

May 25, 1943.

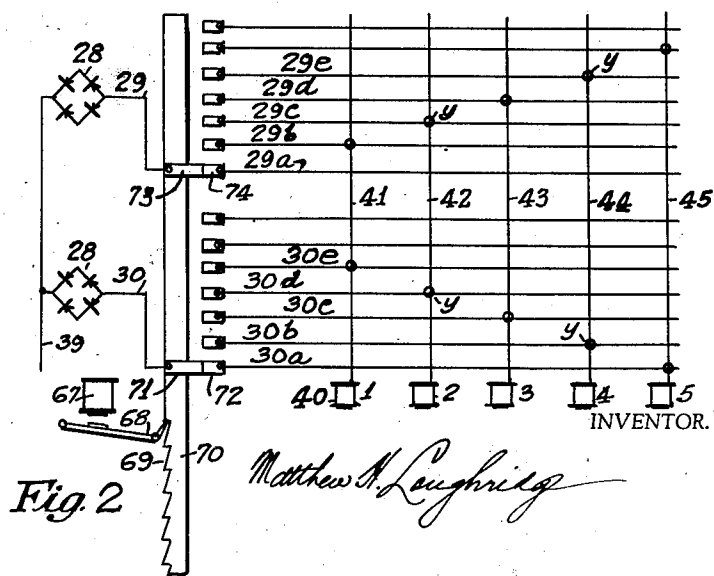
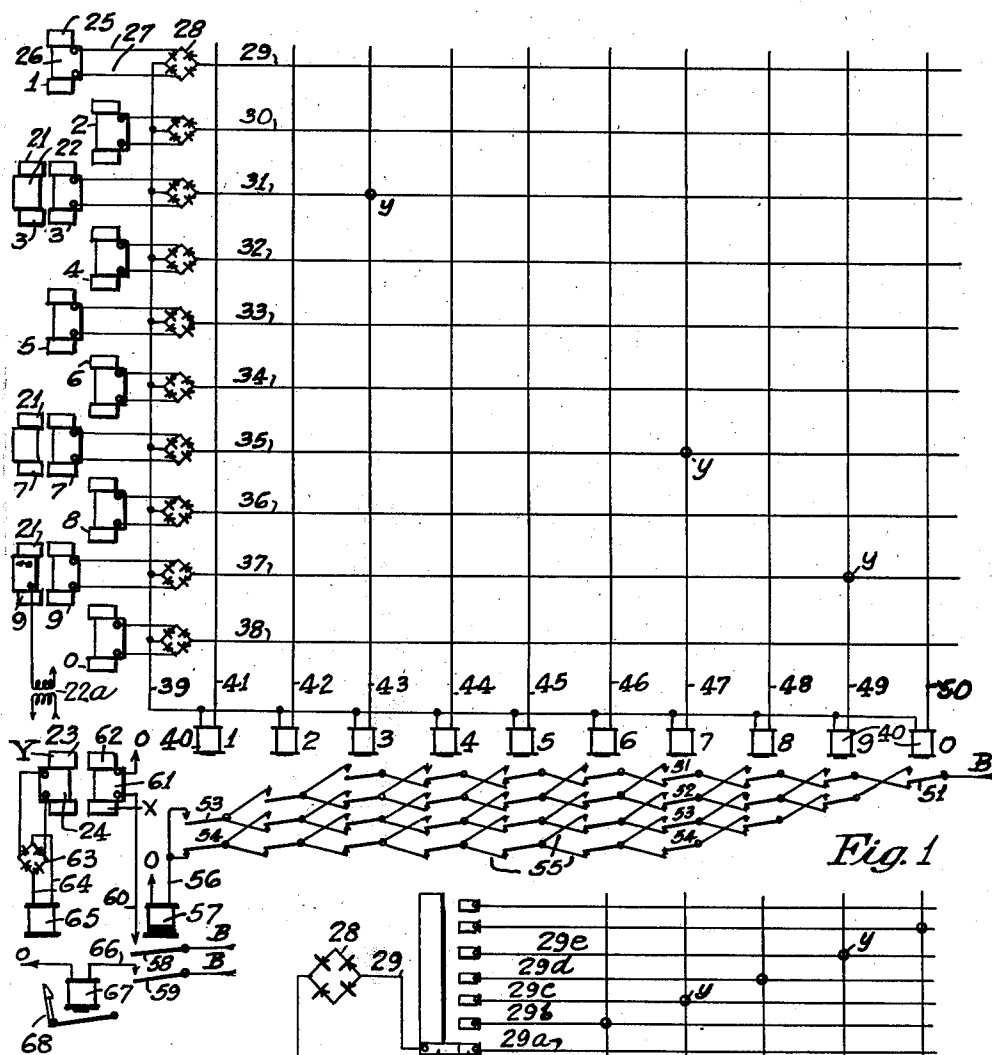
M. H. LOUGHRIDGE

2,320,150

CODE SELECTIVE APPARATUS

Filed July 9, 1940

4 Sheets-Sheet 1



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May 25, 1943.

