June 7, 1932. L. R. ALLISON ET AL 1,861,488

RAILWAY TRAFFIC CONTROLLING APPARATUS

Filed May 1, 1931 2 Sheets-Sheet 1

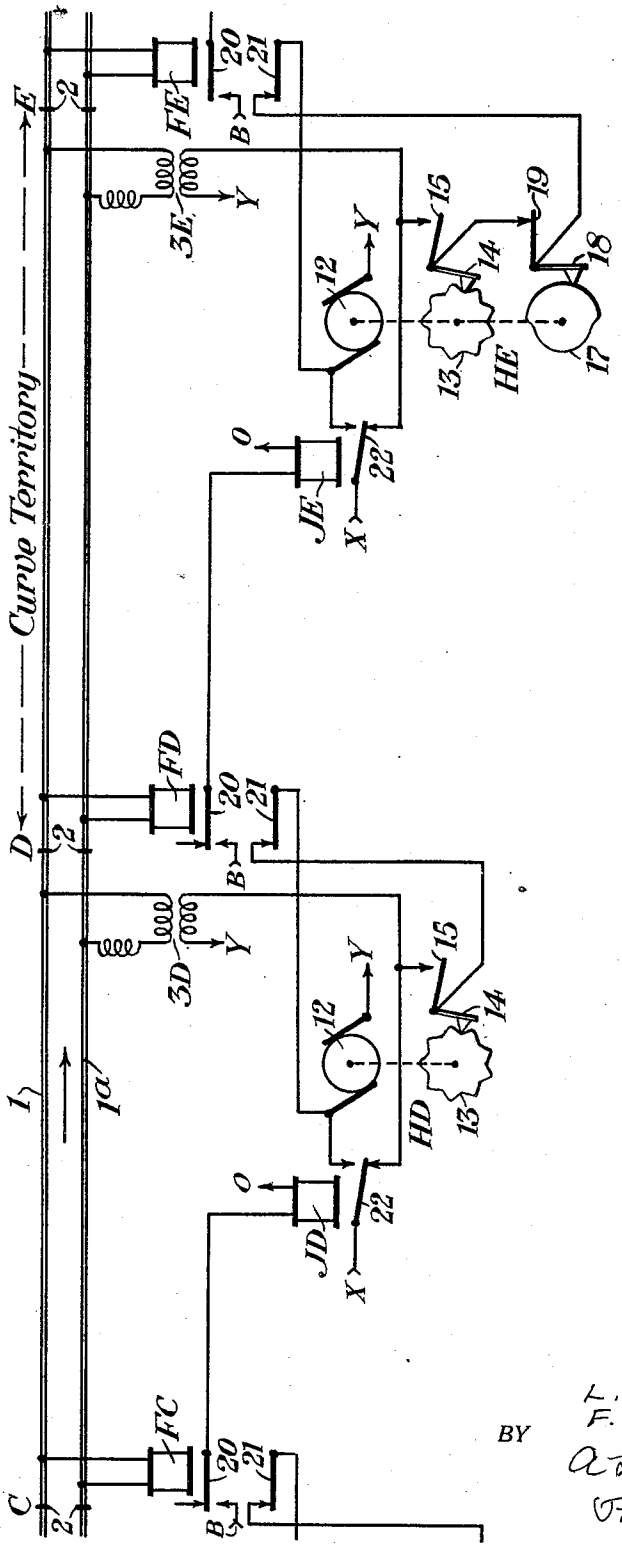


Fig. 1.

INVENTORS:
L. R. Allison, and
F. H. Nicholson,
BY
A. R. Kendall
Their ATTORNEY.

