longitudinal girder which carries the roadway, and forms the top of the spandril, is 18 in. in depth, with upper angle irons 5½ in. by 3 in. by ⅜ in., and lower ones 3½ in. by 2½ in. by ⅜ in. The spandril filling consists of diagonal angle-iron bracing 4½ in. by 4½ in. by ½ in., a vertical T-iron 6 in. by 6 in. by ½ in. at the end against the piers forming the completion of the spandril, while at the centre a gusset plate ⅜ in. thick connects the longitudinal curved and straight girders together. The form of the outside arched girders differs from that of the inner ones, as is shown in the section Fig. 4. In the same figure is shown the transverse lattice girders that connect the arches together, and which are all 8 ft. 2 in. apart, except the outside and first inner girders, which are 10 ft. ½ in. apart. The lattice girders are formed of light angle irons, 3 in. by 2 in. by ¼ in. A system of transverse bracing is rivetted to the under side of the road joists, and to the top of the lattice girders, the former being beams 18 in. deep, with ¼ in. web, and top and bottom angle irons 3½ in. by 3½ in. by ⅜ in. Upon them the buckle plates are fastened, two such plates occupying the width between the longitudinal spandril girders, while a light I iron runs from end to end beneath each plate, as shown in Fig. 4, to which the buckle plates are also secured. The arches spring from wrought-iron wall plates or girders built into the piers and abutments, as shown in Fig. 3. These wall plates consist of two girders 3 ft. 3 in. in depth, with top and bottom flanges 15 in. wide to ⅝ in. thick, with ¼ in. web, and angle irons 4 in. by 3½ in. by ⅜ in., cover plates 4 in. by ⅜ in. being placed at the joints. These girders are of such a length that they extend the whole width of the bridge, and form the foundation from which all the curved girders spring. They are connected together by plate girders, with webs ¼ in. thick, and top and bottom angle irons 4 in. by 3 in. by ⅜ in. Upon the top of these are placed wrought-iron skewbacks, as shown in Fig. 6.

Fig. 6, Plate XVI., shows a section of one of the abutments, the cast-iron cylinders which form the foundation being in section, while other views are given in Plate XV. It will be seen that within this cylinder the masonry is built down to a depth of 10 ft., the space below being filled with concrete. Upon the top of the masonry the abutment is built, the facing being in ashlar, the backing of rubble work, and the space behind made good with débris from the old bridge. The masonry proper extends from the face of the abutment back to a depth of 20 ft., a thickness of concrete being laid beneath, as shown. The height from the top of the cylinder to the springing of the arch is 10 ft. 6 in., and the depth of the masonry is decreased by steps until at the top it is only 4 ft. 3 in. in thickness. The abutment walls are carried upon timber piles.

The foundations in the river bed are all formed of cast-iron cylinders, 10 ft. in diameter. These cylinders are sunk right down through the sand of the river bed, until the solid substratum is reached, which, in some instances, was only found at a depth of 80 ft. from the surface. The excavation within the cylinders during the operation of sinking was accomplished by the employment of a dredger of an ingenious description. Owing to the great quantity of stony débris met with in sinking the cylinders, the operation proved very tedious and annoying to the contractors. The cylinders are filled throughout with concrete formed of sand and hydraulic mortar, and thus they form hard and solid pillars sunk down to the solid rock.

From the cylinders, which in their upper part are 12 ft. in diameter, the piers arise. These are faced on the outside with white Scotch granite, and under the arches they are faced with ashlar masonry in freestone, while the internal portion is of substantial rubble work. The ashlar facing was laid and jointed in Portland cement, and the rubble grouted at every course. Into the interior of each pier and abutment iron beams are built, which receive the weight of the wrought-iron girders forming the arches of the bridge. There are eight of these ribs in each arch. In the outer spandril filling on each side of the façia arches, panels are formed enclosing scroll work and armorial shields; and the arms of the city are displayed on the parapet in the centre of the bridge. The ornamental ironwork, as well as the lamp standards over the parapets, are bronzed and picked out with gilding.

In the construction of the roadway, due regard has been had to the heavy and increasing traffic that is likely to come upon the bridge. The upper surface of the supporting plates, coated with gas tar, is covered with a layer of concrete, and that again with asphalte ¾ in. thick. The carriage way formed over this substratum consists of granite blocks 8 in. deep, 9 in. to 14 in. long, and 4 in. thick. With a view to solidity, the stones are bedded in mortar, and grouted with hydraulic lime. The gutters and kerbstones are formed of white granite laid in large blocks.

As already mentioned, the engineers were Messrs. Bell and Miller, and the contractors Messrs. Hanna, Donald, and Wilson. The resident engineer was Mr. Kyle.