



A SunCam online continuing education course

Intellectual Property and Patents

For the Professional Engineer[®]

By

**Luis Figarella, MS, PE, Patent Agent
CEO, Matrix Patent Agency**

and

**Raymond L. Barrett, Jr., PhD, PE
CEO, American Research and Development, LLC**



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

1. Introduction

1.1 Outline - This course is organized with an introduction to the general practice of the engineering arts with emphasis on the facets that are specific to the profession of the Registered Professional Engineer, a similar emphasis and distinctions of the recognized forms of intellectual property with particular emphasis on patents such as are likely to be associated with the practice of the Professional Engineer. Some practical considerations are developed as apply to the practice of Professional Engineering and a Summary and Conclusions with a Reference Bibliography are included.

1.2 Author Introductions and Disclaimers - This course has been produced by two practicing Professional Engineers. Dr. Raymond L. Barrett, Jr., PhD, PE who has many years of engineering experience and is an author of books, articles, and courses, as well as an inventor with over 35 issued US patents as a named inventor. Similarly, Luis Figarella, PE who also has over 20 years of experience as a practicing engineer and Patent Agent and is an author of articles, presentations and courses, as well as a named inventor in 14 issued US patents, in addition to having over 35 issued/allowed US Patents for his clients.

Due to the nature of the course, the materials presented in this course were extensively obtained from referenced public sources with links to those sources conveniently provided. On completion of the course the terms should be clear, many of the issues as well as an introduction to the processes and procedures needed to identify intellectual property issues and protect the rights of the owner of the intellectual property should be clearer. The course is presented as an overview and is not a substitute for competent legal advice in any particular cases.

2. Engineering

2.1 The Engineering Art - In the broadest and historical sense, engineering is the art of applied science and mathematics used to produce technology. In the economic sense a technology can be viewed as a specific cost relationship between material and labor factors in producing an outcome.

A dictionary (<http://www.merriam-webster.com/dictionary/engineering>) defines engineering as:

“Professional art of applying science to the optimum conversion of the resources of



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

nature to the uses of humankind. Engineering is based principally on physics, chemistry, and mathematics and their extensions into materials science, solid and fluid mechanics, thermodynamics, transfer and rate processes, and systems analysis. A great body of special knowledge is associated with engineering; preparation for professional practice involves extensive training in the application of that knowledge.”

In economic terms, a technology is the optimization of a specific cost relationship between material and labor factors in producing a desired outcome. Outcomes that generate or enable creation of economic wealth or well-being are generally highly prized and rewarded either tangibly or occasionally with less tangible result.

2.2 Engineering Practice – Engineering practice can be categorized as primarily belonging to two broad overlapping classifications involving design-to-specification and innovation/invention. Much of the engineering art for design-to-specification involves the application of well understood principles, practices, standards and methodologies to produce a particular solution to a specified problem. Engineering innovation, however, involves the development of new principles, practices, and methodologies to produce both particular and general solutions to specific and general problems. Generally it is innovation and invention that can produce Intellectual Property (IP).

2.3 Economic Outcomes – The engineer produces two forms of economic value. One specific work-product is the result of the technology for its value in a marketplace. A second specific work-product is the more intellectual innovation in engineering principles, practices, and methodologies. Insofar as this course is concerned, we are discussing the second innovative and inventive forms of work-product. We make these and other distinctions for purposes of classifying different forms of intellectual property and economic and legal status within the structure of the US marketplace and its governmental structure. These distinctions are not unlike similar comparisons between engineering employment and Professional Engineering status.

2.4 Innovation – Wikipedia (<http://en.wikipedia.org/wiki/Innovation>) provides a definition for innovation and its contrast with invention as:

*“**Innovation** is the application of better solutions that meet new requirements, unarticulated needs, or existing market needs. This is accomplished through more effective products, processes, services, technologies, or ideas that are readily*



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

available to markets, governments and society. The term innovation can be defined as something original and, as consequence, new that "breaks into" the market or society. One usually associates to new phenomena that are important in some way. A definition of the term, in line with these aspects, would be the following: 'An innovation is something original, new, and important—in whatever field—that breaks in to (or obtains a foothold in) a market or society'.[1]

While something novel is often described as an innovation, in economics, management science, and other fields of practice and analysis it is generally considered a process that brings together various novel ideas in a way that they have an impact on society.

Innovation differs from invention in that innovation refers to the use of a better and, as a result, novel idea or method, whereas invention refers more directly to the creation of the idea or method itself.

Innovation differs from improvement in that innovation refers to the notion of doing something different rather than doing the same thing better.”

3. Professional Engineering

3.1 Professional Engineering Licensure – In the United States, a license to practice engineering is awarded by each state contingent on completion of several steps to ensure minimum competency with the expressed intention of protecting the public. Laws were written by each state to regulate the licensing of Professional Engineers

(<http://www.nspe.org/resources/licensure/what-pe>) with the common set of requirements:

“... engineers must complete several steps to ensure their competency.

- Earn a four-year degree in engineering from an accredited engineering program*
- Pass the Fundamentals of Engineering (FE) exam*
- Complete four years of progressive engineering experience under a PE*
- Pass the Principles and Practice of Engineering (PE) exam “*

From the same source, we find some of the distinctions that set apart the practice of the Professional Engineer:

“A century ago, anyone could work as an engineer without proof of competency. In order to protect the public health, safety, and welfare, the



Intellectual Property and Patents for the Professional Engineer®
A SunCam online continuing education course

first engineering licensure law was enacted in 1907 in Wyoming. Now every state regulates the practice of engineering to ensure public safety by granting only Professional Engineers (PEs) the authority to sign and seal engineering plans and offer their services to the public.”

and

“What makes a PE different from an engineer?

PEs must also continuously demonstrate their competency and maintain and improve their skills by fulfilling continuing education requirements depending on the state in which they are licensed.

- *Only a licensed engineer may prepare, sign and seal, and submit engineering plans and drawings to a public authority for approval, or seal engineering work for public and private clients.*
- *PEs shoulder the responsibility for not only their work, but also for the lives affected by that work and must hold themselves to high ethical standards of practice.*
- *Licensure for a consulting engineer or a private practitioner is not something that is merely desirable; it is a legal requirement for those who are in responsible charge of work, be they principals or employees.*
- *Licensure for engineers in government has become increasingly significant. In many federal, state, and municipal agencies, certain governmental engineering positions, particularly those considered higher level and responsible positions, must be filled by licensed professional engineers.*
- *Many states require that individuals teaching engineering must also be licensed. Exemptions to state laws are under attack, and in the future, those in education, as well as industry and government, may need to be licensed to practice. Also, licensure helps educators prepare students for their future in engineering.”*

3.2 Professional Engineering Disciplines – By mutual agreement, the individual states utilize the nonprofit National Council of Examiners for Engineering and Surveying (NCEES - <http://ncees.org/>) to develop, administer and score the common sets of examinations required for Professional Engineering licensure in each recognized discipline.

Although the state license is not specific to particular areas of practice (a general Professional Engineer license is issued), parts of the examinations are most relevant to individual practices and the individual practitioner is expected to practice within an area of competence; being



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

liable for malpractice as a potential consequence. We present the list below because many Professional Engineers may be unaware of all the accepted areas of expertise/practice.

Presently, recognized areas of competence include (<http://ncees.org/exams/pe-exam/>)

“Exam specifications and design standards are posted 6 months before the exam administration. Updates for April exams are posted in November, and updates for October exams are posted in May.

Agricultural

Architectural

Chemical

Civil: Construction (with design standards for the 2014 exams)

Civil: Geotechnical

Civil: Structural (with design standards for the 2014 exams)

Civil: Transportation (with design standards for the 2014 exams)

Civil: Water Resources and Environmental

Control Systems

Electrical and Computer: Computer Engineering

Electrical and Computer: Electrical and Electronics

Electrical and Computer: Power

Environmental

Fire Protection

Industrial

Mechanical: HVAC and Refrigeration

Mechanical: Mechanical Systems and Materials

Mechanical: Thermal and Fluids Systems

Metallurgical and Materials

Mining and Mineral Processing

Naval Architecture and Marine

Nuclear

Petroleum (new specifications for the October 2014 exam)

Software

Structural (with design standards for the 2014 exams)”

Despite the extensive list of areas of competency, not all areas are offered for examination at any one instance as implied by the following published PE pass rates from the same source:



Intellectual Property and Patents for the Professional Engineer®
A SunCam online continuing education course

“Pass rates are from the October 2013 exam administration, except where otherwise noted.

<i>Exam</i>	<i>First-time takers (%)</i>	<i>Repeat takers (%)</i>
<i>Agricultural</i>	69	50
<i>Architectural (April 2013)</i>	74	43
<i>Chemical</i>	67	40
<i>Civil</i>	64	29
<i>Control Systems</i>	76	53
<i>Electrical and Computer</i>	63	28
<i>Environmental</i>	63	35
<i>Fire Protection</i>	69	37
<i>Industrial (April 2013)</i>	72	50
<i>Mechanical</i>	72	41
<i>Metallurgical and Materials</i>	62	0
<i>Mining and Mineral Processing</i>	71	37
<i>Naval Architecture and Marine Engineering (April 2013)</i>	58	46
<i>Nuclear</i>	54	44
<i>Petroleum</i>	75	53
<i>Software (April 2013)</i>	50	

4. Intellectual Property in General

4.1 Recognized Types of IP - In a similar distinction based on legal recognition of the difference between engineering as an activity and Professional Engineering as a recognized legal status, there exists a distinction that distinguishes the various legal forms of intellectual property.

It is fundamental to understand that Intellectual Property is a sovereign right allowed by the government of a sovereign state. As such, when speaking of any of the types of IP addressed below, the reader must be acutely aware that while there are some International treaties in effect, as a rule the types of IP mentioned below must be obtained on a country by country basis.



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

For discussion, we use the Wikipedia definitions of intellectual property (http://en.wikipedia.org/wiki/Intellectual_property) as follows in the sections below:

“Intellectual property (IP) are the legally recognized exclusive rights to creations of the mind.[1] Under intellectual property law, owners are granted certain exclusive rights to a variety of intangible assets, such as musical, literary, and artistic works; discoveries and inventions; and words, phrases, symbols, and designs. Common types of intellectual property rights include copyright, trademarks, patents, industrial design rights, trade dress, and in some jurisdictions trade secrets. There are also more specialized varieties of sui generis exclusive rights, such as circuit design rights (called mask work rights in U.S. law, protected under the Integrated Circuit Topography Act in Canadian law, and in European Union law by Directive 87/54/EEC of 16 December 1986 on the legal protection of topographies of semiconductor products), plant breeders' rights, plant variety rights, industrial design rights, supplementary protection certificates for pharmaceutical products and database rights (in European law).”

4.1.1 Copyrights: Across all areas of Professional Engineer's practice, we recognize the need to identify copyrights as a form of intellectual property. As one example, this course falls under the copyrights form of intellectual property affording some protection for the copyright holder.

“A copyright gives the creator of an original work exclusive rights to it, usually for a limited time. Copyright may apply to a wide range of creative, intellectual, or artistic forms, or "works".[14][15] Copyright does not cover ideas and information themselves, only the form or manner in which they are expressed.[16]”

4.1.2 Trademarks: Insofar as a Professional Engineer may practice for a firm or obtain a Certificate of Authorization to offer services under a fictitious name, the entity may wish to create a logo or symbol to associate the entity with the engineering practice. In such circumstances, the logo or symbol would make a good candidate for a trademark registration.

