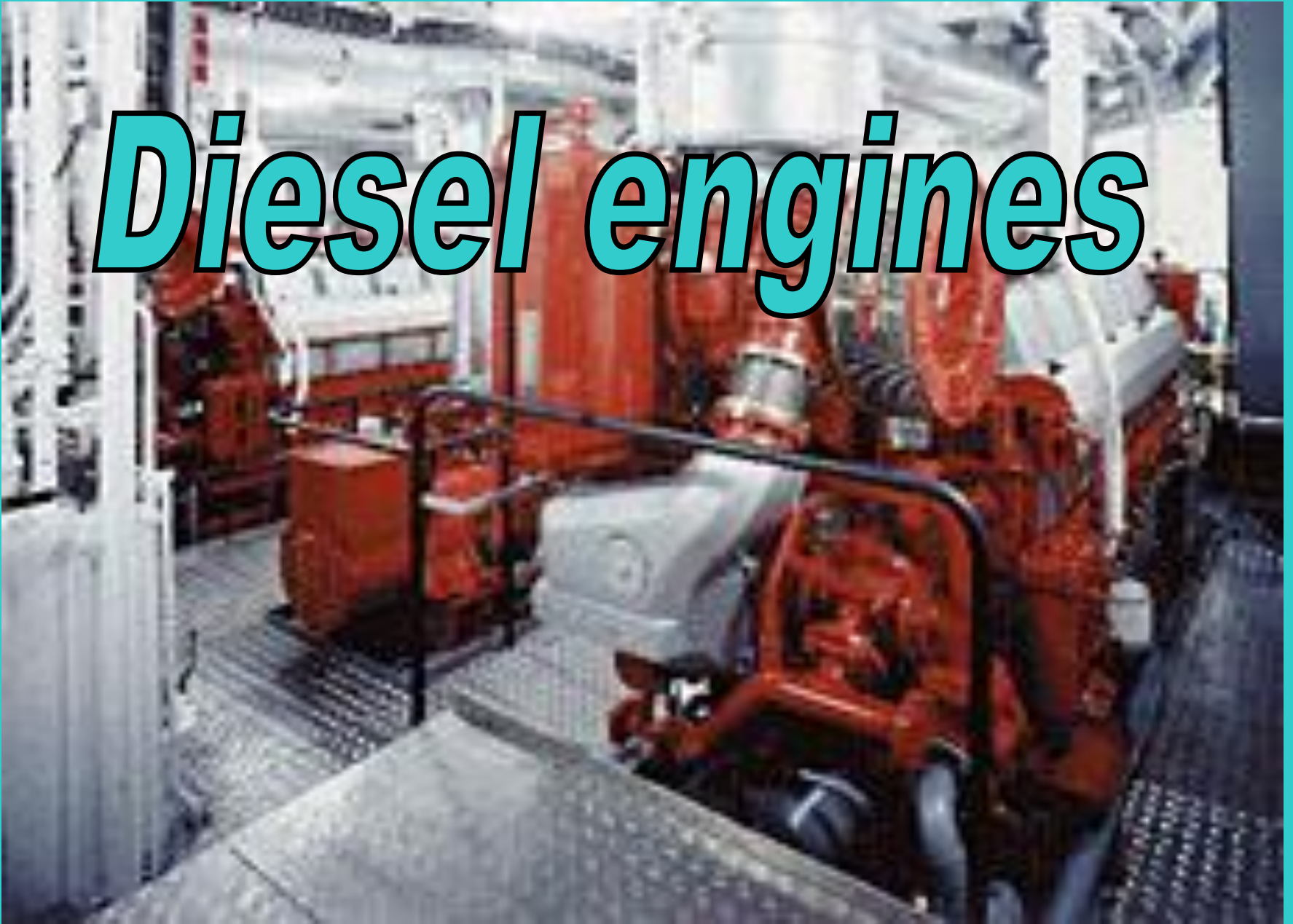
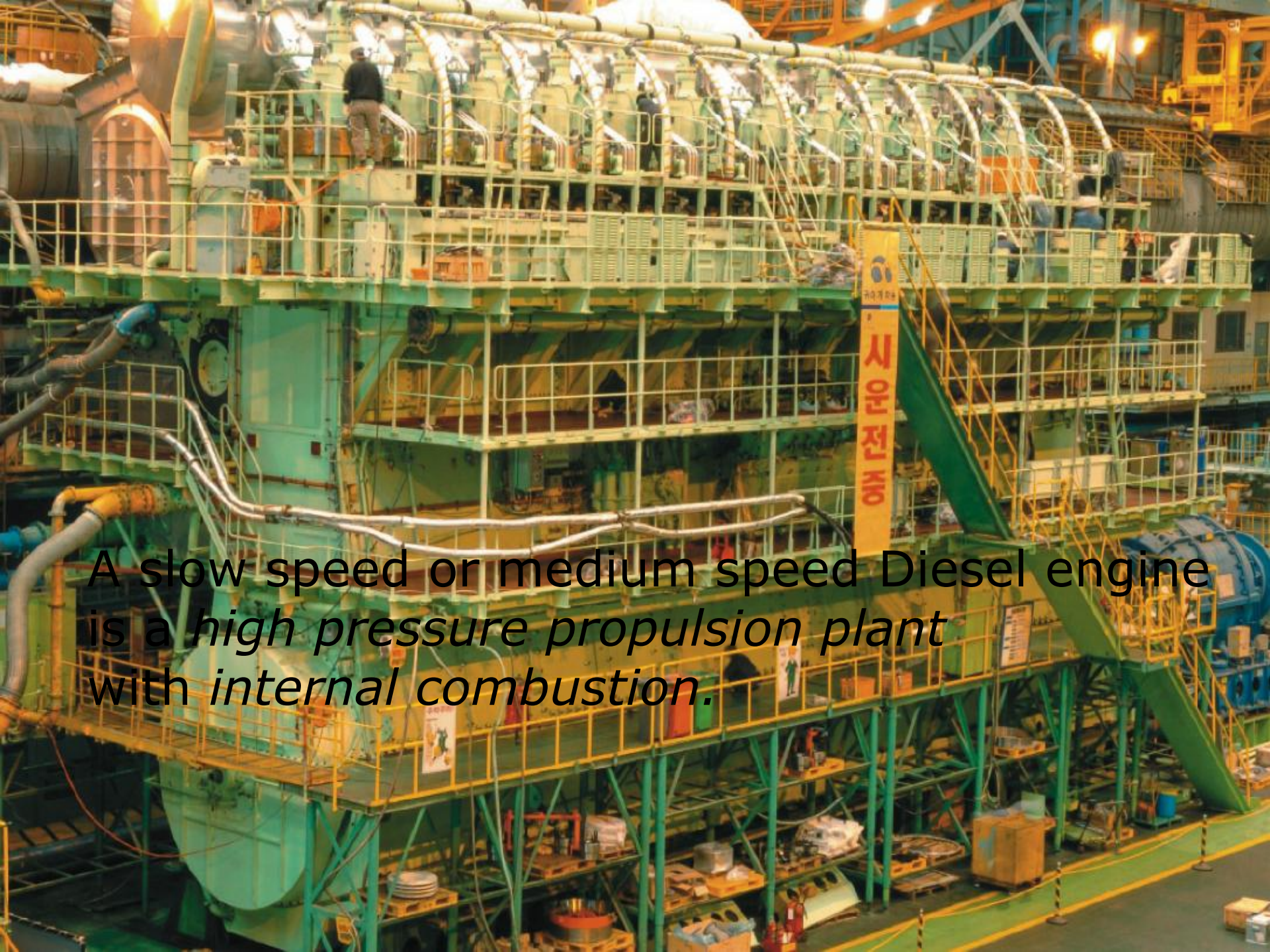


# *Diesel engines*



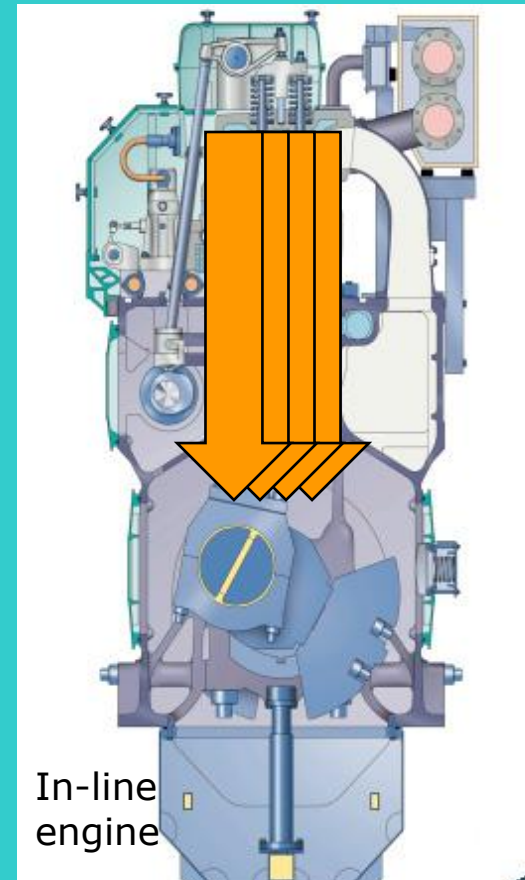
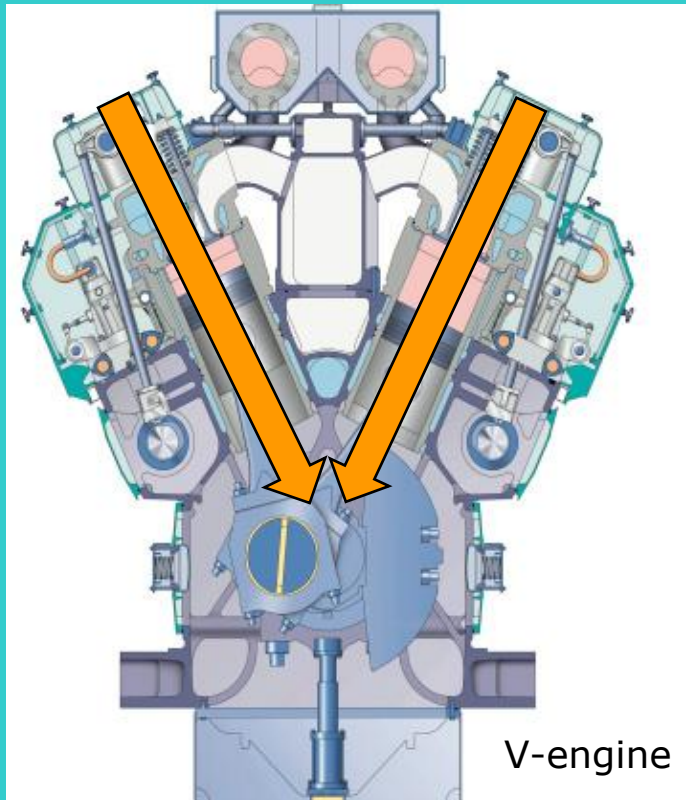


