

Burlington Protects Three Crossings

Three highway crossings at Rockford, Ill., are protected with flashing-light signals and revolving disks at two streets and automatic gates at the third

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THE Chicago, Burlington & Quincy has recently completed its second installation of automatic highway crossing gates, which form a part of a larger project, including two additional streets protected by flashing light highway crossing signals equipped with revolving disks. All three points protected co-ordinate into one installation. This work was done in the city of Rockford, Ill., which city is located at the end of a single-track branch line extending from a junction with the Chicago-St. Paul line at Flag Center, Ill. Rockford is located 110 miles northwest of Chicago.

Rockford is a city of diversified manufacturing, which produces considerable freight traffic on this line,

especially that portion within the city limits where switch engine moves are numerous. The main track and sidings traverse a portion of the city where both manufacturing and population are the densest, and in so doing naturally crosses numerous streets, some of which are important arterial highways. These crossings have produced some problems, especially since several have graduated into outlets for principal state highways.

The highway crossings recently protected under this project are: Seminary street, 15th avenue and 16th avenue. Seminary street crosses

the tracks at a fairly flat angle. This is a very busy diagonal street and was previously protected by mechanical crossing gates, controlled manually from a gate tower located near the point of operation. The old gates were of the wire-connected type, had been in service for several years, and had about reached the point where they were due for complete renewal. The new installation provided flashing light signals on each side of the track on the right hand side of the highway as traffic approaches. In addition to the flashing light signals, revolving stop disks are a part of the equipment. The crossings at 15th avenue and 16th avenue originally were protected by old type wire-connected crossing gates, manually controlled from a gate



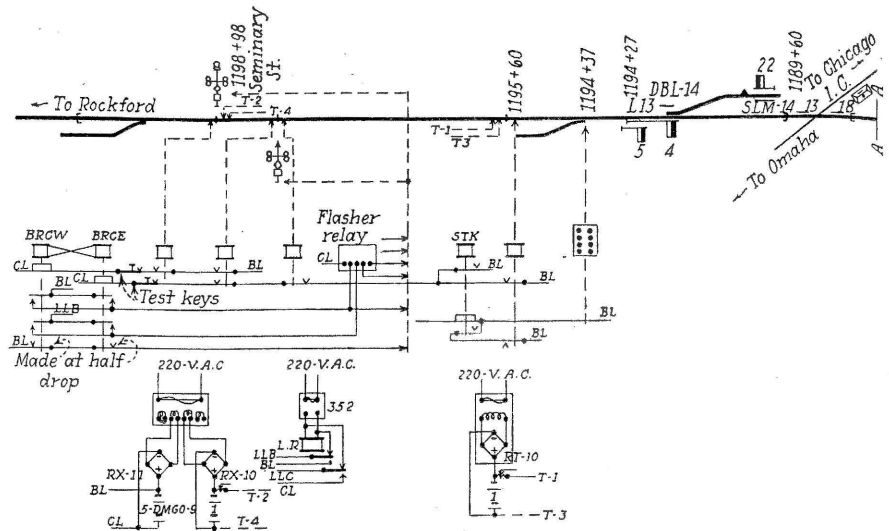
Automatic gates were installed at Fifteenth Avenue

tower at 15th avenue. These gates also were old and about ready for renewal. At 15th avenue they were replaced by automatic crossing gates which are operated at all times automatically by the trains. At 16th avenue the old manually-operated crossing gates were replaced by a flashing light signal on each side of the tracks and on the right hand side of the highway approaching the tracks, and equipped with revolving stop disks.

Installation by Ordinance

This installation, covering all three highway crossings, was installed under a city ordinance. In fact, the city council, in their ordinance, requested automatic gates at 15th avenue and the automatic flashing light, revolving disk signals at Seminary street and 16th avenue. This ordinance was prompted due to the increase of traffic over the above streets and especially 15th avenue, which is perhaps one of the busiest highways passing through the city of Rockford. After the city ordinance was passed, permission was obtained from the Illinois Commerce Commission in the regular manner covering this installation. Since these types of apparatus have been in service there have been no complaints, and without doubt the city authorities are satisfied.

