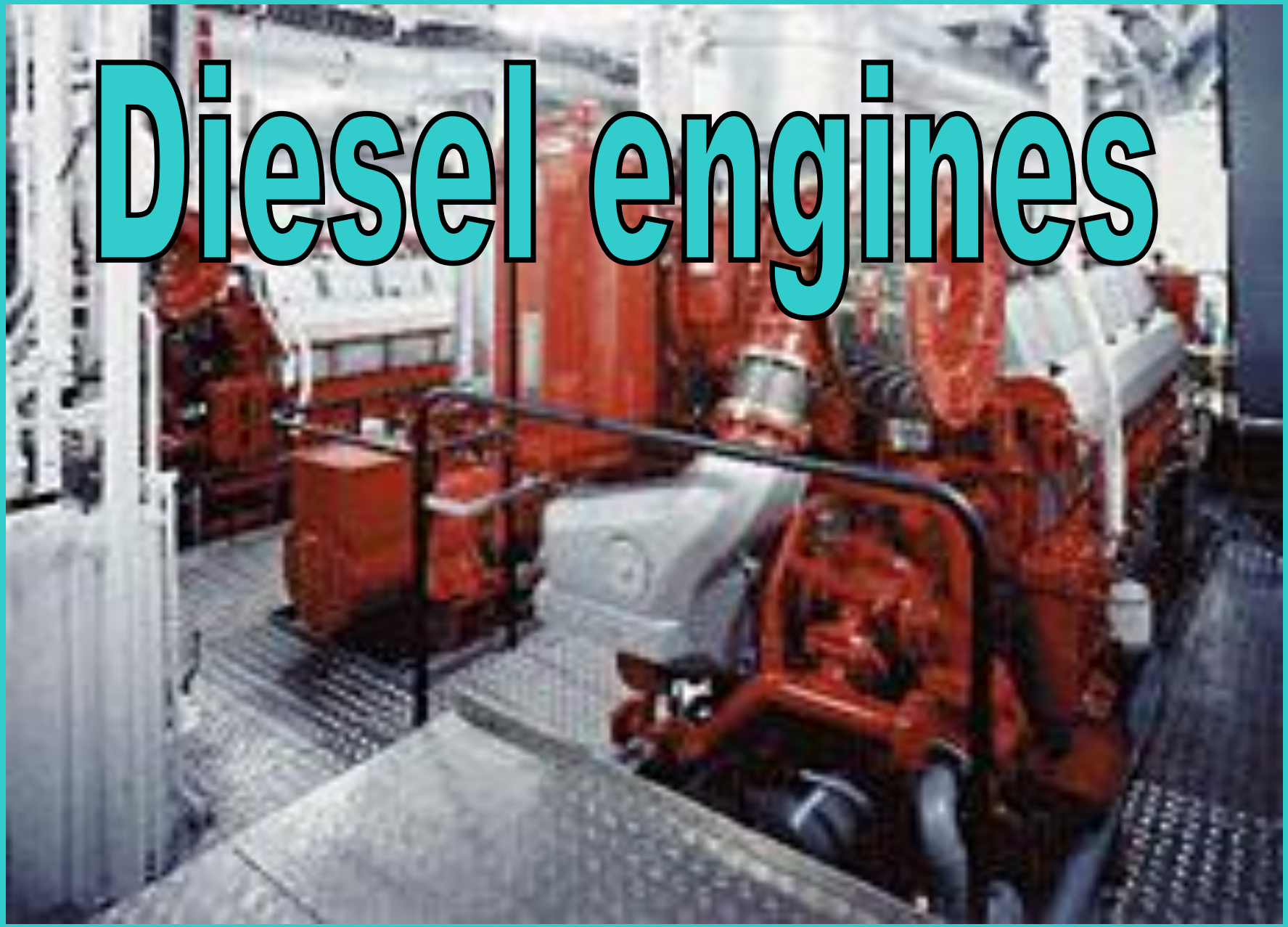
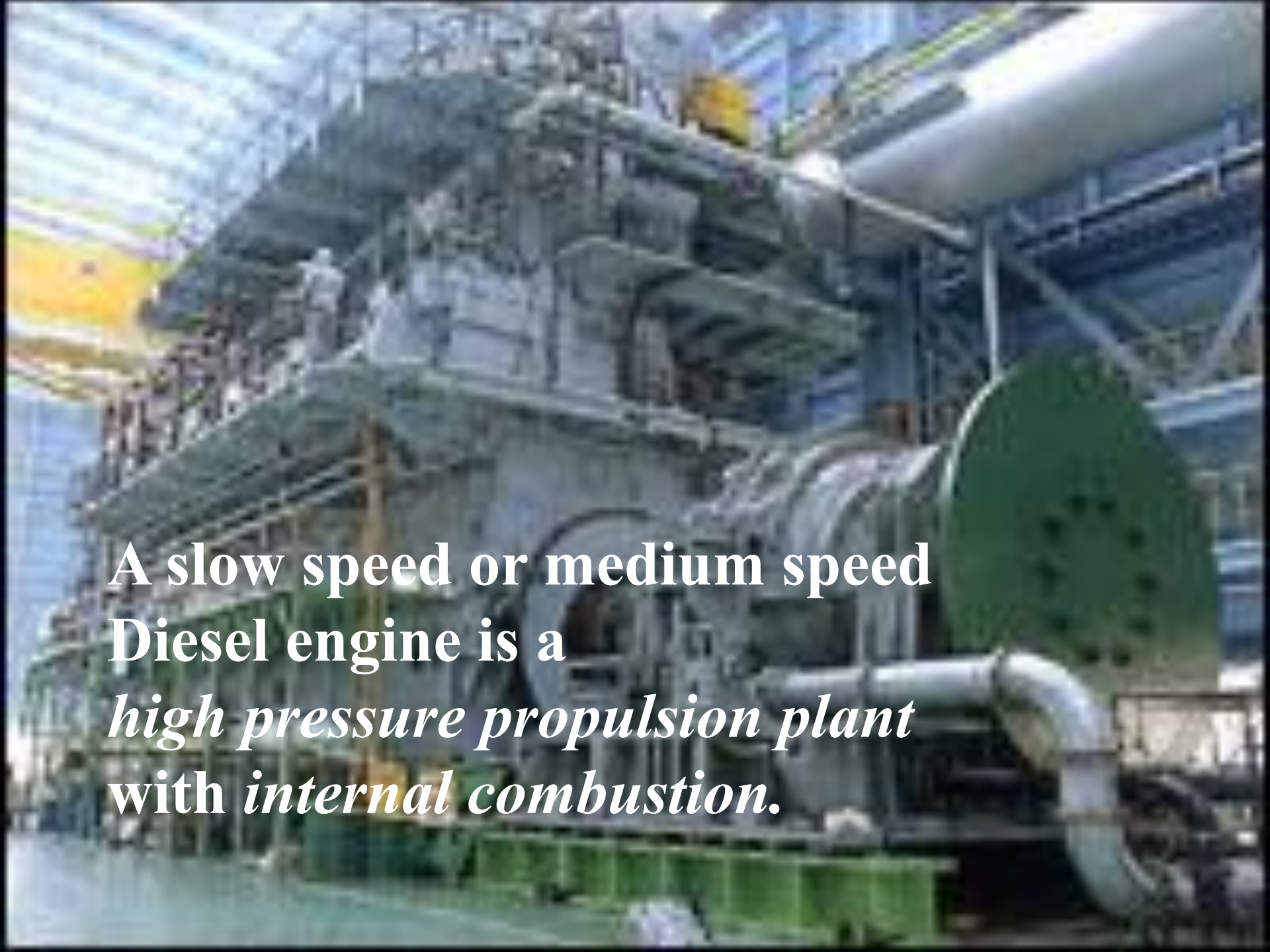
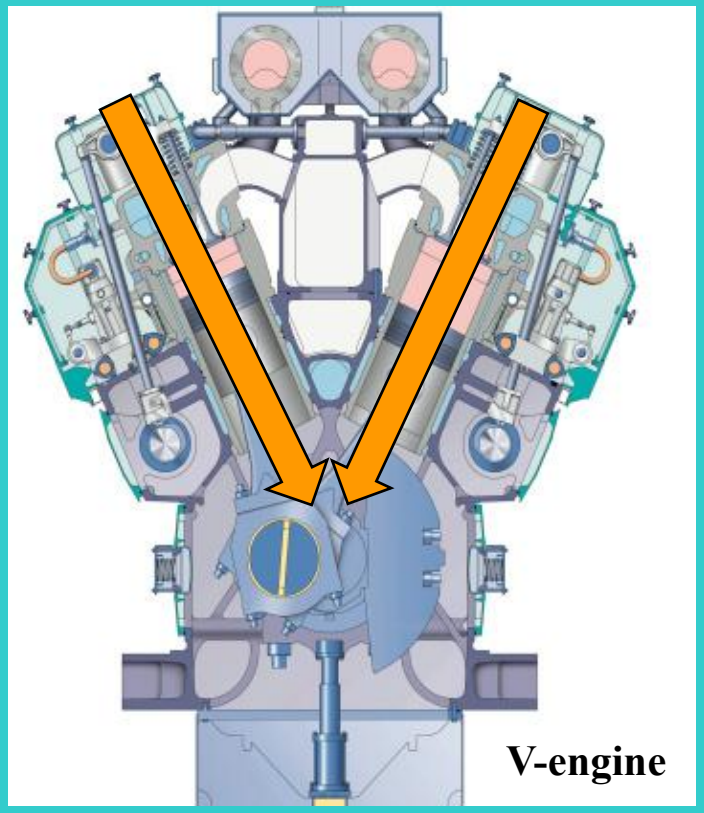

Diesel engines

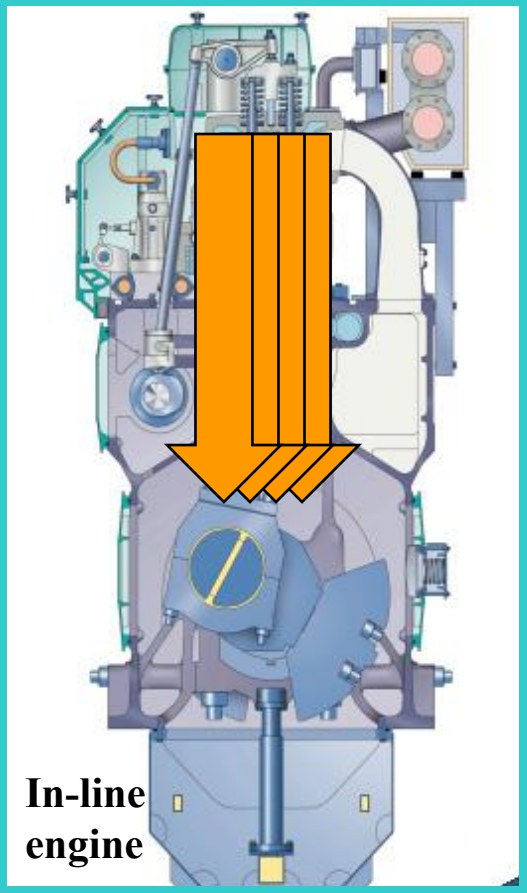

A slow speed or medium speed
Diesel engine is a
high pressure propulsion plant
with *internal combustion.*

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"*.

