ADDITIONAL PLANS FOR THE ST. LOUIS BRIDGE.

On Plate 10, three more plans of the St. Louis Bridge are exhibited, all different modifications of the same parabolic truss principle.

The elevation No. 2 presents two openings of 600 feet each, from centre to centre, two openings of 420 feet, and two small end spans of 150 feet each.

Plan No. 3 provides two large spans of 600 feet, joined by quarter openings of 180 feet, and lesser spans of 150 feet. It will be noticed that the security of the 180 ft. spans involves the necessity of vertical anchoring to the masonry of the piers, so that the ends of the parabolic trusses will be kept from rising, in case the large spans should be heavily loaded. To do this without interfering with the free expansion and contraction of the trusses, has already been fully explained and illustrated.

The fourth design presents one central opening of 800 feet, and two three-quarter spans of 548 feet, connecting with smaller spans of 150 feet.

Fig. 1, on Plate 11, is a section of the superstructure for the 800 feet Parabolic Truss. The arches are composed of 12-inch heavy channel-bars. The dimensions of the principal parts of this plan are stated in the section, which thus will explain itself.

The top view on Plate 10 demonstrates at a glance that very ample provisions are made to insure the lateral stability of the 800 ft. span. The diagonal bracing, together with the storm-cables, if made of adequate strength, will furnish all the requisite security needed to guard against such lateral motions as may be produced either by heavy gales, or by the transit of swift-moving trains.

Plan No. 6, Plate 11, is the last design, herewith presented, to span the Mississippi river at St. Louis, or at any other locality. With one central opening of 800 feet, and two lesser spans of 630 feet each, the whole river is crossed, excepting a series of small arches between the abutments and anchorage. This design is a pure suspension bridge, rendered stiff enough for railway traffic by four lines of trusses, as is fully made clear by the section, Fig. 2, Plate 11.

Plan No. 4, with an 800 ft. central span, I consider the practical and economical limit of the Parabolic Truss. The pure suspension plan, No. 5, if carried out, will be found more rigid than the Niagara bridge, and consequently will answer all requirements of railway and common traffic. The pure suspension will also be found cheaper than the parabolic truss.

No general formula can be advanced which will enable us to indicate a just comparison between these different plans. To do so, detailed estimates must be made of each, including masonry and cost of foundations. Owing to the great cost of foundations at St. Louis, a suspension bridge of 800 to 1,000 feet central span may be the cheapest. Leaving the channel open for 1,000 feet, ice-gorges will be rare, and at any rate not dangerous; and deep channel foundations may be avoided.

The most important details of the St. Louis bridge, No. 5, are exhibited on Plate No. 12. Fig. 1 is a front elevation of one of the wrought-iron towers. Fig. 2 shows a side elevation.

Each tower is composed of four shafts, constructed of wrought-iron plates and efficiently braced on all sides. The two centre shafts support two cables each, while the outside shafts only support one cable. By comparing these elevations with the sections of the roadway, Fig. 2, Plate 11, the construction of details will become intelligible without further remarks.

Only one important feature remains to be explained; and this is the provision made for the free contraction and expansion of the trusses and roadway. In this particular the plan before us differs materially from all the previous plans. The towers and trusses are firmly anchored upon their respective piers and abutments. Near the ends of