June 30, 1936. N. C. L. BROWN 2,045,695

CONTROL SYSTEM FOR CLASSIFICATION YARDS

Filed July 31, 1931 5 Sheets-Sheet 1

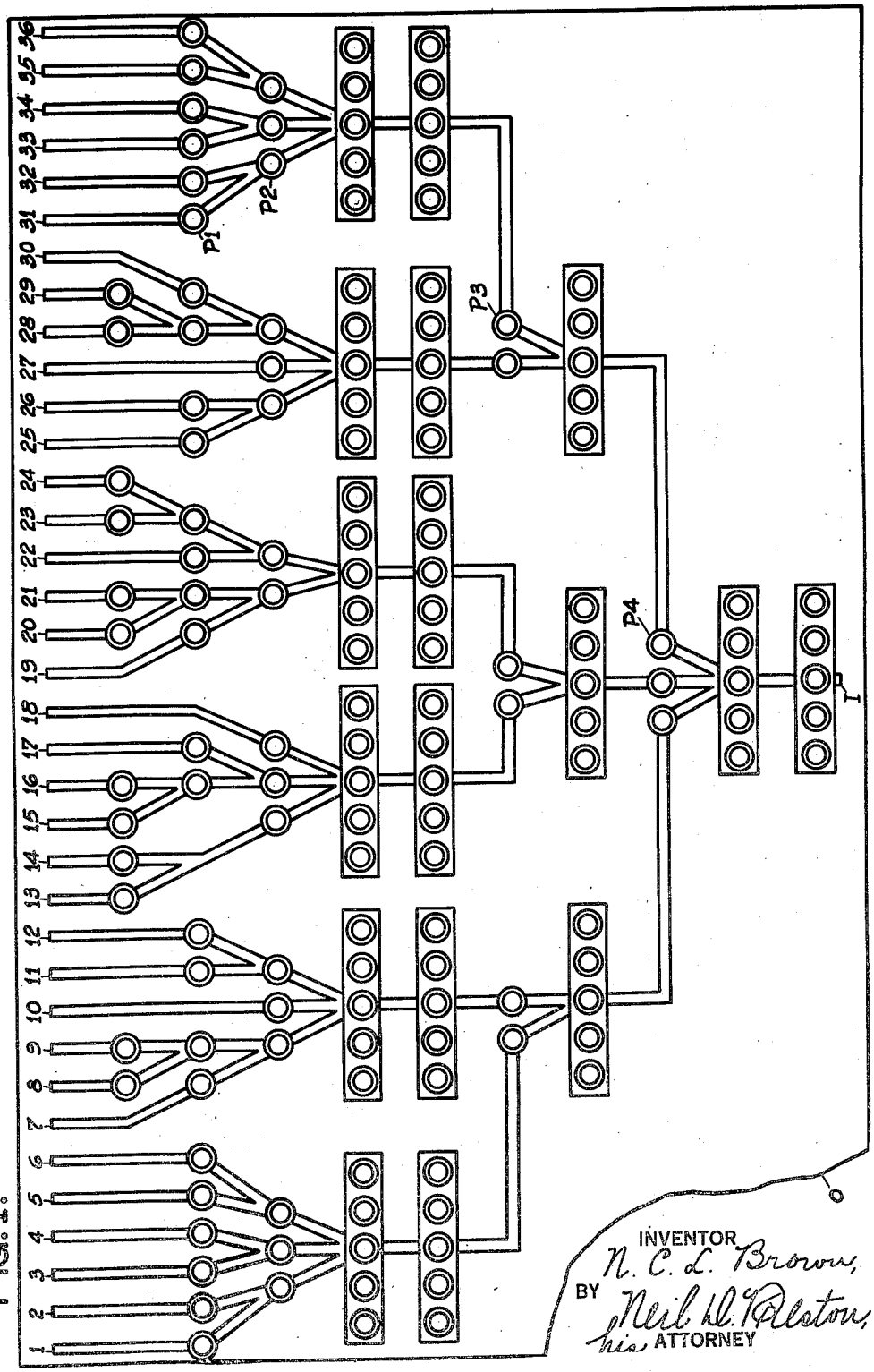


Fig. 1.

