Four miles of city streets are annually cleared of poles and wires by ordinance. A program for 20 miles of streets to be cleared in the next five years is being prepared. All the streets cleared will be major-traffic streets. It is also hoped that a standard system of lighting can gradually be installed on all the major streets.

Serious attention has been given to the methods and means of executing the major-street plan in the easiest and most economical manner. A uniform method for arriving at the amount of cost to be paid by the city and by assessment, quite similar to that adopted in New York, has been suggested. The city's share will be increased in proportion to the increase of street width. A more logical manner of determining the benefit district has also been recommended, the principle followed being that, in general, all property on or adjacent to thoroughfares which have been given more direct connections to various other parts of the city shall be included in the benefit district. By so doing, the benefit district is enlarged and the assessments are more equitably distributed in accordance with the benefit derived.

As to methods of payment, the most important recommendation is that for large improvements the city be permitted to issue special bonds for completing the entire project at once. These bonds would not be included in the regular debt limit, but should be special bonds, the collateral for which would be the tax bills issued for the improvement. Benefit assessments could be paid if desirable, in installments covering a period of from 10 to 20 years, the first payment to be deferred for 5 years in order that an owner may actually begin to derive benefit from the improvement by the time the payment falls due.

At the next session of the legislature the passage of the following laws will be sought to secure the necessary authority for completing the major-street plan: (1) Establishment of building lines; (2) the creation of permanent assessment boards; (3) approval of all land subdivisions; (4) constitutional amendment granting power of excess condemnation; (5) constitutional amendment permitting the establishment of streets on the city plan; (6) a law authorizing the creation of county plan commissions; (7) a law authorizing the creation of city plan commissions in small cities.

Locomotive Cranes Erect Cantilever Bridge Over Ohio River

Suspended Span Swung on May 10 Practically Completed Construction by Method Applied for First Time to Big Cantilever Span—Single-Track Structure Is 1120 Feet Long

By J. L. DE VOU
Division Erecting Manager, American Bridge Co., Pittsburgh, Penn.