“A trademark is a recognizable sign, design or expression which distinguishes products or services of a particular trader from the similar products or services of other traders.[17][18][19]”

4.1.3 Patents: Considerable intellectual property value has been created by engineers in the form of patents. Recently, for instance, Google bought the certain parts of the value of



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

Motorola, primarily the existing patent portfolio, for ~\$12.5 billion (<http://techcrunch.com/2014/01/29/lenovo-to-buy-motorola-mobility-from-google/>) and consequently sold the Motorola brand and trademark to Lenovo for ~\$2.91 billion but retained ownership of the vast majority of the Motorola patents. Mostly because of the considerable potential value of patents, we will develop a deeper discussion of patents following this introduction. For now, we include the barest definition:

“A patent grants an inventor the right to exclude others from making, using, selling, offering to sell, and importing an invention for a limited period of time, in exchange for the public disclosure of the invention. An invention is a solution to a specific technological problem, which may be a product or a process.[13]:17”

4.1.4 Industrial design rights: Similar to trademarks, design patents, and copyrights, industrial design rights are an overlapping set of intellectual property rights that are accepted differently in many jurisdictions. Again, we include a simple definition from the same source quoted in this section:

“An industrial design right protects the visual design of objects that are not purely utilitarian. An industrial design consists of the creation of a shape, configuration or composition of pattern or color, or combination of pattern and color in three-dimensional form containing aesthetic value. An industrial design can be a two- or three-dimensional pattern used to produce a product, industrial commodity or handicraft.”

4.1.5 Trade dress: In the US, trade dress and trademarks are legislated in the Lanham Act, but may be recognized differently in other jurisdictions. Again, we include a simple definition from the same source quoted in this section:

“Trade dress is a legal term of art that generally refers to characteristics of the visual appearance of a product or its packaging (or even the design of a building) that signify the source of the product to consumers.[20]”

“In the U.S., like trademarks, a product’s trade dress is legally protected by the Lanham Act, the federal statute which regulates trademarks and trade dress.[2] Trade dress protection is intended to protect consumers from packaging or appearance of products that are designed to imitate other products; to prevent a consumer from buying one product under the belief that it is another.[3] For example, the shape, color, and arrangement of the materials of a children’s line of clothing can be protectable trade dress (though, the design of the garments



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

themselves is not protected),[4] as can the design of a magazine cover,[5] the appearance and décor of a chain of Mexican-style restaurants,[6] and a method of displaying wine bottles in a wine shop.[7]”

4.1.6 Trade secrets: The operative concept in the trade secret form of intellectual property is the term “secret.” The concept is prevalent in the US and differently accepted elsewhere.

“A trade secret is a formula, practice, process, design, instrument, pattern, or compilation of information which is not generally known or reasonably ascertainable, by which a business can obtain an economic advantage over competitors or customers. In the United States, trade secret law is primarily handled at the state level under the Uniform Trade Secrets Act, which most states have adopted, and a federal law, the Economic Espionage Act of 1996 (18 U.S.C. §§ 1831–1839), which makes the theft or misappropriation of a trade secret a federal crime. This law contains two provisions criminalizing two sorts of activity. The first, 18 U.S.C. § 1831(a), criminalizes the theft of trade secrets to benefit foreign powers. The second, 18 U.S.C. § 1832, criminalizes their theft for commercial or economic purposes. (The statutory penalties are different for the two offenses.) Trade secret law varies from country to country.[13]:15”

4.1.7 Plants: We can also certainly see a possible implied connection between *plant breeders' rights* and *plant variety rights* generating intellectual property under the recognized practice of Agricultural Engineering as a recognized Professional Engineer's discipline. In addition, the US patent law Plant Patent Act in 1930 (US) [4] also permits issuance of another form of intellectual property under patent laws covering plants and:

“There is tension over the relationship between patent rights and plant breeder's rights. There has been litigation in Australia, the United States, and Canada over the overlap between such rights.[3] Each of these cases was decided on the principle that patents and plant breeders' rights were overlapping and not mutually exclusive. Thus, the exemptions from infringement of plant breeders' rights, such as the saved seed exemption, do not create corresponding exemptions from infringement of the patents covering the same plants. Likewise, acts that infringe the plant breeders' rights, such as exportation of the variety, would not necessarily infringe a patent on the variety, which only allows the patent owner to prohibit making, using or selling the patented invention.”



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

5. The Patent as Intellectual Property

In the United States, Patents are issued and administered by the United States Patent and Trademark Office, a federal agency in charge of Patents for all 50 States, the District of Columbia and all US Possessions (Puerto Rico, Guam, US Virgin Islands).

5.1 USPTO Patent Definitions - The USPTO provides the operative definition of a patent and patent types for the US jurisdiction (<http://www.uspto.gov/patents/>) as:

“A patent is an intellectual property right granted by the Government of the United States of America to an inventor “to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States” for a limited time in exchange for public disclosure of the invention when the patent is granted.”

5.2 US Patent Types – The US government recognizes three types of patents:

5.2.1 *“Utility patents may be granted to anyone who invents or discovers any new and useful process, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof. Here is the **process for obtaining a utility patent.**”*

(Utility Patents include Provisional and Non-Provisional Patent applications, albeit only Non-Provisional Patent applications are issued as Utility Patents. The difference between these and Provisional Patent Applications will be discussed more extensively below).

5.2.2 *“Design patents may be granted to anyone who invents a new, original, and ornamental design for an article of manufacture.”*

In general, design patents are valuable when the exact copying on one's product is not desirable. An easy mental model is that of a sculptor desiring protection of his/her sculpture, or an industrial designer desiring protection of his/her coffee cup. As such, a design patent may be a cost effective way to protect against outright piracy.

Design patents are good for 14 years. They are easy to identify as their number begins with a D, as in D467,389 (D1)



Intellectual Property and Patents for the Professional Engineer®
A SunCam online continuing education course



US00D467389S

D1

(12) United States Design Patent (10) Patent No.: US D467,389 S
Torkiya (45) Date of Patent: ** Dec. 17, 2002

(54) NAIL BUFFER

(76) Inventor: Adi Torkiya, 114 Oak Bend Dr., Coppel, TX (US) 75019

(**) Term: 14 Years

(21) Appl. No.: 29/155,619

(22) Filed: Feb. 13, 2002

Related U.S. Application Data

(62) Division of application No. 29/149,507, filed on Oct. 11, 2001, now Pat. No. Des. 459,548.

(51) LOC (7) Cl. 28-03

(52) U.S. Cl. D28/59

(58) Field of Search D28/56, 57, 59; D4/119, 121, 137; D8/90-94; D32/40, 52; 132/73, 73.5, 75, 75.6, 76.4, 76.5; 451/490, 522-525, 540, 552-558; 15/167.3

(56) References Cited

U.S. PATENT DOCUMENTS

Table with 4 columns: Patent No., Class, Inventor, and Reference No. Includes entries like 651,479 A 6/1900 Essich et al., 965,444 A 7/1910 Dahl, etc.

Table with 4 columns: Patent No., Class, Inventor, and Reference No. Includes entries like 5,177,909 A 1/1993 Klocke, D360,121 S 7/1995 Anderson, etc.

* cited by examiner

Primary Examiner—Ted Shooman
Assistant Examiner—C. Tuttle
(74) Attorney, Agent, or Firm—Gardere Wynne Sewell LLP

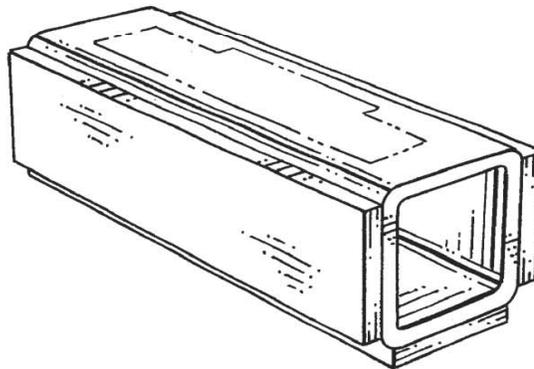
(57) CLAIM

The ornamental design for a nail buffer, as shown and described.

DESCRIPTION

FIG. 1 is a perspective view of a nail buffer in accordance with my invention; FIG. 2 is a left side elevation view of the nail buffer shown in FIG. 1; FIG. 3 is a right side elevation view of the nail buffer shown in FIG. 1; FIG. 4 is a front elevation view of the nail buffer shown in FIG. 1; FIG. 5 is a rear end elevation view of the nail buffer shown in FIG. 1; FIG. 6 is a top plan view of the nail buffer shown in FIG. 1; and, FIG. 7 is a bottom plan view of the nail buffer shown in FIG. 1. The dashed outlines in the views of FIGS. 1 and 6 showing the location of indicia are for illustrative purposes only and form no part of the claimed design.

1 Claim, 3 Drawing Sheets



For more detail go to:

http://www.suncam.com/authors/112Figarella-Barrett/USD467389.pdf



Intellectual Property and Patents for the Professional Engineer®
A SunCam online continuing education course

5.2.3 “*Plant patents may be granted to anyone who invents or discovers and asexually reproduces any distinct and new variety of plant.*”

Plant patents are good for 20 years. They are easy to identify as their number begins with a P, as in PP18,512 (P1)



US00PP18512P3

<p>(12) United States Plant Patent McDonald</p> <p>(54) APPLE TREE NAMED 'EL NIÑO'</p> <p>(50) Latin Name: <i>Malus domestica</i> Varietal Denomination: El Niño</p> <p>(76) Inventor: Steven A. McDonald, 13321 R. 1 SW, Royal City, WA (US) 98357</p> <p>(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.</p> <p>(21) Appl. No.: 11/501,205</p> <p>(22) Filed: Aug. 7, 2006</p> <p>(65) Prior Publication Data US 2007.0044182 P1 Feb. 22, 2007</p> <p>Related U.S. Application Data</p> <p>(60) Provisional application No. 60/709,892, filed on Aug. 19, 2005.</p>	<p>(10) Patent No.: US PP18,512 P3</p> <p>(45) Date of Patent: Feb. 26, 2008</p> <p>(51) Int. Cl. A01H 5/00 (2006.01)</p> <p>(52) U.S. Cl. Plt./162</p> <p>(58) Field of Classification Search Plt./162 See application file for complete search history.</p> <p>Primary Examiner—Kent Bell</p> <p>(74) Attorney, Agent, or Firm—Klarquist Sparkman LLP</p> <p>(57) ABSTRACT</p> <p>A new and distinctive variety of an apple tree, named 'El Niño' characterized by fruit color having intense dark red stripes over a bright red background.</p> <p align="center">4 Drawing Sheets</p>
--	--

P1 →

1

CROSS REFERENCE TO RELATED APPLICATION

The entire disclosure of the provisional application is considered to be part of the disclosure of the following application and is hereby incorporated by reference herein.

Latin name of the genus and species of the plant claimed: *Malus domestica*.

Variety denomination: 'El Niño'.

