UNIT -I

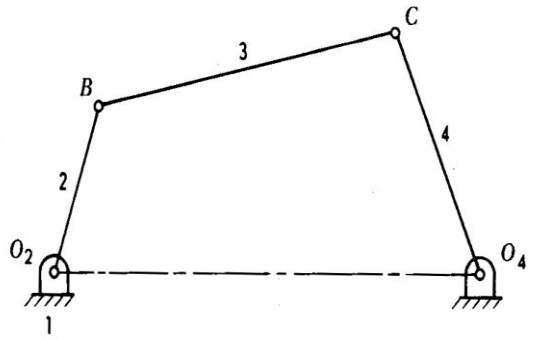
Inversions of Four bar Mechanisms

INVERSION OF MECHANISM

- The method of obtaining different mechanism by fixing different links in a kinematic chain is known as inversion of mechanism.

FOUR BAR CHAIN-It consist of four links and four Turning Pairs.

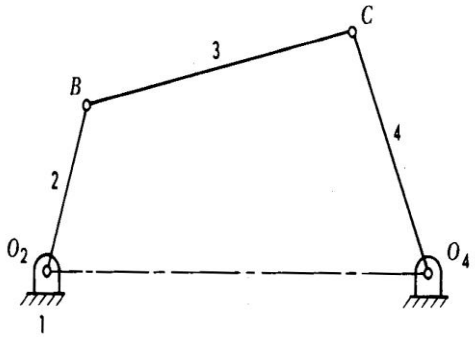
link 1- frame
link 2- crank (driver)
link 3 - Connecting rod (coupler)
link 4- lever (rocker)



It should satisfy Grashof's law.

Four bar chain mechanism .....

- Link 1)Frame –the fixed link is known as frame.
- Link2)Crank-A link that make complete revolution is called as crank.
- Link3)Coupler – The link opposite to the fixed link is known as coupler.
- Link4) Lever or rocker or follower – the link which makes partial rotation or oscillation is known as lever.

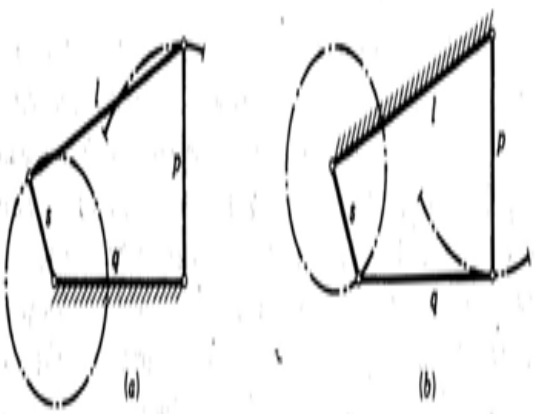


INVERSIONS OF FOUR BAR CHAIN MECHANISM.

