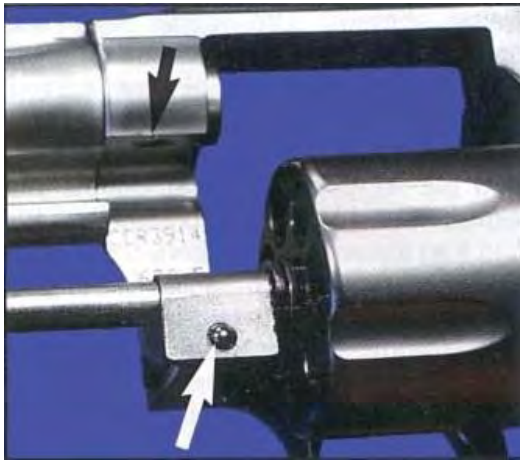


# Common Mechanical Engineering Terms

**Ball and Detent** (n) A simple mechanical arrangement used to hold a moving part in a temporarily fixed position relative to another part. The ball slides within a bored cylinder, against the pressure of a spring, which pushes the ball against the detent, a hole of smaller diameter than the ball. When the hole is in line with the cylinder, the ball falls partially into the hole under spring pressure, holding the parts at that position. Additional force will push the ball back into its cylinder, compressing the spring, and allowing the parts to move. (also shown: detent pins)



**Bearing** (ball, roller, and spherical shown ) (n) The part of a machine within which a rotating or sliding shaft is held. In some bearing types, balls or rollers are used between the bearing surfaces to reduce rolling friction.



**Bell crank** (n) A pivoting double lever used to change the direction of applied motion.



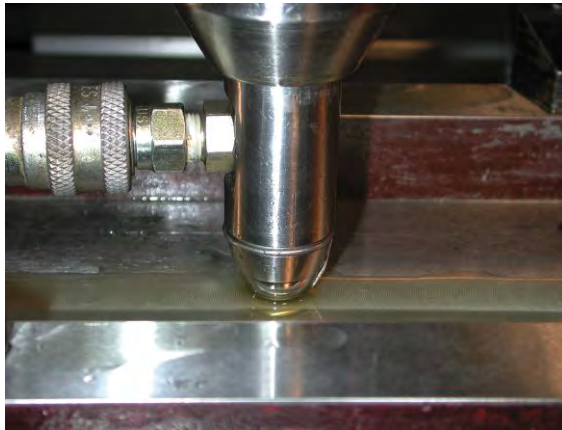
**Boss** (n) A cylindrical projection, as on a casting or a forging. Usually provides a contact surface around a hole.



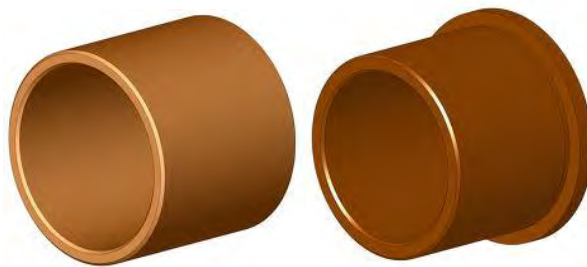
**Broach** (v) To finish the inside of a hole to a shape other than round, as in a keyway (n) The tool for the process, which has serrated edges and is pushed or pulled through the hole to produce the required shape.



**Burnish** (v) To smooth or polish by a rolling or sliding tool under pressure.



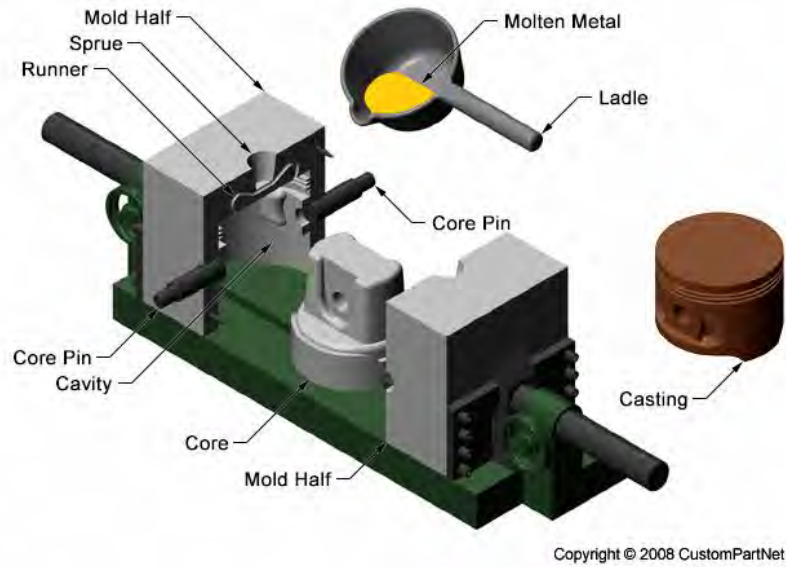
**Bushing** (n) A smooth walled bearing (AKA a plain bearing). Also a tool guide in a jig or fixture.



