No. 855,966. PATENTED JUNE 4, 1907.

E. L. ORCUTT.

ELECTRIC SIGNALING DEVICE.

APPLICATION FILED SEPT. 1, 1906.

Fig. 2,

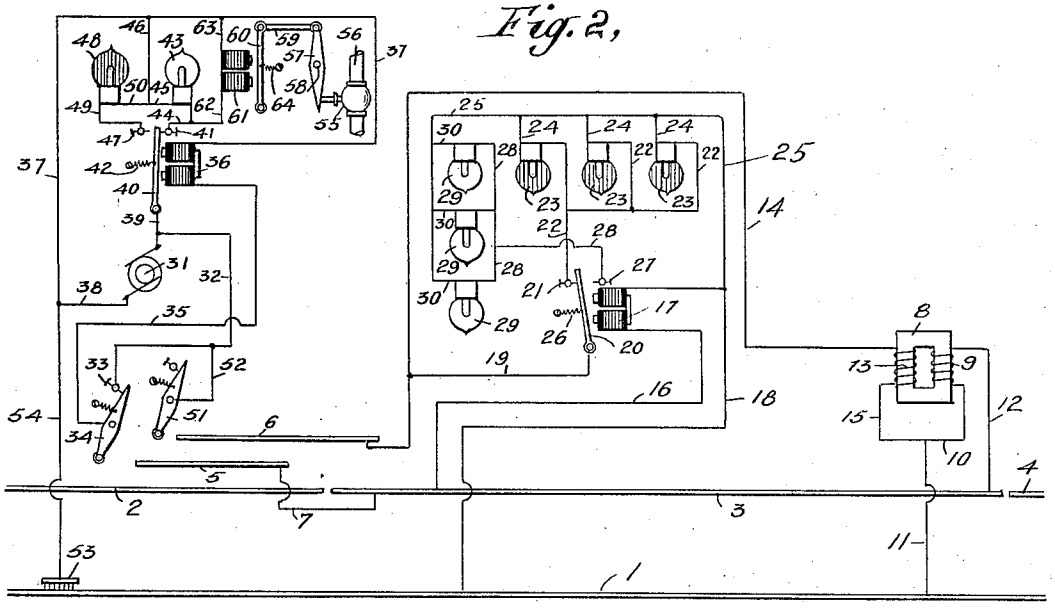

Fig. 1,

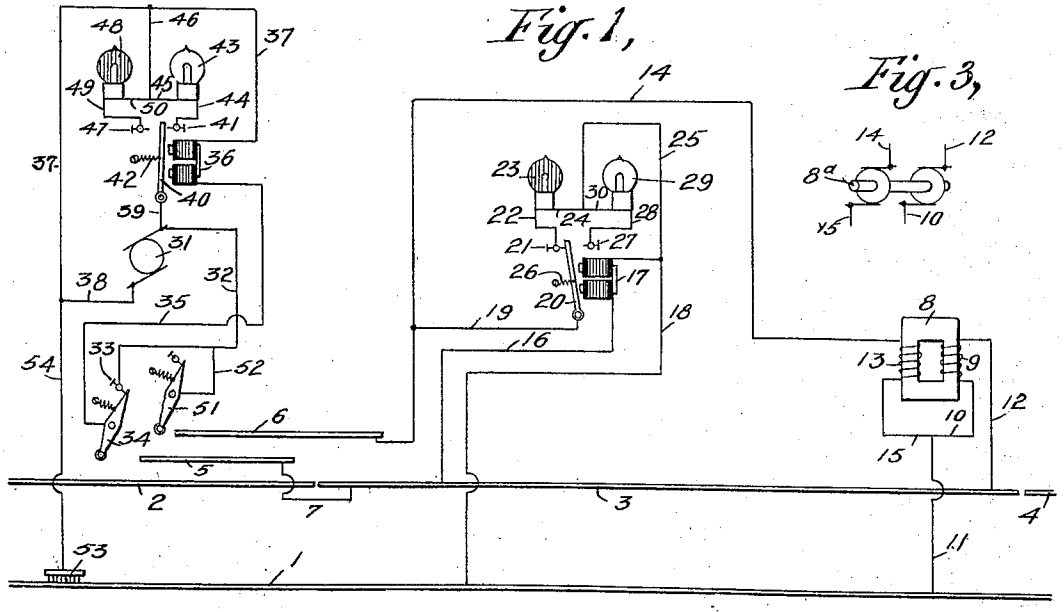

Fig. 3,

WITNESSES:

Leonard Day

Ida Gilmore

INVENTOR

Edward L. Orcutt

BY

Nicholas Wm. Goodlett Jr.

HIS ATTORNEY

UNITED STATES PATENT OFFICE.

