A Half Century *of* Chicago Building

A PRACTICAL REFERENCE GUIDE

All Building Laws and Ordinances Brought to Date

Historical, Technical and Statistical Review of the Construction and Material Development of America's Inland Metropolis

John H. Jones & Fred A. Britten.

CHICAGO... 1910

The Bascule Bridge in Chicago

By J. B. STRAUSS, C. E.

CHICAGO is, among other things, a city of bridges. Perhaps nowhere in the United States is there a larger number and variety of bridge structures and there certainly is no single city where these structures play a more important or conspicuous part in the city's every day existence. In Chicago all the main arteries of communication in the city proper, are cut through by the Chicago River and its two branches and in the outlying districts, the Calumet River, the Drainage Canal and its feeders, together with the minor streams and canals, present multiplied opportunities for bridge construction of every kind and degree.

With but few exceptions, Chicago bridges are movable and despite the heavy traffic on both land and water, these movable bridges serve the community so well that the effect of the withdrawal, during the past few years, of the three old tunnels from service has been scarcely, if at all, noticeable. Without attempting to enter into a discussion of the relative merits of tunnels and draw bridges, this experience clearly indicates the sufficiency of the above-surface methods of transit for heavy traffic, and throws some doubt upon the wisdom of general sub-surface transportation.

Up to the years 1893 or 1894 all the movable bridges of Chicago were the ordinary type of draw or swing bridges, the earlier structures being combination wood and iron, and the latter steel. Some of the former are still in service on the South and North branches and a considerable number of the latter are also in use at the principal crossings of the main river. There were also two or three deviations from the draw bridge, such as the folding lift bridges at Weed and Canal Streets over the North Branch and the vertical lift bridge over the South Branch, representing the first halting steps towards the supremacy of Chicago in the practice and use of the modern bascule bridge.

At the present time Chicago is the acknowledged bascule center of the world; it is here that this type of movable bridges has reached its greatest development; with but few exceptions, all the recent designs originated or were recreated or exploited here and almost all the bascule patentees and going bascule bridge companies are located in Chicago. The most successful work in this field has been conceived and executed in Chicago and the largest number of these bridges in any one spot is found within its environs.

The term "bascule" is derived from the French, and specifically means a rocking bridge. It has, however, been extended to cover all types of bridges moving in a vertical plane, and about a center, being thus distinguished from the bridge which is simply hoisted up bodily and which is designated as a lift or hoist bridge. The vertical lift over the South Branch or the Halsted Street bridge already referred to, is an example of the latter. Contrary to general opinion, this particular design is not a novelty in bridge construction, except in that the size of span and height of lift are greater than in other bridges of this type. The lift bridge is not a bascule and is not comparable to the bascule, as is evidenced by the amazing rapidity with which the latter has multiplied since the completion of the Halsted Street bridge in 1893, while the lift bridge still counts but very few structures of any size.

The first of the modern types of bascule bridge in this country was built for the Metropolitan West Side Elevated R. R. near Van Buren Street, Chicago, in 1894. It was designed by William Scherzer, then engineer for the Metropolitan Elevated, and was patterned after a small bridge of the same general type built at Havre, France. A second bridge was built at Van Buren Street in 1895 and a third at North Halsted Street in 1897, both constructed for the City of Chicago. William Scherzer died before the completion of the Metropolitan bridge and this design remained simply the occasional design for special conditions until Albert Scherzer undertook its commercial development under the name of the Scherzer Rolling Lift Bridge Co., but the Van Buren and North Halsted Street bridges are still the only Scherzer bridges used by the municipality of Chicago.

The greatest impulse to the Scherzer bridge and to the bascule bridge in general was given by its adoption by the Sanitary District of Chicago, in

pursuance of a policy adopted in connection with the water flow and calling for the elimination of center pier bridges. In all ten Scherzer bridges, constituting, with the exception of the three above mentioned, the full total in the city of Chicago, were built under the direction of the Sanitary District and subsequently turned over by it to the City of Chicago to be maintained and operated. From its inception and up to 1902 the Scherzer Bridge Co. occupied the field entirely alone and with the impetus given by the Sanitary District, succeeded in introducing its bridges at numerous other points. In 1902, however, the first hint of future competition came in the construction of the Page bridge at Ashland Avenue, also a result of the policy of the Sanitary District, and in 1906 a second Page bridge, this time ordered by the C. & A. R. R., was built for this company over the South Fork of the South Branch of the Chicago River, near Archer Avenue. The Page bridge is unlike the Scherzer, an original design, the particular aim of the inventor being the elimination of the deep pits required in the usual form of the Scherzer highway bridge.

A small bridge designed by William Rall, of Chicago, was built at Delphos, Ohio, in 1901. The right for this type has since been acquired by the Strobel Steel Construction Co., and three bridges have been built by this company for the Pennsylvania, the Baltimore & Ohio and the Lake Shore & Michigan Southern Rys. jointly where their lines parallel each other in the crossing of the East Chicago Canal at Indiana Harbor, a few miles from Chicago. The canal is not in service as yet and the bridges therefore are not operative. The design is a different and distinct type from any of the other Chicago bridges and is a development of a design originated by W. L. Worden, of Milwaukee, in 1895, but never reduced by him to practice.

