

***RESEARCHING THE PATENT LITERATURE  
IN THE ELECTRONIC AGE***

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## Internet Addresses for On-line Searching

Fee based sites are indicated with \$ sign.

### *CIPO Home Page*

<http://cipo.gc.ca>

Canadian Intellectual Property Office

### *Searching Canadian Patents*

<http://strategis.ic.gc.ca>

<http://strategis.ic.gc.ca/ssg/ed01333e.html>

Strategis

Business Intelligence Express (BIX)  
(A business guide to using patents)

### *Searching United States Patents*

<http://uspto.gov/index.html>

<http://patents.cos.com> (classifications too)

[http://www.nal.usda.gov/bic/Biotech\\_Patents/](http://www.nal.usda.gov/bic/Biotech_Patents/)

<http://www.godunov.com/Bucky/Patents.html>

<http://apollo.osti.gov/waisgate/gc.html>

<http://casweb.cas.org>

U.S. Patent and Trademark Office  
Community of Science \$  
USDA  
Fullerene Patent Database  
Department Of Energy  
Chemical Patents Plus

### *Searching International Patents on the Commercial Services*

<http://www.derwent.com/intellectualproperty>

<http://www.delphion.com>

<http://www.questel.orbit.com>

<http://stneasy.cas.org>

<http://www.dialogweb.com>

<http://www.micropat.com>

Derwent Intellectual  
Property \$\$  
Delphion (account required) \$  
Questel (Offers many patent files) \$  
Science and Technical Network \$\$  
Dialog (Offers many patent files) \$  
Micropatent \$

### *Searching Patents in National Patent Databases*

<http://ep.espacenet.com/>  
<http://www.jpo.go.jp/>  
<http://www.hpo.hu/English/szkv/ekerform.cgi>  
<http://www.inpi.gov.br/idiomas/ingles.htm>  
<http://www.ipaustralia.gov.au>  
<http://www.wipo.org>

European Network of Patent Office  
Japanese IP  
Hungarian IP  
Brazilian IP  
Australian IP  
WIPO - IPC

### *Searching Non-patent Literature*

<http://www.dialogweb.com>  
<http://stneasy.cas.org>  
[http://www.nrc.ca/cisti/cisti\\_e.shtml](http://www.nrc.ca/cisti/cisti_e.shtml)  
  
<http://www.cup.cam.ac.uk>  
<http://www.oclc.org/firstsearch/>  
<http://adswww.harvard.edu>  
[http://www.optics.org/search/spie\\_ab\\_search.html](http://www.optics.org/search/spie_ab_search.html)  
<http://www.bioscience.org/urllists/proserch.htm>  
<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi>  
<http://www.bmn.com/>  
<http://www.colby.edu/chemistry/cmp/cmp.html>  
<http://chemfinder.com>

Assorted technical databases  
Assorted technical databases  
Canadian Institute for Science and  
Technical Information  
Cambridge University Press holdings  
Assorted technical and business journals  
NASA astrophysics databases  
Optics and computer related databases  
Protein search tools  
Medline and sequence databases  
BioMedNet  
Organic compounds  
Chemical compounds

### *Other Links to Patent Data Resources*

[www.piug.org](http://www.piug.org)  
[www.mayallj.freemove.co.uk/](http://www.mayallj.freemove.co.uk/)

Patent Information Users Group  
Mayall's IP Links

## Document Delivery, Canada and International

On the Espacenet service, provided by the European patent office, a person can find patent documents from most of the major countries. Coverage of countries such as the US and Germany goes back 70 years. Documents are usually available in PDF format. A quick way to print these patents (if your printer has a lot of memory) is with a shareware programs such as PatSee, downloadable from <http://www.mayallj.freeserve.co.uk/patsee.htm> or PATMATE at <http://www.patmate.com>. These robot programs will find any indicated patents on the Internet and print them for you.

Many other sites, such as those for CIPO and the USPTO have full text patents. However for the USPTO site you must download a program to display TIFF images. One such TIFF viewer is available free at [www.alternatTIFF.com](http://www.alternatTIFF.com)

### International Patent Copies

<a href="http://www.optipat.com">www.optipat.com</a>	Optipat, USA
<a href="http://www.direct-patent.nl">www.direct-patent.nl</a>	Direct Patent, Netherlands.
<a href="http://www.leeds.gov.uk/library/services/patents.html">www.leeds.gov.uk/library/services/patents.html</a>	Leeds Library, UK
<a href="http://www.fiz-karlsruhe.de/autodoc/">www.fiz-karlsruhe.de/autodoc/</a>	AutoDoc, Germany

**Older copies of Canadian and some foreign patents may be available from CIPO at the locations below.**

CIPO: Document Delivery, Client Service Centre:

Phone: 819-997-1936

Fax: 819-953-7620

Address: Canadian Intellectual Property Office  
Place du Portage Phase I  
50 Victoria Street  
Hull, Quebec  
K1A 0C9

To order copies of patent documents you may contact the Reproduction and Sales Unit by fax @ 819-997-7771 (24 hrs) or by phone @ 819-997-2985 (0800 to 1645 EST, M-F)

Clients who are required to pay copy costs for this service may do so by:

- : opening a deposit account with the CIPO Finance Branch,
- : paying through MasterCard or Visa, or
- : sending a cheque payable to the Receiver-General for Canada.

Copy costs are as follows:

CA patents/applications prior to patent number 445,931:	\$4 each
CA correspondence pages and patent documents after patent number 445,931:	\$0.50 page
All others:	\$0.50 page
“Old Act” patent document on microfiche	\$3 each

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## **Patents - What are they?**

Patents can be considered as a contract between the government and an inventor, whereby the inventor receives legal protection for an invention while the government gets full disclosure of what the invention is and how it works. The patent system is intended to stimulate economic growth by providing incentives to inventors while also providing critical technological information to others in society.

In Canada, patents are valid for a term of up to 20 years from the filing date of the patent application, provided the appropriate maintenance fees are paid. During this period, a patentee can prevent others from making, using, selling, renting or importing the protected invention. However, if the patented invention is an improvement on another patented invention, then the first patentee does not have the right to use his own invention unless a licensing agreement is struck or the other patent is lapsed or voided.

Canadian patents are only valid in Canada. As well, foreign patents do not afford any protection in Canada. However, inventors often obtain patents for the same invention in many countries around the world so the existence of a foreign patent may signal the existence of a similar Canadian patent and vice-versa.

Canadian patent applications (and many foreign ones as well) are published 18 months after the filing date or of the priority filing date, whichever is earlier. During the period in which a patent application is laid-open but not issued into a patent, the applicant cannot enforce his rights. However, after the application issues to patent, the patentee can sue back to the laid-open date for compensation from any party who infringed during that time.

## **Anatomy of Canadian Patent Documents**

Patent documents are divided into several parts:

- 1) Cover Page - Bibliographic data
- 2) Abstract - Short technical summary with use of invention
- 3) Description - Detailed disclosure of invention with examples or embodiments
- 4) Drawings - Pictorial representation of various aspects of the invention
- 5) Claims - Statements which define the scope of legal protection afforded by the patent

Part 1 - The Cover Page:

Typical information is:

\*(54) title

(11) patent number

(21) application number      Patents issued in Canada after October, 1989 retain the same number as the application.

(19) country code      See list on following pages.

(51) IPC      First one in list is primary classification.

(52) national classification      First one in list is primary classification.

(72) inventors

(73) assignee      Owners at time of issue or publication.

(22) filing date      Term of patent in Canada is 20 years from this date for patents filed from October 1989.

(45) issue date      Date at which patent protection can be enforced.  
Term of patent in Canada is 17 years from this date for patents filed before October 1989.

(43) publication date      Date at which application is laid-open to public inspection.  
Compensation is possible for infringement between this date and the issue date but action cannot be taken until after issue.

(30) priority data

(32) priority date      Date that subject matter was first filed in another foreign or domestic application. Must be no more than 1 year earlier than filing date.

(31) priority application number      Application number of the first filing above.

(33) priority country      Country in which the first filing above took place.

\*The numbers before each piece of information are International Identification (INID) codes which are relatively consistent around the world. Thus the code for a filing date (22) is the same on both Canadian and U.S. patent documents. This allows easier identification of the various data associated with a patent document.

Country Codes

AD	Andorra	CA	Canada	FI	Finland (SF)
AE	United Arab Emirates	CF	Central Africa (ZR)	FJ	Fiji
AF	Afghanistan	CG	Congo (CF)	FK	Falkland Islands
AG	Antigua	CH	Switzerland	FR	France
AL	Albania (AN)	CI	Ivory Coast		
AO	Angola	CL	Chile (CE)	GA	Gabon
AR	Argentina	CM	Cameroon (KA)	GB	United Kingdom
AT	Austria (OE)	CN	China (RC)	GD	Grenada
AU	Australia	CO	Colombia	GG	Guernsey
		CR	Costa Rica	GH	Ghana
BB	Barbados (BD)	CS	Czechoslovakia	GI	Gibraltar
BD	Bangladesh (BA)	CU	Cuba	GM	Gambia (GE)
BE	Belgium	CV	Cape Verde	GN	Guinea (GI)
BG	Bulgaria	CY	Cyprus	GQ	Equatorial Guinea
BH	Bahrain (BB)			GR	Greece
BI	Burundi	DD	East Germany (DL)	GT	Guatemala (GU)
BJ	Benin (Dahomey (DA))	DE	West Germany (DT)	GW	Guinea Bissau
BM	Bermuda	DJ	Djibuti	GY	Guyana
BN	Brunei	DK	Denmark		
BO	Bolivia	DM	Dominica	HK	Hong Kong
BR	Brazil	DO	Dominican Republic (DR)	HN	Honduras (HO)
BS	Bahamas	DZ	Algeria (AG)	HT	Haiti (HI)
BT	Bhutan (BH)			HU	Hungary
BU	Burma	EC	Ecuador	HV	Upper Volta (UV)
BW	Botswana (BT)	EG	Egypt (ET)		
BY	Byelorussia (SB)	EP	European Patent Office	ID	Indonesia
BZ	Belize	ES	Spain	IE	Ireland (EI)

