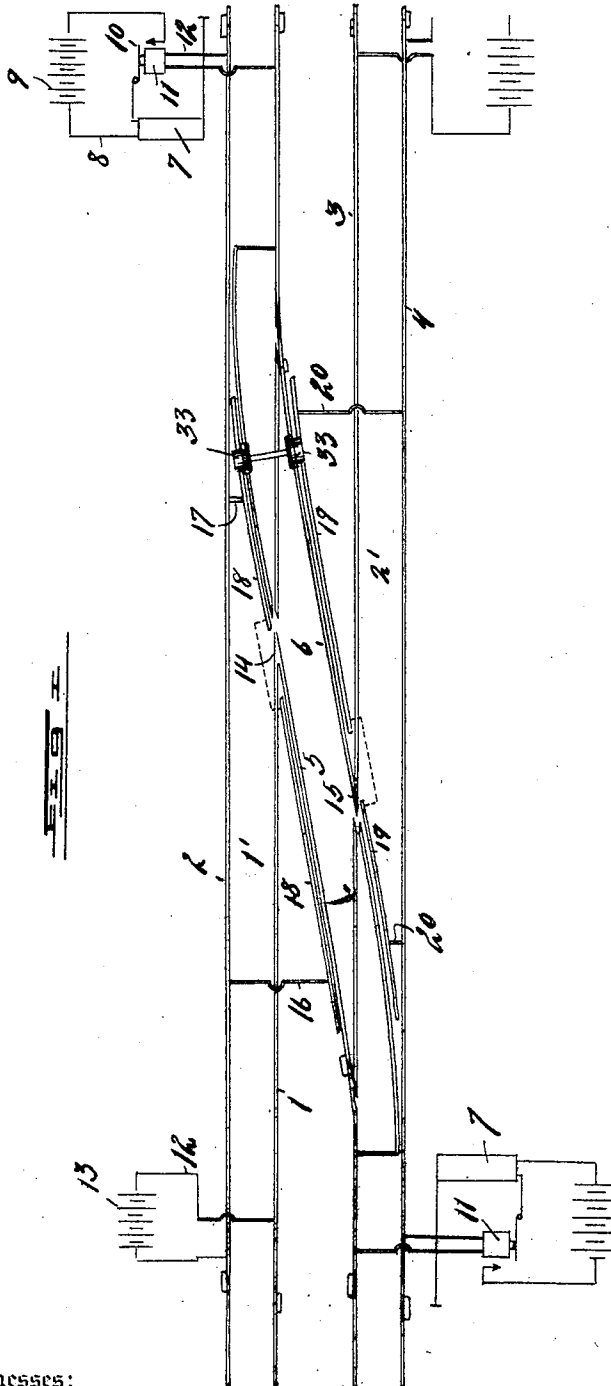


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APPLICATION FILED JAN. 11, 1904.