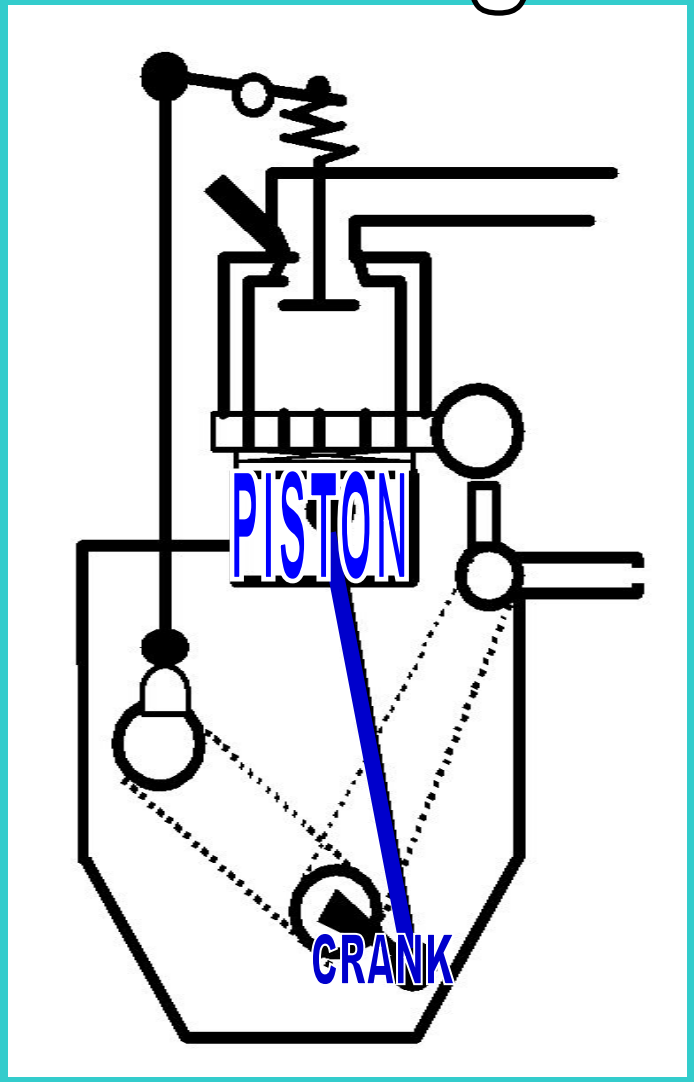


V-engine

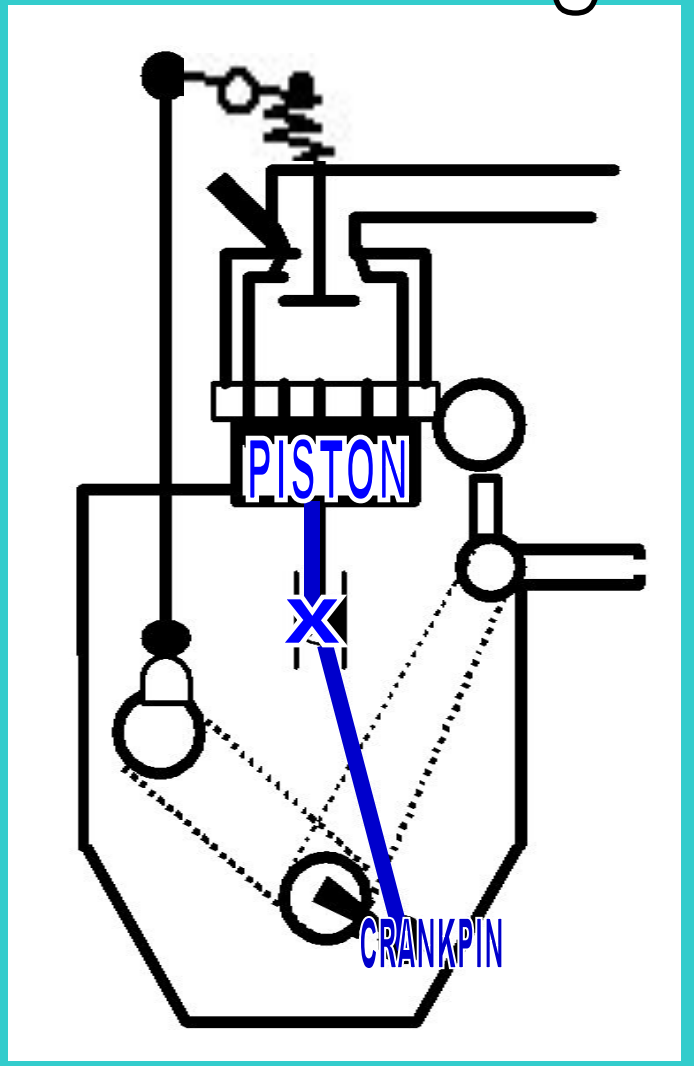


In-line engine

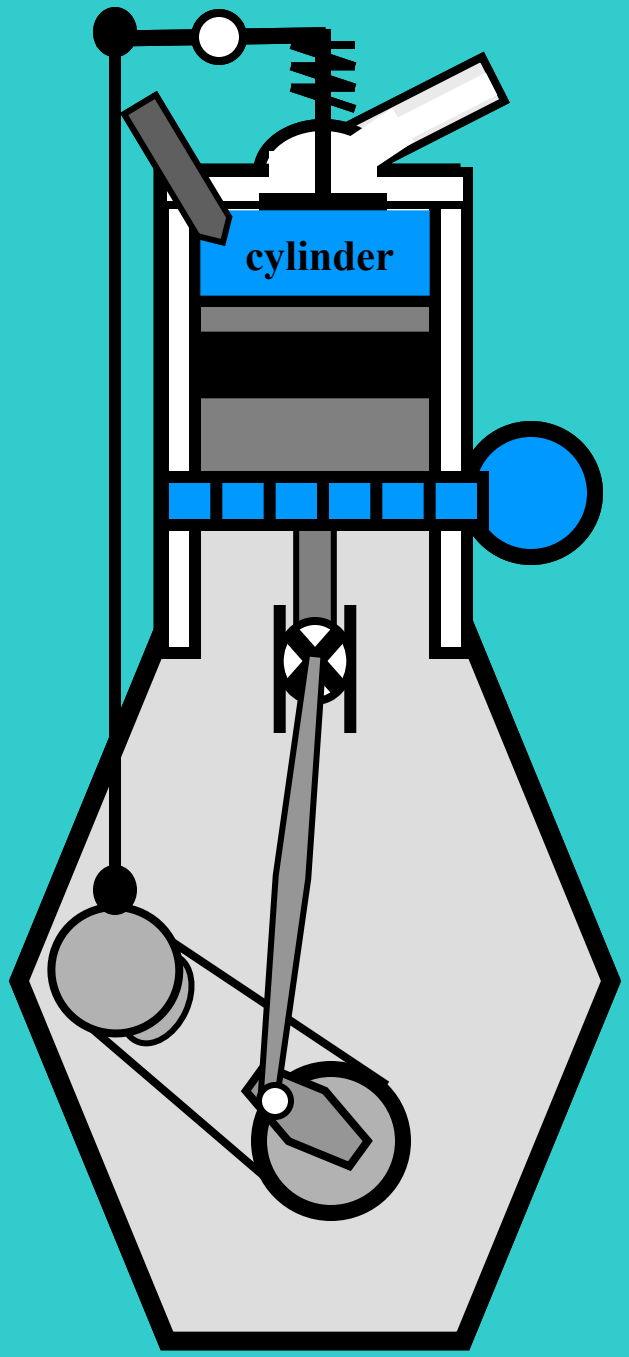
Trunk engine



Crosshead engine

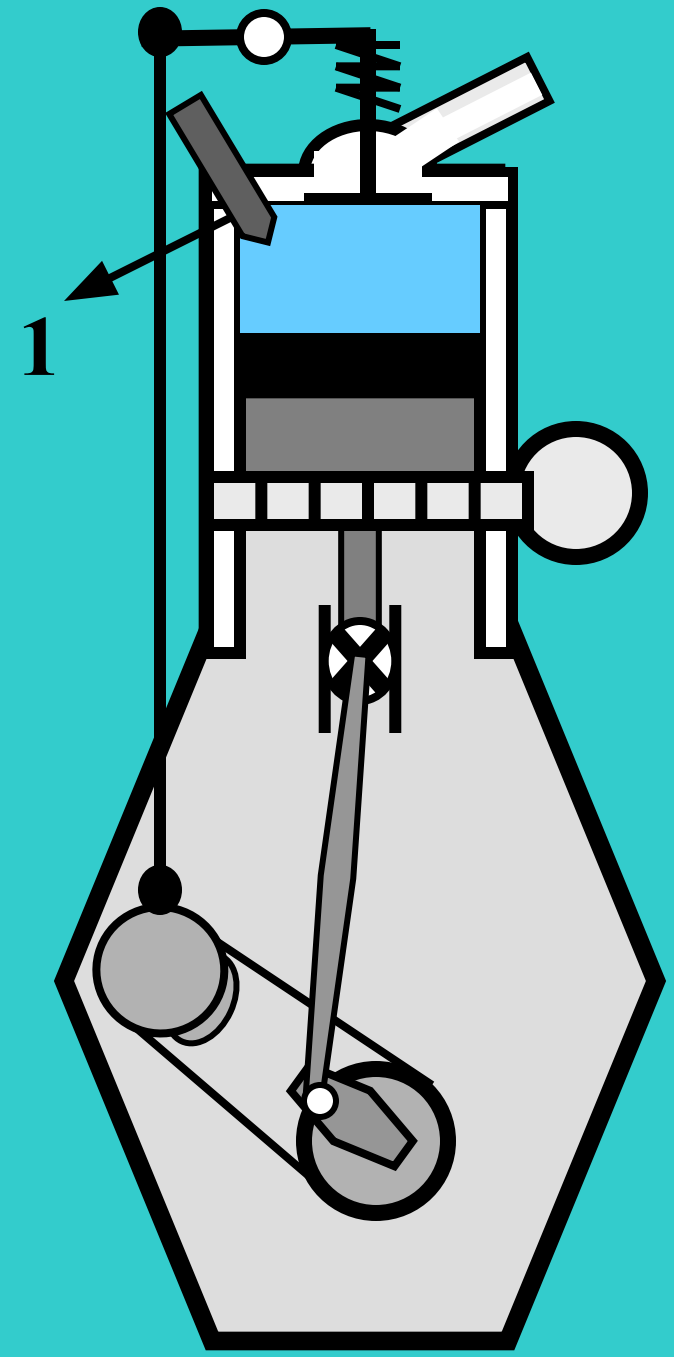



2-stroke crosshead engine



The cylinder is filled with air.

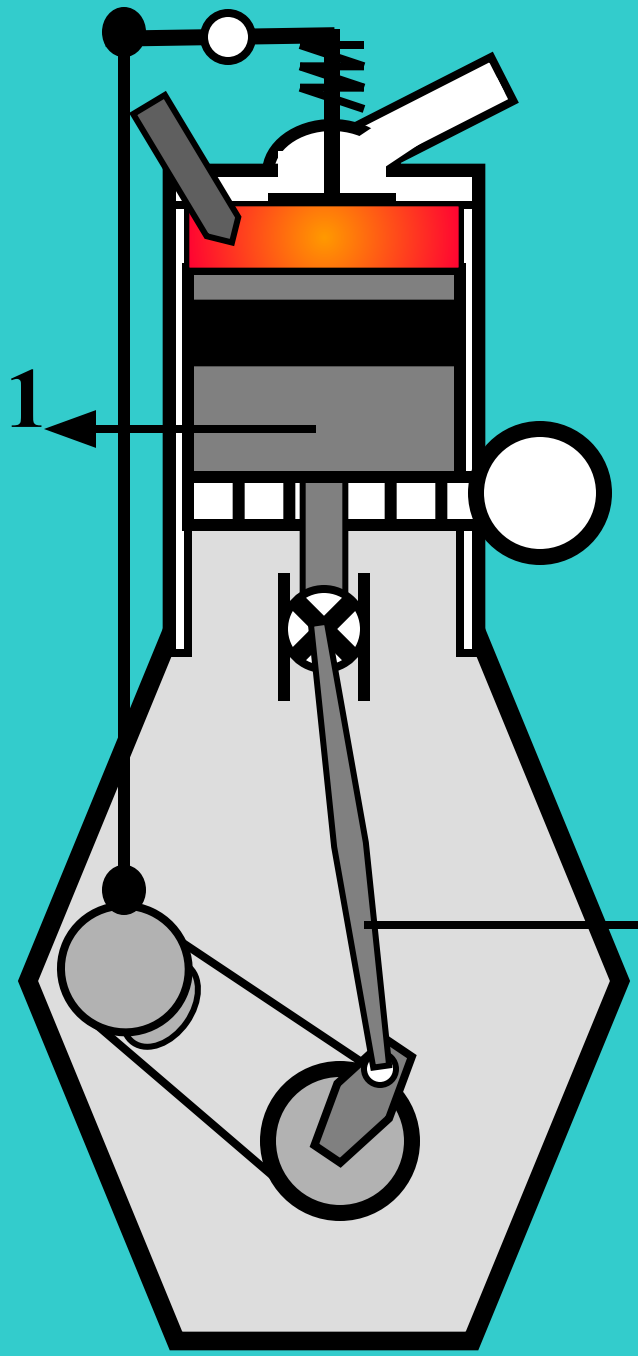
During the compression stroke the air in the cylinder is compressed.