	ET	Ethiopia (EA)	IL	Israel	
IN	India	LY	Libya	QA	Qatar
IQ	Iraq				
IR	Iran	MA	Morocco	RD	Research Disclosure
IS	Iceland	MC	Monaco	RH	Zimbabwe
IT	Italy	MG	Madagascar (MD)	RO	Romania (RU)
		ML	Mali (MJ)	RW	Rwanda
JE	Jersey	MN	Mongolia (MO)		
JM	Jamaica	MS	Montserrat	SA	Saudi Arabia
JO	Jordan	MR	Mauritania (MT)	SB	Solomon Islands
JP	Japan (JA)	MT	Malta (ML)	SC	Seychelles
		MU	Mauritius (MS)	SD	Sudan
KE	Kenya	MV	Maldives	SE	Sweden (SW)
KI	Kiribati	MW	Malawi	SG	Singapore
KH	Kampuchea (CD)	MX	Mexico	SH	St. Helena
KM	Comoros	MY	Malaysia	SL	Sierra Leone (WL)
KN	Anguila	MZ	Mozambique	SM	San Marino
KP	North Korea (KN)			SN	Senegal
KR	South Korea (KS)	OA	OAPI	SO	Somalia
KW	Kuwait (KU)	OM	Oman (MU)	SR	Surinam
KY	Cayman Islands			ST	Sao Tome and Principe
		PA	Panama (PM)	SU	Soviet Union
LA	Laos	PE	Peru	SV	El Salvador (SL)
LB	Lebanon	PG	Papua New Guinea (PP)	SY	Syria (SR)
LC	Saint Lucia	PH	Philippines	SZ	Swaziland
LI	Liechtenstein (FL)	PK	Pakistan		
LR	Sri Lanka (CL)	PL	Poland (PO)	TD	Chad (TS)
LR	Liberia	PT	Portugal	TG	Togo (TO)
LS	Lesotho	PY	Paraguay (PG)	TH	Thailand

LU	Luxembourg			TN	Tunisia
TO	Tonga (TI)	UY	Uruguay	WS	Samoa
TR	Turkey				
TT	Trinidad & Tobago (TD)	VA	Vatican City (CV)	YD	Yemen, Democratic (SY)
TV	Tuvalu	VC	St. Vincent & Grenadines	YE	Yemen
TW	Taiwan (CT)	VE	Venezuela	YU	Yugoslavia
TZ	Tanzania (TA)	VG	Virgin Islands		
		VN	Vietnam	ZA	South Africa
UA	Ukraine (UU)	VU	Vanuatu	ZM	Zambia (ZB)
UG	Uganda			ZR	Zaire (CB)
US	United States	WP	WIPO (PCT)		

The two letter codes in brackets after some of the countries are former country codes. Some older documents may bear these codes instead of the new codes.

## Part 2 - The Abstract:

The INID code for abstracts is (57). Abstracts can appear on the front page or on a separate page. They are a short summary of the invention written by the applicant which also contains a statement of the use of the invention.

Abstracts cannot be used to interpret the scope of the invention from a legal standpoint. They are used to aid in searching. Many patent abstracts provide a very poor description of the technology covered by the patent.

## Part 3 - The Description:

The description forms the main part of the patent. It must contain all the subject matter related to the invention.

The description normally starts with a broad statement which indicates the area of technology in which the invention falls. This is usually followed by a description of the prior literature which is pertinent to the subject matter at hand. The prior literature description should include the problems faced in the area and how each researcher tried to overcome them. After the prior literature, there should be a section on the specific problems which the inventor is trying to overcome followed by a very general statement of how the invention overcomes them.

Then, the description should begin to describe the invention in general terms. The parts and how they interconnect should be described in terminology which encompasses as many possible alternatives as the inventor can envisage. Gradually, the description becomes more and more specific with each part or interconnection being described in more exact terminology until, finally, at least one specific embodiment of the invention is described in detail.

At some point, usually early in the patent, the drawings should be introduced in a formal way by referring to the Figure numbers and their titles. After the formal introduction of the drawings, the description can then refer to drawings to help in describing the invention. Any reference to drawings should be made by Figure number and all parts referred to must be given a reference character which remains consistent throughout the patent.

The progressive nature of the description and the detailed reference to drawings often leads people to believe that patents are obscure and impossible to understand. However, once you begin to understand the overall structure of a patent, you will be able to focus in on the relevant parts and glean some very useful ideas from them.

## Part 4 - The Drawings:

Drawings must be included in a patent if the subject matter lends itself to illustration. This makes understanding the invention easier.

There are many formal requirements in the Patent Act and Rules but the general rule of thumb is that they must be legible and labelled. Parts which are referred to in the description must be given reference characters in the drawings and each drawing must be given a Figure number.

The drawings appear collectively at the end of the patent after the claims.

## Part 5 - The Claims:

The claims form the legal basis for patent protection. The wording of the claims defines the limit of that protection. The wording is therefore quite legal in nature and can be confusing for those who do not understand the jargon.

A claim generally consists of three parts:

- the preamble,
- the purview and
- the link between the preamble and the purview.

The preamble is generally a short statement of the type of invention with the general area of technology sometimes included. The purview is a specific legal description of the exact invention which is being protected. The link is usually a word or short phrase to describe how the purview relates to the preamble.

e.g. A data input device comprising:

- an input surface adapted to be locally exposed to a pressure or pressure force,
- a sensor means disposed below the input surface for detecting the position of the pressure or pressure force on the input surface and for outputting an output signal representing said position, and
- an evaluating means for evaluating the output signal of the sensor means.

In the above example, “A data input device” is the preamble, “comprising” is the link, and the rest of the claim is the purview. In addition to the purview, the linking word or phrase is often very important in assessing the scope of the claim as it could be either restrictive or permissive in nature.

Each claim must be considered separately as each affords separate protection. The invalidation of one claim does not necessarily invalidate the others. There can be any number of claims in a patent (400 claims is known!) although the 10-20 range is common. Many claims allow the inventor to have legal title over many different aspects of the same invention. In addition, it allows the inventor to claim broadly and narrowly in the same patent. Thus, if the broad claim is invalidated for some reason, the narrow claims may survive and still afford protection over the narrow aspects of the invention. This is why the invention is described broadly and gradually more narrowly in the description. Because nothing may appear in the claims which is not also in the description, you will often see the claims repeated word-for-word in the description, especially the broad claims.

The claims appear in the patent on a new page after the description but before the drawings. They are preceded by a short introductory statement such as: “I claim:”.

## Why Search Patents?

The number and importance of patents and patent applications (patent documents thereafter) are increasing at a rapid rate, worldwide. More than 35 million patent documents have been published so far around the world and the number of inventions since 1968 have been estimated in excess of 8 million. The U.S. Patent & Trademark Office (USPTO), in its 200 years history, issued approximately 5 million patents - 1 million of which in the 1976-1991 period alone! The World Intellectual Property Organization (WIPO) estimates the global figure for patent applications in 1993 was more than 2 million, up from 1.3 million in 1987.

Further, patent documents also have increasing technical and strategic importance - approximately 25% of all scientific or technical publications produced each year originate in patent offices around the world - most of which can be searched as any other kind of literature in databases.

Searching the patent literature can be beneficial for many reasons:

- avoiding re-inventing the wheel and spending a lot of money doing it;
- avoiding wasted legal costs in pursuing patents for "old" technology;
- avoiding potential infringement situations;
- discovering research ideas and solving problems;
- monitoring the activities of players in the field to reveal future plans;
- predicting hot-areas of research that can impact on current products and those that are in the development stage;
- uncovering new market players;
- identifying patents owned and licensed by firms;
- assessing speakers at conferences and trade-shows.

In addition, there are many benefits to searching patent documents over the scientific literature, such as:

- most private enterprises, especially large companies, publish in the patent literature before, or to the exclusion of, the scientific literature. In fact, it has been estimated that 80% of the information contained in patent documents is not reported elsewhere in the scientific and technical literature.
- patent documents generally describe the invention in very broad terms which gives some idea of the potential directions of and alternatives to the technology of interest.
- patent documents present information that is detailed and complete, and that is indexed - or classified - according to the type of technology involved, which makes searching a lot easier.

## Overview of Patent Classification Systems

Attempts to prevent drowning in the flood of patent literature by designing a classification system started over 100 years ago. The growth of the files of patent specifications led the patent offices to develop classifications of their own, as library classifications were not considered suitable.

The primary purpose of classification systems is to facilitate the searching and retrieving of patent documents by patent offices and other users. Various classification systems exist and most have been designed so that each technical aspects of an invention to which a patent document relates can be classified as a whole. A patent document may contain several technical aspects of an invention, and therefore be allocated several classification symbols.

Classification systems are hierarchical in nature, with main headings covering a general area of technology, such as “optics”, and each sub-heading a given type of invention such as “stereo-viewers” (or “3D”). Each sub-heading has a specific number which is assigned to all the patent documents relevant to that category.

Clearly, effective classification of patent documents is essential for searching the growing number of patent documents (>1.4 million in Canada, >5 million in the U.S.).

