(No Model.) 2 Sheets—Sheet 1.

# J. BRADFORD & J. P. WILLIAMS.

## ELECTRIC RAILWAY SIGNAL.

No. 493,678. Patented Mar. 21, 1893.

Fig. 1.

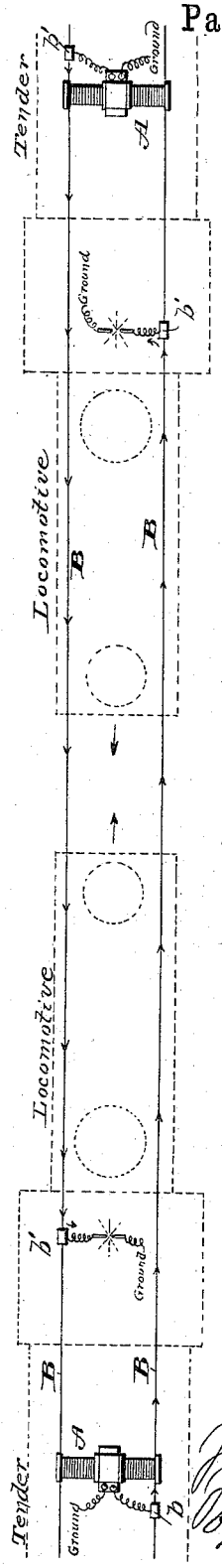
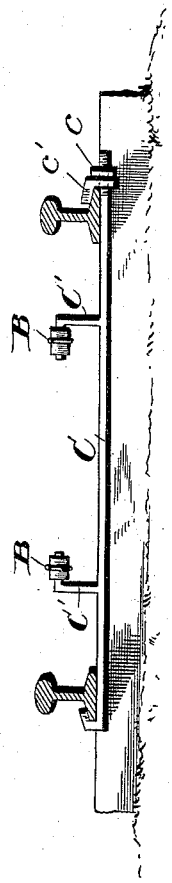



Fig. 4.




Witnesses
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(No Model.) 2 Sheets—Sheet 2.

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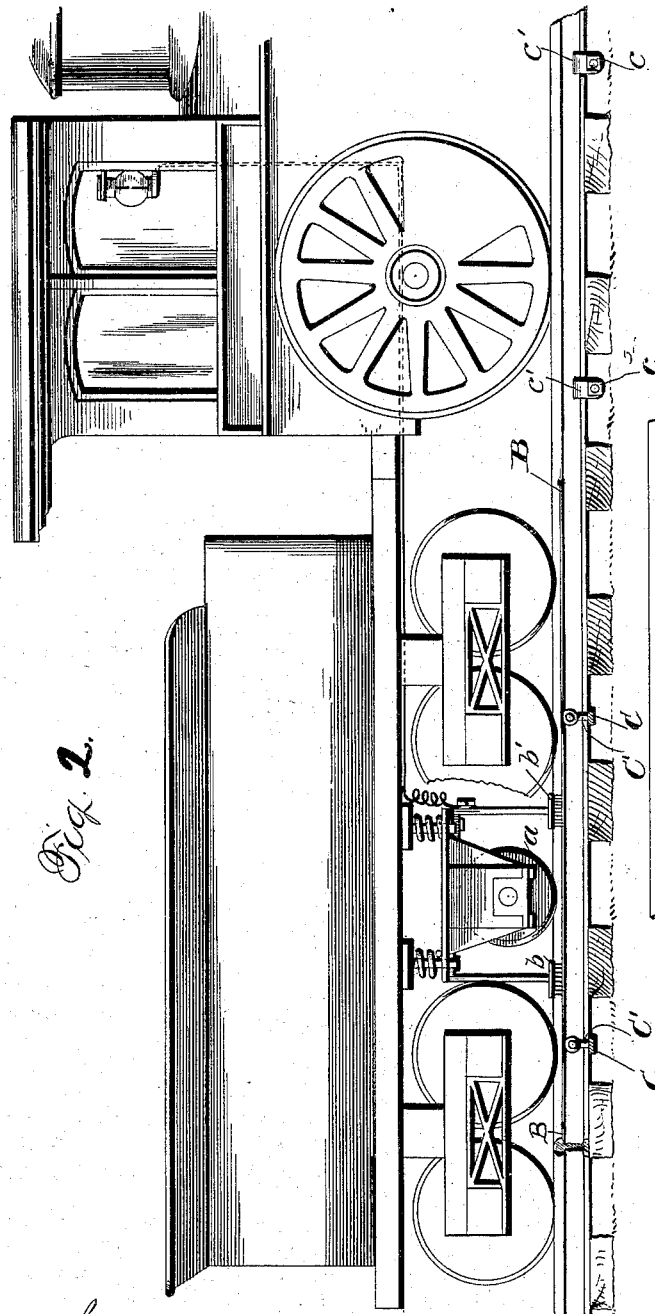


Fig. 2.

