



国家示范性高等职业教育汽车类“十三五”规划教材  
高等职业教育汽车类专业“双证课程”培养方案教材



# 汽车专业

# 英语

主 编 张金花 刘宗正 刘 力



QICHE  
ZHUANYE  
YINGYU



华中科技大学出版社  
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本书从高等职业教育的实际情况出发,深入浅出地介绍了汽车各主要系统的构造和工作原理,以及汽车文化方面的知识。通过规定学时的专业英语教学,帮助学生较系统地学习汽车专业知识,熟练掌握汽车专业英语词汇,能够阅读和翻译一般的汽车英语使用说明书和有关技术资料,达到能用英语进行专业交流的目的。

本书共有7个单元,每个单元由2~3篇课文组成,包括汽车专业知识和汽车文化知识两个方面的内容。汽车专业知识分别从汽车性能参数、汽车发动机、汽车底盘、汽车车身、汽车电气设备、汽车电控系统、汽车检测设备等方面讲解汽车各主要系统的构造与工作原理。汽车文化知识涵盖汽车历史、世界著名汽车公司介绍、汽车名人以及与汽车相关的汽车大赛、汽车污染等。每个单元包括课文、词汇、课文注释、思考题、译文及相关练习。

本书可以作为高职高专院校汽车类专业的专业英语教材或汽车构造双语教学的辅助教材,亦可供有一定英语基础的汽车销售、维修和管理人员自学参考。

本书由长沙职业技术学院张金花、武汉航海职业技术学院刘宗正、甘肃林业职业技术学院刘力担任主编,由译国译民翻译服务有限公司吴蓉、昆山登云科技职业学院张旭、长沙职业技术学院阳文辉担任副主编,由湖北交通职业技术学院曹登华担任主审。

由于篇幅有限,本书不能将汽车专业英语知识讲解得非常全面。编者希望读者通过阅读本书提升专业英语水平,解决工作实践中的一些具体问题,力求能学以致用。由于时间仓促、水平有限,书中如有不妥之处,恳请读者批评指正。

编者

2016年5月



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# Unit 1

## ◀ Text 1 Automobile Performance Parameters ▶

The dimensions of an automobile can make you know the appearance of it. It contains the wheelbase (the track front and rear) the overall length, the overall width, the overall height, the overhang front, the overhang rear, the angle of approach, the angle of departure, interior length, interior width, interior height, the ground clearance, curb weight, gross vehicle weight, number of the doors, seating capacity and trunk or cargo space.

### The Shape and Size of a Vehicle

The shape and size of a vehicle(See Figure 1-1) includes the following parameters:

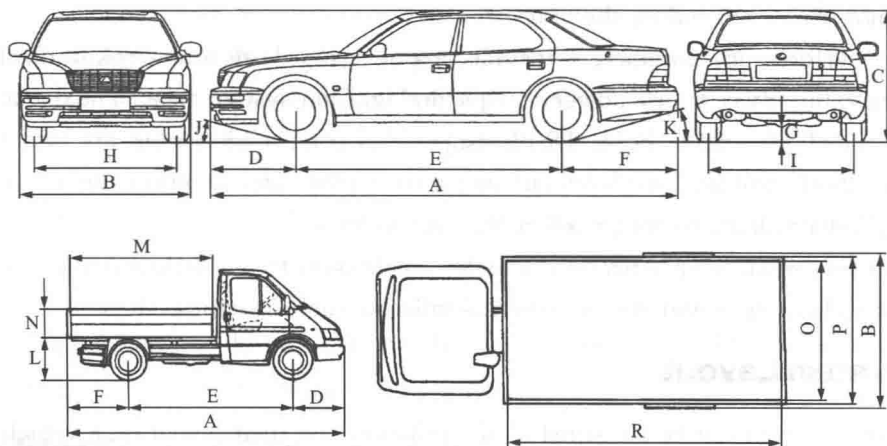


Figure 1-1 The shape and size of a vehicle

- A — overall length, total length; vehicle length
- B — overall width, total width; vehicle width
- C — unload height; vehicle height
- D — front overhang
- E — axle base
- F — rear overhang

G — ground clearance

H\I — track tread; tread width; wheel track

H — front track; track front

I — rear track; track rear

J — approach angle; angle of incidence

K — departure angle; angle of departure, rear overhang angle

L — loading height

M — maximum length of chassis frame behind cab

N — cargo body height

O — interior cargo body width

P — cargo body width

R — interior cargo body length

The wheelbase is the distance between the center of the front wheel and the center of the rear wheel. It is normally the same on both sides of the vehicle. Some vehicles may have different wheelbase measurements from left to right. Before you take the measurements, always check the manufacturer's specifications.

