



WIPO Guide to Using Patent Information

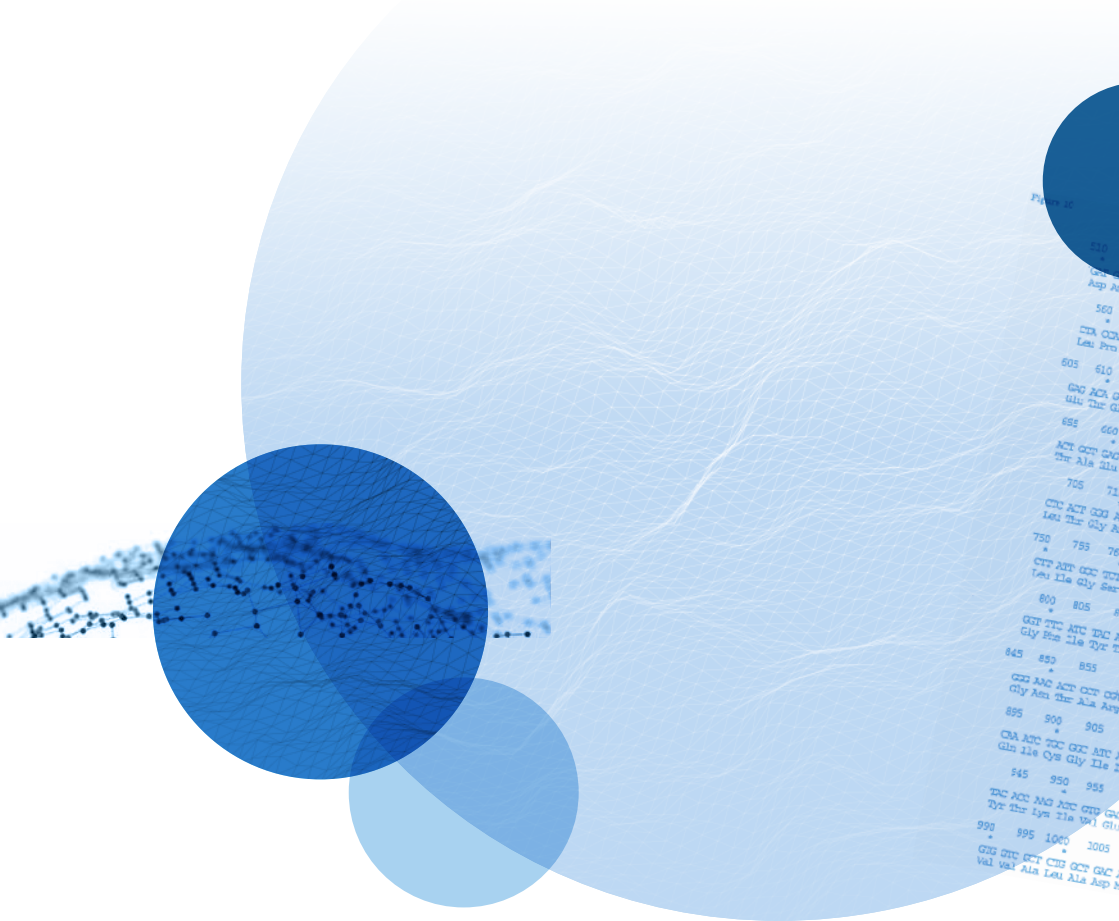


Figure 2

560 *
CXA CDA
Leu: Pro

805 610 *
GAG ACA G
Mit: Thr: Gl

695 660
ACT GGT GAG
Thr: Ala: Glu

705 710
CTC ACT GCG A
Leu: Thr: Gly: A

730 * 755 760
CTC AAT GCG TCA
Leu: Ile: Gly: Ser

800 805 *
GGT TTC ATT TDC A
Gly: His: Ile: Tyr: T

845 850 855
CGG AAC ACT GGT CGT
Gly: Ala: Thr: Ala: Arg

895 900 905
CRA ATC TCC GGC ATT G
Gln: Ile: Cys: Gly: Ile: S

945 950 955
TAC ACC AAC ACC GTC GAC
Tyr: Thr: Lys: Ile: Val: Glu

990 895 1000 1005
GTC TTC GGT CAG GCG GAC
Val: Val: Ala: Leu: Ala: Asp: M



Disclaimer

The main purpose of this publication is to provide basic information, it is not meant as a substitute for professional legal advice. Mention of names of firms and organizations and their websites does not imply the endorsement of WIPO.

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Introduction

Access to technology information has expanded rapidly in recent years, as a result of the increasing availability of technical documents in digital format and the progressive development of electronic means of distribution and retrieval. As the volume of technology information available to the public has grown, so too have the challenges of finding relevant information from which useful knowledge can be extracted.

This Guide aims to assist users in searching for technology information using patent documents, a rich source of technical, legal and business information presented in a generally standardized format and often not reproduced anywhere else. Though the Guide focuses on patent information, many of the search techniques described here can also be applied in searching other sources of technology information.

How does the patent system work?

A patent has two important functions:

- **Protection.** A patent allows the patent holder to exclude others from commercially exploiting the invention covered by the patent and as specified in the claims in a certain country or region in which the patent was granted and for a specific period of time, generally not exceeding 20 years from the filing date.
- **Disclosure.** The publication of a patent and in many countries patent applications give the public access to information regarding new technologies in order to stimulate innovation and contribute to economic growth.

Protection

A patent application may be filed via one of the following routes:

- **National.** An application for a patent is generally filed at a national patent office, and a patent for an invention may be granted and enforced only in a country in which patent protection is requested, in accordance with the law of that country. Corresponding applications covering the same invention can be filed in accordance with the respective national patent laws in different countries on an individual country-by-country basis.
- **Regional.** In some regions, regional patent applications may be filed at a regional patent office, for example the African Regional Intellectual Property Organization (ARIPO) or the European Patent Office (EPO). Regional patent applications have the same effect as applications filed

in the member states of the respective regional patent agreement. In certain regions, patents are granted centrally as a “bundle” of national patents. In some other regions, a single regional patent granted by the regional patent office has effect in the entire territory of that region. In order to validate regional patents in the Member States, submission of a translation of the granted patent into the national language may be required.

- **International.** International applications may be filed with the national or certain regional patent offices of Contracting States of the Patent Cooperation Treaty (PCT) or the International Bureau of the World Intellectual Property Organization (WIPO) by any resident or national of a PCT Contracting State. A single international patent application has the same effect as national or certain regional applications filed in each Contracting State of the PCT. Although the major part of the patent application procedure is carried out within the international phase, a patent can only be granted by each designated State within the subsequent national phase.

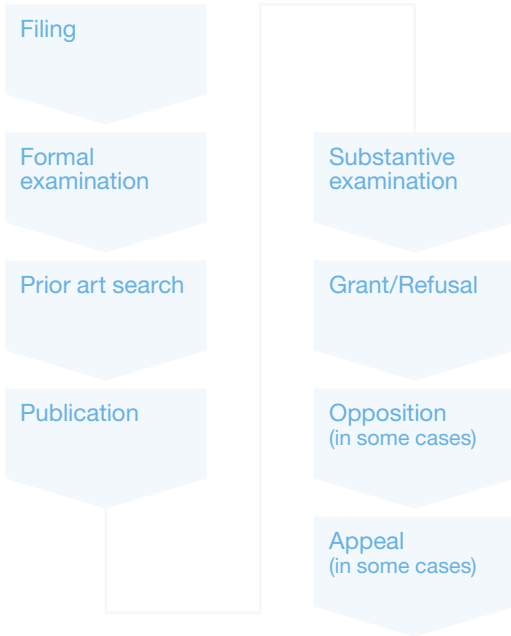
Although procedures vary amongst patent offices, the following illustrates a very generalized procedure for granting a patent:

- **Filing.** An applicant chooses a filing route, i.e. national, regional or international, and files an application. The initial filing is considered the “priority filing” from which further successive national, regional or international filings can be made within the “priority period” of one year under the Paris Convention for the Protection of Industrial Property.
- **Formal examination.** The patent office ensures that all administrative formalities have been complied with, e.g., that all relevant documentation is included in the application, and that a filing fee has been paid.
- **Prior art search.** In many countries, but not all, the patent office carries out a search of the prior art, i.e., of all relevant technological information publicly known at the time of

filing of the patent application or when applicable, at the time of the priority filing. Using extensive databases, expert examiners draft a “search report”, which lists relevant prior art.