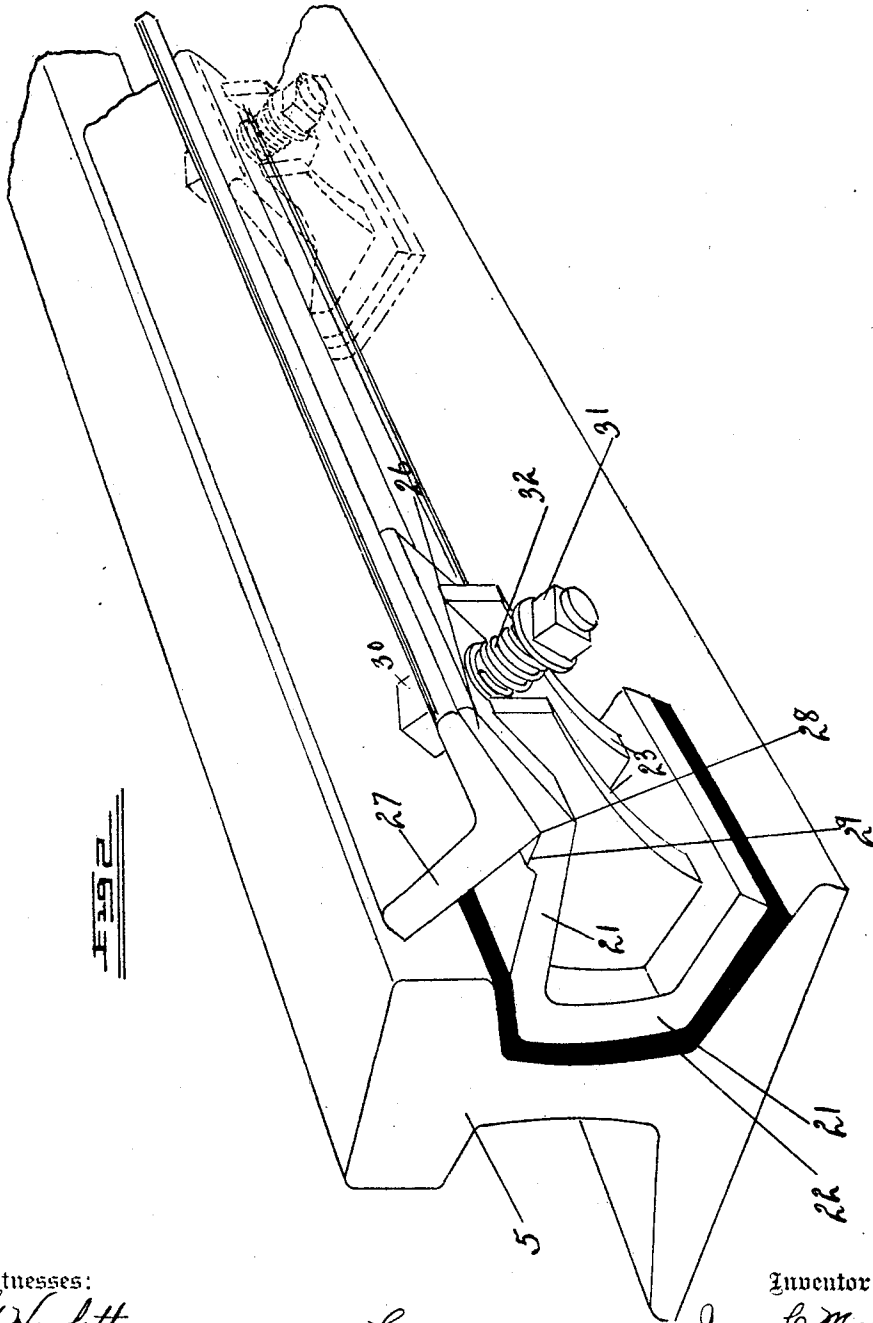
3 SHEETS—SHEET 1.



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Fig 3.

