

# ON THE GRAMMAR OF PATENT CLAIMS

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## **Abstract**

*At the heart of the patent system lies something both patent law and international treaties give less attention than it actually might deserve: Patent claims are the very essence of every patent, defining the exact scope of the exclusive rights the patent holder is granted. Generally outlined at best by legislation and often neglected by the courts, patent offices and patent lawyers have developed their own grammar, syntax and logic of how these exclusive rights are to be formulated. This paper suggest that some aspects of the patent system currently perceived as problematic - from patents on software to patents on life, from Amazon's gift-ordering to Monsanto biotec patents - have their root in some peculiar features of the language used in patent claims and its use established by patent offices and patent attorneys.*

## **1. The Patent System in Crisis?**

There are at least two issues on which the patent system has become subject to criticism from experts and also suffered severe backlashes in public opinion: So called biotechnical patents and patents on software. Both have been granted by the European Patent Office (EPO) since the 80ies and early 90ies, both have been heavily criticised on ethical as well as legal grounds, among the main arguments being their violation of Article 52 respectively 53 of the European Patent Convention (EPC). A legislative approach of ex-post justification was perceived to be enough to resolve this dilemma. And so, after being rejected in 1995 by the European Parliament (EP), the directive 98/44/EC on the legal protection of biotechnological inventions was finally adopted in 1998 in its second reading despite continuing concern across Europe. However, the second attempt to legalise a questionable EPO practise, the directive proposal COM (2002) 92 on the patentability of computer-implemented inventions, trying de facto to abolish the provision of Art 52 (2) (c), which excludes programs for computers *as such* from patentability, was finally rejected by the EP in its second reading on 6 July 2005 with a large majority of 648 votes. Efforts of rewriting that decision by various procedural backdoors like the Community Patent or the European Patent Litigation Agreement have been put forward ever since, while, as we will see on the following pages, the EPO simply continues its practise without significant change.

Some might see one issue as being more important than the other, but both are closely related. While one is about patents on life, the other is about patents on mathematical instructions, therefore on human thought processes [14], p 32. Although sometimes a major problem is identified in such patents as generally being too broad, with no clearly defined boundaries [1], p 46 ff, this is not necessarily

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always the case. As we will see, some of the claims in question are quite specific indeed. The problem is rather that these claims contain subject matter excluded from patentability and no novel inventive teaching.

## 2. Some Patent Basics

### 2.1. Description, Claims and Infringement

Before we start our analysis, it is important to recall the basic architecture of a patent once more. Every patent consists of a detailed description, often some drawings and one or more claims. While the technical description and the drawings help to understand the details of an invention, these claims are the really interesting part, since they are exactly defining the monopoly of the patent holder who is entitled to ban (or collect license fees from) everybody else from using anything that is mentioned in the claims.

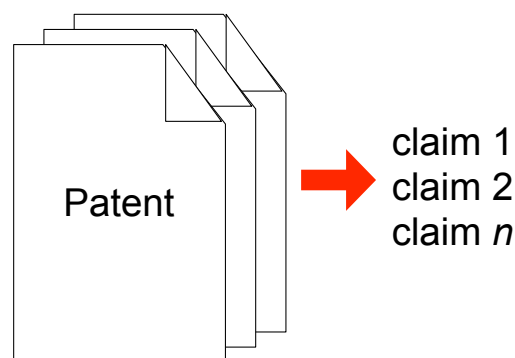


Figure 1. Patent claims

Some national legislations treat patent claims in more or less detail than others (the most detailed perhaps being § 9 of the German Patentverordnung, but cf also Rule 43 of the Implementing Regulations to the Convention on the Grant of European Patents), but a common requirement is that they should be clear and concise as well as supported by the description (cf Art 84 EPC). Usually, they briefly summarise the state of the art regarding a particular invention and then, introduced by "characterised by" or "comprising" contain those elements that the applicant deems his essential invention [10], p 148. A typical patent claim looks like this:

- A process and/or apparatus (of patentable subject matter) consisting of (state of the art), comprising...
- ...an inventive step (that is being disclosed, i.e. a novel teaching) of industrial application.

