Jacek Zaleski

The logic of patent claims

Each enterprise which has their activity based on the innovative technologies, ex aequo some methods, being the intellectual properties protected by patent law, can be exposed to any kind of activities from the competitors. These activities have, as the aim to disturb or to stop the current production based on requested intellectual property.

Mentioned above situation appears quite often and depends on the fact, how high is the market value of the requested product, *ex aequo* method, based on the intellectual property protected by patent law. The accusation of intellectual property, particularly some patent claims of the patent protecting this intellectual property, is a legal procedure from the law point of view and in most of the cases, the accused part, after the court proclaims the final sentence, is the winning part, but in the same time, the accused enterprise is weaker, what was the main goal of the accusing part. The lack of confidence to the efficacy of protection of the intellectual property leads to the situation, that a lot of innovative technologies escape to some other countries, where they are patented and commercialized.

This article will analyse the reasons, why such a situation mentioned above can appear, and in the same time it will be presented some preventive measures, which can minimize these uncomfortable occurrences for the owners of the intellectual property. The basic research is based on the discerning analyses of many of patent applications placed in the archives of WIPO, ESPACENET, USPTO and DEPATISNET. All the patent claims in these patent applications where correct from the patent law point of view, which means each patent claim was expressed by one sentence and it was generated from the invention (*ex aequo* method) description. The result of this analyse is the object of further analyse and they helped to build the new method of creation of patent claims. The next step was to analyse the existing publications, where the authors were trying to find some formulas which could limit these uncomfortable occurrences.

Most of the publications are based on the mathematic logic, set theory and also on the semantic of created patent claims. Unfortunately, most of these publications don't take into consideration two important elements. The first one is the fact, that even if each patent claim is generated from the invention (*ex aequo* method) description, but it's not mentioned how this description should be done. The invention description should be correct from the logic point of view, which means that all expressions which have nothing common with the invention, should be eliminated, also if some significant point is placed in the patent claim, it must also appear in the description. It's obvious that some of the expressions, even if they don't concern the invention, should be kept due to the ergonomic of the whole text, otherwise is the risk that the whole description will not be understandable for the average reader.

The second element is the fact, that the authors of these publications don't see the difference between the sentence in the grammatical sense, which is called in the logic an open sentence, and the sentence in the logic sense, called in the logic, atomic formula. In order to explain it better, the atomic formula express exactly one unique meaning. If this condition is not full field, automatically the atomic formula is converting to an open sentence, which can contain two or more atomic formulas, however it is still the one sentence in the grammatical sense. This situation took place in many patent claims analysed by the author of this article. In order to prepare the patent application in correct way, it will be necessary during the preparation of patent claims, to go back to the invention description and make some modifications. In order to understand this meaning better, some example is shown below.

Let's take a part of the description of some invention.

…In this device is placed a synthetic crystal which in some conditions is completely transparent and in some other conditions is semi-transparent…

The text above is the part of an invention description from which has been generated the significant point and after the patent claim shown below:

This device (the name of this device) is significant to the fact that the placed in it a synthetic crystal in some conditions is completely transparent and in some other conditions is semi-transparent.

If we analyse this patent claim, at once appears the first remark. The patent claim is not expressed by atomic formula; it is an open sentence containing two atomic formulas connected by conjunction functor Û. If now by symbol *p* will be designated the sentence *the synthetic crystal in some conditions is completely transparent* and by *q* will be designated the sentence *the synthetic crystal in some conditions is semi- transparent,* the notation shown below can be written.

$$P \wedge \neg$$

Second reflection is the fact, that this independent patent claim should be divided into two patent claims, one independent and one dependent. If the inventor will proceed in such a way, at once it will appear the next remark. Both *p* and *q*, are the prior art, which means that they are not patentable. The inventor during preparation of patent description overlooked one important detail. The significant point is not the transparency state of the crystal. The significant point is the ability of the synthetic crystal to change the state of the transparency. The inventor changed the invention description and wrote the controversial part of the description in form shown below.

…In this device is placed a synthetic crystal which in some conditions can change the state of the transparency…

After this modification, it appears only one significant point, which can be expressed by the patent claim shown below.

This device (the name of this device) is significant to the fact that the placed in it a synthetic crystal in some conditions can change the state of the transparency.

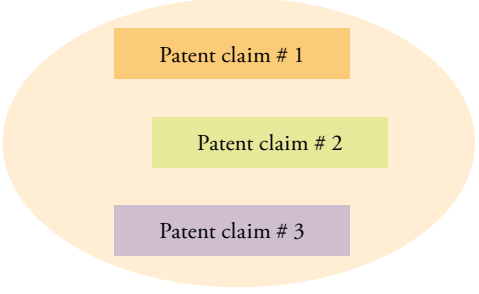
The patent claim build in such a way will pass both the patent attorney, as well as the expert from the patent office, who will examine this patent application.

