

Patents and Scientific Papers: Quite Different Concepts

The reward is found in giving, not in keeping.

By Max E. Valentinuzzi

Cuando pones la proa visionaria hacia una estrella y tiendes el ala hacia tal excel-situd inasible, afanoso de perfección y rebelde a la mediocridad, llevas en ti el resorte misterioso de un Ideal. [When you place the visionary prow heading to a star and extend your wings towards such unreachable loftiness, eager for perfection and rebelling against mediocrity, you carry within yourself the mysterious flame of an Ideal].

—José Ingenieros (1877–1925) [1]

An inventor creates something new of practical value, not necessarily following an intellectually reasoned path; a scientist (by and large, after a long process, whether theoretical, experimental, or both) discovers something new that eventually may significantly change the course of knowledge. Both the inventor and the scientist are creators, but their philosophical bases and motivations are utterly different, even opposed to each other, as when two soccer or football teams are engaged in a game. The creation of the inventor usually lasts a shorter time, while that of the scientist tends to remain longer, even becoming an essential principle. The objective of this column is to trace the roots of these forms of creativity and pinpoint their differences, which are many and highly significant.

The Patent: Origins

Let us briefly review what the current concept of a *patent* is: it is a set of exclusive rights

granted by a state to an inventor or assignee for a limited period of time in exchange for detailed public disclosure of a product or process (called an “invention”) that is supposedly able to solve a specific problem. Patents are a form of intellectual property. Usually, a patent must meet some requirements, such as novelty, usefulness, and nonobviousness. The exclusive right granted to a patentee in most countries is the right to prevent others, or at least to try to prevent others, from commercially making, using, selling, importing, or distributing a patented invention without permission.

Apparently, some form of patent rights was recognized in ancient Greece. In 500 BCE, in the city of Sybaris (located in what is now southern Italy), encouragement was held out to all who should discover any new refinement in luxury, the profits arising from which were secured to the inventor by patent for the space of a year. Sybaris was an important city on the Gulf of Tarento. The city amassed great wealth thanks to its fertile land and busy port. Its inhabitants became famous for their feasts and excesses; *sybarite* has become a byword for one who enjoys luxury. The city underwent occupations, violence, and confusion until it disappeared, became forgotten, and was buried by sediment over time. It was rediscovered in the 1950s by archaeologists. Today, the ruins can be found to the southeast in the province of Cosenza, Calabria, Italy.

In England, letters patent were issued by the sovereign to inventors who peti-

tioned and were approved. In 1331, John Kempe obtained the earliest authenticated instance of a royal grant. These letters patent provided the recipient with a monopoly to produce particular goods or provide particular services. Another early example was a grant, in 1449, by Henry VI to John of Utynam for a 20-year monopoly for some invention. This artisan was a master glassmaker from Flanders who came to England to construct the windows for Eton College.

The first true patent (the documents cited previously were just early forms) was awarded by the Republic of Florence in 1421 to the architect Filippo Brunelleschi for a barge with a hoisting gear intended to carry marble along the Arno River; the patent was granted for three years. Patents were also systematically granted in Venice as of 1450, where, by a decree, new and inventive devices had

to be communicated to the republic in order to obtain legal protection against potential infringers. The period of protection was ten years. These patents were mostly in the field of glassmaking. The Venetian Patent Statute, issued by the Senate of Venice in 1474, is probably the earliest patent system in the world.

King Henry II of France introduced the concept of publishing the description of an invention in a patent in 1555. The first such patent was awarded to inventor Abel Foullon for “*Usaige & Description de l’holmetre*” (a kind of rangefinder, telemeter, or distance measurement to an object apparatus). Patents were granted by the monarchy and by other institutions such as the *Maison du Roi* and the Parliament of Paris. The novelty of the invention was examined by the French Academy of Sciences, which acted as a patent office evaluator. Digests were published irregularly starting in 1729 with enormous delays. Examinations were generally performed in

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secret, with no requirement to publish a description of the invention. The inventor's right was considered a natural one, and patent costs were very high. The patent law was revised in 1844, and the cost was lowered.