시운전중

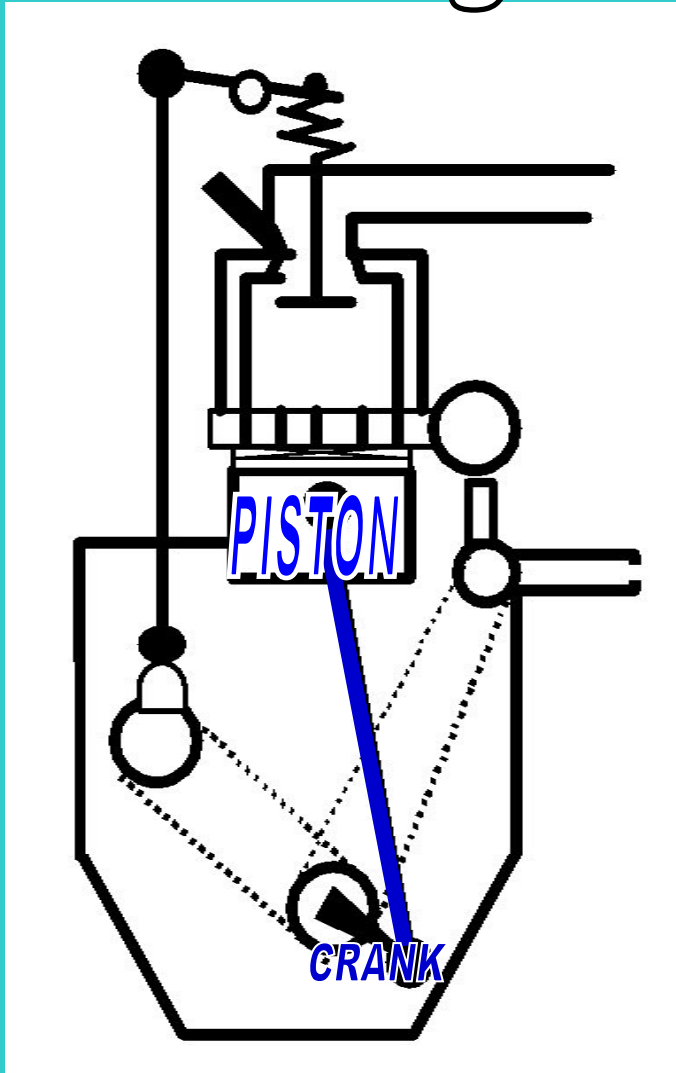
A slow speed or medium speed Diesel engine is a *high pressure propulsion plant with internal combustion.*

# V-engine and in-line engine

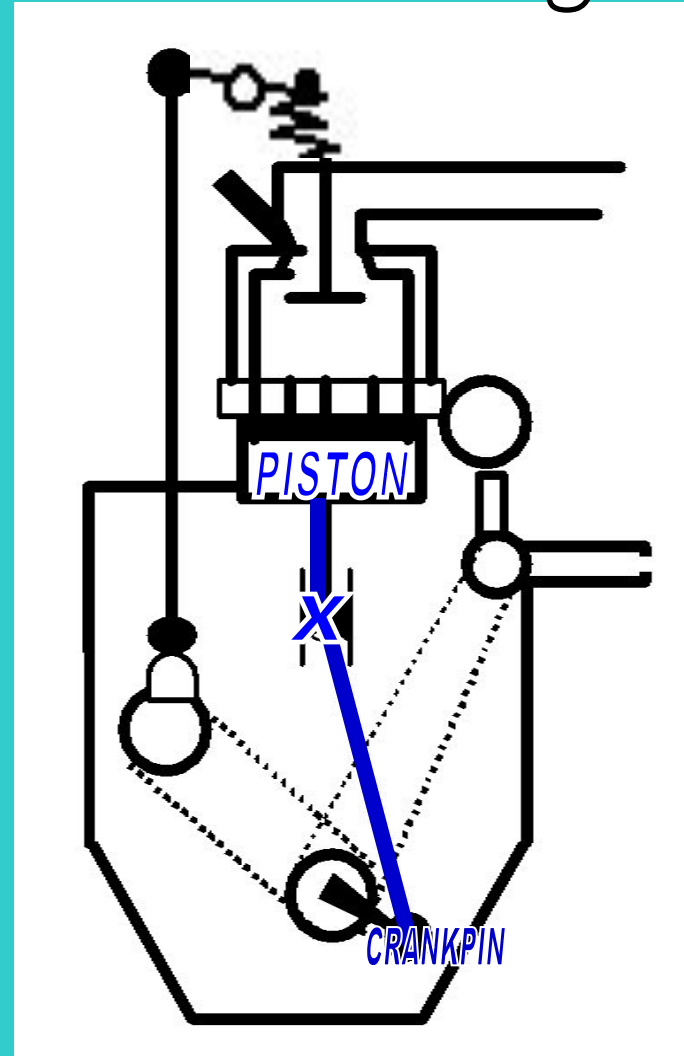
In a V-engine the cylinders are placed in an *oblique* (or *bevel*) position, unlike the *in-line engine*, where the cylinders are placed "in line".



