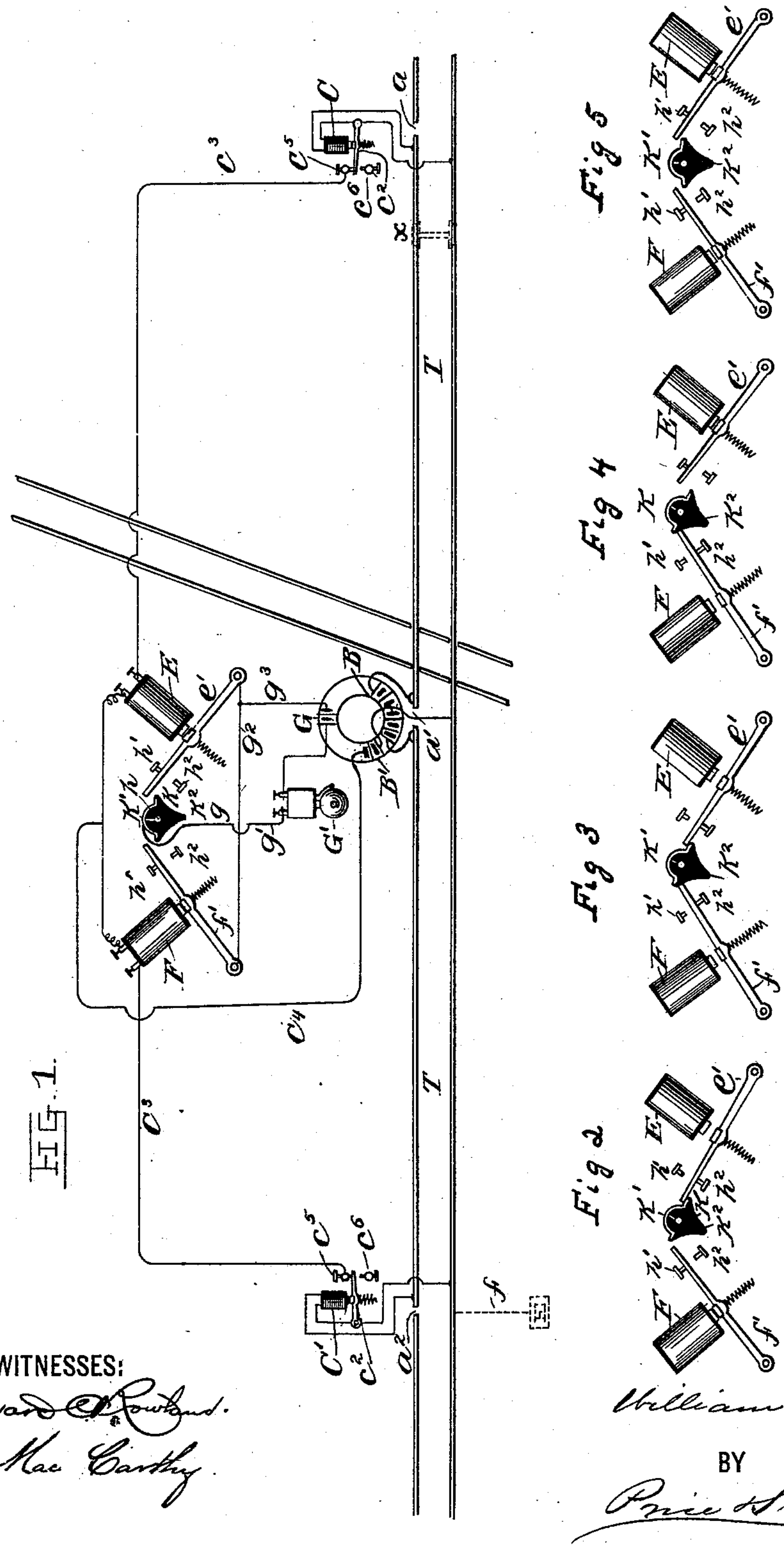
(No Model.) 3 Sheets—Sheet 1.

W. DAVES.

RAILWAY SIGNALING DEVICE.

No. 524,038. Patented Aug. 7, 1894.



