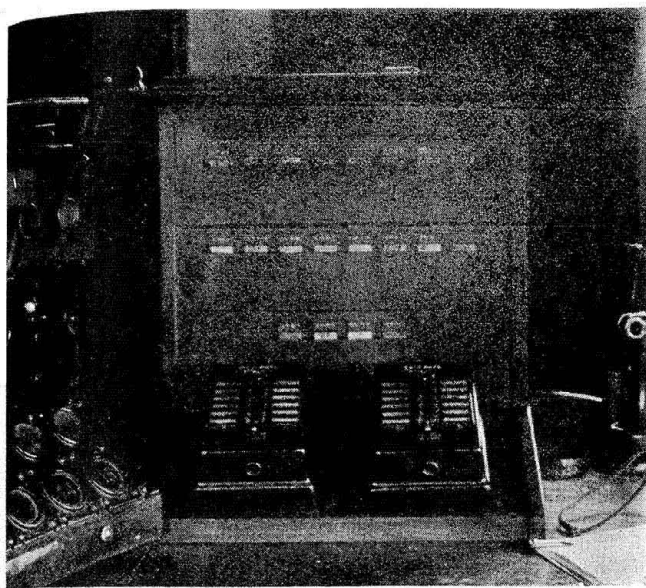


An Automatic Wheel Counter on the Union Pacific



Counter, located near the interlocking machine

Charges for use of bridge are made on wheelage basis, and are calculated from record made by automatic counter designed by signal-department forces—Short rail sections are used in track—Selector and counters are located in nearby interlocking tower

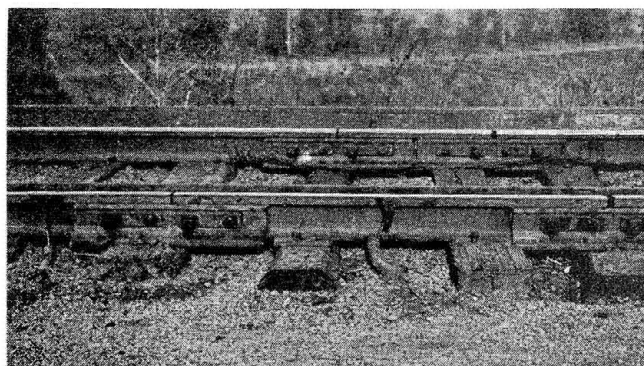
AN AUTOMATIC wheel counter has been installed at the Union Pacific bridge over the Missouri river at Omaha, Neb. This bridge is owned by the Union Pacific and, in addition to the trains of this road, those of eight other roads are operated over this bridge, including the Chicago & North Western, the Rock Island, the Milwaukee, the Illinois Central, the Chicago Great Western, the Wabash, and the Burlington. The charges for the use of the bridge are made on the wheelage basis, and previously two men located at the west end of the bridge were employed on each trick to count the wheels of each train, and to record this number as well as the name of the road operating the train. The new automatic wheel-counting system was installed as a means of securing an absolutely accurate count, and, as a further advantage, this change permitted transferring to other duties the men formerly employed as counters, thus reducing operating expenses.

Designed by Signal Department

The new automatic wheel-counting system was developed, constructed and installed by signal-department forces of the Union Pacific. Each counting device consists of a Union Switch & Signal Co. light-signal counter, which includes a counter actuated by a small electromagnet and armature. Twenty of these counters are mounted in a neat oak cabinet located on the operator's desk near the interlocking machine in the tower near the east end of the bridge. These counters are actuated by circuits which are completed when a set of car wheels and their axle pass over short insulated sections of track, one such track section being located in each of the four tracks extending eastward from the interlocking.

Because trains of nine roads use the main tracks, the first problem was to devise a selector system to set up a certain counter to operate for trains of each road. Fur-

thermore, eastbound trains must be counted separately from westbound trains. As a further complication, the Chicago Great Western freight trains take a different route after leaving the west end of the bridge and, therefore, must be counted separately. Two tracks extend across the bridge to the interlocking at the east end, at which point two tracks, used principally by the Union Pacific, branch off. Therefore, in order to check all the operation, it was necessary to count the trains on each of the four tracks. Thus to include all the various fac-