Two other dimensions should be noted. The first is the overall length of the vehicle. This is the distance between the front and rear extremities. The second is the overall width of the vehicle. It is the distance from the extreme right side to the extreme left side of the vehicle, but not usually including the external mirrors.

Engine performance parameters include engine type, bore and stroke, displacement, compression ratio, valve train, power, torque and ignition system type. The diameter of the cylinder is called the engine bore. Displacement and compression ratio are two frequently used engine specifications. Displacement indicates engine size, compression ratio compares the total cylinder volume to compression chamber volume. <sup>(1)</sup>

Chassis performance specification includes suspension type, brakes type, steering type and turning radius, type and size of tires and wheels, fuel capacities. <sup>(2)</sup>

## Drive System Layout

The drive system can be classified as the following by their layout on a vehicle.

### 1. Front-wheel drive layout

In front-wheel drive vehicles the engine can be mounted transversely or longitudinally. Drive reaches the front wheels through a transmission and final drive unit called a transaxle.

### 2. Rear-wheel drive layout

In a conventional rear wheel drive, engine and transmission are mounted longitudinally at the front. Drive is transmitted to a rear axle assembly by a propeller shaft.

### 3. Four-wheel drive layout

Vehicles with part-time four wheel drive are designed for optional off road use. Four-



wheel drive can be selected for abnormal surfaces and disconnected for normal road surfaces. The engine and transmission are mounted longitudinally at the front. Propeller shafts transfer the drive from a transfer case on the rear of the transmission, to the drive units at front and rear.

Today's sedans are very different from the models 10 years ago. The old ones had manual door locks and windows. They had no air conditioning and basic audio systems. In only ten years' time, ordinary passenger cars have gained basic convenience features, advanced engine technologies and safety features.

Despite the added weight of new safety and convenience features, today's middle-sized cars outperform their predecessors. Engines are getting larger and more efficient.

Performance isn't the only area where middle-sized cars are improving. Safety features like side curtain airbags, antilock brakes and electronic stability systems are installed. Electronic stability systems apply individual brakes when a vehicle begins to skid, in order to keep it under control.<sup>(3)</sup> The majority of best-selling sedans have power windows and door locks, a CD player and air conditioning. Luxury cars are typically built with higher standards than middle-sized cars, including the gap between panels in the interior.

Safety feature is very important. It contains SRS, seatbelts, daytime running lights, standard regenerative anti-lock brake system, adjustable front seatbelt shoulder anchors, child-protector rear door locks, internal trunk-release handle. For example, the Toyota vehicle contains driver, front passenger and front seat-mounted side-impact airbags are supplemental restraint system (SRS). The driver and front passenger airbags are designed to deploy in severe (usually frontal) collisions where the magnitude and duration of the forward deceleration of the vehicle exceeds the design threshold level. The side-impact airbags are designed to inflate in severe side-impact collisions. In all other accidents, the airbags will not inflate. To decrease the risk of injury from a deploying airbag, always wear seatbelts, sit upright in the middle of the seat as far back as possible from the airbag modules and do not lean against the door.<sup>(4)</sup> Do not put objects in front of an airbag or around the seatback. Do not use rearward-facing child seats in any front passenger seat. The force of a deploying airbag SRS may cause serious injury or death.

