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Jet Engines

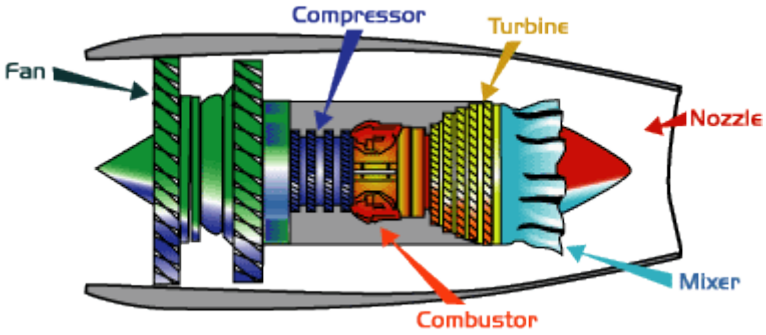
Jet engines are the one of the biggest and the most important invention in the history of aviation. Besides, jet engines lead to improve a lot of different and complex systems. Nowadays, jet engines are used in space, defense and aviation industries.

History of jet engine

Hans Von Ohain & his jet prototipe

The invention of jet engine was begun aeolipile which made around 150 B.C. On the other hand, Dr. Hans von Ohain and Sir Frank Whittle were recognized as being inventors of jet engines by everybody. Both of them did not know their works of each other. Von Ohain was the first designer of operational jet engines but Whittle was the first, registering a patent for schematics of a prototype, in 1930. Von Ohain obtained a patent for his prototype in 1936 for the first time and first flight of his jet was in 1939. Prototype which Whittle made, conducted its first flight in 1941.

Working principle of jet engines



Components of Jet Engine

When jet engines were produced, it was used impact-react principle. Air reaction was used in order to obtain torque which was used to move jet aircraft. Jet engine consist of four main part: air intake, compression of air, explosion of air-fuel mixture, exhaust of gas. Jet engines contains compressor, turbine, and nozzle in order to do these four main processes. Air, which is taken by frontal fan, is transferred to compressor. Air is compressed there. Temperature and pressure increase as the air is compressed. Compressed air moves from compressor to combustion chamber. Fuel is sprayed in compressed air and is ignited by spark plugs. Compressed and hot air-fuel mixture want to go out from engine by ignition effect. Exhaust gas pass throughout turbine. Turbine provides energy to compressor. Exhaust gas speed is increased by nozzle, so more powerful thrust is obtained. That thrust provides movement to jet aircraft.

The Types of Jet Engines

There are several types of jet engines. The types which consist of rotating parts, are called turbo: Turbojet, Turboprop, Turbofan, Turboshaft comparable with the types which do not consist of rotating parts, are called jet: Ramjet, Scramjet, pulsejet.

Turbojet

The engines which have turbojet type, have a basic working principle. Air is taken from the atmosphere to engine and fuel is added to air, then the fuel-air mixture is compressed by the compressor. At the same time, compressed air-fuel mixture increases temperature. After all of these operations, air-fuel mixture is ignited by spark plug so the engine has powerful torque.

Turboprop

Exhaust gas is used to move shaft which connects to turbine for saving fuel in lower altitude. Hot air rotates turbine behind of engine. At the same time, shaft that is connected to turbine, is connected to compressor and propeller. Generally, turboprop is used in cargo planes and small planes. Modern turboprop engines are smaller and perform better than before. The first turboprop engine was designed on Budapest which is capital of Hungary in 1938 by Gyorgy Jendrassik.

Turbofan

Turbofan Engine

Turbofan engines consist of fan which produce extra force, for more efficiency in high attitude. There is fan which assume air in front of the engine. There is an extra gas generator unlike turbojet. Turbofan is quitter and produce more thrust power in low speed. The consumption fuel of turbofan is lower. Nowadays, turbofan engine is used 4 in most of the planes.

Turboshaft

Turboshaft is different form of the jet engines. Propeller is not used in turboshaft engine. Helicopter rotor is provided power turboshaft engine instead of propeller. Speed of helicopter rotor was designed independent on speed of gas generator. Even if generator speed change, that provides no change of speed of the helicopter rotor.

Ramjet

Ramjet engine is the simplest engine. It does not have moved components. Ramjet engine is known a turbojet which does not have rotate components. Rate of the compressed air is limited based on speed. Ramjet produces static and very little power on lower than sound speed. Tool assisted takeoff application is needed like other mainstream planes. Generally, Ramjet engine is used in guided missile systems. It is used in space vehicles like ramjet engines.

Scramjet

Scramjet is type of ramjet. Scramjet has supersonic combustion chamber unlike ramjet. Scramjet consists of component which is called nozzle. Air is taken compressed from atmosphere to nozzle and air is taken out faster than speed of exhaust inlet by nozzle. Speed of the plane is used for compressing air. Scramjet needs little moving components. Generally, scramjet is used in planes which NASA uses.

Pulsejet

Pulsejet engine needs little moving components and can work static. There are also models which do not need moving components. There are two type of pulsejets. One type of pulsejet has valve, other has not valve. Scramjet is simple and materials of scramjet are very cheap. Fuel which can burn, is used by pulsejet.

Ramjet

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