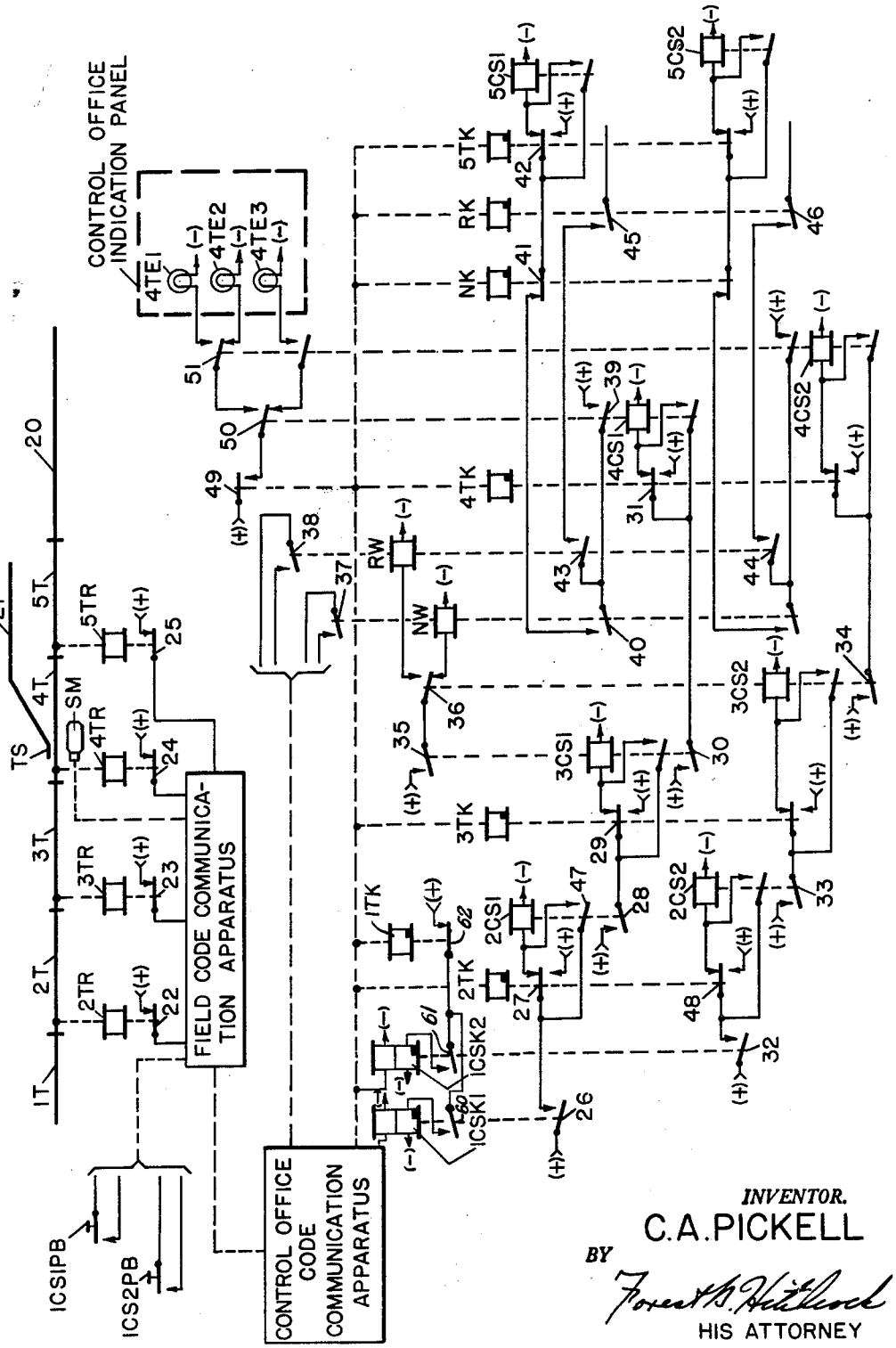
April 7, 1964 C. A. PICKELL 3,128,069

TRAIN DESCRIBER SYSTEM

Filed Nov. 9, 1959



INVENTOR.

