

# All Electric Interlocking at Joliet

## Describing the Protection of the Crossing of the Rock Island, Michigan Central, Santa Fe and the Alton

One of the largest interlocking plants in the Middle West was recently put in service at Joliet, Ill. The four roads interested in this plant are the Chicago, Rock Island & Pacific, the Michigan Central, the Atchison, Topeka & Santa Fe and the Chicago & Alton. Joliet has a population of approximately 35,000, engaged in many important industries, and is located close to Chicago. For these reasons the amount of passenger traffic is heavier than is usual for cities of this size. The Rock Island and Michigan Central jointly use a four-track line running approximately east and west, which crosses the joint four-track line of the Alton and the Santa Fe at an angle of nearly 80 degrees.

The recent track elevation at this point was completed about May, 1912, and some quite important changes were made in the track alignment which brought the tracks into the position shown in the accompanying diagram. The Alton and the Santa Fe formerly operated independent double-track lines with a

The two-story concrete interlocking tower is located in the northeast corner of the crossing, and the station is situated directly west and across the tracks from it.

The plant consists of a 224-lever General Railway Signal Company all-electric interlocking machine, with three spare levers, 29 spare spaces and 192 working levers, controlling 17 high signals, seven dwarf signals, 10 derails and 13 switches, four traffic locks, four section locks and one crossing lock on the Rock Island and Michigan Central lines; and 25 high signals, 32 dwarf signals, 39 switches and derails, and 31 switches and 9 M. P. frogs, on the Santa Fe and Alton. There are four four-track signal bridges on the Rock Island and Michigan Central, and one five-track and two four-track signal bridges on the Santa Fe and Alton.

On the Rock Island and Michigan Central north of the tower, the tracks are signaled for traffic in both directions, and traffic levers for reversing traffic in cases of emergency are provided



Fig. 1. Operating Room on Second Floor of Tower, Showing Lever Lights and Illuminated Track Diagram.

grade crossing near the center of the business district and a separated grade crossing south of the city. The present arrangement provides for the use of a joint four-track line from Clinton street near the old point of crossing, to Osgood street, crossovers being provided at both ends to allow passenger trains on both roads to use the two tracks adjoining the station, and freight trains to run on the two outside tracks.

There was much co-operation between the various signal and construction departments at the time of the track elevation. By working together, the various roads interested were able to make provision for the signal and interlocking arrangements. The main conduit was laid and concrete manholes were built at the junction points at the time the elevation of the tracks was under way. Aside from this, provision was made for derails, signal bridges and other signal department structures before the whole work was really completed.

in this plant, and also in the all-electric plant at Michigan Central Junction, which is approximately one mile north of the crossing.

All signals indicate in the upper quadrant. The high signals are Model 2-A, three-position, semi-automatic, and the dwarf signals are Model 2-A, operating from zero to 45 degrees. The switches and derails are equipped with Model 2 switch machines. No detector bars are used. Approach and section locking was installed, and each lever is equipped with an electric light which indicates whether the section in which the function is located is occupied. The lever lights are shown in the above illustration. An extra precaution was used in the selection of the signal circuits, they being looped through the switch box and also through the extra contacts on the pole changer to insure that the points are locked in the proper position before the signal is cleared. The main wire runs were made in vitrified

duct, and the cross runs in fibre conduit. Two extra wires were installed through the plant for telephone use, making it possible for the maintainer to readily communicate at each manhole with the leverman when testing.

Frog point derails were installed on the tracks used for passenger traffic, 50 feet from the crossings on the station side, so as to allow trains to stand at the station and at the same



Fig. 3. View of Tower from the Santa Fe and Alton Tracks.

time not to block movements of trains on the other road over the crossings.

Three sets of Willard lead type storage 120 A. H. battery were used. The first, 110 volt, is the main operating battery, and is charged from the d. c. side of a motor generating set. A generator driven by a gasoline engine was also installed for emergency. The second set of 10 volts is used for energizing the track circuit, and the third set of six volts for energizing line circuits.

