

parts gravel. In this part of the work large stones were embedded in the concrete. These stones were separated enough to be each completely surrounded by concrete, and not nearer the face of the work than 3 inches. The concrete in the arch, spandrel walls, wings, etc., was composed of a mixture of one part cement, two parts sand and four parts screened gravel and crushed stone. The spandrel walls were battered on the inside from 4 feet thick at the ends to a foot thick just below the level of



Concrete Bridge near Hornby, Ont., of 30-foot span. The bridge floor is reinforced with four 12-inch "I" beams 30 feet long. Net cost less than \$900.

the floor. The wing walls were 12 feet long and 1 foot thick. They were supported by two counterfort walls running back to the abutment and sloping up to within 2 feet of the top of the wing walls. The tops of the wings and the base of the railing were finished off with a mortar facing 1 inch thick, composed of one part cement and two parts sand. The Kahn system of reinforcing was used throughout.



A 40-foot Beam Span, Mapleton, Ont.

The contract price of the bridge, exclusive of the steel, was \$9,399. The steel was supplied by the city of St. Thomas, about $18\frac{1}{4}$ tons being used, costing \$1,453. The bridge was designed by Jas. A. Bell, city engineer, St. Thomas, and Mr. A. Gillies was inspector-in-charge.

The concrete girder bridge at Mapleton, Ont., shown herewith, has a forty-foot span clear between abutments. The foundations of abutments extend 3 feet



An Artistic Bridge Design, Indiana—36-foot Span.

below the bottom of the creek, and are on hard pan. The abutments and wings are built up with a mixture of one part of Portland cement to seven parts of creek



An 80-foot Span at Rockville, Indiana.

gravel and sand. The beams, floor and railing are in the proportion of one of cement to two of broken stone and

four of sand; the floor surface, one of cement, two of sand and one of broken stone.

The total cost, including building of railing for one hundred feet on each end and filling in of approaches was \$1,458. The engineer was J. A. Bell, St. Thomas, Ont.; contractor, J. W. Chivers, Belmont, Ont.