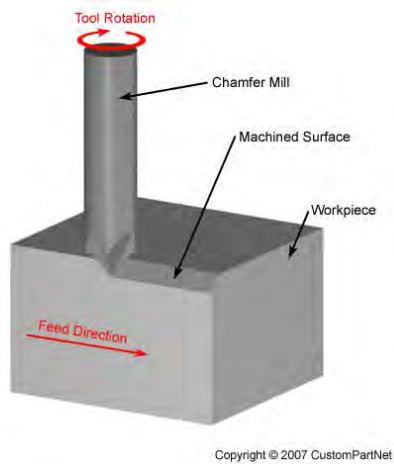
**Cam** (n) A mechanical device consisting of an eccentric or multiply curved wheel mounted on a rotating shaft, used to produce variable or reciprocating motion in another engaged or contacted part (cam follower). Also *Camshaft*



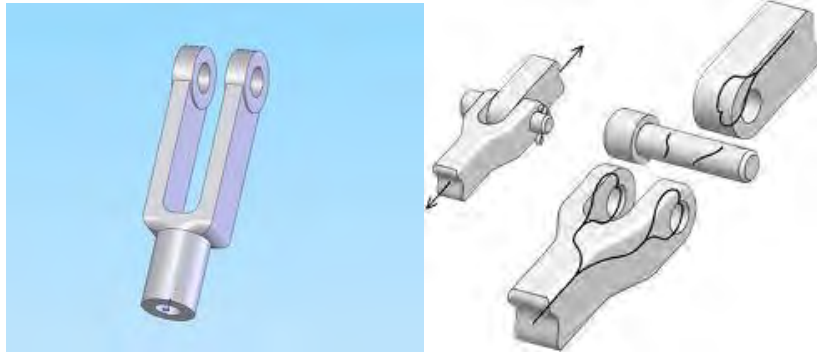
**Casting** (n) Any object made by pouring molten metal into a mold.



**Chamfer** (n) A flat surface made by cutting off the edge or corner of a object (bevel) (v) the process of creating a chafer



**Clevis** (n) A U-shaped piece with holes into which a link is inserted and through which a pin or bolt is run. It is used as a fastening device which allows rotational motion.



**Collar** (n) A cylindrical feature on a part fitted on a shaft used to prevent sliding (axial) movement.



**Collet** (n) A cone-shaped sleeve used for holding circular or rodlike pieces in a lathe or other machine.





**Core** (v) To form the hollow part of a casting, using a solid form placed in the mold (n) The solid form used in the coring process, often made of wood, sand, or metal.

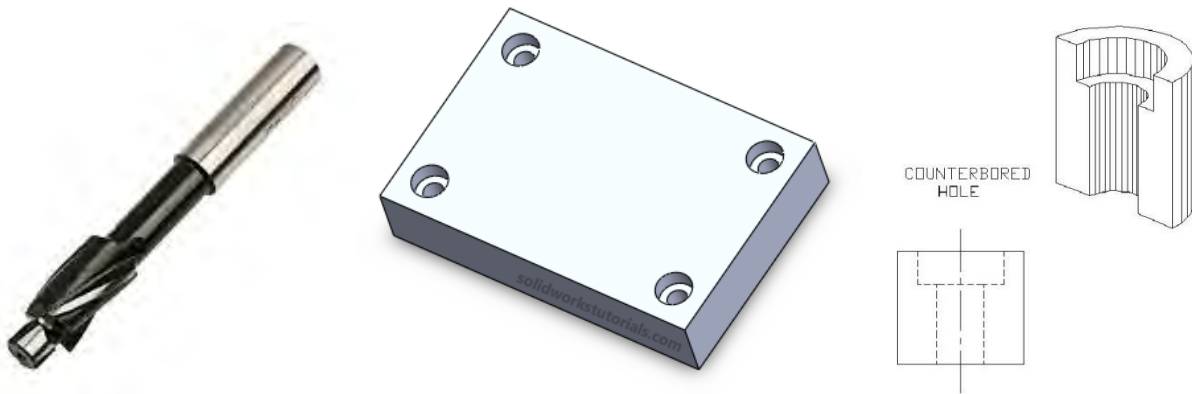
*Mold with CORE*



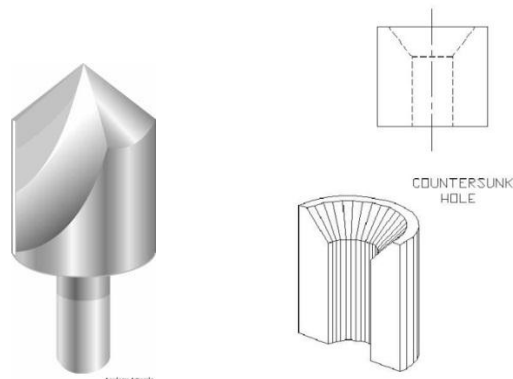
*Final Cast Manifold*



**Counterbore** (n) A cylindrical flat-bottomed hole, which enlarges the diameter of an existing pilot hole. (v) The process used to create that feature. (the req'd tool is shown)



