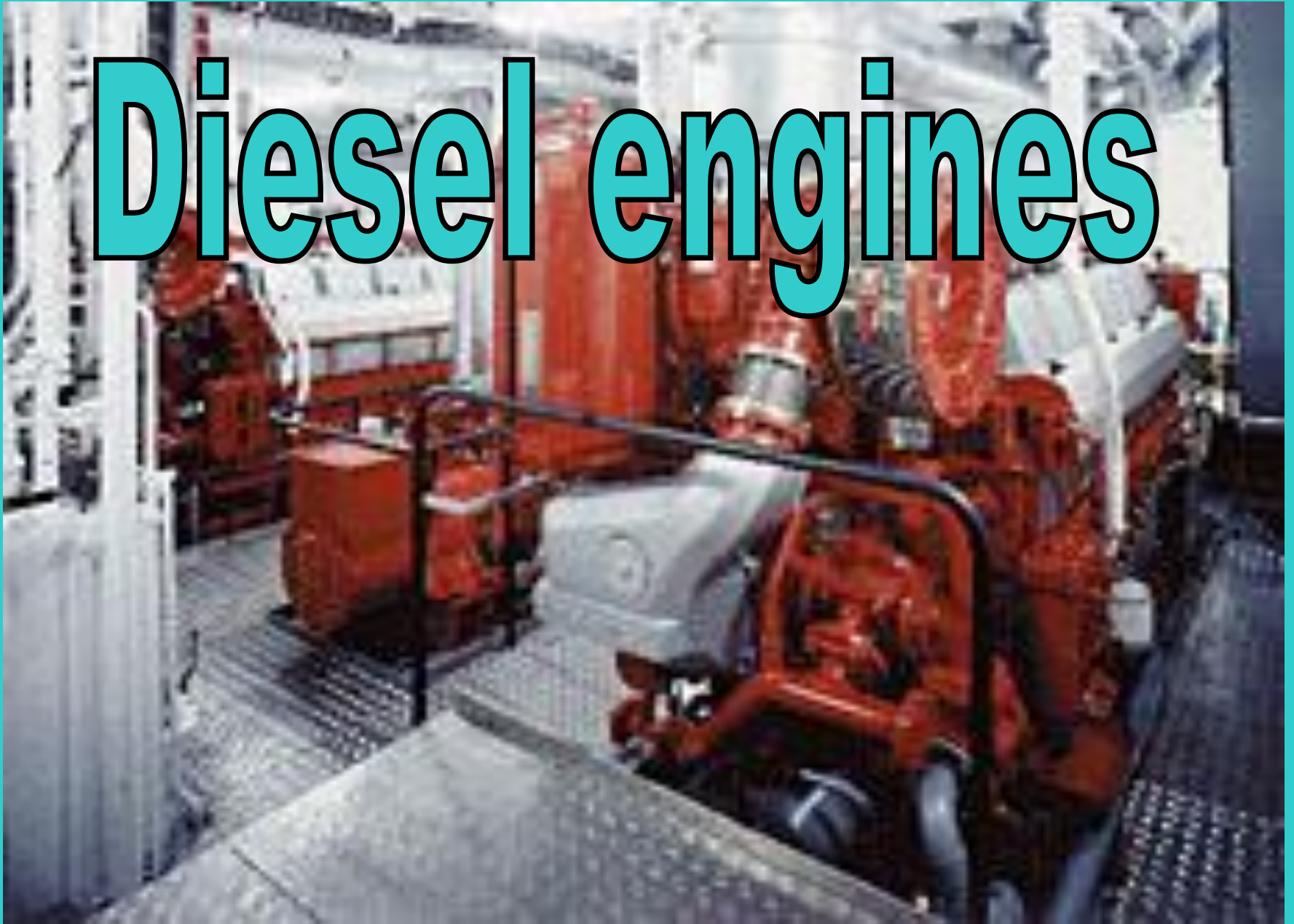
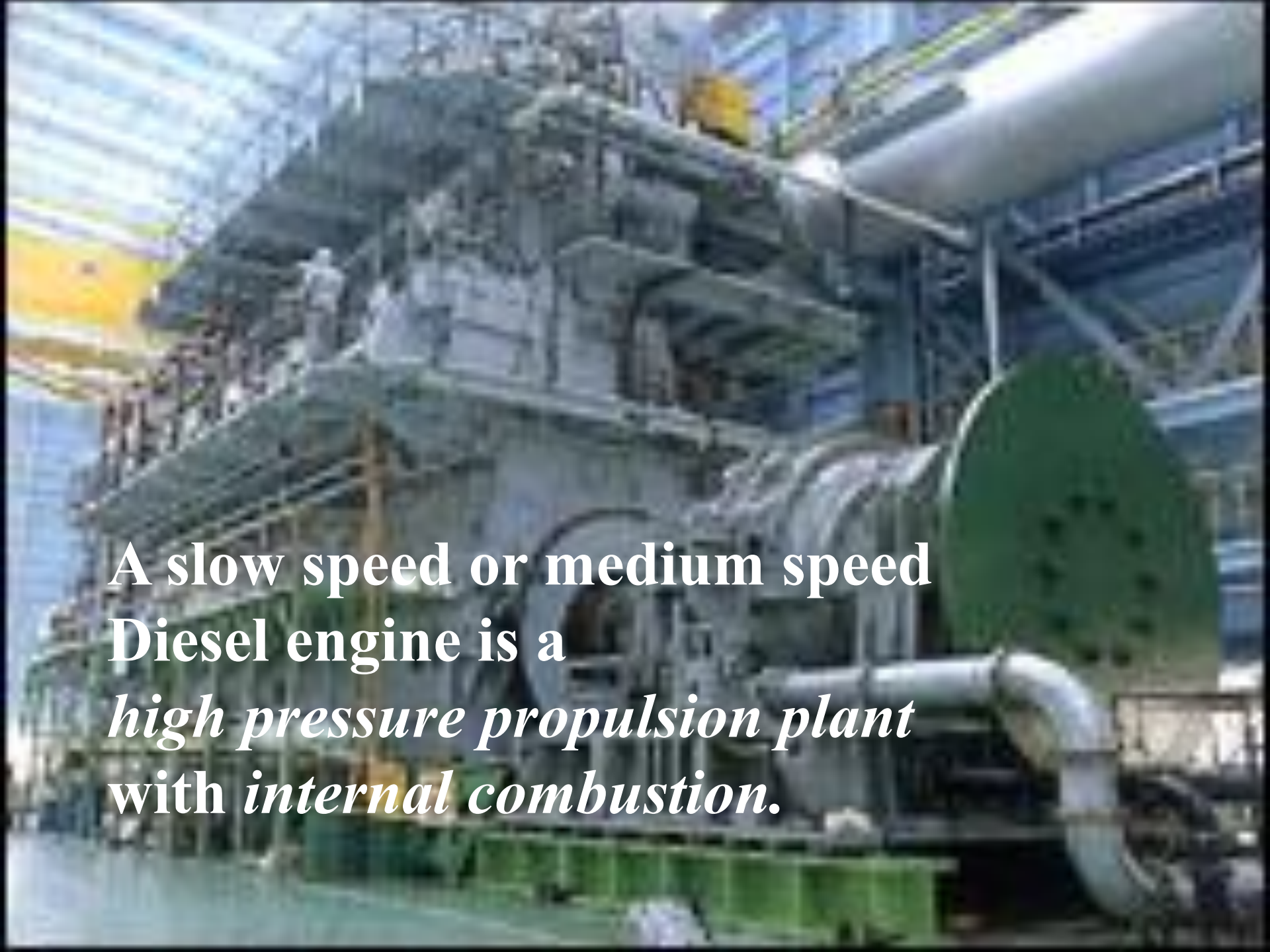


Diesel engines

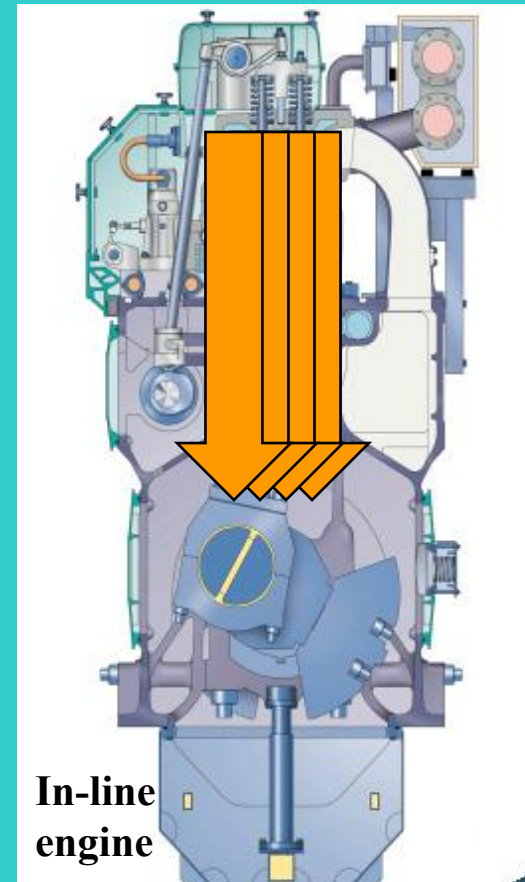
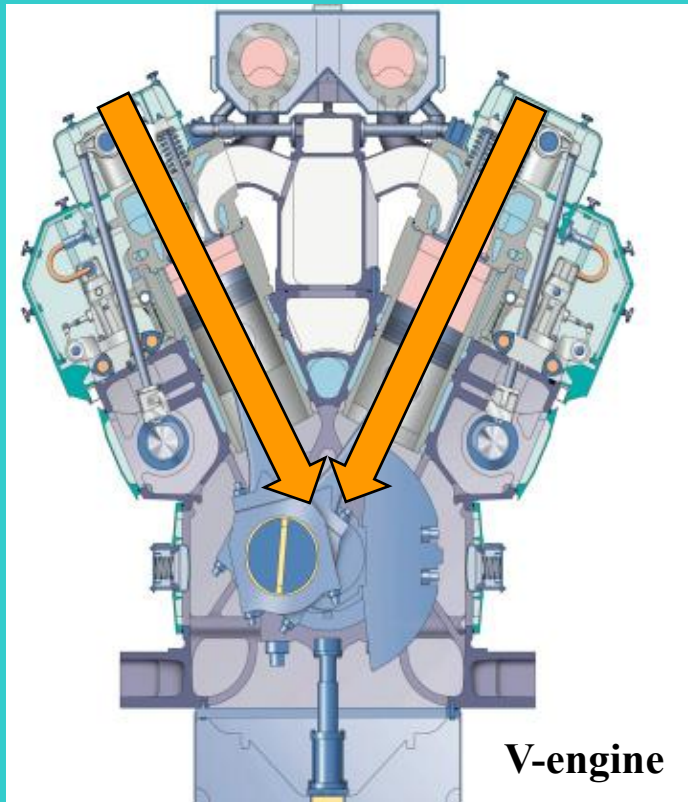




