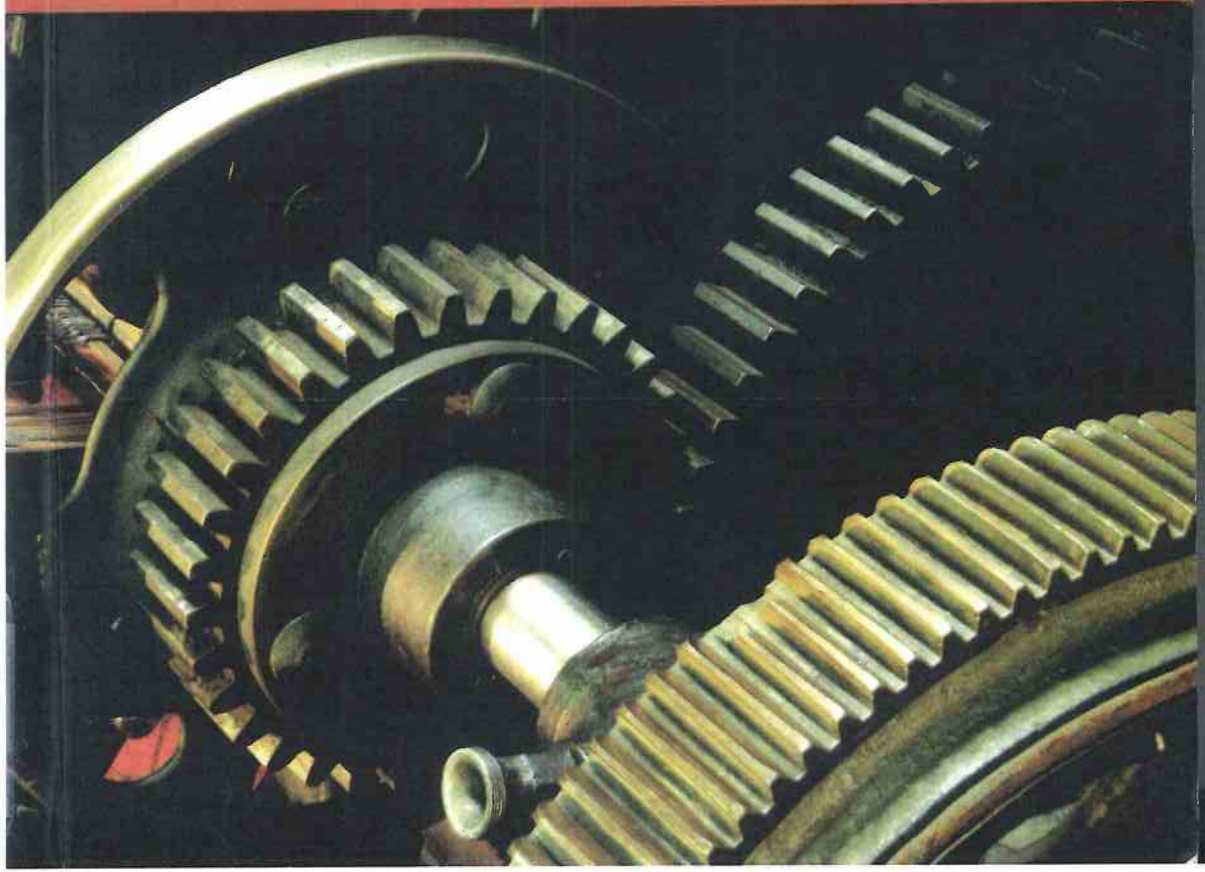
Dictionary of Mechanical Engineering



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cup seal A disc-shaped seal with a single turned-up lip at its periphery used for sealing hydraulic and pneumatic pistons. Cf. ***gasket; gland; breaking joint; labyrinth gland***.

sealing *Figure S.9* illustrates some types of sealing on shafts.