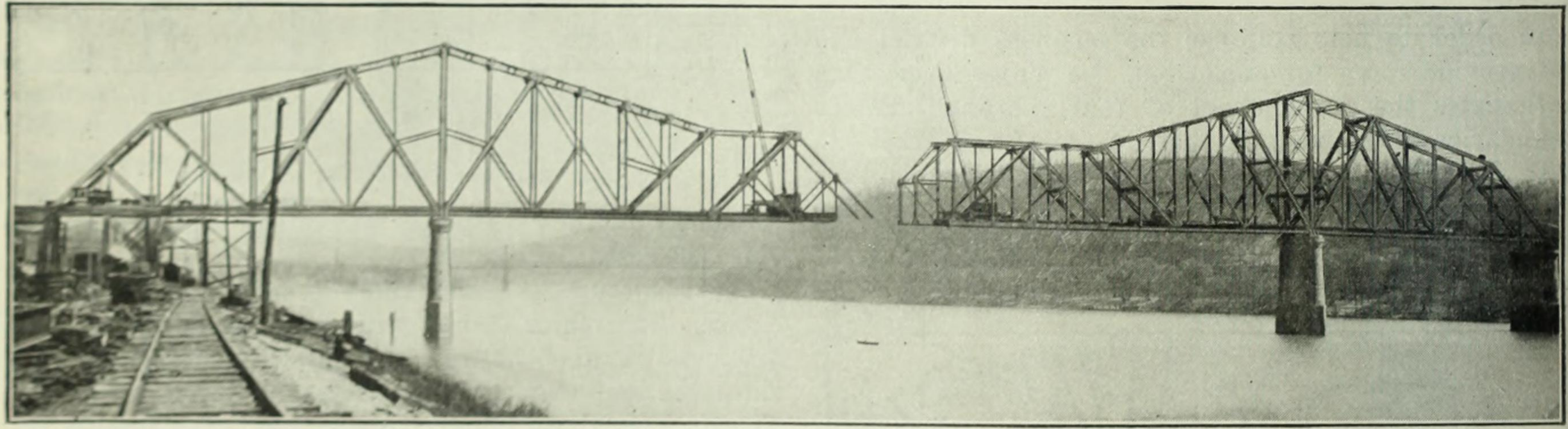

FIG. 1. ERECTION OF CANTILEVER BRIDGE BY LOCOMOTIVE CRANES APPROACHING CLOSURE

A FORWARD step in the development of bridge-erecting methods was recorded when on May 10 the suspended span of the new cantilever bridge across the Ohio River at Steubenville, Ohio, was swung. This single-track steel bridge 1120 ft. long and 110 ft. deep over the main piers was erected complete by two locomotive cranes operating on a central track placed as the erection progressed. Another special feature of the construction which marks a departure from common methods is seen in the use of hydraulic jacks instead of wedges and screws for the final adjustment in swinging the suspended span for closure. The erection features were carefully considered by designer and detailers and included special pins for eye-bar top chords and spacing of the trusses 30 ft. apart in order to allow complete reversal of the erecting cranes and the necessary space for a temporary material track.

This structure is being built for the Ohio-West Virginia Bridge Co., a subsidiary of the Labelle Iron Works, of Steubenville, and connects the new byproducts coke plant on the West Virginia side of the river with the furnaces and mills on the Ohio side. It is a single-track railroad bridge with a plate-girder approach at each end. The cantilever bridge has a total length of 1120 ft., made up of two anchor arms of 230 ft. each, two cantilever arms of 180 ft. each and a suspended span of 300 ft. The distance center to center of tower piers is 660 ft. The weight of the steel, exclusive of approaches, is 4088 tons.

The bridge is interesting principally because the American Bridge Co., contractor for the superstructure, used locomotive cranes exclusively in its erection, and it is believed to be the first cantilever bridge erected entirely with this kind of equipment. Two standard erecting cranes, equipped with booms 110 ft. in length, were operated from each end of the bridge.

