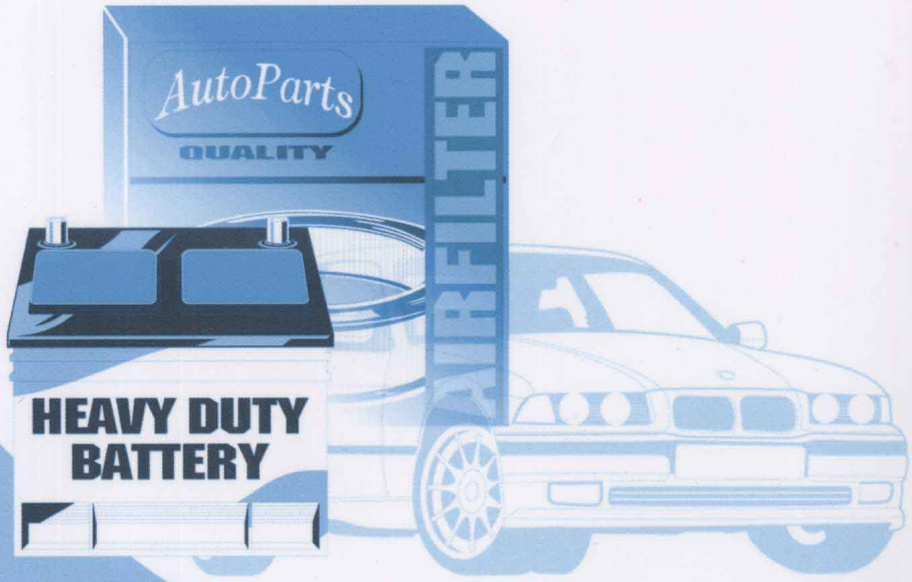
第2版

交通运输专业英语

普通高等教育交通类专业规划教材

陈焕江　徐双应　编



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本书以公路运输为主线，系统地选编了有关汽车构造、交通环境、交通安全、运输车辆和运输管理、物流管理等方面的英语课文共38篇。为便于自学，书中对每篇课文中的语法难点和长句、难句作了较详细的分析，对常用英译汉翻译技巧进行了简要介绍，并附有生词解释。

本书为普通高等教育交通类专业规划教材，既可作为高等院校交通运输(汽车运用工程)和其他相关专业“专业英语”课程的教材，也可供具有一定英语基础的汽车运输和管理部门的技术人员和管理人员参考。

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前　言

《交通运输专业英语》(第1版)自2002年6月出版以来，数次重印，在全国许多高等院校的交通运输(汽车运用工程)专业和其他相关专业的教学中得以广泛应用。

《交通运输专业英语》(第2版)的课文内容仍以公路运输为主线，涵盖汽车构造、交通环境、交通安全、运输车辆和运输管理、物流管理；课文难度与公共英语相衔接，且由浅入深；其教学目标侧重于：扩大专业词汇量，熟悉科技英语文献常用句型、篇章结构和表达方法，提高分析和翻译长句、难句和阅读英语专业文献的能力。在保持《交通运输专业英语》(第1版)的结构框架、内容框架和基本优点的基础上，《交通运输专业英语》(第2版)调整合并了第1版中的一些课文；在保持以公路运输内容为主线的同时，根据形势发展和教学需要，增添了物流管理方面的课文；对第1版课文中的注释和生词解释作了部分修改，使之更便于理解；在每一课中增添了“学翻译”方面的内容，循序渐进，对常用英译汉翻译技巧进行了简要介绍。

《交通运输专业英语》(第2版)由长安大学陈焕江、徐双应编写。参加编写的还有：王来军、邱兆文、肖梅、何天仓、李良敏、祁东辉、董元虎、任军等同志。编写过程中，参阅了国内外许多有关书籍和杂志，得到了长安大学汽车学院许多老师的关心和帮助。作者对此深表谢意。

恳请读者对本书的内容和章节安排等提出宝贵意见，并对书中存在的错误及不当之处提出批评和修改建议，以便本书再版修订时参考。

编　者

2007年9月

Contents

Unit One Structure of Automobile

Lesson 1 Fundamentals of Automobile

Today's average car contains more than 15,000 separate, individual parts that must work together. These parts can be grouped into four major categories: engine, body, chassis and electrical equipment(Fig. 1.1).