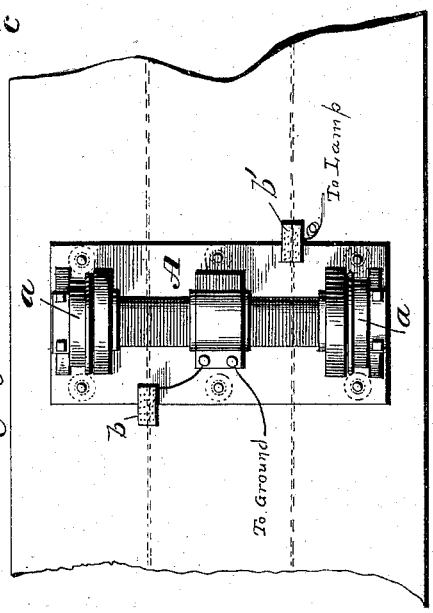


Fig. 3.

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# UNITED STATES PATENT OFFICE.

JEFFERSON BRADFORD AND JAMES P. WILLIAMS, OF BOSTON STATION, KENTUCKY.

## ELECTRIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 493,678, dated March 21, 1893.

Application filed June 23, 1892. Serial No. 437,772. (No model.)

*To all whom it may concern.*

Be it known that we, JEFFERSON BRADFORD and JAMES P. WILLIAMS, citizens of the United States, residing at Boston Station, in the county of Pendleton and State of Kentucky, have invented certain new and useful Improvements in Electric Railway-Signals; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Our invention relates to electric signaling devices for giving notice to two trains approaching each other upon the same track and our object is to provide improved apparatus for this purpose.

To this end our invention consists in the apparatus constructed and operating substantially as hereinafter specified.

In the accompanying drawings, Figure 1 is a diagrammatic view illustrating the operation of our system; Fig. 2, a side elevation of a tender and a portion of a locomotive equipped with the portion of the apparatus they carry, with the rail and the conductor nearest the observer broken away, the rail section being upon an inclined line; Fig. 3, a bottom view of a portion of the tender; Fig. 4, a transverse section of the track showing the manner of supporting the conducting wires.

In carrying our invention into practice we employ a generator, preferably carried by the locomotive tender, a signal in the cab, two lines of conducting wires, a contact with one of the latter leading from the generator and a contact with the other wire leading from the signal. The generator is preferably dynamo A of any preferred form, and as shown, bolted to the middle portion of the bottom of the tender. Its armature shaft lies transversely of the track and at its ends carries wheels *a a* resting on the track rails, by friction with which they, and in consequence the armature are rotated. By this arrangement the dynamo is in action only when the train is in motion. If desired, of course, other means of driving the dynamo may employed, and indeed, if preferable, other forms of generators, as storage batteries may be employed. Running parallel with and preferably between the track rails are two lines of wires B and B that are supported by transverse rods C placed at suitable intervals along the track. These rods are attached to the rails in the manner shown best in Fig. 4. Each rod C has a vertical extension C′ on which is placed a glass or other insulator to which the wire is connected. One pole of the generator A is connected electrically with one wire B by a brush or contact *b* suitably supported from the tender, while the other pole is grounded in any suitable way, as through one of the tender truck wheels.

In the locomotive cab is placed an electric signal, preferably an arc lamp, one electrode of which is electrically connected with the other wire B′ by a suitable brush *b′*, while the other electrode is grounded. It will be seen that with the arrangement described, if two trains be approaching each other on the same track as shown in the diagram in Fig. 1, a circuit will be formed from the generator of one train through the generator brush *b* along the wire B to the lamp brush *b′* of the lamp of the other train and through said lamp, forming an arc, the return being through the earth. A circuit can only be formed when the trains are approaching each other, as when they are moving in the same direction there is no electrical connection between the wires B and B′ since all of the generator brushes are on one wire, and all of the lamp brushes are on the other. Of course, if found desirable to run a locomotive backward, the brushes will be made so as to enable them to be shifted from one wire to the other. It will be noted that with the apparatus on both trains in working order, a signal will be given each train, but should the apparatus of one train be inoperative, one signal, will nevertheless be given. At switchings and crossings the wires will be insulated and carried underground.

To supplement the weight of the parts, to produce necessary friction between the dynamo wheels *a* and the rails coiled springs

are interposed between the bottom of the tender and the frame on which the dynamo is mounted.

Having thus described our invention, what we claim to be new, and desire to secure by Letters Patent, is—

The combination with the track-rails, of the transverse rods connected to the rails and beneath the same and formed with oppositely extending hooked extensions, insulators on the horizontal portions of said extensions, and the two line wires on said insulators, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

JEFFERSON BRADFORD.
JAMES P. WILLIAMS.

Witnesses:
JNO. H. FRYER,
H. C. HAMILTON, Jr.