

The Doctrine of Equivalence in Patent Law

A Comparative Study in Different Jurisdictions

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Abstract

In the field of patent law, the doctrine of equivalence extends the scope of a patent beyond its literal language to cover inconsequential variations of a patentable invention. This doctrine is arguably one of the most important aspects of patent law. The protection a patent confers is meaningless if its scope is determined to be so narrow that trivial changes to a device bring it out of the bounds of the patent. One of the greatest challenges courts and legislatures therefore face in patent law is to create rules for determining patent scope that maintain the protection a patent is meant to confer while still keeping the patent monopoly within reasonable bounds.

Despite the general unity in patent laws among developed countries, the difficulty of this task has led to different results in different jurisdictions. Many jurisdictions have chosen to determine patent scope under a doctrine of equivalence, while others have maintained the position that adequate scope can be found within the meaning of a patent's claim. Even jurisdictions which agree that a doctrine of equivalence should apply differ significantly in its application.

This thesis provides an examination of the doctrine of equivalence from the perspective of three different jurisdictions – The United States, Germany and the United Kingdom – and their separate answers to the question of patent scope.

Abbreviations

EU	European Union
EPC	European Patent Convention
GPA	German Patent Act
SCOTUS	The Supreme Court of the United States
UK	The United Kingdom
UKSC	The Supreme Court of the United Kingdom
US	The United States of America
WIPO	World Intellectual Property Organization

1. Introduction

1.1 Background

“A patent is an exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem.”¹ It is a form of intellectual property that gives the right to an inventor who has created something new, useful and non-obvious. Patent rights give owners the privilege to prevent another from taking advantage of their invention and allows them a fair return on their work and investment. A patent work always requires to be defined in "full, clear, and, concise" terms.

A patent's importance stems from the protection of the exclusive rights to an invention. The exclusive rights constitute an incentive for innovators to invent by the return that the exclusive right to the commercial use of the invention awards them. The costs, risks and time effort to innovate would be too high without such a protection.

Sometimes, copying of the patent might not be a literal imitation, but may provide the same effect. If such copying is allowed, the purpose of granting the patent rights to the inventor will be meaningless. It would become easy for any person to imitate the patent by making minor changes and enjoy returns larger than those accruing to the original inventor. To counter such behaviour, the doctrine of equivalence was introduced. It was decided by court that an infringement may occur even though the literal language of the claims was avoided.

The doctrine of equivalence is a legal rule in many (but not all) of the world's patent systems that allows a court to hold a party liable for patent infringement even though the infringing device or process does not fall within the literal scope of a patent claim, but nonetheless is equivalent to the claimed invention. US Judge Learned Hand has described its purpose as being "to

¹ Definition from WIPO website: <https://www.wipo.int/patents/en/> (31.04.2021).

temper unsparing logic and prevent an infringer from stealing the benefit of the invention”.²

In many jurisdictions, the scope of protection afforded by a patent is defined by the claims of the patent as read either literally or under doctrine of equivalence. Infringement based on the doctrine of equivalence is generally not based on any statutory law but rather has been established via case law (e.g., Court decisions). The purpose of the doctrine of equivalence is to promote fair patent coverage so that trivial departures (e.g., variants) from the claim language cannot be used to avoid infringement.

Most jurists over the world would concede that determining patent scope is one of the most difficult aspects of patent law. It is no wonder then that there are considerable differences in attitudes towards the doctrine of equivalence – a doctrine that is often central to the issue of patent scope – in different jurisdictions as it permits a court to find infringement even when the accused device or process is not literally covered by a valid claim of the patent.

The doctrine of equivalence plays an inevitable role in balancing the interests of the patent holder on the one side and the legal certainty of others on the other side. This on the first sight easily seeming question of drawing the line between the area that only the patent holder is entitled to use, due to his inventive achievement, and the area that every competitor may use in order to compete in the market, has been subject to many discussions and judicial developments.

The doctrine of equivalence has a long history, as it was born more than one hundred and fifty years ago. Therefore, there have been plenty of decisions and research regarding this doctrine. Moreover, it has dramatically developed in the past years. For instance, in 2016, the Supreme Court of Germany made a remarkable decision in the *Pemetrexed*³ case and then, less than a year later, the Supreme Court of the United Kingdom overruled its precedent and decided to introduce the doctrine of equivalence in its legal system with the *Actavis*⁴ case in 2017.

² Royal Typewriter Co. v. Remington Rand, Inc., 168 F.2d 691, 692 (2d Cir. 1948).

³ Bundesgerichtshof [Federal Court of Justice]. Decision on 14 June 2016. Case No. X ZR 29/15, 2016 GRUR 921, *Pemetrexed* (Germany), translated in 48 IIC 208 (2017).

⁴ Actavis UK Limited & Others v. Eli Lilly and Company, [2017] UKSC 48.

This research focus at an analysis of the doctrine of equivalence as developed by the case law in the US, Germany and the UK, as some of the most important patent litigation jurisdictions of the world, touching upon the common and different points amongst them.

1.2 Purpose and research question

The purpose of this thesis is to describe and analyse the scope of doctrine of equivalence and its developments in three different jurisdictions – the United States, Germany, and the United Kingdom – as well as a comparison between the doctrine in these jurisdictions.

To fulfil this purpose, the thesis will answer the following questions:

1. What is the scope of the doctrine of equivalence in patent law in the United States, Germany and the United Kingdom?
2. What are the main similarities and differences of the doctrine of equivalence in these countries, and how may they be explained?

1.3 Scope and constraints

This thesis does not purport to decide which jurisdiction has the right solution, but merely to point out that different solutions can be and have been found for the question of equivalence. Although a traditional case of patent infringement under the doctrine of equivalence may find protection under all three jurisdictions, the laws of these countries start to diverge on questions regarding after-arising technology, the essential elements of a patent claim, and equivalents that clearly fall outside the language of a claim.

1.4 Materials and method

To fulfil the purpose of this thesis and to answer the research questions, a legal scientific method will be applied. The main legal sources that will be used are national legislation and EPC provisions (and the protocol) on equivalence, relevant case law and legal literature. In addition, other sources such as official documents, reports and newspaper articles etc. are used.

Amidst various methods of legal research, the comparative method is of importance due to increased interaction of experiences among the legal systems. Better understanding, wider choice of reform and harmonization are the objectives of comparative legal research.

1.5 Structure

The introductory chapter aims at providing relevant information in regard to the basis which to this research shall be built on. The background section presents the importance and the relevance of the topic; the purpose and research question section sets out the grounds in which the whole research shall be based on; the scope and constraints section sets the boundaries on what is included in the scope of this research; the materials and method section, as the name implies, lays out the materials and methodology that shall be used to conduct this research.

In the second chapter, the doctrine of equivalence is overviewed under the United States perspective, which is considered to be its birth place.

The third chapter describes and analyses the same doctrine and its developments from the perspective of German jurisdiction.

In the fourth chapter, the doctrine of equivalence is presented under the United Kingdom perspective.

Finally, the fifth and final chapter brings a summary of the common and different points between the doctrine in these countries, presenting a discussion and conclusion about this research findings, as well as answering the research questions.

2. Doctrine of equivalence in the United States

2.1 Introduction

The doctrine of equivalence has been a key feature of US patent law for over a century and a half, finding its roots in the 1853 Supreme Court case of *Winans v. Denmead*.⁵ Although the doctrine has been refined during the ensuing years, *Winans* enunciated the basic principle underlying this doctrine that patent owners should be entitled to assert claims for infringement “over every form in which [their] invention might be copied,” even if not explicitly covered by a claim.

The doctrine allows for a finding of infringement where an accused product or process does not literally contain a particular claim element, but instead contains an element that is otherwise identical or equivalent to that in the asserted claim. Equivalence is generally found when the substitute element performs the same function as the missing limitation in the same way and produces the same result (also known as the “function-way-result” test).

2.2 US Patent Act

Since the doctrine of equivalence was established by the case law, the US Patent Act (United States Code Title 35) hardly refers to the doctrine. The only statutory mention can be found in Section 112 (f), which provides that “[a]n element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof [emphasis added].” It means that the coverage of the “means plus function” claim should be

⁵ *Winans v. Denmead*, 56 U.S. 330 (1853).

limited to the equivalents of the actual means shown in the patent specification.⁶ This provision should be regarded as an exception against the principle that the general doctrine extends not only to the equivalents available at the issuance of the patent but also to the technological equivalents developed after that.⁷

2.3 *Graver Tank* (Supreme Court, 1950)

The *Graver Tank*⁸ is the leading case for the doctrine of equivalence. In this case, the Supreme Court of the United States (“SCOTUS”) revived the doctrine, which was introduced in the *Winans* case almost one hundred years before and once declined because of the conversion from the “central limitation” principle to the “peripheral limitation” principle.⁹

First of all, the Supreme Court explained the grounds for the doctrine of equivalence. In determining a patent infringement, it should be first examined whether the accused matter falls clearly within the words of the claim.¹⁰ However, there are unscrupulous copyists, who do not copy every literal detail of a patented invention but make unimportant and insubstantial changes and substitutions to conceal and shelter their piracy.¹¹ To permit such imitation would be to change the protection of the patent grant into a hollow and useless thing and even to encourage those copyists.¹² To prohibit only clear and direct duplications would place the inventor at the mercy of verbalism and deprive him of the benefit of his invention.¹³ Then it would promote concealment rather than disclosure of inventions, which is one of the primary purposes of patent system.¹⁴ The doctrine of equivalence was developed to overcome such problems.¹⁵ The Supreme Court stated that “[t]he essence of the doctrine is that one may not practice a fraud on a patent.”¹⁶ This

⁶ James L. Robart. Speech at the Munich International Patent Law Conference 2018. Available online: http://www.munichinternationalpatentlawconference.de/wsp_images/robart.pdf (03.05.2021).

⁷ Ibid.

⁸ *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605 (1950).