The major patent classification systems are briefly defined below:

### 1. International Patent Classification (IPC)

- Published and managed by the World Intellectual Property Organization (WIPO), one of 16 specialised agencies of the United Nations.
- As its name suggests, it is a *single international system* used by Canada since 1978, by the European Patent Office (EPO) and 80 other countries including the US; the U.S. assigns IPC codes to their patents as a secondary code but use their own classification system as their primary search and retrieval tool.
- IPC is a combined function (or intrinsic nature) / application classification system in which the function theoretically takes precedence. In the IPC, an invention is classified according to its “function” (how it operates), except when its application alone determines its technical characteristics. In actual use, the IPC operates as a highly application-oriented system because of the multiplicity of application-type places in the schedules. For example, subclass F16K is a product-oriented subclass concerning valves while subclass A61F specifically provides for heart valves.
- Current version (7th) divides technology into 8 main sections, 118 classes, 624 subclasses and over 67,000 subgroups.
- Versions are revised and, if required, amended every 5 years by an international committee of experts. The current version was revised on January 1, 2000 . Patent offices use the current version for assigning IPC codes and do not re-index their documents when a new revised edition is published (Japan is the main exception).
- A consolidated version including all 7 editions is available for a fee on CD-ROM and in many languages such as English, French, German and Spanish. Also free on the web at [http://www.wipo.int/classifications/fulltext/new\\_ipc/index.htm](http://www.wipo.int/classifications/fulltext/new_ipc/index.htm)
- The European Patent Office uses the European Patent Classification ( ECLA) to classify the Espacenet databases. This highly regarded system is an adaptation and refinement of the IPC. It is available to browse at <http://l2.espacenet.com/espacenet/ecla/index/index.htm>

## 2. Canadian Patent Classification (CPC)

- Based initially on the United States Patent Classification and developed by the Canadian Intellectual Property Office (CIPO), this classification system slightly differs from the IPC in terms of its function orientation both in theory and in use. It is now obsolete and not maintained.
- The technology is separated into 3 main “art” categories - i.e. the chemical, electrical and mechanical arts, and the three groups form some 340 classification schedules and 37,000 subclasses.
- Before 1978, only the CPC appeared on Canadian patent documents. Between 1978 and October 1989, both CPC and IPC were printed on the documents. After October 1989, IPC appears exclusively.

## 3. United States Patent Classification (USPC)

- A national classification system managed by the U.S. Patent & Trademark Office. It is of international significance given the importance of the U.S. patent system, and shares many similarities with the CPC. It is undoubtedly the best system to search U.S. patents.
- The system comprises 3 main categories - i.e. chemicals, electricals and mechanicals, and the three groups form about 400 classes which are themselves subdivided into more than 125,000 individual subclasses.
- The USPC is updated several times every year, and all individual patent document classifications correspond to the most recent revision.
- The USPC can be consulted free of charge on the Internet. See <http://www.uspto.gov/go/classification/>

## 4. Other classification systems

- Some patent database operators have produced classifications of their own. *Derwent Inc.*, the producer of the World Patent Index and other specialty databases, has developed a series of ‘Derwent Classes’ according to subject areas. Patent document abstracts are assigned such classes, regardless of the patent document’s original IPC, US and other classification.
- The Chemical Abstracts Service (‘CAS’), with its many databases, also has its chemistry-specific classification system. Every publication - patent document or scientific literature - is assigned CAS registry numbers identifying the substances included.

## Patent Classification Systems - Rules and Principles

A patent document often contains information about different forms of invention. For example, a single patent document can include claims to a new chemical compound *as such* and to the novel process of making it. If both these forms of invention are novel, are useful and demonstrate an inventive step, claims to them can be patented. Because it is the duty of patent examiners to determine whether such forms of invention are patentable, classification systems were developed based on rules and principles that ensure their consistent and very specific indexing.

It is important to recognize the characteristics and differences of each classification system when searching the patent literature. The main rules associated with the indexing of technical subject matter are provided below for the IPC, CPC and USPC:

### 1. International Patent Classification (IPC)

1.1 - The IPC provides places for classifying:

- a) technical subject matter 'in general' that is characterised by its intrinsic nature or function, e.g. F16K covers valves characterised by specific constructional or functional aspects, and C07 covers chemical compounds characterised by their specific chemical structure;
- b) technical subject matter that is "specially adapted for" a particular use or purpose, e.g. A61F has provision for a mechanical valve specially adapted for insertion into a human heart;
- c) the particular use or application of technical subject matter, e.g. C05 deals with the use of organic chemicals as fertilisers; and
- d) the incorporation of technical subject matter into a larger system, e.g. B60G covers the incorporation of a leaf spring into the suspension of a vehicle wheel.

1.2 - The IPC has a number of rules that were developed to address various 'forms' of inventions:

- a) Chemical compounds: are classified according to their chemical structure when the invention lies in the compound per se. When the invention also concerns a specific field of use, it is also classified in the place provided for that field of use if such field constitutes an essential technical characteristic of the subject and an appropriate place exists. However, when the invention concerns only the application of a compound then it is classified only in the place covering the field of use.
- b) Chemical mixtures or compositions: also classified according to the intrinsic nature of the mixtures or compositions if a place exists - e.g. glass, cement, and ceramics. If no such place exists, they are classified according to their use or application. If the use of application constitutes an essential technical characteristic, it is classified according to both intrinsic nature and use or application.
- c) Preparation or treatment of compounds: when the invention concerns a process of preparation or treatment of a chemical compound, it is classified in the place for the type of compound concerned. If a place exists for the process of preparation or treatment, it is also classified there. General processes for the preparation or treatment of classes of compounds are classified in the groups for the processes employed, when such groups exist.
- d) Apparatus or processes: if the invention concerns an apparatus or process for the making or treatment

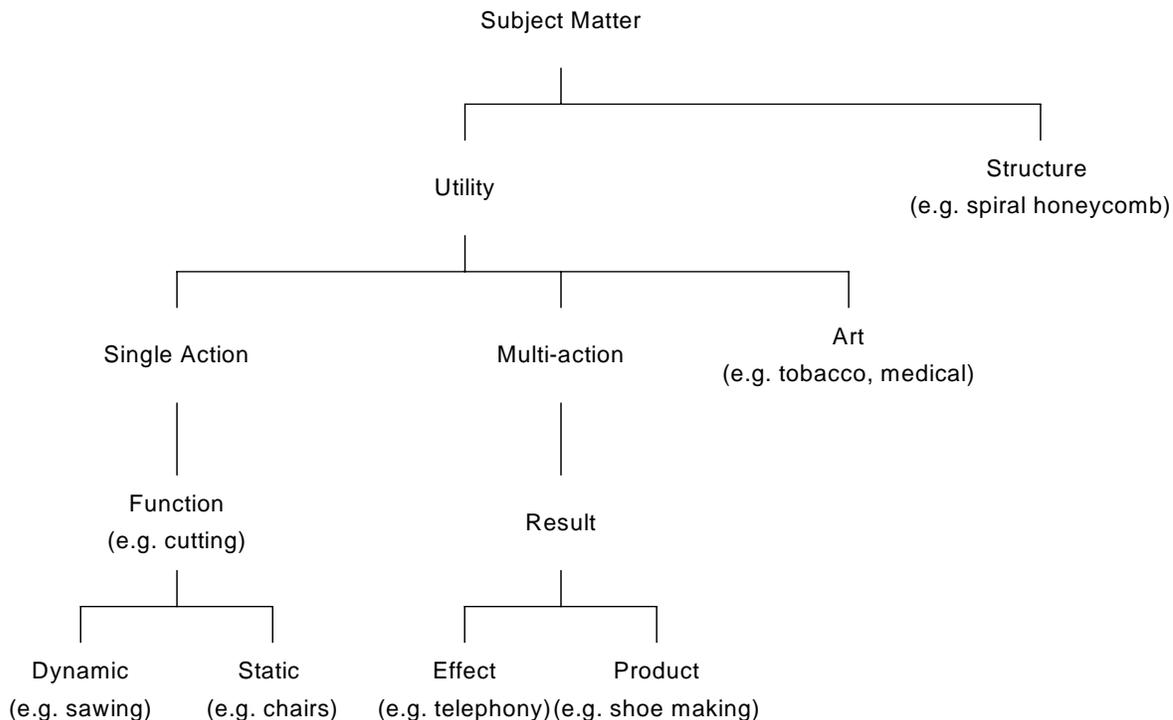
of articles of manufacture, then it is classified in the place dealing with the process or operation involved or the apparatus used. If no place exist for the apparatus, it will be in the place for the process performed by the apparatus. If no place exists for the process, then it will in the place dealing with the apparatus for performing the process. If neither place exists, it is classified in the place dealing with the article of manufacture.

- e) Articles of manufacture: are classified in the place dealing with the article, but if no place exists for the article itself, it is classified in an appropriate function-oriented place or, if not possible, according the field of use.
- f) Multi-step processes, plants: when the invention concerns a combination of process steps, it is classified as a whole, e.g. subclass B09B (“Disposal of Solid Waste”). If no such place exists, it is classified in a place dealing with the product obtained by such combination. When the invention also concerns an individual element of the combination, the element is classified separately.
- g) Details, constructional parts: when constructional or functional details or parts are only applicable to, or only of use for, one specific kind of apparatus, they are classified only in the place for that apparatus. However, when distinct places are provided for different kinds of apparatus, there may sometimes be special places provided for constructional or functional details or parts of such apparatus, which are applicable to more than one of the different kinds of apparatus. Such details or parts are classified in those appropriate places.
- h) More than one technical subject; one subject covered by several groups; general chemical formula: when the invention concerns more than one technical subject, each being covered by a different classification group, the symbol of each of these groups is allotted. When the invention concerns subject matter that is covered by more than one classification group under the same ‘main’ classification group and at the same level of indentation, the subject matter should be classified in the hierarchically higher classification group unless a specific place is provided for it. If no such main classification group exists, then the symbols of each classification groups should be allotted.

Finally, general chemical formula may be classified as such. When complete classification would lead to a high number of symbols, it may be necessary to limit that number of symbols, e.g. regroup similar compounds into a single hierarchically higher group.

