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THE PREPARATION OF A PATENT SPECIFICATION

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THE PREPARATION OF A PATENT SPECIFICATION

The specification of a patent application is a keystone in the patent system. In fact, in Canada, the specification rates a paragraph [27(3)] in the *Patent Act*, where the contents of the specification are outlined. The description of the invention provided for therein is at the centre of the bargain between the inventor and the State. In return for details on how the invention works, and to provide guidance to practice or construct the invention, the inventor is given a period of time during which the inventor can prevent others from practicing the invention.

Thus, in response to the question “what is your invention and how does it work”, the inventor prepares the specification. With respect to these questions, the description must be correct and full. Not only is this important for the public to understand the context of the invention, and to eventually determine the metes and bounds of the grant of the patent, the specification also serves its purpose once the period of validity of the patent is expired: to permit those wishing to reproduce the invention for doing so with a minimum of experimentation.

THE CONTENT OF THE SPECIFICATION OF A PATENT

The purpose of the specification is to describe the invention and its application or exploitation, as devised by the inventor(s), and to explain the context surrounding the invention.

The specification is divided into two sections, a first one forming what is called the description, followed by a second one forming what are called the claims, where the legal boundaries of the patent are outlined. The role of the description is to provide a person skilled in the art with a clear, complete and accurate teaching of what is the invention, and how to make it and put it into practice. It is used to set forth the

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embodiments recommended by the inventor(s) among many possible embodiments of the invention. The teaching must permit the public to practice the invention when the exclusive period conferred by the patent will expire. The role of the claims is to define with words the subject matter of the invention sought to be protected, so that when the patent will issue, the public will be in position to discern the scope of the exclusive right conferred by the patent and determine what they are not entitled to do without the consent of the patentee, otherwise there will be infringement of the patent. It is worth mentioning that the specification of an application is directed to a person skilled in the art, so the language and the explanations must be adapted to the level of knowledge to be expected from such a person. This does not prevent the use of simple terms for some particular subjects in the application, but it is useless to elaborate upon the subjects that are well known by the persons skilled in the art.

THE DESCRIPTION

Typically, the description broaches the following topics in the following order (reference can be made to the attached patent):

1. TITLE:

The title identifies the invention in a few words representative of its category.

2. FIELD OF THE INVENTION:

The general technical field of the invention and its field of application is outlined.

3. BACKGROUND OF THE PRIOR ART:

This section sets forth the nature of the problem addressed by the invention, in reference with the prior art, by skimming through the relevant patents or public patent applications among the prior art. In other words, the problem allegedly solved by the invention is set forth, as are prior attempts to solve the problem and why they have failed.

4. STATEMENT OF THE OBJECTS OF THE INVENTION (OPTIONAL BUT PREFERABLE):

This section sets forth the objects of the invention, allowing the reader to understand the real nature of the invention and the progress that it represents in the technique.

5. SUMMARY OF THE INVENTION:

This section sets forth the important (some might say essential) elements of the invention and is used to support the broadest claims. The advantages of the invention can be discussed.

6. BRIEF DESCRIPTION OF THE DRAWINGS:

This section introduces the various figures used in the description to illustrate the invention and to assist the reader in understanding. Typically, for an invention in electronics or in computers, it is recommended to use block diagrams, time diagrams showing control signals, bubble diagrams, algorithms, flowcharts, etc. For chemical and biotech-related inventions, molecular structures, sequence listings, process steps, schematic representations of equipment used, results, etc., are also advantageously included.

To make the invention better understood, the prior art can also be illustrated.

7. DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S) OF THE INVENTION:

The detailed description sets forth one or several preferred manners to construct the invention, in reference to the figures. It is as short and specific as it is necessary for adequately and accurately describing the invention. The industrial application(s) of the invention can be mentioned. It provides a clear and accurate description, setting forth the nature of the invention, its operating mode, the warnings (e.g. operating range and conditions for proper results), its use, and drawings (illustrating at least one embodiment).

THE CLAIMS

The claims specify the scope and the extent of the right claimed for the invention, generally starting by the broadest scope to a narrower and more limitative scope. Claims of different scope are used to ensure as far as possible that in case of dispute involving the patent, at least one claim will be declared valid with respect to the prior art and infringed with respect to the matter in dispute.

