No. 898,221. PATENTED SEPT. 8, 1908.

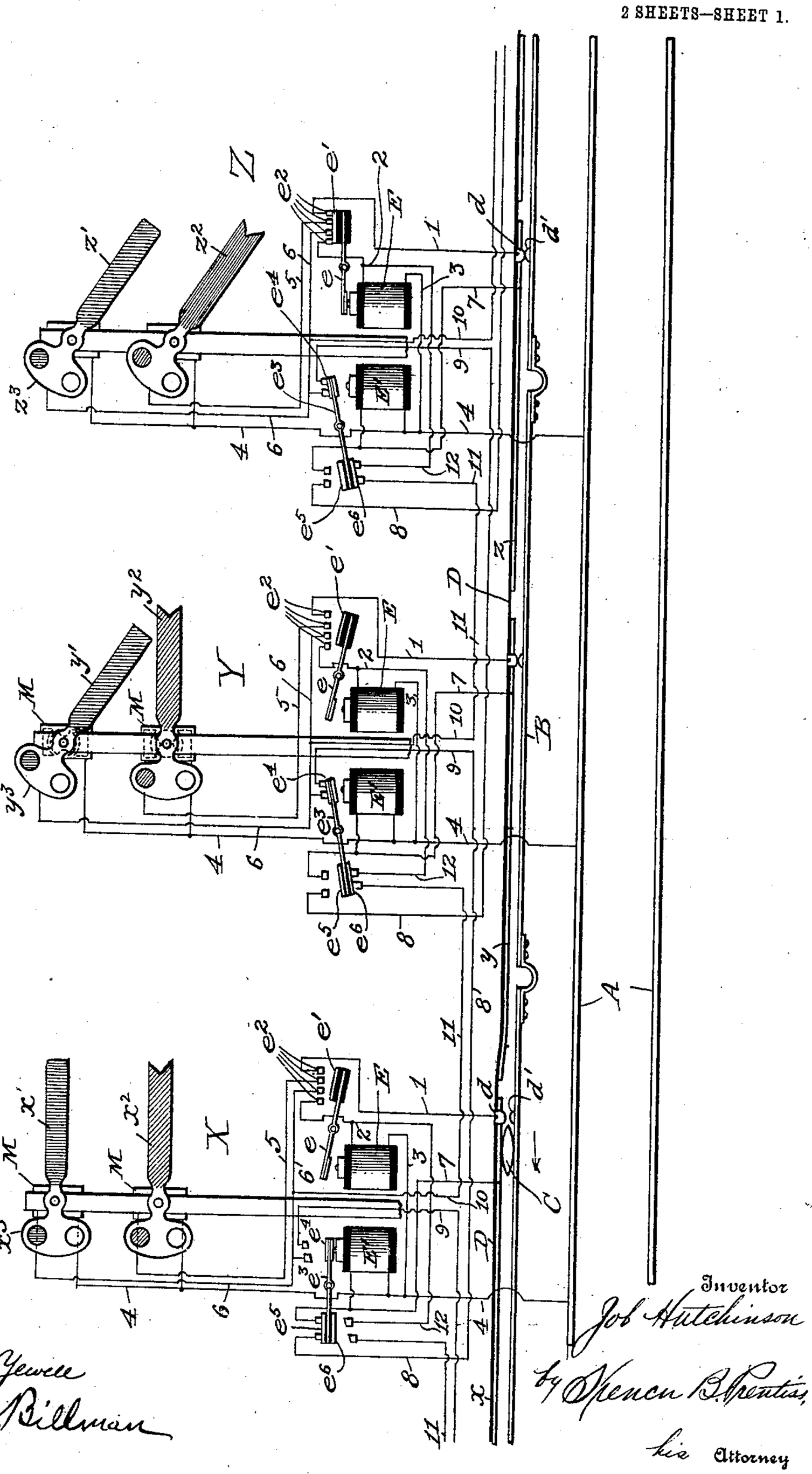
J. HUTCHINSON.

RAILWAY ELECTRIC SIGNALING SYSTEM.

