

中国国家博物馆国际交流系列丛书

创造的力量

The Power of Innovation

美国19世纪专利模型

Patent Models from the United States of America

王春法 主编

A. HESSLER,
Machine for Cutting

No. 215,553.

Patented July 1, 1879.

Inventor,
Anthony Hessler
by Charles S. Jones
Attorney

北京时代华文书局

中国国家博物馆国际交流系列丛书

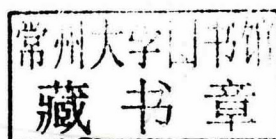
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美国
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力量

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前言

用创造的力量把人类带向更加美好的明天

在全国上下深入学习领会习近平新时代中国特色社会主义思想、全面贯彻落实党的十九大精神的大背景下，中国国家博物馆携手中国科学技术协会、清华大学共同主办“创造的力量——美国19世纪专利模型展”，主要目的就是充分发挥中国国家博物馆作为国家文化客厅的重要作用，礼敬在科技发展前沿不懈探索、为提高人们生活水平作出重大贡献的杰出发明家和创新者，展示专利制度作为一种知识产权保护制度对调动激发创新创造活力的重要功能，深化对习近平总书记关于创新是支撑发展第一动力这一重大判断的深刻内涵的理解，推动落实“倡导创新文化，强化知识产权创造、保护、运用”的重要指示精神，为推动践行创新发展理念、实现高质量发展作出应有的贡献。

美国是世界上较早实施专利制度并且独具特点的发达国家，关于提交专利模型的规定就是其中之一。1790年，时任美国总统华盛顿签署了美国历史上第一部专利法，明确要求专利申请人提交的专利申请文件须同时包括专利说明书、专利图示和专利模型，使得美国成为当时世界上唯一一个要求专利申请人同时满足三项专利申请条件的国家。之所以如此，主要是因为当时美国的专利审查员无法仅仅通过专利说明书和专利图纸去理解专利原理。同时，专利申请人为了给专利审查人员留下深刻印象以便更容易获得通过，往往会请专业工匠来打造精美的模型，因而使得这些专利模型兼具了实用性和艺术性双重价值。

独具特点的专利制度为美国早期发展注入了强大的创新创造活力。至1867年，美国每年通过的专利申请达到13000多项。随着专利申请数量的快速增加，检查和保管专利模型的成本和风险也随之提高。1877年，一场大火烧毁了美国专利局保存的87000个模型，使人们意识到曾经宽敞的大楼已经因为大量模型的存放而变得拥挤不堪了。1880年，负责专利事务的美国专员发布新规，规定只有当审查人员要求时，专利申请人才可以在提交附图和书面说明书的同时提交专利模型。到1890年，在26000项授权专利中，只有535个模型提交至专利局收藏。1900年以后，专利申请已经很少提交专利模型了。作为立国之初100多年间美国发明和进取精神的象征，专利模型逐渐成为历史。

位于美国特拉华州维明顿市的哈格利博物馆与图书馆，从1961年首次获赠800座专利模型后即开始专利模式收藏，至今已有50多年的历史，收藏了5000余件从1809年至1906年间制作的专利模型，覆盖50多种商业门类，全面呈现了推动美国19世纪在地理和经济方面迅速扩张的技术与商业变革，其模型馆藏规模仅次于美国史密森学会。本次展览的60余件19世纪美国专利模型均为哈

格利博物馆与图书馆馆藏，包括发动机、交通运输、采掘工业、印刷业、轻工业、衣食住行6个部分，较为全面地展示了19世纪美国在各领域的技术发展和发明创造。与此同时，展览还展出了一份1797年由乔治·华盛顿总统签署的美国专利证书，这份珍贵文件相当程度上展示了美国在建国初期对专利制度的探索和重视。

科技是国家强盛之基，创新是民族进步之魂，科技创新是实施创新驱动发展战略、实现高质量发展的战略根基。中国国家博物馆作为国家的文化客厅，肩负着促进不同文化交流互鉴的重要职责，既要从各种角度来呈现艺术的美感，更要深入发掘历史文物中所蕴含的丰富人文精神。我相信，通过这个展览，我们一定能够对科技进步促进经济社会发展的内在机理有了更加深刻的理解和认识，坚信在一代代发明家、创新者的不懈努力和持续推动下，人类的知识边界必将不断拓展，人们的生活水平性质不断提高，创造的力量一定会把人类带入更加美好的明天。

