

THE details of the following report on the latest type Mercedes engines and the accompanying scale sectional drawings have been collected from an investigation of the twin engines taken from the captured German aeroplane G.23, a three-seater "Gotha" biplane of the pusher type, which was brought down near Vron by Lieut. Breadner on April 23rd, 1917. The machine was set on fire by the occupants after landing and partially destroyed, one engine being scrapped and the crankcase melted. The other engine, No. 29870, however, was little damaged, with the result that after certain repairs had been carried out, this engine was able to be put

Lubrication system, forced feed to all bearings and camshaft; brand of oil recommended, Sternoil (air-cooled) on test; oil pressure recommended, no indicator; oil temperature recommended, not above 60° C.; oil consumption per hour, 8.125 pints; oil consumption per b.h.p. hour, .032 pint; specific gravity of oil, .9.

Type of carburettor, 1 twin jet Mercedes; mixture control, automatic; fuel consumption per hour, 125 pints; fuel consumption per b.h.p. hour, .605 pint; specific gravity of fuel, .720.

Type of magneto, 2 Z.H.6; firing sequence of engine, prop. 1 5 3 6 2 4; numbering of cylinders, prop. 1 2 3 4 5 6; speed of magneto, 1.5 E.S.; direction of rotation of magneto, facing driving end of armature, anti-clock; magneto timing, 31° E.

Inlet valve opens, degree on crank, 1° L.; inlet valve closes, degree on crank, 49° 3' L.; maximum lift of inlet valve, 10.125 mm.; diameter inlet valve, 55.25 mm.; area of inlet valve opening (2 valves), 35.12 sq. cm., 5.44 sq. in.; mean gas velocity through inlet valve, 151.1 ft. per second; clearance of inlet tappet, .018 in.

Exhaust valve opens, degrees on crank, 50.6° E.; exhaust valve closes, degrees on crank, 17.6° E.; maximum lift of exhaust valve, 10 mm.; diameter exhaust valve, 55.25 mm.; area of exhaust valve opening (2 valves), 34.70 sq. cm., 5.4 sq. in.; clearance of exhaust tappet, .018 in.

Speed of revolution counter drive, camshaft speed.

Weight of engine complete without water, fuel or oil, 936 lbs.; weight per b.h.p. ditto, 3.71 lbs.; weight of exhaust manifold, 26 lbs.; weight of starting gear not integral with engine, nil; weight of fuel per hour, 136.8 lbs.; weight of oil per hour, 9.14 lbs.; total weight of fuel and oil per hour, 145.94 lbs.; gross weight of engine in running order, less fuel and oil, 1,099 lbs. approx.; weight per b.h.p. ditto, 4.36 lbs.; gross weight of engine in running order with fuel and oil for six hours, 2,072 lbs.; weight per b.h.p. ditto, 8.2 lbs.

Period of induction, 228°; period of exhaust, 247°; half compression cam opens exhaust cam, 12° A.B.C.; half compression cam closes exhaust cam, 44° B.T.C.; diameter of induction pipe main, 100 mm.; diameter of

diameter of induction pipe branch, 75 mm.; diameter of choke tube, 32 mm.

Length of connecting rod between centres, 326 mm.; diameter of crank pin, 64 mm.; length of crank pin bearing, 80 mm.; diameter of journals, 64 mm.; length of journal bearings, 64 mm.; length of front journal bearing, 104 mm.; connecting rod side-clearance (total) in piston, 2.25 mm.

Total capacity of each petrol tank, 95 galls.; total capacity of each oil tank, 7.25 galls.; total capacity of each water in system, 6.5 galls.

Weight of complete cylinder with valves and springs, 34.25 lbs.; weight of complete piston with rings and gudgeon pin, 10.725 lbs.; total weight of complete connecting rod with gudgeon pin bush, 7 lbs.; weight of connecting rod, big-end, complete, 4 lbs. 14 oz.; weight of connecting rod, small-end, with bush, 2 lbs. 2 oz.; weight complete valve with spring washer and nut (inlet and exhaust), .759 lbs.; weight of valve rocker complete, 1.246 lbs.; total weight of engine with water, including radiator, &c., 1,099 lbs. approx.; weight of crankshaft with propeller boss, 139.5 lbs.

