R. K. BOYLE.

Improvement in Apparatus for Signaling between Railway Trains.

No. 132,434. Patented Oct. 22, 1872.

Fig. 1.

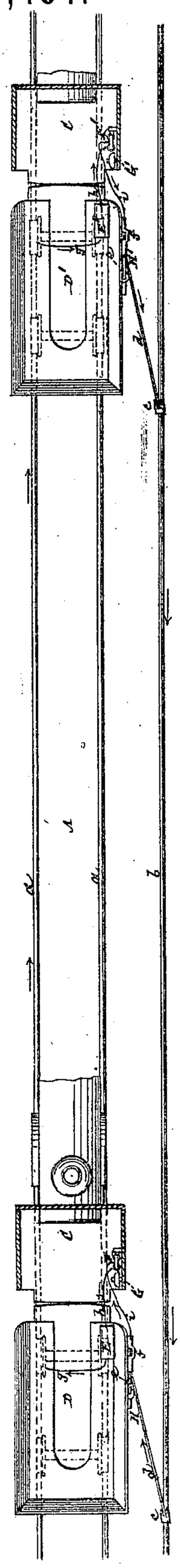


Fig. 2.

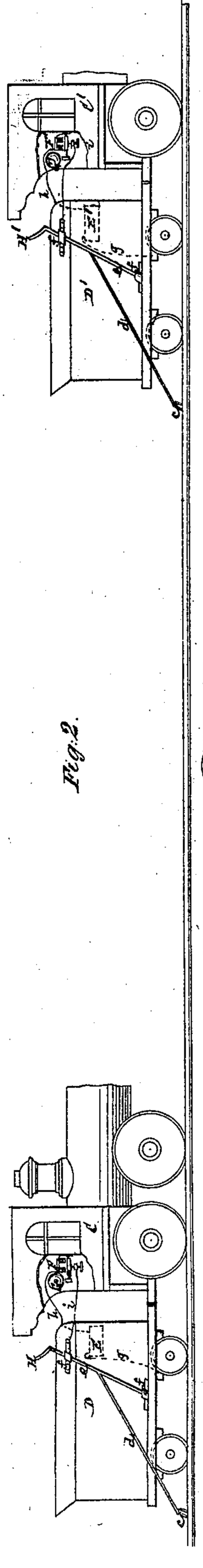
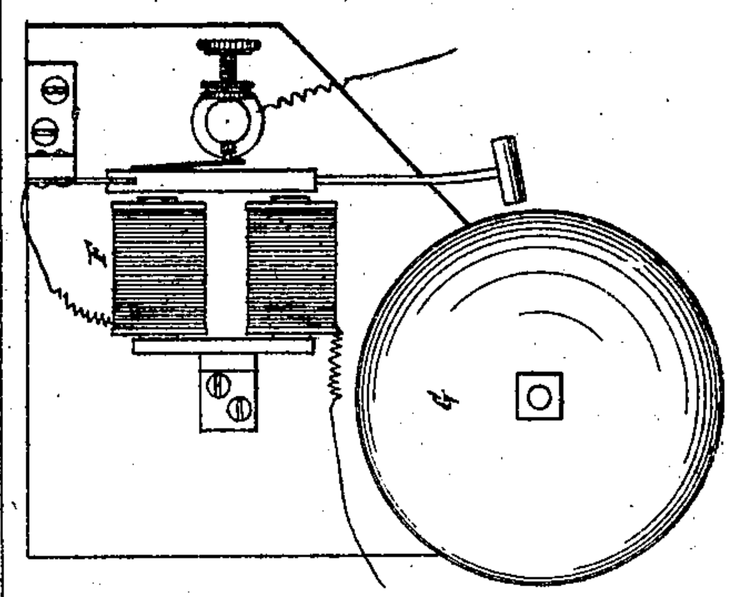


Fig. 3.



Witnesses:
Fred Haynes
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UNITED STATES PATENT OFFICE.

ROBERT K. BOYLE, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN APPARATUS FOR SIGNALING BETWEEN RAILWAY TRAINS.