- 1.3 - Priority: in certain places of the IPC, some particular classification rules are specified. Normally, one would go from the ‘broad’ to the ‘specific’, from the top to the bottom of the classification schedules. But in certain areas, where a particular technical subject matter is covered by 2 or more places of the same level of indentation, a “last place rule” has been introduced. According to this rule, the invention is to be classified only in the place that appears last, e.g. in A61K (“Preparation for Medicinal, Dental, or Toilet Purposes”).

Also, specific rules other than “last place” exist in other classifications of the IPC, such as B32B (“Layered Products, i.e. Products built-up of Strata of Flat or Non-Flat, e.g. cellular or honeycomb, Form”). All rules are usually set out in the notes specific to the subject matter in the very beginning of the classification (class, subclass or group) concerned.



## 2. Canadian Patent Classification (CPC)

- 2.1 - Similar to the IPC, the classification of an invention in the CPC is based either on its utility or its structure. The figure above illustrates the relationship of the basis of classification of patent document subject matter. It shows that utility as a basis for classification is further divided into function, result and art.
- 2.2 - Priority: between utility and structure, structure (e.g. spiral honeycomb) should be used as a basis of classification only when the subject matter to be classified has no distinct utility. Also, priority is given to utility as expressed by function (e.g. cutting) rather than result, because it is considered a better and more direct way of describing an invention. Finally, art type classification (e.g. tobacco) have the highest priority.
- 2.3 - Patent documents are generally classified based on the broadest claim or the claim with the least number of elements. The claims may be directed to one or more categories of subject matter, e.g. product and process, and the document will be classified on the claim having the highest superiority and cross-referenced to one or more of the remaining claims also in order of superiority.

### Order:

- 1) Product
- 2) Process or method
- 3) Apparatus

A true composition of matter will be handled as chemical subject matter within the product category. Within a single category of subject matter, the following superiority generally follows:

- 1) Chemical subject matter
- 2) Electrical subject matter
- 3) Mechanical subject matter

Moreover, within the chemical discipline, the superiority of subject matter is as follows:

- 1) Compound
- 2) Composition
- 3) Process
  - 3.1) Biochemical
  - 3.2) Electrochemical
  - 3.3) Chemical
- 4) Apparatus

Biotechnology subject matter, e.g. genetic engineering, generally takes precedence over compounds and compositions classifiable elsewhere.

### 3. *United States Patent Classification (USPC)*

3.1 - The USPC shares many similarities with the CPC. Using this system, all claims are first assigned a classification and then an “original” (OR) classification is selected from all of the classifications produced. If all of the claims are classified in the same class, then the OR classification is the first appearing classification within the hierarchy of that class. If the claims are classified in different classes, then the OR classification is selected after having considered the following factors:

- a) selection of the most comprehensive claim, i.e. the claim with the most elements;
- b) selection among statutory categories of subject matter when claims are of equal comprehensiveness;
- c) selection among superiority of types of subject matter; and
- d) selection among classes in “related subject” listings.

The remaining classifications are kept as cross-references.

3.2 - Arrangement of subclasses: usually, the most complex inventions are positioned higher in class schedules. Combined machines or processes will also be found higher in the schedules than single operation machines or processes, which in turn are located higher than the individual parts of the machines (or steps of the processes). Minor details or accessories are normally found near the bottom of the class schedules, as well as other aspects not classifiable elsewhere (the “miscellaneous” subclass found in many classes is always at the end). Finally, “special” subclasses for inventions having a common unique feature are sometimes found, positioned higher in the schedules than more complex inventions.

3.3 - Alpha Subclasses: Sometimes, “alpha” subclasses - i.e. subclasses ending with a letter - are created to simplify searches within given technical subject matters. They basically contain patents from those that are found in an official, numbered subclass. This collection is then made an indented subclass under the original official subclass and given a subclass designator which is composed of the parent subclass number followed by an alpha designation (e.g. A, B, T, DD). The Public Search File does not contain alpha subclasses but the letter appears on the paper documents and in the CASSIS database.

CASSIS (*Classification and Search Support Information System*) is a U.S. patent search tool developed by the U.S. Patent & Trademark Office. CASSIS is available on CD-ROM (but not on the Internet) from the USPTO and patent depository libraries, for a fee.

3.4 - Digests: At the end of each class schedule, there is a list of digests - or cross-reference collections - collecting patents based on concepts which relate to the concepts of the class but not to any particular subclass of that class. Digests cannot be designated as an (OR) classification; moreover, digests are not defined and are not available as collections by themselves in the Public Search Room but may be viewed on CASSIS.

## Indexing Technical Information Using Patent Classification Systems

A number of examples that illustrate how classification systems are used to index various kinds of technical information are provided below.

### 1) Canadian Patent Serial No.: 1,232,624 (issued February 9, 1988)

This document is entitled 'Golf Ball Dimple Pattern', and concerns a golf ball which has dimples which are evenly and uniformly distributed so that the ball has six axis of symmetry. This document was classified in the IPC (4th Edition) in A63B 37/00 and in CPC 273/177.

#### IPC (4th edition)

A	Section	Human Necessities
A63	Class	Sports; Games; Amusements
A63B	Subclass	Apparatus for Physical Training, Gymnastics, Swimming, Climbing or Fencing; Ball Games; Training Equipment
A63B-37/00	Main Group	Solid Balls; Marbles

This Main Group is further subdivided into more specific subgroups, as follows:

(...)		
37/00	<i>Main Group</i>	<i>Solid Balls; Marbles</i>
37/02	One-dot subgroup	. Special cores
37/04	Two-dot subgroup	. . Rigid cores
37/06	Two-dot subgroup	. . Elastic cores
37/08	Two-dot subgroup	. . Liquid cores; Plastic cores
37/10	Two-dot subgroup	. . with eccentric centre of gravity
37/12	One-dot subgroup	. Special coverings
37/14	One-dot subgroup	. Special surfaces
(...)		

The hierarchy among subgroups is determined by the number of dots preceding their titles, and not by the numbering of the subgroups.

There are also several other main groups within A63B that could concern golf balls (cf. list below). In this case, however, Main Group 37/00 was considered to be the most appropriate.

- 39/00 Hollow non-inflatable balls
- 41/00 Hollow inflatable balls
- 43/00 Balls with special arrangements
- 45/00 Apparatus or methods for manufacturing balls
- 47/00 Device for handling or treating balls

## CPC

Canadian Patent Class No. 273, entitled “Athletics”, is the class concerned with golf balls. In this example, subclass 177 was chosen as the most appropriate.

Classification is done from the top down. Within a class, the first relevant “no-dot subclass” is determined, then under that “no-dot subclass”, the first relevant “one-dot subclass” is determined, and so forth until there are no more appropriate further indented subclasses.

(...)		
168	No-dot subclass	Projectiles
169	One-dot subclass	. With indicator or recorder
170	One-dot subclass	. With finger holes
171	One-dot subclass	. Hollow
172	Two-dot subclass	. . Surface configurations
173	Three-dot subclass	. . . Imitation seams and laces
174	Two-dot subclass	. . Inflatable
175	Three-dot subclass	. . . Valved
176	One-dot subclass	. Golf balls
177	<i>Two-dot subclass</i>	. . <i>Surface configurations</i>
178	Two-dot subclass	. . Moulded
179	One-dot subclass	. Shuffleboard
(...)		

## 2) U. S. Patent Serial No.: 4,560,168 (issued December 24, 1985)

This document is the American counterpart of Canadian Patent 1,232,624 (previous example), and is entitled “Golf Ball”. Even though there may be minor differences between the 2 documents, they concern the same invention, i.e. a golf ball with dimples. Interestingly, the IPC classification also slightly differs - this document was allocated IPC (4th Edition) A63B 37/14 instead of 37/00, and USPC 273/232.

### IPC (4th edition)

The U.S. Patent Examiner selected subgroup 37/14, which is more specific than Main Group 37/00. This difference in classification may be caused by a different interpretation of the scope of IPC subgroups (there are no group and subgroup definitions available for the IPC).

(...)		
37/00	Main Group	Solid Balls; Marbles
37/02	One-dot subgroup	. Special cores
37/04	Two-dot subgroup	. . Rigid cores
37/06	Two-dot subgroup	. . Elastic cores
37/08	Two-dot subgroup	. . Liquid cores; Plastic cores
37/10	Two-dot subgroup	. . with eccentric centre of gravity
37/12	One-dot subgroup	. Special coverings
37/14	<i>One-dot subgroup</i>	. <i>Special surfaces</i>
(...)		

## USPC

Subclass 232 within U. S. Patent Class No. 273, entitled “Amusement Devices: Games”, was selected for this document.

(...)			
58R	No-dot subclass	BALLS	(...)
62	One-dot subclass	. Golf	
213	Two-dot subclass	.. With alarm, location, or indicator means	
214	Two-dot subclass	.. Center expanded or under compression	(...)
217	Two-dot subclass	.. Mechanical bond between encompassing points	
218	Two-dot subclass	.. Unitary structure	
219	Two-dot subclass	.. Buoyant	
220	Two-dot subclass	.. Center	(...)
232	<i>Two-dot subclass</i>	.. <i>Surface configurations</i>	
(...)			

The U.S. Patent Classification System follows the same basic philosophy as the Canadian System and, therefore, there are many similarities between the two.

### **3) Canadian Patent Serial No.: 1,322,772** (issued October 5, 1993)

Entitled “Tennis Ball and Method of Manufacturing the Same”, this patent document concerns a tennis ball having relative durability, elasticity, flexibility and firmness, and a method of manufacturing such a tennis ball. This document received IPC (5th Edition) A63B 39/06, 41/08, and CPC 273/171, 26/204.

