Chinese Patent Information: Significant Resources

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In the past dozen years, the number of Chinese patent applications has increased steadily. Chinese patent documents are published in print and on tape and CD-ROM. Nearly 50 million patent documents and more the 20 CD-ROM titles, covering 18 countries, are gathered in the Chinese Patent Office. Computerized information systems for Chinese patents have been developed, and a variety of patent information services are offered. The main subclasses of Chinese patent application and foreign patent applications are in different chemical fields.

INTRODUCTION

The Chinese patent system has made great progress since 1985, when the Chinese Patent Law took effect. The number of patent applications and examinations has increased every year since then. Between 1985 and 1996, 625 309 applications were received by The Patent Office of the People's Republic of China (CPO). Of these, 531 518 were domestic applications and 93 791 were applications from other countries. A total of 88 foreign countries and regions filed patent applications in China; the top 5, in decreasing order, were Japan, the United States of America, Germany, France, and the Republic of Korea. The total number of granted patents was 311 996; 282 381 of these were granted to Chinese patentees and 29 615 to foreigners.[1]

In the international cooperation and communication of patents, China has been a contracting state of the Patent Cooperation Treaty (PCT) since Jan 1, 1994. The CPO is a Receiving Office, International Searching Authority, and International Preliminary Examining Authority of the PCT, and Chinese is an official working language for PCT patent applications. China has become a member state of the World Intellectual Property Organization (WIPO), the Paris Convention on the Protection of Industrial Property, the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure, the Strasbourg Agreement Concerning the International Patent Classification, and the Locarno Agreement Establishing an International Classification for Industrial Designs. A Chinese patent system in examination, agent, documentation, administrative, and automatic management has been established in China, and these capabilities are subject to continuous development.

CHINESE PATENT DOCUMENTS AND PUBLICATIONS

In recent years, the Chinese Patent Documentation Publishing House has published about 400 000 printed patent specifications, including Unexamined Applications for Patents for Inventions, Specifications of Patents for Inventions, and Specifications of Patents for Utility Models. In addition, Official Gazettes are issued every week. These consist of Gazettes of Patents for Invention, Gazettes of Patents for Utility Model, and Gazettes of Patents for Design and other publications, such as the Annual IPC Index to Chinese Patents, the Annual Name Index to Chinese Patents, the Annual Chinese Patent Abstracts, International Patent Classification (Chinese version), the Catchwords Index to IPC (Chinese version), and so on.

To keep up with the international trend in digitization of patent document publications, the Patent Documentation Publishing House and Patent Information Center of the CPO have committed to changing the media type from print to machine-readable materials. A Patent Document Management System (PDMS) was developed by the Publishing House in 1990 and undertook the computerized publication of the Gazettes. In 1992, the CD-ROM of the Gazettes was produced, and in 1993, the CD-ROM of Chinese Patent Specifications was developed successfully and issued on a legally specified date every week from Jan 1, 1996. In addition, the CPO has stored Chinese Patent Specification (full text) on WORM for the full-text online searching by patent examiners in their offices. At present, five kinds of CD-ROM are available:[2]

(1) Chinese Patent Abstract (CNPAT). This includes two kinds of patents (invention and utility model) abstract from 1985 and provides information such as bibliographic data, claims, and legal status. It is issued in a Chinese version (CNPAT/ABSDAT) and an English version (CNPAT/ACCESS).

(2) Chinese Patent Database (CPAS). This includes three kinds of Gazettes from 1985 and offers (in Chinese) all patent information like keywords, abstract, claims, legal status, and bibliographic data.

(3) Chinese Patent Specification (CPS). This compresses all information from three kinds of printed specification such as bibliographic data, abstract, drawing, claims, and full text of the specification from 1985 (in Chinese).

(4) Chinese Patent Specification Ordered by IPC Code. Two versions of this are available, on standard CD-ROM and on a user-defined version CD-ROM. In this database,

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all of the patent specifications are divided into 14 sections and grouped by IPC. Both versions are in Chinese.

(5) Chinese Patent Gazette with Drawings. This is issued annually and consists of the Gazettes of Patent for Invention and Gazettes of Patent for Utility Models with drawings, published during the current year. If required by users, quarterly or biannual issues (in Chinese) can be published.

CHINESE PATENT INFORMATION SERVICE

The Patent Documentation Division of the CPO has paid more attention to the gathering and processing of patent documents from home and abroad and to the provision of information services. International agreements calling for the exchange of patent documents have been established with 18 countries and 2 international organizations. At present, the CPO holds nearly 50 million patent documents, including patent specifications and official gazettes, from 26 countries and international organizations, and these collections are increasing by about 1 million documents every year. The huge collection of patent documents is the basis for all patent examination and also of information services provided by the CPO to Chinese users.

