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The Method for Defining and Dividing Technical Features in Patent Claims

Yu Qiu*

China Jiliang University, Hangzhou, Zhejiang, China

**Corresponding Author*

Abstract: This paper examines the rules for dividing technical features in patent infringement determinations and their impact on defining the scope of patent protection. In China, the protection scope of a patent is defined by all the technical features recorded in the claims, and infringement judgments follow the "all-elements rule," covering both literal infringement and infringement under the doctrine of equivalents. The level of detail in dividing technical features significantly influences infringement outcomes: overly refined division may narrow protection improperly, while overly broad division may unduly extend it. Through theoretical analysis and comparative study, particularly drawing on judicial practices from the United States and other jurisdictions, this research explores standards and methods for dividing technical features. The findings emphasize that the division should balance the integrity of the claims and the independence of individual features, avoiding both excessive fragmentation and over-generalization. In conclusion, China should develop operable dividing criteria by integrating international experience with domestic practical needs, thereby improving the patent infringement liability system and judicial decision-making rules.

Keywords: Patent Infringement; Claim; Technical Feature; Classification Rule; Principle of All Technical Features

1. The Basic Issues and Causes of the Classification of Patent Technical Features

1.1 The Historical Development of Patent Protection and the Origin of the Issue Regarding the Classification of Technical Features

Since the patent system emerged as a form of monopoly privilege, although its specific rules have continuously evolved and improved with the rapid advancements in science and technology and the constant changes in social conditions, the core essence of the system has remained unchanged: inventors must disclose their inventions to the public, in exchange for which the patent office representing the state or international organization will grant them exclusive rights within a specific time frame. Moreover, from the perspective of the origin and evolution of the patent system, countries gradually recognized the significant role of this monopoly right in promoting industrial and commercial development, especially in the industrial sector, where it became an effective means to motivate technical personnel's innovation activities, facilitate the flow and migration of talents, and reward continuous innovation.

Therefore, under the early framework of the patent system, the scope of patent protection mainly relied on the personal will of the monarch. However, with the gradual establishment of modern patent systems, the definition of patent protection scope began to be closely linked to the extent to which patent holders disclosed their invention contents to the public, and also aligned with the purpose of the patent law to encourage innovation and promote technological progress [1]. Therefore, the protection scope of modern patents is no longer solely determined by the will of the state, but is determined based on the essential characteristics of the invention and the detailed documents submitted and required to be disclosed by the patentee when applying for the patent.

The claim, as the key standard for defining the scope of patent protection, is of no doubt its importance. However, in the early stage of the development of patent law, the necessity of claims was not clearly stipulated. As technology continued to become more complex and the

scale of patent authorization expanded, in order to more precisely determine patent infringement and clearly define the scope of protection at the micro level, claims began to be actively incorporated by inventors into the text of their patent applications. Subsequently, from the 19th century to the early 20th century, claims gradually became a legal element in the patent laws of various countries and eventually became the core basis for determining the scope of patent protection.

Patent documents centered around claims have gradually transformed from simple technical descriptions to independent legal documents with legal binding force. This transformation has made the patent protection rules increasingly exhibit a complex state where technical facts and legal rules interweave and influence each other. This not only requires us to consider both technical and legal aspects when understanding and applying patent protection rules, but also prompts us to constantly explore how to more effectively balance the delicate relationship between technological innovation and legal protection.

1.2 From the Scope of Patent Protection to the Determination of Patent Infringement

Patent rights, as an intangible property right, inherently carry an element of uncertainty in their protection scope. This is because the claims, through the description in written language, establish the boundaries of the patent rights. The patentee must personally draft the claims to clearly define the scope of patent protection they are claiming. Therefore, the claims establish the boundaries of the rights protection and clearly delineate the boundaries between infringement and non-infringement.

Theoretically, the process of determining patent infringement should follow the logical sequence of first determining the scope of patent protection and then judging whether the alleged infringing technical solution falls within that protection scope. However, in practice, these two steps often interweave and are difficult to separate clearly. If patent technical solutions are compared to individual "two-dimensional boundaries" and if such a metaphorical boundary is to be established in the process of patent infringement determination, the judge needs to invest a lot of effort to deeply explore the boundary defined by the patentee. This approach is not only costly but also inefficient and is not a wise choice. A more appropriate way is to separately study and fully understand the protection scope of the patent claims claimed by the patentee and the alleged infringing technology, and then conduct a comparative analysis of the two. During this process, the judge needs to repeatedly compare the plaintiff's claims and the defendant's technical solution, and through detailed comparison, clarify the common points and differences between them. In conclusion, the definition of the patent protection scope and the infringement determination are essentially inseparable and closely linked. Therefore, when discussing the patent protection scope, it is inevitable to involve the discussion of patent infringement determination. [2]