INVENTOR
N. C. L. Brown,
BY
Neil W. Alston,
his ATTORNEY

June 30, 1936. N. C. L. BROWN 2,045,695

CONTROL SYSTEM FOR CLASSIFICATION YARDS

Filed July 31, 1931 5 Sheets-Sheet 2

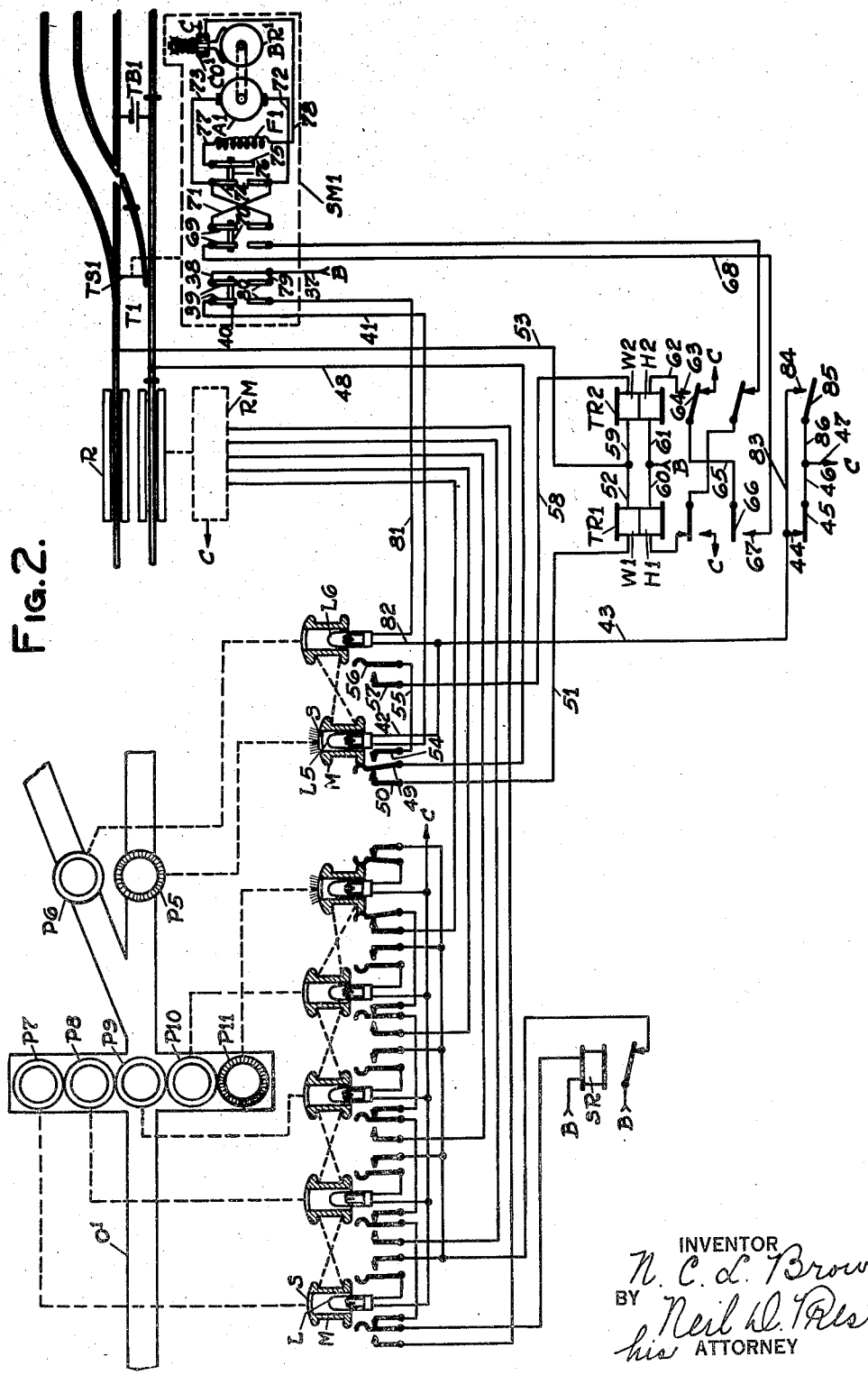


FIG. 2.

INVENTOR
N. C. L. Brown,
BY Neil W. Preston,
his ATTORNEY

June 30, 1936. N. C. L. BROWN 2,045,695

CONTROL SYSTEM FOR CLASSIFICATION YARDS

Filed July 31, 1931 5 Sheets-Sheet 3

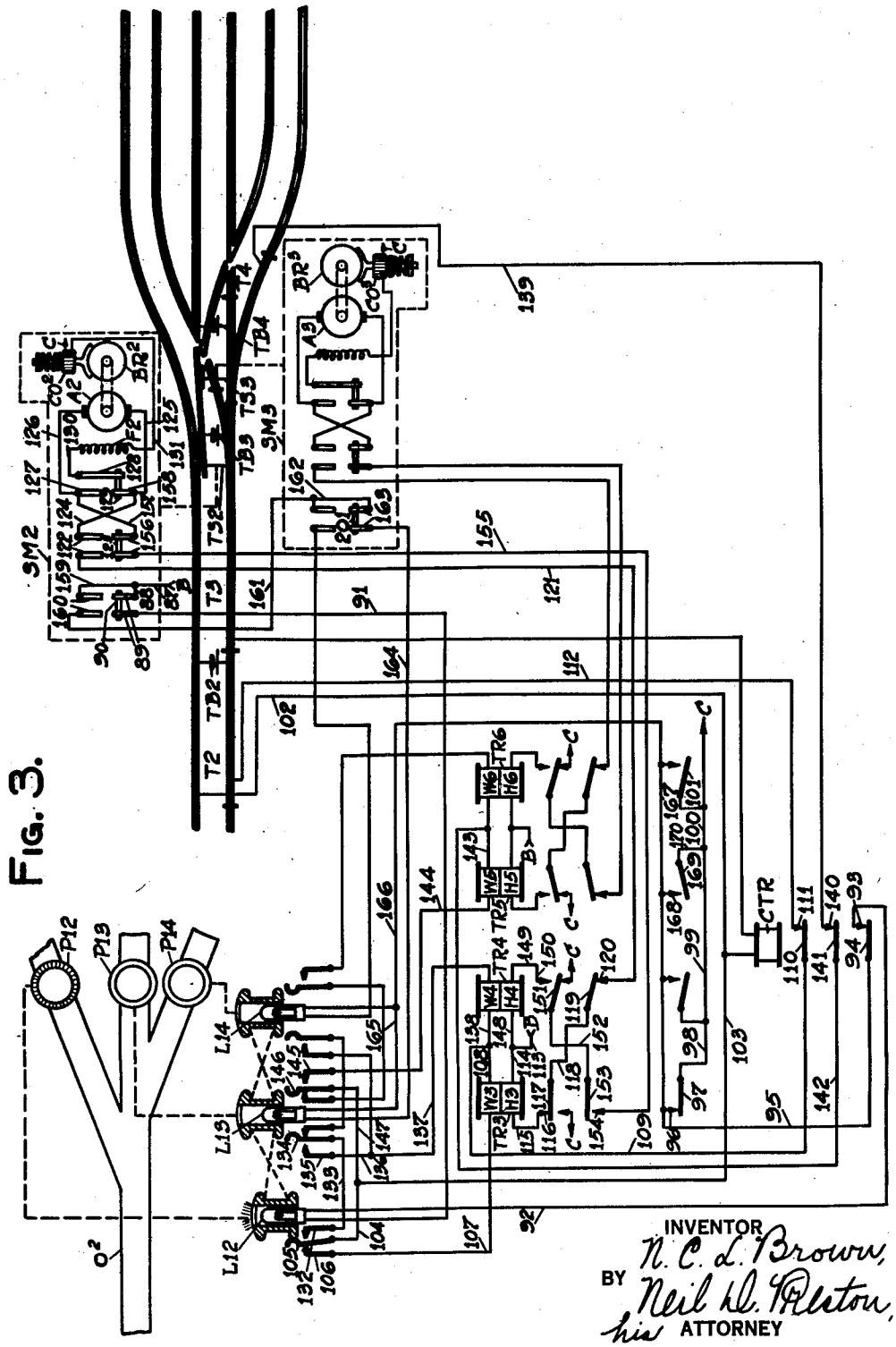


FIG. 3.

INVENTOR
N. C. L. Brown,
BY Neil W. Preston,
his ATTORNEY

June 30, 1936. N. C. L. BROWN 2,045,695

CONTROL SYSTEM FOR CLASSIFICATION YARDS

Filed July 31, 1931 5 Sheets-Sheet 4

FIG. 5.

