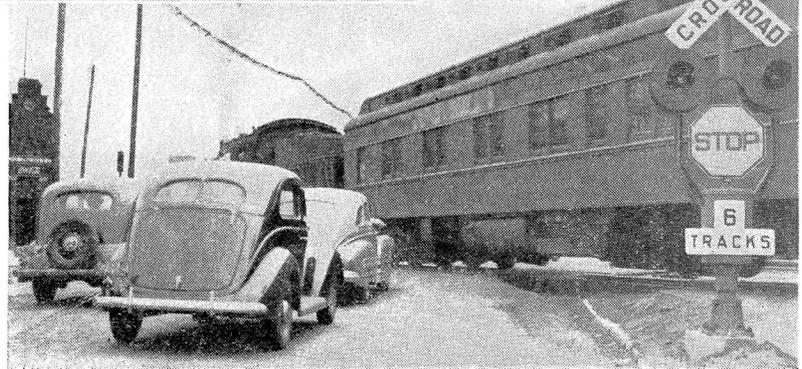


Left—Signal including flashing lights and a rotating Stop disk sign. Below—Signal at Cedar Avenue including also "Stop" and "Go" signals



# Crossing Protection on Milwaukee In the City of Minneapolis, Minn.

THE passenger terminal of the Milwaukee railroad in Minneapolis, Minn., is of the stub-end type facing 3rd avenue and paralleling Washington avenue. Between this terminal and the railroad shops at 23rd avenue and 26th street, a multiple track runs south-east, thus crossing streets and avenues at an angle of about 45 degrees, and in several instances a street and avenue cross on the railroad tracks. Two main tracks and three or more freight tracks extend through this entire area. From the shops to the Mississippi river, two main tracks and an industry track run east, crossing avenues at right angles. At Eighth street, at one end of the coach yard, there are 11 tracks involved in the street crossing. On account of the heavy street traffic and the numerous switching moves, the

speed of trains is necessarily limited west of the shops.

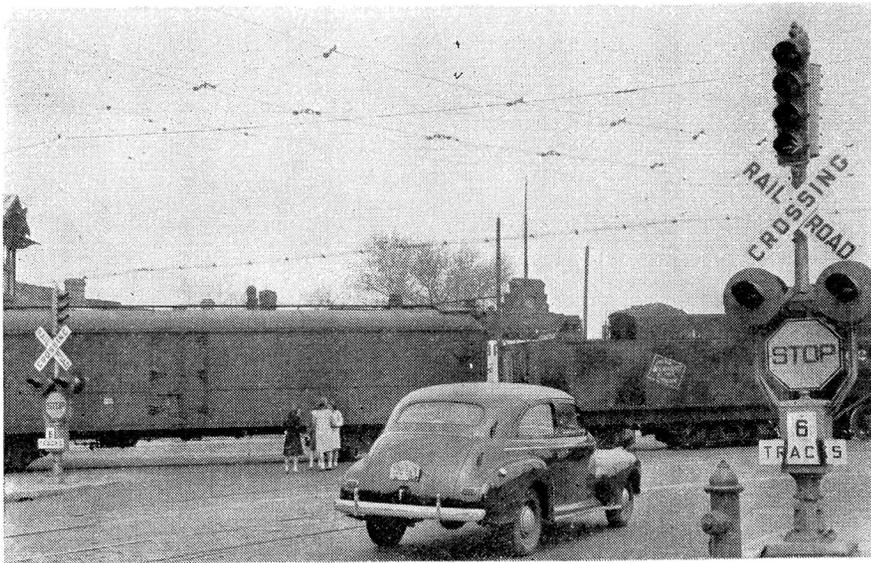
All of these crossings were formerly protected by manually-operated crossing gates, the crossing towerman controlling the gates at not more than two crossings. In 1928, the gates were removed on these 25 crossings and replaced by flashing-light crossing signals with rotating stop disks manufactured by the Griswold Signal Company. On account of the numerous switching moves and the complicated track layouts, it was not practicable to use track circuits to control the signals automatically. Therefore, the signals are controlled by enclosed snap-type switches which are mounted in cabinets and located in elevated towers. In only one instance does a towerman control signals at only one crossing, but at all other layouts one

**Signals moved from the center to the side of street thus increasing capacity to handle the vehicles, and traffic lights added at some of the busy crossings**

towerman controls signals at several crossings; for example, the towerman at Eleventh avenue controls the signals at Ninth avenue, Tenth avenue, Third street, Eleventh avenue, Fourth street, and Twelfth avenue.

