An Exploration of Patent Matters Associated With Emerging Technologies—Part 1 But … What Does Flight Have to do With It?

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Emerging technologies will continue to have a significant impact on all markets, but in particular on metal finishing markets. This has been recognized and addressed by the AESF with the formation of an "Emerging Technologies" Committee co-chaired by Dr. Eric Brooman, AESF Fellow, and Phillip Miller. The purpose of this committee is to identify potential emerging technologies that will impact AESF members. Under the leadership of Eric and Phillip, the focus encompasses technology push and market pull. To date, the Emerging Technologies committee has spun-off two subcommittees—Nanotechnology and Metal Removal Processes. A third committee is in the works dealing with micro-electro-mechanical systems (MEMS). These efforts regarding emerging technologies are aligned with Research Board grant selection and funding activities.

An important component of emerging technologies is the intellectual property associated with them—in particular patents. While the U.S. patent system was mandated in the Constitution of the United States, there is considerable confusion regarding the overall purpose and operation of the same. This column will introduce ideas associated with the U.S. patent system to provide a perspective for emerging technologies.

During this centennial anniversary of the invention of flight, it is interesting to consider emerging technology patent matters from the perspective of the inventions and innovations leading to commercial aviation. This column introduces the issues associated with patents, with a case study of two early aviation patents. Then, various key components of the U.S. patent system are presented. Questions, in particular as related to emerging technologies, are dispersed herein.

Kill Devil Hills, NC

On December 17, 1903, Wilbur and Orville Wright flew a "heavier than air" machine 120 feet and, thereby, demonstrated their "Flying Machine." A patent application for their flying machine had been filed March 23, 1903, approximately nine months prior to its "actual reduction to practice." Their patent application did not include a motor, as the Wright Brothers were afraid that they'd have to demonstrate flight with a motor![1] The Wright Brothers patent, No. 821,393 issued May 22, 1906. The main invention covered in the '393 patent was "wing warping" moving in concert with the rudder to provide "lateral balance"(Fig. 1).

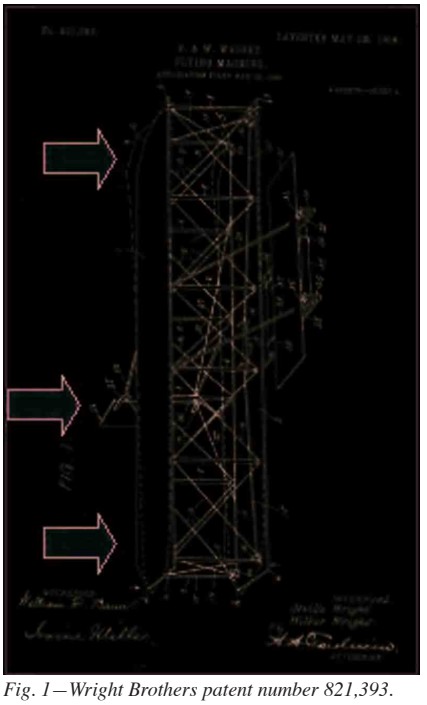
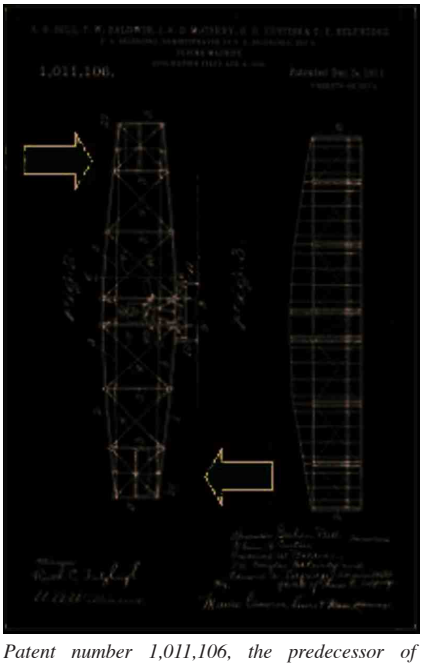


Fig. 1—Wright Brothers patent number 821,393.

On December 5, 1911, patent No. 1,011,106 for a "Flying Machine" was issued to Glenn Curtiss and a group of inventors including Alexander Graham Bell. The '106 patent achieved "lateral balance or equilibrium" or restored the same using "rigid non-flexible wings" with "little wings" (Fig. 2), the predecessor of modern day ailerons.

Curtiss announced he was going to make an airplane as described in his patent. The Wright Brothers filed suit and received a preliminary injunction against Curtiss. A patent infringement suit ensued ruling in favor of the Wright Brothers and infringement was affirmed on appeal. Henry Ford entered the picture and provided legal counsel and public relations assistance to Curtiss. In the press it was claimed that the Wright Brothers wanted such broad coverage for their invention that, to paraphrase: "…if I went on the street corner and flapped my arms they would claim infringement of their '393 patent!"



Patent number 1,011,106, the predecessor of modern day ailerons.

The hostile activities of the inventors were halted by the U.S. government because of World War I. Specifically, the British needed the improved flying machine described in the '106 patent. After the war, the "hostile" activities regarding the '393 and '106 patents were not resumed. The use of little wings in the form of ailerons continue today (Fig. 3).