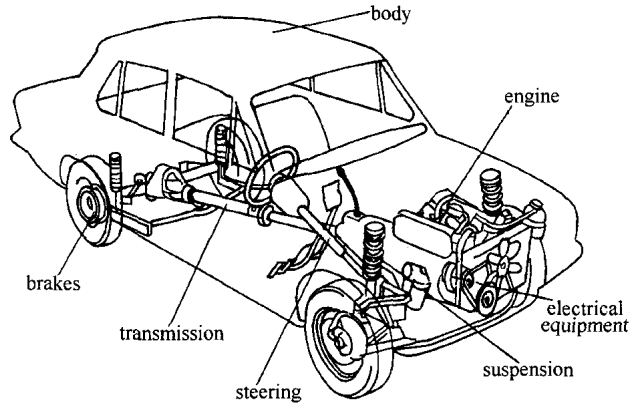

Fig. 1.1 Layout of a modern automobile

1 Engine

The engine acts as the power unit. The internal combustion engine is most common: this obtains its power by burning a liquid fuel inside the engine cylinder. There are two types of engine: gasoline(also called a spark-ignition engine) and diesel(also called a compression-ignition engine). Both engines are called heat engines; the burning fuel generates heat which causes the gas inside the cylinder to increase its pressure and supply power to rotate a shaft connected to the transmission[1].

2 Body

An automobile body is a sheet metal shell with windows, doors, a hood, and a trunk deck built into it. It provides a protective covering for the engine, passengers, and cargo. The body is designed to keep passengers safe and comfortable. The body

styling provides an attractive, colorful, modern appearance for the vehicle.

3 Chassis

The chassis is an assembly of those systems that are the major operating parts of a vehicle. The chassis includes the transmission, suspension, steering, and brake systems(Fig. 1.2).

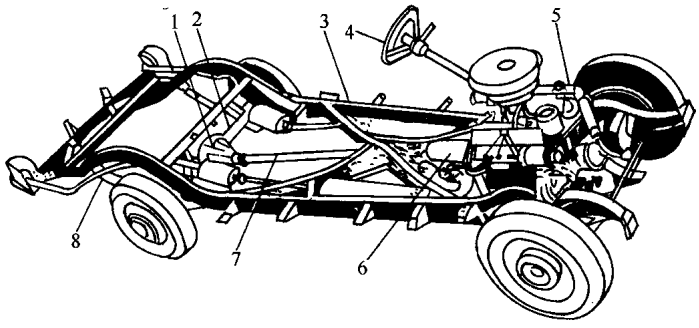

Fig. 1.2 Chassis of a car

1-differential 2-rear-axle housing 3-frame 4-steering wheel
5-engine 6-transmission 7-drive shaft 8-suspension

3.1 Transmission

The transmission system comprises clutch, gearbox, propellor shaft, rear axle and differential and the driven road wheels.

Clutch

The clutch or torque converter has the task of disconnecting and connecting the engine's power from and to the driving wheels of the vehicle[2]. This action may be manual or automatic.

Gearbox

The main purpose of the gearbox is to provide a selection of gear ratios between the engine and driving wheels, so that the vehicle can operate satisfactorily under all driving conditions[3]. Gear selection may be done manually by the driver or automatically by a hydraulic control system.

Propellor shaft

The function of the propellor(drive)shaft is to transmit the drive from the gearbox to the input shaft of the rear axle and differential assembly. Flexible joints allow the rear axle and wheels to move up and down without affecting operation.

Rear axle and differential

The rear axle and differential unit transmits the engine's rotational power through

90° from propshaft to axle shaft to road wheels[4]. A further function is to allow each driven wheel to turn at a different speed; essential when cornering because the outer wheel must turn further than the inside wheel. A third function is to introduce another gear ratio for torque multiplication.

3.2 Suspension

The axles and wheels are isolated from the chassis by a suspension system. The basic job of the suspension system is to absorb the shocks caused by irregular road surfaces that would otherwise be transmitted to the vehicle and its occupants, thus helping to keep the vehicle on a controlled and level course, regardless of road conditions[5].

