

面向21世纪普通高等教育规划教材

新编 汽车专业英语



第2版

黄汽驰 黄星 编



 机械工业出版社
CHINA MACHINE PRESS



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New English for Automobile

黄汽驰 黄 星 编
李新大 审



机械工业出版社

本书为面向 21 世纪普通高等教育系列规划教材之一,是高级英语阶段的专业英语教材,旨在不断提高汽车类专业的学生和汽车行业相关人员的专业英语水平。

本书是根据教育部“大学英语教学基本要求”组织编写的。全书共分为 10 个单元,每个单元包括课文、词汇、练习、阅读材料和汽车常见故障诊断等内容。本书的“练习答案”位于机械工业出版社教材服务网(www.cmpedu.com)上,向本书授课教师免费提供,请需要者根据书末的“信息反馈表”进行索取。

本书注重遵循“边学边用、学用结合”的原则,内容上系统、全面,难点、重点突出;形式上力求创新,但仍注重实用性和通俗易懂,真正反映当代汽车领域发展的前沿技术和最新动态。

本书既可作为高等学校汽车类专业的专业英语教材,也可用做高职高专、成人高校汽车类专业的专业英语教材,还可用做相关企业人员的培训教材或相关技术人员的自学参考书。

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前 言

本书是面向 21 世纪普通高等教育系列规划教材之一，是根据教育部“大学英语教学基本要求”组织编写的。

本书旨在使学生了解当今汽车领域发展的前沿技术和最新动态，以提高学生运用专业知识的职业能力和职业素质。本书突出了汽车专业的词语和用法，参考了最新的汽车资料。其目的是要培养学生的英文阅读理解、翻译和资料查询等能力，使学生通过阅读和翻译能直接从教材中获取大量有关汽车方面的信息。

本教材分为 10 个单元，供一个学期使用。每个单元包括三个部分：

第一部分为专业阅读。着重培养学生汽车专业英语的阅读能力。本部分包括两篇文章，一篇为精读，另一篇为泛读。所收入的文章反映了当今汽车专业方面的最新高科技以及最新汽车发展，同时还配以一些最新的汽车零部件图片。

第二部分为练习。主要包括词汇练习，短语练习，短句翻译，常用缩略语，国内、外车标等。其设计独特，练习的编排形式新颖。这部分的编写意图是使学生根据所学汽车专业知识，能直接参照范例进行套写、拟写和翻译汽车说明书、系统操作手册及相关信息等。

第三部分为汽车常见故障诊断。本部分列出汽车中常见的故障并加以说明，最后附上解决的方法。其目的是使学生通过本课程的学习，具备处理国外进口汽车的一般常见故障的能力。

本书的“练习答案”位于机械工业出版社教材服务网（www.cmpedu.com）上，向本书授课教师免费提供，请需要者根据书末的“信息反馈表”进行索取。

本书实用性强，选材新颖，贴近企业，紧密结合专业，重点突出，针对性强；尤其在练习的编排上，突出了专业英语的特色，设计独特，学生通过练习既能学到英语，又能学到汽车方面的知识，如“识别汽车车标”、“汽车故障诊断”等，可谓一举两得。

本书由黄汽驰编写第 1、2、5、6、8 单元，由黄星编写第 3、4、7、9、10 单元；全书由李新大审阅。

本书在编写过程中得到编者学校汽车专业教师和第一汽车集团公司的许多科技工作者的大力支持，他们提出了许多汽车技术方面的宝贵意见和建议，编者在此深表谢意。

由于本书要突出汽车专业英语方面的一些特色，因而在编写过程中采用了许多与众不同的编写方式。但由于水平所限，书中难免出现一些缺点和错误，恳请广大读者批评指正，编者在此表示衷心的感谢。