王春法

中国国家博物馆馆长

2018年5月

Preface

Lead the Humanity to a Brighter Tomorrow with the Power of Innovation

Under the background of the whole country deeply studying Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, and comprehensively implementing the spirit of the 19th CPC National Congress, the National Museum of China, together with China Association for Science and Technology and Tsinghua University, hold the exhibition "The Power of Innovation: The 19th Century Patent Models from the United States of America". The National Museum of China, as the cultural sitting-room of China, for pays homage to those great innovators who unremitting working at the frontier of science development and contributed to human progress in history, display patent system as an intellectual property protection system plays an important role in mobilizing and stimulating creativity, for deepen the understanding of the Central Committee General Secretary Xi Jinping's important judgement of innovation as the most important power to support development, and promoting the implementation of the spirit of the important instruction: "Advocating innovation culture, strengthening the creation, protection and application of intellectual property rights", and to make our due contributions of promoting the practice of innovation and realizing high quality development.

The United States has an early implementation of the patent system and developed a unique patent system, one of it's original creation is about the patent model. The First Patent Act signed by American President George Washington in 1790 makes preliminary requirement on documents that need to be filed for patent application, namely, patent specifications, patent drawings and patent models. The United States of America was the only country in the world that required those three things at the same time, mainly because the personnel responsible for the examination of patents at that time could not understand the working principles of the patents just based on the specifications and drawings. On the part of the patent applicants, in order to impress the patent examiners, they often asked professional craftsmen to create exquisite models. This made the patent models both practical and artistic.

The unique patent system injected vitality for innovation and creation into the United States in the early 19th century when the country was just founded. Up to 1867 over 13,000 patents were authorized annually. Along with the increase in the number of patent applications, the cost and risk for examining and keeping patent models also increased. In 1877 a fire in the Patent Office ruined 87,000 models, which led people to realize the otherwise spacious building became cramped due to the storage of a big number of models. In 1880, the commissioner of patents issued new regulations which stipulated that the patent applicant shall not provide any model along with the drawing and specification unless it is requested by the patent examiner. Up to 1890, 26,000 patents were counted, but only 535 models were submitted to the Patent Office. Since 1900, patent model is hardly seen in patent application. The patent models symbolic of American inventive and enterprising spirit for more than a century have become things of the past.

Hagley Museum and Library located in Wilmington, Delaware. Since it was presented with 800 patent

models in 1961, the institution has a collection history of more than 50 years. Currently, Hagley Museum and Library has collected over 5,000 patent models crafted between 1809 and 1906, covering more than 50 trades and industries. These models give a panoramic view of the technological and commercial reform that drove fast geological and economic expansion of the United States of America in the 19th century. The scale of collection in the Hagley Museum and Library is only second to that of Smithsonian Institution. All the exhibits for this exhibition are from Hagley Museum and Library. The 60 patent models of the 19th century from the United States of America for this exhibition comprise six components, covering engines, transportation means, mining, printing, and light industries, as well as daily life, giving a panoramic view about the technological advances, inventions and creations of the country in diverse fields during the 19th century. In addition, a patent certificate signed by President George Washington in 1797 will also be displayed. The valuable document shows how the US, as a newly founded country, explored and attached importance to the patent system.

Science and technology are essential to the prosperity of a country while innovation is central to a nation's progress since scientific innovation is the strategic foundation of the implementation of the innovation driven development strategy and the high quality development. The National Museum of China, as the cultural sitting-room of China, shoulders the important mission of promoting communication and exchanges among cultures. The NMC is duty-bound to present the artistic aesthetic from multiple perspectives and explore the cultural value embodied by the heritage. I believe, through this exhibition, we would certainly have a deeper understanding about the internal mechanism of the progress of science and technology to promote economic and social development. I firmly believe that by the unremitting efforts and continuous promotion of generation upon generation of inventors and innovators, the humanity will keep pushing ahead the boundary of knowledge and enjoy ever-improving living standards. The Power of Innovation will Leading Humanity Towards a Better Tomorrow.