3.3 Steering

The steering system, under the control of the driver at the steering wheel, provides the means by which the front wheels are directionally turned. The steering system may be power assisted to reduce the effort required to turn the steering wheel and make the vehicle easier to manoeuvre.

3.4 Brakes

The braking system on a vehicle has three main functions. It must be able to reduce the speed of the vehicle, when necessary; it must be able to stop the car in as short a distance as possible; it must be able to hold the vehicle stationary. The braking action is achieved as a result of the friction developed by forcing a stationary surface(the brake lining)into contact with a rotating surface(the drum or disc).

Each wheel has a brake assembly, of either the drum type or the disc type, hydraulically operated when the driver applies the foot brake pedal[6].

4 Electrical Equipment and Instrumentation

The electrical system supplies electricity for the ignition, horn, lights, heater, and starter. The electricity level is maintained by a charging circuit. This circuit consists of a battery, and an alternator(or generator). The battery stores electricity. The alternator changes the engine's mechanical energy into electrical energy and recharges the battery.

The motor vehicle incorporates a number of electrical devices that are used for:

Battery charging	—alternator and regulator.
Engine purposes	—starting and ignition.
Safety and convenience	—lighting, horn, wipers, washers etc
Driver information	—instrumentation and warning lamps[7].

Of these devices instrumentation is, perhaps, most influenced by the advance of

microelectronics. The basic electromechanical systems of:

Speedometer	—for indicating vehicle speed.
Engine oil pressure	—warning lamp or gauge to show operating limits.
Engine coolant temperature	—warning lamp or gauge to show operating limits.
Battery charging	—warning lamp or gauge to indicate satisfactory/unsatisfactory action.
Fuel tank content	—gauge to show amount of fuel in the fuel tank.

are giving way to computerized vehicle management information centres[8].

New Words

category	['kætigəri]	n.	种类，类型
chassis	['ʃæsi]	n.	底盘
cylinder	['siliŋdə]	n.	气缸，柱体
ignition	[ig'niʃən]	n.	点燃，点火
compression	[kəm'preʃən]	n.	压缩
transmission	[trænz'miʃən]	n.	传动系
hood	[hud]	n.	罩
trunk deck			行李舱盖
cargo	['kɑ:gəu]	n.	货物
assembly	[ə'sembli]	n.	总成，装配
suspension	[səs'penʃən]	n.	悬架
clutch	[klʌtʃ]	n.	离合器
propellor	[prə'pelə]	n.	螺旋桨，推进器
propellor shaff			传动轴
differential	[difə'renʃəl]	n.	差速器
hydraulic	[hai'drɔ:lik]	a.	水力的，液力的，液压的
flexible	['fleksəbl]	a.	易弯的，灵活的
flexible joint			万向节
torque	[tɔ:k]	n.	转矩，扭矩
torque convertor			变矩器
multiplication	[mʌltipli'keiʃən]	n.	增加，放大
absorb	[əb'sɔ:b]	vt.	吸收，缓冲
shock	[ʃɔk]	n.	冲击
occupant	['kjupənt]	n.	占有者，乘员
steering	['stiəriŋ]	n.	转向，操纵

steering wheel		转向盘
manoeuvre	[mə'nu:və] n. ; v.	机动，动作，操纵
stationary	['steiʃnəri] a.	不动的，静止的
lining	['lainiŋ] n.	衬里，衬片
drum	[drʌm] n.	鼓，圆筒
disc	[disk] n.	圆盘
charge	[tʃɑ:dʒ] v.	充电
alternator	['ɔ:ltəneitə] n.	交流发电机
incorporate	[in'kɔ:pəreit] v.	结合，包括
regulator	['regjuleitə] n.	调节器
horn	[hɔ:n] n.	喇叭
wiper	[waipə] n.	擦拭之物，刮水器
washer	['wɔʃə] n.	洗涤器
speedometer	[spi'dɔmitə] n.	速度计，里程计
coolant	['ku:lənt] n.	冷却剂
computerise	[kəm'pju:təraiz] vt.	计算机化

Notes to the Text

[1] Both engines are called... connected to the transmission.

两种发动机均被称为热机，由燃烧的燃油产生热，引起气缸内气体的压力升高，并输出动力使连接到传动系的轴旋转。

句中：which 所引导的从句为修饰 heat 的定语从句；过去分词短语 connected to... 作定语，修饰 a shaft。

[2] The clutch or torque converter... of the vehicle.