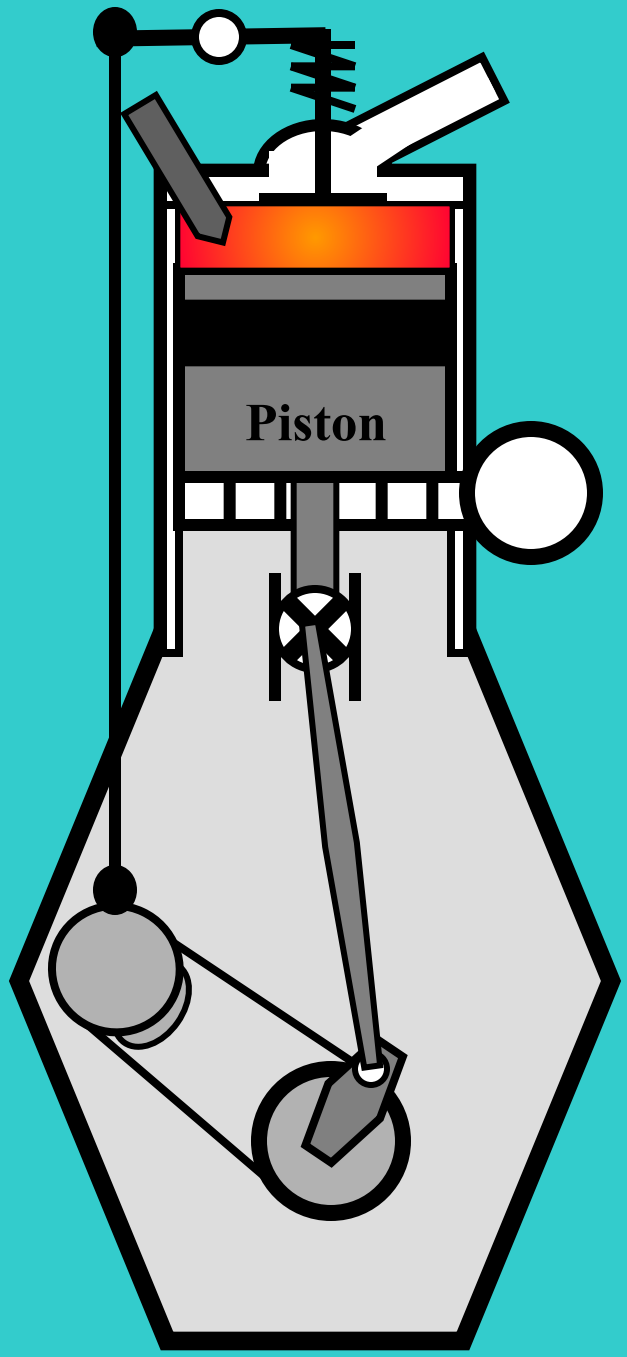
The *atomizer* (1) sprays the fuel into the cylinder.
The *nozzle* divides the fuel into *small particles.*

atomizer

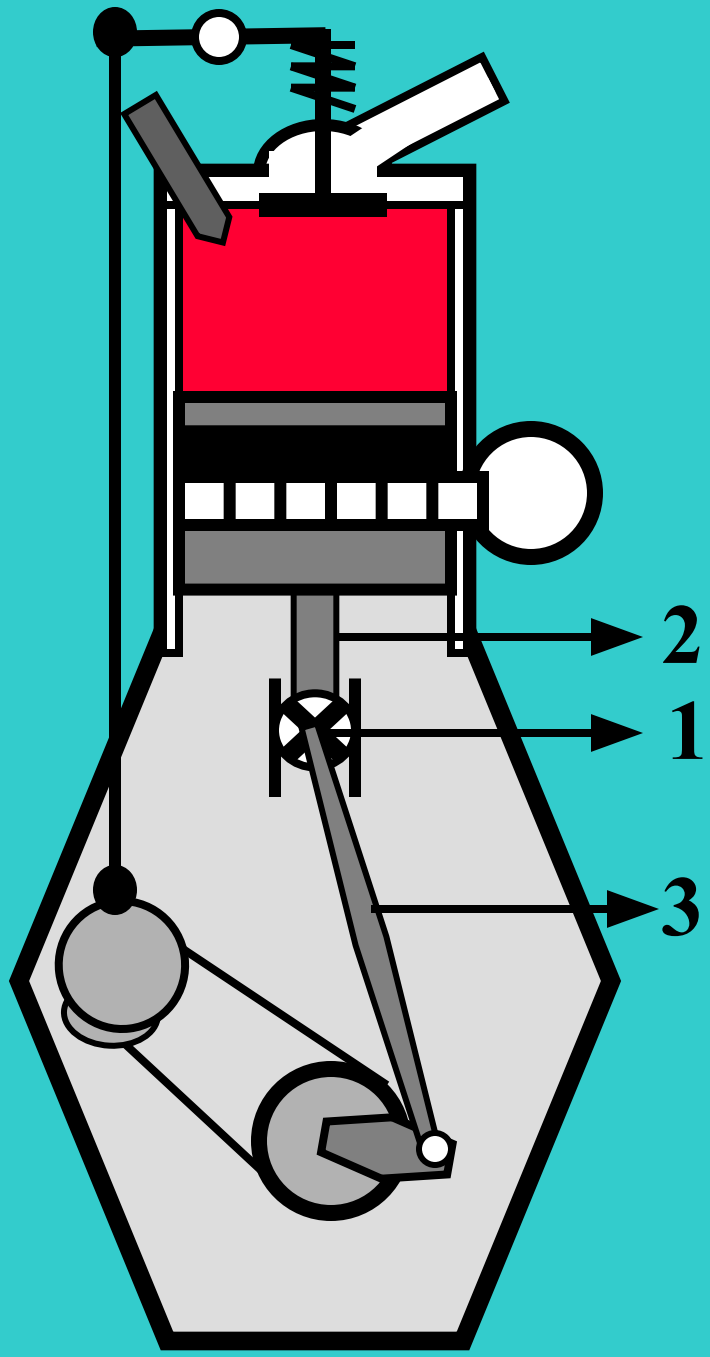
Tip of the atomizer (nozzle).



During the *power stroke* the fuel is injected and burnt.
This *actuates* the piston (1) and connecting rod (2).

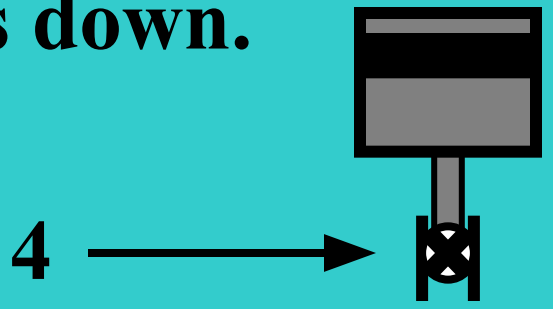


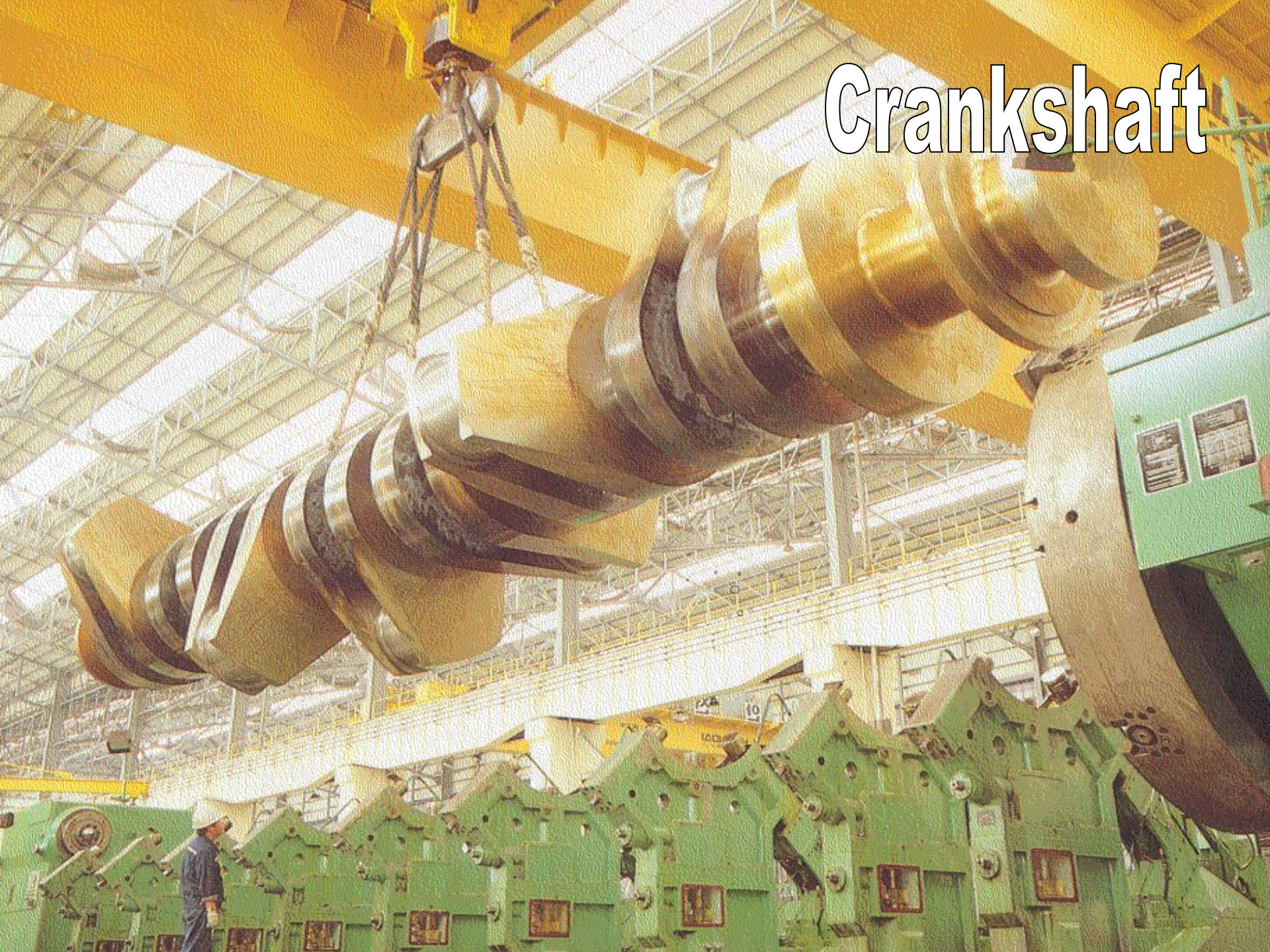
The piston makes a *reciprocating motion.*

