Low-Voltage Interlocking on C. & N.W.

Operator Handles Junction Switch and Signals by Table Levers, Simplified Locking Circuits Used

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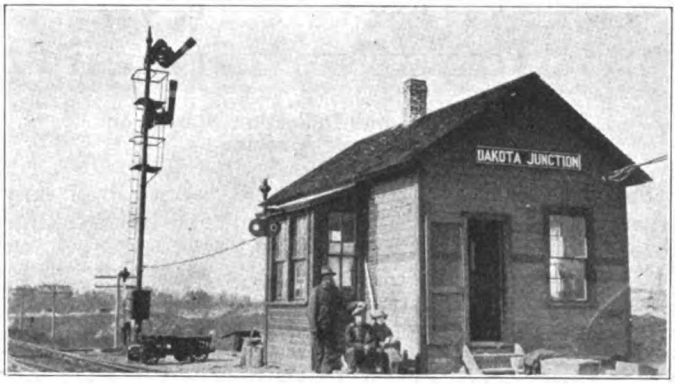
DAKOTA JUNCTION, four miles west of Chadron, Neb., on the Chicago and North Western, is the junction of the lines to Wyoming and to the Black Hills. On account of the increased activities in the Wyoming oil fields, the conjestion at Dakota Junction increased to such an extent that is was found advisable to construct a passing track. The nearest available place for the passing track was with the west switch, about 2,000 ft. east of the junction switch, on account of the fact that the grade ascends in all directions from the latter. It was desired to have the operators handle the passing track switch as well as the junction switch.

A low-voltage interlocking plant was, therefore, installed operating the junction switch, controlled from the operator's cabin located at the west end of the passing track. The signaling apparatus was furnished by the General Railway Signal Company.

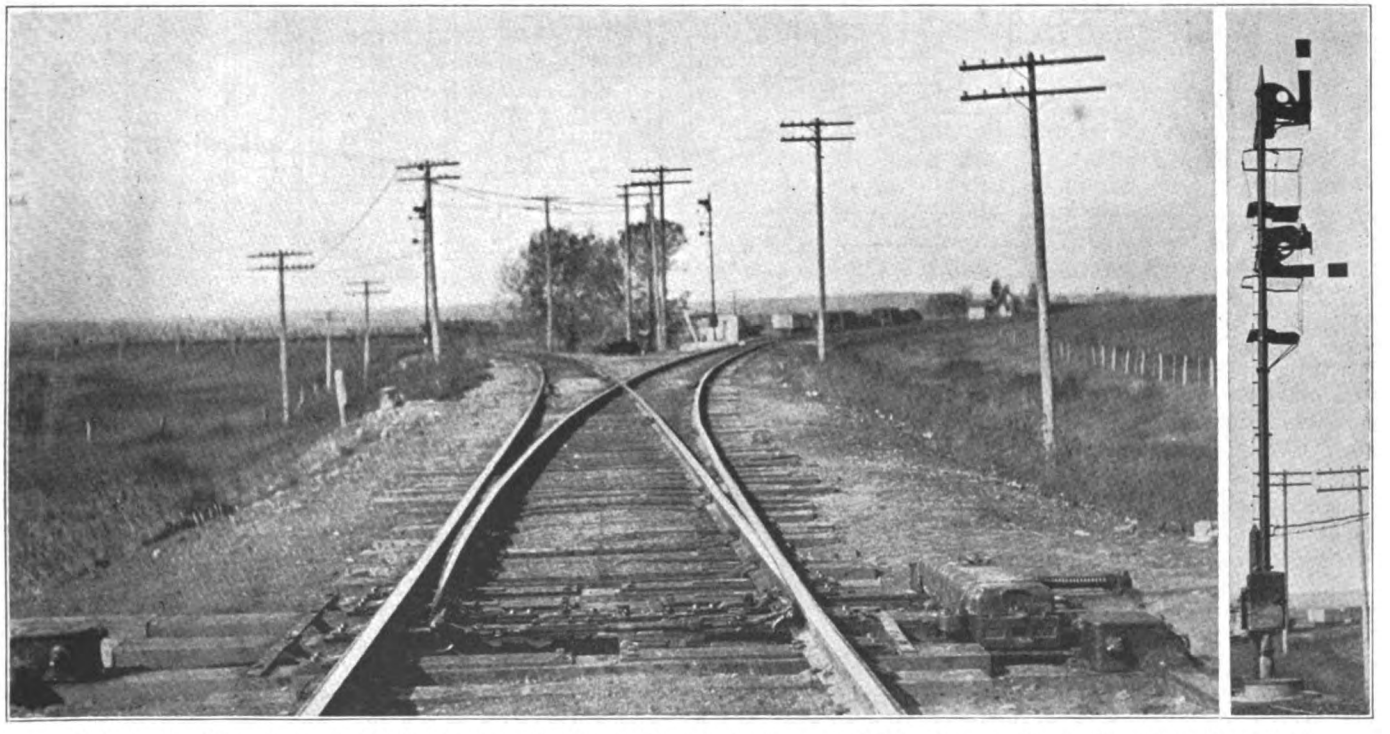
No power being available, it was necessary to use soda battery. For the operation of the switch mechanism, a storage battery was used charged by soda battery. The battery is housed in battery cellars, which are so made that they act as signal foundations. It was necessary to build only one foundation at the location where there were no battery requirements. These battery cellars were furnished by the C. F. Massey Company. An independent pole line was built to carry the line wires. The plant was installed by railroad forces under the supervision of R. A. Sheets, signal supervisor, and was placed in service in October, 1923. Satisfactory service has been rendered by this plant, and the only failure which has come to my attention was caused by a broken spring.