The claims are used to set forth distinctly and in explicit terms the combinations of elements that the inventor(s) consider(s) as novel and for which he claims the exclusive property or privilege. Only the claims define the essential elements and features of the invention for which a right is solicited and granted by the patent.

Each claim takes the form of a numbered paragraph, comprising only one sentence, where there is no place for ambiguity. Each claim sets forth a combination of elements and their interrelations. Each claim must be supported by the description, i.e. all the elements defined therein must be found somehow in the drawings and

description. The preamble of each independent claim is used to identify the utility of the invention and often its environment.

In the case of an apparatus, a machine, a mechanism, a device or an engine, the claim defines the structural (functional) elements essential to the functioning, their function, their input(s)/output(s), their interactive and cooperative arrangement with the other elements of the apparatus, their composition, their properties and the secondary elements that form them.

In the case of a method or a process, the claim defines the steps of the method or the processing mode of the elements involved in the process.

Each claim has legal scope independent from the others, and must therefore be read and construed in an independent manner.

In its wording, a claim can however be dependent on another by referring thereto (it is said that it is attached thereto), hence avoiding the repetition of the text of the claim to which it is attached, thereby reducing redundancy. In other words, a dependent claim must be read as if it would comprise not only the matter introduced thereby, but also what is defined in the claims from which it depends. Therefore, the independent claims of a patent that do not refer to any other claim, define the general scope of the invention. The dependent claims must on the other hand be considered as including all the matter of the claims to which they are attached, and thus, have a more limitative scope.

The abstract is not a part of the specification, but it is essential in a patent application, like the Petition. The abstract provides a brief technical description and the use of the disclosed invention to allow the reader to determine quickly if he is interested to obtain more information about the inventions by means of the whole specification. The abstract takes the form of a single paragraph having no more than 150 words where, in addition to the above-mentioned topics, the use of the invention and the progress made in the art should be defined. The abstract has no legal value and cannot be used in any manner to construe the claims or define the nature of the invention. The employed language must remain simple.

POINTS TO CLARIFY BETWEEN THE PATENT AGENT AND THE INVENTOR BEFORE PREPARING THE APPLICATION

The applicant of a patent has the duty to give in the specification all the information in his possession to allow the invention to be exploited according to the best mode of construction devised. The description must not contain erroneous or misleading statements calculated to deceive or mislead the persons to whom the specification is addressed and make it hard for them, without tests and experimentations, to understand and construct the invention. Since an invention must be useful, certain

points relating to its utility must be found in the specification. The description must be complete or else the patent may be proven invalid.

For these reasons, it is essential that the inventor provides the patent agent with all information concerning the invention and keep no secrets in order to prevent any attack on the validity of the resulting patent.

Since each claim must be supported by the description, it is essential that the drawings provided by the inventor(s) to the agent be well elaborated, as these drawings often constitute the base upon which the patent agent relies all along the drafting of the application.

It is important that the inventor provides copies of the documents of the prior art known to him. It is highly recommended that these documents be provided without any discrimination, in order that the agent might discuss them in the background of the prior art in the application, as required. This is a statutory duty in the United States (under risk of invalidating the patent).

ROLE OF THE PATENT AGENT

The role of the patent agent consists, in addition to the various services and counselling that he can provide during a mandate, in preparing a draft of a patent application that he will submit for approval to the client, before proceeding with its filing in the concerned countries. It should be noted that the agent is not an inventor. Thus, no inventive contribution should be expected from him even if it happens sometimes. The collaboration of the inventor is essential to answer the questions of the agent before, during and after the drafting of the Application, because no one is better placed than the inventor to explain the invention.

The agent relies on his experience and knowledge to attempt to obtain the best possible protection for the invention. He especially provides a capital contribution on the formulation of the claims, so that their scope and their extent be the largest as possible, while remaining valid. He ensures that the various requirements of the law concerning the format and the content of the applications be respected. Besides, he acts as a counsellor during the prosecution of the applications, and can even express useful opinions to defend the rights conferred by a patent, especially in relation with potential infringement or the validity of a patent.

