

Train Operating Over Switch, Oxford Junction

Levers and Indicators in the Station, at Oxford, Neb.

View of Switch and Machine at Oxford Junction

C. B. & Q. Controls Switches Remotely

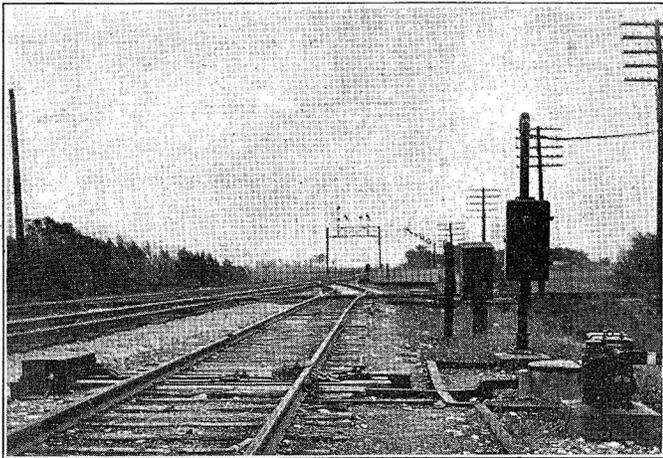
Distant Ends of Passing Tracks and Junction Switches Operated Electrically, Eliminating Train Stops

THE Chicago, Burlington & Quincy has been using electric switch machines controlled remotely for the operation of passing track and junction switches at several points for about eight years. At present, junction and crossover switches are worked in this manner at five points and passing siding switches at four points. These installations have been the means of

having to stop or slacken to permit the switch to be closed behind them. It is estimated that the elimination of three stops a day at a given switch pays for the cost of maintenance, interest on the investment and depreciation. An explanation of the application of remote control to several different layouts on the Burlington follows.

Remote Control of Junction Switches

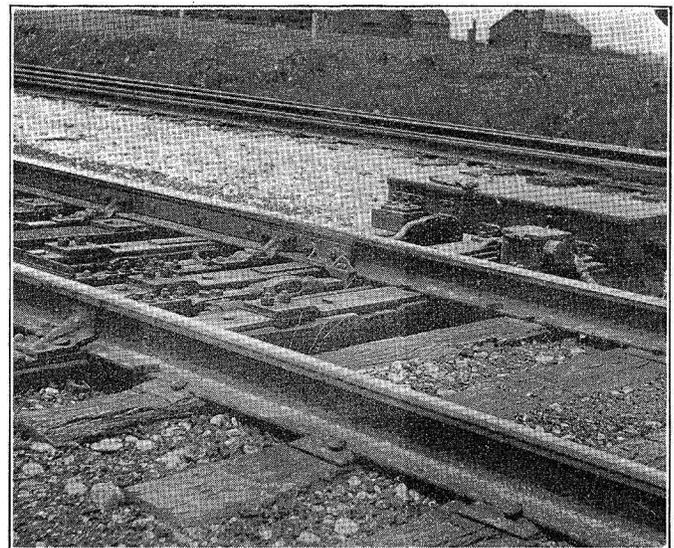
The single track Quincy branch from the south joins the main double track line on the Illinois side of the Mississippi river, just across the bridge from Burlington, Iowa. The time required for branch line trains to stop and throw the junction and crossover switches by hand



View Looking East, Showing Dwarf Signal and Derail on Siding at Earlville, Ill., Railroad Crossing in Background

eliminating train stops for movements in or out of the siding and over junction switches and the control has been located, in most cases, in existing interlocking towers or in telegraph offices, the levers being handled by the levermen or operators, thus saving any additional labor charge for the service.

The Burlington uses a separate power switch machine for each switch or derail, which, with the necessary signals, costs about \$5,100 for the outgoing end of one siding situated one mile from the operator. When so used they enable trains to head in on a passing siding without stopping to open the switch ahead of them, and trains leaving a siding to continue accelerating speed without



A Typical Electric Switch Machine Layout on the Burlington

caused relays not only to those trains but also to main line trains. Train stops for eastbound trains on the bridge are undesirable and likewise westbound trains if stopped while approaching the bridge are started with difficulty.