The only special signaling is the westward approach signal, which is located just west of the operator's house and serves to hold westward trains when desired by the operators. The upper arm of this signal gives approach information for the upper arm of the junction signal and the lower arm, the corresponding information for the lower arm of the junction signal. One of the illustrations shows this signal clear for the lower arm of the junction signal.



Westbound Approach Signal and Operator's Cabin

Each signal is controlled independently. The signal levers are of the type which operate each side of the center. Conflicting signals are placed on opposite sides of the same lever. The switch lever is of the type which has the normal position at the left and the reverse posi-



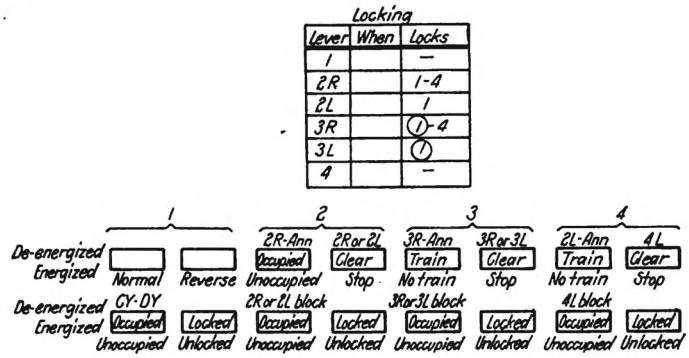
Switch Machine Layout With Eastbound Home Signals in Rear and Westbound Home Signal at the Right

tion at the right. The switch moves from one position to the other in about 14 seconds. A telephone located at the switch may be used when necessary to communicate with the operator.

Special Control Circuits of Interest

Detector or sectional locking is provided by the use of a (Z) relay, which cuts off battery from the motor of the switch mechanism. The (Z) relay is energized only when all home signals are normal and the track circuits between them are unoccupied. Two track circuits were used between home signals, for the purpose of reducing the possibility of track circuit failures. In case of a track circuit failure the only release is the use of the hand crank for turning the switch machine, and for convenience the crank is located in a box on the post with the telephone. The removal of the crank from the box opens the circuit to the switch machine, preventing the machine from moving by power while it is cranked. The crank is to be used for all failures where the switch fails to follow the lever.

