



## Review Article

# PATENT SEARCH AND ANALYSIS - AN INFORMATION RETRIEVAL METHOD

R. SELVAM\*

Department of Animal Genetics and Breeding, Veterinary College and Research Institute, Tirunelveli, 627 358, Tamil Nadu Veterinary and Animal Sciences University, Chennai, 600051, Tamil Nadu, India

\*Corresponding Author: Email - [selvam.r@tanuvas.ac.in](mailto:selvam.r@tanuvas.ac.in)

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**Abstract:** Aim of this paper is to enlighten the basic ideas and concepts in patent searching. The "Patent search" is a method of examining for the documents that will determine whether an invention is novel and non-obvious and qualify for a patent and helps the inventor in decision making and saves his time and money. Patent search may be conducted to find out the most recent innovation, to study the development of a particular field, and to find the patents filed by a person or Organisation and it may be conducted by inventor itself or by a patent agent or patent attorney or private search. The different types of patent search are Prior art search, Patentability search, Validity search, Infringement search and Freedom to operate search. There are various online and offline resources available to search patents which include USPTO, WIPO, ESPACENET etc. There are commercial databases also available with additional features. There are many search tools which are used to broaden or narrow down the patent search results. The patent search results will always be useful either if the invention was found to be original or not and its helps to decide what to do next.

**Keywords:** Patent, Prior art, Infringement, Freedom to operate, Database

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## Introduction

"Patent search" is a method of examining for the documents that will determine whether an invention is novel and non-obvious and it may meet the requirements for granting a patent or not. Patent searches usually originate with a database of issued patents, patent applications and also include other types of documents, such as journal articles and scientific papers that describe unpatented inventions. Patent search can be done by inventor itself or hiring a patent search professional namely a patent agent or patent attorney or private searcher. The results of a patent search should make known any identical or partially similar innovation. Patent search results help to write patent application, to understand competition, to avoid patent infringement and to learn more about field of invention [1].

## Purpose of A Patent Search

Patent search may be conducted when a researcher would like to list out the patents in a certain field, which helps in guiding his research, identify specific new ideas and technical solutions, products or processes and for improvement of an existing product or process. It is known as Prior art / State-of-the-Art search. When an inventor would like to make sure that his invention is unique before he spends time and money to obtain a patent and it is called as Patentability / Novelty search. Freedom to operate search / Infringement search is an organization would like to produce a product and wants to make sure that they do not get sued by someone else that might have already patented that idea. Patent search also conducted when an organization is making a product, and is being sued by another organization, which believes it holds a patent on that product, and the first organization would like to prove that the second organization's patent is invalid that is validity search [2].

## Types of Patent Search

The patent searches conducted for different purpose and having different approach [1].

## Patent Family Search

This kind of search is carried out to identify a member of a "patent family." Patent family searches are used to find the countries in which a given patent application has been filed and to obtain a list of references cited and to estimate the importance of the invention (by number of patent documents relating to the same invention and being published in different countries).

## Cited or Citing References Search

A patent may refer to or be referenced by important documents that may be crucial for making an improvement to an existing invention. Cited or Citing References search gives a comprehensive list of documents that refers to a patent and documents that the patent refers to.

## Inventor, Author or Assignee Search

Inventor, author or assignee search provides a complete list of documents that belongs to a particular inventor, author or assignee.

## Patent Search Process

The various ways of searching patent databases are as follows.

## Hand Search

This is basically a patent by patent manual search. The patents are filed by classes and subclasses. This type of search is conducted in the public search room at the patent office.

## Computer Search

This is basically a searching patent by using the online databases. The database of the United States Patent and Trademark Office (USPTO) is one of the earliest and free online patent information services. Another major online free patent database is espacenet, which has some 30 million patent documents.