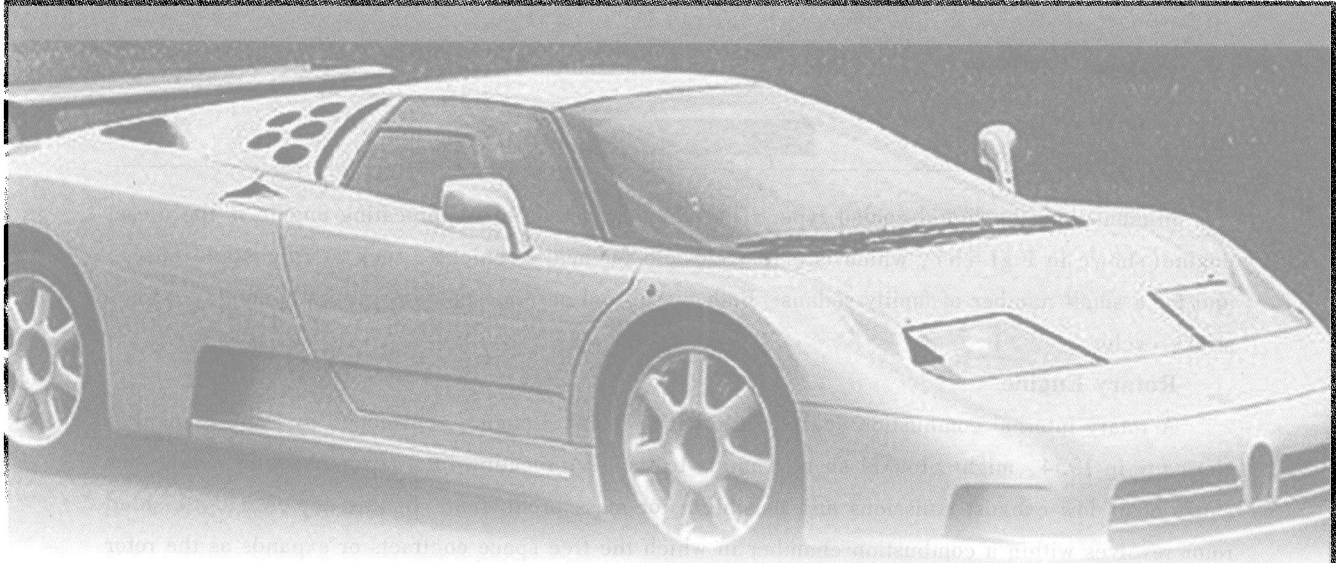
编 者

Contents

前言

Unit 1 Engine Overview	1
Passage A Kinds of Engines	1
Passage B Engine Types and Operating Principles	7
Passage C Have a Try	12
Unit 2 Hybrid-Electric Vehicle and VR6/W12 Engine	14
Passage A Hybrid-Electric Vehicle	14
Passage B VR6 and W12 Engine	19
Passage C Have a Try	23
Unit 3 Valve Train and Variable Valve Timing	25
Passage A Valve Train	25
Passage B Variable Valve Timing	31
Passage C Have a Try	35
Unit 4 Engine Ignition System and Starting System	37
Passage A Ignition System	37
Passage B Starting System	42
Passage C Have a Try	46
Unit 5 The Power Train	48
Passage A Power Train (I)	48
Passage B Power Train (II)	55
Passage C Have a Try	61
Unit 6 Automobile Brake System	63
Passage A Brake System (I)	63
Passage B Brake System (II)	69
Passage C Have a Try	73

Unit 7 Automobile Suspension System	74
Passage A Suspension System	74
Passage B Suspension Types	80
Passage C Have a Try	85
Unit 8 Automobile Steering System	87
Passage A Steering System	87
Passage B Power Steering	93
Passage C Have a Try	96
Unit 9 Engine Lubrication and Cooling System	98
Passage A Lubrication System	98
Passage B Cooling System	102
Passage C Have a Try	107
Unit 10 SRS Airbag and Air Conditioning System	109
Passage A SRS Airbag	109
Passage B Air Conditioning System	114
Passage C Have a Try	119
Glossary (词汇表)	121
Phrases and Expressions (短语和词组)	134
References (参考文献)	144



Unit 1

Engine Overview

Passage A Kinds of Engines

The engine is the heart of an automobile. The purpose of an automotive engine is to convert fuel into the energy that moves the automobile. Currently the easiest way to create motion from fuel is to burn the fuel inside an engine. Therefore, an automotive engine is an internal combustion engine, which burns fuel within the cylinders and converts the expanding force of the combustion into rotary force used to drive the automobile.

There are several types of internal combustion engines classified as reciprocating or rotary engine; spark ignition or compression ignition engine; and alternative-fuel engine or hybrid-electric vehicle.

