HOFFMANN EITLE

HOFFMANN EITLE June 2023 QUARTERLY

Patenting Computer-Implemented Inventions in the Mechanical Field is (Almost) Easy

In this article, we look at how computer-implemented inventions (CII) in the field of mechanical engineering and applied physics can be patented. We provide case studies and give examples of how computer-related aspects can be key features to support the existence of an inventive step, although these features may by themselves be considered non-technical. The take-home message is not to shy away from filing patent applications that combine basic mechanical or physical concepts with computer- and software-related aspects.

1. Patenting computer-implemented inventions

It is hard to imagine a field of technology that does not, at least to some extent, involve software and computers. Whilst, of course, some finished products do not include these elements, computers and software were almost certainly used during their production. Considerable time and effort are often invested in optimising the software used for these purposes and this can be a valuable asset worth protecting.

An obstacle to obtaining patent protection for such inventions in Europe is often seen in Art. 52(2) EPC, which requires, *inter alia*, that programs for computers "*shall not be regarded as inventions within the meaning of*" Art. 52(1) EPC. Further exclusions in Art. 52(2) EPC include discoveries, scientific theories, mathematical methods, schemes, rules and methods of doing business, and presentations of information. However, Art. 52(3) EPC specifies that this exclusion only applies to the subject-matter excluded from patentability as defined in Art. 52(2) EPC as such. From this, the EPO case law has derived that the subject-matter referred to in Art. 52(2) EPC as being excluded from patentability is to be disregarded when assessing inventive step if, and only if, it does not contribute to the technical character of an invention. How this is examined according to the so-called "COMVIK approach" is described for example in the June 2022 issue of the *HOFFMANN EITLE Quarterly*.[1]

In summary, a feature that, taken by itself, would fall under one of the exclusions of Art. 52(2) EPC (for example because it relates to software or a mathematical method) can still contribute to the technical character of an invention if it produces a technical effect serving a technical purpose. In that case, an invention relating to the feature can be patented at the EPO.

2. Case studies

It is instructive to study how these rather abstract principles apply to all kinds of inventions, in particular inventions in fields such as mechanical engineering or applied physics where computers are used. While the COMVIK approach is most widely known when it is applied to inventions in the fields of computer science or communication technology, its scope is not limited to those fields.

[1] Michele Baccelli, "Driven by Technology: Patenting AI Before the European Patent Office (Part I)", *HOFFMANN EITLE Quarterly*, June 2022, pp. 2-5.

2.1 Using software models in copper moulding

The first case is closely modelled on a case prosecuted by HOFFMANN EITLE for which the EPO recently issued its intention to grant.

The invention related to a method of moulding a copper sheet. During the moulding process, the mould was pressed into the sheet. However, due to the inherent elasticity of the sheets, they did not stay in the as-moulded shape after the moulding process. Rather, they displayed a tendency to partially revert back to their earlier "flat" shape. The invention related to software that identified those portions of the sheets that significantly contributed to the elasticity.

The claims as originally filed related to a method of determining the portions that contribute strongly to elasticity. The claims did not define that the method was computer-implemented, nor did they make clear that an actual, physical change was being made to a copper sheet. During examination, the claims were amended to define that, in addition to the determination steps, a copper sheet was modified in those parts that strongly contribute to elasticity. As a result, the intention to grant was issued.

This shows that the EPO considered that the determination steps contributed to the technical character of the invention in that they allowed the identification of the parts of the copper sheet that significantly contributed to the elasticity. This is despite the fact that the determination steps by themselves were regarded as falling under the exclusion of Art. 52(2) EPC as relating to programs for computers. Furthermore, a technical contribution was seen in the fact that the method allowed targeted strengthening of the critical parts of the copper sheet, rather than strengthening parts that made only a minimal contribution to the tendency to revert back to the original shape. Accordingly, the method was much more efficient, which was then seen as leading to an inventive step.

2.2 Optimizing related to a refinery process

This real-life case[2] related to a blending control system in a refinery. In a method claim, a mathematical model was used, which simulated an ongoing refinery process taking initial values and cost parameters into account.

A question in this case was whether the claimed invention was technical as a whole. This was confirmed for the claimed control method as the simulation results obtained were converted into control signals. These in turn could eventually be used to control a splitter in the blending control system, i.e., an actual, physical entity, which provided the required link to physical reality. This was additionally seen to be a "further technical effect" going beyond the mere technical implementation of an algorithm in a computer. The technical character was thus confirmed also for the computer-based method claims.

2.3 Planning surgery

In this third case,[3] the invention related to a computer-implemented method of planning at least a part of a surgical procedure to be carried out on a body part of a patient. The method used a statistical shape model of the body part, and, ultimately, the surgeon was provided with information which could be used, for example, to determine the best type and/or size of the implant(s) to be used.

In this case, the question was whether the inclusion of the planning data in the statistical shape model resulted in an improvement and thus a technical effect that could be used as a basis for inventive step. The Board found that using a statistical shape model of the body part and incorporating planning data of the surgery provided the technical effect of allowing anatomical variations in both shape and surgical planning to be considered. Thus, on the basis of data features, an inventive step could be acknowledged.

[2] Cf. T 1618/19.
[3] Cf. T 0803/17.

2.4 Operation of a nuclear reactor

This simulation-related case,[4] which was discussed in the Enlarged Board of Appeal decision G 1/19, concerns the simulation of the operation of a nuclear reactor.

