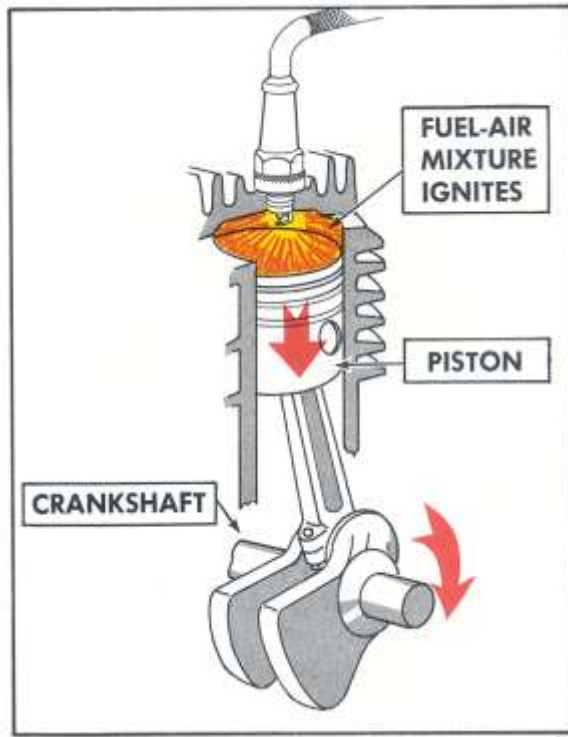


Small gas Engines



- Called Internal Combustion Engines
- All energy for driving the crankshaft is generated within the engine itself.
- Fuel-and-air mixture ignites within a confined chamber (cylinder) forcing piston to move

Distinguishing Features

- Because of the different requirements for small engines they come in many shapes and sizes
- Most variations are in accessories such as the types of starters, carburetors, and ignition systems
- Cylinder blocks are made from aluminum, or magnesium alloys, or from cast iron
- A major difference in the two most common types of small engines is in the number of strokes per cycle (we will discuss this later)
- One distinguishing feature that is easily seen on most engines is the *operating position of the crankshaft*

Crankshaft Operating Positions

- All crankshafts operate at a right angle to the cylinder and there are three basic operating positions of crankshafts in small engines:
 - *Vertical Crankshaft Engines*
 - *Horizontal Crankshaft Engines*
 - *Multi-position Crankshaft Engines*

Vertical Crankshaft Engines



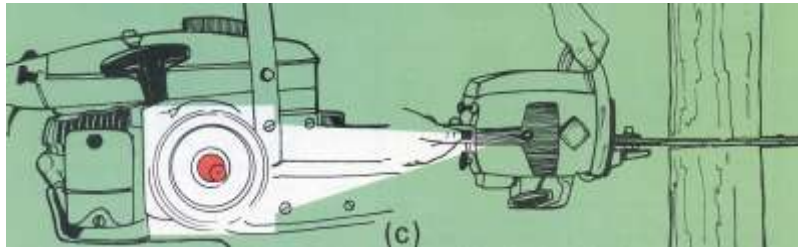
- Vertical crankshaft engines has its cylinder in a horizontal position
- The vertical crankshaft is well adapted to mounting a mower blade directly to the shaft
- If a horizontal shaft engine where to be used for a mower some type of right-angle drive would be necessary to align the crankshaft with the mower blade

Horizontal Crankshaft Engines



- May have its cylinder in a vertical, a horizontal, or an intermediate position.
- In the picture the horizontal crankshaft engine is well adapted to supplying power to a horizontal transmission shaft
- Such engines are often used on small tractors

Multi-position Crankshaft Engines

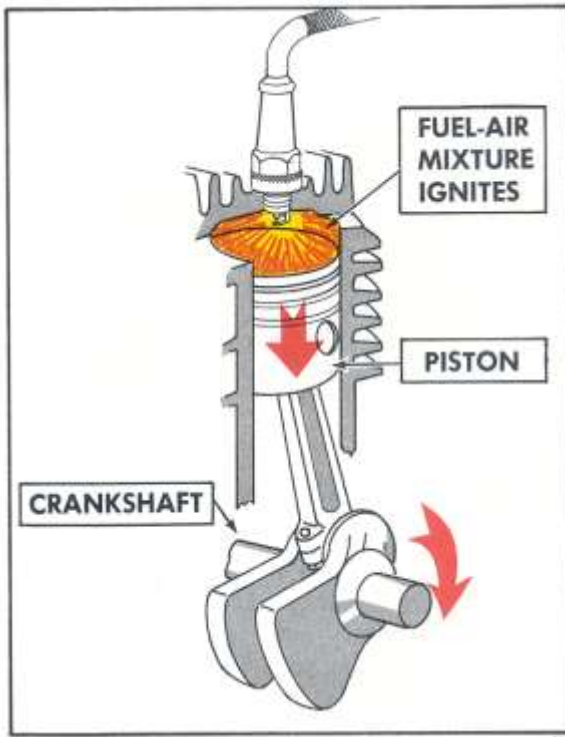


- Multi-position crankshaft engines will operate in any position. Of course the piston is always at a right angle to the position of the crankshaft
- This type of engine is used on chain saws and other applications where the position of operation may be at extreme angles, or even in upside down positions

Engine Cycles

- To make an internal combustion engine work continuously four principal events must take place. The four events are as follows;
 - **Intake**, or suction of the fuel-air mixture into the cylinder
 - **Compression** of the fuel-air mixture
 - **Power** – ignition and expansion of the heated fuel-air mixture
 - **Exhaust** of burned gases

Engines Cycles



- The completion of this series of events is called a **“cycle”**
- When the first cycle is completed, the second cycle starts, the third follows and so on as long as the engine is running
- The full travel of the piston in one direction – either toward the crankshaft or away from the crankshaft is called a **“stroke”**

Engine Cycles

- Some small engines are designed to complete a cycle during one revolution of the crankshaft (two strokes of the piston)
- Others require two revolutions of the crankshaft to complete one cycle (four strokes of the piston)
- Thus :
 - Two-stroke cycle engine
 - Four-stroke cycle engine

Next Lesson

Four Stroke Cycle vs
Two Stroke Cycle