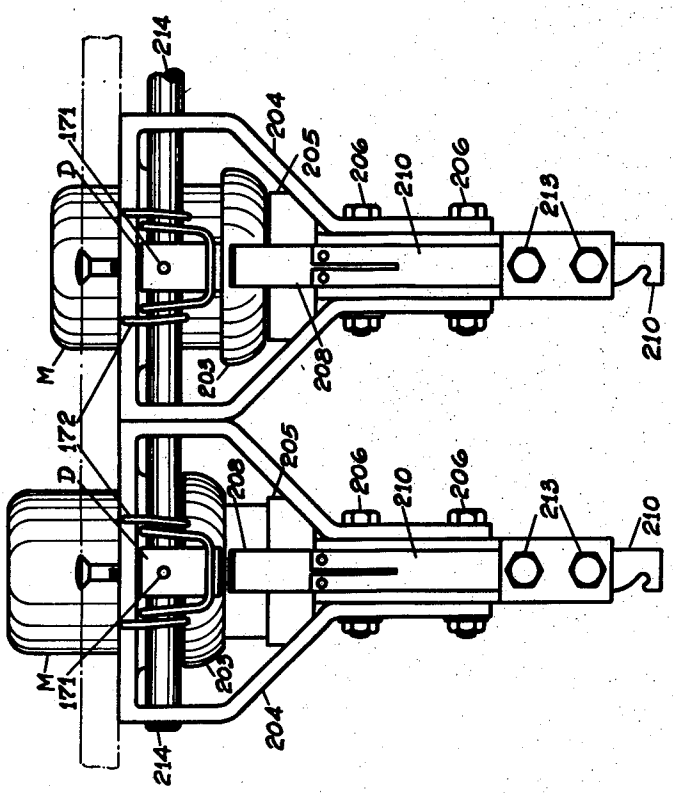
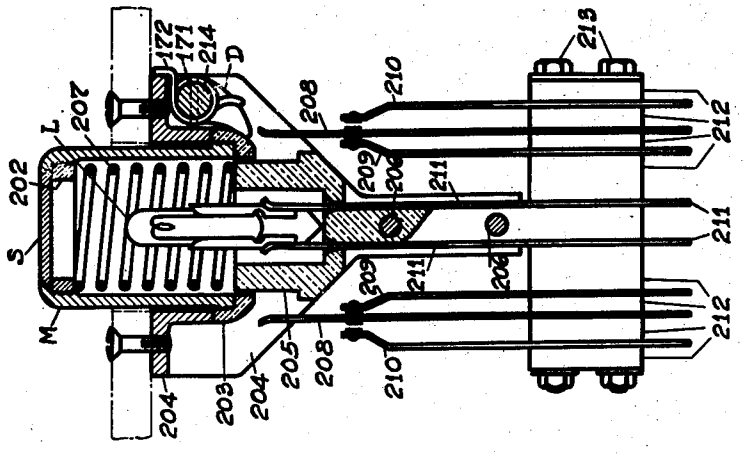


FIG. 4.



INVENTOR
N. C. L. Brown,
BY
Neil H. Preston,
his ATTORNEY

June 30, 1936. N. C. L. BROWN 2,045,695

CONTROL SYSTEM FOR CLASSIFICATION YARDS

Filed July 31, 1931 5 Sheets-Sheet 5

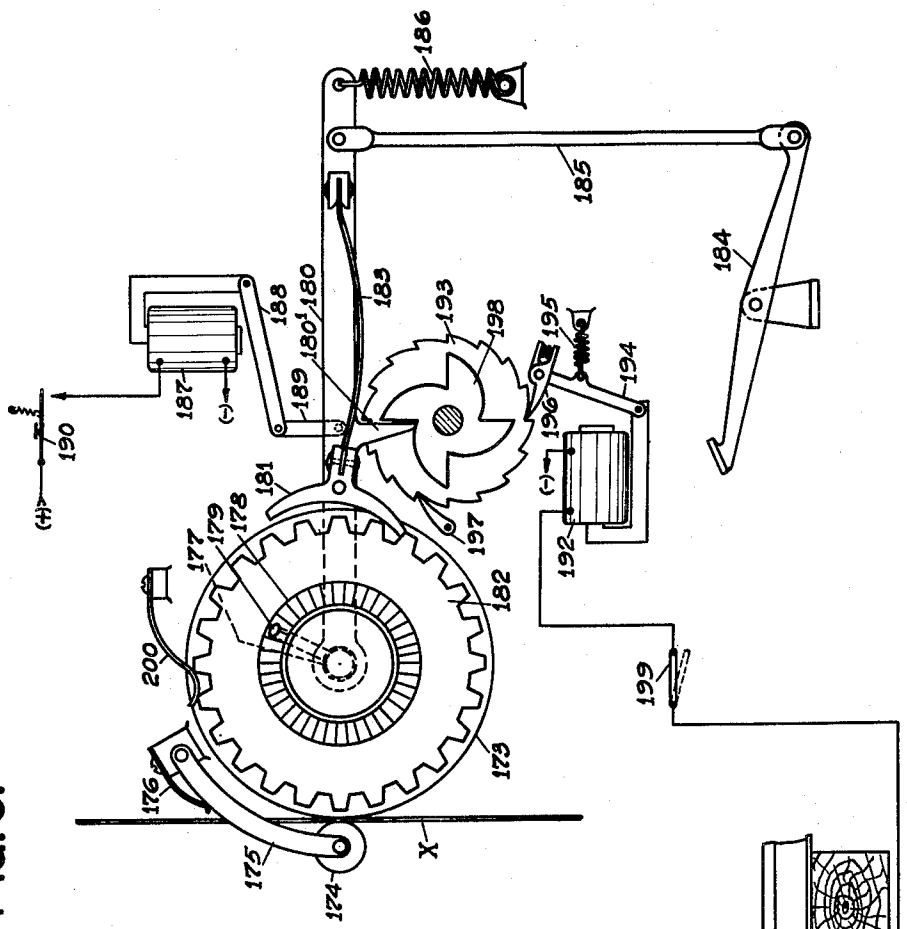


FIG. 6.

INVENTOR
N. C. L. Brown,
BY
Neil W. Preston,
his ATTORNEY

Patented June 30, 1936 2,045,695

UNITED STATES PATENT OFFICE

2,045,695

CONTROL SYSTEM FOR CLASSIFICATION YARDS

Ned C. L. Brown, Scottsville, N. Y., assignor to General Railway Signal Company, Rochester, N. Y.

Application July 31, 1931, Serial No. 554,282

22 Claims. (Cl. 104—26)

This invention relates to control systems for railway traffic controlling devices and more particularly to a system for centrally controlling switches and car retarders in a railway classification yard.

In railway classification yard systems, a large number of track switches are employed to properly route cars from a single in-coming track to a large number of diverging tracks classified according to their destination. Track brakes or car retarders are also employed to prevent excessive speed over such switches or undue impact when coupling with other cars in their destination track. Such track switches and car retarders are usually power operated and controlled by operators who are located in one or more centrally located towers and set up routes to properly direct each car to its classification track according to information furnished him by a previously arranged switch list. These switch lists give the initial and number of each car in the order of arrival at the yard, their weight and the classification tracks to which they are assigned. The present type of control machines with which the operator routes these cars consists of control panels having lever operated contact means which are given numbers corresponding to the devices which they control and the operator may associate such numbers with corresponding numbers of switches or retarders designated on a miniature diagram of the classification system.