BACKGROUND OF THE INVENTION

'El Niño Gala' was originally found by Steven A. McDonald as a bud sport of a tree growing in a cultivated area in his orchard, commonly known as Royal T Farms, 13321 Rd 1 SW, Royal City, Wash. The original plant originated as a bud sport that had been grown by grafting 'Royal Gala' (expired U.S. Plant Pat. No. 4,121) budwood to a Mark rootstock in 1991. More specifically, a number of 'Kidd's Gala' trees growing on Mark rootstock were damaged during a storm. These trees with Mark rootstock were each budded with 'Royal Gala' budwood. The resulting original plant of my new variety grew from one of these 'Royal Gala' budwood grafts. The new tree grew unnoticed until 1996 when the distinct red color of its fruit was apparent.

This new and distinct 'El Niño' tree variety has not been observed under all possible environmental conditions. The phenotype may vary significantly with variations in environment such as temperature, light intensity and day length, without any variation in genotype. However, the distinctive combination of traits set forth in the description below have been repeatedly observed in the original tree and in asexually propagated progeny and have been determined to be firmly fixed and to be the basic characteristics of this new tree, which in combination distinguishes 'El Niño' as a new and distinct variety.

2

The new variety has been asexually propagated by or at the direction of Steven A. McDonald by grafting onto Emla 26 rootstock. Asexual propagation has been performed at the Royal T Farms in Royal City, Wash.

BRIEF SUMMARY OF THE INVENTION

The 'El Niño' variety is distinguished from other apple varieties due to the following unique combination of characteristics:

1. Achieves excellent fruit color with intense dark red stripe over a bright red background.
2. Color is consistent on apples throughout the tree.

The following detailed description is from observations of the original 'El Niño' tree and from observations of approximately seven year old asexually propagated 'El Niño' progeny that were observed growing in a cultivated area in Royal City, Grant County, Wash. Certain characteristics of this variety, such as growth and color, may change with changing environmental conditions (e.g., light, temperature, moisture, nutrient availability, or other factors). Color descriptions and other terminology are used in accordance with their ordinary dictionary descriptions, unless the context clearly indicates otherwise. Color designations are made with reference to The Royal Horticultural Society (RHS) Colour Chart.

BRIEF DESCRIPTION OF THE PHOTOGRAPHS

FIG. 1 shows the fruit on one of the new 'El Niño' Gala apple trees.

FIG. 2 shows the fruit on a 'Royal' Gala apple tree taken at the same time as the photograph of FIG. 1.

FIG. 3 shows blooms on one of the new 'El Niño' Gala apple trees.

FIG. 4 illustrates exemplary fruit of the new variety at harvest maturity on Aug. 29, 2006, showing intense full color with darker stripes.

For more detail go to:

<http://www.suncam.com/authors/112Figarella-Barrett/USPP18512.pdf>



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

5.3 Utility Patent Emphasis – Both Plant patents and design patents may be considered in the practice of the Professional Engineer, but the vast majority of experiences are likely to be with Utility patents, strictly considering the cumulative numbers of patents filed issued: by 2014; 8,621,662 utility patents, 696,836 design patents, and 44,689 plant patents were issued. There is no simple way to compare quality or values, though.

<http://www.uspto.gov/web/offices/ac/ido/oeip/taf/issuyear.htm>

Regardless of the type of patent considered, we reiterate that the inventor should seek professional advice in the filing of patents, including the provisional filings discussed later.

5.4.3 Reading a Utility Patent Application – Issued utility patents are numbered X,XXX,XXX. In the US the structure of the patent includes a cover page, the drawings, the specification and the claims.

The cover sheet has a number of fields of interest, including the Patent Number **U1**, and just below it the date of Issuance, the primary inventor Name **U2** (followed by 'et al' when two or more inventors are included), the names of all inventors **U3**. Directly below the inventor is any extension of time **U4**, as well as the original Application number and the date the patent was filed **U5**.

Published patent application will have a number XXXX/YYYYYYY where XXXX is the year of publication (e.g. 2008, 2014) and YYYYYYY is a seven digit number making it a unique ID.

The information on a patent, is valid at the time of its publication. In many cases, over time, the status of a patent will change. After the 20 years, or if the maintenance fees are not paid (at 3.5, 7.5 and 11.5 years after issuance), the patent will expire.

One of the easiest ways to ascertain the status of a patent, is to go into the USPTO Public Patent Application Information Retrieval System PAIR system(<http://portal.uspto.gov/pair/PublicPair>) which will allow you to query information about any application's status at the USPTO.



Intellectual Property and Patents for the Professional Engineer[®]



US008245449B2

U2

U1

United States Patent
Berdut Teruel

(10) Patent No.: **US 8,245,449 B2**
(45) Date of Patent: **Aug. 21, 2012**

U3

(54) **COMPRESSED FLUID BUILDING STRUCTURES**

(76) Inventor: **Elberto Berdut Teruel, San Juan, PR (US)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **12/766,392**

(22) Filed: **Apr. 23, 2010**

(65) **Prior Publication Data**
US 2011/0258940 A1 Oct. 27, 2011

(51) **Int. Cl.**
E04B 1/34 (2006.01)
E04C 3/34 (2006.01)

(52) **U.S. Cl.** 52/2.11; 524/834

(58) **Field of Classification Search** 52/2.11, 52/2.13, 2.21, 2.23, 301, 834; 405/289, 288, 405/229, 256; 248/354.1
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS
3,773,475 A * 11/1973 Madden, Jr. 428/558
4,295,302 A * 10/1981 Liu 52/2.21
4,685,253 A * 8/1987 Bitterly 52/2.11

4,958,953 A *	9/1990	Charondiere	.....	403/297
5,117,606 A *	6/1992	Mikami	.....	52/834
5,339,594 A *	8/1994	Ventura-Berti	.....	52/834
5,533,309 A *	7/1996	Rivin	.....	52/223.8
5,546,707 A *	8/1996	Caruso	.....	52/2.13
5,555,678 A *	9/1996	Schoo	.....	52/2.13
5,735,083 A *	4/1998	Brown et al.	.....	52/2.13
6,484,469 B2 *	11/2002	Drake	.....	52/649.2
7,232,103 B2 *	6/2007	Heath	.....	248/631
7,293,412 B2 *	11/2007	Fuchs	.....	60/512
2002/0157322 A1 *	10/2002	Pedretti	.....	52/2.13
2004/0000118 A1 *	1/2004	Fuerle	.....	52/737.4
2004/0074150 A1 *	4/2004	Wycech	.....	52/2.13
2006/0059788 A1 *	3/2006	Kassianoff	.....	52/2.11
2006/0242925 A1 *	11/2006	Koerner	.....	52/721.4
2009/0019784 A1 *	1/2009	Tinker et al.	.....	52/2.11
2009/0095366 A1 *	4/2009	Gray, Jr.	.....	138/30
2010/0163683 A1 *	7/2010	Quine	.....	244/158.5
2011/0047886 A1 *	3/2011	Welch et al.	.....	52/2.21

* cited by examiner

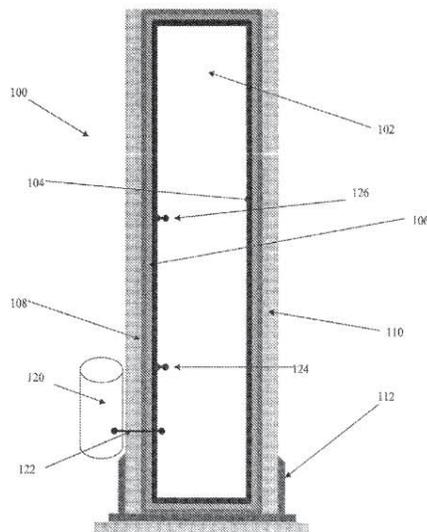
Primary Examiner — Christine T Cajilig

(74) Attorney, Agent, or Firm — Luis Figarella

(57) **ABSTRACT**

The compressive strength of a fluid-pressurized structure is combined with the tensile strength of interior members to maintain the geometric shape of a structure used to provide support with very low mass. These compressed fluid building structures can be combined with other traditional construction materials in creating columns, beams and other structural support elements.

15 Claims, 5 Drawing Sheets





Intellectual Property and Patents for the Professional Engineer®
A SunCam online continuing education course

The final pages of the patent include the first independent claim U6, followed by the claims dependent on said first independent claim U7.

US 8,245,449 B2

7
volume filled with gas (preferably air), the composite container (also lighter than concrete) and concrete. The rigidity of the encased beam(s) 400 provides a stronger assembly than one with simple openings to save weight. To span an opening 600, 700, the assemblies 502 are supported at their ends by the columns 100.

Example 1

To give an idea of the kind of load that can be borne by a column such as the one in FIG. 1, suppose it is constructed in the form of a cylinder that has a diameter of 3 meters (r=1.5 m). Such a surface would have an area A=3.14*1.5**2 or 7.065 meter sq., if the cavity were filled at a pressure of 1,380 kPa, the resulting surface would be able to bear almost 10 metric tons (9.75 to be exact).

Various embodiments and features of the present invention have been described in detail with a certain degree of particularity. The utilities thereof can be appreciated by those skilled in the art. It should be emphasized that the above-described embodiments of the present invention merely describe possible examples of the implementations to set forth a clear understanding of the principles of the invention, and that numerous changes, variations, and modifications can be made to the embodiments described herein without departing from the spirit and scope of principles of the invention. Also, such variations and modifications are intended to be included herein within the scope of the present invention, as set forth in the appended claims. The scope of the present invention is defined by the appended claims, rather than the foregoing description of embodiments. Accordingly, what is desired to be secured by Letters Patent is the invention as defined and differentiated in the following claims, and all equivalents

What is claimed is:

- 1. A column assembly apparatus for supporting a compressive load comprising: a sealed internal cavity surrounded and defined by an impermeable layer; one or more fluids under pressure within said cavity; and one or more structural containment layers surrounding said impermeable layer, with at least one of said structural containment layers extending substantially the same length as said impermeable layer, and said containment layer being comprised of a significantly rigid and non-collapsible material of a pre-determined length that is incapable of significantly altering its shape or length so as to provide structural integrity to a layer immediately within it, and a concrete encasement surrounding said containment layers.
2. The column assembly of claim 1 wherein: the compressed fluid is comprised substantially of air and one of said containment layers is comprised of a Polyvinyl Chloride mix.
3. The column assembly of claim 1 wherein: the compressed fluid is comprised substantially of an inert gas and one of said containment layers is comprised of a Polyvinyl Chloride mix.
4. The column assembly of claim 1 wherein: the compressed fluid is comprised substantially of water and one of said containment layers is comprised of a Polyvinyl Chloride mix.
5. The column assembly of claim 2 further comprising: cavity pressure sensing means.