APPLICATION FILED JAN. 2, 1906. RENEWED MAY 20, 1908.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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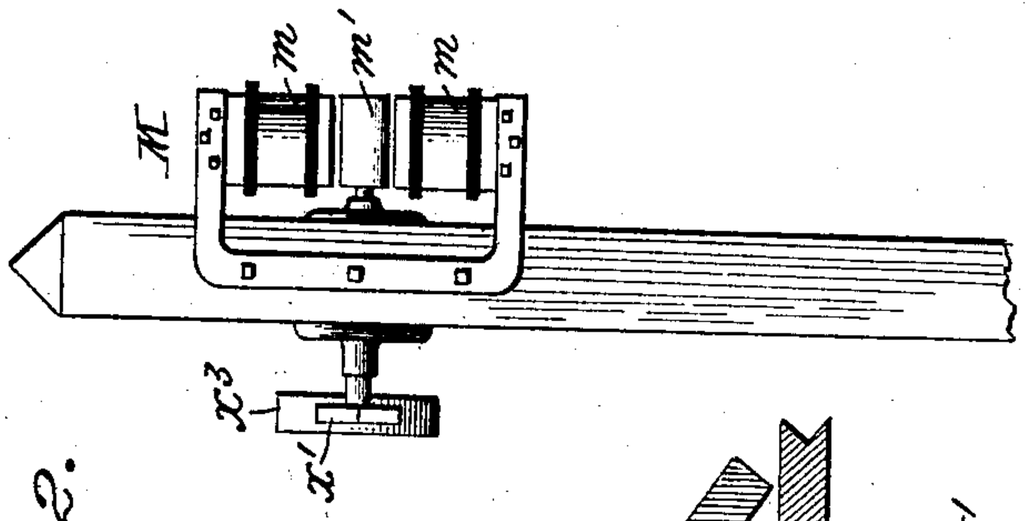

Fig. 2.

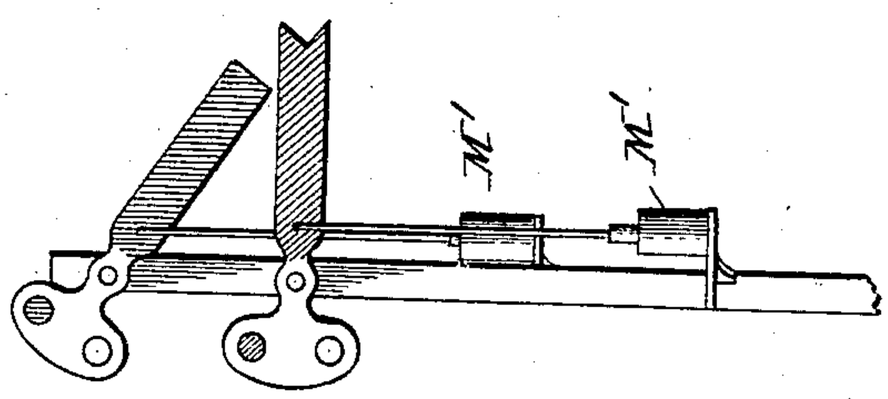

Fig. 7.

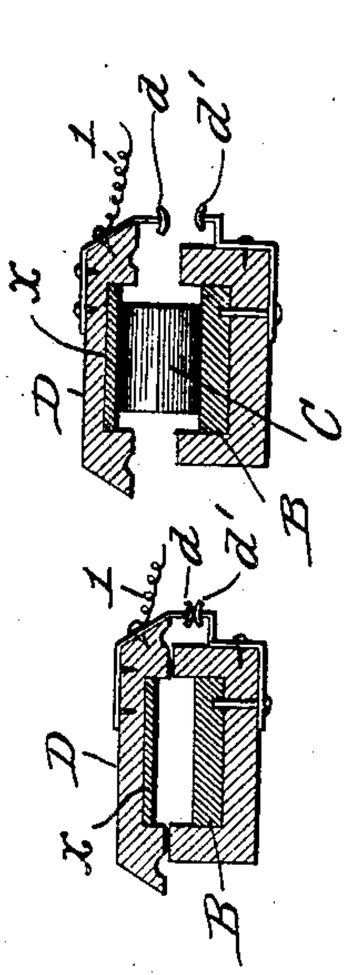

Fig. 4.

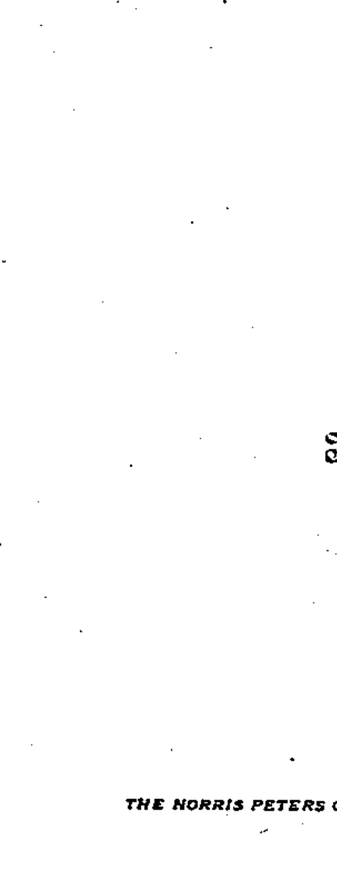

Fig. 3.

