only immediately before its journey to the bridge site. In order to prevent the lifting of the span by the scows when the weather conditions are not favorable, there are a number of 8-in. disc bottom valves in each scow, and these are left open. The elevations of the beds of the scows were so chosen that the scows will be emptied through these bottom valves during the last low tide before the beginning the journey to the site of the main span. The valves have a total area of one five-thousandth the clear area of the scows. All interior areas of the scows are given unobstructed access to some one of the valves, and it is estimated that the water will drain out practically as fast as the tide falls.

As illustrated in fig. 1, the load of the suspended span is transferred from the floor-beams at each of the panel points L1, L2, L3, L 15, L16 and L17 to the bulkheads of the scows by means of eight 24-in. 80-lb. I-beam track stringers, with their end-connection angles interlocked at the ends, and four track girders braced together by swaying frames and top laterals. These I-beam stringers and track girders are part of the permanent floor material of the span—all the floor steel and the railway track floor, except the main floor beams, being left off the span during the operation of floating-in and hoisting. (This floor material will be placed afterward by means of derrick cars.) The total load carried by one scow under these conditions is 970 tons, distributed over four bulkheads. The draft of the unloaded scow is 1½ ft. and when carrying the load of 970 tons the draft is 8 ft. 2 in. The stresses in the truss members of the span while it is being supported entirely by the scows are such that a tension connection had to be provided at the joint U2; and the bottom-chord eye-bars between the panel points L0-L4 and L14-L18 had to be stiffened temporarily, as indicated in fig. 1, with longitudinal timbers and transverse blocking and bolts. The subtension verticals and the subcompression diagonals directly over the scows had also to be specially designed and stiffened to take reversal of stress while floating the span.

The three scows at each end of the span are braced and connected together as shown in fig. 1, by using the inside staging posts from the framework of the anchor arm as continuous connecting girders. Four of these posts are used for each set of three scows and are spaced 42 ft. c. to c. These posts were connected to the scows by means of a pair of cross channels, pin connected to vertical angles which were in turn bolted to the transverse bracing frames of the scows. Wedges were driven between the posts and the scow decks. These connections and the connecting girders were calculated to resist the bending and shearing stresses arising from the action of a 4 ft. wave.

Just before the span is lifted off the supports at L0 and L18 the load is nearly all taken by the scows, and the span could be easily displaced from its position by the current and wind, unless it is anchored against their combined effect. It is desirable to prevent this shifting off before the actual moment of starting arrives, inasmuch as it may happen that after deciding to raise the span preparatory to moving out, a change in the weather conditions may make it desirable not to proceed on the journey and the span would have to be returned again to its bearings on the staging bents, to await the next favorable opportunity for making a trial. To keep the span in its position until the final decision to float away has been made, timber bents will be placed between the points L0 and L18 and the adjacent scows and also bents on the shore side of the span, against which the scows will guide themselves as the span is raised or lowered on its supports.

The bottoms of the scows are placed at El. 83, where they rest on bearing timbers. The bed of the river over which the scows must pass will be cleared off to El. 82. The draft of the loaded scows will be 8 ft. 2 in. In order to float the span, a high tide elevation of at least 92 ft. will be required, and in order to

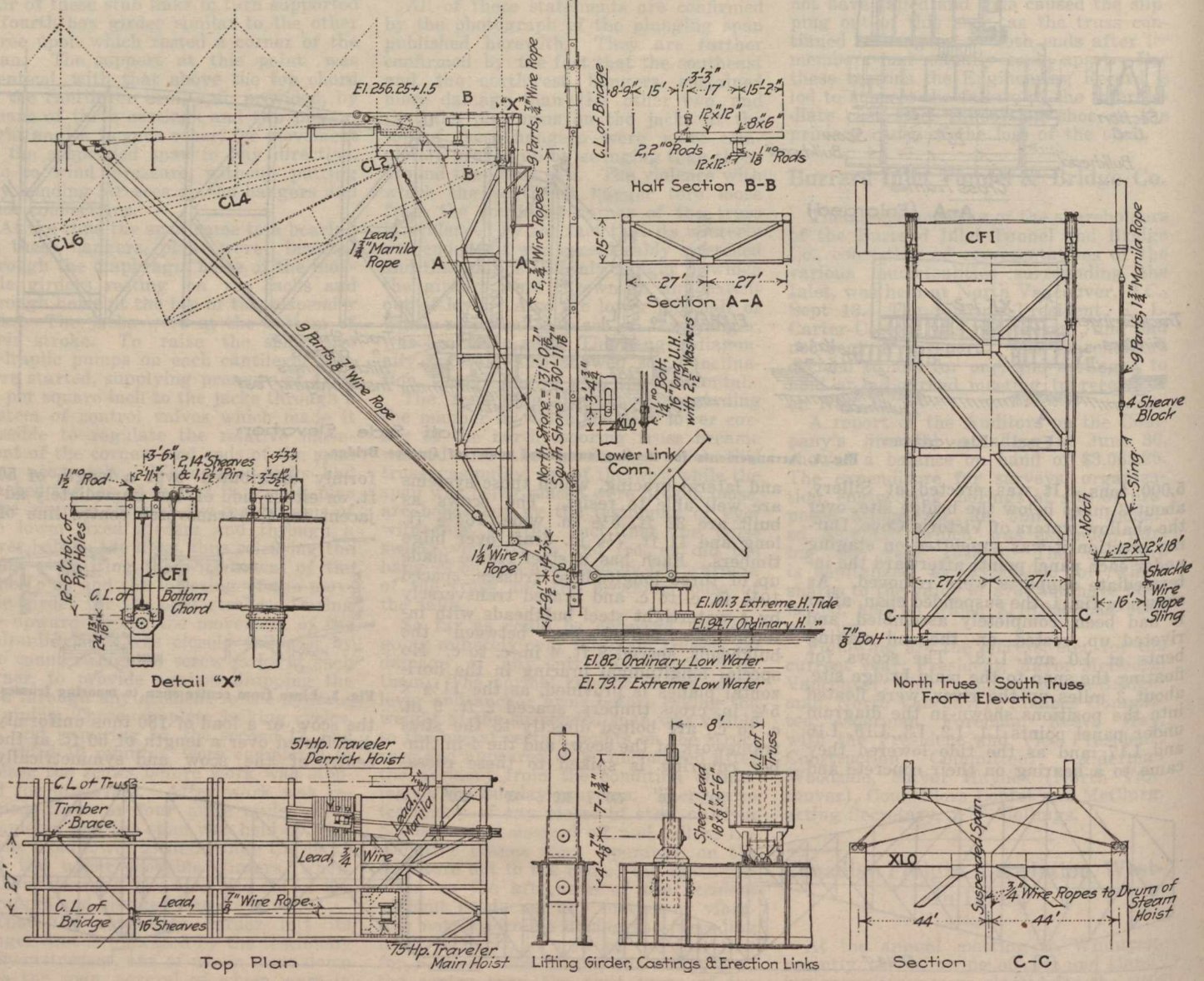

Fig. 4. Detail of arrangements for mooring and hoisting suspended span, Quebec Bridge.