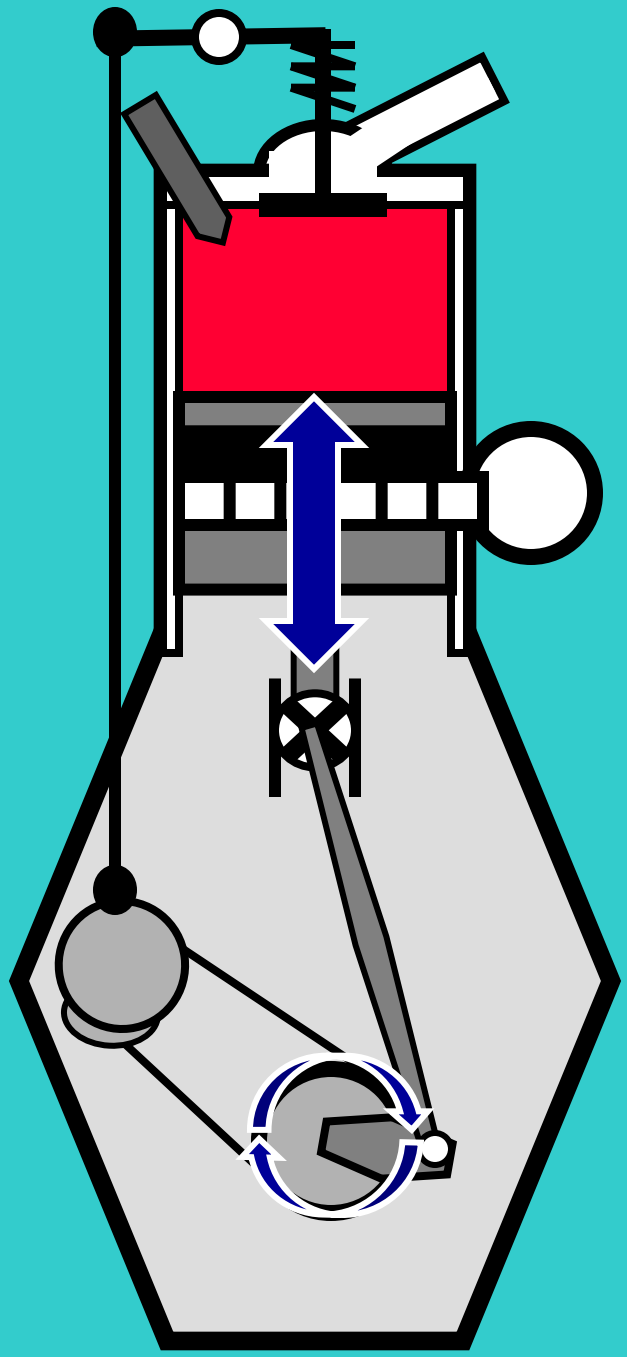


The crosshead (1) serves as a *hinging connection* between *piston rod* (2) and *connecting rod* (3).

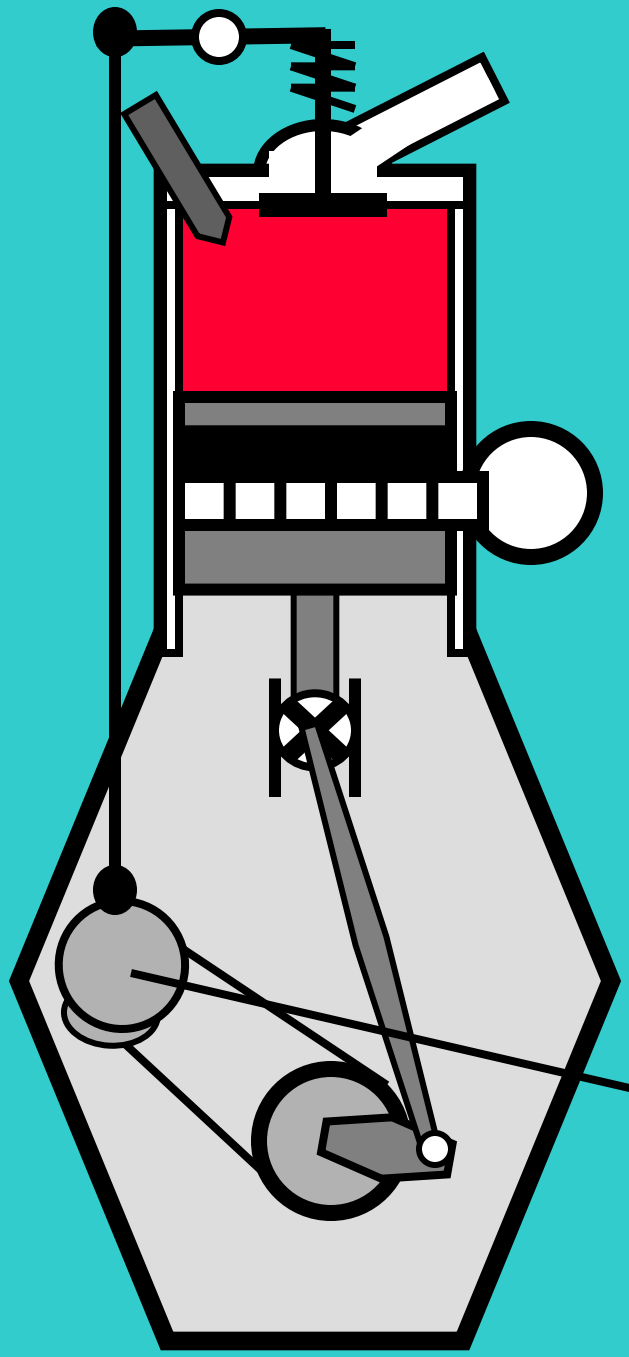
***Crosshead guides* and *crosshead guide shoes* (4) absorb the forces onto the crosshead when the piston goes down.**

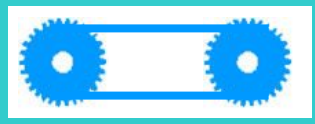


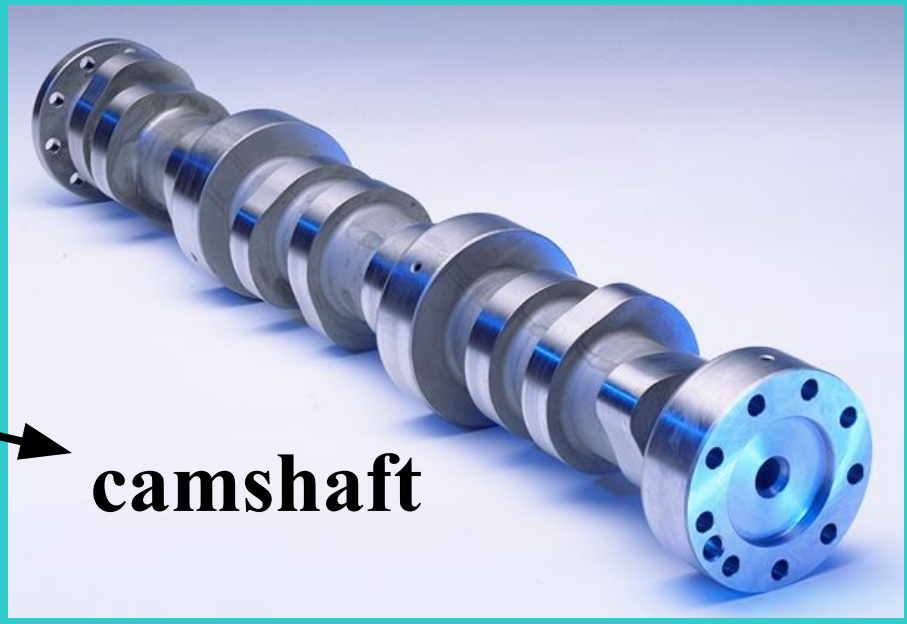

Crankshaft

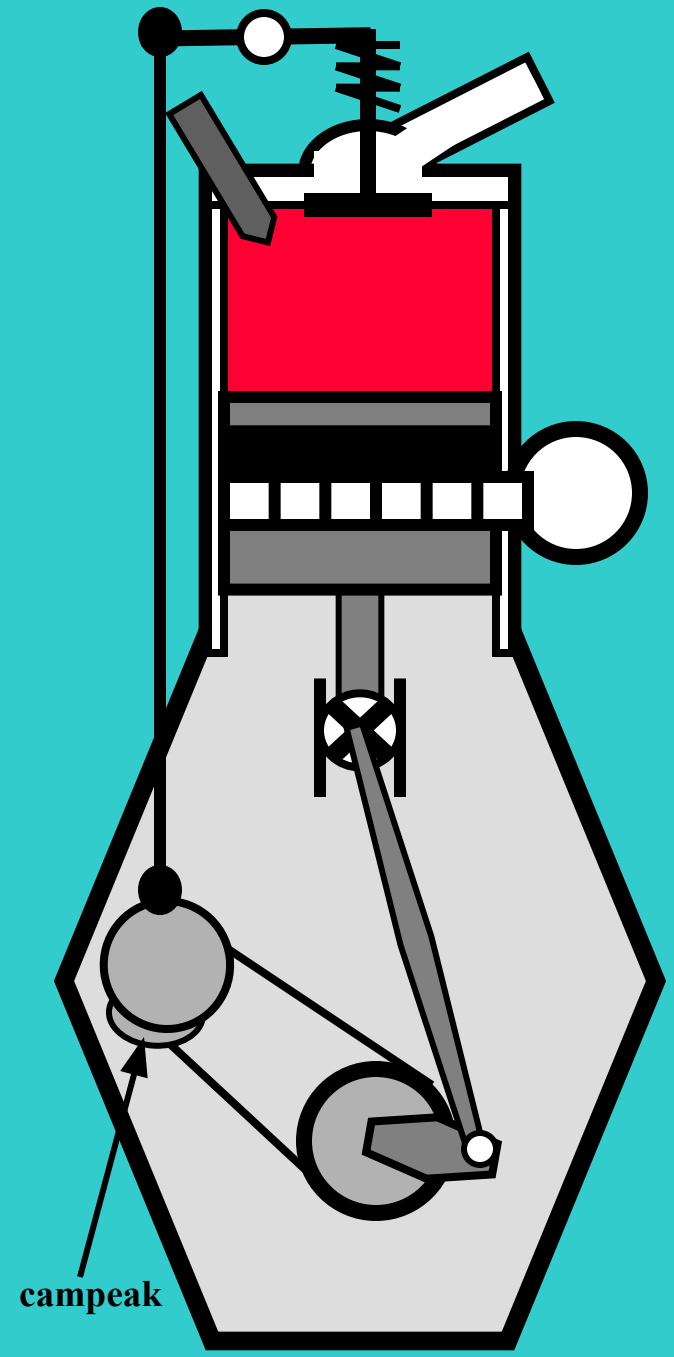


The *crank*
changes the
reciprocating motion
of the piston into a
rotary motion
of the *crank shaft* .

