PLAN OF A BRIDGE

OVER THE MISSISSIPPI RIVER, AT ST. LOUIS,

FOR RAILWAY AND COMMON TRAVEL.

Plate 7 presents an elevation of this plan, with a middle span of 600 feet from centre to centre of pier, and 2 side spans of 420 feet, with a continuation of small spans of 150 feet at both ends, to connect with a proper grade on both shores. The bridge itself is highest in the centre span, and descends both ways at the rate of 1 foot in 100. The elevation of the lower chords above low-water in the centre span is assumed at 90 feet clear, leaving 50 feet clear above the highest known stage. It is further presumed that the level of the railways on the lower floor will connect with a tunnel on the St. Louis side, and with trestle-work or embankment on the Illinois shore.

The upper floor is appropriated for common travel. On the St. Louis side, its elevation is such that its level will readily connect, by a moderately descending grade, with the level of Broadway and other principal streets.

An inspection of the section of superstructure, Fig. 2, Plate 9, will explain the main features of the plan. There are three double trusses,—two outside and one in the centre. The space between the two floors is thereby divided in two, each occupied by a railway track. Each truss is double.; that is, two rows of posts and panels, with their panel-rods, are united in one by the upper and lower floor-beams and intermediate cross-bars. The posts are all 9 inches wide. Those of the outer trusses are lighter in section than those of the centre truss. The outer trusses are 3' 6" wide from out to out of posts, leaving a clear space of 24" between. This space is enlarged to 2' 6" in the centre truss, making its outside width 4 feet. The railway spaces between the trusses are 14 feet each in the clear.

There are four cables suspended in vertical planes, one in each of the outside trusses, and two in the centre truss. There is also one set of stays for each cable, but they extend only to the upper and not to the lower floor. The arrangement of the arches varies materially from that of the previous plan. In place of rising above the upper chords the crown stops at that line, but the foot extends below the lower floor.

Not only is the general appearance of the bridge much improved by this change, but its vertical as well as lateral stiffness is also greatly increased. As has been remarked before, whenever the spring of the arches can be permitted to commence below the lower chords, it should be done.

An inspection of Plate 8 will show how thoroughly the spandrels are braced. The truss-posts descend through the lower chords, in order to connect with the arches; and intermediate posts of a lighter section are also introduced to add still more to the stiffness.

A system of diagonal braces, meeting in central rings, and properly tightened, is also applied between the arches below the floor in a horizontal as well as vertical direction. The channel-bars composing the arches are 12 in. wide.

The construction of the towers is made sufficiently clear by the details on Plates 8 and 9. Each tower forms a square box in its section.

The plates are connected by strong angle-irons, and below the upper floor are strengthened by outside bars in line with the truss-posts. The outside shafts are of a uniform width of 24 inches between the ribs, and the middle shaft is 90 inches wide. In the direction of the bridge, the breadth of shaft tapers off from the bottom to the top.