June 7, 1932. L. R. ALLISON ET AL 1,861,488

RAILWAY TRAFFIC CONTROLLING APPARATUS

Filed May 1, 1931 2 Sheets-Sheet 2

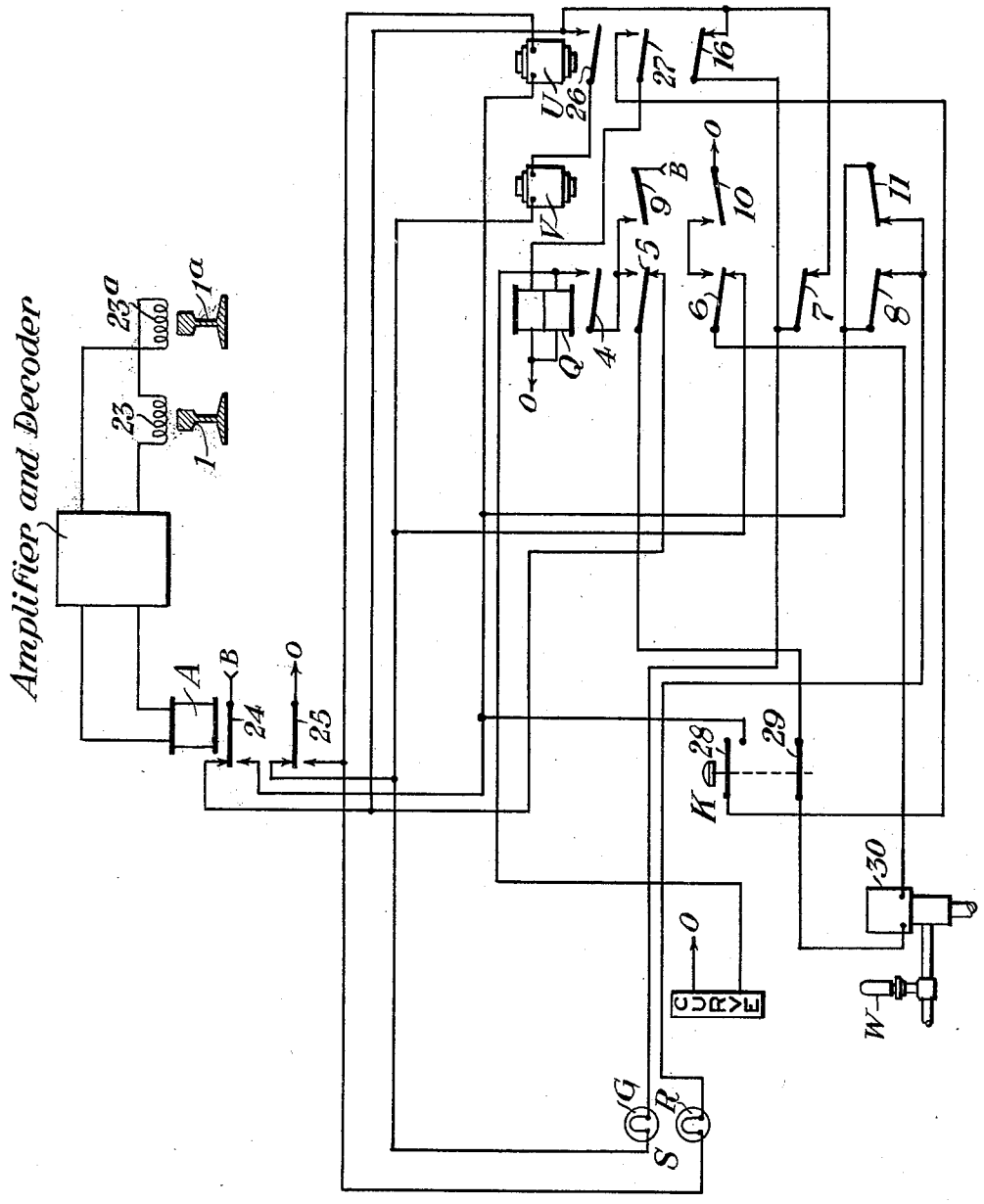


Fig. 2.

INVENTORS:
L. R. Allison, and
F. H. Nicholson,
by A R Vincell
their ATTORNEY.

Patented June 7, 1932 1,861,488

UNITED STATES PATENT OFFICE

LESLIE R. ALLISON, OF WILKINSBURG, AND FRANK H. NICHOLSON, OF EDGEWOOD, PENNSYLVANIA, ASSIGNORS TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

RAILWAY TRAFFIC CONTROLLING APPARATUS

Application filed May 1, 1931. Serial No. 534,294.

Our invention relates to railway traffic controlling apparatus of the type involving train-carried governing mechanism controlled by train governing current in the track rails. One feature of our invention is the provision, in apparatus of this character, of means on the train selectively responsive to periodic interruption of the train governing current to display a distinctive indication, such, for example, as a curve signal.

We will describe one form of apparatus embodying our invention, and will then point out the novel features thereof in claims.