离合器或变矩器具有接合和切断发动机与汽车驱动轮间动力的作用。

[3] The main purpose of... under all driving conditions.

变速器或变矩器的主要作用是在发动机与驱动轮间具有一个可选择的齿轮比，以便车辆可以在各种运行工况下满意地工作。

句中：between... and... 意为“在……与……之间”；so that 意为“为了”、“以便”，引导结果状语从句。

[4] The rear axle and differential unit... to road wheels.

后轴和差速器装置把发动机的旋转动力，在传动轴与后轴间转向 90°后传递给车轮。

句中：from... to... 意为“从……到……”；transmit... to... 意为“把……传递到……”。

[5] The basic job of the suspension system... regardless of road conditions.

悬架系统的基本作用是吸收由不规则路面引起的振动，从而有助于把车辆保持在一个受控的水平方向上，否则振动将传至车辆和车辆上的乘员。

句中：that 引导的从句为与现在事实相反的虚拟的条件句，作 the shocks 的分隔定语；现在分词短语 thus helping... 表示结果；keep one's course 意为“保持……的方向”。

[6] Each wheel has a brake assembly... the foot brake pedal.

每个车轮具有一个鼓式或盘式制动总成，当驾驶员踩脚制动踏板时，靠液力产生制动。

句中：连词 either... or... 意为“或者……或者……”；过去分词短语 operated when... 作 a brake assembly 的分隔定语。

[7] The motor vehicle incorporates a number of... instrumentation and warning lamps.

句中：that 引导的从句为修饰 electrical devices 的定语从句；定语从句中的介词 for 有多个宾语。

[8] The basic electromechanical systems of... management information centre.

该长句的主语为 the basic electromechanical systems，谓语(系词)为 are；介词 of 后有多个并列的宾语；give way to 意为“让位于”。

Learn to Translate

翻译简介(1)

翻译：翻译是把用一种语言表达的事物改用另一种语言重新表达出来的过程。

翻译标准：确切的翻译并不是逐字逐句的原文翻译，而是要把原文的内容准确地表达出来，同时不能歪曲原文的意思。翻译的标准可以归纳为：以合乎规范的译文语言确切忠实地表达原作的内容，并在译文中保持和原作一致的修辞作用。

应强调的是：翻译技巧和水平只有通过大量的练习和实践才能提高，本教材仅结合课文简单介绍科技文献英译汉过程中常用的一些基本方法。

Lesson 2 Internal Combustion Engine

1 Principle of Operation

The engine is a self-contained power unit which converts the heat energy of fuel into mechanical energy for moving the vehicle. Because fuel is burned within, the engine is known as an internal combustion (IC) engine. In the IC engine, an air-fuel mixture is introduced into a closed cylinder where it is compressed and then ignited. The burning of the fuel (combustion) causes a rapid rise in cylinder pressure which is converted to useful mechanical energy by the piston and crank-shaft.

The fuel may be ignited either by a spark or by compression giving rise to classifications of spark-ignition (SI) and compression-ignition (CI) engines[1]. An sectional engine view of a typical spark ignition petrol engine is shown in Fig. 2.1, detailing the major components.

