

# Procedures required for Filing a Patent Application

**[Postscript]**

- Developing and determining the nature of an invention -
- Survey of conventional technology -

**Japan Patent Office**

**Asia-Pacific Industrial Property Center, JIII**

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## Chapter 1

### Developing and determining the nature of an invention

If you take an invention that is the product of your research and development and attempt to patent it in its existing state, it is likely that the patent rights you obtain will be full of loopholes. It is essential to obtain patent rights that are broad, robust and free of loopholes. The following sections will describe the steps of developing an invention and determining the nature of an invention, which are important in ensuring that patent rights will be broad in scope and robust.

#### (1) Developing an invention

The process of developing an invention means that once an invention has been created as the result of research and development, the inventor intentionally uses this as a base to expand from, engaging in the production of the invention. As a result, the fruits of the research and development can be protected by patent rights systematically and comprehensively.

Moreover, developing an invention may also be an opportunity to expand one-dimensional research to something more multifaceted and systematic.

#### [1] Aims in developing an invention

##### i ) Widen the scope of the invention as first perceived

Instead of being satisfied with just one invention, produce several inventions in a multifaceted way, such as inventions approached from different angles, ancillary inventions, and application inventions.

##### ii ) Deepen the scope of the invention

Produce an invention that has greater possibilities for implementation by studying its logical basis, adding depth to the invention, and giving it a higher quality finish.

##### iii ) Protect the invention with a patent "net"

Form a "net" of patents so that the fruits of your research and development

are protected by patent rights and others are prevented from obtaining patents or using the invention.

iv) Enhance R&D activities using invention development methods

Use invention development methods when deciding on the direction of your R&D, setting research topics, and selecting means for resolving problems in research areas.

## [2] Types of invention development methods

i) Development in response to defects

Development in response to defects refers to the method of producing the invention after formulating strategies to eliminate or reduce defects (defect countermeasures) discovered as a result of the research and development process (in the system or device etc.).

ii) Needs-based development

Similar to development in response to defects, needs-based development refers to the method of producing the invention after formulating strategies to meet new needs that arise concerning the results of the research and development (with respect to the system or device etc.).

