

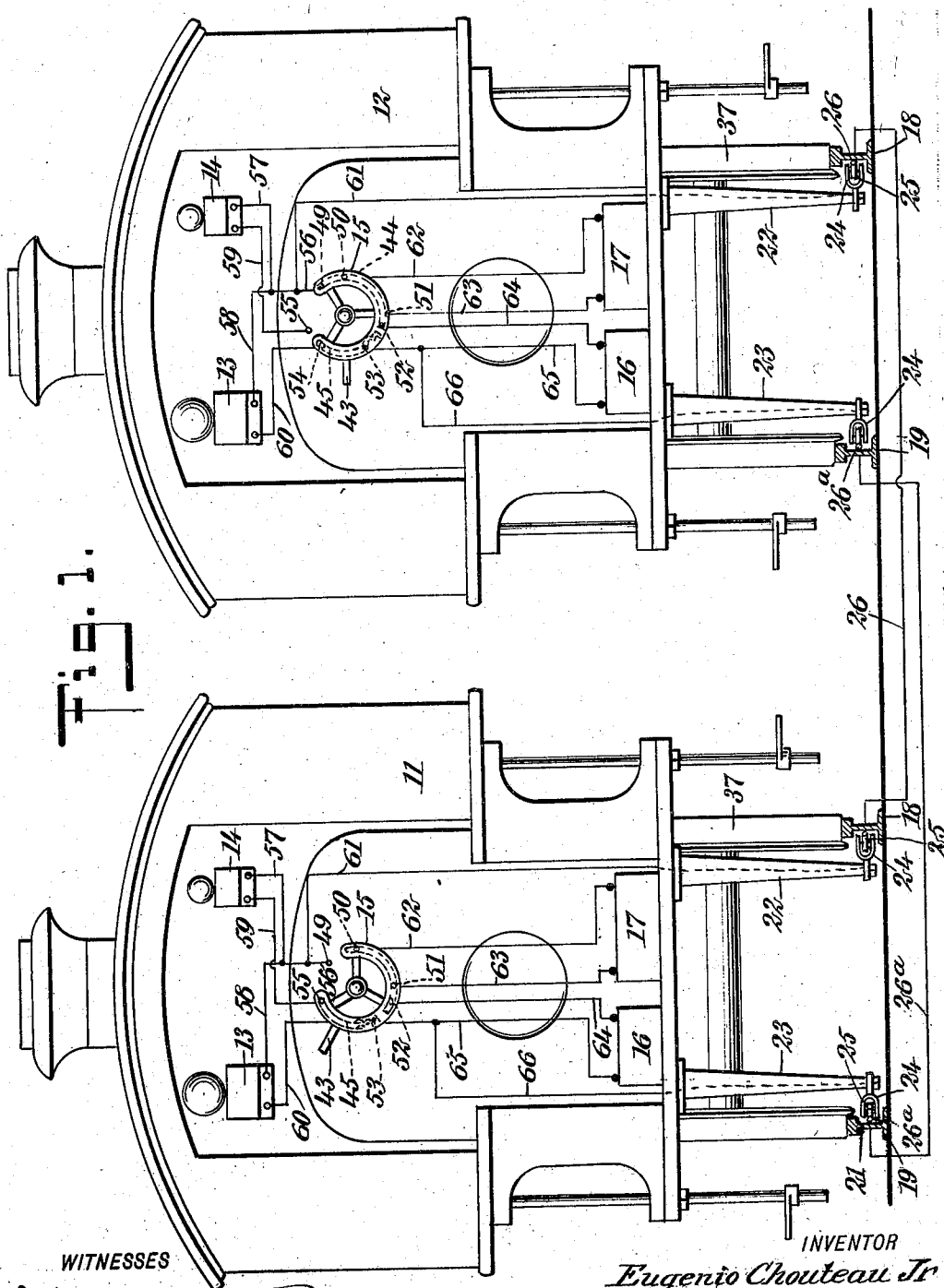
No. 847,905.

