CAM MECHANISMS

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Definition

- A *cam* may be defined as a machine element having a curved outline or a curved groove, which, by its oscillation, rotation or reciprocating motion, gives a predetermined specified motion to another element called the *follower*. 
General Diagram

- frame
- follower
- cam
KINEMATIC DIAGRAM FOR CAM MECHANISM
The first cam designs were found in Leonardo da Vinci’s sketches in his notebooks titled *Codex Madrid I-II.*

Leonardo designed cam mechanisms as compact mechanical devices that could transform rotary motion to linear motion.
Cam hammer

Designed around 1497 by Leonardo da Vinci. The hammer uses a cam to convert rotary motion to oscillating motion.
First designs seen were by Leonardo da Vinci (1452, 1519), Codex Madrid I.
Cams are classified in three ways:

- In terms of their shape, such as wedge, radial, cylindrical, globoidal, conical, spherical, or three-dimensional;
- In terms of the follower motion, such as dwell-rise-dwell (DRD), dwell-rise-return-dwell (DRRD), or rise-return-rise (RRR); or
- In terms of the follower constraint, which is accomplished by either positive drive or spring load.
The follower moves in a plane perpendicular to the axis of rotation of the cam. Most used type of cam mechanism.
Uses

- Toys
- Safety pins/locks
The follower has a roller that operates in a groove cut on the face of a cylinder. The follower then oscillates as it follows the path.
Uses

- This type of cam can be seen in some old clock mechanisms and still in modern sewing machines.
- Machines that perform repetitive movements may use a cylinder cam profile.
Parallel Crank Rocker

- Turns a circular rotation into a rocking motion.
Boomed during the Industrial Revolution.

- Cloth making
- Power conversion
- Speed regulation
- Mechanical computation
- Typewriting
- Machining.
Advantages

- Change the length or angle of the rods to achieve different motions.
Uses

- Bicycles
- Heavy Machinery
A follower displacement diagram is a graph showing displacement of the follower plotted as a function of time.

Since the cam usually rotates at constant angular velocity, the $t$-axis can be considered as the $\theta$-axis.

The follower displacement diagram determines the shape of the cam.
Animations

- http://www.youtube.com/watch?v=KRnTXvjTeIA
- http://www.youtube.com/watch?v=9jGHAL5ZRkA
References

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