This skew in the bridge, while to a certain extent increasing the difficulty of form work and consequently also the cost thereof, effected a substantial saving in the amounts of concrete and steel which would have been required had the piers and abutments been placed at right angles to the centre line of the bridge, while at the same time the appearance of the structure as a whole was not materially impaired.

The deck of the bridge provides a roadway 46 feet between curbs with two street railway tracks having a 4-foot 4-inch devil strip in the centre, and two 7-foot sidewalks.

The General Specifications of the Ontario and Railway Municipal Board govern the loading and the allowable working stresses used in the design, which are briefly as follows:—

For the electric railway, two 40-ton cars; for the roadway, one 20-ton road roller or one 12-ton (loaded) motor truck and 135 lbs. per square foot for otherwise unoccupied roadway; for the sidewalks, 100 lbs. per square foot.

For 1:2:4 concrete: Compression in beams, 600 lbs. per square inch; compression in columns, 500 lbs. per square inch; shear, 40 lbs. per square inch.

For reinforcing steel: Compression or tension in beams, 15,000 lbs.; compression or tension in columns, 10,000 lbs.; maximum shear, 1,000 lbs.; modulus of elasticity, 30,000,000 lbs. Bond stress, 60 lbs. per square inch, equals 65 diameters for plain, round rods.

As will be noted by an inspection of the general plan of the structure, shown herewith (Fig. 4), the general outline gives the casual observer the impression of an arched bridge. In reality, however, as appears upon examination the longitudinal section through the centre of the bridge, the design is that of a span of cantilevered beams supported on piers and enclosed at the abutment ends. This adaptation of the cantilever principle has two distinct advantages, *viz.*, economy of material and vertical pier loads; in this case the load on the the foundation being less than two tons.

This is a new type of structure for Toronto, though several bridges of similar design have been built in the United States in recent years.

As previously stated, the structure consists essentially of a pair of beams, each cantilevered over a pier and anchored at an abutment. The joint where the ends of the cantilevers meet is free insofar as the concrete is concerned. The longitudinal rods, however, project from one cantilever into the other for a short distance, bond, however, being prevented by tar-paper wrapping. The function of these rod extensions is to take care of any local inequalities resulting from the passing live loads at this point.

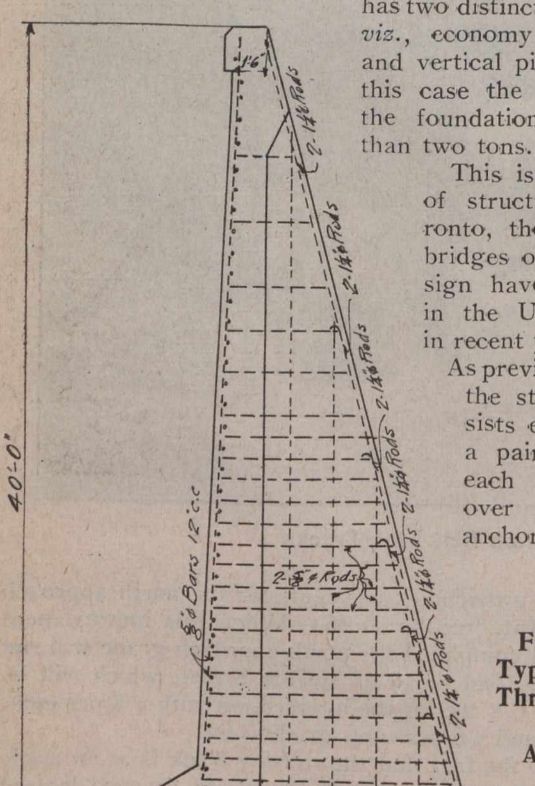

Fig. No. 2. Typical Section Through Wing Wall of Abutments

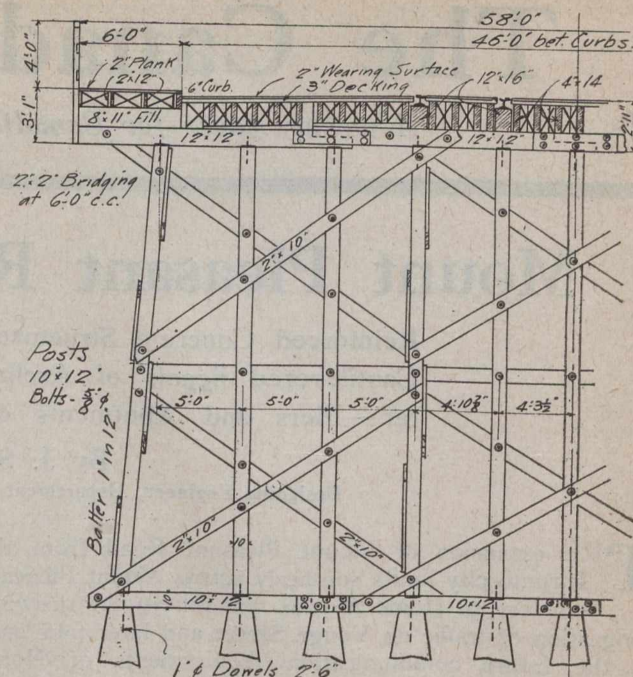

Fig. No. 3.—Typical Trestle Bent
(Half Bent Shown)

The arched beam between the abutment and the pier is 36 inches thick at its centre, being reinforced with 1-inch diameter round rods, spaced 4½ inches centre to centre in the bottom and 1¼-inch diameter rods spaced 4½ inches centre to centre in the top.

The top reinforcing rods are continuous over the pier to the end of the cantilever, two-thirds of the rods being bent down near the end to provide for shear. At the abutment or anchor end of the beam the top rods stop at intervals, one-third of the number continuing a certain distance down the back of the abutment to provide anchorage, as shown in Fig. 4. Of the bottom reinforcing rods it will be observed that one-third of the number extend into the pier and abutment while the remainder are bent up at intervals to provide for shear stresses.

The pier reinforcement consists of ⅝-inch diameter rods, spaced 2 feet apart vertically and 4 feet longitudinally, to provide against surface cracking due to contraction.

The pier footings are reinforced with three ⅞-inch diameter rods longitudinally on each side and ⅞-inch diameter rods at 6-inch centres transversely.

The main sections of the abutments are designed as reinforced slabs supported against the pressure of the earth fill by the floor of the bridge on top and the footings at the bottom.

The north abutment varies in effective thickness from 50 inches at the bottom to 32 inches at the top, and is reinforced vertically with 1-inch diameter rods 4 inches centre to centre.

The south abutment has an effective thickness of 34 inches throughout and is reinforced vertically with 1-inch diameter rods spaced 6 inches centres, both abutments being reinforced longitudinally by ½-inch rods spaced 24 inches centres.