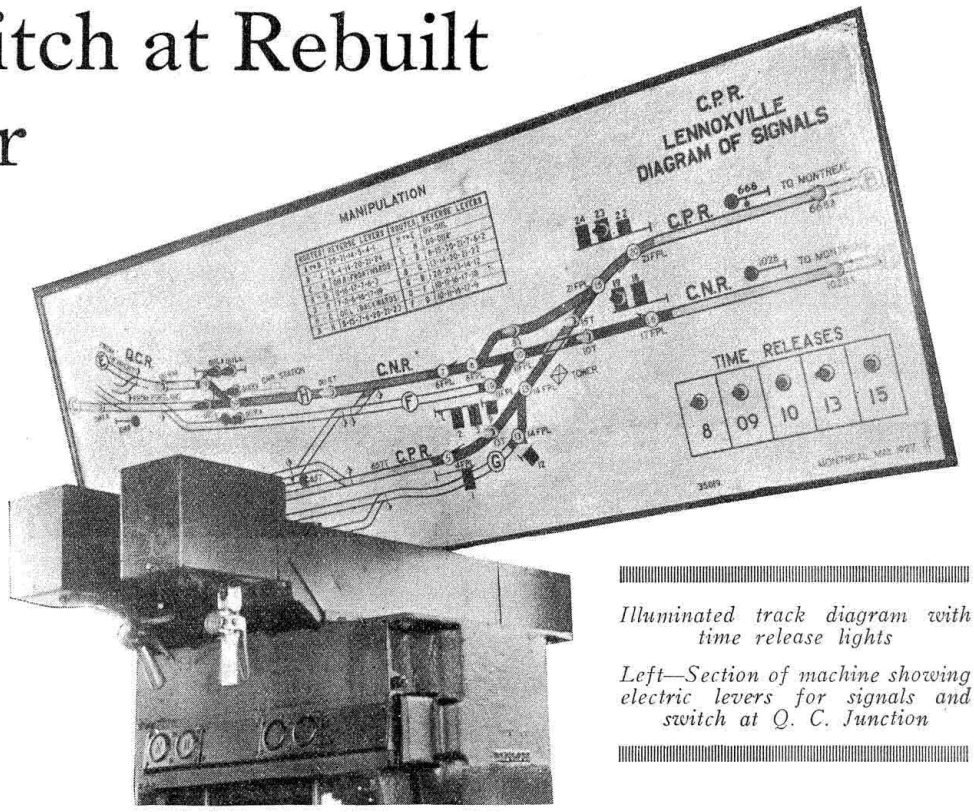
Canadian Pacific Installs Remote Power Switch at Rebuilt Interlocker

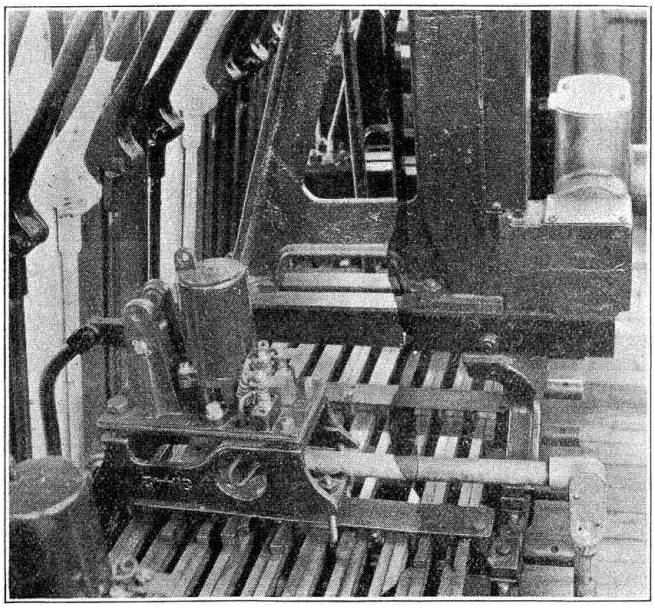
Train stops eliminated at junction switch and additional protection provided by electric locking—Time release lights on track diagram a novel feature



