Chemistry Information Literacy
Patent searching

Sunette Steynberg
Department of Library Services
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Purdue University Libraries
Overview

- Overview of Intellectual Property
- What is a patent?
- Why search patents?
- What can be patented?
- Details of a patent
- Unique features of chemical patents
- Searching patents
What is “intellectual property”?

Creations of the mind – creative works or ideas embodied in a form that can be shared or can enable others to recreate, emulate, or manufacture them.
Protection of intellectual property can take one of four forms:

- Trademark
- Copyright
- Patents
- Trade Secrets
Trademarks

Trademarks protect words, names, symbols, sounds, or colors that distinguish goods and services from those manufactured and sold by others and to indicate the source of the goods.

Trademarks, unlike patents, can be renewed forever as long as they are being used in commerce.
Copyright

Copyright is a form of protection to the authors of “original works of authorship,” including literary, dramatic, musical, artistic, and certain other intellectual works, both published and unpublished, that have been tangibly expressed.
What is a patent?

• A patent for an invention is the grant of a property right to the inventor for a limited period of time (usually 20 years from date of application)

• Grants to the owner the right to exclude others from making, using, offering for sale, selling, or importing the invention into the country where the patent is obtained

• In return for this protection, the owner must describe the discovery in full (public disclosure)
Patents – some history

- Originated during the Industrial Revolution in the 18\textsuperscript{th} & 19\textsuperscript{th} centuries
- Intent:
  - to encourage technological advance
  - to provide information for later inventors to build on
- Since the beginning of the 20\textsuperscript{th} century, patents have become increasingly international in scope
Why are patents important?

- Nearly 17% of the records in Chemical Abstracts are patents
- Most information in patents is not published elsewhere
- Help avoid duplication in R&D
- Monitor competition
Why do we need to search patents?

- Often patents are the only documents for the R&D activities of a company
- If you are going to work in the chemical industry, your job may depend on your knowing about patents!

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What are some limits to patents?

- No experimental proof of prototypes or proof of chemicals actually tested or synthesized—“paper patents”
  - Many patents might be invalidated if challenged
- Titles can be very short and simple; not easily describing the invention
- In terms of chemical structures, patents may be too general (use of Markush groups)
Patentability of an invention

In order to be patentable, an invention must be:

- **Novel**: The invention in its entirety must not have been known or used before
- **Useful**: The invention must be fit for some desirable practical purpose.
- **Non-obvious** in light of the prior art; not apparent to someone with “ordinary skill in the art”
Is every invention/innovation published via patents?

- No, the other route is *trade secrets*.
- If not disclosed, they do not have the time limitations.
- So, if not disclosed, the information is not available!
- Can keep it secret indefinitely, but…
  - Depends on confidentiality
  - Can be reverse engineered
Three Types of Patents

- **Utility** patents. For new and useful processes, machines, articles of manufacture, compositions of matter, or any useful improvements thereof. (xxxxxxx) (20 yrs) *(chemical patents usually are utility patents)*

- **Design** patents. For new, original, and ornamental design for an article of manufacture. Protects only the appearance, not structure or utilitarian features. (Dxxxxxxx) (14 yrs) *(Examples: iPod case; Koosh ball design)*

- **Plant** patents. For invention, discovery or asexual reproduction of distinct and new varieties of plants. (PPxxxxx) (20 yrs)
Example of a Utility Patent

- US Patent 6,934,812
- Title: Media player with instant play capability
Example of a Design Patent

• US Patent D506,476

• Title: Media Device

![Fig. 4](image1.png)

![Fig. 5](image2.png)

![Fig. 6](image3.png)

![Fig. 7](image4.png)
A distinct new variety of plant

US Patent PP21,535 P2

Title: Sweet orange tree

BACKGROUND OF THE NEW PLANT

The invention relates to a new and distinct variety of sweet orange tree, *Citrus sinensis* L. Osbeck, named ‘SF14W-62’, which is a moderately vigorous tree that produces standard ‘Valencia’ type sweet orange fruit but with a significantly earlier fruit maturation date (4 to 8 weeks) than standard ‘Valencia’ trees. In Florida, fruit can generally be harvested from mid-January through February, depending on environmental conditions. Juice quality from fruit of ‘SF14W-62’ is equivalent to that of ‘Valencia’, the highest quality juice from oranges currently available. ‘SF14W-62’ provides the processing industry with earlier harvesting opportunities with ‘Hamlin’ or ‘Midwest’ sweet oranges to improve the flavor and color of NFC (Not From Concentrate) orange juice. In the event of January or February freeze-mandated harvests in Florida, this blending opportunity would allow for grade A juice recovery and would significantly lessen economic losses as would normally be encountered with standard ‘Valencia’ oranges that have not reached full maturity at this time.


SUMMARY OF THE INVENTION

‘SF14W-62’ is a new and distinct variety of sweet orange tree which bears fruit that ripens from mid-January through February in central Florida. The trees usually bloom between early to late March in central Florida, depending on seasonal weather. ‘SF14W-62’ trees are upright and of moderate vigor, with a tendency for alternate bearing. Second and third generation trees are more thorny than traditional ‘Valencia’ selections, especially on internal scaffold branches; however, thorniness diminishes over time and is less obvious with each generation of propagation. Thorns can be long, but are quite variable. Trees tend to bear more terminal fruit, which can cause long scaffold branches to bend over from the weight of the fruit, but also minimizes the impact of the thorns on harvesting.