PATENTED MAR. 19, 1907.

E. CHOUTEAU, JR.  
ELECTRIC SIGNAL SYSTEM.

APPLICATION FILED OCT. 24, 1906.

4 SHEETS—SHEET 1.



WITNESSES

*John A. Bergstrom*  
*Walton Harrison*

INVENTOR

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BY

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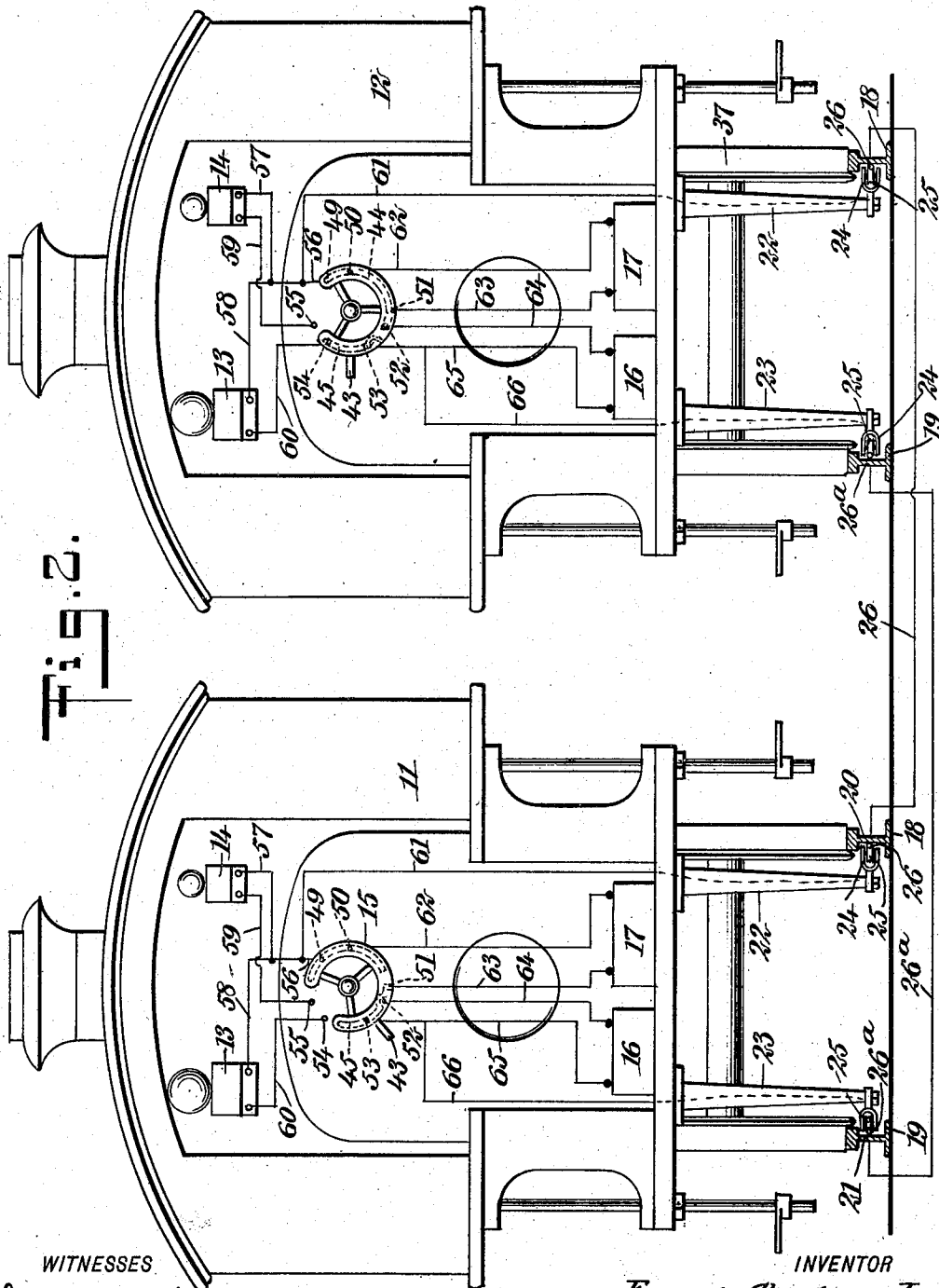
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4 SHEETS—SHEET 2.