There are independent and dependent claims, the latter of which refer to other claims. It is important to keep in mind though, that a patent can already be infringed by violating only one single claim. If the defendant does not use the claim features identically or does not use all claim features, infringement might still lie in what is called equivalent use (BGH 28 IIC 795, 1987 - Formstein). Some arguments developed in this context are considered "obscure teachings" by individual scholars [8], [10], p 182

and a more detailed analysis of this discussion would likely exceed the purpose of this article; suffice to say, in a worst case scenario, any single patent claim can have the effect of the whole patent. therefore, every patent with only one claim on a computer program as such is in essence a patent on a computer program as such. In other words, any patent containing even one program claim has to be considered a software patent in violation of Art 52 (2) EPC. Likewise, any patent containing just one claim on natural properties of an organism can be seen as a patent on life.

In the US, patent applications have been filed containing more than 1.000 claims. At the EPO, such applications are usually rejected or split into up to 26 seperated applications [11], p 12.

## **2.2. Patent People: Patent Attorneys and Patent Officials**

A patent attorney in many cases is not, for lack of a better word, a lawyer as such. According e.g. to § 6 of the German Patentanwaltsordnung or the §§ 3 ff of the Austrian Patentanwaltsgesetz, the most important prerequisite is not a degree in law, but in either natural science or engineering.<sup>1</sup> Such a degree qualifies for the patent attorney training, which usually includes an apprenticeship of practical work at a patent attorney firm and/or the patent office, some additional studies of law and a final exam at the patent office. It is not unusual that a patent attorney becomes a patent examiner or vice-versa. The patent community therefore is a highly specialised group of experts and it would hardly be surprising to observe them constructing a language of their own.

## **3. Patent Claim Language**

Although there is a vast literature dealing with the construction and interpretation of patent claims, e.g. [4], [2], [3], [6], [12], [17], [18], little attempts have been made at linguistically analysing the construction of claims, c.f. [20]. What follows is the first attempt to document a grammatical peculiarity common to many patents which are being perceived as problematic by experts, unwanted by the general public and often revoked by the patent office itself in the end, years after they have been granted.

### **3.1. The Monsanto Patent EP301749**

In 1989, an application for an European patent by Monsanto Inc. on particle-mediated transformation of soybean plants and lines was published. This patent, EP301749 was granted in 1994 and opposition was filed immediately. From its frist publication on, the patent had been under heavy criticism because of claims monopolising vast areas of genetic research regarding soy (such as claim 5 on the genes being present in the meristematic tissue of a soy plant). After legal battles which lasted over a decade, the patent was finally revoked in 2007. Since protection is granted from the moment of application, the patent was in force - and enforceable - for a total of 18 years - only two years less than the maximum lifespan of a patent. According to Art 63 EPC, the duration of an European patent is 20 years (which can be extended only under special circumstances). Although Art 68 EPC specifies that a patent after its revocation shall be deemed not to have had its effect, it still endows its holder with a very strong market position as long as it is not revoked, enabling him to bully competitors, achieve out-of court settlements and close valuable cross-licensing deals, all of which hardly provide practicable means of revision after the revocation of the patent they were based on.

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<sup>1</sup>According to a conversation with the president of the German Patent and Trademark Office held on 15. July 2008, a degree in Computer science is not sufficient, although this subject is taught at technical universities.

But monopolisation of such basic research rights was not the only problem with this patent. Some of the procedures of identifying the presence of modified genes in soy plants even have a practical application which one might sarcastically call "Digital Rights Management on living creatures". Claim 24 of EP301749 reads:

A seed produced by a plant as claimed in either claim 22 or claim 23.

The claims 22 and 23 are on marking a modified genome by an enzyme and detecting such a mark by luminescent or colorimetric assay. Together with claim 24 that also means that e.g. a farmer whose crop has been contaminated by genetically modified seeds even without his knowledge, could be considered as infringing EP301749: Not only a seed produced in a laboratory is protected, but any seed by any plant in which that genome can be detected by the described method. This is not a hypothetical issue, as the case of the Canadian farmer Percy Schmeiser demonstrates. Schmeiser was forced by court order in 2001 (2001 FCT 256) to hand over his saved seed from 1997 on to Monsanto, because it had been contaminated by a patented Monsanto seed. The following decision by the Canadian Supreme Court (2004 SCC 34) confirmed the patent infringement, but ruled that Schmeiser was not liable to also pay further damages to Monsanto.[13]

Of course, one could argue that the checks and balances in at the EPO work quite well. After all, a widely criticised patent has been revoked. However one should not forget that this patent has been in force for 18 years. In the meantime, Monsanto has gathered a collection of 152 more patents or published patent applications at the EPO, so the investment in keeping a protected monopoly on basic research techniques looks to have paid of quite well in this case - at least for the patent holder.