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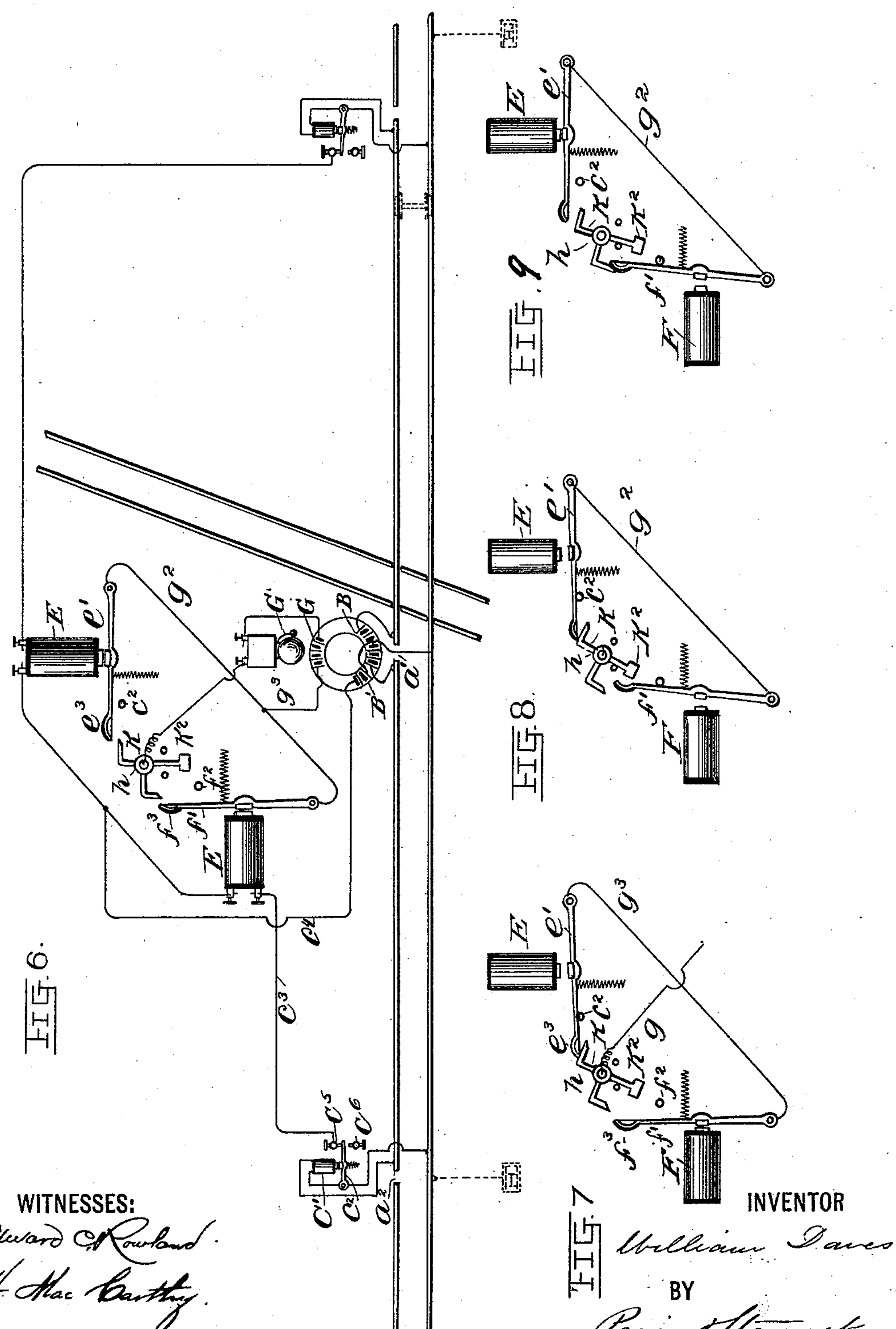

