

View Looking North Along North Western Track Across Douglas Avenue, Edge of Division Street in Foreground

C. & N. W. Replaces Highway Crossing Gates With Wig-Wags

Twenty-Five Crossings in Elgin, Ill., Protected by 41 Signals, With Annual Saving of \$9,213; Special Manual Control Solves Difficult Problem

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THE Chicago & North Western has recently completed an extensive installation of 41 wig-wags in the city of Elgin, Ill., as protection for highway traffic at 25 street crossings, there being two wig-wags at 16 crossings and one at each of the remaining nine crossings. These wig-wags replace gates or flagmen at most of the crossings and have thus made possible a saving of \$9,213 a year.

Why City Desired Gates Removed

About three years ago a proposed hotel was designed to be built on the corner of Douglas avenue and Division street in Elgin. A single track of the North-Western line to Fox Lake cuts across this corner and the two crossings of the two streets with the railroad were protected by gates with the gate-man's shanty directly in front of the proposed hotel lobby on the first floor, resulting in an unsightly outlook from the hotel, so much so that the promoters of the hotel were almost ready to abandon the project when it was decided to request the city commission to order the railroad to remove the obstructions. The commissioners were unwilling to order the gates to be removed without some other protection being installed. Therefore, they requested the railroad to advise as to whether an installation

of wig-wags would take care of the situation, the railroad having suggested a trial installation nearly a year previously. A conference resulted in an agreement that the railroad should replace the gates with wig-wags to protect these crossings, two wig-wags

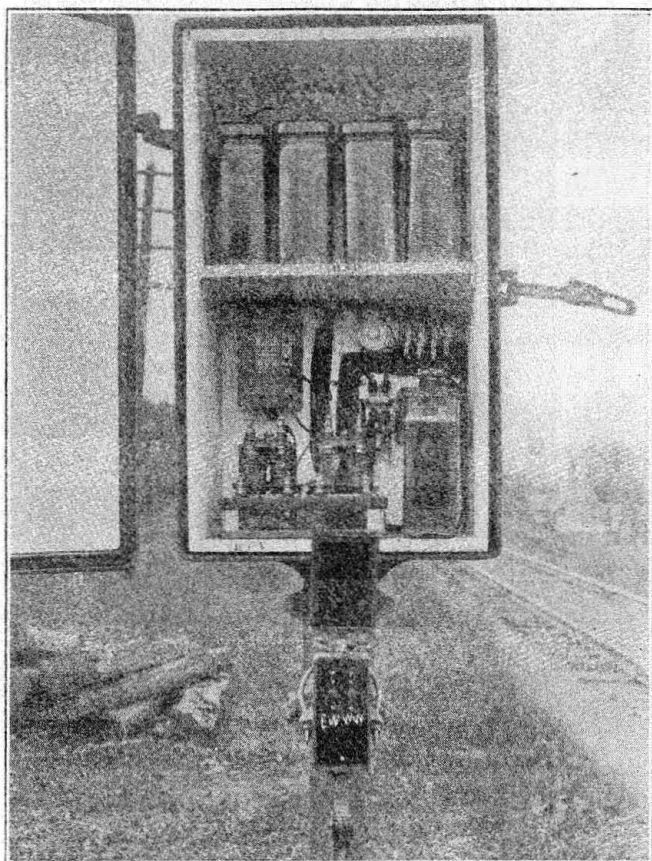


An Installation of Six Wig-Wags Replacing Gates at Busy Crossings in Elgin, Ill.

to be installed on each street and all to be manually controlled from a tower centrally located.

Automatic control of these wig-wags on the approach of trains could not be used on account of the

fact that the track is occupied a considerable proportion of the time by switching movements in which the train does not come to the crossing and likewise trains stopping at the station near by would cause confusing indications. It was, therefore, arranged to start and stop the wig-wags with manual control by a man known as a signal controller to be located in a tower placed in an open space across the street and away from the hotel. A separate enclosed type switch with a large handle controls the two wig-wags for each of the three street crossings, the wire connections being carried overhead to each signal.



Electrolytic Rectifier, Storage Battery and Relays for Wig-Wag Housed in One Box, With Test Buttons in Small Box Below

The right of way, which is only 33 ft. wide, crosses the streets at an angle as shown in the sketch. The streets are approximately 60 ft. wide with sidewalks on both sides leaving the paved way rather narrow and to add to the difficulties one street has a street car line on it, making it impossible to use the center of the street location for the wig-wags. Therefore, each of the six wig-wags was placed just inside the curb line on the sidewalk on the right side of the street approaching the railroad.

Service Proves Satisfactory

The man in the tower, known as the signal controller, keeps a watch for approaching trains, the movements through this section all being at speeds under 25 miles an hour, thus allowing him plenty of time to start the wig-wags before the train arrives at the crossings. In view of the fact that the wig-wags for each crossing are controlled by a separate switch he can stop each set as soon as the rear of the train goes by the street.