⁹ Katsufumi Izumi, *Beikoku ni okeru Kintōron*. Doctrine of Equivalents in the United States, Patent vol. 55, no. 12, p. 49 (2002).

¹⁰ See case cited *supra* note 8, at 607.

¹¹ Ibid.

¹² Ibid.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Ibid, at 608.

¹⁶ Ibid.

“unscrupulous copyist” theory justifies the doctrine of equivalence as well as other theories such as “nature of language” and “after arising technology”.¹⁷

Moreover, the Supreme Court cited some cases coming out after the *Winans* case. Then, as a framework to apply the doctrine, the Supreme Court adopted the famous, already mentioned, “function-way-result (FWR)” test or the “triple identity” test. Under this test, a device would be regarded as infringing a patent on the doctrine of equivalence, “if it performs substantially the same function in substantially the same way to obtain the same result” as the invention.¹⁸ The reason is that “if two devices do the same work in substantially the same way, and accomplish substantially the same result, they are the same, even though they differ in name, form or shape.”¹⁹

In addition, according to the Supreme Court, the context of the patent, the prior art and the particular circumstances of the case must be examined in the determination of equivalence.²⁰ The purpose of using an ingredient in a patent, the qualities given when the ingredient is combined with the other ones and the function intended to perform must be taken into consideration.²¹ The Supreme Court mentioned that “[a]n important factor is whether persons reasonably skilled in the art would have known of the interchangeability of an ingredient not contained in the patent with one that was.”²²

2.4 Warner-Jenkinson (Supreme Court, 1997)

Probably the *Warner-Jenkinson*²³ is the most significant case for the doctrine of equivalence, in which the Federal Circuit (United States Court of Appeals for the Federal Circuit, CAFC) and the Supreme Court showed some important rules regarding the doctrine. The points of the decision can be summarised as it follows.

¹⁷ Martin J. Adelman, Randall R. Rader, Gordon P. Klancnik. Patent Law in a Nutshell. Thomson Reuters ed, 2nd ed. (2013), at pp. 372-375.

¹⁸ See case cited *supra* note 8, at 608.

¹⁹ *Ibid.*

²⁰ *Ibid.*, at 609.

²¹ *Ibid.*

²² *Ibid.*

²³ *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*, 520 U.S. 17 (1997).

The doctrine of equivalence survived the 1952 revision of the US Patent Act as well as other pre-1952 precedent.²⁴ It is not the court but the congress that can and should decide whether to legislate the doctrine out of existence.²⁵

Nevertheless, when the doctrine of equivalence is applied freely, it might conflict with the definitional and public-notice functions of the statutory claiming requirement.²⁶ One means to avoid this conflict is the “all elements” rule or the “element by element” rule, which is a basic limitation on the doctrine. Since each element contained in a patent claim is deemed material to defining the scope of the patented invention, “the doctrine of equivalence must be applied to individual elements of the claim, not to the invention as a whole.”²⁷ Naturally, it is not allowed to apply the doctrine so broadly as to eliminate an individual element completely in effect.²⁸ In practice, the all elements rule arises when the court decides that the missing element creates a rather substantial difference from the literal claim language.²⁹

There is another important limitation on the doctrine of equivalence, which is called the rule of “prosecution history estoppel (PHE)” or “file wrapper estoppel”. Under this rule, a patent owner would be regarded as having abandoned subject matter when he narrowed a pre-existing claim limitation or added a new claim limitation by amendment.³⁰ However, it is not correct that any surrender of subject matter, regardless of the reason for such surrender, prevents recapturing any part of that subject matter.³¹ Prosecution history estoppel should be applied only where claims have been amended for a limited set of reasons, for example, to avoid the prior art, or to address a specific concern, such as obviousness, that probably would have made the claimed subject matter unpatentable.³²

²⁴ Ibid, at 26.

²⁵ Ibid, at 28.

²⁶ Ibid, at 29.

²⁷ Ibid.

²⁸ Ibid.

²⁹ Martin J. Adelman et al, *supra* note 17, at pp. 382-383.

³⁰ Ibid, at p. 378.

³¹ See case cited *supra* note 23, at 30.

³² Ibid, at 30-32.

The issue here is how to deal with a case where the reason for an amendment is not necessarily clear from the record.³³ Although certain reasons for a claim amendment may avoid the application of prosecution history estoppel, it does not follow that the absence of a reason for an amendment may similarly avoid such an estoppel.³⁴ Considering that claims do serve both of the definitional and notice function, “the better rule is to place the burden on the patent owner to establish the reason for an amendment required during patent prosecution.”³⁵ If the patent owner succeeds in proving a sufficient reason for the amendment, then he can overcome prosecution history estoppel.³⁶ On the other hand, if the patent owner does not give any explanation, it should be presumed that the Patent and Trademark Office had a substantial reason related to patentability for including the limiting element added by that amendment.³⁷ In that case, prosecution history estoppel would bar the application of the doctrine of equivalents as to that element.³⁸

Even though the *Graver Tank* case referred to the prevention of copying and piracy when describing the benefits of the doctrine of equivalence, it does not mean that its application is limited only to the cases where those particular benefits are obtained.³⁹ In other words, intent of an infringer plays no role in the application of the doctrine.⁴⁰

“[T]he proper time for evaluating equivalency and thus knowledge of interchangeability between elements is at the time of infringement, not at the time the patent was issued.”⁴¹ Therefore, the doctrine of equivalence should not be limited to equivalents which are disclosed within the patent itself.⁴²

There are two frameworks under which equivalence is determined: the so called “triple identity” test, which the Supreme Court adopted in the *Graver Tank* case,

³³ Ibid, at 33.

³⁴ Ibid.

³⁵ Ibid.

³⁶ Ibid.

³⁷ Ibid.

³⁸ Ibid.

³⁹ Ibid, at 34.

⁴⁰ Ibid, at 36.

⁴¹ Ibid, at 37.

⁴² Ibid.

and the “insubstantial differences” test, which the *en banc* Federal Circuit⁴³ developed in this case.⁴⁴ The former examines whether the accused embodiment performs substantially the same function in substantially the same way to obtain the same result, while the latter examines whether the accused embodiment is substantially different from what is patented.⁴⁵ However, “the particular linguistic framework used is less important than whether the test is probative of the essential inquiry: Does the accused product or process contain elements identical or equivalent to each claimed element of the patented invention? Different linguistic frameworks may be more suitable to different cases, depending on their particular facts.”⁴⁶ For example, the triple identity test seems to work better with mechanical devices than with other products or processes.⁴⁷ On the other hand, the insubstantial differences test would be helpful in the cases where the inflexibility of language makes the determination difficult.⁴⁸

As for the question whether the application of the doctrine of equivalence is a task for the judge or for the jury, the Supreme Court did not decide on that day.⁴⁹

2.5 *Festo* (Supreme Court, 2002)

In the *Festo*⁵⁰ case the *en banc* Federal Circuit⁵¹ made a rather surprising decision on the rule of prosecution history estoppel. It overruled the previous “flexible bar” rule, under which prosecution history estoppel takes away some, but not all, claims of equivalence, depending on the purpose of the amendment and alteration in the text, and instead established the controversial “complete bar” rule, under which prosecution history estoppel bars all claims of equivalence to the narrowed amendment.⁵² Thus, the Supreme Court addressed once again the relation between

⁴³ Hilton Davis Chemical Co. v. Warner-Jenkinson Co., 62 F.3d 1512 (Fed. Cir. 1995) (*en banc*).

⁴⁴ See case cited *supra* note 23, at 39.

⁴⁵ James L. Robart, *supra* note 6.

⁴⁶ See case cited *supra* note 23, at 40.

⁴⁷ *Ibid*, at 39-40.

⁴⁸ Martin J. Adelman et al, *supra* note 17, at p. 377.

⁴⁹ See case cited *supra* note 23, at 38.

⁵⁰ *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722 (2002).

⁵¹ *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558 (Fed. Cir. 2000) (*en banc*).

⁵² See case cited *supra* note 50, at 730.

two patent law concepts, the doctrine of equivalence and the rule of prosecution history estoppel.⁵³

Firstly, the Supreme Court, following the *Warner-Jenkinson* case, stated that prosecution history estoppel arises when an amendment is made to secure the patent and the amendment narrows the patent's scope, even if it is made only for the purpose of better description.⁵⁴ A patent owner who narrows a claim as a condition for obtaining a patent must be regarded as having conceded an inability to claim the broader subject matter or at least as having abandoned his right to appeal a rejection, regardless of whether the amendment was made to avoid the prior art or to comply with other requirements related to patentability.⁵⁵ On the other hand, if the amendment is not necessary but truly cosmetic, then prosecution history estoppel would not arise.⁵⁶

Secondly, as for the issue of the flexible bar rule and the complete bar rule, the Supreme Court chose the former rather than the latter. Although a narrowing amendment may be presumed to be a general disclaimer of the territory between the original claim and the amended claim, there are some cases where the amendment cannot reasonably be viewed as giving up a particular equivalent.⁵⁷ “The equivalent may have been unforeseeable at the time of the application; the rationale underlying the amendment may bear no more than a tangential relation to the equivalent in question; or there may be some other reason suggesting that the patentee could not reasonably be expected to have described the insubstantial substitute in question.”⁵⁸ In those cases, the patent owner can overcome the above presumption.⁵⁹ Thus, the Supreme Court showed three rebuttal criteria: “foreseeability”, “tangentiality” and “some other reason”.⁶⁰ Foreseeability is

⁵³ Ibid, at 726.

⁵⁴ Ibid, at 735-737.

⁵⁵ Ibid, at 737.

⁵⁶ Ibid, at 736-737.

⁵⁷ Ibid, at 740.

⁵⁸ Ibid, at 740-741.

⁵⁹ Ibid, at 741.