The Evolution of the Patent System

The English patent system evolved from its early medieval origins into the first modern patent system that recognized intellectual property, a crucial legal foundation for the Industrial Revolution. Already in the 16th century, the Crown would habitually issue letters patent for monopolies to specific persons. This power represented input of money for the Crown, and it was widely abused, as the Crown granted patents to all sorts of common goods that barely could be called inventions.

Consequently, the Court began to limit the circumstances under which they were granted—so much so that King James I was forced to revoke all existing monopolies and declare that they were only to be applied for projects of new invention, thus limiting the letters patent to the introducers of original ideas for a fixed number of years. The statute became the foundation for later developments in patent law in England and even elsewhere. James Puckle's 1718 early autocannon was one of the first inventions required to provide a specification for a patent, a new requirement not asked for earlier. Significant changes and improvements came about during the 18th century. Legal battles, due to the 1796 patent by James Watt for his famous steam engine, established the principles that patents could be issued for improvements of an already existing machine and that ideas without specific practical application could also legally be patented.

This legal system heavily influenced patent laws in other countries such as the United States, New Zealand, and Australia. In the thirteen colonies, inventors could obtain patents through petition to a given colony's legislature. In 1641, Samuel Winslow was granted the first patent in North America by the Massachusetts General Court for a new process for making salt. By the end of the 18th century, under

the influence of the philosopher and physician John Locke (1632–1704), the granting of patents began to be viewed as a form of intellectual property right, rather than simply aiming at an economic privilege.

Some negative consequences soon arose, as patent privilege was abused to monopolize the market and prevent improvements by other inventors. Notable is the example of Boulton and Watt, who hounded their competitor Richard Trevithick in court. The thermodynamic origins of the pressure-volume diagrams were explained in an earlier column, which mentioned some of the inconveniences encountered by the people involved in their development and evolution [2].

The history of patents is full of bitter litigation between people, between enterprises, and between people and enterprises, often ending in very grievous results. Some cases became gloomily famous; in the middle of the 19th century, during the long struggle around the development of anesthesia, personal interests, secrecy, and monetary ambition brought confusion and stained one of the most useful and humane solutions ever discovered [3]–[5]. (The latter three references plus the references listed in them offer a rather good picture of the subject.)

Another regrettable case was the legal action between Nikola Tesla and Guglielmo Marconi regarding wireless communications, which is recognized as an essential component for the advance of civilization. Our daily experience demonstrates its truth. Tesla was mixed up in several problems at the time, but when Marconi won the Nobel Prize in 1911, Tesla was furious. He sued the Marconi Company for infringement in 1915; however, he could not afford to litigate a case against a major corporation. A few months after Tesla's death, in 1943, the United States Supreme Court upheld Tesla's radio patent number 645,576 and restored the priority of his patent over Marconi's [6]. The matter does not seem to be fully settled yet, for there are those who still question the issue [7].

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The conclusion—or, perhaps more accurately, the moral—of this story comes down to acknowledging, with pity and sorrow, that no one won anything in these cases, and, assuredly, everybody turned out to be a loser, merely due to lack of generosity combined with overreaching ambition. Examples of the kind abound—too many, in fact—and they may give material for a full paper.

A Patent Today

The U.S. Patent Office's website (<http://patft.uspto.gov/metahtml/PTO/searchbool.html>) provides a source for more data and information. Other possibilities include the U.S. Patent and Trademark Resource Center and the European Patent Office. The Russian Federation has an established patent system, too, while China maintains the China Trademark Office (<http://www.chinatradooffice.com/>). Unfortunately, information for other Eastern countries is more difficult to access, if, indeed, it is available at all. It is illustrative to take a look at a current patent to get an idea of its structure. As an example, Figure 1 shows an abstract of a specific medical device patent dated in 2003.

The history of patents and laws regulating them is long, complex, and often blurred with economic interests. There are websites where details can be found for those interested in the subject [8]–[10].