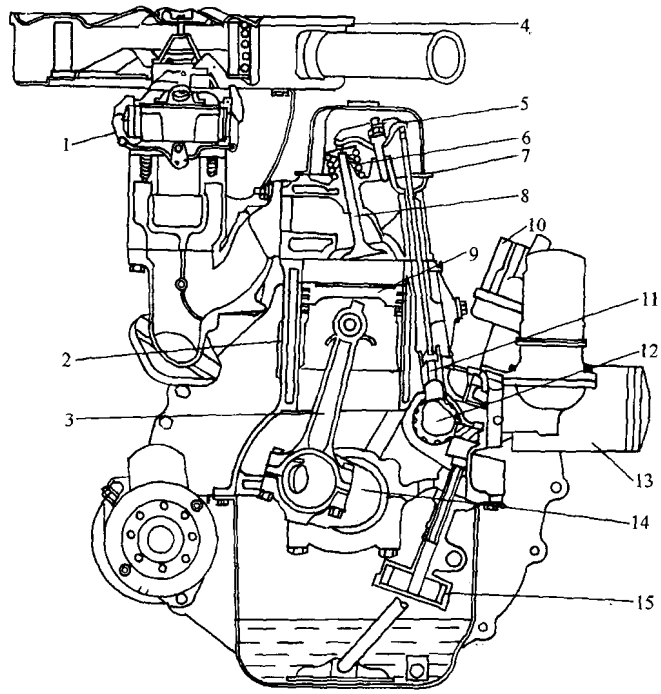

Fig. 2.1 Sectional view of a six-cylinder engine

1-carburetor 2-cylinder wall 3-connecting rod 4-air cleaner 5-rocker arm 6-valve spring 7-pushrod 8 -valve 9-piston 10-distributor 11-valve lifter 12-camshaft 13-oil filter 14-crankshaft 15-oil pump

The four strokes of such an engine are shown in Fig. 2. 2. At the beginning of the induction stroke(Fig. 2. 2a), the inlet valve opens and the piston travels down the cylinder from top dead centre(TDC) to bottom dead centre(BDC). The partial vacuum created by the moving piston causes the air-fuel mixture to rush in from the inlet manifold and through the open valve, into the cylinder. The correct air-fuel mixture is provided by the carburetor. When the piston reaches the end of its stroke the inlet valve closes, sealing the top end of the cylinder as both valves are closed.

In Fig. 2. 2b the piston is moving up the cylinder, compressing the air-fuel mixture between the piston and cylinder head to a very small volume-the compression stroke. Just before TDC, an electrical spark, generated across the electrodes of the spark plug, ignites the air-fuel mixture. For good performance the timing of the spark must be closely controlled.

As the mixture burns, the hot gas expands causing a rapid and extreme rise in cylinder pressure, to such an extent that the piston is forced down the cylinder and the connecting rod gives the crankshaft a powerful turning effort[2]. This is the combustion stroke, also called the power stroke, shown in Fig. 2. 2c.

Once the mixture has been burned it must be removed from the cylinder as quickly as possible[3]. In the exhaust stroke(Fig. 2. 2d) the rising piston pushes the hot gases and combustion products out of the cylinder through the open exhaust valve and exhaust system into the earth's atmosphere.

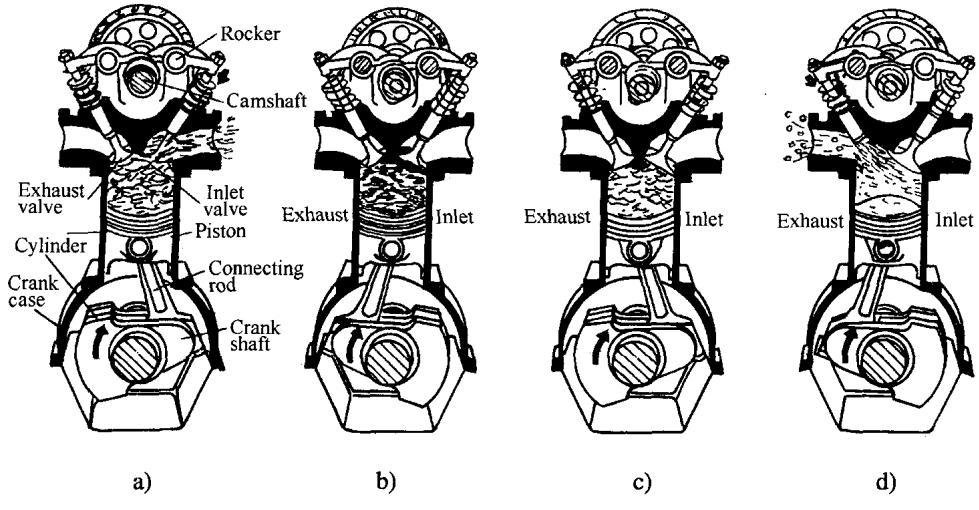

Fig. 2. 2 Four-stroke cycle principle of operation

a) Induction stroke b) Compression stroke c) Combustion stroke d) Exhaust stroke

This sequence of events is repeated continually, with power delivered to the crankshaft on only one of the four strokes-the combustion stroke[4]. Crankshaft rotation continues through the other strokes due to the kinetic energy of the heavy flywheel which is connected to the crankshaft. Note that the crankshaft rotates through two full revolutions for each four-stroke cycle and a spark occurs only once in the cylinder[5]. In a multicylinder engine, power strokes of each cylinder are staggered so that power is delivered almost continuously to the crankshaft for a smooth operation.