## Type of Signals

Each of these signals consist of two pairs of back-to-back flashing-light lamps, a reflectorized rotating stop disk and a standard reflectorized crossbuck railroad crossing sign. The disk is normally turned edgewise so that the word "Stop" is not visible



The "Stop" and "Go" traffic is mounted on the mast above the crossing sign

as viewed from the street approaching the track. When the signal is set in operation, the lamps are flashed, and the disk is released to rotate 90 degrees so that the word "Stop" is displayed toward the drivers of approaching vehicles on the street.

#### Moved from Center of Street

As originally installed in 1928, the signals were in the center of the street pavement, a policy which was insisted upon at that time by the city authorities. Experience has proven that careless drivers were apt to strike the foundations of the signals. Furthermore, the presence of signals in the center of the pavement divided the traffic into two lanes, reduced the speed of vehicles, thereby reducing the volume of traffic over the crossing

moved to the side of the streets, some additional signals installed, and all signals modernized to conform to present A. A. R. standards.

#### Also Traffic Signals

Cedar and Franklin avenues cross at right angles just east of the coach yard. In addition to street cars, each of these avenues carries a very heavy motor vehicle traffic. City traffic records show that an average of 1,496 vehicles use this crossing hourly. Two problems were involved: (1) To direct street traffic over the crossing between the two avenues, and (2) to stop street traffic on both avenues when a train is approaching or occupying the crossing. As shown in one of the accompanying illustrations, a regulation color-light type stop-and-

25 seconds. When a train approaches, the towerman throws a hand switch which takes away the control of the traffic signals from the timer and causes these signals to display the stop aspect and, at the same time, the railroad crossing signals display the word "Stop," and the flashing lights on these signals are set in operation.

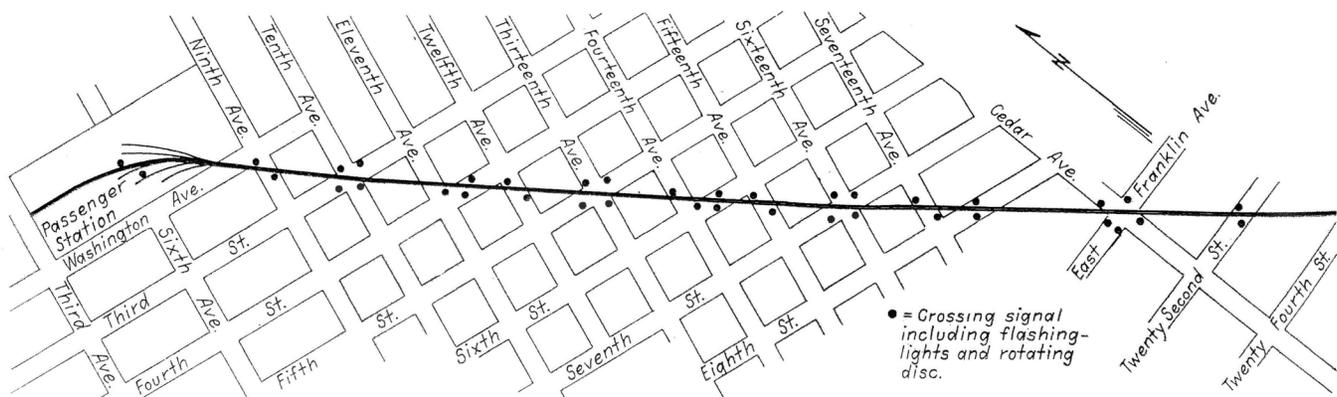
When the train has cleared the crossing, the towerman restores his controller to the normal position, which causes the disk "Stop" sign to be restored to normal, the operation of the flashing light is stopped and the control of the traffic light signals reverts to the automatic timer. This is so arranged that a full cycle is given to the street which automatically gets the "Go" signal, but the towerman can start the cycle on either street as traffic conditions require.

#### Manual or Automatic

The traffic signals may be operated by manual control whenever it is deemed necessary, due to heavier travel on one street over the other.

The signal lamps and controls are operated on alternating current from one or the other of two sources of supply.

The layout at Cedar and Franklin avenues was designed by the Griswold Signal Company of Minneapolis.



Map showing layout of signals at street crossings in Minneapolis

at one time, and thus reducing the capacity of the street to handle traffic.

For these reasons the city traffic engineers suggested that the signals be moved from the center of the street to the side of the street and inside the curb line. In 1942, signals were

go traffic signal is mounted on top of the combined flashing-light disk signal. Ordinarily, the traffic-type stop-and-go signals are controlled by a timing mechanism to show clear for Cedar avenue 25 seconds, and then clear for Franklin avenue for

Careful checks of traffic by city engineers reveal that, since signals have been moved from the center to the side of streets, the capacity of the streets to handle vehicles at the crossings has been increased 30 to 40 per cent.