

全国高等学校高职高专汽车类专业规划教材  
教育部高职高专汽车类专业教学指导委员会审定

QICHE SHIYONG YINGYU

# 汽车实用英语

纪常伟 雷艳 王春丽 主编



中央广播电视大学出版社

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## 前 言

汽车被称为“改变世界的机器”。由于汽车工业具有很强的产业关联度，因而被视为一个国家经济发展水平的重要标志。现阶段，我国汽车工业快速而稳步发展，汽车工业正在成为拉动我国经济增长的发动机。汽车工业的繁荣，使汽车及其相关产业的人才需求量大幅度增长，与之相应地，作为人才培养主要基地的汽车工业高等教育也得到了长足发展。

随着汽车领域的创新及对汽车再生资源利用的不断提高，汽车技术正发生着日新月异的变化。计算机及其控制技术的广泛应用，使汽车成为典型的机电液一体化产品；汽车新材料、清洁能源的研发，使汽车产品的内涵与以往相比具有质的差别。这就要求在人才培养时既要具有前瞻性，又要与我国汽车技术现有水平相结合。要在注重培养具有自主开发能力的研究型人才的同时，大力培养专业水平高，实践能力强，并有着较强的科技运用、推广、转换能力的应用型人才。这也意味着对我国汽车高等教育的办学体制、机制、模式和人才培养理念等提出了全新的要求。

为了满足新形势下对汽车类高等工程技术人才培养的需求，现组织一批具有丰富汽车类专业教学经验的一线教师及在汽车研究机构担任汽车科研工作的工作者编写了本套高职高专汽车专业教材，并由教育部高职高专教学指导委员会汽车类专业委员会专家审定，为教材把关。

在教材的编写过程中，我们力求做到以下几点：

第一，从“汽车运用、维修企业岗位要求”分析入手，结合多年高等职业院校培养高等技术应用型人才的经验，确定课程体系、教学目标和教材的结构与内容，强化教材的针对性和实用性。

第二，根据“以汽车运用与维修技能为主线、相关知识为支撑”的编写思路，精练教材内容，切实落实“管用、够用、适用”的教学指导思想。

第三，根据院校的教学设备和汽车行业的发展趋势，合理安排教学内容。在使学生掌握典型汽车的相关知识和运用、检测、维修技能的基础上，介绍其

他车型，尤其介绍能够体现先进技术的相关内容，既保证教材的可操作性，又体现先进性。

教材图文结合，将大量的高难技术术语、工作原理简练化、形象化，便于理解和运用，巧妙解决了汽车运用与维修学习中术语多、难理解的问题；注重实际操作能力和职业技能的培养，理论知识与实训操作并行，以此降低学习难度，提高学生的学习兴趣，达到好教、好学的目的。

本书由纪常伟、雷艳、王春丽担任主编，陈立旦、赵永来、李丽英担任副主编，由尹万建担任主审。其中一到九课由陈立旦编写，十到二十课由赵永来编写，二十一到三十课由李丽英编写，在编写的过程中参阅了大量的书籍和资料，在此一并表示诚挚的谢意。

本教材可作为高职高专和普通高校汽车类专业教材，或作为项目教学或理实一体化教学教材；也可作为职工大学、成人教育等汽车工程、汽车运用类专业教材；还可作为汽车维修培训及中专技校参考教材。

编 者

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# Lesson 1 The History of Automobile

## Study Goal



1. To understand what an internal combustion engine is.
2. To understand who built the first practical four-stroke internal combustion engine.
3. To understand what kind of car Daimler first invented.
4. To understand what the trend of the automobile development is.

## 1. Introduction

The New York Times' mention of the name "automobile" was the first public use of the term by the media and helped to popularize that name for motor *vehicles*. However, the credit for the name automobile goes to a 14<sup>th</sup> Century Italian painter and engineer named Martini. Martini never built an automobile but he did draw plans for a man-powered *carriage* with four *wheels*. Martini thought up the name "automobile" from the Greek word "auto" (meaning self) and the Latin word "mobils" (meaning moving). The other popular name for an automobile is the car. The word "car" is derived from Celtic word "carrus" (meaning cart or wagon).

As we know, the automobile was not invented in a single day by a single inventor. The history of the automobile reflects an evolution that took place worldwide. It is estimated that over 100,000 patents created the modern automobile.

