(No Model.) 4 Sheets—Sheet 1.

O. H. CLARK.

ELECTRIC CIRCUIT FOR RAILROAD CROSSING GATES.

No. 307,097. Patented Oct. 28, 1884.

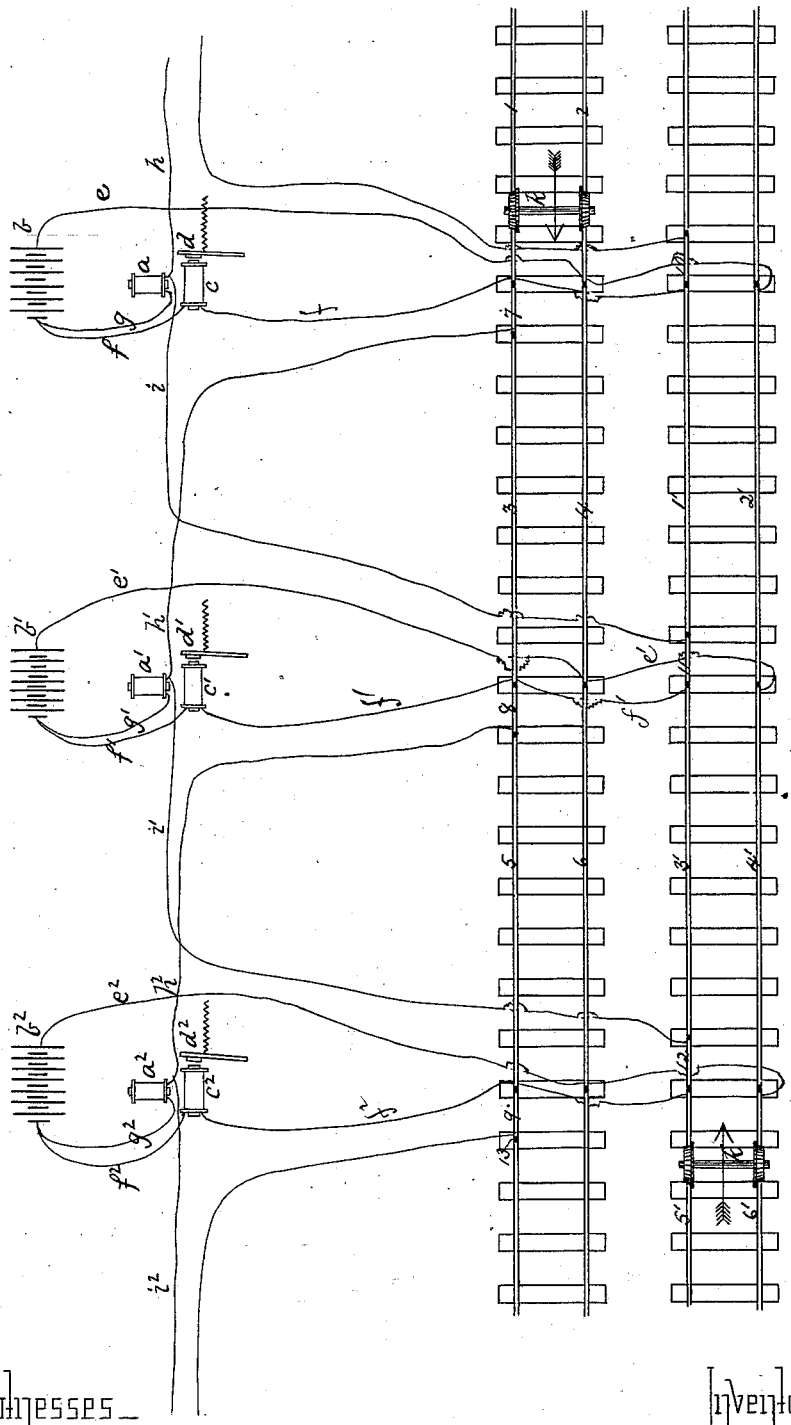

