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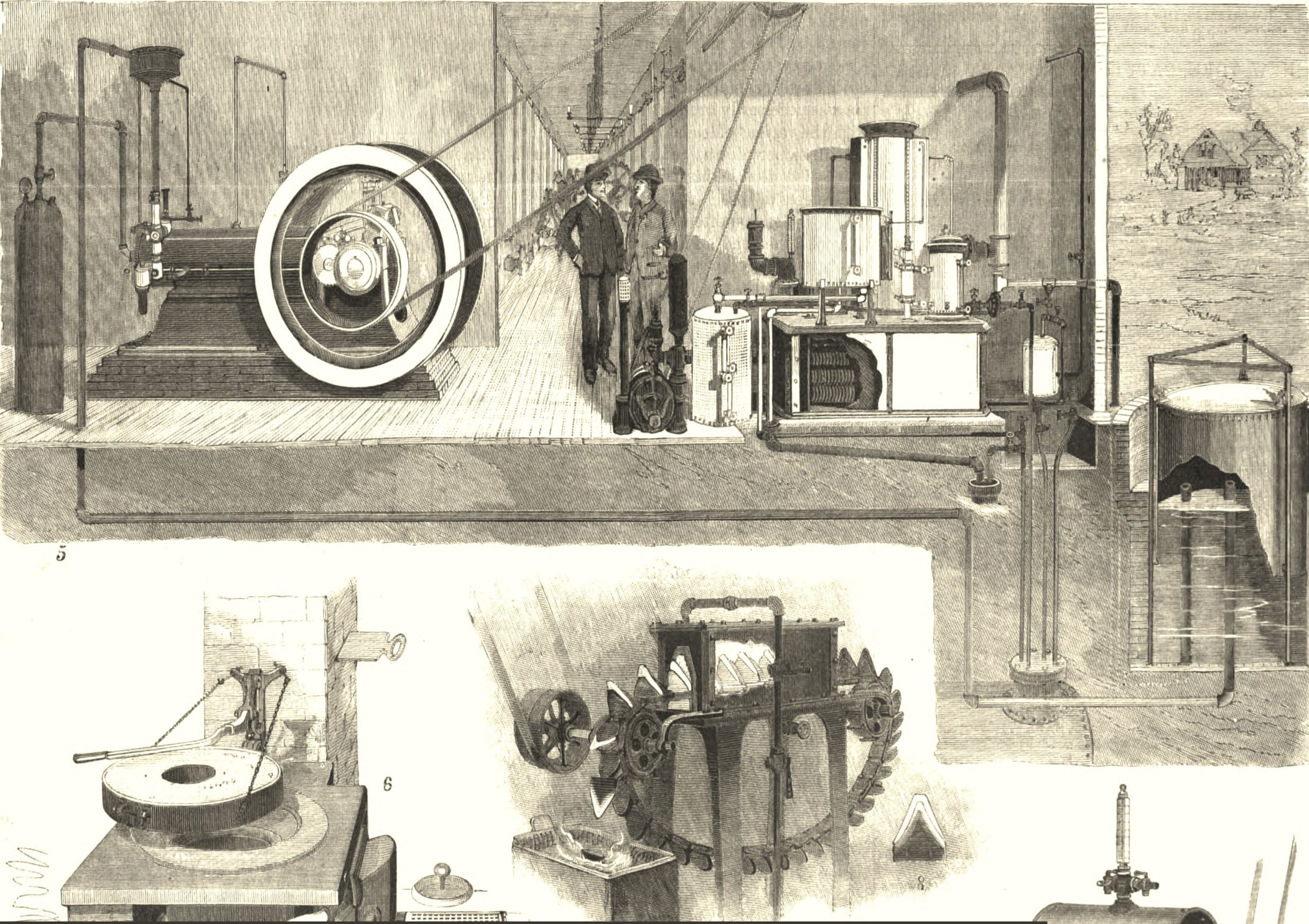