It is desirable to operate nuclear reactors at reduced power when demand on the grid is low, before returning to full power when required. Such use of a nuclear reactor, which would allow better use of its capabilities, should not lead to safety problems. An object of the invention was thus to provide a method for determining at least one threshold value of an operational parameter of a nuclear reactor in order to make better use of the capabilities of the reactor while maintaining safe operation of the reactor.

The main question in this case was whether the calculation of an operating parameter of a nuclear reactor on the basis of a computer-implemented simulation step contributed to the technical character of the invention. The Board accepted that the determination of the value of the operating parameter contributed to the technical character of the claim, as this involved more than a simple interaction between the numerical simulation algorithm and the computer system. The nature of the parameter was found to be linked to the operation of a nuclear reactor, i.e., a physical entity. In that context, it did not even matter whether said parameter was actually used within a nuclear reactor or not, the close link sufficed to acknowledge inventive step.

2.5 System for measuring blood glucose

In this medical technology-related case,[5] a system for measuring blood glucose variability was provided, for acquiring a plurality of blood glucose data points over a predetermined time period. The system included a processor programmed to calculate a risk index based on the acquired blood glucose data points and to define risk categories. An algorithm was used to calculate the risk index from the acquired blood glucose data points. The invention aimed at a better measure of the overall blood glucose variability compared to the state of the art, also to allow the effectiveness of therapies to be assessed.

In that case, the distinguishing technical features related only to the algorithm to process the acquired blood glucose data points. Consequently, these features, when taken in isolation, were non-technical, but could support the presence of an inventive step if they credibly contributed to producing a technical effect serving a technical purpose over the whole scope claimed. Therefore, the main claim was amended to include the feature that a certain well-defined time period must be observed for monitoring the blood glucose data, thus limiting the scope to technical aspects only and providing the basis to confirm inventive step.

3. Conclusion

At the EPO, claim features considered to be non-technical in isolation may become technical if they contribute to the technical character of an invention by participating in producing a technical effect serving a technical purpose. In that case, these non-technical features are not ignored when assessing inventive step. This is relevant in all technological fields, including mechanical engineering and applied physics.

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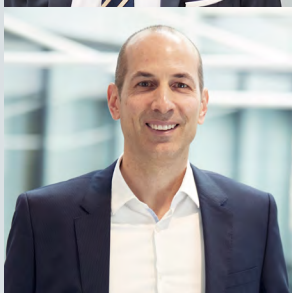

[4] Cf. T 0625/11.
[5] Cf. T 2681/16.

Patenting Quantum Computing Technologies in Europe and the U.S.

Quantum technologies, and quantum computing in particular, are not only setting new technical frontiers but also new legal frontiers when it comes to patenting these technologies. We look at the challenges of these new frontiers at the EPO and the USPTO and what can help to address them.

The unique capabilities of quantum computers are expected to help address complex challenges, such as drug discovery, aircraft design, material research, and logistics, as quantum computers may be able to tackle certain complex problems that conventional computers cannot. Industry organizations such as QuiC[1] in Europe, Q-STAR[2] in Japan, and QED-C[3] in the United States are working to advance quantum computing technology and industry, and both government and private sector funding continues to grow.

With this new technical frontier has come a new legal frontier. Patent offices around the world have recognized the tremendous growth this emerging field has shown in the recent years. One of the key messages of a recent report[4] published by the EPO is that the growth in the number of patent applications in the field of quantum computing is well above the growth in most other fields of technology. A similar trend has been observed at the USPTO, where quantum computing-related patent applications continue to rise year on year.[5]

Quantum technologies fall into a number of categories including the hardware used to realize various types of quantum computers—including superconducting circuits, quantum dots, integrated photonic circuits, and supporting hardware to perform quantum computing operations—, quantum computing algorithms implemented using conventional computers, quantum circuits for performing computations using the quantum computing hardware, and further technical applications such as quantum communication, quantum sensing, and quantum simulations.

In this article, we focus on patenting inventions directed to quantum computing software and circuits, which are most likely to present challenges at the new technical and legal frontiers associated with quantum technologies.

Challenges before the EPO

Challenges when patenting quantum computing technologies at the EPO may arise at various steps. A first one may be sufficiency of disclosure (Article 83 EPC). As quantum computing is a new technical field, the knowledge of the skilled person as judged by the examiner may be limited, in particular more limited than expected by experienced inventors.

Furthermore, as quantum computing is based on intricate concepts such as entanglement, wave-particle duality and qubits[6] as basic building block, results and advantages of an invention may seem non-intuitive or even counter-intuitive, in particular to the untrained reader, thus opening the door to potential doubts about whether the invention can be put into practice and whether its advantages can be credibly achieved.

Accordingly, describing how to put an algorithm or a circuit into practice, as well as the underlying (preferred) quantum hardware and its implications, may require clear and detailed explanations.

[1] European Quantum Industry Consortium (QuIC). Retrieved 28 May 2023.
[2] Quantum STrategic industry Alliance for Revolution (Q-STAR). Retrieved 28 May 2023.
[3] Quantum Economic Development Consortium (QED-C). Retrieved 28 May 2023.
[4] "Quantum computing technologies on the rise". www.epo.org. European Patent Office. 25 January 2023. Retrieved 28 May 2023.
[5] Mason, Elliott (13 February 2023). "Quantum patent trends update: 2022". QED-C. Retrieved 28 May 2023.
[6] "Qubit" (from "quantum bit") is the basic unit of quantum information and the quantum version of the classical binary bit.

