(No Model.) 2 Sheets—Sheet 1.

A. B. MURRAY.

ELECTRIC DANGER SIGNAL FOR RAILWAYS.

No. 524,947. Patented Aug. 21, 1894.

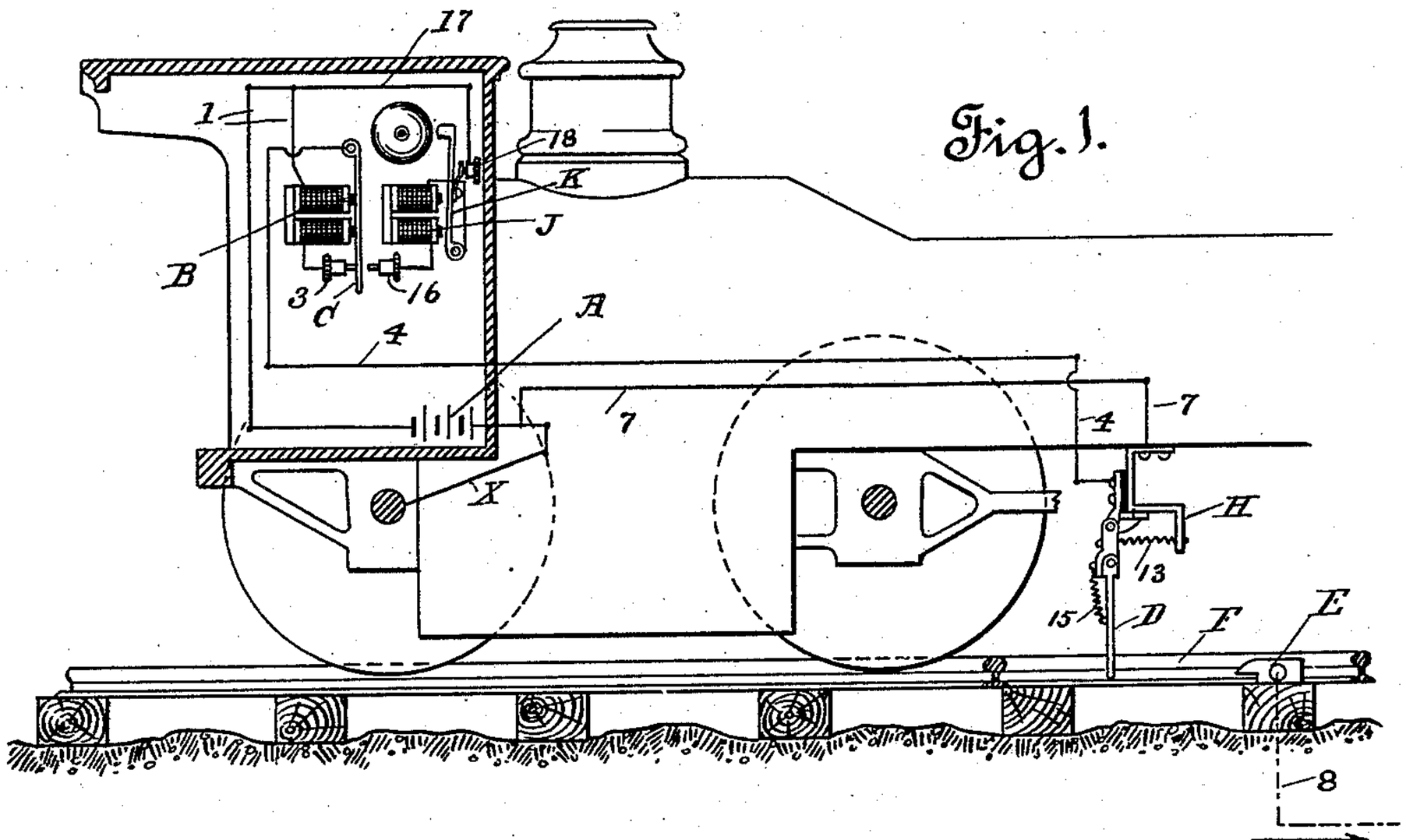

Fig. 1.