- 6. The column assembly of claim 5 further comprising: cavity temperature sensing means.
7. The column assembly of claim 5 further comprising: cavity pressure adjusting means.
8. The column assembly of claim 7 further comprising: a mounting base.
9. The column assembly of claim 1 further comprising: one of said containment layers is comprised of a Polyvinyl Chloride mix, and tension members running along the length of the compressed member securing the end caps to said compressed member.
10. The column assembly of claim 9 further comprising: one or more internal baffles separating the cavity into connected portions.
11. The column assembly of claim 10 wherein: said tension members run within the cavity and through the baffles and end caps.
12. The column assembly of claim 11 wherein: the compressed fluid is comprised substantially of air.
13. The column assembly of claim 11 wherein: the compressed fluid is comprised substantially of an inert gas.
14. A method for supporting a compressive load comprising: providing a column assembly comprising: providing a sealed internal cavity surrounded and defined by an impermeable layer; filling said cavity with air under pressure; placing one or more structural containment layers surrounding said impermeable layer, with at least one of said structural containment layer extending substantially the same length as said impermeable layer, and said containment layer being comprised of a significantly rigid and non-collapsible material of a pre-determined length that is incapable of significantly altering its shape or length so as to provide structural integrity to the layer immediately within it, one of said containment layers being comprised of a Polyvinyl chloride mix; providing tension members running along the length of the column assembly securing end caps to said column assembly; and placing a compressive load on said column assembly.
15. A column assembly apparatus for supporting a compressive load comprising: one or more sealed internal cavity surrounded and defined by an impermeable layer, each said cavity containing one or more fluids under pressure within it; one or more structural containment layers surrounding said impermeable layer, with at least one of said structural containment layers extending substantially the same length as said impermeable layer, and said containment layer being comprised of a significantly rigid and non-collapsible material of a pre-determined length that is incapable of significantly altering its shape or length so as to provide structural integrity to a layer immediately within it; tension members running along the length of the column assembly securing end caps to said column assembly, with one or more internal baffles separating the cavity into connected portions; and a concrete encasement surrounding said cavity.

* * * * *

U6

U7

For more detail go to:

http://www.suncam.com/authors/112Figarella-Barrett/US8245449.pdf



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

5.3.1 Positive attributes of patents: The utility patent provides a written document, granted by the US government for 20 years from the date of application that specifies rights in the form of allowed claims. The rights are exclusive, preventing others from making, using, offering for sale, importing, or otherwise generally benefiting from the invention. Prototypes are not required. The patent is truly a property right that can be sold, licensed, and mortgaged much like other forms of real property. The patent provides a real deterrent against an infringer because it permits the assignment of treble damages against the party infringing the patent. Note that the 20 year term may be extended by the USPTO when the prosecution is deemed to have taken excessive time. This can be seen on the first page of a patent, under term extensions.

5.3.2 Negative attributes of patents: Securing a patent can involve significant costs in the form of the time related costs of the preparation, the direct costs of assistance in the preparation, the filing fees, possible travel costs to the USPTO during prosecution, and maintenance fees after the patent is granted.

Insofar as an infringement may occur despite the risk of treble damages, the owner of the patent does have the right to sue the infringer, but the legal costs to prosecute may be substantial before any resolution. Further, as mentioned before, the jurisdiction of a US patent is limited to the United States only and offers limited protection internationally.

5.3.3 Characteristics of a Patent: The subject of a patent must be statutory and among the primary requirements to be met by a patent application include;

- Disclosure of the preferred embodiment
- Must be Novel
- Non-obviousness

In effect, the patent application must involve a new and useful process, machine, composition of matter, or be a new and useful improvement of any of those. Among others, the disclosure must include the best embodiment known by the inventors at the time of filing. To be novel, it can cover a physical aspect or be a novel use of a pre-existing item. Even though it may be novel, it cannot be obvious, or an obvious combination, to one skilled in the art. A mathematical formula, a law of nature, or a natural phenomenon is also disallowed.

In the US, Software and Business Methods can be patented under the right circumstances.



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

5.3.4 Impediments to issuing a Patent: The content matter of the patent cannot be already patented, published, or disclosed anywhere in the world. In particular, inventors must take care to control disclosure of the invention by themselves and anyone associated with them. In the past, inventors had up to one year to file a patent in the US after disclosure. Under the terms of the America Invents Act, this has been severely weakened. The authors recommend strongly being careful about any disclosures, and consulting a patent practitioner before disclosing outside the limits of a Non-Disclosure agreement.

Prior publication by others is also an impediment to issue of a patent. Public use of the subject matter of the patent cannot be offered for sale or used or presented publicly and is interpreted as disclosure under US law.

5.3.5 Patent Document Structure: There are three required components of the patent document; specification(s), drawing(s), and claim(s).

5.3.5.1 A specification is a written enabling description of the invention. The preferred embodiment of the invention must be disclosed.

5.3.5.2 The drawing(s) complement the specification and are very important. There is a particular black-and-white style that is acceptable. Each drawing has areas of interest with corresponding numbers that are referenced in the other components. The phrase “a picture is worth a thousand words” should apply in generating the drawings.

5.3.5.3 The claims are the heart of the patent and are used to compare patents. Claims may be independent, or they may be dependent on prior claims extending those independent claims in matters of device, methods, or means of implementation. The claims are framed by the specifications and drawings and are limited by what is written.

The claims define the inventor's rights. For a competing product to infringe a patent, each and every element in the claim must be supported. In short, a short claim is always superior to a long claim, i.e., more is less.

The allowed claim language is the language presumed to be allowed. If a patent description extensively teaches an invention performed with say one camera, but the claim states 'a plurality of cameras', then the only infringement devices will be those having two or more cameras. The inventor is warned to pursue claims that would be difficult to design around.



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

5.4 Filing a Patent – The patent application is filed with the United States Patent Office according to well established procedures.

In general;

An Agent or attorney is not a requisite for filing, for any inventor may represent him/herself (known as a Pro-se inventor). As far as the eligibility for filing:

“An applicant for patent may file and prosecute the applicant's own case, or the applicant may give power of attorney so as to be represented by one or more patent practitioners or joint inventors”

(<http://www.uspto.gov/web/offices/pac/mpep/s401.html>)

There is no requisite for US Citizenship or Residence to be a named inventor in a US application. However, US Citizens are required by law to file their inventions with the USPTO before filing overseas.

Once filed, an application will be examined in turn, depending on the technical area upon which it is classified. Usually an examiner is assigned within six months, but it normally takes from one to three years after filing before the application is examined. Once examined, the office issues an Office Action which may include allowance/rejection of one or more claims, etc.

The Office Action (OA) includes any objections/rejections from the examiner, typically related to grammar/claim construction (35 USC § 112), Prior Art (35 USC § 102) and Obviousness (35 USC § 103).

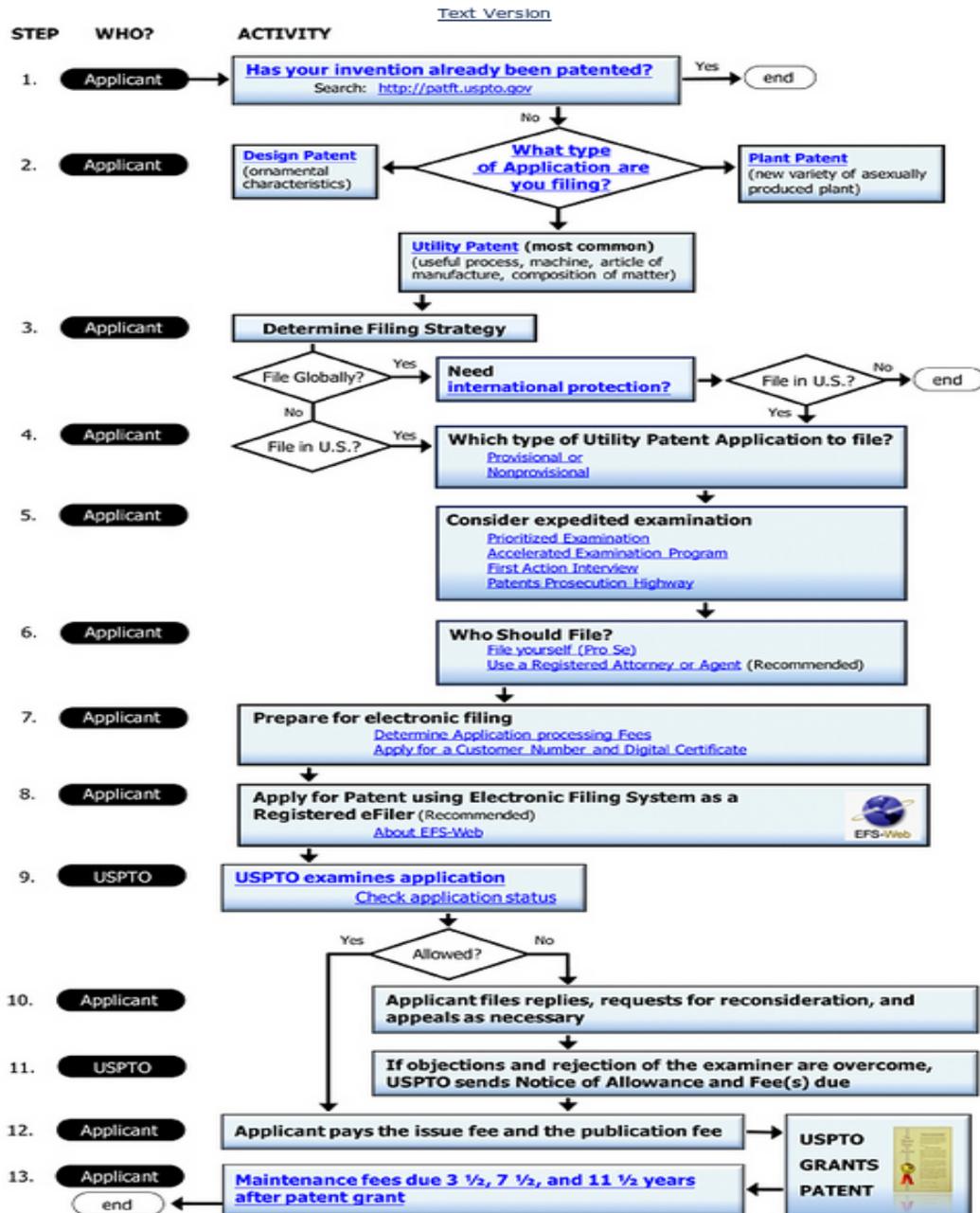
For the filing fee paid, the office will issue one non-final OA and a final OA. Do not despair, even if a Final OA is issued, prosecution may be continued by requesting and paying for a Request for Continued examination (RCE). It is not rare to have to pay for one or two RCEs during prosecution.



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

The Process flowchart below is obtained from the USPTO site:

Process for Obtaining a Utility Patent



For more detail go to
(<http://www.uspto.gov/patents/process/index.jsp>)



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

5.4.1 Patent Practitioners: The USPTO accepts two types of patent practitioners:

“In the United States, a practitioner may either be a patent attorney or patent agent. Both patent attorneys and patent agents have the same license to practice and represent clients before the United States Patent and Trademark Office (USPTO). Both patent attorneys and patent agents may prepare, file, and prosecute patent applications. Patent agents and patent attorneys may also provide patentability opinions, as noted by the U.S. Supreme Court.”

“Patent agents may not provide an 'opinion of validity of another party's patent when the client is contemplating litigation and not seeking reexamination' because such activity 'could not be reasonably necessary and incident to the prosecution' of a client's patent.”

“Patent attorneys must also be admitted to the practice of law in at least one state or territory of the U.S. Or in the District of Columbia.”