⁶⁰ Martin J. Adelman et al, *supra* note 17, at p. 380

perhaps the best justification for the doctrine of equivalents overall, while tangentiality is a very narrow category.⁶¹ The last catch all category is also narrowly applicable, for example where the limitation of the language prevents drafting a claim to include the equivalent subject matter.⁶²

Consequently, the whole framework for applying prosecution history estoppel should be as it follows. If the applicant narrowed the scope of claims by amendment, he has to explain the reason to overcome the presumption that it was made to fulfil the requirements for patentability. Otherwise, the rule of prosecution history estoppel may apply. However, even in that case, the patent owner can still rely on the doctrine of equivalence, if he succeeds in showing that at the time of the amendment the person skilled in the art could not reasonably be expected to have drafted a claim that would have literally encompassed the alleged equivalent.⁶³ Although it was favourable for the patent owner that the Supreme Court adopted the flexible bar rule rather than the complete bar rule, the burden of proof imposed on the patent owner seems to be so heavy that it is almost impossible to prove it.⁶⁴ In other words, the substance of the flexible bar rule here is pretty close to the complete bar rule.⁶⁵ Before this case, the American court had applied the doctrine of equivalence rather broadly, or too broadly.⁶⁶ Thus, the Supreme Court put a brake on the broad application with the strong rule of prosecution history estoppel.⁶⁷

2.6 *Johnson & Johnson (Federal Circuit, 2002)*

This *Johnson & Johnson*⁶⁸ case is related to the “public dedication” doctrine, the third limitation on the doctrine of equivalence. The *en banc* Federal Circuit stated that “when a patent drafter discloses but declines to claim subject matter, as in this case, this action dedicates that unclaimed subject matter to the public.”⁶⁹ In other words, the doctrine of equivalence should not be applied to recapture subject matter

⁶¹ Ibid, at pp. 380-381.

⁶² Ibid, at p. 381.

⁶³ See case cited *supra* note 50, at 741.

⁶⁴ Katsufumi Izumi, *supra* note 9, at p. 55.

⁶⁵ Ibid.

⁶⁶ Ibid.

⁶⁷ Ibid.

⁶⁸ *Johnson & Johnson Associates Inc. v. R.E. Service Co., Inc.*, 285 F.3d 1046 (Fed. Cir. 2002) (*en banc*).

⁶⁹ Ibid.

which was deliberately left unclaimed, because it is the claims that define the scope of patent owner's exclusive right.⁷⁰ It should not be allowed that the patent owner narrowly claims the invention, while broadly disclosing it in the specification, to avoid strict examination by the Patent and Trademark Office and use the doctrine of equivalence to establish infringement after patent issuance.⁷¹ Thus, the coverage of an exclusive right would not extend to more than that properly examined by the Patent and Trademark Office.⁷² This public dedication doctrine requires not only the fact that an equivalence was foreseeable but also the fact that the patent owner showed his knowledge of that equivalent.⁷³

Even if the patent owner carelessly failed to claim disclosed subject matter, he still has some chances for remedy.⁷⁴ He may file a reissue application and attempt to enlarge the scope of the original claims to include that subject matter.⁷⁵ He can also file a separate application claiming that subject matter.⁷⁶

2.7 *Wilson Sporting Goods (Federal Circuit, 1990)*

The *Wilson Sporting Goods*⁷⁷ is an interesting case about the “hypothetical claim” approach, which is related to the last limitation on the doctrine of equivalence.

The Federal Circuit stated that “a patentee should not be able to obtain, under the doctrine of equivalents, coverage which he could not lawfully have obtained from the PTO [Patent and Trademark Office] by literal claims.”⁷⁸ Therefore, the patent owner cannot assert the scope of equivalency so broadly that it would encompass the prior art, which is the primary limitation in the prosecution before the Patent and Trademark Office.⁷⁹

⁷⁰ Ibid.

⁷¹ Ibid.

⁷² Ibid.

⁷³ Martin J. Adelman et al, *supra* note 17, at p. 386

⁷⁴ See case cited *supra* note 68.

⁷⁵ Ibid.

⁷⁶ Ibid.

⁷⁷ *Wilson Sporting Goods Co. v. David Geoffrey & Associates*, 904 F.2d 677 (Fed. Cir. 1990).

⁷⁸ Ibid.

⁷⁹ Ibid.

In order to analyse this limitation, it may be helpful to visualise a hypothetical patent claim which is broad enough to cover the accused product literally.⁸⁰ If that hypothetical claim could have been allowed by the Patent and Trademark Office, then the prior art would not bar infringement under the doctrine of equivalents.⁸¹ If not, then the patent owner would not obtain that coverage.⁸² In practicing this hypothetical claim analysis, it should be noted that a patent owner may not use it to narrow a claim in some aspects while at the same time broadening it in other aspects, for it is not an opportunity to freely redraft granted claims.⁸³

2.8 Summary

In the United States, the doctrine of equivalence was originally established in the *Winans* case and developed greatly through the *Graver Tank* case and the *Warner-Jenkinson* case.

There are two frameworks to determine equivalency. The first one is the so called “triple identity” test, which requires that the attacked embodiment performs substantially the same function in substantially the same way to obtain the same result as the patented invention.⁸⁴ The second one is the alternative “insubstantial differences” test, which requires that the attacked embodiment is not substantially different from the patented invention.⁸⁵ The former would be more suitable for mechanical inventions, while the latter would be more suitable for chemical inventions.⁸⁶ The court can choose either of these two tests, depending on the field of the art.⁸⁷ Choice of test is important because it may determine the outcome.⁸⁸

In any case, the essential question is whether the attacked embodiment contains “all elements” of the patented invention in the identical or equivalent form.⁸⁹ It is also an important factor whether the person skilled in the art would have known of the

⁸⁰ Ibid.

⁸¹ Ibid.

⁸² Ibid.

⁸³ Martin J. Adelman et al, *supra* note 17, at p. 386.

⁸⁴ The *Graver Tank* case, *supra* note 8.

⁸⁵ The *Warner-Jenkinson* case (Federal Circuit), *supra* note 43.

⁸⁶ James L. Robart, *supra* note 6.

⁸⁷ The *Warner-Jenkinson* case (Supreme Court), *supra* note 23.

⁸⁸ James L. Robart, *supra* note 6.

⁸⁹ The *Warner-Jenkinson* case (Supreme Court), *supra* note 23.

interchangeability of the replaced part.⁹⁰ The proper time for determining this factor is at the time of the alleged infringement.⁹¹

However, if the court rely on only these frameworks, the scope of equivalents would be too broad. Therefore, the American court have developed some limitations on the doctrine of equivalence. The most important one would be the rule of “prosecution history estoppel”, which was strengthen in the *Festo* case. Under this rule, a patent applicant who narrowed the scope of claims to secure the patent is barred from recapturing the abandoned subject matter, regardless of whether the amendment was made to avoid the prior art or to comply with other requirements related to patentability.⁹² Where the patent applicant narrowed the scope of claims, there arise two presumptions that he amended the claim to fulfil the conditions of patentability and thus that he surrendered the subject matter in issue.⁹³ The patent applicant has the burden of proof to overcome either of these double presumptions.⁹⁴

Moreover, there is another similar limitation called the “public dedication” doctrine, under which a patent owner who disclosed certain subject matter but deliberately left it unclaimed is regarded as having dedicated that subject matter to the public and thus barred from recapturing it.⁹⁵ It is not sufficient to apply this doctrine that the unclaimed subject matter was foreseeable at the time of the patent application.⁹⁶ It is necessary that the patent applicant showed his knowledge of that subject matter.⁹⁷

As for the limitation by the prior art, there is an interesting method called the “hypothetical claim” approach. If the hypothetical claim, which is broad enough to cover the patented invention as well as the attacked embodiment literally, could not have been permitted by the patent office, then the prior art would prevent the

⁹⁰ The *Graver Tank* case, *supra* note 8.

⁹¹ The *Warner-Jenkinson* case (Supreme Court), *supra* note 23.

⁹² *Ibid*, The *Festo* case (Supreme Court) *supra* note 50.

⁹³ The *Warner-Jenkinson* case (Supreme Court), *supra* note 23, The *Festo* case (Supreme Court) *supra* note 50.

⁹⁴ *Ibid*.

⁹⁵ The *Johnson & Johnson* case, *supra* note 68.

⁹⁶ Martin J. Adelman et al, *supra* note 17.

⁹⁷ *Ibid*.

doctrine of equivalents from extending the scope of protection to the attacked embodiment.⁹⁸

Due to these limitations, the doctrine of equivalence is less frequently claimed before the court these days.⁹⁹

⁹⁸ The *Wilson Sporting Goods* case, *supra* note 77.

⁹⁹ James L. Robart, *supra* note 6.

3. Doctrine of equivalence in Germany

3.1 Introduction

Even though the rules governing the scope of protection of patents have a common base in the European Patent Convention (“EPC”) and in its Protocol on Interpretation, the application of such rules is in the hands of the national courts, being determined on a country-by-country basis. Hence the approaches taken by respective countries to the determination of the extent of protection and specifically the relevance of equivalents in patent infringements differ from each other and the deserved harmonisation has not been achieved.

The EPC provides guidance on how the Contracting States should determine the scope of protection of a European patent, and specifically mentions that any element that is equivalent to an element specified in the claims should be considered when determining the scope of protection. Therefore, it provides basis for application of the doctrine of equivalence.

However, the EPC fails to explain how equivalent elements should be taken into account, contributing to different approaches to determining the scope of protection of European patents being developed by different member countries.

Almost two-thirds of patent infringement cases brought in Europe are filed in Germany. In fact, Germany handles about 1,200 patent infringement year, the most of any European country, putting it third in the world (behind the US and China) in terms of the number of patent cases handled per year.¹⁰⁰

Germany has a bifurcated patent litigation system wherein patent infringement and invalidity (i.e., revocation) actions are tried in different courts. Twelve District Courts (*Landgerichte*) have exclusive jurisdiction over patent infringement actions whereas the German Federal Patent Court has exclusive jurisdiction over invalidity

¹⁰⁰ What You Need To Know About Patent Litigation in Germany. Available online: <https://www.mintz.com/sites/default/files/media/documents/2018-07-30/Law360%20-%20Renaud%20-%207-27-18.pdf> (06.05.2021).

actions. A large number of the patent litigation cases filed in Germany are filed in the court in Düsseldorf.

