

# **Guidebook of IP/Technology Transfer**

# **Track 1**

## **Entry-level Tech Transfer Professional**

### **Topic 1.7.1**

#### **IP basics (Types of IP and their uses)**

# Today's Lecture

Intellectual Property (IP) as a tool

What are patents?

- A brief overview

What purpose do they serve?

What role do they play?

- For society

  - Inventors

    - In technology and product development

    - In research

Patents: some myths “busted”

The “pros” and “cons” of patents

Patents in the global context

# Intellectual Property as a Tool

- IP converts intellectual assets into a property right
- That property right can be used to control the intellectual asset
- Protects inventors and creators from “theft” and “freeloading”
- IP is an asset that can be bought, sold, gifted, and traded
- It can be used to incentivize investment
- The IP Tool must be created, managed, and enforced

# Intellectual Property types:

- **Patents** (Utility, Plant)  
novel, inventive, useful inventions; public documents
- **Copyright**  
rights in the media expression, not the idea
- **Trademark, Certification Mark, Geographical Indication**  
rights in a word, logo, look, combinations
- **Trade Secrets**  
not registered; not public; perpetual;  
requires management/protection;
- **Utility models**  
similar to patents; less powerful, shorter duration;  
questionable enforcement
- **Plant Breeder's Rights**  
like patents but with distinct differences
- **Design Patents**

# Intellectual Property types:

- **Design Patents**

similar to utility patents but very narrow in scope (only the design, not the idea)

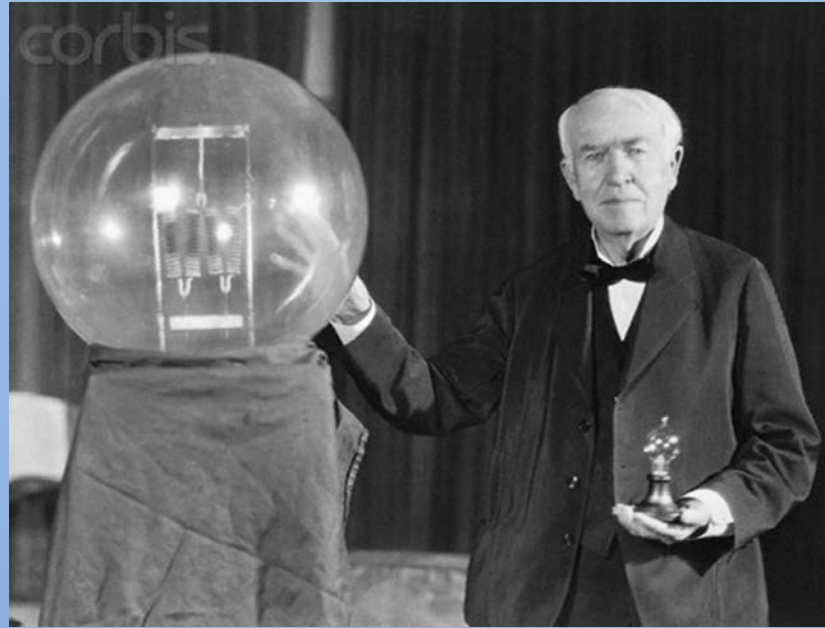
(example:

shoe sole vs

tre



# The fundamental purpose of IP:



**Development and commercialization of  
new technology**

*“the patent.....*

*adds the fuel of interest*

*to the fire of genius*

*in the discovery and production*

*of new and useful things”*

Abraham Lincoln

(a patent)

