Aug. 25, 1942. H. A. WALLACE 2,293,926

RAILWAY TRAFFIC CONTROLLING APPARATUS

Filed Aug. 24, 1940

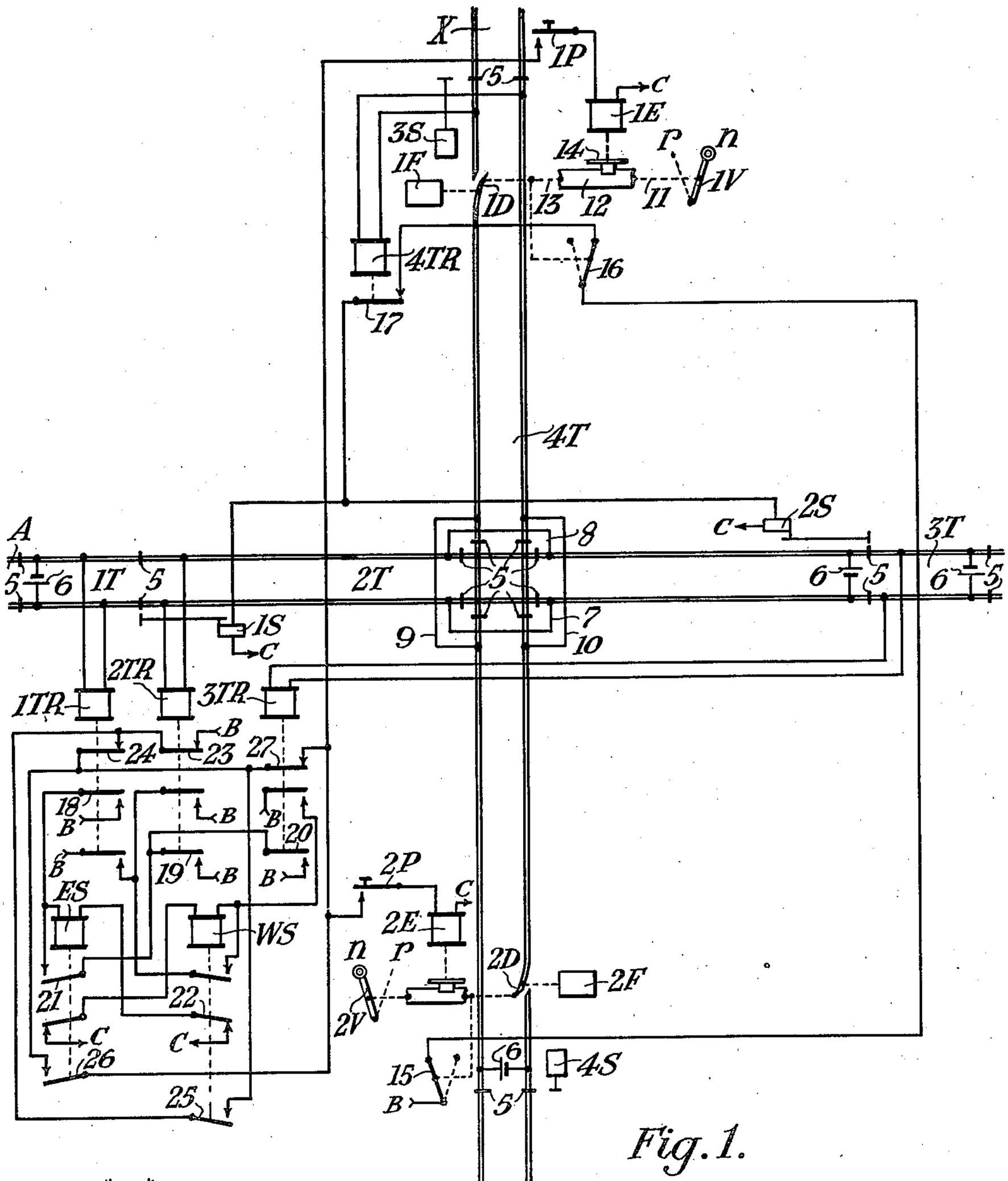

Fig. 1.

