

Rocket train crossing the 5th Street crossing in Moline

Protection at 38 Street Crossings In and Near Rock Island, Ill.

Project, involving the installation of gates, signals and bells, on four railroads provides 24-hour uniform crossing protection—Eleven crossings were closed

IN ROCK ISLAND, Ill., Moline, East Moline, Watertown and Carbon Cliff, the main streets of the business, industrial and Mississippi River waterfront district are crossed at grade by an extensive network of tracks of four railroads. In these areas, with the co-operation of Municipal, State and Federal authorities, the Chicago, Rock Island & Pacific; Chicago, Burlington & Quincy; Davenport, Rock Island & Northwestern, and the Chicago, Milwaukee, St. Paul & Pacific have established 24-hour protection at 38 street crossings throughout a distance of approximately 14 miles.

An important phase of this extensive project was that 11 crossings were closed, 2 crossings were closed

to vehicular traffic, and 1 crossing was converted from a public to a private crossing. The crossings protected, as well as those closed, are listed in the accompanying table, while the plan shows the locations of the crossings at which protection was provided.

This improvement program involved the installation of flashing-light signals and bells at 10 crossings, and electric gates with flasher-light signals and bells at 28 crossings. In some instances "No Left Turn" or "No Right Turn" operative signs were used in addition to the other protection. At 15 of the crossings the control of the protection is straight automatic, at 7 crossings the control is automatic except during certain hours of the day when manual control is in effect, and at 16 crossings straight manual control is used 24 hours daily.

Previous Protection

This new system replaces various forms of crossing protection, including flashers, bells, watchmen, mechanical or pneumatic gates, etc., while at some of the crossings no protection,

other than fixed crossbuck signs, had been in service. At some of the crossings, flagmen were on duty various periods ranging from 8 to 13 hours daily, while at other crossings flagmen were provided the full 24 hours of each day.

Manual Control

Because of the variations in main-line train speeds, and the stops at the railroad stations, as well as the complexity of the extensive switching movements, the use of track circuits was impracticable for the control of the crossing gates, signals and bells in the groups of these facilities between 44th and 46th Streets in Rock Island; 3rd and 8th Streets, 12th and 15th Streets, and 16th and 20th Streets in Moline; and between 17th and 19th Streets, East Moline. Therefore, a system of straight manual control was devised, the crossings being divided into 5 groups, as heretofore mentioned, with the gates and signals in each group controlled by a panel-type machine in a small elevated cabin. Where auto-manual or semi-automatic gates, signals and bells are

in service, as will be explained later, similar control panels are used during certain periods each 24 hours.

Rock Island Area

Reference is made first to the west portion of the diagram. At 17th and 18th Streets in Rock Island, flashers, with bells, as well as operative "No Right Turn" and "No Left Turn" signs, were installed on the main line of the D. R. I. & N., and the industrial tracks of the C. R. I. & P. and the C. B. & Q. At 1st Avenue, 19th and 20th Streets, gates, flashers and bells were installed to protect crossings over two main tracks of the C. B. & Q. The control of this protection is semi-automatic in operation, while at 17th, 18th and 19th Streets and 1st Avenue the control is manual from a tower between 18th and 19th Streets during the hours between 7 a.m. and 6 p.m. The protection at the C. B. & Q. crossing is manually controlled between 6:45 a.m. and 10:00 p.m.

At 44th, 45th and 46th Streets, the double-track main line and sidings of the C. R. I. & P. parallel the main line and sidings of the C. B. & Q. Gates, flashers and bells were installed at these three crossings, and are manually controlled 24 hours, from a tower on the south side of the C. R. I. & P. between 45th and 46th Streets.

Moline Area

Extending east, the two main lines of the C. R. I. & P. and the C. B. & Q. enter Moline, the boundary being

46th Street. Gates, flashers and bells were installed at 3rd, 5th, 6th, 8th, 12th, 14th, 15th, 16th, 17th, 19th and 20th Streets. The facilities at the 3rd, 5th, 6th and 8th Street crossings are controlled from a tower on the south

from a tower on top of the C. R. I. & P. station platform roof. Straight automatic gates, flashers and bells were installed at 23rd, 34th and 41st Streets. Cut-outs, operated by switch keys, were installed at the 23rd Street

Crossings Closed

Rock Island

- 5th Ave. (CRI&P)
- 7th St. (CRI&P-CB&Q)
- 19th St. (CRI&P)

Note:

19th St. crossing is subject to temporary reopening.

