It is recommended that the tower spans be made of the same depth as the main girders. This has advantages, as omitting the brackets for carrying the short spans and utilizing the bottom flange of the tower span for the top strut of the longitudinal bracing.

From the point of view of the erector the erection is simplified by making the main girders and the tower spans of the same depth, for the reason that the traveller or derrick car can be run on the tower spans easily, whereas, in the case of the shallow tower spans, it is necessary to block up one end of the span and slide in the long girders afterward.

When the track is on a grade the two bents of any one tower should be made identical by adding fillers on the tops of the columns which are on the up-grade side of the tower. This provision simplifies the fabrication of the steel considerably.

The deflection of the main spans when over about 70 ft. in length throws the bearing pressure on the edge of the base plate. This unequal distribution of pressure may be overcome by the use of a short base plate or by having the girder reaction carried on a narrow strip or steel placed transversely to the length of the girder.

To secure the proper bearing of the columns on the masonry the stress must be distributed over an area considerably larger than the area of the columns. The best way to accomplish this is to provide a casting which flares out to the required area and the base of the column will be simplified without the use of elaborate wing plates, diaphragms, etc. It should be remembered in this connection that fitted stiffeners, wing plates, etc., are difficult to fabricate so as to insure bearing contact through the milled ends.

The diagonals of the longitudinal and transverse bracing are tension members. For simplified shop work it is recommended that the angles of these members be held together with tie plates and not with lacing bars. Narrow struts composed of four angles in the shape of an I-beam are perfectly riveted up with a solid web plate instead of being laced. The weight in either case is practically the same as the solid web may be utilized as part of the section of the strut.

Wide struts, of course, should be laced rather than built up with a solid web in order to save the weight.

Column sections are generally shipped in lengths not exceeding 60 ft. The engineer should design the column for the length of one shipping piece of the same cross section. The shop splices are avoided thereby, the weight is somewhat heavier, but the member is stiffer in consequence.

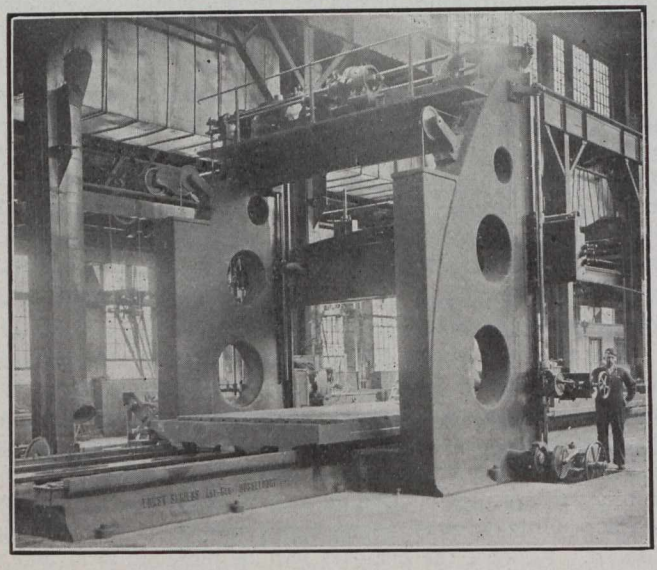
Base plates, cap plates and sole plates should be straightened in straightening rolls to secure an even surface in bearing. It is not necessary to plane the surfaces of the plates to get this result.

NEW WELLAND CANAL.

Tenders are likely to be called in a few months' time for the Welland Canal improvement. The cost will be approximately $50,000,000 and the time required for construction five years. The work is to be done at several sections at once, and seventy-five steam shovels and over a dozen dredges will work at various points along the route. The old course will be widened and deepened from Port Colborne to Thorold, but the descent from Thorold to the new harbor at McCalla's Grove, about three miles east of Port Dalhousie, will be by an entirely new channel, the outlet being at the Ten Mile Creek. Between Thorold and Lake Ontario there will be seven locks, with a depth of 25 feet. The lift system instead of the swing gate system will be in vogue. All will be operated by electricity.

A LARGE PLANER.

The planer, which is illustrated, was built by the well-known firm of Ernst Schiess, Limited, in Duesseldorf, Germany, and was furnished some time ago to the Mesta Machine Company in Pittsburg. When Mr. Mesta was in Europe some time ago he found that a great many large machine works were using Schiess planers, and was favorably impressed with the advantages of the German design. He consequently placed an order for such a Schiess planer with the agents of the German firm, the Wiener Machinery Company, 50 Church Street, New York, N.Y. The machine is now in successful operation for some time, and it may interest our readers to get acquainted with some data of this big planer. The machine has a planing length of 33 ft., a width of 13 ft. 1 in., and will accommodate pieces 11 ft. 6 in. high. There are four toolholders, two at each standard. All these holders are arranged for automatic setting in a horizontal, vertical or inclined position up to 45 degrees, and are furthermore provided with a quick-acting power arrangement, to be moved at the rate of about 2 ft. per minute, and an automatic lifting of the tools when the table is running back. The cross-rails can be lowered



View of Planer.

or raised at the rate of 10 in. per minute. All these quick changes can be made independently from the main drive of the machine, and this is accomplished by means of a 12 horse-power motor arranged on top of the machine. This motor is easily accessible from a bridge arranged for this purpose. Of course, the motor is operated in different ways very easily from a switch on the right side of the machine. The table, which is 10½ ft wide, and arranged to permit an easy removal of the shavings, runs in three wide, flat grooves, which are provided with a very good, durable and automatic oiling system. The table is driven by two broad steel racks by means of a 50 horse-power reversible motor. The motor runs with between 300 to 600 revolutions in such a way that when the table is running backward the motor is running at 900 r.p.m., which corresponds with the planing speed of 4-8 in. and backward speed of 12 in. The machine was built to accommodate pieces up to 110,000 pounds weight the normal tool pressure being about 25,000 pounds. The machine complete without the motor, which was furnished by the Westinghouse Electric and Manufacturing Company, weighs about 300,000 pounds.