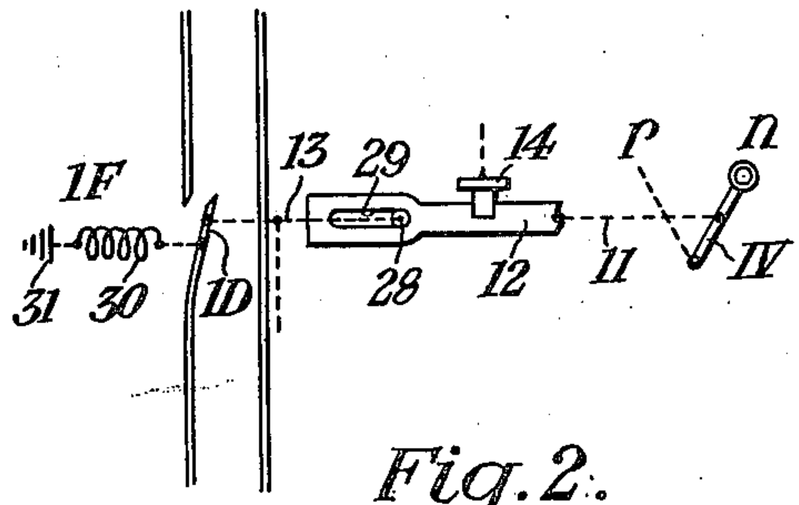

Fig. 2.

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Patented Aug. 25, 1942

2,293,926

UNITED STATES PATENT OFFICE

2,293,926

RAILWAY TRAFFIC CONTROLLING APPARATUS

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Application August 24, 1940, Serial No. 354,069

2 Claims. (Cl. 246—114)

My invention relates to railway traffic controlling apparatus, and particularly to such apparatus for the control of traffic movements along intersecting tracks.

More specifically, my invention relates to railway traffic controlling apparatus for intersecting tracks one of which constitutes a relatively inferior line on which all trains are required to stop before proceeding over the intersection, and the other of which constitutes a main or more important line on which it is desired that as few trains as possible shall be required to stop at the intersection.

A few features of my invention are the provision of two derails for the inferior line, one on each side of the intersection, each of which is biased towards the derailing position by some suitable means such, for example, as a spring, but each operable against the force exerted by the biasing means to the non-derailing position by a train receding from the intersection; the provision of means such for example, as a lever for at times manually operating each derail to the non-derailing position against the force exerted by the biasing means; and the provision of locking means responsive to traffic movements on the more important track for preventing operation of the manual means if a train on the more important track occupies a given approach section on either side of the intersection while approaching the intersection or if it occupies a given detector section at the intersection, but for releasing the manual means while the train occupies the approach section on the opposite side of the intersection while receding from the intersection after leaving the detector section.

I shall describe one form of apparatus embodying my invention, and shall then point out the novel features thereof in claims.

In the accompanying drawing, Fig. 1 is a diagrammatic view showing one form of apparatus embodying my invention; and Fig. 2 is a diagrammatic view showing more in detail a portion of the apparatus shown in Fig. 1.

Similar reference characters refer to similar parts in each of the views.

Referring first to Fig. 1, a main track A is shown intersected by an inferior track X. Main track A is divided by insulated joints 5 into a detector section 2T extending through the intersection, and approach sections 1T and 3T adjacent opposite ends of the detector section. The section 4T is divided from adjacent portions of track X by other insulated joints 5. The portions of section 2T on opposite sides of the intersection are connected together by conductors 7 and 8, and the portions of section 4T on opposite sides of the intersection are connected to each other by conductors 9 and 10.

Each track section is provided with a track circuit including a suitable source of current such as a battery 6 connected across the rails adjacent one end of the section, and a track relay designated by the reference character R preceded by the reference character for the associated section connected across the rails adjacent the opposite end of the section.

A signal 1S governs traffic movements on track A over the intersection from left to right as shown in the drawing, which I shall assume is the eastbound direction. A second signal 2S governs traffic movements on track A over the intersection in the opposite or westbound direction.

Track X is equipped with two derails 1D and 2D, shown as of the split-point type, one on each side of the intersection. These derails are biased towards the derailing position in which they are shown by suitable means 1F and 2F, respectively, such, for example, as a spring, but each is operable against the biasing means to a non-derailing position by a train trailing through it after passing over the intersection.