A further challenge may arise regarding clarity (Article 84 EPC). The nomenclature in the field of quantum computing does not always clearly separate the quantum computing aspects, i.e., the logical operations constituting the computation, and the quantum physics aspects, i.e., the concrete steps carried out in the system or experiment.

For example, the term "qubit" is on the one hand used to refer to the quantum analog of a bit as a basis building block for quantum algorithms and on the other hand to two specific states of a degree of freedom of the system or experiment. Sophisticated algorithms also introduce the further distinction between logical and physical qubits. This illustrates that the various terms used in the field are not always clearly distinct from another, potentially leading to clarity objections if this distinction between "hierarchies" of quantum computing becomes blurry.

Further, in the present noisy intermediate-scale quantum (NISQ) era,[7] many quantum computing inventions use classical computers for all or part of the computing. For example, classical computers are used for the simulation of quantum systems, and hybrid applications are implemented partly on classical computers and partly on quantum computers. Confusion may arise as to which parts of the invention are implemented on which type of hardware or which type of hardware is used in general.

Inventive step (Article 56 EPC) will likely be another challenge, particularly for inventions related to quantum software and circuits in the field of quantum computing. Inventions in this field may be regarded as "quantum computer-implemented inventions," i.e., the quantum version of well-established computer-implemented inventions (CII). Hence, these inventions may be assessed using the EPO's approach for mixed type of inventions containing technical and non-technical features, and a determination as to which features contribute to the technical character of the invention, i.e., contribute to producing a technical effect, may lead to objections.

In this context, expressions on the level of quantum information science, i.e., operations performed on the level of a logical qubit without any apparent relation to specific hardware, will likely be treated by the EPO as part of a mathematical model. These expressions will therefore require explanations about their underlying technical context to be considered as contributing to the technical character of the invention.

This contribution can either be achieved by the feature under consideration being tied to a field of technology, e.g., drug discovery, aircraft design, or material research, or by the feature being adapted to a specific technical implementation, e.g., the internal functioning of the hardware used, such as details of the superconducting circuits, etc.

Thus, the established practice of CII will likely be applied analogously to inventions directed at quantum software and quantum circuits.

Challenges before the USPTO

At the USPTO, similar challenges may arise, including challenges based on written description under 35 U.S.C. § 112(a) or definiteness under 35 U.S.C. § 112(b). U.S. patent law requires that a patent application contains a "full and clear description of the invention" (35 U.S.C. § 112(a)) and that the "specification concludes with one or more claims particularly pointing out and distinctly claiming the subject matter ... [of the] invention" (35 U.S.C. § 112(b)).

As at the EPO, a patent examiner at the USPTO is likely to be unfamiliar with common terminology used to describe quantum computers, and the technology itself may be unintuitive. When addressing rejections based on either written description or definiteness, it can be helpful if the specification provides clear definitions of important claim terms—particularly those claim terms that read like jargon. Additionally, providing working examples illustrating how the technology is implemented (i.e., describing exactly how a quantum circuit is performed physically by sending certain signals to the qubit(s)) can be helpful in enabling the claims.

[7] This term is used for the current state of quantum computing, in which quantum processors contain 50 to 100 qubits not yet advanced enough for fault-tolerance or large enough to achieve quantum supremacy.

Another challenge that an Applicant is likely to face at the USPTO is that of subject matter eligibility under 35 U.S.C. § 101. Due to the subjective nature of subject matter eligibility doctrine, it can, unfortunately, be applied differently by different patent examiners, making a rejection sometimes difficult to overcome.

To try to avoid a subject matter eligibility challenge, it can be helpful to provide a clear, relatively simple description explaining the story of the invention and highlighting any inventive aspects of the claimed technology. Including this story can help an examiner better understand the inventive concept of the application, which is one part of the *Alice/Mayo* test used to determine subject matter eligibility.

Additionally, it can be helpful to describe how the claimed invention provides an improvement to the functioning of a computer, including to the quantum computer itself. U.S. courts have held that, where an invention improves a computer, it likely is subject matter eligible as it recites additional elements that integrate the judicial exceptions (i.e., the abstract ideas of the claim) into a practical application.

For any challenge faced at the USPTO by a quantum computing patent application, it can be most helpful to request a telephone interview with the examiner. Often a conversation explaining the technology of the patent application and answering any of the examiner's questions can go a long way towards moving the application to allowance.

Conclusions

To master the challenges of patenting quantum computing technologies, considering the following when drafting may be helpful.

Since quantum technologies are still relatively new and unfamiliar to many, providing explicit and detailed explanations about how an invention is implemented may help to prevent sufficiency of disclosure objections and furthermore may help the examiner in understanding the invention.

Seemingly counter-intuitive results of the invention may be clarified by passages aiming at making these effects plausible, for example by using analogies to classical technologies.

By clearly explaining what hardware is used to implement a software invention, by emphasizing what portions of the invention are quantum in nature, and by considering implicit requirements to be included in the claims, clarity objections may be avoided when drafting the application.

In view of the different "hierarchies" of quantum computing, particular care given to the nomenclature used in the patent application may simplify understanding of the claimed concepts.