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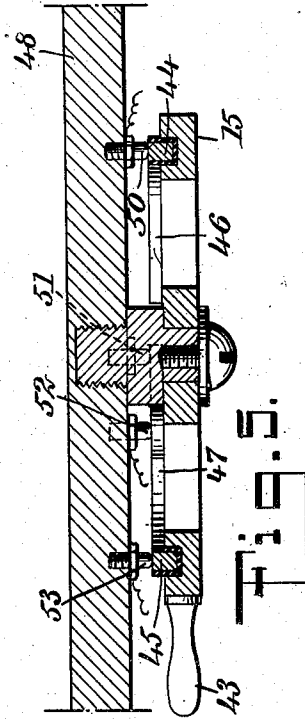
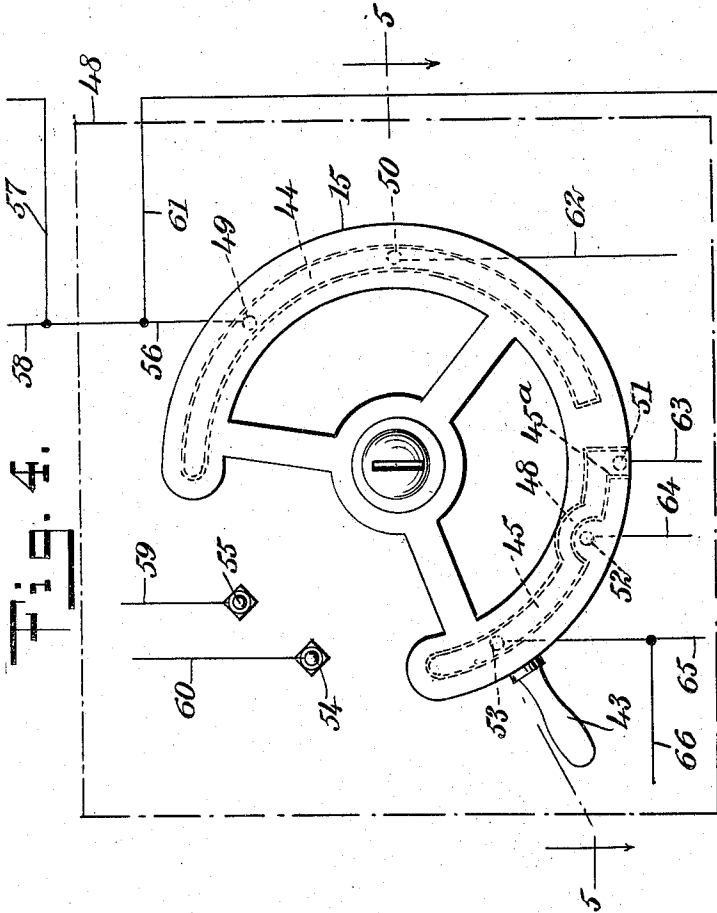
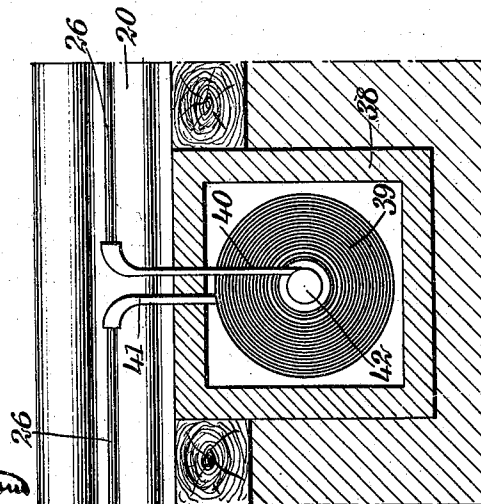


Fig. 3.