Derail 1D is also operable manually by a lever 1V against the biasing means to the non-derailing position through mechanical connections 11, 12 and 13. Derail 2D is similarly operable manually by a lever 2V to the non-derailing position against the biasing means. Each of the levers 1V and 2V has a normal position *n* in which it is shown in the drawing, and a reverse position *r*.

Fixed indicating devices 3S and 4S are shown adjacent opposite ends of section 4T and adjacent derails 1D and 2D, respectively, to show to the enginemen the location of these derails and track section 4T.

Manual operation of lever 1V is controlled by an electric lock magnet 1E which, when deenergized, drops a locking dog 14 into a notch in the bar 12, thereby preventing operation of derail 1D by lever 1V. Magnet 1E, upon becoming energized, lifts dog 14 out of the notch in bar 12, thereby permitting operation of derail 1D to the non-derailing position by lever 1V. The operation of derail 2D by lever 2V is similarly controlled by an electric lock magnet 2E.

Lock magnets 1E and 2E are controlled by track relays 1TR, 2TR and 3TR and by directional stick relays ES and WS, so that a portion of the energizing circuits for magnet 1E, for

example, will be open while an eastbound train occupies sections 1T and 2T, but a branch path will be closed for energizing magnet 1E while the eastbound train occupies section 3T after leaving section 2T. Push button circuit controllers 1P and 2P which are biased in a suitable manner to the open position in which they are shown, but which are manually operable to the closed position, are used in the energizing circuits for magnets 1E and 2E, respectively, in order to keep the circuits for these magnets normally open and thereby save current.

Stick relay ES is controlled by an eastbound train to become energized when the train enters section 1T, and to remain energized while the train occupies sections 2T and 3T. Relay WS is similiarly controlled by westbound trains.

Referring now to Fig. 2, one form of mechanical connections which can be used between lever 1V and derail 1D, and one form of the biasing means 1F are shown in detail. As here shown, bar 12 has a slot 29 in which a pin or roller 28 is freely movable from one end to the other. When derail 1D is operated to the non-derailing position by a train, pin 28 is moved to the left-hand end of slot 29, by mechanical connection 13, without moving bar 12. When derail 1D is operated by lever 1V, bar 12 bears against pin 28 at the right-hand end of slot 29, forcing derail 1D to the non-derailing position through connection 13, and thereby compressing a spring 30, one end of which is attached to derail 1D and the other end of which is attached to a fixed block 31. When lever 1V is returned to the *n* position, derail 1D will be returnd to the derailing position by spring 30. The mechanical connections between lever 2V and derail 2D, and the biasing means 2F can also be as shown in Fig. 2.

Having described, in general, the arrangement and control of the apparatus shown in the accompanying drawing, I shall now describe in detail its operation.

As shown in the drawing, all parts are in the normal condition, that is, all track relays are energized; relays ES and WS are deenergized; levers 1V and 2V are in the normal or *n* position; lock magnets 1E and 2E are deenergized because their circuits are open at push button circuit controller contacts 1P and 2P; derails 1D and 2D are in the derailing position; and signals 1S and 2S are indicating proceed.

Signals 1S and 2S are retained in their proceed positions by means controlled by circuits passing from terminal B of a suitable source of current, through contact 15 operated in conjunction with derail 2D, contact 16 operated in conjunction with derail 1D, contact 17 of track relay 4TR, and thence through the mechanisms of signals 1S and 2S in multiple to terminal C of the same source of current.

I shall assume that an eastbound train enters section 1T, thereby deenergizing relay 1TR. Contact 24 of relay 1TR then opens a portion of the circuits for magnets 1E and 2E. Relay 1TR, upon becoming deenergized, completes a pickup circuit for relay ES passing from terminal B, through contact 18 of relay 1TR, winding of relay ES, and contact 22 of relay WS to terminal C. When the train enters section 2T, a stick circuit is completed for relay ES passing from terminal B, through contact 19 of relay 2TR, contact 21 of relay ES, winding of relay ES, and contact 22 of relay WS to terminal C. When the train proceeds further and enters section 3T, a second stick circuit is completed for relay ES, which is the same as the first stick circuit except including contact 20 of relay 3TR instead of contact 19 of relay 2TR.