The Lonely Inventor and Inventions Within an Organization

The lonely inventor is that person who, perhaps in a home garage or a small shop, patiently carries out his or her ideas, comes up with a gadget, submits the idea to the patent office, pays the requested fees, claims originality, and, finally, after a long process, is or is not granted legal rights for a given period of time. Typical and famous examples of the lonely inventor include Thomas A. Edison (1847–1931) [11], Guglielmo Marconi (1874–1937) [12], and Nikola Tesla (1856–1943) [13]. These people sweated it out and often fought in court for what they considered to be their intellectual property—sometimes not very gentlemanly or fairly; but that is the story of human beings, always exhibiting

Abstract

An ultraviolet disinfection (UV) system for appliances including at least one UV light-ready appliance having at least one portal in the appliance for receiving UV light input from at least one light source, which is removably connected to the at least one UV light-ready appliance via a connector at the portal, and positioned to provide a focused, controllable UV light output that has at least one UV dose zone for providing effective sterilization of microorganisms and disinfection within an interior of the appliance. Also, an ultraviolet disinfection (UV) system for appliances, the system comprising at least one light source positioned within a housing that is external to at least one appliance and capable of being connected thereto via at least one connector and connected to a power source for producing a UV light output from the housing; this system includes at least one source optical component positioned between the at least one light source and the UV light output from the housing, thereby producing a focused, controllable UV light output that has at least one UV dose zone for providing effective sterilization of microorganisms within the at least one appliance. A method for UV disinfection of the interior of appliances is also included in the present invention.

Inventors: Horton, III; Isaac B. (Raleigh, NC)
Family ID: 24909354
Appl. No.: 09/724,180
Filed: November 28, 2000

FIGURE 1 An example of a patent.

both right and wrong, both weakness and strength of character. The lonely inventor is rarely encountered nowadays, or, at least, that is this author's subjective impression.

Quite different is the situation of well-qualified people working in large companies in different areas (communications, biotechnology, biomedical engineering, the chemical industry, and the like), where, by and large, there are established lines needing permanent improvement—as well as strong competition from other similar companies. Often patent claims turn out to be small changes or additions to a given product. Cell phones, cardiac pacemakers, and computers are excellent examples in this respect. The corporate inventor is quite different from the lonely inventor, as he or she enjoys enormous support in all areas—technical, financial, and legal.

Such companies usually have a team of specialized lawyers who—after receiving the ideas from the technical group, which are carefully kept in daily logbooks—write down the patent according to the format designed by the patent office. The company then pays the filing

fee, and the corporate inventor does not have to worry about either of those steps. In fact, he or she is not chasing really new, wholly different ideas, as only relatively minor improvements are searched for in much-focused technologies. This inventor does not own any rights to his or her inventions, because those belong to the company, and eventually the company rewards the inventor with a special monetary recognition.

This new kind of inventor, who might be called a *shielded inventor*, has virtually nothing in common with the lonely inventor. They are two different species, and the former, when leaving the what might be called “protecting” company (the shield), is not prepared to become a lonely inventor, for he or she lacks the experience required or, even worse, may lack acumen, as when a canary (used to its cage) is left free in the open.

A third type of inventor is the researcher located within a university, where academic freedom is guaranteed. The inventor receives assistance in the filing process, both in its preparation and financially, and the rights and potential profits are shared between the inventor

and the university, usually following the latter's statute or bylaws. Yes, the academic inventor is also shielded, but he or she does not lose rights, although neither does such an inventor collect field experience, as the lonely type does. So far, so much for inventions and inventors.

Scientific Papers

In 1662, the newly formed Royal Society of London was granted permission to publish by King Charles II, and on 6 March 1665, the first issue of *Philosophical*

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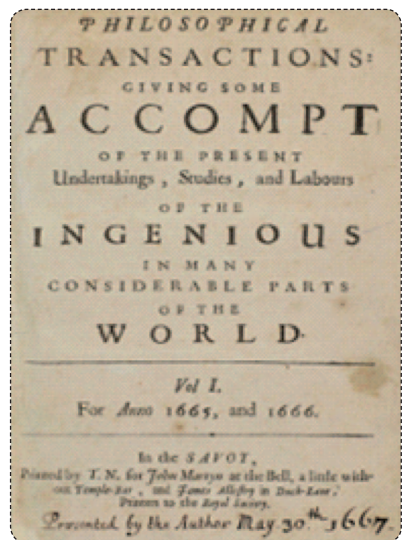


FIGURE 2 The cover of volume I, 1665 and 1666, of the *Philosophical Transactions* [14].

Transactions appeared under the editorship of Henry Oldenburg (1619–1677). It was the first journal setting forth the latest scientific discoveries; it established the important principles of scientific priority and peer review, which have become the central foundations of scientific journals ever since. Not long ago, it celebrated its 350th anniversary, certainly an occasion deserving of great respect (Figure 2).