The Burlington operates seven passenger trains and about 15 freight trains each way on the main line at this junction and there are two trains each way on the branch. With these circumstances it was decided to operate the junction switch and the crossover switches electrically and to control these switches, together with the derails and attendant signals governing movements over these

if possible, if necessary to derail a train, to derail it on solid ground instead of on the bridge.

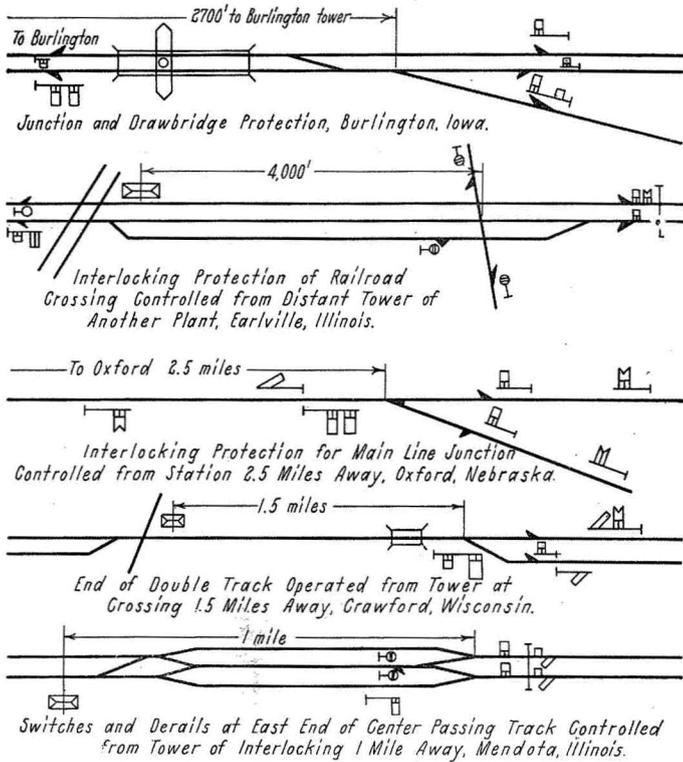
A Crossing Controlled Remotely

At Earlville, Ill., a single track branch line crosses a passing track and two main tracks at grade. All train stops for this crossing as well as when leaving the passing track were eliminated by installing a low-voltage interlocking layout to include the passing track switch, the five derails and the signals governing the several routes. The levers controlling these functions are located in the tower of a mechanical interlocking at a crossing of the Chicago & North Western about 4,000 ft. away. By operating this additional interlocking from this tower the advantages of an interlocking were secured without any additional expense for operation. The cost of installation was \$13,000 and it makes possible an annual saving of \$4,900 in towermen's wages which would have been required if a separate interlocking had been installed.

At Oxford Junction, 2½ miles east of Oxford, Neb., the Denver-Lincoln line branches off the Denver-Kansas City line. The Lincoln-Denver line handles five passenger trains and about eight freight trains each way per day, while the Denver-Kansas City line has three passenger trains and about five freight trains each way. It was necessary that all trains on the Kansas City line stop to operate this junction switch. The installation of an interlocking with 24-hour service of levermen at this point was not justified so a low-voltage remote control system, together with the two derails and signals, was installed, the control being located in the station at Oxford two miles away and the levers being handled by the operator in conjunction with his other duties. For a long time a station had been maintained at Oxford Junction, the operators doing nothing but handle this junction switch and train orders. Although this expense of \$4,818 had been done away with a year or two before the installation of the present arrangement the new facilities, which cost \$11,500, afford the service previously given without the operating expense.

