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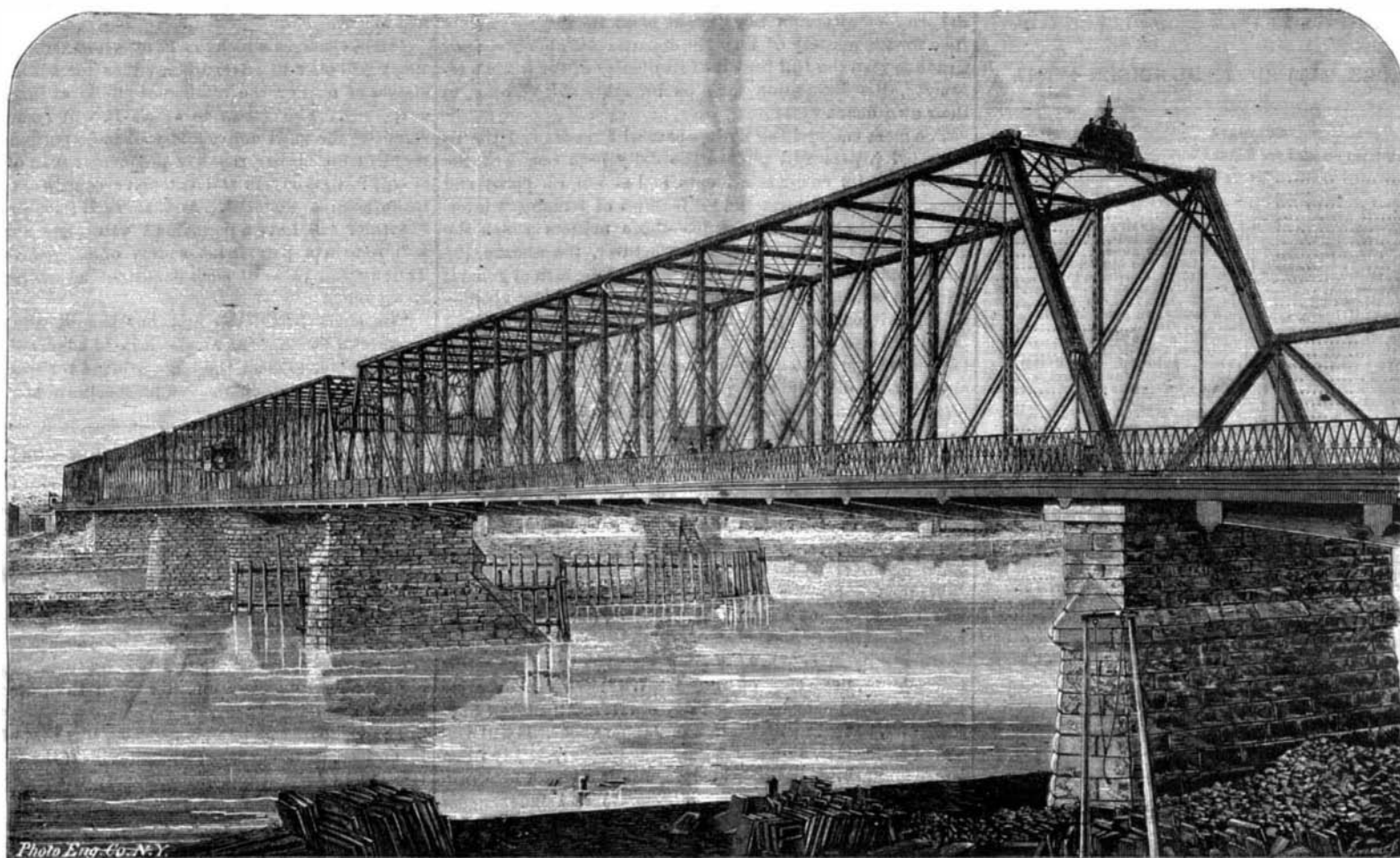
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## THE HUDSON RIVER BRIDGE AT TROY, N. Y.

We herewith give an illustration of the bridge which crosses the Hudson and connects Troy with West Troy. It was designed by Mr. Alfred P. Boller, and is the largest highway bridge ever built in this land of great bridges, excepting the truly magnificent Girard avenue bridge, by Clarke, Reeves, & Co., at Philadelphia. The bridge consists of (measurements from center of piers): 2 spans, 244 feet,

Pittsburgh *Evening Chronicle*, is "the greatest mechanical curiosity we have ever examined, inasmuch as we are utterly unable to conceive, much less comprehend, the means employed to produce the extraordinary results attained in a brief space of time. This is dubbed the Hydro-Pneumatic Puzzle, and was originally designed for the Centennial, where it will excite a degree of attention such as is seldom accorded to mechanical contrivances. This puzzle is constructed wholly

recently it weighs seventy pounds, perhaps less. A water gage and an air gage are attached. When the pressure derived from the city reservoir is employed (about 45 lbs. to the inch) the vapor or air gage, in a very few minutes succeeding, indicates rapidly 500, 1,000, and finally 5,000 lbs. to the square inch! Now, the conundrum we submit to the mechanic is: How is the result brought about? There is absolutely no movement in the pneumatic puzzle perceptible to human



## BRIDGE OVER THE HUDSON AT TROY, N. Y.

488 feet; 1 span, 226 feet; 1 pivot draw, 258; 1 span, 85; 1 span, 65; total, 1,122: not including the masonry approaches at either end, bringing the grade up to 34 feet above ordinary water mark. All the masonry was designed and its execution superintended by the engineer, Colonel G. Haward Ellers, and is thoroughly first-class rock-faced ashlar work. The piers are all founded on a grillage supported on piles cut off at the river bottom, about 10 feet below ordinary stages of water.

