WHY IP MATTERS MORE THAN YOU THINK

Engineers working in high-tech solve complex technical problems every day. New algorithms, control strategies, hardware architectures, production methods and software tools are constantly being developed inside engineering teams. Yet many engineers rarely think about intellectual property (IP) during their daily work. This is a missed opportunity. IP is not only a legal topic. It is closely tied to innovation, technology development and competitive strategy. Understanding IP basics can help engineers recognise valuable inventions, avoid losing patent rights and contribute more effectively to their company's innovation strategy. This article explains why IP matters for engineers, how patents work, and how engineers can integrate IP thinking into their normal development work.

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The idea behind the patent system

Although patents grant exclusive rights, the patent system is designed to stimulate innovation. The idea is simple. Inventors are encouraged to disclose their inventions to the public in exchange for temporary exclusivity. In return for the right to exclude others for a limited period, the inventor must publish a detailed description of the invention.

This publication requirement has an important purpose. By studying patent documents, the general public can learn from existing solutions, avoid reinventing the wheel and build upon previous technologies once the patent expires. Today, patent databases contain tens of millions of technical disclosures. For engineers, patents are therefore not only legal documents but also valuable technical information sources.

Why patent inventions?

For engineering companies, patents can serve several important goals. A well-known goal of patents is to protect technological innovations. A patent gives its owner the right to prevent others from commercially using the patented invention for a limited period, usually twenty years. This exclusivity can protect investments in research and development.

From a business perspective, patents strengthen a company's competitive position. In technology-driven industries, competitors often develop similar solutions. A strong patent portfolio can prevent competitors from copying key technological advances or entering certain markets. Patents can also create business opportunities. Patents can be licensed to third parties, generating revenue through royalties. In some industries, companies actively exchange licenses in cross-licensing agreements, allowing each party to use the other's technologies.

Furthermore, patents can increase company value. For high-tech start-ups and scale-ups, IP is often one of the most valuable assets. Investors frequently view a solid patent portfolio as proof that the company possesses defensible technology. For engineers, patents also provide recognition. Inventors are typically named on patent applications and granted patents. In many companies, patents are an important indicator of technical contribution and innovation.

Patent wars: competition through technology

The strategic importance of patents becomes clear when companies compete in highly technological markets. One well-known example in the semiconductor industry is the long-running competition between ASML and Nikon. Both companies develop highly advanced lithography systems used in semiconductor manufacturing. Over the years, the companies have filed numerous patents relating to optical systems, wafer positioning, illumination techniques and other critical technologies. Patent disputes between such companies can determine who is allowed to market certain technologies.

Nikon and ASML have engaged in patent disputes across multiple jurisdictions, most notably in the Netherlands. The conflict also extended to Germany, where ASML's supplier Zeiss became involved, and to a lesser extent to France. In 2019, the parties reached a comprehensive settlement that included a cross-licensing agreement, allowing both companies to use each other's technologies. The agreement also includes royalty payments linked to the sale of lithography systems by both ASML and Nikon. Ultimately, market performance will determine which company benefits most from this arrangement over time. Following the settlement, all ongoing legal dispute,

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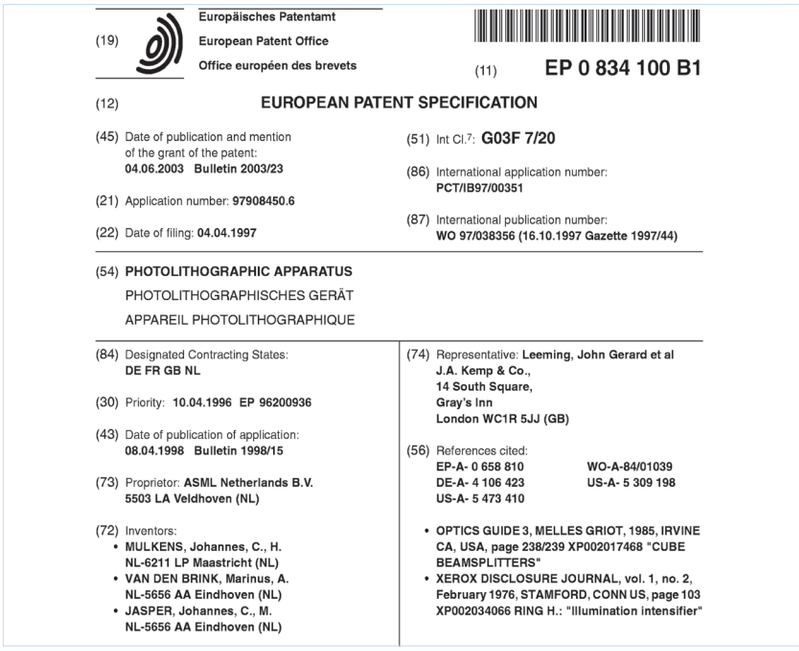

