



Mechanism of Crankshaft and its Applications

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DESCRIPTION

A crankshaft is a shaft driven by a crank mechanism consisting of a series of cranks and crankpins to which the connecting rods of an engine is attached. It is a mechanical part ready to perform a conversion between reciprocating motion and rotational motion. In a internal-combustion engine, it translates reciprocating motion of the piston into rotational motion, whereas during a reciprocating compressor, it converts the rotational motion into reciprocating motion. In order to do the conversion between two motions, the crankshaft has crank throws or crankpins, additional bearing surfaces whose axis is offset from that of the crank, to which the large ends of the connecting rods from each cylinder attach.

It is typically connected to a flywheel to scale back the pulsation characteristic of the four-stroke cycle, and sometimes a torsional or vibrational damper at the other end, to scale back the torsional vibrations often caused along the length of the crankshaft by the cylinders farthest from the output end working on the torsional elasticity of the metal. A crank is an arm attached at a right angle to a shaft by which circular motion is imparted to or received from the shaft. When combined with a connecting rod, it is often wont to convert circular motion into reciprocating motion, or the other way around. The arm could also be a bent portion of the shaft, or a separate arm or disk attached to it. Attached to the top of the crank by a pivot may be a rod, usually called a connecting rod.

The term often refers to a human-powered crank which is used to manually turn an axle, as during a bicycle crank set or a brace and bit drill. In this case a person's arm or leg serves as the connecting rod, applying reciprocating force to the crank. There is usually a bar perpendicular to the opposite end of the arm, often with a freely rotatable handle or pedal attached. To withstand the heavy loads involved, crankshafts have a hardened

surface and a tough core. Therefore, crankshafts are often made from forged steel. The continuous grain course enables a high torsion resistance to be achieved. The bearing positions on the crankshaft are surface hardened, making them more resistant to wear.

Inside the crankshaft, it is consists of main bearings are also called the plain bearings. The crankshaft is supported by the main bearing on the plain bearings. A balanced load is provided in the opposite direction of the crank arm for the equilibrium. A crankshaft is typically manufactured of steel by casting or forging process and is machined and grounded to offer suitable journals for the connecting rod and main bearing. It must be strong enough to take the thrust of the pistons during the power strokes without the excessive distortion. Also, it must be carefully balanced to eliminate undue vibration resulting from the load of the offset cranks. The crankshaft has drilled oil passages through which oil can flow from the main bearing to the connecting rod bearing.

Applications of crankshaft

- The crankshaft is commonly used in an engine for converting the reciprocating motion into a circular motion, making the use of energy or power much easier. A crankshaft is actually the heart of the internal combustion engine.
- The crankshaft is liable for the proper operation of the engine. In some circumstances, it also saves energy to move the piston for compression, suction, and exhaust strokes.
- A balanced crankshaft can keep your engine running smoothly, provide more power, less waste of energy, and reduce engine vibration. It is mainly employed to convert linear motion to the rotational speed.

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