

Determining Inventive Step or Nonobviousness for a Patent Requirement in View of the Formation Process of an Invention

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Received 9 July 2016; accepted 4 September 2016; published 7 September 2016

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Abstract

Regarding the criteria for determining the inventive step or nonobviousness (unobviousness) for a patent requirement of a patent invention, the conventional approach in the court decisions and examination standard of Japan, USA and EPO focused on acts, for example, whether or not the act to invent in the invention claimed in the application was “suggested” or “motivated” by the prior arts. On the other hand, Author regarded “conception based on a principle” and “establishment of a model” as the most important stage by analyzing the formation process of an invention. Especially, principles (typically in physics and chemistry) are important; furthermore, they are objective as the object of acts of the inventions. Therefore, I would like to propose a way in order to compare the applied invention with the prior arts. That is, we should set the “principle” and “ways of their utilization” as the object to analyze and judge their difference between the said invention and the arts. If the degree of the difference is large, an inventive step can be recognized. Because the problem to be solved does not consist of the contents of an invention, it should not be focused too much. In this article, the various factors in order to recognize differences with reference to principles and ways of their utilization were explained in a good order. Because the determination of the principles and their utilization seems to be made more objectively compared to that of acts, it can exclude hindsight. Up to now, this kind of discussion in this article has not yet been made.

Keywords

Patent Invention, Patent Requirements, Inventive Step, Nonobviousness (Unobviousness), Could-Would Approach

2. Meaning of an Invention

2.2. Laws of Nature (Principle)

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by Author³.

The same thing can be said about the reproducible phenomena.

3. Formation Process of an Invention

Using an example of inventing an airplane (if the term “airplane” did not exist, it would be something like “an apparatus to carry people for flying in the sky”), we can consider as **Table 1** shows.

Table 1. Purpose of an invention and the formation process of an invention (the case of inventing an airplane).

[1] Purpose of an invention (the problem)	-want to make the apparatus to carry people for flying in the sky
[2] Formation process of an invention	
(A) Conception (proposal of ^{*1})	
(i) Mere intuition	-make the apparatus which has the structure like a bird
(ii) Conception based on a principle	-make an object float in the air using the air resistance by propelling it forward (generate a lifting force for an object using the air resistance caused by propulsion force)
(B) Embodiment of the conception	
(i) Establishment of a model	-install a power device in an object to rotate a propeller, etc., and establish a structure having wings with a specially devised shape
(ii) Experiments, calculations ^{*2}	-conduct progressive experiments starting from (a) parts such as propellers and wings, to (b) a model of the airplane body, and proceeding to (c) a full sized airplane body -obtain necessary experiment results, calculation results and calculation formulas
(iii) Adjustment of the model	
(iv) Completing by repeating (i) to (iii)	-something that is practically applicable/usable

*1 In the case of a joint invention, conception needs to be proposed; otherwise it is very difficult for the other relevant parties to understand. *2 Generally speaking, experiments and calculations are conducted considering the parts to start with and then the whole, and also starting from the models then expanding to the full sized object. Here, calculations include computer simulations.

What is most important in the process above is the “establishment of the model” ([2] (B) (i)) for embodying the conception and the “conception based on a principle” ([2] (A) (ii)) for proposing the conception. The reasons for this are as follows: By the way, inventors are those who have contributed to either of the above.

(1) The establishment of the model and the conception based on a principle are important from a technical perspective.

In this regard, W. Brian Arthur⁴, who is a distinguished scholar of complexity economics, wrote in his book as follows:

“At the heart of invention lies the act of...seeing a suitable principle that will do the job...Sometimes this principle emerges naturally, ...But in most cases it arrives by conscious deliberation...”⁵ in his book “The Nature of Technology: What It is and How It Evolves” (2009) (p. 121).

(2) In terms of the relation to the purpose of the patent system and the subject matter of its protection; given that the patent system “aims for...development of industry...” (Japanese Patent Act, Article 1), it is most important to establish a model that has an embodiment which allows for industrial application, and the conception based on a principle is also important, as the subject matter of protection are technical ideas that use the laws of nature.

(3) From the definition of an invention given earlier, the following can be considered:

As an invention is defined to be the creation of technical ideas, it is beyond question that the establishment of the model is most important in a patented invention, and the conception based on a principle is also important because an invention is a creation utilizing the laws of nature⁶.

³Kageyama, K. (2015). Recognition of Inventor/Joint Inventors and Product-by-Process Claims-based on Consideration of Categorization into Physical-Object & Material Inventions and Formation Process of Inventions. Berlin: Lambert Academic Publishing.

⁴He is a distinguished economist who was awarded the International Schumpeter Award in 1990.

⁵Arthur, W. B. (2009). The Nature of Technology: What It Is and How It Evolves. London: Penguin Books. 121.

⁶In this connection, a court decision in the United States said that an inventor was a person who had the conception of the subject matter of an invention (p. 239 before) and the conception was required to have “definite and permanent idea of an operative invention” (Sewall v. Walters, 1994, paragraph 21). It seems that the above “definite and permanent” thing which is the object of the “idea” must be “a principle”. Furthermore, the way of the recognition of an inventor in this case was common to the way mentioned in the text of this page.

In **Table 1**, [1] is a preliminary stage of [2]; each stage in [2] carries some recognizable originality (creativity).

4. Patent Invention

4.1. Configuration of Patent Invention

A patent invention is composed of several parts: a problem to be solved (purpose), a constitution (means for solving the problem), and effects. Among them, the content of the invention is shown in the constitution, and the essence of the constitution is principles and models (establishment).

The problem (purpose) defines a direction of inventive actions. The effects are achievements of the purpose. The problem is the cause for the utilization of natural laws (principles) and the effect is its result.

4.2. Inventive Step (Nonobviousness or Noneasiness in Conceiving of an Invention)

(1) Definition of inventive step

(i) European Patent Convention (EPC)

“An invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art” (Article 56).

(ii) U.S. Patent Code

“A patent may not be obtained..., if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art...” (Article 103).

(iii) The Japanese Patent Act

“Where, prior to the filing of the patent application, a person ordinarily skilled in the art of the invention would have been able to easily make the invention based on the prior art, a patent shall not be granted for such an invention” (Article 29, paragraph 2).

(2) Person ordinarily skilled in the art

In the above, the person ordinarily skilled in the art of the invention is defined as “a person who has an ordinary knowledge in a technical field pertaining to the invention (or subject matter)”. With regard to this definition, there is no meaningful difference in interpretation among nations. However, one thing to be noted is that the notion of the person ordinarily skilled in the art is simply to indicate an aspect or level to determine obviousness or easiness in conceiving of an invention (hereinafter called “conceptual easiness”). In other words, the person ordinarily skilled in the art shows the state of the art, and provides a threshold to recognize common general knowledge. The object to be determined, as discussed later, is “whether it is suggested” (under the EPC) and “whether it is motivated” (under the Japanese law). In Author’s view, it can be whether there are differences of principle and its utilization. This matter shall be elaborated on further in the following.

In arguments on the natural laws (principle), Author has stated that “the basics of high school (at about 15 or 16 years old) physics and chemistry would suffice (or the degree of level is basically such that necessary understanding can be obtained by studying, as needed, starting from the knowledge of that level)”. If so, the person ordinarily skilled in the art may be considered as expert in the industry, assuming that it indicates the level (extent) as mentioned above.

With reference to the upper, inventions derive from technologies, while technologies are based on science including the principles of physics and chemistry. Patents derive from inventions while inventions, as mentioned earlier, use the principles of physics and chemistry. The number of principles is limited, but technologies are applied to a wide variety of usages, as they are basically rested on the utilization of principles (This will be elaborated on more and in detail in Sections 12 and 13). It can be said that what is frequently treated in the invention is not the “new principle” for utilization, but the “new way of utilization” of principles. Generally speaking, the utilization of a “new principle” would be called “epoch-making”.

Here, a certain relationship and difference arises in the understanding of the principle itself and technological levels in the field where the person ordinarily skilled in the art pertains.

(3) Obviousness and easiness in conceiving of an invention

With regard to the inventive step, both the EPC and the U.S. law, except the Japanese law, adopts whether it is obvious, but not whether it is easily conceived. The former is the criterion called “obviousness”, and the latter is the criterion called “easiness in conceiving of an invention” (conceptual easiness). In actuality, the latter crite-

tion is considered to be the same as the obviousness. However, the obviousness appears somewhat objective, as its determination tends to rely on the object⁷. In principle, the term “obviousness” is commonly used in this article, whereas the terms “conceptual easiness” are occasionally used in connection with the arguments on the Japanese court decision and the examination standard. In some occasion, the terms “inventive step” may also be used to cover both nonobviousness and conceptual noneasiness.

4.3. Invention and Patent

The patent is a social system, whereas invention which consists of its contents, relates to social, technical and engineering matters. Based on such technical nature, the problems to be solved by patents are in compliance with the social and economical needs. (This is the reason why the problems to be solved do not question originality.)

In the process considering the inventive step, it is reasonable to deal with the problems to be solved first, and then, with the natural laws and ways of their utilization (hereinafter called simply “principle” also). Such approach has been supported by practice and experience.