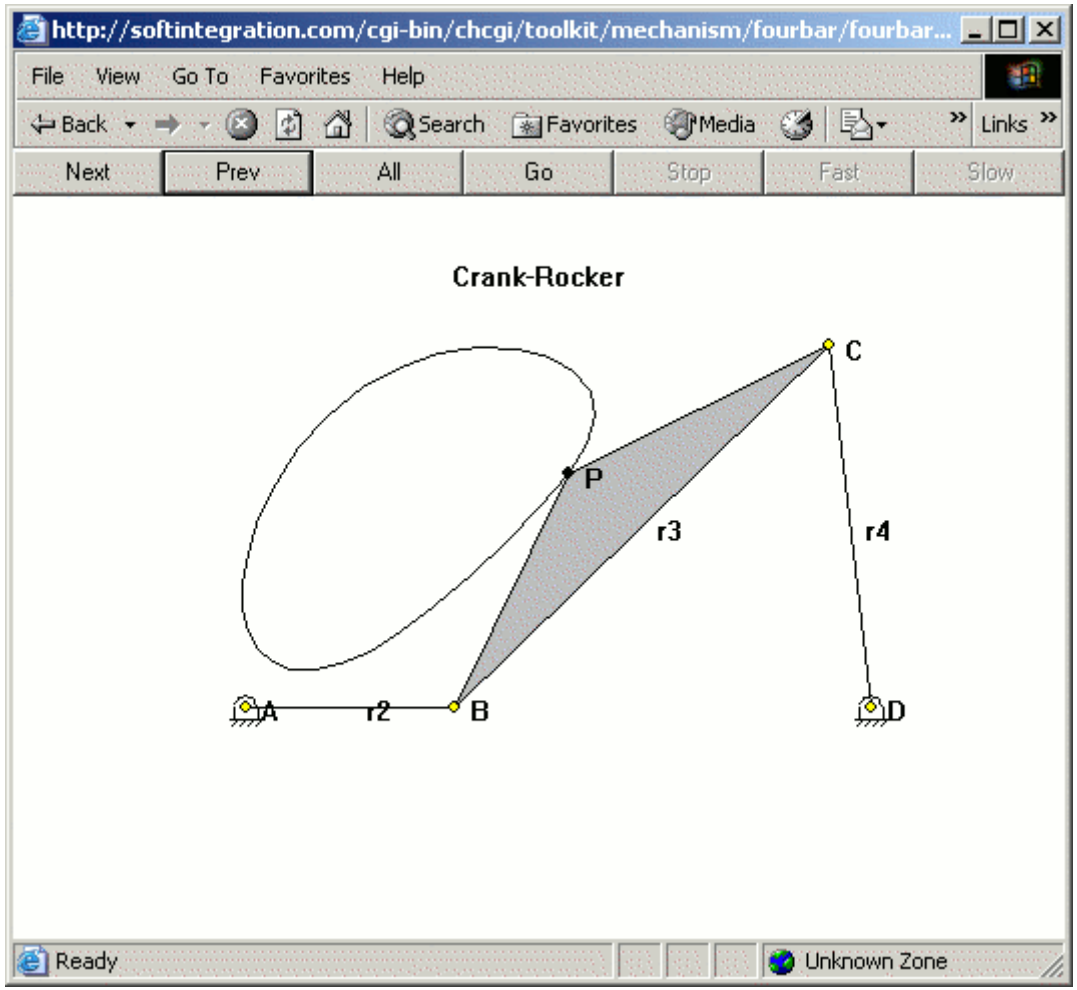
- <u>FIRST INVERSION :</u>

Fig(a) Link1 is crank ,Link4 is fixed ,and Link3 oscillates.

Fig(b) Link2 is fixed, and Link 3 oscillates known as ***crank-rocker Mechanism, or a crank lever mechanism or Rotary oscillating converter.***