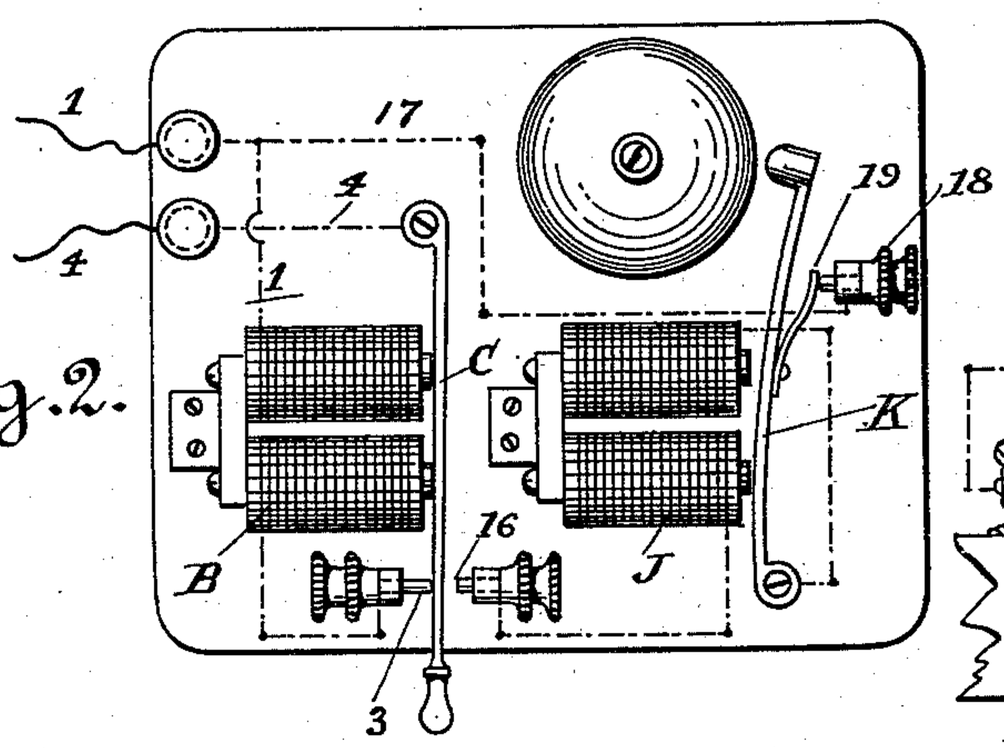

Fig. 2.

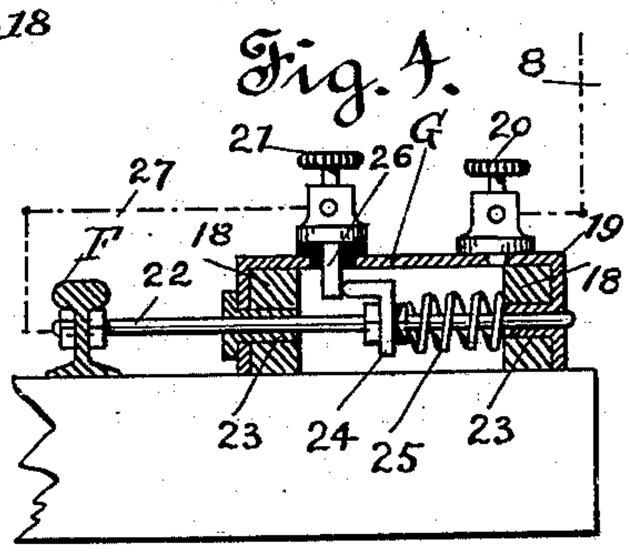

Fig. 4.

