(No Model.) 2 Sheets—Sheet 1.

A. W. REPPY.

AUTOMATIC ELECTRIC TRAIN SIGNAL.

No. 433,216. Patented July 29, 1890.

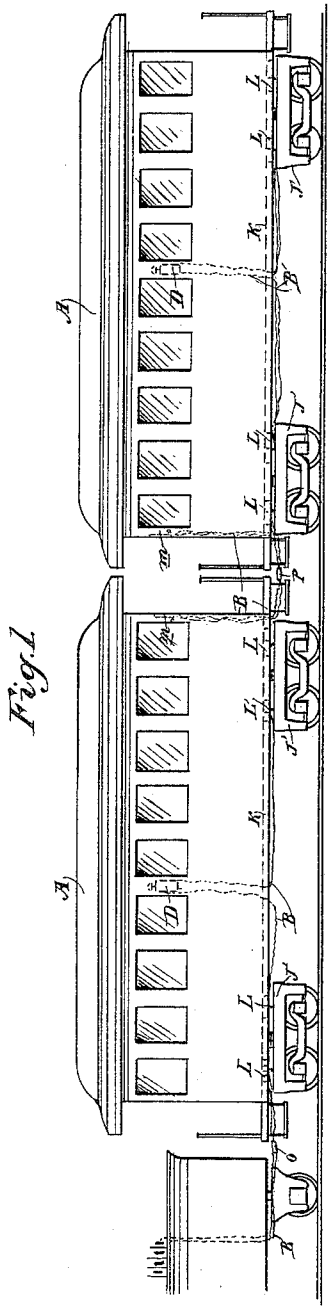

Fig. 1.

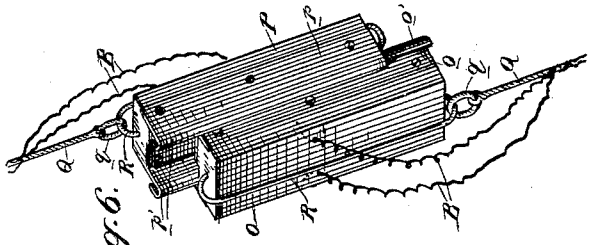

Fig. 6.

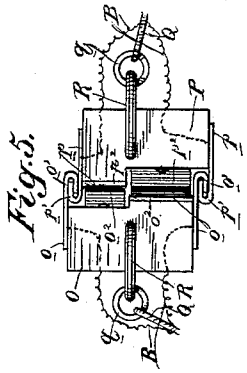

Fig. 5.

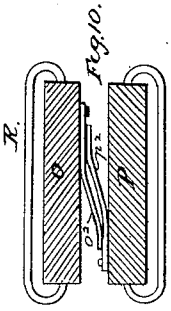

Fig. 10.

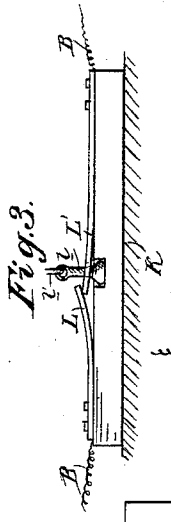

Fig. 3.

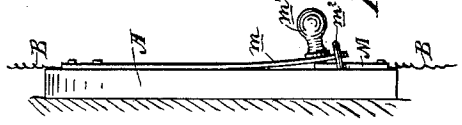

Fig. 4.

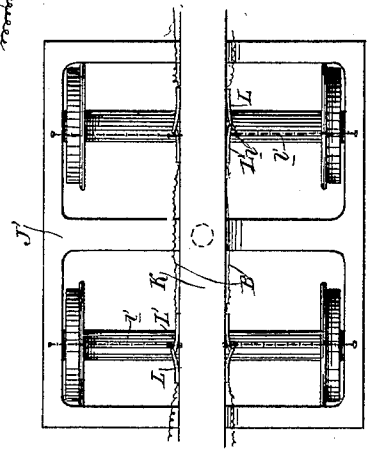

Fig. 2.

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(No Model.)