It is well known that the consequences of patent infringement are classified into two major categories: identical infringement and equivalent infringement. However, in the early stage of the development of the patent system, the concept of equivalent infringement did not yet exist. It truly emerged after the claim was established as the basis for the patent protection scope. Regarding identical infringement, since the infringing technical solution completely covers the patent protection scope, in judicial practice, no complex comparison rules or techniques are needed. The judge only needs to read and understand the technical solution to easily reach the conclusion that the infringing solution is literally in full agreement with the patent claim. In contrast, the situation of equivalent infringement is more complex. When the patent protection scope is defined by the claim, due to the limitations of language expression, the written statement often fails to accurately capture the subtle differences in the invention or accurately define the scope of innovation. At the same time, the infringer often avoids infringement through minor technical modifications. Driven by the incentive mechanism of strengthening patent protection, the equivalent principle first emerged in the judicial precedents of the United States and then expanded to Europe, Japan, and China, becoming an important legal principle to address the issue of equivalent infringement [3]. The application of the equivalent principle, to a certain extent, protects the legitimate rights and interests of patent holders and alleviates the problem that the patent protection scope does not match its contribution to society. However,

the monopoly effect brought about by strengthened protection also limits the overall behavioral freedom of society to a certain extent, which makes it difficult for the public to accurately define the "boundary" of patent protection from the public claims, thus causing difficulties in conducting peripheral design or improvement. This situation has triggered a conflict between the interests of patent holders and the public notice effect of patents.

To minimize the damage to the public notice effect of the patent claims, at the macro level, various countries, based on the consideration of balancing interests, constantly constrain, adjust, and improve the determination rules of equivalence based on judicial practice, gradually building a large and complex system of equivalent infringement determination rules.

1.3 All Technical Features Have been Clearly Defined

The existing rules for determining equivalent infringement in our country include criteria for identifying equivalence, comparison objects, benchmark time, and a series of restrictions on the principle of equivalence. The comparison object in equivalent infringement refers to the basic unit for comparison when the comparing patent and the alleged infringing technical solution are considered, and it is divided into complete technical feature equivalence and overall equivalence.

The complete technical feature principle emphasizes that the protection scope of the patent right is jointly defined by all technical features described in the patent description and recorded in the claims. When conducting infringement comparison, if the alleged infringing technical solution lacks one or more technical features recorded in the claims, or if there is a situation where one or more technical features are not equivalent, it does not constitute infringement. From the perspective of patent protection scope, this principle is called the "complete technical feature principle", and from the perspective of patent infringement, it can also be called the "comprehensive coverage principle".

In the 19th century, the United States experienced a divergence between overall equivalence and complete technical feature equivalence. However, since the application of overall equivalence was not restricted by the claims, it was difficult to clearly indicate the boundary of patent exclusivity. Therefore, in the Hilton case in 1997, the United States Supreme Court rejected overall equivalence and established "complete technical feature equivalence" as the standard for determining equivalent infringement. [4]

In China, in judicial practice before 2009, the comprehensive coverage principle (i.e., the complete technical feature principle) was only applicable to the determination of identical infringement and was excluded from the application in the determination of equivalent infringement, resulting in a confrontational state between the comprehensive coverage principle and the equivalent principle. The "Opinions on Several Issues Concerning the Determination of Patent Infringement (Trial)" of the Beijing Higher People's Court followed this separation approach, listing the application of the comprehensive coverage principle and the equivalent principle separately, and they coexisted side by side.

Over time, the complete technical feature principle in China has undergone a development process from ambiguity to clarity. Now, it has become a technical comparison principle that is commonly followed when determining identical infringement or equivalent infringement. Its normative basis is Article 7 of the "Interpretation on Several Issues Concerning the Application of Law in Patent Infringement Disputes" of the Supreme People's Court in 2009. This article clearly stipulates in the field of patent practice that the "comprehensive coverage principle" is the basic principle for patent infringement determination and specifies that its application scope includes both identical infringement and equivalent infringement.

