

A HALF-INTERLOCKING PLANT ON THE CANADIAN NORTHERN

BY JAMES H. CORMICK,
Signal Engineer.

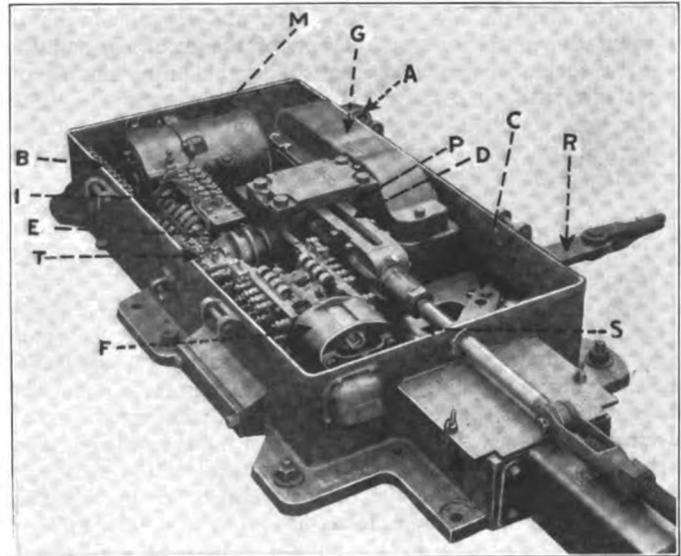
At Portage avenue, St. James, Manitoba, the single-track line of the Canadian Northern crosses the single-track line of the Winnipeg Electric Railway, and adjacent to this crossing, the Tuxedo Park street-car line uses the Canadian Northern track for a short distance over a wooden bridge spanning the Assiniboine river. Portage avenue is a busy thoroughfare, at which the rule of the Board of Railroad Commissioners requires all steam trains to make a complete stop. The railroad commissioners directed the steam road to install a half-interlocking plant, employing only derrails on the electric line and signals on the steam line.

An improved Saxby & Farmer interlocking machine arranged for horizontal leadout was used, having 10 working levers and two spare spaces. One of these 10 levers is of the Union Switch & Signal Company's electro-pneumatic type, operated by 110-volt, 60-cycle alternating current for the control of a switch and derail located about 2,500 ft. from the tower. The switch and lock movement at this switch and derail is of the Union Switch & Signal Company's improved alternating current type, known as the model 13. This movement consists of a motor, M; a reduction gear train, G; a rack and pinion movement, P; a type F circuit controller, F; an indication circuit controller, I; an indication transformer, T, and a main terminal board, B. The method of operation is as follows: The power is transmitted from the motor by means of the reduction gear train to the slide bar, S, of the rack and pinion movement, which by means of an escapement crank, C, operates the switch rod bar which is connected to the switch point. The detector bar is operated by a driving rod, D, mounted directly over the shaft of the rack and pinion movement and taking motion from the shaft. The driving bar travels one-half of its stroke before unlocking the switch.

To prevent the motor being damaged in the event of obstructions in the switch, a flexible coupling is used between the motor and the reduction gear train, and a friction clutch, A, is used on the motor shaft in the reduction gear, devised to prevent the motor from stalling. The indication circuit controller is operated by a revolving cam, E, which is mounted on the rack and pinion shaft and which insures

quick action of the controller. The reduction gear shafts are arranged horizontally and can be removed separately. All gears in the train are mounted in a box-like base casting, provided with a cast-iron cover for protection from dirt.