Illuminated track diagram with time release lights

Left—Section of machine showing electric levers for signals and switch at Q. C. Junction

THE Canadian Pacific has recently rebuilt a mechanical interlocking at its crossing with the Canadian National at Lennoxville, Que., on the Quebec district, adding a two-lever electro-mechanical unit to the machine together with a remote control power switch machine and necessary signal protection to handle the connection of the Quebec Central with the Canadian National about a half-mile from the crossing. The track layout in the plant was also changed to provide a connection from the Canadian National to the Canadian Pacific so that Quebec Central trains could run into Sherbrooke on the Canadian Pacific rather than over the Canadian National. The Quebec Central trains were formerly required to stop to allow this switch to be thrown and to get orders before going onto the C. N. main line, which resulted in considerable loss of time.



View of machine showing electric lock with cover off, also conduit connections

Plant Revised Without Rebuilding Tower

The old plant was a straight mechanical one with detector bars but without electrical features excepting an annunciator. No space was available for additional mechanical levers in the tower, and as six new levers were required for the operation of the junction switch and the new track connection inside the home signals, a revision of the machine was necessary.

The four old distant signals were operated by wire connections from four levers in the machine. By replacing these signals with color-light signals, controlled automatically by track circuits and the home signals, no levers are now required for distant signals, thus releasing four levers in the old mechanical machine, two of which are now used to operate and lock each end of the new track connection in the plant. For the operation and control of the power-operated switch and the signals at the Quebec Central junction, a Type S-8 Union, electro-mechanical unit was mounted over the mechanical machine as shown in the heading illustration.

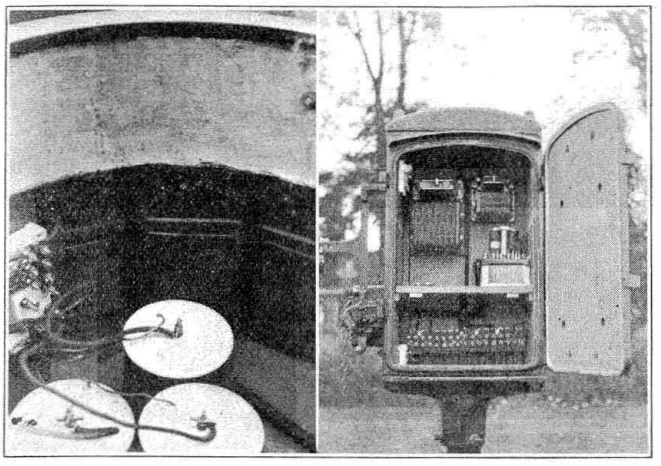
Electric Locking Installed

All detector bars were eliminated and track circuits were installed throughout; approach, route, and detector locking being used on the facing point lock levers. Union, solenoid type, forced drop, electric locks with connection to the rocker link were used. The track relays in the plant are located in the tower and are mounted on the same rack as the

stick relays and other control relays. Outlying track relays are repeated by a second relay in the tower. Track circuits and the clear position of all signals are repeated on the illuminated track diagram, shown in the heading illustration.

Release Lights on Diagram

A novel feature of this plant is the use of time release lights, shown in the lower right corner of the diagram. When a route is lined up and the signal cleared, the corresponding route light is illuminated, through the back contact of a stick relay for that route. When a train passes this signal, the stick relay is picked up through the back contact of a track relay and if the signal lever is then restored, while the track circuit is occupied, the route or time release light goes out. If the towerman fails to restore the signal lever to normal while the train is on the track circuit, the route will remain locked up, and the time release light remains illuminated after the train leaves the circuit. The advantage of these release lights is that the towerman is able to tell by the number of the light illuminated, which time release should be operated to release the route. The corresponding lights and releases are numbered.