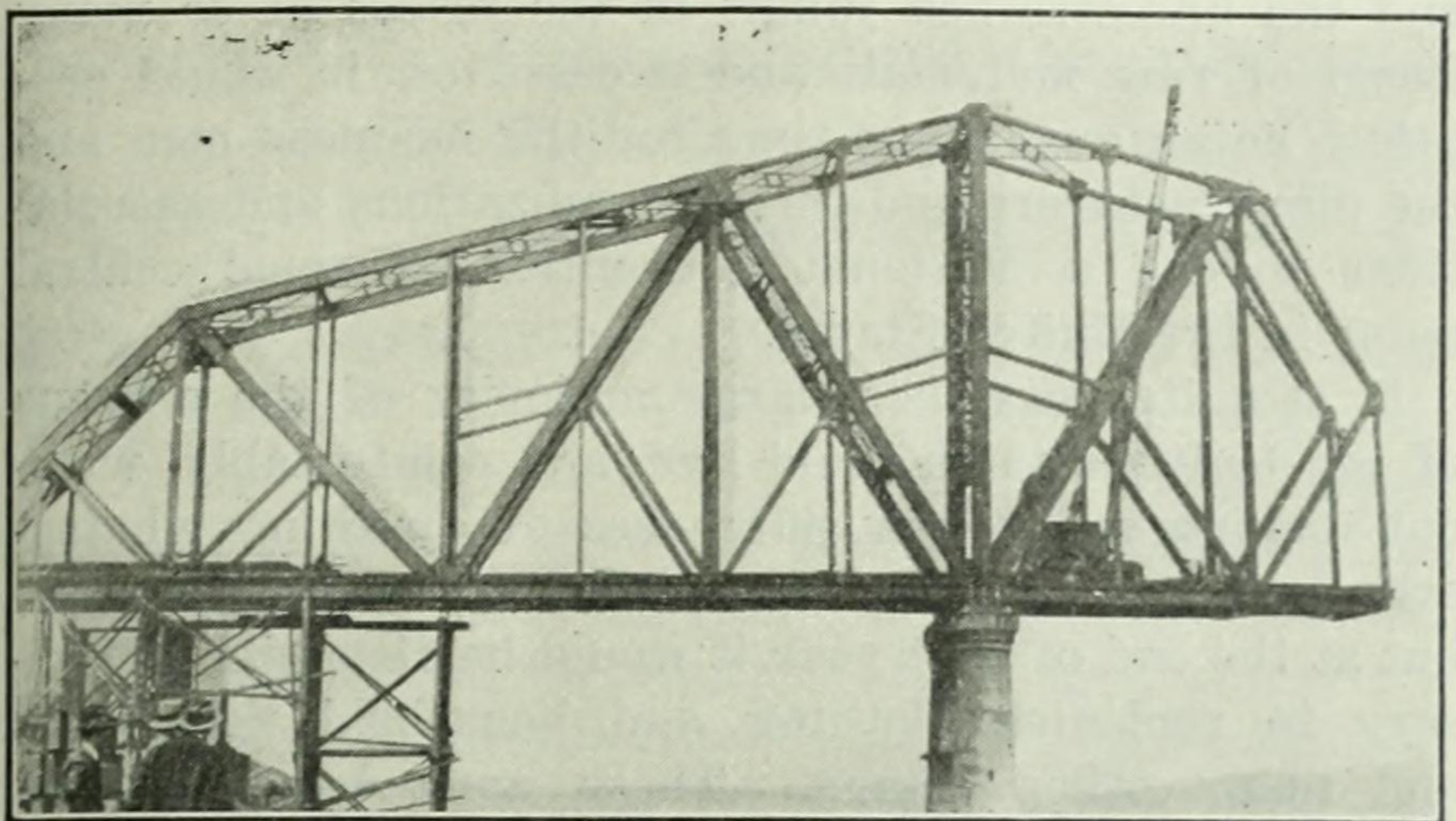

FIG. 2. EYE-BARS M_{11} L_{12} FOLDED BACK IN FIRST POSITION

The maximum depth of truss is 110 ft. center to center of chords. The width of the bridge is 30 ft. center to center of trusses. This width was enough to permit the use of a temporary material track beside the track that carried the crane laid in the center of the bridge. The material track was supported on stringers that will carry a footwalk in the completed structure. This width was also sufficient to let the cranes turn completely around for the purpose of erecting the top laterals and sway bracing behind them.

