

the switches behind them. The estimated saving for this remote switch control at this crossover as described above was figured at \$4,000, while the actual figures for a year showed an annual saving of \$7,804 in fuel alone. East of Whitewood there is a plus 0.21 per cent grade about two miles long for east-bound trains which had a similar effect on train movements as at Viriden. The estimated saving for this point was figured at \$2,800 but as this machine has only been in service about five months actual figures are not yet available.

#### Details of Construction

The signals have standard masts, 26 ft. 8 in. high overall, which are mounted on concrete foundations, the concrete for which was mixed by small hand mixers locally and poured in place.

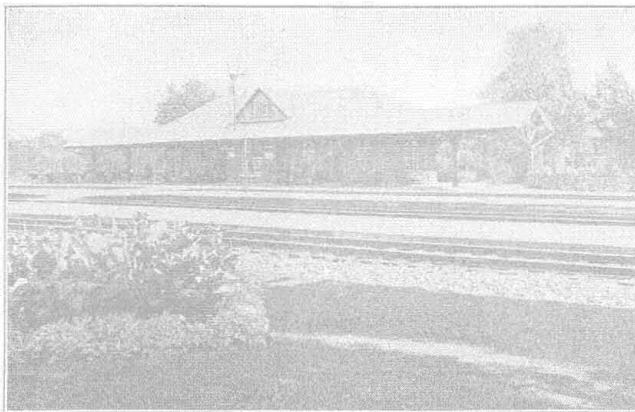
Sheet metal wood lined relay cases are mounted on bracket arms bolted to the signal masts, and the track wires are brought in through the mast and up into the bottom of the relay box through this bracket. The line wires are brought in through a goose neck inlet and down through a 1½ in. pipe screwed into the top of the relay case. The jumpers, made of No. 14 Pullman special flexible wire, run continuous from the terminals or arresters in the lower compartment of the case to the terminals of the relays located on the upper two shelves. The line relays are 100-ohm Model-12, the stick relays 670-ohm, Model-13 and the slow-acting relays 500-ohm also of the same model.

The line wire is all No. 10, 40 per cent copperweld, weatherproof, and is carried on crossarms placed below the telegraph wires on the railroad company's pole line. At signal locations these wires are dead-ended on single crossarms using the Ohio Brass Company's strain insulators No. 27744 and No. 27536. All the insulated wire conforms to A.R.A. Signal Section specifications. Number 9 copper is used for track connections.

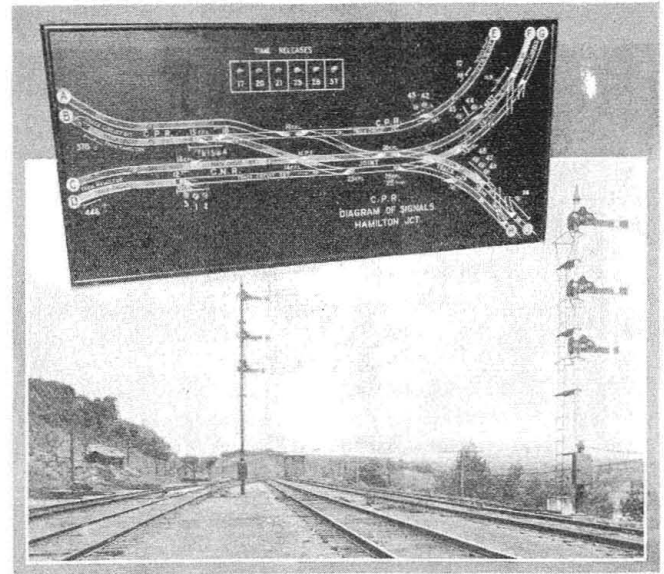
Primary batteries are used for the operation of the automatic signals and switch machines, 500-a.h. Edison cells being used. Sixteen cells are used for signal operation, two for hold-clear, and four for line. At Viriden the switch machines are operated from a battery of two sets of 32 cells connected in multiple and at Whitewood one set of 32 cells is used.

The rail is 100-lb. R. E. section, each joint being bonded with two No. 6 A.W.G. copperweld wires, placed behind the angle bars.

The work was carried out by the Canadian Pacific signal forces under A. M. Bears, signal supervisor.