5. Patenting an Invention

5.1. Patent Application

The following discusses the actual situations concerning the formation process of an invention and a patent application for a completed invention, and reviews the issues arising therefrom.

(1) Actual situations of completion of an invention

The formation process of an invention of an airplane shown in Section 3, in actuality, was adjusted after the completion of the invention.

In practice, a business plan sets the direction and goal of technological development. The actual development follows the plan. During development phases, however, the direction and/or goal occasionally change their shapes including their expansion or reduction. The outcomes of development are thus obtained. One or more of outcomes are arranged to be filed for patent protection. Some others are selected as know-how to keep them undisclosed.

(2) Patent application for completed inventions

In arranging for patent filing, a prior art is searched and carefully reviewed to study the patentability of an invention, in particular, novelty and inventive step. Searches are conducted to find out prior arts, focusing on the similar ones in view of its technical field and problems to be solved, and the similarity and difference among their constitutions are analyzed. Patent specification is drafted to distinguish the constitution of the invention from that of prior art. The models of an invention (establishment) are written in the scope of patent claim. However, technical ideas including principles and their utilization are not clearly described in the claim. In most cases, they have to be read out from the detailed description of the invention in the specification. The problem to be solved is reviewed to comply with the constitution of the invention⁸.

In other words, for the purpose of patent application, the review of the problem to be solved which prior art discusses is not extensive. In some cases, even the problem to be solved of the invention claimed in the application (hereinafter called the “applied invention”) can be adjusted to meet the constitution of the applied invention (See, Subsection 11(2) for abstract description of the problem to be solved).

Thus, the inventive step has to be determined with more emphasis on the constitution of the invention in view of the constitution disclosed in the prior arts. Needless to say, a point in time to determine is not the time when the invention at issue was completed. It is the time when the invention was filed (this is the so called “first to file system”).

⁷It is commonly said that there are no substantial differences in patentability among Japan, the United States and the European Union (Tokyo-chō and Shadanhōjin Hatsumeikyōkai Ajia Taiheiyō Kōgyō-shoyūken Sentā (APIC), Tsukanaka, T. coop., 2011. *Hatsumei no Shinposei*, p. 6). URL (last checked 2 July 2016)

[http://www.training-jpo.go.jp/en/images_x/uploads/text_vtr/pdf/Inventive%20Step%20of%20Invention2011\(JP\).pdf](http://www.training-jpo.go.jp/en/images_x/uploads/text_vtr/pdf/Inventive%20Step%20of%20Invention2011(JP).pdf). It is said that the Japanese Patent Act, Article 29, Paragraph 2 introduced the U.S. law, 35 USC §103 (which adopts nonobviousness) as the model.

⁸If the problem to be solved is the goal of technical development set by the business plan or the like, it can be prerequisites for the invention, as discussed earlier in the preceding paragraph (1). Such problem may be called the problem of a broad scope. However, as discussed in this paragraph (2), the problem to be solved written in the patent specification is actually composed after the completion of the invention. Such latter problem may be called problems of a narrow scope. In this article, the latter one is dealt in as the “problem to be solved”.

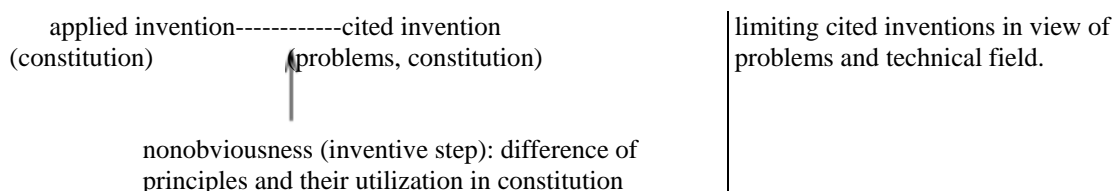
(3) Decision of examiners

Examiners have to objectively determine the patentability of applied inventions comparing to many disclosed prior arts. Even under these situations at the time of application, however, Examiners should not be too much inclined to the problem to be solved. Focusing on the constitution of an invention, Examiners should pick up technical ideas including principles and their utilization. This is because the problem to be solved does not necessarily express the essence of an invention. The effects rather than problems tend to show the results of principles and their utilization.

5.2. Framework of Inventive Step Determination

(1) Framework of determination

In determining inventive step, all prior arts (known arts) should ideally be reviewed. However, such review is difficult in actuality. Therefore, it is considered that the review should go through in view of the formation process of an invention, the patent system and patenting processes. It should adopt the following framework (In this context, the constitution means a comparison by component)⁹. The review of the problem to be solved is for the convenience of examination.



(2) Relationship with problems to be solved

For nonobviousness tests, it is difficult to compare the acts themselves of inventions in comparison between two technologies (inventions). Therefore, the first thing to do is to set a specific principle (objective fact) as a standard for comparison. Such a standard will narrow the scope of comparison to make it clear. It would be easier to determine the quantitative degree of commonality or difference (in this article, commonality and similarity have the similar meaning, but the latter is used more broadly), too. The problem to be solved is out of the invention prior to it as the purpose of the invention. It mirrors subjective observations more than the invention does. Therefore, in determining nonobviousness, a comparison should be made among the inventions themselves, that is, the constitution and the principle, and the review for the problem to be solved should be limited to the useful scope for obviousness comparison. From some points of view, the effect of the invention is inclusive, however it expresses an objective result. Therefore, it is surmised that the effect would be more helpful for comparison purposes than the problem to be solved.

In addition, by starting from the principle, the review would help reduce the hindsight in determination. Hindsight is the method of the thought analyzed afterwards.

6. Practice of Determining Inventive Step and Its Application

6.1. Processes

(1) Recognition of applied invention

(2) Selection of cited invention and recognition of its content

In principle, as cited inventions, the inventions similar in their constitution are selected among prior inventions which have common things to the applied invention in technical fields and problems to be solved. There is no need to be a single invention for this purpose. Cited inventions may be primary and secondary. Well-known art (an ordinary knowledge in the field to which the invention pertains) may be chosen as well.

(3) Recognition of identical/different points comparing the applied invention and cited invention

(i) A different point or feature can be found in the constitution. Examiner may notify in its notice of reasons for rejection that different point or feature is a mere gathering of the cited inventions and the applied invention

⁹This article mainly discusses the determination of the inventive step which is carried out based on the differences in an applicable principle and its utilization. Therefore, the discussion in this article may be inclined to a little in favor of applicants who argue for the inventive step.

lacks in nonobviousness, for instance.

(ii) In response, the applicant may argue specifying the difference in principles and their utilization between the applied invention and the cited invention. This is because the difference discussed in Item (i) is based on the difference in principles and ways of their utilization.

(iii) Differences in the technical fields and the problems to be solved are not substantial. They are used for the references to principles and ways of their utilization.

(4) Nonobviousness can be assumed in view of the differences in principles and ways of their utilization (although some may argue that such assumption should be supported by a *prima facie* evidence).

When Examiner argues that the invention is obvious, he/she is required to prove the basis for such argument by evidence.

(i) The invention will be found nonobvious when the “difference” according to the above process (4) is recognized to cause a *prima facie* effect to society in view of the problem to be solved and the effects of the invention, considering based on common general knowledge. The person ordinarily skilled in the art provides a basis for this point of view. Common general knowledge can be called an accumulation of prior arts. For example, the above can be required to the level explained using a simple statement: “That is a good idea and useful thing (way)”. More specifically, I shall discuss examples on this point in Sections 12 and 13.

(ii) Despite the arguments by the applicant for the principles and ways of their utilization, Examiner may insist an insufficiency of the difference to maintain obviousness rejection. In that case, Examiner is required to prove its arguments by evidence.

For such proof, (a) whether the difference is common general knowledge, and (b) the extent of the difference, and so on, are estimated as the important factor. The fact that the inventor recognized the difference in the principle would be conceivable as an indirect factor to support nonobvious finding, as the principle was not used (See, Subsection 3(1)).

(iii) As discussed in Subsection (4) above, the difference in the principles (as the object of the act), but not the act as a criterion for the determination of conceptual easiness, has been adopted. This approach appears to be more objective than the criteria which have been introduced in court decisions and examination standards in Japan, such as the existence of “motivation”, “suggestion”, or “obstructive factors”. The former two criteria take human acts as their premise, and appear to be constructive factors to show motivation and evaluate such act. The latter criterion, the existence of obstructive factors, looks at the object of the invention but tends to be subjective with reference to the evaluation of obstructive factors¹⁰. The principle also would be better to use for the determination of the extent of the difference.

6.2. Reasoning of the Process

In Subsection (6.1) (3), (i) a difference between the applied invention and the cited invention was discussed. Let us assume that the applied invention comprises A, B and C, whereas the cited invention comprises A and B (hereinafter called “primary cited invention”). Also, an assumption is made that another cited invention comprises C (hereinafter called “secondary cited invention”). The applied invention, when compared to primary cited invention, has the identical components of A and B and the different component of C. Examiner may point out that the applied invention is a mere gathering of two cited inventions, for instance, and that the difference is insufficient to find it nonobvious. (Theoretically, it would be desirable to point out insufficient difference in principles. However, it would be practically difficult.) In response, (ii) the applicant, based on the review of the principles in the applied invention and all cited inventions, might argue that the principle in the applied invention differs from one in the primary cited invention and another in the secondary cited invention. Otherwise, the applicant might argue that a new principle was added on to the applied invention. Thus, the applicant points out the difference of principles [object/fact]¹¹.

