

bored conical $3\frac{3}{4}$ inches and $3\frac{1}{2}$ inches diameter. The places of attachment of the connecting rods to the said cross heads are to be $4\frac{1}{2}$ inches diameter and $4\frac{1}{2}$ inches long, and 13 inches from centre to centre. Inside the cheeks and both top and bottom there are to be brass gibs as shewn on the plan, which when fitted together are to bring the bearing surfaces of the inner gibs 2 feet 6 inches apart when placed on the cross head, and the space between top and bottom of the inside of the said gibs to $2\frac{1}{2}$ inches.

The outside part of the hub and cheeks at said cross head is to be fitted and polished.

5th. CONNECTING RODS.—These connecting rods are to be made two in number; they are to be made of wrought iron, with wrought iron straps and keys, and brass boxes. Each is to be 15 feet from centre to centre, and that end nearest the pumps and connecting to the cross heads is to be forked with brass bearings $4\frac{1}{2}$ inches diameter, $4\frac{1}{2}$ inches long, and at a distance of 13 inches from centre to centre. The other extremity connecting with the crank pin is to present a brass box 5 inches in diameter 8 inches width. All these boxes in each connecting rod are to be secured to their position by means of wrought iron straps fitted as shewn on plan, and keys with set screws and gibs. The main body of each connecting rod is to be $4\frac{1}{2}$ inches diameter round at each end, and $6\frac{1}{2}$ inches diameter in the centre. In addition to this increase of diameter so as to increase the firmness of the rods there are to be at each connecting rod and secured to the flat part of each head a set of braces in wrought iron $1\frac{1}{2}$ inch diameter, spreading at the centre to 27 inches. The whole outside part of these connecting rods, including straps, keys, gibs, and braces, are to be fitted to the parts they belong to or connect with and polished.

6th. CRANK PINS.—These pins are two in number; they are to be made of tool steel, and present a diameter of 5 inches as bearing, where the connecting rod connects with; said bearing to be 8 inches width; on each side of said bearing there is to be a collar 7 inches diameter and 1 inch breadth. The whole length of each pin is 24 inches, and is to be turned conical 5 inches and $4\frac{1}{2}$ inches, for which the holes in the two crank wheels are to be most carefully prepared. Each pin is to be secured to its crank wheel by means of a wrought iron key 1 inch thick $2\frac{1}{2}$ inches wide and 10 inches long, with strongly rounded corners; this key has to be fitted also into a slot to be made into a boss at the back part of the crank wheel. All the work on the hole for pin on the crank wheel, in addition to the mere boring of a conical hole, is to be part of the pump work.

All the corners of bearings in cross heads, crank pins, also in crank shaft and counter shaft are to be rounded off, though it is not mentioned before.