

Necessity and Feasibility Study of Establishing Standard Essential Patent Regime in Industrial Design Industry in China

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Abstract. Standard-essential patents are an important means to effectively promote the transformation of scientific and technological achievements in the field of industrial design into real productivity, and enhance the amplification effect of manufacturing industry chain. Through analyzing the current situation, characteristics and problems of patents in industrial design industry and the current situation of standards, this paper studied the necessity and feasibility of establishing a standard-essential patent regime in China's industrial design industry.

Keywords. Standard Essential Patents (SEPs), industrial design, patent, standard

1. Introduction

If an innovative technology is protected by a patent, and it is adopted by international, national, or industry standards, the patent becomes Standard Essential Patent. As an important means, the standard operation and patent layout can support the high-quality development of the manufacturing industry chain and supply chain, its strategic position is constantly improving [1]. Important patent licensing and transactions in global manufacturing revolve around standard essential patents. In recent years, multinational corporations have established a mature standard operation mode, by signing the standard necessary patent implementation license agreement, to obtain profits, and enhance the amplification effect of the manufacturing industry chain.

Industrial design through system integration and horizontal coordination of multiple jobs, multidisciplinary, multi-professional ideas and methods, the knowledge, technology, information and creative set into products, equipment and service system solutions, is the starting point of industrial chain, value chain and innovation chain and leading [2], its development level is one of the important symbols of a country's industrial competitiveness. As an important means to support the orderly development of manufacturing industry, standards and patents can effectively promote the transformation of scientific and technological achievements in the field of industrial design to real productive forces.

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Combined with the characteristics of patents and standards of Chinese industrial design industry, this paper analyzes and studies the standard essential patent regime of establishing standards in this industry.

2. The current application of standard necessary patents in industrial design industry

Industrial design is an innovative activity that takes industrial products as the main object, and integrates and optimizes the product materials, function, structure, form and packaging, by comprehensively using scientific and technological achievements and engineering, aesthetics, psychology, economics and other knowledge. Industrial design leads the process of the integration and innovation of production factors and the optimization and upgrading of industrial structure. It is not only an important part of producer services, but also an important guide for the high-quality development of manufacturing industry, and a key breakthrough to promote the transformation of Chinese manufacturing to Chinese manufacturing in China. China's industrial design development started in the 1980s. By the end of 2017, there were nearly 14,000 enterprises and professional industrial design companies with industrial design departments, with more than 600,000 employees. In recent years, excellent design enterprises and innovative design achievements have been emerging. Haier, Xiaomi, Huawei, Gree, Midea and other industry leading enterprises have set up overseas design centers successively, and a number of professional design companies such as Yichang, Maojian, Jialantu and Rococo have a certain international competitiveness. The survey shows that industrial design is of great significance in developing new products to meet the market demand, improving the added value of products, promoting the technological upgrading of the industry, and enhancing the professional degree of innovation subjects. Industrial design has played an important role in leading consumer demand and promoting enterprise income growth [2].

Influenced by historical evolution and lack of awareness of intellectual property protection and other reasons, the awareness of patent protection in the industry and patent operation is still relatively weak in the number of patent litigation. In terms of appearance design patent, the necessary standards in the industry patent is minimal, many enterprises even did not realize the integration of standard and patent is a means of effective use of intellectual property rights, with the help of this way of operation, can accelerate the industrialization of patent technology, grab market competition, especially facing "made in China" going out in the process of national standards, intellectual property rights, some enterprises are still confused.

Foreign countries have formed a long-term mechanism of two-way integration of standard and patent layout during a long time. Through patent layout and standard operation, on the one hand, obtain patent royalties from standard implementer, on the other hand, expand market share and enhance the international competitiveness of [3].

As of August 30, 2021, there were 3,224 standards in ISO and ISO / IEC JTC1 involving patents, and China has participated in the compilation of 41 standards, accounting for 1.3% of the total patent standards involved. From the perspective of technical field distribution, the standard necessary patent disclosure mainly focused on the two key areas of audio and video coding (ISO / IEC JTC1 SC29, 1,850) and automatic identification (ISO / IEC JTC1 SC31, 399). China's industrial design field involves standard necessary patents were very few [4].