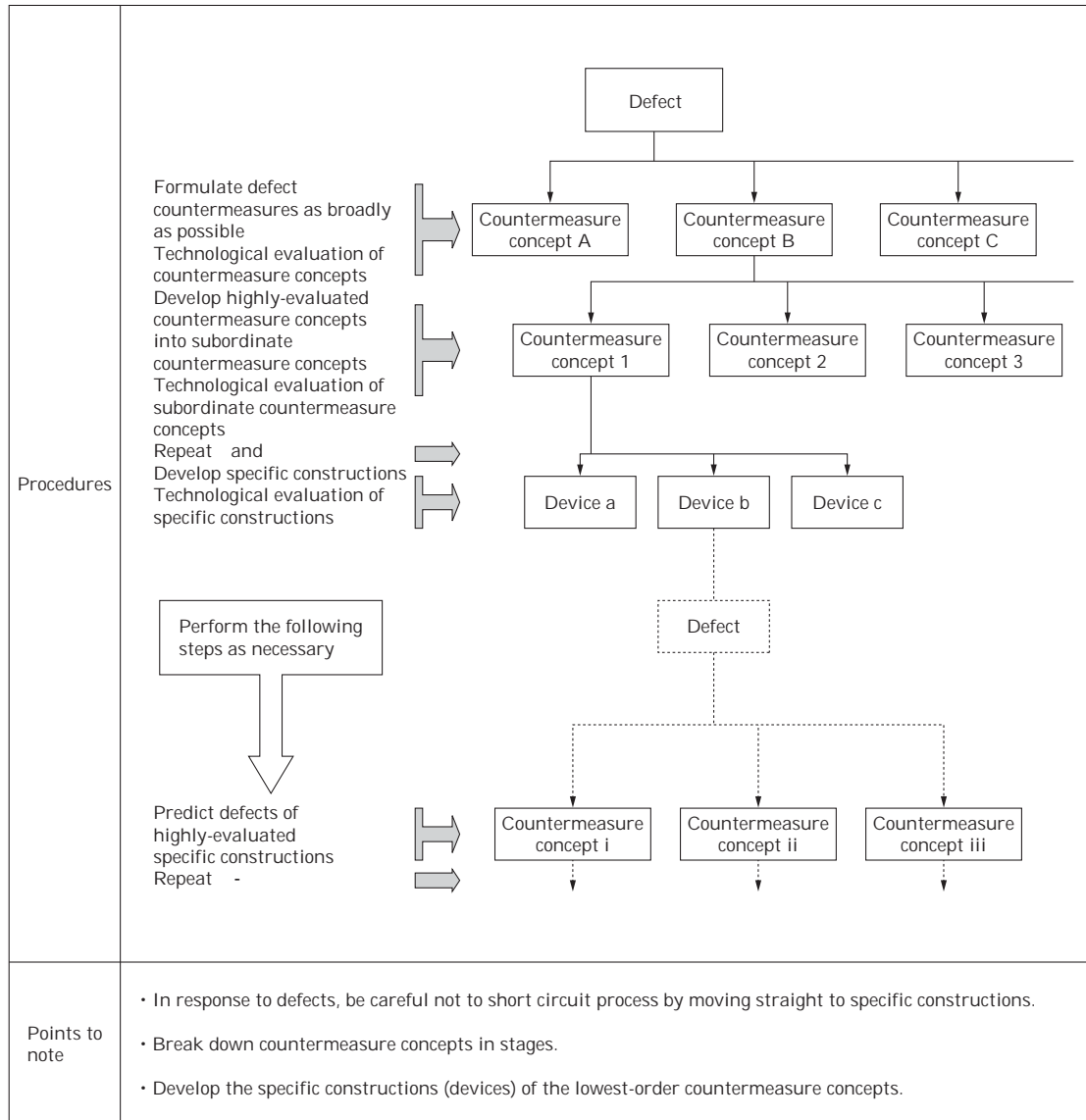
iii) Development of use

Development of use is a method of producing the invention giving effect to the applications and uses of new "seeds" of research that are conceived of during the research and development process.

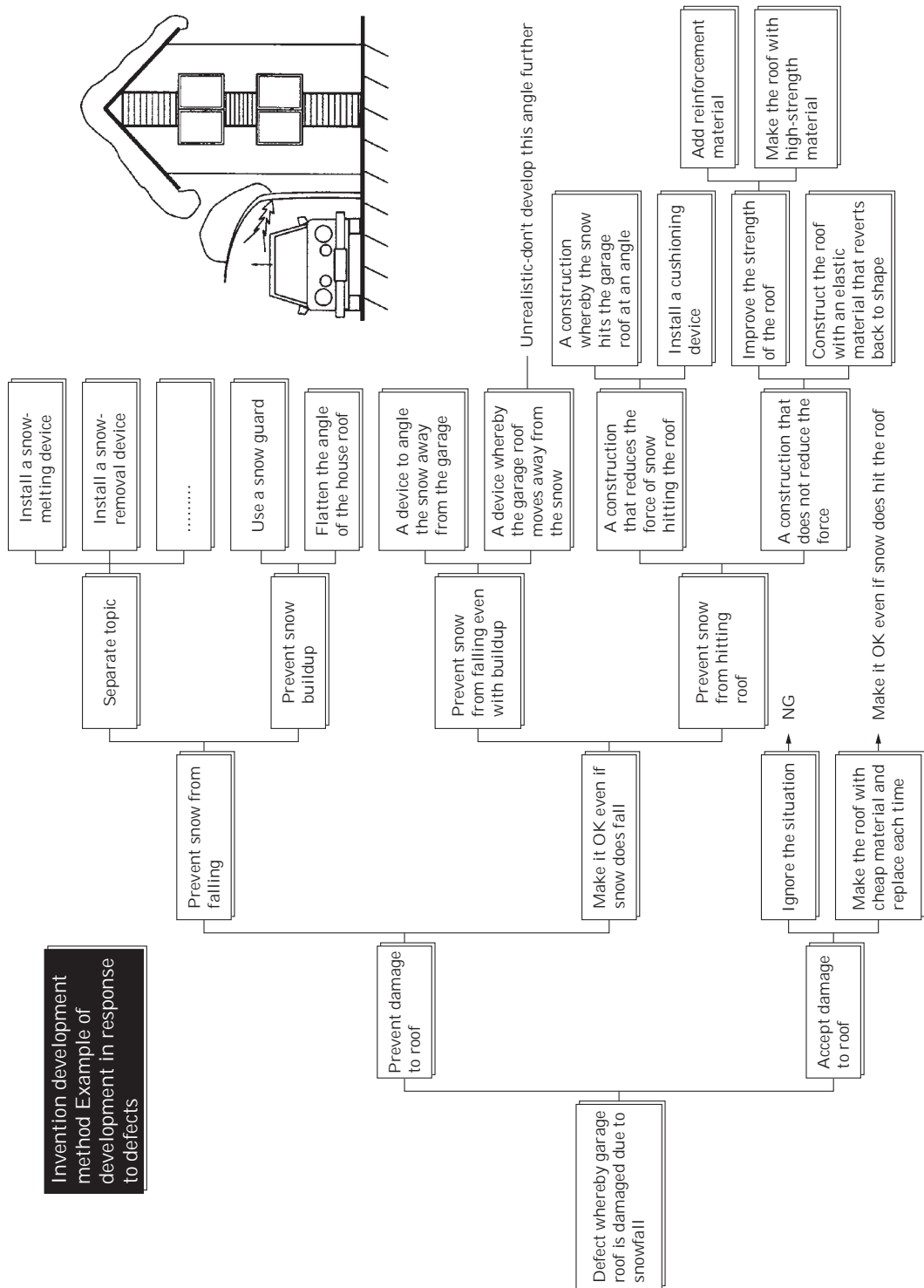
However, when developing uses it is important to be aware that it is difficult to obtain a patent simply by using new research outcomes in a different way from previously, and even if a patent is obtained it may not be a useful one.