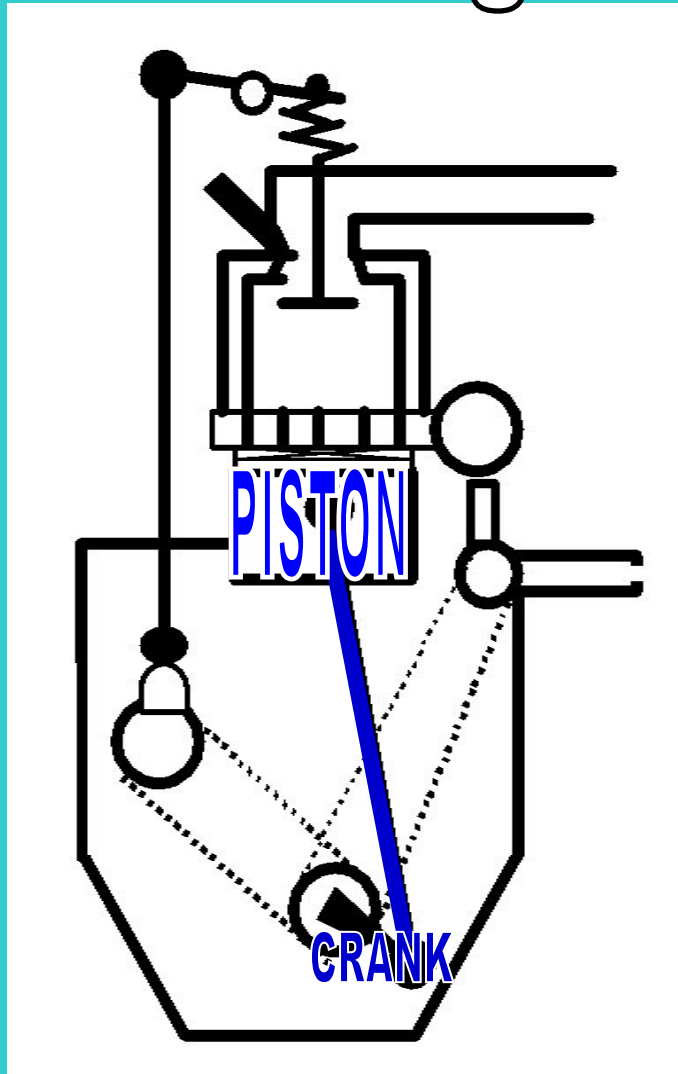
A slow speed or medium speed
Diesel engine is a
high pressure propulsion plant
with *internal combustion*.

V-engine and in-line engine

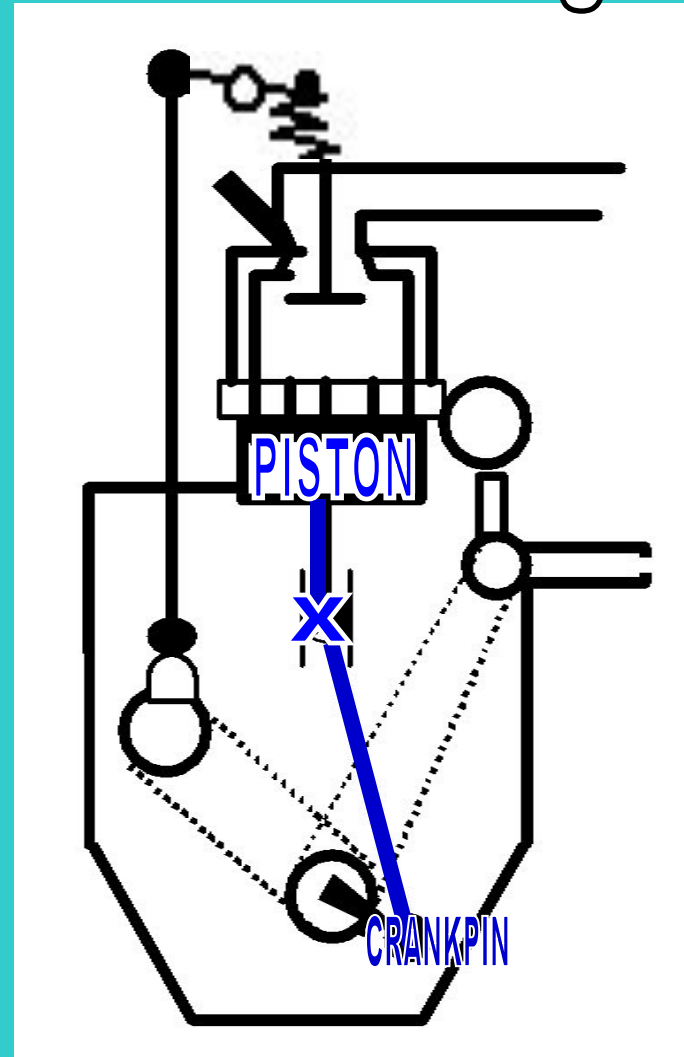
In a V-engine the cylinders are placed in an *oblique* (or *bevel*) position, unlike the *in-line engine*, where the cylinders are placed “*in line*”.



Trunk engine

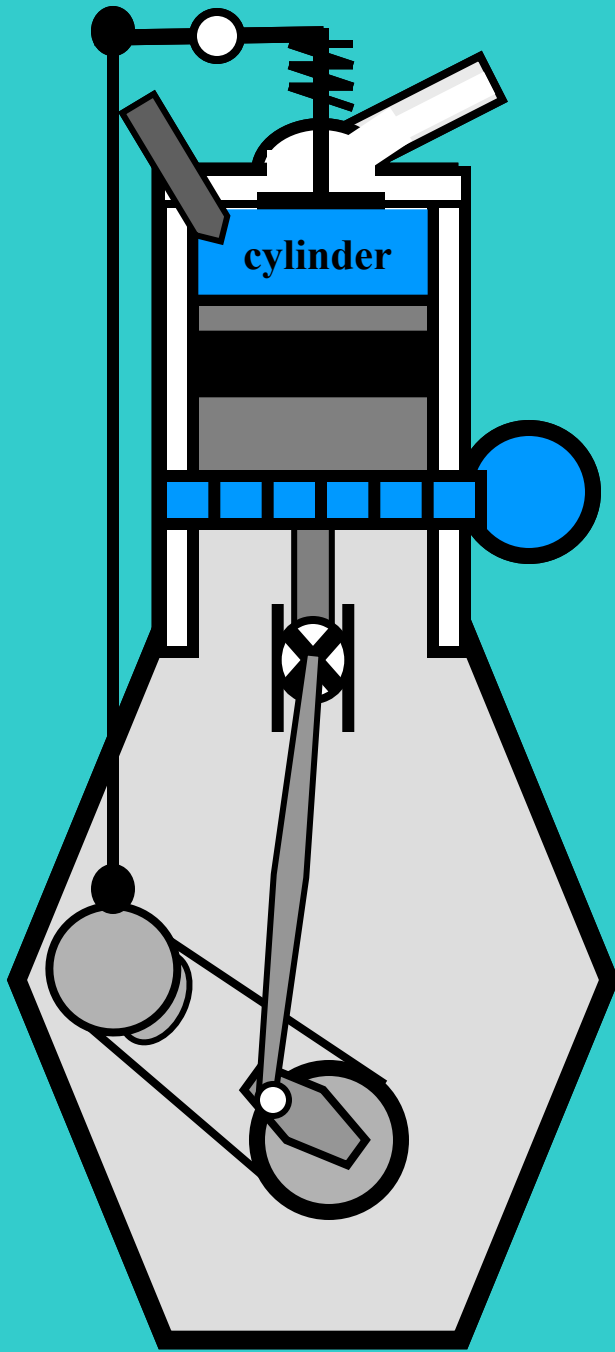


Crosshead engine



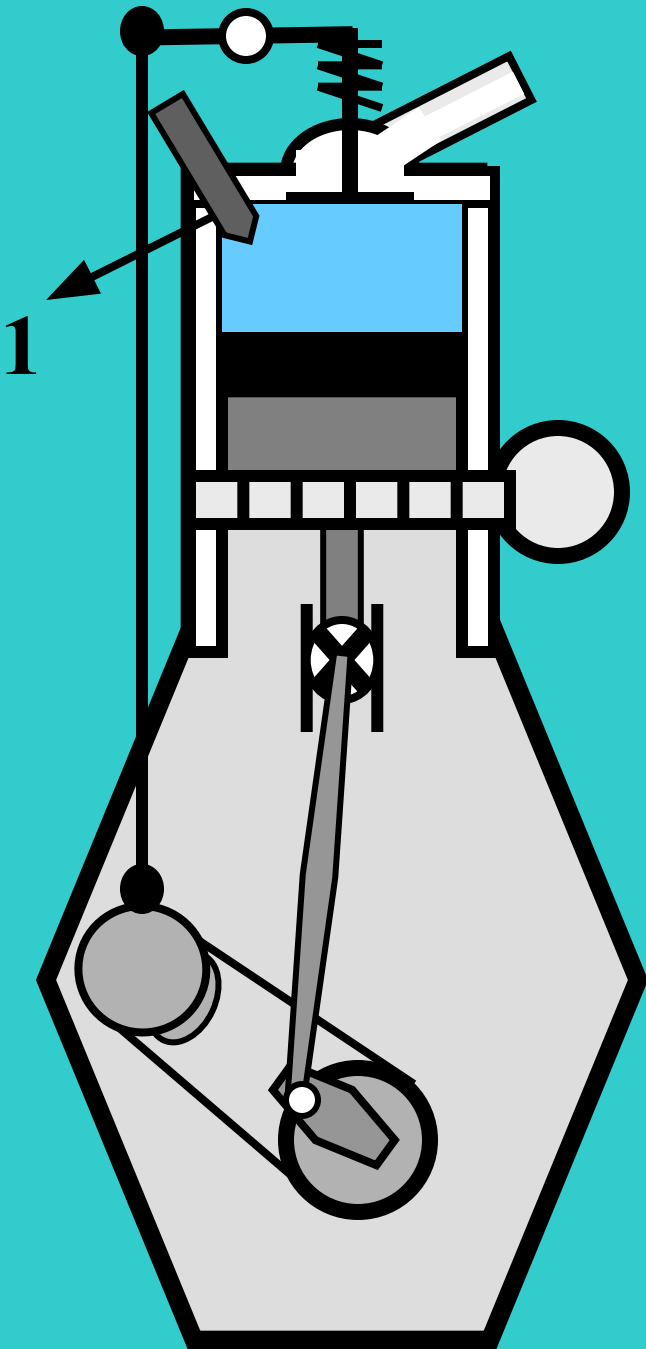
2-stroke crosshead engine





The cylinder is filled with **air**.

During the compression stroke the air in the cylinder is compressed.



The *atomizer* (1) sprays the **fuel** into the cylinder.