2. Analysis and Clarification of the Concept of Patent Technical Features

2.1 Technical Features and Claims

From the perspective of patent authorization, the significance of technical features becomes evident during the initial drafting stage of the claims. For instance, Article 43 of the European Patent Convention specifies the content and form of the claims, clearly stating that technical features are the fundamental "units" for defining the scope of protection of the claims. Similarly, the Examination Guidelines of the European Patent Office also emphasize that the

drafting of claims must be based on the "technical features" of the invention. Moreover, Article 112, Paragraph 6 of the United States Patent Law provides specific regulations for functional technical features. In the Section 608.01(i) of the United States Patent Examination Guidelines (MPEP), regarding the drafting and formal requirements of claims, the (i)th paragraph clearly states that if a claim contains multiple elements or steps, each element or step should be separated by indentation. Additionally, Article 9, Paragraph 1 of the German Patent Regulations also stipulates that patent claims can adopt a single-paragraph or two-paragraph structure, but regardless of the structure chosen, the patent is composed of technical features.

Thus, the recognition that technical features are the basic constituent units of claims actually stems from the formal stipulations of technical features during the process of claim formation. These technical features, when combined together, form the technical solution that we can read and understand pointed to by the claims. At the same time, technical features are presented in the form of words, which is the actual existence state of technical features in claims.

2.2 Analysis of Technical Features in China's Patent Law and Their Concepts

Firstly, the concept of technical features has not been clearly elaborated in laws, regulations and judicial interpretations. The relevant definitions can only be found in two currently effective guiding documents, and these definitions mainly focus on the actual existence state of technical features and their relationship with the claims. It is worth noting that in 2003, the Supreme People's Court released a draft of "Solutions for Handling Patent Infringement Dispute Cases on Certain Issues (for Public Comment)" (though not implemented yet), in which technical features were defined as "technical units (elements) or their combinations in the technical scheme that can generate technical effects for solving technical problems". Similarly, in the "Patent Law Interpretation (II) (for Public Comment)", an attempt was made to give a legal definition of technical features: "Technical features refer to the smallest technical units in the technical scheme that can independently achieve a certain technical function and produce independent technical effects". However, unfortunately, this definition was deleted by the legislators in the subsequent officially released documents.

In judicial practice, the "Patent Infringement Determination Guide" (2017 Edition) of the Beijing Higher People's Court (from the perspective of technical feature classification and elements) provided a definition of technical features. Moreover, in multiple patent infringement dispute cases, the Supreme People's Court has also repeatedly defined technical features from the perspective of feature classification: "Technical features are the smaller technical units that can independently achieve a certain technical function and produce independent technical effects".

3. The Extraterritorial Judicial Practice of the Rules for Dividing Patent Technical Features

In the United States, the equivalence principle is a rule that is only found in case law. Regarding the application of the equivalence principle, in the 1980s, the United States underwent a shift from "overall equivalence" to "equivalence of all technical features" (or "equivalence of all elements" or "equivalence of all restrictive conditions"). In the Lemelson v. United States case in 1985, the United States Court of Appeals for the Federal Circuit was the first to propose the principle of all technical features and argued that each technical feature in the claim is crucial and indispensable. To prove infringement, the plaintiff must prove that the accused infringing object contains each technical feature or its equivalent feature. In 1997, the United States Supreme Court further emphasized in the Warner-Jenkinson case that for determining the scope of an invention, each technical feature of the claim is crucial, thus establishing the principle of all technical features. In the United States, the principle of all technical features, as a sub-principle of the equivalence principle, is applied only to make the protection scope of the patent slightly larger than the literal scope stated in the claim.

Although the principle of all technical features aims to limit the excessive expansion of patent protection scope, scholars such as Chruism hold different views on this. They believe that applying the principle of all technical features does not necessarily effectively limit the application of the equivalence principle and

enhance the clarity of the patent. Because how to define or divide the substantive technical features (i.e., elements or restrictive conditions) covered by a patent claim depends on two factors: one is the composition of the technical features; the other is the expression method of the claim writer. Chruism uses a hypothetical six-sided snuff box claim to illustrate this: the writer can require (1) "a snuff box consisting of the first, second, third, fourth, fifth, and sixth sides", or (2) "a snuff box with six sides". These two literal scopes are exactly the same, but according to the equivalence principle, whether a five-sided snuff box constitutes infringement becomes complicated. If the principle of all technical features is mechanically applied, since the "sixth side" technical feature is missing, a five-sided snuff box does not constitute infringement of the first claim; however, if it can be proved that the five-sided snuff box is essentially the same as the six-sided one, then it may be determined to constitute equivalent infringement of the second claim. Therefore, the application of the equivalence principle is largely influenced by the form of the claim writing. "If due to carelessness or inattention, overly narrow language is used to describe content that could be more broadly described, then it cannot be remedied by resorting to the equivalence principle", otherwise it will hinder the legal definition and announcement function of the claim. [5]

Scholar Mark Lemley further pointed out that the definition of technical features is inherently difficult, and their size and abstractness are difficult to accurately grasp. Courts inevitably have subjectivity when determining what constitutes a technical feature, and the determination of technical features has sometimes become a policy tool. Although the principle of all technical features has the above controversies and objections, the United States still adopted this principle in practice. In conclusion, the principle of all technical features is essentially established to prevent falling into the trap of overall equivalence. When dividing technical features, as long as the overall equivalence method is not actually adopted, it achieves the original intention of its institutional design.