As patent offices treat quantum software and quantum circuit inventions as analogous to classical computer-implemented inventions involving mathematical methods, drafting claims with this knowledge in mind and emphasizing how a technical effect is achieved, either via the application to a field of technology or via the specific technical implementation, is likely to achieve a more successful outcome at the patent office.

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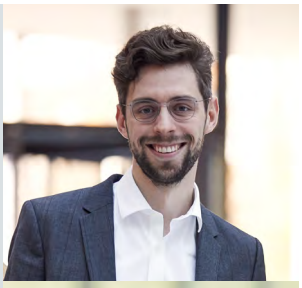

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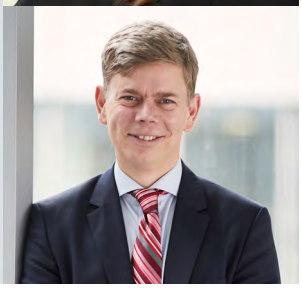

Louboutin Shoes: Amazon's Responsibility for Third-Party Offers

The European Court of Justice (ECJ) has decided on questions referred to it by national Courts concerning the interpretation of Article 9(2) EUTMR,[1] namely whether the operator of an online market platform can itself be regarded as using a trade mark, even when only third-party sellers offer goods bearing that trade mark on that platform.

Christian Louboutin is a French designer of luxury footwear and handbags whose best-known goods are high-heeled women's shoes. Since the mid-1990s, he has added to his high-heeled shoes an outer sole in a red colour. That colour applied to the sole of a high-heeled shoe is registered *inter alia* as a Benelux trade mark and as an EU trade mark since 10 May 2016:

After having been involved in several legal proceedings in relation to the protection of his red-soled shoes in the past, Louboutin is once again the initiator of a particularly interesting case, this time against several Amazon companies. The dispute concerns the liability of operators of online market platforms for trade mark infringement committed by third parties on their platforms.

Amazon operates online shops selling goods which it offers both directly, i.e., in its own name and on its own behalf, and indirectly, by also providing a sales platform for third-party sellers. With regard to these offers by third parties, the shipping of the goods may be handled either by the sellers themselves or by Amazon, which then stocks the goods in its distribution centres and ships them to the purchasers.

The Amazon websites further regularly display advertisements for red-soled shoes relating to goods allegedly having been placed on the market without Louboutin's consent.

Louboutin claimed that Amazon, through its role as an online marketplace for third parties and through the advertisement for footwear with red-soled shoes on its platform in connection therewith, was infringing their trade mark rights. Amazon, on the other hand, disputed whether the use of the trade mark could be attributed to it, claiming that it could not be held liable for the use of a sign by third-party sellers on its online marketplace.

In its judgement of December 22, 2022,[2] the ECJ answered the questions from the referring Courts *Tribunal d'arrondissement de Luxembourg* (Luxembourg District Court, Luxembourg) and the *Tribunal de l'entreprise francophone de Bruxelles* (Brussels Companies Court (French-speaking), Belgium) concerning, in essence, whether and under which circumstances the operator of a market platform itself uses a trade mark in the sense of Article 9(2) European Union Trade Mark Regulation ("EUTMR").

The ECJ held that Article 9(2) EUTMR must be interpreted as meaning that under certain circumstances the operator of an online sales website incorporating an online marketplace may be regarded as itself using a sign, even when only third-party sellers offer goods bearing that sign.

[1] EUTMR stands for European Union trade mark regulation (EU) 2017/1001 (full title: Regulation (EU) 2017/1001 of the European Parliament and of the Council of 14 June 2017 on the European Union trade mark).
[2] ECJ, Judgment of 22.12.2022 – C-148/21, C-184/21.

This is the case if a well-informed and reasonably observant user of that site establishes a link between the services of that operator and the sign at issue, which is in particular the case where such a user may have the impression that the operator itself is marketing the goods bearing that sign.

In that regard, the following facts were deemed to be relevant:

- The operator uses a uniform method of presenting the offers, displaying both the advertisements relating to the goods which it sells itself and those relating to goods offered by third-party sellers;
- It places its own logo as a renowned distributor on all those advertisements; and
- It offers third-party sellers additional services consisting *inter alia* in the storing and shipping of their goods.

In view of the foregoing, it may be difficult, according to the ECJ, even for a well-informed and reasonably observant user to avoid the impression that the operator is marketing, in its own name and on its own behalf, the goods offered for sale by those third-party sellers.

This decision by the ECJ on the liability of an online marketplace operator establishes new criteria that could make it easier to enforce trade marks on online market platforms. From now on, the Courts of the EU Member States will have to apply these criteria in their decisions. As for the Louboutin case, it has been referred back to the Courts in Luxembourg and Belgium for a decision.

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G 2/21: The End of "Plausibility"?

The referral **G 2/21** to the EPO's Enlarged Board of Appeal (EBoA) sought to clarify if and under what circumstances post-published data can be used to prove a technical effect relied upon for inventive step. In particular, it was asked whether it is required that the technical effect is at least plausible, or at least not implausible, from the application as originally filed.

In its decision **G 2/21**, the EBoA now seems to reject the concept of plausibility for inventive step and instead introduces a new test for technical effects, which entails challenges and opportunities for Patentees and Opponents.