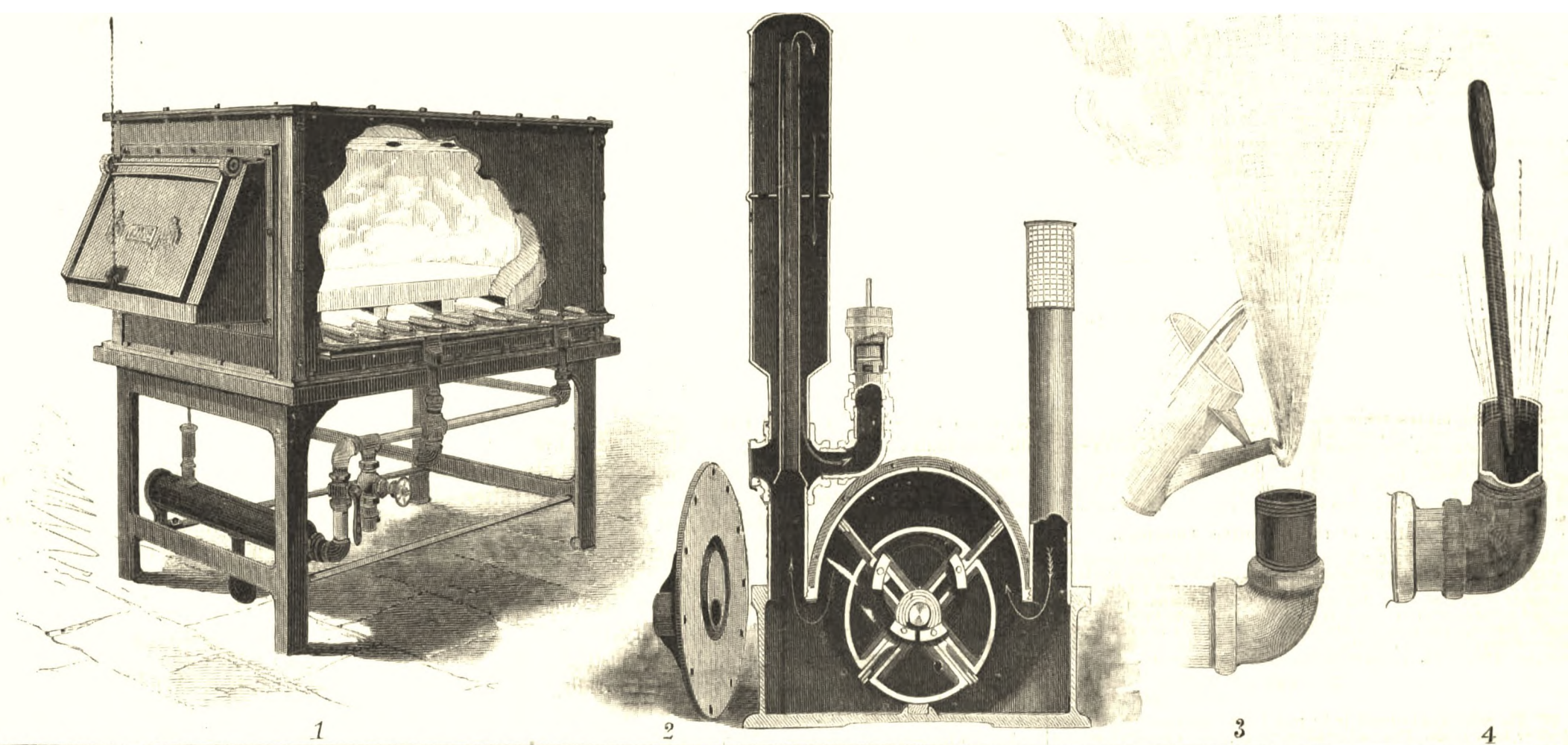
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Scientific American

