In the C.A.M. engine, which has not hitherto appeared in public, there is a startling innovation in the form of aluminium pistons.

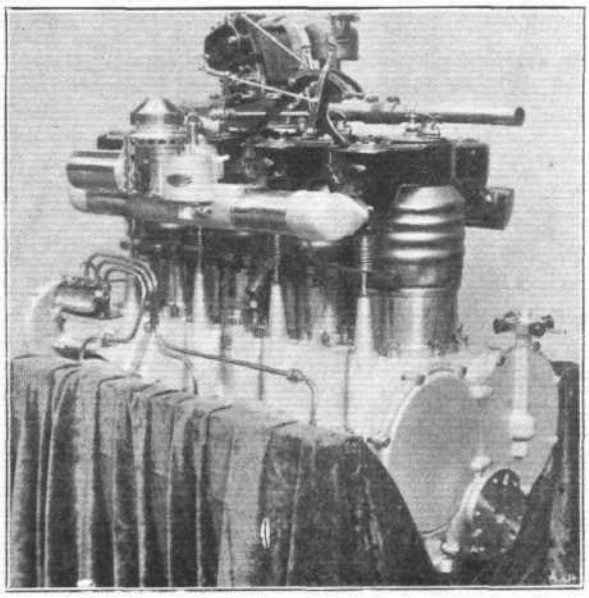
With these few remarks about the engines in general, we now proceed to give a brief description of each make under its own heading, and in conjunction with the accompanying illustrations :—

Darracq 50-h.p. (also 100-h.p.). — Four-cylinder engine of the vertical type, the cylinders, cylinder-jackets, pistons and piston-rings are made of steel. The cylinders are bolted to an ordinary two-part aluminium crank-chamber, which supports the crank-shaft on five bearings, and also encloses the gear-wheels which drive the single cam-shaft. Both valves are mechanically operated by rockers and push-rods; they are situated in a vertical position in the cylinder-heads. The inlet-valves are arranged in adjacent pairs, and their valve-chambers coupled together, so that a two-branch induction-pipe suffices for all four.

Dimensions.—Bore, 120 mm. ; stroke, 140 mm. ; weight, 175 kilogs. ; h.p., 50 at 1,500 r.p.m. ; price, 10,000 francs.

Bore, 170 mm. ; stroke, 140 mm. ; weight, 250 kilogs. ; h.p., 100 at 1,200 r.p.m. ; price 1,500 francs.

Panhard.—All the engines are of the 4-cyl. vertical type and have steel cylinders with corrugated copper



PARIS FLIGHT SALON.—The 120-h.p. Panhard engine, showing the unusual arrangement of the magneto.

water-jackets, soldered in place. The heads are made of cast iron and are fastened by four bolts, which pass through a flange on the upper end of the cylinder trunk. Holes in the flange permit the circulation of the cooling water without external pipes. The valves in all but the 35-h.p. model are arranged on opposite sides and are mechanically operated. On the small engine the inlet and exhaust-valves are combined in one concentric valve situated in the cylinder-head. On the largest 120-h.p. engine — that illustrated herewith — the magneto is mounted on a bracket above the engine and driven by bevels from a vertical shaft. The top of this shaft carries a centrifugal governor to govern the speed of the engine by operating on the throttle.

Dimensions.—185 mm. by 200 mm. ; weight, 380 kilogs. ; h.p., 120 at 900 r.p.m.

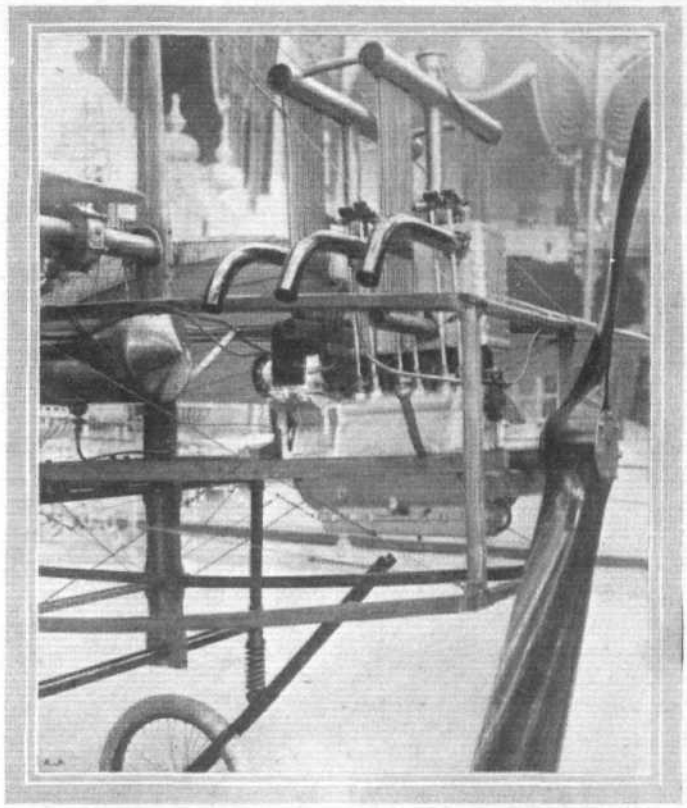
170 mm. by 170 mm. ; weight, 240 kilogs. ; h.p., 80 at 900 r.p.m. ; price, 9,000 francs.

125 mm. by 150 mm. ; weight, 214 kilogs. ; h.p., 35 at 900 r.p.m. ; price, 5,000 francs.

110 mm. by 140 mm. ; weight, 168 kilogs. ; h.p., 25 at 900 r.p.m. ; price, 4,400 francs.

110 mm. by 140 mm. ; weight, 90 kilogs. ; h.p., 35 at 1,000 r.p.m. ; price, 10,000 francs.

Gregoire-Gyp 40-h.p.—Four-cylinder vertical engine, cast *en bloc*, water-cooled; the water jackets are completed by flat aluminium plates, which gives the engine a box-like appearance. All the valves are in the cylinder-heads, and are operated by overhead rockers, worked by



PARIS FLIGHT SALON.—The 120-h.p. Gregoire-Gyp engine in place on its frame. The arrangement of the tubular radiator, built in as an integral part of the engine, is the special feature.

long push-rods from a single cam-shaft. The gearing for the cam-shaft and magneto is exposed. A vertical tubular copper radiator of small dimensions is built on to the engine in the manner illustrated by an accompanying photograph. The crank-chamber is a circular aluminium casting, with detachable steel end-plates, which carry the crank-shaft on ball-bearings; there is also a third ball-bearing in the centre. The cam-shaft drives a small gear-wheel pump for the circulation of the lubricating oil.

Dimensions.—Bore, 92 mm. ; stroke, 140 mm. ; weight, 79 kilogs. ; h.p., 40 at 1,500 r.p.m. ; price, 5,500 francs.

Aster 50-h.p.—Four-cylinder vertical engine cast *en bloc*, but having a separate sheet-steel water-jacket riveted in place. The cylinder-casting is fixed to the aluminium base-chamber by lugs situated about half-way up the cylinders, a considerable length of which, therefore, projects down inside the crank-chamber. The *desaxe* principle of offsetting the cylinders from the crank-shaft is followed. The valves are all mechanically operated, and are arranged on the same side of the engine.

A neat arrangement of oblique shaft has been devised to simultaneously drive an oil-pump inside the crank-chamber and a water-pump outside. The latter is visible in the accompanying photograph. The crank-chamber is a one-piece casting, with detachable end-plates.

130 mm. by 140 mm.; weight, 110 kilogs.; h.p., 50 at 1,000 r.p.m.; price, 10,000 francs.