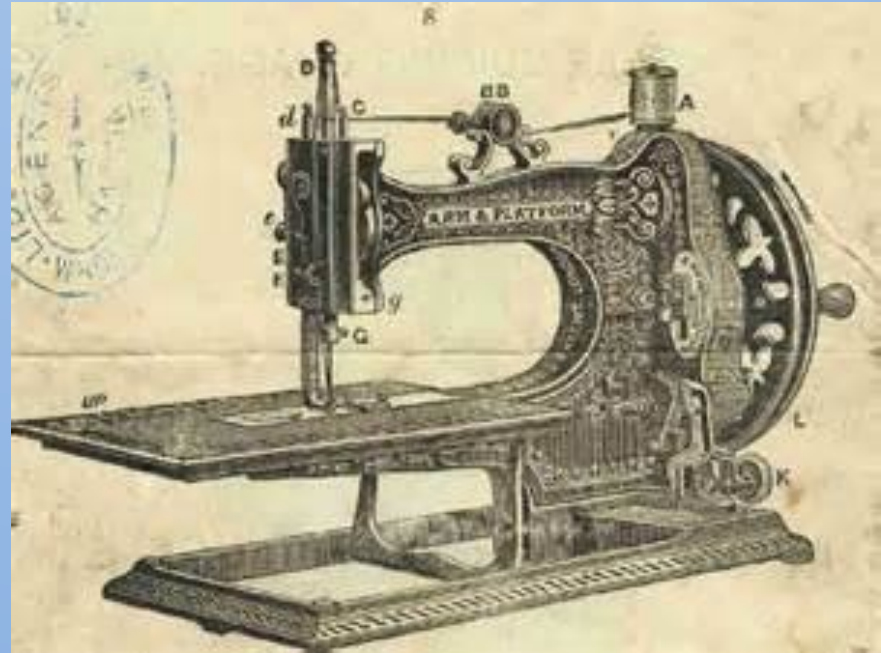




# A fundamental purpose of IP:

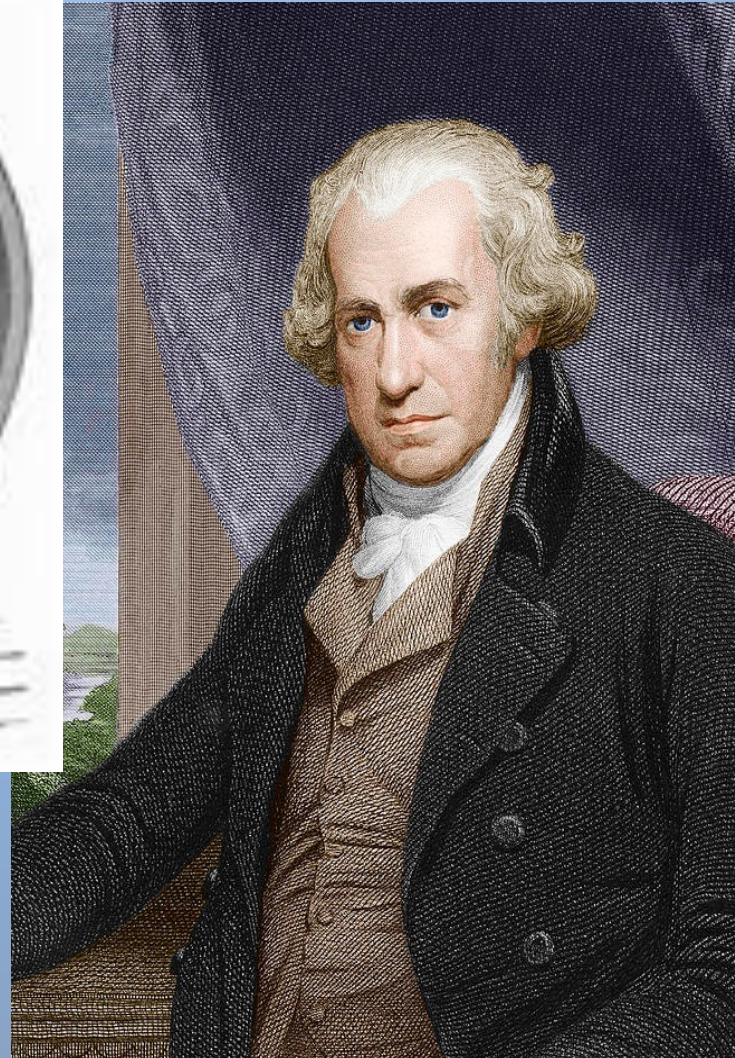
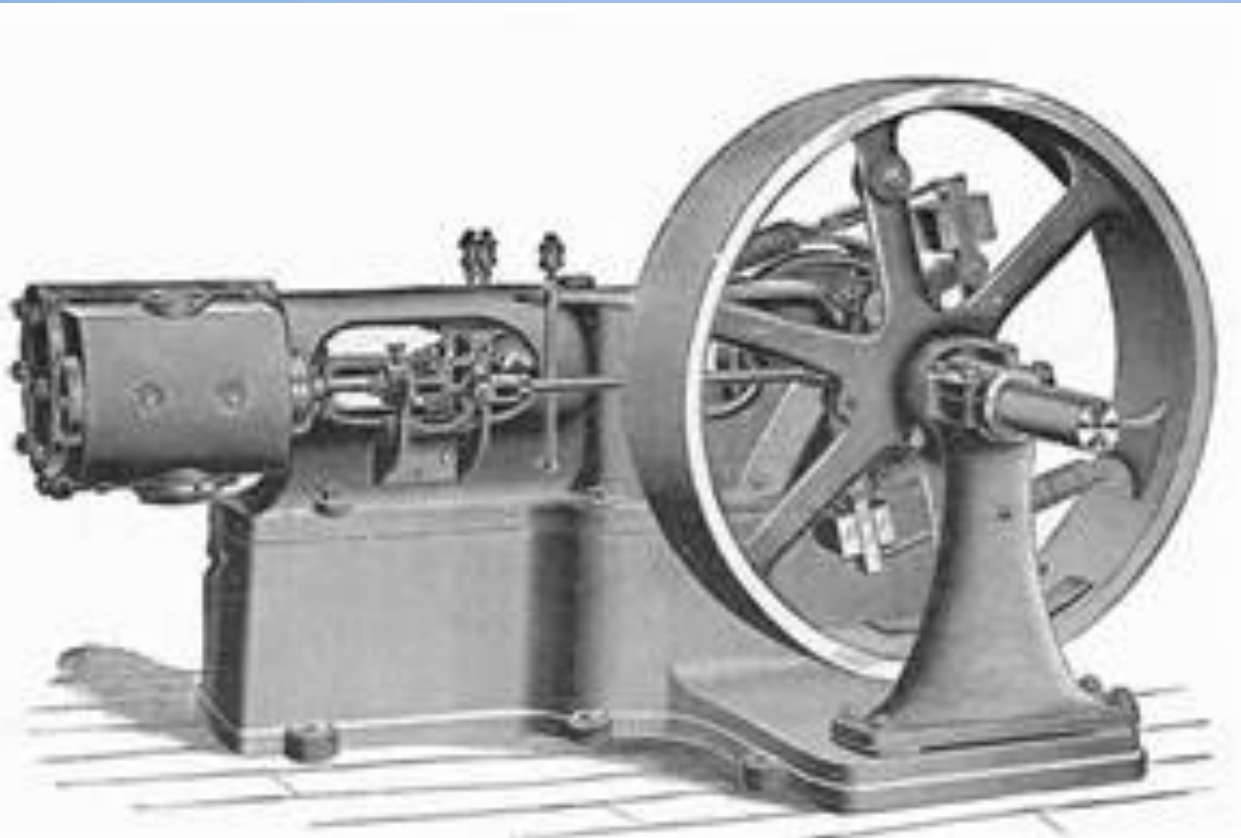
**Development and commercialization of  
new technology**

IP laws were originally intended to motivate and  
reward the individual inventor,  
working in their garage