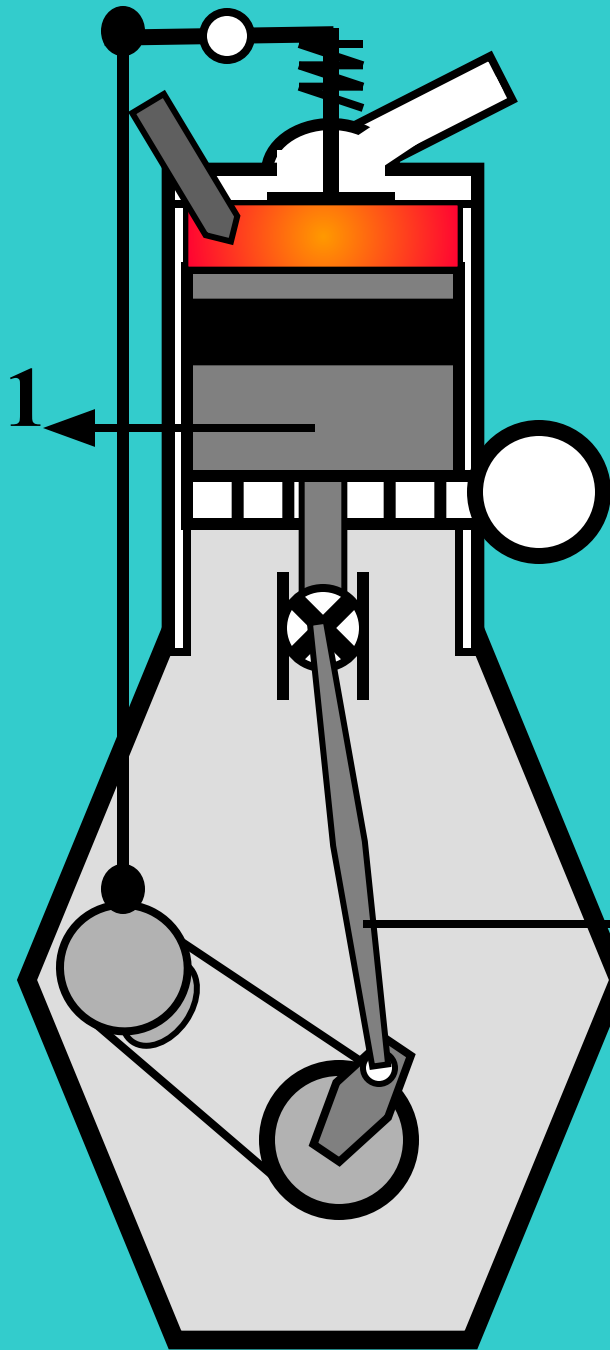
The *nozzle* divides the fuel into *small particles*.



atomizer

Tip of the atomizer (nozzle).

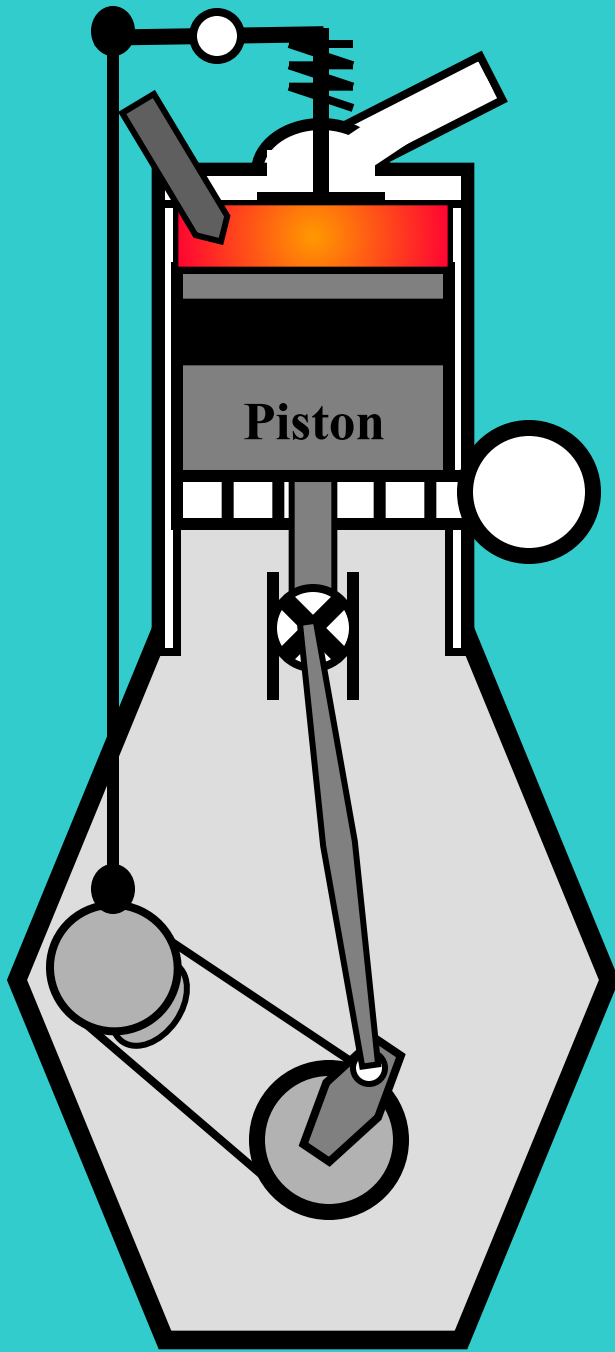




During the *power stroke* the fuel is injected and burnt.

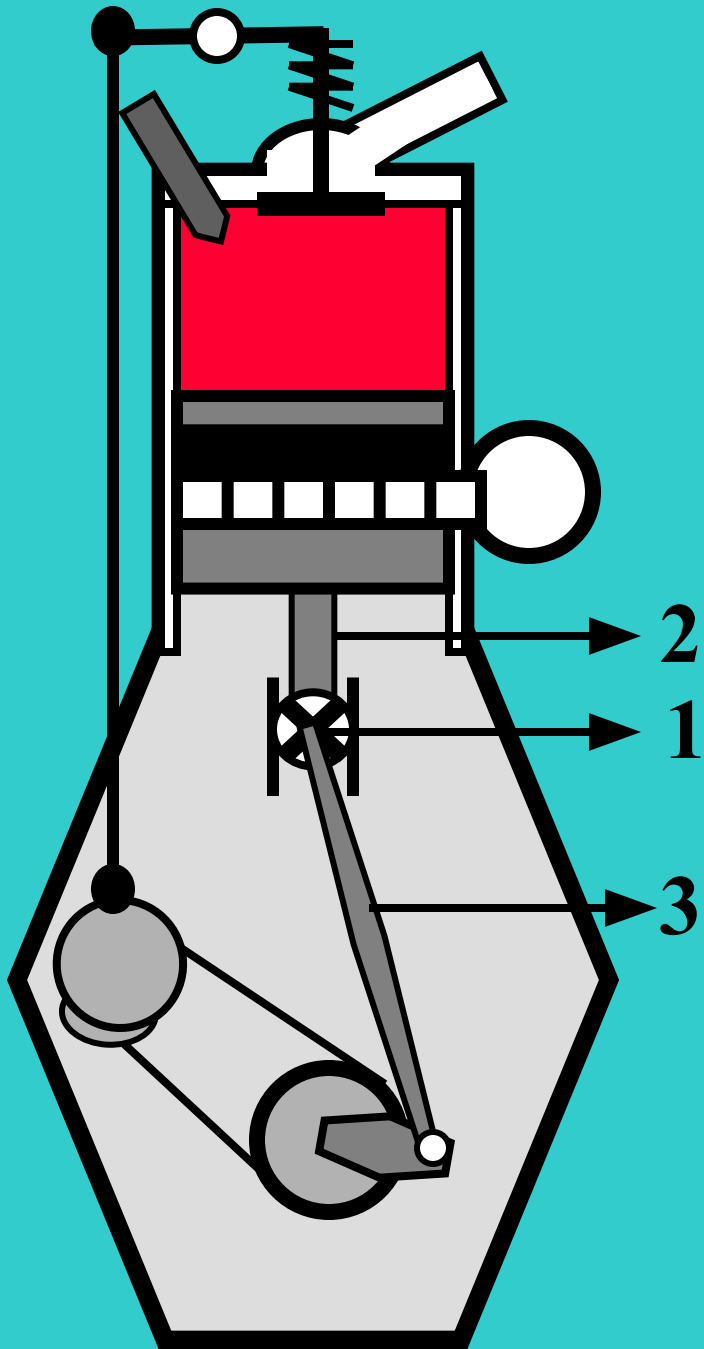
This *actuates* the piston (1) and connecting rod (2).





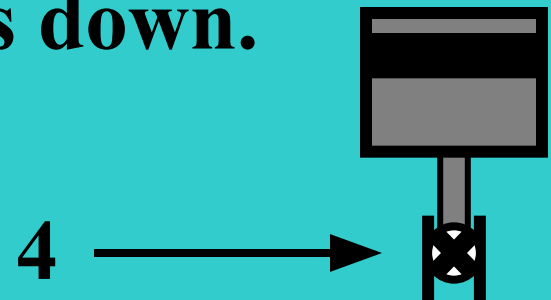
**The piston makes a
*reciprocating motion.***