## 【New Words and Expressions】

performance *n.* 特性(曲线), 操作, (运转)性能

parameter *n.* 参数

dimension *n.* 尺寸参数, 尺寸

appearance *n.* 外观, 外部特性, 状态, 出现

wheelbase *n.* 轴距

track *n.* 轮距, 轨迹, 胎面花纹 *v.* 跟踪, 沿辙印行驶

overhang *v.* 外(悬)伸 *n.* 突出物(部分), 悬臂, (前/后)悬

interior *a.* 内部的 *n.* 车身内部, 内饰, 客(车)厢, 驾驶室  
 capacity *n.* 容量(积), (发动机)排量, (额定)功率  
 trunk *n.* (车辆)行李厢(舱), 后备厢, 干线, 主干道, 中继线  
 bore *n.* 孔, 孔径, (转子发动机)气缸筒(内壁), 钻孔器, 镗头  
 displacement *n.* (发动机)排量  
 volume *n.* 体积, 容量, 数量, 音量  
 feature *n.* 特点, 性能, 零(部)件  
 seatbelt *n.* (座椅)安全带  
 adjustable *a.* 可(调整, 节, 准)的, 可校正(准)的  
 anchor *n.* 锚, 支座, 支撑点, (载货汽车)紧急制动器, 电枢  
 internal *a.* 内部的, 固有的 *n.* (复)内部零(部)件  
 handle *n.* (控制)手柄, (车门/内部设施)拉手 *v.* 操纵  
 deploy *v.* & *n.* (安全气囊)展开  
 collision *n.* 碰撞, 打(冲, 撞)击  
 deceleration *n.* 负加速度, 减速  
 threshold *n.* 门槛(限), 入口, 起点, 临界值, 限度  
 inflate *v.* 充(打)气, (使)膨胀, (安全气囊)充气胀开  
 upright *n.* 立柱, 支柱 *a.* 直立的, 垂直的  
 module *n.* 模(数, 量), 系(因)数, 模件, (控制)模块, 组件  
 lean *a.* (混合气)稀薄(的), (生产管理)得力的 *v.* 倚靠, 斜靠  
 seatback *n.* 座椅靠背  
 rearward-facing *a.* (车辆)向后面的, 在后面的

approach angle 接近角  
 departure angle 离去角  
 ground clearance (摩托车)离地间隙, (汽车)最小离地间隙  
 curb weight (车辆)整备质量, 全装备后自重  
 gross vehicle weight (GVW) 车辆最大允许总质量(整备质量+最大载量)  
 cargo space (商用车)载货容积, (货车)货厢, 载货空间(容积)  
 compression ratio 压缩比(率)  
 turning radius 转弯半径  
 supplemental restraint system (SRS) (乘员保护系统)辅助约束系统  
 anti-lock brake system (ABS) 防抱死制动系统

## 【Notes to the Text】

(1) Displacement and compression ratio are two frequently used engine specifications. Displacement indicates engine size, compression ratio compares the total cylinder volume to compression chamber volume.

排量和压缩比是经常使用的两个发动机参数。排量表明了发动机的规格,压缩比是气缸总容积与燃烧室容积之比。

(2) Chassis performance specification includes suspension type, brakes type and size, steering type and turning radius, type and size of tires and wheels, fuel capacities.

底盘性能参数中含有悬架类型、制动方式、转向形式、转弯半径、车轮和轮胎的类型与大小、油箱容量等。

(3) Electronic stability systems apply individual brakes when a vehicle begins to skid, in order to keep it under control.

当汽车打滑时,为了控制住汽车,电子稳定系统实施单独制动。

(4) To decrease the risk of injury from a deploying airbag, always wear seatbelts, sit upright in the middle of the seat as far back as possible from the airbag modules and do not lean against the door.

为了减轻安全气囊弹出时带来的伤害,乘员应系好安全带,尽可能向后垂直坐在座椅中间,从而远离安全气囊组件,同时不要倚靠车门。

## 【Exercises】

(1) What does dimensions of an automobile include?

(2) What is compression ratio?

## 【Translation】

### 汽车性能参数

汽车尺寸参数可以帮助我们了解汽车的外形。汽车尺寸参数有轴距(即前桥与后桥之间的距离)、总长、总宽、总高,前悬、后悬,接近角、离去角,车厢内部的长、宽、高,最小离地间隙、整备质量、总载量、车门数、座位数、货厢和行李厢。

#### 汽车的外形尺寸

汽车外形尺寸(见图 1-1)具体包括以下这些参数:

A — 总长,车长;

B — 总宽,车宽;

C — 空载高度,无装载高度,车高;

D — 前悬;

E — 轴距;

F — 后悬;

G — 最小离地间隙;

H\I — 轮距;

H — 前轮距;

I — 后轮距;

- J — 接近角;
- K — 离去角;
- L — 装载高度;
- M — 驾驶室后车架最大可用长度;
- N — 货厢高度;
- O — 货厢内宽度;
- P — 货厢宽度;
- R — 货厢内长度。