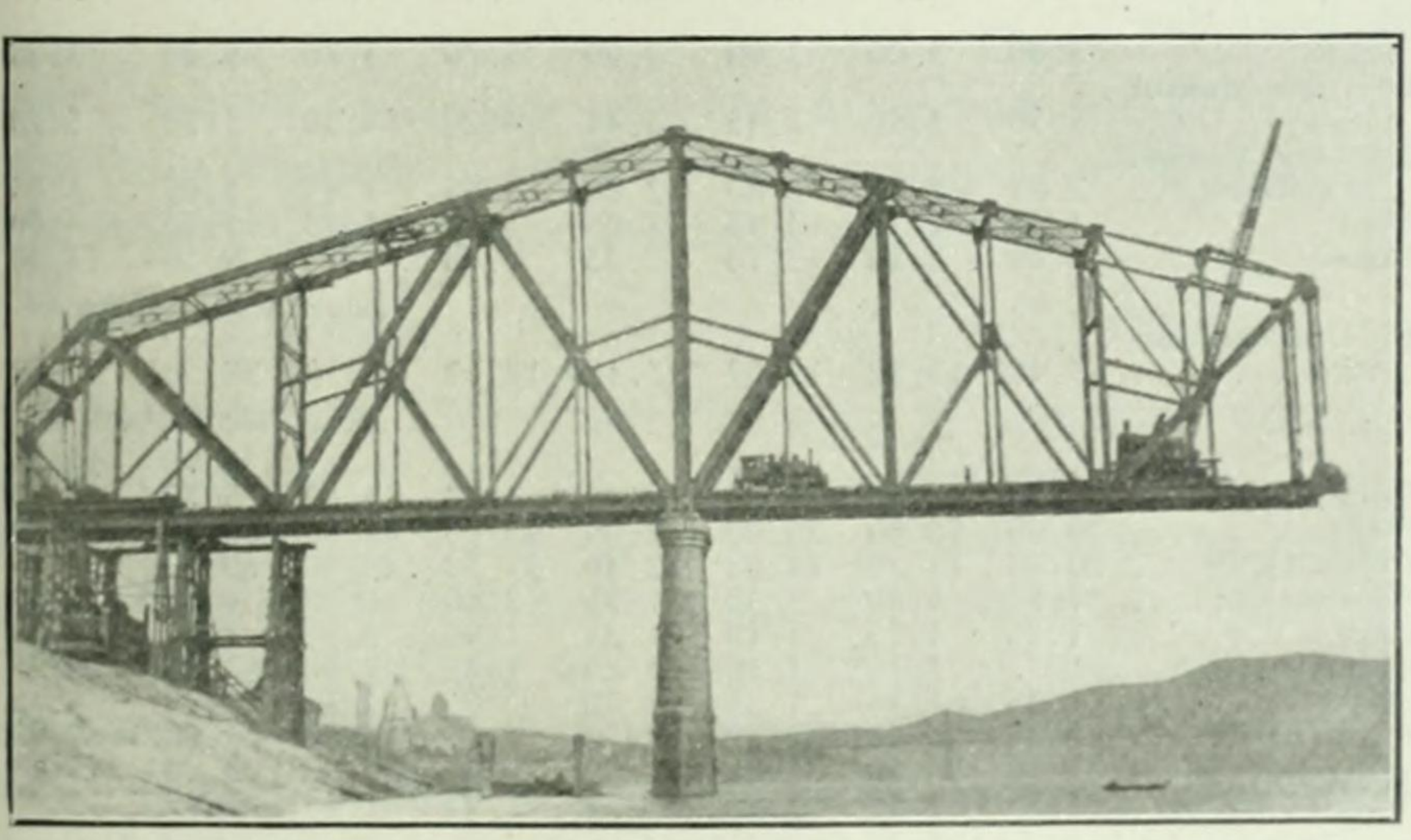

FIG. 3. EYE-BARS U_{14} U_{15} IN FIRST ERECTION POSITION

The design was made with the proposed method of erection in view, and the weights of all members were kept within the capacity of the cranes. While the erection could have been accomplished more rapidly and at less cost if the top chord of the cantilever arm had been a built-up, riveted member, the difference in weight and in shop costs threw the balance in favor of eye-bars. But since erecting with a single boom demands that each member shall be capable of being supported in place at once, so that the crane may cut loose from it and be free to handle the next piece, the designer was careful not only to keep to a minimum the number of members connected by any one pin, but also to make the arrangement of the pin joints such that the members could be set in place and supported before the pin was driven. For this purpose small lug angles were provided where necessary to hold the eye-bars in place.

At some points where two sets of bars come together, it was necessary to drive the pin after the first set of bars was placed, in order to enable the cantilever to carry the crane in the new position it must take before placing the second set. This condition occurred at *U*10, *U*12, *M*11 and *U*14. At *M*11 the two sets of bars were erected with the *M*11 *L*12 bars folded back almost parallel with the *U*10 *M*11 bars, and the pin was driven. After the trusses were sufficiently articulated (see Fig 2) to permit the crane to move forward to the required position for setting the heavy bottom chord *L*10 *L*12, the *M*11 L12 bars were rotated about the pin into their proper position.

A similar method was used at *U*12 and *U*14. In Fig. 3 the *U*14 *U*15 bars may be seen folded back above the