“ Both patent attorneys and patent agents are generally required to have a technical degree (such as engineering, chemistry or physics) and must take and pass the USPTO registration examination (officially titled Examination for Registration to Practice in Patent Cases Before the United States Patent and Trademark Office).
(http://en.wikipedia.org/wiki/Patent_attorney)

5.4.2 Why a Patent Attorney is considered: In some patent related matters, there may be a necessity for a Patent Attorney rather than a Patent Agent:

“Since patent attorneys are admitted to practice law in a state or territory, they can additionally provide legal services outside the Patent Office if practicing within the jurisdiction they are admitted to practice or if the law of the jurisdiction otherwise permits them to practice although not admitted in that jurisdiction. These legal services include advising a client on matters relating to the licensing of the invention; whether to appeal a decision by the Patent Office to a court; whether to sue for infringement; whether someone is infringing upon the claims of a client's issued patent; and conversely, whether a client is infringing the claims of someone else's issued patent. Patent agents cannot provide legal services of this nature, nor can they represent clients before the Trademark Office part of the USPTO.”

(http://en.wikipedia.org/wiki/Patent_attorney)

5.5 Provisional Patent Application – A provisional patent application is a special kind of Utility Patent Application, often misunderstood as being a “provisional patent,” a term for



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

something that does not exist. In general, a provisional patent application is a legal document with relaxed structural requirements and reduced filing fees that provides protection for one year. The primary purpose of the provisional patent application is the establishment of a filing date (prior art date), and a protection against public disclosure. The latter has become a major consideration under the “first-to-file” environment of the relatively recent change of precedents brought about by the Leahy-Smith America Invents Act (AIA).

A prior art date, is the date that will be allowed to the patent examiner in looking for art that precedes your patent application. In effect, filing an encompassing provisional application will allow you to 'force' the examiner to have to find art earlier art in defeating your application. This can be critical in fast moving technical areas, where an examiner may look for a company's FAQ section in a web-site to defeat your patent request.

In addition to the establishment of the prior art date for the follow on non-provisional patent timeline, the filing fee for the provisional application is significantly lower (US\$130 as of April 2014 for a Small Entity (less than 500 employees)) and permits all material related to the invention to include the term “Patent Pending” associated to it. A one-year period is permitted prior to a non-provisional patent filing that allows the detailed preparation of the non-provisional patent, the raising of investment funding using the “Patent Pending” designation, and the detail preparation of specifications (including professional drawings and supported claims).

5.5.1 Provisional Patent Application Structure: A Provisional Patent Application requires at least one inventor, a specification and drawings. The authors also recommend the addition of at least one claim. While the specification/drawing/claim of a provisional are not evaluated by the USPTO (drawings are inspected for blurring/folds, but otherwise not commented upon), practitioners recommend that the drawings be as complete as possible because the purpose of the application entails the potential inclusion by reference into a non-provisional patent establishing prior filing date.

The non-provisional filing based on the prior art date of a provisional (known colloquially as 'converting' a provisional into a non-provisional) must be made within a one-year period allowing the refinement of specifications and claims, as well as drawings. Care must be taken that extensive enhancements/developments following the provisional may not receive the same prior art date. At times, it may be advisable to submit two or more provisional applications during the year period, particularly in areas where a technological 'pivot' creates



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

a fluid IP landscape. In this fashion, the final non-provisional application is derived from those two or more applications.

Device, method or means represented in the drawings but weak in the specifications have been successfully included in the later non-provisional patent, but the subject matter must be related and that is most represented by the drawings. For the purposes of the provisional patent application, though, the drawings need not follow the stringent practices of the non-provisional patent and may be only black-and-white, pencil-and-paper illustrations. The most effort in the provisional patent application should be made to provide very thorough illustrations.

5.5.2 Provisional Patent Application Characteristics: A decision to file a provisional application may involve filing strategy for a following non-provisional patent:

“The earliest filing date of a 'provisional' (application) may be very important where, for example, a statutory condition of patentability is about to expire and there is insufficient time to generate a complete non-provisional application. In many cases, a provisional is filed the same day as a public disclosure of the invention, which disclosure could otherwise permanently jeopardize the patentability in non-U.S. countries having strict requirements on "complete or absolute novelty". In other cases the provisional application is filed soon after such a disclosure in order to preserve only the inventor's U.S. patent rights. The date of filing of the provisional patent application can also be used as the foreign priority date for applications filed in countries other than the United States and for an international application, but not for a design patent. The filing of a provisional application triggers a review period for the U.S. license necessary for the subsequent foreign or international filings. Though the "provisional" need not be submitted in English, a translation will be required when (and if) a non-provisional application claims the benefit of the provisional.

A provisional application, as such, is never examined by the USPTO, and therefore can never become a patent. It is also not 'published', but will become a part of any later non-provisional application file that references it, and thus becomes 'public' upon issuance or publication of a patent claiming its priority benefit.[6]



Intellectual Property and Patents for the Professional Engineer®
A SunCam online continuing education course

Note: The above is crucial. If you include two or more inventions within one provisional application, and later opt only to pursue one of them, at the time the provisional becomes public, **both** inventions will become disclosed.

A 'provisional' is automatically abandoned (expires) one year after it is filed. The provisional filing date is not counted as part of the 20-year life of any patent that may issue with a claim to the provisional filing date.[6]

The United States Patent and Trademark Office (USPTO) announced on December 8, 2010, that it was implementing a Missing Parts Pilot Program. This pilot program would provide applicants with a 12 month extension to the existing 12 month provisional application period. This pilot program would not change the requirement for an applicant to file a non-provisional application within 12 months; though it would allow additional time to reply to a missing parts notice.[7]"

http://en.wikipedia.org/wiki/Provisional_application

5.5.3 Leahy-Smith America Invents Act: Prior to the Leahy-Smith America Invents Act legislation, the United States had a “first-to-invent” policy that was subsequently changed to a “first-to-file” policy. The change aligns the United States policy with the rest of the world as well as making other substantial changes in patent procedures. One consequence is the relative importance of the provisional patent application in establishing prior art dates.

5.5.4 Leahy-Smith America Invents Act (AIA) Impact: More will be said in later sections about the impact of the AIA on individual Professional Engineers, their practice, clients and employers. As recognized by the USPTO, the impact should be substantial and according to the USPTO, four immediate impact factors of the Act include:

“1. It's accelerated the timeline of provisional patent applications. A provisional patent gives inventors the chance to file "without a formal patent claim, oath or declaration, or any information disclosure (prior art) statement" -- and after filing, inventors have a year to file a non-provisional (i.e., permanent) application. For universities especially, it's sped up the timeline for filing these sorts of applications. "It used to be you'd make an invention, you'd work on it for six months and then when you felt you were ready to publish on it, you'd file a provisional," says Elyse Ball, Counsel, University of Akron Research Foundation. "As of late, as soon as we get the disclosure we're going to file a provisional -- and then take that year to look at the market for the technology, as well as to try and reduce that technology to practice and make sure it's something we can make in a lab and



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

think we can license out." But first to file has increased the number of patent applications overall, too; according to a Cincinnati Enquirer article by Laura Baverman, the number of patents filed so far this year (5112) already exceeds the total of applications from 2012 (5024). While some of this increased activity no doubt reflects people wanting to get patents filed before the law changed, Baverman also notes another positive (and perhaps unintended) consequence: "Lawyers expect more companies to take advantage of the opportunity to accelerate the process, and in many cases, get their product to market faster."

2. It gives quick decision-makers -- and strategists -- an advantage. *With this acceleration naturally comes the need to make decisions more quickly about all aspects of a new technology – when to disclose it, how soon to file a provisional patent application for it or how to develop the idea in the most efficient way. But despite what Dan McMullen, Partner, Calfee Halter & Griswold calls the "sense of increased urgency" created by first to file, there still needs to be some due diligence (and deliberate action) around the application process.*

That's where having a strategic intellectual property plan comes in handy, McMullen says. "As new ideas and innovations percolate to the surface, you have an established way to look at them, evaluate them, deal with them and make a decision on how you want to treat them, rather than treating each one as an ad hoc event that comes along."

3. It makes patents more affordable for "garage inventors." *With these new regulations also comes a new status category called "micro-entity," which makes it financially easier for certain types of entrepreneurs to file for a patent. "For individual inventors -- you know, the proverbial garage inventor -- [qualifying] for micro-entity status at least reduces some of the administrative cost associated with patent applications," McMullen says. These savings could be significant, as they represent a 75 percent discount in fees (half of the small entity fee, which was half of the large entity fee). To qualify as a micro entity;*

A. (Higher Education) *Every patent application inventor or applicant is;*

- 1. an employee of an Institution of Higher Education;*
- 2. the institution of higher education is also a Small entity, i.e. less than 500 employees)*

or;

B.(Gross Income) *Every patent application inventor or applicant;*

- 1. meets small entity requirement*
- 2. has been named in less than four other non-provisional US patent applications*



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

3. has had income below 3X the median household income in the preceding year (roughly \$150K, but look at:

http://www.uspto.gov/patents/law/micro_entity.jsp

for exact amounts.

Note that the term applicant is another feature of the AIA, and refers to people having a significant ownership of a patent application through contractual means.

4. However, companies with deeper pockets still have an advantage. For even slightly bigger organizations, filing for a patent can be pricey. (A quick glance at the current fee schedule gives insights into why.) Navigating the paperwork involved is also still complicated, which is why the USPTO recommends that a registered attorney or patent professional file these forms on behalf of the inventor -- which simplifies the process, but tacks on more fees if pro bono assistance isn't available. Patent fees are especially onerous if you're a startup or small business trying to fundraise or develop your technology, says Patricia Smith, the owner of P.A. Smith LLC, a Northeast Ohio intellectual property and corporation transactions law firm. "You're trying to assess the commercial liability of your technology, and you might be looking for licensing deals or venture capital, but you don't have the money yourself to put into filing the patent application. You may need to hire independent contractors to help you to continue to develop your technology, but you're having problems being able to fund that. Larger companies already have the R&D departments in place; they already have the financial resources and the means in order to get the process going."

Keep in mind that these changes only scratch the surface of how first to file is overhauling the patent system. In fact, it'll take years to see how all the nuances of these new regulations play out, as well as the implications of this reform on startups, universities and other innovation hubs. In the meantime, it's critical that startup CEOs prioritize being knowledgeable about first to file and how best to act on it, in particular where it comes to their own company's intellectual property. At the end of the day, IP of any type -- be it patents, trade secrets, copyrights or trademarks, to name a few -- is the most important asset any young company has in its pocket. The more CEOs emphasize protecting intellectual property when they're looking at strategy development, the better off their companies will be in the future."

http://www.uspto.gov/aia_implementation/index.jsp



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

5.6 Patent Property Rights – Patents issued in the United States confer property rights on the inventor(s) within the US. With the property rights created by the individual inventor(s) only, it is not possible for any organization to file as an inventor. It is possible, however, for the ownership of that property to be transferred and that is the mechanism used by organizations to build extensive patent portfolios. A transfer or sale of patent rights is a legal contract and the USPTO recommends that a patent attorney be employed to assist in the execution of such contracts.