Moline

- 1st St. (DRI&NW)
- *2nd St. (CRI&P-CB&Q)
- 4th St. (CRI&P-CB&Q)
- 11th St. (CRI&P-CB&Q)
- 19th St. (DRI&NW-CB&Q)
- 22nd St. (CRI&P-CB&Q)
- 25th St. (CRI&P-CB&Q-DRI&NW)
- 38th St. (CRI&P-CB&Q-DRI&NW)
- 48th St. (CRI&P-CB&Q-DRI&NW)

East Moline

- **5th St. (CRI&P-CB&Q-DRI&NW)
- *11th St. (CRI&P)
- * Closed to vehicular traffic only.
- ** Converted to private crossings.

side of the C. R. I. & P. tracks at 5th Street. The protection at 12th, 14th and 15th Street crossings, like the 3rd to 8th Street facilities, are controlled manually 24 hours a day from a tower. "No Left Turn" signs are provided at the crossings at 14th, 15th and 16th Street crossings. The crossing protection group, including 16th, 17th, 19th and 20th Streets are manually controlled 24 hours a day

Crossings Protected

Rock Island

- 17th St. (CRI&P-CB&Q-DRI&NW)
- 18th St. (CRI&P-CB&Q-DRI&NW)
- 1st Ave. (CB&Q-DRI&NW)
- 19th St. (CB&Q)
- 20th St. (CB&Q)
- 44th St. (CRI&P-CB&Q)
- 45th St. (CRI&P-CB&Q)

Moline

- 1st St. (CRI&P-CB&Q)
- 3rd St. (CRI&P-CB&Q)
- 5th St. (CRI&P-CB&Q)
- 6th St. (CRI&P-CB&Q)
- 8th St. (CRI&P-CB&Q)
- 12th St. (CRI&P-CB&Q)
- 14th St. (CRI&P-CB&Q)
- 15th St. (CRI&P-CB&Q)
- 16th St. (CRI&P-CB&Q)
- 17th St. (CRI&P-CB&Q)
- 19th St. (CRI&P-CB&Q)
- 20th St. (CRI&P-CB&Q)
- 20th St. (DRI&NW-CB&Q)
- 23rd St. (CRI&P-CB&Q)
- 3rd Ave. (CB&Q)
- 34th St. (CRI&P-CB&Q-DRI&NW)
- 41st St. (CRI&P-CB&Q-DRI&NW)

East Moline

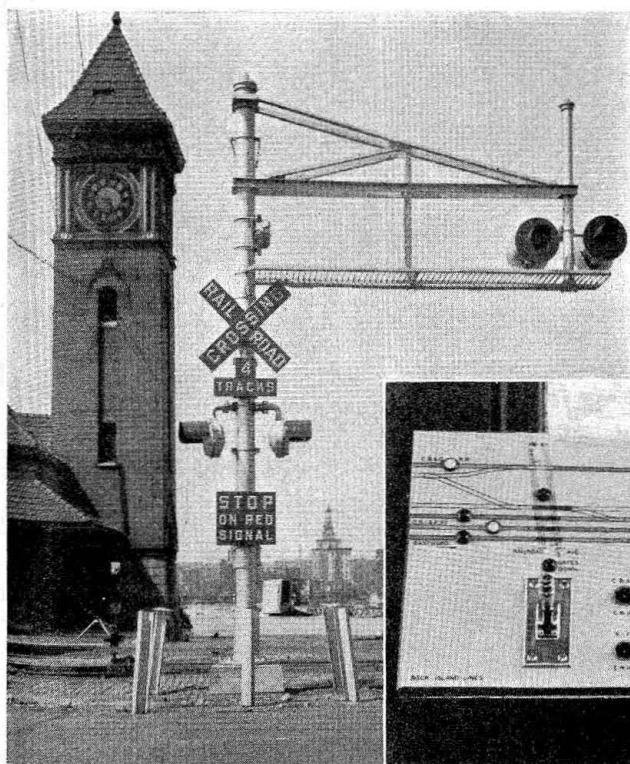
- 1st St. (CRI&P-CB&Q-DRI&NW)
- 3rd St. (CRI&P-CB&Q-DRI&NW)
- 7th St. (CRI&P-CB&Q-DRI&NW-CMStP&P)
- 9th St. (CRI&P)
- 10th St. (CRI&P)
- 10th St. (DRI&NW-CB&Q-CRI&P-CMStP&P)
- 13th St. (CRI&P)
- 13th St. (CB&Q-DRI&NW)
- 17th St. (CRI&P)
- 17th St. (CB&Q)
- 19th St. (CRI&P)
- 19th St. (CMStP&P)