Left—Primary batteries for signals and track circuits
Right—Union electronic rectifier at power switch location

The bulbs in the track diagram are 12-volt screw base, Mazda, Christmas tree lamps. The diagram is constructed of Beaverboard, over which is pasted a black and white print, adjacent track circuits being colored differently. The ordinary porcelain receptacles for the lamps are placed in holes drilled in the Beaverboard, the front of the receptable being flush with the front of the board so that nothing shows but the lamps. The finished diagram is mounted in a neat wooden frame, and is supported from the wall and ceiling by iron brackets. Normally the diagram lights receive power from the 10-volt tap of the rectifier transformer, controlled through the front contacts of a power-off relay. If the a-c. power is cut off, the power-off relay cuts the 10-volt d-c. battery supply onto the lights.

Six cells of Exide 7-plate storage battery are charged by a Balkite rectifier, this battery being used normally for the lock circuits only. The wiring in the tower is all in conduit, as can be seen in the rear view of the machine. A 4-in. pipe and conduit fitting is used at the rear of the Type S-8 unit, and a ¾-in. conduit for each electric lock.

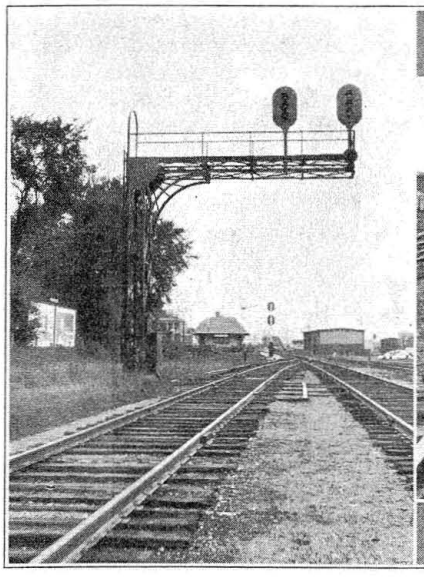
The rocker shaft leadout for the pipe connections was overhauled using new up and down rods. The pipe line was rebuilt using new Hercules iron tops and carriers. Pipe connections, cranks, switch fittings, etc., throughout the plant, were overhauled.

Signal Changes and Remote Control Facilities

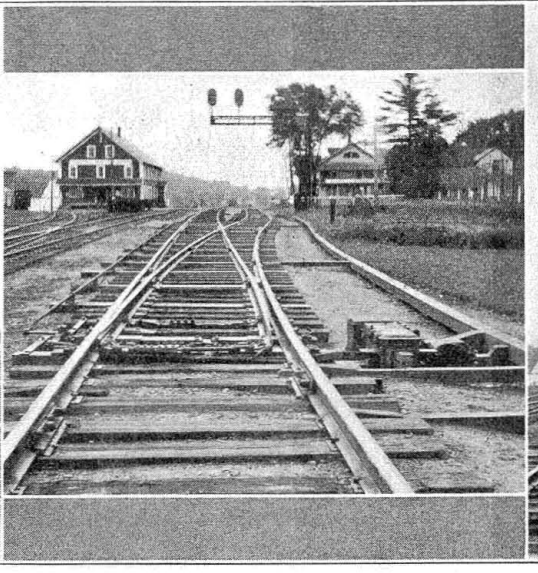
The east-bound mechanical home signal for the Canadian National was replaced by a semaphore power signal and the new home signal for the east-bound Quebec Central connection is an electric semaphore. Eastbound trains on the C. N. and the Q. C. are operated by signal indication only from this plant to the Q. C. connection east of the station, and therefore, these electric signals were required as protection within this territory.

The electric home signals are operated by 16-cell, primary batteries. Track circuits are operated by three primary cells connected in multiple and with a limiting resistance in series. All primary batteries are Waterbury type.