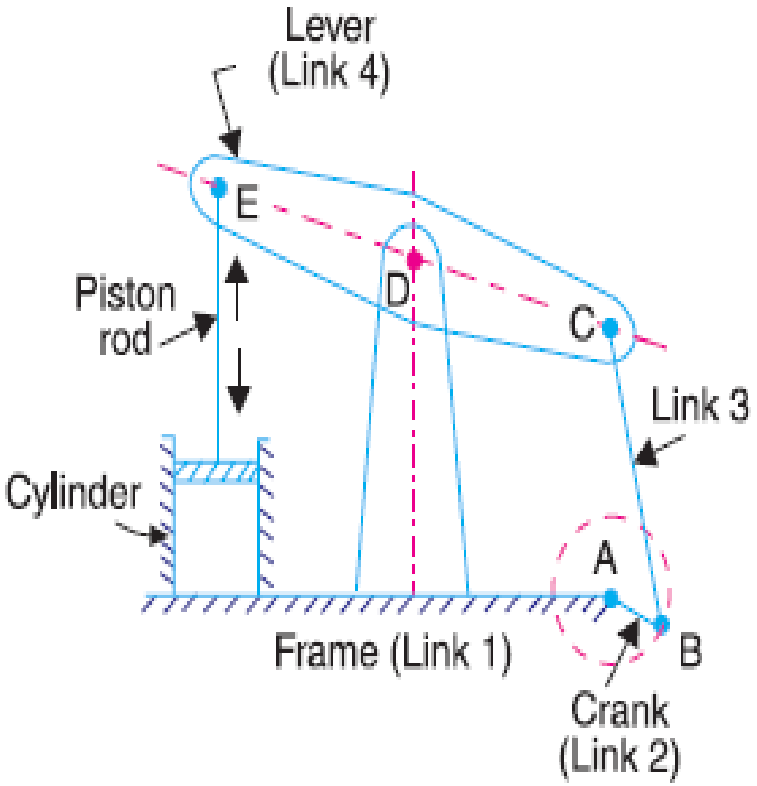


Crank rocker mechanism

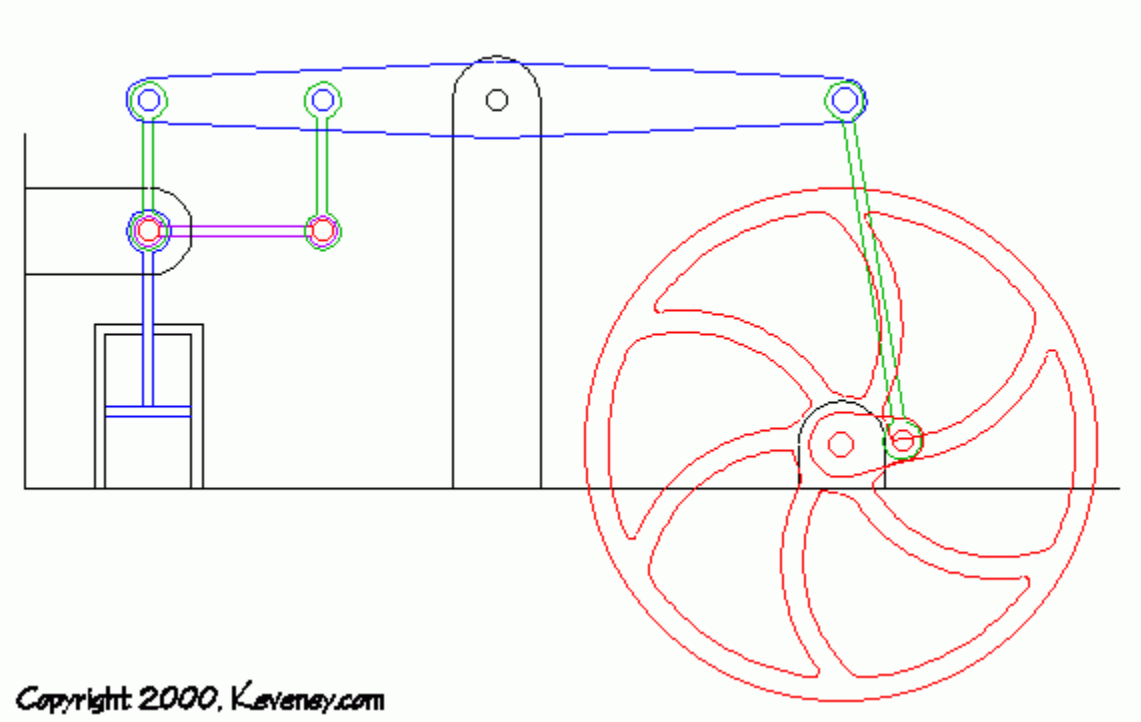


APPLICATION

- **Example: Beam engine.**
- Link 1:fixed frame
- Link 2 : crank
- Link 3 : connecting rod
- Link 4 : lever
- Purpose: convert rotary motion into reciprocating motion .