Carbon Cliff

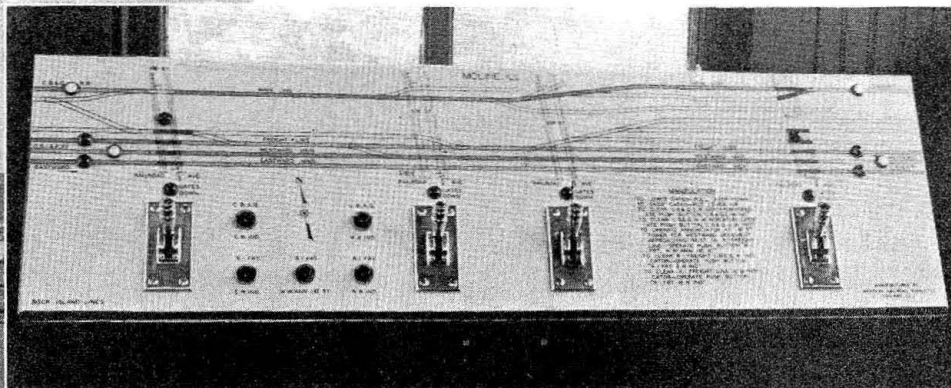
- 1st Ave. (CRI&P)

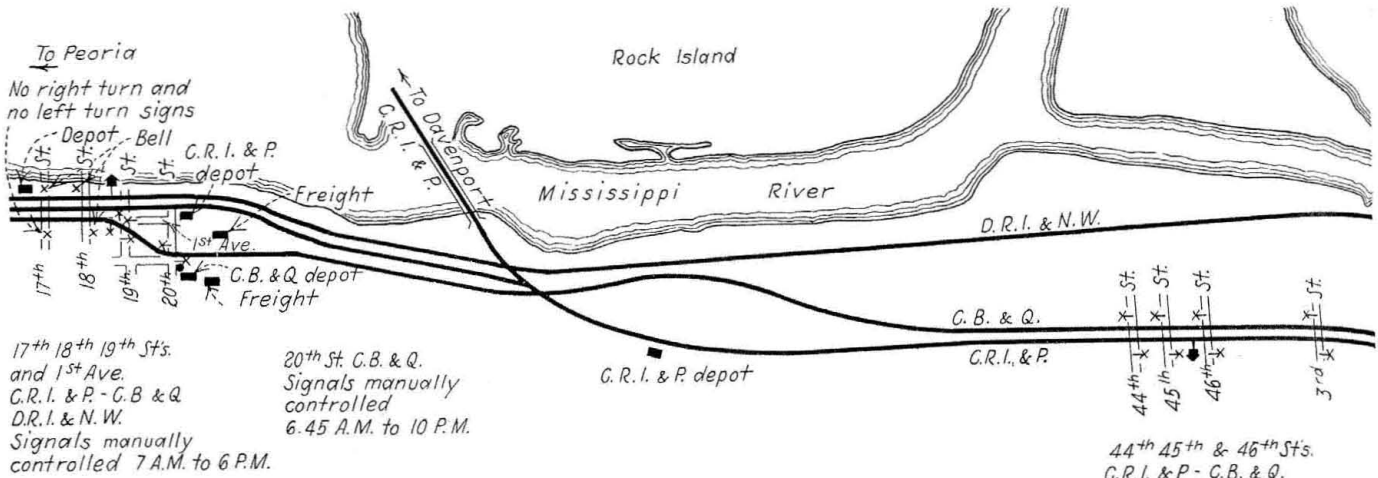
crossing to cut out operation of the protection when switching moves are not destined to pass over the crossing in the immediate future.