In recent years, the Division has emphasised the collection of CD-ROMs and has established a CD-ROM searching room, in which 10 CD-ROM workstations were installed and more than 20 titles of CD-ROMs of patents from 18 countries and international organizations were collected. The countries or organizations whose patents were collected in CD-ROM versions were America, Germany, Japan, the United Kingdom, France, PCT, EPO, etc., but also China. The total number of CD-ROM disks is in excess of 8000.

A variety of patent information services are provided by the Patent Documentation Division, the Patent Information Center, and the Searching and Consulting Center of CPO. These services include online searching, translation, copying, microform-making, training and corresponding search services. The type of end-user patent information services has changed since the first implementation of the China Patent Law. At that time, most of the users were from research institutes, universities, or colleges where research and the state of the art were under investigation. Along with the establishment of a commodity-based economic system in China, the number of users representing enterprises or business companies increased sharply for those organizations that were manufacturing and developing new products. In 1994, the number of users visiting the Patent Documentation Division was about 44 000; 33% of these were enterprise or business users, 31% represented research institutes, and 23% were from universities or colleges.[3] This means that commercial competition in China has forced the enterprise or business users to recognize the value of patent documents containing both technical and legal information.

A hierarchical networking system of Chinese information services has been established and involves one national level institute, the Patent Documentation Division of CPO, more than 20 Patent Information Divisions in provincial Institutes of Sci-Tech Information, and 62 Chinese Patent Documents Depository Libraries, which are found increasingly in universities and colleges, research institutes, patent agents' offices, and large enterprises all over China.[4] Computerizing and networking in patent information services will be formulated in 1998. When this is complete, users throughout China will be able to get the patent documents deposited in the Patent Documentation Division of the CPO by a computer or terminal in local areas.

COMPUTERIZED CHINESE PATENT INFORMATION SYSTEMS

Since 1985, the CPO has devoted significant resources to automatic processing for patent receipt, searching, examination, and publishing. The Chinese Patent Information System (CIPIS) was built up originally for patent information storage and retrieval and was made available to the public in 1992. This system contains two kinds of patent data (invention and utility model) published by the CPO from 1985 to the present. New documents will be incorporated into the system as they appear. More than 10 fields are available for searching and include the date of application, number of application or publication, the IPC code, the name of the applicant, assignee, or inventor, priority data, and word strings from the title or abstract. The Patent Information Center of the CPO and the Beijing Documentation Center provide the patent information searching services, and more than 180 terminals have been set up in China. At present, a new version of the system (CIPIS V2.0) is available. This is based on client−server architecture and provides all full-text specifications of Chinese patents *via* a local area network of the CPO.

Two other systems, the Chinese Patent Management System (CPMS) and the Chinese Patent Retrieval System (CPRS), have been developed and put to use. CPMS is a management system of the patent procedure including the receipt of the application, examination, the grant of the patent, and a variety of durations or periods and fees. CPRS is a patent retrieval system based on CPMS which provides the newest legal status of an application or a granted patent, and the database of CPRS is renewed every day. Both of the patent information systems are only available to patent examiners and local users.

In addition, the Searching and Consulting Center of CPO has established a Wireless (Microwave Spread Spectrum) Networking Telecommunication System that is connected with the Internet, providing an international online retrieval and alert service using DIALOG, STN, and other information hosts. As an Agency of Text Express Service for Knight-Ridder Information, Inc., the Center is able directly to provide patent specification with drawings through the DIALOG System *via* the Internet. Some seminars and training courses were provided by the CPO to promote professional searching skills for chemical and biological patent information, especially for chemical formulas, complex polymers, chemical structures, genetic sequences, proteins, and pharmaceuticals. Experts from the Chemical Abstracts Service of the U.S. and from Derwent Information Ltd. of the U.K. were invited to present lectures, and the seminars and courses received an excellent response.

Currently, the CPO is reforming and optimizing its automatic systems. Comprehensive and powerful computerized systems will be completed in 2 or 3 years and will include electronic application, electronic publication of patent documents, computerized storage and retrieval, information management of patent procedure, and implementation of patent technology.