THE VAN BUREN STREET DRAWBRIDGE OF THE METROPOLITAN WEST SIDE ELEVATED RAILROAD OF CHICAGO.

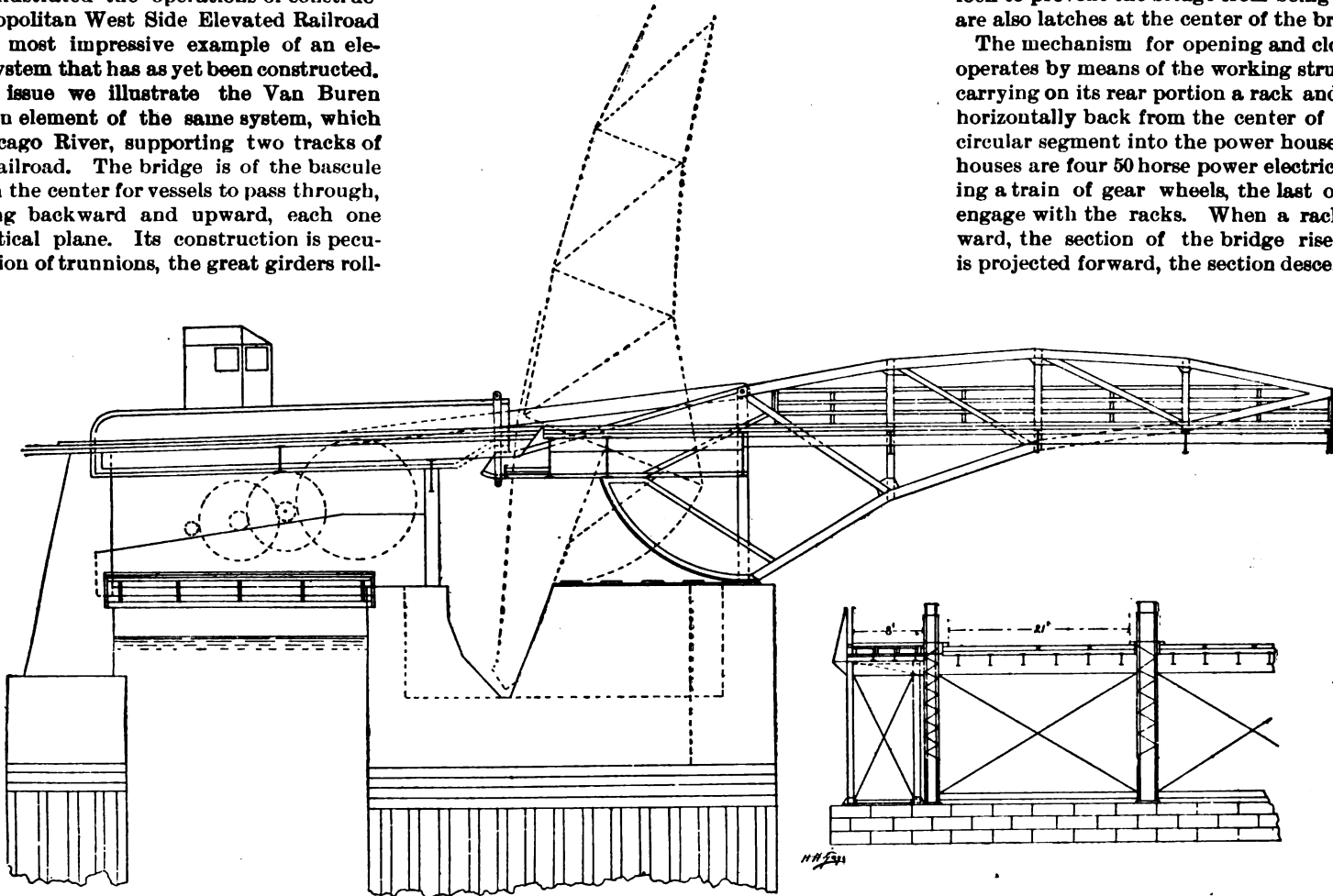
(Continued from SCIENTIFIC AMERICAN of April 27, 1895.)