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CODE SELECTIVE APPARATUS

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4 Sheets-Sheet 2

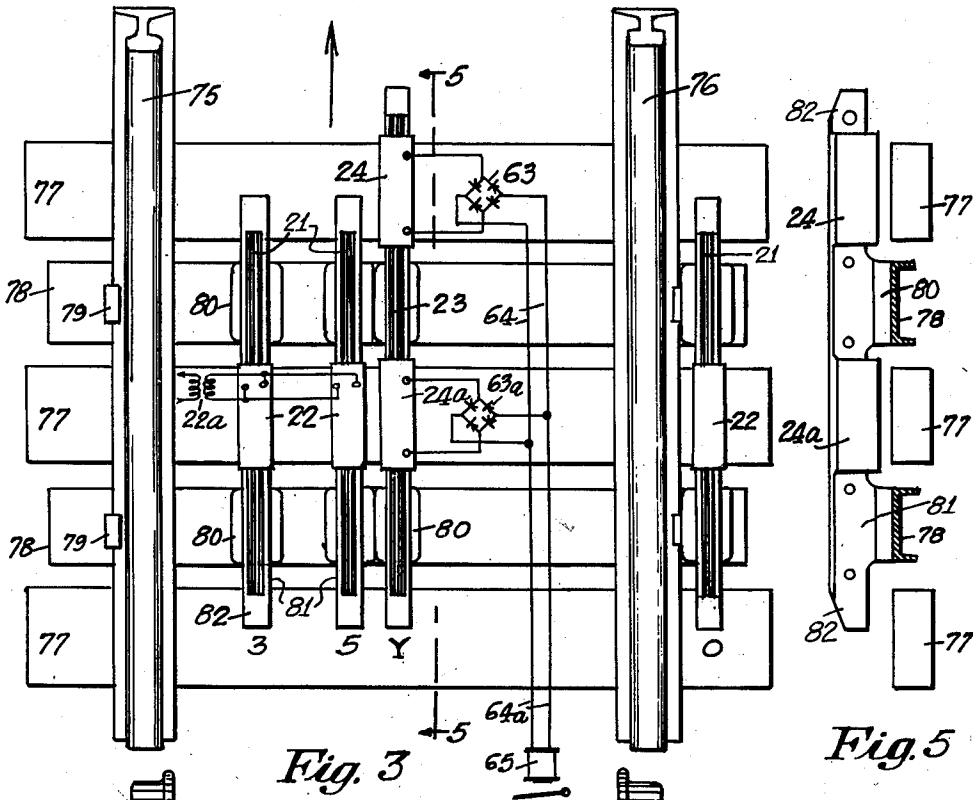


Fig. 3

Fig. 5

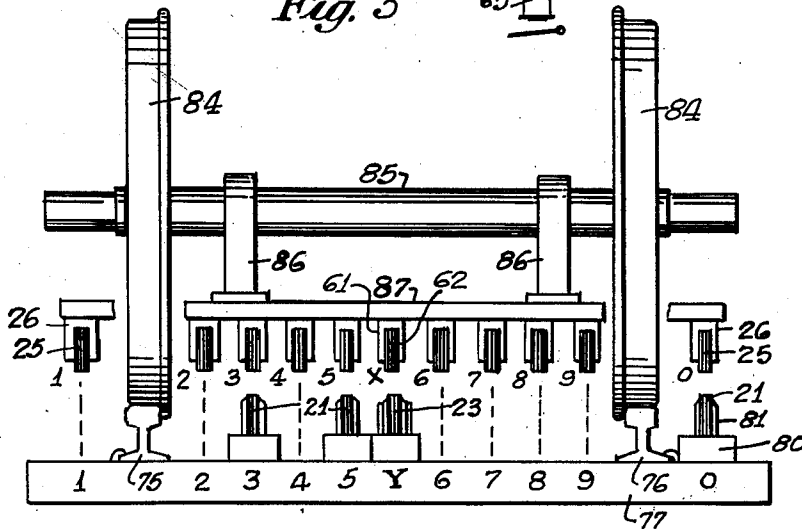


Fig. 4

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4 Sheets-Sheet 4

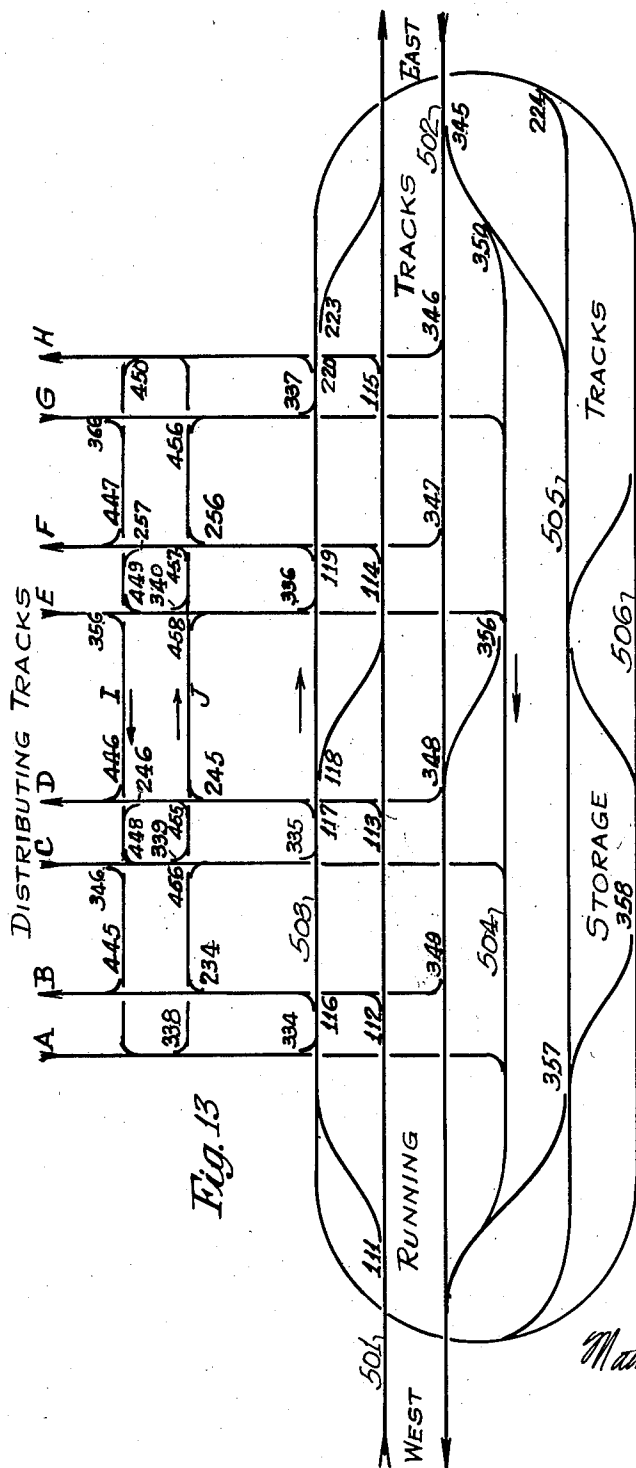


Fig. 13

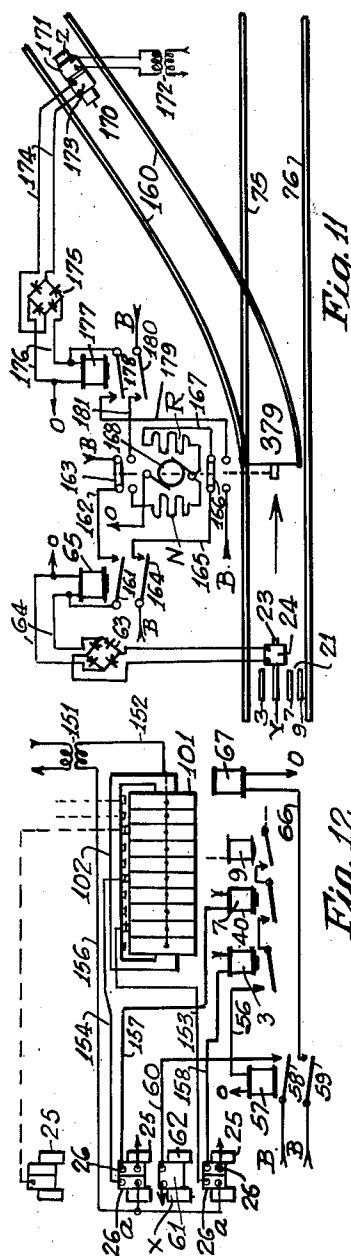


Fig. 11

Fig. 12

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2,320,150

CODE SELECTIVE APPARATUS

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Application July 9, 1940, Serial No. 344,493

3 Claims. (Cl. 177—353)

This invention relates to a selective system and the apparatus used therewith and is shown in connection with the application of a code selective system. An object of the invention is to provide a selective system in which a number of codes may be prearranged and the system operated progressively by these codes; another object of the invention is to provide a manually adjustable mechanism in which a number of codes may be prearranged to be subsequently used by scanning means to which the code responds; another object of the invention is to operate a code selective system by a plurality of responsive means which means operate together; another object of the invention is to operate a code selective system by scanning means through impulses transmitted by electro-magnetic induction and another object of the invention is to provide means for prearranging a plurality of codes with means for changing the code each time the system is operated.