As discussed in Subsection (6.1) (4), Examiner may consider that the difference specified by the applicant is insufficient because the principle has a common feature, thus, it is obvious [object/evaluation]. In that case,

¹⁰Nevertheless, it may be possible to describe such case in a manner that “there is a motivation or suggestion” when and if the difference remains to be the level of being obvious.

¹¹In this article, such factors as “act/object” and “facts (findings)/evaluation” are discussed. Their relationship would be shown as the combination, that is, (i) fact (finding) to act, (ii) evaluation to act, (iii) fact (finding) to object, (iv) evaluation to object. They are shown in bracket [] in the text. It would be necessary to consider them for the review of the criterion and test of the inventive step.

however, Examiner has to prove it by evidence. Consequently, the parties would argue centering around the difference of the principle [object/evaluation].

In contrast to the above, according to the court decision and the examination standard in Japan, Examiner has, in general, argued in its notice of reasons for rejection that the applied invention was easily conceivable from the cited invention. More specifically, Examiner has insisted that the applied invention was motivated or suggested by the cited invention [act/evaluation]. In response to this, the applicant has argued that the applied invention was not suggested by the cited invention [act/evaluation].

By stating the existence of motivation or suggestion, it is conceivable that Examiner's conclusion was introduced using such conventional concepts as the operations and effects, mechanisms, and functions of the invention. The essence of these operations and effects, and so on, can be the principle. The principle also would help clarify the point of view to watch operations and effects, and so on.

6.3. Actual Application of Process

Here, the processes as discussed above are applied to specific cases of general categories in which nonobviousness is a major concern.

(1) Combination case

(i) Let us assume a case where the applied invention comprises elements A and B. One of the cited inventions discloses element A. Another one discloses element B (Case of a combination of A and B).

Here, an assumption is made that element A employs a principle α and element B employs a principle β . The applied invention is assumed to have employed α and β . In this case, the applied invention will be found obvious, as it is a mere combination of known elements. However, if another principle γ is recognized as a factor to combine elements A and B, it may be found nonobviousness. The principle γ , for example, would suffice if it allows the adhesion of the two elements (it shows correlations, for instance). At this time, in the applied invention, when compared to two cited inventions, a new effect can be found. In many cases, the effect implies an inclusively quantitative concept arising from the totality of the constitution, for example, high producing ratio or safety. On the contrary, the difference in principles provides individually and/or totally a more clarified consideration based on a difference of constitution.

The court decisions (B) and (C) discussed in Subsection (8.1) (2) later fall into this category and the inventive step was found in these cases.

(ii) Let us assume a case where the applied invention comprises elements A, B and C. One of the cited inventions discloses elements A and B. Another cited invention discloses element C (Case of an addition of C to A + B).

This case would be considered as an invention where element C was combined into the element comprising elements A and B.

(2) Substitution case

Let us assume a case where the applied invention comprises elements A and B. The primary cited invention discloses elements of A + B' and the secondary cited invention discloses element B (Case of substitution of B' by B).

By changing element A + B' into element A + B, a new principle to replace B' with B would possibly be found. If this principle is found not being in both the primary cited invention and the secondary cited invention, an inventive step would be found in the applied invention.

The court decision (A) in Subsection (8.1) (2) later can be surmised to be in this category, and the inventive step was found.

The same thing could be said about the case where the constitution of an invention comprises A, B, C, D,...¹²

¹²When an allegedly infringing technology (a) does not literally read upon patented invention (b), but technology (a) is substantially equivalent to patented invention (b), the doctrine of equivalent will allow invention (b) to read upon technology (a). The doctrine of equivalent requires the element of technology (a), which is literally out of boundary of the technical scope of invention (b) to have (i) replaceability and (ii) easiness of replacement. The Former Chief Judge of the Intellectual Property High Court, Toshiaki Imura, explained in his article that above (i) means whether there is a common feature in principle for solving the problem, and above (ii) means whether it is easy to use common principle for solving the problems (Imura, 2011; 2014). Both technology (a) and technology (b) in which the application of equivalent doctrine is at issue have the same problem to be solved. Therefore, it is said that the subtle differences between two technologies, which have the common problem to be solved, are compared based on the principles and their utilization. In other words, the argument made in this article is usable for the issue of infringement under the doctrine of equivalent.

7. Selection of Cited Inventions and Primary Cited Invention and Secondary Cited Invention

7.1. Selection of Cited Inventions

According to the process for determining inventive step as discussed above, the cited inventions are extremely important as they fall into the object to be reviewed for inventive step determination.

In the Opinion, as well as in the court decision and the examination standard in Japan, inventions having constitution closer to the applied invention are to be selected as the cited inventions, among the inventions having the technical field and problems to be solved common or similar to those described in the applied invention.

7.2. Primary Cited Invention and Secondary Cited Invention

The actual process of determining whether an invention is nonobvious is conducted according to the court decision and the examination standard in Japan, as follows. First, the process selects a primary cited invention and a secondary cited invention. Then, the secondary cited invention is applied to the primary cited invention thereby to assess the easiness of reaching the applied invention. There is a convenient reason to adopt this process for the easiness test.

In this respect, the selection of the primary cited invention and the secondary cited invention has to be made objectively as much as possible. If necessary, it shall be flexible. This is because, depending on how to select the secondary cited invention to the primary cited invention, the results would be affected. There is a concern that when the primary cited invention and the secondary cited invention are selected and fixed, the commonality or differences of the principles and their utilization would be also fixed.

8. Inventive Step According to Japanese Court Decision and Examination Standard (Conceptual Easiness)

8.1. Court Decision in Japan

(1) Process of determination

- (i) Recognition of applied invention
- (ii) Selection of cited inventions and recognition of their contents
- (iii) Recognition of identical/different points comparing the applied invention and cited inventions
- (iv) As the premise on the state of the art at the time of application, whether it was easy for a person ordinarily skilled in the art to have reached the constitution of the applied invention with difference starting from the cited invention.

(2) Representative court decisions (summary. norm (major premise))

(A) Intellectual Property High Court Decision rendered on January 28, 2009 (Case of a circuit connecting member)¹³ ((i)~(iii) are added by Author)

(i) (Inventive step) may be determined based on whether it was easy for a person ordinarily skilled in the art, based on the prior art, to arrive at the features of the invention claimed in the application (the structure that constitutes the difference from the prior art) starting from the prior art.

(ii) Since the features of the invention claimed in the application are to solve the problem given as a purpose to be solved by the said invention, it is indispensable to accurately grasp the feature of the said invention, in other words, to accurately grasp the problem to be solved by the said invention, in order to objectively determine whether it was easy for a person ordinarily skilled in the art to conceive of the features.

(iii) In order to determine that the said invention could have been easily conceived of, it is not sufficient to be able to merely presume that efforts to conceive of the features of the said invention might have been made, rather it is necessary that there are suggestions and so on showing the fact that efforts must have been made to arrive at the features.

(B) Intellectual Property High Court Decision rendered on March 25, 2009 (Case of air-cellular cushioning sheet)¹⁴

¹³Hitachi Kasei Kōgyō K.K. v. Tokkyo-cho, (Chiteki-zaisan High Ct., Jan. 28, 2009). HanreiJihō, 2043, 117-127; Hanrei Times, 1299, 272-282.

¹⁴Sakai Kagaku Kōgyō K.K. v. Kawakami Sangyō K.K. (Chiteki-zaisan High Ct, Mar. 25, 2009). Saikō-saibannsho Website, Saibannrei-jōhō, Chiteki-zaisanSaibannrei-shū. URL (last checked 2 July 2016) http://www.courts.go.jp/app/hanrei_jp/search7.

(Inventive step) may be determined based on whether it was easy for a person ordinarily skilled in the art to arrive at the features of the invention claimed in the application (the structure that constitutes the difference from the primary cited invention) starting from the primary cited invention which has the common structures, considering the secondary cited invention and the common general knowledge or well-known art.

Author's Note: the above (A) is the case where the number of cited invention is one, and (B) is the case where cited inventions are two of the primary and secondary ones. In (B), following the above, the same explanation with (A) (ii) & (iii) is made.

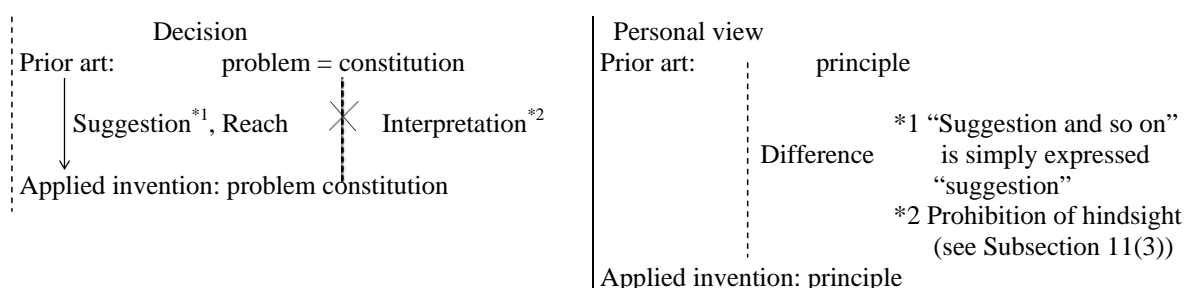
(C) Intellectual Property High Court Decision rendered on January 31, 2011 (Case of Oxaliplatin)¹⁵

When judging easiness in conceiving of the invention claimed in the application, the conclusion must be drawn, by comparing the said invention with selected prior arts to specify the structure of the said invention different from the prior arts, and examining whether it was easy for a person ordinarily skilled in the art, on the condition of the state of the art at the time of application, to arrive at the structure of the said invention in relation to the differences. In this examination, the following matters should be considered as a whole: the degree of relation in the technical field between the said invention and the prior arts, the commonality in the problem to be solved, the operation and effect and so on.