We recently illustrated the operations of construction of the Metropolitan West Side Elevated Railroad of Chicago, the most impressive example of an elevated railroad system that has as yet been constructed. In our present issue we illustrate the Van Buren Street bridge, an element of the same system, which crosses the Chicago River, supporting two tracks of the Elevated Railroad. The bridge is of the bascule type, opening in the center for vessels to pass through, the trusses rising backward and upward, each one moving in a vertical plane. Its construction is peculiar in the omission of trunnions, the great girders roll-

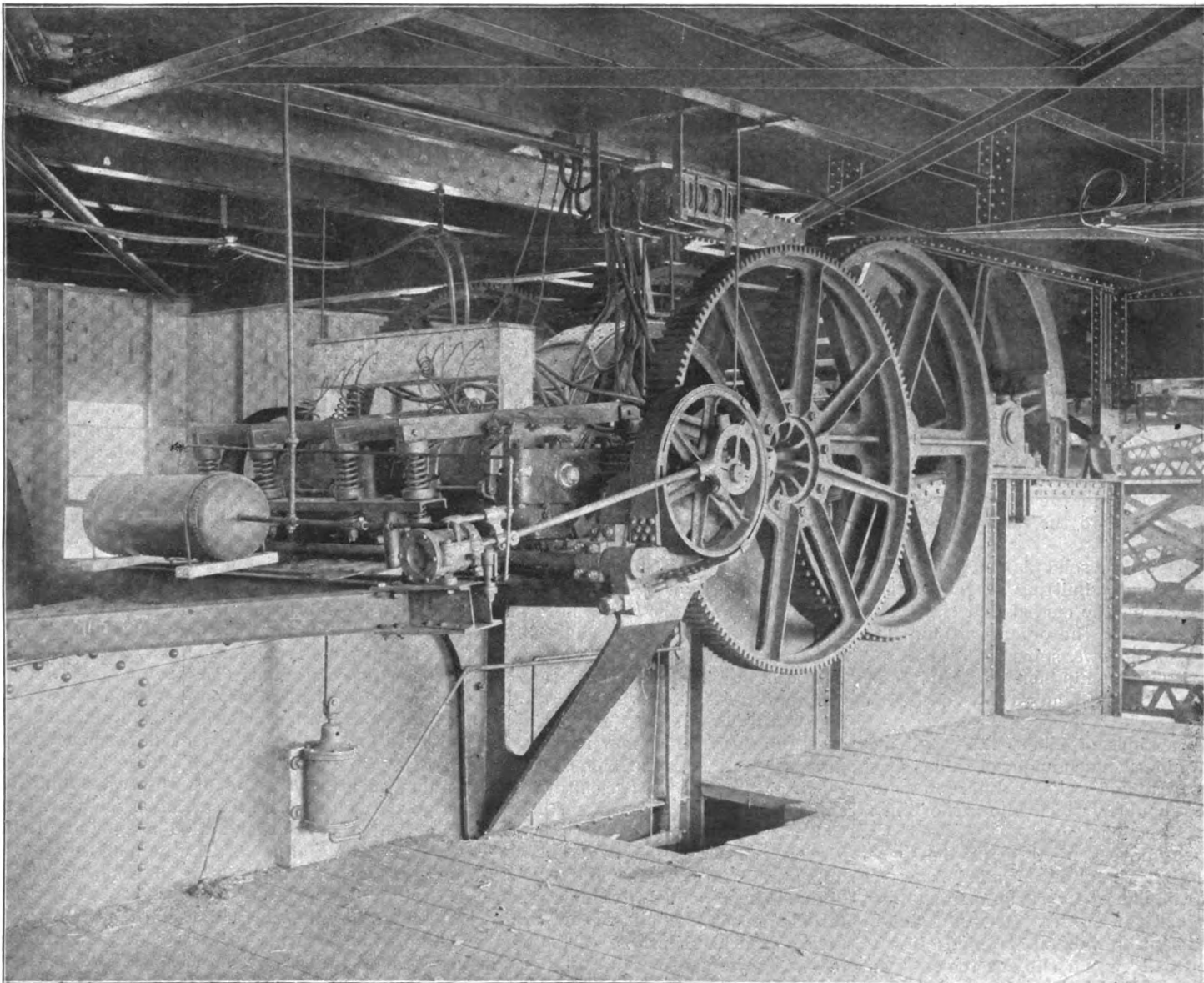
cular segments are struck, and runs back horizontally or nearly so to the machine for opening. In the two diagrams this working strut is indicated by a single line extending from such center back along the fixed roadbed. The cuts also show how part of the deck

operation. On the right hand of the picture is seen the portion of roadway extending back of the center of curvature, which portion goes down when the bridge rises; it is cut off obliquely at its rear end, and a latch or link swings over this end, operating as a lock to prevent the bridge from being opened. There are also latches at the center of the bridge.