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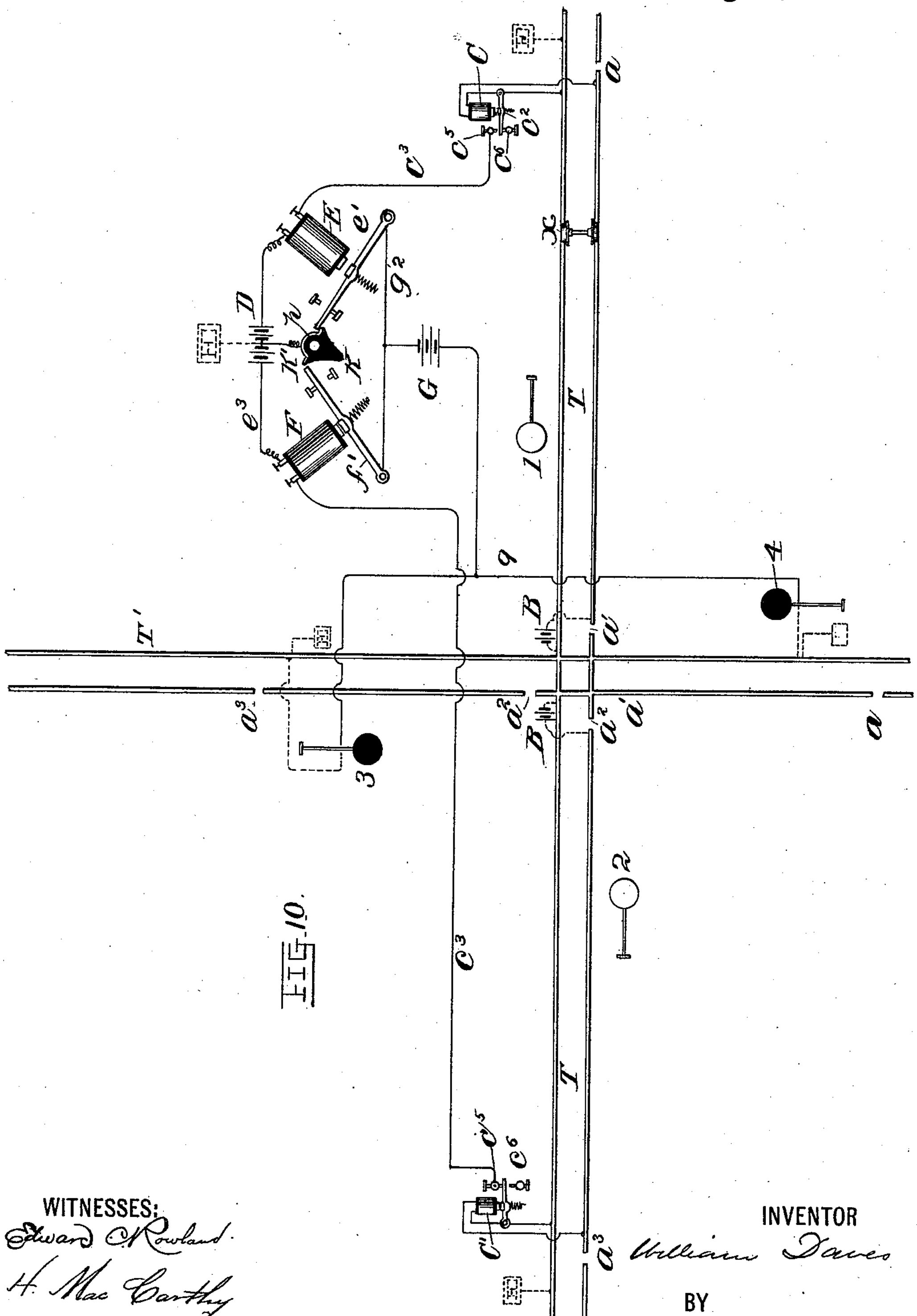

FIG. 10.

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UNITED STATES PATENT OFFICE.

WILLIAM DAVES, OF JERSEY CITY, NEW JERSEY, ASSIGNOR OF TWO-THIRDS TO SAMUEL S. BOGART, OF SCHRAALENBURG, NEW JERSEY, AND BENJAMIN PRICE, OF BALTIMORE, MARYLAND.

RAILWAY SIGNALING DEVICE.

SPECIFICATION forming part of Letters Patent No. 524,038, dated August 7, 1894.

Application filed August 3, 1892. Serial No. 442,051. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM DAVES, a citizen of the United States and a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Railway Signaling Devices, of which the following is a specification.

