Featured Article

Explorations of Claim-drafting Strategies Based on Case Studies

High-quality patents are fundamental to high-value patents, while the high-quality patents are rooted in drafting the patent application documents in high quality. As claims are the core components of the patent application documents, to address the issue of claim-drafting strategies is the most critical step in drafting the patent application documents, and also matters a great deal to the exercise of patent rights after patent applications are granted. This article analyzes the claim-drafting strategies based on an actual case which has been granted in China, the United States, and Europe, and elaborates the key points that require special attention in the process of drafting claims in combination with practical experiences.

I. Dilemma of Starting from Scratch

Drafting of claims is a process that starts from scratch. The difficulties and challenges include but are not limited to the following four aspects.

The claims need to meet legal requirements. There are as many as a dozen clauses related to the claims in the Patent Law of China and the Implementing Regulations of the Patent Law, which provide detailed provisions on various aspects of the claims, such as the subject matters of the claims, the formal requirements that the claims need to meet, the conditions for granting the claims and the like. However, the starting point for drafting the claims is a technical

introduction document which is a confidential technical document provided by the inventor (referred to as "technical introduction document" here below); due to factors such as different clients and different technical fields, technical introduction documents are often diverse in form and style. So, how to understand and sort out the technical disclosure document so as to obtain the claims that meet legal requirements?

The claims are the basis for determining the protection scope of patent and also the ground for judging whether the patent right is infringed. If the scope of the drafted claims is too broad, it will increase the difficulty in obtaining the patent right; if the scope of the drafted claims is too narrow, it will add to the difficulty in exercising the patent right. So, how to lay out the claims to make them appropriately scoped and hierarchical?

The claims should clearly and concisely define the scope sought for patent protection. However, in light of the complexity and professionalism of the technical solutions, the technical introduction documents may often have problems such as insufficient introduction of background technology, jumps in technical logic, and many technical blind spots, thus resulting in ambiguity and uncertainty of the technical solutions. So, how to extract clear and concise claims from complex and fuzzy technical solutions?

China adopts a first-to-file system, which requires the claim-drafting work to be completed as quickly as possible to help the client obtain the earliest possible filing date. However, the drafting of claims is a large and systematic project. So, how to balance speed and quality?

II. Break through the dilemma by focusing on technical problems

Confronted with the above dilemma, the author believes that the technical problems can be used as a beacon for the drafting of claims, that is, the drafting of claims can be carried out by focusing closely on the technical problems. So, how to draft the claims by focusing on the technical problems? The author summarizes the following five steps.

Step I: Understand the technical introduction document by focusing on the technical problems. In this step, all the technical problems to be solved in the technical introduction document need to be determined first, and then various technical aspects corresponding to each technical problem are sorted out. This is equivalent to that the complex technical introduction document is divided into multiple small technical modules based on the technical problems as clues, and then the small technical modules are understood one by one, so as to prevent mixing all technical contents in the

technical introduction document together to result in neglecting some technical contents or the technical contents interfering with each other. Firstly, such division based on the technical problems as clues can improve the efficiency and depth of understanding the complex technical introduction document; secondly, such division makes it easier to realize the technical blind spots of each technical module, which facilitates taking targeted remedial measures; thirdly, such division makes it easier to carry out targeted expansion and mining for each specific technical module, thus laying a good foundation for the reasonable determination of the scope of protection.

Step II: Rank all of the technical problems. When drafting the claims later, the claims will be laid out in accordance with the ranking order of the technical problems determined in this step, which will not only help achieve the logical clarity of the overall claims and the rationality of the hierarchical arrangement, but also help improve efficiency in claim-drafting.

Step III: Draft independent claim based on the basic technical problem determined by the ranking order of the technical problems. In this step, the first technical problem ranked at the top of the order is regarded as the basic technical problem, and the independent claim is drafted based on the basic technical problem, which can prevent technical contents related to other technical problems from interfering with the drafting of the independent claim and help to reasonably determine the scope of protection of the independent claim.