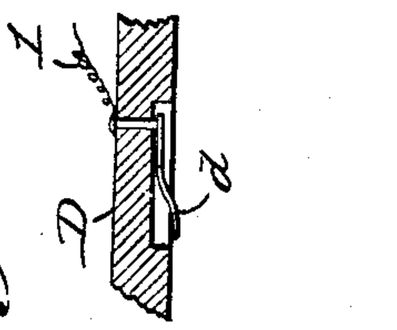

Fig. 6.

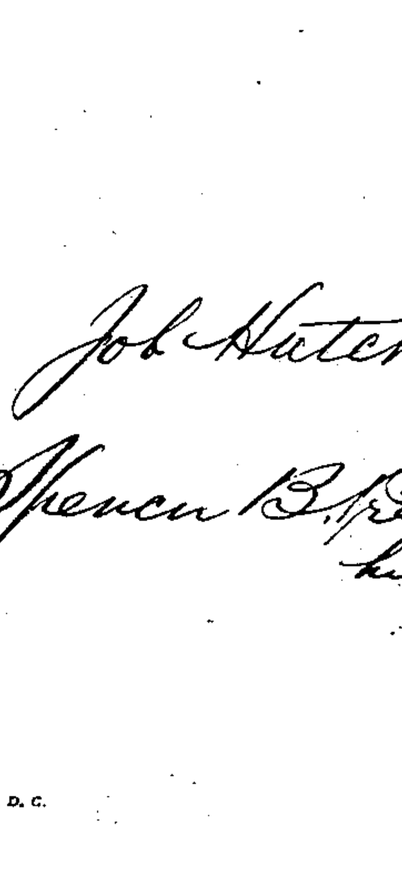

Fig. 5.

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UNITED STATES PATENT OFFICE.

JOB HUTCHINSON, OF NEW YORK, N. Y.

RAILWAY ELECTRIC SIGNALING SYSTEM.

No. 898,221. Specification of Letters Patent. Patented Sept. 8, 1908.

Application filed January 2, 1906, Serial No. 294,224. Renewed May 20, 1908. Serial No. 433,937.

To all whom it may concern:

Be it known that I, JOB HUTCHINSON, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Railway Electric Signaling System, of which the following is a specification.

My invention relates to electric signaling systems for railways in which a signal conductor divided into sections extends along the line of way. Each section of the signal conductor preferably constitutes a block of the system, and has at least one signal station associated with it located at or near the entrance to the block.

The principal objects of my invention are to produce a system in which the possibility of failure to act is reduced to a minimum, and in which the giving of a false "safety" signal when one car or train too closely follows another shall be prevented. These and other objects will more fully appear hereinafter.

In carrying my invention into effect, two signals are preferably located at each signal station, one of which signals is termed the danger signal and is usually colored red, and the other is termed the caution signal which is usually colored green. The arrangement of the signal operating mechanisms and the circuit controlling devices is such that the indications given correspond with the indications of a three-position signal, each of my signals being adapted for two positions. The signals of three consecutive sections are supposed to be operated as follows: When a section is occupied by a car or train both signals of that section, or only the danger signal, are displayed; the caution signal of the next section in the rear is displayed, and the danger signal cleared; and both danger and caution signals of the second section in the rear are cleared.

The sectional signal conductor as employed in this system is similar to that described and claimed in my pending application, Serial Number 259,813, filed May 10, 1905, in which it is arranged within a protecting cover for the third rail of an electric railway, but in some aspects of the invention this particular construction is not essential.

The invention consists in the novel features of the system above outlined, and hereinafter described and claimed, reference being had to the accompanying drawings taken in connection with the following specification for a more complete understanding thereof.

In the drawings, Figure 1 shows three blocks or sections of my system in diagram; Fig. 2 is an enlarged detail showing the preferred form of signal and its operating motor; Figs. 3, 4 and 5 are enlarged details showing the supply conductor and signal conductor with their housings, in cross section, and also showing arrangements of a circuit opener and closer controlled by the movement of the signal conductor; Fig. 6 is a detail of a spring contact shown in Fig. 5; and Fig. 7 illustrates the employment of solenoids for operating the signals instead of the form of motor shown in Fig. 2.

