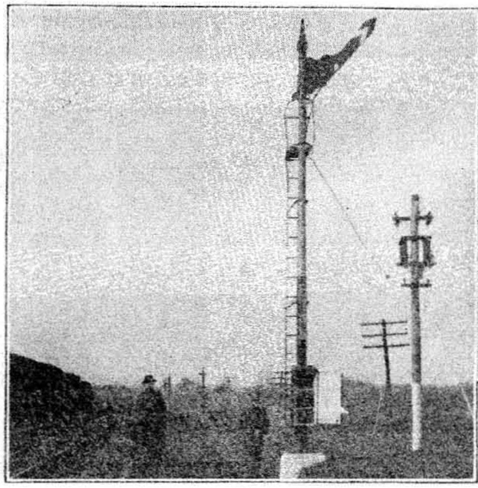

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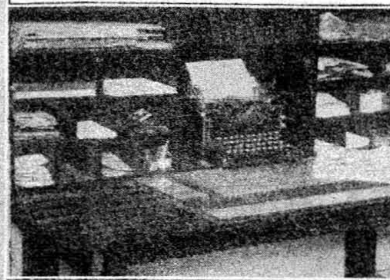
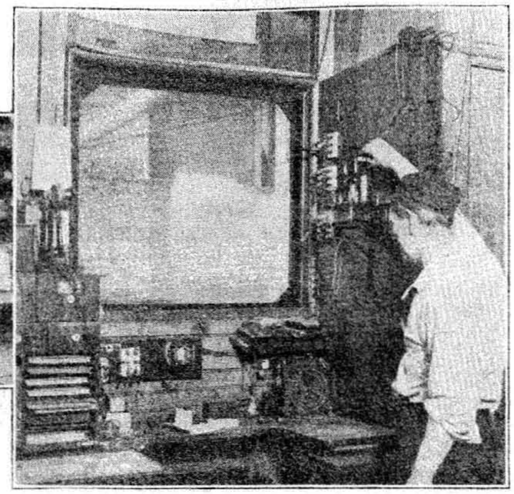




Answer?

An open forum for the discussion of maintenance and construction problems encountered in the signaling field. *Railway Signaling* solicits the co-operation of its readers both in submitting and answering any questions of interest.

To be answered next month

(1) Is it better to pour concrete signal foundations in place or to use pre-cast foundations made at a central point? What are the advantages of each system?

(2) What is the longest track circuit operated successfully in automatic signaling—(1) direct current, (2) alternating current?

(3) What are the advantages and disadvantages of sealing wires in trunking with pitch?

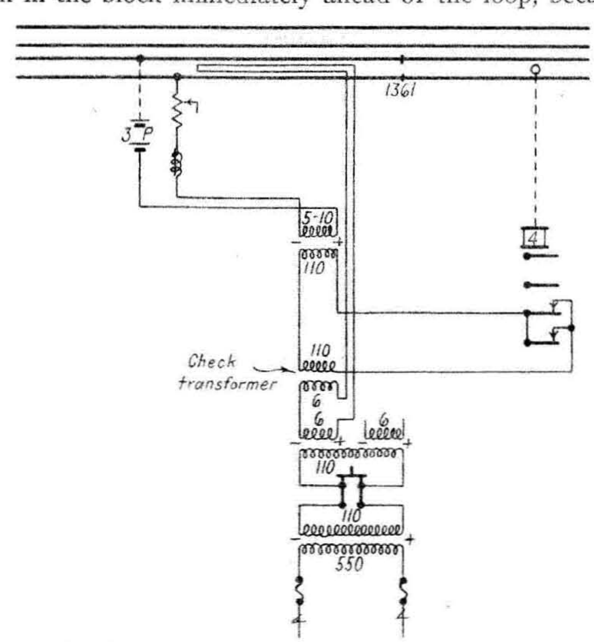
Recurrent Acknowledgment at Stop Signals

"What circuits are used to control the recurrent acknowledgment loop feeds on continuous train stop or train control installations?"

First Answer

TO FORCE the recurrent acknowledgment of stop signals in continuous automatic train stop territory on the Illinois Central a continuously energized loop circuit is employed. The latter is fed from the main power supply through step down transformers. The primary winding of another transformer is connected in series with this loop and the secondary side of this series transformer supplies the a. c. track circuit energy for the operation of the train stop system, after passing through the proper control apparatus. It is the track circuit current that induces the current in the receiver coils on the engines.