The drafting of a patent application requires a good collaboration between the patent agent and the inventor. The patent agent must explain to the inventor the descriptive elements that he needs to draft the patent application. He should, if he considers that the description submitted by the inventor is ambiguous or incomplete, let him know that certain parts should be further detailed. The exchange between the patent agent and the inventor has the purpose of, on the one hand, to ensure that the patent agent

has a very good understanding of the invention and, on the other hand, of making the inventor understand what are the descriptive elements necessary for the drafting of the patent application.

THE SPECIFICATION, WITH A CLOSE EYE ON AMERICAN PRACTICE

The specification must meet certain requirements. The requirements according to Canadian practice are slightly different from those of the American practice. But considering that the American practice is more demanding than the Canadian practice regarding the specification, and considering that many applicants file both in Canada and the United States, the requirements of the American practice will be discussed since they are more than sufficient in Canada.

According to the American practice, the first paragraph of section 35 USC §112 of the Act outlines the legal requirements for a patent specification, and reads as follows:

The specification shall contain

- (1) a written description of the invention,
- (2) and the manner of the process of making and using it, in such full, clear, concise and exact term as to enable a person skilled in the art to which it pertains, or to which it is most nearly connected, to make and use the same,
- (3) and shall set forth the best mode contemplated by the inventor for carrying out his invention. @

There are thus three requirements. The first (1) is to describe the invention, the second (2) is to describe an embodiment to allow someone skilled in the art to make and use the invention, and the third (3) is to describe the best mode contemplated by the inventor.

FIRST REQUIREMENT: DESCRIBING THE INVENTION

The first requirement of describing the invention has implications with respect to what can be claimed. For example, an inventor describes in his patent application an electronic control circuit comprising a combination of logic gates. After the filing of his application, he then wishes to claim another equivalent (and obvious) embodiment where the logic gates are replaced by a circuit provided with a microprocessor. Since this embodiment was not described in the application as filed, it will not be possible to claim it. All the claimed elements must be described in the specification, and must be shown in the drawings of the application.

This does not mean that the applicant must literally limit his claims to what has been described. He can, and this is even highly recommended, claim the best embodiment described by means of broad and general terms to cover other possible embodiments, but he cannot specifically claim embodiments that are not described.

The specification must be complete. This is important since a patent is a contract between the government and the inventor where the government grants to the inventor exclusive rights for his invention in exchange for a complete description of the invention. If the inventor does not describe his invention in a complete manner, this can be a cause for invalidating the patent which results in a withdrawal of the exclusive rights granted to the inventor by the government. In addition, it is crucial to completely describe the invention at the time of filing of the application since no new matter can be added to a patent application once filed.

The caveat to this requirement lies in the theory of sound prediction, discussed in the accompanying article by Bob H. Sotiriadis et al.

SECOND REQUIREMENT: DESCRIBING THE INVENTION TO ENABLE A PERSON SKILLED IN THE ART TO MAKE IT

In the context of inventions concerning computer software, it is important to write a description that is sufficiently complete to enable a person skilled in the art to make it without undue experimentation.

The drawings of a patent application are very important. According to the American practice, all claimed subject matter must usually be supported by the drawings. At least one drawing is necessary to describe the hardware of the invention. Usually, for inventions comprising computer software, block diagrams are often used to describe the hardware. Preferably at least one block diagram should describe the essential hardware elements and their immediate surrounding.

Also, at least one second drawing is necessary to describe the main steps of the method to attain the objective of the invention. This second drawing can be for example an algorithm or a flow chart.

The preparation of a complete description of the invention is often the step requiring the most work from the inventor. The computer program can comprise thousands of lines of code. It must be understood that the patent agent cannot write a patent application based on a listing of all the code lines. It is thus necessary for the inventor to synthesize, for example, by means of algorithms, all the steps of the program he feels are important to attain the objective of the invention. This synthesis must be done while making sure that all the steps described by the algorithm are included directly or indirectly in the program.

