through steel trusses, each 254 ft. long, c. to c. of end pins, & one of 348 ft. over the steamboat channel. The trusses will carry two railway tracks to be used by ordinary steam railway trains, as well as by electric railway cars, & the floor beam system will be extended beyond the trusses sufficiently to carry a 10 ft. roadway & a $5\frac{1}{2}$ ft. sidewalk on either side.

The details of one of the 254 ft. spans are shown in fig. 4. It has parallel chords & inclined end posts, & is divided into two panels of 25 ft. $4\frac{3}{4}$ ins. c. to c. of pins, the depth of truss is 40 ft., c. to c. of pins, & the width between trusses is 31 ft. 2 ins. c. to c. The top chord is of trough section, 28 ins. deep, having four web plates, a top cover plate & eight flange angles. The pins in this chord are 6, 7 & 7 1-2 ins. diameter. The posts are of I-beams & built-up sections, & the diagonals are eye-bars, with turnbuckles on the counters in the two middle panels. The bottom chord is composed of 8 in. eye-bars, with 7 1-2 in. pins, the thickness & number of bars varying with each panel. The end pins are a guard timber outside each rail. On each cantilever end of the floor beams will be two lines of 20 in. I-beams for the roadway, & a 15 in channel on the end of the beam. These carry the roadway timbers, which will be similar to the track ties, but 12 ins. apart. Upon these timbers will be laid a flooring of 4 in. plank for the roadway & sidewalk.

Across each end of each masonry pier (parallel with the bridge) will be laid seven 24 in. I-beams (100 lbs. per foot), 19 ft. long, the ends of which will be riveted to the end floor beams. On each set of I-beams will be 2 wall plates 4×5 ft., 1 1-2 ins. thick, upon which will rest the shoes of the trusses. The shoes at the expansion end will have nine rockers, 4 ft. 3 in. long, 334 ins. wide, & 7 ins. high, the top & bottom having curved faces. A variation in temperature to the extent of 150° is provided for in the expansion bearings. Between the floor beams, carried by the I-beams on the piers, are 15 in. I-beams which support the floor system across the pier

The channel span of 348 ft, will have curved

weighing 284,000 lbs. on a length of roadway of 54 ft., followed by a uniformly distributed train load weighing 4,000 lbs. per lin. ft. The distribution of the engine loads is shown in one of the accompanying illustrations.

4. A moving load in either direction on each of the roadways of 1,100 lbs. per lin. ft. 5. A live load on each footwalk of 200 lbs. per lin. ft.

To provide for wind strains and vibrations in the 254 ft. spans, the bottom lateral bracing is proportioned to resist a lateral force of 450 lbs. per lin. ft. of span, 300 lbs. of this being considered as a moving load & as acting on a train of cars at a line 8 ft. 6 ins, above the base of the rail. The top lateral bracing is proportioned to resist a lateral force of 150 lbs. per lin. ft. of span. For wind strains in the 348 ft. span, 35 lbs. are added in each of the above cases.

Following are some extracts from the specifications :

Bed plates (on masonry) for the trusses are to be made of cast-steel. These castings shall be free from blow-holes, true to patter n



FIG 3 .- ABUTMENT AND END SPANS, VICTORIA JUBILEE BRIDGE.

8 1-12 ins. diameter. The floor beams are plate girders 66 ft. 3 ins. long, suspended from the pins by I-beam hangers, the girders extending beyond the trusses to carry the roadways & sidewalks. The girders are connected by longitudinal & diagonal bracing. The trusses will be connected by transverse struts between the top chords, & between the posts, the latter struts being 15 ft. 1 in. below the top chords, giving a clear headway of 23 ft. 1 1-2 ins. from base of rail to the lower struts of the overhead lateral bracing. There will also be the usual horizontal & vertical lateral bracing, as shown in the plan & cross section, fig. 3.

Upon the central portion of these floor beams are carried 8 lines of stringers of 24 in. I-beams, 4 under each track, 2 ft. 5 1-2 ins. c. to c., the inner lines being connected by vertical diagonal bracing. Across these beams are laid pitch pine ties, 10 x 10 ins., 4 in. apart in the clear, these ties being long enough to carry both tracks. There will be two tracks of standard gauge, 13 ft. c. to c., with top chords to the main trusses, but the plans of this span have not yet been finally adopted.

The railway tracks will be used not only for ordinary trains, but also for electric cars, thus affording a more frequent service between Montreal & several small towns on the south shore. These cars will be run between the times of the regular trains, & interlocking switch & signal plants will be installed at each end of the bridge at the junction of the electric railway with the bridge tracks.

The trusses are designed for the following loads :

1. The total weight of metal in them, amounting to 5,910 lbs. per lin. ft. of span.

2. The weight of the wooden floor beams, planking, sidewalks, guard timbers, railings, rails & fastenings, etc., amounting, in the aggregate, to 2,800 lbs. per lin. ft. This, with the weight of metal, gives the assumed dead load of 8,710 lbs. per lin. ft. of span.

3. A moving load in either direction on each of the two tracks, consisting of two consolidation engines & tenders coupled, each & of a workmanlike finish. When tested in specimens not more than 2 ins. long, & of at least 1-2 in. uniform sectional area, it must give the undermentioned results :

All steel must be made by the open-hearth process, & shall contain not more than 0.08% of phosphorus in acid steel, or $0.04^{\circ}/_{\circ}$ in basic steel, & each kind must be of uniform quality.

All tests for tensile strength, limit of elasticity & ductility shall be made on samples cut from the finished material after rolling, & shall be at least 12 ins. long, & shall have a uniform sectional area of not less than $\frac{1}{2}$ -sq. in. All broken samples must show a silky fracture of uniform color.

When material is to be annealed or otherwise treated before use, the specimen representing such material is to be similarly treated before testing.