Reciprocating Engine

The most familiar combination is the reciprocating, spark-ignited, four-stroke gasoline engine, shown in Fig. 1-1a. The modern automobile is usually driven by a water-cooled, piston-type internal combustion engine, mounted in the front of the automobile; its power may be transmitted either to the front wheels, to the rear wheels, or to all four wheels. Some automobiles use air-cooled engines, but these are generally

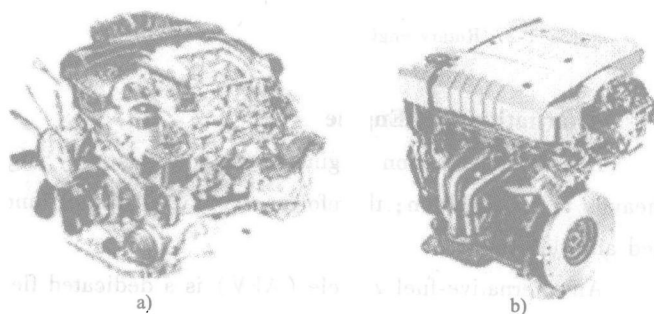


Fig. 1-1 Engines

a) Gasoline engine b) Diesel engine

less efficient than the liquid-cooled type. The other main type of reciprocating engine is the diesel engine (shown in Fig1-1b), which is employed both for heavy vehicles, such as trucks and buses, and for a small number of family sedans. Both diesel and gasoline engines generally employ a four-stroke cycle.

Rotary Engine

A rotary internal combustion engine, also called Wankel engine, developed by Felix Wankel of Germany in 1954, might provide an alternative to the reciprocating internal combustion engine because of its low exhaust emissions and feasibility for mass production. In this engine a three-sided rotor revolves within a combustion chamber in which the free space contracts or expands as the rotor turns, see Fig. 1-2. Fuel is inhaled, compressed, and fired by the ignition system. The expanding gas turns the rotor and the exhausted gas is expelled, shown in 1-3. The rotary engine has no valves, pistons, connecting rods, reciprocating parts, or crankshaft. It develops a high horsepower, and essentially, produces no vibration, but its fuel consumption is higher than that of the conventional piston engine.

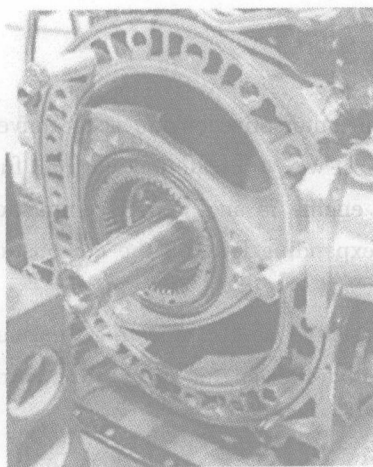


Fig. 1-2 Rotary engine

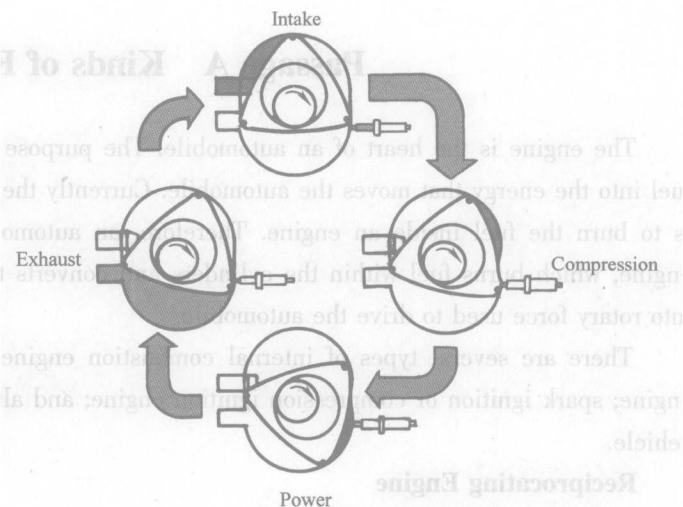


Fig. 1-3 Rotary cycle

Alternative-fuel Engine

Internal combustion engines consume relatively high amounts of petroleum, and contribute heavily to air pollution; therefore, other types of fuels and non-conventional engines are being studied and developed.