C. A. PICKELL

BY Forrest B. Hitchcock

HIS ATTORNEY

United States Patent Office 3,128,069 Patented Apr. 7, 1964

3,128,069

TRAIN DESCRIBER SYSTEM

Clark A. Pickell, Rochester, N.Y., assignor to General Signal Corporation

Filed Nov. 9, 1959, Ser. No. 851,820
6 Claims. (Cl. 246—2)

This invention relates to train describer systems for railroads, and it more particularly pertains to systems for indicating at a remote control office the description and location of trains as they progress along a stretch of railway track.

In most train describer systems it is necessary to provide a plurality of banks of code storage relays for storing train descriptions, along with a pair of transfer relays for each bank for advancing the descriptions from storage to storage comparable to the passage of a train.

The system provided by the present invention provides a plurality of storage relay banks for storing train descriptions, but it is unnecessary to provide transfer relays for transferring from storage to storage as a train progresses. One bank of storage relays is provided for each track section of a stretch of railway track. The storage of a train description is propagated through storage relay banks for track sections ahead of a train so far as the track sections are unoccupied by a preceding train, but the identity of the train for which the storage is provided is indicated on a control panel only for storage relay banks associated with occupied track sections. Thus the location and the identity of each train is readily indicated on a control panel with a minimum amount of control apparatus required. The indication on a control panel is maintained effective only so long as the associated track section is occupied by a train.

An object of the present invention is to provide a train describer system wherein storage units are provided for several track sections of a stretch of railway track, and train description storages are set up successively in these storage units for successive unoccupied track sections in advance of a train.

Another object of the present invention is to control the storage relays associated with each track section so as to permit the picking up of these storage relays when the associated track section is unoccupied and to maintain these storage relays in their energized conditions dependent upon occupancy of the associated track section.

Other objects, purposes and characteristic features of the present invention will be in part obvious from the accompanying drawings, and in part pointed out as the description of the invention progresses.

In describing the invention in detail, reference is made to the accompanying drawing illustrating in a conventional schematic manner one embodiment of the present invention as applied to a specific stretch of railway track. The circuits illustrated in the drawings have been arranged to facilitate the disclosure of the present invention as to its mode of operation, rather than to illustrate the specific construction and arrangement of parts that would be employed in practice. The symbols (+) and (—) have been used to indicate connections to the positive and negative terminals respectively of suitable batteries or other sources of direct current.

This embodiment of the present invention is illustrated as being applied to a stretch of track 20 having traffic from left to right for eastbound trains, and having associated therewith a track switch TS provided with a power switch machine SM for governing the passage of traffic to a track 21. The stretch of track 20 is divided into conventional adjoining track sections 1T, 2T, 3T, 4T and 5T, the track section 4T being a detector track section including the track switch TS. Conventional normally energized track relays TR are provided in suitable track circuits for the several track sections.

A code communication system is illustrated as being provided for the communication of indications of track occupancy and of the description of trains entering the stretch of track from the field to the control office, and for the communication of controls for track switches and the like from the control office to the field.

The control office has several banks of train description storage relays CS, one bank (including relays CS1 and CS2) being provided for each of the track sections 2T, 3T, 4T and 5T of the stretch of track. A track indication relay TK is provided at the control office for each of the track sections, and it is to be understood that this relay is controlled in accordance with the condition of the track relay TR in the field for the associated track section via the Code Communication Apparatus.

Relays NW and RW are provided at the control office for selecting switch control codes for transmission to the field for the control of the track switch TS, and normal and reverse switch indication relays NK and RK of the magnetic stick type are provided at the control office for indicating the position of the track switch TS. The relays NK and RK are actuated in accordance with indications transmitted via the Code Communication Apparatus from the track switch to the control office.