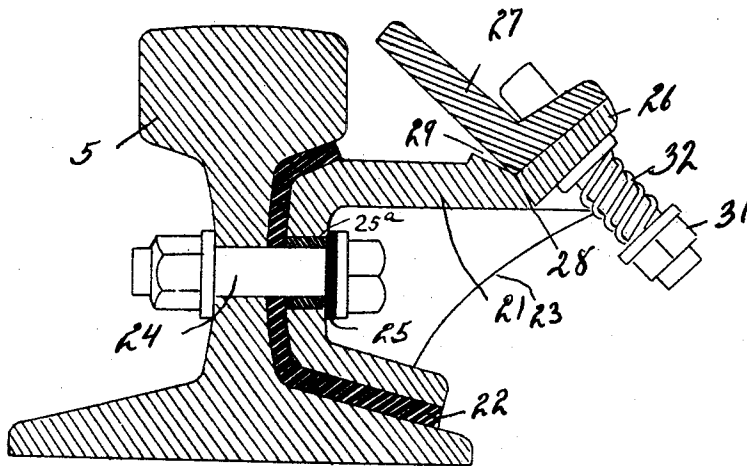
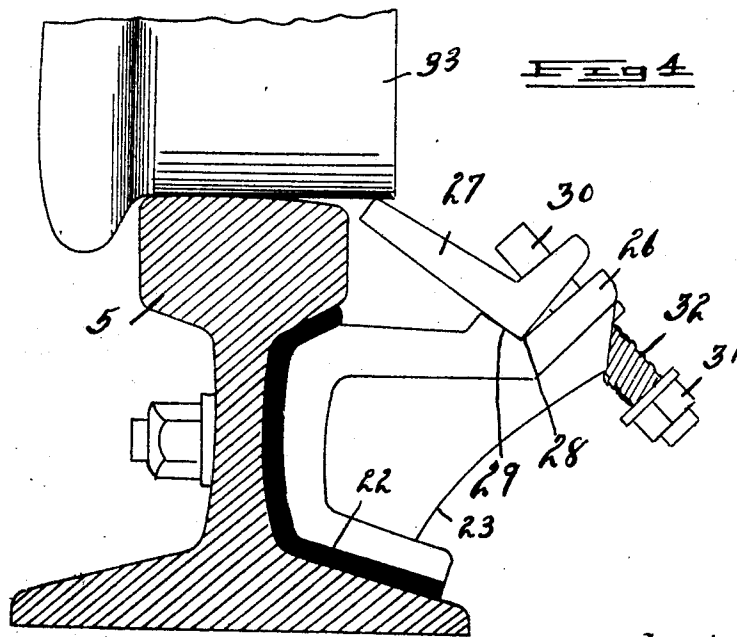


Fig 4.



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RAILWAY SIGNAL SYSTEM.

No. 803,502.

Specification of Letters Patent.

Patented Oct. 31, 1905.

Application filed January 11, 1904. Serial No. 138,443.

To all whom it may concern:

Be it known that I, JAMES C. MOCK, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Railway Signal Systems; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to signal apparatus adapted for use in connection with railway block systems, where the rails form a part of the track-circuit which is controlled by the passing train to actuate the signal-indicating mechanism.

The object of the invention is to provide an apparatus capable of being operated automatically, wherein the arrangement is such as to obviate the necessity of making a complete and separate track-circuit of the crossover-rails between main tracks or between a side track and a main track in order to provide protection to trains when an engine or any part of a train is on the connecting-rails of said crossover-track and fouling the main track.

The above object is attained by the apparatus illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatical view of a section of two main tracks connected by a crossover, showing the application of my improved signal apparatus thereto. Fig. 2 is a perspective view of a portion of one of the rails of the crossover-track and a portion of a movable contact-rail mounted upon but insulated from the crossover-rail and serving as a conductor which carries one side of the track-circuit. Fig. 3 is a sectional view through the crossover and contact rails and the brackets supporting the latter. Fig. 4 is a similar section showing the bracket in elevation and the tread of a car-wheel making a short circuit between the conductor-rail and the track-rail.

So far as I know, the only way prior to my invention employed for setting the track-signal to "danger" or "stop" or for preventing the clearing of the signals protecting the track in the case of an engine or car standing upon the crossover-rails, with the switches set for the straight track, was to make a separate

track section or circuit of the crossover-rails, requiring insulated joints, an extra battery and relays, and independent circuit-wires to the signals. The expense of this arrangement is considerable, both as to first cost and maintenance, so that in nearly all systems of automatic block-signaling the crossover protection, above mentioned, is not provided.