A further object of the invention is to provide a code selective system for operating switches on a railway track from a vehicle passing over the track. Other objects of the invention will be more particularly understood from the following specification and the accompanying drawings, in which:

Fig. 1 is a circuit diagram showing the operation of the system by electro-magnetic induction;

Fig. 2 is a circuit diagram showing a method of changing the system from operating on one code to operate by another code;

Fig. 3 is a plan view of a railway track having inductors thereon corresponding to a scanning arrangement for operating the code selector system on cars passing over this portion of track;

Fig. 4 is an elevation of a railway track corresponding to Fig. 3 with a vehicle thereon having inductors in correlation with the trackway inductors;

Fig. 5 is a side elevation of the trackway inductors on line 5—5 of Fig. 3;

Fig. 6 is an elevation, partly sectioned, of the code selector mechanism;

Fig. 7 is an end elevation of the code selector mechanism on line 7—7 of Fig. 6;

Fig. 8 is an elevation, partly sectioned, of the mechanism for automatically changing the code;

Fig. 9 is a sectional detail showing the method of setting up the code from a keyboard;

Fig. 10 is a top plan view of the keyboard that may be used to adjust the code selector mechanism;

Fig. 11 is a wiring diagram of a facing switch,

on a railway track, operated by the code selector system;

Fig. 12 is a diagram of the circuits on the vehicle for operating the switch in Fig. 11, and

Fig. 13 is an interconnecting trackway system in which the switches are automatically operated by the code selector system.

This invention is shown applied to a code system in which the code has a base of ten possible positions and when the apparatus associated with any three of these positions is operated together and at the same time, the selection for a particular code is established. This is the only condition in which the code can be established. The ten positions of the base are represented by ten relays, one for each position. Each relay is connected with an inductor and a scanning system is provided in which three inductors are provided co-acting with three selected inductors connected with the relays which, through inductive impulses, energize the three selected relays together while the remaining relays remain deenergized.

The ten relays control a repeating circuit which is so arranged that when any three of these relays are energized and the others are deenergized a translating device is energized and operates the desired function according to the code. This function may be transmitted by an inductive coupling to produce the results desired.

By a switching arrangement the circuits for three relays only are established between the inductors and these relays with the result that impulses transmitted to any of the inductors except those in circuit with their relays, will not register. Since the scanning arrangement is limited to three inductors it is apparent that the system will not synchronize or function unless the scanning inductors correspond with the inductors which are connected with the operating relays.

In many applications, as well as in the application to railroad switches shown in the drawings, it is desirable to pre-arrange a number of codes or combinations which will operate the system one at a time and in which these pre-arranged codes will be taken up progressively after each operation of the translating device. For this purpose a code selector mechanism is provided which comprises ten discs, one corresponding to each relay of the base and having radially projecting contact members which are normally latched in an inactive position. A bail is mounted to rotate about these discs with a contacting member located to register with the contacting member of each disc. A movable key-

board is provided with a key for each disc and is so arranged that when a key is depressed the contact member of the disc is released to assume the active position. Three keys are operated to release the contacting members of the discs corresponding to the relays that are to be operated in the code, then the keyboard is moved relative to the discs and three more keys are operated corresponding to the next code, then the keyboard is again moved and three more contacts of the discs are again released corresponding to the next code, and so on for the number of codes that are to be established. A stepping magnet is provided for moving the bail forward one step each time this magnet is energized which moves the contact members of the bail from one code to the next code and this is repeated each time the operating magnet is energized. This magnet is energized when the system is synchronized by establishing the code and thus a new code is brought into effect.

A selector system for operating railway switches is shown in U. S. Patent 1,381,317; adjustable selective apparatus is shown in U. S. Patent 1,724,210 and a development of the code system of the present invention is described in co-pending application 205,186, filed April 30, 1938, now Patent No. 2,266,779, issued December 23, 1941.

In the drawings, Fig. 1, 25 is an inductor with a coil 26, connected by the circuit 27, with the full wave rectifier 28, which connects to the switchboard by the conductor 29 and connects to the return circuit 39. Ten inductors, corresponding to 25, are provided, numbered from 1 to 0 and each connecting to the switchboard inductors 30 to 38 inclusive. 40 is a code relay connecting to the switchboard by the conductor 41 and ten relays corresponding to 40 are provided, numbered from 1 to 0 inclusive, and connecting to the switchboard by the conductors 41 to 50 inclusive. Any three of the relay conductors 41 to 50 may be connected to any three of the inductor conductors 29 to 38 inclusive as, for instance, at *y* between conductor 31 and 43, between conductor 35 and 47 and between conductor 37 and 49. By this arrangement, relays 3, 7 and 9 are connected with their corresponding inductors and the remaining relays are out of circuit and cannot be energized.

