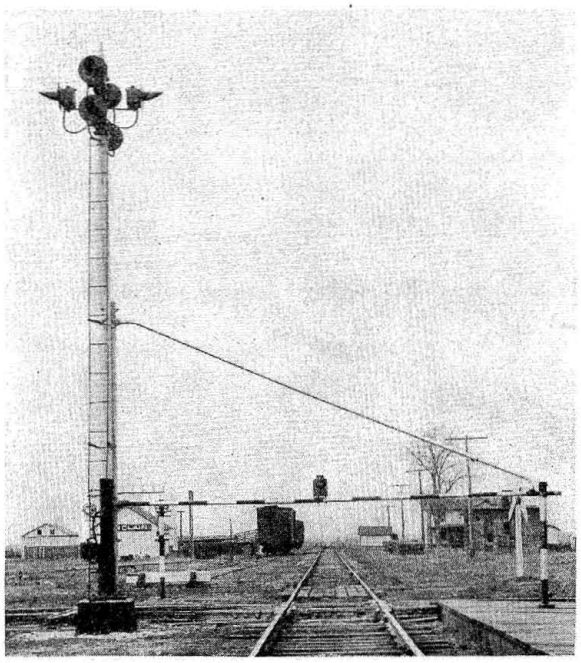
# Crossing Gate With Light Signals Installed at Railroad Crossing

## Interlocking at crossing of single-track lines of Alton and Pennsylvania replaced by simple arrangement adequate for present traffic



The gate is hinged to the signal mast

AT Minier, Ill., the Jacksonville single-track main line of the Alton crosses the Peoria-Terre Haute single-track line of the Pennsylvania. A mechanical interlocking with 22 working levers was installed at this crossing in 1901, at which time the Alton had a second track extending over the crossing. Certain passing-track switches, two interchange track switches and certain crossovers, as well as six main-line derails, were also included in the plant.

Traffic on these lines has been seriously reduced on account of business conditions. At present the trains operated over this crossing daily include four local passenger trains and eight fast through freight trains on the Alton, and two passenger trains and three freight trains on the Pennsylvania. On the Pennsylvania line, the passenger service consists of a gas-electric rail car in each direction daily, while the freight trains handle comparatively small tonnage.

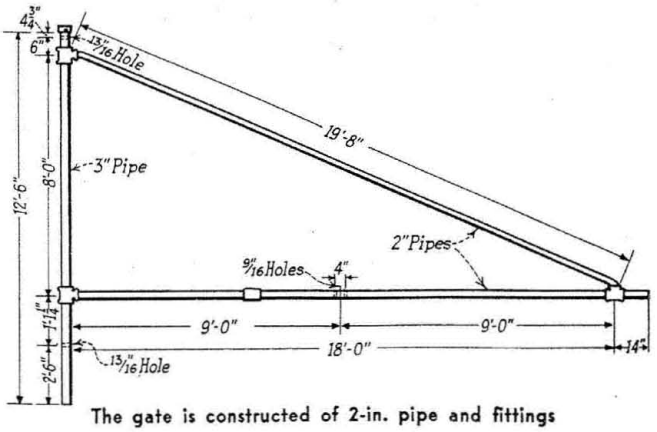
The normal charges for the maintenance and operation of the mechanical interlocking at this crossing totaled about $6,000 annually, and in view of the present traffic several means were studied to reduce this heavy charge. Consideration was given to an automatic interlocking plant, but even this expense was not justifiable, and as a result it was decided to install a crossing gate, set normally across the Pennsylvania track. As an added feature, color-light signals were included in the plans as a means of affording a long-range indication as to the position of the gate. A set of plans showing the new gate which the roads proposed to install in place of the interlocking, were presented to, and approved by, the Illinois Railroad Commission.

### Features of the Gate and Signal

As shown in the diagram, the gate post is made of a standard 6-in.-pipe signal mast, 23 ft. high, set on a concrete foundation. The gate itself is made up of 2-in. galvanized iron pipe as shown, and is set on forged hinges attached to the post. The gate is held in one position or the other by a special hasp on a 2-in. pipe post, the pin being arranged for a standard switch padlock. A special feature worthy of note is that the gate is so constructed that the bottom arm is five feet clear of the top of the rail, so that track motor cars can be pushed under the gate without opening it.

The signals mounted at the top of the gate are made up of standard General Railway Signal Company signal marker units with a 6⅜-in. lens and an 8-volt 18-watt lamp. Directed each way on the Alton, are two lights, the top ones indicating red and the lower, yellow. Directed each way on the Pennsylvania is a single lamp indicating red.