An alternative-fuel vehicle (AFV) is a dedicated flexible-fuel vehicle with a common fuel tank designed to run on varying blends of unleaded gasoline with either ethanol or methanol or a dual-fuel vehicle designed to run on a combination of an alternative fuel and a conventional fuel. An advanced-technology vehicle (ATV) combines a new engine, power train, and drive train system to significantly improve fuel economy. The ideal alternative-fuel engine would burn fuel much more

cleanly than conventional gasoline-powered internal combustion engines and yet still be able to use the existing gas stations.

Hybrid-electric Vehicle

A hybrid vehicle, or a hybrid-electric vehicle (HEV) (shown in Fig. 1-4), is powered by two or more energy sources, one of which is electricity, to produce a high-mile-per-gallon, low-emission drive. There are two types of HEVs, series and parallel. In a series hybrid, all of the vehicle power is provided from one source. For example, an electric motor

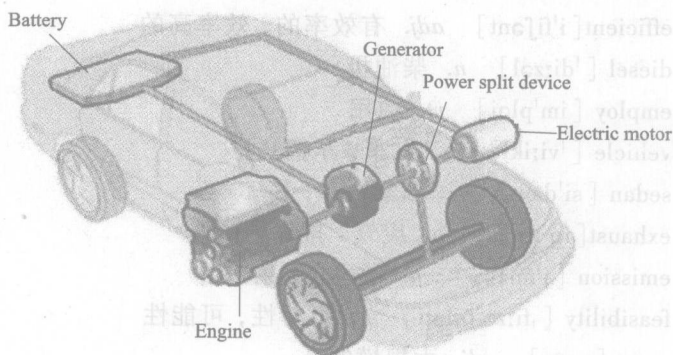


Fig. 1-4 Hybrid-electric vehicle

drives the vehicle from the battery pack and the internal combustion engine powers a generator that charges the battery. In a parallel hybrid, power is delivered through both paths, the electric motor and the internal combustion engine powering the vehicle. Thus, the electric motor may help power the vehicle while idling and during acceleration. The internal combustion engine takes over while cruising, powering the drive train and recharging the electric motor's battery.

In current production hybrids both the engine and the electric motor are connected to the wheels by the same transmission. With the assistance of the electric motor the engine can be much smaller.

New Words

- engine [ˈendʒɪn] *n.* 发动机
 automobile [ˈɔ:təməubi:l] *n.* 汽车
 automotive [ɔ:tə'məutiv] *adj.* 汽车的
 convert [kən'veɪt] *vt.* 使转变, 转换
 energy [ˈenədʒi] *n.* 能, 能量
 create [kri'eɪt] *vt.* 创造, 引起, 造成
 fuel [fjuəl] *n.* 燃料
 cylinder [ˈsɪlɪndə] *n.* 气缸
 reciprocating [rɪ'sɪprəkeɪtɪŋ] *adj.* 往复的
 rotary [ˈrəʊtəri] *adj.* 旋转的
 classify [ˈklæsɪfaɪ] *vt.* 分类
 spark [spɑ:k] *n.* 火花
 ignition [ɪgˈniʃən] *n.* 点火, 点燃
 compression [kəm'preʃ(ə)n] *n.* 压缩
 alternative [ɔ:l'tə:nətɪv] *n.* 交换的, 互换的
 stroke [strəʊk] *n.* 冲程, 行程
 gasoline [ˈgæsəli:n] *n.* 汽油