The D. R. I. & N., the C. R. I. &



Left— Cantilever signal at 17th Street in Rock Island. Below—Typical manual control machine at 5th Street in Moline



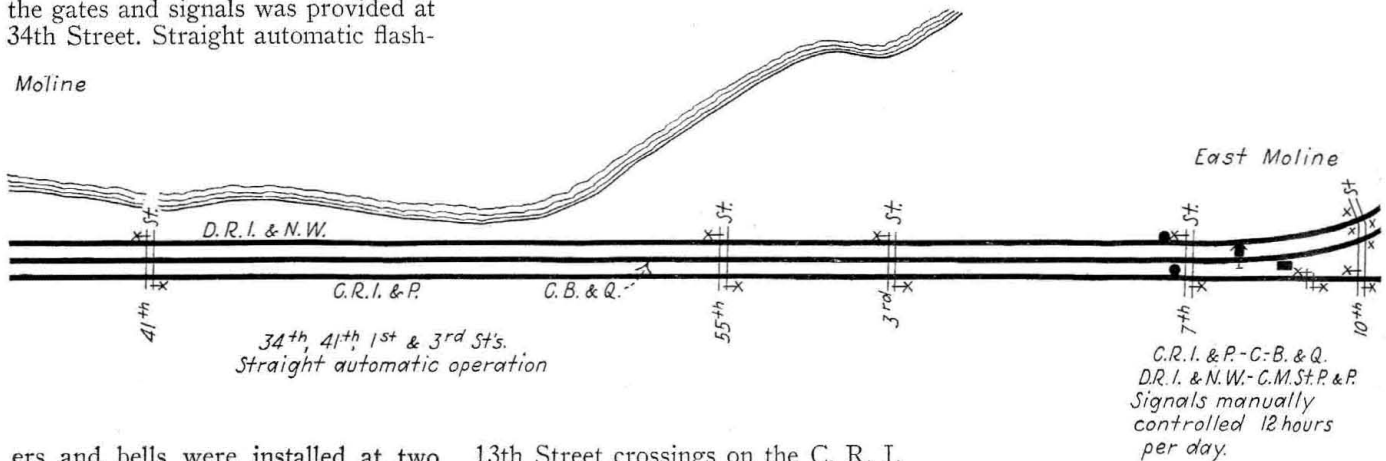


P., and the C. B. & Q. have separate yard facilities between 25th and 34th Streets, the latter point from which the single, double and single-track lines respectively extend eastward. A switch key cut-out for the control of the gates and signals was provided at 34th Street. Straight automatic flash-

Savanna. At 10th Street, where the D. R. I. & N. and the C. B. & Q. cross the highway, automatic flashers and bells were installed. Automatic gates were installed at the 10th and

were installed. Straight manually-controlled gates were installed at the

Moline



ers and bells were installed at two crossings on the main line of the D. R. I. & N. and industrial tracks of the C. B. & Q. at 20th Street and 3rd Avenue.

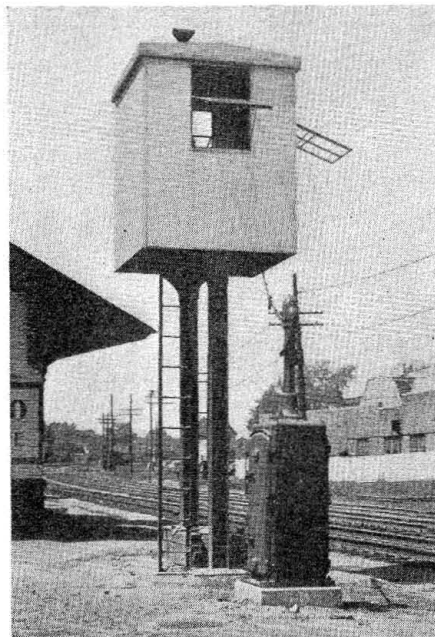
13th Street crossings on the C. R. I. & P. At the 13th and 17th Street crossings on the C. B. & Q., automatic flashing-light signals with bells

17th and 19th Street crossings on the C. R. I. & P., and are controlled 24 hours a day from a tower on the south side of the tracks at 19th Street.