2 Sheets—Sheet 2.

A. W. REPPY.

AUTOMATIC ELECTRIC TRAIN SIGNAL.

No. 433,216. Patented July 29, 1890.

Fig. 7.

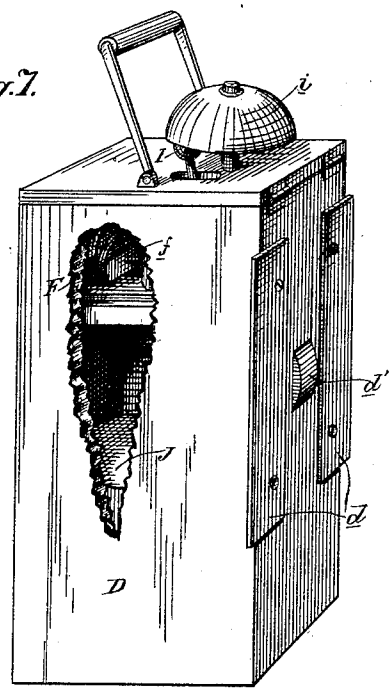


Fig. 8.

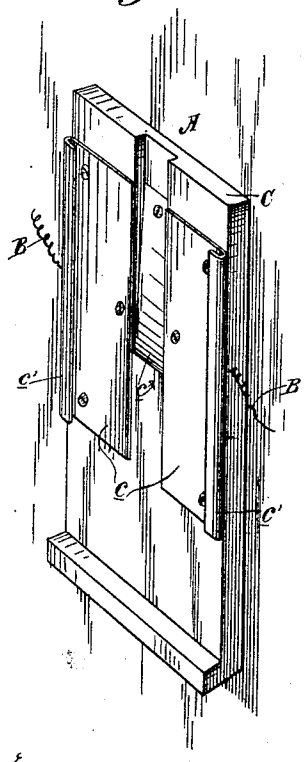
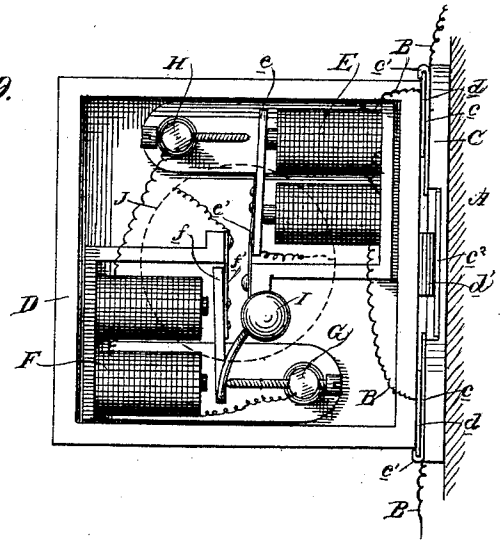


Fig. 9.



Witnesses
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L. Burke

Inventor,
Albert W. Reppy,
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Attys

UNITED STATES PATENT OFFICE.

ALBERT W. REPPY, OF OAKLAND, CALIFORNIA, ASSIGNOR OF ONE-HALF TO THADDEUS C. MASTELLER, OF SAME PLACE.

AUTOMATIC ELECTRIC TRAIN-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 433,216, dated July 29, 1890.

Application filed January 14, 1890. Serial No. 336,928. (No model.)

To all whom it may concern:

Be it known that I, ALBERT W. REPPY, a citizen of the United States, residing at Oakland, Alameda county, State of California, have invented an Improvement in Automatic Electric Train-Signals; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of train-signaling apparatus in which a normally-closed electric main circuit is employed in connection with one or more local circuits in the several cars and engine of the train, said local circuits, including an alarm, being normally inoperative or open, but adapted to be closed and brought into action by the breaking or opening from any cause of the main circuit.

My invention consists in the novel improvements, in the details of construction and arrangement in this class of apparatus, hereinafter fully described, and specifically pointed out in the claims, and also in the novel construction of the necessary coupling mechanism, by which the wires of the main circuit are adapted to be readily joined between the several vehicles or cars of the train.

