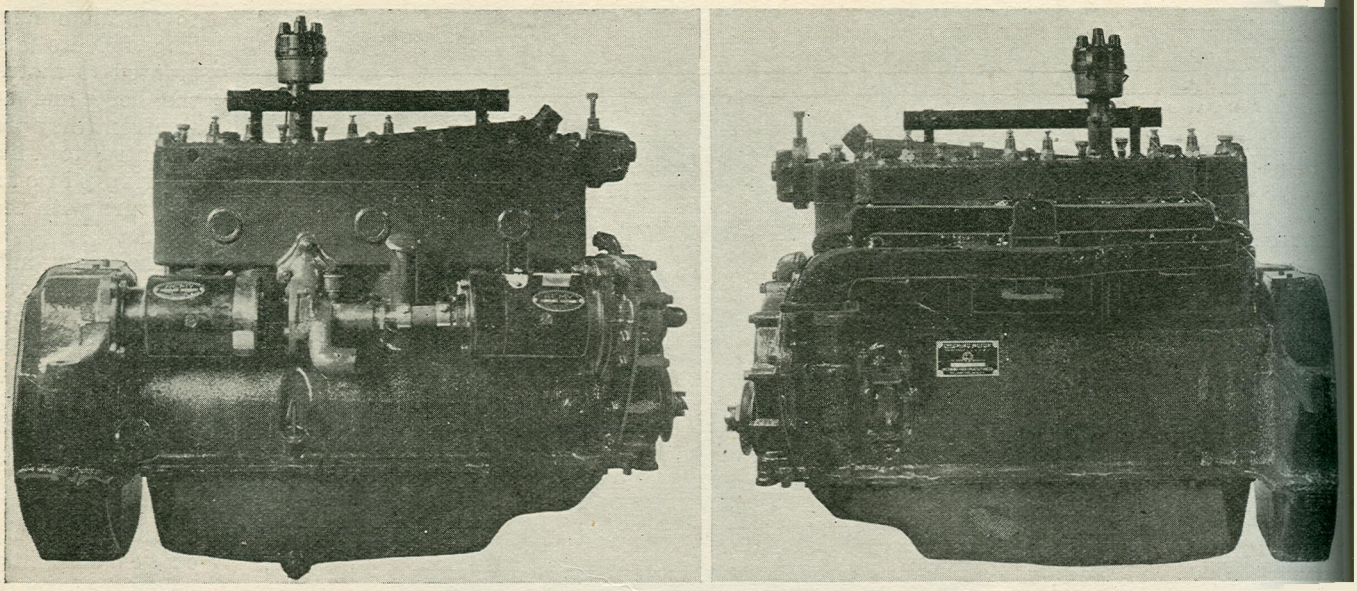


Right and left side views of new Lycoming six-cylinder engine

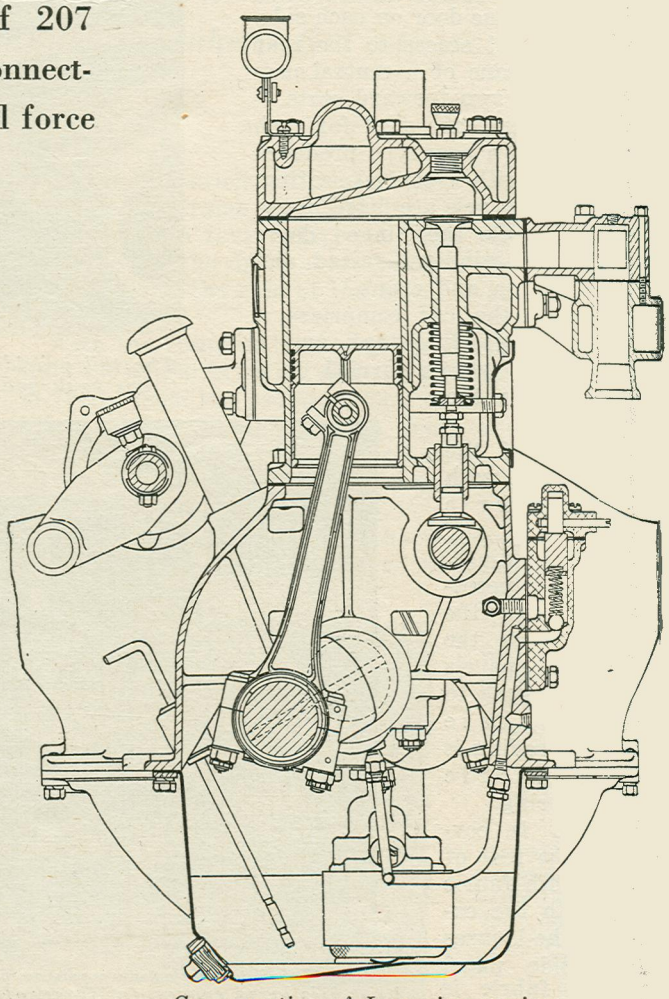
Six Cylinder Engine Latest Addition to Lycoming Line