After accurate analyses of the received results, it started the work to create a new method of patent claims preparation. The new system is based on the mathematic logic and the set theory, by using the Venn diagrams. One of important feature of the new system is that it is completely compatible with the existing patent law. The new system, which is called shortly SSM (***S****trictly* ***S****yntax* ***M****ethod*) was created by author of this article, however, he was collaborating and got a lot of help from the member of SATW (***S****chweizerische* ***A****kad-*

*emy für **T**echnische **W**irtschaft*) prof. Raymond Morel, Johann Sievering PhD and Antoine Wasserfallen PhD (both research cooperative social–IN3 executive members). Most of the work was supported by dir. Andreas Schweizer of API (***A**ssociation pour le **P**atrimoine **I**ndustriel*) in Geneva. The author is also the member of this organization. In the present time we have discussion with dir. Michal Svantner from WIPO in order to have closer cooperation with this organization in the mentioned project. The continuation of this work is to build the computer program, which will be able to generate from the correct prepared invention (*ex aequo* method) description, the patent claims expressed by atomic formulas. This work is quite advanced.

The employment of the mathematic logic in the new system is obvious and doesn't need any explanations. All deep explanations would take at least twenty more pages. In the set theory it was necessary to introduce a new operation called, the exclusive sum. This modification was necessary due to the fact, that the elements of the sets, which are one element sets and correspond to the separate patent claims, can have semantic character (some physical elements or some events), can have syntax character, but they can be still treated as the elements which have semantic character (some numbers or some actions), they can also have a syntax character but they cannot be treated in the same way like elements which have semantic character (relations between human beings or relations between physical objects).

Figure 1 **Venn diagram containing three sets**

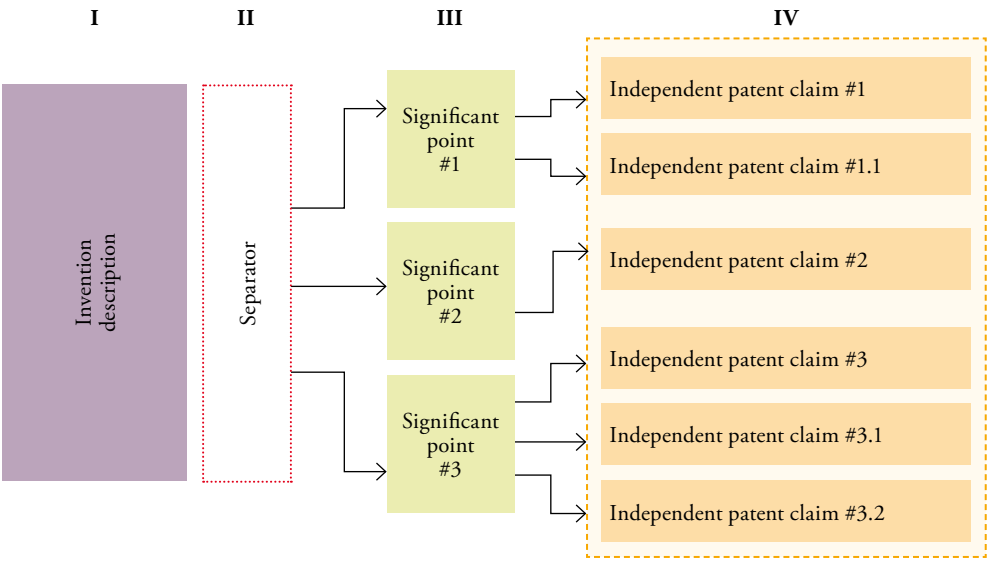


The character of the last group is the reason, why it was necessary here, to modify theset theory. As it was mentioned earlier, in the set theory the Venn diagrams were employed. The Venn diagrams are the graphic way to show the sets and also the relations between them. On the figure 1, there is a Venn diagram containing three sets. Each set is the one element set and corresponds to the separate patent claims. The space in which the sets are placed corresponds to the invention description. The part of the space which is not occupied by the sets, corresponds to some prior arts and some texts which give to the whole description an ergonomic character. It is obvious, that the sets cannot overlap each other. If such a situation will appear, it means that the invention description or some patent claims are not correct and the whole application should be modified. It can also appear that after the modification, the significant points will disappear and what was treated as an invention, is not.

By building Venn diagrams it is important to take into consideration the fact, that we don't employed some existing models, the diagrams are built on the base of some sentences which contain important information and they are taken from the invention description. Depends, how the space and the sets will be defined, the created diagram can contain a lot of useful information for the potential reader, but it can also be not clear and not understandable, even if from the logic point of view, everything is correct. This means that the final result should be always checked carefully.

