SNS COLLEGE OF TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)

Department of Mechanical Engineering

19MET302 - THEORY OF MACHINES

Unit – I

BASICS OF MECHANISMS

TOPIC - 4

SINGLE SLIDER CRANK CHAIN(SSCC)

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SINGLE SLIDER CRANK CHAIN

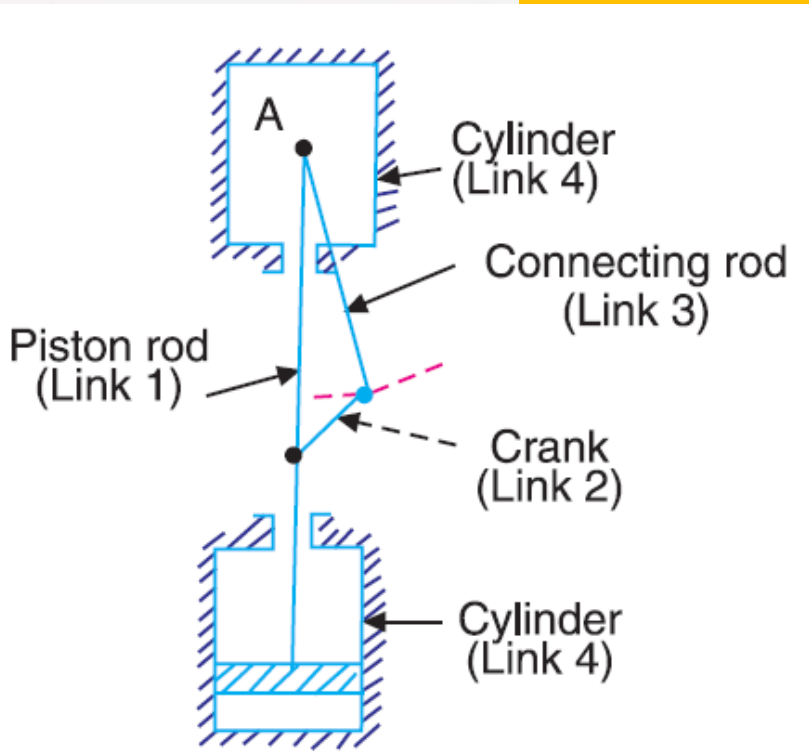
1. Pendulum pump or Bull engine.
2. Oscillating cylinder engine.
3. Rotary internal combustion engine or Gnome engine.
4. Crank and slotted lever quick return motion mechanism.
5. Whitworth quick return motion mechanism.

SOURCE: DREAMSTIME

PENDULUM PUMP OR BULL ENGINE

SOURCE: Khurmi R S

- In this mechanism, the inversion is obtained by fixing the cylinder or link 4 (i.e. sliding pair), as shown in Figure.
- In this case, when the crank (link 2) rotates, the connecting rod (link 3) oscillates about a pin pivoted to the fixed link 4 at A and the piston attached to the piston rod (link 1) reciprocates.
- The duplex pump which is used to supply feed water to boilers have two pistons attached to link 1

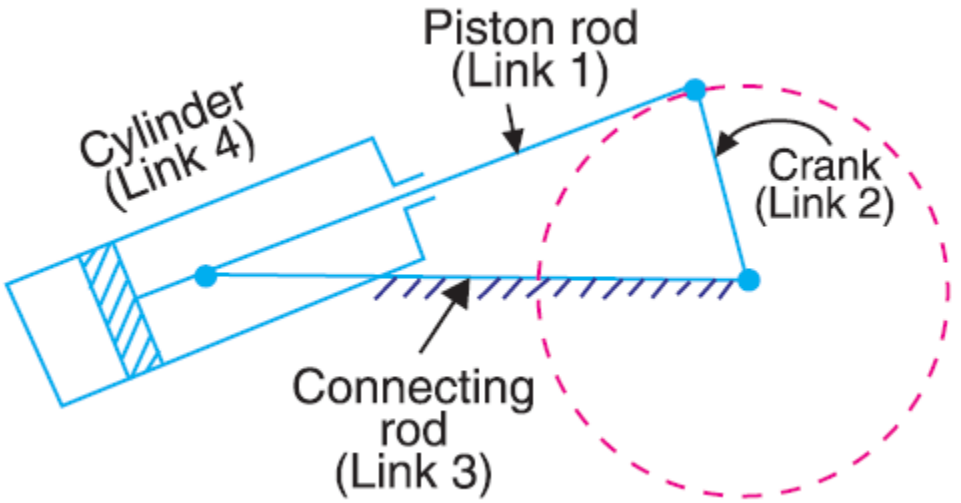


BOARD USAGE ALSO

BULL ENGINE

OSCILLATING CYLINDER ENGINE

- In this mechanism, the link 3 forming the turning pair is fixed. The link 3 corresponds to the connecting rod of a reciprocating steam engine mechanism.
- When the crank (link 2) rotates, the piston attached to piston rod (link 1) reciprocates and the cylinder (link 4) oscillates about a pin pivoted to the fixed link at A.