German procedural law does not provide for jury trial. Cases are decided by judges, who tend to be very sophisticated. Also, unlike most jurisdictions, injunctions are generally awarded as a matter of right in Germany. Finally, the losing party is required to cover the winning party's costs and fees (up to a statutory defined limit).

3.2 German Patent Act and European Patent Convention

Section 14 of the German Patent Act ("GPA") states that "[t]he extent of the protection conferred by the patent and the patent application shall be determined by the patent claims. Nevertheless, the description and the drawings shall be used to interpret the patent claims."

This provision is almost the same as Article 69 Paragraph 1 of the EPC, which provides that "[t]he extent of the protection conferred by a European patent or a European patent application shall be determined by the claims. Nevertheless, the description and drawings shall be used to interpret the claims."

In order to interpret these provisions, it is necessary to refer to the Protocol on the Interpretation of Article 69 EPC. Article 1 of the Protocol states as it follows:

"Article 69 should not be interpreted as meaning that the extent of the protection conferred by a European patent is to be understood as that defined by the strict, literal meaning of the wording used in the claims, the description and drawings being employed only for the purpose of resolving an ambiguity found in the claims. Nor should it be taken to mean that the claims serve only as a guideline and that the actual protection conferred may extend to what, from a consideration of the description and drawings by a person skilled in the art, the patent proprietor has contemplated. On the contrary, it is to be interpreted as defining a position between these extremes which combines a fair protection for the patent proprietor with a reasonable degree of legal certainty for third parties."

The first part seems to assume the British traditional "peripheral limitation" principle with the "fence-post" approach, while the second part seems to assume

the German traditional “central limitation” principle with the “tripartite” doctrine, which classifies the scope of protection into three parts: immediate subject matter of the invention, subject matter of the invention and general inventive idea.¹⁰¹

In addition, Article 2 of the Protocol, which was added at the same time as EPC 2000¹⁰², provides as it follows:

“For the purpose of determining the extent of protection conferred by a European patent, due account shall be taken of any element which is equivalent to an element specified in the claims [emphasis added].”

Therefore, all the courts in the Contracting States are now required to consider the doctrine of equivalence in patent infringement litigation.

3.3 Moulded Curbstone (Supreme Court, 1986)

The *Moulded Curbstone*¹⁰³ case is considered the leading case for the doctrine of equivalence after the introduction of the European Patent Convention.

First of all, the Supreme Court (Bundesgerichtshof, BGH) declared that “patent claims now are not merely the starting point but rather the essential basis for the determination of scope” under the GPA of 1981.¹⁰⁴ The contents of the claim have to be interpreted with the specifications and drawings.¹⁰⁵ According to the Protocol on the Interpretation of Article 69 EPC, this interpretation does not only correct uncertainties in claims but also clarify the technical terms as well as the limits and bounds of the invention described in the claims.¹⁰⁶

Additionally, the Protocol opened the way to extend the scope of protection beyond the precise wording of the claim to include equivalent embodiments.¹⁰⁷ The

¹⁰¹ Jochen Pagenberg, William R. Cornish, *Interpretation of Patents in Europe Application of Article 69 EPC* (Carl Heymanns Verlag ed, 2006), at pp. 91, 231.

¹⁰² The EPC 2000 or European Patent Convention 2000 is the version of the European Patent Convention as revised by the Act Revising the Convention on the Grant of European Patents signed in Munich on November 29, 2000.

¹⁰³ Bundesgerichtshof [Federal Court of Justice] Decision on 29 April 1986, Case No. X ZR 28/85, 1986 GRUR 803, *Formstein* (Germany), translated in 18 IIC 795 (1987).

¹⁰⁴ *Ibid.*, at 798.

¹⁰⁵ *Ibid.*

¹⁰⁶ *Ibid.*

¹⁰⁷ *Ibid.*, 799.

question to determine the scope of protection is “whether a person skilled in the art based on the invention protected by the claims, is able to clear up the problem solved by the invention with equally effective means, i.e., to achieve the desired success with other means which also lead to the same result.”¹⁰⁸ According to the Supreme Court, it is irrelevant whether the attacked embodiment uses the same solution principle as that of the protected embodiment.¹⁰⁹ Consequently, the decisive question is “whether the average person skilled in the art was able to determine the equally effective means of the alleged infringement from the claim using the description and the drawings and based on his professional knowledge, and not whether a “principle” is the same.”¹¹⁰

In addition, the Supreme Court mentioned that “the defence that the embodiment attacked and claimed to be an equivalent does not represent a patentable invention in view of the prior art is admissible.”¹¹¹ In other words, the defendant in patent infringement litigation can defend himself with the fact that the alleged patent infringing embodiment is known from the prior art or obvious in view of the prior art.¹¹² It should be noted that the embodiment has to be not new or not inventive over the prior art without reading the patent specification.¹¹³ The burden of proof and procedure for this defence rests on the defendant.¹¹⁴ This was later named the *Formstein* defence after the German name of this case.

¹⁰⁸ Ibid.

¹⁰⁹ Ibid.

¹¹⁰ Ibid, at 799-800.

¹¹¹ Ibid, at 800.

¹¹² Ibid.

¹¹³ Matthias Zigann, Sabine Klepsch. Speech at the Munich International Patent Law Conference 2018. Available online: http://www.munichinternationalpatentlawconference.de/wsp_images/klepsch_zigann.pdf (04.05.2021).

¹¹⁴ See case cited *supra* note 106, at 800.

3.4 *Cutting Blade I* (Supreme Court, 2002)

On 12 March, 2002, the Supreme Court made significant decisions in the *Cutting Blade I*¹¹⁵ case and four other cases¹¹⁶. These five parallel decisions are sometimes referred to as the *Quintet* cases.¹¹⁷

In the *Cutting Blade I* case, the Supreme Court stated that in the examination of patent infringement it is first necessary to use the interpretation of the person skilled in the art, which determines the definition of the contents of the patent claims including the concept used and the extent going beyond the wording of the protection based on the patent claims.¹¹⁸ If the contested embodiment uses the essential meaning of a patent claim, then it uses the invention under protection.¹¹⁹

However, even if it does not use the essential meaning, it still may use the invention, provided that the person skilled in the art could find the modified means used in the contested embodiment as having the same effect for the solution of the problem underlying the invention protected in the claims, combining considerations based on the essential meaning of the invention with his specialist knowledge.¹²⁰ Thus, in order to determine if an embodiment departing from the essential meaning of the patent claim is included within the extent of protection, the Supreme Court established the following three principles to be satisfied:

- (1) “it solves the problem underlying the invention with modified but objectively equivalent means” (“equal effect”),
- (2) “the person skilled in the art is able to use his specialist knowledge to identify the modified means as having the same effect” (“obviousness”),

¹¹⁵ Bundesgerichtshof [Federal Court of Justice] Decision on 12 March, 2002, Case No. X ZR 168/00, 2002 GRUR 515, *Schneidmesser I* (Germany), translated in 33 IIC 873 (2002).

¹¹⁶ Bundesgerichtshof [Federal Court of Justice] Decision on 12 March, 2002, Case No. X ZR 135/01, 2002 GRUR 519, *Schneidmesser II* (Germany), Bundesgerichtshof [Federal Court of Justice] Decision on 12 March, 2002, Case No. X ZR 43/01, 2002 GRUR 511, *Kunststoffrohrteil* (Germany), translated in 34 IIC 302 (2003), Bundesgerichtshof [Federal Court of Justice] Decision on 12 March, 2002, Case No. X ZB 12/00, 2002 GRUR 523, *Custodiol I* (Germany), Bundesgerichtshof [Federal Court of Justice] Decision on 12 March, 2002, Case No. X ZR 73/01, 2002 GRUR 527, *Custodiol II* (Germany), translated in 34 IIC 197 (2003).

¹¹⁷ Jochen Pagenberg et al, *supra* note 104, at p. 94.

¹¹⁸ See case cited *supra* note 118, at 874.

¹¹⁹ *Ibid.*

¹²⁰ *Ibid.*

(3) “the considerations that the person skilled in the art must apply must in addition be focused on the essential meaning of the technical teaching protected in the patent claim in such a way that the person skilled in the art regards the different embodiment with its modified means as being equivalent to the solution in question” (“equal value” or “orientation on the teaching of the patent”).¹²¹

The first principle is called the “equal effect” and it requires that the modified means have the objectively equal effect to the means mentioned in the claim.¹²² It is not sufficient if the attacked embodiment has essentially the same effect in solving the underlying problem.¹²³ The modified means have to realise all the results which are achieved by every single feature and by the mutual connection of all features of the claim.¹²⁴ Any potential benefit of the patented means is irrelevant if it does not have an effect on the problem solution.¹²⁵

The second principle is called the “obviousness” and it requires that the person skilled in the art having read the patent specification may find the modified means at the priority date.¹²⁶ However, it does not automatically exclude the modified means which were unknown to the person skilled in the art at the priority date.¹²⁷ If the person skilled in the art can come up with those unknown means without inventive considerations, they may still fulfil the requirement.¹²⁸

The third principle is called the “equal value” or the “orientation on the teaching of the patent” and it requires that the considerations of the person skilled in the art must be focused on the semantic content of the subject matter protected in the claim in such a way that he considers the possibility of the divergent embodiment with its modified means as being an equivalent solution.¹²⁹ In other words, it is necessary that the considerations which enable the person skilled in the art to find the modified

¹²¹ Ibid, at 875.

¹²² Matthias Zigann et al, *supra* note 116.

¹²³ Ibid.

¹²⁴ Ibid.

¹²⁵ Ibid.

¹²⁶ Ibid.

¹²⁷ Ibid.