# *Trunk engine*

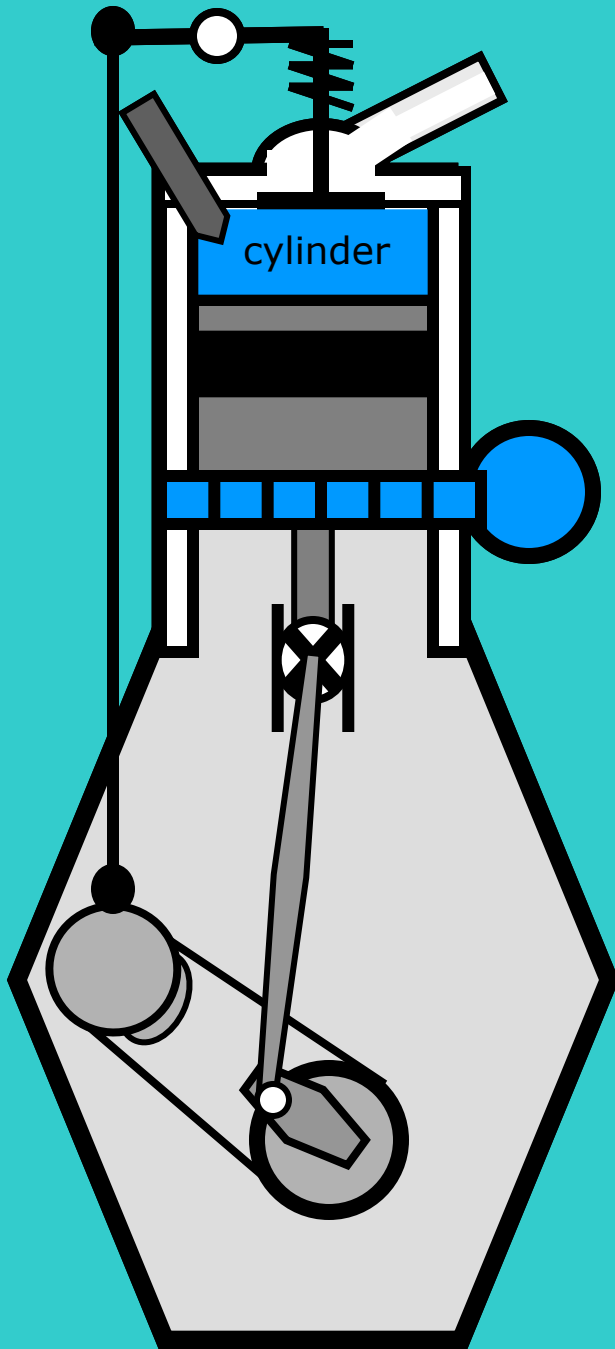


# *Crosshead engine*



# *2-stroke crosshead engine*

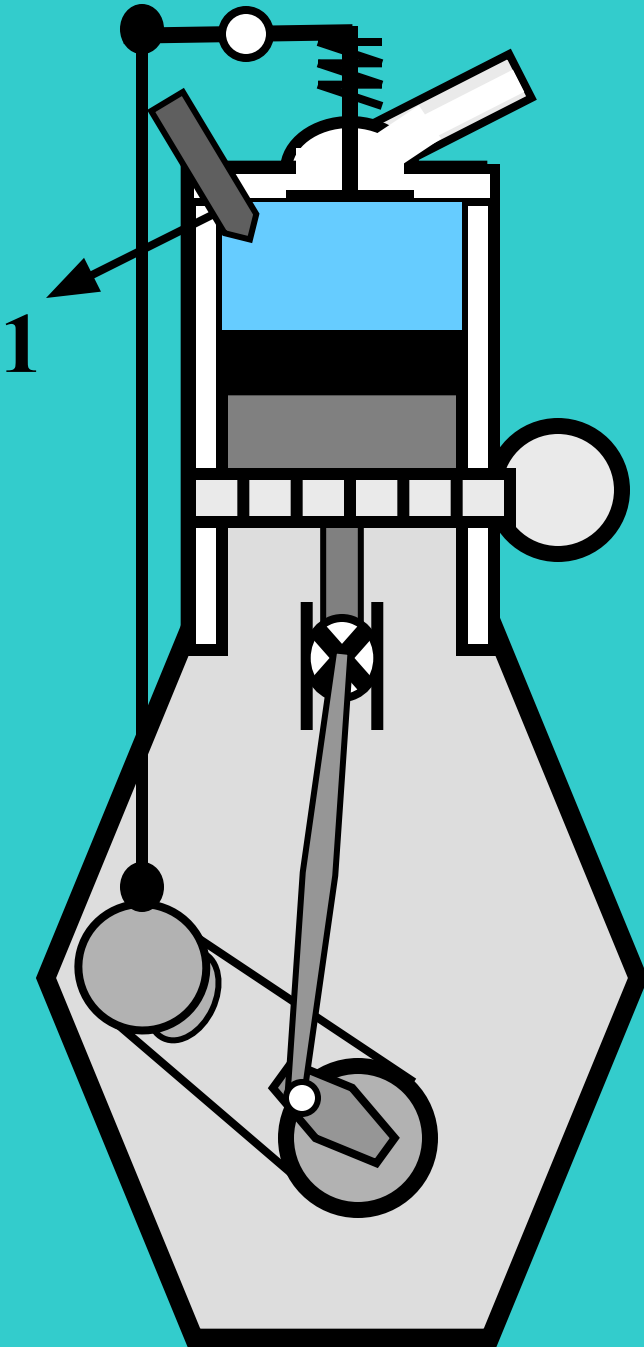




**The cylinder is filled with air.**

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

# The atomizer



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

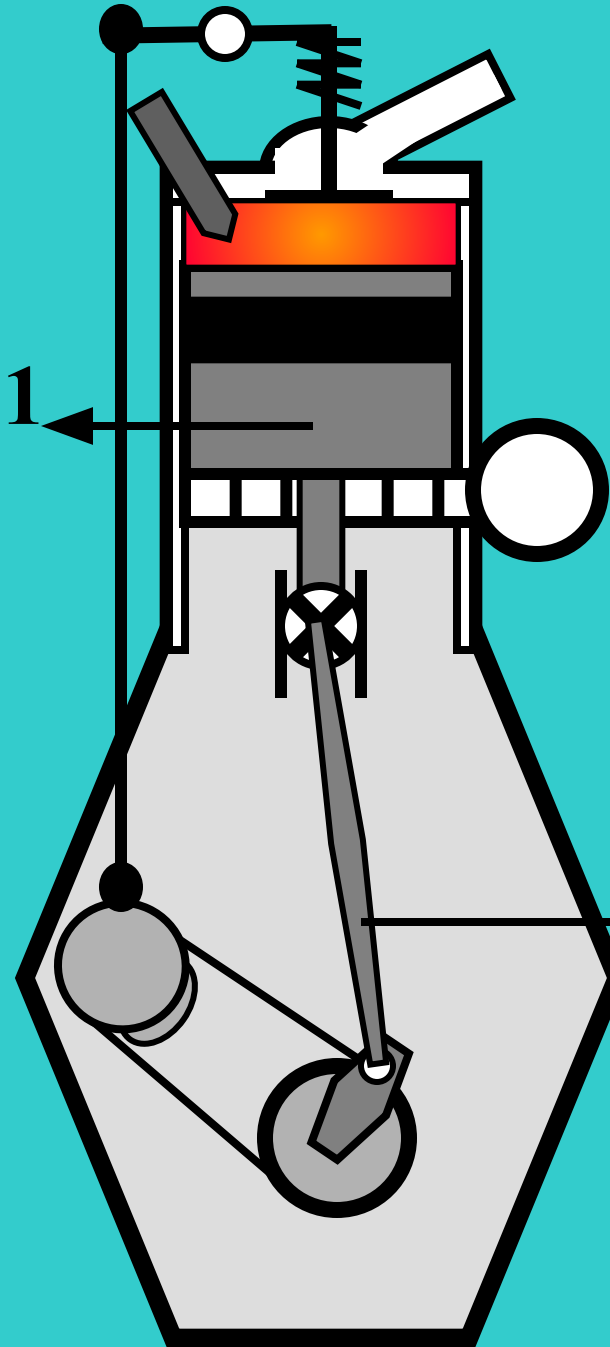


atomizer

Tip of the atomizer  
(nozzle).

# The power stroke

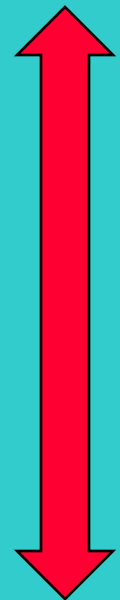
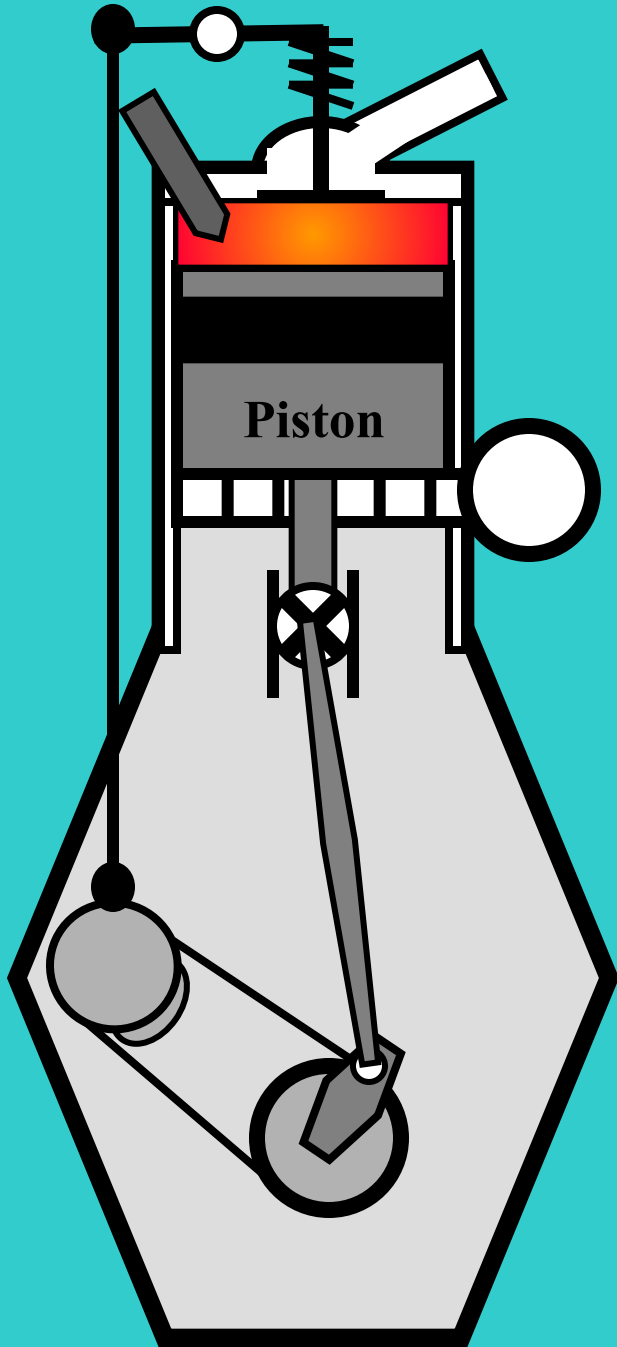
During the *power stroke* the fuel is injected and burnt. This *actuates* the piston(1) and connecting rod (2).





# The piston

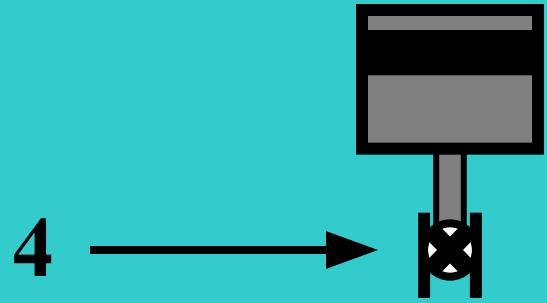
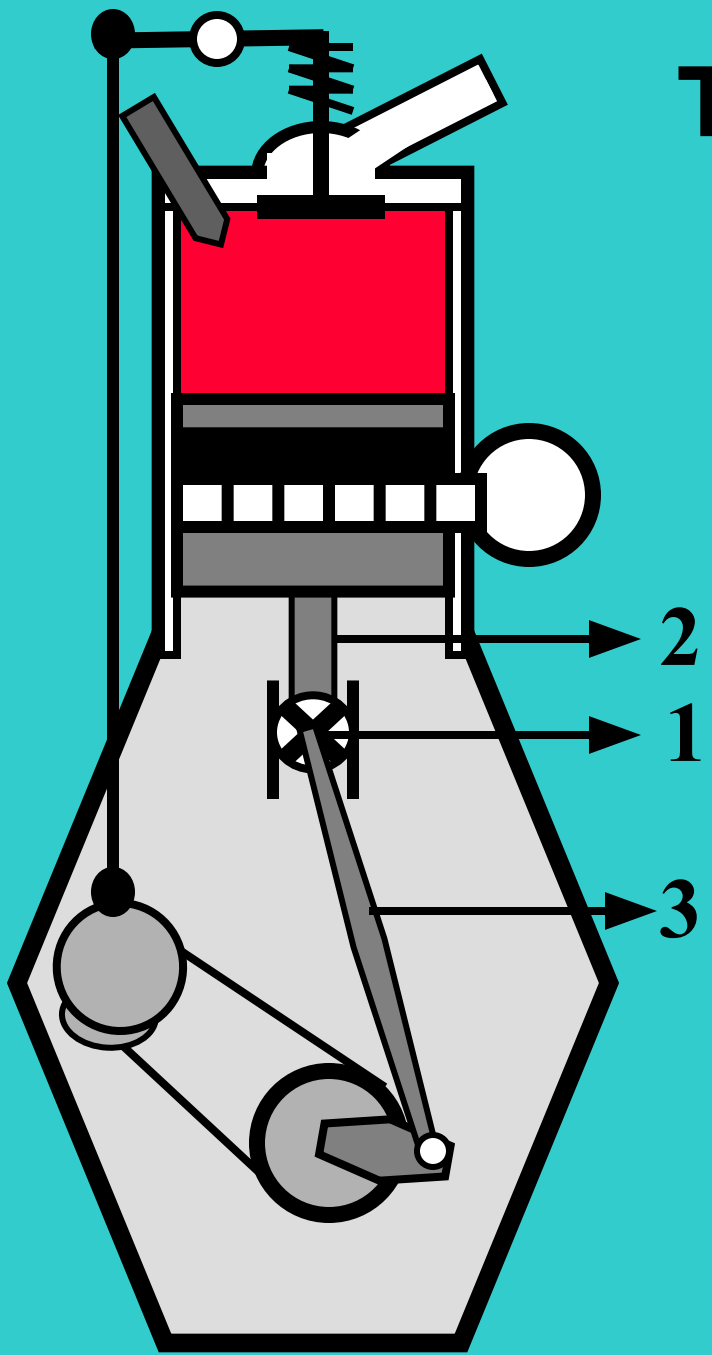
The piston makes a *reciprocating motion*.

