There are many interesting features worthy of note in the shops of the St. Lawrence Bridge Company, mentioned elsewhere. Among the accompanying illustrations

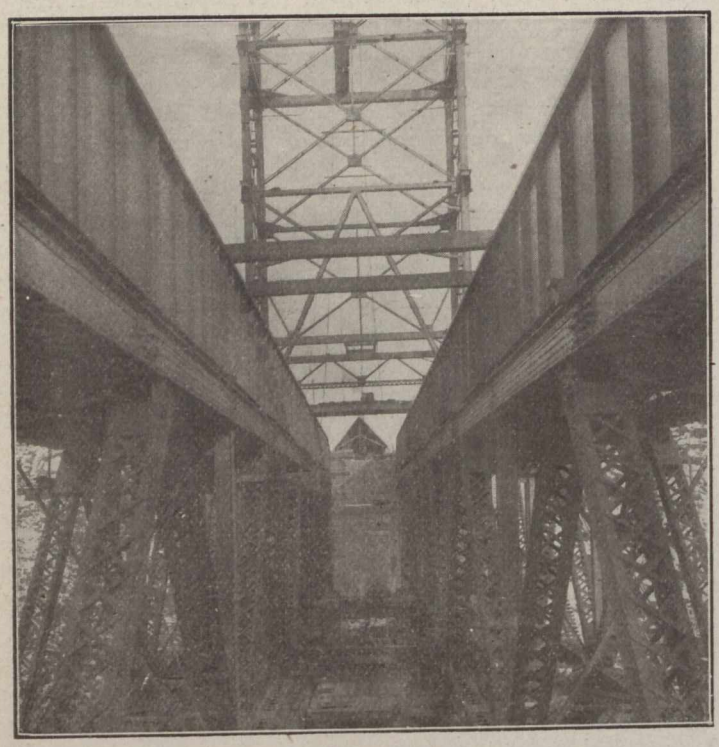

Fig. 6.—North approach span erected. As the railway tracks on the bridge are 32 ft. centre to centre, these approach spans are erected as two separate bridges, each carrying a track.

there are several which convey a slight idea of the size and weight of some of the bridge members which these shops are turning out. Their proportions greatly excel

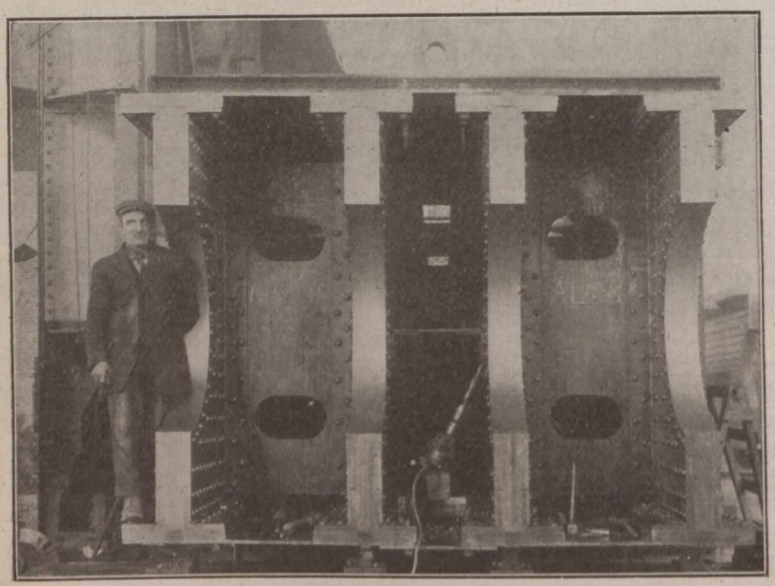

Fig. 7.—End view of member shown in facing machine. This end is bored for a 45-inch pin sleeve, which takes a 30-inch pin weighing 12 tons. Each of the webs are 7 inches thick at the pin. Manholes are provided at all diaphragms to allow contractors, painters, etc., to reach every portion of each member.

those of the product of any other shop removed any distance from the site. Moreover, the special machinery with which the plant is equipped for the rapid and accurate machining of special designs is in itself remarkable in its massiveness and adjustments. Among these various machines are the two planing machines, manufactured by James Bennie and Sons, Glasgow, with a capacity for plates up to 46 ft. in length. In them the heavy sheared plates have their edges finished, the cutting tools operating on both forward and return strokes.

The drilling and reaming are carried out on 16 stationary 7-foot radial drills, made by the Canadian Machinery Company, and 24 portable drills, transferred by cranes from one place to another. Shop rivetting is done for the most part by pneumatic yoke machines of 100 tons capacity.

A vertical boring mill manufactured by John Bertram and Sons Company, is used for boring large pin-holes and oval manholes. These large pin-holes, up to 4 ft. in diameter, are then finished in a horizontal boring machine with horizontal and vertical motions sufficient to permit the finishing of five of these pin-holes without resetting.

GRAND RIVER IMPROVEMENT.

SINCE the publication of the preliminary report of the Hydro-Electric Power Commission of Ontario on a proposed scheme or artificial storage and flood control on the Grand River, an exhaustive study of the flow characteristics of the river and its tributaries has been under way. The preliminary report appeared in *The Canadian Engineer* for April 17th, 1913. According to the 6th annual report of the Commission the investigation was begun in June, 1913, and at the present time gauging stations are established on the Grand River, and gauge recorders employed at each station to take readings of water level twice a day. This work has now been carried through one low-water season and some valuable information obtained. There has so far been a reasonably close relationship between gauge height and discharge. This satisfactory relationship has been mainly the result of low-water conditions, and there is unfortunately no likelihood that similar conditions will obtain during high stages of flow, when the gauges will be unavoidably affected by back-water.

In anticipation of the effect of back-water upon the gauges, a line of levels was run up the Grand River valley as far as Bellwood, and for several miles up each of the main tributaries. The work was started at Dunnville, using the U.S. Lake Survey level of Lake Erie as a datum. Permanent bench marks referred to sea level were established at convenient intervals on the main stream and tributaries.

During the course of the work all accessible Geodetic Survey bench marks were picked up, and in every case a very satisfactory check was obtained. A reasonable check was also obtained on various railway elevations.

All the gauges from which water level readings are being taken on the Grand River and tributaries are set from these bench marks, consequently all gauges are set to the same datum throughout the watershed, and slope data can be taken directly from the gauge readers' records. With the help of this slope data it is hoped that it may be possible to apply corrections to the gauge readings during high stages of flow, and thus eliminate to a large extent the effect of back-water.