Referring to the drawings, A indicates the track rails of an electric railway, and B the third rail or power conductor. In proximity to the third rail B, and preferably overlying it, is the sectional signal conductor of which I have shown three sections x, y and z, with which are associated the signal stations X, Y and Z respectively, which are preferably located at the entrance to the sections. The sectional signal conductor is carried by the cover D of the third rail B, as shown diagrammatically in Fig. 1, and in section in Figs. 3, 4 and 5, reference being had for a more complete description of this construction to my prior application above referred to.

In Fig. 1 I have shown the use of semaphores as the signal devices, but it will be understood that any other form of signals may be employed.

The signals at each station are similar and similarly arranged, so that a description of one station apparatus will apply to all.

At station X two signals are mounted upon a pole one above the other as shown, x^1 being the danger signal which is usually colored red, and arranged above the caution signal x^2 which is usually colored green. Each signal is provided with a spectacle frame x^3 for night indication, as is well understood. Each signal is operated by an electric motor M which, as shown in Fig. 2, consists of field magnets m adapted to be energized from a source of current, and an armature which is not wound and is so arranged and constructed as to bring the semaphore arm into its depressed or safety position when the field magnets m are energized. The semaphore arm is preferably counterweighted as by the spec-

tacle frame so that when the motor is deënergized the signal will assume the danger position, or in other words is "biased to danger".

Instead of the electric motor having a rotary armature, I may employ any other electromotive device such as a solenoid M^1 as shown in Fig. 7, one adapted to actuate each signal device by the attraction of its core.

Each station is provided with an electro-responsive device E shown as an electromagnet adapted to actuate a movable element e which carries a bridging contact e^1 for the fixed contacts indicated generally by e^2. A second electro-responsive device E^1 is also provided at each station in the form of an electromagnet adapted to control a movable element e^3 carrying bridging contacts e^4, e^5, and e^6. Movable element e is so weighted that when magnet E is deënergized the bridging contact e^1 is off of its coöperating contacts; and movable element e^3 is so weighted that when magnet E^1 is deënergized bridging contact e^4 will engage its fixed contacts, and bridging contact e^6 will engage its fixed contacts, the fixed contacts of bridging contact e^5 being open.

Near the entrance to each section and controlled by the movement of the signal rail is a movable contact d coöperating with a fixed contact d^1 in electrical connection with the third rail B. Normally when no car is entering the section these contacts are in engagement and current may flow to the first of the series of fixed contacts e^2, but upon a car entering this section the cover is lifted by the contact shoe C and the contacts d, d^1 are opened.

The circuit connections of the above apparatus will now be described in connection with the operation of the system.

Normally when the sections are unoccupied current flows from the third rail B through contacts d, d^1, conductor 1, fixed contacts e^2 and bridging contact e^1, conductor 2, magnet E which retains its movable element e in the operative position, conductor 3, and return by conductor 4 to ground or return conductor which may be the track. This circuit divides at fixed contacts e^2, a branch flowing through conductor 5 through the motor M of the caution signal x^2 (or y^2, z^2, as the case may be) to conductor 4; and still another branch flowing through conductor 6, through motor M of the danger signal x^1 (or y^1, z^1 as the case may be), and so to conductor 4. This energizes the motors of both signals at each station to maintain the signals in the safety position, illustrated at station Z. Suppose now a car to be entering section x and moving in the direction of right to left as indicated by the arrow. Contact shoe C electrically connects section x of the signal conductor and the supply conductor or third rail B, at the same time slightly lifting the cover and separating contacts d, d^1. The separation of these latter contacts deenergizes magnet E which permits its movable element e to drop back and open the circuits of both the motors M of signal devices x^1 and x^2 of station X, these signals then assuming by gravity the horizontal or displayed position. The bridging of the section x and supply conductor B by shoe C closes the circuit of magnet E^1 through conductor 7 and conductor 4, thereby bringing bridging contact e^5 into engagement with its coöperating fixed contacts and energizing the following circuit: conductor 7, contact e^5, conductor 8, conductor 9 at station Y, bridging contact e^4 to conductor 6 where the current divides, a part going through conductor 6, motor of danger signal y^1, and return to ground by conductor 4. This clears danger signal y^1 which had previously been displayed when the car or train occupied section y, and caution signal y^2 still remains displayed. The other branch of the circuit continues from conductor 6 through conductors 10 and 11 to station Z, bridging contact e^6 at said station, conductor 12, magnet E, and return to ground by conductors 3 and 4 at station Z. This energizes magnet E at station Z, this station being now considered as the second station in the rear, movable element e is attracted (it being remembered that this magnet E was deënergized when the car was passing over section z and up to this time remained so), thereby closing the circuit through conductor 1 at station Z and magnet E, and motors of signals z^1, z^2 in parallel. The signals z^1, z^2 are thus again brought to and maintained in their safety positions. The positions of the signals at the three stations, and also of the movable elements of the electromagnetic responsive devices, are therefore as shown in Fig. 1 of the drawings.