An impulse inductor 21, having a coil 22, registers with the inductor connected to wire 31, a second impulse inductor 21 corresponding to the previous inductor, registers with the inductor connected with conductor 35 and a third impulse inductor registers with the inductor connected with conductor 37. The inductors 21 correspond to a scanning system and, as shown, are arranged to energize relays 3, 7 and 9. Any other arrangement of the inductors 21, with the switchboard connected as shown, would not energize three of the code relays and therefore, would not operate the system.

The code relays 40 control a circuit starting at B, through contact finger 51 of the first relay and is repeated from relay to relay by the conductors 55, connecting to the relay contacts 51 to 54 inclusive and, finally terminating at contact fingers 53 and 54 of relay at 1, and which connect to conductor 56 of the relay, or translating device, 57 and the return circuit 0. This repeating circuit is so designed that the circuit of relay 57 is established only when any three of the ten coding relays 40 are energized and the remaining relays are deenergized. Relay 57 may

be made slow-releasing as indicated, so that it will maintain its contacts closed for an instant after the inductive impulse which energized the coding relays 40, has ceased.

When relay 57 is energized, a circuit is established through contact 58 from the energy wire B through conductor 60, to coil 61 of inductor 62. Inductor 62 is coupled with inductor 23, having the coil 24, which, through the rectifier 63 and circuit 64 energizes the translating device 65 to perform the work desired. A second circuit is established when relay 57 is energized, through contact finger 59 from energy wire B through conductor 66 to the stepping magnet 67 which operates the stepping device 68, hereinafter referred to.

The switchboard indicated in Fig. 1 is set for one code only and when it is desired to make the system operate on another code, the switchboard must be manually adjusted for this purpose. In Fig. 2, the fragmentary diagram indicates a switchboard on which a number of codes can be set up, only one of which can be effective at a time. For this purpose the conductor 29, from the receiving inductor, is subdivided into a number of separate parallel inductors indicated on the drawing from 29a to 29e, inclusive. In the same way the next conductor 30 is sub-divided into parallel conductors indicated in the drawing from 30a to 30e, inclusive. The bar 70 is provided with an insulated contact 71 connected with conductor 30 and connecting to a terminal 72 on conductor 30a; it is also provided with an insulated contact 73 connecting to conductor 29 and connecting with terminal 74 on conductor 29a. Each time that magnet 67 is energized the stepping armature 68 engages the ratchet 69 on bar 70 and moves it forward one step. This moves the contacts 71 and 73 and all the other contacts on this bar forward from the first conductor of the row to the second conductor of the row. The next step of 67 moves the bar 70 forward another step to the third conductor of the row and in this way each time magnet 67 is energized the bar 67 is progressively moved from one conductor to the next conductor of the same row.

It is apparent that the conductors 29a to 29e, inclusive, may be plugged as indicated at *y* to connect with the conductors of any of the relays 40, and it is also apparent that the same arrangement may be carried out with respect to the conductors 30a to 30e inclusive. Providing the parallel conductors in rows, only one of which can be in circuit at a time, leaves the disconnected conductors free for setting up pre-arranged codes thereon, which codes are determined by the movement of the bar 70. A result corresponding to this circuit arrangement is shown in Figs. 7 to 10, inclusive.

It is apparent that conductors 29 to 38, inclusive, can be controlled by a contact system instead of by the inductive apparatus shown, the main requirement being to provide for energizing three of the coding relays at a time.

Application to the operation of railway switches

The selective system described is applied to the automatic operation of railway switches by providing on the trackway approaching the switch three impulse inductors arranged according to a predetermined code represented by a number of three figures; the switch is operated by an approaching train or vehicle which carries the selector mechanism, the selector relays and the in-

ductors to register with the impulse inductors on the trackway. When the system on the vehicle is synchronized the translating device establishes the circuit of an impulse inductor on the vehicle which transmits impulses to the circuit of a registering inductor on the trackway and the latter circuit is connected with a relay which sets up the circuits for the operation of the switch to switch the train from the running track to the connecting track. The code selector mechanism on the vehicle is operated with the switch mechanism so that when the train enters upon a new track the system is conditioned to operate on another code on this track, and this condition is maintained each time a new track is entered.

In the drawings, Figs. 3, 4 and 5, the trackway is indicated by the running rails 75 and 76, supported by the ties 77 and to which the channel bars 78 are secured by the cleats 79. Pillow blocks 80 are provided on the channel bars 78 which support the laminated inductors 21 and which may be secured by side plates 81 and with solid tapering ends at 82. On the center line of the track at *x* an impulse inductor for receiving impulses from the vehicle 23 is provided, having the coils 24 and 24a thereon. Coil 24 connects through the full wave rectifier 63 with the circuit 64 and coil 24a connects through the full wave rectifier 63a in multiple with coil 24 to the circuit 64a and the relay 65 which sets up the circuits for operating the switch mechanism.