In view of the above, it is proposed to provide an improved control system in which the inconvenience and possible confusion due to the necessity of associating switch numbers with their proper control lever is avoided by providing control devices directly associated with routes over a miniature representation of the device which they govern. It is also proposed to provide indicating means in such control devices which enables the status of the traffic controlling devices to be readily apparent at all times and to provide a more convenient and efficient means of manipulating the switch list used in such systems to thereby increase the number of traffic controlling devices over which an operator may conveniently control traffic movements.

Other objects, purposes and characteristic features of the invention will appear as the description thereof progresses, during which references will be made to the accompanying drawings which show the invention in a manner intended to make it easily understood, rather than with the view of showing the particular construction preferably employed in practice, and in which:—

Fig. 1 is a diagrammatic showing of a control panel for a typical classification yard arranged according to this invention;

Fig. 2 is a control circuit diagram for a single car retarder and a simple track switch in accordance with this invention;

Fig. 3 is a control circuit diagram for a lap track switch also in accordance with this invention;

Fig. 4 is a sectional view of a proposed control push button to be used in the above system also included as a part of the present invention;

Fig. 5 is a side view of two push buttons of the type shown in Fig. 4 arranged to show their interlocked relation; and,

Fig. 6 is a diagrammatic showing of a proposed switch list holder and actuator also in accordance with this invention.

The control panel O shown in Fig. 1 may be mounted at a desk or the like and constructed of suitable flat material of a size which enables the operator to conveniently reach all parts thereof. The panel O is conspicuously marked by grooves or other means to represent the layout of the actual track, and in this disclosure a typical system is assumed such as shown in Fig. 1. In this system shown, various classification tracks numbered consecutively from 1 to 36 may be alined, by a series of switches, with a single in-coming track I.

The point at which each of the representations of track in Fig. 1 diverges, represents a switch in the actual track layout, and each route over such switch is represented by a push button P1 etc. which is so located as to make its associated route readily apparent. Each car retarder unit is also represented in a corresponding position on the panel O by five transversely spaced push buttons, each of which is arranged to effect different degrees of retardation.

It is now obvious that, with a system of push buttons thus arranged, a distinctive condition may be quickly set up which will represent the alining of a route to any one of the 36 tracks shown. It may be found expedient for the operator to start at the particular destination on the control panel and depress all switch control push buttons which are included in a route from there to the in-coming track, as for example, if it is desired to route a car to track 31, push buttons P1, P2, P3 and P4 are depressed. The proper retarder push button to be depressed in the various units included in such routes may be judged by the operator from the weight of the car given on his switch list or by observing the actual speed at which the car is moving.

The manner in which these push buttons function to control the traffic controlling devices is diagrammatically shown in Figs. 2 and 3, which show the push buttons in a very diagrammatic manner, as a manually operable button M arranged, when depressed, to operate contact means and having an indicating lamp L included therein which is visible through a lens or glass S in the top of the button M. These push buttons are biased to an upper position and are interlocked by suitable means which is clearly shown in Figs. 4 and 5 and which will be fully described hereinafter.

Referring now to Fig. 2, a section of the operator's control panel O^1 which includes the controls for a simple switch and a car retarder is shown with a diagrammatic illustration of each push button associated with its position thereon by dotted lines. A simple track switch TS1 is shown as operated by a switch machine SM1 which is controlled by push buttons P5 and P6 and a car retarder R is illustrated as operated by a retarder mechanism RM (shown as a dotted rectangle) which is controlled by the push buttons P7, P8, P9, P10 and P11.

A short track circuit T1 including the switch TS1 is energized by a source of energy TB1 and two relays TR1 and TR2 are connected so as to be selectively energized from this track circuit according to the positions of the push buttons P5 and P6. These relays TR1 and TR2 each have compound windings with one winding of each, W1 and W2, adapted to pick up its armature when energized from the track section T^1 and a second winding of each, H1 and H2, arranged in series with the switch machine operating circuit, is adapted to hold the armature up after having been previously picked up by the first winding.

The push button P5 representing the normal route over the track switch TS1 is shown depressed in Fig. 2 and the track switch TS1 is shown as operated to its normal position in accordance therewith. The indicating lamp L5 in the push button P5 is thus energized over the following circuit:—beginning at one terminal B of a source of energy, wires 37 and 38, contacts 39 of the switch machine SM1 bridged by a shunting block 40 in its normal position as shown, wire 41, lamp L5, wires 42 and 43, front point 44 and contact 45 of relay TR1, wires 46 and 47 to the other terminal of the source of energy. The indicating lamp L5, being energized, then indicates directly on the operator's control panel O that a normal route is alined over the track switch TS1 and that the track section T1 is unoccupied.

If it is now desired to aline a reverse route over the track switch TS1, the push button P6 is depressed which sticks down and releases the push button P5 which then returns to its upper position as will be described hereinafter. Relay TR1, having been energized from the track section T1 over wire 48, contacts 49 and 50, wire 51, winding W1 and wires 52 and 53, is now deenergized and relay TR2 is energized over the track circuit T1 over the following circuit:—wire 48, contacts 49 and 54, wire 55, contacts 56 and 57, wire 58, winding W2 and wires 59 and 53.

A reverse operating circuit for the switch machine is now established from a terminal B of a source of energy, wires 60 and 61, winding H2 of relay TR2, wire 62, front point 63 and contact 64, wire 65, contact 66 and back point 67 of relay TR1, wire 68, switch machine contacts 69 bridged by a shunting block 70 in its normal position, wires 71 and 72, switch machine motor armature A1, wire 73, contacts 74 and 75 bridged by a shunting block 76 in its normal position, wire 77, motor field F1 wire 78 winding CO^1 of the brake BR^1 to the opposite terminal C of the source of energy. This causes the switch machine SM1 to operate the track switch TS1 to its reverse position and shift the contact shunting blocks 40, 70 and 76 to their reverse position in preparation for the return operation of the switch machine.

The shifting of the contact shunting block 40 deenergizes the indicating lamp L5 and energizes the lamp L6 from the terminal B of the aforesaid source of energy, wires 37 and 79, contacts 80 bridged by block 40 in the reverse position, wire 81, lamp L6, wires 82, 43 and 83, front point 84 and contact 85 of relay TR2 and wires 86 and 47 to the opposite terminal C of the source of energy. The energizing of the indicating lamp L6 now indicates to the operator that a reverse route is alined over the switch TS1 and that the track section T1 is not occupied. It is obvious that when the section T1 is occupied both relay TR1 and relay TR2 will be deenergized and thereby extinguish both indicating lamps by interrupting their common circuit at the parallel contacts 45 and 85.

The operation of the switch TS1 back to its normal position may of course be accomplished by pressing push button P5 which in a similar way releases P6 and is effective to aline a normal route in a manner which is now obvious by referring to the drawings. It will also be noticed that if both push buttons P5 and P6 are pressed at the same time, P5 only will be effective as the circuit ordinarily completed by P6 includes a contact made only with P5 in an upper position.

