GENERAL DESCRIPTION.

STAYS.

Similar to the plan just described, is the method of fastening the ends of the stays: with this difference—that each stay-ropc has a cast-iron socket for itself. This socket, together with the wrought-iron stirrup which holds it, is represented by Fig. 3 on Plate 6. The stirrup is made of round iron 1½ inches diameter, and varies in length to suit the inclination of the stay. Where the stirrup passes around the floor-beam, a small segmental casting, forming a seat for the stirrup, is fitted against the beam for the purpose of giving the stirrup a fair bearing. The screws must be long enough to tighten the stays. To preserve their straight lines, they are connected with the suspenders by wire-wrappings.

It will be noticed that the stays as well as suspenders, together with the cables, are all suspended in one vertical plane which passes through the centre of the 2-foot space left open between the two rows of trans-posts. The cross-bars connecting each pair of posts are not to be put up until the stays, cables, and suspenders have been placed and fixed in their position.

At the ends of the trusses four small stays may be noticed, which are provided for the purpose of guarding against vibrations at those points, and also to add to the supporting strength. The upper and lower chords being necessary, independent of support; their strength is thereby brought into play. Accordingly, as much tension is thrown upon the stay-ropes as the resistance of the chords will permit. The ropes are double, and their diameter varies from 1 to 2 inches. I do not apprehend any vibration in any part of the work; but this end of the truss is more liable to it than any other part, and I want to make ample provision to meet it.

CABLES.

There are two wire-cables, one on each side, suspended in vertical planes between the double rows of trans- posts. Each cable is composed of 19 wire-ropes of 24 inches diameter. The maximum tension of the 2 cables at the lower is 764 tons, and at the centre of the main span 696 tons. Dividing 764 by 38.6, we have the tension of each rope equal to 20½ tons; and allowing six times the strength, we have for the ultimate strength of each rope 120.6 tons.

Although the tension of the cables is less in the centre, the same section and strength is observed throughout. A chain may be tapered, but it would be false economy to attempt it in a cable. Fig. 1, Plate 6, shows a section of one cable on a larger scale. The 19 ropes are suspended in 5 layers, and care must be had to preserve the relative position of each layer as well as of each individual rope throughout its length, so that the union of the whole 19 will in section form a hexagon. The suspenders being attached every 10 feet, a strap is laid around the cable and screwed up tight to preserve its form. These straps should be made by about three different patterns, to suit the inclination of the different parts of the cables. When putting them on they are heated in a small hand-forgue, and a strip of sheet-iron is laid over the cable to prevent heating the wire. After closing they are cooled by pouring on water.

To keep snow and wet out of the cables, they should be protected by a half-circular cover made of tin, secured to the straps by small wire-wrapings. This is indicated in Fig. 1, Plate 6.

A uniform tension of the ropes is easily obtained by suspending them parallel to each other in level layers, and in close contact. First secure one end in the anchor-plate; then adjust the rope in the saddles with a proper deflection at the lowest point of each span. Then pass the other end through the other plate, open the seven strands, and pass the centre one through a conical tube 7 inches long, wide enough at the small end to admit the strand, and at the other end enlarged to double the diameter. The whole rope being a little longer than necessary, say 1 to 2 feet, the centre may be fastened temporarily or anchored back, preserving at the same time its central position in the hole. By slackening or tightening this centre now, the position of the rope in the cable may be adjusted. When right, drive the hollow