	Prior art search	Patentability	Validity Search	Infringement Search	Freedom to operate search
Description	Previously used or published technology that may be referred in a patent.	Patentability/ Novelty search are typically performed before filing a patent in order to determine whether or not the invention is novel and non-obvious.	A search conducted with the intent of finding prior art to invalidate a pre-existing patent.	A search conducted for the purpose of determining if a given product or process would infringe upon any in-force patent claims	Searching the claims of third-party in-force patents to determine if the claims of the prior art read on aspects of the technology that is to enter the market place.
Coverage	Worldwide Patents and Applications	Worldwide Patents and Applications and Non-Patent literature. Any product/technical presentation	Worldwide Patents and Applications and Non-Patent literature. Any product/technical presentation	Worldwide Patents and Applications	Active patents of a particular country where the product under question is to be manufactured
Date Range	All	All	Documents dated till the critical date of the query patent	Active patents	Active patents and expired patents (if required)
Area of focus in patent	Query in Full text of the documents	Query in Full text of the documents	Claim of the query patent in full text of the documents	Claim of the query patent in claims of other patents	Query in claims of the patents
Result	List of issued patents and published application	List of issued patents, published application, non-patent literature and patentability opinion	List of issued patents, published application, non-patent literature and Validity opinion	List of issued patents and Infringement opinion	List of issued patents and Freedom to operate opinion

There are a number of private companies that have commercial databases. These include Derwent, Dialog, STN, Questel Orbit, Micropatent, Delphion etc. Commercial services offer enhanced or value-added patent information, based on the actual requirement of particular end users [3, 4].

### Literature Search

This is a search of the published literature to locate patents. This can be easily done in a library that has the abstract volumes of the particular science concerned. Chemical Abstracts, Electronic Abstracts, Physical Abstracts, etc., are typical sources of data.

### Patent Search Tools

There are different tools used in conducting the patent search are as given below.

#### A. Keyword Search

A keyword search is querying a patent database using the key words. A process of carrying out a keyword search is by identifying words that define the features of the invention, identify synonymous for the keywords and form key strings that can be used as a search query in the database. The search may also specify the fields or parts of patents. Keyword searches are quick and suitable for very recently developed technology for which patent classifications are not yet developed. The inventors may not have used the same words for describing an invention in the patents. So, it is crucial to develop a good list of keywords and its synonymous, and then implement the searches with appropriate logic.

#### Boolean Operators

Boolean operators help to combine words or phrases to broaden or narrow the search. Boolean operators can be used to specify what we want and what we do not want while searching.

Boolean Operator	Example	Function
AND	Drug and Formulation	Finds documents which have both drug and formulation.
OR	Drug or Formulation	Finds documents which have either drug or formulation or both.
NOT	Drug not Formulation	Finds documents which have only drug.

#### Nested Queries/Creating queries with Parentheses or Brackets

The search terms and its Boolean operators can be enclosed in parentheses or brackets to specify the order in which they should be processed. The data within the parentheses is process first and then the data outside of the parentheses process next.

#### Wildcards

Wildcard or truncation search used to retrieve documents containing variations of a search term. Wildcard symbols can be used to replace a single letter or a part of a word, or one or more numbers.

Query	Results
Standardi?ation	Standardisation and Standardization
Col*r	Color and Colour

Wildcard for USPTO is "\$" and for Delphion, Espacenet, WIPO databases is "\*\*\*".

### Proximity Search

Proximity search helps to specify how near/distant the search terms must be. The distance or nearness of the terms searched can be specified as whole numbers. The proximity operator is "~". The proximity operator is pursued by a number of representing the proximity of the search terms.

Query	Results
"Mastitis Treatment"~5	Documents with both mastitis and treatment and within five words of each other.

### Word Stemming

Word stemming is a language tool, it considers the origin of a word first, and then retrieve all possible variation of that word. If word stemming ON, documents with both the root word, and its variants will be retrieved and if word stemming OFF, the search is limited to the exact word.

### Search Term Weighting

The "^" (caret) operator is used for search term weighting. The caret "^" should be followed by a whole number that indicates relative importance.