WITNESSES

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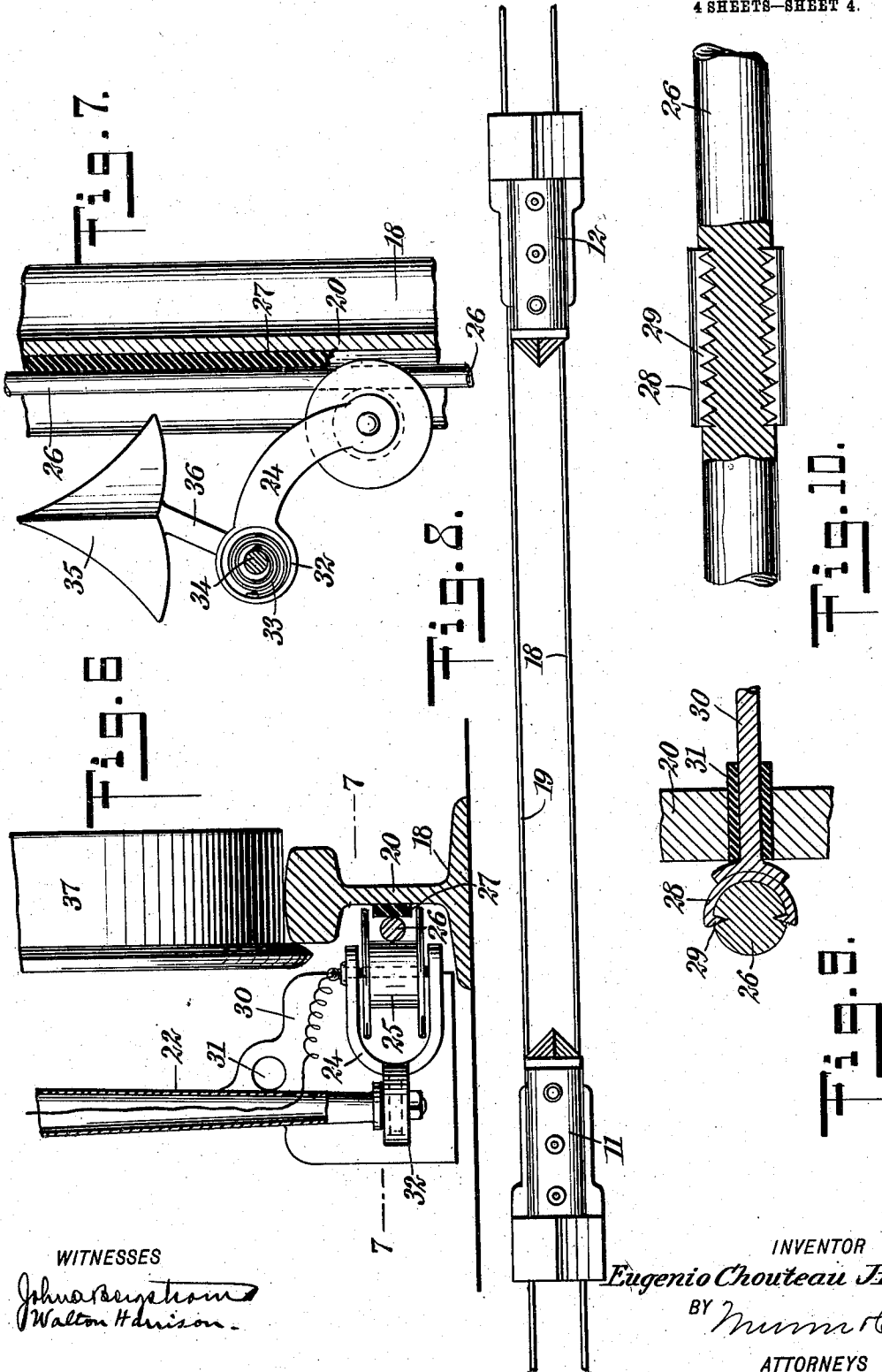
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4 SHEETS—SHEET 4.



