PROFESSIONAL ENGLISH OF AUTOMOBILE 汽车专业英语

主 编 边浩毅

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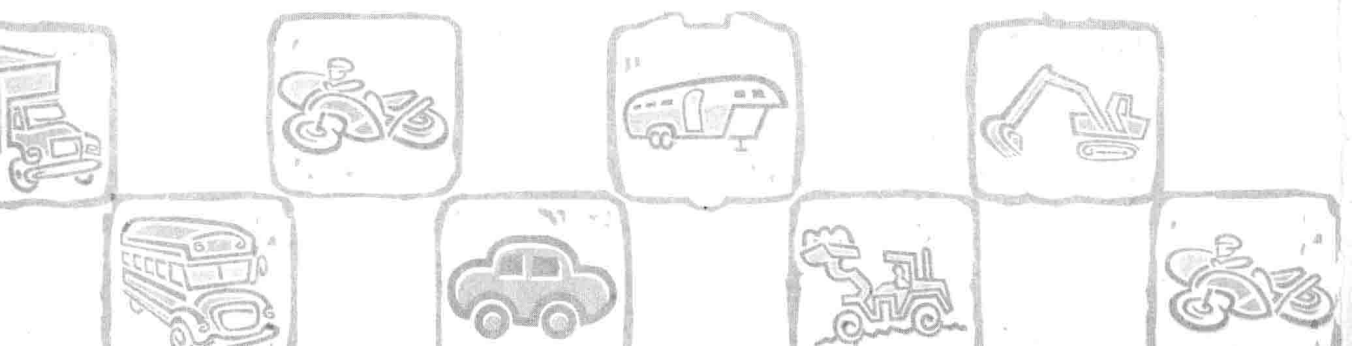
汽车专业英语

PROFESSIONAL ENGLISH OF AUTOMOBILE

《汽车专业英语》是为了适应并推动高等职业教育的发展，落实国务院《关于加强职业培训促进就业的意见》、教育部《关于推进高等职业教育改革创新引领职业教育科学发展的若干意见》及《浙江省高等教育“十二五”发展规划》精神，探索工学结合、任务驱动要求下的教学模式改革，适应技术领域和职业岗位的任职要求，参照相关的职业资格标准的要求而编写的。

本教材为中高职教育汽车运用技术、汽车检测与维修、汽车技术服务与营销等相关专业的英语教材，也可供相关专业工程技术人员、营销人员阅读，为服务浙江省特色产业并确保浙江省经济社会发展水平继续走在全国前列提供智力保障。



编写说明

Preface

《国家中长期教育改革和发展规划纲要（2010—2020年）》指出，要将加强课程教材建设作为提高人才培养质量的重要发展任务来抓。为了适应并推动高等职业教育的发展，落实国务院《关于加强职业培训促进就业的意见》（国发〔2010〕36号）、教育部《关于推进高等职业教育改革创新引领职业教育科学发展的若干意见》（教职成〔2011〕12号）及《浙江省高等教育“十二五”发展规划（2011—2015年）》精神，探索工学结合、任务驱动要求下的教学模式改革，适应技术领域和职业岗位（群）的任职要求，参照相关的职业资格标准及浙江省教育厅办公室《关于做好2010年度省高校重点教材建设立项工作的通知》（浙教办高教〔2010〕106号）要求，我们编写了本教材。本教材为中高职教育汽车运用技术、汽车检测与维修、汽车技术服务与营销等相关专业的英语教材，也可供相关专业工程技术人员、营销人员阅读，为服务浙江省特色产业并确保浙江省经济社会发展水平继续走在全国前列提供智力保障。

本教材由浙江交通职业技术学院边浩毅副教授担任主编。所有素材来自浙江省吉利汽车研究院有限公司的第一手宝贵资料，丁勇副总经理、整车部副总工程师兼部长邹凌华、赵行阳工程师为本教材提供了最新车型及发动机等原始资料，所以本教材实质上是双方合作共同编写完成的。

由于编写时间紧迫，经验不足，水平有限，缺点错误在所难免，恳请广大师生和读者批评指正。

编　者

2012 年春

目录

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任务一 四冲程发动机基础知识介绍

【学习目标】

1. 掌握与发动机四冲程的工作过程、发动机分类相关的专业术语、词汇。
2. 能对关于发动机四个冲程的资料进行中英互译。
3. 能进行相关内容的简单阅读和翻译工作。
4. 能对汽车实物上的英语单词或词汇进行辨认。
5. 正确完成课后练习。

【任务描述】

以四冲程发动机为例，介绍发动机四冲程的工作过程、发动机分类等相关专业术语、词汇。通过完成该任务，阅读关于发动机工作过程的外文文献，并掌握简单的翻译技巧。

【学习引导】

本学习任务沿着以下脉络进行学习：

通读全文→学习单词和语法→课后练习→分组讨论→课后阅读

Task 1 Introduction to the Elementary Knowledge of the Four-stroke Engine

History

A four-stroke engine, also known as four-cycle, is an internal combustion engine in which the piston completes four separate strokes—intake, compression, power, and exhaust—during two

separate revolutions of the engine's crankshaft, and one single thermodynamic cycle.