## 2. Early Steam Powered Cars

During the early history the self-propelled vehicles were developed with steam engines. In 18<sup>th</sup> century, James Watt of Scotland successfully built the steam engine. Watt's steam engine was the catalyst for a wave of rapid mechanization and industrialization, indeed for the entire Industrial Revolution, which originated in England. Steam engines powered cars by burning *fuel*

that heated water in a boiler, creating steam that expanded and pushed pistons that turned the **crankshaft**, which turned the wheels. In 1769, the very first self-propelled road vehicle powered by a **steam engine** was a military **tractor** invented by French engineer and mechanic, Nicolas Joseph Cugnot. Cugnot became the first to design and build a steam-powered vehicle — a three-wheeled conveyance capable of carrying four persons. It was used by the French Army to haul artillery at a whopping speed of 2.5 mph on only three wheels. The vehicle had to stop every ten to fifteen minutes to build up steam power. The steam engine and boiler were separate from the rest of the vehicle and placed in the front (Fig.1). Steam engines added so much weight to a vehicle that they proved a poor design for road vehicles; however, steam engines were very successfully used in locomotives.

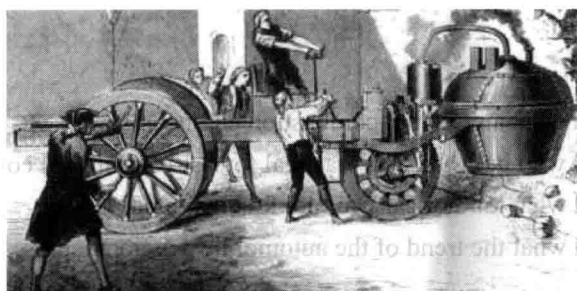


Fig.1 Cugnot's steam-powered vehicle

In 1801, Richard Trevithick made a steam carriage for 8 people. In 1830, more people became interested in the new steam vehicles. The sparks, fires and noise annoyed people so much that the railway and horse-coach owners were able to force steam **coaches** to be banned. Some engineers continued making steam carriages for a while.

### 3. Early Electric Cars

Steam engines were not the only engines used in early automobiles. Vehicles with electrical engines were also invented. Between 1832 and 1839, the first electric carriage was invented in Scotland. Electric cars used rechargeable batteries that powered a small electric motor. The vehicles were heavy, slow, expensive, and needed to stop for recharging frequently. However, around 1900, electric land vehicles in America outsold all other types of cars. Then in the several years following 1900, sales of electric vehicles as a new type of vehicle came to dominate the consumer market. Electricity found greater success in **tramways** and **streetcars**, where a constant supply of electricity was possible.

### 4. The Internal Combustion Engine and Early Gas-Powered Cars

At the end of 18<sup>th</sup> century, the invention of coal gas, produced by the decomposition of coal and other fuels by heat in the absence of air, spurred considerations for design of gas engines.

Both steam and electric road vehicles were abandoned in favor of gas-powered vehicles. An **internal combustion engine** is any engine that uses the explosive combustion of fuel to push a **piston** within a **cylinder** — the piston's movement turns a crankshaft that then turns the car wheels via a chain or a drive shaft. The different types of **fuel** commonly used for car combustion engines are **gasoline** (or **petrol**), **diesel**, and **kerosene**.

1680: Dutch physicist, Christian Huygens designed (but never built) an internal combustion engine that was to be fueled with gunpowder.

1807: Francois Isaac de Rivaz of Switzerland invented an internal combustion engine that used a mixture of hydrogen and oxygen for fuel. Rivaz designed a car for his engine — the first internal combustion powered automobile. However, his design was very unsuccessful.

1858: Belgian-born engineer, Jean Joseph Étienne Lenoir invented and patented (1860) an electric spark-ignition internal combustion engine fueled by coal gas. In 1863, Lenoir attached an improved engine (using **petroleum** and a primitive **carburetor**) to a three-wheeled wagon that managed to complete an historic fifty-mile road trip.

1860: several Paris workshops built Lenoir's gas engine under license, the first example of an engine being built on an industrial scale (300 to 400 examples).

1866: German engineers, Eugen Langen and Nikolaus August Otto improved on Lenoir's and de Rochas' designs and invented a more efficient gas engine.

1876: One of the most important landmarks in engine design came from Nicolaus August Otto who in 1876 invented an effective gas motor engine. Otto built the first practical four-**stroke** internal combustion engine called the "Otto Cycle Engine," and as soon as he had completed his engine, he built it into a **motorcycle**. Otto's contributions were very historically significant, it was his four-stroke engine that was universally adopted for all liquid-fueled automobiles going forward. Otto's four-stroke engine ended the 200-year-long search for an engine suited to the needs of craftsmen, small shops, and, ten years later, road vehicles.

In 1885, German mechanical engineer, Gottlieb Daimler together with his design partner Wilhelm Maybach took Otto's internal combustion engine a step further and patented what is generally recognized as the prototype of the modern gas engine. The 1885 Daimler-Maybach engine was small, lightweight, fast, used a carburetor, and had a vertical cylinder. The size, speed, and efficiency of the engine allowed for a revolution in car design. Daimler first built a two-wheeled vehicle the "Reitwagen" (Riding Carriage) with this engine. In late 1885, after several successful test runs, it seemed that a powerful engine suitable for road vehicles had finally been born. A year later (on March 8, 1886), Daimler took a stagecoach and adapted it to hold his engine, thereby designing the world's first practical four-wheeled automobile (Fig.2).