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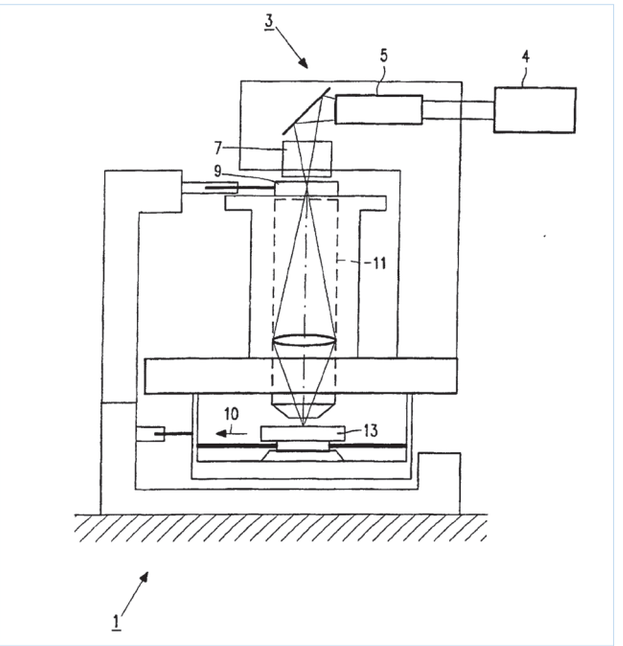

ASML patent (filed 1997), with the recently retired president and CTO Martin van den Brink as one of the inventors, featuring a photolithographic apparatus in which both the stepper and the scanner mode can be selected.

including cases in Japan and the United States, was brought to an end.

Another example is the smartphone industry, where companies such as Apple, Samsung, Google and others have been involved in large-scale patent disputes. These cases often involve hundreds of patents covering hardware features, communication technologies, software functions and user interfaces.

However, such 'patent wars' are extremely rare. In practice, less than 1% of patents is the subject of a dispute, and companies tend to look for ways to resolve such IP disputes by mutual agreement or by designing technical work-arounds, to avoid costly legal procedures.

Standard-essential patents and FRAND licensing

In some technology sectors, patents are closely linked to industry standards. Many modern technologies rely on technical standards to ensure interoperability between products from different manufacturers. Examples include communication standards such as 4G, 5G, Wi-Fi and Bluetooth. Another example is the Qi standard for wireless charging developed by, inter alia, Samsung, LG, Sony, Philips and Nokia.

During the development of these standards, companies often contribute patented technologies. If implementing the standard necessarily requires the use of a patented invention, that patent is called a 'standard-essential patent' (SEP). Because standards must remain accessible to all market participants, companies that own SEPs typically commit to licensing them under FRAND terms: Fair, Reasonable and Non-Discriminatory conditions. This means that licenses must be offered on commercially reasonable terms and made available to all companies implementing the standard.

FRAND licensing seeks to balance two interests. Innovators should be rewarded for developing technologies that become part of widely used standards, while the standards themselves must remain accessible to ensure a functioning technology ecosystem. SEP disputes are common in industries such as telecommunications and consumer electronics. As a result, many companies negotiate large cross-licensing agreements covering entire SEP portfolios. For engineers working in these fields, understanding the link between patents and standards is therefore increasingly important.

When is an invention patentable?

Not every idea can be patented. In general, an invention must meet three basic requirements:

- Novelty:
The invention must be new. This means that it cannot have been publicly disclosed anywhere in the world before the patent application is filed. Publications, conference presentations, scientific articles, product launches and even public demonstrations can destroy novelty.
- Inventive step:
The invention must not be obvious to a skilled person in the relevant technical field. This requirement is often called 'inventive step' or 'non-obviousness'. Importantly,

an invention does not need to be a revolutionary breakthrough. Many patents relate to improvements of existing technologies. The key question is whether the solution would have been obvious to a skilled engineer at the time of the invention. In practice, many valuable patents protect relatively small but clever improvements.
- Industrial applicability:
  The invention must be capable of being used in industry. In engineering contexts, this requirement is usually easy to satisfy.

Although patent laws differ between countries, these three fundamental criteria for patentability are largely the same worldwide. However, the way these criteria are interpreted and applied can vary between jurisdictions and depending on the type of invention. Patent offices and courts in different regions may apply different tests or thresholds when assessing whether an invention is truly new or sufficiently inventive.

For example, the European Patent Office (EPO) and the United States Patent and Trademark Office (USPTO) both apply the same basic requirements, but they sometimes assess them differently in practice. This is particularly noticeable for inventions involving software, artificial intelligence (AI) or business-related methods, where the concept of what constitutes a 'technical' contribution may be interpreted more strictly in Europe than in the US.