C. P. R. station at Montreal, West



Home signals at Hamilton Junction plant—Insert shows track diagram

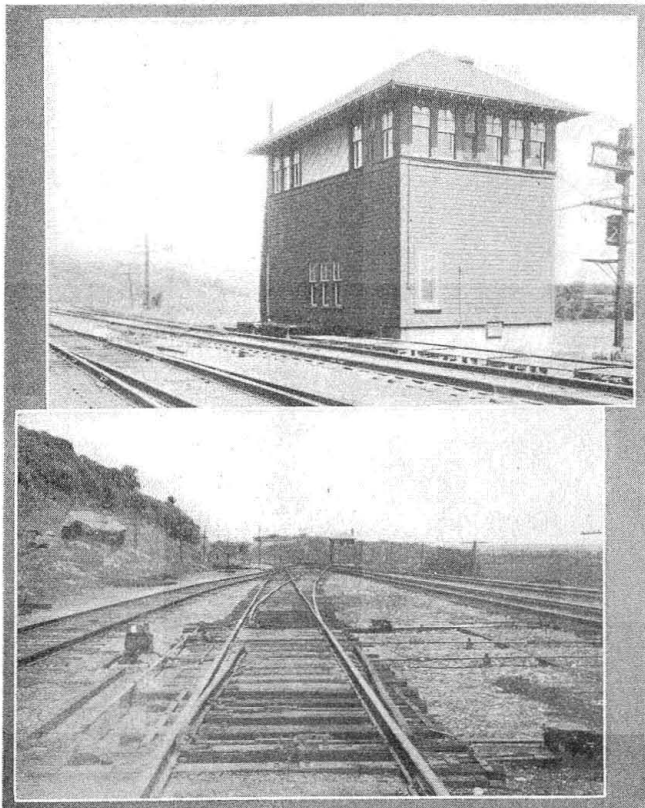
## Mechanical Interlocker on the Canadian Pacific

**T**HE mechanical interlockers on the Canadian Pacific are noteworthy for their high standard of maintenance. One of these plants, namely, at Hamilton Junction, Ont., will be described briefly to give some idea of this road's interlocking practice. The Hamilton Junction plant is operated for the benefit of the Canadian Pacific and Canadian National, the plant being maintained by the former road. This plant handles all the traffic on the Canadian National between Hamilton, Ont., and Toronto and between Hamilton and London, as well as the single-track line of the Canadian Pacific between Hamilton and Guelph Junction. Both the Canadian Pacific and Toronto, Hamilton & Buffalo trains operate over the Canadian National's double-track line between Hamilton Junction and Toronto.

The 48-lever Saxby & Farmer machine with horizontal locking bed is mounted on the second floor of the interlocking tower, which is a steam-heated frame building with ample lighting in the upper floor. A noticeable feature of the locking bed is the spic and span condition which is obtained only by constant cleaning and oiling. A color scheme has been carried out very effectively by painting the 6 derail and 7 switch levers black, the 9 facing point lock levers blue, and the 17 signal levers red. In addition two levers, painted half black and half blue, operate switch and lock movements as well as derails, one lever operates a movable point frog, and two levers operate train order boards at the tower. Of the 17 signal levers, four are for dwarf signals and five for call-on arms. A total of 11 lever plunger locks are used on the facing point lock levers and the two levers for switch and lock movements operated jointly with derails. The plunger locks can be seen mounted over the horizontal locking bed in one of the illustrations. The vertical rod connections from the Saxby & Farmer machine to the horizontal rocker shaft on the floor below are shown in another of the illustrations. The rocker shaft lead-out and mechanical pipe line is shown clearly in the exterior view of the tower.

The illuminated track diagram mounted behind and above the machine is of interest because of its simple

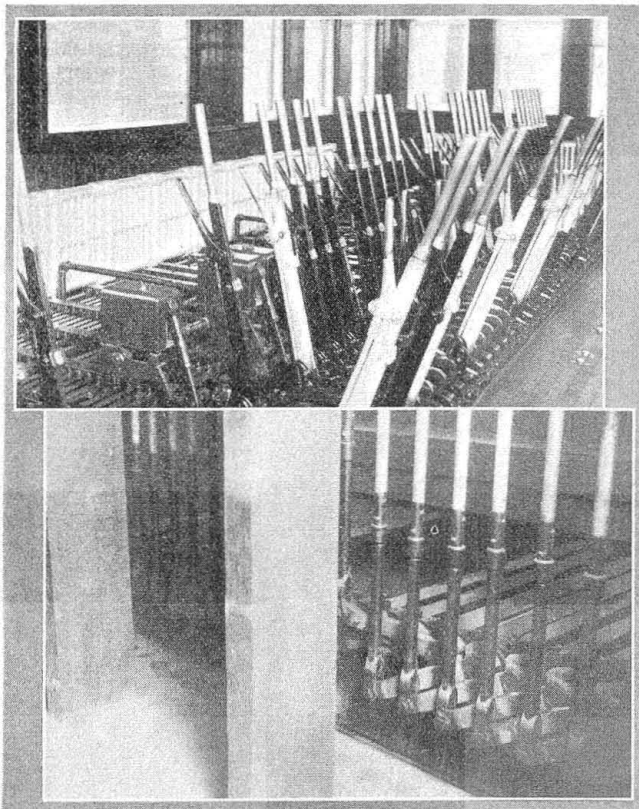
construction. Each track circuit is painted in a distinctive color and when occupied by a train its presence is indicated by the illumination of a 10-volt bulb mounted at the center of the miniature track circuit. Similar lamps are mounted on the board to repeat the signal position. Other lamps also serve as annunciators to announce the approach of trains. The lamps for this