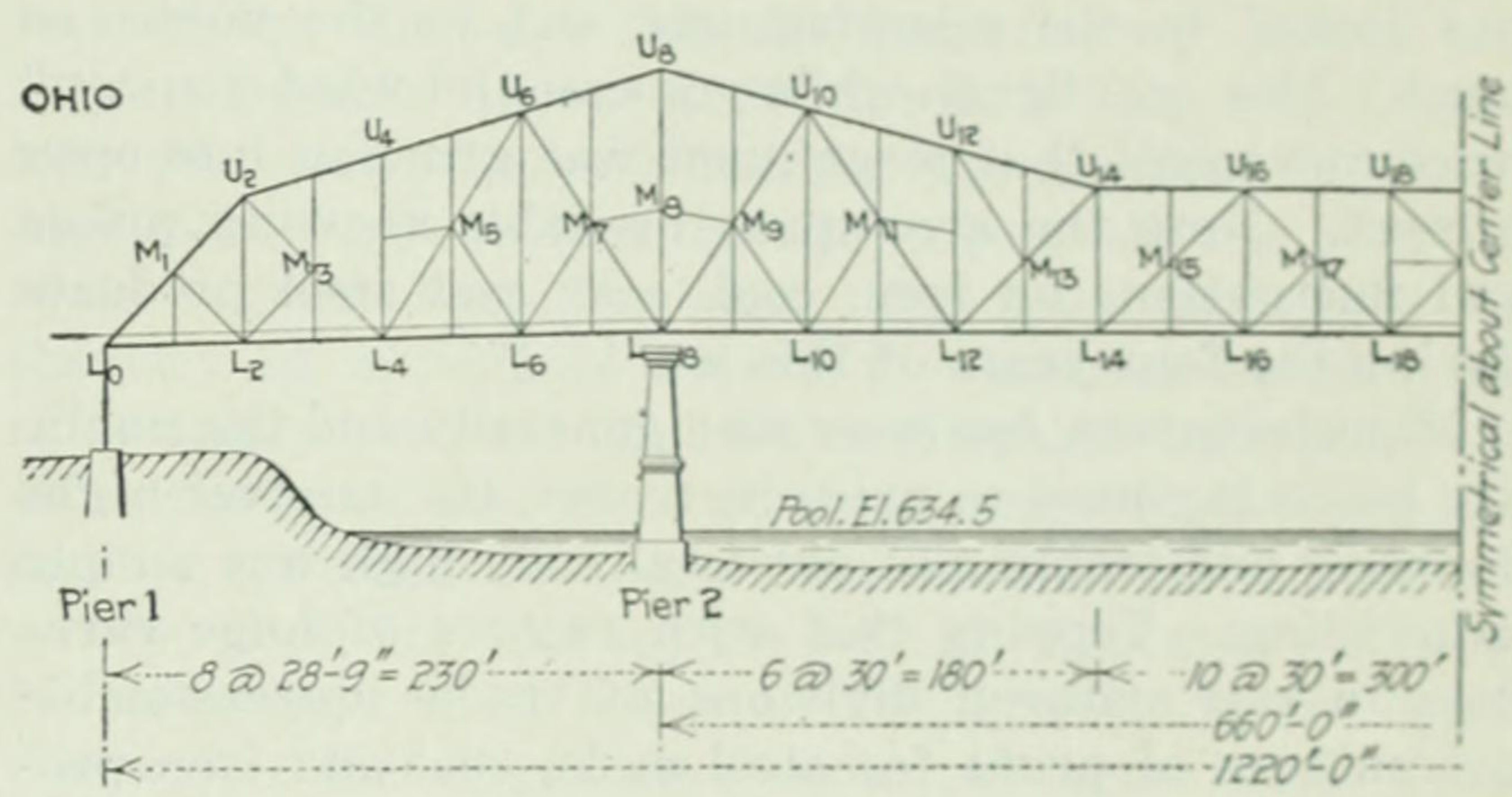

FIG. 4. HALF-ELEVATION OF STEUBENVILLE BRIDGE

*U*13 *U*14 bars. Because of the great height of truss at *U*10 the boom was not long enough to rotate the bars, so at this point separate pins were provided for each set of bars.

Hydraulic Jacks Used for Closure

The use of hydraulic jacks instead of wedges and screws for the final adjustment incidental to swinging the suspended span is also believed to be new, and proved to be quite satisfactory.

The anchor arms were erected on wooden falsework; and owing to the urgent necessity for completion of the bridge as early as possible the erectors were obliged, though at grave risk, to go into the river with their falsework at the worst season of the year. The falsework fortunately withstood three floods, two of which were accompanied by running ice. The erection of the cantilever arm began in the week ended Mar. 3 on the West Virginia end and in the week ended Mar. 24 on the Ohio end. The suspended span was erected as a cantilever from each end in the usual way until swung on May 10.

The bridge was designed, fabricated and erected under the direction of Albert Lucius, consulting engineer. For the American Bridge Co., Richard Khuen is general manager of erection, and James L. deVou is division manager.