EXPERIMENT NO. 1

OBJECT

To study and sketch the model of C.I. Engine (4-Stroke Diesel).

EQUIPMENTS

Model of 4-stroke diesel engine (cut section)

CONSTRUCTIONAL DETAIL

4-Stroke diesel engine consists of following main parts.

1. Cylinder
2. Cylinder head
3. Piston
4. Connecting rod
5. Crank shaft
6. Crank
7. Flywheel
8. Big and small end bearing
9. Crank case
10. Piston rings
11. Intake valve
12. Outlet valve
13. Cam shaft
14. Governor
15. Fuel injection pump
16. Injector

WORKING PRINCIPLE

The diesel engine is also known as compression ignition engine or constant pressure engine. In 4-stroke diesel engine, one cycle is completed in two revolution of crank shaft and four strokes of the piston. This type of engine is called four stroke engine. A, 4-stroke diesel engine has suction, compression, expansion and exhaust strokes for each operating cycle.

SUCTION STROKE

This stroke begins just before the piston reaches to top dead center during its upward movement in cylinder. The suction stroke begins at about 10-20^{o} before TDC. At this time inlet valve begins to open. AS the inlet valve opens piston goes past TDC and begins to move downward in cylinder, due to that low pressure is created in cylinder and air enters into the cylinder. The intake process ends when piston reaches at about 25^{o}-40^{o} after BDC.

COMPRESSION STROKE

In this stroke 'piston moves from B.D.C. to T.D.C. and compressed the air, because of compression temperature and pressure will be increased, at this time, both valves will be closed and fuel will be injected in atomized form. Due to which at the end of this stroke ignition takes place.

EXPANSION STROKE OR POWER STROKE

After ignition burnt gases inside the cylinder expands and exerts the pressure on piston due to that piston again moves from T.D.C. to B.D.C. and power produced on crank shaft and flywheel gets movement by this stroke.

EXHAUST STROKE

Exhaust stroke occurs as the piston moves from BDC to TDC. The exhaust valve begins to open before the end of power stroke that is before BDC, as the piston moves up in cylinder, the combustion product are pushed out through the exhaust valve.

The cycle is completed, now the engine is ready to such the fresh air again.

PARTS OF DIESEL ENGINE

GOVERNOR

A governor is used to adjust the power output from an engine in conformity with the external load and accordingly make the engine operate at constant speed.

FUEL INJUECTION IN A C.I. ENGINE

In a diesel engine correct quantity of fuel is injected into the engine cylinder at the end of the compression stroke by a fuel injector. The required high pressure is build by the fuel injection pump.

VALVE OPERATING MECFHANISM

The valve and valve operating mechanism of an I.C. engine admit at the right moment, fresh charge into the engine cylinders and exhaust the products of combustion into the atmosphere. There are two valves located at the cylinder head. 1. Inlet valve, 2. Outlet valve, these valves are opened and closed at the proper timings with the help of camshaft.

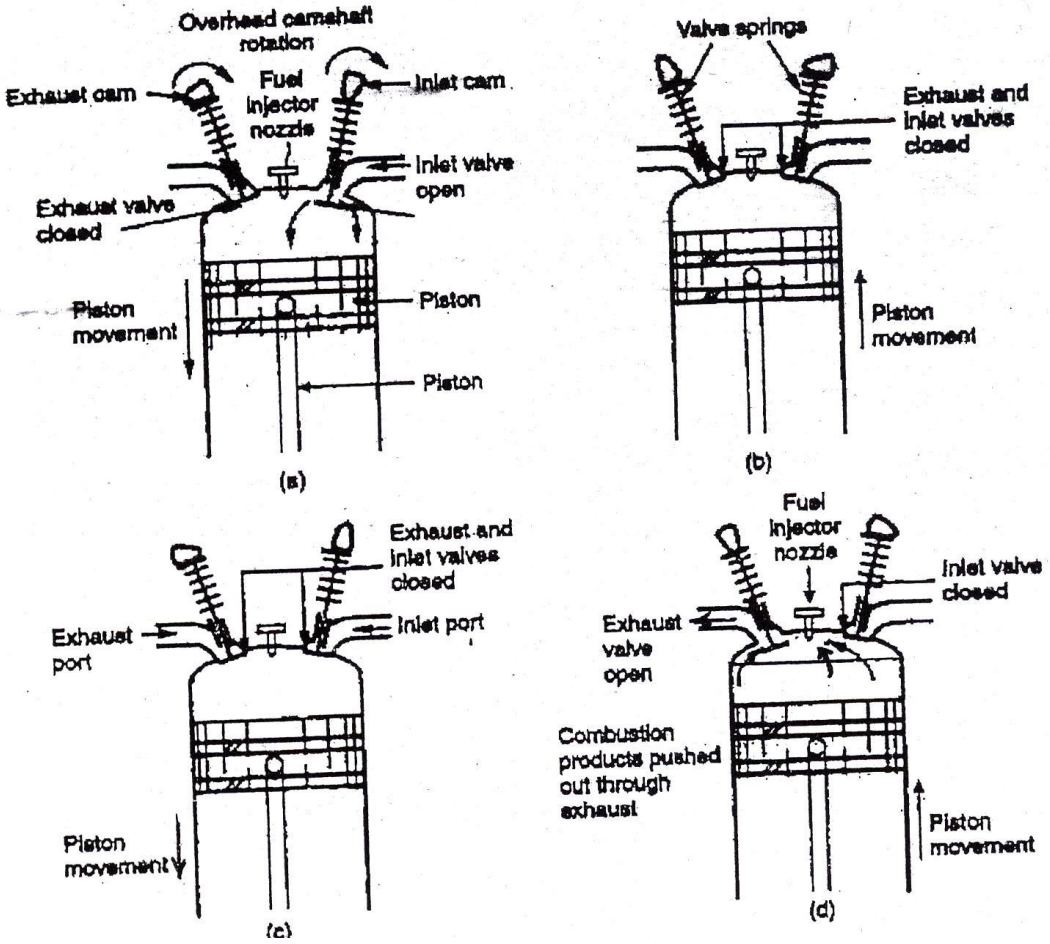
APPLICATIONS

4-stroke diesel engines are widely used in transportation as bus, trucks, railway engines etc.

RESULT

The study and sketch of 4-stroke diesel engine is done.

DISCUSSION



Working of 4-Stroke Diesel Engine