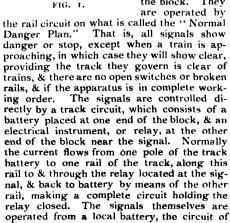
## The Hall Signals at Montreal.

The Canadian Pacific Railway has recently completed the installation of a system of automatic electric block signals between Windsor Street station, Montreal, & Montreal Junction, a distance of about 5 miles of double track road. The system was installed by the Hall Signal Company, of 44 Broad Street, New York City. The signals are of the disc type & are placed on wooden posts, located to the right of the track they govern, & consist of a home & distant signal on each post; home signal, red, governs first block; distant signal, green, governs second block; one above the other, with the exception of the last east-bound signal at Montreal, & the last west-

bound signal at Montreal Junction, which are arranged for special movements of trains.

The home or top signal (red) governs block immediately in advance of the signal. The bottom or caution signal (green) indicates the posi-tion of the next signal inadvance, or of the second block ahead. If an engineer upon approaching a signal finds both at clear, he knows that the track is clear for two blocks ahead. If he finds the home signal at clear, & the caution signal displayed, he knows that the second block ahead is occupied & he must be prepared to stop before passing the next home signal. If he finds both the home & distant signal displayed, he will of course come to a stop before entering the block.

The road is divided into sections or blocks of about one mile each, the signals being located at the entrance to the block. They are operated by



which is controlled by the relay referred to above. Therefore, a signal can only be cleared when its relay is closed.

The ends of the rails are electrically separated from each other at the entrance to and the end of each block. Therefore, each track section has its own track circuit. When a train passes a signal, the current from the track battery which had been passing through the relay at the entrance of the block, is shunted through the wheels & axles of the train, causing the relay to open, breaking the signal circuit, causing the signal to go to the danger position by gravity.

The local circuit which operates the signals is conducted by means of weatherproof copper wire, strung on the telegraph poles by the side of the road in the usual manner. The batteries are all placed underground, away from the frost, and are of the gravity type for track circuits, & Gordon-Burnham type for signal circuits, each signal being provided with a separate battery.

In addition to the signals for the information of the engineers, there are small miniature signals or indicators placed at each switch, & so arranged that they will show danger (red) when a train on the main line approaches the distant signal which is connected with said switch. When it is necessary to open a switch leading to the main line, the switchman must first look at the indicator. If this shows clear, he knows that there is no train approaching, in which case he will open the switch, which will at once set to danger the home signal protecting the block in which the switch is located, and the distant signal in the next block back.

In the case of a cross-over, the opening of either switch would immediately block both tracks. At Windsor Street yard special arrangment has been provided in order to govern the entrance to the yard, as it is sometimes necessary to run trains a short distance against traffic.

Distant bells are also provided so that the switchman is informed when a train is approaching the yard, & indicators located in switch-house advise him the position of the signals.

This system of automatic block signals is believed to be the first application of this character that has been introduced into Canada, although the Hall Signal Company has installed a large number of them in the United States.

In response to an inquiry as to how the signals are working, Manager Tait, of the C.P.R. Eastern Lines, writes The RAILWAY & SHIPPING WORLD: "We are having very satisfactory results with the Hall automatic electric block signals on our track between Montreal & Montreal Junction, as you will see from the enclosed working statement from Oct. 17, '97 to Feb. 17, '98: No of days in operation, 123; approximate no. of trains daily, 40; no. of



FIG. 2.

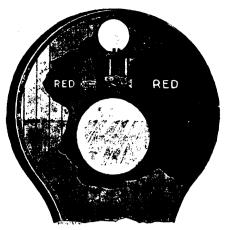


FIG. 3.

signals, 14; approximate no. of operations, 68,880; no. of failures, 11; percentage of failures to operations, .000012."

## DETAILS OF FAILURES.

	No. of train or engine.	CAUSE.	Minutes Delay.	Signal no.
1897				-
Oct. 29	101	Broken line wire	2	7
Nov. 19	101	Open switch spring at cross over	2	3
Dec. 2	2		2	1
" 2	E. 18	Locking gear of signal instru-	1	1
		ment failing to work	2	8
" 5	Spcl.	" " "	2	4
" 5 " 4 " 18	- 3		2	4
18	7		2	7
" 28	14	Open switch spring	2	8
1898			1	1
Jan. 4	12	•• ••	2	112
	623	•• ••	2	13
" 25 " 28	101	Locking gear of signal instru-	-	ľ
	'	ment failing to work	2	1 7

Delay of a minutes to each failure as per rules.

General Superintendent Leonard, of the Ontario & Quebec Division, writes: "These signals are giving the best of satisfaction, notwithstanding the very severe weather we have had, and I have no doubt they will prove eminently satisfactory."

The record above given is certainly a very good showing, in view of the unusually severe weather experienced in Montreal this winter. Among the causes of failure are a number of cases where the locking-gear failed to work in the signal instrument. It should be explained that any failure of this lock, or in fact any part of the apparatus, produces a danger signal, causing an unnecessary stop. The system does not display a safety signal when the apparatus is out of order. The locks have been readjusted & it is not expected any more trouble will be caused on that account, & that the next quarterly report will most likely be even better than the last.

In the accompanying illustrations fig. I shows the signals on post, the two discs on the top signal being colored red, & those in the bottom signal green. Figs. 2 & 3 give interior views of the signal case, fig. 2 showing "danger" position of signal (by gravity), & fig. 3 "safety" position of signal (by electromagnetism).

Last September the despatching office for the Manitoba division of the Northern Pacific was removed from Winnipeg to Grand Forks, North Dakota. Superintendent Vanderslice now says the removal, which was thought to be only temporary, is likely to be permanent.

A Prince Albert, Sask., paper is authority for the statement that on a recent drifty night a horse & vehicle were carried nine miles on the cow-catcher of a locomotive on the C.P.R.'s Prince Albert branch. The horse had started home without its owner, & was picked up en route by the locomotive.