Step IV: Draft corresponding dependent claims based on the ranking order of the technical problems. In this step, the dependent claims are drafted sequentially according to the ranking order of the technical problems that have been determined previously, thereby obtaining the claims with a clear arrangement structure and ensuring that no technical content is omitted.

Step V: Check first draft of the claims by focusing on technical problems. In this step, the first draft of the claims are checked under the guidance of the technical problems, to make the claim-checking work more targeted, so that the claims can be polished efficiently and effectively.

III. Discuss on breaking through the dilemma by focusing on technical problems based on actual case

In the following, the above five steps of drafting the claims by focusing on the technical problems are introduced one by one in combination with the actual case.

First of all, the case is briefly introduced. The technical introduction document of the case provides a liquid crystal display device. Fig. 1 is a top view of an array

substrate of the liquid crystal display device; Fig. 2 is a cross-sectional view of a first embodiment of the liquid crystal display device; Fig. 3 is a cross-sectional view of a second embodiment of the liquid crystal display device, in which the left part of Figs. 2 and 3 is a cross-sectional view taken along the line AA' of Fig. 1, and the right part of Figs. 2 and 3 is a cross-sectional view taken along the line BB' of Fig. 1. The liquid crystal display device comprises the array substrate, the opposite substrate and the liquid crystal layer provided therebetween. The array substrate comprises a first substrate 1, a gate layer (including gate lines 5 and gate electrodes G), an interlayer insulation layer 6, a data layer (including data lines 7, source electrodes S and drain electrodes D), a passivation layer 8, via holes 9 provided in the passivation layer 8, pixel electrodes 10, an inter-electrode insulation layer 11 and common electrodes 12. The gate lines 5 and the data lines 7 intersect with each other to define a plurality of sub-pixels, and the pixel electrode 10 is connected to the drain electrode D by the via hole 9 in each sub-pixel. The opposite substrate includes a second substrate 20, a black matrix 13 and a cover layer 14. In the prior art, a spacer for maintaining a constant distance between the array substrate and the opposite substrate is formed on the opposite substrate, and the free end of the spacer abuts on a flat region between two adjacent sub-pixels of the array substrate; due to the existence of the via hole, the flat region between two adjacent sub-pixels is very small; if the liquid crystal display device is subjected to an external force, the spacer easily slides into the via hole, so it is difficult to keep the distance between the array substrate and the opposite substrate constant and the sliding spacer adversely scratches other structural layer of the array substrate. Different from the prior art, in the first and second embodiments, the spacer 15 is formed on the array substrate and located in the via hole 9, and the spacer 15 cannot slide, so that the distance between the array substrate and the opposite substrate can be kept constant and other structural layer of the array substrate can be prevented from being scratched. In the first and second embodiments, the barrier element 17 is provided on the data line 7, which can reduce the electric field interference between two adjacent sub-pixels. In addition, if the number of the spacers 15 is too large, vacuum bubbles are generated in the liquid crystal layer, resulting in defect of vacuum bubbles; if the number of the spacers 15 is reduced, the defect of vacuum bubbles can be avoided to a certain extent, but defect relating with pressing can be caused; in order to prevent both the defect of vacuum bubbles and the defect relating with pressing, the liquid crystal display device is provided with a main spacer and an auxiliary spacer, and the height of the main spacer is greater than that of the auxiliary spacer. Specifically, in the first embodiment, a plurality of spacers 15 with different heights are provided, in which the high spacer 15 serves as the main spacer and the low spacer 15 serves as the auxiliary spacer; in the second

embodiment, a plurality of spacers 15 with the same height are provided, at least one spacer 15 is combined with the inter-electrode insulation layer 11 to serve as the main spacer, and at least one spacer 15 is not combined with the inter-electrode insulation layer 11 to serves as the auxiliary spacer by itself.