- piston ['pɪstən] *n.* 活塞
- mount [maunt] *vt.* 装上, 安装, 装配
- transmit [trænʒ'mɪt] *vt.* 传输, 转送
- efficient [i'fɪʃənt] *adj.* 有效率的, 效率高的
- diesel ['di:zəl] *n.* 柴油机
- employ [ɪm'plɔɪ] *vt.* 使用
- vehicle ['vi:ɪkl] *n.* 汽车, 车辆
- sedan [si'dæən] *n.* 私家轿车, 轿车
- exhaust [ɪg'zɔ:st] *n.* 废气, 排气
- emission [i'mɪʃən] *n.* 散发, 喷射
- feasibility [,fi:zə'biləti] *n.* 可行性, 可能性
- mass [mæs] *adj.* 大规模的
- revolve [ri'vɒlv] *v.* 旋转
- rotor ['rəʊtə] *n.* 转子
- chamber ['tʃeɪmbə] *n.* 室, 箱
- inhale [ɪn'heɪl] *vt.* 吸入
- compress [kəm'pres] *vt.* 压缩
- expel [ɪks'pel] *v.* 驱逐, 排出
- valve [vælv] *n.* 阀, 气门
- crankshaft ['kræŋkʃɑ:ft] *n.* 曲轴
- horsepower ['hɔ:spauə] *n.* 功率
- essentially [i'senʃəli] *adv.* 本质上, 本来
- vibrationless [vaɪ'breɪʃənles] *adj.* 无振动的
- consumption [kən'sʌmpʃən] *n.* 消费, 消耗
- conventional [kən'venʃənəl] *adj.* 常规的, 传统的
- consume [kən'sju:m] *vt.* 消耗, 消费
- relatively ['relətɪvli] *adv.* 相对地, 比较地
- petroleum [pi'trəʊliəm] *n.* 石油
- contribute [kən'trɪbjʊ:t] *v.* 捐助, 贡献
- pollution [pə'lju:ʃən] *n.* 污染
- blend [blend] *n.* 混合
- unleaded [ʌn'li:ded] *adj.* 无铅的, 不含铅的(汽油)
- ethanol ['eθənɔ:l] *n.* 乙醇, 酒精
- methanol ['meθənɔ:l] *n.* 甲醇
- combine [kəm'beɪn] *v.* 结合
- significant [sig'nɪfɪkənt] *adj.* 有意义的, 重大的, 重要的
- improve [ɪm'pru:v] *v.* 改善, 改进, 提高
- ideal [ai'diəl] *adj.* 理想的, 完美的
- existing [ɪg'zɪstɪŋ] *adj.* 现有的

hybrid ['haɪbrɪd] *adj.* 混合的
 high-mile-per-gallon *adj.* 每加仑行驶里程的
 series ['siəri:z] *n.* 串联
 parallel ['pærəlel] *n.* 并联
 battery ['bætəri] *n.* 蓄电池, 电池
 idle ['aɪdl] *vt.* 空转
 acceleration [æk,sələ'reɪʃən] *n.* 加速度
 cruise [kru:z] *vi.* 行车, 巡航
 recharge ['ri:tʃɑ:dʒ] *vt.* 再充电
 assistance [ə'sɪstəns] *n.* 协助, 帮助

Phrases and Expressions

internal combustion engine 内燃(发动)机
 reciprocating engine 往复式发动机
 rotary engine/Wankel engine 转子发动机/汪克尔发动机
 spark ignition engine 火花点火发动机
 compression ignition engine 压燃点火发动机
 alternative engine 代用燃料发动机
 water-cooled/liquid-cooled engine 水冷式发动机/液冷式发动机
 front wheel 前轮
 rear wheel 后轮
 air-cooled engine 风冷式发动机
 diesel engine 柴油发动机
 heavy vehicle 重型车
 family sedan 私家车
 four-stroke cycle 四行程循环
 exhaust emissions 废气排放
 mass production 大规模生产
 combustion chamber 燃烧室
 ignition system 点火系
 connecting rod 连杆
 fuel consumption 燃料消耗
 air pollution 空气污染
 alternative-fuel vehicle 代用燃料汽车
 flexible-fuel vehicle 柔性燃料汽车
 dual-fuel vehicle 双燃料汽车
 advanced-technology vehicle 高科技汽车
 power train 动力传动系(包括发动机和变速器, 不包括发动机时称“drive train”)
 drive train system 传动系

fuel economy 燃油经济性
 gas station 加油站
 hybrid-electric vehicle 混合动力电动车
 electric motor 电动机
 battery pack 蓄电池组

EXERCISE 1

Decide whether the following statements are True or False according to the passage.

1. The engine is generally called the "heart" of an automobile.
2. The aim of an automotive engine will convert the energy into fuel that moves the automobile.
3. The other main type of reciprocating engine is the diesel engine that is employed only for heavy vehicles, such as trucks and buses.
4. The rotary engine has a high horsepower and produces no vibration, but its higher fuel consumption.
5. Internal-combustion engines consume relatively less amounts of petroleum, and contribute commonly to air pollution.
6. It has been proved that the ideal alternative-fuel engine would burn fuel much more cleanly than traditional gasoline-powered internal combustion engines.

EXERCISE 2

Translate the following phrases into Chinese or English.