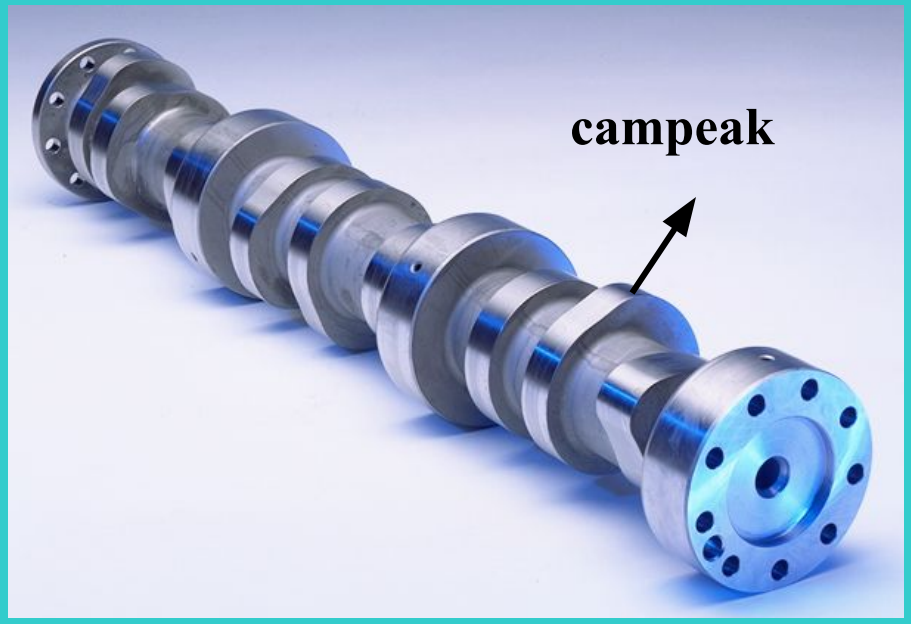


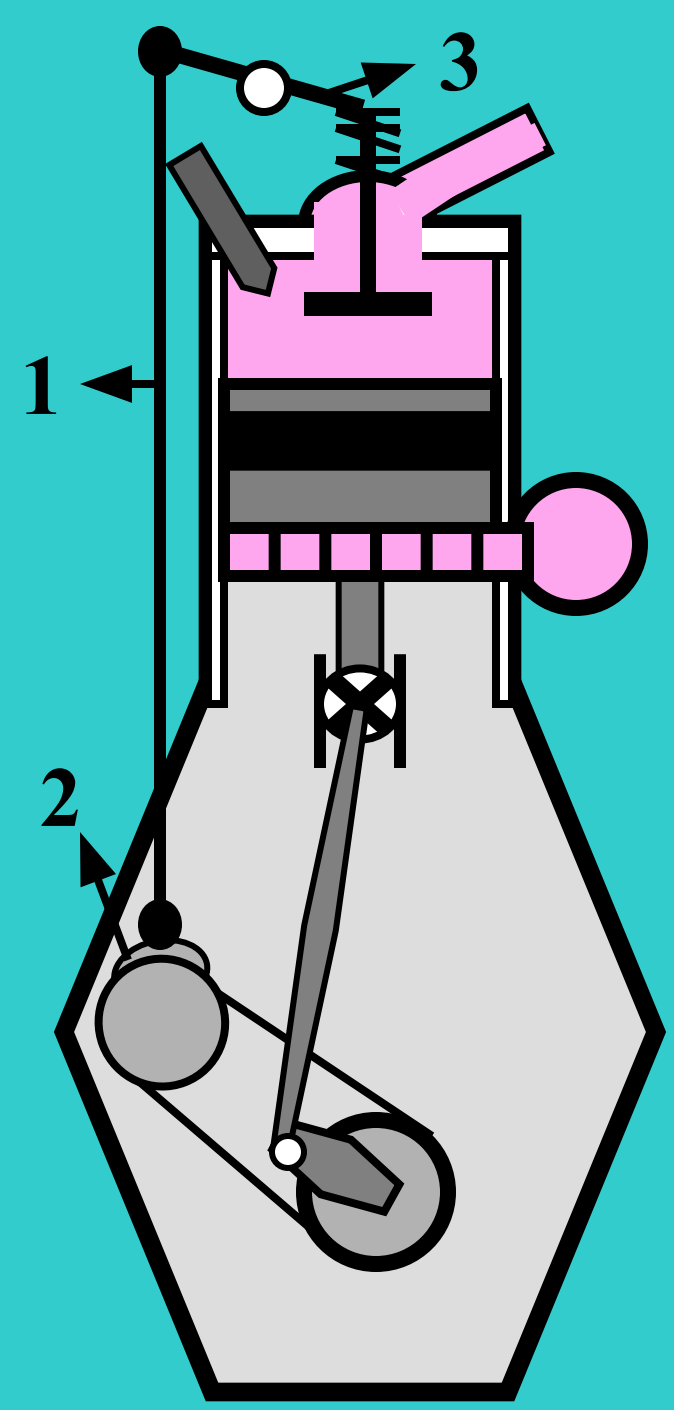
Gearwheels 
to drive the *camshaft*
are driven by chains
(“chaindrive”). 



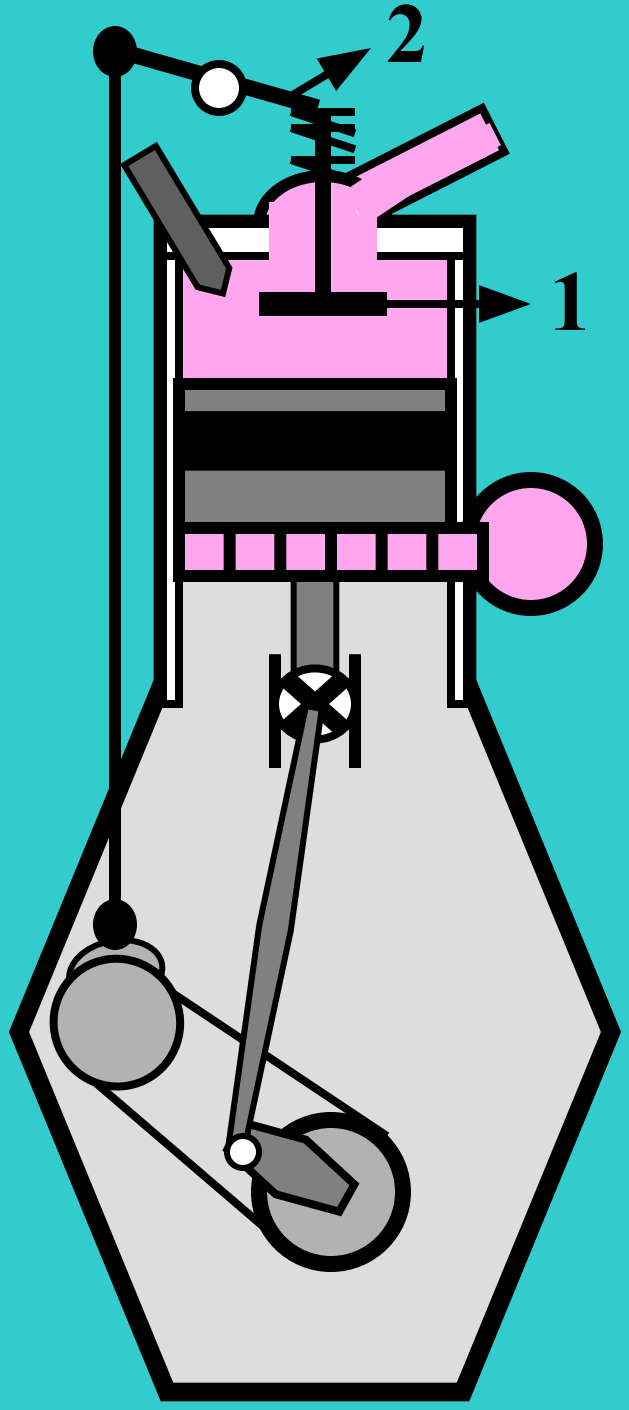


The *campeak* is fixed to the *camshaft*.

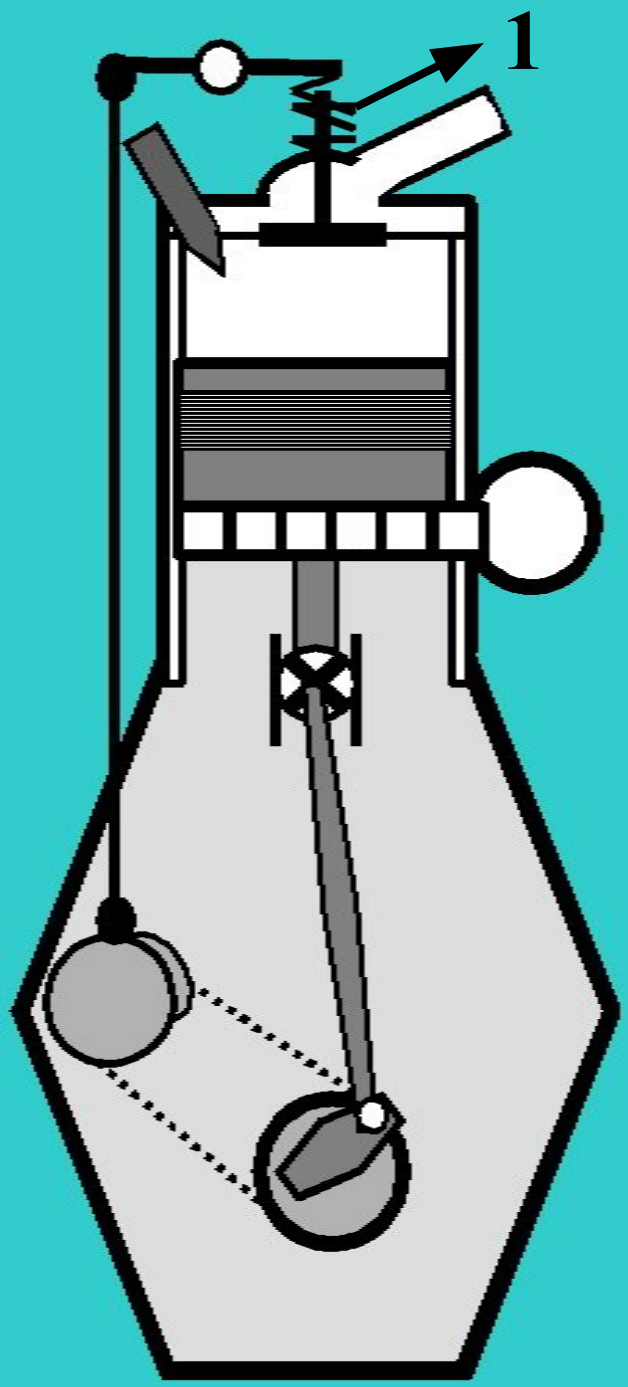




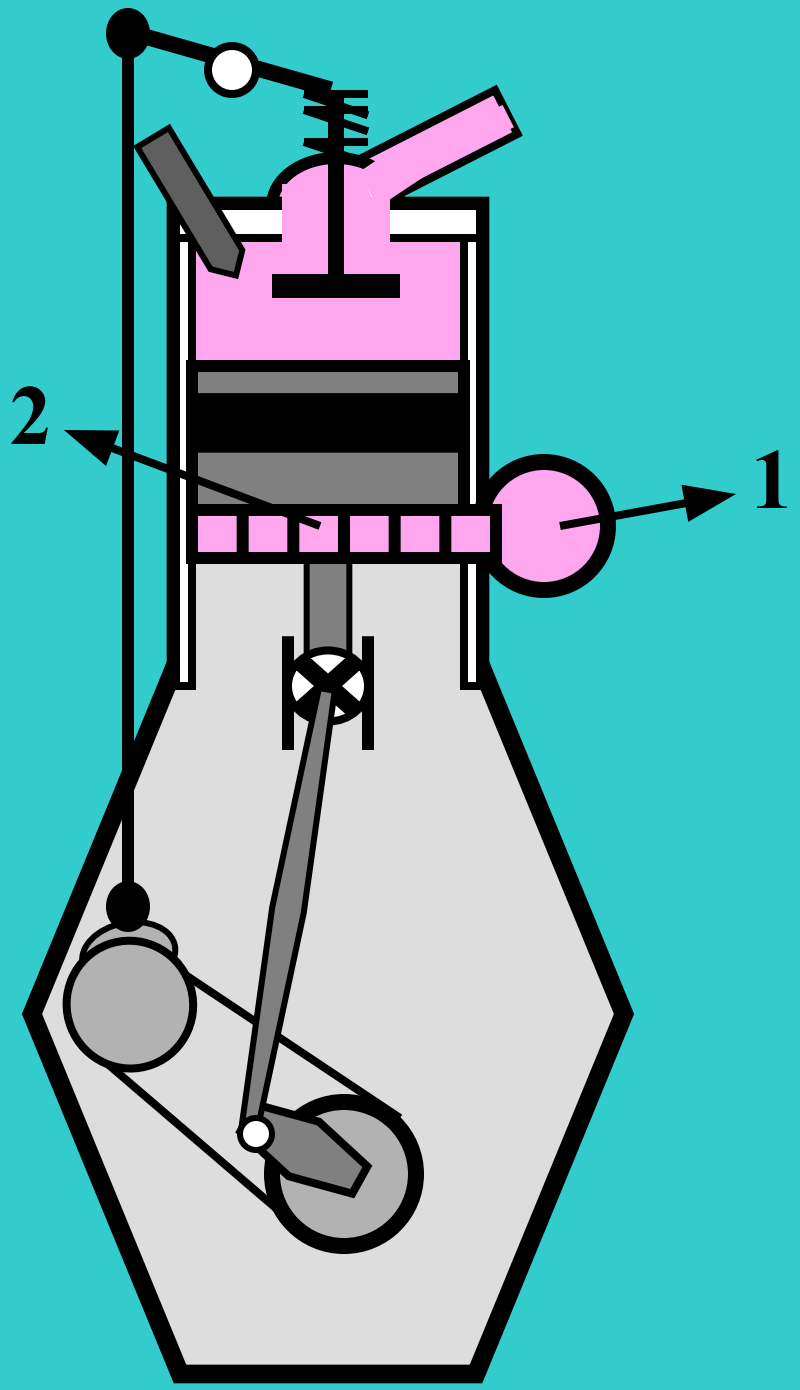
The *push rod* (1) may be used as a *distance piece* between *campeak* (2) and *rocker arm* (3).



