GENERAL DESCRIPTION.

The section of a saddle on Plate 5, exhibits plainly the different layers of rope. First, there are four laid down in the bottom, forming the first row; then one is added at each end in the second row. These six ropes are the stays. Next come the three ropes which compose the first or lower layer in the cable; this is followed by a second row of four ropes; next comes the centre layer of five ropes; next, a layer of four ropes, and then the top layer of three ropes; the whole number of 19, which are in a cable, forming the section of a regular hexagon.

It is all-important that the five different layers should preserve their stratification and their proper level throughout the whole length of cable. To facilitate this operation, strips of canvas or strong cotton sheeting, say 3 in. wide, may be wrapped around each layer, and afterward again removed. Whenever a rope is added, it should be secured at various points by ties of fine annealed wire. The best plan, however, is to introduce short strips of tin which cross each other diagonally, the whole being kept together by temporary wire or hemp strings. After all the 19 ropes have thus been suspended, adjusted, and collected into one cable, strong temporary wire-bands, made of No. 19 annealed wire, must be put around every 10 or 15 feet; which operation will be greatly facilitated by using iron screw-clamps made in two halves, and fitting the section of the cable.

Referring to Plate 4, we notice that the lattice-beams which connect the opposite saddles of each tower may be omitted for the present, and that the two ropes for the footwalks may be supported on the cross-beams next below the lattice, which will be about the right elevation for cable-making.

It was remarked that the two ropes suspended temporarily for footwalks are to be laid into the main cables eventually. This method is recommended for the sake of economy. But if some more wire-rope is on hand, strong enough for that purpose, then it will be better not to make temporary use of the permanent cable-ropes. It is supposed, however, that there is no spare rope on hand, and in that case two of the cable-ropes are to be suspended for footwalks, one on each side. Now, after the other 18 ropes have been raised and adjusted in each main cable, the cross-beams which support the foot-plank may be suspended to the main cables by simply throwing small manilla ropes over in such a manner that they can be easily removed. This being done with all the beams, the two wire-ropes which supported the foot-planks are now free and may be raised into the saddles, adjusted to their proper levels in the various spans, and both ends secured. This being done, the manilla suspenders over the main cables are now lifted, one after another, and thrown over the last wire-rope, and again fastened to their respective beams. The cables are now ready for the permanent suspenders and straps. The latter are hexted at one corner, so that they may be readily closed and screwed up tight. To prevent injury to the cable, a piece of sheet-iron is laid around it: the strap is then closed and cooled off with water. A small hand-forged may be moved along on the suspended scaffolding for that purpose.

It will be a somewhat difficult task for those not experienced in the construction of wire-cable bridges, to get the cable-ropes and suspenders properly spaced.

Measurements from the towers being uncertain and the cables being movable, no satisfactory adjustment can be effected in this way. I will therefore endeavor to convey a correct description of my method, which, if properly attended to, will never fail to produce correct results. Either by calculation or actual suspension, or both. I measure off the actual distances upon a small wire-cord, or upon a single wire. These distances in the suspended cable form the hypotenuses of right-angled triangles, the horizontal base of which is a constant, equal to the horizontal distance of the suspenders. The vertical is variable, and is equal to the difference of the lengths of two adjoining suspenders. These triangles may all be laid off on one board, and the length of the hypotenuses transferred upon the wire-cord and marked by small wrappings made of fine wire, so that they cannot be shifted. This wire line is then suspended alongside of the centre of the cable, and whitened marks are put upon the latter, which will correspond to the centre of the suspended ropes.

These measurements and marks being correctly made, there will be no further difficulty in spacing the suspenders correctly; their length will come out nearly correct, and the beams suspended to them will be found equally spaced.

The main cables being completed, they should be further secured in their saddles by bolting down those cushions which are to prevent their slipping. A temporary platform must next be suspended below the level of the lower chords, strong enough to support one ton per foot lineal. The suspenders being ten feet apart, timber-beams 24 feet long, about 8 × 14, may be suspended to them by means of temporary stirrups, so made that the level may be adjusted. A plank-walk about five feet wide should then be laid down under each cable. The next step is to lay down upon these plank-walks the channel-bars which are to form the lower chords. Care must be had to distribute these bars evenly and uniformly on each side of a pier and in all the spans at the same time, so that the equilibrium of the cables is not much disturbed. This distribution being properly made, the bars may be connected by bolts temporarily, and partly spliced, but so that the posts can afterward be set up between.

In order to add to the weight of the platform, and to increase its stability, the true-posts should now be distrib-