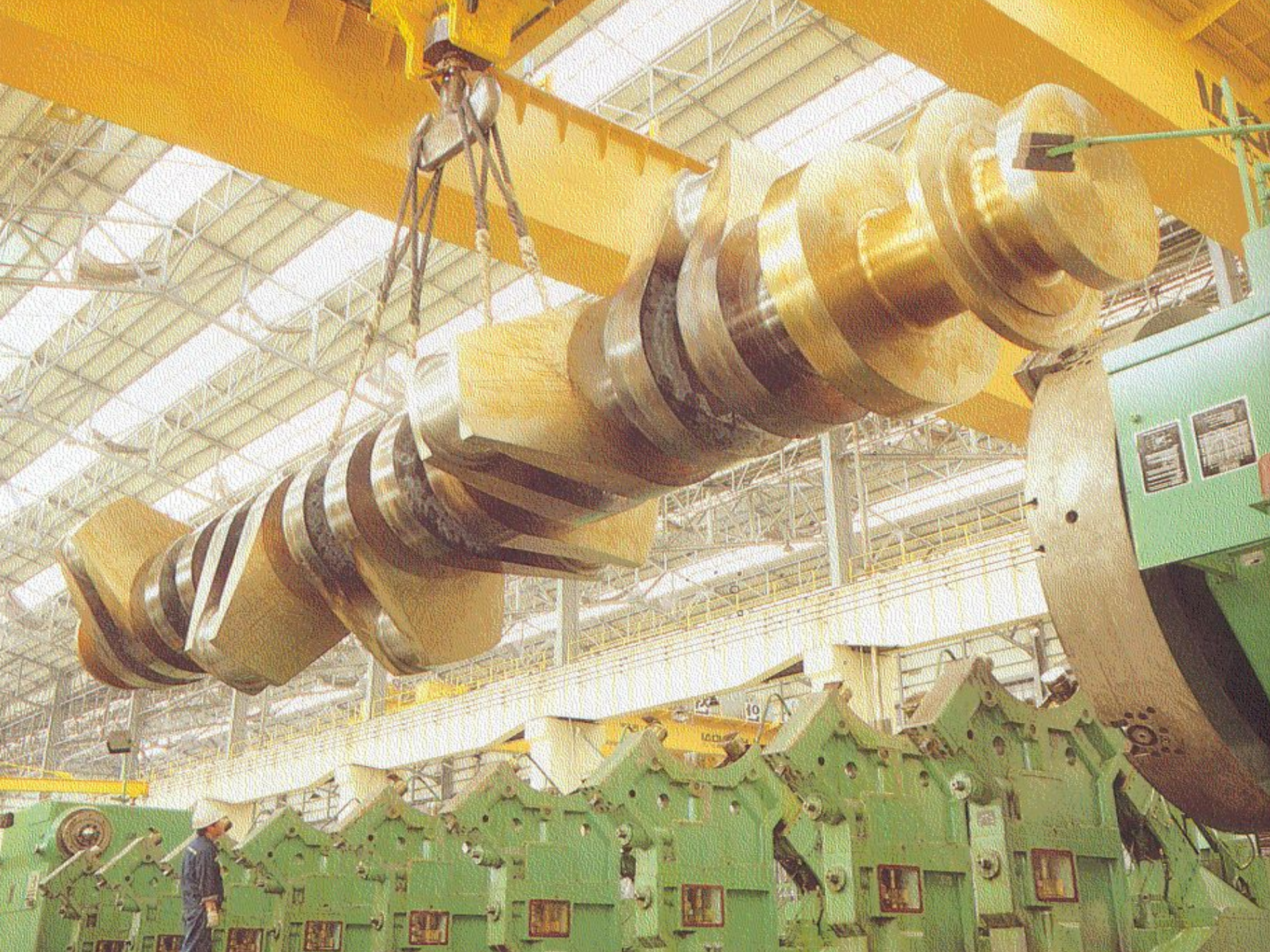


# The crosshead

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

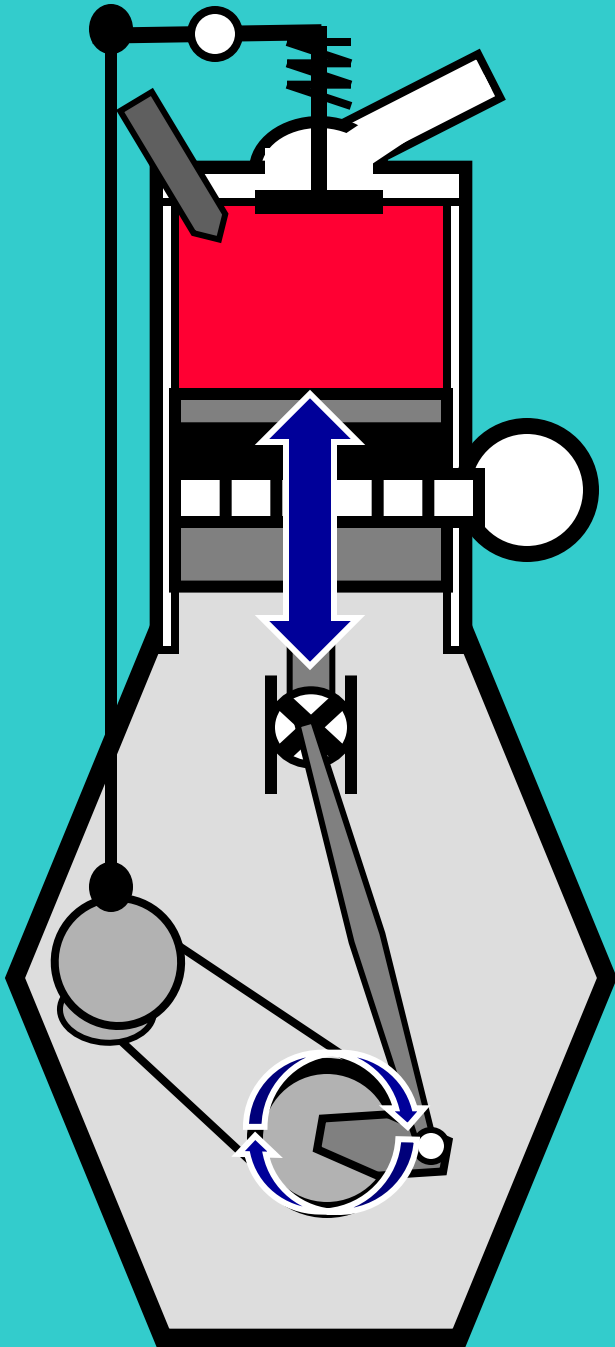
*Crosshead guides* and *crosshead guide shoes* (4) absorb the forces onto the crosshead when the piston goes down.



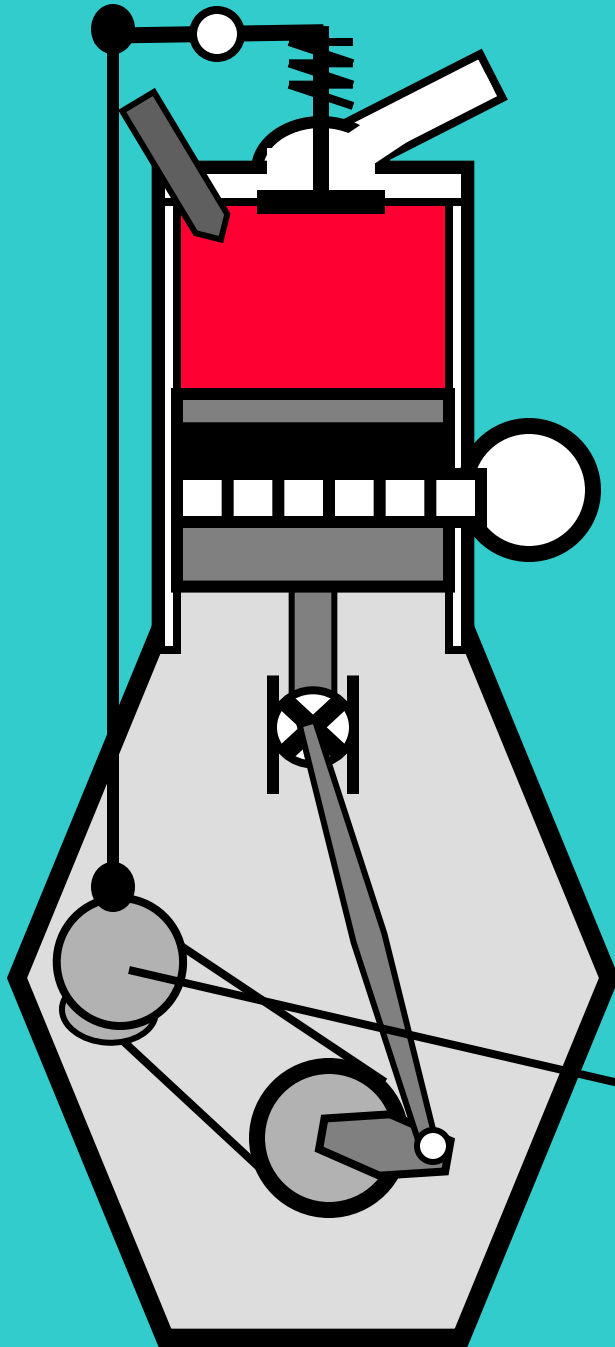


# The crankshaft

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



# The camshaft



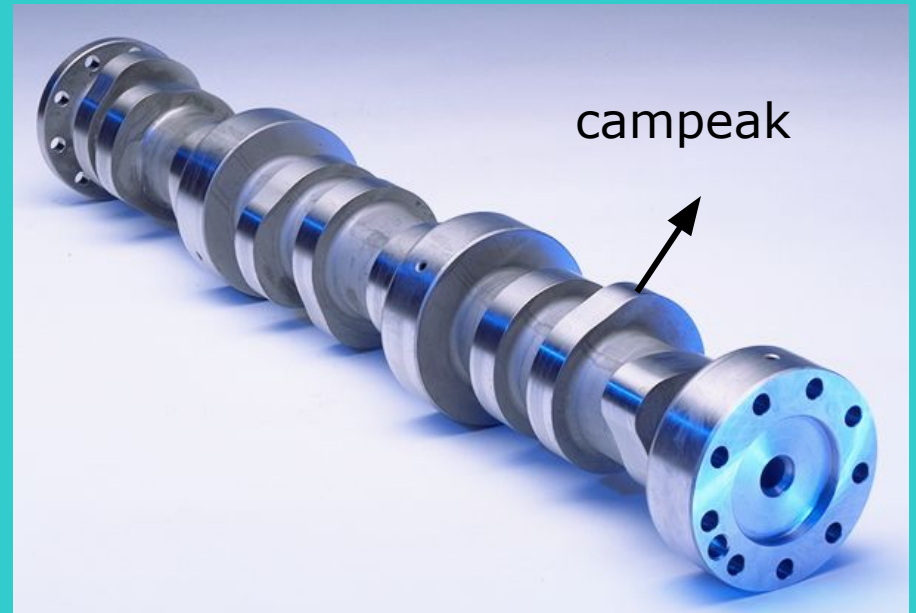
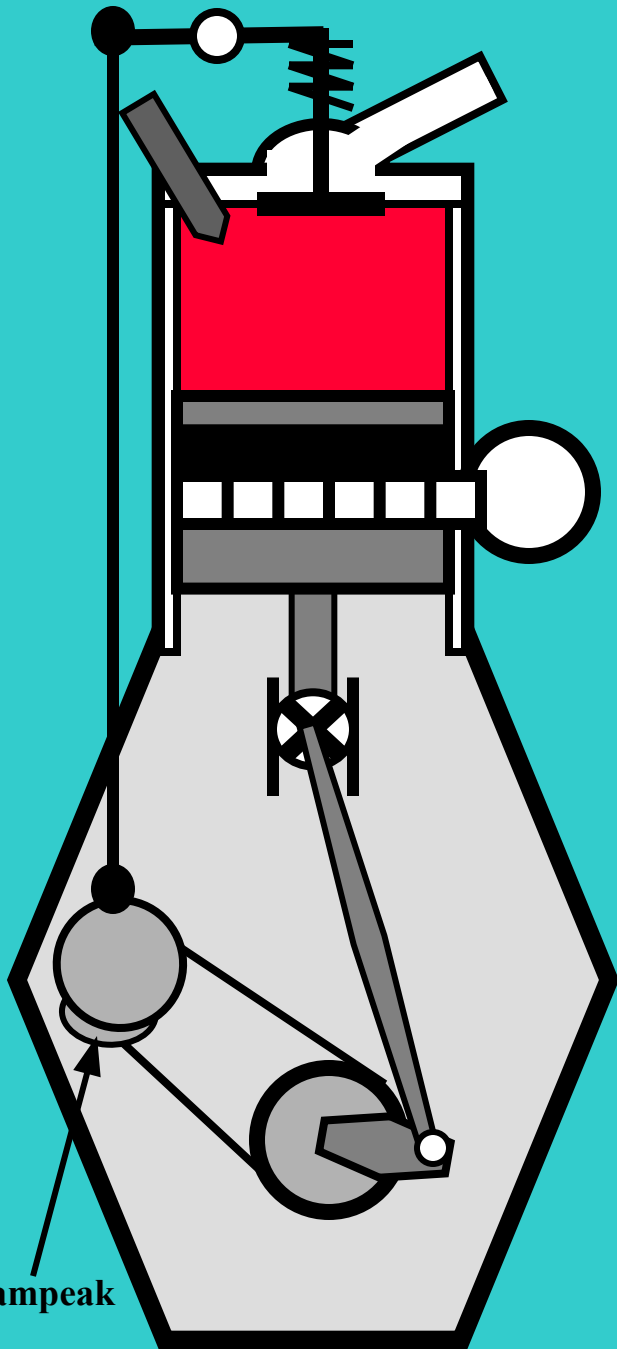
Gearwheels to drive the *camshaft* are driven by chains ("*chaindrive*").



