

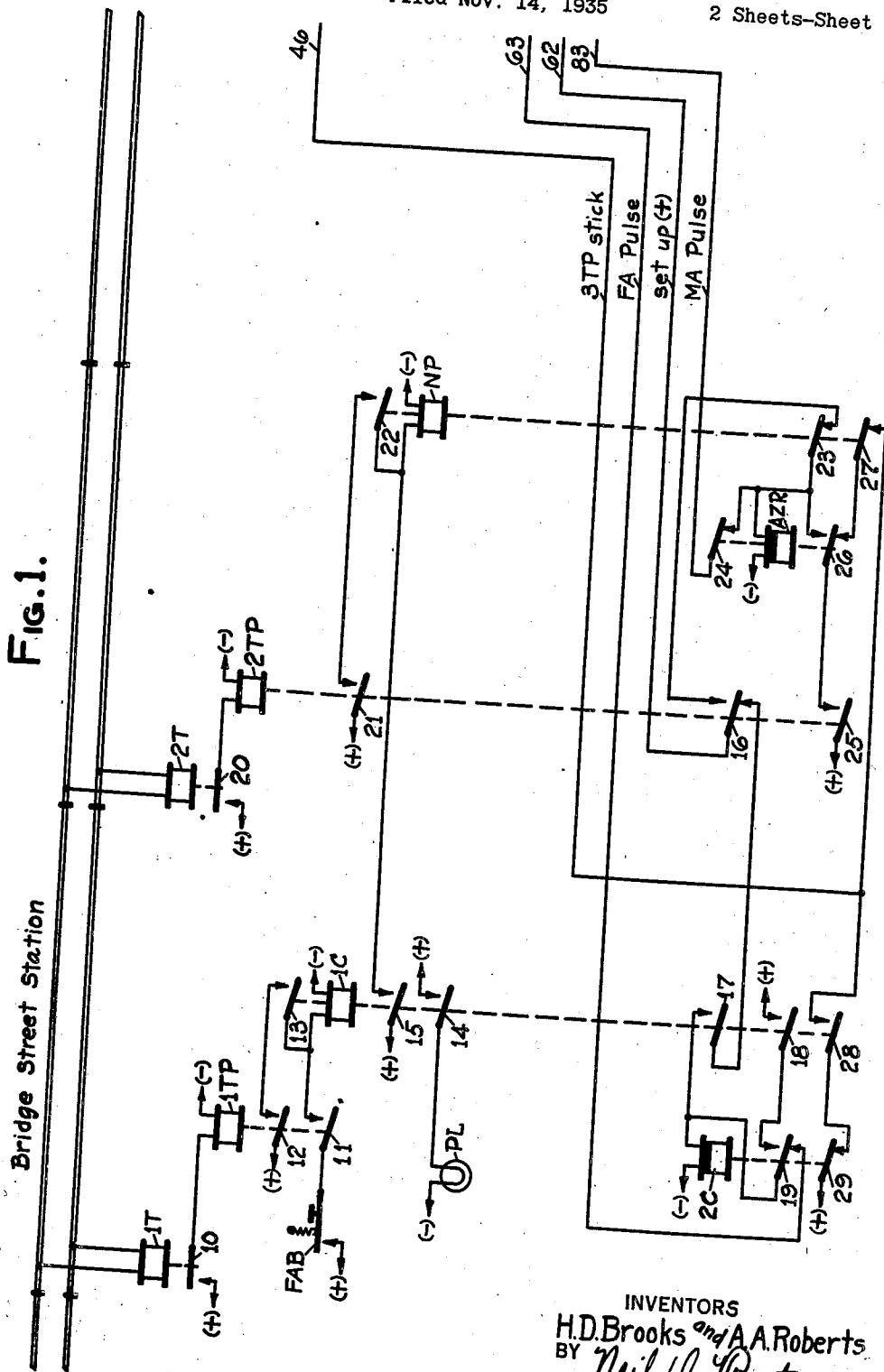
Dec. 26, 1939.

H. D. BROOKS ET AL
TRAIN DESCRIPTOR SYSTEM

2,184,544

Filed Nov. 14, 1935

2 Sheets-Sheet 1



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Dec. 26, 1939.