Top—Hamilton Junction tower  
Bottom—Dwarf signal, derail and bolt lock

purpose are mounted in advance of the distant signal in each case.

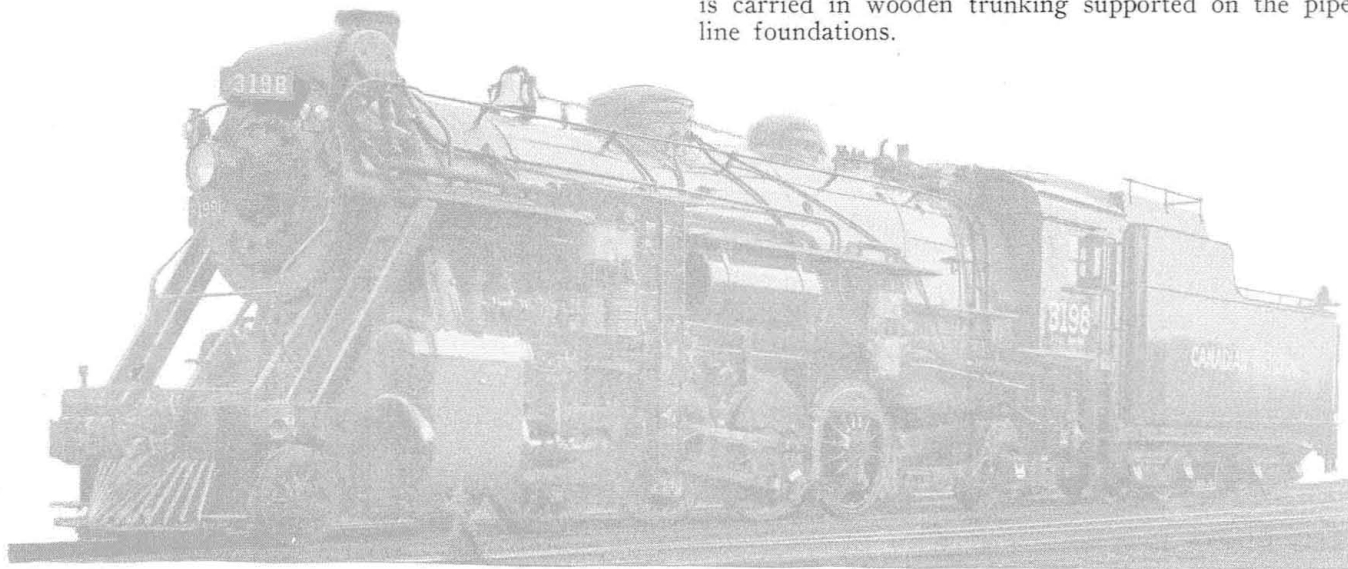
The interlocking signals are Federal 3-position upper-quadrant semaphore type with 10-volt mechanisms. They are electrically-lighted with 13-volt bulbs from an a-c. lighting system which is connected to a vane type power-off relay to switch the lights from a-c. to



Top—Second floor of tower—note bright finish of levers and locking bed  
Bottom—Vertical rod connections to rocker shaft leadout on first floor

d-c. in case of a power failure. Approach route locking is installed to protect trains moving through the plant and the time releases necessary for the approach locking system are provided with indicating lamps mounted on the track diagram. These are clearly visible in the illustration of the diagram, the six lamps being located in a horizontal row above the track layout and are lighted when the stick route locking relays are de-energized. When it is desired to change a route, the corresponding time release is operated.

For signal operation a battery of six Exide KXHII, 13-plate storage cells, charged by a Balkite rectifier, is located in the first floor of the tower. All outside wiring is carried in wooden trunking supported on the pipe line foundations.



C. N. R. heavy freight locomotive