camshaft

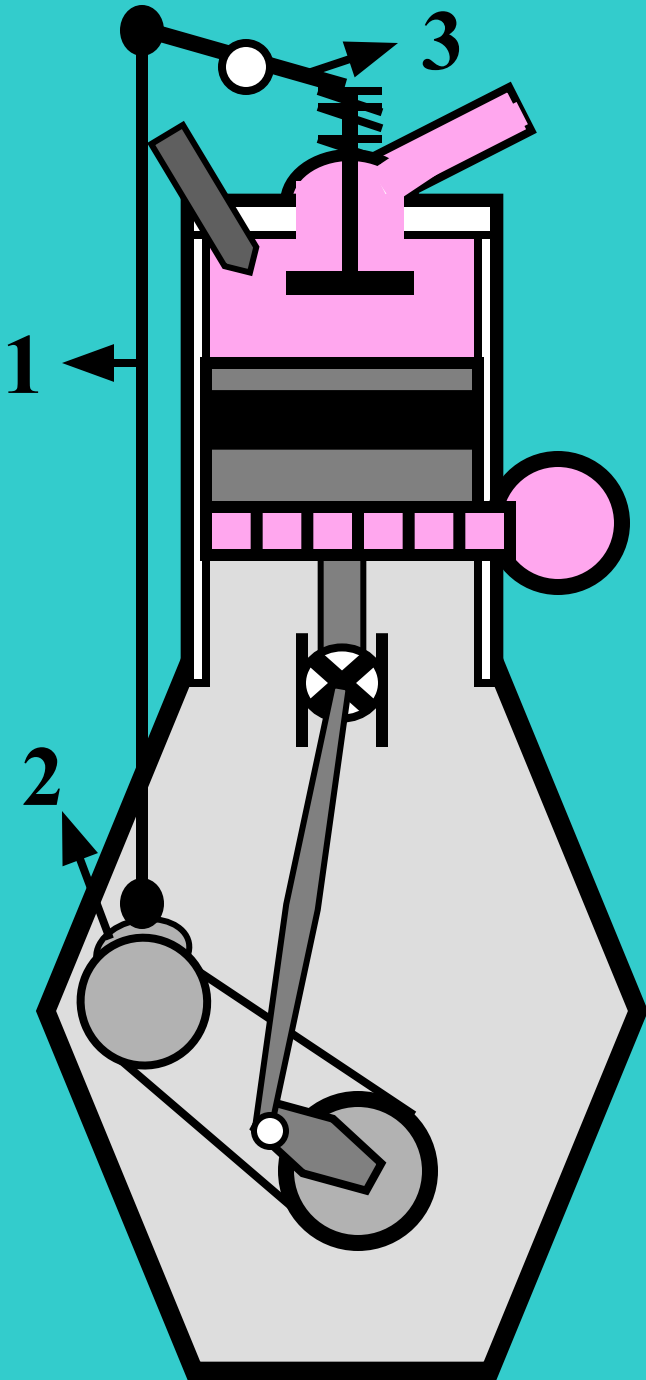
# The camshaft

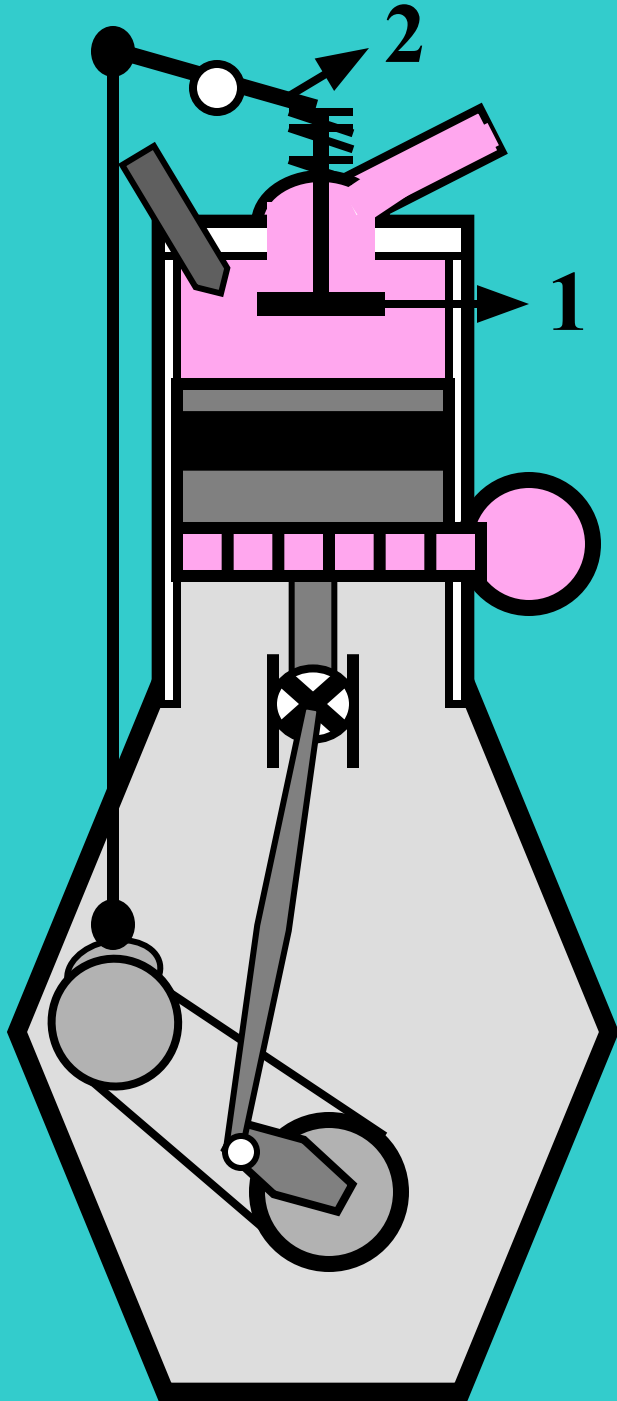
The *campeak* is fixed to the *camshaft*.