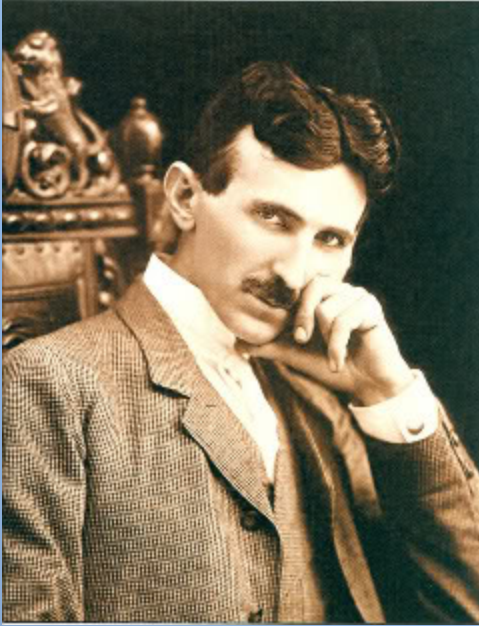


**Singer**

# Watt

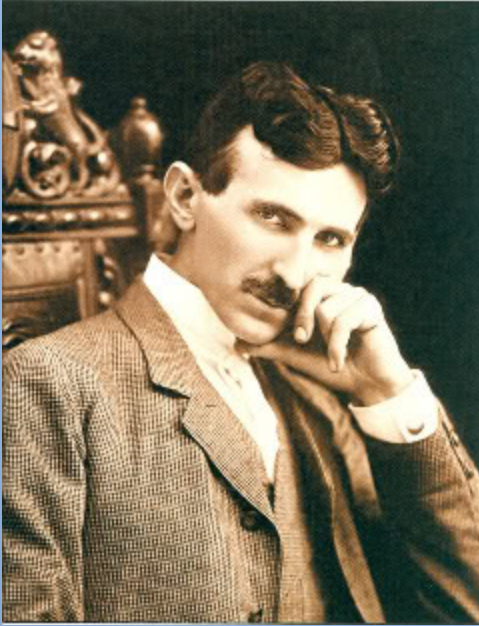






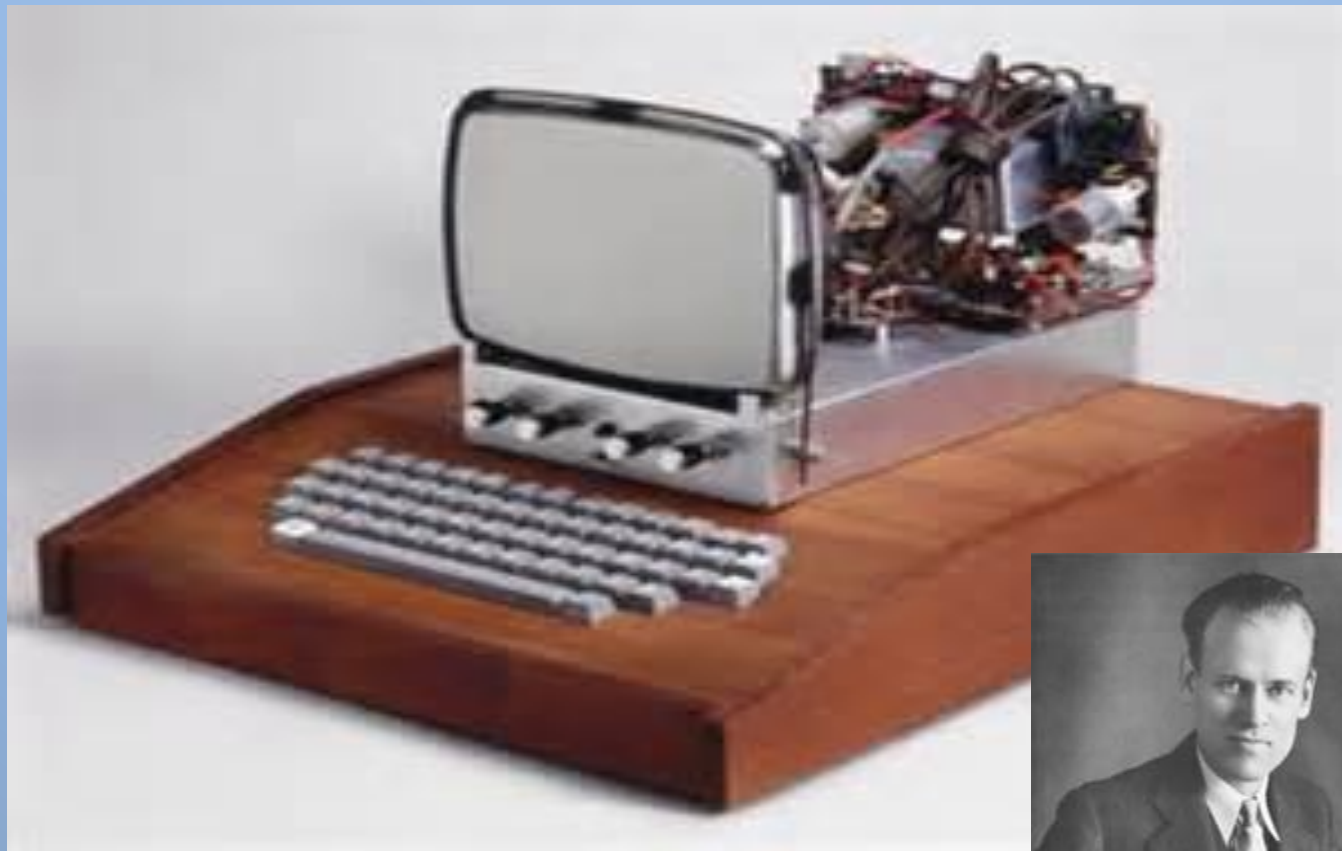
# Tesla





# Tesla





**Farnsworth**





**Strauss**





**Carrier**





de Mestral





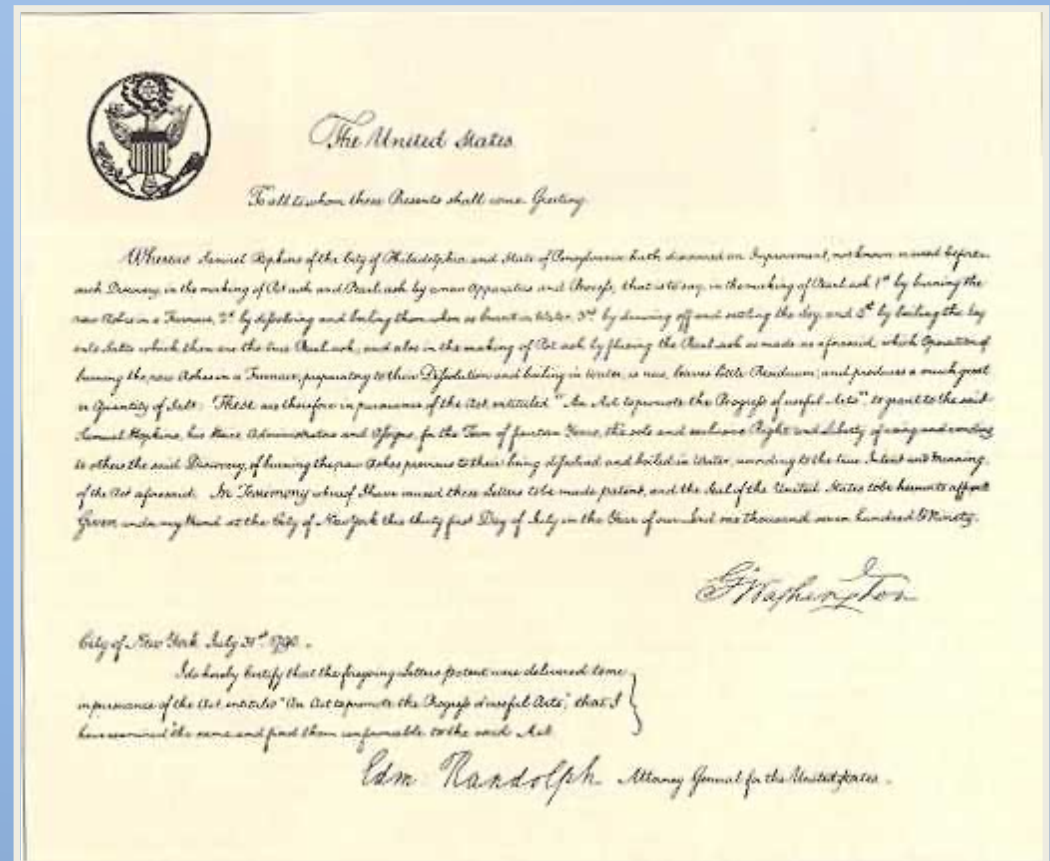
**Bell**

# The first U.S. Patent: 1790

Right enshrined  
in US Constitution:

... promote progress of  
science and useful arts

... exclusive right for  
a limited time.