- **Publication.** In most countries, the patent application is published 18 months after the priority date, i.e., after the filing date or the priority filing. In general, a patent is also published once granted.
- **Substantive examination.** Not all offices conduct substantive examination and some only do so if requested within a specified time. The examiner checks that the application satisfies the requirements of novelty and inventive step (non-obviousness) against the prior art listed in the search report. Further, he/she checks whether the invention is susceptible of industrial application and within the scope of patentable subject matter. In many countries prior art search and substantive examination are conducted consecutively.
- **Grant/refusal.** In general, if the patentability requirement is not met, the applicant is given an opportunity to amend the application. If the examination process reaches a positive outcome, the patent is granted and the office issues a certificate of grant. Otherwise, the patent application is refused.
- **Opposition.** Within a specified period, many patent offices allow third parties to oppose the granted patent on the grounds that it does not in fact satisfy patentability requirements. In some countries, third party observations and opposition may also be allowed in a certain time frame before the grant of a patent.
- **Appeal.** In general, decisions of grant or refusal of a patent and decisions of opposition boards can be challenged before an administrative body or a court.

Fig. 1 Patent granting procedure



Disclosure

The second important function of the patent system is disclosure, i.e., a patent gives the public access to information regarding new technologies in order to stimulate innovation and contribute to economic growth.

Though the **protection** offered by a patent is **territorial**, covering only the jurisdiction in which the patent has been granted, the information contained in a patent document is global, available as a disclosure to any individual or organization worldwide, thus allowing anyone to learn from and build on this knowledge.

Why use patent information?

Patent information is an important resource for researchers and inventors, entrepreneurs and commercial enterprises, and patent professionals. Patent information can assist users to:

- Avoid duplicating research and development effort;
- Determine the patentability of their inventions;
- Avoid infringing other inventors' patents;
- Estimate the value of their or other inventors' patents;
- Exploit technology from patent applications that have never been granted, are not valid in certain countries, or from patents that are no longer in force;
- Gain intelligence on the innovative activities and future direction of business competitors;
- Improve planning for business decisions such as licensing, technology partnerships, and mergers and acquisitions;
- Identify key trends in specific technical fields of public interest such as those relating to health or to the environment and provide a foundation for policy planning.

What information does a patent document contain?

Patent information comprises all information which has either been published in a patent document or can be derived from analyzing patent filing statistics and includes:

- **Technical information** from the description and drawings of the invention;
- **Legal information** from the patent claims defining the scope of the patent and from its legal status;
- **Business-relevant information** from reference data identifying the inventor, date of filing, country of origin, etc.;
- **Public policy-relevant information** from an analysis of filing trends to be used by policymakers, e.g., in national industrial policy strategy.

In particular, this information refers to the following:

- **Applicant.** Name of the individual or company applying to have a particular invention protected;
- **Inventor.** Name of the person or persons who invented the new technology and developed the invention;
- **Description.** Clear and concise explanation of known existing technologies related to the new invention and explanation of how this invention could be applied to solve problems not addressed by the existing technologies; specific embodiments of the new technology are also usually given;
- **Claims.** Legal definition of the subject matter for which protection is sought or granted; each claim is a single sentence in a legalistic form that defines an invention and its unique technical features; claims must be clear and concise and fully supported by the description;
- **Priority filing.** Original first filing on the basis of which further successive national, regional or international filings

can be made within the priority period of one year;¹

- **Priority date.** Date of the first filing from which the one-year priority period for further applications starts;
- **Filing date.** Date of submitting an individual patent application at a particular patent office;
- **Designated states.** If the application is regional or international, the countries to which the rights may be extended;
- **Legal status.** Indicates whether the patent has been granted or not; if granted, the countries or regions in which the patent has been granted; and whether it is still valid or has expired or been invalidated in a particular country or region;
- **Citations and references.** Certain patent documents also include references to related technology information uncovered by the applicant or by a patent examiner during the patent granting procedure; these references and citations include both patent and non-patent documents;
- **Bibliographic data.** Refers generally to the various data appearing on the front page of a patent document or the corresponding applications and may comprise document identification data, domestic filing data, priority data, publication data, classification data, and other concise data relating to the technical content of the document;
- **Document kind codes.** Used to distinguish published patent documents according to type and status (see WIPO Standard ST.16); for example, with respect to published international applications under the PCT, the code A1 denotes an international application published with the International Search Report (ISR), while the code A2 indicates an international application published without the ISR, and the code A3 designates an ISR published with a revised front page.
- **INID codes** (“Internationally agreed Numbers for the

¹ A group of applications based on a single application as described above is referred to as a “patent family.” Identifying the members of a patent family will not only reveal in which countries or regions patent protection is being sought by an applicant, but may also uncover translations of the application in different languages.

Identification of [bibliographic] Data”). Identify different elements of bibliographic data (see WIPO Standard ST.9); for example, the code 11 is associated with the patent number and the code 54 is associated with the title of the invention; the full list of INID codes can be found at: www.wipo.int/standards/en/pdf/03-09-01.pdf#INID

- **Country codes.** Specify different countries by a unique two-letter country code for example, the code “WO” indicates the International Bureau of WIPO; a list of country codes is given in WIPO Standard ST.3 available on the WIPO website.

Fig. 2 Sample patent application front page

The image shows a sample patent application front page with various fields and annotations. The page is titled "INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)". It includes the WIPO logo and the international publication number "WO 2019/038605 A1".

Classification: The page lists several international patent classification codes under the heading "09 - International Patent Classification".

Filing date: The international filing date is listed as "2018.05.25".

Priority data: The page lists several priority dates and corresponding application numbers under the heading "17 - Application".

Applicant: The applicant is listed as "SARIL SK. NIKHILESH COMPASS PVT. LTD." with its address in India.

Title: The title of the invention is "A NOVEL COMPOSITION OF MATTER FOR THE TREATMENT OF ALLERGIC DERMATITIS".

Abstract: The abstract describes a novel composition of matter for the treatment of allergic dermatitis, comprising a mixture of various active ingredients.

Annotations: The page is annotated with labels on the left side: "Classification", "Filing date", "Priority data", "Applicant", "Title", and "Abstract". On the right side, there are labels "Inventor" and "Designated states".

Where can patent information be found?

Patent information is made available to the public through a variety of databases. Each database covers a particular set of patent documents. At present no database has complete coverage of all patent documents ever published worldwide. Thus it may be necessary to consult multiple databases in order to find and then access patent documents relevant to your interests.

Many national and regional patent offices provide free online access to their own patent collections as well as to selected patent documents from other offices. An extensive list of national patent databases can be found at: www.wipo.int/patentscope/en/national_databases.html

WIPO offers free online access to all international patent applications within the framework of the PCT² and their related documents and patent collections from National and Regional Offices through its global patent database PATENTSCOPE: <https://patentscope.wipo.int>

A number of commercial and non-profit providers also offer free patent information databases online. Certain commercial providers have established value-added services for access on a fee-paying basis including translations of patent information and additional systematic classification, for instance by chemical structures and reactions or biological sequences.