At Watertown, 2 miles north of East Moline, automatic flashing signals were installed at the C. M. St. P. & P. crossing with 19th Street. At Carbon Cliff, 3.5 miles east of East Moline, flashing signals and bells were provided at a crossing of 1st Avenue on the C. R. I. & P.

East Moline Area

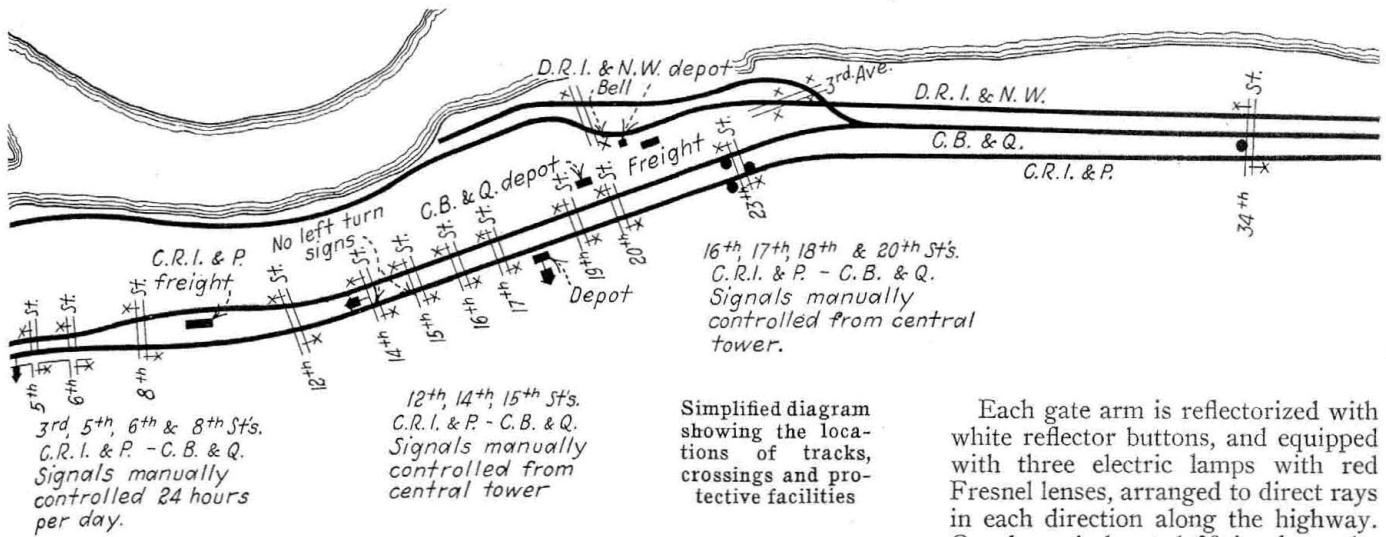
Automatic gates, bells and flashers were installed at 1st Street, the boundary between Moline and East Moline, and at 3rd Avenue; the C. R. I. & P., the C. B. & Q., and the D. R. I. & N. being involved. With the same three roads involved, semi-automatic gates and signals were provided at the 7th Street crossing, and on the C. R. I. & P. alone at 9th Street. These signals and gates are controlled 12 hours a day from a tower north of the C. R. I. & P. tracks, between 7th and 8th Streets. At 9th Street, the C. R. I. & P. tracks, eastward to Chicago, separate from those of the C. B. & Q. and D. R. I. & N., which extend in a northward direction and split again, the C. B. & Q. extending to Barstow and the D. R. I. & N. joining with the C. M. St. P. & P. at 10th Street, the line of the latter road extending to