Now suppose a second car or train to be following the first, and to enter section z while the train ahead occupies section x (the second section in advance). The second car or train therefore opens contacts d, d^1 at section Z, thereby displaying both signals z^1, z^2 and opening the local circuit of magnet E. At the same time magnet E^1 at station Z is energized, which clears the danger signal of the preceding section just vacated by the second car, in the manner hereinbefore described. It also opens the circuit from the second section in advance of magnet E at station Z by the movement of bridging contact e^6, thereby preventing any further energization of magnet E from the second section in advance when the second car or train has passed sufficiently far along on section z to permit the contacts d, d^1 of that section to close again, thereby preventing the giving of a false safety signal at section Z. It will thus be seen that the entrance of the follow-

ing car or train, under consideration, upon the second section in the rear of the first car operates to permit both of the signals of said second section in the rear to be displayed, and prevents said signals from being operated to safety position which would otherwise occur owing to the presence of the first car upon the second section in advance. Suppose now that owing to accident or other cause of delay, the car or train in advance still occupies section x when the following car or train enters section y. The entrance of the following car or train upon section y, which may be considered as the first section in the rear (of the car in advance), displays the danger signal at station Y and operates the signals of the two preceding sections in the usual manner. The caution signal z^2 at station Z therefore remains displayed and can not be cleared from section x because the following car or train on section y has opened the clearing circuit x, conductors 7, 8, 9, 10, 11, 12, 3 and 4 at bridging contact e^4 of station Y. There is therefore no possibility of a false clear or safety signal.

Referring now to Figs. 3 and 4, it will be seen that movable contact d is mounted upon cover D but insulated from the sectional signal conductor, indicated by x. The lower contact d^1 is in electrical connection with the supply conductor or third rail B. Fig. 4 shows the contacts separated by the car shoe C. Figs. 5 and 6 show a modification of these contacts so arranged as to be protected by the cover D. Here the upper contact is shown as a spring adapted to engage the lower contact with a yielding pressure.

It will be understood that in the installment of my system I contemplate the proper proportioning of the resistance of the various circuits and their branches, so as to obtain the desired amount of current flow through the various electromagnetic devices. This may of course be done by winding the various magnets and motors themselves to the proper resistance, or by the insertion of suitable resistances wherever required. It will also be understood that any well-known devices are to be employed to prevent arcing at the various separable contacts, and also to prevent sticking of the magnet armatures.

While I have described as illustrative of my invention a particular combination of apparatus and circuits by which it may be carried into effect, I wish it understood that various changes may be made without departing from the spirit of the invention, and these I aim to cover in the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a railway electric signaling system, the combination with a sectional signal conductor and a signal device for each section of said signal conductor, of a connection for energizing said signal device from its section, means energizable from a given section and from the second section in advance for controlling said connection and means controlled by the entrance of a car upon said given section for deënergizing said controlling means.

2. In a railway electric signaling system, the combination with a sectional signal conductor and a signal device for each section of said signal conductor, of a connection for energizing said signal device from its section, means energizable from a given section and from the second section in advance for controlling said connection, means controlled by the entrance of a car upon said given section for deënergizing said local connection, and means for preventing the energization of said controlling means from said second section in advance.

3. In a railway electric signaling system, the combination with a sectional signal conductor and a signal station for each section of said signal conductor provided with a signal device, means controlled from a given section for normally maintaining its signals at safety, said means being also controllable from the second section in advance, and means controlled by the entrance of a car upon said given section to prevent the operation of said signal device from the second section in advance.

4. In a railway electric signaling system, the combination with a sectional signal conductor and a signal station for each section of said signal conductor provided with two signal devices having a bias to danger, electromotive means energized from a given section for operating the signals of that section to safety, an electro-responsive device energizable from said section and the second section in advance for controlling said electromotive means, and a second electro-responsive device for controlling one of said signals and disabling the connection of said first electro-responsive device with said second section in advance.