(3) Points of issues

(i) In the court decision (A) and (B) of the preceding Subsection (2), a grasp of the difference of the constitution (features) is regarded as a grasp of the problem to be solved. However, the constitution shows the content of the invention while the problem to be solved shows what existed prior to the invention. Therefore, the review should not stick to the problem, but proceed to the principles and their utilization which cause the differences of constitution.

With regard to this Item (i) and the following Item (ii), contents can be described in the figure that follows.



(ii) In the court decision (A) of the preceding Subsection (2), discussion is made on conceptual easiness. Not staying in presumption (a) of an attempt to reach the feature of the applied invention, it requires suggestion (b) that such attempt ought to have been made so that the inventor may reach the feature of the invention. Either of the presumption (a) and the suggestion (b) indicates subjective acts of the parties or acts of subjective inclination. It is difficult to distinguish "existence of suggestion" from the "establishment of presumption". In order to lay a criterion for objective determination, the review has to focus on the object of acts. It is the principle and ways of their utilization.

(iii) In the court decision (A) above, the existence of "suggestion" for the inventor is required to start from prior art to reach the applied invention. In the court decision (B), however, the required "suggestion" starts from the primary cited invention (wherein identical components exist) to reach the applied invention (wherein components differ) considering the secondary cited invention. There is a difference between the two cases.

In other words, there are two cited inventions in the court decision (B), wherein reaching conceptual easiness is more indirect than in the court decision (A). In the Opinion, commonalities and differences of the principles should be reviewed for both the applied invention and all of the cited inventions.

(iv) In the court decision (C), reaching conceptual easiness is determined judging from the degree of relation in the technical field, commonality in the problem to be solved, and the operation and effect and so on. This suggests that more factors have to be considered than in the court decision (A). However, note that the technical field and the problem to be solved have taken place prior to the invention. In the operation and effect, operation

¹⁵X v. *DebiofāmuEsuĀ* (Chiteki-zaisan High Ct., Jan. 31, 2009). Saikō-saibannsho Website, Saibanrei-jōhō, Chiteki-zaisanSaibannrei-shū. URL (last checked 2 July 2016) http://www.courts.go.jp/app/hanrei_jp/search7.

may be considered as a principle but the principle relates to the essence of the invention. The Opinion focuses on principles rather than the technical field and the problem to be solved, which should be considered to observe the difference of principles and their utilization.

It is clear in the above court decision that there is some confusion between the problem to be solved and the constitution of the invention.

8.2. Examination Standard in Japan¹⁶

(1) Process of determination

- (i) recognition of the applied invention
- (ii) recognition of the cited invention
- (iii) selection of one as the primary cited invention and its comparison with the applied invention, thereby making the identical/different features clear
- (iv) review of whether the difference can be easily overcome as the result that the secondary cited invention is applied to the primary cited invention.

Because there are identical features between the primary cited invention and the applied invention, and different features between the secondary cited invention and the applied invention, the primary cited invention is reviewed applying the secondary cited invention to it.

(2) IP high court decision

The court decision (B) of the preceding Subsection (8.1) (2), the Intellectual Property High Court, dated March 25, 2009, adopts the same process.

9. Examination Standard of EPO and Court Decision in the UK

9.1. Examination Standard of the EPO

(1) “Problem-Solution” approach

This approach was adopted by the European Patent Office (EPO). United Kingdom follows this approach and Germany harmonizes its policy to comply with it. United States of America is considered to be using it as a major approach. Japan tends to be in the direction to weigh it.

In the Problem-and-solution approach, there are three main stages¹⁷:

- (i) Determining the “closest prior art”,
- (ii) Establishing the “objective technical problem” to be solved, and
- (iii) Considering whether or not the applied invention, starting from the closest prior art and the objective technical problem, would have been obvious to the skilled person.

The “closest prior art” in the first stage normally focuses on the most common features of the components. In the second stage, the “objective technical problem” is determined in view of the differences in components and effects between the applied invention and the prior art. It is not bound by descriptions of the problem in not only the applied invention but also the prior art.

The “Could-Would” approach is used in the third stage. This approach tests whether there is a teaching or suggestion to infer “an intention to do something (would)”, but not a “possibility of doing something (could)” in the prior art.

For more details, see the example described in the court decision (B) in Subsection (9.2) (1).

(2) Summary of issues

- (i) Establishing the objective technical problem

Apart from the descriptions of problems to be solved in the applied invention and the prior art, the technical problem is established. However, this is said to be top-heavy, so to speak because too many factors are included in the problem. Given objective purposes, it may raise a concern that Examiners establish the problem to be solved arbitrarily.

¹⁶See, [Japan Patent Office \(2015\)](http://www.jpo.go.jp/tetuzuki_e/t_tokkyo_e/1312-002_e.htm). Examination Guidelines for Patent and Utility Model in Japan, Part III, Chapter 2, Section 2, Inventive Step. URL (last checked 2 July 2016) http://www.jpo.go.jp/tetuzuki_e/t_tokkyo_e/1312-002_e.htm.

¹⁷[European Patent Office \(2015\)](http://documents.epo.org/projects/babylon/eponet.nsf/0/A62ECC3718E570B3C1257EF100351F38/$File/guidelines_for_examination_part_g_en.pdf). Guidelines for Examination in the European Patent Office, November 2015 edition, Part G, Chapter VII/5, Problem-and-Solution approach. URL (last checked 2 July 2016) [http://documents.epo.org/projects/babylon/eponet.nsf/0/A62ECC3718E570B3C1257EF100351F38/\\$File/guidelines_for_examination_part_g_en.pdf](http://documents.epo.org/projects/babylon/eponet.nsf/0/A62ECC3718E570B3C1257EF100351F38/$File/guidelines_for_examination_part_g_en.pdf).

Thus, many factors are included in the problem to be solved at the time of application, which may cause an issue of hindsight at the present time.

Depending on some of the prior arts, the establishment of the problem is difficult. In this respect, discussion is made later in Subsection 11 (3).

Author's suggestion is to follow the description in the applied invention. Solutions of the problem will appear as effects, so questions for the problem can be answered by checking through the effects.

(ii) Could-Would approach

This approach, like in the court decision in Japan, follows a determination based on subjective acts (teaching), and thus is somewhat unclear. Determination should be based on the principle which relates to the essence of the invention and which can bear objective observation¹⁸.

9.2. Count Decision in the UK

(1) Court Decision

(A) The Supreme Court of Judicature Court of Appeal (Civil Division)

*Pozzoli SPA v. BDMO SA*¹⁹

"...the well-known Windsurfing test of Oliver LJ [1985] FSR 59 at 73...provides a structured approach to the problem and is often useful"²⁰.

(At the present moment) I would restate the Windsurfing questions²¹ thus:

(1) (a) Identify the notional "person skilled in the art"

(b) Identify the relevant common general knowledge of that person;

(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;

(3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed;

(4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

(B) The High Court of Justice Chancery Division Patent Court

*Hoechst Celanese Corp. v. BP Chemicals Ltd*²²

All of these passages are consistent with the Object/Solution approach to obviousness adopted in the Technical Board of Appeal of the EPO. Even if the step from the prior art is a small one, to prove obviousness it is necessary to demonstrate that there is some reason for taking it. If, in a chemical case, the inventor shows that he reacted A with B to obtain a product which had some extremely desirable properties, that will not be rendered obvious simply by showing that a man in the art knew of A and B and would have realized that they were capable of reacting with one another. It would need to be proved that he would have bothered doing it²³.

(2) Summary of issues

In the court decision (A) above, focus is put on the inventive concept but it should go further to specific principles and their utilization.

The court decision (B) shows examples utilizing the Problem-Solution approach. The same thing as before could be said about this court decision.

10. Court Decision and Examination Standard in the USA

10.1. Court Decision in the USA

(1) Supreme Court of the United States

*KSR International Co. v. Teleflex Inc.*²⁴ ((i) (ii)...are added by Author. (ii) is behind (iii) in the judgment)

(i) Seeking to resolve the question of obviousness..., the Court of Appeals for the Federal Circuit has em-

¹⁸In reverse, when the difference in the principle and its utilization is obvious, it might be possible to use "would" (See p. 7, footnote 10).

¹⁹*Pozzoli SPA v. BDMO SA* (2007) EWCA Civ 588 (22 June 2007).

²⁰Id. at para. 113.