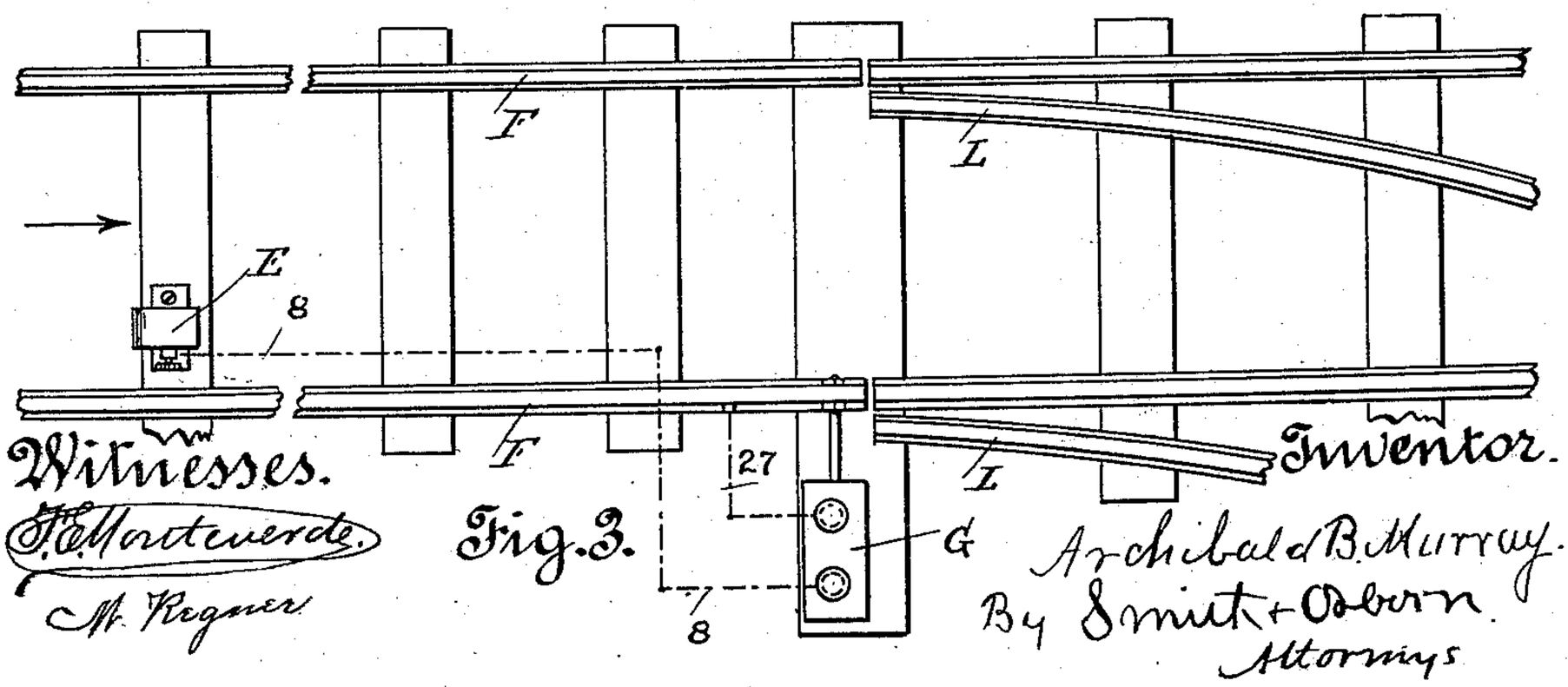

Fig. 3.

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(No Model.) 2 Sheets—Sheet 2.

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ELECTRIC DANGER SIGNAL FOR RAILWAYS.

No. 524,947. Patented Aug. 21, 1894.

Fig. 5.