To obviate the possibility of any operation of the switch machine SM1 when the track section T1 is occupied, as by a short, or cross the following shunt circuit on the switch machine motor is established by both relays TR1 and TR2 deenergized:—beginning at the terminal C of the operating energy, contact 64 of relay TR2 deenergized, wire 65, contact 66 and back point 67 of relay TR1 deenergized, wire 68, contacts 69 shunted by block 70, wires 71 and 72, armature A1, wire 73, contacts 74 and 75 shunted by block 76, wire 77, field winding F1, wire 78, winding CO^1 of the brake BR^1 to the same terminal C of the operating energy. It is obvious that with the switch machine SM1 in its reverse position, a similar shunt circuit is also established over the reverse control circuit whenever the track section T1 is occupied.

Push buttons P7, P8, P9, P10 and P11 are positioned on the section of the control panel O^1 to represent the location of the retarder R and may be arranged from the operator's left to right to represent various successive degrees of retardation as shown in Fig. 2. These retarder push buttons may be of the same type and interlocked in the same manner as those used in the switch control previously described and are effective to selectively energize any one of five circuits leading to the retarder mechanism RM. It will be noticed also that the circuit which each push button is arranged to complete includes series contacts on each button of lesser degree which contacts are made only with the buttons in the upper position. Thus, in the event that more than one push button is depressed at the same time, only the lesser degree button will be effective.

The retarder mechanism represented by the dotted rectangle RM may include an arrange-

ment such as shown in the patent to W. K. Howe No. 1,757,428 dated May 6, 1930 in which the five push buttons of this case are replaced by the manual control lever and can be used in combination with relays and contactors shown in this patent to cause the retarder R to assume any one of five positions in accordance with whichever push button is depressed.

An indicating lamp in each push button is energized by a contact closed when the button is depressed and a relay SR is connected in series with the common energy circuit to these push buttons which relay is arranged to extinguish all the retarder indicating lamps when energized by the retarder control current, or in other words, when a selected push button is depressed, the operating energy for the retarder mechanism RM flows in series with the winding of the relay SR thus depriving all the indicating lamps of energy until this operating circuit is broken by contacts in the retarder mechanism RM in a manner disclosed in the above mentioned patent. These indicating lamps then indicate directly on the control panel the status of this retarder only when the retarder mechanism has operated into correspondence with the selected position.

The control circuit shown in Fig. 3 uses apparatus which is similar to that used in the simple switch layout in Fig. 2, but is arranged to select any one of three routes by pressing push buttons associated therewith. In this arrangement, two overlapping track switches TS2 and TS3 are respectively operated by switch machines SM2 and SM3 and their control is effected by four relays TR3, TR4, TR5 and TR6 which are selectively energized from track circuit energy by push button P12, P13 and P14. Three track sections T2, T3 and T4 may be employed and respectively energized by three sources of energy TB2, TB3 and TB4, as shown. The central one of these sections T3 may control a relay CTR which is arranged to deenergize the relays TR3, TR4, TR5 and TR6 when this central section is occupied and it is obvious that the first section T2 controls relays TR3 and TR4 and likewise the last section T4 controls relays TR5 and TR6.

The push button P12 in the section of the control panel O^2 is shown depressed and a left diverging route in accordance therewith is alined by the switch TS2 in its reverse position. An indicating lamp L12 in the push button P12 is accordingly energized over the following circuit:—beginning at a terminal B of a source of energy, wires 87 and 88, contacts 89 of switch machine SM2 shunted by block 90, wire 91, lamp L12, wire 92, front point 93 and contact 94 of relay CTR, wire 95, front point 96 and contact 97 of relay TR3, and wires 98, 99, and 100 to the opposite terminal C of the source of energy.

The circuit which was effective to energize relay TR3 upon pushing the button P12 is as follows:—beginning at a rail of the track section T2, wires 102, 103 and 104, push button contacts 105 and 106 closed, wire 107, winding W3 of relay TR3, wires 108 and 109, contact 110 and front point 111 of relay CTR, wire 112 to the opposite rail of the track section T2.

The relay TR3 being energized closes the following operating circuit for the switch machine SM2:—beginning at the terminal B of a source of energy, wires 113 and 114, winding H3 of relay TR3, wire 115, front point 116 and contact 117 of relay TR3, wire 118, contact 119 and back point 120 of relay TR4, wire 121, switch machine contacts 122 then shunted by block 123 in its normal operated position, wires 124 and 125, switch machine motor armature A2, wire 126, contacts 127 and 128 shunted by block 129 in its normal operated position, wire 130, switch machine motor field F2, wire 131, winding CO^2 of the brake BR^2 to the opposite terminal C of the source of energy. This circuit being completed was effective to aline a left diverging route by operating the switch machine SM2 to a reverse position thereby shifting its contact blocks 90, 123, and 129 to the position now shown and complete the indicating circuit previously described.

Considering that it is next desired to aline a straight through route in the layout of Fig. 3, the push button P13 on the operator's panel O^2 is depressed which releases the push button P12 and energizes the relays TR4 and TR5. The energizing circuit for relay TR4 may be traced as follows:—beginning at a rail of the track section T2, wires 102, 103 and 104, contacts 105 and 132 of push button P12 in its upper position, wire 133, contacts 134 and 135 of push button P13 depressed, wires 136 and 137, winding W4 of relay TR4, wires 138 and 109, contact 110 and front point 111 of relay CTR and wire 112 to the other rail of track section T2. The relay TR5 is also energized over the following circuit:—beginning at a rail of the track section T4, wire 139, front point 140 and contact 141 of relay CTR, wires 142 and 143, winding W5 of relay TR5, wire 144, contacts 145 and 146 of push button P13 depressed, wires 147, 103 and 102 to the opposite rail of the track section T4.

The return of push button P12 to its upper position deenergizes relay TR3 by interrupting its circuit at contacts 105 and 106 and consequently when the relay TR4 is energized the following normal operating circuit for switch machine SM2 is completed:—beginning at a terminal B of a source of energy, wires 113 and 148, winding H4 of relay TR4, wire 149, front point 150 and contact 151 of relay TR4, wire 152, contact 153 and back point 154 of relay TR3, wire 155, contacts 156 of switch machine SM2 shunted by block 123, wires 157 and 126, motor armature A2, wire 125, contacts 158 and 128 shunted by block 129, wire 130, motor field F2, wire 131, winding CO^2 of the brake BR^2 to the opposite terminal C of the source of energy. The completion of this circuit results in the operation of the switch machine SM2 to its normal position which accordingly shifts the shunting blocks 90, 123, and 129 to their normal operation position which is opposite to that shown.