The 28-in. section is in the rail on the far side

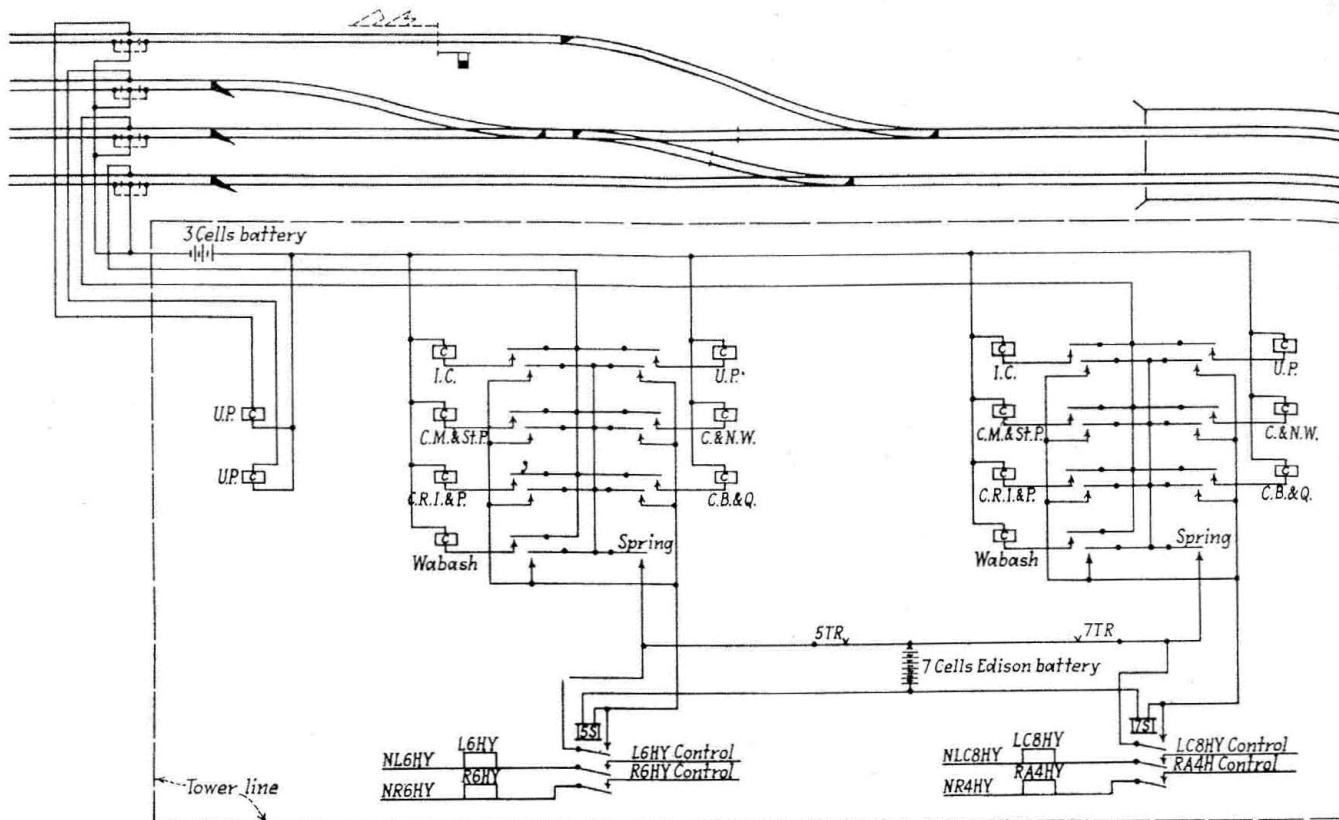
tors as to roads, tracks, and direction of movements, a total of 20 counters were required. The top row of counters in the cabinet are for westbound trains and the second row is for eastbound trains, one counter in each row being used for each of the eight roads other than the U. P. The third row has four counters, one for C. G. W. freights westbound, one of C. G. W. freights eastbound, one of U. P. track 3 and the fourth for U. P. track 4.

Selector Control

Having devised a system of counters and a method of operation to meet the requirements, the next step was to provide a selector control to use the four rail-control lay-

the wheel reports are made up, and the charges to each road are based on these reports.

The section of rail on one side of the track is 28 in. long. It was determined by measurements and tests that this length of rail section is correct to secure proper oper-



Circuit diagram of the counting system

outs to get the 20 selections as to roads, direction, etc. It was decided that the 12-way Graybar interphone push-button selectors could be readily adapted to meet the requirement. Two of these selectors—one for eastbound and the other for westbound trains—are used, and are mounted as shown on the desk just in front of the counter cabinet. The operator either has advance information as to the identity of approaching trains, or he can identify them as they approach within his range of vision. He then pushes the button on the selector marked for the certain road and direction. This sets up the circuit so that the circuit on the track will operate the correct counter. When the button is pushed down, it automatically breaks down the previous set-up and, as the button sticks down, it automatically locks out any other set-up for the same direction.

In order to be sure that no train passes through without the counter control being set up, the home-signal control circuits are controlled through stick relays that are picked up when the button on the counter selector is pushed. Therefore, before the leverman can clear the signal, he must first set up the counter control. When the train enters the plant, the stick relay is dropped, so that the leverman must again set up the counter control before clearing the signal for another train.

Details of Track Control Feature

The counter counts up to 9,999, and each night, at midnight, the operator on duty makes a record of the number displayed on each counter. From these records

ation of the device for six-wheel trucks such as used on passenger-train equipment. Although train speeds are limited in this area to 25 m. p. h., the counter will work satisfactorily for train speeds up to 45 m. p. h. For high speeds the coils of the counters would have to be rewound to secure quicker action. The insulated section on the opposite rail can be the same length or longer, and on this installation the sections are from five to six feet long, the idea being to get the joints on different ties than those used for the joints of the shorter section on the opposite rail. The regular track circuits are jumpered around these short sections.

Limited Speeds Permit Short Rail Sections

From a track viewpoint, it is agreed that it is not desirable to have in service rail sections as short as 28-in. However, consideration is given to the fact that train speeds are limited to 25 m. p. h. through this interlocking and over the bridge. Where higher speeds obtain, it would be practical to secure sections of angle bars long enough to extend throughout the 28-in. section with joints at the ends, the entire section being insulated.

One set of four cells of Edison-B4H storage cells is used to feed all of the counters, and this battery is on floating charge through a Union rectifier. When the installation was first completed, some trouble was occasioned by leakage between the rails during wet weather, and this trouble was overcome by rewinding the coils for the counters to afford a lower resistance.