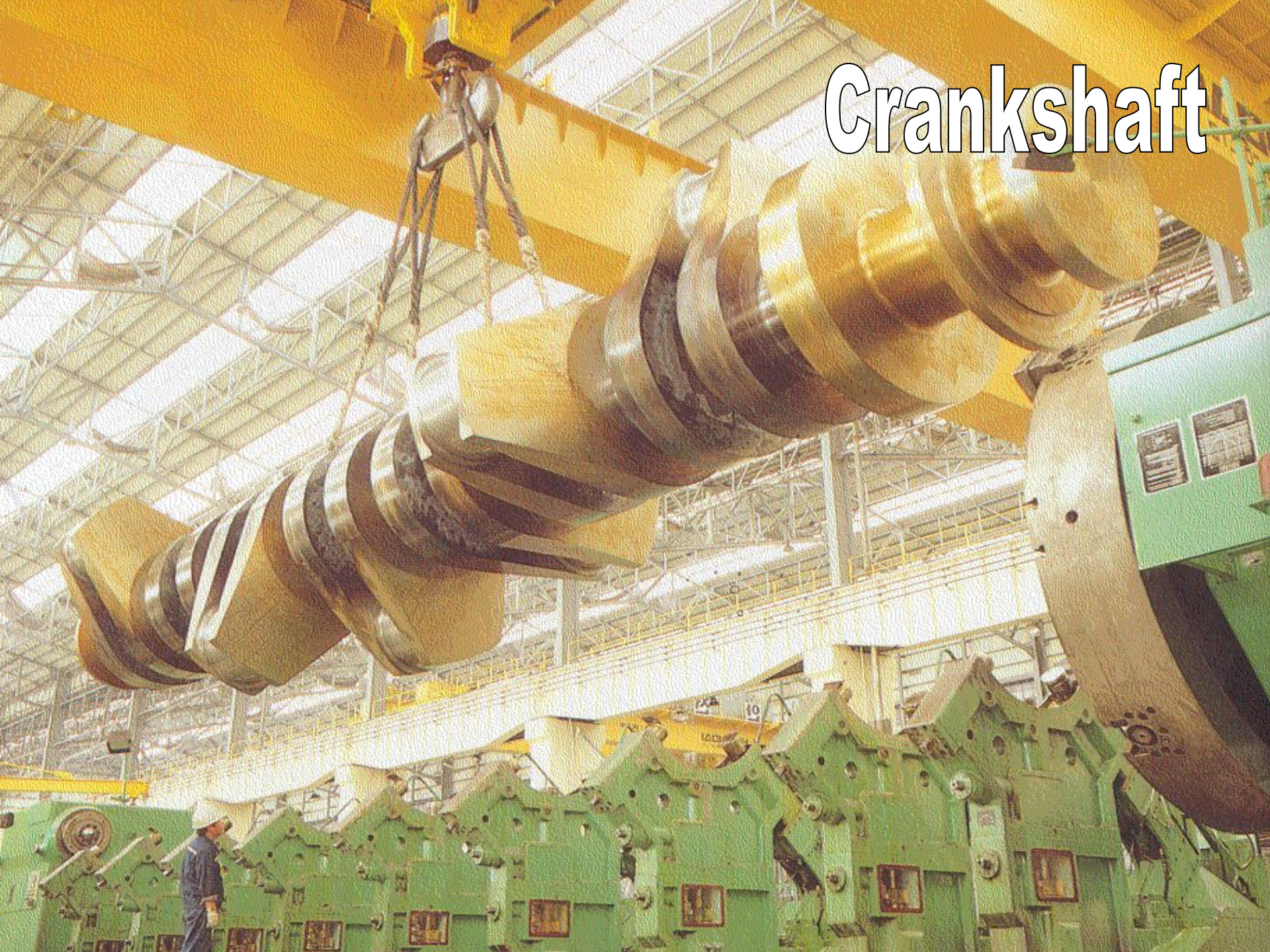


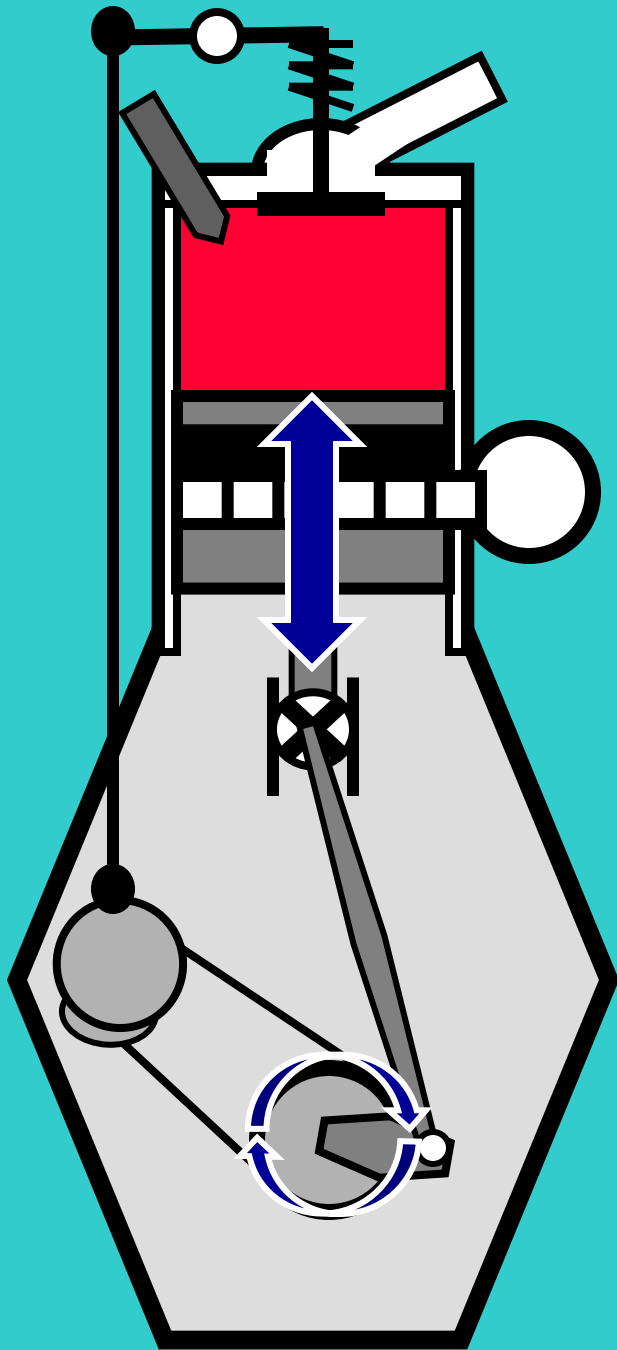
The crosshead (1) serves as a *hinging connection* between *piston rod* (2) and *connecting rod* (3).

Crosshead guides and *crosshead guide shoes* (4) absorb the forces onto the crosshead when the piston goes down.

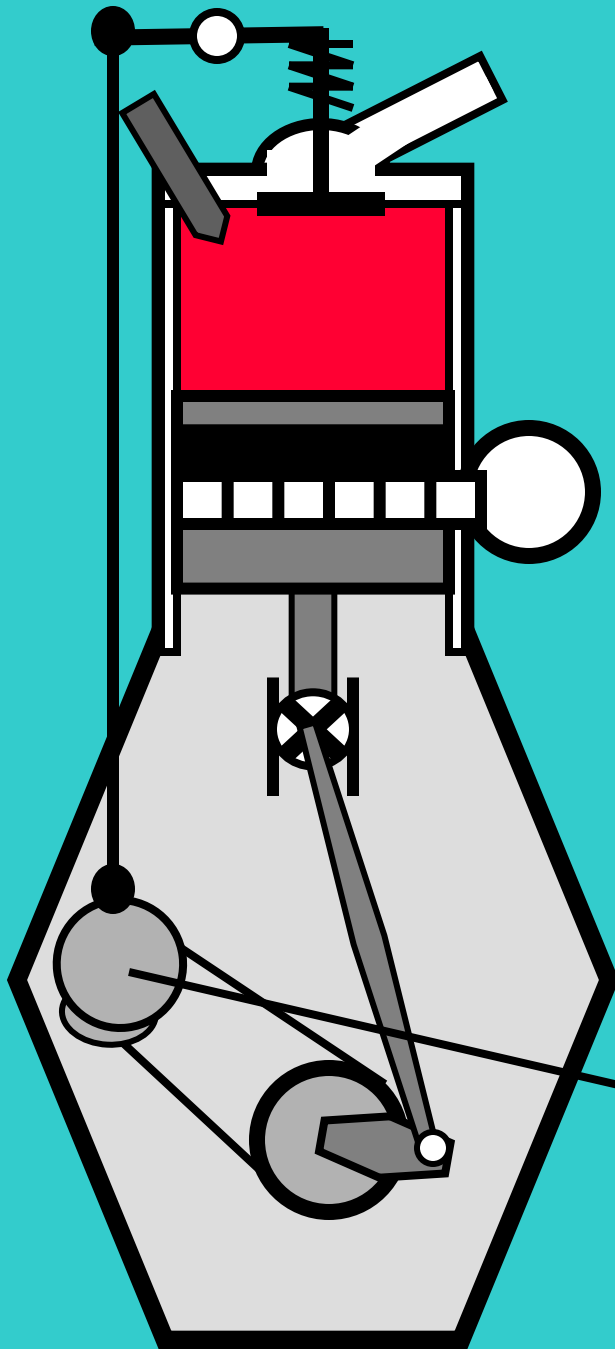


Crankshaft





The *crank* changes the *reciprocating motion* of the piston into a *rotary motion* of the *crank shaft* .

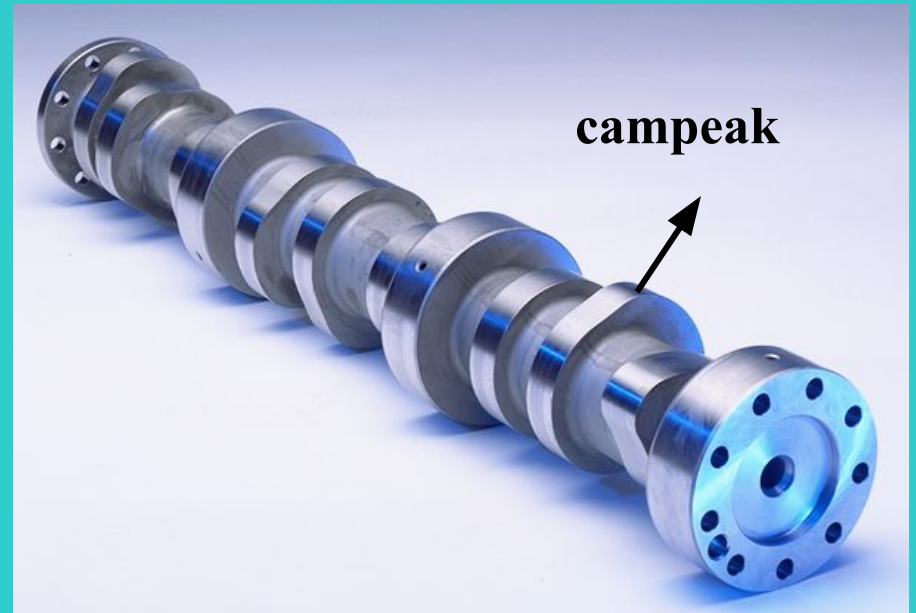
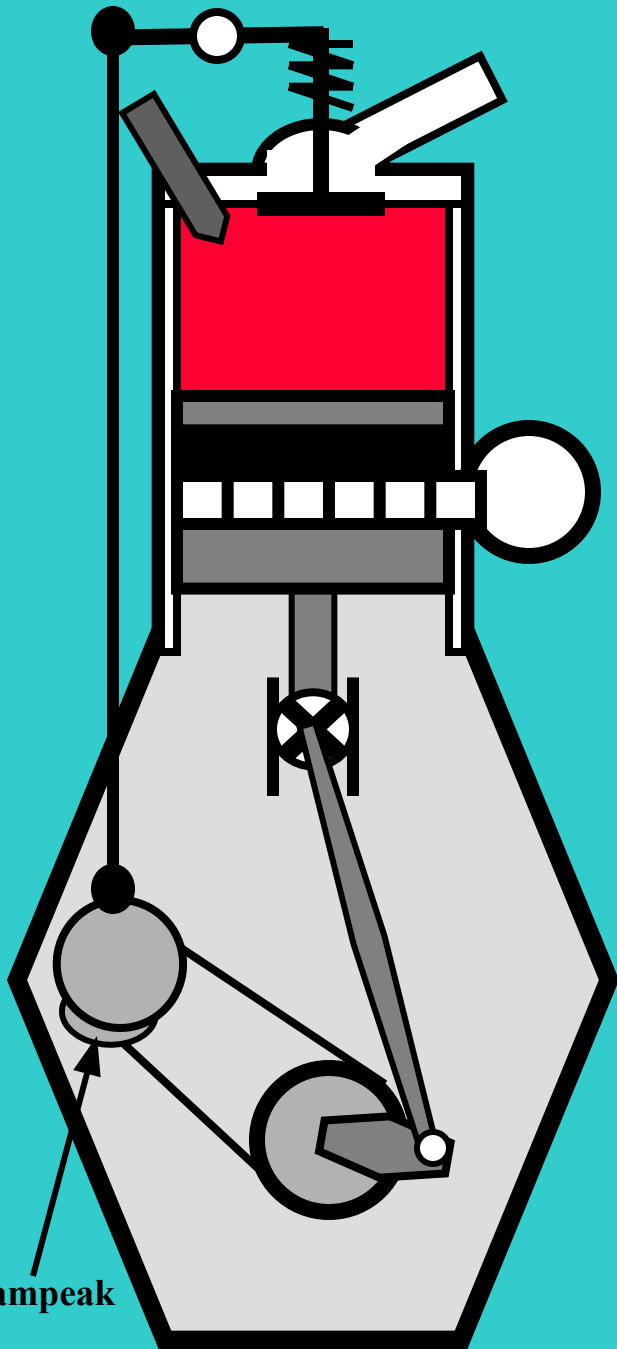