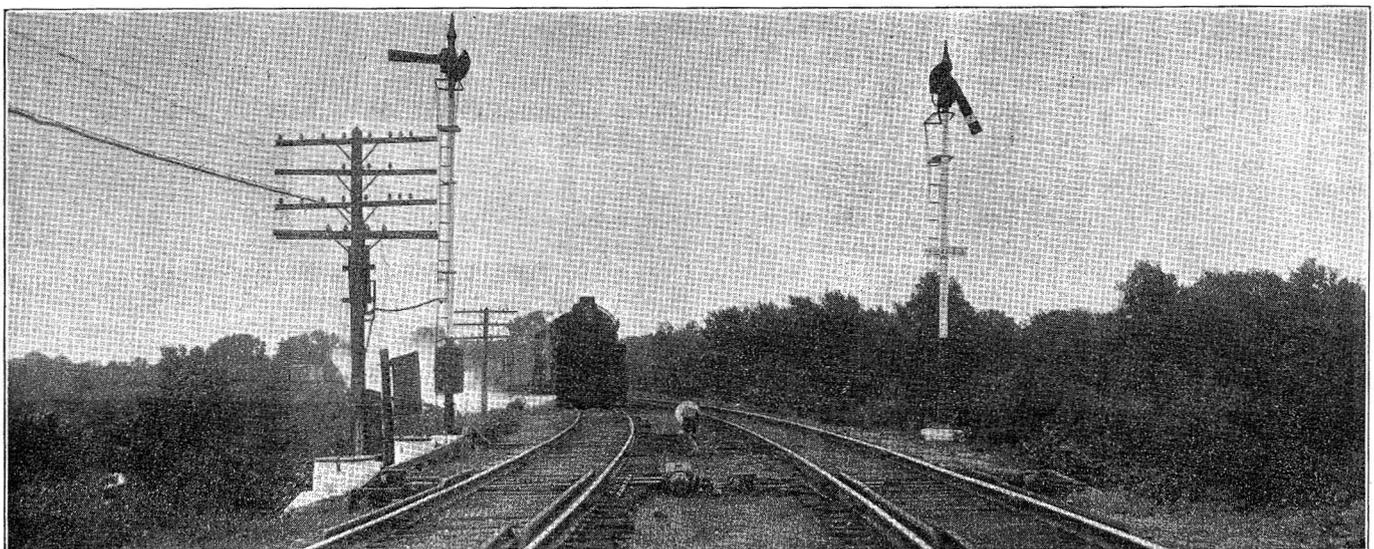
The operation of junctions by this remote control system has been so satisfactory that a plant is now being installed at Cobb Junction, west of Lincoln, Neb., situated nearly eight miles from the point of control.

A switch for an industry track about 1,500 ft. from an interlocking tower was installed in the main line near Murray, Mo., and it was arranged to operate this new switch with power machines with an electro-mechanical



Track and Signal Plans for Typical Layouts Where Remote Control Switch Operation Is Used

switches, by means of levers located in the existing interlocking tower on the Iowa side of the river over a half mile away. This installation, which was built in 1918, virtually constitutes an interlocking with all of the advantages of eliminating the stopping of trains while with the low-voltage operation and remote control the advantages of interlocking are secured without additional cost for levermen. In addition, these derails also serve to protect the draw bridge from the Illinois side and make

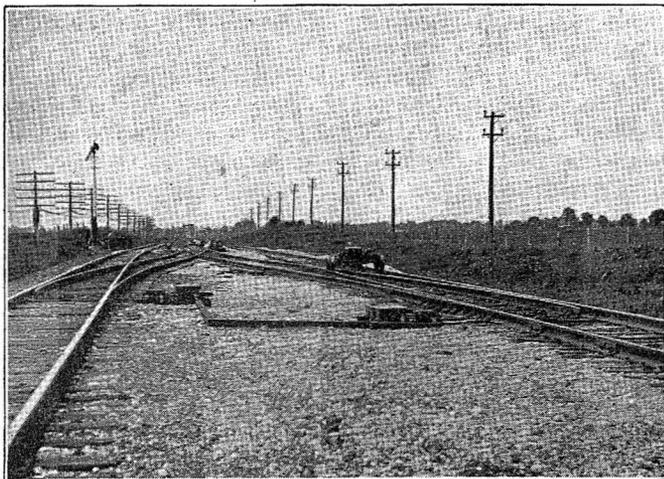


Derails and Signals on Main Line Approaching Junction, From the East, Burlington, Iowa

addition to the machine on account of the fact that an enlargement of the mechanical machine would have been very expensive. The outgoing switch of a large yard at Davies, Mo., is located in the main line about 5,000 ft. from a railroad crossing where there is an interlocking plant and it was arranged to operate this outgoing switch by power machines and save employing switchtenders. The cost of this installation was \$4,300 while the annual cost of switchtenders would have been \$5,168.