#### IPC (5th edition)

A	Section	Human Necessities
A63	Class	Sports; Games; Amusements
A63B	Subclass	Apparatus for Physical Training, Gymnastics, Swimming, Climbing or Fencing; Ball Games; Training Equipment

This patent was classified in 2 places within A63B, i.e. primarily in:

(...)		
39/00	Main Group	Hollow non-inflatable balls
39/02	One-dot subgroup	. Arrangements for maintaining the pressure
39/04	Two-dot subgroup	.. Pricking balls
39/06	<i>One-dot subgroup</i>	.. <i>Special coverings</i>
39/08	Two-dot subgroup	.. made of two halves
(...)		

and cross-referenced in:

(...)		
41/00	Main Group	Hollow inflatable balls
41/02	One-dot subgroup	. Bladders
41/04	Two-dot subgroup	. . Closures therefor
41/08	<i>One-dot subgroup</i>	. <i>Ball covers; Closures therefor</i>
41/10	One-dot subgroup	. Bladder and cover united
41/12	One-dot subgroup	. Tools or devices for blowing up or closing balls
(...)		

The product and method-aspects of the invention were classified in the same place.

### CPC

In this example, the product and method-aspects that were claimed were classified in distinct places, as follows:

For the product (tennis ball) claims, Canadian Patent Class No. 273, entitled “Athletics”, subclass 171 was selected.

(...)		
168	No-dot subclass	Projectiles
169	One-dot subclass	. With indicator or recorder
170	One-dot subclass	. With finger holes
171	<i>One-dot subclass</i>	. <i>Hollow</i>
172	Two-dot subclass	. . Surface configurations
173	Three-dot subclass	. . . Imitation seams and laces
174	Two-dot subclass	. . Inflatable
175	Three-dot subclass	. . . Valved
(...)		

The method-aspect claims were classified in Class 26, “Assembling and Miscellaneous Manufacturing”, subclass 204.

(...)		
111	No-dot subclass	MISCELLANEOUS MANUFACTURING, REPAIRING, ETC.
112	One-dot subclass	. Of Electrical Devices
		(...)
144	One-dot subclass	. Of Heating and Ventilating Equipment
		(...)
204	<i>One-dot subclass</i>	. <i>Of Recreational Devices, Toys</i>
205	One-dot subclass	. Of Jewellery Articles
(...)		

**4) U. S. Patent Serial No.: 5,211,788** (issued May 18, 1993)

This document is the American counterpart of Canadian Patent 1,322,772 (example no. 3), and is entitled "Tennis Ball and Method of Manufacturing the Same". However, this document only has one method claim. Here too, the classification differs for the IPC - this document was allocated IPC (5th Edition) A63B 39/06, B29C 65/48, and USPC 156/148, 156/213 and 273/61B.

IPC (5th edition)

Details about IPC A63B 39/06 can be found in example no. 3 above. Details about B29C 65/48 is provided below.

B	Section	Performing Operations; Transporting
B29	Class	Working of Plastics; Working of Substances in Plastic State in general
B29C	Subclass	Shaping or Joining of Plastics; Shaping of Substances in a Plastic State, in general; After-Treatment of the Shaped Products, e.g. Repairing

Main Group 65/00 has many subgroups, only some of which are represented here for the purpose of the example.

(...)		
65/00	Main Group	Joining Preformed Parts; Apparatus Therefor
65/02	One-dot subgroup	. by heating, with or without pressure (...)
65/48	<i>One-dot subgroup</i>	. <i>using adhesives</i>
65/50	Two-dot subgroup	. . using adhesive tape
65/52	Two-dot subgroup	. . applying the adhesive
65/54	Three-dot subgroup.	. . . between pre-assembled parts
(...)		

USPC

Subclasses 148 and 213 of U. S. Patent Class No. 156, entitled “Adhesive Bonding and Miscellaneous Chemical Manufacture”, and subclass 61B of Class 273, “Athletics”, were selected for this document.

For Class 156:

1	No-dot subclass	METHODS	(...)
60	One-dot subclass	. Surface bonding and/or assembly therefor	(...)
148	<i>Two-dot subclass</i>	. . <i>With weaving, knitting, braiding, twisting or needling</i>	
149	Three-dot subclass	. . . About tubular lamina	(...)
196	Two-dot subclass	. . With permanent bending or reshaping or surface deformation of self sustaining lamina	(...)
212	Three-dot subclass	. . . By bending, drawing or stretch forming sheet to assume shape of configured lamina while in contact therewith	
213	<i>Four-dot subclass</i>	. . . . <i>Encasing or enveloping the configured lamina</i>	
(...)			

For Class 273:

(...)			
58R	No-dot subclass	BALLS	(...)
61R	One-dot subclass	. Tennis	
61A	Two-dot subclass	. . Ping-pong balls	
61B	<i>Two-dot subclass</i>	. . <i>Fabrics, per se</i>	
61C	Two-dot subclass	. . Rubber formulations	
61D	Two-dot subclass	. . Methods of pressurizing	
(...)			

5) **Canadian Patent Serial No.: 2,008,876** (issued September 14, 1993)

This document issued to the Timex Corporation is entitled “Automatic Display Illumination for a Multimode Wristwatch”, and concerns an improvement in operating an illuminated electro-optic display for a multifunction wristwatch. This document was classified in the IPC (5th Edition) in G04C 17/00 and in CPC 58/22.

IPC (5th edition)

G	Section	Physics
G04	Class	Horology
G04C	Subclass	Electromechanical Clocks or Watches

Several main groups concern the indicating of time or the producing of time signals electrically, but the one that is of interest here is Main Group 17/00.

(...)		
17/00	<i>Main Group</i>	<i>Indicating the time optically by electric means</i>
17/02	One-dot subgroup	. by electric lamps
(...)		

CPC

Canadian Patent Class No. 58, entitled “Horology”, subclass 22 was chosen as the most appropriate.

(...)		
20	No-dot subclass	TIME INDICATING
21	One-dot subclass	. Metronome
22	<i>One-dot subclass</i>	. <i>By Visual Means</i>
23	Two-dot subclass	. . Calendars
24	Two-dot subclass	. . Motion Works (e.g. Dial Trains)
25	Two-dot subclass	. . Dials and/or Hands
26	Three-dot subclass	. . . Geographical (e.g. Universal Dials)
(...)		

**6) U. S. Patent Serial No.: 4,912,688** (issued March 27, 1990)

This document is the American counterpart of Canadian Patent 2,008,876 (example no. 5), and is entitled “Automatic Display Illumination for a Multimode Wristwatch”. The classification given was IPC (5th Edition) G04B 19/30, and USPC 368/67 and 368/227.

IPC (5th edition)

Interestingly, the classification in this example differs from its Canadian counterpart at the group level.

G	Section	Physics
G04	Class	Horology
G04B	Subclass	Mechanically-driven Clocks or Watches; Mechanical Parts of Clocks or Watches in general; Time-Pieces Using the Position of the Sun, Moon, or Stars

Subgroup 19/30 was selected:

(...)		
19/00	Main Group	Indicating by visual means
(...)		
19/30	One-dot subgroup	. Illumination of dials or hands
19/32	Two-dot subgroup	. . by luminescent substances
(...)		

USPC

Subclasses 67 and 227 of U. S. Patent Class No. 368, entitled “Horology: Time Measuring Systems or Devices”, were selected.

(...)		
62	No-dot subclass	CHRONOLOGICAL (...)
67	One-dot subclass	. With auxiliary illumination for display (...)
223	No-dot subclass	DISPLAYS OR DISPLAY DEVICE DETAILS (...)
227	One-dot subclass	. With auxiliary illumination for display (...)

**7) Canadian Patent Application Serial No.: 2,079,598** (laid-open on July 31, 1992)

Entitled “Ergonomic Multi-Axis Controller”, this patent application concerns a manually operated multi-axis controller used for controlling cursor position along x and y axes and for entering x, y and/or z coordinate information in a computer (note: mice, trackballs and joysticks are considered as “controllers”). This patent application was classified in IPC (5th Edition) G06F 3/033.

There is no Canadian classification allocated to this document because the patent application was laid-open after the Canadian Patent Office had ceased using the CPC system.

IPC (5th edition)

G	Section	Physics
G06	Class	Computing; Calculating; Counting
G06F	Subclass	Electric Digital Data Processing

Subgroup 3/033 was selected:

(...)		
3/00	Main Group	Input arrangement for transferring data to be processed into a form capable of being handled by the computer; output arrangements for transferring data from processing unit to output unit, e.g. interface arrangements
3/02	One-dot subgroup	. Manual input, e.g. key, dial
3/023	Two-dot subgroup	. . Arrangements for converting discrete items of information into a coded form, e.g. keyboards for generating alphanumeric codes, operand codes, instruction codes
3/027	Three-dot subgroup	. . . for insertion of the decimal point
3/03	Two-dot subgroup	. . Arrangements for converting the position of a member into a coded form
3/033	<i>Two-dot subgroup</i>	. . <i>using a movable member co-operating with a display device, e.g. light pen, joystick, tracing-ball</i>
3/037	Three-dot subgroup	. . . wherein the display device is a cathode-ray tube
(...)		

A point of interest: this patent application was filed in many countries such as France, Japan and the U.S., via the “Patent Cooperation Treaty”. The International Patent Application as published by WIPO received a different IPC (5th Edition) classification than the one assigned by the Canadian Patent Office: G09G 5/00.

IPC G09G is entitled “Arrangements or circuits for control of indicating devices using static means to present variable information”, and Main Group 5/00 is entitled “Control arrangements or circuits for visual indicators common to cathode-ray tube indicators and other visual indicators”.

**8) U. S. Patent Serial No.: 5,252,970** (issued October 12, 1993)

This document is the American counterpart of Canadian Patent Application 2,079,598 (example no. 7), and is entitled "Ergonomic Multi-Axis Controller". The classification given was IPC (5th Edition) G05G 9/047, and USPC 341/20, 345/161 and 345/164.

IPC (5th edition)

Again, the classification in this example differs from its Canadian counterpart at the group level.