Any break in the loop circuit will insure a stop condition in the block immediately ahead of the loop, because



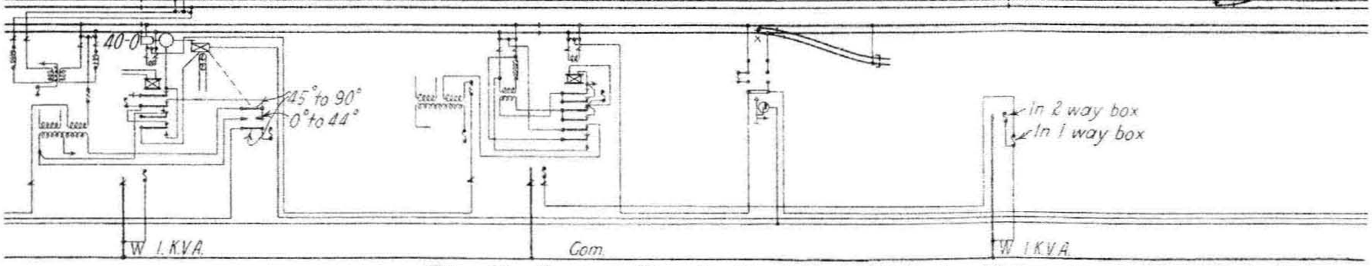
Closed Circuit Features Incorporated in Train Control Loop Installation.

of this series circuit arrangement. A total of four transformers are required at each loop location.

Chicago A. R. WHITEHORN
Office Engineer, Signal Dept., Illinois Central

Second Answer

IN THE continuous train stop system of the Union Switch & Signal Company used on the Chicago, Milwaukee & St. Paul between Bridge Switch, Minn., and Hastings, the recurrent acknowledgment feature at successive stop signals is incorporated in the wayside control circuits reproduced herewith. This is double track



Wayside Control Circuits Employed With the Union Switch & Signal Company

territory, but to simplify the drawing, the circuits have been shown only for one track because the same circuit principles apply to both tracks.

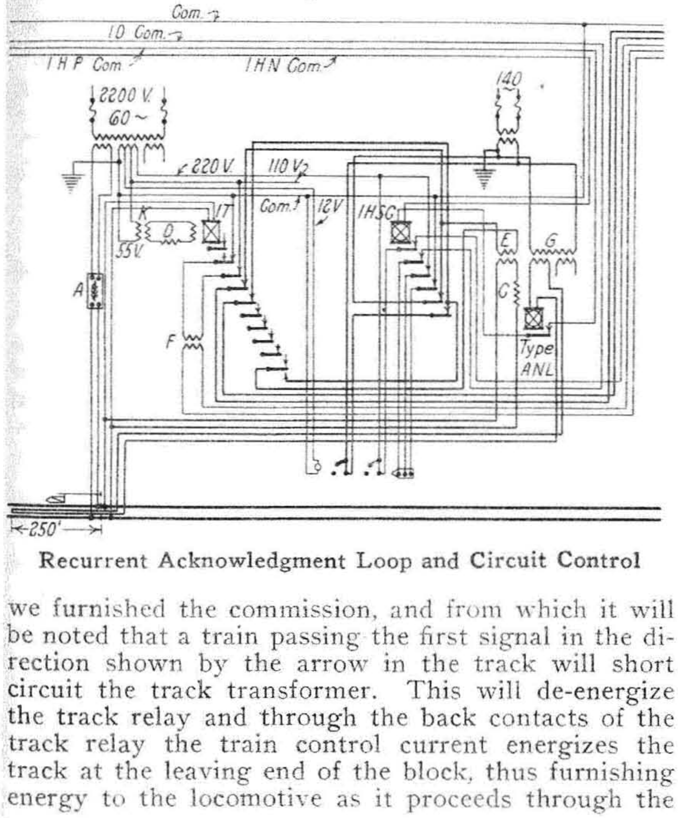
The engine device is arranged so as to initiate brake application whenever the cab indicator changes to a more unfavorable indication, that is, from white to green, from green to red, or from white to red. The red indication is obtained by the shunting out or lack of track circuit energy. The green and white indication are dependent upon loop polarity.

Now it follows that with two trains in the same block the second one, of course, is proceeding under a red cab indication and it also follows that the first train necessarily has to pass out of the block ahead of the following train, so that for at least a short interval the cab indication on the second train will change from red to green until this train passes the stop signal again entering an occupied block, changing the cab indicator from green to red, thereby initiating a brake application unless acknowledged or nullified.

