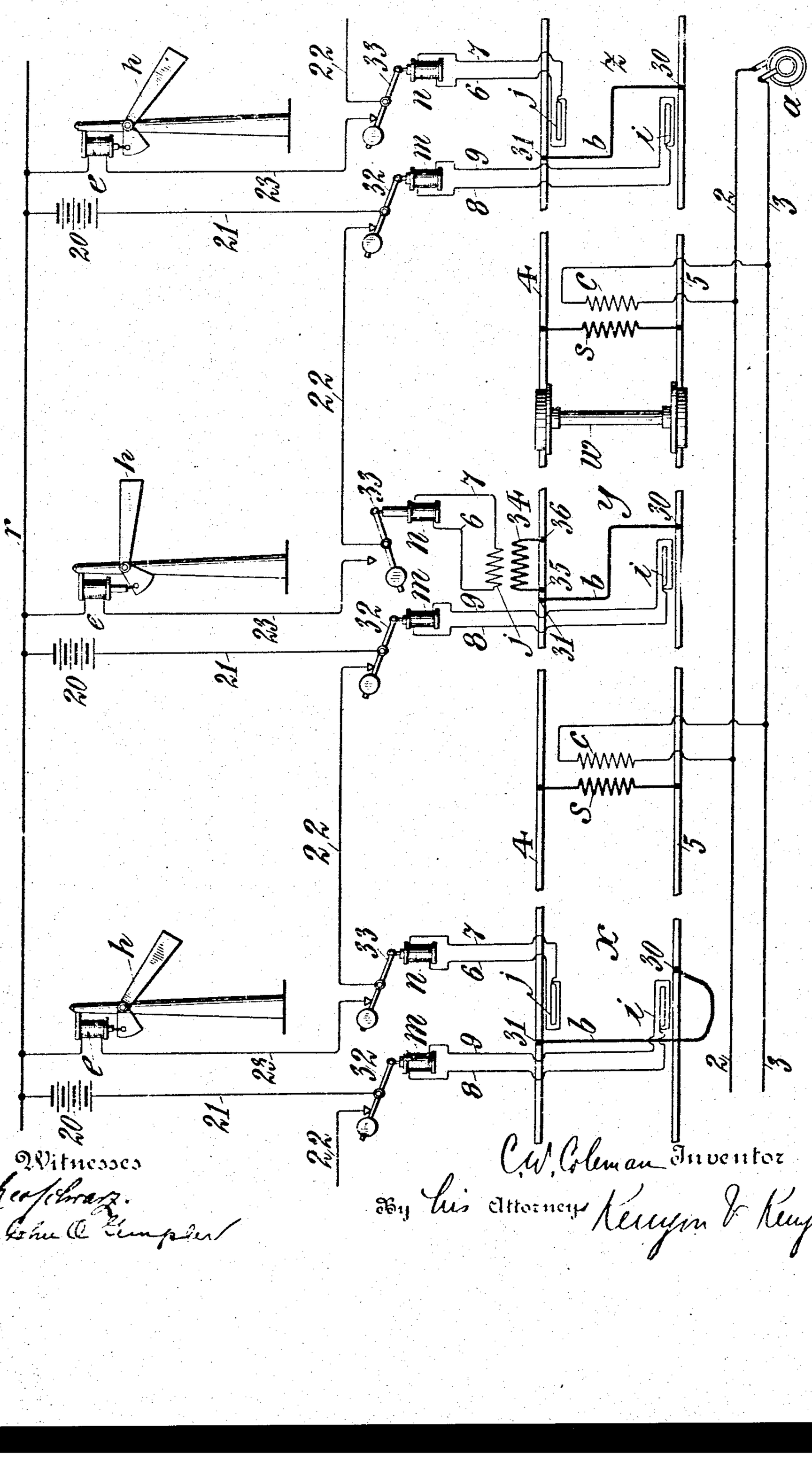
C. W. COLEMAN.

RAILWAY SIGNAL.

APPLICATION FILED FEB. 12, 1908.

934,996. Patented Sept. 28, 1909.



Witnesses

Geo. Schwartz.

Chas. C. Kemper

C. W. Coleman Inventor

By his attorneys Kenyon & Kenyon

UNITED STATES PATENT OFFICE.

CLARENCE W. COLEMAN, OF WESTFIELD, NEW JERSEY, ASSIGNOR TO THE HALL SIGNAL COMPANY, A CORPORATION OF MAINE.

RAILWAY-SIGNAL.

934,996. Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed February 12, 1908. Serial No. 415,562.

To all whom it may concern:

Be it known that I, CLARENCE W. COLEMAN, a citizen of the United States, and a resident of Westfield, Union county, New Jersey, have invented certain new and useful Improvements in Railway-Signals, of which the following is a specification.