But increasingly, patents are not only granted on genetically modified plants, but also on substances derived from plants which have been known and used for a long time (sometimes centuries) only because they are chemically isolated or synthesised. By proper claim construction, a patent can be obtained not only on the process of isolation or synthesising, but on all products containing the substance, no matter if of natural origin, isolated or synthesised. See e.g. [19] and for a vast array of further examples [7].

### **3.2. The Amazon Patent EP0927945**

In 1999, a patent application from Amazon.com Inc. on a method and system for placing a purchase order via a communications network was published by the EPO. Although supporters of the directive proposal COM (2002) 92 claimed that patents like the infamous Amazon one-click patent in the US would be highly unlikely or even impossible under the current EPO doctrine, the patent was granted in 2003. Passages like

An embodiment of the present invention provides a method and system for ordering an item from a client system. The client system is provided with an identifier that identifies a customer. The client system displays information that identifies the item and displays an indication of an action (e.g., a single action such as clicking a mouse button) that a purchaser is to perform to order the identified item.

in the summary reveal this patent as a direct descendant, if not a twin brother to its American relative. The first claim immediately demonstrates what this is all about:

1. A method in a computer system for co-ordinating delivery of a gift from a gift giver to a recipient, the gift and recipient being specified in a gift order, the method comprising: determining whether the gift order includes sufficient information so that the gift can be delivered to the recipient; when sufficient information is not provided in the gift order, obtaining delivery information from one or more information sources; and when sufficient delivery information can be obtained from the additional information sources so that the gift can be delivered to the recipient, directing the gift to be sent to the recipient as indicated by the deliver information.

Ordering a gift for somebody else was hardly anything new in 1999, neither is any of the instructions on handling contact data. The only distinctive thing here might be that these instructions are supposed to be carried out by a computer - also nothing earth-shakingly new in 1999. A set of instructions running on a computer is simply a computer program, nothing more. The linguistic game that is being played here is quite trivial. Instead of claiming a computer program in a completely obvious manner like

1. A computer program, comprising...
2. (whatever the computer program does)

the grammatical logic is modified by explicitly stating the obvious, i.e. mentioning the general purpose computer (on which any program needs to run to have any use at all) as if it was a patentable machine and defining a computer program (as such) as a core invention:

1. A computer system, comprising...
2. a computer program

Every single other claim of the gift ordering patent confirms this: receiving the gift order via email (claim 2), determining if the order contains contact data of the recipient (claim 3), contacting the recipient via email or phone (claims 4 and 5), reading the contact information from various kinds of databases (claim 6) as well as a logistics program containing more of the same (claims 7-11). All claims are on pure instructions for reading, processing and writing data, in other words: on mere software *as such*. The only exception might be seen in claim 5: If you can't find the contact data in any of the databases and if you get no response via email either, pick up the phone and make a call. Not that new either.

Accordingly, that patent was revoked by the EPO board of appeals after an opposition filed by FFII e.V. et al. When Amazon's representative stated during the oral proceedings that the method to be patented comprised a computer, and therefore represented patentable new technology, one of the patent examiners responded: "The machine was always able to do that. You just programmed it to do it!" Although this is the case for all patents on software as such, the EPO could not yet bring itself to a rejection based on unpatentable subject matter based upon Art 52 EPC. This led to a mental balancing act, of having to re-examine the whole patent in detail and rejecting the claims due to the lack of an inventive step, which entitled Amazon to immediately formulate new patent claims. Since all of the newly filed claims were found to be in violation of the (rather formal) prescriptions of Art

123 EPC, the patent was then revoked in its entirety. Nevertheless, that patent enjoyed theoretical enforceability for a total of 8 years before its revocation. If you look at the progress computers and computer programs made since 1999, this looks like an eternity.