Magnetic stick initial storage relays 1CSK1 and 1CSK2 are provided at the control office for setting up a storage initially in accordance with the description of a train about to enter the stretch of track 20, these relays being conditioned in accordance with the actuation of suitable train description designating means as is indicated by the push buttons 1CS1PB and 1CS2PB. Although the circuits are not illustrated for the control of the relays 1CSK1 and 1CSK2, it is to be understood that these relays are actuated to set up a description in response to a train description communicated from the field via the Code Communication Apparatus, for example, and it is also to be understood that these relays are controlled so as to be actuated to their dropped away positions after their descriptions have been registered by the relays 2CS1 and 2CS2 for the first storage for the embodiment of the invention that is illustrated.

Indicator lamps 4TE1, 4TE2 and 4TE3 are provided on a suitable indication panel for indicating the descriptions of trains occupying the track section 4T. These lamps and their control circuits are to be considered as typical of the lamps and control circuits that are provided for each of the other track sections in accordance with the requirements of practice.

Operation

Under normal conditions, with no trains present in the track layout, the track relays 2TR, 3TR, 4TR and 5TR are all in their picked up positions as is illustrated in the drawings, and in accordance with the closure of front contacts 22, 23, 24 and 25 of these relays respectively, indication codes are communicated via the Code Communication Apparatus to the control office to cause the actuation of the corresponding magnet stick track indication relays 2TK, 3TK, 4TK and 5TK to their picked up positions. The switch indication relay NK is also in its picked up position at the control office in accordance with the normal position of the track switch TS. The switch control relays NW and RW are in their deenergized positions because neither normal or reverse controls are designated by a train description.

When a train enters the stretch of track, the description of the train is registered, as by a station master, for example, at some point along the trackway by the selective actuation of the push button 1CS1PB and 1CS2PB. Thus if a train of one particular identity is to be designated as

entering the track section 1T, the push buttons 1CS1PB and 1CS2PB may both be actuated, for example, and in accordance therewith the corresponding magnetic stick indication relays 1CSK1 and 1CSK2 at the control office are both actuated to their picked up positions via the Code Communication Apparatus to register at the control office the identity of a train about to enter the stretch of track. It will be readily apparent that other means may be provided for setting up the initial train identity, and that the relays 1CSK1 and 1CSK2 could as well be actuated by manual designating means at the control office, if the operator is informed as to what train description to set up initially for a train entering the stretch of track. The relays 1CSK1 and 1CSK2 are maintained picked up because of their magnetic stick characteristics until the track indication relay 1TK for the first track section in the stretch of track becomes picked up to indicate that the track section 1T has become unoccupied. Relays 1CSK1 and 1CSK2 are knocked down by momentary energization through their front contacts 60 and 61 respectively and front contact 62 of indication relay 1TK when relay 1TK is restored to its picked up position in accordance with the track section 1T becoming vacated in the rear of the train.

Upon picking up of relay 1CSK1, relay 2CS1 becomes picked up by the energization of a circuit extending from (+) including front contact 26 of relay 1CSK1, front contact 27 of relay 2TK and winding of relay 2CS1, to (−).

In response to the picking up of relay 2CS1, relay 3CS1 becomes picked up by the energization of a circuit extending from (+) including front contact 28 of relay 2CS1, front contact 29 of relay 3TK and winding of relay 3CS1, to (−). The picking up of relay 3CS1 causes the picking up of relay 4CS1 by the energization of a circuit extending from (+) including front contact 30 of relay 3CS1, front contact 31 of relay 4TK and winding of relay 4CS1, to (−).

Similarly, in accordance with the relay 1CSK2 being picked up in registering the description initially at the control office, the closure of its front contact 32 causes the picking up of relay 2CS2, and the picking up of relay 2CS2 in turn closes its front contact 33 to cause the picking up of relay 3CS2. Relay 3CS2 upon closing its front contact 34 causes the picking up of relay 4CS2.