²¹*Windsurfing International Inc. v. Tauber Marine* (1985) RPC59 (25 April 1985). In the Windsurfing test, "inventive concept" in relation to obviousness is identified in its first stage.

²²*Hoechst Celanese Corp. v. BP Chemicals Ltd.* (1997) EWHC 370 (Pat) (6 Feb. 1997).

²³Id. at the title "Validity".

²⁴*KSR International Co. v. Teleflex Inc.* 550 U.S.398 (2007) (April 30, 2007).

ployed an approach referred to by the parties as the “teaching, suggestion, or motivation” test (TSM test)²⁵, under which a patent claim is only proved obvious if “some motivation or suggestion to combine the prior art teachings” can be found in the prior art, the nature of the problem, or the knowledge of a person having ordinary skill in the art. See, e.g., *Al-Site Corp. v. VSI Int’l, Inc.*, 174 F.3d 1308, 1323-1324 (CA Fed. 1999).

(ii) (Based on the TSM test,) the obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents.

(iii) The subject matter of the patent before the Court was a device combining two pre-existing elements. The two in combination did no more than they would in separate, sequential operation. “...it added nothing to the nature and quality...already patented”, and the patent failed.

(iv) Rigid preventative rules that deny factfinders recourse to common sense, however, are neither necessary under our case law nor consistent with it.

(v) ...we see little difference between the teachings of Asano and Smith (Author’s Note: prior arts) and the adjustable electronic pedal disclosed in claim 4 of the Engelgau patent (Author’s Note: present invention). A person having ordinary skill in the art could have combined Asano with a pedal position sensor in a fashion encompassed by claim 4, and would have seen the benefits of doing so.

(2) Summary of issues

The “Teaching-Suggestion-Motivation” test (TSM test) suggests flexible application in view of common general knowledge, but not strict application. The same criticisms against the court decision in Japan of motivation and the existence of suggestion are applicable to the TSM test. The example requires something additional to already known features and qualities, in a case of a combination of various elements. This should be elaborated on more concretely with regard to the principles and their utilization.

10.2. Examination Guidelines in the USA

Considering the above court decision, “Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in view of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*” was published on October 10, 2010²⁶.

11. Further Analysis Based on the Opinion

The essence of the court decisions and examination standards in Japan, EU and USA are common in general, though new ones are more concrete (A good example is the determination of obviousness based on the suggestion of prior art). In this respect, the Opinion is different as follows briefly, in which further analysis is made from a new point of view.

(1) Set a basis for determination on an object of acts but not acts, and focus on the differences in principles and ways of their utilization as the object.

Evaluation of dynamic acts is difficult to do in comparison with evaluation of a static, objective object. In order to establish a rule on inventive step (nonobviousness), the principle should be treated as an object of acts but not acts. In other words, the entrance and the exit are acts while the object is the content²⁷. Apart from this, there is a legal issue called “negligence” in which acts are evaluated depending upon the object.

²⁵With reference to the decision of inventive step, *Graham v. John Deere Co* (1966) proposed the following analysis method (Graham test). The TSM test does not contradict the said court decision. “Under (U.S. law) §103, (i) the scope and content of the prior art are to be determined; (ii) the differences between the prior art and the claims at issue are to be ascertained; (iii) and the level of ordinary skill in the pertinent art resolved; (iv) Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances” ((i) (ii)...are added by Author).

²⁶United States Patent and Trademark Office (USPTO) (2010). URL (last checked 2 July 2016) <http://www.uspto.gov/web/offices/com/sol/notices/72fr57526.pdf>

²⁷Law decides rights and duties. The rights are given to legal subjects, that is, human beings. Whether the rights are given or not depends on the human acts. In order to evaluate them more clearly, there are two points of view: (a) one in which the causes (motivation, etc.), that is the premise of the human acts, are considered, and (b) another in which the objects of the human acts are considered. Considering the “inventive acts”, the court decisions and examination standards of the countries above mentioned are thought to take the point of view (a). However, different from this, the Opinion takes the point of view (b), because a “principle”, which can be the object of human acts, is concrete and definite. Supposing principles, their differences in degree can be evaluated more easily (quantitatively). See p. 243 also. Furthermore, it is natural that a principle should be considered more important than the problem to be solved, because a principle consists of contents of the invention, while the problem is set prior to the invention.

If Examiner picks up the acts, he/she tends to consider them from his/her own judgment, on the contrary, the object is objective. Then, his/her judgment may fall in that of the present time. This may lead to hindsight. Therefore, focusing on the object is required in determining its inventive step.

A question of whether the invention has an inventive step is answered by “yes” or “no”, depending on the existence of obviousness or conceptual easiness. However, determination is made by way of difference of the principle which is neutral to obviousness and conceptual easiness, intermediately. By way of going through the analysis of the principle once, more careful and flexible results would be attained.

(2) Do not put weight easily on the problem

It is prohibited to put a weight easily on the problem to be solved. Given some burden, inherent principles and their utilization should be pursued.

To begin with, the requirement of inventive step ensures nonobviousness (conceptual non-easiness) against (i) prior non-patent technical literatures (academic papers, journals, product catalogues and so on) and (ii) implemented technologies (Japanese Patent Act, Art. 29, Paragraph 1 (1) & (2)). However, it is difficult to find out problems from these known technologies. They would be only available from assuming based on the constitution and the effects of these technologies. Assumption has a risk of accompanying subjective inference by the determiner. Also, the claim as filed is subject to modification while the problem is not. Therefore, there can be a “gap” between the problem and the constitution. For this reason, in practice, the problem to be solved is often abstractly written for patent application.

In view of these, putting an excessive weight on the significance of the problem to be solved is inappropriate.

It is also surmised that too much weighing of the significance of the problem tends to cause a concern of hindsight. This is because the solution of the problem is the effect which attracts the attention after the completion of the invention.

(3) Exclusion of hindsight

Inventive step of the applied invention has to be determined based on common general knowledge available at the time of application. Hindsight means a determination of inventive step based on knowledge which is available after the application up to the present time. If hindsight is allowed, many patents would be considered to lack in inventive step and be invalid. This is because technologies relevant to the applied invention develop after its application and establishment of the patent. We often experience the argument based on hindsight in practice. For example, in patent infringement troubles, an alleged infringer often argues “The patent at issue has a commonplace technology and it is invalid”. Actual time for the determination is present, so determination based on the technical level at the time of application is not easy.

Exclusion of hindsight is a question of how a determination is made. It appears in different forms. A typical form of hindsight is to refer to the description itself of the specification of the applied invention for the recognition of prior art. However, this should be prohibited.

In the Opinion, a focus should be given to the difference between the principle of the applied invention and prior art, but not the description of specification, therefore it would minimize the occurrence of hindsight. Note, however, that the difference of the principle is one which was known at the time of application. Later known difference should not be adopted for this purpose.

In Author’s view, a criterion for determination should be the principle as the object but not the act of whether there is a suggestion. To avoid too much weight on the problem would help exclude hindsight.

12. Principles and Ways of Their Utilization

With several examples of inventions (technologies), this article now discusses the principles and ways of their utilization which are supposed to be the focal point in view of determining the nonobviousness step. Specifically, the first thing to do is to look at the commonalities and/or differences of the principles themselves. The second thing is to look how commonalities and/or similarities are used. This approach is suggested based on the recognition that the principle itself is the object and that the difference of principles brings a larger difference of outcomes of technologies than that of way of their utilization.

In this article, the utilization of a principle is viewed from the standpoint of its user. For example, the utilization of a principle in the field of industry and technology, as discussed in Subsection (12.2) (1), is a different way of using the same principle. There would be a case where a principle which has not been used in that field is newly introduced. In this case, such introduced principle can be evaluated to be a different principle (This may

be referred to as the “new principle”). In Sections (12.1) and (12.2), the order of the cases follows that of the principle or its utilization on which the difference of technologies is supposed to depend (In Section (12.1), however, the order of Subsections (2) and (3) is reversed).

The principle (science) itself is limited in number to some extent, but its ways of utilization (technologies) are diverse. Along with the development of society, economy and technology, new ways of utilization take place. Principle and utilization are considered in combination in view of whether it meets a requirement for patent of an invention. The purpose of this article is to analyze the factors (viewpoints) to cause a difference in the principle and its utilization. The following examples were found nonobvious due to the difference of the principle and its utilization.

12.1. Principle Itself

In Sections 12 and 13, inventions (technologies) are explained simply using examples with understandable principles. Technologies cited are those which Author argued for a case of patent infringement. JP Patent No. 2110441 (Item (12.2) (2) (iii)) is a patent specification drafted by Author. Cited patents are all Japanese ones.

A well-known art is an example in which the principle and its utilization are well known.

(1) Apart from the ordinary difference of principles, the following points of view may be taken.

(2) Level of the principle (broader/subordinate concept)

(i) Any principle differs in the level of its detailed content. For example, **Figure 1** shows different levels of principles.