G	Section	Physics
G05	Class	Controlling; Regulating
G05G	Subclass	Control Devices or Systems insofar as Characterised by Mechanical Features only

Subgroup 9/047 was selected:

(...)		
9/00	Main Group	Manually-actuated control mechanisms provided with one single controlling member co-operating with two or more controlled members, e.g. selectively, simultaneously
9/02	One-dot subgroup	. the controlling member being movable in different independent ways, movement in each individual way actuating one controlled member only
9/04	Two-dot subgroup	. . in which movement in two or more ways can occur simultaneously
9/047	<i>Three-dot subgroup</i>	. . . <i>the controlling member being movable by hand about orthogonal axes, e.g. joysticks</i>
9/053	Four-dot subgroup	. . . . the controlling member comprising a ball
(...)		

USPC

Subclass 20 of U. S. Patent Class No. 341, entitled "Coded Data Generation or Conversion", and subclasses 161 and 164 of Class 345, entitled "Selective Visual Display Systems", were selected.

For Class 341:

(...)		
20	<i>No-dot subclass</i>	<i>BODILY ACTUATED CODE GENERATOR</i>
(...)		

and for Class 345:

(...)		
156	No-dot subclass	DISPLAY PERIPHERAL INTERFACE INPUT DEVICES
157	One-dot subclass	. Cursor mark position control devices
		(...)
161	Two-dot subclass	. . With joystick
162	Two-dot subclass	. . Positional storage means
163	Two-dot subclass	. . With mouse
164	<i>Three-dot subclass</i>	. . . <i>Rotatable ball detector</i>
165	Four-dot subclass	. . . . With photo sensor encoder

**9) Canadian Patent Application Serial No.: 2,040,242** (laid-open on October 14, 1991)

This patent application is entitled “Treatment with Benzodiazepine Compounds”, and concerns a new treatment of central nervous system disorders by administration of a benzodiazepine compound to a mammal. This patent application was classified in IPC (5th Edition) A61K 31/55 and in CPC 167/210.

IPC (5th Edition)

A	Section	Human Necessities
A61	Class	Medical or Veterinary Science; Hygiene
A61K	Subclass	Preparations for Medical, Dental or Toilet Purposes

Note: in A61K, in the absence of an indication to the contrary, classification is made in the last appropriate place.

Subgroup 31/55 was selected:

(...)		
31/00	Main Group	Medicinal preparations containing organic active ingredients (...)
31/33	One-dot subgroup	. Heterocyclic compounds (...)
31/395	Two-dot subgroup	. . having nitrogen as a ring hetero atom (...)
31/55	<i>Three-dot subgroup</i>	. . . <i>having seven-membered rings</i> (...)

CPC

Canadian Patent Class No. 167, entitled “Poisons, Medicines and Cosmetics”, subclass 210 was chosen:

(...)		
100	No-dot subclass	MEDICINES (...)
179	One-dot subclass	. Organic (...)
207	Two-dot subclass	. . Heterocyclic
208	Three-dot subclass	. . . Heterocyclic Nitrogen Atom
209	Four-dot subclass	. . . . 7 or More Member Hetero Nitrogen Ring
210	<i>Five-dot subclass</i>	. . . . . <i>Diazepines</i>
(...)		

**10) U. S. Patent Serial No.: 5,270,306** (issued December 14, 1993)

This document is the American counterpart of Canadian Patent Application 2,040,242 (example no. 9), and is entitled “Method of Antagonizing Excitatory Amino Acids By Administration of Imidazobenzodiazepine Compounds”. The classification given was IPC (5th Edition) A01N 43/62, A61K 31/55, and USPC 514/220.

IPC (5th edition)

The primary IPC (A01N 43/62) in the U.S. patent is not found in the Canadian patent application “equivalent”; IPC subclass A01N is entitled “Preservation of bodies of humans or animals or plants or parts thereof; Biocides, e.g. as disinfectants, as pesticides, as herbicides; Pest repellants or attractants; Plant growth regulators”, and seems inappropriate in this case.

The secondary IPC (A61K 31/55) is the same as found in the Canadian patent application equivalent. Details of this IPC are found in example no. 9 above.

USPC

This patent was classified in subclass 220 of U. S. Patent Class No. 514, entitled “Drug, Bio-affecting and Body Treating Compositions”.

1	No-dot subclass	DESIGNATED ORGANIC ACTIVE INGREDIENT (DOAI) CONTAINING (...)
183	One-dot subclass	. Heterocyclic carbon compounds containing a hetero ring having chalcogen (i.e. O, S, Se or Te) or nitrogen as the only ring hetero atoms (DOAI) (...)
218	Two-dot subclass	. . Hetero ring is seven-membered consisting of two nitrogens and five carbon atoms
219	Three-dot subclass	. . . Polycyclo ring system having the seven-membered hetero ring as one of the cyclos
220	Four-dot subclass	. . . . <i>Tricyclo ring system having the seven-membered hetero ring as one of the cyclos</i>
(...)		

**11) Canadian Patent Serial No.: 2,050,468** (issued on July 9, 1996)

This patent is entitled “A Thermostable (1,3-1,4)-beta-Glucanase”, and concerns new enzymes, their use in food and feed manufacturing, DNA fragments that encode such enzymes, organisms expressing the DNA fragments, and a method for producing the enzymes. This patent application was classified in IPC (6th Edition) C12N 9/42, C12N 15/56, C12P 19/14, C12C 7/04, and A23K 1/165.

There is no Canadian classification allocated to this document because the patent issued after the Canadian Patent Office had ceased using the CPC system.

IPC (6th edition)

The multiple aspects of this invention have each received their own classification. These are outlined below.

Note: in C12M to Q or S, in absence to an indication to the contrary, classification is made in the last appropriate place.

C	Section	Chemistry; Metallurgy
C12	Class	Biochemistry; Beer; Spirits; Wine; Vinegar; Microbiology; Enzymology, Mutation or Genetic Engineering
C12N	Subclass	Micro-organisms or enzymes; Compositions Thereof; Propagating, Preserving, or Maintaining Micro-organisms; Mutation, or Genetic Engineering; Culture Media

Subgroups 9/42 and 15/56 were selected:

(...)		
9/00	Main Group	Enzymes, e.g. ligases; Proenzymes; Compositions thereof; Processes for preparing, activating, inhibiting, separating, or purifying enzymes (...)
9/14	One-dot subgroup	. Hydrolases (3.) (...)
9/24	Two-dot subgroup	. . acting on glycosyl compounds (3.2) (...)
9/42	<i>Three-dot subgroup</i>	. . . acting on beta-1,4-glucosidic bonds, e.g. cellulase
9/44	Three-dot subgroup	. . . acting on alpha-1,6-glucosidic bonds, e.g. isoamylase (...)
(...)		
15/00	Main Group	Mutation or genetic engineering; DNA or RNA concerning genetic engineering, vectors, e.g. plasmids, or their isolation, preparation or purification; Use of hosts therefor (...)
15/09	One-dot subclass	. Recombinant DNA-technology (...)
15/11	Two-dot subgroup	. . DNA or RNA fragments; Modified forms thereof (...)
15/52	Three-dot subgroup	. . . Genes encoding for enzymes or proenzymes (...)
15/55	Four-dot subgroup	. . . . Hydrolases (3.)
15/56	<i>Five-dot subgroup</i>	. . . . . acting on glycosyl compounds (3.2, e.g. amylase, galactosidase, lysozyme)

15/57          Five-dot subgroup          . . . . . acting on peptide bonds (3.4)  
 (...)

In addition, subgroup 19/14 from subclass C12P was selected,

C12P          Subclass                          Fermentation or Enzyme-using processes to synthesise a desired chemical compound or composition or to separate optical isomers from a racemic mixture

(...)

19/00          Main Group                          Preparation of compound containing saccharide radicals  
 (...)

19/14          *One-dot subgroup*                  *.Produced by the action of a carbohydrase, e.g. by alpha-amylase*

(...)

Subgroup 7/04 from subclass C12C was also chosen:

C12C          Subclass                          Brewing of beer

(...)

7/00          Main Group                          Preparation of wort  
 (...)

7/04          *One-dot subgroup*                  *. Preparation or treatment of the mash*

7/047          Two-dot subgroup                  . . part of the mash being unmalted cereal mash

7/053          Two-dot subgroup                  . . part of the mash being non-cereal material

7/06          Two-dot subgroup                  . . Mashing apparatus

(...)

Finally, subgroup 1/165 from subclass A23K, entitled *Fodder* , was selected; this subgroup is placed as follows:

1/00          Main Group                          Animal feeding-stuffs  
 (...)

1/16          *One-dot subgroup*                  *. Supplemented with accessory food factors; Salt blocks*

1/165          *Two-dot subgroup*                  *. . with steroids, hormones, or enzymes*

(...)

As illustrated in a previous example, the patent application that issued into this Canadian patent was filed in many countries such as France, Japan and the U.S., via the “Patent Cooperation Treaty”. The International Patent Application as published by WIPO received identical - but much less - IPC (of the 5th Edition) classifications than the ones assigned by the Canadian Patent Office.

Also, the International Patent Application bears IPC classifications after a “double slash” (“//”), which refer to additional technical information. As a matter of policy, the Canadian Patent Office does not use this notation.

**12) U. S. Patent Serial No.: 5,470,725** (issued November 28, 1995)

This document is the American counterpart of Canadian Patent 2,050,468 (example no. 11), and is entitled "Thermostable (1,3-1,4)-beta-Glucanase". The classification given was IPC (6th Edition) C12P 19/02, C12N 9/24, and C12N 15/56, and USPC 435/93, 435/105, 435/200, 435/240.1, 435/243, 435/252.33, 435/254.21, and 536/23.2

IPC (6th edition)

When compared to the classifications indicated on the Canadian counterpart, only 1 of the 3 classifications of the U.S. patent is identical (C12N 15/56). Of the remaining 2 classifications that differ, C12N 9/24 is not that different from the point of view that it corresponds to the broader two-dot subgroup which includes the three-dot subclass C12N 9/42 indicated on the Canadian patent.

