

rocks can be creditably compared in hardness with the diked Trenton limestone now being excavated in the Mount Royal tunnel. However, as the rock encountered in the Loetschberg tunnel was sufficiently hard to require the use of air drills, that progress of 1,013 ft. will undoubtedly stand as a world's record for a long time, and certainly stands as a monument to good tools, good management, and good men.

The rock in the Dorchester St. heading of the Mount Royal tunnel, while not so hard as it is back of the mountain, is a very good Trenton limestone, which makes an excellent concrete stone, being sharp and not too high in lime. All stone coming from the tunnel is being crushed and what is not used by the company is being sold for massive and reinforced concrete, principally in Montreal.

The break ups, as they are called, where the full sized tunnel is excavated, are opened at as many intervals as desired. This excavation is extremely cheap and rapid. In one, break up about 200 cu. yds. are now being excavated per day with two shifts of drillers. Jumbo timbers are framed into the headings at the break ups, so that the heading traffic is never interfered with, and the bulk of the break up muck drops into the cars by gravity. It is to permit the use of a fairly broad gauge double track at these break ups that the Mount Royal headings are driven 8 to 10 ft. high by 12 ft. wide.

While so large a cross-section very materially reduces the progress of the headings driven each month, it very greatly increases the economy of further excavation and construction. Back of the mountain, where the very hard rock is encountered and the drill carriage is in use, the heading averages about 10 x 12.5 ft., and the May progress was 510 ft. in 27 working days. At the city end, where the record was made, it was permitted to reduce this to about 8 x 12 ft. in order to assist the progress. It is expected to remove most of the benches below the level of the jumbo timbers with a steam shovel.

consists of R. Byers, General Superintendent, West; E. Duffy, General Superintendent, East; W. C. Lancaster, Electrical and Mechanical Engineer; H. T. Fisher, Tunnel Engineer; H. D. Robinson, Engineer of Design, and J. C. K.

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Hopper Bottom Grain and Coal Car Built for Canadian Pacific Railway.

Ever since grain has been handled in box cars, the construction of a suitable grain door has been one of the most difficult problems in car design, and up till recently it has remained the one unfinished part of the car. A satisfactory grain door is one that will hold grain as

out and as railroading as a whole is becoming more efficient and refined, there will be a demand for a higher degree of efficiency in the handling of grain. Working to this end, the Canadian Pacific Ry. has built 200 Burnett hopper bottom grain cars, shown in the

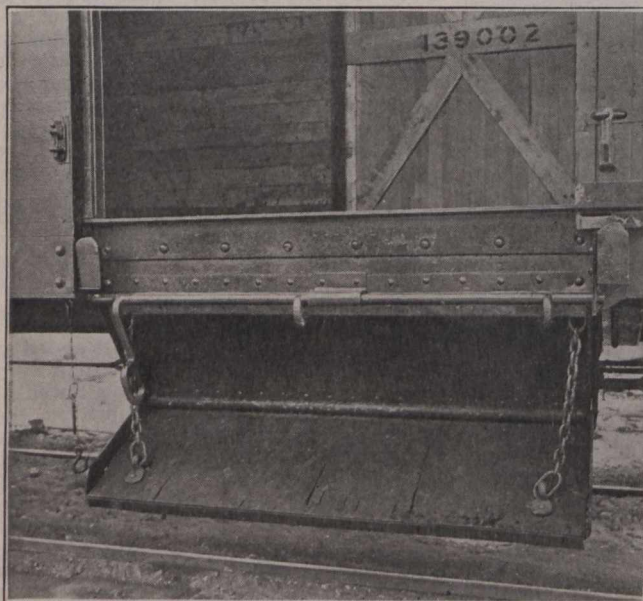


Hopper Bottom Grain and Coal Car for C.P.R.

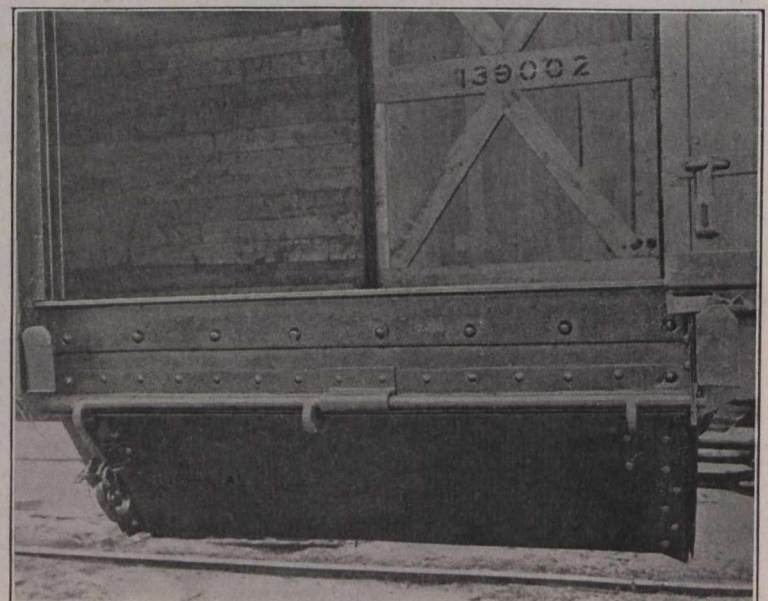
securely as any other part of the car body, is always there when required, will not be demolished in unloading, does not obstruct or decrease lading room when not in use, and is of reasonable first cost and low cost of maintenance. A grain car so constructed that

accompanying illustrations.

There are several new features in this hopper door. The hinge is made by interlocking the edge of the hopper door and floor, making a continuous hinge, which, instead of weakening the edge, strengthens it the same as would the ap-



Car With Steel Hopper Open.



Car With Steel Hopper Closed.

As this work is being done by Mackenzie, Mann & Company, Ltd., who also represent the Canadian Northern Ry., every opportunity for economy may be taken advantage of. The job organization covering both design and construction

there will be no loss that would be detected, will appeal to all persons who are in close enough touch with the handling of grain to be familiar with the loss that there has always been, and as other problems in railroading are being worked

plication of an angle, and instead of the load having a tendency to open the joint as with all other hinges, the load tightens the joint. The hopper door also differs from hopper doors previously constructed, in that it is hinged at the bot-