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

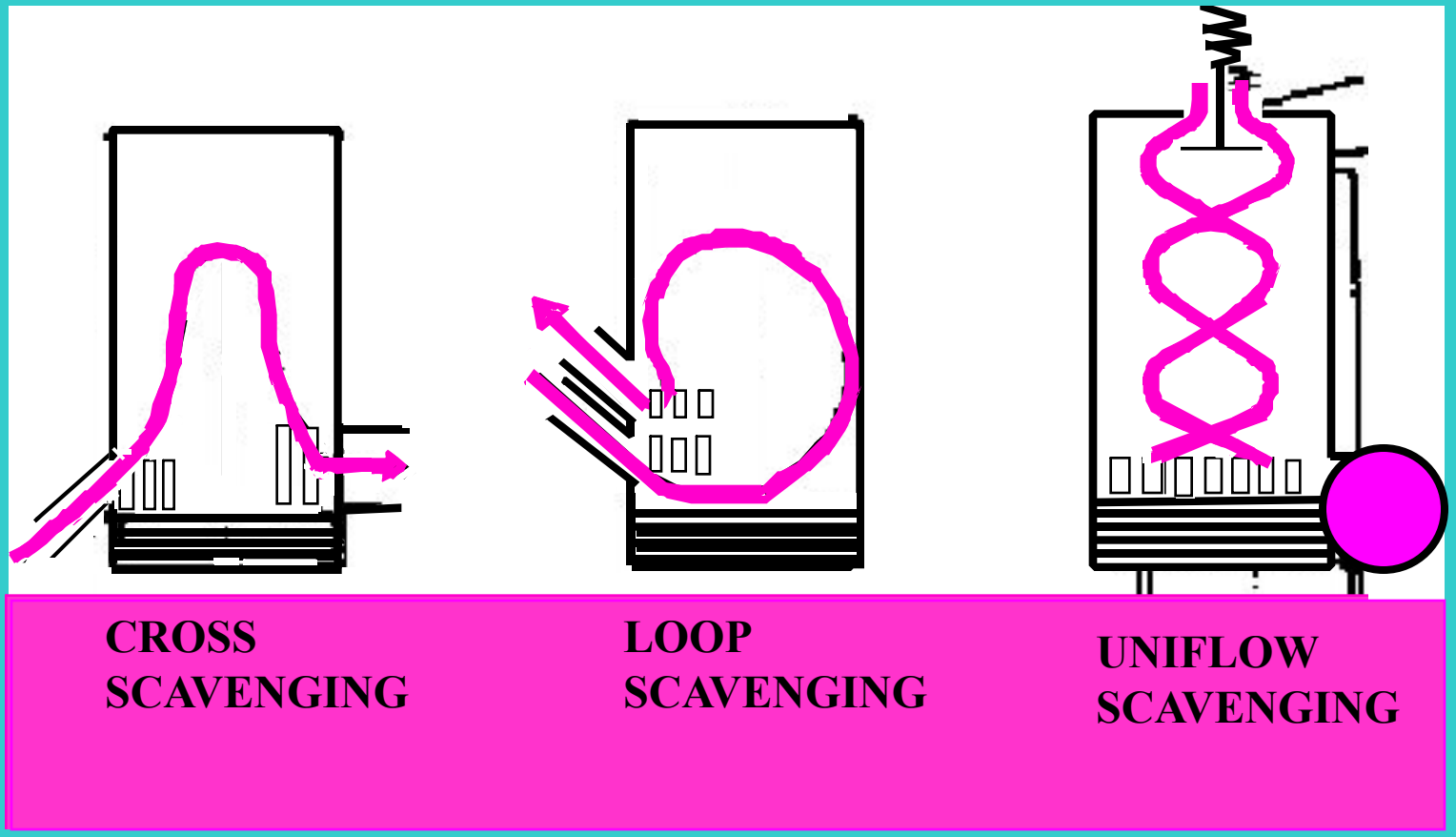


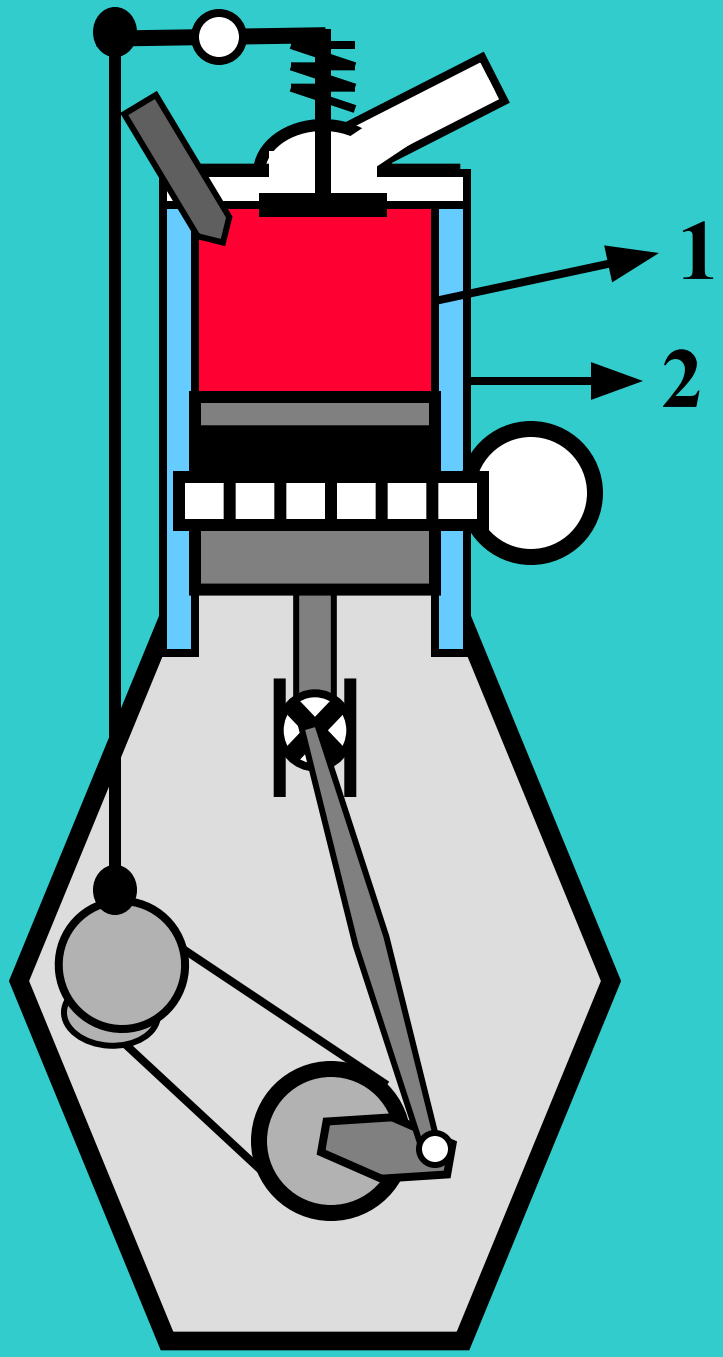
The exhaust valve is *actuated* (closed) by the *exhaust valve spring* (1).



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

SCAVENGING SYSTEMS

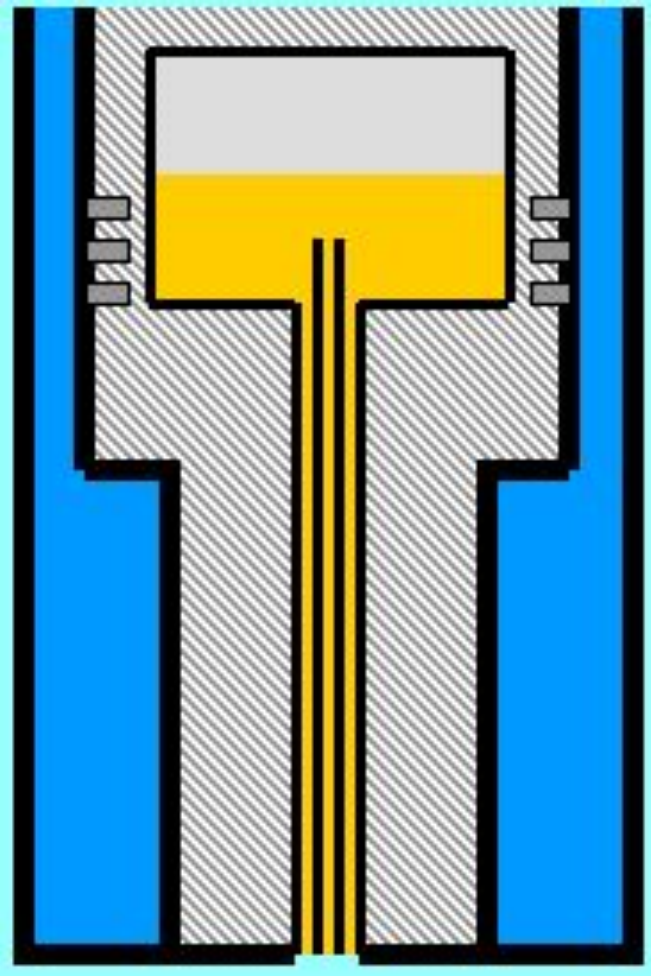




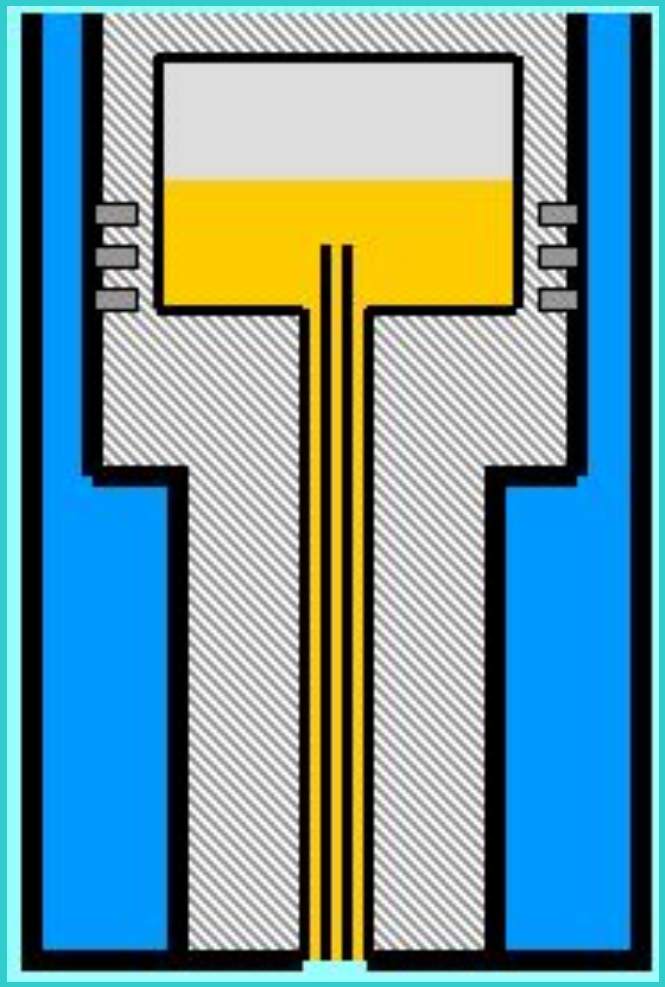
Cooling the cylinder:

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.