In describing the hardware by means of block diagrams, it is important that a person skilled in the art understands every block appearing in a patent application. Thus if the invention resides in one of the blocks of the main diagram, this block must be further described by means of at least another block diagram until a person skilled in the art can understand how to realize every block shown in the drawings. It is difficult to say in advance how many drawings will be necessary to describe an invention. In very simple cases, one diagram can be sufficient to describe the hardware and one algorithm can be sufficient to describe the operation mode of the apparatus. In other cases, fifteen drawings can be necessary to describe the hardware and as many algorithms to describe the operation mode of the apparatus. It is easily understood that the cost of writing a patent application is directly linked to the number of drawings needed to explain the invention. The more complex an invention is, the more costly the application will be to write.

Furthermore, in cases where it would be important to understand the temporal pulses to control the elements showed in the block diagrams, the use of timing charts or chronograms should be considered, to make easier the understanding of different control sequences of the circuit elements.

An invention embodied in an apparatus is claimed as a combination of elements. However, most of the time, many elements that are part of the combination are not themselves new. In this case it is preferable that these elements be clearly identified in the specification to allow a person skilled in the art to quickly understand what kind of elements they are while avoiding a detailed description of their function.

The description details required to describe an invention and enable a person skilled in the art to make the invention depends on the general knowledge of this person skilled in the art at the time the application is filed. If the knowledge of the person skilled in the art is extensive in the context of the invention then the quantity of details necessary to support the claims can be relatively small. Inversely, if the invention concerns a very specific field of a new technology and a person skilled in the art would be unlikely to be very knowledgeable on the subject, then the specification should be elaborate and complete to enable the person skilled in the art to understand and make the invention.

In other words, there is no need to reinvent the wheel. If the invention is in a field where certain terms are well known, or where certain components have near-consecrated functions and meanings, there is no need to redefine them. However, since the inventor is a lexicographer, if words or concepts are used when describing the invention in a particular manner which lies outside of the typically accepted definition, then it is fundamental to have the “new” definition in the specification.

In practice, a question or one like it, often asked is: “How much of the hardware must be described in the specification for an invention where the novelty mostly resides in the software?”. It is very difficult to answer this since it depends on the general

knowledge of the person skilled in the art. However, the following are some guidelines for the inventor in his approach:

- having a good knowledge of the state of the art in the field of the invention. After all, it is pointless to describe in details what is already known in the art and is not related to the novelty of the invention. What is already well known can be summarized and it is of course possible to refer in the specification to other documents or patents which show certain aspects of the invention that are already known;
- having a good discussion with the patent agent to reach a mutual understanding of what is the novelty of the innovation. This is necessary so the inventor can concentrate his efforts and energy to describe the new aspects of his invention which are usually those important to reach the objectives of the invention;
- including, if necessary, time charts to explain how the apparatus works. Usually, at least one time chart is required when there is a block called "control" in the block diagrams, to define what is meant by "control"; and
- including at least one drawing to show the hardware even if the innovation resides wholly in the software to allow a person skilled in the art to understand in what context the software is used.

Should a patent application comprise an object code listing or a source code listing? Object codes are those read and interpreted by a microprocessor while source codes are those written by the programmer. It is by far preferable to use source codes instead of object codes, since the latter codes are very difficult, if not impossible to be read and understood by the Examiner while source codes can be useful, should the need arise, to explain certain steps of the method to the Examiner.

THIRD REQUIREMENT: DESCRIBING THE BEST MODE CONTEMPLATED BY THE INVENTOR

The inventor must disclose, to the best of his knowledge, the best mode for carrying out his invention at the time of filing of the application. There are two important aspects to this requirement. First, the best mode to be described is the one to carry out the invention as claimed, and not necessarily the product developed for the market. This means that the inventor does not have to disclose in his patent application innovative aspects that are part of his commercial product but are not directly related to the invention.

The second important aspect can be very subjective; the inventor must describe the best mode according to his knowledge. Certain cases can raise a dilemma for the

inventor where, for example, a first embodiment of the invention is preferable in a first context while a second embodiment of the invention is preferable in a second context. When in doubt, it is preferable to disclose both embodiments. It is almost certain that, if the inventor for any reason deliberately leaves out an aspect of his invention he knows is important, the validity of the resulting patent may be in doubt.