Ends of Double Track Handled Economically

At several places on the Burlington, where the switch at the end of double track would otherwise necessitate train stops, this switch, together with the signals protecting the movement of trains, are operated electrically by low-voltage motors and are controlled by levers in nearby stations or towers. For example, at Bridge Switch, Wis., the switch at the end of double track is controlled from the tower at a railroad crossing at Crawford, 1½ miles away, thereby eliminating the necessity for trains stopping. This line handles four passenger trains and about eight freight trains each way per day. This installation



Two of the Switch Machines at East End of Center Passing Track, Mendota, Ill.

cost about \$9,000, as compared with a separate interlocking which would have cost \$7,500 and necessitated the services of operators at \$4,900 a year.

A somewhat similar arrangement was installed at the end of a passing siding at Armour, Mo. A crossover located about 5,000 ft. from the actual end of double track is used for the operating end, the extra track being used as an advance passing siding. The distant switch is operated by a power machine controlled from the station, which cost \$5,200 and eliminates many train stops. The control of this switch is in the hands of the operator at the station 5,000 ft. away. At Shannon, Iowa, the mechanical interlocking at the end of double track is being replaced by a low-voltage electrical layout to be controlled from levers in the interlocking plant at Harrison which is the other end of a short piece of single track 3.9 miles long.

Permits Great Economies at Passing Track Switches

In locations where grades are adverse for the starting of trains, either in entering passing sidings or in starting trains after stopping to close the switch when pulling out, the use of switch machines to operate passing track switches has proved to be an important factor in reducing delays and in reducing the number of pulled-out drawbars and other unnecessary wear in equipment, especially in long freight trains.

On the double track main line through Mendota, Ill., the west end switches for a middle passing track are operated mechanically by pipe connections from a mechanical interlocking machine. The three switches at the east end of this siding as well as the derail on the siding, together with the necessary signals, are operated by low-voltage motors, controlled by a separate set of levers in the tower about one mile away. This installation, which cost \$18,500, facilitates train movements out of a congested yard.

In the double track line through Oneida, Ill., lap sidings are used, the entrances to which are at the station and are handled by the station operator. The sidings are 5,000 ft. long and the outgoing switches were handled by trainmen, making it necessary to stop the trains to set the switches behind them. The switch of the eastward siding is 5,000 ft. from the station and at the foot of a grade, making it difficult to start a heavy freight train after stopping to pick up a brakeman after he has reset the switch behind it. To avoid such stops and the consequent delays this switch was equipped with a power machine controlled by the operator in the station, at a cost of \$5,200, which has not only saved the cost of making the stops but has appreciably shortened the time of eastward freight trains which have taken the siding at this point.

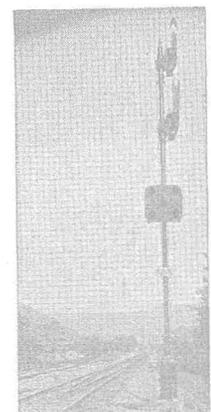
In most cases, as shown by the foregoing, the Burlington has installed remote control power switch machines to enlarge the scope of an existing interlocking plant and in that way get the advantage of the facility without increasing operating expenses. One installation proposed for this year, which is estimated to cost \$13,000, will completely eliminate an existing interlocking plant which costs \$4,900 per year for labor to operate.

Position - Light Take Siding Signal in Combination With Semaphore Installed on C. & O.

THE Chesapeake & Ohio has recently installed a position-light type take siding signal to be used in combination with a semaphore automatic signal located 3,450 ft. west of Deepwater Station, W. Va. This is a special signal of the two-position light type used to indicate to approaching trains that they should take siding at the first non-interlocked switch located 1,150 ft. east of the signal.

If the operator receives instructions from the train dispatcher to have an approaching train take siding the operator manipulates a double pole switch in Deepwater station which controls a line relay located at the signal and the five lights are continuously lighted from primary battery until the train has passed the signal and the operator has placed the double pole switch in the normal position. The lights on the signal give the appearance of the letter "X" when burning.

This is the first position-light signal in service on the Chesapeake & Ohio. On account of its special type the indication given by the signal does not conflict with other indications given in the book of rules. The use of this signal has proved of great value in facilitating train movements into the Deepwater passing siding.



Position-Light Take Siding Signal