The description stored by the conditions of the storage relays 3CS1 and 3CS2 determines the position to which the track switch TS is to be operated in accordance with the train description thus stored. In other words, a train description requiring the energization of both of these relays is assumed to be a description for a train which is to be routed over the track switch TS in its reverse position to track 21, while the energization of only the relay 3CS1 in the storage is indicative of a train description requiring the track switch TS to be actuated to its normal position. Thus the relay NW can be picked up through front contact 35 of relay 3CS1 and back contact 36 of relay 3CS2 for selecting a control through front contact 37 of relay NW for transmission via the Code Communication Apparatus for the actuation of the track switch TS by the switch machine SM. It will be readily apparent that if the relay 3CS2 is picked up as well as relay 3CS1, the relay RW is picked up rather than the relay NW, and the closure of its contact 38 is effective to cause the operation of the track switch TS to its reverse position. The switch indication relays NK and RK are selectively actuated in accordance with the position to which the track switch TS has last been actuated.

After the track switch TS has been positioned in accordance with the train description stored by the storage relays 3CS1 and 3CS2, the description is transferred to the storage for the next unoccupied track section as selected by the position of the track switch TS. Thus, if the track switch TS is operated to its normal position, for example, and the relay 4CS1 is in its picked up position because of the train description stored for the approaching train, the relay 5CS1 becomes picked up by the energization of a circuit extending from (+) including front contact 39 of relay 4CS1, front contact 40 of relay NW, front contact 41 of relay NK, front contact 42 of relay 5TK and winding of relay 5CS1, to (−). If the relay 4CS2 is also in its picked up position because of the description stored by the relays 4CS1 and 4CS2, the relay 5CS2 becomes picked up by the energization of a circuit similar to that which has been described for the relay 5CS1. The relays 5CS1 and 5CS2, when selectively energized, provide storages which can be transferred to provide control for the next track switch (not shown) and for the control of other indicators (not shown).

If the track switch TS has been operated to its reverse position in accordance with the train description, the storages are selected by front contacts 43 and 44 of relay RW and front contacts 45 and 46 of relay RK to extend the storages (not shown) associated with various track sections of the track 21.

It will thus be readily apparent that the system provides for the actuation of track switches automatically ahead of a train to establish a route for the train in accordance with its description that is propagated from storage to storage along the trackway over the selected route.

When a train enters the track section 2T, for example, in its progress through the stretch of track illustrated, the dropping away of relay 2TR transmits an indication to the control office to cause the dropping away of the track indication relay 2TK. The dropping away of relay 2TK opens the pick up circuit that has been described for the relay 2CS1 at front contact 27 and closes a stick circuit for this relay through back contact 27 and through front contact 47 of relay 2CS1 to maintain the storage relay 2CS1 energized as long as the track section 2T is maintained occupied. Relay 2CS1 is sufficiently slow to drop away so that it is not dropped away during the crossover time of contact 27. Similarly, if the storage relay 2CS2 has been picked up for the particular train description of the train, this relay is similarly maintained energized by its stick circuit, and its pick up circuit is opened by the dropping away of relay 2TK.

As the train progresses further so as to occupy the track section 3T, the dropping away of the indication relay 3TK provides stick circuits for the relays 3CS1 and 3CS2 and opens the pick up circuits for these relays. As the train progresses further from track section to track section, a similar mode of operation is effective in opening the pick up circuits for the storage relays associated with the occupied track sections and establishes stick circuits for these storage relays.

As has heretofore been pointed out, the relays 1CSK1 and 1CSK2 are restored to their normal positions after having initially registered the identity of a train and thus when the track section 2T becomes unoccupied in the rear of the train, the storages established by the relays 2CS1 and 2CS2 are cancelled, and these relays are conditioned by the reclosure of front contacts 27 and 48 of relay 2TK so that they can be conditioned in accordance with a new train description to be received by the relays 1CSK1 and 1CSK2. In a similar manner, the restoration of the track relays 3TR, 4TR and 5TR to their picked up positions after passage of a train causes the cancellation of storages established as associated with these track sections respectively, thus restoring the system to normal and to a condition prepared to be conditioned in accordance with the description of the next following train.