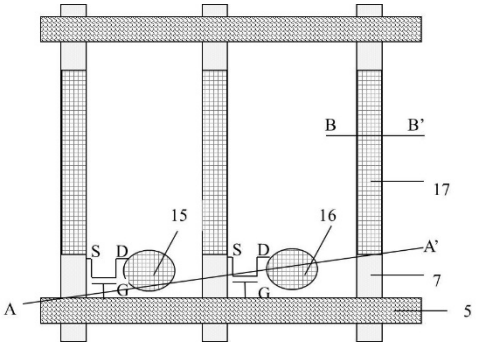

Fig. 1

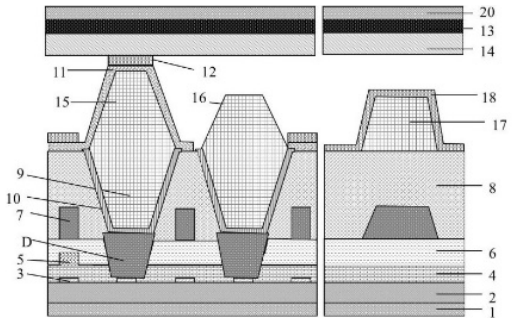

Fig. 2

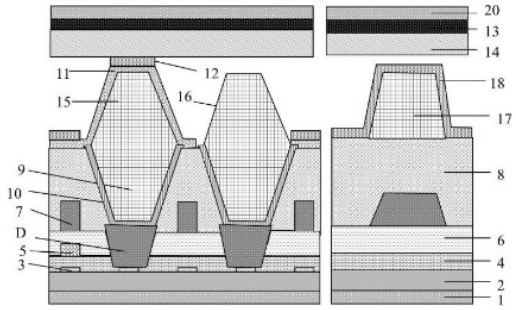

Fig. 3

Step I: Understand the technical introduction document by focusing on the technical problems.

No matter what form and style the technical introduction document is provided and no matter how complex the technical solution is, there is usually an information that is conveyed clearly or implicitly by the technical introduction document, that is, what is the technical problem to be solved or what is the technical effect that can be achieved. For example, the technical introduction document often uses words such as "may" and "can" to describe the technical effect; it is suggested that each technical effect is concerned and then the corresponding technical problem is obtained by inferring from the technical effect.

In step I, the first recommended task to be done well is to find all the technical problems to be solved in the technical introduction document. It is important to ensure that no technical problem is missed, as the missing of the technical problem often leads to the omission of the technical content. It should be particularly noted that: do not mix a new derivative technical problem caused by solving a technical problem with the technical problem itself. It is recommended to distinguish them as two technical problems.

Specific to the above case, a total of three technical problems are determined by the expressions that clearly describe the technical problems in the technical introduction document or by the expressions that describe the technical effects in the technical introduction document: how to prevent the spacer from sliding; how to prevent the electric field interference between two adjacent sub-pixels; and how to prevent both the defect

of vacuum bubbles and the defect relating with pressing?

Furthermore, in step I, the second recommended task to be done well is to complete technical sorting for technical contents corresponding to each technical problem. In the process of technical sorting, only the technical content related to the current technical problem is focused on, instead of mixing technical contents of all technical problems for consideration. In the process of technical sorting, at least the following work is suggested to be completed: understanding the key technical point of the technical solution for solving the technical problem; summarizing what is the technical principle adopted by the technical solution to solve the technical problem, where summarizing the technical principle will help to define the technical solution clearly when drafting the claims later, and the technical principle is the basis for subsequent judgment of whether the technical solution is complete and for the expansion and mining of the technical solution; determining whether the technical solution is complete based on the technical principle; expanding and mining the technical solution based on the technical principle; analyzing whether each technical solution has its own unique advantage when there are multiple technical solutions for solving the same technical problem, where the unique advantage will be very helpful in arguments on inventiveness during the substantive examination process.

According to the above ideas, various technical aspects corresponding to each of the three technical problems in the case are sorted out as follows.