# U.S. Constitution Article 1, Section 8

## The Powers of Congress

*To promote the Progress of Science and useful Arts, by  
securing for limited Times to Authors and  
Inventors the exclusive Right to their  
respective Writings and  
Discoveries;*

# The first US Patent

On July 31, 1790, US Patent #1 Samuel Hopkins  
was issued to Samuel Hopkins for a process  
of making potash, an ingredient used in  
fertilizer.

The patent was signed by  
President George  
Washington.

# Most recent US Patent

- US Patent No. 10,770,000

***Pixel circuit, driving method, display panel and display device***

issued on September 08, 2020

# Development and commercialization of new technology

In the modern era, invention and technology commercialization is increasingly dominated by companies (often big), and complex technologies









# 250,000 patents on Smartphones

[www.techdirt.com](http://www.techdirt.com)

# **Development and commercialization of new technology**

**Let's not forget the importance of the sole inventor, working in their “garage”**

Avoid laws, policies, and practices that hurt or hinder this inventor

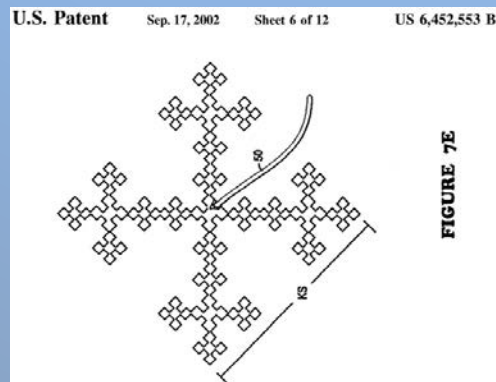
Encourage laws, policies that encourage and support the sole inventor

# Don't forget the individual inventor





Carles Puente Baliarda



The fractal antenna

# US Patents

- Patents in the United States are governed by the [Patent Act \(35 U.S. Code\)](#), which established the United States Patent and Trademark Office (the USPTO).
- The most common type of patent is a utility patent. Utility patents have a duration of twenty years from the date of filing, but are not enforceable until the day of issuance.
- Design patents protect ornamental designs.
- Plant patents protect new varieties of asexually reproducing plants.
- The Patent Law:

<https://www.bitlaw.com/source/35usc/index.html>



# What are patents?

- National legal instruments  
(a property right issued by national govt;  
they are territorial)
- National Government grants **limited rights** to  
inventors on their “patentable” inventions  
(if a patent application is filed with/issued by  
USPTO\*)
- They are public documents
- The *quid pro quo*: limited exclusive rights in exchange  
for total transparency (absolute “candor”)
- Like any property, they may be bought and sold,  
traded, rented (licensed)

\*USPTO = United States Patent & Trademark Office

# What is patentable?

“Anything under the sun made by man”

*Diamond v. Chakrabarty* 1980

Products *from* nature; not *of* nature

utility & purification doctrines

Compositions of matter,

methods,

manufactures

U.S. most liberal coverage; other countries have prohibitions (e.g. India – plants)

# To be Patentable, Inventions must be:

Novel

Useful

Not obvious, inventive

Reduced to practice

Fully enabled

Best-mode described

Only true inventors

Duty of candor



# The 3 Critical Criteria for Patentability

- Novel

new, never published

one-year grace period in the U.S.

- Useful

some form of utility.....

doesn't have to be economically viable or  
socially important,

can be trivial

- Inventive (non-obvious in U.S.)

# The key to all patents: non-obviousness

- A two-legged stool falls over:
  - is adding a third leg obvious?
  - what if 3<sup>rd</sup> leg is foldable?
- An airplane with not enough lift (insufficient wing surface)
  - is adding a larger wing obvious?
  - what if the wing is made of spider-silk?
- A ball made of wood doesn't bounce
  - is making the ball out of rubber obvious?
  - what if the rubber is inside the wood ball?
- A shoe with a hard wood sole
  - making the sole of rubber – obvious?
  - what if the rubber has Boron nanoparticles that enhance tribological (friction) properties?

# The key to all patents: “inventiveness”

## Inventiveness has two essential elements:

1) unique (compared to the “prior art”)

2) this uniqueness confers significant performance characteristics

- A hairbrush with a blue handle

is it inventive?

not unique, doesn't confer performance advantage

- A hairbrush with a handle made of hemp stalks

is it inventive?

probably unique, does it confer any performance advantage?

- A hairbrush with a blue-tooth speaker

inventive?

unique and performance advantage

# Quiz

17 Sept 2020

- 1) What is the key difference between a patent and a trade secret?
- 2) If you think you've made an invention, what is the FIRST thing you should do?
- 3) What are the two basic elements of "inventiveness"?

The  
United  
States  
of  
America



The Commissioner of  
Patents and Trademarks

*Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.*

Therefore, this                      5,860,492

United States Patent

*Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law:*

*If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.*

*If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extension.*

*J. Todd Johnson*

Acting Commissioner of Patents and Trademarks

# Intellectual Property (patents)

Are fundamental socio/economic/legal  
tools

but.....

patents (IP) are only a tool.....  
a very useful tool!

but..... just a tool

# Intellectual Property (patents)

As a tool:

patents (IP) are like a hammer

The hammer is useless, without a carpenter;

but, without a hammer, the carpenter  
cannot build

The point  :

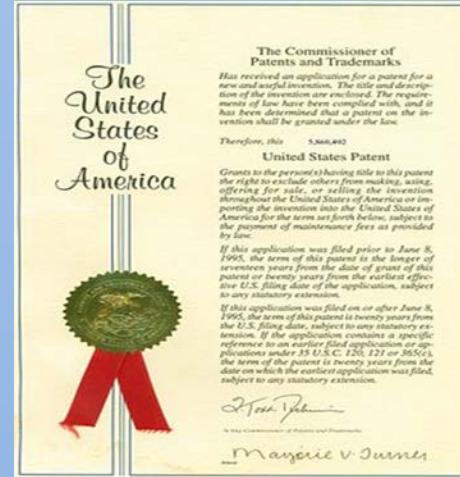
isn't the hammer.....

or the carpenter .....

It's building the house



# Patents and Hammers are only tools





# Patents

Intangible property

Private property

Issued by the national government

(a patent issued in a country is valid only there)

Limited by metes and bounds of “Claims”

(similar to boundary of real estate property)

Only a “negative” right

(to stop others from making, using, selling....)