Taking into consideration the fact that the employment of the SSM will demand quite good knowledge of both the mathematic logic and the set theory by using Venn diagrams (containing the modifica-

Figure 2 **The block diagram of preparation of the patent claims**



tions), the number of users can be limited. This problem will be solved when the computer program will be ready. This program will work in similar way like the computer programs for the accountants. In this case the user of the SSM system should only know the computer and the procedure, how to implement the correctly prepared the invention description into the program. After this the computer will generate the patent claims in form of atomic formulas. It's obvious, that the user should also know how to verify the received information. The mentioned computer program can be also used to analyse the existing patent claims due to their logic and semantic.

During preparation of the patent claims it's important to follow the role, that all the claims should be taken from the invention description and all of them should be expressed by atomic formulas. It happens quite often that what is treated as an atomic formula, after deeper analyse can be an open sentence. Very often the sentence expressing patent claim should be analysed also with the rest of the invention description. In order to understand this problem better, on the figure 2 there is shown a block diagram, which explains how the patent claims are generated. This diagram is built on the base of the fundamental research and verified by the specialists of patent law. The diagram is divided in four blocks and contains a correctly prepared invention description, which means that this description doesn't contain any information which doesn't correspond to the invention. It contains only the significant points, some prior arts which belong to the project as well as some expressions which makes the whole text more understandable for the reader, which means, gives to the text some ergonomic character. In the block II there is done an important separation of the significant points from the rest of the text, which means that the text of the invention description is vectorized. The block III presents all the significant points which were earlier generated from the text. The significant point #2 is an atomic formula, while the significant points #1 and #3 are the open sentences and they should be taken to the further analyse.

The result of this analyse is shown in block IV. In this block the significant point #2 is directly converted into the patent claim #2. The significant points #1 and #3 were containing in their structure some prior arts and they should be expressed by dependent patent claims which

will show clear that in some special configuration they can be treated as the significant points. There are also some cases where the significant points are the result of some special configuration of prior arts (only). In such a situation, the best solution is to take the model of patent claim #3 placed in block IV. In this block the patent claim #3 is divided into one independent patent claim, which express this configuration and two or more dependent patent claims expressing, how this configuration is performed. If the patent claim #3 would be expressed only by one independent patent claim, it will be easy for the good specialist of patent law to invalid it. In the computer program which is prepared, all these blocks on the picture shown above, are taken into consideration, however before commercialisation it's necessary to build the compilation device, which gives the possibility to the average user, to understand it and to use it in the right way.

After reading this article, it appears at once a simple question, is it really necessary to use this system to build patent claims? Before giving the answer, we would like to explain, that during the whole research, only inventions which have high market value were taken into consideration. It's also necessary to explain, that invention which has high market value is not always a great invention from the technological point of view. Very often the inventions with the low technological level have a high market value. As higher is the market value of the invention, as higher is the risk, that after commercialisation the competitors will do everything to show that the intellectual property is based on the existing prior arts. If the enterprise which is using this intellectual property is accused by competitors, in most of the cases the accused part leaves the court as a winner, but this victory is apparent.

Depends, how the patent claims were prepared, the procedure in the court can take sometimes even two years. During this time the production based on the requested intellectual property is disturbed or stopped and the market is taken by the competitors. The main reason, why the court procedure can last so long is that some patent claims in the requested patent application are not unique due to the logic. It's important to stress here that all these patent claims are univocal due to the patent law. If the patent claim is expressed by open sentence it's obvious that it contains at least two atomic formulas. The SSM system can protect the owner of intellectual property against such a situation. If the patent claims will be build according to the SSM system, even a very good lawyer of the accusing part will think seriously before sending the case to the court. In this case, if the patent claims are univocal due to the logic, there are no points which can be in favour of the accusing part and the court procedure can be limited to three session, which means that the accusing part will have no profit by accusing this intellectual property, the production will be not disturbed enough to cover the high expenses of the court procedure. Sometimes it can even lead to some financial loses.

This articule is an abstract of the description of the presented method. If you are interested about more details, please, send a request to the author jacek.zaleski@patrimoineindustriel.ch.

Jacek Zaleski jest członkiem Swiss Academy of Enginering Sciences, Social IN3 Coop, zajmującym się promowaniem nowych rozwiązań z dziedziny techniki oraz własności intelektualnej, oraz Association pour le Patrimoine Industriel, promującej administrowanie własnością intelektualną. Współpracuje z World Intellectual Property Organization nad nową metodą budowania zastrzeżeń patentowych – Strictly Syntax Method.