‘SF14W-62’ trees bear fruit that is typical of ‘Valencia’ trees but ‘SF14W-62’ fruit ripens 4 to 8 weeks earlier than standard ‘Valencia’ clones based on the bréach/acid ratio (see Table 1). Juice quality of ‘SF14W-62’ is typical of ‘Valencia’ in sugar and acid content, color and flavor. The fruit of ‘SF14W-62’ are juicy and difficult to peel. The peel of ‘SF14W-62’ is slightly less seedy than standard ‘Valencia’ but not seedless. Replicated trials (both 2nd generation and 3rd generation trees) to determine yield were destroyed by the Florida state-run canker eradication program. The original tree in Venus, Fla. yielded more than 10
The life of a patent

- Initial application is filed at the patent office (PO) of a country or a supranational entity like the European Patent Office. This date is the **Priority Date**
- After initial examination by the PO, the full patent specification is published, or Open for Public Inspection (OPI)
- After further PO inspection (USA & some other countries), the patent is granted, provided it meets certain criteria (see “Patentability” slide)
- Patents are generally valid for **20 years** after their initial filing date (Priority Date), although there are exceptions
Some types of patent documents

- Patent application
- Granted patent
- Abandoned patent
- Continuations
  - Continuation-in-part
  - Division
  - Reissue
Parts of a Patent

- Using: US Patent 7,335,897
- Method and system for desorption electrospray ionization
- Developed by Dr. R. Graham Cooks and others
- The method has been used to create a device that reads a fingerprint's chemical signature and can unearth fingerprints buried beneath others or reveal what a person recently handled, as well as create an image of the fingerprint for identity searches.
- Appeared in Season 7, Episode 9 of CSI: Miami
Parts of a patent

Nearly all specifications contain the following elements:

• The **patent number**: In the USA, it is a sequential number presently in the 7 millions. Other countries may include the year in the number

• The **date of issue** of the patent and the **priority filing date**

• The **patent title**, which is frequently vague, and is usually rewritten by indexing and abstracting services

• The **name(s)** of the applicant/inventor(s) and the **assignee**, if any

• **References** to prior work

*Indicates most useful fields for using a patent as an information resource.*
Parts of a patent, cont’d.

- The **subject**, or field of technology of the invention
- **Prior art** discussion, including a statement of the problem to be solved
- The “**objects**” of the invention, i.e., the benefits provided by the inventor’s discovery
- A “**definition**” of the invention, i.e., the solution to the problem stated
- Details of all aspects of the invention
- A description of the usefulness (“**utility**”) of the invention
- Working **examples**; drawings are sometimes included
- A list of **claims**, which is the legal description of what has been granted as an exclusive right to right to the inventor

*Indicates most useful fields for using a patent as an information resource.*
Markush groups in chemical patents

The intent is to cover as many variations as possible in patented chemical structures by (a) designating one or more generic groups attached to the core molecular structure or by (b) designating variable points of attachment to the core (or both).
Markush patent searching in SciFinder
Search for patents by Markush structure

Patents can contain Markush structures that represent generic and hypothetical compounds covered by a patent claim. For example:

trans-6-[2-(Substituted pyrrol-1-yl)alkyl]pyran-2-one inhibitors of cholesterol synthesis

\[ \begin{align*}
R_1 &= \text{(un)substituted Ph, naphtyl, cyclohexyl, norbornyl, etc.} \\
R_2, R_3 &= \text{H, Br, Cl, cyan, C1-4 alkyl, etc.} \\
R_2R3 &= \text{atoms required to form a fused heterocycle} \\
R_4 &= \text{C1-4 alkyl, cycloalkyl, CF3} \\
X &= \text{CH2, CH2CH2, CHMeCH2}
\end{align*} \]

The inventor need not have tested or prepared all members of the family, but can make a chemically plausible claim of equivalence via a Markush structure.

A Markush search differs from a substructure search in that it matches the structure query against generic structures found in patents. The result is a list of patent references.
Where to search for patents

• *When you have the patent number*
  - USPTO
  - Esp@ceNet

• *When you want to do a topic search*
  - SciFinder Scholar
  - Google Scholar

• *When you want to do a structure search*
  - SciFinder Scholar (Markush)
Patent for “Uncrustables”

• Retrieve via USPTO by patent number

United States Patent
Valenzky, Jr. et al.

METHOD AND APPARATUS FOR MAKING COMMERCIAL CRUSTLESS SANDWICHES AND THE CRUSTLESS SANDWICH MADE THEREBY

Inventors: Robert John Valenzky, Jr., Akron, OH (US); Duane Nathan Eberhart, Wooster, OH (US)

Assignee: The J. M. Smucker Company, Orrville, OH (US)

FOREIGN PATENT DOCUMENTS

AU A-40334/95 6/1996

OTHER PUBLICATIONS

Selected Excerpts From a Book Pasta, Pies and Pasteries—Tart Recipes From Around the World, Authored by Ursula
Retrieve via Esp@ceNet

• WO2011157848 (A1)
PRODUCTION OF BIODIESEL BY YEAST FROM
LIGNOCELLULOSE AND GLYCEROL
A Process for the synthesis of riboflavin (a vitamin) that would permit economical, large-scale production of the essential vitamin (B2).
Thank you

sunette.steynberg@up.ac.za