Limited by time (20 years from filing)

Saleable, rentable (no obligation to exercise the right)

Owning a patent **doesn't grant the right to use**

# What purpose do patents serve?

- An engine of technical advancement for society
- Incentive to invent/create
  - stimulates creation of technical solutions to problems
- Incentive to invest
  - in science & technology, new products, ventures
- Gives economic and legal power to inventors and creators
- “Teaches” the nation
- Facilitates benefit sharing among all participants in the invention-to-market chain
- Allows control of technology for stewardship, quality control, philanthropic use, etc
- Provides essential framework for structuring technology partnerships and collaborations

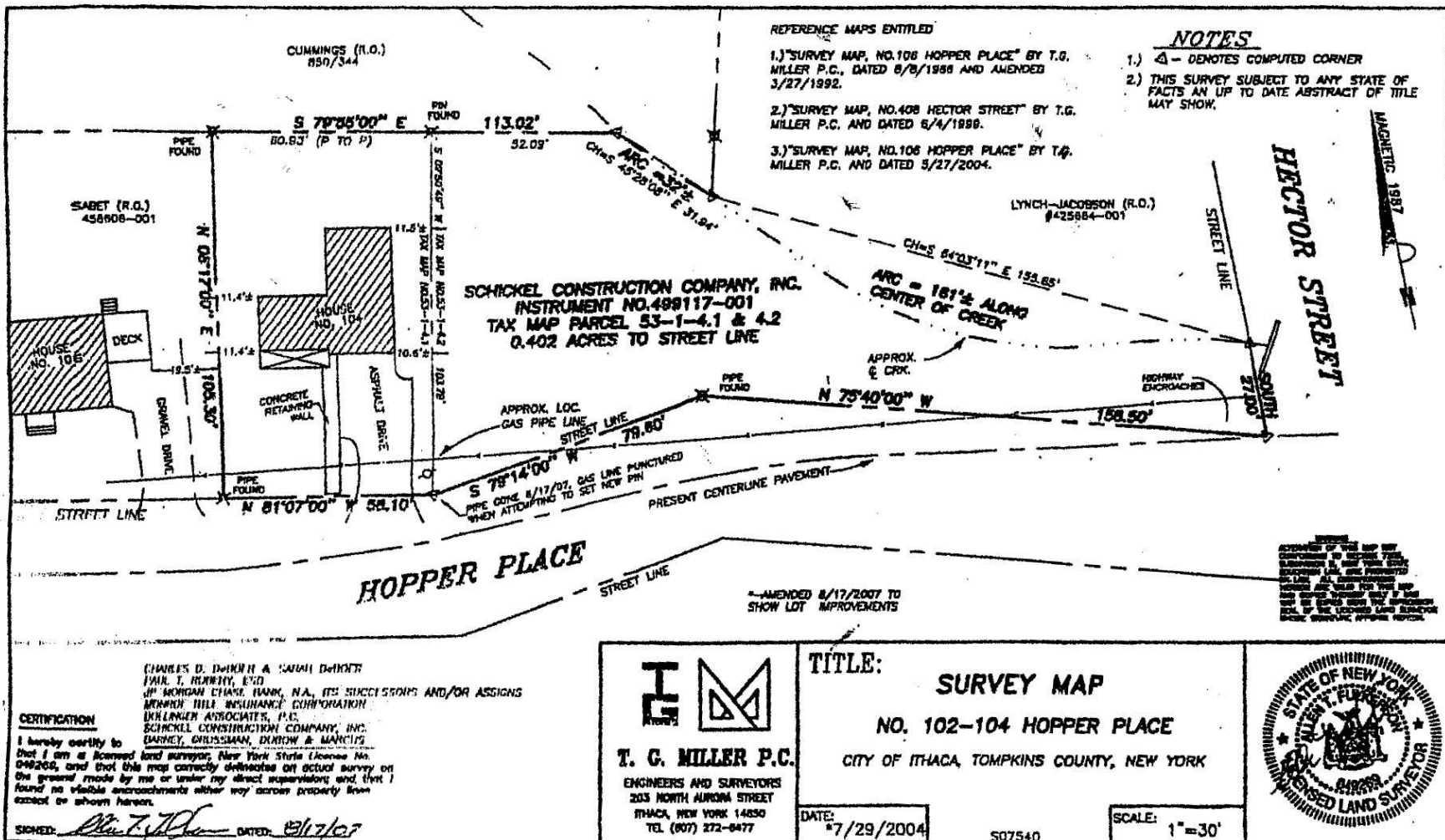
# What role do patents play?

- For society  
technical advancement
- For inventors  
financial return, stewardship, recognition
- For technology  
investment of time and money;
- For companies  
profits, growth, assets, ROI
- For non-profit research institutions  
satisfy mission for technology development and dissemination, recognition & reputation, sustainable research, stewardship

# Patents: the Claims

The Property Right defined in words

the “metes and bounds” of the property



REFERENCE MAPS ENTITLED

- 1.) "SURVEY MAP, NO. 108 HOPPER PLACE" BY T.G. MILLER P.C., DATED 6/8/1998 AND AMENDED 3/27/1992.
- 2.) "SURVEY MAP, NO. 408 HECTOR STREET" BY T.G. MILLER P.C. AND DATED 6/4/1998.
- 3.) "SURVEY MAP, NO. 108 HOPPER PLACE" BY T.G. MILLER P.C. AND DATED 3/27/2004.

NOTES

- 1.)  $\Delta$  - DENOTES COMPUTED CORNER
- 2.) THIS SURVEY SUBJECT TO ANY STATE OF FACTS AN UP TO DATE ABSTRACT OF TITLE MAY SHOW.

MAGNETIC 1987

HECTOR STREET

HOPPER PLACE

TITLE:

SURVEY MAP

NO. 102-104 HOPPER PLACE

CITY OF ITHACA, TOMPKINS COUNTY, NEW YORK



**T. G. MILLER P.C.**  
ENGINEERS AND SURVEYORS  
203 NORTH AURORA STREET  
ITHACA, NEW YORK 14850  
TEL (807) 272-6477

DATE: 7/29/2004

SCALE: 1"=30'



CERTIFICATION

I hereby certify to that I am a licensed land surveyor, New York State License No. 049208, and that this map correctly delineates an actual survey on the ground made by me or under my direct supervision and that I found no visible encroachments either way across property lines indicated or shown herein.

