My invention relates to railway traffic control and indication apparatus, and particularly to apparatus for effecting continuous control of a railway traffic governing device, such for example as a switch or a signal, over a given pair of conductors, and at the same time effecting continuous control of indication apparatus over the same pair of conductors in the opposite direction.

Various schemes have been devised for controlling a railway track switch or a signal from a remote control point over a given pair of line conductors, and for controlling indication means at the control point over the same pair of line conductors from a field location adjacent the switch or signal. In some of those schemes, constant current is used for both the control and indication circuits, so that only one of such circuits can be closed at any given time, and hence the indication means cannot be controlled at the same time as the traffic governing device is being controlled. In other such schemes, an indication control relay is included, at the control point, in a given circuit in series with a control relay at the field location, and the circuit is periodically interrupted at the field location to control the indication relay at the control point. In still other schemes, coded control current is supplied over a pair of conductors for effecting energization of a stick relay which then remains energized by a stick circuit while coded indication current is supplied to the same pair of conductors.

One feature of my invention is the provision of means for supplying successive pulses of current at different frequencies and polarities at a field location adjacent a railway traffic governing device, such for example as a switch or a signal, to a given pair of conductors for effecting continuous control of indication means at a remote control point, and for supplying other pulses of current of different polarities to the same pair of conductors at the control point, during the off periods between the successive pulses of current supplied at the field location, for effecting continuous control of the switch or signal.

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

The accompanying drawings, comprising Figs. 1a, 1b, 1c and 1d, constitute a diagrammatic view showing one form of apparatus embodying my invention.

Referring first to Fig. 1a, a track plan is shown including a switch 1 which connects an auxiliary track Y with a main track X. In order to simplify the drawings, each of these tracks is represented by but a single line. These tracks are divided by insulated joints, designated by the reference character 3, into section 1T in which switch 1 is located, and two approach sections, designated by the reference characters 2RT and 2LT, respectively. Each of these sections is provided with a track circuit including a suitable source of current, such for example as a battery 4, connected across the rails adjacent one end of the section, and a track relay, designated by the reference character 1R, 2R or 2L, respectively, connected across the rails adjacent the opposite end of the section.

Traffic movements over switch 1 toward the right, as shown in the drawings, which I shall assume is the eastbound direction, are governed by signals designated by the reference characters 2RA and 2RB, when switch 1 is in the normal position or reverse position respectively, and traffic movements in the opposite or westbound direction over switch 1 are governed by signals 2LA and 2LB. These signals may be of any suitable design such, for example, as the searchlight type.

The contacts operated by the various relays and other control devices are identified by numbers, each such number having a distinguishing prefix from which it is separated by a dash when the associated contact is shown apart from the relay or other device by which it is operated. The prefix for each of these contact numbers comprises the reference character for the relay or other device by which the associated contact is operated. For example, contact 2RH—51, shown in Fig. 1a, in the operating circuit for signal 2RA, is identified by the number 51 which is separated by a dash from the prefix 2RH which is the reference character for relay 2RH by which this contact is operated.

Switch 1 is operated to its normal position, in which it is shown in the drawings, or to the opposite or reverse position by a mechanism designated by the reference character 1W. Mechanism 1W is in turn controlled by a polarized switch control relay 1WR.

A switch contact 5 is operated in conjunction with switch 1 so as to be closed for completing a circuit for energizing a normal switch relay 1N when switch 1 is in the normal position, and to be closed for completing a circuit for energizing a reverse switch relay 1R when switch 1 is in its reverse position.

Signals 2LA and 2RA are shown controlled in
part by signal home relays 2LH and 2RH, respectively.

Referring next to Fig. 1b, signal indication and approach indication control apparatus at a remote control point, shown in the right-hand portion of the drawing, are controlled, over a pair of conductors comprising a line wire 11 and ground designated GD, by successive pulses of current of normal or reverse polarity supplied to the pair of conductors at various frequencies at a field location adjacent the switch and signals shown in Fig. 1a. The various currents supplied to the pair of conductors at the field location are provided from a source such, for example, as a battery Q1 having a positive terminal FB, a negative terminal FN, and a center tap connected to ground GD.