My invention provides a simple, reliable, and inexpensive means for affording the same protection as does the separate track-circuit and overcomes the objections to said track-circuit in that it does away with the insulated joints and the extra battery, relay, and wires in the signal-circuits. By means of the structure herein shown the presence of a pair of wheels upon the crossover-track between the main tracks will short-circuit both main-track circuits and prevent the signals on the main track from clearing, thereby utilizing the main-track signal-circuits to protect said tracks when a car or train is standing on the crossover-tracks without the employment of a battery, relay, or other apparatus in addition to the main-track circuits and the conductor-rails, which parallel the crossover-rails and by means of which the short-circuiting of the track-circuits through the crossover-rails is accomplished.

Referring to the characters of reference, 1 and 2 designate the track-rails of one of the main tracks, and 3 and 4 the track-rails of the other main track, said tracks being connected in the ordinary manner by the crossover-track rails 5 and 6. In Fig. 1 is shown one block of a block signal system wherein the main-track rails in each block are insulated from the track-rails of the adjoining blocks, and each block of the track is provided with a signal comprising an indicator 7 in the circuit 8 of battery 9, in which is a circuit-breaker 10, controlled by a relay or electrical magnet 11, included in the track-circuit 12, of which the track-rails form a complementary part, and in which is included a suitable battery 13. For convenience I will term the track composed of the rails 1 and 2 "track 1'," and the track comprising the rails 3 and 4 "track 2'."

It will be observed that rail 1 of track 1' is electrically connected to rail 5 of the crossover-track by the frog 14, and that rail 6 of the crossover-track is electrically connected to rail 3 of the opposite main track by the frog 15, whereby each of the rails of the crossover-track is electrically connected to one pole

of the track-battery for each of the main tracks. The other pole of the track-circuit of track 1' is connected by the conductors 16 and 17 with the conductor-rail 18, which stands parallel with and adjacent to the crossover-rail 5. In like manner the opposite pole of the battery of the track-circuit of track 2' is connected with the conductor-rail 19 by means of the conductors 20, said conductor-rail 19 lying parallel with and adjacent to the crossover-rail 6. It will now be understood that the circuit of track 1' is shunted into the crossover-rail 5 and the conductor-rail 18, and that the track-circuit of track 2' is shunted into the crossover-rail 6 and the conductor-rail 19.

The conductor-rails 18 and 19 are of like structure and will be described with reference to Figs. 2, 3, and 4, wherein the crossover-rail 5 is shown as carrying a series of brackets 21, which are curved to fit the contour of the web and base of said rail and are insulated therefrom by the interposed strip of insulating material 22. The bracket 21 is strengthened by the opposed webs 23, between which passes the bolt 24, which secures said bracket to the rail, said bolt being insulated from the bracket by the insulating-washer 25 and bushing 25^a, so as to prevent any electrical communication between the bracket and rail. The upper portion of the bracket is provided with an inclined plate 26, and supported upon said plate is an angle-bar 27, which forms the conductor-rail with which one side of the main-track circuit is connected as opposed to the rail 5, which carries the other side of said circuit. There will be as many of the brackets 21 employed as are necessary to properly support the angle-bars 27, which lie thereon against the inclined plate 26 with the vortex 28 of the angle-bar resting in a flaring channel 29 at the base of said plates and secured to the brackets by the bolts 30, which pass freely through openings in one side of said bar and through the plates 26 of the brackets, the heads of said bolts engaging the angle-bar and the lower ends thereof receiving the nuts 31, adapted to screw thereon to compress the coiled springs 32, mounted upon said bolts between said nuts and the under face of the plates 26. The tension of said springs is sufficient to normally hold the conductor-rail in the position shown in Figs. 2 and 3; but said springs will yield sufficiently to allow the conductor-rail to tilt or rock upon its point or vortex 28 when a car-wheel is passing over the rail, as shown in Fig. 4, the tension of the springs 32 being exerted to hold the edge of the conductor-rail continuously in contact with the wheel.

