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GENERAL SUBJECTS.

ERECTION OF THE COLUMBIA RIVER BRIDGE.

[BUILDERS' AND CONTRACTORS' ENGINEERING AND PLANT.—NO. CLXXVI.]

(Continued from page 37.)

THE erection of the bridge carrying the recently completed Great Northern Railway line over the Columbia River near Rock Island, Wash., is notable on account of the manner in which an ordinary fixed span was erected as a cantilever in a way that is, so far as we are aware, novel and original.

The water in the channel at low stages is about 130 feet deep with a very swift current, which rendered the construction of erection falseworks impracticable, and at the same time the usual form of cantilever construction could not be adopted, as a spur of the Cascade Mountains rises so abruptly from the west bank of the river at this point that it was necessary to begin a curve as quickly as possible after crossing the river in order to locate the line on the side hill, consequently it was impracticable to continue a tangent for a sufficient distance to admit of the construction of a shore arm.

The bridge as finally designed (shown in Fig. 1) consists of a 250-foot deck span over a side channel and a 416.5-foot through span over the main channel. A fixed

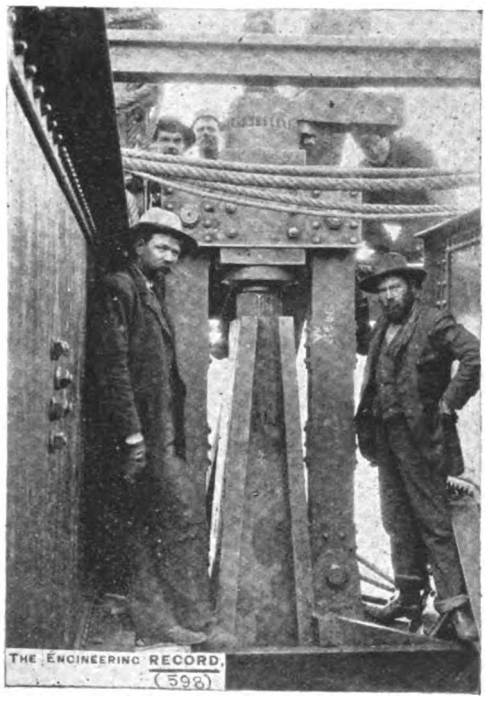


FIG. 5.

triangular steel tower built on a rock island carries one end of both spans, the east end of the 250-foot span resting on a natural rock abutment, and the west end of the 416.5-foot span being supported on a rocker tower standing on the edge of the perpendicular rock bluff rising out of the river behind the rock shown in the foreground at the left side of the picture, Fig. 3, which apparently supports it.

To meet the difficult conditions of erection as indicated above, the channel span was designed with a stiff bottom chord and its details were arranged for cantilever erection. The 250-foot span was utilized as shore arms by erecting one-half of the span upside down upon falseworks at each end of the channel span as shown in Fig. 2. The channel span was then built out cantileverwise from these shore arms, being temporarily connected to them by eye-bars at the top and struts at the bottom made specially for the purpose. As the erection progressed the outer ends of the shore arms were counterweighted with rails, indicated by dark masses in Figs. 2 and 3, 400 tons being finally put on each end. Material was delivered on the regular permanent track below, to travelers running on tracks laid on the top chords, which are more clearly shown in Fig. 4, made from a photograph taken just before the center panel was assembled and the span connected.

When the connection was made at the center the channel span was brought to its bearings by means of a set of top wedges at each end, and a set of bottom wedges introduced between the ends of the chords of the channel span and shore span back of the rocker tower indicated in Fig. 2.

One of the bottom wedges is shown in Fig. 5, which indicates the size, method of setting, and operating. The picture was taken before the wedge had been moved for the adjustment of the span. In addition to the bracing of the falsework, to prevent any longitudinal movement of the portion of the structure which was balanced over the rocker tower, the shore arm on the west side was anchored back to the rock bluff by steel cables, and heavy horizontal timber shores were wedged in tightly between the ends of the chords and the face of the bluff. In