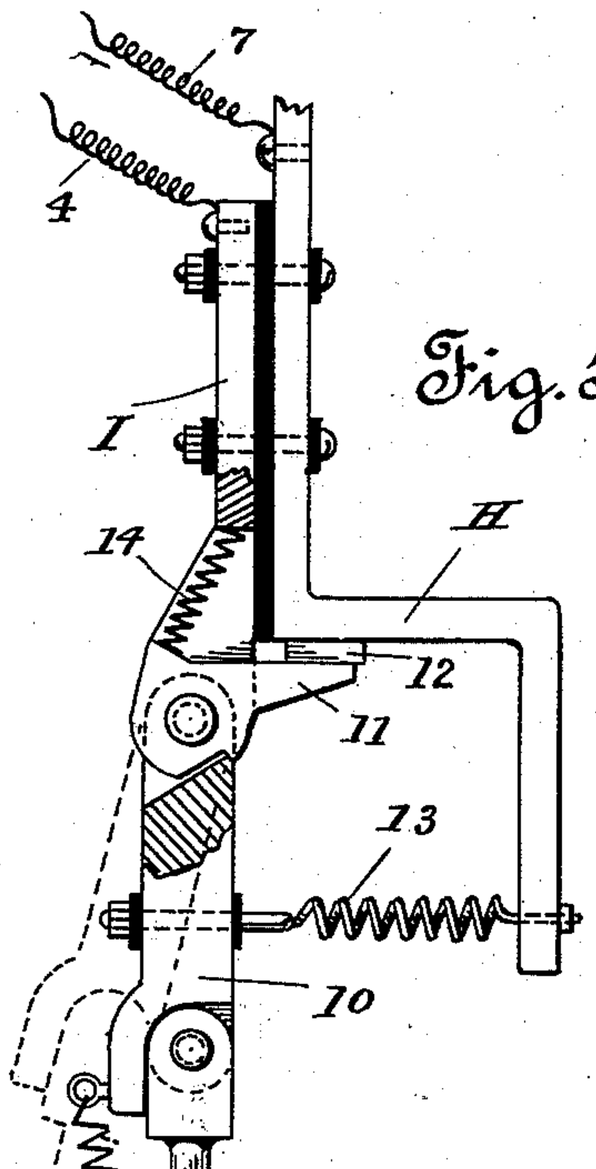


Fig. 7.