SIGNED: *Charles D. Dinkin* DATED: 8/17/07

CHARLES D. DINKIN & JAMES DINKIN  
JAMES I. HUNTER, ETO  
JIM MORGAN CHASE BANK, N.A., ITS SUCCESSORS AND/OR ASSIGNS  
MORGAN HILL INSURANCE CORPORATION  
WILLIAMSON ASSOCIATES, P.C.  
SCHICKEL CONSTRUCTION COMPANY, INC.  
DARREY, GRUSSMANN, DUNN & MARCITS



US005616493A

# United States Patent [19]

## Cahoon

[11] **Patent Number:** 5,616,493  
 [45] **Date of Patent:** Apr. 1, 1997

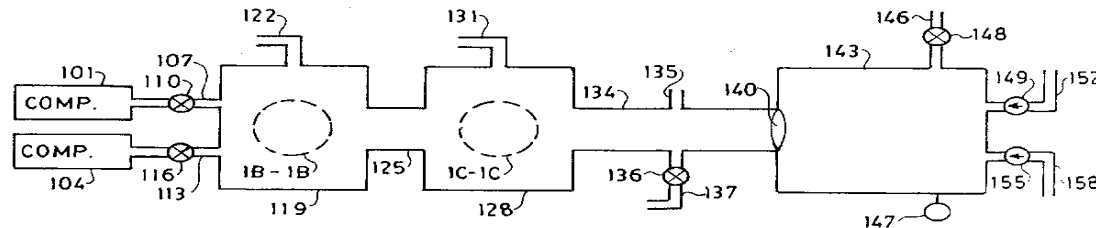
[54] **METHOD FOR FOAM BIOPROCESS**[76] **Inventor:** Richard S. Cahoon, 68 Spring Run Rd., Freeville, N.Y. 13068[21] **Appl. No.:** 426,193[22] **Filed:** Apr. 21, 1995[51] **Int. Cl.<sup>6</sup>** ..... C12N 1/00[52] **U.S. Cl.** ..... 435/246; 435/261[58] **Field of Search** ..... 435/246, 247, 435/250, 255.7, 261, 812[56] **References Cited****U.S. PATENT DOCUMENTS**

Re. 30,543	3/1981	Hitzman et al.	435/246
3,186,959	6/1965	Shriver et al.	261/DIG. 26
3,677,895	7/1972	Hashimoto	435/246
4,340,677	7/1982	Hitzman	435/246
4,654,305	3/1987	Barnett et al.	435/246
5,021,069	6/1991	Whellock et al.	435/282
5,266,481	11/1993	Wegner et al.	435/246

*Primary Examiner*—George Yeung  
*Attorney, Agent, or Firm*—Nixon, Hargrave, Devans & Doyle

[57] **ABSTRACT**

A biological process includes the step of producing a substantially continuous foam of gas bubbles in a liquid capable of undergoing a biological process utilizing prokaryotic or eukaryotic cells. The cells are introduced into the foam after the foam is produced and maintained in the foam under conditions effective to carry out the process. A reaction product of a biological process utilizing a foam culture medium is recovered by subjecting the foam to a pressure change after maintaining the cells in the foam culture medium under conditions effective to sustain the process. An apparatus for carrying out a biological process includes a foam production chamber having one or more inlets for introducing a gas and components of a culture medium. The chamber is adapted for producing a foam of bubbles of the gas in the culture medium. A plug-flow reactor is positioned to receive foam from the foam production chamber as a continuously flowing plug. The apparatus further includes means for introducing cells into the plug-flow reactor.

**21 Claims, 5 Drawing Sheets**



# Patents: the Claims

The Property Right defined in words

Single sentences (of unlimited length)

Every word has value in the meaning and  
interpretation of the Claim

The basis of patent infringement allegation and  
litigation

The heart of the economic value of a patent

# Patents Defined:

examples of Claims (independent)

We claim:

1. A method for introducing particles into cells comprising accelerating particles having a diameter sufficiently small to penetrate and be retained in a preselected cell without killing the cell, and propelling said particles at said cells whereby said particles penetrate the surface of said cells and become incorporated into the interior of said cells.

U.S. Patent no. **4,945,050**

# Patents Defined:

examples of Claims (independent)

What is claimed is:

1. A seed of soybean cultivar 7904162,  
representative sample seed of said  
cultivar was deposited under ATCC  
Accession No. PTA-10761.

U.S. Patent no. **8,609,938**

# Patents Defined:

examples of Claims (Plant Patent)

What is claimed is:

1. A new and distinct *Malus domestica* apple tree variety named `New York 2` as described and illustrated herein.

U.S. Patent no. **PP22,207**

# Patents Claims: examples

What is claimed is:

1. A writing instrument of the type comprising a reservoir for charging dense ink having an air-intake and a free ball tip located in a corresponding setting and fed through a single conduit derived from said reservoir, wherein said ball setting is constituted by channels provided in the Walls thereof and leading from said conduit to the sides of the setting socket, said channels being spaced so as to remain in alternate relation with bearing seats for said ball in said setting.

US Patent No. 2,390,636 (L. Biro) 1943

“ball-point pen”

## **Patents Claims: examples**

What is claimed is:

1. The combination with a spindle, of an arm removably secured thereto, an adjustable weight for counterbalancing one end thereof, and cleaners yieldingly pivoted to the main portion of the arm.

US Patent No. 743,801 (N. Anderson), 1903

“windshield wiper’



# Patents:

## Claim Dominance Characteristic

Patents are often issued with claims dominated by the claims of other patents

It is entirely possible (and often typical) that your issued patent is dominated by one or more patents.

Owners of these patents can STOP YOU (or others such as licensees) from using your own patented invention.

**You don't have "Freedom-to-Operate"**

Device with a handle on one end and numerous bristles attached perpendicular to handle on other end (i.e., a brush)

A brush with dimensions suitable for cleaning oral surfaces by hand (toothbrush)

tooth brushes with polymer bristles

tooth brush with elastomer bristles  
impregnated with nanoparticles

**Each concentric ring encompasses and dominates others inside it**

# The Patent Dominance Characteristic

Patents are often issued with claims that are dominated by the claims of other patents

## Hypothetical Examples:

- Writing instruments, pens, ball-point pens
- Chairs, plastic chairs, folding plastic chairs
-

# Freedom to Operate:

## The Patent Domination Characteristic

Technologies are typically covered by multiple patents....

GM crops for example, may have patents on:  
transformation method,  
promoters, trait genes,  
translation enhancers, terminators,  
constructs *per se*, disease resistance  
methods (pathogen-derived-resistance to  
virus), etc., etc.

.....and on the whole plant

# **Freedom to Operate: Patent Dominance Characteristic**

IP/technology, covered by multiple patents:

- Any one of the patents covering the technology can be used to stop the making, using, and selling of the technology by the IP/technology owner
- Also, bioproperty owners may have “strings attached” to the use of their materials.