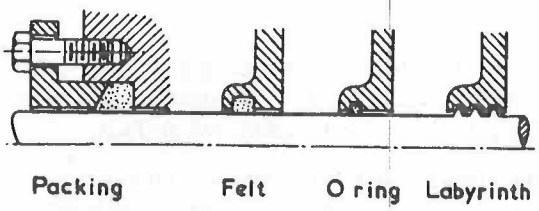

Figure S.9 Sealing on shafts.

seaming machine A ***press*** for ***forming*** and closing interlocking joints in the manufacture of sheet-metal containers.

seat board The platform that carries the movement of a long-case clock.

seat face (of a **valve**) ***Body seat***. See ***body***.

seating A surface for the support of another part of an assembly, such as a ***bearing*** or ***seal***.

seating ring A spherical-surface ring outside a thrust bearing which renders it self-aligning.

second (s) The second is the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the cesium-133 atom. Definitions of units, and common prefixes for multiples, are given in the Appendix.

second moment of area (moment of inertia of an area) The sum of the products of each element of area, δA, multiplied by the square of its distance from an axis x, to give $\int dAx^2$ for a plane surface containing the X-axis. If the axis is perpendicular to the plane then it is known as the Polar Moment of Inertia.

second tap A ***tap*** used after a ***taper tap*** to carry the full thread diameter further down the hole or to give the finished size of thread in a through hole.

sector gears A form of toothed gearing with the wheels broken up into sectors of different curvatures, each pair of arcs transmitting different velocity ratios in an intermittent motion. See ***variable gears***.

segmental gears (mutilated gears) Gears with teeth which are not continuous around the periphery.

segmental rack (segmental wheel) An arc of a toothed wheel imparting, through a wheel gearing into the rack, a reversible motion to a spindle.

seismograph An instrument in which a heavy mass is poised in such a way that a vibration of its support, together with the inertia of the mass, causes a relative motion of mass and support, that when amplified produces the record. The recording in older instruments is by a stylus on a rotating drum and in more modern instruments an electromagnetic current operates a mirror galvanometer to give a photographic trace. An observatory may have N-S and E-W horizontal instruments plus a vertical recorder.

seizure or **seizing up (U.S.: freeze)** The locking of two moving surfaces such as in a bearing due to the partial welding together of the two surfaces, caused by insufficient lubrication or insufficient clearance between the two surfaces.

selector forks (U.S.: shift forks) Forked members in an automobile gearbox with prongs that engage with grooves cut in the bosses of the gears, which they move along a splined shaft to change the gear.

self-acting balance crane See ***crane***.

self-acting lathe A lathe furnished with a slide rest whose movements are either partially or entirely self-acting; a lathe in which the tools are fed to the work by means of gearing actuated by the lathe itself, instead of being traversed by hand.

self-aligning ball-bearing A ***ball-bearing*** with two rows of balls between an inner race and a spherical surface for an outer race thus allowing considerable shaft deviation from the normal. Cf. ***spherical roller bearing;*** *Figure R.12.*

self-centring The automation ***centring*** of a piece of work to be put into lathe.

self-centring chuck (centring chuck, universal chuck) A lathe chuck for cylindrical work with the jaws maintained concentric by a scroll (see ***scroll chuck***) or by the radial screws driven by a ring gear that is operated by a key. (See *Figure C.14.*)

self-correcting mechanism for chiming clock A mechanism consisting of radial ***cams, locking levers***, locking wheels and pins, and ***pawls*** which ensures that the striking mechanism produces the correct number and type of chime for each hour and quarter hour.

self-induced (self-excited) vibration See ***vibration***.

self-opening die See ***opening die***.

self-tapping A screw which cuts its own thread. See ***screw, self-tapping***.

self-winding watch A watch that winds itself while being worn, by an action similar to that of a ***pedometer***, or is wound by the opening and shutting of the case.

Sellers' screw threads See ***threads***.

semi-elliptic spring A ***carriage spring*** consisting of a pair of curved steel strips, one inverted, attached to each other at the ends, their arrangement resembling an ellipse. Cf. ***leaf spring***.