3. Current status of industrial design patents in China

3.1. Connotation of patent protection of industrial design

In industrial design, the key to achieving high value-added products is innovation, so that the innovation subject can obtain higher profits. The innovation of industrial design from the perspective of intellectual property rights is mainly manifested in cultural innovation, design innovation and technological innovation [5]. As the result of intangible intellectual labor, such innovation must be protected through intellectual property rights. The development of industrial design is always accompanied by the protection of intellectual property rights, including patents, Copyrights, trademarks, trade secrets, and anti-unfair competition law. Among them, patent is particularly important to the protection of intellectual rights of industrial design. The relationship between patent and industrial design is very close, which is the most important legal protection for the fruits of industrial design in China. Industrial design involves different connotations in appearance design patent, invention patent and utility model patent respectively.

3.1.1. Appearance design patent

The Chinese design patent protects the design combining practical function and visual decoration. Firstly, the design must be attached to the physical product, and the product usually has practical function; secondly, the visual design with shape, pattern or color. Most of the industrial design innovations can protect the intellectual property rights through the design patent. Design innovation is the integration of product function and cultural connotation, and the products involved in visual innovation design are the protection objects of the appearance patent. For the cultural innovation in the industrial design, the physical cultural products with the visual content as the cultural innovation content, can also be protected by the appearance design patent. In addition to meeting the object conditions, the relevant design must also meet the entity conditions such as novelty and reaching the legal innovation height. Industrial design products are the main object of appearance design patent protection. Other relevant laws, such as copyright Law, trademark Law and anti-unfair competition Law, also provide some protection, but the protection object is not directly designed for industrial design products, but only intersects with industrial design products, so the vast majority of industrial design products can only be protected by patent law.

3.1.2. Invention patent and utility model patent

The important feature of industrial design is based on the application of high and new technology, and there is a wide range of scientific and technological innovation. The Patent law is the basic law of science and technology protection. Through the invention patent and the utility model patent [6], the intellectual labor results of technological innovation can be protected. The technological innovation in industrial design is mainly reflected in the created production equipment, methods, and the new technology used in the created products. For the products using the new technology, especially those that must use the new technology, the technology can be protected through invention and utility model patents, which can occupy the exclusive market position and achieve the monopoly use of industrial design that cannot be realized by other intellectual property rights protection. Actively use standard necessary patents and other means, through a

series of modern patent strategies such as patent pool, patent transfer and licensing, can maximize the value of industrial design [7].

3.2. Characteristics of patents in the industrial design industry

3.2.1. The industrial design level and the intellectual property creation ability are uneven

In general, China's industrial design level and directly related intellectual property creation ability show an overall increasing trend of development, but compared with developed countries, there are still more obvious problems such as regional, industrial and enterprise development imbalance. Regionally, Beijing, Guangdong, Shanghai, Jiangsu, Zhejiang and other high-tech enterprises and relatively developed manufacturing regions are relatively mature, while some provinces have a certain scale of manufacturing capacity, but the intellectual property creation capacity is still relatively backward. From the perspective of industry, in the electronic communication industry, China's intellectual property creation ability is not backward, even has certain advantages, such as Lenovo, Huawei design patents of large quantity and high quality; However, in packaging products and other plane products, there are less than developed countries, there are still a considerable number of design patent applications focused on plane products, the product applications increased year by year, the design level and patent quality are not synchronized. From the perspective of enterprises, the intellectual property creation ability of different enterprises in the same industry is uneven. Even in the more active electronic communication industry, a considerable number of enterprises have design patents at a low level, and still rely on imitation of Europe, America, the United States, Japan and South Korea, and do not form their own design style. It can be said that some well-known enterprises have embarked on the road of independent innovation, however, a considerable number of small and medium-sized enterprises still have a long way to take [7].

3.2.2. The intellectual property application and management ability of enterprises need to be improved

The number of design patent applications in China continues to grow, but the enterprises' ability to use and manage patents still needs to be improved. On the one hand, the maintenance rate and transformation rate of the design patent are not high; on the other hand, the management ability of the design patent analysis, early warning, rights protection and license is slightly insufficient, and many enterprises do not even have the intellectual property management ability suitable for the enterprise scale. At present, a considerable part of domestic enterprises have not yet established intellectual property management departments, and the understanding of intellectual property management is only at the level of patent mining and patent application; patent mining is held by research and development personnel and mainly rely on patent agencies for patent application, without a complete intellectual property application and management mechanism.