This installation was designed and



Track and signal plan and also circuit diagram of crossing protection including signals and automatic gates at Rockford

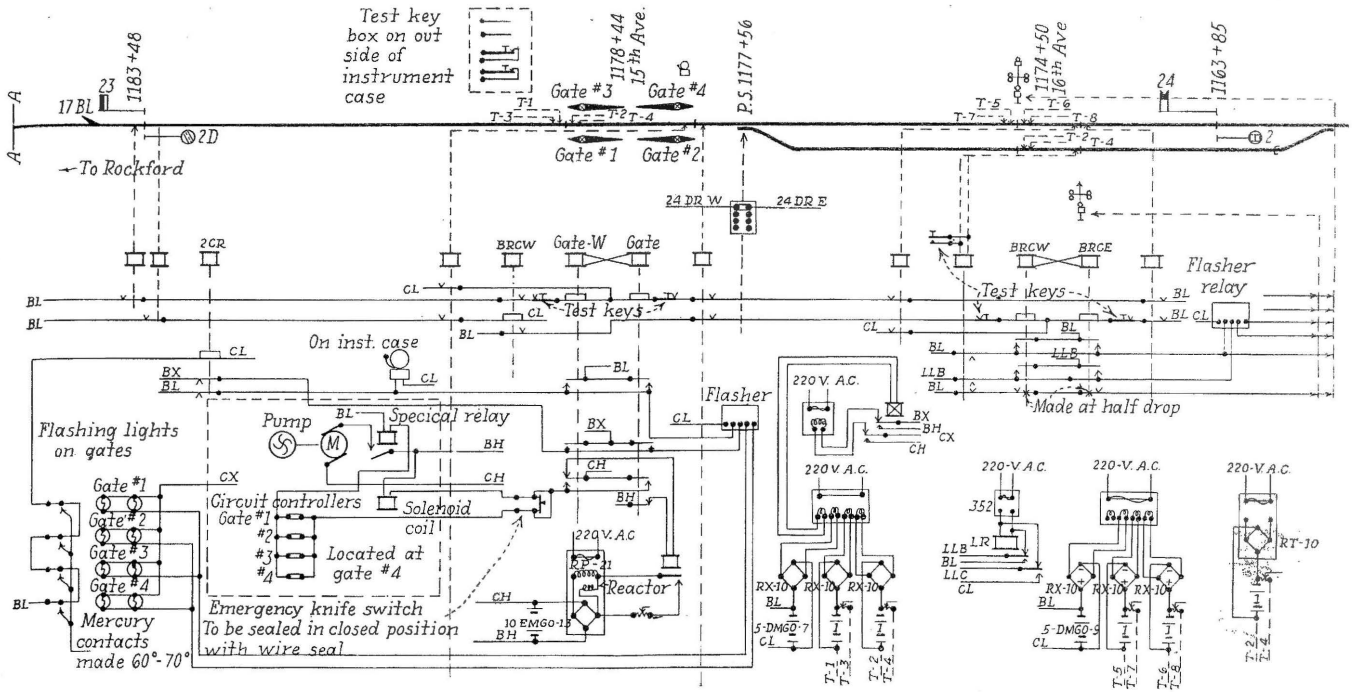
installed by the signal department, and the design and installation of the automatic gates follows the same principals as covered by the requisites in my article in *Railway Signaling*, April, 1936, issue, and it is interesting to know that the requisites used on the installation described in the above article have produced results so de-

sirable that in the second installation they could be followed.

Just north of Seminary street is a railroad crossing with the Illinois Central, protected by an interlocking plant, while 15th and 16th avenues are in the end of an automatic protection signal territory. Consequently, in making the new installation for



Flashing-light signal with rotating stop disk were installed at Sixteenth Avenue and Seminary Street



highway crossing protection, it was necessary to design circuits that would co-ordinate with existing signal circuits. The location of the highways and the signal apparatus is shown on the accompanying sketch.

The signal work was started on October 28, 1936, and completed and placed in service on November 28, 1936, and there has been just one case where an automobile ran into the crossing gate arm.

The automatic signal protection at Seminary street and 16th avenue consists of standard A.R.A. flash light signals, back-to-back mounting, with "stop-on-red" reflectorized track sign and non-reflectorized cross-buck sign. The flashing light signals and revolving disks are W.R.S. Model 6 mechanisms, the flashing light signals being provided with Mangan mirror reflectors in front of which is an 18 watt electric lamp bulb, the Burlington standard being to use the 18 watt lamp bulb instead of the 10 watt lamp bulb in more general use, as it has been found a much better day indication is produced by a higher wattage light.