There are two common types of engines, which are closely related to each other but have major differences in their design and behavior. The earliest of these to be developed is the Otto cycle engine which was developed in 1876 by Nicolaus A. Otto in Germany. This engine is most often referred to as a petrol engine or gasoline engine, after the fuel that powers it. The main components of a gasoline engine are shown in Fig. 1-1. The second type of four-cycle engine is the Diesel engine developed in 1892 by Rudolf Diesel, also of Germany. Diesel created his engine to maximize efficiency which was lacking in the Otto engine.

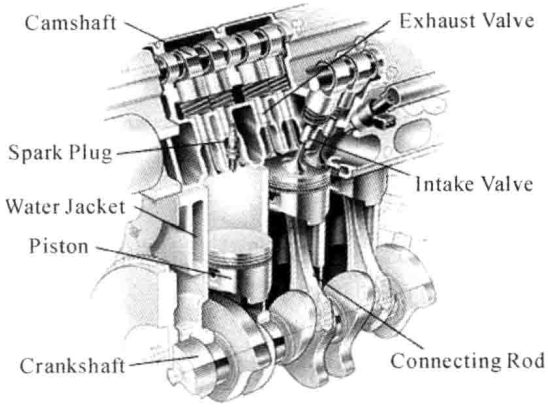

Fig. 1-1 Main Components of a Gasoline Engine

Internal Combustion Engine

A vehicle engine is a self-contained power unit which converts the heat energy of fuel into mechanical energy for moving the vehicle.[1] Because fuel is burned within the engine, it is known as an internal combustion engine. In the internal combustion engine, air/fuel mixture is introduced into a closed cylinder where it is compressed and then ignited. The burning of the fuel causes a rapid rise in cylinder pressure which is converted to useful mechanical energy by the piston and crankshaft. The most common engine is the four-stroke engine. These four strokes are intake stroke, compression stroke, power stroke and exhaust stroke.

Intake Stroke

The intake stroke (Fig. 1-2) of a four-stroke engine begins with the piston at top dead center (TDC). The starter causes the crankshaft to rotate in a clockwise direction. The crankshaft forces the piston to move downward through the connecting rod. This downward movement of the piston creates a vacuum, a pressure difference between TDC and bottom dead center (BDC) in the space above the piston. The engine manufacturer times the intake valve action so that it opens automatically at or slightly before the piston starts down. Therefore, a mixture of gasoline and air, pushed by the atmospheric pressure outside the engine, rushes through the intake manifold and into the engine

cylinder. At the same time, the exhaust valve remains closed. This valve closure prevents the entering air/fuel charge from escaping through the exhaust port. After the piston reaches the bottom of its first stroke, the cylinder is practically full of an air/fuel charge. The drawing of an air/fuel charge into the cylinder in this manner, during the downward movement of the piston, constitutes the intake stroke of the piston. [2]

Compression Stroke

After the piston reaches bottom dead center, it moves upward again as the starter continues to turn the crankshaft in a clockwise direction. As the piston is beginning to move upward, the intake valve closes, and the exhaust valve remains closed. Since both valves are closed, the piston compresses the air/fuel mixture in the small space between the top of the piston and the cylinder head. As the piston reaches TDC again during its upward travel, the compression stroke (Fig. 1-3) of the piston is over. The air/fuel charge is now under compression so that it will produce a great deal of power when the spark plug ignites it.