WITNESSES

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# UNITED STATES PATENT OFFICE.

EUGENIO CHOUTEAU, JR., OF ST. LOUIS, MISSOURI.

## ELECTRIC SIGNAL SYSTEM.

No. 847,905.

Specification of Letters Patent.

Filed March 19, 1907.

Application filed October 24, 1906. Serial No. 340,292.

*To all whom it may concern:*

Be it known that I, EUGENIO CHOUTEAU, Jr., a citizen of Valparaiso, Chile, and a resident of the city of St. Louis, and State of Missouri, have invented a new and Improved Electric Signal System, of which the following is a full, clear, and exact description.

My invention relates to electric railway-signals, my more particular object being to produce a system which is to a certain extent automatic and to a certain extent is controlled at will.

My invention further relates to the production of various improvements in construction hereinafter pointed out and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a diagram representing two locomotives approaching each other upon the same track, the condition being such that engine 12 may automatically sound an alarm upon engine 11, the track being shown, for convenience, in section. Fig. 2 is a diagram somewhat similar to Fig. 1, but showing the switch 15 in such position that engine No. 11 now sounds an alarm upon engine No. 12. Fig. 3 is a section through a resistance-coil, a number of which coils are employed at intervals along the track for the purpose of producing a sensitiveness of the system as between locomotives but a little distance apart. Fig. 4 is a front elevation of the hand-switch used upon each locomotive. Fig. 5 is a section through the hand-switch upon the line 5 5 of Fig. 4 looking in the direction of the arrow. Fig. 6 is an enlarged section through one of the service-rails and shows the part of the trolley mechanism for energizing the conductor 26 used in signaling. Fig. 7 is a horizontal section through the rail shown in Fig. 6, on the line 7 7 in said figure, and shows more completely the arrangement of a part of the trolley mechanism. Fig. 8 is a reduced plan view showing two locomotives approaching each other and in condition relative to signaling. Fig. 9 is a vertical section showing how the conductor 26 is mounted upon the rail-web 20; and Fig. 10 is an elevation of the mechanism shown in Fig. 9, partly broken away, so as to show how the conductor is held comparatively rigid in position.

The locomotives 11 and 12 are substantially alike in equipment. Each locomotive is provided with a high-resistance bell 13 and

a low-resistance bell 14. Carried by each locomotive and free to turn within certain limits is a switch-sector 15. A small battery 16 is for producing currents of low intensity and a larger battery 17 for currents of higher intensity. The service-rails are shown at 18 19 and for convenience are represented in Figs. 1 and 2 as broken. It will be understood, however, that the rail 18 at the extreme right of each of these figures represents a continuation of the rail 18 to the left of the middle of each figure and that the rails 19 are in reality one continuous rail. These rails may be divided into blocks in the conventional manner or not, as desired. The conductors 26 and 26<sup>a</sup> are rendered of comparatively high resistance by means of special coils for the purpose as indicated in Fig. 3. By this means the locomotives are prevented from alarming each other except when in comparatively close proximity. In other words, resistance is thrown into the conductors extending along the track for preventing these conductors from being so sensitive as to allow locomotives to alarm each other when they are too far apart, and consequently there is no danger of collision. Each rail 18 is provided with the usual web portions 20 21. Each locomotive is provided with depending standards 22 23, carrying at their lower ends trolley-harps 24, resilient in relation thereto, as hereinafter described, each trolley-harp being provided with a trolley-wheel 25, which rolls upon a longitudinal conductor 26. This conductor is insulated from the rail-web by a longitudinal strip 27 of insulating material and is secured firmly in position by jaws 28, provided with oppositely-disposed teeth 29. These jaws are mounted upon stems 30, each encircled by tubes 31, of insulating material, passing through the rail-webs. The teeth 27 are forced directly into the body of the conductor 26, as will be understood by Figs. 9, 10, and thus hold the conductor very securely. Each harp 24 is secured firmly to a barrel 32, the latter being connected by a spiral spring 33 with a stem 34, the latter being virtually the lower end of the standard 22. By this arrangement the trolley-harps are allowed to yield slightly in order to compensate for the swaying of the locomotive from right to left and also for trivial deviations in the position of the conductor 26. A plow (shown at 35) is mounted upon a stem 36 and carried by each standard 22. This is for the purpose of