Background

The assessment of inventive step by the EPO is governed by the "*problem-solution approach*", which relies on the technical effect *vis-à-vis* the closest prior art for formulating the objective technical problem. Owing to this approach, the question of whether a technical effect can be relied upon is oftentimes decisive for inventive step.

In the case underlying the referral **G 2/21**, inventive step hinged on whether the Patentee could invoke an alleged synergistic effect of two compounds by relying solely on post-published evidence.[1]

The referring Board identified three lines of case law on post-published evidence.

1. First, it considered case law rejecting plausibility requirements altogether (referring thereto as a "***no plausibility***" approach). In particular, the Board asked whether it is permissible to disregard post-published evidence automatically if the technical effect solely depends thereon, thus forming an exception to the principle of free evaluation of evidence (question 1). The referring Board considered that if no such exception exists and this question is answered in the negative, plausibility requirements should be rejected in general, i.e., the "no plausibility" approach should be applied.

Alternatively, if question 1 is answered in the positive, the Board asked whether the following plausibility hurdles might be applied to post-published evidence:

2. Trying to distinguish purely speculative applications or patents from those that contain a credible technical disclosure, some Boards applied an "***ab initio plausibility***" standard, i.e., post-published evidence can be relied upon only if the technical effect is made at least plausible in the application as filed, e.g., by experimental data (question 2).

3. Other Boards applied a seemingly more lenient "***ab initio implausibility***" standard, stating that post-published evidence can only be disregarded if the skilled person would have had legitimate reasons to doubt the purported technical effect on the filing date of the patent (question 3).

[1] For a summary, see Daniel Offenbartl-Stiegert, Lasse Weinmann, "Plausibility and G2/21", *HOFFMANN EITLE Quarterly*, March 2023, pp. 18-20.

Decision

The EBoA provides two answers, which relate to the referred questions but do not adhere to their structure:

1. *Evidence submitted by a patent applicant or proprietor to prove a technical effect relied upon for acknowledgement of inventive step of the claimed subject-matter may not be disregarded solely on the ground that such evidence, on which the effect rests, had not been public before the filing date of the patent in suit and was filed after that date.*

2. *A patent applicant or proprietor may rely upon a technical effect for inventive step if the skilled person, having the common general knowledge in mind, and based on the application as originally filed, would derive said effect as being encompassed by the technical teaching and embodied by the same originally disclosed invention.*

Answer 1 – Free evaluation of evidence is to be applied

According to the first answer, there is no exception to the principle of free evaluation of evidence on the mere ground that the evidence is post-published. This answer addresses question 1. Furthermore, the reasons of the decision also state more generally that the principle of free evaluation of evidence is universally applicable (reasons 55-56).

In view of this answer, no answers to questions 2 and 3 would have been required, strictly speaking, because the referring Board had made those questions conditional upon an exception to the principle of free evaluation of evidence, which the EBoA refused to make.

However, the EBoA chose to nonetheless provide a second answer outlining under which circumstances such post-published evidence may be relied upon. The EBoA thus seems to consider that although no evidence may be *disregarded* entirely (answer 1), it is nonetheless the case that a technical effect (and evidence supporting it) may – or may not – be *relied upon* for inventive step during the further evaluation of the evidence, depending on whether it meets the indicated criteria (answer 2).

It therefore appears that in the EBoA's view, the question of whether one can rely, or not rely, on a purported technical effect and post-filed corroborating evidence does not require an *exception* to the principle of free evaluation of evidence. Rather, this principle is to be applied universally, and it is necessary to define *how* this principle is to be applied to technical effects and to the respective evidence (reasons 59).

Answer 2 – Criteria for reliance upon a technical effect

In its second answer, the EBoA stipulates criteria that need to be met in order for a technical effect to be relied upon. These criteria are, however, relatively vague and quite abstract, as has even been acknowledged by the EBoA (reasons 95), and so it will be very interesting to see what the referring Board will actually do with the Enlarged Board's guidance.

Importantly, the EBoA's second answer does not refer to any standard of "*plausibility*" and seems to reject the notion of a plausibility requirement for inventive step upfront. Instead, it provides a test that has no established interpretation. Apparently, it was the EBoA's intention to adhere closely to the EPC and to avoid promoting an additional "*distinct legal concept*" of plausibility for the validity of European patents (reasons 92). This approach by the EBoA may have been influenced by the fact that the decision was made without participation of any members of the classical "biotech" Boards 3.3.04 and 3.3.08, which had created a large body of the case law on plausibility.

In this regard, it is also noteworthy that two members of the EBoA (P. Gryczka and F. Blumer) had previously been involved in a decision which had rejected the concept of plausibility altogether ("*no plausibility*" approach), **T 2371/13**.

In light of **G 2/21**, future EPO decisions on inventive step will most likely no longer use the catchword "*plausibility*". However, owing to the lack of explanations by the EBoA and the deviation from the established case law, the second answer by the EBoA leaves considerable room for interpretation – and legal uncertainty. This has previously been criticized by several EPO practitioners including our colleagues at HOFFMANN EITLE.[2] We will therefore discuss below in more detail how practitioners and deciding bodies might apply the ruling of **G 2/21**.

A flexible two-step test that reconciles divergent case law?

The EBoA's second answer seems to propose a two-step test, as reflected by the "*and*" conjunction ("*[...] would derive said effect as being encompassed by the technical teaching and embodied by the same originally disclosed invention*"; underlining added).