The object of my invention is to provide a simple and effective apparatus of this class adapted to be called into action in any possible contingency, particularly upon the breaking of any portion of the train, the derailment of any of its wheels, or the will of any passenger, train-man, or engineer.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 shows the general arrangement of my device. Fig. 2 is a plan view of a car-truck with the center sill of the car and the springs attached to it. Fig. 3 is a detail view of the springs. Fig. 4 shows the device by which the main circuit can be broken by a passenger. Fig. 5 is an end view of the coupling-blocks. Fig. 6 shows the blocks partly separated. Fig. 7 is a view of the alarm-box ready to be let into the bracket. Fig. 8 is a view of the bracket. Fig. 9 is a top view of the alarm-box, the cover being removed. Fig. 10 is a detail showing in section the blocks O and P and the springs o^2 and p^2.

In order to illustrate the general application of my apparatus, I have herein shown a portion of a train represented by the two cars A.

B are the main-line wires, which extend from a suitable electric battery, which may be located in any portion of the train or on engine, said wires being carried through the train in any suitable position.

For convenience I have herein shown the main-line battery on the water-tank of the tender, though in practice it would be in the cab, preferably under the engineer's seat.

At any suitable position in each car is placed a bracket C. This bracket consists of a frame-work or plate, provided on its face with separated and independent metallic side plates *c*, having guide-flanges *c'* on their outer edges, adapting them to receive the box of the alarm mechanism. These two plates are connected with the main-line wires B in such a way as to form part of the main circuit, being electrically connected by means of an intervening spring c^2, the lower end of which remains normally, when freed from pressure, in contact with the two plates *c*, so that the main-line circuit is unbroken.

The box D, which contains the alarm mechanism, has on its back and at each side thereof the metallic plates *d*, the projecting edges of which are adapted to enter the side flanges of the plates *c*, thereby forming guides and holds for said box, whereby the box may be readily connected with and disconnected from the bracket C, and at the same time form part of the main-line circuit by reason of the contact of its metallic plates with the metallic plate *c* of the bracket. On the back of the box is an inclined plane or cam *d'*, which, when the box is inserted in the bracket, is adapted to bear against the intervening spring c^2 of the bracket and force it back out of contact with the side plates *c*, thereby opening the circuit at that point, so that the current will then pass from one of the plates *c* to one of the plates *d* of the box, and thence through the mechanism of the box to its other plate and out through the other plate *c* on its course. This construction is simply to deflect the main-line current from a direct course, which it normally pursues into the box, so that the box mechanism may be included therein by

simply placing it in position in the bracket. Within the box is an electro-magnet E, which is let into the main circuit, suitable electric connections being formed between the plates *d* of the box and this magnet. An armature *e* is controlled by the electro-magnet E, said armature being affected by a spring *e'*, the tendency of which is to hold the armature normally out of connection with its magnet. In the box is a second electro-magnet F, which forms part of a local circuit, which includes armature *e* of magnet E, armature *f* of the magnet F, controlled by a spring *f'*, the contact-post G of said armature, and the contact-post H of the armature *e* of the main-line magnet. Upon the armature *f* is a hammer I, which extends upwardly through a suitable aperture in the lid of the box and is adapted to operate upon a gong *i*. Within the box is located a suitable battery, (represented generally by J,) by which the local circuit is established.

The operation of the apparatus, as far as described, is as follows: When the box D is not in place, the main-line current passes directly through its line-wires B and through the several brackets C in the cars. Now, when the box (or any number of them) is placed in position in the bracket, its cam or inclined plane *d'*, acting on the spring c^2, deflects the current, so that it passes into the box and through its main magnet E therein, and as long as the main line is closed said magnet is energized, so that its armature *e* is attracted and is kept away from the contact-post H of the local circuit, thereby keeping said circuit open. Now, if anything occurs to interrupt the main-line current—as by the breaking apart of the train, said circuit being thus opened—its magnet E ceases to attract the armature *e*, and consequently said armature, under the influence of its spring *e'*, is thrown over into contact with the post H, consequently completing the local circuit and energizing its magnet F. The armature *f* of said magnet is thereby attracted, producing a vibratory motion and causing the hammer to strike the gong, and thereby sound the alarm.