In order to obtain a useful patent, it is important to properly analyze the new outcomes that have been achieved, determine any defects that would arise if the outcomes were applied to a different use, and produce the new invention using the method of development in response to defects, formulating strategies to eliminate or reduce defects (defect countermeasures).

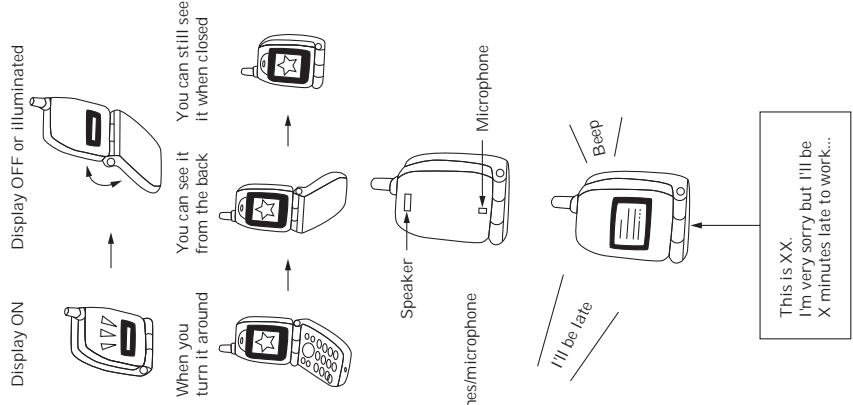
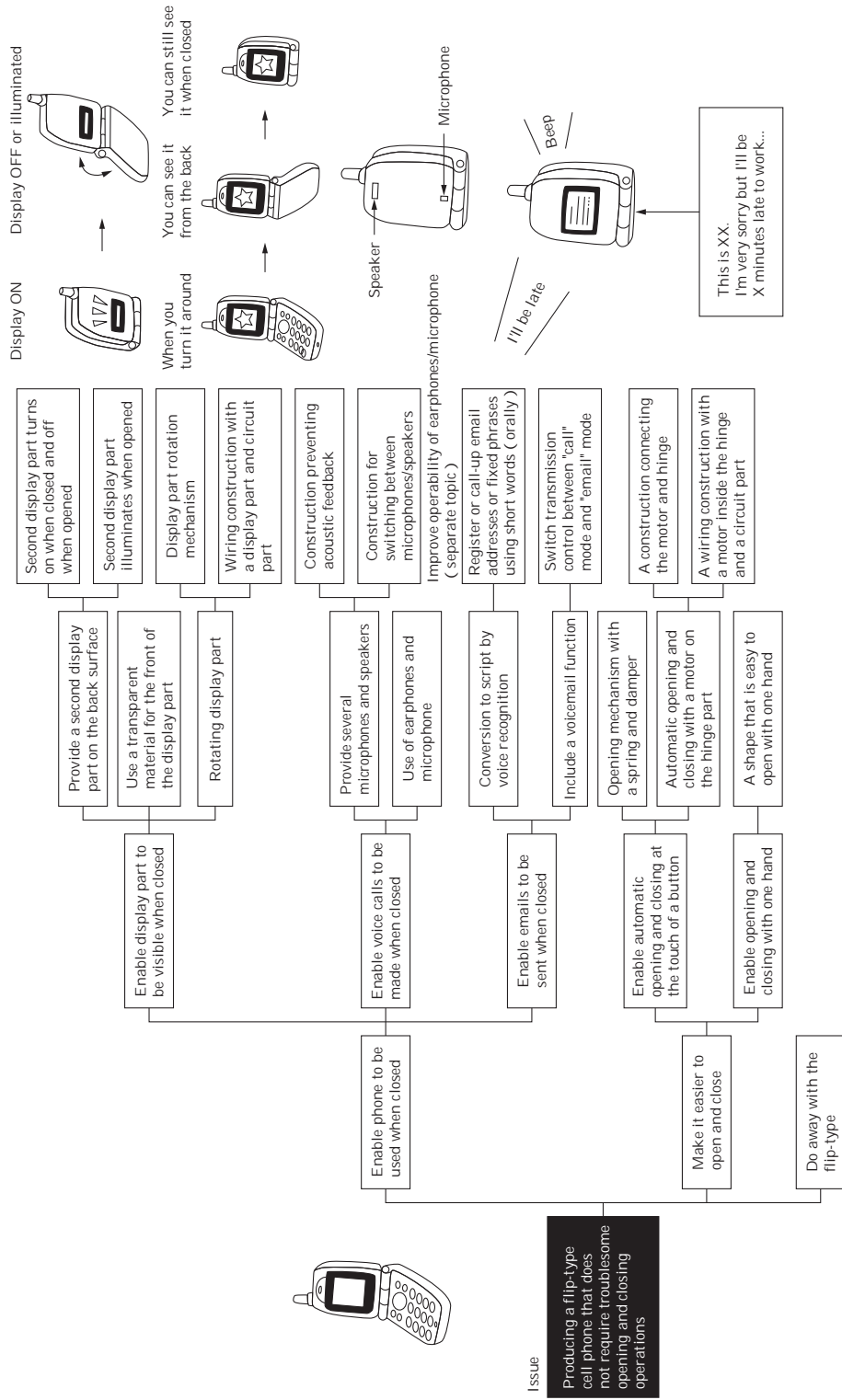
Example of development process in response to defects