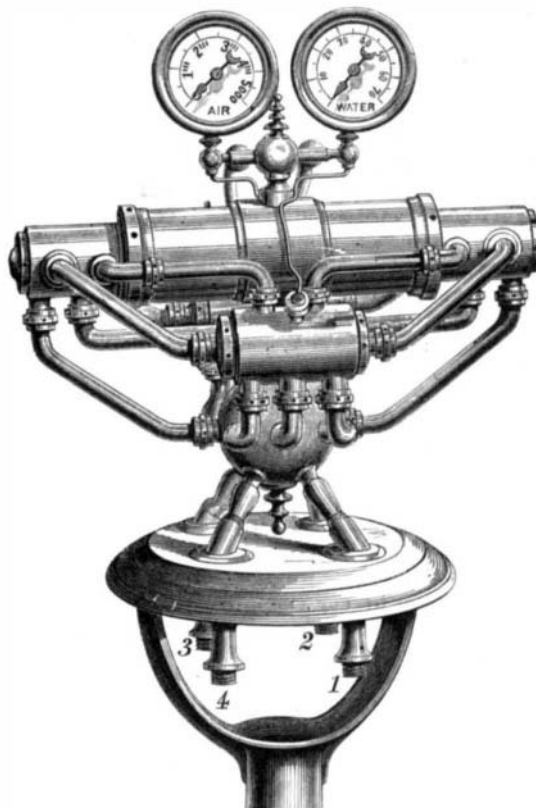
The flooring of the superstructure is 37 feet wide, of which 24 feet is taken up by the double roadway. The trusses are placed 25 feet 9 inches between centers, and are so designed as to have all constructive details of wrought iron. All parts are accessible for painting and inspection, and have machine joints and pin connections, thus embodying the best features of the riveted and pin connection systems.

The draw span is proportioned on the theory of a continuous girder supported at center when closed, modified by the always existing open draw strains. The pivot on which the draw swings is a Parry anti-friction pivot, made by Sellers and Co., Philadelphia. All the weight is carried to the center by means of a system of horizontal radial struts and diagonal ties, pulling against a double web wrought iron drum 3 feet deep. Although weighing some 250 tons, one man on a still day can handle this draw of 258 feet in length with perfect ease. The ends are supported by means of folding wedges, operated by line shafting of gas pipe, each way from center of bridge. The rolling load for which the whole structure has been proportioned is 2,500 lbs. per lineal foot.

### The Tradesmen's Industrial Institute.—Keely Out-Keelled.

The first exposition of the Tradesmen's Industrial Institute of Pittsburgh, Pa., from October 7 to November 6, was a pronounced success, and will doubtless be regularly held hereafter. The display of industrial works and specimens was very fine. The brass work and steam and mechanical instruments of Bailey, Farrell & Co., were especially excellent; and there was one exhibit by this firm which, says the

of brass, is composed of a small cylinder, supported by and connected with a series of tubes, scarcely more than an inch in diameter, placed at regular intervals, similar in curvature, and all describing and reproducing Hogarth's line of beauty



THE HYDRO-PNEUMATIC PUZZLE.

is in outline. The cylinder is sixteen inches long, the apparatus is fifteen inches high, and about twelve in width. Appa-

eye. The mystery is concealed in the cylinder and tubes. It would be as easy to run the pressure up to 10,000. We observed this water or vapor devil a moment, and were inclined to call for Keely, when it occurred to us that it out-Keelied Keely.

"Next to this really remarkable mechanical device, we think the specimen of Knowles' pump near by is the most attractive article. What with the silver plating, the perfect fitting, and the thoroughness and degree of finish displayed, it is the most noteworthy piece of complete mechanism in the exposition."

Since the above was put in type, the manufacturers above mentioned have sent us a photograph of the curious "puzzle," which we have engraved.

In their letter to us, Messrs. Bailey, Farrell & Co. say: "The machine carries a 'cold vapor' gage marked up to 5,000 lbs., and a gage to register the water pressure applied and marked up to 70 lbs. The pipe, 1, is the inlet for water pressure from the city main; 4 is the water outlet or waste; 2 is the inlet for air; 3 is the outlet for air or 'cold vapor,' if you see fit to call it that. Having the Keely motor contrivance fresh in our minds, we prefer to make no statement in regard to the machine whatever, and we put it on exhibition as the 'What Is It?' or 'The Hydro-Pneumatic Puzzle.' Let those who can make it out. It was made for and will be exhibited at the Centennial. When we make public the workings of the machine we will write you. It is on public exhibition, not running for 60 seconds, but right along. We prefer not to solve our own puzzle."

We are sorry that our Pittsburgh friends should, like the Keely people, decline to explain how the trick is done. But perhaps the mind's eye of some of our ingenious readers, with the data given, can penetrate the brass cylinders, ascertain the interior construction, sketch, and send it to the SCIENTIFIC AMERICAN.

J. P. N. says: "I would state that the experience in New York State, with a class of water wheels which carry an immense load upon the stepping, indicates that the sycamore is incomparably the best wood for bearings."