### 3.3. Further Examples

So far we have analysed patents which have been revoked. Despite these decisions as well as the rejection of the directive proposal COM (2002) 92 in 2005, many such patents are still in force or even newly granted. One example is EP0287578, one in a series of patents on the famous MP3 music compression format by the Fraunhofer Institute, which by some is even considered to be a digital example of the famous German art of engineering as well as a justified protection of years of investment in research. Although there really has been conducted some valuable research on the human perception of music during the development of the file format, the only claim actually referring to the results of such research is claim 11. The main claim is quite different, though:

Digital coding process for transmitting and/or storing acoustic signals, specifically music signals, comprising the following steps: N samples of the acoustic signal are converted into M spectral coefficients; said M spectral coefficients are subjected to quantization at a first level; after coding by means of an entropic encoder the number of bits required to represent all the quantized spectral coefficients is checked; when the required number of bits does not correspond to a specified number of bits quantization and coding are repeated in subsequent steps, each at a modified quantization level, until the number of bits required for representation reaches the specified number of bits, and additionally to the data bits the required quantization level is transmitted and/or stored.

This sounds rather complicated, but is actually a quite simple procedure:[9]

- First, it is decided how much disk space shall be assigned to a file yet to be created.
- The music is then compressed by already known methods (spectral coefficients, entropic encoding) with a certain trade-off in quality, since parts of the information are simply left out.
- The resulting file is checked if it uses the desired disk space. If it does not, the process is repeated until it does.

It is somewhat misleading to refer to something like this as a "broad claim". Rather, it is a quite specific monopoly on methods that are already known in an application (music) and which are not that difficult to come up with. The MP3-patent has been applied for in 1987, therefore the European patent has expired in 2007, because the maximum patent lifetime was reached. Although most of its claims are similar in nature to those of the Amazon patent, none of them have been revoked or at least limited by the EPO. And that patent is only one of a series of at least 18 other international patents covering the MP3 format, some of which will be in force up until 2017. After holding still until MP3 had become a widely accepted format on the market towards the end of 1998, the patent holders are enforcing their patents ever since against and collecting license fees from most known developers of audio encoding software.[21]

This is neither a singular lapse of judgement, nor a past practice of the EPO. In fact such patents are still being granted. FFII research has shown that many of the most basic elements of a simple on-line webshop continue to be protected by patents. The examples<sup>2</sup> in Figure 2 contain such claims as

- A network-based sales system, comprising: a merchant database comprising a plurality of digital advertisements and a plurality of respective product fulfillment items [...] (EP0803105, claim 1)
- A method according to claim 1 or 2, characterized in that the specification of the service request in step b) takes place in a dialogue with the central data base device, the service request being specified, amongst other things, on the basis of one or more parameters for time, place, price and quality respectively. (EP0738446, claim 3)
- An apparatus according to any one of the preceding claims, wherein said central server further comprises third storage means for storing an array of data representing the current exchange rate between each resource and at least one other resource, and wherein said processing means is further for retrieving exchange rate data from said third storage means. (EP1016014, claim 6)
- The method of claim 1 wherein the established area is movable to various desirable locations around the screen (EP0689133, claim 2)
- The method as claimed in claim 1, including the step of: closing said preview window whenever said button is released. (EP0537100, claim 2)

These examples are quite random and the list could be continued at will based on any of the patents shown in Figure 2.

