, located outside or between the rails of a railroad and in an electrical circuit, when the piston and rod are adapted to be forced rapidly downward by a passing train and permitted to ascend with a slow or regulated motion, for the purpose of alternately opening and closing the circuit to indicate at a station the distance of the train therefrom, substantially as herein described.

2. In combination with the cylinder, piston, and graduated piston-rod, the air chambers and passages and the induction and eduction valves, substantially as described, for the purpose specified.

3. The indicating piston-rod, constructed substantially as described, for the purpose specified.

4. The combination of the insulating-block T and guide-plate U with the piston-rod E, substantially as described, for the purpose specified.

5. The combination and arrangement of the spiral spring Z, insulated guide-plate U, sliding pin Y, spring W, and the conductors Q R, substantially as described, for the purpose specified.

6. The spring W and sliding pin Y, in combination with the conductor R and insulated plate U, substantially as described, for the purpose specified.

7. The combination of the insulating-blocks 1, &c., with the plate U and sliding pin, substantially as described, for the purpose specified.

ALEXANDER J. ELDER.

Witnesses:

N. H. SHERBURNE,  
FCK. ELLSWORTH.