Moreover, professional search services exist that can perform prior art searches on behalf of potential patent applicants

² For more information on the Patent Cooperation Treaty, please refer to www.wipo.int/pct/en/treaty/about.htm

and may be useful if an initial search does not produce desired results.

An extensive list of patent service providers can be found at: www.piug.org/vendors

What strategies can be used to search patent information?

A search carried out in patent documents allows you to find information on recent developments in a range of technical areas. In fact, for some fields of technology, new developments are initially and sometimes exclusively recorded in patent documents. Nonetheless, it is critical to keep in mind the limitations of the data in which the search is being carried out. No single data source covers all available technology information, or even all available patent information. The information may be limited with respect to the range of dates or countries for which records are available or in terms of the search facilities offered.

Effective searching of patent documentation and other sources of technology information often requires a solid knowledge of the technical field to which an invention belongs. An awareness of the terminology and issues related to this field are necessary if appropriate search criteria are to be identified.

Among the search criteria that can be used to find relevant patents are:

- Keywords
- Patent classification
- Dates (e.g., priority date, application date, publication date, grant date)
- Patent reference or identification numbers (application number, publication number, patent number)
- Names of applicants/assignees or inventors

The criteria supported by different patent databases may vary. Some patent databases allow patent documents to be

searched according to a broader range, others by a more limited range of criteria.

The sections of patent documents that can be searched using the above criteria may also differ from one patent database to another. Most patent databases permit users to search bibliographic/front page data, that is all data contained in a patent application except the description and claims.

Some patent databases, including PATENTSCOPE, allow full-text searches, including the description and claims.

The range of searchable data may also be more limited for older patent documents. In some cases, for instance, these documents can only be searched according to their title or patent reference number.

Careful!

Time lag between filing and publication. The period between the priority date and the date of publication is generally 18 months. Nonetheless, if a patent is granted, its owner is allowed to exclude third parties from commercially exploiting the technology covered from the priority date. In order to reduce the potential of infringing someone else's rights, patent documentation in the relevant country or region should be monitored to reveal the very latest published patent documents.

Tip

Some patent databases allow you to take advantage of notification systems such as RSS feeds to track developments in a specific field of technology.

Search by keyword

Patent information databases can generally be searched using keywords that describe the technology or problem the technology is designed to solve.

To target searches effectively, the following tools can be used to structure search queries using keywords or other terms:

- **Word operators.** Keywords can be combined using so-called “Boolean operators” such as: “AND”, “ANDNOT” (or simply “NOT”), “OR” and “XOR”, for example:

tennis AND ball	documents having both the word “tennis” and “ball”
tennis ANDNOT ball	documents having the word “tennis” but not “ball”
tennis OR ball	documents having either the word “tennis” or “ball” or both
tennis XOR ball	documents having either the word “tennis” or “ball” but not both

Proximity operators such as “NEAR” or “BEFORE” can be used to combine keywords or other terms and further specify that the combined terms must be within a certain proximity to each other. Documents in which the terms appear out of context with each other, which might appear when using the AND operator, are thus excluded.³

- **Truncation.** Words can be truncated, i.e., shortened to their primary root or stem, and variations on this root or stem found by using an operator called a wildcard, usually an asterisk (*), question mark (?), dollar sign (\$), or percent sign (%), so as to increase the coverage of the search, for instance:

³ Proximity operators generally have a default range within which search terms joined by the operator must lie, but in most cases a user-defined range may also be specified.

elect*	all documents having words based on the word stem “elect,” e.g., “electricity”, “electrical”, “electron” (but will also include words such as “election”, “electoral”, etc., which might not be relevant to a specific search, e.g., for electricity-related technology)
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Most patent databases allow right truncation, meaning that variations of a search term with different endings can be found with wildcard operators. Some also allow center and left truncation. Certain patent databases treat all search terms as word stems without requiring the use of wildcards.

- **Nesting.** Multiple potential search outcomes can result when using one or more different word operators, for example the “AND” and “OR” operators together, in a search query. Nesting can help resolve this issue by using parentheses or similar to specify in which order terms should be combined using the operators. For example:

tennis AND ball OR racket	two potential search outcomes to be resolved
(tennis AND ball) OR racket	documents having either the words “tennis” and “ball” or the word “racket”
tennis AND (ball OR racket)	documents having the word “tennis” and either the word “ball” or “racket”

- **Phrases.** Multiple terms can be treated as if they were a single term and thus found in the exact order in which they are found by enclosing them in quotation marks or similar. For instance:

tennis ball	documents having both the words “tennis” and “ball” (by default often treated as an “AND” clause)
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“tennis ball” documents having the phrase
“tennis ball”

The specific expressions used to represent the tools described above may vary from one patent databases to another. You can refer to documentation available for each patent databases to determine which exact expressions to use.

Careful!

Multiple languages. Patent documentation is available in a number of languages. This fact must be taken into account when conducting patent searches. For example, international patent applications filed under the Patent Cooperation Treaty (PCT) must have the title and abstract available in both English and French, but other parts of the application (e.g., description and claims) can be in a number of other languages. Therefore, a search using English language terms may only retrieve results with English language text. Certain terms can exist in multiple languages but have different meanings in each language. For example, the term “vent” describes an opening or outlet in English but means “wind” in French.

Misspelling. In spite of quality control mechanisms built into the patenting process, terms may not always be spelled correctly.

Synonyms or scientific names. Technologies can often be described using a variety of different technical or common terms.

Tip

Brainstorm for synonyms (e.g., using specialized technical dictionaries) and try to find a general concept central to the invention (essential technical feature or core technical subject matter). Keywords identified in this manner can be combined using the search tools described above (Boolean operators, proximity operators, truncation, and nesting).

Search by patent classification

All patent documents are individually classified using a standardized system identifying the technology group or groups to which the innovation described in the document belongs. These classification systems are independent of language and terminology and are assigned to patent and other technical documents by professional patent examiners. As a result, searching patent documents by patent classification can help overcome some of the pitfalls of searching by keywords alone.

A widely used system is the International Patent Classification (IPC) system. More information about the IPC system is available at: www.wipo.int/classifications/ipc/en

The IPC system covers nearly every imaginable field of technology.

The IPC is regularly revised in order to improve the system and to take account of technical developments. In its latest version, it subdivides technology into about 70,000 fields or groups.

Each group describes a specific technology and is identified by a “classification symbol” consisting of a sequence of numbers and letters. IPC symbols can generally be

found in the bibliographic data contained in published patent documents.

The IPC system is organized according to hierarchical levels. From highest, or most general, to lowest, or most specific; these levels are: sections, classes, subclasses, and groups (main groups and subgroups). Each section has a title and a so-called symbol, as follows:

- A Human Necessities
- B Performing Operations; Transporting
- C Chemistry; Metallurgy
- D Textiles; Paper
- E Fixed Constructions
- F Mechanical Engineering; Lighting; Heating; Weapons; Blasting
- G Physics
- H Electricity

From section (highest hierarchical level) to sub-group (lowest hierarchical level), the symbol “C21B 7/10” can, for instance, be broken down as follows:

- > Section C: Chemistry; Metallurgy
- > Class C21: Metallurgy of iron
- > Subclass C21B: Manufacture of iron or steel
- > Main group C21B 7/00: Blast furnaces
- > Subgroup C21B 7/10: Cooling; Devices therefor

A search performed using, for example, the subclass C21B will return all records classified under the main group C21B 7/00 as well as the main groups C21B 3/00, C21B 5/00, and so forth.

Subgroups are further subdivided with one or more dots preceding their title indicating the hierarchical position of each subgroup. A subgroup with a certain number of dots forms a subdivision of the nearest subgroup above it having one dot less. In the example on the next page, subgroups C02F 1/461

and C02F 1/469 (two-dot level) represent subdivisions of the subgroup C02F 1/46 (one-dot level).

