In engines based on the other mode of operation possible, unmixed air is drawn into the compression space, compressed at a high ratio on the upward movement of the piston to obtain a high rise in temperature. A fine jet of fuel is fed at high pressure through an injection nozzle into the chamber of combustion where it is mixed with the compressed air present. This mixture is automatically ignited because of the high heat of compression. The gases produced expand, press on the piston and thus cause it to perform work.

Engines whose mode of operation is based on this principle are called compression-ignition engines, the older terms Diesel or oil engine are passing out of use in so far as the automobile industry is concerned (Fig. 24).

(2) Four-stroke Engines

(a) Design and Mode of Operation

Internal-combustion engines are not only distinguished from each other by the two different combustion processes the fundamentals of which have just been dealt with, but may further be divided into classes according to the mode of operation or cycle. Both petrol engines and compression-ignition engines operate on the four-stroke cycle or the two-stroke cycle and are used for the construction of tractors.

The distance through which the piston travels from top to bottom dead-centres is equal to half a revolution of the crankshaft and is called a stroke. One cycle of a four-stroker comprises the following four movements:

Suction stroke
Compression stroke
Power stroke (expansion)
Exhaust stroke

To ensure a constant cycle of the engine, each cylinder must be provided with an intake valve to feed fresh air or fuel-air mixture into the combustion chamber in due time. Further, each cylinder must be provided with an exhaust valve to discharge the burnt gases at the selected time. Fig. 25 shows the cycle of a four-stroke engine.

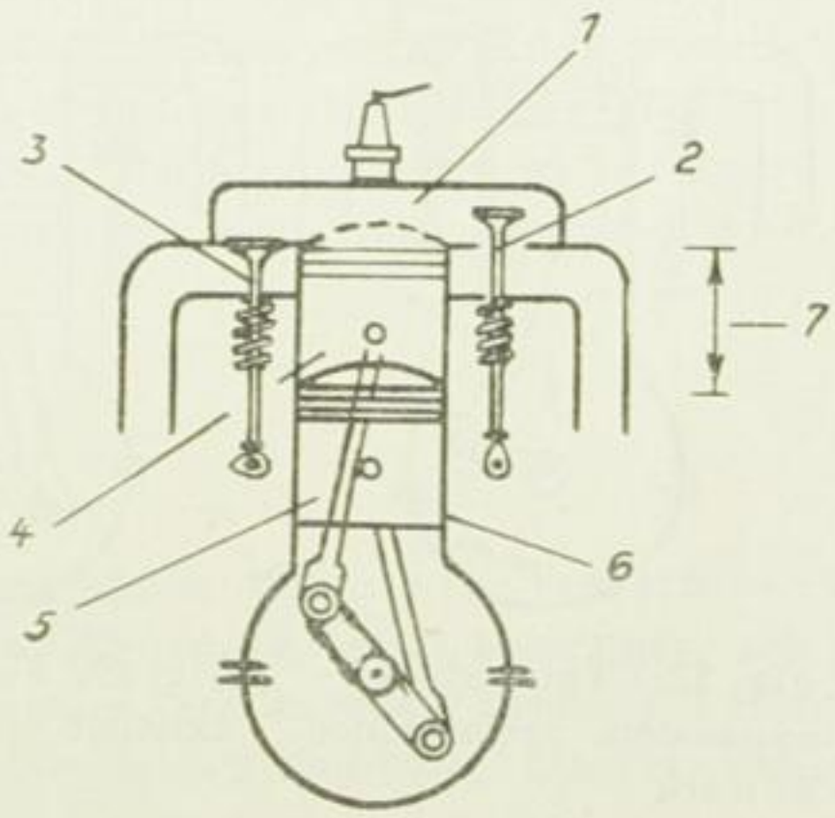

Fig. 25. Cycle of the four-stroke petrol engine
1 Combustion chamber
2 Intake valve
3 Exhaust valve
4 Piston (close to top dead-centre)
5 Piston (close to bottom dead-centre)
6 Cylinder
7 Stroke