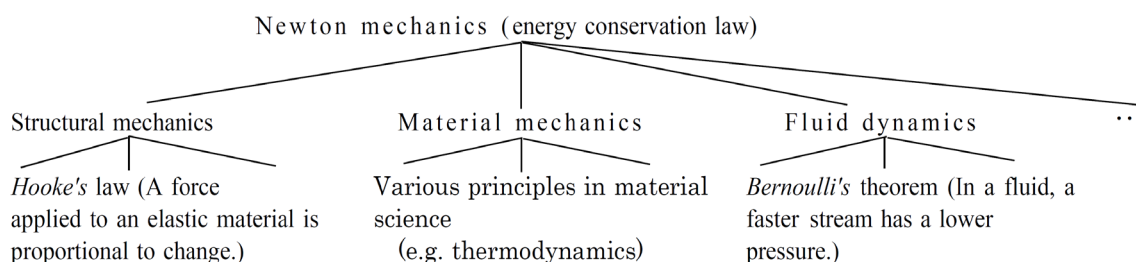


Figure 1. Examples of principle levels.

See, the case (1) (iv) which is discussed later in Section (12.4) (the IP High Court Case of water treatment apparatus decided March 17, 2011).

(ii) Regarding the principle listed in the preceding Item (i), a “sprayer” uses *Bernoulli’s* theorem (principle) in our daily life. As shown in **Figure 2**, when a horizontal pipe of the sprayer is blown, the air at the top end of the vertical pipe is blown off to cause a fast velocity of air where a pressure is low. Water rises up in the pipe to be blown off as mist.

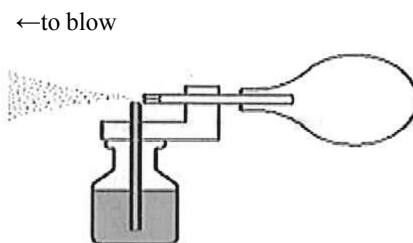


Figure 2. Sprayer.

The sprayer uses a negative pressure (pressure to be sucked) but requires a technology to reduce the negative pressure as well. For this reason, the problem has to be solved by the invention.

Bernoulli’s theorem, commonly found in daily life, can be used in two directions: positive utilization and passive reduction. It is widely applicable to gas and liquid, and machinery and construction, in combination with other principles. In this article, discussion is made progress on this theorem. In everyday life, we feel positive

pressure but do not feel negative pressure. When we are near the fast velocity in a large scale, negative pressure becomes powerful. The technical utilization of negative pressure can be called an effective use of a principle which is hard to sense. Interestingly, the conception to use such a principle is supposed to be part of essence to produce an invention.

(3) Number of principles

In cases where inventions are composed of a combination of principles, it is likely that each invention is different in the number of principles used.

For example, there is an invention to mix gas and fluid. As shown in **Figure 3(a)**, “the impeller (rotating blade) 2” rotates to cause negative pressure in the backward. Using thus caused negative pressure, air is introduced into liquid. Liquid mixed with air is pushed to the deep water portion to circulate. Small bubbles generated in liquid absorbingly collect contaminated articles in the water to exclude them” (Patent No. 3418608 and others).

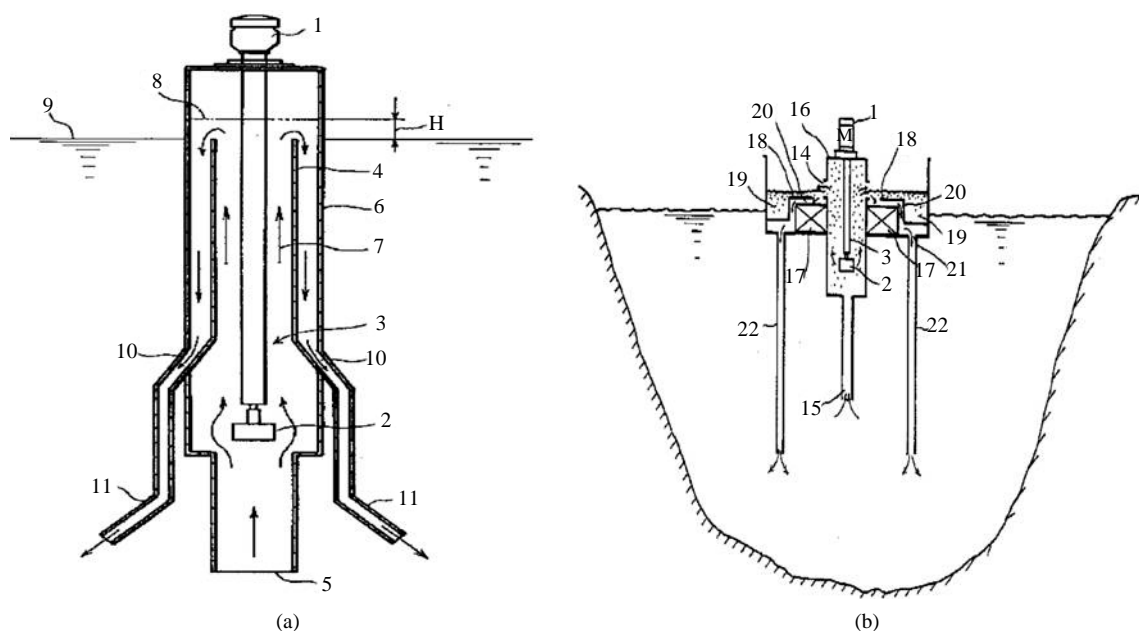


Figure 3. (a) Mixing device; (b) Embodiment (of (a)).

The invention discussed above uses two principles: *Bernoulli's* theorem and the absorption nature of bubbles.

(4) Other aspects of utilization of the same principle—The cases where different principles can be seemed to be used functionally.

One example is an electric resistor element which exhibits a principle to cause heat when electricity is flowed (Relations between electric current strength, resistance value and heat amount are defined by *Joule's* law. e.g., the *nichrome* wire of an electric heater). It can be used as a resistor in a load tester for power generators.

The invention of a load tester uses a resistor element as a resistor as shown in **Figure 4** (See, Patent Nos. 3718875, 3718874, and others).

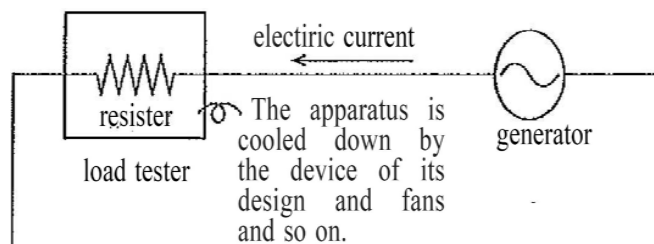


Figure 4. Load tester.

As seen above, a different feature of one particular principle has been used. In other words, different principles can be seemed to be used functionally.

This technology was applicable to high voltage. At the beginning, practical application accompanied serious dangers. After repeated experiments, a new invention was made.

Generally speaking, there resides an essence of a principle and ways of its utilization that is the basis of an invention in failure of experiments and device of improvements. The inventor and applicant should be aware of this point, and extract and put the principle and ways of its utilization from the applied invention in order, and then construct arguments in the procedure of lawsuit and so on using them as proof²⁸.

12.2. Utilization of a Principle

(1) Relations with the field of industry and technology.

The relationship between the field of industry/technology and the principle used in those can be generally and categorically illustrated as follows.

In **Figure 5** below, the part shown by the double line (\equiv) is supposed to have a close relationship between the principle and the field of industry/technology. For example, at point A, it is easy to assume that the chemical principles are used in the chemical industry. However, at point B, it is harder to foresee that dynamical principles are used in the medical and pharmaceutical industry. Given its extreme generality, practically, observation here should be categorized as “stronger” or “less strong”.

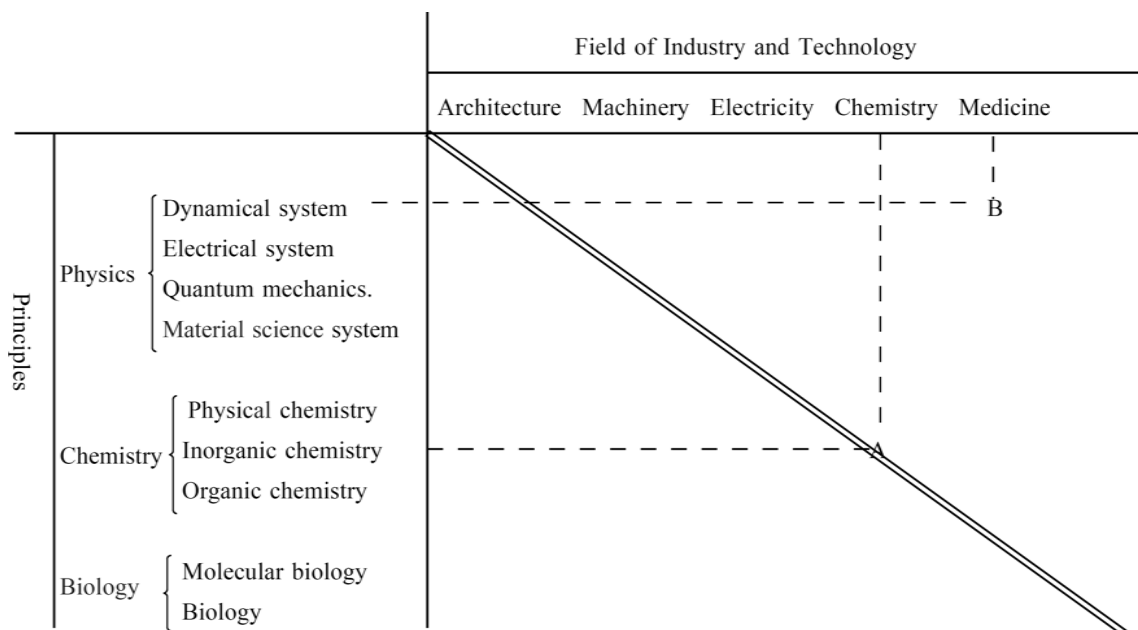


Figure 5. Relationship between the principle and the field of industry/technology.