Professional employment contracts may also encumber patent property rights:

“When you create an invention while employed, who owns the right to acquire a patent: you or your employer? The general rule is that you own the patent rights to the invention unless:

- *you signed an employment agreement assigning invention rights, or*
- *you were specifically hired (even without a written agreement) for your inventing skills or to create the invention.*

Even if your employer does not acquire ownership under one of these two methods, the employer may still acquire a limited right to use your patent (called a shop right) without paying you. Shop rights are discussed below. Keep in mind that simply because an individual is employed does not necessarily grant the employer ownership of the patent. Each situation must be evaluated on its own set of facts.

<http://www.nolo.com/legal-encyclopedia/who-owns-patent-rights-employer-inventor.html>

5.6.1 Patent Assignment: A patent assignment is one form of transfer of patent rights:

*“Patent law provides for the transfer or sale of a patent by a written agreement called an **“assignment”** that can transfer the entire interest in the patent. The **assignee**, when the patent is assigned to him or her, becomes the owner of the patent and has the same rights that the original patentee had.*

Patent law also provides for the assignment of a part interest, that is, a half interest, a fourth interest, etc., in a patent.

You can also grant an assignment that is only for a particularly specified part of the United States.

A mortgage of patent property passes ownership to the mortgagee or lender until the mortgage has been paid back and a re-transfer from the mortgagee (lender) back to the mortgagor (the borrower) is made.



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

This situation is called a "conditional assignment" however, all patent rights are transferred until the conditional assignment is canceled by both parties or by the decree of a competent court."

An assignment, grant, or conveyance of any patent or application for patent should be acknowledged before a notary public or officer authorized to administer oaths or perform notarial acts. The certificate of such acknowledgment constitutes undisputable evidence of the execution of the assignment, grant, or conveyance.

The US Patent Office records assignments, grants, and similar instruments sent to it for recording, and the recording serves as notice. If an assignment, grant, or conveyance of a patent or an interest in a patent (or an application for patent) is not recorded in the US Patent Office within three months from its date, there can be no subsequent purchaser(s).

Any written document should identify the patent by number and date. The name of the inventor and title of the invention as stated in the patent should also be given. An written document relating to a patent application should identify the application by its application number and date of filing, the name of the inventor, and title of the invention as stated in the application should also be given.

Sometimes an assignment of an application is executed at the same time that the application is prepared and before it has been filed in the Office. Such assignment should adequately identify the application, as by its date of execution and name of the inventor and title of the invention, so that there can be no mistake as to the application intended.

If an application has been assigned and the assignment is recorded, on or before the date the issue fee is paid, the patent will be issued to the assignee as owner. If the assignment is of a part interest only, the patent will be issued to the inventor and assignee as joint owners.

Patents may be owned jointly by two or more persons as in the case of a patent granted to joint inventors, or in the case of the assignment of a part interest in a patent. Any joint owner of a patent, no matter how small the part interest, may make, use, offer for sale and sell and import the invention for his or her own profit provided they do not infringe another's patent rights, without regard to the other owners, and may sell the interest or any part of it, or grant patent licensing to others, without regard to the other joint owner, unless the joint owners have made a contract governing their relation to each other. It is accordingly dangerous to assign a part interest without a definite agreement between the parties as to the extent of their



Intellectual Property and Patents for the Professional Engineer®
A SunCam online continuing education course

respective rights and their obligations to each other if the above result is to be avoided.

http://inventors.about.com/od/licensingmarketing/a/patent_licensin.htm

5.6.2 Patent Licensing: A patent license is another form of transfer of patent rights:

The owner of a patent may grant licenses to others. Since the patentee has the right to exclude others from making, using, offering for sale or selling or importing the invention, no one else may do any of these things without his/her permission. A patent licensing agreement is in essence nothing more than a promise by the licensor not to sue the licensee. No particular form of license is required; a license is a written contract and may include whatever provisions the parties agree upon, including the payment of royalties, etc.

The drawing up of a license agreement (as well as assignments) is within the field of an attorney at law. Such attorney should be familiar with patent matters as well. A few States have prescribed certain formalities to be observed in connection with the sale of patent rights.

http://inventors.about.com/od/licensingmarketing/a/patent_licensin.htm

5.6.3 Pre-Invention Assignment Agreements: In the US Constitution, Article 1, Section 8, Clause 8, the rights to intellectual property is specified: *“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.”* This right has been held to be vested as an individual right and an employer may require an employee to promise to assign any intellectual property to the employer as a condition of employment. The specific document is often titled a pre-assignment agreement. Opponents to these agreements may call them by other names objecting to the unilateral nature of the agreement claiming they are signed under a form of duress that predisposes the individual's Constitutional right.

In addition to the specific constitutional rights, a number of states including California, Delaware, Illinois, Kansas, Minnesota, North Carolina, Utah and Washington all have applicable sections in their State Law concerning pre-invention assignment agreements.

Opinions vary on the subject of pre-assignment agreements and:

“Employers believe they must protect their interests, but employee inventors think the statement is so broad that a diversified corporation can take ownership of almost any invention, nullifying the law's purpose. Because intellectual property is a federal



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

matter, most researchers believe legal conditions affecting ownership fall under federal jurisdiction.

Questions still remain. Does the common U.S. business practice of pre-assignment carry out the Constitutional purpose — "promote the progress of science and useful arts" — or is it an impediment to America's ability to compete in the global marketplace? Is national economic development and trade balance a matter of national security?

The aforementioned questions should be the basis for any debate on the pre-assignment of intellectual property issues. Rights of inventors and employers are important, but the Constitutional purpose establishing intellectual property transcends"

More discussion is at: <http://www.todaysengineer.org/2008/Jun/pre-assignment.asp>

5.6.4 Shop Rights: English common law allows an employer a license without royalty or fees that is non-exclusive but the inventor retains the ownership of the patent. This "shop right" may be asserted formally in a contract or otherwise as another condition of employment.

"Even in instances where the employer does not own the employee's patent, it may have a "shop right" to use the patent on a non-exclusive, non-assignable, royalty-free basis. A shop right entitles an employer to use, without charge, an invention patented by one of its employees without liability for infringement. In addition, the employer has a royalty-free, non-exclusive and non-assignable license to use the invention. The right is based on the employer's presumed contribution to the invention through materials, time, and equipment. In determining whether an employer has a shop right, the following factors have been considered:

- *the contractual nature of the relationship between employer and employee*
- *whether the employee consented to the employer's use of the invention, and*
- *whether the employee induced, acquiesced in, or assisted the employer in the use of the invention.*

In general, an employer will have shop rights in an invention in situations where the employer has financed an employee's invention by providing wages, materials, tools and a work place. Other factors creating shop rights include an employee's consent, acquiescence, inducement, or assistance to the employer in using the invention without demanding compensation or other notice of restriction. Although the employer has a shop right, the employee retains full ownership of the patent and may



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

issue licenses or even sell the patent to third-parties. However, even where the patent is sold to a third-party, the (former) employer retains its shop rights in the patent.”

<http://www.nolo.com/legal-encyclopedia/who-owns-patent-rights-employer-inventor.html>

5.6.5 Disclosure and Non-Disclosure Agreements: In addition to invention pre-assignment agreements, clauses are often included in employment contracts that bind an employee to disclose inventions to the employer. Similarly, employees as well as prospective customers, potential investors and others are induced to sign a non-disclosure agreements (NDA) the purpose of the NDA is generally to prevent premature disclosure of patentable material that would prevent filing subsequent patents. There is a potential for these agreements to overlap leaving the individual in a precarious position between parties. Legal advice on such matters should be sought from a patent attorney.

5.6.6 Hold-Over Clauses: Employment contracts may also bind an employee to assign patent rights following termination of employment:

“Of all the provisions in pre-invention assignments, “holdover clauses” are the most legally suspect. The reason employers use such clauses is obvious: They’re afraid you’ll walk out the door without telling them about an invention you created while employed and later develop and patent it yourself. However, courts don’t like such post-employment assignment provisions (also called “holdover clauses”) because they can make it impossible for an employee to get a new job. After all, a prospective new employer doesn’t want to be subject to lawsuits by a former employer claiming that it owns an invention developed by its ex-employee. To protect employees, courts will enforce holdover clauses only if they are reasonable. To be reasonable, a holdover clause must: (1) be for a limited time—probably no more than six months to one year after employment ends; and (2) apply only to inventions conceived as a result of work done for the former employer. Some courts are even more restrictive and will enforce such clauses only for inventions made using the ex-employer’s trade secrets.”

<http://www.nolo.com/legal-encyclopedia/pre-invention-assignment-agreements.html>

5.6.7 International Patents: As a single document, there is no such thing as an “International Patent,” but rather numerous individual patents in differing international jurisdictions. Seek a patent attorney who specializes in filing foreign patents for advice in such matters.



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

Some supra-jurisdictions, such as the European Union have had their individual member countries enter single-examiner agreements, which allow for a single examining entity (The European Patent Office or EPO) to examine an application and emit a patentability opinion for all member states. More about the EPO at www.epo.org

Similar (albeit 'looser') arrangements may be procured in Oceania, Africa and some other jurisdictions.

5.6.8 The Patent Cooperation Treaty: Often confused with an 'international patent application', the PCT is a mechanism that allows you to extend the time at which you must decide to exercise your international patent rights or lose them.

In general, your right to file for a patent in any worldwide jurisdiction expires a year after your prior art date in any of them. Recall this date is either the date at which you filed the provisional on which your non-provisional is based, or a year after you filed your non-provisional (when no provisional was filed).

On that date (a year after your prior art date), you either file in each jurisdiction of interest (yes, all 190+ countries) or you lose your rights to file, forever. This filing is known as the National Entry, and can be a very expensive process. It is estimated to exceed \$500K or more to file in every country on earth, and at least \$60K to file in Europe, Japan, and the BRICKS (Brazil, Russia, India, China, Korea, South Africa).

Note the above include the country filing fees, as well as those of the Patent Agent/Attorneys accredited in each of those countries to represent you. In addition, the figures quoted are for filing, follow on Office Actions, allowances, issuances and maintenance are bound to increase the number significantly. Oh yes, most countries outside the US require you to pay yearly to keep your application alive.

Many inventors have a bit of a problem having such cash laying around a year after filing their initial application. To help them, the Worldwide Intellectual Property Office (WIPO) in Switzerland created the PCT process. The PCT is an application based on your non-provisional application that acts as an 'option' or a 'put' on your application. By filing a PCT application within a year of said prior art date, the inventor delays the decision date another 18 or 19 months (depending on the country), for a total of 30/31 months from the prior art



Intellectual Property and Patents for the Professional Engineer®
A SunCam online continuing education course

date. In effect, the PCT fee (from \$2,800 to over \$4,500) allows you to buy an extra 18/19 months before having to commit.

A US inventor may file a PCT directly through WIPO, or through the USPTO. In either case, he/she may select one of five National patent offices to produce an International Search Report (ISR). These are (as of April 2014) the US, EPO, Australia, Korea, or Russian patent offices. These patent offices will produce the ISR, which while not enforceable (the US examiner will perform his/her own search) provides the applicant an idea of patentability.

A PCT has another cost, publication of the application. If a US inventor is only filing in the US, he/she may elect to keep the application non-published. As such, the only time his/her competitors will find out about the filing (other than when informed so by the inventor) will be at the time of issuance of a patent, or if the application is referred to by another patent from the same inventor.