Fig. 3 IPC classification dot-levels

D	C02F 1/40	• Devices for separating or removing fatty or oily substances or similar floating material (cleaning or keeping clear the surface of open water from oil or like materials E02B 15/04; devices in sewers for separating liquid or solid substances from sewage E03F 5/14) [2006.01]
D	C02F 1/42	• by ion-exchange [2006.01]
	C02F 1/44	• by dialysis, osmosis or reverse osmosis [2006.01]
—	C02F 1/46	• by electrochemical methods [2006.01]
—	C02F 1/461	• • by electrolysis [2006.01]
	C02F 1/463	• • • by electrocoagulation [2006.01]
	C02F 1/465	• • • by electroflotation [2006.01]
	C02F 1/467	• • • by electrochemical disinfection [2006.01]
	C02F 1/469	• • • by electrochemical separation, e.g. by electro-osmosis, electrodialysis, electrophoresis [2006.01]
	C02F 1/48	• with magnetic or electric fields (C02F 1/46 takes precedence) [2006.01]
	C02F 1/50	• by addition or application of a germicide or by oligodynamic treatment (C02F 1/467 takes precedence) [2006.01]
—	C02F 1/52	• by flocculation or precipitation of suspended impurities [2006.01]
—	C02F 1/54	• • using organic material [2006.01]
	C02F 1/56	• • • Macromolecular compounds [2006.01]

In order to identify relevant IPC symbols, a keyword search of the IPC can be performed on the IPC Official Publication at www.wipo.int/ipcpub. Entering keywords into the system will return a list of possible IPC symbols related to the terms entered.

Other notable classification systems used by patent offices include the:

- Cooperative Patent Classification (CPC) system developed jointly by the European Patent Office (EPO) and the United States Patent and Trademark Office, which is based on the IPC but which is further subdivided into specific subgroups;
- File Index (FI) system, used by the Japan Patent Office, based on the IPC but with additional subdivisions and additional classification elements (“F-terms”) used to indicate particular technical features or aspects of an invention.

Careful!

Lag in IPC reclassification. The IPC is revised periodically to take into account new technological developments. Patent applications published after the entry into force of a new version of the IPC generally bear the codes of the newest version, but some older patent documents may not be immediately reclassified (or may not be reclassified at all) and can thus only be located using IPC symbols from earlier versions of the IPC or other (non-IPC) search methods.

Search by number/date ranges

Patent documents are assigned unique identification numbers at each stage in the patenting process, i.e.:

- an application number;
- a publication number; and
- a patent number, if the patent is granted by a competent national or regional authority.

Also recorded in patent documents are key dates, including:

- date of filing;
- date of publication; and
- priority date (the date of filing of the patent application on the basis of which priority is claimed).

When granted, national or regional patent applications receive a date of granting. International patent applications entering the national phase are given a national application number and national phase entry date and are later assigned information regarding possible grant, refusal or withdrawal.

Patent documents can be located using the identification numbers and key dates assigned to them. Some search

services support the use of range operators to narrow the search in numerical fields, including date fields. Common range operators can include: greater than (>), less than (<), greater than or equal to (>=), less than or equal to (<=) and unequal to (<>). PATENTSCOPE uses brackets [... TO...] and the -> operator to specify a range of dates, for instance:

DP:[20070908 TO 20071231] documents with a publication date (DP) between 8 September 2007 and 31 December 2007

PATENTSCOPE supports a variety of date formats including:

YYYY	e.g.: DP:2000
YYYYMMDD	e.g.: DP:19981201
DD.MM.YYYY	e.g.: DP:01.12.1997
DD/MM/YYYY	e.g.: DP:01/12/1997

Careful!

Variation in number and date formats. Number and date formats may vary across databases. Patent identification numbers can differ in length and may include country codes, region codes, letter codes indicating type of protection, zeros, spaces, special characters (slashes, commas, periods, etc.), and document kind codes. Each patent office determines the number format to be used for the patent documents it issues, which may in fact change over time as offices change their numbering practices or as a result of legislative changes. Though some databases maintain patent reference numbers in the same format as they are given by the issuing patent office, many databases, particularly those that include patent documents from multiple patent offices, adapt the patent reference numbers to their own specific format.

For instance, a patent application published by the Italian Patent and Trademark Office is given the publication number MO2006A000199 (composed of a region code, the year, a letter code indicating type of protection, and a serial number including three zeros) but is recorded in the Espacenet search portal with the publication number IT2006MO00199 (adding a country code, while omitting the letter code indicating the type of protection and a zero in the serial number).

Tip

One approach for presenting patent reference numbers is given by WIPO Standard ST.10/C at: www.wipo.int/standards/en/pdf/03-10-c.pdf. However, in the absence of a universally applied standard for number and date formats, it is critical to refer to database documentation in order to obtain satisfactory search results.

Search by applicant/assignee name or by inventor name

Information on the patenting activities of specific individuals, companies or organizations may be obtained quickly by searching patent documents according to their names. The same techniques as described in the section on searching by keywords can be used for this purpose (word operators, truncation, nesting, and phrases).

Careful!

Name variations. It is not uncommon for a single applicant to appear under different names in patent documents. The name may simply be misspelled, abbreviated (e.g., “Limited” or “Ltd.”) or may change

over time (e.g., “International Harvester” was renamed “Navistar International Corporation” in 1986).

Search in specific data fields

It is often desirable to search for words, numbers, or combinations thereof in a particular data field rather than in the whole document. For instance, a user might want to search for a certain keyword only in the title or abstract of a collection of patent documents.

In some patent databases, search terms can be entered into different predefined search fields.

Fig. 4 PATENTSCOPE field combination search

FIELD COMBINATION ▾

	Field Front Page	▾	Value	?
Operator AND	Field WIPO Publication Number	▾	Value	?
Operator AND	Field Application Number	▾	Value	?
Operator AND	Field Publication Date	▾	Value	?
Operator AND	Field English Title	▾	Value	?
Operator AND	Field Abstract	▾	Is Empty: N/A	▾

Some patent databases allow users more flexibility in organizing their searches through the use of field codes. Field codes uniquely identify a particular data field in a document and are inserted in front of search terms (keywords, etc.), usually separated by a backslash (/) or colon (:). Field codes vary among patent databases and must be obtained from the

guidance provided by each patent database. Search terms not preceded by field codes may be located in all data fields rather than any specific field by default.

For example, in the advanced search of PATENTSCOPE, the field code “DE” is associated with the “Description” field.

semiconductor	documents having the word “semiconductor” in any data field
DE/semiconductor	documents having the word “semiconductor” in the “Description” data field

The first search would return all patent documents containing the word “semiconductor,” including documents in which the word does not appear in the “Description” field. Thus, any patent application filed by the company Freescale Semiconductor would also be included in the results, even those not actually relating to semiconductor technology, since the word “semiconductor” would turn up in the “Applicant Name” field.

Using citations and reference information

Patent applications often contain references to earlier patent documents (e.g., patent applications or granted patents) or to information published in scientific and technical literature (e.g., journals or handbooks), particularly in the description section of the application. Moreover, in the course of the procedure for obtaining a patent, patent examiners prepare reports in which they may cite patent documents or other documents describing similar or closely related technical solutions to the one for which the patent is being sought. These reports are made available to the public by most patent offices. Citations contained in patent documents can be a useful way of identifying additional documents related to the technology being investigated or help uncover further search criteria.

A common standard used for classifying documents cited by patent examiners in their search report according to their relevance provides for several categories of documents, the most prevalent of which are:

- **Category X.** Document that, taken alone, anticipates the claimed invention, as a result of which the claimed invention cannot be considered novel or cannot be considered to involve an inventive step;
- **Category Y.** Document that, in combination with one or more other such documents, anticipates the claimed invention, insofar as such a combination can be considered obvious to a person skilled in the art;
- **Category A.** Document providing technical background information on the claimed invention.