The control machine at 14th Street in Moline is located in a new elevated tower

Control Machines

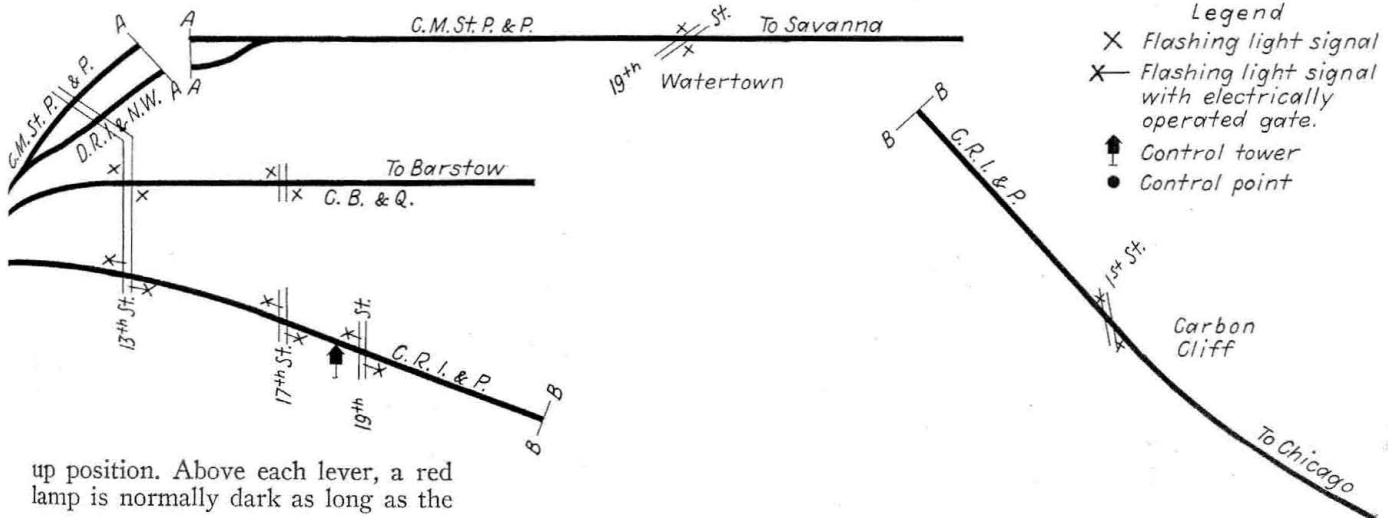
The control panels for the straight manual and auto-manual or semi-automatic crossing protection facilities were designed and manufactured by the Western Railroad Supply Company. Each panel is inclined, and is made of laminated bakelite mounted on a sheet-iron cabinet. A track diagram, across the top, includes yellow and white track-occupancy lamps, the two colors being used to distinguish certain tracks from others. Below the diagram is a set of levers, each of which is in line vertically with the



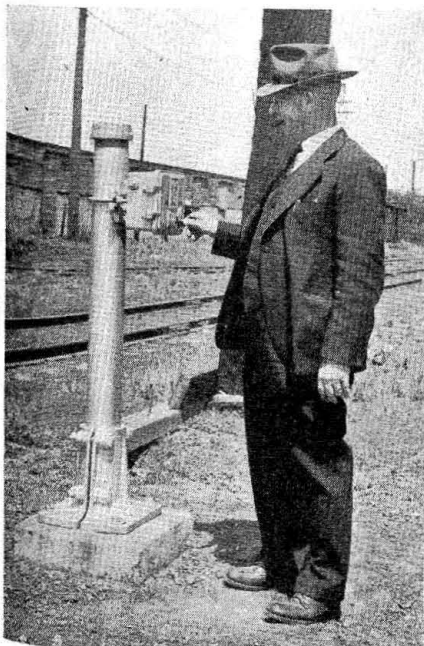
respective facilities it controls as represented on the diagram of the machine. These are two-position levers, up and down, normally in the

respective controlled gate is up. When any gate is in the down position, the red lamp directly above the respective lever is illuminated. At certain

Each gate arm is reflectorized with white reflector buttons, and equipped with three electric lamps with red Fresnel lenses, arranged to direct rays in each direction along the highway. One lamp is located 30 in. from the tip end of the arm, and two others are spaced 40 in. to 72 in. apart, depending on the length of the gate arm. When in operation, the end lamp is



up position. Above each lever, a red lamp is normally dark as long as the



H. B. McCallum, signal supervisor, operating switch key controller at 23rd Street

manually - controlled - gate locations, where the view of the crossing is obstructed, a red lamp is provided on the diagram, representing that location and all of the tracks. If a locomotive or car is standing on the crossing, the respective red lamp will be illuminated. Also located on the panel, are annunciator cut-out and gate-forestalling buttons.