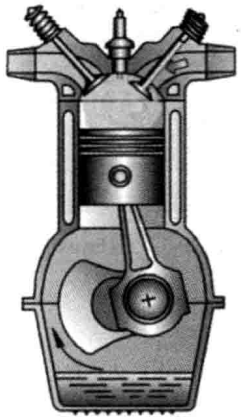

Fig. 1-2 Intake Stroke

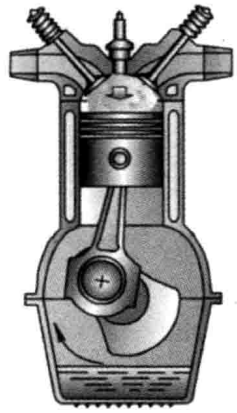

Fig. 1-3 Compression Stroke

Power Stroke

Just as or slightly before the piston reaches TDC on the compression stroke with the air/fuel mixture fully compressed, a timed electrical spark appears at the spark plug. This spark ignites the compressed air/fuel mixture. The burning mixture begins to expand; the pressure in the combustion chamber above the piston immediately increases. This results in a high pressure applied to the top of the piston. Now, both valves remain closed during the power stroke (Fig. 1-4). This assures that the total force of the expanding gas applies itself to the head of the piston. This tremendous force pushes the piston downward on the power stroke, causing the connecting rod to rotate the crankshaft. [3] In other words, the force resulting from the expansion of the burning air/fuel mixture is turning the crankshaft.

Exhaust Stroke

Near the end of the downward movement of the piston on the power stroke, the camshaft opens the exhaust valve, but the intake valve remains closed. Although much of the gas pressure has expended itself driving the piston downward, some pressure still remains when the exhaust valve opens. This remaining pressurized gas flows comparatively freely from the cylinder through the passage (port) opened by the exhaust valve. [4] Then, as the piston again moves up in the cylinder, it drives any remaining gases out of the cylinder past the open exhaust valve (Fig. 1-5). As the piston travels through the TDC position and starts downward again in the cylinder, a new operating cycle begins. The four strokes are continuously repeated in every cylinder as long as the engine remains running.

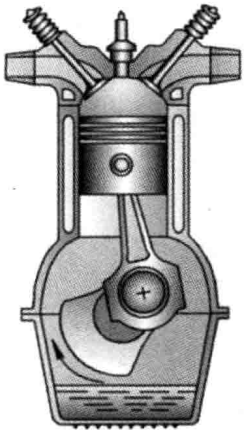

Fig. 1-4 Power Stroke

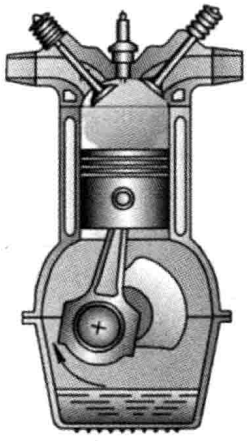

Fig. 1-5 Exhaust Stroke

Flywheel

The engine cycle has only one power stroke where the piston is actually driving the crankshaft. During the other three strokes, the rotating crankshaft is moving the piston up or down in its cylinder. Thus, during the power stroke, the crankshaft tends to speed up; during the other three strokes, it tends to slow down. To keep the crankshaft turning smoothly between two power strokes, a flywheel is attached to the end of the crankshaft. [5] This wheel resists any effort to change its speed of rotation. When the crankshaft tends to speed up or slow down, the flywheel inertia resists it.

Multiple-cylinder Engine

The single-cylinder engine just described as above provides only one power stroke during every two crankshaft revolutions or delivers power only one-fourth of the time. To provide a more even and continuous flow of power, vehicles have engines with four, six, or eight cylinders.

Engine Classification

For identification purposes, manufacturers classify automobile engines by their cylinder arrangement, valve arrangement, and type of the system used to cool the engine. [6]

Engine manufacturers basically use three distinct ways to arrange the cylinders in an engine: in-line, V-shape, or opposed (Fig. 1-6).

Automobile engines have their valves arranged in one of three ways. In an L-head engine, the valves are in the block, sitting side by side, adjacent to the cylinder. This engine design was at one time very common, but because of its limited compression ratio, the usage now has been confined. The F-type engine has one valve in the cylinder head and one in the engine block. Modern automotive engines utilize the third type of valve arrangement, with both valves in the cylinder head.

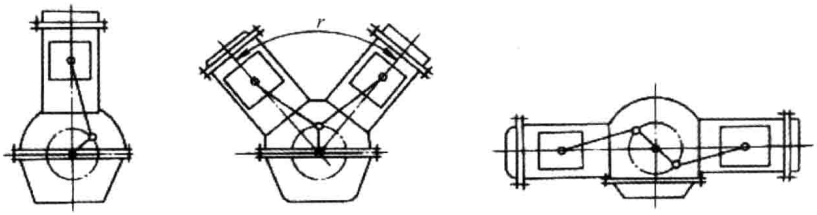

Fig. 1-6 Engine Arrangement

Manufacturers also classify engines as being either air- or water-cooled (Fig. 1-7). In these air-cooled engines, the cylinders are cooled by the air flowing around. A liquid-cooled engine uses a liquid coolant as the medium to remove heat from the engine. With this system, the engine has the water jackets in the block and head, which surround the cylinders and combustion chambers and through which coolant circulates freely. [7] This coolant enters the engine from the bottom of the radiator and circulates throughout the engine, where it absorbs heat. Then it exits from the upper water jackets and pours into the upper portion of the radiator. As the coolant passes through the radiator, it picks up the heat contained in the coolant and passes this heat to the air flowing around the radiator passages or tubes. Thus, the coolant leaving the lower tank is cool and ready to flow through the engine again.