2 Mixture Supply System

Fuel stored in a large tank, is fed via a pump to the carburetor. The carburetor (Fig. 2.3) mixes the liquid petrol with filtered air on its way to the cylinders and in the process turns it into a vapor. The inlet manifold (Fig. 2.4) directs the mixture to the cylinders. The ratio of air to fuel in the mixture delivered to the cylinder is controlled by the size and shape of the carburetor bore and venturi, and the size of the fuel metering jets. The standard manual control for the amount of air and fuel mixture delivered to the engine is the throttle valve, which is controlled by the driver's depression of the accelerator pedal. The throttle valve is simply a round disc, mounted on a thin pivot shaft so shat it can be tilted at different angles under the control of the accelerator pedal[6]. In the vertical position the throttle valve offers virtually no restriction and the full volume of air and fuel passes to the cylinders to produce maximum engine power. As the throttle valve moves towards the horizontal position the airflow is restricted (throt-

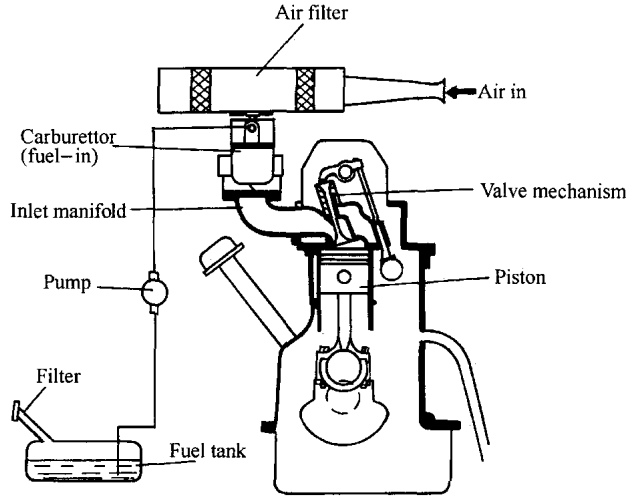

Fig. 2.3 Basic fuel supply system

tled) and engine power and speed is reduced accordingly. In normal operation the air-fuel ratio (by mass) varies, typically, in the range12: 1 to 17: 1.

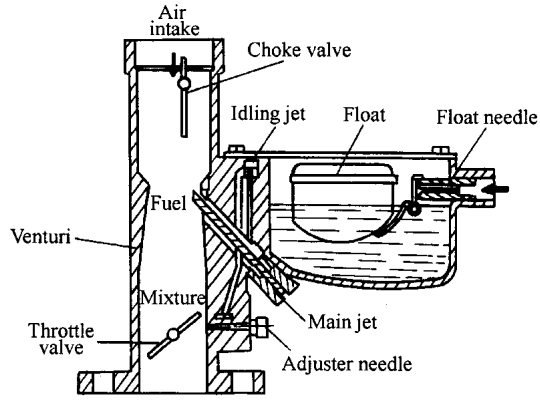

Fig. 2. 4 Mixture supply principles

3 Ignition System

The basic ignition system of the SI petrol engine is shown in Fig. 2. 5. The battery provides a low voltage (12V) source of direct current. When the ignition switch is turned on and the contact breaker points are closed (Fig. 2. 6a), current flows through the primary winding of the ignition coil. This current flow creates a magnetic field in the primary coil. When the contact breaker points open, interrupting the flow of cur-