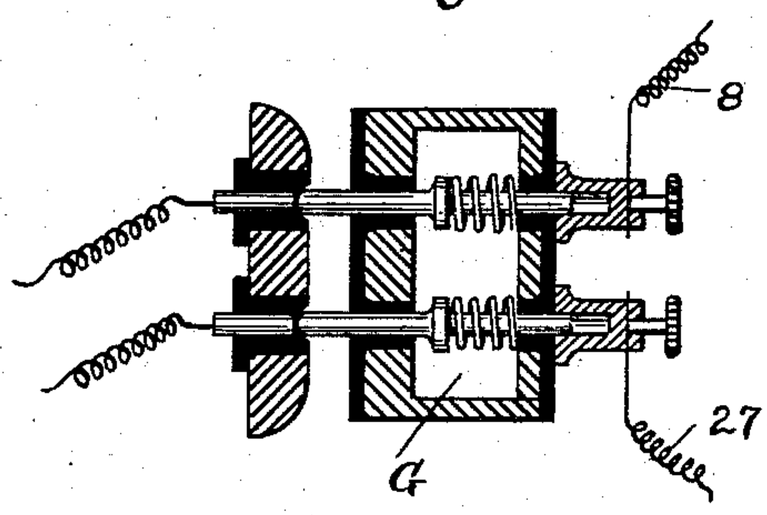
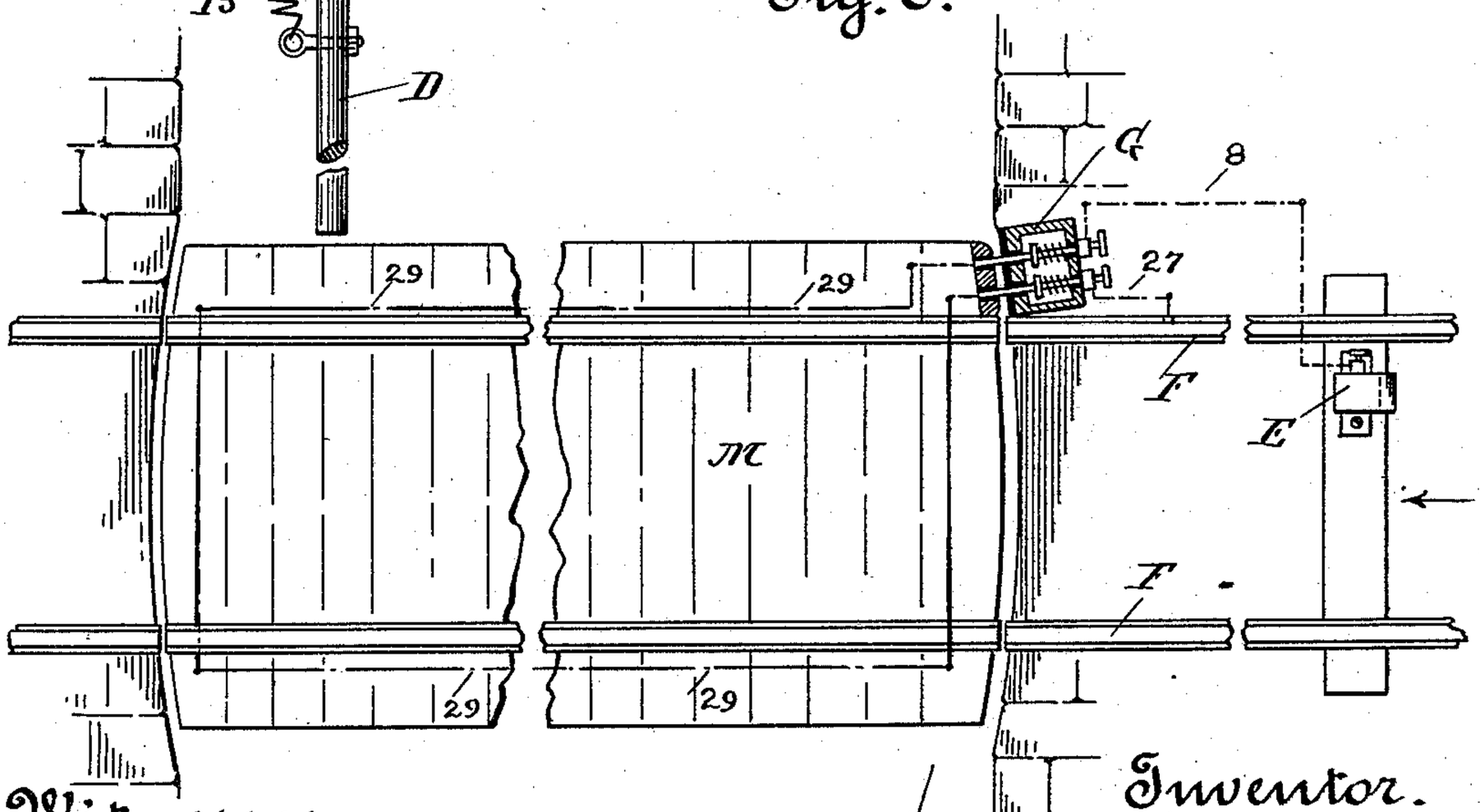


Fig. 6.



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UNITED STATES PATENT OFFICE.

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ELECTRIC DANGER-SIGNAL FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 524,947, dated August 21, 1894.

Application filed March 17, 1893. Serial No. 466,433. (No model.)

To all whom it may concern:

Be it known that I, ARCHIBALD B. MURRAY, a citizen of the United States, residing at San Rafael, in the county of Marin and State of California, have invented a new and useful Electric Danger-Signal for Railways, of which the following is a specification.

My invention relates to a system of automatic electrical signaling for the protection of railway-trains near points of danger.