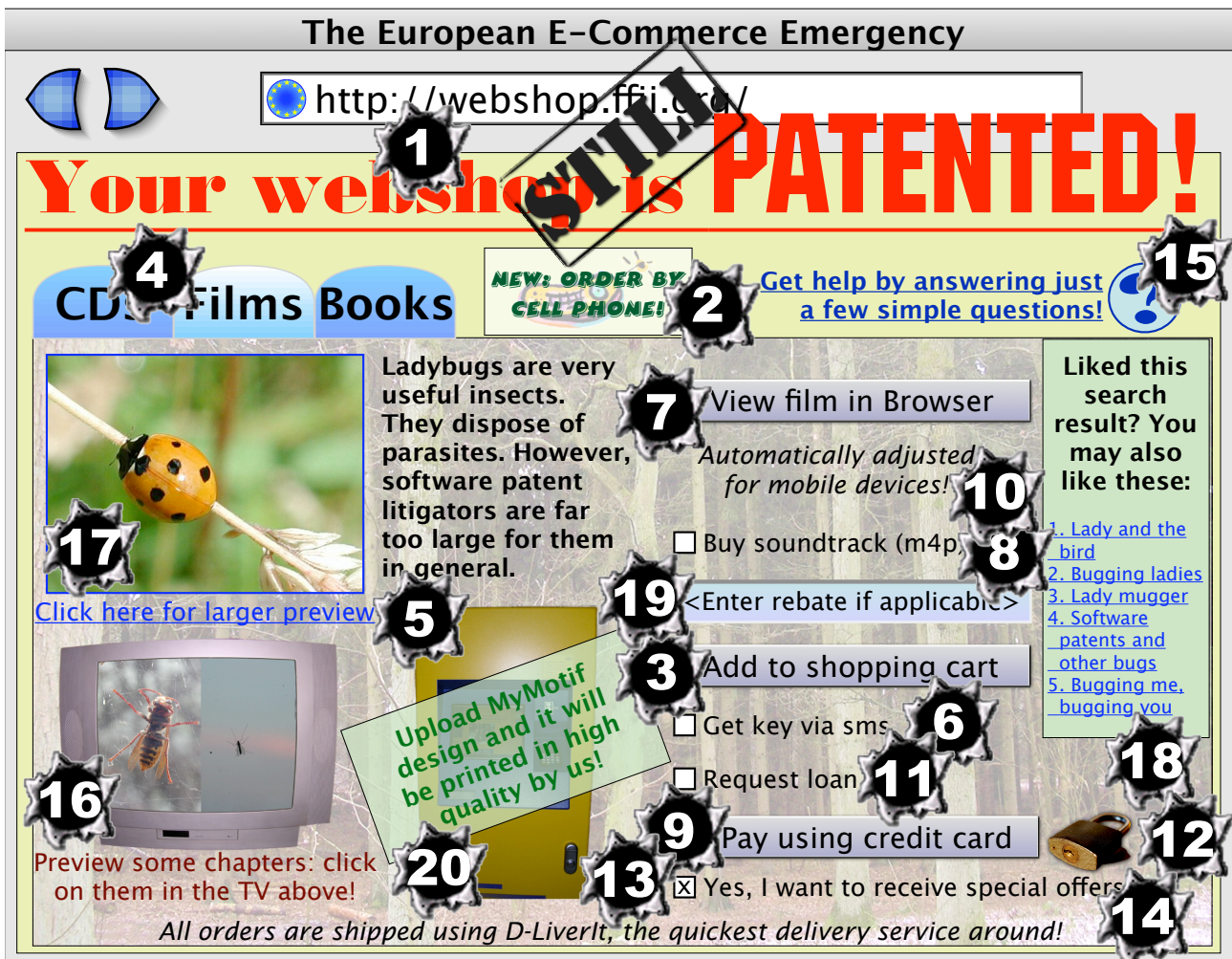
#### **4. Conclusion: Towards a more consistent Grammar of Claims**

Apart from the two topics mentioned in the introduction and analysed in this paper so far, there is one more reason why the patent system is under fire - this time from within: Patent offices suffer from an overload of applications they have to deal with. Among the main reasons why EPO employees went on strike in 2006 was that they were "having to assess an increasing number of patent applications, with the backlog of applications piling up".[16]

Understanding the true effect of patent claims and the language used in them might also help in developing a deeper understanding of the correct interpretation of the exclusion of *programs for computers as such* in Art 52 EPC which in turn could provide effective means to significantly reduce that overload by avoiding the granting of most of the above mentioned patent claims in the first place in a simple, transparent and reliable way. Before entering a thorough examination of the patent and its technical description, an examiner should ask himself if a program for computers as such can be found in any of the claims. Any such claim could then be rejected without further examination by applying two rather simple rules which were (re-)proposed by the FFII in 2005[5]:

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<sup>2</sup>According to the EPO database, only two patents mentioned there have lapsed in the meantime due to non-payment of fees by the patent holder (EP0807891 lapsed 9 years after publication, EP1072143 after 5 years). All others still remain enforceable, some of them for up to 15 years more.