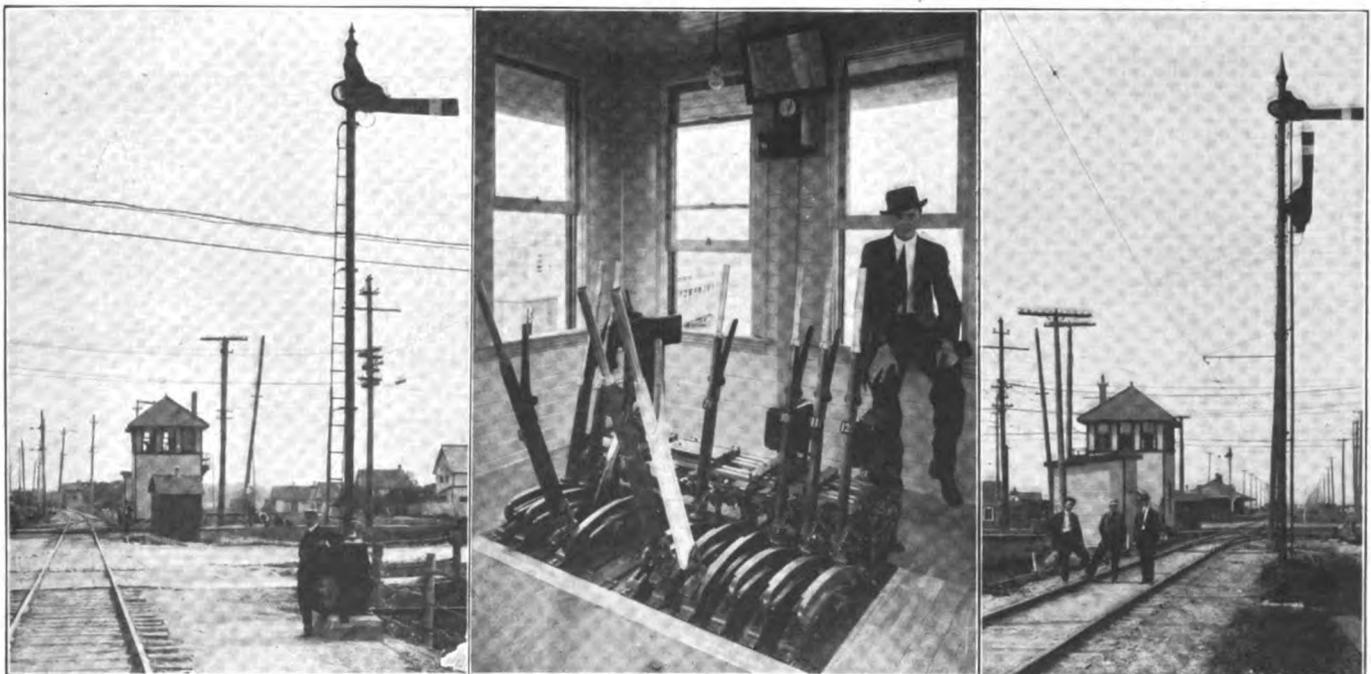
Four of the mechanical levers and the electric lever are equipped with the U. S. & S. a. c. electric locks for route



The Alternating Current Switch-and-Lock Machine.

locking purposes. About 2,500 ft. from the tower, on the electric line, there is in operation one of the Protective Signal Manufacturing Company's oscillators, controlling an annunciator, which indicates to the towerman the approach of a car so that he may line up the route over the bridge and through the interlocking limits. This annunciator is shown in the interior view of the operating room of the tower.

The plant includes two U. S. & S. style S, semi-automatic signals, operated by 110-volt, 60-cycle alternating current and controlled by a. c. track circuit installed for a distance of about 2,300 ft. on the Canadian Northern track. There is also a two-arm high semaphore mechanical pipe-connected signal, one power-operated dwarf and one mechanically-operated dwarf signal. One lever operates the two de-



Half-Interlocking Plant on the Canadian Northern, at Crossing of Electric Line, Showing Two Exterior Views of the Tower and Home Signals and an Interior of the Tower.

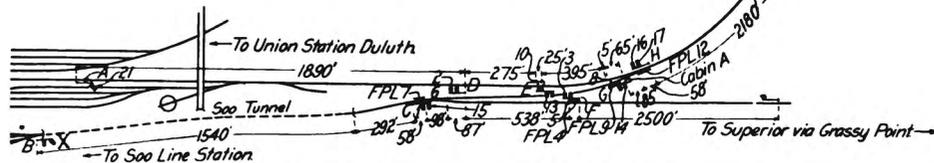
rails on the electric line in Portage avenue, which are located 60 ft. each side of the crossing, and are of the tongue switch type. The connections to these derails are made by 1-in. galvanized pipe, placed in 2-in. galvanized pipe with waterproof crank boxes filled with polar ice machine oil. An indicator is provided in the tower for the purpose of designating whether the track circuit is occupied. This indicator controls the necessary lock and signal circuits to prevent the incorrect manipulation of the machine, and the electric locks on the lever controlling the outer signals on the steam road are arranged for back locking purposes. This plant was installed by the Union Switch & Signal Company, under the personal supervision of J. H. Nieter, foreman.

