crank-shaft for driving the spur-wheel on the pump-shaft. This pinion is made in two halves, and turned together, having twenty teeth, 8 in. pitch and 21 in. wide, shrouded up to pitch-line. The engine-bed is made of heavy cast-iron box girder section, having a depth of 18 in. and a width at the narrowest point on the top of 10½ in., and 15 in. over beading at bottom. Each bed is made in two pieces, firmly bolted and joggled together. The beds are planed all over on the bottom, and also faced where the cylinder slide-bars and pedestals rest.

The air-pump is worked from the tail-slide of the high-pressure cylinder by means of steel levers, shafts, and links, the shafts to oscillate in gun-metal bearings, and the ends of the links are fitted with gun-metal bushes. The air-pump body is made of cast iron lined with gun-metal, having the pump-bucket also made of same material. The air-pump rod is made of Muntz metal, having the foot-valves and seatings of brass. The bucket-valve and delivery-valve are made of indiarubber. The hot well at the top of the air-pump is covered over to prevent water flowing into the foundations. The circulating pump is worked from the tail-slide of the low-pressure engine in a similar manner to the air-pump, and is double acting, of sufficient size to maintain a constant supply of water to the condenser. All the valves, seatings, plunger, and liner for pump-barrel are of gun-metal. The condenser is of the surface-condensing type, having a cooling surface of 2,450 square feet, with tubes of 1 in. in diameter outside and 19 w.g. thick, secured at both ends with screwed brass glands and nipples. The tube plates are of brass 1⅛ in. thick, and are stayed together by five gun-metal stays. The condenser body is of steel plates and angles, and the joints lapped and on top. A single-acting feed-pump, with gun-metal seatings and valves, is provided to supply feed-water for seven boilers, and is worked from the same levers as the circulating pumps. There are ten boilers, of the Lancashire double-flued type, each 7 ft. in diameter and 30 ft. long, constructed so as to carry a daily working pressure of 120 lb. to the square inch. The plates for the shell are of Siemens-Martin steel, 5 in. thick; the longitudinal seams are butt-jointed, with inside and outside cover-plates. The circular seams are lap-jointed, and zigzag riveted. All the rivets are $\frac{13}{16}$ in. diameter, $\frac{7}{8}$ in. holes, $1\frac{5}{16}$ in. pitch. The circular seams have a lap of 3¾ in., and the covering-plates for longitudinal seams are 8 in. wide and $\frac{5}{8}$ in. thick. All the holes in the boiler are drilled, and plates bent and ready to put into position on landing in the colony, and also all the plates planed on edges; each belt of plating or ring of the shell is all in one plate. These were sent out to the colony in pieces, and the boilers are now being riveted by Messrs. Price Brothers at the Thames. The flues are 2 ft. 9 in. internal diameter, except the last two rings of plates at the back. The last plate is 2 ft. 3 in. in diameter, and the second to that tapers from 2 ft. 9 in. to 2 ft. 3 in. All flue-plates are of steel, ½ in. thick, welded longitudinally, and flanged outwards at the ends; each length is connected by a solid welded ring, which takes all the rivets out of the action of the fire. The ends of the boilers are also made of Siemens-Martin steel, in one plate, $\frac{11}{16}$ in. thick. The front plate is attached to the shell by an angle-iron ring 4¼ in. by 4¼ in. by $\frac{11}{16}$ in., and the back plate is flanged to meet the boiler. The ends are stayed by means of strong gusset-plates fastened by double angles to shell and end plates. There are five gussets above the flue and two below. These stays are not brought too close to the furnaces, sufficient space being allowed for expansion. The ends are further stayed by two longitudinal stays, 2 in. diameter, extending from end to end of the boiler, and securely fastened by nuts and washers inside and outside of end plates. Each boiler has a dome on its third ring from front 3 ft. in diameter and 3 ft. high, solid welded, and flanged to meet the boiler shell; the top is fitted with an angle-iron ring 3½ in. by 3½ in. by ¾ in. The top plate is 1¼ in. thick, on which the shut-off and dead-weight safety-valves are placed. The hole in the boiler shell to which this dome is riveted is 1 ft. 10 in. diameter, and has a strengthening ring added in the boiler under the dome. A strong steel man-hole is riveted on to the top of the boiler on the second ring from the back, and has a strengthening ring underneath, fitted with covered dogs and bolts. On the top of each dome there is a steam stop-valve, 6 in. diameter, with gun-metal spindle, valve, and seating; also a dead-weight safety-valve, 3 in. diameter, which is used when steam is at 120 lb. pressure. Each boiler is fitted with two check feed-valves, 2½ in. diameter, with iron body and gun-metal working-parts. A horizontal internal pipe projecting for 12 ft. into boiler; also one gun-metal blow-off cock, 2½ in. diameter, with compound glands, and one taper connecting-pipe fitted to cast-steel mountings on underside of boiler shell. Two sets of asbestos packed glass gauge-cocks, with ¾ in. glass; flanges being 4¼ in. diameter, fixed on steel bases. One brass pointer to show working-level of water in boiler. One pressure-gauge, with 9 in. dial, indicating up to 250 lb. per square inch, fitted with syphon and tap, and one fusible plug in each flue. There is also sent along with each boiler one of Howl's patent hot-blast forced-draught furnaces, which is to be fitted to each flue, having a grate 8 ft. long. These, however, are not at present fixed on to the boilers. One of these will be fitted on to see what difference, if any, it will make in regard to its economy in using fuel before fitting them on to each boiler. Three of these boilers are now fitted together, and are in course of being built in, while the whole of the plates for the boilers are landed at the Thames, and are being fitted up at Price Brothers' foundry as quickly as possible. With reference to the whole of the machinery in connection with this pumping plant, only some of it has yet arrived, but the greater portion is now in course of transit from England.

The second motion shaft is to be of the best hammered steel turned all over; the bearings are 20 in. diameter and 30 in. long, three of these being in the shaft. The shaft is swelled in the centre to 22 in. to receive the spur-wheel. The weight of this shaft with solid crank is 18 tons. The spur-wheel, which fits on to the shaft, has seventy-two teeth 8 in. pitch and 21 in. wide shrouded up to pitch-line. There are to be two sets of pumps in the shaft, each plunger or draw-lift being 25 in. in diameter, having a single rising main 20 in. in diameter; these are fitted so that a change of lifts will occur at every 327 ft. of vertical height. All rods and connections are of sufficient strength to admit of sets of pumps being added to lift 2,000 gallons of water from a depth of 2,000 ft. The draw-lift pumps are of the open-bucket type, 25 in. in diameter, and suitable for a stroke of 6 ft. The barrels are made of cast iron, truly bored, and fitted with strong suction-valve boxes of