### Query Interpretation

Catalyst^5 or Reagent Catalyst is 5 times more important than Reagent. Finds all documents with either Catalyst or Reagent, or both, rank documents with Catalyst higher.

### B. Classification Search

A patent classification is a method of arranging the patent applications according to the technological specification of the inventions. Each patent application will be classified in one or more classes. The patent office's assign classes to the patent applications. Hence, by using patent classification codes as search query, patent documents filed across various patent offices can be searched. There are various classification systems. The International Patent Classification (IPC) is agreed internationally. The United States Patent Classification is by the United States Patent and Trademark Office. The European Classification is based on the International Patent Classification but personalized by the European Patent Office. The Derwent classification system is followed by an organisation. Since Searches based patent classification depends on the features of a patent, all patents that make use of specific features will be arrived as a search result.

### C. Patent Number Search

The patent numbers are displayed in products or packaging or available in the "non-patent" literature, such as scientific and technical reports can be used to search the concerned patents.

### D. Date Range Search

Patent documents bear several dates (date of application, priority date and date of grant). These dates are very important to decide the age of an invention and to the question of whether the inventions they describe are still under legal protection. If they are no longer legally protected, they can be used without the consent of the patentee. Date range searching is searching patents which are filed or published during a defined period of time. For ex. the search query, "APD/10/22/1986->10/21/2006 AND recombinant AND vaccine" will retrieve all patents applied

for between October 22, 1986, and October 21, 2006, that contain the words recombinant and vaccine [5].

### Important Databases for Patent Search

The various resources for searching the patents are as follows

Patent Offices

United States Patent and Trademark Office, (<http://patft.uspto.gov>)

European Patent Office (<http://ep.espacenet.com>)

World Intellectual Property Organization ([www.wipo.int](http://www.wipo.int))

Indian Patent Office (<http://ipindia.nic.in/patsea.htm>)

### Non-Patent Literature

PubMed ([www.ncbi.nlm.nih.gov/sites/entrez](http://www.ncbi.nlm.nih.gov/sites/entrez))

Science Direct ([www.sciencedirect.com](http://www.sciencedirect.com))

Commercial database

Delphion ([www.delphion.com](http://www.delphion.com))

Micro Patent ([www.micropatent.com](http://www.micropatent.com))

The STN ([www.cas.org](http://www.cas.org))

Genome Quest ([www.genomequest.com](http://www.genomequest.com))

Google Patents ([www.google.com/patents](http://www.google.com/patents))

Free patents Online ([www.freepatentsonline.com](http://www.freepatentsonline.com))

Patent Lens ([www.patentlens.net](http://www.patentlens.net))

India Big patents (<http://india.bigpatents.org>)

### Conclusion

The patent search helps the inventor in decision making. The patent search can save the inventor's time and money spent on an idea that is not original. The patent search needs to be done to find all similar patents and then draft the patent application accordingly. A complete report will show what areas of the idea need change if they conflict with existing patents or which areas of the idea need to be further developed as they are truly original. If the invention is considered as unique through the patent search, the patent search results will help the drafting of the patent application, so it will be more likely to be approved for a patent. The patent search results will always be useful either if the invention was found to be original or not and its helps to decide what to do next.

**Application of research:** This article enlightens about conducting a patent search and analysis, provides guidance to the inventor, before deciding whether to conduct a research or improving or redesigning the invention and to prepare and file a patent application and helps in save time and cost in conducting research and filing patent application.

**Research Category:** Information science and IPR

**Abbreviations:** USPTO: United States Patent and Trademark Office;

WIPO: World Intellectual Property Organization;

IPC: International Patent Classification; IPR: Intellectual Property Rights

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**\*\*Principal Investigator or Chairperson of research: Dr R. Selvam**

University: Tamil Nadu Veterinary and Animal Sciences University, Chennai, 600051, Tamil Nadu, India

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