5. In a railway electric signaling system, the combination with a sectional signal conductor and a signal station for each section of said signal conductor provided with two signal devices, means for controlling one of the signal devices of a given station from the next section in advance, means for controlling the other of said signal devices of the given station from the second section in advance, and means controlled from the section of the given station for taking away the control from said second section in advance.

6. In a railway electric signaling system, the combination with a supply conductor and a sectional signal conductor, of a signal station for each section of said signal conductor provided with two signal devices biased to danger, means for controlling one of said signal devices from the next section in advance,

means at each station for maintaining said signals at safety, means controlled from the second section in advance for actuating said maintaining means, and means controlled from the station section for preventing the effective action of said actuating means.

7. In a railway electric signaling system, the combination with a supply conductor extending along the way, and a sectional signal conductor movably mounted in proximity thereto, of a signal station for each section of said signal conductor provided with signal mechanism biased to danger, circuit connections between said stations, means at each station for maintaining the signal mechanism of that station at safety, means controlled from the next section in advance for causing the signal mechanism of the given station to indicate caution, means controlled from the second section in advance for setting said signal mechanism at safety, and means controlled by the movement of said signal conductor when a car enters the given section to disable said control from the second section in advance.

8. In a railway electric signaling system, the combination with a supply conductor extending along the way, and a sectional signal conductor movably mounted in proximity thereto, of a signal station for each section of said signal conductor provided with signal mechanism biased to danger, circuit connections between said stations, means normally acting in a given section to maintain the signal mechanism of that section at safety, means controlled by the movement of said signal conductor when a car enters the given section to permit the signal mechanism to go to danger, and means to prevent the operation of said maintaining means when a car or train enters the second section in advance.

9. In a railway electric signaling system, the combination with a supply conductor extending along the way and a sectional signal conductor, of a signal station for each section of said signal conductor provided with signal mechanism biased to danger, circuit connections between said stations, a connection from said supply conductor to the signal mechanism of each station to maintain said signal mechanism at safety, means controlled from the second section in advance for completing said connection, car-actuated contacts adapted to open said connection, and means for disabling said control from the second section in advance.

10. In a railway electric signaling system, the combination with a third rail supply conductor extending along the way and provided with a movably mounted cover, of a sectional signal conductor carried by said cover and adapted to be engaged by a car-carried contact, a signal station for each section of said signal conductor provided with signal mechanism, a connection from said supply conductor to the signal mechanism of each station, and a contact carried by said cover but insulated from said signal conductor and adapted to open said connection.

11. In a railway electric signaling system, the combination with a supply conductor extending along the way and a sectional signal conductor, of a signal station for each section of said signal conductor provided with signal mechanism biased to danger, circuit connections between said stations, a connection from said supply conductor to the signal mechanism of each station to maintain said signal mechanism at safety, a movably mounted cover for said supply conductor upon which said signal conductor is mounted, and a contact carried by said cover but insulated from said signal conductor and adapted to open said connection.

12. In a railway electric signaling system, the combination of a plurality of signal stations, each comprising an electro-responsive signal, contacts in circuit with said signal, an electro-responsive device adapted to close said contacts, contacts and conductors adapted to maintain the circuit of said electro-responsive device after it has been closed, and contacts controlling the initial closure of the circuit of the corresponding electro-responsive device at the second station in the rear.

13. In a railway electric signaling system, the combination of a plurality of signal stations, each comprising an electro-responsive signal, contacts in circuit with said signal, an electro-responsive device adapted to close said contacts, but biased to open them, contacts and conductors adapted to maintain the circuit of said electro-responsive device after it has been closed, and contacts controlling the initial closure of the circuit of the corresponding electro-responsive device at the second station in the rear.

14. In a railway electric signaling system, the combination of a plurality of signal stations, each comprising an electro-responsive signal, contacts in circuit with said signal, an electro-responsive device adapted to close said contacts, contacts and conductors adapted to maintain the circuit of said electro-responsive device after it has been closed, contacts controlling the initial closure of the circuit of the corresponding electro-responsive device at the second station in the rear and a second electro-responsive device controlling the last mentioned contacts.

15. In a railway electric signaling system, the combination of a plurality of signal stations, each comprising an electro-responsive signal, contacts in circuit with said signal, an electro-responsive device adapted to close said contacts, contacts and conductors adapted to maintain the circuit of said electro-responsive device after it has been closed, contacts controlling the initial closure of the

circuit of the corresponding electro-responsive device at the second station in the rear and a second electro-responsive device adapted to close the last mentioned contacts but biased to open them.