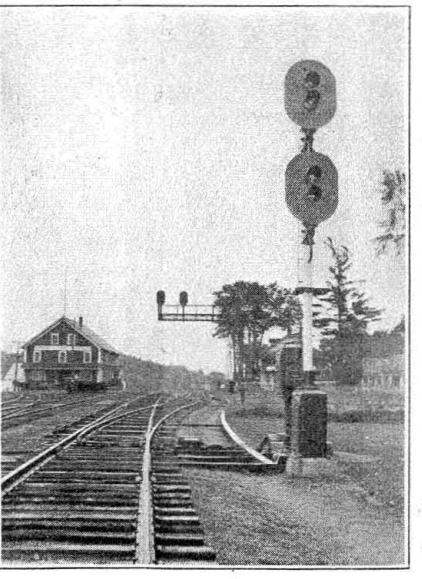
The junction switch of the Q. C. is operated by a Union Type-M electric switch machine. A 12-cell Exide storage battery provides power for the switch



Westbound color-light home signals for the C. N. and Q. C. mounted on cantilever bridge



Union Type-M power switch machine operates Quebec Central connection



Eastbound home signals at junction —Top unit for C. N. and bottom unit for Q. C. diverging route

machine and the surrounding signals; the battery being charged by a Union Model T-36 electronic rectifier. A normal floating charge of 260 m.a. keeps this battery charged.

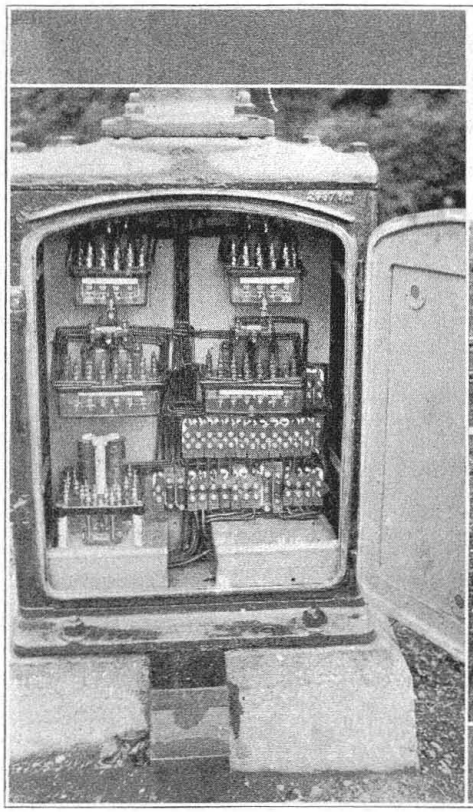
Four color-light signals protect the junction switch. The top unit of the eastbound signal (indicating red and green) is for the through C. N. route and the lower unit (indicating red and yellow) for the Q. C. diverging route. The westbound signals, one for the through C. N. route and the other for the route off of the Q. C. line (each indicating red, yellow and green), are mounted over the track on a Bates steel signal bridge of the cantilever type. The signals are Union Type P-2, using 12-volt bulbs behind 8⅜-in. lenses.

As an additional safety factor, a switch controller is connected to the points as a point detector, the purpose of which is to insure that the position of the points corresponds with the position of the switch machine. The indication circuits are carried through this point detector controller.

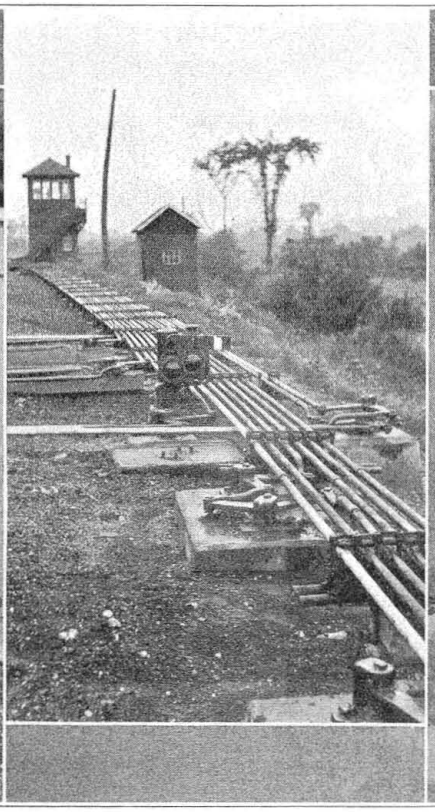
The Hayes derail on the Q. C. is pipe-connected to the power switch and a switch circuit controller is connected to this derail to control the signals for this route.