Table 1. Main Subclasses and Numbers of Chinese Patent Applications by Chinese

1996		1995		1994		1993		1992	
subclass	no.	subclass	no.	subclass	no.	subclass	no.	subclass	no.
C04B	208	C04B	203	C04B	227	C04B	243	C04B	189
C07C	194	C09D	133	C09D	175	C09D	200	C07C	130
C09D	145	C12G	86	C07C	117	C09K	146	C09D	122

Table 2. Main Subclasses and Number of Chinese Patent Applications by Foreigners

1996		1995		1994		1993		1992	
subclass	no.	subclass	no.	subclass	no.	subclass	no.	subclass	no.
C07C	283	C07D	339	C07D	442	C07D	389	C07D	301
C07D	263	C07C	273	C07C	288	C07C	185	C07C	174
C08L	154	C08F	142	C08F	131	C11D	109	C08F	86

ANALYSIS OF CHINESE CHEMICAL PATENT APPLICATIONS

Invention and patent activities are very dynamic in the chemical industry, and chemical patents play an important role in the research, manufacture, sale, and export and import of chemical products. On Jan 1, 1993, a new revision of the China Patent Law came into effect, allowing the patenting of substances produced by chemical processes. Since then, the number of chemical patent applications has increased greatly, and at present, the total number of chemical patent applications in China stands at 43 653.

Table 1 shows the three major IPC subclasses found in Chinese chemical patents by Chinese applicants for the period 1992−1996, and Table 2 shows the same data for foreign applicants. Comparison of these tables shows immediately that there are significant differences between the Chinese patents applied by Chinese and foreigners in terms of the field of application. The subclass C07C (aliphatic, carbocyclic compounds) is an active area for all patents, but, otherwise, Chinese patent applications are more likely to be in the area of construction materials (C04B), composition of coatings (C09D), and other materials like liquid crystal materials (C09K) than are foreign patents. The latter include in their three main subclasses, heterocyclic compounds (C07D), macromolecular compounds (C08F), and composition of macromolecular compounds (C08L). Through such examinations of patent applications, clear differences between the Chinese chemical industry and that of foreign countries can be discerned.

APPLICATION OF PATENTED CHINESE TECHNOLOGY: AN EXAMPLE

As industry, agriculture, and the economy have developed in China, Chinese chemists have attached great importance to the use of patent information. Service operations such as the Patent Document Division, the Patent Information Center, and the Consulting Center of the CPO receive large numbers of search requests in the field of chemistry. The patent information search service serves to promote the use of new patented technologies and creates enormous economic benefits and social effects. The following is an example of the application and development of patented technology to development of catalysts for hydrocarbon oxidation.

Nylon is a major raw material in the chemical engineering and synthetic fiber industry. Cyclohexane is one of the more important raw materials used in the production of nylon, and the oxidation of cyclohexane to cyclohexanone is a significant process in the petrochemical industry. Worldwide, more than 3 million tons of cyclohexane are converted to cyclohexanone each year. In the oxidation process, however, low carbon acids formed as byproducts often damage the oxidation vessel and gradually form slag and cake on the surface of the reactors and tubes of the system, ultimately causing blockages. Such a system must be shut down for cleaning every 4−6 months. The cleaning process involves washes with large quantities of alkali, disposal of which, together with the slag removed from the reactor, constitutes a major environmental problem. In addition, the cleaning process leads to waste of valuable raw materials and requires that the system be out of action, resulting in a loss of efficient production time. Dealing with these problems has been a major concern to polyamide production facilities around the world.

After more than 10 years' research, Xiao Zhaosheng, a Chinese inventor, identified HEDP ester, which serves as a catalyst for the oxidation of cyclohexane and showed that it can solve these problems very effectively. He filed for patents in the Chinese Patent Office, the U.S. Patent and Trademark Office, and the Japanese Patent Office. Since that time, the technology has become widely used throughout China; the invention not only promises to resolve the environmental difficulties caused by slag and wastewater but it has also created an annual profit on the order of U.S.$2.5M. The patent applications have been granted in China [CN1035960, CN1011202 (granted), CN1044281, CN1017434 (granted)], in the U.S. [US5233092, US549804], and in Japan [JP 2067789 (granted)]. The patented technology and the catalyst materials have been licensed to several companies, including the Du Pont Corp.

CONCLUSION

The Chinese Patent Law has been in operation for 12 years, and during that time the Chinese patent information and service system has been developed. Computerization, use of networks, and production of CD-ROMs are now among the goals of service, and it is expected that as Chinese patent information management and services continue to be modernized, they will soon reach the same advanced levels found elsewhere. Patent information is a valuable human intellectual property, and it will play a significant role in the economic development of China.

REFERENCES AND NOTES

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