slow charring, progressing equally in all directions. Whenever a stick was only partially consumed it was carefully scraped and the cavity rammed full of cement. The larger spaces were filled up with yellow pine forced in with screw-jacks and wedges, in lengths of from eight to ten feet, and well-bolted vertically and laterally. Care was taken to break joints and to scarf as much as possible. It was difficult to introduce larger timber, since it had to be inserted into the fourth course through the openings cut from below. All jagged burnt ends were cut to a square face with chisels. After everything was filled up solid, a number of five-foot bolts were driven up from below so as to unite both the old and new timber into a compact body.

Forty iron straps of 4x3-4 iron were also bolted against the roof from below, so as to balance the break of bond in the fourth course. In order to further prevent any undue settling over the line of the fire, the space beneath in the air-chamber was built entirely of square blocks of trap-rock, carefully laid in cement, in place of the gravel concrete which fills the rest of the chamber. It must be remembered that there are still eleven courses of sound timber above the burnt district. These have abundant capacity to distribute any local deficiency in equal bearing. From the faithful manner in which the work was done it is certain that the burnt district is fully as strong, if not stronger than the rest of the caisson.

The final repairs were concluded March 6th, and the air chamber completely filled March 11th.

**Lighting of Caisson.**

The subject of illuminating a caisson in a satisfactory manner, is rather a difficult problem to solve. A powerful light is of prime necessity, to overcome the want of all reflecting surfaces; to penetrate the thick mist usually occupying such places; and to illuminate every foot of soil which was anything but uniform in character. The burning of candles is attended with an intolerable amount of smoke, resulting from a rapid but incomplete combustion. This nuisance was overcome somewhat by reducing the size of the wick, and of the