If the signals are controlled to indicate stop, indication relays shown in Fig. 1c, designated by the reference characters 2RP and 2LP, are energized, and the current supplied to conductors 11 and GD is of normal polarity, whereas if either of these relays is deenergized, the current supplied to conductors 11 and GD is of reverse polarity.

Such current of either polarity is periodically interrupted by code transmitters designated by the reference characters 15CT, 120CT, 180CT and 240CT, respectively, to produce 75, 120, 180 or 240 pulses of current per minute according to the energized or deenergized condition of track relays 2L and 2R. Each of the code transmitters is connected across the positive terminal B and the center tap O of a battery Q2, and is therefore constantly in operation.

Current of either polarity and of any of the four frequencies mentioned is transmitted from the field location over conductors 11 and GD through the back point of a contact 2P—12 and the windings of polar biased code following indication relays 2PS and 2HP in series. If the current is of normal polarity, relay 2PS will operate its contact 14 in response to each pulse, whereas if the current is of the opposite polarity, relay 2HP will operate its contact 13 in response to each pulse.

A slow release signal indication relay 2PR becomes periodically energized when relay 2PS operates its contact 14. Because of its slow release characteristic, relay 2PR retains its contacts closed at their front points during the open circuit intervals between the periodic energization periods.

If contact 14 of relay 2PS or contact 13 of relay 2HP is being operated in response to successive pulses of current having frequencies of 120, 180 or 240 per minute, one of three decoding relays, designated by the reference characters 2LD, 2RD and 2LRD, respectively, will be energized by a circuit including the portion 10 of the primary winding of a transformer 2EF. These decoding relays are selectively energized through resonant decoding units, designated by the reference characters 120DU, 180DU and 240DU, respectively, according to the frequency of the pulses of current by which relays 2PS and 2HP are excited, similarly to the manner referred to on page 8, column 1, lines 34 to 37 of Reissue Patent 21,783 granted April 29, 1941, to Herman G. Blosser for Approach control apparatus for railway signaling systems.

A polar biased code following impulse relay 2P will operate its contact 2P—12 in response to pulses of current produced in the secondary winding 19 of transformer 2EF each time relay 2PS or relay 2HP releases its contact 14 or 13, respectively, in the manner referred to in lines 40 to 56 inclusive, column 2, page 2 of the Blosser Reissue patent referred to. Contact 2P—12 will therefore be closed at its front point for a brief period of time during each off period while the back point of contact 2P—12 is in the position of the transmitter 15CT or the back point of a similar contact of code transmitters 120CT, 180CT and 240CT, respectively, is closed between the successive pulses of current supplied through the front points of the corresponding code transmitter contact.

Current pulses of positive or negative polarity according as a switch control lever 1V, shown in Fig. 1d, is in its n or r position, will be supplied through the front point of contact 2P—12 from a suitable source of current such, for example, as a battery Q3. The pulses of current supplied through the front point of contact 2P—12 will be transmitted over conductor 11 and ground GD and the back point of contact 8 of code transmitter 15CT or a back point of one of the similar code transmitters 120CT, 180CT and 240CT, according to the condition of relays 2PS and 2HP, through the windings of polar biased normal and reverse switch control relays 1NW and 1RW, respectively, which may or may not be of the code following type. If these pulses of current are of normal polarity, relay 1NW will close its contact 23, whereas if the pulses of current are of reverse polarity, relay 1RW will close its contact 42.

If a switch locking relay 1LR is energized, relay 1WR will be energized by current of normal or reverse polarity according to whether contact 73 of relay 1NW or contact 42 of relay 1RW is closed. Switch locking relay 1LR is in turn controlled by contact 1TR—22 and by contact 21 of an approach or time locking relay 2AS which may be controlled in any suitable manner such, for example, as shown for relay 2AS in Letters Patent of the United States No. 2,196,712 granted April 30, 1940, to Harry C. Vantassel for Railway traffic controlling apparatus.

Referring now to Fig. 1c, switch indication and switch section indication control apparatus at the remote control point, shown in the right-hand portion of the drawings, are controlled, similarly to the indication control apparatus shown in Fig. 1b, over a pair of conductors comprising a line wire 29 and ground GD, by successive pulses of current of normal or reverse polarity supplied to the pair of conductors at various frequencies at the field location adjacent the switch and signals shown in Fig. 1a. The various currents supplied to the pair of conductors at the field location are provided from battery Q1, referred to in connection with Fig. 1b.