removing obstructions which might otherwise interfere at times with the proper working of the trolleys. The service-wheels of the locomotives are shown at 37 and are of ordinary construction. At intervals along the track I employ the construction shown in Fig. 3. A box 38 is buried beneath the track and in this is placed a coil 39 of wire, the entire length of which is covered with an insulating-jacket 40 and virtually forms a continuation of the conductor 26, as will be understood from Fig. 3. A core 42, of iron, may be employed, and, indeed, the winding 39 may be of iron wire, if this be deemed desirable. The purpose of the devices shown in Fig. 3 is to prevent unnecessary alarm where locomotives are approaching each other but are a considerable distance apart. The function of the device shown in Fig. 3 is therefore comparatively simple. It virtually increases the resistance of the main conductor extending along the track.

The sector 15 is provided with a handle 43, whereby it may be turned. Mounted upon the sector 15 are two contact members 44 and 45 of substantially arcuate form, insulated from the sector by means of linings 46 47, of insulating material. A bar 48 serves as a support for the sector and its accompanying parts. Mounted upon this bar are contact-pins 49, 50, 51, 52, 53, 54, and 55. A wire 56 is connected with the contact-pin 49 and with wires 57 58, leading, respectively, to bells 14 13. The contact-pin 55 is connected by a wire 59 with the bell 14, and a wire 60 connects the contact-pin 54 with the bell 13. Connected with the wire 56 is a wire 61, leading downwardly through the standard 22 to the trolley-harp 24, carried thereby. Wires 63 and 64 connect the contact-pins 51 52, respectively, with the batteries 16 17. The wire 65 is connected with the battery 16 and with the contact-pin 53, and joining the wire 65 is a wire 66, which leads downwardly through the standard 23 to the trolley-harp 26<sup>a</sup>, carried by the lower end thereof.

The operation of my system is described below. It is well known that in the operation of block-signals heretofore used the engineers are proverbially negligent in so far as they can rely upon the automatic operation of the mechanism—that is to say, an engineer may be vigilant and careful in instances where he knows that the safety of the train depends upon himself; but if the operation of the signaling mechanism be entirely automatic he yields to a weakness in human nature and fails to exercise any further vigilance in that respect. In my system I seek to render the operation of the alarms partly automatic, but not altogether so, and to leave upon the engineer a direct sense of responsibility. Suppose now that the trains 11 12 are approaching each other and that the sectors 15 upon the respective locomotives

are set as indicated in Fig. 1. So long as the locomotives are separated by a considerable distance no alarm in each locomotive is possible, owing to the use of the resistances shown in Fig. 3. Any current which may be passing through the connections from one locomotive to the other is not sufficient to ring any bell, and therefore all of the bells are silent. If now the engines approach each other a distance of, say, a kilometer, the current flows from one of the locomotives to the other with sufficient intensity to ring an alarm. The circuit is as follows: battery 16 of locomotive 12, wire 64, contact-pin 52, arcuate contact member 44, and contact-pin 49 of said locomotive 12, wire 61, trolley-harp 24, trolley-wheel 25, conductor 26, (see Figs. 1 and 8,) trolley-wheel 25, and trolley-harp 24 of locomotive 11, wire 61, wire 57, bell 14, wire 59, contact-pin 55, arcuate contact member 45, contact-pin 53, wire 66, down to trolley-harp 24 and trolley-wheel 25, carried by standard 23, thence through conductor 26<sup>a</sup>, back to locomotive 12, upward through wire 66 and downward through wire 65 of this locomotive back to battery 16. This rings the sensitive bell 14 of locomotive 11.

