## 5.1 Introduction to Patents

This FitBit *(show FitBit on wrist)* is a unique and useful gadget that monitors your steps and heart rate while giving you the time of day like a regular watch. This clever device has revolutionized the world of fitness, and it all began with a patent. But what is a patent? And why is it so important to patent your inventions? Keep watching to find out! *(Look at FitBit)* Great, only a few more steps to 10,000!

Patents are a type of intellectual property. According to the World Intellectual Property Office, *[show IP definition]* **intellectual property** refers to “creations of the mind – everything from works of art to inventions, computer programs to trademarks and other commercial signs.” Intellectual property rights allow creators, who might be for example, inventors, artists, or businesses, to control how their work is used. Some types of intellectual property include *[display each of these*]:

* Copyright (for expressions of ideas, such as a song, novel, or film),
* Trademark (which are words or symbols that distinguish the goods or services of an enterprise),
* Industrial design or design patent (which protects the ornamental design of a product), and
* Patents which relate to inventions of new products or processes, or improvements to products or processes.

*[display patent definition]* We can define a **patent** as a type of intellectual property that provides the patent holder with certain rights to protect their invention. These rights pertain only to the country where the patent was issued and are for a limited period of time.

A patent gives the patent holder the exclusive right to the invention being patented. Others cannot make, use, sell, or distribute the invention without the permission of the patent holder, and if they do then the patent holder can seek damages.

*[display the following list of bullet points]* What can you patent? In Canada, patents protect inventions that are:

* A product (for example, a toothbrush),
* A composition (for example, a formulation for toothpaste),
* A machine (for example, a machine that manufactures toothbrushes),
* A process (for example, a process for making toothpaste), or
* An improvement on any of these

An invention in Canada must also meet three criteria to be patentable: *[display the words new, useful, and inventive]* it must be new, useful, and inventive. An invention is new if it is the first in the world. It is useful if it has a function, so it *does something* that is useful. And it is inventive if it requires some creativity or imagination, so that the invention is not obvious to someone who works in the field of the invention.

When a patent is published, there are benefits for the patent holder, in the form of the exclusive right to their invention. But there are also benefits for the rest of society, as patents must provide a full description of the invention. Because they provide a high level of detail about inventions, patents can be a useful source for when you want to identify and understand recent inventions and technologies. You can learn from the latest technologies that inventors have developed and use these to inspire your own ideas, while of course making sure not to infringe on any patents! Because they provide detailed descriptions of inventions that often are not published anywhere else, patents are a unique and valuable source of information for engineering research.

## 5.2 Reading a Patent

*[Use* [*US patent 8,945,017*](https://patentimages.storage.googleapis.com/46/1e/08/d5aeb539154d5c/US8945017.pdf) *Wearable Heart Rate Monitor. Highlight relevant sections of the patent as they are discussed]*

Have you ever looked at a patent before? What kinds of information do you think you’ll find in a patent?

Let’s look at an example*. [show first page of US patent 8,945,017]* We’ll start on the first page of the patent, which always contains a lot of important information. At the very top of the first page, you can find some basic details about this document. First, you can see the type of document you are looking at. In this case, it’s a United States patent. You can also see the number that is used to identify th3e patent. There is a prefix before the patent number (U.S.) and a kind-of-document code after the number (B2), but neither of these is a part of the patent number itself. You can also find the date of the patent, which refers to the date that the patent was issued or published by the intellectual property office.

As we continue looking at the first page, there is lots more to learn about the invention. We can see the title of the patent which is “Wearable Heart Rate Monitor”. Then we can see the applicant, inventors, and assignee. The inventors are Subramaniam Venkatraman and Shelten Gee Jao Yuen. Fitbit, Inc. is the assignee and the applicant. *[show definitions of inventor, then assignee, then applicant].* You’ve probably heard the term “inventor” before – the **inventors** are the people who developed the idea for the invention. A term you may not have heard before is assignee. The **assignee**, sometimes referred to as the **owner**, is the person, company, or organization that owns the patent. Note that the patent will list who the assignee was at the time the patent was issued, and the assignee can change. The **applicant** is the person, company, or organization that filed the application for the patent.

Below this, we find the application number and the filing date, or the date that the application was filed with the intellectual property office.

Then there is some information about classification [highlight classification codes in sections 51 and 52]. The patent lists both international classification and U.S. classification. We’ll talk more about these in another video, so for now just remember that you can find these classification codes on the first page of a patent.