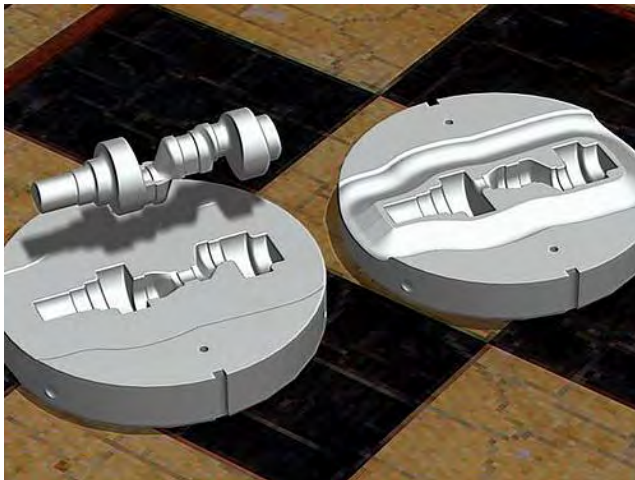
**Countersink** (n) A conical depression added to an existing hole to accommodate and the conic head of a fastener recessing it below the surface of a face. (v) The process used to create that feature. (the req'd tool is shown)



**Coupling** (n) A device used to connect two shafts together at their ends for the purpose of transmitting power. May be used to account for minor misalignment or for mitigating shock loads.



**Die** (n) One of a pair of hardened metal plates or impressing or forming desired shape. Also, a tool for cutting external threads.



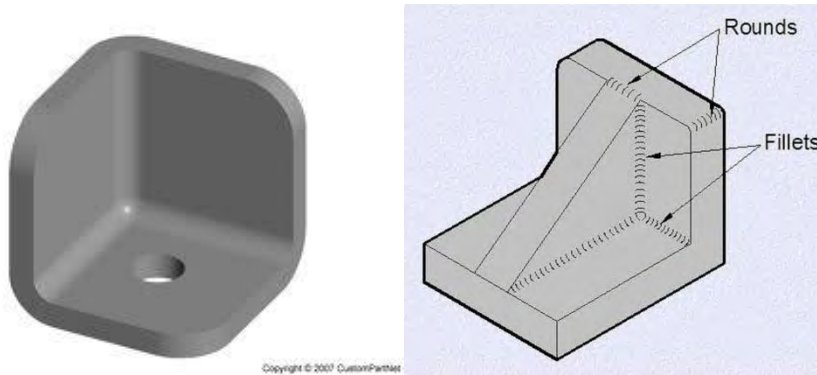
Thread Rolling Dies



**Face** (v) To machine a flat surface perpendicular to the axis of rotation of a piece.



**Fillet** (n) A rounded surface filling the internal angle between two intersection surfaces. Also *Rounds*

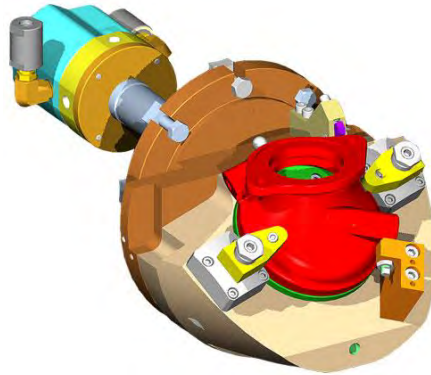


**Fit** (n) The class of contact between two machined surfaces, based upon their respective specified size tolerances (clearance, transitional, interference)





**Fixture** (n) A device used to hold a workpiece while manufacturing operations are performed upon that workpiece.



**Flange** (see bushing example) (n) A projecting rim or edge for fastening, stiffening or positioning.



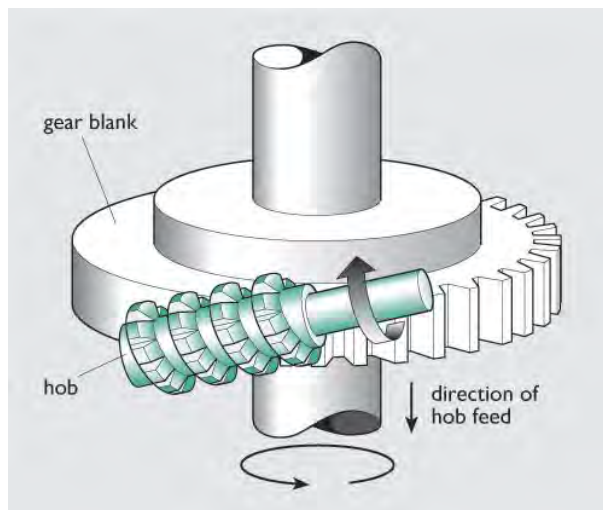
**Gage** (n) A device used for determining the accuracy of specified manufactured parts by direct comparison..