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

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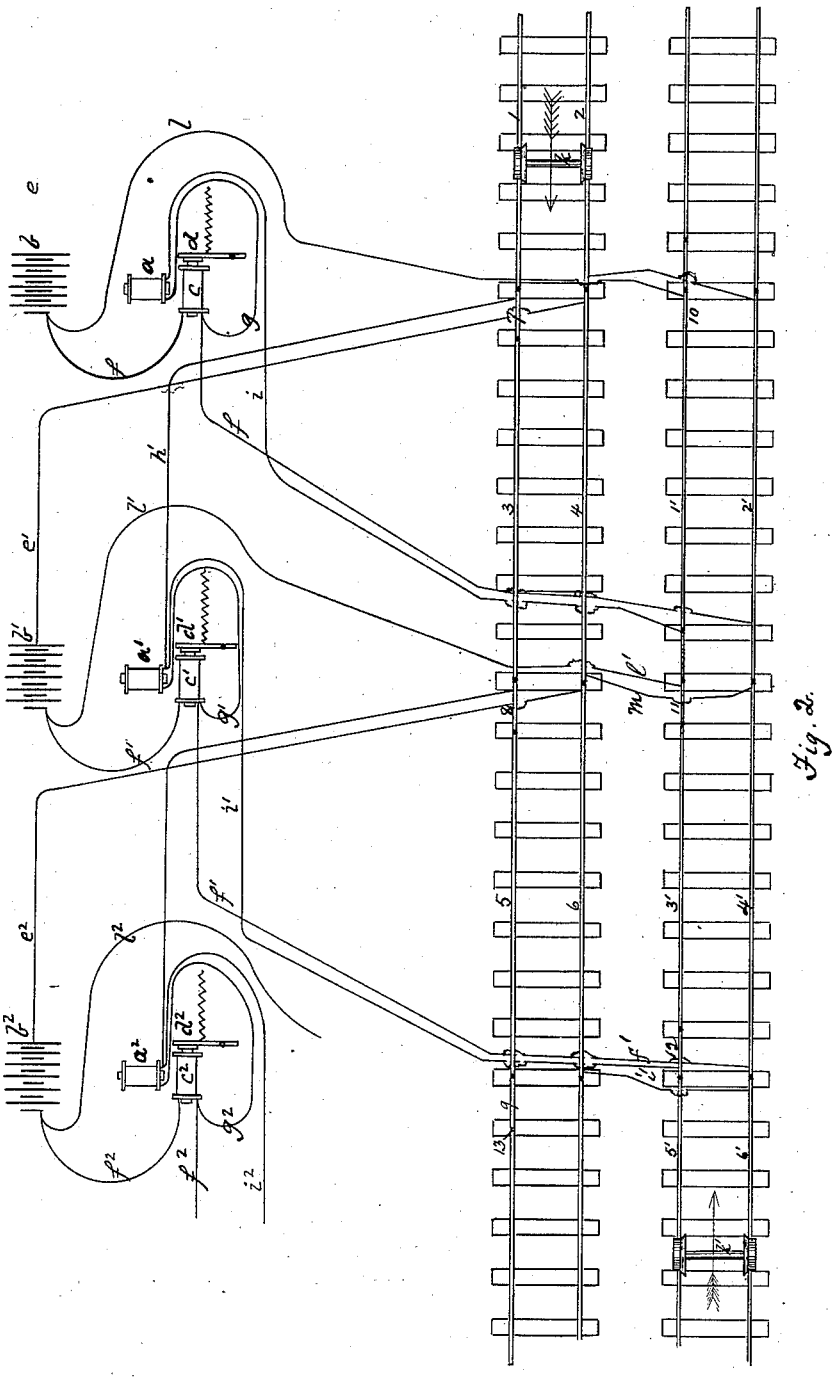