The mechanism for opening and closing the bridge operates by means of the working strut. This is a bar carrying on its rear portion a rack and running nearly horizontally back from the center of curvature of the circular segment into the power houses. In the power houses are four 50 horse power electric motors, operating a train of gear wheels, the last of which wheels engage with the racks. When a rack is drawn backward, the section of the bridge rises; when a rack is projected forward, the section descends. Within the



THE VAN BUREN STREET BRIDGE, CHICAGO—DIAGRAM OF CONSTRUCTION.



THE VAN BUREN STREET BRIDGE, CHICAGO—OPENING AND CLOSING MECHANISM.

ing on a segment of a circle, one of which is formed on the backward prolongation of each of them.

On reference to the cut, two small diagrams will be seen illustrating the bridge, open and closed. The rocking operation of the bridge is made clear in these cuts. They indicate two additional features. The working struts, as they are called, by which the bridge is opened and shut, constitute one of these features. One such strut for each half of the bridge is connected to the point representing the center, from which the cir-

carried by the trusses, as they rock backward, descends beneath the level of the fixed decks on either side of the river.

Referring to the general view of the bridge, it will be seen that each section of the bridge comprises three parallel trusses, each with a circular segment. For the circular segments to roll on, there are provided steel ways on which are projections or teeth of steel, which enter pockets in the faces of the segments. This insures alignment of the three trusses in their

backward extension of the roadway just alluded to ballast is placed to bring the center of gravity into proper position. The effect of this is that the bridge naturally rests partly open, and if it is stirred from this position, tends to rock back and forth. The working struts are attached by pin connections to the central trusses; one strut operates each half of the bridge.

Assuming the bridge now to be closed, if it is desired to open it, the machinery is started so as to draw the racks backward. As each rack moves, its first effect is

to revolve a cam by which pin latches at the center of the span are withdrawn and the latches at the heels of the trusses, one of which is shown in the general view of the bridge, are swung backward, leaving the trusses free to move. As the motion continues, the bridge opens, twenty seconds sufficing for the entire operation. In closing, the reverse succession of operations takes place. The pin latches at the center are designed to prevent lateral movement and to insure the ends of the rails abutting in line; the other latches hold the trusses closed. Each truss may be treated as a cantilever, the tail girder representing the anchoring span.

We have referred to the counterpoise weights. They are placed within the tail girders and between them, beneath the railway floor. As these weights are sufficient to prevent the bridge from naturally coming to a horizontal position, in the closing operation force has to be applied to bring the end down. To work each half of the draw span, two of the fifty horse power electric motors are provided, which are wired to operate together or alone. If by any accident the current is cut off, compressed air brakes are automatically applied, which instantly bring the bridge to rest.

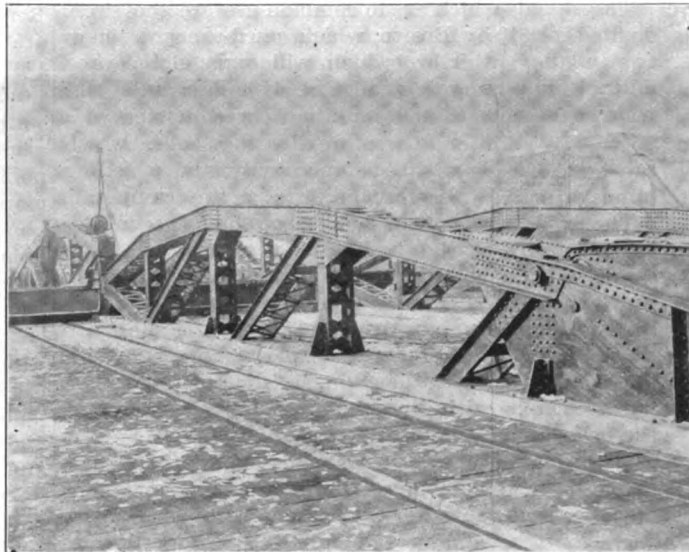
In the closing process, before the ends come together the sections are automatically brought to a full stop, so that the final closing has to be performed with special care. A powerful emergency brake is supplied to guard against accidents, which brake can be made instantly to act upon the structure. It is believed that all these precautions and structural features make an accident impossible. Owing to the height of the bridge, it will have to be raised for comparatively few vessels, as most can freely pass under it.

