

10th. **PUMP BARREL.**—These barrels are 2 in number; they are to be made in cast iron, cast on end, with 18 inches sinking heads of the diameter and thickness of the body of the barrel. Inside diameter when finished 18 inches, outside diameter  $21\frac{1}{2}$  inches, giving  $1\frac{1}{2}$  inch metal when finished. Total length 7 feet, diameter of flange 2 feet 4 inches, thickness of flange when finished  $2\frac{1}{2}$  inches. The centre of barrel is to come  $15\frac{1}{2}$  inches from the face of the foundation-plate when secured to the two valve chests.

11th. **BARREL HEADS.**—There are two heads planed, fitted, and bolted on the back part of each rear chest of pump; they are 2 feet 4 inches diameter and  $2\frac{1}{4}$  inches thickness of metal, and shaped converse to the pressure as shewn on the plan. These barrel heads are to be held down by wrought iron bolts  $1\frac{1}{2}$  inch diameter, placed about  $5\frac{1}{2}$  inches apart with substantial six-sided nuts.

There are further two heads for the front with stuffing boxes. Said barrels are also to be secured to the valve chests by bolts  $1\frac{1}{2}$  inch diameter placed about  $5\frac{1}{2}$  inches apart. The diameter of said front heads are the same, also the thickness of metal, as those heads above mentioned.

The stuffing boxes are to be held each by 4 stud bolts 1 inch in diameter; bore of stuffing boxes to be slightly more than the diameter of piston-rods. The flanges and outside parts of these front heads, also the stuffing boxes and nuts, are to be polished. The packing is to be of a combined form of hemp bands and brass cloth saturated in tallow.

12th. **VALVE BONNETS.**—The bonnets are to be made of cast iron; they are to be 8 in number and of the form shewn on the plan, with flanges 3 feet 8 inches total width, and 3 feet  $3\frac{1}{4}$  inches total breadth; the thickness of metal when finished is 2 inches; and they are to be held down each by 28 tap bolts of  $1\frac{1}{2}$  inch diameter with six-sided nuts.

13th. **PISTON HEADS.**—They are two in number; to be 12 $\frac{1}{2}$  inches long, and follower  $2\frac{1}{4}$  inch thick; hub of piston 9 inches diameter with ribs on which a conical ring  $8\frac{1}{2}$  inches long is to slide. On this conical ring are to be arranged wooden segments with the end of the grain outwards. This wood is to be "apple wood," thoroughly soaked in tallow. This wood is to be made in 4 layers of blocks, 8 pieces in each layer  $2\frac{1}{2}$  inches thick; the blocks to be fitted to the bevel and curve of the cone and so arranged that when the cone is thrust in by 4 screws 1 inch diameter tapped into the follower, all the blocks are forced outwards. The follower to be secured to the piston head by 4 one inch diameter tap-bolts. The hub of the piston heads are to be bored 4 inches diameter at the front and 5 inches at the back.