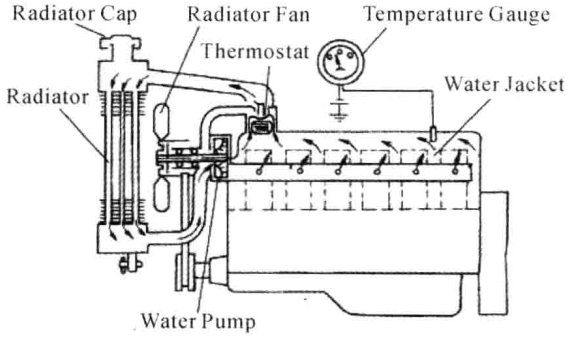

Fig. 1-7 Water-cooled Engine

Word List

1. adjacent [ə'dʒeɪsənt]	*adj.*	邻近的，接近的
2. arrange [ə'reɪndʒ]	*v.*	排列，安排
3. arrangement [ə'reɪndʒmənt]	*n.*	排列，安排
4. attach [ə'tætʃ]	*vt.*	安装上，系上，贴上
5. automobile ['ɔ:təməbi:l]	*n.*	汽车
6. burn [bɜ:n]	*v.*	燃烧
7. camshaft ['kæmʃɑ:ft]	*n.*	凸轮轴
8. charge [tʃɑ:dʒ]	*n.*	充气，装料
9. clockwise ['klɒkwaɪz]	*adj.*	顺时针方向的
	adv.	顺时针方向地
10. combustion [kəm'bʌstʃ(ə)n]	*n.*	燃烧
11. compress [kəm'pres]	*vt.*	压缩，浓缩
12. constitute ['kɒnstɪtju:t]	*vt.*	组成，构成
13. continuously [kən'tɪnjʊəslɪ]	*adv.*	不断地，连续地
14. convert [kən'vɜ:t]	*vt.*	使转变，转换……
15. coolant ['ku:lənt]	*n.*	冷却液
16. crankshaft ['kræŋkʃɑ:ft]	*n.*	曲轴
17. cylinder ['sɪlɪndə(r)]	*n.*	气缸；圆筒；圆柱体
18. draw [drɔ:]	*vt.*	吸引，吸入
19. engine ['endʒɪn]	*n.*	发动机
20. even ['i:v(ə)n]	*adj.*	平滑的，偶数的，平均的
21. expand [ɪk'spænd]	*vt.*	使膨胀，详述，扩张
22. expend [ɪk'spend]	*vt.*	消耗，花费，支出
23. flywheel ['flaɪwi:l]	*n.*	飞轮
24. gasoline ['gæsəli:n]	*n.*	汽油
25. ignite [ɪg'naɪt]	*v.*	点火，点燃
26. ignition [ɪg'nɪʃ(ə)n]	*n.*	点火，点燃
27. inertia [ɪ'nɜ:ʃə]	*n.*	惯性，惯量
28. intake ['ɪnteɪk]	*n.*	进气，入口，进口
29. introduction [ˌɪntrə'dʌkʃ(ə)n]	*n.*	介绍，导言，绪论，入门
30. manifold ['mænɪfəʊld]	*n.*	进、排气歧管
31. medium ['mi:dɪəm]	*n.*	媒体，媒介，介质
32. movement ['mu:vmənt]	*n.*	运动，动作，运转
33. passage ['pæsɪdʒ]	*n.*	通道，通路
34. piston ['pɪst(ə)n]	*n.*	活塞

35. port [pɔ:t]	*n.*	通道，港口，端口
36. power ['paʊə(r)]	*n.*	能量，动力
37. radiator ['reɪdɪeɪtə(r)]	*n.*	散热器
38. remain [rɪ'meɪn]	*vi.*	保持，逗留，剩余
39. resist [rɪ'zɪst]	*vt.*	抵抗，反抗，忍得住
40. revolution [ˌrevə'lu:ʃ(ə)n]	*n.*	转数，旋转一周
41. spark [spɑ:k]	*n.*	火花
42. starter ['stɑ:tə(r)]	*n.*	起动机
43. stroke [strəʊk]	*n.*	冲程，行程
44. tank [tæŋk]	*n.*	油箱
45. travel ['træv(ə)l]	*v.*	旅行，传播，行进
46. unit ['ju:nɪt]	*n.*	元件，部件，零件，装置
47. vacuum ['vækjʊəm]	*n.*	真空
	adj.	真空的
48. vehicle ['vi:ɪk(ə)l]	*n.*	车辆，交通工具