NEW RULING ON I. C. C. ACCIDENT REPORTS

It is expected that the accident reports required by the new I. C. C. rules, which went into effect July 1, will contain some figures which will tax the capacity of the statistician's adding machines; among others, figures showing the number of hours that employees of the railways have worked during the month. This requirement of a statement of "man hours" and of train and locomotive mileage is the most noticeable addition to the list of facts called for by the new rules; but the changes in form have imposed an immense amount of extra work on the railroad clerks who make them out. For instance, the principal blank, form T, provides for answers to questions covering every detail from the name of the reporting carrier (i. e., the road upon which the accident occurred) to the distance and direction from the nearest milepost at the time of the accident; the condition of the weather; whether at night or in the daytime, and ends with question 51, "Detail of, cause and nature of accident; circumstances, estimate and description of damage to property; responsibility and experience of employees responsible. When not manifestly immaterial, give number of cars in train (loaded, empty), percentage of air brakes operating, and gross weight in tons." The size of the whole blank is 8½ in. by 11 in.

Besides form T, there are three others, F, R and V. Form F is a monthly statement of fatalities which have developed from previously reported injuries. Form R is a supplementary report to accompany form T in the case of an accident due to a broken rail, calling under 39 heads for all of the available facts which may serve to explain the breakage of the rail.

Form V ("verification"), one to be sent in for each month, contains the oath of the officer sending the report and a comparative statement showing the total number of non-



Track and Signal Layout of the Great Northern Trestle at Duluth, Slightly Condensed.

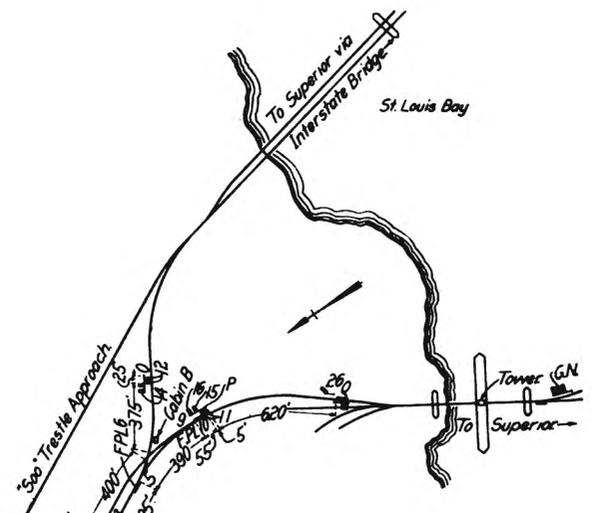
train accidents happening during the month and the number of casualties therefrom. For these accidents no form T is required, and the injured are divided into six classes, shopmen, stationmen, trackmen, bridge and building men, other employees, and all other persons. There are 11 classes of accidents or causes listed on form V.

At the bottom of each column containing a total number of killed or injured there is a space for a total number of "man-hours," that is, the aggregate number of hours worked during the month by all employees subject to industrial casualties in the classes named; and following this, a statement of the average number of casualties per million man-hours.

DULUTH TERMINAL TRESTLE SIGNALING

The Great Northern has recently completed the installation of two mechanical interlockings and certain automatic block signals on an elevated steel structure approximately two miles long, between Duluth, Minn., and Superior, Wis. This trestle was built some years ago and automatic signals were installed on it in 1905. The two new connections with the Minneapolis, St. Paul & Sault Ste. Marie, completed this year, one near each end of the trestle, necessitated the installation of an interlocking plant at each junction and in connection with this new work, the automatic signal layout was revised, so that the home signals for the two plants, in conjunction with the intermediate automatic signals, comprise an absolute permissive block system. The trestle carries a very busy single-track line, with about 90 train movements per day. These movements are controlled exclusively by the block signals.

The machines in the two plants, known respectively as North tower and South tower, are of the Saxby & Farmer design, with horizontal leadouts, having a 17-lever and a



16-lever frame, respectively. The North tower plant has 8 levers controlling 11 signals, 2 levers for 2 switches, 3 levers for 2 derails and 1 torpedo machine, and 4 levers for 4 facing point locks. The South tower machine has 6 levers for 8 signals, 2 levers for 2 switches, 2 levers for 2 facing point locks, 4 levers for 4 torpedo machines and 4 smashboards, and 2 spare spaces. The towers are of standard ground cabin design with supports attached to the steel trestle and extending also to the ground.

Each interlocking home signal is equipped with two arms and two lights, a smashboard, mechanical detector lock and torpedo machine, except in two cases in the North tower