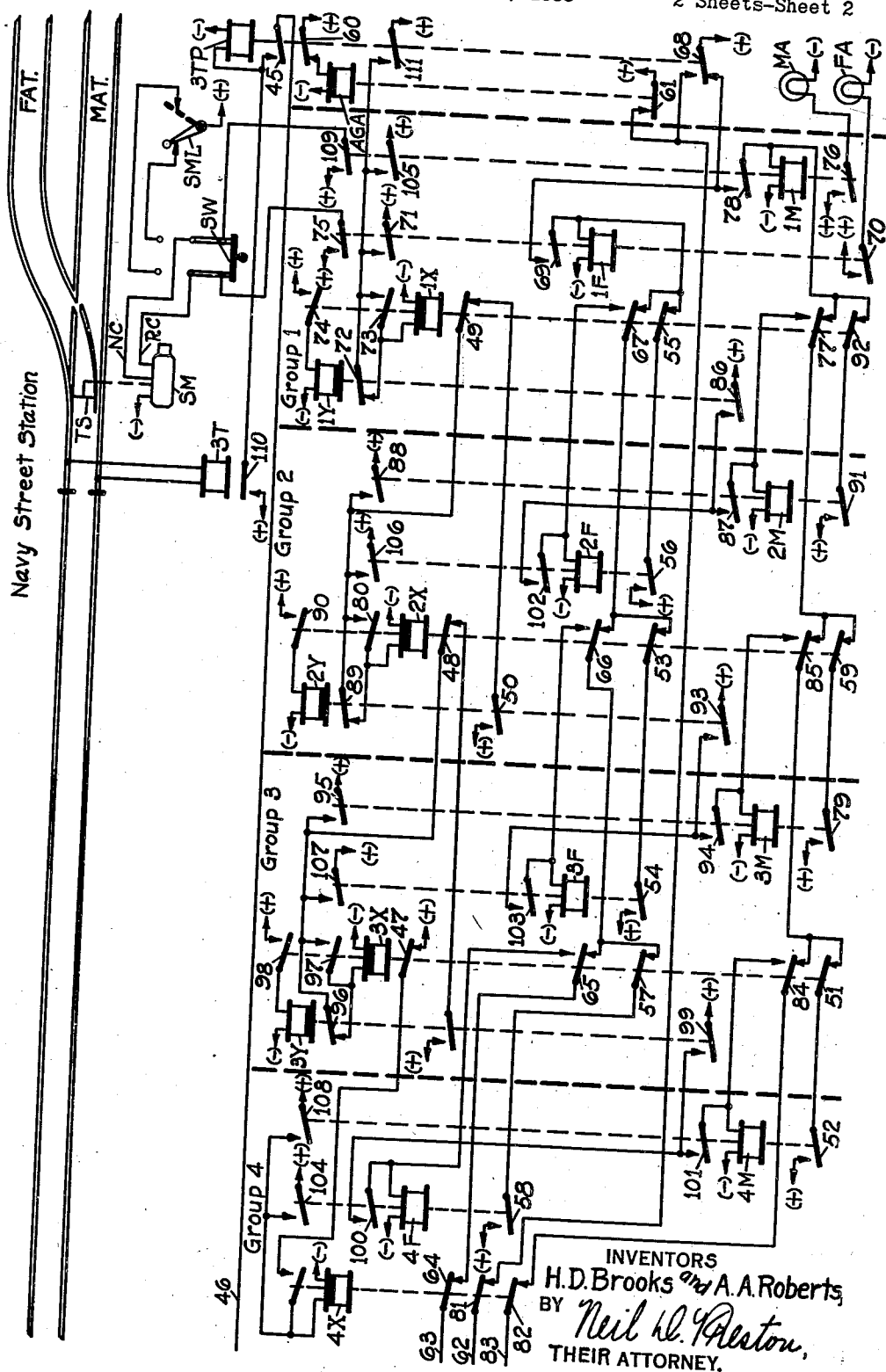
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FIG. 2.



UNITED STATES PATENT OFFICE

2,184,544

TRAIN DESCRIBER SYSTEM

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Application November 14, 1935, Serial No. 49,792

22 Claims. (Cl. 246—2)

This invention relates to train describers or announcers and it more particularly pertains to a semi-automatic train describer or announcer, whereby trains of one class cause the circuits to function automatically to display a lamp or the like at a distant point, while trains of another class require a manual operation of a push button or the like to cause the circuits to function to display another lamp at the distant point, for identifying approaching trains.

In accordance with the present invention it is proposed to indicate at a distant platform or station the kind or class of the next car or train that is approaching, such as local or express trains, or the destination of such car or train and to cancel or wipe out these indications automatically as the train enters the station.

Another feature of the present invention resides in the provision of means for automatically storing in train describer units or relay groups the identity of a plurality of trains which pass a first station and for displaying at a second station an indication manifesting the identity of the trains one at a time in the order of their passing the first station, with each succeeding indication being displayed as the preceding train leaves the second station.

Another feature of the present invention resides in the provision of automatic storing and transferring means for storing the identity of trains passing the first station on groups of relays conveniently called train describer units and for transferring the stored identity from higher to lower numbered groups as each train clears out of the second station, with the lowest numbered group controlling the identifying lamps to indicate the identity of the next approaching train.

Other objects, purposes and characteristic features of the present invention will be obvious from the accompanying drawings when taken in connection with the following description.

In describing the invention in detail reference will be made to the accompanying drawings in which:—

Figs. 1 and 2 when placed end to end in the order named and with correspondingly identified lines in alignment, show the invention applied to a section of track over which trains of two classes travel from west to east (left to right), with traffic routed over two separate routes at the second station.

For convenience in describing the present invention, it will be assumed that Myrtle Avenue trains and Fifth Avenue trains pass through the Bridge Street station illustrated in Fig. 1 and are

routed by way of track switch TS (and corresponding signals not shown) at the Navy Street station (illustrated in Fig. 2) over Myrtle Avenue track MAT and Fifth Avenue track FAT respectively. It will also be assumed that an attendant on each Fifth Avenue train is instructed to manually operate push button FAB illustrated in the upper left hand portion of Fig. 1, while the attendant on each Myrtle Avenue train does not operate this button.

It will also be assumed that any number of trains up to four may have their identity stored in the four groups of relays of Fig. 2 before one is cleared out of the Navy Street station. It will be understood that this number can be increased by increasing the number of groups of relays shown grouped by the heavy dashed lines of Fig. 2.

It is believed that the features of the present invention may be best understood by considering the detailed operation of the system.

Operation

Normal conditions.—With no trains in the sections of track illustrated in Figs. 1 and 2, track relays 1T, 2T and 3T are normally energized in the usual manner by current from the usual track batteries not shown. Relay AGA illustrated in the upper right hand portion of Fig. 2 is normally energized over an obvious circuit closed at back contact 60 of relay 3TP.

In the following description it will be understood that those relays having heavy lines at the upper portion of the block illustrating the winding of each relay indicate that the relay is slow to pick up, while those relays having a heavy line at the lower portion of the block illustrating the winding of the relay indicates that the relay is slow to release.

Entrance and storage.—It will be assumed that the first train to enter the track section of the Bridge Street station with which track relay 1T is associated is a Fifth Avenue train and as above pointed out an attendant will operate push button FAB as the train passes through this station.

The dropping of relay 1T in response to the entrance of the train in the associated track section closes an obvious circuit at back contact 10 for picking up relay 1TP. When button FAB is actuated a circuit is closed for picking up relay 1C which extends from (+), contact of button, FAB front contact 11 of relay 1TP and winding of relay 1C to (—). Relay 1C closes a stick circuit for itself which extends from (+), front contact 12 of relay 1TP, front contact 13 and winding of relay 1C to (—). Relay 1C closes an obvious cir-

cuit at its front contact 14 for lighting pilot lamp PL, which lamp indicates that the button has been properly operated by the train attendant.

