

is tapered to fit the crank shaft, and a key way cut in it to receive a cotter. The pinion is rivetted together by four rivets of $\frac{1}{4}$ " Bessemer rod, and the hole tapered and slotted as in the case of the gear.

Noise is almost entirely eliminated, the teeth being cut to mesh with an accuracy that ensures quiet and smooth running, which is a feature of such herring-bone gear.

The number of teeth are in the ratio of 16:124, giving 7.75 revolutions of the armature to one of the crank shaft.

The cylinder head is of cast iron, and is fastened to the cylinder end by eight $\frac{1}{2}$ " cap screws, a brown paper gasket being inserted to ensure an air tight joint. The suction and discharge valve ports are at "D" and "E" respectively. The four valves are similar in construction, made in two pieces of wrought iron, one of cylindrical shape closed at one end (which end fits in the valve seat), and the other of flat circular shape brazed into the open end of the cylinder. It will be noticed that no springs are used in connection with these valves, which work independently and by gravity alone. They are ground into their seats, and may be removed at any time by simply unscrewing the brass nuts above them, without disturbing any other part.

The incoming air may come in through the port at "F"; but usually in the case of electric cars, in order to avoid dust interfering with the operation of the pump, the air is filtered through hair at the top of the car and brought down in pipes tapped into the cylinder head below the suction valve. The ports "F" are equipped with a wire screen, and are chiefly used when the compressor is in shop service, where less trouble from dust is encountered.

The crank shaft, pistons, piston rings, connecting rods, and piston pins are all shown on Plate 3.

The crank shaft consists of a steel forging with bearings turned to size. One end is tapered to receive the gear, which is securely fastened in place by a cotter key, washer, nut, and split key. The cotter is $1\frac{1}{2}$ " x $\frac{3}{8}$ " x $\frac{7}{16}$ ", and made of machine steel.

The two pistons are of cast iron, machined and ground in a grinding machine to exactly fit the cylinder.

Each of the two piston rings is made in three segments, each segment being in two pieces rivetted together, all of cast iron. These are ground in a similar manner to the pistons, and each ring is put in position in the cylinder with three small spiral springs inserted at holes in each segment placed at "A," which