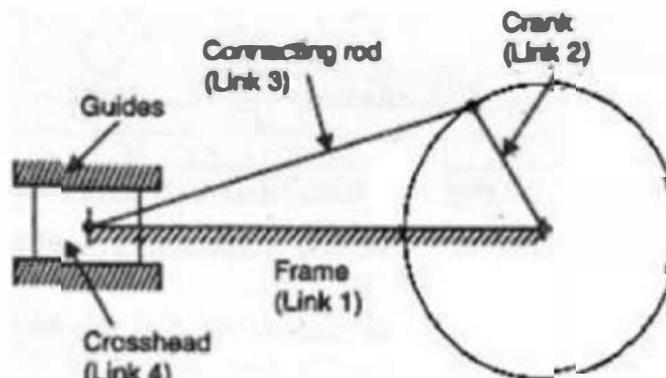


Single Slider Crank Mechanism

The single slider crank mechanism is a four-bar linkage with a rotating crank attached to a slider that moves in a straight line. This mechanism is made up of three major components: the crank, which is the revolving disc, the slider, which slides inside the tube; and the connecting rod, which connects the pieces. The single slider crank mechanism is one of the high-scoring topics of the [GATE ME syllabus](#). The connecting rod drives the wheel around for the first 180 degrees of wheel rotation while the slider travels to the right. The connecting rod pushes the wheel around to complete the rotation when the slider begins to move back into the tube.

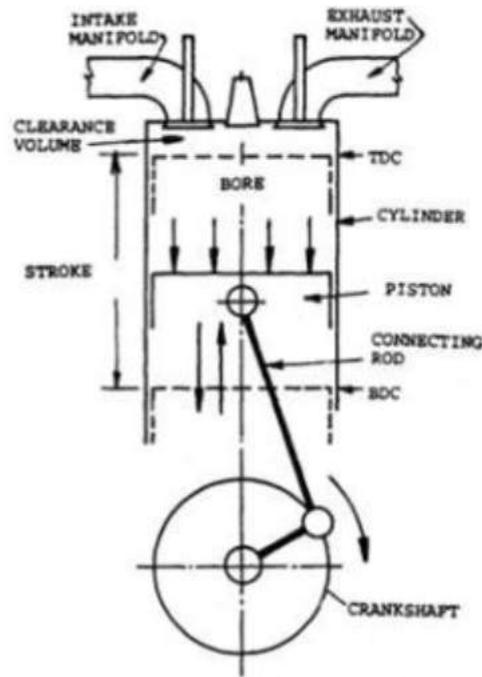


Inversions of Single Slider Crank Mechanism

A mechanism is formed when one of the links in a kinematic chain is fixed. So, by fixing distinct links in a kinematic chain, in turn, we can generate as many mechanisms as the number of links in a kinematic chain. Inversion of the mechanism refers to the process of getting alternative mechanisms by fixing different links in a kinematic chain. The single slider crank mechanism inversions are used to formulate various questions in the [GATE question paper](#). Various inversions of this mechanism are also important in the exam perspective.

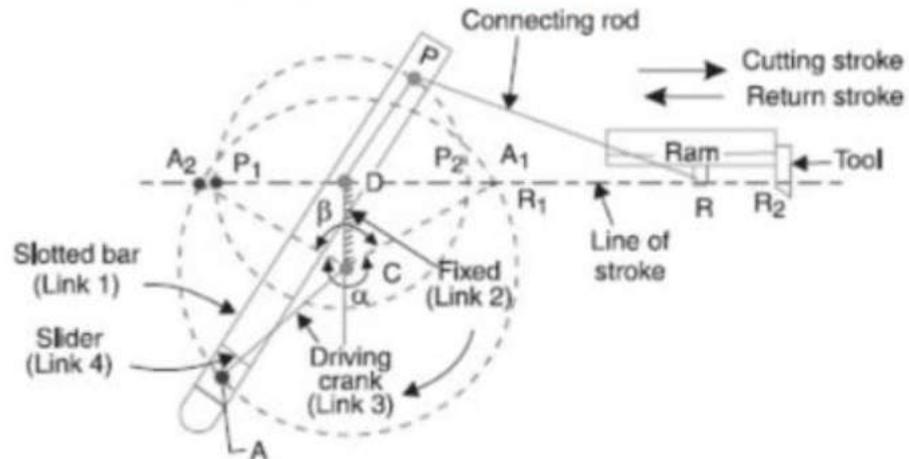
First Inversion of Single Slider Crank Mechanism