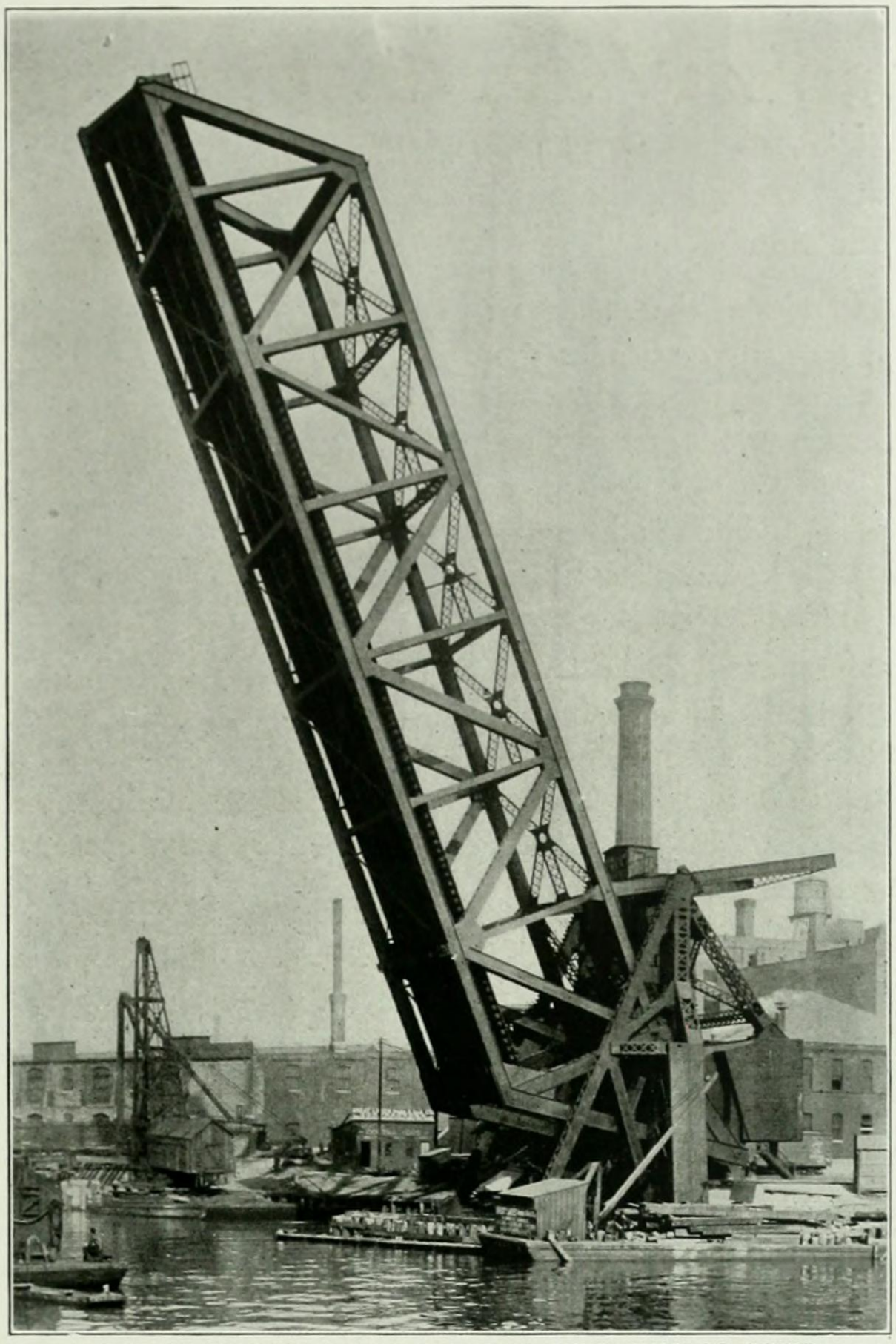
The Chicago design of trunnion bascule bridges first became a reality in the Clybourn Place bridge built in 1902. The design is an adaptation of the standard trunnion bridge of Europe to American practice and Chicago conditions, and so well has the work been done by the Chicago Bridge Department that this type has been adopted, in more or less modified form, by the cities of Milwaukee, Philadelphia and others, as well as by the District of Columbia and by the State of New York in connection with its Barge Canal. About nine bridges of that type in all have been constructed in Chicago to date.

In 1905 the Strauss Trunnion Bascule Bridge, following its successful construction and operation in a half dozen other cities, was adopted by the Chicago & Northwestern R. R. for its crossing of the North Branch of the Chicago River near Kinzie Street.

A second bridge of this type is under construction at Polk Street for the city of Chicago, being the first deviation of the city authorities from the city type of trunnion bridge. The Chicago & Northwestern bridge holds the record for the longest double track single leaf bascule bridge in the world and the most heavily trafficked and frequently operated, but it will be exceeded by the Strauss bridge now under construction for the C. & W. I. R. R. across the Grand Calumet River.