This invention relates to those automatic, electric signals for railways in which the signals are spaced along the track, a main signal conductor is employed and a signal is continuously under control of a moving vehicle. This improvement employs a signaling current in a main or track rail circuit which circuit may also carry a current of a different character, employed for a different purpose, as for propulsion. Where a direct current is employed for propulsion it is convenient to employ an alternating current superposed on the track circuit for signaling purposes.

My invention is directed to improvement in that class of signaling system in which the track may be electrically continuous and supplied by sources of current at intervals, the various circuits being completed by bonds connecting the rails between successive sources. Such a system is shown and described in the application of C. J. Coleman, Serial No. 383,366, filed July 12th 1907.

It is the object of the present invention to so devise the system that there shall be no point or points thereon no matter how short at which a truck could rest without causing a signal behind it to stand at danger. To this end I complete the various track circuits by a bond of conducting material which offers substantially no impedance to the flow of the signaling current and which bond is connected to a point in one rail a sufficient distance in advance of the point to which it is connected to the other rail as to permit the coils through which the signals of successive blocks are controlled to be in operative relation with opposite rail portions. In other words, the coils are governed by the presence or absence of currents through different sources yet are simultaneously acted upon by the circuit closer such as the axle and wheels of the car carried by the train. In this way the coils of different blocks are lapped and there is no point at which even a single truck can stand without being protected, for the truck will act upon the current in the coil of the forward block before it has ceased to act upon the coil of a rearward block.

My invention will be better understood by reference to the accompanying drawing, which is a diagram of one embodiment of my invention illustrating a normally clear system, and with reference to the following more detailed description.

The track rails 4 and 5 are electrically continuous from end to end and may jointly constitute the return conductor of a direct current electric propulsion system. There are sources of alternating current connected in parallel branches *s* to the opposite rails, an alternating generator *a* in a parallel circuit 2, 3, supplies a primary coil *c* with alternating impulses which act inductively on the coil constituting the source *s*. There is a bond or conducting section *b* which completes the track circuit for the current from the sources *s* forward and rearward of the bond. This may be and preferably is of negligible impedance as relates both to the signaling and the traction currents. This is connected to one rail at the point 30 and to a point in advance 31 in the other rail. The sources *s* are at or about the centers of the blocks and the conducting section *b* divides the space between sources into two track circuits. Three signal spaces *x*, *y*, and *z*, are shown. On opposite sides of the section *b* are coils of insulated wire *i*, *j*, each laid in inductive relation to the adjacent rail. The signal employed is shown at *h* and is shown as controlled by a magnet *e* in a local circuit including a battery 20, conductors 21, 22, 23, and the return conductor *r*; there are two circuit breakers 32, 33, in this circuit operated by magnets *m* and *n*, respectively. The magnet *n* is connected in a circuit 6, 7, with the coil *j*, and the magnet *m* is in a circuit 8, 9, with the coil *i*.

Normally, the signals as shown indicate safety, and the local controlling circuit is closed; when the wheels *w* of a vehicle are in the signal block as shown, current from the source *s* which normally flowed through the rails and the conducting section *b* inducing a current in the coil *j* to energize the magnet *n* is cut off or diverted; magnet *n* is deënergized, circuit of the magnet *e* is broken at 33 and the signal goes to danger by gravity. As the wheels *w* pass from section *y* to section *z* current gradually increases in coil *i* and is gradually excluded

from coil *j* and there is no interval of no protection.

The coils *i* and *j* are acted upon inductively by current variations in the rails and they may be located in inductive proximity to the rails or a shunt wire 34 may be employed in which the fluctuations and changes in current are the same as in the rail between the points 35, 36, to which the terminals of shunt wire 34 are connected.

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

1. In a railway signaling system, the combination of two signals, a pair of continuous rails and two sources of supply in operative relation therewith, two coils for governing the respective signals, the coils being electrically related each to a part of one of two opposite rail portions, and a bond so connecting the rails as to complete circuits from said sources of power with said opposite rail portions in circuit with different sources.

2. In a railway signaling system, the combination of two signals, a pair of continuous conductors and two sources of supply in operative relation therewith, two coils for governing the respective signals, the coils being electrically related each to a part of one of two opposite conductor portions, and a bond so connecting the conductors as to complete circuits from said sources of power with said conductor portions in circuit with different sources.

3. In a railway signaling system, the combination of two signals, a pair of continuous rails and two sources of supply in operative relation therewith, two coils for governing the respective signals, the coils being electrically related respectively to portions of the two rails, and a bond connecting the rails at points at opposite ends of said rail portions.

4. In a railway signaling system, the combination of the track, two signals, two sources of supply in operative relation with said track, a bond connecting the rails at points intermediate said sources, the connection to one rail being forward of that of the other, a coil for governing the rearward of the two signals in operative relation with the rail to which the forward end of the bond is connected, and a coil for governing the forward of the two signals in operative relation with the opposite rail.

5. In a railway signaling system, signal controlling circuits comprising the track, sources of supply at intervals in operative relation therewith, and bonds diagonally connecting the rails of the track and each completing signal controlling circuits from a source at each side of the bond.