Figure 1 of the drawings shows a railway track with one of the rails insulated and the signaling device standing in normal position. Figs. 2, 3, 4 and 5 illustrate different positions of the armature levers and contacts. Fig. 6 is the same as Fig. 1 showing a modified form of the device for actuating the signal. Figs. 7, 8 and 9 show the different positions of the device as the train passes over the railway section. Fig. 10 shows two cross tracks and their insulations and batteries and illustrates the means by which a train passing over one of the tracks may operate a signal on the other track.

Various devices for operating signals on railway crossings have been heretofore invented in which the track itself is a part of an electric circuit and these devices are operated frequently by dividing the track into insulated sections, and the device herein described will operate equally well under those systems in which both rails are insulated as that wherein but one of them is insulated.

Viewing Fig. 1, the operation of the device is illustrated upon a track in which only one rail is insulated. T is the track with the insulations shown by lines broken at different points as a, a', a^2. The batteries are also shown arranged to convey the current through the track to the relays C and C'. From one stop of each the relays C, C', a conductor runs to the magnets E and F. The magnet E is provided with its armature lever e', and F with its armature lever f', so that when there is no train on a section, the device stands in normal position as shown in Figs. 1, and 6. As before said, this track has but one of the rails insulated as shown in Fig. 1 at a, a', a^2, the other rail serving to conduct the return current or act as a ground terminal for the circuit. The batteries for the operation of this device are all located together and generally within a single well so that the operator may attend to each or all of them as the necessity of the case requires. A battery as B, B', which is shown in Fig. 1 as one battery but may be divided into two batteries, has one of its poles connected with the insulated rail and the other with the non-insulated rail. From the insulated rail the current runs through the coils of the relay magnets C and C', thence to their respective armature levers C^2, thence to the non-insulated rail and back to battery. From one of the stops as C^5 of these relays, the current is conducted by wire C^3 to the magnets E and F. About midway between these two magnets a conductor as C^4 returns the current back to the opposite pole of battery B, B'. The magnets E and F are supplied each with an appropriate armature lever e', f', and are joined together by the conducting wire g^2, and from the conducting portion of the stop a wire as g runs to the coils of the signal magnet, thence to one pole of battery G and from the other pole, by wire g^3 to the conductor g^2 which joins the ends of the armature levers e', f'. Thus it will be seen that when no train is upon any portion of the section of track, the normal position of the device remains with the circuits closed through the magnets C—C'—E—F.

Upon a shaft or spindle h there is hung a movable contact stop K; the upper part of this contact stop is provided with a suitable conducting material K', and the lower part is either made of non-conducting material or provided with insulating surface edges. It is weighted as K^2 at the bottom so as always to assume its normal position when unaffected by the operating armature lever. From the conducting part of this stop a wire as g communicates with the coils of the signal magnet, thence through battery G to the wire g^2. Suitable stops as h'—h^2 may be provided to limit the throw of the armature lever if necessary.

The operation of the device will be more fully explained by describing the movement of a train in a given direction. Supposing a train passing over the track from right to left; when the front wheels of the engine have passed the insulating point a as shown for example at X, the relay magnet C will be short-circuited allowing its armature lever C^2 to be retracted and break the circuit through the magnet E. The armature lever e' drops upon the conducting portion of the stop K, slightly turning this stop on the spindle h, and assuming the position shown in Fig. 2. It will be seen by this that the conducting portion of the stop K has passed out of the way of the movement of the lever f'. When the forward end of the train has passed the insulation a', the relay magnet C' to the left is short-circuited, breaking the current through the magnet F and allowing the lever f' to drop upon the insulated part of the stop K as shown in Fig. 3. The configuration of this stop prevents this lever from going farther as its free end impinges upon the arc of the circle formed by the lower part of that stop. The bell however will continue to ring or the signal to be displayed until the rear of the train has passed the insulation a'; when this occurs the armature lever e' is free to be drawn back to the pole of its magnet and assumes the position shown in Fig. 4, while the position of the stop K still remains the same, and the bell stops ringing or the signal returns to safety. When the entire train has passed the insulation a^2, the circuit is restored to magnet F, its armature lever f' returns to the pole of its magnet as shown in Fig. 5, and the stop K by virtue of its weighted lower end returns to its normal position as shown in Fig. 5. The operation of a train passing in the opposite direction produces similar results except that the relay magnet C' is first short-circuited allowing the armature lever f' to drop and remove the conducting portion of stop K out of the path of the lever e'.