New model has piston displacement of 207 cu. in. Develops 50 hp. at 3000 r.p.m. Connecting rod bearings are cast under centrifugal force

A SIX cylinder model has been added to the line of passenger car engines manufactured by the Lycoming Mfg. Co. of Williamsport, Pa., which now embraces four, six and eight cylinder designs. The new six has the same cylinder dimensions as the Lycoming 8-in-line, viz., 3⅛ in. bore by 4½ in. stroke, and its piston displacement is therefore 207 cu. in. The engine is of the L head type, with the cylinders cast in block, the cylinder heads detachable and the crankcase a separate iron casting which extends 2 9/16 in. below the crankshaft axis. Peaking at 3000 r.p.m., the engine develops a maximum of 50 hp.

The cylinder block is cast with integral jacket walls, without large openings in it. Compression chambers of conventional form, deeper over the valves than over the cylinder bore, are provided, and a compression ratio of 4.5 to 1 is used. The spark plug bosses are located directly over the inlet valves, which location is said to give the best idling characteristics. In this connection it is worth noting that the engine when mounted on a chassis of the type for which it is designed will permit of idling down to about 1½ m.p.h. on direct drive.

Inlet and exhaust valves are not only of different materials but they are also somewhat different in size. The inlets, which are made of S. A. E. No. 3140 Steel, are 1 7/16 in. in diameter and have a 5/16 in. lift, while the exhaust valves, which are made of silcrome, have a diameter of 1 5/16 in. and a lift of 5/16 in. The diameters given are the clear or throat diameters. It has been found that by making the inlets somewhat larger than the exhaust valves—the available space must, of course, be divided be-



Cross section of Lycoming engine

tween the two—it is possible to get more power from the engine. Mushroom type cam followers are used, with set screw and lock nut adjustment. The clearance on both sets of valves is adjusted to 0.006-0.008 in.

Pistons are of cast iron and of light section, with ribs joining the bosses to the head. The length of the pistons is 3½ in. and there are four ⅛ in. piston rings, all above the piston pin. These rings are of the Perfect Circle type, three being plain rings and the fourth an oil-regulating ring. The piston pin which is ¾ in. in diameter, is clamped in the upper end of the connecting rod by a clamp screw passing through bosses on the split lug, and has its bearings directly in the piston bosses. The combined length of the two bearings is 1 23/32 in.