The EBoA provides a few (albeit vague) hints as to how this test is to be applied.

- The EBoA indicates that it is satisfied that the outcome of all of the previous – seemingly divergent – Board of Appeal (BoA) decisions would still be the same had the test been applied (reasons 71-72). In other words, the EBoA apparently holds that its test allows to 'reconcile' the results of these seemingly divergent decisions.

- The EBoA emphasizes that it is essential to pay attention to the "*pertinent circumstances of each case*" when applying the test (reasons 95). One may think that this is a superfluous statement. However, it is nonetheless noteworthy, because it expresses the EBoA's apparent view that the test is more flexible and adaptable to the varying circumstances of different cases as compared to the previous (diverging) plausibility standards.

- The Board stipulates that the criteria for reliance on technical effects for inventive step are more lenient than those for sufficiency of disclosure (reasons 77).

So, what could this test mean and how could it be brought in line with the outcome of the divergent case law?

The first step of the test asks to determine whether the skilled person can "*derive*" the effect as being "*encompassed by the technical teaching*". At first glance, this appears to be a rather lenient criterion which is in line with existing case law stating that technical effects can be relied upon if they do not change the character of the invention and closely relate to the original problem.[3] In accordance with such a lenient interpretation, the word "*derive*" had also been used in the "*no plausibility*" decision T 31/18 (reasons 2.5.2) in a way which suggests that no explicit mention of the technical effect is necessary, i.e., that an implicit derivability of the effect *vis-à-vis* the closest prior art may be sufficient.

By contrast, it seems more challenging to interpret the second step of the test ("*derive as [...] embodied by the same originally disclosed invention*"). This step may have been introduced as an additional hurdle to exclude highly speculative inventions.

Turning to the details of this step, the reference to "*the same [...] invention*" is again reminiscent of the above-mentioned case law on the character of the invention. On the other hand, by referring to the same "*originally disclosed*" invention, the second step also seems to allude to the requirements of Art. 123(2) EPC, i.e., original disclosure/added subject-matter. In accordance with such interpretation, it is noteworthy that the words "*the same invention*" are also used in Art. 87(1) EPC (priority) and have previously been interpreted as an original disclosure requirement in that context.[4] It seems unclear, however, why and how the requirements of original disclosure should be implemented in the assessment of technical effects for inventive step and/or whether other requirements of the EPC[5] should be 'read into' the second step of the test. The interpretation of this second step of test will therefore pose a particular challenge to EPO practitioners and Board of Appeal (BoA) members.

[2] Bausch, Thorsten; Lacy, Adam (29 March 2023). "Plausibility in G2/21: has the elephant left the room?". Kluwer Patent Blog. Retrieved 28 May 2023.
[3] T 440/91, headnote.
[4] G 2/98, headnote.
[5] Art. 82 EPC (unity) refers to "one invention". However, unlike lack of inventive step, non-compliance with Art. 82 EPC is not a ground of opposition, and it would be unclear why and how such a requirement should be applied to the assessment of technical effects for inventive step.

It is therefore tempting to speculate on how the test of G 2/21 could reconcile the outcome of the seemingly divergent case law. The following thoughts may be of interest:

In decision T 1329/04 (favouring "*ab initio plausibility*"), the Board held that the claimed protein, GDF-9, did not solve the technical problem of being a further member of the TGF-β superfamily. The application as filed merely contained a paper statement but no data demonstrating technical effects of the TGF-β superfamily for GDF-9. The effect was doubtful at the effective date, because GDF-9 lacked some relevant structural characteristics of other TGF-β superfamily members.

In that case, the effect in question was mentioned and may thus be derivable as "*encompassed*" by the technical teaching (first step).

The effect might nonetheless fail to pass at least the second step of the test for various potential reasons: Firstly, both the claimed GDF-9 and the alleged technical effect were selected from lists of embodiments. From a formalistic point of view, one could argue that this two-fold selection contravenes the "*two-list principle*" applied by the EPO and thus fails to meet the 'original disclosure' requirement of the test, i.e., that the technical effect is not derivable as embodied by the same "*originally disclosed*" invention.

Alternatively, one could consider that in view of its speculative character, *inventive skill* was necessary to derive, at the effective date, that *the alleged effect can be put into practice*. Consequently, the effect may be viewed as being indicative of a new invention made after the filing date – rather than being derivable as embodied by the "*same originally disclosed invention*". Such an approach would be consistent with established EPO case law on sufficiency of disclosure, requiring that the claimed invention can be put into practice without exercising inventive skill.[6]

A similar reasoning could be applied, *mutatis mutandis*, to the T 488/16 ("*dasatinib*") case (also favouring "*ab initio plausibility*"), where the claimed compound was just one among millions of other compounds allegedly having protein tyrosine kinase inhibitory activity. The application as filed contained a vague paper statement that a technical effect was observed for exemplified compounds (reasons 4.5), but there were several hundreds of such compounds. The Board concluded that (reasons 4.9):

> *"it is not acceptable to draw up a generic formula, which covers millions of compounds, [...] and leave it to the imagination of the skilled reader or to future investigations to establish which compound inhibits which kinase [...]."*

Such "*future investigations*" may well require inventive skills and thus contravene the G 2/21 test.

