

*Tests at Dunedin.**Magnetic brake.*

A series of tests of the Newell electro-magnetic combined track and wheel brake (old-pattern magnets) was made at Dunedin. In all, thirty-seven "stops" were made with car No. 20, fitted with this brake, viz. :—

Fifteen stops down Caversham grade (1 in 18·7), with a mean total retardation of 5·84 feet per second². (Appendix I, Tables 15 and 16.)

Four stops down Anderson's Bay Hill (1 in 14), with a mean total retardation of 6·34 feet per second². (Appendix I, Table 17.)

Eight stops down Anderson's Bay Rise (1 in 155·25), with a mean total retardation of 6·22 feet per second². (Appendix I, Table 18.)

Ten stops on the level, with a mean total retardation of 4·75 feet per second². (Appendix I, Table 19.)

Electric emergency stops.

Two electric emergency stops, one with No. 2 and one with No. 3 electric emergency brake, were made with satisfactory results, and a demonstration of the retaining-power of the magnetic brake on a gradient of 1 in 14 was given in the following manner :—

Control on grade.

The controller-handle having been placed in the last magnetic-brake notch, the hand-brake was released, and the car allowed to proceed from rest down the grade. The car gathered way up to about five miles per hour, and was then automatically stopped by the brake. After a short period of rest it again gathered way, and was again automatically stopped, and so on indefinitely.

Critical speed.

In the Dunedin trials the critical speed-limit of the magnetic brake was on the first day, with perfectly clean commutators, about twenty-two miles per hour on the level, and towards the conclusion of the trials, when upwards of thirty emergency stops had been made, it was about eighteen miles per hour down a gradient of 1 in 14. Above this speed, flashing round the commutators, with accompanying skidding and lurching, occurred, though in every case fairly satisfactory stops were accomplished.

The commutators were inspected after the first day's tests, and found to be in good order. They were not interfered with, and on reinspection at the conclusion of the trials were found to be only slightly affected.

STOPPING-POWER OF THE BRAKES COMPARED.

The average mean retardation obtained is a measure of the stopping-power of a brake. The average mean retardations obtained with the different brakes tested were as follows :—

	Feet per Second ² .
Mechanical track-brake	4·02
Hand wheel-brake and mechanical track-brake	3·06
Pneumatic wheel and mechanical track brake	5·63
Pneumatic wheel-brake alone	4·24
Newell electro-magnetic track and wheel brake	5·80

The average distances in which the cars experimented upon can, under the conditions of test, be arrested on the level, and on various gradients at ten and at fifteen miles per hour are clearly shown on the set of curves marked Curve sheets 1 and 2, Appendix II, and also in tabular form in Table 5, Appendix II.

The stopping power of the pneumatic wheel with track-brake is directly compared with that of the Newell magnetic brake on curve sheet 3, and the length of "stops" made by the pneumatic brake alone and by the Newell magnetic brake on the level at all speeds are shown by curve sheet 4.