Four-Bearing Crankshaft

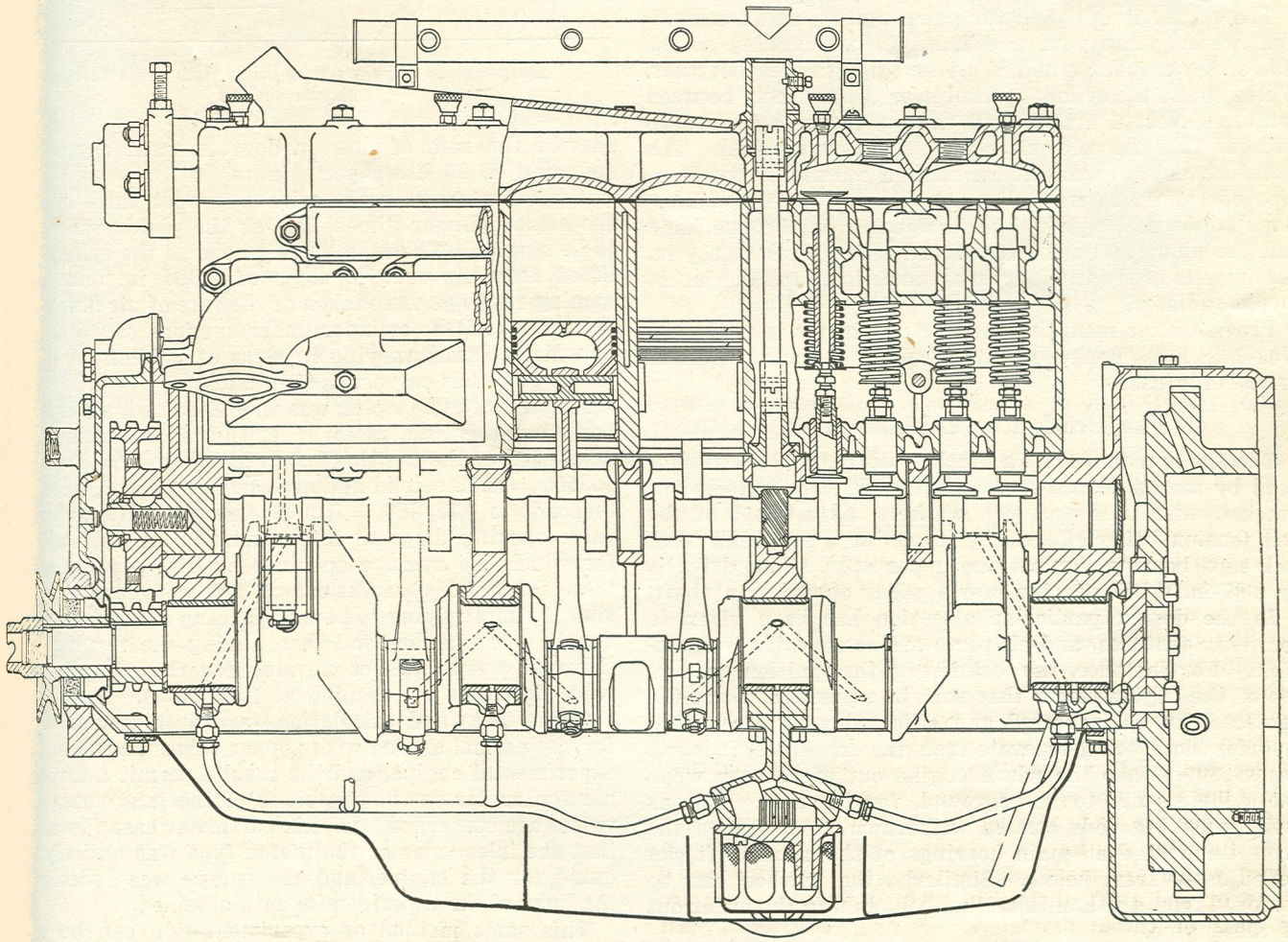
The crankshaft is of the four-bearing type, having two throws between each pair of adjacent supporting bearings. Crankpin bearings are 2⅛ in. in diameter by 1½ in. in length while all main bearings are 2⅜ in. in diameter, the respective lengths being as follows: Front, 2 in.; first intermediate, 1¾ in.; second intermediate, 1 15/16 in.; rear, 2 ¼ in. The main bearings are of the conventional bronze back, babbitt lined type, but the connecting rod head bearings consist of babbitt cast directly into the head under centrifugal pressure. Connecting rod and cap are made in a single forging. An oblong hole is machined in the head. This is clamped to an aluminum face plate, with the center of the hole at the axis of rotation. The face plate is then connected to a source of power by means of an air clutch and set into rotation of the order of 1000 r.p.m. The clamping devices form a mold around the head and babbitt is poured into this with a ladle which holds exactly the right amount. By the centrifugal force acting on it the babbitt is evenly distributed over the circumference of the oblong hole.

Connecting Rod Tinned

Before the connecting rod is placed into the babbitting fixture, it is prepared for the process by being tinned (by dipping) over the surface to which the babbitt is to adhere, and in order that the tin may not cover the whole of the big end, that end is previously given a coating of whitewash, except on the bore of the hole. After the babbitting operation, the babbitted hole is bored out to two centers, ⅛ in. apart, and the cap is then milled off, ⅛ in. of metal being removed by the milling cutter. This makes the hole circular and of a diameter conforming to the crankpin diameter.