The above cases are notably different from the case underlying decision T 578/06 (favouring the "*ab initio implausibility*" approach). In that case, the applicant claimed a medical use of somatostatin or a somatostatin agonist for the treatment of a human patient in receipt of transplanted isolated pancreatic islet cells. The application as filed mentioned a technical effect of prolonging the survival of these cells but did not prove it. Inventive step was acknowledged by the BoA, because there was no evidence that would have cast doubts on the technical effect.

In this case, the technical effect was clearly described in the application and should qualify as being "*encompassed*" by the technical teaching of the application (first step). Also, since there were no doubts on file and no highly speculative selections were made, the effect should pass the second step of the G 2/21 test, since putting the effect into practice would, for instance, not require inventive skills. A similar reasoning could be applied, for instance, to the case underlying decision T 31/18 (favouring the "*no plausibility*" approach).

[6] T 206/83 and T 1040/03.

Dos and don'ts

So, where does this leave us?

While there remains considerable uncertainty as to how exactly the criteria of G 2/21 will be applied by the EPO's deciding bodies, one thing is fairly certain: It is the apparent intention of the EBoA to allow a reasonable degree of speculation for technical effects relied upon for inventive step, while preventing highly speculative inventions, with particular regard to the individual circumstances of the case.

Applicants may consider the following:

Provide a solid disclosure of the invention (or what can subjectively and reasonably be perceived as the invention) both in terms of the structural features required to define the invention and the technical effect(s) associated with it.

Further, applicants should explain technical effect(s) in some technical detail such that there can be no doubt that the skilled person sees the technical effect as both encompassed by the technical "*teaching*" and embodied by the same invention.

It will also remain safest to substantiate the (perceived) technical effect of the invention by including experimental data already in the application as filed, especially if they were doubtful from the prior art. Including experimental data is advisable not only from the viewpoint of inventive step but also for sufficiency of disclosure. This is because, according to the EBoA, sufficiency may require that the technical effect is credible from the application as filed. This standard of sufficiency, which is different from the standard for inventive step, seems to be a synonym of the previous standard of "*ab initio plausibility*" and may apply at least to medical indication claims (reasons 77).

Finally, applicants should try to avoid unreasonably long "laundry lists" of speculative embodiments and alleged (unproven) technical effects, which might cause the application or patent to fail the G 2/21 test.

Opponents and adverse parties should pay attention to the circumstances of the case. For instance, if it can be argued that based on common general knowledge and the application as filed, there were doubts concerning the technical effect which were not overcome by the technical teaching of the application as filed, this may make it challenging for patentees/applicants to pass the test of G 2/21.

Similarly, if the technical effect for a claimed embodiment was originally disclosed in a highly speculative fashion and hidden in long lists of embodiments and their alleged effects, this may help to challenge patents and applications.

G 2/21 will change how the EPO argues inventive step. In this regard, a first follow-up landmark decision will be issued soon: The referring Board has scheduled oral proceedings for the case for July 28, 2023, and has now issued its preliminary opinion,[7] which provides two tentative interpretations of G 2/21. The first interpretation favours either the *ab initio plausibility* approach or the *ab initio implausibility* approach (point 4.1), while the second one focuses on the derivability of the technical effect from the application as filed, thus rejecting plausibility standards altogether (point 4.2). However, the Board states inter alia that "It is possible that the parties themselves will support further interpretations of G 2/21" (point 5.1), suggesting that it has not yet formed a firm opinion on any particular interpretation of G 2/21. The resulting decision will warrant further thoughts – and we will also be following up on it in the *HOFFMANN EITLE Quarterly.*

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[7] Board 3.3.02's communication dated June 14, 2023 pursuant to Article 15(1) RPBA.

When Can a German Nullity Action Be Brought During Pending Opposition?

The Federal Court of Justice (FCJ) clarified that a German nullity action is admissible after a final decision on the claim scope in EPO opposition proceedings. It is not necessary to wait for the formal conclusion of the EPO opposition proceedings, which could be years later. The article also discusses whether UPC revocation actions are admissible if filed before grant of the patent.

Background

The German Patent Act gives priority to EPO opposition proceedings by blocking German nullity actions during the nine-month opposition period and while opposition proceedings are ongoing (§ 81 para. 2 Patent Act). This is an exception in Europe. Although this provision has been criticized for making it more difficult to revoke invalid patents, it has so far survived every legislative attempt to abolish it.

Why do nullity actions have to wait? Efficiency. Waiting until EPO opposition proceedings have ended aims at avoiding contradictory decisions between the EPO and the Federal Patent Court (FPC) and wasting the FPC's resources on duplicative work (if the patent is revoked in opposition proceedings, there is no need for a nullity action anymore). However, the standards for patent validity assessment are not fully harmonized. If an EPO opposition was not or only partly successful, a nullity action may lead to the patent being fully revoked, at least for Germany. Some European patents are attacked in multiple proceedings before the EPO and national authorities, particularly in the pharmaceutical field. In those situations, this provision in German law only delays the nullity action. As nullity proceedings take a long time, an accused infringer may want to file the action before the EPO opposition proceedings are over.

What is the earliest point in time at which a nullity action can be brought in Germany?

The FCJ has now clarified when a nullity action is admissible before EPO opposition proceedings have been fully concluded.[1]

The decision pertains to EP 2 377 536, which was revoked by an EPO opposition division (OD) in 2016. In 2019, the Board of Appeal (BoA) set the decision aside and maintained the patent in amended form. The case was then remitted to the OD with instructions to adapt the description to the amended claims, a process that can take a long time. The amended patent specification was published in 2022, three years later. This marked the end of the EPO opposition proceedings.