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

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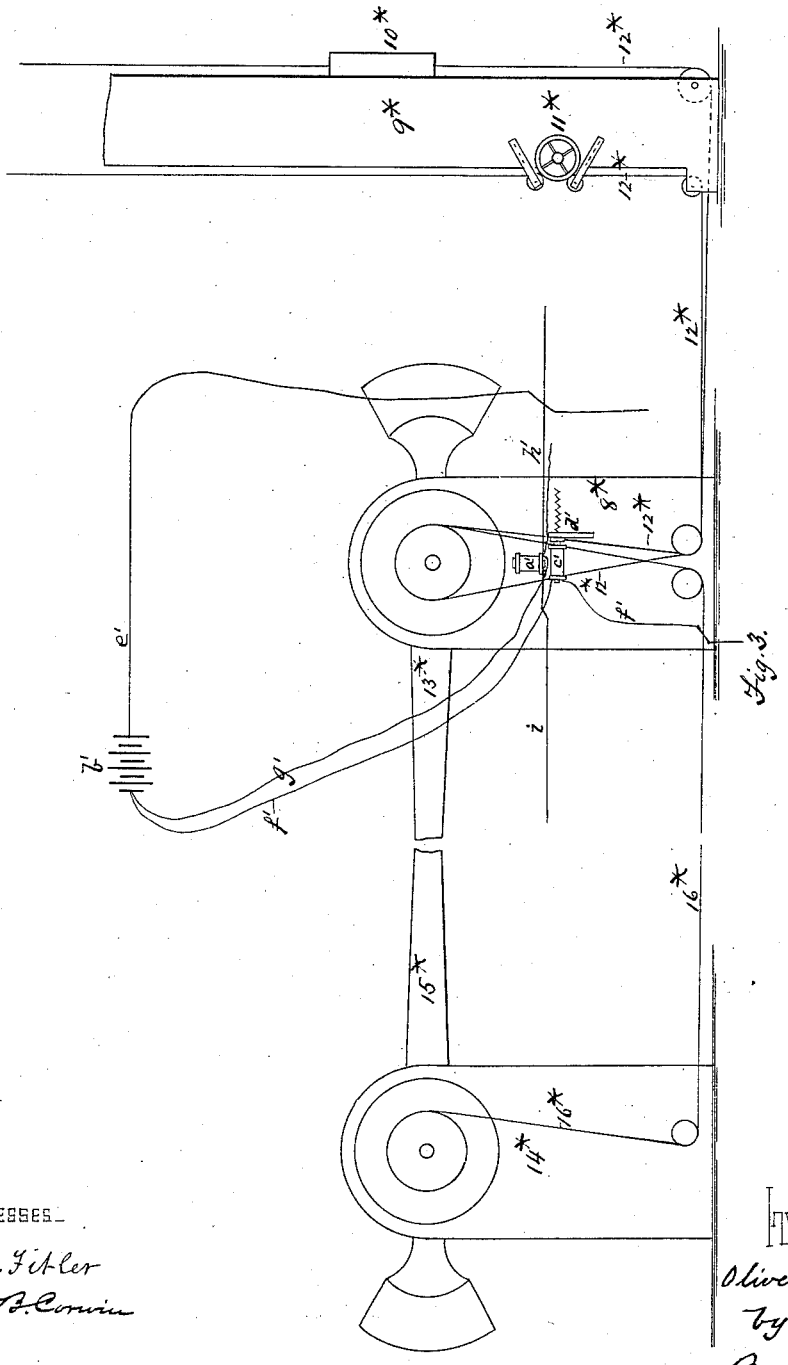

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ELECTRIC CIRCUIT FOR RAILROAD CROSSING GATES.

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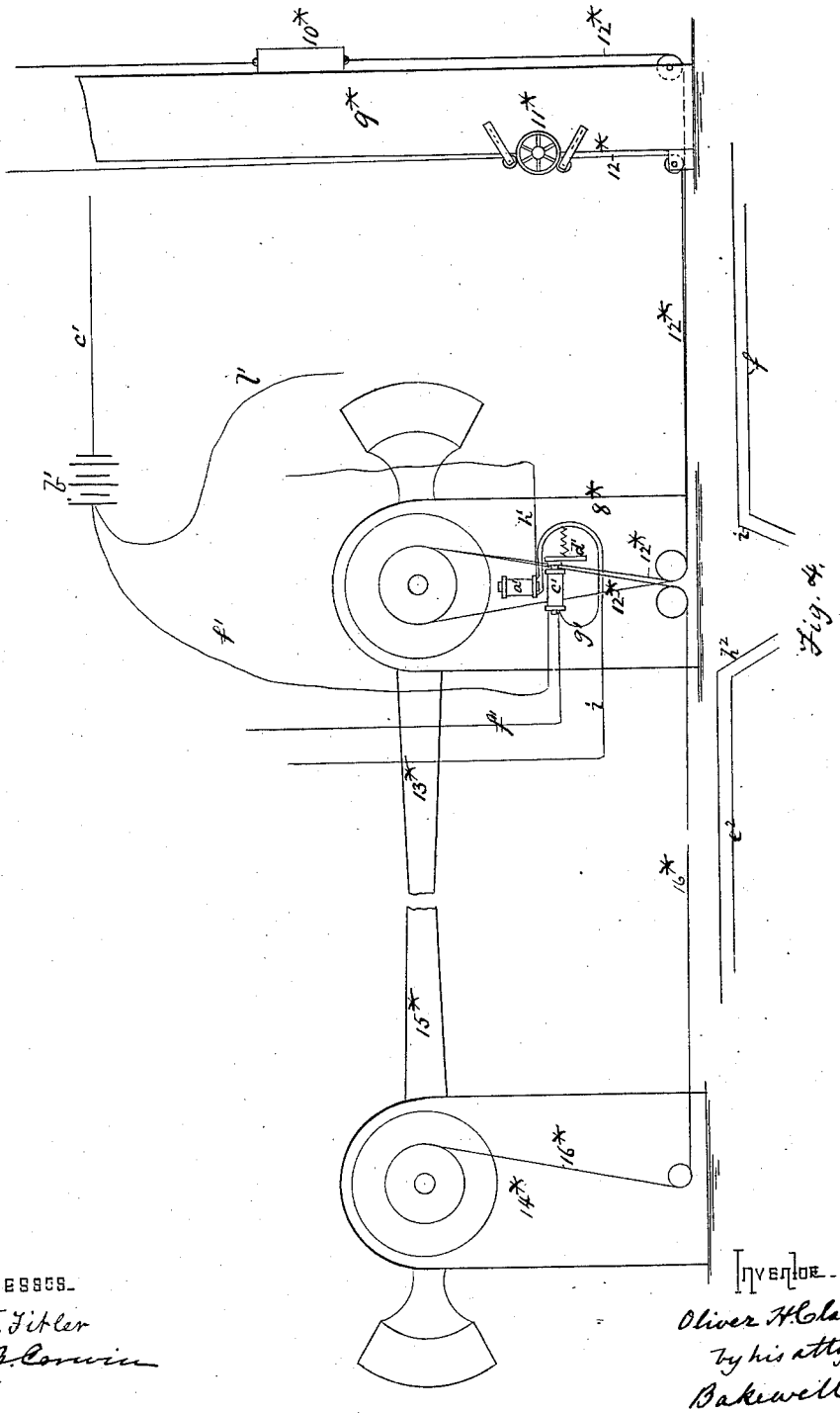