In the accompanying drawings, Fig. 1 is a diagrammatic view showing one form of trackway apparatus embodying our invention. Fig. 2 is a diagrammatic view showing one form of train-carried apparatus embodying our invention, and suitable for cooperation with the trackway apparatus shown in Fig. 1.

Similar reference characters refer to similar parts in each of the views.

Referring first to Fig. 1, the reference characters 1 and 1ª designate the track rails of a stretch of railway track along which traffic normally moves in the direction indicated by the arrow. These rails are divided by insulated joints 2 to form track sections, of which only two sections C—D and D—E are shown in the drawings. Section D—E involves a special hazard, such, for example, as a curve requiring less than maximum speed. Each section is provided with the usual track relay F, and the usual track transformer 3. As here shown, the apparatus is of the code type, that is, the train governing current which is supplied to the track rails is a periodically interrupted alternating current, and for this purpose each section is provided with a coding device H comprising a motor 12, a cam 13 operated by the motor, a follower 14, and a contact 15 which is periodically opened while the coding device is in operation. The coding device HE for section D—E is provided with an additional cam 17 coacting with a follower 18 which operates a contact 19. Each section is further provided with a relay J which controls the coding device and which also controls the supply of current to the associated transformer 3.

Normally the track relays F are closed, and the code relays J are open. Assuming that a train moving toward the right enters section C—D, track relay FC will open, thereby energizing relay JD. The circuit for relay JD includes a back contact 20 of relay FC, and the circuit is supplied with current from a source the terminals of which are designated B and O. While relay JD is deenergized, alternating track circuit current is uninterruptedly supplied to the primary of transformer 3D, through the back point of contact 22 of relay JD, the terminals of this source of current being designated X and Y. When relay JD becomes energized, the supply of uninterrupted alternating current for transformer 3D is discontinued, and motor 12 of coding device HD is supplied with current through the front point of contact 22 of relay JD. Track relay FD being energized, coded alternating current is supplied to the primary of transformer 3D, the circuit being from terminal X, through the front point of contact 22 of relay JD, front point of contact 21 of relay FD, coding device contact 15, and the primary 3D to terminal Y. This is the train governing current of the present system, and it will be clear from the foregoing that it consists of a coded or periodically interrupted alternating current. If relay FD is deenergized, the supply of train governing current to transformer 3D will be prevented.

When the train enters section D—E it will open track relay FD, and this will energize relay JE, thereby setting the coding device HE into operation. The circuit for transformer 3E will then be from terminal X, through the front point of contact 22 of relay JE, front contact 21 of relay FE, coder contact 19, coder contact 15, and the primary of transformer 3E to terminal Y. Coder contact 19 operates at a slower rate than contact 15, so that the current which is supplied to transformer 3E will be periodically interrupted alternating current, that is, train governing current, which in turn is supplied intermittently.

Referring now to Fig. 2, the train-carried apparatus comprises a main relay A which responds to the train governing current in the track rails. As here shown, the train is provided with two windings 23 and 23[a] located in inductive relation to the two track rails 1 and 1[a], respectively, these windings being connected in series in a circuit which includes amplifying and decoding apparatus, and this apparatus in turn supplied energy to the main relay A. The amplifying and decoding apparatus forms no part of our present invention, and it is sufficient to state that relay A will be continuously energized when coded current, that is, train governing current, is being continuously supplied to the track rails, but will be energized intermittently when this coded current is being intermittently supplied through contact 19 of coding device HE, and will be continuously deenergized when uncoded alternating current is being supplied to the track rails or when no current is being supplied to the track rails. One form of decoding apparatus which operates in the manner described is disclosed in the patent to P. N. Bossart No. 1,773,472, dated Aug. 19, 1930, and relay A of the present structure operates in the manner described with respect to relay K[3], for example, of said patent to Bossart.

