A little consideration will show that in the initial mean position of the mechanism, the instantaneous centre of the link BAlies at infinity. Therefore the motion of the point Pis along the vertical line BA. Let OB′ A′O1

be the new position of the mechanism after the links OBand O1 Aare displaced through an angle θand φrespectively. The instantaneous centre now lies atI. Since the angles θand φare very small, therefore

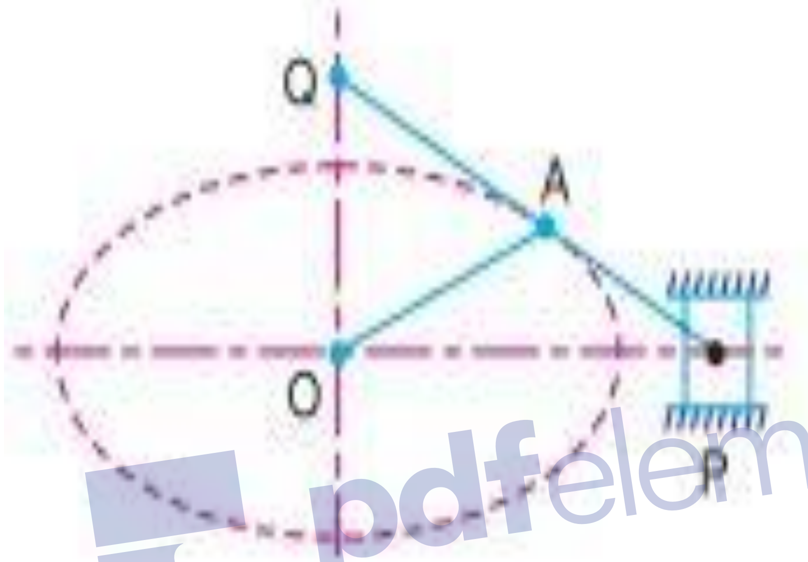
arc B B′= arc A A′or OB× θ= O1 A× φ ...(i)

2. Modified Scott-Russel mechanism.

This mechanism, as shown in Fig., is similar to Scott-Russel mechanism but in this case AP is not equal to AQ and the points P and Q are constrained to move in the horizontal and vertical directions.

A little consideration will show that it forms an elliptical trammel, so that any point A on PQ traces an ellipse with semi-major axis AQ and semi minor axis AP.

If the point A moves in a circle, then for point Q to move along an approximate straight line, the length OA must be equal (AP)2 / AQ. This is limited to only small displacement of P.

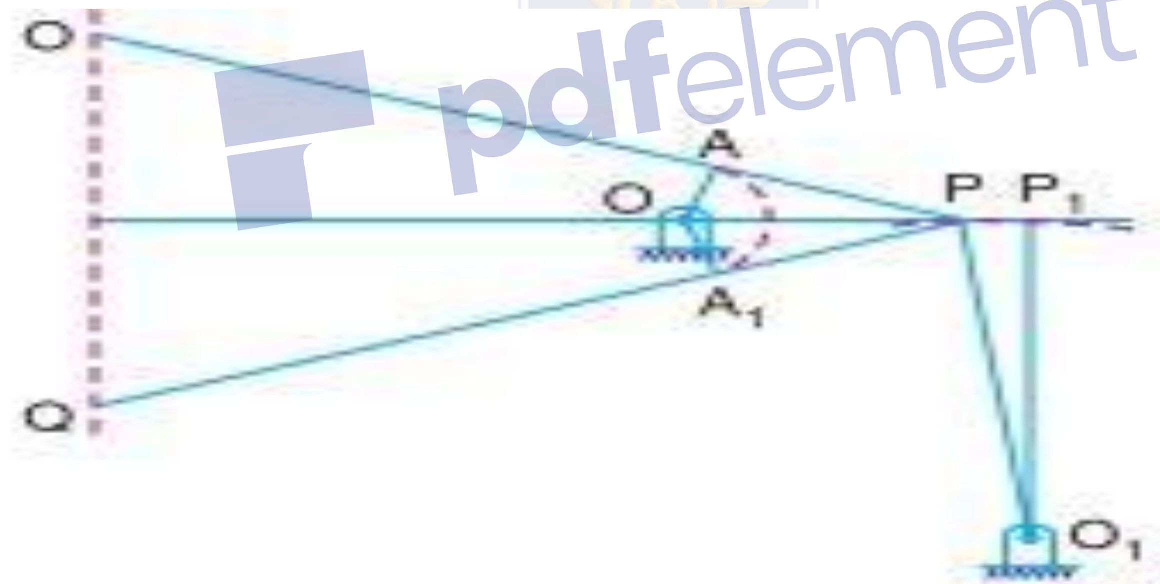


3. Grasshopper mechanism.

This mechanism is a modification of modified Scott-Russel's mechanism with the difference that the point Pdoes not slide along a straight line, but moves in a circular arc with centre O.

It is a four bar mechanism and all the pairs are turning pairs as shown in Fig. 9.8. In this mechanism, the centres Oand O1 are fixed..

The link OA oscillates about O through an angle AOA1 which causes the pin P to move along a circular arc with O1 as centre and O1 Pas radius. For small angular displacements of OP on each side of the horizontal, the point Q on the extension of the link PA traces out an approximately a straight path QQ′, if the lengths are such that OA = (AP) 2 / AQ



4. Tchebicheff's mechanism.

It is a four bar mechanism in which the crossed links OA and O1 Bare of equal length, as shown in Fig. 9.9. The point P, which is the mid-point of AB traces out an approximately straight line parallel to OO1 . The proportions of the links are, usually, such that point P is exactly above Oor O1in the extreme positions of the mechanism i.e. when BA lies along OA or when BA lies along BO1.It may be noted that the point P will lie on a straight line parallel to OO1

, in the two extreme positions and in the mid position, if the lengths of the links are in proportions

AB: OO1 : OA= 1 : 2 : 2.5.

5. Roberts mechanism.

It is also a four bar chain mechanism, which, in its mean position, has the form of a trapezium. The links OA and O1 Bare of equal length and OO1 is fixed. A bar Pqis rigidly attached to the link AB at its middle point P.

A little consideration will show that if the mechanism is displaced as shown by the dotted lines in Fig. the point Q will trace out an approximately straight line.

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