¹²⁸ Ibid.

¹²⁹ Jochen Pagenberg et al, *supra* note 104, at p. 95.

means is based on the sense of the patent claim and that he considers the deviating embodiment with its modified means as an approach equal to the approach that is directly based on the literal meaning.¹³⁰ The third principle provides the appropriate scope of protection by considering both contribution of inventors to the state of the art and legal certainty for third parties.¹³¹

According to the *Quintet* cases, there would be no infringement by equivalence only if (i) an essential and decisive feature is replaced by a means which does not satisfy the purpose of the invention, (ii) it is an essential and decisive feature that achieves a particular effect without additional means or effort while the contested embodiment uses such means, or (iii) the contested embodiment dispenses with the decisive advantage of the invention by using a means that leads to the same result and it is the avoidance of this means that constituted the main purpose of the invention.¹³²

Additionally, the Supreme Court mentioned that those principles are also applicable for the case in which the patent claim contains figures or measurements.¹³³ Like any element of a patent claim, figures are fundamentally capable of interpretation by the person skilled in the art in the overall context of the patent claim.¹³⁴ However, since figures are as such unambiguous, from the viewpoint of the specialist reader, concretised features with such details can be made to mean that the objective achievement of the invention should be defined more narrowly and closely than the case for a mere verbal definition.¹³⁵ Accordingly, an unambiguous specification of figures fundamentally determines and hence limits the subject matter of protection thoroughly.¹³⁶ On the other hand, the person skilled in the art may still regard a certain vagueness as being compatible with the essential technical meaning of figures.¹³⁷ A value must be complied with exactly if the person skilled in the art realises that this is a critical value, but in some cases it may be considered to

¹³⁰ Matthias Zigann et al, *supra* note 116.

¹³¹ Bernd Allekotte, Markus Grammel, translated by Toshio Nakamura, Kintōron – Doitsu niokeru Aratana Tenkai [Doctrine of Equivalents – New Development in Germany], AIPPI vol. 62, no. 6, p. 26 (2017).

¹³² Jochen Pagenberg et al, *supra* note 104, at p. 94.

¹³³ See case cited *supra* note 118, at 875.

¹³⁴ *Ibid.*

¹³⁵ *Ibid.*, at 875-876.

¹³⁶ *Ibid.*, at 876.

¹³⁷ *Ibid.*

comprise the usual tolerances.¹³⁸ An embodiment is basically not encompassed by the scope of protection of the patent, unless it is identified by the person skilled in the art as achieving not merely the effect of a feature of the invention but also precisely the effect that the numeric restriction of this feature is intended to achieve.¹³⁹ In other words, “[i]f the person skilled in the art does not identify different figures as having the same effect as the values according to the claim, the extent of protection does not extend beyond the essential meaning of the claim.”¹⁴⁰

Furthermore, if the patent is restricted to a narrower wording of the claim than the full technical contents of the invention, experts can rely on the fact that protection is restricted accordingly.¹⁴¹ In that case, the patent owner cannot claim protection subsequently for something that he has not protected, since it is his responsibility to ensure that everything for which he requests protection is set out in the patent claims.¹⁴²

3.5 Occlusion Device (Supreme Court, 2001)

In the *Occlusion Device*¹⁴³ case the Supreme Court established a limitation on the doctrine of equivalence, which is called the “selection decision” principle.

The Supreme Court stated that “[i]n the event of contradictions between the patent claims and the description, the elements of the description that are not reflected in the patent claims are, as a matter of principle, not included in the protection afforded by the patent. The description is only to be taken into account to the extent that it can be read as an explanation of the subject matter of the claim.”¹⁴⁴ In other words, if the technical teaching of the description and that of the patent claim cannot be reconciled, the patent claim has priority over the description.¹⁴⁵ The description and drawings should be used only to determine the semantic content of the patent and

¹³⁸ Ibid.

¹³⁹ Ibid.

¹⁴⁰ Ibid, at 873.

¹⁴¹ Ibid, at 877

¹⁴² Ibid, at 876-877.

¹⁴³ Bundesgerichtshof [Federal Court of Justice] Decision on 10 May 2011, Case No. X ZR 16/09, 2011 GRUR 701, *Okklusionsvorrichtung* (Germany), translated in 42 IIC 851 (2011).

¹⁴⁴ Ibid, at 854-855.

¹⁴⁵ Ibid, at 854.

must not be used to extend or narrow the subject matter specified by the literal meaning of the patent claim.¹⁴⁶

Moreover, the Supreme Court mentioned that “[i]f the patent claim makes a selection between different ways of achieving a technical effect, the considerations of the person skilled in the art on possible modifications must also be compatible with this selection.”¹⁴⁷ For example, if the description discloses solutions A and B, both of which can achieve a specific technical effect, but the patent claims include only A, then as a rule B does not constitute an infringement of the patent with equivalent means.¹⁴⁸ In that case, the principle of the equal value would not be fulfilled.¹⁴⁹

3.6 Diglycidyl Compounds (Supreme Court, 2011)

In the *Diglycidyl Compounds*¹⁵⁰ case the Supreme Court further developed the selection decision principle in a more complicated situation.

The Supreme Court observed that “[i]f the description of a patent discloses several possibilities to achieve a specific technical effect, but only one of these possibilities is included in the patent claim, an infringement under the doctrine of equivalents can only be assumed if the attacked solution in its specific effects corresponds to the claimed solution and differs in a similar manner as the claimed solution from the non-claimed solution which was disclosed only in the description.”¹⁵¹ In other words, it requests both correspondence to the claimed solution and difference from the non-claimed solution.¹⁵² For example, if the description discloses solutions A and B, both of which can achieve a specific technical effect, but the patent claims include only A, and the attacked embodiment adopts solution C, which can achieve the same technical effect as well, then C can constitute an infringement of the patent

¹⁴⁶ Ibid.

¹⁴⁷ Ibid, at 857.

¹⁴⁸ Ibid, at 851.

¹⁴⁹ Shimako Katō, Aya Usami, Doitsu ni okeru Saikin no Claim Kaishaku oyobi Kintōron ni tsuite [Recent Claim Interpretation and Doctrine of Equivalents in Germany], Patent vol. 68, no. 1, p. 98 (2015).

¹⁵⁰ Bundesgerichtshof [Federal Court of Justice] Decision on 13 September 2011, Case No. X ZR 69/10, 2012 GRUR 45, *Diglycidverbindung* (Germany), the English summary provided by Bardehle Pagenberg is available online: <http://eplaw.org/de-diglycidverbindung-diglycidyl-compounds/> (01.05.2021).

¹⁵¹ Ibid.

¹⁵² Shimako Katō et al, *supra* note 155, at p. 101.

with equivalent means, provided that C corresponds to A and differs from B in a similar manner as A.¹⁵³ Stated quite simply, an infringement under the doctrine of equivalence may be found if C belongs to the group of A rather than that of B.¹⁵⁴ If C belongs to the group of B, then the third principle of equal value would not be fulfilled.¹⁵⁵

3.7 *Pemetrexed* (Supreme Court, 2016)

The two decisions overviewed above were understood to have limited the scope of protection so narrowly that it was thought that they have almost killed the doctrine of equivalence.¹⁵⁶ In the *Pemetrexed*¹⁵⁷ case, the Supreme Court revisited the issue of selection decision to clarify the principle.¹⁵⁸

First of all, the Supreme Court reconfirmed the selection decision principle, stating that “a patent infringement by equivalent means it [*sic*] is as a rule to be denied if the description of the patent discloses more than one possibility of how to achieve a certain technical effect but only one of these possibilities has been included in the patent claim.”¹⁵⁹ However, the situation was similar to but rather different from the above two cases. In this case, the patent specification referred to a species of chemical compounds but disclosed only one individual compound belonging to that species.¹⁶⁰ In other words, if there are materials A and B, both of which belong to a group of X, the patent specification referred to X generally but disclosed only A concretely, and the patent claims named only A as well.

According to the Supreme Court, B may still constitute an infringement of the patent with equivalent means, since the disclosure of a species of chemical compounds does not have the same legal effects as the listing of all compounds belonging to that species and as such was already known on the date of priority.¹⁶¹ The fact that B belongs to the same group as A is not sufficient to deem it disclosed

¹⁵³ See case cited *supra* note 156.

¹⁵⁴ Shimako Katō et al, *supra* note 155, at p. 99.

¹⁵⁵ *Ibid*, at p. 101.

¹⁵⁶ Bernd Allekotte et al, *supra* note 137, at p. 25.

¹⁵⁷ See case cited *supra* note 3.

¹⁵⁸ Bernd Allekotte et al, *supra* note 137, at p. 25

¹⁵⁹ See case cited *supra* note 3, at 214.

¹⁶⁰ *Ibid*.

¹⁶¹ *Ibid*.

by the specification of the patent, unless special circumstances that could indicate that the skilled person nevertheless implicitly understands B as being included is ascertained.¹⁶² The selection decision principle is only for what is explicitly and specifically disclosed but not claimed.¹⁶³

On the other hand, it does not necessarily follow that the finding of a selection decision is completely ruled out.¹⁶⁴ In individual cases, it is possible that the focus on an individual compound of a group of substances is based on a choice that rules out other compounds belonging to that group, for instance when the compound displays a special property that is significant for exercising the function aimed at by the invention.¹⁶⁵

In addition, the Supreme Court suggested that a comparison between the current version of the patent and the published application or any earlier versions of the right can be considered in individual cases, although no general rules can be established.¹⁶⁶ The Supreme Court mentioned that “[i]f the patent proprietor claims protection for a group of compounds in a certain stage of the process, but later formulates the patent claims such that their literal meaning now only includes one single compound, this may in an individual case indicate that the proprietor has excluded the other compounds from the application for protection.”¹⁶⁷ Such assumption may be justified when a comparison of the different claim versions makes it sufficiently clear that the concretisation has been made so as to describe the subject matter of the patent from the state of the art and therefore to avoid doubts about patentability, even when it is not objectively necessary.¹⁶⁸ By contrast, if the concretisation has been made with concerning formal requirements or if the reason for the concretisation does not become sufficiently clear, then as a rule the above assumption cannot be made.¹⁶⁹ This is a remarkable opinion, considering that traditionally the German court has not taken prosecution history into account to

¹⁶² Ibid.