The train-carried governing apparatus comprises a signal S having a proceed lamp G and a stop lamp R. This apparatus also involves a whistle W controlled by a magnet 30. When relay A is energized, the proceed lamp G is lighted, the circuit being from terminal B, through front point of contact 24 of relay A, back contact 16 of a slow-releasing relay U or back contact 7 of a stick relay Q, lamp G, and the front point of contact 25 of relay A to terminal O. At the same time the whistle magnet 30 is energized, the circuit being from terminal B, through front contact 24 of relay A, back contact 5 of relay Q, acknowledging contact 29, magnet 30, back contact 6 of relay Q, and front contact 25 of relay A, to terminal O. When relay A is deenergized, the circuits for lamp G and magnet 30 will be opened, and lamp R will become lighted by virtue of a circuit which passes from terminal B, through back contact 24 of relay A, back contact 8 of relay Q, or back contact 11 of a second slow-releasing relay V, lamp R, and back contact 25 of relay A, to terminal O. The usual acknowledging apparatus will be provided to enable the engineer to stop the operation of the whistle W when relay A becomes deenergized, but this apparatus forms no part of our present invention and is omitted from the drawings in order to simplify the disclosure.

Relay U is provided with a circuit which passes from terminal B, through back contact 24 of relay A, winding of relay U, and back contact 25 of relay A to terminal O. Relay V is provided with a circuit which passes from terminal B, through front contact 24 of relay A, front contact 26 of relay U, winding of relay V, and front contact 25 of relay A, to terminal O. It will be seen, therefore, that normally either relay U or relay V will be open, but that when relay A is operating intermittently, both of the slow-releasing relays U and V will be closed, it being understood that these relays are sufficiently slow-releasing to bridge the intervals between successive operations of relay A while coded train governing current is being supplied intermittently to the track rails.

Relay Q is provided with a pick-up circuit which passes from terminal B, through back contact 24 of relay A, normally open contact 28 of an acknowledging switch K, front contact 27 of relay U, and the upper winding of relay Q, to terminal O. Relay Q is provided with a stick circuit which passes from terminal B, through front contact 9 of relay V, front contact 4 of relay Q, and the lower winding of this relay, to terminal O.

Whistle magnet 30 is provided with an auxiliary circuit which passes from terminal B, through front contact 9 of relay V, front contact 5 of relay Q, normally closed contact 29 of acknowledging switch K, winding of magnet 30, front contact 6 of relay Q, and front contact 10 of relay V to terminal O.

The operation of the apparatus shown in Fig. 2 is as follows: While coded train governing current is being continuously supplied to the track rails, relay A will be continuously energized, so that signal lamp G will be lighted and whistle magnet 30 will be energized to keep the whistle silent. Relays U, V and Q will all be open. When coded train governing current is intermittently supplied to the track rails, relay A will be intermittently operated. When the back contacts of this relay close, relay U will become energized, and the next time that the front contacts of relay A close, relay V will become energized. These relays U and V will remain energized as long as the intermittent operation of relay A continues. Lamps G and R will then each be lighted intermittently, and whistle magnet 30 will be intermittently deenergized, thereby causing intermittent blasts of the whistle W. If now the engineer reverses the acknowledging switch K while relay A is deenergized, the pick-up circuit for relay Q will be closed, because this circuit is closed at contact 27 of relay U. The stick circuit for relay Q will then become closed at contact 9 of relay V, so that the acknowledging switch K may be released. Relays Q, V and U will then be closed, so that the circuit for lamp G will be opened at both contacts 7 and 16, the cir-

cuit for lamp R will be opened at contact 8, and the circuit for magnet 30 will be closed at contacts 9, 5, 6 and 10. It follows that lamp G will remain extinguished, and magnet 30 will be continuously energized to prevent the intermittent operation of whistle W. At the same time, a special curve signal will be lighted, the circuit being from terminal B, through front contact 9 of relay V, front contact 4 of relay Q, and the lamps of the curve signal, to terminal O.

When coded train governing current is again continuously supplied to the track rails, or when the intermittent supply of this current is discontinued, relay A will either remain energized, or remain deenergized. In either event relay V will open, thereby opening the stick circuit for relay Q, and the parts of the apparatus will then be restored to their normal conditions.

Although we have herein shown and described only one form of apparatus embodying our invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of our invention.

Having thus described our invention, what we claim is:

1. Railway traffic controlling apparatus comprising means for supplying train governing current to the track rails, means for at times periodically interrupting the supply of such current to the rails, a train carried main relay controlled by such current and arranged to be energized continuously or intermittently according as the current is supplied continuously or is periodically interrupted, two signals controlled by said relay and one or the other of which is displayed according as the relay is energized or deenergized, and means including a manually operable member effective when and only when said relay is intermittently energized to prevent the display of either of said signals and to cause the display of a third signal.