The figures from 1 to 0 are used to indicate the code combinations and are shown in Fig. 4 applied to the inductors 25 on the vehicle which are provided with coils 26 and are supported by the bar 87, connecting by the supports 86 in a suitable manner with a portion of the vehicle 85 supported by the running wheels 84 in the relation shown in Fig. 4. The trackway inductors may be arranged to occupy any of the positions indicated at 77 from 1 to 0, three inductors only being provided at each location and these inductors 21 may be numbered according to the number arrangement of their location as a convenient designation for the switch.

Several methods are in use for inductively operating apparatus by a passing train and these methods may be designed to operate from a source of power on the train or from a source of power on the trackway and any of these arrangements may be used in applying the present invention. As shown, the trackway inductors 21 are provided with an energizing coil 22, energized by alternating current from 22a and when the vehicle inductor sweeps over the trackway inductor an impulse is induced in the coil 26 which energizes the circuit connected with the corresponding coding relay. When three of these relays are energized at the same time coil 61 of inductor 62, on the center line of the vehicle, is energized from a source of current on the vehicle. This induces a current in coil 24a, followed by another in coil 24 which energizes relay 65 to operate the switch. The relay 57 on the vehicle which establishes the circuit of coil 61 is slow-releasing so that while the vehicle may have passed over the inductors 21, the circuit established thereby is maintained to continue the impulse from 24 in coil 24 and thereby increase the operating time period of relay 65.

By placing the coding inductors transversely on the track and energizing the coding relays simultaneously, it is not necessary to accumulate the code operations as it would be with a stepping system and it is not necessary to provide a re-

taining device for holding the accumulated operations. Further, the operation is secured with rapidity and occurs at one point on the trackway instead of being continued along the trackway and, finally, only three impulses are necessary in a selective system having a base of ten with three changeable units thereon and in this way the operation is much simplified while a coded system of this particular type has 120 combinations.

Code selector adjustment

The code selector mechanism is shown in Figs. 6 to 10 and comprises ten discs 101 and numbered from 1 to 0. These discs are mounted on a tubular support 104 in frame 103 and are held in position on 104 by the end sleeves 105 which provide a bearing in the frame 103 at 106, a nut 107, on tube 104 holds the parts in assembled relation.

The discs 101 are insulated from each other by the insulation 109 and are mounted at 108 on the tube 104. These discs are provided with radial cylinders indicated from *a* to *l* in Fig. 7, and at 110 in Fig. 6. A spring 111 in cylinder 110 projects the contact member 112 to the active or contacting position. This member is provided with a notch 113 which is engaged by the latch 115 of spring 114 and is so arranged that when the contact members 112 are pressed into the cylinder and flush with the surface of the disc, they are latched by 114 and remain in the inactive position.

A bail 116 is mounted at 102 and at 121 to rotate on the sleeves 105 and is provided with the insulated contacts 117 arranged in a row parallel with the axis of the discs there being one contact for each disc which engages the projecting contact member 112 of the disc. The bail 116 is provided with a groove at 119 where the contacts 117 are exposed and are connected by conductors, indicated at 118 and leading to conductor segments 120 on the end 102 of the bail, from these segments a separate circuit is connected to each contact 117.

The bail 116 is operated by the stepping magnet 67 through the ratchet 121 operated by the detent 122 connected with lever 123 and normally held in engagement by spring 124. Lever 123 is pivoted at 125 and by link 127 connects to plunger 128, operated by armature 129 of magnet 67 against spring 126, connected to the frame at 103. When the magnet 67 is energized, the detent 122 is moved forward to engage the next tooth of ratchet 121 and to step forward the bail 116 by the action of spring 126 when the magnet 67 is deenergized. Detent 122 may be released from the ratchet by turning back on its pivot, over the toggle formed by spring 124. The bail is held in the position to which it is moved by the roller 131, held by spring 130 against the ratchet tooth 121.

A circuit is established from each of the discs 101 by the conductor 132 in the tube 104, connecting at 133 with the segmental contacts mounted on nut 107 so that each disc is brought into circuit by the conductor connected to the corresponding segment at 133. This arrangement, with the segments at 120, avoids the use of commutators since it is not necessary that the bail rotate completely around the discs.

For convenience in setting up the codes on the selector mechanism, a keyboard 135 is provided which is mounted on the sockets 136 and 137, slidable on the vertical arms 103 of the frame so that it may be raised to the position

shown in Fig. 6 and latched by the spring latches 138 in position to clear the bail 116. When the keyboard is to be used the bail is pushed aside and it is brought into the position shown in Fig. 9 adjacent to the discs. The keys 139 are retrieved by the spring 140 and are provided with a tapering end at 141 which engages the spring 114 of the latch and withdraws the latch and releases the contact member 112 so that it may be projected to the active position. The keyboard is provided with a projection 142 having an inclined face 143 adjacent to the face 144 which engages the discs. The discs may be rotated by rotating tube 104 by means of knob 145, which is provided with a collar 147 having notches engaged by the spring 146, corresponding to each position of the discs in which the contact members may be released.