The example below provides an illustration of how these different categories are used.

For further information on this classification system for cited documents, see: www.wipo.int/standards/en/pdf/03-14-01.pdf

Good practices in searching patent documentation

The most effective searches exploit all the search options elaborated above, by using and combining keywords, IPC symbols, and number/ date ranges, as supported by the patent database used.

Effective searching of patent documentation is a step-by-step process, moving from an initial broad search to increasingly more focused searches. Casting a wide net at first will allow you to uncover unexpected – but nonetheless potentially relevant – search results, as well as identify additional search criteria for subsequent searches. Ultimately, however, the number of search results must be limited to a reasonable number to allow the individual records to be examined in detail.

Fig. 5 Sample international search report (ISR)

INTERNATIONAL SEARCH REPORT		International Application No PCT/AT 02/00172
A. CLASSIFICATION OF SUBJECT MATTER IPC 7 B62M3/08		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 B62M		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 516 494 A (DANEL FRANCOIS-LEOPOLD-AUG) 19 April 1921 (1921-04-19) abstract; figures	1
Y	---	4
Y	US 5 628 710 A (HERVIG DANA P) 13 May 1997 (1997-05-13) abstract; figures	4
X	FR 2 753 953 A (FRECHAUT JEAN) 3 April 1998 (1998-04-03) abstract; figures	1
A	---	1,4,5
	WD 00 68067 A (BADARNEH ZIAD) 16 November 2000 (2000-11-16) abstract; figures	
<input type="checkbox"/> Further documents are listed in the continuation of box C.		
<input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents:		
'A' document defining the general state of the art which is not considered to be of particular relevance		'1*' later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention 'X*' document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone 'Y*' document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. 'A*' document member of the same patent family
'E' earlier document but published on or after the international filing date		
'I*' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another claim or other special reason (as specified)		
'O*' document referring to an oral disclosure, use, exhibition or other means		
'P*' document published prior to the international filing date but after than the priority date claimed		
Date of the actual completion of the international search		
10 September 2002		Date of mailing of the international search report
17/09/2002		Authorized officer
Name and mailing address of the ISA European Patent Office, P.O. 5018 Patentstr 2 NL - 2280 HV Rijswijk Tel: (+31-70) 340-2140, Tx. 31 851 epo nl Fax: (+31-70) 340-3016		Wagner, H

Form PCT/ISA210 (second sheet) July 1992

To this end, the following issues should be considered when developing a search strategy:

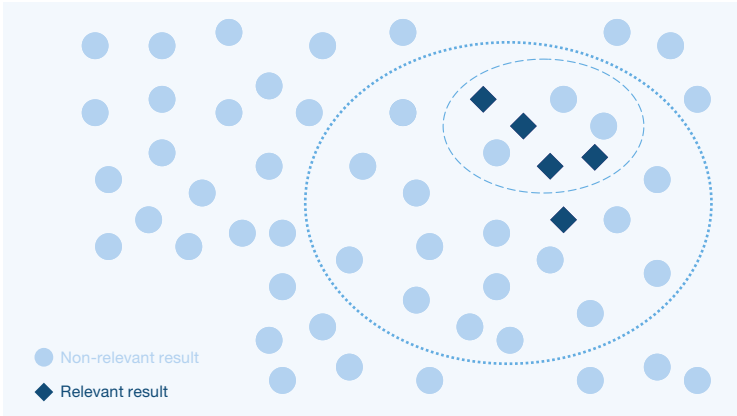
- **Broad vs. specific search terms.** The keywords and IPC symbols used in the first rounds of searching should cover the broad field of technology to which the innovation in question belongs. For example: if you are searching for information on light-emitting diodes, you may want to initially search using keywords such as “semiconductor” or IPC symbols such as the subclass “H01L” (semiconductor devices) rather than the group “H01L 33/00” (semiconductor devices specially adapted for light emission).
- **Inclusive/exclusive search operators.** Certain search operators can be used to broaden your search (inclusive operators), while others serve to narrow your search (exclusive operators).

Inclusive operators are, for example, “OR” and any wildcard operator (since all word combinations based on the word stem to which a wildcard operator is applied are included in the results).

Exclusive operators are, for instance, “AND”, since results must contain both words or phrases joined by this operator, and quotation marks, since results must contain the exact phrase inside the quotation marks.

As shown in the diagram on page 32 (Fig. 6), narrowing the search scope should increase the proportion of relevant records included in the search results, i.e., increasing the precision of the search. However, narrowing the search scope may also decrease the number of relevant records retrieved, i.e., decreasing the recall of the search.

Fig. 6 Search precision vs. recall



Precision: In the diagram above, the wider search (represented by the dotted line) produces 23 results of which only five, or approximately 20 percent, are relevant, while the narrower search (represented by the dashed line) produces seven results of which four, or more than half, are relevant.

Recall: Above, the wider search retrieves all five, or 100 percent of, relevant results, while the narrower search retrieves only four of five, or 80 percent of, relevant results.

How can patent information be used?

Patent documents include a broad range of technical and legal information that can be used for a number of different purposes including:

- Prior art searches;
- Gathering business intelligence;
- Avoiding patent infringement;
- Patent valuation;
- Identifying key trends in technology development.

In the examples given in the section below, PATENTSCOPE search service is used for illustrative purposes, but similar approaches can be taken using other patent and non-patent databases.

The steps described in the practical cases may be used as guidance in performing your own searches.

Prior art searches

Among the criteria that are used to determine the patentability of a claimed invention are:

- Novelty: Is an invention new?
- Non-obviousness/Existence of an inventive step: Is the invention sufficiently different from existing technologies?

To determine whether a claimed invention meets these criteria, it must be compared to the prior art, i.e., the pool of existing knowledge made available to the public anywhere

around the world. Patent documents are an important channel through which technical information is made publicly available. Consequently, searching patent documents is an important step in determining whether an invention is ultimately patentable.

Before conducting a patentability search for existing patent documentation, it is important to determine the characteristics of the innovation for which you are considering seeking patent protection:⁴

- What problem does your invention solve?
- What does your invention do?
- What effect does your invention produce?
- How is your invention constructed?
- What materials or methods are used in the construction of your invention?

Answers to these questions should then be distilled into essential words and phrases that will be used in searching existing patent documentation.

Remember that existing patents in fields of technology not obviously related to the innovation at hand may contain information that has a bearing on the patentability of your invention.

For example, your invention relates to a novel blade design for a wind turbine. Patents on the design of helicopter rotor blades, airplane wings, or other aerodynamic structures may contain relevant prior art. As a result, the scope of your search should not be restricted unnecessarily to avoid missing relevant documents.

⁴ Considering these questions may also assist you in improving the quality of an eventual patent application.

Careful!

Non-patent literature. An important contribution to prior art in many technical fields is made by non-patent literature, including scientific and trade journals. An exhaustive search for prior art must therefore take into account this body of information.

Alternative types of IP protection. Some countries offer types of IP protection apart from patents including utility models, petty patents, or similar. The information disclosed in applications for these types of protection also represents prior art that must be considered in determining the patentability of an invention.

Patent laws. Legal requirements for patentability, such as the extent of the inventive step needed to obtain a patent for a particular invention, may vary from one jurisdiction to another. Therefore, it may be useful to seek the advice of a patent professional if a preliminary patentability search does not reveal any prior art that clearly invalidates your potential patent claims.

Practical case

You have developed a method for printing solar cells onto aluminum foil at low temperatures using a nanoparticle ink.

Step 1

Identify central concepts related to your innovation

From the description offered above, central concepts could include: “solar cell” (product), “aluminum foil”, “nanoparticle ink” (materials used in the production process).