When the gate is in the normal position, i.e., across the Pennsylvania and locked, the red indication is displayed both ways on the Pennsylvania and the yellow indication both ways on the Alton. When the gate is unlocked, and moved a distance of about 6 in. from the post, the red lights on the Alton are illuminated and the yellow lights are extinguished, this condition continuing




The gate is constructed of 2-in. pipe and fittings

until the gate is within 6 in. of the opposite locking post, i.e., with the gate across the Alton track, at which time the red lights on the Pennsylvania are extinguished. Conversely, when the gate is being operated to the normal position, the red signals for the Pennsylvania are lighted as soon as the gate is moved about 6 in. from the post, all

four red signals being lighted until the gate returns to within a few inches of the normal locking post, at which time the red signals on the Alton are extinguished and the yellow signals are illuminated. The control of these circuits is accomplished by means of a G. R. S. Model 7 switch circuit controller mounted on the lower part of the gate mast and actuated by a connection from the gate. The signal feed is taken from the low-voltage side of a 110—10-volt transformer which is connected to a commercial source of power. As supplementary protection, caution signs are located on the Alton 2,500 ft. from the crossing, and on the Pennsylvania a stop sign is located 200 ft. from the crossing in each direction.

In operation, the trains on the Alton are required to slow down to 15 m.p.h. when approaching the crossing. Trains on the Pennsylvania are, of course, required to stop and, if no trains are seen approaching on the Alton, the brakeman unlocks the gate and moves it to the opposite position. After the train pulls by, he returns the gate to the normal position and locks it. The installation of the gate cost about $460 for materials and labor. It is estimated that the operating expenses with the gate will not exceed $200 annually, as compared with $6,000 when the interlocking was in service.

At Higbee, Mo., where this same line of the Alton is crossed by a branch line of the Missouri-Kansas-Texas, a gate similar to the one just described was installed where no protection was formerly in service. In this case the benefits consisted of the elimination of train stops on the Alton.

# Ends of Double Track Equipped With Automatic Interlocking

## Interlockings at both ends of a 20-mile section of double track are made automatic—Changeover pays for itself in six months

LAST JULY the Great Northern converted to automatic operation two interlocking plants—formerly manually controlled—one at each end of the 20-mile section of double track extending from Atwater, Minn., westward to Pennock, Minn., on the "lower" main line between St. Paul and Seattle. The cost of changing both of these interlockings was approximately $1,540, and the net annual saving amounts to $3,058.

In 1923, when this line was equipped with automatic color-light signals, mechanical interlockings were installed at these two ends of double-track. In each case the interlocking machine was of the Saxby & Farmer type and was handled by the telegraph operators, who were then on duty three tricks daily. Under these circumstances, manually-controlled interlocking was logical and gave somewhat more flexibility than could be obtained under automatic operation.

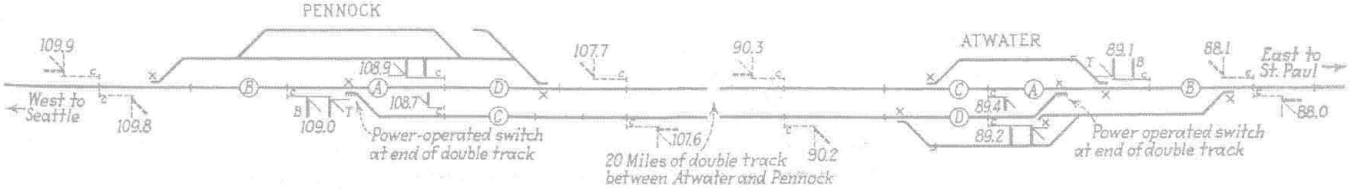
However, operating conditions became such that it was no longer practicable to maintain three-trick telegraph operation at the two end-of-double-track stations, and therefore it was decided to make the change herein described. This decision was especially warranted in view of the Great Northern's extensive and successful experience in the application of automatic interlocking to complicated crossings, gauntlets, junctions and ends of double track.* The new, automatic, interlockings, as well as the manually-controlled plants which they supersede, were designed and installed by the forces of the railroad company.

Atwater is 13 miles east, and Pennock is 7 miles west, of Willmar, an important point on a division that is mostly single track except for the section between Atwater and Pennock. The traffic at the present time consists normally of four passenger trains and three freight trains each way daily.

### Existing Signals Unchanged

In converting the electric interlockings to automatic operation, the (color-light) signals were left in the positions they formerly occupied. The interlocking machine, at each station, was removed from the depot, and in its place were substituted two-push-buttons which the agent can use when, for example, it is desired to run a train from the single track to the double track against the current of traffic. Except for special movements of this kind, however, the operation of the new layout is entirely automatic. The electric switch machines were equipped with dual selectors, so that trainmen may make special

*See *Railway Signaling*, December, 1932, for description of the Great Northern's pioneering experience in automatic interlocking, and for description of automatic end-of-double-track interlocking at Lohman, Mont.




Both ends of the double track between Pennock and Atwater are protected by automatic interlocking with power-operated switches