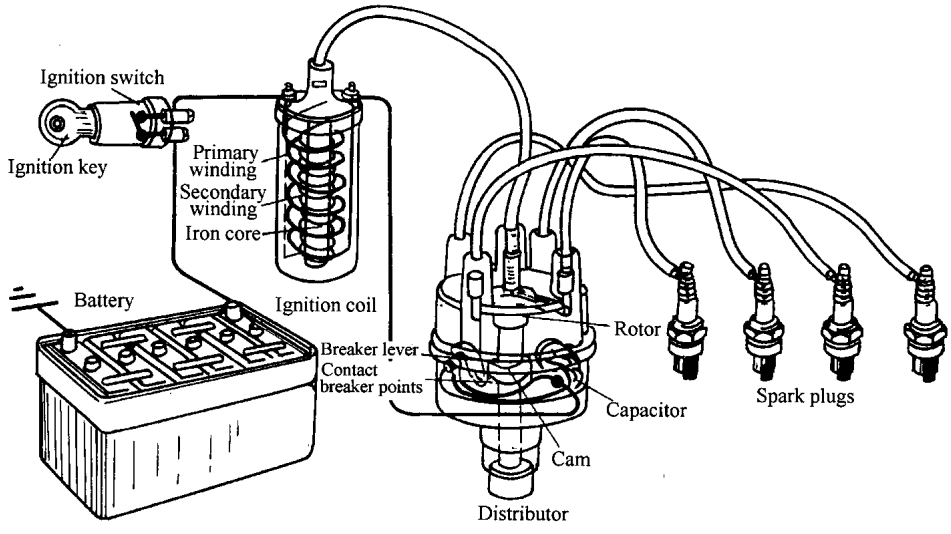

Fig. 2. 5 Basic ignition system used in SI petrol engines

rent(Fig. 2. 6b), a rapid voltage change is produced across the primary winding and a high voltage(15,000 ~ 20,000V) is induced across the secondary winding. This secondary voltage is high enough to jump the gap of a spark plug, creating a spark between the electrodes with sufficient energy and direction to ignite the air-fuel mixture. To assist in the rapid change of primary voltage a capacitor is connected in parallel with the breaker points, which also reduces arcing across the points-extending useful life[7].

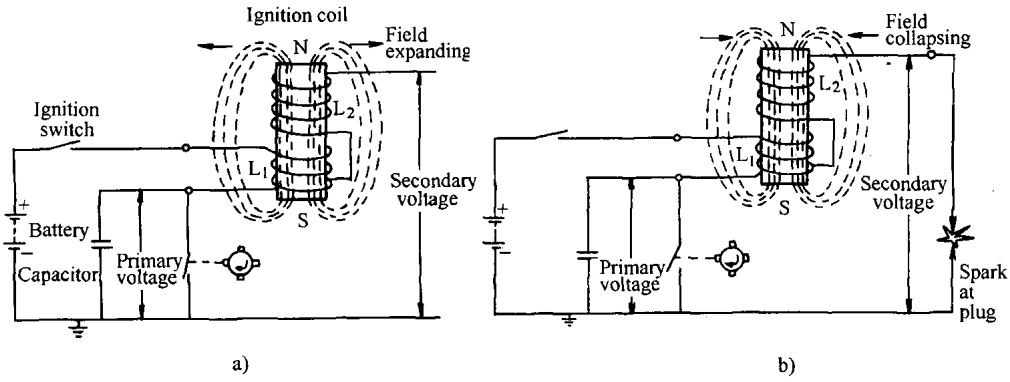

Fig. 2. 6 Basic ignition system principles

a) with control breaker points closed b) with control breaker points open

The high voltage pulses generated across the secondary coil winding must be delivered to the appropriate spark plug at the correct time. The distributor, shown in Fig. 2. 5, is used for this purpose.

It contains a rotary switch(rotor) and fixed cap, which connects the secondary pulse to the appropriate spark plug just before the corresponding piston reaches TDC on the compression stroke. The distributor is connected to the coil and spark plugs by high tension plug leads and the distributor shaft controls the opening and closing of the contact breaker points. As the spark(ignition) timing must be related to the position of the piston in the cylinder the distributor shaft rotation must be coupled to the crankshaft. This coupling is made by mechanical gearing to the camshaft, which is crankshaft driven. The camshaft rotates at half the speed of the crankshaft, because only one spark and one valve sequence is required for each two revolutions of the crankshaft.

Initial ignition timing is set by positioning number one cylinder piston just before TDC, both valves closed, at the end of the compression stroke. The contact breaker points are then set to just opening with the rotor feeding the number one cylinder plug lead. Prior to this, the gap between the *fully* open points must be set, to give correct dwell time.