If switch 1 is in the normal position, so that the normal switch repeater relay 1XR is energized, the current supplied to the conductors will be of normal polarity, whereas if switch 1 is in the reverse position, so that the reverse switch repeater relay 1RR is energized, the current supplied to the conductors will be of reverse polarity. The current of either polarity is periodically interrupted by code transmitters 15CT, 120CT and 240CT to produce 75, 120 or 180 pulses per minute, respectively, according to the energized or deenergized condition of switch locking relay 1LR and track relay 1TR.

Polar biased code following indication relays 1NP and 1RP, slow release normal and reverse switch indication relays 1NR and 1RR, transformer 1RF, polar biased code following impulse relay 1P, and decoding relays 1LD and 1TD are
controlled similarly to the corresponding parts shown in Fig. 1b. Polar biased signal control relays 2LR and 2RR are also controlled by a signal control lever 2V similarly to the manner in which switch control relays 1NW and 1RW are controlled by switch control lever 4V as described in connection with Fig. 1b.

Signal home relays 2LH and 2RH are controlled by relays 2LR and 2RR, respectively. Signal stop indication relays 2LP and 2RP are controlled by circuits including back contacts of relays 2LH and 2RH, respectively.

Referring to Fig. 1c, a track model and indication lamps are here shown, together with switch control lever 4V having a normal position 8 and a reverse position 7, signal control lever 2V having a normal position 6 and control positions 5 and 4, and circuits for controlling the indication lamps.

Having described, in general, the arrangement and control of the apparatus shown by the accompanying drawings, I shall now describe, in detail, a few typical examples of its operation.

As shown by the drawings, all points are in the normal position, that is, switch 4 is in its normal position; all signals are indicating stop; track sections 2RT, 1T and 2L1 are unoccupied, and hence the track relays are energized; levers 1V and 2V are in their normal position 8; code transmitters 15CT, 120CT, 180CT and 140CT are energized, so they are constantly operating; relays 2PS and 1NP are operating their contacts in response to pulses of current of normal polarity from the field location; impulse relays 1P and 2P are operating their contacts; relays 1NP and 1NR are periodically energized; relays 2PS and 1NP and 2P, 2RP, and 1NR are energized; relay 1WR is energized by current of normal polarity; relays 4R, 2LD, 2RD, 2LDR, 2LR, 2RR, 1RR, 1LH, 2RH, 1LD and 1TD are deenergized; indication lamps 1IN and 2PK are lighted; and other indication lamps are deenergized.

The circuit by which relay 2PS is energized passes from terminal PB of battery Q1, through the front points of contacts 2RP—6, 2LP—7, contact 8 of code transmitter 180CT, contacts 2L—9 and 2R—10, conductor 11, back point of contact 2P—12, windings of relay 2PS and 2HP, and ground GD back to the center tap of battery Q1. Relay 2PS is therefore closing its contact 14 alternately at the front and back points in response to pulses of current, having a frequency of 75 per minute, flowing in this circuit.

Relay 2FR is periodically energized through a circuit including the front point of contact 14 of relay 2PS, this circuit passing from terminal OB of a suitable source of current, such for example as battery Q3, through the back point of contact 13 of relay 2HP, front point of contact 14 of relay 2PS, winding of relay 2FR, and the primary winding of transformer 2RF and ground GD to the center tap of battery Q3.

In response to the periodic closing of contact 14 of relay 2PS at its back point, relay 2P operates its contact 2P—12 in the manner referred to in the Bresser reissue patent.

Each time contact 2P—12 closes at its front point, a circuit is completed for energizing relay 1NW, this circuit passing from terminal OB of battery Q3, through contact 1V—20 in the left hand position, front point of contact 2P—12, conductor 11, front points of contacts 2R—10 and 4L, and contact 8 of code transmitter 15CT, the windings of relays 1RW and 1NW, and ground GD to the center tap of battery Q3.

Switch locking relay 1LR is energized by a circuit including contact 21 of relay 2AS, contact 1TR—22, and the winding of relay 1LR to terminal O.