轴距是指前轮中心和后轮中心之间的距离。汽车两边的轴距通常是相等的。有些车的左右轴距可能不同。测量轴距之前,应先查看制造商的规格说明书。

还有两项参数需要注意。汽车总长指汽车前后两端极点间的距离。车辆总宽是指车辆右端点到左端点间的距离,但通常不包括后视镜。

发动机性能参数包括发动机类型、缸径、冲程、排量、压缩比、气门机构、发动机功率、发动机扭矩和点火系统类型。气缸的直径称为缸径。排量和压缩比是经常使用的发动机参数。排量表明了发动机的规格,压缩比是气缸总容积与燃烧室容积之比。

底盘性能参数中含有悬架类型、制动方式、转向形式、转弯半径、车轮和轮胎类型与大小、油箱容量等。

## 传动系统的布置

根据传动系统在汽车上的布置可以将其分为以下几种。

### 1. 前轮驱动布置

前轮驱动的汽车,发动机可横向或纵向安装。动力通过由变速器和主减速器组成的变速驱动桥到达前轮。

### 2. 后轮驱动布置

常见的后轮驱动的汽车,发动机和变速器纵向安装在车的前部。动力由传动轴传送到后桥总成。

### 3. 四轮驱动布置

非全时四轮驱动可以在不同路面上选择驱动方式。在不规则的路面使用四轮驱动,在规则的路面上不用四轮驱动。发动机和变速器纵向安装在车的前部。传动轴把动力从变速器后部的分动器传到前后的主减速器组。

现在的轿车和十年前的大不一样。过去的车需要人手动锁门和关窗,车里没有空调和基本的音响系统。在仅仅十年的时间里,普通的客车里有了基本的便利装置、先进的发动机技术和安全装置。

除了新的安全和便利装置增加车的重量外,现在的中型轿车胜过了以前的中型轿车。发动机功率变大了,同时也更有效了。

中型轿车的性能改进了,安全装置如侧帘安全气囊、防抱死制动系统和电子稳定系统都装配在车上。为了使汽车能被控制住,汽车打滑时,电子稳定系统实施单独制动。大多数畅销车都装有电动车窗、门锁、CD 播放器和空调。豪华轿车在特色结构方面的标准比中型车更高,

其中包括仪表板和内部的缝隙方面。

安全性能是非常重要的,包括安全气囊、安全带、日常行驶灯、回归标准的制动防抱死系统、可调式前安全带肩部支撑点、保护儿童的后门锁、内部行李厢扳手等。例如,丰田车在驾驶员座位和前排乘员座位的侧面均装有安全气囊、辅助约束系统。驾驶员座位和前排乘员座位的安全气囊设计原理为,当汽车发生严重碰撞而使向前的减速时间和速度大小超出设计界限时弹出。侧气囊设计原理为,当汽车发生严重侧面碰撞时弹出。在除此之外的事故中,安全气囊不会弹出。为了减轻安全气囊弹出时带来的伤害,乘员应系好安全带,尽可能向后垂直坐在座椅中间,从而远离安全气囊组件,同时不要倚靠车门。不要在安全气囊的前面或周围放置任何物体。不要在前排座位使用向后的儿童座椅,否则,安全气囊弹出时所释放的力量可能导致严重伤害甚至死亡。

## ◀ Text 2 The History of the Automobile ▶

### Early Steam Powered Cars

The automobile, as we know, 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.

In 1769, the very first self-propelled road vehicle was a military tractor invented by French engineer and mechanic, Nicolas-Joseph Cugnot (1725 - 1804). Cugnot used a steam engine to power his vehicle under mechanic Brezin's instructions at the Paris Arsenal. It was used by the French Army to haul artillery at a whopping speed of 4 km/h 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 were placed in the front. In 1770, Cugnot built a steam-powered tricycle that carried four passengers.

In 1771, Cugnot drove one of his road vehicles into a stone wall, making Cugnot the first person to get into a motor vehicle accident. This was just the beginning of bad luck for the inventor. After one of Cugnot's patrons died and the other was exiled, the money for Cugnot's road vehicle experiments ended.

Steam engines powered cars by burning fuel that heated water in a boiler, creating steam expanded and pushed pistons that turned the crankshaft, which then turned the wheels. <sup>(1)</sup> During the early history of self-propelled vehicles — both road and railroad vehicles were being developed with steam engines. (Cugnot also designed two steam locomotives with engines that never worked well.) 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. Historians, who accept that early steam-powered road vehicles were automobiles, feel that Nicolas Cugnot was the inventor of the first automobile.