If non-publication is not requested, or if any foreign application (whether individual National Entry at the one year mark or a PCT) based on the US prior art date, the complete patent application will publish at 18 months (including access to the provisionals).

6. Software Utility Patents

6.1 Pervasive Computer Technology – Today, there can be no dispute that computer technology in the “Information Age” has had an impact on nearly all aspects of society and has altered the art of engineering substantially. Certainly, the engineer recognizes the value of the operating-system software, the spreadsheet, the word-processor and even Engineering Design Automation (EDA) software that each are run as a computing service distinct from the hardware it runs on. However, an embedded controller within an airframe comprised of the hardware and its software becomes less separable in providing value. Regardless of its origins, the Professional Engineer faces responsibility for proper software function in the final work product.

Patents have been issued on computer hardware for many decades but the value of the computer has shifted substantially from consideration of its hardware to the software that provides the functionality. Tracking the progress of computer technology from the room-sized main-frame era through mini-computers, micro-computers, and ubiquitous computers embedded as information appliances leaves the hardware/software division less distinct.



Intellectual Property and Patents for the Professional Engineer®
A SunCam online continuing education course

Patent issues regarding software patents first appeared in the US courts in the 1960's era and have been with us ever since. A culture of intellectual property rights surrounding software has been and continues to be contentious. It is not surprising that with the shift of value from the hardware towards the software in computer systems that the battle ground issues in intellectual property are shifting right along with the dependence on software.

The original framers of the constitution could not have foreseen the contention that has developed between individual and corporate ownership of intellectual property and those issues are being fought and resolved today primarily in the software arena. Notwithstanding the evolving software culture of "Free Open-Source Software" in response to corporate hegemony, there are derivative related issues also evolving in open-source hardware that are very much enabled by the capabilities presented by essentially software driven product development utilizing low-cost 3D printing technology.

We present some discussion from the references in this rapidly evolving arena as well as topics that are derived from the tensions of intellectual property stake holders being resolved in the courts, even to the U.S. Supreme Court. Much of the discussion covers unresolved issues with both proponents and opponents struggling to make their points.

6.2 Software Patents and Copyrights - A software patent has been defined by the Foundation for a Free Information Infrastructure (FFII) as being a "patent on any performance of a computer realized by means of a computer program".[1]
http://en.wikipedia.org/wiki/Software_patent

As discussed above, software patents are a matter of some debate. The source above is as good as any, lacking a well defined description of a software patent by the USPTO. The source above explains:

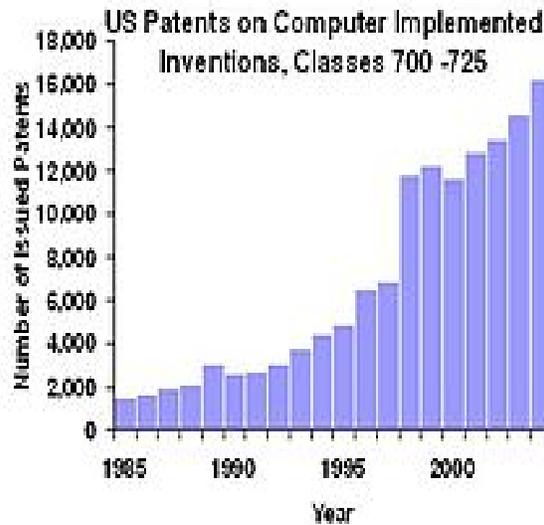
"Most countries place some limits on the patenting of invention involving software, but there is no legal definition of a software patent. For example, U.S. patent law excludes "abstract ideas", and this has been used to refuse some patents involving software. In Europe, "computer programs as such" are excluded from patentability and European Patent Office policy is consequently that a program for a computer is not patentable if it does not have the potential to cause a "further technical effect" beyond the inherent technical interactions between hardware and software.[2]



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

There is intense debate over the extent to which software patents should be granted, if at all. Important issues concerning software patents include:

- *Whether software patents should be allowed, and if so, where the boundary between patentable and non-patentable software should lie;[3]*
- *Whether the inventive step and non-obviousness requirement is applied too loosely to software;[4] and*
- *Whether patents covering software discourage, rather than encourage, innovation.[5] “*



http://en.wikipedia.org/wiki/Software_patent

Text is available under the [Creative Commons Attribution-ShareAlike License](#); additional terms may apply. By using this site, you agree to the [Terms of Use](#) and [Privacy Policy](#). Wikipedia[®] is a registered trademark of the [Wikimedia Foundation, Inc.](#), a non-profit organization.

“The United States Patent and Trademark Office has granted patents that may be referred to as software patents since at least the early 1970s.[28] In Gottschalk v. Benson (1972), the United States Supreme Court ruled that a patent for a process should not be allowed if it would "wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself", adding that "it is said that the decision precludes a patent for any program servicing a computer. We do not so hold." [29] In 1981, the Supreme Court stated that "a claim drawn to subject matter



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

otherwise statutory does not become nonstatutory simply because it uses a mathematical formula, computer program, or digital computer" and a claim is patentable if it contains "a mathematical formula [and] implements or applies the formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect".[30]"

http://en.wikipedia.org/wiki/Software_patent

An alternative to a software patent has been employed attempt to protect intellectual property by means of a copyright on the software. Software can be copyrighted as an expression of a work of literature and generally there has been no need to register that copyright with the USPTO. Matters get confusing, however if the code expression is compiled, cross-compiled, or otherwise “translated” to another hardware platform because its genealogy is masked by the process. In Europe, some jurisdictions allow software patents because the intention is to capture the method embodied in the software and the expression in code is de-facto independently copyrighted.

Partly because there is extremely rapid evolution in the computer arena, it is debatable whether the software patent or copyright acts to speed or slow national competitiveness. Notwithstanding, there were 145,000 patents issued in the United States through 2004, each in one of the 22 recognized classes of patents covering “computer implemented inventions.”

6.3 “Free Open Source Software (FOSS)” - Frustration amongst programmers concerning the possible infringement of existing intellectual property rights on computer software has lead to the evolution of the “Free Open Source Software” venue for development and distribution of royalty-free software. Such software is often distributed under a usage license that has several restrictive clauses, usually requiring that such use and derivative works remain under a similar license.

One such license that is popularly used in the community is the GNU General Public License (GPL) that originated with the **GNU project** by members of the **Free Software Foundation (FSF)**. This form of agreement is designated as a “copyleft” in contrast to the restrictive copyright:

“It is believed that the copyleft provided by the GPL was crucial to the success of Linux-based systems, giving the programmers who contributed to the kernel the assurance that their work would benefit the whole world and remain free, rather than being exploited by software companies that would not have to give anything back to the community.[11]”

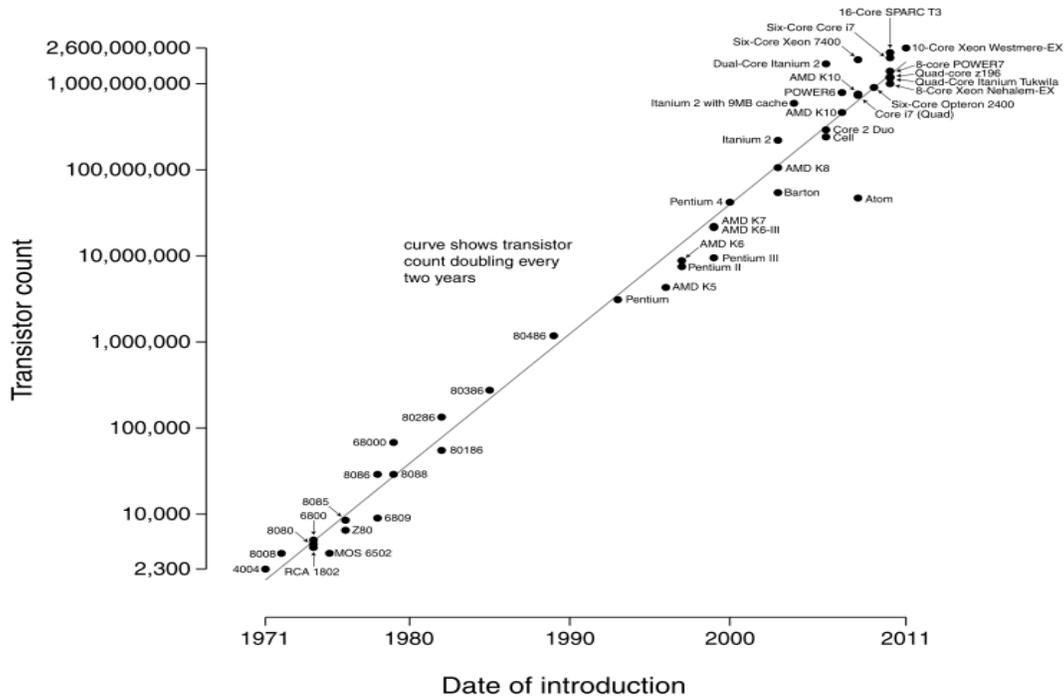
http://en.wikipedia.org/wiki/GNU_General_Public_License



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

6.4 Open Source Hardware – The evolution of microcomputer hardware has nearly followed the famous “Moore's Law” predicting device scaling by one-half and transistor device count doubling device approximately every 18 to 24 months since Gordon Moore, one of the founders of Intel made the observation from ~1970 based on the limited data available to him from the short history available then. His “Law” has been remarkably accurate for more than 40 years fueling the dispersal of computer technology into many product areas.

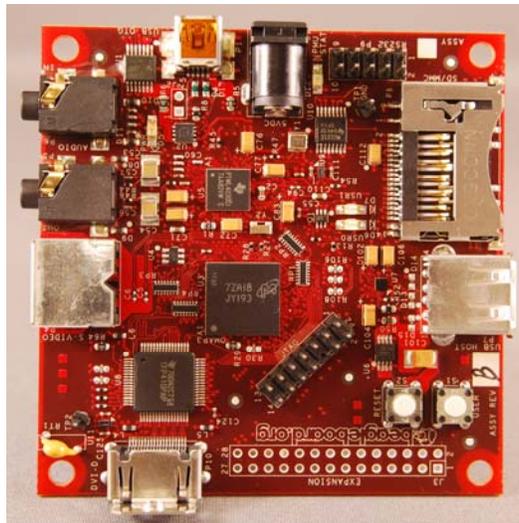
Microprocessor Transistor Counts 1971-2011 & Moore's Law





Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

Regardless of the theory of the “Law,” one consequence has been the regular reduction of hardware costs associated with remarkable computing capability. Single-chip Micro-controller components with the processor, memory, and Input/Output (I/O) are available for less than US\$ 1, and development assemblies for a few US\$. Those same assemblies are available through component distributor channels so that small runs of innovative products can reasonably be produced and sold with little or no hardware development costs. The software needed to support these assemblies can be developed on desktop and laptop computers with freely available development software. Another full course deals with just this topic alone, but for purposes here, we include illustrations of the “Beagle Board” with its OMAP processor from Texas Instruments including full DSP and ARM computers.