When technical fields are different, the ways of using the principles are generally different. Nevertheless, in some cases the difference of ways of using principle can be found closer to that of the principle itself as stated before.

When commonality is missing in the problem to be solved, it can be surmised as an evidence to show that principles are apart from each other qualitatively.

(2) Utilization to positively enhance effects and to passively reduce effects.

Bernoulli's theorem can be used for two directions as discussed below: (A) to use negative pressure and (B) to reduce it.

²⁸Tomokazu Tsukahara stated that “learning from his experience, the inventor is expected to construct specific features to negate arguments of conceptual easiness”. He stated further that “a representative in patent lawsuit should submit evidence so as to objectively prove its own argument” (Tsukahara, 2010). His statements are in the line of analysis discussed in this article.

A: Wing shape of airplane (ii),
 Mixing device for air and gas (See Subsection (12.1)
 (3) before),
 Air-cycling house (iii)

B: Back of vehicle (i)

(i) Shape of the back of vehicles

When a vehicle moves forward, air pressure is applied against the front of the vehicle and negative pressure is caused along with its back which causes energy to hinder the vehicle to move forward. To solve this problem for economic reasons, a design of the back shape of the vehicle has been refined, as shown in **Figure 6(a)** & **Figure 6(b)**. This is a case where negative pressure is reduced.

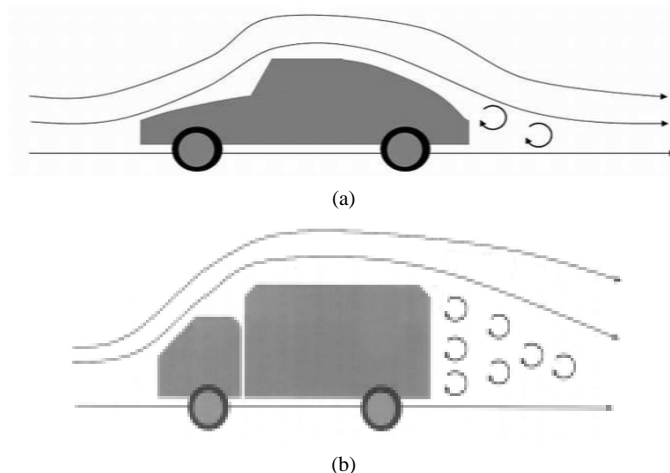


Figure 6. (a) Back of the vehicle(shape with a smaller negative pressure); (b) Back of the vehicle (shape with a larger negative pressure)²⁹.

(ii) Shape of the wing of airplanes

Referring to **Figure 7**, the cross-sectional view of a wing of an airplane shows a rather round shape on the top compared to its bottom. With this shape, air flows faster and pressure reduces on the round top, thereby to cause lift. To enhance the force of lift, the wing shape has been improved. In this case, the problem to be solved is caused by the technical request. This is an example of using negative pressure.

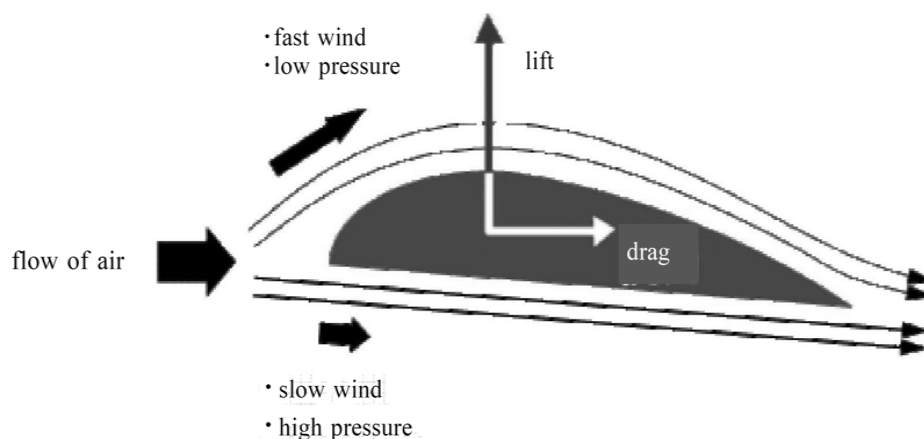


Figure7. Shape of the wing of airplane³⁰.

²⁹The images are available at Nikkei Technology Online. URL (last checked 2 July 2016) <http://techon.nikkeibp.co.jp/article/COLUMN/20140414/346207/>.

³⁰Airplanes, How do airplanes fly? URL (last checked 2 July 2016) <http://www.explainthatstuff.com/howplaneswork.html>.

See **Table 1** also, with reference to the invention of an airplane.

(iii) Air-cycling house

In **Figure 8** below, solar heat is absorbed in from the outside of the house. Air is taken from the outside of the house to ventilate inside the house. A vent layer “B” is placed under the roof and on the inner side of the wall. A ventilation device “H” is provided beneath the floor to suck air outside in the house. Another ventilation device “I” is provided on the roof to emit air inside the house to outside, wherein a check valve “F” is provided to allow updraft to go through but shut out air coming down. In summer, the valves in the ventilation devices “H” and “I” are open to ventilate air inside the house to keep it cool. In winter, the valves are closed to stop the air flow to keep warmed air inside the house. Thus, this house has the structure in which the air flow in it is controlled naturally. These valves are for one way operation: valve “H” is for the entry of outside air into the house and valve “I” is for the emission of updraft to outside. The former uses passive pressure and the latter uses negative pressure to be caused by outside wind (See Patent No. 2110441 and others).

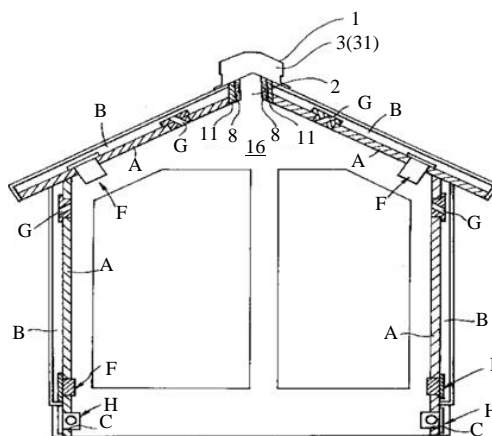


Figure 8. Air-cycling house.

In the load tester in Subsection (12.1) (4), heat generation is against tests in view of too much heating of apparatus and instability of resistance. Efforts have been made to escape the heat from the apparatus and to cool it down by fans. These efforts can be thought of as a utilization of *Joule's* law to passively reduce heating effects, also.

(3) Difference in substances and materials which cause principles (give function)

In the case discussed later in Section (12.4), the applied invention discloses oxidization by ozone, whereas the cited invention discloses oxidization by hot water under high temperature and high pressure.

(4) Difference in the object body to which principles are applied

Bernoulli's theorem, for example, is applicable not only to gases but also to the liquids. When it is used for liquids, a resultant invention can be thought of as a different invention from one using gas.

Gas: Wing of airplanes

Back of vehicles

Air-cycling house

Gas & Liquid: *pitot* tube (shown in **Figure 9**)

Liquid: Mixing device for gas and liquid (including gas)

Flow of fluid (gas and liquid)

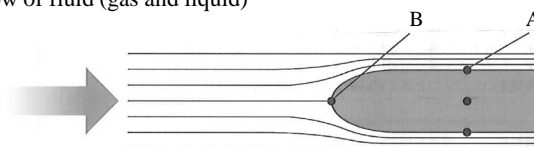


Figure 9. *Pitot* tube. Velocity is calculated from the difference of pressure at the hole A (positive/negative pressure) and the hole B (only positive).

With reference to above, the technical field of airplanes, vehicles, mixing devices and the *pitot* tubes is categorized as the machinery, and the air-cycling house is the construction (See, **Figure 5**).

12.3. How to Better Use *Bernoulli's* Theorem—A Summary

With regard to *Bernoulli's* theorem, a wide variety of uses are available only even in this article as shown using the sign \circ , and so on, in **Table 2**. For both positive and negative pressures (A, B), a combination of various factors (a, b, c) is available.

Table 2. How to better use *Bernoulli's* theorem—a summary.

	a. Direction of use		b. Object body		c. Technical field		
	Positive use	Passive reduction	air	liquid	machinery	construction	...
A. Positive pressure	$\square \times \circ$	*	$\times \circ$	$\square \times$	$\square \times$	\circ	
B. Negative pressure	$\circ \square \times \circ$	\diamond	$\circ \diamond \times \circ$	$\square \times$	$\circ \diamond \square \times$	\circ	

*Commonly found in the front of the vehicle and so on (See **Figure 6(a)**, **Figure 6(b)**). \circ : Wing of airplanes, \diamond : Back of vehicles, \square : mixing device, \times : *pitot* tube, \circ : air-cycling house.