4. The Essence of Patent Technology Feature Classification

4.1 Stabilize the Scope of Patent Protection

The technical solution described in the claim encompasses multiple technical limitations (or technical units) in its wording. From the perspective of the formation of the claim, these technical limitations are formed through different selective combinations, resulting in various technical solutions with different connotations and extensions, constituting a "two-dimensional map" of patent protection scope ranging from independent claims to subordinate claims, from broad to detailed. From the perspective of patent authorization, the technical solutions encompassed by a claim collectively shape the technology, delineating a clear boundary between the patent and the prior art. The existence of distinct technical limitations becomes the key basis for the patent office to grant a patent right. [6] In the scenario of infringement determination, ignoring any one of the technical limitations in the claim will change the content, nature, and "boundary" of the patent protection scope, potentially leading to the introduction of "new technical solutions" that the patent office has not reviewed.[7]

In the practice of patent infringement in China, this phenomenon of ignoring technical limitations has two significant manifestations: one is the principle of redundant specification, which holds that if a technical feature has no direct relevance to the purpose of the invention, its limiting effect on the claim can be disregarded; the other is the principle of deteriorated invention, which holds that if the infringing technical solution lacks the technical features that should have been included and was deliberately omitted, the equivalent principle should be applied to determine infringement. Therefore, the core value of the all technical features principle in China lies in denying the application of the principle of redundant specification and the principle of deteriorated invention in the determination of equivalent infringement, serving as a balancer for the expansion and limitation of the patent protection scope.[8]

Furthermore, there are differences in the degree of detail in the division of technical features. Excessively detailed division of technical features will lead to an increase in the number of technical features, and even an adjective may be regarded as a single feature. This is prone to fail to comply with the all technical features principle in the comparison of rights due to the

lack of a certain technical feature. On the contrary, if the division and induction of technical features and their classification are too rough and at a higher level, it may easily overlook a necessary technical limitation in the infringement comparison, and even mistakenly consider the entire claim as a single technical feature, thereby wrongly determining infringement. This essentially represents an inappropriate expansion of the patent protection scope. Therefore, the definition and division results of technical features not only directly affect the practical application effect of the all technical features principle, but also indirectly become an important mechanism for regulating the expansion and limitation of the patent protection scope in the context of the interweaving of infringement determination and patent protection scope.

4.2 Identifying the Important Considerations for Formulating Industrial Technology Protection Strategies and Determining the Technological Development Path

The rules for dividing technical features resulting from the application of the technical feature principle, as a key and important policy lever for delineating existing patents, leave room for discretion for judges in their judicial proceedings. During the discretion process, courts can, in combination with the type of patent, the textual description of the claims, especially the policy protection inclination of the industry field to which the patent belongs, to some extent, take this as a consideration for the degree of technical feature division. However, improper division of technical features can also lead to the imbalance of the benefit scale of the patent system towards either the patentee or the public, thereby failing to achieve a reasonable balance between patent monopoly protection and free competition. Specifically, if the division is too fine, from the perspective of technical protection strategy, the patentee's choice of the extent to which to disclose their technical solution will be significantly weakened.If the division is too coarse, from the perspective of technological development and innovation competition, since secondary alternative technological improvements will easily fall within the protection scope of adjacent patents, it will compress the innovation space for the public and reduce the public's willingness to innovate, essentially resulting in excessive monopoly. [9] Therefore, outside the most common field of mechanical and electrical technology, through the application of technical feature division rules that combine industrial policies and patent fields to exert policy leverage, these rules become an important influencing factor for the macro technological development and micro technological protection of the specific industry. [10]

5. Improvement of the Rules for Classifying Patent Technical Features

5.1 Definition and Improvement of Technical Characteristics

In the determination of patent infringement, the concept of "technical features" is rooted in the principle of "all technical features", and its semantic object refers to "legal facts that exist as institutional facts". From the perspective of legal reasoning, once it is recognized as a technical feature, it becomes the basic unit for comparing technical features and used to determine whether they are the same or equivalent. Technical features belong to the category of "vague concepts" among uncertain concepts, and their object domains can be divided into affirmative candidate domain, negative candidate domain, and neutral candidate domain. Although the precise definition of technical features is difficult to grasp in light of current judicial practice, the importance of their classification is self-evident. This leads to the judicial reasoning process of "determining technical features - comparing features - reaching a conclusion" where judges often form a basic comparative conclusion first, and then interpret the concept of technical features based on this. This is the "consequentialist thinking" in the practice of dividing technical features.

