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Canadian Northern Railway Dynamometer Car.

One of the best investments made by the Canadian Northern Ry.'s mechanical department is a dynamometer car built in its Winnipeg shops early last year for testing the motive power on its western lines.

The exterior of the car is shown in fig. 1, and the floor layout and interior arrangement in fig. 2. It is a converted passenger car of the older type, the interior arranged for the convenience of the operator, and as a business car for the mechanical department. The designs were all prepared under the supervision of S. J. Hungerford, Superintendent of Rolling Stock, from whom the following information was obtained.

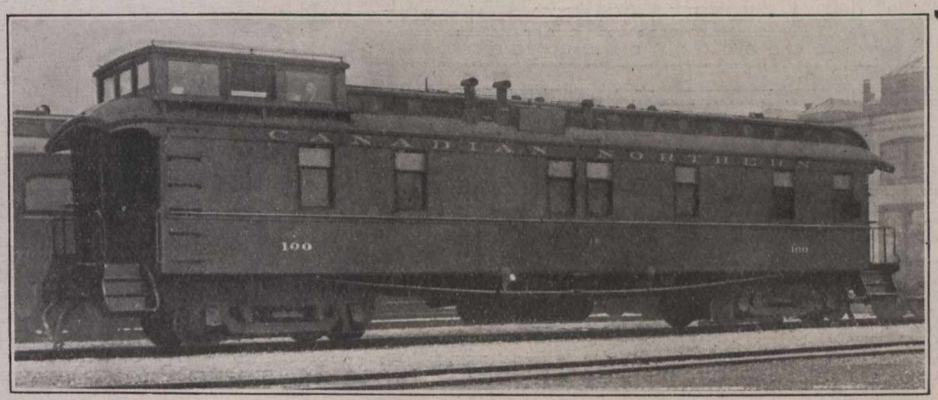

Fig. 1.—Canadian Northern Railway Dynamometer Car.

The dynamometer draft gear is shown in fig. 3. The body of the old car has been reinforced by building into the underframe two 15 by 6 in. I beams, extending the car length, to which the draft gear at both ends is attached. These beams are spaced 26 ins. apart between the webs, as shown in fig. 3. Between the web is attached a section of ¾ in. plate, 44⅛ ins. long, the edges of which are flanged, and secured to edges of which are flanged, and secured to the webs of the large I beam by twenty two ⅞ in. rivets on each flange. To the under side of this plate is secured the dynamometer draft rigging, nesting between two 12 in. channels, the backs of which are 14¼ ins. apart. Three under brackets across between the lower flanges of the large I beams support the channels from the bottom, forming a rigid box construction.

The coupler and yoke are of the usual type, carrying two spring plates, between which are the usual nested coiled springs. All this portion is of standard construction. Along the sides of the coupler yoke are the two arms of a heavy U connector piece, inward lugs on the latter forming bearings against which the spring plates bear, carrying the pull or push from the coupler into the U connector, all as shown in the plan view, fig. 3.

Through the base of the U, passes a piston rod, secured to the U by a block on the inside, through which passes a tapered key pin, securing the U connector to the piston rod. The location of the cylinder is shown in this same view, and the construction in fig. 4. The construction allows for cylinder flanges, by which means the cylinder is attached to the webs of the body I beams.

The cylinder is an iron casting, bored to a 16½ in. diameter, with a central 15 in. portion 16 in. diameter, in which the piston fits. The piston is 12 ins. long, containing six ¼ by ¼ in. annular grooves around the outside for fluid packing. The cylinder and piston are ground into each other, making a snug working fit, the fluid packing proving ample, with the long contact surface and snug fit. The fit is such that the friction is small.

The piston rod from the U connector is 4 in. diam., and at the front end of the cylinder, 2½ ins. Both ends pass through the heads in packed bushings, 9 ins. long, the heads being secured to the cylinder ends by twenty 1¼ in. studs.

Friction throughout the draft rigging is eliminated as much as possible. Under both legs of the U connector are two 8 in. rollers, each pair being carried on a shaft in bearings on the under side of the side channels, the weight of the yoke, coupler and spring plates being carried by the same means.

In the plan view of fig. 3 it will be noticed that there are side lugs attached to the inner face of the side channels, near the ends of the normal position of the U connector; these lugs are shown in section. When the dynamometer is not in use, double pins are placed between the ends of the U connector and these lugs, holding the U connector in its normal central position, the pull or push being taken up by the springs inside the yoke in the usual manner, the dynamometer cylinder arrangement being made dead. When the dynamometer is in operation the springs in the yoke are useful in taking up sudden shocks, relieving the cylinder, but in no way affecting the readings.

From the ends of the oil cylinder there are pipe connections to the dynamometer room in the car. On the floor of the car there is located a pump for pumping the cylinders full of oil, with a by pass between the cylinder ends, connected to the pump, by means of which the oil can be shifted from one end to the other, when after a long run, the leakage around the piston has been found to be sufficient to bring the piston too near one end. The customary practice in centering the piston, when leakage has shifted its position, is to open the by pass, and have the locomotive pull or push on the drawbar, shifting the piston back to normal, the by pass being then closed. In summer the oil used is dynamo oil, and in winter equal parts of dynamo and signal oils.

The dynamometer observation room, as shown in figs. 1 and 2, is in an elevated position at the dynamometer draft gear end of the car, similar to the cupola of a caboose, the floor of the room being at as high an elevation as the clearance limits of the car will permit, there being just standing room, with a close clearance for outside obstructions over the top of the cupola. All four sides have observation windows for outside inspection. The room is reached by a short tier of steps at the end of the car.

In the centre of the room is the dynamometer table, shown in fig. 5, the top of which is shown in fig. 6. On the top of the table is the dynamometer recording apparatus, the main part of which is shown in fig. 7. It will be observed that integral

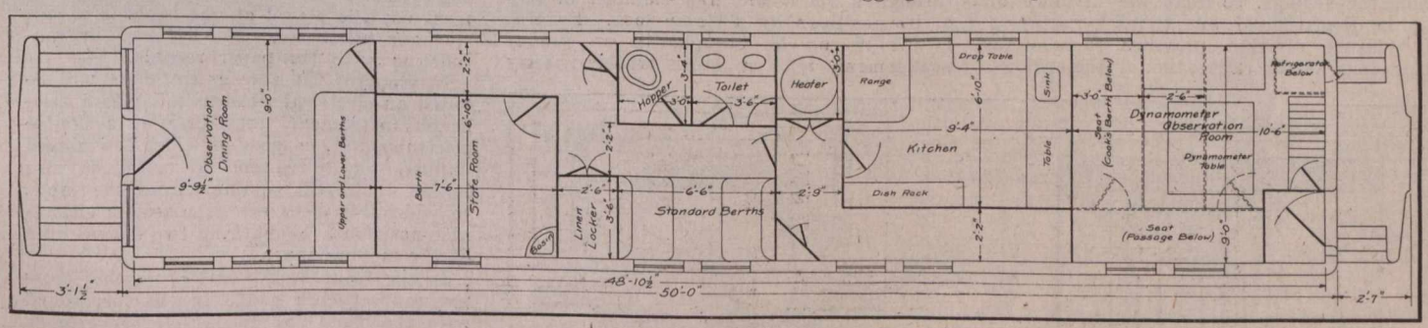

Fig. 2.—Floor Plan and Interior Arrangement of Dynamometer Car.