The patent includes a list of references cited, which include both patent documents and other publications. These references are known as “prior art” which refers to existing published knowledge related to the invention. Then we come to the abstract. This is a short summary of the invention and what it does, much like you might find an abstract at the start of a journal article that summarizes the article and its findings.

The final thing to highlight on the first page of a patent is the representative drawing, which is exactly what it sounds like, a drawing that represents the invention.

As you’re looking at the front page of a patent, you might notice the numbers shown in brackets beside some of the different types of information. For example, the number 54 beside the title of the invention. These numbers are called INID codes. INID is an acronym for “Internationally agreed upon Numbers for the Identification of bibliographic Data”. These numbers are common across patents from different countries based on a standard created by the World Intellectual Property Organization. This means that the code 54 should always appear beside the title of the invention, regardless of which country a patent is published in. These codes make it easier for you to read patents across different countries, because if you know the INID code for the information you need, you can look for that code on the patent to find what you’re looking for.

On the following pages, you’ll typically find some more drawings, the specification, and the claims. We’ll discuss each of these in turn.

*[display definition, examples of drawing(s) from this patent]* **Drawings** are the diagrams that show the different elements and features of the invention. These are generally not photographs and are shown in black and white. Different elements of the drawings are labelled with numbers so that they can be referred to in the description of the invention.

*[display definition]*The **specification** of the invention provides the written explanation of the invention. It includes a discussion of prior art and other background information. It also describes the technical problem that the invention aims to solve and how the invention solves that problem. It will explain the invention in detail, with references to the drawings.

The last thing you’ll find in the specification are the patent’s claims. *[display definition]*The **claims** provide a legal definition of which elements of the invention are protected by the patent. They define the boundary of what is protected by the patent and what isn’t. There are often multiple claims and they are written to be clear and concise. This patent has 30 claims.

So, what parts of the patent will be most important for you to read? It really depends on what you are using the patent for. Often you can get an overview of the invention just by browsing the details listed on the first page, including the title of the invention, the inventors and owner or assignee, the abstract, and the representative drawing. To get a deeper understanding of the invention, you’ll need to spend some time looking at the drawings and reading the specification and claims. Now you know where to find all that information, so you’re ready to start reading and learning from patents.

## 5.3 Searching for Patents

*[show names of the different IP offices as they are mentioned]* How do you find patents? A good starting point is the patent office of a country whose patents you are interested in. It is important to note that there is no such thing as an international patent, thus when finding a patent, it is important to start at the country where it was filed. In Canada, this is the Canadian Intellectual Property Office (or CIPO). This office provides free access to the Canadian Patents Database, which you can use to search for patents issued in Canada. There are equivalent offices in other countries, such as the United States Patent and Trademark Office (or USPTO), the European Patent Office (or EPO), and the Japan Patent Office (or JPO). Each of these offices offers a free patent search tool so that you can search for patents issued there.

*[show names of the different patent search tools]* There are some other search tools available online too. Some of these are tools that are free for anyone to use, such as PatentScope from the World Intellectual Property Organization, Free Patents Online, Google Patents, and The Lens. Some academic libraries provide their students with subscriptions to tools that are not freely available, such as the Derwent Innovations Index, or SciFinder.

If you are interested in patenting an invention in a particular country, you’ll probably want to search in that country’s patent database. If you’re searching to see what patents exist for a type of technology anywhere, then a free tool that searches across countries might work for you. In this video, we’ll search using PatentScope, the database provided by the World Intellectual Property Organization for searching for patents from many different countries.

*[Show a demo of each of the* ***three*** *searches that follow in PatentScope]*

If you know the patent number for a patent you wish to find, this is all the information you need to look up the patent. You’ll want to choose the ID/Number field from the drop-down menu. It helps to include the country code for the issuing patent office as well. If I know the patent number for a patent for insulin and its country code, I can search with the country code, GB, and the patent number, 203778, to find the relevant patent.

If you know the title of a patent you wish to find, you can search the front page, since we know the title will be listed on the patent’s front page. *[show headline/photo from the article at* [*https://www.businessinsider.com/walmart-robot-bees-farming-patent-2018-3*](https://www.businessinsider.com/walmart-robot-bees-farming-patent-2018-3)] So if you read an article about Walmart filing a patent for crop-pollinating robot bees and the article provided the title of the patent, you could search, for that patent title “Systems and methods for pollinating crops via unmanned vehicles”. There are 12 results here, showing similar patents issued in different countries.

It’s also easy to search for an inventor, an applicant, or company by searching in the Names field. For example, I can search for all the patents which are associated with the National Research Council of Canada, which is an organization of the Government of Canada that is involved in science and technology research. The search finds over 3000 patents from patent offices around the world.