The really differing classification is C12P 19/02, which corresponds to

C12P	Subclass	Fermentation or Enzyme-using processes to synthesise a desired chemical compound or composition or to separate optical isomers from a racemic mixture
(...)		
19/00	Main Group	Preparation of compound containing saccharide radicals
19/02	One-dot subgroup	. <i>Monosaccharides</i>
(...)		

Again, the differences in classification between the Canadian and U.S. patent "equivalents" may be due to a different interpretation of the scope and meaning of IPC groups and subgroups.

USPC

As can be seen from the (large) number of classifications, the U.S. Patent & Trademark Office seems to prefer more its own classification system to the IPC system.

Subclasses 93, 105, 200, 240.1, 243, 252.33 and 254.21 of U. S. Patent Class No. 435, entitled "Chemistry: Molecular Biology and Microbiology", and subclass 23.2 of Class 536, entitled "Organic Compounds", were selected.

For Class 435:

(...)		
41	No-dot subclass	MICRO-ORGANISM, TISSUE CELL CULTURE OR ENZYME USING PROCESS TO SYNTHESIZE A DESIRED CHEMICAL COMPOUND OR COMPOSITION
		(...)
72	One-dot subclass	. Preparing compound containing saccharide radical
		(...)
93	Two-dot subclass	. . <i>Mashing or wort making</i>
		(...)
105	Two-dot subclass	. . <i>Monosaccharide</i>
(...)		



## Retrieving Technical Information Using Patent Classification Systems

Locating the proper patent document may not be an easy task, but with classification systems and the various search tools that were developed in relation to those systems, it is not as complicated as it might seem on the surface.

There are Catchword Indexes for the IPC, CPC and USPC which allow you to identify the classification areas in which the subject technology can be found. However, due to the large variations in terminology within a technology, and due to specialized patent vocabulary, you may end up trying a variety of approaches before finding what you are interested in. After having identified potential classification areas from the catchword index, the class schedules must be consulted to determine the best and most exact classification areas/groups in which to search.

In addition, CIPO has developed concordance tables which allow you to compare IPCs with CPCs. The U.S. Patent & Trademark Office has also developed a similar concordance between its USPC system and the IPC, available on the USPTO website. However, these concordance tables are not always accurate nor complete since the various classification systems are different and not all revised at the same frequency - as a result, “one-to-one” correspondence is not possible in many cases. Concordance tables can be used to determine preliminary classification areas but reference to the class schedules is imperative.

Once preliminary classification of the subject matter is done, a preliminary search can be performed to obtain relevant patent documents. *From the relevant patent document, more classification groups can be determined* (tip: U.S. patents usually list U.S. classifications that can be searched). The class schedules should then be consulted to determine the scope and applicability of these potential areas. Another search can then be performed in the new classes to find more relevant documents. This process can be iterated as many times as you think is needed. Unless you are an expert patent classification examiner, this iterative approach is the best way to ensure that most appropriate classification areas are found.

Once you become more familiar with the classification codes that relate to your area of interest, then you will probably use the catchword index and the iterative approach much less.

## Accessing Classification Search Tools

### *International Patent Classification (IPC):*

- The Official Catchword Index, the Guide, Survey of Classes and Summary of Main Groups, as well as the 8 Sections - all in French and English, are printed publications distributed in North America by IFI Claims Patent Services.

- Published by :  
World Intellectual Property Organization  
34, chemin des Colombettes  
1211 Geneva 20 (Switzerland)

- The following websites offer listings of IPC codes:

[http://www.wipo.int/classifications/fulltext/new\\_ipc/index.htm](http://www.wipo.int/classifications/fulltext/new_ipc/index.htm)

<http://www.dagostini.it/patclass/patclass>

- The European Patent Classification (ECLA), an enhanced version of the IPC can be found at:

<http://12.espacenet.com/espacenet/ecla/index/index.htm>

### *Canadian Patent Classification (CPC):*

- The Catchword Index (called "Subject Matter Index") and the Class Schedules (all in French and English) can be consulted on site at CIPO in Hull, Quebec

<http://cipo.gc.ca>

### *U.S. Patent Classification (USPC):*

- The Class Schedules can be consulted on the USPTO site from [www.uspto.gov](http://www.uspto.gov) or several other pay per view sites such as [www.delphion.com](http://www.delphion.com)

## Search Strategies

There are a few simple steps to searching “SMARTER” in the patent literature:

- \* **S**pecify information needs (e.g. identifying recent technical developments only ?)
- \* **M**atch information sources to needs (e.g. talk with a patent expert in addition to the database search ?)
- \* **A**ssess on-line patent search tools (e.g. which patent database(s) should I use ?)
- \* **R**ecognize patent databases and search tools differences (e.g. which classification system should I use ?)
- \* **T**hink search statements (e.g. which wildcards or Boolean operators should I use ?)
- \* **E**xecute the search
- \* **R**efine the search (e.g. what other parameters could I use to refine the search results ?)

The most efficient and effective search strategy depends on two factors:

1) Purpose of the search

- Patentability searches require a complete and thorough coverage of all databases as far back in time as possible;
- Infringement searches require a complete and thorough search of patent databases, in the country of interest, within the life-time of a patent (generally 17 to 20 years);
- “State-of-the-art” technology searches require a generally superficial search in a variety of pertinent databases over the last few years;
- “Cutting edge” technology searches require a complete search but only within the last year or less.

2) Database being used

Simply put, the database limits the fields and dates that can be searched and also limits the results which can be viewed. Consider the nature, strengths and weaknesses of each database in light of the purpose for the search. For example, is the database deriving its information from a single national patent office, or is it combining information from several offices ?

### Types of Strategies:

There are 4 basic strategies that are commonly used to search the patent literature:

1) *Classification Search Only:*

Using the classification catchword index, schedules and concordance tables along with preliminary searches, determine all possible classifications for your invention.

Retrieve all documents from the above classes and go through them one-by-one to assess their relevancy.

This method of searching emulates the old manual method employed by patent examiners when doing a search in the paper files. It is quite thorough provided you are confident that all appropriate classes have been determined. It is effective for doing patentability searches in the patent literature. However, this method is also quite tedious.

One disadvantage of searching classes relates to the IPC. Every five years the IPC is updated and new classes are created in high activity areas. However, old patent documents are not reclassified into the new version thus there can be a problem with class continuity.

## 2) *Keyword Search Only:*

Using keyword searches in titles, abstracts, descriptions and/or claims will retrieve relevant documents. However, there are problems with doing searches using keywords alone; for example, searching for methods of defoaming liquids while filling containers would be very time-consuming, if not impossible, by using words: truncated words like fill\* (or fill?, etc.), contain\*, bottl\*, flask\*, and their synonyms would yield too many postings.

Other limitations of searching exclusively with keywords include:

- a) There are a large number of synonyms, patent jargon and spelling variations to consider for each word. This problem can be attacked with operators and Wildcards but the problem cannot be eliminated.
- b) Most databases work with indexed keywords; thus, you are relying on the quality of indexing.
- c) Most databases only allow title or abstract searching which severely limits the utility of keyword searching.
- d) One term can be used in a variety of technologies; thus you will obtain many completely irrelevant hits.

Keyword searches alone should not be used if you want a thorough search. Keyword searches are good for doing a state of the art search in the patent literature or if you are trying to determine other possible classes, keywords, inventors or assignees on which to do a search.

In addition, a keyword search should be done to supplement a classification search to ensure complete coverage of the database.

Finally, combinations of keyword strategies using operators and wildcards should be used to maximize the quality of hits obtained.

## 3) *Classification AND Other Parameters Search:*

All the relevant classes can be searched to compile an initial list of patents. If the quantity of patents is too large for a one-by-one assessment, then another parameter can be used to narrow the hit list. These parameters could be:

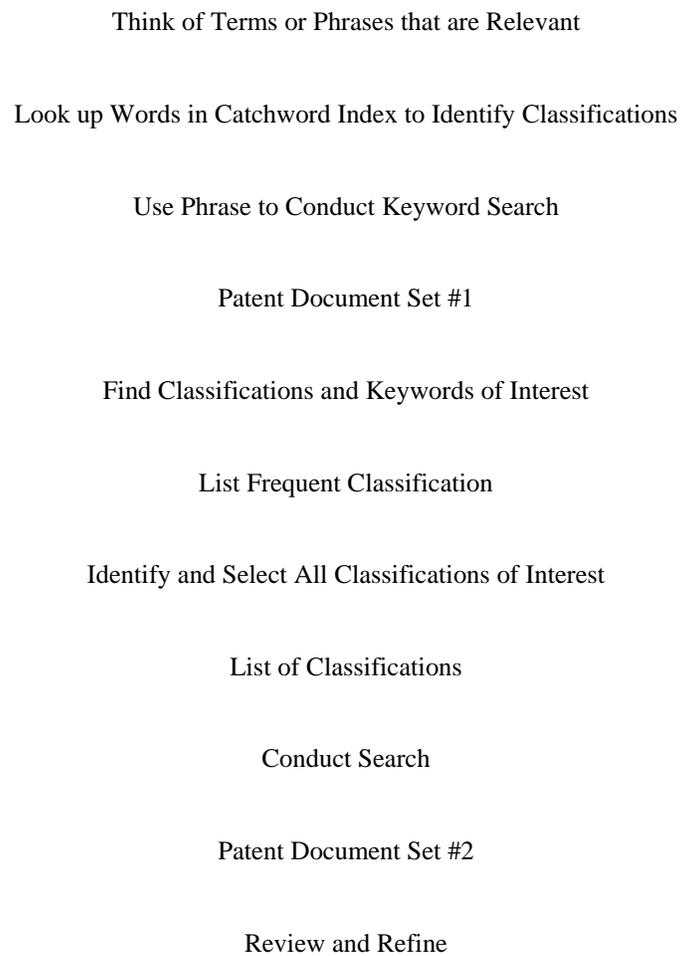
- Keywords in the title, abstract, description or claims (depending on the database) - note: keywords in patent titles are very unreliable
- Date ranges such as issue date, publication date and filing date
- Country/ies of interest

## 4) *Others:*

- a) Citations in relevant U.S. patents should be checked for additional relevant hits, for more classes, and/or for more keywords.
- b) Inventor and assignee (owner) searches can be done if you know active inventors or companies in the area of technology.