Wang Chunfa

Director of National Museum of China

May 2018

序 一

发明的精神

发明是为解决技术领域中特定问题而提出的创新性方案、工艺措施和技术成果。发明创造的目的是改变生活，专利保护的核心是激励创新。

发明自从来到人间，就是为了满足人们生产生活的需要、满足经济社会发展的需要。他山之石，可以攻玉。这里展出的西方国家专利模型，将我们的思绪带回19世纪中叶，让我们一起探究、分析西方工业革命的兴起与发展，深刻思考发明的精神、创造的意义和专利的价值。

发明的精神在于创新。发明创造是前人留给我们的宝贵财富。纵观人类近现代历史，发明创造与一个国家的命运紧密相连，息息相关。中华民族五千年的历史，就是一部发明创造的历史，先贤们诸多的伟大发明深刻影响了历史进程，为人类社会的发展进步做出了突出贡献。

创造的意义在于人人皆可创造。发明创造不是科技工作者的特权，而是人人享有的基本人权。我国宪法第四十七条规定：中华人民共和国公民有进行科学研究、文学艺术创作和其他文化活动的自由。国家对于从事教育、科学、技术、文学、艺术和其他文化事业的公民的有益于人民的创造性工作，给以鼓励和帮助。1985年4月1日，中国的专利法正式实施，发明创造者的贡献和智慧受到法律意义上的保护。时代呼唤创新创造，人人皆可创新，处处皆应有所创造，时时应思创新创造。

专利的价值在于应用。专利强调三性，即新颖性、创造性和实用性。发明以其核心技术的公开换取了法律的保护。法律保护的是发明创造者的劳动价值，即因发明创造的实施所带来的经济效益和社会效益。发明创造者有权获得因产品应用所产生的价值。

当前，创新驱动发展的号令已经发出，向科技强国进军的号角已经吹响，“大众创业、万众创新”的激情正在被点燃。新时代、新征程、新使命，我们大力弘扬发明的精神，就是要激发民众的创新热情，汇聚时代发展的巨大力量；就是要让创新创造活力竞相迸发，让聪明才智充分涌流。让中国创造的基因、机制和动力悄然复兴，把成果变成财富，让知识产生价值，推动经济社会不断发展进步，为人类社会的共同进步做出新的更大的贡献。

中国科学技术协会科学技术传播中心

2018年5月

Foreword

The Spirit of Invention

Inventions are innovative plans, process measures, or technological results put forth in order to solve specific technical problems. They are aimed to change life, and the core of patent protection is encouraging innovation.

From the very beginning, inventions are aimed to meet people's living and production needs and the needs for economic and social development. As an old Chinese saying goes, experience from others can be used by us. The patent models from a western country that are exhibited here take us back to the middle of the 19th century, enable us to analyze the emergence and development of the western industrial revolution, and set us thinking about the spirit of invention, the significance of creation, and the value of patent.

The spirit of invention lies in innovation. Inventions are valuable wealth left by our ancestors. In the contemporary and modern history of mankind, invention has always been closely related with a nation's destiny. The 5,000-year history of the Chinese nation is also a history of invention, during which the great inventions by ancient sages deeply influenced the trajectory of history and contributed to the development and progress of human society.

The significance of creation is that everyone can create something. Invention is not an exclusive privilege of scientists or engineers, but a basic human right entitled to all. Article 47 of the Chinese Constitution provides that citizens of the People's Republic of China have the freedom to carry out scientific research, literary and artistic creation and other cultural activities. The nation encourages and supports citizens engaged in education, science, technology, literature, art and other cultural undertakings as well as the creative work beneficial to the people. On April 1, 1985, the Patent Law of the People's Republic of China came into force, which provided the legal protection of the contributions and intelligence of inventors. The times call for innovation and creation, and creation is possible everywhere, all the time and for everyone.

The value of patent lies in application. Patents have to be original, creative and practical. Inventions obtain legal protection in exchange for the openness of its core technology. What the law protects is the inventor's labor value, namely the economic and social benefits brought by the application of the invention. Inventors are entitled to the values arising from the application of their inventions.

In China today, the banner of "innovation-driven development" has been held high, the clarion of "strengthening the nation through science and technology" has been sounded, and the passion of "mass entrepreneurship and mass innovation" has been kindled. In the new era, embarking on a new journey and carrying a new mission, we strongly uphold the spirit of invention in order to inspire the public's passion for innovation and pool together the forces of the times, unleash the vitality of innovation and creation, and give full play to everyone's wit and intelligence. We will revitalize the genes, mechanism and motivation of "Created in China," turn technological results into wealth, create value out of knowledge, ensure continuous economic and social development, and make new and greater contributions to the common progress of the human society.

