SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

Department of Mechanical Engineering

Kinematics of Machinery

Unit – I

BASICS OF MECHANISMS

TOPIC - 5

DOUBLE SLIDER CRANK CHAIN

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DOUBLE SLIDER CRANK CHAIN

1. Elliptical trammels.
2. Scotch yoke mechanism.
3. Oldham's coupling.

Internship: BULL MACHINES.

SOURCE: HY-MAC

ELLIPTICAL TRAMMELS

- It is an instrument used for drawing ellipses. This inversion is obtained by fixing the slotted plate (link 4), as shown in next slide Figure.
- The fixed plate or link 4 has two straight grooves cut in it, at right angles to each other.
- The link 1 and link 3, are known as sliders and form sliding pairs with link 4. The link AB (link 2) is a bar which forms turning pair with links 1 and 3.

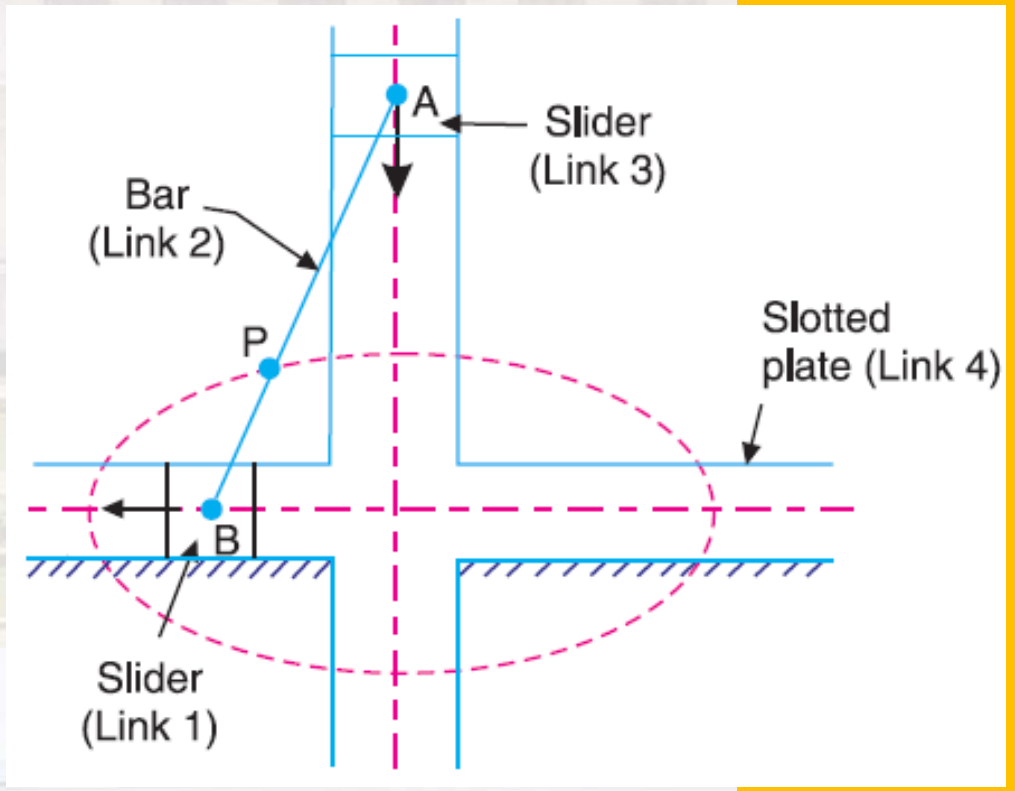
BOARD USAGE ALSO

BULL ENGINE

ELLIPTICAL TRAMMELS

SOURCE: Khurmi R S

- When the links 1 and 3 slide along their respective grooves, any point on the link 2 such as P traces out an ellipse on the surface of link 4, as shown in Figure.



