## Electric Locomotives for Lake Erie and Northern Railway.

The L.E. & N.R. has received one of its 60-ton electric locomotives and the second is expected to be shipped by March 31. The principal dimensions are as follows:

Gauge, 4 ft.  $8\frac{1}{2}$  ins. Distance between truck centres, 17 ft. 8 ins. Wheelbase, each truck, 6 ft. 8 ins. Wheelbase, total, 24 ft. 4 ins. Driving wheels, diameter, 36 ins. Journals,  $5\frac{1}{2} \ge 10$  ins. Width over all, 10 ft. Within over all, 10 ft. Height to top of eab, 12 ft. 0½ in. Height over all, 12 ft. 10 ins. Length, centre to centre of coupler knuckles, 7 ft. 6¼ ins. Weight, 120,000 lbs.

voltage across each is 750 volts. Their nominal rating is 75 kw. (100 h.p.).

The frame is of soft steel, cast in a single niece The projections of the frame, to which the axle caps are bolted, extend over the axle, to a large extent relieving the axle cap bolts of the weight of the motors. At each end there is a large bored opening through which the armature, pole pieces and field coils may be removed. These and field coils may be removed. These openings are enclosed by housings, which will carry the bearings and oiling arrangements and are securely bolted to the frame. Tapped holes are provided in each housing



These locomotives are of the 8-wheeled. double-truck type, so equipped that they can be used in passenger, freight or switching They will operate on 85-lb. rails, service. traversing curves of 40 ft. radius without a trailing load and of 130 ft. radius with a trailing load. In service they will handle standard freight cars and Canadian Pacific passenger cars, the maximum train load being about 800 tons.

The trucks are of the equalized pedestal type, with rigid bolsters and half elliptic springs. This design of truck, it is claimed, combines simplicity of construction with combines simplicity of constitution with ample strength, and with riding qualities which are satisfactory for locomotive ser-vice. The wheels are steel tired, with cast steel centres. The longitudinal frame sills consist of four 13-in. steel channels, which are strongly braced transversely above the truck centre pins. The bumpers are of cast truck centre pins. The bumpers are of cast iron, with push pole pockets, and are made in one piece with heavy lugs which are riveted to the frame sills. This provides a most substantial frame structure. Iron pilots and short shank M.C.B. couplers are applied at each end.

The locomotives are arranged for double end operation and they have central cabs with sloping hoods at either end. The cab is of steel, and is lined with wood for the comfort of the enginemen. Steps and handholds are arranged to conform to the Board of Railway Commissioners' requirements.

The motors are of a new type, styled 562-D-5, which has been developed by the Westinghouse Electric & Mfg. Co. for high potential direct current. Two motors are permanently connected in series so that the

for use in removing it. Access to the commutator and brushes is afforded by a large opening over the commutators. The cover is held by a tee bolt at one end and a locking device at the other. Tapped drain holes are provided through the bottom of the frame.

The four main poles are built up of

preventing vibration and chafing, and are protected from abrasion by metal coil shields.

The commutating poles are of steel and are bolted to finished seats. The coils are wound, insulated and prevented from vibrating in substantially the same manner as the main field coils.

The brushholder is readily accessible for adjustment, cleaning and removal of car-bons. Each holder is supported by two insulated pins, over which are placed porcelain bushings, which give a large creepage distance between the holder and the motor The holders are arranged for frame. radial adjustment to allow for wear of the commutator. The proper brush tension is provided by an adjustable spiral spring. flexible shunt protects the springs for excessive current.

Both armature and axle bearings are arranged for oil and waste lubrication. Large waste pockets are provided having an opening into the low pressure side of the bearings. Separate oil reservoirs permit the fresh oil to be fed and filtered up through the waste to the bearing. The depth of oil in the reservoir may be easily gauged, so that the most economical height may be maintained. Oil guards and wiper rings prevent the oil from reaching the inside of the motor.

Two separate field windings are used on the main poles. By connecting the two field windings in series during acceleration, a relatively high tractive effort at low speed is secured with a small current. After all the resistance has been cut out, one of the field windings is cut out reducing the total active field turns. This gives a higher speed at any given current. While the full field connection is intended primarily for acceleration, it may be used to some extent

for slow-speed running. The motors have a unique system of ventilation. While air for cooling is normally provided by a motor driven blower, each motor has a fan at one end of the armature which will provide sufficient ventilation to the locomotive at three-quarter operate capacity in case of accident to the blower. The control equipment used on the locomotives is HB electro pneumatic and is

practically the same as the high voltage



laminations of soft steel, riveted between end plates. The main poles are secured by studs extending through the frame and fitted with easily accessible nuts. The field coils are wound with flat copper strap, insulated between turns with asbestos ribbon. The outside is protected by a covering and the entire coil is impregnated with a heat conducting and water proofing insulat-ing compound. The coils are held rigidly against the pole tips by stiff flat springs,

control outfits used on the motor cars.

The various main circuit connections are made by individual or unit switches, arranged compactly in a group, these switches beed compactly in a group, tassed air. The magnet valves governing the flow of air to the switch cylinders are actuated by low voltage current from a storage battery. The switch group consists of a number of unit switches in a common frame. Each switch is provided with a powerful magnetic blow