Polarized switch control relay 1WR is therefore energized by current of normal polarity in a circuit passing from terminal B of battery Q2, contact 23 of relay 1NW, contact 24 of relay 1LH, and the winding of relay 1WR to terminal O of battery Q2.

With relay 1IN energized on account of switch 4 being in its normal position, a circuit is completed, as shown in Fig. 1c, for energizing relays 4NP and 4RP by current of normal polarity to which relay 4NP responds by operating its contact 32, this circuit passing from terminal PB, through the front points of contacts 4N—25, 78CT—28, 1LR—27 and 4TR—29, conductor 29, back point of contact 1P—30, and windings of relays 4NP and 4RP, and ground GD back to battery Q1. Relay 1IN will be periodically energized by current passing from terminal OB, through the back point of contact 31 of relay 1RP, front point of contact 32 of relay 1NP, winding of relay 1NR, portion 33 of the primary winding of transformer 1RP, and ground GD back to battery Q3. Impulse relay 1P is now periodically energized in response to the periodic closing of contact 32 of relay 1IN at its back point. Relay 1P therefore operates its contact 1P—30 alternately between the front and back points.

With lever 2V occupying its normal position, the circuits including the front point of contact 1P—30 for energizing relays 2LR and 2RR are open, and hence neither of these relays is energized. With slow release relay 1NR energized, a circuit is completed for constantly lighting indication lamp 1NK, this circuit passing from terminal B of a suitable source of current, through contact 1IN—31, and lamp 1NK to terminal O of the same source of current. With relay 2PR energized, an indication circuit is completed for energizing lamp 2PK, passing from terminal B, through the front point of contact 2PR—38, and lamp 2PK to terminal O.

I shall assume that, with all parts thus in the normal condition, an eastbound train arrives on section 2RT, deenergizing relay 2R. The circuit previously traced through contact 8 of code transmitter 180CT for energizing relay 2PS will now be opened at the front point of contact 2R—10, and a second circuit will be completed, for energizing relay 2PS, which is the same as the circuit previously traced as far as the front point of contact 2L1—7, and then passes through the front point of contact 39 of transmitter 180CT, front point of contact 2L—40, and the back point of contact 2R—10, and is then the same as the circuit previously traced. Relay 2PS will now respond to current of 180 pulses per minute and impulse relay 2P will now operate its contact 2P—12 180 times per minute.

Decoding relay 2RD will now be energized through the decoding unit 186DU in response to the pulses of current having a frequency of 180 per minute. With relay 2RD energized, a circuit will be completed for energizing indication lamp 2RK in the track model, this circuit passing from terminal B, through contact 2RD—41, and lamp 2RK to terminal O.

Relay 1NW will now respond to current of 180 pulses per minute in a circuit which is the same as the circuits previously traced for this relay as far as conductor 11, and then passes through the back point of contact 2R—10, front point
of contact 2L—40, back point of contact 39 of
transmitter 180 CT, and then through the wind-
ings of relays IRW and INW to ground GD.

I shall further assume that the leverman now
desires to operate switch 1. He will, therefore,
move lever 1V to the right-hand position, thereby
completing a circuit for energizing relays IRW
and INW by current of reverse polarity to which
only relay IRW responds, this circuit passing
from the center tap of battery Q2, through ground
GD, the windings of relays INW and IRW, back
point of contact 39 of transmitter 180 CT, front
point of contact 2L—40, back point of contact
2R—10, conductor 11, front point of contact
2R—12, and contact IV—20 in the right-hand
position to terminal ON of battery Q2. Relay
IRW will now become energized by current of
reverse polarity passing from terminal O of bat-
tery Q2, through the winding of relay IWR, con-
tact 24 of relay I LR, and contact 42 of relay IRW
to terminal N of battery Q2. With relay IWR en-
ergized by current of reverse polarity, mechanism
I MW will be energized for operating switch 1 to
the reverse position by a circuit including contact
I WR—43, contact I WR—44 closed in the right-
hand position, and mechanism I MW to terminal O.