The above five types represent practically all those which have passed beyond the stage of a single initial installation, so that we have here in Chicago examples of every design which has experienced commercial development. And it is in Chicago therefore that the true rating and standing of these types will be determined. The highway bridges whether built by the city or the sanitary district, are all operated and maintained by the city, and the bridge department has put into practice an excellent system of performance and maintenance records, covering the different types, which records are proving of incalculable value, in arriving at an accurate idea of their efficiency.

From these records it has become evident that bascule bridges naturally fall into two groups, namely, those with rolling contacts and those without. The trunnion bridge, which include the City Trunnion and the Strauss Trunnion, belong to the latter group; the remaining three types belong to the rolling contact group. The rolling contact bridges have given evidence of elemental weakness in the tracks and threads which in two or three structures have resulted in fracture, throwing grave doubt upon the suitability of the rolling contact principle for such usage. On the other hand, the trunnion has proven here as it has during a period of fifty years or so in Europe, that it is a highly efficient and absolutely reliable device under all conditions of service and for all limits of size and weight.

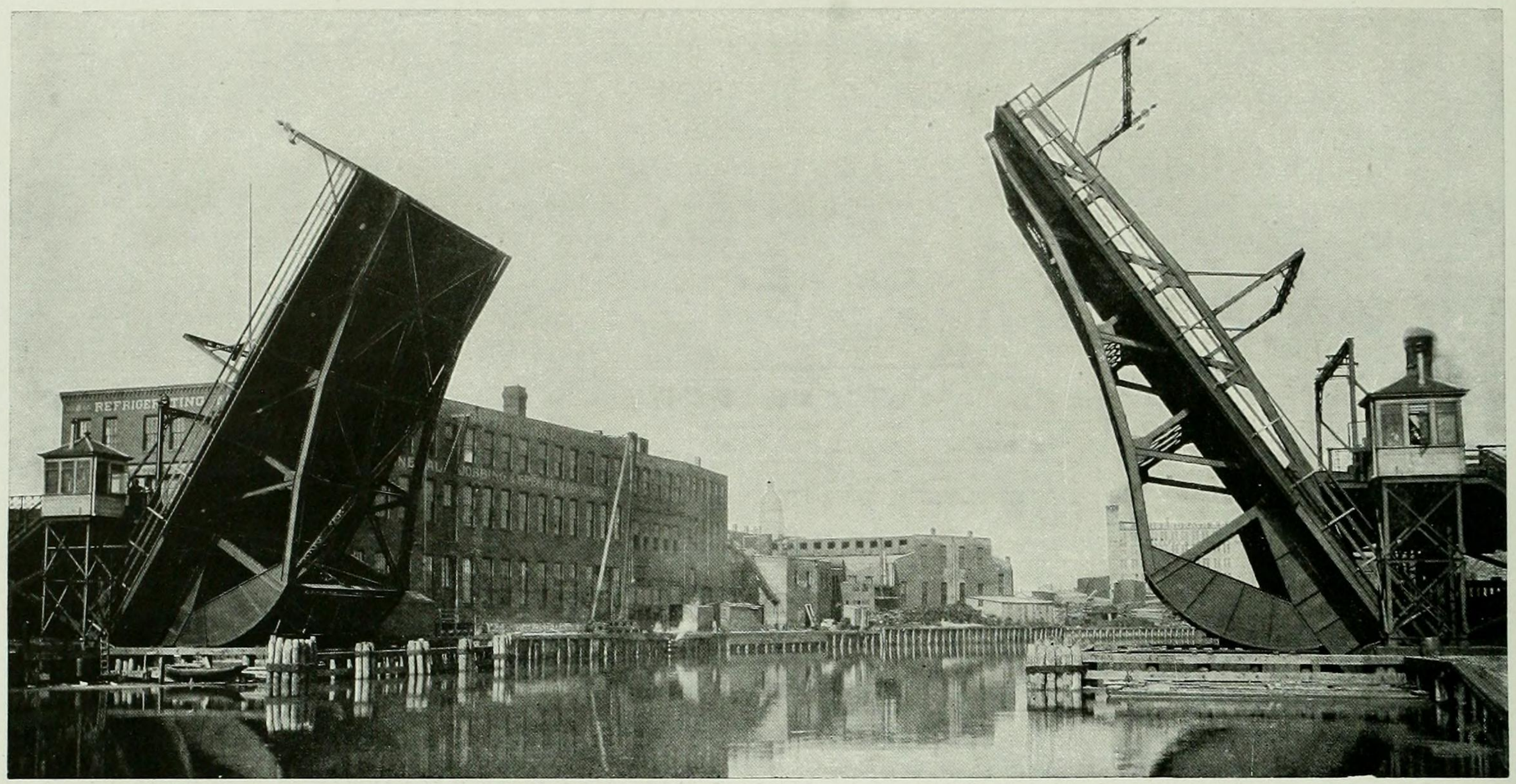


TYPE OF STRAUSS BASCULE BRIDGE OVER CHICAGO RIVER.

