

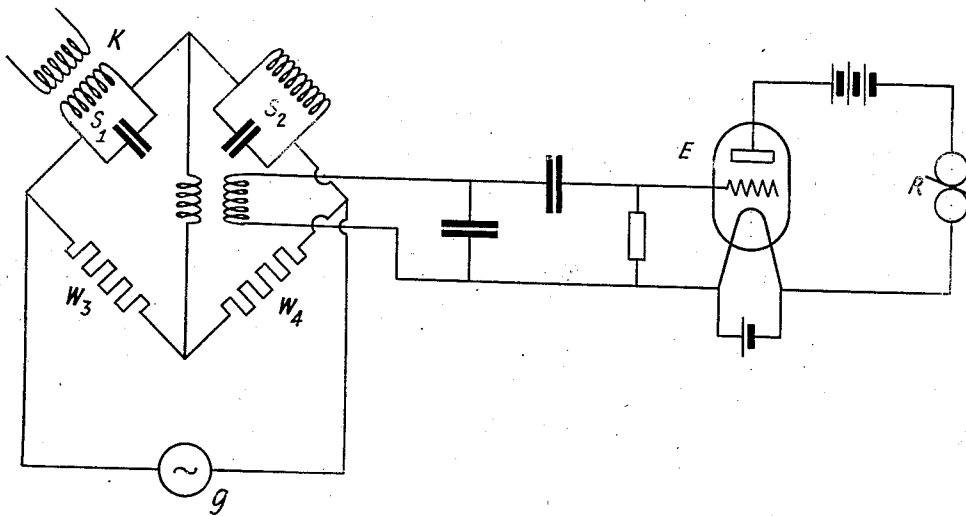
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P. TATZ

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RAILWAY SIGNALING

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INVENTOR
PAUL TÄTZ
BY *Ira J. Adams*
ATTORNEY

UNITED STATES PATENT OFFICE.

PAUL TÄTZ, OF BERLIN, GERMANY, ASSIGNOR TO GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M. B. H. HALLESCHES, OF BERLIN, GERMANY, A CORPORATION OF GERMANY.

RAILWAY SIGNALING.

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This invention relates to the art of railway signaling and is designed to produce an automatic railway signal which is both simple and dependable in its operation.

5 Heretofore it has been suggested to mount oscillation generators such as tube transmitters upon moving trains for the purposes of signaling thereto. In these systems as the train passes over a track signal the state
10 of oscillation of the generator is changed and a suitable indicator operated by means of a relay. These devices have been found unsatisfactory for the reason that its certainty of operation depends upon the in-
15 stability of the oscillatory state of the tube transmitter; that is, the signal is transmitted by an alteration in the state of oscillation of the afore-mentioned generator, and the necessary change in the state of oscilla-
20 tion is comparatively high in order to transmit the signal with certainty.

In the present invention I provide an arrangement which is free from the drawbacks outlined above; my system is based
25 upon the null-method. I mount a balanced bridge upon the engine or any one of the cars of the train, which bridge consists of two arms having alternating current resistances therein. With the diagonal
30 branch of the said bridge I unite the indicating device. As the train passes over the track signaling device, one of the branches becomes coupled thereto, which results in a change in the impedance of one of the arms
35 of the balanced bridge, whereby the balance is destroyed and there is a flow of current between the zero points. This current is in turn picked up by a suitable amplifying means which in turn operates a relay to in-
40 dicate the signal transmitted.

The manner in which I carry out my invention will be better understood from the following description when read in connection with the drawing in which the single
45 figure is a diagrammatic view of my invention.

Referring to the drawing, *g* indicates an alternating current generator of high frequency which is carried by the train and is
50 provided to feed the bridge arrangement having the two branches S_1 and S_2 and the arms W_3 and W_4 . S_1 and S_2 are preferably oscillatory circuits and W_3 and W_4 are two resistances or impedances. One of the os-
55 cillatory circuits, S_1 in the drawing, is

coupled to the track device by means of the transformer K . It may be found desirable to couple the circuit S_2 to a track device also. The zero branch of the bridge is coupled to an audion E in the anode circuit
60 of which I provide a relay R , which relay is employed to actuate the indicating device.

The present arrangement is merely an example of one embodiment of my invention it being understood that the same may be
65 modified in various ways. In any case, however, I find it desirable to use tuned circuits, it not being necessary for S_1 and S_2 to be in current resonance, for they may also be arranged to be in voltage resonance. Also
70 the amplifying device may be eliminated and the indicator actuated directly by the current flowing between the zero points of the bridge.

In order that the coupling between the
75 bridge branch and the track device may be as close as possible, I may use iron-cored coils the latter being so disposed that the coupling coil of the track device as well as the coupling coil leading to the bridge arm
80 are spaced apart a distance limited only by the structure of the car. The cores furthermore should be so formed that the magnetic circuit is closed through the locomotive
85 wheels, the rails, and a special armature for the coil of a track device. There is thus provided a complete magnetic path.

Having thus described my invention what I claim is:

1. In a device of the class described, a
90 train mechanism comprising a closed, balanced bridge one arm of said bridge comprising a tuned circuit including an inductance, a stationary track impedance of fixed value, adapted to cooperate with the
95 inductance of said tuned circuit to change the tuning of said circuit and unbalance said bridge, a zero branch connected across a pair of neutral points of said bridge, and an amplifier having an input circuit coupled to
100 said zero branch, said input circuit being unenergized when said bridge is balanced.

2. In a railway signal device, an alternating current generator, a balanced bridge
105 connected across said generator, said bridge being balanced by a tuned circuit, a track device adapted to render said bridge unbalanced, an amplifier coupled to the zero points of the balanced bridge, said amplifier
110 being constructed and arranged to amplify

the current flowing between the zero points of the bridge when the same is rendered unbalanced, and a relay associated with said amplifying means.

- 5 3. In a railway signal device, the combination of a train mechanism and a track mechanism, the track mechanism being adapted to cooperate with said train mechanism, said train mechanism comprising an

energized balanced bridge having in one arm 10 thereof an oscillatory circuit, said oscillatory circuit being adapted to render the bridge unbalanced in response to the operation of the said track mechanism, and means coupled to the zero points of said bridge 15 and adapted to actuate an indicating means when the bridge becomes unbalanced.

PAUL TÄTZ.