16. In a railway electric signaling system, the combination of a plurality of signal stations, each comprising an electro-responsive signal, contacts in circuit with said signal, an electro-responsive device adapted to close said contacts when energized but biased to open them, contacts and conductors adapted to maintain the circuit of said electro-responsive device after it has been closed, contacts controlling the initial closure of the circuit of the corresponding electro-responsive device at the second station in the rear, and means whereby the first mentioned electro-responsive device is deënergized upon the entrance of a car into its corresponding section.

17. In a railway electric signaling system, the combination of a plurality of signal stations, each comprising an electro-responsive signal, contacts in circuit with said signal, an electro-responsive device adapted to close said contacts, contacts and conductors adapted to maintain the circuit of said electro-responsive device after it has been closed, contacts controlling the initial closure of the circuit of the corresponding electro-responsive device at the second station in the rear, a second electro-responsive device adapted to close the last mentioned contacts when energized but biased to open them and means whereby the said second electro-responsive device is energized upon the entry of a car into its corresponding section.

18. In a railway signaling system, the combination of a plurality of signal stations, each comprising an electro-responsive signal, contacts in circuit with said signal, an electro-responsive device adapted when energized to close said contacts but normally biased to open them, contacts and conductors adapted to maintain the circuit of said electro-responsive device after it has been closed, contacts controlling the initial closure of the circuit of the corresponding electro-responsive device at the second station in the rear, a second electro-responsive device adapted when energized to close the last mentioned contacts but biased to open them, and means whereby the first mentioned electro-responsive device is deënergized and means whereby the said second electro-responsive device is energized upon the entry of a car into the section corresponding to the station.

19. In a railway electric signaling system, the combination of a plurality of signal stations, each comprising an electro-responsive signal, contacts in circuit with said signal, an electro-responsive device controlling said contacts, contacts controlling the electro-responsive device, corresponding to the aforesaid electro-responsive device, at the next station in the rear, and contacts controlling the analogous electro-responsive device at the second station in the rear.

20. In a railway electric signaling system, the combination of a plurality of signal stations, each comprising an electro-responsive signal, contacts in circuit with said signal, an electro-responsive device controlling said contacts, contacts controlling the electro-responsive device, corresponding to the aforesaid electro-responsive device, at the next station in the rear, and contacts controlling the analogous electro-responsive device at the second station in the rear, a second electro-responsive device controlling the contacts aforesaid which control the said electro-responsive devices at the rear, the circuit of the first mentioned electro-responsive device at each station being closed through the two stations in advance of it when the said second electro-responsive devices at those stations are the one energized and the other deënergized.

21. In a railway electric signaling system, the combination of a plurality of signal stations, each comprising an electro-responsive signal, contacts in circuit with said signal, an electro-responsive device controlling said contacts, contacts controlling the electro-responsive device, corresponding to the aforesaid electro-responsive device, at the next station in the rear, and contacts controlling the analogous electro-responsive device at the second station in the rear, a second electro-responsive device controlling the contacts aforesaid which control the said electro-responsive devices at the rear, the circuit of the first mentioned electro-responsive device at each station being closed through the two stations in advance of it when the said second electro-responsive device at the first station in advance is deënergized and the said second electro-responsive device at the second station in advance is energized.

22. In a railway electric signaling system, the combination of a plurality of signal stations, each comprising an electro-responsive signal, contacts in circuit with said signal, an electro-responsive device controlling said contacts, contacts controlling the circuit of the said electro-responsive device at their own station through stations in advance, contacts controlling the circuit of the aforesaid electro-responsive device at the first station in the rear, contacts controlling the circuit of the aforesaid electro-responsive device at the second station in the rear, and a second electro-responsive device controlling the aforesaid contacts which control the first mentioned electro-responsive devices at the different stations.

23. In a railway electric signaling system, the combination of a plurality of signal stations, each comprising an electro-responsive

signal, contacts in circuit with said signal, an electro-responsive device controlling said contacts, contacts controlling the circuit of the said electro-responsive device at their own station through stations in advance, contacts controlling the circuit of the aforesaid electro-responsive device at the first station in the rear, contacts controlling the circuit of the aforesaid electro-responsive device at the second station in the rear, and a second electro-responsive device controlling the aforesaid contacts which control the first mentioned electro-responsive devices at the different stations, the circuit of the first mentioned electro-responsive device at a given station being closed through stations in advance when the given station and the first station in advance on the one hand and the second station in advance on the other have their said second electro-responsive devices the one energized and the other deenergized.