From the mode of operation which has been described, it will be readily apparent that for two trains following in close succession, the description of the second train can be propagated through the storages only to the storage for the track section in the rear of the track section occupied by a first train. The storages of the description for the second train cannot govern the storage for the track section occupied by the first train because of the pick up circuits for such storage being opened by front contacts of the track indication relay TK for the associated

track section. It will be readily apparent that as a first train progresses, the storages for track sections in the rear of the train are immediately changed to receive the description for the second train and thus the descriptions are progressed as the two trains progress through the stretch of track.

Indication can be provided on a control panel indicative of the description of each train which occupies the respective track sections as is illustrated, for example, with respect to the indications shown for the track section 4T. It is illustrated that upon the occupancy of the track section 4T, the dropping away of the relay 4TK at the control office is effective to cause the display of an indication indicative of the description of the train occupying that track section. Thus, for example, if relays 4CS1 and 4CS2 are both picked up in accordance with a train description, the indicator lamp 4TE1 becomes energized to indicate the description of the train occupying that track section. The circuit for energization of lamp 4TE1 extends from (+) including back contact 49 of relay 4TK, front contact 50 of relay 4CS1 and front contact 51 of relay 4CS2.

It is to be understood that additional capacity for storage of train descriptions can be provided by providing a greater number of storage relays CS for the respective storages, and that other means may be used for the display of indications indicative of the descriptions of the trains in accordance with the requirements of practice.

Having thus described a train describer system as applied to describing trains passing through a particular typical track layout, it is to be understood that the invention is readily applicable to other forms of track layouts and conditions of switch and signal control to be encountered in practice of the invention, and that various adaptations, alterations and modifications may be applied to the specific form shown, within the scope of the appending claims.

What I claim is:

1. A train describer system for indicating at a remote control office identity and location of a train as it progresses from track section to track section in a stretch of track divided into a plurality of adjoining track sections comprising, a bank of description storage relays for each of the track sections, there being a storage relay for each character of a multiple element train description code, circuit means for selectively picking up said storage relays in correspondence with the condition of energization of corresponding relays provided for an adjoining track section, said circuit means being rendered effective to pick up said storage relays only provided the associated track section is unoccupied by a train, stick circuit means for maintaining said storage relays picked up provided that the associated track section is occupied, and means for indicating at the control office the descriptions of trains occupying the various track sections in accordance with the condition of said storage relays.

2. A train describer system according to claim 1 wherein means is provided for operating a track switch in response to the actuation of said storage means associated with a track section in advance of the track switch.

3. A train describer system according to claim 1 wherein the selective actuation of said storage relays for the several track sections in accordance with a train description is rendered effective successively for track sections ahead of a train to an extent limited by occupancy of a track section by a preceding train.

4. A train describer system according to claim 3 wherein selection is made by the positioning of a track switch as to a series of successive track sections corresponding to an established route to have train describer storages distinctively conditioned in accordance with the identity of an approaching train.

5. A train describer system for indicating at a remote control office the identity of trains occupying different track sections of a stretch of railway track comprising, train describer storage means at the control office for each of the track sections responsive to the condition of the storage means for the next adjoining track section, and means including track circuits for the respective track sections for permitting the response of said storage means for each track section to the condition of the storage means for the next adjoining track section only provided that the associated track section is unoccupied by a train, whereby train description for the storages associated with several track sections are contemporaneously established for the same train provided that such track sections are unoccupied.

6. A train describer system according to claim 5 wherein indication means is provided at the control office for at least one of the several track sections for registering the description stored in the storage means for the associated track section, said indicating means being rendered effective only provided that said associated track section is occupied by a train.

References Cited in the file of this patent

UNITED STATES PATENTS

1,830,820	Young	Nov. 10, 1931
2,194,352	Brixner et al.	Mar. 19, 1940