The main-track circuits which control the signals 7 are normally closed, maintaining the electromagnets energized and holding said signals to indicate a clear track, except when a train is at some point upon the tracks between said signals and their controlling-batteries 13,

in which situation the presence of the wheels upon the rails 1 and 2 or 3 and 4 will short-circuit the track-circuit and cut out the electromagnet 11, causing the signal 7 to show "danger" until the train passes beyond said block, when the signal will clear as soon as the track-circuit is restored through the magnet 11. The purpose of this construction is to cause the signals to show "danger" without additional batteries, circuits, and relays when a car or train is standing upon the crossover-rails at any point between the main tracks. This result is accomplished by short-circuiting the track-circuits between the conductor-rails 18 and 19 and the rails of said crossover-track through the contact of the wheels 33 with said rails, as shown in Fig. 4, whereby the short-circuiting of the track-circuits will cut out their respective magnets 11 and place the signals at "danger," by reason of the wheel or wheels establishing a continuity of the circuits between the conductor-rails and the rails of the crossover. In Fig. 4, 33 represents a pair of wheels upon the rails of the crossover-track whose presence, as will be seen, establishes an electrical connection between the conductor-rails 18 and 19 and the crossover-rails 5 and 6, thereby short-circuiting both of the main-track circuits and causing the signals which protect both tracks to show "danger," so that both the main tracks are protected no matter at what point the train or car may be upon the crossover-track between said main tracks. It will also be seen that by means of this arrangement both signals will clear automatically as soon as the train or car passes from the crossover-rails and beyond the block controlled by said signals.

Having thus fully set forth my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a railway signal system, the combination with the main-track circuit, including a battery and a signal controlled thereby, of a branch track leading from the main track, a rail of which carries one pole of the main-track circuit, and a conductor-rail adjacent to and parallel with said branch-track rail carrying the opposite pole of the main-track circuit, whereby the presence of a wheel upon the branch-track rail, establishes electrical connection between said branch rail and the conductor-rail, and short-circuits the main-track circuit, which operates the signal.

2. In a railway signal system, the combination with the main-track circuit and the signal controlled thereby, of a branch track having parallel with one of its rails, a conductor adapted to contact with a wheel passing along said rail, said conductor and rail being in parallel with the main-track circuit.

3. In a railway signal system, the combination of the parallel tracks and track-circuit for each track, and the signal apparatus controlled thereby, a crossover-track connecting

the rails of the main tracks, a conductor-rail parallel with and adjacent each rail of the crossover-track, said conductor-rails being adapted to be engaged by a wheel upon the parallel rail of the crossover-track and insulated from the crossover-track rails, and each of said crossover-rails and its conductor-rail being in parallel with one of the main-track circuits.

4. In a railway signal system, the combination of the main-track signal-circuit and signal apparatus controlled thereby, a branch track, one of whose rails is in shunt with one side of the signal-circuit, a conductor-rail mounted adjacent to said branch rail and insulated therefrom, said conductor-rail being movably retained in position and projecting into the path of the tread of a wheel passing along said branch rail, said conductor-rail being in shunt with the opposite side of the track-circuit.

5. In a railway signal system, the combination with the constantly-charged track-circuit and track-signal mechanism controlled thereby, of a branch track communicating with the main track, a rail of which carries the main-track circuit, a conductor-rail mounted upon the rail of the branch track

and insulated therefrom, said conductor-rail also carrying the main-track circuit and means for holding the conductor-rail yielding in contact with the tread of a wheel passing over the branch rail, thereby establishing electrical communication between said rail and conductor and short-circuiting the main-track circuit.

6. In a railway signal system, the combination of the main-track circuit and the signal apparatus controlled thereby, of a branch track leading from the main track, brackets mounted upon a rail of said branch track and insulated therefrom, an angular movable conductor-rail supported by said brackets, one side of which extends into contact with a wheel upon the rail of the branch track, a bolt passing through said conductor-rail and through each bracket, and a spring upon said bolt whose tension is exerted to hold the conductor-rail yieldingly in place.

In testimony whereof I sign this specification in the presence of two witnesses.

JAMES C. MOCK.

Witnesses:

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I. G. HOWLETT.