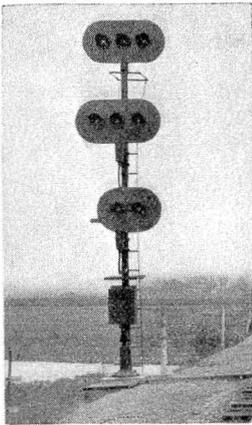
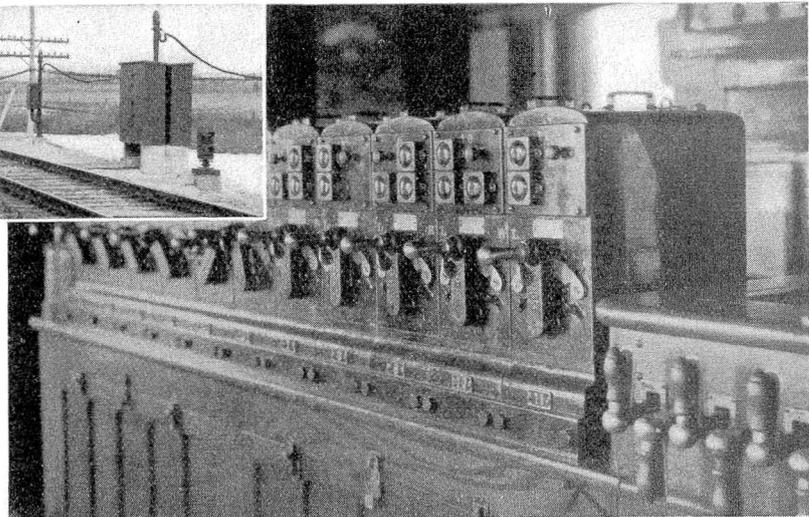


Remotely-Controlled Interlocking Solves Problem on C. & N. W.

Extensive plant controlled from desk levers in
tower at another interlocking



Above—View at West Nelson looking east
Right—The desk-lever controllers at Nelson



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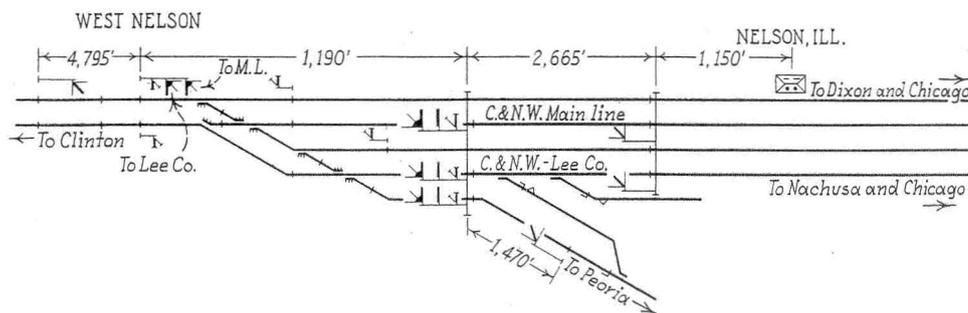
A REMOTELY-CONTROLLED electric interlocking has been installed recently to replace a mechanical plant at West Nelson, Ill., on the Chicago & North Western. The track layout includes two crossovers and three single switches, while five high signals and seven dwarf signals are provided to direct train movements over the plant.

Problem to be Solved

A double-track low-grade freight line, known as the Lee County cut-off, starts at West Nelson and extends

yard and the Southern Illinois division which leads to Peoria, Ill., and to St. Louis, Missouri. The four tracks, starting at West Nelson, run parallel for a mile to Nelson where the freight line diverges to the south and at this point is located the eastward connection to the Southern Illinois division. A 46-lever electric interlocking plant is provided to handle crossover movements between all four tracks, and traffic to and from Chicago to the Southern Illinois division.

It was first decided in 1926 to replace the mechanical interlocking plant at West Nelson with a remote-control plant, operated from Nelson, thereby eliminating three