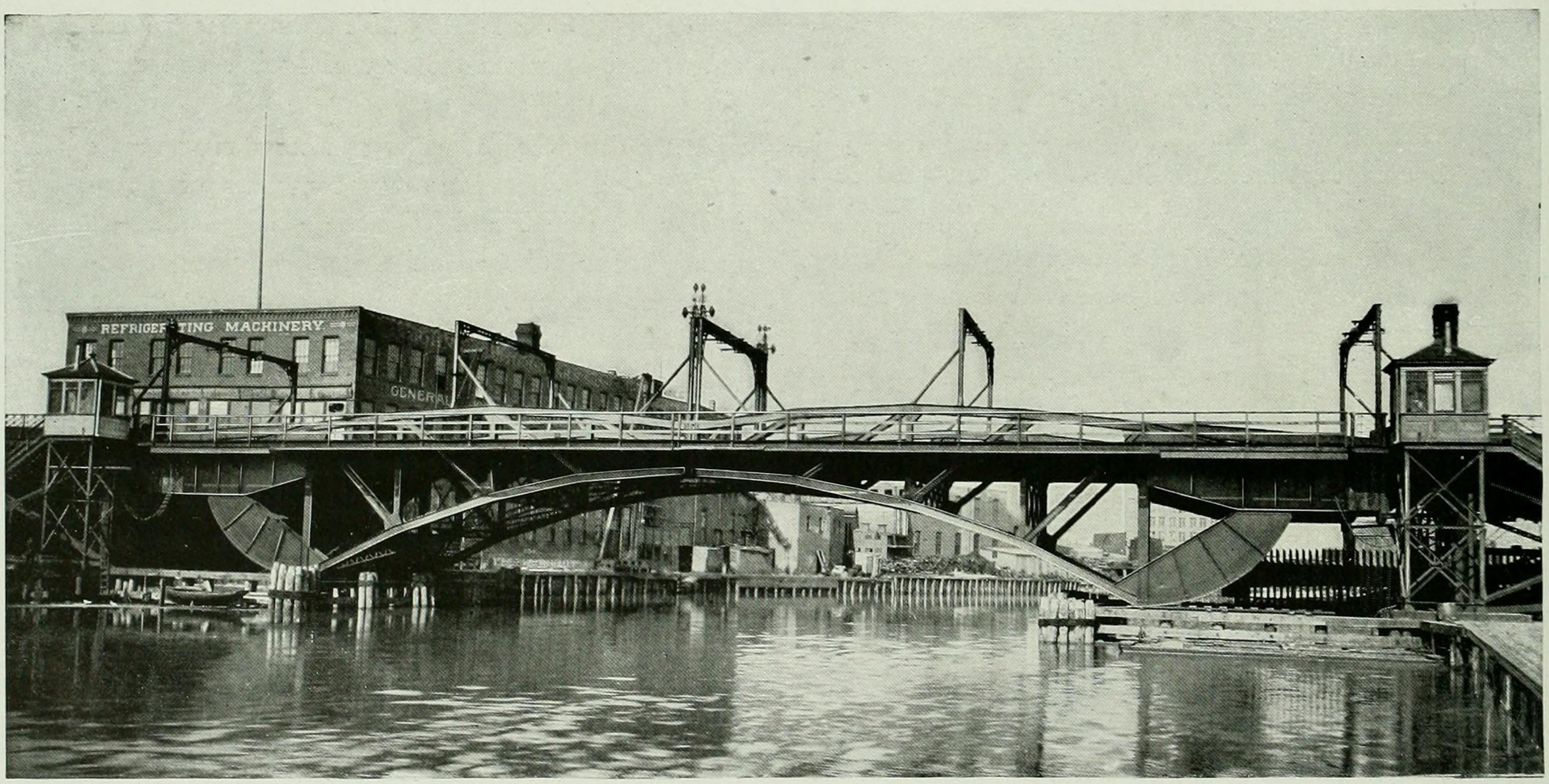
At the present time Chicago faces the necessity for further advance in bascule bridge design in connection with the proposed increase in the clear width of channel in the main river. The existing bascules provide a clear waterway of 140 feet between fender lines, cutting off approximately 60 feet of the river width because of the projecting abutments. The new harbor commissioner appointed by the mayor to improve and develop the harbor and river and which commission is headed by John M. Ewen as harbor engineer, has recommended a clear channel width equal to the full width of the river or approximately 200 feet, and it seems more than likely that the future bascule bridges of Chicago will be required to provide this clear width.

Since the building line in almost all cases extends to the dock, and since the dock will be the new fender line, it becomes rather a knotty problem to develop a design which shall not encroach on either, or interfere with the full utility of the river or the value of abutting property. The present depth of counterweight pit is also close to the maximum limit and it will be necessary for the new design to exceed this limit but little. Last but not least, the cost must not amount much above the cost of the present city standard, all of which means a bascule bridge of still greater efficiency and greater capacity, and it is safe, therefore, to expect still further Chicago contributions to the bridge builder's art in the future than have been given in the past.

What the Chicago engineers have already accomplished is the firm establishment of the bascule, throughout the world, as the most advanced type of movable bridge, and in so doing they have contributed in no small degree to the present remarkable development of our internal waterways.