Firstly, with respect to the technical problem of how to prevent the spacer from sliding:

The key technical point of solving the technical problem is that: the spacer is provided in the via hole. The technical principle for solving the technical problem is summarized as follows: providing the spacer in the via hole is equivalent to inserting the spacer into the via hole and fixing the spacer by the via hole, so that the spacer cannot slide. It can be seen that the technical solution with respect to this technical problem is relatively complete and reasonable. Further, the technical solution is expanded and mined as follows: is it possible to use other via hole originally existing in the array substrate to fix the spacer instead of the via hole connecting the pixel electrode and the drain electrode; is it possible to specially form a via hole in the array substrate to fix the spacer? Based on the above technical principle, it can be judged that these expanded and mined solutions are feasible. Further, analysis of the advantages of respective solutions is as follows: it is considered as the best implementation mode to use the originally existing via hole of the array substrate, such as the via hole 9, to fix the spacer for the manufacture process of the array substrate can be simplified; however, the position of the spacer can be selected in a

relatively flexible way if the via hole for fixing the spacer is specially formed in the array substrate.

Secondly, with respect to the technical problem of how to prevent the electric field interference between two adjacent sub-pixels:

The key technical point of solving the technical problem is that: the barrier element is provided on the data line. The technical principle for solving the technical problem is summarized as follows: forming the barrier element on the data line is equivalent to forming a wall between two adjacent sub-pixels, thus the electric field in each of two adjacent sub-pixels is physically blocked and the electric field interference is prevented. It can be seen that the technical solution with respect to this technical problem is relatively complete and reasonable. Further, the technical solution is expanded and mined as follows: is it possible to form the barrier element on the gate line; is it possible to form the barrier element on both of the data line and the gate line? Based on the above technical principle, it can be judged that the expanded and mined solutions are feasible. Further, analysis of the advantages of respective solutions is as follows: forming the barrier element on both of the data line and the gate line is equivalent to surround the sub-pixel by the barrier element, so that the electric field interference can be prevented more effectively.

Thirdly, with respect to the technical problem of how to prevent both the defect of vacuum bubbles and the defect relating with pressing:

The key technical point of solving the technical problem is that: the main spacer and the auxiliary spacer are provided, the height of the main spacer is greater than that of the auxiliary spacer, and the specific implementation modes are the first embodiment shown in Fig. 2 and the second embodiment shown in Fig. 3. The technical principle for solving the technical problem is summarized as follows: on one hand, when the liquid crystal display device is not pressed, only the high main spacer works so that defect of vacuum bubbles can be prevented; on the other hand, when the liquid crystal display device is pressed, the main spacer and the auxiliary spacer work together due to the pressing action so that the defect relating with pressing can be prevented. It can be seen that the technical solution with respect to this technical problem is relatively complete and reasonable. Further, the technical solution is expanded and mined as follows: when the plurality of spacers have the same height, is it possible to combine the spacer with other layers than the inter-electrode insulation layer or with the combination of the inter-electrode insulation layer and other layers to respectively obtain the main spacer and the auxiliary spacer; when the plurality of spacers have different heights, is it possible to combine the spacer with the inter-electrode insulation layer or with the

combination of the inter-electrode insulation layer and other layers to adjust the height difference between the main spacer and the auxiliary spacer? Based on the above technical principle, it can be judged that these expanded and mined solutions are feasible. Further, analysis of the advantages of respective solutions is as follows: in the case that the plurality of spacers have the same height, the difficulty of forming the spacers can be reduced; in the case that the plurality of spacers have different heights, the main spacer and the auxiliary spacer can be obtained without combining with other layers, thus the difficulty of forming other layers can be reduced.

Step II: Rank all of the technical problems.

In step II, all of the technical problems are ranked. This ranking order is crucial to the determination of independent claim and the arrangement order of dependent claims. All the technical problems may be ranked at least based on the following factors: the importance of the technical solution corresponding to the technical problem, the application of the technical solution corresponding to the technical problem in actual products, the logical dependence between various technical problems, the prior art, etc. For example, the technical problem corresponding to the important technical solution is ranked relatively high, the technical problem corresponding to the technical solution that has practical application or are widely used in practice is ranked relatively high, the technical problem that cannot be solved until other technical problems are solved is ranked relatively low, and the technical problem corresponding to the technical solution that is significantly different from the prior art is ranked relatively high.

