THE VIADUCTS.

PLATE X.

The general views and details of the viaducts which connect the river pier at Beeton with the retort houses, are shown in Plate X. The work is of two classes, the one carrying a double line from the pier through the centre of the space between the retort houses, and the other adapted only for a single line, which leaves the wider part of the viaduct, as shown in Fig. 1, a short distance to the rear of the abutment of the pier, and branches into two independent lines on each side of the central viaduct, each pair running through the retort houses, as shown in the plan, and reuniting with the central line at some distance on the other side.

The total length of the single viaduct is 2000 ft., divided into 80 spans of 25 ft. each; and the length of the double viaduct is 1400 ft., equal to 56 bays of the same span. These lengths are, however, exclusive of that part of the line which lies within the retort houses, and which, belonging to that portion of the works, will not be further alluded to here.

The single line viaduct is carried upon piles, as shown in the elevation, Fig. 2. These piles were formed with pointed ends, so that they could be driven, as shown in the detail, Fig. 11, although screwed ends were specified (Figs. 12 and 13). All the foundation piles were sunk to a depth of 30 ft. below Trinity high water, and they were placed 25 ft. apart longitudinally and transversely with 12 ft. centres, so that in its width the viaduct is carried upon two piles. In the wider structure, however, three are employed. The piles below the ground level were made in two lengths each of 15 ft., the thickness of the castings being 1¾ in., and the two lengths were united by a joint or coupling, as shown in Figs. 9 and 10. Above the ground level the piles are extended in the form of columns (see details); they are 20 ft. in height, and are cast in one length with an octagonal shaft and a base of the design shown. The sole plate of this base is fastened to the cap of the pile by eight 1¾ in. bolts.

In all those bays which cross over the terrace behind the river wall (Fig. 2) the base of the plinth is placed 5 ft. higher than in the other bays, on account of the level of the terrace being higher than the remainder of the ground. The piles for these bays are, therefore, made rather longer, so that their caps may occupy the same relative position to the surface, as in the rest of the viaduct. The shafts of the columns above the plinth measure 15 in. across at the base and 12 in. at the neck; and in connexion with the capitals, ornamental brackets are attached to them in the centre line of the longitudinal girders of the viaduct, as shown in Fig. 5, Plate X.

The columns and piles are filled throughout with concrete in Portland cement, the interior of the piles having been cleared from the accumulation of soil, gathered during the operation of sinking. Transversely the columns are braced together in the manner shown by Fig. 19 on the present page, by braces 4 in. by ½ in., secured at the necking of one column by a 1¾ in. turned pin, passing through lugs cast upon that column, and connected by three ⅜ in. rivets to the adjacent one. The cast-iron brackets are fastened to the upper part of the columns by twelve bolts, ⅜ in. diameter, tapped into the shaft, six on each side. The filling of the brackets is of cast iron, as shown, ¾ in. thick, the sides and top being of T-iron 4 in. by 2¾ in. by ¾ in.

The superstructure of the single viaduct in each bay consists of two wrought-iron plate girders 25 ft. long and 2 ft. deep, resting on the caps of the columns, as shown in Figs. 4 and 5. The flanges of each girder are formed of a plate 10 in. by ¾ in., and two angle irons 3 in. by 3 in. by ¾ in. The top and bottom flanges are of the same section throughout, both plates and angle irons being rolled in one length for the whole span. The webs of the girders are of ⅜ in. plate, and are strengthened at each end with double angle irons 3 in. by 3 in. by ¾ in., and a flat plate 10 in. wide by ¾ in. thick. Two additional stiffeners of T-irons, 5 in. by 3 in. by ¾ in., are rivetted to the web on each side, with intervals of 8 ft.