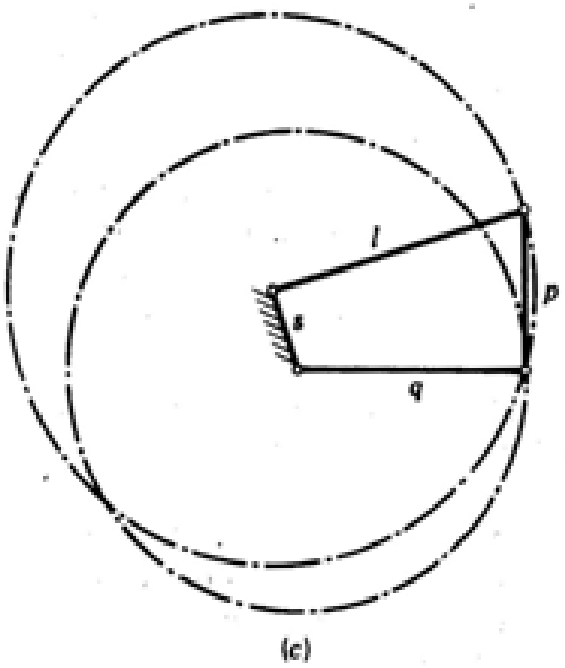


Beam engine ….



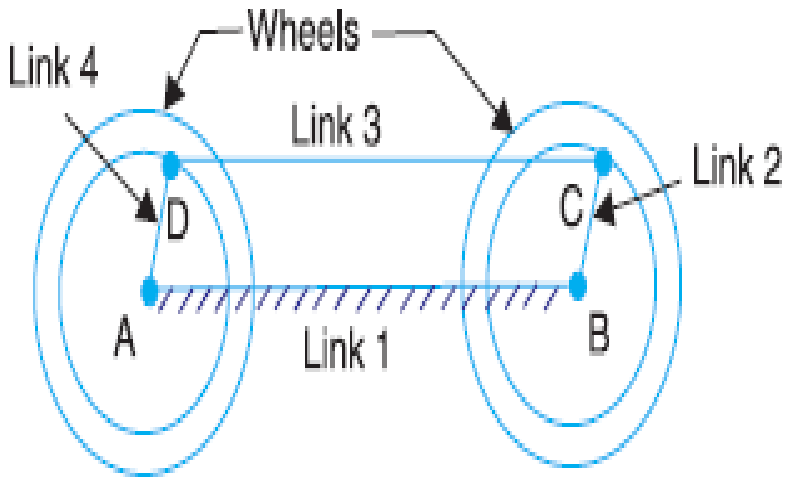
Second inversion

- If the shortest link i.e. crank is fixed, the adjacent links 2 and4 would make the complete revolutions .
- Thus mechanism thus obtained is known as ***crank-crank or double crank or rotary-rotary converter.***



APPLICATION -COUPLING ROD OF A LOCOMOTIVE.

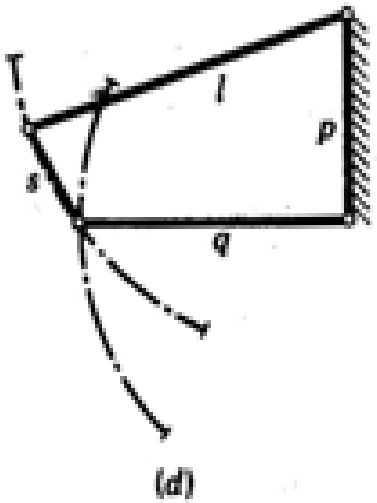
- Link 1:fixed frame
- Link 2 : crank
- Link 3 : connecting rod
- Link 4 : crank



Purpose: convert rotary motion into rotating motion

THIRD INVERSION

- If the link opposite to the shortest link is made coupler and the other two links would oscillate .
- The mechanism thus obtained is known as ***rocker-rocker, double rocker ,oscillating-oscillating converter.***



WATTS INDICATOR DIAGRAM

- Link 1:fixed frame
- Link 2 : lever (CB)
- Link 3 : connecting rod (CE)
- Link 4 : lever (BFD)

Purpose: convert linear motion into linear motion .