24. In a railway electric signaling system, the combination of a plurality of signal stations, each comprising an electro-responsive signal, contacts in circuit with said signal, an electro-responsive device controlling said contacts, contacts controlling the circuit of the said electro-responsive device at their own station through stations in advance, contacts controlling the circuit of the aforesaid electro-responsive device at the first station in the rear, contacts controlling the circuit of the aforesaid electro-responsive device at the second station in the rear, and a second electro-responsive device controlling the aforesaid contacts which control the first mentioned electro-responsive devices at the different stations, the circuit of the first mentioned electro-responsive device at a given station being closed through stations in advance when the said second electro-responsive devices at the given station and the first station in advance are deenergized and the said second electro-responsive device at the second station in advance is energized.

25. At a station in a system of electric railway signaling, the combination with a plurality of electro-responsive signals, contacts controlling said signals, an electro-responsive device controlling said contacts, other contacts controlling one of said signals, contacts controlling the aforesaid electro-responsive device through a circuit extending through stations in advance and a second electro-responsive device controlling the last two mentioned sets of contacts.

26. At a station in a system of electric railway signaling, the combination with an electro-responsive signal, of contacts controlling said signal, an electro-responsive device controlling said contacts, contacts controlling the circuit of said electro-responsive device through stations in advance, a second electro-responsive device controlling the last mentioned contacts, means whereby the first mentioned electro-responsive device is operated to open the contacts which it controls and means whereby the said second electro-responsive device is operated to open the aforesaid contacts which it controls, upon the entry of a car into the section corresponding to the station.

27. At a station in a system of electric railway signaling, the combination with an electro-responsive signal, of contacts controlling said signal, an electro-responsive device adapted to close said contacts but biased to open them, contacts controlling the circuit of said electro-responsive device through stations in advance, a second electro-responsive device biased to close the last mentioned contacts but adapted to open the same, means operated by the entrance of a car into the section corresponding to the station for deënergizing the first mentioned electro-responsive device, and means set into operation by the presence of a car within the section for energizing the said second electro-responsive device.

28. At a station in a system of electric railway signaling, the combination with an electro-responsive signal, of contacts controlling said signal, an electro-responsive device controlling said contacts, contacts controlling the circuit of said electro-responsive device through stations in advance, contacts controlling the circuit of said signal through a station in advance and a second electro-responsive device adapted to control the two last aforesaid contacts and to close them simultaneously.

29. At a station in a system of electric railway signaling, the combination with an electro-responsive signal, of contacts controlling said signal, an electro-responsive device controlling said contacts, contacts controlling the circuit of said electro-responsive device through stations in advance, contacts controlling the circuit of an electro-responsive device analogous to the aforesaid electro-responsive device at a station to the rear, and a second electro-responsive device controlling the last two aforesaid contacts and adapted to close them dissimultaneously.

30. At a station in a system of electric railway signaling, the combination with an electro-responsive signal, of contacts controlling said signal, an electro-responsive device controlling said contacts, contacts controlling the circuit of said electro-responsive device through stations in advance, contacts controlling the circuit of said signal through a station in advance, contacts controlling the circuit of an electro-responsive device analogous to the aforesaid at a station in the rear, and a second electro-responsive device controlling the three last said contacts, the signal controlling contact and the contacts controlling the first mentioned electro-respon-

sive device being adapted to be simultaneously closed with relation to each other and dissimultaneously closed with relation to the contacts controlling the electro-responsive device at the station at the rear.

31. At a station in a system of electric railway signaling, the combination with a plurality of electro-responsive signals, of contacts controlling said signals, an electro-responsive device adapted to close said contacts but biased to open them, contacts controlling the circuit of said electro-responsive device through stations in advance, contacts controlling the circuit of one of said signals through a station in advance, contacts controlling the circuit of an electro-responsive device analogous to the aforesaid at a station at the rear, a second electro-responsive device controlling the three last said contacts, said second electro-responsive device being biased to simultaneously close the said contacts in the signal circuit and the said contacts in the circuit of the first mentioned electro-responsive device and to open the said contacts in the circuit of the said electro-responsive device at the station at the rear, means whereby the entrance of a car into a section corresponding to the station deënergizes the first mentioned electro-responsive device and means whereby the entrance of the car into the section energizes the said second electro-responsive device.

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

JOB HUTCHINSON.

Witnesses:
JOS. M. MALAMENT,
M. BERLER.