# The pushrod

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

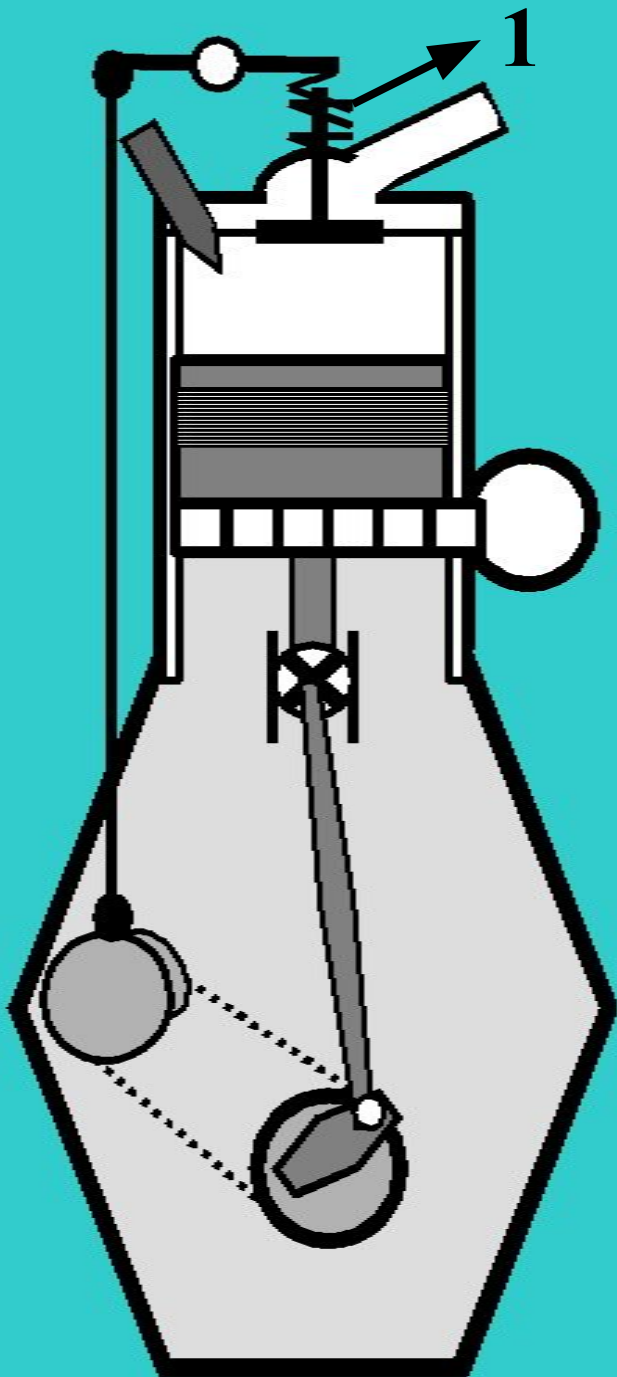




# The exhaust valve

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

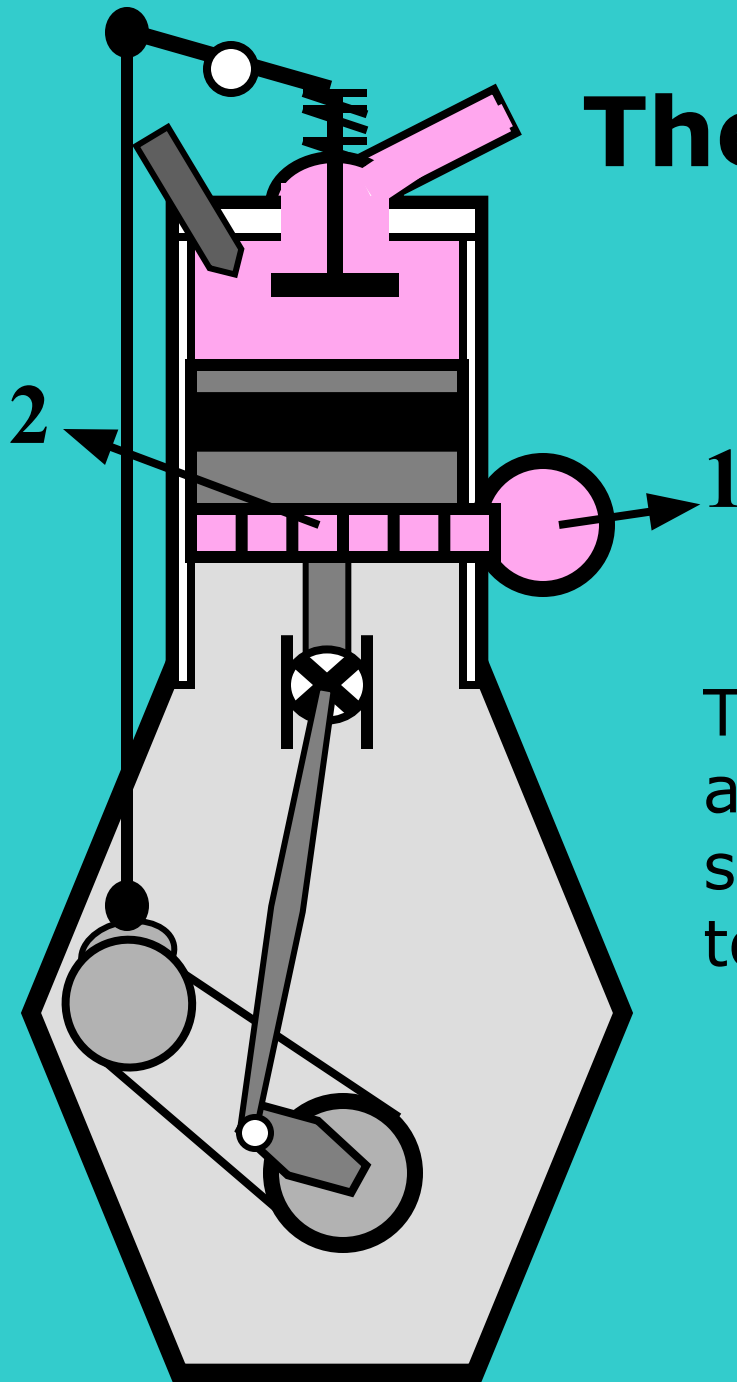




# The exhaust valve

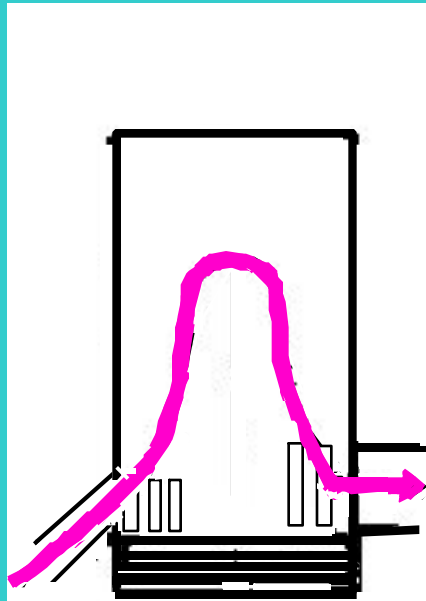
The exhaust valve is *actuated* (closed) by the *exhaust valve spring* (1).

# The scavenging system

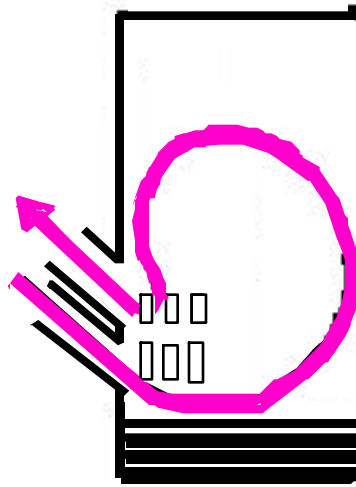


The *scavenging air manifold* (1) and *scavenging ports* (2) supply the **scavenging air** to remove the exhaust gases.

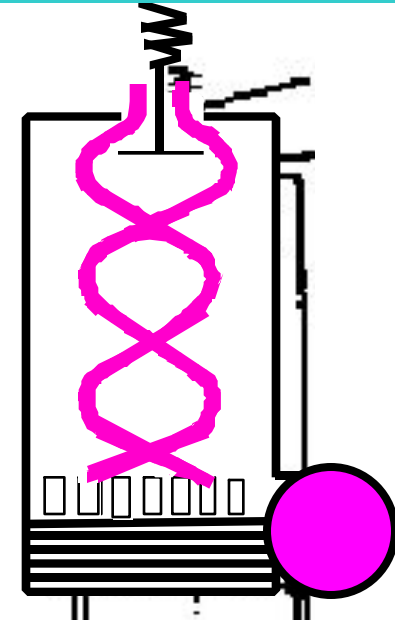
# SCAVENGING SYSTEMS



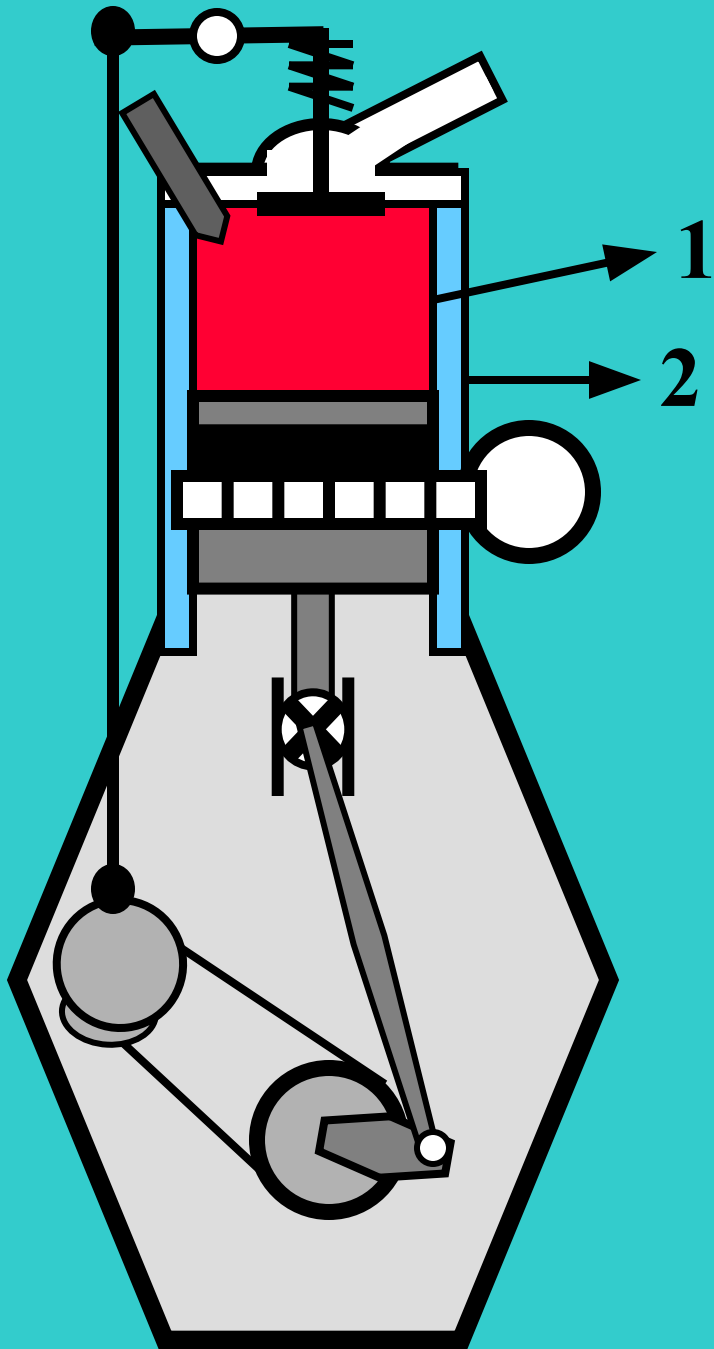
CROSS  
SCAVENGING



LOOP  
SCAVENGING



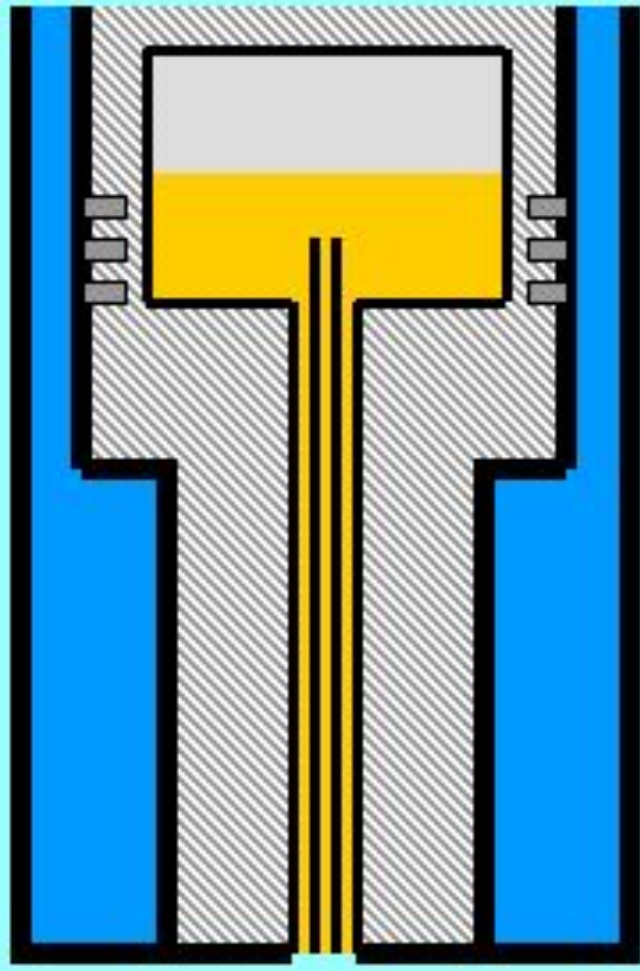
UNIFLOW  
SCAVENGING



## Cooling the cylinder:

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

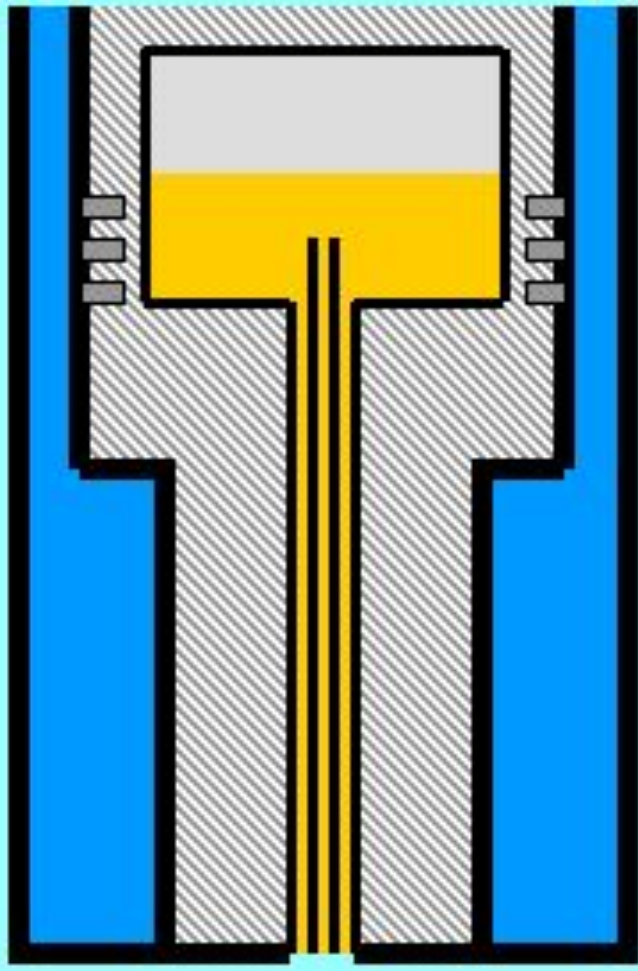
## Cooling the cylinder:



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

## Cooling the piston:

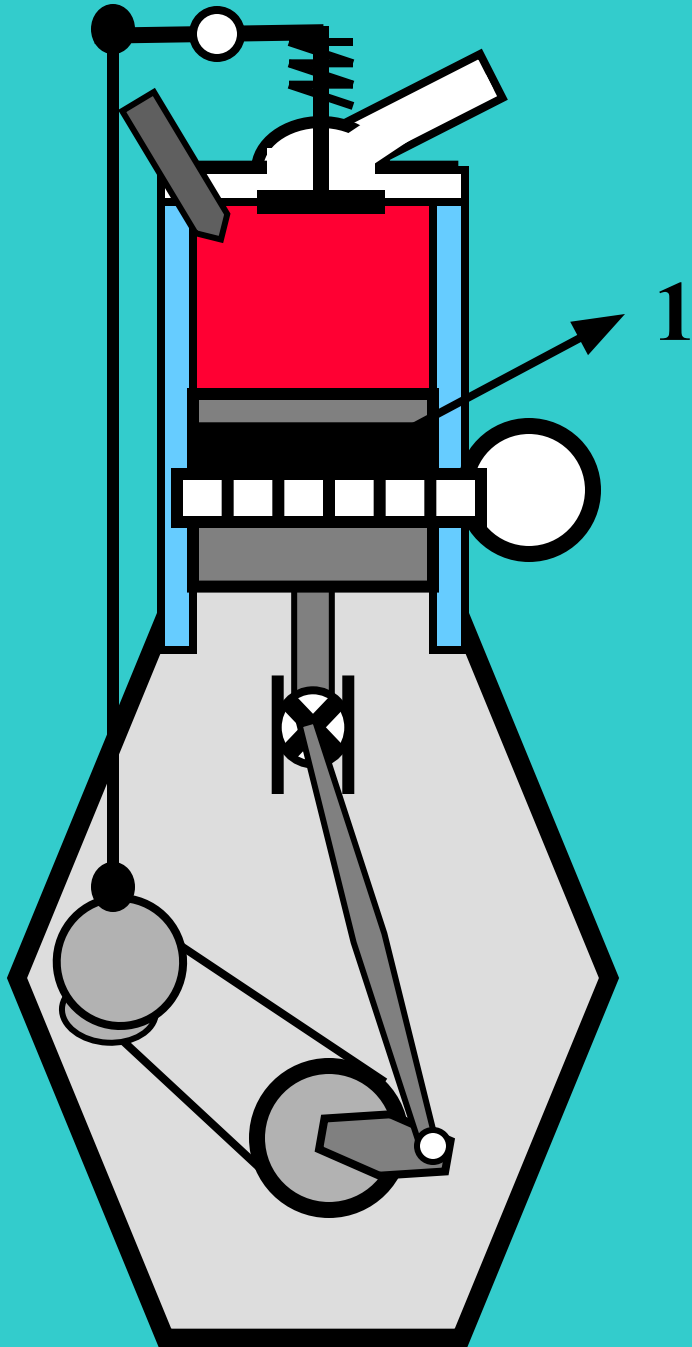
The piston is cooled by **oil.**



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.

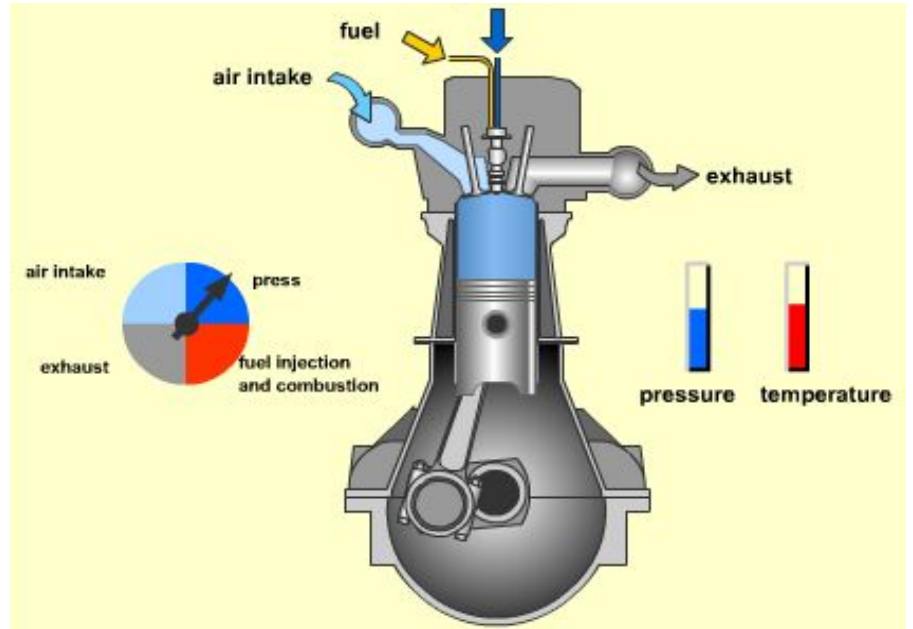
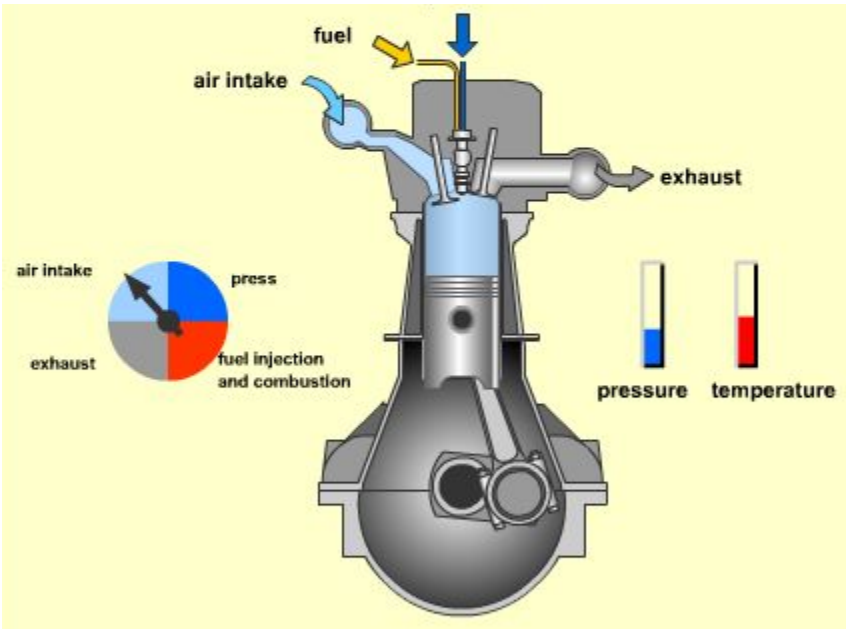
# Piston rings



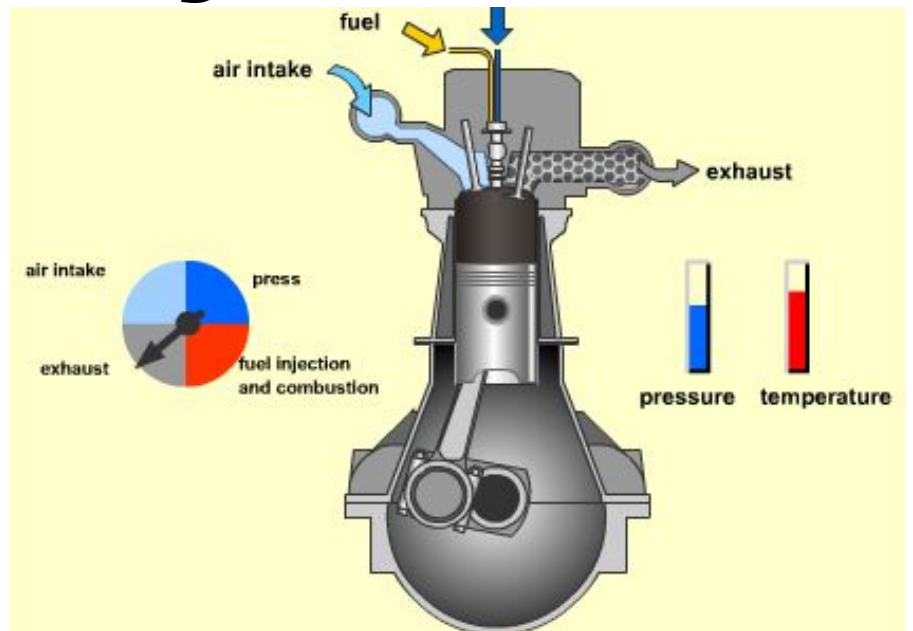
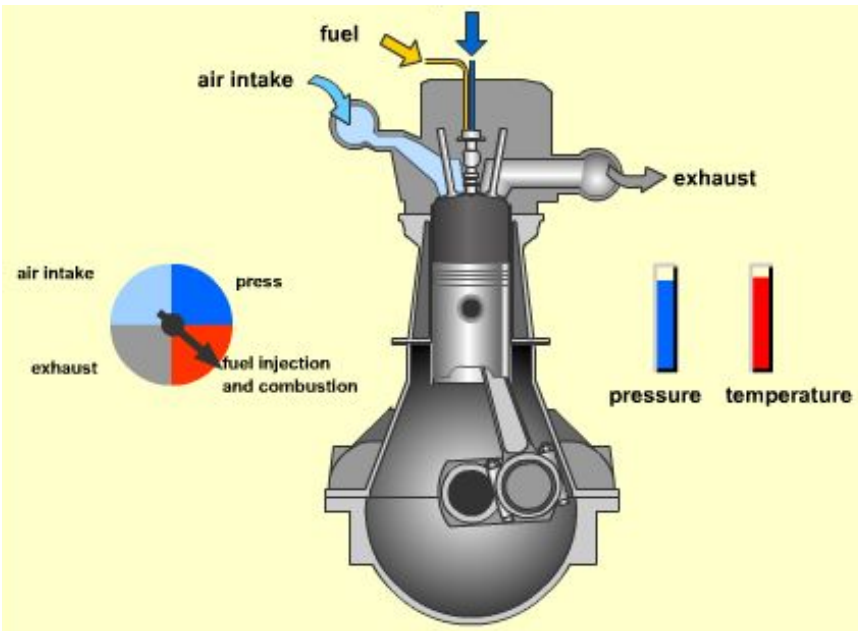
The *piston rings* (1) form a *seal* around the cylinder and carry away the heat.