If the wig-wags are started for an approaching train making a switching movement which stops and

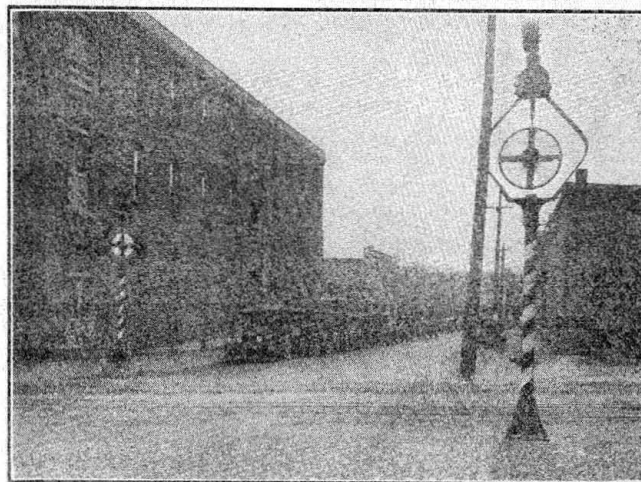
then goes the other way before reaching the crossing the man can stop the wig-wags, thereby affording protection only when needed. The traffic on these streets is heavy, in fact Douglas avenue with the car line is often congested. The operation of the wig-wags has been so satisfactory to the public, to the hotel proprietors and to the railroad, that after a year's service a suggestion was made by the city

CHANGES IN CROSSING PROTECTION AT ELGIN, ILL.

Street	Type	Former Protection		New Protection	
		Men	Cost	Men	Cost
Lake		1		2	
Prairie		1		1	
National	Gates	1	\$ 70.92	2	
Fulton	Wig-wag			1	
Du Page	Gates	2	116.84	2	\$ 69.67
Ziegler				1	
Spring				2	
Chicago		2	69.67	2	
Milwaukee		2	116.84	2	
Division				2	
Douglas		2	69.67	2	69.67
Dexter			60.92	2	
North	Flagman	1		2	
Brook	Gates			2	
Kimball		2	121.84	2	
Ann	Wig-wag			1	
North Grove	Gates	2	116.84	2	121.84
McBride		1		1	
Slade	Wig-wag			1	60.92
Walnut	Gates	2	121.84	2	
So. State		1	70.92	2	35.46
Wing				1	
Schiller		1		2	
Washington		2	121.84	1	35.46
Lawrence				1	
Total		22	\$1,125.31	41	\$357.56

authorities that the railroad should replace all the gates and most of the flagmen at other crossings in the city with wig-wags. As a result of a survey and a series of conferences, an extensive program was carried out which, including the original installation, is given in the accompanying table.

A summary of this table shows that 16 sets of gates, one flagman, and 21 gatemen were removed and in place thereof 41 wig-wags were installed which are operated by 8 men known as signal controllers.



View From End of Station Platform Looking West on Dexter Street Across Tracks

The net operating expense to the railroad was reduced \$767.75 per month or \$9,213 per year, while the cost of maintaining the wig-wags is less than the same charge was for the old gates. The construction expense was \$12,650, thus a saving of over 70 per cent on the investment is being made. The low cost for wages, \$35.46, as shown in the table for some of the crossings is due to these men being used and paid for jointly with the electric railway.

The same type of wig-wag is used for all crossings

regardless of whether the control is manual or automatic. At outlying street crossings in the city automatic control is used. As will be noticed in the pictures, the wig-wags are low, being nine feet from the pavement to the center of the wig-wag when mounted at the side of the road and six feet when

at the center. This low mounting is considered important to be effective. Bells are used on all wig-wags in outlying territory but sparingly in the business districts for fear of their being a nuisance. Bells are, however, considered as a good auxiliary protection, particularly for pedestrians.

How to Test D-C. Low Voltage Signals with a Volt-Ammeter

Instructions Governing the Method of Using This Handy Instrument in Testing Relays, Hold-Clear Coils, Circuits, and Grounds Are Given in an Understandable Manner

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A Volt-Ammeter Is Practically an Indispensable Tool in Signal Maintenance Work

A VOLT-AMMETER is probably the most valuable tool that a signalman uses. He finds a use for it in practically every thing that he does; testing batteries, locating trouble, testing circuits to find what condition they are in, and adjusting circuits. These, however, are only a few of the many uses that he finds for it. With such a valuable tool it would seem that he would make every effort to become familiar with its care and use, so as to use it to the best advantage. For this reason, the following instructions, which may give him a better understanding of its use are written.

In the first place a volt-ammeter is a very delicate instrument which deserves the same care that is given a high grade watch. It consists of an armature mounted on jeweled pivot bearings between the poles of a permanent magnet. To this armature is attached a pointer which registers on a graduated scale the pressure or current flow that is being measured. On the ammeter side of the instrument, a low resistance, which varies in amount with the scale used, is connected in series with the armature winding. Bridged across this circuit is a fixed resistance, the value of which is carefully calculated so that on any current flow, only enough flows through the armature winding to deflect the pointer to the correct reading on the graduated scale. Any variation in the resistance of the coil in series with the armature will of course, vary the deflection of the pointer in proportion. This

is the way the different scales on the ammeter are prepared. The voltmeter is really a high resistance ammeter with the resistance in series with the armature so figured that the deflection of the pointer will correspond with the voltage of the circuit. In the voltmeter all of the current flows through the armature winding instead of only a portion as is the case with the ammeter. As in the case of the ammeter any variation of the resistance in series with the armature winding varies the deflection of the pointer to the same extent.

All meters are carefully tested before they leave the factory and readings are checked with a master instrument which is kept for that purpose, in order to make sure that all readings on the meter are accurate. In order for a meter to remain accurate for any length of time, however, it must not be subjected to any jars or rough treatment.

The majority of meters used in railway signal work have a scale similar to the following: 150 volts, 15 volts, 1.5 volts, 15 amp., 1.5 amp., and 0.15 amp. The scale is usually graduated into 15 divisions and each division into 5 sub-divisions.

Preliminary Instructions for Handling Meters

In testing the first thing to remember is to place the meter on a scale which will cover a higher reading than will be obtained on the circuit being tested and then if necessary work down to a scale better