Proper Names

1. air/fuel mixture	空气燃油混合物(可燃混合气)
2. atmospheric pressure	大气压力
3. bottom dead center (BDC)	下止点
4. combustion chamber	燃烧室
5. compression ratio	压缩比
6. compression stroke	压缩行程
7. connecting rod	连杆
8. cylinder head	气缸盖
9. engine block	发动机气缸体
10. exhaust stroke	排气行程
11. exhaust valve	排气门
12. heat energy	热能
13. intake manifold	进气歧管
14. intake stroke	进气行程
15. intake valve	进气门
16. internal combustion engine	内燃机
17. mechanical energy	机械能
18. power stroke	做功行程
19. self-contained	自备的
20. spark plug	火花塞

21. top dead center (TDC)	上止点
22. water jacket	水套

Useful Expressions

1. at the same time	同时，但是
2. because of	因为
3. result in	导致
4. side by side	并排，并肩
5. slow down	(使)慢下来
6. so that	所以，因此
7. speed up	加速

Key Vocabulary

1. arrange

vt. 排列，整理

He arranged the books on the shelf. 他把书架上的书整理了一下。

vt. 安排，准备

We have arranged a party. 我们准备了一个聚会。

vi. 商定

Arranged with her to meet at 8. 和她商定8点钟见面。

arrange for 安排

2. expand

vt. 使膨胀，扩张，扩大

The business has expanded from having one office to having twelve. 这个公司已从拥有1个分公司发展到拥有12个分公司了。

vi. 张开，发展

expand on 详述

expand to 扩大为

Notes

1. A vehicle engine is a self-contained power unit which converts the heat energy of fuel into mechanical energy for moving the vehicle.

翻译：发动机属于自备动力型装置，该装置将燃料的热能转换成机械能，用于推动车辆运动。

语法：which converts…引导定语从句修饰 self-contained power unit。

2. The drawing of an air/fuel charge into the cylinder in this manner, during the downward movement of the piston, constitutes the intake stroke of the piston.

翻译：在活塞向下运动时，可燃混合气以这种方式被吸入气缸，该过程就是进气行程。

语法：during the downward movement of the piston 作时间状语从句。

3. This tremendous force pushes the piston downward on the power stroke, causing the connecting rod to rotate the crankshaft.

翻译：在做功行程期间，巨大的气体压力推动着活塞向下运动，带动连杆转动曲轴。

语法：causing the connecting rod to rotate the crankshaft 是现在分词作结果状语从句。

4. This remaining pressurized gas flows comparatively freely from the cylinder through the passage (port) opened by the exhaust valve.

翻译：剩余的被压缩气体从已被排气门开启的排气道中较为顺畅地排出。

5. To keep the crankshaft turning smoothly between two power strokes, a flywheel is attached to the end of the crankshaft.

翻译：为了使曲轴在两个相邻的做功行程间平稳地转动，在曲轴的后端安装了飞轮。

6. For identification purposes, manufacturers classify automobile engines by their cylinder arrangement, valve arrangement, and type of system used to cool the engine.

翻译：发动机制造商按气缸排列、气门布置以及冷却系统的类型对发动机进行分类。

语法：for identification purposes 作目的状语。

7. With this system, the engine has the water jackets in the block and head, which surround the cylinders and combustion chambers and through which coolant circulates freely.

翻译：在水冷式发动机上，发动机气缸体和气缸盖内均有水套，水套包围着气缸和燃烧室，水套内部有自由循环流动的冷却液。

语法：which 引导的定语从句修饰 the water jackets。

Exercises

1. Choose the best answer from the following choices according to the text.

1) In the internal combustion engine, air/fuel mixture is introduced into a closed _____ where it is compressed and then ignited.

A. tank　　B. spark　　C. cylinder　　D. flywheel

2) The air/fuel charge is now under _____ so that it will produce a great deal of power when the spark plug ignites it.

A. compression　　B. inflation　　C. vacuum　　D. ignition

3) Thus, the coolant leaving the lower tank is _____ ready to flow through the engine again.

A. hot　　B. cool　　C. cold　　D. warm

2. Translate the following into Chinese.

1) internal combustion engine　2) vehicle　3) power stroke