Track and signal plan of remotely-controlled plant

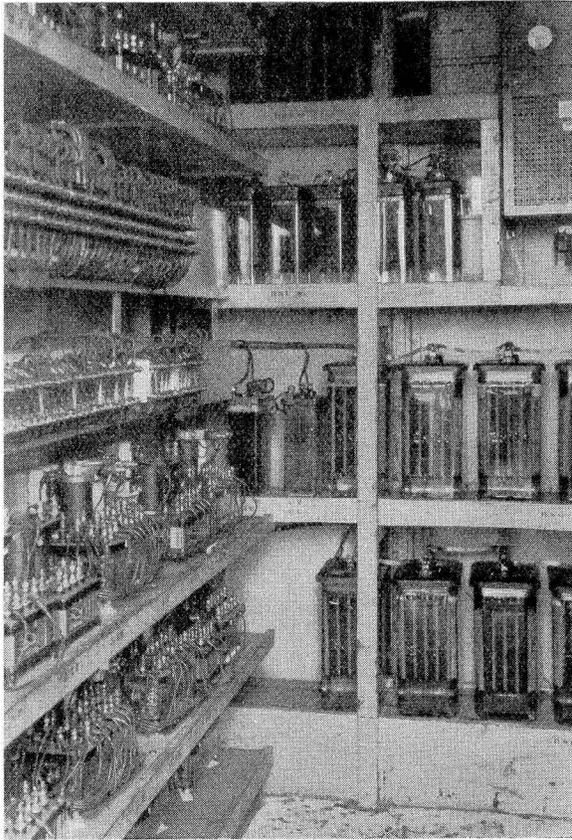
eastward, connecting with the main line at Nachusa, 10 miles east. Likewise, within the plant a single-track connection extends to the south to connect with the Nelson

levermen. Due to the Chicago & North Western having a considerable number of General Railway Signal Company Model-2, 110-volt switch machines in stock at that

time, it was thought desirable to use them. Therefore, a 110-volt remote-control scheme was developed. A 12-lever set of desk-lever controllers was provided with mechanical locking and electric lever locks. Polar relays were to be used to control the normal and reverse position of the switches. The 110-volt operating battery, safety magnets, polars, etc., were to be located in the old mechanical interlocking tower at West Nelson. Battery indication was to be provided for the levers.

Change In Layout and Circuit Design

The work had gotten nicely started along these lines, when it was delayed on account of a proposal to extend tracks 3 and 4 and the Southern Illinois connection at West Nelson, so as to provide space for longer trains



Interior view of concrete house at West Nelson

between the Nelson and West Nelson interlocking plants, and to give greater flexibility of movements.

This matter was not finally decided until 1930. In the meantime the supply of Model-2 switch machines had been used in maintenance work. Also, the development of the low-voltage switch machine with dual-control had reached the point where it was thought that an installation of this type would be more satisfactory than the one originally proposed.

Desk Lever Set Used

The set of 12 desk-levers had already been purchased for this proposed plant, therefore it was decided to use this machine, but to utilize the more modern control circuits thereby reducing the number of line wires and accomplishing the locking electrically in the field. The mechanical locking between the levers was retained with the primary object of requiring a route to be lined up before a signal lever could be operated, thereby eliminat-

ing some possible confusion in the operation of the machine.

The line-control circuits are based on the polar relay control circuit with split battery and a neutral wire, which allowed the use of one control wire for each switch, crossover, or group of signals governing movements over the same route. The electric locking is accomplished locally in the field. "O.S.ing" is obtained through a relay in series with the control relay near the control lever.

Lever Indication Lights

The electric locks and indicators were removed from the desk controllers and light indicators were installed. The switch levers are equipped with two separate indication lights, one above the normal and the other above the reverse position of the lever. The light flashes and a buzzer sounds when the switch starts to move, and flashes and sounds again when the switch is over and locked. The normal position of each switch lever is to the left. These lights also flash and the buzzer sounds when a train enters a track circuit in which the switch is located.

The signal levers operate in three positions, being on center normally, and are thrown to the right to control the eastward signal and to the left to control the opposing signal. The call-on arm will clear automatically if the high-arm block is occupied and the high-arm lever is in the clear position.

Above each right or left position of every signal lever there is a light which indicates green when the signal is clear. One light for each lever, at the top, indicates green when the track circuits in the block controlled by that signal are unoccupied. The signals are normally non-stick but can be made stick by operating the push-button near the block-indication light.

Outside Construction

The line control circuits from the tower to West Nelson are in a 29-conductor cable, made up of single-conductor insulated wire, the control circuits being No. 14 and the common No. 9; five spare wires are provided. The cable was run on the signal department pole line, being supported from a stranded galvanized iron messenger with insulated wire ties. A Massey concrete house, 6 ft. by 8 ft., located as shown in the view, houses all the relays, batteries and rectifiers required at the West Nelson layout. One of the illustrations shows an interior view of this instrument house.

The switch operating battery consists of 12 cells of Exide Type EMGO-9 storage battery, charged by a copper-oxide rectifier, and the control circuit battery consists of 6 cells of Exide Type KXHS-5 battery, divided into two groups of three each, charged by a Balkite rectifier.

The switch machines are the General Railway Signal Company's 20-volt, Model-5D equipped with dual-control, as shown in one of the views. The high signals are the horizontal color-light type with 18-watt 10-volt lamps, while the dwarf signals are the vertical type with 10-watt 10-volt lamps.

The operation of this plant has been entirely satisfactory since it was placed in service on November 18, 1930. The maintenance force is the same as before and the annual savings in wages for levermen formerly required is approximately \$5,000. The installation was designed and constructed by the signal department forces of the Chicago & North Western.