The oil well is a steel stamping and is secured to the crankcase with a cork gasket between. The engine is designed for three point support on the main frame. At the forward end there is a cylindrical seat on the hub of the chain case cover which takes a trunnion to be mounted on the front cross member of the frame, while at the rear there are two arms which are designed to rest on pressed steel brackets secured to the frame and to be secured by a single bolt each.

Two methods of camshaft and accessories drive are offered, one by means of the Link-Belt automatically tensioned chain and the other by means of the conventional hand adjusted chain. A chain of ⅜ in. pitch and 1½ in. wide is used. The crankcase is provided at its forward end with a flange to which the housing for the chain is



Longitudinal section of Lycoming six cylinder engine (3⅛ in. bore by 4½ in. stroke)

bolted. Provision is made for a No. 2 S.A.E. flange mounting for the generator, and with the manual adjustment the generator flange is provided with oblong holes or slots permitting of moving the generator away from the crankshaft axis for purposes of chain adjustment. With the automatically tensioned chain the generator mounting is similar, except that the mounting is fixed or invariable. The chain case cover is of cast iron.

Separate inlet and exhaust manifolds are used. The inlet manifold is of the Swan type, of square cross section, and is located above the exhaust, its riser passing through the exhaust so as to form a hot spot. There are three inlet ports in the cylinder casting to which the inlet manifold bolts.

Force Feed Lubrication

Lubrication is by force feed to all main bearings and to the crankpin bearings, and by splash to all other parts. A gear-type oil pump is located in the oil pan, about even with the normal oil level therein. It is bolted to the main bearing cap between cylinders Nos. 4 and 5 and is driven from the camshaft through a pair of helical gears which also serve to drive the ignition unit on top of the engine. From the pump oil is fed to all of the main bearings through copper tubing of 5/16 in. outside diameter, which fastens into the bearing caps.

The oil pressure on the bearings is controlled by means of a regulator which is mechanically connected to the throttle lever. When the throttle is in the idling position the oil pressure is limited to about 10 lb. per sq., while when the throttle is wide open the oil pressure may rise to 50 lb. per sq. in. This oil regulator is mounted on the outside of the crankcase. A spear type oil gage is provided.

The engine is designed for pump cooling and a centrifugal water pump with a 3 in. rotor is mounted at the side of the crankcase and is driven through the generator. Water enters the cylinder jacket near the rear end, between cylinders Nos. 4 and 5, and the water passages are so laid out that the cold water strikes the valves first. The water leaves the jacket at the head in the usual way. Hose pipe of 1¼ in. internal diameter is used for the connections between the pump and the jacket on the one hand and the pump and radiator on the other, while a 1½ in. hose pipe is used for the return connection from the jacket to the radiator.

Provision for mounting an electric starter is made, the No. 1 S.A.E. flange mounting with outboard Bendxi drive being used.

Fan Bracket on Cylinder Head

The fan is mounted on a bracket secured to the cylinder head by means of two studs passing through slots in the bracket, with nuts and lock washers, adjustment of the belt tension being effected by means of a set screw with lock nut, bearing against the upper stud. Fan drive is by a ⅝-in. V-belt passing over a pulley on the crankshaft.

In the design particular attention has been given to servicing features, and all parts are comparatively accessible. For instance, the location of the ignition unit on top of the engine places that part in a position where the contacts can be inspected and adjusted with ease. The cylinder block being separate from the crankcase, it is not necessary to take the whole engine out of the car when the cylinders are to be reground, for instance. Pistons and connecting rods can be withdrawn from the engine from below, and all main bearings of the crankshaft can be adjusted from below. Similarly, the flywheel can be removed from the crankshaft without taking the latter out of the engine.

A feature of some importance from the service point of view relates to the mounting of the generator. On engines with the Link Belt self-tensioning chain the generator can be removed without interfering with the chain in any way, and on engines with the manually adjustable chain a large hand hole is provided in the chain case cover opposite the generator driving sprocket, closed by a sheet metal cover plate, so that it is not necessary to take off the chain case cover when it is desired to adjust the chain or take off the generator.