A circuit is now closed for picking up relay NP which extends from (+), front contact 15 of relay 5 IC and winding of relay NP to (-). The picking up of relay IC also closes a circuit for picking up relay 2C which extends from (+), front contact 61 of relay AGA, back contact 31 of relay 4X, 10 conductor 62, back contact 16 of relay 2TP, front contact 17 of relay IC and winding of relay 2C to (-). Relay 2C completes a stick circuit for itself which extends from (+), front contact 18 of relay IC, front contact 19 and winding of relay 15 2C to (-).

The picking up of relay IC also closes a circuit for applying a FA pulse to conductor 63 for picking up relay IF, which circuit extends from (+), front contact 61 of relay AGA, back contact 81 of relay 4X, conductor 62, back contact 16 of relay 2TP, front contact 17 of relay IC, back contact 19 of relay 2C, conductor 63, back contact 64 of relay 4X, back contact 65 of relay 3X, 25 back contact 66 of relay 2X, back contact 67 of relay IX and winding of relay IF to (-). It will be noted that this pulse is applied to conductor 63 after relay IC picks up and before relay 2C picks up to open back contact 19, due to the fact that relay 2C is slow to pick up. Relay IF closes a stick circuit for itself which extends 30 from (+), back contact 68 of relay 3TP, front contact 69 and winding of relay IF to (-).

A circuit is now closed for energizing lamp FA as an indication that the next approaching train is a Fifth Avenue train, which circuit extends 35 from (+), front contact 70 of relay IF and lamp FA to (-). Relay IX is energized over a circuit extending from (+), front contact 71 of relay IF, back contact 72 of relay IY and winding of relay IX to (-). Relay IX closes a circuit at its front contact 73 which bridges back contact 72 and is for the purpose of maintaining relay IF energized after relay IY is picked up over a circuit extending from (+), front contact 40 74 of relay IX and winding of relay IY to (-).

Relay IF closes a circuit at its front contact 45 75 for operating switch machine SM to operate the track switch to its reverse position, which circuit extends through a contact of double pole double throw switch SW and reverse switch machine conductor RC. It will be obvious that the track switch may be manually controlled by lever SML when switch SW is thrown to its upper position.

It will be noted that contacts 67 and 77 of relay IX transfer the FA pulse conductor 63 and the MA pulse conductor 83 from the IF and IM relays respectively to the 2F and 2M relays respectively, so that the second train can be registered on the proper relay 2F or 2M in accordance with its identity.

When the Fifth Avenue train enters the track section with which relay 2T is associated this relay drops and closes an obvious circuit at its back 65 contact 20 for energizing relay 2TP. Relay 2TP closes a stick circuit for relay NP which extends from (+), front contact 21 of relay 2TP, front contact 22 and winding of relay NP to (-). The picking up of relay 2TP transfers the "set up" 70 conductor 62 from the circuit leading to relay 2C to the circuit leading to relay AZR, which circuit is open at this time at back contact 23 of relay NP.

When the Fifth Avenue train leaves the track 75 section with which relay IT is associated this re-

lay picks up and de-energizes relay IT at open back contact 10. Relay IT drops and effects the dropping of relay IC by opening its stick circuit at front contact 12. The pilot lamp is de-energized at open front contact 14 and relay 2C 5 is de-energized at open front contact 13.

When the Fifth Avenue train clears out of the track section with which relay 2T is associated this relay picks up and de-energizes relay 2TP 10 at open back contact 20. Relay NP is now de-energized at open front contact 21 of relay 2TP.

It will be assumed that a Myrtle Avenue train enters the Bridge Street station while the indication which identifies the Fifth Avenue train is stored in the first group of relays as above 15 described. The dropping of relay IT again energizes relay ITP but since button FAB is not actuated neither relay IC nor 2C is picked up. When the Myrtle Avenue train enters the second track section relay 2T is dropped and relay 20 2TP is picked up but in this instance relay NP is not energized because of open front contact 15 of relay IC.

Relay AZR is energized in response to the entrance of the Myrtle Avenue train into the second 25 section over a circuit extending from (+), front contact 61 of relay AGA, back contact 81 of relay 4X, conductor 62, front contact 16 of relay 2TP, back contact 23 of relay NP and winding of relay AZR to (-). The opening of back contact 24 of relay AZR disconnects the MA pulse conductor 83 but since this relay is slow to pick up, a pulse is applied to conductor 83 for an interval of time sufficient to pick up relay 2M over a circuit extending from (+) on the right hand 35 terminal of relay AZR (above traced), back contact 24 of relay AZR, conductor 83, back contact 32 of relay 4X, back contact 34 of relay 3X, back contact 35 of relay 2X, front contact 77 of relay IX and winding of relay 2M to (-). Relay 2M 40 closes a stick circuit for itself extending from (+), front contact 86 of relay IY, front contact 87 and winding of relay 2M to (-). Relay AZR closes a stick circuit for itself which extends from (+), front contact 25 of relay 2TP, front contact 45 26 and winding of relay AZR to (-).

The picking up of relay 2M closes a circuit for picking up relay 2X which extends from (+), front contact 88 of relay 2M, back contact 39 of relay 2Y and winding of relay 2X to (-). Front 50 contact 80 of relay 2X bridges back contact 39 of relay 2Y so that relay 2X is maintained energized after relay 2Y is picked up over a circuit extending from (+), front contact 90 of relay 2X and winding of relay 2Y to (-).

From the above it will be observed that relay 2M is energized to store the identity of the second train entering the Bridge Street station but that this relay does not complete a circuit for the train identifying lamp. It prepares a circuit at its front contact 91 for picking up relay IM 55 to transfer the second storage indication to the first group of relays, but this circuit is not complete at this time because of open back contact 92 of relay IX. It will also be observed that 65 relay 2X transfers the FA pulse wire 63 and the MA pulse wire 83 from the F and M relays of the second group to the F and M relays of the third group at front contacts 66 and 85 respectively.