Gates at 15th Ave.

The automatic crossing gates at 15th avenue are of the type manufactured by the Automatic Safety Signal Gate Company and consist of four posts with sidewalk arms on the gates on only one side of the street, as there is no sidewalk on the opposite side. The gates are equipped with red flashing lights, two to each gate arm, which start operating a few seconds previous to the commencement of the actual operation of the gate. These

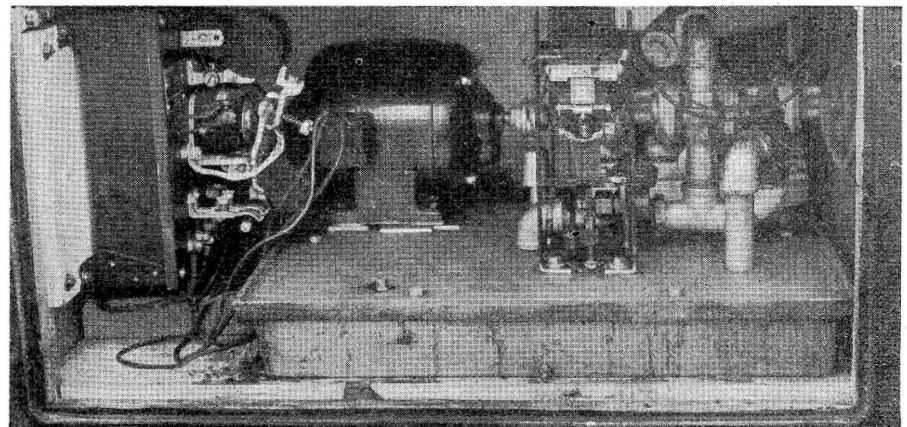
lights continue to flash during the complete downward movement and while the gates are horizontal across the street and during the complete upward movement, thus giving highway traffic the desired time interval warning. These gates are of the electro-hydraulic type, with all four pumps consolidated in one mechanism case, the pumps being operated by a 3/4 hp. d.c. motor.

From the accompanying wiring diagram for the gates and the re-

as there has been no gate failure.

The power to operate the gates is obtained from storage batteries floated on a 220-volt, a.c., single-phase, 60-cycle power line. A five-cell DMGO-9 lead storage battery operates the revolving disk flashing light signals at Seminary street and 16th avenue, while the gate is operated by a 10-cell EMGO-13 lead storage battery.

All control wires are aerial and the necessary underground conductors are in parkway cable of the Burling-



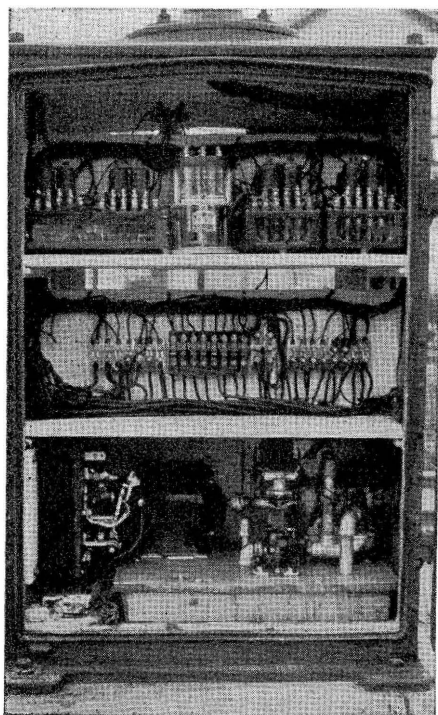
Motor and pump for operating the four gates

volving disk flashing light signals at the three streets, it will be noted that the automatic crossing gate is provided with an emergency knife switch, sealed in the closed position. This switch is to be operated only by section men or maintainers in case of gate failure, as it is located so that they can get at it. However, to date there has been no necessity for breaking the seal and recording its number,

ton standard, which includes lead and steel tape assembly. The relays used, including the interlocking relays, are of C. B. & Q. design and were manufactured at the Chicago, Burlington & Quincy signal shop at Aurora, Ill. The rectifiers charging the different batteries are of the copper disk type and of a capacity that will assure that the storage batteries are charged at all times, and that the apparatus, in-

cluding the automatic crossing gates, will operate directly from the rectifier should there be a battery failure.