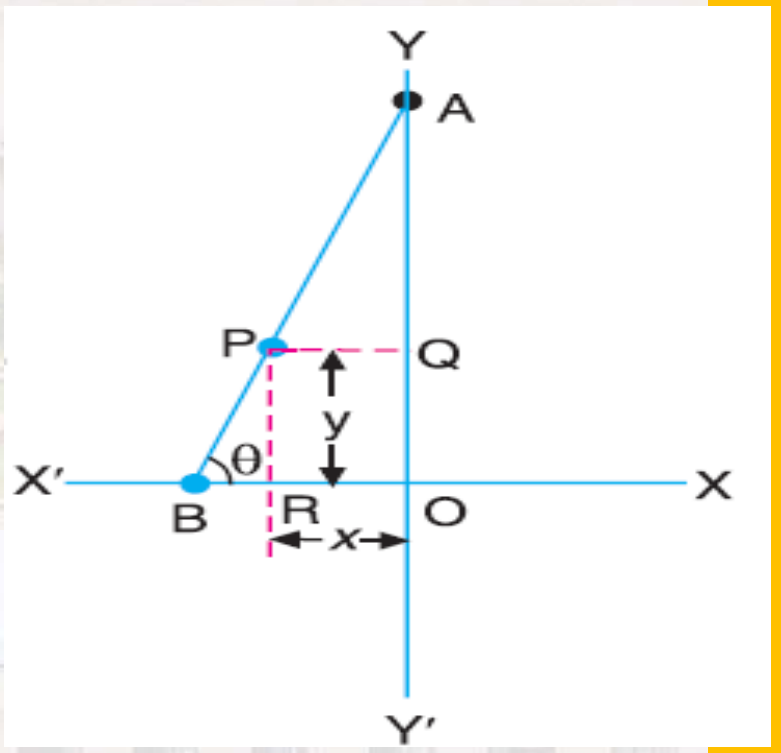
ELLIPTICAL TRAMMELS

BOARD USAGE ALSO

ELLIPTICAL TRAMMELS

$x = PQ = AP \cos\theta$; and $y = PR = BP \sin\theta$

$x2 + y2 = (AP)2$



BOARD USAGE ALSO

SOURCE: Khurmi R S

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