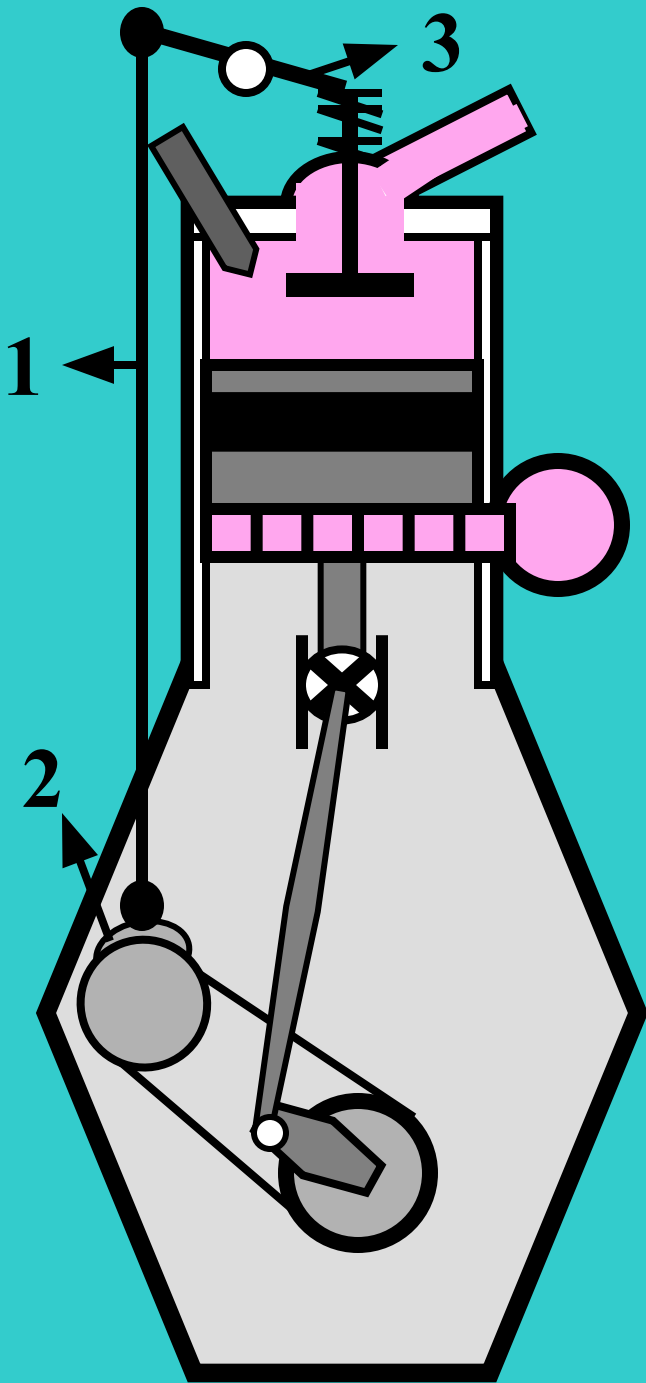
Gearwheels 
to drive the *camshaft*
are driven by chains
(“*chaindrive*”). 



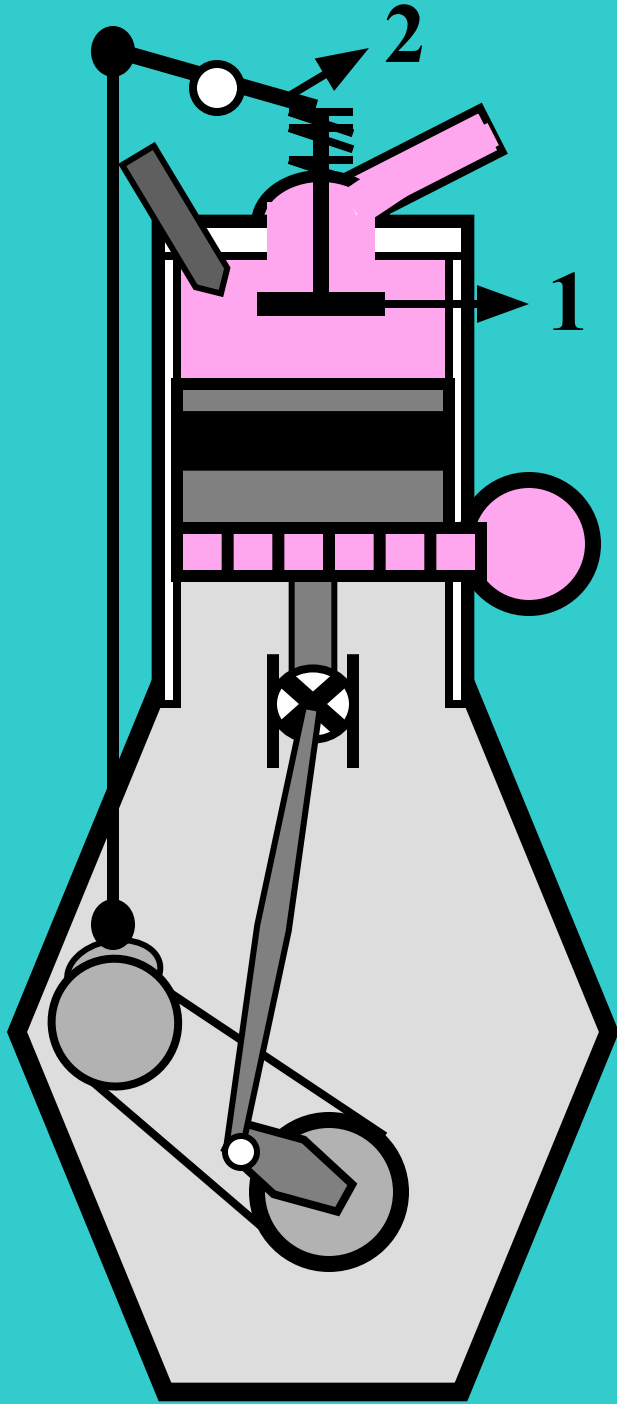
camshaft

The *campeak* is fixed to the *camshaft*.

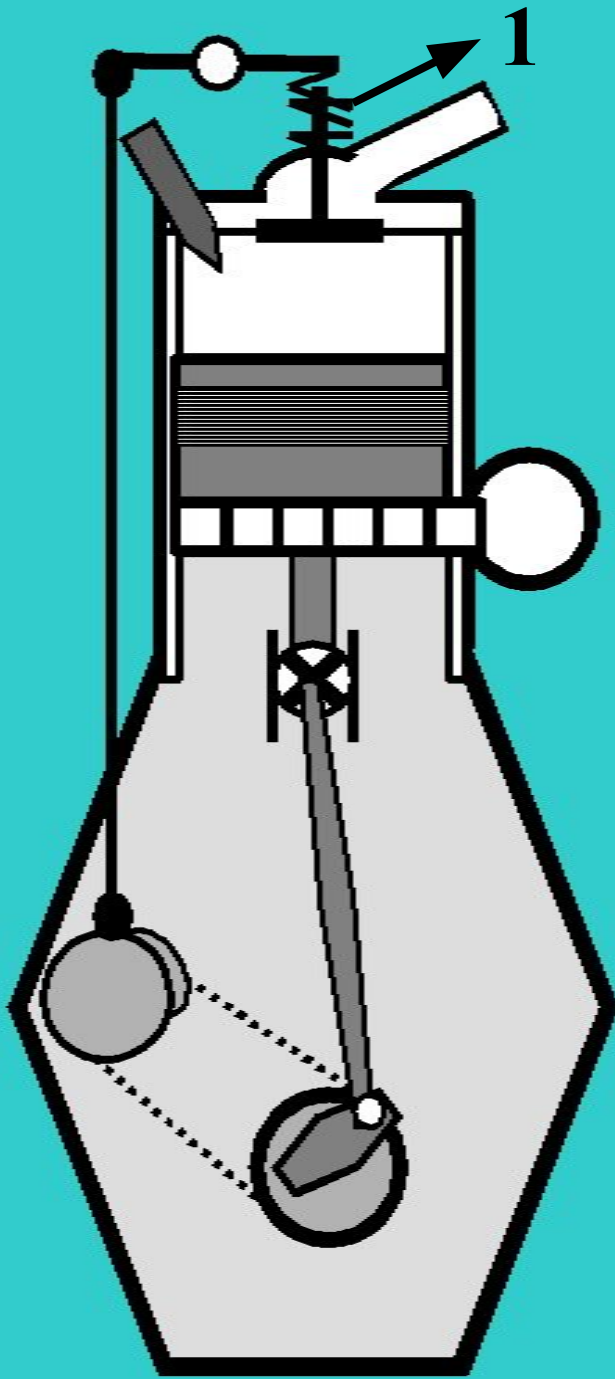




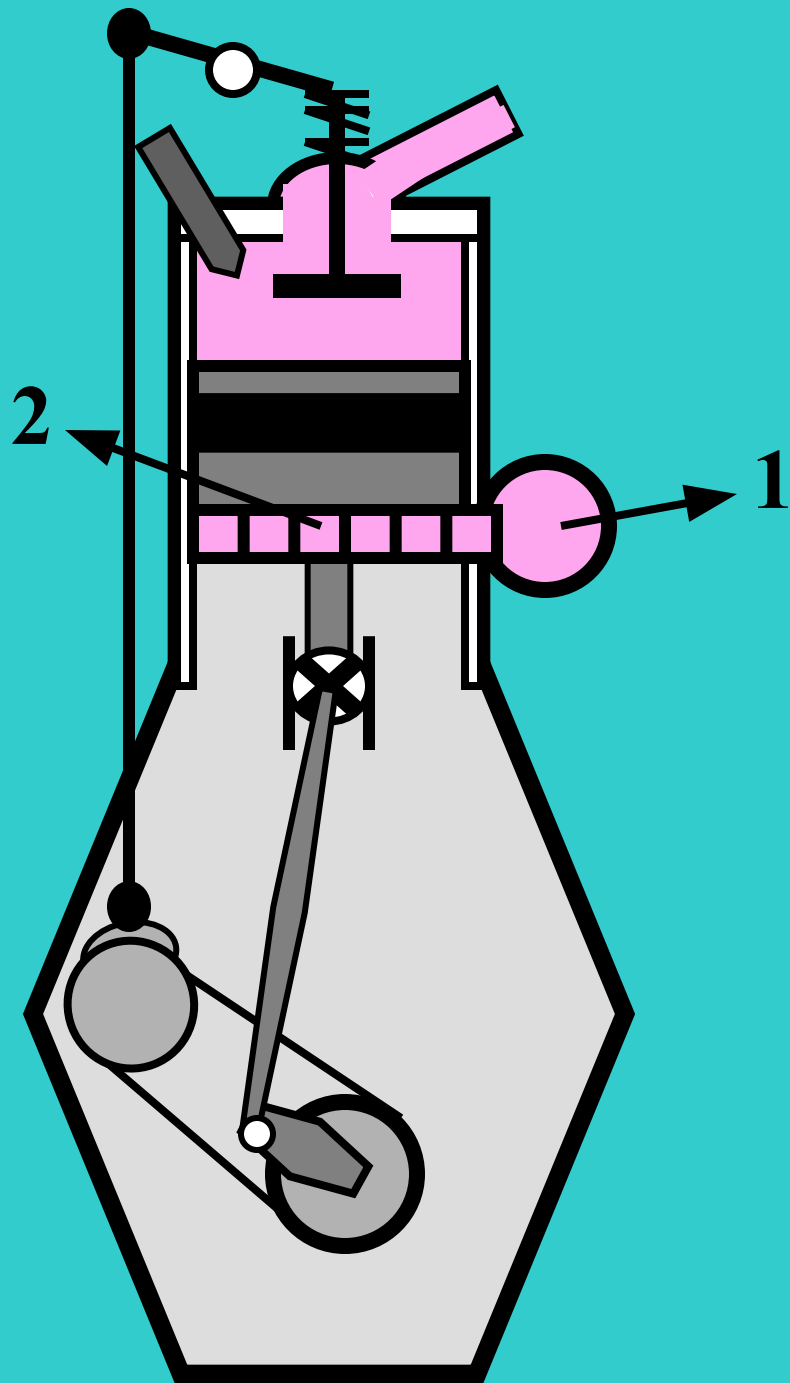
The *push rod* (1)
may be used as a
distance piece
between *campeak* (2)
and *rocker arm* (3).