If you don’t have a specific patent in mind, but you want to find patents related to a particular topic or technology, you can try searching with keywords. You’ll want to search in the Front Page, Full Text, or Any Field. For example, if you were interested in any sort of container that could be used to serve hot drinks*, [list these three keyword combinations on the screen]* you might search for the words “coffee” and “cup” but you might also try searching for “mug” or for the words “hot beverage” and “cup”. To find more results, you’ll want to try experimenting with different keywords to try to find patents that talk about the same kind of invention using different terminology. Think about all the different ways that someone might describe an invention – what words might they use?

Now you’re ready to start searching for patents and discovering all the inventions that are out there. Use the strategies discussed to help you in your search.

## 5.4 Patent classification

If you were going to try and organize all the patents that have ever been published in a way that made sense and made them easier to find, what would that look like? This is the idea behind patent classification. *[display definition of patent classification]* **Patent classification** refers to the detailed systems that categorize patents so that patents for similar technologies are grouped together and easily findable.

These systems make it easier to find all the patents for a certain topic or technology. If you try to search for all the patents on a subject with keywords, you’ll encounter some challenges. Patents may use jargon, that is, words and phrases that are used by a particular profession or group that may be difficult to search for or to understand, and they may use a lot of words to describe something simple. It can also be challenging to search for patents published in languages that you aren’t fluent in. It’s difficult to conduct a keyword search so that you can find every patent published on your topic. Patent classification schemes simplify the process of searching for and finding **all** the patents available for a particular topic or technology.

There are multiple patent classification systems that are used. Some that you might encounter include *[show this list]:*

* Canadian Patent Classification,
* United States Patent Classification,
* Cooperative Patent Classification, developed jointly by the United States Patent and Trademark Office and the European Patent Office, and
* International Patent Classification

Let’s look at the International Patent Classification scheme, or IPC, as an example. We’ll start by talking about how patents are organized in this scheme. There are four levels of classification in the IPC hierarchy: Section; Class; Subclass; and Group. The highest level of organization is the Section. There are 8 possible sections, *[show this list]*:

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

*[show graphic displaying how a section is broken into classes, subclasses, and groups]* Each of these sections is subdivided into multiple Classes. Each Class is subdivided into multiple Subclasses. And each Subclass is divided into multiple Groups. The Groups may be either Main Groups or Subgroups. In this way, the IPC scheme takes inventions and puts them into increasingly more specific categories.

The IPC represents different parts of this system with classification symbols*. [show front page of US 8,945,017]* Let’s look at an example of an IPC symbol to see how this works. If we look at this US patent for a Wearable Heart Rate Monitor, I can see that it has multiple international classification symbols. Let’s look at the second one: A61B 5/024.

You can look up the meaning of any IPC symbol by accessing the International Patent Classification Scheme at <https://www.wipo.int/classifications/ipc/en/>.

*[show the following table, fix the colours]*

|  |  |  |
| --- | --- | --- |
| **Level** | **Symbol** | **Title** |
| Section | A | Human Necessities |
| Class | A61 | Medical or Veterinary Science; Hygiene |
| Subclass | A61B | Diagnosis; Surgery; Identification |
| Group | A61B 5 | Measuring for diagnostic purposes; identification of persons |
| Subgroup | A61B 5/024 | Measuring pulse rate or heart rate |

Here we can see a breakdown of what the IPC scheme tells us that this symbol means. It belongs to Section A for Human Necessities. At the next level, it belongs to Class A61 for Medical or Veterinary Science, or Hygiene. The Subclass is A61B for Diagnosis, Surgery, or Identification. The Main Group is A61B 5 Measuring for diagnostic purposes or identification of persons. And finally, the subgroup is A61B 5/024 Measuring pulse or heart rate. You can see how this invention has been categorized into smaller and smaller groups until we have a symbol for inventions that relate to measuring pulse or heart rate.

It’s easy to search for other patents that are associated with the same IPC symbol. *[demo search by IPC symbol A61B 5/024 in PatentScope*] In PatentScope, you can search in the International Classification (IPC) field and put the IPC symbol A61B 5/024 in the search box. Now you’ll find a list of all the patents that have this same IPC symbol and relate to inventions for measuring pulse or heart rate.

To summarize, if you ever need to make sure you’re finding all the patents for a technology, start by finding the appropriate classification symbols, either by looking at what symbols are applied to relevant patents, or by finding the symbol in the classification scheme. Then you can search by those symbols to find all the relevant patents.