BeagleBoard with the TI OMAP Processor; ARM and DSP

<http://en.wikipedia.org/wiki/BeagleBoard>

[http://upload.wikimedia.org/wikipedia/commons/e/e1/Beagle Board big.jpg](http://upload.wikimedia.org/wikipedia/commons/e/e1/Beagle_Board_big.jpg)

This file is licensed under the [Creative Commons Attribution-Share Alike 2.0 Generic](https://creativecommons.org/licenses/by-sa/2.0/) license.

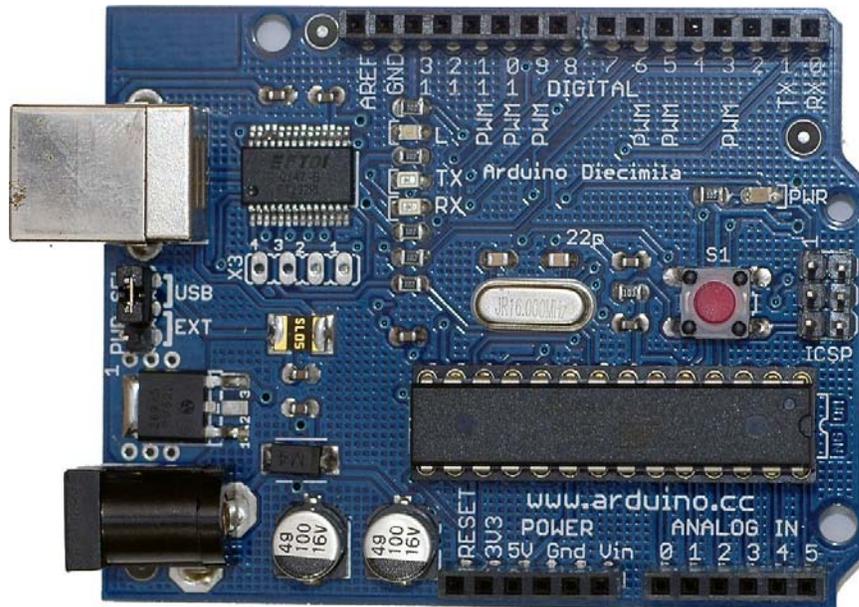
Another such differently configured example is the PSoC5™ First Touch System Experimenter Board shown below and available from Cypress Semiconductor and from such



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

component distributors as DigiKey. Other popular units such as the Arduino and Adafruit experimenter kits; many others are available, too.

The following link shows the full documentation for the Cypress CY8CKIT-050 PSoC5 Development Kit Guide: <http://www.cypress.com/?docID=46949>



The Arduino Diecimila

http://en.wikipedia.org/wiki/List_of_Arduino_boards_and_compatible_systems

http://upload.wikimedia.org/wikipedia/commons/4/4b/Flamingo_Arduino.jpg

This file is licensed under the [Creative Commons Attribution-Share Alike 2.0 Generic](https://creativecommons.org/licenses/by-sa/2.0/) license.

Because the hardware and software for projects and experimentation are so closely linked in these environments, the hardware vendors have freely “borrowed” from FOSS practice:

“Open-source hardware consists of physical artifacts of technology designed and offered by the open design movement. Both free and open-source software (FOSS) as well as open-source hardware is created by this open-source culture movement and applies a like concept to a variety of components. The term usually means that information about the hardware is easily discerned. Hardware design (i.e. mechanical drawings, schematics, bills of material, PCB layout data, HDL source

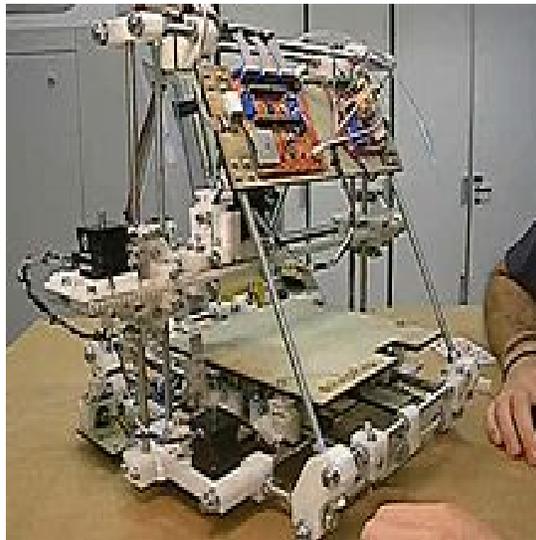


Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

code and integrated circuit layout data), in addition to the software that drives the hardware, are all released with the FOSS approach.

Since the rise of reconfigurable programmable logic devices, sharing of logic designs has been a form of open-source hardware. Instead of the schematics, hardware description language (HDL) code is shared. HDL descriptions are commonly used to set up system-on-a-chip systems either in field-programmable gate arrays (FPGA) or directly in application-specific integrated circuit (ASIC) designs. HDL modules, when distributed, are called semiconductor intellectual property cores, or IP cores.”
http://en.wikipedia.org/wiki/Open-source_hardware

6.5 Open Source 3D Hardware Printing – The hardware development has been facilitated also by the recent development of 3D printing technology. One notable example is the RepRap printer that is provided with all necessary instructions to make its own components:



http://en.wikipedia.org/wiki/Open-source_hardware

This file is licensed under the [Creative Commons Attribution-Share Alike 3.0 Unported](#) license.

One relatively extreme example of the open source hardware came about from the distribution of the 3D printer files to construct various forms of workable firearms. The proponents of this distribution seem to be trying to make statements about constitutional Second Amendment rights, as well as the distribution of the open-source software to drive the 3D printer.



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

“Here's the question: in a world where the design of a 3D printed gun is freely available on the internet, can we—or should we—regulate open source design? Or are limits impossible in a world of anonymous file sharing? Does any attempt at control go against the whole spirit of open source, decentralized innovation?”

"We cannot limit open source design, even when we do not support the consequences."

“That was the argument made by Cody Wilson at a debate held at the Museum of Modern Art last week. Wilson, you might remember, is the guy who designed a working, entirely 3D printed gun and then uploaded the CAD files to the Internet. At the start of the evening, the majority of the audience agreed with Wilson's position: we simply cannot—and should not—limit open source design, even when it leads to the spread of a lethal, untraceable weapon.”

Follow the link below to the article, including pictures of the gun with its operation:

<http://gizmodo.com/join-the-debate-3d-printed-guns-or-government-regulati-1555676392>

The idea of designing and freely distributing such innovations has resulted in a far more practical design realized in metal and that has test-fired a substantial number of rounds, although the design files are apparently not released under any form of license:

“First 3D-Printed Metal Gun Fires 50 Rounds and Counting”

“Engineering firm Solid Concepts has produced the first 3D-printed metal gun, and is out to prove that it works as well as a gun that comes from a factory.

Eric Mutchler, a project coordinator and engineer at Solid Concepts, fired 50 rounds from the 3D-printed pistol to show that the material would hold up. He told Mashable that he plans to fire 500 more rounds as further proof.

See also: 3D Printing Is a Matter of Life and Death

Mutchler said he wanted to demonstrate that a 3D-printed gun would operate under the intense pressure caused by firing a bullet to prove its durability.

Previous iterations were printed in plastic. The makers of these guns faced legal issues resulting from the Undetectable Firearms Act of 1988, which prevents anyone from making a gun from material that can quietly pass through an airport metal detector. The plastic guns were also unstable and often cracked after firing several rounds.



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

Solid Concepts won't run into the first problem, because its gun is made from metal, and the company has a firearms license. The success of its weapon should also give manufacturers more confidence in the emerging technology, Mutchler said.

This sense of confidence could boost customer service, too.

"Whatever part fails on [a 3D-printed gun], I can have that part building while I'm driving to the shop and have it done in a matter of hours," Mutchler said.

For now, no plans are set to sell the pistol. But that was never the point to begin with, Mutchler said."

Follow the link below to the article, including pictures and video of the gun with its operation: <http://mashable.com/2013/11/11/3d-printed-metal-gun/>

7. Some Practical Considerations for the PE

7.1 Establish the Invention and Inventor – The America Invents Act and its change of precedence from first-to-invent to a first-to-file policy makes the date of filing of prime importance in establishing the intellectual property rights. Under a first-to-invent system, the well maintained, dated, and witnessed pages of an engineer's notebook established precedence. That same notebook can now be interpreted as a liability because the information, while not a disclosure, may be seen by others who file using the information within. The USPTO seems to have made the provisional patent disclosure usurp the role of the engineer's notebook.

Because the USPTO neither reviews nor publishes the contents of a provisional patent disclosure, it is not considered as a public disclosure which would be a statutory impediment to a non-provisional patent issuance until it is accessible to the public (see PCT above).

The individual Professional Engineer may wish to file any number of provisional patent disclosures with the USPTO for topics that may be considered patentable by that engineer. Certainly, the filing of a provisional patent disclosure does establish the priority date and the identity of the inventor. To the inventor these may be important issues in later disputes with either employers or clients over the origination of a patent.

7.2 Intellectual Property in Agreements – It is certainly in the best interest of the Professional Engineer to seek the counsel of a patent attorney to review Non-Disclosure Agreements (NDA), disclosure agreements, pre-invention assignment agreements, hold-over clauses, and other terms of employment contracts. Unfortunately, such agreements are often



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

presented on a first-day basis as a condition of employment without prior review. A Professional Engineer may wish to request preview of all such agreement with a patent attorney prior to making irrevocable commitments to a new employer.

Independent contractors who are Professional Engineers face similar issues but those are often also complicated by overlapping disclosure and non-disclosure terms, as well as patent assignment conditional on final payment of billings.

7.3 Engineering Expertise - Each engineer spends a considerable time prior to attaining credentials to develop expertise that makes the expertise valuable. Again, it is in the Professional Engineer's best interest to seek the counsel of a patent attorney to review the possibilities of treating accumulated expertise as a Trade Secret. While accumulated experience and expertise is a major part of the value of every Professional Engineer, it is mostly the basis for the independent contractor and risks being litigated by a client as an assumed deliverable in a particular contract. An engineer who has spent time and effort developing expertise does not generally expect to transfer ownership of that expertise to a single client as an exclusive one-time sale, although contracts may be expressed by the client with exactly that purpose. We repeat, it is certainly in the best interest of the Professional Engineer to seek the counsel of a patent attorney to review all contract terms.

8. Summary and Conclusions

8.1 Course Summary - This course has built on the experiences of two Registered Professional Engineers with extensive experience in intellectual property matters and due to the nature of the material, it used pertinent reference materials gleaned from numerous relevant sources.

The nature of the engineering art leading to the recognition of Professional Engineering status is recognized as being a driving force in innovation and invention and the distinction between differing forms of similarly recognized intellectual property were introduced and discussed.

The Utility patent, as one specific form of intellectual property was discussed due to its close coupling with the work-product of the innovative Professional Engineer. The evolving focus on ubiquitous computing resources led to a discussion of software patents, the evolution of Free Open Source Software (FOSS) and the extension driven by emerging 3D printing technology into open-source hardware issues.



Intellectual Property and Patents for the Professional Engineer[®]
A SunCam online continuing education course

Finally, a few practical considerations were discussed including the caveat that it is in the best interest of the Professional Engineer to seek the counsel of a patent attorney on unclear intellectual property contracts and issues.

8.2 Conclusions – It should be the prime conclusion that the Professional Engineer cannot avoid issues of intellectual property and should expect to need the counsel of an intellectual property attorney on occasion.