## Early Electric Cars

Steam engines were not the only engines used in early automobiles. Vehicles with electrical engines were also invented. During 1832 and 1839, Robert Anderson of Scotland invented the first electric carriage. Electric cars used rechargeable batteries that powered a small electric motor. The vehicles were heavy, slow, expensive, and needed to stop for recharging frequently. Both steam and electric road vehicles were abandoned. Electricity found greater success in tramways and streetcars, where a constant supply of electricity was available.

Around 1900, electric vehicles in America outsold all other types of cars. In the following years, sales of electric vehicles took a nosedive as a new type of vehicle came to dominate the consumer market. The very first self-powered road vehicles were powered by steam engines and by that definition Nicolas Joseph Cugnot of France built the first automobile in 1769 — recognized by the British Royal Automobile Club and the Automobile Club due to France as being the first.<sup>(2)</sup> So why do so many history books say that the automobile was invented by either Gottlieb Daimler or Karl Benz? It is because both Daimler and Benz invented highly successful and practical gasoline-powered vehicles that ushered in the age of modern automobiles. The cars Daimler and Benz invented looked and worked like the cars we use today. But it is unfair to say that either man invented “the automobile”.

## The History of the Internal Combustion Engine

An internal combustion engine is an 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.<sup>(3)</sup> The different types of fuel commonly used for car combustion engines are gasoline (or petrol), diesel, and kerosene. A brief outline of the history of the internal combustion engine includes the following highlights.

- 1680: Dutch physicist, Christian Huygens designed (but never built) an internal combustion engine that was to be fueled with gunpowder.
- 1807: Francois Isaac of Switzerland invented an internal combustion engine that used a mixture of hydrogen and oxygen for fuel. Isaac designed a car for his engine — the first internal combustion powered automobile. However, this was a very unsuccessful vehicle.
- 1824: English engineer, Samuel Brown adapted an old steam engine to burn gas. He used it to briefly power a vehicle up a hill in London.
- 1858: Belgian engineer, Jean Joseph Lenoir invented and patented (1860) a double-acting, 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 a historic fifty-mile road trip.
- 1862: Alphonse Rochas, a French civil engineer, patented but did not build a four-



stroke engine (French patent #52 593, January 16, 1862).

- 1864: Austrian engineer, Siegfried Marcus, built a one-cylinder engine with a crude carburetor, and he attached his engine to a cart for a rocky 500-foot drive. It was the world's first gasoline-powered vehicle. Several years later, Marcus was able to design a vehicle that briefly ran at 10 mph. Some historians consider it was the forerunner of the modern automobile.
- 1873: George Brayton, an American engineer, developed an unsuccessful two-stroke kerosene engine. But it was considered the first safe and practical oil engine.
- 1876: German engineers, Eugen Langen and Nikolaus August Otto improved on Isaac's and Rochas' designs and invented a more efficient gas engine.
- 1876: The first successful two-stroke engine was invented by Sir Dougald Clerk.
- 1885: Gottlieb Daimler invented what is often recognized as the prototype of the modern gas engine with a vertical cylinder, and with gasoline injected through a carburetor (patented in 1887). Daimler first built a two-wheeled vehicle with this engine. A year later he built the world's first four-wheeled motor vehicle.
- 1886: On January 29, Karl Benz received the first patent (DRP No. 37435) for a gas-fueled car.
- 1889: Daimler built an improved four-stroke engine with mushroom-shaped valves and two V-slant cylinders.
- 1890: Wilhelm Maybach built the first four-cylinder, four-stroke engine.

Engine design and car design were integral activities, almost all of the engine designers mentioned above also designed cars, and a few went on to become major manufacturers of automobiles. All of these inventors made notable improvements in the design of the internal combustion vehicles.

## Nicolaus Otto

One of the most important landmarks in engine design comes from Nicolaus August Otto. In 1876 he invented an effective gas motor engine. Otto built the first practical four-stroke internal combustion engine called the "Otto Cycle Engine", as soon as he had completed his engine, he built it into a motorcycle. Otto's contributions were historically significant. It was his four-stroke engine that was universally adopted for all liquid-fueled automobiles.

## Karl Benz

In 1885, German mechanical engineer, Karl Benz designed and built the world's first practical automobile to be powered by an internal-combustion engine. On January 29, 1886, Benz received the first patent (DRP No. 37435) for a gas-fueled car. It was a three-wheeled car. Benz built his first four-wheeled car in 1891. Benz & Cie., the company started by the

inventor, became the world's largest manufacturer of automobiles by 1900. Benz was the first inventor to integrate an internal combustion engine with a chassis - designing together.