With reference to these ways of utilization of principles, taking into account their differences and factors (viewpoints) of difference and then the weight of factors (normally factor “a” has a big weight), the degree of differences to the entire technologies should be evaluated.

When two technologies (inventions) are compared, the differences in principles and ways of their utilization would be objectively revealed by analyzing and considering. As results, it may be possible to articulately argue and prove in relation to the difference of two technologies based on the factors (viewpoints) putting principles and ways of their utilization in order. Such argument and proof would be a basis for an approach to determine inventive step clearer.

12.4. An Example of a Court Decision Where a “Principle” Is Dealt with Well

In the case of Intellectual Property High Court Decision rendered on March 13, 2011 (Case of water treatment apparatus)³¹, the oxidation reaction of ozone against disposed water and hydrothermal reaction of high temperature and high pressure water against disposed organic matters in waste liquid

(1) The above court decision stated as follows.

In “water treatment apparatus” of the applied invention, water is the object of the treatment, on the contrary, in the “hydrothermal reaction apparatus” of the cited invention, water is a medium that promotes the oxidative decomposition of organic matters, and water itself is not the object of the treatment. Therefore, in the above two inventions, the roles played by water and technical fields are different. Consequently, the trial decision contains an error in its finding of a common feature in the part of being a “treatment apparatus.”

As to the above, the decision was explained with the factor “the roles played by water are different” as the center. Focusing the difference in terms of principles and ways of their utilization according to the Opinion, it can be said more reasonably as follows.

(i) First of all, in applied invention, the oxidation reaction is used, whereas, in the cited invention, the hydrolysis reaction is recognized in addition to the oxidation reaction (the court decision used the words “oxidation reaction, etc.”). Therefore, the kind and number of principles used are different [(12.1) (1) (3)].

(ii) With reference to “the roles played by water are different” in the court decision, directly, in the applied invention, the ozone shows the oxidation reaction, whereas, in the cited invention, the high temperature and high pressure water shows the oxidation reaction and so on. Materials which cause principles (give function) are different in both inventions [(12.2) (3)].

(iii) Furthermore, in the applied invention, the disposed water is the object to which a principle is applied, whereas, in the cited invention, the disposed organic matters in the waste liquid are objects [(12.2)] (4)].

(iv) The court decision says that both the applied invention and the cited invention use the oxidation reaction;

³¹K.K. Hokukon v. Tokkyo-chō. (Chiteki-zaisan High Ct, Mar. 13, 2011). HanreiJihō, 2122, 118-127; HanreiTaimuzu, 1383, 357-365.

however, it is impossible to recognize “without analyzing the state of a concrete disposed subject, the same treatment...by being included into inappropriate generic (broader) concept”.

That is, under the generic concept, the oxidation reaction is used as a principle; however, under the subordinate concrete application, the states of the object which the principle is applied to are different. Consequently, we can understand that it is useful to discriminate between the generic concept and subordinate conception of the principle [(12.1) (2) (i) for reference].

(v) The point that court decision stated “technical fields are different” shows that the difference in the ways of utilization of the principles is huge [(12.2) (1)].

Furthermore, the court decision stated that “(hydrothermal reaction apparatus was) clearly not appropriate as the cited reference because the technical fields in the both inventions are so different”. In relation to that, in the decision case, except the technical fields, as mentioned above, there are many differences in terms of principles and their utilization. Therefore, it can be concluded that it was not appropriate as the cited reference according to the Opinion also. This demonstrates how difficult and important it is to select appropriate cited inventions.

In terms of the above court decision, the factors relating to principles and their utilization described in (12.1) and (12.2) are shown in []. It is interesting that the decision case includes many issues which correspond to the factors. Because the above court decision explains so as to be able to extract easily principles and their utilization, Author could analyze the case in detail and explain by applying the factors based on the Opinion to the case. Needless to say, the difference of principles and ways of their utilization should be explained in good order so that it can be understood easily.

(2) It is expected that factors and criteria to identify the differences in principle and ways of their utilization are arranged in a good order and established by collecting precedents mentioning to the principles and ways of their utilization and then analyzing and elucidating them. To realize this, it is necessary for interested parties to claim and give proof based on principles.

13. Difference (Commonality) in Principles and Their Utilization

Comparing two inventions (technologies), their difference (or commonality in other way) in principles and ways of their utilization can be analyzed as follows.

13.1. Principle Itself

- (1) Ordinary difference of principles
- (2) The difference in the level of principles used infers difference of the principle.
- (3) Number of the principles used

The more principles the applied invention uses than the cited invention, the more likely inventive step is found.

(4) A different aspect of the principle is used, that is, different principles can be seemed to be used functionally; it can be said that the applied invention uses different principles.

13.2. Utilization of Principles

(1) When a less relevant principle is used in the field of industry and technology, it may be more likely that an inventive step is found for an invention with such less relevant principle.

(2) There is a difference in philosophy to use a principle to positively enhance its effect and to use it to passively reduce its effect.

(3) When a different substance or material is used to cause a principle (to give function), the way of its utilization is considered to be different.

(4) When an object body to which a principle is applied is different, generally its utilization is considered to be different.

13.3. How to Think about Commonality/Difference in Principles

Even if a same principle is used, it would cause a difference when its use, that is, the way of its utilization to apply to the problem to be solved is different. The degree of difference also can be considered. In case where a different principle is used, it generally causes a larger degree of difference than the difference in the way of its

utilization. (When the principle is new, it would be generally accepted as a more epoch-making invention.) When a quantitative difference, as discussed in Subsection (13.1) (3), is multiplied by a qualitative difference, as in Subsection (13.2) (1), it is thought that so-called a weight of principle or moment will be produced thereby to allow a determination of a quantitative difference within the scope stated above. As a result, a determination of “scarce commonality or a little commonality” among principles is to be made. This is what Author discussed on the commonality (difference) of the principles in Subsections (6.1) (3) & (4). Based on this understanding, non-obviousness can be determined like in Item (6.1) (4) (i).

As stated above, the reason why the principle and ways of its utilization are analyzed with more focus on them is because the patent invention relates to the outcome of science, technology and engineering under the patent system as a social framework as stated in Section (4.3) before. This observation coincides with the fact that an invention uses (d₁) a natural law (principle) (d₂) ((2.1) for reference).

When the problem to be solved is new, the commonality of the principles can be viewed as lower to determine its inventive step. In actuality, however, it is likely that the principle at issue is qualitatively remote when the problem is new.

As stated above, taking into account the principle and ways of its utilization as a whole, the commonality or difference of the principles would be determined.

In patent disputes, parties may positively argue commonality or difference of the principles. In this occasion, the determiner (courts and the central patent office) should encourage such approach as necessary, solve the issue, and accordingly make a decision.

14. Postscript

Author’s view on inventive step has been discussed in Section 6 before.

Even if the ways of thinking and steps for determination as suggested specifically by Author are not taken as they are, the approach for the review of the principle and ways of its utilization may be accepted to be effective for practice at least in Japan. Such approach is applicable to consider issues of whether the difference of the applied invention could have been easily reached starting from the cited invention (there were the suggestions) or whether the difference has been easily overcome. In addition, it would help exclude hindsight.

This approach is likely effective for the Problem-Solution Approach also to determine whether the applied invention is obvious or not, starting from the cited inventions and the established problem.

This approach may be effective in response to office actions of a patent application, too. Suppose a notice of reasons for rejection or decision of rejection is issued by Examiner after an application was filed, the applicant may refute the rejection with an opinion which is written based on the difference of the principle, because the principle is the essence of an invention, or arguing that a different industry uses a different principle, for instance.

The inventive step of an invention of combination was discussed earlier in Subsection (6.3) (1). A test for this issue was to determine whether the combination produces new effects. In addition to the conventional test, the review is effective in view of whether a new principle exists in the combination. The same thing could be said about an invention of substitution as discussed in Subsection (6.3) (2).

Finally, I would like to touch upon the gap between the conventional test of the inventive step (nonobviousness) and the approach in the Opinion.

In the past, the approach of determining the inventive step in Japan weighed the problem to be solved by the invention, and attempted to analyze the problem as a factor to determine (See Sections (8.1) and (8.2)). On the contrary, the European Patent Office (EPO) adopts the Problem-Solution Approach wherein many factors are comprehensively included in the technical problem (See Subsection (9.1) (1)). This is the approach which puts more weight on the stage prior to the completion of the applied invention (See Sections 3 and (4.1)). In other words, this approach attempts to grasp the invention socio-economically. It is considered that court decisions in Japan tend to comply with the European approach.

Nevertheless, as stated in Subsection 3(1) before, the essence of an invention resides in the principle. The Opinion, contrary to the conventional approach which weighs the problem, suggests an approach in which the principles are evaluated to be important, returning to invention itself, with the mind of science and engineering (See footnote 27 in p. 250 for reference). My approach seems to allow a determination of the inventive step of an invention more objectively than the conventional one. The problem to be solved may be considered naturally when it is needed.

In the near future, I would like to illustrate some of very important problems with reference to inventions and patents systematically, based on my approach, that is, on the Opinion.

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