The object of my invention is to give a signal to the engineer at a point sufficient distance, of an open switch, of an open draw-bridge, of a bridge on fire or destroyed, or of any danger of a generally similar character of which an engineer often has no warning until too late.

The details of what I consider the best means of embodying my invention are fully described in the specification; but I give as an introduction a brief description of the general features, which will aid those skilled in the art to fully comprehend the operation of my system. An alarm signal is carried in the engine cab, operated under certain circumstances by a local bell-circuit, which however is normally open. Another circuit, normally closed, includes as part of it a peculiar tripping device carried by the engine and including a circuit-breaker as part of itself. At a sufficient distance from any assumed point of danger, is a tripping block on the track, in electrical connection with that point, and thence through the rails and the engine to the battery in the cab. At the point of danger, (a switch for instance,) there is a circuit breaker, which, if the switch is misplaced, keeps the circuit open at that point. The result is that at the signaling point, (the tripping block,) the bell circuit is thrown in and the bell sounds continuously. If the switch is not misplaced and the circuit not broken there, the necessary opening of the circuit in the trip-lever produces no effect, and the bell cannot sound.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 represents part of a locomotive engine, showing the main circuit, the bell circuit, the alarm, the battery and magnets for both circuits, the trip lever and the tripping-block. Fig. 2 is an enlarged elevation of the magnets and bell signal shown in Fig. 1. Fig. 3 is a plan of a section of track to show the connection between a tripping block and a circuit breaker at a distant switch. Fig. 4 is a longitudinal section of a circuit breaker at a switch. Fig. 5 is an enlarged elevation of the tripping lever or trailer. Fig. 6 shows a modification of my system as applied to a draw-bridge. Fig. 7 is a detail of circuit breaker at such point.

In describing my invention in detail, the explanation will be simplified by considering that the basis of the system is the existence of two independent circuits, one of which I will call the main circuit, normally closed, the other the bell-circuit normally open.

In Figs. 1 and 2, A represents a battery carried by the engine, one pole of which is connected to the electro-magnet B by wires 1. The spring armature C of the magnet is ordinarily in contact with the point 3, and hence forms a part of the main circuit. From the armature a wire 4 extends to the tripping lever D. Before describing this lever in detail, I shall assume that it has two contacts normally closed and that it is secured to a convenient part of the engine-frame from which a wire 7 extends to the battery, thus completing the circuit; and this is the condition while the train is running under the usual circumstances. At various predetermined points on the line, each relatively near another point of possible danger, is a tripping-block E with which the suspended tripping-lever D makes contact as the engine passes. This tripping-block is in electrical connection through a wire 8, (which may be carried by the telegraph pole or in any other way,) with one of the rails F of the main track first passing through the normally closed circuit-breaker G. The track rail and the engine wheels and frame complete the circuit to the battery.

I have thus far assumed a two part circuit; first, a circuit including battery, magnet and trip-lever, closed while running between any two tripping-blocks; secondly, the same circuit extended by instantaneous contact of the

block and lever to the distant circuit breaker, track rails, engine, and battery, the switch being in proper position as shown by the silence of the bell, and no alarm being necessary. I shall now describe how the alarm is thrown in if the switch should have been misplaced; but as a preliminary to a complete understanding of this part of the system, shall describe the particular construction of the trip-lever and of the circuit breaker at the switch.

Referring to Fig. 5, let H represent a part of the engine-frame, and I a bracket bolted to and insulated from it. Pivoted in the bracket is a depending arm 10, having a contact point 11, held normally in contact with a point 12 on the engine, by a tension spring 13. An auxiliary pressure spring 14 may also be used if found necessary.