Furthermore, the evaluation of inventive step can depend on the technological field and the available prior art. What may be considered an obvious improvement in one context might be viewed as a non-obvious technical contribution in another.

AI and software inventions

Many modern innovations involve software, AI or machine learning. However, patenting these types of inventions can be more complex. In Europe, computer programs and mathematical methods are not patentable 'as such'. AI algorithms, machine-learning models and mathematical optimisation techniques are often considered as mere mathematical methods when they are not claimed in combination with hardware that produces a measurable effect.

It is important to note that software and AI can still be patented if they contribute to solving a technical problem using technical means and produce a technical effect. Examples of technical effects include:
- AI optimising energy consumption in an industrial system.
- Control software improving the performance of a robotic system.
- Algorithms enhancing image processing in medical equipment.
- Software improving communication efficiency in a network.

In such cases, the invention is not just an abstract algorithm. It contributes to a technical system, which can make it patentable in Europe. In the US, AI and software inventions are typically analysed under rules relating to 'abstract ideas'. An invention is eligible for a patent if it involves more than an abstract concept. For example, under US patent law, software inventions may be patentable if they provide a practical technological application or improve the functioning of a computer or technical system.

For AI inventions, these differences have very practical consequences. In Europe, the emphasis is strongly on the technical application of AI. An AI model on its own is usually not enough. What matters is what technical problem it solves, and how it improves a technical system. For example, an improved neural-network architecture is often not patentable by itself, but applying that model to reduce noise in medical imaging or to optimise a control loop in a machine may be. In the U.S., there is more room to argue that the AI invention itself is patentable, especially if it improves computer performance, or is framed as a concrete, practical application.

The same AI invention can have very different outcomes depending on how it is described. In Europe, the application should emphasise the technical context (e.g. hardware, sensors, processing steps, how a model is trained) and the measurable technical effect (e.g. reduced latency, improved accuracy in a physical system). In the US, it is often effective to frame the invention as a specific implementation, rather than a general idea, and highlight improvements to conventional computer functionality or system performance.

Thus, although the approaches in Europe and the US share similarities, there are differences in how strictly these requirements are applied. While both the European system and the US system aim to exclude abstract ideas, Europe focuses more strictly on technical character, whereas the US merely requires that the invention is applied in a practical, non-abstract way. For engineers, this means that how an invention is described and claimed can significantly influence patentability, especially when seeking protection in multiple jurisdictions.

Trade secrets: an alternative to patents

Not every invention is patented. Some technologies are protected as trade secrets. A trade secret is confidential information that provides a competitive advantage. Examples include manufacturing processes, algorithms, formulas or design know-how.

To qualify as a trade secret, three conditions generally need to be met:
- The information must be secret.
- It must have commercial value because it is secret.
- Reasonable steps must be taken to keep it confidential.

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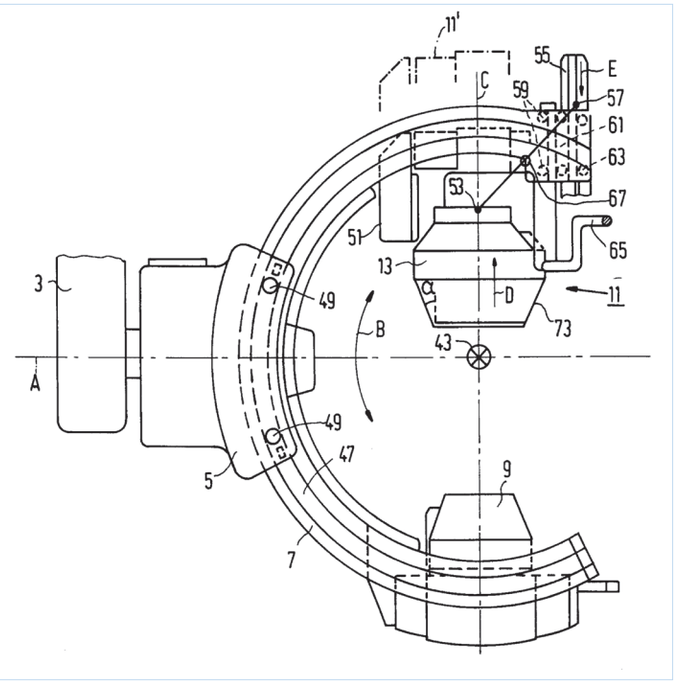
(54) **X-ray examination apparatus comprising a balanced X-ray detector.**



Philips patent (filed 1994), featuring an X-ray examination apparatus comprising a balanced X-ray detector.

Examples of such steps include confidentiality agreements (NDAs), restricted access to technical documentation and internal security procedures. Trade secrets have one major advantage over patents: they can last indefinitely. As long as the information remains secret, protection continues.