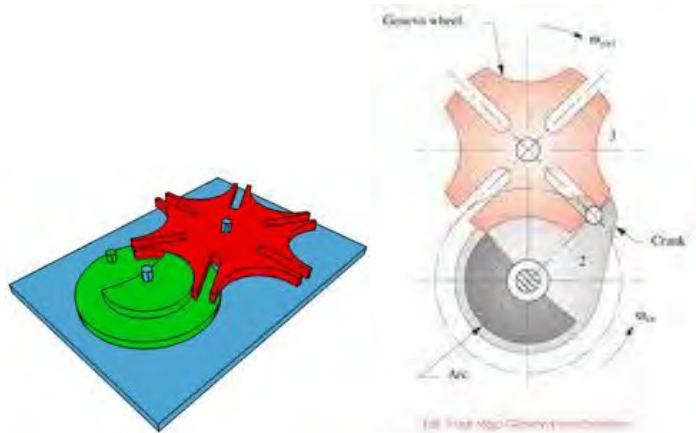
**Gage blocks** (n) Precision machined steel blocks having two flat, parallel surfaces whose separation distance is fabricated to a guaranteed accuracy of a few millionths of an inch;



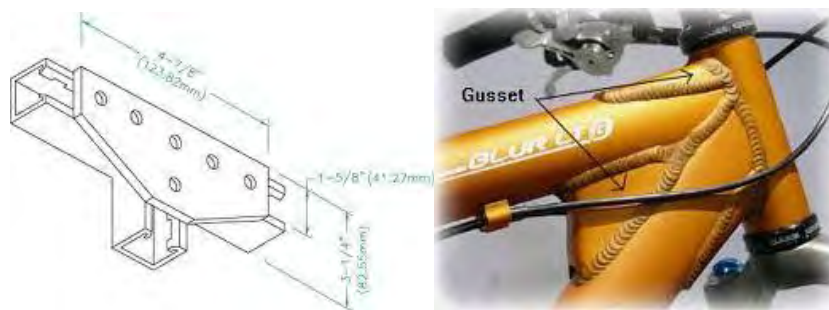
**Gear Hobbing** (v) A special form of manufacturing that cuts gear tooth geometries. It is the major industrial process for cutting involute form spur gears of.



**Geneva Cam** (n) A device to turn constant rotational motion into intermittent rotational motion.



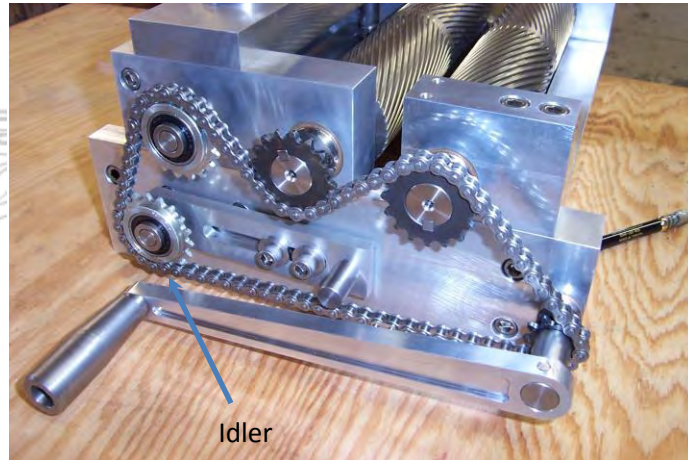
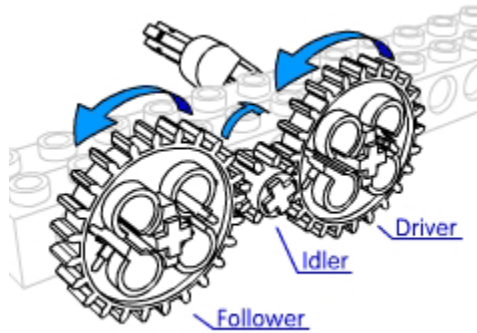
**Gusset (plate)** (n) A triangular metal piece used to strengthen a joint.



