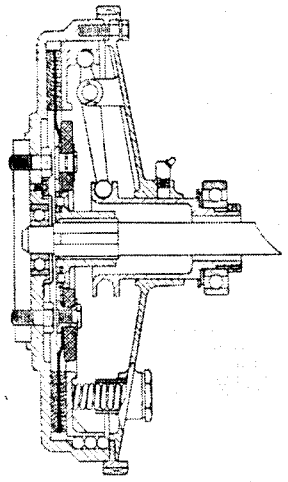
In connection with the contour of the cams it may be mentioned that instead of the flat sides of the cams being a tangent to the base circle, they are formed as tangents to a circle, the radius of which is the ...us of the cam plus the normal clear...ce. The base circle diameter merges gradually over a few degrees into the larger figure. The objective in this arrangement is that the clearance between the face of the cam and the platten shall be taken up gradually. It is claimed that this scheme reduces to some extent the effect of the hammer blow occurring when the cam comes in contact with the tappet.

The water jacket capacities are on the ample side, they extend right to the bottom of each cylinder. There is space between every cylinder bore.

Zephyr pistons, which are a composite construction, are employed. The upper portion is of aluminium, and carries three rings, the lower ring being of special form and acting as a scraper. Below this is a fourth groove with drilled holes for venting the scraped oil back through the piston to the crankcase. The gudgeon pin bosses are supported from the crown, the fully floating hollow gudgeon pin being located by a wire circlip at each end. The piston skirt is a manganese steel pressing, the upper edge of which is turned inwards to fit a groove in the piston head beneath the lowest ring. Near the centre the skirt is doubled in to form an internal flange, by which it is attached to the head by four locked setscrews in the gudgeon pin bosses.

Of I-section, the connecting rods are nickel chrome steel stampings of orthodox form, except that they are slightly offset, the centre of the big end bearing being about $\frac{1}{32}$in. out of line with the small end. A plain phosphor-bronze bush is fitted at the small end. The big end shell is of phosphor-bronze, white metal lined, the cap being retained by two bolts.



Clutch.

A five-bearing crankshaft is employed, the forward bearing being 2in. wide, the centre being $1\frac{3}{4}$in., and the rear bearing $2\frac{1}{2}$in. The two intermediate bearings are $1\frac{1}{4}$in. wide, the diameter of the shaft being $2\frac{3}{8}$in.

On the extension of the crankshaft in front of the first bearing there is the timing chain pinion and the combined damper and V belt pulley for the fan drive. This part is of considerable mass, and consists of a series of friction rings, and thus forms a vibration damper and gives a friction drive for the fan.

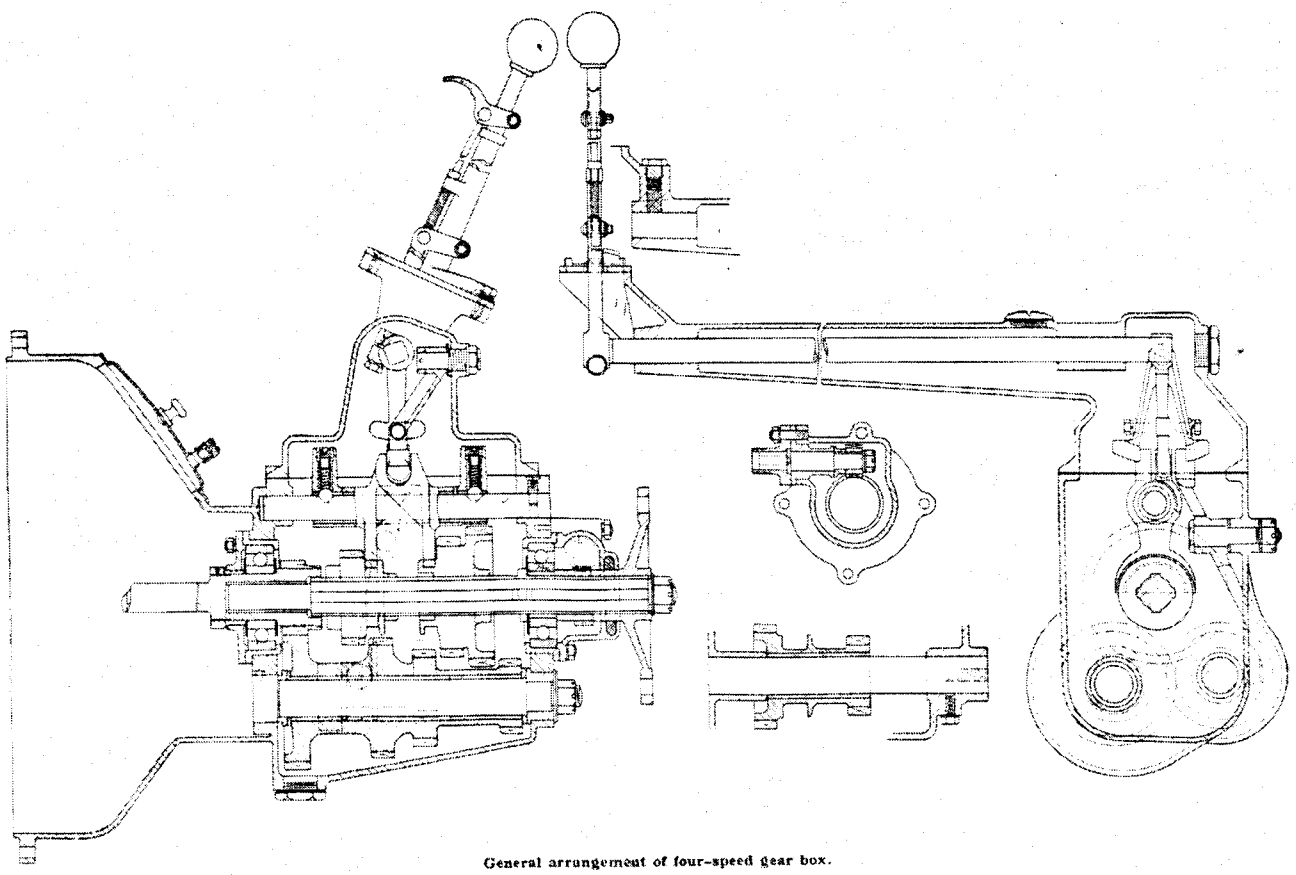
The claw end for the starting handle is formed in a hexagon-headed part, screwed into the end of the crankshaft. Two sheet metal thrower rings are fitted between the chain pinion and the end of the crank case to prevent oil leakage.

The fan spindle is in one with the impellor spindle in the water outlet casting attached by studs to the end of the detachable head. The spindle runs in one plain bearing and one ball bearing, the rear extension of the spindle behind the plain bearing carrying the impellor for circulating the water.

Adjustment of the fan belt is provided by movement of the pulley flange, which is furnished with a left-hand thread. In this way the effective diameter of the V pulley may be varied. This method is perhaps hardly as convenient as the eccentric mounting commonly employed. It may be mentioned, however, that two special C-spanners are provided, one of which fits the castellated ring nut, while the other has pegs which fit the holes drilled in the pulley flange.

A four-bladed fan is employed, attached by set-screws to the pulley boss, which is mounted on the end of the spindle by Woodruff key. There is an oil point on the boss, for lubrication of the ball bearing.

Lubrication of the engine is by a carefully planned system. An oil pump driven from a skew gear near the centre of the crankshaft is bolted to the outside of the



General arrangement of four-speed gear box.