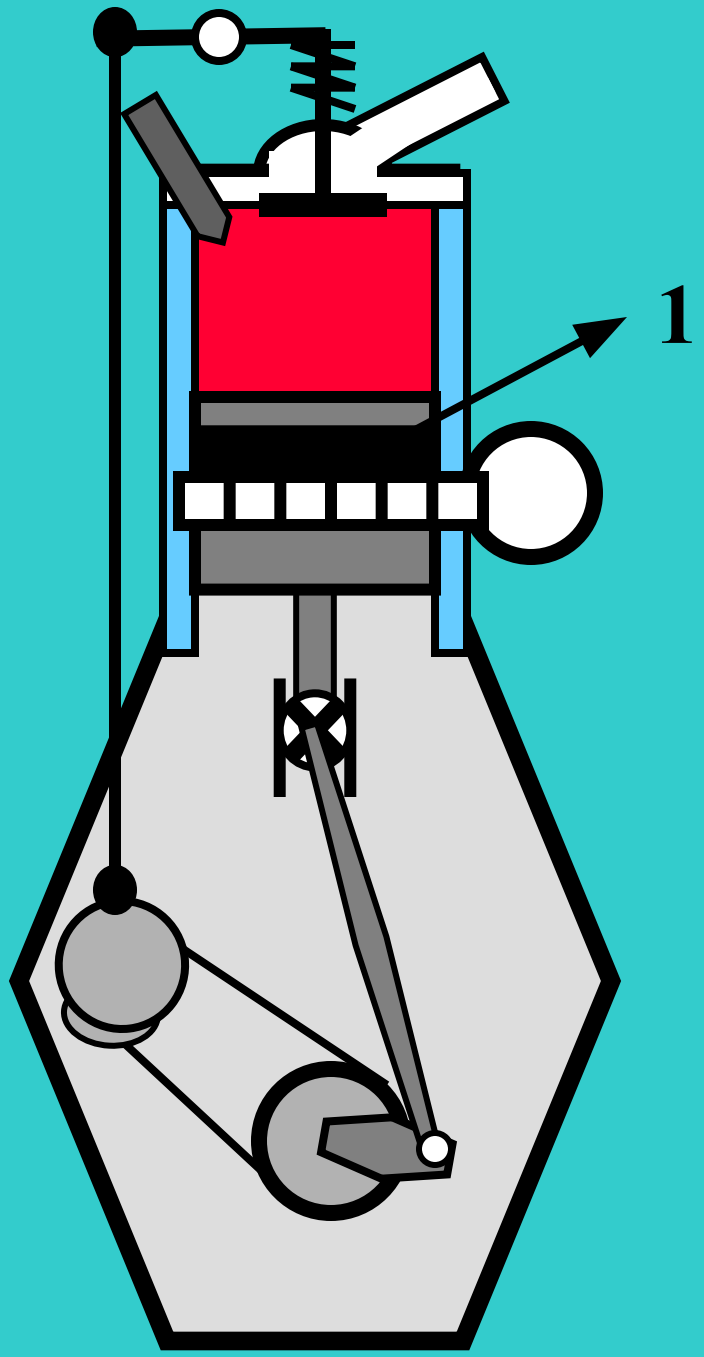


Cooling the piston:

The piston is cooled by oil.

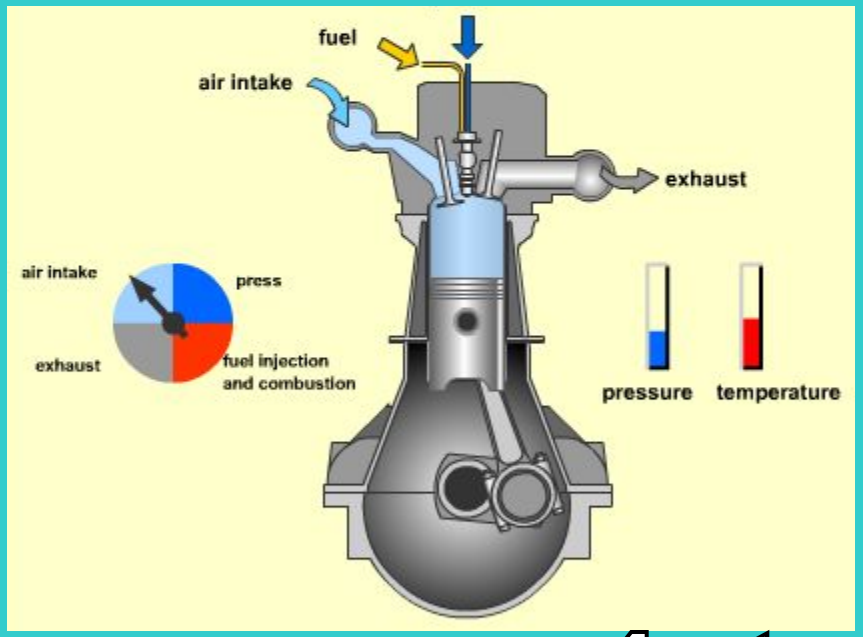
The advantages of oil as a coolant are:

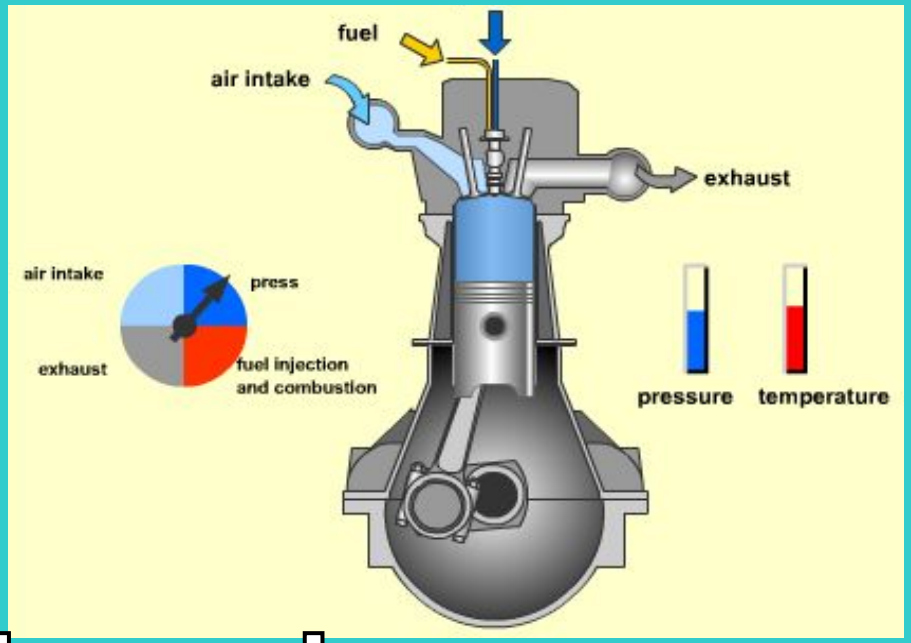
. it reduces noise;
. it purifies;
. it forms a seal;
. it lubricates;
. it is anti-corrosive;
. it has a higher resistance to heat.



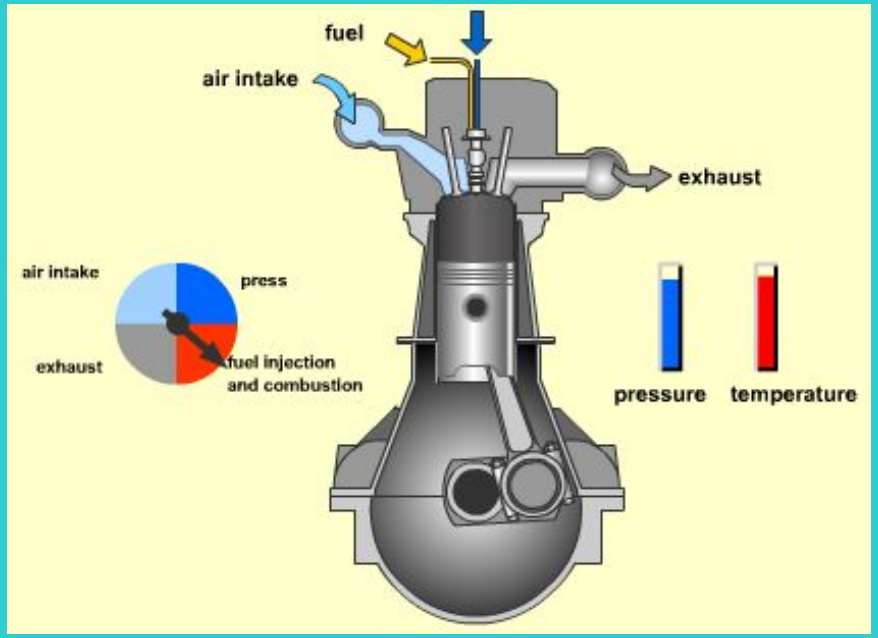
The *piston rings* (1) form a *seal* around the cylinder and carry away the heat.