The *exhaust valve* (1)
is *actuated* (opened)
by the
rocking lever (2)
(*rocker arm*).

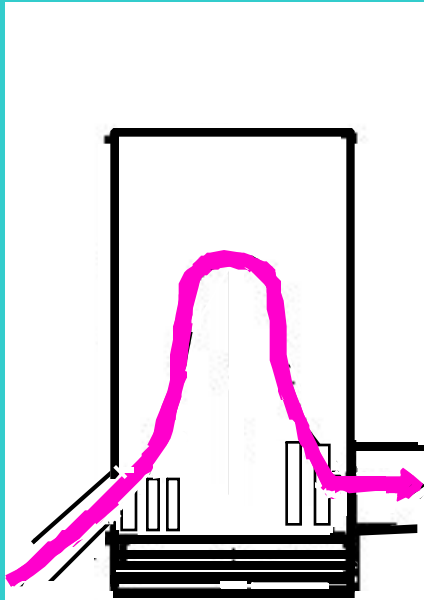


The exhaust valve
is *actuated* (closed)
by the
exhaust valve spring (1).

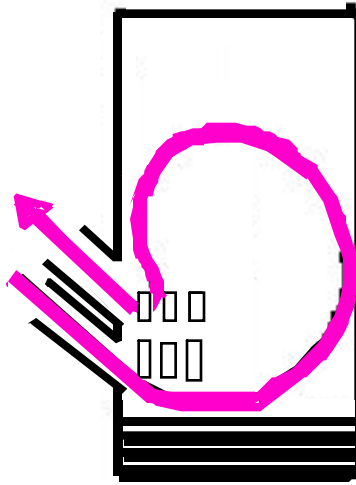


The *scavenging air manifold* (1) and *scavenging ports* (2) supply the *scavenging air* to remove the exhaust gases.

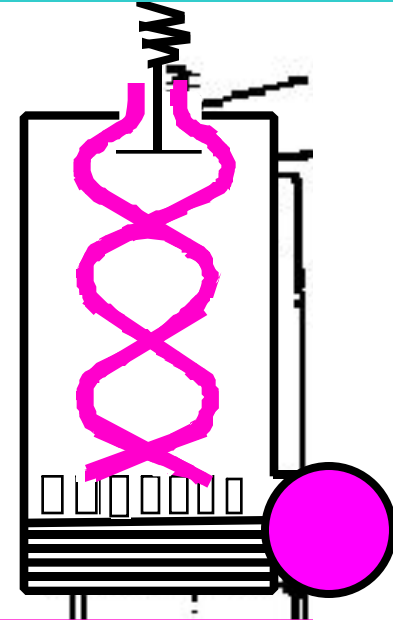
SCAVENGING SYSTEMS



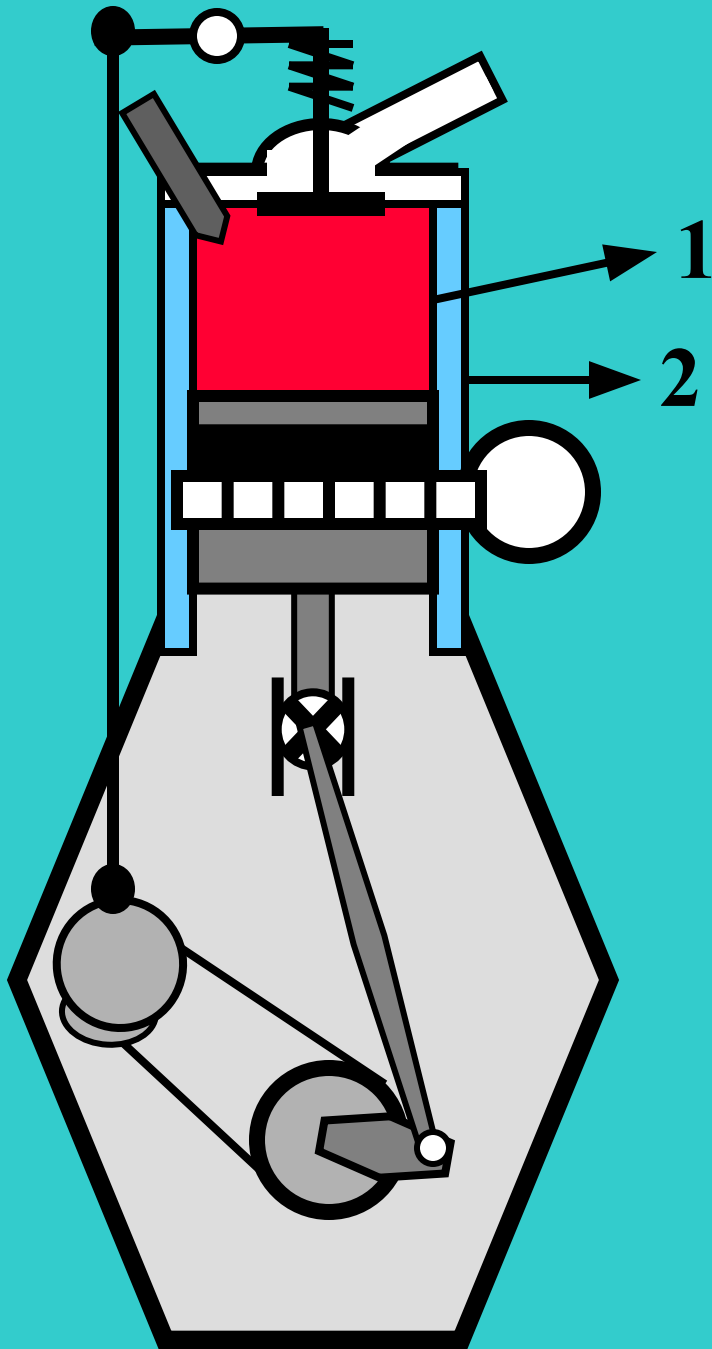
**CROSS
SCAVENGING**



**LOOP
SCAVENGING**



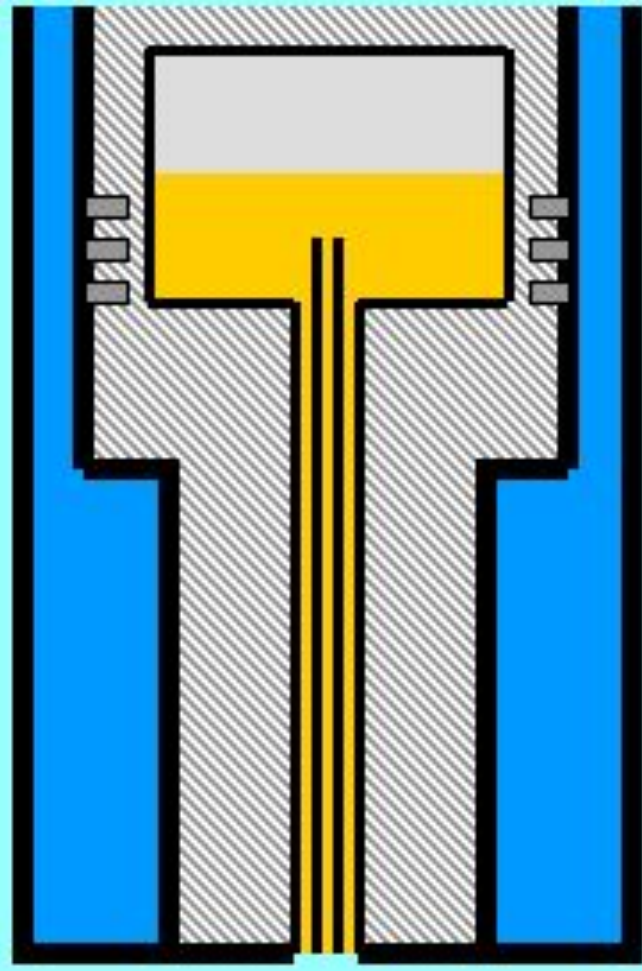
**UNIFLOW
SCAVENGING**



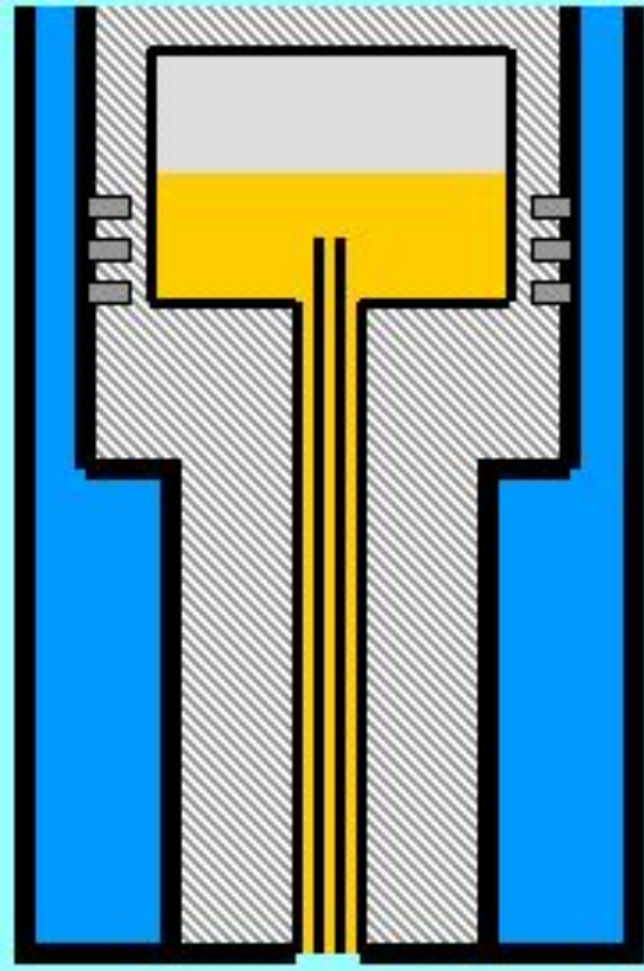
Cooling the cylinder:

The cylinder *liner* (1)
and cylinder *jacket* (2)
form the cylinder wall.

Cooling the cylinder:



A coolant (fresh water) is injected between liner and jacket to cool the cylinder.