Science and Technology Promotion Center of China Association for Science and Technology

May 2018

序 二

创造的力量

人类文明的进步、生存条件的改善和生活方式的更替，无疑是由一次次重要的技术发明所推动。发明，既是对技术性问题提出创新性方案，也是以艺术智慧致力于技术与人类美好生活情感的相适宜。

在国家博物馆举行的“创造的力量——美国19世纪专利模型展”是“发明的精神——美国哈格利博物馆与图书馆藏19世纪美国专利模型展（巡）”中国巡展的第二站，展出了美国哈格利博物馆及图书馆的经典收藏品。这些藏品是19世纪美国人民的发明创造，体现了发明人的创意和匠心，是技术发明的直观呈现，同时，这些模型设计也包含了艺术智慧，堪称艺术与科学结合的典范。

专利法的建立，就是要以制度“促进科学和实用艺术的进步”，而今这已成为世界各国政府相关管理机构的普遍共识。在工业技术大发展的时期，工业技术解决了人类重大的经济生产方式问题，也深刻影响着人类日常生活的方方面面。那些以机械原理制造的蛋糕机、印刷机、洗衣机、羊毛剪、陶器成型机、缝纫机等，见证了工业技术向实用领域和日常生活产品转化的历史。

本次展览的展品，大多为普通百姓在生活中产生的发明创造，关乎人们日常生活各个领域。这些发明表达了普通大众对生活的热情，心怀美好的生命情感。从工业技术到工业设计，皆凝聚着发明创造者的智慧与情怀。“游于艺”，既是科学研究的境界，也是艺术创造而赋予人类的生命意义。

当今中国，李克强总理倡导的“大众创业、万众创新”被视为中国新常态下经济发展“双引擎”之一。正如爱默生所说：“每个人都是发明家，在探索的航行中各自扬帆，每个人都有一张自己的地图，没有任何两张完全相同。世界中到处有门径，到处是机遇。”透过展览，我们回顾美国的发展史，处处体现了对于发明创造的重视和知识产权的保护对国家的迅速崛起起到了极为重要的作用，本次展览对大众，尤其是青少年创造力的激发无疑是非常好的借鉴和展示。

大力推进自主创新，实现由中国制造向中国创造的飞跃，是我们肩负的教育及科学研究责任。其中，发挥自主知识产权的重要支撑作用不可或缺。这次专利模型展，使我们在回望工业技术及工业设计的历程中，以“创造的力量”激励我们继续思索未来，探索未知。

鲁晓波

清华大学美术学院院长

2018年5月

Foreword

The Power of Innovation

The progress of human civilization, improvement of living conditions and changes of lifestyle are all driven by important technological inventions. Invention not only provides an innovative solution to technical problems, but also contributes to the harmonization between technology and the positive attitude towards the beauty of life through the wisdom of art.

"The Power of Innovation: Patent Models from the United States of America", held at the National Museum of China, is the second leg of "The Spirit of Invention: Hagley Museum and Library 19th Century American Patent Model Exhibition Tour" in China. Classic collections of the Hagley Museum and Library were exhibited. These models created by 19th-century Americans reflected inventors' creativity and ingenuity and were the most direct display of technological inventions. The models also conveyed the wisdom of art and were perfect examples of the combination of art and science.

The establishment of patent law is "to promote the progress of science and useful arts" in an institutional way, and this is the consensus of relevant government authorities of all countries in the world today. During the period when industrial technology was thriving, it solved a major problem for the mankind, namely the way of economic production, and had a profound influence on every aspect of daily life. All the machines manufactured according to mechanical principles, such as cake machines, printing machines, washing machines, sheep clippers, pottery molding machines and sewing machines, witnessed how industrial technology shifted to practical use and products of everyday life.

Most of the exhibits were invented by the ordinary people and concerned all aspects of their daily life. These inventions reflected their passion for and positive attitude towards the beauty of life. The inventors' wisdom and sentiments were embedded in both the industrial technology and the industrial design. "To enjoy art freely", a phrase from The Analects of Confucius, is not only a state of mind to pursue for scientific research, but also the meaning of life endowed by the artistic creation upon the mankind.

In today's China, "mass entrepreneurship and innovation" advocated by Premier Li Keqiang is considered as one of the "two engines" of China's economic development under the new normal. As Emerson wrote, "We are all inventors, each sailing out on a voyage of discovery, guided each by a private chart, of which there is no duplicate. The world is all gates, all opportunities." The exhibition gave us a review of America's development history, which demonstrated that emphasis on inventions and protection of intellectual property rights were essential for a nation's rapid rise. The exhibition shed much light on how to inspire the creativity of the public, especially the young people.

