**RADIAL PISTON ENGINE**

The radial engine is an internal combustion engine configuration in which the cylinders point outward from a central crankshaft like the spokes on a wheel. This configuration was very commonly used in aircraft engines before being superseded by turboshaft and turbojet engines. It is a reciprocating engine.  
The cylinders are connected to the crankshaft with a master-and-articulating-rod assembly. One cylinder has a master rod with a direct attachment to the crankshaft. The remaining cylinders pin their connecting rods attachments to rings around the edge of the master rod (see animation). Four-stroke radials almost always have an odd number of cylinders, so that a consistent every-other-piston firing order can be maintained, providing smooth running.  
  
  
  
  
**DEBATE OF USE**

The debate about the merits of the radial vs. the inline continued throughout the 1930s, with both types seeing some use. The radial was more popular largely due to its simplicity, and most navy air arms had dedicated themselves to the radial because of its improved reliability for over-water flights and better power/weight ratio for aircraft carrier takeoffs. Although inline engines offer smaller frontal area than radials, inline engines require the added weight and complexity of cooling systems and are generally more vulnerable to battle damage.  
The vast majority of radial-engined aircraft designed since the 1930s were also were fitted with NACA cowlings to reduce drag & to also enhance forward thrust by virtue of its airfoil effect.  
  
**PISTON**

In general, a piston is a sliding plug that fits closely inside the bore of a cylinder.  
Its purpose is either to change the volume enclosed by the cylinder, or to exert a force on a fluid inside the cylinder  
There are two ways that a piston engine can make power. These are the two-stroke cycle and the four-stroke cycle. A single cylinder two-stroke engine produces power every crankshaft revolution, while a single cylinder four-stroke engine produces power every other crankshaft revolution. Older designs of small two-stroke engines produced more pollution than four stroke engines, however modern two-stroke designs, like the Vespa ET2 Injection utilise fuel-injection and are as clean as four-strokes. Large diesel two-stroke engines, as used in ships and locomotives, have always used fuel injection and produce low emissions. One of the biggest internal combustion engines in the world, the Wärtsilä-Sulzer RTA96-C is a two-stroke; it is bigger than most two-story houses, has pistons nearly 1 meter in diameter and is one of the most efficient mobile engines in existence. In theory, a four stroke engine has to be larger than a two stroke engine to produce an equivalent amount of power. Two stroke engines are becoming less common in developed countries these days, mainly due to manufacturer reluctance to invest in reducing two-stroke emissions. Traditionally, two stroke engines needed more maintenance, even though they have fewer moving parts and tended to wear out faster than four stroke engines, however fuel-injected two-strokes achieve better engine lubrication and cooling and reliability should improve considerably.

**PISTON RING**

Is an open-ended ring that fits into a groove on the outer diameter of a piston in an internal combustion engine.  
Piston Rings The three main functions of piston rings in internal combustion engines are:  
1. Sealing the combustion chamber.   
2. Supporting heat transfer from the piston to the cylinder wall.   
3. Regulating motor oil consumption.   
The gap in the piston ring compresses to a few thousandths of an inch when inside the cylinder head. Most automotive pistons have three rings: The top two whilst also controlling oil are primarily for compression sealing (compression rings); the lower ring is for controlling the supply of oil to the liner which lubricates the piston skirt and the compression rings (oil control rings). Typical compression ring designs will have an essentially rectangular cross section or a keystone cross section. The periphery will then have either a barrel profile (top compression rings) or a taper or taper napier form (second compression rings. There are some taper faced top rings and on some old engines simple plain faced rings were used. Oil control rings typically are of 3 types. Single piece cast iron, helicoil spring backed cast iron or steel, multipiece steel. The spring backed oil rings and the cast iron oil rings have essentially the same range of peripheral forms which consist of 2 scraping lands of various detailed form. The multipiece oil control rings usually consist of 2 rails or segments (these are thin steel rings) with a spacer expander spring which keeps the two rails apart and provides the radial load.