Specification forming part of Letters Patent No. **132,434**, dated October 22, 1872.

To all whom it may concern:

Be it known that I, ROBERT K. BOYLE, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Means of Signaling between Railway Trains, of which the following is a specification:

This invention has for its object signaling by electricity between trains or locomotives on the same track to prevent collision alike by trains meeting when traveling in opposite directions or by one train overtaking another; and to this end it will be found particularly serviceable in going round curves or through tunnels, and at nights or in foggy weather. The invention consists in an arrangement whereby the circuit is formed, to establish electrical communication, by or through the trains themselves on the same track, the rails of said track, and a third or ordinary rail of an adjacent track, or additional rail of the first-mentioned track, without insulating, or at least necessarily so, any of the rails.

In the accompanying drawing, which forms part of this specification, Figure 1 represents a plan of a double-track railroad, with two engines in part and their tenders on one of the tracks, and apparatus connected therewith for establishing electrical communication between said engines or the trains to which they respectively belong; Fig. 2 is a longitudinal elevation of the same; and Fig. 3, a view on a larger scale of an electro-magnetic signaling apparatus carried by either train, its engine, or tender.

Similar letters of reference indicate corresponding parts throughout the several figures of the drawing.

A and B represent the two tracks of a double line of railroad, or the two rails *a a* may constitute one track and the rail *b* adjacent to them a third rail of the same track, such rail *b* in any case being one of the ordinary rails of the road. C D and C′ D′ are engines and tenders of two independent trains on the same track A. These engines and tenders, or, in other words, both trains, carry each a battery, E or E′, and electro-magnet F or F′; also a bell or signaling device, G or G′, for operation by the magnets when the circuit is closed. A visible signal may be substituted for an audible one, if desired. H or H′ is a circuit-closer carried by each engine or tender, and formed of a wire brush, *c*, the arm *d* of which projects laterally and downward from an inclined rotating shaft, *e*, working in insulated bearings *f*, so that by turning said shafts in one direction the brushes *c* of the circuit-closers H H′ are brought in contact with the rail *b*, and by turning said shafts in the reverse direction the brushes and their arms *d* are not only raised to break the circuit, but are drawn inward toward the sides of the vehicles which carry them, and are thus held clear of all possible contact with obstacles on the ground, with a train passing on the adjacent track, or with any body or object between the track A and rail *b*. The batteries E E′ connect at their one pole, by wires *g*, with the axles of the vehicles which carry them, and so with the rails *a a* of the track A. The other pole of the batteries connects, by wires *h*, with the one pole of the electro-magnets F F′—each battery with its magnet, respectively. Wires *i* connect the opposite pole of each magnet with the circuit-closers H H′, so that when the two latter are brought in contact by their brushes *c* with the rail *b* the circuit is closed and the bells G G′ are sounded—that is, when the two trains are in sufficiently close proximity to warrant an alarm being given. The extreme distance apart of the trains at which signaling may be kept up will, in a measure, depend upon the strength of the batteries, and may be regulated by a proper adjustment of the bells relatively with their magnets. The three rails used in forming the circuit presenting so large an amount of conducting-surface, while the earth between the tracks offers a still greater amount of resistance, the current will necessarily take the course of the rails; hence no special insulation besides that of the circuit-closers H H′ is necessary to establish the circuit between the two engines. The circuit is closed, at the option of the engineers or conductors of the trains, whenever it may be deemed advisable to guard against danger—as, for instance, in going round curves or through tunnels.

What is here claimed, and desired to be secured by Letters Patent, is—

The method herein described of signaling

between trains on the same track by means of the track and a third rail proper of the road, in combination with batteries, electro-magnets, signaling devices, and adjustable circuit-closers carried by the trains, their engines, or tenders, whereby said rails and two adjacent trains on the same track serve to complete the circuit, at the option of the engineers or their attendants, substantially as specified.

R. K. BOYLE.

Witnesses:
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FERD. TUSCH.