ROTARY ENGINE

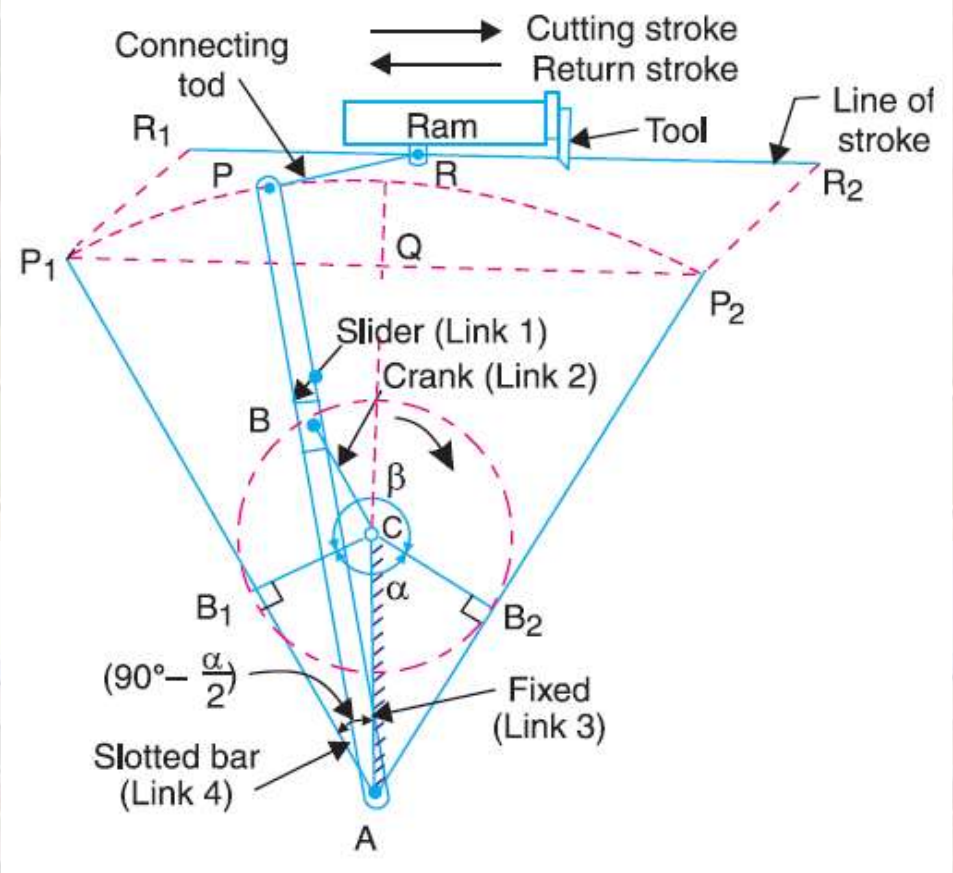
BOARD USAGE ALSO

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



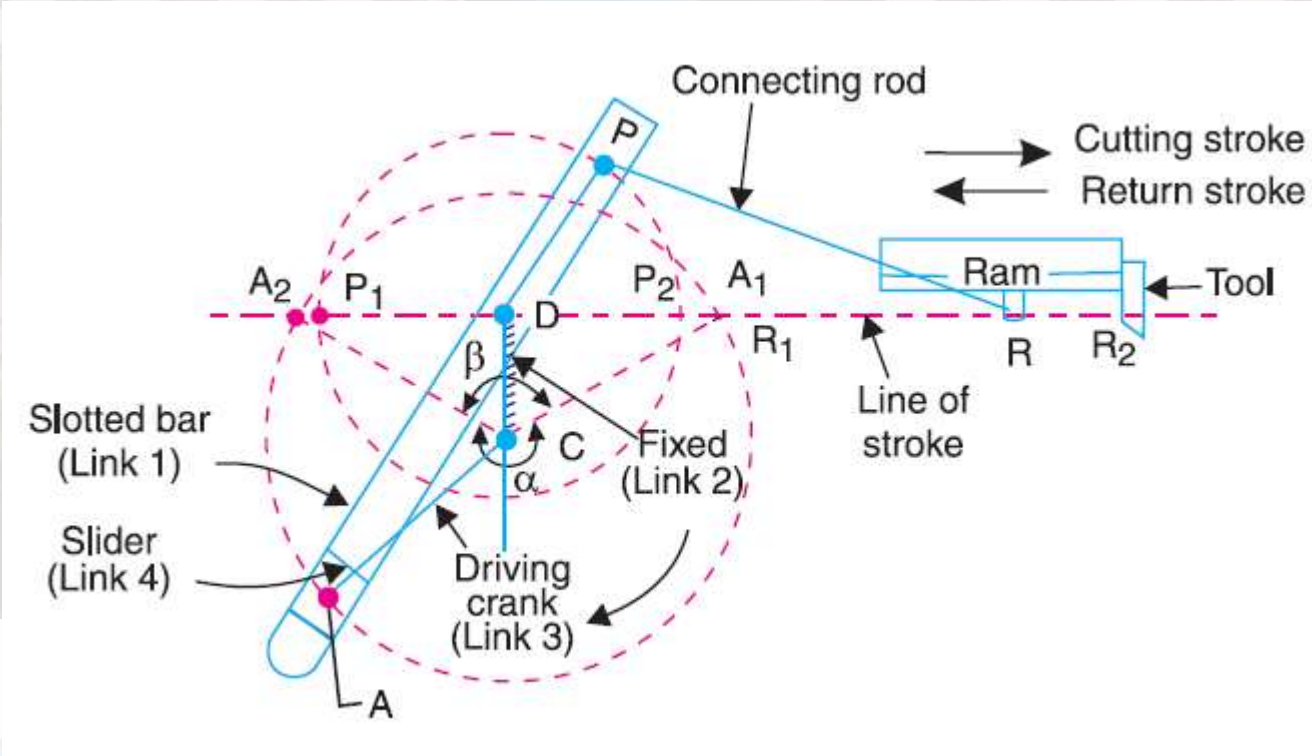
SOURCE: Khurmi R S

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