- | | |
|-----------------------------------|--------|
| 1. the internal combustion engine | _____ |
| 2. _____ | 往复式发动机 |
| 3. exhaust emissions | _____ |
| 4. _____ | 燃料消耗 |
| 5. fuel economy | _____ |
| 6. _____ | 燃烧室 |
| 7. hybrid-electric vehicle | _____ |
| 8. _____ | 大规模生产 |
| 9. dual-fuel vehicle | _____ |
| 10. _____ | 风冷式发动机 |

EXERCISE 3

Fill in the blanks with the suitable words or phrases given below, changing the form where necessary.

in a reciprocating engine, a diesel engine, convert ... into, electric motor, diesel engine, four-stroke cycle, internal combustion engine, engine

1. _____ compresses its cylinder air on its compression stroke before any fuel enters

the cylinder.

2. The _____ is the one most commonly used in the automotive field.
3. According to the fuel energy used, the internal combustion engines are also divided into gasoline engines, and _____.
4. The piston _____ the potential energy of the fuel _____ the kinetic energy.
5. The power production cycle consists of four strokes of the piston _____.
6. The _____ is generally considered the "heart" of an automobile.
7. This _____ of piston within the cylinder is repeated time and again to push the vehicle forward.
8. There are actually various types of engines such as _____, steam engines, and internal combustion engines.

EXERCISE 4

Match the following English phrases in Column A equivalents in Column B.

A	B
1. compression ratio	A. a heart of an automobile
2. internal combustion engine	B. the movement of the piston within the cylinder and the distance of piston travel
3. engine	C. the total volume divided by the compression volume
4. stroke	D. a mixture of flammable liquid hydrocarbons derived chiefly from crude petroleum
5. reciprocating	E. the up and down action of a piston in the cylinder
6. gasoline	F. burning their fuel inside their cylinders

EXERCISE 5

Translate the Chinese given in the brackets into English.

1. If you know something about ordinary gasoline engines, you will have notice that _____ (柴油机的工作方式在很多方面与汽油机是一样的).
2. The engine is the source of power that _____ (使得汽车行驶).
3. As it would not be reasonable to have to stop the engine _____ (每次要停车).
4. _____ (有些部件使得汽车更舒适或更美观), but most of them are to make it run.
5. Not all of this heat can be used, and _____ (如果让其热量保留在发动机中), it would soon destroy it.

Passage B Engine Types and Operating Principles

There are several engine types which are identified by the number of cylinders and the way the cylinders are laid out. Automobiles will have from 4 to 12 cylinders or more, which are arranged in

the engine block in several configurations. In a multi-cylinder engine, the cylinders usually are arranged in one of three ways; in-line engine, V-type engine or flat engine (also known as horizontally opposed or boxer), as shown in the following figures.

In-line engine has the cylinders arranged, one after the other, in a straight line. Almost all four-cylinder engines use this arrangement like Fig. 1-5 shown. There are some five- and six-cylinder-in-line engines.

An in-line four-cylinder engine fires every 180° , which means that always two pistons are in the same position and move in the same direction. Pistons that are moving up are moving at different speeds than pistons that are moving down. So there are vibrations that have to be cancelled by balancer shafts.

An in-line six engine consists basically of two three-cylinder engines. So there isn't even end-to-end vibration. Because the crankshaft is identical with the one of a three cylinder, only twice as long and with twice as much pistons. That is the reason why in-line six cylinder engines run so smoothly.

The V-type engine has two banks of cylinders side-by-side and is commonly used in V-6, V-8, and V-12 configurations at a ninety or sixty degree angle to each other. Its advantages are its short length, the great rigidity of the block. This type of engine lends itself to very high compression ratios without block distortion under load, resistance to torsional vibration, and a shorter car length without losing passenger room. Fig. 1-6 shows V6 engine.

A flat engine or horizontal-opposed engine uses two opposing banks of cylinders and are less common than the other two designs, see Fig. 1-7. It is ideal for installations where vertical space is limited, because it has a very low height. Flat engines are usually either four or six cylinders, and have been used by Porsche and Subaru. Flat engines are also used in some Ferrari's with 12 cylinders.

Different configurations have different advantages and disadvantages in terms of smoothness, manufacturing cost and shape characteristics. These advantages and disadvantages make them more suitable for certain vehicles.