Upon the operation of switch 1 to the reverse
position, contact 5 will become closed in its re-
verse position, causing relay IR2 to become en-
ergized by a circuit passing from terminal B,
through contact 5 in the reverse position, and
winding of relay IR2 to terminal O. Relays IRP
and INP, shown in Fig. 1c, will now become en-
ergized by current of reverse polarity to which
only relay IRP will respond, this circuit passing
from the center tap of battery Q1, through ground
GD, the windings of relays IRP and INP, back
point of contact IP—30, conductor 25, front
points of contacts ITR—28, ILR—27 and 78CT—
28, and contact IR—45 energized to terminal FN.
Contact 32 of relay INP will therefore now be con-
stantly closed at its back point, and contact 31 of
relay IRP will be alternately closed at its front
and back points. Relay IWR will therefore now
be energized by a circuit passing from terminal O,
through the front point of contact 31 of relay
IRP, winding of relay IRP, and portion 33 of the
primary winding of transformer IRP to ground
GD. With relay IRR thus energized, a circuit will
be completed for energizing indication lamp IRR,
passing from terminal B, through contact I RR—46,
and lamp I RRK to terminal O.

I shall now assume that all parts of the appa-
ratus are again in the normal condition, and
that the leverman decides to clear signal 2RA.
He will, therefore, move lever 2V to the right-
hand position, thereby completing a circuit for
energizing relays 2RR and 2LR by current of
reverse polarity to which only relay 2RR re-
sponds, this circuit passing from the center tap
of battery Q3, through ground GD, the windings
of relays 2RR and 2LR, back point of contact
78CT—26, front points of contacts 1LR—27 and
ITR—28, conductor 29, front point of contact
IP—33, and contact 2V—47 closed in the right-
hand position, to terminal ON. With relay 2RR
thus energized, signal home relay 2RH will be
energized by a circuit passing from terminal B,
through contact 48 of relay 2RR, and the wind-
ing of relay 2RH to terminal O. Signal stop in-
dication relay 2RP will therefore be deenergized
because of the opening of contact 49 of relay
2RH. With relay 2RH energized, the arm of sig-
nal 2RA will be operated to a position for direct-
ing traffic past signal 2RA, this circuit including
contact 2RH—51, and the mechanism of signal
2RA to terminal O.

With relay 2RP deenergized, a circuit will be
periodically closed for energizing relays 2PS and
2HP by current of reverse polarity to which only
relay 2HP will respond, this circuit passing from
battery Q1, through ground GD, windings of rel-
ays 2HP and 2PS, back point of contact 2P—12,
conductor 11, front points of contacts 2R—10
and 2L—8, front point of contact 8 of code trans-
mitter 78CT, front point of contact 2LP—7, and
the back point of contact 2RP—6 to terminal FN.
With relay 2PS constantly deenergized, its con-
tact 14 will be constantly closed at the back point
and hence relay 2PR will be deenergized, caus-
ing indication lamp 2VRRK to be energized by
a circuit passing from terminal B, through the
back point of contact 2PR—36, contact 50 of
lever 2V closed in the r position, and indication
lamp 2VRRK to terminal O.

From the foregoing description and the ac-
companying drawings, it follows that in apparatus
embracing my invention, an indication de-
vice in a control station, in response to a given
traffic condition such, for example, as the pos-
tion of a switch, the indication displayed by a
signal, or the condition of a track relay or of a
switch locking relay, can be continuously con-
trolled by successive pulses of current supplied
to a pair of conductors such, for example, as a
line wire and ground, while at the same time a
switch or a signal can be continuously controlled
from the remote control station by other pulses
of current supplied to the conductors between
the successive pulses of indication.

Although I have herein shown and described
only one form of apparatus embodying my in-
vention, it is understood that various changes
and modifications may be made therein within the
scope of the appended claims without depar-
ting from the spirit and scope of my inven-
tion.

Having thus described my invention, what I
claim is:

1. In control and indication means including
a pair of conductors and means for gen-
ersing successive pulses of current to said conductors of each
polarity at each of a plurality of frequencies one
for each of a corresponding plurality of traffic
conditions, including a normal code following relay
and a reverse code following relay responsive to
said pulses of current of normal and reverse
polarity respectively, the combination compris-
ing, a contact of said normal code following relay and
a contact of said reverse code following relay each
having a front and a back point, a reverse indica-
tion circuit including the front point of said con-
sult, the said reverse code following relay, a nor-
mal indication circuit including the back point of
said contact of said reverse code following relay
in series with the front point of said contact of
said normal code following relay, normal and re-
verse indication means controlled by said normal
and reverse indication circuits respectively, other
indication means selectively controlled by said
front contact points according to the frequency of
said pulses of current passing, an indication of the
polarity of said pulses, a third code following relay,
a circuit including said back points of said con-
sults in series for energizing said third code fol-
lowing relay, and manually controllable circuit
means including a front contact of said third code
following relay and including said pair of conduc-
tors for effecting operation of given traffic governing means.