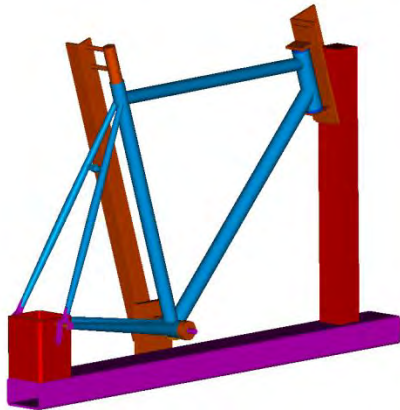
**Hasp** (n) A metal fastener with a slotted, hinged part that fits over a loop and is secured by a pin, bolt, or padlock



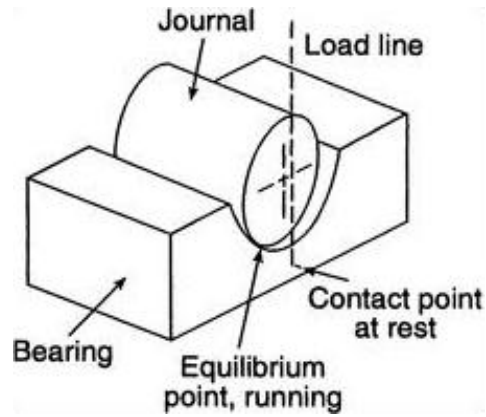
**Idler** (n) A mechanism used to regulate the tension in belt or chain. Or, a gear used between a driver and follower gear to maintain the direction of rotation.



**Jig** (n) A special device used to guide a cutting tool (drill jig) or to hold material in the correct position for cutting or fitting together (as in welding or brazing)



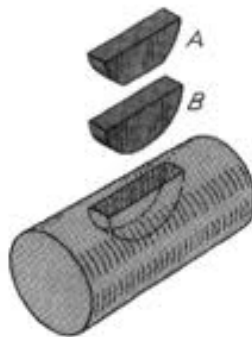
**Journal** (n) The part of a shaft that rotates within a bearing



**Kerf** (n) A channel or groove cut by a saw or other tool.

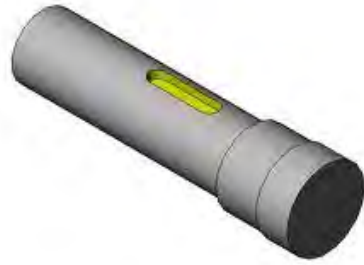


**Key** (Woodruff key shown) (n) A small block or wedge inserted between a shaft and hub to prevent circumferential movement.

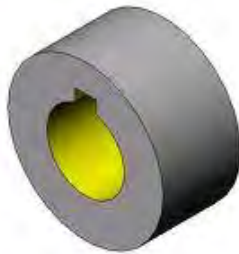




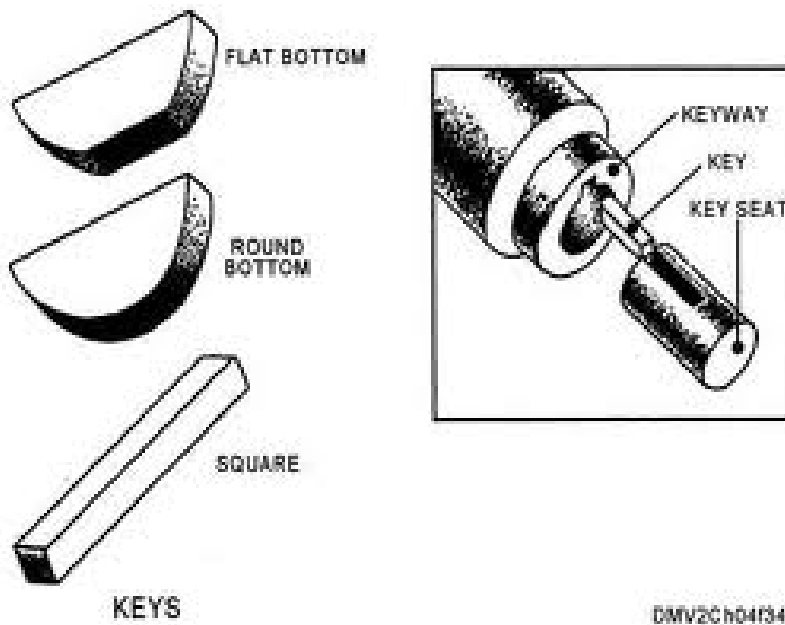
**Keyseat** (n) A slot or groove cut in a shaft to fit a key. A key rests in a keyseat.



**Keyway** (n) A slot cut into a hub to fit a key. A key slides in a keyway. See Broach.



**Key/Keyway/Keyseat assembly** (see above for individual definitions)



**Knurl**

(v) To roughen a turned surface, as in a handle or a knob.