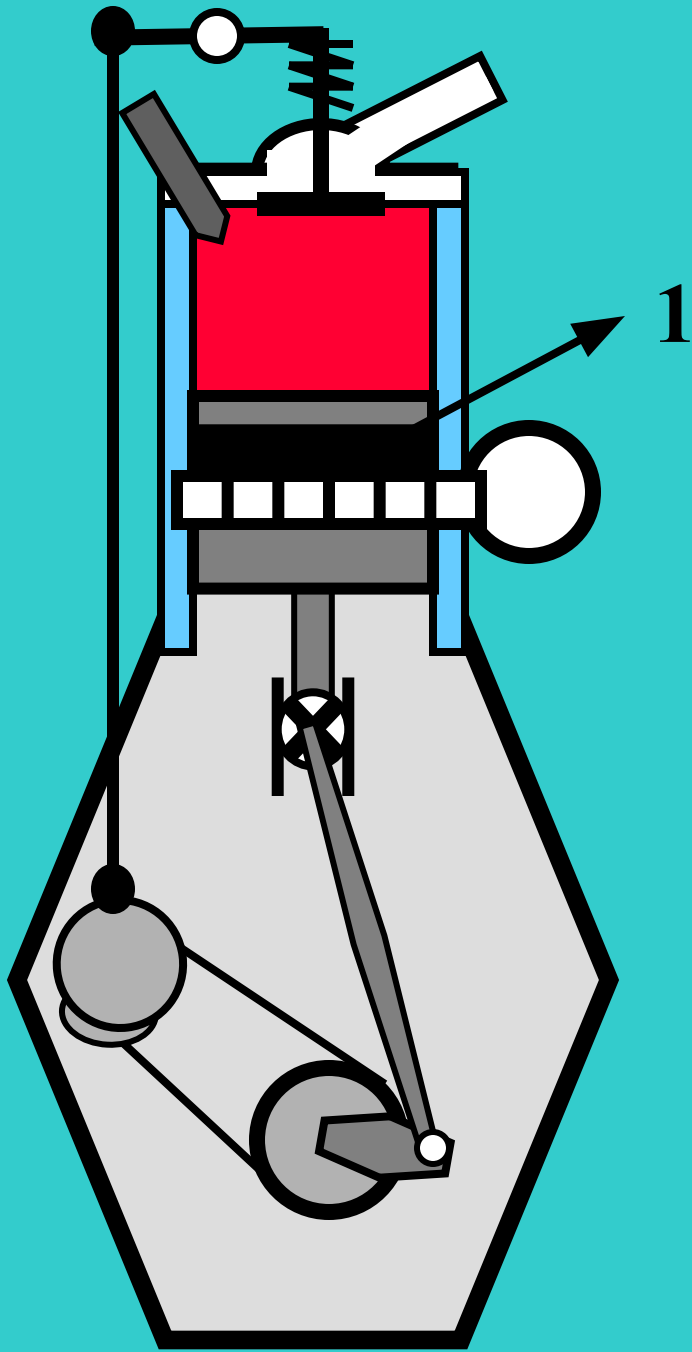


Cooling the piston:

The piston is cooled by **oil**.

The advantages of oil as a coolant are:

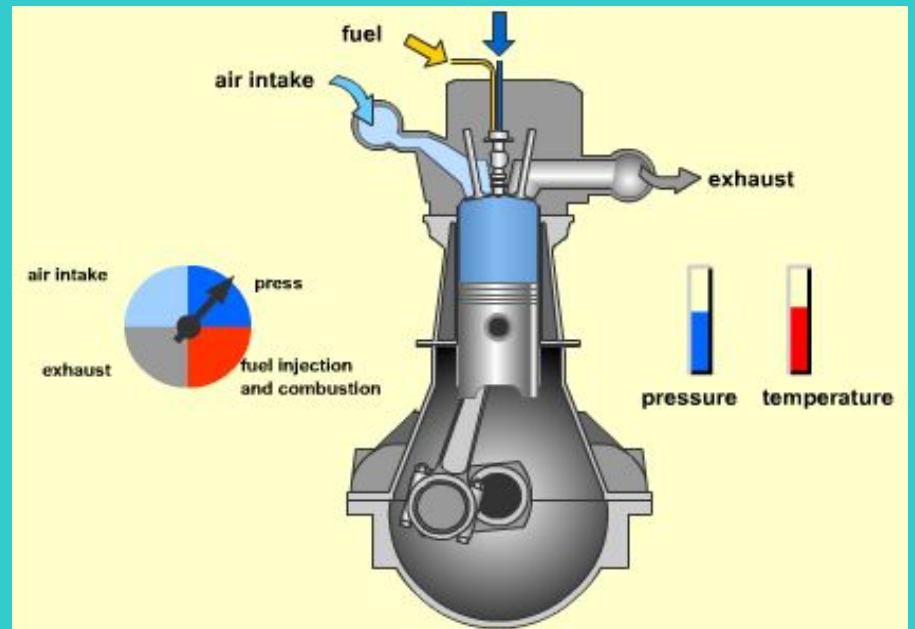
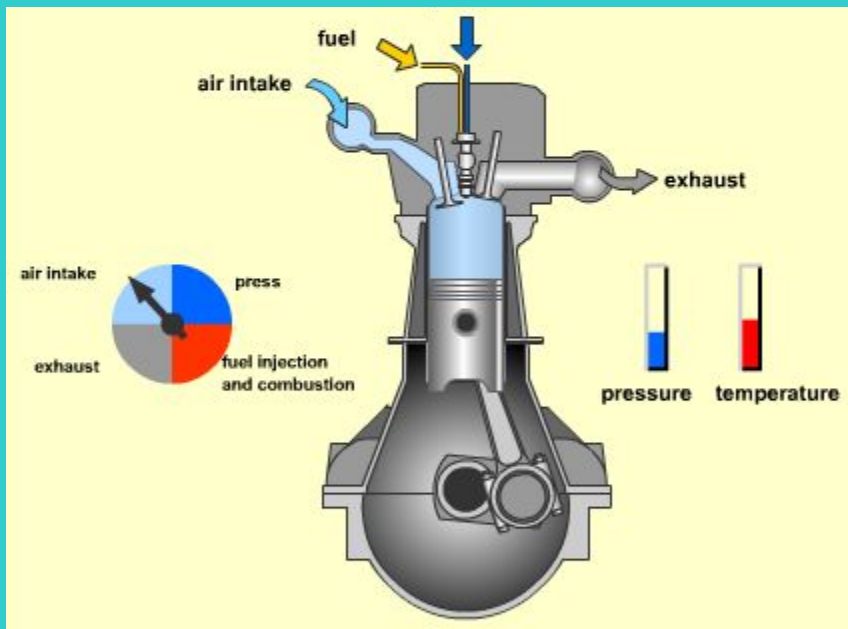
- . it reduces noise;
- . it purifies;
- . it forms a seal;
- . it lubricates;
- . it is anti-corrosive;
- . it has a higher resistance to heat.



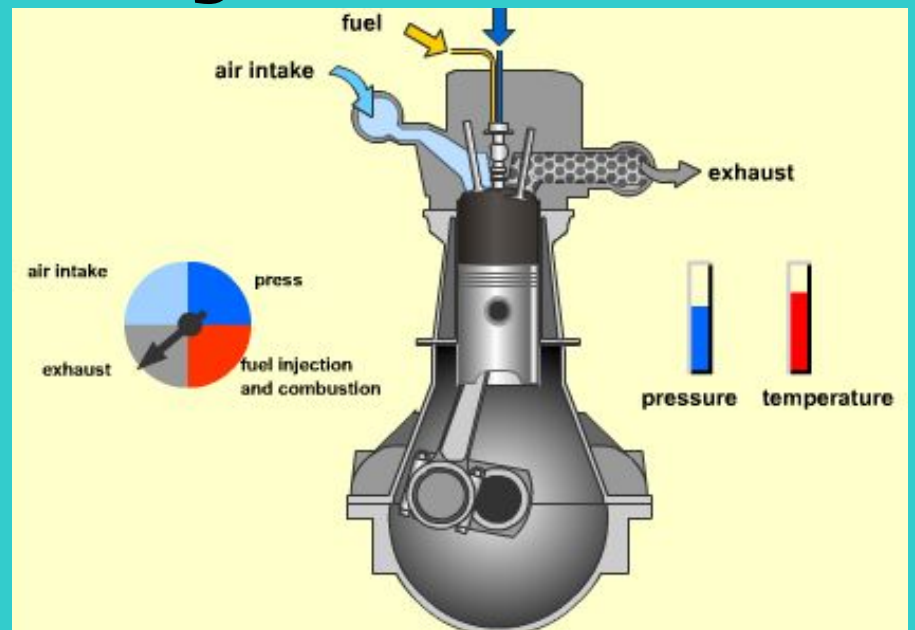
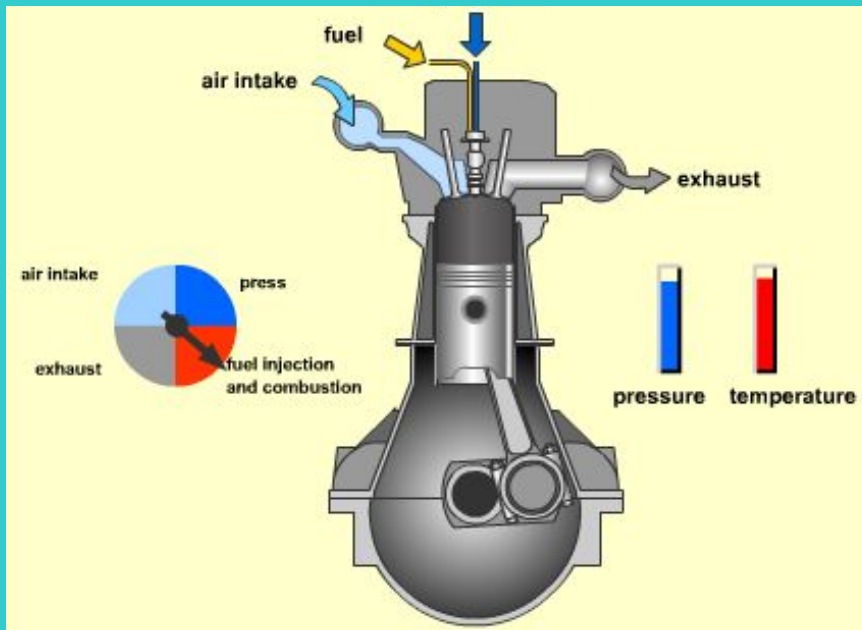
The *piston rings* (1) form a *seal* around the cylinder and carry away the heat.