HIGHWAY AND ELECTRIC RAILWAY SCHERZER ROLLING LIFT BRIDGE ACROSS THE NORTH BRANCH OF THE CHICAGO RIVER AT NORTH HALSTED STREET, CHICAGO.
In a partly opened position.



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HIGHWAY AND ELECTRIC RAILWAY SCHERZER ROLLING LIFT BRIDGE ACROSS THE CHICAGO RIVER AT TWENTY-SECOND STREET, CHICAGO, FOR THE SANITARY DISTRICT OF CHICAGO.
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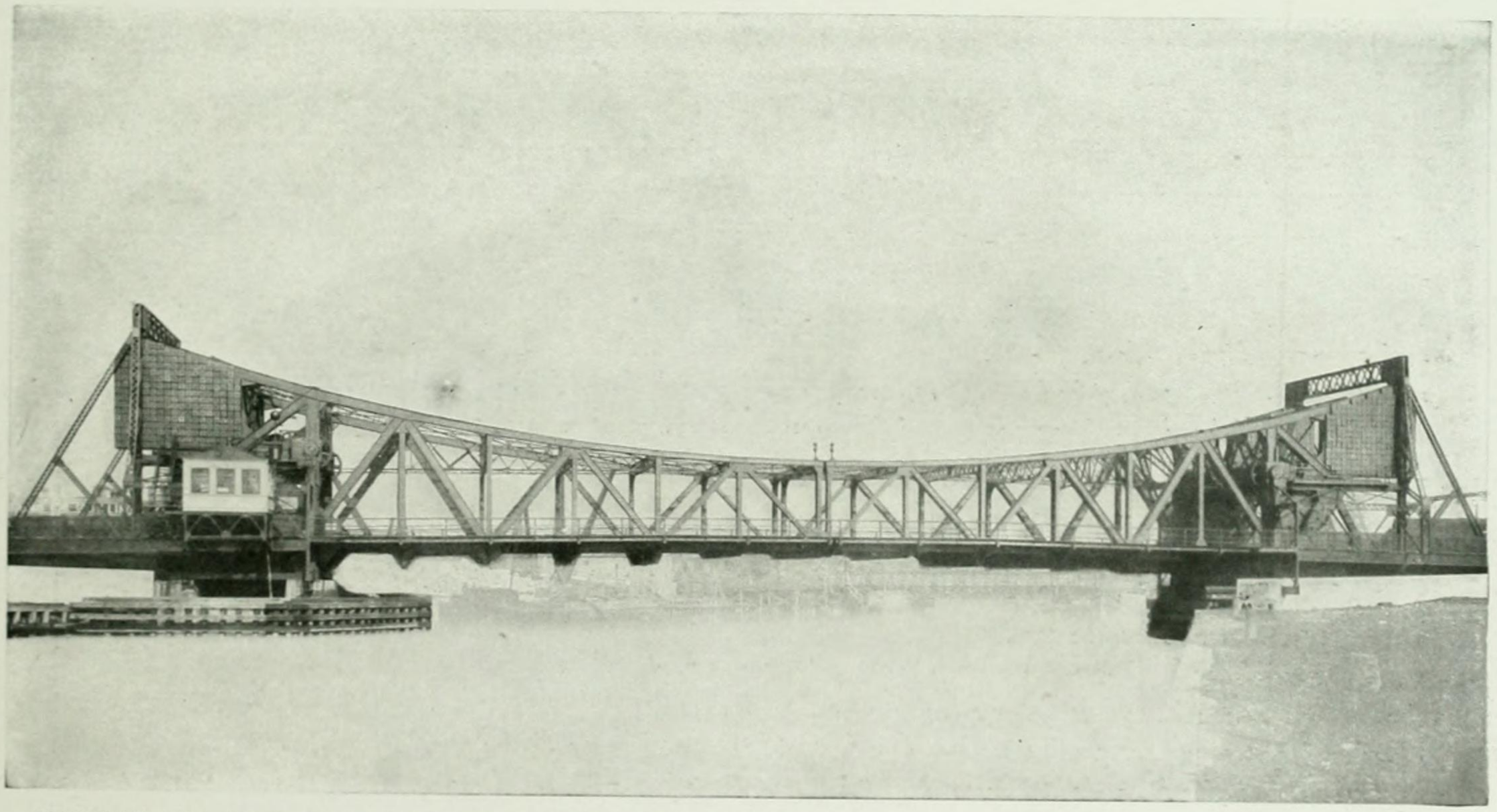