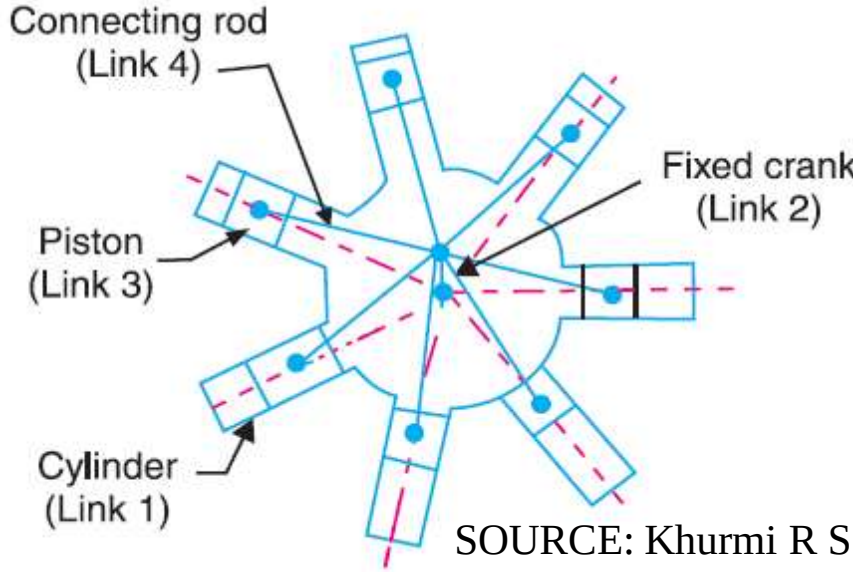
SOURCE: Khurmi R S

OSCILLATING ENGINE

BOARD USAGE ALSO

ROTARY INTERNAL COMBUSTION ENGINE OR GNOME ENGINE

- It consists of seven cylinders in one plane and all revolves about fixed centre D, as shown in Figure , while the crank (link 2) is fixed.
- In this mechanism, when the connecting rod (link4) rotates, the piston (link 3) reciprocates inside the cylinders forming link 1.



SOURCE: Khurmi R S

GNOME ENGINE

ROTARY INTERNAL COMBUSTION ENGINE OR GNOME ENGINE

- Sometimes back, rotary internal combustion engines were used in aviation.
- But now-a-days gas turbines are used in its place.

SOURCE: Khurmi R S

BOARD USAGE ALSO

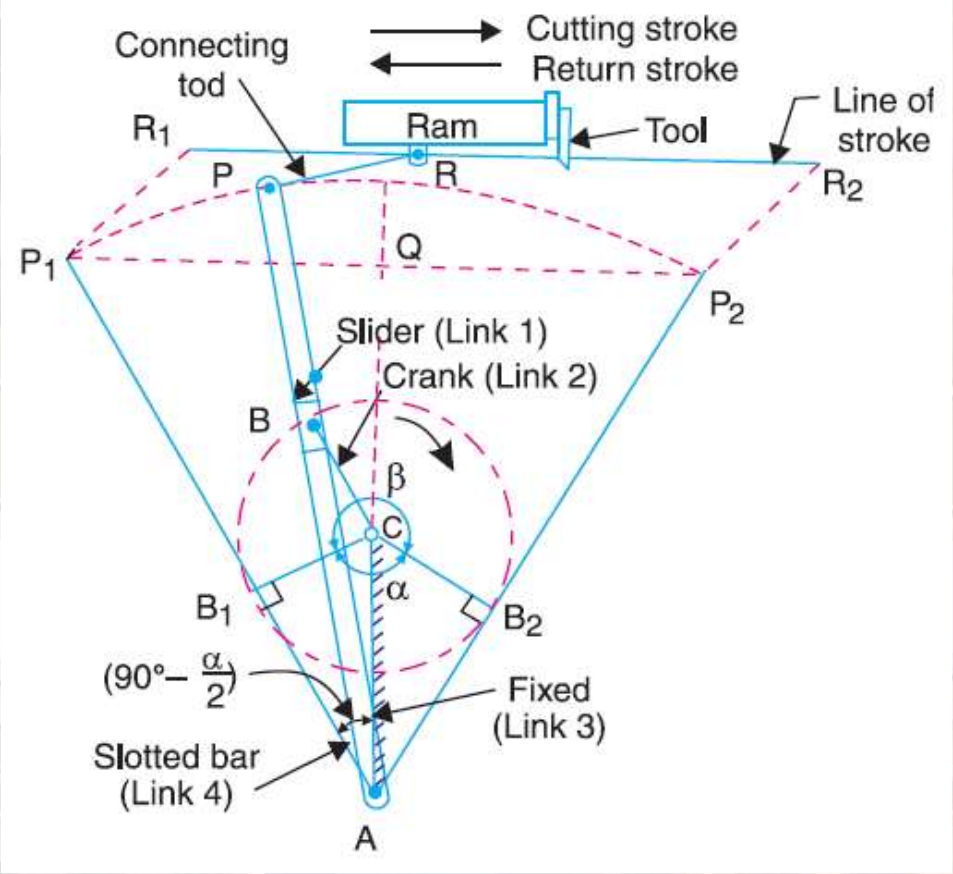
ROTARY ENGINE

CRANK AND SLOTTED LEVER QUICK RETURN MOTION MECHANISM

- This mechanism is mostly used in shaping machines, slotting machines and in rotary internal combustion engines.
- The link 3 corresponds to the connecting rod of a reciprocating steam engine. The driving crank CB revolves with uniform angular speed about the fixed centre C.