The latter two sets are floated from a duplicate charging set mounted on a common base. Each set consists of an alternating current motor directly connected to and on the same shaft, with the 10-volt generator on one end of the shaft and the

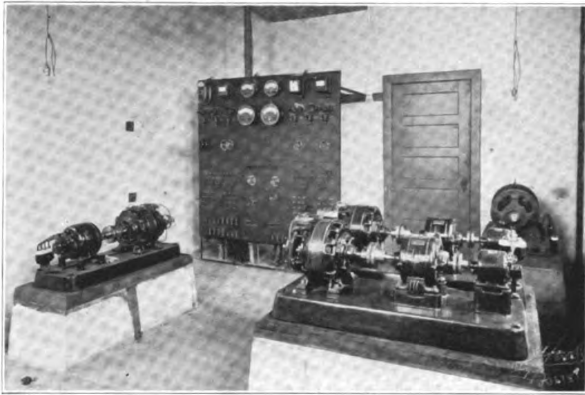


Fig. 4. Showing Charging Sets and Switchboard on First Floor of Tower.

six-volt generator on the other end of the shaft. An auxiliary lighting set is provided, consisting of a 110-volt d. c. motor driven from the 110-volt storage battery directly connected to a 110-volt. a. c. generator which furnishes energy for 110 volts, 10-volt lighting transformers used for lighting 2½ watt, 10-volt Tungsten lamps, and for 110-55-volt transformer which energizes the lever locks and lever lights as well as light for illuminating the track diagrams. This machine is provided with a governor to maintain constant frequency, and voltage on the a. c. current line regardless of the voltage of the storage battery.

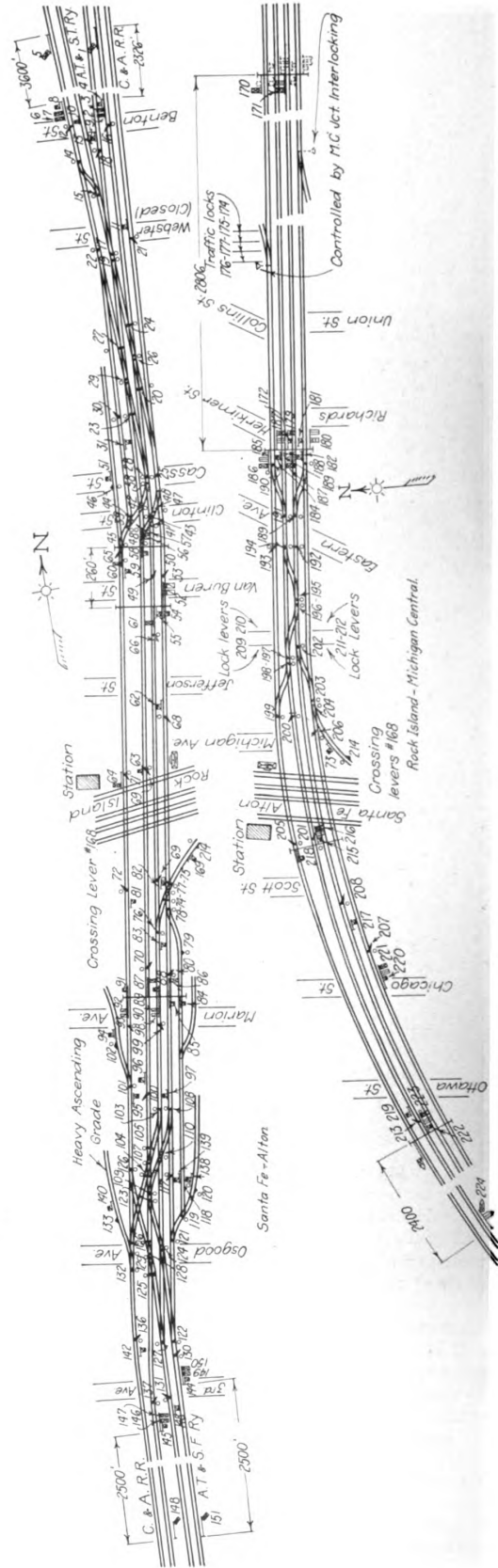


Fig. 2. Diagram Showing General Layout of Tracks.