Step 2

Determine keywords for your search

The next step is to find synonyms and related keywords and phrases for the concepts identified in the first step:

solar cell	photovoltaic cell (synonym)
aluminum foil	aluminium foil (alternative spelling), metal foil (related term)
nanoparticle ink	nanoparticle solution (related term), nanoparticle suspension (related term)

Step 3

Determine IPC symbols for your search

We can identify pertinent IPC symbols using some of the words and phrases found in the previous steps on the IPC Official Publication (see: www.wipo.int/ipcpub). Searching for the term “solar cell” using the default settings identifies the IPC group H01L 31/00 as a relevant IPC symbol.

Step 4

Perform first search

The first searches should be relatively broad, using (i) the “OR” Boolean operator to join related keywords and IPC symbols; and (ii) a wildcard operator to include plural forms of words and phrases. The “International Class” field code (“IC”) can be used in PATENTSCOPE (advanced search interface) to restrict the search for IPC symbols to this field.

The first search will focus on finding a broad range of patent applications relating to the product in question:

```
IC/H01L31/00 OR “solar cell*” OR “photovoltaic cell*”
```

This search produces over 250 000 results, a number of results far too great to allow a detailed review of individual records. Examining the results reveals that they include applications covering not only methods for producing solar cells but also for arranging and using solar cells. The results also cover a much

broader range of basic construction materials than apply to the innovation whose patentability you are seeking to examine.

Fig. 7 PATENTSCOPE search results

The screenshot shows a search interface with the query: IC:H01L31/00 OR "solar cell*" OR "photovoltaic cell*". The results are sorted by relevance, showing 528,419 results. Two results are visible:

- 1. 3318317 SOLAR CELL MODULE** (EP - 02.05.2018)
 Int.Class H01L 31/048 Appl.No 16198276 Applicant NEXIOT AG Inventor WARTMANN CHRISTOPH
 A solar cell module (1) has a rear housing (3) to accommodate (4) a photovoltaic cell module (5) attached to the rear housing (3) and comprising an array of photovoltaic cells (6) arranged opposite to the rear housing wall (3). The solar cell module (1) further comprises a grid (20) comprising webs (22), wherein the grid (20) is attached on the upper surface (10) of the photovoltaic cell module (5) and partly on the surrounding rear housing (3); wherein the webs (22) define window openings (30) essentially provided in front of the photovoltaic cells (6) thus that the webs (22) do not shadow the photovoltaic cells (6).
- 2. 20180122976 SOLAR CELL MODULE** (US - 03.05.2018)
 Int.Class H01L 31/05 Appl.No 15796238 Applicant Nexiot AG Inventor Christoph Wartmann
 A solar cell module has a rear housing to accommodate a photovoltaic cell module attached to the rear housing and comprising an array of photovoltaic cells arranged opposite to the rear housing wall. The solar cell module further comprises a grid comprising webs, wherein the grid is attached on the upper surface of the photovoltaic cell module and partly on the surrounding rear housing, wherein the webs define window openings essentially provided in front of the photovoltaic cells thus that the webs do not shadow the photovoltaic cells.

Step 5

Sharpen search

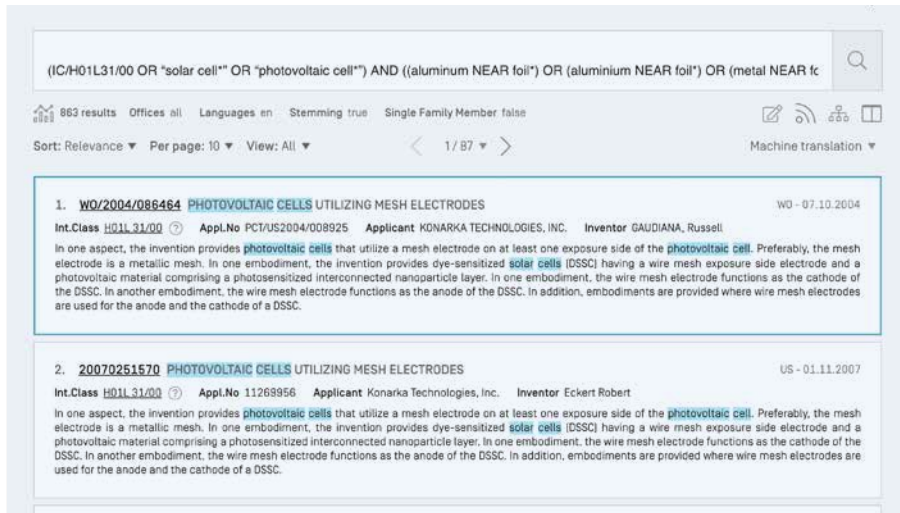
Taking into account the results from our preliminary search, the search should be limited using more specific search terms and linked using the “AND” Boolean operator. Nesting should be used to resolve any potentially ambiguous search syntax.

In order to capture results containing wordings such as “nanoparticle solution” as well as “solution containing nanoparticles,” we will use the “NEAR” operator in order to define the distance between 2 words (5 in the example):

```
(IC:H01L31/00 OR "solar cell*" OR "photovoltaic cell*") AND
((aluminum NEAR foil*) OR (aluminium NEAR foil*) OR (metal
NEAR foil*)) AND ((nanoparticle* NEAR suspension) OR
(nanoparticle* NEAR solution) OR (nanoparticle* NEAR ink))
```

This search produces a more manageable number of results.

Fig. 8 PATENTSCOPE search results



Gathering business intelligence

Knowing which companies or individuals are technology leaders in your area of business can play an important role in planning your commercial and research and development activities. Patenting activity and patent ownership can be important in identifying principal innovators in different areas of technology.

Though a search will reveal any patent documents meeting the specified search criteria that are published at the time the search is performed, new applications emerge over time that are relevant to your business.

To keep track of these developments, some patent databases offer the possibility of requesting email updates or

establishing customized RSS feeds, which are continuously updated to reflect newly published documents and can be accessed using common software applications.

Careful!

Trade secrets. Rather than seeking patent protection for an innovation and accepting the mandatory disclosure associated with applying for a patent, some businesses may seek to protect their ideas by keeping them confidential, particularly if these innovations are susceptible to reverse engineering. Thus some of your competitors' innovative activities and strategies for the future may not be revealed through a patent search.

Commercialization. A technology need not be commercialized by the patent holder but may also be licensed to one or more third parties. As a result, published patent applications may not always fully reflect the business activities of competitors.

Practical case

Your company produces farm equipment and would like to keep track of new developments in plow technology on the international market.

Step 1

Determine criteria for your search

An obvious choice would be to search for patent applications using the keyword "plow." However, keyword searches can be easily misled by alternative spellings (e.g., "plough"), technical terminology, obfuscation, or foreign language applications. Therefore, it may be advisable to use IPC symbols to find relevant applications.

Searching the IPC according to keywords using the IPC Official Publication (see: www.wipo.int/ipcpub) reveals that several IPC main groups are related to plow technology.

Step 2

Perform search

Since multiple IPC main groups seem to be relevant, you should include all of these main groups identified in the first step in your search. This can be done using the “OR” Boolean operator. Since you are interested only in searching the using IPC symbols, you can limit your search to the appropriate field in PATENTSCOPE (advanced search interface) by using the “International Class” field code (“IC”) in front of the relevant IPC symbols as follows:

```
IC/(A01B3/00 OR A01B5/00 OR A01B9/00 OR A01B11/00 OR  
A01B13/00 OR A01B15/00 OR A01B17/00)
```

This search retrieves over several thousand results, including applications covering “ground or soil-working tools and machines” and an “agricultural cutting tool that engages the soil.”

Step 3

Analyze the data

From PATENTSCOPE results page, you can quickly navigate to in-depth analysis of the results and visualize the patenting activity in your area of interest in tabular (Figure 9a) or graphical (Figure 9b) format, as shown below.