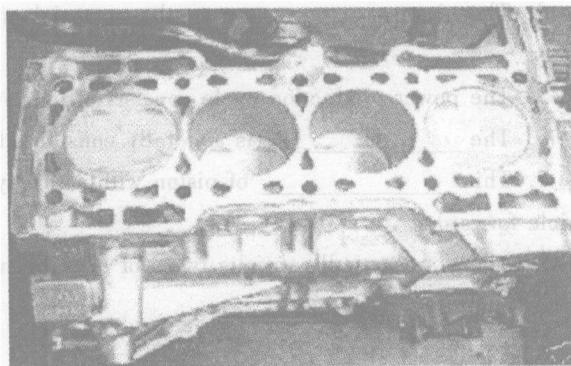


Fig. 1-5 In-line engine

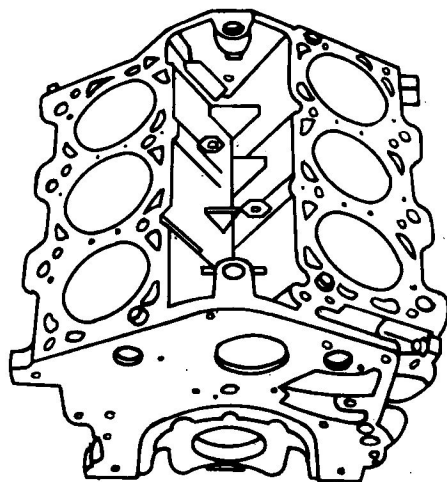


Fig. 1-6 V-type engine

How an engine works

Almost all cars currently use a four-stroke combustion cycle to convert gasoline into motion. That is to say that the Intake stroke, Compression stroke, Power stroke and Exhaust stroke are one engine cycle. When the fourth stroke is completed, the cycle begins again. The four-stroke approach is also known as the Otto cycle, in honor of Nikolaus Otto, who invented it in 1867. The four-strokes are illustrated in Fig. 1-8. They are:

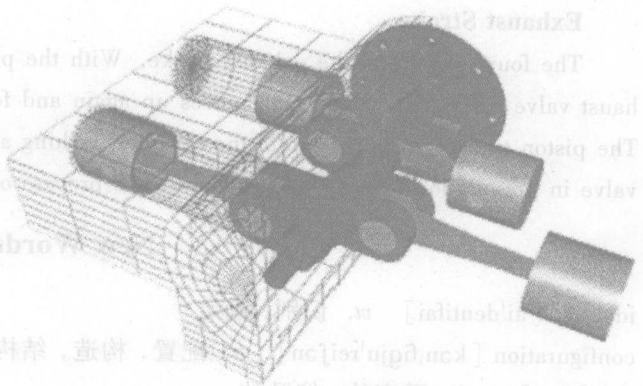


Fig. 1-7 Flat engine

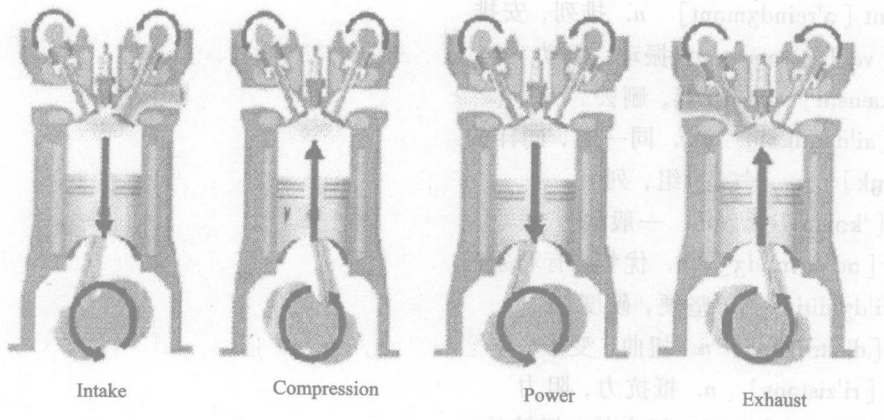


Fig. 1-8 Four strokes

Intake Stroke

The first stroke is the intake stroke. As the piston starts down, the intake valve opens and the air-fuel mixture enters into the cylinder. When the piston reaches the bottom of the intake stroke, the intake valve closes, trapping the air-fuel mixture in the cylinder. During this stroke, the exhaust valve stays closed.

Compression Stroke

The second stroke is the compression stroke. The piston moves up in the cylinder with both valves closed and compresses the trapped air-fuel mixture. When the piston reaches the top of the cylinder, the pressure rises.