# The patenting process

Invention/discovery

Prepare a patent application

File patent application

with national patent office (USPTO)

Patent examination & “prosecution”

Issue (18-36 months is typical)

Patent life = 20 years from filing

(maint payments at 3.5, 7, 11 years)

## The patent right:

*stop others from making , using, selling, offering to sell, importing, exporting, etc.*



# Patents: some myths “busted”

They don't grant the right to use the invention

They don't last forever

They have no power unless/until they are issued

There is no “international” patent

A patent in one country has no power in any other country

Products from nature are patentable (by virtue of utility and purification doctrines)

Only the US has a plant patent

Only the “claims” of the patent establish the property owned

It is ALWAYS possible to get a patent issued IF one is willing to narrow the “scope” of the claims

# Patents and Claim scope

**Invention filed:** Device for boiling and peeling eggs

*Patent office will allow:* Device for boiling/peeling duck eggs

**Invention filed:** Manufacture of improved Li batteries

*Patent office will allow:* Manufacture of improved Li batteries that weigh more than 10 tons

**Invention filed:** Insulation panels made of hemp fiber

*Patent office will allow:* Insulation panels made of hemp fiber and plant-based adhesive

**Invention filed:**

# International Patents?

Patents are strictly national in scope

.....however,

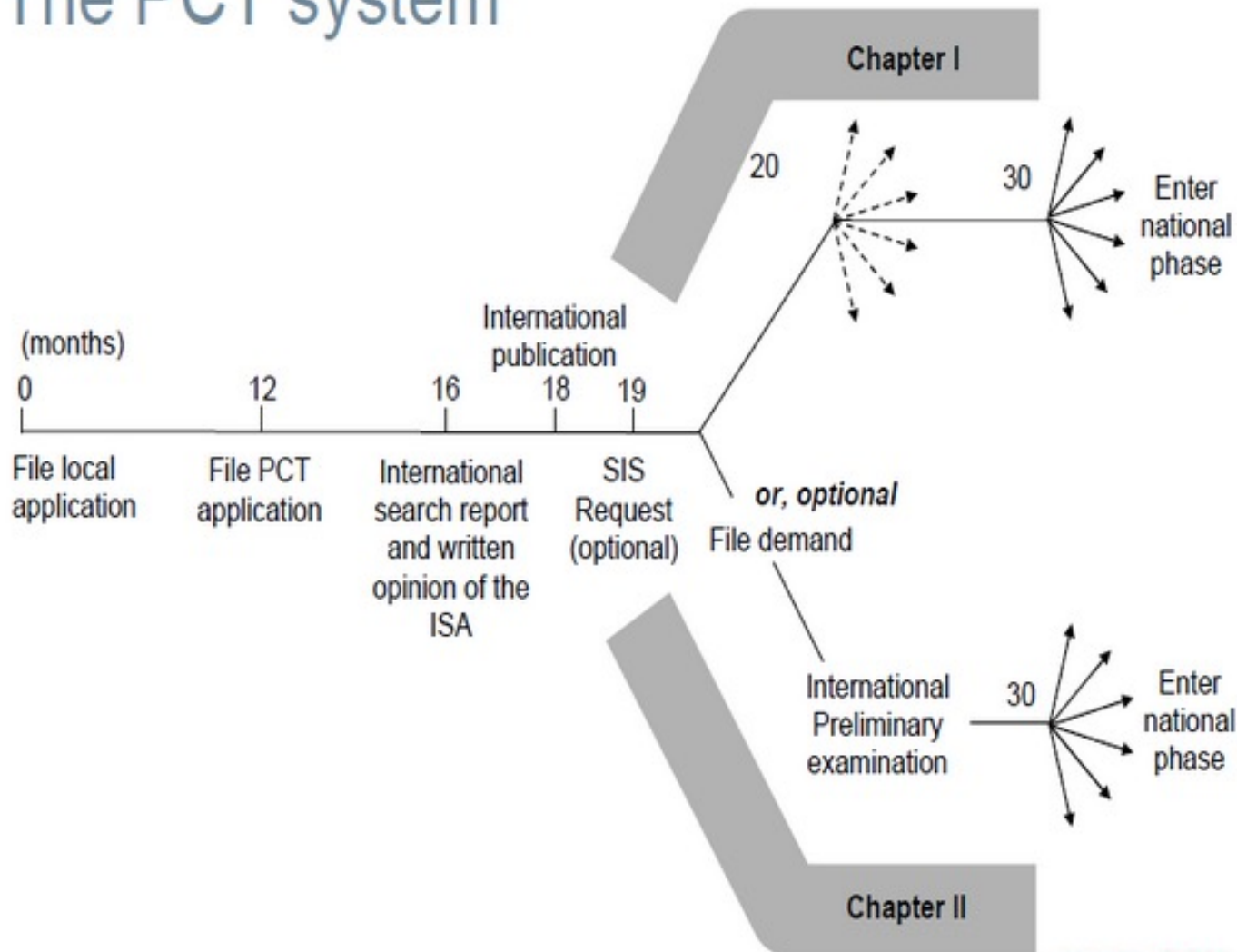
WTO and TRIPS treaties have

“harmonized” national patent laws

via modifying national law, and the...

Patent Cooperation Treaty (PCT) 1970

## The PCT system



# The “PCT” process (Patent Cooperation Treaty)

1. An international patent application
2. international search
3. national/regional (e.g., EPO) filings  
(30 months from filing)

150 countries are members

[http://www.wipo.int/treaties/en/ShowResults.jsp?lang=en&treaty\\_id=6](http://www.wipo.int/treaties/en/ShowResults.jsp?lang=en&treaty_id=6)

# More about Patents

Like any property, patents can be bought, sold, traded, rented (licensed)

A patent owner is not obligated to make, use, sell, trade, license, or utilize their patented invention

Patents are expensive

Most patents never generate any financial return to their owners

Patents are amoral (like money)

In the US, patents may be filed and prosecuted by the inventors themselves

(no patent attorney required)

Anyone (even non-citizens) can file and obtain patents (in the U.S)



# Patents: the “pros” and “cons

## Some “pros”:

They incentivize inventing and investment, protect inventors

They effectively structure collaborations

They can be very valuable

They can be used for philanthropic purposes

They spawned “academic entrepreneurialism”, venture creation, new products, jobs

Often the basis for start-ups

Provide quality control, duty of diligence, stewardship

They give power to the powerless

They are the opposite of secrets

# Patents: the “pros” and “cons

## Some “cons”:

They can hinder free technology use and development

They are costly and time-consuming

They are often worthless

They often cluster in the hands of wealthy multi-national corporations

Patent litigation is a huge drain on productivity

They require technical/legal competence to obtain and utilize

They are not secret

They can allow the rich to get richer

# Patents in the global context

- The historical trend
  - Widespread adoption
- Growth of “knowledge economies”
- Globalization of commerce
- GATT (General Agreement on Tariffs and Trade)
- TRIPS (trade-related aspects of intellectual property rights)
- World Trade Organization
- IP “harmonization” (WIPO)
- Developed countries pressure developing countries to adopt reciprocal IP laws (trade negotiations)