**Lug**

(n) Projection on (typically) a cast or forged part to provide support or allow mounting or the attachment of another component.



**Neck**

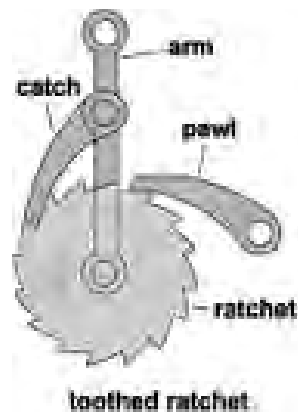
(v) To cut a groove around a shaft, usually toward the end or at a change in diameter.  
(n) A portion of reduced diameter between the ends of a shaft.



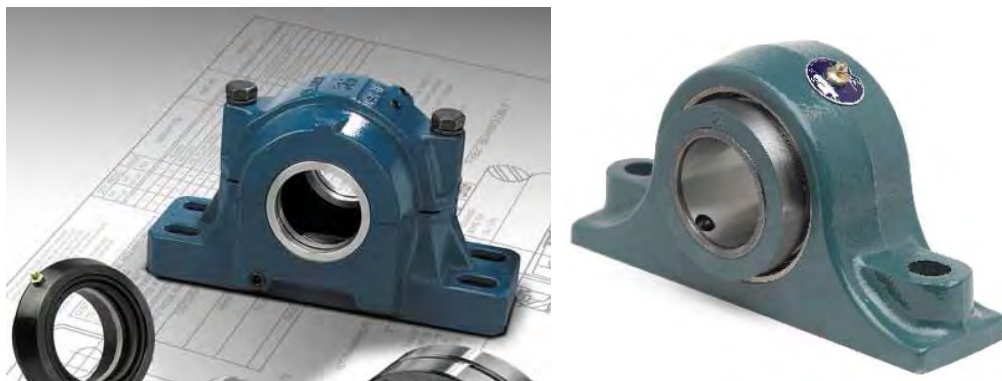
**Pad** (n) A rectangular or irregular projection, as on a casting or a forging. Usually provides a contact surface around a set of holes.



**Pawl** (n) A device used to prevent a toothed wheel (ratchet) from rotating backwards, or a device that stops, locks, or releases a mechanism.



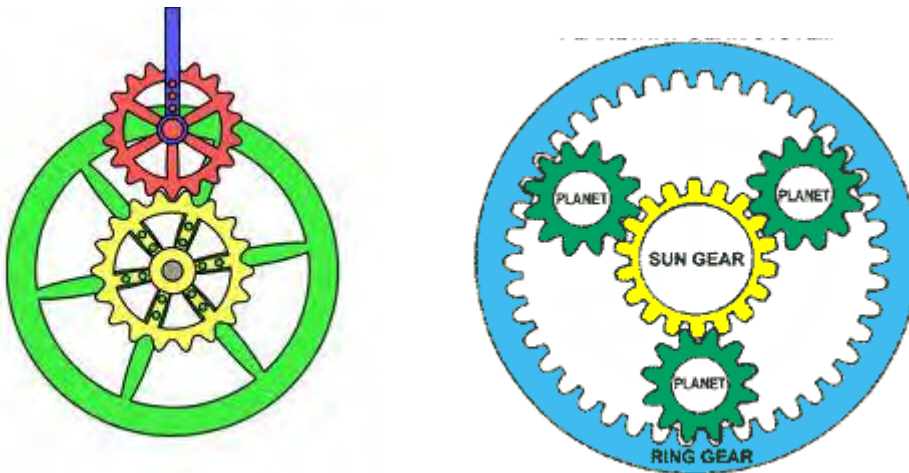
**Pillow Block** (n) A bearing housing which typically mounts to a single planar face. May be split or un-split to accommodate insertion /removal of the bearing.



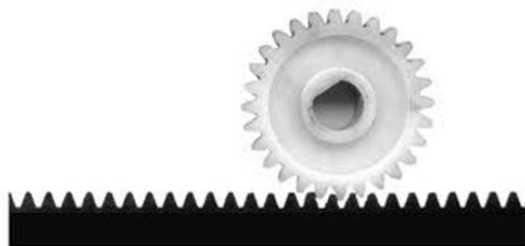
**Pinion** (n) A plain gear, often the smallest gear in a gearset, often the driving gear. May be used in conjunction with a gear rack (rack and pinion, see below)



