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MODERN SUSPENSION BRIDGES.

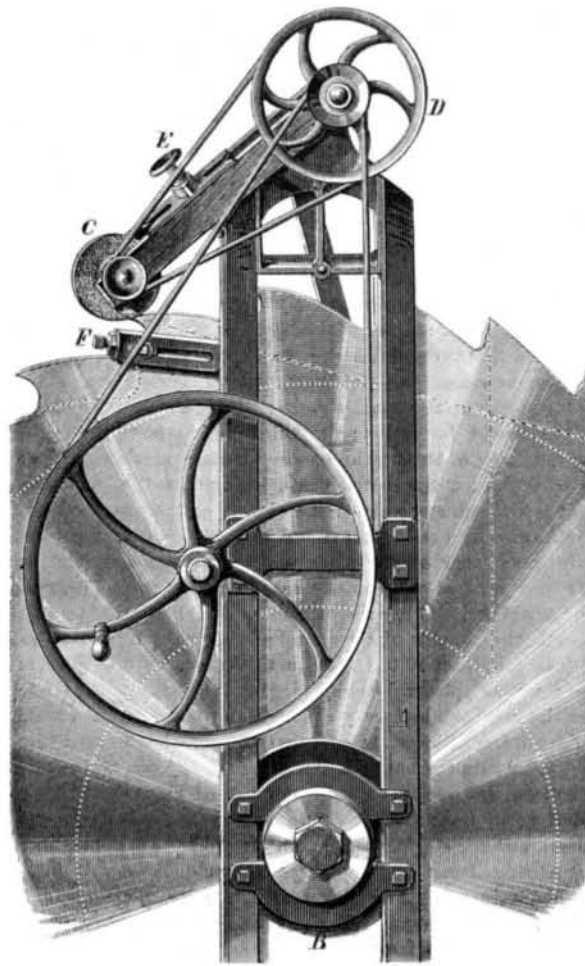
At Kiev, one of the most ancient towns in European Russia, and for centuries the recognized capital of the whole empire, is one of the most graceful and solid bridges ever erected. The roadway is perfectly level, being suspended from catenary chains of great strength which hang between the piers, of which latter there are five. Although the dimensions of these spans have been far exceeded in many bridges in the country, it will be admitted that the architect of the Kiev bridge has united, to a form of construction exceedingly difficult to treat with any artistic effect, a picturesque and imposing appearance.

Although we are accustomed to consider the suspension bridge as one of the triumphs of modern engineering skill, it is really one of the oldest forms of bridge construction in existence. In the year A.D. 65, Ming, the Emperor of China, built one in the province of Yun-nan; it was 330 feet long, and the road bed was laid directly on chains suspended across the river and drawn comparatively taut. In the time of the Incas of Peru, suspension bridges across the defiles of the Andes were made of ropes of the bark of trees; a roadway was in some places constructed, and in others a basket was drawn to and fro. The latter plan is in use in that country in this day. The iron suspension bridge was not brought into use till the year 1819, the first being the bridge at Berwick-on-Tweed, England. The roadway was hung to 12 cables, and the span was 449 feet, a considerable distance for a first attempt. Telford's bridge over the Menai Strait has a span of 580 feet. The Conway bridge by the same engineer, 327 feet, and Tierney Clark's bridge over the Thames at Hammersmith, London, 422 feet, were considered marvels of engineering in their day; but the wire bridge at Fribourg, Switzerland, with a span of 870 feet, eclipsed all previous achievements. But of late years, suspension bridges have been numerous constructed, and we have ceased to marvel at the dimensions they assume. The Cincinnati bridge has a clear span of 1,057 feet; and the most remarkable of all the suspension bridges yet designed, the New York and Brooklyn, is to have a span of 1,595 feet, the whole bridge being 3,475 feet long.

It must be considered that the bridges of the future, for long spans, will be constructed on the suspension plan. The great superiority of the iron and steel of the present day, and the improved facilities for turning out large masses of these metals, make it impossible to limit the capability of bridge constructors to defy the difficulties which Nature has placed in their way; and every year shows us fresh achievements in the art of engineering the way over crevasse, canons, and defiles.

J. AND J. A. CROOK'S SAW SHARPENER.

The annexed illustration represents a new saw sharpener consisting of emery wheels adapted for dressing both sides



of the teeth and gumming the saw. It is claimed that by the use of the device the saw is kept perfectly circular, and the teeth equidistant and of similar shape. The saw, it is further stated, will last longer, since no more metal is used than is necessary (see dotted lines in the engraving). The employment of files is obviated, the teeth are cut square