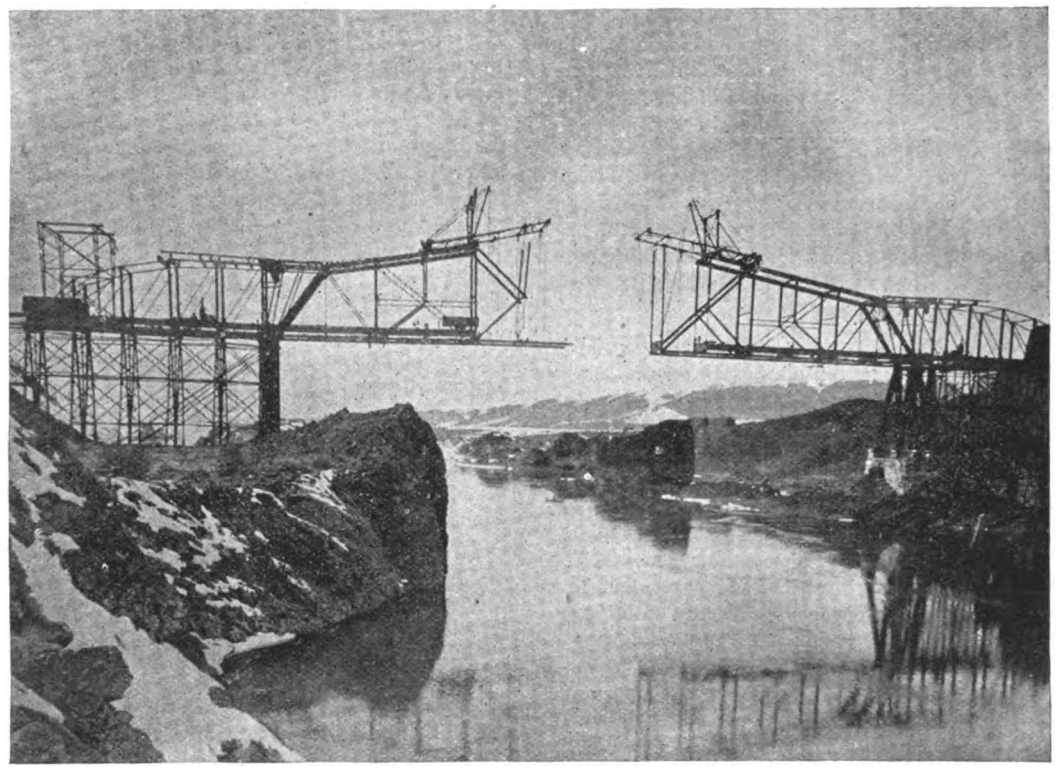


FIG. 3.

erecting the shore arms on the falsework a fine steel wire was used to place them the proper distance apart. As soon as the channel span was swung the two halves of the 250-foot span, which had served temporarily as shore arms,

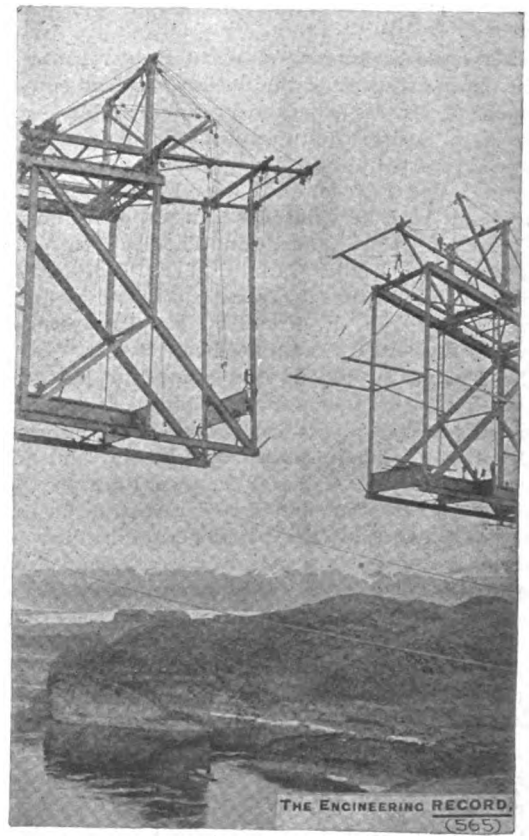
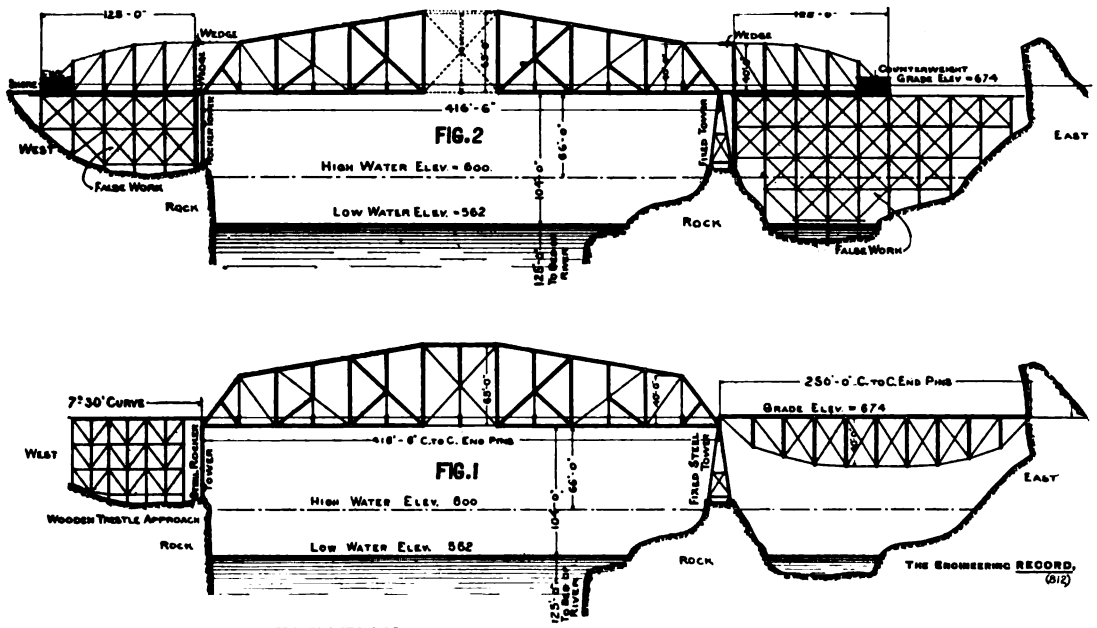


FIG. 4.

were taken down and the span erected in its proper position.

The work was carried through successfully and satisfactorily, although extremely high winds prevailed during the erection of the channel span. This bridge was designed, constructed, and erected by the Edge Moor Bridge Works, Wilmington, Del.



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