3.2.3. Enterprises do not pay much attention to the intellectual property rights of industrial design

Take an example, the furniture industry belongs to the active field of domestic design patent. Compared with well-known foreign enterprises, most well-known furniture enterprises in China have very few or no design patent applications. Chinese companies in the United States, Japan and other countries, far behind European countries. The reason is that, on the one hand, the lack of intellectual property rights innovation and application ability, directly lead to the plagiarism between furniture enterprises to imitate each other, can not form a unique style. On the other hand, the lack of patent protection of the appearance design, can not effectively protect the potential market of products, also can not bring practical value to the enterprise. According to statistics, 60% of Chinese export enterprises have encountered foreign patent and technical barriers, which makes China's export volume lose about 50 billion US dollars of per year[8], which is a severe challenge for Chinese enterprises. Therefore, the independent innovation ability of enterprises should be transformed into intellectual property rights in time, so as to effectively protect innovative products and markets and improve their own competitiveness.

3.2.4. The protection measures are single, and the punishment for infringement is insufficient.

Industrial design is an intellectual property-intensive industry, and the high added value of its products mainly depends on the intellectual property brought from innovation. The development of industrial design is dynamic and keeps up with the hot spots in the market. Therefore, compared with traditional industries, the impact of unauthorized counterfeiting and counterfeiting is more obvious. Many enterprises, especially small and medium-sized design enterprises, stay in the improved, following and imitation design that can quickly push to the market in a short term. There are not many original design products, especially the lack of design works that can lead the industry or even lead the world. Low level and low price marketing based on imitation and simple improvement restricts the benign development of the industry to some extent. This puts forward higher requirements for the legal relief after its intellectual property rights are once infringed, and the rapid handling and deterrence of violators still need to be strengthened. The overall intellectual property environment is not good, and the protection is not in place, which also restricts the transfer of some foreign advanced design achievements and design business to China.

4. Related information of industrial design standards

4.1. Research status of domestic Industrial design standards

4.1.1. In the aspect of industrial design standardization technical institutions

China has carried out the design standardization of specific products in some specific professional fields (such as gears, boiler and pressure vessels, and ship TC). The existing 544 professional standardization technical committees (TC) and 12 directly affiliated working groups (SWG) names were screened, with four SC names containing "design", namely TC207 / SC6 environmental management / environmental awareness design,

TC297 / SC2 EA / E design, TC208 / SC1 Mechanical safety / Mechanical safety design, TC28 / SC22 information technology / programming language. In addition, there are 17 TC, 13 SC and 1 SWG professional scope involving "design", mainly for specific professional products, engineering and construction, mechanical safety, systems, environment and other aspects of the design.

4.1.2. In terms of the current national standards

The current national standard name includes 441 articles of "design", among which the standards related to "industrial design" are: GB / T 35455-2017 "Household and Similar Use Electrical Appliance Industrial Design Evaluation Rules", and the "product design" related standards are: GB / T 16722.3-2008 "Technical Product Document Computer aided Technology Information Processing Product Design Process status", GB / T 12985-1991 "General Rules for the Application of Human Size percentile in Product Design". In addition to the design standards for specific products, engineering, systems, there are some industrial general design rules, such as: GB / T 12123-2008 "General Requirements for Packaging Design", GB / T 24256-2009 "Product Ecological Design Rules", GB / T 23686-2018 "Environmental awareness Design", GB / T 29289-2012 "General Rules for Consumer Product Safety Design", etc.

4.1.3. In terms of the current industry standards

The current industry standard name includes 1180 "design", and the standards related to "product design" cover some specific products or industries, such as: JB / T 5055-2001 "Mechanical Industry Product Design and Development Basic Procedures", DZ / T 0198.3-1997 "Geological Instrument Process Management Guide Product Design Process Review and Process Quality Review", etc. The current local standards include 647 names including "design", and the standards related to "industrial design" are: DB44 / T 1367-2014 "Industrial Design Public Technology Platform Construction Guide", DB44 / T 1183-2013 "Industrial Design Industrial Park Construction Code". The current group standard contains 381 names of "design", and the standards related to "product design" are: T / SXHK 003- -2019 Quality Testing Requirements for Product Design Model and 3 D Drawing, and T / SCGS 303002- -2019 Technical Product Document Comprehensive Design of Mechanical Product Standardization Guide.

4.2. Foreign Research Status

At present, most of the international and foreign design-related standards are material standards, environmental protection standards, safety standards and technical standards applicable to people of different ages and different objects, focusing on construction, artificial interaction, symbols and other fields.

From the situation of ISO and IEC, there are 1,925 ISO technical committees, sub-technical committees, sub-technical committees and working groups, and 27 technical committees, sub-technical committees and working groups with "design". The scope of work is all specific product design.