2. Railway traffic controlling apparatus comprising means for supplying train governing current to the track rails, means for at times periodically interrupting the supply of such current to the rails, cab signaling apparatus controlled by said current and comprising two signals one or the other of which is displayed according as the current is present or absent, and means including a manually operable member effective when and only when said current is being periodically interrupted to prevent the display of either of said signals and to cause the display of a third signal.

3. Railway traffic controlling apparatus comprising means for supplying train governing current to the track rails, means for at times periodically interrupting the supply of such current to the rails, cab signaling apparatus controlled by said current and comprising a signal which is displayed when the current is present but not when it is absent, and means including a manually operable member effective when and only when said current is being periodically interrupted to prevent the display of said signal and to cause the display of another signal.

4. Railway traffic controlling apparatus comprising means for supplying train governing current to the track rails, means for at times periodically interrupting the supply of such current to the rails, a train carried main relay controlled by such current and arranged to be energized continuously or intermittently according as the current is supplied continuously or is periodically interrupted, cab signaling apparatus comprising a signal which is displayed when said relay is energized but not when it is deenergized, and means including a manually operable member effective when and only when said relay is being intermittently energized to prevent the display of said signal and to cause the display of another signal.

5. Railway traffic controlling apparatus comprising means for supplying train governing current to the track rails, means for at times periodically interrupting the supply of such current to the rails, a train carried whistle arranged to sound when such current is absent but not when it is present, and means including a manually operable member effective when and only when such current is being periodically interrupted to prevent said whistle from sounding and to cause the display of a distinctive signal.

6. Railway traffic controlling apparatus comprising means for supplying train governing current to the track rails, means for at times periodically interrupting the supply of such current to the rails, a train carried main relay controlled by such current and arranged to be energized continuously or intermittently according as the current is supplied continuously or is periodically interrupted, a train carried whistle arranged to sound when said relay is deenergized but not when it is energized, and means including a manually operable member effective when and only when said relay is intermittently energized to prevent said whistle from sounding and to cause the display of a distinctive signal.

7. Railway traffic controlling apparatus comprising means for supplying train governing current to the track rails, means for at times periodically interrupting the supply of such current to the rails, a train carried main relay controlled by such current and arranged to be energized continuously or intermittently according as the current is supplied continuously or is periodically interrupted, two slow releasing relays, a cir-

cuit for one slow releasing relay including a front contact of said main relay, a circuit for the other slow releasing relay including a back contact of the main relay and a front contact of the first slow releasing relay, a stick relay, a pick-up circuit for said stick relay including a back contact of said main relay and a normally open manually closable contact as well as a front contact of said first slow releasing relay, a stick circuit for said stick relay including a front contact of said second slow releasing relay, a first signal having a circuit including a front contact of said main relay and also including in multiple a back contact of said stick relay and a back contact of said first slow releasing relay, and a second signal having a circuit which includes a front contact of said stick relay and a front contact of said second slow releasing relay.

8. Railway traffic controlling apparatus comprising means for supplying train governing current to the track rails, means for at times periodically interrupting the supply of such current to the rails, a train carried main relay controlled by such current and arranged to be energized continuously or intermittently according as the current is supplied continuously or is periodically interrupted, two slow-releasing relays controlled by front and back contacts respectively of said main relay, cab signaling apparatus comprising a signal which is displayed when said main relay is energized but not when it is deenergized, and means including a manually operable device effective when said main relay is operating intermittently and both of said slow-releasing relays are closed to prevent the display of said signal and to cause the display of another signal.

9. Railway traffic controlling apparatus comprising means for supplying train governing current to the track rails, means for at times periodically interrupting the supply of such current to the rails, and cab signaling apparatus controlled by said current and comprising two signals one or the other of which is displayed continuously according as the current is present or absent and one of which is displayed periodically when the train governing current is periodically interrupted.

10. Railway traffic controlling apparatus comprising means for supplying coded train governing current to the track rails, means for at times periodically interrupting the supply of such current to the rails, a train carried relay controlled by such current and arranged to be energized continuously or intermittently according as the current is supplied continuously or is periodically interrupted, signals controlled by said relay and one or another of which is continuously displayed according as the relay is continuously energized or de-energized, whereby one of said signals is displayed periodically when the relay is periodically energized.

In testimony whereof we affix our signatures.

LESLIE R. ALLISON.
FRANK H. NICHOLSON.