Specific to the case, the technical solution relating with the technical problem of how to prevent the spacer from sliding is more important to the client, so this technical problem is ranked first; the technical solution of using the barrier element to prevent the electric field interference is less applicable to practical product because forming the barrier element on the very thin data line and/or gate line is relatively difficult, so the technical problem corresponding to this technical solution is ranked last. Accordingly, the technical problems of the case are ranked as follows:

Technical problem 1: how to prevent the spacer from sliding?

Technical problem 2: how to prevent both the defect of vacuum bubbles and the defect relating with pressing?

Technical problem 3: how to prevent the electric field interference between two adjacent sub-pixels?

Step III: Draft independent claim based on the basic technical problem determined by the ranking order of the technical problems

The technical problem ranked at the top of the ranking order of technical problems is regarded as the basic technical problem, and the independent claim should be drafted by focusing on the basic technical problem. In the process of drafting the independent claim based on the basic technical problem, it is recommended to do at least the following work: determining the subject matter of protection and determining whether to draft a single independent claim or multiple independent claims, where, when drafting multiple independent claims, the relationship between the multiple independent claims may be inclusive, associated or collaborative; determining essential technical features based on the basic technical problem, where each independent claim should include all the essential technical features for solving the basic technical problem without lacking any essential technical features, and each independent claim should only include the essential technical features for solving the basic technical problem and not include other technical features that are irrelevant to the basic technical problem; determining whether each essential technical feature is reasonably generalized by using an up-level term; and determining whether the multiple independent claims meet the requirements on unity of invention when drafting multiple independent claims.

Specific to the case, the technical problem 1 ranked at the top of the order as described above is determined as the basic technical problem. In the technical solution corresponding to the technical problem 1, the spacer is provided in the via hole of the array substrate, which belongs to an improvement of the structure of the array substrate, so the independent claim claiming the array substrate and the independent claim claiming the manufacturing method of the array substrate are drafted, and these two independent claims belong to associated independent claims; in addition, the array substrate is a component of the liquid crystal display device, so the independent claim claiming the liquid crystal display device is further drafted, and this independent claim and the independent claim claiming the array substrate belong to inclusive relationship. In view of the technical problem 1 determined as the basic technical problem, "providing the spacer in the via hole" is the essential technical feature and should be defined in the independent claims; however, "providing the main spacer and the auxiliary spacer with height difference" and "providing the barrier element on data line and/or gate line" are not essential technical features and should not be defined in the independent claims.

It should be noted that the technical solution recorded in the technical introduction document is often the actual implementation, or the best implementation (or relatively specific implementation) provided by the inventor after considering various factors. When determining the essential technical

features of the independent claim, it is necessary to get rid of the constraints caused by the actual implementation and/or the best implementation, and to focus on the basic technical problem to filter out the technical features in the actual implementation and/or the best implementation that are irrelevant to the solution of the basic technical problem. Specific to the case, all figures in the technical introduction document show both the high main spacer and the low auxiliary spacer as shown in Figs. 2 and 3 above, and due to such guidance of the technical introduction document, it is easy to define both the main spacer and the auxiliary spacer corresponding to the technical problem 2 into the independent claim. However, if only the basic technical problem is considered upon drafting the independent claim, it is easy to avoid such improper operations.

Step IV: Draft corresponding dependent claims based on the ranking order of the technical problems

In step IV, the dependent claims are drafted sequentially according to the ranking order of the technical problems determined in step II. During this process, at least the following work is recommended to do: ensuring that the best implementation mode of the technical solution corresponding to each technical problem is defined by corresponding claim; determining whether intermediate generalized claim may be laid out before drafting the claim corresponding to the best implementation mode; and ensuring that the reference relationship between the claims is accurate.