When the second train (Myrtle Avenue) leaves the first track section, relay IT is picked up and relay ITP is dropped in the manner previously described. When the second train leaves the second track section, relay 2T is picked up and re- 75

lay 2TP is dropped in the manner previously described. The dropping of relay 2TP de-energizes the stick circuit of relay AZR at open front contact 25 and relay AZR is released.

5 It will now be assumed that, while the identities of the first and second trains are stored in groups 1 and 2, a third train (Myrtle Avenue) enters the Bridge Street station. This effects the dropping of relay 1T and the picking up of relay 1TP as previously described. Relays 1C, 2C and NP remain de-energized but relay AZR is picked up as previously described. A circuit is closed for applying a pulse to the MA pulse wire 83 before the picking up of relay AZR, which circuit is effected by the closure of front contact 16 of relay 2TP before the opening of back contact 24 of relay AZR.

This pulse applied to conductor 83 extends through front contact 85 of relay 2X and through the winding of relay 3M to (-). Relay 3M picks up and closes a stick circuit for itself extending from (+), front contact 93 of relay 2Y, front contact 94 and winding of relay 3M to (-).

25 A circuit is now closed for picking up relay 3X which extends from (+), front contact 95 of relay 3M, back contact 96 of relay 3Y and winding of relay 3X to (-). Front contact 97 of relay 3X bridges back contact 96 of relay 3Y so that relay 3X is maintained energized after 3Y is picked up over an obvious circuit including front contact 98 of relay 3X.

When the third train clears out of the first and second track sections the relays are restored to the positions indicated in Fig. 1 in the previously described manner. When a fourth train enters the Bridge Street station it effects the above described operations of relays 1T, 1TP, 2T and 2TP and in the event that this is a Fifth Avenue train for example, the operation of button FAB picks up relay 1C, after which relays 2C and NP are energized. A pulse is applied to FA pulse conductor 63 before the opening of back contact 19 of relay 2C in the previously described manner, which pulse extends through back contact 64 of relay 4X, front contact 65 of relay 3X and winding of relay 4F to (-).

Relay 4F is picked up and its stick circuit is closed which extends from (+), front contact 99 of relay 3Y, front contact 100 and winding of relay 4F to (-). It will of course be obvious that this stick circuit would extend through front contact 101 to the winding of relay 4M in the event that relay 4M was picked up due to the fourth train being a Myrtle Avenue train. It will also be obvious that front contacts 102 and 103 complete stick circuits for relays 2F and 3F respectively in the event that these relays are picked up in response to the second and third trains being Fifth Avenue trains instead of Myrtle Avenue trains as above assumed.

The picking up of relay 4F closes a circuit for picking up relay 4X which extends from (+), front contact 104 of relay 4F and winding of relay 4X to (-). Since there is no Y relay in the fourth (last) group there is no contact on relay 4X corresponding to contact 97 on relay 3X.

It will be obvious from an examination of Fig. 2 that either an F or an M relay of each group closes a pick-up circuit for the X relay of the corresponding group. These other pick-up circuits include front contacts 105, 106, 107 and 108 of relays 1M, 2F, 3F and 4M respectively. It will also be obvious that the closure of front contact 109 of relay 1M, in response to the storage by

relay 1M of the approaching train being a Myrtle Avenue train instead of a Fifth Avenue train, will effect the operation of the switch machine and the track switch to its normal position (in the event that switch SW is in its lower position) to route the train over the Myrtle Avenue track MAT.

Wipe out operation.—The above description points out how the identity of four succeeding trains is stored in the four groups of relays illustrated in Fig. 2, with the identity of the first train displayed on the indicator lamp in accordance with the class of this first train. It will now be explained how a displayed indication will be wiped out when the first train enters the Navy Street Station.

The entrance of the first train into the track section with which track relay 3T is associated drops this relay and closes an obvious circuit at its back contact 110 for picking up relay 3TP. Relay 3TP applies (+) at its front contact 111 to the stick circuit of relay 1X so that this relay will not be released when relay 1F is dropped as will be later explained. The opening of back contact 60 of relay 3TP de-energizes relay AGA. The closure of front contact 68 of relay 3TP applies (+) to the "set up" conductor 62 before contact 61 of relay AGA drops.

The picking up of relay 3TP and the consequent opening of its back contact 63 de-energizes the stick circuit of relay 1F so that this relay is dropped and lamp FA is de-energized at open front contact 70.

Transfer operation.—When the first train leaves the track section with which track relay 3T is associated this relay is picked up and relay 3TP is released. Energy is applied to relay AGA at back contact 60 of relay 3TP but relay AGA is slow to pick up, so that (+) potential is removed from conductor 62 for a comparatively long interval of time so that impulses from the circuits of Fig. 1 are held off until the transfer operation is completed and all relays have ceased operating. This delay is controlled by the time adjustment of relay AGA. It will of course be understood that (+) potential is disconnected from conductor 62 at back contact 81 of relay 4X as long as four indications are stored in the four groups of relays. The purpose of contacts 61 and 68 of relays AGA and 3TP, which keep (+) potential off of conductor 62, is to hold back the pulses during transfer operations when there are not four indications stored in the relay groups of Fig. 2.

The dropping of relay 3TP de-energizes relay 1X at open front contact 111 and the dropping of relay 1X de-energizes relay 1Y at open front contact 74. During the interval between the dropping of relay 1X and the dropping of relay 1Y (because relay 1Y is slow to release), the indication which is stored in the second group is transferred to the first group and since it was assumed that the second train was a Myrtle Avenue train which effected the energization of relay 2M, relay 1M is picked up over a circuit extending from (+), front contact 91 of relay 2M, back contact 92 of relay 1X and winding of relay 1M to (-). Relay 1M closes a stick circuit for itself which extends from (+), back contact 69 of relay 3TP, front contact 73 and winding of relay 1M to (-).