EDWARD L. ORCUTT, OF NEW YORK, N. Y., ASSIGNOR TO RAILWAY SAFETY SIGNAL COMPANY, A CORPORATION OF NEW JERSEY.

ELECTRIC SIGNALING DEVICE.

No. 855,966. Specification of Letters Patent. Patented June 4, 1907.

Application filed September 1, 1906. Serial No. 333,003.

To all whom it may concern:

Be it known that I, EDWARD L. ORCUTT, a citizen of the United States, and a resident of the borough of Manhattan, in the county, city, and State of New York, have invented certain new and useful Improvements in Electric Signaling Devices for Railways, of which the following is a specification.

This invention relates to electric signaling systems for railways.

It seeks to provide an efficient, economical and reliable system and also one in which both track signals and cab or train signals may be utilized. The track signals are arranged in blocks along the track.

The invention also seeks to provide an efficient, reliable and economical arrangement by means of which the brakes may be applied to stop the train when the block about to be entered is dangerous or occupied by a preceding train.

In the accompanying drawings forming part of this specification, and in which like numerals indicate corresponding parts in the several figures, Figure 1 is a diagram embodying the invention and showing a single track signal for the block; Fig. 2 is a similar view showing a plurality of track signals for a block and associated means on the train for stopping the train; and Fig. 3 is a diagrammatic representation of a rotary transformer or motor dynamo which may be used in place of the stationary transformer shown in Figs. 1 and 2.

Referring now to the drawings and more particularly to Fig. 1, the track is divided into blocks of which rails 1 and 3 belong to the second block, and rails 1 and 4 belong to the third block. Rails 2, 3, 4, etc. are insulated from each other. Rail 1 may, as shown, be electrically continuous through the several blocks. 5 and 6 are two separate track contacts associated with the block to which the rails 1 and 3 belong. These track contacts 5 and 6 consist of suitable electric conductors which extend along the track for a suitable distance immediately in advance of the block to which they belong. They are preferably formed of rails fixed on the road-bed. Track contact 5 is connected by wire 7 to rail 3 at the entering end of the block. At the opposite end of the block is transformer 8 whose secondary coil 9 is connected by wire 12 to rail 3 and by wires 10 and 11 to rail 1. Primary coil 13 of transformer 8 is connected by wire 15 to wire 11 and is connected by wire 14 to track contact 6. Track magnet 17 is connected by wires 16 and 18 to rails 3 and 1, respectively, near the entering end of the block. Thus magnet 17 is connected in the track circuit which includes rails 1 and 3 and the secondary coil 9 of the transformer. This track magnet 17 is arranged to control the track signal for the block. This track signal may consist of any type of signal capable of giving a danger and safety indication, as required, and this signal may be operated from any convenient source, but preferably from a source of electricity located on the train. As shown in the drawings, this signal consists of two lamps. One lamp lights up to show that the guarded block is dangerous, as for example when a train is occupying this block. The other lamp lights up to show that the guarded block is safe, as for example when there is no train in this block. As shown in the accompanying drawings, the signal consists of these danger and safety lamps and is operated from the supply circuit for the transformer, said supply circuit including the track contact 6, wire 14, primary coil of transformer 8, and rail 1. Armature 20 of magnet 17 is connected by wire 19 to wire 14. Back contact 21 is connected by wires 22 and 24 to wire 25 and includes lamp 23. Front contact 27 is connected by wires 28 and 30 to wire 25 and includes lamp 29. Wire 25 is connected to wire 18. Thus lamps 23 and 29 are arranged to be connected alternately in a shunt or bridge across the supply circuit. When magnet 17 is deënergized and armature 20 is retracted by its spring 26, the shunt is closed through lamp 23. When, however, magnet 17 is energized, the armature 20 moves over to contact 27, lamp 29 is included in the shunt and lamp 23 is cut out. In the preferred arrangement of the system, the generator for the supply circuit is carried on the train. Any suitable type of generator may be employed. 31 is the generator on the train. One side of this generator is connected by wires 32 and 52 to a traveling contact 51, carried by the train. This traveling contact, as the train advances, is arranged to make connection with track contact 6. The opposite side of the generator is connected by wires 38 and 54 to a traveling