a) Example of development in response to defects: a garage

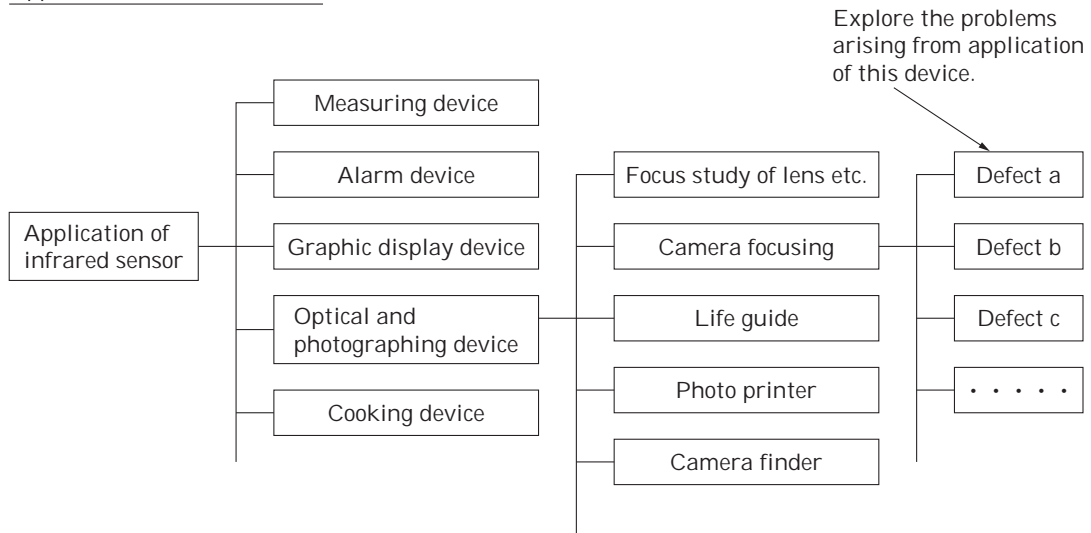


b) Example of needs-based development: cell phone



c) Development of use example: infrared sensor

Application of infrared sensor



**[3] Hints for invention creation**

In order to obtain valuable patent rights, it is desirable to produce original inventions based on research themes, using the methods for developing inventions described above.

However, sometimes exceptionally useful inventions arise out of areas that the researcher has unconsciously overlooked during the research and development process. In order to discover hidden inventions that are often overlooked in the R&D process, it is important to be aware that even embodiments of inventions such as those described below which hardly contain any new constituent features may be patented if they exhibit new functions or effects.



Embodiments of inventions	
Combined inventions	Inventions comprising a combination of several different conventional technologies that are commonly known
Substituted/converted inventions	Inventions comprised by substituting some constituent features of conventional technology that is commonly known with other conventional technology
Inventions with modified or restricted uses	Inventions wherein the use of conventional technology that is commonly known is modified or restricted
Inventions with modified or restricted numerical values, shapes, arrangements, materials etc.	Inventions wherein the numerical values, shapes, arrangements, materials, etc. of conventional technology that is commonly known are modified or restricted
Selected inventions	Inventions wherein all or some constituent features of conventional technology are selected for a prescribed, specific embodiment that is a subordinate concept

## (2) Determining the nature of an invention

Determining the nature of an invention refers to understanding the invention, which is a product of research and development, as an invention that corresponds to new functions and principles, in other words as a technological concept. In order to properly determine the nature of an invention, it is vital to determine its essential quality. If you can grasp its essential quality, you will be able to ensure that the product of your research and development gains protection of the maximum possible rights. If you fail to correctly grasp the nature of the invention, the scope of your rights will be limited. Thus in order to ensure maximum rights protection for the products of research and development, correctly determining the nature of the invention is a central responsibility of an inventor.

### [1] Clarifying the essential quality of an invention

The essential quality of an invention is its functions and principles.

It is necessary to consider the following points when determining the essential quality of an invention.

- 1) What technological progress has been made by the invention?
- 2) What is the central function of the invention or what is the central problem that it attempts to resolve?