The energization of relay 1M closes an obvious circuit at front contact 76 for lighting lamp MA to display the indication that the next approaching train is a Myrtle Avenue train. After relay

1Y is released, a circuit is closed for again picking up relay 1X, which circuit includes front contact 105 of relay 1M and back contact 72 of relay 1Y. Relay 1X is stuck up over the previously described circuit and relay 1Y is again picked up by means of a circuit closed at front contact 74 of relay 1X. During the transfer from group 2 to group 1, relay 2M is de-energized by the dropping of relay 1Y because of open front contact 85 and relay 2X is de-energized because of open front contact 88 of relay 2M. Relay 2Y is also de-energized because of open front contact 90 of relay 2X. This completes the transfer of the indication from group 2 to group 1 and it will now be explained how the transfer is made from group 3 to group 2.

It will be recalled that relay 3M was energized because the third train was assumed to be a Myrtle Avenue train. A circuit is closed for picking up relay 2M which extends from (+), front contact 79 of relay 3M, back contact 59 of relay 2X, front contact 77 of relay 1X and winding of relay 2M to (-). Relay 2M closes a stick circuit for itself extending from (+), front contact 86 of relay 1Y, front contact 87 and winding of relay 2M to (-). After relay 2Y releases a circuit is closed for picking up relay 2X which extends from (+), front contact 88 of relay 2M, back contact 89 of relay 2Y and winding of relay 2X to (-). Relay 2X again closes the circuit at its front contact 80 for bridging back contact 89 and causes relay 2Y to be picked up by a circuit closed at its front contact 90. During the transfer from group 3 to group 2, relay 3M is de-energized by the dropping of relay 2Y because of open front contact 93 and relay 3X is de-energized because of open front contact 95 of relay 3M. Relay 3Y is also de-energized because of open front contact 98 of relay 3X. This completes the transfer from group 3 to group 2 and it will now be explained how the indications stored in group 4 are transferred to group 3.

A circuit is closed for picking up relay 3F which extends from (+), front contact 58 of relay 4F, back contact 57 of relay 3X, front contact 66 of relay 2X and winding of relay 3F to (-). Relay 3F closes an obvious stick circuit for itself at its front contact 103 to (+) at front contact 93 of relay 2Y. Relay 3F closes a circuit at its front contact 107 for energizing relay 3X and relay 3X closes a circuit at its front contact 93 for energizing relay 3Y.

During the interval when relay 3Y was de-energized, the stick circuit for relay 4F was open at front contact 99 of relay 3Y so that relay 4F is de-energized. Relay 4X is de-energized at open front contact 104 of relay 4F. This completes the transfer from group 4 to group 3. It will be understood from the above description that the clearing of the second train out of the track section illustrated in the upper right hand portion of Fig. 2 effects a similar transfer from group 2 to group 1 and from group 3 to group 2. Likewise, when the third train clears out of the Navy Street station track section, a similar transfer is made from group 2 to group 1 and when the fourth train clears this track section the circuits are placed in their normal conditions as illustrated in the drawings.

From the above description it will be apparent that Fifth Avenue trains register their successive entrance into the first track section illustrated in Fig. 1 by picking up relays 1F, 2F, etc. Relay 1F lights lamp FA to display the iden-

tity of the first train as being a Fifth Avenue train.

Likewise a plurality of Myrtle Avenue trains register their successive entrance into the first track section by picking up relays 1M, 2M, etc., and relay 1M lights lamp MA to display the identity of the first train as being a Myrtle Avenue train.

These trains may enter the first track section in any order and will register their successive entrance into the track section by picking up the associated F and M relay in accordance with the class of train entering, the particular F or M relay being picked up being governed in accordance with the number of trains already stored in the relay groups, the sequence being indicated by the numeral preceding the relay designation.

As each train enters the track section illustrated in the upper right hand portion of Fig. 2, the 1F or 1M relay is dropped to put out the associated indication lamp and as each train leaves this track section the indication stored in the higher numbered groups of relays are each transferred to the next lower group in order, where the identity is stored on the proper M or F relay in accordance with the class of the next train in order.

In the event that relay 2F is picked up because the second stored indication is for a Fifth Avenue train, then when the transfer is made relay 1F will be energized over a circuit extending through front contact 56 of relay 2F and back contact 55 of relay 1X.

In the event that relay 3F is picked up because the third stored indication is for a Fifth Avenue train, then when the transfer is made relay 2F will be energized over a circuit extending through front contact 54 of relay 3F and back contact 53 of relay 2X.

In the event that relay 4M is picked up because the fourth stored indication is for a Myrtle Avenue train, then when the transfer is made relay 3M will be energized over a circuit extending through front contact 52 of relay 4M and back contact 51 of relay 3X.

During the transfer from group 2 to group 1 it is necessary to maintain relay 2X energized as long as relay 1X remains down to prevent an improper indication transfer from group 3 to group 1. Assume for example that relay 3F in group 3 is up and relay 2M in group 2 is up. This means that relay 2M must transfer to relay 1M and relay 3F must transfer to relay 2F.

If relay 2X were permitted to release while relay 1X is down, a circuit would be completed through front contact 54 of relay 3F, back contact 53 of relay 2X and back contact 67 of relay 1X to relay 1F, which would operate relay 1F when not desired. To prevent this false operation a stick circuit for relay 2X is provided which extends from (+), front contact 50 of relay 2Y, back contact 49 of relay 1X, front contact 80 and winding of relay 2X to (-). This prevents the release of relay 2X during the transfer operations until relay 1X is picked up to switch the circuits from the 1F and 1M relays to the 2F and 2M relays. Similar stick circuits for relays 3X and 4X are provided by way of back contacts 48 and 47 of relays 2X and 3X respectively.

A stick circuit including conductor 46 is provided for relay 3TP to delay the transfer operations when a pulse is coming over conductor 63 or conductor 83. A pulse is sent over conductor 63 in response to the picking up of relay 1C and a pulse is sent over conductor 83 in response to the

picking up of relay 2TP (with relay NP down) as previously described. (+) is applied to stick conductor 46 by way of back contact 29 of relay 2C and front contact 28 of relay 1C at the time an FA pulse is being sent and by way of front contact 25 of relay 2TP, back contact 26 of relay AZR and back contact 27 of relay NP at the time an MA pulse is being sent. This sticks relay 3TP and delays the transfer operations above described, even though the track section with which relay 3TP is associated is cleared, until after the pulse has been passed to its proper F or M relay and this relay picked up and stuck up. This stick circuit for relay 3TP includes its own front contact 45.