- 1** **Webshop**: Selling things over a network using a server, client and payment processor, or using a client and a server – [EP803105](#), [EP738446](#) and [EP1016014](#)
- 2** **Order by cell phone**: Selling over a mobile phone network – [EP1090494](#)
- 3** **Shopping cart**: Electronic shopping cart – [EP807891](#)
- 4** **[CDs] [Films] [Books]**: Tabbed palettes and restrict search – [EP689133](#) and [EP1131752](#)
- 5** **Picture link**: Preview window – [EP537100](#)
- 6** **Get key via sms**: Sending key to decrypt bought data via mobile phone network – [EP1374189](#)
- 7** **View film**: Video streaming ("segmented video on-demand") – [EP633694](#)
- 8** **Copy protection**: Encrypt file so it can only be played on authorised devices – [EP1072143](#)
- 9** **Credit card**: Pay with credit card on the Internet – [EP779587](#)
- 10** **Adapt pages**: Generate different web page depending on detected device – [EP1320972](#)
- 11** **Request loan**: Automated loan application – [EP715740](#)
- 12** **Secure card payment**: Secure online credit/debit card payment with PIN code – [EP1218865](#)
- 13** **Send offers**: Send offers in response to request – [EP986016](#)
- 14** **Delivery**: Ship items to the correct pick-up point of the used delivery service – [EP1181655](#)
- 15** **Support system**: Support system based on answers to questions – [EP915422](#)
- 16** **Preview chapters**: Use of TV as metaphor for selecting different video fragments – [EP670652](#)
- 17** **Image**: Reduce page loading time by automatically reducing image quality – [EP992922](#)
- 18** **Related results**: Show related results if customer likes the current ones – [EP628919](#)
- 19** **Rebate code**: Allow rebate codes to be entered by customers – [EP929874](#)
- 20** **Web-to-Print**: Generation of prepress formats or printouts from low resolution templates via the Internet – [EP852359](#) and [EP1169848](#)

Figure 2. The patented webshop



1. A claimed object that consists only of instructions for use of generic data processing hardware (universal computer), also called "program for computers" or "computer-implemented solution", is not an invention in the sense of patent law, regardless of the form in which it is claimed.
2. A claimed object can be an invention in the sense of patent law only if it contributes knowledge to the state of the art in a field of applied natural science.

The first of these two rules is not only contained in Article 52 of the European Patent Convention, but also explained in the European Patent Office's Examination Guidelines of 1978. It is one of the simplest rules that patent courts have ever applied and theoretically would allow even a robot to sort out the most common software patent claims. The second is a simplification of more elaborate versions that were developed by German courts (see e.g. BGH 28 X ZB 23/74, 1976 - Dispositionsprogramm; for details and an earlier version of the two rules [15]). It is an auxiliary rule, needed for cases that do not fit clearly into the list of unpatentable items of Art 52 (2) EPC. According to its strictest interpretation, an invention must impart knowledge about effects of the use of forces of nature, i.e. knowledge that was gained by experimentation rather than by deduction. The EPO has never sought to formulate this rule as clearly as the German courts, and yet they have, in a series of decisions starting with *Vicom* in 1986, heavily relied on it and stretched it beyond bearing, so that it became increasingly difficult for them to argue that their practise was still in line with rule 1, respectively Art 52 EPC.

The first rule could also easily be adapted to avoid those cases that might be considered "patents on life" by a simple reformulation like "consist only of properties found in non-genetically-modified (naturally bred) life-forms" instead of "consists only of instructions for use of generic data processing hardware (universal computer), also called[...]" Such a rule would have helped to reject at least some of the claims in EP0927945 already upon application and would exclude many of the examples in [7] as well.

These proposed rules need not lead to the complete rejection of the complete patent application in each and every case. Quite to the contrary, they would only serve to cut out those claims that are not compliant. But instead of further burdening the patent offices by forcing them to thoroughly examine lengthy rhetoric explaining why a certain software (or organism) should be, according to the applicant, considered an invention despite of Art 52 EPC (or Art 53 EPC), and then re-examining it all over again during an opposition procedure, it would encourage the applicant to formulate his claims in a proper - and more understandable - manner in the first place.