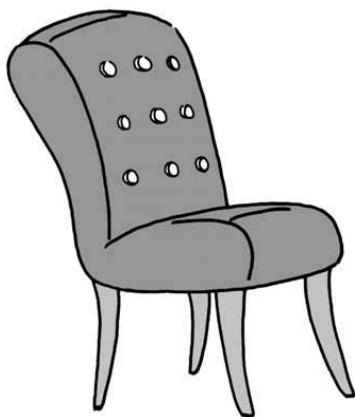
- 3) What are the minimum constituent features that perform the function?
- 4) What is the scope of application?

It is very common for inventors not to be conscious of the essential quality of an invention, but rather have in mind a specific embodiment, only looking at the invention's qualities from a single perspective. In such a case, the rights obtained can only be of narrow scope.

Therefore, by using this one perspective as a base to explore the functions and principles of the invention, looking at its multiple dimensions from many angles, parts of the invention that you were not conscious of at the start will become clear and the invention will broaden in scope. The invention as a whole, in other words its essential quality, will be clarified.

a) Example of the essential quality of an invention

Let's assume that a researcher has discovered that "an excellent massage effect is achieved when spherical objects containing a particular kind of magnetic material are provided in the back of a chair."



What is the essential quality of this invention?

To determine the essential quality, it is necessary to consider what technological progress has been made by the invention, what is the central function of the invention or what is the central problem that it attempts to

resolve, and what are the minimum constituent features that perform the function?

Examining these issues, it is evident that the essential quality of this invention is the back-massage effect produced by spherical objects containing specific magnetic material.

Next, one must examine the scope to which this can be applied. It is evident that this invention need not be limited to a chair. The chair is irrelevant to the essential quality of the invention. It is simply one embodiment.

As a result of the foregoing analysis, the essential quality of the invention can be understood as "the back-massage effect produced by spherical objects containing specific magnetic material". By understanding the essential quality in this way, the invention can be conceptualized in the following ways.

<Ways of conceptualizing the invention (example)>

- Spherical objects containing specific magnetic material
- A back-massage mechanism using spherical objects containing specific magnetic material
- A chair with spherical objects containing specific magnetic material provided in the backrest
- A backpack with spherical objects containing specific magnetic material provided in the back surface
- A bed with spherical objects containing specific magnetic material provided in the inside or on the surface thereof
- A jacket with spherical objects containing specific magnetic material provided in the back surface

The massage effect may not be limited to one's back. If a massage effect can also be obtained for the legs, hands and neck, the essential quality of the invention will become "the massage effect on the human body produced by spherical objects containing specific magnetic material". As a result, it can be developed into many more inventions.

- **Steps for determining the functions and principles from embodiments**

The following steps are useful in determining the central functions and principles of an invention.

- 1) Analyze the mechanism of the invention (problems and means of solution)

The mechanism of the invention refers to the problem-solving scheme, that is, what kinds of problems are solved using what kind of functions and principles, and in what way?

- 2) Depict the invention as a drawing

Depicting the invention as a drawing allows you to explore it abstractly as well as visually, enabling a correct understanding of the central functions and principles.

- 3) Extract the constituent features, relating them to each other

By extracting the constituent features that provide the central functions of the invention, and relating them to other constituent features, you will gain a correct understanding of the functions and principles.

- 4) Discover the new functions and principles, and analyze the invention

When you determine the new functions and principles, analyze the invention as a whole, checking that the new functions and principles are precise in terms of how they solve the problems and their effectiveness.

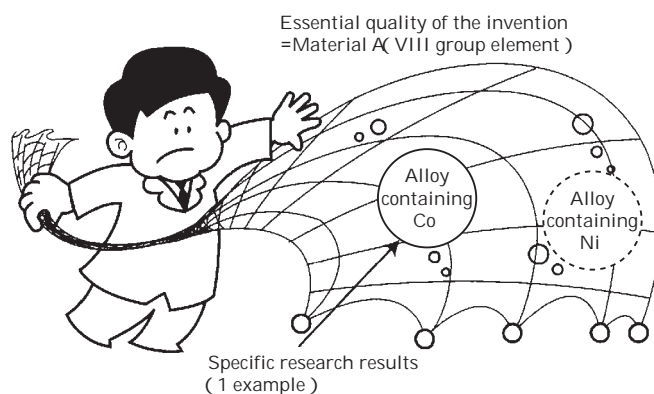
- b) Example of steps for determining the functions and principles from an embodiment: cell phone antenna

Let's suppose that current cell phones have a problem with noise and you are working on improvements to antenna materials to reduce noise. As a result, you have discovered that noise is reduced when material  $\alpha$  (for example, an alloy containing cobalt) is used for the antenna material. Is the essential quality of the invention simply a cell phone using material  $\alpha$  as the antenna material?

To decide this, the mechanism of the invention (problems and means of resolution) is analyzed. In other words, you analyze technologically why noise is

reduced when material  $\alpha$  is used as the antenna material. If you find that this is due to the properties of material  $\alpha$ , you should check by testing noise levels using other materials with the same properties as material  $\alpha$ .