Having thus shown and described a specific embodiment of the present invention and having specifically pointed out how the system is proposed to be used, it is desired to be understood that this should not be construed as a limitation of the scope of the invention, nor should it be construed as illustrating the exact construction to be employed in practicing the invention, but that the specific system illustrated has been selected for the purpose of disclosing the principles and one method of practicing the invention and that various changes and additions may be made to adapt the invention to particular problems encountered in practice, all without departing from the spirit thereof except as limited by the scope of the following claims.

What we claim is:—

1. In combination, a stretch of railway track, a station at the exit end of said stretch of track, a plurality of indicators at said station each representing a train of a particular class, a plurality of groups of class identifying relays each group including one relay for each class, means automatically controlled by the successive entrances of a plurality of trains of one class into said stretch of track for successively operating the relays for one class of certain of said groups, means automatically and manually controlled upon the successive entrances of another plurality of trains of another class into said stretch of track for successively operating the relays for another class of subsequent groups, whereby indications are registered on said groups of relays in accordance with the class of successive trains entering said stretch of track, means controlled only by the relays of a first group for selectively actuating said indicators in accordance with the class of the first train to enter said stretch of track, and means for transferring the train indication from a second one of said groups to said first group.

2. In combination, a stretch of railway track, a station at the exit end of said stretch of track, a plurality of routes at said station selectable by a track switch, a plurality of groups of route identifying class relays, train controlled means for successively operating the relays of one class of certain groups to register the route of each successive train of a plurality of trains of one class entering said stretch of track, conjoint train and manually controlled means for successively operating the relays of another class of each of subsequent groups to register the route of each successive train of a plurality of trains of another class entering said stretch of track, means controlled only by the relays of the first of said groups for selectively actuating said track switch in accordance with the class of the first train to enter said stretch of track, and means responsive to said first train leaving said stretch of track

for transferring the train indication from a second one of said groups to said first group.

3. In combination, a track layout comprising a plurality of routes, a first passenger station and a second passenger station along the track, two indicators at said second station each designating the approach of a train and each identifying the approaching train in accordance with the route it is to take, a first relay for controlling one of said indicators, a second relay for controlling the other of said indicators, a track relay and a manually operable device at said first station, means controlled by said track relay for operating said first relay, and means controlled by said device for operating said second relay.

4. In a switching system for railways, a track section comprising a main track and a diverging route connected to said main track by a track switch, a power operated switch machine for operating said track switch, a first storing means automatically controlled by the successive entrances of a plurality of trains into said main track for storing said entrances, a second storing means manually controlled during the successive entrance of a plurality of trains into said main track, and means including said first and said second storing means for successively and distinctively operating said track switch in accordance with the automatic and manual control of corresponding entrances into said main track.

5. A train describer system, comprising a plurality of indicators each active indicator displaying an indication identifying the class of an approaching train, a plurality of indicator relays for each of said indicators, means controlled by the actuation of a first relay of each plurality for causing the associated indicator to display its indication, means including track circuit controlled means for applying a plurality of impulses to said indicator relays, means responsive to said impulses for actuating a plurality of said indicator relays including one of said first relays whereby a plurality of indications are stored, means for cancelling a displayed indication, and means for automatically transposing each stored indication to the next lower order indicator relay when said displayed indication is cancelled.

6. In combination, a stretch of railway track divided into a plurality of successive sections traversed by trains of different classes, a plurality of train class indicators, a separate track relay for each of some of said sections, a manually operable key for one of said sections, a first class circuit and a second class circuit corresponding to trains of a first class and a second class respectively, means for momentarily energizing said first class circuit only when a first one of said track relays is activated and said key is actuated, means for momentarily energizing said second class circuit only when a second one of said track relays is activated and said key is not actuated, a plurality of first class storage relays, a plurality of second class storage relays, means responsive to the momentary energization of said first class circuit for activating one of said first class storage relays, means responsive to the momentary energization of said second class circuit for activating one of said second class storage relays, and means controlled by the activation of said first and said second class storage relays for selectively actuating said train class indicators.

7. In a signaling system; a first and a second indicator each adapted when operated to register a selected one of a plurality of indications and

to store such indication until released; manually operable electro-responsive control means effective through a front contact thereof and only when there is no indication stored in said second indicator for operating said indicator to store a selected indication therein; means rendered effective upon the operation of said second indicator for rendering it non-responsive to said control means; means effective if there is no indication stored in said first indicator to transfer the stored indication of the second indicator thereto and to then release said second indicator; means requiring said electroresponsive control means to be released for, through the medium of a back contact thereof, rendering said second indicator again responsive to the operation of said control means; and means for releasing said first indicator.

8. In combination with a railway track switch, a power switch machine for operating the switch, a series of indicators each comprising relay means adapted to be energized in a particular arrangement for each position of the track switch, manually operable means for energizing in turn said indicators of the series to register controls for the track switch, transfer means associated with each indicator, except the last of the series, and responsive to the release of such indicator to automatically energize it in accordance with the condition of energization of the next succeeding indicator of the series and for then releasing such succeeding indicator, means for controlling the switch machine in accordance with the condition of the first indicator of the series; and means responsive to the movement of a train over the switch for releasing said first indicator.

9. In combination, a detector section of railway track including a track switch, a power switch machine for operating the switch, a series of indicators each comprising relay means adapted to be energized in a particular arrangement for each position of the track switch, manually operable means for energizing the indicators of the series in turn to register controls for the track switch, transfer means associated with each indicator except the last of the series, and responsive to the release of such indicator to automatically energize it in accordance with the condition of energization of the next succeeding indicator of the series and to then release such succeeding indicator, means releasing the first indicator when the detector section is occupied, and means effective each time the detector section becomes vacated for operating said switch machine in accordance with the next control registered by said first indicator.

