GENERAL DESCRIPTION.

this, an exact template should be formed of the top of the shaft, before the saddle is hoisted; then the holes may be marked off for the set-screws, and sunk into the saddle: the small plates can then be screwed on to its lower side before the saddle is finally put in place.

The inside section of the saddle is so shaped that the wire-ropes for supporting the cables and stays will occupy their exact relative positions. Four ropes are placed in the bottom row; they, together with the two outside ropes of the next tier, compose the 6 stays. The next 3 middle ropes, the second tier, form the lowest layer of the cable. The two half-circles shaded dark, in the section of the saddle, represent half-round pieces of wrought-iron or strands of wire put in as fillings to make the whole compact.

Two forged pieces of wrought-iron 4' x 6', with triangular pieces underneath, are let into the 4 notches of the sides of the saddle and screwed down for the purpose of securing the cables and to prevent sliding. This being done, the cables and tower now form one. When there is a greater strain on one side than on the other, the elasticity of the tower will admit of sufficient yield to equalize the difference. The employment of pendulums or rollers for the support of the cables and stays may appear necessary to some, but I am satisfied that they can be safely dispensed with.

ANCHOR-PLATES.

The end of each cable is secured to a cast-iron plate, which at the same time serves for the arch to butt against, and thus the two are made to balance each other. Plate 3 exhibits views of both faces of the plate, and also a section in which the fastening of the ends of the wire-ropes is made clear. The dimensions of the plates are 4' 2" x 3' 8", with a thickness of metal of 8" in the centre and 3" around the sides, strengthened by ribs. A cable being composed of 19 ropes or smaller cables (twisted or not), there are 19 corresponding holes for their reception. These holes are conically shaped, the larger opening having twice the diameter of the smaller one. Some of the large openings are elliptical shaped, in order to gain room. That face which serves as an abutment for the channel-bars composing the arch, is to be planed off to admit of a fair bearing. The weight of the plate is supported by its upper flange, which rests upon the ends of the upper channel-bars. A further support is provided by 2 cast-iron posts which fit against the face of the end trans-ports and are bolted to it. It remains now to convey a clear idea of the manner of securing the ends of the small cables within the plate. This is done by spreading apart the different wire-strings and wires which compose a rope, and inserting a number of iron points between them in such a manner that the whole span inside of the conical hole is filled out solid. By these means the end of the rope is swelled out into a conical lump 8 inches long, which cannot slip out of the plate without bursting it.

It is important that these plates should be cast of the strongest metal—good, strong, cold-blast charcoal metal—such as is used for the manufacture of good car-wheels. The points driven in between the wires may vary in length as well as in thickness. First drive in a number of long ones, 6 to 7 inches in length, about 1 inch in diameter at the think end and gradually reduced to a point, filed off round and dipped in linseed oil before driving, to make them go easy. Also pour some linseed oil between the wires, to make them smooth. The oil will prevent the staving up of the wires, and will facilitate the process. After filling up the remaining spaces with shorter and thinner points, then cut off the ends of the wires projecting over the plate even with it, one after another, and bend their ends to a right angle over the ends of the points. This being accomplished, apply a clay mould around the whole, so as to form a raised rim, and pour in melted lead, which will fill all the remaining interstices and make the whole one compact mass. After removal of the mould apply the hammer to make the lead solid, file it smooth, and round it off a little to give it a finish. To insert the ends of the ropes without trouble, it is necessary to wrap them well with annealed wire; and as the end is forced in, the wrappings will be pushed back. This mode of securing wire-ropes in sockets and plates, I have practised for 27 years. I can recommend it as a safe and neat method, superior to any other plan practised in Europe. Those who are desirous of informing themselves more particularly about these details, can witness this operation daily at my works.