contact 53 arranged to travel in electric connection with rail 1. When the train reaches contact 6, the supply circuit for the transformer 8 is completed as follows—from generator 31 through wires 32 and 52, traveling contact 51, track contact 6, wire 14, primary coil 13, wires 15 and 11, rail 1, traveling contact 53, and wires 54 and 38, back to generator 31. This circuit, of course, energizes secondary coil 9 of the transformer, thereby energizing magnet 17. 43 and 48 indicate electric lamps carried in the train, and preferably in the engine cab, and constitute a train signal. This signal is controlled by magnet 36 carried in the train, the arrangement being such that when the magnet is energized the lamp 43 will be lighted to indicate safety, and when this magnet is deënergized the lamp 48 will be lighted to indicate danger. Magnet 36 is connected on one side by wire 35 to traveling contact 34 carried on the train, and is connected on its other side by wires 37 and 54 to traveling contact 53. Traveling contact 34 is arranged to make electric connection with a track contact 5. When the train reaches track contact 5, magnet 36 is connected in the track circuit as follows—from magnet 36 through wire 35, traveling contact 34, track contact 5, wire 7, rail 3 secondary coil 9 of transformer 8, rail 1, traveling contact 53, and wires 54 and 37 to magnet 36. If, at this time, the primary coil of the transformer is energized and there is no train in the block, magnet 36 will be energized and will cause the safety lamp 43 to light up. If, however, primary coil 13 is energized and a train is occupying the block, and thereby shunting the current in the track circuit, magnet 36 will be deënergized and danger lamp 48 will light up. The circuit for these lamps will be presently explained. 40 is the armature of magnet 36 and is connected by wire 39 to one side of the generator 31. Back contact 47 is connected by wires 49 and 50 to wire 46 and includes lamp 48. Front contact 41 is connected by wires 44 and 45 to wire 46 and includes lamp 43. Wire 46 is connected by wires 37 and 38 to the opposite side of the generator 31. The spring 42 holds its armature 40 on the back contact 47 when magnet 36 is not energized. The generator is designed to be continuously active so as to light up either lamp 43 or 48 depending upon the condition of magnet 36. Wire 32 is connected to back stop 33 of the traveling contact 34. This traveling contact 34, when it makes connection with the stationary contact 5, opens the connection with back stop 33. At other times, the spring of this traveling contact keeps the connection with back stop 33 closed as shown in the drawings. Before the train reaches track contact 5, the magnet 36 is energized from generator 31 by the following circuit—from generator 31, wire 32, back stop 33, contact 34, wire 35, magnet 36, wires 37 and 38, back to generator.

The operation of the system is as follows—Before the train reaches the track contacts 5 and 6, the local train circuit through magnet 36, just above traced, energizes the magnet and closes the circuit through lamp 43, which is a white lamp and gives a safety indication. When the train reaches track contacts 5 and 6, traveling contact 51 makes connection with track contact 6 thereby connecting generator 31 with the supply circuit, as heretofore traced. This circuit operates transformer 8 and energizes track magnet 17 thereby cutting out lamp 23 and cutting in lamp, 29 which thereupon lights up to show safety. At the same time, traveling contact 34 makes connection with track contact 5 and breaks at back stop 33 the local train circuit through magnet 36 but connects this magnet by means of co-operating contacts 34 and 5 and by means of contact 53 with the track circuit so that this magnet 36 is immediately energized from current in the track circuit thereby causing safety lamp 43 to continue lighted. If, at this time, a train is occupying the block, the train magnet 17 will be deënergized thereby causing track lamp 23 to light up to indicate danger. The presence of the train in the block also prevents magnet 36 from being energized by the track circuit so that armature 40 cuts out safety lamp 43 and cuts in danger lamp 48 causing the latter to light up.

The resistances of the various lamps and magnets, especially those on the train, can be adjusted in a way so as to secure the best results.

In Fig. 2 are shown three track signals, each consisting of a danger and safety lamp. The danger lamps 23 are connected in multiple by wires 22 and 24 to back contact 21 on one side and to wire 25 on the other side. The safety lamps 29 are connected in multiple by wires 28 and 30 to front contact 27 on one side and to wire 25 on the other side. Each pair of danger and safety lamps 23 and 29 constitutes a signal. In Fig. 2, 61 is a magnet carried on the train and connected by wires 62 and 63, respectively, to contact 41 on one side and to wire 37 on the other side. The armature 60 of this magnet is connected by link 59 to lever 57 fulcrumed at 58 and operating a valve 55 in fluid pressure pipe 56. This fluid pressure pipe may control or operate a whistle, or other signal, or serve to apply the brakes. Magnet 61 is energized concurrently with safety lamp 43. When magnet 36 is deënergized and lamp 48 lights up to indicate danger, magnet 61 is deenergized, its armature is retracted by spring 64 thereby operating valve 55 to apply the brakes or blow the whistle, as desired.

In Fig. 3 is shown a diagram of a rotary

transformer or motor dynamo 8ª. This may be substituted for the stationary transformer 8 shown in Figs. 1 and 2, in which case wires 10, 15, 12 and 14 will be connected in the track circuit and in the supply circuit in substantially the same way as shown in Figs. 1 and 2.