A similar scene has been played out numerous times before and since the early days of aviation and will undoubtedly be at issue in the future, in particular as related to emerging technologies. Simply stated, initial inventors seek the broadest interpretation possible of their patent while subsequent improvers look to gain recognition and reward for their enabling inventions.

While there are some recent publications dealing specifically with intellectual

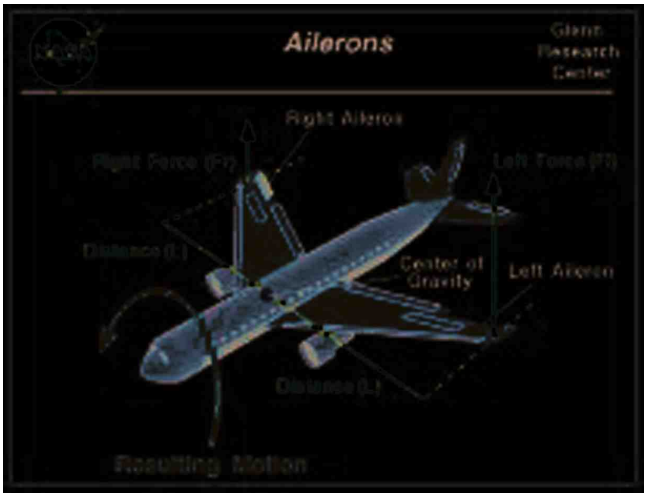


Fig. 3—The use of little wings in the form of ailerons are still used in modern aviation.

property rights and technology, generally the focus is on introducing the patent system to allow inventors to protect their rights.[2,3] Furthermore, the legal issues have been addressed predominantly from a regulatory perspective as related to medical applications of technology.[4]

However, recently studies have clearly indicated an explosion of technology related patents.[5,6] In addition to the volume of patents and patent applications, recent indications of the growing complexity of patents issued today versus those of 20 years ago have been noted.[7] This column focuses on potential patent issues associated with nanotechnology. Below are some preliminary questions.

Questions

- What breadth should be allowed for the first patent in a field?
- Should more breadth be allowed for so-called pioneer patents?
- How should the property rights associated with patents be partitioned between first patents and improvement patents?
- Are these issues best addressed by congressionally generated statute or common law judicial precedent?
- Is the current patent system ready for the challenges associated with emerging technologies?

The remainder of this column is presented to provide a basis for further focusing these questions and developing additional questions.

Purpose of the U.S. Patent System

Constitutional Basis

The basis of the U.S. patent system is derived from the founding fathers: "The Congress shall have the power … 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."[8]

There is no record of debate on this matter and presumably this provision was not contested by the founding fathers.[9] James Madison had previously written that this provision will "scarcely be questioned."[10] This clause of the constitution provided the basis for both our patent and copyright systems. This paper focuses on the patent system.

A Natural Right?

Because the word "right" is only used once in the Constitution, one may be inclined to think of an invention as a natural right. However, because statutory law generally limits the term of a patent to 20 years from filing,[11] it is difficult to rationalize the patent right as a natural right. In contrast, for example, the copyright statute provides protection for the life of the author plus 75 years. Consequently, although derived from the same clause of the Constitution, patent and copyright statutes are implemented quite differently.[12] Even so, the natural issue related to patents continue to be debated.[13]

To Promote Technological Innovation

While the U.S. patent laws were unique to our country, it was based on previous attempts by countries to control craft knowledge and the associated economic benefits.[14,15,16,17] The only U.S. President to receive a patent, Abraham Lincoln, said that the patent clause in the Constitution "…added the fuel of interest to the fire of genius, in the discovery and production of new and useful things."[18]

Regarding the U.S. patent system, Thomas Jefferson said that the patent statute "…has given a spring to invention beyond my conception."

Jefferson further noted the success of the U.S. patent system as "…encouragement to men to pursue ideas which may produce utility."

In today's parlance, "to promote the useful arts" may be thought of as "to promote economic development and well-being through technological innovation." Consequently, the U.S. patent system is, in effect, a policy tool. More recently, the patent system has been described as the "[my emphasis] *primary* policy tool to encourage the development of new technologies."

The explicit "contract" of the patent system is that an inventor is given a "right to exclude others" provided that the inventor fully describes his invention in the patent. The full public disclosure alerts subsequent inventors, *i.e*. improvers, to the original inventor's ideas, which in turn lead to improvements on the original invention. As a result, technological progress proceeds in the form of both disruptive and incremental innovations.[19]

The U.S. patent system consists of three components, statutory law based on congressional legislation, examination procedures and rules for the U.S. Patent & Trademark Office (USPTO), and common law based on judicial precedent. These are introduced below.

Other Questions

- Has the patent system effectively encouraged technological innovation?
- What modifications, if any, are required for the patent system to effectively promote technological innovation related to emerging technologies?

In the March issue of P&SF, Part 2 will continue discussion of the legal issues associated with the U.S. patent system as related to invention and innovation regarding emerging technologies. P&SF

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