In operation the keyboard 135 is lowered to the engaging position and latched there. As the discs are rotated relative to the keyboard, each projecting contact is depressed by 143 to the latching position to cancel any previous established codes. In the first position, the keys are depressed corresponding to the code that is to be set up; this will release the contact members of three of the discs; the discs are then rotated to the second position by the knob 145 and three more keys are operated according to the code required in this position. In the same way a new code is established for each position of the discs by the keyboard as far as desired. When the codes have been established in this way the keyboard is restored to the inactive position, the discs are returned to the starting position and the bail is also placed in the starting position or the position of the first code. As soon as the first code has been set up by the scanning mechanism, the magnet 67 is energized and the bail is advanced to the next position and this is repeated after each operation.

The control of the circuits by this mechanism corresponds with Fig. 2 and in which it may be assumed, for instance, that each of the contacts 117 connect to one of the coding relays 40 and each of the contacts 133 connect to one of the coils of the inductors 25 so that each inductor may be selectively connected with its coding relay according to the position of the contact members 112 for each location of the bail.

In Figs. 3 and 4 it will be noted that the inductor x on the center line of the trackway is not included with the numbered inductors. This inductor has a fixed location with five possible locations for other inductors on each side thereof. It is contemplated that the vehicle in Fig. 4 may be a truck which can be turned around on the track and run with either end leading, as in U. S. Patent 1,857,760. In order to adjust the system for this condition the keyboard, Fig. 10, is provided with numbers for the keys 139 reading in one direction on one side and in the opposite direction on the other side. By using the numbers on one side of the keyboard for one direction of running and using the numbers on the opposite side of the keyboard for the other direction of running, the code combinations set up by the keyboard will synchronize with the scanning combinations set up on the trackway for operating each switch.

The invention has been described in connection with a selector system having a base of ten with three movable characters. This is the system most commonly used but it is apparent that

the code may be applied as shown in application 206,186 of April 30, 1938.

One arrangement of circuits for operating the code selector relays by the code selector shown in Fig. 12, has the bail 102 mounted to rotate about the selector discs 101 and the transformer 151 through conductor 152 connects each of the discs 101 to one side of the transformer. The other side of this transformer by conductor 156 connects to the coils 26a of the inductors 25 and from the first coil a return circuit is completed on conductor 154 to one of the contacts of the bail 102; another circuit is completed on conductor 153 from the coil of the next inductor to another of the contacts on the bail 102. This arrangement is carried out for each of the inductors 25 so that each of the energizing coils 26a are controlled in series by the contacts between the discs 101 and the contacts on the bail 102. A secondary coil 26 is provided on each inductor 25 and through the conductor 157 one of the coding relays 40 is energized, also from secondary coil 26 on the next inductor, by conductor 158, another of the coding relays is energized from an impulse in the inductor 25. In this arrangement the power for producing the impulse in the inductors is supplied by transformer 151 on the vehicle. Energizing the proper number of coding relays energizes relay 57, which energizes the coil 61 of inductor 62 to transmit the control effect to the trackway and also energizes magnet 67 to change the code.

The inductors 25, when provided with a primary circuit 26a and a secondary circuit 26, are normally on open circuit until they register with the laminated inductive member on the trackway. This completes the magnetic circuit for the vehicle inductor, through an air gap, and enables an impulse to be inductively transmitted from the primary coil to the secondary coil to energize the coding relay, which otherwise is insufficiently energized to close its contacts.

The trackway circuits for operating the switch are shown in Fig. 11 in which the turnout switch 160 connects to the main track, 75, 76, by the switch designated by the number 379. This number is obtained from the arrangement of the inductors 21 preceding the switch in which the first inductor occupies the third position, the next inductor occupies the seventh position and the third inductor occupies the ninth position. A code set up on the keyboard by the keys 3, 7, 9 will be operated by this scanning arrangement.

Coil 24 on the inductor 23 receives an impulse from inductor 62 and through rectifier 63 and circuit 64 energizes the stick relay 65. When this relay is energized a holding circuit is established through contact finger 161, inductor 162 and contact 163 to energy. Contact 163 is controlled by the switch 379 so that when the switch reverses its position the holding circuit is opened at 163 and relay 65 is deenergized. Switch 379 is operated by the motor 168 controlled from energy wire B through contact 164 of relay 65 energized, conductor 165, controller 166, conductor 167 to the reverse field R and through motor 168 to the return circuit 0. When the motor completes the reverse movement of the switch the circuit is opened at 166.

