

CAM

A cam is a rotating machine element which gives reciprocating or oscillating motion to another element known as follower.

The cam and the follower have a line contact and constitute a higher pair.

The cams are usually rotated at uniform speed by a shaft, but the follower motion is predetermined and will be according to the shape of the cam.

The cam and follower is one of the simplest as well as one of the most important mechanisms found in modern machinery today.

The cams are widely used for operating the inlet and exhaust valves of internal combustion engines, automatic attachment of machineries, paper cutting machines, spinning and weaving textile machineries, feed mechanism of automatic lathes etc.

Classification of Followers

1. According to the surface in contact.

(a) Knife edge follower. When the contacting end of the follower has a sharp knife edge, it is called a knife edge follower, as shown in Fig.

The sliding motion takes place between the contacting surfaces (i.e. the knife edge and the cam surface).

It is seldom used in practice because the small area of contacting surface results in excessive wear.

In knife edge followers, a considerable side thrust exists between the follower and the guide.

(b) Roller follower. When the contacting end of the follower is a roller, it is called a roller follower, as shown in Fig.). Since the rolling motion takes place between the contacting surfaces (i.e. the roller and the cam), therefore the rate of wear is greatly reduced.

In roller followers also the side thrust exists between the follower and the guide. The roller followers are extensively used where more space is available such as in stationary gas and oil engines and aircraft engines.

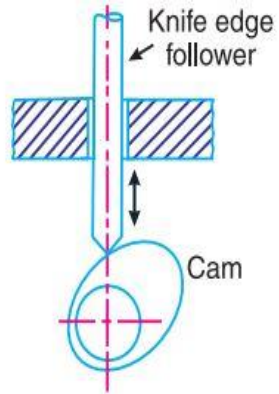
(c) Flat faced or mushroom follower. When the contacting end of the follower is a perfectly flat face, it is called a flat-faced follower, as shown in Fig.

It may be noted that the side thrust between the follower and the guide is much reduced in case of flat faced followers.

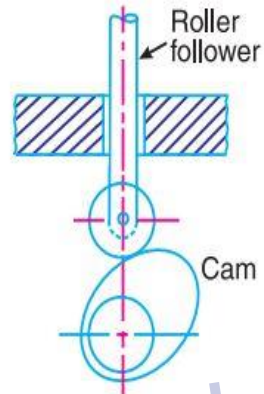
The only side thrust is due to friction between the contact surfaces of the follower and the cam.

The relative motion between these surfaces is largely of sliding nature but wear may be reduced by off-setting the axis of the follower, as shown in Fig.) so that when the cam rotates, the follower also rotates about its own axis. The flat faced followers are generally used where space is limited such as in cams which operate the valves of automobile engines.

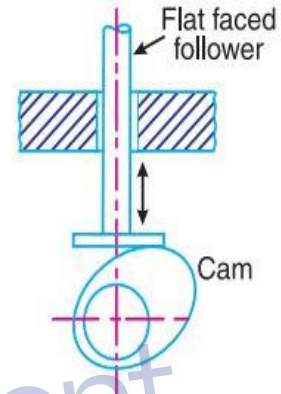
(d) Spherical faced follower. When the contacting end of the follower is of spherical shape, it is called a spherical faced follower, as shown in Fig. It may be noted that when a flat-faced follower is used in automobile engines, high surface stresses are produced. In order to minimise these stresses, the flat end of the follower is machined to a spherical shape.



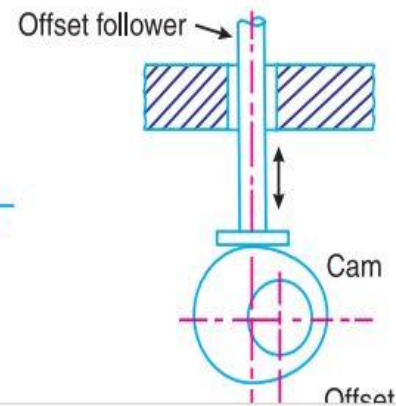
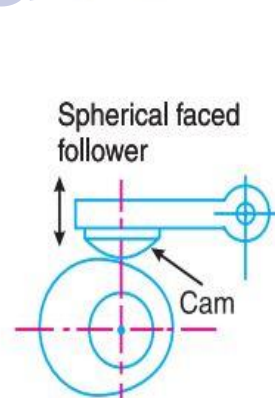
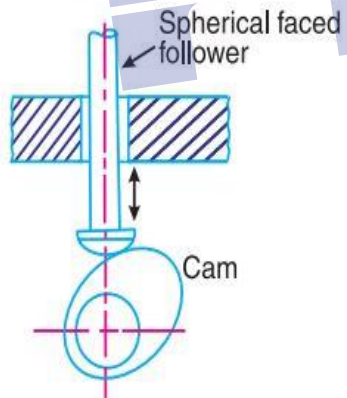
(a) Cam with knife edge follower.



(b) Cam with roller follower.



(c) Cam with flat faced follower.



2. According to the motion

(a) Reciprocating or translating follower.

When the follower reciprocates in guides as the cam rotates uniformly, it is known as reciprocating or translating follower. The followers as shown in Fig. (a) to (d) are all reciprocating or translating followers.

(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 Fig (e), is an oscillating or rotating follower.