Specific to the case, the dependent claim 2 is drafted based on the technical problem 1, which defines the best implementation mode of the technical solution corresponding to the technical problem 1, that is, the via hole for fixing the spacer is the via hole for connecting the pixel electrode and the drain electrode. Dependent claims 3-10 are drafted based on the technical problem 2. Specifically, claim 3 is the intermediate generalized claim to define the commonness of the first embodiment, that is, the plurality of spacers have different heights; claims 4-6 define the combination of the spacers with the inter-electrode insulation layer and/or other layers to adjust the height difference between the main spacer and the auxiliary spacer in the case of the first embodiment; claim 7 is the intermediate generalized claim to define the commonness of the second embodiment, that is, the plurality of spacers have the same height; claims 8-10 define the combination of the spacers with the inter-electrode insulation layer and/or other layers to obtain the main spacer and the auxiliary spacer in the case of the second embodiment. Dependent claim 11 is drafted based on the technical problem 3. Specifically, claim 11 defines that the barrier element is provided on the data line and/or the gate line.

Step V: Check first draft of the claims by focusing on technical problems

In the claim-drafting process, it may be difficult to draft the claims that meet various requirements in one go. Under this circumstance, it is recommended to write a first draft of the claims, then check up the first draft of the claims based on the technical problems, and revise and improve them if necessary. During this process, it is suggested that at least the following work should be done. (1) Checking the independent claim closely based on the basic technical problem. On the one hand, the independent claim should be checked feature by feature to determine whether each technical feature in the independent claim is indeed indispensable to solve the basic technical problem, so as to determine whether there is unessential technical feature in the independent claim. On the other hand, the independent claim should be checked by closely following the basic technical problem to determine whether the technical solution defined in the independent claim is insufficient in the technical chain and cannot solve the technical problem, thereby determining whether the independent claim lacks essential technical feature. (2) Based on all of the technical problems that have determined, determining whether each of all the technical problems has at least one corresponding claim so as to prevent the omission of any technical contents. (3) According to the ranking order of the technical problems, checking whether the order of various claims is appropriate and whether the reference relationship is correct. (4) Based on the technical solution corresponding to each technical problem, checking whether the description of the technical solution is complete, clear and concise.

Specific to the case, the claims of the first draft are checked one by one based on all of the three technical problems determined in step I.

After completing the above five steps, the claims that meet the legal requirements are obtained.

Conclusion

Disclaimer amendments play an important role in ensuring fair protection of patentee interests. However, as exceptions to the rule of "extend-beyond-disclosure", they should be subject to strict limitations. In comparison to the EPO Guidelines, the Chinese Examination Guidelines should introduce more operationally feasible provisions regarding the disclaimer amendments. This would facilitate a more uniform understanding of this manner of amendment among practitioners, including applicants, patent agents, attorneys, examiners, and judges. Through this article, it is hoped that the disclaimer amendments would be paid more attention to in practice.

The "Featured article" is not equal to legal opinions.

If you need special legal opinions, please consult our professional consultants and lawyers.

Email address : ltbj@lungtin.com Website www.lungtin.com

For more information, please contact the author of this article.

WANG, Xiaoyan

Partner, Quality Inspector, Senior Patent Attorney

Ms. Wang has expertise in patent prosecution in China, as well as cooperating with local attorneys to handle patent prosecution in major countries and regions such as United States, Europe, Japan, Korea, India, Mexico, Russia, Australia, Canada, Brazil, etc. Ms. Wang has rich experience in patent agency services, including patent layout, patent drafting and prosecution, Office Action responses, patent reexamination, patent invalidation, patent search and analysis etc., and she is very experienced in handling patent cases in technical areas of semiconductor technology, display technology, storage technology, medical instrument, mechanical engineering, new energy, and automation, etc.. Ms. Wang has handled more than 1,000 patent applications and more than 1,000 Office Actions in China, United States, Europe, Japan, Korea, India and other countries and regions.