Fig. 4.

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UNITED STATES PATENT OFFICE.

OLIVER H. CLARK, OF PITTSBURG, PENNSYLVANIA.

ELECTRIC CIRCUIT FOR RAILROAD-CROSSING GATES.

SPECIFICATION forming part of Letters Patent No. 307,097, dated October 28, 1884.

Application filed September 11, 1883. (No model.)

To all whom it may concern:

Be it known that I, OLIVER H. CLARK, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Electric Circuits for Railroad-Crossing Gates; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to electric circuits for operating the releasing mechanism of railroad-crossing gates whereby the passage of the train makes and breaks the circuit and causes the automatic operation of the gates.

To enable others skilled in the art to make and use my invention, I will now describe it by reference to the accompanying drawings, in which—

Figure 1 is a diagram illustrating the construction and operation of the same; Fig. 2, a modification. Fig. 3 is a diagram illustrating the application of the open circuit, Fig. 1, to a crossing-gate. Fig. 4 is a diagram illustrating the application of the closed circuit, Fig. 2, to a crossing-gate.

Two tracks are shown, the first of which is composed of rails or sections of rails 1 2 3 4 5 6 of the usual length, and short sections 7 8 9. These sections are insulated from each other by the interposed insulating material 13. The other track is composed of long and short sections separated by insulating material, and is similar to the first track. At each crossing, of which three are shown, is a battery, b b' b^2.

Referring now to Fig. 1 and to the battery b' and its connections, the wire c' extends from one pole to the rail 4. The wire f' extends from the other pole to the rail 3. Included in the circuit, by being connected with the wire f', is an electro-magnet, c', provided with an armature, d'. Extending from one pole of the battery is a second wire, g', which is connected with an electro-magnet, a'. A wire, h', extends from the electro-magnet a' to the short rail-section 7. This construction is designed for use with a railroad-crossing gate having counterweighted oscillating barriers.

In the present instance we will suppose that there is a preponderance of weight with the counter-weight, so that the normal position of the barrier is a vertical one, leaving the gate open.

In applications of even date herewith, Serial Nos. 106,147 and 106,150, I have shown and described gates provided with an electro-magnet corresponding to c', and trip mechanism operated thereby to release the barriers, and I hereby make reference thereto for more specific description of such devices, which, as they form no part of the subject-matter of the present case, have been omitted from this case. A train represented by the wheels and axle k enters on the section of the rails 3, 4, and 7. When one wheel is on 7 and another wheel is on 4, the circuit of the battery b' is closed through wire g', electro-magnet a', wire h', rail 7, axle k, rail 4, and wire c'.