After the train passes over the switch and on to the connecting track 160 it is necessary to restore the switch to the normal position and for this purpose an inductor 170 is provided on the center line of the track, having a primary coil 171 energized from transformer 172 and a sec-

ondary coil 173 connected by circuit 174, rectifier 175 and circuit 176 to stick relay 177. When relay 177 is energized a holding circuit is established through contact finger 178, conductor 179 and controller 166 now is the reverse position to the energy wire B. An operating circuit is also established through contact 180, conductor 181, controller 163 in the reverse position, normal field N and motor 168 to the return conductor 0. When the switch movement is completed to the normal position the circuits established by 163 and 166 are interrupted and normal conditions are restored. It should be noted that the inductor 62 on the vehicle, which registers with the inductor 170, has the coil 61 on open circuit at this time so that conductor 62 completes the magnetic circuit through an air gap around the primary 171 and secondary 173 of inductor 170, thereby producing an inductive impulse sufficient to energize relay 177. It should be understood that a resetting inductor for operating relay 177 may be provided on the main track to be operated by a passing vehicle before the inductors 21 are reached to insure that the switch is in the normal position.

The application of this system to an interconnecting track system is shown in Fig. 13 in which a single line diagram is used to indicate the tracks and the facing switches only are operated by the selector and grade crossings are avoided. The trailing switches may be spring controlled and trailed through or they may be operated by other means as the train approaches the switch, but selection is not necessary as there is no alternative route at a trailing switch.

The switches are indicated by three figured numbers, preferably arranged in ascending order, and it is apparent that switches may have the same numbers on succeeding tracks as the code selector can repeat any combination of the code in each position. In the track arrangement shown, eastbound traffic on the running track 501 may be deflected at the switches 112, 113, 114 and 115 to the tracks B, D, F, and H respectively. This traffic may also be deflected over cross-over 111 to track 503 and directed into the same distributing tracks over switches 116, 117, 119 and 220. Westbound traffic, on track 502, may be deflected by switches 346, 347, 348 and 349 to tracks H, F, D and B respectively; this traffic may also be deflected into tracks 505, over switch 345 and to track 504, over switches 345 and 350.

Cars from the distributing track A, C, E and G may be deflected over track 503 by switches 334, 335, 336 and 337 respectively. This traffic may be returned to the eastbound track over switch 223 or returned to the storage tracks 505 or 506. Interconnecting tracks I and J connecting the distributing tracks by the switches as shown to provide for interconnecting traffic without using the switching yard. Traffic on the storage tracks 505 and 506 may be returned to the distributing tracks or may be routed over switches 357 and 358 to the running track 502. It is apparent that while an extensive interconnecting system is shown, the operation is secured by relatively few selectively operated switches, while the code selector of Fig. 6 with twelve separate rows, each having a total of 120 different combinations represents a capacity of 1,440 switches,

Having thus described my invention, I claim:

1. Code selective apparatus comprising a scanning system, a group of relays controlled by said scanning system, adjustable apparatus controlling the circuits of said relays so that a predetermined number of selected relays may be operated by said scanning system according to a pre-arranged code, said apparatus comprising a frame with a row of insulated discs mounted on a shaft for the circuit of each relay, a plurality of contacts radially arranged on each disc, means for securing each contact in an inoperative position, a bar parallel with said shaft sliding on said frame and normally clear of said discs, means for moving said bar to engage said discs, a key on said bar for each disc, means for releasing each contact of the disc to the operative position by the operation of the corresponding key, means for rotating said discs relative to said bar for releasing the contacts, and a bail rotatably mounted on said shaft when said bar is in the normal position and rotating about said discs and an insulated contact on said bail for each disc engaging the released contacts of the discs for continuing the circuit of the selected relays.

2. Code selective apparatus comprising a scanning system, a group of relays controlled by said scanning system, adjustable apparatus controlling the circuits of said relays so that a predetermined number of selected relays may be operated by said scanning system according to a pre-arranged code, said apparatus comprising a frame with a row of insulated discs mounted on a shaft for the circuit of each relay, a plurality of contacts radially arranged on each disc, a spring for projecting each contact to the engaging position, means for latching said contacts in the inactive position, a bar parallel with said shaft sliding on said frame and normally clear of the discs, means for latching said bar to engage the discs, said bar having a ledge engaging said discs with an inclined plane forcing said contacts into the latching position as said discs are rotated relative to said bar, a key on said bar for each disc engaging the latching means for releasing the contacts desired, and a bail rotating about said discs when said bar is in the normal position and having an insulated contact for each disc engaging with the active contacts of the disc for continuing the circuit of the selected relays.

3. Code selective apparatus for selecting predetermined codes which will synchronize the system, comprising a tubular shaft, a row of insulated discs mounted on said shaft corresponding with the number of characters in the base of the code, radially arranged contact members on each disc adjustably positioned in an active or inactive position, an insulated conductor in said tubular shaft, connecting the contact members of each disc with a terminal at the end of the shaft, a bail mounted on said shaft and rotatable about said discs, an insulated contact member on said bail for each disc, a row of radial terminals mounted about the axis of said bail to which said contact members are connected and electric translating apparatus connected to said terminals and controlled by said contacts for selectively operating the code.

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