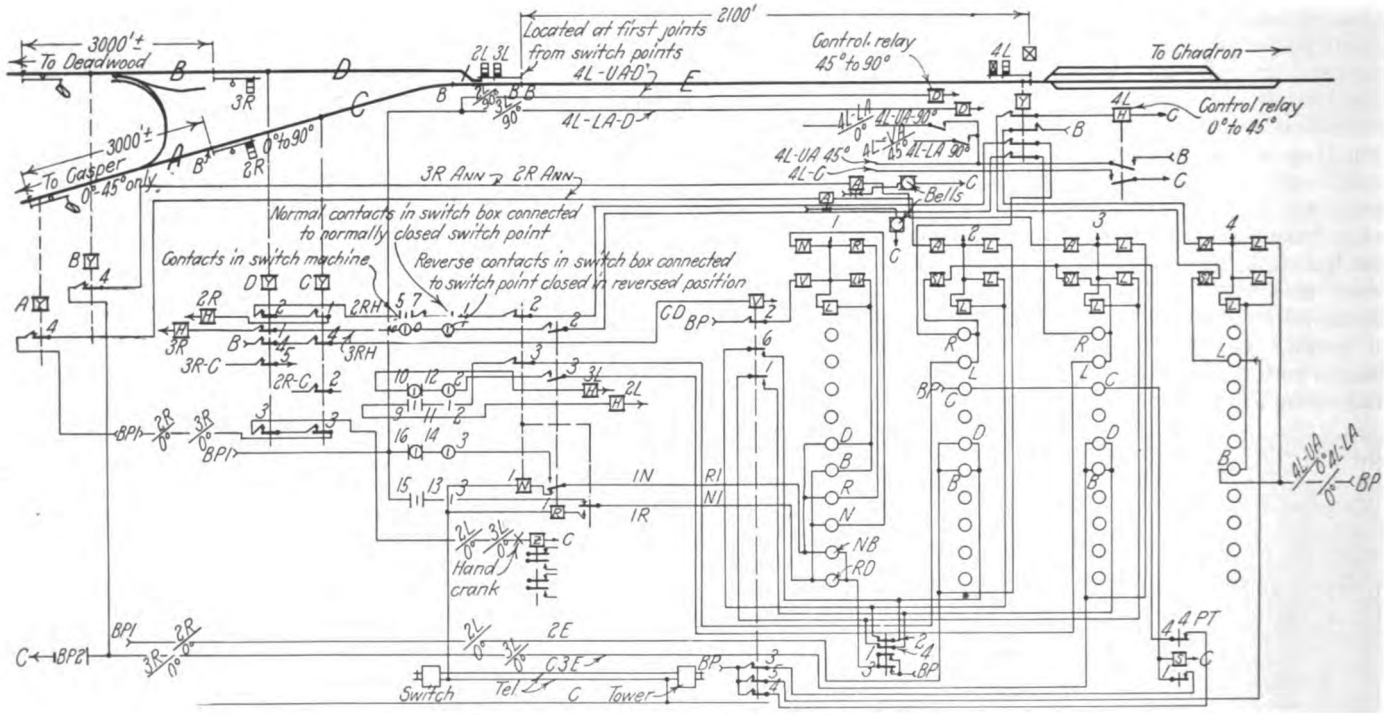
Stick type electric locking is used to prevent the changing of a route while a train may be approaching. The locking is accomplished by carrying the normal indication locking circuits of the signals, through the back points of the track repeater. The signal levers can, therefore, be put normal only when the train is passing through the track sections within the plant. A clockwork time release is provided to permit a change of the route. For the purpose of checking the return of the time release to normal, it is arranged that the switch control circuits and the signal circuits through the control relays are open when the release is not normal.



Locking Sheet and Indication Shown on Desk Lever Machine

Eastbound Home Signals

In order to prevent the clearing of a signal automatically, in case the operator fails to put the lever normal at the proper time, a stick relay is used which is de-energized when the train passes the home signal and is energized when the signal lever is restored to normal. The remaining circuits will be easily understood.



Track and Signal Plan with Typical Circuits

Germany Claims World's Fastest Freight Train.—The distinction of having the world's fastest freight train is claimed by the German railways. The train is composed of twenty cars of a new type, each of fifty tons capacity, and although its weight is practically double that of a standard express train, it can, from full speed of about 100 kilometers (approximately 62½ miles) per hour, be stopped at a braking distance of only about 3,300 ft. This performance is rendered possible by the design of the cars and locomotive, by the use of specially designed high-speed pneumatic brakes, and, finally, by the use of automatic couplers.