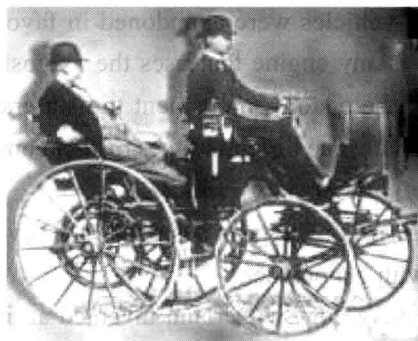


Fig.2 Daimler's four-wheeled car

At the same time in 1885, another German engineer Karl Benz succeeded in designing and building his own road vehicle, which also was powered by a gasoline engine. On January 29, 1886 Benz received the first patent (DRP No. 37435) for a gas-fueled car. It was a three-wheeler (Fig.3). In contrast to the Daimler's motor carriage, Benz based his construction on the three-wheeled car popular in Britain and France. For the first time, a road vehicle propelled by a four-stroke gasoline engine moved under its own *power*. Benz built his first four-wheeled car in 1891. Benz was the first inventor to integrate an internal combustion engine with a chassis - designing both together.

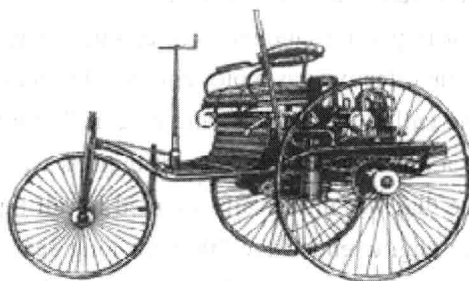


Fig.3 Benz's three-wheeled car

Both Benz and Daimler are considered the men to invent the automobile powered by an internal combustion engine because they invented highly successful and practical gasoline-powered vehicles that ushered in the age of modern automobiles. Daimler and Benz invented cars that looked and worked like the cars we use today. Daimler and Benz continued to improve their engines for many years.

Some years later, some people used a Daimler engine in a *front-engine* rear-wheel vehicle. The French engineers made use of the good roads that had been built in France by Napoleon and began to build cars with large wheels, high seats and petrol engines which gradually began to look a bit less like a horse carriage without the horse.

There were several developments in engineering that made petrol driven vehicles a practicability.

★ Petrol was available as a fuel.



- ★ Good quality **iron** and steel was being produced.
- ★ Machines were developed which could accurately **machine** cylinders and **shafts**.
- ★ Electrical devices such as **coils** and **spark plugs** were developed.

During the early 20<sup>th</sup> century British engineers began working on cars. Engines became more reliable; **windcreens** and lights were added and passenger comfort became more important as more people bought the cars that Rover, Riley and Rolls-Royce were building.

## 5. The First Mass Producers of Cars — The Assembly Line

By the early 1900s, gasoline cars started to outsell all other types of motor vehicles. The market was growing for economical automobiles and the need for industrial production was pressing.

The first car manufacturers in the world were French: Panhard & Levassor (1889) and Peugeot (1891). By car manufacturer we mean builders of entire motor vehicles for sale and not just engine inventors who experimented with car design to test their engines.

In 1908, American car manufacturer, Henry Ford decided to make a cheap car that many people would be able to afford. He invented an improved assembly line and installed the first conveyor belt-based assembly line in his car factory around 1913-1914. The assembly line reduced production costs for cars by reducing assembly time. After installing the moving assembly lines in his factory in 1913, Ford became the world's biggest car manufacturer. Ford's famous Model T was assembled in ninety-three minutes. The Model T was cheap and reliable. By 1927, 15 million Model Ts had been manufactured. The assembly line won both money and fame for Ford Company. From that time cars were becoming cheaper than horses to buy and maintain, steam cars were unpopular and the four-stroke petrol engine powered car became an accepted form of transport.

## 6. The Development of Cars

From 1910s, the mass production techniques became more mature and popular in the world. In 1920s, Morris, Cowley and Austin used the mass production techniques to make cheap cars in Britain. Engineers began to think about **body** styling.

In 1930s, the smaller firms began to go out of business as they could not afford to compete with the large, well equipped production lines making economical and reliable pressed steel-body cars. There were two million cars in Britain.

From 1940s, American designers produced bigger and better cars.

In 1950s, safety became more important. British designers copied American styling. Different types of cars, in different colors with better equipment were produced. Roads were improved.