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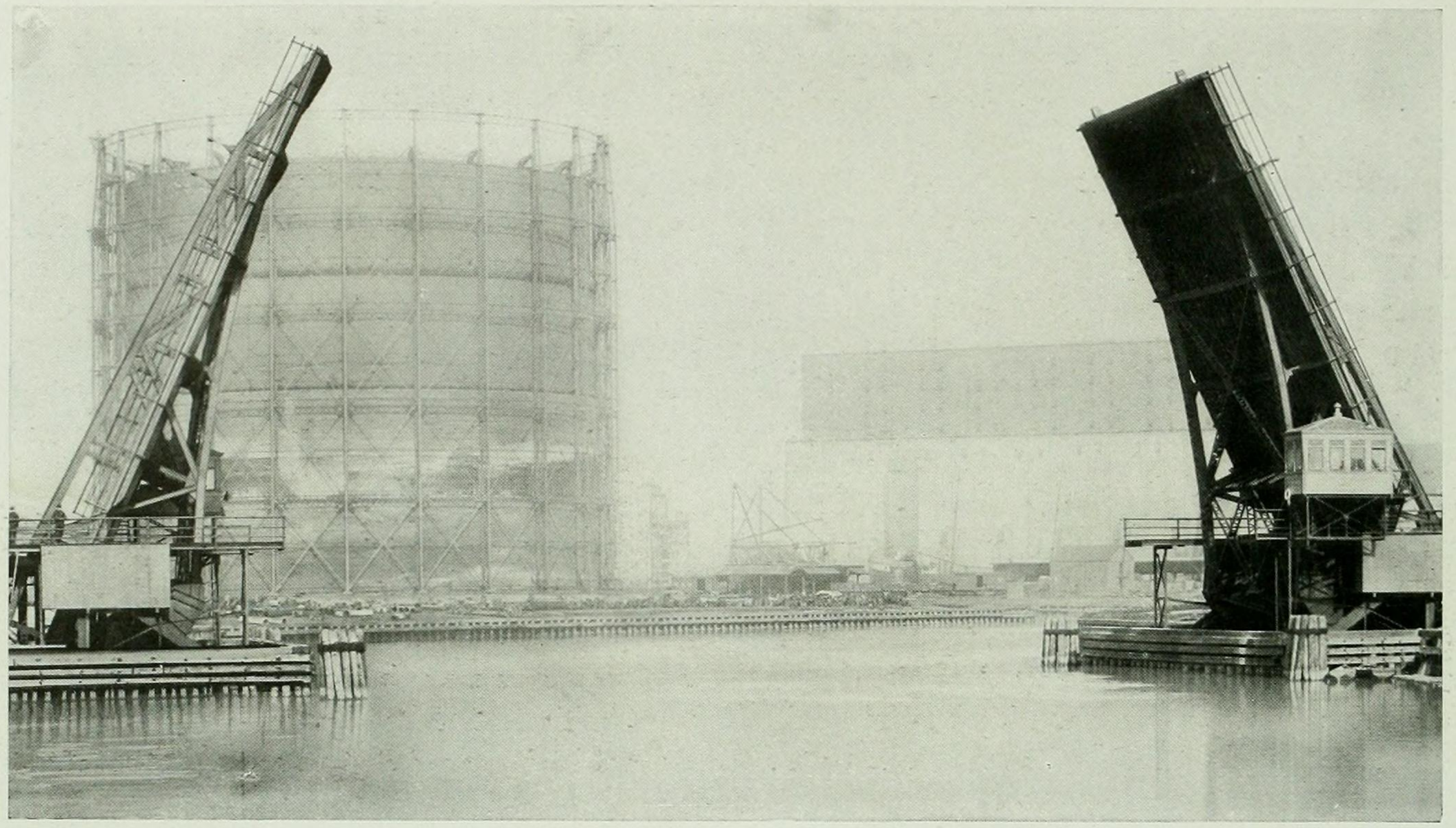