The pole line in this layout was reconstructed to accommodate two additional 10-pin crossarms, glass insulators and No. 10 weatherproof copperweld wire being used. Cable drops are No. 12 solid insulated copper wire and track leads are No. 10. All insulated wire is according to A. R. A. specifications and made by the Standard Underground Cable Company, Hamilton, Ont. Creosoted cypress trunking and cedar stakes are used. The track is bonded with two No. 9 galvanized iron bond wires with single channel pins.

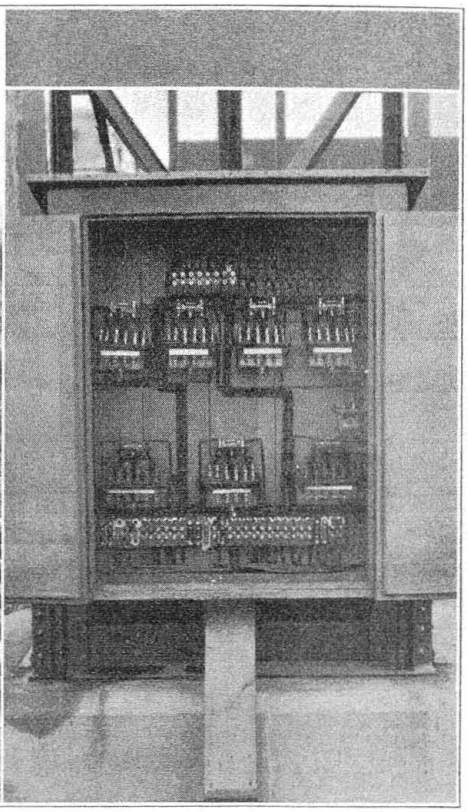
This installation was made by the construction forces of the signal department of the Canadian Pacific.



Relays in case at eastbound home signal



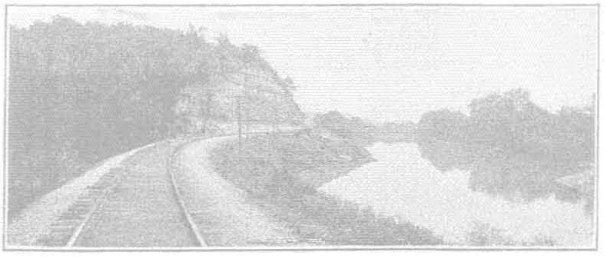
Mechanical dwarf signal and pipe line



Relays in wood box on cantilever bridge

Unique Features of the Control

The switch is controlled by a polarized switch operating relay which in turn is controlled by a lever in the tower. This lever has an electric lock (detector locking) controlled by track circuits. The main control of the switch machine is taken through this polarized operating relay, and then through a switch crank box controller, and then to the machine. The feature of the crank controller is that the crank is locked up by an ordinary switch lock so that if the switch machine fails, the trainmen can obtain this hand crank, and turn the switch over. However, when the switch is so operated, the levermen cannot again operate the switch until the maintainer has inspected the switch and restored the circuit controller which is in a separate compartment in the crank box and locked with a signal department padlock. This special arrangement is provided to prevent the battery being discharged unnecessarily in case the switch movement is not completed and locked up, when cranked over by trainmen.



A single track line needs signal protection