Milwaukee, Wis. J. C. MILL,
Signal Engineer, Chicago, Milwaukee & St. Paul.

Third Answer

THE following circuit scheme is typical of our signal and train stop installation between Cedar Hill, Conn., and Springfield, Mass. This was known as "Exhibit B" in the description of the installation which



Recurrent Acknowledgment Loop and Circuit Control

we furnished the commission, and from which it will be noted that a train passing the first signal in the direction shown by the arrow in the track will short circuit the track transformer. This will de-energize the track relay and through the back contacts of the track relay the train control current energizes the track at the leaving end of the block, thus furnishing energy to the locomotive as it proceeds through the block. The train having passed the second signal, the track relay is energized by the 60-cycle current and the 140 cycle train control current is interrupted.

Please note especially that by this arrangement, while the signal system operates on a normal or usually clear position the train control system operates on the normal danger system. Also by referring to this plan it will be noted that a continuously energized circuit approximately 250 ft. long is located at each signal. The object of this circuit is to force a re-acknowledgement in passing each signal, provided train control restrictions are in force. It will be noted that this circuit is looped through the magnets of an ANL relay and that the signal control circuit passes through the contacts of this relay, thereby employing the closed circuit principle; that is, if the loop circuit were broken or interrupted the signal control circuit would also be interrupted, causing the signal in the rear to assume the most restrictive aspect, with the result that the brakes would be applied before the train would reach this point.

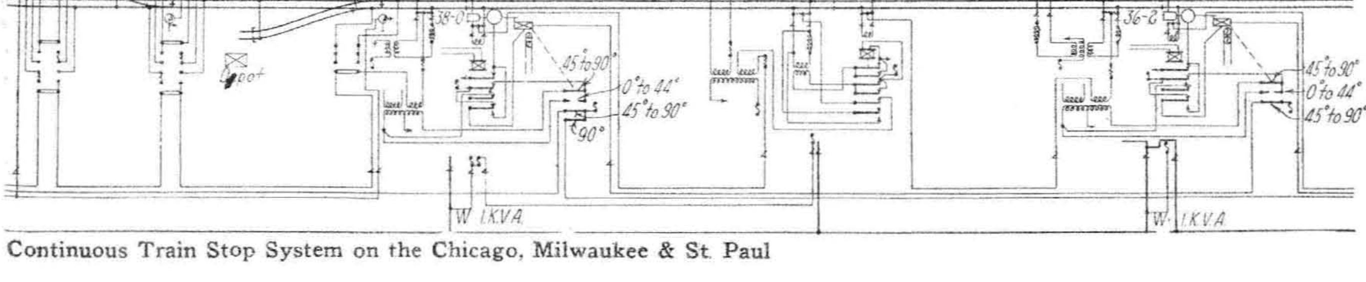
New Haven, Conn. C. H. MORRISON,
Signal Engineer, New York, New Haven & Hartford.

Ballast Resistance of Alternating Current Track Circuits

SUPPLEMENTING the solution of the determination of the rail and ballast resistance of a d.c. track circuit, as published on page 240 of the June, 1925, issue of *Railway Signaling*, the following short method for finding the ballast resistance of an a.c. track circuit will most likely be of benefit to many maintainers. The method was developed after considerable testing of a.c. track circuits and is simple enough to enable any signal maintainer, equipped with proper voltmeter and ammeter, to use it successfully.

One of the principal factors in adjusting alternating current track circuits is the ballast resistance. This is the resistance of the ballast, ties, etc. to the leakage of current from one rail of a circuit to the other. This resistance is constantly changing and may vary in track circuits from 2 to 6 ohms per 1,000 ft. of track when wet to 80 or 100 ohms when frozen. This wide variation in the ballast resistance makes it difficult to adjust a track circuit to operate satisfactorily when the ballast is dirty and wet, and not over-energize the relay when the ballast is dry or frozen. It has been found that the lowest ballast resistance exists when the track is thawing late in the winter or the early part of spring.

On roads of heavy freight traffic, especially where there are long steep grades, there is a gradual accumulation of cinders on the tracks during the winter as it is impractical to do much cleaning during the winter months in the greater part of the country. The accumulation of front end cinders on the track becomes bad at points where it is necessary to work the locomotives to their full



Continuous Train Stop System on the Chicago, Milwaukee & St. Paul