I do not confine myself to the operation of the alarm merely upon the breaking of the train, as it may be operated by the interruption of the main-line current from any cause. I have, therefore, shown in this connection another cause which may accomplish the result, and which is of considerable importance.

J' is a car-truck, and K is the center sill of the car. Upon each side of this sill are secured the springs L and L', the adjacent ends of which overlap and touch each other. Connected with the under one of these springs is an insulated rod *l*, from which extends a wire, spring, cable, or other connection *l'* to the sides of the truck to which it is attached. The main-line wires B are connected with the springs L and L', so that normally said springs are in the main-line circuit. There are four pairs of these springs, two being connected with the truck-frame on each side near the wheels. Upon the derailment of any of the wheels of the truck, said truck, being thrown thereby to one side, pulls upon the cable or spring *l'*, which, through the rod *l*, by which it is connected, acts to pull out the under spring L' from contact with the upper spring L, thereby separating them, and thus breaking the main-line circuit and operating the alarm mechanism, as heretofore described.

I have also shown a means for breaking the main-line circuit by a passenger, train-man, or engineer. Within the car, at any suitable point, I place a contact-plate M, upon which is a contact-spring *m*, remaining normally in contact with the plate. Said spring is provided with an insulated button *m'*, by which it may be pulled out, and is limited in its movement by a suitable cross bail or bracket m^2. The main-line wires B are carried to this plate and spring, whereby they are included within the main-line circuit. Now, if any passenger or train-man desires to give the alarm, he can do so by grasping the button and pulling the spring *m* out of contact with the plate M, thereby opening the main-line circuit and effecting the operation of the alarm mechanism, as heretofore described.

The plate M and spring *m* may, if desired, be placed over the end doors of the car inside, and from the buttons *m'* a normally-taut cord may extend, whereby the device may be operated from any portion of the car. The engine may also be provided with a plate M and spring *m* for use of the engineer.

In order to provide a suitable means for coupling the main-line wires between the cars and adapting said couplings to any change of position of the car end for end, I have the following device: O is one coupling-block and P is the opposite block. The block O has on each side the metallic plates *o*, the edges *o'* of which are bent to a hook shape, as shown. The block P has on each side the metallic plates *p*, the edges *p'* of which are also bent. The bent edges of the plates *o* and *p* are adapted to be fitted together by sliding the one within the other, thereby not only effecting the coupling of the two blocks, but also acting as electrical contacts between them. The main-line wires B from one side are brought to the block O and thence into contact with its side plates *o*, while the main-line wires B from the other side are brought to the block P and into contact with its side plates *p*, so that when the side plates are fitted together the circuit is complete; but in order to provide for any change in the position of the blocks with respect to one another caused by the reversing of the ends of the cars I provide that the wires B of each block can be thrown over from end to end, being guided in this movement by a pull-wire Q, having a ring *q* on its end fitted and traveling upon a guide-rail R on each block and extending from end to end thereof, so that the ring

may be run from one end to the other, thereby carrying the wires of the main line over from end to end. By this means, no matter in what position the blocks may approach each other, they can be put together properly and the main-line wires extended in their proper course by throwing them over from one end to the other. The pull-wires Q are shorter than the connected ends of the main wires, so that they act to take all the strain off the couplings and allow the main wires free movement. On the inner sides of the blocks O and P, I place flexible contact-springs o^2 and p^2, which are adapted to bear against each other when the blocks are coupled. These springs serve a double purpose—namely, of better holding the two blocks together by their pressure and also of enabling me to make the same coupling-block serve for different main-line circuits throughout the train, some of which are adapted for other purposes than herein described. This is accomplished by placing within the blocks two or more independent springs and running the several main-line wires to and from said springs.