¹⁶³ Matthias Zigann et al, *supra* note 116.

¹⁶⁴ See case cited *supra* note 3, at 216.

¹⁶⁵ Ibid.

¹⁶⁶ Ibid.

¹⁶⁷ Ibid.

¹⁶⁸ Ibid.

¹⁶⁹ Ibid, at 217.

interpret claims or to determine the scope of protection.¹⁷⁰ However, at the present moment it is still unclear whether the file wrapper can be used for interpreting an equivalent protection.¹⁷¹

3.8 Summary

In Germany, the doctrine of equivalents was introduced in the *Moulded Curbstone* case. This case is also famous for the *Formstein* defence, which prevents the scope of protection from extending to the embodiment which has already been known or obvious from the prior art at the time of the patent application.¹⁷² The burden of proof for this defence is on the alleged infringer.¹⁷³

The framework for the doctrine of equivalence was established in the *Cutting Blade I* and the other *Quintet* cases. There are three principles to be fulfilled. The first principle of “equal effect” requires that the modified means of the attacked embodiment has the objectively equal effect to the claimed means of the patented invention and thus the attacked embodiment can solve the problem underlying the patented invention.¹⁷⁴

The second principle of “obviousness” requires that the person skilled in the art could have identified the modified means as having the equal effect to the claimed means without inventive considerations if he had read the description at the priority date.¹⁷⁵ However, the modified means which were unknown to the person skilled in the art at the priority date may still fulfil this requirement.¹⁷⁶

The third principle of “equal value” requires that the considerations which the person skilled in the art applies to identify the modified means are focused on the essential meaning of the technical teaching of the patented invention and that

¹⁷⁰ Bernd Allekotte et al, *supra* note 137, at p. 28.

¹⁷¹ Matthias Zigann et al, *supra* note 116.

¹⁷² The *Moulded Curbstone* case, *supra* note 106.

¹⁷³ *Ibid.*

¹⁷⁴ The *Cutting Blade I* case, *supra* note 118.

¹⁷⁵ Matthias Zigann et al, *supra* note 116.

¹⁷⁶ *Ibid.*

consequently he regards the attacked embodiment as having the equal value to the patented invention in solving the underlying problem.¹⁷⁷

In regard to the third principle, there is a strong limitation called the “selection decision” principle, which excludes disclosed but not claimed solution from the scope of protection. If the patent applicant disclosed alternative elements A and B in the description but named only A in the patent claim, then as a rule B does not constitute an infringement under the doctrine of equivalents.¹⁷⁸ In addition, another alternative element C may constitute an infringement under the doctrine of equivalents if C corresponds to A and differs from B in a similar manner as A.¹⁷⁹ Nevertheless, if the patent applicant referred to group X to which A and B belong and disclosed A in the description and named A in the patent claim, B may still constitute an infringement under the doctrine of equivalents.¹⁸⁰ The selection decision principle applies only where an alternative element is explicitly and specifically disclosed but not claimed.¹⁸¹

As for the file wrapper, traditionally the German court had consistently ignored it, but recently it suggested that an amendment narrowing the scope of claims may constitute a selection decision as far as it was made to avoid the prior art.¹⁸²

¹⁷⁷ The *Cutting Blade I* case, *supra* note 118.

¹⁷⁸ The *Occlusion Device* case, *supra* note 149.

¹⁷⁹ The *Diglycidyl Compounds* case, *supra* note 156.

¹⁸⁰ The *Pemetrexed* case *supra* note 3.

¹⁸¹ Matthias Zigann et al, *supra* note 116.

¹⁸² Bernd Allekotte et al, *supra* note 137, The *Pemetrexed* case *supra* note 3.

4. Doctrine of equivalence in the United Kingdom

4.1 Introduction

The UK is one of the top jurisdictions in the world for patent enforcement. Nevertheless, it has for a long time denied the doctrine of equivalence as such and applied solely one-step purposive construction.

In the *Van der Lely*¹⁸³ case, the House of Lords (Lord Reid) stated that “[c]opying an invention by taking its ‘pith and marrow’ without textual infringement of the patent is an old and familiar abuse which the law has never been powerless to prevent.”¹⁸⁴ It also mentioned that “you cannot avoid infringement by substituting an obvious equivalent for an unessential integer. On the other hand, ... you cannot be held to have taken the substance of an invention if you omit, or substitute something else for, an essential integer.”¹⁸⁵ Thus, the British court used to have the “pith and marrow” doctrine.

In 2017, however, the Supreme Court of the United Kingdom (“UKSC”) issued its landmark decision in the *Actavis*¹⁸⁶ case, that introduced the doctrine of equivalence in to the UK practice, which was an especially important step towards a harmonised approach across Europe. In this decision, Lord Neuberger accused the former UK approach of conflating two issues, the normal interpretation as a tool of the literal infringement and the doctrine of equivalence. With this step the UK for the first time gave up the purposive construction as the sole tool for assessing infringement and turned towards a two-step structure which is common for the most European jurisdictions.

¹⁸³ C. Van der Lely N.V. v. Bamfords Ltd., [1963] R.P.C. 61.

¹⁸⁴ Ibid, at 75.

¹⁸⁵ Ibid, at 76

¹⁸⁶ See case cited *supra* note 4.

4.2 UK Patent Act and European Patent Convention

Section 125 (1) of the UK Patent Act states that “[f]or the purposes of this Act an invention for a patent for which an application has been made or for which a patent has been granted shall, unless the context otherwise requires, be taken to be that specified in a claim of the specification of the application or patent, as the case may be, as interpreted by the description and any drawings contained in that specification, and the extent of the protection conferred by a patent or application for a patent shall be determined accordingly.” This provision also corresponds to Article 69 of the EPC.

Moreover, Section 125 (3) of the UK Patent Act provides that “[t]he Protocol on the Interpretation of Article 69 of the European Patent Convention (which Article contains a provision corresponding to subsection (1) above) shall, as for the time being in force, apply for the purposes of subsection (1) above as it applies for the purposes of that Article.” Therefore, the Protocol provides the UK with the same legal basis as Germany, although both countries have separately developed their own case law.

4.3 *Catnic* (House of Lords, 1980)

The *Catnic*¹⁸⁷ is the leading case after the introduction of the EPC, in which the House of Lords established its original “purposive construction” approach.

The House of Lords (Lord Diplock) declared that there is a single cause of action and no distinction between “textual infringement” which is determined only as a matter of construction and infringement of the “pith and marrow” of an invention which is determined upon some broader principle of colourable evasion.¹⁸⁸

A patent specification, by which the patent owner states what he claims to be essential features of his invention, should be given a purposive construction rather than a purely literal one of meticulous verbal analysis.¹⁸⁹ The relevant question here is “whether persons with practical knowledge and experience of the kind of work

¹⁸⁷ *Catnic Components Ltd. v. Hill & Smith Ltd.*, [1982] R.P.C. 183.

¹⁸⁸ *Ibid.*

¹⁸⁹ *Ibid.*

in which the invention was intended to be used, would understand that strict compliance with a particular descriptive word or phrase appearing in a claim was intended by the patentee to be an essential requirement of the invention so that any variant would fall outside the monopoly claimed, even though it could have no material effect upon the way the invention worked.”¹⁹⁰

Additionally, the above question arises only if “the variant would in fact have a material effect upon the way the invention worked” and “at the date of publication of the specification it would be obvious to the informed reader that this was so.”¹⁹¹ Where it is not obvious, the reader is entitled to assume that the patent owner thought that he had good reason for limiting his monopoly so strictly and had intended to do so, even though subsequent work in the field of the invention might show the limitation to have been unnecessary.¹⁹² On the one hand, this judgment was conservative in excluding any separate concept of equivalence in the form of “pith and marrow” infringement.¹⁹³ On the other hand, it was radical in its call for purposive, rather than literal, construction.¹⁹⁴

4.4 *Improver* (Court of Appeal, 1988)

In the *Improver*¹⁹⁵ case, the Court of Appeal (Hoffmann J, as then he was) organised the questions of the *Catnic* case as it follows:

“(1) Does the variant [a feature embodied in an alleged infringement which fell outside the primary, literal or a contextual meaning of a descriptive word or phrase in the claim] have a material effect upon the way the invention works? [the first question]

If yes, the variant is outside the claim. If no-

¹⁹⁰ Ibid.

¹⁹¹ Ibid.

¹⁹² Ibid.

¹⁹³ Jochen Pagenberg et al, *supra* note 104, at p. 238.

¹⁹⁴ Ibid.

¹⁹⁵ *Improver Corporation v. Remington Consumer Products Ltd.*, [1990] F.S.R. 181.

(2) Would this (i.e., that the variant had no material effect) have been obvious at the date of publication of the patent to a reader skilled in the art. [the second question]

If no, the variant is outside the claim. If yes-

(3) Would the reader skilled in the art nevertheless have understood from the language of the claim that the patentee intended that strict compliance with the primary meaning was an essential requirement of the invention. [the third question]

If yes, the variant is outside the claim.”¹⁹⁶

These are called the *Improver* questions or the “Protocol” questions because they are based on the Protocol on the Interpretation of Article 69 EPC.

One key for the first question (*No difference in the way it works?*) is the level of generality at which the invention is described in the claim.¹⁹⁷ It seems that “the way it works” requires a broad understanding of the claimed technique as it relates to the outcome of its use.¹⁹⁸

The second question (*Obvious that there was no material difference in working?*) is only asked on the assumption that the variant has already been found not to change the working of invention and that the functioning variant was compared side by side with embodiments described in the claim.¹⁹⁹

The third question (*Does the claim nevertheless cover only what is strictly required by its primary meanings?*) is often regarded as the primary restraint required for legal certainty for third parties.²⁰⁰ It requires the construction by the objective perception of the reasonable skilled worker.²⁰¹ It does not focus on the subjective

¹⁹⁶ Ibid.