It is our responsibility to vigorously promote independent innovation and to achieve the leap from "Made in China" to "Created in China" in the fields of education and scientific research. To this end, it is crucial for the independent IPRs that we have to serve as the solid foundation. While leading us through the history of industrial technology and industrial design, this patent model exhibition, with the "power of innovation", motivated us to continue contemplating the future and exploring the unknown.

Lu Xiaobo

Dean of the Academy of Arts & Design, Tsinghua University

May 2018

序 三

创新，从过去走向未来

“我知道一个没有专利局和好的专利法的国家，除了倒退之外是别无他路的。”美国作家马克·吐温（1835-1910）的这一洞见指出了一条重要的真理：强有力的知识产权体系可以为一个国家的发明家们提供至关重要的支持，并且能够对经济增长和社会进步起到催化作用。今天的中国和美国——两个在历史上都不乏改变世界的创新和创业精神事例的国家——正致力于营造能够为创造力和进取提供支持的环境，从而促进经济发展和社会进步。

对创新的共同追求，在于创新所带来的利益，同时也在于发明家和他的造物中所蕴含的精神，这些都在本次开创性的展览中得以体现。“创造的力量展”展示了60件专利模型，均来自19世纪的美国，一个发明和发展的“黄金时代”。每件专利模型都在讲述着许多故事——关于发明家们是如何在工厂和牧场上辛勤工作，努力克服困难，解决一个个难题，又是如何不懈努力，开拓美国广阔的土地。

无论对于个人或是大众，这些珍贵的工艺精湛的发明模型都有助于驱散一些关于创新的，有可能阻碍当今发明家的误区。其中一种误区是，认为过去那些重要的发明家们都是知名人物。诚然，本次展览展出了一些出自名家的发明，如小乔治·威斯汀豪斯、乔治·科里斯和制造波本威士忌的比姆家族。但大部分展品的发明者已几乎被历史遗忘，尽管他们对人类进步贡献卓著。

另一个需要摒弃的误区是，发明家都是极具天赋的“天才”，他们那些改变世界的想法都是灵光乍现的结果。这种颇具浪漫色彩的想法很有吸引力，但事实上，大部分发明都是长时间（甚至多年）实验和努力的产物，而且都是为了解决工作、娱乐和生活中遇到的实际问题而创造出来的。我们举办本次展览，就是希望鼓励观众用新鲜的视角看世界，寻找新的途径让这个世界变得更好。我们期待人们能够创造出新的灵感结晶。

戴维·A·科尔

哈格利博物馆与图书馆执行馆长

2018年5月

Foreword

Innovation Past, Innovation Future....

“I knew that a country without...good patent laws was just a crab, and could not travel any way but sideways and backwards.” This observation by the American writer Mark Twain (1835-1910) captures an important truth: a strong intellectual property system provides essential support for a nation’s inventors and can act as a catalyst for economic growth and social progress. Today, China and the United States—countries whose histories are rich in examples of world-changing innovations and entrepreneurship—are committed to promoting economic and social progress by fostering supportive climates for creativity and enterprise.

This shared interest in innovation, in the benefits that it can generate, and in the people and creations that embody its spirit, is reflected in this pathbreaking exhibition. “The Power of Innovation” features sixty patent models from America’s “golden age” of invention and rapid growth in the nineteenth century. Each of these patent models has multiple tales to tell—of inventors grappling with problems in factory yards and in barnyards, and of the ceaseless drive to meet challenges presented by the settlement of a vast and rough country.

Individually and collectively, these rare “artifacts of invention” also help dispel myths about innovation that may discourage would-be inventors today. One such myth is that the important inventors of yesteryear were famous people. To be sure, this exhibition includes models by well-known figures, such as George Westinghouse, George Corliss, and the bourbon-making Beam family. The majority of the models, however, were produced by people whose names history has largely forgotten, even though their contributions were often influential and successful.

The other myth that needs dispelling is that inventors are specially gifted “geniuses,” whose world-changing ideas come to them in miraculous epiphanies. This myth has romantic appeal, but the truth is that most inventions are the products of long hours (even years!) of experimentation and effort by people responding to practical problems they encounter at work, at play, and at home. In presenting this exhibition, it is our hope that visitors will be encouraged to look at the world with fresh eyes and to dream about new ways to improve it. We look forward to the fruits of their inspirations.

David A. Cole

Executive Director of Hagley Museum and Library

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