Piston rings

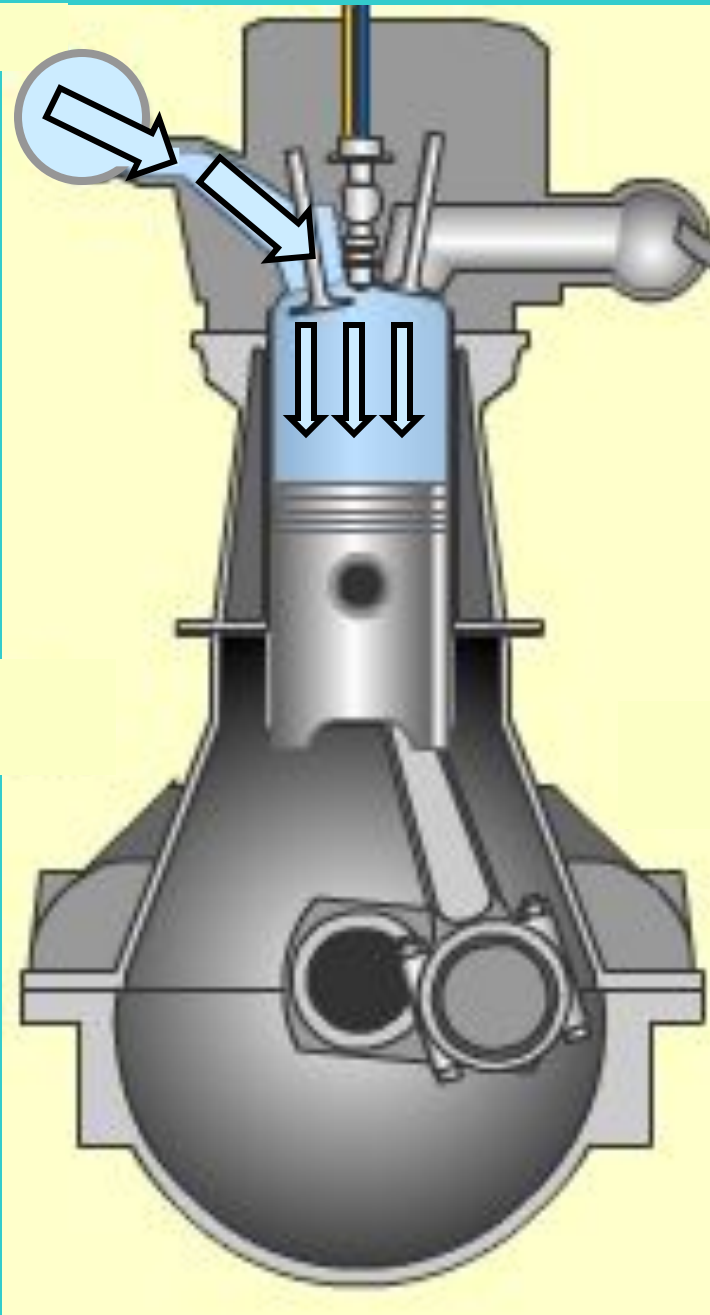


4-stroke cycle



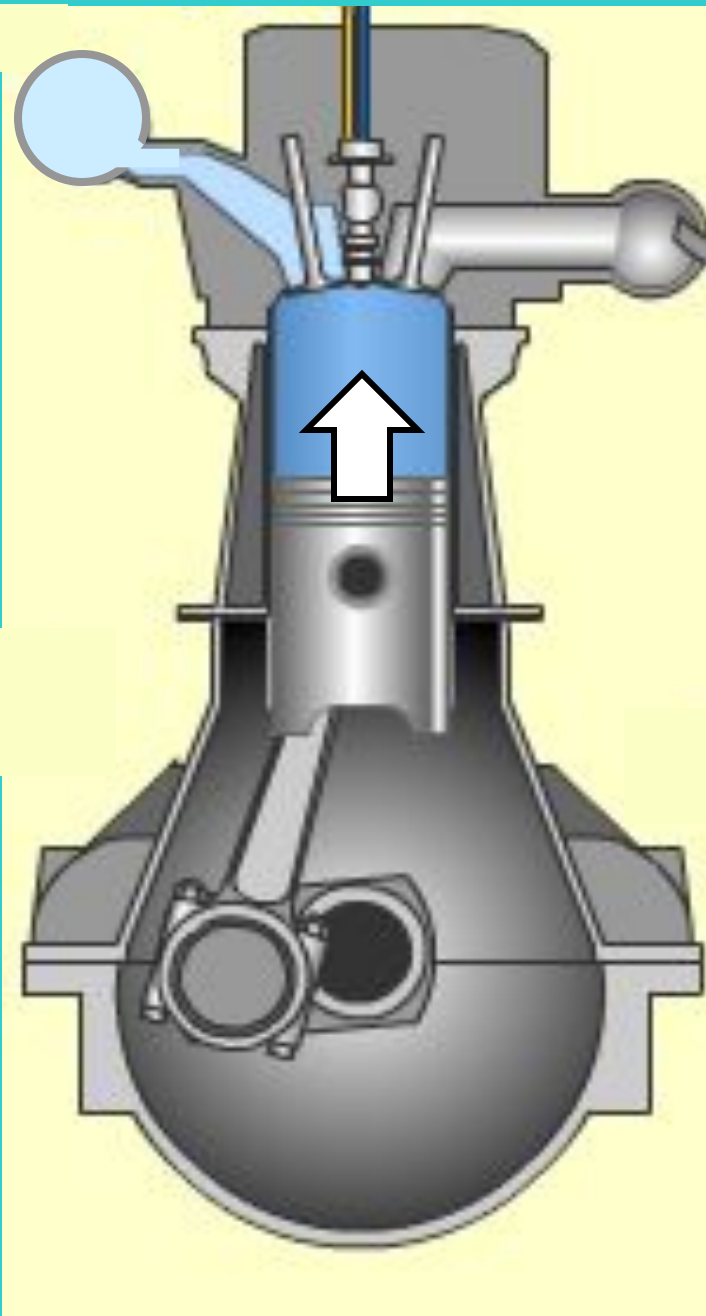
Suction stroke

**During the
air induction stroke
(or *inlet stroke*,
or *suction stroke*)
air is drawn into
the cylinder.**



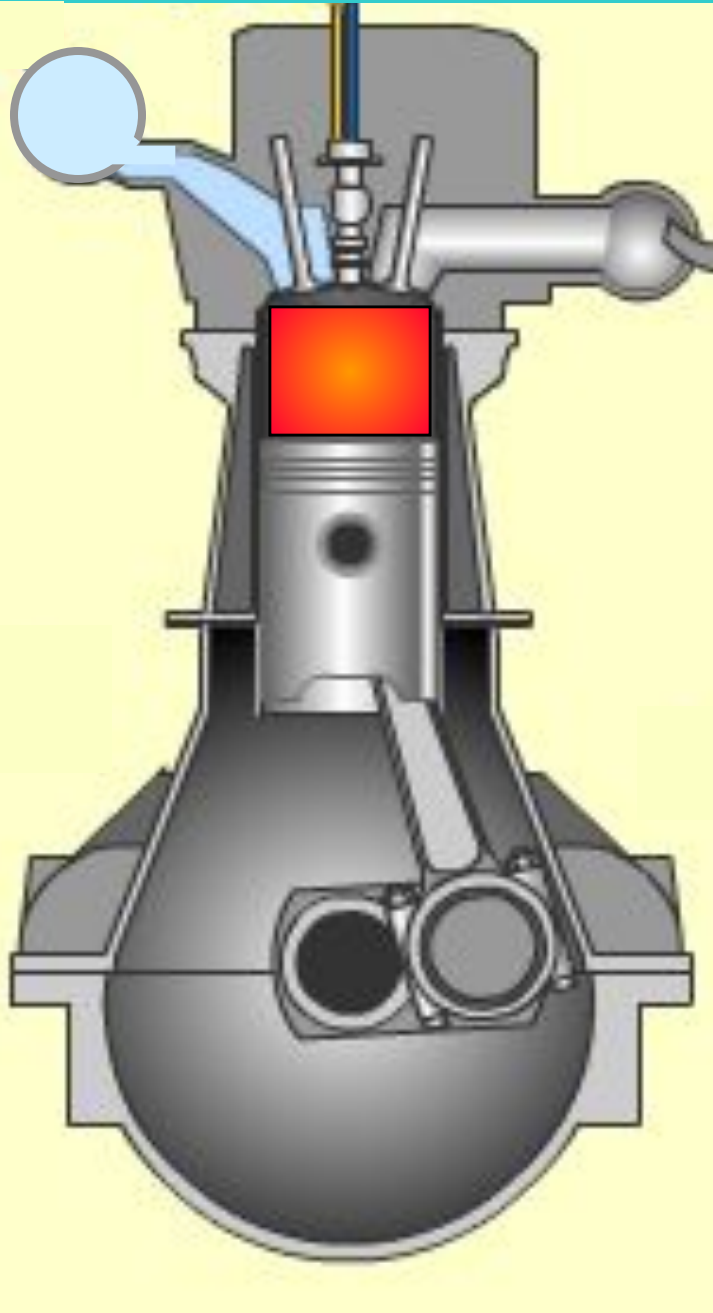
Compression stroke

During the compression stroke the air in the cylinder is compressed.



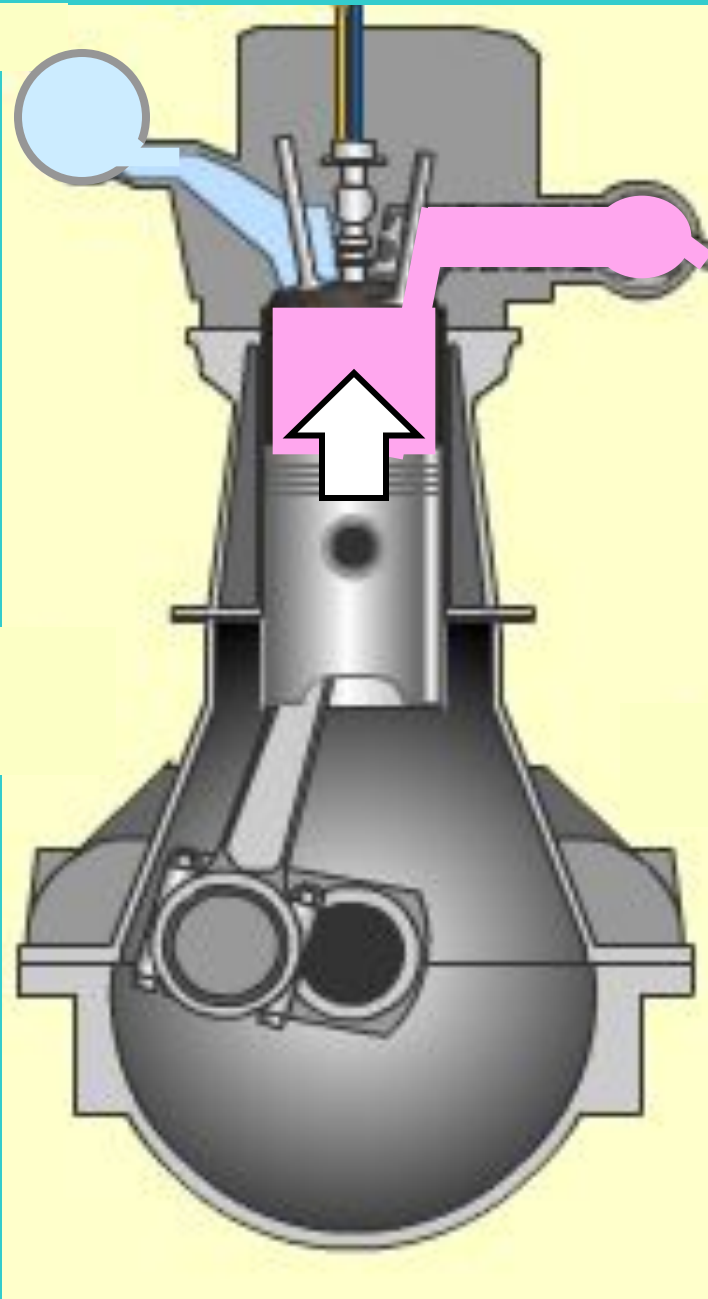
Power stroke

**During the power stroke
fuel is injected
and burnt.**



Exhaust stroke

During the exhaust stroke the exhaust gases are driven out of the cylinder by the piston.



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SHIPPING AND TRANSPORT COLLEGE ROTTERDAM