It will be noted that while the current is passing through the circuit above traced bell 13 of locomotive 12 is in parallel with the battery-circuit through the wires 58 60. This fact does not cause the bell 13 of locomotive 12 to ring, however, because, as above stated, the bells 13 are of high resistance and are comparatively insensitive. The engineer of locomotive 11 being warned by the ringing of his sensitive bell 14 now knows that his locomotive and some other locomotive on the same track are mutually in danger and that a collision is imminent. He accordingly grasps the handle 43 of locomotive 11 and turns the sector 15 into the position indicated at the left of Fig. 2. This completes the following circuit: battery 17 of locomotive 11, wire 62, contact-pin 50, arcuate contact member 44, and contact pin 49 of this locomotive, wires 56 61, trolley-harp 24, trolley-wheel 25 of locomotive 11, through conductor 26 to locomotive 12, trolley-wheel 25, trolley-harp 24, wire 61, wire 58, bell 13, (this bell being comparatively insensitive,) wire 60, contact-pin 54, arcuate contact member 45, contact-pin 53, wire 66, trolley-wheel 25, conductor 26<sup>a</sup>, back to locomotive 11, trolley-wheel 25, and wire 66 of this locomotive, arcuate contact member 45, contact-pin 51, and wire 63, back to battery 17 of locomotive 11. This circuit causes the insensitive bell 13 of locomotive 12 to ring and apprises the engineer of this locomotive that danger is imminent. The engineers being thus mutually warned stop their respective engines and otherwise take precautions to prevent a collision.

It will be noted that while the current is flowing through the circuit last above traced the battery 16 of locomotive 12 is connected in parallel with the connections through which the traced current flows—that is to say, in locomotive 12 the battery 16 being connected by wires 64 65 and contact-pins 52 53 with the arcuate contact members 44 45, which are included in the circuit just traced and are located upon opposite sides of the bell 13 in said circuit, reinforces the action of battery 17 of locomotive 11, and the conjoint effect of these two batteries is to ring the bell 13 of locomotive 12 notwithstanding the high resistance of this bell. As above explained, the battery 16 of locomotive 12 is alone unable to ring this bell.

When a locomotive arrives at its final destination and is turned around for the purpose of traveling in the opposite direction, the engineer by aid of the handle 43, as above explained, turns the switch to its proper relative position suitable for movement of the locomotive in the proper direction. It is preferable, therefore, that in all locomotives 12 traveling in one direction the sectors 15 shall each occupy the position indicated at the right of Fig. 2, the sectors 15 in locomotives traveling in the opposite direction being alone actuated by hand. Such being the case, the engineer of each locomotive 12 traveling in one direction relies entirely upon the warning to be given by the engineer of a locomotive 11, and the engineer of the last-mentioned locomotive relies upon the automatic action of the system for his warning.

By this arrangement each locomotive engineer in traveling in one direction at least must rely upon his own actions rather than upon the automatic working of the system, and this keeps his mind constantly trained, so that his vigilance becomes habitual and he does not relapse into the habit of carelessness, as above explained.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The combination of wiring extending along a railway-track, a plurality of locomotives occupying said track, a sensitive electric alarm and an insensitive electric alarm carried by each locomotive, a powerful battery mounted upon each locomotive for energizing the insensitive bell of the other locomotive, a weaker battery upon each locomotive for energizing the sensitive bell of the other locomotive, and a single switch mounted upon each locomotive and provided with connections for establishing communication between the weaker battery of one locomotive, and the sensitive bell of the other locomotive, and further provided with connections for establishing communication from the powerful battery of one locomotive to the sensitive bell of the other locomotive.

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

EUGENIO CHOUTEAU, Jr.

Witnesses:

BRO. SAXHEY,  
BROTHER ELZEAR.