## Gottlieb Daimler

In 1885, 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. Daimler's connection to Otto was a direct one. There is some argument as to who built the first motorcycle: Otto or Daimler.

The Daimler-Maybach engine was small, lightweight, fast, used a gasoline-injected carburetor, and had a vertical cylinder. The size, speed, and efficiency of the engine allowed for a revolution in car design. On March 8, 1886, Daimler took a stagecoach and adapted it to hold his engine, thereby designing the world's first four-wheeled automobile. Daimler is considered the first inventor to have invented a practical internal-combustion engine.

In 1889, Daimler invented a V-slanted two cylinder, four-stroke engine with mushroom-shaped valves. Just like Otto's 1876 engine, Daimler's new engine set the basis for all car engines going forward. Also in 1889, Daimler and Maybach built their first automobile from the ground up. The new Daimler automobile had a four-speed transmission and obtained speeds of 10 mph. Daimler founded the Daimler Motoren-Gesellschaft in 1890 to manufacture his designs. Eleven years later, Wilhelm Maybach designed the Mercedes automobile.

## Rene Panhard and Emile Levassor

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 Panhard & Levassor (1889) and Peugeot (1891) of France. 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 — Daimler and Benz began as the latter before becoming full car manufacturers and made their early money by licensing their patents and selling their engines to car manufacturers.<sup>(4)</sup>

Rene Panhard and Emile Levassor were partners in a woodworking machinery business when they decided to become car manufacturers. They built their first car in 1890 using a Daimler engine. The partners not only manufactured cars, they also made improvements to the automotive body design.

Panhard-Levassor made vehicles with a pedal-operated clutch, a chain transmission leading to a change-speed gearbox, and a front radiator.<sup>(5)</sup> Levassor was the first designer to move the engine to the front of the car and use a rear-wheel drive layout. This design was known as the System Panhard and quickly became the standard for all cars because it gave a better balance and improved steering.

Early on, French manufacturers did not standardize car models. Each car was different

from the other. The first standardized car was the 1894, Benz Velo. One hundred and thirty-four identical Velos were manufactured in 1895.

### Charles and Frank Duryea

The first gasoline-powered commercial car manufacturers in America were Charles and Frank Duryea. The brothers were bicycle makers who became interested in gasoline engines and automobiles and built their first motor vehicle in 1893, in Springfield, Massachusetts. By 1896, the Duryea Motor Wagon Company had sold thirteen models of the Duryea, an expensive limousine, which remained in production into the 1920s.

### Ransome Eli Olds

The first automobile to be mass produced in the United States was in 1901, Curved Dash Oldsmobile, built by the American car manufacturer Ransom Olds (1864-1950). Olds invented the basic concept of the assembly line and started the Detroit area automobile industry. He first began making steam and gasoline engines with his father, Pliny Fisk Olds, in Lansing, Michigan in 1885. Olds designed his first steam-powered car in 1887. In 1899, with a growing experience of gasoline engines, Olds moved to Detroit to start the Olds Motor Works, and produced low-priced cars. He produced 425 “Curved Dash Olds” in 1901, and was leading auto manufacturer in America from 1901 to 1904.

### Henry Ford

American car manufacturer, Henry Ford (1863-1947) invented an improved assembly line and installed the first belt-based assembly line in his car factory in Ford's Highland Park, Michigan plant, around 1913-1914. The assembly line reduced production costs for cars by reducing assembly time. Ford's famous Model T was assembled in ninety-three minutes. Ford made his first car, called the “Quadricycle”, in June, 1896. Success came after he formed the Ford Motor Company in 1903. This was the third car manufacturing company formed to produce the cars he designed. He introduced the Model T in 1908 and it was a success. After installing the moving assembly lines in his factory in 1913, Ford became the world's biggest car manufacturer. By 1927, 15 million Model Ts had been manufactured.

Another victory won by Henry Ford was patent battle with George B. Selden. Selden, who had never built an automobile, held a patent on a road engine, on that basis Selden was paid royalties by all American car manufacturers. Ford overturned Selden's patent and opened the American car market for building inexpensive cars.

### 【New Words and Expressions】

engraving *n.* 雕刻术, 雕版, 雕版图

depict *vt.* 描述, 描写