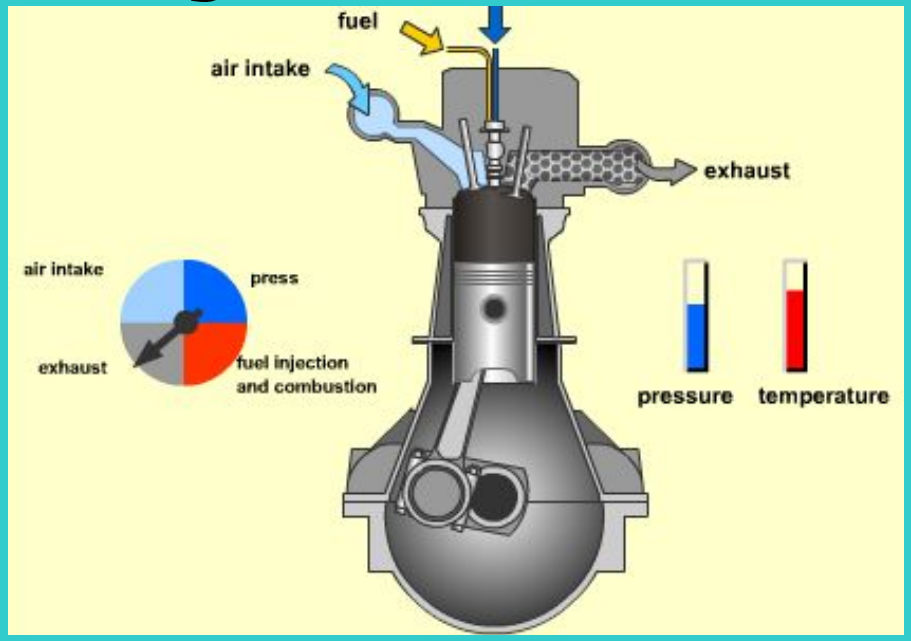
Piston rings

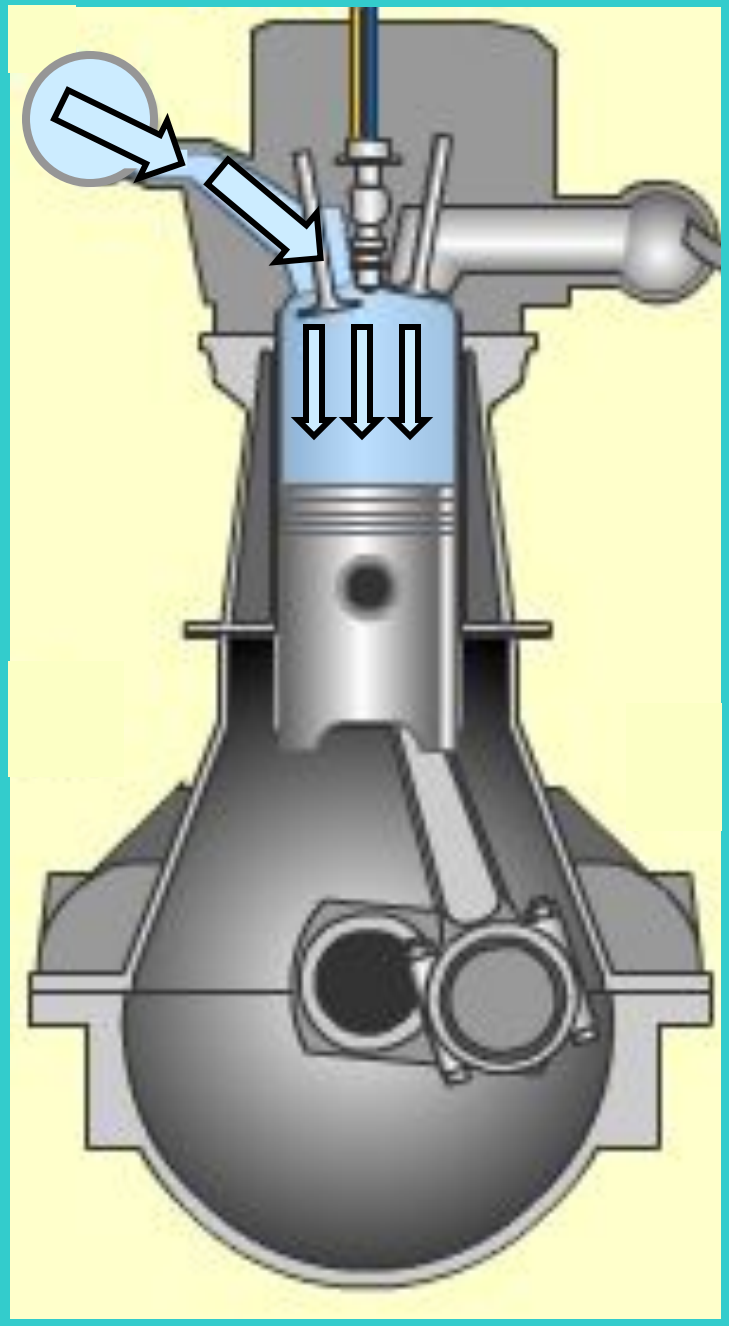




4-stroke cycle

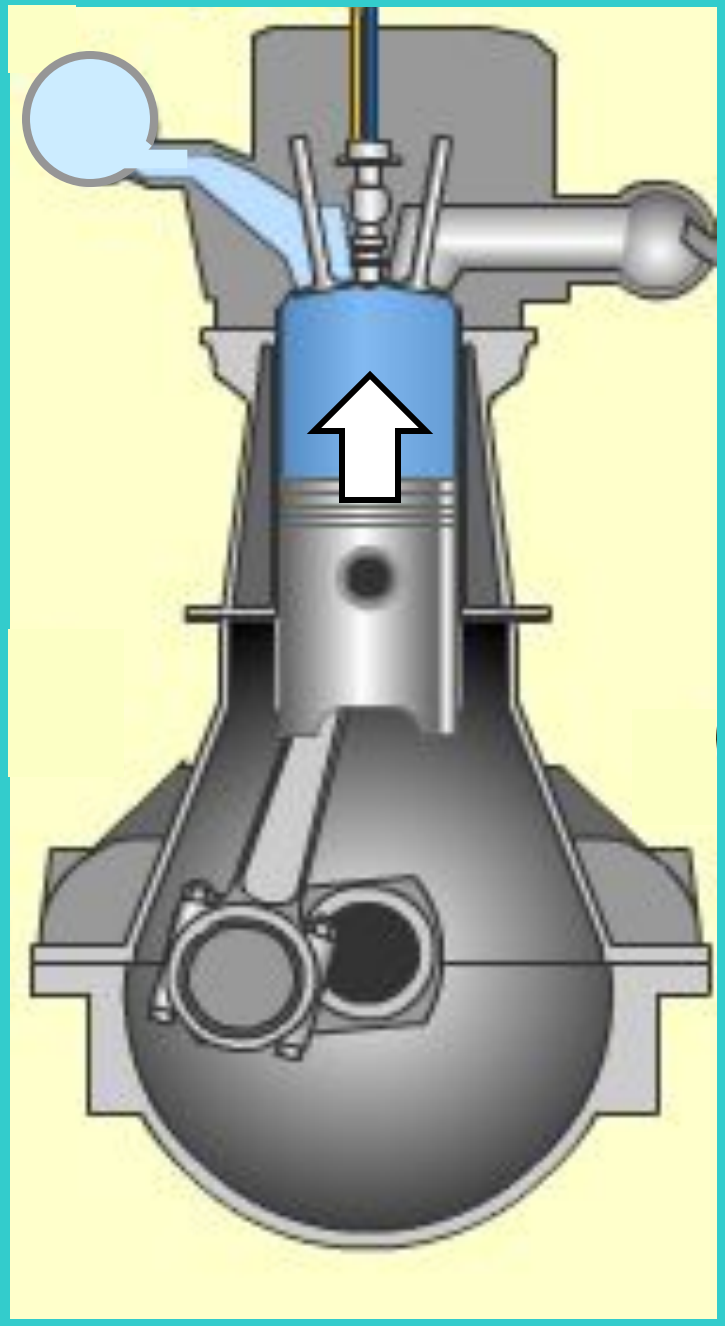






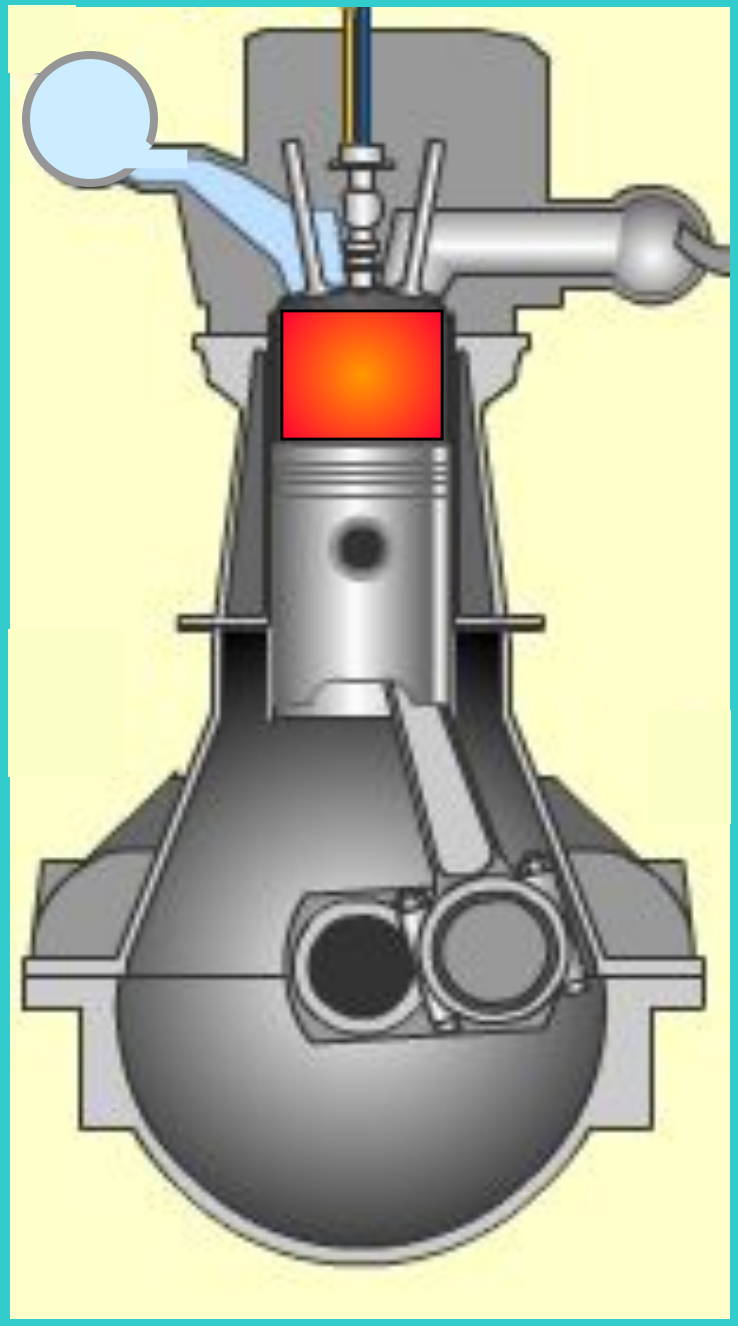
Suction stroke

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



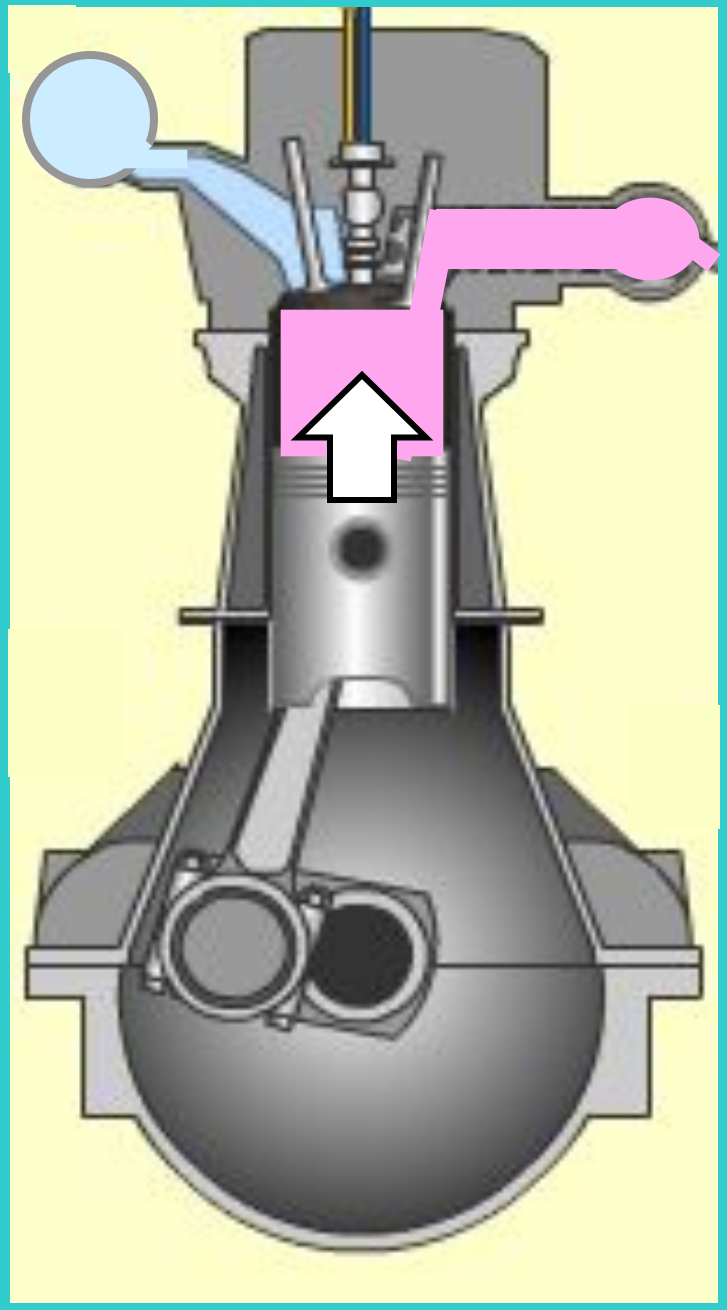
Compression stroke

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.

SHIPPING AND TRANSPORT COLLEGE ROTTERDAM