FACULTY OF ENGINEERING & TECHNOLOGY

In a Davis steering gear, the distance between the pivots of the front axle is 1.2 metres and the wheel base is 2.7 metres. Find the inclination of the track arm to the longitudinal axis of the car, when it is moving along a straight path.

Solution.Given : c = 1.2 m ; b= 2.7 m

Let α= Inclination of the track arm to the longitudinal axis.

We know that

1.2 /tan 0.222

222.7

c/bα= = =×

or α= 12.5°

Ackerman Steering Gear

The Ackerman steering gear mechanism is much simpler than Davis gear. The difference

between the Ackerman and Davis steering gears are :

1. The whole mechanism of the Ackerman steering gear is on back of the front wheels; whereas in Davis steering gear, it is in front of the wheels.

2. The Ackerman steering gear consists of turning pairs, whereas Davis steering gear consists of sliding members.

Left turn

Back axle
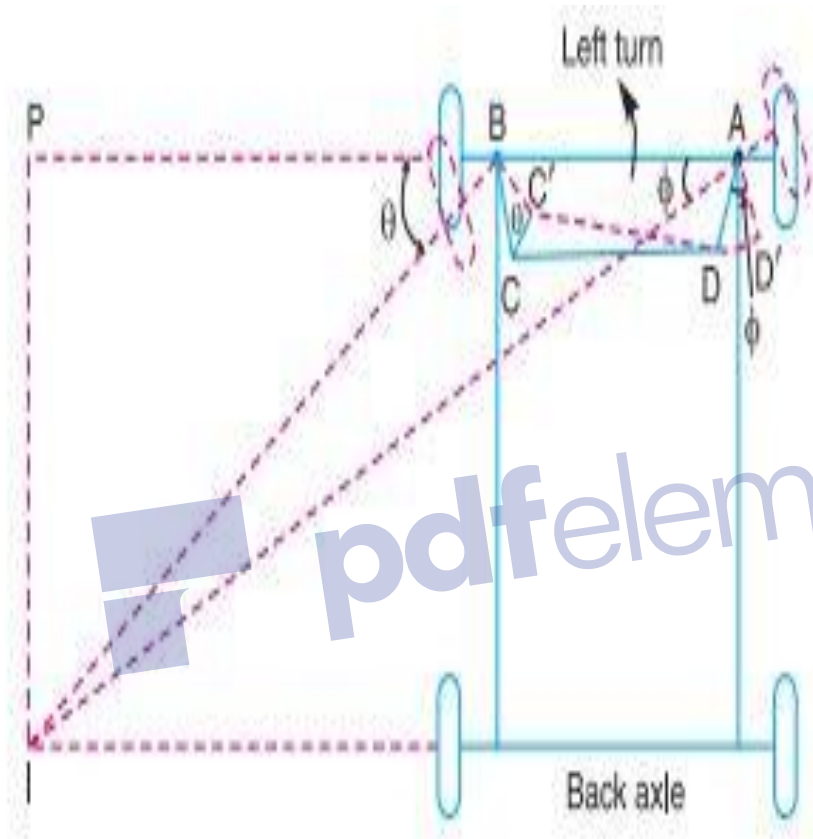
In Ackerman steering gear, the mechanism ABCD is a four bar crank chain, as shown in Fig.

. The shorter links B C and AD are of equal length and are connected by hinge joints with front wheel axles. The longer links AB and CDare of unequal length. The following are the only three positions for correct steering.

1. When the vehicle moves along a straight path, the longer links AB and Cd are parallel and the shorter links BC and AD are equally inclined to the longitudinal axis of the vehicle, as shown by firm lines in Fig.

2. When the vehicle is steering to the left, the position of the gear is shown by dotted lines in Fig. In this position, the lines of the front wheel axle intersect on the back wheel axle at I, for correct steering.

3. When the vehicle is steering to the right, the similar position may be obtained. In order to satisfy the fundamental equation for correct steering, as discussed in, the inks AD and DCare suitably proportioned. The value of θ and φmay be obtained either graphically or by calculations.

Universal or Hooke's Joint

A *Hooke's joint is used to connect two shafts, which are intersecting at a small angle, as shown in Fig. The end of each shaft is forked to U-type and each fork provides two bearings. for the arms of a cross. The arms of the cross are perpendicular to each other.

The motion is transmitted from the driving shaft to driven shaft through a cross. The inclination of the two shafts may be constant, but in actual practice it varies, when the motion is transmitted. The main application of the Universal or Hooke's joint is found in the transmission from the **gear box to the differential or back axle of the automobiles. It is also used for transmission of power to different spindles of multiple drilling machine. It is also used as a knee joint in milling machines.