It will also be noted that the energizing of relay TR5 sets up a similar normal operating circuit for the switch machine SM3 but as this switch machine is already in such a position, no operation thereof takes place. The straight through route is thus alined with both switch machines SM2 and SM3 in their normal position and the indicating lamp L13 in the push button P13 is energized over the following circuit:—beginning at a terminal B of a source of energy, wires 87 and 159, contacts 160 of switch machine SM2 shunted by block 90 in its normal operated position, wires 161 and 162, contacts 163 of switch machine SM3 shunted by block 201 in its normal operated position, wire 164, indicating lamp L13, wires 165, 166, and 167, front point 168 and contact 169 of relay TR5 energized, and wires 170 and 100 to the opposite terminal C of the source of energy.

It is now obvious that a right diverging route may similarly be alined by pressing push button P14 which is effective to energize relays TR4 and TR6 thereby establishing a normal operating circuit for switch machine SM2 and a reverse operating circuit for switch machine SM3. Inasmuch as these circuits are similar to the ones just traced, it is not considered necessary to trace them in detail.

When these switch machines SM2 and SM3 have assumed a position alining the aforesaid route, an indicating circuit is completed to the indicating lamp L14 which includes contacts of switch machine SM2 made in its normal operated position which contacts are in series with contacts on switch machine SM3 made in its reverse operated position. It will be noted that when the track sections T2, T3 and T4 are occupied, a shunt is established on the operating motors of these switch machines SM2 and SM3 in the same general manner as in the simple switch arrangement previously described.

The arrangement illustrated in Fig. 3 shows a layout for routing cars in any one of three tracks by employing what is generally termed a lap switch layout, but it is desired to be understood that this circuit arrangement may equally well be applied to the conventional three-throw or "slip" switch layout which is interchangeable with the overlap arrangement shown. In either of such layouts, i. e. the present lap switch, and the alternative "slip" switch, a single track section to replace sections T2, T3 and T4 may be employed to control a single track relay which in turn may deenergize the four relays TR3, TR4, TR5 and TR6 when this track section is occupied, by means of this single relay supplying energy through its front point to wires 109 and 142 in multiple. It is obvious that such an arrangement although more economical would not have the operating flexibility possessed by the three track sections.

A proposed construction of a push button P which may be employed in the previously described circuits is shown in the sectional view in Fig. 4 and this single type of push button may be mounted on the operator's panel in interlocked groups of two or more as illustrated in Fig. 5. This push button consists of a cylindrical button M having a cover glass S secured in its top by a threaded ring 202, and an insulating ring 203 threaded and adapted to screw on to the lower end of the button M when assembled. A frame member 204, having a top cylindrical guide arranged to receive the button M, has two downwardly extending sides which hold an insulating socket member 205 by through bolts 206. The button M may be inserted in the cylindrical guide in the frame member 204 and screwed into the insulating ring 203 which then stops the downward motion of the button M by engaging an annular shoulder on the socket member 205 as well as limiting its upward motion by engaging the lower end of the aforesaid frame guide. A compression spring 207 resting on the top of the socket member 205 engages the ring 203 thereby biasing the button M upwardly.

The socket member 205 has a downwardly extending stem portion by which it is held to the frame 204, and may also serve to hold resiliently movable contacts 208 each side thereof which are biased to normally engage resilient contacts 209 and are operable to engage similar contacts 210. Two insulated resilient terminal strips 211 extend through the base of the socket 205 and serve to hold a small incandescent lamp L and to conduct energy thereto. These strips 211 and the contacts 208, 209 and 210 are assembled between insulating spacers 212 and the assembly is clamped to the lower end of the stem of the socket member 205 by through bolts 213 having insulated body bushings (not shown).

The movable contacts 208 extend into the path of the button M so that when depressed, the insulating ring 203 forces the movable contacts 208 into engagement with the fixed contacts 210 and out of engagement with the contacts 209. A shaft 214 is rotatably held in the frame member 204 and is sufficiently long to include each push button in the interlocked group. A locking dog D is secured to the shaft 214 at each push button by a pin 171 and is biased inwardly by a spring 172. This dog D is so positioned that when the button M is depressed, the dog is forced outwardly by the insulating ring 203 thus rotating the shaft 214 and causing a corresponding motion of the other dogs attached thereto. When the button M has reached its extreme lower position, the lower end of the dog D clears the insulating ring 203 and is forced inwardly by the spring 172 to retain the button M in its lower position when the pressure thereon is removed.

Referring now to Fig. 5 which shows the right hand push button retained in a depressed position as described above, it is obvious that when the left hand push button is depressed the locking dog thereon is forced outwardly which rotates the locking dog on the right hand push button correspondingly through the shaft 214 thereby releasing the right-hand button and retaining the left-hand button depressed. It is seen that any number of push buttons may be interlocked in like manner so that when one is depressed, any others which are then retained depressed will be released, thus making effective only the last selected push button in the group.

The apparatus shown in Fig. 6 shows diagrammatically a proposed means for manipulating the switch list by which the operator is guided in routing the cars over the system. This list should be mounted in a convenient location preferably at a point above the control panel where it may be conveniently read by the operator. A side view of such a switch sheet is shown as X in Fig. 6 which may be of any convenient size and should include the necessary information concerning each car to be classified in spaced horizontal lines thereon.

It is proposed to actuate this list X between a large roller 173 and a small roller 174 each time a car is disposed of by being released over its route. The small roller 174 is rotatably supported at the ends of arms 175 which are biased by a spring 176 to hold the list X against the large roller 173. The large roller 173 is mounted on a shaft 177 by which it is rotatably held in bearings (not shown) and the ends of this shaft 177 may have knobs 178 secured thereto by pins 179 whereby it can be manually turned.

A ratcheting arm 180 is rotatably held on the shaft 177 and carries a double pawl 181 which is engageable with teeth on a ratcheting wheel 182 secured against rotating motion to the shaft 177. This double pawl 181 is biased by an over center buckling spring 183 to engage either the lower end or the upper end thereof with the teeth of the wheel 182 according to which side of center the spring 183 is manually buckled. This spring 183 is arranged to absorb the ratcheting motion of the pawl 181 in either of the above

mentioned positions without being bent to a beyond-center position, which thereby provides a resilient biasing means for the pawl 181 as well as a means for manually shifting the direction of ratcheted motion of the roller 173.

A pedal means for actuating the ratcheting arm 180 is provided by a pivoted pedal 184 which operates to force the arm 180 upward through a connecting rod 185, and a spring 186 is included to return the arm 180 to a lower position. An electro-magnetic means for lifting the arm 180 is also provided by an electro-magnet 187 operating an armature 188 connected to the arm 180 by a link 189. This electro-magnetic means may be controlled manually by a push button 190 arranged to energize the electro-magnet 187, as shown, and this push button may be conveniently located on or near the operator's control panel.