One of the cuts shows the lifting mechanism placed beneath the roadway, the under surface of the roadway or deck forming the ceiling. The general relation of the trusses to the abutments is shown in the larger diagram, giving a view partly in section of the structure, the open position being indicated by dotted lines. The small illustration gives a view of the deck of the bridge. The distant section in this cut is shown partly raised, a further descent of about three feet being required to complete the closing.

The "Blow Hole," Kiama, N. S. W.

One of the most pleasant as well as famous tourist resorts in New South Wales is situated on the coast

some 70 miles south of Sydney. The center of this district is Kiama, a picturesque and thriving town surrounded by rich agricultural country, and which has been built upon an old igneous flow of basalt that has solidified and crystallized into huge columns of what is popularly called "bluestone." This formation is seen to perfection on the west coast of Scotland and



DECK VIEW OF THE VAN BUREN STREET BRIDGE, CHICAGO.

north of Ireland at St. Fingal's Cave and other places; and those who are acquainted with the rugged appearance of the coast in these places can form a good idea of the appearance of the New South Wales coast at this point. Kiama, unlike other tourist resorts, can be thoroughly enjoyed in either fair or stormy weather, and those who visit the town when a good gale is blowing have an opportunity of witnessing a sight the like of which does not exist elsewhere on our globe. The famous "Blow Hole" here situated, in the middle of a rocky headland running out into the sea, forms a truly wondrous sight. With each successive breaker the ocean spray is sent shooting up into the air sometimes as high as from 300 feet to 400 feet, descending in a drenching shower and accompanied by a rumbling noise as of distant thunder, which can be heard for many miles around.