10. In combination with a stretch of railway track, a track circuit at one end of the stretch having a track relay, a track switch at the other end of stretch, a route indicator adjacent the switch for indicating the routes to be taken by trains which have passed over said track circuit and are approaching the switch, a manually controllable contact, a stick relay, a pick-up circuit for said stick relay closed only if said manually controllable contact is closed and said track relay is deenergized, means controlled by the stick relay when energized to maintain it energized as long as the track relay remains deenergized irrespective of further operation of said manually operable contact, means controlled by said stick relay when deenergized to prepare a circuit for controlling said route indicator, and means effective when said stick relay becomes energized to control said route indicator over the circuit which

was prepared when said stick relay was deenergized, whereby only temporarily manual actuation is necessary and whereby said route indicator can be controlled only once for each train passing over said track circuit.

11. In a train describer and switch control system; the combination with a plurality of relay groups, each group, except the last, including a normally deenergized transfer relay and each group including a plurality of normally deenergized storage relays; the storage relays by their condition of energization manifesting the description of a train destination; a contact on each transfer relay for each storage relay in its associated group, which contact when in its retracted condition is included in a pick-up circuit for a storage relay of that group and when in its attracted condition is included in the pick-up circuit for a corresponding storage relay of the group next in the rear; a track switch associated with the first of said relay groups; a switch machine for operating said track switch; circuits for controlling said switch machine including contacts of the storage relays of said first group; a detector track circuit including a track relay associated with said track switch; cancelling means including said track relay for cancelling the train description stored in said first group upon occupancy of said track circuit; and means including said track relay and the transfer relay of said first group for transferring the train description stored in a second group into said first group.

12. In a train describer and switch control system; the combination with a plurality of relay groups, each group, except the last, including a normal deenergized transfer relay and each group including a plurality of normally deenergized storage relays; the storage relays by their condition of energization manifesting the description of a train destination; a contact on each transfer relay for each storage relay in its associated group, which contact when in its retracted condition is included in a pick-up circuit for a storage relay of that group and when in its attracted condition is included in the pick-up circuit for a corresponding storage relay of the group next in the rear; a track switch associated with the first of said relay groups; a switch machine for operating said track switch; circuits for controlling said switch machine including contacts of the storage relays of said first group; a detector track circuit including a track relay associated with said track switch; cancelling means including said track relay for cancelling the train description stored in said first group upon occupancy of said track circuit; and means including said track relay and the transfer relay of said first group for transferring the train description stored in a second group into said first group, said cancelling means being constructed to prevent operation of said track switch while said detector track circuit is occupied.

13. In an automatic track switch control system; the combination with a plurality of relay groups, each group, except the last, including a normal deenergized transfer relay and each group including a plurality of normally deenergized storage relays; the storage relays by their condition of energization manifesting the description of a train destination; a pick-up circuit for each transfer relay including in multiple front contacts of its associated storage relays; a stick circuit for each transfer relay except the first including a back contact of the next transfer relay

in advance; a contact on each transfer relay for each storage relay in its associated group, which contact when in its retracted condition is included in a pick-up circuit for a storage relay of that group and when in its attracted condition is included in the pick-up circuit for a corresponding storage relay of the group next in the rear; a track switch associated with the first of said relay groups; a switch machine for operating said track switch; circuits for controlling said switch machine including contacts of the storage relays of said first group; a detector track circuit including a track relay associated with said track switch; cancelling means including said track relay for cancelling the train description stored in said first group upon occupancy of said track circuit; and means including said track relay and the transfer relay of said first group for transferring the train description stored in a second group into said first group.

14. In a train describer system; the combination with a plurality of train describer units each unit including a transfer relay and a plurality of normally deenergized storage relays; a pick-up circuit for each storage relay except the storage relays of the first unit including a normally closed contact controlled by its associated transfer relay, normally closed contacts controlled by the transfer relays of the units in the rear and also including a normally opened contact controlled by the transfer relay of the unit in advance; a stick circuit for each storage relay except the storage relays of the first unit including a normally open contact controlled by the transfer relay of the unit next in advance; a pick-up circuit for each transfer relay including in multiple front contacts of the storage relays of its unit; a stick circuit for each transfer relay except the transfer relay of the first unit including a normally closed contact controlled by the transfer relay of the unit next in advance; and stick circuits for the storage relays of the first unit including a normally closed track circuit controlled contact.

15. In a train describer system; the combination with a plurality of train describer units each unit including a transfer relay and a plurality of normally deenergized storage relays; a pick-up circuit for each storage relay except the storage relays of the first unit including a normally closed contact controlled by its associated transfer relay, normally closed contacts controlled by the transfer relays of the units in the rear and also including a normally open contact controlled by the transfer relay of the unit in advance; a stick circuit for each storage relay except the storage relays of the first unit including a normally open contact controlled by the transfer relay of the unit next in advance; a pick-up circuit for each transfer relay including in multiple front contacts of the storage relays of its unit; a stick circuit for each transfer relay except the transfer relay of the first unit including a normally closed contact controlled by the transfer relay of the unit next in advance; stick circuits for the storage relays of the first unit including a normally closed track circuit controlled contact; and a stick circuit for the transfer relay of the first unit including a track circuit controlled contact.

16. In a train describer system; the combination with a plurality of train describer units each unit including a transfer relay, a transfer repeater relay and a normally deenergized storage relay; a circuit for each transfer repeater relay including a front contact of its associated trans-

fer relay; a pick-up circuit for each storage relay except the storage relay of the first unit including a normally closed contact of its associated transfer relay and a normally open contact controlled by the transfer relay of the unit in advance; a stick circuit for each storage relay except the storage relays of the first unit including a normally open contact of the repeater transfer relay of the unit next in advance; and an energizing circuit for each transfer relay including a front contact of its associated storage relay.

