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Powerplants

THE ORIGINAL EFFORT TO DEVELOP AN INTERNAL COMBUSTION engine is documented as far back as the 1820s, but it wasn't until 1876 that August Otto and Eugen Langen of Germany built the first four-stroke-cycle engine. Through the years there have been many changes in engine shapes and the numbers of cylinders per engine. "Round engines," such as the seven-cylinder radial engine used in U.S. Navy training aircraft and shown in Figure 4-1, were very popular for many years.

There have even been 12-cylinder engines such as the V-12, shown in Figure 4-2, used by the British in one of the versions of their Spitfire. And though there have been numerous, major improvements in technology and increases in efficiency since both of those engines were in everyday service, the "Otto-cycle" engine clearly traces its way through engine history and is the undisputed great grandfather of today's aircraft and automotive engines.

The reason an aircraft engine works is based on the simple chemical fact that if you compress the correct fuel/air mixture and ignite it, the result will be a rapid, even burning, which results in substantial expansion of the gasses. To understand how this works, let's look at a typical four-cylinder engine, such as the one shown in Figure 4-3, which uses a normally aspirated carburetor. We'll follow a drop of fuel from the fuel tank through the exhaust.