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swaging Drawing down a piece of wrought metal to the desired form; commonly the opening out of the end of tubes to take a threaded coupling.

swarf Metal or plastic turnings, chips or powder removed from the ***workpiece*** during a machining operation.

swashplate (wabbling disc) A circular plate mounted obliquely on a shaft, as a substitute for a crank mechanism.

swashplate motor or engine See ***engines; servomotor types***.

swashplate pump See ***pump***.

sway bar U.S. term for ***anti-roll bar***.

sway brace A support, often horizontal, to control vibration and to damp undesirable movements.

sweat cooling The cooling of a component of an engine or mechanism by evaporating fluid through a porous surface layer, such as in rocket engines and gas-turbine blades. See also ***film cooling***.

sweep-seconds watch A watch with the seconds hand at the centre of the watch, a movement which requires a supplementary ***third wheel*** and fourth ***pinion***.

swell A device with spring control at the back of a shuttle box on a ***loom*** to hold the shuttle in position.

swell of pulley The curved surface of a pulley rim to prevent a belt from working off while running.

swept volume The ***cross-sectional*** area of a ***cylinder*** bore multiplied by the length of the ***piston stroke***.

swifts (or cylinders) *(a)* The large rollers in a set of woolen carding engines which, with manual aid, scribble (card) the wool. *(b)* Light revolving frames to carry the hanks of wool during unwinding. *(c)* The revolving frames used in dark rooms for processing and drying long rolls of film.

swing The radial clearance available in a ***machining tool*** which dictates the maximum radius of the workpiece that can be rotated in it.

swing axle A vehicle ***half shaft*** pivoted at the outboard edge of the casing of the ***differential*** such that the point of contact of the ***tyre*** on the road, this ***pivot*** position and the vehicle's roll centre are all in a straight line.

swing table The table of a ***drilling maching*** which swivels around a central pillar.

swinging caliper See ***callipers***.

Swiss lever See ***escapement***.

Swiss machine (Schiffle or **shuttle machine)** An embroidery machine with the shuttles placed diagonally.

Swiss screw thread *Thury screw thread*.

switch *(a)* A mechanism for altering the direction of a moving body. *(b)* A device for diverting rolling stock from one rail track to another. *(c)* A mechanical device for opening and closing an electric circuit.

swivel *(a)* A pin or collar to permit circular motion in a mechanism. *(b)* A link in a chain consisting of a ***shank*** and collar to permit circular motion.

swivel-head lathe A special lathe for boring and turning tapered objects having the mandrel headstock mounted and pivotable on a base plate.

swivel pin A kingpin.

swivelling propellor A propellor capable of being turned bodily so as to transmit its thrust in any direction.

sylphon bellows A thin-walled air-tight cylindrical metal ***bellows*** like a concertina, which responds to pressure variations.

synchro A generic term for a class of electromechanical devices used for data transmission. See also under ***differential***.

synchro angle The angular displacement of a synchro rotor from its electrical zero position.

synchromesh gear A gear in which the driving and driven members are automatically synchronized by small ***cone clutches*** before engagement.

synchronized clock A clock having its accuracy corrected electrically at defined intervals.

synchronizing gear A gear to synchronize the firing mechanism of a gun with the rotation of the ***airscrew*** so that the bullets do not meet the blades.

synchronous Occurring at the same time; simultaneous; in step.

synchronous motor See ***stepping and synchronous motors***.

synchronous vibrations Vibrations which correspond exactly in period and phase.

T

θ (Greek letter theta) The symbol for angle of twist.

t and b Turned and bored.

t, T The symbols for time and period, respectively. *T* also for kinetic energy and for torque.

TM Twisting moment (***torque***).

tpi Threads per inch.

TS Tensile strength, ultimate.

tab washer A ***washer*** with protruding tabs which can be bent to secure a nut or bolt head from rotating undone. See *Figure W.1.*

table The horizontal portion of a machine on which the work is placed for planing and other operations.

table feed A machine which has a stationary cutting tool and a traversing work table is said to have table feed. See ***planing machine*** *(b).*

tachograph An electronic device that records vehicle usage relative to time.

tachometer An instrument for indicating the revolutions per minute of a revolving shaft, operated either by a spring-controlled ring pendulum or by sprin-loaded governors, or by magnetic means (see ***governor***). When registering the revolutions of a revolving shaft in cotton spinning it is called an "indicator."

tackle (lifting tackle) A combination of pulleys, blocks, etc., for hoisting purposes.

tail The back part of a portable crane upon which the balance weights rest.

tail pin The ***back centre*** pin of a lathe.

tail race The channel conducting water away from a water wheel or other hydraulic machine.

tail (auxiliary) rotor A small rotor mounted at the tail of a helicopter on a horizontal axis to provide sideways thrust to counteract the torque of a single ***main***