This inversion occurs when connection 1 (the ground body) is fixed. Applications include reciprocating engines and reciprocating compressors. Let us see the diagram of the first inversion of the single slider crank mechanism provided below:



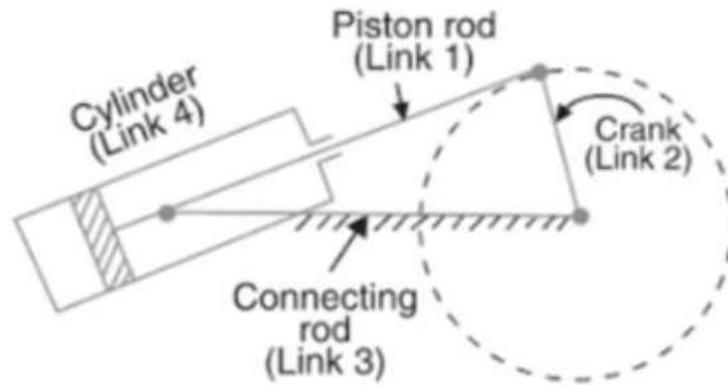
Second Inversion of the Single Slider Crank Mechanism

When link 2 (crank) is fixed, this inversion occurs. Whitworth rapid return mechanism, Rotary engine, and so on. The diagram of this mechanism is:



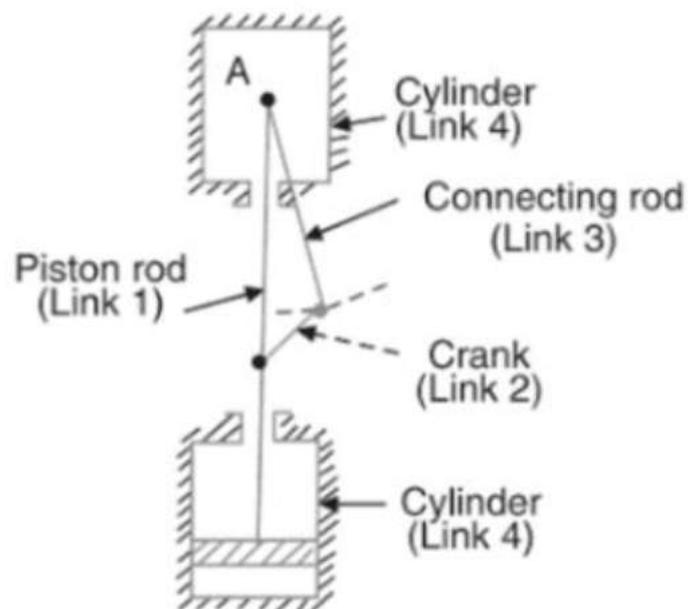
Third Inversion of the Single Slider Crank Mechanism

This inversion occurs when link 3 (the connecting rod) is fastened. Third inversion of single slider crank mechanism is shown below. Applications include slotted crank mechanisms and oscillatory engines.



Fourth Inversion of the Single Slider Crank Mechanism

When link 4 (slider) is fixed, this inversion occurs. Hand pump, pendulum pump, or bull engine, for example. Fourth inversion of the single slider crank mechanism is shown in the diagram provided below:



Single Slider Crank Mechanism Applications

A slider-crank mechanism is a mechanical arrangement that converts straight-line motion to rotary motion, as in a reciprocating piston engine, or rotary motion to straight-line motion, as in a reciprocating piston pump. These applications are descreetly elaborated in the [GATE notes](#). The applications of a single slider crank mechanism are as follows:

1. **Reciprocating Engines/Pumps:** The slider-crank mechanism of reciprocating engines/pumps converts straight-line motion to rotary motion and vice versa.
2. **Combustion Engines:** A slider-crank mechanism is utilized in combustion engine piston cylinder assemblies to convert reciprocating motion into circular motion and vice versa.

3. Rotary Engines: By securing the crank in the Slider-crank mechanism, rotary engines can be formed. Cars utilize rotary engines.
4. Oscillating Cylinder Engine: By securing the connecting rod in the Slider-crank mechanism, oscillating cylinder engines can be created.
5. Hand Pump: Attach the slider to the Slider-crank mechanism, which is used to create hand pumps.