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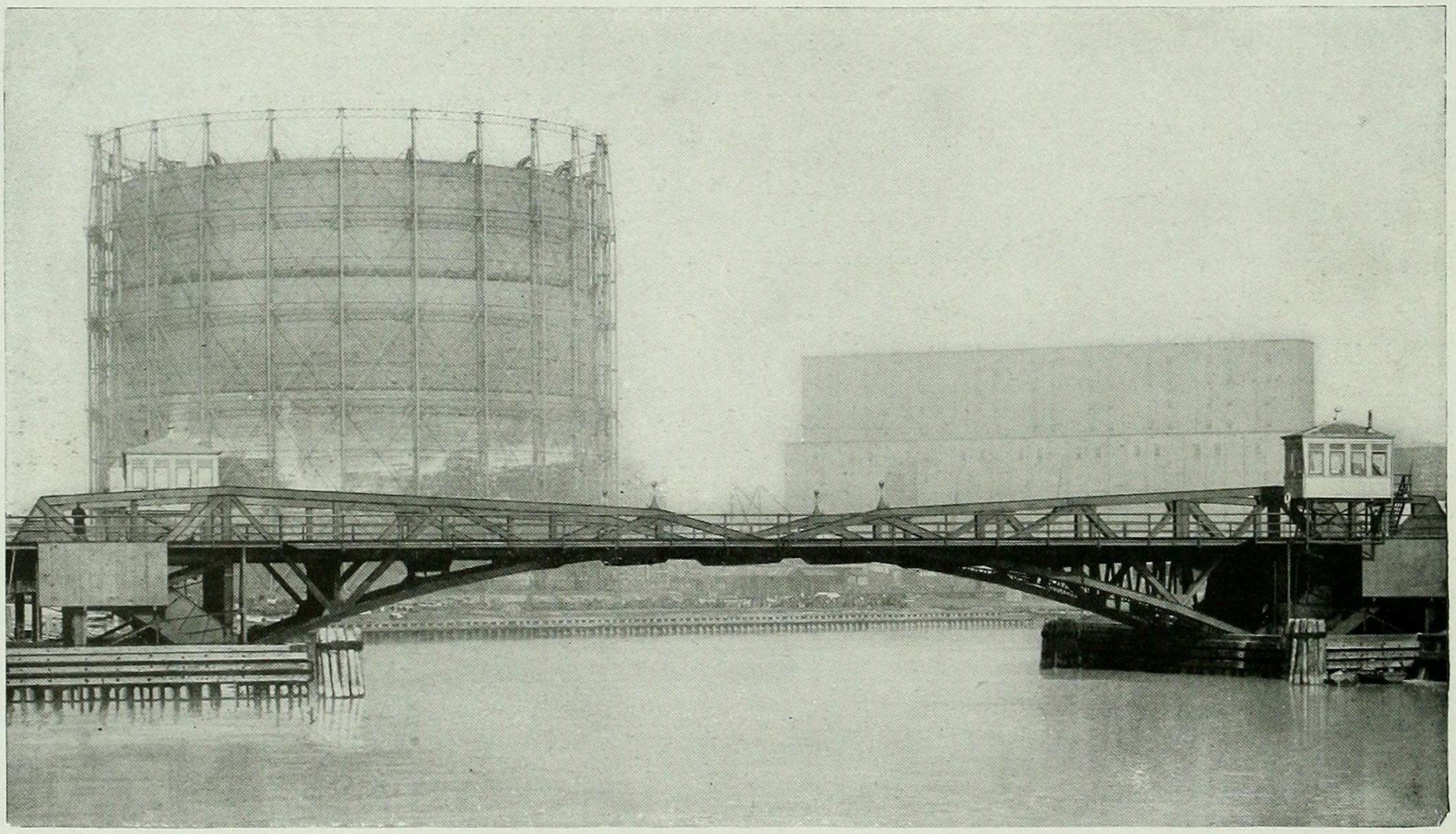