Gates and Signals

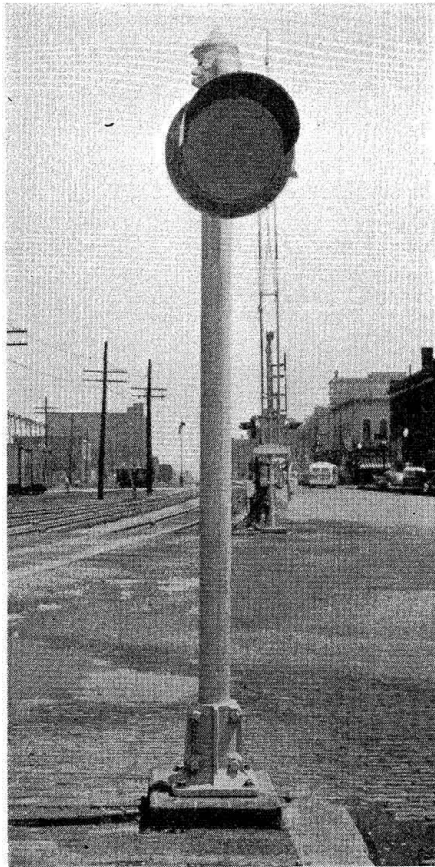
The gates are of the short-arm type with arms ranging from 16 ft. to 34 ft. in length, which is adequate to reach across the right-hand lane of traffic approaching the crossing. In all cases, the gate arms extend to the center line of the highway paving. One gate and signal mast is used at the right-hand side of the pavement for each of the approaches to the crossings, and no gate obstructs the lane of traffic departing from the crossing, so that vehicles are free to move off the crossing.

lighted constantly, while the other two flash alternately in synchronism with the flashing-light signals. The gate lamps, as well as those in the flashing-light signals are rated at 10 volts, 18 watts.

Details of Equipment

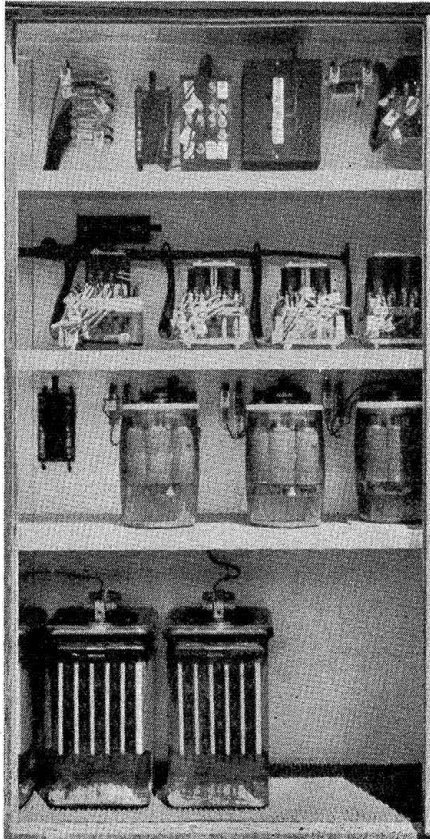
On each gate mast, the equipment includes, from top to bottom, a 10-volt, d-c. bell, a reflectorized "Railroad Crossing" crossbuck sign, a reflectorized number-of-track sign, the flashing-light units, equipped with 8 3/8-in. spread-light roundels, and the gate mechanism, which is the Type 3564, employing a 10-volt, d-c. motor, the complete assembly of which is known as the Model-10 of the Western Railroad Supply Company.

This project was planned and installed by the railroads involved, the signal forces of each road handling the office work and construction as applied to the crossings on its re-



"No Left Turn" sign at the 14th Street crossing, Moline. Gates in background

spective road. Practices of the railroads vary in certain details, but, in general, the construction is similar



Interior of instrument case

throughout, although there are variations of some details.