5. Necessity of standard necessary patents

5.1. *The combination of intellectual property rights and standards is the inevitable result of scientific and technological progress and economic development.*

The combination of intellectual property rights and standards is the inevitable result of scientific and technological progress and economic development, especially in the high-tech field is almost inevitable. A standard is a regulation, whose essence lies in unity. In a certain field, all participants who accept the standard will comply with the provisions of the standard and produce and operate according to its requirements. One of the most important ways for intellectual property owners to exercise their rights is licensing and authorization. When the intellectual property owner intends to license the authorization, it must want to have more licensee, and its license authorization is unique and without competitors. Obviously, if an intellectual property is included in a certain standard, it means that all members involved will use the intellectual property right on the premise of obtaining the authorization of the intellectual property owner, which undoubtedly expands the scope of intellectual property license and enhances the strength of licensing authorization.

5.2. *Reduce government supervision and corporate compliance costs*

Industrial design standards, emphasize in the process of design need to "specification", to understand and may detect the humanized index and performance in the technical design from the perspective of "people" to the product safety, rationality, applicability of the "constraints" and "guidance", so as to implement, supervision and promotion in industrial production.[9] Therefore, in the practice of China's manufacturing industry, standards are to be placed in the same position as the law to a certain extent. ——— a large part of practitioners daily contact with standards and norms, for product quality and safety supervision and spot check, risk monitoring and other product supervision means, are based on standards as the main technical support. In the current industry intellectual property protection consciousness needs to improve the reality situation, the necessary patent into standard, in product innovation design and processing production laws, documented, rational, documented, also is possible to ensure that the product in the basic quality standards continue to improve and extension, whether from the perspective of protecting the patentee, or with this opportunity to instill intellectual property protection will be consciousness is particularly necessary, while helping to establish the product, implementation unit (enterprise) -standard-necessary patent infringement-patent evidence chain, to reduce the government's regulatory costs, And corporate compliance costs. It is helpful to standardize the behavior of industry design, promote the road of professional and large-scale development of industrial design, and promote the rapid and orderly development of industrial design industry.

5.3. *Promote industrial technological innovation and promote industrial upgrading*

The core of industrial design is innovation, through innovation, to achieve high added value of products. Industrial innovation technology needs to have standards as the backbone of industrialization, to ensure the speed of technology renewal and the speed of industrial development. The standard formulation of industrial design is based on the constantly updated science and technology in the field, and it is also expected to

incorporate relatively mature new technologies. Although patents protect the interests of knowledge creators, their purpose is to meet the needs of the public by producing good and inexpensive products by promoting technology research and development and technology transformation. In the standard is necessary to write after evaluation, weighing that it is necessary to include the standard of patent, through the implementation of the standard, the industrial design field relatively mature advanced experience, play a role of bridge in technology promotion and innovation, can improve the efficiency of design, save design costs, drive the overall level of industrial design in our country. In practice, communication and many other fields have proved that the establishment of standard and necessary patents mechanism plays a positive role in promoting the rapid development of industry technology and industry, and provides the public with fully functional and reasonable price products.

5.4. It is conducive to improving the integration and creativity of new technologies in the field of industrial design

As an important part of the creative industry, the industrial design industry has a high content of technology, high radiation ability, high added value and low resource consumption. In the face of the increasingly fierce competition in the international and domestic markets, as well as the higher requirements of product innovation, the industrial design has also entered the deep water zone, which needs to carry out self-adjustment and promotion. Today's product innovation puts more emphasis on interdisciplinary crossover, knowledge integration, integration and innovation, and cross-border exploration of new technologies, new forms, new services and design, etc. The new materials and new processes in industrial design also bring more selectivity and creativity to the design. Including in the standard patent, can make full use of the standard of mandatory, universal advantages, promote the advanced technology in the patent, to solve the rapid development of technology cause technical coordination between enterprises, improve the field of new technology in industrial design fusion creative ability, widen the possibility of industrial design under a new round of industrial revolution.