Fig. 9a Statistical analysis of search results

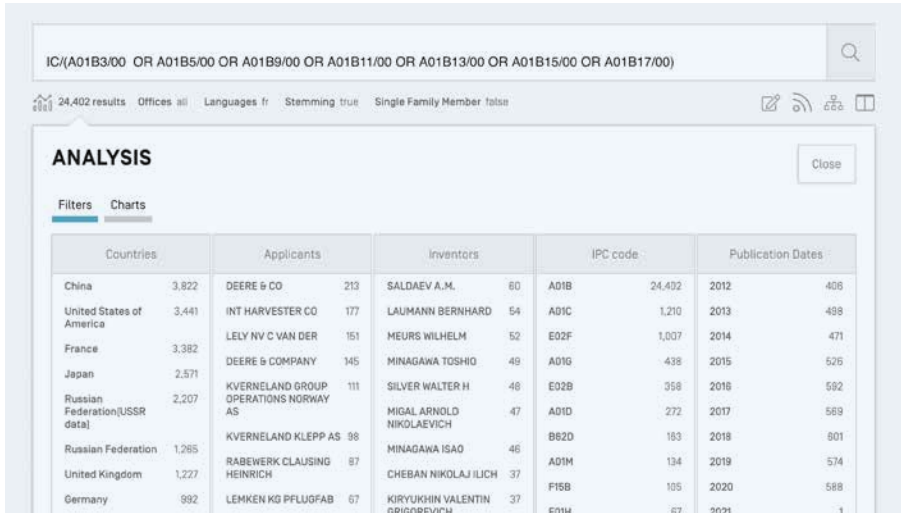


Fig. 9b Graphical analysis of search results



Step 4

Keep track of current information

From PATENTSCOPE results page you can also access RSS feeds as shown below. By subscribing to the RSS feed, you can remain up-to-date on the latest international applications relevant to your business interests, since the content of the feed is continuously updated as new applications are published that meet the criteria specified for the original search.

Avoiding patent infringement

Costly legal procedures associated with patent infringement can often be avoided by gathering information on the scope of existing patents and their legal status in the jurisdictions in which you plan to establish business operations. This information can be obtained by way of systematic searching of patent documents. Such a search should include patent documentation for the PCT system and for national and regional jurisdictions in which you wish to commercialize the technology in question. Having identified relevant patent documents, the first step is to examine the legal status of the patent application:

- Has the patent been granted, rejected, withdrawn, or is it still pending?
- In which countries?
- Is the patent still valid, or has it expired?
- Do patent term extensions apply, which might exist in very specific cases?

If a patent is in force in a particular jurisdiction in which you wish to market your product, the second step is to appraise the claims made under this patent. Potential infringements can be avoided by modifying your product to take into account these claims.

Since patent applications are not published until around 18 months after they are filed, it is important to continue monitoring patent documentation in fields of technology related to your product. Many patent databases incorporate notification tools, e.g., RSS feeds, that can greatly facilitate this process.

Patent valuation

Patent documentation can provide an indication as to the value of patents that you or your competitors have been granted. In particular, the citation information contained in patent documents – notably other patents, patent applications, or national or International Search Reports (ISRs) – subsequent to a particular patent can be useful for estimating the value of the patent in question. For example, the number of times a patent is cited in later patent documents is indicative of its technical relevance and thus of its value.

A number of patent databases are offered by patent offices and commercial providers that allow the analysis of citation information, in particular by identifying later patent documents that cite a particular patent. One such database is provided by the European Patent Office at: register.epo.org.

Careful!

Patent value. The commercial value of a patent depends on many factors that may not be reflected in patent documentation, including the ability of the patent holder or licensee to promote products based on the protected technology as well as the size of the potential market.

Identifying key trends in technology development

Statistical data obtained from patent documents can be used to map key trends across different fields of technology and different countries, thereby helping policymakers make better informed decisions.

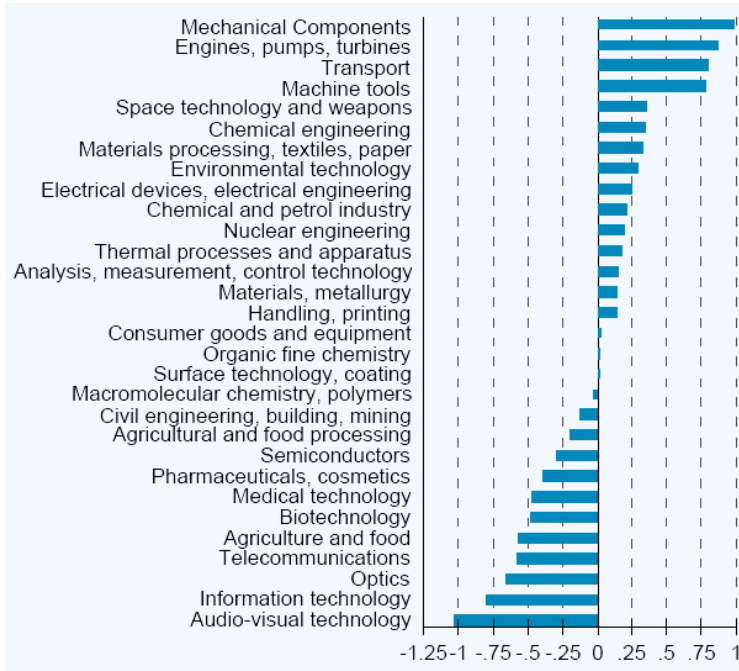
Patent data can be obtained through national and regional patent offices' statistical publications, notably their annual reports, which are often released through the patent offices' websites. WIPO provides access to a broad range of statistics on world patent activity at: www.wipo.int/ipstats/en.

The data generally describes the number of patents filed, granted, and in force in different countries and may be broken down according to a number of criteria including by technology group or by country of origin of applicant or inventor.

Depending on the criteria according to which patent data can be broken down, it can, for instance, be used to track the growth and changes in patent activity over time, examine the distribution of patent applications in a country by residents compared to non-residents, or identify the technical areas in which a country is predominantly active in terms of patenting activity.

One patent statistic used by certain government agencies in planning their industrial development strategy is the "relative specialization index," as shown below. This index compares the country's share in global patent activity in one technology area to the country's share in global patent activity over all areas of technology. It may be useful to identify the relative strengths and weaknesses of a country in terms of patenting activity and thus highlight possible areas to be targeted for investment.

Fig. 10 Relative specialization index showing concentration of patenting activity in a specific country



Source: PCT Quarterly Report: Trends and Analysis, WIPO

Practical case

Your government has identified the absence of adequate food preservation technology as a key obstacle to the further development of the agricultural export sector and is considering negotiating technology transfer agreements with other countries in order to obtain better access to relevant technologies.

Step 1

Determine criteria for your search

Browsing the IPC shows that, in this specific case, an IPC group exists that appears to cover the field of technology in question, namely A23L 3/00.

Step 2

Perform search

Since only a single IPC group is required to cover the field of technology at hand, the search criteria required to identify relevant records is exceptionally simple in this case. The IPC symbol identified in the first step can be entered into the appropriate field in PATENTSCOPE (advanced search interface).

Step 3

Analyze the data

Summary data and graphical representations of the international data and graphical representations of the international patent applications identified in the previous step can be quickly obtained from the results page, as shown below.

