(*b*) *Oscillating or rotating follower*. When the uniform rotary motion of the cam is converted into predetermined oscillatory motion of the follower, it is called oscillating or rotating follower. The follower, as shown in Figure (*e*), is an oscillating or rotating follower.

3. *According to the path of motion of the follower*. The followers, according to its path of motion, are of the following two types:

(a) *Radial follower*. When the motion of the follower is along an axis passing through the centre of the cam, it is known as radial follower. The followers, as shown in Figure (*a*) to (*e*), are all radial followers.

(b) *Off-set follower*. When the motion of the follower is along an axis away from the axis of the cam centre, it is called off-set follower. The follower, as shown in Figure (*f*), is an off-set follower.

Note: In all cases, the follower must be constrained to follow the cam. This may be done by springs, gravity or hydraulic means. In some types of cams, the follower may ride in a groove.

Classification of Cams

Though the cams may be classified in many ways, yet the following two types are important from the subject point of view:

(*a*) Cylindrical cam with reciprocating follower.

(*b*) Cylindrical cam with oscillating follower.

Figure. Cylindrical cam.

1. *Radial or disc cam*. In radial cams, the follower reciprocates or oscillates in a direction perpendicular to the cam axis. The cams as shown in Figure are all radial cams.

2. *Cylindrical cam*. In cylindrical cams, the follower reciprocates or oscillates in a direction parallel to the cam axis. The follower rides in a groove at its cylindrical surface. A cylindrical

grooved cams with a reciprocating and an oscillating follower is shown in Figure (*a*) and (*b*) respectively.

Terms Used in Radial Cams

Figure shows a radial- cams with reciprocating roller follower. The following terms are important in order to draw the cam profile.

1. *Base circle*. It is the smallest circle that can be drawn to the cam profile.

2. *Trace point.* It is a reference point on the follower and is used to generate the *pitch curve*. In case of knife edge follower, the knife edge represents the trace point and the pitch curve corresponds to the cam profile. In a roller follower, the centre of the roller represents the trace point.

3. *Pressure angle*. It is the angle between the direction of the follower motion and a normal to the pitch curve. This angle is very important in designing a cam profile. If the pressure angle is too large, a reciprocating follower will jam in its bearings.

4. *Pitch point*. It is a point on the pitch curve having the maximum pressure angle.

5. *Pitch circle*. It is a circle drawn from the centre of the cam through the pitch points.

6. *Pitch curve*. It is the curve generated by the trace point as the follower moves relative to the cam. For a knife edge follower, the pitch curve and the cam profile are same whereas for a roller follower, they are separated by the radius of the roller.

7. *Prime circle*. It is the smallest circle that can be drawn from the centre of the cam and tangent to the pitch curve. For a knife edge and a flat face follower, the prime circle and the base circle are identical. For a roller follower, the prime circle is larger than the base circle by the radius of the roller.

8. *Lift or stroke*. It is the maximum travel of the follower from its lowest position to the topmost position.