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FACULTY OF ENGINEERING & TECHNOLOGY

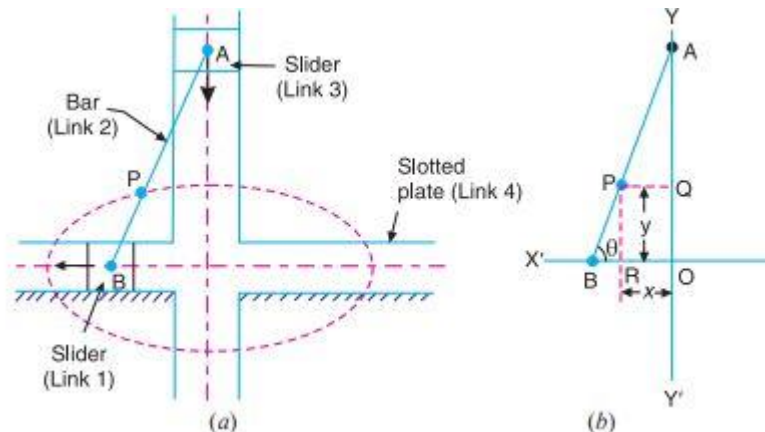
Double Slider Crank Chain

A kinematic chain which consists of two turning pairs and two sliding pairs is known as double slider crank chain, as shown in Fig. We see that the link 2 and link 1 form one turning pair and link 2 and link 3 form the second turning pair. The link 3 and link 4 form one sliding pair and link 1 and link 4 form the second sliding pair.

Inversions of Double Slider Crank Chain

1. Elliptical trammels.

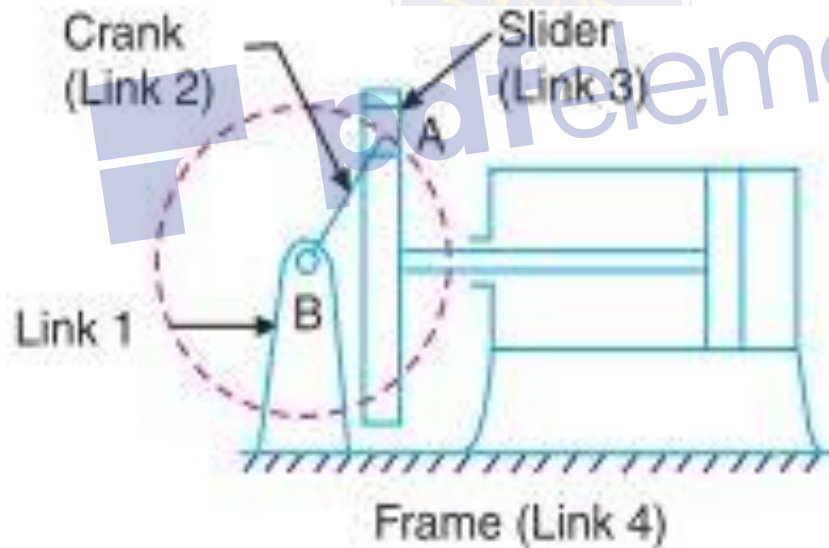
It is an instrument used for drawing ellipses. This inversion is obtained by fixing the slotted plate (link 4), as shown in Fig.. The fixed plate or link 4 has two straight grooves cut in it, at right angles to each other. The link 1 and link 3, are known as sliders and form sliding pairs with link 4.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



2. Scotch yoke mechanism.

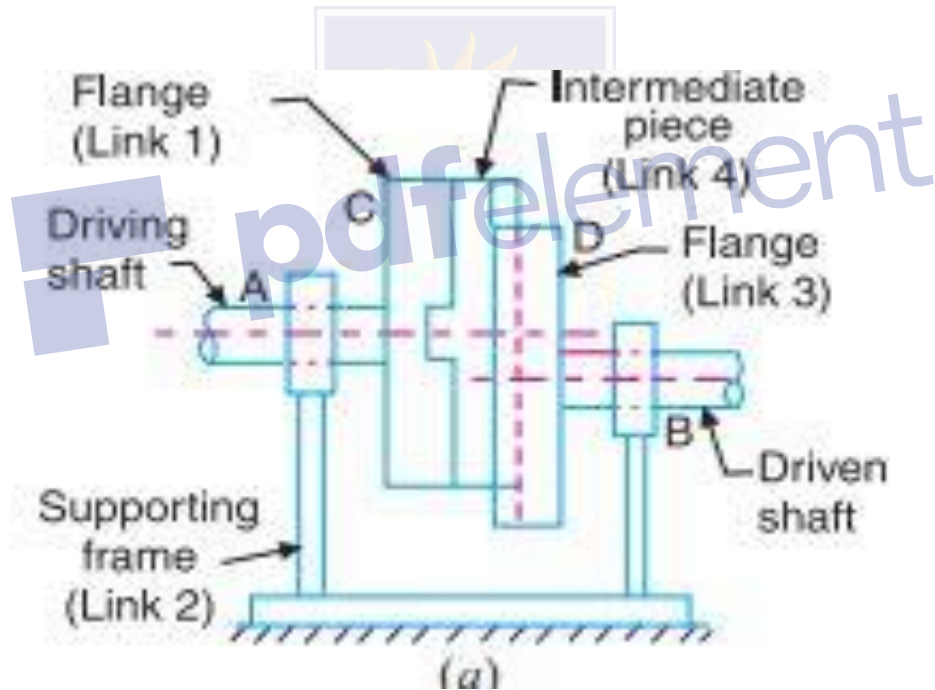
This mechanism is used for converting rotary motion into a reciprocating motion.

The inversion is obtained by fixing either the link 1 or link 3, link 1 is fixed. In this mechanism, when the link 2 (which corresponds to crank) rotates about B as centre, the link 4 (which corresponds to a frame) reciprocates. The fixed link 1 guides the frame.



3. Oldham's coupling.

An Oldham's coupling is used for connecting two parallel shafts whose axes are at a small distance apart. The shafts are coupled in such a way that if one shaft rotates, the other shaft also rotates at the same speed. This inversion is obtained by fixing the link 2, as shown in Fig.



Properties of the Instantaneous Centre

1. A rigid link rotates instantaneously relative to another link at the instantaneous centre for the configuration of the mechanism considered.
2. The two rigid links have no linear velocity relative to each other at the instantaneous centre. At this point (i.e. instantaneous centre), the two rigid links have the same linear velocity relative to the third rigid link.

Number of Instantaneous Centres in a Mechanism

The number of instantaneous centres in a constrained kinematic chain is equal to the number of possible combinations of two links. The number of pairs of links or the number of instantaneous centres is the number of combinations of n links taken two at a time.

Types of Instantaneous Centres :

$$N = n(n-1)/2$$

1. Fixed instantaneous centres,
2. Permanent instantaneous centres, and
3. Neither fixed nor permanent instantaneous centres.

The first two types i.e. fixed and permanent instantaneous centres are together known as primary instantaneous centres and the third type is known as secondary instantaneous centres.