Piston rings



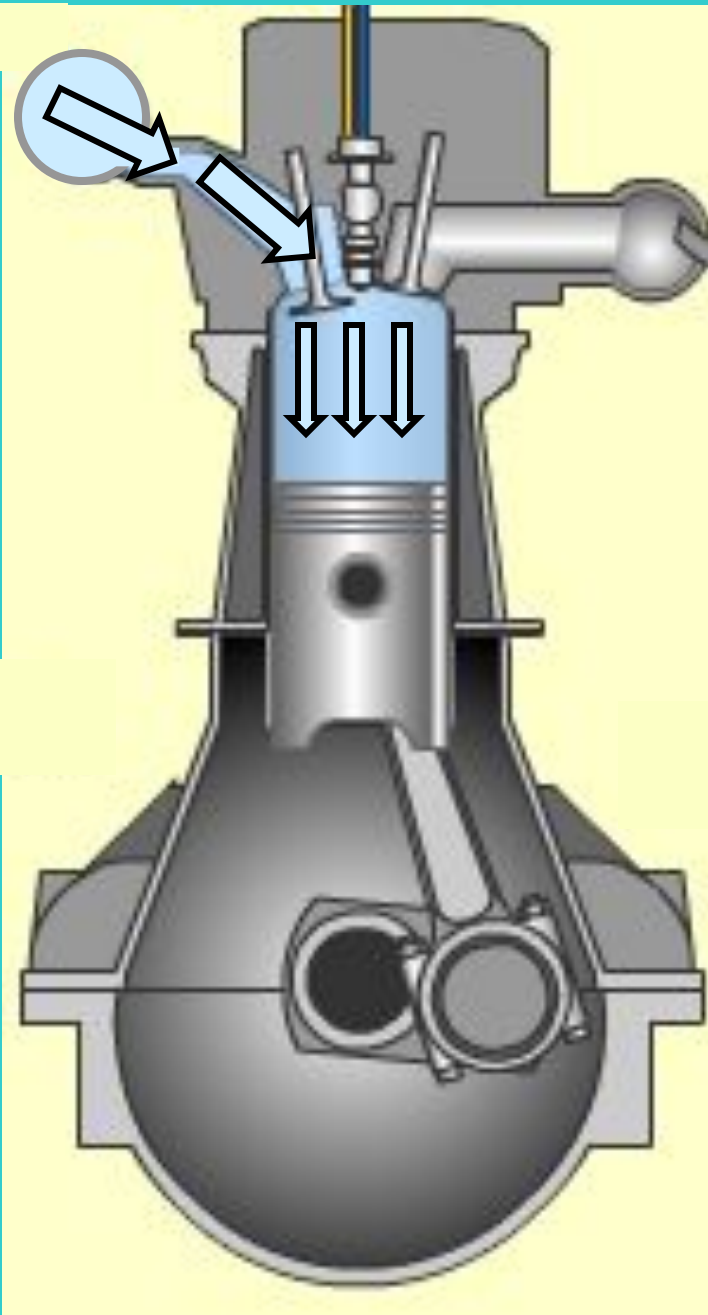
## 4-stroke cycle





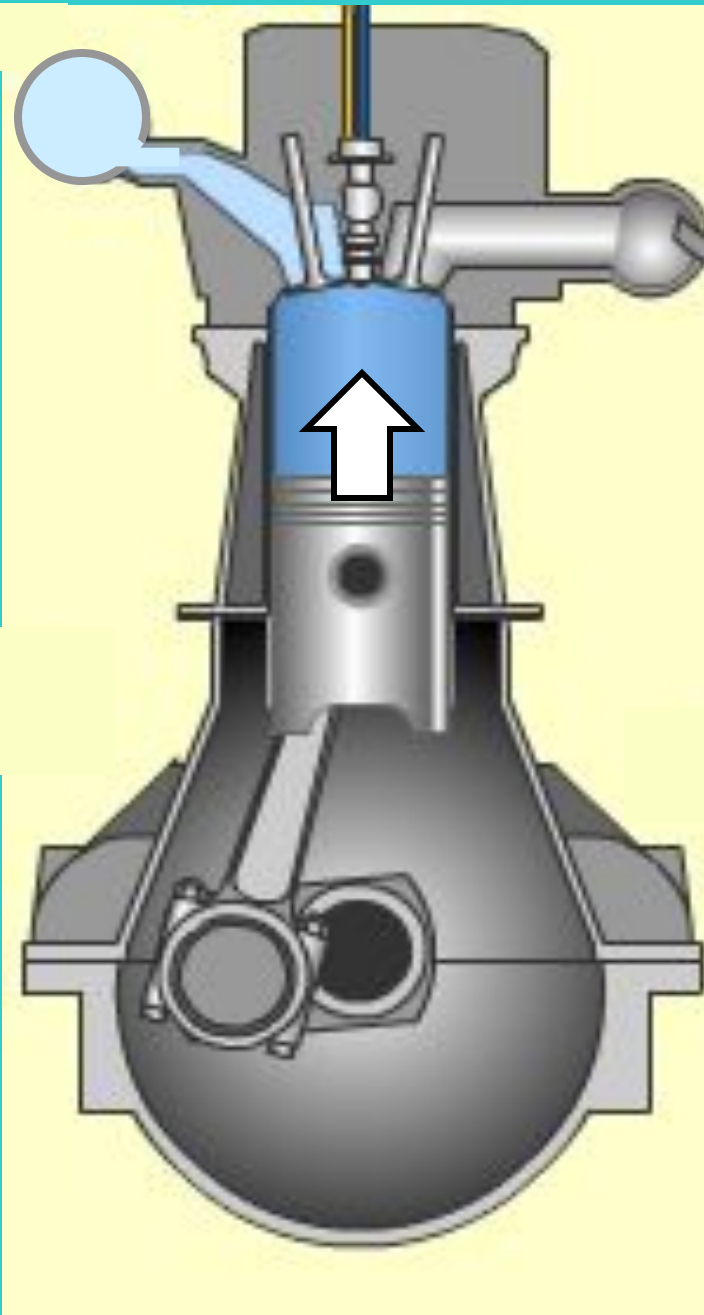
# *Suction stroke*

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



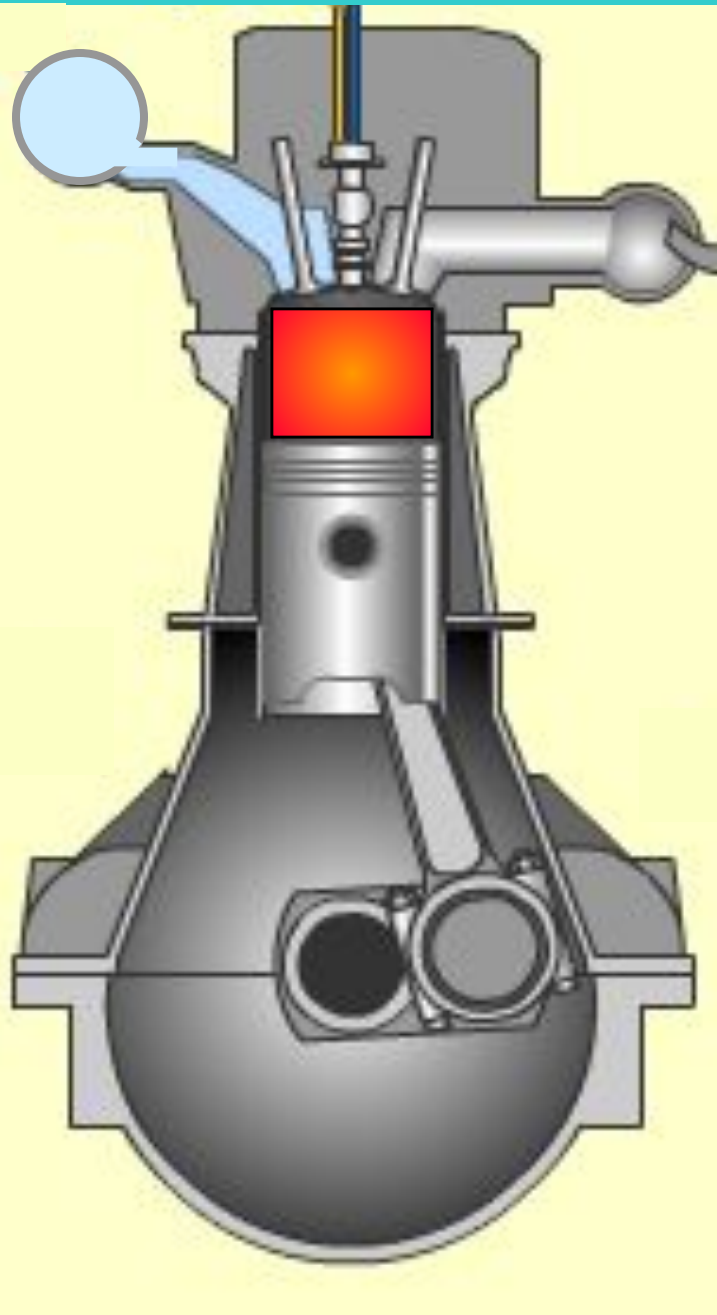
# *Compression stroke*

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



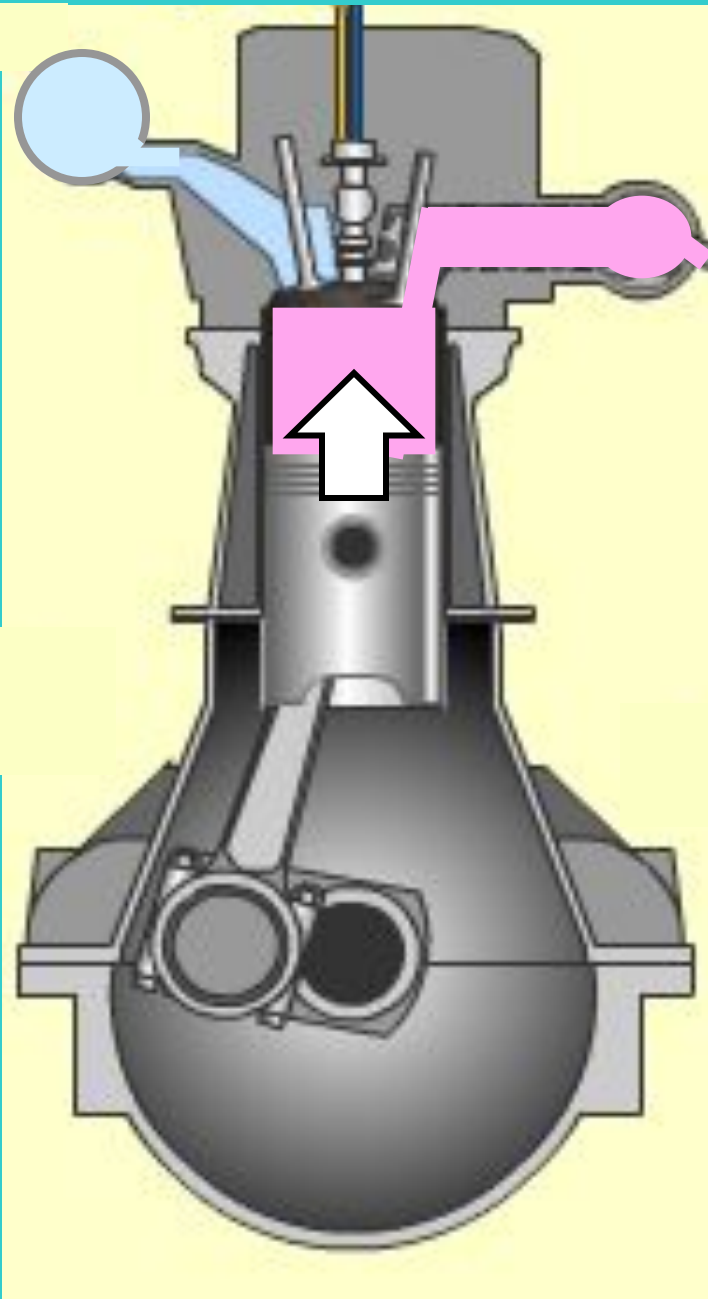
# ***Power stroke***

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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