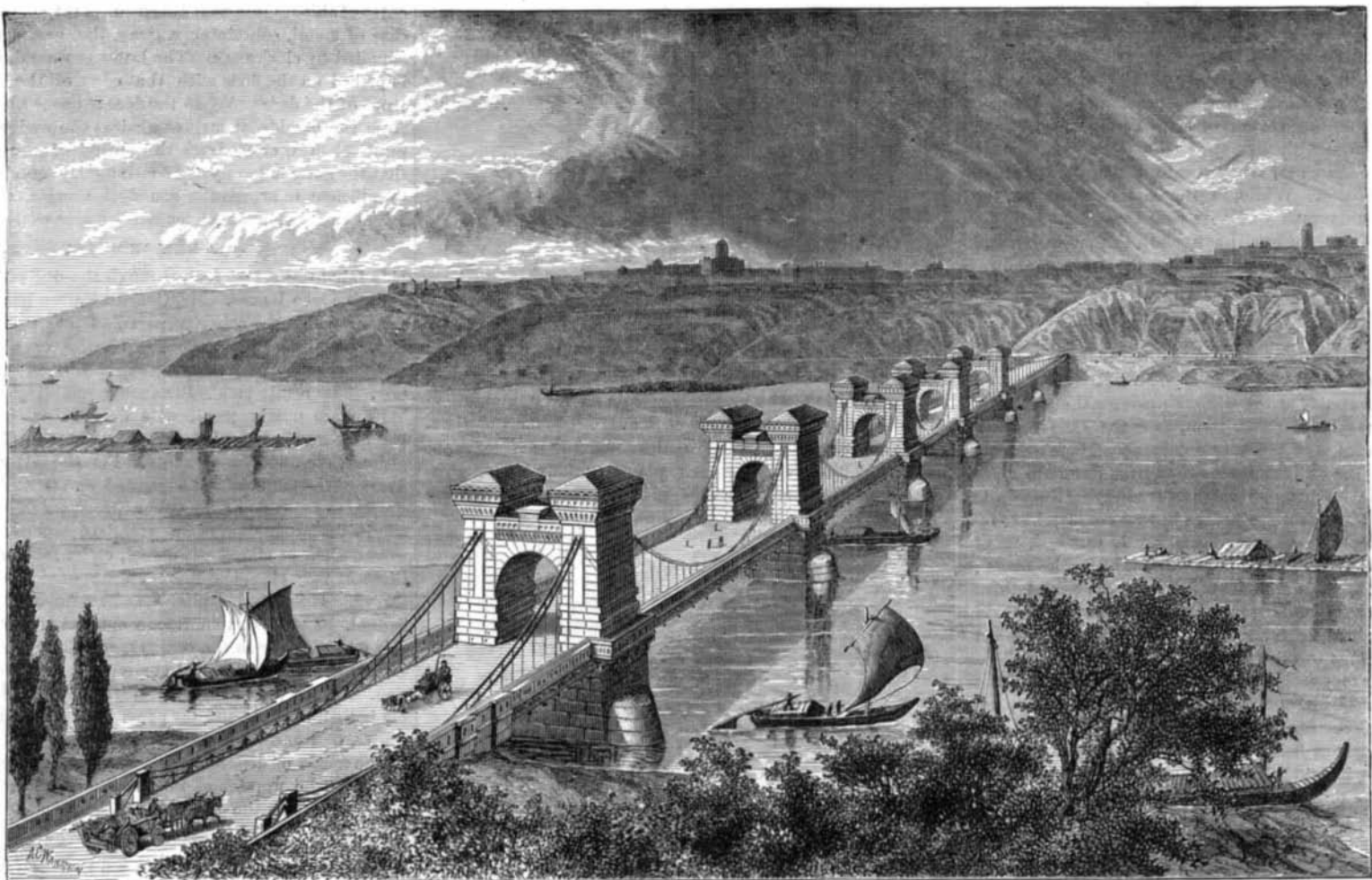
across, and the work is done in one half the time usually required.

The radius bar, A, is provided with adjustable bearing pieces, B, which fit on the saw collar. At the outer end of the bar, a frame is pivoted which carries the grinding disk, C, and also, on the same mandrel, not shown, a smaller disk. These are turned by the belt from the pulley, D, which is actuated by the driving pulley on the radius bar. The pivoted frame swings toward and from the teeth, and has a spring which tends to keep it away from the latter. It has also a gage screw, E, which touches a stop when the teeth are dressed off sufficiently, and thus gages them to uniform sizes. Another gage, F, regulates the depth of the notches when gummed out by the small grinder. Both of these gages are adjustable to adapt the machine to different saws.

The large emery wheel, C, serves for dressing the teeth on the top, and the small one dresses the under or concave side of the teeth and gums the saw plate. Said wheels are adjustable lengthwise on their axis to adapt each for being located in the desired position relative to the saw. They are clamped in place by means of collars which are screwed along the mandrel. When the small wheel is used, the gage screw, E, is screwed back sufficiently to let the wheel drop into the notches, to the required extent. The stop for the gage screw is contrived so that the frame may be shifted over to the opposite side of the axis, as may be sometimes required for saws having the teeth arranged reversely to the direction of the same shown in the engraving. The driving wheel, gage, F, and a spring cam lever—which swings down on the opposite side of the saw and over a cam to hold the radius bar to the teeth and on the collar—are arranged to shift in the above manner and for like purposes. The grinders are pressed on the teeth, and the radius bar is moved forward and backward along the teeth by one hand, while the crank is turned by the other hand.

Patented through the Scientific American Patent Agency, January 5, 1875. For further particulars regarding sale of State rights, etc., address the inventors, Messrs. J. and J. A. Crook, Augusta, Carroll county, Ohio.

PREVENTING SUFFOCATION IN THE EARTH.—M. A. G. suggests that, in cases of men being accidentally buried in the earth, who frequently survive some time before completely suffocated, iron pipes, of the sort used for drive wells, should be driven down just at the edge of the soft earth until the proper depth is reached: when, by the application of a pump at the top, an abundance of fresh air could be forced down to sustain life until the men could be rescued by digging.



SUSPENSION BRIDGE OVER THE DNIEPER AT KIEV RUSSIA