Diameter of piston at top, 159.258 mm.; diameter of piston

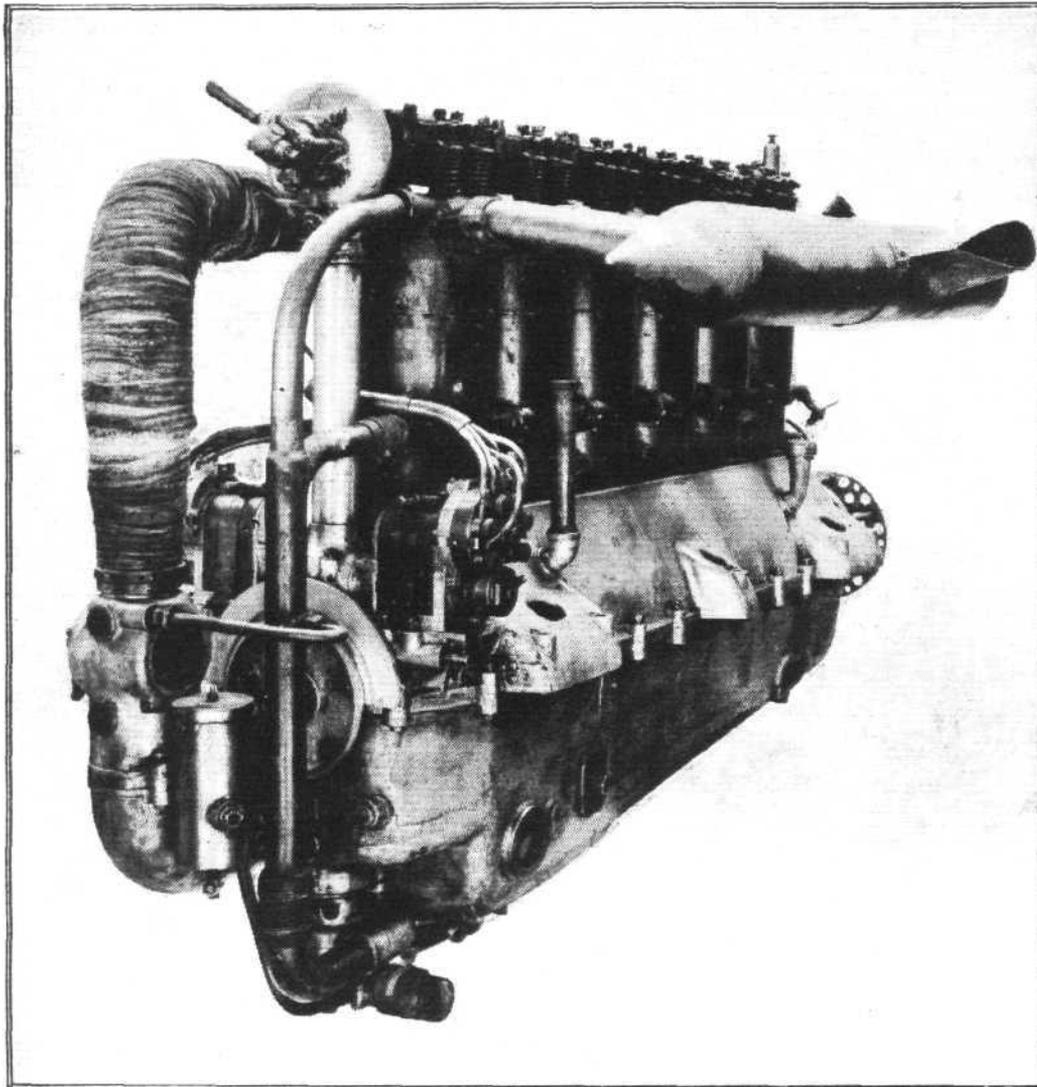


Fig. 3.—Front end of engine.

through a bench test at the Royal Aircraft Factory, where the following particulars regarding b.h.p., consumption, &c., were taken:—

*Leading Particulars of the 260 h.p. Mercedes Engine.*

Number and arrangement of cylinders, 6, vertical; bore, 160 mm., 6.30 in.; stroke, 180 mm., 7.09 in.; stroke/bore ratio, 1.125—1; stroke volume of one cylinder, 3,620 cub. cms., 220.82 cub. in.; total stroke volume of engine, 21,720 cub. cms., 1,324.92 cub. in.; area of one piston, 201.062 sq. cms., 31.164 sq. in.; total piston area of engine, 1,206.372 sq. cms., 186.984 sq. in.; clearance volume of one cylinder, 920 cub. cms., 56.12 cub. in.; compression ratio, 4.94—1; normal b.h.p. and speed, 252 at 1,400; piston speed, 1,653 ft. per min. at 1,400, 1,775 ft. per min. at 1,500.

Brake mean effective pressure, 107.5 lbs. per sq. in.; cub. in. of stroke volume per b.h.p., 5.25; sq. in. of piston area per b.h.p., 0.74; h.p. per cub. ft. of stroke volume, 329.14 h.p.; h.p. per sq. ft. of piston area, 194.6; direction of rotation of crank, anti-clock; direction of rotation of propeller, anti-clock; normal speed of propeller, E.S.