It is also proposed to provide an automatic means for actuating the ratcheting arm 180 by a track treadle 191 which is operated by each wheel of a car passing thereover. This treadle 191 may be located at the in-coming track, such as I in Fig. 1, and is employed to close an electrical circuit to an electro-magnet 192 which operates a ratchet wheel 193 by an armature 194 biased by a spring 195 and having a pawl arrangement 196 attached thereto. The ratcheting wheel 193 has a dog 197 operating to permit only uni-directional rotation thereof and has a cam wheel 198 attached thereto which is arranged to lift the ratcheting arm 180 through an extension 180^1 thereon once for every four operations of the electro-magnet 192 thereby ratcheting the roller 173 one space for every car, i. e. every four wheels, passing over the track treadle 191.

A manual cut-out switch 199 which opens the circuit controlled by the track treadle 191 is provided to disconnect the automatic means just described when it is desired to operate the ratchet by either the manual or the pedal means. It is obvious that either the automatic, the manual or the pedal means can operate the ratchet arm 180 which in turn can notch the roller 173 one space in either direction through the pawl 181, which direction is effected by the selected position of the spring 183. To retain such forward ratcheted motion of the roller 173, a resilient detent 200 is provided which exerts a retaining force on the roller 173 when resting between the teeth thereon, as shown.

A classification yard control system has thus been disclosed which is extremely simple in its operation, which provides readily apparent means for indicating the status of each controlled device thereof, which has a control panel with so compact control apparatus thereon that a complete system may be conveniently controlled by a single operator, and to avoid confusion of the operator, such control apparatus is so located on a miniature representation of the actual track layout that their function is readily associated therewith and to further increase the efficiency of the system an accurate and time saving means for manipulating the operator's switching sheet is also provided. And the present invention has further disclosed as an economic feature, a unit push button which may be assembled in the required groups to thereby increase the flexibility of the system.

In describing the present invention, attention has been directed to one specific embodiment thereof, without attempting to point out the various alternate or optional features of construction, or the different organizations or combinations that may be employed. For example, the current supplied to the track sections in Fig. 2 and Fig. 3 is shown as a battery but an alternating source of current may as well be used by employing the conventional transformer and rectifier arrangement, and indication selectors such as conventionally used in interlocking with suitable windings thereon may be substituted for the relays TR1, TR2, etc. The specific construction of the push button shown is also merely suggested as one way in which a device may be made which will function as required in the system disclosed herein. Other types of switch machines may also be employed in this system, such as the well known type which does not include the magnetic brake as shown herein, but relies upon dynamic snubbing which may be obtained by making slight changes in the control circuits all of which is well known in the art.

In other words, the particular embodiment of the present invention has been selected to facilitate in the disclosure thereof rather than to limit the number of forms which it may assume, and it is desired to be understood that various modifications, adaptations and alterations may be applied to the specific form shown to meet the requirements of practice, without in any manner departing from the spirit or scope of the present invention except as limited by the appended claims.

Having thus described my invention, what I claim is:—

1. In a control system for classification yards, in combination, a classification yard, a control panel marked to simulate the layout of said classification yard, switch control push buttons arranged to represent routes over switches on said control panel, car retarder control push buttons arranged on said control panel in progressive order of retardation at a location thereon to simulate the location of the associated car retarder, individual contacts operated by said push buttons to selectively energize circuits which are effective to distinctively operate associated traffic controlling devices, means in each push button arranged to indicate when the condition of the associated traffic controlling device corresponds thereto, and means interlocking the push buttons associated with each traffic controlling device whereby any one of such interlocked push buttons is retained depressed and is released by a subsequent depression of another push button interlocked therewith.

2. In a control system, a miniature track diagram, push buttons on said track diagram arranged to represent various conditions of traffic controlling devices in said system, means interlocking the push buttons which are associated with each traffic controlling device whereby a depressed push button is retained in such a position until released by the depression of another push button interlocked therewith, contacts operated by the depression of said push buttons, electrical circuits including said contacts which are effective to distinctively condition said associated traffic controlling devices, an indicating lamp in each of said push buttons arranged to be viewed from the top of said control panel and an indicating circuit for each of said indicating lamps arranged to energize said lamp when the condition of its associated traffic controlling device corresponds thereto.

3. In a control system, a miniature track diagram, a push button arranged to represent a nor-

mal route over each track switch thereon, a push button arranged to represent a reverse route over each track switch thereon, a switch machine operably connected to each of said track switches, a normal and a reverse control relay associated with each of said switch machines, said control relays having an operating winding and a holding winding thereon, track circuits extending through each track switch in said system, said track circuits including contacts operated by an associated normal control push button and contacts operated by an associated reverse control push button whereby either an associated normal control relay or an associated reverse control relay may be selectively energized, a normal and a reverse operating circuit for each of said switch machines each of which operating circuits includes a series holding winding and an energized contact of the associated control relay and a deenergized contact of the other control relay and shunting circuits for the operating motor of said switch machines effective when both the associated normal and reverse control relays are deenergized.

4. In a control system, a track switch power operated by a switch machine, a miniature representation of said track switch, a push button on said miniature representation arranged to simulate a normal route over said track switch, a push button on said miniature representation arranged to simulate a reverse route over said track switch, a track section including said track switch, a track circuit completed by said normal push button in a depressed position including the rails of said track section, contacts of said normal push button and windings of a normal control relay for said switch machine, and a track circuit completed by said normal push button in an upper position and said reverse push button in a depressed position including the rails of said track section, contacts of said normal push button, contacts of said reverse push button and windings of a reverse control relay for said switch machine.

5. In a control system for classification yards, a car retarder, a control panel having a group of push buttons located with respect to a miniature track diagram thereon to simulate the location of said car retarder, individual contacts operated by said push buttons, a source of energy, control circuits for said car retarder associated with each of said push buttons and arranged to be selectively connected with said source of energy by the depression of said associated push button, said push buttons being arranged to represent various progressive degrees of retardation of said car retarder, said control circuits including series contacts of each push button representing lesser degrees of retardation and said series contacts being made with said lesser degree push buttons in an upper position.

6. In a control system for classification yards, a car retarder, a control panel having a group of push buttons representing various degrees of retardation of said car retarder, a source of energy, control circuits for said car retarder selectively connected to said source of energy by the depression of the associated push button, a relay connected in series with said source of energy and said control circuits, indicating means associated with each of said push buttons and having individual energizing circuits including contacts on its associated push button closed during depression thereof and each of said indicating circuits being interrupted by contact means on said series relay when energized.