In the end, the best approach to searching the patent literature is to use the classification system that suits your needs and to supplement classification with keyword searches and with searches in other fields such as the inventor field. If you have the time and resources, a variety of strategies and databases should be employed to ensure a thorough and complete search.

The following diagram illustrates a very popular search strategy:



## Basic Search Syntax

Search syntax is the “language” used to perform a search in a search engine. Each search engine has its own peculiarities which the searcher must learn. However, there are some commonalities among all search engines.

When formulating a search, the searcher must write a “search string” which is like writing a sentence in normal languages. If the construction and grammar (syntax) is obeyed, then the computer will successfully perform the search. However, since computers are essentially dumb, it is imperative to formulate the search string in exactly the correct manner. This means that if even one small mistake is made, the search will not be performed correctly. Thus, it is important to learn both the basics of search syntax as well as the peculiarities of each search engine.

A search string consists of essentially three types of elements. These are:

1. Search terms (sometimes called “keywords”)

Search terms are the specific words, phrases or characters which the searcher desires to look for in the database. These may be real words such as in a subject matter search, numbers in a patent number search or dates in a filing date search.

2. Search fields

Search fields are the areas of the database in which the search for the term will take place. If the search term is a word for a subject matter search, then the desired fields could be the title, abstract, description or any other available content field. If the term is a patent number, then the desired field is the patent number field. Searching the appropriate field will maximize the relevancy of the documents obtained. There is no point searching for the inventor by name in the title field since the inventor field is more appropriate.

The quantity and type of fields available vary from database to database but in the patent world there are a number of standard fields which occur in virtually every database. These roughly correspond to bibliographic elements and textual elements.

3. Operators

Operators are used to link search terms in a logical fashion in order to combine a number of terms into a single search. This permits the searcher to maximize both the quantity and quality of documents retrieved during a search. The number and type of operators useable in a search engine are often an indication of the overall usefulness of the search engine for retrieving information.

## Search terms:

Search terms are normally entered by the searcher, either in individual boxes as in Panel type search engines or on a single line in Command line search engines. The syntax of a search term depends on the field being searched.

eg. text fields like title and abstract usually have normal words	“skateboard”
eg. the inventor field will have people’s names	“Polyani”
eg. the patent number field will have a number	“2132345”
eg. the International Class field will have letters and numbers	“C12P-19/00”

In most search engines, the fields are case insensitive so that terms can be capitalized or not. However, occasionally a field will be case sensitive. Particular attention must be paid in each database to such peculiarities. In addition, punctuation should be considered closely since a punctuation mark may be part of a term.

In most search engines (but not all) the term typed will be searched as it appears. If there are variations in spelling of the term, or if there are other alternative forms of the term, the search engine will not find them. In order to overcome this problem, most search engines allow the use of “wildcards”. Wildcards are special characters which can be used to take the place of one or more normal characters found in a term. The types of wildcards vary widely from one search engine to another but there are some standard concepts.

eg. Wildcards which replace any number of characters - \* is the most common

This wildcard replaces any number of characters including zero characters. Sometimes it can be used anywhere in a term and sometimes only at the end of a term.

- skate\* - would retrieve the terms “skate”, “skater”, “skaters”, “skateboard”, etc.
- d\*g - would retrieve the terms “dog”, “drug”, “distinguishing”, etc.
- \*board - would retrieve the terms “board”, “skateboard”, “inboard”, etc.

Extreme care must be used when using this wildcard since many irrelevant terms can be encompassed. This would disproportionately increase the number of documents retrieved and make the search useless. In addition, the length of time required to do the search dramatically increases, and, in some cases, the search engine would refuse to do the search.

eg. Wildcards which replace exactly one character -

The character used is different in almost every search engine. The Canadian Patent Database uses the underscore. This wildcard is much more precise than the ones above as it can represent only a single character. For example:

- skate\_ - would retrieve the terms “skates” and “skater” but not the term “skate”
- d\_g - would retrieve the terms “dog” and “dig” but not the term “drug”

Some search engines do not use wildcards explicitly. They have an implicit wildcard at the end of any term (this is called stemming). Thus, typing “skate” would also retrieve “skates”, “skateboard”, etc. This feature can be usually turned off to permit searching on “skate” alone. However, most patent search engines use the explicit wildcard idea described above.

## Search Fields:

Databases are constructed in discrete areas of information called “fields”. Each field contains information specific to one concept. In this manner, an information searcher can quickly focus on the desired information by searching the fields which are most appropriate for the needs. Therefore, when writing a search string, the searcher must specify a field for each search term.

The fields in most patent databases can be conveniently divided into two types: bibliographic fields and text fields. Bibliographic fields include fields like inventor name, filing date, patent number, international class, etc. Text fields include the title (although this is sometimes considered bibliographic), abstract, description, etc. Patent databases differ widely in the fields which can be searched although there is generally a core standard which is common to all. Before conducting a search, the searcher should be familiar with all of the available fields in the database.

In Panel type search engines, fields are normally chosen from a pop-down menu through a click and select mechanism with the mouse. In Command line search engines, the searcher must type a field code into the search string along with the search term. The syntax varies considerably for field codes and their use in a search string so the database Help feature should be consulted for search engines which use a Command line.

## Operators:

Operators are words which connect search terms in a logical manner in order to maximize the efficiency of a search. Operators are relatively consistent among databases. There are two types of operators and the most common examples of each are given. However, there are many other operators which can be used and the Help feature of a given database should be consulted to determine their availability.

Boolean operators:     AND  
                              OR  
                              NOT (sometimes ANDNOT or BUTNOT are used)

Proximity operators:    NEAR

AND     Both terms must appear in any record retrieved by the search.

eg.    skateboard   AND   rollerskate                    All records retrieved must contain both the term “skateboard” and the term “rollerskate”.

OR     Either one or the other term must appear in any record retrieved by the search.

eg. skateboard   OR   rollerskate                    All records retrieved will either have the term “skateboard” or “rollerskate”. Both may appear but only one is necessary.

NOT    The first term must appear but the second term must not appear in any record retrieved by the search.

eg. skateboard   NOT   rollerskate                    All records retrieved must contain the term “skateboard” but must not contain the term “rollerskate”. If “rollerskate” appears, the record will not be retrieved even if “skateboard” does appear.

NEAR The second term must appear within a certain number of terms of the first, either before or after. The default varies from one search engine to another although 10 terms is common. Many search engines permit the searcher to change the value so that NEAR can equal a different number of terms. The syntax for changing the value varies widely. There are also a wide variety of other proximity operators which are supported by various search engines. They will not be discussed here so refer to the Help feature of the particular search engine that is used.

eg. skateboard NEAR brake All records must contain the term “brake” within a certain number of characters before or after “skateboard”.

Just as in mathematical operations, search operations are conducted in a certain order depending on the precedence of the operators. In general, the precedence of operators is as follows:

proximity operators > NOT > AND > OR

Example 1: skateboard OR wheel NOT tire

The operation “wheel NOT tire” is performed first to form a set of documents in which the term “wheel” appears but not the term “tire”. Then the OR operation is performed to form the final set of documents in which the term “skateboard” appears or the term “wheel” provided that when “wheel” appears, “tire” does not also appear. Therefore, documents will be retrieved which could contain both the terms “skateboard” and “tire” as long as “wheel” is not in these documents. This can happen because the NOT operation is performed first.

Example 2: skateboard AND wheel NEAR rubber

The operation “wheel NEAR rubber” is performed first to form a set of documents in which the term “rubber” appears close to the term “wheel”. Then the AND operation is performed to give a final set of documents in which “wheel” and “rubber” are close together and in which the term “skateboard” also appears.

It is apparent from the examples that the use of more than one operator can lead to some logical confusion. With many operators, the confusion is even greater. This can result in search results which are unexpected and irrelevant or even in the failure of the search altogether.

Fortunately, many (but not all) search engines support the use of parentheses for establishing different orders of precedence. This is the same concept as the use of parentheses in mathematics, thus much of the confusion of operator precedence can be cleared up. The basic rule is that operations between terms within the same parentheses are done first.

Example 3: (skateboard AND wheel) NOT tire

The operation “skateboard AND wheel” is done first since it is parentheses to form a set of documents in which both the terms “skateboard” and “wheel” must appear. Then the NOT operation is done to form a final set in which the term “tire” does not appear but both the terms “skateboard” and “wheel” do appear. Compare this to Example 1 above.

Example 4: ((skateboard OR rollerskate) AND wheel) NOT blade

The OR operation is performed first since it is within the deepest parentheses. The AND operation is done next followed by the NOT operation. As is evident from this example, nested parentheses can be used to establish a more complex search string.

### Menu Panel vs. Command Line Search Engines:

Panel type search engines are generally more limited in their capability but simpler to use. They use pop-down menus to choose fields and operators thus their use is more intuitive. However, they usually have a fixed number of boxes for entering search terms which limits the ability of the searcher to perform complex searches. Also, they often have a more limited selection of fields and operators which can be used.

Command line search engines are generally more flexible but more difficult to use. The flexibility arises from the ability to use a wider range of fields and operators and the possibility to use more complex search strings since Command lines usually support the use of parentheses. However, the search syntax is not intuitive and they also differ widely among search engines.

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