Then, if you can confirm that noise is reduced not just using material  $\alpha$ , (for example an alloy containing cobalt) but also using material  $\beta$  (for example an alloy containing nickel), the essential quality of the invention can be considered to be "a cell phone using material A as the antenna material", where material A is a term covering both materials, (for example an alloy which includes VIII group element). Applying this as the essential quality of the invention, you can obtain rights that are broad in scope and robust.



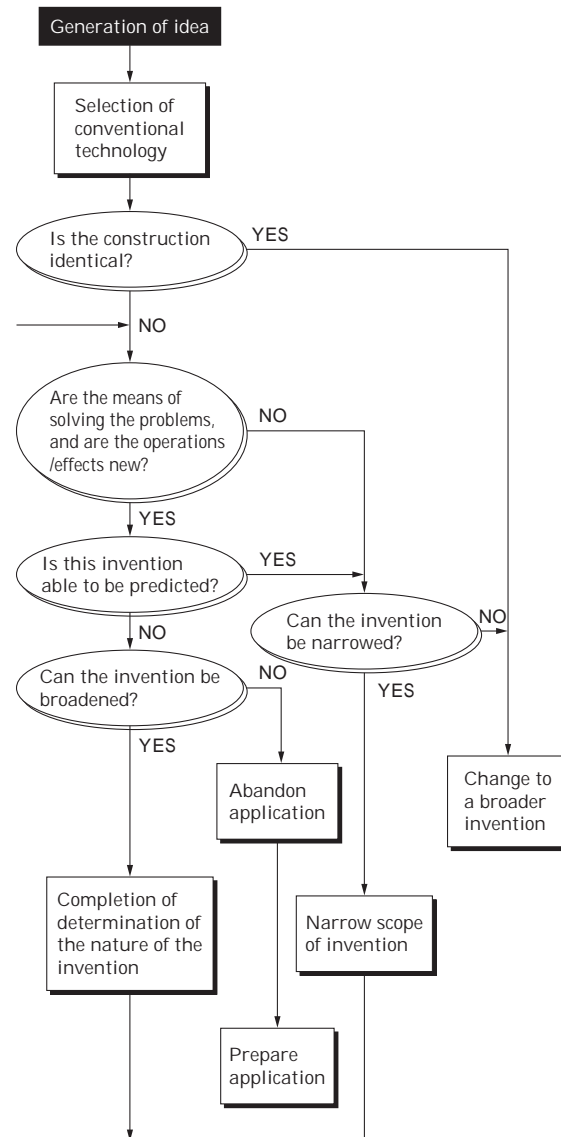
In a case where a rival company manufactures and sells a cell phone using material  $\beta$  as the antenna material, if you have only obtained rights regarding a cell phone using material  $\alpha$  as the antenna material, you will be unable to assert your rights against the rival company. However, if you have obtained rights regarding a cell phone using material A as the antenna material, this will cover both materials  $\alpha$  and  $\beta$ , so you will be able to assert your rights.

It is important to put effort into obtaining rights that are broad in scope and robust, using the invention first conceived of as a starting point to explore the invention at a broader level including other inventions as well, and thereby determine the essential quality of the invention.

## **[2] Steps in determining the nature of an invention**

When an idea is generated during the research and development process, you should investigate it according to the following steps, and determine the nature of the invention.

Select from the conventional technology that is the closest to your idea, either from the conventional technology that you possessed or discovered at the time you had the idea. After selecting the conventional technology, examine your invention according the operational steps below and determine the nature of the invention. After determining the nature of the invention, it may be considered desirable to re-examine to ensure that no conventional technology exists that is closer to the nature of the invention determined, and go through the operational steps again to re-determine the nature of the invention.



c ) Example of broadening the scope of an invention through investigation of alternative methods: satellite

This uses the example of a satellite to show investigation of an invention according to the operational steps in order to determine the nature of the invention.

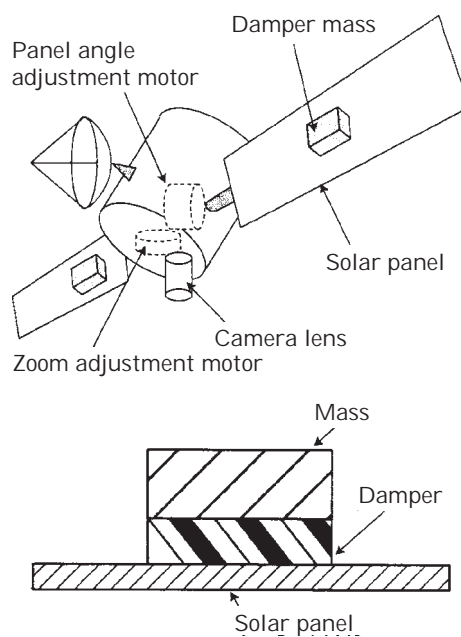
**[a] The idea that has been generated**

Let's assume that the idea that has been generated is as follows.