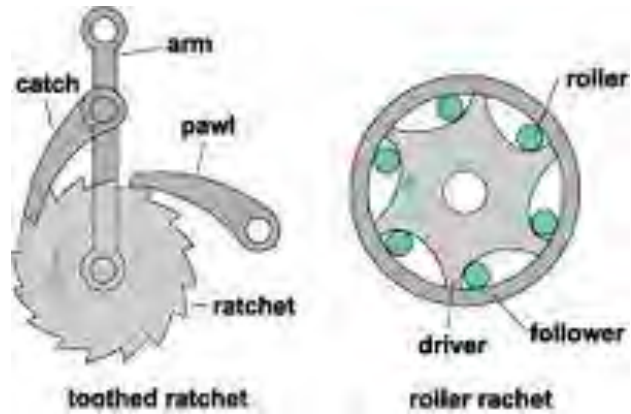
**Planetary Gears** (n) A gearset characterized by one or more planet gear(s) rotating around a sun gear. Epicyclic gearing systems include an outer ring gear (known as an annulus) with the planetary system.



**Rack (w/pinion gear)** (n) A toothed bar acting on (or acted upon), by a gear (pinion)



**Ratchet** (n) A mechanical device used to permit motion in one direction only.



**Relief** (n) A groove or cut on a part used to facilitate machining.

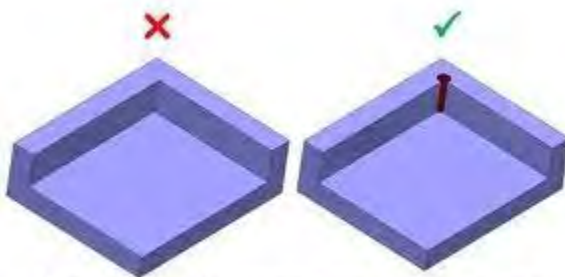


Fig 11 – Sharp internal corner may require expensive machining methods

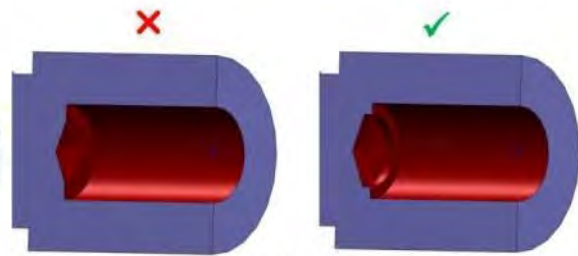


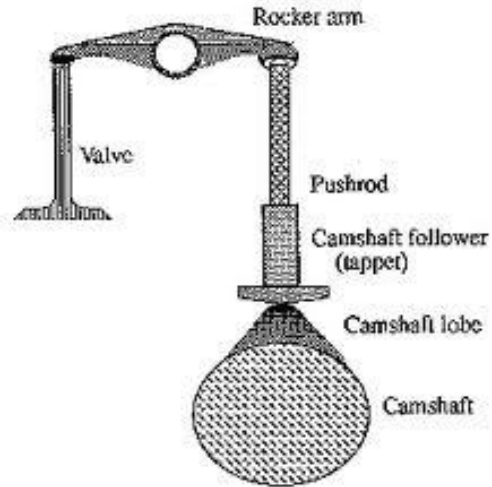
Fig 12 – Provide relief for blind bored holes

**Retaining Ring** (n) A tool steel ring used in conjunction with a shaft groove or internal groove to located or control position of a component.

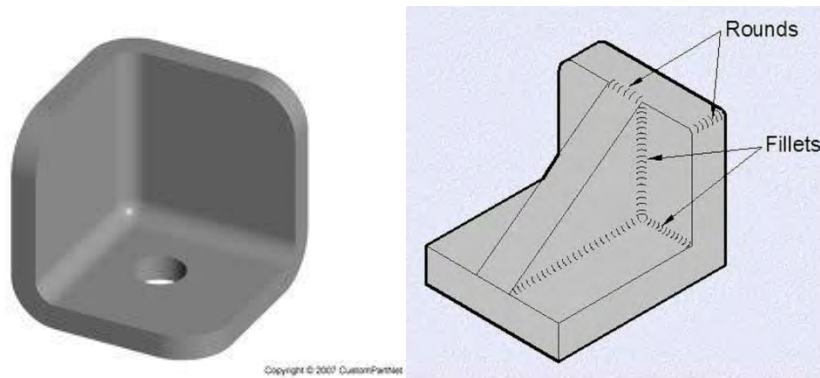




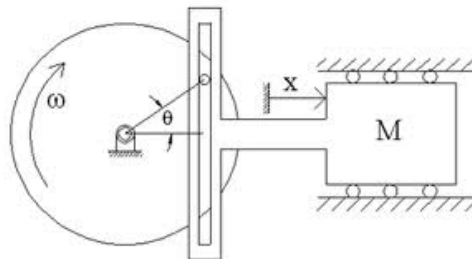
**Rocker Arm** (n) A pivoted arm-like lever used to transfer the application direction of a linear force.