¹⁹⁷ Jochen Pagenberg et al, *supra* note 104, at p. 243.

¹⁹⁸ Ibid.

¹⁹⁹ Ibid, at p. 244.

²⁰⁰ Ibid, at pp. 245-246.

²⁰¹ Ibid, at p. 246.

intention of the patent owner any more than it introduces consideration of fairness to the patent owner.²⁰²

The first two questions basically do not involve questions of construction.²⁰³ They are just prerequisite questions about fact.²⁰⁴ What is conclusive is the third question, which raises the question of construction.²⁰⁵ In the end, the question is always whether the alleged infringement is covered by the language of the claim as an immaterial variant.²⁰⁶

It is interesting to mention that the British court denied infringement in this case, while the German and the other countries' courts affirmed infringement regarding the same product named *Epilady*.²⁰⁷

4.5 Kirin-Amgen (House of Lords, 1980)

In *Kirin-Amgen*²⁰⁸ case the House of Lords (Lord Hoffmann) reconfirmed and completed the purposive construction approach.

First of all, the House of Lords stated that the question for the purposive construction is always “what the person skilled in the art would have understood the patentee to be using the language of the claim to mean.”²⁰⁹ The language which the patent owner has chosen is usually of critical importance.²¹⁰ The British court decided to abandon literalism, while the American court adhered to literalism in construing the claims and evolved a doctrine which makes up the claims by extending protection to equivalents.²¹¹ The House of Lords declared that Article 69 EPC firmly shuts the door on any doctrine which extends protection outside the claims.²¹²

²⁰² Ibid.

²⁰³ See case cited *supra* note 202.

²⁰⁴ Ibid.

²⁰⁵ Ibid.

²⁰⁶ Ibid.

²⁰⁷ Nick Reeve, Zack Mummery, translated by AIPPI, Claim Shingai no Kentō ni okeru Eikoku Tokkyo Saibansho no Approach no Ōhabana Henka [Great Change in Approach of British Patent Court in Examination of Claim Infringement], AIPPI vol. 62, no. 12, p. 16 (2017).

²⁰⁸ *Kirin-Amgen Inc. v. Hoechst Marion Roussel Ltd.*, [2005] R.P.C. 9.

²⁰⁹ Ibid, at 34.

²¹⁰ Ibid.

²¹¹ Ibid, at 42.

²¹² Ibid, at 43.

Secondly, the House of Lords observed that the *Catnic* principle of purposive construction is precisely in accordance with the Protocol on the Interpretation of Article 69 EPC, since “[i]t is intended to give the patentee the full extent, but not more than the full extent, of the monopoly which a reasonable person skilled in the art, reading the claims in context, would think he was intending to claim.”²¹³ On the one hand, the principle gives effect to the requirements of the Protocol, which is the universal basis of patent construction.²¹⁴ On the other hand, it only gives the guidelines, more useful in some cases than in others, for applying that principle to equivalents, which are contained in the Protocol questions.²¹⁵

As for the use of the Protocol questions, the House of Lords emphasised again that “[t]he determination of the extent of protection conferred by a European patent is an examination in which there is only one compulsory question, namely that set by article 69 and its Protocol: what would a person skilled in the art have understood the patentee to have used the language of the claim to mean? Everything else, including the Protocol questions, is only guidance to a judge trying to answer that question.”²¹⁶ Therefore, it is not necessary to go through the Protocol questions when it is not appropriate.²¹⁷ In some cases, they may simply provide a formal justification for a conclusion which has already been reached on other grounds.²¹⁸ Therefore, the Protocol questions were degraded to mere “guideline”, which only become useful when the extension being sought beyond the plain word language of the claims is relatively slight.²¹⁹

4.6 *Actavis* (Supreme Court 2017)

The *Actavis*²²⁰ is a notable case, in which the Supreme Court (Lord Neuberger) declared that the *Catnic*, *Improver* and *Kirin-Amgen* cases no longer represented

²¹³ Ibid, at 48.

²¹⁴ Ibid, at 52.

²¹⁵ Ibid.

²¹⁶ Ibid, at 69.

²¹⁷ Ibid.

²¹⁸ Ibid.

²¹⁹ Jochen Pagenberg et al, *supra* note 104, at p. 243.

²²⁰ See case cited *supra* note 4.

the law and finally adopted the doctrine of equivalence.²²¹²²² The decision unexpectedly and greatly deviated from the precedent of several decades.²²³ It is also interesting to mention that this case is related to the same European patent as the German *Pemetrexed* case.

The Supreme Court denied the notion that there is a single compound issue which involves a question of interpretation.²²⁴ The best approach to a problem of infringement, which complies not only with Article 1 but also with Article 2 of the Protocol on the Interpretation of Article 69 EPC, is addressing the following two issues:

“(i) does the variant infringe any of the claims as a matter of normal interpretation; [the first issue]

and, if not,

(ii) does the variant nonetheless infringe because it varies from the invention in a way or ways which is or are immaterial? [the second issue]

If the answer to either issue is “yes”, there is an infringement; otherwise, there is not.”²²⁵

Each of these issues should be considered through the eyes of the person skilled in the relevant art.²²⁶ The first issue involves solving a problem of normal interpretation, while the second issue poses more difficulties of principle with the word “immaterial”.²²⁷ The *Improver* questions may provide helpful assistance for the second issue, although they need some exegesis and reformulation.²²⁸

The first *Improver* question seems generally satisfactory as far as it is focused on “the problem underlying the invention”, “the inventive core” or “the inventive

²²¹ Christopher Floyd, Speech at the Munich International Patent Law Conference 2018. Available online: (http://www.munichinternationalpatentlawconference.de/wsp_images/floyd.pdf) (10.05.2021).

²²² Nick Reeve et al, *supra* note 214, at p. 13.

²²³ *Ibid.*

²²⁴ See case cited *supra* note 4, at 55.

²²⁵ *Ibid.*, at 54.

²²⁶ *Ibid.*

²²⁷ *Ibid.*, at 58-59.

²²⁸ *Ibid.*, at 59.

concept”.²²⁹ The relevant question is “whether the variant achieves the same result in substantially the same way as the invention.”²³⁰

The second *Improver* question is more problematic, for it imposes too high a burden on the patent owner.²³¹ The better question is “whether, on being told what the variant does, the notional addressee would consider it obvious that it achieved substantially the same result in substantially the same way as the invention.”²³² In other words, it should be assumed that the notional addressee knows that the variant works to the extent that it actually does work.²³³ This reformulated question should also apply to developments which have appeared since the priority date, although the notional addressee is treated as answering the question at the priority date.²³⁴

The third *Improver* question is an acceptable test as it is.²³⁵ However, there are some points to be noticed: (1) as well as the language of the claim, the specification of the patent and all the knowledge and expertise should be considered; (2) the fact that the language of the claim does not cover the variant is certainly not enough to answer the question in the negative; (3) it is appropriate to ask whether the component at issue is an “essential” part of the invention, not of the overall product or process; (4) when developments which were made after the priority date is concerned, it is necessary to provide the notional addressee with rather more information than he might have had at the priority date.²³⁶

Consequently, the reformulated *Improver* questions, or the *Actavis* questions, should be as follows:

“i) Notwithstanding that it is not within the literal meaning of the relevant claim(s) of the patent, does the variant achieve substantially the same result in substantially the same way as the invention, i.e., the inventive concept revealed by the patent? [the first question]

²²⁹ Ibid, at 60.

²³⁰ Ibid.

²³¹ Ibid, at 61.

²³² Ibid, at 62.

²³³ Ibid.

²³⁴ Ibid, at 63.

²³⁵ Ibid, at 65.

²³⁶ Ibid.

ii) Would it be obvious to the person skilled in the art, reading the patent at the priority date, but knowing that the variant achieves substantially the same result as the invention, that it does so in substantially the same way as the invention? [the second question]

iii) Would such a reader of the patent have concluded that the patentee nonetheless intended that strict compliance with the literal meaning of the relevant claim(s) of the patent was an essential requirement of the invention? [the third question]”²³⁷

If the answer to the first two questions is “yes” and the answer to the third question is “no”, infringement would be established, even though there is no literal infringement.²³⁸ The new questions would give more favourable answers to the patent owner than the old ones.²³⁹

Moreover, as for the third question, the Supreme Court mentioned that the fact that the specification refers to a species of chemical compounds and the claims are limited to only one individual compound belonging to that species does not mean that the drafter of the patent would have been understood to intend that the other individual compounds would not infringe.²⁴⁰ If the specification does not refer to a species of chemical compounds but only refers to one individual compound belonging to that species, that would be a more powerful indication that the patent owner was intending to limit himself to that individual compound.²⁴¹

In addition, as for the effect of prosecution history, the Supreme Court stated that it is appropriate to adopt a sceptical, but not absolutist, attitude to taking the prosecution file of a patent into consideration.²⁴² Although there will be some occasions where prosecution history may be relied on, such circumstances must be limited.²⁴³ According to the Supreme Court, “reference to the file would only be appropriate where (i) the point at issue is truly unclear if one confines oneself to the

²³⁷ Ibid, at 66.

²³⁸ Ibid.

²³⁹ Nick Reeve et al, *supra* note 214, at p. 20.

²⁴⁰ See case cited *supra* note 4, at 72.

²⁴¹ Ibid, at 73.

²⁴² Ibid, at 87.

²⁴³ Ibid.

specification and claims of the patent, and the contents of the file unambiguously resolve the point, or (ii) it would be contrary to the public interest for the contents of the file to be ignored.”²⁴⁴ Thus, although it is limited to certain situations, the Supreme Court opened the way to consider prosecution history.²⁴⁵ This was also a remarkable opinion because it had been considered unfavourable to refer to prosecution history in the conventional practice.²⁴⁶

4.7 Summary

In the UK, the court has adhered to the literal infringement and developed their original “purposive construction” approach through the *Catnic*, *Improver* and *Kirin-Amgen* cases.