The electro-magnet a' is designed to operate a gong or other alarm-signal indicating the approach of the train. When the wheels pass onto the rails 3 and 4, the circuit through the bell-magnet a' and its wires g' h' and rail 7 is opened, and the circuit is closed through wire c', rail 4, axle k, rail 3, and wire f'. This causes the electro-magnet c' to attract the armature d' and effect the release of the stop mechanism of the barrier, permitting the operative weight to act thereon and to close the gates. When the train passes onto the section composed of rails 5, 6, and 8, the circuit is opened as to section 3, 4, and 7, and the train having by this time passed the crossing of the battery b' the circuit is opened, and the crossing-gates are opened also. The same operation is repeated as the train passes the crossing of the battery b^2. The wires c' and f' are also connected with the rails 3′ and 4′ in the other track, and the signal-magnet a' is connected with the short section 12. If a train represented by the axle k' enters on the sections 3′ and 4′ and 12, the same operation of closing and opening the gate is repeated. The axle k' closes the circuit between the short rail 12 and the rail 4′ and rings the bell, the circuit in that case being by wire c', rail 4′, short rail 12, wire i', electro-magnet a', and wire g'. When the axle k' passes onto the rail 3′, it opens the circuit to the magnet a' and closes that to the magnet c', causing the operation of the gates.

The apparatus I have just described is that which is designed to effect the operation of the gates automatically by means of an open circuit.

I will now describe the use of my invention with a closed circuit, referring to Fig. 2. In

this case the insulated rail-sections are the same.

Taking now the middle crossing, (represented by battery b',) the positive wire c' extends to rail 4. The negative wire f', including the magnet c', extends to the rail 4'. A wire, l', extends from the negative pole of the battery to the rails 3 and 3'. The magnet a', by which the alarm-signal gong is operated, is connected by wire h' to section 7, by wire g' to the wire f', and by the wire i' to section 12. The current of the battery b' is constantly flowing through the circuit c', rail 4, wire m, rail 4', wire f', including magnet c', to battery b'. When the train k comes on the rails 4 and 7, the current passes from wire c', rail 4, axle k, rail 7, wire h', alarm-magnet a', wire g', magnet c', wire f' back to the battery b', causing the sounding of the alarm, but still passing through magnet c' and enabling it to retain the armature d' in contact with its core. When the axle passes upon the rails 3 4, the magnets a' c' are cut out, the current being short-circuited through the wire l', which passes directly to the negative pole of the battery b'. When this occurs, the armature d' is released and operates the trip mechanism, which permits the closing of the gates. The axle k then passes onto the section composed of rails 5, 6, and 8, and repeats the operation just described at the gate controlled by battery b^2. The same operation is repeated when the train k' on the other track enters on the section composed of the rails 3', 4', and 12. The circuit is then by wire c', rail 4, wire m, rail 4', axle k', rail 12, wire i', magnet a', wire g', magnet c', wire f', to battery b', making the signal. When the train k' enters on the rails 3' 4', the magnets a' and c' are cut out and the current short-circuited, and passes by wire e', rail 4', wire m, axle k', and wire l' to the battery b'. This permits the retraction of the armature d', releasing the trip mechanism of the gate and permitting the gate to close. When the train has passed off the section, the original circuit is restored and the armature d' is drawn to the magnet c', which operates the trip mechanism so as to permit the gates to open.

In Figs. 3 and 4 I show a diagram of a crossing-gate consisting of a standard, 8*, containing the magnets and armatures shown in Fig. 1, and the stop mechanism by which the movements of the operating mechanism are controlled, a weight-standard, 9*, operating-weight 10*, weight-raising drum 11*, operating-chain 12*, counter-weighted oscillating barrier 13*, opposite standard 14*, and barrier 15*, and chain 16*, for actuating the barrier 15* from standard 8*.

The barriers have weighted ends 17*, which cause them to stand normally in a vertical position. When the weight 10* is permitted to descend by the operation of the stop mechanism in the standard 8*, it draws the barriers down to a horizontal position, as shown in Figs. 3 and 4. The opening of the circuit in Fig. 3 and the closing of the circuit in Fig. 4 causes the stop mechanism to act and release the barriers, which are then free to rise.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of a railroad-track having the section approaching a crossing insulated from the other rails, the rails on one side of such section being separated into two sub-sections which are insulated from each other, a battery, one pole of which is electrically connected to the two insulated sub-sections and the other to the opposite insulated section of the track, an electro-magnet for operating an alarm-gong, and an electro-magnet for operating the trip mechanism of the gates, both arranged in the circuit, whereby the passage of a train will effect the sounding of an alarm and the operation of the gates, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 9th day of July, A. D. 1883.

OLIVER H. CLARK.

Witnesses:

W. B. CORWIN,

JNO. K. SMITH.