The battery is located in the basement of the tower, the connection to the switchboard being made with lead strips. The relay cabinet is located on the first floor of the tower, and wires leading to same are run in a concrete trough under the floor.

One of the practical features of the arrangement of the oper-



Fig. 5. View of Signal Bridge Looking North on the Rock Island and Michigan Central.

ating room is a pit three feet deep provided under the interlocking machine so that the wiremen can get in and stand up when making connections or repairs that may be necessary. Owing to the size of the machine, four-track diagrams are used, attached to the machine directly above the levers. The manipulation charts read from signal to signal instead of from letters



Fig. 6. Showing Frog Point Derail.

designating certain sections of track, as is the usual manner. Ammeters were installed at each end of the machine supported on a standard meter bracket so that the leverman may easily ascertain how much current is consumed by the function being operated.

The plant is sectionalized for crossing protection so that if a cross should occur on any two of the tracks, it will not throw the other six tracks out of operation.

The switchboards are equipped with watt meters for all ser-

vices, one for track circuit and one for line circuit, and one for interlocking circuit, so that a check can be made on the power consumed.

The interlocking plant was installed by the signal force of the Chicago, Rock Island & Pacific. The actual construction was started September, 1913, under the direct supervision of C. Hartvig, foreman, and L. Wyant, superintendent of construction. The plant was put in service in three sections, the first section covering all functions on the Rock Island and Michigan Central, and the derails and signals protecting the crossing on the Santa Fe and Alton went in service March 25. The second section, protecting the North Junction of the Santa Fe and Alton, was put in April 13, and the third, section protecting the South Junction, was put in service May 1.

### AN UNUSUAL METHOD OF COLLECTING SCRAP.

On January 5 to 28, inclusive, a scrap-collecting train was operated over the St. Louis division on the Illinois Central in charge of the division superintendent and his entire staff, including the roadmaster, supervisors of bridges and buildings, signals, water service, etc.; trainmasters, storekeeper, master mechanic, traveling engineers, agents of the important stations, etc., making in all a party of about 50 men. The train consisted of a caboose, coach, dining car from the division wrecking outfit, and the necessary cars for the collection of the scrap material. This train moved over all the branch and main lines of the division and gathered all of the surplus material which could be found.

In addition to the collection of scrap the entire party was organized so that each officer made a close inspection of all work under his supervision at each station. The superintendent, accompanied by the roadmaster, signal foreman and track supervisor, examined every switch and made notes of any repairs found necessary. The supervisor of bridges and buildings, with the painter foreman, inspected all buildings, stock pens, water tanks, etc., looking especially after the fire protection. The division claim clerk checked the expense bills against the freight in the freight house to determine if the agent was properly handling his accounts.

The agents from the larger stations who accompanied the party checked over the passenger tariffs with the local agents at the smaller stations, and instructed them in their duties. In this way a very thorough inspection of the entire division was secured. While on this trip the quarterly staff meeting of the division officers was also held, and the men had an opportunity to examine the conditions under consideration as they went over the division.

The amount of scrap and obsolete material gathered on this train amounted to 147 car loads. The storekeeper gave credit for new material to the extent of \$581.48; second-hand material, \$7,917.76; scrap material, \$25,245.81, or a total of \$40,745.50. The cost for labor, train expense and meals on this trip amounted to \$2,203.81, leaving a net gain of \$38,541.69. In addition surplus tools valued at \$2,800 were transferred from sections where they were not needed to other sections. As an illustration of the conditions encountered, 12 bottles of ink were found at one small station, where one bottle was sufficient for nearly a year. At another point 50 non-insulated bridle rods were found at a station on insulated territory which were useless there, but serviceable elsewhere.

Entirely aside from the savings in scrap recovered, this trip was considered a success because of the opportunity it offered for the officers of each department to come in contact with the employees of that department over the entire division. It also provided an opportunity for the entire staff to discuss problems of common interest on the ground from place to place. Since the trip proved to be such a decided success, the plan will probably be adopted on other divisions of the Illinois Central in the near future.