7. In a control system for railroad yards, a track switch power operated by a switch machine, a control panel, a normal control push button on said control panel arranged to effect the normal control of said switch machine, a reverse control push button on said control panel arranged to effect the reverse control of said switch machine, individual indicating means in said normal control push button and in said reverse control push button, circuit means energizing said normal indicating means when said switch machine is in its normal operated position, circuit means energizing said reverse indicating means when said switch machine is in said reverse operated position, and a track circuit arranged to control both said normal indicating circuit means and said reverse indicating circuit means.

8. In a control system for railroad yards, a section of railroad track constituting a straight through route and having a power operated track switch therein controlling a right hand diverging route therefrom and a power operated track switch therein controlling a left hand diverging route therefrom, a miniature representation of said section of railroad track, individual push buttons on said miniature representation arranged to simulate said right hand diverging route, said left hand diverging route and said straight through route over said section of track, insulated track sections individually including said track switches, a source of energy at one end of each section, a normal control relay and a reverse control relay associated with each of said power operated switches, control circuit means whereby said relays may be distinctively energized from said associated track sections in accordance with a depressed push button, operating circuits for the switch machines, means arranged to distinctly operate said switch machines in accordance with the energization of said associated control relays and a shunt for each operating circuit effective when both of the associated control relays are deenergized.

9. In a railway control system, a three-way track switch arrangement power operated by switch machines, individual push buttons corresponding to the three routes over said switch arrangement, track circuits including said switch arrangement, a normal and a reverse control relay for each of said switch machines, energizing circuits for said control relays including said track circuits whereby said control relays may be selectively energized by depression of said push buttons, indicating means in each of said push buttons, individual energizing circuits for said indicating means including contacts on said switch machines made when the condition of said switch machine is in accordance with the route represented by the push button and contact means interrupting said indicating circuits when the section of track included in said associated track circuit is occupied.

10. In a control system for railway yards, a miniature diagram of a yard having manually operable contact means each so located on said diagram as to simulate a condition of a traffic controlling device associated therewith, said contact means which are associated with any particular traffic controlling device being interlocked whereby the operation of one contact means releases other contact means interlocked therewith and retains said operated contact means.

11. In a control system for railway yards, a miniature diagram of a yard having manually operable contact means each so located on said diagram as to simulate a condition of a traffic controlling device associated therewith, said contact means being interlocked with other contact means associated with the same traffic controlling device and having individual indicating lights therein visible on said miniature diagram.

12. In control systems for railway yards, in combination, a miniature diagram of an actual yard having a traffic controlling device, a plurality of control means on the diagram for governing the said device, the control means being so located on the diagram as to simulate a condition of said device, each control means being movable to operated position against biasing means, and interlocking means for the plurality of control means whereby operation of one control means releases all the others and retains the operated one in operated position.

13. In control systems for railway yards, in combination, a miniature diagram of an actual yard having a traffic controlling device, a plurality of control means on the diagram for governing the said device, the control means being so located on the diagram as to simulate a condition of said device, each control means being movable to operated position against biasing means, and interlocking means for the plurality of control means whereby operation of one control means releases all the others and retains the operated one in operated position, a circuit controlled by each control means and arranged so that but one circuit can be effective at any one time to affect the traffic controlling device.

14. In a control system for railway systems, in combination, an insulated track section, a device associated with the section, operating means for the device, control circuits for the operating means, a track circuit including the track section and a plurality of track relays, a corresponding plurality of manually operable control members, the control circuits being controlled by the track relays, and the track relays being controlled by the control members.

15. In a control system for railway systems, in combination, an insulated track section, a device associated with the section, operating means for the device, control circuits for the operating means, a track circuit including the track section and a plurality of track relays, a corresponding plurality of manually operable control members, the control circuits being controlled by the track relays, the track relays being controlled by the control members, a holding winding on each relay, each control circuit including a back point of a track relay and a holding winding of a different track relay.

16. In a control system for railway systems, in combination, an insulated track section, a device associated with the section, operating means for the device, control circuits for the operating means, a track circuit including the track section and a plurality of track relays, a corresponding plurality of manually operable control members, the control circuits being controlled by the track relays, the track relays being controlled by the control members, an operating winding on each track relay, an energizing circuit for the operating winding of one relay including only a contact controlled by one of the control members, and an energizing circuit for the operating winding of another relay including, in series, contacts controlled by a plurality of the control members.

17. In a control system for railway systems, in combination, an insulated track section, a device associated with the section, operating means for the device, control circuits for the operating means, a track circuit including the track section and a plurality of track relays, a corresponding plurality of manually operable control members, the control circuits being controlled by the track relays, the track relays being controlled by the control members, a holding winding on each relay, each control circuit including a back point of a track relay and a holding winding of a different track relay, an operating winding on each track relay, an energizing circuit for the operating winding of one relay including only a contact controlled by one of the control members, and an energizing circuit for the operating winding of another relay including, in series, contacts controlled by a plurality of the control members.

18. In a railway track switch layout, two overlapping track switches, a power operated means for operating each switch respectively, a first pair of translating devices for controlling one of the means, a second pair of translating devices for controlling the other means, a push button arranged to jointly control one device of each pair of devices, a push button arranged to control the other device of one pair, and a push button arranged to control the other device of the other pair.

19. In a railway track switch layout, two overlapping track switches, a power operated means for operating each switch respectively, a first pair of translating devices for controlling one of the means, a second pair of translating devices for controlling the other means, a push button arranged to jointly control one device of each pair of devices, a push button arranged to control the other device of one pair, a push button arranged to control the other device of the other pair, and indicating means in each button to indicate the response of a power operated means to its button.

20. In a railway track switch layout, two overlapping track switches, a power operated means for operating each switch respectively, a first pair of translating devices for controlling one of the means, a second pair of translating devices for controlling the other means, a push button arranged to jointly control one device of each pair of devices, a push button arranged to control the other device of one pair, a push button arranged to control the other device of the other pair, means retaining each button in depressed position upon being depressed, and means releasing the retaining means of any depressed button, upon depressing another button.

21. In a railway track switch layout, two overlapping track switches, a power operated means for operating each switch respectively, a first pair of translating devices for controlling one of the means, a second pair of translating devices for controlling the other means, a push button arranged to jointly control one device of each pair of devices, a push button arranged to control the other device of one pair, and a push button arranged to control the other device of the other pair, a normal and a reverse operating circuit for each power operated means, the normal operating circuits for both power operated means being completed by the depressing of the button which controls two of the translating devices.

22. In a railway track switch layout, two overlapping track switches, a power operated means

for operating each switch respectively, a first pair of translating devices for controlling one of the means, a second pair of translating devices for controlling the other means, a push button arranged to jointly control one device of each pair of devices, a push button arranged to control the other device of one pair, a push button arranged to control the other device of the other pair, and indicating means in each button to indicate the response of a power operated means to its button, a normal and a reverse operating circuit for each power operated means, the normal operating circuits for both power operated means being completed by the depressing of the button which controls two of the translating devices.

NED C. L. BROWN.