5.5. Provide technical support for Chinese brand building

With the rapid development of economy, China's industrial design is changing from "reverse design" based on digestion and absorption to "positive design" based on original innovation and comprehensive integration, and some excellent design achievements have come to the international market. However, compared with the world's advanced level, there are still prominent problems such as low industrial concentration, less leading enterprises, and disconnection between industry, university and research. [10], which has become a short board of China from "manufacturing power" to "manufacturing power", and is also one of the important reasons for the lack of Chinese brands' competitiveness and the spillover of consumption. Under the background of China's new double-circular development pattern with domestic circulation as the main body and domestic and international mutual promotion, Around the industrial design, To develop the combination of standards and intellectual property rights, On the basis of summarizing the practical experience and resources of industrial design at home and abroad, To improve the overall level and ability of China's industrial design, Using standards containing advanced core technology patents to force manufacturing industries to

transform and upgrade its quality, Is an important means to promote the high-end development of the manufacturing industry in China, It is also the urgent need to get through the industrial product design and manufacturing blockage and promote the development of double cycle; Improving product design, production process, and applicability of services in industrial product development, 'Prevent trade frictions,' Promoting technical cooperation among industries, And to form a benign mechanism, Promote the quality of industrial products to be guaranteed. To provide technical support for the transformation of Made in China to China creation, China speed to China quality, and the transformation of Chinese products to Chinese brands.

6. Feasibility of establishing standard necessary patent mechanism in industrial design industry

6.1. Exploration of the path of the application of the standard and necessary patent mechanism in overseas China

In recent years, the industrial design industry is also implementing the national "going global" strategy. Haier, Xiaomi, Huawei, Gree, Midea and other industry leading enterprises have set up overseas design centers successively, and a number of professional design companies such as Yichang, Maojian, Jialantu and Rococo have a certain international competitiveness. Excellent design enterprises and innovative design achievements continue to emerge. The necessary patents of industrial design standards should be based in China. With the upgrading of Chinese standards to international standards or with the expansion of the markets in manufacturing and service industries. After developing the core technology of domestic industrial design enterprises, they can first apply for patents in China and distribute PCT patents in combination with overseas target market; integrate patents into domestic industry standards and upgrade to national standards and complete the domestic patent standardization steps; or establish national industrial design enterprise alliance to formulate group standards and include patents into group standards. Finally, with the gradual implementation of the national "going out" strategy, the national standards (or group standards) will be upgraded to the international standards when the time is ripe.

6.2. National policy support

With the establishment of the domestic market economic system, especially since the 18th National Congress of the Communist Party of China, scientific and technological innovation, intellectual property protection and standardization construction have been raised to a new height. Since January 2014, China has issued the national standards involving patent management regulations (provisional), deepening the reform of the standardization work, the national standardization system construction development plan (2016-2020) and a series of management documents, further guide and standardize the whole society of scientific and technological innovation, intellectual property protection, standard management, etc., on the premise of suitable for national conditions, gradually in line with international standards. In October 2021, the CPC Central Committee and The State Council issued the Outline for National Standardization Development and the Outline for Building a Strong Intellectual Property Country (2021-2035), both pointing out that "to promote the effective combination of standards and patents, and to build a

joint innovation system of technology, patents and standards". From the perspective of national policy, it is fully feasible to use the mechanism of standard necessary patents.

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References

- [1] Bin Zhang, Research on the new situation of Enterprise patent Operation. *Patent Examination Practice & Research*, **7**(2015), 89-92.
- [2] Yan Li, Leading the high-quality development of manufacturing industry with industrial design, *Wisdom China* **1** (2020), 4.
- [3] Yu Zhou. Intertwining of Intellectual Property Rights and Standards, *Electronics Intellectual Property*, **1**(2020), 19
- [4] Liangliang Wang, Junlei Wang, Research on Standards Essential Patent (SEP) Disclosure and Over-Declaration, *Automotive Digest (Chinese)* **6** (2020), 21-24.
- [5] Qingping Xu, Yunhua Cheng, Promote Industrial Design with Patent Protection, *Chinese Journal of Design* **6** (2015), 2.
- [6] The Patent Law of the People's Republic of China, 2020, Article 2.
- [7] Xiaoyue Lin, Yin Wu & Su Wu, Industrial Design and Intellectual Property Strategy, *Globalization* **09** (2013), 88-89.
- [8] Jinbiao Xia, patent barriers have become an obstacle to foreign trade, *China Economic Times*, September 25, 2005.
- [9] Cuiqin Lan, On Intermediate Level of Industrial Design Technology: Basic Concept and Connotation of Industrial Design Standards, *Art & Design Research*, **2** (2020), 6.
- [10] Chengyue Wang, Analyze the innovation status quo, existing problems and countermeasures of industrial design in China, *Macroeconomic Management*, **S1** (2017), 345.
- [11] Changyou Yu, Liqun Gao, Industrial Design Drive National Economic Development, *Guangxi Quality Supervision Guide Periodical*, **07**, (2020), 150-151.