A 115-volt, 60-cycle, a-c. power supply is distributed to each of the crossings. The flashing-light signals and gate lamps are fed normally through transformers from the a-c. supply. If the a-c. power is cut off, a power-off relay switches the lamp feed circuit to a set of Exide lead storage cells, such a battery being provided at each of the crossings. At the crossings where gates are used, the d-c. motors of the gate mechanisms are fed from the storage battery, as mentioned above. In numerous instances, the previously existing track circuits which were fed from primary batteries, were retained in service. On practically all of the new work, each track circuit is fed by one cell of primary battery with a rectifier connected across the cell in an a-c. primary arrangement. These primary cells are rated at 500 a.h., and various types, such as Waterbury, Edison, Le Carbone and Columbia, are used.

I. C. C. Annual Statistics

In accordance with practice in the past, the Bureau of Safety of the Interstate Commerce Commission, Washington, D.C., has compiled and issued a tabulation of statistics pertaining to signals, interlocking, automatic train control, and communications facilities utilized for train-order transmission. This data is effective as of January 1, 1941.

The total length of railroad in the United States, operated under the block system, as of January 1, 1941, was 112,974.5 miles. Of this total 65,691.9 miles of road were automatic and 47,282.6 miles were non-automatic. Comparing these figures with the corresponding figures, as of January 1, 1940, there was an increase of 436.4 miles in the length of road operated under the automatic block system and a decrease of 429.4 miles of road operated under the non-automatic system. The total of 65,691.5 miles of road operated under the automatic block system represented 96,459.4 miles of track, 52,721.8 miles of which were equipped with semaphore signals, and 41,596.4 miles of which were equipped with light signals.

An aggregate of 7,860.7 miles of road, representing 14,360.5 miles of track, and 5,280 locomotives and 1,316 motor cars were equipped with automatic train stop or train control devices. Automatic cab signal devices and equipment was in service on 4,033 locomotives and 665 motor cars, and

on 8,583 miles of track. Cab signal operation was provided in connection with automatic wayside signals, without automatic train control, on 6,109 miles of track; without automatic wayside signals and automatic train control on 110.5 miles of track; with automatic wayside signals and automatic train control on 608 miles of track; and with automatic train control, but without automatic wayside signals on 1,755.5 miles of track.

As of January 1, 1941, automatic interlockings were in service at 376 points, electric interlockings at 1,384 points, electro-mechanical at 431 points, electro-pneumatic at 338 points, mechanical at 1,883 points, pneumatic at 5 points, and other types at 83 points. A total of 423 interlockings were remotely controlled.

A total of 212 installations of centralized traffic were in service, covering 1,890.8 miles of road, 2,406.5 miles of track, and 323 passing sidings. Controls were effected for 1,529 switches, 616 semaphore signals and 3,288 light signals. The numbers of automatic semaphore and light signals utilized in these areas totaled 337 and 1,489, respectively.

A total of 17,634 miles of road were operated under the manual block system using telegraph; 29,849.1 miles of road using telephone; 212.5 miles using electric bell or light; 135.6 miles of road under the controlled manual block system; and 56.5 miles under the train staff. Manual block signal stations totaled 5,475. Permissive signaling was allowed for all trains on 21,441.5 miles of road, and for all except passenger trains on 24,115.8 miles of road.

Operation by Signal Indication

One direction operation by signal indication, without written train orders, was utilized on 155.9 miles of track in centralized traffic control territory on 14 installations; on 2,906.4 miles of track in manual block territory on 58 installations; on 9.4 miles of track in controlled manual block territory on 2 installations; and on 28,088.2 miles of track in automatic block territory on 383 installations. Either direction operation by signal indication, without train orders, was utilized on 2,247.8 miles of track in centralized traffic control territory on 164 installations; on 393.2 miles of track in controlled manual block territory on 57 installations; on 2,302.3 miles of track with automatic block in both directions on 145 installations, and on 487.2 miles of track in territory that is provided with automatic block in one direction, traffic locking reverse direction, on 66 installations.