2. In control and indication means including a pair of conductors, and means for supplying successive pulses of current to said conductors of each polarity at each of a plurality of frequencies and of said plurality of traffic conditions, including a normal code following relay and a reverse code following relay responsive to said pulses of current of normal and reverse polarity, respectively, the combination comprising, indication means selectively controlled by said conductors of said plurality of traffic conditions and of normal or reverse polarity at each of said frequencies according to one or another traffic governing condition, normal and reverse code following relays responsive to said pulses of current of normal and reverse polarities, indication means selectively controlled by said code following relays according to the frequency of the current pulses but independently of the polarity of said pulses, other indication means selectively controlled by front contacts of said code following relays according to the polarity of said pulses of current, and manually controllable circuit means controlled by back contacts of said code following relays for supplying other pulses of current to said conductors during the off periods between said successive pulses of current of each frequency of said plurality of frequencies for effecting operation of given traffic governing means.

3. In control and indication means including a pair of conductors, the combination comprising, means for supplying successive pulses of current to said conductors at each of a plurality of frequencies for each of a plurality of traffic conditions and of normal or reverse polarity at each of said frequencies according to one or another traffic governing condition, a normal and a reverse code following relay selectively responsive to said pulses of current of normal and reverse polarities respectively, indication means selectively controlled by said code following relays according to the frequency of the current pulses by which they are energized but independently of the polarity of said pulses, other indication means selectively controlled by said code following relays according to the polarity of said pulses of current, and manually controllable circuit means controlled by said code following relays for supplying other pulses of current to said conductors during the off periods between said successive pulses of current of each frequency of said plurality of traffic conditions and of normal or reverse polarity at each of said frequencies according to one or another traffic governing condition.

4. In control and indication means including a pair of conductors, the combination comprising, means for supplying successive pulses of current to said conductors at each of a plurality of frequencies for each of a plurality of traffic conditions and of normal or reverse polarity at each of said frequencies according to one or another traffic governing condition, a normal and a reverse code following relay selectively responsive to said pulses of current of normal and reverse polarity respectively, a contact of said normal code following relay and a contact of said reverse code following relay each having a front and a back point, indication means selectively controlled by said contacts according to the frequency and polarity of said pulses of current, and manually controllable circuit means controlled by said back points of said contacts for supplying other pulses of current to said conductors during the off periods between said successive pulses of current for effecting operation of given traffic governing apparatus.

5. In control and indication means including a pair of conductors, the combination comprising, means for supplying successive pulses of current to said conductors at each of a plurality of frequencies for each of a plurality of traffic conditions and of normal or reverse polarity at each of said frequencies according to one or another traffic governing condition, normal and reverse code following relays responsive to said pulses of current of normal and reverse polarities, indication means selectively controlled by said code following relays according to the frequency of the current pulses but independently of the polarity of said pulses, other indication means selectively controlled by front contacts of said code following relays according to the polarity of said pulses of current, and manually controllable circuit means controlled by back contacts of said code following relays for supplying other pulses of current to said conductors during the off periods between said successive pulses of current of each frequency of said plurality of frequencies for effecting operation of given traffic governing means.

6. In indication means for a signal and control means for a railway track switch, including a normal code following relay and a reverse code following relay and a pair of conductors, the combination comprising, means for supplying successive pulses of current to said conductors of normal or reverse polarity according as said signal displays a first or a second indication respectively for energizing said code following relays, indication means controlled by front contacts of said code following relays to display a first or a second indication according as said pulses of current are of normal or reverse polarity respectively, a manually operable device, means controlled by said manually operable device and by back contacts of said code following relays for supplying other pulses of current of normal or reverse polarity to said conductors during the off periods between said first pulses of current, and means controlled by said other pulses of current of normal or reverse polarity for operating said switch to its normal or its reverse position respectively.