BOARD USAGE ALSO

CRANK AND SLOTTED LEVER QUICK RETURN MOTION MECHANISM



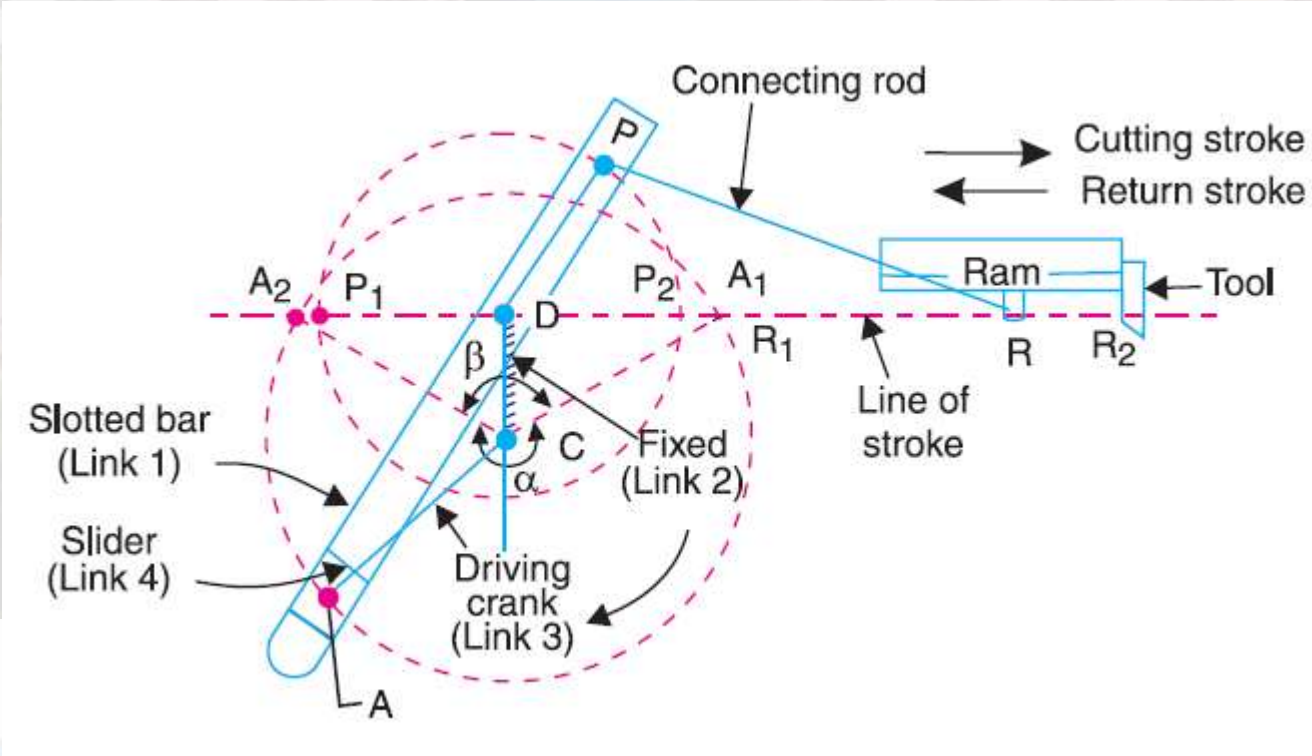
SOURCE: Khurmi R S

WHITWORTH QUICK RETURN MOTION MECHANISM

- This mechanism is mostly used in shaping and slotting machines.
- The link 2 corresponds to a crank in a reciprocating steam engine.
- The driving crank CA (link 3) rotates at a uniform angular speed.
- The slider (link 4) attached to the crank pin at A slides along the slotted bar PA (link 1) which oscillates at a pivoted point D.
- The connecting rod PR carries the ram at R to which a cutting tool is fixed.

BOARD USAGE ALSO

WHITWORTH QUICK RETURN MOTION MECHANISM



SOURCE: Khurmi R S

BOARD USAGE ALSO

SINGLE SLIDER CRANK CHAIN

ASSESMENT QUESTION

1. Show that slider crank mechanism is a modification of the basic four bar mechanism.

2. Sketch slider crank chain and its various inversions, stating actual machines in which these are used in practice.

SINGLE SLIDER CRANK CHAIN

ASSESMENT QUESTION

1. Which of the following is an inversion of single slider crank chain ?
(a) Beam engine (b) Watt's indicator mechanism
(c) Elliptical trammels (d) Whitworth quick return motion mechanism

2. The mechanism forms a structure, when the number of degrees of freedom (n) is equal to
(a) 0 (b) 1 (c) 2 (d) – 1

SOURCE: WEB