A competitor did not wait so long and filed a nullity action in 2020, about a year after the BoA decision. The patent proprietor argued that this was too early and that the nullity action was inadmissible. The FPC agreed. Although a nullity action is not inadmissible simply because it was filed while opposition proceedings are ongoing, the FPC reasoned that the opposition proceedings must have been fully concluded before the end of the oral hearing in the nullity action.

[1] FCJ, decision of 6 December 2022, case no. X ZR 47/22.

Otherwise, the basis for the nullity action would be unclear, e.g. if the description needs to be adapted and the patent could even be revoked by the EPO for formal reasons.

On appeal, the FCJ disagreed and remanded the case for further consideration by the FPC. The FCJ considered the question of when the opposition proceedings had reached a stage where there was no risk of a contradictory decision or unnecessary duplicative work. It held that this was when the EPO had decided to maintain the patent with amended claims and this decision could no longer be challenged. After that, there was sufficient basis for the FPC to assess the patent's validity although the description had not been adapted yet.

The FCJ also noted that the Patent Act does not preclude a nullity action after the opposition proceedings have terminated. Blocking it while opposition proceedings are ongoing ensures that the FPC assesses the patent on the basis upheld by the EPO. However, once the BoA has ruled on the claim scope, the basis for the nullity action is clear. There is no longer a reason to block the nullity action.

The decision provides more clarity. A nullity action is admissible if, by the time of the oral hearing before the FPC, the EPO's BoA has already fully decided on the claim scope.

Filing a nullity action before the BoA's decision bears a risk. A nullity action requesting that the patent should be revoked will be unsuccessful, e.g. if already the BoA fully revokes the European patent or if the BoA maintains the patent in amended form and the FPC accepts validity of the amended claims. In those situations, the plaintiff in the nullity action bears at least part of the (often high) costs of those proceedings.

Can a UPC revocation action be filed before grant of a European patent?

The issue clarified by the FCJ has some similarity to the question as to whether and, if so, when a UPC revocation action can be filed before grant of a European patent.

According to Art. 3(c), the UPC Agreement applies to European patents which had not yet lapsed when that agreement entered into force on June 1, 2023 or which were granted afterwards (as long as they have not been opted out). Further, the UPC's competence for revocation actions is limited to granted patents (Art. 32(1)(d) UPCA).

The UPCA is silent on what happens if a revocation action is filed before grant. Filing a revocation action early may achieve two things: (a) preventing an opt-out of the patent (if an opt-out has not been declared before grant), and (b) getting the revocation action decided before a later filed infringement action. Whether these objectives can be achieved is, however, uncertain.

(a) Under Art. 83(3) UPCA, an opt-out is precluded if "*an action has already been brought*" before the UPC. However, since the UPCA does not allow revocation actions against patent applications, a revocation action filed before grant might not prevent an opt-out. The UPC will have to address this issue.

(b) Filing a revocation action with the UPC before grant of the European patent risks that the action is rejected as inadmissible. The FCJ considered a German nullity action admissible if, by the time the nullity action is decided, the outcome of the earlier EPO opposition proceedings is clear. Considering this reasoning, a UPC revocation action may also be filed early as long as the patent is granted before the UPC decides on the revocation action's admissibility. The patentee can trigger such a decision with a preliminary objection under Rule 48. If it is filed right away and the UPC gives the plaintiff in the revocation action only a short time to respond (there is no minimum term for this under Rule 19.5), the revocation action could be rejected as inadmissible shortly after it was filed. Such a decision allowing the preliminary objection and rejecting the revocation as inadmissible may be appealed but the revocation action may then be stayed pending the appeal (Rule 21.2), which would prevent the action from progressing quickly.

Thus, even if a UPC revocation action is not rejected as inadmissible only because it was filed before grant of the European patent, the advantage in time of an early filing would be small. The earlier a revocation action is filed before grant, the higher the risk that the revocation action will be rejected as inadmissible.

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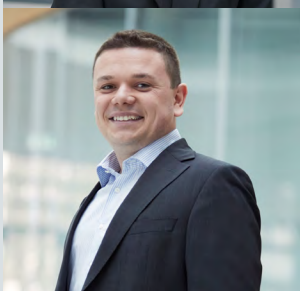

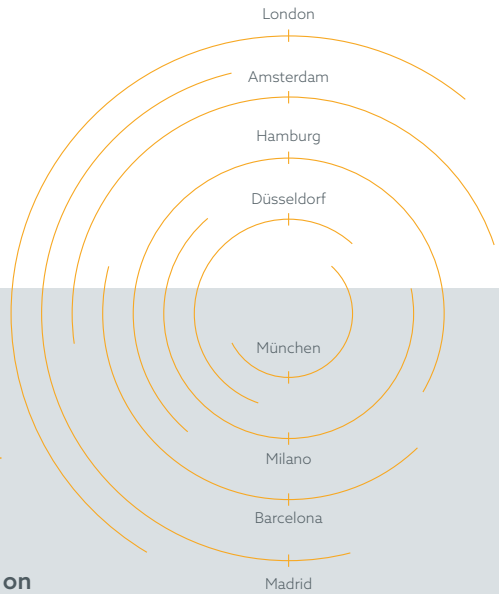

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