7. In indication means for a signal and for a plurality of other traffic control devices and in control means for a railway track switch, including a normal code following relay and a reverse code following relay and a pair of conductors, the combination comprising, means for supplying successive pulses of current to said conductors of normal or reverse polarity according as said signal displays a first or a second indication respectively and at one of a plurality of frequencies each of which is provided only in response to a given set of conditions of said other control devices for energizing said code following relays, indication means for said signal selectively controlled by said code following relays according to the frequency of said pulses but independently of the polarity of said pulses, indication means for said signal selectively controlled by said code following relays according to the polarity of said pulses of current, and means controlled by said other pulses of current of normal or reverse polarity for operating said switch to its normal or its reverse position respectively.

8. In indication means for a railway track switch and control means for a signal, including a normal code following relay and a reverse code following relay and a pair of conductors, the combination comprising, means for supplying successive pulses of current to said conductors of normal or reverse polarity at each of said frequencies according to one or another traffic governing condition, normal and reverse code following relays responsive to said pulses of current of normal and reverse polarities, indication means selectively controlled by said code following relays according to the frequency of the current pulses but independently of the polarity of said pulses, other indication means selectively controlled by front contacts of said code following relays according to the polarity of said pulses of current, and manually controllable circuit means controlled by back contacts of said code following relays for supplying other pulses of current to said conductors during the off periods between said successive pulses of current of each frequency of said plurality of frequencies for effecting operation of given traffic governing means.
mal or reverse polarity according as said switch is in its normal or its reverse position for energizing said code following relays, a contact of said normal code following relay and a contact of said reverse code following relay each having a front and a back point, indication means controlled by the front points of said contacts of said code following relays to display a normal or a reverse indication according as said pulses are of normal or reverse polarity respectively, a manually operable device, means controlled by said manually operable device and by the back points of said contacts of said code following relays in series for supplying other pulses of current to said conductors during the off periods between said first pulses of current of one polarity, and means controlled by said other pulses of current for clearing said signal.

9. In indication means for a railway track switch and for a plurality of other control devices and in control means for a signal, including a normal code following relay and a reverse code following relay and a pair of conductors, the combination comprising, means for supplying successive pulses of current to said conductors of normal or reverse polarity according as said switch is in its normal or its reverse position and at one of a plurality of frequencies each of which is provided only in response to a corresponding set of conditions of said other control devices for energizing said code following relays, a contact of said normal code following relay and a contact of said reverse code following relay each having a front and a back point, indication means selectively controlled by the front points of said contacts of said code following relays according to the frequency of said pulses, other indication relays selectively controlled by the front points of said contacts of said code following relays according to the polarity of said pulses of current, manually operable means, means controlled by said manually operable means and by the back points of said contacts of said code following relays in series for supplying other pulses of current to said conductors during the off periods between said first pulses of current of one polarity, and means controlled by said other pulses of current for clearing said signal.

10. In indication means for a plurality of control devices and in control means for another control device, including a normal code following relay and a reverse code following relay and a pair of conductors, the combination comprising, means for supplying successive pulses of current to said conductors of normal or reverse polarity according as there exists one or another set of conditions of said plurality of control devices and for supplying said pulses at any one of a plurality of frequencies according as there exists a corresponding other set of conditions of a corresponding plurality of sets of conditions of said plurality of control devices for energizing said relays, a contact of said normal code following relay and a contact of said reverse code following relay each having a front and a back point, indication means selectively controlled by the front points of said contacts of said code following relays according to the frequency and polarity of said pulses, manually operable means, means controlled by said manually operable means and by the back points of said contacts of said code following relays in series for supplying other pulses of current of one polarity to said conductors during the off periods between said first pulses of current, and means controlled by said other pulses of current for energizing said control means for said another control device.

JOHN M. PELIKAN.
CERTIFICATE OF CORRECTION.

JOHN M. PELIKAN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 6, first column, line 36, claim 9, for "means" read --relays--; line 37, same claim, for "relays" read --means--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of March, A. D. 1946.

Leslie Frazer

(Seal)                               First Assistant Commissioner of Patents.