Fig. 11 PATENTSCOPE search results

IC/(A23L3/00)

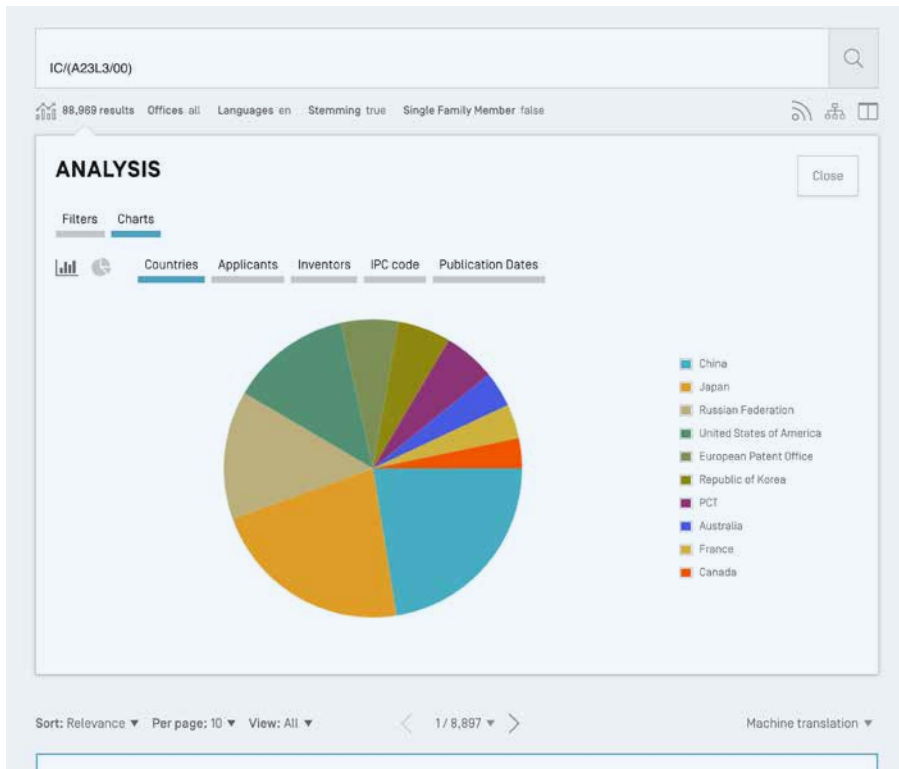
88,969 results Offices all Languages en Stemming true Single Family Member false

Sort: Relevance Per page: 10 View: All 1 / 8,897 Machine translation

1.	1201802698	QUY TRÌNH TẠO HẠT THỰC PHẨM	VN - 25.11.2019
	Int.Class	A23L 3/00	Appl.No 1201902698 Applicant Société des Produits Nestlé S.A. Inventor TANG, Tianyue
	Quy trình tạo hạt thực phẩm, trong đó hạt bao gồm hạt axit xitric, thành phần tinh thể khác, dầu, và tùy chọn gia vị và/hoặc hương liệu.		
2.	1201804477	QUY TRÌNH TẠO HẠT THỰC PHẨM VÀ HẠT THỰC PHẨM CÓ THỂ THU ĐƯỢC BẰNG QUY TRÌNH NÀY	VN - 25.03.2019
	Int.Class	A23L 3/00	Appl.No 1201804477 Applicant Société des Produits Nestlé s.a. Inventor TANG, Tianyue
	Sáng chế đề cập đến quy trình tạo hạt thực phẩm, trong đó hạt bao gồm chất béo, muối, tinh bột, nguyên liệu thực phẩm hút ẩm và tùy chọn các gia vị khô. Ngoài ra, sáng chế đề cập đến hạt thực phẩm có thể thu được bằng quy trình này.		

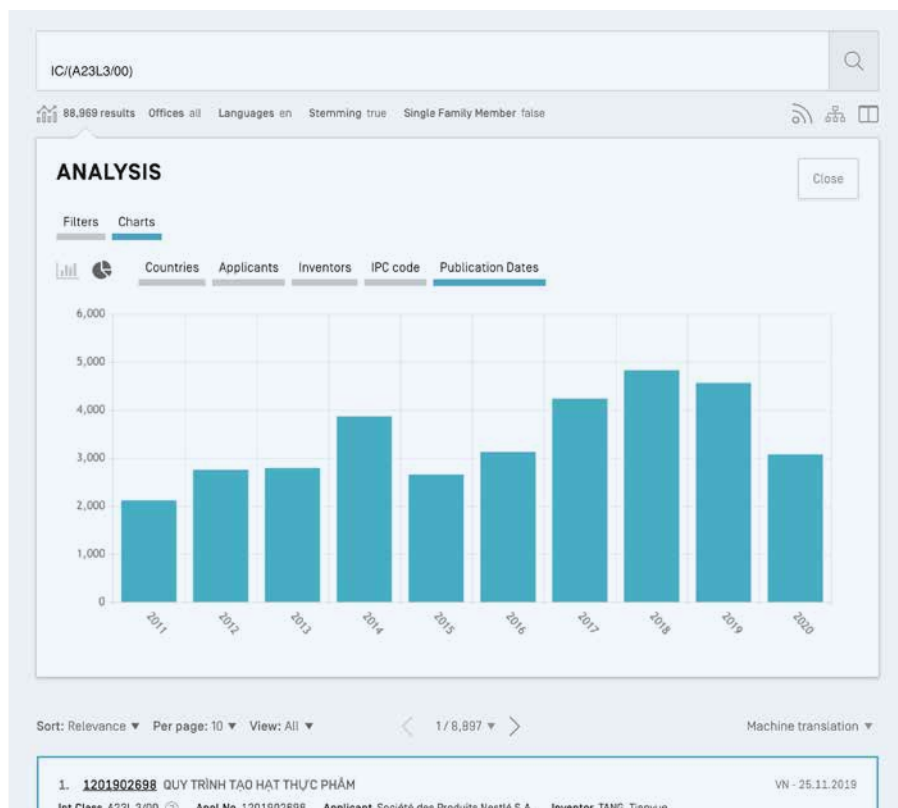
The information obtained using the graphical analysis tool includes the number and distribution of patent applications relating to the search criteria used in the second step, that is to say, in the field of food preservation technology.

Fig. 12 Visualization of search results by office of filing



It also includes information on historical trends in the filing of international applications in this field. The number of applications for the current year only reflects the number of applications published at the time of the search and thus may appear surprisingly low.

Fig. 13 Visualization of search results by publication date



Where can non-patent literature be located?

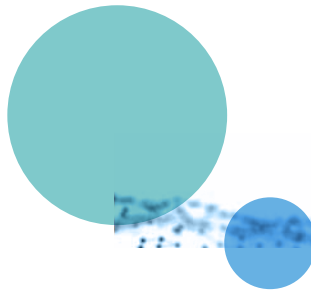
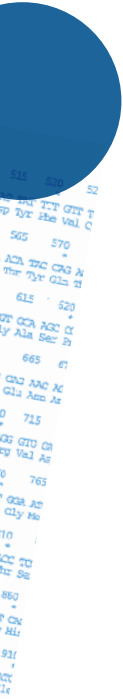
Non-patent literature includes scholarly journals, textbooks and other sources of scientific and technical knowledge. In many fields of technology, non-patent literature plays a central role in defining the prior art and is, therefore, indispensable for determining the patentability of any innovation.

WIPO has established a list of periodicals that intellectual property offices must consult when carrying out international searches as part of the patenting process under the PCT system. This list, known commonly as the PCT Minimum Documentation, is available at: www.wipo.int/standards/en/part_04.html.

A thorough consultation of the periodicals included in the list of non-patent Minimum Documentation is a necessary step for determining whether prior art exists with respect to an innovation. However, additional sources must also be reviewed to determine the novelty of the innovation.

A number of free online tools for searching non-patent literature are offered by commercial providers including Google Scholar and Microsoft Academic. Certain commercial providers also provide enhanced search features, including cross-references and IPC-classified non-patent documents, on a fee-paying basis.

www.wipo.int/tisc
<https://patentscope.wipo.int>



World Intellectual Property Organization
34, chemin des Colombettes
P.O. Box 18
CH-1211 Geneva 20
Switzerland

Tel: +41 22 338 91 11
Fax: +41 22 733 54 28

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