The first issue of the transactions was a bound collection of articles submitted by members of the Royal Society. The authors were largely physicians or natural philosophers, as they were called in those days. The benefits of publishing a journal article, both for the authors and the reading community, included registration of the date of a scientific finding, certification (peer review), dissemination of the results, and archiving of the published content. These are still considered essential values today. Oldenburg was given a contract by the Royal Society's president to publish and distribute the journal at his expense, along with the incentive that he could keep any profits. He was required to give free copies of the transactions to all members of the society, but he was free to sell subscriptions to non-members. Economically, for a very long time, the journal was not a good business. In fact, the journal didn't start to turn a profit until after 1948, when a significant number of institutional subscribers were attracted from venues beyond the United Kingdom [15].

On 5 January 1665, Denis de Sallo published in Paris the first issue of the *Journal des sçavans*. This was actually the earliest scientific journal published in Europe, predating *Philosophical Transactions* of the Royal Society of London by three months. But the journal ceased publication in 1792 during the French Revolution, and although it very briefly reappeared in 1797 under the updated title *Journal des Savants*, it did not recommence regular publication until 1816. From then on, the *Journal des Savants* became more a literary journal and ceased

to carry scientific material. In February 2014, the *Journal des sçavans* became available online from the Gallica Digital Library of the Bibliothèque Nationale de France [16].

At present, there are thousands of scientific journals, both printed and virtual (this latter format is only about 20 years old), most of them following rigorous rules of scientific writing; however, these rules may vary from journal to journal, especially among journals from different publishers. As of 2006, almost all scientific journals have established electronic versions; a number have moved entirely to electronic publication. All of them, though, show a unique characteristic: the content is freely offered to the scientific community as long as it is properly referred to when publishing another paper or book. This feature underlines a marked philosophical difference with the previously described patent.

Discussion

Based on this review of the patent and the scientific paper, it seems clear that even though both are products of the human mind, the former has mainly as a driving force the hope of monetary reward while the latter is more often made available to any potential user, requesting only proper recognition. One tends to conceal, and the other explains everything clearly. One is greedy, the other is generous. A whole book would not suffice to cover the sad history of patent lawsuits of all kinds claiming infringement of someone against another, be they persons or corporations. Many times, these actions lead to bankruptcy for one party, usually the economically weaker.

However, patenting, as a whole subject, has become much more complex than the relatively simplistic description just previously given. The patenting of life appears as a dramatic example full of implications, consequences, and discussions. In 1980, the U.S. Supreme Court ruled that a living microorganism was patentable matter. The decision derived from a

patent application submitted in 1972 by Ananda Chakrabarty, a microbiologist at the University of Illinois, asserting claims related to a bacterial strain that he had obtained with techniques of genetic engineering [17]. Kass very judiciously underscores that universities—within their fragile frame of virtues and faults and being precious and precarious institutions that stand between the useful and the true—often seem to tip the balance toward the former (the useful), perhaps forgetting that caution must be exerted about further changes that tend to diminish the latter (the true) [17].

The copyright represents a kind of bad boy in the scientific paper arena. Piles of editorials and comments of all sorts have been published about it, and always the question of whom the copyright protects comes up (both directly and indirectly); for, apparently, it should protect the author, but the author of an article is required to transfer the copyright to the journal publisher (which obviously is not the author). This leads to a complex, long saga, still unsettled and unresolvable here—and may never be resolved, with the author inevitably playing the weaker role.

In turn, scientific papers are not devoid of infringements, as plagiarism—or worse, plain forgery—has also been committed, driving people into copyright fights and even lawsuits. However, I dare say that, compared to patent fights, the number of scientific misdemeanors remains negligible; the reason is possibly that the motivations of scientific writers and patent seekers are very different. Without denying the importance of patents in the civilized world, the scientific paper appears to be closer to the human being. And, indeed, being a little more generous and less ambitious—while not ignoring the fact that we all need money to live—would not hurt and might even help in solving this legal (and moral) tangle.

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Philosophical Transactions established the important principles of scientific priority and peer review, which have become the central foundations of scientific journals ever since.

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