**Round** (n) A rounded external intersection between two surfaces. Compare to *Fillet*



**Scotch Yoke** (n) Mechanism used to convert rotational motion to linear motion.



**Sheave** (n) A grooved wheel used to accommodate a belt for the transmission of power. Sometimes referred to as a pulley sheave.



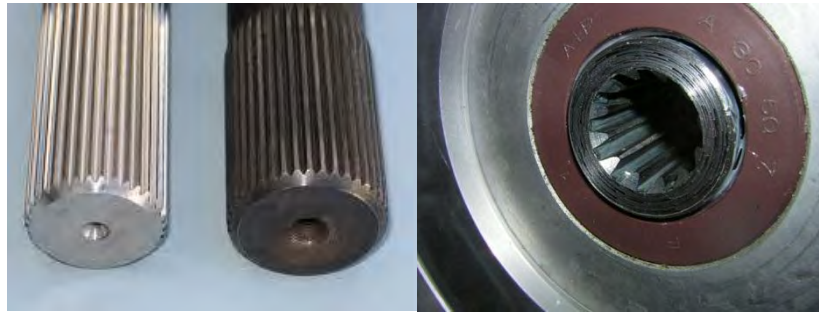
**Shim** (n) A thin strip of metal inserted between two surfaces to adjust for fit. (v) The process of inserting shims.



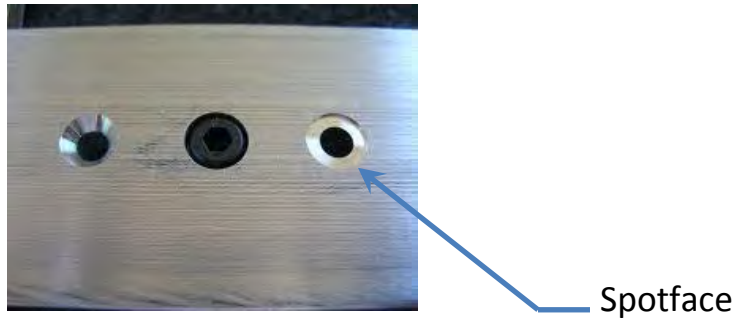
**Shoulder** (n) A plane surface on a shaft, normal to the axis, produced by a change in diameter



**Spline** (n) A cylindrical pattern of keyways. May be external (L) or internal (R)



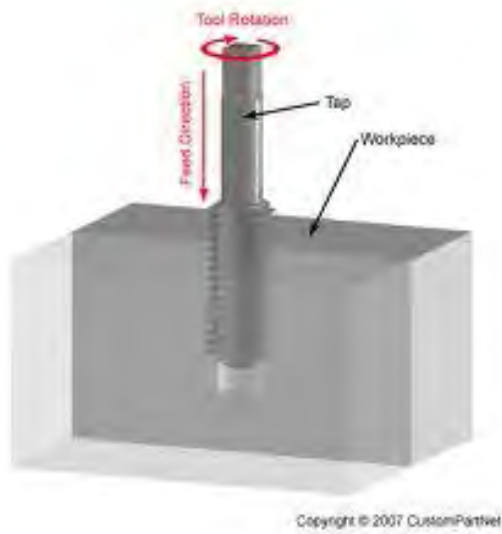
**Spotface** (n) a round machine surface around a hole on a casting or forging, usually to provide a contact surface for a fastener or other mating component, (v) the process used to create that feature



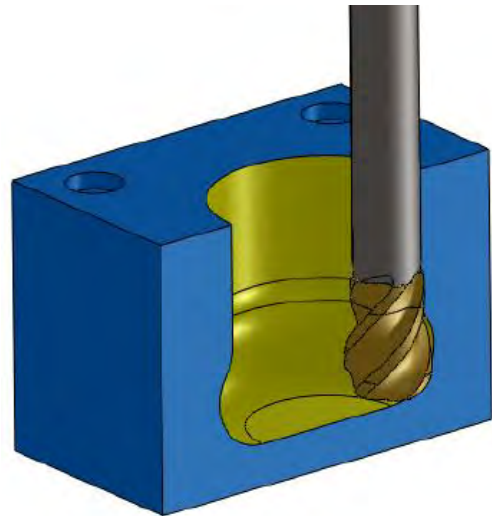
**Standoffs** (n) A mounting designed to position objects a predetermined distance above or away from the surface upon which they are mounted.



**Tap** (v) To cut internal machine threads in a hole, (n) the tool used to create that feature.



**Undercut** (n) A cut having inward sloping sides, (v) to cut leaving an overhanging edge



**Yoke** (n) A clamp or vise that holds a machine part in place or controls its movement or that holds two such parts together. A crosshead of relatively thick cross section, that secures two or more components so that they move together.