"The device currently being researched is an artificial satellite equipped with a

solar panel and camera. The solar panel is attached to the outside of the satellite in space, and its angle can be adjusted by a panel angle adjustment motor. The camera's magnification can be adjusted by a zoom adjustment motor. After performing simulations for this satellite, it was discovered that when both the panel angle adjustment motor and the zoom adjustment motor are operated at the same time, a beat due to the vibrations of the two motors is generated, and the beat frequency causes the whole solar panel to resonate, leading to damage to the panel.

In order to solve this problem, it was found that by providing a damper mass in the centre of the solar panel, the damping effect of this damper mass would absorb the solar panel vibrations, reducing the resonance of the solar panel as a whole and



**[b] Is the construction identical to conventional technology?**

Let's assume that the following two conventional technologies exist.

<Conventional technology 1>

A satellite with a solar panel attached to the outside thereof, the angle of which



can be adjusted by a panel angle adjustment motor (no description regarding a camera).

<Conventional technology 2>

A satellite equipped with a camera, the magnification of which can be adjusted by a zoom adjustment motor (no description regarding solar panel).

Next, compare the idea with the conventional technologies 1 and 2, extracting the constructions which are not identical to, in other words differ from the conventional technologies.

<Construction that is not identical>

A satellite that is equipped with a solar panel attached to the outside of the satellite in space, which can have its angle adjusted by a panel angle adjustment motor, and a camera which can have its magnification adjusted by a zoom adjustment motor; wherein a damper mass is provided in the solar panel for preventing damage to the solar panel due to resonance of the panel as a result of the beat caused during operation of both motors"

**[c] Are the means of resolution and the operations/effects new?**

The problem to be solved by the invention was:

"the prevention of damage to the solar panel due to resonance of the solar panel itself, arising from the beat of the two motors".

This problem does not exist in conventional technologies 1 or 2.

**[d] Is this invention able to be predicted?**

For this example, we will presume that it is not able to be predicted.

**[e] Narrowing the invention**

In this example, since the invention is not able to be predicted, it will not be narrowed.

**[f] Can the invention be broadened?**

In this example, you would analyze the mechanism that is the cause of damage to the solar panel and examine whether the invention can be broadened.

<Mechanism causing solar panel damage>

As shown below, damage occurs as a result of the process of steps a-h.

- a . The two motors are operated at the same time→
- b . The two motors vibrate at the same time→
- c . The vibration frequency of the two motors during operation is within the range that generates a beat→
- d . The vibration of the two motors generate a beat→
- e . The beat is transmitted to the solar panel→
- f . The natural frequency of the solar panel is within a range that resonates with the frequency of the motors' beat→
- g . The solar panel resonates→
- h . The solar panel resonates and the damage generates inevitable fatigue.

Now, let's consider alternative means for preventing this damage-causing mechanism from operating.

<Alternative means for preventing damage-causing mechanism from operating> (the small letters in brackets correspond to the steps of the solar panel damage-causing mechanism).

- A1 (a). Perform control so as not to operate the two motors at the same time.
- A2 (a). Provide only one motor and switch between the solar panel and zoom using a clutch.
- B1 (b). Provide a damper mass to absorb the motor vibrations of at least one of the motors.
- B2 (b). Provide a vibration exciter (speaker etc.) to cancel out the vibrations of at least one of the motors.
- C (c). Set the vibration frequency of the two motors so that it is within a range that will not generate a beat.
- D (d). Provide a vibration exciter (speaker etc.) to cancel out the vibrations of the two

motors.

E (e). Provide a soft component in the transmission path of the motor's beat to dampen the transmission of vibrations.

F (f). Set the natural frequency of the solar panel to within a range that does not resonate with the frequency of the motors' beat.

G (g). Provide a vibration exciter (speaker etc.) to cancel out the resonance of the solar panel.

H1 (h). Reinforce the part that easily becomes fatigued due to the solar panel resonance.

H2 (h). Soften the part that easily becomes fatigued due to the solar panel resonance.

Next, let's examine the technological concepts that encompass both the original idea of using a damper mass, and the newly devised alternative means.

<Essential quality of the invention>

The essential quality of the invention is determined by investigating the concept that encompasses both the damper mass and the alternative means for preventing the operation of the solar panel damage-causing mechanism. As a result of this investigation, the essential quality of this invention is:

"a damage prevention means for preventing damage to the solar panel when it resonates due to the beat during operation of the panel angle adjustment motor and zoom adjustment motor."

Thus, from its essential quality, the invention can be understood broadly as defined below. Broadening the invention in this way enables the production of an invention encompassing not only a damper mass as in the original idea, but also many alternative means.

<Way of understanding the invention>

"A satellite that is equipped with a solar panel attached to the outside of the satellite in space, which can have its angle adjusted by a panel angle adjustment motor, and a camera which can have its magnification adjusted by a zoom adjustment motor; wherein a damage prevention means is provided for preventing damage to the solar

panel due to resonance of the panel as a result of the beat caused during operation of both motors".

