manner. The cast-iron cylinders just mentioned are sunk for the greater part of their length in the bed of the river, their tops being about 4 ft. 6 in. below low-water mark, and during the construction of the masonry they were surmounted by wrought-iron caissons, connected as shown in Fig. 6, Plate XLIV. From this figure it will be seen that the top length of each cylinder was furnished with a channel around its upper edge, this channel being 3 in. wide and 2 in. deep. At the bottom of this channel was laid a packing of indiarubber, and upon this the lower edge of the wrought-iron caisson was allowed to rest, the connexion between the caisson and cylinder being rendered secure by means of bolts, hooked at their lower end so as to take hold of the overhanging portion of the channel and passing up through the ribs of the caisson, as shown in Fig. 6.

This arrangement produced a very simple and effective joint, and one which could be very readily disconnected when required.

The wrought-iron caissons were, like the cylinders, 21 ft. in diameter outside, at their lower part; and they extended to above high-water mark. They were constructed of 3 in. plate, strengthened by stiffening ribs placed around the outside as shown in Fig. 6, these ribs being 10\(\frac{1}{2}\) in. broad, and being formed of 3 in. plate and 3\(\frac{1}{2}\) in. by 3\(\frac{1}{2}\) in. by \(\frac{3}{4}\) in. angle iron. The manner in which the cast-iron cylinders were loaded to force them down into their places is shown in Figs. 7 and 8, from which it will be seen that a series of shelves were slung around the inside of each cylinder by means of wrought-iron straps, supported by bolts passed through bosses formed on the flanges by which the segments were united. On these shelves was placed keelwood, the weight required being about 100 tons for each cylinder, whilst the time occupied in sinking each to its proper depth averaged eight days, and the number of men employed fifteen. The bottom of the river was levelled by spoon and bag to receive the cylinders, and the same appliance was used to clear round the inside edge of each cylinder until the London clay was reached. Men were then introduced to excavate, following the cylinder as it descended. The bottom ends of the cylinders are bedded on the London clay at a depth of about 45 ft. below high-water mark.

After the cylinders had been sunk, and the bed of the river excavated within them, they were filled for a height of 12 ft. 6 in. with cement concrete, as shown below in Fig. 11. From the top of the concrete, solid brickwork set in cement was then carried up nearly to low-water mark, and upon this was placed a load of keelwood equal in weight to that of the superstructure loaded with locomotives. In the case of the cylinders next the piers of the old bridge, this load amounted to 1280 tons, and the case of the others to 1000 tons, this heavy test being applied to prevent any subsidence taking place after the new and old piers were bonded together. The greatest settlement produced during the testing was \(\frac{5}{16}\) in., a slight return taking place when the load was removed. It may be mentioned here that if the bridge was loaded all over with locomotives, the maximum weight upon the brickwork on the cylinders at low-water mark would be nearly 6 tons per square foot, and that upon the clay at the bottom 5 tons per square foot.

After the cylinders had been tested by the application of the load above mentioned, a course of masonry was laid upon the brickwork, and the wrought-iron caissons