Generally speaking, in cases where the meaning of a concept is unclear, judges will introduce other interpretive arguments to weaken the status of the meaning. However, this article holds that the determination of technical features is in the domain of "the integration of law and facts" in patent law, where its uncertainty is extremely high, but the meaning and concept still have their role to play. Even if there is "consequentialist thinking" in the judicial process, the meaning still sets the boundaries for such activities. If judges

"interpret" technical features beyond the scope of the meaning, such as including the objects of the negative candidate domain in the concept of technical features or excluding the objects of the affirmative candidate domain, it is invalid. Moreover, the determination conclusion of technical features in individual cases can, to a certain extent, provide established semantic rules for subsequent judges handling similar cases. The numerous judicial practices carried out in China are a positive implementation of this approach.

5.2 Correction of the Corresponding Rules for Technical Features

In practice, when judges make the division of technical features, they often consider that the technical features should achieve relatively independent functions. Taking product structure patents as an example, the product technical solution is composed of a series of components, the connection relationships between the components, and the structure of the components. If the division is made based on the principle of independent functions, in the judicial practice of our country, it often occurs that two physically independent parts are classified as the same technical feature for comparison. From the perspective of the smallest unit of technical features - technical limitations, in most cases of our country's technical features, they are equivalent to the collection of technical limitations. Therefore, if the infringing technical solution actually realizes the functions and effects of multiple technical limitations in the claim by an equivalent minimum technical limitation, then in the comparison of technical features, the item-by-item correspondence can still be applied, because the relevant technical means of the claim have been divided into one technical feature. If the infringing technical solution realizes the function of one minimum technical limitation in the claim by multiple technical limitations, at this time, this minimum technical limitation in the claim may be divided into a separate technical feature or belong to a certain technical feature. The former only needs to be compared for equivalence based on the "three basic+non-creative association" of the equivalent judgment without splitting or merging the technical features, while the latter, since the technical features are divided based on "relative independent functions", it proves that this minimum technical limitation does not have an independent functional and effect contribution compared to the overall technical solution of the patent. Therefore, splitting the comparison is actually unnecessary.

5.3 Establishing Functional Independence through Reinforced Autonomy Principles

When reviewing the judicial decisions summarizing the disputes over the classification of technical features, we noticed that courts usually focus on whether the alleged infringing technical solution falls within the protection scope of the relevant patent claims when elaborating on the key points of the litigation dispute. Therefore, in the initial stage of conducting infringement comparisons, the primary task of the courts theoretically is to comprehensively understand and analyze the semantic content of the claims, precisely divide the technical features, and only on this basis can they delve deeper into the specific dispute points. During this process, the courts often play a crucial role as the key problem identifiers. When dividing technical features, courts need to actively list all the technical features in the patent claims and compare them one by one with the technical features in the alleged infringing technical solution. If there is no infringement of the same kind, the courts also need to actively conduct analysis of equivalent infringement. However, the division of technical features is carried out based on their definitions and standards, which undoubtedly adds a more detailed judicial reasoning process for judges compared to the infringement determination. Given that a single claim may contain a large number of technical features, determining a single technical feature requires a significant amount of effort, and this approach undoubtedly consumes considerable judicial resources.

It is worth noting that "the interpretation of claims" in China is not a mandatory step in judicial practice and is only applied when the claim terms are unclear or there are disputes over the meaning of the text. Similarly, this paper argues that the process of deconstructing claims and dividing technical features can also be moderately simplified. Specifically, courts can first identify the disputed technical points of infringement by the parties, and focus on the technical features and related technical limitations of these disputed technical features

for targeted technical feature division and subsequent comparisons, thereby reducing the number of technical features that need to be explained or confirmed, and effectively improving the efficiency of judicial resource utilization. For example, in the "Cutting Edge Machine Case", the court clearly stated in the judgment that, on the premise that both parties had no dispute over other features, the alleged infringing product had already fallen within the protection scope of the relevant patent claims.

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