## References

- [1] BESSEN, JAMES and MICHAEL J. MEURER: *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk*. Princeton, 2008.
- [2] BEURSKENS, MICHAEL: *Restricting Broad Claims in Germany: The Federal Supreme Court's Perspective (Blasenfreie Gummibahn - Weite Patentansprüche und Auswählerfindung)*. <http://ssrn.com/abstract=646703>, 2004.
- [3] COTROPIA, CHRISTOPHER A.: *Patent Claim Interpretation Methodologies and Their Claim Scope Paradigms*. Public Law and Legal Theory Research Paper Series, Research Paper No. 05-05, March 2005.

- [4] DUFFY, JOHN F.: *On Improving the Legal Process of Claim Interpretation: Administrative Alternatives*. Washington University Journal of Law and Policy, Vol. 2:109–166, 2000.
- [5] FFII: *Stop Software Patents Now!* <http://eupat.ffii.org/07/p2parl/epo/>, 2005.
- [6] FRANZOSI, MARIO FRANZOSI: *Claim Interpretation*. In KRASSER, RUDOLF (editor): "*...und sie bewegt sich doch!*" *Patent Law on the Move, Festschrift für Gert Kolle und Dieter Stauder*, pages 123–134. Köln, 2005.
- [7] FREIN, MICHAEL and HARTMUT MEYER: *Die Biopiraten*. Berlin, 2008.
- [8] GELLER, PAUL EDWARD: *Die Auflösung des Geistigen Eigentums*. GRUR International, pages 273–277, 2006.
- [9] GERWINSKI, PETER: *Die MP3-Patente*. <http://patinfo.ffii.org/mp3.de.html>, 2003.
- [10] GÖTTING, HORST PETER: *Gewerblicher Rechtsschutz*. München, 8. Auflage edition, 2007.
- [11] HARTHOFF, DIETMAR, CHRISTOF ENGEL and WERNHARD MÖSCHEL (editors): *Patentschutz und Innovation*. Wissenschaftlicher Beirat beim Bundesministerium für Wirtschaft und Technologie, März 2007.
- [12] HOLBROOK, TIMOTHY R.: *Substantive versus process-based Formalism in Claim Construction*. Lewis & Clark Law Review, Vol. 9:123–152, 2005.
- [13] JAKOB, GEORG: *Der Geist - ein handelbares Gut?* In JAKOB, RAIMUND, MARTIN USTERI and ROBERT WEIMAR (editors): *Festschrift für Manfred Rehbinder: Gelebtes Recht als Objekt qualitativer und quantitativer Betrachtung*, pages 99–114. Bern, 2006.
- [14] KLEMENS, BEN: *Math you can't use*. Washington DC, 2006.
- [15] KOLLE, GERT: *Technik, Datenverarbeitung und Patentrecht – Bemerkungen zur Dispositionsprogramm - Entscheidung des Bundesgerichtshofs*. GRUR, 02:58–74, 1977.
- [16] KREMPL, STEFAN and CRAIG MORRIS: *Strike continues at European Patent Office*. <http://www.heise.de/english/newsticker/news/73165>, May 2006.
- [17] MEURER, MICHAEL J. and CRAIG ALLEN NARD: *Invention, Refinement and Patent Claim Scope: A New Perspective on the Doctrine of Equivalents*. Boston Univ. School of Law Working Paper No. 04-03, pages 1947–2012, 2005.
- [18] MILLER, JOSEPH SCOTT: *Enhancing Patent Disclosure for Faithful Claim Construction*. Lewis & Clark Law Review, Vol. 9:177–207, 2005.
- [19] MOYER-HENRY, KARI: *Patenting Neem and Hoodia: Conflicting Decisions Issued by the Opposition Board of the European Patent Office*. Biotechnology Law Report, Volume 27(Number 1), February 2008.
- [20] OSENGA, KRISTEN JAKOBSEN: *Linguistics and Claim Construction*. <http://ssrn.com/abstract=882431>, Februar 2006.
- [21] PILCH, HARTMUT: *MPEG-related patents on compression of acoustic data*. <http://eupat.ffii.org/patente/wirkungen/mpeg/index.en.html>, 2004.