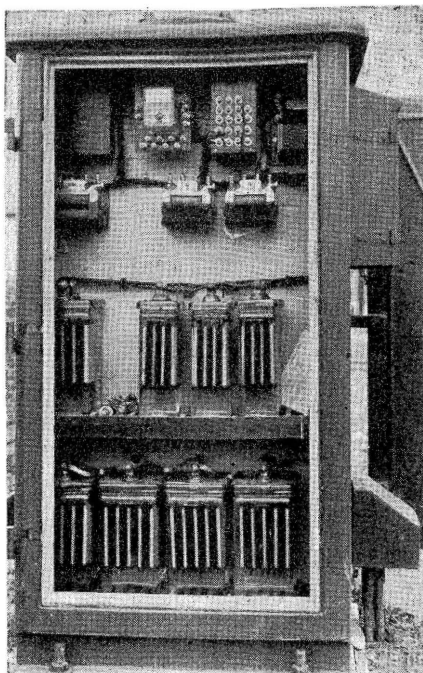
The installation costs for protecting the three streets were as follows: Capital, \$5,502; operating, \$2,339; cash outlay, \$7,400. These figures, consolidated with other costs such as transportation of material and re-used parts, produce a net expenditure of \$7,740. The total annual savings accomplished by this installation are \$4,100, which represents 40.39 per cent annual savings on a cash outlay



Control relays, motor and pump in case at gate location at Fifteenth Ave.

of \$7,400. In addition to these savings, a large contributing factor in the decision to make these changes is the additional safety obtained by the use of modern, up-to-date automatic protection.

The experience obtained since the installation of the automatic crossing gates at 15th avenue is the same and substantiates similar experience that has been obtained from the installation of the first automatic crossing gates at Rochelle, Ill., as described in the above mentioned article in *Railway Signaling*, and has shown that such protection is satisfactory and desirable at certain classes of crossings. This desirability is more dependent upon the railroad traffic than it is upon the highway traffic. Fortunately, 15th avenue in Rockford is located where there is very little actual switching, the majority of the moves being through moves. Consequently, most of the gate operations are regular and the gates are permitted to come down across the high-



Transformers, rectifiers and storage battery in case at Seminary Street

way and come to rest during the passage of the train and then are normally raised to their clear position. This eliminates unnecessary bobbing of the gates which, while not injurious to the gate or the signal apparatus, would possibly be somewhat confusing to highway traffic, especially for any switching moves made where the train did not eventually cross the highway.

It is my opinion that automatic crossing gates have their place but that conditions at each crossing should be studied to determine the percentage of moves made on the controlling circuits which are not completed.

All automatic crossing gates which I have installed are controlled the same as would be the case with flashing light signals, that is, with a 20 second operation in advance of the fastest train. They are also controlled by standard interlocking relays and other automatic features the same as in the case of the flashing light signals, and I have developed no cases

where the gates have not promptly followed the railroad traffic. It has also been noticeable at both Rochelle and Rockford that the drivers of automobiles on the highway apparently understand the warning and protection given by these gates, as no complaints have been made and cases where cars have come in contact with the gate arm have been few, thus proving that they do furnish more or less positive protection to the highway traffic.

This installation has again demonstrated that any automatic crossing gate should be locked in the normal up position, in the down position, as well as against horizontal wind pressure which might blow the arms out of their true plane of operation. These features I have on both of the Rochelle and Rockford installations and have not found any cases where the wind has changed the alinement of the gates, either while standing in the up or down position or during the cycle of operation.

The actual field installation of automatic crossing gates is simple. Operating costs will run from \$1.50 to \$2.00 per month for electric current. This is dependent upon the electric rate obtainable. Maintenance has been extremely low, consisting almost entirely of the regular inspections. If locations are judiciously selected for this type of protection, my experience has shown that they are the ideal barrier type of apparatus. I believe, also, that it is theoretical, not practical, to consider a barrier type of protection which in any manner attempts to physically retard or stop a vehicle on the highway, unless civic authority, in control of the highway, assumes all responsibility for accidents, and that either manually controlled or automatic crossing gates should be located at points judiciously selected, as at the largest number of highway crossings the standard A.R.A. flashing light signal is more desirable, due to the fact that they are in such general use that the public is familiar with them.



Automatic gate installation at Rochelle, Ill.