The trip lever D is pivoted in a recess at the bottom of arm 10 having a square bearing against the bottom of such recess and being connected to the arm by a pressure spring 15. The purpose of this arrangement of levers and springs is to modify and lessen the shock of contact, and at the same time to close the circuit at points 11 and 12, immediately after passing the obstruction, Fig. 1 gives a clear illustration of the electrical connections. Ordinarily the course of the current is from magnet B to bracket I, contact points 11, 12 and wire 7 to battery. When the tripping-block is struck, the circuit is closed through the block and its connections although the instant after, it is broken at contacts 11 and 12; so that if all is right at the switch, the main circuit has never been completely opened. In other words, if the circuit has not been broken by any accident at the switch, the temporary breaking of the circuit at the points 11, 12 (which always occurs at the tripping-block), will not affect the main circuit. After passing the tripping-block, the springs immediately restore the levers to normal position for the ordinary running of the train. Now if instead, we suppose the circuit to have been broken at the switch, the contact at the tripping-block completely opens the main circuit and releases the spring armature C, which makes a contact at the point 16 (Fig. 1) and throws in the independent bell circuit of which the armature C becomes a part. J is another magnet, the armature K of which is the ordinary vibrating bell-striker. The circuit from battery is now through wire 17, binding post 18, and spring 19 to armature K, magnet J, point 16, armature C, wire 4, trip-levers and wire 7 to battery, and the bell rings continuously by the usual make and break until armature C is restored to its proper magnet B, and the original main circuit closed.

Assuming that the point of danger is a switch I refer to Figs. 3 and 4, where the main line F and switch I are shown in proper position. The circuit-breaker G is mounted upon a tie adjacent to the movable rail of the main line. I have shown it as consisting of blocks 18 having a metallic cover 19 and binding-posts 20, 21, the latter being insulated. The wire 8 is connected to the post 20. A rod 22 is connected to or is in contact with the movable rail, and slides through passages formed by sleeves 23 in the posts 18. To this rod is secured a contact point 24; and a spring 25 forces this point normally into contact with a point 26 projecting from the insulated post 21 and connected to a main line rail by wire 27. If the switch has been misplaced by moving the rails F and L, the circuit is broken between points 24 and 26, the effect of which has been before explained.

Figs. 6 and 7 show a simple arrangement of circuit breaker for use at a bridge, and includes the sliding spring-rods, forced against contact points on the draw M from which the wires may extend along the bridge timbers. It is easy to see that an open draw will break the circuit, and signal the engineer of an approaching train in the manner before described.

To provide for a bridge on fire, I provide the wires extending along the timbers, with fusible joints 29, the melting of any one of which will break the circuit.

While I have described only three specific forms of danger to which trains are subject, I desire it understood that in connection with my arrangement of circuits and signal, other threatened dangers can be protected against, provided of course that means for breaking the main circuit are provided near the threatened point.

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

1. In an electrical signaling and alarm system for railways, a closed main circuit in the engine including as part of it the armature C, a magnet and a circuit breaking trip-lever; an obstruction on the track, a circuit breaker at a relatively distant point electrically connected to a rail and to the said obstruction, and positively operated by the movement of said rail, and another magnet in the engine having a bell-sounding armature and in open-circuit with the battery, all arranged so that in case the main circuit is broken at both trip-lever and distant point, the armature C will close an independent bell circuit on the engine, substantially as set forth.

2. The flexible trip-lever composed of the pivoted arms D and 10, the latter having a contact 11 in combination with the engine-frame having a contact 12, a spring connecting said arms D and 10 together and a spring connecting said arm 10 to the engine-frame, substantially as specified.

3. In a system of signaling for the purpose specified, a circuit breaker consisting of a sliding-rod forced by a spring against a laterally movable railway rail and having a contact point, another and stationary contact point, and electrical connections to a main line rail closed normally through said points,

but broken by the lateral movement of the rail, an obstruction upon the track connected with the circuit breaker a main circuit and bell circuit carried by an engine and a tripping lever in both circuits adapted to make contact with said obstruction substantially as specified.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

ARCHIBALD B. MURRAY. [L. S.]

Witnesses:
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CHAS. E. KELLY.