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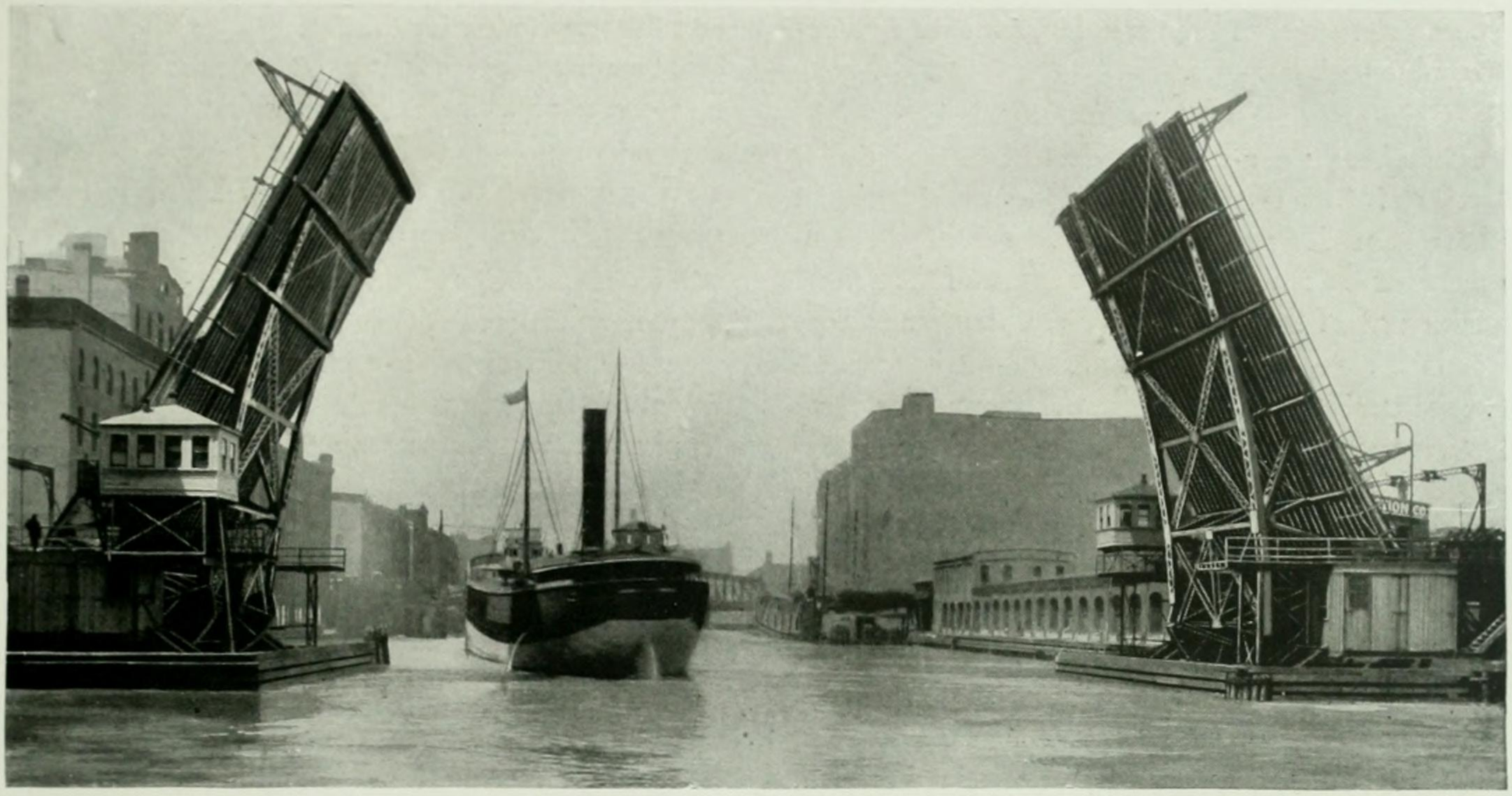
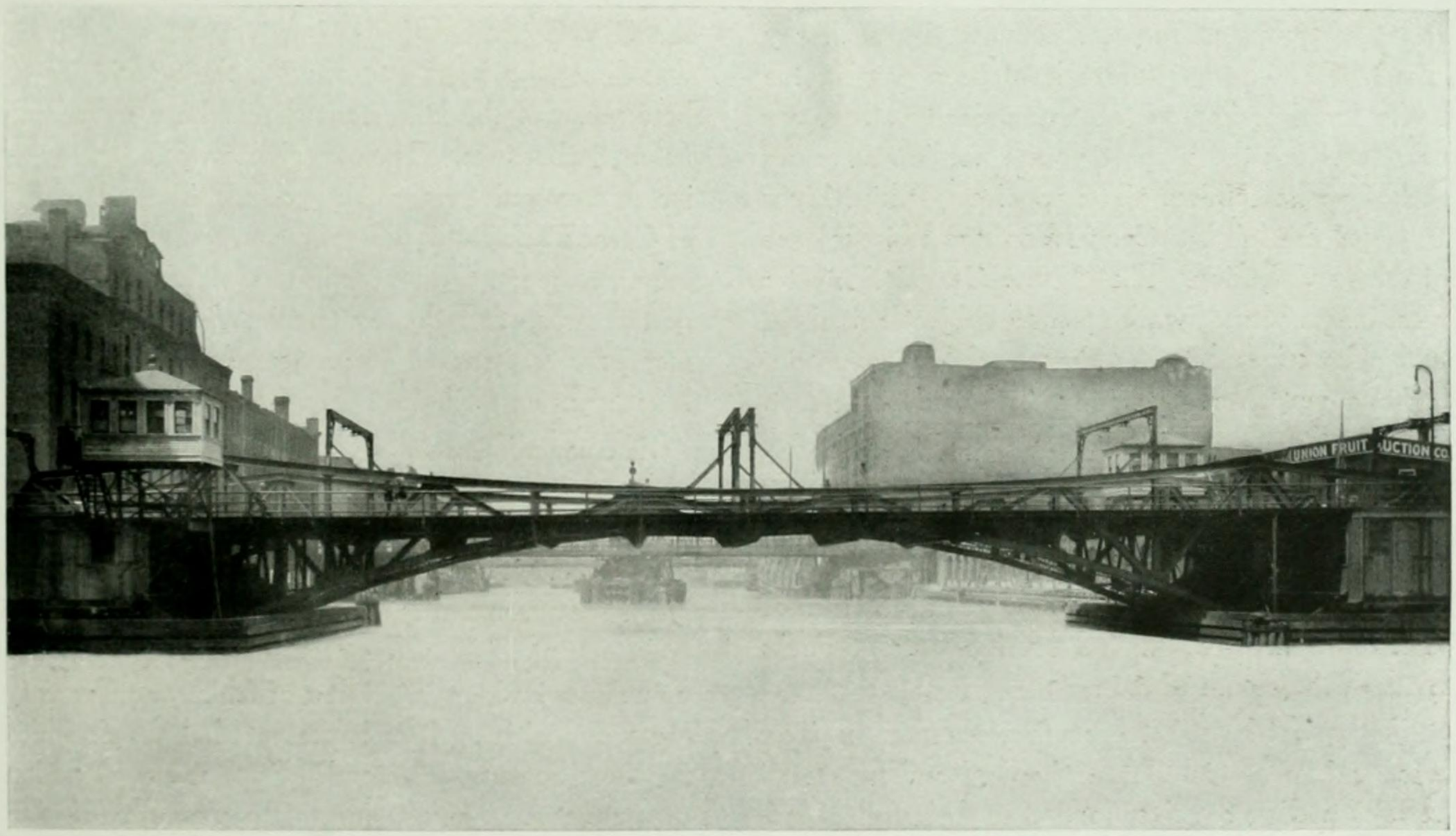


HIGHWAY AND ELECTRIC RAILWAY SCHERZER ROLLING LIFT BRIDGE ACROSS THE CHICAGO RIVER AT STATE STREET, CHICAGO, FOR THE SANITARY DISTRICT OF CHICAGO.

View showing bridge in the open position. This bridge is the first bascule bridge on the route of the Deep Waterway from the Great Lakes to the Gulf of Mexico and Panama Canal.



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