# Patent Basics in the U.S.

Relatively liberal scope of patentability

only few prohibitions

natural laws, products of nature,  
mathematical expressions, algorithms

*“everything under the sun made by man”* is patentable

U.S. Supreme

Court , 1980

Practically any subject matter is patentable in the US as long as it satisfies the required criteria

# Types of US Patents

## **Provisional (1 year)**

no claims, no translation, no examination

## **Regular Utility**

materials, methods, manufactures, apparatus, etc.

claims, all parts required, English required, examined

## **Regular Design**

example: tire tread

## **Plant**

vegetatively propagated species (trees, shrubs, vines)

# Basics of Patenting in the U.S.

Criteria:

novel (no publication),

useful,

not obvious (this is the critical factor)

Application options:

Provisional (1 year),

Regular, or

PCT



# Basics of Patenting in the U.S.

## **Provisional** (1 year)

- no claims or translation required, not examined

- can be low cost (\$1000), used to extend patent life

## **Regular**

- complete application, translation required (\$4k+)

- typical cost to prepare and file = \$10k

## **PCT** (file in any patent office....e.g., Japan)

- complete application, translation delayed 30 months

- initial cost: \$5k-\$7k application + \$2k PCT fees

# Basics of Patenting in the U.S.

The process: patent application → prosecution → rejection or allowance → issuance

PCT filing (delays “national phase”) of direct filing

First “office action”: 6-12 months (can be more)

Prosecution: 1.5 – 3 yrs is typical (can be much more)

Types of rejections:

- Administrative

- Substantive

  - (usually regards obviousness *vis a vis* prior art)

# Basics of Patenting in the U.S.

Upon issue, the patent owner has the right to stop others from using, making, selling, offering to sell, importing, exporting.

Patent life = 20 years from date of filing

Two key parts of the patent:

- specifications (the body): the teaching

- claims: defines the property right

# Typical patent costs

Prior art search \$500-\$1000

Patentability opinion \$1500-\$3500

“Simple” provisional patent application filing  
\$1000-\$5000

Regular, utility patent application filing  
\$5000-\$20,000, \$10k avg.

Total cost of patent from filing to issue  
\$7500 - \$30,000 (can be much higher, not lower)

# The Power of a Patent: Enforcement

Patent labelling

Infringement

- notification

- litigation

- injunction

Patent damages

# Basics of Patenting in the U.S.

Maintenance fees at 3.5, 7.5, and 11.5 years

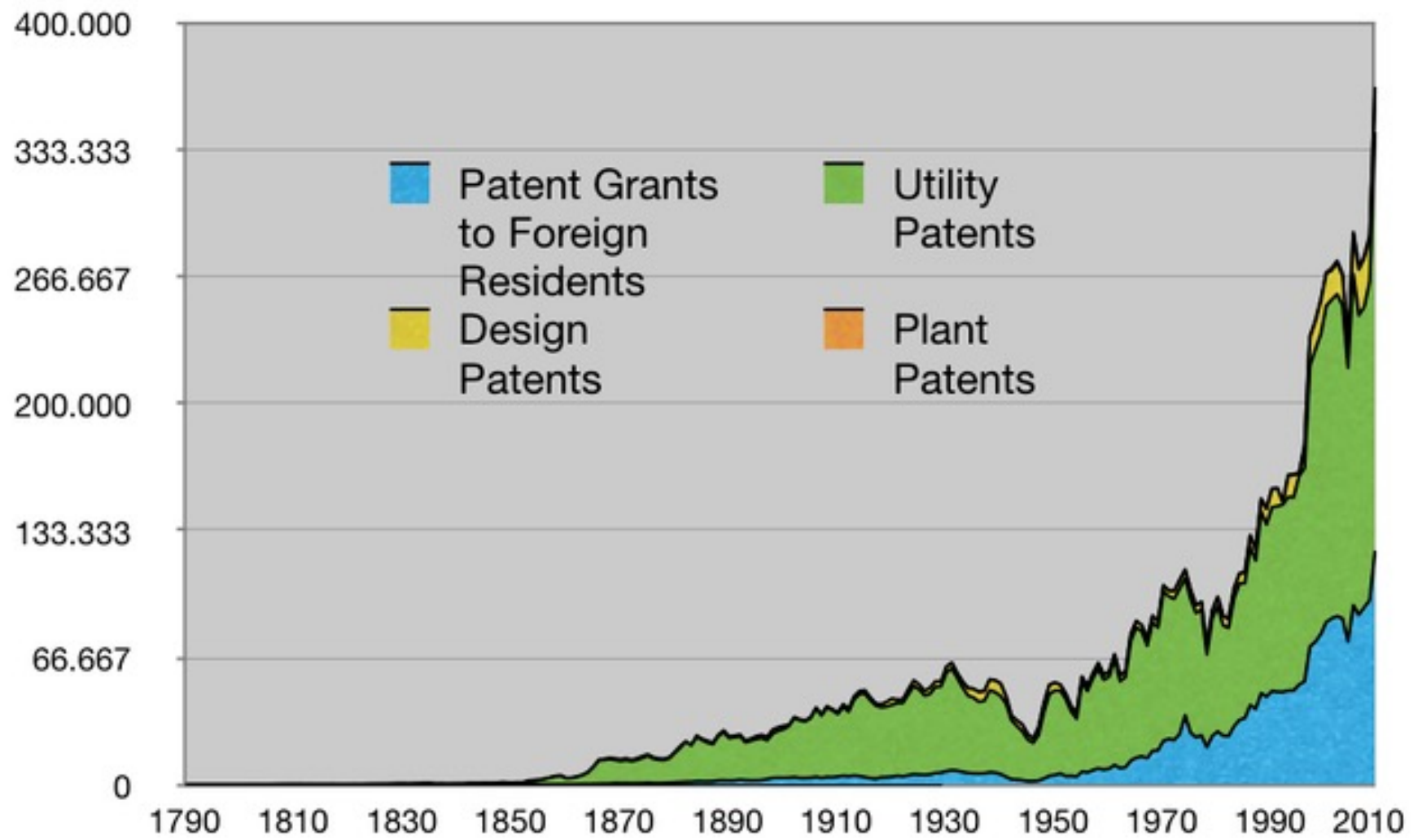
3.5 yr =        \$1130 (large entity),        \$565 (small)

7.5 yr =        \$2850 (large),        \$1425  
(small)

11.5 yr = \$4730 (large),        \$2365 (small)

Patent infringement enforcement = \$\$\$\$\$\$





<https://www.uspto.gov/patents-application-process/search-patents>

# **Track 1**

## **Entry-level Tech Transfer Professional**

### **Topic 1.7.1**

#### **IP basics (Types of IP and their uses)**

**Thank you**