It is to be understood that the various features of the invention may be modified and combined in different ways without departing from the substance of the invention.

What I claim and desire to secure by Letters Patent is:—

1. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator for the supply circuit; and contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit.

2. In an electric railway signaling system, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator on said train for the supply circuit; and contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit.

3. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator on said train for the supply circuit for operating said train signal; and contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit.

4. In an electric signaling system for railways, the combination of a track circuit, including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a track signal; and a magnet in the track circuit controlling said track signal.

5. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator on said train for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a track signal; and a magnet in the track circuit controlling said track signal.

6. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator on said train for the supply circuit and for operating said train signal; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a track signal; and a magnet in the track circuit controlling said track signal.

7. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a track signal operated by the supply circuit; and a magnet in the track circuit controlling said track signal.

8. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator on said train for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a track signal operated by the supply circuit; and a magnet in the track circuit controlling said track signal.

9. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator on said train for the supply circuit and for operating said train signal; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track,

whereby said train signal is controlled by the track circuit; a track signal operated by the supply circuit; and a magnet in the track circuit controlling said track signal.

10. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a plurality of track signals; and a magnet in the track circuit controlling said track signals.

11. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a plurality of track signals operated by the supply circuit; and a magnet in the track circuit controlling said track signals.

12. In an electric railway signaling system, the combination of a track circuit including a transformer; both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator on said train for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a plurality of track signals; and a magnet in the track circuit controlling said track signals.

13. In an electric railway signaling system, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator on said train for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a plurality of track signals operated by the supply circuit; and a magnet in the track circuit controlling said track signals.

14. In an electric signaling system for railways, the combination of a track circuit including both rails of the track, a transformer, and a magnet arranged to be shunted by a passing train; a supply circuit including said transformer; a generator on a train arranged to be connected with the supply circuit to energize the transformer; a track signal controlled by said magnet of the track circuit; a train signal; and means operated by the track circuit for controlling said train signal.

15. In an electric signaling system for railways, the combination of a track circuit including both rails of the track, a transformer, and a magnet arranged to be shunted by a passing train; a supply circuit including said transformer; a generator on a train arranged to be connected with the supply circuit to energize the transformer; a plurality of track signals controlled by said magnet of the track circuit; a train signal; and means operated by the track circuit for controlling said train signal.

16. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a brake applying device on a train; a magnet on said train controlling said brake applying device; a supply circuit for the transformer; a generator for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said brake applying device is controlled by the track circuit; a track signal; and a magnet in the track circuit controlling said track signal.

17. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a brake applying device on a train; a magnet on said train controlling said brake applying device; a supply circuit for the transformer; a generator on said train for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said brake applying device is controlled by the track circuit; a track signal; and a magnet in the track circuit controlling said track signal.

18. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; and a brake applying device on said train controlled by said track circuit.

19. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a

brake applying device on said train; a magnet on said train controlling said signal and said brake applying device; a supply circuit for the transformer; a generator for the supply circuit; and contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal and said brake applying device are controlled by the track circuit.

20. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a brake applying device on said train controlled by said track circuit; and a track signal controlled by said track circuit.

21. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a brake applying device on said train; a magnet on said train controlling said signal and said brake applying device; a supply circuit for the transformer; a generator for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal and said brake applying device are controlled by the track circuit; and a track signal controlled by said track circuit.

22. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a brake applying device on said train controlled by said track circuit; a track signal controlled by said track circuit and operated by the supply circuit.

23. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a brake applying device on said train; a magnet on said train controlling said signal and said brake applying device; a supply circuit for the transformer; a generator on said train for the supply circuit; and contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal and said brake applying device are controlled by the track circuit and operated by the supply circuit.

24. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a track signal consisting of danger and safety electric lamps; and a magnet in the track circuit controlling said track signal.

25. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator on said train for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a track signal consisting of danger and safety electric lamps operated by the supply circuit; and a magnet in the track circuit controlling said track signal.

26. In an electric signaling system for railways, the combination of a track circuit including a transformer, both rails of the track, and a track contact; a signal on a train; a magnet on said train controlling said signal; a supply circuit for the transformer; a generator on said train for the supply circuit; contacts on said train connected with said magnet and arranged to make connection with said track contact and one rail of the track, whereby said train signal is controlled by the track circuit; a track signal consisting of danger and safety electric lamps operated by the supply circuit; a magnet in the track circuit controlling said track signal; and a brake applying device on said train controlled by the track circuit.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

EDWARD L. ORCUTT.

Witnesses:
RICHARD SHELDON,
LEONARD DAY.