In Figs. 6, 7, 8 and 9 I have shown a modification of this device. When the lever e' as shown in those figures, drops upon its stop it removes the other portion of the contact out of the way of the armature lever f'; the lever f' then drops upon its stop f^2. When the lever e' is returned to the pole of its magnet, the weight K^2 in assuming its normal position brings the stop K back against the end of armature lever f', but as that end of the lever is insulated as shown at f^3, the current through the signal magnet is not closed. It will be seen from this arrangement that there is no interlocking of the armatures. Each of the armature levers e'—f' is free in its movements to be retracted or returned to the poles of its respective magnet without interlocking or stoppage of any kind. It will also be seen that should a train break upon any portion of the section, the signal will be displayed or the bell continued to ring so long as any portion of the train is on any portion of the section.

In Fig. 10 I have illustrated the operation of my invention and device upon signals of two cross tracks and in this case I have arranged four insulations instead of three to suit the frogs at the crossing, and are marked on said figure a, a', a^2, a^3 and the batteries B—B' in this case are constructed as two batteries instead of one as heretofore described. The circuits may be arranged in different ways. So far as the circuits through the relays and magnets E, F are concerned, they are the same as already described. Upon viewing Fig. 10 however, it will be seen that T represents one track and T' a cross track, both of them provided with one insulated rail; and the signals of track T are represented by figures 1 and 2, and of track T', the black signals 3 and 4.

The battery G connects at one of its poles with the wire g^2 which joins the ends of the armature levers e', f' and from the other pole proceeds by wire 8 joining wire 9 where the current divides, part of it going to signal 3 and a part to signal 4, and thence to the ground as shown. The coils of the magnets E and F are joined by the wire e^3 and interposed about midway between them is the battery D which may be two batteries and by its negative pole with the conducting portion of the stop K on one side and grounded on the other. Now it will be seen that when a train has passed the insulation a, as for example as shown at X Fig. 10, the relay C is short-circuited breaking the current in the magnet E, its armature lever drops upon the conducting portion of the stop K and the current is established from one pole of battery G through armature lever e', battery D, to ground; and from the other pole of battery G, through conductors 8 and 9, to signal magnets 3 and 4, and thence to the ground; thus when the train is at X the signals 3 and 4 on track T' will be displayed at danger and are kept at danger until the train has passed the insulation a' when the current is restored to magnet E releasing the signals and allowing them to return to safety; and when the train has entirely passed the insulation a^3 the parts are restored to their normal position.

It will be understood that the signals 1, 2, 3 and 4 of Fig. 10, are the usual visual or audible signals, operated by a magnet through which the circuit is closed by the action of the armature levers e' and f', and as such signals are in common use no further description is needed.

The above description is intended to explain the illustrations showing how one railroad may protect itself against a cross line by exhibiting signals to the trains on said cross line. Should, however, the cross-line desire to protect itself from the trains on the other, it would erect the apparatus and circuits on its own line and control signals 1 and 2 in the same way as those described for signals 3 and 4.

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

1. In a railway electric signaling system adapted to be actuated by a moving engine or train, the combination with two armature levers and their contact for closing the signal circuit, of means operated by one of the

armatures in closing its circuit to move the circuit closing contact out of the path of the other armature lever.

2. In a railway electric signaling system adapted to be actuated by a moving train, the combination with two armature levers having a free movement to and from the poles of their magnets, a contact stop located in the path of the levers to close the circuit in the signal magnet, and means operated by the release of the first armature lever to remove the contact out of the path of the other.

3. In a railway electric signaling system adapted to be actuated by a passing train, the combination with two magnets and their respective armature levers, said levers forming part of an electric circuit of a movable circuit-closing contact common to both levers and actuated by either lever according to the direction in which a train is passing to remove the circuit closing contact out of the path of the other lever.

4. In a railway electric signaling system adapted to be actuated by a moving train the combination with two armature levers and their contacts for closing the signal circuit, of means operated by one of the armature levers in closing its circuit to move the circuit closing contact out of the path of the other and leave the first armature lever free to return to the pole of its magnet.

Signed at New York city, in the county of New York and State of New York, this 23d day of July, A. D. 1892.

WILLIAM DAVES.

Witnesses:
J. W. LATTIG,
WILLIAM SUTPHEN.