I shall now assume that a southbound train on track X arrives at the fixed indicating device 3S. The train will stop, and a trainman will depress push button 1P. If there is no train on track A, a circuit will be completed for energizing magnet 1E passing from terminal B, through contact 23 of relay 2TR, contact 24 of relay 1TR, contact 27 of relay 3TR, push button circuit controller 1P, and the winding of magnet 1E to terminal C. Magnet 1E, upon becoming energized, will lift dog 14 out of the notch in bar 12, and the trainman will then move lever 1V to its *r* position, thereby closing derail 1D against its biasing means. Movement of derail 1D away from its normal position opens contact 16, thereby causing signals 1S and 2S to indicate stop.

The southbound train will then proceed over derail 1D in the closed or non-derailing position. The southbound train, upon entering section 4T, deenergizes relay 4TR, which causes the circuits for signals 1S and 2S to also be opened at contact 17 of this relay. After the train passes derail 1D, a trainman will return lever 1V to the *n* position. It will not be necessary for the train to stop at derail 2D because the train, upon trailing through this derail while receding from the intersection, will operate it to the non-derailing position. After the train passes over derail 2D, the biasing means will return this derail to its derailing position.

I shall next assume that a second southbound train on track X arrives at the fixed indicating device 3S, and that a trainman again closes push button circuit controller 1P. I shall further assume that an eastbound train on track A already occupies section 1T, causing the circuits for magnets 1E and 2E to be opened at contact 24 of relay 1TR. When the eastbound train enters section 2T, the circuits for energizing magnets 1E and 2E will also be opened at contact 23 of relay 2TR. When this train leaves section 2T, a second circuit for energizing magnets 1E and 2E will become closed if a trainman depresses push button 1P, this circuit passing from terminal B, through contact 23 of relay 2TR, contact 24 of relay 1TR, contact 28 of relay ES, circuit controller 1P, and the winding of magnet 1E to terminal C.

I have described the operation of the apparatus for typical eastbound and southbound train movements. It is believed that, in view of this description, the operation of the apparatus for westbound and northbound traffic movements, or for any other possible traffic movements, will be readily understood by reference to the accompanying drawing.

Although I have herein shown and described only one form of apparatus embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. Railway traffic controlling apparatus for governing traffic movements over an intersection of two tracks one of which includes a detector section in which the intersection is located and also includes two approach sections one at each end of said detector section, comprising in com-

bination, two derails for the other of said tracks one on each side of the intersection and each provided with biasing means for forcing the corresponding derail toward the derailing position but each operable against its biasing means to the non-derailing position by a train receding from the intersection, manual means for also operating said derails to the non-derailing position, two stick relays one for each direction of traffic movements over said one track, means responsive to a train approaching the intersection in either direction in the corresponding approach section for energizing the stick relay for that direction if the other stick relay is deenergized and for retaining the stick relay for that direction energized while said train occupies the detector section and while the train recedes from the intersection in the other approach section, and locking means responsive to a train moving in either direction on said one track for preventing operation of said manual means while said train is approaching said intersection in the corresponding approach section or occupies said detector section and controlled by the corresponding stick relay for releasing said manual means while said train is receding from said intersection in the other of said approach sections after leaving said detector section.

2. Railway traffic controlling apparatus for governing traffic movements over a point at which two tracks meet, one of said tracks including a detector section in which the meeting point of the two tracks is located and also including two approach sections one at each end of said detector section, comprising in combination, a derail for the other of said tracks provided with biasing means for forcing the derail toward the derailing position but operable against the biasing means to the non-derailing position by a train receding from the meeting point over said derail, manual means for also operating said derail to the non-derailing position, two stick relays one for each direction of traffic movements over said one track, means responsive to a train approaching the meeting point in either direction in the corresponding approach section for energizing the stick relay for that direction if the other stick relay is deenergized and for retaining the stick relay for that direction energized while said train occupies the detector section and while the train recedes from the meeting point in the other approach section, and locking means responsive to a train moving over said one track for preventing operation of said derail by said manual means while said train on said one track is approaching said meeting point in the corresponding approach section or occupies said detector section but controlled by said stick relays for releasing said derail for manual operation while a train is receding in the other approach section from said meeting point after leaving said detector section.

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