6. In a railway signaling system, the combination of a main metallic circuit including a source of alternating current, a series of signals, electro-magnetic means for controlling the signals including coils energized inductively by variations of current in the main circuit, the coil of one signal lapping the coil of the adjacent signal, and means for confining said lapping coils to electrically independent circuits consisting of a bond of low impedance connecting the direct and return members of the circuit.

7. In a railway signaling system, a signal space including two parallel, electrically continuous track rails, a source of alternating current connected to said rails, a bond connected to a point in one rail and a point in advance thereof in the other rail, a signal, two local circuits for controlling said signal and a coil in each circuit inductively energized by current variations in the adjacent rail.

8. In a railway signaling system, the combination of an electrically continuous, main, metallic conductor, a series of signals at separated points along said conductor, a series of sources of alternating current, one for each signal, connected in parallel to said conductor, electro-magnetic means for controlling said signals, circuits for controlling said means; a series of coils, one in circuit with each magnetic means, so arranged that the coil of one signal laps the coil of the adjacent signal, and means for energizing said coils by current variations in said conductor.

9. In a railway signaling system, the combination of a main circuit including the track rails as the direct and return members thereof, a series of signals at separated points along said track, a series of sources of alternating current, one for each signal, connected in parallel to said rails, electro-magnetic means for controlling signals, circuits for controlling said means, a series of coils, one in circuit with each magnetic means so arranged that the coil of one signal laps the coil of the adjacent signal and means for energizing said coils by current variations in said rails.

10. In a railway signaling system, the combination of an electrically continuous, main, metallic conductor, a series of signals at separated points along said conductor, a series of sources of alternating current, one for each signal, connected in parallel to said conductor, electro-magnetic means for controlling said signals, two circuits for controlling said means at each signal, a series of coils, one in each circuit so arranged that the coil of one signal laps the coil of the adjacent signal, and means for energizing said coils by current variations in said conductor.

11. In a railway signaling system, the combination of a continuous, main, metallic conductor, a series of separated signals, a series of sources of alternating current for each signal, electro-magnetic means for controlling the signals including coils energized by

current variations in the main conductor, the coils of one signal lapping the coils of an adjacent signal, and means for dividing said main conductor into blocks consisting of a bond bridging the conductor and confining the lapped coils to independent circuits.

12. In a railway signaling system, the combination of two parallel, electrically continuous track rails, a series of sources of alternating current connected with the rails at separated points, means for electrically dividing said track rails into blocks consisting of a series of bonds, each bond connecting a point in one rail with a point in advance in the other rail, each block having a signal, a local controlling circuit for the signal and a coil in said circuit inductively energized by current variations in the adjacent rail.

13. In a railway signaling system, the combination with electrically continuous parallel track rails of a series of sources of alternating current connected to the rails in parallel branches, a series of bonds connecting a point in one rail between two sources of current with a point in advance in the other rail between said sources of current, each signal space having electro-magnetic means for operating the signal including a local circuit and a coil in said circuit inductively energized by the current in the adjacent rail.

14. In a railway signaling system, a block including parallel, electrically continuous track rails, a source of alternating current connected to said rails, a conducting bond connected to a point in one rail and a point in advance thereof in the other rail, a signal, a controlling circuit for the signal and a coil in said circuit inductively energized by current variations in said rail.

15. In a railway signaling system, the combination of an electrically continuous, metallic, main signal circuit, a circuit closer carried by the car in continuous contact with the circuit, sources of alternating current connected to said circuit in parallel branches at separated points, means for electrically dividing the space between successive sources into independent circuits consisting of a conducting bond connected to a point in one conductor and a point in advance in the other conductor; each section having a suitable signal, a local circuit for controlling said signal and a coil in said circuit inductively energized by the current flowing in said main, signal conductor, each of said coils located in position to lap the coils in the adjacent signal section.

16. In a railway signaling system, the combination of an electrically continuous, metallic, main signal circuit, a circuit closer carried by the car in continuous contact therewith, sources of alternating current connected to said circuit in parallel branches at separated points, means for electrically dividing the space between successive sources into independent circuits consisting of a conducting bond connected to a point in one conductor and a point in advance in the other conductor, each signal space having a suitable signal, a local circuit for controlling said signal, and means for producing induced current impulses in said circuit due to current variations in the main circuit.

17. In a railway signaling system, the combination of an electrically continuous, metallic, main signal circuit, having a series of blocks, a circuit closer carried by the car in continuous contact with said circuit, sources of alternating current connected to said circuit in parallel branches at separated points, means for electrically dividing the spaces between successive sources into independent circuits consisting of a conducting bond connected to a point in one conductor and a point in advance in the other conductor each space having a suitable signal, a local circuit for controlling said signal, a coil in said circuit arranged to lap the coil in an adjoining circuit and means for energizing said coils inductively by current variations in the adjacent main conductor.

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

CLARENCE W. COLEMAN.

Witnesses:
WM. M. TOWNLEY,
A. K. GALE.