17. In a train describer system; the combination with a plurality of train describer units each unit including a transfer relay, a transfer repeater relay and a normally deenergized storage relay; a circuit for each transfer repeater relay including a front contact of its associated transfer relay; a pick-up circuit for each storage relay except the storage relay of the first unit including a normally closed contact of its associated transfer relay and a normally open contact controlled by the transfer relay of the unit in advance; a stick circuit for each storage relay except the storage relays of the first unit including a normally open contact of the repeater transfer relay of the unit next in advance; and a circuit for each transfer relay except the transfer relay of the first unit including a back contact of the transfer relay of the unit next in advance and a front contact of its associated transfer repeater relay.

18. In a train describer system; the combination with a plurality of train describer units each unit including a transfer relay, a transfer repeater relay and a normally deenergized storage relay; a circuit for each transfer repeater relay including a front contact of its associated transfer relay; a pick-up circuit for each storage relay except the storage relay of the first unit including a normally closed contact of its associated transfer relay and a normally open contact controlled by the transfer relay of the unit next in advance; a stick circuit for each storage relay except the storage relays of the first unit including a normally open contact of the repeater transfer relay of the unit next in advance; a pick-up circuit for each transfer relay including a front contact of its associated storage relay; and a stick circuit for each transfer relay except the transfer relay of the first unit including a back contact of the transfer relay of the unit next in advance and a front contact of its associated transfer repeater relay.

19. In a train describer system; the combination with a plurality of train describer units each including a plurality of normally deenergized storage relays and a normally deenergized transfer relay, which storage relays by their condition of energization define the class of a particular train; a first pick-up circuit for each storage relay except the storage relays of the first unit including a front contact of the transfer relay of the unit in advance and the back contact of the transfer relays of one or more units in the rear all included in series; a second pick-up circuit for each storage relay including in series a back contact of its associated transfer relay and a front contact of the corresponding storage relay of the unit next in the rear; and a stick circuit for each storage relay except the storage relays of the first unit including a contact closed when the transfer relay of the unit in advance is energized; an energizing circuit for each transfer relay including in multiple front contacts of the storage relays of the same unit;

whereby the first unit having no storage relay energized to the rear of a unit having a storage relay energized is connected to receive a train description through back contacts in series of transfer relays of the units in the rear and whereby if a particular describer unit is vacated by having its storage relays deenergized the associated transfer relay will assume a deenergized condition and will allow closure of said second pick-up circuit for that storage relay of the particular unit having a corresponding storage relay energized in the unit next in the rear of such particular unit.

20. In a train describer system; the combination with a plurality of train describer units each including a plurality of normally deenergized storage relays and a normally deenergized transfer relay, which storage relays by their condition of energization define the class of a particular train; a first pick-up circuit for each storage relay except the storage relays of the first unit including a front contact of the transfer relay of the unit in advance and the back contact of the transfer relay of one or more units in the rear all included in series; a second pick-up circuit for each storage relay including in series a back contact of its associated transfer relay a front contact of the transfer relay of the unit next in advance and a front contact of the corresponding storage relay of the unit next in the rear; and a stick circuit for each storage relay except the storage relays of the first unit including a contact closed when the transfer relay of the unit in advance is energized; an energizing circuit for each transfer relay including in multiple front contacts of the storage relays of the same unit; whereby the first unit having no storage relay energized to the rear of a unit having a storage relay energized is connected to receive a train description through back contacts in series of transfer relays of the units in the rear and whereby if a particular describer unit is vacated by having its storage relay deenergized the associated transfer relay will assume a deenergized condition and will upon closure of the front contact of the transfer relay of the unit next in advance allow closure of said second pick-up circuit for that storage relay of the particular unit having a corresponding storage relay energized in the unit next in the rear of such particular unit.

21. In a train describer system; the combination with a plurality of train describer units each including a plurality of normally deenergized storage relays and a normally deenergized transfer relay, which storage relays by their condition of energization define the class of a particular train; a first pick-up circuit for each storage relay except the storage relays of the first unit including a front contact of the transfer relay of the unit in advance and the back contact of the transfer relay of one or more units in the rear all included in series; a second pick-up circuit for

each storage relay including in series a back contact of its associated transfer relay and a front contact of the corresponding storage relay of the unit next in the rear; and a stick circuit for each storage relay except the storage relays of the first unit including a contact closed when the transfer relay of the unit in advance is energized; an energizing circuit for each transfer relay including in multiple front contacts of the storage relays of the same unit; whereby the first unit having no storage relay energized to the rear of a unit having a storage relay energized is connected to receive a train description through back contacts in series of transfer relays of the units in the rear and whereby if a particular describer unit is vacated by having its storage relay deenergized the associated transfer relay will assume a deenergized condition and will allow closure of said second pick-up circuit for that storage relay of the particular unit having a corresponding storage relay energized in the unit next in the rear of such particular unit; and a stick circuit for the storage relays of the first unit including a track circuit controlled contact.

22. In a train describer system; the combination with a plurality of train describer units each including a plurality of normally deenergized storage relays and a normally deenergized transfer relay, which storage relays by their condition of energization define the class of a particular train; a first pick-up circuit for each storage relay except the storage relays of the first unit including a front contact of the transfer relay of the unit in advance and the back contact of the transfer relays of one or more units in the rear all included in series; a second pick-up circuit for each storage relay including in series a back contact of its associated transfer relay and a front contact of the corresponding storage relay of the unit next in the rear; and a stick circuit for each storage relay except the storage relays of the first unit including a contact closed when the transfer relay of the unit in advance is energized; an energizing circuit for each transfer relay including in multiple front contacts of the storage relays of the same unit; whereby the first unit having no storage relay energized to the rear of a unit having a storage relay energized is connected to receive a train description through back contacts in series of transfer relays of the units in the rear and whereby if a particular describer unit is vacated by having its storage relay de-energized the associated transfer relay will assume a deenergized condition and will allow closure of said second pick-up circuit for that storage relay of the particular unit having a corresponding storage relay energized in the unit next in the rear of such particular unit; and a track switch controlled by, and in accordance with, the train description stored in the storage relays of the first unit.

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