However, not so long ago, it has finally decided to adopt the doctrine of equivalence in the *Actavis* case. Probably it was not irrelevant to Article 2 of the Protocol on the Interpretation of Article 69 EPC which came into effect in 2007. Under the current case law, infringement would be examined in two stages: the “normal interpretation” and the “immaterial variant”.²⁴⁷

In the second stage, the *Actavis* questions, which have superseded the *Improver* questions, would be helpful. The first question of “same result” requires that the attacked embodiment achieves substantially the same result in substantially the same way as the patented invention.²⁴⁸ This question should be focused on the inventive core or the inventive concept.²⁴⁹ In other words, the attacked embodiment has to solve the problem underlying the patented invention.²⁵⁰

The second question of “obviousness” requires that the person skilled in the art would have considered it obvious that the attacked embodiment achieves substantially the same result in substantially the same way as the patented invention

²⁴⁴ Ibid, at 88.

²⁴⁵ Nick Reeve et al, *supra* note 214, at p. 13.

²⁴⁶ Ibid, at p. 22.

²⁴⁷ The *Actavis* case, *supra* note 4.

²⁴⁸ Ibid.

²⁴⁹ Ibid.

²⁵⁰ Ibid.

if he had read the description and known that it actually does so at the priority date.²⁵¹

The third question of “essential requirement” requires that the person skilled in the art would not have concluded that the patent holder nonetheless intended that strict compliance with the literal meaning of the relevant claim was an essential requirement of the patented invention.²⁵² It should be asked whether the component at issue is an essential part of the patented invention.²⁵³ These new questions clearly made the scope of protection broader than before.

Regarding the third question, there is a limitation which is somewhat similar to the “selection decision” principle in Germany. However, even if the patent applicant referred to a group of elements and named only one of them in the patent claim, it does not follow that he intended to exclude other elements from the scope of protection.²⁵⁴ If the patent applicant only referred to that one element and just named it in the patent claim, it may suggest that he intended to limit the scope of protection to that single element.²⁵⁵

As for prosecution history, conventionally the British court had not taken it into consideration, but in the recent years it suggested that prosecution history can be referred to in limited situations where it is absolutely necessary.²⁵⁶

Moreover, the British courts are known to have the *Gillette* defence²⁵⁷, which is similar to the German *Formstein* defence. Although it is not yet clear whether such defence is effective against the doctrine of equivalence, probably the court will continue to develop the theory in the future.²⁵⁸

²⁵¹ Ibid.

²⁵² Ibid.

²⁵³ Ibid.

²⁵⁴ Ibid.

²⁵⁵ Ibid.

²⁵⁶ Ibid.

²⁵⁷ *Gillette Safety Razor Company v. Anglo-American Trading Company Ltd.*, [1913] R.P.C. 30.

²⁵⁸ Christopher Floyd, *supra* note 228.

5. Discussion and Conclusion

5.1 Comparative Analysis

5.1.1 Introduction

This research findings have shown that the doctrine of equivalence of the compared countries have much in common. These jurisdictions have similar conditions (positive requirements) such as the “same result” and “obviousness”, as well as similar limitations (negative requirements) like “prosecution history estoppel”, “selection decision” and “public domain defence”. However, there are also some differences.

After studying each jurisdiction individually, this final chapter summarises the similar and different points for each requirement amongst the US, Germany and the UK.

5.1.2 Conditions (Positive Requirements)

5.1.2.1 Same Result

In each jurisdiction, it is commonly required that the attacked embodiment with modified means achieve the same result as the patented invention (the “triple identity” test in the US and the first question of “same result” in the UK), in other words, that the attacked embodiment solves the problem underlying the patented invention (the first principle of “equal effect” in Germany). This is the most basic requirement for the doctrine of equivalence.

Moreover, it is also required that the same result is obtained by the same function (the US), by the same effect (Germany) or in the same way (the US and the UK). If the modified means have the same function or the same effect as the claimed means, the attacked embodiment will have achieved the same result in the same way. Therefore, there is no substantial difference among these requirements.

5.1.2.2 Obviousness

In Germany and the UK, it is commonly required that the attacked embodiment is conceivable or obvious (the second principle of “obviousness” in Germany and the second question of “obviousness” in the UK) for the person skilled in the art from the patented invention. In the US, this is also regarded as an important factor.

Notwithstanding, there is an important difference whether the relevant time is at the time of the alleged infringement (the US) or at the time of the patent application (Germany, the UK). Apparently, it is easier to affirm the conceivability or the obviousness at the time of the alleged infringement than at the time of the patent application. However, even in Germany, the modified means which were unknown to the person skilled in the art at the priority date are not always excluded. It is sufficient if one can identify the equal effect without inventive considerations. Furthermore, in the UK, it is assumed that the person skilled in the art knew that the attacked embodiment achieved substantially the same result in substantially the same way as the patented invention. Therefore, there may be not so decisive difference amongst these requirements.

5.1.2.3 Another Requirement

Besides the above two requirements, these countries have an additional requirement (the third principle of “equal value” in Germany and the third question of “essential requirement” in the UK) or an alternative requirement (the “insubstantial differences” test in the US) and it is rather difficult to point out similarities amongst them.

It is worth mentioning, however, that these requirements ask the core question, in different ways, namely whether the attacked embodiment is equivalent to the patented invention. This is why they often determine the result of the case in each country.

5.1.3 Limitations (Negative Requirements)

5.1.3.1 Prosecution History Estoppel

As for the issue of narrowing amendment, the US has the rule of “prosecution history estoppel”. In addition, not so long ago, Germany and the UK also suggested

a possibility of reference to prosecution history. However, the strength of the limitation is rather different. The American court has a quite strong and broad rule of prosecution history estoppel with the double presumptions. By contrast, the German and British courts may refer to prosecution history only in limited situations.

5.1.3.2 Selection Decision

As for the issue of disclosed but unclaimed element, the US and Germany have a similar rule that the patent holder cannot recapture the disclosed but unclaimed element as far as the unclaimed element is explicitly and specifically disclosed as an alternative of the claimed element (the “public dedication” doctrine in the US and the “selection decision” principle in Germany). Therefore, in these countries, the patent applicant must claim only disclosed elements and must not disclose unclaimed elements. By contrast, in the UK, if the patent applicant disclosed and claimed only one element, he may be regarded as intending to limit the scope of protection to that single element.

5.1.3.3 Public Domain Defence

Perceptibly, each country has a common rule that the patent holder cannot obtain an exclusive right on what was already known or obvious from the prior art at the time of the patent application (the “hypothetical claim” approach in the US, the *Formstein* defence in Germany and the *Gillette* defence in the UK). This is a natural consequence from the conditions of novelty and inventive step.

5.2 Conclusion

For decades, the doctrine of equivalence of the three countries analysed in this thesis was quite different. The American and German courts applied it rather broadly, while the British court denied the doctrine and adhered to its unique “purposive construction” approach. After a long period of time, the American court strengthened the limitation by the rule of “prosecution history estoppel” and the German court developed the limitation of the “selection decision” principle to put a brake on the broad application.

Not so long ago, the British court still denied the application of the doctrine of equivalence. However, the situation has significantly changed over the past few

years. The most notable event was in 2017, when the British court finally abandoned the purposive construction approach and adopted the doctrine of equivalence. Additionally, the German and British courts suggested a possibility of reference to prosecution history which they had ignored for a long period of time. Now it can be stated that these jurisdictions have quite similar conditions such as the “same result” and “obviousness”. They also have similar limitations such as “prosecution history estoppel”, “selection decision” and “public domain defence”. Although these positive and negative requirements are called by different names, they are substantially similar. One could even argue that the three countries are heading towards fundamentally the same understanding and interpretation, balancing both conditions and limitations. The American and German courts have restrained their broad protection, while the British court have extended their narrow protection.

Needless to say, there are still some differences amongst the doctrine of these jurisdictions. The American court flexibly chooses the framework depending on the case, while the other courts systematically follow the fixed framework composed of three questions. In addition, the core questions are somewhat different country by country, as for example the “insubstantial differences” (the United States) and the “equal value” (Germany). Probably these primary differences will remain to a certain extent in the future, due to the fact that they are based on the long history of these countries.

Nevertheless, it seems that there is still some room for further harmonisation amongst these jurisdictions. The most interesting issue would be the rule of prosecution history estoppel. The American court finalised this issue more than fifteen years ago. Whereas the German and British courts only recently (in the last decade) suggested a possibility of reference to prosecution history under limited situations. It is expected that the courts of these countries will show whether and how to take prosecution history into consideration in the near future.

Finally, when it comes to the scope of the doctrine of equivalence, each country analysed in this thesis provides us with a different approach. The US arguably provides the broadest protection under the doctrine, counting foreseeable equivalents as infringing so long as they are not equivalent to an amended aspect of

a claim, and unforeseeable equivalents as always infringing - with the caveat that unforeseeable equivalents have difficulty passing the "way" aspect of the equivalents test. The UK has only adapted the doctrine of equivalence in the recent years, establishing that the scope of protection afforded by the patent extends beyond the ambit of the claims as construed according to normal principles of interpretation. Contrastingly, Germany has declared that its test for equivalents be based on a specialist's knowledge at the time of priority, and therefore has established a clear doctrine of equivalence that does not cover unforeseeable equivalents or suffer from other major issues.

All criteria used to determine infringement by equivalence if applied according to the rationale underlying patent protection leads to the same conclusion. Above all, this conclusion outlines a consistent search for proportionality. In summa, the centrality of claims in the assessment of infringement allows each patent to be given balanced protection, rewarding those who have created it, but not hindering those who intend to use the information and ideas contained therein to find alternative solutions and create new progress and knowledge.

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