The inventor must disclose the best mode of making his invention and must describe it in a complete manner. To insure that the invention is completely disclosed and that the best mode is disclosed, a complete listing of the software can be included in the specification. Inventors are often reluctant to do this especially in consideration of the large quantity of effort and money that is usually necessary for developing software. They do not want to freely give away the fruits of their labor to competitors. Nevertheless, one must remember that a patent is a contract between the government and the inventor and the latter agrees to completely disclose his invention in exchange for exclusive rights. The inclusion of a software listing in the specification is a security measure to prevent a rejection of the application based on an incomplete disclosure of the invention or a non disclosure of the best mode of making it.

Knowing this, it is still possible that many code lines of the software are not part to the invention. These code lines are not necessary to completely describe the invention. They can thus be omitted from the listing to prevent the disclosure to competitors of software parts that can be kept secret. It is not compulsory to include a software listing to completely disclose the invention especially in a case where the specification already describes in a complete manner all the steps of the invention. This inclusion of the software listing in the patent application is mostly a security measure to insure that in cases where important elements of the invention are missing, the applicant can count on the software listing to provide those missing elements.

EXAMPLE OF A TYPICAL U.S. PATENT

To better understand the fundamentals explained above, the specification of the U.S. patent no. 5,455,506 issued on October 3rd, 1995 will be shown and discussed. As can be seen on the first page of this patent, it concerns a method and a portable testing apparatus for safely testing an autotransformer for power distribution lines. Figure 1 of this patent shows how the apparatus (6) is connected to the autotransformer. Figure 3 is a block diagram showing the elements of the apparatus shown in Figure 1. All the blocks shown in this figure 3 are elements known to a person skilled in the art, namely a signal generator (16), a programmable connector switcher (18), a signal amplifier (20), an AC to DC converter (30), an analogue to digital converter (32), a keyboard (36), a microcontroller (38) and a display screen (40).

Figure 4 shows the panel that allows the user to interact with the apparatus. The last drawing shows Figures 2 and 5. Figure 2 is a schematic view of the autotransformer and Figure 5 is an algorithm showing the operation mode of the apparatus. The novelty resides in the software used by the microcontroller rather than in the hardware. The source code was included in the application.

The objective of the invention, as mentioned in the second column of the patent is to propose a method and a portable testing apparatus for safely testing an autotransformer for power distribution lines. The drawback with methods and apparatus of the prior art is that when a technician has to make some measurements on an autotransformer, the terminals of the primary and secondary windings are not always clearly identified. If a high power testing voltage is applied on the wrong terminals by mistake, this could result in a power overload dangerous for the technician. The inventors have thus developed an apparatus which makes a series of preliminary low voltage tests that allow the apparatus to identify the various terminals of the autotransformer. Then, when the apparatus has identified the terminals of the autotransformer, it can apply in a safe manner high power signals on the appropriate terminals. As a result the technician does not have to bother whether the right connections were made on the primary and secondary windings because the apparatus can identify the terminals of the autotransformer primary and secondary windings and it takes care of applying the appropriate voltages on the right terminals.

Referring now to Figure 5, there is shown that firstly low voltage signals are applied on at the autotransformer terminals and measurements are made. Then, a series of tests are done to the resulting values to determine and show to the technician where are connected the terminals of the apparatus. The technician can then start the high voltage testing. As can be seen, this high voltage testing is not described since it is not part of the invention. The invention resides more precisely in the series of preliminary tests allowing to determine where are connected the terminals of the apparatus.

The patent agent needs drawings similar to those shown in this patent to start the drafting of a patent application. Each drawing must be accompanied with a description describing every element shown. The inventor must also describe the drawbacks of the prior art to bring out the objectives of his invention. He must in addition describe a normal operation mode of his invention as completely as possible by referring to the drawings. If more than one operation mode is possible, each of them should be described.

CONCLUSION

As can it be seen, a lot of work can be necessary for the inventor to describe his invention. It must be understood that the patent agent is not the inventor, and does not have his expertise to describe the invention. The primary role of the patent agent

is to write the claims. In particular, he will start by the main claim which determines the scope of the patent.

It is important to see that the more the invention is described in a complete manner, the less likely it is to encounter problems in the examination process, which results in a reduction of the cost involved. Indeed, if a patent application is not well written from the start, the inventor can later be faced with a very costly prosecution to successfully get his patent delivered. It is thus in his own interest to take the time to write a description that is as complete as possible.

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