However, trade secrets also have limitations. If someone independently develops the same technology or discovers the secret through reverse engineering, protection may be lost. In contrast, patents provide enforceable rights regardless of how the competing technology was developed. Choosing between patents and trade secrets therefore requires strategic consideration.

The risk of publishing too early

Engineers often publish research results in scientific journals or present their work at conferences. While this is valuable for scientific progress, it can have serious consequences for patent protection. As mentioned earlier, patents require novelty. Public disclosure before filing a patent application can destroy novelty and make patent protection impossible in many countries.

Some jurisdictions, such as the US, provide limited grace periods. Europe, on the other hand, generally does not. A single public presentation can therefore permanently eliminate patent rights. For companies active in R&D, it is therefore essential to coordinate publications and patent filings. Ideally, a patent application should be filed before the invention becomes public.

Table
Netherlands Patent Rankings 2024:
Who filed the most? *(Source: insights.greyb.com)*

Company		University/Research institute	
Philips	4,185	TNO	412
Signify Holding	1,549	Delft	266
ASML Holding	1,328	Eindhoven	136
Versuni Holding	586	Twente	124
NXP	540	Groningen	64
Vmi Group	193		
Nutricia	188		
ITREC	182		
DSM	166		
DAF Trucks	158		

Patenting versus open innovation

In recent years, many companies have embraced open-innovation models. These approaches encourage collaboration between companies, universities and research institutes. Open innovation can accelerate technological development and enable access to external expertise. However, it also raises questions about IP ownership.

Patents and open innovation are not mutually exclusive. In fact, many successful collaborations are based on clearly defined IP agreements. Patents can help define ownership boundaries and enable licensing arrangements between partners. At the same time, some organisations intentionally publish certain technologies without seeking patents. By placing knowledge in the public domain, they can prevent competitors from obtaining exclusive rights. Both strategies have advantages and drawbacks. The optimal balance depends on the company's technology, market and long-term goals.

The importance of a good IP strategy

Patents should not be viewed as isolated legal filings. They are most valuable when integrated into a broader IP strategy. A strong IP strategy considers questions such as:

- Which technologies are core to the company's products?
- Which inventions should be patented and which should remain confidential?
- In which countries should protection be obtained?
- How does the patent portfolio support the company's long-term business goals?

For high-tech companies, the patent portfolio often evolves alongside product development. Early patents may cover fundamental concepts, while later patents protect improvements and specific implementations. Engineers play an important role in this process because they are closest to the technology. By recognising potentially patentable ideas early, engineers can help build a strong and strategically valuable IP portfolio.

The role of patent attorneys

Patent attorneys act as intermediaries between technology and law. Their role includes identifying potentially patentable inventions, drafting patent applications, guiding patent prosecution before patent offices, advising on IP strategy, and supporting licensing or legal matters.

For engineers, working with a patent attorney often involves explaining the invention in technical detail. The patent attorney then translates that technical information into legal language that defines the scope of protection. Because patents must describe inventions in sufficient detail for a skilled person to reproduce them, clear communication between engineers and patent attorneys is essential. By law, all patent attorneys must have a master degree in a field of engineering as well as a legal (IP) degree.

Furthermore, patent attorneys are bound by professional secrecy obligations imposed by law. This means that information disclosed to a patent attorney in the context of seeking advice on IP is always kept confidential. In many jurisdictions, this confidentiality is comparable to the professional secrecy that applies to lawyers.

For engineers and companies, this is particularly important in the early stages of an invention. At that stage, technical details may still be highly sensitive and have not yet been protected by a patent application. Discussing the invention with a patent attorney therefore does not jeopardise confidentiality or patentability.

Why engineers should think about IP

Engineers are often the first to recognise innovative solutions during development projects. However, inventions are sometimes dismissed because they appear obvious in hindsight. In reality, many patentable inventions are incremental improvements rather than radical breakthroughs. A clever modification to a mechanical structure, a more efficient control algorithm, or an improved sensor-calibration method can all be patentable if they solve a technical problem in a non-obvious way. By paying attention to such improvements during normal engineering work, engineers can help ensure that valuable innovations are properly protected.

Conclusion

IP is an essential element of modern technology development. For companies operating in high-tech and deep-tech industries, patents and other forms of IP can protect innovations, strengthen competitive positions and create significant economic value.

For engineers, understanding IP basics is increasingly important. Recognising potentially patentable ideas, avoiding premature disclosure and contributing to a thoughtful IP strategy can significantly increase the impact of engineering work.

Ultimately, IP should not be seen as a purely legal matter. It is a powerful tool that supports innovation, rewards creativity and helps ensure that technological advances can be successfully developed and commercialised.

Support

For legal advice or IP support, an independent overview of patent attorney firms in the Netherlands is available.

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