This "Blow Hole" is a singular natural phenomenon,

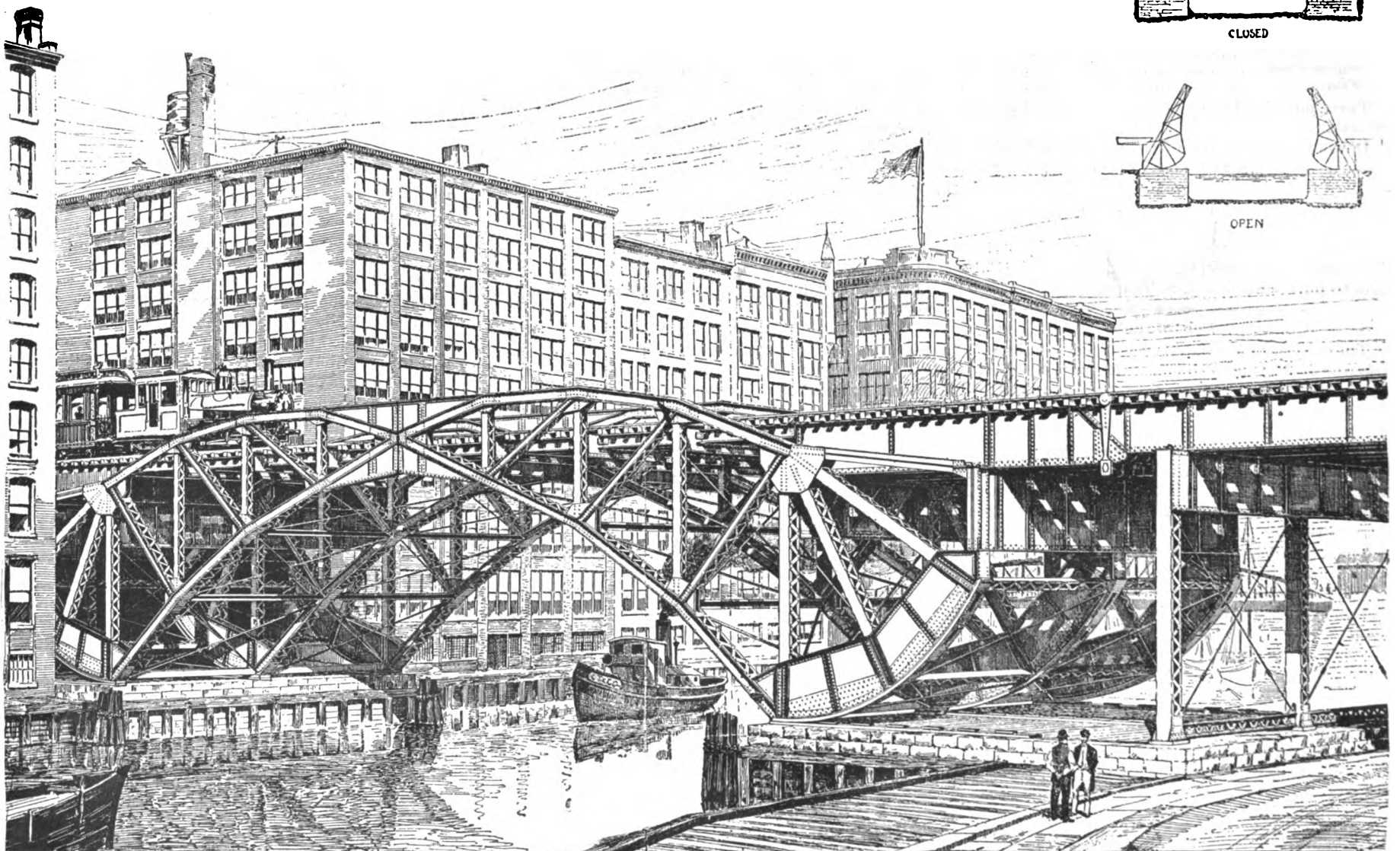
and consists of a perpendicular hole, nearly circular, with a diameter of about 10 yards across, and has the appearance of being the crater of an extinct volcano. This is connected with the ocean by a cave about a hundred yards in length, the seaward opening of which is in all respects similar to St. Fingal's Cave on the west coast of Scotland, the same perpendicular basaltic columns forming the side walls of each. Into this cave towering waves rush during stormy weather, and as the cave extends some distance further into the rock than the "Blow Hole," on the entrance of each wave this cavity becomes full of compressed air, which, when the tension becomes too great, blows the water with stupendous force up the perpendicular opening.—Aust. Photo. Jour.

The Palais de l'Elysée, Paris.

The Elysée Palace, where the President of the French republic lives, was built in 1718 by a banker. In 1748 Madam de Pompadour purchased it, and in 1768 Louis XV bought it from her heirs; later, he sold it to the financier Meaujou, the only proprietor that died in it. Louis XVI bought it for \$260,000 and gave it to the Duchess of Bourbon, who, in 1790, presented it to the French nation. In 1808 Murat acquired it and gave it to Napoleon I, who was very fond of the garden. In 1814 Emperor Alexander I, of Russia, resided here. Then the Duke of Berry, the Dauphin, lived in it, and, after his death, the baby Duke of Bordeaux. In 1848 it was assigned to Louis Napoleon. Since 1873 Presidents McMahon, Grevy, Carnot, and Casimir-Perier have dwelt in it. Now M. Faure is the master.—Cincinnati Commercial-Gazette.

RAW silk waste machine wipers, instead of the cotton waste wipers heretofore almost universally used, are said to be entirely free from danger by spontaneous combustion, and this one fact should be sufficient to highly commend them to all who have charge of running machinery. These wipers are manufactured by the American Silk Manufacturing Company, of Philadelphia, and their cost in use is lessened, where used in considerable quantity, by means of a special washing compound, enabling the washers to be employed over again as many as eight to twelve times. These wipers are also said to more thoroughly clean the machinery on which they are used, leaving no small detached fibers or shreds on parts wiped.

DIAGRAMS of BRIDGE



THE VAN BUREN STREET BRIDGE CHICAGO—GENERAL VIEW.