ed upon for a strength of 32 tons of 2000 lbs. per square inch. I have tested them thoroughly by cutting up a number of extra bars and pins, and forging them over into various shapes. All the sockets attached to the ends of the wire rope suspenders and stays, which are very difficult to forge, and require the best quality of material, have been made of this Napannock iron.

The tension of the different links composing each chain, diminishes as they descend, the strain upon the vertical links being more than one-third reduced, in consequence of position, friction and hold in the masonry. The lowest link is secured to a cast-iron plate of 6 ft. 6 inches square, 2½ inches thick, at the edges, with 8 heavy ribs upon the lower side. The central portion through which the bars are admitted, has a depth of metal of 12 inches. Where a seam in the rock offered a good chance to form a solid bed, one half of the plate rests against it, and the other half against masonry. After securing the position of the plate and chain, the whole shaft was filled out with masonry laid in cement mortar and copiously grouted. Great care has been taken to grout the bars well. My experience has given me ample proof, that cement grout will take a firm hold of iron, and will effectually guard it against oxidation. The bars were well oiled with linseed oil, then painted twice with zinc paint and Spanish-brown. Where no solid face could be obtained, the roof of the chamber was cut out prismatically. The masonry resting upon the plate presses against this roof like a wedge. Large stones were laid upon the knuckles, so that every joint has a hold in the masonry, above as well as below the surface of the rock. Above the rock, where the chain curves,