**[g] Completion of determining nature of invention**

The process is completed when you judge that the invention cannot be broadened any further.

## Chapter 2

### Survey of conventional technology

#### **(1) Necessity of surveying conventional technology**

By surveying the conventional technology you will be able to determine the nature of your invention and confirm that it has novelty and an inventive step. You can accurately determine the nature of the invention and check its novelty and inventive step by comparing it with, in other words clarifying its distinction from the conventional technology that is the most similar to your invention. It is not an exaggeration to say that the precision with which you perform this survey of conventional technology will largely determine the nature of the invention and its novelty/inventive step.

#### **[1] Determining the nature of the invention**

For example, if you overlook conventional technology that is close to the content of the invention you are applying for because your survey of conventional technology was inadequate, you will have an incomplete grasp of the nature of your invention. This may result in a refusal to grant a patent if you apply for examination with an application that contains errors, including regarding the conventional technology.

Therefore, the survey of conventional technology is an important task for correctly determining the nature of your invention.

#### **[2] Confirming novelty and inventive step**

Specifically, it is necessary to compare your invention being applied for with the conventional technology, examining differences in composition, and operations/effects. If there are no differences in composition, the invention will be judged not to have novelty, whereas if there are compositional differences, novelty will be found. However, even with compositional differences, if there are

no differences in operations/effects, it will lack an inventive step. If compositional differences are recognized and based on these differences there are superior or new operations/effects that have not been realized up to now, there will be a higher probability that the application will be judged to contain an inventive step.

## **(2) Procedure for surveying the conventional technology**

### **[1] Clarification of the purpose of the survey**

First it is necessary to clearly specify the purpose of the conventional technology survey.

The purpose of the survey in the case of determining the nature of the invention and its novelty/inventive step (hereinafter "this case") is to check whether any conventional technology exists that is identical to or similar to the technology of the invention being applied for.

### **[2] Setting the survey concept**

Before beginning the survey it is necessary to determine the survey concept. The survey concept refers to the scope of the technology to be surveyed. The survey concept will determine the international patent classification (IPC) and search terms to be used for the survey. If the survey concept is too broad or vague there will be too many hits, making it difficult to narrow them down to conduct the survey. On the other hand if the survey concept is too narrow, it will not catch all the necessary conventional technology. In most cases the appropriate survey concept is arrived at by trial and error during the process.

When deciding on the survey concept it is important to be careful about the following points. If the invention being applied for is related to a construction, it may be preferable to include in the survey concept not only similar constructions but different types of constructions that have the same functions. Further, it may also be desirable to add to the survey concept not only the technological field that the invention arises from, but also technological fields that it can be

applied to. For example, a camera's zoom lens function and a photocopiers magnification function have different technological fields but their functions are the same. You should survey both technological fields in such a case.

### **[3] Setting the survey classification and search terms**

The international patent classification to be surveyed is decided based on the survey concept.

In this case, since the purpose of the survey is to determine the nature of the invention and confirm its novelty/inventive step, it is usual to set only the core patent classification and search terms relating to the invention applied for.

### **[4] Setting the survey countries**

The survey countries are set according to the survey purpose. For a survey purpose such as in this case, it is appropriate to set the survey country as one's own country (for example, if the application is to be made in Japan, the survey country will be Japan).

In the case of a survey of rights with the purpose of determining the existence or otherwise of a patent infringement, the survey country will be the country using the relevant technology. Likewise, if the purpose of the survey is to set the direction for future research and development, the survey country should be the country where the relevant technology is most advanced.

### **[5] Setting the survey period**

This refers to the decision as to how many years back from the present should be surveyed. It is necessary to set the survey period according to the survey purpose, when the technology to be surveyed was created and so on.

In this case one would decide on the survey period after estimating when the technology of the invention applied for became commonly known. In the case of a survey of rights with the purpose of determining the existence or otherwise of a patent infringement, the survey would need to be carried out for the period of

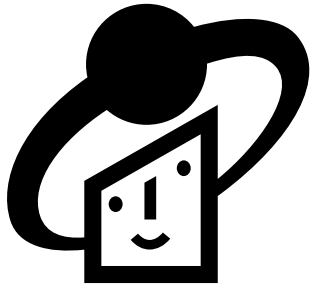
continuation of the rights. In Japan, this would be 20 years before the application. When conducting a patent survey in order to render invalid a problem patent that is discovered to potentially infringe another patent, the period of survey needs to be determined going back from the day of application of the problem patent.

#### **[6] Selecting the survey database**

A number of survey databases exist, including patent information databases and technical bibliography databases. The Industrial Property Digital Library (IPDL) is a patent information database operated by the Japan Patent Office. The IPDL includes Patent Abstracts of Japan (PAJ) in English.

In this case when doing a survey of the conventional technology concerning the invention applied for, one should select a database containing the full text and all the drawings.





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