Power Stroke

The third stroke is the power stroke. Near the end of the compression stroke, the spark plug fires, igniting the compressed air-fuel mixture that produces a powerful explosion. The combustion process pushes the piston down the cylinder with great force turning the crankshaft to provide the

power to drive the car.

Exhaust Stroke

The fourth stroke is the exhaust stroke. With the piston at the bottom of the cylinder, the exhaust valve opens, and the piston moves up again and forces the burned gases out of the cylinder. The piston travels up to the top of the cylinder pushing all the exhaust out before closing the exhaust valve in preparation for starting the four-stroke process over again.

New Words

- identify [ai'dentifai] *vt.* 识别, 确定
 configuration [kən'figju'reiʃən] *n.* 配置, 构造, 结构, 外形
 flat [flæt] *adj.* 平直的, 仰卧的
 horizontal [ˌhɒri'zɒntl] *adj.* 水平的
 opposed [ə'pəuzd] *adj.* 反对的
 arrangement [ə'reindʒmənt] *n.* 排列, 安排
 vibration [vai'breiʃən] *n.* 振动, 颤动
 cancel ['kænsəl] *vt.* 取消, 删去
 identical [ai'dentikəl] *adj.* 同一的, 同样的
 bank [bæŋk] *n.* (气缸)组, 列
 commonly ['kɒmənli] *adv.* 一般地
 advantage [əd'vɑ:ntidʒ] *n.* 优势, 有利条件
 rigidity [ri'dʒiditi] *n.* 坚硬, 硬度
 distortion [dis'tɔ:ʃən] *n.* 扭曲, 变形
 resistance [ri'zistəns] *n.* 抵抗力, 阻力
 torsional [ˈtɔ:ʃənəl] *adj.* 扭力的, 扭转的
 opposing [ə'pəuziŋ] *adj.* 反向的, 相反的
 installation [ˌinstə'leɪʃən] *n.* 安装, 装置
 vertical ['vɜ:tikəl] *adj.* 垂直的, 直立的
 disadvantage [ˌdisəd'vɑ:ntidʒ] *n.* 不利, 缺点, 劣势
 suitable ['sju:təbl] *adj.* 适当的, 相配的
 smoothness ['smu:ðnis] *n.* 平滑, 柔滑, 光滑
 characteristic [ˌkærɪktə'ristɪk] *n.* 特性, 特征
 cycle ['saɪkl] *n.* 周期, 循环
 approach [ə'prəʊtʃ] *n.* 方法, 步骤
 illustrate ['iləstreɪt] *vt.* 图解, 阐明
 trap [træp] *vt.* 收集, 留住, 截留

Phrases and Expressions

- multi-cylinder engine 多缸发动机
 in-line engine 直列式发动机

V-type engine V型发动机
 flat engine 顶置式发动机
 balancer shaft 平衡轴
 end-to-end 衔接的, 两端相连的
 lend oneself to 帮助, 有助于, 适宜于
 compression ratio 压缩比
 torsional vibration 扭转振动
 manufacturing cost 制造成本
 intake stroke 进气行程
 compression stroke 压缩行程
 power stroke 做功行程
 exhaust stroke 排气行程
 in honor of 以纪念……
 intake valve 进气阀
 air-fuel mixture 空气燃油混合气
 exhaust valve 排气阀
 spark plug 火花塞
 burned gas 废气

EXERCISE 6

Fill in the blanks with the suitable words or phrases given below.

solve, exhaust pipe, based on, years, benefited, the right side, without, in the 80's, basically, runs out

We configuration would have been never realized if not the invention of VR6. Audi had been researching its own W-engines for _____ but eventually pulled out the plug. I remember sources said it failed to _____ the exhaust/ventilation problems. It was _____ formed by 3 banks of 4-cylinder in-line. The problem was how to run the _____ for the center bank without overheating the surrounding and _____ wasting too much space.

It seems that Volkswagen's approach is not _____ by Audi's experience, because the Volkswagen unit is _____ the VR6 that was under development well _____. Benefited by VR6's asymmetric design, exhaust of the left VR6 _____ from the left side, while exhaust of the right VR6 runs out from _____. Therefore the exhaust system is just the same as any V-type engine.

EXERCISE 7

The following are some expressions for the famous brands (General Motors Corp.). Match the following brands in Column A with their Chinese equivalents in Column B.