

which constitute the supplementary housings for the driving and differential mechanism. All the moving parts in this construction are supported by that part of the housing which

is secured to the forward side of the axle forging. In this way all of the parts, the meshes of the gears, etc., can be made to line up and register absolutely, without the

slightest chance for shifting or loss of adjustment. The cover piece at the rear serves simply as a protecting cover and very readily removable inspection plate.

## Chalmers "30" Two-Bearing Crank.

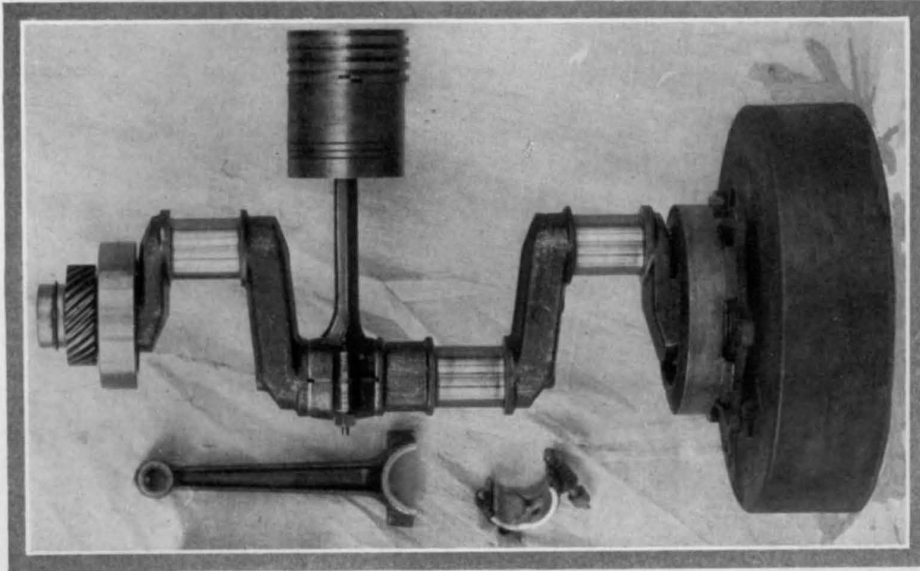
Besides Embodying Exceptionally Heavy Crank Sections, Very Large Bearings Are Used. Declutching End Thrust is Taken up by the Bearing at the Rear.

**I**N no case that has come to our notice has the idea of the large, stubby, two-bearing crankshaft been more admirably

worked out than in the motor of the Chalmers-Detroit "30." As will be seen, upon reference to the photograph herewith, one of the

most striking features of this crankshaft design is the exceptionally heavy construction throughout. Exceptionally large ball races are used at each end of the shaft. In fact, these races are of such diameter that the row of balls is distributed about a circle of approximately the same diameter as the crank throw. This insures a minimum of wear and friction and strain on the crankshaft. Besides permitting of the use of an extremely short motor, this crankshaft design precludes the possibility of crank bearing disalignment.

It will be noted that the rear ball bearing next the flywheel is mounted within a containing bushing which fits into the rear end of the crankcase and is provided with lugs for securing it in position. This rear bearing is used for the taking up of end thrust upon disengagement of the clutch and therefore really serves to locate the crank in its proper longitudinal position within the case. The forward bearing is of such external diameter that while it bears perfectly in its seat it is at the same time capable of locating itself. A careful study of the photograph will at once make clear the extraordinary size of the shaft relative to the other parts of the crank assembly. Possibly, in this direction, the relative sizes of the crank pins and arms compared with the piston will prove most striking, particularly when it is remembered that these pistons are of only four inches diameter.



But two main bearings are used on the Chalmers-Detroit "30" crank shaft. Note the relative sizes of the parts.

## Kline Kar Multiple Unit Bloc Engine.

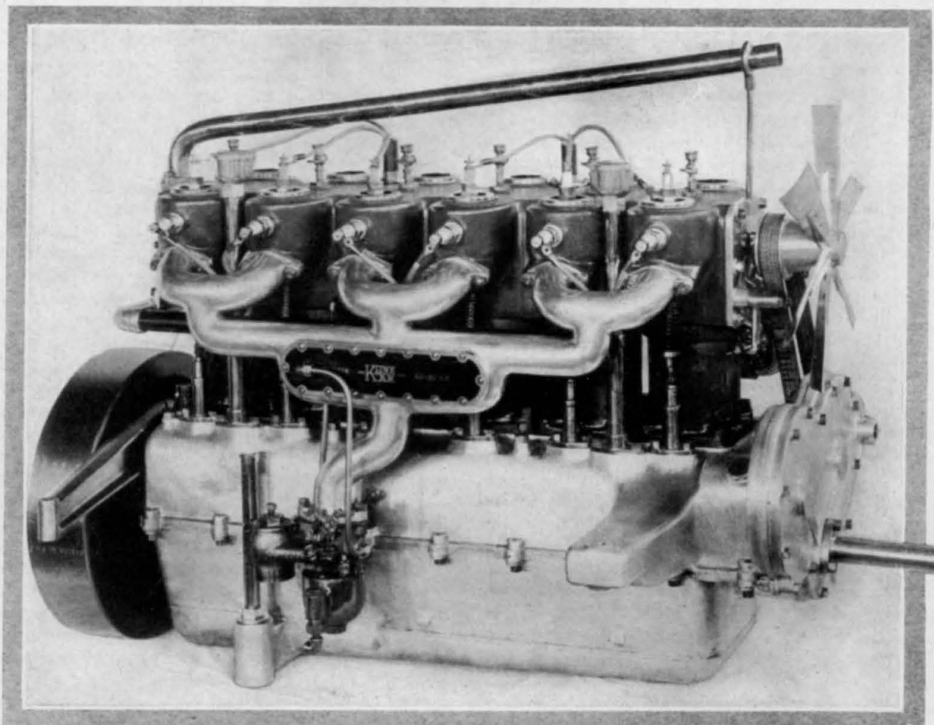
The Separately Cast Cylinders Are Bolted Up to Form a Bloc of Great Rigidity. Vaporization of the Fuel is Assisted by a Unique Manifold Jacket.

**I**N the Kline Kar the B. C. K. Motor Car Company, of York, Pa., has presented an engine of quite notable design. Probably the chief distinguishing feature is the manner in which the individual cylinder castings are formed into a single unit or bloc. This is accomplished by casting the water jackets open on opposite faces, at right angles with a line through the valve pockets, and facing the edges of these openings so that they match each other perfectly. This machine work is done with absolute accuracy and the six cylinders of the engine are then bolted together to form what is practically a bloc casting with a continuous jacket space from one end to the other. The open ends of this jacket space are in each case closed by attached plates, that at the forward end serving as a mounting for the radiator fan and as an entrance for the cooling water as it is delivered from the pump. The cover plate at the rear provides the outlet for the cooling water in its passage to the radiator. The obvious advantages of this cylinder construction are that the very desirable rigidity which is inherent in bloc engines is secured, while at the same time the machine shop operations are much simplified and replacements of cylinders can be made very cheaply.

It will also be noted in the accompanying photograph that the central loop in the intake manifold carries what appears to be a quite large and neat name plate. As a matter of fact, this name plate serves as one of the walls of a water jacket which partially surrounds this central loop in the manifold. Heated water is led from the engine jacket

through this manifold and from the latter to a jacket about the throttle valve of the car-

bureter. From this latter jacket the water returns to the suction side of the pump.



A bloc engine with individually cast cylinders. In addition to this feature, a portion of the intake manifold is jacketed.