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

1. In an electric train-signal apparatus, the combination of a normally-closed main-line circuit extending throughout the train and including electro-magnets, normally-open local circuits at points throughout the train, alarm mechanisms adapted to be operated by said local circuits when closed, and a circuit maker and breaker controlled by the main-line circuit for keeping open its local circuit when the main-line circuit is closed and closing said local circuit when the main-line circuit is open, whereby the alarm mechanism is operated, substantially as herein described.

2. In an electric train-signal apparatus, the combination of a normally-closed main-line circuit extending throughout the train, alarm mechanisms in the cars of the train, normally-open local circuits in said cars adapted when closed to operate the alarm mechanisms, electro-magnets in the main-line circuit, armatures controlled by said magnets to keep the local circuits open when the main-line circuit is closed and to close said local circuits when the main-line circuit is open, substantially as herein described.

3. In an electric train-signal apparatus, the combination of a normally-closed main-line circuit extending throughout the train, independent local circuits normally open in the cars of the train, electro-magnets in said local circuits, armatures controlled thereby, and a hammer-and-gong mechanism operated by the armatures, electro-magnets in the main-line circuit, armatures controlled thereby and forming part of the local circuits, and contact-posts in said local circuits against which the armatures are adapted to bear, whereby when the main line is closed the local circuits are inoperative and when the main line is open the local circuits are closed to operate the alarm mechanisms, substantially as herein described.

4. In an electric train-signal apparatus, a main-line circuit, the brackets C, having the metallic plates c, and intervening spring c' in the main-line circuit, in combination with the alarm-mechanism box having the metallic side plates, whereby it is fitted to the bracket, and the inclined plane or lug for pressing back the spring c' of the bracket to divert the main-line current through the box, substantially as herein described.

5. In an electric train-signal apparatus, the main-line circuit, the brackets C, having the metallic guide-plates c, and intervening contact-spring c', in combination with the boxes D, having the metallic side guide-plates d, whereby said boxes are fitted to the brackets, the cam or lug on the back of the boxes for forcing back the spring c' and diverting the main-line current into the box, the electro-magnets E in said boxes included in the main-line circuit, the spring-controlled armatures e of said magnets, the local circuits in said boxes including the armature e, the electro-magnets of said circuits, the spring-controlled armatures of said magnets, the alarm mechanism operated by said armatures, and the contact-posts H of the local circuits, against which the armatures e bear when released by their magnets, whereby said local circuits are thrown into operation to effect the alarm mechanism upon the opening of the main-line circuit, substantially as herein described.

6. In an electric train-signal apparatus in which an alarm is adapted to be operated by the opening of the main-line electric circuit, the separable contact-plates L L′, included in the main-line circuit and secured to the center sill of the car, and connections between one of said plates and the truck-frame, whereby when the wheels of the truck are derailed the plates are separated, thereby opening the main-line circuit, substantially as herein described.

7. In an electric train-signal apparatus, the combination of a normally-closed main-line circuit extending throughout the train, normally-open local circuits in the cars of the train, and alarm mechanisms adapted to be operated by said local circuits upon the opening of the main-line circuit, the separable contacts L L′ of the main-line circuit, and the pull-rods or connections between one of said contacts and the truck of the train, whereby when the wheels are derailed the contacts are separated and the main-line circuit opened, substantially as herein described.

8. In an electric train-signal apparatus, the coupling-blocks O P, having the interengaging contact-plates o p, in combination with the main-line wires B from each side extending to the blocks and in contact with said plates and a sliding connection between said wires and the blocks, whereby the blocks may be turned and the wires guided from end to

end of the blocks, substantially as herein described.

9. In an electric train-signal apparatus, the coupling-blocks O P and the interengaging contact-plates *o p* of said blocks, in combination with the main-line wires B, extending to each block and connected with the plates thereof, the guide-rails extending longitudinally of said blocks, the pull-wires connected with the main-line wires, and the rings of the pull-wires fitted upon the guide-rails, whereby the main-line wires may be turned and guided from end to end of the blocks, substantially as herein described.

In witness whereof I have hereunto set my hand.

ALBERT W. REPPY.

Witnesses:
E. C. FENNESSY,
C. C. PRIOR.